MITSUBISHI MATERIALS

DRILLING TOOLS

MITSUBISHI MATERIALS

GENERAL CATALOGUE C010
2025 – 2027

TARGETED, COMPACT, HANDY.

Mitsubishi Materials' wide product portfolio is now shown in catalogues that represent individual application areas, offering users fast and easy access to targeted product information.

There is now a set of catalogues in small, practical sizes that comprise the following five volumes:

- **TURNING TOOLS**
- **DRILLING TOOLS**
- **SOLID MILLING TOOLS**
- **INDEXABLE MILLING TOOLS**
- **MPLUS**

EASY HANDLING

HIGHER FLEXIBILITY

INDIVIDUAL APPLICATION AREAS

The slipcase provided enables easy storage and offers the required space for all future catalogues, including the product news brochures that will be published within the life cycle of the catalogue. Each new product news brochure published within the catalogue cycle will completely replace the previous version. Therefore, please dispose of old versions when new ones are supplied to ensure that the collection is up to date.

NOTES:

- With this publication, all previous general catalogues and product news brochures lose their validity.
- The product news catalogues are released twice a year, in April and October.
- The new general catalogue can be ordered only as a set of five. **Order number: C010E**

DIGITAL VERSION

For the digital version of the catalogue, please scan the QR code or visit our mediastore: www.mhg-mediastore.net

Visit also:
www.mmc-carbide.com

DRILLING TOOLS

PERFORMANCE – REDEFINING THE PARAMETERS

The modern manufacturing industry is fast moving, therefore Mitsubishi Materials continuously strives to be at the forefront of the market.

In a constant exchange with partners and clients, solutions are offered for every situation.

From the indexable insert drill MVX for hole depths up to 6xD, through to the deep-hole MPS1, Mitsubishi Materials has individual solutions for all drilling applications.

DIAEDGE

MITSUBISHI MATERIALS

2025 – 2027

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HOW TO READ THE STANDARD OF DRILLING TOOLS

●How this section page is organised

①Organised according to the application for the drill.

PHOTO OF PRODUCT

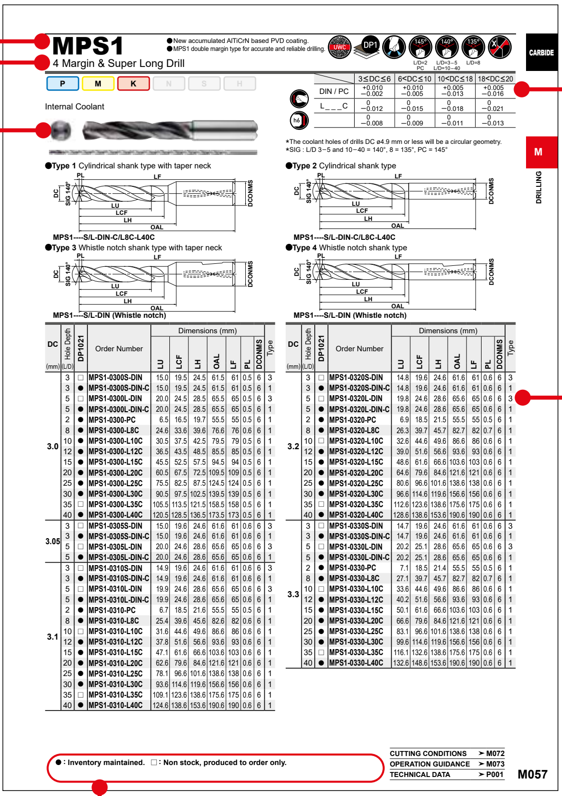
PRODUCT TITLE

PRODUCT TYPE

DIAMETER TOLERANCE

PRODUCT TYPE

GEOMETRY



MPS1

4 Margin & Super Long Drill

●New accumulated AlTiCrN based PVD coating.
●MPS1 double margin type for accurate and reliable drilling.

Internal Coolant

	3≤DC≤6	6<DC≤10	10<DC≤18	18<DC≤20
DIN / PC	+0.010 −0.002	+0.010 −0.005	+0.005 −0.013	+0.005 −0.016
L_ _ _C	0 −0.012	0 −0.015	0 −0.018	0 −0.021
h6	0 −0.008	0 −0.009	0 −0.011	0 −0.013

*The coolant holes of drills DC ø4.9 mm or less will be a circular geometry.
*SIG : L/D 3−5 and 10−40 = 140°, 8 = 135°, PC = 145°

●**Type 1** Cylindrical shank type with taper neck

MPS1----S/L-DIN-C/L8C-L40C

●**Type 2** Cylindrical shank type

MPS1----S/L-DIN-C/L8C-L40C

●**Type 3** Whistle notch shank type with taper neck

MPS1----S/L-DIN (Whistle notch)

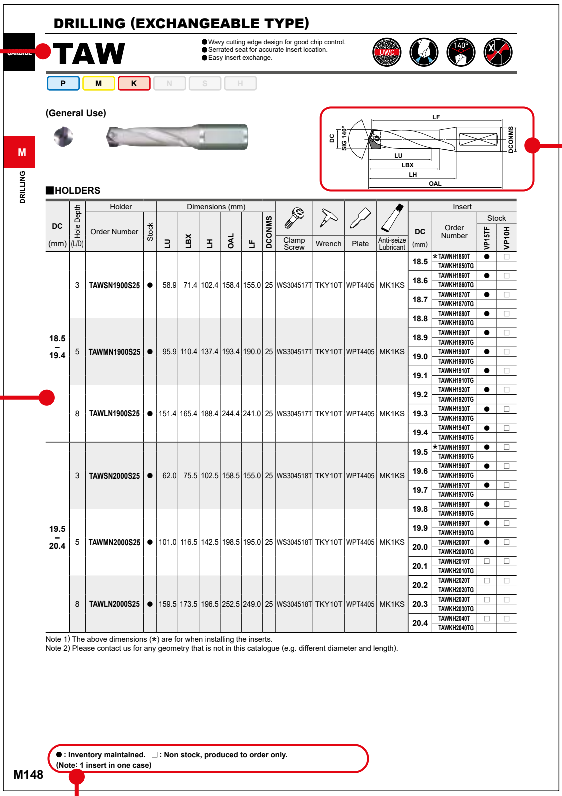
●**Type 4** Whistle notch shank type

MPS1----S/L-DIN (Whistle notch)

● : Inventory maintained. ☐ : Non stock, produced to order only.

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

M057



DRILLING (EXCHANGEABLE TYPE)

TAW

●Wavy cutting edge design for good chip control.
●Serrated seat for accurate insert location.
●Easy insert exchange.

(General Use)

■HOLDERS

Note 1) The above dimensions (★) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ☐ : Non stock, produced to order only.
(Note: 1 insert in one case)

M148

PRODUCT STANDARDS
indicates diameters, order numbers, stock status, number of flutes, dimensions, and spare parts for the title product.

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

DRILLING TOOLS

PRODUCT CODE IDENTIFICATION ········ **M002**
SYMBOL DESCRIPTIONS ········ **M003**
DRILL SELECTION CHART ········ **M004**

DRILL STANDARD
SOLID CARBIDE
MSE ········ [Micro Drill] ········ **M008**
MSP ········ [Spot Drill] ········ **M011**
DLE ········ [Solid Carbide Drills for Centering and Chamfering] ········ **M012**
MINI-MFE ········ [Solid Carbide Flat Bottom Drill] ········ **M018**
NEW **DFAS** ········ [Solid Carbide Flat Bottom Drill] ········ **M020**
NEW **DVAS** ········ [Solid carbide TRISTAR Drill Series] ········ **M033**
MINI-DWAE ········ [For Swiss-type Automatic and Small CNC Lathes] ········ **M024**
DWAE ········ [For Swiss-type Automatic and Small CNC Lathes] ········ **M025**
MINI-MVS ········ [4 Margin Drill with internal coolant] ········ **M049**
MINI-MWS ········ [2 Margin Drill with internal coolant] ········ **M053**
MPS1 ········ [4 Margin & Super Long Drill] ········ **M057**
MICRO-MGS ········ [Micro Gun Drill with internal coolant] ········ **M075**
MMS ········ [Unique Coolant hole Drill for Stainless Steel] ········ **M078**
DSAS ········ [For Machining Heat Resistant Alloys] ········ **M092**
MNS ········ [4 Coolant hole Drill for Aluminium] ········ **M098**
MAE/MAS ········ [High Precision Drill for Aluminium] ········ **M122**
MHS ········ [Precision Drill for hard materials] ········ **M128**
DIAMOND COATED DRILLS
MCC ········ [For CNC Machine / CFRP] ········ **M186**
MCA ········ [For CNC Machine / CFRP + Al] ········ **M187**
MCT ········ [For CNC Machine / CFRP + Ti] ········ **M188**
MCW ········ [For CNC Machine / CFRP and stack material high precision] ········ **M189**
MCCH ········ [For Hand tool / CFRP] ········ **M190**
MCAH ········ [For Hand tool / CFRP + Al] ········ **M191**
INDEXABLE TYPE
STAW ········ [Small Diameter Insert Drill] ········ **M139**
TAW ········ [Insert Drill] ········ **M148**
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HSS DRILLS
VIOLET DRILLS
VAPDS ········ [HSS-Co short Drill for Steel] ········ **M172**
VAPDM ········ [HSS-Co medium Drill for Steel] ········ **M177**
VSD ········ [HSS long Drill for Stainless Steel] ········ **M181**
VAPDSCB ········ [HSS-Co Drill for Counter Boring] ········ **M183**

REAMER STANDARD
EXCHANGEABLE HEAD REAMER
NEW **RX1S** ········ [Exchangeable Head Reamer] ········ **M195**

*Alphabetical order index

M012 **DLE**
M020 **DFAS**
M092 **DSAS**
M033 **DVAS**
M025 **DWAE**
M170 **JFS (SLEEVE)**
M122 **MAE**
M122 **MAS**
M187 **MCA**
M191 **MCAH**
M186 **MCC**
M190 **MCCH**
M188 **MCT**
M189 **MCW**
M128 **MHS**
M075 **MICRO-MGS**
M024 **MINI-DWAE**
M018 **MINI-MFE**
M049 **MINI-MVS**
M053 **MINI-MWS**
M078 **MMS**
M098 **MNS**
M057 **MPS1**
M008 **MSE**
M011 **MSP**
M158 **MVX**
M166 **MVX (INSERT)**
M139 **STAW**
M142 **STAW (INSERT)**
M148 **TAW**
M153 **TAW (INSERT)**
M177 **VAPDM**
M172 **VAPDS**
M183 **VAPDSCB**
M181 **VSD**

M195 **RX1S**

PRODUCT CODE IDENTIFICATION

PRODUCT CODE OF DRILLS

MV	S	0300	X	S
Drill Product Name	Coolant Type	Diameter	L/D	Shank Diameter Type

Drill Product Name

DLE : DLE Drills
DFA : DFAS Drills
DSA : DSAS Drills
DWA : DWAE Drills
MPS1 : MPS1 Drills
MV : MVS Drills
MW : MWS Drills
MF : MFE Drills
MG : MGS Drills
MA : MAE/MAS Drills
MS : MSE Drills
MM : MMS Drills
MN : MNS Drills
MH : MHS Drills
MC : MC Drills

Coolant Type

E : External Coolant
S : Internal Coolant

Diameter

Ex.
0050 → Ø 0.5
0300 → Ø 3.0

L/D

S : 2D
M : 3D
L : 5D
(MAE / MAS Type Drills is 6D)
L8C : 8D
L10C : 10D
L12C : 12D
L15C : 15D
L20C : 20D
L25C : 25D
L30C : 30D
L40C : 40D
X : 12D
X8DB : 8D
X10DB : 10D
X15DB : 15D
X20DB : 20D
X25DB : 25D
X30DB : 30D

Shank Diameter Type

A : Shank with the same diameter as the drill
B : Shank with fixed diameter
C : Cylindrical shank type
S*** : Shank Diameter

* Exceptions partly included.

VA	PD	S	D0050
Drill Product Name	Applications	Flute Length	Diameter

Drill Product Name

VA : Violet coated precision drills (High Grade, High Speed Steel)
V : Violet drills

Applications

SD : General-purpose straight drill
PD : For high-precision machining

Flute Length

S : Short
M : Medium

Diameter

Ex.
D0300 → Ø 3.0
D0050 → Ø 0.5

* Exceptions partly included.

DVA	S	0100	X50	S040
Applications	Coolant	Diameter	L/D	Type of Shank

Applications

DVA : General-purpose

Coolant

S : Internal Coolant

Diameter

0100 → Ø 1.0mm
0290 → Ø 2.9mm

L/D

X50 : L/D=50
X02 : L/D=2

Type of Shank

S040 : Shank Diameter 4mm

SYMBOL DESCRIPTIONS

Tool Material

UWC

Ultra micro-grain carbide

Ultra micro-grain carbide is used as the substrate material.

HG HSS

High grade high alloy HSS

High grade high alloy HSS is used as the substrate material.

HSS

High speed steel

High speed steel is used as the substrate material.

Web Thinning

X

X web thinning

X web thinning is used at the drill point.

Z

Z web thinning

Z web thinning is used at the drill point.

XR

XR web thinning

XR web thinning is used at the drill point.

N

N web thinning

N web thinning is used at the drill point.

Tolerance

Drill diameter tolerance

h6

Shank diameter tolerance

Coolant Hole

With coolant hole

Material Range

1st recommendation

P M K N S H

No recommendation

P M K N S H

Coating

VP

MIRACLE coating

The original MIRACLE (Al,Ti)N coating.
Also suitable for dry cutting.

DP1A

PVD coating

DP102A is a PVD coated cemented carbide grade specialized for small diameter drills, with greatly improved wear resistance.

DP1

PVD coating

Exhibits outstanding wear resistance with a wide range of work steel, cast iron-based materials, and aluminium alloys.
*MPS1 is not recommended for aluminium alloys.

DP7

PVD coating

An ultra micro-grain cemented carbide optimal for stainless steel, and a PVD coating with outstanding heat resistance and lubricity.

DP9

PVD coating

DP9020 provides both high wear and breakage resistance, plus longer tool life.

V

VIOLET coating

Increased tool life of 2–3 times that of TiN coated products.

DD

CVD Diamond coating

Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

Angle and Sharp Corner Edge

150°

Point angle

Indicates the drill point angle at the tip.

DRILLS SELECTION CHART

Tool material	Size Range	Hole Depth (L/D)	Product Code	Coolant	Coating	Material						Shape	Page Number	
						P	M	K	N	S	H			
						Carbon Steel, Alloy Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy	Hardened Steel		Dimensions	Cutting Conditions
Solid Carbide	Ø 0.1 –Ø 0.99	5 – 12	**MSE**	External	VP	◎	○	◎	○	○		 MSP=Pilot Drill for MSE	M008	M009
	Ø 1.0 –Ø 16.0	–	**DLE**	External	DP1 DP1A	◎	◎	◎				 SIG=60°, 90°, 120°, 145°	M012	M016
	Ø 0.75 –Ø 2.95	2	**MINI-MFE**	External	DP1A	◎	◎	◎	○				M018	M019
	Ø 3.0 –Ø 14.0	3	NEW **DFAS**	Internal	DP1A	◎	◎	◎	◎	○			M020	M023
	Ø 1.0 –Ø 2.9	2 – 50	NEW **DVAS**	Internal	DP1	◎	◎	○	○	◎			M033	M037
	Ø 1.0 –Ø 2.9	2,4	**MINI-DWAE**	External	DP1A	◎	◎	◎					M024	M031
	Ø 3.0 –Ø 14.0	2,4	**DWAE**	External	DP1A	◎	◎	◎					M025	M031
	Ø 1.0 –Ø 2.9	2* – 30	**MINI-MVS**	Internal	DP1	◎	◎	○	○	○			M049	M051
	Ø 0.5 –Ø 0.99	1 – 12	**MINI-MWS**	Internal	VP	◎	◎	○	○	○			M053	M055
	Ø 3.0 –Ø 20.0	3 – 40	**MPS1**	Internal	DP1	◎	○	◎				 MPS1-xxxx-PC=Pilot Drill for MPS1	M057	M072
	Ø 0.95 –Ø 12.0	1 – 30	**MHS**	Internal	VP	○	○			○	◎		M128	M136
	Ø 3.0 –Ø 20.0	3, 5	**MMS**	Internal	DP7		◎						M078	M090
	Ø 3.0 –Ø 15.0	3, 5	**DSAS**	Internal	DP9					◎			M092	M097
	Ø 0.7 –Ø 3.0	– 80	**MICRO-MGS**	Internal	–	◎	◎	◎	◎				M075	M076

2* = Pilot hole drill. Tolerance is +0.014 and hole depth is DCx2.

Tool material	Size Range	Hole Depth (L/D)	Product Code	Coolant	Coating	Material						Shape	Page Number	
						P	M	K	N	S	H		Dimensions	Cutting Conditions
						Carbon Steel, Alloy Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy	Hardened Steel			
Solid Carbide	Ø 3.0 –Ø 16.0	3	**MAE**	External	–			○	◎				M122	M127
	Ø 3.0 –Ø 16.0	3, 6	**MAS**	Internal	–			○	◎				M122	M127
	Ø 3.0 –Ø 20.0	3–30	**MNS**	Internal	–				◎				M098	M118
	Ø 4.76 –Ø 11.14	3	**MCC**	External	DD	For CFRP							M186	M186
	Ø 6.38 –Ø 9.55	5	**MCA**	Internal	DD	For CFRP + Al							M187	M187
	Ø 6.38 –Ø 9.55	5	**MCT**	Internal	–	For CFRP + Ti							M188	M188
	Ø 6.38 –Ø 9.55	5	**MCW**	Internal	DD	For CFRP and stack material high precision							M189	M189
	Ø 2.5 –Ø 9.55	2–15	**MCCH**	External	–	For CFRP							M190	Hand Tool manual
	Ø 2.5 –Ø 9.55	3–15	**MCAH**	External	–	For CFRP + Al							M191	Hand Tool manual
High-Speed Steel	Ø 0.5 –Ø 13.0	2–3	**VAPDS**	External	V	◎	○	○					M172	M176
	Ø 0.5 –Ø 32.0	3–6	**VAPDM**	External	V	◎	○	○					M177	M180
	Ø 0.5 –Ø 13.0	3–6	**VSD**	External	V	◎	○						M181	M182
	Ø 2.0 –Ø 32.0	2–3	**VAPDSCB**	External	V	◎	○	○	○				M183	M185
Indexable	Ø 10.0 –Ø 18.4	1.5–8	**STAW**	Internal	VP	◎	○	◎					M139	M144
	Ø 18.5 –Ø 30.4	3–8	**TAW**	Internal	VP	◎	○	◎					M148	M155
	Ø 17.0 –Ø 63.0	2–6	**MVX**	Internal	–	◎	○	◎	○		○		M158	M167

◎ : 1st recommendation / ○ : 2nd recommendation

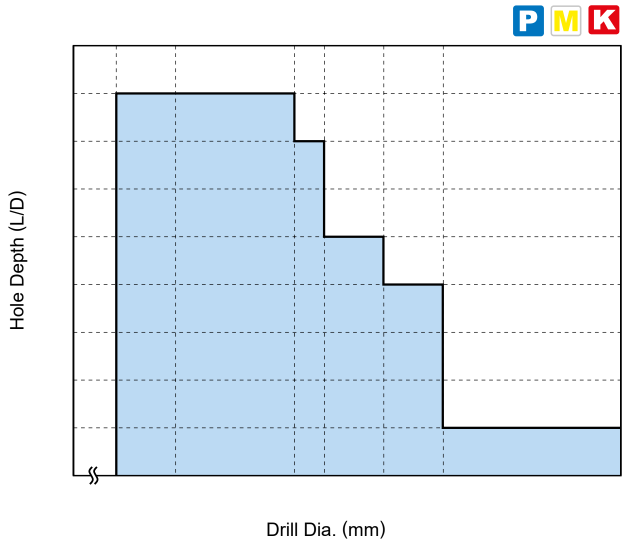
DRILLS SERIES

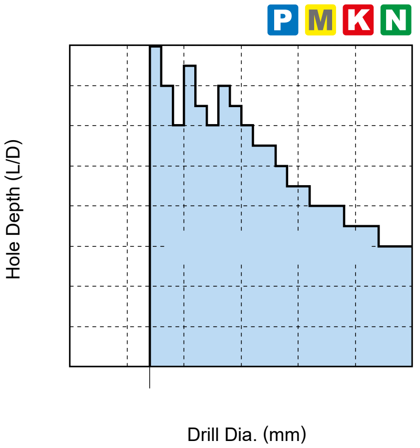
1st Recommendation
P M K N S H

2nd Recommendation
P M K N S H

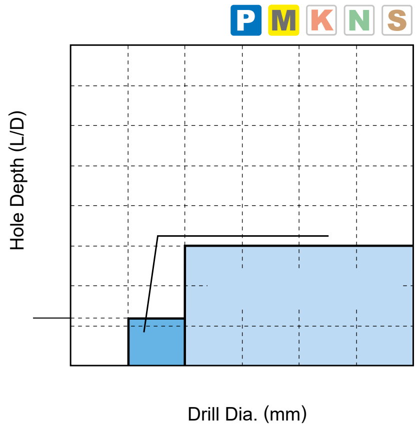
SOLID CARBIDE

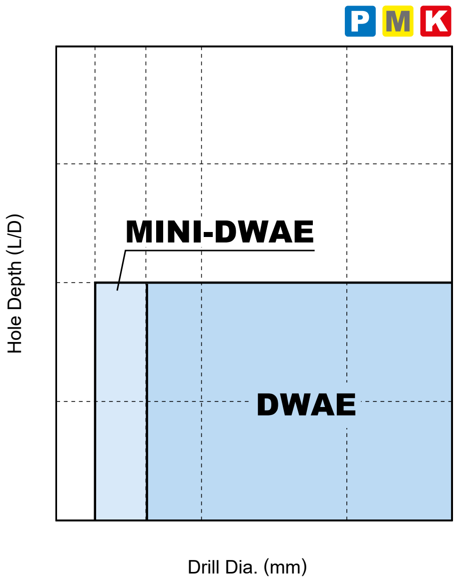
MPS1 (Double margin type)

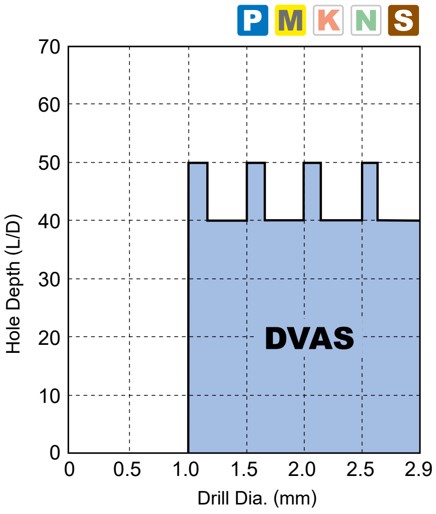




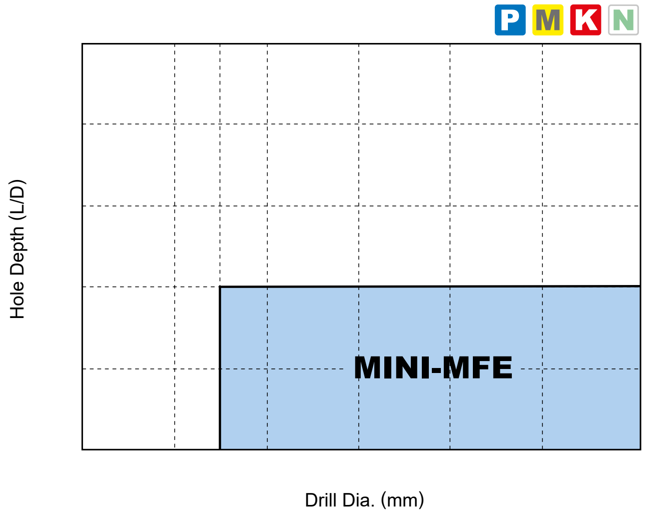
DVAS NEW

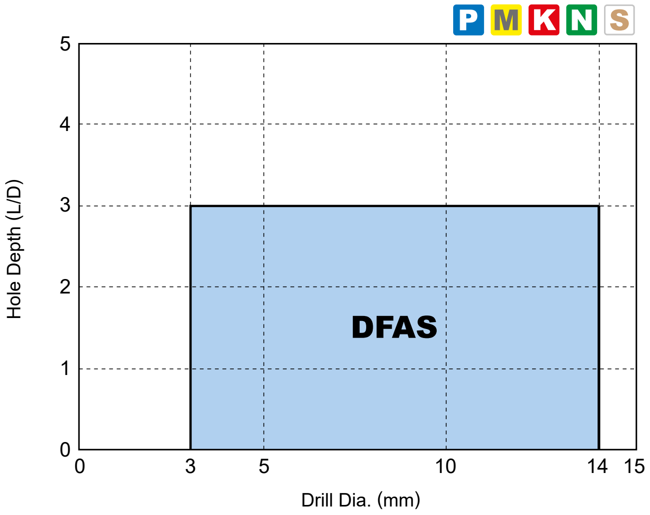






DFAS



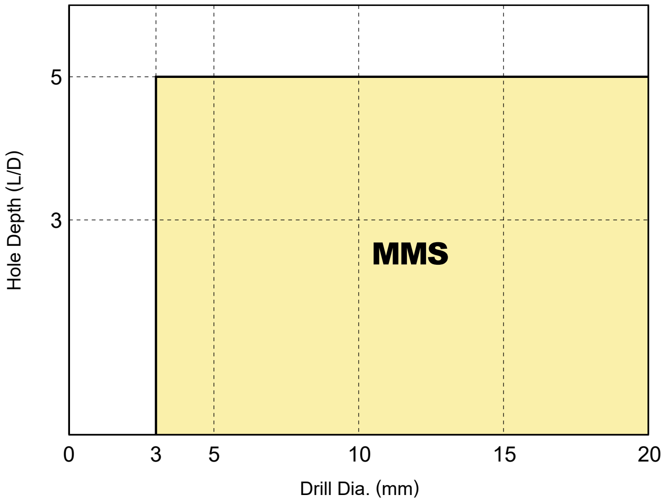


1st Recommendation
P M K N S H
2nd Recommendation
P M K N S H

SOLID CARBIDE

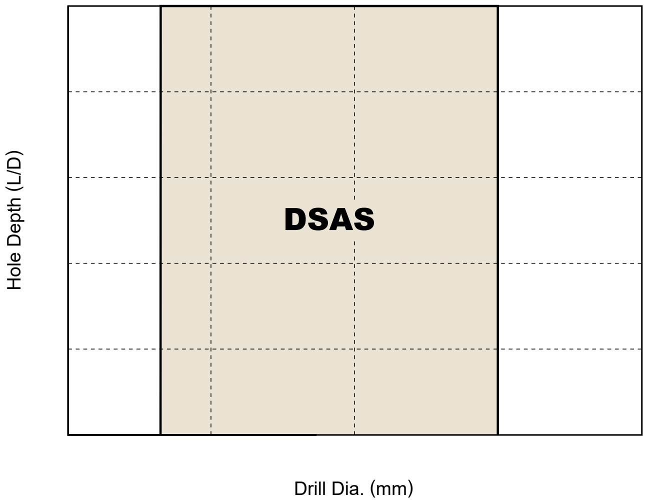
MMS (For stainless steel)

M



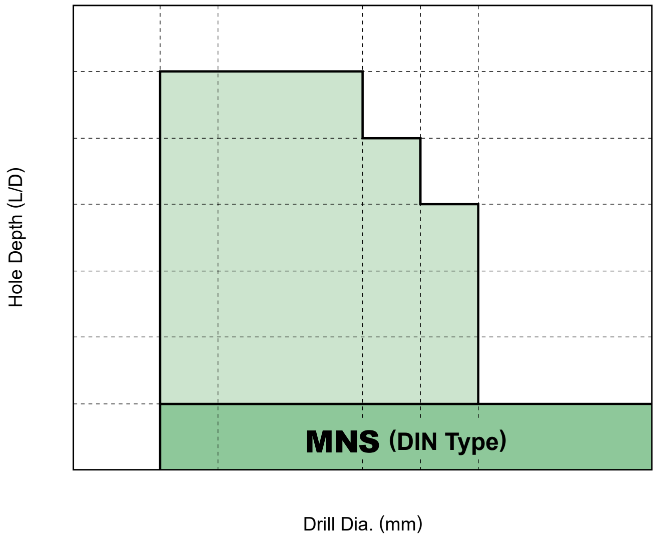
DSAS (For Machining Heat Resistant Alloys)

S



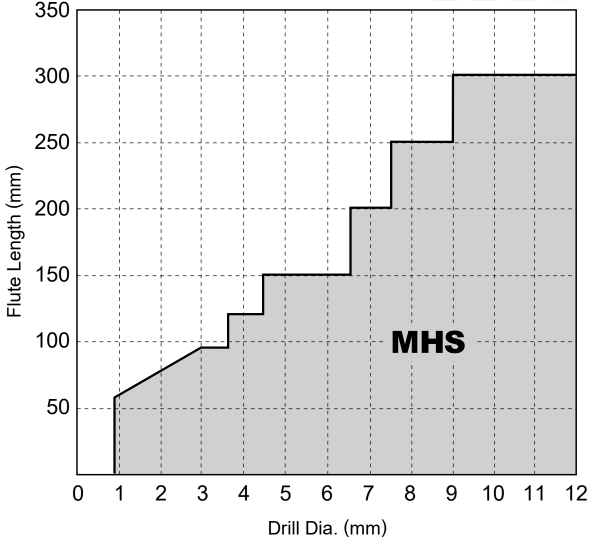
MNS (For machining aluminium alloys)

N



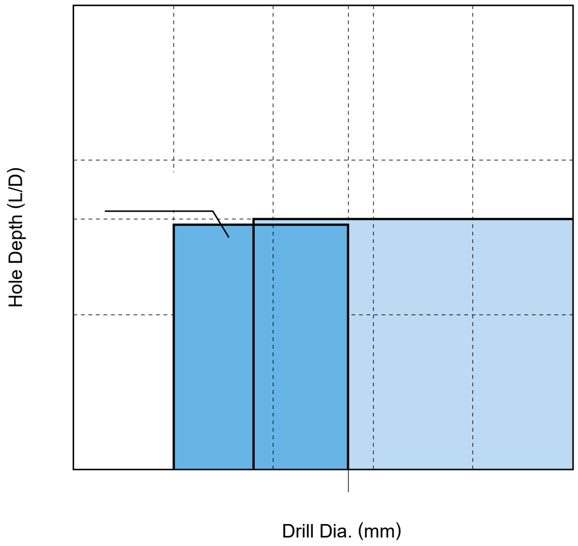
MHS (For die & mould machining)

P M S H

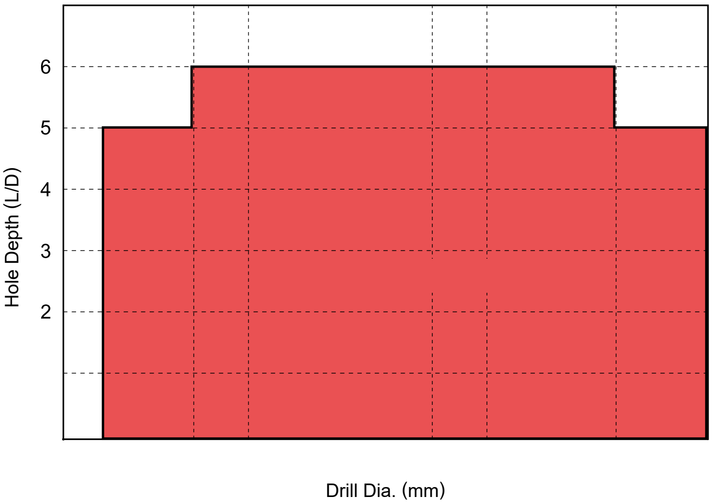


INDEXABLE TYPE

P M K



P M K N H



DRILLING (SOLID CARBIDE)

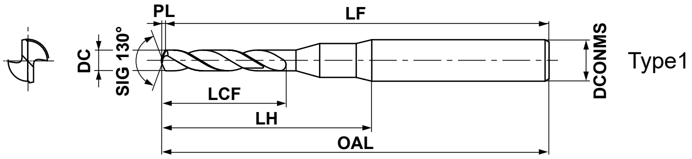
MSE

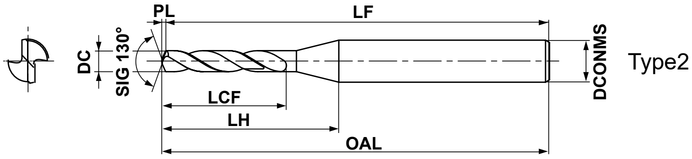
- Wide flute for preventing chip jamming.
- Stable, small diameter machining.

UWC VP 130°

P M K N S H

External Coolant





0.10≤DC≤0.99
0
− 0.009

h6 DCONMS=3
0
− 0.006

- MSE drills are suitable for use with shrink fit holders.

DC (mm)	VP20MF	VP15TF	Order Number	Dimensions (mm) LCF	LH	OAL	LF	PL	DCONMS	Type
0.10	●		**MSE0010SB**	1.2	9.7	38.0	38	0.02	3	1
0.11	●		**MSE0011SB**	1.2	9.7	38.0	38	0.03	3	1
0.12	●		**MSE0012SB**	1.4	9.7	38.0	38	0.03	3	1
0.13	●		**MSE0013SB**	1.4	9.7	38.0	38	0.03	3	1
0.14	●		**MSE0014SB**	2.0	9.7	38.0	38	0.03	3	1
0.15	●		**MSE0015SB**	2.0	9.7	38.0	38	0.03	3	1
0.16	●		**MSE0016SB**	2.0	9.7	38.0	38	0.04	3	1
0.17	●		**MSE0017SB**	2.0	9.7	38.0	38	0.04	3	1
0.18	●		**MSE0018SB**	2.0	9.7	38.0	38	0.04	3	1
0.19	●		**MSE0019SB**	2.0	9.7	38.0	38	0.04	3	1
0.20	●		**MSE0020SB**	2.6	9.8	38.1	38	0.05	3	1
0.21	●		**MSE0021SB**	2.6	9.8	38.1	38	0.05	3	1
0.22	●		**MSE0022SB**	2.6	9.8	38.1	38	0.05	3	1
0.23	●		**MSE0023SB**	2.6	9.8	38.1	38	0.05	3	1
0.24	●		**MSE0024SB**	3.1	9.8	38.1	38	0.06	3	1
0.25	●		**MSE0025SB**	3.1	9.8	38.1	38	0.06	3	1
0.26	●		**MSE0026SB**	3.1	9.8	38.1	38	0.06	3	1
0.27	●		**MSE0027SB**	3.1	9.8	38.1	38	0.06	3	1
0.28	●		**MSE0028SB**	3.1	9.8	38.1	38	0.07	3	1
0.29	●		**MSE0029SB**	3.1	9.8	38.1	38	0.07	3	1
0.30		●	**MSE0030SB**	5.1	10.3	38.1	38	0.07	3	2
0.31		●	**MSE0031SB**	5.1	10.3	38.1	38	0.07	3	2
0.32		●	**MSE0032SB**	5.1	10.3	38.1	38	0.07	3	2
0.33		●	**MSE0033SB**	5.1	10.3	38.1	38	0.08	3	2
0.34		●	**MSE0034SB**	6.1	11.3	38.1	38	0.08	3	2
0.35		●	**MSE0035SB**	6.1	11.2	38.1	38	0.08	3	2
0.36		●	**MSE0036SB**	6.1	11.2	38.1	38	0.08	3	2
0.37		●	**MSE0037SB**	6.1	11.2	38.1	38	0.09	3	2
0.38		●	**MSE0038SB**	6.1	11.2	38.1	38	0.09	3	2
0.39		●	**MSE0039SB**	6.1	11.2	38.1	38	0.09	3	2
0.40		●	**MSE0040SB**	7.1	12.2	38.1	38	0.09	3	2
0.41		●	**MSE0041SB**	7.1	12.1	38.1	38	0.10	3	2
0.42		●	**MSE0042SB**	7.1	12.1	38.1	38	0.10	3	2
0.43		●	**MSE0043SB**	7.1	12.1	38.1	38	0.10	3	2
0.44		●	**MSE0044SB**	7.1	12.1	38.1	38	0.10	3	2
0.45		●	**MSE0045SB**	7.1	12.1	38.1	38	0.10	3	2
0.46		●	**MSE0046SB**	7.1	12.0	38.1	38	0.11	3	2
0.47		●	**MSE0047SB**	7.1	12.0	38.1	38	0.11	3	2
0.48		●	**MSE0048SB**	7.1	12.0	38.1	38	0.11	3	2
0.49		●	**MSE0049SB**	7.1	12.0	38.1	38	0.11	3	2
0.50		●	**MSE0050SB**	7.1	12.0	38.1	38	0.12	3	2
0.51		●	**MSE0051SB**	7.1	11.9	38.1	38	0.12	3	2
0.52		●	**MSE0052SB**	7.1	11.9	38.1	38	0.12	3	2
0.53		●	**MSE0053SB**	7.1	11.9	38.1	38	0.12	3	2
0.54		●	**MSE0054SB**	7.1	11.9	38.1	38	0.13	3	2
0.55		●	**MSE0055SB**	7.1	11.9	38.1	38	0.13	3	2
0.56		●	**MSE0056SB**	7.1	11.9	38.1	38	0.13	3	2
0.57		●	**MSE0057SB**	7.1	11.8	38.1	38	0.13	3	2
0.58		●	**MSE0058SB**	7.1	11.8	38.1	38	0.14	3	2
0.59		●	**MSE0059SB**	7.1	11.8	38.1	38	0.14	3	2
0.60		●	**MSE0060SB**	7.1	11.8	38.1	38	0.14	3	2
0.61		●	**MSE0061SB**	7.1	11.8	38.1	38	0.14	3	2
0.62		●	**MSE0062SB**	7.1	11.7	38.1	38	0.14	3	2
0.63		●	**MSE0063SB**	7.2	11.8	38.2	38	0.15	3	2
0.64		●	**MSE0064SB**	7.2	11.8	38.2	38	0.15	3	2
0.65		●	**MSE0065SB**	7.2	11.8	38.2	38	0.15	3	2
0.66		●	**MSE0066SB**	7.2	11.8	38.2	38	0.15	3	2
0.67		●	**MSE0067SB**	7.2	11.7	38.2	38	0.16	3	2
0.68		●	**MSE0068SB**	7.2	11.7	38.2	38	0.16	3	2
0.69		●	**MSE0069SB**	7.2	11.7	38.2	38	0.16	3	2
0.70		●	**MSE0070SB**	8.2	12.7	38.2	38	0.16	3	2
0.71		●	**MSE0071SB**	8.2	12.7	38.2	38	0.17	3	2
0.72		●	**MSE0072SB**	8.2	12.7	38.2	38	0.17	3	2
0.73		●	**MSE0073SB**	8.2	12.6	38.2	38	0.17	3	2
0.74		●	**MSE0074SB**	8.2	12.6	38.2	38	0.17	3	2
0.75		●	**MSE0075SB**	8.2	12.6	38.2	38	0.17	3	2
0.76		●	**MSE0076SB**	8.2	12.6	38.2	38	0.18	3	2
0.77		●	**MSE0077SB**	8.2	12.6	38.2	38	0.18	3	2

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameters and lengths can be made to order).

● : Inventory maintained.

DC (mm)	VP20MF	VP15TF	Order Number	Dimensions (mm)						Type
				LCF	LH	OAL	LF	PL	DCONMS	
0.78		●	**MSE0078SB**	8.2	12.5	38.2	38	0.18	3	2
0.79		●	**MSE0079SB**	8.2	12.5	38.2	38	0.18	3	2
0.80		●	**MSE0080SB**	10.2	14.5	38.2	38	0.19	3	2
0.81		●	**MSE0081SB**	10.2	14.5	38.2	38	0.19	3	2
0.82		●	**MSE0082SB**	10.2	14.5	38.2	38	0.19	3	2
0.83		●	**MSE0083SB**	10.2	14.5	38.2	38	0.19	3	2
0.84		●	**MSE0084SB**	10.2	14.4	38.2	38	0.20	3	2
0.85		●	**MSE0085SB**	10.2	14.4	38.2	38	0.20	3	2
0.86		●	**MSE0086SB**	10.2	14.4	38.2	38	0.20	3	2
0.87		●	**MSE0087SB**	10.2	14.4	38.2	38	0.20	3	2
0.88		●	**MSE0088SB**	10.2	14.4	38.2	38	0.21	3	2

DC (mm)	VP20MF	VP15TF	Order Number	Dimensions (mm)						Type
				LCF	LH	OAL	LF	PL	DCONMS	
0.89		●	**MSE0089SB**	10.2	14.3	38.2	38	0.21	3	2
0.90		●	**MSE0090SB**	10.2	14.3	38.2	38	0.21	3	2
0.91		●	**MSE0091SB**	10.2	14.3	38.2	38	0.21	3	2
0.92		●	**MSE0092SB**	10.2	14.3	38.2	38	0.21	3	2
0.93		●	**MSE0093SB**	10.2	14.3	38.2	38	0.22	3	2
0.94		●	**MSE0094SB**	10.2	14.2	38.2	38	0.22	3	2
0.95		●	**MSE0095SB**	10.2	14.2	38.2	38	0.22	3	2
0.96		●	**MSE0096SB**	10.2	14.2	38.2	38	0.22	3	2
0.97		●	**MSE0097SB**	10.2	14.2	38.2	38	0.23	3	2
0.98		●	**MSE0098SB**	10.2	14.2	38.2	38	0.23	3	2
0.99		●	**MSE0099SB**	10.2	14.2	38.2	38	0.23	3	2

RECOMMENDED CUTTING CONDITIONS

Material	P									
	Mild Steel (≦180HB) Ck10					Carbon steel, Alloy steel (180—280HB) Ck45, 41CrMo4				
Drill Dia. DC (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)
0.10	6	20000	0.002 (0.001—0.003)	0.02	40	6	20000	0.002 (0.001—0.003)	0.02	40
0.12	8	20000	0.002 (0.001—0.003)	0.02	40	8	20000	0.002 (0.001—0.003)	0.02	40
0.16	10	20000	0.002 (0.001—0.003)	0.02	40	10	20000	0.002 (0.001—0.003)	0.02	40
0.20	13	20000	0.003 (0.002—0.004)	0.04	60	13	20000	0.003 (0.002—0.004)	0.04	60
0.25	16	20000	0.003 (0.002—0.004)	0.04	60	16	20000	0.003 (0.002—0.004)	0.04	60
0.32	20	20000	0.004 (0.003—0.005)	0.05	80	20	20000	0.004 (0.003—0.005)	0.05	80
0.40	25	20000	0.004 (0.003—0.005)	0.05	80	25	20000	0.004 (0.003—0.005)	0.05	80
0.50	31	20000	0.006 (0.005—0.007)	0.10	120	31	20000	0.006 (0.005—0.007)	0.10	120
0.63	40	20000	0.008 (0.006—0.010)	0.10	160	40	20000	0.008 (0.006—0.010)	0.10	160
0.80	50	20000	0.020 (0.015—0.025)	0.30	400	50	20000	0.015 (0.012—0.018)	0.30	300
0.99	62	20000	0.040 (0.030—0.050)	0.30	800	62	20000	0.020 (0.015—0.025)	0.30	400

Material	P									
	Carbon steel, Alloy steel (280—350HB) 36CrNiMo4					Pre-Hardened Steel (35—45HRC) X36CrMo17				
Drill Dia. DC (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)
0.10	6	20000	0.002 (0.001—0.003)	0.02	40	6	20000	0.002 (0.001—0.003)	0.02	40
0.12	8	20000	0.002 (0.001—0.003)	0.02	40	8	20000	0.002 (0.001—0.003)	0.02	40
0.16	10	20000	0.002 (0.001—0.003)	0.02	40	10	20000	0.002 (0.001—0.003)	0.02	40
0.20	13	20000	0.003 (0.002—0.004)	0.04	60	13	20000	0.003 (0.002—0.004)	0.04	60
0.25	16	20000	0.003 (0.002—0.004)	0.04	60	16	20000	0.003 (0.002—0.004)	0.04	60
0.32	20	20000	0.004 (0.003—0.005)	0.05	80	20	20000	0.004 (0.003—0.005)	0.05	80
0.40	25	20000	0.004 (0.003—0.005)	0.05	80	25	20000	0.004 (0.003—0.005)	0.05	80
0.50	31	20000	0.006 (0.005—0.007)	0.10	120	31	20000	0.006 (0.005—0.007)	0.10	120
0.63	40	20000	0.008 (0.006—0.010)	0.10	160	40	20000	0.008 (0.006—0.010)	0.10	160
0.80	50	20000	0.015 (0.012—0.018)	0.30	300	50	20000	0.015 (0.012—0.018)	0.30	300
0.99	62	20000	0.020 (0.015—0.025)	0.30	400	62	20000	0.020 (0.015—0.025)	0.30	400

Note 1) When drilling holes up to Ø 0.3 mm, the use of a spot drill is recommended.
Note 2) Change the cutting conditions depending on your machine and workpiece rigidity.
Note 3) When machining holes over DCx5, reduce the peck distance stated above.
Note 4) The use of water-soluble fluid (diluted 20 times) is recommended for drilling using the cutting conditions above.
Lower the revolutions if oil fluid or mist is used.
Note 5) Materials marked by "—" in the tables above are difficult to drill with external coolant.

MSE

- ●Wide flute for preventing chip jamming.
- ●Stable, small diameter machining.

RECOMMENDED CUTTING CONDITIONS

Material	M					K				
	Austenitic Stainless Steel (≤200HB) X5CrNi1810, X5CrNiMo17-12-2					Gray Cast Iron (≤350MPa) GG30				
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)
0.10	6	20000	0.002 (0.001—0.003)	0.02	40	6	20000	0.002 (0.001—0.003)	0.02	40
0.12	8	20000	0.002 (0.001—0.003)	0.02	40	8	20000	0.002 (0.001—0.003)	0.02	40
0.16	10	20000	0.002 (0.001—0.003)	0.02	40	10	20000	0.002 (0.001—0.003)	0.02	40
0.20	11	18000	0.003 (0.002—0.004)	0.04	54	13	20000	0.003 (0.002—0.004)	0.04	60
0.25	14	18000	0.003 (0.002—0.004)	0.04	54	16	20000	0.003 (0.002—0.004)	0.04	60
0.32	15	15000	0.004 (0.003—0.005)	0.05	60	20	20000	0.004 (0.003—0.005)	0.05	80
0.40	19	15000	0.004 (0.003—0.005)	0.05	60	25	20000	0.004 (0.003—0.005)	0.05	80
0.50	16	10000	0.006 (0.005—0.007)	0.10	60	31	20000	0.006 (0.005—0.007)	0.10	120
0.63	20	10000	0.008 (0.006—0.010)	0.10	80	40	20000	0.008 (0.006—0.010)	0.10	160
0.80	15	6000	0.015 (0.012—0.018)	0.20	90	50	20000	0.020 (0.015—0.025)	0.30	400
0.99	19	6000	0.020 (0.015—0.025)	0.20	120	62	20000	0.040 (0.030—0.050)	0.30	800

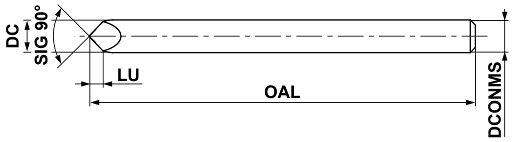
Material	N					S				
	Aluminium Alloy (Si<5%)					Heat Resistant Alloy Inconel®718				
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Step (mm)	Table Feed (mm/min)
0.10	6	20000	0.002 (0.001—0.003)	0.05	40	2	7000	0.001 (0.0005—0.001)	0.02	7
0.12	8	20000	0.003 (0.002—0.004)	0.05	60	3	7000	0.001 (0.0005—0.001)	0.02	7
0.16	10	20000	0.004 (0.003—0.005)	0.05	80	4	7000	0.001 (0.0005—0.001)	0.02	7
0.20	13	20000	0.006 (0.005—0.007)	0.10	120	3	5000	0.002 (0.001—0.002)	0.04	10
0.25	16	20000	0.008 (0.006—0.010)	0.10	160	4	5000	0.002 (0.001—0.002)	0.04	10
0.32	20	20000	0.010 (0.008—0.012)	0.30	200	4	4000	0.002 (0.001—0.002)	0.05	8
0.40	25	20000	0.020 (0.015—0.025)	0.30	400	5	4000	0.002 (0.001—0.002)	0.05	8
0.50	31	20000	0.030 (0.025—0.035)	0.50	600	5	3000	0.003 (0.001—0.003)	0.10	9
0.63	40	20000	0.040 (0.035—0.045)	0.50	800	6	3000	0.004 (0.002—0.004)	0.10	12
0.80	50	20000	0.050 (0.045—0.055)	0.80	1000	5	1800	0.006 (0.004—0.006)	0.20	10.8
0.99	62	20000	0.060 (0.055—0.065)	0.80	1200	6	1800	0.010 (0.008—0.010)	0.20	18

Note 1) When drilling holes up to Ø 0.3 mm, the use of a spot drill is recommended.
Note 2) Change the cutting conditions depending on your machine and workpiece rigidity.
Note 3) When machining holes over DCx5, reduce the peck distance stated above.
Note 4) The use of water-soluble fluid (diluted 20 times) is recommended for drilling using the cutting conditions above.
Lower the revolutions if oil fluid or mist is used.
Note 5) Materials marked by "—" in the tables above are difficult to drill with external coolant.

MSP

Spot drill

P **M** **K** **N** **S** H



Order Number	Grade	Stock	Dimensions (mm)				Diameter Range (mm)
			DC	LU	OAL	DCONMS	
MSP0300SB	**VP15TF**	●	3.0	1.5	38.0	3.0	**0.1−3.0**

RECOMMENDED CUTTING CONDITIONS

Hole Size Range (mm)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Table Feed (mm/min)
0.1−3.0	10000	0.0005 (0.00025−0.001)	5

● : Inventory maintained.

DLE

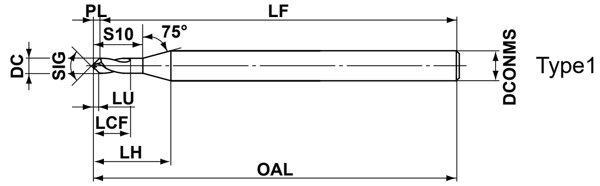
Leading Drill Series

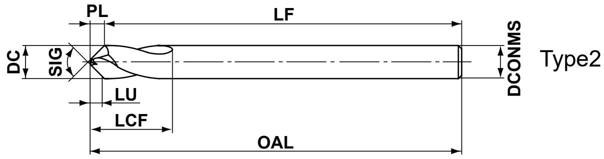
UWC DP1 DP1A 60° 90° 120° 145° X

P M K N S H

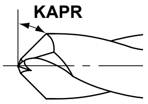
External Coolant

Point Angle SIG 60°, 90°





Point Angle SIG 120°, 145°



h7	DCONMS=3	3<DCONMS≦6	6<DCONMS≦10	10<DCONMS≦16
	0 −0.010	0 −0.012	0 −0.015	0 −0.018

DC (mm)	SIG	DP1020	DP102A	Order Number	Dimensions (mm)									Type
					LU	LCF	LH	S10	OAL	LF	PL	KAPR	DCONMS	
3.0	60°	●		**DLE0300S030P060**	2.0	9	—	—	45	42.9	2.1	60°	3	2
4.0	60°	●		**DLE0400S040P060**	2.7	12	—	—	50	47.2	2.8	60°	4	2
5.0	60°	●		**DLE0500S050P060**	3.4	14	—	—	60	56.5	3.5	60°	5	2
6.0	60°	●		**DLE0600S060P060**	4.0	15	—	—	66	61.8	4.2	60°	6	2
7.0	60°	●		**DLE0700S070P060**	4.7	18	—	—	74	69.1	4.9	60°	7	2
8.0	60°	●		**DLE0800S080P060**	5.4	20	—	—	74	68.4	5.6	60°	8	2
10.0	60°	●		**DLE1000S100P060**	6.8	24	—	—	84	77.0	7.0	60°	10	2
12.0	60°	●		**DLE1200S120P060**	8.1	28	—	—	95	86.6	8.4	60°	12	2
1.0	90°		●	**DLE0100S030P090**	0.35	2	6.7	3.0	45	44.6	0.4	45°	3	1
1.5	90°		●	**DLE0150S030P090**	0.55	3	7.3	4.5	45	44.4	0.6	45°	3	1
2.0	90°		●	**DLE0200S030P090**	0.8	4	7.9	6.1	45	44.1	0.9	45°	3	1
2.5	90°		●	**DLE0250S030P090**	1.0	5	7.9	7.1	45	43.9	1.1	45°	3	1
3.0	90°	●		**DLE0300S030P090**	1.2	9	—	—	45	43.7	1.3	45°	3	2
4.0	90°	●		**DLE0400S040P090**	1.6	12	—	—	50	48.3	1.7	45°	4	2
5.0	90°	●		**DLE0500S050P090**	2.0	14	—	—	60	57.9	2.1	45°	5	2
6.0	90°	●		**DLE0600S060P090**	2.4	15	—	—	66	63.4	2.6	45°	6	2
7.0	90°	●		**DLE0700S070P090**	2.8	18	—	—	74	71.0	3.0	45°	7	2
8.0	90°	●		**DLE0800S080P090**	3.2	20	—	—	74	70.6	3.4	45°	8	2
10.0	90°	●		**DLE1000S100P090**	4.1	24	—	—	84	79.7	4.3	45°	10	2
12.0	90°	●		**DLE1200S120P090**	4.9	28	—	—	95	89.9	5.1	45°	12	2
16.0	90°	●		**DLE1600S160P090**	6.6	35	—	—	113	106.2	6.8	45°	16	2

Note 1) In the region of roughly **DC**/4, which is the region of the two-step point angles, the central area will not have a 60° and 90° hole bottom. Chamfering will also not be possible in this region.

Note 2) The centering diameter should be less than the main drill diameter **DC** and the usable length **LU** should be referred to as a guideline.

● : Inventory maintained.

DC	SIG	DP1020	DP102A	Order Number	Dimensions (mm)									Type
(mm)					**LU**	**LCF**	**LH**	**S10**	**OAL**	**LF**	**PL**	**KAPR**	**DCONMS**	
3.0	120°	●		**DLE0300S030P120**	0.8	9	–	–	45	44.1	0.9	30°	3	2
4.0	120°	●		**DLE0400S040P120**	1.1	12	–	–	50	48.8	1.2	30°	4	2
5.0	120°	●		**DLE0500S050P120**	1.3	14	–	–	60	58.6	1.4	30°	5	2
6.0	120°	●		**DLE0600S060P120**	1.6	15	–	–	66	64.3	1.7	30°	6	2
7.0	120°	●		**DLE0700S070P120**	1.9	18	–	–	74	72.0	2.0	30°	7	2
8.0	120°	●		**DLE0800S080P120**	2.2	20	–	–	74	71.7	2.3	30°	8	2
10.0	120°	●		**DLE1000S100P120**	2.8	24	–	–	84	81.1	2.9	30°	10	2
12.0	120°	●		**DLE1200S120P120**	3.3	28	–	–	95	91.5	3.5	30°	12	2
3.0	145°	●		**DLE0300S030P145**	0.4	9	–	–	45	44.5	0.5	17.5°	3	2
4.0	145°	●		**DLE0400S040P145**	0.5	12	–	–	50	49.4	0.6	17.5°	4	2
5.0	145°	●		**DLE0500S050P145**	0.7	14	–	–	60	59.2	0.8	17.5°	5	2
6.0	145°	●		**DLE0600S060P145**	0.8	15	–	–	66	65.1	0.9	17.5°	6	2
7.0	145°	●		**DLE0700S070P145**	1.0	18	–	–	74	72.9	1.1	17.5°	7	2
8.0	145°	●		**DLE0800S080P145**	1.1	20	–	–	74	72.7	1.3	17.5°	8	2
10.0	145°	●		**DLE1000S100P145**	1.4	24	–	–	84	82.4	1.6	17.5°	10	2
12.0	145°	●		**DLE1200S120P145**	1.7	28	–	–	95	93.1	1.9	17.5°	12	2

Note 1) The centering diameter should be less than the main drill diameter (**DC** and the usable length **LU** should be referred to as a guideline.

CUTTING CONDITIONS ➢ **M016**
OPERATION GUIDANCE ➢ **M016**
TECHNICAL DATA ➢ **P001**

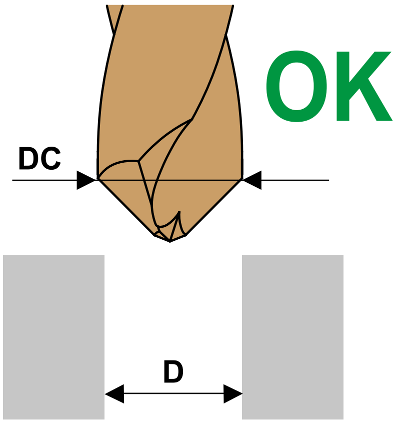
DLE

Leading Drill Series

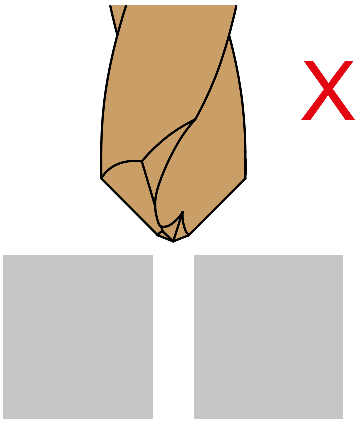
DRILL DIAMETER SELECTION

WHEN CHAMFERING

With respect to guide hole diameter **D**, select the drill diameter (cutting diameter) **DC** to be within the range of **D** < **DC** < **2D**.

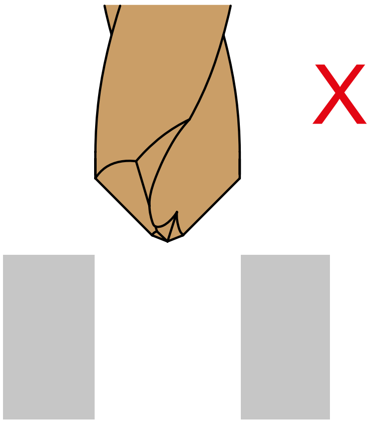


Example) If guide hole diameter **D** is 5 mm: Drill diameter **DC** should be equal to or greater than 6 mm but less than 10 mm. Select a **DC** of 6 mm, 7 mm, or 8 mm.



If DC is equal to or greater than 2D:

If drill diameter **DC** is too large compared to guide hole diameter **D** (equal to or greater than **2D**), chamfering cannot be performed.

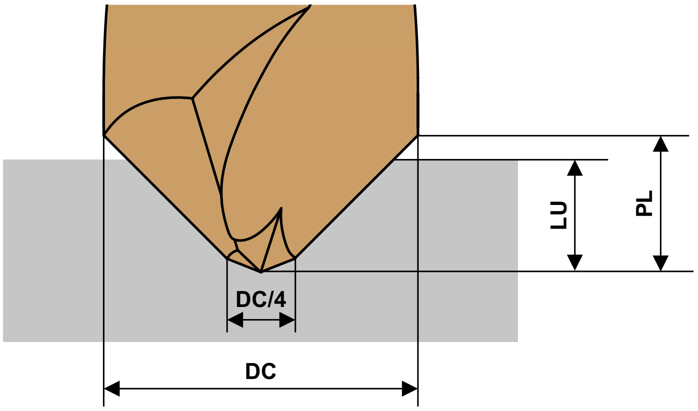


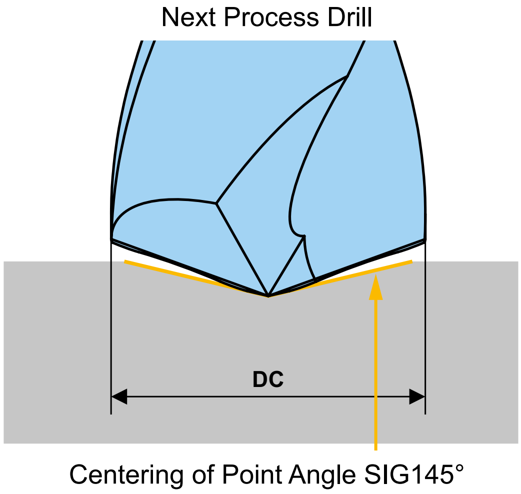
If DC is a drill diameter equal to D:

Chamfering cannot be performed if drill diameter **DC** is the same as guide hole diameter **D**.

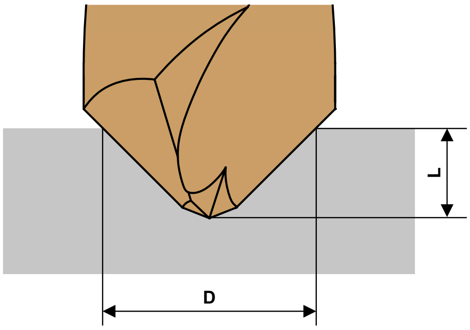
WHEN CENTERING

The centering diameter should be less than the main drill diameter **DC** and the usable length **LU** should be referred to as a guideline.
The central area of holes (approx 25% of the full diameter) formed by two step point angles will not have their respective 60º and 90º angles. Chamfering is also not possible in the centre areas.
Select a centering drill with a larger point angle than the final hole drill if it is desired to make initial contact with the centre.





Drilling Depth (L) Chart by Tool Diameter



(mm)

DC	SIG 90°			
	Min.		Max.	
	D	L	D	L
1.0	0.5	0.18	0.8	0.33
1.5	0.8	0.29	1.3	0.54
2.0	1.0	0.35	1.9	0.8
2.5	1.3	0.47	2.4	1.0
3.0	1.5	0.5	2.8	1.2
4.0	2.0	0.7	3.8	1.6
5.0	2.5	0.9	4.7	2.0
6.0	3.0	1.1	5.7	2.4
7.0	3.5	1.2	6.6	2.8
8.0	4.0	1.4	7.6	3.2
10.0	5.0	1.8	9.7	4.1
12.0	6.0	2.1	11.6	4.9
16.0	8.0	2.8	15.5	6.6

(mm)

DC	SIG 60°				SIG 120°				SIG 145°			
	Min.		Max.		Min.		Max.		Min.		Max.	
	D	L	D	L	D	L	D	L	D	L	D	L
3.0	1.5	0.8	2.9	2.0	1.5	0.4	2.8	0.8	1.5	0.2	2.5	0.4
4.0	2.0	1.1	3.9	2.7	2.0	0.6	3.8	1.1	2.0	0.3	3.2	0.5
5.0	2.5	1.3	4.9	3.4	2.5	0.7	4.5	1.3	2.5	0.4	4.4	0.7
6.0	3.0	1.6	5.8	4.0	3.0	0.9	5.5	1.6	3.0	0.5	5.1	0.8
7.0	3.5	1.9	6.8	4.7	3.5	1.0	6.6	1.9	3.5	0.6	6.3	1.0
8.0	4.0	2.1	7.8	5.4	4.0	1.2	7.6	2.2	4.0	0.6	7.0	1.1
10.0	5.0	2.7	9.8	6.8	5.0	1.4	9.7	2.8	5.0	0.8	8.9	1.4
12.0	6.0	3.2	11.6	8.1	6.0	1.7	11.4	3.3	6.0	0.9	10.8	1.7

DRILLING (SOLID CARBIDE)

DLE

Leading Drill Series

Point Angle SIG 60°

RECOMMENDED CUTTING CONDITIONS

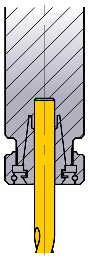
Material	P					
	Mild Steels (≤180HB) DIN C10E etc.		Carbon Steels, Alloy Steels (180−280HB) DIN Ck45, 41CrMo4 etc.		Carbon Steels, Alloy Steels (280−350HB) DIN 40CrNiMoA etc.	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)
3.0	7900	0.05 (0.03−0.07)	6800	0.05 (0.03−0.07)	6300	0.04 (0.02−0.06)
4.0	5900	0.05 (0.03−0.07)	5100	0.05 (0.03−0.07)	4700	0.04 (0.02−0.06)
5.0	5000	0.06 (0.04−0.08)	4400	0.06 (0.04−0.08)	4100	0.05 (0.03−0.07)
6.0	4200	0.06 (0.04−0.08)	3700	0.06 (0.04−0.08)	3400	0.05 (0.03−0.07)
7.0	3600	0.07 (0.04−0.09)	3100	0.07 (0.04−0.09)	2900	0.05 (0.03−0.07)
8.0	3100	0.07 (0.04−0.09)	2700	0.07 (0.04−0.09)	2500	0.05 (0.03−0.07)
10.0	2700	0.08 (0.04−0.10)	2300	0.08 (0.04−0.10)	2200	0.06 (0.03−0.08)
12.0	2200	0.08 (0.04−0.10)	1900	0.08 (0.04−0.10)	1800	0.06 (0.03−0.08)

Material	M		K			
	Austenitic Stainless Steels (≤200HB) DIN X5CrNi189, X5CrNiMo1810 etc.		Gray Cast Irons (≤350MPa) DIN GG30 etc.		Ductile Cast Irons (≤450MPa) DIN GGG40.3 etc.	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)
3.0	1500	0.03 (0.01−0.05)	7900	0.05 (0.03−0.07)	5800	0.05 (0.03−0.07)
4.0	1100	0.03 (0.01−0.05)	5900	0.05 (0.03−0.07)	4300	0.05 (0.03−0.07)
5.0	1200	0.04 (0.02−0.06)	5000	0.06 (0.04−0.08)	3800	0.06 (0.04−0.08)
6.0	1000	0.04 (0.02−0.06)	4200	0.06 (0.04−0.08)	3100	0.06 (0.04−0.08)
7.0	900	0.04 (0.02−0.06)	3600	0.07 (0.04−0.09)	2700	0.06 (0.04−0.08)
8.0	790	0.04 (0.02−0.06)	3100	0.07 (0.04−0.09)	2300	0.06 (0.04−0.08)
10.0	630	0.04 (0.02−0.06)	2700	0.08 (0.04−0.10)	1900	0.07 (0.04−0.09)
12.0	530	0.04 (0.02−0.06)	2200	0.08 (0.04−0.10)	1500	0.07 (0.04−0.09)

Note 1) Use a tool larger (DC) than the centre hole required but less than 2 x DC.
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.
Note 3) When V-grooving and chamfering, please reduce cutting conditions.
Note 4) When chatter vibration or abnormal noise is generated, please shorten the dwell time or reduce the revolutions.
Note 5) When centering, please do not exceed the LU (usable length).

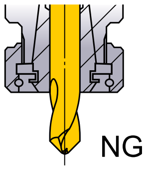
■ OPERATIONAL GUIDANCE

Drill Holding



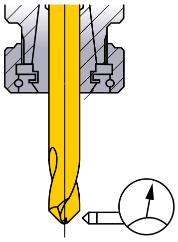
Collet chuck holds the drill securely.

Drill Length



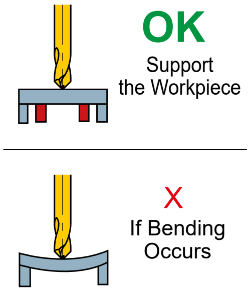
Do not clamp on the flutes.

Installation Tolerance

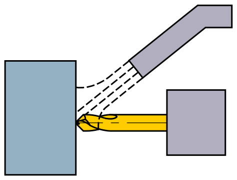


Run-out ≤ 0.03 mm

Thin Workpiece



Coolant Method



Coolant positions, at the end at the centre are ideal.

Point Angle SIG 90°, 120° and 145°

RECOMMENDED CUTTING CONDITIONS

Material	P					
	Mild Steels (≤180HB) DIN C10E etc.		Carbon Steels, Alloy Steels (180—280HB) DIN Ck45, 41CrMo4 etc.		Carbon Steels, Alloy Steels (280—350HB) DIN 40CrNiMoA etc.	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
1.0	9500	0.02 (0.01—0.03)	6300	0.02 (0.01—0.03)	4700	0.02 (0.01—0.03)
1.5	9500	0.02 (0.01—0.03)	7400	0.02 (0.01—0.03)	6300	0.02 (0.01—0.03)
2.0	9500	0.04 (0.03—0.05)	7900	0.04 (0.03—0.05)	7100	0.04 (0.03—0.05)
2.5	9500	0.04 (0.03—0.05)	8200	0.04 (0.03—0.05)	7600	0.04 (0.03—0.05)
3.0	7900	0.06 (0.04—0.08)	6800	0.06 (0.04—0.08)	6300	0.05 (0.03—0.07)
4.0	5900	0.06 (0.04—0.08)	5100	0.06 (0.04—0.08)	4700	0.05 (0.03—0.07)
5.0	5000	0.07 (0.05—0.09)	4400	0.07 (0.05—0.09)	4100	0.06 (0.04—0.08)
6.0	4200	0.07 (0.05—0.09)	3700	0.07 (0.05—0.09)	3400	0.06 (0.04—0.08)
7.0	3600	0.08 (0.05—0.10)	3100	0.08 (0.05—0.10)	2900	0.06 (0.04—0.08)
8.0	3100	0.08 (0.05—0.10)	2700	0.08 (0.05—0.10)	2500	0.06 (0.04—0.08)
10.0	2700	0.09 (0.05—0.11)	2300	0.09 (0.05—0.11)	2200	0.07 (0.04—0.09)
12.0	2200	0.09 (0.05—0.11)	1900	0.09 (0.05—0.11)	1800	0.07 (0.04—0.09)
16.0	1700	0.12 (0.10—0.14)	1500	0.12 (0.10—0.14)	1400	0.08 (0.06—0.10)

Material	M		K			
	Austenitic Stainless Steels (≤200HB) DIN X5CrNi189, X5CrNiMo1810 etc.		Gray Cast Irons (≤350MPa) DIN GG30 etc.		Ductile Cast Irons (≤450MPa) DIN GGG40.3 etc.	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
1.0	6300	0.01 (0.005—0.015)	9500	0.02 (0.01—0.03)	3100	0.02 (0.01—0.03)
1.5	4200	0.01 (0.005—0.015)	9500	0.02 (0.01—0.03)	5300	0.02 (0.01—0.03)
2.0	3100	0.04 (0.03—0.05)	9500	0.04 (0.03—0.05)	6300	0.04 (0.03—0.05)
2.5	2500	0.04 (0.03—0.05)	9500	0.04 (0.03—0.05)	7000	0.04 (0.03—0.05)
3.0	2100	0.04 (0.02—0.06)	7900	0.06 (0.04—0.08)	5800	0.06 (0.04—0.08)
4.0	1600	0.04 (0.02—0.06)	5900	0.06 (0.04—0.08)	4300	0.06 (0.04—0.08)
5.0	1200	0.06 (0.04—0.08)	5000	0.07 (0.05—0.09)	3800	0.07 (0.05—0.09)
6.0	1000	0.06 (0.04—0.08)	4200	0.07 (0.05—0.09)	3100	0.07 (0.05—0.09)
7.0	900	0.06 (0.04—0.08)	3600	0.08 (0.05—0.10)	2700	0.07 (0.05—0.09)
8.0	790	0.06 (0.04—0.08)	3100	0.08 (0.05—0.10)	2300	0.07 (0.05—0.09)
10.0	630	0.06 (0.04—0.08)	2700	0.09 (0.05—0.11)	1900	0.08 (0.05—0.10)
12.0	530	0.06 (0.04—0.08)	2200	0.09 (0.05—0.11)	1500	0.08 (0.05—0.10)
16.0	390	0.08 (0.06—0.10)	1700	0.12 (0.10—0.14)	1100	0.11 (0.09—0.13)

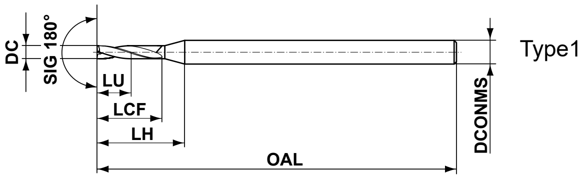
Note 1) Use a tool larger (DC) than the centre hole required but less than 2 x DC.
Note 2) When centering into curved or inclined surfaces, please reduce the feed rate.
Note 3) When V-grooving and chamfering, please reduce cutting conditions.
Note 4) When chatter vibration or abnormal noise is generated, please shorten the dwell time or reduce the revolutions.
Note 5) When centering, please do not exceed the LU (usable length).

MINI-MFE for Small Diameter

UWC DP1A 180° XR

P M K N S H

External Coolant



0.75≤DC≤2.95	
0 −0.014	
DCONMS=3	DCONMS=4
0 −0.006	0 −0.008

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)					Type
				LU	LCF	LH	OAL	DCONMS	
0.75	2	★	MFE0075X02S030	1.5	3.0	7.7	45	3	1
0.80	2	★	MFE0080X02S030	1.6	3.2	7.8	45	3	1
0.85	2	★	MFE0085X02S030	1.7	3.4	7.9	45	3	1
0.90	2	★	MFE0090X02S030	1.8	3.6	8.0	45	3	1
0.95	2	★	MFE0095X02S030	1.9	3.8	8.1	45	3	1
1.00	2	★	MFE0100X02S030	2.0	4.0	8.2	45	3	1
1.05	2	★	MFE0105X02S030	2.1	4.2	8.3	45	3	1
1.10	2	★	MFE0110X02S030	2.2	4.4	8.4	45	3	1
1.15	2	★	MFE0115X02S030	2.3	4.6	8.6	45	3	1
1.20	2	★	MFE0120X02S030	2.4	4.8	8.7	45	3	1
1.25	2	★	MFE0125X02S030	2.5	5.0	8.8	45	3	1
1.30	2	★	MFE0130X02S030	2.6	5.2	8.9	45	3	1
1.35	2	★	MFE0135X02S030	2.7	5.4	9.0	45	3	1
1.40	2	★	MFE0140X02S030	2.8	5.6	9.1	45	3	1
1.45	2	★	MFE0145X02S030	2.9	5.8	9.2	45	3	1
1.50	2	★	MFE0150X02S030	3.0	6.0	9.3	45	3	1
1.55	2	★	MFE0155X02S030	3.1	6.2	9.4	45	3	1
1.60	2	★	MFE0160X02S030	3.2	6.4	9.5	45	3	1
1.65	2	★	MFE0165X02S030	3.3	6.6	9.6	45	3	1
1.70	2	★	MFE0170X02S030	3.4	6.8	9.7	45	3	1
1.75	2	★	MFE0175X02S030	3.5	7.0	9.8	45	3	1
1.80	2	★	MFE0180X02S030	3.6	7.2	9.9	45	3	1
1.85	2	★	MFE0185X02S030	3.7	7.4	10.0	45	3	1
1.90	2	★	MFE0190X02S030	3.8	7.6	10.2	45	3	1
1.95	2	★	MFE0195X02S030	3.9	7.8	10.3	45	3	1
2.00	2	★	MFE0200X02S040	4.0	8.0	12.2	50	4	1
2.05	2	★	MFE0205X02S040	4.1	8.2	12.3	50	4	1
2.10	2	★	MFE0210X02S040	4.2	8.4	12.4	50	4	1
2.15	2	★	MFE0215X02S040	4.3	8.6	12.6	50	4	1
2.20	2	★	MFE0220X02S040	4.4	8.8	12.7	50	4	1
2.25	2	★	MFE0225X02S040	4.5	9.0	12.8	50	4	1
2.30	2	★	MFE0230X02S040	4.6	9.2	12.9	50	4	1
2.35	2	★	MFE0235X02S040	4.7	9.4	13.0	50	4	1
2.40	2	★	MFE0240X02S040	4.8	9.6	13.1	50	4	1
2.45	2	★	MFE0245X02S040	4.9	9.8	13.2	50	4	1
2.50	2	★	MFE0250X02S040	5.0	10.0	13.3	50	4	1
2.55	2	★	MFE0255X02S040	5.1	10.2	13.4	50	4	1
2.60	2	★	MFE0260X02S040	5.2	10.4	13.5	50	4	1
2.65	2	★	MFE0265X02S040	5.3	10.6	13.6	50	4	1
2.70	2	★	MFE0270X02S040	5.4	10.8	13.7	50	4	1
2.75	2	★	MFE0275X02S040	5.5	11.0	13.8	50	4	1
2.80	2	★	MFE0280X02S040	5.6	11.2	13.9	50	4	1
2.85	2	★	MFE0285X02S040	5.7	11.4	14.0	50	4	1
2.90	2	★	MFE0290X02S040	5.8	11.6	14.2	50	4	1
2.95	2	★	MFE0295X02S040	5.9	11.8	14.3	50	4	1

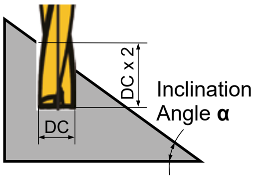
★ : Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

Material		P					
		Mild Steels (≤180HB) C10E etc.		Carbon Steels, Alloy Steels (180—280HB) DIN Ck45, 41CrMo4 etc.		Carbon Steels, Alloy Steels (280—350HB) DIN 40CrNiMoA etc.	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)
0.75	**≤2**	23300	0.030 (0.010—0.050)	19000	0.030 (0.010—0.050)	16900	0.030 (0.010—0.050)
1.0	**≤2**	17500	0.030 (0.010—0.050)	14300	0.030 (0.010—0.050)	12700	0.030 (0.010—0.050)
1.5	**≤2**	12200	0.035 (0.015—0.055)	10000	0.035 (0.015—0.055)	8400	0.035 (0.015—0.050)
2.0	**≤2**	9500	0.040 (0.020—0.060)	7900	0.040 (0.020—0.060)	6700	0.040 (0.020—0.060)
2.5	**≤2**	7900	0.050 (0.030—0.070)	6600	0.050 (0.030—0.070)	5700	0.050 (0.030—0.070)
2.95	**≤2**	7900	0.060 (0.040—0.080)	7900	0.060 (0.040—0.080)	6800	0.060 (0.040—0.080)

Material		M		K			
		Austenitic Stainless Steels (≤200HB) DIN X5CrNi189, X5CrNiMo1810 etc.		Gray Cast Irons (≤350MPa) DIN GG30 etc.		Ductile Cast Irons (≤450MPa) DIN GGG40.3 etc.	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)
0.75	**≤2**	10600	0.007 (0.003—0.011)	23300	0.030 (0.010—0.050)	16900	0.010 (0.005—0.015)
1.0	**≤2**	7900	0.007 (0.003—0.011)	17500	0.030 (0.010—0.050)	12700	0.010 (0.005—0.015)
1.5	**≤2**	5300	0.010 (0.005—0.015)	12200	0.035 (0.015—0.055)	10000	0.020 (0.010—0.030)
2.0	**≤2**	4700	0.015 (0.010—0.020)	9500	0.040 (0.020—0.060)	8700	0.030 (0.015—0.045)
2.5	**≤2**	3800	0.015 (0.010—0.020)	7900	0.050 (0.030—0.070)	7300	0.045 (0.025—0.065)
2.95	**≤2**	3100	0.020 (0.010—0.030)	7900	0.060 (0.040—0.080)	6800	0.050 (0.040—0.060)

Material		N	
		Aluminium Alloys (Si<5%) AlMg1SiCu, Al-Zn6MgCu etc.	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)
0.75	**≤2**	42400	0.020 (0.010—0.030)
1.0	**≤2**	31800	0.020 (0.010—0.030)
1.5	**≤2**	21200	0.020 (0.010—0.030)
2.0	**≤2**	17500	0.050 (0.030—0.070)
2.5	**≤2**	14000	0.060 (0.040—0.090)
2.95	**≤2**	11600	0.060 (0.040—0.090)



Note 1) The recommended hole depth is DCx2. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)

Note 2) The above cutting table assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, adjust the feed rate to 70% or lower as a guideline.
When the inclination angle α is greater than 30°, adjust the feed rate to 50% or lower as a guideline.

Note 3) This product is a tool intended for hole drilling. It cannot be used for cross-feed machining or helical machining.

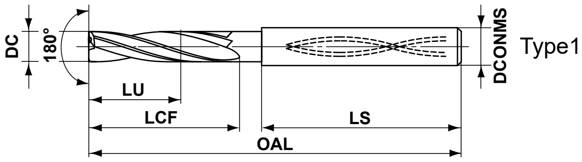
DFAS NEW

Solid Carbide Flat Bottom Drills

UWC DP1A 180° XR

P M K N S H

Internal Coolant



	DC=3	3 < DC≦6	6 < DC≦10	10 < DC≦14
	0 −0.014	0 −0.018	0 −0.022	0 −0.027
h6	4 < DCONMS≦6	6 < DCONMS≦10	10 < DCONMS≦14	
	0 −0.008	0 −0.009	0 −0.011	

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)					Type
				LU	LCF	LS	OAL	DCONMS	
3.0	3	●	**DFAS0300X03S040**	9.0	14	39.0	55	4	1
3.1	3	★	**DFAS0310X03S040**	9.3	16	37.0	55	4	1
3.2	3	★	**DFAS0320X03S040**	9.6	16	37.0	55	4	1
3.3	3	●	**DFAS0330X03S040**	9.9	16	37.0	55	4	1
3.4	3	★	**DFAS0340X03S040**	10.2	16	37.0	55	4	1
3.5	3	●	**DFAS0350X03S040**	10.5	16	37.0	55	4	1
3.6	3	★	**DFAS0360X03S040**	10.8	18	35.0	55	4	1
3.7	3	★	**DFAS0370X03S040**	11.1	18	35.0	55	4	1
3.8	3	★	**DFAS0380X03S040**	11.4	18	35.0	55	4	1
3.9	3	★	**DFAS0390X03S040**	11.7	18	35.0	55	4	1
4.0	3	●	**DFAS0400X03S040**	12.0	18	35.0	55	4	1
4.1	3	★	**DFAS0410X03S050**	12.3	20	40.0	62	5	1
4.2	3	●	**DFAS0420X03S050**	12.6	20	40.0	62	5	1
4.3	3	★	**DFAS0430X03S050**	12.9	20	40.0	62	5	1
4.4	3	★	**DFAS0440X03S050**	13.2	20	40.0	62	5	1
4.5	3	●	**DFAS0450X03S050**	13.5	20	40.0	62	5	1
4.6	3	★	**DFAS0460X03S050**	13.8	23	37.0	62	5	1
4.7	3	★	**DFAS0470X03S050**	14.1	23	37.0	62	5	1
4.8	3	★	**DFAS0480X03S050**	14.4	23	37.0	62	5	1
4.9	3	★	**DFAS0490X03S050**	14.7	23	37.0	62	5	1
5.0	3	●	**DFAS0500X03S050**	15.0	23	37.0	62	5	1
5.1	3	★	**DFAS0510X03S060**	15.3	25	39.0	66	6	1
5.2	3	★	**DFAS0520X03S060**	15.6	25	39.0	66	6	1
5.3	3	●	**DFAS0530X03S060**	15.9	25	39.0	66	6	1
5.4	3	★	**DFAS0540X03S060**	16.2	25	39.0	66	6	1
5.5	3	●	**DFAS0550X03S060**	16.5	25	39.0	66	6	1
5.6	3	★	**DFAS0560X03S060**	16.8	27	37.0	66	6	1
5.7	3	★	**DFAS0570X03S060**	17.1	27	37.0	66	6	1
5.8	3	★	**DFAS0580X03S060**	17.4	27	37.0	66	6	1
5.9	3	★	**DFAS0590X03S060**	17.7	27	37.0	66	6	1

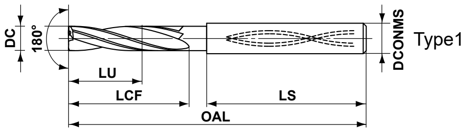
● : Inventory maintained. ★ : Inventory maintained in Japan.

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)					Type
				LU	LCF	LS	OAL	DCONMS	
6.0	3	●	DFAS0600X03S060	18.0	27	37.0	66	6	1
6.1	3	★	DFAS0610X03S070	18.3	29	44.0	75	7	1
6.2	3	★	DFAS0620X03S070	18.6	29	44.0	75	7	1
6.3	3	★	DFAS0630X03S070	18.9	29	44.0	75	7	1
6.4	3	★	DFAS0640X03S070	19.2	29	44.0	75	7	1
6.5	3	●	DFAS0650X03S070	19.5	29	44.0	75	7	1
6.6	3	★	DFAS0660X03S070	19.8	32	41.0	75	7	1
6.7	3	★	DFAS0670X03S070	20.1	32	41.0	75	7	1
6.8	3	●	DFAS0680X03S070	20.4	32	41.0	75	7	1
6.9	3	★	DFAS0690X03S070	20.7	32	41.0	75	7	1
7.0	3	●	DFAS0700X03S070	21.0	32	41.0	75	7	1
7.1	3	★	DFAS0710X03S080	21.3	34	44.0	80	8	1
7.2	3	★	DFAS0720X03S080	21.6	34	44.0	80	8	1
7.3	3	★	DFAS0730X03S080	21.9	34	44.0	80	8	1
7.4	3	★	DFAS0740X03S080	22.2	34	44.0	80	8	1
7.5	3	●	DFAS0750X03S080	22.5	34	44.0	80	8	1
7.6	3	★	DFAS0760X03S080	22.8	36	42.0	80	8	1
7.7	3	★	DFAS0770X03S080	23.1	36	42.0	80	8	1
7.8	3	★	DFAS0780X03S080	23.4	36	42.0	80	8	1
7.9	3	★	DFAS0790X03S080	23.7	36	42.0	80	8	1
8.0	3	●	DFAS0800X03S080	24.0	36	42.0	80	8	1
8.1	3	★	DFAS0810X03S090	24.3	38	45.0	85	9	1
8.2	3	●	DFAS0820X03S090	24.6	38	45.0	85	9	1
8.3	3	★	DFAS0830X03S090	24.9	38	45.0	85	9	1
8.4	3	★	DFAS0840X03S090	25.2	38	45.0	85	9	1
8.5	3	●	DFAS0850X03S090	25.5	38	45.0	85	9	1
8.6	3	★	DFAS0860X03S090	25.8	41	42.0	85	9	1
8.7	3	★	DFAS0870X03S090	26.1	41	42.0	85	9	1
8.8	3	●	DFAS0880X03S090	26.4	41	42.0	85	9	1
8.9	3	★	DFAS0890X03S090	26.7	41	42.0	85	9	1
9.0	3	●	DFAS0900X03S090	27.0	41	42.0	85	9	1
9.1	3	★	DFAS0910X03S100	27.3	43	45.0	90	10	1
9.2	3	★	DFAS0920X03S100	27.6	43	45.0	90	10	1
9.3	3	★	DFAS0930X03S100	27.9	43	45.0	90	10	1
9.4	3	★	DFAS0940X03S100	28.2	43	45.0	90	10	1
9.5	3	●	DFAS0950X03S100	28.5	43	45.0	90	10	1
9.6	3	★	DFAS0960X03S100	28.8	45	43.0	90	10	1
9.7	3	●	DFAS0970X03S100	29.1	45	43.0	90	10	1
9.8	3	★	DFAS0980X03S100	29.4	45	43.0	90	10	1
9.9	3	★	DFAS0990X03S100	29.7	45	43.0	90	10	1

CUTTING CONDITIONS ➢ M023
TECHNICAL DATA ➢ P001

DFAS NEW

Solid Carbide Flat Bottom Drills



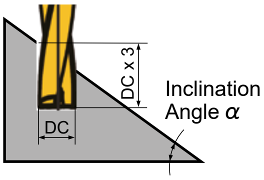
DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)					Type
				LU	LCF	LS	OAL	DCONMS	
10.0	3	●	**DFAS1000X03S100**	30.0	45	43.0	90	10	1
10.1	3	★	**DFAS1010X03S110**	30.3	47	52.0	101	11	1
10.2	3	●	**DFAS1020X03S110**	30.6	47	52.0	101	11	1
10.3	3	★	**DFAS1030X03S110**	30.9	47	52.0	101	11	1
10.4	3	★	**DFAS1040X03S110**	31.2	47	52.0	101	11	1
10.5	3	●	**DFAS1050X03S110**	31.5	47	52.0	101	11	1
10.6	3	★	**DFAS1060X03S110**	31.8	50	49.0	101	11	1
10.7	3	★	**DFAS1070X03S110**	32.1	50	49.0	101	11	1
10.8	3	★	**DFAS1080X03S110**	32.4	50	49.0	101	11	1
10.9	3	★	**DFAS1090X03S110**	32.7	50	49.0	101	11	1
11.0	3	●	**DFAS1100X03S110**	33.0	50	49.0	101	11	1
11.1	3	★	**DFAS1110X03S120**	33.3	52	51.0	105	12	1
11.2	3	★	**DFAS1120X03S120**	33.6	52	51.0	105	12	1
11.3	3	★	**DFAS1130X03S120**	33.9	52	51.0	105	12	1
11.4	3	★	**DFAS1140X03S120**	34.2	52	51.0	105	12	1
11.5	3	●	**DFAS1150X03S120**	34.5	52	51.0	105	12	1
11.6	3	★	**DFAS1160X03S120**	34.8	54	49.0	105	12	1
11.7	3	★	**DFAS1170X03S120**	35.1	54	49.0	105	12	1
11.8	3	★	**DFAS1180X03S120**	35.4	54	49.0	105	12	1
11.9	3	★	**DFAS1190X03S120**	35.7	54	49.0	105	12	1
12.0	3	●	**DFAS1200X03S120**	36.0	54	49.0	105	12	1
12.5	3	★	**DFAS1250X03S130**	37.5	56	52.0	110	13	1
13.0	3	●	**DFAS1300X03S130**	39.0	59	49.0	110	13	1
13.5	3	★	**DFAS1350X03S140**	40.5	61	51.0	114	14	1
14.0	3	●	**DFAS1400X03S140**	42.0	63	49.0	114	14	1

● : Inventory maintained. ★ : Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

Material		P		M		K	
		Mild Steel, Carbon Steel, Alloy Steel St44-2, C10, 41CrMo4, 40CrNiMoA		Stainless Steel, Precipitation-Hardening Stainless Steel X5CrNi18-10, X5CrNiMo17-12-2, 17-4PH, X7CrNiAl17-7		Gray Cast Iron, Ductile Cast Iron GG-30, GGG-40	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)
3.0	**≤3**	10610	0.07 (0.04—0.10)	3180	0.05 (0.04—0.06)	10610	0.04 (0.02—0.07)
4.0	**≤3**	7960	0.08 (0.04—0.11)	2390	0.06 (0.05—0.08)	7960	0.05 (0.03—0.09)
5.0	**≤3**	6370	0.10 (0.05—0.14)	1910	0.08 (0.06—0.10)	6370	0.07 (0.03—0.11)
6.0	**≤3**	5310	0.12 (0.06—0.17)	1590	0.10 (0.08—0.12)	5310	0.08 (0.04—0.13)
7.0	**≤3**	4550	0.13 (0.07—0.20)	1360	0.11 (0.09—0.14)	4550	0.09 (0.05—0.15)
8.0	**≤3**	3980	0.16 (0.08—0.23)	1190	0.13 (0.10—0.16)	3980	0.11 (0.05—0.17)
9.0	**≤3**	3540	0.17 (0.09—0.26)	1060	0.15 (0.12—0.18)	3540	0.12 (0.06—0.20)
10.0	**≤3**	3180	0.20 (0.10—0.29)	950	0.16 (0.13—0.20)	3180	0.13 (0.07—0.22)
11.0	**≤3**	2890	0.22 (0.11—0.32)	870	0.18 (0.14—0.22)	2890	0.15 (0.07—0.24)
12.0	**≤3**	2650	0.24 (0.12—0.35)	800	0.20 (0.16—0.24)	2650	0.16 (0.08—0.26)
13.0	**≤3**	2450	0.26 (0.13—0.39)	730	0.22 (0.17—0.26)	2450	0.17 (0.09—0.28)
14.0	**≤3**	2270	0.28 (0.14—0.42)	680	0.23 (0.19—0.28)	2270	0.19 (0.09—0.30)

Material		N		S	
		Aluminium Alloys AlMg1SiCu, Al-Zn6MgCu		Titanium Alloys Ti-6Al-4V, Ti-5Al-5V-5Mo-3Cr	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	α=0° Feed rate (Min.—Max.) (mm/rev)
3.0	**≤3**	13790	0.04 (0.02—0.07)	3710	0.03 (0.01—0.05)
4.0	**≤3**	10350	0.05 (0.03—0.09)	2790	0.04 (0.01—0.07)
5.0	**≤3**	8280	0.07 (0.03—0.11)	2230	0.05 (0.02—0.08)
6.0	**≤3**	6900	0.08 (0.04—0.13)	1860	0.06 (0.02—0.10)
7.0	**≤3**	5910	0.09 (0.05—0.15)	1590	0.07 (0.02—0.12)
8.0	**≤3**	5170	0.11 (0.05—0.17)	1390	0.08 (0.03—0.13)
9.0	**≤3**	4600	0.12 (0.06—0.20)	1240	0.09 (0.03—0.15)
10.0	**≤3**	4140	0.13 (0.07—0.22)	1110	0.10 (0.03—0.17)
11.0	**≤3**	3760	0.15 (0.07—0.24)	1010	0.11 (0.04—0.18)
12.0	**≤3**	3450	0.16 (0.08—0.26)	930	0.12 (0.04—0.20)
13.0	**≤3**	3180	0.17 (0.09—0.28)	860	0.13 (0.04—0.22)
14.0	**≤3**	2960	0.19 (0.09—0.30)	800	0.14 (0.05—0.23)



Note 1) The recommended hole depth is DCx3. This should be the depth from the uppermost surface of the workpiece when machining on an angled surface. (Refer to diagram)

Note 2) The above cutting table assumes drilling on a flat surface.
For hole drilling on an angled surface, adjust the feed rate in accordance with the inclination angle.
When the inclination angle α is 30° or less, reduce the feed rate by 30% or more as a guideline.
When the inclination angle α is bigger than 30°, reduce the feed rate by 50% or more as a guideline.

Note 3) For flat surface machining of stainless steel, first drill a pilot hole with the same diameter or machine a countersink.

Note 4) This product is a tool intended for hole drilling. It cannot be used for cross-feed or helical machining.

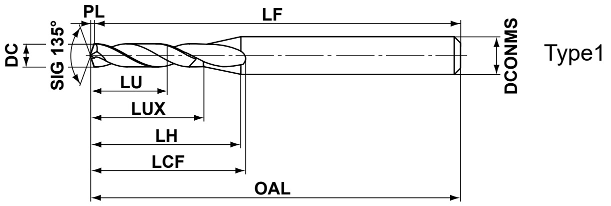
MINI-DWAE

Mini Size

DC<2.0 DC≥2.0

P **M** **K** N S H

External Coolant



DC≤3	
0 −0.014	
DCONMS=3	DCONMS=4
0 −0.006	0 −0.008

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)								Type
				LU	LUX	LCF	LH	OAL	LF	PL	DCONMS	
1.0	2	●	DWAE0100X02S030	2.2	5.0	7.7	8.7	45.0	44.8	0.2	3	1
1.0	4	●	DWAE0100X04S030	4.2	7.0	9.9	10.7	45.0	44.8	0.2	3	1
1.1	2	★	DWAE0110X02S030	2.4	5.4	8.1	8.9	45.0	44.8	0.2	3	1
1.1	4	★	DWAE0110X04S030	4.6	7.6	10.5	11.1	45.0	44.8	0.2	3	1
1.2	2	★	DWAE0120X02S030	2.6	5.8	8.5	9.2	45.0	44.8	0.2	3	1
1.2	4	★	DWAE0120X04S030	5.0	8.2	11.1	11.6	45.0	44.8	0.2	3	1
1.3	2	★	DWAE0130X02S030	2.9	6.3	9.0	9.5	45.0	44.7	0.3	3	1
1.3	4	★	DWAE0130X04S030	5.5	8.9	11.9	12.1	45.0	44.7	0.3	3	1
1.4	2	★	DWAE0140X02S030	3.1	6.7	9.4	9.7	45.0	44.7	0.3	3	1
1.4	4	★	DWAE0140X04S030	5.9	9.5	12.5	12.5	45.0	44.7	0.3	3	1
1.5	2	●	DWAE0150X02S030	3.3	7.1	9.8	9.9	45.0	44.7	0.3	3	1
1.5	4	●	DWAE0150X04S030	6.3	10.1	13.1	12.9	45.0	44.7	0.3	3	1
1.6	2	★	DWAE0160X02S030	3.5	7.5	10.2	10.1	45.0	44.7	0.3	3	1
1.6	4	★	DWAE0160X04S030	6.7	10.7	13.7	13.3	45.0	44.7	0.3	3	1
1.7	2	★	DWAE0170X02S030	3.8	8.0	10.7	10.4	45.0	44.6	0.4	3	1
1.7	4	★	DWAE0170X04S030	7.2	11.4	14.4	13.8	45.0	44.6	0.4	3	1
1.8	2	★	DWAE0180X02S030	4.0	8.4	11.1	10.6	45.0	44.6	0.4	3	1
1.8	4	★	DWAE0180X04S030	7.6	12.0	15.1	14.2	45.0	44.6	0.4	3	1
1.9	2	★	DWAE0190X02S030	4.2	8.8	11.5	10.9	45.0	44.6	0.4	3	1
1.9	4	★	DWAE0190X04S030	8.0	12.6	15.7	14.7	45.0	44.6	0.4	3	1
2.0	2	●	DWAE0200X02S040	4.4	9.2	12.8	12.9	50.0	49.6	0.4	4	1
2.0	4	●	DWAE0200X04S040	8.4	13.2	17.2	16.9	50.0	49.6	0.4	4	1
2.1	2	★	DWAE0210X02S040	4.6	9.6	13.2	13.1	50.0	49.6	0.4	4	1
2.1	4	★	DWAE0210X04S040	8.8	13.8	17.8	17.3	50.0	49.6	0.4	4	1
2.2	2	★	DWAE0220X02S040	4.9	10.1	13.7	13.5	50.0	49.5	0.5	4	1
2.2	4	★	DWAE0220X04S040	9.3	14.5	18.5	17.9	50.0	49.5	0.5	4	1
2.3	2	★	DWAE0230X02S040	5.1	10.5	14.1	13.7	50.0	49.5	0.5	4	1
2.3	4	★	DWAE0230X04S040	9.7	15.1	19.2	18.3	50.0	49.5	0.5	4	1
2.4	2	★	DWAE0240X02S040	5.3	10.9	14.5	13.9	50.0	49.5	0.5	4	1
2.4	4	★	DWAE0240X04S040	10.1	15.7	19.8	18.7	50.0	49.5	0.5	4	1
2.5	2	●	DWAE0250X02S040	5.5	11.3	14.9	14.1	50.0	49.5	0.5	4	1
2.5	4	●	DWAE0250X04S040	10.5	16.3	20.4	19.1	50.0	49.5	0.5	4	1
2.6	2	★	DWAE0260X02S040	5.7	11.7	15.3	14.3	50.0	49.5	0.5	4	1
2.6	4	★	DWAE0260X04S040	10.9	16.9	21.0	19.5	50.0	49.5	0.5	4	1
2.7	2	★	DWAE0270X02S040	6.0	12.2	15.8	14.6	50.0	49.4	0.6	4	1
2.7	4	★	DWAE0270X04S040	11.4	17.6	21.7	20.0	50.0	49.4	0.6	4	1
2.8	2	★	DWAE0280X02S040	6.2	12.6	16.2	14.8	50.0	49.4	0.6	4	1
2.8	4	★	DWAE0280X04S040	11.8	18.2	22.4	20.4	50.0	49.4	0.6	4	1
2.9	2	★	DWAE0290X02S040	6.4	13.0	16.6	15.1	50.0	49.4	0.6	4	1
2.9	4	★	DWAE0290X04S040	12.2	18.8	23.0	20.9	50.0	49.4	0.6	4	1

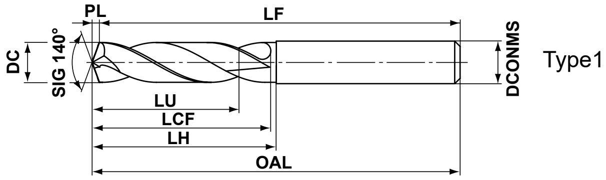
● : Inventory maintained. ★ : Inventory maintained in Japan.

DWAE

UWC DP1A 140° Z

P **M** **K** N S H

External Coolant



	DC=3	3<DC≤6	6<DC≤10	10<DC≤14
	0 −0.014	0 −0.018	0 −0.022	0 −0.027
	DCONMS=3	3<DCONMS≤6	6<DCONMS≤10	10<DCONMS≤14
h6	0 −0.006	0 −0.008	0 −0.009	0 −0.011

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.0	2	●	**DWAE0300X02S030**	6.5	12.5	14.5	45.5	45	0.5	3	1
3.0	4	●	**DWAE0300X04S030**	12.5	21.5	23.5	55.5	55	0.5	3	1
3.1	2	●	**DWAE0310X02S040**	6.8	12.6	14.6	55.6	55	0.6	4	1
3.1	4	●	**DWAE0310X04S040**	13.0	21.6	23.6	60.6	60	0.6	4	1
3.2	2	●	**DWAE0320X02S040**	7.0	13.6	15.6	55.6	55	0.6	4	1
3.2	4	●	**DWAE0320X04S040**	13.4	22.6	24.6	60.6	60	0.6	4	1
3.3	2	●	**DWAE0330X02S040**	7.2	13.6	15.6	55.6	55	0.6	4	1
3.3	4	●	**DWAE0330X04S040**	13.8	23.6	25.6	60.6	60	0.6	4	1
3.4	2	●	**DWAE0340X02S040**	7.4	13.6	15.6	55.6	55	0.6	4	1
3.4	4	●	**DWAE0340X04S040**	14.2	23.6	25.6	60.6	60	0.6	4	1
3.5	2	●	**DWAE0350X02S040**	7.6	14.6	16.6	55.6	55	0.6	4	1
3.5	4	●	**DWAE0350X04S040**	14.6	24.6	26.6	60.6	60	0.6	4	1
3.6	2	●	**DWAE0360X02S040**	7.9	14.7	16.7	55.7	55	0.7	4	1
3.6	4	●	**DWAE0360X04S040**	15.1	25.7	27.7	60.7	60	0.7	4	1
3.7	2	●	**DWAE0370X02S040**	8.1	14.7	16.7	55.7	55	0.7	4	1
3.7	4	●	**DWAE0370X04S040**	15.5	25.7	27.7	60.7	60	0.7	4	1
3.8	2	●	**DWAE0380X02S040**	8.3	15.7	17.7	55.7	55	0.7	4	1
3.8	4	●	**DWAE0380X04S040**	15.9	26.7	28.7	60.7	60	0.7	4	1
3.9	2	●	**DWAE0390X02S040**	8.5	15.7	17.7	55.7	55	0.7	4	1
3.9	4	●	**DWAE0390X04S040**	16.3	27.7	29.7	60.7	60	0.7	4	1
4.0	2	●	**DWAE0400X02S040**	8.7	15.7	17.7	55.7	55	0.7	4	1
4.0	4	●	**DWAE0400X04S040**	16.7	27.7	29.7	60.7	60	0.7	4	1
4.1	2	●	**DWAE0410X02S050**	8.9	16.7	18.7	62.7	62	0.7	5	1
4.1	4	●	**DWAE0410X04S050**	17.1	28.7	30.7	80.7	80	0.7	5	1
4.2	2	●	**DWAE0420X02S050**	9.2	16.8	18.8	62.8	62	0.8	5	1
4.2	4	●	**DWAE0420X04S050**	17.6	29.8	31.8	80.8	80	0.8	5	1
4.3	2	●	**DWAE0430X02S050**	9.4	17.8	19.8	62.8	62	0.8	5	1
4.3	4	●	**DWAE0430X04S050**	18.0	30.8	32.8	80.8	80	0.8	5	1
4.4	2	●	**DWAE0440X02S050**	9.6	17.8	19.8	62.8	62	0.8	5	1
4.4	4	●	**DWAE0440X04S050**	18.4	30.8	32.8	80.8	80	0.8	5	1

CUTTING CONDITIONS ➤ M031
TECHNICAL DATA ➤ P001

DWAE

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.5	2	●	**DWAE0450X02S050**	9.8	17.8	19.8	62.8	62	0.8	5	1
4.5	4	●	**DWAE0450X04S050**	18.8	31.8	33.8	80.8	80	0.8	5	1
4.6	2	●	**DWAE0460X02S050**	10.0	18.8	20.8	62.8	62	0.8	5	1
4.6	4	●	**DWAE0460X04S050**	19.2	32.8	34.8	80.8	80	0.8	5	1
4.7	2	●	**DWAE0470X02S050**	10.3	18.9	20.9	62.9	62	0.9	5	1
4.7	4	●	**DWAE0470X04S050**	19.7	32.9	34.9	80.9	80	0.9	5	1
4.8	2	●	**DWAE0480X02S050**	10.5	18.9	20.9	62.9	62	0.9	5	1
4.8	4	●	**DWAE0480X04S050**	20.1	33.9	35.9	80.9	80	0.9	5	1
4.9	2	●	**DWAE0490X02S050**	10.7	19.9	21.9	62.9	62	0.9	5	1
4.9	4	●	**DWAE0490X04S050**	20.5	34.9	36.9	80.9	80	0.9	5	1
5.0	2	●	**DWAE0500X02S050**	10.9	19.9	21.9	62.9	62	0.9	5	1
5.0	4	●	**DWAE0500X04S050**	20.9	34.9	36.9	80.9	80	0.9	5	1
5.1	2	★	**DWAE0510X02S060**	11.1	21.9	23.9	66.9	66	0.9	6	1
5.1	4	★	**DWAE0510X04S060**	21.3	35.9	37.9	80.9	80	0.9	6	1
5.2	2	●	**DWAE0520X02S060**	11.3	21.9	23.9	66.9	66	0.9	6	1
5.2	4	●	**DWAE0520X04S060**	21.7	36.9	38.9	80.9	80	0.9	6	1
5.3	2	★	**DWAE0530X02S060**	11.6	22.0	24.0	67.0	66	1.0	6	1
5.3	4	★	**DWAE0530X04S060**	22.2	37.0	39.0	81.0	80	1.0	6	1
5.4	2	●	**DWAE0540X02S060**	11.8	22.0	24.0	67.0	66	1.0	6	1
5.4	4	●	**DWAE0540X04S060**	22.6	38.0	40.0	81.0	80	1.0	6	1
5.5	2	★	**DWAE0550X02S060**	12.0	22.0	24.0	67.0	66	1.0	6	1
5.5	4	★	**DWAE0550X04S060**	23.0	39.0	41.0	81.0	80	1.0	6	1
5.6	2	●	**DWAE0560X02S060**	12.2	24.0	26.0	67.0	66	1.0	6	1
5.6	4	●	**DWAE0560X04S060**	23.4	39.0	41.0	81.0	80	1.0	6	1
5.7	2	★	**DWAE0570X02S060**	12.4	24.0	26.0	67.0	66	1.0	6	1
5.7	4	★	**DWAE0570X04S060**	23.8	39.0	41.0	81.0	80	1.0	6	1
5.8	2	●	**DWAE0580X02S060**	12.7	24.1	26.1	67.1	66	1.1	6	1
5.8	4	●	**DWAE0580X04S060**	24.3	41.1	43.1	81.1	80	1.1	6	1
5.9	2	★	**DWAE0590X02S060**	12.9	24.1	26.1	67.1	66	1.1	6	1
5.9	4	★	**DWAE0590X04S060**	24.7	41.1	43.1	81.1	80	1.1	6	1
6.0	2	●	**DWAE0600X02S060**	13.1	24.1	26.1	67.1	66	1.1	6	1
6.0	4	●	**DWAE0600X04S060**	25.1	42.1	44.1	81.1	80	1.1	6	1
6.1	2	★	**DWAE0610X02S070**	13.3	26.1	28.1	75.1	74	1.1	7	1
6.1	4	★	**DWAE0610X04S070**	25.5	44.1	46.1	84.1	83	1.1	7	1
6.2	2	●	**DWAE0620X02S070**	13.5	26.1	28.1	75.1	74	1.1	7	1
6.2	4	●	**DWAE0620X04S070**	25.9	44.1	46.1	84.1	83	1.1	7	1
6.3	2	★	**DWAE0630X02S070**	13.7	26.1	28.1	75.1	74	1.1	7	1
6.3	4	★	**DWAE0630X04S070**	26.3	44.1	46.1	84.1	83	1.1	7	1
6.4	2	●	**DWAE0640X02S070**	14.0	26.2	28.2	75.2	74	1.2	7	1
6.4	4	●	**DWAE0640X04S070**	26.8	44.2	46.2	84.2	83	1.2	7	1
6.5	2	★	**DWAE0650X02S070**	14.2	26.2	28.2	75.2	74	1.2	7	1
6.5	4	★	**DWAE0650X04S070**	27.2	44.2	46.2	84.2	83	1.2	7	1

● : Inventory maintained. ★ : Inventory maintained in Japan.

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.6	2	●	**DWAE0660X02S070**	14.4	28.2	30.2	75.2	74	1.2	7	1
6.6	4	●	**DWAE0660X04S070**	27.6	46.2	48.2	84.2	83	1.2	7	1
6.7	2	★	**DWAE0670X02S070**	14.6	28.2	30.2	75.2	74	1.2	7	1
6.7	4	★	**DWAE0670X04S070**	28.0	46.2	48.2	84.2	83	1.2	7	1
6.8	2	●	**DWAE0680X02S070**	14.8	28.2	30.2	75.2	74	1.2	7	1
6.8	4	●	**DWAE0680X04S070**	28.4	46.2	48.2	84.2	83	1.2	7	1
6.9	2	★	**DWAE0690X02S070**	15.1	28.3	30.3	75.3	74	1.3	7	1
6.9	4	★	**DWAE0690X04S070**	28.9	46.3	48.3	84.3	83	1.3	7	1
7.0	2	●	**DWAE0700X02S070**	15.3	28.3	30.3	75.3	74	1.3	7	1
7.0	4	●	**DWAE0700X04S070**	29.3	46.3	48.3	84.3	83	1.3	7	1
7.1	2	★	**DWAE0710X02S080**	15.5	29.3	31.3	80.3	79	1.3	8	1
7.1	4	★	**DWAE0710X04S080**	29.7	51.3	53.3	91.3	90	1.3	8	1
7.2	2	●	**DWAE0720X02S080**	15.7	29.3	31.3	80.3	79	1.3	8	1
7.2	4	●	**DWAE0720X04S080**	30.1	51.3	53.3	91.3	90	1.3	8	1
7.3	2	★	**DWAE0730X02S080**	15.9	29.3	31.3	80.3	79	1.3	8	1
7.3	4	★	**DWAE0730X04S080**	30.5	51.3	53.3	91.3	90	1.3	8	1
7.4	2	●	**DWAE0740X02S080**	16.1	29.3	31.3	80.3	79	1.3	8	1
7.4	4	●	**DWAE0740X04S080**	30.9	51.3	53.3	91.3	90	1.3	8	1
7.5	2	★	**DWAE0750X02S080**	16.4	29.4	31.4	80.4	79	1.4	8	1
7.5	4	★	**DWAE0750X04S080**	31.4	51.4	53.4	91.4	90	1.4	8	1
7.6	2	●	**DWAE0760X02S080**	16.6	31.4	33.4	80.4	79	1.4	8	1
7.6	4	●	**DWAE0760X04S080**	31.8	53.4	55.4	91.4	90	1.4	8	1
7.7	2	★	**DWAE0770X02S080**	16.8	31.4	33.4	80.4	79	1.4	8	1
7.7	4	★	**DWAE0770X04S080**	32.2	53.4	55.4	91.4	90	1.4	8	1
7.8	2	●	**DWAE0780X02S080**	17.0	31.4	33.4	80.4	79	1.4	8	1
7.8	4	●	**DWAE0780X04S080**	32.6	53.4	55.4	91.4	90	1.4	8	1
7.9	2	★	**DWAE0790X02S080**	17.2	31.4	33.4	80.4	79	1.4	8	1
7.9	4	★	**DWAE0790X04S080**	33.0	53.4	55.4	91.4	90	1.4	8	1
8.0	2	●	**DWAE0800X02S080**	17.5	31.5	33.5	80.5	79	1.5	8	1
8.0	4	●	**DWAE0800X04S080**	33.5	53.5	55.5	91.5	90	1.5	8	1
8.1	2	★	**DWAE0810X02S090**	17.7	33.5	35.5	85.5	84	1.5	9	1
8.1	4	★	**DWAE0810X04S090**	33.9	57.5	59.5	99.5	98	1.5	9	1
8.2	2	●	**DWAE0820X02S090**	17.9	33.5	35.5	85.5	84	1.5	9	1
8.2	4	●	**DWAE0820X04S090**	34.3	57.5	59.5	99.5	98	1.5	9	1
8.3	2	★	**DWAE0830X02S090**	18.1	33.5	35.5	85.5	84	1.5	9	1
8.3	4	★	**DWAE0830X04S090**	34.7	57.5	59.5	99.5	98	1.5	9	1
8.4	2	●	**DWAE0840X02S090**	18.3	33.5	35.5	85.5	84	1.5	9	1
8.4	4	●	**DWAE0840X04S090**	35.1	57.5	59.5	99.5	98	1.5	9	1
8.5	2	★	**DWAE0850X02S090**	18.5	33.5	35.5	85.5	84	1.5	9	1
8.5	4	★	**DWAE0850X04S090**	35.5	57.5	59.5	99.5	98	1.5	9	1
8.6	2	●	**DWAE0860X02S090**	18.8	34.6	36.6	85.6	84	1.6	9	1
8.6	4	●	**DWAE0860X04S090**	36.0	61.6	63.6	99.6	98	1.6	9	1
8.7	2	★	**DWAE0870X02S090**	19.0	34.6	36.6	85.6	84	1.6	9	1
8.7	4	★	**DWAE0870X04S090**	36.4	61.6	63.6	99.6	98	1.6	9	1

CUTTING CONDITIONS ➤ M031
TECHNICAL DATA ➤ P001

DWAE

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.8	2	●	**DWAE0880X02S090**	19.2	34.6	36.6	85.6	84	1.6	9	1
8.8	4	●	**DWAE0880X04S090**	36.8	61.6	63.6	99.6	98	1.6	9	1
8.9	2	★	**DWAE0890X02S090**	19.4	34.6	36.6	85.6	84	1.6	9	1
8.9	4	★	**DWAE0890X04S090**	37.2	61.6	63.6	99.6	98	1.6	9	1
9.0	2	●	**DWAE0900X02S090**	19.6	34.6	36.6	85.6	84	1.6	9	1
9.0	4	●	**DWAE0900X04S090**	37.6	61.6	63.6	99.6	98	1.6	9	1
9.1	2	★	**DWAE0910X02S100**	19.9	36.7	38.7	90.7	89	1.7	10	1
9.1	4	★	**DWAE0910X04S100**	38.1	63.7	65.7	106.7	105	1.7	10	1
9.2	2	●	**DWAE0920X02S100**	20.1	36.7	38.7	90.7	89	1.7	10	1
9.2	4	●	**DWAE0920X04S100**	38.5	63.7	65.7	106.7	105	1.7	10	1
9.3	2	★	**DWAE0930X02S100**	20.3	36.7	38.7	90.7	89	1.7	10	1
9.3	4	★	**DWAE0930X04S100**	38.9	63.7	65.7	106.7	105	1.7	10	1
9.4	2	●	**DWAE0940X02S100**	20.5	36.7	38.7	90.7	89	1.7	10	1
9.4	4	●	**DWAE0940X04S100**	39.3	63.7	65.7	106.7	105	1.7	10	1
9.5	2	★	**DWAE0950X02S100**	20.7	36.7	38.7	90.7	89	1.7	10	1
9.5	4	★	**DWAE0950X04S100**	39.7	63.7	65.7	106.7	105	1.7	10	1
9.6	2	●	**DWAE0960X02S100**	20.9	37.7	39.7	90.7	89	1.7	10	1
9.6	4	●	**DWAE0960X04S100**	40.1	66.7	68.7	106.7	105	1.7	10	1
9.7	2	★	**DWAE0970X02S100**	21.2	37.8	39.8	90.8	89	1.8	10	1
9.7	4	★	**DWAE0970X04S100**	40.6	66.8	68.8	106.8	105	1.8	10	1
9.8	2	●	**DWAE0980X02S100**	21.4	37.8	39.8	90.8	89	1.8	10	1
9.8	4	●	**DWAE0980X04S100**	41.0	66.8	68.8	106.8	105	1.8	10	1
9.9	2	★	**DWAE0990X02S100**	21.6	37.8	39.8	90.8	89	1.8	10	1
9.9	4	★	**DWAE0990X04S100**	41.4	66.8	68.8	106.8	105	1.8	10	1
10.0	2	●	**DWAE1000X02S100**	21.8	37.8	39.8	90.8	89	1.8	10	1
10.0	4	●	**DWAE1000X04S100**	41.8	66.8	68.8	106.8	105	1.8	10	1
10.1	2	●	**DWAE1010X02S110**	22.0	40.8	42.8	101.8	100	1.8	11	1
10.1	4	●	**DWAE1010X04S110**	42.2	71.8	73.8	115.8	114	1.8	11	1
10.2	2	●	**DWAE1020X02S110**	22.3	40.9	42.9	101.9	100	1.9	11	1
10.2	4	●	**DWAE1020X04S110**	42.7	71.9	73.9	115.9	114	1.9	11	1
10.3	2	●	**DWAE1030X02S110**	22.5	40.9	42.9	101.9	100	1.9	11	1
10.3	4	●	**DWAE1030X04S110**	43.1	71.9	73.9	115.9	114	1.9	11	1
10.4	2	●	**DWAE1040X02S110**	22.7	40.9	42.9	101.9	100	1.9	11	1
10.4	4	●	**DWAE1040X04S110**	43.5	71.9	73.9	115.9	114	1.9	11	1
10.5	2	●	**DWAE1050X02S110**	22.9	40.9	42.9	101.9	100	1.9	11	1
10.5	4	●	**DWAE1050X04S110**	43.9	71.9	73.9	115.9	114	1.9	11	1
10.6	2	●	**DWAE1060X02S110**	23.1	41.9	43.9	101.9	100	1.9	11	1
10.6	4	●	**DWAE1060X04S110**	44.3	72.9	74.9	115.9	114	1.9	11	1
10.7	2	●	**DWAE1070X02S110**	23.3	41.9	43.9	101.9	100	1.9	11	1
10.7	4	●	**DWAE1070X04S110**	44.7	72.9	74.9	115.9	114	1.9	11	1
10.8	2	●	**DWAE1080X02S110**	23.6	42.0	44.0	102.0	100	2.0	11	1
10.8	4	●	**DWAE1080X04S110**	45.2	73.0	75.0	116.0	114	2.0	11	1

● : Inventory maintained.　★ : Inventory maintained in Japan.

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.9	2	●	**DWAE1090X02S110**	23.8	42.0	44.0	102.0	100	2.0	11	1
10.9	4	●	**DWAE1090X04S110**	45.6	73.0	75.0	116.0	114	2.0	11	1
11.0	2	●	**DWAE1100X02S110**	24.0	42.0	44.0	102.0	100	2.0	11	1
11.0	4	●	**DWAE1100X04S110**	46.0	73.0	75.0	116.0	114	2.0	11	1
11.1	2	●	**DWAE1110X02S120**	24.2	45.0	47.0	102.0	100	2.0	12	1
11.1	4	●	**DWAE1110X04S120**	46.4	77.0	79.0	123.0	121	2.0	12	1
11.2	2	●	**DWAE1120X02S120**	24.4	45.0	47.0	102.0	100	2.0	12	1
11.2	4	●	**DWAE1120X04S120**	46.8	77.0	79.0	123.0	121	2.0	12	1
11.3	2	●	**DWAE1130X02S120**	24.7	45.1	47.1	102.1	100	2.1	12	1
11.3	4	●	**DWAE1130X04S120**	47.3	77.1	79.1	123.1	121	2.1	12	1
11.4	2	●	**DWAE1140X02S120**	24.9	45.1	47.1	102.1	100	2.1	12	1
11.4	4	●	**DWAE1140X04S120**	47.7	77.1	79.1	123.1	121	2.1	12	1
11.5	2	●	**DWAE1150X02S120**	25.1	45.1	47.1	102.1	100	2.1	12	1
11.5	4	●	**DWAE1150X04S120**	48.1	77.1	79.1	123.1	121	2.1	12	1
11.6	2	●	**DWAE1160X02S120**	25.3	47.1	49.1	102.1	100	2.1	12	1
11.6	4	●	**DWAE1160X04S120**	48.5	79.1	81.1	123.1	121	2.1	12	1
11.7	2	●	**DWAE1170X02S120**	25.5	47.1	49.1	102.1	100	2.1	12	1
11.7	4	●	**DWAE1170X04S120**	48.9	79.1	81.1	123.1	121	2.1	12	1
11.8	2	●	**DWAE1180X02S120**	25.7	47.1	49.1	102.1	100	2.1	12	1
11.8	4	●	**DWAE1180X04S120**	49.3	79.1	81.1	123.1	121	2.1	12	1
11.9	2	●	**DWAE1190X02S120**	26.0	47.2	49.2	102.2	100	2.2	12	1
11.9	4	●	**DWAE1190X04S120**	49.8	79.2	81.2	123.2	121	2.2	12	1
12.0	2	●	**DWAE1200X02S120**	26.2	47.2	49.2	102.2	100	2.2	12	1
12.0	4	●	**DWAE1200X04S120**	50.2	79.2	81.2	123.2	121	2.2	12	1
12.1	2	●	**DWAE1210X02S130**	26.4	49.2	51.2	102.2	100	2.2	13	1
12.1	4	●	**DWAE1210X04S130**	50.6	82.2	84.2	139.2	137	2.2	13	1
12.2	2	●	**DWAE1220X02S130**	26.6	49.2	51.2	102.2	100	2.2	13	1
12.2	4	●	**DWAE1220X04S130**	51.0	82.2	84.2	139.2	137	2.2	13	1
12.3	2	●	**DWAE1230X02S130**	26.8	49.2	51.2	102.2	100	2.2	13	1
12.3	4	●	**DWAE1230X04S130**	51.4	82.2	84.2	139.2	137	2.2	13	1
12.4	2	●	**DWAE1240X02S130**	27.1	49.3	51.3	102.3	100	2.3	13	1
12.4	4	●	**DWAE1240X04S130**	51.9	82.3	84.3	139.3	137	2.3	13	1
12.5	2	●	**DWAE1250X02S130**	27.3	49.3	51.3	102.3	100	2.3	13	1
12.5	4	●	**DWAE1250X04S130**	52.3	82.3	84.3	139.3	137	2.3	13	1
12.6	2	●	**DWAE1260X02S130**	27.5	52.3	54.3	102.3	100	2.3	13	1
12.6	4	●	**DWAE1260X04S130**	52.7	84.3	86.3	139.3	137	2.3	13	1
12.7	2	●	**DWAE1270X02S130**	27.7	52.3	54.3	102.3	100	2.3	13	1
12.7	4	●	**DWAE1270X04S130**	53.1	84.3	86.3	139.3	137	2.3	13	1
12.8	2	●	**DWAE1280X02S130**	27.9	52.3	54.3	102.3	100	2.3	13	1
12.8	4	●	**DWAE1280X04S130**	53.5	84.3	86.3	139.3	137	2.3	13	1
12.9	2	●	**DWAE1290X02S130**	28.1	52.3	54.3	102.3	100	2.3	13	1
12.9	4	●	**DWAE1290X04S130**	53.9	84.3	86.3	139.3	137	2.3	13	1

CUTTING CONDITIONS ➤ M031
TECHNICAL DATA ➤ P001

DWAE

DC (mm)	Hole Depth (L/D)	DP102A	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
13.0	2	●	**DWAE1300X02S130**	28.4	52.4	54.4	102.4	100	2.4	13	1
13.0	4	●	**DWAE1300X04S130**	54.4	84.4	86.4	139.4	137	2.4	13	1
13.1	2	●	**DWAE1310X02S140**	28.6	55.4	57.4	102.4	100	2.4	14	1
13.1	4	●	**DWAE1310X04S140**	54.8	92.4	94.4	149.4	147	2.4	14	1
13.2	2	●	**DWAE1320X02S140**	28.8	55.4	57.4	102.4	100	2.4	14	1
13.2	4	●	**DWAE1320X04S140**	55.2	92.4	94.4	149.4	147	2.4	14	1
13.3	2	●	**DWAE1330X02S140**	29.0	55.4	57.4	102.4	100	2.4	14	1
13.3	4	●	**DWAE1330X04S140**	55.6	92.4	94.4	149.4	147	2.4	14	1
13.4	2	●	**DWAE1340X02S140**	29.2	55.4	57.4	102.4	100	2.4	14	1
13.4	4	●	**DWAE1340X04S140**	56.0	92.4	94.4	149.4	147	2.4	14	1
13.5	2	●	**DWAE1350X02S140**	29.5	55.5	57.5	102.5	100	2.5	14	1
13.5	4	●	**DWAE1350X04S140**	56.5	92.5	94.5	149.5	147	2.5	14	1
13.6	2	●	**DWAE1360X02S140**	29.7	57.5	59.5	102.5	100	2.5	14	1
13.6	4	●	**DWAE1360X04S140**	56.9	97.5	99.5	149.5	147	2.5	14	1
13.7	2	●	**DWAE1370X02S140**	29.9	57.5	59.5	102.5	100	2.5	14	1
13.7	4	●	**DWAE1370X04S140**	57.3	97.5	99.5	149.5	147	2.5	14	1
13.8	2	●	**DWAE1380X02S140**	30.1	57.5	59.5	102.5	100	2.5	14	1
13.8	4	●	**DWAE1380X04S140**	57.7	97.5	99.5	149.5	147	2.5	14	1
13.9	2	●	**DWAE1390X02S140**	30.3	57.5	59.5	102.5	100	2.5	14	1
13.9	4	●	**DWAE1390X04S140**	58.1	97.5	99.5	149.5	147	2.5	14	1
14.0	2	●	**DWAE1400X02S140**	30.5	57.5	59.5	102.5	100	2.5	14	1
14.0	4	●	**DWAE1400X04S140**	58.5	97.5	99.5	149.5	147	2.5	14	1

● : Inventory maintained.

RECOMMENDED CUTTING CONDITIONS

Material	P							
	Mild Steels (≤180HB) EU S275JR, Ck10 etc				Carbon Steels, Alloy Steels (180−250HB) C45, 42CrMo4 etc			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Table Feed (mm/min)
1.0	30	9500	0.03 (0.02–0.04)	285	30	9500	0.03 (0.02–0.04)	285
1.5	30	6300	0.05 (0.03–0.06)	315	30	6300	0.05 (0.03–0.06)	315
2.0	55	8700	0.06 (0.04–0.08)	520	55	8700	0.06 (0.04–0.08)	520
2.5	55	7000	0.08 (0.05–0.10)	560	55	7000	0.08 (0.05–0.10)	560
3.0	65	6800	0.09 (0.07–0.11)	610	60	6300	0.09 (0.07–0.11)	565
4.0	70	5500	0.12 (0.09–0.14)	660	65	5100	0.12 (0.09–0.14)	610
5.0	70	4400	0.15 (0.11–0.18)	660	65	4100	0.15 (0.11–0.18)	615
6.0	80	4200	0.18 (0.14–0.21)	755	75	3900	0.18 (0.14–0.21)	700
7.0	80	3600	0.21 (0.16–0.25)	755	75	3400	0.21 (0.16–0.25)	715
8.0	85	3300	0.23 (0.18–0.28)	760	80	3100	0.23 (0.18–0.28)	715
10.0	90	2800	0.27 (0.21–0.32)	755	85	2700	0.27 (0.21–0.32)	730
12.0	95	2500	0.28 (0.22–0.34)	700	90	2300	0.28 (0.22–0.34)	645
14.0	95	2100	0.29 (0.23–0.35)	610	90	2000	0.29 (0.23–0.35)	580

Material	P				M			
	Carbon Steels, Alloy Steels (280−350HB) 40CrNiMo etc				Austenitic Stainless Steel (≤200HB) Ferritic and Martensitic Stainless Steels (>200HB) X12CrS13, X30Cr13 etc			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.−Max.) (mm/rev)	Table Feed (mm/min)
1.0	25	7900	0.02 (0.01–0.03)	160	30	9500	0.02 (0.01–0.03)	190
1.5	25	5300	0.04 (0.02–0.05)	210	30	6300	0.04 (0.02–0.05)	250
2.0	50	7900	0.05 (0.03–0.07)	395	35	5500	0.04 (0.02–0.06)	220
2.5	50	6300	0.07 (0.04–0.09)	440	35	4400	0.06 (0.03–0.08)	265
3.0	55	5800	0.08 (0.06–0.09)	465	40	4200	0.07 (0.04–0.10)	295
4.0	60	4700	0.11 (0.08–0.13)	515	40	3100	0.08 (0.05–0.10)	250
5.0	60	3800	0.13 (0.10–0.16)	495	40	2500	0.10 (0.05–0.15)	250
6.0	70	3700	0.16 (0.12–0.19)	590	40	2100	0.11 (0.06–0.15)	230
7.0	70	3100	0.18 (0.14–0.22)	560	40	1800	0.12 (0.06–0.18)	215
8.0	75	2900	0.21 (0.16–0.25)	610	40	1500	0.13 (0.06–0.20)	195
10.0	80	2500	0.24 (0.20–0.28)	600	40	1200	0.14 (0.08–0.20)	170
12.0	85	2200	0.25 (0.20–0.30)	550	40	1000	0.18 (0.10–0.25)	180
14.0	85	1900	0.25 (0.20–0.30)	475	40	900	0.18 (0.10–0.25)	160

Note 1) The above cutting conditions are when water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.
Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.
Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC
Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 5) Machining depths exceeding flute length (LU) are not recommended.
Note 6) Clamp the drill so that the drill runout is within 0.03 mm.
Note 7) Do not clamp the flute part of the drill.

TECHNICAL DATA ➤ P001

RECOMMENDED CUTTING CONDITIONS

Material	K							
	Gray Cast Iron (≤350MPa) GG30 etc				Ductile Cast Iron (≤450MPa) EN-GJS-450-10 etc			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
1.0	30	9500	0.03 (0.02—0.04)	285	25	7900	0.02 (0.01—0.03)	160
1.5	30	6300	0.05 (0.03—0.06)	315	25	5300	0.04 (0.02—0.05)	210
2.0	55	8700	0.06 (0.04—0.08)	520	50	7900	0.05 (0.03—0.07)	395
2.5	55	7000	0.08 (0.05—0.10)	560	50	6300	0.07 (0.04—0.09)	440
3.0	65	6800	0.09 (0.07—0.11)	610	55	5800	0.09 (0.05—0.12)	520
4.0	70	5500	0.12 (0.09—0.14)	660	60	4700	0.12 (0.07—0.17)	565
5.0	70	4400	0.15 (0.11—0.18)	660	60	3800	0.14 (0.08—0.20)	530
6.0	80	4200	0.18 (0.14—0.21)	755	70	3700	0.15 (0.10—0.20)	555
7.0	80	3600	0.21 (0.16—0.25)	755	70	3100	0.18 (0.12—0.23)	560
8.0	85	3300	0.23 (0.18—0.28)	760	75	2900	0.20 (0.15—0.25)	580
10.0	90	2800	0.27 (0.21—0.32)	755	80	2500	0.23 (0.18—0.28)	575
12.0	95	2500	0.28 (0.22—0.34)	700	85	2200	0.25 (0.20—0.30)	550
14.0	95	2100	0.29 (0.23—0.35)	610	85	1900	0.25 (0.20—0.30)	475

Note 1) The above cutting conditions are when water soluble coolant is used. For stainless steels, water-insoluble coolant is recommended.
Note 2) When using a water-insoluble coolant, reduce the cutting speed by 20% to ensure adequate lubrication.
Note 3) Check the condition of chips and perform step machining if necessary. * Reference of step length: 0.2 to 1.0 DC
Note 4) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 5) Machining depths exceeding flute length (LU) are not recommended.
Note 6) Clamp the drill so that the drill runout is within 0.03 mm.
Note 7) Do not clamp the flute part of the drill.

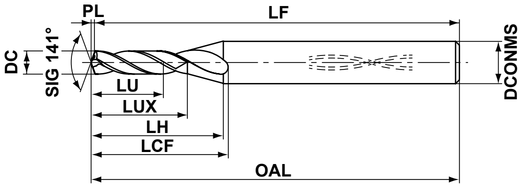
DVAS Pilot Drills Mini Size

TRISTAR Drills

NEW

P M K N S H

Internal Coolant



Type1

DC<3	0.006 −0.004
DCONMS=4	0 −0.008

DC (mm)	Hole Depth (L/D)	DP1120	Order Number	Dimensions (mm)								Type
				LU	LUX	LCF	LH	OAL	LF	PL	DCONMS	
1.0	2	●	**DVAS0100X02S040**	2.2	3.2	8.6	8.8	50.0	49.8	0.2	4	1
1.1	2	●	**DVAS0110X02S040**	2.4	3.5	9.0	8.9	50.0	49.8	0.2	4	1
1.2	2	●	**DVAS0120X02S040**	2.6	3.9	9.4	9.0	50.0	49.8	0.2	4	1
1.3	2	●	**DVAS0130X02S040**	2.8	4.2	9.9	9.2	50.0	49.8	0.2	4	1
1.4	2	●	**DVAS0140X02S040**	3.0	4.5	10.3	9.3	50.0	49.8	0.2	4	1
1.5	2	●	**DVAS0150X02S040**	3.3	4.8	10.7	9.4	50.0	49.7	0.3	4	1
1.6	2	●	**DVAS0160X02S040**	3.5	5.1	11.1	9.6	50.0	49.7	0.3	4	1
1.7	2	●	**DVAS0170X02S040**	3.7	5.5	11.6	9.7	50.0	49.7	0.3	4	1
1.8	2	●	**DVAS0180X02S040**	3.9	5.8	12.0	9.8	50.0	49.7	0.3	4	1
1.9	2	●	**DVAS0190X02S040**	4.1	6.1	12.4	10.0	50.0	49.7	0.3	4	1
2.0	2	●	**DVAS0200X02S040**	4.4	6.4	12.9	10.1	50.0	49.6	0.4	4	1
2.1	2	●	**DVAS0210X02S040**	4.6	6.7	13.3	10.2	50.0	49.6	0.4	4	1
2.2	2	●	**DVAS0220X02S040**	4.8	7.0	13.7	10.3	50.0	49.6	0.4	4	1
2.3	2	●	**DVAS0230X02S040**	5.0	7.4	14.1	10.5	55.0	54.6	0.4	4	1
2.4	2	●	**DVAS0240X02S040**	5.2	7.7	14.6	10.6	55.0	54.6	0.4	4	1
2.5	2	●	**DVAS0250X02S040**	5.5	8.0	15.0	10.7	55.0	54.6	0.4	4	1
2.6	2	●	**DVAS0260X02S040**	5.7	8.3	15.4	10.9	55.0	54.5	0.5	4	1
2.7	2	●	**DVAS0270X02S040**	5.9	8.6	15.8	11.0	55.0	54.5	0.5	4	1
2.8	2	●	**DVAS0280X02S040**	6.1	8.9	16.3	11.1	55.0	54.5	0.5	4	1
2.9	2	●	**DVAS0290X02S040**	6.3	9.3	16.7	11.3	55.0	54.5	0.5	4	1

● : Inventory maintained.

CUTTING CONDITIONS ➤ M037
OPERATION GUIDANCE ➤ M038
TECHNICAL DATA ➤ P001

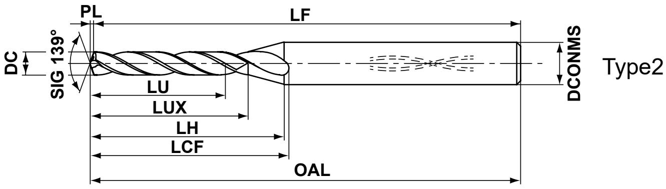
DVAS Mini Size NEW

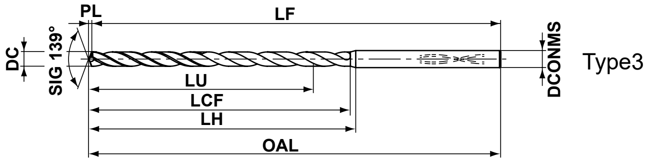
TRISTAR Drills

P **M** **K** **N** **S** H

Internal Coolant

DC<3
0 −0.010
DCONMS=4
0 −0.008





DC (mm)	Hole Depth (L/D)	DP1120	Order Number	Dimensions (mm)								Type
				LU	LUX	LCF	LH	OAL	LF	PL	DCONMS	
1.0	7	●	**DVAS0100X07S040**	7.2	8.2	13.6	13.8	55.0	54.8	0.2	4	2
1.0	12	●	**DVAS0100X12S040**	12.2	13.2	18.6	18.8	58.0	57.8	0.2	4	2
1.0	20	●	**DVAS0100X20S040**	20.2	–	23.2	28.8	67.0	66.8	0.2	4	3
1.0	25	●	**DVAS0100X25S040**	25.2	–	28.2	33.8	73.0	72.8	0.2	4	3
1.0	30	●	**DVAS0100X30S040**	30.2	–	33.2	38.8	79.0	78.8	0.2	4	3
1.0	40	●	**DVAS0100X40S040**	40.2	–	43.2	48.8	90.0	89.8	0.2	4	3
1.0	50	●	**DVAS0100X50S040**	50.2	–	53.2	58.8	102.0	101.8	0.2	4	3
1.1	7	●	**DVAS0110X07S040**	7.9	9.1	14.5	14.4	55.0	54.8	0.2	4	2
1.1	12	●	**DVAS0110X12S040**	13.4	14.6	20.0	19.9	58.0	57.8	0.2	4	2
1.1	20	●	**DVAS0110X20S040**	22.2	–	25.5	30.9	67.0	66.8	0.2	4	3
1.1	25	●	**DVAS0110X25S040**	27.7	–	31.0	36.4	73.0	72.8	0.2	4	3
1.1	30	●	**DVAS0110X30S040**	33.2	–	36.5	41.9	79.0	78.8	0.2	4	3
1.1	40	●	**DVAS0110X40S040**	44.2	–	47.5	52.9	90.0	89.8	0.2	4	3
1.2	7	●	**DVAS0120X07S040**	8.6	9.9	15.4	15.0	55.0	54.8	0.2	4	2
1.2	12	●	**DVAS0120X12S040**	14.6	15.9	21.4	21.0	60.0	59.8	0.2	4	2
1.2	20	●	**DVAS0120X20S040**	24.2	–	27.8	33.0	71.0	70.8	0.2	4	3
1.2	25	●	**DVAS0120X25S040**	30.2	–	33.8	39.0	77.0	76.8	0.2	4	3
1.2	30	●	**DVAS0120X30S040**	36.2	–	39.8	45.0	84.0	83.8	0.2	4	3
1.2	40	●	**DVAS0120X40S040**	48.2	–	51.8	57.0	97.0	96.8	0.2	4	3
1.3	7	●	**DVAS0130X07S040**	9.3	10.7	16.4	15.7	55.0	54.8	0.2	4	2
1.3	12	●	**DVAS0130X12S040**	15.8	17.2	22.9	22.2	60.0	59.8	0.2	4	2
1.3	20	●	**DVAS0130X20S040**	26.2	–	30.1	35.2	71.0	70.8	0.2	4	3
1.3	25	●	**DVAS0130X25S040**	32.7	–	36.6	41.7	77.0	76.8	0.2	4	3
1.3	30	●	**DVAS0130X30S040**	39.2	–	43.1	48.2	84.0	83.8	0.2	4	3
1.3	40	●	**DVAS0130X40S040**	52.2	–	56.1	61.2	97.0	96.8	0.2	4	3
1.4	7	●	**DVAS0140X07S040**	10.1	11.5	17.3	16.3	55.0	54.7	0.3	4	2
1.4	12	●	**DVAS0140X12S040**	17.1	18.5	24.3	23.3	63.0	62.7	0.3	4	2
1.4	20	●	**DVAS0140X20S040**	28.3	–	32.5	37.3	75.0	74.7	0.3	4	3
1.4	25	●	**DVAS0140X25S040**	35.3	–	39.5	44.3	82.0	81.7	0.3	4	3
1.4	30	●	**DVAS0140X30S040**	42.3	–	46.5	51.3	90.0	89.7	0.3	4	3
1.4	40	●	**DVAS0140X40S040**	56.3	–	60.5	65.3	105.0	104.7	0.3	4	3
1.5	7	●	**DVAS0150X07S040**	10.8	12.3	18.2	16.9	55.0	54.7	0.3	4	2
1.5	12	●	**DVAS0150X12S040**	18.3	19.8	25.7	24.4	63.0	62.7	0.3	4	2
1.5	20	●	**DVAS0150X20S040**	30.3	–	34.8	39.4	75.0	74.7	0.3	4	3
1.5	25	●	**DVAS0150X25S040**	37.8	–	42.3	46.9	82.0	81.7	0.3	4	3
1.5	30	●	**DVAS0150X30S040**	45.3	–	49.8	54.4	90.0	89.7	0.3	4	3

● : Inventory maintained.

DC (mm)	Hole Depth (L/D)	DP1120	Order Number	Dimensions (mm)								Type
				LU	LUX	LCF	LH	OAL	LF	PL	DCONMS	
1.5	40	●	**DVAS0150X40S040**	60.3	–	64.8	69.4	105.0	104.7	0.3	4	3
1.5	50	●	**DVAS0150X50S040**	75.3	–	79.8	84.4	120.0	119.7	0.3	4	3
1.6	7	●	**DVAS0160X07S040**	11.5	13.1	19.2	17.6	57.0	56.7	0.3	4	2
1.6	12	●	**DVAS0160X12S040**	19.5	21.1	27.2	25.6	66.0	65.7	0.3	4	2
1.6	20	●	**DVAS0160X20S040**	32.3	–	37.1	41.6	79.0	78.7	0.3	4	3
1.6	25	●	**DVAS0160X25S040**	40.3	–	45.1	49.6	88.0	87.7	0.3	4	3
1.6	30	●	**DVAS0160X30S040**	48.3	–	53.1	57.6	99.0	98.7	0.3	4	3
1.6	40	●	**DVAS0160X40S040**	64.3	–	69.1	73.6	113.0	112.7	0.3	4	3
1.7	7	●	**DVAS0170X07S040**	12.2	14.0	20.1	18.2	57.0	56.7	0.3	4	2
1.7	12	●	**DVAS0170X12S040**	20.7	22.5	28.6	26.7	66.0	65.7	0.3	4	2
1.7	20	●	**DVAS0170X20S040**	34.3	–	39.4	43.7	79.0	78.7	0.3	4	3
1.7	25	●	**DVAS0170X25S040**	42.8	–	47.9	52.2	88.0	87.7	0.3	4	3
1.7	30	●	**DVAS0170X30S040**	51.3	–	56.4	60.7	99.0	98.7	0.3	4	3
1.7	40	●	**DVAS0170X40S040**	68.3	–	73.4	77.7	113.0	112.7	0.3	4	3
1.8	7	●	**DVAS0180X07S040**	12.9	14.8	21.0	18.8	59.0	58.7	0.3	4	2
1.8	12	●	**DVAS0180X12S040**	21.9	23.8	30.0	27.8	69.0	68.7	0.3	4	2
1.8	20	●	**DVAS0180X20S040**	36.3	–	41.7	45.8	84.0	83.7	0.3	4	3
1.8	25	●	**DVAS0180X25S040**	45.3	–	50.7	54.8	94.0	93.7	0.3	4	3
1.8	30	●	**DVAS0180X30S040**	54.3	–	59.7	63.8	104.0	103.7	0.3	4	3
1.8	40	●	**DVAS0180X40S040**	72.3	–	77.7	81.8	123.0	122.7	0.3	4	3
1.9	7	●	**DVAS0190X07S040**	13.7	15.6	21.9	19.5	59.0	58.6	0.4	4	2
1.9	12	●	**DVAS0190X12S040**	23.2	25.1	31.4	29.0	69.0	68.6	0.4	4	2
1.9	20	●	**DVAS0190X20S040**	38.4	–	44.1	48.0	84.0	83.6	0.4	4	3
1.9	25	●	**DVAS0190X25S040**	47.9	–	53.6	57.5	94.0	93.6	0.4	4	3
1.9	30	●	**DVAS0190X30S040**	57.4	–	63.1	67.0	104.0	103.6	0.4	4	3
1.9	40	●	**DVAS0190X40S040**	76.4	–	82.1	86.0	123.0	122.6	0.4	4	3
2.0	7	●	**DVAS0200X07S040**	14.4	16.4	22.9	20.1	62.0	61.6	0.4	4	2
2.0	12	●	**DVAS0200X12S040**	24.4	26.4	32.9	30.1	73.0	72.6	0.4	4	2
2.0	20	●	**DVAS0200X20S040**	40.4	–	46.4	50.1	91.0	90.6	0.4	4	3
2.0	25	●	**DVAS0200X25S040**	50.4	–	56.4	60.1	102.0	101.6	0.4	4	3
2.0	30	●	**DVAS0200X30S040**	60.4	–	66.4	70.1	113.0	112.6	0.4	4	3
2.0	40	●	**DVAS0200X40S040**	80.4	–	86.4	90.1	136.0	135.6	0.4	4	3
2.0	50	●	**DVAS0200X50S040**	100.4	–	106.4	110.1	158.0	157.6	0.4	4	3
2.1	7	●	**DVAS0210X07S040**	15.1	17.2	23.8	20.7	62.0	61.6	0.4	4	2
2.1	12	●	**DVAS0210X12S040**	25.6	27.7	34.3	31.2	73.0	72.6	0.4	4	2
2.1	20	●	**DVAS0210X20S040**	42.4	–	48.7	52.2	91.0	90.6	0.4	4	3
2.1	25	●	**DVAS0210X25S040**	52.9	–	59.2	62.7	102.0	101.6	0.4	4	3
2.1	30	●	**DVAS0210X30S040**	63.4	–	69.7	73.2	113.0	112.6	0.4	4	3
2.1	40	●	**DVAS0210X40S040**	84.4	–	90.7	94.2	136.0	135.6	0.4	4	3
2.2	7	●	**DVAS0220X07S040**	15.8	18.1	24.7	21.4	62.0	61.6	0.4	4	2
2.2	12	●	**DVAS0220X12S040**	26.8	29.1	35.7	32.4	73.0	72.6	0.4	4	2
2.2	20	●	**DVAS0220X20S040**	44.4	–	51.0	54.4	91.0	90.6	0.4	4	3
2.2	25	●	**DVAS0220X25S040**	55.4	–	62.0	65.4	102.0	101.6	0.4	4	3
2.2	30	●	**DVAS0220X30S040**	66.4	–	73.0	76.4	113.0	112.6	0.4	4	3
2.2	40	●	**DVAS0220X40S040**	88.4	–	95.0	98.4	136.0	135.6	0.4	4	3
2.3	7	●	**DVAS0230X07S040**	16.5	18.9	25.7	22.0	65.0	64.6	0.4	4	2
2.3	12	●	**DVAS0230X12S040**	28.0	30.4	37.2	33.5	78.0	77.6	0.4	4	2
2.3	20	●	**DVAS0230X20S040**	46.4	–	53.3	56.5	98.0	97.6	0.4	4	3

CUTTING CONDITIONS ➢ M037
OPERATION GUIDANCE ➢ M038
TECHNICAL DATA ➢ P001

DVAS Mini Size NEW

TRISTAR Drills

DC (mm)	Hole Depth (L/D)	DP1120	Order Number	Dimensions (mm)								Type
				LU	LUX	LCF	LH	OAL	LF	PL	DCONMS	
2.3	25	●	**DVAS0230X25S040**	57.9	–	64.8	68.0	111.0	110.6	0.4	4	3
2.3	30	●	**DVAS0230X30S040**	69.4	–	76.3	79.5	124.0	123.6	0.4	4	3
2.3	40	●	**DVAS0230X40S040**	92.4	–	99.3	102.5	150.0	149.6	0.4	4	3
2.4	7	●	**DVAS0240X07S040**	17.2	19.7	26.6	22.6	65.0	64.6	0.4	4	2
2.4	12	●	**DVAS0240X12S040**	29.2	31.7	38.6	34.6	78.0	77.6	0.4	4	2
2.4	20	●	**DVAS0240X20S040**	48.4	–	55.6	58.6	98.0	97.6	0.4	4	3
2.4	25	●	**DVAS0240X25S040**	60.4	–	67.6	70.6	111.0	110.6	0.4	4	3
2.4	30	●	**DVAS0240X30S040**	72.4	–	79.6	82.6	124.0	123.6	0.4	4	3
2.4	40	●	**DVAS0240X40S040**	96.4	–	103.6	106.6	150.0	149.6	0.4	4	3
2.5	7	●	**DVAS0250X07S040**	18.0	20.5	27.5	23.3	65.0	64.5	0.5	4	2
2.5	12	●	**DVAS0250X12S040**	30.5	33.0	40.0	35.8	78.0	77.5	0.5	4	2
2.5	20	●	**DVAS0250X20S040**	50.5	–	58.0	60.8	98.0	97.5	0.5	4	3
2.5	25	●	**DVAS0250X25S040**	63.0	–	70.5	73.3	111.0	110.5	0.5	4	3
2.5	30	●	**DVAS0250X30S040**	75.5	–	83.0	85.8	124.0	123.5	0.5	4	3
2.5	40	●	**DVAS0250X40S040**	100.5	–	108.0	110.8	150.0	149.5	0.5	4	3
2.5	50	●	**DVAS0250X50S040**	125.5	–	133.0	135.8	176.0	175.5	0.5	4	3
2.6	7	●	**DVAS0260X07S040**	18.7	21.3	28.4	23.9	65.0	64.5	0.5	4	2
2.6	12	●	**DVAS0260X12S040**	31.7	34.3	41.4	36.9	78.0	77.5	0.5	4	2
2.6	20	●	**DVAS0260X20S040**	52.5	–	60.3	62.9	98.0	97.5	0.5	4	3
2.6	25	●	**DVAS0260X25S040**	65.5	–	73.3	75.9	111.0	110.5	0.5	4	3
2.6	30	●	**DVAS0260X30S040**	78.5	–	86.3	88.9	124.0	123.5	0.5	4	3
2.6	40	●	**DVAS0260X40S040**	104.5	–	112.3	114.9	150.0	149.5	0.5	4	3
2.7	7	●	**DVAS0270X07S040**	19.4	22.2	29.4	24.5	68.0	67.5	0.5	4	2
2.7	12	●	**DVAS0270X12S040**	32.9	35.7	42.9	38.0	83.0	82.5	0.5	4	2
2.7	20	●	**DVAS0270X20S040**	54.5	–	62.6	65.0	107.0	106.5	0.5	4	3
2.7	25	●	**DVAS0270X25S040**	68.0	–	76.1	78.5	122.0	121.5	0.5	4	3
2.7	30	●	**DVAS0270X30S040**	81.5	–	89.6	92.0	137.0	136.5	0.5	4	3
2.7	40	●	**DVAS0270X40S040**	108.5	–	116.6	119.0	167.0	166.5	0.5	4	3
2.8	7	●	**DVAS0280X07S040**	20.1	23.0	30.3	25.2	68.0	67.5	0.5	4	2
2.8	12	●	**DVAS0280X12S040**	34.1	37.0	44.3	39.2	83.0	82.5	0.5	4	2
2.8	20	●	**DVAS0280X20S040**	56.5	–	64.9	67.2	107.0	106.5	0.5	4	3
2.8	25	●	**DVAS0280X25S040**	70.5	–	78.9	81.2	122.0	121.5	0.5	4	3
2.8	30	●	**DVAS0280X30S040**	84.5	–	92.9	95.2	137.0	136.5	0.5	4	3
2.8	40	●	**DVAS0280X40S040**	112.5	–	120.9	123.2	167.0	166.5	0.5	4	3
2.9	7	●	**DVAS0290X07S040**	20.8	23.8	31.2	25.8	68.0	67.5	0.5	4	2
2.9	12	●	**DVAS0290X12S040**	35.3	38.3	45.7	40.3	83.0	82.5	0.5	4	2
2.9	20	●	**DVAS0290X20S040**	58.5	–	67.2	69.3	107.0	106.5	0.5	4	3
2.9	25	●	**DVAS0290X25S040**	73.0	–	81.7	83.8	122.0	121.5	0.5	4	3
2.9	30	●	**DVAS0290X30S040**	87.5	–	96.2	98.3	137.0	136.5	0.5	4	3
2.9	40	●	**DVAS0290X40S040**	116.5	–	125.2	127.3	167.0	166.5	0.5	4	3

● : Inventory maintained.

RECOMMENDED CUTTING CONDITIONS

Material		P			M		
		Mild Steel Carbon Steel, Alloy Steel St44-2, C10, CK45, 41CrMo4 etc			Austenitic Stainless Steel, Ferritic Stainless Steel Ferritic and Martensitic Stainless Steel Precipitation Hardening Stainless Steel X12 Cr 13, X30 Cr 13J2, X5CrNi18-10, X5CrNiMo17-12-2, 17-4PH etc		
Drill Dia. **DC** (mm)	**L/D**	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)
1.0	**2–30**	65 (30—100)	20700	0.035 (0.020—0.050)	60 (20—100)	19100	0.025 (0.010—0.040)
1.0	**40, 50**	65 (30—100)	20700	0.030 (0.020—0.040)	60 (20—100)	19100	0.020 (0.010—0.030)
1.5	**2–30**	65 (30—100)	13800	0.053 (0.030—0.075)	60 (20—100)	12700	0.038 (0.015—0.060)
1.5	**40, 50**	65 (30—100)	13800	0.045 (0.030—0.060)	60 (20—100)	12700	0.030 (0.015—0.045)
2.0	**2–30**	70 (40—100)	11100	0.070 (0.040—0.100)	60 (20—100)	9500	0.050 (0.020—0.080)
2.0	**40, 50**	70 (40—100)	11100	0.060 (0.040—0.080)	60 (20—100)	9500	0.040 (0.020—0.060)
2.5	**2–30**	70 (40—100)	8900	0.088 (0.050—0.125)	60 (20—100)	7600	0.063 (0.025—0.100)
2.5	**40, 50**	70 (40—100)	8900	0.075 (0.050—0.100)	60 (20—100)	7600	0.050 (0.025—0.075)
2.9	**2–30**	70 (40—100)	7700	0.102 (0.058—0.145)	60 (20—100)	6600	0.073 (0.029—0.116)
2.9	**40, 50**	70 (40—100)	7700	0.087 (0.058—0.116)	60 (20—100)	6600	0.058 (0.029—0.087)

Material		K			N		
		Cast Iron Ductile Cast Iron GG-30, GGG-40 etc			Aluminium Alloys AlMg2(B), AlMg1SiCu, Al-Zn6MgCu		
Drill Dia. **DC** (mm)	**L/D**	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)
1.0	**2–30**	70 (40—100)	22300	0.035 (0.020—0.050)	140 (100—180)	31800	0.040 (0.020—0.060)
1.0	**40, 50**	70 (40—100)	22300	0.030 (0.020—0.040)	140 (100—180)	31800	0.035 (0.020—0.050)
1.5	**2–30**	70 (40—100)	14900	0.053 (0.030—0.075)	140 (100—180)	21200	0.060 (0.030—0.090)
1.5	**40, 50**	70 (40—100)	14900	0.045 (0.030—0.060)	140 (100—180)	21200	0.053 (0.030—0.075)
2.0	**2–30**	70 (40—100)	11100	0.070 (0.040—0.100)	140 (100—180)	15900	0.080 (0.040—0.120)
2.0	**40, 50**	70 (40—100)	11100	0.060 (0.040—0.080)	140 (100—180)	15900	0.070 (0.040—0.100)
2.5	**2–30**	70 (40—100)	8900	0.088 (0.050—0.125)	140 (100—180)	12700	0.100 (0.050—0.150)
2.5	**40, 50**	70 (40—100)	8900	0.075 (0.050—0.100)	140 (100—180)	12700	0.088 (0.050—0.125)
2.9	**2–30**	70 (40—100)	7700	0.102 (0.058—0.145)	140 (100—180)	11000	0.116 (0.058—0.174)
2.9	**40, 50**	70 (40—100)	7700	0.087 (0.058—0.116)	140 (100—180)	11000	0.102 (0.058—0.145)

Material		S					
		Heat Resistant Alloys Inconel®718 etc			Titanium Alloys Ti-6Al-4V etc		
Drill Dia. **DC** (mm)	**L/D**	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)
1.0	**2–30**	30 (10—50)	9500	0.015 (0.010—0.020)	30 (20—40)	9500	0.020 (0.010—0.030)
1.0	**40, 50**	30 (10—50)	9500	0.015 (0.010—0.020)	30 (20—40)	9500	0.020 (0.010—0.030)
1.5	**2–30**	30 (10—50)	6400	0.023 (0.015—0.030)	30 (20—40)	6400	0.030 (0.015—0.045)
1.5	**40, 50**	30 (10—50)	6400	0.023 (0.015—0.030)	30 (20—40)	6400	0.030 (0.015—0.045)
2.0	**2–30**	30 (10—50)	4800	0.030 (0.020—0.040)	30 (20—40)	4800	0.040 (0.020—0.060)
2.0	**40, 50**	30 (10—50)	4800	0.030 (0.020—0.040)	30 (20—40)	4800	0.040 (0.020—0.060)
2.5	**2–30**	30 (10—50)	3800	0.038 (0.025—0.050)	30 (20—40)	3800	0.050 (0.025—0.075)
2.5	**40, 50**	30 (10—50)	3800	0.038 (0.025—0.050)	30 (20—40)	3800	0.050 (0.025—0.075)
2.9	**2–30**	30 (10—50)	3300	0.044 (0.029—0.058)	30 (20—40)	3300	0.058 (0.029—0.087)
2.9	**40, 50**	30 (10—50)	3300	0.044 (0.029—0.058)	30 (20—40)	3300	0.058 (0.029—0.087)

Material		S		
		Cobalt Chrome Alloys T7402-2, ASTM F1537, F799 etc		
Drill Dia. **DC** (mm)	**L/D**	Cutting Speed (Min.—Max.) (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev.)
1.0	**2–30**	60 (30—90)	19100	0.020 (0.010—0.030)
1.0	**40, 50**	60 (30—90)	19100	0.020 (0.010—0.030)
1.5	**2–30**	60 (30—90)	12700	0.030 (0.015—0.045)
1.5	**40, 50**	60 (30—90)	12700	0.030 (0.015—0.045)
2.0	**2–30**	60 (30—90)	9500	0.040 (0.020—0.060)
2.0	**40, 50**	60 (30—90)	9500	0.040 (0.020—0.060)
2.5	**2–30**	60 (30—90)	7600	0.050 (0.025—0.075)
2.5	**40, 50**	60 (30—90)	7600	0.050 (0.025—0.075)
2.9	**2–30**	60 (30—90)	6600	0.058 (0.029—0.087)
2.9	**40, 50**	60 (30—90)	6600	0.058 (0.029—0.087)

Note 1) This recommended condition is only when using internal coolant.
Note 2) Check the condition of chips and perform step machining if necessary. * Reference step length: 0.2 to 1.0 DC
Note 3) Adjust the cutting conditions according to machine tool and workpiece clamp rigidity and machining geometry, etc.
Note 4) Machining depths exceeding flute length (LU) are not recommended.
Note 5) Ensure the drill runout is within 0.03mm.
Note 6) Do not clamp the flute part of the drill.

OPERATION GUIDANCE ➤ **M038**
TECHNICAL DATA ➤ **P001**

DVAS

Mini Size NEW

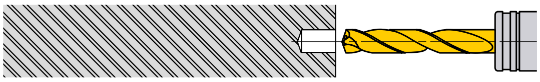
TRISTAR Drills

OPERATIONAL GUIDANCE

■ OPERATIONAL GUIDANCE FOR THE DVAS L/D=2–40

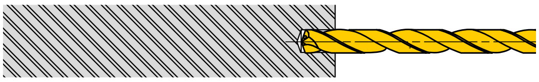
FLAT FACE DRILLING ●Drilling a blind hole

■ 1. Drilling a pilot hole



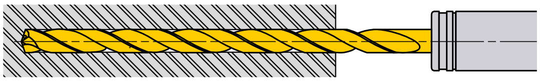
① Use a drill with a larger (flatter) point angle than the super long type.
Use the shortest flute possible.
A DVAS drill with L/D = 2 can be machined up to L/D = 3 when drilling pilot holes.
② Ensure a high precision hole is drilled for the guide.
③ Drill depth : Approx DCx3.
(Adjust the pilot hole depth according to the length of the long type drill.)

■ 2. Initial cutting with the long type drill



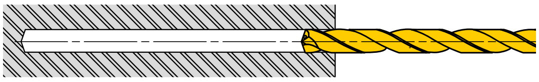
① Insert drill into pilot hole using at low revolutions speed.
(spindle speed 500 – 1000 min^{-1}, feed rate 1000 – 2000 mm/min)
② Stop the drill in the pilot hole 0.5 – 1 mm away from the bottom of the hole.

■ 3. Drill the deep hole



① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

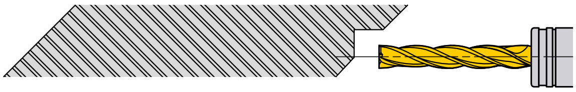
■ 4. Drill retraction



① After drilling, lower the cutting revolution about 0.5 – 1 mm away from the bottom of the hole. (revolutions around 500 – 1000 min^{-1})
② Next, pull out the drill at a feed rate of 1000 to 2000 mm/min.

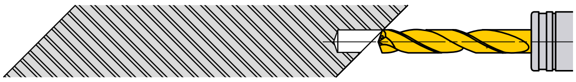
INTERRUPED DRILLING ●Drilling and breaking through on irregular faces or angles

■ 1. Spot facing



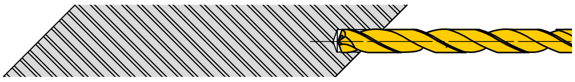
① Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a pilot hole



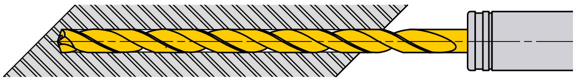
① Use a drill with a larger (flatter) point angle than the super long type.
Use the shortest flute possible.
② Ensure a high precision hole is drilled for the guide.
③ Drill depth : Approx DCx2.
(Adjust the pilot hole depth according to the length of the long type drill.)

■ 3. Initial cutting with the long type drill



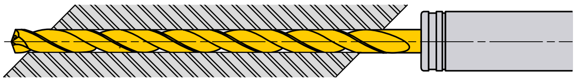
① Insert drill into pilot hole using at low revolutions speed.
(spindle speed 500 – 1000 min^{-1}, feed rate 1000 – 2000 mm/min)
② Stop the drill in the pilot hole 0.5 – 1 mm away from the bottom of the hole.

■ 4. Drill the deep hole



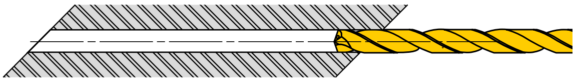
① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

■ 5. Breaking through



① When breaking through, the cutting edge can be damaged.
② Lower the feed rate when penetrating.

■ 6. Drill retraction

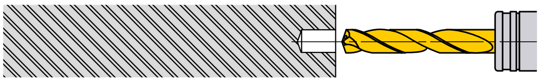


① After penetrating, change the spindle speed to 500 – 1000 min^{-1}.
② Next, pull out the drill at a feed rate of 1000 – 2000 mm/min.

■ OPERATIONAL GUIDANCE FOR THE DVAS L/D=50

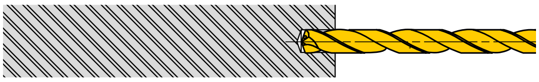
FLAT FACE DRILLING ●Drilling a blind hole

■ 1. Drilling a pilot hole



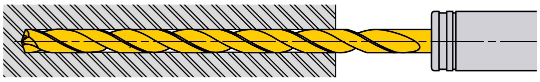
① Use a drill with a larger (flatter) point angle than the super long type.
Use a DVAS drill with L/D = 7.
② Ensure a high precision hole is drilled for the guide.
③ Drill depth : Approx DC×7.
(Adjust the pilot hole depth according to the length of the long type drill.)

■ 2. Initial cutting with the long type drill



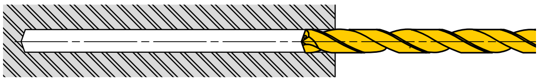
① Insert drill into pilot hole using at low revolutions speed.
(spindle speed 500 – 1000 min^{-1}, feed rate 1000 – 2000 mm/min)
② Stop the drill in the pilot hole 0.5 – 1 mm away from the bottom of the hole.

■ 3. Drill the deep hole



① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

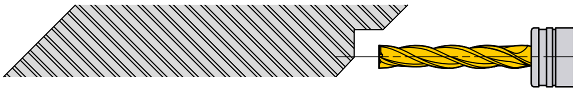
■ 4. Drill retraction



① After drilling, lower the cutting revolution about 0.5 – 1 mm away from the bottom of the hole. (revolutions around 500 – 1000 min^{-1})
② Next, pull out the drill at a feed rate of 1000 to 2000 mm/min.

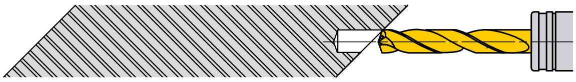
INTERRUPED DRILLING ●Drilling and breaking through on irregular faces or angles

■ 1. Spot facing



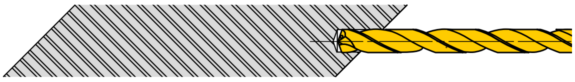
① Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a pilot hole



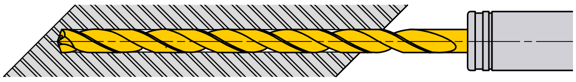
① Use a drill with a larger (flatter) point angle than the super long type.
Use a DVAS drill with L/D = 7.
② Ensure a high precision hole is drilled for the guide.
③ Drill depth : Approx DC×7.
(Adjust the pilot hole depth according to the length of the long type drill.)

■ 3. Initial cutting with the long type drill



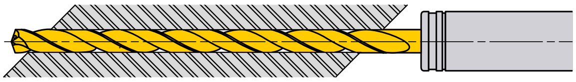
① Insert drill into pilot hole using at low revolutions speed.
(spindle speed 500 – 1000 min^{-1}, feed rate 1000 – 2000 mm/min)
② Stop the drill in the pilot hole 0.5 – 1 mm away from the bottom of the hole.

■ 4. Drill the deep hole



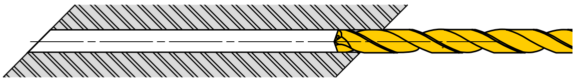
① Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

■ 5. Breaking through



① When breaking through, the cutting edge can be damaged.
② Lower the feed rate when penetrating.

■ 6. Drill retraction



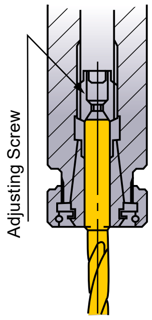
① After penetrating, change the spindle speed to 500 – 1000 min^{-1}.
② Next, pull out the drill at a feed rate of 1000 – 2000 mm/min.

DVAS Mini Size NEW

TRISTAR Drills

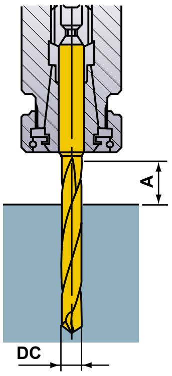
OPERATIONAL GUIDANCE

Drill Holding



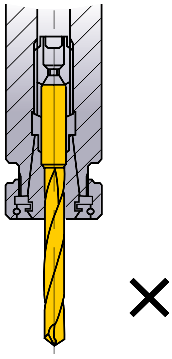
Thrust bearing type collet chuck holds the drill securely.

Drill Length



A ≥ DC x 2

Drill Installation



Do not clamp on the flutes.

Coolant Pressure

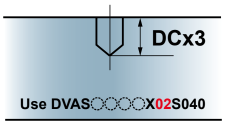
Adjust the coolant pressure according to the type and concentration of coolant.

Drill Dia. **DC**	Water-soluble	Water-insoluble
DC<2mm	≥ 3MPa	≥ 7MPa
DC<3mm	≥ 2MPa	≥ 5MPa

Pilot Drill

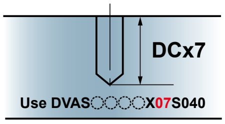
For deep hole drilling, refer to the figure below.

L/D≤40



*L/D = 2 can be machined up to DCx3 when drilling pilot holes.

L/D>40

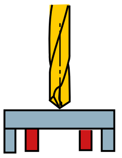


Coolant Handling

Small particles of swarf will jam in the oil hole of small diameter drills.
Always use a fine mesh filter as a preventive measure.

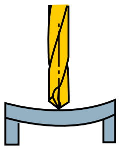
Drill Dia. **DC**	Fine Mesh Filter
DC<2mm	≤ 10μm
DC<3mm	≤ 20μm

Thin Workpiece



Support the Workpiece

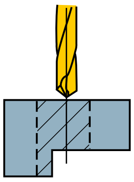
OK



If Bending Occurs

×

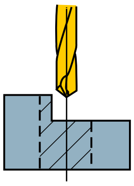
Interrupted Cutting



One Process

OK

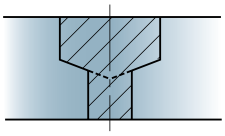
①Lower the feed when drilling the interrupted part.



Requires Prior Machining

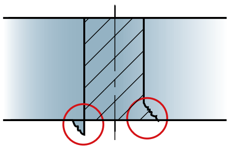
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
*A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Change the point angle.

Tips for drilling a deep hole exceeding L/D = 40

Workpiece rotation method: small lathes, automatic lathes, etc.

(1) Face countersink (DLE drill is recommended)

(2) Drill the pilot hole to a depth of approx. 3D (DVAS drill is recommended)

(3) Drill the deep hole using DVAS◌◌◌◌X50S040.

Tool rotation method: Machining centres, composite machines, etc.

(1) Drill the pilot hole to a depth of approx. 3D (DVAS drill is recommended)

(2) Drill the pilot hole deeper to a approx. 7D
If extra stability is required, drill a pilot hole deeper than 7D.

(3) Drill the deep hole using DVAS◌◌◌◌X50S040.

Memo

Memo

Memo

Memo

Memo

Memo

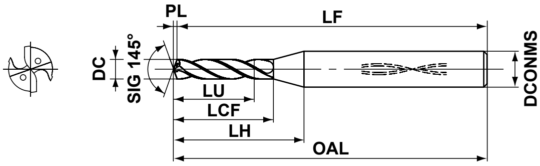
Memo

MINI-MVS

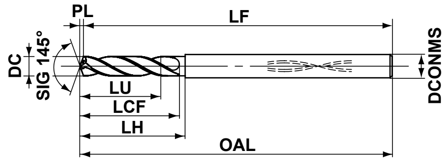
- Straight cutting edge that combines improvement in chips evacuation and cutting edge strength.
- Double margin achieves the optimum balance and precision for small diameter drills.

P | M | K | N | S | H

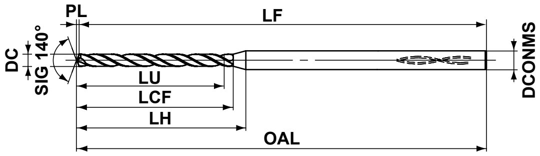
Internal Coolant



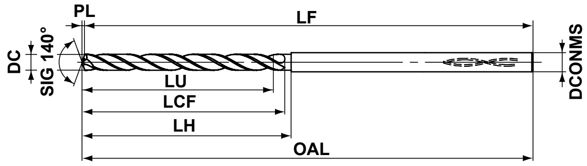
Type1



Type2



Type3



Type4

Order Number	1≤DC≤2.9
MVS-**X02**- (pilot drill)	+0.014 0
Others	0 −0.014

h6

Order Number	DCONMS
MVS	0 −0.006

DC (mm)	Hole Depth (L/D)	DP1020	Order Number	Dimensions (mm) LU	LCF	LH	OAL	LF	PL	DCONMS	Type
1.0	2*	●	**MVS0100X02S030**	2.2	5.2	8.9	55.2	55	0.2	3	1
	7	●	**MVS0100X07S030**	7.2	10.2	14.2	55.2	55	0.2	3	3
	12	●	**MVS0100X12S030**	12.2	15.2	19.2	55.2	55	0.2	3	3
	20	●	**MVS0100X20S030**	20.2	24.2	28.2	60.2	60	0.2	3	3
	25	●	**MVS0100X25S030**	25.2	28.2	32.2	66.2	66	0.2	3	3
	30	●	**MVS0100X30S030**	30.2	33.2	37.2	72.2	72	0.2	3	3
1.1	2*	●	**MVS0110X02S030**	2.4	5.6	9.1	55.2	55	0.2	3	1
	7	●	**MVS0110X07S030**	7.9	11.2	15.2	55.2	55	0.2	3	3
	12	●	**MVS0110X12S030**	13.4	17.2	21.2	55.2	55	0.2	3	3
	20	●	**MVS0110X20S030**	22.2	25.2	29.2	60.2	60	0.2	3	3
	25	●	**MVS0110X25S030**	27.7	31.2	34.2	66.2	66	0.2	3	3
	30	●	**MVS0110X30S030**	33.2	36.2	40.2	72.2	72	0.2	3	3
1.2	2*	●	**MVS0120X02S030**	2.6	6.2	9.6	55.2	55	0.2	3	1
	7	●	**MVS0120X07S030**	8.6	12.2	15.2	55.2	55	0.2	3	3
	12	●	**MVS0120X12S030**	14.6	18.2	21.2	55.2	55	0.2	3	3
	20	●	**MVS0120X20S030**	24.2	28.2	31.2	60.2	60	0.2	3	3
	25	●	**MVS0120X25S030**	30.2	34.2	37.2	66.2	66	0.2	3	3
	30	●	**MVS0120X30S030**	36.2	40.2	43.2	72.2	72	0.2	3	3
1.3	2*	●	**MVS0130X02S030**	2.8	6.6	9.8	55.2	55	0.2	3	1
	7	●	**MVS0130X07S030**	9.3	13.2	16.2	55.2	55	0.2	3	3
	12	●	**MVS0130X12S030**	15.8	20.2	23.2	55.2	55	0.2	3	3
	20	●	**MVS0130X20S030**	26.2	30.2	33.2	68.2	68	0.2	3	3
	25	●	**MVS0130X25S030**	32.7	36.2	40.2	74.2	74	0.2	3	3
	30	●	**MVS0130X30S030**	39.2	43.2	46.2	82.2	82	0.2	3	3
1.4	2*	●	**MVS0140X02S030**	3.0	7.2	10.2	55.2	55	0.2	3	1
	7	●	**MVS0140X07S030**	10.1	14.3	17.3	55.3	55	0.3	3	3
	12	●	**MVS0140X12S030**	17.1	21.3	24.3	55.3	55	0.3	3	3
	20	●	**MVS0140X20S030**	28.3	32.3	35.3	68.3	68	0.3	3	3
	25	●	**MVS0140X25S030**	35.3	39.3	42.3	74.3	74	0.3	3	3
	30	●	**MVS0140X30S030**	42.3	46.3	49.3	82.3	82	0.3	3	3
1.5	2*	●	**MVS0150X02S030**	3.2	7.6	10.4	55.2	55	0.2	3	1
	7	●	**MVS0150X07S030**	10.8	15.3	18.3	55.3	55	0.3	3	3
	12	●	**MVS0150X12S030**	18.3	23.3	26.3	55.3	55	0.3	3	3
	20	●	**MVS0150X20S030**	30.3	35.3	37.3	68.3	68	0.3	3	3
	25	●	**MVS0150X25S030**	37.8	42.3	45.3	74.3	74	0.3	3	3
	30	●	**MVS0150X30S030**	45.3	50.3	52.3	82.3	82	0.3	3	3
1.6	2*	●	**MVS0160X02S030**	3.5	8.3	10.9	68.3	68	0.3	3	1
	7	●	**MVS0160X07S030**	11.5	16.3	19.3	68.3	68	0.3	3	3
	12	●	**MVS0160X12S030**	19.5	24.3	27.3	68.3	68	0.3	3	3
	20	●	**MVS0160X20S030**	32.3	37.3	39.3	78.3	78	0.3	3	3
	25	●	**MVS0160X25S030**	40.3	45.3	47.3	86.3	86	0.3	3	3
	30	●	**MVS0160X30S030**	48.3	53.3	55.3	95.3	95	0.3	3	3
1.7	2*	●	**MVS0170X02S030**	3.7	8.7	11.1	68.3	68	0.3	3	1
	7	●	**MVS0170X07S030**	12.2	17.3	19.3	68.3	68	0.3	3	3
	12	●	**MVS0170X12S030**	20.7	26.3	28.3	68.3	68	0.3	3	3
	20	●	**MVS0170X20S030**	34.3	39.3	42.3	78.3	78	0.3	3	3
	25	●	**MVS0170X25S030**	42.8	48.3	50.3	86.3	86	0.3	3	3
	30	●	**MVS0170X30S030**	51.3	56.3	59.3	95.3	95	0.3	3	3

2* = Pilot hole drill. Tolerance is +0.014 and hole depth is DCx2.

● **: Inventory maintained.**

CUTTING CONDITIONS ➤ M051
OPERATION GUIDANCE ➤ M052
TECHNICAL DATA ➤ P001

DRILLING (SOLID CARBIDE)

MINI-MVS

DC (mm)	Hole Depth (L/D)	DP1020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
1.8	2*	●	**MVS0180X02S030**	3.9	9.3	11.5	68.3	68	0.3	3	1
	7	●	**MVS0180X07S030**	12.9	18.3	20.3	68.3	68	0.3	3	3
	12	●	**MVS0180X12S030**	21.9	27.3	29.3	68.3	68	0.3	3	3
	20	●	**MVS0180X20S030**	36.3	41.3	44.3	84.3	84	0.3	3	3
	25	●	**MVS0180X25S030**	45.3	50.3	53.3	94.3	94	0.3	3	3
	30	●	**MVS0180X30S030**	54.3	59.3	62.3	102.3	102	0.3	3	3
1.9	2*	●	**MVS0190X02S030**	4.1	9.7	11.8	68.3	68	0.3	3	1
	7	●	**MVS0190X07S030**	13.6	19.3	21.3	68.3	68	0.3	3	3
	12	●	**MVS0190X12S030**	23.1	29.3	31.3	68.3	68	0.3	3	3
	20	●	**MVS0190X20S030**	38.3	44.3	46.3	84.3	84	0.3	3	3
	25	●	**MVS0190X25S030**	47.8	53.3	55.3	94.3	94	0.3	3	3
	30	●	**MVS0190X30S030**	57.3	63.3	65.3	102.3	102	0.3	3	3
2.0	2*	●	**MVS0200X02S030**	4.3	10.3	12.2	68.3	68	0.3	3	1
	7	●	**MVS0200X07S030**	14.4	20.4	22.4	68.4	68	0.4	3	3
	12	●	**MVS0200X12S030**	24.4	30.4	32.4	68.4	68	0.4	3	3
	20	●	**MVS0200X20S030**	40.4	46.4	48.4	84.4	84	0.4	3	3
	25	●	**MVS0200X25S030**	50.4	56.4	58.4	94.4	94	0.4	3	3
	30	●	**MVS0200X30S030**	60.4	66.4	68.4	102.4	102	0.4	3	3
2.1	2*	●	**MVS0210X02S030**	4.5	10.7	12.4	74.3	74	0.3	3	1
	7	●	**MVS0210X07S030**	15.1	21.4	23.4	74.4	74	0.4	3	3
	12	●	**MVS0210X12S030**	25.6	32.4	34.4	74.4	74	0.4	3	3
	20	●	**MVS0210X20S030**	42.4	48.4	50.4	94.4	94	0.4	3	3
	25	●	**MVS0210X25S030**	52.9	59.4	60.4	107.4	107	0.4	3	3
	30	●	**MVS0210X30S030**	63.4	69.4	71.4	118.4	118	0.4	3	3
2.2	2*	●	**MVS0220X02S030**	4.7	11.3	12.8	74.3	74	0.3	3	1
	7	●	**MVS0220X07S030**	15.8	22.4	23.4	74.4	74	0.4	3	3
	12	●	**MVS0220X12S030**	26.8	33.4	34.4	74.4	74	0.4	3	3
	20	●	**MVS0220X20S030**	44.4	51.4	52.4	94.4	94	0.4	3	3
	25	●	**MVS0220X25S030**	55.4	62.4	63.4	107.4	107	0.4	3	3
	30	●	**MVS0220X30S030**	66.4	73.4	74.4	118.4	118	0.4	3	3
2.3	2*	●	**MVS0230X02S030**	5.0	11.8	13.1	74.4	74	0.4	3	1
	7	●	**MVS0230X07S030**	16.5	23.4	24.4	74.4	74	0.4	3	3
	12	●	**MVS0230X12S030**	28.0	35.4	36.4	74.4	74	0.4	3	3
	20	●	**MVS0230X20S030**	46.4	53.4	54.4	94.4	94	0.4	3	3
	25	●	**MVS0230X25S030**	57.9	64.4	66.4	107.4	107	0.4	3	3
	30	●	**MVS0230X30S030**	69.4	76.4	77.4	118.4	118	0.4	3	3
2.4	2*	●	**MVS0240X02S030**	5.2	12.4	13.5	74.4	74	0.4	3	1
	7	●	**MVS0240X07S030**	17.2	24.4	25.4	74.4	74	0.4	3	3
	12	●	**MVS0240X12S030**	29.2	36.4	37.4	74.4	74	0.4	3	3
	20	●	**MVS0240X20S030**	48.4	55.4	56.4	94.4	94	0.4	3	3
	25	●	**MVS0240X25S030**	60.4	67.4	68.4	107.4	107	0.4	3	3
	30	●	**MVS0240X30S030**	72.4	79.4	80.4	118.4	118	0.4	3	3
2.5	2*	●	**MVS0250X02S030**	5.4	12.8	13.7	74.4	74	0.4	3	1
	7	●	**MVS0250X07S030**	18.0	25.5	26.5	74.5	74	0.5	3	3
	12	●	**MVS0250X12S030**	30.5	38.5	39.5	74.5	74	0.5	3	3
	20	●	**MVS0250X20S030**	50.5	58.5	59.5	94.5	94	0.5	3	3
	25	●	**MVS0250X25S030**	63.0	70.5	71.5	107.5	107	0.5	3	3
	30	●	**MVS0250X30S030**	75.5	83.5	84.5	118.5	118	0.5	3	3
2.6	2*	●	**MVS0260X02S030**	5.6	13.4	13.4	81.4	81	0.4	3	2
	7	●	**MVS0260X07S030**	18.7	26.5	26.5	81.5	81	0.5	3	4
	12	●	**MVS0260X12S030**	31.7	39.5	39.5	81.5	81	0.5	3	4
	20	●	**MVS0260X20S030**	52.5	60.5	60.5	103.5	103	0.5	3	4
	25	●	**MVS0260X25S030**	65.5	73.5	73.5	117.5	117	0.5	3	4
	30	●	**MVS0260X30S030**	78.5	86.5	86.5	132.5	132	0.5	3	4
2.7	2*	●	**MVS0270X02S030**	5.8	13.8	13.8	81.4	81	0.4	3	2
	7	●	**MVS0270X07S030**	19.4	27.5	27.5	81.5	81	0.5	3	4
	12	●	**MVS0270X12S030**	32.9	41.5	41.5	81.5	81	0.5	3	4
	20	●	**MVS0270X20S030**	54.5	62.5	62.5	103.5	103	0.5	3	4
	25	●	**MVS0270X25S030**	68.0	76.5	76.5	117.5	117	0.5	3	4
	30	●	**MVS0270X30S030**	81.5	89.5	89.5	132.5	132	0.5	3	4
2.8	2*	●	**MVS0280X02S030**	6.0	14.4	14.4	81.4	81	0.4	3	2
	7	●	**MVS0280X07S030**	20.1	28.5	28.5	81.5	81	0.5	3	4
	12	●	**MVS0280X12S030**	34.1	42.5	42.5	81.5	81	0.5	3	4
	20	●	**MVS0280X20S030**	56.5	64.5	64.5	103.5	103	0.5	3	4
	25	●	**MVS0280X25S030**	70.5	78.5	78.5	117.5	117	0.5	3	4
	30	●	**MVS0280X30S030**	84.5	92.5	92.5	132.5	132	0.5	3	4
2.9	2*	●	**MVS0290X02S030**	6.3	14.9	14.9	81.5	81	0.5	3	2
	7	●	**MVS0290X07S030**	20.8	29.5	29.5	81.5	81	0.5	3	4
	12	●	**MVS0290X12S030**	35.3	44.5	44.5	81.5	81	0.5	3	4
	20	●	**MVS0290X20S030**	58.5	67.5	67.5	103.5	103	0.5	3	4
	25	●	**MVS0290X25S030**	73.0	81.5	81.5	117.5	117	0.5	3	4
	30	●	**MVS0290X30S030**	87.5	96.5	96.5	132.5	132	0.5	3	4

2* = Pilot hole drill. Tolerance is +0.014 and hole depth is DCx2.

● : Inventory maintained.

RECOMMENDED CUTTING CONDITIONS

Material		P					
		Mild Steel (≦180HB)		Carbon steel, Alloy steel (180—280HB)		Carbon steel, Alloy steel (280—350HB)	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
1.0	**2*,7DC**	15900	0.04 (0.02—0.05)	15900	0.04 (0.02—0.05)	12700	0.04 (0.02—0.05)
	≥ 12DC	15900	0.02 (0.01—0.03)	12700	0.02 (0.01—0.03)	9500	0.02 (0.01—0.03)
1.5	**2*,7DC**	10600	0.05 (0.03—0.08)	10600	0.05 (0.03—0.08)	8400	0.05 (0.03—0.08)
	≥ 12DC	10600	0.05 (0.02—0.08)	8400	0.05 (0.03—0.08)	6300	0.05 (0.02—0.08)
2.0	**2*,7DC**	7900	0.07 (0.04—0.10)	7900	0.07 (0.04—0.10)	6300	0.07 (0.04—0.10)
	≥ 12DC	7900	0.07 (0.04—0.10)	7900	0.07 (0.04—0.10)	7900	0.07 (0.04—0.10)
2.5	**2*,7DC**	7600	0.09 (0.05—0.13)	7600	0.09 (0.05—0.13)	6300	0.09 (0.05—0.13)
	≥ 12DC	7600	0.09 (0.06—0.13)	6300	0.09 (0.06—0.13)	6300	0.08 (0.05—0.13)

Material		M		K			
		Austenitic Stainless Steel (≦200HB)		Gray Cast Iron (≦350MPa)		Ductile Cast Iron (≦450MPa)	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
1.0	**2*,7DC**	9500	0.03 (0.02—0.05)	15900	0.04 (0.02—0.05)	12700	0.04 (0.02—0.05)
	≥ 12DC	9500	0.02 (0.01—0.03)	12700	0.02 (0.01—0.03)	9500	0.02 (0.01—0.03)
1.5	**2*,7DC**	6300	0.05 (0.03—0.07)	10600	0.05 (0.03—0.08)	8400	0.05 (0.03—0.08)
	≥ 12DC	6300	0.05 (0.02—0.08)	8400	0.05 (0.03—0.08)	6300	0.05 (0.02—0.08)
2.0	**2*,7DC**	4700	0.06 (0.04—0.08)	7900	0.07 (0.04—0.10)	6300	0.07 (0.04—0.10)
	≥ 12DC	4700	0.07 (0.04—0.10)	7900	0.07 (0.04—0.10)	7900	0.07 (0.04—0.10)
2.5	**2*,7DC**	5000	0.08 (0.05—0.10)	7600	0.09 (0.05—0.13)	6300	0.09 (0.05—0.13)
	≥ 12DC	3800	0.08 (0.05—0.12)	6300	0.09 (0.06—0.13)	6300	0.08 (0.05—0.12)

Material		N		S	
		Aluminium Alloy (Si<5%)		Heat Resistant Alloy	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
1.0	**2*,7DC**	19000	0.05 (0.03—0.08)	3100	0.02 (0.01—0.03)
	≥ 12DC	15900	0.05 (0.03—0.08)	3100	0.02 (0.01—0.03)
1.5	**2*,7DC**	16900	0.07 (0.05—0.12)	2100	0.03 (0.02—0.04)
	≥ 12DC	14800	0.08 (0.05—0.12)	2100	0.03 (0.02—0.04)
2.0	**2*,7DC**	14300	0.10 (0.06—0.15)	2300	0.04 (0.03—0.05)
	≥ 12DC	12700	0.11 (0.06—0.15)	2300	0.04 (0.03—0.05)
2.5	**2*,7DC**	12700	0.13 (0.08—0.20)	1900	0.05 (0.04—0.06)
	≥ 12DC	11400	0.14 (0.08—0.20)	1900	0.05 (0.04—0.06)

2* = Pilot hole drill. Hole depth is DCx2.

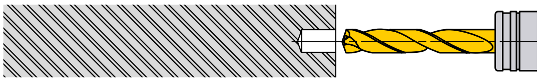
OPERATION GUIDANCE ➤ **M052**
TECHNICAL DATA ➤ **P001**

MINI-MVS

■ OPERATIONAL GUIDANCE FOR THE MINI-MVS LONG TYPE DRILL (L/D ≥ 10)

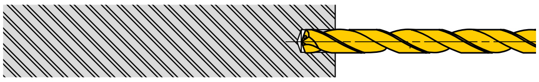
FLAT FACE DRILLING ● Drilling a blind hole

■ 1. Drilling a pilot hole



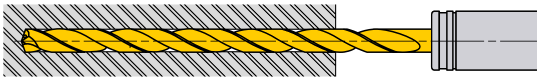
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type drill.)

■ 2. Initial cutting with the long type drill



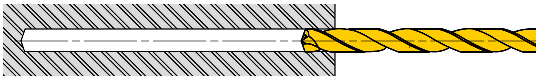
①Penetrate the pilot hole at low revolution.
(Revolution 1000min^{-1}, feed rate 0.2−0.3mm/rev)
②Stop the long type drill 0.5−1mm short of the pilot hole bottom.

■ 3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

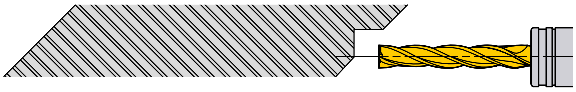
■ 4. Drill retraction



①After drilling, lower the cutting revolution about 0.5−1mm short of the hole end. (Revolution of around 1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20−30m/min and feed rate of 0.2−0.3mm/rev.

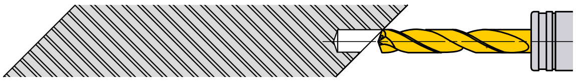
INTERRUPTED DRILLING ● Drilling and breaking through on irregular faces or angles

■ 1. Spot facing



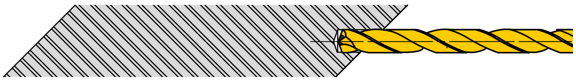
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a pilot hole



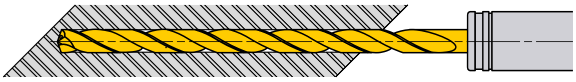
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type drill.)

■ 3. Initial cutting with the long type drill



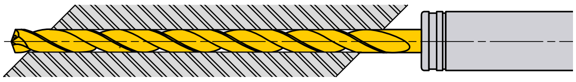
①Penetrate the guide hole at a low revolution. (Revolution 1000min^{-1}, feed rate 0.2−0.3mm/rev)
②Stop the long type drill 0.5−1mm short of the pilot hole bottom.

■ 4. Drill the deep hole



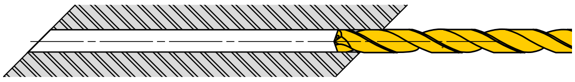
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

■ 5. Breaking through



①When breaking through, the cutting edge can be damaged.
②Lower the feed rate when penetrating.

■ 6. Drill retraction



①Finally clear the hole at a cutting speed of 20−30m/min and feed rate of 0.2−0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

MINI-MWS

- Through coolant micro drills for stable deep hole drilling.
- For high accuracy and efficient drilling of carbon steels through to difficult-to-cut materials.

UWC VP 140° 135°

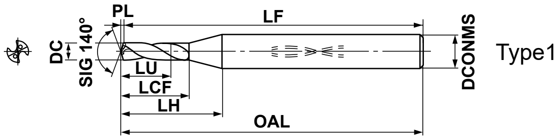
P M K N S H

Internal Coolant

SB Type

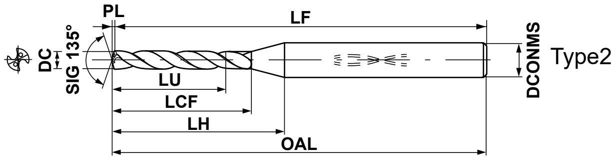
(For pilot holes)

	0.5≤DC<1
	+0.009 0
h6	0 −0.006



	0.5≤DC<1
	0 −0.009
h6	0 −0.006

LB/XB Type



- MWS drills are suitable for use with shrink fit holders.

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
0.50	1	●	**MWS0050SB**	0.6	2.6	7.3	47.1	47	0.09	3	1
	5	★	**MWS0050LB**	2.6	8.1	13.1	47.1	47	0.10	3	2
	12	★	**MWS0050XB**	6.1	16.1	21.1	47.1	47	0.10	3	2
0.51	1	★	**MWS0051SB**	0.6	2.7	7.3	47.1	47	0.09	3	1
	5	★	**MWS0051LB**	2.7	8.1	13.1	47.1	47	0.11	3	2
	12	★	**MWS0051XB**	6.2	16.1	21.1	47.1	47	0.11	3	2
0.52	1	★	**MWS0052SB**	0.6	2.7	7.3	47.1	47	0.09	3	1
	5	★	**MWS0052LB**	2.7	8.1	13.1	47.1	47	0.11	3	2
	12	★	**MWS0052XB**	6.4	16.1	21.1	47.1	47	0.11	3	2
0.53	1	★	**MWS0053SB**	0.6	2.7	7.3	47.1	47	0.10	3	1
	5	★	**MWS0053LB**	2.8	8.1	13.1	47.1	47	0.11	3	2
	12	★	**MWS0053XB**	6.5	16.1	21.1	47.1	47	0.11	3	2
0.54	1	★	**MWS0054SB**	0.6	2.7	7.3	47.1	47	0.10	3	1
	5	★	**MWS0054LB**	2.8	8.1	13.1	47.1	47	0.11	3	2
	12	★	**MWS0054XB**	6.6	16.1	21.1	47.1	47	0.11	3	2
0.55	1	●	**MWS0055SB**	0.7	2.7	7.3	47.1	47	0.10	3	1
	5	★	**MWS0055LB**	2.9	8.1	13.1	47.1	47	0.11	3	2
	12	★	**MWS0055XB**	6.7	16.1	21.1	47.1	47	0.11	3	2
0.56	1	★	**MWS0056SB**	0.7	3.0	7.6	47.1	47	0.10	3	1
	5	★	**MWS0056LB**	2.9	8.1	13.1	47.1	47	0.12	3	2
	12	★	**MWS0056XB**	6.8	16.1	21.1	47.1	47	0.12	3	2
0.57	1	★	**MWS0057SB**	0.7	3.0	7.5	47.1	47	0.10	3	1
	5	★	**MWS0057LB**	3.0	8.1	13.1	47.1	47	0.12	3	2
	12	★	**MWS0057XB**	7.0	16.1	21.1	47.1	47	0.12	3	2

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
0.58	1	★	**MWS0058SB**	0.7	3.0	7.5	47.1	47	0.11	3	1
	5	★	**MWS0058LB**	3.0	8.1	13.1	47.1	47	0.12	3	2
	12	★	**MWS0058XB**	7.1	16.1	21.1	47.1	47	0.12	3	2
0.59	1	★	**MWS0059SB**	0.7	3.0	7.5	47.1	47	0.11	3	1
	5	★	**MWS0059LB**	3.1	8.1	12.1	47.1	47	0.12	3	2
	12	★	**MWS0059XB**	7.2	16.1	20.1	47.1	47	0.12	3	2
0.60	1	●	**MWS0060SB**	0.7	3.0	7.5	47.1	47	0.11	3	1
	5	★	**MWS0060LB**	3.1	8.1	12.1	47.1	47	0.12	3	2
	12	★	**MWS0060XB**	7.3	16.1	20.1	47.1	47	0.12	3	2
0.61	1	★	**MWS0061SB**	0.7	3.2	7.7	47.1	47	0.11	3	1
	5	★	**MWS0061LB**	3.2	8.1	12.1	47.1	47	0.13	3	2
	12	★	**MWS0061XB**	7.5	16.1	20.1	47.1	47	0.13	3	2
0.62	1	★	**MWS0062SB**	0.7	3.2	7.6	47.1	47	0.11	3	1
	5	★	**MWS0062LB**	3.2	8.1	12.1	47.1	47	0.13	3	2
	12	★	**MWS0062XB**	7.6	16.1	20.1	47.1	47	0.13	3	2
0.63	1	★	**MWS0063SB**	0.7	3.2	7.6	47.1	47	0.11	3	1
	5	★	**MWS0063LB**	3.3	8.1	12.1	47.1	47	0.13	3	2
	12	★	**MWS0063XB**	7.7	16.1	20.1	47.1	47	0.13	3	2
0.64	1	★	**MWS0064SB**	0.8	3.2	7.6	47.1	47	0.12	3	1
	5	★	**MWS0064LB**	3.3	8.1	12.1	47.1	47	0.13	3	2
	12	★	**MWS0064XB**	7.8	16.1	20.1	47.1	47	0.13	3	2
0.65	1	●	**MWS0065SB**	0.8	3.2	7.6	47.1	47	0.12	3	1
	5	★	**MWS0065LB**	3.4	8.1	12.1	47.1	47	0.13	3	2
	12	★	**MWS0065XB**	7.9	16.1	20.1	47.1	47	0.13	3	2

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.

CUTTING CONDITIONS ➤ M055
OPERATION GUIDANCE ➤ M056
TECHNICAL DATA ➤ P001

MINI-MWS

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
0.66	1	★	**MWS0066SB**	0.8	3.5	7.9	47.1	47	0.12	3	1
	5	★	**MWS0066LB**	3.4	8.1	12.1	47.1	47	0.14	3	2
	12	★	**MWS0066XB**	8.1	16.1	20.1	47.1	47	0.14	3	2
0.67	1	★	**MWS0067SB**	0.8	3.5	7.8	47.1	47	0.12	3	1
	5	★	**MWS0067LB**	3.5	8.1	12.1	47.1	47	0.14	3	2
	12	★	**MWS0067XB**	8.2	16.1	20.1	47.1	47	0.14	3	2
0.68	1	★	**MWS0068SB**	0.8	3.5	7.8	47.1	47	0.12	3	1
	5	★	**MWS0068LB**	3.5	8.1	12.1	47.1	47	0.14	3	2
	12	★	**MWS0068XB**	8.3	16.1	20.1	47.1	47	0.14	3	2
0.69	1	★	**MWS0069SB**	0.8	3.5	7.8	47.1	47	0.13	3	1
	5	★	**MWS0069LB**	3.6	8.1	12.1	47.1	47	0.14	3	2
	12	★	**MWS0069XB**	8.4	16.1	20.1	47.1	47	0.14	3	2
0.70	1	●	**MWS0070SB**	0.8	3.5	7.8	47.1	47	0.13	3	1
	5	★	**MWS0070LB**	3.6	8.1	12.1	47.1	47	0.14	3	2
	12	★	**MWS0070XB**	8.5	16.1	20.1	47.1	47	0.14	3	2
0.71	1	★	**MWS0071SB**	0.8	3.7	8.0	50.1	50	0.13	3	1
	5	★	**MWS0071LB**	3.7	10.1	14.1	50.1	50	0.15	3	2
	12	★	**MWS0071XB**	8.7	20.1	24.1	50.1	50	0.15	3	2
0.72	1	★	**MWS0072SB**	0.9	3.7	8.0	50.1	50	0.13	3	1
	5	★	**MWS0072LB**	3.8	10.1	14.1	50.1	50	0.15	3	2
	12	★	**MWS0072XB**	8.8	20.1	24.1	50.1	50	0.15	3	2
0.73	1	★	**MWS0073SB**	0.9	3.7	7.9	50.1	50	0.13	3	1
	5	★	**MWS0073LB**	3.8	10.1	14.1	50.1	50	0.15	3	2
	12	★	**MWS0073XB**	8.9	20.1	24.1	50.1	50	0.15	3	2
0.74	1	★	**MWS0074SB**	0.9	3.7	7.9	50.1	50	0.13	3	1
	5	★	**MWS0074LB**	3.9	10.1	14.1	50.1	50	0.15	3	2
	12	★	**MWS0074XB**	9.0	20.1	24.1	50.1	50	0.15	3	2
0.75	1	●	**MWS0075SB**	0.9	3.7	7.9	50.1	50	0.14	3	1
	5	★	**MWS0075LB**	3.9	10.1	14.1	50.1	50	0.16	3	2
	12	★	**MWS0075XB**	9.2	20.1	24.1	50.1	50	0.16	3	2
0.76	1	★	**MWS0076SB**	0.9	4.0	8.2	50.1	50	0.14	3	1
	5	★	**MWS0076LB**	4.0	10.1	14.1	50.1	50	0.16	3	2
	12	★	**MWS0076XB**	9.3	20.1	24.1	50.1	50	0.16	3	2
0.77	1	★	**MWS0077SB**	0.9	4.0	8.2	50.1	50	0.14	3	1
	5	★	**MWS0077LB**	4.0	10.1	14.1	50.1	50	0.16	3	2
	12	★	**MWS0077XB**	9.4	20.1	24.1	50.1	50	0.16	3	2
0.78	1	★	**MWS0078SB**	0.9	4.0	8.1	50.1	50	0.14	3	1
	5	★	**MWS0078LB**	4.1	10.1	14.1	50.1	50	0.16	3	2
	12	★	**MWS0078XB**	9.5	20.1	24.1	50.1	50	0.16	3	2
0.79	1	★	**MWS0079SB**	0.9	4.0	8.1	50.1	50	0.14	3	1
	5	★	**MWS0079LB**	4.1	10.1	14.1	50.1	50	0.16	3	2
	12	★	**MWS0079XB**	9.6	20.1	24.1	50.1	50	0.16	3	2
0.80	1	●	**MWS0080SB**	1.0	4.1	8.2	50.2	50	0.15	3	1
	5	★	**MWS0080LB**	4.2	10.2	14.2	50.2	50	0.17	3	2
	12	★	**MWS0080XB**	9.8	20.2	24.2	50.2	50	0.17	3	2
0.81	1	★	**MWS0081SB**	1.0	4.3	8.4	50.2	50	0.15	3	1
	5	★	**MWS0081LB**	4.2	10.2	14.2	50.2	50	0.17	3	2
	12	★	**MWS0081XB**	9.9	20.2	24.2	50.2	50	0.17	3	2
0.82	1	★	**MWS0082SB**	1.0	4.3	8.4	50.2	50	0.15	3	1
	5	★	**MWS0082LB**	4.3	10.2	14.2	50.2	50	0.17	3	2
	12	★	**MWS0082XB**	10.0	20.2	24.2	50.2	50	0.17	3	2

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
0.83	1	★	**MWS0083SB**	1.0	4.3	8.3	50.2	50	0.15	3	1
	5	★	**MWS0083LB**	4.3	10.2	14.2	50.2	50	0.17	3	2
	12	★	**MWS0083XB**	10.1	20.2	24.2	50.2	50	0.17	3	2
0.84	1	★	**MWS0084SB**	1.0	4.3	8.3	50.2	50	0.15	3	1
	5	★	**MWS0084LB**	4.4	10.2	14.2	50.2	50	0.17	3	2
	12	★	**MWS0084XB**	10.3	20.2	24.2	50.2	50	0.17	3	2
0.85	1	●	**MWS0085SB**	1.0	4.3	8.3	50.2	50	0.15	3	1
	5	★	**MWS0085LB**	4.4	10.2	14.2	50.2	50	0.18	3	2
	12	★	**MWS0085XB**	10.4	20.2	24.2	50.2	50	0.18	3	2
0.86	1	★	**MWS0086SB**	1.0	4.6	8.6	50.2	50	0.16	3	1
	5	★	**MWS0086LB**	4.5	10.2	14.2	50.2	50	0.18	3	2
	12	★	**MWS0086XB**	10.5	20.2	24.2	50.2	50	0.18	3	2
0.87	1	★	**MWS0087SB**	1.0	4.6	8.6	50.2	50	0.16	3	1
	5	★	**MWS0087LB**	4.5	10.2	14.2	50.2	50	0.18	3	2
	12	★	**MWS0087XB**	10.6	20.2	24.2	50.2	50	0.18	3	2
0.88	1	★	**MWS0088SB**	1.0	4.6	8.6	50.2	50	0.16	3	1
	5	★	**MWS0088LB**	4.6	10.2	14.2	50.2	50	0.18	3	2
	12	★	**MWS0088XB**	10.7	20.2	24.2	50.2	50	0.18	3	2
0.89	1	★	**MWS0089SB**	1.1	4.6	8.5	50.2	50	0.16	3	1
	5	★	**MWS0089LB**	4.6	10.2	14.2	50.2	50	0.18	3	2
	12	★	**MWS0089XB**	10.9	20.2	24.2	50.2	50	0.18	3	2
0.90	1	●	**MWS0090SB**	1.1	4.6	8.5	50.2	50	0.16	3	1
	5	★	**MWS0090LB**	4.7	10.2	14.2	50.2	50	0.19	3	2
	12	★	**MWS0090XB**	11.0	20.2	24.2	50.2	50	0.19	3	2
0.91	1	★	**MWS0091SB**	1.1	4.8	8.7	50.2	50	0.17	3	1
	5	★	**MWS0091LB**	4.7	10.2	14.2	50.2	50	0.19	3	2
	12	★	**MWS0091XB**	11.1	20.2	24.2	50.2	50	0.19	3	2
0.92	1	★	**MWS0092SB**	1.1	4.8	8.7	50.2	50	0.17	3	1
	5	★	**MWS0092LB**	4.8	10.2	14.2	50.2	50	0.19	3	2
	12	★	**MWS0092XB**	11.2	20.2	24.2	50.2	50	0.19	3	2
0.93	1	★	**MWS0093SB**	1.1	4.8	8.7	50.2	50	0.17	3	1
	5	★	**MWS0093LB**	4.8	10.2	14.2	50.2	50	0.19	3	2
	12	★	**MWS0093XB**	11.4	20.2	24.2	50.2	50	0.19	3	2
0.94	1	★	**MWS0094SB**	1.1	4.8	8.6	50.2	50	0.17	3	1
	5	★	**MWS0094LB**	4.9	10.2	14.2	50.2	50	0.19	3	2
	12	★	**MWS0094XB**	11.5	20.2	24.2	50.2	50	0.19	3	2
0.95	1	●	**MWS0095SB**	1.1	4.8	8.6	50.2	50	0.17	3	1
	5	★	**MWS0095LB**	5.0	10.2	14.2	50.2	50	0.20	3	2
	12	★	**MWS0095XB**	11.6	20.2	24.2	50.2	50	0.20	3	2
0.96	1	★	**MWS0096SB**	1.1	5.1	8.9	50.2	50	0.17	3	1
	5	★	**MWS0096LB**	5.0	10.2	14.2	50.2	50	0.20	3	2
	12	★	**MWS0096XB**	11.7	20.2	24.2	50.2	50	0.20	3	2
0.97	1	★	**MWS0097SB**	1.2	5.1	8.9	50.2	50	0.18	3	1
	5	★	**MWS0097LB**	5.1	10.2	14.2	50.2	50	0.20	3	2
	12	★	**MWS0097XB**	11.8	20.2	24.2	50.2	50	0.20	3	2
0.98	1	★	**MWS0098SB**	1.2	5.1	8.9	50.2	50	0.18	3	1
	5	★	**MWS0098LB**	5.1	10.2	14.2	50.2	50	0.20	3	2
	12	★	**MWS0098XB**	12.0	20.2	24.2	50.2	50	0.20	3	2
0.99	1	★	**MWS0099SB**	1.2	5.1	8.9	50.2	50	0.18	3	1
	5	★	**MWS0099LB**	5.2	10.2	14.2	50.2	50	0.21	3	2
	12	★	**MWS0099XB**	12.1	20.2	24.2	50.2	50	0.21	3	2

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

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RECOMMENDED CUTTING CONDITIONS

■ SB/LB/XB Type Drill (L/D<10)

Material	P							
	Mild Steel (≤180HB) Ck10				Carbon Steel, Alloy Steel (180—280HB) Ck45, 42CrMo4			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.5	40	25400	0.010 (0.005—0.015)	250	40	25400	0.010 (0.005—0.015)	250
0.63	40	20200	0.014 (0.008—0.020)	280	40	20200	0.014 (0.008—0.020)	280
0.8	45	17900	0.028 (0.016—0.040)	500	45	17900	0.028 (0.016—0.040)	500
1.0	50	15900	0.035 (0.020—0.050)	555	50	15900	0.035 (0.020—0.050)	555

Material	P				M			
	Carbon Steel, Alloy Steel (280—350HB) 36CrNiMo4				Austenitic Stainless Steel (≤200HB) X5CrNi1810, X5CrNiMo17-12-2			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.5	30	19000	0.010 (0.005—0.015)	190	20	12700	0.008 (0.005—0.010)	100
0.63	30	15100	0.014 (0.008—0.020)	210	20	10100	0.010 (0.008—0.013)	100
0.8	35	13900	0.028 (0.016—0.040)	385	25	9900	0.020 (0.016—0.026)	195
1.0	40	12700	0.035 (0.020—0.050)	440	30	9500	0.030 (0.020—0.044)	285

Material	K							
	Gray Cast Iron (≤350MPa) GG30				Ductile Cast Iron (≤450MPa) GGG45			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.5	40	25400	0.010 (0.005—0.015)	250	30	19000	0.010 (0.005—0.015)	190
0.63	40	20200	0.014 (0.008—0.020)	280	30	15100	0.014 (0.008—0.020)	210
0.8	45	17900	0.028 (0.016—0.040)	500	35	13900	0.028 (0.016—0.040)	385
1.0	50	15900	0.035 (0.020—0.050)	555	40	12700	0.035 (0.020—0.050)	440

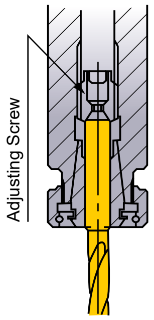
Material	N				S			
	Aluminium Alloy (Si<5%)				Heat Resistant Alloy Inconel®718			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.5	40	25400	0.014 (0.008—0.020)	355	10	6300	0.006 (0.004—0.008)	35
0.63	40	20200	0.020 (0.012—0.030)	400	10	5000	0.008 (0.007—0.010)	40
0.8	45	17900	0.036 (0.024—0.050)	640	10	3900	0.016 (0.013—0.021)	60
1.0	60	19000	0.050 (0.030—0.075)	950	10	3100	0.020 (0.016—0.027)	60

OPERATION GUIDANCE ➤ M056
TECHNICAL DATA ➤ P001

MINI-MWS

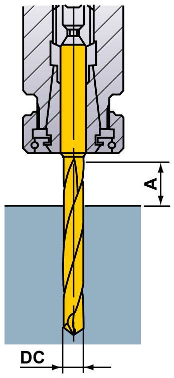
OPERATIONAL GUIDANCE

Drill Holding



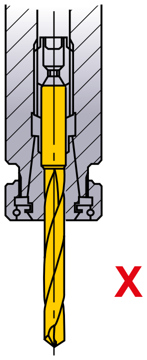
Thrust bearing type collet chuck holds the drill securely.

Drill Length



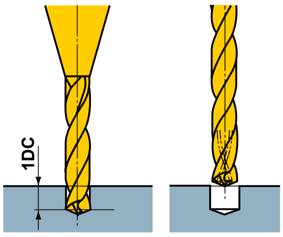
A≥ DC x 2.0

Drill Installation



Do not clamp on the flutes.

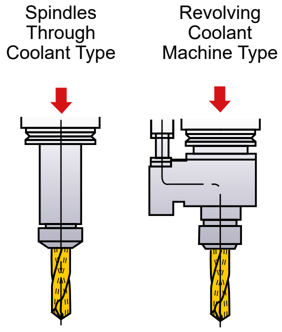
Drill Installation



①For pilot hole drilling, use the SB type drill.

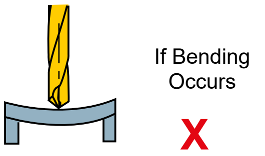
②Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.

Through Coolant Type



Recommended coolant pressure: ≥30 bar
At least 15 bar is required.

Thin Workpiece



Coolant Handling

1) Small particles of chips will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

NOTES ON USE

●Please use a fine mesh filter (mesh≤5μm) for coolant to prevent jamming in the coolant hole.

TECHNICAL DATA ➤P001

MPS1

4 Margin & Super Long Drill

- New accumulated AlTiCrN based PVD coating.
- MPS1 double margin type for accurate and reliable drilling.

UWC DP1 145° 140° 135°

L/D=2 PC | L/D=3−5 L/D=10−40 | L/D=8

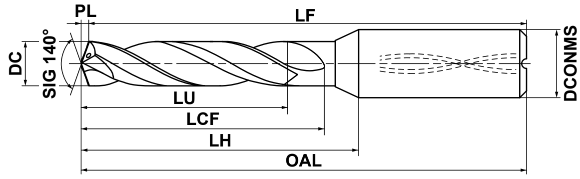
P **M** **K** N S H

Internal Coolant

	3≤DC≤6	6<DC≤10	10<DC≤18	18<DC≤20
DIN / PC	+0.010 −0.002	+0.010 −0.005	+0.005 −0.013	+0.005 −0.016
L_ _ _C	0 −0.012	0 −0.015	0 −0.018	0 −0.021
h6	0 −0.008	0 −0.009	0 −0.011	0 −0.013

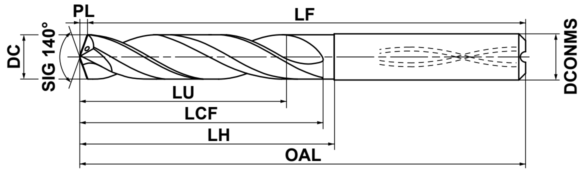
*The coolant holes of drills DC Ø4.9 mm or less will be a circular geometry.
*SIG : L/D 3−5 and 10−40 = 140°, 8 = 135°, PC = 145°

●Type 1 Cylindrical shank type with taper neck



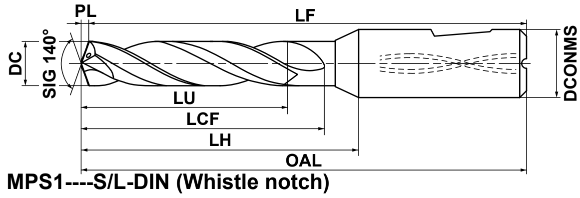
MPS1----S/L-DIN-C/L8C-L40C

●Type 2 Cylindrical shank type



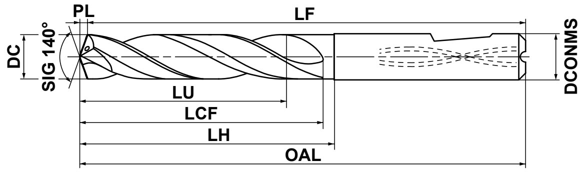
MPS1----S/L-DIN-C/L8C-L40C

●Type 3 Whistle notch shank type with taper neck



MPS1----S/L-DIN (Whistle notch)

●Type 4 Whistle notch shank type



MPS1----S/L-DIN (Whistle notch)

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.0	3	☐	MPS1-0300S-DIN	15.0	19.5	24.5	61.5	61	0.5	6	3
	3	●	MPS1-0300S-DIN-C	15.0	19.5	24.5	61.5	61	0.5	6	1
	5	☐	MPS1-0300L-DIN	20.0	24.5	28.5	65.5	65	0.5	6	3
	5	●	MPS1-0300L-DIN-C	20.0	24.5	28.5	65.5	65	0.5	6	1
	2	●	MPS1-0300-PC	6.5	16.5	19.7	55.5	55	0.5	6	1
	8	●	MPS1-0300-L8C	24.6	33.6	39.6	76.6	76	0.6	6	1
	10	●	MPS1-0300-L10C	30.5	37.5	42.5	79.5	79	0.5	6	1
	12	●	MPS1-0300-L12C	36.5	43.5	48.5	85.5	85	0.5	6	1
	15	●	MPS1-0300-L15C	45.5	52.5	57.5	94.5	94	0.5	6	1
	20	●	MPS1-0300-L20C	60.5	67.5	72.5	109.5	109	0.5	6	1
	25	●	MPS1-0300-L25C	75.5	82.5	87.5	124.5	124	0.5	6	1
	30	●	MPS1-0300-L30C	90.5	97.5	102.5	139.5	139	0.5	6	1
	35	☐	MPS1-0300-L35C	105.5	113.5	121.5	158.5	158	0.5	6	1
	40	●	MPS1-0300-L40C	120.5	128.5	136.5	173.5	173	0.5	6	1
3.05	3	☐	MPS1-0305S-DIN	15.0	19.6	24.6	61.6	61	0.6	6	3
	3	●	MPS1-0305S-DIN-C	15.0	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MPS1-0305L-DIN	20.0	24.6	28.6	65.6	65	0.6	6	3
	5	●	MPS1-0305L-DIN-C	20.0	24.6	28.6	65.6	65	0.6	6	1
3.1	3	☐	MPS1-0310S-DIN	14.9	19.6	24.6	61.6	61	0.6	6	3
	3	●	MPS1-0310S-DIN-C	14.9	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MPS1-0310L-DIN	19.9	24.6	28.6	65.6	65	0.6	6	3
	5	●	MPS1-0310L-DIN-C	19.9	24.6	28.6	65.6	65	0.6	6	1
	2	●	MPS1-0310-PC	6.7	18.5	21.6	55.5	55	0.5	6	1
	8	●	MPS1-0310-L8C	25.4	39.6	45.6	82.6	82	0.6	6	1
	10	☐	MPS1-0310-L10C	31.6	44.6	49.6	86.6	86	0.6	6	1
	12	●	MPS1-0310-L12C	37.8	51.6	56.6	93.6	93	0.6	6	1
	15	●	MPS1-0310-L15C	47.1	61.6	66.6	103.6	103	0.6	6	1
	20	●	MPS1-0310-L20C	62.6	79.6	84.6	121.6	121	0.6	6	1
	25	●	MPS1-0310-L25C	78.1	96.6	101.6	138.6	138	0.6	6	1
	30	●	MPS1-0310-L30C	93.6	114.6	119.6	156.6	156	0.6	6	1
	35	☐	MPS1-0310-L35C	109.1	123.6	138.6	175.6	175	0.6	6	1
	40	●	MPS1-0310-L40C	124.6	138.6	153.6	190.6	190	0.6	6	1

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.2	3	☐	MPS1-0320S-DIN	14.8	19.6	24.6	61.6	61	0.6	6	3
	3	●	MPS1-0320S-DIN-C	14.8	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MPS1-0320L-DIN	19.8	24.6	28.6	65.6	65	0.6	6	3
	5	●	MPS1-0320L-DIN-C	19.8	24.6	28.6	65.6	65	0.6	6	1
	2	●	MPS1-0320-PC	6.9	18.5	21.5	55.5	55	0.5	6	1
	8	●	MPS1-0320-L8C	26.3	39.7	45.7	82.7	82	0.7	6	1
	10	☐	MPS1-0320-L10C	32.6	44.6	49.6	86.6	86	0.6	6	1
	12	●	MPS1-0320-L12C	39.0	51.6	56.6	93.6	93	0.6	6	1
	15	●	MPS1-0320-L15C	48.6	61.6	66.6	103.6	103	0.6	6	1
	20	●	MPS1-0320-L20C	64.6	79.6	84.6	121.6	121	0.6	6	1
	25	●	MPS1-0320-L25C	80.6	96.6	101.6	138.6	138	0.6	6	1
	30	●	MPS1-0320-L30C	96.6	114.6	119.6	156.6	156	0.6	6	1
	35	☐	MPS1-0320-L35C	112.6	123.6	138.6	175.6	175	0.6	6	1
	40	●	MPS1-0320-L40C	128.6	138.6	153.6	190.6	190	0.6	6	1
3.3	3	☐	MPS1-0330S-DIN	14.7	19.6	24.6	61.6	61	0.6	6	3
	3	●	MPS1-0330S-DIN-C	14.7	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MPS1-0330L-DIN	20.2	25.1	28.6	65.6	65	0.6	6	3
	5	●	MPS1-0330L-DIN-C	20.2	25.1	28.6	65.6	65	0.6	6	1
	2	●	MPS1-0330-PC	7.1	18.5	21.4	55.5	55	0.5	6	1
	8	●	MPS1-0330-L8C	27.1	39.7	45.7	82.7	82	0.7	6	1
	10	☐	MPS1-0330-L10C	33.6	44.6	49.6	86.6	86	0.6	6	1
	12	●	MPS1-0330-L12C	40.2	51.6	56.6	93.6	93	0.6	6	1
	15	●	MPS1-0330-L15C	50.1	61.6	66.6	103.6	103	0.6	6	1
	20	●	MPS1-0330-L20C	66.6	79.6	84.6	121.6	121	0.6	6	1
	25	●	MPS1-0330-L25C	83.1	96.6	101.6	138.6	138	0.6	6	1
	30	●	MPS1-0330-L30C	99.6	114.6	119.6	156.6	156	0.6	6	1
	35	☐	MPS1-0330-L35C	116.1	132.6	138.6	175.6	175	0.6	6	1
	40	●	MPS1-0330-L40C	132.6	148.6	153.6	190.6	190	0.6	6	1

● : Inventory maintained. ☐ : Non stock, produced to order only.

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.4	3	☐	MPS1-0340S-DIN	14.5	19.6	24.6	61.6	61	0.6	6	3
	3	●	MPS1-0340S-DIN-C	14.5	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MPS1-0340L-DIN	20.0	25.1	28.6	65.6	65	0.6	6	3
	5	●	MPS1-0340L-DIN-C	20.0	25.1	28.6	65.6	65	0.6	6	1
	2	●	MPS1-0340-PC	7.3	18.5	21.3	55.5	55	0.5	6	1
	8	●	MPS1-0340-L8C	27.9	39.7	45.7	82.7	82	0.7	6	1
	10	☐	MPS1-0340-L10C	34.6	44.6	49.6	86.6	86	0.6	6	1
	12	●	MPS1-0340-L12C	41.4	51.6	56.6	93.6	93	0.6	6	1
	15	●	MPS1-0340-L15C	51.6	61.6	66.6	103.6	103	0.6	6	1
	20	●	MPS1-0340-L20C	68.6	79.6	84.6	121.6	121	0.6	6	1
	25	●	MPS1-0340-L25C	85.6	96.6	101.6	138.6	138	0.6	6	1
	30	●	MPS1-0340-L30C	102.6	114.6	119.6	156.6	156	0.6	6	1
	35	☐	MPS1-0340-L35C	119.6	132.6	138.6	175.6	175	0.6	6	1
	40	●	MPS1-0340-L40C	136.6	148.6	153.6	190.6	190	0.6	6	1
3.5	3	☐	MPS1-0350S-DIN	14.4	19.6	24.6	61.6	61	0.6	6	3
	3	●	MPS1-0350S-DIN-C	14.4	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MPS1-0350L-DIN	19.9	25.1	28.6	65.6	65	0.6	6	3
	5	●	MPS1-0350L-DIN-C	19.9	25.1	28.6	65.6	65	0.6	6	1
	2	●	MPS1-0350-PC	7.6	18.6	21.2	55.6	55	0.6	6	1
	8	●	MPS1-0350-L8C	28.7	39.7	45.7	82.7	82	0.7	6	1
	10	☐	MPS1-0350-L10C	35.6	44.6	49.6	86.6	86	0.6	6	1
	12	●	MPS1-0350-L12C	42.6	51.6	56.6	93.6	93	0.6	6	1
	15	●	MPS1-0350-L15C	53.1	61.6	66.6	103.6	103	0.6	6	1
	20	●	MPS1-0350-L20C	70.6	79.6	84.6	121.6	121	0.6	6	1
	25	●	MPS1-0350-L25C	88.1	96.6	101.6	138.6	138	0.6	6	1
	30	●	MPS1-0350-L30C	105.6	114.6	119.6	156.6	156	0.6	6	1
	35	☐	MPS1-0350-L35C	123.1	132.6	138.6	175.6	175	0.6	6	1
	40	●	MPS1-0350-L40C	140.6	148.6	153.6	190.6	190	0.6	6	1
3.6	3	☐	MPS1-0360S-DIN	14.3	19.7	24.7	61.7	61	0.7	6	3
	3	●	MPS1-0360S-DIN-C	14.3	19.7	24.7	61.7	61	0.7	6	1
	5	☐	MPS1-0360L-DIN	19.8	25.2	28.7	65.7	65	0.7	6	3
	5	●	MPS1-0360L-DIN-C	19.8	25.2	28.7	65.7	65	0.7	6	1
	2	●	MPS1-0360-PC	7.8	20.6	23.1	55.6	55	0.6	6	1
	8	●	MPS1-0360-L8C	29.5	44.7	50.7	87.7	87	0.7	6	1
	10	☐	MPS1-0360-L10C	36.7	50.7	55.7	92.7	92	0.7	6	1
	12	●	MPS1-0360-L12C	43.9	58.7	63.7	100.7	100	0.7	6	1
	15	●	MPS1-0360-L15C	54.7	70.7	75.7	112.7	112	0.7	6	1
	20	●	MPS1-0360-L20C	72.7	90.7	95.7	132.7	132	0.7	6	1
	25	☐	MPS1-0360-L25C	90.7	110.7	115.7	152.7	152	0.7	6	1
	30	●	MPS1-0360-L30C	108.7	130.7	135.7	172.7	172	0.7	6	1
	35	☐	MPS1-0360-L35C	126.7	143.7	155.7	192.7	192	0.7	6	1
	40	●	MPS1-0360-L40C	144.7	160.7	175.7	212.7	212	0.7	6	1
3.7	3	☐	MPS1-0370S-DIN	14.1	19.7	24.7	61.7	61	0.7	6	3
	3	●	MPS1-0370S-DIN-C	14.1	19.7	24.7	61.7	61	0.7	6	1
	5	☐	MPS1-0370L-DIN	20.1	25.7	28.7	65.7	65	0.7	6	3
	5	●	MPS1-0370L-DIN-C	20.1	25.7	28.7	65.7	65	0.7	6	1
	2	●	MPS1-0370-PC	8.0	20.6	23.1	55.6	55	0.6	6	1
	8	●	MPS1-0370-L8C	30.4	44.8	50.8	87.8	87	0.8	6	1
	10	☐	MPS1-0370-L10C	37.7	50.7	55.7	92.7	92	0.7	6	1
	12	●	MPS1-0370-L12C	45.1	58.7	63.7	100.7	100	0.7	6	1
	15	●	MPS1-0370-L15C	56.2	70.7	75.7	112.7	112	0.7	6	1
	20	●	MPS1-0370-L20C	74.7	90.7	95.7	132.7	132	0.7	6	1
	25	●	MPS1-0370-L25C	93.2	110.7	115.7	152.7	152	0.7	6	1
	30	●	MPS1-0370-L30C	111.7	130.7	135.7	172.7	172	0.7	6	1
	35	☐	MPS1-0370-L35C	130.2	143.7	155.7	192.7	192	0.7	6	1
	40	●	MPS1-0370-L40C	148.7	160.7	175.7	212.7	212	0.7	6	1

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.8	3	☐	MPS1-0380S-DIN	18.0	23.7	28.7	65.7	65	0.7	6	3
	3	●	MPS1-0380S-DIN-C	18.0	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MPS1-0380L-DIN	28.0	33.7	36.7	73.7	73	0.7	6	3
	5	●	MPS1-0380L-DIN-C	28.0	33.7	36.7	73.7	73	0.7	6	1
	2	●	MPS1-0380-PC	8.2	20.6	23.0	55.6	55	0.6	6	1
	8	●	MPS1-0380-L8C	31.2	44.8	50.8	87.8	87	0.8	6	1
	10	☐	MPS1-0380-L10C	38.7	50.7	55.7	92.7	92	0.7	6	1
	12	●	MPS1-0380-L12C	46.3	58.7	63.7	100.7	100	0.7	6	1
	15	●	MPS1-0380-L15C	57.7	70.7	75.7	112.7	112	0.7	6	1
	20	●	MPS1-0380-L20C	76.7	90.7	95.7	132.7	132	0.7	6	1
	25	●	MPS1-0380-L25C	95.7	110.7	115.7	152.7	152	0.7	6	1
	30	●	MPS1-0380-L30C	114.7	130.7	135.7	172.7	172	0.7	6	1
	35	☐	MPS1-0380-L35C	133.7	150.7	155.7	192.7	192	0.7	6	1
	40	●	MPS1-0380-L40C	152.7	170.7	175.7	212.7	212	0.7	6	1
3.9	3	☐	MPS1-0390S-DIN	17.9	23.7	28.7	65.7	65	0.7	6	3
	3	●	MPS1-0390S-DIN-C	17.9	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MPS1-0390L-DIN	27.9	33.7	36.7	73.7	73	0.7	6	3
	5	●	MPS1-0390L-DIN-C	27.9	33.7	36.7	73.7	73	0.7	6	1
	2	●	MPS1-0390-PC	8.4	20.6	22.9	55.6	55	0.6	6	1
	8	●	MPS1-0390-L8C	32.0	44.8	50.8	87.8	87	0.8	6	1
	10	☐	MPS1-0390-L10C	39.7	50.7	55.7	92.7	92	0.7	6	1
	12	●	MPS1-0390-L12C	47.5	58.7	63.7	100.7	100	0.7	6	1
	15	●	MPS1-0390-L15C	59.2	70.7	75.7	112.7	112	0.7	6	1
	20	●	MPS1-0390-L20C	78.7	90.7	95.7	132.7	132	0.7	6	1
	25	☐	MPS1-0390-L25C	98.2	110.7	115.7	152.7	152	0.7	6	1
	30	●	MPS1-0390-L30C	117.7	130.7	135.7	172.7	172	0.7	6	1
	35	☐	MPS1-0390-L35C	137.2	150.7	155.7	192.7	192	0.7	6	1
	40	●	MPS1-0390-L40C	156.7	170.7	175.7	212.7	212	0.7	6	1
4.0	3	☐	MPS1-0400S-DIN	17.7	23.7	28.7	65.7	65	0.7	6	3
	3	●	MPS1-0400S-DIN-C	17.7	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MPS1-0400L-DIN	27.7	33.7	36.7	73.7	73	0.7	6	3
	5	●	MPS1-0400L-DIN-C	27.7	33.7	36.7	73.7	73	0.7	6	1
	2	●	MPS1-0400-PC	8.6	20.6	22.8	55.6	55	0.6	6	1
	8	●	MPS1-0400-L8C	32.8	44.8	50.8	87.8	87	0.8	6	1
	10	●	MPS1-0400-L10C	40.7	50.7	55.7	92.7	92	0.7	6	1
	12	●	MPS1-0400-L12C	48.7	58.7	63.7	100.7	100	0.7	6	1
	15	●	MPS1-0400-L15C	60.7	70.7	75.7	112.7	112	0.7	6	1
	20	●	MPS1-0400-L20C	80.7	90.7	95.7	132.7	132	0.7	6	1
	25	●	MPS1-0400-L25C	100.7	110.7	115.7	152.7	152	0.7	6	1
	30	●	MPS1-0400-L30C	120.7	130.7	135.7	172.7	172	0.7	6	1
	35	☐	MPS1-0400-L35C	140.7	150.7	155.7	192.7	192	0.7	6	1
	40	●	MPS1-0400-L40C	160.7	170.7	175.7	212.7	212	0.7	6	1
4.05	3	☐	MPS1-0405S-DIN	17.7	23.7	28.7	65.7	65	0.7	6	3
	3	●	MPS1-0405S-DIN-C	17.7	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MPS1-0405L-DIN	27.7	33.7	36.7	73.7	73	0.7	6	3
	5	●	MPS1-0405L-DIN-C	27.7	33.7	36.7	73.7	73	0.7	6	1

● : Inventory maintained. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.1	3	☐	MPS1-0410S-DIN	17.6	23.7	28.7	65.7	65	0.7	6	3
	3	●	MPS1-0410S-DIN-C	17.6	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MPS1-0410L-DIN	27.6	33.7	36.7	73.7	73	0.7	6	3
	5	●	MPS1-0410L-DIN-C	27.6	33.7	36.7	73.7	73	0.7	6	1
	2	●	MPS1-0410-PC	8.8	22.6	24.7	62.6	62	0.6	6	1
	8	●	MPS1-0410-L8C	33.6	50.8	55.8	92.8	92	0.8	6	1
	10	☐	MPS1-0410-L10C	41.7	58.7	62.7	99.7	99	0.7	6	1
	12	●	MPS1-0410-L12C	49.9	67.7	71.7	108.7	108	0.7	6	1
	15	●	MPS1-0410-L15C	62.2	80.7	84.7	121.7	121	0.7	6	1
	20	●	MPS1-0410-L20C	82.7	103.7	107.7	144.7	144	0.7	6	1
	25	●	MPS1-0410-L25C	103.2	125.7	129.7	166.7	166	0.7	6	1
	30	●	MPS1-0410-L30C	123.7	148.7	152.7	189.7	189	0.7	6	1
	35	☐	MPS1-0410-L35C	144.2	164.7	174.7	211.7	211	0.7	6	1
	40	●	MPS1-0410-L40C	164.7	184.7	198.7	235.7	235	0.7	6	1
4.2	3	☐	MPS1-0420S-DIN	17.5	23.8	28.8	65.8	65	0.8	6	3
	3	●	MPS1-0420S-DIN-C	17.5	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MPS1-0420L-DIN	28.0	34.3	36.8	73.8	73	0.8	6	3
	5	●	MPS1-0420L-DIN-C	28.0	34.3	36.8	73.8	73	0.8	6	1
	2	●	MPS1-0420-PC	9.1	22.7	24.6	62.7	62	0.7	6	1
	8	●	MPS1-0420-L8C	34.5	50.9	55.9	92.9	92	0.9	6	1
	10	☐	MPS1-0420-L10C	42.8	58.8	62.8	99.8	99	0.8	6	1
	12	●	MPS1-0420-L12C	51.2	67.8	71.8	108.8	108	0.8	6	1
	15	●	MPS1-0420-L15C	63.8	80.8	84.8	121.8	121	0.8	6	1
	20	●	MPS1-0420-L20C	84.8	103.8	107.8	144.8	144	0.8	6	1
	25	●	MPS1-0420-L25C	105.8	125.8	129.8	166.8	166	0.8	6	1
	30	●	MPS1-0420-L30C	126.8	148.8	152.8	189.8	189	0.8	6	1
	35	●	MPS1-0420-L35C	147.8	164.8	174.8	211.8	211	0.8	6	1
	40	●	MPS1-0420-L40C	168.8	184.8	198.8	235.8	235	0.8	6	1
4.3	3	☐	MPS1-0430S-DIN	17.3	23.8	28.8	65.8	65	0.8	6	3
	3	●	MPS1-0430S-DIN-C	17.3	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MPS1-0430L-DIN	27.8	34.3	36.8	73.8	73	0.8	6	3
	5	●	MPS1-0430L-DIN-C	27.8	34.3	36.8	73.8	73	0.8	6	1
	2	●	MPS1-0430-PC	9.3	22.7	24.5	62.7	62	0.7	6	1
	8	●	MPS1-0430-L8C	35.3	50.9	55.9	92.9	92	0.9	6	1
	10	☐	MPS1-0430-L10C	43.8	58.8	62.8	99.8	99	0.8	6	1
	12	●	MPS1-0430-L12C	52.4	67.8	71.8	108.8	108	0.8	6	1
	15	●	MPS1-0430-L15C	65.3	80.8	84.8	121.8	121	0.8	6	1
	20	●	MPS1-0430-L20C	86.8	103.8	107.8	144.8	144	0.8	6	1
	25	●	MPS1-0430-L25C	108.3	125.8	129.8	166.8	166	0.8	6	1
	30	●	MPS1-0430-L30C	129.8	148.8	152.8	189.8	189	0.8	6	1
	35	☐	MPS1-0430-L35C	151.3	170.8	174.8	211.8	211	0.8	6	1
	40	●	MPS1-0430-L40C	172.8	194.8	198.8	235.8	235	0.8	6	1
4.4	3	☐	MPS1-0440S-DIN	17.2	23.8	28.8	65.8	65	0.8	6	3
	3	●	MPS1-0440S-DIN-C	17.2	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MPS1-0440L-DIN	27.7	34.3	36.8	73.8	73	0.8	6	3
	5	●	MPS1-0440L-DIN-C	27.7	34.3	36.8	73.8	73	0.8	6	1
	2	●	MPS1-0440-PC	9.5	22.7	24.4	62.7	62	0.7	6	1
	8	●	MPS1-0440-L8C	36.1	50.9	55.9	92.9	92	0.9	6	1
	10	☐	MPS1-0440-L10C	44.8	58.8	62.8	99.8	99	0.8	6	1
	12	●	MPS1-0440-L12C	53.6	67.8	71.8	108.8	108	0.8	6	1
	15	●	MPS1-0440-L15C	66.8	80.8	84.8	121.8	121	0.8	6	1
	20	☐	MPS1-0440-L20C	88.8	103.8	107.8	144.8	144	0.8	6	1
	25	☐	MPS1-0440-L25C	110.8	125.8	129.8	166.8	166	0.8	6	1
	30	☐	MPS1-0440-L30C	132.8	148.8	152.8	189.8	189	0.8	6	1
	35	☐	MPS1-0440-L35C	154.8	170.8	174.8	211.8	211	0.8	6	1
	40	●	MPS1-0440-L40C	176.8	194.8	198.8	235.8	235	0.8	6	1

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.5	3	☐	MPS1-0450S-DIN	17.1	23.8	28.8	65.8	65	0.8	6	3
	3	●	MPS1-0450S-DIN-C	17.1	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MPS1-0450L-DIN	27.6	34.3	36.8	73.8	73	0.8	6	3
	5	●	MPS1-0450L-DIN-C	27.6	34.3	36.8	73.8	73	0.8	6	1
	2	●	MPS1-0450-PC	9.7	22.7	24.3	62.7	62	0.7	6	1
	8	●	MPS1-0450-L8C	36.9	50.9	55.9	92.9	92	0.9	6	1
	10	☐	MPS1-0450-L10C	45.8	58.8	62.8	99.8	99	0.8	6	1
	12	●	MPS1-0450-L12C	54.8	67.8	71.8	108.8	108	0.8	6	1
	15	●	MPS1-0450-L15C	68.3	80.8	84.8	121.8	121	0.8	6	1
	20	●	MPS1-0450-L20C	90.8	103.8	107.8	144.8	144	0.8	6	1
	25	●	MPS1-0450-L25C	113.3	125.8	129.8	166.8	166	0.8	6	1
	30	●	MPS1-0450-L30C	135.8	148.8	152.8	189.8	189	0.8	6	1
	35	☐	MPS1-0450-L35C	158.3	170.8	174.8	211.8	211	0.8	6	1
	40	●	MPS1-0450-L40C	180.8	194.8	198.8	235.8	235	0.8	6	1
4.6	3	☐	MPS1-0460S-DIN	16.9	23.8	28.8	65.8	65	0.8	6	4
	3	●	MPS1-0460S-DIN-C	16.9	23.8	28.8	65.8	65	0.8	6	2
	5	☐	MPS1-0460L-DIN	28.9	35.8	36.8	73.8	73	0.8	6	4
	5	●	MPS1-0460L-DIN-C	28.9	35.8	36.8	73.8	73	0.8	6	2
	2	●	MPS1-0460-PC	9.9	24.7	27.7	62.7	62	0.7	6	2
	8	●	MPS1-0460-L8C	37.8	56.0	59.0	96.0	95	1.0	6	2
	10	☐	MPS1-0460-L10C	46.8	65.8	68.8	105.8	105	0.8	6	2
	12	●	MPS1-0460-L12C	56.0	75.8	78.8	115.8	115	0.8	6	2
	15	●	MPS1-0460-L15C	69.8	90.8	93.8	130.8	130	0.8	6	2
	20	●	MPS1-0460-L20C	92.8	115.8	118.8	155.8	155	0.8	6	2
	25	●	MPS1-0460-L25C	115.8	140.8	143.8	180.8	180	0.8	6	2
	30	●	MPS1-0460-L30C	138.8	165.8	168.8	205.8	205	0.8	6	2
	35	☐	MPS1-0460-L35C	161.8	184.8	192.8	229.8	229	0.8	6	2
	40	●	MPS1-0460-L40C	184.8	204.8	217.8	254.8	254	0.8	6	2
4.65	3	☐	MPS1-0465S-DIN	16.9	23.8	28.8	65.8	65	0.8	6	4
	3	●	MPS1-0465S-DIN-C	16.9	23.8	28.8	65.8	65	0.8	6	2
	5	☐	MPS1-0465L-DIN	28.9	35.8	36.8	73.8	73	0.8	6	4
	5	●	MPS1-0465L-DIN-C	28.9	35.8	36.8	73.8	73	0.8	6	2
4.7	3	☐	MPS1-0470S-DIN	16.8	23.9	28.9	65.9	65	0.9	6	4
	3	●	MPS1-0470S-DIN-C	16.8	23.9	28.9	65.9	65	0.9	6	2
	5	☐	MPS1-0470L-DIN	28.8	35.9	36.9	73.9	73	0.9	6	4
	5	●	MPS1-0470L-DIN-C	28.8	35.9	36.9	73.9	73	0.9	6	2
	2	●	MPS1-0470-PC	10.1	24.7	27.7	62.7	62	0.7	6	2
	8	●	MPS1-0470-L8C	38.6	56.0	59.0	96.0	95	1.0	6	2
	10	☐	MPS1-0470-L10C	47.9	65.9	68.9	105.9	105	0.9	6	2
	12	●	MPS1-0470-L12C	57.3	75.9	78.9	115.9	115	0.9	6	2
	15	●	MPS1-0470-L15C	71.4	90.9	93.9	130.9	130	0.9	6	2
	20	●	MPS1-0470-L20C	94.9	115.9	118.9	155.9	155	0.9	6	2
	25	●	MPS1-0470-L25C	118.4	140.9	143.9	180.9	180	0.9	6	2
	30	●	MPS1-0470-L30C	141.9	165.9	168.9	205.9	205	0.9	6	2
	35	☐	MPS1-0470-L35C	165.4	184.9	192.9	229.9	229	0.9	6	2
	40	●	MPS1-0470-L40C	188.9	204.9	217.9	254.9	254	0.9	6	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.8	3	☐	**MPS1-0480S-DIN**	20.7	27.9	28.9	65.9	65	0.9	6	4
	3	●	**MPS1-0480S-DIN-C**	20.7	27.9	28.9	65.9	65	0.9	6	2
	5	☐	**MPS1-0480L-DIN**	36.7	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MPS1-0480L-DIN-C**	36.7	43.9	44.9	81.9	81	0.9	6	2
	2	●	**MPS1-0480-PC**	10.4	24.8	27.8	62.8	62	0.8	6	2
	8	●	**MPS1-0480-L8C**	39.4	56.0	59.0	96.0	95	1.0	6	2
	10	☐	**MPS1-0480-L10C**	48.9	65.9	68.9	105.9	105	0.9	6	2
	12	●	**MPS1-0480-L12C**	58.5	75.9	78.9	115.9	115	0.9	6	2
	15	●	**MPS1-0480-L15C**	72.9	90.9	93.9	130.9	130	0.9	6	2
	20	●	**MPS1-0480-L20C**	96.9	115.9	118.9	155.9	155	0.9	6	2
	25	●	**MPS1-0480-L25C**	120.9	140.9	143.9	180.9	180	0.9	6	2
	30	●	**MPS1-0480-L30C**	144.9	165.9	168.9	205.9	205	0.9	6	2
	35	☐	**MPS1-0480-L35C**	168.9	190.9	192.9	229.9	229	0.9	6	2
	40	●	**MPS1-0480-L40C**	192.9	215.9	217.9	254.9	254	0.9	6	2
4.9	3	☐	**MPS1-0490S-DIN**	20.5	27.9	28.9	65.9	65	0.9	6	4
	3	●	**MPS1-0490S-DIN-C**	20.5	27.9	28.9	65.9	65	0.9	6	2
	5	☐	**MPS1-0490L-DIN**	36.5	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MPS1-0490L-DIN-C**	36.5	43.9	44.9	81.9	81	0.9	6	2
	2	●	**MPS1-0490-PC**	10.6	24.8	27.8	62.8	62	0.8	6	2
	8	●	**MPS1-0490-L8C**	40.2	56.0	59.0	96.0	95	1.0	6	2
	10	☐	**MPS1-0490-L10C**	49.9	65.9	68.9	105.9	105	0.9	6	2
	12	●	**MPS1-0490-L12C**	59.7	75.9	78.9	115.9	115	0.9	6	2
	15	●	**MPS1-0490-L15C**	74.4	90.9	93.9	130.9	130	0.9	6	2
	20	☐	**MPS1-0490-L20C**	98.9	115.9	118.9	155.9	155	0.9	6	2
	25	●	**MPS1-0490-L25C**	123.4	140.9	143.9	180.9	180	0.9	6	2
	30	●	**MPS1-0490-L30C**	147.9	165.9	168.9	205.9	205	0.9	6	2
	35	☐	**MPS1-0490-L35C**	172.4	190.9	192.9	229.9	229	0.9	6	2
	40	●	**MPS1-0490-L40C**	196.9	215.9	217.9	254.9	254	0.9	6	2
5.0	3	☐	**MPS1-0500S-DIN**	20.4	27.9	28.9	65.9	65	0.9	6	4
	3	●	**MPS1-0500S-DIN-C**	20.4	27.9	28.9	65.9	65	0.9	6	2
	5	☐	**MPS1-0500L-DIN**	36.4	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MPS1-0500L-DIN-C**	36.4	43.9	44.9	81.9	81	0.9	6	2
	2	●	**MPS1-0500-PC**	10.8	24.8	25.8	62.8	62	0.8	6	2
	8	●	**MPS1-0500-L8C**	41.0	56.0	59.0	96.0	95	1.0	6	2
	10	●	**MPS1-0500-L10C**	50.9	65.9	68.9	105.9	105	0.9	6	2
	12	●	**MPS1-0500-L12C**	60.9	75.9	78.9	115.9	115	0.9	6	2
	15	●	**MPS1-0500-L15C**	75.9	90.9	93.9	130.9	130	0.9	6	2
	20	●	**MPS1-0500-L20C**	100.9	115.9	118.9	155.9	155	0.9	6	2
	25	●	**MPS1-0500-L25C**	125.9	140.9	143.9	180.9	180	0.9	6	2
	30	●	**MPS1-0500-L30C**	150.9	165.9	168.9	205.9	205	0.9	6	2
	35	☐	**MPS1-0500-L35C**	175.9	190.9	192.9	229.9	229	0.9	6	2
	40	●	**MPS1-0500-L40C**	200.9	215.9	217.9	254.9	254	0.9	6	2
5.05	3	☐	**MPS1-0505S-DIN**	20.3	27.9	28.9	65.9	65	0.9	6	4
	3	●	**MPS1-0505S-DIN-C**	20.3	27.9	28.9	65.9	65	0.9	6	2
	5	☐	**MPS1-0505L-DIN**	36.3	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MPS1-0505L-DIN-C**	36.3	43.9	44.9	81.9	81	0.9	6	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
5.1	3	☐	**MPS1-0510S-DIN**	20.3	27.9	28.9	65.9	65	0.9	6	4
	3	●	**MPS1-0510S-DIN-C**	20.3	27.9	28.9	65.9	65	0.9	6	2
	5	☐	**MPS1-0510L-DIN**	36.3	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MPS1-0510L-DIN-C**	36.3	43.9	44.9	81.9	81	0.9	6	2
	2	●	**MPS1-0510-PC**	11.0	26.8	28.8	66.8	66	0.8	6	2
	8	●	**MPS1-0510-L8C**	41.9	62.1	65.1	102.1	101	1.1	6	2
	10	☐	**MPS1-0510-L10C**	51.9	72.9	75.9	112.9	112	0.9	6	2
	12	●	**MPS1-0510-L12C**	62.1	83.9	86.9	123.9	123	0.9	6	2
	15	●	**MPS1-0510-L15C**	77.4	99.9	102.9	139.9	139	0.9	6	2
	20	●	**MPS1-0510-L20C**	102.9	127.9	130.9	167.9	167	0.9	6	2
	25	●	**MPS1-0510-L25C**	128.4	154.9	157.9	194.9	194	0.9	6	2
	30	●	**MPS1-0510-L30C**	153.9	182.9	185.9	222.9	222	0.9	6	2
	35	☐	**MPS1-0510-L35C**	179.4	203.9	211.9	248.9	248	0.9	6	2
	40	●	**MPS1-0510-L40C**	204.9	230.9	241.9	278.9	278	0.9	6	2
5.2	3	☐	**MPS1-0520S-DIN**	20.1	27.9	28.9	65.9	65	0.9	6	4
	3	●	**MPS1-0520S-DIN-C**	20.1	27.9	28.9	65.9	65	0.9	6	2
	5	☐	**MPS1-0520L-DIN**	36.1	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MPS1-0520L-DIN-C**	36.1	43.9	44.9	81.9	81	0.9	6	2
	2	●	**MPS1-0520-PC**	11.2	26.8	28.8	66.8	66	0.8	6	2
	8	●	**MPS1-0520-L8C**	42.7	62.1	65.1	102.1	101	1.1	6	2
	10	☐	**MPS1-0520-L10C**	52.9	72.9	75.9	112.9	112	0.9	6	2
	12	●	**MPS1-0520-L12C**	63.3	83.9	86.9	123.9	123	0.9	6	2
	15	●	**MPS1-0520-L15C**	78.9	99.9	102.9	139.9	139	0.9	6	2
	20	●	**MPS1-0520-L20C**	104.9	127.9	130.9	167.9	167	0.9	6	2
	25	●	**MPS1-0520-L25C**	130.9	154.9	157.9	194.9	194	0.9	6	2
	30	●	**MPS1-0520-L30C**	156.9	182.9	185.9	222.9	222	0.9	6	2
	35	☐	**MPS1-0520-L35C**	182.9	203.9	211.9	248.9	248	0.9	6	2
	40	●	**MPS1-0520-L40C**	208.9	230.9	241.9	278.9	278	0.9	6	2
5.3	3	☐	**MPS1-0530S-DIN**	20.0	28.0	29.0	66.0	65	1.0	6	4
	3	●	**MPS1-0530S-DIN-C**	20.0	28.0	29.0	66.0	65	1.0	6	2
	5	☐	**MPS1-0530L-DIN**	36.0	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MPS1-0530L-DIN-C**	36.0	44.0	45.0	82.0	81	1.0	6	2
	2	●	**MPS1-0530-PC**	11.4	26.8	28.8	66.8	66	0.8	6	2
	8	●	**MPS1-0530-L8C**	43.5	62.1	65.1	102.1	101	1.1	6	2
	10	☐	**MPS1-0530-L10C**	54.0	73.0	76.0	113.0	112	1.0	6	2
	12	●	**MPS1-0530-L12C**	64.6	84.0	87.0	124.0	123	1.0	6	2
	15	●	**MPS1-0530-L15C**	80.5	100.0	103.0	140.0	139	1.0	6	2
	20	☐	**MPS1-0530-L20C**	107.0	128.0	131.0	168.0	167	1.0	6	2
	25	●	**MPS1-0530-L25C**	133.5	155.0	158.0	195.0	194	1.0	6	2
	30	●	**MPS1-0530-L30C**	160.0	183.0	186.0	223.0	222	1.0	6	2
	35	☐	**MPS1-0530-L35C**	186.5	210.0	212.0	249.0	248	1.0	6	2
	40	●	**MPS1-0530-L40C**	213.0	241.0	242.0	279.0	278	1.0	6	2
5.4	3	☐	**MPS1-0540S-DIN**	19.9	28.0	29.0	66.0	65	1.0	6	2
	3	●	**MPS1-0540S-DIN-C**	19.9	28.0	29.0	66.0	65	1.0	6	4
	5	☐	**MPS1-0540L-DIN**	35.9	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MPS1-0540L-DIN-C**	35.9	44.0	45.0	82.0	81	1.0	6	2
	2	●	**MPS1-0540-PC**	11.7	26.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0540-L8C**	44.3	62.1	65.1	102.1	101	1.1	6	2
	10	☐	**MPS1-0540-L10C**	55.0	73.0	76.0	113.0	112	1.0	6	2
	12	●	**MPS1-0540-L12C**	65.8	84.0	87.0	124.0	123	1.0	6	2
	15	●	**MPS1-0540-L15C**	82.0	100.0	103.0	140.0	139	1.0	6	2
	20	●	**MPS1-0540-L20C**	109.0	128.0	131.0	168.0	167	1.0	6	2
	25	☐	**MPS1-0540-L25C**	136.0	155.0	158.0	195.0	194	1.0	6	2
	30	☐	**MPS1-0540-L30C**	163.0	183.0	186.0	223.0	222	1.0	6	2
	35	☐	**MPS1-0540-L35C**	190.0	210.0	212.0	249.0	248	1.0	6	2
	40	●	**MPS1-0540-L40C**	217.0	241.0	242.0	279.0	278	1.0	6	2

● : Inventory maintained. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
5.5	3	☐	**MPS1-0550S-DIN**	19.8	28.0	29.0	66.0	65	1.0	6	4
	3	●	**MPS1-0550S-DIN-C**	19.8	28.0	29.0	66.0	65	1.0	6	2
	5	☐	**MPS1-0550L-DIN**	35.8	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MPS1-0550L-DIN-C**	35.8	44.0	45.0	82.0	81	1.0	6	2
	2	●	**MPS1-0550-PC**	11.9	26.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0550-L8C**	45.1	62.1	65.1	102.1	101	1.1	6	2
	10	☐	**MPS1-0550-L10C**	56.0	73.0	76.0	113.0	112	1.0	6	2
	12	●	**MPS1-0550-L12C**	67.0	84.0	87.0	124.0	123	1.0	6	2
	15	●	**MPS1-0550-L15C**	83.5	100.0	103.0	140.0	139	1.0	6	2
	20	●	**MPS1-0550-L20C**	111.0	128.0	131.0	168.0	167	1.0	6	2
	25	●	**MPS1-0550-L25C**	138.5	155.0	158.0	195.0	194	1.0	6	2
	30	●	**MPS1-0550-L30C**	166.0	183.0	186.0	223.0	222	1.0	6	2
	35	☐	**MPS1-0550-L35C**	193.5	210.0	212.0	249.0	248	1.0	6	2
	40	●	**MPS1-0550-L40C**	221.0	241.0	242.0	279.0	278	1.0	6	2
5.55	3	☐	**MPS1-0555S-DIN**	19.7	28.0	29.0	66.0	65	1.0	6	4
	3	●	**MPS1-0555S-DIN-C**	19.7	28.0	29.0	66.0	65	1.0	6	2
	5	☐	**MPS1-0555L-DIN**	35.7	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MPS1-0555L-DIN-C**	35.7	44.0	45.0	82.0	81	1.0	6	2
5.6	3	☐	**MPS1-0560S-DIN**	19.6	28.0	29.0	66.0	65	1.0	6	4
	3	●	**MPS1-0560S-DIN-C**	19.6	28.0	29.0	66.0	65	1.0	6	2
	5	☐	**MPS1-0560L-DIN**	35.6	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MPS1-0560L-DIN-C**	35.6	44.0	45.0	82.0	81	1.0	6	2
	2	●	**MPS1-0560-PC**	12.1	28.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0560-L8C**	46.0	67.2	70.2	107.2	106	1.2	6	2
	10	☐	**MPS1-0560-L10C**	57.0	79.0	82.0	119.0	118	1.0	6	2
	12	●	**MPS1-0560-L12C**	68.2	91.0	94.0	131.0	130	1.0	6	2
	15	●	**MPS1-0560-L15C**	85.0	109.0	112.0	149.0	148	1.0	6	2
	20	☐	**MPS1-0560-L20C**	113.0	139.0	142.0	179.0	178	1.0	6	2
	25	☐	**MPS1-0560-L25C**	141.0	169.0	172.0	209.0	208	1.0	6	2
	30	●	**MPS1-0560-L30C**	169.0	199.0	202.0	239.0	238	1.0	6	2
	35	☐	**MPS1-0560-L35C**	197.0	223.0	231.0	268.0	267	1.0	6	2
	40	●	**MPS1-0560-L40C**	225.0	251.0	262.0	299.0	298	1.0	6	2
5.7	3	☐	**MPS1-0570S-DIN**	19.5	28.0	29.0	66.0	65	1.0	6	4
	3	●	**MPS1-0570S-DIN-C**	19.5	28.0	29.0	66.0	65	1.0	6	2
	5	☐	**MPS1-0570L-DIN**	35.5	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MPS1-0570L-DIN-C**	35.5	44.0	45.0	82.0	81	1.0	6	2
	2	●	**MPS1-0570-PC**	12.3	28.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0570-L8C**	46.8	67.2	70.2	107.2	106	1.2	6	2
	10	☐	**MPS1-0570-L10C**	58.0	79.0	82.0	119.0	118	1.0	6	2
	12	●	**MPS1-0570-L12C**	69.4	91.0	94.0	131.0	130	1.0	6	2
	15	●	**MPS1-0570-L15C**	86.5	109.0	112.0	149.0	148	1.0	6	2
	20	☐	**MPS1-0570-L20C**	115.0	139.0	142.0	179.0	178	1.0	6	2
	25	●	**MPS1-0570-L25C**	143.5	169.0	172.0	209.0	208	1.0	6	2
	30	☐	**MPS1-0570-L30C**	172.0	199.0	202.0	239.0	238	1.0	6	2
	35	☐	**MPS1-0570-L35C**	200.5	223.0	231.0	268.0	267	1.0	6	2
	40	●	**MPS1-0570-L40C**	229.0	251.0	262.0	299.0	298	1.0	6	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
5.8	3	☐	**MPS1-0580S-DIN**	19.4	28.1	29.1	66.1	65	1.1	6	4
	3	●	**MPS1-0580S-DIN-C**	19.4	28.1	29.1	66.1	65	1.1	6	2
	5	☐	**MPS1-0580L-DIN**	35.4	44.1	45.1	82.1	81	1.1	6	4
	5	●	**MPS1-0580L-DIN-C**	35.4	44.1	45.1	82.1	81	1.1	6	2
	2	●	**MPS1-0580-PC**	12.5	28.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0580-L8C**	47.6	67.2	70.2	107.2	106	1.2	6	2
	10	☐	**MPS1-0580-L10C**	59.1	79.1	82.1	119.1	118	1.1	6	2
	12	●	**MPS1-0580-L12C**	70.7	91.1	94.1	131.1	130	1.1	6	2
	15	●	**MPS1-0580-L15C**	88.1	109.1	112.1	149.1	148	1.1	6	2
	20	●	**MPS1-0580-L20C**	117.1	139.1	142.1	179.1	178	1.1	6	2
	25	☐	**MPS1-0580-L25C**	146.1	169.1	172.1	209.1	208	1.1	6	2
	30	●	**MPS1-0580-L30C**	175.1	199.1	202.1	239.1	238	1.1	6	2
	35	☐	**MPS1-0580-L35C**	204.1	229.1	231.1	268.1	267	1.1	6	2
	40	●	**MPS1-0580-L40C**	233.1	261.1	262.1	299.1	298	1.1	6	2
5.9	3	☐	**MPS1-0590S-DIN**	19.2	28.1	29.1	66.1	65	1.1	6	4
	3	●	**MPS1-0590S-DIN-C**	19.2	28.1	29.1	66.1	65	1.1	6	2
	5	☐	**MPS1-0590L-DIN**	35.2	44.1	45.1	82.1	81	1.1	6	4
	5	●	**MPS1-0590L-DIN-C**	35.2	44.1	45.1	82.1	81	1.1	6	2
	2	●	**MPS1-0590-PC**	12.7	28.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0590-L8C**	48.4	67.2	70.2	107.2	106	1.2	6	2
	10	☐	**MPS1-0590-L10C**	60.1	79.1	82.1	119.1	118	1.1	6	2
	12	●	**MPS1-0590-L12C**	71.9	91.1	94.1	131.1	130	1.1	6	2
	15	●	**MPS1-0590-L15C**	89.6	109.1	112.1	149.1	148	1.1	6	2
	20	●	**MPS1-0590-L20C**	119.1	139.1	142.1	179.1	178	1.1	6	2
	25	●	**MPS1-0590-L25C**	148.6	169.1	172.1	209.1	208	1.1	6	2
	30	☐	**MPS1-0590-L30C**	178.1	199.1	202.1	239.1	238	1.1	6	2
	35	☐	**MPS1-0590-L35C**	207.6	229.1	231.1	268.1	267	1.1	6	2
	40	●	**MPS1-0590-L40C**	237.1	261.1	262.1	299.1	298	1.1	6	2
6.0	3	☐	**MPS1-0600S-DIN**	19.1	28.1	29.1	66.1	65	1.1	6	4
	3	●	**MPS1-0600S-DIN-C**	19.1	28.1	29.1	66.1	65	1.1	6	2
	5	☐	**MPS1-0600L-DIN**	35.1	44.1	45.1	82.1	81	1.1	6	4
	5	●	**MPS1-0600L-DIN-C**	35.1	44.1	45.1	82.1	81	1.1	6	2
	2	●	**MPS1-0600-PC**	12.9	28.9	28.9	66.9	66	0.9	6	2
	8	●	**MPS1-0600-L8C**	49.2	67.2	70.2	107.2	106	1.2	6	2
	10	●	**MPS1-0600-L10C**	61.1	79.1	82.1	119.1	118	1.1	6	2
	12	●	**MPS1-0600-L12C**	73.1	91.1	94.1	131.1	130	1.1	6	2
	15	●	**MPS1-0600-L15C**	91.1	109.1	112.1	149.1	148	1.1	6	2
	20	●	**MPS1-0600-L20C**	121.1	139.1	142.1	179.1	178	1.1	6	2
	25	●	**MPS1-0600-L25C**	151.1	169.1	172.1	209.1	208	1.1	6	2
	30	●	**MPS1-0600-L30C**	181.1	199.1	202.1	239.1	238	1.1	6	2
	35	☐	**MPS1-0600-L35C**	211.1	229.1	231.1	268.1	267	1.1	6	2
	40	●	**MPS1-0600-L40C**	241.1	261.1	262.1	299.1	298	1.1	6	2
6.05	3	☐	**MPS1-0605S-DIN**	25.0	34.1	42.1	79.1	78	1.1	8	4
	3	●	**MPS1-0605S-DIN-C**	25.0	34.1	42.1	79.1	78	1.1	8	2
	5	☐	**MPS1-0605L-DIN**	44.0	53.1	54.1	91.1	90	1.1	8	4
	5	●	**MPS1-0605L-DIN-C**	44.0	53.1	54.1	91.1	90	1.1	8	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.1	3	☐	MPS1-0610S-DIN	25.0	34.1	42.1	79.1	78	1.1	8	4
	3	●	MPS1-0610S-DIN-C	25.0	34.1	42.1	79.1	78	1.1	8	2
	5	☐	MPS1-0610L-DIN	44.0	53.1	54.1	91.1	90	1.1	8	4
	5	●	MPS1-0610L-DIN-C	44.0	53.1	54.1	91.1	90	1.1	8	2
	2	●	MPS1-0610-PC	13.2	32.0	35.0	75.0	74	1.0	8	2
	8	●	MPS1-0610-L8C	50.1	73.3	76.3	113.3	112	1.3	8	2
	10	☐	MPS1-0610-L10C	62.1	86.1	89.1	126.1	125	1.1	8	2
	12	●	MPS1-0610-L12C	74.3	99.1	102.1	139.1	138	1.1	8	2
	15	●	MPS1-0610-L15C	92.6	118.1	121.1	158.1	157	1.1	8	2
	20	●	MPS1-0610-L20C	123.1	151.1	154.1	191.1	190	1.1	8	2
	25	●	MPS1-0610-L25C	153.6	183.1	186.1	223.1	222	1.1	8	2
	30	●	MPS1-0610-L30C	184.1	216.1	219.1	256.1	255	1.1	8	2
	35	☐	MPS1-0610-L35C	214.6	241.1	250.1	287.1	286	1.1	8	2
	40	●	MPS1-0610-L40C	245.1	271.1	284.1	321.1	320	1.1	8	2
6.2	3	☐	MPS1-0620S-DIN	24.8	34.1	42.1	79.1	78	1.1	8	4
	3	●	MPS1-0620S-DIN-C	24.8	34.1	42.1	79.1	78	1.1	8	2
	5	☐	MPS1-0620L-DIN	43.8	53.1	54.1	91.1	90	1.1	8	4
	5	●	MPS1-0620L-DIN-C	43.8	53.1	54.1	91.1	90	1.1	8	2
	2	●	MPS1-0620-PC	13.4	32.0	35.0	75.0	74	1.0	8	2
	8	●	MPS1-0620-L8C	50.9	73.3	76.3	113.3	112	1.3	8	2
	10	☐	MPS1-0620-L10C	63.1	86.1	89.1	126.1	125	1.1	8	2
	12	●	MPS1-0620-L12C	75.5	99.1	102.1	139.1	138	1.1	8	2
	15	●	MPS1-0620-L15C	94.1	118.1	121.1	158.1	157	1.1	8	2
	20	●	MPS1-0620-L20C	125.1	151.1	154.1	191.1	190	1.1	8	2
	25	☐	MPS1-0620-L25C	156.1	183.1	186.1	223.1	222	1.1	8	2
	30	●	MPS1-0620-L30C	187.1	216.1	219.1	256.1	255	1.1	8	2
	35	☐	MPS1-0620-L35C	218.1	241.1	250.1	287.1	286	1.1	8	2
	40	●	MPS1-0620-L40C	249.1	271.1	284.1	321.1	320	1.1	8	2
6.3	3	☐	MPS1-0630S-DIN	24.7	34.1	42.1	79.1	78	1.1	8	4
	3	●	MPS1-0630S-DIN-C	24.7	34.1	42.1	79.1	78	1.1	8	2
	5	☐	MPS1-0630L-DIN	43.7	53.1	54.1	91.1	90	1.1	8	4
	5	●	MPS1-0630L-DIN-C	43.7	53.1	54.1	91.1	90	1.1	8	2
	2	●	MPS1-0630-PC	13.6	32.0	35.0	75.0	74	1.0	8	2
	8	●	MPS1-0630-L8C	51.7	73.3	76.3	113.3	112	1.3	8	2
	10	☐	MPS1-0630-L10C	64.1	86.1	89.1	126.1	125	1.1	8	2
	12	●	MPS1-0630-L12C	76.7	99.1	102.1	139.1	138	1.1	8	2
	15	●	MPS1-0630-L15C	95.6	118.1	121.1	158.1	157	1.1	8	2
	20	●	MPS1-0630-L20C	127.1	151.1	154.1	191.1	190	1.1	8	2
	25	☐	MPS1-0630-L25C	158.6	183.1	186.1	223.1	222	1.1	8	2
	30	●	MPS1-0630-L30C	190.1	216.1	219.1	256.1	255	1.1	8	2
	35	☐	MPS1-0630-L35C	221.6	248.1	250.1	287.1	286	1.1	8	2
	40	●	MPS1-0630-L40C	253.1	281.1	284.1	321.1	320	1.1	8	2
6.4	3	☐	MPS1-0640S-DIN	24.6	34.2	42.2	79.2	78	1.2	8	4
	3	●	MPS1-0640S-DIN-C	24.6	34.2	42.2	79.2	78	1.2	8	2
	5	☐	MPS1-0640L-DIN	43.6	53.2	54.2	91.2	90	1.2	8	4
	5	●	MPS1-0640L-DIN-C	43.6	53.2	54.2	91.2	90	1.2	8	2
	2	●	MPS1-0640-PC	13.8	32.0	35.0	75.0	74	1.0	8	2
	8	●	MPS1-0640-L8C	52.5	73.3	76.3	113.3	112	1.3	8	2
	10	☐	MPS1-0640-L10C	65.2	86.2	89.2	126.2	125	1.2	8	2
	12	●	MPS1-0640-L12C	78.0	99.2	102.2	139.2	138	1.2	8	2
	15	●	MPS1-0640-L15C	97.2	118.2	121.2	158.2	157	1.2	8	2
	20	●	MPS1-0640-L20C	129.2	151.2	154.2	191.2	190	1.2	8	2
	25	●	MPS1-0640-L25C	161.2	183.2	186.2	223.2	222	1.2	8	2
	30	●	MPS1-0640-L30C	193.2	216.2	219.2	256.2	255	1.2	8	2
	35	☐	MPS1-0640-L35C	225.2	248.2	250.2	287.2	286	1.2	8	2
	40	●	MPS1-0640-L40C	257.2	281.2	284.2	321.2	320	1.2	8	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.5	3	☐	MPS1-0650S-DIN	24.4	34.2	42.2	79.2	78	1.2	8	4
	3	●	MPS1-0650S-DIN-C	24.4	34.2	42.2	79.2	78	1.2	8	2
	5	☐	MPS1-0650L-DIN	43.4	53.2	54.2	91.2	90	1.2	8	4
	5	●	MPS1-0650L-DIN-C	43.4	53.2	54.2	91.2	90	1.2	8	2
	2	●	MPS1-0650-PC	14.0	32.0	35.0	75.0	74	1.0	8	2
	8	●	MPS1-0650-L8C	53.3	73.3	76.3	113.3	112	1.3	8	2
	10	☐	MPS1-0650-L10C	66.2	86.2	89.2	126.2	125	1.2	8	2
	12	●	MPS1-0650-L12C	79.2	99.2	102.2	139.2	138	1.2	8	2
	15	●	MPS1-0650-L15C	98.7	118.2	121.2	158.2	157	1.2	8	2
	20	●	MPS1-0650-L20C	131.2	151.2	154.2	191.2	190	1.2	8	2
	25	●	MPS1-0650-L25C	163.7	183.2	186.2	223.2	222	1.2	8	2
	30	●	MPS1-0650-L30C	196.2	216.2	219.2	256.2	255	1.2	8	2
	35	☐	MPS1-0650-L35C	228.7	248.2	250.2	287.2	286	1.2	8	2
	40	●	MPS1-0650-L40C	261.2	281.2	284.2	321.2	320	1.2	8	2
6.6	3	☐	MPS1-0660S-DIN	24.3	34.2	42.2	79.2	78	1.2	8	4
	3	●	MPS1-0660S-DIN-C	24.3	34.2	42.2	79.2	78	1.2	8	2
	5	☐	MPS1-0660L-DIN	43.3	53.2	54.2	91.2	90	1.2	8	4
	5	●	MPS1-0660L-DIN-C	43.3	53.2	54.2	91.2	90	1.2	8	2
	2	●	MPS1-0660-PC	14.2	35.0	37.0	75.0	74	1.0	8	2
	8	●	MPS1-0660-L8C	54.2	78.4	81.4	118.4	117	1.4	8	2
	10	☐	MPS1-0660-L10C	67.2	92.2	95.2	132.2	131	1.2	8	2
	12	●	MPS1-0660-L12C	80.4	106.2	109.2	146.2	145	1.2	8	2
	15	●	MPS1-0660-L15C	100.2	127.2	130.2	167.2	166	1.2	8	2
	20	☐	MPS1-0660-L20C	133.2	162.2	165.2	202.2	201	1.2	8	2
	25	●	MPS1-0660-L25C	166.2	197.2	200.2	237.2	236	1.2	8	2
	30	●	MPS1-0660-L30C	199.2	232.2	235.2	272.2	271	1.2	8	2
	35	☐	MPS1-0660-L35C	232.2	267.2	269.2	306.2	305	1.2	8	2
	40	●	MPS1-0660-L40C	265.2	301.2	304.2	341.2	340	1.2	8	2
6.7	3	☐	MPS1-0670S-DIN	24.2	34.2	42.2	79.2	78	1.2	8	4
	3	●	MPS1-0670S-DIN-C	24.2	34.2	42.2	79.2	78	1.2	8	2
	5	☐	MPS1-0670L-DIN	43.2	53.2	54.2	91.2	90	1.2	8	4
	5	●	MPS1-0670L-DIN-C	43.2	53.2	54.2	91.2	90	1.2	8	2
	2	●	MPS1-0670-PC	14.5	35.1	37.1	75.1	74	1.1	8	2
	8	●	MPS1-0670-L8C	55.0	78.4	81.4	118.4	117	1.4	8	2
	10	☐	MPS1-0670-L10C	68.2	92.2	95.2	132.2	131	1.2	8	2
	12	●	MPS1-0670-L12C	81.6	106.2	109.2	146.2	145	1.2	8	2
	15	●	MPS1-0670-L15C	101.7	127.2	130.2	167.2	166	1.2	8	2
	20	☐	MPS1-0670-L20C	135.2	162.2	165.2	202.2	201	1.2	8	2
	25	☐	MPS1-0670-L25C	168.7	197.2	200.2	237.2	236	1.2	8	2
	30	●	MPS1-0670-L30C	202.2	232.2	235.2	272.2	271	1.2	8	2
	35	☐	MPS1-0670-L35C	235.7	267.2	269.2	306.2	305	1.2	8	2
	40	●	MPS1-0670-L40C	269.2	301.2	304.2	341.2	340	1.2	8	2
6.8	3	☐	MPS1-0680S-DIN	24.0	34.2	42.2	79.2	78	1.2	8	4
	3	●	MPS1-0680S-DIN-C	24.0	34.2	42.2	79.2	78	1.2	8	2
	5	☐	MPS1-0680L-DIN	43.0	53.2	54.2	91.2	90	1.2	8	4
	5	●	MPS1-0680L-DIN-C	43.0	53.2	54.2	91.2	90	1.2	8	2
	2	●	MPS1-0680-PC	14.7	35.1	37.1	75.1	74	1.1	8	2
	8	●	MPS1-0680-L8C	55.8	78.4	81.4	118.4	117	1.4	8	2
	10	☐	MPS1-0680-L10C	69.2	92.2	95.2	132.2	131	1.2	8	2
	12	●	MPS1-0680-L12C	82.8	106.2	109.2	146.2	145	1.2	8	2
	15	●	MPS1-0680-L15C	103.2	127.2	130.2	167.2	166	1.2	8	2
	20	●	MPS1-0680-L20C	137.2	162.2	165.2	202.2	201	1.2	8	2
	25	●	MPS1-0680-L25C	171.2	197.2	200.2	237.2	236	1.2	8	2
	30	●	MPS1-0680-L30C	205.2	232.2	235.2	272.2	271	1.2	8	2
	35	☐	MPS1-0680-L35C	239.2	267.2	269.2	306.2	305	1.2	8	2
	40	●	MPS1-0680-L40C	273.2	301.2	304.2	341.2	340	1.2	8	2

● : Inventory maintained. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.9	3	☐	**MPS1-0690S-DIN**	23.9	34.3	42.3	79.3	78	1.3	8	4
	3	●	**MPS1-0690S-DIN-C**	23.9	34.3	42.3	79.3	78	1.3	8	2
	5	☐	**MPS1-0690L-DIN**	42.9	53.3	54.3	91.3	90	1.3	8	4
	5	●	**MPS1-0690L-DIN-C**	42.9	53.3	54.3	91.3	90	1.3	8	2
	2	●	**MPS1-0690-PC**	14.9	35.1	37.1	75.1	74	1.1	8	2
	8	●	**MPS1-0690-L8C**	56.6	78.4	81.4	118.4	117	1.4	8	2
	10	☐	**MPS1-0690-L10C**	70.3	92.3	95.3	132.3	131	1.3	8	2
	12	●	**MPS1-0690-L12C**	84.1	106.3	109.3	146.3	145	1.3	8	2
	15	●	**MPS1-0690-L15C**	104.8	127.3	130.3	167.3	166	1.3	8	2
	20	●	**MPS1-0690-L20C**	139.3	162.3	165.3	202.3	201	1.3	8	2
	25	●	**MPS1-0690-L25C**	173.8	197.3	200.3	237.3	236	1.3	8	2
	30	●	**MPS1-0690-L30C**	208.3	232.3	235.3	272.3	271	1.3	8	2
	35	☐	**MPS1-0690-L35C**	242.8	267.3	269.3	306.3	305	1.3	8	2
	40	●	**MPS1-0690-L40C**	277.3	301.3	304.3	341.3	340	1.3	8	2
7.0	3	☐	**MPS1-0700S-DIN**	23.8	34.3	42.3	79.3	78	1.3	8	4
	3	●	**MPS1-0700S-DIN-C**	23.8	34.3	42.3	79.3	78	1.3	8	2
	5	☐	**MPS1-0700L-DIN**	42.8	53.3	54.3	91.3	90	1.3	8	4
	5	●	**MPS1-0700L-DIN-C**	42.8	53.3	54.3	91.3	90	1.3	8	2
	2	●	**MPS1-0700-PC**	15.1	35.1	37.1	75.1	74	1.1	8	2
	8	●	**MPS1-0700-L8C**	57.4	78.4	81.4	118.4	117	1.4	8	2
	10	●	**MPS1-0700-L10C**	71.3	92.3	95.3	132.3	131	1.3	8	2
	12	●	**MPS1-0700-L12C**	85.3	106.3	109.3	146.3	145	1.3	8	2
	15	●	**MPS1-0700-L15C**	106.3	127.3	130.3	167.3	166	1.3	8	2
	20	●	**MPS1-0700-L20C**	141.3	162.3	165.3	202.3	201	1.3	8	2
	25	●	**MPS1-0700-L25C**	176.3	197.3	200.3	237.3	236	1.3	8	2
	30	●	**MPS1-0700-L30C**	211.3	232.3	235.3	272.3	271	1.3	8	2
	35	☐	**MPS1-0700-L35C**	246.3	267.3	269.3	306.3	305	1.3	8	2
	40	●	**MPS1-0700-L40C**	281.3	301.3	304.3	341.3	340	1.3	8	2
7.1	3	☐	**MPS1-0710S-DIN**	30.6	41.3	42.3	79.3	78	1.3	8	4
	3	●	**MPS1-0710S-DIN-C**	30.6	41.3	42.3	79.3	78	1.3	8	2
	5	☐	**MPS1-0710L-DIN**	42.6	53.3	54.3	91.3	90	1.3	8	4
	5	●	**MPS1-0710L-DIN-C**	42.6	53.3	54.3	91.3	90	1.3	8	2
	2	●	**MPS1-0710-PC**	15.3	35.1	38.1	80.1	79	1.1	8	2
	8	●	**MPS1-0710-L8C**	58.3	84.5	87.5	124.5	123	1.5	8	2
	10	☐	**MPS1-0710-L10C**	72.3	99.3	102.3	139.3	138	1.3	8	2
	12	●	**MPS1-0710-L12C**	86.5	114.3	117.3	154.3	153	1.3	8	2
	15	●	**MPS1-0710-L15C**	107.8	136.3	139.3	176.3	175	1.3	8	2
	20	●	**MPS1-0710-L20C**	143.3	174.3	177.3	214.3	213	1.3	8	2
	25	●	**MPS1-0710-L25C**	178.8	211.3	214.3	251.3	250	1.3	8	2
	30	●	**MPS1-0710-L30C**	214.3	249.3	252.3	289.3	288	1.3	8	2
	35	☐	**MPS1-0710-L35C**	249.8	286.3	288.3	325.3	324	1.3	8	2
	40	●	**MPS1-0710-L40C**	285.3	321.3	323.3	360.3	359	1.3	8	2
7.2	3	☐	**MPS1-0720S-DIN**	30.5	41.3	42.3	79.3	78	1.3	8	4
	3	●	**MPS1-0720S-DIN-C**	30.5	41.3	42.3	79.3	78	1.3	8	2
	5	☐	**MPS1-0720L-DIN**	42.5	53.3	54.3	91.3	90	1.3	8	4
	5	●	**MPS1-0720L-DIN-C**	42.5	53.3	54.3	91.3	90	1.3	8	2
	2	●	**MPS1-0720-PC**	15.5	35.1	38.1	80.1	79	1.1	8	2
	8	●	**MPS1-0720-L8C**	59.1	84.5	87.5	124.5	123	1.5	8	2
	10	☐	**MPS1-0720-L10C**	73.3	99.3	102.3	139.3	138	1.3	8	2
	12	●	**MPS1-0720-L12C**	87.7	114.3	117.3	154.3	153	1.3	8	2
	15	☐	**MPS1-0720-L15C**	109.3	136.3	139.3	176.3	175	1.3	8	2
	20	☐	**MPS1-0720-L20C**	145.3	174.3	177.3	214.3	213	1.3	8	2
	25	☐	**MPS1-0720-L25C**	181.3	211.3	214.3	251.3	250	1.3	8	2
	30	☐	**MPS1-0720-L30C**	217.3	249.3	252.3	289.3	288	1.3	8	2
	35	☐	**MPS1-0720-L35C**	253.3	286.3	288.3	325.3	324	1.3	8	2
	40	●	**MPS1-0720-L40C**	289.3	321.3	323.3	360.3	359	1.3	8	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.3	3	☐	**MPS1-0730S-DIN**	30.4	41.3	42.3	79.3	78	1.3	8	4
	3	●	**MPS1-0730S-DIN-C**	30.4	41.3	42.3	79.3	78	1.3	8	2
	5	☐	**MPS1-0730L-DIN**	42.4	53.3	54.3	91.3	90	1.3	8	4
	5	●	**MPS1-0730L-DIN-C**	42.4	53.3	54.3	91.3	90	1.3	8	2
	2	●	**MPS1-0730-PC**	15.8	35.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0730-L8C**	59.9	84.5	87.5	124.5	123	1.5	8	2
	10	☐	**MPS1-0730-L10C**	74.3	99.3	102.3	139.3	138	1.3	8	2
	12	●	**MPS1-0730-L12C**	88.9	114.3	117.3	154.3	153	1.3	8	2
	15	☐	**MPS1-0730-L15C**	110.8	136.3	139.3	176.3	175	1.3	8	2
	20	☐	**MPS1-0730-L20C**	147.3	174.3	177.3	214.3	213	1.3	8	2
	25	☐	**MPS1-0730-L25C**	183.8	211.3	214.3	251.3	250	1.3	8	2
	30	☐	**MPS1-0730-L30C**	220.3	249.3	252.3	289.3	288	1.3	8	2
	35	☐	**MPS1-0730-L35C**	256.8	286.3	288.3	325.3	324	1.3	8	2
	40	●	**MPS1-0730-L40C**	293.3	321.3	323.3	360.3	359	1.3	8	2
7.4	3	☐	**MPS1-0740S-DIN**	30.2	41.3	42.3	79.3	78	1.3	8	4
	3	●	**MPS1-0740S-DIN-C**	30.2	41.3	42.3	79.3	78	1.3	8	2
	5	☐	**MPS1-0740L-DIN**	42.2	53.3	54.3	91.3	90	1.3	8	4
	5	●	**MPS1-0740L-DIN-C**	42.2	53.3	54.3	91.3	90	1.3	8	2
	2	●	**MPS1-0740-PC**	16.0	35.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0740-L8C**	60.7	84.5	87.5	124.5	123	1.5	8	2
	10	☐	**MPS1-0740-L10C**	75.3	99.3	102.3	139.3	138	1.3	8	2
	12	●	**MPS1-0740-L12C**	90.1	114.3	117.3	154.3	153	1.3	8	2
	15	☐	**MPS1-0740-L15C**	112.3	136.3	139.3	176.3	175	1.3	8	2
	20	☐	**MPS1-0740-L20C**	149.3	174.3	177.3	214.3	213	1.3	8	2
	25	☐	**MPS1-0740-L25C**	186.3	211.3	214.3	251.3	250	1.3	8	2
	30	☐	**MPS1-0740-L30C**	223.3	249.3	252.3	289.3	288	1.3	8	2
	35	☐	**MPS1-0740-L35C**	260.3	286.3	288.3	325.3	324	1.3	8	2
	40	●	**MPS1-0740-L40C**	297.3	321.3	323.3	360.3	359	1.3	8	2
7.5	3	☐	**MPS1-0750S-DIN**	30.1	41.4	42.4	79.4	78	1.4	8	4
	3	●	**MPS1-0750S-DIN-C**	30.1	41.4	42.4	79.4	78	1.4	8	2
	5	☐	**MPS1-0750L-DIN**	42.1	53.4	54.4	91.4	90	1.4	8	4
	5	●	**MPS1-0750L-DIN-C**	42.1	53.4	54.4	91.4	90	1.4	8	2
	2	●	**MPS1-0750-PC**	16.2	35.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0750-L8C**	61.6	84.6	87.6	124.6	123	1.6	8	2
	10	☐	**MPS1-0750-L10C**	76.4	99.4	102.4	139.4	138	1.4	8	2
	12	●	**MPS1-0750-L12C**	91.4	114.4	117.4	154.4	153	1.4	8	2
	15	●	**MPS1-0750-L15C**	113.9	136.4	139.4	176.4	175	1.4	8	2
	20	●	**MPS1-0750-L20C**	151.4	174.4	177.4	214.4	213	1.4	8	2
	25	●	**MPS1-0750-L25C**	188.9	211.4	214.4	251.4	250	1.4	8	2
	30	●	**MPS1-0750-L30C**	226.4	249.4	252.4	289.4	288	1.4	8	2
	35	☐	**MPS1-0750-L35C**	263.9	286.4	288.4	325.4	324	1.4	8	2
	40	●	**MPS1-0750-L40C**	301.4	321.4	323.4	360.4	359	1.4	8	2
7.6	3	☐	**MPS1-0760S-DIN**	30.0	41.4	42.4	79.4	78	1.4	8	4
	3	●	**MPS1-0760S-DIN-C**	30.0	41.4	42.4	79.4	78	1.4	8	2
	5	☐	**MPS1-0760L-DIN**	42.0	53.4	54.4	91.4	90	1.4	8	4
	5	●	**MPS1-0760L-DIN-C**	42.0	53.4	54.4	91.4	90	1.4	8	2
	2	●	**MPS1-0760-PC**	16.4	38.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0760-L8C**	62.4	89.6	92.6	129.6	128	1.6	8	2
	10	☐	**MPS1-0760-L10C**	77.4	105.4	108.4	145.4	144	1.4	8	2
	12	●	**MPS1-0760-L12C**	92.6	121.4	124.4	161.4	160	1.4	8	2
	15	●	**MPS1-0760-L15C**	115.4	145.4	148.4	185.4	184	1.4	8	2
	20	☐	**MPS1-0760-L20C**	153.4	185.4	188.4	225.4	224	1.4	8	2
	25	●	**MPS1-0760-L25C**	191.4	225.4	228.4	265.4	264	1.4	8	2
	30	☐	**MPS1-0760-L30C**	229.4	265.4	268.4	305.4	304	1.4	8	2
	35	☐	**MPS1-0760-L35C**	267.4	305.4	307.4	344.4	343	1.4	8	2
	40	●	**MPS1-0760-L40C**	305.4	341.4	342.4	379.4	378	1.4	8	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.7	3	☐	**MPS1-0770S-DIN**	29.9	41.4	42.4	79.4	78	1.4	8	4
	3	●	**MPS1-0770S-DIN-C**	29.9	41.4	42.4	79.4	78	1.4	8	2
	5	☐	**MPS1-0770L-DIN**	41.9	53.4	54.4	91.4	90	1.4	8	4
	5	●	**MPS1-0770L-DIN-C**	41.9	53.4	54.4	91.4	90	1.4	8	2
	2	●	**MPS1-0770-PC**	16.6	38.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0770-L8C**	63.2	89.6	92.6	129.6	128	1.6	8	2
	10	☐	**MPS1-0770-L10C**	78.4	105.4	108.4	145.4	144	1.4	8	2
	12	●	**MPS1-0770-L12C**	93.8	121.4	124.4	161.4	160	1.4	8	2
	15	●	**MPS1-0770-L15C**	116.9	145.4	148.4	185.4	184	1.4	8	2
	20	☐	**MPS1-0770-L20C**	155.4	185.4	188.4	225.4	224	1.4	8	2
	25	●	**MPS1-0770-L25C**	193.9	225.4	228.4	265.4	264	1.4	8	2
	30	☐	**MPS1-0770-L30C**	232.4	265.4	268.4	305.4	304	1.4	8	2
	35	☐	**MPS1-0770-L35C**	270.9	305.4	307.4	344.4	343	1.4	8	2
	40	●	**MPS1-0770-L40C**	309.4	341.4	342.4	379.4	378	1.4	8	2
7.8	3	☐	**MPS1-0780S-DIN**	29.7	41.4	42.4	79.4	78	1.4	8	4
	3	●	**MPS1-0780S-DIN-C**	29.7	41.4	42.4	79.4	78	1.4	8	2
	5	☐	**MPS1-0780L-DIN**	41.7	53.4	54.4	91.4	90	1.4	8	4
	5	●	**MPS1-0780L-DIN-C**	41.7	53.4	54.4	91.4	90	1.4	8	2
	2	●	**MPS1-0780-PC**	16.8	38.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0780-L8C**	64.0	89.6	92.6	129.6	128	1.6	8	2
	10	☐	**MPS1-0780-L10C**	79.4	105.4	108.4	145.4	144	1.4	8	2
	12	●	**MPS1-0780-L12C**	95.0	121.4	124.4	161.4	160	1.4	8	2
	15	●	**MPS1-0780-L15C**	118.4	145.4	148.4	185.4	184	1.4	8	2
	20	☐	**MPS1-0780-L20C**	157.4	185.4	188.4	225.4	224	1.4	8	2
	25	☐	**MPS1-0780-L25C**	196.4	225.4	228.4	265.4	264	1.4	8	2
	30	●	**MPS1-0780-L30C**	235.4	265.4	268.4	305.4	304	1.4	8	2
	35	☐	**MPS1-0780-L35C**	274.4	305.4	307.4	344.4	343	1.4	8	2
	40	●	**MPS1-0780-L40C**	313.4	341.4	342.4	379.4	378	1.4	8	2
7.9	3	☐	**MPS1-0790S-DIN**	29.6	41.4	42.4	79.4	78	1.4	8	4
	3	●	**MPS1-0790S-DIN-C**	29.6	41.4	42.4	79.4	78	1.4	8	2
	5	☐	**MPS1-0790L-DIN**	41.6	53.4	54.4	91.4	90	1.4	8	4
	5	●	**MPS1-0790L-DIN-C**	41.6	53.4	54.4	91.4	90	1.4	8	2
	2	●	**MPS1-0790-PC**	17.0	38.2	38.2	80.2	79	1.2	8	2
	8	●	**MPS1-0790-L8C**	64.8	89.6	92.6	129.6	128	1.6	8	2
	10	☐	**MPS1-0790-L10C**	80.4	105.4	108.4	145.4	144	1.4	8	2
	12	●	**MPS1-0790-L12C**	96.2	121.4	124.4	161.4	160	1.4	8	2
	15	☐	**MPS1-0790-L15C**	119.9	145.4	148.4	185.4	184	1.4	8	2
	20	☐	**MPS1-0790-L20C**	159.4	185.4	188.4	225.4	224	1.4	8	2
	25	●	**MPS1-0790-L25C**	198.9	225.4	228.4	265.4	264	1.4	8	2
	30	●	**MPS1-0790-L30C**	238.4	265.4	268.4	305.4	304	1.4	8	2
	35	☐	**MPS1-0790-L35C**	277.9	305.4	307.4	344.4	343	1.4	8	2
	40	●	**MPS1-0790-L40C**	317.4	341.4	342.4	379.4	378	1.4	8	2
8.0	3	☐	**MPS1-0800S-DIN**	29.5	41.5	42.5	79.5	78	1.5	8	4
	3	●	**MPS1-0800S-DIN-C**	29.5	41.5	42.5	79.5	78	1.5	8	2
	5	☐	**MPS1-0800L-DIN**	41.5	53.5	54.5	91.5	90	1.5	8	4
	5	●	**MPS1-0800L-DIN-C**	41.5	53.5	54.5	91.5	90	1.5	8	2
	2	●	**MPS1-0800-PC**	17.3	38.3	38.3	80.3	79	1.3	8	2
	8	●	**MPS1-0800-L8C**	65.7	89.7	92.7	129.7	128	1.7	8	2
	10	●	**MPS1-0800-L10C**	81.5	105.5	108.5	145.5	144	1.5	8	2
	12	●	**MPS1-0800-L12C**	97.5	121.5	124.5	161.5	160	1.5	8	2
	15	●	**MPS1-0800-L15C**	121.5	145.5	148.5	185.5	184	1.5	8	2
	20	●	**MPS1-0800-L20C**	161.5	185.5	188.5	225.5	224	1.5	8	2
	25	●	**MPS1-0800-L25C**	201.5	225.5	228.5	265.5	264	1.5	8	2
	30	●	**MPS1-0800-L30C**	241.5	265.5	268.5	305.5	304	1.5	8	2
	35	☐	**MPS1-0800-L35C**	281.5	305.5	307.5	344.5	343	1.5	8	2
	40	●	**MPS1-0800-L40C**	321.5	341.5	342.5	379.5	378	1.5	8	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.05	3	☐	**MPS1-0805S-DIN**	34.4	46.5	47.5	88.5	87	1.5	10	4
	3	●	**MPS1-0805S-DIN-C**	34.4	46.5	47.5	88.5	87	1.5	10	2
	5	☐	**MPS1-0805L-DIN**	48.4	60.5	61.5	102.5	101	1.5	10	4
	5	●	**MPS1-0805L-DIN-C**	48.4	60.5	61.5	102.5	101	1.5	10	2
8.1	3	☐	**MPS1-0810S-DIN**	34.3	46.5	47.5	88.5	87	1.5	10	4
	3	●	**MPS1-0810S-DIN-C**	34.3	46.5	47.5	88.5	87	1.5	10	2
	5	☐	**MPS1-0810L-DIN**	48.3	60.5	61.5	102.5	101	1.5	10	4
	5	●	**MPS1-0810L-DIN-C**	48.3	60.5	61.5	102.5	101	1.5	10	2
	2	●	**MPS1-0810-PC**	17.5	38.3	41.3	85.3	84	1.3	10	2
	8	●	**MPS1-0810-L8C**	66.5	95.7	98.7	139.7	138	1.7	10	2
	10	☐	**MPS1-0810-L10C**	82.5	112.5	115.5	156.5	155	1.5	10	2
	12	●	**MPS1-0810-L12C**	98.7	129.5	132.5	173.5	172	1.5	10	2
	15	●	**MPS1-0810-L15C**	123.0	154.5	157.5	198.5	197	1.5	10	2
	20	●	**MPS1-0810-L20C**	163.5	197.5	200.5	241.5	240	1.5	10	2
	25	☐	**MPS1-0810-L25C**	204.0	239.5	242.5	283.5	282	1.5	10	2
	30	☐	**MPS1-0810-L30C**	244.5	282.5	284.5	325.5	324	1.5	10	2
	35	☐	**MPS1-0810-L35C**	285.0	324.5	326.5	367.5	366	1.5	10	2
	40	●	**MPS1-0810-L40C**	325.5	366.5	370.5	411.5	410	1.5	10	2
8.2	3	☐	**MPS1-0820S-DIN**	34.2	46.5	47.5	88.5	87	1.5	10	4
	3	●	**MPS1-0820S-DIN-C**	34.2	46.5	47.5	88.5	87	1.5	10	2
	5	☐	**MPS1-0820L-DIN**	48.2	60.5	61.5	102.5	101	1.5	10	4
	5	●	**MPS1-0820L-DIN-C**	48.2	60.5	61.5	102.5	101	1.5	10	2
	2	●	**MPS1-0820-PC**	17.7	38.3	41.3	85.3	84	1.3	10	2
	8	●	**MPS1-0820-L8C**	67.3	95.7	98.7	139.7	138	1.7	10	2
	10	☐	**MPS1-0820-L10C**	83.5	112.5	115.5	156.5	155	1.5	10	2
	12	●	**MPS1-0820-L12C**	99.9	129.5	132.5	173.5	172	1.5	10	2
	15	●	**MPS1-0820-L15C**	124.5	154.5	157.5	198.5	197	1.5	10	2
	20	●	**MPS1-0820-L20C**	165.5	197.5	200.5	241.5	240	1.5	10	2
	25	☐	**MPS1-0820-L25C**	206.5	239.5	242.5	283.5	282	1.5	10	2
	30	☐	**MPS1-0820-L30C**	247.5	282.5	284.5	325.5	324	1.5	10	2
	35	☐	**MPS1-0820-L35C**	288.5	324.5	326.5	367.5	366	1.5	10	2
	40	●	**MPS1-0820-L40C**	329.5	366.5	370.5	411.5	410	1.5	10	2
8.3	3	☐	**MPS1-0830S-DIN**	34.1	46.5	47.5	88.5	87	1.5	10	4
	3	●	**MPS1-0830S-DIN-C**	34.1	46.5	47.5	88.5	87	1.5	10	2
	5	☐	**MPS1-0830L-DIN**	48.1	60.5	61.5	102.5	101	1.5	10	4
	5	●	**MPS1-0830L-DIN-C**	48.1	60.5	61.5	102.5	101	1.5	10	2
	2	●	**MPS1-0830-PC**	17.9	38.3	41.3	85.3	84	1.3	10	2
	8	●	**MPS1-0830-L8C**	68.1	95.7	98.7	139.7	138	1.7	10	2
	10	☐	**MPS1-0830-L10C**	84.5	112.5	115.5	156.5	155	1.5	10	2
	12	●	**MPS1-0830-L12C**	101.1	129.5	132.5	173.5	172	1.5	10	2
	15	☐	**MPS1-0830-L15C**	126.0	154.5	157.5	198.5	197	1.5	10	2
	20	☐	**MPS1-0830-L20C**	167.5	197.5	200.5	241.5	240	1.5	10	2
	25	☐	**MPS1-0830-L25C**	209.0	239.5	242.5	283.5	282	1.5	10	2
	30	☐	**MPS1-0830-L30C**	250.5	282.5	284.5	325.5	324	1.5	10	2
	35	☐	**MPS1-0830-L35C**	292.0	324.5	326.5	367.5	366	1.5	10	2
	40	●	**MPS1-0830-L40C**	333.5	366.5	370.5	411.5	410	1.5	10	2

● : Inventory maintained. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.4	3	☐	**MPS1-0840S-DIN**	33.9	46.5	47.5	88.5	87	1.5	10	4
	3	●	**MPS1-0840S-DIN-C**	33.9	46.5	47.5	88.5	87	1.5	10	2
	5	☐	**MPS1-0840L-DIN**	47.9	60.5	61.5	102.5	101	1.5	10	4
	5	●	**MPS1-0840L-DIN-C**	47.9	60.5	61.5	102.5	101	1.5	10	2
	2	●	**MPS1-0840-PC**	18.1	38.3	41.3	85.3	84	1.3	10	2
	8	●	**MPS1-0840-L8C**	68.9	95.7	98.7	139.7	138	1.7	10	2
	10	☐	**MPS1-0840-L10C**	85.5	112.5	115.5	156.5	155	1.5	10	2
	12	●	**MPS1-0840-L12C**	102.3	129.5	132.5	173.5	172	1.5	10	2
	15	●	**MPS1-0840-L15C**	127.5	154.5	157.5	198.5	197	1.5	10	2
	20	☐	**MPS1-0840-L20C**	169.5	197.5	200.5	241.5	240	1.5	10	2
	25	☐	**MPS1-0840-L25C**	211.5	239.5	242.5	283.5	282	1.5	10	2
	30	☐	**MPS1-0840-L30C**	253.5	282.5	284.5	325.5	324	1.5	10	2
	35	☐	**MPS1-0840-L35C**	295.5	324.5	326.5	367.5	366	1.5	10	2
	40	●	**MPS1-0840-L40C**	337.5	366.5	370.5	411.5	410	1.5	10	2
8.5	3	☐	**MPS1-0850S-DIN**	33.8	46.5	47.5	88.5	87	1.5	10	4
	3	●	**MPS1-0850S-DIN-C**	33.8	46.5	47.5	88.5	87	1.5	10	2
	5	☐	**MPS1-0850L-DIN**	47.8	60.5	61.5	102.5	101	1.5	10	4
	5	●	**MPS1-0850L-DIN-C**	47.8	60.5	61.5	102.5	101	1.5	10	2
	2	●	**MPS1-0850-PC**	18.3	38.3	41.3	85.3	84	1.3	10	2
	8	●	**MPS1-0850-L8C**	69.8	95.8	98.8	139.8	138	1.8	10	2
	10	☐	**MPS1-0850-L10C**	86.5	112.5	115.5	156.5	155	1.5	10	2
	12	●	**MPS1-0850-L12C**	103.5	129.5	132.5	173.5	172	1.5	10	2
	15	●	**MPS1-0850-L15C**	129.0	154.5	157.5	198.5	197	1.5	10	2
	20	●	**MPS1-0850-L20C**	171.5	197.5	200.5	241.5	240	1.5	10	2
	25	●	**MPS1-0850-L25C**	214.0	239.5	242.5	283.5	282	1.5	10	2
	30	●	**MPS1-0850-L30C**	256.5	282.5	284.5	325.5	324	1.5	10	2
	35	☐	**MPS1-0850-L35C**	299.0	324.5	326.5	367.5	366	1.5	10	2
	40	●	**MPS1-0850-L40C**	341.5	366.5	370.5	411.5	410	1.5	10	2
8.6	3	☐	**MPS1-0860S-DIN**	33.7	46.6	47.6	88.6	87	1.6	10	4
	3	●	**MPS1-0860S-DIN-C**	33.7	46.6	47.6	88.6	87	1.6	10	2
	5	☐	**MPS1-0860L-DIN**	47.7	60.6	61.6	102.6	101	1.6	10	4
	5	●	**MPS1-0860L-DIN-C**	47.7	60.6	61.6	102.6	101	1.6	10	2
	2	●	**MPS1-0860-PC**	18.6	41.4	43.4	85.4	84	1.4	10	2
	8	●	**MPS1-0860-L8C**	70.6	100.8	103.8	144.8	143	1.8	10	2
	10	☐	**MPS1-0860-L10C**	87.6	118.6	121.6	162.6	161	1.6	10	2
	12	●	**MPS1-0860-L12C**	104.8	136.6	139.6	180.6	179	1.6	10	2
	15	●	**MPS1-0860-L15C**	130.6	163.6	166.6	207.6	206	1.6	10	2
	20	☐	**MPS1-0860-L20C**	173.6	208.6	211.6	252.6	251	1.6	10	2
	25	●	**MPS1-0860-L25C**	216.6	253.6	256.6	297.6	296	1.6	10	2
	30	●	**MPS1-0860-L30C**	259.6	298.6	300.6	341.6	340	1.6	10	2
	35	☐	**MPS1-0860-L35C**	302.6	343.6	345.6	386.6	385	1.6	10	2
	40	●	**MPS1-0860-L40C**	345.6	391.6	394.6	435.6	434	1.6	10	2
8.7	3	☐	**MPS1-0870S-DIN**	33.5	46.6	47.6	88.6	87	1.6	10	4
	3	●	**MPS1-0870S-DIN-C**	33.5	46.6	47.6	88.6	87	1.6	10	2
	5	☐	**MPS1-0870L-DIN**	47.5	60.6	61.6	102.6	101	1.6	10	4
	5	●	**MPS1-0870L-DIN-C**	47.5	60.6	61.6	102.6	101	1.6	10	2
	2	●	**MPS1-0870-PC**	18.8	41.4	43.4	85.4	84	1.4	10	2
	8	●	**MPS1-0870-L8C**	71.4	100.8	103.8	144.8	143	1.8	10	2
	10	☐	**MPS1-0870-L10C**	88.6	118.6	121.6	162.6	161	1.6	10	2
	12	●	**MPS1-0870-L12C**	106.0	136.6	139.6	180.6	179	1.6	10	2
	15	●	**MPS1-0870-L15C**	132.1	163.6	166.6	207.6	206	1.6	10	2
	20	☐	**MPS1-0870-L20C**	175.6	208.6	211.6	252.6	251	1.6	10	2
	25	●	**MPS1-0870-L25C**	219.1	253.6	256.6	297.6	296	1.6	10	2
	30	☐	**MPS1-0870-L30C**	262.6	298.6	300.6	341.6	340	1.6	10	2
	35	☐	**MPS1-0870-L35C**	306.1	343.6	345.6	386.6	385	1.6	10	2
	40	●	**MPS1-0870-L40C**	349.6	391.6	394.6	435.6	434	1.6	10	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.8	3	☐	**MPS1-0880S-DIN**	33.4	46.6	47.6	88.6	87	1.6	10	4
	3	●	**MPS1-0880S-DIN-C**	33.4	46.6	47.6	88.6	87	1.6	10	2
	5	☐	**MPS1-0880L-DIN**	47.4	60.6	61.6	102.6	101	1.6	10	4
	5	●	**MPS1-0880L-DIN-C**	47.4	60.6	61.6	102.6	101	1.6	10	2
	2	●	**MPS1-0880-PC**	19.0	41.4	43.4	85.4	84	1.4	10	2
	8	●	**MPS1-0880-L8C**	72.2	100.8	103.8	144.8	143	1.8	10	2
	10	☐	**MPS1-0880-L10C**	89.6	118.6	121.6	162.6	161	1.6	10	2
	12	●	**MPS1-0880-L12C**	107.2	136.6	139.6	180.6	179	1.6	10	2
	15	●	**MPS1-0880-L15C**	133.6	163.6	166.6	207.6	206	1.6	10	2
	20	●	**MPS1-0880-L20C**	177.6	208.6	211.6	252.6	251	1.6	10	2
	25	●	**MPS1-0880-L25C**	221.6	253.6	256.6	297.6	296	1.6	10	2
	30	●	**MPS1-0880-L30C**	265.6	298.6	300.6	341.6	340	1.6	10	2
	35	☐	**MPS1-0880-L35C**	309.6	343.6	345.6	386.6	385	1.6	10	2
	40	●	**MPS1-0880-L40C**	353.6	391.6	394.6	435.6	434	1.6	10	2
8.9	3	☐	**MPS1-0890S-DIN**	33.3	46.6	47.6	88.6	87	1.6	10	4
	3	●	**MPS1-0890S-DIN-C**	33.3	46.6	47.6	88.6	87	1.6	10	2
	5	☐	**MPS1-0890L-DIN**	47.3	60.6	61.6	102.6	101	1.6	10	4
	5	●	**MPS1-0890L-DIN-C**	47.3	60.6	61.6	102.6	101	1.6	10	2
	2	●	**MPS1-0890-PC**	19.2	41.4	43.4	85.4	84	1.4	10	2
	8	●	**MPS1-0890-L8C**	73.0	100.8	103.8	144.8	143	1.8	10	2
	10	☐	**MPS1-0890-L10C**	90.6	118.6	121.6	162.6	161	1.6	10	2
	12	●	**MPS1-0890-L12C**	108.4	136.6	139.6	180.6	179	1.6	10	2
	15	☐	**MPS1-0890-L15C**	135.1	163.6	166.6	207.6	206	1.6	10	2
	20	☐	**MPS1-0890-L20C**	179.6	208.6	211.6	252.6	251	1.6	10	2
	25	☐	**MPS1-0890-L25C**	224.1	253.6	256.6	297.6	296	1.6	10	2
	30	☐	**MPS1-0890-L30C**	268.6	298.6	300.6	341.6	340	1.6	10	2
	35	☐	**MPS1-0890-L35C**	313.1	343.6	345.6	386.6	385	1.6	10	2
	40	●	**MPS1-0890-L40C**	357.6	391.6	394.6	435.6	434	1.6	10	2
9.0	3	☐	**MPS1-0900S-DIN**	33.1	46.6	47.6	88.6	87	1.6	10	4
	3	●	**MPS1-0900S-DIN-C**	33.1	46.6	47.6	88.6	87	1.6	10	2
	5	☐	**MPS1-0900L-DIN**	47.1	60.6	61.6	102.6	101	1.6	10	4
	5	●	**MPS1-0900L-DIN-C**	47.1	60.6	61.6	102.6	101	1.6	10	2
	2	●	**MPS1-0900-PC**	19.4	41.4	43.4	85.4	84	1.4	10	2
	8	●	**MPS1-0900-L8C**	73.9	100.9	103.9	144.9	143	1.9	10	2
	10	●	**MPS1-0900-L10C**	91.6	118.6	121.6	162.6	161	1.6	10	2
	12	●	**MPS1-0900-L12C**	109.6	136.6	139.6	180.6	179	1.6	10	2
	15	●	**MPS1-0900-L15C**	136.6	163.6	166.6	207.6	206	1.6	10	2
	20	●	**MPS1-0900-L20C**	181.6	208.6	211.6	252.6	251	1.6	10	2
	25	●	**MPS1-0900-L25C**	226.6	253.6	256.6	297.6	296	1.6	10	2
	30	●	**MPS1-0900-L30C**	271.6	298.6	300.6	341.6	340	1.6	10	2
	35	☐	**MPS1-0900-L35C**	316.6	343.6	345.6	386.6	385	1.6	10	2
	40	●	**MPS1-0900-L40C**	361.6	391.6	394.6	435.6	434	1.6	10	2
9.1	3	☐	**MPS1-0910S-DIN**	33.0	46.7	47.7	88.7	87	1.7	10	4
	3	●	**MPS1-0910S-DIN-C**	33.0	46.7	47.7	88.7	87	1.7	10	2
	5	☐	**MPS1-0910L-DIN**	47.0	60.7	61.7	102.7	101	1.7	10	4
	5	●	**MPS1-0910L-DIN-C**	47.0	60.7	61.7	102.7	101	1.7	10	2
	2	●	**MPS1-0910-PC**	19.6	41.4	44.4	90.4	89	1.4	10	2
	8	●	**MPS1-0910-L8C**	74.7	106.9	109.9	150.9	149	1.9	10	2
	10	☐	**MPS1-0910-L10C**	92.7	125.7	128.7	169.7	168	1.7	10	2
	12	●	**MPS1-0910-L12C**	110.9	144.7	147.7	188.7	187	1.7	10	2
	15	●	**MPS1-0910-L15C**	138.2	172.7	175.7	216.7	215	1.7	10	2
	20	☐	**MPS1-0910-L20C**	183.7	220.7	223.7	264.7	263	1.7	10	2
	25	☐	**MPS1-0910-L25C**	229.2	267.7	270.7	311.7	310	1.7	10	2
	30	●	**MPS1-0910-L30C**	274.7	315.7	318.7	359.7	358	1.7	10	2
	35	☐	**MPS1-0910-L35C**	320.2	362.7	364.7	405.7	404	1.7	10	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
9.2	3	□	MPS1-0920S-DIN	32.9	46.7	47.7	88.7	87	1.7	10	4
	3	●	MPS1-0920S-DIN-C	32.9	46.7	47.7	88.7	87	1.7	10	2
	5	□	MPS1-0920L-DIN	46.9	60.7	61.7	102.7	101	1.7	10	4
	5	●	MPS1-0920L-DIN-C	46.9	60.7	61.7	102.7	101	1.7	10	2
	2	●	MPS1-0920-PC	19.9	41.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0920-L8C	75.5	106.9	109.9	150.9	149	1.9	10	2
	10	□	MPS1-0920-L10C	93.7	125.7	128.7	169.7	168	1.7	10	2
	12	●	MPS1-0920-L12C	112.1	144.7	147.7	188.7	187	1.7	10	2
	15	●	MPS1-0920-L15C	139.7	172.7	175.7	216.7	215	1.7	10	2
	20	□	MPS1-0920-L20C	185.7	220.7	223.7	264.7	263	1.7	10	2
	25	□	MPS1-0920-L25C	231.7	267.7	270.7	311.7	310	1.7	10	2
	30	□	MPS1-0920-L30C	277.7	315.7	318.7	359.7	358	1.7	10	2
	35	□	MPS1-0920-L35C	323.7	362.7	364.7	405.7	404	1.7	10	2
9.3	3	□	MPS1-0930S-DIN	32.7	46.7	47.7	88.7	87	1.7	10	4
	3	●	MPS1-0930S-DIN-C	32.7	46.7	47.7	88.7	87	1.7	10	2
	5	□	MPS1-0930L-DIN	46.7	60.7	61.7	102.7	101	1.7	10	4
	5	●	MPS1-0930L-DIN-C	46.7	60.7	61.7	102.7	101	1.7	10	2
	2	●	MPS1-0930-PC	20.1	41.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0930-L8C	76.3	106.9	109.9	150.9	149	1.9	10	2
	10	□	MPS1-0930-L10C	94.7	125.7	128.7	169.7	168	1.7	10	2
	12	●	MPS1-0930-L12C	113.3	144.7	147.7	188.7	187	1.7	10	2
	15	□	MPS1-0930-L15C	141.2	172.7	175.7	216.7	215	1.7	10	2
	20	□	MPS1-0930-L20C	187.7	220.7	223.7	264.7	263	1.7	10	2
	25	□	MPS1-0930-L25C	234.2	267.7	270.7	311.7	310	1.7	10	2
	30	□	MPS1-0930-L30C	280.7	315.7	318.7	359.7	358	1.7	10	2
	35	□	MPS1-0930-L35C	327.2	362.7	364.7	405.7	404	1.7	10	2
9.4	3	□	MPS1-0940S-DIN	32.6	46.7	47.7	88.7	87	1.7	10	4
	3	●	MPS1-0940S-DIN-C	32.6	46.7	47.7	88.7	87	1.7	10	2
	5	□	MPS1-0940L-DIN	46.6	60.7	61.7	102.7	101	1.7	10	4
	5	●	MPS1-0940L-DIN-C	46.6	60.7	61.7	102.7	101	1.7	10	2
	2	●	MPS1-0940-PC	20.3	41.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0940-L8C	77.1	106.9	109.9	150.9	149	1.9	10	2
	10	□	MPS1-0940-L10C	95.7	125.7	128.7	169.7	168	1.7	10	2
	12	●	MPS1-0940-L12C	114.5	144.7	147.7	188.7	187	1.7	10	2
	15	□	MPS1-0940-L15C	142.7	172.7	175.7	216.7	215	1.7	10	2
	20	□	MPS1-0940-L20C	189.7	220.7	223.7	264.7	263	1.7	10	2
	25	□	MPS1-0940-L25C	236.7	267.7	270.7	311.7	310	1.7	10	2
	30	□	MPS1-0940-L30C	283.7	315.7	318.7	359.7	358	1.7	10	2
	35	□	MPS1-0940-L35C	330.7	362.7	364.7	405.7	404	1.7	10	2
9.5	3	□	MPS1-0950S-DIN	32.5	46.7	47.7	88.7	87	1.7	10	4
	3	●	MPS1-0950S-DIN-C	32.5	46.7	47.7	88.7	87	1.7	10	2
	5	□	MPS1-0950L-DIN	46.5	60.7	61.7	102.7	101	1.7	10	4
	5	●	MPS1-0950L-DIN-C	46.5	60.7	61.7	102.7	101	1.7	10	2
	2	●	MPS1-0950-PC	20.5	41.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0950-L8C	78.0	107.0	110.0	151.0	149	2.0	10	2
	10	□	MPS1-0950-L10C	96.7	125.7	128.7	169.7	168	1.7	10	2
	12	●	MPS1-0950-L12C	115.7	144.7	147.7	188.7	187	1.7	10	2
	15	●	MPS1-0950-L15C	144.2	172.7	175.7	216.7	215	1.7	10	2
	20	●	MPS1-0950-L20C	191.7	220.7	223.7	264.7	263	1.7	10	2
	25	●	MPS1-0950-L25C	239.2	267.7	270.7	311.7	310	1.7	10	2
	30	●	MPS1-0950-L30C	286.7	315.7	318.7	359.7	358	1.7	10	2
	35	□	MPS1-0950-L35C	334.2	362.7	364.7	405.7	404	1.7	10	2
9.6	3	□	MPS1-0960S-DIN	32.3	46.7	47.7	88.7	87	1.7	10	4
	3	●	MPS1-0960S-DIN-C	32.3	46.7	47.7	88.7	87	1.7	10	2
	5	□	MPS1-0960L-DIN	46.3	60.7	61.7	102.7	101	1.7	10	4
	5	●	MPS1-0960L-DIN-C	46.3	60.7	61.7	102.7	101	1.7	10	2
	2	●	MPS1-0960-PC	20.7	44.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0960-L8C	78.8	112.0	115.0	156.0	154	2.0	10	2
	10	□	MPS1-0960-L10C	97.7	131.7	134.7	175.7	174	1.7	10	2
	12	●	MPS1-0960-L12C	116.9	151.7	154.7	195.7	194	1.7	10	2
	15	●	MPS1-0960-L15C	145.7	181.7	184.7	225.7	224	1.7	10	2
	20	□	MPS1-0960-L20C	193.7	231.7	234.7	275.7	274	1.7	10	2
	25	□	MPS1-0960-L25C	241.7	281.7	284.7	325.7	324	1.7	10	2
	30	□	MPS1-0960-L30C	289.7	331.7	334.7	375.7	374	1.7	10	2
	35	□	MPS1-0960-L35C	337.7	381.7	383.7	424.7	423	1.7	10	2
9.7	3	□	MPS1-0970S-DIN	32.2	46.8	47.8	88.8	87	1.8	10	4
	3	●	MPS1-0970S-DIN-C	32.2	46.8	47.8	88.8	87	1.8	10	2
	5	□	MPS1-0970L-DIN	46.2	60.8	61.8	102.8	101	1.8	10	4
	5	●	MPS1-0970L-DIN-C	46.2	60.8	61.8	102.8	101	1.8	10	2
	2	●	MPS1-0970-PC	20.9	44.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0970-L8C	79.6	112.0	115.0	156.0	154	2.0	10	2
	10	□	MPS1-0970-L10C	98.8	131.8	134.8	175.8	174	1.8	10	2
	12	●	MPS1-0970-L12C	118.2	151.8	154.8	195.8	194	1.8	10	2
	15	●	MPS1-0970-L15C	147.3	181.8	184.8	225.8	224	1.8	10	2
	20	□	MPS1-0970-L20C	195.8	231.8	234.8	275.8	274	1.8	10	2
	25	□	MPS1-0970-L25C	244.3	281.8	284.8	325.8	324	1.8	10	2
	30	□	MPS1-0970-L30C	292.8	331.8	334.8	375.8	374	1.8	10	2
	35	□	MPS1-0970-L35C	341.3	381.8	383.8	424.8	423	1.8	10	2
9.8	3	□	MPS1-0980S-DIN	32.1	46.8	47.8	88.8	87	1.8	10	4
	3	●	MPS1-0980S-DIN-C	32.1	46.8	47.8	88.8	87	1.8	10	2
	5	□	MPS1-0980L-DIN	46.1	60.8	61.8	102.8	101	1.8	10	4
	5	●	MPS1-0980L-DIN-C	46.1	60.8	61.8	102.8	101	1.8	10	2
	2	●	MPS1-0980-PC	21.1	44.5	44.5	90.5	89	1.5	10	2
	8	●	MPS1-0980-L8C	80.4	112.0	115.0	156.0	154	2.0	10	2
	10	□	MPS1-0980-L10C	99.8	131.8	134.8	175.8	174	1.8	10	2
	12	●	MPS1-0980-L12C	119.4	151.8	154.8	195.8	194	1.8	10	2
	15	●	MPS1-0980-L15C	148.8	181.8	184.8	225.8	224	1.8	10	2
	20	●	MPS1-0980-L20C	197.8	231.8	234.8	275.8	274	1.8	10	2
	25	□	MPS1-0980-L25C	246.8	281.8	284.8	325.8	324	1.8	10	2
	30	●	MPS1-0980-L30C	295.8	331.8	334.8	375.8	374	1.8	10	2
	35	□	MPS1-0980-L35C	344.8	381.8	383.8	424.8	423	1.8	10	2
9.9	3	□	MPS1-0990S-DIN	32.0	46.8	47.8	88.8	87	1.8	10	4
	3	●	MPS1-0990S-DIN-C	32.0	46.8	47.8	88.8	87	1.8	10	2
	5	□	MPS1-0990L-DIN	46.0	60.8	61.8	102.8	101	1.8	10	4
	5	●	MPS1-0990L-DIN-C	46.0	60.8	61.8	102.8	101	1.8	10	2
	2	●	MPS1-0990-PC	21.4	44.6	44.6	90.6	89	1.6	10	2
	8	●	MPS1-0990-L8C	81.3	112.1	115.1	156.1	154	2.1	10	2
	10	□	MPS1-0990-L10C	100.8	131.8	134.8	175.8	174	1.8	10	2
	12	●	MPS1-0990-L12C	120.6	151.8	154.8	195.8	194	1.8	10	2
	15	●	MPS1-0990-L15C	150.3	181.8	184.8	225.8	224	1.8	10	2
	20	□	MPS1-0990-L20C	199.8	231.8	234.8	275.8	274	1.8	10	2
	25	□	MPS1-0990-L25C	249.3	281.8	284.8	325.8	324	1.8	10	2
	30	□	MPS1-0990-L30C	298.8	331.8	334.8	375.8	374	1.8	10	2
	35	□	MPS1-0990-L35C	348.3	381.8	383.8	424.8	423	1.8	10	2

● : Inventory maintained. □ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.0	3	☐	MPS1-1000S-DIN	31.8	46.8	47.8	88.8	87	1.8	10	4
	3	●	MPS1-1000S-DIN-C	31.8	46.8	47.8	88.8	87	1.8	10	2
	5	☐	MPS1-1000L-DIN	45.8	60.8	61.8	102.8	101	1.8	10	4
	5	●	MPS1-1000L-DIN-C	45.8	60.8	61.8	102.8	101	1.8	10	2
	2	●	MPS1-1000-PC	21.6	44.6	44.6	90.6	89	1.6	10	2
	8	●	MPS1-1000-L8C	82.1	112.1	115.1	156.1	154	2.1	10	2
	10	●	MPS1-1000-L10C	101.8	131.8	134.8	175.8	174	1.8	10	2
	12	●	MPS1-1000-L12C	121.8	151.8	154.8	195.8	194	1.8	10	2
	15	●	MPS1-1000-L15C	151.8	181.8	184.8	225.8	224	1.8	10	2
	20	●	MPS1-1000-L20C	201.8	231.8	234.8	275.8	274	1.8	10	2
	25	●	MPS1-1000-L25C	251.8	281.8	284.8	325.8	324	1.8	10	2
	30	●	MPS1-1000-L30C	301.8	331.8	334.8	375.8	374	1.8	10	2
	35	☐	MPS1-1000-L35C	351.8	381.8	383.8	424.8	423	1.8	10	2
10.05	3	☐	MPS1-1005S-DIN	39.8	54.8	55.8	101.8	100	1.8	12	4
	3	●	MPS1-1005S-DIN-C	39.8	54.8	55.8	101.8	100	1.8	12	2
	5	☐	MPS1-1005L-DIN	55.8	70.8	71.8	117.8	116	1.8	12	4
	5	●	MPS1-1005L-DIN-C	55.8	70.8	71.8	117.8	116	1.8	12	2
10.1	3	☐	MPS1-1010S-DIN	39.7	54.8	55.8	101.8	100	1.8	12	4
	3	●	MPS1-1010S-DIN-C	39.7	54.8	55.8	101.8	100	1.8	12	2
	5	☐	MPS1-1010L-DIN	55.7	70.8	71.8	117.8	116	1.8	12	4
	5	●	MPS1-1010L-DIN-C	55.7	70.8	71.8	117.8	116	1.8	12	2
	2	●	MPS1-1010-PC	21.8	44.6	47.6	96.6	95	1.6	12	2
	8	●	MPS1-1010-L8C	82.9	118.1	121.1	167.1	165	2.1	12	2
	10	☐	MPS1-1010-L10C	102.8	138.8	141.8	187.8	186	1.8	12	2
	12	●	MPS1-1010-L12C	123.0	159.8	162.8	208.8	207	1.8	12	2
	15	●	MPS1-1010-L15C	153.3	190.8	193.8	239.8	238	1.8	12	2
	20	●	MPS1-1010-L20C	203.8	243.8	246.8	292.8	291	1.8	12	2
	25	☐	MPS1-1010-L25C	254.3	295.8	298.8	344.8	343	1.8	12	2
10.2	3	☐	MPS1-1020S-DIN	39.6	54.9	55.9	101.9	100	1.9	12	4
	3	●	MPS1-1020S-DIN-C	39.6	54.9	55.9	101.9	100	1.9	12	2
	5	☐	MPS1-1020L-DIN	55.6	70.9	71.9	117.9	116	1.9	12	4
	5	●	MPS1-1020L-DIN-C	55.6	70.9	71.9	117.9	116	1.9	12	2
	2	●	MPS1-1020-PC	22.0	44.6	47.6	96.6	95	1.6	12	2
	8	●	MPS1-1020-L8C	83.7	118.1	121.1	167.1	165	2.1	12	2
	10	☐	MPS1-1020-L10C	103.9	138.9	141.9	187.9	186	1.9	12	2
	12	●	MPS1-1020-L12C	124.3	159.9	162.9	208.9	207	1.9	12	2
	15	●	MPS1-1020-L15C	154.9	190.9	193.9	239.9	238	1.9	12	2
	20	●	MPS1-1020-L20C	205.9	243.9	246.9	292.9	291	1.9	12	2
	25	☐	MPS1-1020-L25C	256.9	295.9	298.9	344.9	343	1.9	12	2
10.3	3	☐	MPS1-1030S-DIN	39.4	54.9	55.9	101.9	100	1.9	12	4
	3	●	MPS1-1030S-DIN-C	39.4	54.9	55.9	101.9	100	1.9	12	2
	5	☐	MPS1-1030L-DIN	55.4	70.9	71.9	117.9	116	1.9	12	4
	5	●	MPS1-1030L-DIN-C	55.4	70.9	71.9	117.9	116	1.9	12	2
	2	●	MPS1-1030-PC	22.2	44.6	47.6	96.6	95	1.6	12	2
	8	●	MPS1-1030-L8C	84.5	118.1	121.1	167.1	165	2.1	12	2
	10	☐	MPS1-1030-L10C	104.9	138.9	141.9	187.9	186	1.9	12	2
	12	●	MPS1-1030-L12C	125.5	159.9	162.9	208.9	207	1.9	12	2
	15	☐	MPS1-1030-L15C	156.4	190.9	193.9	239.9	238	1.9	12	2
	20	☐	MPS1-1030-L20C	207.9	243.9	246.9	292.9	291	1.9	12	2
	25	☐	MPS1-1030-L25C	259.4	295.9	298.9	344.9	343	1.9	12	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.4	3	☐	MPS1-1040S-DIN	39.3	54.9	55.9	101.9	100	1.9	12	4
	3	●	MPS1-1040S-DIN-C	39.3	54.9	55.9	101.9	100	1.9	12	2
	5	☐	MPS1-1040L-DIN	55.3	70.9	71.9	117.9	116	1.9	12	4
	5	●	MPS1-1040L-DIN-C	55.3	70.9	71.9	117.9	116	1.9	12	2
	2	●	MPS1-1040-PC	22.4	44.6	47.6	96.6	95	1.6	12	2
	8	●	MPS1-1040-L8C	85.4	118.2	121.2	167.2	165	2.2	12	2
	10	☐	MPS1-1040-L10C	105.9	138.9	141.9	187.9	186	1.9	12	2
	12	●	MPS1-1040-L12C	126.7	159.9	162.9	208.9	207	1.9	12	2
	15	☐	MPS1-1040-L15C	157.9	190.9	193.9	239.9	238	1.9	12	2
	20	☐	MPS1-1040-L20C	209.9	243.9	246.9	292.9	291	1.9	12	2
	25	☐	MPS1-1040-L25C	261.9	295.9	298.9	344.9	343	1.9	12	2
10.5	3	☐	MPS1-1050S-DIN	39.2	54.9	55.9	101.9	100	1.9	12	4
	3	●	MPS1-1050S-DIN-C	39.2	54.9	55.9	101.9	100	1.9	12	2
	5	☐	MPS1-1050L-DIN	55.2	70.9	71.9	117.9	116	1.9	12	4
	5	●	MPS1-1050L-DIN-C	55.2	70.9	71.9	117.9	116	1.9	12	2
	2	●	MPS1-1050-PC	22.7	44.7	47.7	96.7	95	1.7	12	2
	8	●	MPS1-1050-L8C	86.2	118.2	121.2	167.2	165	2.2	12	2
	10	☐	MPS1-1050-L10C	106.9	138.9	141.9	187.9	186	1.9	12	2
	12	●	MPS1-1050-L12C	127.9	159.9	162.9	208.9	207	1.9	12	2
	15	●	MPS1-1050-L15C	159.4	190.9	193.9	239.9	238	1.9	12	2
	20	●	MPS1-1050-L20C	211.9	243.9	246.9	292.9	291	1.9	12	2
	25	●	MPS1-1050-L25C	264.4	295.9	298.9	344.9	343	1.9	12	2
10.6	3	☐	MPS1-1060S-DIN	39.0	54.9	55.9	101.9	100	1.9	12	4
	3	●	MPS1-1060S-DIN-C	39.0	54.9	55.9	101.9	100	1.9	12	2
	5	☐	MPS1-1060L-DIN	55.0	70.9	71.9	117.9	116	1.9	12	4
	5	●	MPS1-1060L-DIN-C	55.0	70.9	71.9	117.9	116	1.9	12	2
	2	☐	MPS1-1060-PC	22.9	48.7	49.7	96.7	95	1.7	12	2
	8	●	MPS1-1060-L8C	87.0	123.2	126.2	172.2	170	2.2	12	2
	10	☐	MPS1-1060-L10C	107.9	144.9	147.9	193.9	192	1.9	12	2
	12	☐	MPS1-1060-L12C	129.1	166.9	169.9	215.9	214	1.9	12	2
	15	☐	MPS1-1060-L15C	160.9	199.9	202.9	248.9	247	1.9	12	2
	20	☐	MPS1-1060-L20C	213.9	254.9	257.9	303.9	302	1.9	12	2
	25	☐	MPS1-1060-L25C	266.9	309.9	312.9	358.9	357	1.9	12	2
10.7	3	☐	MPS1-1070S-DIN	38.9	54.9	55.9	101.9	100	1.9	12	4
	3	●	MPS1-1070S-DIN-C	38.9	54.9	55.9	101.9	100	1.9	12	2
	5	☐	MPS1-1070L-DIN	54.9	70.9	71.9	117.9	116	1.9	12	4
	5	●	MPS1-1070L-DIN-C	54.9	70.9	71.9	117.9	116	1.9	12	2
	2	●	MPS1-1070-PC	23.1	48.7	49.7	96.7	95	1.7	12	2
	8	●	MPS1-1070-L8C	87.8	123.2	126.2	172.2	170	2.2	12	2
	10	☐	MPS1-1070-L10C	108.9	144.9	147.9	193.9	192	1.9	12	2
	12	●	MPS1-1070-L12C	130.3	166.9	169.9	215.9	214	1.9	12	2
	15	☐	MPS1-1070-L15C	162.4	199.9	202.9	248.9	247	1.9	12	2
	20	☐	MPS1-1070-L20C	215.9	254.9	257.9	303.9	302	1.9	12	2
	25	☐	MPS1-1070-L25C	269.4	309.9	312.9	358.9	357	1.9	12	2
10.8	3	☐	MPS1-1080S-DIN	38.8	55.0	56.0	102.0	100	2.0	12	4
	3	●	MPS1-1080S-DIN-C	38.8	55.0	56.0	102.0	100	2.0	12	2
	5	☐	MPS1-1080L-DIN	54.8	71.0	72.0	118.0	116	2.0	12	4
	5	●	MPS1-1080L-DIN-C	54.8	71.0	72.0	118.0	116	2.0	12	2
	2	●	MPS1-1080-PC	23.3	48.7	49.7	96.7	95	1.7	12	2
	8	●	MPS1-1080-L8C	88.6	123.2	126.2	172.2	170	2.2	12	2
	10	☐	MPS1-1080-L10C	110.0	145.0	148.0	194.0	192	2.0	12	2
	12	●	MPS1-1080-L12C	131.6	167.0	170.0	216.0	214	2.0	12	2
	15	☐	MPS1-1080-L15C	164.0	200.0	203.0	249.0	247	2.0	12	2
	20	☐	MPS1-1080-L20C	218.0	255.0	258.0	304.0	302	2.0	12	2
	25	☐	MPS1-1080-L25C	272.0	310.0	313.0	359.0	357	2.0	12	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.9	3	☐	**MPS1-1090S-DIN**	38.6	55.0	56.0	102.0	100	2.0	12	4
	3	●	**MPS1-1090S-DIN-C**	38.6	55.0	56.0	102.0	100	2.0	12	2
	5	☐	**MPS1-1090L-DIN**	54.6	71.0	72.0	118.0	116	2.0	12	4
	5	●	**MPS1-1090L-DIN-C**	54.6	71.0	72.0	118.0	116	2.0	12	2
	2	☐	**MPS1-1090-PC**	23.5	48.7	49.7	96.7	95	1.7	12	2
	8	●	**MPS1-1090-L8C**	89.5	123.3	126.3	172.3	170	2.3	12	2
	10	☐	**MPS1-1090-L10C**	111.0	145.0	148.0	194.0	192	2.0	12	2
	12	☐	**MPS1-1090-L12C**	132.8	167.0	170.0	216.0	214	2.0	12	2
	15	☐	**MPS1-1090-L15C**	165.5	200.0	203.0	249.0	247	2.0	12	2
	20	☐	**MPS1-1090-L20C**	220.0	255.0	258.0	304.0	302	2.0	12	2
	25	☐	**MPS1-1090-L25C**	274.5	310.0	313.0	359.0	357	2.0	12	2
11.0	3	☐	**MPS1-1100S-DIN**	38.5	55.0	56.0	102.0	100	2.0	12	4
	3	●	**MPS1-1100S-DIN-C**	38.5	55.0	56.0	102.0	100	2.0	12	2
	5	☐	**MPS1-1100L-DIN**	54.5	71.0	72.0	118.0	116	2.0	12	4
	5	●	**MPS1-1100L-DIN-C**	54.5	71.0	72.0	118.0	116	2.0	12	2
	2	●	**MPS1-1100-PC**	23.7	48.7	49.7	96.7	95	1.7	12	2
	8	●	**MPS1-1100-L8C**	90.3	123.3	126.3	172.3	170	2.3	12	2
	10	☐	**MPS1-1100-L10C**	112.0	145.0	148.0	194.0	192	2.0	12	2
	12	●	**MPS1-1100-L12C**	134.0	167.0	170.0	216.0	214	2.0	12	2
	15	●	**MPS1-1100-L15C**	167.0	200.0	203.0	249.0	247	2.0	12	2
	20	●	**MPS1-1100-L20C**	222.0	255.0	258.0	304.0	302	2.0	12	2
	25	●	**MPS1-1100-L25C**	277.0	310.0	313.0	359.0	357	2.0	12	2
11.1	3	☐	**MPS1-1110S-DIN**	38.4	55.0	56.0	102.0	100	2.0	12	4
	3	●	**MPS1-1110S-DIN-C**	38.4	55.0	56.0	102.0	100	2.0	12	2
	5	☐	**MPS1-1110L-DIN**	54.4	71.0	72.0	118.0	116	2.0	12	4
	5	●	**MPS1-1110L-DIN-C**	54.4	71.0	72.0	118.0	116	2.0	12	2
	2	●	**MPS1-1110-PC**	23.9	48.7	51.7	96.7	95	1.7	12	2
	8	●	**MPS1-1110-L8C**	91.1	129.3	132.3	178.3	176	2.3	12	2
	10	☐	**MPS1-1110-L10C**	113.0	152.0	155.0	201.0	199	2.0	12	2
	12	●	**MPS1-1110-L12C**	135.2	175.0	178.0	224.0	222	2.0	12	2
	15	●	**MPS1-1110-L15C**	168.5	209.0	212.0	258.0	256	2.0	12	2
	20	☐	**MPS1-1110-L20C**	224.0	267.0	270.0	316.0	314	2.0	12	2
	25	●	**MPS1-1110-L25C**	279.5	324.0	327.0	373.0	371	2.0	12	2
11.2	3	☐	**MPS1-1120S-DIN**	38.2	55.0	56.0	102.0	100	2.0	12	4
	3	●	**MPS1-1120S-DIN-C**	38.2	55.0	56.0	102.0	100	2.0	12	2
	5	☐	**MPS1-1120L-DIN**	54.2	71.0	72.0	118.0	116	2.0	12	4
	5	●	**MPS1-1120L-DIN-C**	54.2	71.0	72.0	118.0	116	2.0	12	2
	2	●	**MPS1-1120-PC**	24.2	48.8	51.8	96.8	95	1.8	12	2
	8	●	**MPS1-1120-L8C**	91.9	129.3	132.3	178.3	176	2.3	12	2
	10	☐	**MPS1-1120-L10C**	114.0	152.0	155.0	201.0	199	2.0	12	2
	12	☐	**MPS1-1120-L12C**	136.4	175.0	178.0	224.0	222	2.0	12	2
	15	●	**MPS1-1120-L15C**	170.0	209.0	212.0	258.0	256	2.0	12	2
	20	☐	**MPS1-1120-L20C**	226.0	267.0	270.0	316.0	314	2.0	12	2
	25	☐	**MPS1-1120-L25C**	282.0	324.0	327.0	373.0	371	2.0	12	2
11.3	3	☐	**MPS1-1130S-DIN**	38.1	55.1	56.1	102.1	100	2.1	12	4
	3	●	**MPS1-1130S-DIN-C**	38.1	55.1	56.1	102.1	100	2.1	12	2
	5	☐	**MPS1-1130L-DIN**	54.1	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MPS1-1130L-DIN-C**	54.1	71.1	72.1	118.1	116	2.1	12	2
	2	☐	**MPS1-1130-PC**	24.4	48.8	51.8	96.8	95	1.8	12	2
	8	●	**MPS1-1130-L8C**	92.7	129.3	132.3	178.3	176	2.3	12	2
	10	☐	**MPS1-1130-L10C**	115.1	152.1	155.1	201.1	199	2.1	12	2
	12	☐	**MPS1-1130-L12C**	137.7	175.1	178.1	224.1	222	2.1	12	2
	15	☐	**MPS1-1130-L15C**	171.6	209.1	212.1	258.1	256	2.1	12	2
	20	☐	**MPS1-1130-L20C**	228.1	267.1	270.1	316.1	314	2.1	12	2
	25	☐	**MPS1-1130-L25C**	284.6	324.1	327.1	373.1	371	2.1	12	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
11.4	3	☐	**MPS1-1140S-DIN**	38.0	55.1	56.1	102.1	100	2.1	12	4
	3	●	**MPS1-1140S-DIN-C**	38.0	55.1	56.1	102.1	100	2.1	12	2
	5	☐	**MPS1-1140L-DIN**	54.0	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MPS1-1140L-DIN-C**	54.0	71.1	72.1	118.1	116	2.1	12	2
	2	☐	**MPS1-1140-PC**	24.6	48.8	51.8	96.8	95	1.8	12	2
	8	●	**MPS1-1140-L8C**	93.6	129.4	132.4	178.4	176	2.4	12	2
	10	☐	**MPS1-1140-L10C**	116.1	152.1	155.1	201.1	199	2.1	12	2
	12	☐	**MPS1-1140-L12C**	138.9	175.1	178.1	224.1	222	2.1	12	2
	15	☐	**MPS1-1140-L15C**	173.1	209.1	212.1	258.1	256	2.1	12	2
	20	☐	**MPS1-1140-L20C**	230.1	267.1	270.1	316.1	314	2.1	12	2
	25	☐	**MPS1-1140-L25C**	287.1	324.1	327.1	373.1	371	2.1	12	2
11.5	3	☐	**MPS1-1150S-DIN**	37.8	55.1	56.1	102.1	100	2.1	12	4
	3	●	**MPS1-1150S-DIN-C**	37.8	55.1	56.1	102.1	100	2.1	12	2
	5	☐	**MPS1-1150L-DIN**	53.8	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MPS1-1150L-DIN-C**	53.8	71.1	72.1	118.1	116	2.1	12	2
	2	●	**MPS1-1150-PC**	24.8	48.8	51.8	96.8	95	1.8	12	2
	8	●	**MPS1-1150-L8C**	94.4	129.4	132.4	178.4	176	2.4	12	2
	10	☐	**MPS1-1150-L10C**	117.1	152.1	155.1	201.1	199	2.1	12	2
	12	●	**MPS1-1150-L12C**	140.1	175.1	178.1	224.1	222	2.1	12	2
	15	●	**MPS1-1150-L15C**	174.6	209.1	212.1	258.1	256	2.1	12	2
	20	●	**MPS1-1150-L20C**	232.1	267.1	270.1	316.1	314	2.1	12	2
	25	●	**MPS1-1150-L25C**	289.6	324.1	327.1	373.1	371	2.1	12	2
11.6	3	☐	**MPS1-1160S-DIN**	37.7	55.1	56.1	102.1	100	2.1	12	4
	3	●	**MPS1-1160S-DIN-C**	37.7	55.1	56.1	102.1	100	2.1	12	2
	5	☐	**MPS1-1160L-DIN**	53.7	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MPS1-1160L-DIN-C**	53.7	71.1	72.1	118.1	116	2.1	12	2
	2	☐	**MPS1-1160-PC**	25.0	48.8	48.8	96.8	95	1.8	12	2
	8	●	**MPS1-1160-L8C**	95.2	134.4	137.4	183.4	181	2.4	12	2
	10	☐	**MPS1-1160-L10C**	118.1	158.1	161.1	207.1	205	2.1	12	2
	12	☐	**MPS1-1160-L12C**	141.3	182.1	185.1	231.1	229	2.1	12	2
	15	☐	**MPS1-1160-L15C**	176.1	218.1	221.1	267.1	265	2.1	12	2
	20	☐	**MPS1-1160-L20C**	234.1	278.1	281.1	327.1	325	2.1	12	2
	25	☐	**MPS1-1160-L25C**	292.1	338.1	341.1	387.1	385	2.1	12	2
11.7	3	☐	**MPS1-1170S-DIN**	37.6	55.1	56.1	102.1	100	2.1	12	4
	3	●	**MPS1-1170S-DIN-C**	37.6	55.1	56.1	102.1	100	2.1	12	2
	5	☐	**MPS1-1170L-DIN**	53.6	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MPS1-1170L-DIN-C**	53.6	71.1	72.1	118.1	116	2.1	12	2
	2	●	**MPS1-1170-PC**	25.2	48.8	48.8	96.8	95	1.8	12	2
	8	●	**MPS1-1170-L8C**	96.0	134.4	137.4	183.4	181	2.4	12	2
	10	☐	**MPS1-1170-L10C**	119.1	158.1	161.1	207.1	205	2.1	12	2
	12	●	**MPS1-1170-L12C**	142.5	182.1	185.1	231.1	229	2.1	12	2
	15	●	**MPS1-1170-L15C**	177.6	218.1	221.1	267.1	265	2.1	12	2
	20	☐	**MPS1-1170-L20C**	236.1	278.1	281.1	327.1	325	2.1	12	2
	25	☐	**MPS1-1170-L25C**	294.6	338.1	341.1	387.1	385	2.1	12	2
11.8	3	☐	**MPS1-1180S-DIN**	37.4	55.1	56.1	102.1	100	2.1	12	4
	3	●	**MPS1-1180S-DIN-C**	37.4	55.1	56.1	102.1	100	2.1	12	2
	5	☐	**MPS1-1180L-DIN**	53.4	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MPS1-1180L-DIN-C**	53.4	71.1	72.1	118.1	116	2.1	12	2
	2	●	**MPS1-1180-PC**	25.5	48.9	48.9	96.9	95	1.9	12	2
	8	●	**MPS1-1180-L8C**	96.8	134.4	137.4	183.4	181	2.4	12	2
	10	☐	**MPS1-1180-L10C**	120.1	158.1	161.1	207.1	205	2.1	12	2
	12	●	**MPS1-1180-L12C**	143.7	182.1	185.1	231.1	229	2.1	12	2
	15	●	**MPS1-1180-L15C**	179.1	218.1	221.1	267.1	265	2.1	12	2
	20	☐	**MPS1-1180-L20C**	238.1	278.1	281.1	327.1	325	2.1	12	2
	25	☐	**MPS1-1180-L25C**	297.1	338.1	341.1	387.1	385	2.1	12	2

● : Inventory maintained. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
11.9	3	☐	MPS1-1190S-DIN	37.3	55.2	56.2	102.2	100	2.2	12	4
	3	●	MPS1-1190S-DIN-C	37.3	55.2	56.2	102.2	100	2.2	12	2
	5	☐	MPS1-1190L-DIN	53.3	71.2	72.2	118.2	116	2.2	12	4
	5	●	MPS1-1190L-DIN-C	53.3	71.2	72.2	118.2	116	2.2	12	2
	2	☐	MPS1-1190-PC	25.7	48.9	48.9	96.9	95	1.9	12	2
	8	●	MPS1-1190-L8C	97.7	134.5	137.5	183.5	181	2.5	12	2
	10	☐	MPS1-1190-L10C	121.2	158.2	161.2	207.2	205	2.2	12	2
	12	☐	MPS1-1190-L12C	145.0	182.2	185.2	231.2	229	2.2	12	2
	15	☐	MPS1-1190-L15C	180.7	218.2	221.2	267.2	265	2.2	12	2
	20	☐	MPS1-1190-L20C	240.2	278.2	281.2	327.2	325	2.2	12	2
	25	☐	MPS1-1190-L25C	299.7	338.2	341.2	387.2	385	2.2	12	2
12.0	3	☐	MPS1-1200S-DIN	37.2	55.2	56.2	102.2	100	2.2	12	4
	3	●	MPS1-1200S-DIN-C	37.2	55.2	56.2	102.2	100	2.2	12	2
	5	☐	MPS1-1200L-DIN	53.2	71.2	72.2	118.2	116	2.2	12	4
	5	●	MPS1-1200L-DIN-C	53.2	71.2	72.2	118.2	116	2.2	12	2
	2	●	MPS1-1200-PC	25.9	48.9	48.9	96.9	95	1.9	12	2
	8	●	MPS1-1200-L8C	98.5	134.5	137.5	183.5	181	2.5	12	2
	10	☐	MPS1-1200-L10C	122.2	158.2	161.2	207.2	205	2.2	12	2
	12	●	MPS1-1200-L12C	146.2	182.2	185.2	231.2	229	2.2	12	2
	15	●	MPS1-1200-L15C	182.2	218.2	221.2	267.2	265	2.2	12	2
	20	●	MPS1-1200-L20C	242.2	278.2	281.2	327.2	325	2.2	12	2
	25	●	MPS1-1200-L25C	302.2	338.2	341.2	387.2	385	2.2	12	2
12.05	3	☐	MPS1-1205S-DIN	42.1	60.2	61.2	107.2	105	2.2	14	4
	3	●	MPS1-1205S-DIN-C	42.1	60.2	61.2	107.2	105	2.2	14	2
	5	☐	MPS1-1205L-DIN	59.1	77.2	78.2	124.2	122	2.2	14	4
	5	●	MPS1-1205L-DIN-C	59.1	77.2	78.2	124.2	122	2.2	14	2
12.1	3	☐	MPS1-1210S-DIN	42.1	60.2	61.2	107.2	105	2.2	14	4
	3	●	MPS1-1210S-DIN-C	42.1	60.2	61.2	107.2	105	2.2	14	2
	5	☐	MPS1-1210L-DIN	59.1	77.2	78.2	124.2	122	2.2	14	4
	5	●	MPS1-1210L-DIN-C	59.1	77.2	78.2	124.2	122	2.2	14	2
	2	●	MPS1-1210-PC	26.1	52.9	55.9	103.9	102	1.9	14	2
	8	●	MPS1-1210-L8C	99.3	140.5	143.5	189.5	187	2.5	14	2
	10	☐	MPS1-1210-L10C	123.2	165.2	168.2	214.2	212	2.2	14	2
	12	●	MPS1-1210-L12C	147.4	190.2	193.2	239.2	237	2.2	14	2
	15	●	MPS1-1210-L15C	183.7	227.2	230.2	276.2	274	2.2	14	2
	20	☐	MPS1-1210-L20C	244.2	290.2	293.2	339.2	337	2.2	14	2
12.2	3	☐	MPS1-1220S-DIN	41.9	60.2	61.2	107.2	105	2.2	14	4
	3	●	MPS1-1220S-DIN-C	41.9	60.2	61.2	107.2	105	2.2	14	2
	5	☐	MPS1-1220L-DIN	58.9	77.2	78.2	124.2	122	2.2	14	4
	5	●	MPS1-1220L-DIN-C	58.9	77.2	78.2	124.2	122	2.2	14	2
	2	●	MPS1-1220-PC	26.3	52.9	55.9	103.9	102	1.9	14	2
	8	●	MPS1-1220-L8C	100.1	140.5	143.5	189.5	187	2.5	14	2
	10	☐	MPS1-1220-L10C	124.2	165.2	168.2	214.2	212	2.2	14	2
	12	●	MPS1-1220-L12C	148.6	190.2	193.2	239.2	237	2.2	14	2
	15	●	MPS1-1220-L15C	185.2	227.2	230.2	276.2	274	2.2	14	2
	20	☐	MPS1-1220-L20C	246.2	290.2	293.2	339.2	337	2.2	14	2
12.3	3	☐	MPS1-1230S-DIN	41.8	60.2	61.2	107.2	105	2.2	14	4
	3	●	MPS1-1230S-DIN-C	41.8	60.2	61.2	107.2	105	2.2	14	2
	5	☐	MPS1-1230L-DIN	58.8	77.2	78.2	124.2	122	2.2	14	4
	5	●	MPS1-1230L-DIN-C	58.8	77.2	78.2	124.2	122	2.2	14	2
	2	☐	MPS1-1230-PC	26.5	52.9	55.9	103.9	102	1.9	14	2
	8	●	MPS1-1230-L8C	100.9	140.5	143.5	189.5	187	2.5	14	2
	10	☐	MPS1-1230-L10C	125.2	165.2	168.2	214.2	212	2.2	14	2
	12	☐	MPS1-1230-L12C	149.8	190.2	193.2	239.2	237	2.2	14	2
	15	☐	MPS1-1230-L15C	186.7	227.2	230.2	276.2	274	2.2	14	2
	20	☐	MPS1-1230-L20C	248.2	290.2	293.2	339.2	337	2.2	14	2

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
12.4	3	☐	MPS1-1240S-DIN	41.7	60.3	61.3	107.3	105	2.3	14	4
	3	●	MPS1-1240S-DIN-C	41.7	60.3	61.3	107.3	105	2.3	14	2
	5	☐	MPS1-1240L-DIN	58.7	77.3	78.3	124.3	122	2.3	14	4
	5	●	MPS1-1240L-DIN-C	58.7	77.3	78.3	124.3	122	2.3	14	2
	2	☐	MPS1-1240-PC	26.8	53.0	56.0	104.0	102	2.0	14	2
	8	●	MPS1-1240-L8C	101.8	140.6	143.6	189.6	187	2.6	14	2
	10	☐	MPS1-1240-L10C	126.3	165.3	168.3	214.3	212	2.3	14	2
	12	☐	MPS1-1240-L12C	151.1	190.3	193.3	239.3	237	2.3	14	2
	15	☐	MPS1-1240-L15C	188.3	227.3	230.3	276.3	274	2.3	14	2
	20	☐	MPS1-1240-L20C	250.3	290.3	293.3	339.3	337	2.3	14	2
12.5	3	☐	MPS1-1250S-DIN	41.5	60.3	61.3	107.3	105	2.3	14	4
	3	●	MPS1-1250S-DIN-C	41.5	60.3	61.3	107.3	105	2.3	14	2
	5	☐	MPS1-1250L-DIN	58.5	77.3	78.3	124.3	122	2.3	14	4
	5	●	MPS1-1250L-DIN-C	58.5	77.3	78.3	124.3	122	2.3	14	2
	2	●	MPS1-1250-PC	27.0	53.0	56.0	104.0	102	2.0	14	2
	8	●	MPS1-1250-L8C	102.6	140.6	143.6	189.6	187	2.6	14	2
	10	☐	MPS1-1250-L10C	127.3	165.3	168.3	214.3	212	2.3	14	2
	12	●	MPS1-1250-L12C	152.3	190.3	193.3	239.3	237	2.3	14	2
	15	●	MPS1-1250-L15C	189.8	227.3	230.3	276.3	274	2.3	14	2
	20	☐	MPS1-1250-L20C	252.3	290.3	293.3	339.3	337	2.3	14	2
12.6	3	☐	MPS1-1260S-DIN	41.4	60.3	61.3	107.3	105	2.3	14	4
	3	●	MPS1-1260S-DIN-C	41.4	60.3	61.3	107.3	105	2.3	14	2
	5	☐	MPS1-1260L-DIN	58.4	77.3	78.3	124.3	122	2.3	14	4
	5	●	MPS1-1260L-DIN-C	58.4	77.3	78.3	124.3	122	2.3	14	2
	2	☐	MPS1-1260-PC	27.2	53.0	55.0	104.0	102	2.0	14	2
	8	●	MPS1-1260-L8C	103.4	145.6	148.6	194.6	192	2.6	14	2
	10	☐	MPS1-1260-L10C	128.3	171.3	174.3	220.3	218	2.3	14	2
	12	☐	MPS1-1260-L12C	153.5	197.3	200.3	246.3	244	2.3	14	2
	15	☐	MPS1-1260-L15C	191.3	236.3	239.3	285.3	283	2.3	14	2
	20	☐	MPS1-1260-L20C	254.3	301.3	304.3	350.3	348	2.3	14	2
12.7	3	☐	MPS1-1270S-DIN	41.3	60.3	61.3	107.3	105	2.3	14	4
	3	●	MPS1-1270S-DIN-C	41.3	60.3	61.3	107.3	105	2.3	14	2
	5	☐	MPS1-1270L-DIN	58.3	77.3	78.3	124.3	122	2.3	14	4
	5	●	MPS1-1270L-DIN-C	58.3	77.3	78.3	124.3	122	2.3	14	2
	2	●	MPS1-1270-PC	27.4	53.0	55.0	104.0	102	2.0	14	2
	8	●	MPS1-1270-L8C	104.2	145.6	148.6	194.6	192	2.6	14	2
	10	☐	MPS1-1270-L10C	129.3	171.3	174.3	220.3	218	2.3	14	2
	12	●	MPS1-1270-L12C	154.7	197.3	200.3	246.3	244	2.3	14	2
	15	☐	MPS1-1270-L15C	192.8	236.3	239.3	285.3	283	2.3	14	2
	20	☐	MPS1-1270-L20C	256.3	301.3	304.3	350.3	348	2.3	14	2
12.8	3	☐	MPS1-1280S-DIN	41.1	60.3	61.3	107.3	105	2.3	14	4
	3	●	MPS1-1280S-DIN-C	41.1	60.3	61.3	107.3	105	2.3	14	2
	5	☐	MPS1-1280L-DIN	58.1	77.3	78.3	124.3	122	2.3	14	4
	5	●	MPS1-1280L-DIN-C	58.1	77.3	78.3	124.3	122	2.3	14	2
	2	●	MPS1-1280-PC	27.6	53.0	55.0	104.0	102	2.0	14	2
	8	●	MPS1-1280-L8C	105.1	145.7	148.7	194.7	192	2.7	14	2
	10	☐	MPS1-1280-L10C	130.3	171.3	174.3	220.3	218	2.3	14	2
	12	●	MPS1-1280-L12C	155.9	197.3	200.3	246.3	244	2.3	14	2
	15	☐	MPS1-1280-L15C	194.3	236.3	239.3	285.3	283	2.3	14	2
	20	☐	MPS1-1280-L20C	258.3	301.3	304.3	350.3	348	2.3	14	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
12.9	3	☐	**MPS1-1290S-DIN**	41.0	60.3	61.3	107.3	105	2.3	14	4
	3	●	**MPS1-1290S-DIN-C**	41.0	60.3	61.3	107.3	105	2.3	14	2
	5	☐	**MPS1-1290L-DIN**	58.0	77.3	78.3	124.3	122	2.3	14	4
	5	●	**MPS1-1290L-DIN-C**	58.0	77.3	78.3	124.3	122	2.3	14	2
	2	☐	**MPS1-1290-PC**	27.8	53.0	55.0	104.0	102	2.0	14	2
	8	●	**MPS1-1290-L8C**	105.9	145.7	148.7	194.7	192	2.7	14	2
	10	☐	**MPS1-1290-L10C**	131.3	171.3	174.3	220.3	218	2.3	14	2
	12	☐	**MPS1-1290-L12C**	157.1	197.3	200.3	246.3	244	2.3	14	2
	15	☐	**MPS1-1290-L15C**	195.8	236.3	239.3	285.3	283	2.3	14	2
	20	☐	**MPS1-1290-L20C**	260.3	301.3	304.3	350.3	348	2.3	14	2
13.0	3	☐	**MPS1-1300S-DIN**	40.9	60.4	61.4	107.4	105	2.4	14	4
	3	●	**MPS1-1300S-DIN-C**	40.9	60.4	61.4	107.4	105	2.4	14	2
	5	☐	**MPS1-1300L-DIN**	57.9	77.4	78.4	124.4	122	2.4	14	4
	5	●	**MPS1-1300L-DIN-C**	57.9	77.4	78.4	124.4	122	2.4	14	2
	2	●	**MPS1-1300-PC**	28.0	53.0	55.0	104.0	102	2.0	14	2
	8	●	**MPS1-1300-L8C**	106.7	145.7	148.7	194.7	192	2.7	14	2
	10	☐	**MPS1-1300-L10C**	132.4	171.4	174.4	220.4	218	2.4	14	2
	12	●	**MPS1-1300-L12C**	158.4	197.4	200.4	246.4	244	2.4	14	2
	15	●	**MPS1-1300-L15C**	197.4	236.4	239.4	285.4	283	2.4	14	2
	20	●	**MPS1-1300-L20C**	262.4	301.4	304.4	350.4	348	2.4	14	2
13.1	3	☐	**MPS1-1310S-DIN**	40.7	60.4	61.4	107.4	105	2.4	14	4
	3	●	**MPS1-1310S-DIN-C**	40.7	60.4	61.4	107.4	105	2.4	14	2
	5	☐	**MPS1-1310L-DIN**	57.7	77.4	78.4	124.4	122	2.4	14	4
	5	●	**MPS1-1310L-DIN-C**	57.7	77.4	78.4	124.4	122	2.4	14	2
	2	☐	**MPS1-1310-PC**	28.3	56.1	59.1	109.1	107	2.1	14	2
	8	●	**MPS1-1310-L8C**	107.5	151.7	154.7	200.7	198	2.7	14	2
	10	☐	**MPS1-1310-L10C**	133.4	178.4	181.4	227.4	225	2.4	14	2
	12	☐	**MPS1-1310-L12C**	159.6	205.4	208.4	254.4	252	2.4	14	2
	15	☐	**MPS1-1310-L15C**	198.9	245.4	248.4	294.4	292	2.4	14	2
	20	☐	**MPS1-1310-L20C**	264.4	313.4	316.4	362.4	360	2.4	14	2
13.2	3	☐	**MPS1-1320S-DIN**	40.6	60.4	61.4	107.4	105	2.4	14	4
	3	●	**MPS1-1320S-DIN-C**	40.6	60.4	61.4	107.4	105	2.4	14	2
	5	☐	**MPS1-1320L-DIN**	57.6	77.4	78.4	124.4	122	2.4	14	4
	5	●	**MPS1-1320L-DIN-C**	57.6	77.4	78.4	124.4	122	2.4	14	2
	2	●	**MPS1-1320-PC**	28.5	56.1	59.1	109.1	107	2.1	14	2
	8	●	**MPS1-1320-L8C**	108.3	151.7	154.7	200.7	198	2.7	14	2
	10	☐	**MPS1-1320-L10C**	134.4	178.4	181.4	227.4	225	2.4	14	2
	12	●	**MPS1-1320-L12C**	160.8	205.4	208.4	254.4	252	2.4	14	2
	15	☐	**MPS1-1320-L15C**	200.4	245.4	248.4	294.4	292	2.4	14	2
	20	☐	**MPS1-1320-L20C**	266.4	313.4	316.4	362.4	360	2.4	14	2
13.3	3	☐	**MPS1-1330S-DIN**	40.5	60.4	61.4	107.4	105	2.4	14	4
	3	●	**MPS1-1330S-DIN-C**	40.5	60.4	61.4	107.4	105	2.4	14	2
	5	☐	**MPS1-1330L-DIN**	57.5	77.4	78.4	124.4	122	2.4	14	4
	5	●	**MPS1-1330L-DIN-C**	57.5	77.4	78.4	124.4	122	2.4	14	2
	2	☐	**MPS1-1330-PC**	28.7	56.1	59.1	109.1	107	2.1	14	2
	8	●	**MPS1-1330-L8C**	109.2	151.8	154.8	200.8	198	2.8	14	2
	10	☐	**MPS1-1330-L10C**	135.4	178.4	181.4	227.4	225	2.4	14	2
	12	☐	**MPS1-1330-L12C**	162.0	205.4	208.4	254.4	252	2.4	14	2
	15	☐	**MPS1-1330-L15C**	201.9	245.4	248.4	294.4	292	2.4	14	2
	20	☐	**MPS1-1330-L20C**	268.4	313.4	316.4	362.4	360	2.4	14	2
13.4	3	☐	**MPS1-1340S-DIN**	40.3	60.4	61.4	107.4	105	2.4	14	4
	3	●	**MPS1-1340S-DIN-C**	40.3	60.4	61.4	107.4	105	2.4	14	2
	5	☐	**MPS1-1340L-DIN**	57.3	77.4	78.4	124.4	122	2.4	14	4
	5	●	**MPS1-1340L-DIN-C**	57.3	77.4	78.4	124.4	122	2.4	14	2
	2	☐	**MPS1-1340-PC**	28.9	56.1	59.1	109.1	107	2.1	14	2
	8	●	**MPS1-1340-L8C**	110.0	151.8	154.8	200.8	198	2.8	14	2
	10	☐	**MPS1-1340-L10C**	136.4	178.4	181.4	227.4	225	2.4	14	2
	12	☐	**MPS1-1340-L12C**	163.2	205.4	208.4	254.4	252	2.4	14	2
	15	☐	**MPS1-1340-L15C**	203.4	245.4	248.4	294.4	292	2.4	14	2
	20	☐	**MPS1-1340-L20C**	270.4	313.4	316.4	362.4	360	2.4	14	2
13.5	3	☐	**MPS1-1350S-DIN**	40.2	60.5	61.5	107.5	105	2.5	14	4
	3	●	**MPS1-1350S-DIN-C**	40.2	60.5	61.5	107.5	105	2.5	14	2
	5	☐	**MPS1-1350L-DIN**	57.2	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MPS1-1350L-DIN-C**	57.2	77.5	78.5	124.5	122	2.5	14	2
	2	●	**MPS1-1350-PC**	29.1	56.1	59.1	109.1	107	2.1	14	2
	8	●	**MPS1-1350-L8C**	110.8	151.8	154.8	200.8	198	2.8	14	2
	10	☐	**MPS1-1350-L10C**	137.5	178.5	181.5	227.5	225	2.5	14	2
	12	●	**MPS1-1350-L12C**	164.5	205.5	208.5	254.5	252	2.5	14	2
	15	☐	**MPS1-1350-L15C**	205.0	245.5	248.5	294.5	292	2.5	14	2
	20	☐	**MPS1-1350-L20C**	272.5	313.5	316.5	362.5	360	2.5	14	2
13.6	3	☐	**MPS1-1360S-DIN**	40.1	60.5	61.5	107.5	105	2.5	14	4
	3	●	**MPS1-1360S-DIN-C**	40.1	60.5	61.5	107.5	105	2.5	14	2
	5	☐	**MPS1-1360L-DIN**	57.1	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MPS1-1360L-DIN-C**	57.1	77.5	78.5	124.5	122	2.5	14	2
	2	☐	**MPS1-1360-PC**	29.3	56.1	56.1	109.1	107	2.1	14	2
	8	●	**MPS1-1360-L8C**	111.6	156.8	159.8	205.8	203	2.8	14	2
	10	☐	**MPS1-1360-L10C**	138.5	184.5	187.5	233.5	231	2.5	14	2
	12	☐	**MPS1-1360-L12C**	165.7	212.5	215.5	261.5	259	2.5	14	2
	15	☐	**MPS1-1360-L15C**	206.5	254.5	257.5	303.5	301	2.5	14	2
	20	☐	**MPS1-1360-L20C**	274.5	324.5	327.5	373.5	371	2.5	14	2
13.7	3	☐	**MPS1-1370S-DIN**	39.9	60.5	61.5	107.5	105	2.5	14	4
	3	●	**MPS1-1370S-DIN-C**	39.9	60.5	61.5	107.5	105	2.5	14	2
	5	☐	**MPS1-1370L-DIN**	56.9	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MPS1-1370L-DIN-C**	56.9	77.5	78.5	124.5	122	2.5	14	2
	2	☐	**MPS1-1370-PC**	29.6	56.2	56.2	109.2	107	2.2	14	2
	8	●	**MPS1-1370-L8C**	112.4	156.8	159.8	205.8	203	2.8	14	2
	10	☐	**MPS1-1370-L10C**	139.5	184.5	187.5	233.5	231	2.5	14	2
	12	☐	**MPS1-1370-L12C**	166.9	212.5	215.5	261.5	259	2.5	14	2
	15	☐	**MPS1-1370-L15C**	208.0	254.5	257.5	303.5	301	2.5	14	2
	20	☐	**MPS1-1370-L20C**	276.5	324.5	327.5	373.5	371	2.5	14	2
13.8	3	☐	**MPS1-1380S-DIN**	39.8	60.5	61.5	107.5	105	2.5	14	4
	3	●	**MPS1-1380S-DIN-C**	39.8	60.5	61.5	107.5	105	2.5	14	2
	5	☐	**MPS1-1380L-DIN**	56.8	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MPS1-1380L-DIN-C**	56.8	77.5	78.5	124.5	122	2.5	14	2
	2	☐	**MPS1-1380-PC**	29.8	56.2	56.2	109.2	107	2.2	14	2
	8	●	**MPS1-1380-L8C**	113.3	156.9	159.9	205.9	203	2.9	14	2
	10	☐	**MPS1-1380-L10C**	140.5	184.5	187.5	233.5	231	2.5	14	2
	12	☐	**MPS1-1380-L12C**	168.1	212.5	215.5	261.5	259	2.5	14	2
	15	☐	**MPS1-1380-L15C**	209.5	254.5	257.5	303.5	301	2.5	14	2
	20	☐	**MPS1-1380-L20C**	278.5	324.5	327.5	373.5	371	2.5	14	2

● : Inventory maintained. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP1021	Order Number	Dimensions (mm) LU	LCF	LH	OAL	LF	PL	DCONMS	Type
13.9	3	☐	**MPS1-1390S-DIN**	39.7	60.5	61.5	107.5	105	2.5	14	4
	3	●	**MPS1-1390S-DIN-C**	39.7	60.5	61.5	107.5	105	2.5	14	2
	5	☐	**MPS1-1390L-DIN**	56.7	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MPS1-1390L-DIN-C**	56.7	77.5	78.5	124.5	122	2.5	14	2
	2	☐	**MPS1-1390-PC**	30.0	56.2	56.2	109.2	107	2.2	14	2
	8	●	**MPS1-1390-L8C**	114.1	156.9	159.9	205.9	203	2.9	14	2
	10	☐	**MPS1-1390-L10C**	141.5	184.5	187.5	233.5	231	2.5	14	2
	12	☐	**MPS1-1390-L12C**	169.3	212.5	215.5	261.5	259	2.5	14	2
	15	☐	**MPS1-1390-L15C**	211.0	254.5	257.5	303.5	301	2.5	14	2
	20	☐	**MPS1-1390-L20C**	280.5	324.5	327.5	373.5	371	2.5	14	2
14.0	3	☐	**MPS1-1400S-DIN**	39.5	60.5	61.5	107.5	105	2.5	14	4
	3	●	**MPS1-1400S-DIN-C**	39.5	60.5	61.5	107.5	105	2.5	14	2
	5	☐	**MPS1-1400L-DIN**	56.5	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MPS1-1400L-DIN-C**	56.5	77.5	78.5	124.5	122	2.5	14	2
	2	●	**MPS1-1400-PC**	30.2	56.2	56.2	109.2	107	2.2	14	2
	8	●	**MPS1-1400-L8C**	114.9	156.9	159.9	205.9	203	2.9	14	2
	10	☐	**MPS1-1400-L10C**	142.5	184.5	187.5	233.5	231	2.5	14	2
	12	●	**MPS1-1400-L12C**	170.5	212.5	215.5	261.5	259	2.5	14	2
	15	●	**MPS1-1400-L15C**	212.5	254.5	257.5	303.5	301	2.5	14	2
	20	●	**MPS1-1400-L20C**	282.5	324.5	327.5	373.5	371	2.5	14	2
14.2	3	☐	**MPS1-1420S-DIN**	43.3	64.6	65.6	114.6	112	2.6	16	4
	3	●	**MPS1-1420S-DIN-C**	43.3	64.6	65.6	114.6	112	2.6	16	2
	5	☐	**MPS1-1420L-DIN**	61.3	82.6	83.6	132.6	130	2.6	16	4
	5	●	**MPS1-1420L-DIN-C**	61.3	82.6	83.6	132.6	130	2.6	16	2
14.5	3	☐	**MPS1-1450S-DIN**	42.9	64.6	65.6	114.6	112	2.6	16	4
	3	●	**MPS1-1450S-DIN-C**	42.9	64.6	65.6	114.6	112	2.6	16	2
	5	☐	**MPS1-1450L-DIN**	60.9	82.6	83.6	132.6	130	2.6	16	4
	5	●	**MPS1-1450L-DIN-C**	60.9	82.6	83.6	132.6	130	2.6	16	2
15.0	3	☐	**MPS1-1500S-DIN**	42.2	64.7	65.7	114.7	112	2.7	16	4
	3	●	**MPS1-1500S-DIN-C**	42.2	64.7	65.7	114.7	112	2.7	16	2
	5	☐	**MPS1-1500L-DIN**	60.2	82.7	83.7	132.7	130	2.7	16	4
	5	●	**MPS1-1500L-DIN-C**	60.2	82.7	83.7	132.7	130	2.7	16	2
15.5	3	☐	**MPS1-1550S-DIN**	41.6	64.8	65.8	114.8	112	2.8	16	4
	3	●	**MPS1-1550S-DIN-C**	41.6	64.8	65.8	114.8	112	2.8	16	2
	5	☐	**MPS1-1550L-DIN**	59.6	82.8	83.8	132.8	130	2.8	16	4
	5	●	**MPS1-1550L-DIN-C**	59.6	82.8	83.8	132.8	130	2.8	16	2
16.0	3	☐	**MPS1-1600S-DIN**	40.9	64.9	65.9	114.9	112	2.9	16	4
	3	●	**MPS1-1600S-DIN-C**	40.9	64.9	65.9	114.9	112	2.9	16	2
	5	☐	**MPS1-1600L-DIN**	58.9	82.9	83.9	132.9	130	2.9	16	4
	5	●	**MPS1-1600L-DIN-C**	58.9	82.9	83.9	132.9	130	2.9	16	2
16.5	3	☐	**MPS1-1650S-DIN**	48.3	73.0	74.0	123.0	120	3.0	18	4
	3	●	**MPS1-1650S-DIN-C**	48.3	73.0	74.0	123.0	120	3.0	18	2
	5	☐	**MPS1-1650L-DIN**	68.3	93.0	94.0	143.0	140	3.0	18	4
	5	●	**MPS1-1650L-DIN-C**	68.3	93.0	94.0	143.0	140	3.0	18	2
17.0	3	☐	**MPS1-1700S-DIN**	47.6	73.1	74.1	123.1	120	3.1	18	4
	3	●	**MPS1-1700S-DIN-C**	47.6	73.1	74.1	123.1	120	3.1	18	2
	5	☐	**MPS1-1700L-DIN**	67.6	93.1	94.1	143.1	140	3.1	18	4
	5	●	**MPS1-1700L-DIN-C**	67.6	93.1	94.1	143.1	140	3.1	18	2
17.5	3	☐	**MPS1-1750S-DIN**	46.9	73.2	74.2	123.2	120	3.2	18	4
	3	●	**MPS1-1750S-DIN-C**	46.9	73.2	74.2	123.2	120	3.2	18	2
	5	☐	**MPS1-1750L-DIN**	66.9	93.2	94.2	143.2	140	3.2	18	4
	5	●	**MPS1-1750L-DIN-C**	66.9	93.2	94.2	143.2	140	3.2	18	2
18.0	3	☐	**MPS1-1800S-DIN**	46.3	73.3	74.3	123.3	120	3.3	18	4
	3	●	**MPS1-1800S-DIN-C**	46.3	73.3	74.3	123.3	120	3.3	18	2
	5	☐	**MPS1-1800L-DIN**	66.3	93.3	94.3	143.3	140	3.3	18	4
	5	●	**MPS1-1800L-DIN-C**	66.3	93.3	94.3	143.3	140	3.3	18	2
18.5	3	☐	**MPS1-1850S-DIN**	51.6	79.4	80.4	131.4	128	3.4	20	4
	3	●	**MPS1-1850S-DIN-C**	51.6	79.4	80.4	131.4	128	3.4	20	2
	5	☐	**MPS1-1850L-DIN**	73.6	101.4	102.4	153.4	150	3.4	20	4
	5	●	**MPS1-1850L-DIN-C**	73.6	101.4	102.4	153.4	150	3.4	20	2
19.0	3	☐	**MPS1-1900S-DIN**	51.0	79.5	80.5	131.5	128	3.5	20	4
	3	●	**MPS1-1900S-DIN-C**	51.0	79.5	80.5	131.5	128	3.5	20	2
	5	☐	**MPS1-1900L-DIN**	73.0	101.5	102.5	153.5	150	3.5	20	4
	5	●	**MPS1-1900L-DIN-C**	73.0	101.5	102.5	153.5	150	3.5	20	2
19.5	3	☐	**MPS1-1950S-DIN**	50.3	79.5	80.5	131.5	128	3.5	20	4
	3	●	**MPS1-1950S-DIN-C**	50.3	79.5	80.5	131.5	128	3.5	20	2
	5	☐	**MPS1-1950L-DIN**	72.3	101.5	102.5	153.5	150	3.5	20	4
	5	●	**MPS1-1950L-DIN-C**	72.3	101.5	102.5	153.5	150	3.5	20	2
20.0	3	☐	**MPS1-2000S-DIN**	49.6	79.6	80.6	131.6	128	3.6	20	4
	3	●	**MPS1-2000S-DIN-C**	49.6	79.6	80.6	131.6	128	3.6	20	2
	5	☐	**MPS1-2000L-DIN**	71.6	101.6	102.6	153.6	150	3.6	20	4
	5	●	**MPS1-2000L-DIN-C**	71.6	101.6	102.6	153.6	150	3.6	20	2

CUTTING CONDITIONS ➤ M072
OPERATION GUIDANCE ➤ M073
TECHNICAL DATA ➤ P001

MPS1

4 Margin & Super Long Drill

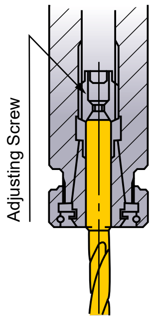
RECOMMENDED CUTTING CONDITIONS

● MPS1 DRILL (3xDC – 40xDC)

DC	L x DC		P			M	K		
			Mild Steel, Carbon Steel, Alloy Steel			Stainless Steel	Cast Iron		
			≦ 180 HB	180–250 HB	280–350 HB		≦ 350 MPa	≦ 450 MPa	≦ 800 MPa
3	3–8	Vc m/min	100 (60–150)	90 (60–140)	80 (50–110)	40 (20–50)	90 (60–100)	80 (50–90)	60 (40–80)
		f mm/rev	0.15 (0.1–0.2)	0.15 (0.1–0.19)	0.12 (0.1–0.14)	0.08 (0.06–0.12)	0.15 (0.1–0.2)	0.12 (0.08–0.16)	0.09 (0.06–0.12)
	10–25	Vc m/min	90 (40–110)	90 (40–110)	80 (40–90)	40 (20–60)	90 (40–110)	90 (40–110)	—
		f mm/rev	0.17 (0.1–0.24)	0.17 (0.1–0.24)	0.15 (0.09–0.22)	0.07 (0.05–0.09)	0.19 (0.11–0.26)	0.17 (0.1–0.24)	—
	30–40	Vc m/min	75 (40–95)	75 (40–85)	65 (40–75)	30 (20–50)	75 (45–95)	30 (20–50)	—
		f mm/rev	0.14 (0.08–0.19)	0.14 (0.08–0.19)	0.15 (0.07–0.18)	0.06 (0.04–0.07)	0.15 (0.09–0.21)	0.14 (0.08–0.19)	—
4	3–8	Vc m/min	120 (70–170)	100 (70–160)	90 (60–120)	40 (30–50)	100 (70–110)	90 (60–100)	70 (50–90)
		f mm/rev	0.19 (0.12–0.25)	0.18 (0.12–0.24)	0.15 (0.12–0.18)	0.09 (0.07–0.13)	0.21 (0.12–0.3)	0.17 (0.1–0.24)	0.13 (0.08–0.18)
	10–25	Vc m/min	90 (40–110)	90 (40–110)	80 (40–90)	40 (20–60)	90 (40–110)	90 (40–110)	—
		f mm/rev	0.2 (0.12–0.3)	0.2 (0.12–0.3)	0.18 (0.11–0.27)	0.08 (0.06–0.1)	0.22(0.13–0.33)	0.2 (0.12–0.3)	—
	30–40	Vc m/min	75 (40–95)	75 (40–85)	65 (40–75)	30 (20–50)	75 (45–95)	30 (20–50)	—
		f mm/rev	0.16 (0.1–0.24)	0.16 (0.1–0.24)	0.18 (0.09–0.22)	0.06 (0.05–0.08)	0.18 (0.1–0.26)	0.16 (0.1–0.24)	—
5	3–8	Vc m/min	130 (80–190)	110 (80–180)	90 (70–140)	40 (30–50)	110 (80–130)	90 (70–120)	70 (60–100)
		f mm/rev	0.23 (0.15–0.3)	0.22 (0.15–0.29)	0.19 (0.15–0.22)	0.11 (0.08–0.16)	0.25 (0.15–0.35)	0.21 (0.14–0.28)	0.17 (0.12–0.22)
	10–25	Vc m/min	90 (40–110)	90 (40–110)	80 (40–90)	40 (20–60)	90 (40–110)	90 (40–110)	—
		f mm/rev	0.25 (0.15–0.35)	0.25 (0.15–0.35)	0.22 (0.14–0.32)	0.1 (0.07–0.12)	0.28 (0.17–0.39)	0.25 (0.15–0.35)	—
	30–40	Vc m/min	75 (40–95)	75 (40–85)	65 (40–75)	30 (20–50)	75 (45–95)	30 (20–50)	—
		f mm/rev	0.2 (0.12–0.28)	0.2 (0.12–0.28)	0.22 (0.11–0.26)	0.08 (0.06–0.1)	0.22 (0.13–0.31)	0.2 (0.12–0.28)	—
6	3–8	Vc m/min	140 (90–210)	120 (90–190)	100 (80–150)	50 (40–70)	120 (90–140)	100 (80–130)	80 (70–110)
		f mm/rev	0.27 (0.18–0.35)	0.26 (0.18–0.33)	0.22 (0.18–0.25)	0.14 (0.11–0.18)	0.29 (0.18–0.4)	0.25 (0.16–0.34)	0.2 (014–0.26)
	10–25	Vc m/min	110 (70–120)	100 (60–110)	90 (40–110)	50 (20–60)	100 (60–110)	100 (60–110)	—
		f mm/rev	0.27 (0.17–0.37)	0.24 (0.15–0.33)	0.24 (0.15–0.33)	0.12 (0.08–0.16)	0.3 (0.19–0.41)	0.27 (0.17–0.37)	—
	30–40	Vc m/min	90 (40–110)	80 (40–90)	75 (40–85)	40 (20–60)	90 (60–110)	40 (30–60)	—
		f mm/rev	0.22 (0.14–0.3)	0.22 (0.14–0.3)	0.24 (0.12–0.26)	0.1 (0.06–0.13)	0.24 (0.15–0.33)	0.22 (0.14–0.3)	—
8	3–8	Vc m/min	160 (100–240)	140 (100–220)	120 (90–170)	50 (40–70)	140 (100–160)	120 (90–150)	100 (80–130)
		f mm/rev	0.3 (0.2–0.4)	0.29 (0.2–0.38)	0.24 (0.2–0.27)	0.15 (0.12–0.2)	0.33 (0.2–0.45)	0.28 (0.18–0.38)	0.23 (0.16–0.3)
	10–25	Vc m/min	110 (70–120)	100 (60–110)	90 (40–110)	50 (20–60)	100 (60–110)	100 (60–110)	—
		f mm/rev	0.3 (0.2–0.4)	0.3 (0.2–0.4)	0.27 (0.18–0.36)	0.14 (0.1–0.17)	0.33 (0.22–0.44)	0.3 (0.2–0.4)	—
	30–40	Vc m/min	90 (40–110)	80 (40–90)	75 (40–85)	40 (20–50)	90 (60–100)	40 (30–60)	—
		f mm/rev	0.24 (0.16–0.32)	0.24 (0.16–0.32)	0.27 (0.14–0.29)	0.11 (0.08–0.14)	0.26 (0.18–0.35)	0.24 (0.16–0.32)	—
10	3–8	Vc m/min	170 (100–250)	150 (100–230)	130 (90–180)	50 (40–70)	150 (100–170)	130 (90–160)	110 (80–140)
		f mm/rev	0.33 (0.2–0.45)	0.32 (0.2–0.43)	0.25 (0.2–0.3)	0.16 (0.12–0.22)	0.35 (0.2–0.5)	0.29 (0.18–0.4)	0.24 (0.16–0.32)
	10–25	Vc m/min	110 (70–120)	100 (60–110)	90 (40–110)	50 (20–60)	100 (60–110)	100 (60–110)	—
		f mm/rev	0.32 (0.22–0.42)	0.32 (0.22–0.42)	0.29 (0.2–0.38)	0.15 (0.12–0.18)	0.35 (0.24–0.46)	0.32 (0.22–0.42)	—
	30–40	Vc m/min	90 (40–110)	80 (40–90)	75 (40–95)	40 (20–50)	90 (60–100)	40 (30–60)	—
		f mm/rev	0.26 (0.18–0.34)	0.26 (0.18–0.34)	0.29 (0.16–0.3)	0.12 (0.1–0.14)	0.28 (0.19–0.37)	0.26 (0.18–0.34)	—
12	3–8	Vc m/min	180 (100–250)	160 (100–230)	140 (90–180)	50 (40–70)	160 (100–170)	140 (90–160)	110 (80–140)
		f mm/rev	0.35 (0.2–0.5)	0.34 (0.2–0.48)	0.27 (0.2–0.34)	0.18 (0.14–0.24)	0.4 (0.2–0.6)	0.31 (0.18–0.44)	0.25 (0.16–0.34)
	10–25	Vc m/min	130 (90–150)	120 (80–140)	100 (60–110)	60 (25–65)	120 (90–140)	120 (90–140)	—
		f mm/rev	0.34 (0.24–0.44)	0.34 (0.24–0.44)	0.3 (0.22–0.4)	0.17 (0.14–0.19)	0.37 (0.26–0.48)	0.34 (0.24–0.44)	—
	30–40	Vc m/min	105 (55–125)	95 (55–105)	80 (40–100)	50 (20–60)	105 (65–115)	50 (40–70)	—
		f mm/rev	0.27 (0.19–0.35)	0.27 (0.19–0.35)	0.3 (0.18–0.32)	0.14 (0.11–0.15)	0.3 (0.21–0.38)	0.27 (0.19–0.35)	—
16	3–8	Vc m/min	180 (100–250)	160 (100–230)	140 (90–180)	50 (40–70)	160 (100–170)	140 (90–160)	110 (80–140)
		f mm/rev	0.38 (0.2–0.55)	0.36 (0.2–0.52)	0.28 (0.2–0.36)	0.19 (0.15–0.26)	0.43 (0.2–0..65)	0.33 (0.18–0.48)	0.27 (0.16–0.38)
	10–25	Vc m/min	130 (90–150)	120 (80–140)	100 (60–110)	60 (25–65)	120 (90–140)	120 (90–140)	—
		f mm/rev	0.36 (0.26–0.46)	0.36 (0.26–0.46)	0.32 (0.23–0.41)	0.17 (0.14–0.19)	0.4 (0.29–0.48)	0.36 (0.26–0.46)	—
20	3–8	Vc m/min	180 (100–250)	160 (100–230)	140 (90–180)	50 (40–70)	160 (100–170)	140 (90–160)	110 (80–140)
		f mm/rev	0.4 (0.2–0.6)	0.39 (0.2–0.57)	0.3 (0.2–0.4)	0.21 (0.16–0.28)	0.45 (0.2–0.7)	0.35 (0.18–0.52)	0.28 (0.16–0.4)

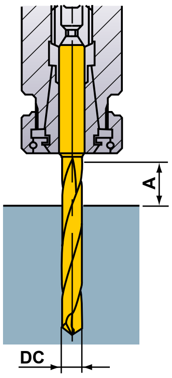
OPERATIONAL GUIDANCE FOR THE MPS1 LONG TYPE DRILL

Drill Holding



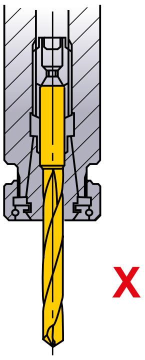
Thrust bearing type collet chuck holds the drill securely.

Drill Length



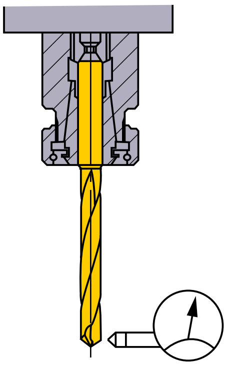
A≥ DC x 1.5

Drill Installation



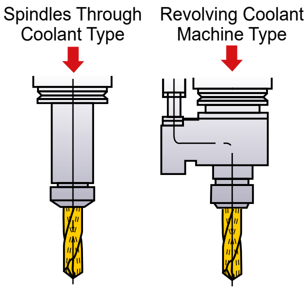
Do not clamp on the flutes.

Installation Tolerance



Run-out ≤ 0.03mm

Through Coolant Type



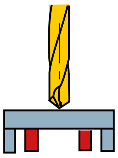
Coolant pressure is approx. 5—10 bar (<Ø5:2—30 bar).

Coolant Handling

1) Small particles of chips will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

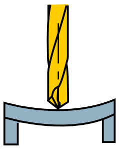
2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Thin Workpiece



OK

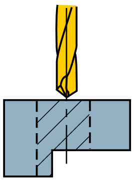
Support the Workpiece



X

If Bending Occurs

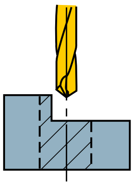
Interrupted Cutting



One Process

OK

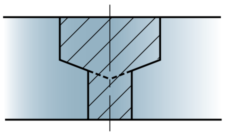
①Lower the feed when drillng the interrupted part.



Requires Prior Machining

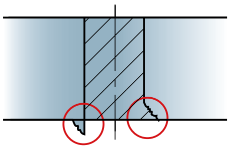
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
*A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

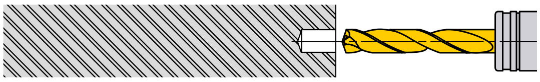
MPS1

4 Margin & Super Long Drill

HOW TO USE LONG TYPE DRILLS

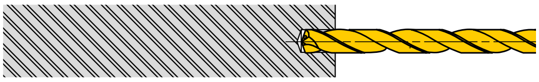
FLAT FACE DRILLING ● Drilling a blind hole

■ 1. Drilling a pilot hole



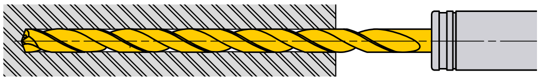
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type drill.)

■ 2. Initial cutting with the long type drill



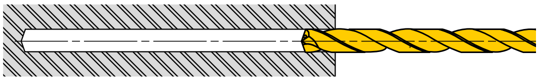
①Penetrate the pilot hole at low revolution. (Revolution 1000min^{-1}, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 0.5—1mm short of the pilot hole bottom.

■ 3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

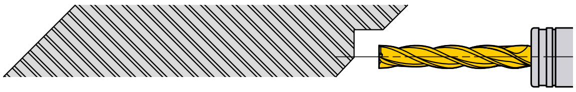
■ 4. Drill retraction



①After drilling, lower the cutting revolution about 0.5—1mm short of the hole end. (Revolution of around 1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.

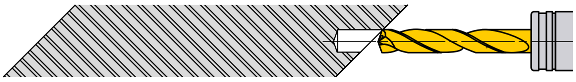
INTERRUPTED DRILLING ● Drilling and breaking through on irregular faces or angles

■ 1. Spot facing



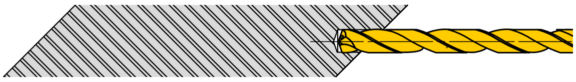
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a pilot hole



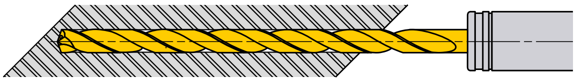
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type drill.)

■ 3. Initial cutting with the long type drill



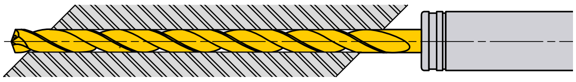
①Penetrate the guide hole at a low revolution. (Revolution 1000min^{-1}, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 0.5—1mm short of the pilot hole bottom.

■ 4. Drill the deep hole



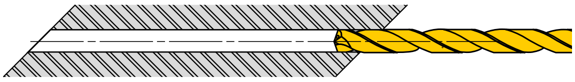
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

■ 5. Breaking through



①When breaking through, the cutting edge can be damaged.
②Lower the feed rate when penetrating.

■ 6. Drill retraction



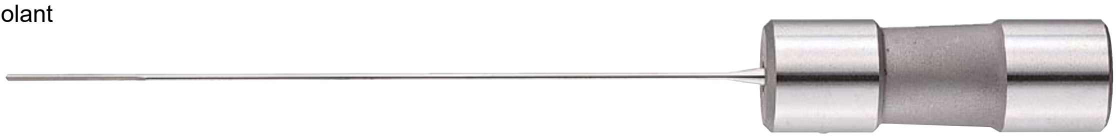
①Finally clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

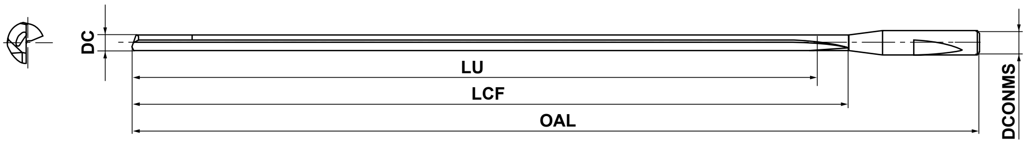
MICRO-MGS

- ●Micro deep hole drilling is possible.
- ●Excellent run-out accuracy ensures high precision drilling.

P **M** **K** **N** S H

Internal Coolant





DC≤3
0 −0.005

● MGS drills are suitable for use with shrink fit holders.

DC (mm)	Hole Depth (L/D)	HTi10	Order Number	Dimensions (mm)			
				LU	LCF	OAL	DCONMS
0.7	50	★	**MGS0070L040B**	35.0	40	80	3
	80	★	**MGS0070L060B**	56.0	60	100	3
0.8	45	★	**MGS0080L040B**	36.0	40	80	3
	70	★	**MGS0080L060B**	56.0	60	100	3
0.9	40	★	**MGS0090L040B**	36.0	40	80	3
	60	★	**MGS0090L060B**	54.0	60	100	3
1.0	35	★	**MGS0100L040B**	35.0	40	80	3
	55	★	**MGS0100L060B**	55.0	60	100	3
	75	★	**MGS0100L080B**	75.0	80	120	3
1.1	30	★	**MGS0110L040B**	33.0	40	80	3
	50	★	**MGS0110L060B**	55.0	60	100	3
	65	★	**MGS0110L080B**	71.5	80	120	3
1.2	30	★	**MGS0120L040B**	36.0	40	80	3
	45	★	**MGS0120L060B**	54.0	60	100	3
	60	★	**MGS0120L080B**	72.0	80	120	3
1.3	40	★	**MGS0130L060B**	52.0	60	100	3
	55	★	**MGS0130L080B**	71.5	80	120	3
	70	★	**MGS0130L100B**	91.0	100	140	3
1.4	35	★	**MGS0140L060B**	49.0	60	100	3
	50	★	**MGS0140L080B**	70.0	80	120	3
	65	★	**MGS0140L100B**	91.0	100	140	3
1.5	35	★	**MGS0150L060B**	52.5	60	100	3
	50	★	**MGS0150L080B**	75.0	80	120	3
	60	★	**MGS0150L100B**	90.0	100	140	3
1.6	30	★	**MGS0160L060B**	48.0	60	100	3
	45	★	**MGS0160L080B**	72.0	80	120	3
	55	★	**MGS0160L100B**	88.0	100	140	3
1.7	30	★	**MGS0170L060B**	51.0	60	100	3
	40	★	**MGS0170L080B**	68.0	80	120	3
	55	★	**MGS0170L100B**	93.5	100	140	3

DC (mm)	Hole Depth (L/D)	HTi10	Order Number	Dimensions (mm)			
				LU	LCF	OAL	DCONMS
1.8	30	★	**MGS0180L060B**	54.0	60	100	3
	40	★	**MGS0180L080B**	72.0	80	120	3
	50	★	**MGS0180L100B**	90.0	100	140	3
1.9	25	★	**MGS0190L060B**	47.5	60	100	3
	35	★	**MGS0190L080B**	66.5	80	120	3
	45	★	**MGS0190L100B**	85.5	100	140	3
2.0	25	★	**MGS0200L060B**	50.0	60	100	3
	35	★	**MGS0200L080B**	70.0	80	120	3
	45	★	**MGS0200L100B**	90.0	100	140	3
2.1	35	★	**MGS0210L080B**	73.5	80	120	3
	40	★	**MGS0210L100B**	84.0	100	140	3
2.2	30	★	**MGS0220L080B**	66.0	80	120	3
	40	★	**MGS0220L100B**	88.0	100	140	3
2.3	30	★	**MGS0230L080B**	69.0	80	120	3
	40	★	**MGS0230L100B**	92.0	100	140	3
2.4	30	★	**MGS0240L080B**	72.0	80	120	3
	35	★	**MGS0240L100B**	84.0	100	140	3
2.5	25	★	**MGS0250L080B**	62.5	80	120	3
	35	★	**MGS0250L100B**	87.5	100	140	3
2.6	25	★	**MGS0260L080B**	65.0	80	120	3
	35	★	**MGS0260L100B**	91.0	100	140	3
2.7	25	★	**MGS0270L080B**	67.5	80	120	3
	30	★	**MGS0270L100B**	81.0	100	140	3
2.8	25	★	**MGS0280L080B**	70.0	80	120	3
	30	★	**MGS0280L100B**	84.0	100	140	3
2.9	20	★	**MGS0290L080B**	58.0	80	120	3
	30	★	**MGS0290L100B**	87.0	100	140	3
3.0	20	★	**MGS0300L080B**	60.0	80	120	3
	30	★	**MGS0300L100B**	90.0	100	140	3

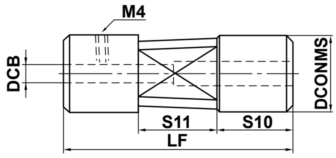
Note 1) Please consult us regarding coated type drills (**VP**, **GP** and **UP** coated carbide).

★ : Inventory maintained in Japan.

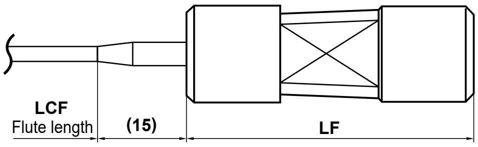
CUTTING CONDITIONS ➤M076
TECHNICAL DATA ➤P001

MICRO-MGS

■ DRIVER



■ WHEN USING WITH A DRIVER



Order Number	Stock	Dimensions (mm)						
		DCONMS	DCB	LF	S10	S11	Set Screw	Wrench
MGD38	★	12.7	3.0	38.1	12.6	12.7	HSS04004	HKY20F
MGD70	★	12.7	3.0	70.0	25.0	20.0	HSS04004	HKY20F

RECOMMENDED CUTTING CONDITIONS

Material	P							
	Mild Steel (≤180HB) Ck10				Carbon steel, Alloy steel (180—280HB) Ck45, 42CrMo4			
Coolant type	Water insoluble cutting oil				Water insoluble cutting oil			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.8	50	19800	0.01 (0.005—0.016)	195	40	15900	0.01 (0.005—0.016)	155
1.0	50	15900	0.01 (0.007—0.020)	155	40	12700	0.01 (0.007—0.020)	125
1.2	60	15900	0.015 (0.008—0.024)	235	50	13200	0.015 (0.008—0.024)	195
1.6	60	11900	0.02 (0.011—0.032)	235	50	9900	0.02 (0.011—0.032)	195
2.0	60	9500	0.025 (0.013—0.040)	235	50	7900	0.025 (0.013—0.040)	195
2.5	70	8900	0.03 (0.017—0.050)	265	60	7600	0.03 (0.017—0.050)	225
3.0	70	7400	0.04 (0.020—0.060)	295	60	6300	0.04 (0.020—0.060)	250

Material	P				M			
	Carbon steel, Alloy steel (280—350HB) 36CrNiMo4				Austenitic Stainless Steel (≤200HB) X5CrNi1810, X5CrNiMo17-12-2			
Coolant type	Water insoluble cutting oil				Water insoluble cutting oil			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.8	30	11900	0.005 (0.004—0.005)	55	30	11900	0.01 (0.005—0.016)	115
1.0	30	9500	0.005 (0.005—0.007)	45	30	9500	0.01 (0.007—0.020)	95
1.2	40	10600	0.005 (0.006—0.008)	50	30	7900	0.015 (0.008—0.024)	115
1.6	40	7900	0.01 (0.008—0.011)	75	40	7900	0.02 (0.011—0.032)	155
2.0	40	6300	0.01 (0.010—0.013)	60	40	6300	0.025 (0.013—0.040)	155
2.5	50	6300	0.015 (0.013—0.017)	90	40	5000	0.03 (0.017—0.050)	150
3.0	50	5300	0.015 (0.015—0.020)	75	40	4200	0.04 (0.020—0.060)	165

Material	K							
	Gray Cast Iron (≤350MPa) GG30				Ductile Cast Iron (≤450MPa) GGG45			
Coolant type	Water insoluble cutting oil • Water soluble cutting oil				Water insoluble cutting oil • Water soluble cutting oil			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.8	50	19800	0.01 (0.008—0.016)	195	40	15900	0.005 (0.005—0.008)	75
1.0	50	15900	0.015 (0.010—0.020)	235	40	12700	0.005 (0.007—0.010)	60
1.2	60	15900	0.015 (0.012—0.024)	235	50	13200	0.01 (0.008—0.012)	130
1.6	60	11900	0.02 (0.016—0.032)	235	50	9900	0.01 (0.011—0.016)	95
2.0	60	9500	0.03 (0.020—0.040)	285	50	7900	0.015 (0.013—0.020)	115
2.5	70	8900	0.035 (0.025—0.050)	310	60	7600	0.02 (0.017—0.025)	150
3.0	70	7400	0.045 (0.030—0.060)	330	60	6300	0.025 (0.020—0.030)	155

Note 1) For safety and success, high pressure coolant is required. (Minimum coolant pressure=1,000PSI)
Note 2) Coolant filter must be less than 5 microns. Fine filtration is necessary to prevent blockage of the coolant holes.
Note 3) A pilot hole or guide bushing is required.

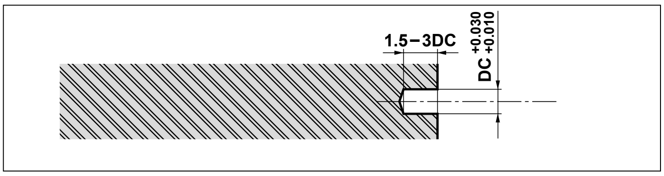
★ : Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

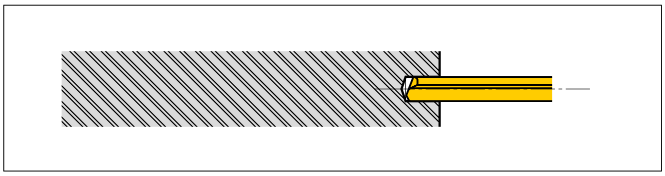
	N							
Material	Aluminium Alloy (Si<5%)				Copper, Copper alloy			
Coolant type	Water insoluble cutting oil • Water soluble cutting oil				Water insoluble cutting oil • Water soluble cutting oil			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
0.8	50	19800	0.01 (0.008—0.016)	195	40	15900	0.01 (0.008—0.016)	155
1.0	60	19000	0.015 (0.010—0.020)	285	50	15900	0.015 (0.010—0.020)	235
1.2	70	18500	0.015 (0.012—0.024)	275	60	15900	0.015 (0.012—0.024)	235
1.6	80	15900	0.02 (0.016—0.032)	315	70	13900	0.02 (0.016—0.032)	275
2.0	90	14300	0.03 (0.020—0.040)	425	80	12700	0.03 (0.020—0.040)	380
2.5	100	12700	0.035 (0.025—0.050)	440	90	11400	0.035 (0.025—0.050)	395
3.0	100	10600	0.045 (0.030—0.060)	475	100	10600	0.045 (0.030—0.060)	475

Note 1) For safety and success, high pressure coolant is required. (Minimum coolant pressure=70 bar)
Note 2) Coolant filter must be less than 5 microns. Fine filtration is necessary to prevent blockage of the coolant holes.
Note 3) A pilot hole or guide bushing is required.

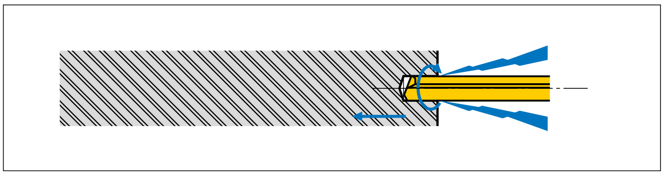
HOW TO USE



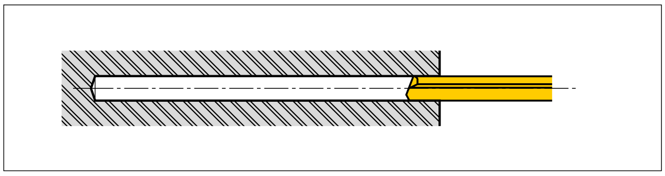
1. Pilot hole drilling.
(Mitsubishi Materials MWE or MWS is recommended.)



2. Penetrate the pilot hole without rotation or counter rotate under 300 rpm.
Stop the MGS gun drill 1 mm – 2 mm short of the bottom of the pilot hole.



3. Turn the coolant on, raise cutting speed and feed to the recommended cutting condition, and commence drilling.



4. Return to "Pos 2" after drilling, turn the coolant off, and stop the drill rotating.

DRILLING (SOLID CARBIDE)

MMS

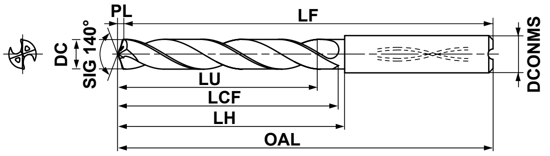
- For high accuracy and efficient drilling of stainless steels.
- Trigon shaped coolant holes in drills from diameter 4.60mm.

P M K N S H

	DC=3	3<DC≤6	6<DC≤10	10<DC≤18	18<DC≤20
DIN type (m7)	+0.012 +0.002	+0.016 +0.004	+0.021 +0.006	+0.025 +0.007	+0.029 +0.008
Others (h8)	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
		0 −0.008	0 −0.009	0 −0.011	0 −0.013

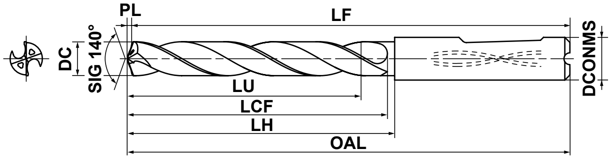
Internal Coolant

●Type 1 Cylindrical shank type



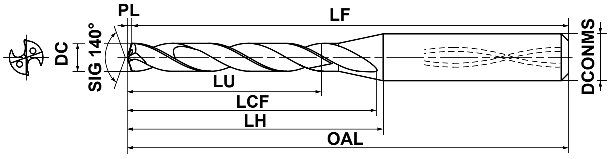
MMS----S/L-DIN-C (L/D 3−5)
MMS----X3/X5DB (L/D 3−5)

●Type 2 Whistle notch shank type



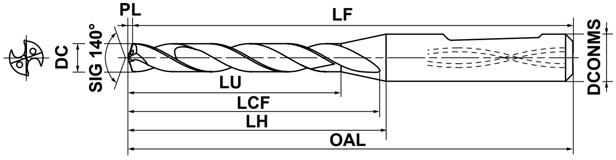
MMS----S/L-DIN (L/D 3−5)

●Type 3 Cylindrical shank type with taper neck



MMS----S/L-DIN-C (L/D 3−5)
MMS----X3/X5DB (L/D 3−5)

●Type 4 Whistle notch shank type with taper neck



MMS----S/L-DIN (L/D 3−5)

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.0	3	☐	MMS0300S-DIN	15.0	19.5	24.5	61.5	61	0.5	6	4
	3	●	MMS0300S-DIN-C	15.0	19.5	24.5	61.5	61	0.5	6	3
	5	☐	MMS0300L-DIN	23.0	27.5	28.5	65.5	65	0.5	6	4
	5	●	MMS0300L-DIN-C	23.0	27.5	28.5	65.5	65	0.5	6	3
	3	★	MMS0300X3DB	9.5	21.5	23.5	70.5	70	0.5	6	3
	5	★	MMS0300X5DB	15.5	28.5	31.5	78.5	78	0.5	6	3
3.05	3	☐	MMS0305S-DIN	15.0	19.6	24.6	61.6	61	0.6	6	4
	3	●	MMS0305S-DIN-C	15.0	19.6	24.6	61.6	61	0.6	6	3
	5	☐	MMS0305L-DIN	23.0	27.6	28.6	65.6	65	0.6	6	4
	5	●	MMS0305L-DIN-C	23.0	27.6	28.6	65.6	65	0.6	6	3
3.1	3	☐	MMS0310S-DIN	14.9	19.6	24.6	61.6	61	0.6	6	4
	3	●	MMS0310S-DIN-C	14.9	19.6	24.6	61.6	61	0.6	6	3
	5	☐	MMS0310L-DIN	22.9	27.6	28.6	65.6	65	0.6	6	4
	5	●	MMS0310L-DIN-C	22.9	27.6	28.6	65.6	65	0.6	6	3
	3	★	MMS0310X3DB	9.9	21.6	23.6	70.6	70	0.6	6	3
	5	★	MMS0310X5DB	16.1	28.6	31.6	78.6	78	0.6	6	3
3.2	3	☐	MMS0320S-DIN	14.8	19.6	24.6	61.6	61	0.6	6	4
	3	●	MMS0320S-DIN-C	14.8	19.6	24.6	61.6	61	0.6	6	3
	5	☐	MMS0320L-DIN	22.8	27.6	28.6	65.6	65	0.6	6	4
	5	●	MMS0320L-DIN-C	22.8	27.6	28.6	65.6	65	0.6	6	3
	3	★	MMS0320X3DB	10.2	21.6	23.6	70.6	70	0.6	6	3
	5	★	MMS0320X5DB	16.6	28.6	31.6	78.6	78	0.6	6	3
3.3	3	☐	MMS0330S-DIN	14.7	19.6	24.6	61.6	61	0.6	6	4
	3	●	MMS0330S-DIN-C	14.7	19.6	24.6	61.6	61	0.6	6	3
	5	☐	MMS0330L-DIN	22.7	27.6	28.6	65.6	65	0.6	6	4
	5	●	MMS0330L-DIN-C	22.7	27.6	28.6	65.6	65	0.6	6	3
	3	★	MMS0330X3DB	10.5	21.6	23.6	70.6	70	0.6	6	3
	5	★	MMS0330X5DB	17.1	28.6	31.6	78.6	78	0.6	6	3
3.4	3	☐	MMS0340S-DIN	14.5	19.6	24.6	61.6	61	0.6	6	4
	3	●	MMS0340S-DIN-C	14.5	19.6	24.6	61.6	61	0.6	6	3
	5	☐	MMS0340L-DIN	22.5	27.6	28.6	65.6	65	0.6	6	4
	5	●	MMS0340L-DIN-C	22.5	27.6	28.6	65.6	65	0.6	6	3
	3	★	MMS0340X3DB	10.8	21.6	23.6	70.6	70	0.6	6	3
	5	★	MMS0340X5DB	17.6	28.6	31.6	78.6	78	0.6	6	3
3.5	3	☐	MMS0350S-DIN	14.4	19.6	24.6	61.6	61	0.6	6	4
	3	●	MMS0350S-DIN-C	14.4	19.6	24.6	61.6	61	0.6	6	3
	5	☐	MMS0350L-DIN	22.4	27.6	28.6	65.6	65	0.6	6	4
	5	●	MMS0350L-DIN-C	22.4	27.6	28.6	65.6	65	0.6	6	3
	3	★	MMS0350X3DB	11.1	21.6	23.6	70.6	70	0.6	6	3
	5	★	MMS0350X5DB	18.1	28.6	31.6	78.6	78	0.6	6	3
3.6	3	☐	MMS0360S-DIN	14.3	19.7	24.7	61.7	61	0.7	6	4
	3	●	MMS0360S-DIN-C	14.3	19.7	24.7	61.7	61	0.7	6	3
	5	☐	MMS0360L-DIN	22.3	27.7	28.7	65.7	65	0.7	6	4
	5	●	MMS0360L-DIN-C	22.3	27.7	28.7	65.7	65	0.7	6	3
	3	★	MMS0360X3DB	11.5	22.7	23.7	70.7	70	0.7	6	3
	5	★	MMS0360X5DB	18.7	30.7	31.7	78.7	78	0.7	6	3
3.7	3	☐	MMS0370S-DIN	14.1	19.7	24.7	61.7	61	0.7	6	4
	3	●	MMS0370S-DIN-C	14.1	19.7	24.7	61.7	61	0.7	6	3
	5	☐	MMS0370L-DIN	22.1	27.7	28.7	65.7	65	0.7	6	4
	5	●	MMS0370L-DIN-C	22.1	27.7	28.7	65.7	65	0.7	6	3
	3	★	MMS0370X3DB	11.8	22.7	23.7	70.7	70	0.7	6	3
	5	★	MMS0370X5DB	19.2	30.7	31.7	78.7	78	0.7	6	3
3.8	3	☐	MMS0380S-DIN	18.0	23.7	28.7	65.7	65	0.7	6	4
	3	●	MMS0380S-DIN-C	18.0	23.7	28.7	65.7	65	0.7	6	3
	5	☐	MMS0380L-DIN	30.0	35.7	36.7	73.7	73	0.7	6	4
	5	●	MMS0380L-DIN-C	30.0	35.7	36.7	73.7	73	0.7	6	3
	3	★	MMS0380X3DB	12.1	22.7	23.7	70.7	70	0.7	6	3
	5	★	MMS0380X5DB	19.7	30.7	31.7	78.7	78	0.7	6	3
3.9	3	☐	MMS0390S-DIN	17.9	23.7	28.7	65.7	65	0.7	6	4
	3	●	MMS0390S-DIN-C	17.9	23.7	28.7	65.7	65	0.7	6	3
	5	☐	MMS0390L-DIN	29.9	35.7	36.7	73.7	73	0.7	6	4
	5	●	MMS0390L-DIN-C	29.9	35.7	36.7	73.7	73	0.7	6	3
	3	★	MMS0390X3DB	12.4	22.7	23.7	70.7	70	0.7	6	3
	5	★	MMS0390X5DB	20.2	30.7	31.7	78.7	78	0.7	6	3

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.0	3	☐	MMS0400S-DIN	17.7	23.7	28.7	65.7	65	0.7	6	4
	3	●	MMS0400S-DIN-C	17.7	23.7	28.7	65.7	65	0.7	6	3
	5	☐	MMS0400L-DIN	29.7	35.7	36.7	73.7	73	0.7	6	4
	5	●	MMS0400L-DIN-C	29.7	35.7	36.7	73.7	73	0.7	6	3
	3	★	MMS0400X3DB	12.7	22.7	23.7	70.7	70	0.7	6	3
	5	★	MMS0400X5DB	20.7	30.7	31.7	78.7	78	0.7	6	3
4.05	3	☐	MMS0405S-DIN	17.7	23.7	28.7	65.7	65	0.7	6	4
	3	●	MMS0405S-DIN-C	17.7	23.7	28.7	65.7	65	0.7	6	3
	5	☐	MMS0405L-DIN	29.7	35.7	36.7	73.7	73	0.7	6	4
	5	●	MMS0405L-DIN-C	29.7	35.7	36.7	73.7	73	0.7	6	3
4.1	3	☐	MMS0410S-DIN	17.6	23.7	28.7	65.7	65	0.7	6	4
	3	●	MMS0410S-DIN-C	17.6	23.7	28.7	65.7	65	0.7	6	3
	5	☐	MMS0410L-DIN	29.6	35.7	36.7	73.7	73	0.7	6	4
	5	●	MMS0410L-DIN-C	29.6	35.7	36.7	73.7	73	0.7	6	3
	3	★	MMS0410X3DB	13.0	24.7	26.7	73.7	73	0.7	6	3
	5	★	MMS0410X5DB	21.2	33.7	35.7	82.7	82	0.7	6	3
4.2	3	☐	MMS0420S-DIN	17.5	23.8	28.8	65.8	65	0.8	6	4
	3	●	MMS0420S-DIN-C	17.5	23.8	28.8	65.8	65	0.8	6	3
	5	☐	MMS0420L-DIN	29.5	35.8	36.8	73.8	73	0.8	6	4
	5	●	MMS0420L-DIN-C	29.5	35.8	36.8	73.8	73	0.8	6	3
	3	★	MMS0420X3DB	13.4	24.8	26.8	73.8	73	0.8	6	3
	5	★	MMS0420X5DB	21.8	33.8	35.8	82.8	82	0.8	6	3
4.3	3	☐	MMS0430S-DIN	17.3	23.8	28.8	65.8	65	0.8	6	4
	3	●	MMS0430S-DIN-C	17.3	23.8	28.8	65.8	65	0.8	6	3
	5	☐	MMS0430L-DIN	29.3	35.8	36.8	73.8	73	0.8	6	4
	5	●	MMS0430L-DIN-C	29.3	35.8	36.8	73.8	73	0.8	6	3
	3	★	MMS0430X3DB	13.7	24.8	26.8	73.8	73	0.8	6	3
	5	★	MMS0430X5DB	22.3	33.8	35.8	82.8	82	0.8	6	3
4.4	3	☐	MMS0440S-DIN	17.2	23.8	28.8	65.8	65	0.8	6	4
	3	☐	MMS0440S-DIN-C	17.2	23.8	28.8	65.8	65	0.8	6	3
	5	☐	MMS0440L-DIN	29.2	35.8	36.8	73.8	73	0.8	6	4
	5	☐	MMS0440L-DIN-C	29.2	35.8	36.8	73.8	73	0.8	6	3
	3	★	MMS0440X3DB	14.0	24.8	26.8	73.8	73	0.8	6	3
	5	★	MMS0440X5DB	22.8	33.8	35.8	82.8	82	0.8	6	3
4.5	3	☐	MMS0450S-DIN	17.1	23.8	28.8	65.8	65	0.8	6	4
	3	●	MMS0450S-DIN-C	17.1	23.8	28.8	65.8	65	0.8	6	3
	5	☐	MMS0450L-DIN	29.1	35.8	36.8	73.8	73	0.8	6	4
	5	●	MMS0450L-DIN-C	29.1	35.8	36.8	73.8	73	0.8	6	3
	3	★	MMS0450X3DB	14.3	24.8	26.8	73.8	73	0.8	6	3
	5	★	MMS0450X5DB	23.3	33.8	35.8	82.8	82	0.8	6	3
4.6	3	☐	MMS0460S-DIN	16.9	23.8	28.8	65.8	65	0.8	6	2
	3	●	MMS0460S-DIN-C	16.9	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MMS0460L-DIN	28.9	35.8	36.8	73.8	73	0.8	6	2
	5	●	MMS0460L-DIN-C	28.9	35.8	36.8	73.8	73	0.8	6	1
	3	★	MMS0460X3DB	14.6	25.8	28.8	75.8	75	0.8	6	1
	5	★	MMS0460X5DB	23.8	35.8	38.8	85.8	85	0.8	6	1
4.65	3	☐	MMS0465S-DIN	16.9	23.8	28.8	65.8	65	0.8	6	2
	3	●	MMS0465S-DIN-C	16.9	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MMS0465L-DIN	28.9	35.8	36.8	73.8	73	0.8	6	2
	5	●	MMS0465L-DIN-C	28.9	35.8	36.8	73.8	73	0.8	6	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.7	3	☐	MMS0470S-DIN	16.8	23.9	28.9	65.9	65	0.9	6	2
	3	☐	MMS0470S-DIN-C	16.8	23.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0470L-DIN	28.8	35.9	36.9	73.9	73	0.9	6	2
	5	☐	MMS0470L-DIN-C	28.8	35.9	36.9	73.9	73	0.9	6	1
	3	★	MMS0470X3DB	15.0	25.9	28.9	75.9	75	0.9	6	1
	5	★	MMS0470X5DB	24.4	35.9	38.9	85.9	85	0.9	6	1
4.8	3	☐	MMS0480S-DIN	20.7	27.9	28.9	65.9	65	0.9	6	2
	3	●	MMS0480S-DIN-C	20.7	27.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0480L-DIN	36.7	43.9	44.9	81.9	81	0.9	6	2
	5	●	MMS0480L-DIN-C	36.7	43.9	44.9	81.9	81	0.9	6	1
	3	★	MMS0480X3DB	15.3	25.9	28.9	75.9	75	0.9	6	1
	5	★	MMS0480X5DB	24.9	35.9	38.9	85.9	85	0.9	6	1
4.9	3	☐	MMS0490S-DIN	20.5	27.9	28.9	65.9	65	0.9	6	2
	3	☐	MMS0490S-DIN-C	20.5	27.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0490L-DIN	36.5	43.9	44.9	81.9	81	0.9	6	2
	5	☐	MMS0490L-DIN-C	36.5	43.9	44.9	81.9	81	0.9	6	1
	3	★	MMS0490X3DB	15.6	25.9	28.9	75.9	75	0.9	6	1
	5	★	MMS0490X5DB	25.4	35.9	38.9	85.9	85	0.9	6	1
5.0	3	☐	MMS0500S-DIN	20.4	27.9	28.9	65.9	65	0.9	6	2
	3	●	MMS0500S-DIN-C	20.4	27.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0500L-DIN	36.4	43.9	44.9	81.9	81	0.9	6	2
	5	●	MMS0500L-DIN-C	36.4	43.9	44.9	81.9	81	0.9	6	1
	3	★	MMS0500X3DB	15.9	25.9	28.9	75.9	75	0.9	6	1
	5	★	MMS0500X5DB	25.9	35.9	38.9	85.9	85	0.9	6	1
	3	☐	MMS0505S-DIN	20.3	27.9	28.9	65.9	65	0.9	6	2
5.05	3	●	MMS0505S-DIN-C	20.3	27.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0505L-DIN	36.3	43.9	44.9	81.9	81	0.9	6	2
	5	●	MMS0505L-DIN-C	36.3	43.9	44.9	81.9	81	0.9	6	1
5.1	3	☐	MMS0510S-DIN	20.3	27.9	28.9	65.9	65	0.9	6	2
	3	●	MMS0510S-DIN-C	20.3	27.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0510L-DIN	36.3	43.9	44.9	81.9	81	0.9	6	2
	5	●	MMS0510L-DIN-C	36.3	43.9	44.9	81.9	81	0.9	6	1
	3	★	MMS0510X3DB	16.2	28.9	30.9	81.9	81	0.9	6	1
	5	★	MMS0510X5DB	26.4	39.9	42.9	89.9	89	0.9	6	1
5.2	3	☐	MMS0520S-DIN	20.1	27.9	28.9	65.9	65	0.9	6	2
	3	●	MMS0520S-DIN-C	20.1	27.9	28.9	65.9	65	0.9	6	1
	5	☐	MMS0520L-DIN	36.1	43.9	44.9	81.9	81	0.9	6	2
	5	●	MMS0520L-DIN-C	36.1	43.9	44.9	81.9	81	0.9	6	1
	3	★	MMS0520X3DB	16.5	28.9	30.9	81.9	81	0.9	6	1
	5	★	MMS0520X5DB	26.9	39.9	42.9	89.9	89	0.9	6	1
5.3	3	☐	MMS0530S-DIN	20.0	28.0	29.0	66.0	65	1.0	6	2
	3	☐	MMS0530S-DIN-C	20.0	28.0	29.0	66.0	65	1.0	6	1
	5	☐	MMS0530L-DIN	36.0	44.0	45.0	82.0	81	1.0	6	2
	5	☐	MMS0530L-DIN-C	36.0	44.0	45.0	82.0	81	1.0	6	1
	3	★	MMS0530X3DB	16.9	29.0	31.0	82.0	81	1.0	6	1
	5	★	MMS0530X5DB	27.5	40.0	43.0	90.0	89	1.0	6	1
5.4	3	☐	MMS0540S-DIN	19.9	28.0	29.0	66.0	65	1.0	6	2
	3	☐	MMS0540S-DIN-C	19.9	28.0	29.0	66.0	65	1.0	6	1
	5	☐	MMS0540L-DIN	35.9	44.0	45.0	82.0	81	1.0	6	2
	5	☐	MMS0540L-DIN-C	35.9	44.0	45.0	82.0	81	1.0	6	1
	3	★	MMS0540X3DB	17.2	29.0	31.0	82.0	81	1.0	6	1
	5	★	MMS0540X5DB	28.0	40.0	43.0	90.0	89	1.0	6	1

MMS

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
5.5	3	☐	**MMS0550S-DIN**	19.8	28.0	29.0	66.0	65	1.0	6	2
	3	●	**MMS0550S-DIN-C**	19.8	28.0	29.0	66.0	65	1.0	6	1
	5	☐	**MMS0550L-DIN**	35.8	44.0	45.0	82.0	81	1.0	6	2
	5	●	**MMS0550L-DIN-C**	35.8	44.0	45.0	82.0	81	1.0	6	1
	3	★	**MMS0550X3DB**	17.5	29.0	31.0	82.0	81	1.0	6	1
	5	★	**MMS0550X5DB**	28.5	40.0	43.0	90.0	89	1.0	6	1
5.55	3	☐	**MMS0555S-DIN**	19.7	28.0	29.0	66.0	65	1.0	6	2
	3	●	**MMS0555S-DIN-C**	19.7	28.0	29.0	66.0	65	1.0	6	1
	5	●	**MMS0555L-DIN-C**	35.7	44.0	45.0	82.0	81	1.0	6	1
5.6	3	☐	**MMS0560S-DIN**	19.6	28.0	29.0	66.0	65	1.0	6	2
	3	●	**MMS0560S-DIN-C**	19.6	28.0	29.0	66.0	65	1.0	6	1
	5	☐	**MMS0560L-DIN**	35.6	44.0	45.0	82.0	81	1.0	6	2
	5	●	**MMS0560L-DIN-C**	35.6	44.0	45.0	82.0	81	1.0	6	1
	3	★	**MMS0560X3DB**	17.8	31.0	31.0	82.0	81	1.0	6	1
	5	★	**MMS0560X5DB**	29.0	43.0	43.0	90.0	89	1.0	6	1
5.7	3	☐	**MMS0570S-DIN**	19.5	28.0	29.0	66.0	65	1.0	6	2
	3	●	**MMS0570S-DIN-C**	19.5	28.0	29.0	66.0	65	1.0	6	1
	5	☐	**MMS0570L-DIN**	35.5	44.0	45.0	82.0	81	1.0	6	2
	5	●	**MMS0570L-DIN-C**	35.5	44.0	45.0	82.0	81	1.0	6	1
	3	★	**MMS0570X3DB**	18.1	31.0	31.0	82.0	81	1.0	6	1
	5	★	**MMS0570X5DB**	29.5	43.0	43.0	90.0	89	1.0	6	1
5.8	3	☐	**MMS0580S-DIN**	19.4	28.1	29.1	66.1	65	1.1	6	2
	3	●	**MMS0580S-DIN-C**	19.4	28.1	29.1	66.1	65	1.1	6	1
	5	☐	**MMS0580L-DIN**	35.4	44.1	45.1	82.1	81	1.1	6	2
	5	●	**MMS0580L-DIN-C**	35.4	44.1	45.1	82.1	81	1.1	6	1
	3	★	**MMS0580X3DB**	18.5	31.1	31.1	82.1	81	1.1	6	1
	5	★	**MMS0580X5DB**	30.1	43.1	43.1	90.1	89	1.1	6	1
5.9	3	☐	**MMS0590S-DIN**	19.2	28.1	29.1	66.1	65	1.1	6	2
	3	☐	**MMS0590S-DIN-C**	19.2	28.1	29.1	66.1	65	1.1	6	1
	5	☐	**MMS0590L-DIN**	35.2	44.1	45.1	82.1	81	1.1	6	2
	5	☐	**MMS0590L-DIN-C**	35.2	44.1	45.1	82.1	81	1.1	6	1
	3	★	**MMS0590X3DB**	18.8	31.1	31.1	82.1	81	1.1	6	1
	5	★	**MMS0590X5DB**	30.6	43.1	43.1	90.1	89	1.1	6	1
6.0	3	☐	**MMS0600S-DIN**	19.1	28.1	29.1	66.1	65	1.1	6	2
	3	●	**MMS0600S-DIN-C**	19.1	28.1	29.1	66.1	65	1.1	6	1
	5	☐	**MMS0600L-DIN**	35.1	44.1	45.1	82.1	81	1.1	6	2
	5	●	**MMS0600L-DIN-C**	35.1	44.1	45.1	82.1	81	1.1	6	1
	3	★	**MMS0600X3DB**	19.1	31.1	31.1	82.1	81	1.1	6	1
	5	★	**MMS0600X5DB**	31.1	43.1	43.1	90.1	89	1.1	6	1
6.05	3	☐	**MMS0605S-DIN**	25.0	34.1	42.1	79.1	78	1.1	8	2
	3	●	**MMS0605S-DIN-C**	25.0	34.1	42.1	79.1	78	1.1	8	1
	5	☐	**MMS0605L-DIN**	44.0	53.1	54.1	91.1	90	1.1	8	2
	5	●	**MMS0605L-DIN-C**	44.0	53.1	54.1	91.1	90	1.1	8	1
6.1	3	☐	**MMS0610S-DIN**	25.0	34.1	42.1	79.1	78	1.1	8	2
	3	●	**MMS0610S-DIN-C**	25.0	34.1	42.1	79.1	78	1.1	8	1
	5	☐	**MMS0610L-DIN**	44.0	53.1	54.1	91.1	90	1.1	8	2
	5	●	**MMS0610L-DIN-C**	44.0	53.1	54.1	91.1	90	1.1	8	1
	3	★	**MMS0610X3DB**	19.4	34.1	36.1	87.1	86	1.1	8	1
	5	★	**MMS0610X5DB**	31.6	47.1	49.1	96.1	95	1.1	8	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.2	3	☐	**MMS0620S-DIN**	24.8	34.1	42.1	79.1	78	1.1	8	2
	3	●	**MMS0620S-DIN-C**	24.8	34.1	42.1	79.1	78	1.1	8	1
	5	☐	**MMS0620L-DIN**	43.8	53.1	54.1	91.1	90	1.1	8	2
	5	●	**MMS0620L-DIN-C**	43.8	53.1	54.1	91.1	90	1.1	8	1
	3	★	**MMS0620X3DB**	19.7	34.1	36.1	87.1	86	1.1	8	1
	5	★	**MMS0620X5DB**	32.1	47.1	49.1	96.1	95	1.1	8	1
6.3	3	☐	**MMS0630S-DIN**	24.7	34.1	42.1	79.1	78	1.1	8	2
	3	☐	**MMS0630S-DIN-C**	24.7	34.1	42.1	79.1	78	1.1	8	1
	5	☐	**MMS0630L-DIN**	43.7	53.1	54.1	91.1	90	1.1	8	2
	5	☐	**MMS0630L-DIN-C**	43.7	53.1	54.1	91.1	90	1.1	8	1
	3	★	**MMS0630X3DB**	20.0	34.1	36.1	87.1	86	1.1	8	1
	5	★	**MMS0630X5DB**	32.6	47.1	49.1	96.1	95	1.1	8	1
6.4	3	☐	**MMS0640S-DIN**	24.6	34.2	42.2	79.2	78	1.2	8	2
	3	☐	**MMS0640S-DIN-C**	24.6	34.2	42.2	79.2	78	1.2	8	1
	5	☐	**MMS0640L-DIN**	43.6	53.2	54.2	91.2	90	1.2	8	2
	5	☐	**MMS0640L-DIN-C**	43.6	53.2	54.2	91.2	90	1.2	8	1
	3	★	**MMS0640X3DB**	20.4	34.2	36.2	87.2	86	1.2	8	1
	5	★	**MMS0640X5DB**	33.2	47.2	49.2	96.2	95	1.2	8	1
6.5	3	☐	**MMS0650S-DIN**	24.4	34.2	42.2	79.2	78	1.2	8	2
	3	●	**MMS0650S-DIN-C**	24.4	34.2	42.2	79.2	78	1.2	8	1
	5	☐	**MMS0650L-DIN**	43.4	53.2	54.2	91.2	90	1.2	8	2
	5	●	**MMS0650L-DIN-C**	43.4	53.2	54.2	91.2	90	1.2	8	1
	3	★	**MMS0650X3DB**	20.7	34.2	36.2	87.2	86	1.2	8	1
	5	★	**MMS0650X5DB**	33.7	47.2	49.2	96.2	95	1.2	8	1
6.6	3	☐	**MMS0660S-DIN**	24.3	34.2	42.2	79.2	78	1.2	8	2
	3	●	**MMS0660S-DIN-C**	24.3	34.2	42.2	79.2	78	1.2	8	1
	5	☐	**MMS0660L-DIN**	43.3	53.2	54.2	91.2	90	1.2	8	2
	5	●	**MMS0660L-DIN-C**	43.3	53.2	54.2	91.2	90	1.2	8	1
	3	★	**MMS0660X3DB**	21.0	36.2	38.2	91.2	90	1.2	8	1
	5	★	**MMS0660X5DB**	34.2	50.2	52.2	99.2	98	1.2	8	1
6.7	3	☐	**MMS0670S-DIN**	24.2	34.2	42.2	79.2	78	1.2	8	2
	3	☐	**MMS0670S-DIN-C**	24.2	34.2	42.2	79.2	78	1.2	8	1
	5	☐	**MMS0670L-DIN**	43.2	53.2	54.2	91.2	90	1.2	8	2
	5	☐	**MMS0670L-DIN-C**	43.2	53.2	54.2	91.2	90	1.2	8	1
	3	★	**MMS0670X3DB**	21.3	36.2	38.2	91.2	90	1.2	8	1
	5	★	**MMS0670X5DB**	34.7	50.2	52.2	99.2	98	1.2	8	1
6.8	3	☐	**MMS0680S-DIN**	24.0	34.2	42.2	79.2	78	1.2	8	2
	3	●	**MMS0680S-DIN-C**	24.0	34.2	42.2	79.2	78	1.2	8	1
	5	☐	**MMS0680L-DIN**	43.0	53.2	54.2	91.2	90	1.2	8	2
	5	●	**MMS0680L-DIN-C**	43.0	53.2	54.2	91.2	90	1.2	8	1
	3	★	**MMS0680X3DB**	21.6	36.2	38.2	91.2	90	1.2	8	1
	5	★	**MMS0680X5DB**	35.2	50.2	52.2	99.2	98	1.2	8	1
6.9	3	☐	**MMS0690S-DIN**	23.9	34.3	42.3	79.3	78	1.3	8	2
	3	●	**MMS0690S-DIN-C**	23.9	34.3	42.3	79.3	78	1.3	8	1
	5	☐	**MMS0690L-DIN**	42.9	53.3	54.3	91.3	90	1.3	8	2
	5	●	**MMS0690L-DIN-C**	42.9	53.3	54.3	91.3	90	1.3	8	1
	3	★	**MMS0690X3DB**	22.0	36.3	38.3	91.3	90	1.3	8	1
	5	★	**MMS0690X5DB**	35.8	50.3	52.3	99.3	98	1.3	8	1

●: Inventory maintained.　★: Inventory maintained in Japan.
☐: Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.0	3	☐	**MMS0700S-DIN**	23.8	34.3	42.3	79.3	78	1.3	8	2
	3	●	**MMS0700S-DIN-C**	23.8	34.3	42.3	79.3	78	1.3	8	1
	5	☐	**MMS0700L-DIN**	42.8	53.3	54.3	91.3	90	1.3	8	2
	5	●	**MMS0700L-DIN-C**	42.8	53.3	54.3	91.3	90	1.3	8	1
	3	★	**MMS0700X3DB**	22.3	36.3	38.3	91.3	90	1.3	8	1
	5	★	**MMS0700X5DB**	36.3	50.3	52.3	99.3	98	1.3	8	1
7.1	3	☐	**MMS0710S-DIN**	30.6	41.3	42.3	79.3	78	1.3	8	2
	3	☐	**MMS0710S-DIN-C**	30.6	41.3	42.3	79.3	78	1.3	8	1
	5	☐	**MMS0710L-DIN**	42.6	53.3	54.3	91.3	90	1.3	8	2
	5	☐	**MMS0710L-DIN-C**	42.6	53.3	54.3	91.3	90	1.3	8	1
	3	★	**MMS0710X3DB**	22.6	39.3	40.3	91.3	90	1.3	8	1
	5	★	**MMS0710X5DB**	36.8	54.3	57.3	104.3	103	1.3	8	1
7.2	3	☐	**MMS0720S-DIN**	30.5	41.3	42.3	79.3	78	1.3	8	2
	3	☐	**MMS0720S-DIN-C**	30.5	41.3	42.3	79.3	78	1.3	8	1
	5	☐	**MMS0720L-DIN**	42.5	53.3	54.3	91.3	90	1.3	8	2
	5	☐	**MMS0720L-DIN-C**	42.5	53.3	54.3	91.3	90	1.3	8	1
	3	★	**MMS0720X3DB**	22.9	39.3	40.3	91.3	90	1.3	8	1
	5	★	**MMS0720X5DB**	37.3	54.3	57.3	104.3	103	1.3	8	1
7.3	3	☐	**MMS0730S-DIN**	30.4	41.3	42.3	79.3	78	1.3	8	2
	3	●	**MMS0730S-DIN-C**	30.4	41.3	42.3	79.3	78	1.3	8	1
	5	☐	**MMS0730L-DIN**	42.4	53.3	54.3	91.3	90	1.3	8	2
	5	●	**MMS0730L-DIN-C**	42.4	53.3	54.3	91.3	90	1.3	8	1
	3	★	**MMS0730X3DB**	23.2	39.3	40.3	91.3	90	1.3	8	1
	5	★	**MMS0730X5DB**	37.8	54.3	57.3	104.3	103	1.3	8	1
7.4	3	☐	**MMS0740S-DIN**	30.2	41.3	42.3	79.3	78	1.3	8	2
	3	●	**MMS0740S-DIN-C**	30.2	41.3	42.3	79.3	78	1.3	8	1
	5	☐	**MMS0740L-DIN**	42.2	53.3	54.3	91.3	90	1.3	8	2
	5	●	**MMS0740L-DIN-C**	42.2	53.3	54.3	91.3	90	1.3	8	1
	3	★	**MMS0740X3DB**	23.5	39.3	40.3	91.3	90	1.3	8	1
	5	★	**MMS0740X5DB**	38.3	54.3	57.3	104.3	103	1.3	8	1
7.5	3	☐	**MMS0750S-DIN**	30.1	41.4	42.4	79.4	78	1.4	8	2
	3	●	**MMS0750S-DIN-C**	30.1	41.4	42.4	79.4	78	1.4	8	1
	5	☐	**MMS0750L-DIN**	42.1	53.4	54.4	91.4	90	1.4	8	2
	5	●	**MMS0750L-DIN-C**	42.1	53.4	54.4	91.4	90	1.4	8	1
	3	★	**MMS0750X3DB**	23.9	39.4	40.4	91.4	90	1.4	8	1
	5	★	**MMS0750X5DB**	38.9	54.4	57.4	104.4	103	1.4	8	1
7.6	3	☐	**MMS0760S-DIN**	30.0	41.4	42.4	79.4	78	1.4	8	2
	3	☐	**MMS0760S-DIN-C**	30.0	41.4	42.4	79.4	78	1.4	8	1
	5	☐	**MMS0760L-DIN**	42.0	53.4	54.4	91.4	90	1.4	8	2
	5	☐	**MMS0760L-DIN-C**	42.0	53.4	54.4	91.4	90	1.4	8	1
	3	★	**MMS0760X3DB**	24.2	41.4	41.4	91.4	90	1.4	8	1
	5	★	**MMS0760X5DB**	39.4	57.4	57.4	104.4	103	1.4	8	1
7.7	3	☐	**MMS0770S-DIN**	29.9	41.4	42.4	79.4	78	1.4	8	2
	3	☐	**MMS0770S-DIN-C**	29.9	41.4	42.4	79.4	78	1.4	8	1
	5	☐	**MMS0770L-DIN**	41.9	53.4	54.4	91.4	90	1.4	8	2
	5	☐	**MMS0770L-DIN-C**	41.9	53.4	54.4	91.4	90	1.4	8	1
	3	★	**MMS0770X3DB**	24.5	41.4	41.4	91.4	90	1.4	8	1
	5	★	**MMS0770X5DB**	39.9	57.4	57.4	104.4	103	1.4	8	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.8	3	☐	**MMS0780S-DIN**	29.7	41.4	42.4	79.4	78	1.4	8	2
	3	●	**MMS0780S-DIN-C**	29.7	41.4	42.4	79.4	78	1.4	8	1
	5	☐	**MMS0780L-DIN**	41.7	53.4	54.4	91.4	90	1.4	8	2
	5	●	**MMS0780L-DIN-C**	41.7	53.4	54.4	91.4	90	1.4	8	1
	3	★	**MMS0780X3DB**	24.8	41.4	41.4	91.4	90	1.4	8	1
	5	★	**MMS0780X5DB**	40.4	57.4	57.4	104.4	103	1.4	8	1
7.9	3	☐	**MMS0790S-DIN**	29.6	41.4	42.4	79.4	78	1.4	8	2
	3	☐	**MMS0790S-DIN-C**	29.6	41.4	42.4	79.4	78	1.4	8	1
	5	☐	**MMS0790L-DIN**	41.6	53.4	54.4	91.4	90	1.4	8	2
	5	☐	**MMS0790L-DIN-C**	41.6	53.4	54.4	91.4	90	1.4	8	1
	3	★	**MMS0790X3DB**	25.1	41.4	41.4	91.4	90	1.4	8	1
	5	★	**MMS0790X5DB**	40.9	57.4	57.4	104.4	103	1.4	8	1
8.0	3	☐	**MMS0800S-DIN**	29.5	41.5	42.5	79.5	78	1.5	8	2
	3	●	**MMS0800S-DIN-C**	29.5	41.5	42.5	79.5	78	1.5	8	1
	5	☐	**MMS0800L-DIN**	41.5	53.5	54.5	91.5	90	1.5	8	2
	5	●	**MMS0800L-DIN-C**	41.5	53.5	54.5	91.5	90	1.5	8	1
	3	★	**MMS0800X3DB**	25.5	41.5	41.5	91.5	90	1.5	8	1
	5	★	**MMS0800X5DB**	41.5	57.5	57.5	104.5	103	1.5	8	1
8.05	3	☐	**MMS0805S-DIN**	34.4	46.5	47.5	88.5	87	1.5	10	2
	3	●	**MMS0805S-DIN-C**	34.4	46.5	47.5	88.5	87	1.5	10	1
	5	☐	**MMS0805L-DIN**	48.4	60.5	61.5	102.5	101	1.5	10	2
	5	●	**MMS0805L-DIN-C**	48.4	60.5	61.5	102.5	101	1.5	10	1
8.1	3	☐	**MMS0810S-DIN**	34.3	46.5	47.5	88.5	87	1.5	10	2
	3	☐	**MMS0810S-DIN-C**	34.3	46.5	47.5	88.5	87	1.5	10	1
	5	☐	**MMS0810L-DIN**	48.3	60.5	61.5	102.5	101	1.5	10	2
	5	☐	**MMS0810L-DIN-C**	48.3	60.5	61.5	102.5	101	1.5	10	1
	3	★	**MMS0810X3DB**	25.8	44.5	46.5	97.5	96	1.5	10	1
	5	★	**MMS0810X5DB**	42.0	61.5	63.5	114.5	113	1.5	10	1
8.2	3	☐	**MMS0820S-DIN**	34.2	46.5	47.5	88.5	87	1.5	10	2
	3	☐	**MMS0820S-DIN-C**	34.2	46.5	47.5	88.5	87	1.5	10	1
	5	☐	**MMS0820L-DIN**	48.2	60.5	61.5	102.5	101	1.5	10	2
	5	☐	**MMS0820L-DIN-C**	48.2	60.5	61.5	102.5	101	1.5	10	1
	3	★	**MMS0820X3DB**	26.1	44.5	46.5	97.5	96	1.5	10	1
	5	★	**MMS0820X5DB**	42.5	61.5	63.5	114.5	113	1.5	10	1
8.3	3	☐	**MMS0830S-DIN**	34.1	46.5	47.5	88.5	87	1.5	10	2
	3	●	**MMS0830S-DIN-C**	34.1	46.5	47.5	88.5	87	1.5	10	1
	5	☐	**MMS0830L-DIN**	48.1	60.5	61.5	102.5	101	1.5	10	2
	5	●	**MMS0830L-DIN-C**	48.1	60.5	61.5	102.5	101	1.5	10	1
	3	★	**MMS0830X3DB**	26.4	44.5	46.5	97.5	96	1.5	10	1
	5	★	**MMS0830X5DB**	43.0	61.5	63.5	114.5	113	1.5	10	1
8.4	3	☐	**MMS0840S-DIN**	33.9	46.5	47.5	88.5	87	1.5	10	2
	3	☐	**MMS0840S-DIN-C**	33.9	46.5	47.5	88.5	87	1.5	10	1
	5	☐	**MMS0840L-DIN**	47.9	60.5	61.5	102.5	101	1.5	10	2
	5	☐	**MMS0840L-DIN-C**	47.9	60.5	61.5	102.5	101	1.5	10	1
	3	★	**MMS0840X3DB**	26.7	44.5	46.5	97.5	96	1.5	10	1
	5	★	**MMS0840X5DB**	43.5	61.5	63.5	114.5	113	1.5	10	1
8.5	3	☐	**MMS0850S-DIN**	33.8	46.5	47.5	88.5	87	1.5	10	2
	3	●	**MMS0850S-DIN-C**	33.8	46.5	47.5	88.5	87	1.5	10	1
	5	☐	**MMS0850L-DIN**	47.8	60.5	61.5	102.5	101	1.5	10	2
	5	●	**MMS0850L-DIN-C**	47.8	60.5	61.5	102.5	101	1.5	10	1
	3	★	**MMS0850X3DB**	27.0	44.5	46.5	97.5	96	1.5	10	1
	5	★	**MMS0850X5DB**	44.0	61.5	63.5	114.5	113	1.5	10	1

OPERATION GUIDANCE ➤ M089
CUTTING CONDITIONS ➤ M090
TECHNICAL DATA ➤ P001

MMS

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.6	3	□	MMS0860S-DIN	33.7	46.6	47.6	88.6	87	1.6	10	2
	3	●	MMS0860S-DIN-C	33.7	46.6	47.6	88.6	87	1.6	10	1
	5	□	MMS0860L-DIN	47.7	60.6	61.6	102.6	101	1.6	10	2
	5	●	MMS0860L-DIN-C	47.7	60.6	61.6	102.6	101	1.6	10	1
	3	★	MMS0860X3DB	27.4	46.6	48.6	102.6	101	1.6	10	1
	5	★	MMS0860X5DB	44.6	64.6	66.6	117.6	116	1.6	10	1
8.7	3	□	MMS0870S-DIN	33.5	46.6	47.6	88.6	87	1.6	10	2
	3	●	MMS0870S-DIN-C	33.5	46.6	47.6	88.6	87	1.6	10	1
	5	□	MMS0870L-DIN	47.5	60.6	61.6	102.6	101	1.6	10	2
	5	●	MMS0870L-DIN-C	47.5	60.6	61.6	102.6	101	1.6	10	1
	3	★	MMS0870X3DB	27.7	46.6	48.6	102.6	101	1.6	10	1
	5	★	MMS0870X5DB	45.1	64.6	66.6	117.6	116	1.6	10	1
8.8	3	□	MMS0880S-DIN	33.4	46.6	47.6	88.6	87	1.6	10	2
	3	●	MMS0880S-DIN-C	33.4	46.6	47.6	88.6	87	1.6	10	1
	5	□	MMS0880L-DIN	47.4	60.6	61.6	102.6	101	1.6	10	2
	5	●	MMS0880L-DIN-C	47.4	60.6	61.6	102.6	101	1.6	10	1
	3	★	MMS0880X3DB	28.0	46.6	48.6	102.6	101	1.6	10	1
	5	★	MMS0880X5DB	45.6	64.6	66.6	117.6	116	1.6	10	1
8.9	3	□	MMS0890S-DIN	33.3	46.6	47.6	88.6	87	1.6	10	2
	3	□	MMS0890S-DIN-C	33.3	46.6	47.6	88.6	87	1.6	10	1
	5	□	MMS0890L-DIN	47.3	60.6	61.6	102.6	101	1.6	10	2
	5	□	MMS0890L-DIN-C	47.3	60.6	61.6	102.6	101	1.6	10	1
	3	★	MMS0890X3DB	28.3	46.6	48.6	102.6	101	1.6	10	1
	5	★	MMS0890X5DB	46.1	64.6	66.6	117.6	116	1.6	10	1
9.0	3	□	MMS0900S-DIN	33.1	46.6	47.6	88.6	87	1.6	10	2
	3	●	MMS0900S-DIN-C	33.1	46.6	47.6	88.6	87	1.6	10	1
	5	□	MMS0900L-DIN	47.1	60.6	61.6	102.6	101	1.6	10	2
	5	●	MMS0900L-DIN-C	47.1	60.6	61.6	102.6	101	1.6	10	1
	3	★	MMS0900X3DB	28.6	46.6	48.6	102.6	101	1.6	10	1
	5	★	MMS0900X5DB	46.6	64.6	66.6	117.6	116	1.6	10	1
9.1	3	□	MMS0910S-DIN	33.0	46.7	47.7	88.7	87	1.7	10	2
	3	□	MMS0910S-DIN-C	33.0	46.7	47.7	88.7	87	1.7	10	1
	5	□	MMS0910L-DIN	47.0	60.7	61.7	102.7	101	1.7	10	2
	5	□	MMS0910L-DIN-C	47.0	60.7	61.7	102.7	101	1.7	10	1
	3	★	MMS0910X3DB	29.0	49.7	51.7	102.7	101	1.7	10	1
	5	★	MMS0910X5DB	47.2	68.7	71.7	122.7	121	1.7	10	1
9.2	3	□	MMS0920S-DIN	32.9	46.7	47.7	88.7	87	1.7	10	2
	3	□	MMS0920S-DIN-C	32.9	46.7	47.7	88.7	87	1.7	10	1
	5	□	MMS0920L-DIN	46.9	60.7	61.7	102.7	101	1.7	10	2
	5	□	MMS0920L-DIN-C	46.9	60.7	61.7	102.7	101	1.7	10	1
	3	★	MMS0920X3DB	29.3	49.7	51.7	102.7	101	1.7	10	1
	5	★	MMS0920X5DB	47.7	68.7	71.7	122.7	121	1.7	10	1
9.3	3	□	MMS0930S-DIN	32.7	46.7	47.7	88.7	87	1.7	10	2
	3	●	MMS0930S-DIN-C	32.7	46.7	47.7	88.7	87	1.7	10	1
	5	□	MMS0930L-DIN	46.7	60.7	61.7	102.7	101	1.7	10	2
	5	●	MMS0930L-DIN-C	46.7	60.7	61.7	102.7	101	1.7	10	1
	3	★	MMS0930X3DB	29.6	49.7	51.7	102.7	101	1.7	10	1
	5	★	MMS0930X5DB	48.2	68.7	71.7	122.7	121	1.7	10	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
9.4	3	□	MMS0940S-DIN	32.6	46.7	47.7	88.7	87	1.7	10	2
	3	□	MMS0940S-DIN-C	32.6	46.7	47.7	88.7	87	1.7	10	1
	5	□	MMS0940L-DIN	46.6	60.7	61.7	102.7	101	1.7	10	2
	5	□	MMS0940L-DIN-C	46.6	60.7	61.7	102.7	101	1.7	10	1
	3	★	MMS0940X3DB	29.9	49.7	51.7	102.7	101	1.7	10	1
	5	★	MMS0940X5DB	48.7	68.7	71.7	122.7	121	1.7	10	1
9.5	3	□	MMS0950S-DIN	32.5	46.7	47.7	88.7	87	1.7	10	2
	3	●	MMS0950S-DIN-C	32.5	46.7	47.7	88.7	87	1.7	10	1
	5	□	MMS0950L-DIN	46.5	60.7	61.7	102.7	101	1.7	10	2
	5	●	MMS0950L-DIN-C	46.5	60.7	61.7	102.7	101	1.7	10	1
	3	★	MMS0950X3DB	30.2	49.7	51.7	102.7	101	1.7	10	1
	5	★	MMS0950X5DB	49.2	68.7	71.7	122.7	121	1.7	10	1
9.6	3	□	MMS0960S-DIN	32.3	46.7	47.7	88.7	87	1.7	10	2
	3	□	MMS0960S-DIN-C	32.3	46.7	47.7	88.7	87	1.7	10	1
	5	□	MMS0960L-DIN	46.3	60.7	61.7	102.7	101	1.7	10	2
	5	□	MMS0960L-DIN-C	46.3	60.7	61.7	102.7	101	1.7	10	1
	3	★	MMS0960X3DB	30.5	51.7	51.7	102.7	101	1.7	10	1
	5	★	MMS0960X5DB	49.7	71.7	71.7	122.7	121	1.7	10	1
9.7	3	□	MMS0970S-DIN	32.2	46.8	47.8	88.8	87	1.8	10	2
	3	□	MMS0970S-DIN-C	32.2	46.8	47.8	88.8	87	1.8	10	1
	5	□	MMS0970L-DIN	46.2	60.8	61.8	102.8	101	1.8	10	2
	5	□	MMS0970L-DIN-C	46.2	60.8	61.8	102.8	101	1.8	10	1
	3	★	MMS0970X3DB	30.9	51.8	51.8	102.8	101	1.8	10	1
	5	★	MMS0970X5DB	50.3	71.8	71.8	122.8	121	1.8	10	1
9.8	3	□	MMS0980S-DIN	32.1	46.8	47.8	88.8	87	1.8	10	2
	3	●	MMS0980S-DIN-C	32.1	46.8	47.8	88.8	87	1.8	10	1
	5	□	MMS0980L-DIN	46.1	60.8	61.8	102.8	101	1.8	10	2
	5	●	MMS0980L-DIN-C	46.1	60.8	61.8	102.8	101	1.8	10	1
	3	★	MMS0980X3DB	31.2	51.8	51.8	102.8	101	1.8	10	1
	5	★	MMS0980X5DB	50.8	71.8	71.8	122.8	121	1.8	10	1
9.9	3	□	MMS0990S-DIN	32.0	46.8	47.8	88.8	87	1.8	10	2
	3	□	MMS0990S-DIN-C	32.0	46.8	47.8	88.8	87	1.8	10	1
	5	□	MMS0990L-DIN	46.0	60.8	61.8	102.8	101	1.8	10	2
	5	□	MMS0990L-DIN-C	46.0	60.8	61.8	102.8	101	1.8	10	1
	3	★	MMS0990X3DB	31.5	51.8	51.8	102.8	101	1.8	10	1
	5	★	MMS0990X5DB	51.3	71.8	71.8	122.8	121	1.8	10	1
10.0	3	□	MMS1000S-DIN	31.8	46.8	47.8	88.8	87	1.8	10	2
	3	●	MMS1000S-DIN-C	31.8	46.8	47.8	88.8	87	1.8	10	1
	5	□	MMS1000L-DIN	45.8	60.8	61.8	102.8	101	1.8	10	2
	5	●	MMS1000L-DIN-C	45.8	60.8	61.8	102.8	101	1.8	10	1
	3	★	MMS1000X3DB	31.8	51.8	51.8	102.8	101	1.8	10	1
	5	★	MMS1000X5DB	51.8	71.8	71.8	122.8	121	1.8	10	1
10.05	3	□	MMS1005S-DIN	39.8	54.8	55.8	101.8	100	1.8	12	2
	3	●	MMS1005S-DIN-C	39.8	54.8	55.8	101.8	100	1.8	12	1
	5	□	MMS1005L-DIN	55.8	70.8	71.8	117.8	116	1.8	12	2
	5	●	MMS1005L-DIN-C	55.8	70.8	71.8	117.8	116	1.8	12	1

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.1	3	□	**MMS1010S-DIN**	39.7	54.8	55.8	101.8	100	1.8	12	2
	3	□	**MMS1010S-DIN-C**	39.7	54.8	55.8	101.8	100	1.8	12	1
	5	□	**MMS1010L-DIN**	55.7	70.8	71.8	117.8	116	1.8	12	2
	5	□	**MMS1010L-DIN-C**	55.7	70.8	71.8	117.8	116	1.8	12	1
	3	★	**MMS1010X3DB**	32.1	54.8	56.8	112.8	111	1.8	12	1
	5	★	**MMS1010X5DB**	52.3	75.8	79.8	135.8	134	1.8	12	1
10.2	3	□	**MMS1020S-DIN**	39.6	54.9	55.9	101.9	100	1.9	12	2
	3	●	**MMS1020S-DIN-C**	39.6	54.9	55.9	101.9	100	1.9	12	1
	5	□	**MMS1020L-DIN**	55.6	70.9	71.9	117.9	116	1.9	12	2
	5	●	**MMS1020L-DIN-C**	55.6	70.9	71.9	117.9	116	1.9	12	1
	3	★	**MMS1020X3DB**	32.5	54.9	56.9	112.9	111	1.9	12	1
	5	★	**MMS1020X5DB**	52.9	75.9	79.9	135.9	134	1.9	12	1
10.3	3	□	**MMS1030S-DIN**	39.4	54.9	55.9	101.9	100	1.9	12	2
	3	●	**MMS1030S-DIN-C**	39.4	54.9	55.9	101.9	100	1.9	12	1
	5	□	**MMS1030L-DIN**	55.4	70.9	71.9	117.9	116	1.9	12	2
	5	●	**MMS1030L-DIN-C**	55.4	70.9	71.9	117.9	116	1.9	12	1
	3	★	**MMS1030X3DB**	32.8	54.9	56.9	112.9	111	1.9	12	1
	5	★	**MMS1030X5DB**	53.4	75.9	79.9	135.9	134	1.9	12	1
10.4	3	□	**MMS1040S-DIN**	39.3	54.9	55.9	101.9	100	1.9	12	2
	3	●	**MMS1040S-DIN-C**	39.3	54.9	55.9	101.9	100	1.9	12	1
	5	□	**MMS1040L-DIN**	55.3	70.9	71.9	117.9	116	1.9	12	2
	5	●	**MMS1040L-DIN-C**	55.3	70.9	71.9	117.9	116	1.9	12	1
	3	★	**MMS1040X3DB**	33.1	54.9	56.9	112.9	111	1.9	12	1
	5	★	**MMS1040X5DB**	53.9	75.9	79.9	135.9	134	1.9	12	1
10.5	3	□	**MMS1050S-DIN**	39.2	54.9	55.9	101.9	100	1.9	12	2
	3	●	**MMS1050S-DIN-C**	39.2	54.9	55.9	101.9	100	1.9	12	1
	5	□	**MMS1050L-DIN**	55.2	70.9	71.9	117.9	116	1.9	12	2
	5	●	**MMS1050L-DIN-C**	55.2	70.9	71.9	117.9	116	1.9	12	1
	3	★	**MMS1050X3DB**	33.4	54.9	56.9	112.9	111	1.9	12	1
	5	★	**MMS1050X5DB**	54.4	75.9	79.9	135.9	134	1.9	12	1
10.6	3	□	**MMS1060S-DIN**	39.0	54.9	55.9	101.9	100	1.9	12	2
	3	□	**MMS1060S-DIN-C**	39.0	54.9	55.9	101.9	100	1.9	12	1
	5	□	**MMS1060L-DIN**	55.0	70.9	71.9	117.9	116	1.9	12	2
	5	□	**MMS1060L-DIN-C**	55.0	70.9	71.9	117.9	116	1.9	12	1
	3	★	**MMS1060X3DB**	33.7	56.9	57.9	117.9	116	1.9	12	1
	5	★	**MMS1060X5DB**	54.9	78.9	79.9	135.9	134	1.9	12	1
10.7	3	□	**MMS1070S-DIN**	38.9	54.9	55.9	101.9	100	1.9	12	2
	3	●	**MMS1070S-DIN-C**	38.9	54.9	55.9	101.9	100	1.9	12	1
	5	□	**MMS1070L-DIN**	54.9	70.9	71.9	117.9	116	1.9	12	2
	5	●	**MMS1070L-DIN-C**	54.9	70.9	71.9	117.9	116	1.9	12	1
	3	★	**MMS1070X3DB**	34.0	56.9	57.9	117.9	116	1.9	12	1
	5	★	**MMS1070X5DB**	55.4	78.9	79.9	135.9	134	1.9	12	1
10.8	3	□	**MMS1080S-DIN**	38.8	55.0	56.0	102.0	100	2.0	12	2
	3	●	**MMS1080S-DIN-C**	38.8	55.0	56.0	102.0	100	2.0	12	1
	5	□	**MMS1080L-DIN**	54.8	71.0	72.0	118.0	116	2.0	12	2
	5	●	**MMS1080L-DIN-C**	54.8	71.0	72.0	118.0	116	2.0	12	1
	3	★	**MMS1080X3DB**	34.4	57.0	58.0	118.0	116	2.0	12	1
	5	★	**MMS1080X5DB**	56.0	79.0	80.0	136.0	134	2.0	12	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.9	3	□	**MMS1090S-DIN**	38.6	55.0	56.0	102.0	100	2.0	12	2
	3	□	**MMS1090S-DIN-C**	38.6	55.0	56.0	102.0	100	2.0	12	1
	5	□	**MMS1090L-DIN**	54.6	71.0	72.0	118.0	116	2.0	12	2
	5	□	**MMS1090L-DIN-C**	54.6	71.0	72.0	118.0	116	2.0	12	1
	3	★	**MMS1090X3DB**	34.7	57.0	58.0	118.0	116	2.0	12	1
	5	★	**MMS1090X5DB**	56.5	79.0	80.0	136.0	134	2.0	12	1
11.0	3	□	**MMS1100S-DIN**	38.5	55.0	56.0	102.0	100	2.0	12	2
	3	●	**MMS1100S-DIN-C**	38.5	55.0	56.0	102.0	100	2.0	12	1
	5	□	**MMS1100L-DIN**	54.5	71.0	72.0	118.0	116	2.0	12	2
	5	●	**MMS1100L-DIN-C**	54.5	71.0	72.0	118.0	116	2.0	12	1
	3	★	**MMS1100X3DB**	35.0	57.0	58.0	118.0	116	2.0	12	1
	5	★	**MMS1100X5DB**	57.0	79.0	80.0	136.0	134	2.0	12	1
11.1	3	□	**MMS1110S-DIN**	38.4	55.0	56.0	102.0	100	2.0	12	2
	3	□	**MMS1110S-DIN-C**	38.4	55.0	56.0	102.0	100	2.0	12	1
	5	□	**MMS1110L-DIN**	54.4	71.0	72.0	118.0	116	2.0	12	2
	5	□	**MMS1110L-DIN-C**	54.4	71.0	72.0	118.0	116	2.0	12	1
	3	★	**MMS1110X3DB**	35.3	60.0	62.0	118.0	116	2.0	12	1
	5	★	**MMS1110X5DB**	57.5	83.0	86.0	142.0	140	2.0	12	1
11.2	3	□	**MMS1120S-DIN**	38.2	55.0	56.0	102.0	100	2.0	12	2
	3	●	**MMS1120S-DIN-C**	38.2	55.0	56.0	102.0	100	2.0	12	1
	5	□	**MMS1120L-DIN**	54.2	71.0	72.0	118.0	116	2.0	12	2
	5	●	**MMS1120L-DIN-C**	54.2	71.0	72.0	118.0	116	2.0	12	1
	3	★	**MMS1120X3DB**	35.6	60.0	62.0	118.0	116	2.0	12	1
	5	★	**MMS1120X5DB**	58.0	83.0	86.0	142.0	140	2.0	12	1
11.3	3	□	**MMS1130S-DIN**	38.1	55.1	56.1	102.1	100	2.1	12	2
	3	□	**MMS1130S-DIN-C**	38.1	55.1	56.1	102.1	100	2.1	12	1
	5	□	**MMS1130L-DIN**	54.1	71.1	72.1	118.1	116	2.1	12	2
	5	□	**MMS1130L-DIN-C**	54.1	71.1	72.1	118.1	116	2.1	12	1
	3	★	**MMS1130X3DB**	36.0	60.1	62.1	118.1	116	2.1	12	1
	5	★	**MMS1130X5DB**	58.6	83.1	86.1	142.1	140	2.1	12	1
11.4	3	□	**MMS1140S-DIN**	38.0	55.1	56.1	102.1	100	2.1	12	2
	3	●	**MMS1140S-DIN-C**	38.0	55.1	56.1	102.1	100	2.1	12	1
	5	□	**MMS1140L-DIN**	54.0	71.1	72.1	118.1	116	2.1	12	2
	5	●	**MMS1140L-DIN-C**	54.0	71.1	72.1	118.1	116	2.1	12	1
	3	★	**MMS1140X3DB**	36.3	60.1	62.1	118.1	116	2.1	12	1
	5	★	**MMS1140X5DB**	59.1	83.1	86.1	142.1	140	2.1	12	1
11.5	3	□	**MMS1150S-DIN**	37.8	55.1	56.1	102.1	100	2.1	12	2
	3	●	**MMS1150S-DIN-C**	37.8	55.1	56.1	102.1	100	2.1	12	1
	5	□	**MMS1150L-DIN**	53.8	71.1	72.1	118.1	116	2.1	12	2
	5	●	**MMS1150L-DIN-C**	53.8	71.1	72.1	118.1	116	2.1	12	1
	3	★	**MMS1150X3DB**	36.6	60.1	62.1	118.1	116	2.1	12	1
	5	★	**MMS1150X5DB**	59.6	83.1	86.1	142.1	140	2.1	12	1
11.6	3	□	**MMS1160S-DIN**	37.7	55.1	56.1	102.1	100	2.1	12	2
	3	□	**MMS1160S-DIN-C**	37.7	55.1	56.1	102.1	100	2.1	12	1
	5	□	**MMS1160L-DIN**	53.7	71.1	72.1	118.1	116	2.1	12	2
	5	□	**MMS1160L-DIN-C**	53.7	71.1	72.1	118.1	116	2.1	12	1
	3	★	**MMS1160X3DB**	36.9	62.1	62.1	118.1	116	2.1	12	1
	5	★	**MMS1160X5DB**	60.1	86.1	86.1	142.1	140	2.1	12	1

CUTTING CONDITIONS ➤ M090
OPERATION GUIDANCE ➤ M089
TECHNICAL DATA ➤ P001

MMS

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
11.7	3	□	**MMS1170S-DIN**	37.6	55.1	56.1	102.1	100	2.1	12	2
	3	●	**MMS1170S-DIN-C**	37.6	55.1	56.1	102.1	100	2.1	12	1
	5	□	**MMS1170L-DIN**	53.6	71.1	72.1	118.1	116	2.1	12	2
	5	●	**MMS1170L-DIN-C**	53.6	71.1	72.1	118.1	116	2.1	12	1
	3	★	**MMS1170X3DB**	37.2	62.1	62.1	118.1	116	2.1	12	1
	5	★	**MMS1170X5DB**	60.6	86.1	86.1	142.1	140	2.1	12	1
11.8	3	□	**MMS1180S-DIN**	37.4	55.1	56.1	102.1	100	2.1	12	2
	3	●	**MMS1180S-DIN-C**	37.4	55.1	56.1	102.1	100	2.1	12	1
	5	□	**MMS1180L-DIN**	53.4	71.1	72.1	118.1	116	2.1	12	2
	5	●	**MMS1180L-DIN-C**	53.4	71.1	72.1	118.1	116	2.1	12	1
	3	★	**MMS1180X3DB**	37.5	62.1	62.1	118.1	116	2.1	12	1
	5	★	**MMS1180X5DB**	61.1	86.1	86.1	142.1	140	2.1	12	1
11.9	3	□	**MMS1190S-DIN**	37.3	55.2	56.2	102.2	100	2.2	12	2
	3	□	**MMS1190S-DIN-C**	37.3	55.2	56.2	102.2	100	2.2	12	1
	5	□	**MMS1190L-DIN**	53.3	71.2	72.2	118.2	116	2.2	12	2
	5	□	**MMS1190L-DIN-C**	53.3	71.2	72.2	118.2	116	2.2	12	1
	3	★	**MMS1190X3DB**	37.9	62.2	62.2	118.2	116	2.2	12	1
	5	★	**MMS1190X5DB**	61.7	86.2	86.2	142.2	140	2.2	12	1
12.0	3	□	**MMS1200S-DIN**	37.2	55.2	56.2	102.2	100	2.2	12	2
	3	●	**MMS1200S-DIN-C**	37.2	55.2	56.2	102.2	100	2.2	12	1
	5	□	**MMS1200L-DIN**	53.2	71.2	72.2	118.2	116	2.2	12	2
	5	●	**MMS1200L-DIN-C**	53.2	71.2	72.2	118.2	116	2.2	12	1
	3	★	**MMS1200X3DB**	38.2	62.2	62.2	118.2	116	2.2	12	1
	5	★	**MMS1200X5DB**	62.2	86.2	86.2	142.2	140	2.2	12	1
12.05	3	□	**MMS1205S-DIN**	42.1	60.2	61.2	107.2	105	2.2	14	2
	3	●	**MMS1205S-DIN-C**	42.1	60.2	61.2	107.2	105	2.2	14	1
	5	□	**MMS1205L-DIN**	59.1	77.2	78.2	124.2	122	2.2	14	2
	5	●	**MMS1205L-DIN-C**	59.1	77.2	78.2	124.2	122	2.2	14	1
12.1	3	□	**MMS1210S-DIN**	42.1	60.2	61.2	107.2	105	2.2	14	2
	3	□	**MMS1210S-DIN-C**	42.1	60.2	61.2	107.2	105	2.2	14	1
	5	□	**MMS1210L-DIN**	59.1	77.2	78.2	124.2	122	2.2	14	2
	5	□	**MMS1210L-DIN-C**	59.1	77.2	78.2	124.2	122	2.2	14	1
	3	★	**MMS1210X3DB**	38.5	65.2	68.2	124.2	122	2.2	14	1
	5	★	**MMS1210X5DB**	62.7	90.2	94.2	150.2	148	2.2	14	1
12.2	3	□	**MMS1220S-DIN**	41.9	60.2	61.2	107.2	105	2.2	14	2
	3	□	**MMS1220S-DIN-C**	41.9	60.2	61.2	107.2	105	2.2	14	1
	5	□	**MMS1220L-DIN**	58.9	77.2	78.2	124.2	122	2.2	14	2
	5	□	**MMS1220L-DIN-C**	58.9	77.2	78.2	124.2	122	2.2	14	1
	3	★	**MMS1220X3DB**	38.8	65.2	68.2	124.2	122	2.2	14	1
	5	★	**MMS1220X5DB**	63.2	90.2	94.2	150.2	148	2.2	14	1
12.3	3	□	**MMS1230S-DIN**	41.8	60.2	61.2	107.2	105	2.2	14	2
	3	□	**MMS1230S-DIN-C**	41.8	60.2	61.2	107.2	105	2.2	14	1
	5	□	**MMS1230L-DIN**	58.8	77.2	78.2	124.2	122	2.2	14	2
	5	□	**MMS1230L-DIN-C**	58.8	77.2	78.2	124.2	122	2.2	14	1
	3	★	**MMS1230X3DB**	39.1	65.2	68.2	124.2	122	2.2	14	1
	5	★	**MMS1230X5DB**	63.7	90.2	94.2	150.2	148	2.2	14	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
12.4	3	□	**MMS1240S-DIN**	41.7	60.3	61.3	107.3	105	2.3	14	2
	3	□	**MMS1240S-DIN-C**	41.7	60.3	61.3	107.3	105	2.3	14	1
	5	□	**MMS1240L-DIN**	58.7	77.3	78.3	124.3	122	2.3	14	2
	5	□	**MMS1240L-DIN-C**	58.7	77.3	78.3	124.3	122	2.3	14	1
	3	★	**MMS1240X3DB**	39.5	65.3	68.3	124.3	122	2.3	14	1
	5	★	**MMS1240X5DB**	64.3	90.3	94.3	150.3	148	2.3	14	1
12.5	3	□	**MMS1250S-DIN**	41.5	60.3	61.3	107.3	105	2.3	14	2
	3	●	**MMS1250S-DIN-C**	41.5	60.3	61.3	107.3	105	2.3	14	1
	5	□	**MMS1250L-DIN**	58.5	77.3	78.3	124.3	122	2.3	14	2
	5	●	**MMS1250L-DIN-C**	58.5	77.3	78.3	124.3	122	2.3	14	1
	3	★	**MMS1250X3DB**	39.8	65.3	68.3	124.3	122	2.3	14	1
	5	★	**MMS1250X5DB**	64.8	90.3	94.3	150.3	148	2.3	14	1
12.6	3	□	**MMS1260S-DIN**	41.4	60.3	61.3	107.3	105	2.3	14	2
	3	●	**MMS1260S-DIN-C**	41.4	60.3	61.3	107.3	105	2.3	14	1
	5	□	**MMS1260L-DIN**	58.4	77.3	78.3	124.3	122	2.3	14	2
	5	●	**MMS1260L-DIN-C**	58.4	77.3	78.3	124.3	122	2.3	14	1
	3	★	**MMS1260X3DB**	40.1	67.3	68.3	124.3	122	2.3	14	1
	5	★	**MMS1260X5DB**	65.3	93.3	94.3	150.3	148	2.3	14	1
12.7	3	□	**MMS1270S-DIN**	41.3	60.3	61.3	107.3	105	2.3	14	2
	3	●	**MMS1270S-DIN-C**	41.3	60.3	61.3	107.3	105	2.3	14	1
	5	□	**MMS1270L-DIN**	58.3	77.3	78.3	124.3	122	2.3	14	2
	5	●	**MMS1270L-DIN-C**	58.3	77.3	78.3	124.3	122	2.3	14	1
	3	★	**MMS1270X3DB**	40.4	67.3	68.3	124.3	122	2.3	14	1
	5	★	**MMS1270X5DB**	65.8	93.3	94.3	150.3	148	2.3	14	1
12.8	3	□	**MMS1280S-DIN**	41.1	60.3	61.3	107.3	105	2.3	14	2
	3	□	**MMS1280S-DIN-C**	41.1	60.3	61.3	107.3	105	2.3	14	1
	5	□	**MMS1280L-DIN**	58.1	77.3	78.3	124.3	122	2.3	14	2
	5	□	**MMS1280L-DIN-C**	58.1	77.3	78.3	124.3	122	2.3	14	1
	3	★	**MMS1280X3DB**	40.7	67.3	68.3	124.3	122	2.3	14	1
	5	★	**MMS1280X5DB**	66.3	93.3	94.3	150.3	148	2.3	14	1
12.9	3	□	**MMS1290S-DIN**	41.0	60.3	61.3	107.3	105	2.3	14	2
	3	□	**MMS1290S-DIN-C**	41.0	60.3	61.3	107.3	105	2.3	14	1
	5	□	**MMS1290L-DIN**	58.0	77.3	78.3	124.3	122	2.3	14	2
	5	□	**MMS1290L-DIN-C**	58.0	77.3	78.3	124.3	122	2.3	14	1
	3	★	**MMS1290X3DB**	41.0	67.3	68.3	124.3	122	2.3	14	1
	5	★	**MMS1290X5DB**	66.8	93.3	94.3	150.3	148	2.3	14	1
13.0	3	□	**MMS1300S-DIN**	40.9	60.4	61.4	107.4	105	2.4	14	2
	3	●	**MMS1300S-DIN-C**	40.9	60.4	61.4	107.4	105	2.4	14	1
	5	□	**MMS1300L-DIN**	57.9	77.4	78.4	124.4	122	2.4	14	2
	5	●	**MMS1300L-DIN-C**	57.9	77.4	78.4	124.4	122	2.4	14	1
	3	★	**MMS1300X3DB**	41.4	67.4	68.4	124.4	122	2.4	14	1
	5	★	**MMS1300X5DB**	67.4	93.4	94.4	150.4	148	2.4	14	1
13.1	3	□	**MMS1310S-DIN**	40.7	60.4	61.4	107.4	105	2.4	14	2
	3	□	**MMS1310S-DIN-C**	40.7	60.4	61.4	107.4	105	2.4	14	1
	5	□	**MMS1310L-DIN**	57.7	77.4	78.4	124.4	122	2.4	14	2
	5	□	**MMS1310L-DIN-C**	57.7	77.4	78.4	124.4	122	2.4	14	1
	3	★	**MMS1310X3DB**	41.7	70.4	72.4	128.4	126	2.4	14	1
	5	★	**MMS1310X5DB**	67.9	97.4	100.4	156.4	154	2.4	14	1

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
13.2	3	☐	MMS1320S-DIN	40.6	60.4	61.4	107.4	105	2.4	14	2
	3	☐	MMS1320S-DIN-C	40.6	60.4	61.4	107.4	105	2.4	14	1
	5	☐	MMS1320L-DIN	57.6	77.4	78.4	124.4	122	2.4	14	2
	5	☐	MMS1320L-DIN-C	57.6	77.4	78.4	124.4	122	2.4	14	1
	3	★	MMS1320X3DB	42.0	70.4	72.4	128.4	126	2.4	14	1
	5	★	MMS1320X5DB	68.4	97.4	100.4	156.4	154	2.4	14	1
13.3	3	☐	MMS1330S-DIN	40.5	60.4	61.4	107.4	105	2.4	14	2
	3	☐	MMS1330S-DIN-C	40.5	60.4	61.4	107.4	105	2.4	14	1
	5	☐	MMS1330L-DIN	57.5	77.4	78.4	124.4	122	2.4	14	2
	5	☐	MMS1330L-DIN-C	57.5	77.4	78.4	124.4	122	2.4	14	1
	3	★	MMS1330X3DB	42.3	70.4	72.4	128.4	126	2.4	14	1
	5	★	MMS1330X5DB	68.9	97.4	100.4	156.4	154	2.4	14	1
13.4	3	☐	MMS1340S-DIN	40.3	60.4	61.4	107.4	105	2.4	14	2
	3	☐	MMS1340S-DIN-C	40.3	60.4	61.4	107.4	105	2.4	14	1
	5	☐	MMS1340L-DIN	57.3	77.4	78.4	124.4	122	2.4	14	2
	5	☐	MMS1340L-DIN-C	57.3	77.4	78.4	124.4	122	2.4	14	1
	3	★	MMS1340X3DB	42.6	70.4	72.4	128.4	126	2.4	14	1
	5	★	MMS1340X5DB	69.4	97.4	100.4	156.4	154	2.4	14	1
13.5	3	☐	MMS1350S-DIN	40.2	60.5	61.5	107.5	105	2.5	14	2
	3	●	MMS1350S-DIN-C	40.2	60.5	61.5	107.5	105	2.5	14	1
	5	☐	MMS1350L-DIN	57.2	77.5	78.5	124.5	122	2.5	14	2
	5	●	MMS1350L-DIN-C	57.2	77.5	78.5	124.5	122	2.5	14	1
	3	★	MMS1350X3DB	43.0	70.5	72.5	128.5	126	2.5	14	1
	5	★	MMS1350X5DB	70.0	97.5	100.5	156.5	154	2.5	14	1
13.6	3	☐	MMS1360S-DIN	40.1	60.5	61.5	107.5	105	2.5	14	2
	3	☐	MMS1360S-DIN-C	40.1	60.5	61.5	107.5	105	2.5	14	1
	5	☐	MMS1360L-DIN	57.1	77.5	78.5	124.5	122	2.5	14	2
	5	☐	MMS1360L-DIN-C	57.1	77.5	78.5	124.5	122	2.5	14	1
	3	★	MMS1360X3DB	43.3	72.5	72.5	128.5	126	2.5	14	1
	5	★	MMS1360X5DB	70.5	100.5	100.5	156.5	154	2.5	14	1
13.7	3	☐	MMS1370S-DIN	39.9	60.5	61.5	107.5	105	2.5	14	2
	3	●	MMS1370S-DIN-C	39.9	60.5	61.5	107.5	105	2.5	14	1
	5	☐	MMS1370L-DIN	56.9	77.5	78.5	124.5	122	2.5	14	2
	5	●	MMS1370L-DIN-C	56.9	77.5	78.5	124.5	122	2.5	14	1
	3	★	MMS1370X3DB	43.6	72.5	72.5	128.5	126	2.5	14	1
	5	★	MMS1370X5DB	71.0	100.5	100.5	156.5	154	2.5	14	1
13.8	3	☐	MMS1380S-DIN	39.8	60.5	61.5	107.5	105	2.5	14	2
	3	☐	MMS1380S-DIN-C	39.8	60.5	61.5	107.5	105	2.5	14	1
	5	☐	MMS1380L-DIN	56.8	77.5	78.5	124.5	122	2.5	14	2
	5	☐	MMS1380L-DIN-C	56.8	77.5	78.5	124.5	122	2.5	14	1
	3	★	MMS1380X3DB	43.9	72.5	72.5	128.5	126	2.5	14	1
	5	★	MMS1380X5DB	71.5	100.5	100.5	156.5	154	2.5	14	1
13.9	3	☐	MMS1390S-DIN	39.7	60.5	61.5	107.5	105	2.5	14	2
	3	☐	MMS1390S-DIN-C	39.7	60.5	61.5	107.5	105	2.5	14	1
	5	☐	MMS1390L-DIN	56.7	77.5	78.5	124.5	122	2.5	14	2
	5	☐	MMS1390L-DIN-C	56.7	77.5	78.5	124.5	122	2.5	14	1
	3	★	MMS1390X3DB	44.2	72.5	72.5	128.5	126	2.5	14	1
	5	★	MMS1390X5DB	72.0	100.5	100.5	156.5	154	2.5	14	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
14.0	3	☐	MMS1400S-DIN	39.5	60.5	61.5	107.5	105	2.5	14	2
	3	●	MMS1400S-DIN-C	39.5	60.5	61.5	107.5	105	2.5	14	1
	5	☐	MMS1400L-DIN	56.5	77.5	78.5	124.5	122	2.5	14	2
	5	●	MMS1400L-DIN-C	56.5	77.5	78.5	124.5	122	2.5	14	1
	3	★	MMS1400X3DB	44.5	72.5	72.5	128.5	126	2.5	14	1
	5	★	MMS1400X5DB	72.5	100.5	100.5	156.5	154	2.5	14	1
14.05	3	☐	MMS1405S-DIN	43.5	64.6	65.6	114.6	112	2.6	16	2
	3	☐	MMS1405S-DIN-C	43.5	64.6	65.6	114.6	112	2.6	16	1
	5	☐	MMS1405L-DIN	61.5	82.6	83.6	132.6	130	2.6	16	2
	5	☐	MMS1405L-DIN-C	61.5	82.6	83.6	132.6	130	2.6	16	1
14.1	3	☐	MMS1410S-DIN	43.4	64.6	65.6	114.6	112	2.6	16	2
	3	☐	MMS1410S-DIN-C	43.4	64.6	65.6	114.6	112	2.6	16	1
	5	☐	MMS1410L-DIN	61.4	82.6	83.6	132.6	130	2.6	16	2
	5	☐	MMS1410L-DIN-C	61.4	82.6	83.6	132.6	130	2.6	16	1
	3	★	MMS1410X3DB	44.9	75.6	78.6	137.6	135	2.6	16	1
	5	★	MMS1410X5DB	73.1	104.6	108.6	167.6	165	2.6	16	1
14.2	3	☐	MMS1420S-DIN	43.3	64.6	65.6	114.6	112	2.6	16	2
	3	☐	MMS1420S-DIN-C	43.3	64.6	65.6	114.6	112	2.6	16	1
	5	☐	MMS1420L-DIN	61.3	82.6	83.6	132.6	130	2.6	16	2
	5	☐	MMS1420L-DIN-C	61.3	82.6	83.6	132.6	130	2.6	16	1
	3	★	MMS1420X3DB	45.2	75.6	78.6	137.6	135	2.6	16	1
	5	★	MMS1420X5DB	73.6	104.6	108.6	167.6	165	2.6	16	1
14.3	3	☐	MMS1430S-DIN	43.2	64.6	65.6	114.6	112	2.6	16	2
	3	☐	MMS1430S-DIN-C	43.2	64.6	65.6	114.6	112	2.6	16	1
	5	☐	MMS1430L-DIN	61.2	82.6	83.6	132.6	130	2.6	16	2
	5	☐	MMS1430L-DIN-C	61.2	82.6	83.6	132.6	130	2.6	16	1
	3	★	MMS1430X3DB	45.5	75.6	78.6	137.6	135	2.6	16	1
	5	★	MMS1430X5DB	74.1	104.6	108.6	167.6	165	2.6	16	1
14.4	3	☐	MMS1440S-DIN	43.0	64.6	65.6	114.6	112	2.6	16	2
	3	☐	MMS1440S-DIN-C	43.0	64.6	65.6	114.6	112	2.6	16	1
	5	☐	MMS1440L-DIN	61.0	82.6	83.6	132.6	130	2.6	16	2
	5	☐	MMS1440L-DIN-C	61.0	82.6	83.6	132.6	130	2.6	16	1
	3	★	MMS1440X3DB	45.8	75.6	78.6	137.6	135	2.6	16	1
	5	★	MMS1440X5DB	74.6	104.6	108.6	167.6	165	2.6	16	1
14.5	3	☐	MMS1450S-DIN	42.9	64.6	65.6	114.6	112	2.6	16	2
	3	☐	MMS1450S-DIN-C	42.9	64.6	65.6	114.6	112	2.6	16	1
	5	☐	MMS1450L-DIN	60.9	82.6	83.6	132.6	130	2.6	16	2
	5	☐	MMS1450L-DIN-C	60.9	82.6	83.6	132.6	130	2.6	16	1
	3	★	MMS1450X3DB	46.1	75.6	78.6	137.6	135	2.6	16	1
	5	★	MMS1450X5DB	75.1	104.6	108.6	167.6	165	2.6	16	1
14.6	3	☐	MMS1460S-DIN	42.8	64.7	65.7	114.7	112	2.7	16	2
	3	☐	MMS1460S-DIN-C	42.8	64.7	65.7	114.7	112	2.7	16	1
	5	☐	MMS1460L-DIN	60.8	82.7	83.7	132.7	130	2.7	16	2
	5	☐	MMS1460L-DIN-C	60.8	82.7	83.7	132.7	130	2.7	16	1
	3	★	MMS1460X3DB	46.5	77.7	78.7	137.7	135	2.7	16	1
	5	★	MMS1460X5DB	75.7	107.7	108.7	167.7	165	2.7	16	1
14.7	3	☐	MMS1470S-DIN	42.6	64.7	65.7	114.7	112	2.7	16	2
	3	☐	MMS1470S-DIN-C	42.6	64.7	65.7	114.7	112	2.7	16	1
	5	☐	MMS1470L-DIN	60.6	82.7	83.7	132.7	130	2.7	16	2
	5	☐	MMS1470L-DIN-C	60.6	82.7	83.7	132.7	130	2.7	16	1
	3	★	MMS1470X3DB	46.8	77.7	78.7	137.7	135	2.7	16	1
	5	★	MMS1470X5DB	76.2	107.7	108.7	167.7	165	2.7	16	1

CUTTING CONDITIONS ➤ M090

OPERATION GUIDANCE ➤ M089

TECHNICAL DATA ➤ P001

DRILLING (SOLID CARBIDE)

MMS

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
14.8	3	☐	MMS1480S-DIN	42.5	64.7	65.7	114.7	112	2.7	16	2
	3	☐	MMS1480S-DIN-C	42.5	64.7	65.7	114.7	112	2.7	16	1
	5	☐	MMS1480L-DIN	60.5	82.7	83.7	132.7	130	2.7	16	2
	5	☐	MMS1480L-DIN-C	60.5	82.7	83.7	132.7	130	2.7	16	1
	3	★	MMS1480X3DB	47.1	77.7	78.7	137.7	135	2.7	16	1
	5	★	MMS1480X5DB	76.7	107.7	108.7	167.7	165	2.7	16	1
14.9	3	☐	MMS1490S-DIN	42.4	64.7	65.7	114.7	112	2.7	16	2
	3	☐	MMS1490S-DIN-C	42.4	64.7	65.7	114.7	112	2.7	16	1
	5	☐	MMS1490L-DIN	60.4	82.7	83.7	132.7	130	2.7	16	2
	5	☐	MMS1490L-DIN-C	60.4	82.7	83.7	132.7	130	2.7	16	1
	3	★	MMS1490X3DB	47.4	77.7	78.7	137.7	135	2.7	16	1
	5	★	MMS1490X5DB	77.2	107.7	108.7	167.7	165	2.7	16	1
15.0	3	☐	MMS1500S-DIN	42.2	64.7	65.7	114.7	112	2.7	16	2
	3	☐	MMS1500S-DIN-C	42.2	64.7	65.7	114.7	112	2.7	16	1
	5	☐	MMS1500L-DIN	60.2	82.7	83.7	132.7	130	2.7	16	2
	5	☐	MMS1500L-DIN-C	60.2	82.7	83.7	132.7	130	2.7	16	1
	3	★	MMS1500X3DB	47.7	77.7	78.7	137.7	135	2.7	16	1
	5	★	MMS1500X5DB	77.7	107.7	108.7	167.7	165	2.7	16	1
15.1	3	☐	MMS1510S-DIN	42.1	64.7	65.7	114.7	112	2.7	16	2
	3	☐	MMS1510S-DIN-C	42.1	64.7	65.7	114.7	112	2.7	16	1
	5	☐	MMS1510L-DIN	60.1	82.7	83.7	132.7	130	2.7	16	2
	5	☐	MMS1510L-DIN-C	60.1	82.7	83.7	132.7	130	2.7	16	1
	3	★	MMS1510X3DB	48.0	80.7	82.7	141.7	139	2.7	16	1
	5	★	MMS1510X5DB	78.2	111.7	114.7	173.7	171	2.7	16	1
15.2	3	☐	MMS1520S-DIN	42.0	64.8	65.8	114.8	112	2.8	16	2
	3	☐	MMS1520S-DIN-C	42.0	64.8	65.8	114.8	112	2.8	16	1
	5	☐	MMS1520L-DIN	60.0	82.8	83.8	132.8	130	2.8	16	2
	5	☐	MMS1520L-DIN-C	60.0	82.8	83.8	132.8	130	2.8	16	1
	3	★	MMS1520X3DB	48.4	80.8	82.8	141.8	139	2.8	16	1
	5	★	MMS1520X5DB	78.8	111.8	114.8	173.8	171	2.8	16	1
15.3	3	☐	MMS1530S-DIN	41.8	64.8	65.8	114.8	112	2.8	16	2
	3	☐	MMS1530S-DIN-C	41.8	64.8	65.8	114.8	112	2.8	16	1
	5	☐	MMS1530L-DIN	59.8	82.8	83.8	132.8	130	2.8	16	2
	5	☐	MMS1530L-DIN-C	59.8	82.8	83.8	132.8	130	2.8	16	1
	3	★	MMS1530X3DB	48.7	80.8	82.8	141.8	139	2.8	16	1
	5	★	MMS1530X5DB	79.3	111.8	114.8	173.8	171	2.8	16	1
15.4	3	☐	MMS1540S-DIN	41.7	64.8	65.8	114.8	112	2.8	16	2
	3	☐	MMS1540S-DIN-C	41.7	64.8	65.8	114.8	112	2.8	16	1
	5	☐	MMS1540L-DIN	59.7	82.8	83.8	132.8	130	2.8	16	2
	5	☐	MMS1540L-DIN-C	59.7	82.8	83.8	132.8	130	2.8	16	1
	3	★	MMS1540X3DB	49.0	80.8	82.8	141.8	139	2.8	16	1
	5	★	MMS1540X5DB	79.8	111.8	114.8	173.8	171	2.8	16	1
15.5	3	☐	MMS1550S-DIN	41.6	64.8	65.8	114.8	112	2.8	16	2
	3	☐	MMS1550S-DIN-C	41.6	64.8	65.8	114.8	112	2.8	16	1
	5	☐	MMS1550L-DIN	59.6	82.8	83.8	132.8	130	2.8	16	2
	5	☐	MMS1550L-DIN-C	59.6	82.8	83.8	132.8	130	2.8	16	1
	3	★	MMS1550X3DB	49.3	80.8	82.8	141.8	139	2.8	16	1
	5	★	MMS1550X5DB	80.3	111.8	114.8	173.8	171	2.8	16	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
15.6	3	☐	MMS1560S-DIN	41.4	64.8	65.8	114.8	112	2.8	16	2
	3	☐	MMS1560S-DIN-C	41.4	64.8	65.8	114.8	112	2.8	16	1
	5	☐	MMS1560L-DIN	59.4	82.8	83.8	132.8	130	2.8	16	2
	5	☐	MMS1560L-DIN-C	59.4	82.8	83.8	132.8	130	2.8	16	1
	3	★	MMS1560X3DB	49.6	82.8	82.8	141.8	139	2.8	16	1
	5	★	MMS1560X5DB	80.8	114.8	114.8	173.8	171	2.8	16	1
15.7	3	☐	MMS1570S-DIN	41.3	64.9	65.9	114.9	112	2.9	16	2
	3	☐	MMS1570S-DIN-C	41.3	64.9	65.9	114.9	112	2.9	16	1
	5	☐	MMS1570L-DIN	59.3	82.9	83.9	132.9	130	2.9	16	2
	5	☐	MMS1570L-DIN-C	59.3	82.9	83.9	132.9	130	2.9	16	1
	3	★	MMS1570X3DB	50.0	82.9	82.9	141.9	139	2.9	16	1
	5	★	MMS1570X5DB	81.4	114.9	114.9	173.9	171	2.9	16	1
15.8	3	☐	MMS1580S-DIN	41.2	64.9	65.9	114.9	112	2.9	16	2
	3	☐	MMS1580S-DIN-C	41.2	64.9	65.9	114.9	112	2.9	16	1
	5	☐	MMS1580L-DIN	59.2	82.9	83.9	132.9	130	2.9	16	2
	5	☐	MMS1580L-DIN-C	59.2	82.9	83.9	132.9	130	2.9	16	1
	3	★	MMS1580X3DB	50.3	82.9	82.9	141.9	139	2.9	16	1
	5	★	MMS1580X5DB	81.9	114.9	114.9	173.9	171	2.9	16	1
15.9	3	☐	MMS1590S-DIN	41.0	64.9	65.9	114.9	112	2.9	16	2
	3	☐	MMS1590S-DIN-C	41.0	64.9	65.9	114.9	112	2.9	16	1
	5	☐	MMS1590L-DIN	59.0	82.9	83.9	132.9	130	2.9	16	2
	5	☐	MMS1590L-DIN-C	59.0	82.9	83.9	132.9	130	2.9	16	1
	3	★	MMS1590X3DB	50.6	82.9	82.9	141.9	139	2.9	16	1
	5	★	MMS1590X5DB	82.4	114.9	114.9	173.9	171	2.9	16	1
16.0	3	☐	MMS1600S-DIN	40.9	64.9	65.9	114.9	112	2.9	16	2
	3	☐	MMS1600S-DIN-C	40.9	64.9	65.9	114.9	112	2.9	16	1
	5	☐	MMS1600L-DIN	58.9	82.9	83.9	132.9	130	2.9	16	2
	5	☐	MMS1600L-DIN-C	58.9	82.9	83.9	132.9	130	2.9	16	1
	3	★	MMS1600X3DB	50.9	82.9	82.9	141.9	139	2.9	16	1
	5	★	MMS1600X5DB	82.9	114.9	114.9	173.9	171	2.9	16	1
16.1	3	☐	MMS1610S-DIN	48.8	72.9	73.9	122.9	120	2.9	18	2
	3	☐	MMS1610S-DIN-C	48.8	72.9	73.9	122.9	120	2.9	18	1
	5	☐	MMS1610L-DIN	68.8	92.9	93.9	142.9	140	2.9	18	2
	5	☐	MMS1610L-DIN-C	68.8	92.9	93.9	142.9	140	2.9	18	1
	3	☐	MMS1610X3DB	51.2	85.9	88.9	147.9	145	2.9	18	1
	5	☐	MMS1610X5DB	83.4	118.9	122.9	181.9	179	2.9	18	1
16.2	3	☐	MMS1620S-DIN	48.6	72.9	73.9	122.9	120	2.9	18	2
	3	☐	MMS1620S-DIN-C	48.6	72.9	73.9	122.9	120	2.9	18	1
	5	☐	MMS1620L-DIN	68.6	92.9	93.9	142.9	140	2.9	18	2
	5	☐	MMS1620L-DIN-C	68.6	92.9	93.9	142.9	140	2.9	18	1
	3	☐	MMS1620X3DB	51.5	85.9	88.9	147.9	145	2.9	18	1
	5	☐	MMS1620X5DB	83.9	118.9	122.9	181.9	179	2.9	18	1
16.3	3	☐	MMS1630S-DIN	48.5	73.0	74.0	123.0	120	3.0	18	2
	3	☐	MMS1630S-DIN-C	48.5	73.0	74.0	123.0	120	3.0	18	1
	5	☐	MMS1630L-DIN	68.5	93.0	94.0	143.0	140	3.0	18	2
	5	☐	MMS1630L-DIN-C	68.5	93.0	94.0	143.0	140	3.0	18	1
	3	☐	MMS1630X3DB	51.9	86.0	89.0	148.0	145	3.0	18	1
	5	☐	MMS1630X5DB	84.5	119.0	123.0	182.0	179	3.0	18	1

★ : Inventory maintained in Japan. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
16.4	3	☐	MMS1640S-DIN	48.4	73.0	74.0	123.0	120	3.0	18	2
	3	☐	MMS1640S-DIN-C	48.4	73.0	74.0	123.0	120	3.0	18	1
	5	☐	MMS1640L-DIN	68.4	93.0	94.0	143.0	140	3.0	18	2
	5	☐	MMS1640L-DIN-C	68.4	93.0	94.0	143.0	140	3.0	18	1
	3	☐	MMS1640X3DB	52.2	86.0	89.0	148.0	145	3.0	18	1
	5	☐	MMS1640X5DB	85.0	119.0	123.0	182.0	179	3.0	18	1
16.5	3	☐	MMS1650S-DIN	48.3	73.0	74.0	123.0	120	3.0	18	2
	3	☐	MMS1650S-DIN-C	48.3	73.0	74.0	123.0	120	3.0	18	1
	5	☐	MMS1650L-DIN	68.3	93.0	94.0	143.0	140	3.0	18	2
	5	☐	MMS1650L-DIN-C	68.3	93.0	94.0	143.0	140	3.0	18	1
	3	★	MMS1650X3DB	52.5	86.0	89.0	148.0	145	3.0	18	1
	5	★	MMS1650X5DB	85.5	119.0	123.0	182.0	179	3.0	18	1
16.6	3	☐	MMS1660S-DIN	48.1	73.0	74.0	123.0	120	3.0	18	2
	3	☐	MMS1660S-DIN-C	48.1	73.0	74.0	123.0	120	3.0	18	1
	5	☐	MMS1660L-DIN	68.1	93.0	94.0	143.0	140	3.0	18	2
	5	☐	MMS1660L-DIN-C	68.1	93.0	94.0	143.0	140	3.0	18	1
	3	☐	MMS1660X3DB	52.8	88.0	89.0	148.0	145	3.0	18	1
	5	☐	MMS1660X5DB	86.0	122.0	123.0	182.0	179	3.0	18	1
16.7	3	☐	MMS1670S-DIN	48.0	73.0	74.0	123.0	120	3.0	18	2
	3	☐	MMS1670S-DIN-C	48.0	73.0	74.0	123.0	120	3.0	18	1
	5	☐	MMS1670L-DIN	68.0	93.0	94.0	143.0	140	3.0	18	2
	5	☐	MMS1670L-DIN-C	68.0	93.0	94.0	143.0	140	3.0	18	1
	3	☐	MMS1670X3DB	53.1	88.0	89.0	148.0	145	3.0	18	1
	5	☐	MMS1670X5DB	86.5	122.0	123.0	182.0	179	3.0	18	1
16.8	3	☐	MMS1680S-DIN	47.9	73.1	74.1	123.1	120	3.1	18	2
	3	☐	MMS1680S-DIN-C	47.9	73.1	74.1	123.1	120	3.1	18	1
	5	☐	MMS1680L-DIN	67.9	93.1	94.1	143.1	140	3.1	18	2
	5	☐	MMS1680L-DIN-C	67.9	93.1	94.1	143.1	140	3.1	18	1
	3	☐	MMS1680X3DB	53.5	88.1	89.1	148.1	145	3.1	18	1
	5	☐	MMS1680X5DB	87.1	122.1	123.1	182.1	179	3.1	18	1
16.9	3	☐	MMS1690S-DIN	47.7	73.1	74.1	123.1	120	3.1	18	2
	3	☐	MMS1690S-DIN-C	47.7	73.1	74.1	123.1	120	3.1	18	1
	5	☐	MMS1690L-DIN	67.7	93.1	94.1	143.1	140	3.1	18	2
	5	☐	MMS1690L-DIN-C	67.7	93.1	94.1	143.1	140	3.1	18	1
	3	☐	MMS1690X3DB	53.8	88.1	89.1	148.1	145	3.1	18	1
	5	☐	MMS1690X5DB	87.6	122.1	123.1	182.1	179	3.1	18	1
17.0	3	☐	MMS1700S-DIN	47.6	73.1	74.1	123.1	120	3.1	18	2
	3	☐	MMS1700S-DIN-C	47.6	73.1	74.1	123.1	120	3.1	18	1
	5	☐	MMS1700L-DIN	67.6	93.1	94.1	143.1	140	3.1	18	2
	5	☐	MMS1700L-DIN-C	67.6	93.1	94.1	143.1	140	3.1	18	1
	3	★	MMS1700X3DB	54.1	88.1	89.1	148.1	145	3.1	18	1
	5	★	MMS1700X5DB	88.1	122.1	123.1	182.1	179	3.1	18	1
17.1	3	☐	MMS1710S-DIN	47.5	73.1	74.1	123.1	120	3.1	18	2
	3	☐	MMS1710S-DIN-C	47.5	73.1	74.1	123.1	120	3.1	18	1
	5	☐	MMS1710L-DIN	67.5	93.1	94.1	143.1	140	3.1	18	2
	5	☐	MMS1710L-DIN-C	67.5	93.1	94.1	143.1	140	3.1	18	1
	3	☐	MMS1710X3DB	54.4	91.1	93.1	152.1	149	3.1	18	1
	5	☐	MMS1710X5DB	88.6	126.1	129.1	188.1	185	3.1	18	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
17.2	3	☐	MMS1720S-DIN	47.3	73.1	74.1	123.1	120	3.1	18	2
	3	☐	MMS1720S-DIN-C	47.3	73.1	74.1	123.1	120	3.1	18	1
	5	☐	MMS1720L-DIN	67.3	93.1	94.1	143.1	140	3.1	18	2
	5	☐	MMS1720L-DIN-C	67.3	93.1	94.1	143.1	140	3.1	18	1
	3	☐	MMS1720X3DB	54.7	91.1	93.1	152.1	149	3.1	18	1
	5	☐	MMS1720X5DB	89.1	126.1	129.1	188.1	185	3.1	18	1
17.3	3	☐	MMS1730S-DIN	47.2	73.1	74.1	123.1	120	3.1	18	2
	3	☐	MMS1730S-DIN-C	47.2	73.1	74.1	123.1	120	3.1	18	1
	5	☐	MMS1730L-DIN	67.2	93.1	94.1	143.1	140	3.1	18	2
	5	☐	MMS1730L-DIN-C	67.2	93.1	94.1	143.1	140	3.1	18	1
	3	☐	MMS1730X3DB	55.0	91.1	93.1	152.1	149	3.1	18	1
	5	☐	MMS1730X5DB	89.6	126.1	129.1	188.1	185	3.1	18	1
17.4	3	☐	MMS1740S-DIN	47.1	73.2	74.2	123.2	120	3.2	18	2
	3	☐	MMS1740S-DIN-C	47.1	73.2	74.2	123.2	120	3.2	18	1
	5	☐	MMS1740L-DIN	67.1	93.2	94.2	143.2	140	3.2	18	2
	5	☐	MMS1740L-DIN-C	67.1	93.2	94.2	143.2	140	3.2	18	1
	3	☐	MMS1740X3DB	55.4	91.2	93.2	152.2	149	3.2	18	1
	5	☐	MMS1740X5DB	90.2	126.2	129.2	188.2	185	3.2	18	1
17.5	3	☐	MMS1750S-DIN	46.9	73.2	74.2	123.2	120	3.2	18	2
	3	☐	MMS1750S-DIN-C	46.9	73.2	74.2	123.2	120	3.2	18	1
	5	☐	MMS1750L-DIN	66.9	93.2	94.2	143.2	140	3.2	18	2
	5	☐	MMS1750L-DIN-C	66.9	93.2	94.2	143.2	140	3.2	18	1
	3	★	MMS1750X3DB	55.7	91.2	93.2	152.2	149	3.2	18	1
	5	★	MMS1750X5DB	90.7	126.2	129.2	188.2	185	3.2	18	1
17.6	3	☐	MMS1760S-DIN	46.8	73.2	74.2	123.2	120	3.2	18	2
	3	☐	MMS1760S-DIN-C	46.8	73.2	74.2	123.2	120	3.2	18	1
	5	☐	MMS1760L-DIN	66.8	93.2	94.2	143.2	140	3.2	18	2
	5	☐	MMS1760L-DIN-C	66.8	93.2	94.2	143.2	140	3.2	18	1
	3	☐	MMS1760X3DB	56.0	93.2	93.2	152.2	149	3.2	18	1
	5	☐	MMS1760X5DB	91.2	129.2	129.2	188.2	185	3.2	18	1
17.7	3	☐	MMS1770S-DIN	46.7	73.2	74.2	123.2	120	3.2	18	2
	3	☐	MMS1770S-DIN-C	46.7	73.2	74.2	123.2	120	3.2	18	1
	5	☐	MMS1770L-DIN	66.7	93.2	94.2	143.2	140	3.2	18	2
	5	☐	MMS1770L-DIN-C	66.7	93.2	94.2	143.2	140	3.2	18	1
	3	☐	MMS1770X3DB	56.3	93.2	93.2	152.2	149	3.2	18	1
	5	☐	MMS1770X5DB	91.7	129.2	129.2	188.2	185	3.2	18	1
17.8	3	☐	MMS1780S-DIN	46.5	73.2	74.2	123.2	120	3.2	18	2
	3	☐	MMS1780S-DIN-C	46.5	73.2	74.2	123.2	120	3.2	18	1
	5	☐	MMS1780L-DIN	66.5	93.2	94.2	143.2	140	3.2	18	2
	5	☐	MMS1780L-DIN-C	66.5	93.2	94.2	143.2	140	3.2	18	1
	3	☐	MMS1780X3DB	56.6	93.2	93.2	152.2	149	3.2	18	1
	5	☐	MMS1780X5DB	92.2	129.2	129.2	188.2	185	3.2	18	1
17.9	3	☐	MMS1790S-DIN	46.4	73.3	74.3	123.3	120	3.3	18	2
	3	☐	MMS1790S-DIN-C	46.4	73.3	74.3	123.3	120	3.3	18	1
	5	☐	MMS1790L-DIN	66.4	93.3	94.3	143.3	140	3.3	18	2
	5	☐	MMS1790L-DIN-C	66.4	93.3	94.3	143.3	140	3.3	18	1
	3	☐	MMS1790X3DB	57.0	93.3	93.3	152.3	149	3.3	18	1
	5	☐	MMS1790X5DB	92.8	129.3	129.3	188.3	185	3.3	18	1

CUTTING CONDITIONS ➤ M090
OPERATION GUIDANCE ➤ M089
TECHNICAL DATA ➤ P001

MMS

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
18.0	3	☐	**MMS1800S-DIN**	46.3	73.3	74.3	123.3	120	3.3	18	2
	3	☐	**MMS1800S-DIN-C**	46.3	73.3	74.3	123.3	120	3.3	18	1
	5	☐	**MMS1800L-DIN**	66.3	93.3	94.3	143.3	140	3.3	18	2
	5	☐	**MMS1800L-DIN-C**	66.3	93.3	94.3	143.3	140	3.3	18	1
	3	★	**MMS1800X3DB**	57.3	93.3	93.3	152.3	149	3.3	18	1
	5	★	**MMS1800X5DB**	93.3	129.3	129.3	188.3	185	3.3	18	1
18.1	3	☐	**MMS1810S-DIN**	52.1	79.3	80.3	131.3	128	3.3	20	2
	3	☐	**MMS1810S-DIN-C**	52.1	79.3	80.3	131.3	128	3.3	20	1
	5	☐	**MMS1810L-DIN**	74.1	101.3	102.3	153.3	150	3.3	20	2
	5	☐	**MMS1810L-DIN-C**	74.1	101.3	102.3	153.3	150	3.3	20	1
	3	☐	**MMS1810X3DB**	57.6	96.3	99.3	160.3	157	3.3	20	1
	5	☐	**MMS1810X5DB**	93.8	133.3	137.3	198.3	195	3.3	20	1
18.2	3	☐	**MMS1820S-DIN**	52.0	79.3	80.3	131.3	128	3.3	20	2
	3	☐	**MMS1820S-DIN-C**	52.0	79.3	80.3	131.3	128	3.3	20	1
	5	☐	**MMS1820L-DIN**	74.0	101.3	102.3	153.3	150	3.3	20	2
	5	☐	**MMS1820L-DIN-C**	74.0	101.3	102.3	153.3	150	3.3	20	1
	3	☐	**MMS1820X3DB**	57.9	96.3	99.3	160.3	157	3.3	20	1
	5	☐	**MMS1820X5DB**	94.3	133.3	137.3	198.3	195	3.3	20	1
18.3	3	☐	**MMS1830S-DIN**	51.9	79.3	80.3	131.3	128	3.3	20	2
	3	☐	**MMS1830S-DIN-C**	51.9	79.3	80.3	131.3	128	3.3	20	1
	5	☐	**MMS1830L-DIN**	73.9	101.3	102.3	153.3	150	3.3	20	2
	5	☐	**MMS1830L-DIN-C**	73.9	101.3	102.3	153.3	150	3.3	20	1
	3	☐	**MMS1830X3DB**	58.2	96.3	99.3	160.3	157	3.3	20	1
	5	☐	**MMS1830X5DB**	94.8	133.3	137.3	198.3	195	3.3	20	1
18.4	3	☐	**MMS1840S-DIN**	51.7	79.3	80.3	131.3	128	3.3	20	2
	3	☐	**MMS1840S-DIN-C**	51.7	79.3	80.3	131.3	128	3.3	20	1
	5	☐	**MMS1840L-DIN**	73.7	101.3	102.3	153.3	150	3.3	20	2
	5	☐	**MMS1840L-DIN-C**	73.7	101.3	102.3	153.3	150	3.3	20	1
	3	☐	**MMS1840X3DB**	58.5	96.3	99.3	160.3	157	3.3	20	1
	5	☐	**MMS1840X5DB**	95.3	133.3	137.3	198.3	195	3.3	20	1
18.5	3	☐	**MMS1850S-DIN**	51.6	79.4	80.4	131.4	128	3.4	20	2
	3	☐	**MMS1850S-DIN-C**	51.6	79.4	80.4	131.4	128	3.4	20	1
	5	☐	**MMS1850L-DIN**	73.6	101.4	102.4	153.4	150	3.4	20	2
	5	☐	**MMS1850L-DIN-C**	73.6	101.4	102.4	153.4	150	3.4	20	1
	3	★	**MMS1850X3DB**	58.9	96.4	99.4	160.4	157	3.4	20	1
	5	★	**MMS1850X5DB**	95.9	133.4	137.4	198.4	195	3.4	20	1
18.6	3	☐	**MMS1860S-DIN**	51.5	79.4	80.4	131.4	128	3.4	20	2
	3	☐	**MMS1860S-DIN-C**	51.5	79.4	80.4	131.4	128	3.4	20	1
	5	☐	**MMS1860L-DIN**	73.5	101.4	102.4	153.4	150	3.4	20	2
	5	☐	**MMS1860L-DIN-C**	73.5	101.4	102.4	153.4	150	3.4	20	1
	3	☐	**MMS1860X3DB**	59.2	98.4	99.4	160.4	157	3.4	20	1
	5	☐	**MMS1860X5DB**	96.4	136.4	137.4	198.4	195	3.4	20	1
18.7	3	☐	**MMS1870S-DIN**	51.4	79.4	80.4	131.4	128	3.4	20	2
	3	☐	**MMS1870S-DIN-C**	51.4	79.4	80.4	131.4	128	3.4	20	1
	5	☐	**MMS1870L-DIN**	73.4	101.4	102.4	153.4	150	3.4	20	2
	5	☐	**MMS1870L-DIN-C**	73.4	101.4	102.4	153.4	150	3.4	20	1
	3	☐	**MMS1870X3DB**	59.5	98.4	99.4	160.4	157	3.4	20	1
	5	☐	**MMS1870X5DB**	96.9	136.4	137.4	198.4	195	3.4	20	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
18.8	3	☐	**MMS1880S-DIN**	51.2	79.4	80.4	131.4	128	3.4	20	2
	3	☐	**MMS1880S-DIN-C**	51.2	79.4	80.4	131.4	128	3.4	20	1
	5	☐	**MMS1880L-DIN**	73.2	101.4	102.4	153.4	150	3.4	20	2
	5	☐	**MMS1880L-DIN-C**	73.2	101.4	102.4	153.4	150	3.4	20	1
	3	☐	**MMS1880X3DB**	59.8	98.4	99.4	160.4	157	3.4	20	1
	5	☐	**MMS1880X5DB**	97.4	136.4	137.4	198.4	195	3.4	20	1
18.9	3	☐	**MMS1890S-DIN**	51.1	79.4	80.4	131.4	128	3.4	20	2
	3	☐	**MMS1890S-DIN-C**	51.1	79.4	80.4	131.4	128	3.4	20	1
	5	☐	**MMS1890L-DIN**	73.1	101.4	102.4	153.4	150	3.4	20	2
	5	☐	**MMS1890L-DIN-C**	73.1	101.4	102.4	153.4	150	3.4	20	1
	3	☐	**MMS1890X3DB**	60.1	98.4	99.4	160.4	157	3.4	20	1
	5	☐	**MMS1890X5DB**	97.9	136.4	137.4	198.4	195	3.4	20	1
19.0	3	☐	**MMS1900S-DIN**	51.0	79.5	80.5	131.5	128	3.5	20	2
	3	☐	**MMS1900S-DIN-C**	51.0	79.5	80.5	131.5	128	3.5	20	1
	5	☐	**MMS1900L-DIN**	73.0	101.5	102.5	153.5	150	3.5	20	2
	5	☐	**MMS1900L-DIN-C**	73.0	101.5	102.5	153.5	150	3.5	20	1
	3	★	**MMS1900X3DB**	60.5	98.5	99.5	160.5	157	3.5	20	1
	5	★	**MMS1900X5DB**	98.5	136.5	137.5	198.5	195	3.5	20	1
19.1	3	☐	**MMS1910S-DIN**	50.8	79.5	80.5	131.5	128	3.5	20	2
	3	☐	**MMS1910S-DIN-C**	50.8	79.5	80.5	131.5	128	3.5	20	1
	5	☐	**MMS1910L-DIN**	72.8	101.5	102.5	153.5	150	3.5	20	2
	5	☐	**MMS1910L-DIN-C**	72.8	101.5	102.5	153.5	150	3.5	20	1
	3	☐	**MMS1910X3DB**	60.8	101.5	103.5	164.5	161	3.5	20	1
	5	☐	**MMS1910X5DB**	99.0	140.5	143.5	204.5	201	3.5	20	1
19.2	3	☐	**MMS1920S-DIN**	50.7	79.5	80.5	131.5	128	3.5	20	2
	3	☐	**MMS1920S-DIN-C**	50.7	79.5	80.5	131.5	128	3.5	20	1
	5	☐	**MMS1920L-DIN**	72.7	101.5	102.5	153.5	150	3.5	20	2
	5	☐	**MMS1920L-DIN-C**	72.7	101.5	102.5	153.5	150	3.5	20	1
	3	☐	**MMS1920X3DB**	61.1	101.5	103.5	164.5	161	3.5	20	1
	5	☐	**MMS1920X5DB**	99.5	140.5	143.5	204.5	201	3.5	20	1
19.3	3	☐	**MMS1930S-DIN**	50.6	79.5	80.5	131.5	128	3.5	20	2
	3	☐	**MMS1930S-DIN-C**	50.6	79.5	80.5	131.5	128	3.5	20	1
	5	☐	**MMS1930L-DIN**	72.6	101.5	102.5	153.5	150	3.5	20	2
	5	☐	**MMS1930L-DIN-C**	72.6	101.5	102.5	153.5	150	3.5	20	1
	3	☐	**MMS1930X3DB**	61.4	101.5	103.5	164.5	161	3.5	20	1
	5	☐	**MMS1930X5DB**	100.0	140.5	143.5	204.5	201	3.5	20	1
19.4	3	☐	**MMS1940S-DIN**	50.4	79.5	80.5	131.5	128	3.5	20	2
	3	☐	**MMS1940S-DIN-C**	50.4	79.5	80.5	131.5	128	3.5	20	1
	5	☐	**MMS1940L-DIN**	72.4	101.5	102.5	153.5	150	3.5	20	2
	5	☐	**MMS1940L-DIN-C**	72.4	101.5	102.5	153.5	150	3.5	20	1
	3	☐	**MMS1940X3DB**	61.7	101.5	103.5	164.5	161	3.5	20	1
	5	☐	**MMS1940X5DB**	100.5	140.5	143.5	204.5	201	3.5	20	1
19.5	3	☐	**MMS1950S-DIN**	50.3	79.5	80.5	131.5	128	3.5	20	2
	3	☐	**MMS1950S-DIN-C**	50.3	79.5	80.5	131.5	128	3.5	20	1
	5	☐	**MMS1950L-DIN**	72.3	101.5	102.5	153.5	150	3.5	20	2
	5	☐	**MMS1950L-DIN-C**	72.3	101.5	102.5	153.5	150	3.5	20	1
	3	★	**MMS1950X3DB**	62.0	101.5	103.5	164.5	161	3.5	20	1
	5	★	**MMS1950X5DB**	101.0	140.5	143.5	204.5	201	3.5	20	1

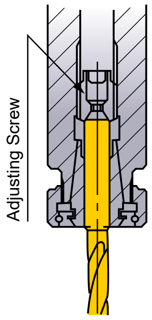
★ : Inventory maintained in Japan. ☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
19.6	3	☐	**MMS1960S-DIN**	50.2	79.6	80.6	131.6	128	3.6	20	2
	3	☐	**MMS1960S-DIN-C**	50.2	79.6	80.6	131.6	128	3.6	20	1
	5	☐	**MMS1960L-DIN**	72.2	101.6	102.6	153.6	150	3.6	20	2
	5	☐	**MMS1960L-DIN-C**	72.2	101.6	102.6	153.6	150	3.6	20	1
	3	☐	**MMS1960X3DB**	62.4	103.6	103.6	164.6	161	3.6	20	1
	5	☐	**MMS1960X5DB**	101.6	143.6	143.6	204.6	201	3.6	20	1
19.7	3	☐	**MMS1970S-DIN**	50.0	79.6	80.6	131.6	128	3.6	20	2
	3	☐	**MMS1970S-DIN-C**	50.0	79.6	80.6	131.6	128	3.6	20	1
	5	☐	**MMS1970L-DIN**	72.0	101.6	102.6	153.6	150	3.6	20	2
	5	☐	**MMS1970L-DIN-C**	72.0	101.6	102.6	153.6	150	3.6	20	1
	3	☐	**MMS1970X3DB**	62.7	103.6	103.6	164.6	161	3.6	20	1
	5	☐	**MMS1970X5DB**	102.1	143.6	143.6	204.6	201	3.6	20	1
19.8	3	☐	**MMS1980S-DIN**	49.9	79.6	80.6	131.6	128	3.6	20	2
	3	☐	**MMS1980S-DIN-C**	49.9	79.6	80.6	131.6	128	3.6	20	1
	5	☐	**MMS1980L-DIN**	71.9	101.6	102.6	153.6	150	3.6	20	2
	5	☐	**MMS1980L-DIN-C**	71.9	101.6	102.6	153.6	150	3.6	20	1
	3	☐	**MMS1980X3DB**	63.0	103.6	103.6	164.6	161	3.6	20	1
	5	☐	**MMS1980X5DB**	102.6	143.6	143.6	204.6	201	3.6	20	1

DC (mm)	Hole Depth (L/D)	DP7020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
19.9	3	☐	**MMS1990S-DIN**	49.8	79.6	80.6	131.6	128	3.6	20	2
	3	☐	**MMS1990S-DIN-C**	49.8	79.6	80.6	131.6	128	3.6	20	1
	5	☐	**MMS1990L-DIN**	71.8	101.6	102.6	153.6	150	3.6	20	2
	5	☐	**MMS1990L-DIN-C**	71.8	101.6	102.6	153.6	150	3.6	20	1
	3	☐	**MMS1990X3DB**	63.3	103.6	103.6	164.6	161	3.6	20	1
	5	☐	**MMS1990X5DB**	103.1	143.6	143.6	204.6	201	3.6	20	1
20.0	3	☐	**MMS2000S-DIN**	49.6	79.6	80.6	131.6	128	3.6	20	2
	3	☐	**MMS2000S-DIN-C**	49.6	79.6	80.6	131.6	128	3.6	20	1
	5	☐	**MMS2000L-DIN**	71.6	101.6	102.6	153.6	150	3.6	20	2
	5	☐	**MMS2000L-DIN-C**	71.6	101.6	102.6	153.6	150	3.6	20	1
	3	★	**MMS2000X3DB**	63.6	103.6	103.6	164.6	161	3.6	20	1
	5	★	**MMS2000X5DB**	103.6	143.6	143.6	204.6	201	3.6	20	1

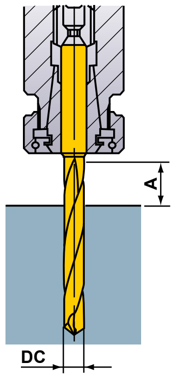
OPERATIONAL GUIDANCE

Drill Holding



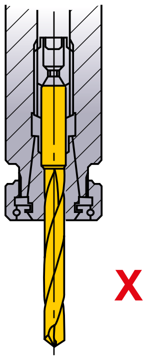
Thrust bearing type collet chuck holds the drill securely.

Drill Length



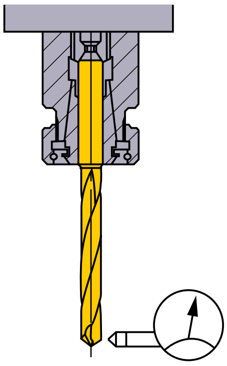
A ≥ DC x 1.5

Drill Installation



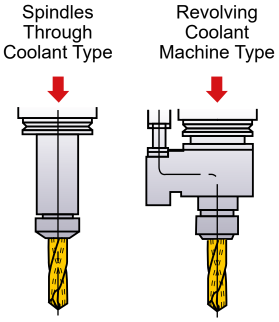
Do not clamp on the flutes.

Installation Tolerance



Run-out ≤ 0.03mm

Through Coolant Type



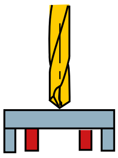
Coolant pressure is approx. 5 bar—70 bar

Coolant Handling

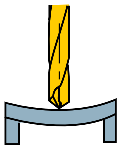
1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular changing of the coolant is recommended.

2) Small particles of chips will jam in the oil hole. Use a filter as a preventative measure. When using small diameter drills, use a fine mesh filter.

Thin Workpiece



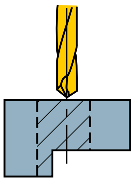
Support the Workpiece



If Bending Occurs

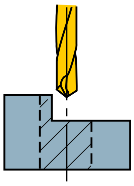
Interrupted Cutting

One Process



①Lower the feed when drilling the interrupted section.

Requires prior machining



①Spot face with MFE drill prior to drilling.

CUTTING CONDITIONS ➤ M090
TECHNICAL DATA ➤ P001

MMS

RECOMMENDED CUTTING CONDITIONS

Material	M									
	Austenitic Stainless Steel (≤200HB) X5CrNi1810, X5CrNiMo17-12-2					Austenitic Stainless Steel (>200HB) X2CrNiN1810, X2CrNiMoN17-12-2				
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)		Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)		Table Feed (mm/min)
3.2	80	7900	0.13	(0.08—0.18)	1025	60	5900	0.10	(0.05—0.15)	590
4.0	80	6300	0.15	(0.10—0.20)	945	60	4700	0.12	(0.08—0.18)	560
5.0	80	5000	0.15	(0.10—0.20)	750	60	3800	0.12	(0.08—0.18)	455
6.3	80	4000	0.17	(0.12—0.22)	680	60	3000	0.15	(0.10—0.20)	450
8.0	80	3100	0.19	(0.14—0.24)	585	60	2300	0.17	(0.12—0.22)	390
10.0	60	1900	0.20	(0.15—0.25)	380	50	1500	0.18	(0.13—0.23)	270
12.0	60	1500	0.21	(0.16—0.26)	315	50	1300	0.19	(0.14—0.24)	245
16.0	60	1100	0.22	(0.17—0.27)	240	50	900	0.20	(0.15—0.25)	180
20.0	60	900	0.23	(0.18—0.28)	205	50	700	0.21	(0.16—0.26)	145

Material	M									
	Two-phase Stainless Steel (≤280HB) X3CrNiMoN27-5-2					Ferritic and Martensitic Stainless Steel (≤200HB) X10Cr13, X6Cr17				
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)		Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)		Table Feed (mm/min)
3.2	50	4900	0.10	(0.05—0.15)	490	80	7900	0.13	(0.08—0.18)	1025
4.0	50	3900	0.12	(0.08—0.18)	465	80	6300	0.15	(0.10—0.20)	945
5.0	50	3100	0.12	(0.08—0.18)	370	80	5000	0.15	(0.10—0.20)	750
6.3	50	2500	0.15	(0.10—0.20)	375	80	4000	0.17	(0.12—0.22)	680
8.0	50	1900	0.17	(0.12—0.22)	320	80	3100	0.19	(0.14—0.24)	585
10.0	40	1200	0.18	(0.13—0.23)	215	60	1900	0.20	(0.15—0.25)	380
12.0	40	1000	0.19	(0.14—0.24)	190	60	1500	0.21	(0.16—0.26)	315
16.0	40	700	0.20	(0.15—0.25)	140	60	1100	0.22	(0.17—0.27)	240
20.0	40	600	0.21	(0.16—0.26)	125	60	900	0.23	(0.18—0.28)	205

Material	M									
	Ferritic and Martensitic Stainless Steel (>200HB) X20CrNi17-2, X30Cr13					PH Hardened Stainless Steel (<450HB) X5CrNiCuNb164, X7CrNiAl177, 17-4PH, 17-7PH				
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)		Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)		Table Feed (mm/min)
3.2	60	5900	0.10	(0.05—0.15)	590	50	4900	0.10	(0.05—0.15)	490
4.0	60	4700	0.12	(0.08—0.18)	560	50	3900	0.12	(0.08—0.18)	465
5.0	60	3800	0.12	(0.08—0.18)	455	50	3100	0.12	(0.08—0.18)	370
6.3	60	3000	0.15	(0.10—0.20)	450	50	2500	0.15	(0.10—0.20)	375
8.0	60	2300	0.17	(0.12—0.22)	390	50	1900	0.17	(0.12—0.22)	320
10.0	50	1500	0.18	(0.13—0.23)	270	40	1200	0.18	(0.13—0.23)	215
12.0	50	1300	0.19	(0.14—0.24)	245	40	1000	0.19	(0.14—0.24)	190
16.0	50	900	0.20	(0.15—0.25)	180	40	700	0.20	(0.15—0.25)	140
20.0	50	700	0.21	(0.16—0.26)	145	40	600	0.21	(0.16—0.26)	125

Note 1) Using a high pressure, through spindle coolant system is recommended.
Note 2) Emulsion type water based coolant is recommended.
Note 3) When using non-water coolant, reduce the revolution by 10%—20%.

STAINLESS STEEL CROSS REFERENCE LIST

Material		Germany		USA	Japan
		W-no.	**DIN**	AISI/SAE	JIS
Ferritic, Martensitic Stainless Steel	≤200HB	1.4005	X12CrS3	416	SUS416
		1.4006	X10Cr13	410	SUS410
		1.4016	X6Cr17	430	SUS430
		1.4113	X6CrMo17	434	SUS434
		1.4510	X6CrTi17	430Ti	SUS430LX
		1.4512	X6CrTi12	409	–
	>200HB	1.4021	X20Cr13	420	SUS420J1
		1.4057	X20CrNi17-2	431	SUS431
		1.4028	X30Cr13	420	SUS420J2
		1.4125	X10CrMo17	440C	SUS440C
PH Stainless Steel	<450HB	1.4542	X5CrNiCuNb16 4	630 (17-4PH)	SUS630
		1.4545	–	S15500 (15-5PH)	–
		1.4568	X7CrNiAl17 7	631 (17-7PH)	SUS631
Austenitic Stainless Steel	≤200HB	1.4301	X5CrNi18 10	304	SUS304
		1.4303	X5CrNi8-12	305	SUS305
		1.4305	X12CrNiS18-9	303	SUS303
		1.4307	X2CrNi19-11	304L	SUS304L
		1.4401	X5CrNiMo17 12 2	316	SUS316
	>200HB	1.4311	X2CrNiN18 10	304LN	SUS304LN
		1.4404	X2CrNiMo17 12 2	316L	SUS316L
		1.4406	X2CrNiMoN17 12 2	316LN	SUS316LN
		1.4435	X2CrNiMo18 14 3	–	SUS316L
		1.4438	X2CrNiMo18 15 4	317L	SUS317L
		1.4529	X1NiCrMoCuN25 20 7	N08926	–
		1.4541	X6CrNiTi18-10	321	SUS321
		1.4550	X6CrNiNb18-10	347	SUS347
		1.4571	X6CrNiMoTi17 12 2	316Ti	SUS316Ti
Duplex Stainless Steel	≤280HB	1.4362	X2CrNiN23 4	–	–
		1.4410	X2CrNiMoN25 7 4	S32750	SCS14A
		1.4460	X3CrNiMoN27 5 2	329	SUS329J1
		1.4462	X2CrNiMoN22 5 3	S31803	SUS329J3L

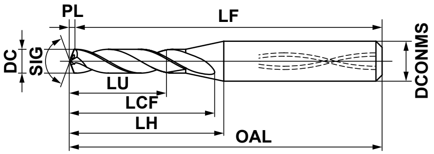
DSAS

P M K N **S** H

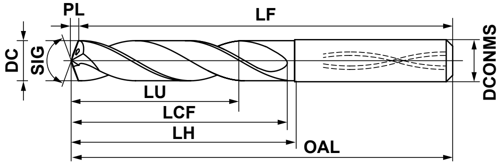
Internal Coolant

The coating colour can vary when viewed at different angles.
This does not have any effect on the performance of the drill.

DC=3	3<DC≤6	6<DC≤10	10<DC≤15	
0 −0.018	0 −0.018	0 −0.022	0 −0.027	
DCONMS=6	6<DCONMS≤10	10<DCONMS≤16		
0 −0.018	0 −0.009	0 −0.011		



Type1



Type2

DC (mm)	Hole Depth (L/D)	DP9020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.00	3	●	**DSAS0300X03S060**	9.5	21.5	23.5	70.5	70	0.5	6	1
3.00	5	●	**DSAS0300X05S060**	15.5	28.5	31.5	78.5	78	0.5	6	1
3.10	3	●	**DSAS0310X03S060**	9.9	21.6	23.6	70.6	70	0.6	6	1
3.10	5	●	**DSAS0310X05S060**	16.1	28.6	31.6	78.6	78	0.6	6	1
3.18	3	●	**DSAS0318X03S060**	10.1	21.6	23.6	70.6	70	0.6	6	1
3.18	5	●	**DSAS0318X05S060**	16.5	28.6	31.6	78.6	78	0.6	6	1
3.20	3	●	**DSAS0320X03S060**	10.2	21.6	23.6	70.6	70	0.6	6	1
3.20	5	●	**DSAS0320X05S060**	16.6	28.6	31.6	78.6	78	0.6	6	1
3.26	3	●	**DSAS0326X03S060**	10.4	21.6	23.6	70.6	70	0.6	6	1
3.26	5	●	**DSAS0326X05S060**	16.9	28.6	31.6	78.6	78	0.6	6	1
3.30	3	●	**DSAS0330X03S060**	10.5	21.6	23.6	70.6	70	0.6	6	1
3.30	5	●	**DSAS0330X05S060**	17.1	28.6	31.6	78.6	78	0.6	6	1
3.40	3	●	**DSAS0340X03S060**	10.8	21.6	23.6	70.6	70	0.6	6	1
3.40	5	●	**DSAS0340X05S060**	17.6	28.6	31.6	78.6	78	0.6	6	1
3.50	3	●	**DSAS0350X03S060**	11.1	21.6	23.6	70.6	70	0.6	6	1
3.50	5	●	**DSAS0350X05S060**	18.1	28.6	31.6	78.6	78	0.6	6	1
3.57	3	●	**DSAS0357X03S060**	11.4	22.7	23.7	70.7	70	0.7	6	1
3.57	5	●	**DSAS0357X05S060**	18.6	30.7	31.7	78.7	78	0.7	6	1
3.60	3	●	**DSAS0360X03S060**	11.5	22.7	23.7	70.7	70	0.7	6	1
3.60	5	●	**DSAS0360X05S060**	18.7	30.7	31.7	78.7	78	0.7	6	1
3.70	3	●	**DSAS0370X03S060**	11.8	22.7	23.7	70.7	70	0.7	6	1
3.70	5	●	**DSAS0370X05S060**	19.2	30.7	31.7	78.7	78	0.7	6	1
3.80	3	●	**DSAS0380X03S060**	12.1	22.7	23.7	70.7	70	0.7	6	1
3.80	5	●	**DSAS0380X05S060**	19.7	30.7	31.7	78.7	78	0.7	6	1
3.90	3	●	**DSAS0390X03S060**	12.4	22.7	23.7	70.7	70	0.7	6	1
3.90	5	●	**DSAS0390X05S060**	20.2	30.7	31.7	78.7	78	0.7	6	1
3.97	3	●	**DSAS0397X03S060**	12.6	22.7	23.7	70.7	70	0.7	6	1
3.97	5	●	**DSAS0397X05S060**	20.5	30.7	31.7	78.7	78	0.7	6	1
4.00	3	●	**DSAS0400X03S060**	12.7	22.7	23.7	70.7	70	0.7	6	1
4.00	5	●	**DSAS0400X05S060**	20.7	30.7	31.7	78.7	78	0.7	6	1
4.10	3	●	**DSAS0410X03S060**	13.0	24.7	26.7	73.7	73	0.7	6	1
4.10	5	●	**DSAS0410X05S060**	21.2	33.7	35.7	82.7	82	0.7	6	1
4.20	3	●	**DSAS0420X03S060**	13.4	24.8	26.8	73.8	73	0.8	6	1
4.20	5	●	**DSAS0420X05S060**	21.8	33.8	35.8	82.8	82	0.8	6	1
4.30	3	●	**DSAS0430X03S060**	13.7	24.8	26.8	73.8	73	0.8	6	1
4.30	5	●	**DSAS0430X05S060**	22.3	33.8	35.8	82.8	82	0.8	6	1
4.37	3	●	**DSAS0437X03S060**	13.9	24.8	26.8	73.8	73	0.8	6	1
4.37	5	●	**DSAS0437X05S060**	22.6	33.8	35.8	82.8	82	0.8	6	1
4.40	3	●	**DSAS0440X03S060**	14.0	24.8	26.8	73.8	73	0.8	6	1
4.40	5	●	**DSAS0440X05S060**	22.8	33.8	35.8	82.8	82	0.8	6	1

Note 1) The through coolant holes of drills Ø5mm or less are round.

● : Inventory maintained.

DC (mm)	Hole Depth (L/D)	DP9020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.50	3	●	**DSAS0450X03S060**	14.3	24.8	26.8	73.8	73	0.8	6	1
4.50	5	●	**DSAS0450X05S060**	23.3	33.8	35.8	82.8	82	0.8	6	1
4.60	3	●	**DSAS0460X03S060**	14.6	25.8	28.8	75.8	75	0.8	6	1
4.60	5	●	**DSAS0460X05S060**	23.8	35.8	38.8	85.8	85	0.8	6	1
4.70	3	●	**DSAS0470X03S060**	15.0	25.9	28.9	75.9	75	0.9	6	1
4.70	5	●	**DSAS0470X05S060**	24.4	35.9	38.9	85.9	85	0.9	6	1
4.76	3	●	**DSAS0476X03S060**	15.2	25.9	28.9	75.9	75	0.9	6	1
4.76	5	●	**DSAS0476X05S060**	24.7	35.9	38.9	85.9	85	0.9	6	1
4.80	3	●	**DSAS0480X03S060**	15.3	25.9	28.9	75.9	75	0.9	6	1
4.80	5	●	**DSAS0480X05S060**	24.9	35.9	38.9	85.9	85	0.9	6	1
4.86	3	●	**DSAS0486X03S060**	15.5	25.9	28.9	75.9	75	0.9	6	1
4.86	5	●	**DSAS0486X05S060**	25.2	35.9	38.9	85.9	85	0.9	6	1
4.90	3	●	**DSAS0490X03S060**	15.6	25.9	28.9	75.9	75	0.9	6	1
4.90	5	●	**DSAS0490X05S060**	25.4	35.9	38.9	85.9	85	0.9	6	1
5.00	3	●	**DSAS0500X03S060**	15.9	28.9	29.9	81.9	81	0.9	6	2
5.00	5	●	**DSAS0500X05S060**	25.9	39.9	42.9	89.9	89	0.9	6	2
5.10	3	●	**DSAS0510X03S060**	16.2	28.9	29.9	81.9	81	0.9	6	2
5.10	5	●	**DSAS0510X05S060**	26.4	39.9	42.9	89.9	89	0.9	6	2
5.16	3	●	**DSAS0516X03S060**	16.5	29.0	30.0	82.0	81	1.0	6	2
5.16	5	●	**DSAS0516X05S060**	26.8	40.0	43.0	90.0	89	1.0	6	2
5.20	3	●	**DSAS0520X03S060**	16.6	29.0	30.0	82.0	81	1.0	6	2
5.20	5	●	**DSAS0520X05S060**	27.0	40.0	43.0	90.0	89	1.0	6	2
5.30	3	●	**DSAS0530X03S060**	16.9	29.0	30.0	82.0	81	1.0	6	2
5.30	5	●	**DSAS0530X05S060**	27.5	40.0	43.0	90.0	89	1.0	6	2
5.40	3	●	**DSAS0540X03S060**	17.2	29.0	30.0	82.0	81	1.0	6	2
5.40	5	●	**DSAS0540X05S060**	28.0	40.0	43.0	90.0	89	1.0	6	2
5.50	3	●	**DSAS0550X03S060**	17.5	29.0	30.0	82.0	81	1.0	6	2
5.50	5	●	**DSAS0550X05S060**	28.5	40.0	43.0	90.0	89	1.0	6	2
5.56	3	●	**DSAS0556X03S060**	17.8	31.1	31.1	82.1	81	1.1	6	2
5.56	5	●	**DSAS0556X05S060**	28.9	43.1	43.1	90.1	89	1.1	6	2
5.60	3	●	**DSAS0560X03S060**	17.9	31.1	31.1	82.1	81	1.1	6	2
5.60	5	●	**DSAS0560X05S060**	29.1	43.1	43.1	90.1	89	1.1	6	2
5.70	3	●	**DSAS0570X03S060**	18.2	31.1	31.1	82.1	81	1.1	6	2
5.70	5	●	**DSAS0570X05S060**	29.6	43.1	43.1	90.1	89	1.1	6	2
5.80	3	●	**DSAS0580X03S060**	18.5	31.1	31.1	82.1	81	1.1	6	2
5.80	5	●	**DSAS0580X05S060**	30.1	43.1	43.1	90.1	89	1.1	6	2
5.90	3	●	**DSAS0590X03S060**	18.8	31.1	31.1	82.1	81	1.1	6	2
5.90	5	●	**DSAS0590X05S060**	30.6	43.1	43.1	90.1	89	1.1	6	2
5.95	3	●	**DSAS0595X03S060**	19.0	31.1	31.1	82.1	81	1.1	6	2
5.95	5	●	**DSAS0595X05S060**	30.9	43.1	43.1	90.1	89	1.1	6	2
6.00	3	●	**DSAS0600X03S060**	19.1	31.1	31.1	82.1	81	1.1	6	2
6.00	5	●	**DSAS0600X05S060**	31.1	43.1	43.1	90.1	89	1.1	6	2
6.10	3	●	**DSAS0610X03S080**	19.5	34.2	37.2	87.2	86	1.2	8	2
6.10	5	●	**DSAS0610X05S080**	31.7	47.2	49.2	96.2	95	1.2	8	2
6.20	3	●	**DSAS0620X03S080**	19.8	34.2	37.2	87.2	86	1.2	8	2
6.20	5	●	**DSAS0620X05S080**	32.2	47.2	49.2	96.2	95	1.2	8	2
6.30	3	●	**DSAS0630X03S080**	20.1	34.2	37.2	87.2	86	1.2	8	2
6.30	5	●	**DSAS0630X05S080**	32.7	47.2	49.2	96.2	95	1.2	8	2
6.35	3	●	**DSAS0635X03S080**	20.3	34.2	37.2	87.2	86	1.2	8	2
6.35	5	●	**DSAS0635X05S080**	33.0	47.2	49.2	96.2	95	1.2	8	2
6.40	3	●	**DSAS0640X03S080**	20.4	34.2	37.2	87.2	86	1.2	8	2
6.40	5	●	**DSAS0640X05S080**	33.2	47.2	49.2	96.2	95	1.2	8	2
6.50	3	●	**DSAS0650X03S080**	20.7	34.2	37.2	87.2	86	1.2	8	2
6.50	5	●	**DSAS0650X05S080**	33.7	47.2	49.2	96.2	95	1.2	8	2
6.60	3	●	**DSAS0660X03S080**	21.1	36.3	38.3	91.3	90	1.3	8	2
6.60	5	●	**DSAS0660X05S080**	34.3	50.3	52.3	99.3	98	1.3	8	2
6.70	3	●	**DSAS0670X03S080**	21.4	36.3	38.3	91.3	90	1.3	8	2
6.70	5	●	**DSAS0670X05S080**	34.8	50.3	52.3	99.3	98	1.3	8	2

CUTTING CONDITIONS ➤ **M097**
TECHNICAL DATA ➤ **P001**

DSAS

DC (mm)	Hole Depth (L/D)	DP9020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.75	3	●	**DSAS0675X03S080**	21.5	36.3	38.3	91.3	90	1.3	8	2
6.75	5	●	**DSAS0675X05S080**	35.0	50.3	52.3	99.3	98	1.3	8	2
6.80	3	●	**DSAS0680X03S080**	21.7	36.3	38.3	91.3	90	1.3	8	2
6.80	5	●	**DSAS0680X05S080**	35.3	50.3	52.3	99.3	98	1.3	8	2
6.90	3	●	**DSAS0690X03S080**	22.0	36.3	38.3	91.3	90	1.3	8	2
6.90	5	●	**DSAS0690X05S080**	35.8	50.3	52.3	99.3	98	1.3	8	2
6.95	3	●	**DSAS0695X03S080**	22.2	36.3	38.3	91.3	90	1.3	8	2
6.95	5	●	**DSAS0695X05S080**	36.1	50.3	52.3	99.3	98	1.3	8	2
7.00	3	●	**DSAS0700X03S080**	22.3	36.3	38.3	91.3	90	1.3	8	2
7.00	5	●	**DSAS0700X05S080**	36.3	50.3	52.3	99.3	98	1.3	8	2
7.10	3	●	**DSAS0710X03S080**	22.7	39.4	40.4	91.4	90	1.4	8	2
7.10	5	●	**DSAS0710X05S080**	36.9	54.4	57.4	104.4	103	1.4	8	2
7.14	3	●	**DSAS0714X03S080**	22.8	39.4	40.4	91.4	90	1.4	8	2
7.14	5	●	**DSAS0714X05S080**	37.1	54.4	57.4	104.4	103	1.4	8	2
7.20	3	●	**DSAS0720X03S080**	23.0	39.4	40.4	91.4	90	1.4	8	2
7.20	5	●	**DSAS0720X05S080**	37.4	54.4	57.4	104.4	103	1.4	8	2
7.30	3	●	**DSAS0730X03S080**	23.3	39.4	40.4	91.4	90	1.4	8	2
7.30	5	●	**DSAS0730X05S080**	37.9	54.4	57.4	104.4	103	1.4	8	2
7.40	3	●	**DSAS0740X03S080**	23.6	39.4	40.4	91.4	90	1.4	8	2
7.40	5	●	**DSAS0740X05S080**	38.4	54.4	57.4	104.4	103	1.4	8	2
7.50	3	●	**DSAS0750X03S080**	23.9	39.4	40.4	91.4	90	1.4	8	2
7.50	5	●	**DSAS0750X05S080**	38.9	54.4	57.4	104.4	103	1.4	8	2
7.54	3	●	**DSAS0754X03S080**	24.1	41.5	41.5	91.5	90	1.5	8	2
7.54	5	●	**DSAS0754X05S080**	39.2	57.5	57.5	104.5	103	1.5	8	2
7.60	3	●	**DSAS0760X03S080**	24.3	41.5	41.5	91.5	90	1.5	8	2
7.60	5	●	**DSAS0760X05S080**	39.5	57.5	57.5	104.5	103	1.5	8	2
7.70	3	●	**DSAS0770X03S080**	24.6	41.5	41.5	91.5	90	1.5	8	2
7.70	5	●	**DSAS0770X05S080**	40.0	57.5	57.5	104.5	103	1.5	8	2
7.80	3	●	**DSAS0780X03S080**	24.9	41.5	41.5	91.5	90	1.5	8	2
7.80	5	●	**DSAS0780X05S080**	40.5	57.5	57.5	104.5	103	1.5	8	2
7.90	3	●	**DSAS0790X03S080**	25.2	41.5	41.5	91.5	90	1.5	8	2
7.90	5	●	**DSAS0790X05S080**	41.0	57.5	57.5	104.5	103	1.5	8	2
7.94	3	●	**DSAS0794X03S080**	25.3	41.5	41.5	91.5	90	1.5	8	2
7.94	5	●	**DSAS0794X05S080**	41.2	57.5	57.5	104.5	103	1.5	8	2
8.00	3	●	**DSAS0800X03S080**	25.5	41.5	41.5	91.5	90	1.5	8	2
8.00	5	●	**DSAS0800X05S080**	41.5	57.5	57.5	104.5	103	1.5	8	2
8.10	3	●	**DSAS0810X03S100**	25.8	44.5	47.5	97.5	96	1.5	10	2
8.10	5	●	**DSAS0810X05S100**	42.0	61.5	63.5	114.5	113	1.5	10	2
8.20	3	●	**DSAS0820X03S100**	26.1	44.5	47.5	97.5	96	1.5	10	2
8.20	5	●	**DSAS0820X05S100**	42.5	61.5	63.5	114.5	113	1.5	10	2
8.30	3	●	**DSAS0830X03S100**	26.4	44.5	47.5	97.5	96	1.5	10	2
8.30	5	●	**DSAS0830X05S100**	43.0	61.5	63.5	114.5	113	1.5	10	2
8.33	3	●	**DSAS0833X03S100**	26.5	44.5	47.5	97.5	96	1.5	10	2
8.33	5	●	**DSAS0833X05S100**	43.2	61.5	63.5	114.5	113	1.5	10	2
8.40	3	●	**DSAS0840X03S100**	26.7	44.5	47.5	97.5	96	1.5	10	2
8.40	5	●	**DSAS0840X05S100**	43.5	61.5	63.5	114.5	113	1.5	10	2
8.50	3	●	**DSAS0850X03S100**	27.0	44.5	47.5	97.5	96	1.5	10	2
8.50	5	●	**DSAS0850X05S100**	44.0	61.5	63.5	114.5	113	1.5	10	2
8.60	3	●	**DSAS0860X03S100**	27.4	46.6	48.6	102.6	101	1.6	10	2
8.60	5	●	**DSAS0860X05S100**	44.6	64.6	66.6	117.6	116	1.6	10	2
8.70	3	●	**DSAS0870X03S100**	27.7	46.6	48.6	102.6	101	1.6	10	2
8.70	5	●	**DSAS0870X05S100**	45.1	64.6	66.6	117.6	116	1.6	10	2
8.73	3	●	**DSAS0873X03S100**	27.8	46.6	48.6	102.6	101	1.6	10	2
8.73	5	●	**DSAS0873X05S100**	45.3	64.6	66.6	117.6	116	1.6	10	2
8.80	3	●	**DSAS0880X03S100**	28.0	46.6	48.6	102.6	101	1.6	10	2
8.80	5	●	**DSAS0880X05S100**	45.6	64.6	66.6	117.6	116	1.6	10	2
8.90	3	●	**DSAS0890X03S100**	28.3	46.6	48.6	102.6	101	1.6	10	2
8.90	5	●	**DSAS0890X05S100**	46.1	64.6	66.6	117.6	116	1.6	10	2

● : Inventory maintained.

DC (mm)	Hole Depth (L/D)	DP9020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
9.00	3	●	**DSAS0900X03S100**	28.6	46.6	48.6	102.6	101	1.6	10	2
9.00	5	●	**DSAS0900X05S100**	46.6	64.6	66.6	117.6	116	1.6	10	2
9.10	3	●	**DSAS0910X03S100**	29.1	49.8	50.8	102.8	101	1.8	10	2
9.10	5	●	**DSAS0910X05S100**	47.3	68.8	71.8	122.8	121	1.8	10	2
9.20	3	●	**DSAS0920X03S100**	29.4	49.8	50.8	102.8	101	1.8	10	2
9.20	5	●	**DSAS0920X05S100**	47.8	68.8	71.8	122.8	121	1.8	10	2
9.30	3	●	**DSAS0930X03S100**	29.7	49.8	50.8	102.8	101	1.8	10	2
9.30	5	●	**DSAS0930X05S100**	48.3	68.8	71.8	122.8	121	1.8	10	2
9.40	3	●	**DSAS0940X03S100**	30.0	49.8	50.8	102.8	101	1.8	10	2
9.40	5	●	**DSAS0940X05S100**	48.8	68.8	71.8	122.8	121	1.8	10	2
9.50	3	●	**DSAS0950X03S100**	30.3	49.8	50.8	102.8	101	1.8	10	2
9.50	5	●	**DSAS0950X05S100**	49.3	68.8	71.8	122.8	121	1.8	10	2
9.53	3	●	**DSAS0953X03S100**	30.4	49.8	50.8	102.8	101	1.8	10	2
9.53	5	●	**DSAS0953X05S100**	49.4	68.8	71.8	122.8	121	1.8	10	2
9.60	3	●	**DSAS0960X03S100**	30.6	49.8	50.8	102.8	101	1.8	10	2
9.60	5	●	**DSAS0960X05S100**	49.8	68.8	71.8	122.8	121	1.8	10	2
9.70	3	●	**DSAS0970X03S100**	30.9	49.8	50.8	102.8	101	1.8	10	2
9.70	5	●	**DSAS0970X05S100**	50.3	68.8	71.8	122.8	121	1.8	10	2
9.80	3	●	**DSAS0980X03S100**	31.2	51.8	51.8	102.8	101	1.8	10	2
9.80	5	●	**DSAS0980X05S100**	50.8	71.8	71.8	122.8	121	1.8	10	2
9.90	3	●	**DSAS0990X03S100**	31.5	51.9	51.8	102.8	101	1.8	10	2
9.90	5	●	**DSAS0990X05S100**	51.3	71.8	71.8	122.8	121	1.8	10	2
9.92	3	●	**DSAS0992X03S100**	31.6	51.8	51.8	102.8	101	1.8	10	2
9.92	5	●	**DSAS0992X05S100**	51.4	71.8	71.8	122.8	121	1.8	10	2
10.00	3	●	**DSAS1000X03S100**	31.8	51.8	51.8	102.8	101	1.8	10	2
10.00	5	●	**DSAS1000X05S100**	51.8	71.8	71.8	122.8	121	1.8	10	2
10.10	3	●	**DSAS1010X03S120**	32.2	54.9	57.9	112.9	111	1.9	12	2
10.10	5	●	**DSAS1010X05S120**	52.4	75.9	79.9	135.9	134	1.9	12	2
10.20	3	●	**DSAS1020X03S120**	32.5	54.9	57.9	112.9	111	1.9	12	2
10.20	5	●	**DSAS1020X05S120**	52.9	75.9	79.9	135.9	134	1.9	12	2
10.30	3	●	**DSAS1030X03S120**	32.8	54.9	57.9	112.9	111	1.9	12	2
10.30	5	●	**DSAS1030X05S120**	53.4	75.9	79.9	135.9	134	1.9	12	2
10.32	3	●	**DSAS1032X03S120**	32.9	54.9	57.9	112.9	111	1.9	12	2
10.32	5	●	**DSAS1032X05S120**	53.5	75.9	79.9	135.9	134	1.9	12	2
10.40	3	●	**DSAS1040X03S120**	33.1	54.9	57.9	112.9	111	1.9	12	2
10.40	5	●	**DSAS1040X05S120**	53.9	75.9	79.9	135.9	134	1.9	12	2
10.50	3	●	**DSAS1050X03S120**	33.4	54.9	57.9	112.9	111	1.9	12	2
10.50	5	●	**DSAS1050X05S120**	54.4	75.9	79.9	135.9	134	1.9	12	2
10.60	3	●	**DSAS1060X03S120**	33.7	54.9	57.9	112.9	111	1.9	12	2
10.60	5	●	**DSAS1060X05S120**	54.9	75.9	79.9	135.9	134	1.9	12	2
10.70	3	●	**DSAS1070X03S120**	34.0	54.9	57.9	112.9	111	1.9	12	2
10.70	5	●	**DSAS1070X05S120**	55.4	75.9	79.9	135.9	134	1.9	12	2
10.72	3	●	**DSAS1072X03S120**	34.1	57.0	59.0	118.0	116	2.0	12	2
10.72	5	●	**DSAS1072X05S120**	55.6	79.0	80.0	142.0	140	2.0	12	2
10.80	3	●	**DSAS1080X03S120**	34.4	57.0	59.0	118.0	116	2.0	12	2
10.80	5	●	**DSAS1080X05S120**	56.0	79.0	80.0	142.0	140	2.0	12	2
10.90	3	●	**DSAS1090X03S120**	34.7	57.0	59.0	118.0	116	2.0	12	2
10.90	5	●	**DSAS1090X05S120**	56.5	79.0	80.0	142.0	140	2.0	12	2
11.00	3	●	**DSAS1100X03S120**	35.0	57.0	59.0	118.0	116	2.0	12	2
11.00	5	●	**DSAS1100X05S120**	57.0	79.0	80.0	142.0	140	2.0	12	2
11.10	3	●	**DSAS1110X03S120**	35.4	60.1	61.1	118.1	116	2.1	12	2
11.10	5	●	**DSAS1110X05S120**	57.6	83.1	86.1	142.1	140	2.1	12	2
11.11	3	●	**DSAS1111X03S120**	35.4	60.1	61.1	118.1	116	2.1	12	2
11.11	5	●	**DSAS1111X05S120**	57.7	83.1	86.1	142.1	140	2.1	12	2
11.20	3	●	**DSAS1120X03S120**	35.7	60.1	61.1	118.1	116	2.1	12	2
11.20	5	●	**DSAS1120X05S120**	58.1	83.1	86.1	142.1	140	2.1	12	2
11.30	3	●	**DSAS1130X03S120**	36.0	60.1	61.1	118.1	116	2.1	12	2
11.30	5	●	**DSAS1130X05S120**	58.6	83.1	86.1	142.1	140	2.1	12	2

CUTTING CONDITIONS ➤ M097
TECHNICAL DATA ➤ P001

DSAS

DC (mm)	Hole Depth (L/D)	DP9020	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
11.40	3	●	**DSAS1140X03S120**	36.3	60.1	61.1	118.1	116	2.1	12	2
11.40	5	●	**DSAS1140X05S120**	59.1	83.1	86.1	142.1	140	2.1	12	2
11.50	3	●	**DSAS1150X03S120**	36.6	60.1	61.1	118.1	116	2.1	12	2
11.50	5	●	**DSAS1150X05S120**	59.6	83.1	86.1	142.1	140	2.1	12	2
11.51	3	●	**DSAS1151X03S120**	36.7	62.2	62.2	118.2	116	2.2	12	2
11.51	5	●	**DSAS1151X05S120**	59.7	86.2	86.2	142.2	140	2.2	12	2
11.60	3	●	**DSAS1160X03S120**	37.0	62.2	62.2	118.2	116	2.2	12	2
11.60	5	●	**DSAS1160X05S120**	60.2	86.2	86.2	142.2	140	2.2	12	2
11.70	3	●	**DSAS1170X03S120**	37.3	62.2	62.2	118.2	116	2.2	12	2
11.70	5	●	**DSAS1170X05S120**	60.7	86.2	86.2	142.2	140	2.2	12	2
11.80	3	●	**DSAS1180X03S120**	37.6	62.2	62.2	118.2	116	2.2	12	2
11.80	5	●	**DSAS1180X05S120**	61.2	86.2	86.2	142.2	140	2.2	12	2
11.90	3	●	**DSAS1190X03S120**	37.9	62.2	62.2	118.2	116	2.2	12	2
11.90	5	●	**DSAS1190X05S120**	61.7	86.2	86.2	142.2	140	2.2	12	2
12.00	3	●	**DSAS1200X03S120**	38.2	62.2	62.2	118.2	116	2.2	12	2
12.00	5	●	**DSAS1200X05S120**	62.2	86.2	86.2	142.2	140	2.2	12	2

● : Inventory maintained.

RECOMMENDED CUTTING CONDITIONS

Material		S			
		Heat Resistant Alloy Inconel®718 etc.		Titanium Alloy Ti-6Al-4V etc.	
Drill Dia. **DC** (mm)	**L/D**	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)
3	**≤ 5**	1000	0.06 (0.04—0.10)	4200	0.08 (0.06—0.12)
4	**≤ 5**	790	0.06 (0.04—0.10)	3100	0.10 (0.08—0.16)
5	**≤ 5**	760	0.08 (0.06—0.12)	2500	0.12 (0.08—0.20)
6	**≤ 5**	790	0.10 (0.08—0.15)	2100	0.14 (0.10—0.20)
8	**≤ 5**	590	0.10 (0.08—0.15)	1600	0.18 (0.15—0.25)
10	**≤ 5**	570	0.10 (0.08—0.15)	1300	0.22 (0.18—0.28)
12	**≤ 5**	530	0.12 (0.08—0.15)	1100	0.24 (0.20—0.30)

Note 1) High pressure through spindle coolant is recommended for stable drilling.
Note 2) Emulsion type water-soluble coolant is recommended.
Note 3) When using non water-soluble coolant reduce the cutting speed by 10-20%.
Note 4) When drilling using an external coolant system, peck / step feed drilling is recommended at every DC x 0.5 to promote the breaking of chips.

MNS

P M K **N** S H

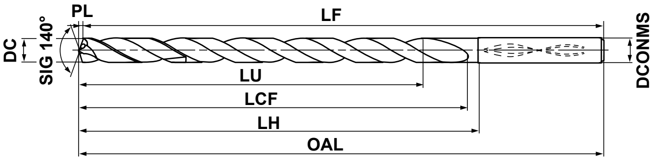
Internal Coolant

	DC=3	3<DC≦6	6<DC≦10	10<DC≦18	18<DC≦20
DIN type	+0.016 +0.004	+0.016 +0.004	+0.021 +0.006	+0.025 +0.007	+0.029 +0.008
Others	0 −0.014	0 −0.018	0 −0.022	0 −0.027	
h6	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

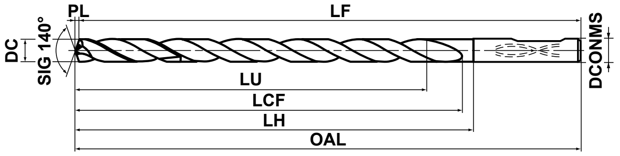
●4.5mm or smaller diameter drills are designed with 2 coolant holes.

●4.6mm or bigger diameter drills are designed with 4 coolant holes.

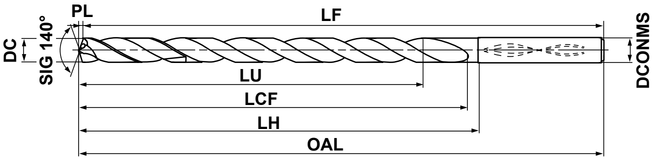
●**Type 1** **MNS----DIN-C, MNS-C, MNS----LB, MNS----DB** (Cylindrical shank type)



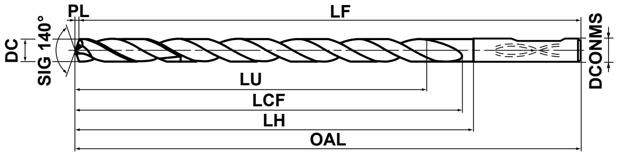
●**Type 2** **MNS----S/L-DIN** (Whistle notch shank type)



●**Type 3** **MNS----DIN-C, MNS-C, MNS----LB, MNS----DB** (Cylindrical shank type)



●**Type 4** **MNS----S/L-DIN** (Whistle notch shank type)



● MNS drills are suitable for use with shrink fit holders.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.0	3	☐	**MNS0300S-DIN**	15.0	19.5	24.5	61.5	61	0.5	6	2
	3	☐	**MNS0300S-DIN-C**	15.0	19.5	24.5	61.5	61	0.5	6	1
	5	☐	**MNS0300L-DIN**	23.0	27.5	28.5	65.5	65	0.5	6	2
	5	●	**MNS0300L-DIN-C**	23.0	27.5	28.5	65.5	65	0.5	6	1
	8	☐	**MNS0300-L8C**	24.5	33.5	36.5	73.5	73	0.5	6	1
	10	☐	**MNS0300-L10C**	30.5	39.5	42.5	79.5	79	0.5	6	1
	12	●	**MNS0300-L12C**	36.5	45.5	48.5	85.5	85	0.5	6	1
	15	☐	**MNS0300-L15C**	45.5	54.5	57.5	94.5	94	0.5	6	1
	20	●	**MNS0300-L20C**	60.5	69.5	72.5	109.5	109	0.5	6	1
	25	☐	**MNS0300-L25C**	75.5	84.5	87.5	124.5	124	0.5	6	1
	30	●	**MNS0300-L30C**	90.5	99.5	102.5	139.5	139	0.5	6	1
	5	★	**MNS0300LB**	15.5	33.5	33.5	81.5	81	0.5	3	1
	10	★	**MNS0300X10DB**	30.5	39.5	42.5	90.5	90	0.5	3	1
	20	★	**MNS0300X20DB**	60.5	69.5	72.5	120.5	120	0.5	3	1
	30	★	**MNS0300X30DB**	90.5	99.5	102.5	150.5	150	0.5	3	1
3.1	3	☐	**MNS0310S-DIN**	14.9	19.6	24.6	61.6	61	0.6	6	2
	3	☐	**MNS0310S-DIN-C**	14.9	19.6	24.6	61.6	61	0.6	6	1
	5	☐	**MNS0310L-DIN**	22.9	27.6	28.6	65.6	65	0.6	6	2
	5	☐	**MNS0310L-DIN-C**	22.9	27.6	28.6	65.6	65	0.6	6	1
	8	☐	**MNS0310-L8C**	25.4	39.6	42.6	79.6	79	0.6	6	1
	10	☐	**MNS0310-L10C**	31.6	46.6	49.6	86.6	86	0.6	6	1
	12	☐	**MNS0310-L12C**	37.8	53.6	56.6	93.6	93	0.6	6	1
	15	☐	**MNS0310-L15C**	47.1	63.6	66.6	103.6	103	0.6	6	1
	20	☐	**MNS0310-L20C**	62.6	81.6	84.6	121.6	121	0.6	6	1
	25	☐	**MNS0310-L25C**	78.1	98.6	101.6	138.6	138	0.6	6	1
	30	☐	**MNS0310-L30C**	93.6	116.6	119.6	156.6	156	0.6	6	1
	5	★	**MNS0310LB**	16.1	39.6	39.6	87.6	87	0.6	4	1
	10	☐	**MNS0310X10DB**	31.6	46.6	49.6	97.6	97	0.6	4	1
	20	☐	**MNS0310X20DB**	62.6	81.6	84.6	132.6	132	0.6	4	1
	30	☐	**MNS0310X30DB**	93.6	116.6	119.6	167.6	167	0.6	4	1
3.2	3	☐	**MNS0320S-DIN**	14.8	19.6	24.6	61.6	61	0.6	6	2
	3	☐	**MNS0320S-DIN-C**	14.8	19.6	24.6	61.6	61	0.6	6	1
	5	☐	**MNS0320L-DIN**	22.8	27.6	28.6	65.6	65	0.6	6	2
	5	●	**MNS0320L-DIN-C**	22.8	27.6	28.6	65.6	65	0.6	6	1
	8	☐	**MNS0320-L8C**	26.2	39.6	42.6	79.6	79	0.6	6	1
	10	☐	**MNS0320-L10C**	32.6	46.6	49.6	86.6	86	0.6	6	1
	12	●	**MNS0320-L12C**	39.0	53.6	56.6	93.6	93	0.6	6	1
	15	☐	**MNS0320-L15C**	48.6	63.6	66.6	103.6	103	0.6	6	1
	20	●	**MNS0320-L20C**	64.6	81.6	84.6	121.6	121	0.6	6	1
	25	☐	**MNS0320-L25C**	80.6	98.6	101.6	138.6	138	0.6	6	1
	30	●	**MNS0320-L30C**	96.6	116.6	119.6	156.6	156	0.6	6	1
	5	★	**MNS0320LB**	16.6	39.6	39.6	87.6	87	0.6	4	1
	10	★	**MNS0320X10DB**	32.6	46.6	49.6	97.6	97	0.6	4	1
	20	★	**MNS0320X20DB**	64.6	81.6	84.6	132.6	132	0.6	4	1
	30	★	**MNS0320X30DB**	96.6	116.6	119.6	167.6	167	0.6	4	1
3.3	3	☐	**MNS0330S-DIN**	14.7	19.6	24.6	61.6	61	0.6	6	2
	3	☐	**MNS0330S-DIN-C**	14.7	19.6	24.6	61.6	61	0.6	6	1
	5	☐	**MNS0330L-DIN**	22.7	27.6	28.6	65.6	65	0.6	6	2
	5	●	**MNS0330L-DIN-C**	22.7	27.6	28.6	65.6	65	0.6	6	1
	8	☐	**MNS0330-L8C**	27.0	39.6	42.6	79.6	79	0.6	6	1
	10	☐	**MNS0330-L10C**	33.6	46.6	49.6	86.6	86	0.6	6	1
	12	●	**MNS0330-L12C**	40.2	53.6	56.6	93.6	93	0.6	6	1
	15	☐	**MNS0330-L15C**	50.1	63.6	66.6	103.6	103	0.6	6	1
	20	●	**MNS0330-L20C**	66.6	81.6	84.6	121.6	121	0.6	6	1
	25	☐	**MNS0330-L25C**	83.1	98.6	101.6	138.6	138	0.6	6	1
	30	●	**MNS0330-L30C**	99.6	116.6	119.6	156.6	156	0.6	6	1
	5	★	**MNS0330LB**	17.1	39.6	39.6	87.6	87	0.6	4	1
	10	☐	**MNS0330X10DB**	33.6	46.6	49.6	97.6	97	0.6	4	1
	20	☐	**MNS0330X20DB**	66.6	81.6	84.6	132.6	132	0.6	4	1
	30	☐	**MNS0330X30DB**	99.6	116.6	119.6	167.6	167	0.6	4	1

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. **★ : Inventory maintained in Japan.**

☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.4	3	☐	MNS0340S-DIN	14.5	19.6	24.6	61.6	61	0.6	6	2
	3	☐	MNS0340S-DIN-C	14.5	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MNS0340L-DIN	22.5	27.6	28.6	65.6	65	0.6	6	2
	5	☐	MNS0340L-DIN-C	22.5	27.6	28.6	65.6	65	0.6	6	1
	8	☐	MNS0340-L8C	27.8	39.6	42.6	79.6	79	0.6	6	1
	10	☐	MNS0340-L10C	34.6	46.6	49.6	86.6	86	0.6	6	1
	12	☐	MNS0340-L12C	41.4	53.6	56.6	93.6	93	0.6	6	1
	15	☐	MNS0340-L15C	51.6	63.6	66.6	103.6	103	0.6	6	1
	20	☐	MNS0340-L20C	68.6	81.6	84.6	121.6	121	0.6	6	1
	25	☐	MNS0340-L25C	85.6	98.6	101.6	138.6	138	0.6	6	1
	30	☐	MNS0340-L30C	102.6	116.6	119.6	156.6	156	0.6	6	1
	5	★	MNS0340LB	17.6	39.6	39.6	87.6	87	0.6	4	1
	10	★	MNS0340X10DB	34.6	46.6	49.6	97.6	97	0.6	4	1
	20	★	MNS0340X20DB	68.6	81.6	84.6	132.6	132	0.6	4	1
	30	★	MNS0340X30DB	102.6	116.6	119.6	167.6	167	0.6	4	1
3.5	3	☐	MNS0350S-DIN	14.4	19.6	24.6	61.6	61	0.6	6	2
	3	☐	MNS0350S-DIN-C	14.4	19.6	24.6	61.6	61	0.6	6	1
	5	☐	MNS0350L-DIN	22.4	27.6	28.6	65.6	65	0.6	6	2
	5	●	MNS0350L-DIN-C	22.4	27.6	28.6	65.6	65	0.6	6	1
	8	☐	MNS0350-L8C	28.6	39.6	42.6	79.6	79	0.6	6	1
	10	☐	MNS0350-L10C	35.6	46.6	49.6	86.6	86	0.6	6	1
	12	●	MNS0350-L12C	42.6	53.6	56.6	93.6	93	0.6	6	1
	15	☐	MNS0350-L15C	53.1	63.6	66.6	103.6	103	0.6	6	1
	20	●	MNS0350-L20C	70.6	81.6	84.6	121.6	121	0.6	6	1
	25	☐	MNS0350-L25C	88.1	98.6	101.6	138.6	138	0.6	6	1
	30	●	MNS0350-L30C	105.6	116.6	119.6	156.6	156	0.6	6	1
	5	★	MNS0350LB	18.1	39.6	39.6	87.6	87	0.6	4	1
	10	☐	MNS0350X10DB	35.6	46.6	49.6	97.6	97	0.6	4	1
	20	☐	MNS0350X20DB	70.6	81.6	84.6	132.6	132	0.6	4	1
	30	☐	MNS0350X30DB	105.6	116.6	119.6	167.6	167	0.6	4	1
3.6	3	☐	MNS0360S-DIN	14.3	19.7	24.7	61.7	61	0.7	6	2
	3	☐	MNS0360S-DIN-C	14.3	19.7	24.7	61.7	61	0.7	6	1
	5	☐	MNS0360L-DIN	22.3	27.7	28.7	65.7	65	0.7	6	2
	5	☐	MNS0360L-DIN-C	22.3	27.7	28.7	65.7	65	0.7	6	1
	8	☐	MNS0360-L8C	29.5	44.7	47.7	84.7	84	0.7	6	1
	10	☐	MNS0360-L10C	36.7	52.7	55.7	92.7	92	0.7	6	1
	12	☐	MNS0360-L12C	43.9	60.7	63.7	100.7	100	0.7	6	1
	15	☐	MNS0360-L15C	54.7	72.7	75.7	112.7	112	0.7	6	1
	20	☐	MNS0360-L20C	72.7	92.7	95.7	132.7	132	0.7	6	1
	25	☐	MNS0360-L25C	90.7	112.7	115.7	152.7	152	0.7	6	1
	30	☐	MNS0360-L30C	108.7	132.7	135.7	172.7	172	0.7	6	1
	5	★	MNS0360LB	18.7	44.7	44.7	92.7	92	0.7	4	1
	10	★	MNS0360X10DB	36.7	52.7	55.7	103.7	103	0.7	4	1
	20	★	MNS0360X20DB	72.7	92.7	95.7	143.7	143	0.7	4	1
	30	★	MNS0360X30DB	108.7	132.7	135.7	183.7	183	0.7	4	1

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.7	3	☐	MNS0370S-DIN	14.1	19.7	24.7	61.7	61	0.7	6	2
	3	☐	MNS0370S-DIN-C	14.1	19.7	24.7	61.7	61	0.7	6	1
	5	☐	MNS0370L-DIN	22.1	27.7	28.7	65.7	65	0.7	6	2
	5	☐	MNS0370L-DIN-C	22.1	27.7	28.7	65.7	65	0.7	6	1
	8	☐	MNS0370-L8C	30.3	44.7	47.7	84.7	84	0.7	6	1
	10	☐	MNS0370-L10C	37.7	52.7	55.7	92.7	92	0.7	6	1
	12	☐	MNS0370-L12C	45.1	60.7	63.7	100.7	100	0.7	6	1
	15	☐	MNS0370-L15C	56.2	72.7	75.7	112.7	112	0.7	6	1
	20	☐	MNS0370-L20C	74.7	92.7	95.7	132.7	132	0.7	6	1
	25	☐	MNS0370-L25C	93.2	112.7	115.7	152.7	152	0.7	6	1
	30	☐	MNS0370-L30C	111.7	132.7	135.7	172.7	172	0.7	6	1
	5	★	MNS0370LB	19.2	44.7	44.7	92.7	92	0.7	4	1
	10	☐	MNS0370X10DB	37.7	52.7	55.7	103.7	103	0.7	4	1
	20	☐	MNS0370X20DB	74.7	92.7	95.7	143.7	143	0.7	4	1
	30	☐	MNS0370X30DB	111.7	132.7	135.7	183.7	183	0.7	4	1
3.8	3	☐	MNS0380S-DIN	18.0	23.7	28.7	65.7	65	0.7	6	2
	3	☐	MNS0380S-DIN-C	18.0	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MNS0380L-DIN	30.0	35.7	36.7	73.7	73	0.7	6	2
	5	☐	MNS0380L-DIN-C	30.0	35.7	36.7	73.7	73	0.7	6	1
	8	☐	MNS0380-L8C	31.1	44.7	47.7	84.7	84	0.7	6	1
	10	☐	MNS0380-L10C	38.7	52.7	55.7	92.7	92	0.7	6	1
	12	☐	MNS0380-L12C	46.3	60.7	63.7	100.7	100	0.7	6	1
	15	☐	MNS0380-L15C	57.7	72.7	75.7	112.7	112	0.7	6	1
	20	☐	MNS0380-L20C	76.7	92.7	95.7	132.7	132	0.7	6	1
	25	☐	MNS0380-L25C	95.7	112.7	115.7	152.7	152	0.7	6	1
	30	☐	MNS0380-L30C	114.7	132.7	135.7	172.7	172	0.7	6	1
	5	★	MNS0380LB	19.7	44.7	44.7	92.7	92	0.7	4	1
	10	☐	MNS0380X10DB	38.7	52.7	55.7	103.7	103	0.7	4	1
	20	☐	MNS0380X20DB	76.7	92.7	95.7	143.7	143	0.7	4	1
	30	☐	MNS0380X30DB	114.7	132.7	135.7	183.7	183	0.7	4	1
3.9	3	☐	MNS0390S-DIN	17.9	23.7	28.7	65.7	65	0.7	6	2
	3	☐	MNS0390S-DIN-C	17.9	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MNS0390L-DIN	29.9	35.7	36.7	73.7	73	0.7	6	2
	5	☐	MNS0390L-DIN-C	29.9	35.7	36.7	73.7	73	0.7	6	1
	8	☐	MNS0390-L8C	31.9	44.7	47.7	84.7	84	0.7	6	1
	10	☐	MNS0390-L10C	39.7	52.7	55.7	92.7	92	0.7	6	1
	12	☐	MNS0390-L12C	47.5	60.7	63.7	100.7	100	0.7	6	1
	15	☐	MNS0390-L15C	59.2	72.7	75.7	112.7	112	0.7	6	1
	20	☐	MNS0390-L20C	78.7	92.7	95.7	132.7	132	0.7	6	1
	25	☐	MNS0390-L25C	98.2	112.7	115.7	152.7	152	0.7	6	1
	30	☐	MNS0390-L30C	117.7	132.7	135.7	172.7	172	0.7	6	1
	5	★	MNS0390LB	20.2	44.7	44.7	92.7	92	0.7	4	1
	10	★	MNS0390X10DB	39.7	52.7	55.7	103.7	103	0.7	4	1
	20	★	MNS0390X20DB	78.7	92.7	95.7	143.7	143	0.7	4	1
	30	★	MNS0390X30DB	117.7	132.7	135.7	183.7	183	0.7	4	1

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.0	3	☐	MNS0400S-DIN	17.7	23.7	28.7	65.7	65	0.7	6	2
	3	☐	MNS0400S-DIN-C	17.7	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MNS0400L-DIN	29.7	35.7	36.7	73.7	73	0.7	6	2
	5	●	MNS0400L-DIN-C	29.7	35.7	36.7	73.7	73	0.7	6	1
	8	☐	MNS0400-L8C	32.7	44.7	47.7	84.7	84	0.7	6	1
	10	☐	MNS0400-L10C	40.7	52.7	55.7	92.7	92	0.7	6	1
	12	●	MNS0400-L12C	48.7	60.7	63.7	100.7	100	0.7	6	1
	15	☐	MNS0400-L15C	60.7	72.7	75.7	112.7	112	0.7	6	1
	20	●	MNS0400-L20C	80.7	92.7	95.7	132.7	132	0.7	6	1
	25	●	MNS0400-L25C	100.7	112.7	115.7	152.7	152	0.7	6	1
	30	●	MNS0400-L30C	120.7	132.7	135.7	172.7	172	0.7	6	1
	5	★	MNS0400LB	20.7	44.7	44.7	92.7	92	0.7	4	1
	10	★	MNS0400X10DB	40.7	52.7	55.7	103.7	103	0.7	4	1
	20	★	MNS0400X20DB	80.7	92.7	95.7	143.7	143	0.7	4	1
	30	★	MNS0400X30DB	120.7	132.7	135.7	183.7	183	0.7	4	1
4.1	3	☐	MNS0410S-DIN	17.6	23.7	28.7	65.7	65	0.7	6	2
	3	☐	MNS0410S-DIN-C	17.6	23.7	28.7	65.7	65	0.7	6	1
	5	☐	MNS0410L-DIN	29.6	35.7	36.7	73.7	73	0.7	6	2
	5	☐	MNS0410L-DIN-C	29.6	35.7	36.7	73.7	73	0.7	6	1
	8	☐	MNS0410-L8C	33.5	50.7	53.7	90.7	90	0.7	6	1
	10	☐	MNS0410-L10C	41.7	59.7	62.7	99.7	99	0.7	6	1
	12	☐	MNS0410-L12C	49.9	68.7	71.7	108.7	108	0.7	6	1
	15	☐	MNS0410-L15C	62.2	81.7	84.7	121.7	121	0.7	6	1
	20	☐	MNS0410-L20C	82.7	104.7	107.7	144.7	144	0.7	6	1
	25	☐	MNS0410-L25C	103.2	126.7	129.7	166.7	166	0.7	6	1
	30	☐	MNS0410-L30C	123.7	149.7	152.7	189.7	189	0.7	6	1
	5	★	MNS0410LB	21.2	50.7	50.7	100.7	100	0.7	5	1
	10	☐	MNS0410X10DB	41.7	59.7	62.7	112.7	112	0.7	5	1
	20	☐	MNS0410X20DB	82.7	104.7	107.7	157.7	157	0.7	5	1
	30	☐	MNS0410X30DB	123.7	149.7	152.7	202.7	202	0.7	5	1
4.2	3	☐	MNS0420S-DIN	17.5	23.8	28.8	65.8	65	0.8	6	2
	3	☐	MNS0420S-DIN-C	17.5	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MNS0420L-DIN	29.5	35.8	36.8	73.8	73	0.8	6	2
	5	●	MNS0420L-DIN-C	29.5	35.8	36.8	73.8	73	0.8	6	1
	8	☐	MNS0420-L8C	34.4	50.8	53.8	90.8	90	0.8	6	1
	10	☐	MNS0420-L10C	42.8	59.8	62.8	99.8	99	0.8	6	1
	12	●	MNS0420-L12C	51.2	68.8	71.8	108.8	108	0.8	6	1
	15	☐	MNS0420-L15C	63.8	81.8	84.8	121.8	121	0.8	6	1
	20	●	MNS0420-L20C	84.8	104.8	107.8	144.8	144	0.8	6	1
	25	☐	MNS0420-L25C	105.8	126.8	129.8	166.8	166	0.8	6	1
	30	●	MNS0420-L30C	126.8	149.8	152.8	189.8	189	0.8	6	1
	5	★	MNS0420LB	21.8	50.8	50.8	100.8	100	0.8	5	1
	10	☐	MNS0420X10DB	42.8	59.8	62.8	112.8	112	0.8	5	1
	20	☐	MNS0420X20DB	84.8	104.8	107.8	157.8	157	0.8	5	1
	30	☐	MNS0420X30DB	126.8	149.8	152.8	202.8	202	0.8	5	1

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.3	3	☐	MNS0430S-DIN	17.3	23.8	28.8	65.8	65	0.8	6	2
	3	☐	MNS0430S-DIN-C	17.3	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MNS0430L-DIN	29.3	35.8	36.8	73.8	73	0.8	6	2
	5	☐	MNS0430L-DIN-C	29.3	35.8	36.8	73.8	73	0.8	6	1
	8	☐	MNS0430-L8C	35.2	50.8	53.8	90.8	90	0.8	6	1
	10	☐	MNS0430-L10C	43.8	59.8	62.8	99.8	99	0.8	6	1
	12	☐	MNS0430-L12C	52.4	68.8	71.8	108.8	108	0.8	6	1
	15	☐	MNS0430-L15C	65.3	81.8	84.8	121.8	121	0.8	6	1
	20	☐	MNS0430-L20C	86.8	104.8	107.8	144.8	144	0.8	6	1
	25	☐	MNS0430-L25C	108.3	126.8	129.8	166.8	166	0.8	6	1
	30	☐	MNS0430-L30C	129.8	149.8	152.8	189.8	189	0.8	6	1
	5	★	MNS0430LB	22.3	50.8	50.8	100.8	100	0.8	5	1
	10	☐	MNS0430X10DB	43.8	59.8	62.8	112.8	112	0.8	5	1
	20	☐	MNS0430X20DB	86.8	104.8	107.8	157.8	157	0.8	5	1
	30	☐	MNS0430X30DB	129.8	149.8	152.8	202.8	202	0.8	5	1
4.4	3	☐	MNS0440S-DIN	17.2	23.8	28.8	65.8	65	0.8	6	2
	3	☐	MNS0440S-DIN-C	17.2	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MNS0440L-DIN	29.2	35.8	36.8	73.8	73	0.8	6	2
	5	☐	MNS0440L-DIN-C	29.2	35.8	36.8	73.8	73	0.8	6	1
	8	☐	MNS0440-L8C	36.0	50.8	53.8	90.8	90	0.8	6	1
	10	☐	MNS0440-L10C	44.8	59.8	62.8	99.8	99	0.8	6	1
	12	☐	MNS0440-L12C	53.6	68.8	71.8	108.8	108	0.8	6	1
	15	☐	MNS0440-L15C	66.8	81.8	84.8	121.8	121	0.8	6	1
	20	☐	MNS0440-L20C	88.8	104.8	107.8	144.8	144	0.8	6	1
	25	☐	MNS0440-L25C	110.8	126.8	129.8	166.8	166	0.8	6	1
	30	☐	MNS0440-L30C	132.8	149.8	152.8	189.8	189	0.8	6	1
	5	★	MNS0440LB	22.8	50.8	50.8	100.8	100	0.8	5	1
	10	☐	MNS0440X10DB	44.8	59.8	62.8	112.8	112	0.8	5	1
	20	☐	MNS0440X20DB	88.8	104.8	107.8	157.8	157	0.8	5	1
	30	☐	MNS0440X30DB	132.8	149.8	152.8	202.8	202	0.8	5	1
4.5	3	☐	MNS0450S-DIN	17.1	23.8	28.8	65.8	65	0.8	6	2
	3	☐	MNS0450S-DIN-C	17.1	23.8	28.8	65.8	65	0.8	6	1
	5	☐	MNS0450L-DIN	29.1	35.8	36.8	73.8	73	0.8	6	2
	5	●	MNS0450L-DIN-C	29.1	35.8	36.8	73.8	73	0.8	6	1
	8	☐	MNS0450-L8C	36.8	50.8	53.8	90.8	90	0.8	6	1
	10	☐	MNS0450-L10C	45.8	59.8	62.8	99.8	99	0.8	6	1
	12	●	MNS0450-L12C	54.8	68.8	71.8	108.8	108	0.8	6	1
	15	☐	MNS0450-L15C	68.3	81.8	84.8	121.8	121	0.8	6	1
	20	●	MNS0450-L20C	90.8	104.8	107.8	144.8	144	0.8	6	1
	25	☐	MNS0450-L25C	113.3	126.8	129.8	166.8	166	0.8	6	1
	30	●	MNS0450-L30C	135.8	149.8	152.8	189.8	189	0.8	6	1
	5	★	MNS0450LB	23.3	50.8	50.8	100.8	100	0.8	5	1
	10	☐	MNS0450X10DB	45.8	59.8	62.8	112.8	112	0.8	5	1
	20	☐	MNS0450X20DB	90.8	104.8	107.8	157.8	157	0.8	5	1
	30	☐	MNS0450X30DB	135.8	149.8	152.8	202.8	202	0.8	5	1

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.6	3	☐	**MNS0460S-DIN**	17.1	23.8	28.8	65.8	65	0.8	6	4
	3	☐	**MNS0460S-DIN-C**	16.9	23.8	28.8	65.8	65	0.8	6	3
	5	☐	**MNS0460L-DIN**	28.9	35.8	36.8	73.8	73	0.8	6	4
	5	☐	**MNS0460L-DIN-C**	28.9	35.8	36.8	73.8	73	0.8	6	3
	8	☐	**MNS0460-L8C**	37.6	55.8	58.8	95.8	95	0.8	6	3
	10	☐	**MNS0460-L10C**	46.8	65.8	68.8	105.8	105	0.8	6	3
	12	☐	**MNS0460-L12C**	56.0	75.8	78.8	115.8	115	0.8	6	3
	15	☐	**MNS0460-L15C**	69.8	90.8	93.8	130.8	130	0.8	6	3
	20	☐	**MNS0460-L20C**	92.8	115.8	118.8	155.8	155	0.8	6	3
	25	☐	**MNS0460-L25C**	115.8	140.8	143.8	180.8	180	0.8	6	3
	30	☐	**MNS0460-L30C**	138.8	165.8	168.8	205.8	205	0.8	6	3
	5	★	**MNS0460LB**	23.8	55.8	55.8	105.8	105	0.8	5	3
	10	☐	**MNS0460X10DB**	46.8	65.8	68.8	118.8	118	0.8	5	3
	20	☐	**MNS0460X20DB**	92.8	115.8	118.8	168.8	168	0.8	5	3
	30	☐	**MNS0460X30DB**	138.8	165.8	168.8	218.8	218	0.8	5	3
4.65	3	☐	**MNS0465S-DIN**	16.9	23.8	28.8	65.8	65	0.8	6	4
	3	☐	**MNS0465S-DIN-C**	16.9	23.8	28.8	65.8	65	0.8	6	3
	5	☐	**MNS0465L-DIN**	28.9	35.8	36.8	73.8	73	0.8	6	4
	5	●	**MNS0465L-DIN-C**	28.9	35.8	36.8	73.8	73	0.8	6	3
4.7	3	☐	**MNS0470S-DIN**	16.8	23.9	28.9	65.9	65	0.9	6	4
	3	☐	**MNS0470S-DIN-C**	16.8	23.9	28.9	65.9	65	0.9	6	3
	5	☐	**MNS0470L-DIN**	28.8	35.9	36.9	73.9	73	0.9	6	4
	5	☐	**MNS0470L-DIN-C**	28.8	35.9	36.9	73.9	73	0.9	6	3
	8	☐	**MNS0470-L8C**	38.5	55.9	58.9	95.9	95	0.9	6	3
	10	☐	**MNS0470-L10C**	47.9	65.9	68.9	105.9	105	0.9	6	3
	12	☐	**MNS0470-L12C**	57.3	75.9	78.9	115.9	115	0.9	6	3
	15	☐	**MNS0470-L15C**	71.4	90.9	93.9	130.9	130	0.9	6	3
	20	☐	**MNS0470-L20C**	94.9	115.9	118.9	155.9	155	0.9	6	3
	25	☐	**MNS0470-L25C**	118.4	140.9	143.9	180.9	180	0.9	6	3
	30	☐	**MNS0470-L30C**	141.9	165.9	168.9	205.9	205	0.9	6	3
	5	★	**MNS0470LB**	24.4	55.9	55.9	105.9	105	0.9	5	3
	10	☐	**MNS0470X10DB**	47.9	65.9	68.9	118.9	118	0.9	5	3
	20	☐	**MNS0470X20DB**	94.9	115.9	118.9	168.9	168	0.9	5	3
	30	☐	**MNS0470X30DB**	141.9	165.9	168.9	218.9	218	0.9	5	3
4.8	3	☐	**MNS0480S-DIN**	20.7	27.9	28.9	65.9	65	0.9	6	4
	3	☐	**MNS0480S-DIN-C**	20.7	27.9	28.9	65.9	65	0.9	6	3
	5	☐	**MNS0480L-DIN**	36.7	43.9	44.9	81.9	81	0.9	6	4
	5	☐	**MNS0480L-DIN-C**	36.7	43.9	44.9	81.9	81	0.9	6	3
	8	☐	**MNS0480-L8C**	39.3	55.9	58.9	95.9	95	0.9	6	3
	10	☐	**MNS0480-L10C**	48.9	65.9	68.9	105.9	105	0.9	6	3
	12	☐	**MNS0480-L12C**	58.5	75.9	78.9	115.9	115	0.9	6	3
	15	☐	**MNS0480-L15C**	72.9	90.9	93.9	130.9	130	0.9	6	3
	20	☐	**MNS0480-L20C**	96.9	115.9	118.9	155.9	155	0.9	6	3
	25	☐	**MNS0480-L25C**	120.9	140.9	143.9	180.9	180	0.9	6	3
	30	☐	**MNS0480-L30C**	144.9	165.9	168.9	205.9	205	0.9	6	3
	5	★	**MNS0480LB**	24.9	55.9	55.9	105.9	105	0.9	5	3
	10	☐	**MNS0480X10DB**	48.9	65.9	68.9	118.9	118	0.9	5	3
	20	☐	**MNS0480X20DB**	96.9	115.9	118.9	168.9	168	0.9	5	3
	30	☐	**MNS0480X30DB**	144.9	165.9	168.9	218.9	218	0.9	5	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.9	3	☐	**MNS0490S-DIN**	20.5	27.9	28.9	65.9	65	0.9	6	4
	3	☐	**MNS0490S-DIN-C**	20.5	27.9	28.9	65.9	65	0.9	6	3
	5	☐	**MNS0490L-DIN**	36.5	43.9	44.9	81.9	81	0.9	6	4
	5	☐	**MNS0490L-DIN-C**	36.5	43.9	44.9	81.9	81	0.9	6	3
	8	☐	**MNS0490-L8C**	40.1	55.9	58.9	95.9	95	0.9	6	3
	10	☐	**MNS0490-L10C**	49.9	65.9	68.9	105.9	105	0.9	6	3
	12	☐	**MNS0490-L12C**	59.7	75.9	78.9	115.9	115	0.9	6	3
	15	☐	**MNS0490-L15C**	74.4	90.9	93.9	130.9	130	0.9	6	3
	20	☐	**MNS0490-L20C**	98.9	115.9	118.9	155.9	155	0.9	6	3
	25	☐	**MNS0490-L25C**	123.4	140.9	143.9	180.9	180	0.9	6	3
	30	☐	**MNS0490-L30C**	147.9	165.9	168.9	205.9	205	0.9	6	3
	5	★	**MNS0490LB**	25.4	55.9	55.9	105.9	105	0.9	5	3
	10	★	**MNS0490X10DB**	49.9	65.9	68.9	118.9	118	0.9	5	3
	20	★	**MNS0490X20DB**	98.9	115.9	118.9	168.9	168	0.9	5	3
	30	★	**MNS0490X30DB**	147.9	165.9	168.9	218.9	218	0.9	5	3
5.0	3	☐	**MNS0500S-DIN**	20.4	27.9	28.9	65.9	65	0.9	6	4
	3	☐	**MNS0500S-DIN-C**	20.4	27.9	28.9	65.9	65	0.9	6	3
	5	☐	**MNS0500L-DIN**	36.4	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MNS0500L-DIN-C**	36.4	43.9	44.9	81.9	81	0.9	6	3
	8	☐	**MNS0500-L8C**	40.9	55.9	58.9	95.9	95	0.9	6	3
	10	☐	**MNS0500-L10C**	50.9	65.9	68.9	105.9	105	0.9	6	3
	12	●	**MNS0500-L12C**	60.9	75.9	78.9	115.9	115	0.9	6	3
	15	☐	**MNS0500-L15C**	75.9	90.9	93.9	130.9	130	0.9	6	3
	20	●	**MNS0500-L20C**	100.9	115.9	118.9	155.9	155	0.9	6	3
	25	☐	**MNS0500-L25C**	125.9	140.9	143.9	180.9	180	0.9	6	3
	30	●	**MNS0500-L30C**	150.9	165.9	168.9	205.9	205	0.9	6	3
	5	★	**MNS0500LB**	25.9	44.9	44.9	100.9	100	0.9	6	3
	10	★	**MNS0500X10DB**	50.9	65.9	68.9	118.9	118	0.9	5	3
	20	★	**MNS0500X20DB**	100.9	115.9	118.9	168.9	168	0.9	5	3
	30	★	**MNS0500X30DB**	150.9	165.9	168.9	218.9	218	0.9	5	3
5.1	3	☐	**MNS0510S-DIN**	20.3	27.9	28.9	65.9	65	0.9	6	4
	3	☐	**MNS0510S-DIN-C**	20.3	27.9	28.9	65.9	65	0.9	6	3
	5	☐	**MNS0510L-DIN**	36.3	43.9	44.9	81.9	81	0.9	6	4
	5	●	**MNS0510L-DIN-C**	36.3	43.9	44.9	81.9	81	0.9	6	3
	8	☐	**MNS0510-L8C**	41.7	61.9	64.9	101.9	101	0.9	6	3
	10	☐	**MNS0510-L10C**	51.9	72.9	75.9	112.9	112	0.9	6	3
	12	☐	**MNS0510-L12C**	62.1	83.9	86.9	123.9	123	0.9	6	3
	15	☐	**MNS0510-L15C**	77.4	99.9	102.9	139.9	139	0.9	6	3
	20	☐	**MNS0510-L20C**	102.9	127.9	130.9	167.9	167	0.9	6	3
	25	☐	**MNS0510-L25C**	128.4	154.9	157.9	194.9	194	0.9	6	3
	30	☐	**MNS0510-L30C**	153.9	182.9	185.9	222.9	222	0.9	6	3
	5	★	**MNS0510LB**	26.4	44.9	44.9	100.9	100	0.9	6	3
	10	★	**MNS0510X10DB**	51.9	72.9	75.9	127.9	127	0.9	6	3
	20	★	**MNS0510X20DB**	102.9	127.9	130.9	182.9	182	0.9	6	3
	30	★	**MNS0510X30DB**	153.9	182.9	185.9	237.9	237	0.9	6	3

CUTTING CONDITIONS ➤ **M118**
OPERATION GUIDANCE ➤ **M119**
TECHNICAL DATA ➤ **P001**

MNS

DC	Hole Depth	TF15	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
5.2	3	□	**MNS0520S-DIN**	20.1	27.9	28.9	65.9	65	0.9	6	4
	3	□	**MNS0520S-DIN-C**	20.1	27.9	28.9	65.9	65	0.9	6	3
	5	□	**MNS0520L-DIN**	36.1	43.9	44.9	81.9	81	0.9	6	4
	5	□	**MNS0520L-DIN-C**	36.1	43.9	44.9	81.9	81	0.9	6	3
	8	□	**MNS0520-L8C**	42.5	61.9	64.9	101.9	101	0.9	6	3
	10	□	**MNS0520-L10C**	52.9	72.9	75.9	112.9	112	0.9	6	3
	12	□	**MNS0520-L12C**	63.3	83.9	86.9	123.9	123	0.9	6	3
	15	□	**MNS0520-L15C**	78.9	99.9	102.9	139.9	139	0.9	6	3
	20	□	**MNS0520-L20C**	104.9	127.9	130.9	167.9	167	0.9	6	3
	25	□	**MNS0520-L25C**	130.9	154.9	157.9	194.9	194	0.9	6	3
	30	□	**MNS0520-L30C**	156.9	182.9	185.9	222.9	222	0.9	6	3
	5	★	**MNS0520LB**	26.9	44.9	44.9	100.9	100	0.9	6	3
	10	□	**MNS0520X10DB**	52.9	72.9	75.9	127.9	127	0.9	6	3
	20	□	**MNS0520X20DB**	104.9	127.9	130.9	182.9	182	0.9	6	3
	30	□	**MNS0520X30DB**	156.9	182.9	185.9	237.9	237	0.9	6	3
5.3	3	□	**MNS0530S-DIN**	20.0	28.0	29.0	66.0	65	1.0	6	4
	3	□	**MNS0530S-DIN-C**	20.0	28.0	29.0	66.0	65	1.0	6	3
	5	□	**MNS0530L-DIN**	36.0	44.0	45.0	82.0	81	1.0	6	4
	5	□	**MNS0530L-DIN-C**	36.0	44.0	45.0	82.0	81	1.0	6	3
	8	□	**MNS0530-L8C**	43.4	62.0	65.0	102.0	101	1.0	6	3
	10	□	**MNS0530-L10C**	54.0	73.0	76.0	113.0	112	1.0	6	3
	12	□	**MNS0530-L12C**	64.6	84.0	87.0	124.0	123	1.0	6	3
	15	□	**MNS0530-L15C**	80.5	100.0	103.0	140.0	139	1.0	6	3
	20	□	**MNS0530-L20C**	107.0	128.0	131.0	168.0	167	1.0	6	3
	25	□	**MNS0530-L25C**	133.5	155.0	158.0	195.0	194	1.0	6	3
	30	□	**MNS0530-L30C**	160.0	183.0	186.0	223.0	222	1.0	6	3
	5	★	**MNS0530LB**	27.5	45.0	45.0	101.0	100	1.0	6	3
	10	□	**MNS0530X10DB**	54.0	73.0	76.0	128.0	127	1.0	6	3
	20	□	**MNS0530X20DB**	107.0	128.0	131.0	183.0	182	1.0	6	3
	30	□	**MNS0530X30DB**	160.0	183.0	186.0	238.0	237	1.0	6	3
5.4	3	□	**MNS0540S-DIN**	19.9	28.0	29.0	66.0	65	1.0	6	4
	3	□	**MNS0540S-DIN-C**	19.9	28.0	29.0	66.0	65	1.0	6	3
	5	□	**MNS0540L-DIN**	35.9	44.0	45.0	82.0	81	1.0	6	4
	5	□	**MNS0540L-DIN-C**	35.9	44.0	45.0	82.0	81	1.0	6	3
	8	□	**MNS0540-L8C**	44.2	62.0	65.0	102.0	101	1.0	6	3
	10	□	**MNS0540-L10C**	55.0	73.0	76.0	113.0	112	1.0	6	3
	12	□	**MNS0540-L12C**	65.8	84.0	87.0	124.0	123	1.0	6	3
	15	□	**MNS0540-L15C**	82.0	100.0	103.0	140.0	139	1.0	6	3
	20	□	**MNS0540-L20C**	109.0	128.0	131.0	168.0	167	1.0	6	3
	25	□	**MNS0540-L25C**	136.0	155.0	158.0	195.0	194	1.0	6	3
	30	□	**MNS0540-L30C**	163.0	183.0	186.0	223.0	222	1.0	6	3
	5	★	**MNS0540LB**	28.0	45.0	45.0	101.0	100	1.0	6	3
	10	□	**MNS0540X10DB**	55.0	73.0	76.0	128.0	127	1.0	6	3
	20	□	**MNS0540X20DB**	109.0	128.0	131.0	183.0	182	1.0	6	3
	30	□	**MNS0540X30DB**	163.0	183.0	186.0	238.0	237	1.0	6	3
5.5	3	□	**MNS0550S-DIN**	19.8	28.0	29.0	66.0	65	1.0	6	4
	3	□	**MNS0550S-DIN-C**	19.8	28.0	29.0	66.0	65	1.0	6	3
	5	□	**MNS0550L-DIN**	35.8	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MNS0550L-DIN-C**	35.8	44.0	45.0	82.0	81	1.0	6	3
	8	□	**MNS0550-L8C**	45.0	62.0	65.0	102.0	101	1.0	6	3
	10	□	**MNS0550-L10C**	56.0	73.0	76.0	113.0	112	1.0	6	3
	12	●	**MNS0550-L12C**	67.0	84.0	87.0	124.0	123	1.0	6	3
	15	□	**MNS0550-L15C**	83.5	100.0	103.0	140.0	139	1.0	6	3
	20	●	**MNS0550-L20C**	111.0	128.0	131.0	168.0	167	1.0	6	3
	25	□	**MNS0550-L25C**	138.5	155.0	158.0	195.0	194	1.0	6	3
	30	●	**MNS0550-L30C**	166.0	183.0	186.0	223.0	222	1.0	6	3
	5	★	**MNS0550LB**	28.5	45.0	45.0	101.0	100	1.0	6	3
	10	★	**MNS0550X10DB**	56.0	73.0	76.0	128.0	127	1.0	6	3
	20	★	**MNS0550X20DB**	111.0	128.0	131.0	183.0	182	1.0	6	3
	30	★	**MNS0550X30DB**	166.0	183.0	186.0	238.0	237	1.0	6	3
5.55	3	□	**MNS0555S-DIN**	19.7	28.0	29.0	66.0	65	1.0	6	4
	3	□	**MNS0555S-DIN-C**	19.7	28.0	29.0	66.0	65	1.0	6	3
	5	□	**MNS0555L-DIN**	35.7	44.0	45.0	82.0	81	1.0	6	4
	5	●	**MNS0555L-DIN-C**	35.7	44.0	45.0	82.0	81	1.0	6	3
5.6	3	□	**MNS0560S-DIN**	19.6	28.0	29.0	66.0	65	1.0	6	4
	3	□	**MNS0560S-DIN-C**	19.6	28.0	29.0	66.0	65	1.0	6	3
	5	□	**MNS0560L-DIN**	35.6	44.0	45.0	82.0	81	1.0	6	4
	5	□	**MNS0560L-DIN-C**	35.6	44.0	45.0	82.0	81	1.0	6	3
	8	□	**MNS0560-L8C**	45.8	67.0	70.0	107.0	106	1.0	6	3
	10	□	**MNS0560-L10C**	57.0	79.0	82.0	119.0	118	1.0	6	3
	12	□	**MNS0560-L12C**	68.2	91.0	94.0	131.0	130	1.0	6	3
	15	□	**MNS0560-L15C**	85.0	109.0	112.0	149.0	148	1.0	6	3
	20	□	**MNS0560-L20C**	113.0	139.0	142.0	179.0	178	1.0	6	3
	25	□	**MNS0560-L25C**	141.0	169.0	172.0	209.0	208	1.0	6	3
	30	□	**MNS0560-L30C**	169.0	199.0	202.0	239.0	238	1.0	6	3
	5	★	**MNS0560LB**	29.0	49.0	49.0	101.0	100	1.0	6	3
	10	□	**MNS0560X10DB**	57.0	79.0	82.0	134.0	133	1.0	6	3
	20	□	**MNS0560X20DB**	113.0	139.0	142.0	194.0	193	1.0	6	3
	30	□	**MNS0560X30DB**	169.0	199.0	202.0	254.0	253	1.0	6	3
5.7	3	□	**MNS0570S-DIN**	19.5	28.0	29.0	66.0	65	1.0	6	4
	3	□	**MNS0570S-DIN-C**	19.5	28.0	29.0	66.0	65	1.0	6	3
	5	□	**MNS0570L-DIN**	35.5	44.0	45.0	82.0	81	1.0	6	4
	5	□	**MNS0570L-DIN-C**	35.5	44.0	45.0	82.0	81	1.0	6	3
	8	□	**MNS0570-L8C**	46.6	67.0	70.0	107.0	106	1.0	6	3
	10	□	**MNS0570-L10C**	58.0	79.0	82.0	119.0	118	1.0	6	3
	12	□	**MNS0570-L12C**	69.4	91.0	94.0	131.0	130	1.0	6	3
	15	□	**MNS0570-L15C**	86.5	109.0	112.0	149.0	148	1.0	6	3
	20	□	**MNS0570-L20C**	115.0	139.0	142.0	179.0	178	1.0	6	3
	25	□	**MNS0570-L25C**	143.5	169.0	172.0	209.0	208	1.0	6	3
	30	□	**MNS0570-L30C**	172.0	199.0	202.0	239.0	238	1.0	6	3
	5	★	**MNS0570LB**	29.5	49.0	49.0	101.0	100	1.0	6	3
	10	□	**MNS0570X10DB**	58.0	79.0	82.0	134.0	133	1.0	6	3
	20	□	**MNS0570X20DB**	115.0	139.0	142.0	194.0	193	1.0	6	3
	30	□	**MNS0570X30DB**	172.0	199.0	202.0	254.0	253	1.0	6	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm) LU	LCF	LH	OAL	LF	PL	DCONMS	Type
5.8	3	☐	MNS0580S-DIN	19.4	28.1	29.1	66.1	65	1.1	6	4
	3	☐	MNS0580S-DIN-C	19.4	28.1	29.1	66.1	65	1.1	6	3
	5	☐	MNS0580L-DIN	35.4	44.1	45.1	82.1	81	1.1	6	4
	5	☐	MNS0580L-DIN-C	35.4	44.1	45.1	82.1	81	1.1	6	3
	8	☐	MNS0580-L8C	47.5	67.1	70.1	107.1	106	1.1	6	3
	10	☐	MNS0580-L10C	59.1	79.1	82.1	119.1	118	1.1	6	3
	12	☐	MNS0580-L12C	70.7	91.1	94.1	131.1	130	1.1	6	3
	15	☐	MNS0580-L15C	88.1	109.1	112.1	149.1	148	1.1	6	3
	20	☐	MNS0580-L20C	117.1	139.1	142.1	179.1	178	1.1	6	3
	25	☐	MNS0580-L25C	146.1	169.1	172.1	209.1	208	1.1	6	3
	30	☐	MNS0580-L30C	175.1	199.1	202.1	239.1	238	1.1	6	3
	5	★	MNS0580LB	30.1	49.1	49.1	101.1	100	1.1	6	3
	10	☐	MNS0580X10DB	59.1	79.1	82.1	134.1	133	1.1	6	3
	20	☐	MNS0580X20DB	117.1	139.1	142.1	194.1	193	1.1	6	3
	30	☐	MNS0580X30DB	175.1	199.1	202.1	254.1	253	1.1	6	3
5.9	3	☐	MNS0590S-DIN	19.2	28.1	29.1	66.1	65	1.1	6	4
	3	☐	MNS0590S-DIN-C	19.2	28.1	29.1	66.1	65	1.1	6	3
	5	☐	MNS0590L-DIN	35.2	44.1	45.1	82.1	81	1.1	6	4
	5	☐	MNS0590L-DIN-C	35.2	44.1	45.1	82.1	81	1.1	6	3
	8	☐	MNS0590-L8C	48.3	67.1	70.1	107.1	106	1.1	6	3
	10	☐	MNS0590-L10C	60.1	79.1	82.1	119.1	118	1.1	6	3
	12	☐	MNS0590-L12C	71.9	91.1	94.1	131.1	130	1.1	6	3
	15	☐	MNS0590-L15C	89.6	109.1	112.1	149.1	148	1.1	6	3
	20	☐	MNS0590-L20C	119.1	139.1	142.1	179.1	178	1.1	6	3
	25	☐	MNS0590-L25C	148.6	169.1	172.1	209.1	208	1.1	6	3
	30	☐	MNS0590-L30C	178.1	199.1	202.1	239.1	238	1.1	6	3
	5	★	MNS0590LB	30.6	49.1	49.1	101.1	100	1.1	6	3
	10	☐	MNS0590X10DB	60.1	79.1	82.1	134.1	133	1.1	6	3
	20	☐	MNS0590X20DB	119.1	139.1	142.1	194.1	193	1.1	6	3
	30	☐	MNS0590X30DB	178.1	199.1	202.1	254.1	253	1.1	6	3
6.0	3	☐	MNS0600S-DIN	19.1	28.1	29.1	66.1	65	1.1	6	4
	3	☐	MNS0600S-DIN-C	19.1	28.1	29.1	66.1	65	1.1	6	3
	5	●	MNS0600L-DIN-C	35.1	44.1	45.1	82.1	81	1.1	6	3
	8	☐	MNS0600-L8C	49.1	67.1	70.1	107.1	106	1.1	6	3
	10	☐	MNS0600-L10C	61.1	79.1	82.1	119.1	118	1.1	6	3
	12	●	MNS0600-L12C	73.1	91.1	94.1	131.1	130	1.1	6	3
	15	☐	MNS0600-L15C	91.1	109.1	112.1	149.1	148	1.1	6	3
	20	●	MNS0600-L20C	121.1	139.1	142.1	179.1	178	1.1	6	3
	25	☐	MNS0600-L25C	151.1	169.1	172.1	209.1	208	1.1	6	3
	30	●	MNS0600-L30C	181.1	199.1	202.1	239.1	238	1.1	6	3
	5	★	MNS0600LB	31.1	49.1	49.1	101.1	100	1.1	6	3
	10	★	MNS0600X10DB	61.1	79.1	82.1	134.1	133	1.1	6	3
	20	★	MNS0600X20DB	121.1	139.1	142.1	194.1	193	1.1	6	3
	30	★	MNS0600X30DB	181.1	199.1	202.1	254.1	253	1.1	6	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm) LU	LCF	LH	OAL	LF	PL	DCONMS	Type
6.1	3	☐	MNS0610S-DIN	25.0	34.1	42.1	79.1	78	1.1	8	4
	3	☐	MNS0610S-DIN-C	25.0	34.1	42.1	79.1	78	1.1	8	3
	5	☐	MNS0610L-DIN	44.0	53.1	54.1	91.1	90	1.1	8	4
	5	☐	MNS0610L-DIN-C	44.0	53.1	54.1	91.1	90	1.1	8	3
	8	☐	MNS0610-L8C	49.9	73.1	76.1	113.1	112	1.1	8	3
	10	☐	MNS0610-L10C	62.1	86.1	89.1	126.1	125	1.1	8	3
	12	☐	MNS0610-L12C	74.3	99.1	102.1	139.1	138	1.1	8	3
	15	☐	MNS0610-L15C	92.6	118.1	121.1	158.1	157	1.1	8	3
	20	☐	MNS0610-L20C	123.1	151.1	154.1	191.1	190	1.1	8	3
	25	☐	MNS0610-L25C	153.6	183.1	186.1	223.1	222	1.1	8	3
	30	☐	MNS0610-L30C	184.1	216.1	219.1	256.1	255	1.1	8	3
	5	★	MNS0610LB	31.6	53.1	53.1	110.1	109	1.1	7	3
	10	★	MNS0610X10DB	62.1	86.1	89.1	142.1	141	1.1	7	3
	20	★	MNS0610X20DB	123.1	151.1	154.1	207.1	206	1.1	7	3
	30	★	MNS0610X30DB	184.1	216.1	219.1	272.1	271	1.1	7	3
6.2	3	☐	MNS0620S-DIN	24.8	34.1	42.1	79.1	78	1.1	8	4
	3	☐	MNS0620S-DIN-C	24.8	34.1	42.1	79.1	78	1.1	8	3
	5	☐	MNS0620L-DIN	43.8	53.1	54.1	91.1	90	1.1	8	4
	5	☐	MNS0620L-DIN-C	43.8	53.1	54.1	91.1	90	1.1	8	3
	8	☐	MNS0620-L8C	50.7	73.1	76.1	113.1	112	1.1	8	3
	10	☐	MNS0620-L10C	63.1	86.1	89.1	126.1	125	1.1	8	3
	12	☐	MNS0620-L12C	75.5	99.1	102.1	139.1	138	1.1	8	3
	15	☐	MNS0620-L15C	94.1	118.1	121.1	158.1	157	1.1	8	3
	20	☐	MNS0620-L20C	125.1	151.1	154.1	191.1	190	1.1	8	3
	25	☐	MNS0620-L25C	156.1	183.1	186.1	223.1	222	1.1	8	3
	30	☐	MNS0620-L30C	187.1	216.1	219.1	256.1	255	1.1	8	3
	5	★	MNS0620LB	32.1	53.1	53.1	110.1	109	1.1	7	3
	10	☐	MNS0620X10DB	63.1	86.1	89.1	142.1	141	1.1	7	3
	20	☐	MNS0620X20DB	125.1	151.1	154.1	207.1	206	1.1	7	3
	30	☐	MNS0620X30DB	187.1	216.1	219.1	272.1	271	1.1	7	3
6.3	3	☐	MNS0630S-DIN	24.7	34.1	42.1	79.1	78	1.1	8	4
	3	☐	MNS0630S-DIN-C	24.7	34.1	42.1	79.1	78	1.1	8	3
	5	☐	MNS0630L-DIN	43.7	53.1	54.1	91.1	90	1.1	8	4
	5	☐	MNS0630L-DIN-C	43.7	53.1	54.1	91.1	90	1.1	8	3
	8	☐	MNS0630-L8C	51.5	73.1	76.1	113.1	112	1.1	8	3
	10	☐	MNS0630-L10C	64.1	86.1	89.1	126.1	125	1.1	8	3
	12	☐	MNS0630-L12C	76.7	99.1	102.1	139.1	138	1.1	8	3
	15	☐	MNS0630-L15C	95.6	118.1	121.1	158.1	157	1.1	8	3
	20	☐	MNS0630-L20C	127.1	151.1	154.1	191.1	190	1.1	8	3
	25	☐	MNS0630-L25C	158.6	183.1	186.1	223.1	222	1.1	8	3
	30	☐	MNS0630-L30C	190.1	216.1	219.1	256.1	255	1.1	8	3
	5	★	MNS0630LB	32.6	53.1	53.1	110.1	109	1.1	7	3
	10	☐	MNS0630X10DB	64.1	86.1	89.1	142.1	141	1.1	7	3
	20	☐	MNS0630X20DB	127.1	151.1	154.1	207.1	206	1.1	7	3
	30	☐	MNS0630X30DB	190.1	216.1	219.1	272.1	271	1.1	7	3

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

DRILLING (SOLID CARBIDE)

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.4	3	☐	**MNS0640S-DIN**	24.6	34.2	42.2	79.2	78	1.2	8	4
	3	☐	**MNS0640S-DIN-C**	24.6	34.2	42.2	79.2	78	1.2	8	3
	5	☐	**MNS0640L-DIN**	43.6	53.2	54.2	91.2	90	1.2	8	4
	5	☐	**MNS0640L-DIN-C**	43.6	53.2	54.2	91.2	90	1.2	8	3
	8	☐	**MNS0640-L8C**	52.4	73.2	76.2	113.2	112	1.2	8	3
	10	☐	**MNS0640-L10C**	65.2	86.2	89.2	126.2	125	1.2	8	3
	12	☐	**MNS0640-L12C**	78.0	99.2	102.2	139.2	138	1.2	8	3
	15	☐	**MNS0640-L15C**	97.2	118.2	121.2	158.2	157	1.2	8	3
	20	☐	**MNS0640-L20C**	129.2	151.2	154.2	191.2	190	1.2	8	3
	25	☐	**MNS0640-L25C**	161.2	183.2	186.2	223.2	222	1.2	8	3
	30	☐	**MNS0640-L30C**	193.2	216.2	219.2	256.2	255	1.2	8	3
	5	★	**MNS0640LB**	33.2	53.2	53.2	110.2	109	1.2	7	3
	10	☐	**MNS0640X10DB**	65.2	86.2	89.2	142.2	141	1.2	7	3
	20	☐	**MNS0640X20DB**	129.2	151.2	154.2	207.2	206	1.2	7	3
	30	☐	**MNS0640X30DB**	193.2	216.2	219.2	272.2	271	1.2	7	3
6.5	3	☐	**MNS0650S-DIN**	24.4	34.2	42.2	79.2	78	1.2	8	4
	3	☐	**MNS0650S-DIN-C**	24.4	34.2	42.2	79.2	78	1.2	8	3
	5	☐	**MNS0650L-DIN**	43.4	53.2	54.2	91.2	90	1.2	8	4
	5	●	**MNS0650L-DIN-C**	43.4	53.2	54.2	91.2	90	1.2	8	3
	8	☐	**MNS0650-L8C**	53.2	73.2	76.2	113.2	112	1.2	8	3
	10	☐	**MNS0650-L10C**	66.2	86.2	89.2	126.2	125	1.2	8	3
	12	●	**MNS0650-L12C**	79.2	99.2	102.2	139.2	138	1.2	8	3
	15	☐	**MNS0650-L15C**	98.7	118.2	121.2	158.2	157	1.2	8	3
	20	●	**MNS0650-L20C**	131.2	151.2	154.2	191.2	190	1.2	8	3
	25	☐	**MNS0650-L25C**	163.7	183.2	186.2	223.2	222	1.2	8	3
	30	●	**MNS0650-L30C**	196.2	216.2	219.2	256.2	255	1.2	8	3
	5	★	**MNS0650LB**	33.7	53.2	53.2	110.2	109	1.2	7	3
	10	★	**MNS0650X10DB**	66.2	86.2	89.2	142.2	141	1.2	7	3
	20	★	**MNS0650X20DB**	131.2	151.2	154.2	207.2	206	1.2	7	3
	30	★	**MNS0650X30DB**	196.2	216.2	219.2	272.2	271	1.2	7	3
6.6	3	☐	**MNS0660S-DIN**	24.3	34.2	42.2	79.2	78	1.2	8	4
	3	☐	**MNS0660S-DIN-C**	24.3	34.2	42.2	79.2	78	1.2	8	3
	5	☐	**MNS0660L-DIN**	43.3	53.2	54.2	91.2	90	1.2	8	4
	5	☐	**MNS0660L-DIN-C**	43.3	53.2	54.2	91.2	90	1.2	8	3
	8	☐	**MNS0660-L8C**	54.0	78.2	81.2	118.2	117	1.2	8	3
	10	☐	**MNS0660-L10C**	67.2	92.2	95.2	132.2	131	1.2	8	3
	12	☐	**MNS0660-L12C**	80.4	106.2	109.2	146.2	145	1.2	8	3
	15	☐	**MNS0660-L15C**	100.2	127.2	130.2	167.2	166	1.2	8	3
	20	☐	**MNS0660-L20C**	133.2	162.2	165.2	202.2	201	1.2	8	3
	25	☐	**MNS0660-L25C**	166.2	197.2	200.2	237.2	236	1.2	8	3
	30	☐	**MNS0660-L30C**	199.2	232.2	235.2	272.2	271	1.2	8	3
	5	★	**MNS0660LB**	34.2	57.2	57.2	110.2	109	1.2	7	3
	10	☐	**MNS0660X10DB**	67.2	92.2	95.2	148.2	147	1.2	7	3
	20	☐	**MNS0660X20DB**	133.2	162.2	165.2	218.2	217	1.2	7	3
	30	☐	**MNS0660X30DB**	199.2	232.2	235.2	288.2	287	1.2	7	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
6.7	3	☐	**MNS0670S-DIN**	24.2	34.2	42.2	79.2	78	1.2	8	4
	3	☐	**MNS0670S-DIN-C**	24.2	34.2	42.2	79.2	78	1.2	8	3
	5	☐	**MNS0670L-DIN**	43.2	53.2	54.2	91.2	90	1.2	8	4
	5	☐	**MNS0670L-DIN-C**	43.2	53.2	54.2	91.2	90	1.2	8	3
	8	☐	**MNS0670-L8C**	54.8	78.2	81.2	118.2	117	1.2	8	3
	10	☐	**MNS0670-L10C**	68.2	92.2	95.2	132.2	131	1.2	8	3
	12	☐	**MNS0670-L12C**	81.6	106.2	109.2	146.2	145	1.2	8	3
	15	☐	**MNS0670-L15C**	101.7	127.2	130.2	167.2	166	1.2	8	3
	20	☐	**MNS0670-L20C**	135.2	162.2	165.2	202.2	201	1.2	8	3
	25	☐	**MNS0670-L25C**	168.7	197.2	200.2	237.2	236	1.2	8	3
	30	☐	**MNS0670-L30C**	202.2	232.2	235.2	272.2	271	1.2	8	3
	5	★	**MNS0670LB**	34.7	57.2	57.2	110.2	109	1.2	7	3
	10	★	**MNS0670X10DB**	68.2	92.2	95.2	148.2	147	1.2	7	3
	20	★	**MNS0670X20DB**	135.2	162.2	165.2	218.2	217	1.2	7	3
	30	★	**MNS0670X30DB**	202.2	232.2	235.2	288.2	287	1.2	7	3
6.8	3	☐	**MNS0680S-DIN**	24.0	34.2	42.2	79.2	78	1.2	8	4
	3	☐	**MNS0680S-DIN-C**	24.0	34.2	42.2	79.2	78	1.2	8	3
	5	☐	**MNS0680L-DIN**	43.0	53.2	54.2	91.2	90	1.2	8	4
	5	●	**MNS0680L-DIN-C**	43.0	53.2	54.2	91.2	90	1.2	8	3
	8	☐	**MNS0680-L8C**	55.6	78.2	81.2	118.2	117	1.2	8	3
	10	☐	**MNS0680-L10C**	69.2	92.2	95.2	132.2	131	1.2	8	3
	12	●	**MNS0680-L12C**	82.8	106.2	109.2	146.2	145	1.2	8	3
	15	☐	**MNS0680-L15C**	103.2	127.2	130.2	167.2	166	1.2	8	3
	20	●	**MNS0680-L20C**	137.2	162.2	165.2	202.2	201	1.2	8	3
	25	☐	**MNS0680-L25C**	171.2	197.2	200.2	237.2	236	1.2	8	3
	30	●	**MNS0680-L30C**	205.2	232.2	235.2	272.2	271	1.2	8	3
	5	★	**MNS0680LB**	35.2	57.2	57.2	110.2	109	1.2	7	3
	10	☐	**MNS0680X10DB**	69.2	92.2	95.2	148.2	147	1.2	7	3
	20	☐	**MNS0680X20DB**	137.2	162.2	165.2	218.2	217	1.2	7	3
	30	☐	**MNS0680X30DB**	205.2	232.2	235.2	288.2	287	1.2	7	3
6.9	3	☐	**MNS0690S-DIN**	23.9	34.3	42.3	79.3	78	1.3	8	4
	3	☐	**MNS0690S-DIN-C**	23.9	34.3	42.3	79.3	78	1.3	8	3
	5	☐	**MNS0690L-DIN**	42.9	53.3	54.3	91.3	90	1.3	8	4
	5	☐	**MNS0690L-DIN-C**	42.9	53.3	54.3	91.3	90	1.3	8	3
	8	☐	**MNS0690-L8C**	56.5	78.3	81.3	118.3	117	1.3	8	3
	10	☐	**MNS0690-L10C**	70.3	92.3	95.3	132.3	131	1.3	8	3
	12	☐	**MNS0690-L12C**	84.1	106.3	109.3	146.3	145	1.3	8	3
	15	☐	**MNS0690-L15C**	104.8	127.3	130.3	167.3	166	1.3	8	3
	20	☐	**MNS0690-L20C**	139.3	162.3	165.3	202.3	201	1.3	8	3
	25	☐	**MNS0690-L25C**	173.8	197.3	200.3	237.3	236	1.3	8	3
	30	☐	**MNS0690-L30C**	208.3	232.3	235.3	272.3	271	1.3	8	3
	5	★	**MNS0690LB**	35.8	57.3	57.3	110.3	109	1.3	7	3
	10	☐	**MNS0690X10DB**	70.3	92.3	95.3	148.3	147	1.3	7	3
	20	☐	**MNS0690X20DB**	139.3	162.3	165.3	218.3	217	1.3	7	3
	30	☐	**MNS0690X30DB**	208.3	232.3	235.3	288.3	287	1.3	7	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.0	3	☐	MNS0700S-DIN	23.8	34.3	42.3	79.3	78	1.3	8	4
	3	☐	MNS0700S-DIN-C	23.8	34.3	42.3	79.3	78	1.3	8	3
	5	☐	MNS0700L-DIN	42.8	53.3	54.3	91.3	90	1.3	8	4
	5	●	MNS0700L-DIN-C	42.8	53.3	54.3	91.3	90	1.3	8	3
	8	☐	MNS0700-L8C	57.3	78.3	81.3	118.3	117	1.3	8	3
	10	☐	MNS0700-L10C	71.3	92.3	95.3	132.3	131	1.3	8	3
	12	●	MNS0700-L12C	85.3	106.3	109.3	146.3	145	1.3	8	3
	15	☐	MNS0700-L15C	106.3	127.3	130.3	167.3	166	1.3	8	3
	20	●	MNS0700-L20C	141.3	162.3	165.3	202.3	201	1.3	8	3
	25	☐	MNS0700-L25C	176.3	197.3	200.3	237.3	236	1.3	8	3
	30	●	MNS0700-L30C	211.3	232.3	235.3	272.3	271	1.3	8	3
	5	★	MNS0700LB	36.3	57.3	57.3	110.3	109	1.3	7	3
	10	★	MNS0700X10DB	71.3	92.3	95.3	148.3	147	1.3	7	3
	20	★	MNS0700X20DB	141.3	162.3	165.3	218.3	217	1.3	7	3
	30	★	MNS0700X30DB	211.3	232.3	235.3	288.3	287	1.3	7	3
7.1	3	☐	MNS0710S-DIN	30.6	41.3	42.3	79.3	78	1.3	8	4
	3	☐	MNS0710S-DIN-C	30.6	41.3	42.3	79.3	78	1.3	8	3
	5	☐	MNS0710L-DIN	42.6	53.3	54.3	91.3	90	1.3	8	4
	5	☐	MNS0710L-DIN-C	42.6	53.3	54.3	91.3	90	1.3	8	3
	8	☐	MNS0710-L8C	58.1	84.3	87.3	124.3	123	1.3	8	3
	10	☐	MNS0710-L10C	72.3	99.3	102.3	139.3	138	1.3	8	3
	12	☐	MNS0710-L12C	86.5	114.3	117.3	154.3	153	1.3	8	3
	15	☐	MNS0710-L15C	107.8	136.3	139.3	176.3	175	1.3	8	3
	20	☐	MNS0710-L20C	143.3	174.3	177.3	214.3	213	1.3	8	3
	25	☐	MNS0710-L25C	178.8	211.3	214.3	251.3	250	1.3	8	3
	30	☐	MNS0710-L30C	214.3	249.3	252.3	289.3	288	1.3	8	3
	5	★	MNS0710LB	36.8	61.3	65.3	119.3	118	1.3	8	3
	10	☐	MNS0710X10DB	72.3	99.3	102.3	156.3	155	1.3	8	3
	20	☐	MNS0710X20DB	143.3	174.3	177.3	231.3	230	1.3	8	3
	30	☐	MNS0710X30DB	214.3	249.3	252.3	306.3	305	1.3	8	3
7.2	3	☐	MNS0720S-DIN	30.5	41.3	42.3	79.3	78	1.3	8	4
	3	☐	MNS0720S-DIN-C	30.5	41.3	42.3	79.3	78	1.3	8	3
	5	☐	MNS0720L-DIN	42.5	53.3	54.3	91.3	90	1.3	8	4
	5	☐	MNS0720L-DIN-C	42.5	53.3	54.3	91.3	90	1.3	8	3
	8	☐	MNS0720-L8C	58.9	84.3	87.3	124.3	123	1.3	8	3
	10	☐	MNS0720-L10C	73.3	99.3	102.3	139.3	138	1.3	8	3
	12	☐	MNS0720-L12C	87.7	114.3	117.3	154.3	153	1.3	8	3
	15	☐	MNS0720-L15C	109.3	136.3	139.3	176.3	175	1.3	8	3
	20	☐	MNS0720-L20C	145.3	174.3	177.3	214.3	213	1.3	8	3
	25	☐	MNS0720-L25C	181.3	211.3	214.3	251.3	250	1.3	8	3
	30	☐	MNS0720-L30C	217.3	249.3	252.3	289.3	288	1.3	8	3
	5	★	MNS0720LB	37.3	61.3	65.3	119.3	118	1.3	8	3
	10	★	MNS0720X10DB	73.3	99.3	102.3	156.3	155	1.3	8	3
	20	★	MNS0720X20DB	145.3	174.3	177.3	231.3	230	1.3	8	3
	30	★	MNS0720X30DB	217.3	249.3	252.3	306.3	305	1.3	8	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.3	3	☐	MNS0730S-DIN	30.4	41.3	42.3	79.3	78	1.3	8	4
	3	☐	MNS0730S-DIN-C	30.4	41.3	42.3	79.3	78	1.3	8	3
	5	☐	MNS0730L-DIN	42.4	53.3	54.3	91.3	90	1.3	8	4
	5	☐	MNS0730L-DIN-C	42.4	53.3	54.3	91.3	90	1.3	8	3
	8	☐	MNS0730-L8C	59.7	84.3	87.3	124.3	123	1.3	8	3
	10	☐	MNS0730-L10C	74.3	99.3	102.3	139.3	138	1.3	8	3
	12	☐	MNS0730-L12C	88.9	114.3	117.3	154.3	153	1.3	8	3
	15	☐	MNS0730-L15C	110.8	136.3	139.3	176.3	175	1.3	8	3
	20	☐	MNS0730-L20C	147.3	174.3	177.3	214.3	213	1.3	8	3
	25	☐	MNS0730-L25C	183.8	211.3	214.3	251.3	250	1.3	8	3
	30	☐	MNS0730-L30C	220.3	249.3	252.3	289.3	288	1.3	8	3
	5	★	MNS0730LB	37.8	61.3	65.3	119.3	118	1.3	8	3
	10	☐	MNS0730X10DB	74.3	99.3	102.3	156.3	155	1.3	8	3
	20	☐	MNS0730X20DB	147.3	174.3	177.3	231.3	230	1.3	8	3
	30	☐	MNS0730X30DB	220.3	249.3	252.3	306.3	305	1.3	8	3
7.4	3	☐	MNS0740S-DIN	30.2	41.3	42.3	79.3	78	1.3	8	4
	3	☐	MNS0740S-DIN-C	30.2	41.3	42.3	79.3	78	1.3	8	3
	5	☐	MNS0740L-DIN	42.2	53.3	54.3	91.3	90	1.3	8	4
	5	☐	MNS0740L-DIN-C	42.2	53.3	54.3	91.3	90	1.3	8	3
	8	☐	MNS0740-L8C	60.5	84.3	87.3	124.3	123	1.3	8	3
	10	☐	MNS0740-L10C	75.3	99.3	102.3	139.3	138	1.3	8	3
	12	☐	MNS0740-L12C	90.1	114.3	117.3	154.3	153	1.3	8	3
	15	☐	MNS0740-L15C	112.3	136.3	139.3	176.3	175	1.3	8	3
	20	☐	MNS0740-L20C	149.3	174.3	177.3	214.3	213	1.3	8	3
	25	☐	MNS0740-L25C	186.3	211.3	214.3	251.3	250	1.3	8	3
	30	☐	MNS0740-L30C	223.3	249.3	252.3	289.3	288	1.3	8	3
	5	★	MNS0740LB	38.3	61.3	65.3	119.3	118	1.3	8	3
	10	☐	MNS0740X10DB	75.3	99.3	102.3	156.3	155	1.3	8	3
	20	☐	MNS0740X20DB	149.3	174.3	177.3	231.3	230	1.3	8	3
	30	☐	MNS0740X30DB	223.3	249.3	252.3	306.3	305	1.3	8	3
7.5	3	☐	MNS0750S-DIN	30.1	41.4	42.4	79.4	78	1.4	8	4
	3	☐	MNS0750S-DIN-C	30.1	41.4	42.4	79.4	78	1.4	8	3
	5	☐	MNS0750L-DIN	42.1	53.4	54.4	91.4	90	1.4	8	4
	5	●	MNS0750L-DIN-C	42.1	53.4	54.4	91.4	90	1.4	8	3
	8	☐	MNS0750-L8C	61.4	84.4	87.4	124.4	123	1.4	8	3
	10	☐	MNS0750-L10C	76.4	99.4	102.4	139.4	138	1.4	8	3
	12	●	MNS0750-L12C	91.4	114.4	117.4	154.4	153	1.4	8	3
	15	☐	MNS0750-L15C	113.9	136.4	139.4	176.4	175	1.4	8	3
	20	●	MNS0750-L20C	151.4	174.4	177.4	214.4	213	1.4	8	3
	25	☐	MNS0750-L25C	188.9	211.4	214.4	251.4	250	1.4	8	3
	30	●	MNS0750-L30C	226.4	249.4	252.4	289.4	288	1.4	8	3
	5	★	MNS0750LB	38.9	61.4	65.4	119.4	118	1.4	8	3
	10	☐	MNS0750X10DB	76.4	99.4	102.4	156.4	155	1.4	8	3
	20	☐	MNS0750X20DB	151.4	174.4	177.4	231.4	230	1.4	8	3
	30	☐	MNS0750X30DB	226.4	249.4	252.4	306.4	305	1.4	8	3

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

DRILLING (SOLID CARBIDE)

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.6	3	□	**MNS0760S-DIN**	30.0	41.4	42.4	79.4	78	1.4	8	4
	3	□	**MNS0760S-DIN-C**	30.0	41.4	42.4	79.4	78	1.4	8	3
	5	□	**MNS0760L-DIN**	42.0	53.4	54.4	91.4	90	1.4	8	4
	5	□	**MNS0760L-DIN-C**	42.0	53.4	54.4	91.4	90	1.4	8	3
	8	□	**MNS0760-L8C**	62.2	89.4	92.4	129.4	128	1.4	8	3
	10	□	**MNS0760-L10C**	77.4	105.4	108.4	145.4	144	1.4	8	3
	12	□	**MNS0760-L12C**	92.6	121.4	124.4	161.4	160	1.4	8	3
	15	□	**MNS0760-L15C**	115.4	145.4	148.4	185.4	184	1.4	8	3
	20	□	**MNS0760-L20C**	153.4	185.4	188.4	225.4	224	1.4	8	3
	25	□	**MNS0760-L25C**	191.4	225.4	228.4	265.4	264	1.4	8	3
	30	□	**MNS0760-L30C**	229.4	265.4	268.4	305.4	304	1.4	8	3
	5	★	**MNS0760LB**	39.4	65.4	65.4	119.4	118	1.4	8	3
	10	□	**MNS0760X10DB**	77.4	105.4	108.4	162.4	161	1.4	8	3
	20	□	**MNS0760X20DB**	153.4	185.4	188.4	242.4	241	1.4	8	3
	30	□	**MNS0760X30DB**	229.4	265.4	268.4	322.4	321	1.4	8	3
7.7	3	□	**MNS0770S-DIN**	29.9	41.4	42.4	79.4	78	1.4	8	4
	3	□	**MNS0770S-DIN-C**	29.9	41.4	42.4	79.4	78	1.4	8	3
	5	□	**MNS0770L-DIN**	41.9	53.4	54.4	91.4	90	1.4	8	4
	5	□	**MNS0770L-DIN-C**	41.9	53.4	54.4	91.4	90	1.4	8	3
	8	□	**MNS0770-L8C**	63.0	89.4	92.4	129.4	128	1.4	8	3
	10	□	**MNS0770-L10C**	78.4	105.4	108.4	145.4	144	1.4	8	3
	12	□	**MNS0770-L12C**	93.8	121.4	124.4	161.4	160	1.4	8	3
	15	□	**MNS0770-L15C**	116.9	145.4	148.4	185.4	184	1.4	8	3
	20	□	**MNS0770-L20C**	155.4	185.4	188.4	225.4	224	1.4	8	3
	25	□	**MNS0770-L25C**	193.9	225.4	228.4	265.4	264	1.4	8	3
	30	□	**MNS0770-L30C**	232.4	265.4	268.4	305.4	304	1.4	8	3
	5	★	**MNS0770LB**	39.9	65.4	65.4	119.4	118	1.4	8	3
	10	□	**MNS0770X10DB**	78.4	105.4	108.4	162.4	161	1.4	8	3
	20	□	**MNS0770X20DB**	155.4	185.4	188.4	242.4	241	1.4	8	3
	30	□	**MNS0770X30DB**	232.4	265.4	268.4	322.4	321	1.4	8	3
7.8	3	□	**MNS0780S-DIN**	29.7	41.4	42.4	79.4	78	1.4	8	4
	3	□	**MNS0780S-DIN-C**	29.7	41.4	42.4	79.4	78	1.4	8	3
	5	□	**MNS0780L-DIN**	41.7	53.4	54.4	91.4	90	1.4	8	4
	5	□	**MNS0780L-DIN-C**	41.7	53.4	54.4	91.4	90	1.4	8	3
	8	□	**MNS0780-L8C**	63.8	89.4	92.4	129.4	128	1.4	8	3
	10	□	**MNS0780-L10C**	79.4	105.4	108.4	145.4	144	1.4	8	3
	12	□	**MNS0780-L12C**	95.0	121.4	124.4	161.4	160	1.4	8	3
	15	□	**MNS0780-L15C**	118.4	145.4	148.4	185.4	184	1.4	8	3
	20	□	**MNS0780-L20C**	157.4	185.4	188.4	225.4	224	1.4	8	3
	25	□	**MNS0780-L25C**	196.4	225.4	228.4	265.4	264	1.4	8	3
	30	□	**MNS0780-L30C**	235.4	265.4	268.4	305.4	304	1.4	8	3
	5	★	**MNS0780LB**	40.4	65.4	65.4	119.4	118	1.4	8	3
	10	★	**MNS0780X10DB**	79.4	105.4	108.4	162.4	161	1.4	8	3
	20	★	**MNS0780X20DB**	157.4	185.4	188.4	242.4	241	1.4	8	3
	30	★	**MNS0780X30DB**	235.4	265.4	268.4	322.4	321	1.4	8	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.9	3	□	**MNS0790S-DIN**	29.6	41.4	42.4	79.4	78	1.4	8	4
	3	□	**MNS0790S-DIN-C**	29.6	41.4	42.4	79.4	78	1.4	8	3
	5	□	**MNS0790L-DIN**	41.6	53.4	54.4	91.4	90	1.4	8	4
	5	□	**MNS0790L-DIN-C**	41.6	53.4	54.4	91.4	90	1.4	8	3
	8	□	**MNS0790-L8C**	64.6	89.4	92.4	129.4	128	1.4	8	3
	10	□	**MNS0790-L10C**	80.4	105.4	108.4	145.4	144	1.4	8	3
	12	□	**MNS0790-L12C**	96.2	121.4	124.4	161.4	160	1.4	8	3
	15	□	**MNS0790-L15C**	119.9	145.4	148.4	185.4	184	1.4	8	3
	20	□	**MNS0790-L20C**	159.4	185.4	188.4	225.4	224	1.4	8	3
	25	□	**MNS0790-L25C**	198.9	225.4	228.4	265.4	264	1.4	8	3
	30	□	**MNS0790-L30C**	238.4	265.4	268.4	305.4	304	1.4	8	3
	5	★	**MNS0790LB**	40.9	65.4	65.4	119.4	118	1.4	8	3
	10	□	**MNS0790X10DB**	80.4	105.4	108.4	162.4	161	1.4	8	3
	20	□	**MNS0790X20DB**	159.4	185.4	188.4	242.4	241	1.4	8	3
	30	□	**MNS0790X30DB**	238.4	265.4	268.4	322.4	321	1.4	8	3
8.0	3	□	**MNS0800S-DIN**	29.5	41.5	42.5	79.5	78	1.5	8	4
	3	□	**MNS0800S-DIN-C**	29.5	41.5	42.5	79.5	78	1.5	8	3
	5	□	**MNS0800L-DIN**	41.5	53.5	54.5	91.5	90	1.5	8	4
	5	●	**MNS0800L-DIN-C**	41.5	53.5	54.5	91.5	90	1.5	8	3
	8	□	**MNS0800-L8C**	65.5	89.5	92.5	129.5	128	1.5	8	3
	10	□	**MNS0800-L10C**	81.5	105.5	108.5	145.5	144	1.5	8	3
	12	●	**MNS0800-L12C**	97.5	121.5	124.5	161.5	160	1.5	8	3
	15	□	**MNS0800-L15C**	121.5	145.5	148.5	185.5	184	1.5	8	3
	20	●	**MNS0800-L20C**	161.5	185.5	188.5	225.5	224	1.5	8	3
	25	□	**MNS0800-L25C**	201.5	225.5	228.5	265.5	264	1.5	8	3
	30	●	**MNS0800-L30C**	241.5	265.5	268.5	305.5	304	1.5	8	3
	5	★	**MNS0800LB**	41.5	65.5	65.5	119.5	118	1.5	8	3
	10	★	**MNS0800X10DB**	81.5	105.5	108.5	162.5	161	1.5	8	3
	20	★	**MNS0800X20DB**	161.5	185.5	188.5	242.5	241	1.5	8	3
	30	★	**MNS0800X30DB**	241.5	265.5	268.5	322.5	321	1.5	8	3
8.1	3	□	**MNS0810S-DIN**	34.3	46.5	47.5	88.5	87	1.5	10	4
	3	□	**MNS0810S-DIN-C**	34.3	46.5	47.5	88.5	87	1.5	10	3
	5	□	**MNS0810L-DIN**	48.3	60.5	61.5	102.5	101	1.5	10	4
	5	□	**MNS0810L-DIN-C**	48.3	60.5	61.5	102.5	101	1.5	10	3
	8	□	**MNS0810-L8C**	66.3	95.5	98.5	139.5	138	1.5	10	3
	10	□	**MNS0810-L10C**	82.5	112.5	115.5	156.5	155	1.5	10	3
	12	□	**MNS0810-L12C**	98.7	129.5	132.5	173.5	172	1.5	10	3
	15	□	**MNS0810-L15C**	123.0	154.5	157.5	198.5	197	1.5	10	3
	20	□	**MNS0810-L20C**	163.5	197.5	200.5	241.5	240	1.5	10	3
	25	□	**MNS0810-L25C**	204.0	239.5	242.5	283.5	282	1.5	10	3
	30	□	**MNS0810-L30C**	244.5	281.5	284.5	325.5	324	1.5	10	3
	5	★	**MNS0810LB**	42.0	69.5	73.5	128.5	127	1.5	9	3
	10	□	**MNS0810X10DB**	82.5	112.5	115.5	170.5	169	1.5	9	3
	20	□	**MNS0810X20DB**	163.5	197.5	200.5	255.5	254	1.5	9	3
	30	□	**MNS0810X30DB**	244.5	282.5	285.5	340.5	339	1.5	9	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.2	3	☐	MNS0820S-DIN	34.2	46.5	47.5	88.5	87	1.5	10	4
	3	☐	MNS0820S-DIN-C	34.2	46.5	47.5	88.5	87	1.5	10	3
	5	☐	MNS0820L-DIN	48.2	60.5	61.5	102.5	101	1.5	10	4
	5	☐	MNS0820L-DIN-C	48.2	60.5	61.5	102.5	101	1.5	10	3
	8	☐	MNS0820-L8C	67.1	95.5	98.5	139.5	138	1.5	10	3
	5	★	MNS0820LB	42.5	69.5	73.5	128.5	127	1.5	9	3
	10	☐	MNS0820X10DB	83.5	112.5	115.5	170.5	169	1.5	9	3
	20	☐	MNS0820X20DB	165.5	197.5	200.5	255.5	254	1.5	9	3
	30	☐	MNS0820X30DB	247.5	282.5	285.5	340.5	339	1.5	9	3
8.3	3	☐	MNS0830S-DIN	34.1	46.5	47.5	88.5	87	1.5	10	4
	3	☐	MNS0830S-DIN-C	34.1	46.5	47.5	88.5	87	1.5	10	3
	5	☐	MNS0830L-DIN-C	48.1	60.5	61.5	102.5	101	1.5	10	3
	8	☐	MNS0830-L8C	67.9	95.5	98.5	139.5	138	1.5	10	3
	10	☐	MNS0830-L10C	84.5	112.5	115.5	156.5	155	1.5	10	3
	12	☐	MNS0830-L12C	101.1	129.5	132.5	173.5	172	1.5	10	3
	15	☐	MNS0830-L15C	126.0	154.5	157.5	198.5	197	1.5	10	3
	20	☐	MNS0830-L20C	167.5	197.5	200.5	241.5	240	1.5	10	3
	25	☐	MNS0830-L25C	209.0	239.5	242.5	283.5	282	1.5	10	3
	30	☐	MNS0830-L30C	250.5	281.5	284.5	325.5	324	1.5	10	3
	5	★	MNS0830LB	43.0	69.5	73.5	128.5	127	1.5	9	3
	10	☐	MNS0830X10DB	84.5	112.5	115.5	170.5	169	1.5	9	3
	20	☐	MNS0830X20DB	167.5	197.5	200.5	255.5	254	1.5	9	3
	30	☐	MNS0830X30DB	250.5	282.5	285.5	340.5	339	1.5	9	3
8.4	3	☐	MNS0840S-DIN	33.9	46.5	47.5	88.5	87	1.5	10	4
	3	☐	MNS0840S-DIN-C	33.9	46.5	47.5	88.5	87	1.5	10	3
	5	☐	MNS0840L-DIN	47.9	60.5	61.5	102.5	101	1.5	10	4
	5	☐	MNS0840L-DIN-C	47.9	60.5	61.5	102.5	101	1.5	10	3
	8	☐	MNS0840-L8C	68.7	95.5	98.5	139.5	138	1.5	10	3
	10	☐	MNS0840-L10C	85.5	112.5	115.5	156.5	155	1.5	10	3
	12	☐	MNS0840-L12C	102.3	129.5	132.5	173.5	172	1.5	10	3
	15	☐	MNS0840-L15C	127.5	154.5	157.5	198.5	197	1.5	10	3
	20	☐	MNS0840-L20C	169.5	197.5	200.5	241.5	240	1.5	10	3
	25	☐	MNS0840-L25C	211.5	239.5	242.5	283.5	282	1.5	10	3
	30	☐	MNS0840-L30C	253.5	281.5	284.5	325.5	324	1.5	10	3
	5	★	MNS0840LB	43.5	69.5	73.5	128.5	127	1.5	9	3
	10	☐	MNS0840X10DB	85.5	112.5	115.5	170.5	169	1.5	9	3
	20	☐	MNS0840X20DB	169.5	197.5	200.5	255.5	254	1.5	9	3
	30	☐	MNS0840X30DB	253.5	282.5	285.5	340.5	339	1.5	9	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.5	3	☐	MNS0850S-DIN	33.8	46.5	47.5	88.5	87	1.5	10	4
	3	☐	MNS0850S-DIN-C	33.8	46.5	47.5	88.5	87	1.5	10	3
	5	☐	MNS0850L-DIN	47.8	60.5	61.5	102.5	101	1.5	10	4
	5	●	MNS0850L-DIN-C	47.8	60.5	61.5	102.5	101	1.5	10	3
	8	☐	MNS0850-L8C	69.5	95.5	98.5	139.5	138	1.5	10	3
	10	☐	MNS0850-L10C	86.5	112.5	115.5	156.5	155	1.5	10	3
	12	●	MNS0850-L12C	103.5	129.5	132.5	173.5	172	1.5	10	3
	15	☐	MNS0850-L15C	129.0	154.5	157.5	198.5	197	1.5	10	3
	20	●	MNS0850-L20C	171.5	197.5	200.5	241.5	240	1.5	10	3
	25	☐	MNS0850-L25C	214.0	239.5	242.5	283.5	282	1.5	10	3
	30	●	MNS0850-L30C	256.5	281.5	284.5	325.5	324	1.5	10	3
	5	★	MNS0850LB	44.0	69.5	73.5	128.5	127	1.5	9	3
	10	☐	MNS0850X10DB	86.5	112.5	115.5	170.5	169	1.5	9	3
	20	☐	MNS0850X20DB	171.5	197.5	200.5	255.5	254	1.5	9	3
	30	☐	MNS0850X30DB	256.5	282.5	285.5	340.5	339	1.5	9	3
8.6	3	☐	MNS0860S-DIN	33.7	46.6	47.6	88.6	87	1.6	10	4
	3	☐	MNS0860S-DIN-C	33.7	46.6	47.6	88.6	87	1.6	10	3
	5	☐	MNS0860L-DIN-C	47.7	60.6	61.6	102.6	101	1.6	10	3
	8	☐	MNS0860-L8C	70.4	100.6	103.6	144.6	143	1.6	10	3
	10	☐	MNS0860-L10C	87.6	118.6	121.6	162.6	161	1.6	10	3
	12	☐	MNS0860-L12C	104.8	136.6	139.6	180.6	179	1.6	10	3
	15	☐	MNS0860-L15C	130.6	163.6	166.6	207.6	206	1.6	10	3
	20	☐	MNS0860-L20C	173.6	208.6	211.6	252.6	251	1.6	10	3
	25	☐	MNS0860-L25C	216.6	253.6	256.6	297.6	296	1.6	10	3
	30	☐	MNS0860-L30C	259.6	297.6	300.6	341.6	340	1.6	10	3
	5	★	MNS0860LB	44.6	73.6	73.6	128.6	127	1.6	9	3
	10	☐	MNS0860X10DB	87.6	118.6	121.6	176.6	175	1.6	9	3
	20	☐	MNS0860X20DB	173.6	208.6	211.6	266.6	265	1.6	9	3
	30	☐	MNS0860X30DB	259.6	298.6	301.6	356.6	355	1.6	9	3
8.7	3	☐	MNS0870S-DIN	33.5	46.6	47.6	88.6	87	1.6	10	4
	3	☐	MNS0870S-DIN-C	33.5	46.6	47.6	88.6	87	1.6	10	3
	5	☐	MNS0870L-DIN	47.5	60.6	61.6	102.6	101	1.6	10	4
	5	☐	MNS0870L-DIN-C	47.5	60.6	61.6	102.6	101	1.6	10	3
	8	☐	MNS0870-L8C	71.2	100.6	103.6	144.6	143	1.6	10	3
	10	☐	MNS0870-L10C	88.6	118.6	121.6	162.6	161	1.6	10	3
	12	☐	MNS0870-L12C	106.0	136.6	139.6	180.6	179	1.6	10	3
	15	☐	MNS0870-L15C	132.1	163.6	166.6	207.6	206	1.6	10	3
	20	☐	MNS0870-L20C	175.6	208.6	211.6	252.6	251	1.6	10	3
	25	☐	MNS0870-L25C	219.1	253.6	256.6	297.6	296	1.6	10	3
	30	☐	MNS0870-L30C	262.6	297.6	300.6	341.6	340	1.6	10	3
	5	★	MNS0870LB	45.1	73.6	73.6	128.6	127	1.6	9	3
	10	☐	MNS0870X10DB	88.6	118.6	121.6	176.6	175	1.6	9	3
	20	☐	MNS0870X20DB	175.6	208.6	211.6	266.6	265	1.6	9	3
	30	☐	MNS0870X30DB	262.6	298.6	301.6	356.6	355	1.6	9	3

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

MNS

DC	Hole Depth	TF15	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
8.8	3	☐	MNS0880S-DIN	33.4	46.6	47.6	88.6	87	1.6	10	4
	3	☐	MNS0880S-DIN-C	33.4	46.6	47.6	88.6	87	1.6	10	3
	5	☐	MNS0880L-DIN	47.4	60.6	61.6	102.6	101	1.6	10	4
	5	☐	MNS0880L-DIN-C	47.4	60.6	61.6	102.6	101	1.6	10	3
	8	☐	MNS0880-L8C	72.0	100.6	103.6	144.6	143	1.6	10	3
	10	☐	MNS0880-L10C	89.6	118.6	121.6	162.6	161	1.6	10	3
	12	☐	MNS0880-L12C	107.2	136.6	139.6	180.6	179	1.6	10	3
	15	☐	MNS0880-L15C	133.6	163.6	166.6	207.6	206	1.6	10	3
	20	☐	MNS0880-L20C	177.6	208.6	211.6	252.6	251	1.6	10	3
	25	☐	MNS0880-L25C	221.6	253.6	256.6	297.6	296	1.6	10	3
	30	☐	MNS0880-L30C	265.6	297.6	300.6	341.6	340	1.6	10	3
	5	★	MNS0880LB	45.6	73.6	73.6	128.6	127	1.6	9	3
	10	☐	MNS0880X10DB	89.6	118.6	121.6	176.6	175	1.6	9	3
	20	☐	MNS0880X20DB	177.6	208.6	211.6	266.6	265	1.6	9	3
	30	☐	MNS0880X30DB	265.6	298.6	301.6	356.6	355	1.6	9	3
8.9	3	☐	MNS0890S-DIN	33.3	46.6	47.6	88.6	87	1.6	10	4
	3	☐	MNS0890S-DIN-C	33.3	46.6	47.6	88.6	87	1.6	10	3
	5	☐	MNS0890L-DIN	47.3	60.6	61.6	102.6	101	1.6	10	4
	5	☐	MNS0890L-DIN-C	47.3	60.6	61.6	102.6	101	1.6	10	3
	8	☐	MNS0890-L8C	72.8	100.6	103.6	144.6	143	1.6	10	3
	10	☐	MNS0890-L10C	90.6	118.6	121.6	162.6	161	1.6	10	3
	12	☐	MNS0890-L12C	108.4	136.6	139.6	180.6	179	1.6	10	3
	15	☐	MNS0890-L15C	135.1	163.6	166.6	207.6	206	1.6	10	3
	20	☐	MNS0890-L20C	179.6	208.6	211.6	252.6	251	1.6	10	3
	25	☐	MNS0890-L25C	224.1	253.6	256.6	297.6	296	1.6	10	3
	30	☐	MNS0890-L30C	268.6	297.6	300.6	341.6	340	1.6	10	3
	5	★	MNS0890LB	46.1	73.6	73.6	128.6	127	1.6	9	3
	10	☐	MNS0890X10DB	90.6	118.6	121.6	176.6	175	1.6	9	3
	20	☐	MNS0890X20DB	179.6	208.6	211.6	266.6	265	1.6	9	3
	30	☐	MNS0890X30DB	268.6	298.6	301.6	356.6	355	1.6	9	3
9.0	3	☐	MNS0900S-DIN	33.1	46.6	47.6	88.6	87	1.6	10	4
	3	☐	MNS0900S-DIN-C	33.1	46.6	47.6	88.6	87	1.6	10	3
	5	☐	MNS0900L-DIN	47.1	60.6	61.6	102.6	101	1.6	10	4
	5	●	MNS0900L-DIN-C	47.1	60.6	61.6	102.6	101	1.6	10	3
	8	☐	MNS0900-L8C	73.6	100.6	103.6	144.6	143	1.6	10	3
	10	☐	MNS0900-L10C	91.6	118.6	121.6	162.6	161	1.6	10	3
	12	●	MNS0900-L12C	109.6	136.6	139.6	180.6	179	1.6	10	3
	15	☐	MNS0900-L15C	136.6	163.6	166.6	207.6	206	1.6	10	3
	20	●	MNS0900-L20C	181.6	208.6	211.6	252.6	251	1.6	10	3
	25	☐	MNS0900-L25C	226.6	253.6	256.6	297.6	296	1.6	10	3
	30	●	MNS0900-L30C	271.6	297.6	300.6	341.6	340	1.6	10	3
	5	★	MNS0900LB	46.6	73.6	73.6	128.6	127	1.6	9	3
	10	★	MNS0900X10DB	91.6	118.6	121.6	176.6	175	1.6	9	3
	20	★	MNS0900X20DB	181.6	208.6	211.6	266.6	265	1.6	9	3
	30	★	MNS0900X30DB	271.6	298.6	301.6	356.6	355	1.6	9	3

DC	Hole Depth	TF15	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
9.1	3	☐	MNS0910S-DIN	33.0	46.7	47.7	88.7	87	1.7	10	4
	3	☐	MNS0910S-DIN-C	33.0	46.7	47.7	88.7	87	1.7	10	3
	5	☐	MNS0910L-DIN	47.0	60.7	61.7	102.7	101	1.7	10	4
	5	☐	MNS0910L-DIN-C	47.0	60.7	61.7	102.7	101	1.7	10	3
	8	☐	MNS0910-L8C	74.5	106.7	109.7	150.7	149	1.7	10	3
	10	☐	MNS0910-L10C	92.7	125.7	128.7	169.7	168	1.7	10	3
	12	☐	MNS0910-L12C	110.9	144.7	147.7	188.7	187	1.7	10	3
	15	☐	MNS0910-L15C	138.2	172.7	175.7	216.7	215	1.7	10	3
	20	☐	MNS0910-L20C	183.7	220.7	223.7	264.7	263	1.7	10	3
	25	☐	MNS0910-L25C	229.2	267.7	270.7	311.7	310	1.7	10	3
	30	☐	MNS0910-L30C	274.7	315.7	318.7	359.7	358	1.7	10	3
	5	★	MNS0910LB	47.2	77.7	81.7	137.7	136	1.7	10	3
	10	☐	MNS0910X10DB	92.7	125.7	128.7	183.7	182	1.7	10	3
	20	☐	MNS0910X20DB	183.7	220.7	223.7	278.7	277	1.7	10	3
	30	☐	MNS0910X30DB	274.7	315.7	318.7	373.7	372	1.7	10	3
9.2	3	☐	MNS0920S-DIN	32.9	46.7	47.7	88.7	87	1.7	10	4
	3	☐	MNS0920S-DIN-C	32.9	46.7	47.7	88.7	87	1.7	10	3
	5	☐	MNS0920L-DIN	46.9	60.7	61.7	102.7	101	1.7	10	4
	5	☐	MNS0920L-DIN-C	46.9	60.7	61.7	102.7	101	1.7	10	3
	8	☐	MNS0920-L8C	75.3	106.7	109.7	150.7	149	1.7	10	3
	10	☐	MNS0920-L10C	93.7	125.7	128.7	169.7	168	1.7	10	3
	12	☐	MNS0920-L12C	112.1	144.7	147.7	188.7	187	1.7	10	3
	15	☐	MNS0920-L15C	139.7	172.7	175.7	216.7	215	1.7	10	3
	20	☐	MNS0920-L20C	185.7	220.7	223.7	264.7	263	1.7	10	3
	25	☐	MNS0920-L25C	231.7	267.7	270.7	311.7	310	1.7	10	3
	30	☐	MNS0920-L30C	277.7	315.7	318.7	359.7	358	1.7	10	3
	5	★	MNS0920LB	47.7	77.7	81.7	137.7	136	1.7	10	3
	10	☐	MNS0920X10DB	93.7	125.7	128.7	183.7	182	1.7	10	3
	20	☐	MNS0920X20DB	185.7	220.7	223.7	278.7	277	1.7	10	3
	30	☐	MNS0920X30DB	277.7	315.7	318.7	373.7	372	1.7	10	3
9.3	3	☐	MNS0930S-DIN	32.7	46.7	47.7	88.7	87	1.7	10	4
	3	☐	MNS0930S-DIN-C	32.7	46.7	47.7	88.7	87	1.7	10	3
	5	☐	MNS0930L-DIN	46.7	60.7	61.7	102.7	101	1.7	10	4
	5	☐	MNS0930L-DIN-C	46.7	60.7	61.7	102.7	101	1.7	10	3
	8	☐	MNS0930-L8C	76.1	106.7	109.7	150.7	149	1.7	10	3
	10	☐	MNS0930-L10C	94.7	125.7	128.7	169.7	168	1.7	10	3
	12	☐	MNS0930-L12C	113.3	144.7	147.7	188.7	187	1.7	10	3
	15	☐	MNS0930-L15C	141.2	172.7	175.7	216.7	215	1.7	10	3
	20	☐	MNS0930-L20C	187.7	220.7	223.7	264.7	263	1.7	10	3
	25	☐	MNS0930-L25C	234.2	267.7	270.7	311.7	310	1.7	10	3
	30	☐	MNS0930-L30C	280.7	315.7	318.7	359.7	358	1.7	10	3
	5	★	MNS0930LB	48.2	77.7	81.7	137.7	136	1.7	10	3
	10	☐	MNS0930X10DB	94.7	125.7	128.7	183.7	182	1.7	10	3
	20	☐	MNS0930X20DB	187.7	220.7	223.7	278.7	277	1.7	10	3
	30	☐	MNS0930X30DB	280.7	315.7	318.7	373.7	372	1.7	10	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. **★ : Inventory maintained in Japan.**
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
9.4	3	☐	MNS0940S-DIN	32.6	46.7	47.7	88.7	87	1.7	10	4
	3	☐	MNS0940S-DIN-C	32.6	46.7	47.7	88.7	87	1.7	10	3
	5	☐	MNS0940L-DIN	46.6	60.7	61.7	102.7	101	1.7	10	4
	5	☐	MNS0940L-DIN-C	46.6	60.7	61.7	102.7	101	1.7	10	3
	8	☐	MNS0940-L8C	76.9	106.7	109.7	150.7	149	1.7	10	3
	10	☐	MNS0940-L10C	95.7	125.7	128.7	169.7	168	1.7	10	3
	12	☐	MNS0940-L12C	114.5	144.7	147.7	188.7	187	1.7	10	3
	15	☐	MNS0940-L15C	142.7	172.7	175.7	216.7	215	1.7	10	3
	20	☐	MNS0940-L20C	189.7	220.7	223.7	264.7	263	1.7	10	3
	25	☐	MNS0940-L25C	236.7	267.7	270.7	311.7	310	1.7	10	3
	30	☐	MNS0940-L30C	283.7	315.7	318.7	359.7	358	1.7	10	3
	5	★	MNS0940LB	48.7	77.7	81.7	137.7	136	1.7	10	3
	10	☐	MNS0940X10DB	95.7	125.7	128.7	183.7	182	1.7	10	3
	20	☐	MNS0940X20DB	189.7	220.7	223.7	278.7	277	1.7	10	3
	30	☐	MNS0940X30DB	283.7	315.7	318.7	373.7	372	1.7	10	3
9.5	3	☐	MNS0950S-DIN	32.5	46.7	47.7	88.7	87	1.7	10	4
	3	☐	MNS0950S-DIN-C	32.5	46.7	47.7	88.7	87	1.7	10	3
	5	☐	MNS0950L-DIN	46.5	60.7	61.7	102.7	101	1.7	10	4
	5	●	MNS0950L-DIN-C	46.5	60.7	61.7	102.7	101	1.7	10	3
	8	☐	MNS0950-L8C	77.7	106.7	109.7	150.7	149	1.7	10	3
	10	☐	MNS0950-L10C	96.7	125.7	128.7	169.7	168	1.7	10	3
	12	●	MNS0950-L12C	115.7	144.7	147.7	188.7	187	1.7	10	3
	15	☐	MNS0950-L15C	144.2	172.7	175.7	216.7	215	1.7	10	3
	20	●	MNS0950-L20C	191.7	220.7	223.7	264.7	263	1.7	10	3
	25	☐	MNS0950-L25C	239.2	267.7	270.7	311.7	310	1.7	10	3
	30	●	MNS0950-L30C	286.7	315.7	318.7	359.7	358	1.7	10	3
	5	★	MNS0950LB	49.2	77.7	81.7	137.7	136	1.7	10	3
	10	☐	MNS0950X10DB	96.7	125.7	128.7	183.7	182	1.7	10	3
	20	☐	MNS0950X20DB	191.7	220.7	223.7	278.7	277	1.7	10	3
	30	☐	MNS0950X30DB	286.7	315.7	318.7	373.7	372	1.7	10	3
9.6	3	☐	MNS0960S-DIN	32.3	46.7	47.7	88.7	87	1.7	10	4
	3	☐	MNS0960S-DIN-C	32.3	46.7	47.7	88.7	87	1.7	10	3
	5	☐	MNS0960L-DIN	46.3	60.7	61.7	102.7	101	1.7	10	4
	5	☐	MNS0960L-DIN-C	46.3	60.7	61.7	102.7	101	1.7	10	3
	8	☐	MNS0960-L8C	78.5	111.7	114.7	155.7	154	1.7	10	3
	10	☐	MNS0960-L10C	97.7	131.7	134.7	175.7	174	1.7	10	3
	12	☐	MNS0960-L12C	116.9	151.7	154.7	195.7	194	1.7	10	3
	15	☐	MNS0960-L15C	145.7	181.7	184.7	225.7	224	1.7	10	3
	20	☐	MNS0960-L20C	193.7	231.7	234.7	275.7	274	1.7	10	3
	25	☐	MNS0960-L25C	241.7	281.7	284.7	325.7	324	1.7	10	3
	30	☐	MNS0960-L30C	289.7	331.7	334.7	375.7	374	1.7	10	3
	5	★	MNS0960LB	49.7	81.7	81.7	137.7	136	1.7	10	3
	10	☐	MNS0960X10DB	97.7	131.7	134.7	189.7	188	1.7	10	3
	20	☐	MNS0960X20DB	193.7	231.7	234.7	289.7	288	1.7	10	3
	30	☐	MNS0960X30DB	289.7	331.7	334.7	389.7	388	1.7	10	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
9.7	3	☐	MNS0970S-DIN	32.2	46.8	47.8	88.8	87	1.8	10	4
	3	☐	MNS0970S-DIN-C	32.2	46.8	47.8	88.8	87	1.8	10	3
	5	☐	MNS0970L-DIN	46.2	60.8	61.8	102.8	101	1.8	10	4
	5	☐	MNS0970L-DIN-C	46.2	60.8	61.8	102.8	101	1.8	10	3
	8	☐	MNS0970-L8C	79.4	111.8	114.8	155.8	154	1.8	10	3
	10	☐	MNS0970-L10C	98.8	131.8	134.8	175.8	174	1.8	10	3
	12	☐	MNS0970-L12C	118.2	151.8	154.8	195.8	194	1.8	10	3
	15	☐	MNS0970-L15C	147.3	181.8	184.8	225.8	224	1.8	10	3
	20	☐	MNS0970-L20C	195.8	231.8	234.8	275.8	274	1.8	10	3
	25	☐	MNS0970-L25C	244.3	281.8	284.8	325.8	324	1.8	10	3
	30	☐	MNS0970-L30C	292.8	331.8	334.8	375.8	374	1.8	10	3
	5	★	MNS0970LB	50.3	81.8	81.8	137.8	136	1.8	10	3
	10	☐	MNS0970X10DB	98.8	131.8	134.8	189.8	188	1.8	10	3
	20	☐	MNS0970X20DB	195.8	231.8	234.8	289.8	288	1.8	10	3
	30	☐	MNS0970X30DB	292.8	331.8	334.8	389.8	388	1.8	10	3
9.8	3	☐	MNS0980S-DIN	32.1	46.8	47.8	88.8	87	1.8	10	4
	3	☐	MNS0980S-DIN-C	32.1	46.8	47.8	88.8	87	1.8	10	3
	5	☐	MNS0980L-DIN	46.1	60.8	61.8	102.8	101	1.8	10	4
	5	☐	MNS0980L-DIN-C	46.1	60.8	61.8	102.8	101	1.8	10	3
	8	☐	MNS0980-L8C	80.2	111.8	114.8	155.8	154	1.8	10	3
	10	☐	MNS0980-L10C	99.8	131.8	134.8	175.8	174	1.8	10	3
	12	☐	MNS0980-L12C	119.4	151.8	154.8	195.8	194	1.8	10	3
	15	☐	MNS0980-L15C	148.8	181.8	184.8	225.8	224	1.8	10	3
	20	☐	MNS0980-L20C	197.8	231.8	234.8	275.8	274	1.8	10	3
	25	☐	MNS0980-L25C	246.8	281.8	284.8	325.8	324	1.8	10	3
	30	☐	MNS0980-L30C	295.8	331.8	334.8	375.8	374	1.8	10	3
	5	★	MNS0980LB	50.8	81.8	81.8	137.8	136	1.8	10	3
	10	★	MNS0980X10DB	99.8	131.8	134.8	189.8	188	1.8	10	3
	20	★	MNS0980X20DB	197.8	231.8	234.8	289.8	288	1.8	10	3
	30	★	MNS0980X30DB	295.8	331.8	334.8	389.8	388	1.8	10	3
9.9	3	☐	MNS0990S-DIN	32.0	46.8	47.8	88.8	87	1.8	10	4
	3	☐	MNS0990S-DIN-C	32.0	46.8	47.8	88.8	87	1.8	10	3
	5	☐	MNS0990L-DIN	46.0	60.8	61.8	102.8	101	1.8	10	4
	5	☐	MNS0990L-DIN-C	46.0	60.8	61.8	102.8	101	1.8	10	3
	8	☐	MNS0990-L8C	81.0	111.8	114.8	155.8	154	1.8	10	3
	10	☐	MNS0990-L10C	100.8	131.8	134.8	175.8	174	1.8	10	3
	12	☐	MNS0990-L12C	120.6	151.8	154.8	195.8	194	1.8	10	3
	15	☐	MNS0990-L15C	150.3	181.8	184.8	225.8	224	1.8	10	3
	20	☐	MNS0990-L20C	199.8	231.8	234.8	275.8	274	1.8	10	3
	25	☐	MNS0990-L25C	249.3	281.8	284.8	325.8	324	1.8	10	3
	30	☐	MNS0990-L30C	298.8	331.8	334.8	375.8	374	1.8	10	3
	5	★	MNS0990LB	51.3	81.8	81.8	137.8	136	1.8	10	3
	10	☐	MNS0990X10DB	100.8	131.8	134.8	189.8	188	1.8	10	3
	20	☐	MNS0990X20DB	199.8	231.8	234.8	289.8	288	1.8	10	3
	30	☐	MNS0990X30DB	298.8	331.8	334.8	389.8	388	1.8	10	3

CUTTING CONDITIONS ➢ M118
OPERATION GUIDANCE ➢ M119
TECHNICAL DATA ➢ P001

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.0	3	☐	**MNS1000S-DIN**	31.8	46.8	47.8	88.8	87	1.8	10	4
	3	☐	**MNS1000S-DIN-C**	31.8	46.8	47.8	88.8	87	1.8	10	3
	5	☐	**MNS1000L-DIN**	45.8	60.8	61.8	102.8	101	1.8	10	4
	5	●	**MNS1000L-DIN-C**	45.8	60.8	61.8	102.8	101	1.8	10	3
	8	☐	**MNS1000-L8C**	81.8	111.8	114.8	155.8	154	1.8	10	3
	10	☐	**MNS1000-L10C**	101.8	131.8	134.8	175.8	174	1.8	10	3
	12	●	**MNS1000-L12C**	121.8	151.8	154.8	195.8	194	1.8	10	3
	15	☐	**MNS1000-L15C**	151.8	181.8	184.8	225.8	224	1.8	10	3
	20	●	**MNS1000-L20C**	201.8	231.8	234.8	275.8	274	1.8	10	3
	25	☐	**MNS1000-L25C**	251.8	281.8	284.8	325.8	324	1.8	10	3
	30	●	**MNS1000-L30C**	301.8	331.8	334.8	375.8	374	1.8	10	3
	5	★	**MNS1000LB**	51.8	81.8	81.8	137.8	136	1.8	10	3
	10	★	**MNS1000X10DB**	101.8	131.8	134.8	189.8	188	1.8	10	3
	20	★	**MNS1000X20DB**	201.8	231.8	234.8	289.8	288	1.8	10	3
	30	★	**MNS1000X30DB**	301.8	331.8	334.8	389.8	388	1.8	10	3
10.1	3	☐	**MNS1010S-DIN**	39.7	54.8	55.8	101.8	100	1.8	12	4
	3	☐	**MNS1010S-DIN-C**	39.7	54.8	55.8	101.8	100	1.8	12	3
	5	☐	**MNS1010L-DIN**	55.7	70.8	71.8	117.8	116	1.8	12	4
	5	☐	**MNS1010L-DIN-C**	55.7	70.8	71.8	117.8	116	1.8	12	3
	8	☐	**MNS1010-L8C**	82.6	117.8	120.8	166.8	165	1.8	12	3
	10	☐	**MNS1010-L10C**	102.8	138.8	141.8	187.8	186	1.8	12	3
	12	☐	**MNS1010-L12C**	123.0	159.8	162.8	208.8	207	1.8	12	3
	15	☐	**MNS1010-L15C**	153.3	190.8	193.8	239.8	238	1.8	12	3
	20	☐	**MNS1010-L20C**	203.8	243.8	246.8	292.8	291	1.8	12	3
	25	☐	**MNS1010-L25C**	254.3	295.8	298.8	344.8	343	1.8	12	3
	5	★	**MNS1010LB**	52.3	85.8	89.8	150.8	149	1.8	11	3
	10	☐	**MNS1010X10DB**	102.8	138.8	141.8	202.8	201	1.8	11	3
	20	☐	**MNS1010X20DB**	203.8	243.8	246.8	307.8	306	1.8	11	3
10.2	3	☐	**MNS1020S-DIN**	39.6	54.9	55.9	101.9	100	1.9	12	4
	3	☐	**MNS1020S-DIN-C**	39.6	54.9	55.9	101.9	100	1.9	12	3
	5	☐	**MNS1020L-DIN**	55.6	70.9	71.9	117.9	116	1.9	12	4
	5	☐	**MNS1020L-DIN-C**	55.6	70.9	71.9	117.9	116	1.9	12	3
	8	☐	**MNS1020-L8C**	83.5	117.9	120.9	166.9	165	1.9	12	3
	10	☐	**MNS1020-L10C**	103.9	138.9	141.9	187.9	186	1.9	12	3
	12	☐	**MNS1020-L12C**	124.3	159.9	162.9	208.9	207	1.9	12	3
	15	☐	**MNS1020-L15C**	154.9	190.9	193.9	239.9	238	1.9	12	3
	20	☐	**MNS1020-L20C**	205.9	243.9	246.9	292.9	291	1.9	12	3
	25	☐	**MNS1020-L25C**	256.9	295.9	298.9	344.9	343	1.9	12	3
	5	★	**MNS1020LB**	52.9	85.9	89.9	150.9	149	1.9	11	3
	10	☐	**MNS1020X10DB**	103.9	138.9	141.9	202.9	201	1.9	11	3
	20	☐	**MNS1020X20DB**	205.9	243.9	246.9	307.9	306	1.9	11	3
10.3	3	☐	**MNS1030S-DIN**	39.4	54.9	55.9	101.9	100	1.9	12	4
	3	☐	**MNS1030S-DIN-C**	39.4	54.9	55.9	101.9	100	1.9	12	3
	5	☐	**MNS1030L-DIN**	55.4	70.9	71.9	117.9	116	1.9	12	4
	5	☐	**MNS1030L-DIN-C**	55.4	70.9	71.9	117.9	116	1.9	12	3
	8	☐	**MNS1030-L8C**	84.3	117.9	120.9	166.9	165	1.9	12	3
	10	☐	**MNS1030-L10C**	104.9	138.9	141.9	187.9	186	1.9	12	3
	12	☐	**MNS1030-L12C**	125.5	159.9	162.9	208.9	207	1.9	12	3
10.3	15	☐	**MNS1030-L15C**	156.4	190.9	193.9	239.9	238	1.9	12	3
	20	☐	**MNS1030-L20C**	207.9	243.9	246.9	292.9	291	1.9	12	3
	25	☐	**MNS1030-L25C**	259.4	295.9	298.9	344.9	343	1.9	12	3
	5	★	**MNS1030LB**	53.4	85.9	89.9	150.9	149	1.9	11	3
	10	☐	**MNS1030X10DB**	104.9	138.9	141.9	202.9	201	1.9	11	3
	20	☐	**MNS1030X20DB**	207.9	243.9	246.9	307.9	306	1.9	11	3
10.4	3	☐	**MNS1040S-DIN**	39.3	54.9	55.9	101.9	100	1.9	12	4
	3	☐	**MNS1040S-DIN-C**	39.3	54.9	55.9	101.9	100	1.9	12	3
	5	☐	**MNS1040L-DIN**	55.3	70.9	71.9	117.9	116	1.9	12	4
	5	☐	**MNS1040L-DIN-C**	55.3	70.9	71.9	117.9	116	1.9	12	3
	8	☐	**MNS1040-L8C**	85.1	117.9	120.9	166.9	165	1.9	12	3
	10	☐	**MNS1040-L10C**	105.9	138.9	141.9	187.9	186	1.9	12	3
	12	☐	**MNS1040-L12C**	126.7	159.9	162.9	208.9	207	1.9	12	3
	15	☐	**MNS1040-L15C**	157.9	190.9	193.9	239.9	238	1.9	12	3
	20	☐	**MNS1040-L20C**	209.9	243.9	246.9	292.9	291	1.9	12	3
	25	☐	**MNS1040-L25C**	261.9	295.9	298.9	344.9	343	1.9	12	3
	5	★	**MNS1040LB**	53.9	85.9	89.9	150.9	149	1.9	11	3
	10	☐	**MNS1040X10DB**	105.9	138.9	141.9	202.9	201	1.9	11	3
	20	☐	**MNS1040X20DB**	209.9	243.9	246.9	307.9	306	1.9	11	3
10.5	3	☐	**MNS1050S-DIN**	39.2	54.9	55.9	101.9	100	1.9	12	4
	3	☐	**MNS1050S-DIN-C**	39.2	54.9	55.9	101.9	100	1.9	12	3
	5	☐	**MNS1050L-DIN**	55.2	70.9	71.9	117.9	116	1.9	12	4
	5	●	**MNS1050L-DIN-C**	55.2	70.9	71.9	117.9	116	1.9	12	3
	8	☐	**MNS1050-L8C**	85.9	117.9	120.9	166.9	165	1.9	12	3
	10	☐	**MNS1050-L10C**	106.9	138.9	141.9	187.9	186	1.9	12	3
	12	●	**MNS1050-L12C**	127.9	159.9	162.9	208.9	207	1.9	12	3
	15	☐	**MNS1050-L15C**	159.4	190.9	193.9	239.9	238	1.9	12	3
	20	●	**MNS1050-L20C**	211.9	243.9	246.9	292.9	291	1.9	12	3
	25	☐	**MNS1050-L25C**	264.4	295.9	298.9	344.9	343	1.9	12	3
	5	★	**MNS1050LB**	54.4	85.9	89.9	150.9	149	1.9	11	3
	10	★	**MNS1050X10DB**	106.9	138.9	141.9	202.9	201	1.9	11	3
	20	★	**MNS1050X20DB**	211.9	243.9	246.9	307.9	306	1.9	11	3
10.6	3	☐	**MNS1060S-DIN**	39.0	54.9	55.9	101.9	100	1.9	12	4
	3	☐	**MNS1060S-DIN-C**	39.0	54.9	55.9	101.9	100	1.9	12	3
	5	☐	**MNS1060L-DIN**	55.0	70.9	71.9	117.9	116	1.9	12	4
	5	☐	**MNS1060L-DIN-C**	55.0	70.9	71.9	117.9	116	1.9	12	3
	8	☐	**MNS1060-L8C**	86.7	122.9	125.9	171.9	170	1.9	12	3
	10	☐	**MNS1060-L10C**	107.9	144.9	147.9	193.9	192	1.9	12	3
	12	☐	**MNS1060-L12C**	129.1	166.9	169.9	215.9	214	1.9	12	3
	15	☐	**MNS1060-L15C**	160.9	199.9	202.9	248.9	247	1.9	12	3
	20	☐	**MNS1060-L20C**	213.9	254.9	257.9	303.9	302	1.9	12	3
	25	☐	**MNS1060-L25C**	266.9	309.9	312.9	358.9	357	1.9	12	3
	5	★	**MNS1060LB**	54.9	89.9	89.9	150.9	149	1.9	11	3
	10	☐	**MNS1060X10DB**	107.9	144.9	147.9	208.9	207	1.9	11	3
	20	☐	**MNS1060X20DB**	213.9	254.9	257.9	318.9	317	1.9	11	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.

☐ : Non stock, produced to order only.

DC	Hole Depth	TF15	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
10.7	3	☐	**MNS1070S-DIN**	38.9	54.9	55.9	101.9	100	1.9	12	4
	3	☐	**MNS1070S-DIN-C**	38.9	54.9	55.9	101.9	100	1.9	12	3
	5	☐	**MNS1070L-DIN**	54.9	70.9	71.9	117.9	116	1.9	12	4
	5	☐	**MNS1070L-DIN-C**	54.9	70.9	71.9	117.9	116	1.9	12	3
	8	☐	**MNS1070-L8C**	87.5	122.9	125.9	171.9	170	1.9	12	3
	10	☐	**MNS1070-L10C**	108.9	144.9	147.9	193.9	192	1.9	12	3
	12	☐	**MNS1070-L12C**	130.3	166.9	169.9	215.9	214	1.9	12	3
	15	☐	**MNS1070-L15C**	162.4	199.9	202.9	248.9	247	1.9	12	3
	20	☐	**MNS1070-L20C**	215.9	254.9	257.9	303.9	302	1.9	12	3
	25	☐	**MNS1070-L25C**	269.4	309.9	312.9	358.9	357	1.9	12	3
	5	★	**MNS1070LB**	55.4	89.9	89.9	150.9	149	1.9	11	3
	10	☐	**MNS1070X10DB**	108.9	144.9	147.9	208.9	207	1.9	11	3
	20	☐	**MNS1070X20DB**	215.9	254.9	257.9	318.9	317	1.9	11	3
10.8	3	☐	**MNS1080S-DIN**	38.8	55.0	56.0	102.0	100	2.0	12	4
	3	☐	**MNS1080S-DIN-C**	38.8	55.0	56.0	102.0	100	2.0	12	3
	5	☐	**MNS1080L-DIN**	54.8	71.0	72.0	118.0	116	2.0	12	4
	5	☐	**MNS1080L-DIN-C**	54.8	71.0	72.0	118.0	116	2.0	12	3
	8	☐	**MNS1080-L8C**	88.4	123.0	126.0	172.0	170	2.0	12	3
	10	☐	**MNS1080-L10C**	110.0	145.0	148.0	194.0	192	2.0	12	3
	12	☐	**MNS1080-L12C**	131.6	167.0	170.0	216.0	214	2.0	12	3
	15	☐	**MNS1080-L15C**	164.0	200.0	203.0	249.0	247	2.0	12	3
	20	☐	**MNS1080-L20C**	218.0	255.0	258.0	304.0	302	2.0	12	3
	25	☐	**MNS1080-L25C**	272.0	310.0	313.0	359.0	357	2.0	12	3
	5	★	**MNS1080LB**	56.0	90.0	90.0	151.0	149	2.0	11	3
	10	☐	**MNS1080X10DB**	110.0	145.0	148.0	209.0	207	2.0	11	3
	20	☐	**MNS1080X20DB**	218.0	255.0	258.0	319.0	317	2.0	11	3
10.9	3	☐	**MNS1090S-DIN**	38.6	55.0	56.0	102.0	100	2.0	12	4
	3	☐	**MNS1090S-DIN-C**	38.6	55.0	56.0	102.0	100	2.0	12	3
	5	☐	**MNS1090L-DIN**	54.6	71.0	72.0	118.0	116	2.0	12	4
	5	☐	**MNS1090L-DIN-C**	54.6	71.0	72.0	118.0	116	2.0	12	3
	8	☐	**MNS1090-L8C**	89.2	123.0	126.0	172.0	170	2.0	12	3
	10	☐	**MNS1090-L10C**	111.0	145.0	148.0	194.0	192	2.0	12	3
	12	☐	**MNS1090-L12C**	132.8	167.0	170.0	216.0	214	2.0	12	3
	15	☐	**MNS1090-L15C**	165.5	200.0	203.0	249.0	247	2.0	12	3
	20	☐	**MNS1090-L20C**	220.0	255.0	258.0	304.0	302	2.0	12	3
	25	☐	**MNS1090-L25C**	274.5	310.0	313.0	359.0	357	2.0	12	3
	5	★	**MNS1090LB**	56.5	90.0	90.0	151.0	149	2.0	11	3
	10	☐	**MNS1090X10DB**	111.0	145.0	148.0	209.0	207	2.0	11	3
	20	☐	**MNS1090X20DB**	220.0	255.0	258.0	319.0	317	2.0	11	3
11.0	3	☐	**MNS1100S-DIN**	38.5	55.0	56.0	102.0	100	2.0	12	4
	3	☐	**MNS1100S-DIN-C**	38.5	55.0	56.0	102.0	100	2.0	12	3
	5	☐	**MNS1100L-DIN**	54.5	71.0	72.0	118.0	116	2.0	12	4
	5	●	**MNS1100L-DIN-C**	54.5	71.0	72.0	118.0	116	2.0	12	3
	8	☐	**MNS1100-L8C**	90.0	123.0	126.0	172.0	170	2.0	12	3
	10	☐	**MNS1100-L10C**	112.0	145.0	148.0	194.0	192	2.0	12	3
	12	●	**MNS1100-L12C**	134.0	167.0	170.0	216.0	214	2.0	12	3

DC	Hole Depth	TF15	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
11.0	15	☐	**MNS1100-L15C**	167.0	200.0	203.0	249.0	247	2.0	12	3
	20	●	**MNS1100-L20C**	222.0	255.0	258.0	304.0	302	2.0	12	3
	25	☐	**MNS1100-L25C**	277.0	310.0	313.0	359.0	357	2.0	12	3
	5	★	**MNS1100LB**	57.0	90.0	90.0	151.0	149	2.0	11	3
	10	★	**MNS1100X10DB**	112.0	145.0	148.0	209.0	207	2.0	11	3
	20	★	**MNS1100X20DB**	222.0	255.0	258.0	319.0	317	2.0	11	3
11.1	3	☐	**MNS1110S-DIN**	38.4	55.0	56.0	102.0	100	2.0	12	4
	3	☐	**MNS1110S-DIN-C**	38.4	55.0	56.0	102.0	100	2.0	12	3
	5	☐	**MNS1110L-DIN**	54.4	71.0	72.0	118.0	116	2.0	12	4
	5	☐	**MNS1110L-DIN-C**	54.4	71.0	72.0	118.0	116	2.0	12	3
	8	☐	**MNS1110-L8C**	90.8	129.0	132.0	178.0	176	2.0	12	3
	10	☐	**MNS1110-L10C**	113.0	152.0	155.0	201.0	199	2.0	12	3
	12	☐	**MNS1110-L12C**	135.2	175.0	178.0	224.0	222	2.0	12	3
	15	☐	**MNS1110-L15C**	168.5	209.0	212.0	258.0	256	2.0	12	3
	20	☐	**MNS1110-L20C**	224.0	267.0	270.0	316.0	314	2.0	12	3
	25	☐	**MNS1110-L25C**	279.5	324.0	327.0	373.0	371	2.0	12	3
	5	★	**MNS1110LB**	57.5	94.0	98.0	160.0	158	2.0	12	3
	10	☐	**MNS1110X10DB**	113.0	152.0	155.0	217.0	215	2.0	12	3
	20	☐	**MNS1110X20DB**	224.0	267.0	270.0	332.0	330	2.0	12	3
11.2	3	☐	**MNS1120S-DIN**	38.2	55.0	56.0	102.0	100	2.0	12	4
	3	☐	**MNS1120S-DIN-C**	38.2	55.0	56.0	102.0	100	2.0	12	3
	5	☐	**MNS1120L-DIN**	54.2	71.0	72.0	118.0	116	2.0	12	4
	5	☐	**MNS1120L-DIN-C**	54.2	71.0	72.0	118.0	116	2.0	12	3
	8	☐	**MNS1120-L8C**	91.6	129.0	132.0	178.0	176	2.0	12	3
	10	☐	**MNS1120-L10C**	114.0	152.0	155.0	201.0	199	2.0	12	3
	12	☐	**MNS1120-L12C**	136.4	175.0	178.0	224.0	222	2.0	12	3
	15	☐	**MNS1120-L15C**	170.0	209.0	212.0	258.0	256	2.0	12	3
	20	☐	**MNS1120-L20C**	226.0	267.0	270.0	316.0	314	2.0	12	3
	25	☐	**MNS1120-L25C**	282.0	324.0	327.0	373.0	371	2.0	12	3
	5	★	**MNS1120LB**	58.0	94.0	98.0	160.0	158	2.0	12	3
	10	☐	**MNS1120X10DB**	114.0	152.0	155.0	217.0	215	2.0	12	3
	20	☐	**MNS1120X20DB**	226.0	267.0	270.0	332.0	330	2.0	12	3
11.3	3	☐	**MNS1130S-DIN**	38.1	55.1	56.1	102.1	100	2.1	12	4
	3	☐	**MNS1130S-DIN-C**	38.1	55.1	56.1	102.1	100	2.1	12	3
	5	☐	**MNS1130L-DIN**	54.1	71.1	72.1	118.1	116	2.1	12	4
	5	☐	**MNS1130L-DIN-C**	54.1	71.1	72.1	118.1	116	2.1	12	3
	8	☐	**MNS1130-L8C**	92.5	129.1	132.1	178.1	176	2.1	12	3
	10	☐	**MNS1130-L10C**	115.1	152.1	155.1	201.1	199	2.1	12	3
	12	☐	**MNS1130-L12C**	137.7	175.1	178.1	224.1	222	2.1	12	3
	15	☐	**MNS1130-L15C**	171.6	209.1	212.1	258.1	256	2.1	12	3
	20	☐	**MNS1130-L20C**	228.1	267.1	270.1	316.1	314	2.1	12	3
	25	☐	**MNS1130-L25C**	284.6	324.1	327.1	373.1	371	2.1	12	3
	5	★	**MNS1130LB**	58.6	94.1	98.1	160.1	158	2.1	12	3
	10	☐	**MNS1130X10DB**	115.1	152.1	155.1	217.1	215	2.1	12	3
	20	☐	**MNS1130X20DB**	228.1	267.1	270.1	332.1	330	2.1	12	3

CUTTING CONDITIONS ➤ **M118**
OPERATION GUIDANCE ➤ **M119**
TECHNICAL DATA ➤ **P001**

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
11.4	3	☐	**MNS1140S-DIN**	38.0	55.1	56.1	102.1	100	2.1	12	4
	3	☐	**MNS1140S-DIN-C**	38.0	55.1	56.1	102.1	100	2.1	12	3
	5	☐	**MNS1140L-DIN**	54.0	71.1	72.1	118.1	116	2.1	12	4
	5	☐	**MNS1140L-DIN-C**	54.0	71.1	72.1	118.1	116	2.1	12	3
	8	☐	**MNS1140-L8C**	93.3	129.1	132.1	178.1	176	2.1	12	3
	10	☐	**MNS1140-L10C**	116.1	152.1	155.1	201.1	199	2.1	12	3
	12	☐	**MNS1140-L12C**	138.9	175.1	178.1	224.1	222	2.1	12	3
	15	☐	**MNS1140-L15C**	173.1	209.1	212.1	258.1	256	2.1	12	3
	20	☐	**MNS1140-L20C**	230.1	267.1	270.1	316.1	314	2.1	12	3
	25	☐	**MNS1140-L25C**	287.1	324.1	327.1	373.1	371	2.1	12	3
	5	★	**MNS1140LB**	59.1	94.1	98.1	160.1	158	2.1	12	3
	10	☐	**MNS1140X10DB**	116.1	152.1	155.1	217.1	215	2.1	12	3
	20	☐	**MNS1140X20DB**	230.1	267.1	270.1	332.1	330	2.1	12	3
11.5	3	☐	**MNS1150S-DIN**	37.8	55.1	56.1	102.1	100	2.1	12	4
	3	☐	**MNS1150S-DIN-C**	37.8	55.1	56.1	102.1	100	2.1	12	3
	5	☐	**MNS1150L-DIN**	53.8	71.1	72.1	118.1	116	2.1	12	4
	5	●	**MNS1150L-DIN-C**	53.8	71.1	72.1	118.1	116	2.1	12	3
	8	☐	**MNS1150-L8C**	94.1	129.1	132.1	178.1	176	2.1	12	3
	10	☐	**MNS1150-L10C**	117.1	152.1	155.1	201.1	199	2.1	12	3
	12	●	**MNS1150-L12C**	140.1	175.1	178.1	224.1	222	2.1	12	3
	15	☐	**MNS1150-L15C**	174.6	209.1	212.1	258.1	256	2.1	12	3
	20	●	**MNS1150-L20C**	232.1	267.1	270.1	316.1	314	2.1	12	3
	25	☐	**MNS1150-L25C**	289.6	324.1	327.1	373.1	371	2.1	12	3
	5	★	**MNS1150LB**	59.6	94.1	98.1	160.1	158	2.1	12	3
	10	☐	**MNS1150X10DB**	117.1	152.1	155.1	217.1	215	2.1	12	3
	20	☐	**MNS1150X20DB**	232.1	267.1	270.1	332.1	330	2.1	12	3
11.6	3	☐	**MNS1160S-DIN**	37.7	55.1	56.1	102.1	100	2.1	12	4
	3	☐	**MNS1160S-DIN-C**	37.7	55.1	56.1	102.1	100	2.1	12	3
	5	☐	**MNS1160L-DIN**	53.7	71.1	72.1	118.1	116	2.1	12	4
	5	☐	**MNS1160L-DIN-C**	53.7	71.1	72.1	118.1	116	2.1	12	3
	8	☐	**MNS1160-L8C**	94.9	134.1	137.1	183.1	181	2.1	12	3
	10	☐	**MNS1160-L10C**	118.1	158.1	161.1	207.1	205	2.1	12	3
	12	☐	**MNS1160-L12C**	141.3	182.1	185.1	231.1	229	2.1	12	3
	15	☐	**MNS1160-L15C**	176.1	218.1	221.1	267.1	265	2.1	12	3
	20	☐	**MNS1160-L20C**	234.1	278.1	281.1	327.1	325	2.1	12	3
	25	☐	**MNS1160-L25C**	292.1	338.1	341.1	387.1	385	2.1	12	3
	5	★	**MNS1160LB**	60.1	98.1	98.1	160.1	158	2.1	12	3
	10	☐	**MNS1160X10DB**	118.1	158.1	161.1	223.1	221	2.1	12	3
	20	☐	**MNS1160X20DB**	234.1	278.1	281.1	343.1	341	2.1	12	3
11.7	3	☐	**MNS1170S-DIN**	37.6	55.1	56.1	102.1	100	2.1	12	4
	3	☐	**MNS1170S-DIN-C**	37.6	55.1	56.1	102.1	100	2.1	12	3
	5	☐	**MNS1170L-DIN**	53.6	71.1	72.1	118.1	116	2.1	12	4
	5	☐	**MNS1170L-DIN-C**	53.6	71.1	72.1	118.1	116	2.1	12	3
	8	☐	**MNS1170-L8C**	95.7	134.1	137.1	183.1	181	2.1	12	3
	10	☐	**MNS1170-L10C**	119.1	158.1	161.1	207.1	205	2.1	12	3
	12	☐	**MNS1170-L12C**	142.5	182.1	185.1	231.1	229	2.1	12	3
	15	☐	**MNS1170-L15C**	177.6	218.1	221.1	267.1	265	2.1	12	3
	20	☐	**MNS1170-L20C**	236.1	278.1	281.1	327.1	325	2.1	12	3
	25	☐	**MNS1170-L25C**	294.6	338.1	341.1	387.1	385	2.1	12	3
	5	★	**MNS1170LB**	60.6	98.1	98.1	160.1	158	2.1	12	3
	10	☐	**MNS1170X10DB**	119.1	158.1	161.1	223.1	221	2.1	12	3
	20	☐	**MNS1170X20DB**	236.1	278.1	281.1	343.1	341	2.1	12	3
11.8	3	☐	**MNS1180S-DIN**	37.4	55.1	56.1	102.1	100	2.1	12	4
	3	☐	**MNS1180S-DIN-C**	37.4	55.1	56.1	102.1	100	2.1	12	3
	5	☐	**MNS1180L-DIN**	53.4	71.1	72.1	118.1	116	2.1	12	4
	5	☐	**MNS1180L-DIN-C**	53.4	71.1	72.1	118.1	116	2.1	12	3
	8	☐	**MNS1180-L8C**	96.5	134.1	137.1	183.1	181	2.1	12	3
	10	☐	**MNS1180-L10C**	120.1	158.1	161.1	207.1	205	2.1	12	3
	12	☐	**MNS1180-L12C**	143.7	182.1	185.1	231.1	229	2.1	12	3
	15	☐	**MNS1180-L15C**	179.1	218.1	221.1	267.1	265	2.1	12	3
	20	☐	**MNS1180-L20C**	238.1	278.1	281.1	327.1	325	2.1	12	3
	25	☐	**MNS1180-L25C**	297.1	338.1	341.1	387.1	385	2.1	12	3
	5	★	**MNS1180LB**	61.1	98.1	98.1	160.1	158	2.1	12	3
	10	☐	**MNS1180X10DB**	120.1	158.1	161.1	223.1	221	2.1	12	3
	20	☐	**MNS1180X20DB**	238.1	278.1	281.1	343.1	341	2.1	12	3
11.9	3	☐	**MNS1190S-DIN**	37.3	55.2	56.2	102.2	100	2.2	12	4
	3	☐	**MNS1190S-DIN-C**	37.3	55.2	56.2	102.2	100	2.2	12	3
	5	☐	**MNS1190L-DIN**	53.3	71.2	72.2	118.2	116	2.2	12	4
	5	☐	**MNS1190L-DIN-C**	53.3	71.2	72.2	118.2	116	2.2	12	3
	8	☐	**MNS1190-L8C**	97.4	134.2	137.2	183.2	181	2.2	12	3
	10	☐	**MNS1190-L10C**	121.2	158.2	161.2	207.2	205	2.2	12	3
	12	☐	**MNS1190-L12C**	145.0	182.2	185.2	231.2	229	2.2	12	3
	15	☐	**MNS1190-L15C**	180.7	218.2	221.2	267.2	265	2.2	12	3
	20	☐	**MNS1190-L20C**	240.2	278.2	281.2	327.2	325	2.2	12	3
	25	☐	**MNS1190-L25C**	299.7	338.2	341.2	387.2	385	2.2	12	3
	5	★	**MNS1190LB**	61.7	98.2	98.2	160.2	158	2.2	12	3
	10	☐	**MNS1190X10DB**	121.2	158.2	161.2	223.2	221	2.2	12	3
	20	☐	**MNS1190X20DB**	240.2	278.2	281.2	343.2	341	2.2	12	3
12.0	3	☐	**MNS1200S-DIN**	37.2	55.2	56.2	102.2	100	2.2	12	4
	3	☐	**MNS1200S-DIN-C**	37.2	55.2	56.2	102.2	100	2.2	12	3
	5	☐	**MNS1200L-DIN**	53.2	71.2	72.2	118.2	116	2.2	12	4
	5	●	**MNS1200L-DIN-C**	53.2	71.2	72.2	118.2	116	2.2	12	3
	8	☐	**MNS1200-L8C**	98.2	134.2	137.2	183.2	181	2.2	12	3
	10	☐	**MNS1200-L10C**	122.2	158.2	161.2	207.2	205	2.2	12	3
	12	●	**MNS1200-L12C**	146.2	182.2	185.2	231.2	229	2.2	12	3
	15	☐	**MNS1200-L15C**	182.2	218.2	221.2	267.2	265	2.2	12	3
	20	●	**MNS1200-L20C**	242.2	278.2	281.2	327.2	325	2.2	12	3
	25	☐	**MNS1200-L25C**	302.2	338.2	341.2	387.2	385	2.2	12	3
	5	★	**MNS1200LB**	62.2	98.2	98.2	160.2	158	2.2	12	3
	10	★	**MNS1200X10DB**	122.2	158.2	161.2	223.2	221	2.2	12	3
	20	★	**MNS1200X20DB**	242.2	278.2	281.2	343.2	341	2.2	12	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

●: Inventory maintained.　★: Inventory maintained in Japan.

☐: Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
12.1	3	☐	**MNS1210S-DIN**	42.1	60.2	61.2	107.2	105	2.2	14	4
	3	☐	**MNS1210S-DIN-C**	42.1	60.2	61.2	107.2	105	2.2	14	3
	5	☐	**MNS1210L-DIN**	59.1	77.2	78.2	124.2	122	2.2	14	4
	5	☐	**MNS1210L-DIN-C**	59.1	77.2	78.2	124.2	122	2.2	14	3
	8	☐	**MNS1210-L8C**	99.0	140.2	143.2	189.2	187	2.2	14	3
	10	☐	**MNS1210-L10C**	123.2	165.2	168.2	214.2	212	2.2	14	3
	12	☐	**MNS1210-L12C**	147.4	190.2	193.2	239.2	237	2.2	14	3
	15	☐	**MNS1210-L15C**	183.7	227.2	230.2	276.2	274	2.2	14	3
	20	☐	**MNS1210-L20C**	244.2	290.2	293.2	339.2	337	2.2	14	3
	5	★	**MNS1210LB**	62.7	102.2	106.2	169.2	167	2.2	13	3
	10	☐	**MNS1210X10DB**	123.2	165.2	168.2	231.2	229	2.2	13	3
	20	☐	**MNS1210X20DB**	244.2	290.2	293.2	356.2	354	2.2	13	3
12.2	3	☐	**MNS1220S-DIN**	41.9	60.2	61.2	107.2	105	2.2	14	4
	3	☐	**MNS1220S-DIN-C**	41.9	60.2	61.2	107.2	105	2.2	14	3
	5	☐	**MNS1220L-DIN**	58.9	77.2	78.2	124.2	122	2.2	14	4
	5	☐	**MNS1220L-DIN-C**	58.9	77.2	78.2	124.2	122	2.2	14	3
	8	☐	**MNS1220-L8C**	99.8	140.2	143.2	189.2	187	2.2	14	3
	10	☐	**MNS1220-L10C**	124.2	165.2	168.2	214.2	212	2.2	14	3
	12	☐	**MNS1220-L12C**	148.6	190.2	193.2	239.2	237	2.2	14	3
	15	☐	**MNS1220-L15C**	185.2	227.2	230.2	276.2	274	2.2	14	3
	20	☐	**MNS1220-L20C**	246.2	290.2	293.2	339.2	337	2.2	14	3
	5	★	**MNS1220LB**	63.2	102.2	106.2	169.2	167	2.2	13	3
	10	☐	**MNS1220X10DB**	124.2	165.2	168.2	231.2	229	2.2	13	3
	20	☐	**MNS1220X20DB**	246.2	290.2	293.2	356.2	354	2.2	13	3
12.3	3	☐	**MNS1230S-DIN**	41.8	60.2	61.2	107.2	105	2.2	14	4
	3	☐	**MNS1230S-DIN-C**	41.8	60.2	61.2	107.2	105	2.2	14	3
	5	☐	**MNS1230L-DIN**	58.8	77.2	78.2	124.2	122	2.2	14	4
	5	☐	**MNS1230L-DIN-C**	58.8	77.2	78.2	124.2	122	2.2	14	3
	8	☐	**MNS1230-L8C**	100.6	140.2	143.2	189.2	187	2.2	14	3
	10	☐	**MNS1230-L10C**	125.2	165.2	168.2	214.2	212	2.2	14	3
	12	☐	**MNS1230-L12C**	149.8	190.2	193.2	239.2	237	2.2	14	3
	15	☐	**MNS1230-L15C**	186.7	227.2	230.2	276.2	274	2.2	14	3
	20	☐	**MNS1230-L20C**	248.2	290.2	293.2	339.2	337	2.2	14	3
	5	★	**MNS1230LB**	63.7	102.2	106.2	169.2	167	2.2	13	3
	10	☐	**MNS1230X10DB**	125.2	165.2	168.2	231.2	229	2.2	13	3
	20	☐	**MNS1230X20DB**	248.2	290.2	293.2	356.2	354	2.2	13	3
12.4	3	☐	**MNS1240S-DIN**	41.7	60.3	61.3	107.3	105	2.3	14	4
	3	☐	**MNS1240S-DIN-C**	41.7	60.3	61.3	107.3	105	2.3	14	3
	5	☐	**MNS1240L-DIN**	58.7	77.3	78.3	124.3	122	2.3	14	4
	5	☐	**MNS1240L-DIN-C**	58.7	77.3	78.3	124.3	122	2.3	14	3
	8	☐	**MNS1240-L8C**	101.5	140.3	143.3	189.3	187	2.3	14	3
	10	☐	**MNS1240-L10C**	126.3	165.3	168.3	214.3	212	2.3	14	3
	12	☐	**MNS1240-L12C**	151.1	190.3	193.3	239.3	237	2.3	14	3
	15	☐	**MNS1240-L15C**	188.3	227.3	230.3	276.3	274	2.3	14	3
	20	☐	**MNS1240-L20C**	250.3	290.3	293.3	339.3	337	2.3	14	3
	5	★	**MNS1240LB**	64.3	102.3	106.3	169.3	167	2.3	13	3
	10	☐	**MNS1240X10DB**	126.3	165.3	168.3	231.3	229	2.3	13	3
	20	☐	**MNS1240X20DB**	250.3	290.3	293.3	356.3	354	2.3	13	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
12.5	3	☐	**MNS1250S-DIN**	41.5	60.3	61.3	107.3	105	2.3	14	4
	3	☐	**MNS1250S-DIN-C**	41.5	60.3	61.3	107.3	105	2.3	14	3
	5	☐	**MNS1250L-DIN**	58.5	77.3	78.3	124.3	122	2.3	14	4
	5	●	**MNS1250L-DIN-C**	58.5	77.3	78.3	124.3	122	2.3	14	3
	8	☐	**MNS1250-L8C**	102.3	140.3	143.3	189.3	187	2.3	14	3
	10	☐	**MNS1250-L10C**	127.3	165.3	168.3	214.3	212	2.3	14	3
	12	●	**MNS1250-L12C**	152.3	190.3	193.3	239.3	237	2.3	14	3
	15	☐	**MNS1250-L15C**	189.8	227.3	230.3	276.3	274	2.3	14	3
	20	●	**MNS1250-L20C**	252.3	290.3	293.3	339.3	337	2.3	14	3
	5	★	**MNS1250LB**	64.8	102.3	106.3	169.3	167	2.3	13	3
	10	☐	**MNS1250X10DB**	127.3	165.3	168.3	231.3	229	2.3	13	3
	20	☐	**MNS1250X20DB**	252.3	290.3	293.3	356.3	354	2.3	13	3
12.6	3	☐	**MNS1260S-DIN**	41.4	60.3	61.3	107.3	105	2.3	14	4
	3	☐	**MNS1260S-DIN-C**	41.4	60.3	61.3	107.3	105	2.3	14	3
	5	☐	**MNS1260L-DIN**	58.4	77.3	78.3	124.3	122	2.3	14	4
	5	☐	**MNS1260L-DIN-C**	58.4	77.3	78.3	124.3	122	2.3	14	3
	8	☐	**MNS1260-L8C**	103.1	145.3	148.3	194.3	192	2.3	14	3
	10	☐	**MNS1260-L10C**	128.3	171.3	174.3	220.3	218	2.3	14	3
	12	☐	**MNS1260-L12C**	153.5	197.3	200.3	246.3	244	2.3	14	3
	15	☐	**MNS1260-L15C**	191.3	236.3	239.3	285.3	283	2.3	14	3
	20	☐	**MNS1260-L20C**	254.3	301.3	304.3	350.3	348	2.3	14	3
	5	★	**MNS1260LB**	65.3	106.3	106.3	169.3	167	2.3	13	3
	10	☐	**MNS1260X10DB**	128.3	171.3	174.3	237.3	235	2.3	13	3
	20	☐	**MNS1260X20DB**	254.3	301.3	304.3	367.3	365	2.3	13	3
12.7	3	☐	**MNS1270S-DIN**	41.3	60.3	61.3	107.3	105	2.3	14	4
	3	☐	**MNS1270S-DIN-C**	41.3	60.3	61.3	107.3	105	2.3	14	3
	5	☐	**MNS1270L-DIN**	58.3	77.3	78.3	124.3	122	2.3	14	4
	5	☐	**MNS1270L-DIN-C**	58.3	77.3	78.3	124.3	122	2.3	14	3
	8	☐	**MNS1270-L8C**	103.9	145.3	148.3	194.3	192	2.3	14	3
	10	☐	**MNS1270-L10C**	129.3	171.3	174.3	220.3	218	2.3	14	3
	12	☐	**MNS1270-L12C**	154.7	197.3	200.3	246.3	244	2.3	14	3
	15	☐	**MNS1270-L15C**	192.8	236.3	239.3	285.3	283	2.3	14	3
	20	☐	**MNS1270-L20C**	256.3	301.3	304.3	350.3	348	2.3	14	3
	5	★	**MNS1270LB**	65.8	106.3	106.3	169.3	167	2.3	13	3
	10	☐	**MNS1270X10DB**	129.3	171.3	174.3	237.3	235	2.3	13	3
	20	☐	**MNS1270X20DB**	256.3	301.3	304.3	367.3	365	2.3	13	3
12.8	3	☐	**MNS1280S-DIN**	41.1	60.3	61.3	107.3	105	2.3	14	4
	3	☐	**MNS1280S-DIN-C**	41.1	60.3	61.3	107.3	105	2.3	14	3
	5	☐	**MNS1280L-DIN**	58.1	77.3	78.3	124.3	122	2.3	14	4
	5	☐	**MNS1280L-DIN-C**	58.1	77.3	78.3	124.3	122	2.3	14	3
	8	☐	**MNS1280-L8C**	104.7	145.3	148.3	194.3	192	2.3	14	3
	10	☐	**MNS1280-L10C**	130.3	171.3	174.3	220.3	218	2.3	14	3
	12	☐	**MNS1280-L12C**	155.9	197.3	200.3	246.3	244	2.3	14	3
	15	☐	**MNS1280-L15C**	194.3	236.3	239.3	285.3	283	2.3	14	3
	20	☐	**MNS1280-L20C**	258.3	301.3	304.3	350.3	348	2.3	14	3
	5	★	**MNS1280LB**	66.3	106.3	106.3	169.3	167	2.3	13	3
	10	☐	**MNS1280X10DB**	130.3	171.3	174.3	237.3	235	2.3	13	3
	20	☐	**MNS1280X20DB**	258.3	301.3	304.3	367.3	365	2.3	13	3

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
12.9	3	☐	MNS1290S-DIN	41.0	60.3	61.3	107.3	105	2.3	14	4
	3	☐	MNS1290S-DIN-C	41.0	60.3	61.3	107.3	105	2.3	14	3
	5	☐	MNS1290L-DIN	58.0	77.3	78.3	124.3	122	2.3	14	4
	5	☐	MNS1290L-DIN-C	58.0	77.3	78.3	124.3	122	2.3	14	3
	8	☐	MNS1290-L8C	105.5	145.3	148.3	194.3	192	2.3	14	3
	10	☐	MNS1290-L10C	131.3	171.3	174.3	220.3	218	2.3	14	3
	12	☐	MNS1290-L12C	157.1	197.3	200.3	246.3	244	2.3	14	3
	15	☐	MNS1290-L15C	195.8	236.3	239.3	285.3	283	2.3	14	3
	20	☐	MNS1290-L20C	260.3	301.3	304.3	350.3	348	2.3	14	3
	5	★	MNS1290LB	66.8	106.3	106.3	169.3	167	2.3	13	3
	10	☐	MNS1290X10DB	131.3	171.3	174.3	237.3	235	2.3	13	3
	20	☐	MNS1290X20DB	260.3	301.3	304.3	367.3	365	2.3	13	3
13.0	3	☐	MNS1300S-DIN	40.9	60.4	61.4	107.4	105	2.4	14	4
	3	☐	MNS1300S-DIN-C	40.9	60.4	61.4	107.4	105	2.4	14	3
	5	☐	MNS1300L-DIN	57.9	77.4	78.4	124.4	122	2.4	14	4
	5	●	MNS1300L-DIN-C	57.9	77.4	78.4	124.4	122	2.4	14	3
	8	☐	MNS1300-L8C	106.4	145.4	148.4	194.4	192	2.4	14	3
	10	☐	MNS1300-L10C	132.4	171.4	174.4	220.4	218	2.4	14	3
	12	●	MNS1300-L12C	158.4	197.4	200.4	246.4	244	2.4	14	3
	15	☐	MNS1300-L15C	197.4	236.4	239.4	285.4	283	2.4	14	3
	20	●	MNS1300-L20C	262.4	301.4	304.4	350.4	348	2.4	14	3
	5	★	MNS1300LB	67.4	106.4	106.4	169.4	167	2.4	13	3
	10	★	MNS1300X10DB	132.4	171.4	174.4	237.4	235	2.4	13	3
	20	★	MNS1300X20DB	262.4	301.4	304.4	367.4	365	2.4	13	3
13.1	3	☐	MNS1310S-DIN	40.7	60.4	61.4	107.4	105	2.4	14	4
	3	☐	MNS1310S-DIN-C	40.7	60.4	61.4	107.4	105	2.4	14	3
	5	☐	MNS1310L-DIN	57.7	77.4	78.4	124.4	122	2.4	14	4
	5	☐	MNS1310L-DIN-C	57.7	77.4	78.4	124.4	122	2.4	14	3
	8	☐	MNS1310-L8C	107.2	151.4	154.4	200.4	198	2.4	14	3
	10	☐	MNS1310-L10C	133.4	178.4	181.4	227.4	225	2.4	14	3
	12	☐	MNS1310-L12C	159.6	205.4	208.4	254.4	252	2.4	14	3
	15	☐	MNS1310-L15C	198.9	245.4	248.4	294.4	292	2.4	14	3
	20	☐	MNS1310-L20C	264.4	313.4	316.4	362.4	360	2.4	14	3
	5	★	MNS1310LB	67.9	110.4	114.4	178.4	176	2.4	14	3
	10	☐	MNS1310X10DB	133.4	178.4	181.4	245.4	243	2.4	14	3
	20	☐	MNS1310X20DB	264.4	313.4	316.4	380.4	378	2.4	14	3
13.2	3	☐	MNS1320S-DIN	40.6	60.4	61.4	107.4	105	2.4	14	4
	3	☐	MNS1320S-DIN-C	40.6	60.4	61.4	107.4	105	2.4	14	3
	5	☐	MNS1320L-DIN	57.6	77.4	78.4	124.4	122	2.4	14	4
	5	☐	MNS1320L-DIN-C	57.6	77.4	78.4	124.4	122	2.4	14	3
	8	☐	MNS1320-L8C	108.0	151.4	154.4	200.4	198	2.4	14	3
	10	☐	MNS1320-L10C	134.4	178.4	181.4	227.4	225	2.4	14	3
	12	☐	MNS1320-L12C	160.8	205.4	208.4	254.4	252	2.4	14	3
	15	☐	MNS1320-L15C	200.4	245.4	248.4	294.4	292	2.4	14	3
	20	☐	MNS1320-L20C	266.4	313.4	316.4	362.4	360	2.4	14	3
	5	★	MNS1320LB	68.4	110.4	114.4	178.4	176	2.4	14	3
	10	☐	MNS1320X10DB	134.4	178.4	181.4	245.4	243	2.4	14	3
	20	☐	MNS1320X20DB	266.4	313.4	316.4	380.4	378	2.4	14	3
13.3	3	☐	MNS1330S-DIN	40.5	60.4	61.4	107.4	105	2.4	14	4
	3	☐	MNS1330S-DIN-C	40.5	60.4	61.4	107.4	105	2.4	14	3
	5	☐	MNS1330L-DIN	57.5	77.4	78.4	124.4	122	2.4	14	4
	5	☐	MNS1330L-DIN-C	57.5	77.4	78.4	124.4	122	2.4	14	3
	8	☐	MNS1330-L8C	108.8	151.4	154.4	200.4	198	2.4	14	3
	10	☐	MNS1330-L10C	135.4	178.4	181.4	227.4	225	2.4	14	3
	12	☐	MNS1330-L12C	162.0	205.4	208.4	254.4	252	2.4	14	3
	15	☐	MNS1330-L15C	201.9	245.4	248.4	294.4	292	2.4	14	3
	20	☐	MNS1330-L20C	268.4	313.4	316.4	362.4	360	2.4	14	3
	5	★	MNS1330LB	68.9	110.4	114.4	178.4	176	2.4	14	3
	10	☐	MNS1330X10DB	135.4	178.4	181.4	245.4	243	2.4	14	3
	20	☐	MNS1330X20DB	268.4	313.4	316.4	380.4	378	2.4	14	3
13.4	3	☐	MNS1340S-DIN	40.3	60.4	61.4	107.4	105	2.4	14	4
	3	☐	MNS1340S-DIN-C	40.3	60.4	61.4	107.4	105	2.4	14	3
	5	☐	MNS1340L-DIN	57.3	77.4	78.4	124.4	122	2.4	14	4
	5	☐	MNS1340L-DIN-C	57.3	77.4	78.4	124.4	122	2.4	14	3
	8	☐	MNS1340-L8C	109.6	151.4	154.4	200.4	198	2.4	14	3
	10	☐	MNS1340-L10C	136.4	178.4	181.4	227.4	225	2.4	14	3
	12	☐	MNS1340-L12C	163.2	205.4	208.4	254.4	252	2.4	14	3
	15	☐	MNS1340-L15C	203.4	245.4	248.4	294.4	292	2.4	14	3
	20	☐	MNS1340-L20C	270.4	313.4	316.4	362.4	360	2.4	14	3
	5	★	MNS1340LB	69.4	110.4	114.4	178.4	176	2.4	14	3
	10	☐	MNS1340X10DB	136.4	178.4	181.4	245.4	243	2.4	14	3
	20	☐	MNS1340X20DB	270.4	313.4	316.4	380.4	378	2.4	14	3
13.5	3	☐	MNS1350S-DIN	40.2	60.5	61.5	107.5	105	2.5	14	4
	3	☐	MNS1350S-DIN-C	40.2	60.5	61.5	107.5	105	2.5	14	3
	5	☐	MNS1350L-DIN	57.2	77.5	78.5	124.5	122	2.5	14	4
	5	●	MNS1350L-DIN-C	57.2	77.5	78.5	124.5	122	2.5	14	3
	8	☐	MNS1350-L8C	110.5	151.5	154.5	200.5	198	2.5	14	3
	10	☐	MNS1350-L10C	137.5	178.5	181.5	227.5	225	2.5	14	3
	12	●	MNS1350-L12C	164.5	205.5	208.5	254.5	252	2.5	14	3
	15	☐	MNS1350-L15C	205.0	245.5	248.5	294.5	292	2.5	14	3
	20	●	MNS1350-L20C	272.5	313.5	316.5	362.5	360	2.5	14	3
	5	★	MNS1350LB	70.0	110.5	114.5	178.5	176	2.5	14	3
	10	☐	MNS1350X10DB	137.5	178.5	181.5	245.5	243	2.5	14	3
	20	☐	MNS1350X20DB	272.5	313.5	316.5	380.5	378	2.5	14	3
13.6	3	☐	MNS1360S-DIN	40.1	60.5	61.5	107.5	105	2.5	14	4
	3	☐	MNS1360S-DIN-C	40.1	60.5	61.5	107.5	105	2.5	14	3
	5	☐	MNS1360L-DIN	57.1	77.5	78.5	124.5	122	2.5	14	4
	5	☐	MNS1360L-DIN-C	57.1	77.5	78.5	124.5	122	2.5	14	3
	8	☐	MNS1360-L8C	111.3	156.5	159.5	205.5	203	2.5	14	3
	10	☐	MNS1360-L10C	138.5	184.5	187.5	233.5	231	2.5	14	3
	12	☐	MNS1360-L12C	165.7	212.5	215.5	261.5	259	2.5	14	3
	15	☐	MNS1360-L15C	206.5	254.5	257.5	303.5	301	2.5	14	3
	20	☐	MNS1360-L20C	274.5	324.5	327.5	373.5	371	2.5	14	3
	5	★	MNS1360LB	70.5	114.5	114.5	178.5	176	2.5	14	3
	10	☐	MNS1360X10DB	138.5	184.5	187.5	251.5	249	2.5	14	3
	20	☐	MNS1360X20DB	274.5	324.5	327.5	391.5	389	2.5	14	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

●: Inventory maintained. ★: Inventory maintained in Japan.
☐: Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
13.7	3	☐	**MNS1370S-DIN**	39.9	60.5	61.5	107.5	105	2.5	14	4
	3	☐	**MNS1370S-DIN-C**	39.9	60.5	61.5	107.5	105	2.5	14	3
	5	☐	**MNS1370L-DIN**	56.9	77.5	78.5	124.5	122	2.5	14	4
	5	☐	**MNS1370L-DIN-C**	56.9	77.5	78.5	124.5	122	2.5	14	3
	8	☐	**MNS1370-L8C**	112.1	156.5	159.5	205.5	203	2.5	14	3
	10	☐	**MNS1370-L10C**	139.5	184.5	187.5	233.5	231	2.5	14	3
	12	☐	**MNS1370-L12C**	166.9	212.5	215.5	261.5	259	2.5	14	3
	15	☐	**MNS1370-L15C**	208.0	254.5	257.5	303.5	301	2.5	14	3
	20	☐	**MNS1370-L20C**	276.5	324.5	327.5	373.5	371	2.5	14	3
	5	★	**MNS1370LB**	71.0	114.5	114.5	178.5	176	2.5	14	3
	10	☐	**MNS1370X10DB**	139.5	184.5	187.5	251.5	249	2.5	14	3
	20	☐	**MNS1370X20DB**	276.5	324.5	327.5	391.5	389	2.5	14	3
13.8	3	☐	**MNS1380S-DIN**	39.8	60.5	61.5	107.5	105	2.5	14	4
	3	☐	**MNS1380S-DIN-C**	39.8	60.5	61.5	107.5	105	2.5	14	3
	5	☐	**MNS1380L-DIN**	56.8	77.5	78.5	124.5	122	2.5	14	4
	5	☐	**MNS1380L-DIN-C**	56.8	77.5	78.5	124.5	122	2.5	14	3
	8	☐	**MNS1380-L8C**	112.9	156.5	159.5	205.5	203	2.5	14	3
	10	☐	**MNS1380-L10C**	140.5	184.5	187.5	233.5	231	2.5	14	3
	12	☐	**MNS1380-L12C**	168.1	212.5	215.5	261.5	259	2.5	14	3
	15	☐	**MNS1380-L15C**	209.5	254.5	257.5	303.5	301	2.5	14	3
	20	☐	**MNS1380-L20C**	278.5	324.5	327.5	373.5	371	2.5	14	3
	5	★	**MNS1380LB**	71.5	114.5	114.5	178.5	176	2.5	14	3
	10	☐	**MNS1380X10DB**	140.5	184.5	187.5	251.5	249	2.5	14	3
	20	☐	**MNS1380X20DB**	278.5	324.5	327.5	391.5	389	2.5	14	3
13.9	3	☐	**MNS1390S-DIN**	39.7	60.5	61.5	107.5	105	2.5	14	4
	3	☐	**MNS1390S-DIN-C**	39.7	60.5	61.5	107.5	105	2.5	14	3
	5	☐	**MNS1390L-DIN**	56.7	77.5	78.5	124.5	122	2.5	14	4
	5	☐	**MNS1390L-DIN-C**	56.7	77.5	78.5	124.5	122	2.5	14	3
	8	☐	**MNS1390-L8C**	113.7	156.5	159.5	205.5	203	2.5	14	3
	10	☐	**MNS1390-L10C**	141.5	184.5	187.5	233.5	231	2.5	14	3
	12	☐	**MNS1390-L12C**	169.3	212.5	215.5	261.5	259	2.5	14	3
	15	☐	**MNS1390-L15C**	211.0	254.5	257.5	303.5	301	2.5	14	3
	20	☐	**MNS1390-L20C**	280.5	324.5	327.5	373.5	371	2.5	14	3
	5	★	**MNS1390LB**	72.0	114.5	114.5	178.5	176	2.5	14	3
	10	☐	**MNS1390X10DB**	141.5	184.5	187.5	251.5	249	2.5	14	3
	20	☐	**MNS1390X20DB**	280.5	324.5	327.5	391.5	389	2.5	14	3
14.0	3	☐	**MNS1400S-DIN**	39.5	60.5	61.5	107.5	105	2.5	14	4
	3	☐	**MNS1400S-DIN-C**	39.5	60.5	61.5	107.5	105	2.5	14	3
	5	☐	**MNS1400L-DIN**	56.5	77.5	78.5	124.5	122	2.5	14	4
	5	●	**MNS1400L-DIN-C**	56.5	77.5	78.5	124.5	122	2.5	14	3
	8	☐	**MNS1400-L8C**	114.5	156.5	159.5	205.5	203	2.5	14	3
	10	☐	**MNS1400-L10C**	142.5	184.5	187.5	233.5	231	2.5	14	3
	12	●	**MNS1400-L12C**	170.5	212.5	215.5	261.5	259	2.5	14	3
	15	☐	**MNS1400-L15C**	212.5	254.5	257.5	303.5	301	2.5	14	3
	20	●	**MNS1400-L20C**	282.5	324.5	327.5	373.5	371	2.5	14	3
	5	★	**MNS1400LB**	72.5	114.5	114.5	178.5	176	2.5	14	3
	10	★	**MNS1400X10DB**	142.5	184.5	187.5	251.5	249	2.5	14	3
	20	★	**MNS1400X20DB**	282.5	324.5	327.5	391.5	389	2.5	14	3
14.1	3	☐	**MNS1410S-DIN**	43.4	64.6	65.6	114.6	112	2.6	16	4
	3	☐	**MNS1410S-DIN-C**	43.4	64.6	65.6	114.6	112	2.6	16	3
	5	☐	**MNS1410L-DIN**	61.4	82.6	83.6	132.6	130	2.6	16	4
	5	☐	**MNS1410L-DIN-C**	61.4	82.6	83.6	132.6	130	2.6	16	3
14.2	3	☐	**MNS1420S-DIN**	43.3	64.6	65.6	114.6	112	2.6	16	4
	3	☐	**MNS1420S-DIN-C**	43.3	64.6	65.6	114.6	112	2.6	16	3
	5	☐	**MNS1420L-DIN**	61.3	82.6	83.6	132.6	130	2.6	16	4
	5	●	**MNS1420L-DIN-C**	61.3	82.6	83.6	132.6	130	2.6	16	3
14.3	3	☐	**MNS1430S-DIN**	43.2	64.6	65.6	114.6	112	2.6	16	4
	3	☐	**MNS1430S-DIN-C**	43.2	64.6	65.6	114.6	112	2.6	16	3
	5	☐	**MNS1430L-DIN**	61.2	82.6	83.6	132.6	130	2.6	16	4
	5	☐	**MNS1430L-DIN-C**	61.2	82.6	83.6	132.6	130	2.6	16	3
14.4	3	☐	**MNS1440S-DIN**	43.0	64.6	65.6	114.6	112	2.6	16	4
	3	☐	**MNS1440S-DIN-C**	43.0	64.6	65.6	114.6	112	2.6	16	3
	5	☐	**MNS1440L-DIN**	61.0	82.6	83.6	132.6	130	2.6	16	4
	5	☐	**MNS1440L-DIN-C**	61.0	82.6	83.6	132.6	130	2.6	16	3
14.5	3	☐	**MNS1450S-DIN**	42.9	64.6	65.6	114.6	112	2.6	16	4
	3	☐	**MNS1450S-DIN-C**	42.9	64.6	65.6	114.6	112	2.6	16	3
	5	☐	**MNS1450L-DIN**	60.9	82.6	83.6	132.6	130	2.6	16	4
	5	●	**MNS1450L-DIN-C**	60.9	82.6	83.6	132.6	130	2.6	16	3
14.6	3	☐	**MNS1460S-DIN**	42.8	64.7	65.7	114.7	112	2.7	16	4
	3	☐	**MNS1460S-DIN-C**	42.8	64.7	65.7	114.7	112	2.7	16	3
	5	☐	**MNS1460L-DIN**	60.8	82.7	83.7	132.7	130	2.7	16	4
	5	☐	**MNS1460L-DIN-C**	60.8	82.7	83.7	132.7	130	2.7	16	3
14.7	3	☐	**MNS1470S-DIN**	42.6	64.7	65.7	114.7	112	2.7	16	4
	3	☐	**MNS1470S-DIN-C**	42.6	64.7	65.7	114.7	112	2.7	16	3
	5	☐	**MNS1470L-DIN**	60.6	82.7	83.7	132.7	130	2.7	16	4
	5	☐	**MNS1470L-DIN-C**	60.6	82.7	83.7	132.7	130	2.7	16	3
14.8	3	☐	**MNS1480S-DIN**	42.5	64.7	65.7	114.7	112	2.7	16	4
	3	☐	**MNS1480S-DIN-C**	42.5	64.7	65.7	114.7	112	2.7	16	3
	5	☐	**MNS1480L-DIN**	60.5	82.7	83.7	132.7	130	2.7	16	4
	5	☐	**MNS1480L-DIN-C**	60.5	82.7	83.7	132.7	130	2.7	16	3
14.9	3	☐	**MNS1490S-DIN**	42.4	64.7	65.7	114.7	112	2.7	16	4
	3	☐	**MNS1490S-DIN-C**	42.4	64.7	65.7	114.7	112	2.7	16	3
	5	☐	**MNS1490L-DIN**	60.4	82.7	83.7	132.7	130	2.7	16	4
	5	☐	**MNS1490L-DIN-C**	60.4	82.7	83.7	132.7	130	2.7	16	3
15.0	3	☐	**MNS1500S-DIN**	42.2	64.7	65.7	114.7	112	2.7	16	4
	3	☐	**MNS1500S-DIN-C**	42.2	64.7	65.7	114.7	112	2.7	16	3
	5	☐	**MNS1500L-DIN**	60.2	82.7	83.7	132.7	130	2.7	16	4
	5	●	**MNS1500L-DIN-C**	60.2	82.7	83.7	132.7	130	2.7	16	3
15.1	3	☐	**MNS1510S-DIN**	42.1	64.7	65.7	114.7	112	2.7	16	4
	3	☐	**MNS1510S-DIN-C**	42.1	64.7	65.7	114.7	112	2.7	16	3
	5	☐	**MNS1510L-DIN**	60.1	82.7	83.7	132.7	130	2.7	16	4
	5	☐	**MNS1510L-DIN-C**	60.1	82.7	83.7	132.7	130	2.7	16	3
15.2	3	☐	**MNS1520S-DIN**	42.0	64.8	65.8	114.8	112	2.8	16	4
	3	☐	**MNS1520S-DIN-C**	42.0	64.8	65.8	114.8	112	2.8	16	3
	5	☐	**MNS1520L-DIN**	60.0	82.8	83.8	132.8	130	2.8	16	4
	5	☐	**MNS1520L-DIN-C**	60.0	82.8	83.8	132.8	130	2.8	16	3

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

MNS

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
15.3	3	☐	MNS1530S-DIN	41.8	64.8	65.8	114.8	112	2.8	16	4
	3	☐	MNS1530S-DIN-C	41.8	64.8	65.8	114.8	112	2.8	16	3
	5	☐	MNS1530L-DIN	59.8	82.8	83.8	132.8	130	2.8	16	4
	5	☐	MNS1530L-DIN-C	59.8	82.8	83.8	132.8	130	2.8	16	3
15.4	3	☐	MNS1540S-DIN	41.7	64.8	65.8	114.8	112	2.8	16	4
	3	☐	MNS1540S-DIN-C	41.7	64.8	65.8	114.8	112	2.8	16	3
	5	☐	MNS1540L-DIN	59.7	82.8	83.8	132.8	130	2.8	16	4
	5	☐	MNS1540L-DIN-C	59.7	82.8	83.8	132.8	130	2.8	16	3
15.5	3	☐	MNS1550S-DIN	41.6	64.8	65.8	114.8	112	2.8	16	4
	3	☐	MNS1550S-DIN-C	41.6	64.8	65.8	114.8	112	2.8	16	3
	5	☐	MNS1550L-DIN	59.6	82.8	83.8	132.8	130	2.8	16	4
	5	●	MNS1550L-DIN-C	59.6	82.8	83.8	132.8	130	2.8	16	3
15.6	3	☐	MNS1560S-DIN	41.4	64.8	65.8	114.8	112	2.8	16	4
	3	☐	MNS1560S-DIN-C	41.4	64.8	65.8	114.8	112	2.8	16	3
	5	☐	MNS1560L-DIN	59.4	82.8	83.8	132.8	130	2.8	16	4
	5	☐	MNS1560L-DIN-C	59.4	82.8	83.8	132.8	130	2.8	16	3
15.7	3	☐	MNS1570S-DIN	41.3	64.9	65.9	114.9	112	2.9	16	4
	3	☐	MNS1570S-DIN-C	41.3	64.9	65.9	114.9	112	2.9	16	3
	5	☐	MNS1570L-DIN	59.3	82.9	83.9	132.9	130	2.9	16	4
	5	☐	MNS1570L-DIN-C	59.3	82.9	83.9	132.9	130	2.9	16	3
15.8	3	☐	MNS1580S-DIN	41.2	64.9	65.9	114.9	112	2.9	16	4
	3	☐	MNS1580S-DIN-C	41.2	64.9	65.9	114.9	112	2.9	16	3
	5	☐	MNS1580L-DIN	59.2	82.9	83.9	132.9	130	2.9	16	4
	5	☐	MNS1580L-DIN-C	59.2	82.9	83.9	132.9	130	2.9	16	3
15.9	3	☐	MNS1590S-DIN	41.0	64.9	65.9	114.9	112	2.9	16	4
	3	☐	MNS1590S-DIN-C	41.0	64.9	65.9	114.9	112	2.9	16	3
	5	☐	MNS1590L-DIN	59.0	82.9	83.9	132.9	130	2.9	16	4
	5	☐	MNS1590L-DIN-C	59.0	82.9	83.9	132.9	130	2.9	16	3
16.0	3	☐	MNS1600S-DIN	40.9	64.9	65.9	114.9	112	2.9	16	4
	3	☐	MNS1600S-DIN-C	40.9	64.9	65.9	114.9	112	2.9	16	3
	5	☐	MNS1600L-DIN	58.9	82.9	83.9	132.9	130	2.9	16	4
	5	●	MNS1600L-DIN-C	58.9	82.9	83.9	132.9	130	2.9	16	3
16.1	3	☐	MNS1610S-DIN	48.8	72.9	73.9	122.9	120	2.9	18	4
	3	☐	MNS1610S-DIN-C	48.8	72.9	73.9	122.9	120	2.9	18	3
	5	☐	MNS1610L-DIN	68.8	92.9	93.9	142.9	140	2.9	18	4
	5	☐	MNS1610L-DIN-C	68.8	92.9	93.9	142.9	140	2.9	18	3
16.2	3	☐	MNS1620S-DIN	48.6	72.9	73.9	122.9	120	2.9	18	4
	3	☐	MNS1620S-DIN-C	48.6	72.9	73.9	122.9	120	2.9	18	3
	5	☐	MNS1620L-DIN	68.6	92.9	93.9	142.9	140	2.9	18	4
	5	☐	MNS1620L-DIN-C	68.6	92.9	93.9	142.9	140	2.9	18	3
16.3	3	☐	MNS1630S-DIN	48.5	73.0	74.0	123.0	120	3.0	18	4
	3	☐	MNS1630S-DIN-C	48.5	73.0	74.0	123.0	120	3.0	18	3
	5	☐	MNS1630L-DIN	68.5	93.0	94.0	143.0	140	3.0	18	4
	5	☐	MNS1630L-DIN-C	68.5	93.0	94.0	143.0	140	3.0	18	3
16.4	3	☐	MNS1640S-DIN	48.4	73.0	74.0	123.0	120	3.0	18	4
	3	☐	MNS1640S-DIN-C	48.4	73.0	74.0	123.0	120	3.0	18	3
	5	☐	MNS1640L-DIN	68.4	93.0	94.0	143.0	140	3.0	18	4
	5	☐	MNS1640L-DIN-C	68.4	93.0	94.0	143.0	140	3.0	18	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
16.5	3	☐	MNS1650S-DIN	48.3	73.0	74.0	123.0	120	3.0	18	4
	3	☐	MNS1650S-DIN-C	48.3	73.0	74.0	123.0	120	3.0	18	3
	5	☐	MNS1650L-DIN	68.3	93.0	94.0	143.0	140	3.0	18	4
	5	●	MNS1650L-DIN-C	68.3	93.0	94.0	143.0	140	3.0	18	3
16.6	3	☐	MNS1660S-DIN	48.1	73.0	74.0	123.0	120	3.0	18	4
	3	☐	MNS1660S-DIN-C	48.1	73.0	74.0	123.0	120	3.0	18	3
	5	☐	MNS1660L-DIN	68.1	93.0	94.0	143.0	140	3.0	18	4
	5	☐	MNS1660L-DIN-C	68.1	93.0	94.0	143.0	140	3.0	18	3
16.7	3	☐	MNS1670S-DIN	48.0	73.0	74.0	123.0	120	3.0	18	4
	3	☐	MNS1670S-DIN-C	48.0	73.0	74.0	123.0	120	3.0	18	3
	5	☐	MNS1670L-DIN	68.0	93.0	94.0	143.0	140	3.0	18	4
	5	☐	MNS1670L-DIN-C	68.0	93.0	94.0	143.0	140	3.0	18	3
16.8	3	☐	MNS1680S-DIN	47.9	73.1	74.1	123.1	120	3.1	18	4
	3	☐	MNS1680S-DIN-C	47.9	73.1	74.1	123.1	120	3.1	18	3
	5	☐	MNS1680L-DIN	67.9	93.1	94.1	143.1	140	3.1	18	4
	5	☐	MNS1680L-DIN-C	67.9	93.1	94.1	143.1	140	3.1	18	3
16.9	3	☐	MNS1690S-DIN	47.7	73.1	74.1	123.1	120	3.1	18	4
	3	☐	MNS1690S-DIN-C	47.7	73.1	74.1	123.1	120	3.1	18	3
	5	☐	MNS1690L-DIN	67.7	93.1	94.1	143.1	140	3.1	18	4
	5	☐	MNS1690L-DIN-C	67.7	93.1	94.1	143.1	140	3.1	18	3
17.0	3	☐	MNS1700S-DIN	47.6	73.1	74.1	123.1	120	3.1	18	4
	3	☐	MNS1700S-DIN-C	47.6	73.1	74.1	123.1	120	3.1	18	3
	5	☐	MNS1700L-DIN	67.6	93.1	94.1	143.1	140	3.1	18	4
	5	●	MNS1700L-DIN-C	67.6	93.1	94.1	143.1	140	3.1	18	3
17.1	3	☐	MNS1710S-DIN	47.5	73.1	74.1	123.1	120	3.1	18	4
	3	☐	MNS1710S-DIN-C	47.5	73.1	74.1	123.1	120	3.1	18	3
	5	☐	MNS1710L-DIN	67.5	93.1	94.1	143.1	140	3.1	18	4
	5	☐	MNS1710L-DIN-C	67.5	93.1	94.1	143.1	140	3.1	18	3
17.2	3	☐	MNS1720S-DIN	47.3	73.1	74.1	123.1	120	3.1	18	4
	3	☐	MNS1720S-DIN-C	47.3	73.1	74.1	123.1	120	3.1	18	3
	5	☐	MNS1720L-DIN	67.3	93.1	94.1	143.1	140	3.1	18	4
	5	☐	MNS1720L-DIN-C	67.3	93.1	94.1	143.1	140	3.1	18	3
17.3	3	☐	MNS1730S-DIN	47.2	73.1	74.1	123.1	120	3.1	18	4
	3	☐	MNS1730S-DIN-C	47.2	73.1	74.1	123.1	120	3.1	18	3
	5	☐	MNS1730L-DIN	67.2	93.1	94.1	143.1	140	3.1	18	4
	5	☐	MNS1730L-DIN-C	67.2	93.1	94.1	143.1	140	3.1	18	3
17.4	3	☐	MNS1740S-DIN	47.1	73.2	74.2	123.2	120	3.2	18	4
	3	☐	MNS1740S-DIN-C	47.1	73.2	74.2	123.2	120	3.2	18	3
	5	☐	MNS1740L-DIN	67.1	93.2	94.2	143.2	140	3.2	18	4
	5	☐	MNS1740L-DIN-C	67.1	93.2	94.2	143.2	140	3.2	18	3
17.5	3	☐	MNS1750S-DIN	46.9	73.2	74.2	123.2	120	3.2	18	4
	3	☐	MNS1750S-DIN-C	46.9	73.2	74.2	123.2	120	3.2	18	3
	5	☐	MNS1750L-DIN	66.9	93.2	94.2	143.2	140	3.2	18	4
	5	●	MNS1750L-DIN-C	66.9	93.2	94.2	143.2	140	3.2	18	3
17.6	3	☐	MNS1760S-DIN	46.8	73.2	74.2	123.2	120	3.2	18	4
	3	☐	MNS1760S-DIN-C	46.8	73.2	74.2	123.2	120	3.2	18	3
	5	☐	MNS1760L-DIN	66.8	93.2	94.2	143.2	140	3.2	18	4
	5	☐	MNS1760L-DIN-C	66.8	93.2	94.2	143.2	140	3.2	18	3

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained.　☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
17.7	3	☐	MNS1770S-DIN	46.7	73.2	74.2	123.2	120	3.2	18	4
	3	☐	MNS1770S-DIN-C	46.7	73.2	74.2	123.2	120	3.2	18	3
	5	☐	MNS1770L-DIN	66.7	93.2	94.2	143.2	140	3.2	18	4
	5	☐	MNS1770L-DIN-C	66.7	93.2	94.2	143.2	140	3.2	18	3
17.8	3	☐	MNS1780S-DIN	46.5	73.2	74.2	123.2	120	3.2	18	4
	3	☐	MNS1780S-DIN-C	46.5	73.2	74.2	123.2	120	3.2	18	3
	5	☐	MNS1780L-DIN	66.5	93.2	94.2	143.2	140	3.2	18	4
	5	☐	MNS1780L-DIN-C	66.5	93.2	94.2	143.2	140	3.2	18	3
17.9	3	☐	MNS1790S-DIN	46.4	73.3	74.3	123.3	120	3.3	18	4
	3	☐	MNS1790S-DIN-C	46.4	73.3	74.3	123.3	120	3.3	18	3
	5	☐	MNS1790L-DIN	66.4	93.3	94.3	143.3	140	3.3	18	4
	5	☐	MNS1790L-DIN-C	66.4	93.3	94.3	143.3	140	3.3	18	3
18.0	3	☐	MNS1800S-DIN	46.3	73.3	74.3	123.3	120	3.3	18	4
	3	☐	MNS1800S-DIN-C	46.3	73.3	74.3	123.3	120	3.3	18	3
	5	☐	MNS1800L-DIN	66.3	93.3	94.3	143.3	140	3.3	18	4
	5	●	MNS1800L-DIN-C	66.3	93.3	94.3	143.3	140	3.3	18	3
18.1	3	☐	MNS1810S-DIN	52.1	79.3	80.3	131.3	128	3.3	20	4
	3	☐	MNS1810S-DIN-C	52.1	79.3	80.3	131.3	128	3.3	20	3
	5	☐	MNS1810L-DIN	74.1	101.3	102.3	153.3	150	3.3	20	4
	5	☐	MNS1810L-DIN-C	74.1	101.3	102.3	153.3	150	3.3	20	3
18.2	3	☐	MNS1820S-DIN	52.0	79.3	80.3	131.3	128	3.3	20	4
	3	☐	MNS1820S-DIN-C	52.0	79.3	80.3	131.3	128	3.3	20	3
	5	☐	MNS1820L-DIN	74.0	101.3	102.3	153.3	150	3.3	20	4
	5	☐	MNS1820L-DIN-C	74.0	101.3	102.3	153.3	150	3.3	20	3
18.3	3	☐	MNS1830S-DIN	51.9	79.3	80.3	131.3	128	3.3	20	4
	3	☐	MNS1830S-DIN-C	51.9	79.3	80.3	131.3	128	3.3	20	3
	5	☐	MNS1830L-DIN	73.9	101.3	102.3	153.3	150	3.3	20	4
	5	☐	MNS1830L-DIN-C	73.9	101.3	102.3	153.3	150	3.3	20	3
18.4	3	☐	MNS1840S-DIN	51.7	79.3	80.3	131.3	128	3.3	20	4
	3	☐	MNS1840S-DIN-C	51.7	79.3	80.3	131.3	128	3.3	20	3
	5	☐	MNS1840L-DIN	73.7	101.3	102.3	153.3	150	3.3	20	4
	5	☐	MNS1840L-DIN-C	73.7	101.3	102.3	153.3	150	3.3	20	3
18.5	3	☐	MNS1850S-DIN	51.6	79.4	80.4	131.4	128	3.4	20	4
	3	☐	MNS1850S-DIN-C	51.6	79.4	80.4	131.4	128	3.4	20	3
	5	☐	MNS1850L-DIN	73.6	101.4	102.4	153.4	150	3.4	20	4
	5	●	MNS1850L-DIN-C	73.6	101.4	102.4	153.4	150	3.4	20	3
18.6	3	☐	MNS1860S-DIN	51.5	79.4	80.4	131.4	128	3.4	20	4
	3	☐	MNS1860S-DIN-C	51.5	79.4	80.4	131.4	128	3.4	20	3
	5	☐	MNS1860L-DIN	73.5	101.4	102.4	153.4	150	3.4	20	4
	5	☐	MNS1860L-DIN-C	73.5	101.4	102.4	153.4	150	3.4	20	3
18.7	3	☐	MNS1870S-DIN	51.4	79.4	80.4	131.4	128	3.4	20	4
	3	☐	MNS1870S-DIN-C	51.4	79.4	80.4	131.4	128	3.4	20	3
	5	☐	MNS1870L-DIN	73.4	101.4	102.4	153.4	150	3.4	20	4
	5	☐	MNS1870L-DIN-C	73.4	101.4	102.4	153.4	150	3.4	20	3
18.8	3	☐	MNS1880S-DIN	51.2	79.4	80.4	131.4	128	3.4	20	4
	3	☐	MNS1880S-DIN-C	51.2	79.4	80.4	131.4	128	3.4	20	3
	5	☐	MNS1880L-DIN	73.2	101.4	102.4	153.4	150	3.4	20	4
	5	☐	MNS1880L-DIN-C	73.2	101.4	102.4	153.4	150	3.4	20	3

DC (mm)	Hole Depth (L/D)	TF15	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
18.9	3	☐	MNS1890S-DIN	51.1	79.4	80.4	131.4	128	3.4	20	4
	3	☐	MNS1890S-DIN-C	51.1	79.4	80.4	131.4	128	3.4	20	3
	5	☐	MNS1890L-DIN	73.1	101.4	102.4	153.4	150	3.4	20	4
	5	☐	MNS1890L-DIN-C	73.1	101.4	102.4	153.4	150	3.4	20	3
19.0	3	☐	MNS1900S-DIN	51.0	79.5	80.5	131.5	128	3.5	20	4
	3	☐	MNS1900S-DIN-C	51.0	79.5	80.5	131.5	128	3.5	20	3
	5	☐	MNS1900L-DIN	73.0	101.5	102.5	153.5	150	3.5	20	4
	5	☐	MNS1900L-DIN-C	73.0	101.5	102.5	153.5	150	3.5	20	3
19.1	3	☐	MNS1910S-DIN	50.8	79.5	80.5	131.5	128	3.5	20	4
	3	☐	MNS1910S-DIN-C	50.8	79.5	80.5	131.5	128	3.5	20	3
	5	☐	MNS1910L-DIN	72.8	101.5	102.5	153.5	150	3.5	20	4
	5	☐	MNS1910L-DIN-C	72.8	101.5	102.5	153.5	150	3.5	20	3
19.2	3	☐	MNS1920S-DIN	50.7	79.5	80.5	131.5	128	3.5	20	4
	3	☐	MNS1920S-DIN-C	50.7	79.5	80.5	131.5	128	3.5	20	3
	5	☐	MNS1920L-DIN	72.7	101.5	102.5	153.5	150	3.5	20	4
	5	☐	MNS1920L-DIN-C	72.7	101.5	102.5	153.5	150	3.5	20	3
19.3	3	☐	MNS1930S-DIN	50.6	79.5	80.5	131.5	128	3.5	20	4
	5	☐	MNS1930L-DIN	72.6	101.5	102.5	153.5	150	3.5	20	4
	5	☐	MNS1930L-DIN-C	72.6	101.5	102.5	153.5	150	3.5	20	3
19.4	3	☐	MNS1940S-DIN	50.4	79.5	80.5	131.5	128	3.5	20	4
	3	☐	MNS1940S-DIN-C	50.4	79.5	80.5	131.5	128	3.5	20	3
	5	☐	MNS1940L-DIN	72.4	101.5	102.5	153.5	150	3.5	20	4
	5	☐	MNS1940L-DIN-C	72.4	101.5	102.5	153.5	150	3.5	20	3
19.5	3	☐	MNS1950S-DIN	50.3	79.5	80.5	131.5	128	3.5	20	4
	3	☐	MNS1950S-DIN-C	50.3	79.5	80.5	131.5	128	3.5	20	3
	5	☐	MNS1950L-DIN	72.3	101.5	102.5	153.5	150	3.5	20	4
	5	●	MNS1950L-DIN-C	72.3	101.5	102.5	153.5	150	3.5	20	3
19.6	3	☐	MNS1960S-DIN	50.2	79.6	80.6	131.6	128	3.6	20	4
	3	☐	MNS1960S-DIN-C	50.2	79.6	80.6	131.6	128	3.6	20	3
	5	☐	MNS1960L-DIN	72.2	101.6	102.6	153.6	150	3.6	20	4
	5	☐	MNS1960L-DIN-C	72.2	101.6	102.6	153.6	150	3.6	20	3
19.7	3	☐	MNS1970S-DIN	50.0	79.6	80.6	131.6	128	3.6	20	4
	3	☐	MNS1970S-DIN-C	50.0	79.6	80.6	131.6	128	3.6	20	3
	5	☐	MNS1970L-DIN	72.0	101.6	102.6	153.6	150	3.6	20	4
	5	☐	MNS1970L-DIN-C	72.0	101.6	102.6	153.6	150	3.6	20	3
19.8	3	☐	MNS1980S-DIN	49.9	79.6	80.6	131.6	128	3.6	20	4
	3	☐	MNS1980S-DIN-C	49.9	79.6	80.6	131.6	128	3.6	20	3
	5	☐	MNS1980L-DIN	71.9	101.6	102.6	153.6	150	3.6	20	4
	5	☐	MNS1980L-DIN-C	71.9	101.6	102.6	153.6	150	3.6	20	3
19.9	3	☐	MNS1990S-DIN	49.8	79.6	80.6	131.6	128	3.6	20	4
	3	☐	MNS1990S-DIN-C	49.8	79.6	80.6	131.6	128	3.6	20	3
	5	☐	MNS1990L-DIN	71.8	101.6	102.6	153.6	150	3.6	20	4
	5	☐	MNS1990L-DIN-C	71.8	101.6	102.6	153.6	150	3.6	20	3
20.0	3	☐	MNS2000S-DIN	49.6	79.6	80.6	131.6	128	3.6	20	4
	3	☐	MNS2000S-DIN-C	49.6	79.6	80.6	131.6	128	3.6	20	3
	5	☐	MNS2000L-DIN	71.6	101.6	102.6	153.6	150	3.6	20	4
	5	●	MNS2000L-DIN-C	71.6	101.6	102.6	153.6	150	3.6	20	3

CUTTING CONDITIONS ➤ M118
OPERATION GUIDANCE ➤ M119
TECHNICAL DATA ➤ P001

MNS

RECOMMENDED CUTTING CONDITIONS

■ Hole Depth : L/D = 3, 5, 8 (LB, S-DIN, S-DIN-C, L-DIN, L-DIN-C, L8C Type Drill)

Material	N					
	Aluminium Alloy (Si<5%)		Aluminium Alloy (5%≦Si≦10%)		Aluminium Alloy (Si>10%)	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
3.2	11900	0.1 (0.11—0.16)	11900	0.15 (0.16—0.21)	11900	0.15 (0.16—0.21)
4.0	9500	0.15 (0.13—0.20)	9500	0.2 (0.20—0.27)	9500	0.2 (0.20—0.27)
5.0	7600	0.2 (0.17—0.25)	7600	0.25 (0.25—0.33)	7600	0.25 (0.25—0.33)
6.3	7500	0.25 (0.21—0.32)	7500	0.35 (0.32—0.42)	7500	0.35 (0.32—0.42)
8.0	5900	0.3 (0.27—0.40)	5900	0.45 (0.40—0.53)	5900	0.45 (0.40—0.53)
10.0	4700	0.4 (0.33—0.50)	4700	0.55 (0.50—0.67)	4700	0.55 (0.50—0.67)
12.0	5300	0.5 (0.40—0.60)	5300	0.7 (0.60—0.80)	5300	0.7 (0.60—0.80)
14.0	4500	0.5 (0.40—0.60)	4500	0.7 (0.60—0.80)	4500	0.7 (0.60—0.80)
16.0	4000	0.5 (0.40—0.60)	4000	0.7 (0.60—0.80)	4000	0.7 (0.60—0.80)
18.0	3500	0.5 (0.40—0.60)	3500	0.7 (0.60—0.80)	3500	0.7 (0.60—0.80)
20.0	3200	0.5 (0.40—0.60)	3200	0.7 (0.60—0.80)	3200	0.7 (0.60—0.80)

Note 1) When using the drill with a length over L/D 10, it is necessary to machine a pilot hole.
(If no pilot-hole is used then drill breakage can occur.)
Note 2) For pilot hole drilling, Mitsubishi Materials MNS, MAE-MB or MAS-MB drill is recommended.

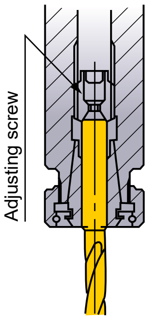
■ Hole Depth : L/D = 10, 12, 15, 20, 25, 30 (X10DB, X20DB, X30DB, L10C, L12C, L15C, L20C, L25C, L30C Type Drill)

Material	N					
	Aluminium Alloy (Si<5%)		Aluminium Alloy (5%≦Si≦10%)		Aluminium Alloy (Si>10%)	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)
3.2	8900	0.1 (0.11—0.16)	8900	0.15 (0.16—0.21)	8900	0.15 (0.16—0.21)
4.0	7100	0.15 (0.13—0.20)	7100	0.2 (0.20—0.27)	7100	0.2 (0.20—0.27)
5.0	5700	0.2 (0.17—0.25)	5700	0.25 (0.25—0.33)	5700	0.25 (0.25—0.33)
6.3	6000	0.25 (0.21—0.32)	6000	0.35 (0.32—0.42)	6000	0.35 (0.32—0.42)
8.0	4700	0.3 (0.27—0.40)	4700	0.45 (0.40—0.53)	4700	0.45 (0.40—0.53)
10.0	3800	0.4 (0.33—0.50)	3800	0.55 (0.50—0.67)	3800	0.55 (0.50—0.67)
12.0	4200	0.5 (0.40—0.60)	4200	0.7 (0.60—0.80)	4200	0.7 (0.60—0.80)
14.0	3600	0.5 (0.40—0.60)	3600	0.7 (0.60—0.80)	3600	0.7 (0.60—0.80)
16.0	3200	0.5 (0.40—0.60)	3200	0.7 (0.60—0.80)	3200	0.7 (0.60—0.80)
18.0	2800	0.5 (0.40—0.60)	2800	0.7 (0.60—0.80)	2800	0.7 (0.60—0.80)
20.0	2500	0.5 (0.40—0.60)	2500	0.7 (0.60—0.80)	2500	0.7 (0.60—0.80)

Note 1) When using the drill with a length over L/D 10, it is necessary to use a prep hole as a guide.
(If no prep-hole is used then drill breakage can occur.)
Note 2) For pilot hole drilling, Mitsubishi Materials MNS, MAE-MB or MAS-MB drill is recommended.

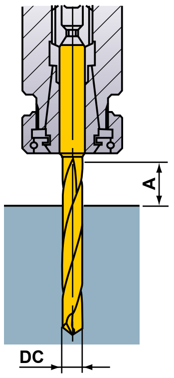
■ OPERATIONAL GUIDANCE FOR THE MNS DRILL (L/D 3, 5, 8)

Drill holding



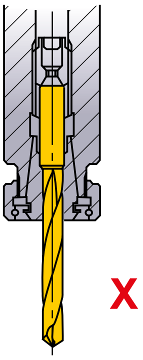
Thrust bearing type collet chuck holds the drill securely.

Drill length



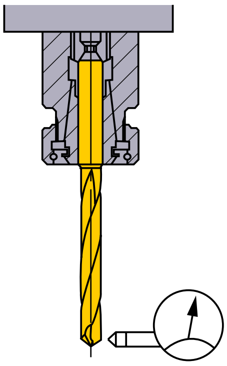
A : ≥ DC x 1.5

Drill installation



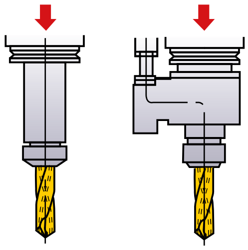
Do not clamp on the flutes.

Installation tolerance



Runout ≤ 0.03mm

Coolant method (MNS)



Through spindle coolant type

Revolving coolant machine type

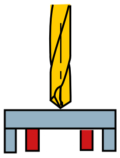
Coolant pressure is approx. 5 bar—70 bar

Coolant handling

< **MNS** type >

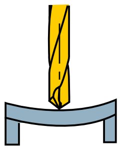
1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular changing of the coolant is recommended.
2) Small particles of chips will jam in the oil hole. Use a filter as a preventative measure. When using small diameter drills, use a fine mesh filter.

Thin workpiece



OK

Support the Workpiece

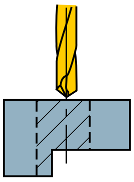


X

If bending occurs

Interrupted cutting

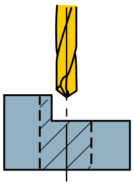
One Process



OK

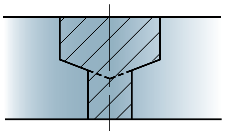
①Lower the feed when drilling the interrupted part.

Requires Prior Machining



①Spot face with MFE drill prior to drilling.

Stepped holes

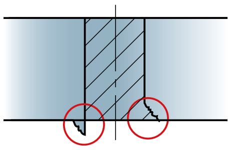


①Divide the machining into two processes.

②Drill the larger hole first.

*Tools for chamfering and spot facing can be produced to order.

Burring and workpiece chipping



①Lower the feed rate when breaking through.

②Add a chamfer.

③Change the point angle.

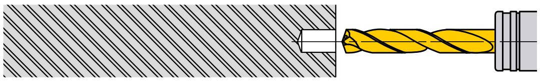
MNS

OPERATIONAL GUIDANCE FOR THE MNS TYPE LONG DRILL (L/D 10, 12, 15, 20, 25, 30)

FLAT FACE DRILLING

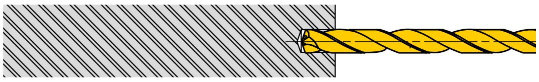
● Drilling a blind hole

1. Drilling a pilot hole



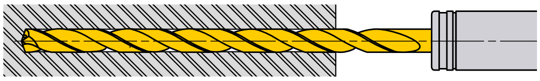
①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi Materials type MNS, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision pilot hole is drilled.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type.)

2. Initial cutting with the long type drill



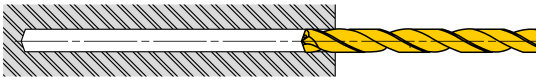
①Penetrate the pilot hole at low revolution.
(Cutting speed 20m-30m/min, feed rate 0.2mm-0.3mm/rev)
②Stop the long type drill 1mm-3mm short of the pilot hole bottom.

3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

4. Drill retraction

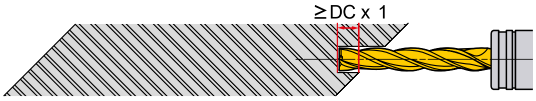


①After drilling, lower the cutting revolution about 1mm-2mm short of the hole end. (Cutting speed of around 20m-30m/min)
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20m-30m/min and feed rate of 0.2mm-0.3mm/rev.

INTERRUPTED DRILLING

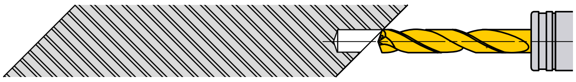
● Drilling and breaking through on irregular faces or angles

1. Spot facing



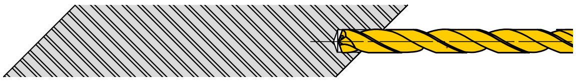
①When machining a deep hole into an inclined surface, use MFE drill as a drill for a guide hole.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx DC×1.

2. Drilling a pilot hole



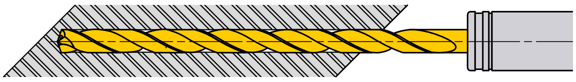
①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi Materials type MNS, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper.
(Adjust the pilot hole depth according to the length of the super long type.)

3. Initial cutting with the long type drill



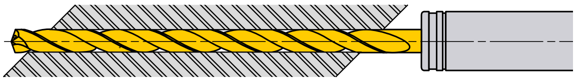
①Penetrate the pilot hole at a low revolution.
(Cutting speed 20m-30m/min, feed rate 0.2mm-0.3mm/rev)
②Stop the long type drill 1mm-3mm short of the pilot hole bottom.

4. Drill the deep hole



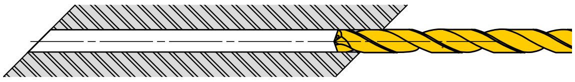
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



①When breaking through, the cutting edge can be damaged.
②A feed rate of 0.05mm-0.1mm/rev is recommended.

6. Drill retraction



①Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
②Finally clear the hole at a cutting speed of 20m-30m/min and feed rate of 0.2mm-0.3mm/rev.

Memo

MAE, MAS

- Specialized for aluminium and cast iron drilling.
- High hole accuracy.
- Pre-hole drilling for roll taps.
- Helical through coolant holes enable high speed machining (MAS type).

UWC

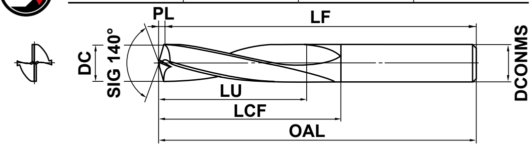
Only MAS

140°

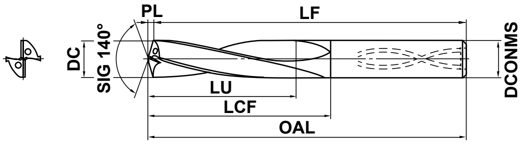
P M **K** **N** S H

	DC=3	3<DC≤6	6<DC≤10	10<DC≤16
	+0.005 0	+0.005 0	+0.005 0	+0.005 0
h6	0 −0.006	0 −0.008	0 −0.009	0 −0.011

MAE (External coolant)



MAS (Internal coolant)



Note 1) MAS type bigger than Ø 5.0 have a recess in the end face.
Note 2) MAE/MAS drills are suitable for use with shrink fit holders.

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
3.0	3	Ext.	★	MAE0300MB	9.5	21.5	61.5	61	0.5	3
	3	Int.	☐	MAS0300MB	9.5	21.5	61.5	61	0.5	3
	6	Int.	●	MAS0300LB	18.5	30.5	70.5	70	0.5	3
3.1	3	Ext.	★	MAE0310MB	9.9	24.6	64.6	64	0.6	4
	3	Int.	☐	MAS0310MB	9.9	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0310LB	19.2	34.6	74.6	74	0.6	4
3.2	3	Ext.	★	MAE0320MB	10.2	24.6	64.6	64	0.6	4
	3	Int.	☐	MAS0320MB	10.2	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0320LB	19.8	34.6	74.6	74	0.6	4
3.3	3	Ext.	★	MAE0330MB	10.5	24.6	64.6	64	0.6	4
	3	Int.	☐	MAS0330MB	10.5	24.6	64.6	64	0.6	4
	6	Int.	●	MAS0330LB	20.4	34.6	74.6	74	0.6	4
3.4	3	Ext.	★	MAE0340MB	10.8	24.6	64.6	64	0.6	4
	3	Int.	☐	MAS0340MB	10.8	24.6	64.6	64	0.6	4
	6	Int.	★	MAS0340LB	21.0	34.6	74.6	74	0.6	4
3.5	3	Ext.	★	MAE0350MB	11.1	24.6	64.6	64	0.6	4
	3	Int.	☐	MAS0350MB	11.1	24.6	64.6	64	0.6	4
	6	Int.	●	MAS0350LB	21.6	34.6	74.6	74	0.6	4
3.6	3	Ext.	★	MAE0360MB	11.5	28.7	68.7	68	0.7	4
	3	Int.	☐	MAS0360MB	11.5	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0360LB	22.3	40.7	80.7	80	0.7	4
3.65	3	Ext.	★	* MAE0365MB	11.7	28.7	68.7	68	0.7	4
	3	Int.	☐	* MAS0365MB	11.7	28.7	68.7	68	0.7	4
	6	Int.	●	* MAS0365LB	22.6	40.7	80.7	80	0.7	4
3.7	3	Ext.	★	MAE0370MB	11.8	28.7	68.7	68	0.7	4
	3	Int.	☐	MAS0370MB	11.8	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0370LB	22.9	40.7	80.7	80	0.7	4
3.8	3	Ext.	★	MAE0380MB	12.1	28.7	68.7	68	0.7	4
	3	Int.	☐	MAS0380MB	12.1	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0380LB	23.5	40.7	80.7	80	0.7	4
3.9	3	Ext.	★	MAE0390MB	12.4	28.7	68.7	68	0.7	4
	3	Int.	☐	MAS0390MB	12.4	28.7	68.7	68	0.7	4
	6	Int.	★	MAS0390LB	24.1	40.7	80.7	80	0.7	4
4.0	3	Ext.	★	MAE0400MB	12.7	28.7	68.7	68	0.7	4
	3	Int.	☐	MAS0400MB	12.7	28.7	68.7	68	0.7	4
	6	Int.	●	MAS0400LB	24.7	40.7	80.7	80	0.7	4
4.1	3	Ext.	★	MAE0410MB	13.0	31.7	71.7	71	0.7	5
	3	Int.	☐	MAS0410MB	13.0	31.7	71.7	71	0.7	5
	6	Int.	★	MAS0410LB	25.3	44.7	84.7	84	0.7	5
4.2	3	Ext.	★	MAE0420MB	13.4	31.8	71.8	71	0.8	5
	3	Int.	☐	MAS0420MB	13.4	31.8	71.8	71	0.8	5
	6	Int.	●	MAS0420LB	26.0	44.8	84.8	84	0.8	5
4.3	3	Ext.	★	MAE0430MB	13.7	31.8	71.8	71	0.8	5
	3	Int.	☐	MAS0430MB	13.7	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0430LB	26.6	44.8	84.8	84	0.8	5
4.4	3	Ext.	★	MAE0440MB	14.0	31.8	71.8	71	0.8	5
	3	Int.	☐	MAS0440MB	14.0	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0440LB	27.2	44.8	84.8	84	0.8	5
4.5	3	Ext.	★	MAE0450MB	14.3	31.8	71.8	71	0.8	5
	3	Int.	☐	MAS0450MB	14.3	31.8	71.8	71	0.8	5
	6	Int.	★	MAS0450LB	27.8	44.8	84.8	84	0.8	5
4.6	3	Ext.	★	* MAE0460MB	14.6	33.8	73.8	73	0.8	5
	3	Int.	☐	* MAS0460MB	14.6	33.8	73.8	73	0.8	5
	6	Int.	●	* MAS0460LB	28.4	48.8	88.8	88	0.8	5
4.7	3	Ext.	★	MAE0470MB	15.0	33.9	73.9	73	0.9	5
	3	Int.	☐	MAS0470MB	15.0	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0470LB	29.1	48.9	88.9	88	0.9	5
4.8	3	Ext.	★	MAE0480MB	15.3	33.9	73.9	73	0.9	5
	3	Int.	☐	MAS0480MB	15.3	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0480LB	29.7	48.9	88.9	88	0.9	5
4.9	3	Ext.	★	MAE0490MB	15.6	33.9	73.9	73	0.9	5
	3	Int.	☐	MAS0490MB	15.6	33.9	73.9	73	0.9	5
	6	Int.	★	MAS0490LB	30.3	48.9	88.9	88	0.9	5
5.0	3	Ext.	★	MAE0500MB	15.9	33.9	73.9	73	0.9	5
	3	Int.	●	MAS0500MB	15.9	33.9	73.9	73	0.9	5
	6	Int.	●	MAS0500LB	30.9	48.9	88.9	88	0.9	5
5.1	3	Ext.	★	MAE0510MB	16.2	36.9	76.9	76	0.9	6
	3	Int.	☐	MAS0510MB	16.2	36.9	76.9	76	0.9	6
	6	Int.	★	MAS0510LB	31.5	52.9	92.9	92	0.9	6
5.2	3	Ext.	★	MAE0520MB	16.5	36.9	76.9	76	0.9	6
	3	Int.	☐	MAS0520MB	16.5	36.9	76.9	76	0.9	6
	6	Int.	●	MAS0520LB	32.1	52.9	92.9	92	0.9	6
5.3	3	Ext.	★	MAE0530MB	16.9	37.0	77.0	76	1.0	6
	3	Int.	☐	MAS0530MB	16.9	37.0	77.0	76	1.0	6
	6	Int.	★	MAS0530LB	32.8	53.0	93.0	92	1.0	6
5.4	3	Ext.	★	MAE0540MB	17.2	37.0	77.0	76	1.0	6
	3	Int.	☐	MAS0540MB	17.2	37.0	77.0	76	1.0	6
	6	Int.	★	MAS0540LB	33.4	53.0	93.0	92	1.0	6

* : Standard hole size for rolled thread taps.

● : Inventory maintained. **★ : Inventory maintained in Japan.**
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
5.5	3	Ext.	★	* **MAE0550MB**	17.5	37.0	77.0	76	1.0	6
	3	Int.	★	* **MAS0550MB**	17.5	37.0	77.0	76	1.0	6
	6	Int.	●	* **MAS0550LB**	34.0	53.0	93.0	92	1.0	6
5.6	3	Ext.	★	**MAE0560MB**	17.8	40.0	80.0	79	1.0	6
	3	Int.	□	**MAS0560MB**	17.8	40.0	80.0	79	1.0	6
	6	Int.	★	**MAS0560LB**	34.6	58.0	98.0	97	1.0	6
5.7	3	Ext.	★	**MAE0570MB**	18.1	40.0	80.0	79	1.0	6
	3	Int.	□	**MAS0570MB**	18.1	40.0	80.0	79	1.0	6
	6	Int.	★	**MAS0570LB**	35.2	58.0	98.0	97	1.0	6
5.8	3	Ext.	★	**MAE0580MB**	18.5	40.1	80.1	79	1.1	6
	3	Int.	□	**MAS0580MB**	18.5	40.1	80.1	79	1.1	6
	6	Int.	★	**MAS0580LB**	35.9	58.1	98.1	97	1.1	6
5.9	3	Ext.	★	**MAE0590MB**	18.8	40.1	80.1	79	1.1	6
	3	Int.	□	**MAS0590MB**	18.8	40.1	80.1	79	1.1	6
	6	Int.	★	**MAS0590LB**	36.5	58.1	98.1	97	1.1	6
6.0	3	Ext.	★	**MAE0600MB**	19.1	40.1	80.1	79	1.1	6
	3	Int.	●	**MAS0600MB**	19.1	40.1	80.1	79	1.1	6
	6	Int.	●	**MAS0600LB**	37.1	58.1	98.1	97	1.1	6
6.1	3	Ext.	★	**MAE0610MB**	19.4	43.1	85.1	84	1.1	7
	3	Int.	□	**MAS0610MB**	19.4	43.1	85.1	84	1.1	7
	6	Int.	★	**MAS0610LB**	37.7	63.1	105.1	104	1.1	7
6.2	3	Ext.	★	**MAE0620MB**	19.7	43.1	85.1	84	1.1	7
	3	Int.	□	**MAS0620MB**	19.7	43.1	85.1	84	1.1	7
	6	Int.	★	**MAS0620LB**	38.3	63.1	105.1	104	1.1	7
6.3	3	Ext.	★	**MAE0630MB**	20.0	43.1	85.1	84	1.1	7
	3	Int.	□	**MAS0630MB**	20.0	43.1	85.1	84	1.1	7
	6	Int.	★	**MAS0630LB**	38.9	63.1	105.1	104	1.1	7
6.4	3	Ext.	★	**MAE0640MB**	20.4	43.2	85.2	84	1.2	7
	3	Int.	□	**MAS0640MB**	20.4	43.2	85.2	84	1.2	7
	6	Int.	★	**MAS0640LB**	39.6	63.2	105.2	104	1.2	7
6.5	3	Ext.	★	**MAE0650MB**	20.7	43.2	85.2	84	1.2	7
	3	Int.	★	**MAS0650MB**	20.7	43.2	85.2	84	1.2	7
	6	Int.	●	**MAS0650LB**	40.2	63.2	105.2	104	1.2	7
6.6	3	Ext.	★	**MAE0660MB**	21.0	43.2	85.2	84	1.2	7
	3	Int.	□	**MAS0660MB**	21.0	43.2	85.2	84	1.2	7
	6	Int.	★	**MAS0660LB**	40.8	66.2	108.2	107	1.2	7
6.7	3	Ext.	★	**MAE0670MB**	21.3	43.2	85.2	84	1.2	7
	3	Int.	□	**MAS0670MB**	21.3	43.2	85.2	84	1.2	7
	6	Int.	●	**MAS0670LB**	41.4	66.2	108.2	107	1.2	7
6.8	3	Ext.	★	**MAE0680MB**	21.6	43.2	85.2	84	1.2	7
	3	Int.	★	**MAS0680MB**	21.6	43.2	85.2	84	1.2	7
	6	Int.	●	**MAS0680LB**	42.0	66.2	108.2	107	1.2	7
6.9	3	Ext.	★	**MAE0690MB**	22.0	43.3	85.3	84	1.3	7
	3	Int.	□	**MAS0690MB**	22.0	43.3	85.3	84	1.3	7
	6	Int.	★	**MAS0690LB**	42.7	66.3	108.3	107	1.3	7
7.0	3	Ext.	★	**MAE0700MB**	22.3	43.3	85.3	84	1.3	7
	3	Int.	★	**MAS0700MB**	22.3	43.3	85.3	84	1.3	7
	6	Int.	●	**MAS0700LB**	43.3	66.3	108.3	107	1.3	7

* : Standard hole size for rolled thread taps.

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
7.1	3	Ext.	★	**MAE0710MB**	22.6	49.3	91.3	90	1.3	8
	3	Int.	□	**MAS0710MB**	22.6	49.3	91.3	90	1.3	8
	6	Int.	★	**MAS0710LB**	43.9	69.3	111.3	110	1.3	8
7.2	3	Ext.	★	**MAE0720MB**	22.9	49.3	91.3	90	1.3	8
	3	Int.	□	**MAS0720MB**	22.9	49.3	91.3	90	1.3	8
	6	Int.	★	**MAS0720LB**	44.5	69.3	111.3	110	1.3	8
7.3	3	Ext.	★	**MAE0730MB**	23.2	49.3	91.3	90	1.3	8
	3	Int.	□	**MAS0730MB**	23.2	49.3	91.3	90	1.3	8
	6	Int.	★	**MAS0730LB**	45.1	69.3	111.3	110	1.3	8
7.35	3	Ext.	★	* **MAE0735MB**	23.4	49.3	91.3	90	1.3	8
	3	Int.	★	* **MAS0735MB**	23.4	49.3	91.3	90	1.3	8
	6	Int.	●	* **MAS0735LB**	45.4	69.3	111.3	110	1.3	8
7.4	3	Ext.	★	**MAE0740MB**	23.5	49.3	91.3	90	1.3	8
	3	Int.	□	**MAS0740MB**	23.5	49.3	91.3	90	1.3	8
	6	Int.	★	**MAS0740LB**	45.7	69.3	111.3	110	1.3	8
7.5	3	Ext.	★	**MAE0750MB**	23.9	49.4	91.4	90	1.4	8
	3	Int.	□	**MAS0750MB**	23.9	49.4	91.4	90	1.4	8
	6	Int.	★	**MAS0750LB**	46.4	69.4	111.4	110	1.4	8
7.6	3	Ext.	★	**MAE0760MB**	24.2	49.4	91.4	90	1.4	8
	3	Int.	□	**MAS0760MB**	24.2	49.4	91.4	90	1.4	8
	6	Int.	★	**MAS0760LB**	47.0	73.4	115.4	114	1.4	8
7.7	3	Ext.	★	**MAE0770MB**	24.5	49.4	91.4	90	1.4	8
	3	Int.	□	**MAS0770MB**	24.5	49.4	91.4	90	1.4	8
	6	Int.	★	**MAS0770LB**	47.6	73.4	115.4	114	1.4	8
7.8	3	Ext.	★	**MAE0780MB**	24.8	49.4	91.4	90	1.4	8
	3	Int.	□	**MAS0780MB**	24.8	49.4	91.4	90	1.4	8
	6	Int.	★	**MAS0780LB**	48.2	73.4	115.4	114	1.4	8
7.9	3	Ext.	★	**MAE0790MB**	25.1	49.4	91.4	90	1.4	8
	3	Int.	□	**MAS0790MB**	25.1	49.4	91.4	90	1.4	8
	6	Int.	★	**MAS0790LB**	48.8	73.4	115.4	114	1.4	8
8.0	3	Ext.	★	**MAE0800MB**	25.5	49.5	91.5	90	1.5	8
	3	Int.	●	**MAS0800MB**	25.5	49.5	91.5	90	1.5	8
	6	Int.	●	**MAS0800LB**	49.5	73.5	115.5	114	1.5	8
8.1	3	Ext.	★	**MAE0810MB**	25.8	51.5	95.5	94	1.5	9
	3	Int.	□	**MAS0810MB**	25.8	51.5	95.5	94	1.5	9
	6	Int.	★	**MAS0810LB**	50.1	76.5	120.5	119	1.5	9
8.2	3	Ext.	★	**MAE0820MB**	26.1	51.5	95.5	94	1.5	9
	3	Int.	□	**MAS0820MB**	26.1	51.5	95.5	94	1.5	9
	6	Int.	★	**MAS0820LB**	50.7	76.5	120.5	119	1.5	9
8.3	3	Ext.	★	**MAE0830MB**	26.4	51.5	95.5	94	1.5	9
	3	Int.	□	**MAS0830MB**	26.4	51.5	95.5	94	1.5	9
	6	Int.	★	**MAS0830LB**	51.3	76.5	120.5	119	1.5	9
8.4	3	Ext.	★	**MAE0840MB**	26.7	51.5	95.5	94	1.5	9
	3	Int.	□	**MAS0840MB**	26.7	51.5	95.5	94	1.5	9
	6	Int.	★	**MAS0840LB**	51.9	76.5	120.5	119	1.5	9
8.5	3	Ext.	★	**MAE0850MB**	27.0	51.5	95.5	94	1.5	9
	3	Int.	●	**MAS0850MB**	27.0	51.5	95.5	94	1.5	9
	6	Int.	★	**MAS0850LB**	52.5	76.5	120.5	119	1.5	9

CUTTING CONDITIONS ➤ M127
TECHNICAL DATA ➤ P001

DRILLING (SOLID CARBIDE)

MAE, MAS

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
8.6	3	Ext.	★	MAE0860MB	27.4	51.6	95.6	94	1.6	9
	3	Int.	☐	MAS0860MB	27.4	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0860LB	53.2	78.6	122.6	121	1.6	9
8.7	3	Ext.	★	MAE0870MB	27.7	51.6	95.6	94	1.6	9
	3	Int.	☐	MAS0870MB	27.7	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0870LB	53.8	78.6	122.6	121	1.6	9
8.8	3	Ext.	★	MAE0880MB	28.0	51.6	95.6	94	1.6	9
	3	Int.	☐	MAS0880MB	28.0	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0880LB	54.4	78.6	122.6	121	1.6	9
8.9	3	Ext.	★	MAE0890MB	28.3	51.6	95.6	94	1.6	9
	3	Int.	☐	MAS0890MB	28.3	51.6	95.6	94	1.6	9
	6	Int.	★	MAS0890LB	55.0	78.6	122.6	121	1.6	9
9.0	3	Ext.	★	MAE0900MB	28.6	51.6	95.6	94	1.6	9
	3	Int.	★	MAS0900MB	28.6	51.6	95.6	94	1.6	9
	6	Int.	●	MAS0900LB	55.6	78.6	122.6	121	1.6	9
9.1	3	Ext.	★	MAE0910MB	29.0	54.7	98.7	97	1.7	10
	3	Int.	☐	MAS0910MB	29.0	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0910LB	56.3	82.7	126.7	125	1.7	10
9.2	3	Ext.	★	MAE0920MB	29.3	54.7	98.7	97	1.7	10
	3	Int.	☐	MAS0920MB	29.3	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0920LB	56.9	82.7	126.7	125	1.7	10
9.21	3	Ext.	★	* MAE0921MB	29.3	54.7	98.7	97	1.7	10
	3	Int.	★	* MAS0921MB	29.3	54.7	98.7	97	1.7	10
	6	Int.	★	* MAS0921LB	57.0	82.7	126.7	125	1.7	10
9.3	3	Ext.	★	MAE0930MB	29.6	54.7	98.7	97	1.7	10
	3	Int.	☐	MAS0930MB	29.6	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0930LB	57.5	82.7	126.7	125	1.7	10
9.4	3	Ext.	★	MAE0940MB	29.9	54.7	98.7	97	1.7	10
	3	Int.	☐	MAS0940MB	29.9	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0940LB	58.1	82.7	126.7	125	1.7	10
9.5	3	Ext.	★	MAE0950MB	30.2	54.7	98.7	97	1.7	10
	3	Int.	★	MAS0950MB	30.2	54.7	98.7	97	1.7	10
	6	Int.	●	MAS0950LB	58.7	82.7	126.7	125	1.7	10
9.6	3	Ext.	★	MAE0960MB	30.5	54.7	98.7	97	1.7	10
	3	Int.	☐	MAS0960MB	30.5	54.7	98.7	97	1.7	10
	6	Int.	★	MAS0960LB	59.3	82.7	126.7	125	1.7	10
9.7	3	Ext.	★	MAE0970MB	30.9	54.8	98.8	97	1.8	10
	3	Int.	☐	MAS0970MB	30.9	54.8	98.8	97	1.8	10
	6	Int.	★	MAS0970LB	60.0	82.8	126.8	125	1.8	10
9.8	3	Ext.	★	MAE0980MB	31.2	54.8	98.8	97	1.8	10
	3	Int.	☐	MAS0980MB	31.2	54.8	98.8	97	1.8	10
	6	Int.	★	MAS0980LB	60.6	82.8	126.8	125	1.8	10
9.9	3	Ext.	★	MAE0990MB	31.5	54.8	98.8	97	1.8	10
	3	Int.	☐	MAS0990MB	31.5	54.8	98.8	97	1.8	10
	6	Int.	★	MAS0990LB	61.2	82.8	126.8	125	1.8	10
10.0	3	Ext.	★	MAE1000MB	31.8	54.8	98.8	97	1.8	10
	3	Int.	●	MAS1000MB	31.8	54.8	98.8	97	1.8	10
	6	Int.	●	MAS1000LB	61.8	82.8	126.8	125	1.8	10

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
10.1	3	Ext.	☐	MAE1010MB	32.1	56.8	102.8	101	1.8	11
	3	Int.	☐	MAS1010MB	32.1	56.8	102.8	101	1.8	11
	6	Int.	☐	MAS1010LB	62.4	90.8	136.8	135	1.8	11
10.2	3	Ext.	☐	MAE1020MB	32.5	56.9	102.9	101	1.9	11
	3	Int.	☐	MAS1020MB	32.5	56.9	102.9	101	1.9	11
	6	Int.	☐	MAS1020LB	63.1	90.9	136.9	135	1.9	11
10.3	3	Ext.	★	MAE1030MB	32.8	56.9	102.9	101	1.9	11
	3	Int.	★	MAS1030MB	32.8	56.9	102.9	101	1.9	11
	6	Int.	●	MAS1030LB	63.7	90.9	136.9	135	1.9	11
10.4	3	Ext.	☐	MAE1040MB	33.1	56.9	102.9	101	1.9	11
	3	Int.	☐	MAS1040MB	33.1	56.9	102.9	101	1.9	11
	6	Int.	☐	MAS1040LB	64.3	90.9	136.9	135	1.9	11
10.5	3	Ext.	★	MAE1050MB	33.4	56.9	102.9	101	1.9	11
	3	Int.	★	MAS1050MB	33.4	56.9	102.9	101	1.9	11
	6	Int.	●	MAS1050LB	64.9	90.9	136.9	135	1.9	11
10.6	3	Ext.	☐	MAE1060MB	33.7	56.9	102.9	101	1.9	11
	3	Int.	☐	MAS1060MB	33.7	56.9	102.9	101	1.9	11
	6	Int.	☐	MAS1060LB	65.5	90.9	136.9	135	1.9	11
10.7	3	Ext.	☐	MAE1070MB	34.0	56.9	102.9	101	1.9	11
	3	Int.	☐	MAS1070MB	34.0	56.9	102.9	101	1.9	11
	6	Int.	☐	MAS1070LB	66.1	90.9	136.9	135	1.9	11
10.8	3	Ext.	☐	MAE1080MB	34.4	57.0	103.0	101	2.0	11
	3	Int.	☐	MAS1080MB	34.4	57.0	103.0	101	2.0	11
	6	Int.	☐	MAS1080LB	66.8	91.0	137.0	135	2.0	11
10.9	3	Ext.	☐	MAE1090MB	34.7	57.0	103.0	101	2.0	11
	3	Int.	☐	MAS1090MB	34.7	57.0	103.0	101	2.0	11
	6	Int.	☐	MAS1090LB	67.4	91.0	137.0	135	2.0	11
11.0	3	Ext.	★	MAE1100MB	35.0	57.0	103.0	101	2.0	11
	3	Int.	★	MAS1100MB	35.0	57.0	103.0	101	2.0	11
	6	Int.	●	MAS1100LB	68.0	91.0	137.0	135	2.0	11
11.08	3	Ext.	★	* MAE1108MB	35.2	62.0	108.0	106	2.0	12
	3	Int.	★	* MAS1108MB	35.2	62.0	108.0	106	2.0	12
	6	Int.	●	* MAS1108LB	68.5	96.0	142.0	140	2.0	12
11.1	3	Ext.	☐	MAE1110MB	35.3	62.0	108.0	106	2.0	12
	3	Int.	☐	MAS1110MB	35.3	62.0	108.0	106	2.0	12
	6	Int.	☐	MAS1110LB	68.6	96.0	142.0	140	2.0	12
11.2	3	Ext.	☐	MAE1120MB	35.6	62.0	108.0	106	2.0	12
	3	Int.	☐	MAS1120MB	35.6	62.0	108.0	106	2.0	12
	6	Int.	☐	MAS1120LB	69.2	96.0	142.0	140	2.0	12
11.3	3	Ext.	☐	MAE1130MB	36.0	62.1	108.1	106	2.1	12
	3	Int.	☐	MAS1130MB	36.0	62.1	108.1	106	2.1	12
	6	Int.	☐	MAS1130LB	69.9	96.1	142.1	140	2.1	12
11.4	3	Ext.	☐	MAE1140MB	36.3	62.1	108.1	106	2.1	12
	3	Int.	☐	MAS1140MB	36.3	62.1	108.1	106	2.1	12
	6	Int.	☐	MAS1140LB	70.5	96.1	142.1	140	2.1	12
11.5	3	Ext.	☐	MAE1150MB	36.6	62.1	108.1	106	2.1	12
	3	Int.	☐	MAS1150MB	36.6	62.1	108.1	106	2.1	12
	6	Int.	☐	MAS1150LB	71.1	96.1	142.1	140	2.1	12

* : Standard hole size for rolled thread taps.

● : Inventory maintained.　★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
11.6	3	Ext.	☐	**MAE1160MB**	36.9	62.1	108.1	106	2.1	12
	3	Int.	☐	**MAS1160MB**	36.9	62.1	108.1	106	2.1	12
	6	Int.	☐	**MAS1160LB**	71.7	96.1	142.1	140	2.1	12
11.7	3	Ext.	☐	**MAE1170MB**	37.2	62.1	108.1	106	2.1	12
	3	Int.	☐	**MAS1170MB**	37.2	62.1	108.1	106	2.1	12
	6	Int.	☐	**MAS1170LB**	72.3	96.1	142.1	140	2.1	12
11.8	3	Ext.	☐	**MAE1180MB**	37.5	62.1	108.1	106	2.1	12
	3	Int.	☐	**MAS1180MB**	37.5	62.1	108.1	106	2.1	12
	6	Int.	☐	**MAS1180LB**	72.9	96.1	142.1	140	2.1	12
11.9	3	Ext.	☐	**MAE1190MB**	37.9	62.2	108.2	106	2.2	12
	3	Int.	☐	**MAS1190MB**	37.9	62.2	108.2	106	2.2	12
	6	Int.	☐	**MAS1190LB**	73.6	96.2	142.2	140	2.2	12
12.0	3	Ext.	★	**MAE1200MB**	38.2	62.2	108.2	106	2.2	12
	3	Int.	●	**MAS1200MB**	38.2	62.2	108.2	106	2.2	12
	6	Int.	●	**MAS1200LB**	74.2	96.2	142.2	140	2.2	12
12.1	3	Ext.	☐	**MAE1210MB**	38.5	67.2	117.2	115	2.2	13
	3	Int.	☐	**MAS1210MB**	38.5	67.2	117.2	115	2.2	13
	6	Int.	☐	**MAS1210LB**	74.8	102.2	152.2	150	2.2	13
12.2	3	Ext.	☐	**MAE1220MB**	38.8	67.2	117.2	115	2.2	13
	3	Int.	☐	**MAS1220MB**	38.8	67.2	117.2	115	2.2	13
	6	Int.	☐	**MAS1220LB**	75.4	102.2	152.2	150	2.2	13
12.3	3	Ext.	☐	**MAE1230MB**	39.1	67.2	117.2	115	2.2	13
	3	Int.	☐	**MAS1230MB**	39.1	67.2	117.2	115	2.2	13
	6	Int.	☐	**MAS1230LB**	76.0	102.2	152.2	150	2.2	13
12.4	3	Ext.	☐	**MAE1240MB**	39.5	67.3	117.3	115	2.3	13
	3	Int.	☐	**MAS1240MB**	39.5	67.3	117.3	115	2.3	13
	6	Int.	☐	**MAS1240LB**	76.7	102.3	152.3	150	2.3	13
12.5	3	Ext.	★	**MAE1250MB**	39.8	67.3	117.3	115	2.3	13
	3	Int.	●	**MAS1250MB**	39.8	67.3	117.3	115	2.3	13
	6	Int.	●	**MAS1250LB**	77.3	102.3	152.3	150	2.3	13
12.6	3	Ext.	☐	**MAE1260MB**	40.1	67.3	117.3	115	2.3	13
	3	Int.	☐	**MAS1260MB**	40.1	67.3	117.3	115	2.3	13
	6	Int.	☐	**MAS1260LB**	77.9	102.3	152.3	150	2.3	13
12.7	3	Ext.	☐	**MAE1270MB**	40.4	67.3	117.3	115	2.3	13
	3	Int.	☐	**MAS1270MB**	40.4	67.3	117.3	115	2.3	13
	6	Int.	☐	**MAS1270LB**	78.5	102.3	152.3	150	2.3	13
12.8	3	Ext.	☐	**MAE1280MB**	40.7	67.3	117.3	115	2.3	13
	3	Int.	☐	**MAS1280MB**	40.7	67.3	117.3	115	2.3	13
	6	Int.	☐	**MAS1280LB**	79.1	102.3	152.3	150	2.3	13
12.9	3	Ext.	☐	**MAE1290MB**	41.0	67.3	117.3	115	2.3	13
	3	Int.	☐	**MAS1290MB**	41.0	67.3	117.3	115	2.3	13
	6	Int.	☐	**MAS1290LB**	79.7	102.3	152.3	150	2.3	13
12.96	3	Ext.	★	* **MAE1296MB**	41.3	67.4	117.4	115	2.4	13
	3	Int.	★	* **MAS1296MB**	41.3	67.4	117.4	115	2.4	13
	6	Int.	★	* **MAS1296LB**	80.2	102.4	152.4	150	2.4	13
13.0	3	Ext.	★	**MAE1300MB**	41.4	67.4	117.4	115	2.4	13
	3	Int.	★	**MAS1300MB**	41.4	67.4	117.4	115	2.4	13
	6	Int.	●	**MAS1300LB**	80.4	102.4	152.4	150	2.4	13

* : Standard hole size for rolled thread taps.

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
13.1	3	Ext.	☐	**MAE1310MB**	41.7	72.4	122.4	120	2.4	14
	3	Int.	☐	**MAS1310MB**	41.7	72.4	122.4	120	2.4	14
	6	Int.	☐	**MAS1310LB**	81.0	112.4	162.4	160	2.4	14
13.2	3	Ext.	☐	**MAE1320MB**	42.0	72.4	122.4	120	2.4	14
	3	Int.	☐	**MAS1320MB**	42.0	72.4	122.4	120	2.4	14
	6	Int.	☐	**MAS1320LB**	81.6	112.4	162.4	160	2.4	14
13.3	3	Ext.	☐	**MAE1330MB**	42.3	72.4	122.4	120	2.4	14
	3	Int.	☐	**MAS1330MB**	42.3	72.4	122.4	120	2.4	14
	6	Int.	☐	**MAS1330LB**	82.2	112.4	162.4	160	2.4	14
13.4	3	Ext.	☐	**MAE1340MB**	42.6	72.4	122.4	120	2.4	14
	3	Int.	☐	**MAS1340MB**	42.6	72.4	122.4	120	2.4	14
	6	Int.	☐	**MAS1340LB**	82.8	112.4	162.4	160	2.4	14
13.5	3	Ext.	★	**MAE1350MB**	43.0	72.5	122.5	120	2.5	14
	3	Int.	★	**MAS1350MB**	43.0	72.5	122.5	120	2.5	14
	6	Int.	★	**MAS1350LB**	83.5	112.5	162.5	160	2.5	14
13.6	3	Ext.	☐	**MAE1360MB**	43.3	72.5	122.5	120	2.5	14
	3	Int.	☐	**MAS1360MB**	43.3	72.5	122.5	120	2.5	14
	6	Int.	☐	**MAS1360LB**	84.1	112.5	162.5	160	2.5	14
13.7	3	Ext.	☐	**MAE1370MB**	43.6	72.5	122.5	120	2.5	14
	3	Int.	☐	**MAS1370MB**	43.6	72.5	122.5	120	2.5	14
	6	Int.	☐	**MAS1370LB**	84.7	112.5	162.5	160	2.5	14
13.8	3	Ext.	☐	**MAE1380MB**	43.9	72.5	122.5	120	2.5	14
	3	Int.	☐	**MAS1380MB**	43.9	72.5	122.5	120	2.5	14
	6	Int.	☐	**MAS1380LB**	85.3	112.5	162.5	160	2.5	14
13.9	3	Ext.	☐	**MAE1390MB**	44.2	72.5	122.5	120	2.5	14
	3	Int.	☐	**MAS1390MB**	44.2	72.5	122.5	120	2.5	14
	6	Int.	☐	**MAS1390LB**	85.9	112.5	162.5	160	2.5	14
14.0	3	Ext.	★	**MAE1400MB**	44.5	72.5	122.5	120	2.5	14
	3	Int.	●	**MAS1400MB**	44.5	72.5	122.5	120	2.5	14
	6	Int.	●	**MAS1400LB**	86.5	112.5	162.5	160	2.5	14
14.1	3	Ext.	☐	**MAE1410MB**	44.9	74.6	132.6	130	2.6	15
	3	Int.	☐	**MAS1410MB**	44.9	74.6	132.6	130	2.6	15
	6	Int.	☐	**MAS1410LB**	87.2	117.6	175.6	173	2.6	15
14.2	3	Ext.	☐	**MAE1420MB**	45.2	74.6	132.6	130	2.6	15
	3	Int.	☐	**MAS1420MB**	45.2	74.6	132.6	130	2.6	15
	6	Int.	☐	**MAS1420LB**	87.8	117.6	175.6	173	2.6	15
14.3	3	Ext.	☐	**MAE1430MB**	45.5	74.6	132.6	130	2.6	15
	3	Int.	☐	**MAS1430MB**	45.5	74.6	132.6	130	2.6	15
	6	Int.	☐	**MAS1430LB**	88.4	117.6	175.6	173	2.6	15
14.4	3	Ext.	☐	**MAE1440MB**	45.8	74.6	132.6	130	2.6	15
	3	Int.	☐	**MAS1440MB**	45.8	74.6	132.6	130	2.6	15
	6	Int.	☐	**MAS1440LB**	89.0	117.6	175.6	173	2.6	15
14.5	3	Ext.	☐	**MAE1450MB**	46.1	74.6	132.6	130	2.6	15
	3	Int.	☐	**MAS1450MB**	46.1	74.6	132.6	130	2.6	15
	6	Int.	☐	**MAS1450LB**	89.6	117.6	175.6	173	2.6	15
14.6	3	Ext.	☐	**MAE1460MB**	46.5	74.7	132.7	130	2.7	15
	3	Int.	☐	**MAS1460MB**	46.5	74.7	132.7	130	2.7	15
	6	Int.	☐	**MAS1460LB**	90.3	117.7	175.7	173	2.7	15

CUTTING CONDITIONS ➤M127
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MAE, MAS

DC (mm)	Hole Depth (L/D)	Coolant (Int./Ext.)	HTi10	Order Number	Dimensions (mm)					
					LU	LCF	OAL	LF	PL	DCONMS
14.7	3	Ext.	□	**MAE1470MB**	46.8	74.7	132.7	130	2.7	15
	3	Int.	□	**MAS1470MB**	46.8	74.7	132.7	130	2.7	15
	6	Int.	□	**MAS1470LB**	90.9	117.7	175.7	173	2.7	15
14.8	3	Ext.	□	**MAE1480MB**	47.1	74.7	132.7	130	2.7	15
	3	Int.	□	**MAS1480MB**	47.1	74.7	132.7	130	2.7	15
	6	Int.	□	**MAS1480LB**	91.5	117.7	175.7	173	2.7	15
14.9	3	Ext.	□	**MAE1490MB**	47.4	74.7	132.7	130	2.7	15
	3	Int.	□	**MAS1490MB**	47.4	74.7	132.7	130	2.7	15
	6	Int.	□	**MAS1490LB**	92.1	117.7	175.7	173	2.7	15
14.96	3	Ext.	★	* **MAE1496MB**	47.6	74.7	132.7	130	2.7	15
	3	Int.	★	* **MAS1496MB**	47.6	74.7	132.7	130	2.7	15
	6	Int.	★	* **MAS1496LB**	92.5	117.7	175.7	173	2.7	15
15.0	3	Ext.	★	**MAE1500MB**	47.7	74.7	132.7	130	2.7	15
	3	Int.	★	**MAS1500MB**	47.7	74.7	132.7	130	2.7	15
	6	Int.	●	**MAS1500LB**	92.7	117.7	175.7	173	2.7	15
15.1	3	Ext.	□	**MAE1510MB**	48.0	78.7	136.7	134	2.7	16
	3	Int.	□	**MAS1510MB**	48.0	78.7	136.7	134	2.7	16
	6	Int.	□	**MAS1510LB**	93.3	122.7	180.7	178	2.7	16
15.2	3	Ext.	□	**MAE1520MB**	48.4	78.8	136.8	134	2.8	16
	3	Int.	□	**MAS1520MB**	48.4	78.8	136.8	134	2.8	16
	6	Int.	□	**MAS1520LB**	94.0	122.8	180.8	178	2.8	16
15.3	3	Ext.	□	**MAE1530MB**	48.7	78.8	136.8	134	2.8	16
	3	Int.	□	**MAS1530MB**	48.7	78.8	136.8	134	2.8	16
	6	Int.	□	**MAS1530LB**	94.6	122.8	180.8	178	2.8	16
15.4	3	Ext.	□	**MAE1540MB**	49.0	78.8	136.8	134	2.8	16
	3	Int.	□	**MAS1540MB**	49.0	78.8	136.8	134	2.8	16
	6	Int.	□	**MAS1540LB**	95.2	122.8	180.8	178	2.8	16
15.5	3	Ext.	□	**MAE1550MB**	49.3	78.8	136.8	134	2.8	16
	3	Int.	□	**MAS1550MB**	49.3	78.8	136.8	134	2.8	16
	6	Int.	□	**MAS1550LB**	95.8	122.8	180.8	178	2.8	16
15.6	3	Ext.	□	**MAE1560MB**	49.6	78.8	136.8	134	2.8	16
	3	Int.	□	**MAS1560MB**	49.6	78.8	136.8	134	2.8	16
	6	Int.	□	**MAS1560LB**	96.4	122.8	180.8	178	2.8	16
15.7	3	Ext.	□	**MAE1570MB**	50.0	78.9	136.9	134	2.9	16
	3	Int.	□	**MAS1570MB**	50.0	78.9	136.9	134	2.9	16
	6	Int.	□	**MAS1570LB**	97.1	122.9	180.9	178	2.9	16
15.8	3	Ext.	□	**MAE1580MB**	50.3	78.9	136.9	134	2.9	16
	3	Int.	□	**MAS1580MB**	50.3	78.9	136.9	134	2.9	16
	6	Int.	□	**MAS1580LB**	97.7	122.9	180.9	178	2.9	16
15.9	3	Ext.	□	**MAE1590MB**	50.6	78.9	136.9	134	2.9	16
	3	Int.	□	**MAS1590MB**	50.6	78.9	136.9	134	2.9	16
	6	Int.	□	**MAS1590LB**	98.3	122.9	180.9	178	2.9	16
16.0	3	Ext.	★	**MAE1600MB**	50.9	78.9	136.9	134	2.9	16
	3	Int.	★	**MAS1600MB**	50.9	78.9	136.9	134	2.9	16
	6	Int.	●	**MAS1600LB**	98.9	122.9	180.9	178	2.9	16

* : Standard hole size for rolled thread taps.

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

RECOMMENDED CUTTING CONDITIONS

Type		Material	Drill Dia. **Ø 3.0—Ø 6.0**		Drill Dia. **Ø 6.1—Ø 10.0**		Drill Dia. **Ø 10.1—Ø 16.0**	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
MAE	**N**	Aluminium Alloy	90 (40—140)	0.15 (0.05—0.3)	100 (50—150)	0.2 (0.1—0.3)	120 (60—170)	0.25 (0.1—0.4)
		Aluminium Alloy Casting	100 (60—150)	0.12 (0.05—0.25)	110 (70—160)	0.15 (0.05—0.25)	130 (80—180)	0.2 (0.1—0.3)
	K	Gray Cast Iron	40 (20—60)	0.15 (0.1—0.2)	60 (40—80)	0.2 (0.1—0.3)	80 (60—100)	0.3 (0.2—0.4)
		Ductile Cast Iron	30 (20—40)	0.1 (0.05—0.15)	40 (20—60)	0.12 (0.05—0.2)	60 (40—80)	0.2 (0.1—0.3)
MAS	**N**	Aluminium Alloy	100 (60—150)	0.15 (0.05—0.3)	120 (80—170)	0.2 (0.1—0.3)	150 (100—200)	0.25 (0.1—0.4)
		Aluminium Alloy Casting	120 (80—170)	0.12 (0.05—0.25)	150 (100—180)	0.15 (0.05—0.25)	160 (120—200)	0.2 (0.1—0.3)
	K	Gray Cast Iron	60 (40—80)	0.15 (0.1—0.2)	80 (60—110)	0.2 (0.1—0.3)	100 (70—130)	0.3 (0.2—0.4)
		Ductile Cast Iron	45 (30—60)	0.1 (0.05—0.15)	60 (40—80)	0.12 (0.05—0.2)	80 (60—100)	0.2 (0.1—0.3)

■ HOLE AND DRILL DIAMETERS FOR THREAD TAPPING

Thread Size	Thread Tapping			Rolled Thread Tapping		
	Drill Diameter **(DC)**	Hole Diameter Tolerance		Drill Diameter **(DC)**	Hole Diameter Tolerance	
		min	max		min	max
M4x0.7	**3.3**	3.242	3.422	**3.65**	3.65	3.70
M5x0.8	**4.2**	4.134	4.334	**4.60**	4.59	4.66
M6x1.0	**5.0**	4.917	5.153	**5.50**	5.48	5.57
M8x1.25	**6.8**	6.647	6.912	**7.35**	7.34	7.41
M10x1.5	**8.5**	8.376	8.676	**9.21**	9.18	9.28
M12x1.75	**10.3**	10.106	10.441	**11.08**	11.05	11.15
M14x2	**12.0**	11.835	12.210	**12.96**	12.92	13.04
M16x2	**14.0**	13.835	14.210	**14.96**	14.92	15.04

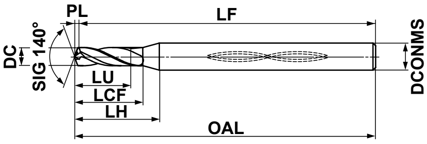
MHS

- Unique double margin and high resistance to bending.
- Non-peck drilling capability and long tool life for high hardened steel, 35HRC-55HRC.

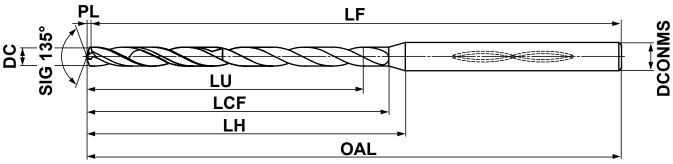
UWC VP 135° 142° 140°

P **M** K N **S** **H**

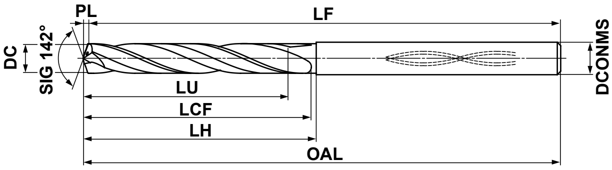
Internal Coolant



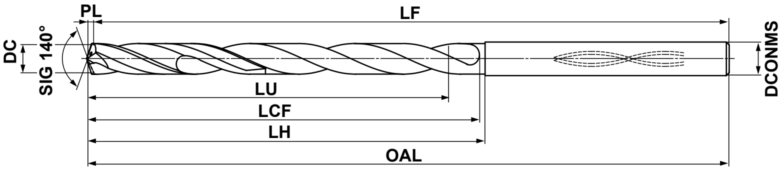
Type1



Type2



Type3



Type4

DC≦3	3<DC≦6	6<DC≦10	10<DC≦12
+ 0.010 − 0.002	+ 0.010 − 0.002	+ 0.010 − 0.005	+ 0.010 − 0.008
DCONMS=3	3<DCONMS≦6	6<DCONMS≦10	10<DCONMS≦12
0 − 0.006	0 − 0.008	0 − 0.009	0 − 0.011

- MHS drills are suitable for use with shrink fit holders.
- Use the shortest type in the respective diameter as a pilot drill.

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
0.95	3	★	**MHS0095L006B**	3.0	6.2	10.0	60.2	60	0.17	3	1
	6	★	**MHS0095L009B**	5.9	9.2	13.0	60.2	60	0.17	3	2
	13	★	**MHS0095L015B**	12.5	15.2	19.0	60.2	60	0.17	3	2
	23	★	**MHS0095L025B**	22.0	25.2	29.0	60.2	60	0.17	3	2
	30	★	**MHS0095L035B**	28.7	35.2	39.0	80.2	80	0.17	3	2
1.00	3	●	**MHS0100L006B**	3.2	6.2	9.9	60.2	60	0.2	3	1
	6	●	**MHS0100L009B**	6.2	9.2	12.9	60.2	60	0.2	3	2
	12	★	**MHS0100L015B**	12.2	15.2	18.9	60.2	60	0.2	3	2
	22	●	**MHS0100L025B**	22.2	25.2	28.9	60.2	60	0.2	3	2
	30	●	**MHS0100L035B**	30.2	35.2	38.9	80.2	80	0.2	3	2
1.10	2	●	**MHS0110L006B**	2.4	6.2	9.7	60.2	60	0.2	3	1
	5	★	**MHS0110L009B**	5.7	9.2	12.7	60.2	60	0.2	3	2
	11	●	**MHS0110L015B**	12.3	15.2	18.7	60.2	60	0.2	3	2
	20	●	**MHS0110L025B**	22.2	25.2	28.7	60.2	60	0.2	3	2
	29	●	**MHS0110L035B**	32.1	35.2	38.7	80.2	80	0.2	3	2
1.20	2	●	**MHS0120L006B**	2.6	6.2	9.6	60.2	60	0.2	3	1
	5	★	**MHS0120L009B**	6.2	9.2	12.6	60.2	60	0.2	3	2
	10	●	**MHS0120L015B**	12.2	15.2	18.6	60.2	60	0.2	3	2
	18	●	**MHS0120L025B**	21.8	25.2	28.6	60.2	60	0.2	3	2
	26	●	**MHS0120L035B**	31.4	35.2	38.6	80.2	80	0.2	3	2
1.30	2	●	**MHS0130L007B**	2.8	7.2	10.4	60.2	60	0.2	3	1
	5	★	**MHS0130L011B**	6.8	11.3	14.5	60.3	60	0.3	3	2
	12	●	**MHS0130L020B**	15.9	20.3	23.5	60.3	60	0.3	3	2
	20	●	**MHS0130L030B**	26.3	30.3	33.5	80.3	80	0.3	3	2
	30	●	**MHS0130L045B**	39.3	45.3	48.5	80.3	80	0.3	3	2
1.40	2	●	**MHS0140L007B**	3.1	7.3	10.3	60.3	60	0.3	3	1
	5	★	**MHS0140L011B**	7.3	11.3	14.3	60.3	60	0.3	3	2
	11	●	**MHS0140L020B**	15.7	20.3	23.3	60.3	60	0.3	3	2
	18	★	**MHS0140L030B**	25.5	30.3	33.3	80.3	80	0.3	3	2
	29	★	**MHS0140L045B**	40.9	45.3	48.3	80.3	80	0.3	3	2
1.45	3	●	**MHS0145L008B**	4.7	8.3	11.2	60.3	60	0.3	3	1
	6	★	**MHS0145L013B**	9.0	13.3	16.2	60.3	60	0.3	3	2
	11	★	**MHS0145L020B**	16.3	20.3	23.2	60.3	60	0.3	3	2
	21	●	**MHS0145L035B**	30.8	35.3	38.2	80.3	80	0.3	3	2
	30	★	**MHS0145L055B**	43.8	55.3	58.2	100.3	100	0.3	3	2
1.50	2	●	**MHS0150L008B**	3.3	8.3	11.1	60.3	60	0.3	3	1
	6	★	**MHS0150L013B**	9.3	13.3	16.1	60.3	60	0.3	3	2
	10	●	**MHS0150L020B**	15.3	20.3	23.1	60.3	60	0.3	3	2
	20	●	**MHS0150L035B**	30.3	35.3	38.1	80.3	80	0.3	3	2
	30	●	**MHS0150L055B**	45.3	55.3	58.1	100.3	100	0.3	3	2
1.60	2	●	**MHS0160L008B**	3.5	8.3	10.9	60.3	60	0.3	3	1
	5	★	**MHS0160L013B**	8.3	13.3	15.9	60.3	60	0.3	3	2
	10	●	**MHS0160L020B**	16.3	20.3	22.9	60.3	60	0.3	3	2
	19	●	**MHS0160L035B**	30.7	35.3	37.9	80.3	80	0.3	3	2
	30	●	**MHS0160L055B**	48.3	55.3	57.9	100.3	100	0.3	3	2
1.70	2	●	**MHS0170L008B**	3.7	8.3	10.7	60.3	60	0.3	3	1
	5	★	**MHS0170L013B**	8.9	13.4	15.8	60.4	60	0.4	3	2
	9	●	**MHS0170L020B**	15.7	20.4	22.8	60.4	60	0.4	3	2
	18	●	**MHS0170L035B**	31.0	35.4	37.8	80.4	80	0.4	3	2
	29	●	**MHS0170L055B**	49.7	55.4	57.8	100.4	100	0.4	3	2

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
□ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
1.80	3	●	MHS0180L010B	5.7	10.3	12.5	60.3	60	0.3	3	1
	5	★	MHS0180L015B	9.4	15.4	17.6	60.4	60	0.4	3	2
	11	●	MHS0180L025B	20.2	25.4	27.6	60.4	60	0.4	3	2
	22	●	MHS0180L045B	40.0	45.4	47.6	80.4	80	0.4	3	2
	30	●	MHS0180L065B	54.4	65.4	67.6	100.4	100	0.4	3	2
1.90	2	●	MHS0190L010B	4.1	10.3	12.4	60.3	60	0.3	3	1
	5	★	MHS0190L015B	9.9	15.4	17.5	60.4	60	0.4	3	2
	10	●	MHS0190L025B	19.4	25.4	27.5	60.4	60	0.4	3	2
	21	●	MHS0190L045B	40.3	45.4	47.5	80.4	80	0.4	3	2
	30	●	MHS0190L065B	57.4	65.4	67.5	100.4	100	0.4	3	2
1.95	2	●	MHS0195L010B	4.3	10.4	12.4	60.4	60	0.4	3	1
	5	★	MHS0195L015B	10.2	15.4	17.4	60.4	60	0.4	3	2
	10	★	MHS0195L025B	19.9	25.4	27.4	60.4	60	0.4	3	2
	20	●	MHS0195L045B	39.4	45.4	47.4	80.4	80	0.4	3	2
	30	★	MHS0195L065B	58.9	65.4	67.4	100.4	100	0.4	3	2
2.00	2	●	MHS0200L010B	4.4	10.4	12.3	60.4	60	0.4	3	1
	5	★	MHS0200L015B	10.4	15.4	17.3	60.4	60	0.4	3	2
	9	●	MHS0200L025B	18.4	25.4	27.3	60.4	60	0.4	3	2
	20	●	MHS0200L045B	40.4	45.4	47.3	80.4	80	0.4	3	2
	30	●	MHS0200L065B	60.4	65.4	67.3	100.4	100	0.4	3	2
2.10	3	●	MHS0210L012B	6.7	12.4	14.1	60.4	60	0.4	3	1
	7	★	MHS0210L020B	15.1	20.4	22.1	60.4	60	0.4	3	2
	11	●	MHS0210L030B	23.5	30.4	32.1	80.4	80	0.4	3	2
	23	●	MHS0210L055B	48.7	55.4	57.1	100.4	100	0.4	3	2
	30	●	MHS0210L075B	63.4	75.4	77.1	120.4	120	0.4	3	2
2.20	2	●	MHS0220L012B	4.8	12.4	13.9	60.4	60	0.4	3	1
	6	★	MHS0220L020B	13.7	20.5	22.0	60.5	60	0.5	3	2
	11	●	MHS0220L030B	24.7	30.5	32.0	80.5	80	0.5	3	2
	22	●	MHS0220L055B	48.9	55.5	57.0	100.5	100	0.5	3	2
	30	●	MHS0220L075B	66.5	75.5	77.0	120.5	120	0.5	3	2
2.30	2	●	MHS0230L012B	5.0	12.4	13.7	60.4	60	0.4	3	1
	6	★	MHS0230L020B	14.3	20.5	21.8	60.5	60	0.5	3	2
	10	●	MHS0230L030B	23.5	30.5	31.8	80.5	80	0.5	3	2
	21	●	MHS0230L055B	48.8	55.5	56.8	100.5	100	0.5	3	2
	30	●	MHS0230L075B	69.5	75.5	76.8	120.5	120	0.5	3	2
2.40	2	●	MHS0240L012B	5.2	12.4	13.5	60.4	60	0.4	3	1
	5	★	MHS0240L020B	12.5	20.5	21.6	60.5	60	0.5	3	2
	9	●	MHS0240L030B	22.1	30.5	31.6	80.5	80	0.5	3	2
	20	●	MHS0240L055B	48.5	55.5	56.6	100.5	100	0.5	3	2
	28	●	MHS0240L075B	67.7	75.5	76.6	120.5	120	0.5	3	2
2.45	2	★	MHS0245L013B	5.3	13.4	14.4	70.4	70	0.4	4	1
	5	★	MHS0245L020B	12.8	20.5	21.5	70.5	70	0.5	4	2
	11	★	MHS0245L035B	27.5	35.5	36.5	90.5	90	0.5	4	2
	24	★	MHS0245L065B	59.3	65.5	66.5	110.5	110	0.5	4	2
	30	★	MHS0245L090B	74.0	90.5	91.5	140.5	140	0.5	4	2
2.50	2	●	MHS0250L013B	5.5	13.5	16.3	70.5	70	0.5	4	1
	5	★	MHS0250L020B	13.0	20.5	23.3	70.5	70	0.5	4	2
	11	●	MHS0250L035B	28.0	35.5	38.3	90.5	90	0.5	4	2
	23	●	MHS0250L065B	58.0	65.5	68.3	110.5	110	0.5	4	2
	30	●	MHS0250L090B	75.5	90.5	93.3	140.5	140	0.5	4	2

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
2.60	2	●	MHS0260L013B	5.7	13.5	16.1	70.5	70	0.5	4	1
	5	★	MHS0260L020B	13.5	20.5	23.1	70.5	70	0.5	4	2
	10	●	MHS0260L035B	26.5	35.5	38.1	90.5	90	0.5	4	2
	22	●	MHS0260L065B	57.7	65.5	68.1	110.5	110	0.5	4	2
	30	●	MHS0260L090B	78.5	90.5	93.1	140.5	140	0.5	4	2
2.70	2	●	MHS0270L013B	5.9	13.5	15.9	70.5	70	0.5	4	1
	4	★	MHS0270L020B	11.4	20.6	23.0	70.6	70	0.6	4	2
	10	●	MHS0270L035B	27.6	35.6	38.0	90.6	90	0.6	4	2
	21	●	MHS0270L065B	57.3	65.6	68.0	110.6	110	0.6	4	2
	30	●	MHS0270L090B	81.6	90.6	93.0	140.6	140	0.6	4	2
2.80	2	●	MHS0280L014B	6.1	14.5	16.7	70.5	70	0.5	4	1
	4	★	MHS0280L020B	11.8	20.6	22.8	70.6	70	0.6	4	2
	9	●	MHS0280L035B	25.8	35.6	37.8	90.6	90	0.6	4	2
	20	●	MHS0280L065B	56.6	65.6	67.8	110.6	110	0.6	4	2
	29	●	MHS0280L090B	81.8	90.6	92.8	140.6	140	0.6	4	2
2.90	2	●	MHS0290L014B	6.3	14.5	16.6	70.5	70	0.5	4	1
	4	★	MHS0290L020B	12.2	20.6	22.7	70.6	70	0.6	4	2
	9	●	MHS0290L035B	26.7	35.6	37.7	90.6	90	0.6	4	2
	19	●	MHS0290L065B	55.7	65.6	67.7	110.6	110	0.6	4	2
	28	●	MHS0290L090B	81.8	90.6	92.7	140.6	140	0.6	4	2
2.95	2	★	MHS0295L014B	6.4	14.5	16.5	70.5	70	0.5	4	1
	4	★	MHS0295L020B	12.4	20.6	22.6	70.6	70	0.6	4	2
	9	★	MHS0295L035B	27.2	35.6	37.6	90.6	90	0.6	4	2
	19	●	MHS0295L065B	56.7	65.6	67.6	110.6	110	0.6	4	2
	28	★	MHS0295L090B	83.2	90.6	92.6	140.6	140	0.6	4	2
3.0	4	●	MHS0300L020B	12.5	19.5	20.5	70.5	70	0.5	4	3
	10	●	MHS0300L040B	30.5	39.5	40.5	90.5	90	0.5	4	4
	17	●	MHS0300L060B	51.5	59.5	60.5	110.5	110	0.5	4	4
	27	●	MHS0300L090B	81.5	89.5	90.5	140.5	140	0.5	4	4
3.1	4	☐	MHS0310L020B	12.9	20.0	20.5	70.5	70	0.5	4	3
	10	☐	MHS0310L040B	31.6	40.1	40.6	90.6	90	0.6	4	4
	17	☐	MHS0310L060B	53.3	60.1	60.6	110.6	110	0.6	4	4
	26	☐	MHS0310L090B	81.2	90.1	90.6	140.6	140	0.6	4	4
3.2	4	☐	MHS0320L020B	13.4	20.1	20.6	70.6	70	0.6	4	3
	10	☐	MHS0320L040B	32.6	40.1	40.6	90.6	90	0.6	4	4
	16	☐	MHS0320L060B	51.8	60.1	60.6	110.6	110	0.6	4	4
	25	☐	MHS0320L090B	80.6	90.1	90.6	140.6	140	0.6	4	4
3.3	3	☐	MHS0330L020B	10.5	20.1	20.6	70.6	70	0.6	4	3
	9	☐	MHS0330L040B	30.3	40.1	40.6	90.6	90	0.6	4	4
	16	☐	MHS0330L060B	53.4	60.1	60.6	110.6	110	0.6	4	4
	25	☐	MHS0330L090B	83.1	90.1	90.6	140.6	140	0.6	4	4
3.4	3	☐	MHS0340L020B	10.8	20.1	20.6	70.6	70	0.6	4	3
	9	☐	MHS0340L040B	31.2	40.1	40.6	90.6	90	0.6	4	4
	15	☐	MHS0340L060B	51.6	60.1	60.6	110.6	110	0.6	4	4
	24	☐	MHS0340L090B	82.2	90.1	90.6	140.6	140	0.6	4	4
3.5	3	●	MHS0350L020B	11.1	20.1	20.6	70.6	70	0.6	4	3
	9	●	MHS0350L040B	32.1	40.1	40.6	90.6	90	0.6	4	4
	14	●	MHS0350L060B	49.6	60.1	60.6	110.6	110	0.6	4	4
	23	●	MHS0350L090B	81.1	90.1	90.6	140.6	140	0.6	4	4

CUTTING CONDITIONS ➤M136
OPERATION GUIDANCE ➤M137
TECHNICAL DATA ➤P001

MHS

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
3.6	3	☐	**MHS0360L020B**	11.4	20.6	20.6	70.6	70	0.6	4	3
	9	☐	**MHS0360L040B**	33.1	40.7	40.7	90.7	90	0.7	4	4
	14	☐	**MHS0360L060B**	51.1	60.7	60.7	110.7	110	0.7	4	4
	22	☐	**MHS0360L090B**	79.9	90.7	90.7	140.7	140	0.7	4	4
	30	☐	**MHS0360L120B**	108.7	120.7	120.7	170.7	170	0.7	4	4
3.7	3	☐	**MHS0370L020B**	11.7	20.6	20.6	70.6	70	0.6	4	3
	8	☐	**MHS0370L040B**	30.3	40.7	40.7	90.7	90	0.7	4	4
	14	☐	**MHS0370L060B**	52.5	60.7	60.7	110.7	110	0.7	4	4
	22	☐	**MHS0370L090B**	82.1	90.7	90.7	140.7	140	0.7	4	4
	30	☐	**MHS0370L120B**	111.7	120.7	120.7	170.7	170	0.7	4	4
3.8	3	★	**MHS0380L020B**	12.1	20.7	20.7	70.7	70	0.7	4	3
	8	★	**MHS0380L040B**	31.1	40.7	40.7	90.7	90	0.7	4	4
	13	★	**MHS0380L060B**	50.1	60.7	60.7	110.7	110	0.7	4	4
	21	★	**MHS0380L090B**	80.5	90.7	90.7	140.7	140	0.7	4	4
	29	★	**MHS0380L120B**	110.9	120.7	120.7	170.7	170	0.7	4	4
3.9	3	★	**MHS0390L020B**	12.4	20.7	20.7	70.7	70	0.7	4	3
	8	★	**MHS0390L040B**	31.9	40.7	40.7	90.7	90	0.7	4	4
	13	★	**MHS0390L060B**	51.4	60.7	60.7	110.7	110	0.7	4	4
	21	☐	**MHS0390L090B**	82.6	90.7	90.7	140.7	140	0.7	4	4
	28	☐	**MHS0390L120B**	109.9	120.7	120.7	170.7	170	0.7	4	4
4.0	2	●	**MHS0400L020B**	8.7	20.7	20.7	70.7	70	0.7	4	3
	7	●	**MHS0400L040B**	28.7	40.7	40.7	90.7	90	0.7	4	4
	12	●	**MHS0400L060B**	48.7	60.7	60.7	110.7	110	0.7	4	4
	20	●	**MHS0400L090B**	80.7	90.7	90.7	140.7	140	0.7	4	4
	27	●	**MHS0400L120B**	108.7	120.7	120.7	170.7	170	0.7	4	4
4.1	2	☐	**MHS0410L020B**	8.9	19.2	20.7	70.7	70	0.7	6	3
	7	☐	**MHS0410L040B**	29.4	39.2	40.7	90.7	90	0.7	6	4
	12	☐	**MHS0410L060B**	49.9	59.2	60.7	110.7	110	0.7	6	4
	19	☐	**MHS0410L090B**	78.6	89.2	90.7	140.7	140	0.7	6	4
	26	☐	**MHS0410L120B**	107.3	119.2	120.7	170.7	170	0.7	6	4
4.2	2	☐	**MHS0420L020B**	9.1	19.2	20.7	70.7	70	0.7	6	3
	7	☐	**MHS0420L040B**	30.2	39.3	40.8	90.8	90	0.8	6	4
	11	☐	**MHS0420L060B**	47.0	59.3	60.8	110.8	110	0.8	6	4
	19	☐	**MHS0420L090B**	80.6	89.3	90.8	140.8	140	0.8	6	4
	26	☐	**MHS0420L120B**	110.0	119.3	120.8	170.8	170	0.8	6	4
4.3	2	☐	**MHS0430L020B**	9.3	19.2	20.7	70.7	70	0.7	6	3
	6	☐	**MHS0430L040B**	26.6	39.3	40.8	90.8	90	0.8	6	4
	11	☐	**MHS0430L060B**	48.1	59.3	60.8	110.8	110	0.8	6	4
	18	☐	**MHS0430L090B**	78.2	89.3	90.8	140.8	140	0.8	6	4
	25	☐	**MHS0430L120B**	108.3	119.3	120.8	170.8	170	0.8	6	4
4.4	2	★	**MHS0440L020B**	9.6	19.3	20.8	70.8	70	0.8	6	3
	6	☐	**MHS0440L040B**	27.2	39.3	40.8	90.8	90	0.8	6	4
	11	☐	**MHS0440L060B**	49.2	59.3	60.8	110.8	110	0.8	6	4
	18	☐	**MHS0440L090B**	80.0	89.3	90.8	140.8	140	0.8	6	4
	24	☐	**MHS0440L120B**	106.4	119.3	120.8	170.8	170	0.8	6	4
4.5	2	●	**MHS0450L020B**	9.8	19.3	20.8	70.8	70	0.8	6	3
	6	●	**MHS0450L040B**	27.8	39.3	40.8	90.8	90	0.8	6	4
	10	●	**MHS0450L060B**	45.8	59.3	60.8	110.8	110	0.8	6	4
	17	●	**MHS0450L090B**	77.3	89.3	90.8	140.8	140	0.8	6	4
	24	●	**MHS0450L120B**	108.8	119.3	120.8	170.8	170	0.8	6	4

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
4.6	2	☐	**MHS0460L020B**	10.0	19.8	20.8	70.8	70	0.8	6	3
	6	☐	**MHS0460L040B**	28.4	39.8	40.8	90.8	90	0.8	6	4
	10	☐	**MHS0460L060B**	46.8	59.8	60.8	110.8	110	0.8	6	4
	17	☐	**MHS0460L090B**	79.0	89.8	90.8	140.8	140	0.8	6	4
	23	☐	**MHS0460L120B**	106.6	119.8	120.8	170.8	170	0.8	6	4
	30	☐	**MHS0460L150B**	138.8	149.8	150.8	200.8	200	0.8	6	4
4.7	2	☐	**MHS0470L020B**	10.2	19.8	20.8	70.8	70	0.8	6	3
	6	☐	**MHS0470L040B**	29.1	39.9	40.9	90.9	90	0.9	6	4
	10	☐	**MHS0470L060B**	47.9	59.9	60.9	110.9	110	0.9	6	4
	16	☐	**MHS0470L090B**	76.1	89.9	90.9	140.9	140	0.9	6	4
	23	☐	**MHS0470L120B**	109.0	119.9	120.9	170.9	170	0.9	6	4
	29	☐	**MHS0470L150B**	137.2	149.9	150.9	200.9	200	0.9	6	4
4.8	1	★	**MHS0480L020B**	5.6	19.8	20.8	70.8	70	0.8	6	3
	6	★	**MHS0480L040B**	29.7	39.9	40.9	90.9	90	0.9	6	4
	10	★	**MHS0480L060B**	48.9	59.9	60.9	110.9	110	0.9	6	4
	16	★	**MHS0480L090B**	77.7	89.9	90.9	140.9	140	0.9	6	4
	22	★	**MHS0480L120B**	106.5	119.9	120.9	170.9	170	0.9	6	4
	29	★	**MHS0480L150B**	140.1	149.9	150.9	200.9	200	0.9	6	4
4.9	1	☐	**MHS0490L020B**	5.7	19.8	20.8	70.8	70	0.8	6	3
	5	☐	**MHS0490L040B**	25.4	39.9	40.9	90.9	90	0.9	6	4
	10	☐	**MHS0490L060B**	49.9	59.9	60.9	110.9	110	0.9	6	4
	16	☐	**MHS0490L090B**	79.3	89.9	90.9	140.9	140	0.9	6	4
	22	☐	**MHS0490L120B**	108.7	119.9	120.9	170.9	170	0.9	6	4
	28	☐	**MHS0490L150B**	138.1	149.9	150.9	200.9	200	0.9	6	4
5.0	1	●	**MHS0500L020B**	5.9	19.9	20.9	70.9	70	0.9	6	3
	5	●	**MHS0500L040B**	25.9	39.9	40.9	90.9	90	0.9	6	4
	9	●	**MHS0500L060B**	45.9	59.9	60.9	110.9	110	0.9	6	4
	15	●	**MHS0500L090B**	75.9	89.9	90.9	140.9	140	0.9	6	4
	21	●	**MHS0500L120B**	105.9	119.9	120.9	170.9	170	0.9	6	4
	27	●	**MHS0500L150B**	135.9	149.9	150.9	200.9	200	0.9	6	4
5.1	3	☐	**MHS0510L030B**	16.2	30.4	30.9	80.9	80	0.9	6	3
	9	☐	**MHS0510L060B**	46.8	60.4	60.9	110.9	110	0.9	6	4
	15	☐	**MHS0510L090B**	77.4	90.4	90.9	140.9	140	0.9	6	4
	21	☐	**MHS0510L120B**	108.0	120.4	120.9	170.9	170	0.9	6	4
	27	☐	**MHS0510L150B**	138.6	150.4	150.9	200.9	200	0.9	6	4
5.2	3	☐	**MHS0520L030B**	16.5	30.4	30.9	80.9	80	0.9	6	3
	9	☐	**MHS0520L060B**	47.7	60.4	60.9	110.9	110	0.9	6	4
	15	☐	**MHS0520L090B**	78.9	90.4	90.9	140.9	140	0.9	6	4
	20	☐	**MHS0520L120B**	104.9	120.4	120.9	170.9	170	0.9	6	4
	26	☐	**MHS0520L150B**	136.1	150.4	150.9	200.9	200	0.9	6	4
5.3	3	☐	**MHS0530L030B**	16.8	30.4	30.9	80.9	80	0.9	6	3
	9	☐	**MHS0530L060B**	48.7	60.5	61.0	111.0	110	1.0	6	4
	14	★	**MHS0530L090B**	75.2	90.5	91.0	141.0	140	1.0	6	4
	20	☐	**MHS0530L120B**	107.0	120.5	121.0	171.0	170	1.0	6	4
	26	☐	**MHS0530L150B**	138.8	150.5	151.0	201.0	200	1.0	6	4
5.4	3	☐	**MHS0540L030B**	17.1	30.4	30.9	80.9	80	0.9	6	3
	9	☐	**MHS0540L060B**	49.6	60.5	61.0	111.0	110	1.0	6	4
	14	☐	**MHS0540L090B**	76.6	90.5	91.0	141.0	140	1.0	6	4
	20	☐	**MHS0540L120B**	109.0	120.5	121.0	171.0	170	1.0	6	4
	25	☐	**MHS0540L150B**	136.0	150.5	151.0	201.0	200	1.0	6	4

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained.   ★ : Inventory maintained in Japan.

☐ : Non stock, produced to order only.

DC	Hole Depth	VP15TF	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
5.5	3	●	**MHS0550L030B**	17.4	30.4	30.9	80.9	80	0.9	6	3
	8	●	**MHS0550L060B**	45.0	60.5	61.0	111.0	110	1.0	6	4
	14	●	**MHS0550L090B**	78.0	90.5	91.0	141.0	140	1.0	6	4
	19	●	**MHS0550L120B**	105.5	120.5	121.0	171.0	170	1.0	6	4
	25	●	**MHS0550L150B**	138.5	150.5	151.0	201.0	200	1.0	6	4
5.6	3	□	**MHS0560L030B**	17.8	31.0	31.0	81.0	80	1.0	6	3
	8	□	**MHS0560L060B**	45.8	61.0	61.0	111.0	110	1.0	6	4
	14	□	**MHS0560L090B**	79.4	91.0	91.0	141.0	140	1.0	6	4
	19	□	**MHS0560L120B**	107.4	121.0	121.0	171.0	170	1.0	6	4
	24	□	**MHS0560L150B**	135.4	151.0	151.0	201.0	200	1.0	6	4
5.7	3	□	**MHS0570L030B**	18.1	31.0	31.0	81.0	80	1.0	6	3
	8	□	**MHS0570L060B**	46.6	61.0	61.0	111.0	110	1.0	6	4
	13	□	**MHS0570L090B**	75.1	91.0	91.0	141.0	140	1.0	6	4
	19	□	**MHS0570L120B**	109.3	121.0	121.0	171.0	170	1.0	6	4
	24	□	**MHS0570L150B**	137.8	151.0	151.0	201.0	200	1.0	6	4
5.8	3	★	**MHS0580L030B**	18.4	31.0	31.0	81.0	80	1.0	6	3
	8	★	**MHS0580L060B**	47.5	61.1	61.1	111.1	110	1.1	6	4
	13	★	**MHS0580L090B**	76.5	91.1	91.1	141.1	140	1.1	6	4
	18	★	**MHS0580L120B**	105.5	121.1	121.1	171.1	170	1.1	6	4
	23	★	**MHS0580L150B**	134.5	151.1	151.1	201.1	200	1.1	6	4
5.9	3	□	**MHS0590L030B**	18.7	31.0	31.0	81.0	80	1.0	6	3
	8	□	**MHS0590L060B**	48.3	61.1	61.1	111.1	110	1.1	6	4
	13	□	**MHS0590L090B**	77.8	91.1	91.1	141.1	140	1.1	6	4
	18	□	**MHS0590L120B**	107.3	121.1	121.1	171.1	170	1.1	6	4
	23	□	**MHS0590L150B**	136.8	151.1	151.1	201.1	200	1.1	6	4
6.0	2	●	**MHS0600L030B**	13.0	31.0	31.0	81.0	80	1.0	6	3
	7	●	**MHS0600L060B**	43.1	61.1	61.1	111.1	110	1.1	6	4
	12	●	**MHS0600L090B**	73.1	91.1	91.1	141.1	140	1.1	6	4
	17	●	**MHS0600L120B**	103.1	121.1	121.1	171.1	170	1.1	6	4
	22	●	**MHS0600L150B**	133.1	151.1	151.1	201.1	200	1.1	6	4
6.1	2	□	**MHS0610L030B**	13.3	29.6	31.1	81.1	80	1.1	8	3
	7	□	**MHS0610L060B**	43.8	59.6	61.1	111.1	110	1.1	8	4
	12	□	**MHS0610L090B**	74.3	89.6	91.1	141.1	140	1.1	8	4
	17	□	**MHS0610L120B**	104.8	119.6	121.1	171.1	170	1.1	8	4
	22	□	**MHS0610L150B**	135.3	149.6	151.1	201.1	200	1.1	8	4
6.2	2	□	**MHS0620L030B**	13.5	29.6	31.1	81.1	80	1.1	8	3
	7	□	**MHS0620L060B**	44.5	59.6	61.1	111.1	110	1.1	8	4
	12	□	**MHS0620L090B**	75.5	89.6	91.1	141.1	140	1.1	8	4
	17	□	**MHS0620L120B**	106.5	119.6	121.1	171.1	170	1.1	8	4
	21	□	**MHS0620L150B**	131.3	149.6	151.1	201.1	200	1.1	8	4
6.3	2	□	**MHS0630L030B**	13.7	29.6	31.1	81.1	80	1.1	8	3
	7	□	**MHS0630L060B**	45.2	59.6	61.1	111.1	110	1.1	8	4
	12	□	**MHS0630L090B**	76.7	89.6	91.1	141.1	140	1.1	8	4
	16	□	**MHS0630L120B**	101.9	119.6	121.1	171.1	170	1.1	8	4
	21	□	**MHS0630L150B**	133.4	149.6	151.1	201.1	200	1.1	8	4
6.4	2	□	**MHS0640L030B**	13.9	29.6	31.1	81.1	80	1.1	8	3
	7	□	**MHS0640L060B**	46.0	59.7	61.2	111.2	110	1.2	8	4
	11	□	**MHS0640L090B**	71.6	89.7	91.2	141.2	140	1.2	8	4
	16	□	**MHS0640L120B**	103.6	119.7	121.2	171.2	170	1.2	8	4
	21	□	**MHS0640L150B**	135.6	149.7	151.2	201.2	200	1.2	8	4

DC	Hole Depth	VP15TF	Order Number	Dimensions (mm)							Type
(mm)	(L/D)			LU	LCF	LH	OAL	LF	PL	DCONMS	
6.5	2	●	**MHS0650L030B**	14.1	29.6	31.1	81.1	80	1.1	8	3
	6	●	**MHS0650L060B**	40.2	59.7	61.2	111.2	110	1.2	8	4
	11	●	**MHS0650L090B**	72.7	89.7	91.2	141.2	140	1.2	8	4
	16	●	**MHS0650L120B**	105.2	119.7	121.2	171.2	170	1.2	8	4
	20	●	**MHS0650L150B**	131.2	149.7	151.2	201.2	200	1.2	8	4
6.6	2	□	**MHS0660L030B**	14.3	30.1	31.1	81.1	80	1.1	8	3
	6	□	**MHS0660L060B**	40.8	60.2	61.2	111.2	110	1.2	8	4
	11	□	**MHS0660L090B**	73.8	90.2	91.2	141.2	140	1.2	8	4
	16	□	**MHS0660L120B**	106.8	120.2	121.2	171.2	170	1.2	8	4
	20	□	**MHS0660L150B**	133.2	150.2	151.2	201.2	200	1.2	8	4
	28	□	**MHS0660L200B**	186.0	200.2	201.2	251.2	250	1.2	8	4
6.7	2	□	**MHS0670L030B**	14.6	30.2	31.2	81.2	80	1.2	8	3
	6	□	**MHS0670L060B**	41.4	60.2	61.2	111.2	110	1.2	8	4
	11	□	**MHS0670L090B**	74.9	90.2	91.2	141.2	140	1.2	8	4
	15	□	**MHS0670L120B**	101.7	120.2	121.2	171.2	170	1.2	8	4
	20	□	**MHS0670L150B**	135.2	150.2	151.2	201.2	200	1.2	8	4
	27	□	**MHS0670L200B**	182.1	200.2	201.2	251.2	250	1.2	8	4
6.8	2	★	**MHS0680L030B**	14.8	30.2	31.2	81.2	80	1.2	8	3
	6	★	**MHS0680L060B**	42.0	60.2	61.2	111.2	110	1.2	8	4
	11	★	**MHS0680L090B**	76.0	90.2	91.2	141.2	140	1.2	8	4
	15	★	**MHS0680L120B**	103.2	120.2	121.2	171.2	170	1.2	8	4
	19	★	**MHS0680L150B**	130.4	150.2	151.2	201.2	200	1.2	8	4
	27	★	**MHS0680L200B**	184.8	200.2	201.2	251.2	250	1.2	8	4
6.9	2	□	**MHS0690L030B**	15.0	30.2	31.2	81.2	80	1.2	8	3
	6	□	**MHS0690L060B**	42.7	60.3	61.3	111.3	110	1.3	8	4
	10	□	**MHS0690L090B**	70.3	90.3	91.3	141.3	140	1.3	8	4
	15	□	**MHS0690L120B**	104.8	120.3	121.3	171.3	170	1.3	8	4
	19	□	**MHS0690L150B**	132.4	150.3	151.3	201.3	200	1.3	8	4
	26	□	**MHS0690L200B**	180.7	200.3	201.3	251.3	250	1.3	8	4
7.0	2	●	**MHS0700L030B**	15.2	30.2	31.2	81.2	80	1.2	8	3
	6	●	**MHS0700L060B**	43.3	60.3	61.3	111.3	110	1.3	8	4
	10	●	**MHS0700L090B**	71.3	90.3	91.3	141.3	140	1.3	8	4
	14	●	**MHS0700L120B**	99.3	120.3	121.3	171.3	170	1.3	8	4
	19	●	**MHS0700L150B**	134.3	150.3	151.3	201.3	200	1.3	8	4
	26	●	**MHS0700L200B**	183.3	200.3	201.3	251.3	250	1.3	8	4
7.1	2	□	**MHS0710L030B**	15.4	30.7	31.2	81.2	80	1.2	8	3
	6	□	**MHS0710L060B**	43.9	60.8	61.3	111.3	110	1.3	8	4
	10	□	**MHS0710L090B**	72.3	90.8	91.3	141.3	140	1.3	8	4
	14	□	**MHS0710L120B**	100.7	120.8	121.3	171.3	170	1.3	8	4
	19	□	**MHS0710L150B**	136.2	150.8	151.3	201.3	200	1.3	8	4
	26	□	**MHS0710L200B**	185.9	200.8	201.3	251.3	250	1.3	8	4
7.2	2	□	**MHS0720L030B**	15.6	30.7	31.2	81.2	80	1.2	8	3
	6	□	**MHS0720L060B**	44.5	60.8	61.3	111.3	110	1.3	8	4
	10	□	**MHS0720L090B**	73.3	90.8	91.3	141.3	140	1.3	8	4
	14	□	**MHS0720L120B**	102.1	120.8	121.3	171.3	170	1.3	8	4
	18	□	**MHS0720L150B**	130.9	150.8	151.3	201.3	200	1.3	8	4
	25	□	**MHS0720L200B**	181.3	200.8	201.3	251.3	250	1.3	8	4

CUTTING CONDITIONS ➤M136
OPERATION GUIDANCE ➤M137
TECHNICAL DATA ➤P001

MHS

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
7.3	2	☐	**MHS0730L030B**	15.9	30.8	31.3	81.3	80	1.3	8	3
	6	☐	**MHS0730L060B**	45.1	60.8	61.3	111.3	110	1.3	8	4
	10	☐	**MHS0730L090B**	74.3	90.8	91.3	141.3	140	1.3	8	4
	14	☐	**MHS0730L120B**	103.5	120.8	121.3	171.3	170	1.3	8	4
	18	☐	**MHS0730L150B**	132.7	150.8	151.3	201.3	200	1.3	8	4
	25	☐	**MHS0730L200B**	183.8	200.8	201.3	251.3	250	1.3	8	4
7.4	1	☐	**MHS0740L030B**	8.7	30.8	31.3	81.3	80	1.3	8	3
	6	☐	**MHS0740L060B**	45.7	60.8	61.3	111.3	110	1.3	8	4
	10	☐	**MHS0740L090B**	75.3	90.8	91.3	141.3	140	1.3	8	4
	14	☐	**MHS0740L120B**	104.9	120.8	121.3	171.3	170	1.3	8	4
	18	☐	**MHS0740L150B**	134.5	150.8	151.3	201.3	200	1.3	8	4
	24	☐	**MHS0740L200B**	178.9	200.8	201.3	251.3	250	1.3	8	4
7.5	1	●	**MHS0750L030B**	8.8	30.8	31.3	81.3	80	1.3	8	3
	5	●	**MHS0750L060B**	38.9	60.9	61.4	111.4	110	1.4	8	4
	9	●	**MHS0750L090B**	68.9	90.9	91.4	141.4	140	1.4	8	4
	13	●	**MHS0750L120B**	98.9	120.9	121.4	171.4	170	1.4	8	4
	17	●	**MHS0750L150B**	128.9	150.9	151.4	201.4	200	1.4	8	4
	24	●	**MHS0750L200B**	181.4	200.9	201.4	251.4	250	1.4	8	4
7.6	1	☐	**MHS0760L030B**	8.9	31.3	31.3	81.3	80	1.3	8	3
	5	☐	**MHS0760L060B**	39.4	61.4	61.4	111.4	110	1.4	8	4
	9	☐	**MHS0760L090B**	69.8	91.4	91.4	141.4	140	1.4	8	4
	13	☐	**MHS0760L120B**	100.2	121.4	121.4	171.4	170	1.4	8	4
	17	☐	**MHS0760L150B**	130.6	151.4	151.4	201.4	200	1.4	8	4
	24	☐	**MHS0760L200B**	183.8	201.4	201.4	251.4	250	1.4	8	4
	30	☐	**MHS0760L250B**	229.4	251.4	251.4	301.4	300	1.4	8	4
7.7	1	☐	**MHS0770L030B**	9.0	31.3	31.3	81.3	80	1.3	8	3
	5	☐	**MHS0770L060B**	39.9	61.4	61.4	111.4	110	1.4	8	4
	9	☐	**MHS0770L090B**	70.7	91.4	91.4	141.4	140	1.4	8	4
	13	☐	**MHS0770L120B**	101.5	121.4	121.4	171.4	170	1.4	8	4
	17	☐	**MHS0770L150B**	132.3	151.4	151.4	201.4	200	1.4	8	4
	23	☐	**MHS0770L200B**	178.5	201.4	201.4	251.4	250	1.4	8	4
	30	☐	**MHS0770L250B**	232.4	251.4	251.4	301.4	300	1.4	8	4
7.8	1	★	**MHS0780L030B**	9.1	31.3	31.3	81.3	80	1.3	8	3
	5	★	**MHS0780L060B**	40.4	61.4	61.4	111.4	110	1.4	8	4
	9	★	**MHS0780L090B**	71.6	91.4	91.4	141.4	140	1.4	8	4
	13	★	**MHS0780L120B**	102.8	121.4	121.4	171.4	170	1.4	8	4
	17	★	**MHS0780L150B**	134.0	151.4	151.4	201.4	200	1.4	8	4
	23	★	**MHS0780L200B**	180.8	201.4	201.4	251.4	250	1.4	8	4
	30	★	**MHS0780L250B**	235.4	251.4	251.4	301.4	300	1.4	8	4
7.9	1	☐	**MHS0790L030B**	9.3	31.4	31.4	81.4	80	1.4	8	3
	5	☐	**MHS0790L060B**	40.9	61.4	61.4	111.4	110	1.4	8	4
	9	☐	**MHS0790L090B**	72.5	91.4	91.4	141.4	140	1.4	8	4
	13	☐	**MHS0790L120B**	104.1	121.4	121.4	171.4	170	1.4	8	4
	16	☐	**MHS0790L150B**	127.8	151.4	151.4	201.4	200	1.4	8	4
	23	☐	**MHS0790L200B**	183.1	201.4	201.4	251.4	250	1.4	8	4
	29	☐	**MHS0790L250B**	230.5	251.4	251.4	301.4	300	1.4	8	4

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.0	1	●	**MHS0800L030B**	9.4	31.4	31.4	81.4	80	1.4	8	3
	5	●	**MHS0800L060B**	41.5	61.5	61.5	111.5	110	1.5	8	4
	9	●	**MHS0800L090B**	73.5	91.5	91.5	141.5	140	1.5	8	4
	12	●	**MHS0800L120B**	97.5	121.5	121.5	171.5	170	1.5	8	4
	16	●	**MHS0800L150B**	129.5	151.5	151.5	201.5	200	1.5	8	4
	22	●	**MHS0800L200B**	177.5	201.5	201.5	251.5	250	1.5	8	4
	29	●	**MHS0800L250B**	233.5	251.5	251.5	301.5	300	1.5	8	4
8.1	2	☐	**MHS0810L040B**	17.6	39.9	41.4	101.4	100	1.4	10	3
	8	☐	**MHS0810L090B**	66.3	90.0	91.5	151.5	150	1.5	10	4
	12	☐	**MHS0810L120B**	98.7	120.0	121.5	181.5	180	1.5	10	4
	16	☐	**MHS0810L150B**	131.1	150.0	151.5	211.5	210	1.5	10	4
	22	☐	**MHS0810L200B**	179.7	200.0	201.5	261.5	260	1.5	10	4
	28	☐	**MHS0810L250B**	228.3	250.0	251.5	311.5	310	1.5	10	4
8.2	2	☐	**MHS0820L040B**	17.8	39.9	41.4	101.4	100	1.4	10	3
	8	☐	**MHS0820L090B**	67.1	90.0	91.5	151.5	150	1.5	10	4
	12	☐	**MHS0820L120B**	99.9	120.0	121.5	181.5	180	1.5	10	4
	16	☐	**MHS0820L150B**	132.7	150.0	151.5	211.5	210	1.5	10	4
	22	☐	**MHS0820L200B**	181.9	200.0	201.5	261.5	260	1.5	10	4
	28	☐	**MHS0820L250B**	231.1	250.0	251.5	311.5	310	1.5	10	4
8.3	2	☐	**MHS0830L040B**	18.0	39.9	41.4	101.4	100	1.4	10	3
	8	☐	**MHS0830L090B**	67.9	90.0	91.5	151.5	150	1.5	10	4
	12	☐	**MHS0830L120B**	101.1	120.0	121.5	181.5	180	1.5	10	4
	15	☐	**MHS0830L150B**	126.0	150.0	151.5	211.5	210	1.5	10	4
	21	☐	**MHS0830L200B**	175.8	200.0	201.5	261.5	260	1.5	10	4
	27	☐	**MHS0830L250B**	225.6	250.0	251.5	311.5	310	1.5	10	4
8.4	2	☐	**MHS0840L040B**	18.2	39.9	41.4	101.4	100	1.4	10	3
	8	☐	**MHS0840L090B**	68.7	90.0	91.5	151.5	150	1.5	10	4
	12	☐	**MHS0840L120B**	102.3	120.0	121.5	181.5	180	1.5	10	4
	15	☐	**MHS0840L150B**	127.5	150.0	151.5	211.5	210	1.5	10	4
	21	☐	**MHS0840L200B**	177.9	200.0	201.5	261.5	260	1.5	10	4
	27	☐	**MHS0840L250B**	228.3	250.0	251.5	311.5	310	1.5	10	4
8.5	2	●	**MHS0850L040B**	18.5	40.0	41.5	101.5	100	1.5	10	3
	8	●	**MHS0850L090B**	69.5	90.0	91.5	151.5	150	1.5	10	4
	11	●	**MHS0850L120B**	95.0	120.0	121.5	181.5	180	1.5	10	4
	15	●	**MHS0850L150B**	129.0	150.0	151.5	211.5	210	1.5	10	4
	21	●	**MHS0850L200B**	180.0	200.0	201.5	261.5	260	1.5	10	4
	27	●	**MHS0850L250B**	231.0	250.0	251.5	311.5	310	1.5	10	4
8.6	2	☐	**MHS0860L040B**	18.7	40.5	41.5	101.5	100	1.5	10	3
	8	☐	**MHS0860L090B**	70.4	90.6	91.6	151.6	150	1.6	10	4
	11	☐	**MHS0860L120B**	96.2	120.6	121.6	181.6	180	1.6	10	4
	15	☐	**MHS0860L150B**	130.6	150.6	151.6	211.6	210	1.6	10	4
	21	☐	**MHS0860L200B**	182.2	200.6	201.6	261.6	260	1.6	10	4
	26	☐	**MHS0860L250B**	225.2	250.6	251.6	311.6	310	1.6	10	4
8.7	2	☐	**MHS0870L040B**	18.9	40.5	41.5	101.5	100	1.5	10	3
	8	☐	**MHS0870L090B**	71.2	90.6	91.6	151.6	150	1.6	10	4
	11	☐	**MHS0870L120B**	97.3	120.6	121.6	181.6	180	1.6	10	4
	15	☐	**MHS0870L150B**	132.1	150.6	151.6	211.6	210	1.6	10	4
	20	☐	**MHS0870L200B**	175.6	200.6	201.6	261.6	260	1.6	10	4
	26	☐	**MHS0870L250B**	227.8	250.6	251.6	311.6	310	1.6	10	4

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
8.8	2	★	**MHS0880L040B**	19.1	40.5	41.5	101.5	100	1.5	10	3
	8	★	**MHS0880L090B**	72.0	90.6	91.6	151.6	150	1.6	10	4
	11	★	**MHS0880L120B**	98.4	120.6	121.6	181.6	180	1.6	10	4
	14	★	**MHS0880L150B**	124.8	150.6	151.6	211.6	210	1.6	10	4
	20	★	**MHS0880L200B**	177.6	200.6	201.6	261.6	260	1.6	10	4
	26	★	**MHS0880L250B**	230.4	250.6	251.6	311.6	310	1.6	10	4
8.9	2	☐	**MHS0890L040B**	19.3	40.5	41.5	101.5	100	1.5	10	3
	7	☐	**MHS0890L090B**	63.9	90.6	91.6	151.6	150	1.6	10	4
	11	☐	**MHS0890L120B**	99.5	120.6	121.6	181.6	180	1.6	10	4
	14	☐	**MHS0890L150B**	126.2	150.6	151.6	211.6	210	1.6	10	4
	20	☐	**MHS0890L200B**	179.6	200.6	201.6	261.6	260	1.6	10	4
	25	☐	**MHS0890L250B**	224.1	250.6	251.6	311.6	310	1.6	10	4
9.0	2	●	**MHS0900L040B**	19.5	40.5	41.5	101.5	100	1.5	10	3
	7	●	**MHS0900L090B**	64.6	90.6	91.6	151.6	150	1.6	10	4
	11	●	**MHS0900L120B**	100.6	120.6	121.6	181.6	180	1.6	10	4
	14	●	**MHS0900L150B**	127.6	150.6	151.6	211.6	210	1.6	10	4
	20	●	**MHS0900L200B**	181.6	200.6	201.6	261.6	260	1.6	10	4
	25	●	**MHS0900L250B**	226.6	250.6	251.6	311.6	310	1.6	10	4
9.1	2	☐	**MHS0910L040B**	19.8	41.1	41.6	101.6	100	1.6	10	3
	7	☐	**MHS0910L090B**	65.4	91.2	91.7	151.7	150	1.7	10	4
	11	☐	**MHS0910L120B**	101.8	121.2	121.7	181.7	180	1.7	10	4
	14	☐	**MHS0910L150B**	129.1	151.2	151.7	211.7	210	1.7	10	4
	19	☐	**MHS0910L200B**	174.6	201.2	201.7	261.7	260	1.7	10	4
	25	☐	**MHS0910L250B**	229.2	251.2	251.7	311.7	310	1.7	10	4
	30	☐	**MHS0910L300B**	274.7	301.2	301.7	361.7	360	1.7	10	4
9.2	2	☐	**MHS0920L040B**	20.0	41.1	41.6	101.6	100	1.6	10	3
	7	☐	**MHS0920L090B**	66.1	91.2	91.7	151.7	150	1.7	10	4
	10	☐	**MHS0920L120B**	93.7	121.2	121.7	181.7	180	1.7	10	4
	14	☐	**MHS0920L150B**	130.5	151.2	151.7	211.7	210	1.7	10	4
	19	☐	**MHS0920L200B**	176.5	201.2	201.7	261.7	260	1.7	10	4
	25	☐	**MHS0920L250B**	231.7	251.2	251.7	311.7	310	1.7	10	4
	30	☐	**MHS0920L300B**	277.7	301.2	301.7	361.7	360	1.7	10	4
9.3	2	☐	**MHS0930L040B**	20.2	41.1	41.6	101.6	100	1.6	10	3
	7	☐	**MHS0930L090B**	66.8	91.2	91.7	151.7	150	1.7	10	4
	10	☐	**MHS0930L120B**	94.7	121.2	121.7	181.7	180	1.7	10	4
	14	☐	**MHS0930L150B**	131.9	151.2	151.7	211.7	210	1.7	10	4
	19	☐	**MHS0930L200B**	178.4	201.2	201.7	261.7	260	1.7	10	4
	24	☐	**MHS0930L250B**	224.9	251.2	251.7	311.7	310	1.7	10	4
	30	☐	**MHS0930L300B**	280.7	301.2	301.7	361.7	360	1.7	10	4
9.4	2	☐	**MHS0940L040B**	20.4	41.1	41.6	101.6	100	1.6	10	3
	7	☐	**MHS0940L090B**	67.5	91.2	91.7	151.7	150	1.7	10	4
	10	☐	**MHS0940L120B**	95.7	121.2	121.7	181.7	180	1.7	10	4
	13	☐	**MHS0940L150B**	123.9	151.2	151.7	211.7	210	1.7	10	4
	19	☐	**MHS0940L200B**	180.3	201.2	201.7	261.7	260	1.7	10	4
	24	☐	**MHS0940L250B**	227.3	251.2	251.7	311.7	310	1.7	10	4
	29	☐	**MHS0940L300B**	274.3	301.2	301.7	361.7	360	1.7	10	4

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
9.5	2	★	**MHS0950L040B**	20.6	41.1	41.6	101.6	100	1.6	10	3
	7	★	**MHS0950L090B**	68.2	91.2	91.7	151.7	150	1.7	10	4
	10	★	**MHS0950L120B**	96.7	121.2	121.7	181.7	180	1.7	10	4
	13	★	**MHS0950L150B**	125.2	151.2	151.7	211.7	210	1.7	10	4
	18	★	**MHS0950L200B**	172.7	201.2	201.7	261.7	260	1.7	10	4
	24	★	**MHS0950L250B**	229.7	251.2	251.7	311.7	310	1.7	10	4
	29	★	**MHS0950L300B**	277.2	301.2	301.7	361.7	360	1.7	10	4
9.6	2	☐	**MHS0960L040B**	20.9	41.7	41.7	101.7	100	1.7	10	3
	7	☐	**MHS0960L090B**	68.9	91.7	91.7	151.7	150	1.7	10	4
	10	☐	**MHS0960L120B**	97.7	121.7	121.7	181.7	180	1.7	10	4
	13	☐	**MHS0960L150B**	126.5	151.7	151.7	211.7	210	1.7	10	4
	18	☐	**MHS0960L200B**	174.5	201.7	201.7	261.7	260	1.7	10	4
	24	☐	**MHS0960L250B**	232.1	251.7	251.7	311.7	310	1.7	10	4
	29	☐	**MHS0960L300B**	280.1	301.7	301.7	361.7	360	1.7	10	4
9.7	2	☐	**MHS0970L040B**	21.1	41.7	41.7	101.7	100	1.7	10	3
	7	☐	**MHS0970L090B**	69.7	91.8	91.8	151.8	150	1.8	10	4
	10	☐	**MHS0970L120B**	98.8	121.8	121.8	181.8	180	1.8	10	4
	13	☐	**MHS0970L150B**	127.9	151.8	151.8	211.8	210	1.8	10	4
	18	☐	**MHS0970L200B**	176.4	201.8	201.8	261.8	260	1.8	10	4
	23	☐	**MHS0970L250B**	224.9	251.8	251.8	311.8	310	1.8	10	4
	28	☐	**MHS0970L300B**	273.4	301.8	301.8	361.8	360	1.8	10	4
9.8	2	★	**MHS0980L040B**	21.3	41.7	41.7	101.7	100	1.7	10	3
	7	★	**MHS0980L090B**	70.4	91.8	91.8	151.8	150	1.8	10	4
	10	★	**MHS0980L120B**	99.8	121.8	121.8	181.8	180	1.8	10	4
	13	★	**MHS0980L150B**	129.2	151.8	151.8	211.8	210	1.8	10	4
	18	★	**MHS0980L200B**	178.2	201.8	201.8	261.8	260	1.8	10	4
	23	★	**MHS0980L250B**	227.2	251.8	251.8	311.8	310	1.8	10	4
	28	★	**MHS0980L300B**	276.2	301.8	301.8	361.8	360	1.8	10	4
9.9	2	☐	**MHS0990L040B**	21.5	41.7	41.7	101.7	100	1.7	10	3
	7	☐	**MHS0990L090B**	71.1	91.8	91.8	151.8	150	1.8	10	4
	10	☐	**MHS0990L120B**	100.8	121.8	121.8	181.8	180	1.8	10	4
	13	☐	**MHS0990L150B**	130.5	151.8	151.8	211.8	210	1.8	10	4
	18	☐	**MHS0990L200B**	180.0	201.8	201.8	261.8	260	1.8	10	4
	23	☐	**MHS0990L250B**	229.5	251.8	251.8	311.8	310	1.8	10	4
	28	☐	**MHS0990L300B**	279.0	301.8	301.8	361.8	360	1.8	10	4
10.0	1	●	**MHS1000L040B**	11.7	41.7	41.7	101.7	100	1.7	10	3
	6	●	**MHS1000L090B**	61.8	91.8	91.8	151.8	150	1.8	10	4
	9	●	**MHS1000L120B**	91.8	121.8	121.8	181.8	180	1.8	10	4
	12	●	**MHS1000L150B**	121.8	151.8	151.8	211.8	210	1.8	10	4
	17	●	**MHS1000L200B**	171.8	201.8	201.8	261.8	260	1.8	10	4
	22	●	**MHS1000L250B**	221.8	251.8	251.8	311.8	310	1.8	10	4
	27	●	**MHS1000L300B**	271.8	301.8	301.8	361.8	360	1.8	10	4
10.1	1	☐	**MHS1010L040B**	11.8	40.2	41.7	101.7	100	1.7	12	3
	6	☐	**MHS1010L090B**	62.4	90.3	91.8	151.8	150	1.8	12	4
	9	☐	**MHS1010L120B**	92.7	120.3	121.8	181.8	180	1.8	12	4
	12	☐	**MHS1010L150B**	123.0	150.3	151.8	211.8	210	1.8	12	4
	17	☐	**MHS1010L200B**	173.5	200.3	201.8	261.8	260	1.8	12	4
	22	☐	**MHS1010L250B**	224.0	250.3	251.8	311.8	310	1.8	12	4
	27	☐	**MHS1010L300B**	274.5	300.3	301.8	361.8	360	1.8	12	4

CUTTING CONDITIONS ➤ M136
OPERATION GUIDANCE ➤ M137
TECHNICAL DATA ➤ P001

MHS

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
10.2	1	☐	**MHS1020L040B**	12.0	40.3	41.8	101.8	100	1.8	12	3
	6	☐	**MHS1020L090B**	63.1	90.4	91.9	151.9	150	1.9	12	4
	9	☐	**MHS1020L120B**	93.7	120.4	121.9	181.9	180	1.9	12	4
	12	☐	**MHS1020L150B**	124.3	150.4	151.9	211.9	210	1.9	12	4
	17	☐	**MHS1020L200B**	175.3	200.4	201.9	261.9	260	1.9	12	4
	22	☐	**MHS1020L250B**	226.3	250.4	251.9	311.9	310	1.9	12	4
	27	☐	**MHS1020L300B**	277.3	300.4	301.9	361.9	360	1.9	12	4
10.3	1	☐	**MHS1030L040B**	12.1	40.3	41.8	101.8	100	1.8	12	3
	6	☐	**MHS1030L090B**	63.7	90.4	91.9	151.9	150	1.9	12	4
	9	☐	**MHS1030L120B**	94.6	120.4	121.9	181.9	180	1.9	12	4
	12	☐	**MHS1030L150B**	125.5	150.4	151.9	211.9	210	1.9	12	4
	17	☐	**MHS1030L200B**	177.0	200.4	201.9	261.9	260	1.9	12	4
	22	☐	**MHS1030L250B**	228.5	250.4	251.9	311.9	310	1.9	12	4
	26	☐	**MHS1030L300B**	269.7	300.4	301.9	361.9	360	1.9	12	4
10.4	1	☐	**MHS1040L040B**	12.2	40.3	41.8	101.8	100	1.8	12	3
	6	☐	**MHS1040L090B**	64.3	90.4	91.9	151.9	150	1.9	12	4
	9	☐	**MHS1040L120B**	95.5	120.4	121.9	181.9	180	1.9	12	4
	12	☐	**MHS1040L150B**	126.7	150.4	151.9	211.9	210	1.9	12	4
	17	☐	**MHS1040L200B**	178.7	200.4	201.9	261.9	260	1.9	12	4
	21	☐	**MHS1040L250B**	220.3	250.4	251.9	311.9	310	1.9	12	4
	26	☐	**MHS1040L300B**	272.3	300.4	301.9	361.9	360	1.9	12	4
10.5	1	★	**MHS1050L040B**	12.3	40.3	41.8	101.8	100	1.8	12	3
	6	★	**MHS1050L090B**	64.9	90.4	91.9	151.9	150	1.9	12	4
	9	★	**MHS1050L120B**	96.4	120.4	121.9	181.9	180	1.9	12	4
	12	★	**MHS1050L150B**	127.9	150.4	151.9	211.9	210	1.9	12	4
	16	★	**MHS1050L200B**	169.9	200.4	201.9	261.9	260	1.9	12	4
	21	★	**MHS1050L250B**	222.4	250.4	251.9	311.9	310	1.9	12	4
	26	★	**MHS1050L300B**	274.9	300.4	301.9	361.9	360	1.9	12	4
10.6	1	☐	**MHS1060L040B**	12.4	40.8	41.8	101.8	100	1.8	12	3
	6	☐	**MHS1060L090B**	65.5	90.9	91.9	151.9	150	1.9	12	4
	9	☐	**MHS1060L120B**	97.3	120.9	121.9	181.9	180	1.9	12	4
	12	☐	**MHS1060L150B**	129.1	150.9	151.9	211.9	210	1.9	12	4
	16	☐	**MHS1060L200B**	171.5	200.9	201.9	261.9	260	1.9	12	4
	21	☐	**MHS1060L250B**	224.5	250.9	251.9	311.9	310	1.9	12	4
	26	☐	**MHS1060L300B**	277.5	300.9	301.9	361.9	360	1.9	12	4
10.7	1	☐	**MHS1070L040B**	12.5	40.8	41.8	101.8	100	1.8	12	3
	6	☐	**MHS1070L090B**	66.1	90.9	91.9	151.9	150	1.9	12	4
	9	☐	**MHS1070L120B**	98.2	120.9	121.9	181.9	180	1.9	12	4
	11	☐	**MHS1070L150B**	119.6	150.9	151.9	211.9	210	1.9	12	4
	16	☐	**MHS1070L200B**	173.1	200.9	201.9	261.9	260	1.9	12	4
	21	☐	**MHS1070L250B**	226.6	250.9	251.9	311.9	310	1.9	12	4
	25	☐	**MHS1070L300B**	269.4	300.9	301.9	361.9	360	1.9	12	4
10.8	1	★	**MHS1080L040B**	12.7	40.9	41.9	101.9	100	1.9	12	3
	6	★	**MHS1080L090B**	66.8	91.0	92.0	152.0	150	2.0	12	4
	9	★	**MHS1080L120B**	99.2	121.0	122.0	182.0	180	2.0	12	4
	11	★	**MHS1080L150B**	120.8	151.0	152.0	212.0	210	2.0	12	4
	16	★	**MHS1080L200B**	174.8	201.0	202.0	262.0	260	2.0	12	4
	21	★	**MHS1080L250B**	228.8	251.0	252.0	312.0	310	2.0	12	4
	25	★	**MHS1080L300B**	272.0	301.0	302.0	362.0	360	2.0	12	4
10.9	1	☐	**MHS1090L040B**	12.8	40.9	41.9	101.9	100	1.9	12	3
	6	☐	**MHS1090L090B**	67.4	91.0	92.0	152.0	150	2.0	12	4
	8	☐	**MHS1090L120B**	89.2	121.0	122.0	182.0	180	2.0	12	4
	11	☐	**MHS1090L150B**	121.9	151.0	152.0	212.0	210	2.0	12	4
	16	☐	**MHS1090L200B**	176.4	201.0	202.0	262.0	260	2.0	12	4
	20	☐	**MHS1090L250B**	220.0	251.0	252.0	312.0	310	2.0	12	4
	25	☐	**MHS1090L300B**	274.5	301.0	302.0	362.0	360	2.0	12	4
11.0	1	●	**MHS1100L040B**	12.9	40.9	41.9	101.9	100	1.9	12	3
	6	●	**MHS1100L090B**	68.0	91.0	92.0	152.0	150	2.0	12	4
	8	●	**MHS1100L120B**	90.0	121.0	122.0	182.0	180	2.0	12	4
	11	●	**MHS1100L150B**	123.0	151.0	152.0	212.0	210	2.0	12	4
	16	●	**MHS1100L200B**	178.0	201.0	202.0	262.0	260	2.0	12	4
	20	●	**MHS1100L250B**	222.0	251.0	252.0	312.0	310	2.0	12	4
	25	●	**MHS1100L300B**	277.0	301.0	302.0	362.0	360	2.0	12	4
11.1	1	☐	**MHS1110L040B**	13.0	41.4	41.9	101.9	100	1.9	12	3
	6	☐	**MHS1110L090B**	68.6	91.5	92.0	152.0	150	2.0	12	4
	8	☐	**MHS1110L120B**	90.8	121.5	122.0	182.0	180	2.0	12	4
	11	☐	**MHS1110L150B**	124.1	151.5	152.0	212.0	210	2.0	12	4
	15	☐	**MHS1110L200B**	168.5	201.5	202.0	262.0	260	2.0	12	4
	20	☐	**MHS1110L250B**	224.0	251.5	252.0	312.0	310	2.0	12	4
	24	☐	**MHS1110L300B**	268.4	301.5	302.0	362.0	360	2.0	12	4
11.2	1	☐	**MHS1120L040B**	13.1	41.4	41.9	101.9	100	1.9	12	3
	5	☐	**MHS1120L090B**	58.0	91.5	92.0	152.0	150	2.0	12	4
	8	☐	**MHS1120L120B**	91.6	121.5	122.0	182.0	180	2.0	12	4
	11	☐	**MHS1120L150B**	125.2	151.5	152.0	212.0	210	2.0	12	4
	15	☐	**MHS1120L200B**	170.0	201.5	202.0	262.0	260	2.0	12	4
	20	☐	**MHS1120L250B**	226.0	251.5	252.0	312.0	310	2.0	12	4
	24	☐	**MHS1120L300B**	270.8	301.5	302.0	362.0	360	2.0	12	4
11.3	1	☐	**MHS1130L040B**	13.2	41.4	41.9	101.9	100	1.9	12	3
	5	☐	**MHS1130L090B**	58.6	91.6	92.1	152.1	150	2.1	12	4
	8	☐	**MHS1130L120B**	92.5	121.6	122.1	182.1	180	2.1	12	4
	11	☐	**MHS1130L150B**	126.4	151.6	152.1	212.1	210	2.1	12	4
	15	☐	**MHS1130L200B**	171.6	201.6	202.1	262.1	260	2.1	12	4
	20	☐	**MHS1130L250B**	228.1	251.6	252.1	312.1	310	2.1	12	4
	24	☐	**MHS1130L300B**	273.3	301.6	302.1	362.1	360	2.1	12	4
11.4	1	☐	**MHS1140L040B**	13.4	41.5	42.0	102.0	100	2.0	12	3
	5	☐	**MHS1140L090B**	59.1	91.6	92.1	152.1	150	2.1	12	4
	8	☐	**MHS1140L120B**	93.3	121.6	122.1	182.1	180	2.1	12	4
	11	☐	**MHS1140L150B**	127.5	151.6	152.1	212.1	210	2.1	12	4
	15	☐	**MHS1140L200B**	173.1	201.6	202.1	262.1	260	2.1	12	4
	19	☐	**MHS1140L250B**	218.7	251.6	252.1	312.1	310	2.1	12	4
	24	☐	**MHS1140L300B**	275.7	301.6	302.1	362.1	360	2.1	12	4
11.5	1	★	**MHS1150L040B**	13.5	41.5	42.0	102.0	100	2.0	12	3
	5	★	**MHS1150L090B**	59.6	91.6	92.1	152.1	150	2.1	12	4
	8	★	**MHS1150L120B**	94.1	121.6	122.1	182.1	180	2.1	12	4
	10	★	**MHS1150L150B**	117.1	151.6	152.1	212.1	210	2.1	12	4
	15	★	**MHS1150L200B**	174.6	201.6	202.1	262.1	260	2.1	12	4
	19	★	**MHS1150L250B**	220.6	251.6	252.1	312.1	310	2.1	12	4
	24	★	**MHS1150L300B**	278.1	301.6	302.1	362.1	360	2.1	12	4

Note 1) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. ★ : Inventory maintained in Japan.
☐ : Non stock, produced to order only.

DC (mm)	Hole Depth (L/D)	VP15TF	Order Number	Dimensions (mm)							Type
				LU	LCF	LH	OAL	LF	PL	DCONMS	
11.6	1	☐	**MHS1160L040B**	13.6	42.0	42.0	102.0	100	2.0	12	3
	5	☐	**MHS1160L090B**	60.1	92.1	92.1	152.1	150	2.1	12	4
	8	☐	**MHS1160L120B**	94.9	122.1	122.1	182.1	180	2.1	12	4
	10	☐	**MHS1160L150B**	118.1	152.1	152.1	212.1	210	2.1	12	4
	15	☐	**MHS1160L200B**	176.1	202.1	202.1	262.1	260	2.1	12	4
	19	☐	**MHS1160L250B**	222.5	252.1	252.1	312.1	310	2.1	12	4
	23	☐	**MHS1160L300B**	268.9	302.1	302.1	362.1	360	2.1	12	4
11.7	1	☐	**MHS1170L040B**	13.7	42.0	42.0	102.0	100	2.0	12	3
	5	☐	**MHS1170L090B**	60.6	92.1	92.1	152.1	150	2.1	12	4
	8	☐	**MHS1170L120B**	95.7	122.1	122.1	182.1	180	2.1	12	4
	10	☐	**MHS1170L150B**	119.1	152.1	152.1	212.1	210	2.1	12	4
	15	☐	**MHS1170L200B**	177.6	202.1	202.1	262.1	260	2.1	12	4
	19	☐	**MHS1170L250B**	224.4	252.1	252.1	312.1	310	2.1	12	4
	23	☐	**MHS1170L300B**	271.2	302.1	302.1	362.1	360	2.1	12	4
11.8	1	★	**MHS1180L040B**	13.8	42.0	42.0	102.0	100	2.0	12	3
	5	★	**MHS1180L090B**	61.1	92.1	92.1	152.1	150	2.1	12	4
	8	★	**MHS1180L120B**	96.5	122.1	122.1	182.1	180	2.1	12	4
	10	★	**MHS1180L150B**	120.1	152.1	152.1	212.1	210	2.1	12	4
	14	★	**MHS1180L200B**	167.3	202.1	202.1	262.1	260	2.1	12	4
	19	★	**MHS1180L250B**	226.3	252.1	252.1	312.1	310	2.1	12	4
	23	★	**MHS1180L300B**	273.5	302.1	302.1	362.1	360	2.1	12	4
11.9	1	☐	**MHS1190L040B**	13.9	42.0	42.0	102.0	100	2.0	12	3
	5	☐	**MHS1190L090B**	61.7	92.2	92.2	152.2	150	2.2	12	4
	8	☐	**MHS1190L120B**	97.4	122.2	122.2	182.2	180	2.2	12	4
	10	☐	**MHS1190L150B**	121.2	152.2	152.2	212.2	210	2.2	12	4
	14	☐	**MHS1190L200B**	168.8	202.2	202.2	262.2	260	2.2	12	4
	19	☐	**MHS1190L250B**	228.3	252.2	252.2	312.2	310	2.2	12	4
	23	☐	**MHS1190L300B**	275.9	302.2	302.2	362.2	360	2.2	12	4
12.0	1	●	**MHS1200L040B**	14.1	42.1	42.1	102.1	100	2.1	12	3
	5	●	**MHS1200L090B**	62.2	92.2	92.2	152.2	150	2.2	12	4
	7	●	**MHS1200L120B**	86.2	122.2	122.2	182.2	180	2.2	12	4
	10	●	**MHS1200L150B**	122.2	152.2	152.2	212.2	210	2.2	12	4
	14	●	**MHS1200L200B**	170.2	202.2	202.2	262.2	260	2.2	12	4
	18	●	**MHS1200L250B**	218.2	252.2	252.2	312.2	310	2.2	12	4
	22	●	**MHS1200L300B**	266.2	302.2	302.2	362.2	360	2.2	12	4

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TECHNICAL DATA ➤ P001

MHS

RECOMMENDED CUTTING CONDITIONS

Material	P				M			
	Mild Steel (≤180HB), Carbon steel, Alloy steel (180—280HB) Ck10, Ck45, 42CrMo4				Ferritic, Martensitic Stainless Steel (>200HB) X20CrNi17-2, X30Cr13			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
1.0	40	12700	0.030 (0.020—0.040)	380	20	6400	0.030 (0.020—0.040)	190
1.2	50	13300	0.035 (0.025—0.050)	465	30	8000	0.035 (0.025—0.050)	280
1.6	60	11900	0.050 (0.030—0.065)	595	40	8000	0.050 (0.030—0.065)	400
2.0	70	11100	0.060 (0.040—0.080)	665	50	8000	0.060 (0.040—0.080)	480
2.5	80	10200	0.075 (0.050—0.100)	765	60	7600	0.075 (0.050—0.100)	570
3.2	80	8000	0.100 (0.070—0.130)	800	60	6000	0.100 (0.070—0.130)	600
4.0	80	6400	0.100 (0.090—0.110)	640	60	4800	0.090 (0.080—0.090)	430
5.0	80	5100	0.130 (0.110—0.140)	665	60	3800	0.110 (0.100—0.120)	420
6.3	80	4000	0.160 (0.140—0.180)	640	60	3000	0.140 (0.130—0.150)	420
8.0	80	3200	0.200 (0.180—0.230)	640	60	2400	0.170 (0.160—0.190)	410
10.0	80	2600	0.250 (0.220—0.280)	650	60	1900	0.220 (0.200—0.230)	420
12.0	80	2100	0.300 (0.270—0.340)	630	60	1600	0.260 (0.240—0.280)	415

Material	P				H		M	
	Pre-hardened steel (35—45HRC), Alloy tool steel (≤350HB) X36CrMo17, X210Cr12, 55NiCrMoV6				Hardened Steel (40—55HRC), PH Stainless Steel (<450HB) X20CrNi17-2, X30Cr13 X5CrNiCuNb164, X7CrNiAl17-7			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
1.0	20	6400	0.025 (0.020—0.030)	160	40	12700	0.020 (0.015—0.025)	255
1.2	30	8000	0.030 (0.020—0.035)	240	40	10600	0.025 (0.020—0.030)	265
1.6	40	8000	0.040 (0.030—0.045)	320	50	10000	0.035 (0.025—0.040)	350
2.0	50	8000	0.045 (0.035—0.060)	360	50	8000	0.040 (0.030—0.050)	320
2.5	60	7600	0.060 (0.045—0.075)	455	60	7600	0.050 (0.040—0.065)	380
3.2	60	6000	0.080 (0.060—0.090)	480	60	6000	0.060 (0.050—0.080)	360
4.0	60	4800	0.080 (0.070—0.100)	385	60	4800	0.080 (0.060—0.100)	385
5.0	60	3800	0.110 (0.090—0.130)	420	60	3800	0.100 (0.080—0.130)	380
6.3	60	3000	0.130 (0.110—0.160)	390	60	3000	0.110 (0.090—0.130)	330
8.0	60	2400	0.170 (0.140—0.200)	410	60	2400	0.140 (0.120—0.160)	335
10.0	60	1900	0.210 (0.170—0.250)	400	60	1900	0.170 (0.140—0.200)	325
12.0	60	1600	0.250 (0.210—0.300)	400	60	1600	0.210 (0.170—0.240)	335

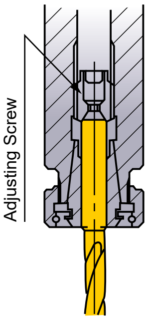
Material	H		S	
	Hardened Steel (40—55HRC), Heat Resistant Alloy X40CrMoV51, 55NiCrMoV7, Inconel®718			
Drill Dia. **DC** (mm)	Cutting Speed (m/min)	Revolution (min^{-1})	Feed rate (Min.—Max.) (mm/rev)	Table Feed (mm/min)
1.0	10	3200	0.015 (0.015—0.020)	50
1.2	10	2700	0.020 (0.015—0.025)	55
1.6	10	2000	0.025 (0.020—0.030)	50
2.0	20	3200	0.035 (0.025—0.040)	110
2.5	20	2600	0.040 (0.030—0.050)	105
3.2	20	2000	0.050 (0.040—0.070)	100
4.0	30	2400	0.070 (0.050—0.080)	170
5.0	30	1900	0.080 (0.060—0.100)	150
6.3	30	1500	0.090 (0.080—0.110)	135
8.0	40	1600	0.120 (0.100—0.130)	190
10.0	40	1300	0.150 (0.130—0.170)	195
12.0	40	1100	0.180 (0.150—0.200)	200

Note 1) When using the drill with a length over L/D 10, it is necessary to use a pilot hole as a guide. (If no pilot hole is used then drill breakage can occur.)

Note 2) Use the shortest flute drill in the respective size as a pilot drill.

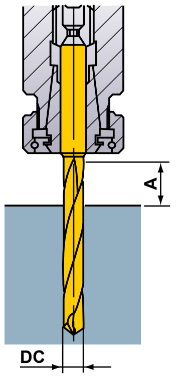
OPERATIONAL GUIDANCE

Drill Holding



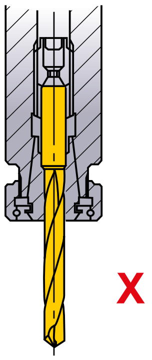
Thrust bearing type collet chuck holds the drill securely.

Drill Length



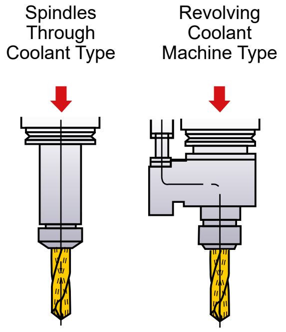
A ≥ DC x 2

Drill Installation



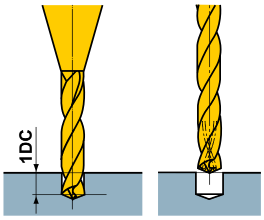
Do not clamp on the flutes.

Through Coolant Type



Coolant pressure is approx.
15 bar—70 bar
Recommended coolant pressure:
≥30 bar

Drill Installation



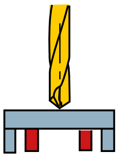
1) Make approx. 1DC(DC: drill diameter) pilot hole by using the MHS with the shortest flutes.
2) Use the pilot hole as a guide and machine by the drill with coolant hole. Depending on the application, carry out pecking.

Coolant Handling

1) Dirt and dust particles in old coolant can clog the oil hole and prevent effective flow. Regular changing of the coolant is recommended.

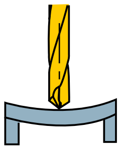
2) Small particles of chips will jam in the oil hole. Use a filter as a preventative measure. When using small diameter drills, use a fine mesh filter.

Thin Workpiece



OK

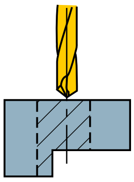
Support the Workpiece



X

If Bending Occurs

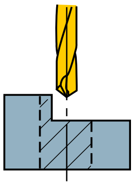
Interrupted Cutting



One Process

OK

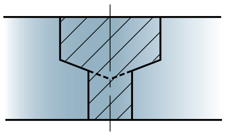
①Lower the feed when drilling the interrupted part.



Requires Prior Machining

①Spot face with MFE drill prior to drilling.

Stepped Holes

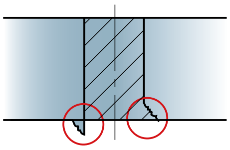


①Divide the machining into two processes.

②Drill the larger hole first.

*Tools for chamfering and spot facing can be produced to order.

Burring and Workpiece Chipping



①Lower the feed rate when breaking through.

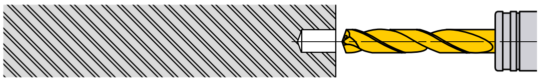
②Change the point angle.

MHS

■ OPERATIONAL GUIDANCE FOR THE MHS LONG TYPE DRILL (L/D ≥ 10)

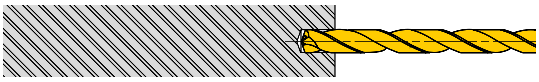
FLAT FACE DRILLING ● Drilling a blind hole

■ 1. Drilling a pilot hole



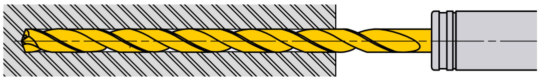
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper. (Adjust the pilot hole depth according to the length of the super long type drill.)

■ 2. Initial cutting with the long type drill



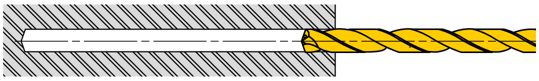
①Penetrate the pilot hole at low revolution. (Revolution 1000min^{-1}, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 0.5—1mm short of the pilot hole bottom.

■ 3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

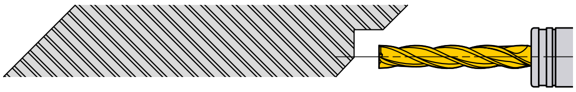
■ 4. Drill retraction



①After drilling, lower the cutting revolution about 0.5—1mm short of the hole end. (Revolution of around 1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.

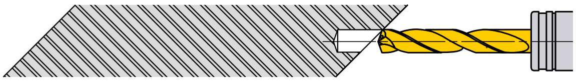
INTERRUPTED DRILLING ● Drilling and breaking through on irregular faces or angles

■ 1. Spot facing



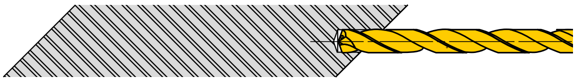
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

■ 2. Drilling a pilot hole



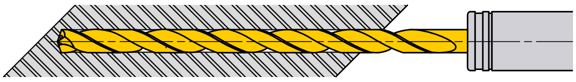
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1DC or deeper. (Adjust the pilot hole depth according to the length of the super long type drill.)

■ 3. Initial cutting with the long type drill



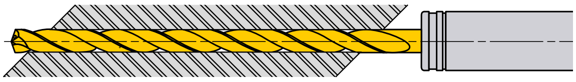
①Penetrate the guide hole at a low revolution. (Revolution 1000min^{-1}, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 0.5—1mm short of the pilot hole bottom.

■ 4. Drill the deep hole



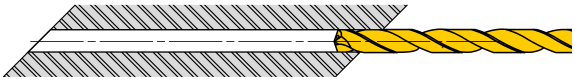
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

■ 5. Breaking through



①When breaking through, the cutting edge can be damaged.
②Lower the feed rate when penetrating.

■ 6. Drill retraction



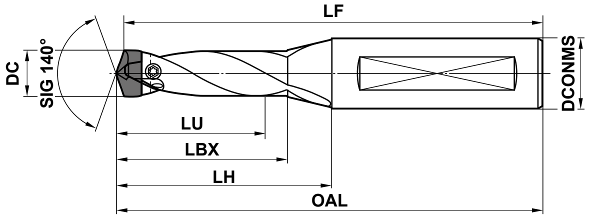
①Finally clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

STAW

- Wavy cutting edge design for good chip control.
- Highly rigid clamping system offers stability and reliability for small hole drilling.

UWC 140°

P M K N S H



HOLDERS

DC	Hole Depth	Holder		Dimensions (mm)						F
(mm)	(L/D)	Order Number	Stock	LU	LBX	LH	OAL	LF	DCONMS	Wrench
10.0 | 10.4	1.5	**STAWSS1000S16**	●	16.8	23.8	33.8	81.8	80	16	TIP06F
	3	**STAWSN1000S16**	●	31.8	38.8	48.8	96.8	95	16	TIP06F
	5	**STAWMN1000S16**	●	51.8	58.8	68.8	116.8	115	16	TIP06F
	8	**STAWLN1000S16**	●	81.8	88.8	98.8	146.8	145	16	TIP06F
10.5 | 10.9	1.5	**STAWSS1050S16**	●	17.7	23.9	33.9	81.9	80	16	TIP06F
	3	**STAWSN1050S16**	●	33.4	38.9	48.9	96.9	95	16	TIP06F
	5	**STAWMN1050S16**	●	54.4	58.9	68.9	116.9	115	16	TIP06F
	8	**STAWLN1050S16**	●	85.9	88.9	98.9	146.9	145	16	TIP06F
11.0 | 11.4	1.5	**STAWSS1100S16**	●	18.5	27.0	38.0	86.0	84	16	TIP06F
	3	**STAWSN1100S16**	●	35.0	43.0	54.0	102.0	100	16	TIP06F
	5	**STAWMN1100S16**	●	57.0	68.0	79.0	127.0	125	16	TIP06F
	8	**STAWLN1100S16**	●	90.0	98.0	109.0	157.0	155	16	TIP06F
11.5 | 11.9	1.5	**STAWSS1150S16**	●	19.4	27.1	38.1	86.1	84	16	TIP06F
	3	**STAWSN1150S16**	●	36.6	43.1	54.1	102.1	100	16	TIP06F
	5	**STAWMN1150S16**	●	59.6	68.1	79.1	127.1	125	16	TIP06F
	8	**STAWLN1150S16**	●	94.1	98.1	109.1	157.1	155	16	TIP06F
12.0 | 12.4	1.5	**STAWSS1200S16**	●	20.2	29.2	41.2	89.2	87	16	TIP06F
	3	**STAWSN1200S16**	●	38.2	47.2	59.2	107.2	105	16	TIP06F
	5	**STAWMN1200S16**	●	62.2	72.2	84.2	132.2	130	16	TIP06F
	8	**STAWLN1200S16**	●	98.2	107.2	119.2	167.2	165	16	TIP06F

Insert		Stock
DC (mm)	Order Number	VP15TF
10.0	* **STAWN1000TH**	●
	STAWK1000TG	
10.1	**STAWN1010TH**	●
	STAWK1010TG	
10.2	**STAWN1020TH**	●
	STAWK1020TG	
10.3	**STAWN1030TH**	●
	STAWK1030TG	
10.4	**STAWN1040TH**	●
	STAWK1040TG	
10.5	* **STAWN1050TH**	●
	STAWK1050TG	
10.6	**STAWN1060TH**	●
	STAWK1060TG	
10.7	**STAWN1070TH**	●
	STAWK1070TG	
10.8	**STAWN1080TH**	●
	STAWK1080TG	
10.9	**STAWN1090TH**	●
	STAWK1090TG	
11.0	* **STAWN1100TH**	●
	STAWK1100TG	
11.1	**STAWN1110TH**	●
	STAWK1110TG	
11.2	**STAWN1120TH**	●
	STAWK1120TG	
11.3	**STAWN1130TH**	●
	STAWK1130TG	
11.4	**STAWN1140TH**	●
	STAWK1140TG	
11.5	* **STAWN1150TH**	●
	STAWK1150TG	
11.6	**STAWN1160TH**	●
	STAWK1160TG	
11.7	**STAWN1170TH**	●
	STAWK1170TG	
11.8	**STAWN1180TH**	●
	STAWK1180TG	
11.9	**STAWN1190TH**	●
	STAWK1190TG	
12.0	* **STAWN1200TH**	●
	STAWK1200TG	
12.1	**STAWN1210TH**	●
	STAWK1210TG	
12.2	**STAWN1220TH**	●
	STAWK1220TG	
12.3	**STAWN1230TH**	●
	STAWK1230TG	
12.4	**STAWN1240TH**	●
	STAWK1240TG	

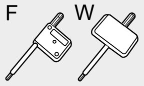
Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained.
(Note: 1 insert in one case)

INSERT DESCRIPTION ➤ M142
CUTTING CONDITIONS ➤ M144
USAGE NOTE ➤ M145
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

DRILLING (EXCHANGEABLE TYPE)

STAW

DC (mm)	Hole Depth (L/D)	Holder		Dimensions (mm)						 F W Wrench	Insert		Stock
		Order Number	Stock	LU	LBX	LH	OAL	LF	DCONMS		DC (mm)	Order Number	VP15TF
12.5 | 12.9	1.5	**STAWSS1250S16**	●	21.1	29.3	41.3	89.3	87	16	TIP06F	12.5	* **STAWN1250TH**	●
												STAWK1250TG	
											12.6	**STAWN1260TH**	●
	3	**STAWSN1250S16**	●	39.8	47.3	59.3	107.3	105	16	TIP06F		**STAWK1260TG**	
											12.7	**STAWN1270TH**	●
												STAWK1270TG	
	5	**STAWMN1250S16**	●	64.8	72.3	84.3	132.3	130	16	TIP06F	12.8	**STAWN1280TH**	●
												STAWK1280TG	
	8	**STAWLN1250S16**	●	102.3	107.3	119.3	167.3	165	16	TIP06F	12.9	**STAWN1290TH**	●
												STAWK1290TG	
13.0 | 13.4	1.5	**STAWSS1300S16**	●	21.9	32.4	45.4	93.4	91	16	TIP08W	13.0	* **STAWN1300TH**	●
												STAWK1300TG	
											13.1	**STAWN1310TH**	●
	3	**STAWSN1300S16**	●	41.4	51.4	64.4	112.4	110	16	TIP08W		**STAWK1310TG**	
											13.2	**STAWN1320TH**	●
												STAWK1320TG	
	5	**STAWMN1300S16**	●	67.4	76.4	89.4	137.4	135	16	TIP08W	13.3	**STAWN1330TH**	●
												STAWK1330TG	
	8	**STAWLN1300S16**	●	106.4	116.4	129.4	177.4	175	16	TIP08W	13.4	**STAWN1340TH**	●
												STAWK1340TG	
13.5 | 13.9	1.5	**STAWSS1350S16**	●	22.8	32.5	45.5	93.5	91	16	TIP08W	13.5	* **STAWN1350TH**	●
												STAWK1350TG	
											13.6	**STAWN1360TH**	●
	3	**STAWSN1350S16**	●	43.0	51.5	64.5	112.5	110	16	TIP08W		**STAWK1360TG**	
											13.7	**STAWN1370TH**	●
												STAWK1370TG	
	5	**STAWMN1350S16**	●	70.0	76.5	89.5	137.5	135	16	TIP08W	13.8	**STAWN1380TH**	●
												STAWK1380TG	
	8	**STAWLN1350S16**	●	110.5	116.5	129.5	177.5	175	16	TIP08W	13.9	**STAWN1390TH**	●
												STAWK1390TG	
14.0 | 14.4	1.5	**STAWSS1400S16**	●	23.5	33.5	47.5	95.5	93	16	TIP08W	14.0	* **STAWN1400TH**	●
												STAWK1400TG	
											14.1	**STAWN1410TH**	●
	3	**STAWSN1400S16**	●	44.5	55.5	69.5	117.5	115	16	TIP08W		**STAWK1410TG**	
											14.2	**STAWN1420TH**	●
												STAWK1420TG	
	5	**STAWMN1400S16**	●	72.5	85.5	99.5	147.5	145	16	TIP08W	14.3	**STAWN1430TH**	●
												STAWK1430TG	
	8	**STAWLN1400S16**	●	114.5	124.5	139.5	187.5	185	16	TIP08W	14.4	**STAWN1440TH**	●
												STAWK1440TG	
14.5 | 14.9	1.5	**STAWSS1450S16**	●	24.4	33.6	47.6	95.6	93	16	TIP08W	14.5	* **STAWN1450TH**	●
												STAWK1450TG	
											14.6	**STAWN1460TH**	●
	3	**STAWSN1450S16**	●	46.1	55.6	69.6	117.6	115	16	TIP08W		**STAWK1460TG**	
											14.7	**STAWN1470TH**	●
												STAWK1470TG	
	5	**STAWMN1450S16**	●	75.1	85.6	99.6	147.6	145	16	TIP08W	14.8	**STAWN1480TH**	●
												STAWK1480TG	
	8	**STAWLN1450S16**	●	118.6	124.6	139.6	187.6	185	16	TIP08W	14.9	**STAWN1490TH**	●
												STAWK1490TG	
15.0 | 15.4	1.5	**STAWSS1500S20**	●	25.2	35.7	50.7	100.7	98	20	TIP08W	15.0	* **STAWN1500TH**	●
												STAWK1500TG	
											15.1	**STAWN1510TH**	●
	3	**STAWSN1500S20**	●	47.7	62.7	77.7	127.7	125	20	TIP08W		**STAWK1510TG**	
											15.2	**STAWN1520TH**	●
												STAWK1520TG	
	5	**STAWMN1500S20**	●	77.7	92.7	107.7	157.7	155	20	TIP08W	15.3	**STAWN1530TH**	●
												STAWK1530TG	
	8	**STAWLN1500S20**	●	122.7	132.7	150.7	200.7	198	20	TIP08W	15.4	**STAWN1540TH**	●
												STAWK1540TG	

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. (Note: 1 insert in one case)

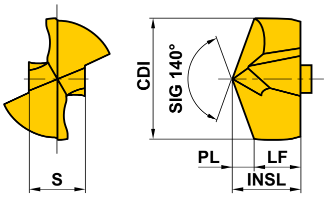
		Holder		Dimensions (mm)						W 	Insert		Stock
DC (mm)	Hole Depth (L/D)	Order Number	Stock	LU	LBX	LH	OAL	LF	DCONMS	Wrench	DC (mm)	Order Number	VP15TF
15.5 | 16.4	1.5	STAWSS1600S20	●	26.1	36.8	52.8	102.8	100	20	TIP10W	15.5	* STAWN1550T	●
												STAWK1550TG	
											15.6	STAWN1560T	●
												STAWK1560TG	
											15.7	STAWN1570T	●
	3	STAWSN1600S20	●	49.3	62.8	82.8	132.8	130	20	TIP10W		STAWK1570TG	
											15.8	STAWN1580T	●
												STAWK1580TG	
											15.9	STAWN1590T	●
												STAWK1590TG	
	5	STAWMN1600S20	●	80.3	92.8	117.8	167.8	165	20	TIP10W	16.0	STAWN1600T	●
												STAWK1600TG	
											16.1	STAWN1610T	●
												STAWK1610TG	
											16.2	STAWN1620T	●
	8	STAWLN1600S20	●	126.8	140.8	160.8	210.8	208	20	TIP10W		STAWK1620TG	
											16.3	STAWN1630T	●
												STAWK1630TG	
											16.4	STAWN1640T	●
												STAWK1640TG	
16.5 | 17.4	1.5	STAWSS1700S20	●	27.8	39.0	56.0	106.0	103	20	TIP10W	16.5	* STAWN1650T	●
												STAWK1650TG	
											16.6	STAWN1660T	●
												STAWK1660TG	
											16.7	STAWN1670T	●
	3	STAWSN1700S20	●	52.5	64.0	88.0	138.0	135	20	TIP10W		STAWK1670TG	
											16.8	STAWN1680T	●
												STAWK1680TG	
											16.9	STAWN1690T	●
												STAWK1690TG	
	5	STAWMN1700S20	●	85.5	98.0	123.0	173.0	170	20	TIP10W	17.0	STAWN1700T	●
												STAWK1700TG	
											17.1	STAWN1710T	●
												STAWK1710TG	
											17.2	STAWN1720T	●
	8	STAWLN1700S20	●	135.0	149.0	169.0	219.0	216	20	TIP10W		STAWK1720TG	
											17.3	STAWN1730T	●
												STAWK1730TG	
											17.4	STAWN1740T	●
												STAWK1740TG	
17.5 | 18.4	1.5	STAWSS1800S20	●	29.5	40.2	58.2	108.2	105	20	TIP10W	17.5	* STAWN1750T	●
												STAWK1750TG	
											17.6	STAWN1760T	●
												STAWK1760TG	
											17.7	STAWN1770T	●
	3	STAWSN1800S20	●	55.7	67.2	93.2	143.2	140	20	TIP10W		STAWK1770TG	
											17.8	STAWN1780T	●
												STAWK1780TG	
											17.9	STAWN1790T	●
												STAWK1790TG	
	5	STAWMN1800S20	●	90.7	103.2	128.2	178.2	175	20	TIP10W	18.0	STAWN1800T	●
												STAWK1800TG	
											18.1	STAWN1810T	●
												STAWK1810TG	
											18.2	STAWN1820T	●
	8	STAWLN1800S20	●	143.2	157.2	177.2	227.2	224	20	TIP10W		STAWK1820TG	
											18.3	STAWN1830T	●
												STAWK1830TG	
											18.4	STAWN1840T	●
												STAWK1840TG	

INSERT DESCRIPTION ➤ M142
CUTTING CONDITIONS ➤ M144
USAGE NOTE ➤ M145
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

DRILLING (EXCHANGEABLE TYPE)

STAW

INSERT



Order Number	Coated		Dimensions (mm)					Applicable Holder
	VP15TF		CDI	INSL	LF	PL	S	
STAWN1000TH	●		10.0	5.6	3.8	1.8	4.6	STAWSS1000S16 STAWSN1000S16 STAWMN1000S16 STAWLN1000S16
STAWN1010TH	●		10.1	5.6	3.8	1.8	4.6	
STAWN1020TH	●		10.2	5.7	3.8	1.9	4.6	
STAWN1030TH	●		10.3	5.7	3.8	1.9	4.6	
STAWN1040TH	●		10.4	5.7	3.8	1.9	4.6	
STAWN1050TH	●		10.5	5.9	4.0	1.9	4.8	STAWSS1050S16 STAWSN1050S16 STAWMN1050S16 STAWLN1050S16
STAWN1060TH	●		10.6	5.9	4.0	1.9	4.8	
STAWN1070TH	●		10.7	5.9	4.0	1.9	4.8	
STAWN1080TH	●		10.8	6.0	4.0	2.0	4.8	
STAWN1090TH	●		10.9	6.0	4.0	2.0	4.8	
STAWN1100TH	●		11.0	6.2	4.2	2.0	5.1	STAWSS1100S16 STAWSN1100S16 STAWMN1100S16 STAWLN1100S16
STAWN1110TH	●		11.1	6.2	4.2	2.0	5.1	
STAWN1120TH	●		11.2	6.2	4.2	2.0	5.1	
STAWN1130TH	●		11.3	6.3	4.2	2.1	5.1	
STAWN1140TH	●		11.4	6.3	4.2	2.1	5.1	
STAWN1150TH	●		11.5	6.5	4.4	2.1	5.3	STAWSS1150S16 STAWSN1150S16 STAWMN1150S16 STAWLN1150S16
STAWN1160TH	●		11.6	6.5	4.4	2.1	5.3	
STAWN1170TH	●		11.7	6.5	4.4	2.1	5.3	
STAWN1180TH	●		11.8	6.5	4.4	2.1	5.3	
STAWN1190TH	●		11.9	6.6	4.4	2.2	5.3	
STAWN1200TH	●		12.0	6.8	4.6	2.2	5.5	STAWSS1200S16 STAWSN1200S16 STAWMN1200S16 STAWLN1200S16
STAWN1210TH	●		12.1	6.8	4.6	2.2	5.5	
STAWN1220TH	●		12.2	6.8	4.6	2.2	5.5	
STAWN1230TH	●		12.3	6.8	4.6	2.2	5.5	
STAWN1240TH	●		12.4	6.9	4.6	2.3	5.5	
STAWN1250TH	●		12.5	7.1	4.8	2.3	5.8	STAWSS1250S16 STAWSN1250S16 STAWMN1250S16 STAWLN1250S16
STAWN1260TH	●		12.6	7.1	4.8	2.3	5.8	
STAWN1270TH	●		12.7	7.1	4.8	2.3	5.8	
STAWN1280TH	●		12.8	7.1	4.8	2.3	5.8	
STAWN1290TH	●		12.9	7.1	4.8	2.3	5.8	
STAWN1300TH	●		13.0	7.3	4.9	2.4	6.0	STAWSS1300S16 STAWSN1300S16 STAWMN1300S16 STAWLN1300S16
STAWN1310TH	●		13.1	7.3	4.9	2.4	6.0	
STAWN1320TH	●		13.2	7.3	4.9	2.4	6.0	
STAWN1330TH	●		13.3	7.3	4.9	2.4	6.0	
STAWN1340TH	●		13.4	7.3	4.9	2.4	6.0	
STAWN1350TH	●		13.5	7.6	5.1	2.5	6.2	STAWSS1350S16 STAWSN1350S16 STAWMN1350S16 STAWLN1350S16
STAWN1360TH	●		13.6	7.6	5.1	2.5	6.2	
STAWN1370TH	●		13.7	7.6	5.1	2.5	6.2	
STAWN1380TH	●		13.8	7.6	5.1	2.5	6.2	
STAWN1390TH	●		13.9	7.6	5.1	2.5	6.2	

● : Inventory maintained. (Note: 1 insert in one case)

Order Number	Coated		Dimensions (mm)					Applicable Holder
	VP15TF		CDI	INSL	LF	PL	S	
STAWN1400TH	●		14.0	7.8	5.3	2.5	6.4	STAWSS1400S16 STAWSN1400S16 STAWMN1400S16 STAWLN1400S16
STAWN1410TH	●		14.1	7.9	5.3	2.6	6.4	
STAWN1420TH	●		14.2	7.9	5.3	2.6	6.4	
STAWN1430TH	●		14.3	7.9	5.3	2.6	6.4	
STAWN1440TH	●		14.4	7.9	5.3	2.6	6.4	
STAWN1450TH	●		14.5	8.1	5.5	2.6	6.7	STAWSS1450S16 STAWSN1450S16 STAWMN1450S16 STAWLN1450S16
STAWN1460TH	●		14.6	8.2	5.5	2.7	6.7	
STAWN1470TH	●		14.7	8.2	5.5	2.7	6.7	
STAWN1480TH	●		14.8	8.2	5.5	2.7	6.7	
STAWN1490TH	●		14.9	8.2	5.5	2.7	6.7	
STAWN1500TH	●		15.0	8.4	5.7	2.7	6.9	STAWSS1500S20 STAWSN1500S20 STAWMN1500S20 STAWLN1500S20
STAWN1510TH	●		15.1	8.4	5.7	2.7	6.9	
STAWN1520TH	●		15.2	8.5	5.7	2.8	6.9	
STAWN1530TH	●		15.3	8.5	5.7	2.8	6.9	
STAWN1540TH	●		15.4	8.5	5.7	2.8	6.9	
STAWN1550T	●		15.5	8.7	5.9	2.8	7.1	STAWSS1600S20 STAWSN1600S20 STAWMN1600S20 STAWLN1600S20
STAWN1560T	●		15.6	8.7	5.9	2.8	7.1	
STAWN1570T	●		15.7	8.8	5.9	2.9	7.1	
STAWN1580T	●		15.8	8.8	5.9	2.9	7.1	
STAWN1590T	●		15.9	8.8	5.9	2.9	7.1	
STAWN1600T	●		16.0	8.8	5.9	2.9	7.1	
STAWN1610T	●		16.1	8.8	5.9	2.9	7.1	
STAWN1620T	●		16.2	8.8	5.9	2.9	7.1	
STAWN1630T	●		16.3	8.9	5.9	3.0	7.1	
STAWN1640T	●		16.4	8.9	5.9	3.0	7.1	
STAWN1650T	●		16.5	9.3	6.3	3.0	7.6	STAWSS1700S20 STAWSN1700S20 STAWMN1700S20 STAWLN1700S20
STAWN1660T	●		16.6	9.3	6.3	3.0	7.6	
STAWN1670T	●		16.7	9.3	6.3	3.0	7.6	
STAWN1680T	●		16.8	9.4	6.3	3.1	7.6	
STAWN1690T	●		16.9	9.4	6.3	3.1	7.6	
STAWN1700T	●		17.0	9.4	6.3	3.1	7.6	
STAWN1710T	●		17.1	9.4	6.3	3.1	7.6	
STAWN1720T	●		17.2	9.4	6.3	3.1	7.6	
STAWN1730T	●		17.3	9.4	6.3	3.1	7.6	
STAWN1740T	●		17.4	9.5	6.3	3.2	7.6	
STAWN1750T	●		17.5	9.9	6.7	3.2	8.1	STAWSS1800S20 STAWSN1800S20 STAWMN1800S20 STAWLN1800S20
STAWN1760T	●		17.6	9.9	6.7	3.2	8.1	
STAWN1770T	●		17.7	9.9	6.7	3.2	8.1	
STAWN1780T	●		17.8	9.9	6.7	3.2	8.1	
STAWN1790T	●		17.9	10.0	6.7	3.3	8.1	
STAWN1800T	●		18.0	10.0	6.7	3.3	8.1	
STAWN1810T	●		18.1	10.0	6.7	3.3	8.1	
STAWN1820T	●		18.2	10.0	6.7	3.3	8.1	
STAWN1830T	●		18.3	10.0	6.7	3.3	8.1	
STAWN1840T	●		18.4	10.0	6.7	3.3	8.1	

CUTTING CONDITIONS ➢ **M144**
USAGE NOTE ➢ **M145**
SPARE PARTS ➢ **N001**
TECHNICAL DATA ➢ **P001**

STAW

HONE WIDTH

If an insert with honing other than standard is needed, please order using the symbols below.

(Insert Order Number)

S T A W N 1 0 0 0 T ◌

S T A W : STAW Product Name

N : Honing Symbol…

(Honing Standard)

Honing Type	Hone Width (mm)
F	0
G	0.02–0.05
H	0.05–0.10
- (Standard)	0.10–0.15
K	0.15–0.20
S	0.20–0.25
M	0.25–0.30

RECOMMENDED CUTTING CONDITIONS

	Material	Drill Diameter	Ø 10.0–Ø 12.9		Ø 13.0–Ø 13.9		Ø 14.0–Ø 15.4		Ø 15.5–Ø 18.4	
		Conditions / Hardness	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	80 (60–100)	0.20 (0.15–0.25)	90 (70–110)	0.25 (0.20–0.30)	100 (80–120)	0.30 (0.25–0.35)	100 (80–120)	0.35 (0.25–0.40)
	Carbon Steel Alloy Steel	180–280HB	80 (60–100)	0.20 (0.15–0.25)	90 (70–110)	0.25 (0.20–0.30)	100 (80–120)	0.30 (0.25–0.35)	100 (80–120)	0.35 (0.25–0.40)
		280–350HB	70 (60–90)	0.20 (0.15–0.25)	80 (60–100)	0.25 (0.20–0.30)	90 (70–110)	0.25 (0.20–0.30)	90 (70–110)	0.30 (0.20–0.35)
M	Stainless Steel	≤200HB	40 (30–50)	0.13 (0.10–0.16)	50 (40–60)	0.15 (0.12–0.18)	60 (50–70)	0.17 (0.14–0.20)	60 (50–70)	0.17 (0.14–0.20)
K	Cast Iron	Tensile Strength ≤350MPa	80 (60–100)	0.20 (0.15–0.25)	90 (70–110)	0.25 (0.20–0.30)	100 (80–120)	0.30 (0.25–0.35)	120 (80–140)	0.45 (0.35–0.55)
	Ductile Cast Iron	Tensile Strength ≤450MPa	70 (60–90)	0.20 (0.15–0.25)	80 (60–100)	0.25 (0.20–0.30)	90 (70–110)	0.30 (0.25–0.35)	100 (80–120)	0.35 (0.25–0.40)

Note 1) When using a drill for DCx1.5 depth of hole, it is possible to increase the feed rate by approx. 20%.
Note 2) When using the DCx8 type holder, reduce the cutting speed by approx. 20%.
Note 3) When using the DCx8 type holder, it is recommended to drill a pilot guide hole.
Note 4) For stainless steel, please use internal coolant. (Mist & MQL are not recommended).

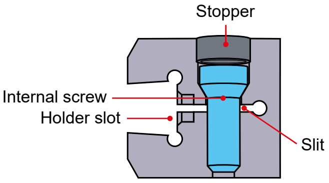
NOTES ON USE

■INSERT INSTALLATION

1. Before inserting the insert into the holder, ensure that there are no foreign objects or dirt in the holder slot or slit. Clean using compressed air if necessary.

2. Use the wrench provided to loosen the inner screw to open the tip of the holder, then place the insert into the holder slot as shown in figure 1.
   ∗Ensure that the wrench is firmly in contact with the base of the inner screw head when tightening.

3. After the insert has been set in the holder slot, tighten the inner screw while pushing the insert lightly into the pocket as shown in figure 2 to securely clamp and locate the insert.
   ∗Ensure that the wrench is firmly in contact with the base of the inner screw head when tightening.



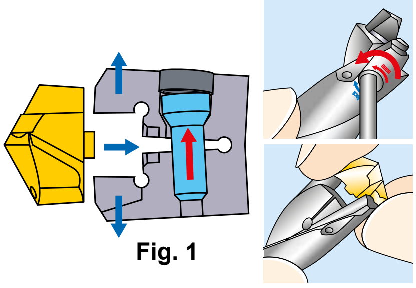


Fig. 1

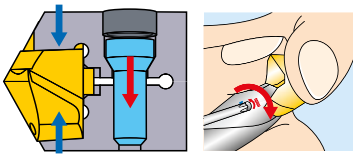
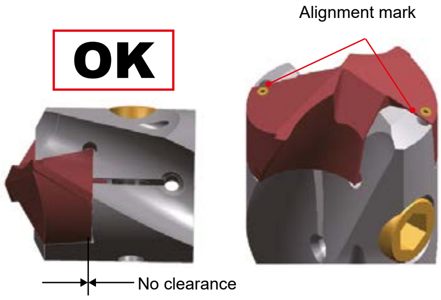


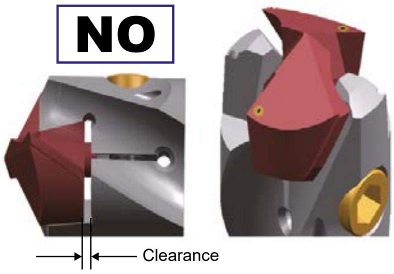
Fig. 2

Tighten the clamp screw according to the torque below.

Drill Dia. (mm)	Torque
	N•m
10 −12.9	1
13 −15.4	2
15.5−18.4	2.5

4. Check there is no gap between the bottom of the insert and holder slot.

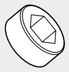




Note 1) Poor or incorrect clamping of inserts can cause poor drilling performance and/or drill breakage.
Therefore ensure that the alignment marks on both the body and insert are aligned when setting.
When machining, use safety guards and goggles.

STAW

SPARE PARTS

Applicable Holder	Pack Order Number (Internal screw & stopper)		
		Internal screw	Stopper
STAWSS/SN/MN/LN1000S16	WS203107TPS-35LH	WS203107TPS	WS35LH
STAWSS/SN/MN/LN1050S16	WS203107TPS-35LH	WS203107TPS	WS35LH
STAWSS/SN/MN/LN1100S16	WS203108TPS-35LH	WS203108TPS	WS35LH
STAWSS/SN/MN/LN1150S16	WS203108TPS-35LH	WS203108TPS	WS35LH
STAWSS/SN/MN/LN1200S16	WS203108TPS-35LH	WS203108TPS	WS35LH
STAWSS/SN/MN/LN1250S16	WS203108TPS-35LH	WS203108TPS	WS35LH
STAWSS/SN/MN/LN1300S16	WS253909TPS-45LH	WS253909TPS	WS45LH
STAWSS/SN/MN/LN1350S16	WS253909TPS-45LH	WS253909TPS	WS45LH
STAWSS/SN/MN/LN1400S16	WS253909TPS-45LH	WS253909TPS	WS45LH
STAWSS/SN/MN/LN1450S16	WS253909TPS-45LH	WS253909TPS	WS45LH
STAWSS/SN/MN/LN1500S20	WS253909TPS-45LH	WS253909TPS	WS45LH
STAWSS/SN/MN/LN1600S20	WS304912TPS-55LH	WS304912TPS	WS55LH
STAWSS/SN/MN/LN1700S20	WS304912TPS-55LH	WS304912TPS	WS55LH
STAWSS/SN/MN/LN1800S20	WS304912TPS-55LH	WS304912TPS	WS55LH

Note 1) The parts package includes internal screw, stopper and operation manual. Please replace the parts in accordance with the operation manual.

Memo

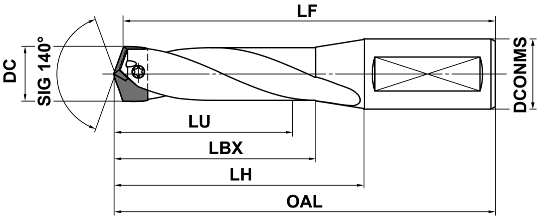
DRILLING (EXCHANGEABLE TYPE)

TAW

- Wavy cutting edge design for good chip control.
- Serrated seat for accurate insert location.
- Easy insert exchange.

P M K N S H

(General Use)



■HOLDERS

DC (mm)	Hole Depth (L/D)	Holder Order Number	Holder Stock	LU	LBX	LH	OAL	LF	DCONMS	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
18.5 – 19.4	3	TAWSN1900S25	●	58.9	71.4	102.4	158.4	155.0	25	WS304517T	TKY10T	WPT4405	MK1KS
	5	TAWMN1900S25	●	95.9	110.4	137.4	193.4	190.0	25	WS304517T	TKY10T	WPT4405	MK1KS
	8	TAWLN1900S25	●	151.4	165.4	188.4	244.4	241.0	25	WS304517T	TKY10T	WPT4405	MK1KS
19.5 – 20.4	3	TAWSN2000S25	●	62.0	75.5	102.5	158.5	155.0	25	WS304518T	TKY10T	WPT4405	MK1KS
	5	TAWMN2000S25	●	101.0	116.5	142.5	198.5	195.0	25	WS304518T	TKY10T	WPT4405	MK1KS
	8	TAWLN2000S25	●	159.5	173.5	196.5	252.5	249.0	25	WS304518T	TKY10T	WPT4405	MK1KS

Dimensions (mm): LU, LBX, LH, OAL, LF, DCONMS

Insert DC (mm)	Insert Order Number	Stock VP15TF	Stock VP10H
18.5	*TAWNH1850T	●	☐
	TAWKH1850TG		
18.6	TAWNH1860T	●	☐
	TAWKH1860TG		
18.7	TAWNH1870T	●	☐
	TAWKH1870TG		
18.8	TAWNH1880T	●	☐
	TAWKH1880TG		
18.9	TAWNH1890T	●	☐
	TAWKH1890TG		
19.0	TAWNH1900T	●	☐
	TAWKH1900TG		
19.1	TAWNH1910T	●	☐
	TAWKH1910TG		
19.2	TAWNH1920T	●	☐
	TAWKH1920TG		
19.3	TAWNH1930T	●	☐
	TAWKH1930TG		
19.4	TAWNH1940T	●	☐
	TAWKH1940TG		
19.5	*TAWNH1950T	●	☐
	TAWKH1950TG		
19.6	TAWNH1960T	●	☐
	TAWKH1960TG		
19.7	TAWNH1970T	●	☐
	TAWKH1970TG		
19.8	TAWNH1980T	●	☐
	TAWKH1980TG		
19.9	TAWNH1990T	●	☐
	TAWKH1990TG		
20.0	TAWNH2000T	●	☐
	TAWKH2000TG		
20.1	TAWNH2010T	☐	☐
	TAWKH2010TG		
20.2	TAWNH2020T	☐	☐
	TAWKH2020TG		
20.3	TAWNH2030T	☐	☐
	TAWKH2030TG		
20.4	TAWNH2040T	☐	☐
	TAWKH2040TG		

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

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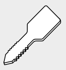
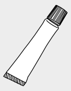
(Note: 1 insert in one case)

DC (mm)	Hole Depth (L/D)	Holder Order Number	Holder Stock	Dimensions (mm) LU	LBX	LH	OAL	LF	DCONMS	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
20.5 – 21.4	3	**TAWSN2100S25**	●	65.2	78.7	102.7	158.7	155.0	25	WS304518T	TKY10T	WPT4405	MK1KS
	5	**TAWMN2100S25**	●	106.2	121.7	142.7	198.7	195.0	25	WS304518T	TKY10T	WPT4405	MK1KS
	8	**TAWLN2100S25**	●	167.7	181.7	205.7	261.7	258.0	25	WS304518T	TKY10T	WPT4405	MK1KS
21.5 – 22.4	3	**TAWSN2200S25**	●	68.4	83.2	108.2	164.2	160.3	25	WS355520T	TKY15T	WPT4405	MK1KS
	5	**TAWMN2200S25**	●	111.4	128.2	148.2	204.2	200.3	25	WS355520T	TKY15T	WPT4405	MK1KS
	8	**TAWLN2200S25**	●	175.9	189.9	213.9	269.9	266.0	25	WS355520T	TKY15T	WPT4405	MK1KS
22.5 – 23.4	3	**TAWSN2300S25**	●	71.6	86.4	108.4	164.4	160.3	25	WS355521T	TKY15T	WPT4405	MK1KS
	5	**TAWMN2300S25**	●	116.6	133.4	158.4	214.4	210.3	25	WS355521T	TKY15T	WPT4405	MK1KS
	8	**TAWLN2300S25**	●	184.1	198.1	227.1	283.1	279.0	25	WS355521T	TKY15T	WPT4405	MK1KS

Insert DC (mm)	Insert Order Number	Stock VP15TF	Stock VP10H
20.5	*TAWNH2050T	●	☐
	TAWKH2050TG		
20.6	TAWNH2060T	☐	☐
	TAWKH2060TG		
20.7	TAWNH2070T	☐	☐
	TAWKH2070TG		
20.8	TAWNH2080T	☐	☐
	TAWKH2080TG		
20.9	TAWNH2090T	☐	☐
	TAWKH2090TG		
21.0	TAWNH2100T	●	☐
	TAWKH2100TG		
21.1	TAWNH2110T	☐	☐
	TAWKH2110TG		
21.2	TAWNH2120T	☐	☐
	TAWKH2120TG		
21.3	TAWNH2130T	☐	☐
	TAWKH2130TG		
21.4	TAWNH2140T	☐	☐
	TAWKH2140TG		
21.5	*TAWNH2150T	●	☐
	TAWKH2150TG		
21.6	TAWNH2160T	☐	☐
	TAWKH2160TG		
21.7	TAWNH2170T	☐	☐
	TAWKH2170TG		
21.8	TAWNH2180T	☐	☐
	TAWKH2180TG		
21.9	TAWNH2190T	☐	☐
	TAWKH2190TG		
22.0	TAWNH2200T	●	☐
	TAWKH2200TG		
22.1	TAWNH2210T	☐	☐
	TAWKH2210TG		
22.2	TAWNH2220T	☐	☐
	TAWKH2220TG		
22.3	TAWNH2230T	☐	☐
	TAWKH2230TG		
22.4	TAWNH2240T	☐	☐
	TAWKH2240TG		
22.5	*TAWNH2250T	●	☐
	TAWKH2250TG		
22.6	TAWNH2260T	☐	☐
	TAWKH2260TG		
22.7	TAWNH2270T	☐	☐
	TAWKH2270TG		
22.8	TAWNH2280T	☐	☐
	TAWKH2280TG		
22.9	TAWNH2290T	☐	☐
	TAWKH2290TG		
23.0	TAWNH2300T	●	☐
	TAWKH2300TG		
23.1	TAWNH2310T	☐	☐
	TAWKH2310TG		
23.2	TAWNH2320T	☐	☐
	TAWKH2320TG		
23.3	TAWNH2330T	☐	☐
	TAWKH2330TG		
23.4	TAWNH2340T	☐	☐
	TAWKH2340TG		

INSERT DESCRIPTION ➤ M153
CUTTING CONDITIONS ➤ M155
USAGE NOTE ➤ M156
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

TAW

DC (mm)	Hole Depth (L/D)	Holder		Dimensions (mm)									
		Order Number	Stock	LU	LBX	LH	OAL	LF	DCONMS	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
23.5 – 24.4	3	**TAWSN2400S32**	●	74.8	90.6	114.6	174.6	170.3	32	WS355521T	TKY15T	WPT4405	MK1KS
	5	**TAWMN2400S32**	●	121.8	139.6	164.6	224.6	220.3	32	WS355521T	TKY15T	WPT4405	MK1KS
	8	**TAWLN2400S32**	●	192.3	206.6	236.6	296.6	292.3	32	WS355521T	TKY15T	WPT4405	MK1KS
24.5 – 25.4	3	**TAWSN2500S32**	●	78.0	93.1	115.1	175.1	170.6	32	WS406023T	TKY25T	WPT4405	MK1KS
	5	**TAWMN2500S32**	●	127.0	145.1	170.1	230.1	225.6	32	WS406023T	TKY25T	WPT4405	MK1KS
	8	**TAWLN2500S32**	●	200.5	215.1	245.1	305.1	300.6	32	WS406023T	TKY25T	WPT4405	MK1KS
25.5 – 26.4	3	**TAWSN2600S32**	●	81.1	97.2	120.2	180.2	175.6	32	WS406024T	TKY25T	WPT4405	MK1KS
	5	**TAWMN2600S32**	●	132.1	151.2	175.2	235.2	230.6	32	WS406024T	TKY25T	WPT4405	MK1KS
	8	**TAWLN2600S32**	●	208.6	223.2	253.2	313.2	308.6	32	WS406024T	TKY25T	WPT4405	MK1KS

Insert			
DC (mm)	Order Number	Stock	
		VP15TF	VP10H
23.5	*TAWNH2350T	●	☐
	TAWKH2350TG		
23.6	TAWNH2360T	☐	☐
	TAWKH2360TG		
23.7	TAWNH2370T	☐	☐
	TAWKH2370TG		
23.8	TAWNH2380T	☐	☐
	TAWKH2380TG		
23.9	TAWNH2390T	☐	☐
	TAWKH2390TG		
24.0	TAWNH2400T	●	☐
	TAWKH2400TG		
24.1	TAWNH2410T	☐	☐
	TAWKH2410TG		
24.2	TAWNH2420T	☐	☐
	TAWKH2420TG		
24.3	TAWNH2430T	☐	☐
	TAWKH2430TG		
24.4	TAWNH2440T	☐	☐
	TAWKH2440TG		
24.5	*TAWNH2450T	●	☐
	TAWKH2450TG		
24.6	TAWNH2460T	☐	☐
	TAWKH2460TG		
24.7	TAWNH2470T	☐	☐
	TAWKH2470TG		
24.8	TAWNH2480T	☐	☐
	TAWKH2480TG		
24.9	TAWNH2490T	☐	☐
	TAWKH2490TG		
25.0	TAWNH2500T	●	☐
	TAWKH2500TG		
25.1	TAWNH2510T	☐	☐
	TAWKH2510TG		
25.2	TAWNH2520T	☐	☐
	TAWKH2520TG		
25.3	TAWNH2530T	☐	☐
	TAWKH2530TG		
25.4	TAWNH2540T	☐	☐
	TAWKH2540TG		
25.5	*TAWNH2550T	●	☐
	TAWKH2550TG		
25.6	TAWNH2560T	☐	☐
	TAWKH2560TG		
25.7	TAWNH2570T	☐	☐
	TAWKH2570TG		
25.8	TAWNH2580T	☐	☐
	TAWKH2580TG		
25.9	TAWNH2590T	☐	☐
	TAWKH2590TG		
26.0	TAWNH2600T	●	☐
	TAWKH2600TG		
26.1	TAWNH2610T	☐	☐
	TAWKH2610TG		
26.2	TAWNH2620T	☐	☐
	TAWKH2620TG		
26.3	TAWNH2630T	☐	☐
	TAWKH2630TG		
26.4	TAWNH2640T	☐	☐
	TAWKH2640TG		

Note 1) The above dimensions (*) are for when installing the inserts.
Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

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(Note: 1 insert in one case)

DC (mm)	Hole Depth (L/D)	Holder Order Number	Holder Stock	LU	LBX	LH	OAL	LF	DCONMS	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
26.5 – 27.4	3	**TAWSN2700S32**	●	84.3	99.4	120.4	180.4	175.6	32	WS406024T	TKY25T	WPT4405	MK1KS
	5	**TAWMN2700S32**	●	137.3	156.4	180.4	240.4	235.6	32	WS406024T	TKY25T	WPT4405	MK1KS
	8	**TAWLN2700S32**	●	216.8	231.4	261.4	321.4	316.6	32	WS406024T	TKY25T	WPT4405	MK1KS
27.5 – 28.4	3	**TAWSN2800S32**	●	87.5	102.2	125.2	185.2	180.2	32	WS508026T	TKY27T	WPT4405	MK1KS
	5	**TAWMN2800S32**	●	142.5	162.2	185.2	245.2	240.2	32	WS508026T	TKY27T	WPT4405	MK1KS
	8	**TAWLN2800S32**	●	225.0	239.2	269.2	329.2	324.2	32	WS508026T	TKY27T	WPT4405	MK1KS
28.5 – 29.4	3	**TAWSN2900S32**	●	90.7	105.4	130.4	190.4	185.2	32	WS508027T	TKY27T	WPT4405	MK1KS
	5	**TAWMN2900S32**	●	147.7	167.4	190.4	250.4	245.2	32	WS508027T	TKY27T	WPT4405	MK1KS
	8	**TAWLN2900S32**	●	233.2	247.4	277.4	337.4	332.2	32	WS508027T	TKY27T	WPT4405	MK1KS

Insert DC (mm)	Insert Order Number	Stock VP15TF	Stock VP10H
26.5	*TAWNH2650T	●	☐
	TAWKH2650TG		
26.6	TAWNH2660T	☐	☐
	TAWKH2660TG		
26.7	TAWNH2670T	☐	☐
	TAWKH2670TG		
26.8	TAWNH2680T	☐	☐
	TAWKH2680TG		
26.9	TAWNH2690T	☐	☐
	TAWKH2690TG		
27.0	TAWNH2700T	●	☐
	TAWKH2700TG		
27.1	TAWNH2710T	☐	☐
	TAWKH2710TG		
27.2	TAWNH2720T	☐	☐
	TAWKH2720TG		
27.3	TAWNH2730T	☐	☐
	TAWKH2730TG		
27.4	TAWNH2740T	☐	☐
	TAWKH2740TG		
27.5	*TAWNH2750T	●	☐
	TAWKH2750TG		
27.6	TAWNH2760T	☐	☐
	TAWKH2760TG		
27.7	TAWNH2770T	☐	☐
	TAWKH2770TG		
27.8	TAWNH2780T	☐	☐
	TAWKH2780TG		
27.9	TAWNH2790T	☐	☐
	TAWKH2790TG		
28.0	TAWNH2800T	●	☐
	TAWKH2800TG		
28.1	TAWNH2810T	☐	☐
	TAWKH2810TG		
28.2	TAWNH2820T	☐	☐
	TAWKH2820TG		
28.3	TAWNH2830T	☐	☐
	TAWKH2830TG		
28.4	TAWNH2840T	☐	☐
	TAWKH2840TG		
28.5	*TAWNH2850T	●	☐
	TAWKH2850TG		
28.6	TAWNH2860T	☐	☐
	TAWKH2860TG		
28.7	TAWNH2870T	☐	☐
	TAWKH2870TG		
28.8	TAWNH2880T	☐	☐
	TAWKH2880TG		
28.9	TAWNH2890T	☐	☐
	TAWKH2890TG		
29.0	TAWNH2900T	●	☐
	TAWKH2900TG		
29.1	TAWNH2910T	☐	☐
	TAWKH2910TG		
29.2	TAWNH2920T	☐	☐
	TAWKH2920TG		
29.3	TAWNH2930T	☐	☐
	TAWKH2930TG		
29.4	TAWNH2940T	☐	☐
	TAWKH2940TG		

INSERT DESCRIPTION ➤ **M153**
CUTTING CONDITIONS ➤ **M155**
USAGE NOTE ➤ **M156**
SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

DRILLING (EXCHANGEABLE TYPE)

TAW

DC (mm)	Hole Depth (L/D)	Holder		Dimensions (mm)						Clamp Screw	Wrench	Plate	Anti-seize Lubricant
		Order Number	Stock	LU	LBX	LH	OAL	LF	DCONMS				
29.5 – 30.4	3	**TAWSN3000S32**	●	93.9	109.6	130.6	190.6	185.2	32	WS508027T	TKY27T	WPT4405	MK1KS
	5	**TAWMN3000S32**	●	152.9	172.6	200.6	260.6	255.2	32	WS508027T	TKY27T	WPT4405	MK1KS
	8	**TAWLN3000S32**	●	241.4	255.6	290.6	350.6	345.2	32	WS508027T	TKY27T	WPT4405	MK1KS

Insert		Stock	
DC (mm)	Order Number	VP15TF	VP10H
29.5	*TAWNH2950T	●	☐
	TAWKH2950TG		
29.6	TAWNH2960T	☐	☐
	TAWKH2960TG		
29.7	TAWNH2970T	☐	☐
	TAWKH2970TG		
29.8	TAWNH2980T	☐	☐
	TAWKH2980TG		
29.9	TAWNH2990T	☐	☐
	TAWKH2990TG		
30.0	TAWNH3000T	●	☐
	TAWKH3000TG		
30.1	TAWNH3010T	☐	☐
	TAWKH3010TG		
30.2	TAWNH3020T	☐	☐
	TAWKH3020TG		
30.3	TAWNH3030T	☐	☐
	TAWKH3030TG		
30.4	TAWNH3040T	☐	☐
	TAWKH3040TG		

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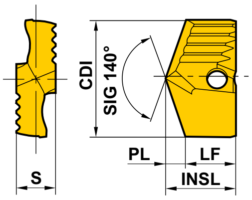
INSERT

H Type



Order Number	Stock		Dimensions (mm)					Applicable Holder
	VP15TF	VP10H	CDI	INSL	LF	PL	S	
TAWNH1850T	●	☐	18.5	12.7	9.3	3.4	7.0	TAWSN 1900S25 TAWMN 1900S25 TAWLN 1900S25
TAWNH1860T	●	☐	18.6	12.7	9.3	3.4	7.0	
TAWNH1870T	●	☐	18.7	12.7	9.3	3.4	7.0	
TAWNH1880T	●	☐	18.8	12.7	9.3	3.4	7.0	
TAWNH1890T	●	☐	18.9	12.7	9.3	3.4	7.0	
TAWNH1900T	●	☐	19.0	12.7	9.2	3.5	7.0	
TAWNH1910T	●	☐	19.1	12.7	9.2	3.5	7.0	
TAWNH1920T	●	☐	19.2	12.7	9.2	3.5	7.0	
TAWNH1930T	●	☐	19.3	12.7	9.2	3.5	7.0	
TAWNH1940T	●	☐	19.4	12.7	9.2	3.5	7.0	
TAWNH1950T	●	☐	19.5	12.6	9.1	3.5	7.0	TAWSN 2000S25 TAWMN 2000S25 TAWLN 2000S25
TAWNH1960T	●	☐	19.6	12.7	9.1	3.6	7.0	
TAWNH1970T	●	☐	19.7	12.7	9.1	3.6	7.0	
TAWNH1980T	●	☐	19.8	12.7	9.1	3.6	7.0	
TAWNH1990T	●	☐	19.9	12.7	9.1	3.6	7.0	
TAWNH2000T	●	☐	20.0	12.6	9.0	3.6	7.0	
TAWNH2010T	☐	☐	20.1	12.7	9.0	3.7	7.0	
TAWNH2020T	☐	☐	20.2	12.7	9.0	3.7	7.0	
TAWNH2030T	☐	☐	20.3	12.7	9.0	3.7	7.0	
TAWNH2040T	☐	☐	20.4	12.7	9.0	3.7	7.0	
TAWNH2050T	●	☐	20.5	12.6	8.9	3.7	7.0	TAWSN 2100S25 TAWMN 2100S25 TAWLN 2100S25
TAWNH2060T	☐	☐	20.6	12.6	8.9	3.7	7.0	
TAWNH2070T	☐	☐	20.7	12.7	8.9	3.8	7.0	
TAWNH2080T	☐	☐	20.8	12.7	8.9	3.8	7.0	
TAWNH2090T	☐	☐	20.9	12.7	8.9	3.8	7.0	
TAWNH2100T	●	☐	21.0	12.6	8.8	3.8	7.0	
TAWNH2110T	☐	☐	21.1	12.6	8.8	3.8	7.0	
TAWNH2120T	☐	☐	21.2	12.7	8.8	3.9	7.0	
TAWNH2130T	☐	☐	21.3	12.7	8.8	3.9	7.0	
TAWNH2140T	☐	☐	21.4	12.7	8.8	3.9	7.0	
TAWNH2150T	●	☐	21.5	14.5	10.6	3.9	8.0	TAWSN 2200S25 TAWMN 2200S25 TAWLN 2200S25
TAWNH2160T	☐	☐	21.6	14.5	10.6	3.9	8.0	
TAWNH2170T	☐	☐	21.7	14.5	10.6	3.9	8.0	
TAWNH2180T	☐	☐	21.8	14.6	10.6	4.0	8.0	
TAWNH2190T	☐	☐	21.9	14.6	10.6	4.0	8.0	
TAWNH2200T	●	☐	22.0	14.5	10.5	4.0	8.0	
TAWNH2210T	☐	☐	22.1	14.5	10.5	4.0	8.0	
TAWNH2220T	☐	☐	22.2	14.5	10.5	4.0	8.0	
TAWNH2230T	☐	☐	22.3	14.6	10.5	4.1	8.0	
TAWNH2240T	☐	☐	22.4	14.6	10.5	4.1	8.0	

Order Number	Stock		Dimensions (mm)					Applicable Holder
	VP15TF	VP10H	CDI	INSL	LF	PL	S	
TAWNH2250T	●	☐	22.5	14.5	10.4	4.1	8.0	TAWSN 2300S25 TAWMN 2300S25 TAWLN 2300S25
TAWNH2260T	☐	☐	22.6	14.5	10.4	4.1	8.0	
TAWNH2270T	☐	☐	22.7	14.5	10.4	4.1	8.0	
TAWNH2280T	☐	☐	22.8	14.5	10.4	4.1	8.0	
TAWNH2290T	☐	☐	22.9	14.6	10.4	4.2	8.0	
TAWNH2300T	●	☐	23.0	14.5	10.3	4.2	8.0	
TAWNH2310T	☐	☐	23.1	14.5	10.3	4.2	8.0	
TAWNH2320T	☐	☐	23.2	14.5	10.3	4.2	8.0	
TAWNH2330T	☐	☐	23.3	14.5	10.3	4.2	8.0	
TAWNH2340T	☐	☐	23.4	14.6	10.3	4.3	8.0	
TAWNH2350T	●	☐	23.5	14.5	10.2	4.3	8.0	TAWSN 2400S32 TAWMN 2400S32 TAWLN 2400S32
TAWNH2360T	☐	☐	23.6	14.5	10.2	4.3	8.0	
TAWNH2370T	☐	☐	23.7	14.5	10.2	4.3	8.0	
TAWNH2380T	☐	☐	23.8	14.5	10.2	4.3	8.0	
TAWNH2390T	☐	☐	23.9	14.5	10.2	4.3	8.0	
TAWNH2400T	●	☐	24.0	14.5	10.1	4.4	8.0	
TAWNH2410T	☐	☐	24.1	14.5	10.1	4.4	8.0	
TAWNH2420T	☐	☐	24.2	14.5	10.1	4.4	8.0	
TAWNH2430T	☐	☐	24.3	14.5	10.1	4.4	8.0	
TAWNH2440T	☐	☐	24.4	14.5	10.1	4.4	8.0	
TAWNH2450T	●	☐	24.5	16.2	11.7	4.5	9.0	TAWSN 2500S32 TAWMN 2500S32 TAWLN 2500S32
TAWNH2460T	☐	☐	24.6	16.2	11.7	4.5	9.0	
TAWNH2470T	☐	☐	24.7	16.2	11.7	4.5	9.0	
TAWNH2480T	☐	☐	24.8	16.2	11.7	4.5	9.0	
TAWNH2490T	☐	☐	24.9	16.2	11.7	4.5	9.0	
TAWNH2500T	●	☐	25.0	16.1	11.6	4.5	9.0	
TAWNH2510T	☐	☐	25.1	16.2	11.6	4.6	9.0	
TAWNH2520T	☐	☐	25.2	16.2	11.6	4.6	9.0	
TAWNH2530T	☐	☐	25.3	16.2	11.6	4.6	9.0	
TAWNH2540T	☐	☐	25.4	16.2	11.6	4.6	9.0	
TAWNH2550T	●	☐	25.5	16.1	11.5	4.6	9.0	TAWSN 2600S32 TAWMN 2600S32 TAWLN 2600S32
TAWNH2560T	☐	☐	25.6	16.2	11.5	4.7	9.0	
TAWNH2570T	☐	☐	25.7	16.2	11.5	4.7	9.0	
TAWNH2580T	☐	☐	25.8	16.2	11.5	4.7	9.0	
TAWNH2590T	☐	☐	25.9	16.2	11.5	4.7	9.0	
TAWNH2600T	●	☐	26.0	16.1	11.4	4.7	9.0	
TAWNH2610T	☐	☐	26.1	16.1	11.4	4.7	9.0	
TAWNH2620T	☐	☐	26.2	16.2	11.4	4.8	9.0	
TAWNH2630T	☐	☐	26.3	16.2	11.4	4.8	9.0	
TAWNH2640T	☐	☐	26.4	16.2	11.4	4.8	9.0	

CUTTING CONDITIONS ➤ M155
USAGE NOTE ➤ M156
SPARE PARTS ➤ N001
TECHNICAL DATA ➤ P001

TAW

Order Number	Stock		Dimensions (mm)					Applicable Holder
	VP15TF	VP10H	CDI	INSL	LF	PL	S	
TAWNH2650T	●	□	26.5	16.1	11.3	4.8	9.0	TAWSN 2700S32 TAWMN 2700S32 TAWLN 2700S32
TAWNH2660T	□	□	26.6	16.1	11.3	4.8	9.0	
TAWNH2670T	□	□	26.7	16.2	11.3	4.9	9.0	
TAWNH2680T	□	□	26.8	16.2	11.3	4.9	9.0	
TAWNH2690T	□	□	26.9	16.2	11.3	4.9	9.0	
TAWNH2700T	●	□	27.0	16.1	11.2	4.9	9.0	
TAWNH2710T	□	□	27.1	16.1	11.2	4.9	9.0	
TAWNH2720T	□	□	27.2	16.1	11.2	4.9	9.0	
TAWNH2730T	□	□	27.3	16.2	11.2	5.0	9.0	
TAWNH2740T	□	□	27.4	16.2	11.2	5.0	9.0	
TAWNH2750T	●	□	27.5	17.3	12.3	5.0	10.0	TAWSN 2800S32 TAWMN 2800S32 TAWLN 2800S32
TAWNH2760T	□	□	27.6	17.3	12.3	5.0	10.0	
TAWNH2770T	□	□	27.7	17.3	12.3	5.0	10.0	
TAWNH2780T	□	□	27.8	17.4	12.3	5.1	10.0	
TAWNH2790T	□	□	27.9	17.4	12.3	5.1	10.0	
TAWNH2800T	●	□	28.0	17.3	12.2	5.1	10.0	
TAWNH2810T	□	□	28.1	17.3	12.2	5.1	10.0	
TAWNH2820T	□	□	28.2	17.3	12.2	5.1	10.0	
TAWNH2830T	□	□	28.3	17.4	12.2	5.2	10.0	
TAWNH2840T	□	□	28.4	17.4	12.2	5.2	10.0	

Order Number	Stock		Dimensions (mm)					Applicable Holder
	VP15TF	VP10H	CDI	INSL	LF	PL	S	
TAWNH2850T	●	□	28.5	17.3	12.1	5.2	10.0	TAWSN 2900S32 TAWMN 2900S32 TAWLN 2900S32
TAWNH2860T	□	□	28.6	17.3	12.1	5.2	10.0	
TAWNH2870T	□	□	28.7	17.3	12.1	5.2	10.0	
TAWNH2880T	□	□	28.8	17.3	12.1	5.2	10.0	
TAWNH2890T	□	□	28.9	17.4	12.1	5.3	10.0	
TAWNH2900T	●	□	29.0	17.3	12.0	5.3	10.0	
TAWNH2910T	□	□	29.1	17.3	12.0	5.3	10.0	
TAWNH2920T	□	□	29.2	17.3	12.0	5.3	10.0	
TAWNH2930T	□	□	29.3	17.3	12.0	5.3	10.0	
TAWNH2940T	□	□	29.4	17.4	12.0	5.4	10.0	
TAWNH2950T	●	□	29.5	17.3	11.9	5.4	10.0	TAWSN 3000S32 TAWMN 3000S32 TAWLN 3000S32
TAWNH2960T	□	□	29.6	17.3	11.9	5.4	10.0	
TAWNH2970T	□	□	29.7	17.3	11.9	5.4	10.0	
TAWNH2980T	□	□	29.8	17.3	11.9	5.4	10.0	
TAWNH2990T	□	□	29.9	17.3	11.9	5.4	10.0	
TAWNH3000T	●	□	30.0	17.3	11.8	5.5	10.0	
TAWNH3010T	□	□	30.1	17.3	11.8	5.5	10.0	
TAWNH3020T	□	□	30.2	17.3	11.8	5.5	10.0	
TAWNH3030T	□	□	30.3	17.3	11.8	5.5	10.0	
TAWNH3040T	□	□	30.4	17.3	11.8	5.5	10.0	

● : Inventory maintained. □ : Non stock, produced to order only.
(Note: 1 insert in one case)

CUTTING CONDITIONS ➢ M155
USAGE NOTE ➢ M156
SPARE PARTS ➢ N001
TECHNICAL DATA ➢ P001

RECOMMENDED CUTTING CONDITIONS

	Material	Drill Diameter	Ø 18.5—Ø 21.4		Ø 21.5—Ø 24.4	
		Conditions Hardness	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	90 (70—110)	0.25 (0.20—0.30)	100 (80—120)	0.30 (0.25—0.35)
	Carbon Steel Alloy Steel	180—280HB	80 (60—100)	0.25 (0.20—0.30)	90 (70—110)	0.30 (0.25—0.35)
		280—350HB	70 (50—90)	0.20 (0.15—0.25)	80 (60—100)	0.25 (0.20—0.30)
M	Stainless Steel	≤200HB	60 (50—70)	0.20 (0.15—0.22)	60 (50—70)	0.20 (0.15—0.22)
K	Cast Iron	Tensile Strength ≤350MPa	120 (60—140)	0.25 (0.20—0.30)	130 (80—150)	0.35 (0.25—0.40)
	Ductile Cast Iron	Tensile Strength ≤450MPa	80 (60—90)	0.25 (0.20—0.30)	90 (60—100)	0.30 (0.25—0.35)

	Material	Drill Diameter	Ø 24.5—Ø 27.4		Ø 27.5—Ø 30.4	
		Conditions Hardness	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	110 (80—120)	0.30 (0.25—0.35)	110 (80—120)	0.30 (0.25—0.35)
	Carbon Steel Alloy Steel	180—280HB	100 (80—120)	0.30 (0.25—0.35)	100 (80—120)	0.30 (0.25—0.35)
		280—350HB	90 (70—110)	0.25 (0.20—0.30)	90 (70—110)	0.25 (0.20—0.30)
M	Stainless Steel	≤200HB	70 (60—80)	0.25 (0.20—0.28)	70 (60—80)	0.25 (0.20—0.28)
K	Cast Iron	Tensile Strength ≤350MPa	140 (90—160)	0.35 (0.25—0.40)	140 (90—160)	0.40 (0.30—0.45)
	Ductile Cast Iron	Tensile Strength ≤450MPa	100 (80—110)	0.30 (0.25—0.35)	100 (80—110)	0.30 (0.25—0.35)

Note 1) H type honing is recommended when machining mild steel and stainless steel.

Note 2) Recommended for use only with a rigid machine and set up. Use the internal coolant system when machining stainless steel. (MQL and mist machining should not be used.)

TAW

HONE WIDTH

If an insert with honing other than standard is needed, please order using the symbols below.

(Insert Order Number)

T A W N H 1 8 5 0 T ◌

TAW Product Name
N : General Use
H : H Type
Insert Diameter
Honing Symbol
Honing Type

(Honing Standard)

Honing Type	Hone Width (mm)
F	0
G	0.02−0.05
H	0.05−0.10
- (Standard)	0.10−0.15
S	0.20−0.25
M	0.25−0.30

NOTES ON USE

INSERT INSTALLATION

- Remove the clamp screw to install the insert. (H type insert)
- Correctly mesh the insert and the holder serrations, then slide the insert to the bottom of the slot.
- Fasten the clamp screw using the torque wrench provided while holding the insert lightly as shown. (Figure 1)
- Check there is no gap between the bottom of the insert and holder. (Figure 2)

Tighten the clamp screw according to the torque below.

Drill Dia.	Torque
Ø14−Ø15	2.0N•m
Ø16−Ø18	2.0N•m
Ø19−Ø21	3.5N•m
Ø22−Ø24	5.5N•m
Ø25−Ø27	8.5N•m
Ø28−Ø30	12.0N•m

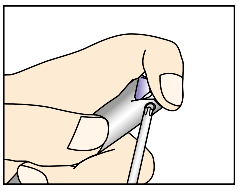


Fig. 1

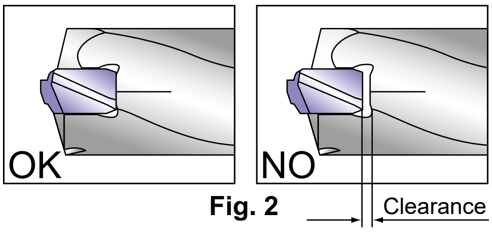


Fig. 2

INSERT REPLACEMENT

- Thoroughly clean the serrations of the holder before installing a new insert.
  Remove heavy dirt in the holder serrations by using the cleaning plate provided.

Memo

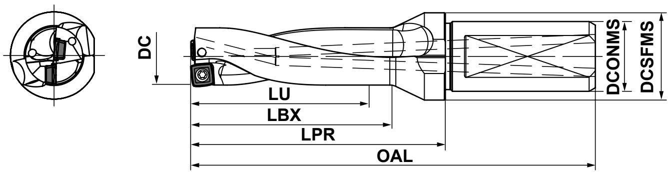
DRILLING (INDEXABLE TYPE)

MVX

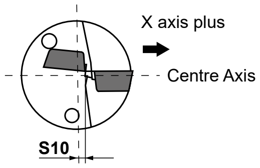
- ●Ideal combination of outer CVD insert and inner PVD insert.
- ●High rigidity body that enables L/D=6 deep hole machining.

UWC

P M K N S H



Maximum offset for turning

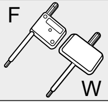


	Machining tolerance(guide) (mm)		
L/D	Ø14.0−Ø33.0	Ø33.5−Ø47.0	Ø48.0−Ø63.0
2D, 3D	0 + 0.25	0 + 0.3	0 + 0.3
4D, 5D	0 + 0.35	0 + 0.4	0 + 0.45
6D	0 + 0.45	0 + 0.6	

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert	Clamp Screw	F Wrench
					LU	LBX	LPR	OAL	DCONMS	DCSFMS				
14.0	2	**MVX1400X2F20**	●	2	28	35	50	93	20	25	0.6	**SO◌X05**	TPS20-1	TIP06F
	3	**MVX1400X3F20**	●	2	42	49	64	107	20	25	0.6	**SO◌X05**	TPS20-1	TIP06F
	4	**MVX1400X4F20**	●	2	56	63	78	121	20	25	0.6	**SO◌X05**	TPS20-1	TIP06F
	5	**MVX1400X5F20**	●	2	70	77	92	135	20	25	0.6	**SO◌X05**	TPS20-1	TIP06F
14.5	2	**MVX1450X2F20**	●	2	29	36	51	94	20	25	0.5	**SO◌X05**	TPS20-1	TIP06F
	3	**MVX1450X3F20**	●	2	43.5	50.5	65.5	108.5	20	25	0.5	**SO◌X05**	TPS20-1	TIP06F
	4	**MVX1450X4F20**	●	2	58	65	80	123	20	25	0.5	**SO◌X05**	TPS20-1	TIP06F
	5	**MVX1450X5F20**	●	2	72.5	79.5	94.5	137.5	20	25	0.5	**SO◌X05**	TPS20-1	TIP06F
15.0	2	**MVX1500X2F20**	●	2	30	37	52	95	20	25	0.35	**SO◌X05**	TPS20-1	TIP06F
	3	**MVX1500X3F20**	●	2	45	52	67	110	20	25	0.35	**SO◌X05**	TPS20-1	TIP06F
	4	**MVX1500X4F20**	●	2	60	67	82	125	20	25	0.35	**SO◌X05**	TPS20-1	TIP06F
	5	**MVX1500X5F20**	●	2	75	82	97	140	20	25	0.35	**SO◌X05**	TPS20-1	TIP06F
15.5	2	**MVX1550X2F20**	●	2	31	38	53	96	20	25	0.3	**SO◌X05**	TPS20-1	TIP06F
	3	**MVX1550X3F20**	●	2	46.5	53.5	68.5	111.5	20	25	0.3	**SO◌X05**	TPS20-1	TIP06F
	4	**MVX1550X4F20**	●	2	62	69	84	127	20	25	0.3	**SO◌X05**	TPS20-1	TIP06F
	5	**MVX1550X5F20**	●	2	77.5	84.5	99.5	142.5	20	25	0.3	**SO◌X05**	TPS20-1	TIP06F
16.0	2	**MVX1600X2F20**	●	2	32	39	54	97	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
	3	**MVX1600X3F20**	●	2	48	55	70	113	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
	4	**MVX1600X4F20**	●	2	64	71	86	129	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
	5	**MVX1600X5F20**	●	2	80	87	102	145	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
16.5	2	**MVX1650X2F20**	●	2	33	40	55	98	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
	3	**MVX1650X3F20**	●	2	49.5	56.5	71.5	114.5	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
	4	**MVX1650X4F20**	●	2	66	73	88	131	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
	5	**MVX1650X5F20**	●	2	82.5	89.5	104.5	147.5	20	25	0.25	**SO◌X05**	TPS20-1	TIP06F
17.0	2	**MVX1700X2F20**	●	2	34	41	56	99	20	25	0.5	**SO◌X06**	TPS25	TIP07F
	3	**MVX1700X3F20**	●	2	51	58	73	116	20	25	0.5	**SO◌X06**	TPS25	TIP07F
	4	**MVX1700X4F20**	●	2	68	75	90	133	20	25	0.5	**SO◌X06**	TPS25	TIP07F
	5	**MVX1700X5F20**	●	2	85	92	107	150	20	25	0.5	**SO◌X06**	TPS25	TIP07F
	6	**MVX1700X6F20**	●	2	102	109	124	167	20	25	0.5	**SO◌X06**	TPS25	TIP07F

⁎ Clamp Torque (N • m) : TPS20-1=0.6, TPS25=1.0

● : Inventory maintained.

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert		
					LU	LBX	LPR	OAL	DCONMS	DCSFMS			Clamp Screw	Wrench
17.5	2	**MVX1750X2F25**	●	2	35	42	62	112	25	32	0.45	**SO◌X06**	TPS25	TIP07F
	3	**MVX1750X3F25**	●	2	52.5	59.5	79.5	129.5	25	32	0.45	**SO◌X06**	TPS25	TIP07F
	4	**MVX1750X4F25**	●	2	70	77	97	147	25	32	0.45	**SO◌X06**	TPS25	TIP07F
	5	**MVX1750X5F25**	●	2	87.5	94.5	114.5	164.5	25	32	0.45	**SO◌X06**	TPS25	TIP07F
	6	**MVX1750X6F25**	●	2	105	112	132	182	25	32	0.45	**SO◌X06**	TPS25	TIP07F
18.0	2	**MVX1800X2F25**	●	2	36	43	63	113	25	32	0.4	**SO◌X06**	TPS25	TIP07F
	3	**MVX1800X3F25**	●	2	54	61	81	131	25	32	0.4	**SO◌X06**	TPS25	TIP07F
	4	**MVX1800X4F25**	●	2	72	79	99	149	25	32	0.4	**SO◌X06**	TPS25	TIP07F
	5	**MVX1800X5F25**	●	2	90	97	117	167	25	32	0.4	**SO◌X06**	TPS25	TIP07F
	6	**MVX1800X6F25**	●	2	108	115	135	185	25	32	0.4	**SO◌X06**	TPS25	TIP07F
18.5	2	**MVX1850X2F25**	●	2	37	44	64	114	25	32	0.35	**SO◌X06**	TPS25	TIP07F
	3	**MVX1850X3F25**	●	2	55.5	62.5	82.5	132.5	25	32	0.35	**SO◌X06**	TPS25	TIP07F
	4	**MVX1850X4F25**	●	2	74	81	101	151	25	32	0.35	**SO◌X06**	TPS25	TIP07F
	5	**MVX1850X5F25**	●	2	92.5	99.5	119.5	169.5	25	32	0.35	**SO◌X06**	TPS25	TIP07F
	6	**MVX1850X6F25**	●	2	111	118	138	188	25	32	0.35	**SO◌X06**	TPS25	TIP07F
19.0	2	**MVX1900X2F25**	●	2	38	45	65	115	25	32	0.3	**SO◌X06**	TPS25	TIP07F
	3	**MVX1900X3F25**	●	2	57	64	84	134	25	32	0.3	**SO◌X06**	TPS25	TIP07F
	4	**MVX1900X4F25**	●	2	76	83	103	153	25	32	0.3	**SO◌X06**	TPS25	TIP07F
	5	**MVX1900X5F25**	●	2	95	102	122	172	25	32	0.3	**SO◌X06**	TPS25	TIP07F
	6	**MVX1900X6F25**	●	2	114	121	141	191	25	32	0.3	**SO◌X06**	TPS25	TIP07F
19.5	2	**MVX1950X2F25**	●	2	39	46	66	116	25	32	0.25	**SO◌X06**	TPS25	TIP07F
	3	**MVX1950X3F25**	●	2	58.5	65.5	85.5	135.5	25	32	0.25	**SO◌X06**	TPS25	TIP07F
	4	**MVX1950X4F25**	●	2	78	85	105	155	25	32	0.25	**SO◌X06**	TPS25	TIP07F
	5	**MVX1950X5F25**	●	2	97.5	104.5	124.5	174.5	25	32	0.25	**SO◌X06**	TPS25	TIP07F
	6	**MVX1950X6F25**	●	2	117	124	144	194	25	32	0.25	**SO◌X06**	TPS25	TIP07F
20.0	2	**MVX2000X2F25**	●	2	40	47	67	117	25	32	0.6	**SO◌X07**	TPS3	TIP10W
	3	**MVX2000X3F25**	●	2	60	67	87	137	25	32	0.6	**SO◌X07**	TPS3	TIP10W
	4	**MVX2000X4F25**	●	2	80	87	107	157	25	32	0.6	**SO◌X07**	TPS3	TIP10W
	5	**MVX2000X5F25**	●	2	100	107	127	177	25	32	0.6	**SO◌X07**	TPS3	TIP10W
	6	**MVX2000X6F25**	●	2	120	127	147	197	25	32	0.6	**SO◌X07**	TPS3	TIP10W
20.5	2	**MVX2050X2F25**	●	2	41	48	68	118	25	32	0.55	**SO◌X07**	TPS3	TIP10W
	3	**MVX2050X3F25**	●	2	61.5	68.5	88.5	138.5	25	32	0.55	**SO◌X07**	TPS3	TIP10W
21.0	2	**MVX2100X2F25**	●	2	42	49	69	119	25	32	0.5	**SO◌X07**	TPS3	TIP10W
	3	**MVX2100X3F25**	●	2	63	70	90	140	25	32	0.5	**SO◌X07**	TPS3	TIP10W
	4	**MVX2100X4F25**	●	2	84	91	111	161	25	32	0.5	**SO◌X07**	TPS3	TIP10W
	5	**MVX2100X5F25**	●	2	105	112	132	182	25	32	0.5	**SO◌X07**	TPS3	TIP10W
	6	**MVX2100X6F25**	●	2	126	133	153	203	25	32	0.5	**SO◌X07**	TPS3	TIP10W
21.5	2	**MVX2150X2F25**	●	2	43	50	70	120	25	32	0.45	**SO◌X07**	TPS3	TIP10W
	3	**MVX2150X3F25**	●	2	64.5	71.5	91.5	141.5	25	32	0.45	**SO◌X07**	TPS3	TIP10W
22.0	2	**MVX2200X2F25**	●	2	44	51	71	121	25	32	0.4	**SO◌X07**	TPS3	TIP10W
	3	**MVX2200X3F25**	●	2	66	73	93	143	25	32	0.4	**SO◌X07**	TPS3	TIP10W
	4	**MVX2200X4F25**	●	2	88	95	115	165	25	32	0.4	**SO◌X07**	TPS3	TIP10W
	5	**MVX2200X5F25**	●	2	110	117	137	187	25	32	0.4	**SO◌X07**	TPS3	TIP10W
	6	**MVX2200X6F25**	●	2	132	139	159	209	25	32	0.4	**SO◌X07**	TPS3	TIP10W
22.5	2	**MVX2250X2F25**	●	2	45	52	72	122	25	32	0.35	**SO◌X07**	TPS3	TIP10W
	3	**MVX2250X3F25**	●	2	67.5	74.5	94.5	144.5	25	32	0.35	**SO◌X07**	TPS3	TIP10W

* Clamp Torque (N • m) : TPS25=1.0, TPS3=2.0

DRILLING (INDEXABLE TYPE)

MVX

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert		
					LU	LBX	LPR	OAL	DCONMS	DCSFMS			Clamp Screw	Wrench
23.0	2	**MVX2300X2F25**	●	2	46	53	73	123	25	32	0.8	**SO◌X08**	TPS351	TIP10W
	3	**MVX2300X3F25**	●	2	69	76	96	146	25	32	0.8	**SO◌X08**	TPS351	TIP10W
	4	**MVX2300X4F25**	●	2	92	99	119	169	25	32	0.8	**SO◌X08**	TPS351	TIP10W
	5	**MVX2300X5F25**	●	2	115	122	142	192	25	32	0.8	**SO◌X08**	TPS351	TIP10W
	6	**MVX2300X6F25**	●	2	138	145	165	215	25	32	0.8	**SO◌X08**	TPS351	TIP10W
23.5	2	**MVX2350X2F25**	●	2	47	54	74	124	25	32	0.75	**SO◌X08**	TPS351	TIP10W
	3	**MVX2350X3F25**	●	2	70.5	77.5	97.5	147.5	25	32	0.75	**SO◌X08**	TPS351	TIP10W
24.0	2	**MVX2400X2F25**	●	2	48	55	75	125	25	32	0.7	**SO◌X08**	TPS351	TIP10W
	3	**MVX2400X3F25**	●	2	72	79	99	149	25	32	0.7	**SO◌X08**	TPS351	TIP10W
	4	**MVX2400X4F25**	●	2	96	103	123	173	25	32	0.7	**SO◌X08**	TPS351	TIP10W
	5	**MVX2400X5F25**	●	2	120	127	147	197	25	32	0.7	**SO◌X08**	TPS351	TIP10W
	6	**MVX2400X6F25**	●	2	144	151	171	221	25	32	0.7	**SO◌X08**	TPS351	TIP10W
24.5	2	**MVX2450X2F25**	●	2	49	56	76	126	25	32	0.65	**SO◌X08**	TPS351	TIP10W
	3	**MVX2450X3F25**	●	2	73.5	80.5	100.5	150.5	25	32	0.65	**SO◌X08**	TPS351	TIP10W
25.0	2	**MVX2500X2F25**	●	2	50	57	77	127	25	32	0.6	**SO◌X08**	TPS351	TIP10W
	3	**MVX2500X3F25**	●	2	75	82	102	152	25	32	0.6	**SO◌X08**	TPS351	TIP10W
	4	**MVX2500X4F25**	●	2	100	107	127	177	25	32	0.6	**SO◌X08**	TPS351	TIP10W
	5	**MVX2500X5F25**	●	2	125	132	152	202	25	32	0.6	**SO◌X08**	TPS351	TIP10W
	6	**MVX2500X6F25**	●	2	150	157	177	227	25	32	0.6	**SO◌X08**	TPS351	TIP10W
25.5	2	**MVX2550X2F25**	●	2	51	58	78	128	25	32	0.6	**SO◌X08**	TPS351	TIP10W
	3	**MVX2550X3F25**	●	2	76.5	83.5	103.5	153.5	25	32	0.6	**SO◌X08**	TPS351	TIP10W
26.0	2	**MVX2600X2F32**	●	2	52	59	79	134	32	42	0.5	**SO◌X08**	TPS351	TIP10W
	3	**MVX2600X3F32**	●	2	78	85	105	160	32	42	0.5	**SO◌X08**	TPS351	TIP10W
	4	**MVX2600X4F32**	●	2	104	111	131	186	32	42	0.5	**SO◌X08**	TPS351	TIP10W
	5	**MVX2600X5F32**	●	2	130	137	157	212	32	42	0.5	**SO◌X08**	TPS351	TIP10W
	6	**MVX2600X6F32**	●	2	156	163	183	238	32	42	0.5	**SO◌X08**	TPS351	TIP10W
26.5	2	**MVX2650X2F32**	●	2	53	60	80	135	32	42	0.5	**SO◌X08**	TPS351	TIP10W
	3	**MVX2650X3F32**	●	2	79.5	86.5	106.5	161.5	32	42	0.5	**SO◌X08**	TPS351	TIP10W
27.0	2	**MVX2700X2F32**	●	2	54	61	81	136	32	42	0.45	**SO◌X08**	TPS351	TIP10W
	3	**MVX2700X3F32**	●	2	81	88	108	163	32	42	0.45	**SO◌X08**	TPS351	TIP10W
	4	**MVX2700X4F32**	●	2	108	115	135	190	32	42	0.45	**SO◌X08**	TPS351	TIP10W
	5	**MVX2700X5F32**	●	2	135	142	162	217	32	42	0.45	**SO◌X08**	TPS351	TIP10W
	6	**MVX2700X6F32**	●	2	162	169	189	244	32	42	0.45	**SO◌X08**	TPS351	TIP10W
27.5	2	**MVX2750X2F32**	●	2	55	62	82	137	32	42	0.4	**SO◌X08**	TPS351	TIP10W
	3	**MVX2750X3F32**	●	2	82.5	89.5	109.5	164.5	32	42	0.4	**SO◌X08**	TPS351	TIP10W
28.0	2	**MVX2800X2F32**	●	2	56	63	83	138	32	42	0.85	**SO◌X09**	TPS4	TIP15W
	3	**MVX2800X3F32**	●	2	84	91	111	166	32	42	0.85	**SO◌X09**	TPS4	TIP15W
	4	**MVX2800X4F32**	●	2	112	119	139	194	32	42	0.85	**SO◌X09**	TPS4	TIP15W
	5	**MVX2800X5F32**	●	2	140	147	167	222	32	42	0.85	**SO◌X09**	TPS4	TIP15W
	6	**MVX2800X6F32**	●	2	168	175	195	250	32	42	0.85	**SO◌X09**	TPS4	TIP15W
28.5	2	**MVX2850X2F32**	●	2	57	64	84	139	32	42	0.8	**SO◌X09**	TPS4	TIP15W
	3	**MVX2850X3F32**	●	2	85.5	92.5	112.5	167.5	32	42	0.8	**SO◌X09**	TPS4	TIP15W
29.0	2	**MVX2900X2F32**	●	2	58	65	85	140	32	42	0.75	**SO◌X09**	TPS4	TIP15W
	3	**MVX2900X3F32**	●	2	87	94	114	169	32	42	0.75	**SO◌X09**	TPS4	TIP15W
	4	**MVX2900X4F32**	●	2	116	123	143	198	32	42	0.75	**SO◌X09**	TPS4	TIP15W
	5	**MVX2900X5F32**	●	2	145	152	172	227	32	42	0.75	**SO◌X09**	TPS4	TIP15W
	6	**MVX2900X6F32**	●	2	174	181	201	256	32	42	0.75	**SO◌X09**	TPS4	TIP15W
29.5	2	**MVX2950X2F32**	●	2	59	66	86	141	32	42	0.7	**SO◌X09**	TPS4	TIP15W
	3	**MVX2950X3F32**	●	2	88.5	95.5	115.5	170.5	32	42	0.7	**SO◌X09**	TPS4	TIP15W

⁎ Clamp Torque (N • m) : TPS351=2.5, TPS4=3.5

● : Inventory maintained.

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert	 Clamp Screw	 Wrench
					LU	LBX	LPR	OAL	DCONMS	DCSFMS				
30.0	2	**MVX3000X2F32**	●	2	60	67	87	142	32	42	0.65	**SO◌X09**	TPS4	TIP15W
	3	**MVX3000X3F32**	●	2	90	97	117	172	32	42	0.65	**SO◌X09**	TPS4	TIP15W
	4	**MVX3000X4F32**	●	2	120	127	147	202	32	42	0.65	**SO◌X09**	TPS4	TIP15W
	5	**MVX3000X5F32**	●	2	150	157	177	232	32	42	0.65	**SO◌X09**	TPS4	TIP15W
	6	**MVX3000X6F32**	●	2	180	187	207	262	32	42	0.65	**SO◌X09**	TPS4	TIP15W
30.5	3	**MVX3050X3F32**	●	2	91.5	98.5	118.5	173.5	32	42	0.6	**SO◌X09**	TPS4	TIP15W
31.0	2	**MVX3100X2F32**	●	2	62	69	89	144	32	42	0.55	**SO◌X09**	TPS4	TIP15W
	3	**MVX3100X3F32**	●	2	93	100	120	175	32	42	0.55	**SO◌X09**	TPS4	TIP15W
	4	**MVX3100X4F32**	●	2	124	131	151	206	32	42	0.55	**SO◌X09**	TPS4	TIP15W
	2	**MVX3100X2F40**	●	2	62	69	89	154	40	50	0.55	**SO◌X09**	TPS4	TIP15W
	3	**MVX3100X3F40**	●	2	93	100	120	185	40	50	0.55	**SO◌X09**	TPS4	TIP15W
	4	**MVX3100X4F40**	●	2	124	131	151	216	40	50	0.55	**SO◌X09**	TPS4	TIP15W
	5	**MVX3100X5F40**	●	2	155	162	182	247	40	50	0.55	**SO◌X09**	TPS4	TIP15W
	6	**MVX3100X6F40**	●	2	186	193	213	278	40	50	0.55	**SO◌X09**	TPS4	TIP15W
31.5	3	**MVX3150X3F40**	●	2	94.5	101.5	121.5	186.5	40	50	0.55	**SO◌X09**	TPS4	TIP15W
32.0	2	**MVX3200X2F32**	●	2	64	71	91	146	32	42	0.45	**SO◌X09**	TPS4	TIP15W
	3	**MVX3200X3F32**	●	2	96	103	123	178	32	42	0.45	**SO◌X09**	TPS4	TIP15W
	4	**MVX3200X4F32**	●	2	128	135	155	210	32	42	0.45	**SO◌X09**	TPS4	TIP15W
	2	**MVX3200X2F40**	●	2	64	71	91	156	40	50	0.45	**SO◌X09**	TPS4	TIP15W
	3	**MVX3200X3F40**	●	2	96	103	123	188	40	50	0.45	**SO◌X09**	TPS4	TIP15W
	4	**MVX3200X4F40**	●	2	128	135	155	220	40	50	0.45	**SO◌X09**	TPS4	TIP15W
	5	**MVX3200X5F40**	●	2	160	167	187	252	40	50	0.45	**SO◌X09**	TPS4	TIP15W
	6	**MVX3200X6F40**	●	2	192	199	219	284	40	50	0.45	**SO◌X09**	TPS4	TIP15W
32.5	3	**MVX3250X3F40**	●	2	97.5	104.5	124.5	189.5	40	50	0.45	**SO◌X09**	TPS4	TIP15W
33.0	2	**MVX3300X2F32**	●	2	66	73	93	148	32	42	0.4	**SO◌X09**	TPS4	TIP15W
	3	**MVX3300X3F32**	●	2	99	106	126	181	32	42	0.4	**SO◌X09**	TPS4	TIP15W
	4	**MVX3300X4F32**	●	2	132	139	159	214	32	42	0.4	**SO◌X09**	TPS4	TIP15W
	2	**MVX3300X2F40**	●	2	66	73	93	158	40	50	0.4	**SO◌X09**	TPS4	TIP15W
	3	**MVX3300X3F40**	●	2	99	106	126	191	40	50	0.4	**SO◌X09**	TPS4	TIP15W
	4	**MVX3300X4F40**	●	2	132	139	159	224	40	50	0.4	**SO◌X09**	TPS4	TIP15W
	5	**MVX3300X5F40**	●	2	165	172	192	257	40	50	0.4	**SO◌X09**	TPS4	TIP15W
	6	**MVX3300X6F40**	●	2	198	205	225	290	40	50	0.4	**SO◌X09**	TPS4	TIP15W
33.5	3	**MVX3350X3F40**	●	2	100.5	107.5	127.5	192.5	40	50	1.15	**SO◌X11**	TPS43	TIP15W
34.0	2	**MVX3400X2F40**	●	2	68	75	105	170	40	50	1.11	**SO◌X11**	TPS43	TIP15W
	3	**MVX3400X3F40**	●	2	102	109	139	204	40	50	1.11	**SO◌X11**	TPS43	TIP15W
	4	**MVX3400X4F40**	●	2	136	143	173	238	40	50	1.11	**SO◌X11**	TPS43	TIP15W
	5	**MVX3400X5F40**	●	2	170	177	207	272	40	50	1.11	**SO◌X11**	TPS43	TIP15W
	6	**MVX3400X6F40**	●	2	204	211	241	306	40	50	1.1	**SO◌X11**	TPS43	TIP15W
34.5	3	**MVX3450X3F40**	●	2	103.5	110.5	140.5	205.5	40	50	1.08	**SO◌X11**	TPS43	TIP15W
35.0	2	**MVX3500X2F40**	●	2	70	77	107	172	40	50	1.03	**SO◌X11**	TPS43	TIP15W
	3	**MVX3500X3F40**	●	2	105	112	142	207	40	50	1.03	**SO◌X11**	TPS43	TIP15W
	4	**MVX3500X4F40**	●	2	140	147	177	242	40	50	1.03	**SO◌X11**	TPS43	TIP15W
	5	**MVX3500X5F40**	●	2	175	182	212	277	40	50	1.03	**SO◌X11**	TPS43	TIP15W
	6	**MVX3500X6F40**	●	2	210	217	247	312	40	50	1.02	**SO◌X11**	TPS43	TIP15W
35.5	3	**MVX3550X3F40**	●	2	106.5	113.5	143.5	208.5	40	50	0.99	**SO◌X11**	TPS43	TIP15W
36.0	2	**MVX3600X2F40**	●	2	72	79	109	174	40	50	0.95	**SO◌X11**	TPS43	TIP15W
	3	**MVX3600X3F40**	●	2	108	115	145	210	40	50	0.95	**SO◌X11**	TPS43	TIP15W
	4	**MVX3600X4F40**	●	2	144	151	181	246	40	50	0.95	**SO◌X11**	TPS43	TIP15W
	5	**MVX3600X5F40**	●	2	180	187	217	282	40	50	0.95	**SO◌X11**	TPS43	TIP15W
	6	**MVX3600X6F40**	●	2	216	223	253	318	40	50	0.94	**SO◌X11**	TPS43	TIP15W

* Clamp Torque (N • m) : TPS4=3.5, TPS43=3.5

INSERT DESCRIPTION ➤ **M166**
CUTTING CONDITIONS ➤ **M167**
JUST FIT SLEEVE ➤ **M170**
USAGE NOTE ➤ **M171**
SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

DRILLING (INDEXABLE TYPE)

MVX

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert	Clamp Screw	W Wrench
					LU	LBX	LPR	OAL	DCONMS	DCSFMS				
37.0	2	**MVX3700X2F40**	●	2	74	81	111	176	40	50	0.87	**SO◌X11**	TPS43	TIP15W
	3	**MVX3700X3F40**	●	2	111	118	148	213	40	50	0.87	**SO◌X11**	TPS43	TIP15W
	4	**MVX3700X4F40**	●	2	148	155	185	250	40	50	0.87	**SO◌X11**	TPS43	TIP15W
	5	**MVX3700X5F40**	●	2	185	192	222	287	40	50	0.87	**SO◌X11**	TPS43	TIP15W
	6	**MVX3700X6F40**	●	2	222	229	259	324	40	50	0.86	**SO◌X11**	TPS43	TIP15W
38.0	2	**MVX3800X2F40**	●	2	76	83	113	178	40	50	0.79	**SO◌X11**	TPS43	TIP15W
	3	**MVX3800X3F40**	●	2	114	121	151	216	40	50	0.79	**SO◌X11**	TPS43	TIP15W
	4	**MVX3800X4F40**	●	2	152	159	189	254	40	50	0.79	**SO◌X11**	TPS43	TIP15W
	5	**MVX3800X5F40**	●	2	190	197	227	292	40	50	0.79	**SO◌X11**	TPS43	TIP15W
	6	**MVX3800X6F40**	●	2	228	235	265	330	40	50	0.78	**SO◌X11**	TPS43	TIP15W
39.0	2	**MVX3900X2F40**	●	2	78	85	115	180	40	50	0.71	**SO◌X11**	TPS43	TIP15W
	3	**MVX3900X3F40**	●	2	117	124	154	219	40	50	0.71	**SO◌X11**	TPS43	TIP15W
	4	**MVX3900X4F40**	●	2	156	163	193	258	40	50	0.71	**SO◌X11**	TPS43	TIP15W
	5	**MVX3900X5F40**	●	2	195	202	232	297	40	50	0.71	**SO◌X11**	TPS43	TIP15W
	6	**MVX3900X6F40**	●	2	234	241	271	336	40	50	0.7	**SO◌X11**	TPS43	TIP15W
40.0	2	**MVX4000X2F40**	●	2	80	87	117	182	40	50	1.46	**SO◌X13**	TPS43	TIP15W
	3	**MVX4000X3F40**	●	2	120	127	157	222	40	50	1.46	**SO◌X13**	TPS43	TIP15W
	4	**MVX4000X4F40**	●	2	160	167	197	262	40	50	1.46	**SO◌X13**	TPS43	TIP15W
	5	**MVX4000X5F40**	●	2	200	207	237	302	40	50	1.46	**SO◌X13**	TPS43	TIP15W
	6	**MVX4000X6F40**	●	2	240	247	277	342	40	50	1.45	**SO◌X13**	TPS43	TIP15W
41.0	2	**MVX4100X2F40**	●	2	82	89	119	184	40	50	1.36	**SO◌X13**	TPS43	TIP15W
	3	**MVX4100X3F40**	●	2	123	130	160	225	40	50	1.36	**SO◌X13**	TPS43	TIP15W
	4	**MVX4100X4F40**	●	2	164	171	201	266	40	50	1.36	**SO◌X13**	TPS43	TIP15W
	5	**MVX4100X5F40**	●	2	205	212	242	307	40	50	1.36	**SO◌X13**	TPS43	TIP15W
	6	**MVX4100X6F40**	●	2	246	253	283	348	40	50	1.35	**SO◌X13**	TPS43	TIP15W
42.0	2	**MVX4200X2F40**	●	2	84	91	121	186	40	50	1.27	**SO◌X13**	TPS43	TIP15W
	3	**MVX4200X3F40**	●	2	126	133	163	228	40	50	1.27	**SO◌X13**	TPS43	TIP15W
	4	**MVX4200X4F40**	●	2	168	175	205	270	40	63	1.27	**SO◌X13**	TPS43	TIP15W
	5	**MVX4200X5F40**	●	2	210	217	247	312	40	63	1.27	**SO◌X13**	TPS43	TIP15W
	6	**MVX4200X6F40**	●	2	252	259	289	354	40	63	1.27	**SO◌X13**	TPS43	TIP15W
	4	**MVX4200X4F50**	★	2	168	175	205	280	50	63	1.27	**SO◌X13**	TPS43	TIP15W
	5	**MVX4200X5F50**	★	2	210	217	247	322	50	63	1.27	**SO◌X13**	TPS43	TIP15W
	6	**MVX4200X6F50**	★	2	252	259	289	364	50	63	1.26	**SO◌X13**	TPS43	TIP15W
43.0	2	**MVX4300X2F40**	●	2	86	93	123	188	40	50	1.18	**SO◌X13**	TPS43	TIP15W
	3	**MVX4300X3F40**	●	2	129	136	166	231	40	50	1.18	**SO◌X13**	TPS43	TIP15W
	4	**MVX4300X4F40**	●	2	172	179	209	274	40	63	1.18	**SO◌X13**	TPS43	TIP15W
	5	**MVX4300X5F40**	●	2	215	222	252	317	40	63	1.18	**SO◌X13**	TPS43	TIP15W
	6	**MVX4300X6F40**	●	2	258	265	295	360	40	63	1.17	**SO◌X13**	TPS43	TIP15W
	4	**MVX4300X4F50**	★	2	172	179	209	284	50	63	1.18	**SO◌X13**	TPS43	TIP15W
	5	**MVX4300X5F50**	★	2	215	222	252	327	50	63	1.18	**SO◌X13**	TPS43	TIP15W
	6	**MVX4300X6F50**	★	2	258	265	295	370	50	63	1.17	**SO◌X13**	TPS43	TIP15W
44.0	2	**MVX4400X2F40**	●	2	88	95	125	190	40	50	1.08	**SO◌X13**	TPS43	TIP15W
	3	**MVX4400X3F40**	●	2	132	139	169	234	40	50	1.08	**SO◌X13**	TPS43	TIP15W
	4	**MVX4400X4F40**	●	2	176	183	213	278	40	63	1.08	**SO◌X13**	TPS43	TIP15W
	5	**MVX4400X5F40**	●	2	220	227	257	322	40	63	1.08	**SO◌X13**	TPS43	TIP15W
	4	**MVX4400X4F50**	★	2	176	183	213	288	50	63	1.08	**SO◌X13**	TPS43	TIP15W
	5	**MVX4400X5F50**	★	2	220	227	257	332	50	63	1.08	**SO◌X13**	TPS43	TIP15W

* Clamp Torque (N • m) : TPS43=3.5

● : Inventory maintained. ★ : Inventory maintained in Japan.

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert	Clamp Screw	W D Wrench
					LU	LBX	LPR	OAL	DCONMS	DCSFMS				
45.0	2	**MVX4500X2F40**	●	2	90	97	127	192	40	50	0.99	**SO◌X13**	TPS43	TIP15W
	3	**MVX4500X3F40**	●	2	135	142	172	237	40	50	0.99	**SO◌X13**	TPS43	TIP15W
	4	**MVX4500X4F40**	●	2	180	187	217	282	40	63	0.99	**SO◌X13**	TPS43	TIP15W
	5	**MVX4500X5F40**	●	2	225	232	262	327	40	63	0.99	**SO◌X13**	TPS43	TIP15W
	4	**MVX4500X4F50**	★	2	180	187	217	292	50	63	0.99	**SO◌X13**	TPS43	TIP15W
	5	**MVX4500X5F50**	★	2	225	232	262	337	50	63	0.99	**SO◌X13**	TPS43	TIP15W
46.0	2	**MVX4600X2F40**	●	2	92	99	129	194	40	50	0.89	**SO◌X13**	TPS43	TIP15W
	3	**MVX4600X3F40**	●	2	138	145	175	240	40	50	0.89	**SO◌X13**	TPS43	TIP15W
	4	**MVX4600X4F40**	●	2	184	191	221	286	40	63	0.89	**SO◌X13**	TPS43	TIP15W
	5	**MVX4600X5F40**	●	2	230	237	267	332	40	63	0.89	**SO◌X13**	TPS43	TIP15W
	4	**MVX4600X4F50**	★	2	184	191	221	296	50	63	0.89	**SO◌X13**	TPS43	TIP15W
	5	**MVX4600X5F50**	★	2	230	237	267	342	50	63	0.89	**SO◌X13**	TPS43	TIP15W
47.0	2	**MVX4700X2F40**	●	2	94	101	141	206	40	63	1.9	**SO◌X16**	TPS54	TIP25D
	3	**MVX4700X3F40**	●	2	141	148	188	253	40	63	1.9	**SO◌X16**	TPS54	TIP25D
	4	**MVX4700X4F40**	●	2	188	195	235	300	40	63	1.9	**SO◌X16**	TPS54	TIP25D
	5	**MVX4700X5F40**	●	2	235	242	282	347	40	63	1.9	**SO◌X16**	TPS54	TIP25D
	4	**MVX4700X4F50**	★	2	188	195	235	310	50	63	1.9	**SO◌X16**	TPS54	TIP25D
	5	**MVX4700X5F50**	★	2	235	242	282	357	50	63	1.9	**SO◌X16**	TPS54	TIP25D
48.0	2	**MVX4800X2F40**	●	2	96	103	143	208	40	63	1.8	**SO◌X16**	TPS54	TIP25D
	3	**MVX4800X3F40**	●	2	144	151	191	256	40	63	1.8	**SO◌X16**	TPS54	TIP25D
	4	**MVX4800X4F40**	●	2	192	199	239	304	40	63	1.8	**SO◌X16**	TPS54	TIP25D
	5	**MVX4800X5F40**	●	2	240	247	287	352	40	63	1.8	**SO◌X16**	TPS54	TIP25D
	4	**MVX4800X4F50**	★	2	192	199	239	314	50	63	1.8	**SO◌X16**	TPS54	TIP25D
	5	**MVX4800X5F50**	★	2	240	247	287	362	50	63	1.8	**SO◌X16**	TPS54	TIP25D
49.0	2	**MVX4900X2F40**	●	2	98	105	145	210	40	63	1.7	**SO◌X16**	TPS54	TIP25D
	3	**MVX4900X3F40**	●	2	147	154	194	259	40	63	1.7	**SO◌X16**	TPS54	TIP25D
	4	**MVX4900X4F40**	●	2	196	203	243	308	40	63	1.7	**SO◌X16**	TPS54	TIP25D
	5	**MVX4900X5F40**	●	2	245	252	292	357	40	63	1.7	**SO◌X16**	TPS54	TIP25D
	4	**MVX4900X4F50**	★	2	196	203	243	318	50	63	1.7	**SO◌X16**	TPS54	TIP25D
	5	**MVX4900X5F50**	★	2	245	252	292	367	50	63	1.7	**SO◌X16**	TPS54	TIP25D
50.0	2	**MVX5000X2F40**	●	2	100	107	147	212	40	63	1.6	**SO◌X16**	TPS54	TIP25D
	3	**MVX5000X3F40**	●	2	150	157	197	262	40	63	1.6	**SO◌X16**	TPS54	TIP25D
	4	**MVX5000X4F40**	●	2	200	207	247	312	40	63	1.6	**SO◌X16**	TPS54	TIP25D
	5	**MVX5000X5F40**	●	2	250	257	297	362	40	63	1.6	**SO◌X16**	TPS54	TIP25D
	4	**MVX5000X4F50**	★	2	200	207	247	322	50	63	1.6	**SO◌X16**	TPS54	TIP25D
	5	**MVX5000X5F50**	★	2	250	257	297	372	50	63	1.6	**SO◌X16**	TPS54	TIP25D
51.0	2	**MVX5100X2F40**	●	2	102	109	149	214	40	63	1.5	**SO◌X16**	TPS54	TIP25D
	3	**MVX5100X3F40**	●	2	153	160	200	265	40	63	1.5	**SO◌X16**	TPS54	TIP25D
	4	**MVX5100X4F40**	●	2	204	211	251	316	40	63	1.5	**SO◌X16**	TPS54	TIP25D
	5	**MVX5100X5F40**	●	2	255	262	302	367	40	63	1.5	**SO◌X16**	TPS54	TIP25D
	4	**MVX5100X4F50**	★	2	204	211	251	326	50	63	1.5	**SO◌X16**	TPS54	TIP25D
	5	**MVX5100X5F50**	★	2	255	262	302	377	50	63	1.5	**SO◌X16**	TPS54	TIP25D
52.0	2	**MVX5200X2F40**	●	2	104	111	151	216	40	63	1.39	**SO◌X16**	TPS54	TIP25D
	3	**MVX5200X3F40**	●	2	156	163	203	268	40	63	1.39	**SO◌X16**	TPS54	TIP25D
	4	**MVX5200X4F40**	●	2	208	215	255	320	40	63	1.39	**SO◌X16**	TPS54	TIP25D
	5	**MVX5200X5F40**	●	2	260	267	307	372	40	63	1.39	**SO◌X16**	TPS54	TIP25D
	4	**MVX5200X4F50**	★	2	208	215	255	330	50	63	1.39	**SO◌X16**	TPS54	TIP25D
	5	**MVX5200X5F50**	★	2	260	267	307	382	50	63	1.39	**SO◌X16**	TPS54	TIP25D

* Clamp Torque (N • m) : TPS43=3.5, TPS54=7.5

DRILLING (INDEXABLE TYPE)

MVX

DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert	Clamp Screw	D Wrench
					LU	LBX	LPR	OAL	DCONMS	DCSFMS				
53.0	2	**MVX5300X2F40**	●	2	106	113	153	218	40	63	1.29	**SO◌X16**	TPS54	TIP25D
	3	**MVX5300X3F40**	●	2	159	166	206	271	40	63	1.29	**SO◌X16**	TPS54	TIP25D
	4	**MVX5300X4F40**	●	2	212	219	259	324	40	63	1.29	**SO◌X16**	TPS54	TIP25D
	5	**MVX5300X5F40**	●	2	265	272	312	377	40	63	1.29	**SO◌X16**	TPS54	TIP25D
	4	**MVX5300X4F50**	★	2	212	219	259	334	50	63	1.29	**SO◌X16**	TPS54	TIP25D
	5	**MVX5300X5F50**	★	2	265	272	312	387	50	63	1.29	**SO◌X16**	TPS54	TIP25D
54.0	2	**MVX5400X2F40**	●	2	108	115	155	220	40	63	1.19	**SO◌X16**	TPS54	TIP25D
	3	**MVX5400X3F40**	●	2	162	169	209	274	40	63	1.19	**SO◌X16**	TPS54	TIP25D
	4	**MVX5400X4F40**	●	2	216	223	263	328	40	63	1.19	**SO◌X16**	TPS54	TIP25D
	5	**MVX5400X5F40**	●	2	270	277	317	382	40	63	1.19	**SO◌X16**	TPS54	TIP25D
	4	**MVX5400X4F50**	★	2	216	223	263	338	50	63	1.19	**SO◌X16**	TPS54	TIP25D
	5	**MVX5400X5F50**	★	2	270	277	317	392	50	63	1.19	**SO◌X16**	TPS54	TIP25D
55.0	2	**MVX5500X2F40**	●	2	110	117	157	222	40	63	1.08	**SO◌X16**	TPS54	TIP25D
	3	**MVX5500X3F40**	●	2	165	172	212	277	40	63	1.08	**SO◌X16**	TPS54	TIP25D
	4	**MVX5500X4F40**	●	2	220	227	267	332	40	63	1.08	**SO◌X16**	TPS54	TIP25D
	5	**MVX5500X5F40**	●	2	275	282	322	387	40	63	1.08	**SO◌X16**	TPS54	TIP25D
	4	**MVX5500X4F50**	★	2	220	227	267	342	50	63	1.08	**SO◌X16**	TPS54	TIP25D
	5	**MVX5500X5F50**	●	2	275	282	322	397	50	63	1.08	**SO◌X16**	TPS54	TIP25D
56.0	2	**MVX5600X2F40**	●	2	112	119	159	224	40	63	0.98	**SO◌X16**	TPS54	TIP25D
	3	**MVX5600X3F40**	●	2	168	175	215	280	40	63	0.98	**SO◌X16**	TPS54	TIP25D
	4	**MVX5600X4F40**	●	2	224	231	271	336	40	63	0.98	**SO◌X16**	TPS54	TIP25D
	5	**MVX5600X5F40**	●	2	280	287	327	392	40	63	0.98	**SO◌X16**	TPS54	TIP25D
	4	**MVX5600X4F50**	★	2	224	231	271	346	50	63	0.98	**SO◌X16**	TPS54	TIP25D
	5	**MVX5600X5F50**	★	2	280	287	327	402	50	63	0.98	**SO◌X16**	TPS54	TIP25D
57.0	2	**MVX5700X2F40**	●	2	114	121	161	226	40	68	1.47	**SO◌X18**	TPS54	TIP25D
	3	**MVX5700X3F40**	●	2	171	178	218	283	40	68	1.47	**SO◌X18**	TPS54	TIP25D
	4	**MVX5700X4F40**	●	2	228	235	275	340	40	68	1.47	**SO◌X18**	TPS54	TIP25D
	5	**MVX5700X5F40**	●	2	285	292	332	397	40	68	1.47	**SO◌X18**	TPS54	TIP25D
	4	**MVX5700X4F50**	★	2	228	235	275	350	50	68	1.47	**SO◌X18**	TPS54	TIP25D
	5	**MVX5700X5F50**	★	2	285	292	332	407	50	68	1.47	**SO◌X18**	TPS54	TIP25D
58.0	2	**MVX5800X2F40**	●	2	116	123	163	228	40	68	1.37	**SO◌X18**	TPS54	TIP25D
	3	**MVX5800X3F40**	●	2	174	181	221	286	40	68	1.37	**SO◌X18**	TPS54	TIP25D
	4	**MVX5800X4F40**	●	2	232	239	279	344	40	68	1.37	**SO◌X18**	TPS54	TIP25D
	5	**MVX5800X5F40**	●	2	290	297	337	402	40	68	1.37	**SO◌X18**	TPS54	TIP25D
	4	**MVX5800X4F50**	★	2	232	239	279	354	50	68	1.37	**SO◌X18**	TPS54	TIP25D
	5	**MVX5800X5F50**	★	2	290	297	337	412	50	68	1.37	**SO◌X18**	TPS54	TIP25D
59.0	2	**MVX5900X2F40**	●	2	118	125	165	230	40	68	1.26	**SO◌X18**	TPS54	TIP25D
	3	**MVX5900X3F40**	●	2	177	184	224	289	40	68	1.26	**SO◌X18**	TPS54	TIP25D
	4	**MVX5900X4F40**	●	2	236	243	283	348	40	68	1.26	**SO◌X18**	TPS54	TIP25D
	5	**MVX5900X5F40**	●	2	295	302	342	407	40	68	1.26	**SO◌X18**	TPS54	TIP25D
	4	**MVX5900X4F50**	★	2	236	243	283	358	50	68	1.26	**SO◌X18**	TPS54	TIP25D
	5	**MVX5900X5F50**	★	2	295	302	342	417	50	68	1.26	**SO◌X18**	TPS54	TIP25D
60.0	2	**MVX6000X2F40**	●	2	120	127	167	232	40	68	1.16	**SO◌X18**	TPS54	TIP25D
	3	**MVX6000X3F40**	●	2	180	187	227	292	40	68	1.16	**SO◌X18**	TPS54	TIP25D
	4	**MVX6000X4F40**	●	2	240	247	287	352	40	68	1.16	**SO◌X18**	TPS54	TIP25D
	5	**MVX6000X5F40**	●	2	300	307	347	412	40	68	1.16	**SO◌X18**	TPS54	TIP25D
	4	**MVX6000X4F50**	★	2	240	247	287	362	50	68	1.16	**SO◌X18**	TPS54	TIP25D
	5	**MVX6000X5F50**	★	2	300	307	347	422	50	68	1.16	**SO◌X18**	TPS54	TIP25D

* Clamp Torque (N • m) : TPS54=7.5

● : Inventory maintained. ★ : Inventory maintained in Japan.

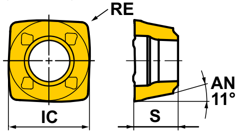
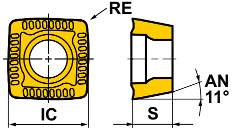
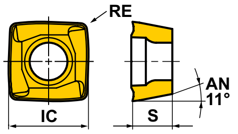
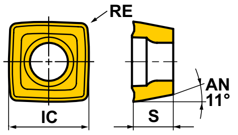
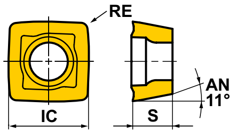
DC (mm)	Hole Depth (L/D)	Order Number	Stock	Teeth	Dimensions (mm)						S10 (mm)	Insert	Clamp Screw	D Wrench
					LU	LBX	LPR	OAL	DCONMS	DCSFMS				
61.0	2	**MVX6100X2F40**	●	2	122	129	169	234	40	68	1.05	**SO◌X18**	TPS54	TIP25D
	3	**MVX6100X3F40**	●	2	183	190	230	295	40	68	1.05	**SO◌X18**	TPS54	TIP25D
	4	**MVX6100X4F40**	●	2	244	251	291	356	40	68	1.05	**SO◌X18**	TPS54	TIP25D
	5	**MVX6100X5F40**	●	2	305	312	352	417	40	68	1.05	**SO◌X18**	TPS54	TIP25D
	4	**MVX6100X4F50**	★	2	244	251	291	366	50	68	1.05	**SO◌X18**	TPS54	TIP25D
	5	**MVX6100X5F50**	★	2	305	312	352	427	50	68	1.05	**SO◌X18**	TPS54	TIP25D
62.0	2	**MVX6200X2F40**	●	2	124	131	171	236	40	68	0.95	**SO◌X18**	TPS54	TIP25D
	3	**MVX6200X3F40**	●	2	186	193	233	298	40	68	0.95	**SO◌X18**	TPS54	TIP25D
	4	**MVX6200X4F40**	●	2	248	255	295	360	40	68	0.95	**SO◌X18**	TPS54	TIP25D
	5	**MVX6200X5F40**	●	2	310	317	357	422	40	68	0.95	**SO◌X18**	TPS54	TIP25D
	4	**MVX6200X4F50**	★	2	248	255	295	370	50	68	0.95	**SO◌X18**	TPS54	TIP25D
	5	**MVX6200X5F50**	★	2	310	317	357	432	50	68	0.95	**SO◌X18**	TPS54	TIP25D
63.0	2	**MVX6300X2F40**	●	2	126	133	173	238	40	68	0.85	**SO◌X18**	TPS54	TIP25D
	3	**MVX6300X3F40**	●	2	189	196	236	301	40	68	0.85	**SO◌X18**	TPS54	TIP25D
	4	**MVX6300X4F40**	●	2	252	259	299	364	40	68	0.85	**SO◌X18**	TPS54	TIP25D
	5	**MVX6300X5F40**	●	2	315	322	362	427	40	68	0.85	**SO◌X18**	TPS54	TIP25D
	4	**MVX6300X4F50**	★	2	252	259	299	374	50	68	0.85	**SO◌X18**	TPS54	TIP25D
	5	**MVX6300X5F50**	★	2	315	322	362	437	50	68	0.85	**SO◌X18**	TPS54	TIP25D

⁎ Clamp Torque (N • m) : TPS54=7.5

DRILLING (INDEXABLE TYPE)

MVX

INSERTS

Shape	Drill Dia.	Insert Number	Dimensions (mm)			Coated				Carbide		Geometry
			IC	S	RE	VP15TF	MC1020	MC5020	DP8020	TF15		
UM   General purpose and inner or outer Edge	Ø14.0—Ø16.5	**SOMX052704-UM**	5.0	2.7	0.4	●	●	●				**Ø14.0–Ø16.5**  **Ø17.0–Ø63.0** 
	Ø17.0—Ø19.5	**SOMX063005-UM**	6.0	3.0	0.5	●	●	●				
	Ø20.0—Ø22.5	**SOMX073505-UM**	7.0	3.5	0.5	●	●	●				
	Ø23.0—Ø27.5	**SOMX084005-UM**	8.3	4.0	0.5	●	●	●				
	Ø28.0—Ø33.0	**SOMX094506-UM**	9.7	4.5	0.6	●	●	●				
	Ø33.5—Ø39.0	**SOMX115506-UM**	11.6	5.5	0.6	●	●	●				
	Ø40.0—Ø46.0	**SOMX136008-UM**	13.8	6.0	0.8	●	●	●				
	Ø47.0—Ø56.0	**SOMX166508-UM**	16.5	6.5	0.8	●	●	●				
	Ø57.0—Ø63.0	**SOMX187008-UM**	18.2	7.0	0.8	●	●	●				
US  For stainless steel and inner edge	Ø17.0—Ø19.5	**SOMX063005-US**	6.0	3.0	0.5	●						
	Ø20.0—Ø22.5	**SOMX073505-US**	7.0	3.5	0.5	●						
	Ø23.0—Ø27.5	**SOMX084005-US**	8.0	4.0	0.5	●						
	Ø28.0—Ø33.0	**SOMX094506-US**	9.0	4.5	0.6	●						
	Ø33.5—Ø39.0	**SOMX115506-US**	11.6	5.5	0.6	●						
	Ø40.0—Ø46.0	**SOMX136008-US**	13.8	6.0	0.8	●						
	Ø47.0—Ø56.0	**SOMX166508-US**	16.5	6.5	0.8	●						
	Ø57.0—Ø63.0	**SOMX187008-US**	18.2	7.0	0.8	●						
UH  Strong Cutting Edge Type and Inner Edge	Ø17.0—Ø19.5	**SOMX062905-UH**	6.0	2.9	0.5				●			
	Ø20.0—Ø22.5	**SOMX073405-UH**	7.0	3.4	0.5				●			
	Ø23.0—Ø27.5	**SOMX083905-UH**	8.3	3.9	0.5				●			
	Ø28.0—Ø33.0	**SOMX094406-UH**	9.7	4.4	0.6				●			
	Ø33.5—Ø39.0	**SOMX115406-UH**	11.6	5.4	0.6				●			
	Ø40.0—Ø46.0	**SOMX135908-UH**	13.8	5.9	0.8				●			
	Ø47.0—Ø56.0	**SOMX166408-UH**	16.5	6.4	0.8				●			
	Ø57.0—Ø63.0	**SOMX186908-UH**	18.2	6.9	0.8				●			
UN  Aluminium Alloy and Inner or Outer Edge	Ø17.0—Ø19.5	**SOGX063005-UN**	6.0	3.0	0.5					●		
	Ø20.0—Ø22.5	**SOGX073505-UN**	7.0	3.5	0.5					●		
	Ø23.0—Ø27.5	**SOGX084005-UN**	8.3	4.0	0.5					●		
	Ø28.0—Ø33.0	**SOGX094506-UN**	9.7	4.5	0.6					●		
	Ø33.5—Ø39.0	**SOGX115506-UN**	11.6	5.5	0.6					●		
	Ø40.0—Ø46.0	**SOGX136008-UN**	13.8	6.0	0.8					●		
	Ø47.0—Ø56.0	**SOGX166508-UN**	16.5	6.5	0.8					●		
	Ø57.0—Ø63.0	**SOGX187008-UN**	18.2	7.0	0.8					●		

Note 1) MC1020 and MC5020 are made exclusively for use as an outer insert. DP8020 are made exclusively for use as an inner insert.

INSERT RECOMMENDATION

	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
P Mild Steel, Alloy Steel	MC1020  **UM Chipbreakaer**	VP15TF  **UM Chipbreakaer**	VP15TF  **UM Chipbreakaer**	VP15TF  **UM Chipbreakaer**
M Stainless Steel	MC1020  **UM Chipbreakaer**	VP15TF  **US Chipbreakaer**	VP15TF  **UM Chipbreakaer**	VP15TF  **US Chipbreakaer**
K Cast Iron	MC5020  **UM Chipbreakaer**	VP15TF  **UM Chipbreakaer**	VP15TF  **UM Chipbreakaer**	VP15TF  **UM Chipbreakaer**

	1st Recommendation		When outer insert fractures	
	Outer Insert	Inner Insert	Outer Insert	Inner Insert
H Hardened Steel	MC1020  **UM Chipbreakaer**	DP8020  **UH Chipbreakaer**	VP15TF  **UM Chipbreakaer**	DP8020  **UH Chipbreakaer**
N Aluminium Alloy	TF15  **UN Chipbreakaer**	TF15  **UN Chipbreakaer**		

● : Inventory maintained.

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	**Vc** (m/min)	Inner Chipbreaker	**Ø 14—Ø 16.5**		
					fr (mm/rev)		
					L/D=2, 3	4	5
P	Mild Steel (C15, Ck15)	≤180HB	200 (180—235)	UM	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.05 (0.04—0.06)
				UH	—	—	—
	Carbon Steel,Alloy Steel (Ck45, 41CrMo4)	180—280HB	140 (115—180)	UM	0.08 (0.06—0.14)	0.08 (0.06—0.09)	0.08 (0.06—0.09)
				UH	—	—	—
	Carbon Steel,Alloy Steel (100Cr6)	280—350HB	100 (75—140)	UM	0.08 (0.06—0.14)	0.08 (0.06—0.09)	0.08 (0.06—0.09)
				UH	—	—	—
	Alloy Tool Steel (X210Cr12)	≤350HB	135 (100—170)	UM	0.08 (0.06—0.14)	0.08 (0.06—0.09)	0.08 (0.06—0.09)
				UH	—	—	—
M	Austenitic Stainless Steel (X5CrNi18-10, X5CrNiMo17-12-2)	≤200HB	130 (80—180)	US	—	—	—
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)
	Austenitic Stainless Steel (X2CrNiN18-9, X5CrNiMoN17-11-2)	>200HB	130 (80—180)	US	—	—	—
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)
	Ferritic and Martensitic Stainless Steel (X12Cr13, X6Cr17)	≤200HB	120 (80—165)	US	—	—	—
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)
	Ferritic and Martensitic Stainless Steel (X17CrNi16-2, X30Cr13)	>200HB	120 (80—165)	US	—	—	—
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)
K	Gray Cast Iron (GG25, GG30)	≤350MPa	160 (130—195)	UM	0.10 (0.06—0.14)	0.08 (0.06—0.10)	0.08 (0.06—0.10)
	Ductile Cast Iron (GG40)	≤450MPa	100 (80—135)	UM	0.10 (0.06—0.14)	0.08 (0.06—0.10)	0.08 (0.06—0.10)
	Ductile Cast Iron (GGG70)	≤800HB	100 (70—125)	UM	0.08 (0.06—0.12)	0.07 (0.06—0.08)	0.07 (0.06—0.08)
N	Aluminium Alloy (AlMg1SiCu, Al-Zn6MgCu)	Si<5%	200 (100-350)	UN	—	—	—
	Aluminium Alloy (AC4B)	5%≤Si≤10%	150 (100-200)	UN	—	—	—
	Aluminium Alloy (ADC12, A390)	Si>10%	150 (100-200)	UN	—	—	—
H	Hardened Steel (X40CrMoV51, 55NiCrMoV6)	38 - 45HRC	50 (30-80)	UH	—	—	—

Note 1) Reduce the cutting speed by 30% when VP15TF is used as an outer insert.
Note 2) L/D=3 is the recommended maximum depth when only external coolant is used.
Note 3) Internal through coolant is a necessity when drilling stainless steel.

USAGE NOTE ➤ **M171**
SPARE PARTS ➤ **N001**
TECHNICAL DATA ➤ **P001**

DRILLING (INDEXABLE TYPE)

MVX

RECOMMENDED CUTTING CONDITIONS

	Material	Hardness	**Vc** (m/min)	Inner Chipbreaker	**Ø 17—Ø 19.5** **fr** (mm/rev) L/D=2, 3	4	5	6
P	Mild Steel (C15, Ck15)	≤180HB	200 (180—235)	UM	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.04 (0.04—0.05)
				UH				
	Carbon Steel,Alloy Steel (Ck45, 41CrMo4)	180—280HB	140 (115—180)	UM	0.08 (0.06—0.14)	0.08 (0.06—0.09)	0.08 (0.06—0.09)	0.05 (0.04—0.06)
				UH				
	Carbon Steel,Alloy Steel (100Cr6)	280—350HB	100 (75—140)	UM	0.08 (0.06—0.14)	0.08 (0.06—0.09)	0.08 (0.06—0.09)	0.05 (0.04—0.06)
				UH				
	Alloy Tool Steel (X210Cr12)	≤350HB	135 (100—170)	UM	0.08 (0.06—0.14)	0.08 (0.06—0.09)	0.08 (0.06—0.09)	0.05 (0.04—0.06)
				UH				
M	Austenitic Stainless Steel (X5CrNi18-10, X5CrNiMo17-12-2)	≤200HB	130 (80—180)	US	0.08 (0.06—0.12)	0.06 (0.04—0.08)	0.06 (0.04—0.08)	0.05 (0.04—0.06)
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.04 (0.04—0.05)
	Austenitic Stainless Steel (X2CrNiN18-9, X5CrNiMoN17-11-2)	>200HB	130 (80—180)	US	0.08 (0.06—0.12)	0.06 (0.04—0.08)	0.06 (0.04—0.08)	0.05 (0.04—0.06)
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.04 (0.04—0.05)
	Ferritic and Martensitic Stainless Steel (X12Cr13, X6Cr17)	≤200HB	120 (80—165)	US	0.08 (0.06—0.12)	0.06 (0.04—0.08)	0.06 (0.04—0.08)	0.05 (0.04—0.06)
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.04 (0.04—0.05)
	Ferritic and Martensitic Stainless Steel (X17CrNi16-2, X30Cr13)	>200HB	120 (80—165)	US	0.08 (0.06—0.12)	0.06 (0.04—0.08)	0.06 (0.04—0.08)	0.05 (0.04—0.06)
				UM	0.06 (0.04—0.08)	0.05 (0.04—0.06)	0.05 (0.04—0.06)	0.04 (0.04—0.05)
K	Gray Cast Iron (GG25, GG30)	≤350MPa	160 (130—195)	UM	0.11 (0.08—0.14)	0.09 (0.08—0.10)	0.09 (0.08—0.10)	0.05 (0.04—0.06)
	Ductile Cast Iron (GG40)	≤450MPa	100 (80—135)	UM	0.11 (0.08—0.14)	0.09 (0.08—0.10)	0.09 (0.08—0.10)	0.05 (0.04—0.06)
	Ductile Cast Iron (GGG70)	≤800HB	100 (70—125)	UM	0.11 (0.08—0.14)	0.09 (0.08—0.10)	0.09 (0.08—0.10)	0.05 (0.04—0.06)
N	Aluminium Alloy (AlMg1SiCu, Al-Zn6MgCu)	Si<5%	200 (100-350)	UN	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)
	Aluminium Alloy (AC4B)	5%≤Si≤10%	150 (100-200)	UN	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)
	Aluminium Alloy (ADC12, A390)	Si>10%	150 (100-200)	UN	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)
H	Hardened Steel (X40CrMoV51, 55NiCrMoV6)	38 - 45HRC	50 (30-80)	UH	0.08 (0.04—0.12)	0.06 (0.04—0.09)	—	—

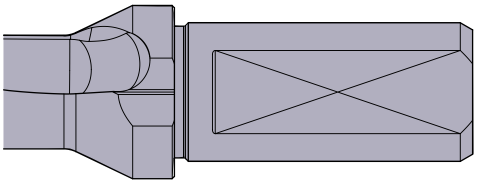
Note 1) Reduce the cutting speed by 30% when VP15TF is used as an outer insert.
Note 2) L/D=3 is the recommended maximum depth when only external coolant is used.
Note 3) Internal through coolant is a necessity when drilling stainless steel.

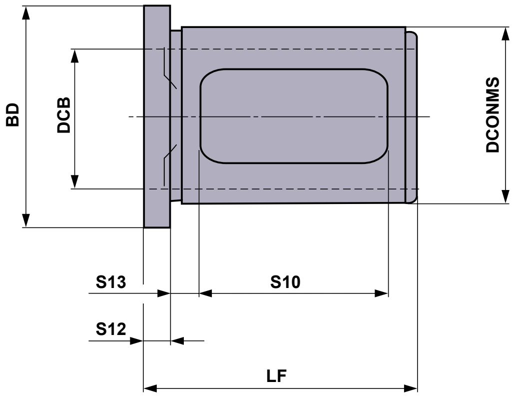
	Ø 20—Ø 23.5				Ø 24—Ø 29.5				Ø 30—Ø 63			
	fr (mm/rev)				fr (mm/rev)				fr (mm/rev)			
	L/D=2, 3	4	5	6	L/D=2, 3	4	5	6	L/D=2, 3	4	5	6
	0.06 (0.04—0.08)	0.06 (0.04—0.07)	0.06 (0.04—0.07)	0.04 (0.04—0.05)	0.07 (0.04—0.08)	0.06 (0.04—0.07)	0.06 (0.04—0.07)	0.05 (0.04—0.06)	0.08 (0.06—0.10)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)
	0.10 (0.06—0.18)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.08)	0.12 (0.08—0.18)	0.10 (0.08—0.12)	0.10 (0.08—0.12)	0.09 (0.08—0.10)	0.14 (0.08—0.20)	0.12 (0.08—0.16)	0.12 (0.08—0.16)	0.11 (0.10—0.12)
	0.10 (0.06—0.18)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.08)	0.12 (0.08—0.18)	0.10 (0.08—0.12)	0.10 (0.08—0.12)	0.09 (0.08—0.10)	0.14 (0.08—0.20)	0.12 (0.08—0.16)	0.12 (0.08—0.16)	0.11 (0.10—0.12)
	0.10 (0.06—0.18)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.08)	0.12 (0.08—0.18)	0.10 (0.08—0.12)	0.10 (0.08—0.12)	0.09 (0.08—0.10)	0.14 (0.08—0.20)	0.12 (0.08—0.16)	0.12 (0.08—0.16)	0.10 (0.08—0.12)
	0.10 (0.06—0.14)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.10 (0.06—0.14)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)	0.10 (0.06—0.14)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.10)
	0.08 (0.06—0.12)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.09 (0.06—0.12)	0.07 (0.06—0.09)	0.07 (0.06—0.09)	0.06 (0.06—0.08)	0.09 (0.06—0.12)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)
	0.10 (0.06—0.14)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.10 (0.06—0.14)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)	0.10 (0.06—0.14)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.10)
	0.08 (0.06—0.12)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.09 (0.06—0.12)	0.07 (0.06—0.09)	0.07 (0.06—0.09)	0.06 (0.06—0.08)	0.09 (0.06—0.12)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)
	0.10 (0.06—0.14)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.10 (0.06—0.14)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)	0.10 (0.06—0.14)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.10)
	0.08 (0.06—0.12)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.09 (0.06—0.12)	0.07 (0.06—0.09)	0.07 (0.06—0.09)	0.06 (0.06—0.08)	0.09 (0.06—0.12)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)
	0.10 (0.06—0.14)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.10 (0.06—0.14)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)	0.10 (0.06—0.14)	0.09 (0.06—0.12)	0.09 (0.06—0.12)	0.07 (0.06—0.10)
	0.08 (0.06—0.12)	0.07 (0.06—0.08)	0.07 (0.06—0.08)	0.06 (0.06—0.07)	0.09 (0.06—0.12)	0.07 (0.06—0.09)	0.07 (0.06—0.09)	0.06 (0.06—0.08)	0.09 (0.06—0.12)	0.08 (0.06—0.10)	0.08 (0.06—0.10)	0.07 (0.06—0.08)
	0.14 (0.10—0.18)	0.10 (0.10—0.12)	0.10 (0.10—0.12)	0.07 (0.06—0.08)	0.15 (0.10—0.20)	0.11 (0.10—0.13)	0.11 (0.10—0.13)	0.09 (0.08—0.10)	0.15 (0.10—0.20)	0.12 (0.10—0.13)	0.12 (0.10—0.13)	0.11 (0.10—0.12)
	0.13 (0.10—0.16)	0.10 (0.10—0.11)	0.10 (0.10—0.11)	0.07 (0.06—0.08)	0.14 (0.10—0.18)	0.11 (0.10—0.12)	0.11 (0.10—0.12)	0.09 (0.08—0.10)	0.15 (0.10—0.20)	0.12 (0.10—0.13)	0.12 (0.10—0.13)	0.11 (0.10—0.12)
	0.13 (0.10—0.16)	0.10 (0.10—0.11)	0.10 (0.10—0.11)	0.07 (0.06—0.08)	0.14 (0.10—0.18)	0.11 (0.10—0.12)	0.11 (0.10—0.12)	0.09 (0.08—0.10)	0.15 (0.10—0.20)	0.12 (0.10—0.13)	0.12 (0.10—0.13)	0.11 (0.10—0.12)
	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)	0.12 (0.05—0.20)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)
	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)	0.12 (0.05—0.20)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)
	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)	0.12 (0.05—0.20)	0.12 (0.05—0.18)	0.12 (0.05—0.18)	0.08 (0.05—0.12)
	0.09 (0.06—0.14)	0.07 (0.06—0.09)	—	—	0.09 (0.06—0.14)	0.07 (0.06—0.09)	—	—	0.11 (0.06—0.16)	0.09 (0.06—0.012)	—	—

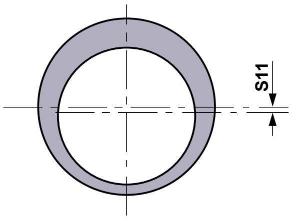
DRILLING (INDEXABLE TYPE)

JUST FIT SLEEVE [JFS]

- A sleeve for the drill shank to enable an increase of the cutting diameter.







Set Order Number	Individual Order Number	Stock	Dimensions (mm)							＊Increase (S11×2)	Suitable MVX Type Drill
			BD	DCONMS	DCB	LF	S10	S12	S13		
JFS-1	**JFS2520-10**	●	33	25	20	43	30	5	5	0.1	MVX1700 X ◌F20
	JFS2520-20	●	33	25	20	43	30	5	5	0.2	
	JFS2520-30	●	33	25	20	43	30	5	5	0.3	
	JFS2520-40	●	33	25	20	43	30	5	5	0.4	
	JFS2520-50	●	33	25	20	43	30	5	5	0.5	
JFS-2	**JFS3225-10**	●	40	32	25	50	34	5	5	0.1	MVX1750 X ◌F25 ︱ MVX2550 X ◌F25
	JFS3225-20	●	40	32	25	50	34	5	5	0.2	
	JFS3225-30	●	40	32	25	50	34	5	5	0.3	
	JFS3225-40	●	40	32	25	50	34	5	5	0.4	
	JFS3225-50	●	40	32	25	50	34	5	5	0.5	
JFS-3	**JFS4032-10**	●	48	40	32	55	40	5	5	0.1	MVX2600 X ◌F32 ︱ MVX3000 X ◌F32
	JFS4032-20	●	48	40	32	55	40	5	5	0.2	
	JFS4032-30	●	48	40	32	55	40	5	5	0.3	
	JFS4032-40	●	48	40	32	55	40	5	5	0.4	
	JFS4032-50	●	48	40	32	55	40	5	5	0.5	
JFS-4	**JFS5040-10**	★	68	50	40	65	50	5	5	0.1	MVX3100 X ◌F40 ︱ MVX6300 X ◌F40
	JFS5040-20	★	68	50	40	65	50	5	5	0.2	
	JFS5040-30	★	68	50	40	65	50	5	5	0.3	
	JFS5040-40	★	68	50	40	65	50	5	5	0.4	
	JFS5040-50	★	68	50	40	65	50	5	5	0.5	

It does not correspond to the shank diameter Ø50mm.

＊ Increase : Size of the increase in the cutting diameter.

■ GUIDELINE FOR SELECTING A JUST FIT SLEEVE

Desired = (Drill Ø + Increase of JFS) + 0.1mm

(Eg.) Desired diameter is 20.3mm (oversize is taken as 0.1mm).

Ø20.3=(MVX2000 X ◌F25+JFS3225-20)+0.1

20mm Drill

Using JFS an Increase of 0.2mm.

Oversize

<Tool Selected>
Drill : **MVX2000 X ◌F25**
Just Fit Sleeve [JFS]
: **JFS3225-20**

Note 1) Oversize can vary due to the cutting conditions used, please use the above as a guideline.

■ ORDERING THE JUST FIT SLEEVE

●Purchasing Method 1

Oversize can vary due to the cutting conditions used. Therefore it is recommended to purchase as a set. When placing an order, please use the Set order number. (5 sleeves/set)

●Purchasing Method 2

It is possible to order individually. When placing an order, please use the individual order number.

● : Inventory maintained. ★ : Inventory maintained in Japan.

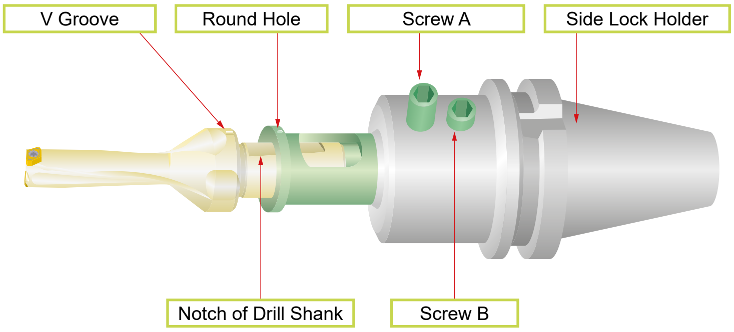
APPLICATION OF JUST FIT SLEEVE

1. When inserting the drill into the side lock holder, align the V groove on the outer peripheral edge of the drill flange, the round holes of the outer peripheral edge of the sleeve flange and the screws of the side lock holder to clamp the drill. (If the drill does not have a V groove, align the notch of the drill shank with the round holes of the sleeve.)

2. Insert screws A of the side lock holder directly through the open window of the sleeve and fix the drill. Tighten screw B to a degree so as not to damage the sleeve.

(Note)

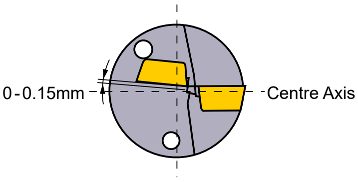
- Fine adjustments cannot be made for the diameter of the sleeve.
- Cannot be used with collect chuck type holders.



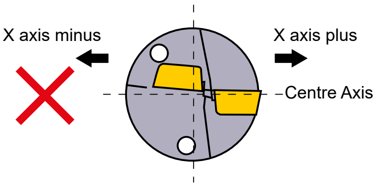
APPLICATION OF MVX TYPE DRILL

●Use on a Lathe

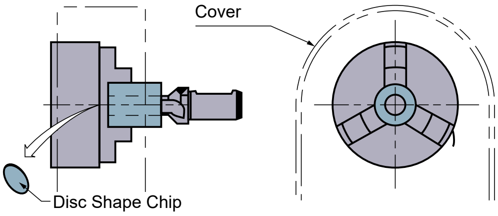
(1) The outer insert and machine X axis must be set parallel. The drill is designed so that the centre of the inner insert is 0-0.15mm lower when matching the drill centre and the machine spindle centre.
*The inner insert may fracture if the centre height of inner insert is higher than the machine X axis.



(2) To adjust the hole diameter by off-setting the drill, please adjust in the X axis plus direction (expanding direction of the hole diameter). Please refer to the holder dimension list for the maximum adjustment of each holder.
*It is not recommended to adjust to X axis minus direction (reducing direction of the hole diameter) as the holder may interfere with the hole.



(3) When through hole drilling on a lathe, the disc produced by the drill exiting the workpiece may be expelled at high velocity. To reduce the danger of injury or damage a cover guard is highly recommended.



VIOLET DRILLS

VAPDS

Short, High precision

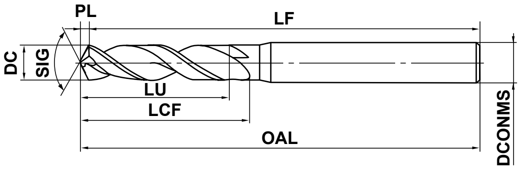
HG HSS

V

118° DC<2

135° DC≥2

P M K N S H



⁎LU = LCF-2DC (Max 3×DC)

0.5≤DC≤3	3<DC≤6	6<DC≤10	10<DC≤13
0 −0.014	0 −0.018	0 −0.022	0 −0.027

* All drills except those with intervals of 0.1mm and under dia. 2.0mm have a tolerance of 0−0.009mm.

- ●Highly efficient drilling and long tool life have been achieved with the developed Violet coating.

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
0.50	**VAPDSD0050**	3.2	50.2	50	0.15	3	●
0.51	**VAPDSD0051**	3.2	50.2	50	0.15	3	★
0.52	**VAPDSD0052**	3.2	50.2	50	0.16	3	★
0.53	**VAPDSD0053**	3.2	50.2	50	0.16	3	★
0.54	**VAPDSD0054**	3.2	50.2	50	0.16	3	★
0.55	**VAPDSD0055**	3.2	50.2	50	0.17	3	★
0.56	**VAPDSD0056**	4.2	50.2	50	0.17	3	★
0.57	**VAPDSD0057**	4.2	50.2	50	0.17	3	★
0.58	**VAPDSD0058**	4.2	50.2	50	0.17	3	★
0.59	**VAPDSD0059**	4.2	50.2	50	0.18	3	★
0.60	**VAPDSD0060**	5.2	50.2	50	0.18	3	★
0.61	**VAPDSD0061**	5.2	50.2	50	0.18	3	★
0.62	**VAPDSD0062**	5.2	50.2	50	0.19	3	★
0.63	**VAPDSD0063**	5.2	50.2	50	0.19	3	★
0.64	**VAPDSD0064**	5.2	50.2	50	0.19	3	★
0.65	**VAPDSD0065**	5.2	50.2	50	0.20	3	★
0.66	**VAPDSD0066**	5.2	50.2	50	0.20	3	★
0.67	**VAPDSD0067**	5.2	50.2	50	0.20	3	★
0.68	**VAPDSD0068**	5.2	50.2	50	0.20	3	★
0.69	**VAPDSD0069**	5.2	50.2	50	0.21	3	★
0.70	**VAPDSD0070**	5.2	50.2	50	0.21	3	★
0.71	**VAPDSD0071**	5.2	50.2	50	0.21	3	★
0.72	**VAPDSD0072**	5.2	50.2	50	0.22	3	★
0.73	**VAPDSD0073**	5.2	50.2	50	0.22	3	★
0.74	**VAPDSD0074**	5.2	50.2	50	0.22	3	★
0.75	**VAPDSD0075**	5.2	50.2	50	0.23	3	★
0.76	**VAPDSD0076**	5.2	50.2	50	0.23	3	★
0.77	**VAPDSD0077**	5.2	50.2	50	0.23	3	★
0.78	**VAPDSD0078**	5.2	50.2	50	0.23	3	★
0.79	**VAPDSD0079**	5.2	50.2	50	0.24	3	★
0.80	**VAPDSD0080**	5.2	50.2	50	0.24	3	★
0.81	**VAPDSD0081**	5.2	50.2	50	0.24	3	★
0.82	**VAPDSD0082**	5.3	50.3	50	0.25	3	★
0.83	**VAPDSD0083**	5.3	50.3	50	0.25	3	★
0.84	**VAPDSD0084**	5.3	50.3	50	0.25	3	★
0.85	**VAPDSD0085**	5.3	50.3	50	0.26	3	★
0.86	**VAPDSD0086**	6.3	50.3	50	0.26	3	★
0.87	**VAPDSD0087**	6.3	50.3	50	0.26	3	★
0.88	**VAPDSD0088**	6.3	50.3	50	0.26	3	★
0.89	**VAPDSD0089**	6.3	50.3	50	0.27	3	★
0.90	**VAPDSD0090**	6.3	50.3	50	0.27	3	★
0.91	**VAPDSD0091**	6.3	50.3	50	0.27	3	★
0.92	**VAPDSD0092**	6.3	50.3	50	0.28	3	★
0.93	**VAPDSD0093**	6.3	50.3	50	0.28	3	★
0.94	**VAPDSD0094**	6.3	50.3	50	0.28	3	★
0.95	**VAPDSD0095**	6.3	50.3	50	0.29	3	★
0.96	**VAPDSD0096**	6.3	50.3	50	0.29	3	★
0.97	**VAPDSD0097**	6.3	50.3	50	0.29	3	★
0.98	**VAPDSD0098**	6.3	50.3	50	0.29	3	★
0.99	**VAPDSD0099**	6.3	50.3	50	0.30	3	★
1.00	**VAPDSD0100**	6.3	50.3	50	0.3	3	●
1.01	**VAPDSD0101**	6.3	50.3	50	0.3	3	★
1.02	**VAPDSD0102**	6.3	50.3	50	0.3	3	★
1.03	**VAPDSD0103**	6.3	50.3	50	0.3	3	★
1.04	**VAPDSD0104**	6.3	50.3	50	0.3	3	★
1.05	**VAPDSD0105**	6.3	50.3	50	0.3	3	★
1.06	**VAPDSD0106**	6.3	50.3	50	0.3	3	★
1.07	**VAPDSD0107**	8.3	55.3	55	0.3	3	★
1.08	**VAPDSD0108**	8.3	55.3	55	0.3	3	★
1.09	**VAPDSD0109**	8.3	55.3	55	0.3	3	★
1.10	**VAPDSD0110**	8.3	55.3	55	0.3	3	★
1.11	**VAPDSD0111**	8.3	55.3	55	0.3	3	★
1.12	**VAPDSD0112**	8.3	55.3	55	0.3	3	★
1.13	**VAPDSD0113**	8.3	55.3	55	0.3	3	★
1.14	**VAPDSD0114**	8.3	55.3	55	0.3	3	★
1.15	**VAPDSD0115**	8.4	55.4	55	0.4	3	★

● : Inventory maintained. ★ : Inventory maintained in Japan.

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
1.16	VAPDSD0116	8.4	55.4	55	0.4	3	★
1.17	VAPDSD0117	8.4	55.4	55	0.4	3	★
1.18	VAPDSD0118	8.4	55.4	55	0.4	3	★
1.19	VAPDSD0119	8.4	55.4	55	0.4	3	★
1.20	VAPDSD0120	8.4	55.4	55	0.4	3	★
1.21	VAPDSD0121	8.4	55.4	55	0.4	3	★
1.22	VAPDSD0122	8.4	55.4	55	0.4	3	★
1.23	VAPDSD0123	8.4	55.4	55	0.4	3	★
1.24	VAPDSD0124	8.4	55.4	55	0.4	3	★
1.25	VAPDSD0125	8.4	55.4	55	0.4	3	★
1.26	VAPDSD0126	8.4	55.4	55	0.4	3	★
1.27	VAPDSD0127	8.4	55.4	55	0.4	3	★
1.28	VAPDSD0128	8.4	55.4	55	0.4	3	★
1.29	VAPDSD0129	8.4	55.4	55	0.4	3	★
1.30	VAPDSD0130	9.4	55.4	55	0.4	3	★
1.31	VAPDSD0131	9.4	55.4	55	0.4	3	★
1.32	VAPDSD0132	9.4	55.4	55	0.4	3	★
1.33	VAPDSD0133	9.4	55.4	55	0.4	3	★
1.34	VAPDSD0134	9.4	55.4	55	0.4	3	★
1.35	VAPDSD0135	9.4	55.4	55	0.4	3	★
1.36	VAPDSD0136	9.4	55.4	55	0.4	3	★
1.37	VAPDSD0137	9.4	55.4	55	0.4	3	★
1.38	VAPDSD0138	9.4	55.4	55	0.4	3	★
1.39	VAPDSD0139	9.4	55.4	55	0.4	3	★
1.40	VAPDSD0140	9.4	55.4	55	0.4	3	★
1.41	VAPDSD0141	9.4	55.4	55	0.4	3	★
1.42	VAPDSD0142	9.4	55.4	55	0.4	3	★
1.43	VAPDSD0143	9.4	55.4	55	0.4	3	★
1.44	VAPDSD0144	9.4	55.4	55	0.4	3	★
1.45	VAPDSD0145	9.4	55.4	55	0.4	3	★
1.46	VAPDSD0146	9.4	55.4	55	0.4	3	★
1.47	VAPDSD0147	9.4	55.4	55	0.4	3	★
1.48	VAPDSD0148	9.4	55.4	55	0.4	3	★
1.49	VAPDSD0149	9.5	55.5	55	0.5	3	★
1.50	VAPDSD0150	9.5	55.5	55	0.5	3	●
1.51	VAPDSD0151	11.5	55.5	55	0.5	3	★
1.52	VAPDSD0152	11.5	55.5	55	0.5	3	★
1.53	VAPDSD0153	11.5	55.5	55	0.5	3	★
1.54	VAPDSD0154	11.5	55.5	55	0.5	3	★
1.55	VAPDSD0155	11.5	55.5	55	0.5	3	★
1.56	VAPDSD0156	11.5	55.5	55	0.5	3	★
1.57	VAPDSD0157	11.5	55.5	55	0.5	3	★
1.58	VAPDSD0158	11.5	55.5	55	0.5	3	★
1.59	VAPDSD0159	11.5	55.5	55	0.5	3	★
1.60	VAPDSD0160	11.5	55.5	55	0.5	3	★
1.61	VAPDSD0161	11.5	55.5	55	0.5	3	★
1.62	VAPDSD0162	11.5	55.5	55	0.5	3	★
1.63	VAPDSD0163	11.5	55.5	55	0.5	3	★
1.64	VAPDSD0164	11.5	55.5	55	0.5	3	★
1.65	VAPDSD0165	11.5	55.5	55	0.5	3	★

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
1.66	VAPDSD0166	11.5	55.5	55	0.5	3	★
1.67	VAPDSD0167	11.5	55.5	55	0.5	3	★
1.68	VAPDSD0168	11.5	55.5	55	0.5	3	★
1.69	VAPDSD0169	11.5	55.5	55	0.5	3	★
1.70	VAPDSD0170	11.5	55.5	55	0.5	3	★
1.71	VAPDSD0171	11.5	55.5	55	0.5	3	★
1.72	VAPDSD0172	11.5	55.5	55	0.5	3	★
1.73	VAPDSD0173	11.5	55.5	55	0.5	3	★
1.74	VAPDSD0174	11.5	55.5	55	0.5	3	★
1.75	VAPDSD0175	11.5	55.5	55	0.5	3	★
1.76	VAPDSD0176	11.5	55.5	55	0.5	3	★
1.77	VAPDSD0177	11.5	55.5	55	0.5	3	★
1.78	VAPDSD0178	11.5	55.5	55	0.5	3	★
1.79	VAPDSD0179	11.5	55.5	55	0.5	3	★
1.80	VAPDSD0180	11.5	55.5	55	0.5	3	★
1.81	VAPDSD0181	11.5	55.5	55	0.5	3	★
1.82	VAPDSD0182	11.6	55.6	55	0.6	3	★
1.83	VAPDSD0183	11.6	55.6	55	0.6	3	★
1.84	VAPDSD0184	11.6	55.6	55	0.6	3	★
1.85	VAPDSD0185	11.6	55.6	55	0.6	3	★
1.86	VAPDSD0186	11.6	55.6	55	0.6	3	★
1.87	VAPDSD0187	11.6	55.6	55	0.6	3	★
1.88	VAPDSD0188	11.6	55.6	55	0.6	3	★
1.89	VAPDSD0189	11.6	55.6	55	0.6	3	★
1.90	VAPDSD0190	12.6	55.6	55	0.6	3	★
1.91	VAPDSD0191	12.6	60.6	60	0.6	3	★
1.92	VAPDSD0192	12.6	60.6	60	0.6	3	★
1.93	VAPDSD0193	12.6	60.6	60	0.6	3	★
1.94	VAPDSD0194	12.6	60.6	60	0.6	3	★
1.95	VAPDSD0195	12.6	60.6	60	0.6	3	★
1.96	VAPDSD0196	12.6	60.6	60	0.6	3	★
1.97	VAPDSD0197	12.6	60.6	60	0.6	3	★
1.98	VAPDSD0198	12.6	60.6	60	0.6	3	★
1.99	VAPDSD0199	12.6	60.6	60	0.6	3	★
2.00	VAPDSD0200	12.4	60.4	60	0.4	3	●
2.05	VAPDSD0205	12.4	60.4	60	0.4	3	★
2.10	VAPDSD0210	12.4	60.4	60	0.4	3	★
2.15	VAPDSD0215	12.5	60.5	60	0.5	3	★
2.20	VAPDSD0220	12.5	60.5	60	0.5	3	★
2.25	VAPDSD0225	12.5	60.5	60	0.5	3	★
2.30	VAPDSD0230	13.5	60.5	60	0.5	3	★
2.35	VAPDSD0235	13.5	60.5	60	0.5	3	★
2.40	VAPDSD0240	13.5	60.5	60	0.5	3	★
2.45	VAPDSD0245	13.5	60.5	60	0.5	3	★
2.50	VAPDSD0250	13.5	60.5	60	0.5	3	●
2.55	VAPDSD0255	13.5	60.5	60	0.5	3	★
2.60	VAPDSD0260	15.5	60.5	60	0.5	3	★
2.65	VAPDSD0265	15.6	60.6	60	0.6	3	★
2.70	VAPDSD0270	15.6	60.6	60	0.6	3	★
2.75	VAPDSD0275	15.6	60.6	60	0.6	3	★

CUTTING CONDITIONS ➢ M176
TECHNICAL DATA ➢ P001

VIOLET DRILLS

VAPDS

Short, High precision

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
2.80	VAPDSD0280	15.6	60.6	60	0.6	3	★
2.85	VAPDSD0285	15.6	60.6	60	0.6	3	★
2.90	VAPDSD0290	15.6	60.6	60	0.6	3	★
2.95	VAPDSD0295	15.6	60.6	60	0.6	3	★
3.00	VAPDSD0300	15.6	60.6	60	0.6	3	●
3.05	VAPDSD0305	17.6	70.6	70	0.6	4	★
3.10	VAPDSD0310	17.6	70.6	70	0.6	4	★
3.15	VAPDSD0315	17.7	70.7	70	0.7	4	★
3.20	VAPDSD0320	17.7	70.7	70	0.7	4	★
3.25	VAPDSD0325	17.7	70.7	70	0.7	4	★
3.30	VAPDSD0330	19.7	70.7	70	0.7	4	★
3.35	VAPDSD0335	19.7	70.7	70	0.7	4	★
3.40	VAPDSD0340	19.7	70.7	70	0.7	4	★
3.45	VAPDSD0345	19.7	70.7	70	0.7	4	★
3.50	VAPDSD0350	19.7	70.7	70	0.7	4	●
3.55	VAPDSD0355	19.7	70.7	70	0.7	4	★
3.60	VAPDSD0360	21.8	70.8	70	0.8	4	★
3.65	VAPDSD0365	21.8	70.8	70	0.8	4	★
3.70	VAPDSD0370	21.8	70.8	70	0.8	4	★
3.75	VAPDSD0375	21.8	70.8	70	0.8	4	★
3.80	VAPDSD0380	21.8	70.8	70	0.8	4	★
3.85	VAPDSD0385	21.8	70.8	70	0.8	4	★
3.90	VAPDSD0390	21.8	70.8	70	0.8	4	★
3.95	VAPDSD0395	21.8	70.8	70	0.8	4	★
4.00	VAPDSD0400	21.8	70.8	70	0.8	4	●
4.05	VAPDSD0405	21.8	80.8	80	0.8	6	★
4.10	VAPDSD0410	21.9	80.9	80	0.9	6	★
4.15	VAPDSD0415	21.9	80.9	80	0.9	6	★
4.20	VAPDSD0420	21.9	80.9	80	0.9	6	★
4.25	VAPDSD0425	21.9	80.9	80	0.9	6	★
4.30	VAPDSD0430	23.9	80.9	80	0.9	6	★
4.35	VAPDSD0435	23.9	80.9	80	0.9	6	★
4.40	VAPDSD0440	23.9	80.9	80	0.9	6	★
4.45	VAPDSD0445	23.9	80.9	80	0.9	6	★
4.50	VAPDSD0450	23.9	80.9	80	0.9	6	●
4.55	VAPDSD0455	23.9	80.9	80	0.9	6	★
4.60	VAPDSD0460	26.0	81.0	80	1.0	6	★
4.65	VAPDSD0465	26.0	81.0	80	1.0	6	★
4.70	VAPDSD0470	26.0	81.0	80	1.0	6	★
4.75	VAPDSD0475	26.0	81.0	80	1.0	6	★
4.80	VAPDSD0480	26.0	81.0	80	1.0	6	★
4.85	VAPDSD0485	26.0	81.0	80	1.0	6	★
4.90	VAPDSD0490	26.0	81.0	80	1.0	6	★
4.95	VAPDSD0495	26.0	81.0	80	1.0	6	★
5.00	VAPDSD0500	26.0	81.0	80	1.0	6	●
5.05	VAPDSD0505	26.1	81.1	80	1.1	6	★
5.10	VAPDSD0510	26.1	81.1	80	1.1	6	★
5.15	VAPDSD0515	26.1	81.1	80	1.1	6	★
5.20	VAPDSD0520	26.1	81.1	80	1.1	6	★
5.25	VAPDSD0525	26.1	81.1	80	1.1	6	★

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
5.30	VAPDSD0530	26.1	81.1	80	1.1	6	★
5.35	VAPDSD0535	28.1	81.1	80	1.1	6	★
5.40	VAPDSD0540	28.1	81.1	80	1.1	6	★
5.45	VAPDSD0545	28.1	81.1	80	1.1	6	★
5.50	VAPDSD0550	28.1	81.1	80	1.1	6	●
5.55	VAPDSD0555	28.2	81.2	80	1.2	6	★
5.60	VAPDSD0560	28.2	81.2	80	1.2	6	★
5.65	VAPDSD0565	28.2	81.2	80	1.2	6	★
5.70	VAPDSD0570	28.2	81.2	80	1.2	6	★
5.75	VAPDSD0575	28.2	81.2	80	1.2	6	★
5.80	VAPDSD0580	28.2	81.2	80	1.2	6	★
5.85	VAPDSD0585	28.2	81.2	80	1.2	6	★
5.90	VAPDSD0590	28.2	81.2	80	1.2	6	★
5.95	VAPDSD0595	28.2	81.2	80	1.2	6	★
6.00	VAPDSD0600	28.2	81.2	80	1.2	6	●
6.05	VAPDSD0605	31.3	81.3	80	1.3	8	★
6.10	VAPDSD0610	31.3	81.3	80	1.3	8	★
6.15	VAPDSD0615	31.3	81.3	80	1.3	8	★
6.20	VAPDSD0620	31.3	81.3	80	1.3	8	★
6.25	VAPDSD0625	31.3	81.3	80	1.3	8	★
6.30	VAPDSD0630	31.3	81.3	80	1.3	8	★
6.35	VAPDSD0635	31.3	81.3	80	1.3	8	★
6.40	VAPDSD0640	31.3	81.3	80	1.3	8	★
6.45	VAPDSD0645	31.3	81.3	80	1.3	8	★
6.50	VAPDSD0650	31.4	81.4	80	1.4	8	●
6.55	VAPDSD0655	31.4	81.4	80	1.4	8	★
6.60	VAPDSD0660	31.4	81.4	80	1.4	8	★
6.65	VAPDSD0665	31.4	81.4	80	1.4	8	★
6.70	VAPDSD0670	31.4	81.4	80	1.4	8	★
6.75	VAPDSD0675	33.4	81.4	80	1.4	8	★
6.80	VAPDSD0680	33.4	81.4	80	1.4	8	★
6.85	VAPDSD0685	33.4	81.4	80	1.4	8	★
6.90	VAPDSD0690	33.4	81.4	80	1.4	8	★
6.95	VAPDSD0695	33.4	81.4	80	1.4	8	★
7.00	VAPDSD0700	33.5	81.5	80	1.5	8	●
7.05	VAPDSD0705	33.5	81.5	80	1.5	8	★
7.10	VAPDSD0710	33.5	81.5	80	1.5	8	★
7.15	VAPDSD0715	33.5	81.5	80	1.5	8	★
7.20	VAPDSD0720	33.5	81.5	80	1.5	8	★
7.25	VAPDSD0725	33.5	81.5	80	1.5	8	★
7.30	VAPDSD0730	33.5	81.5	80	1.5	8	★
7.35	VAPDSD0735	33.5	81.5	80	1.5	8	★
7.40	VAPDSD0740	33.5	81.5	80	1.5	8	★
7.45	VAPDSD0745	33.5	81.5	80	1.5	8	★
7.50	VAPDSD0750	33.6	81.6	80	1.6	8	●
7.55	VAPDSD0755	36.6	86.6	85	1.6	8	★
7.60	VAPDSD0760	36.6	86.6	85	1.6	8	★
7.65	VAPDSD0765	36.6	86.6	85	1.6	8	★
7.70	VAPDSD0770	36.6	86.6	85	1.6	8	★
7.75	VAPDSD0775	36.6	86.6	85	1.6	8	★

● : Inventory maintained.　★ : Inventory maintained in Japan.

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
7.80	**VAPDSD0780**	36.6	86.6	85	1.6	8	★
7.85	**VAPDSD0785**	36.6	86.6	85	1.6	8	★
7.90	**VAPDSD0790**	36.6	86.6	85	1.6	8	★
7.95	**VAPDSD0795**	36.7	86.7	85	1.7	8	★
8.00	**VAPDSD0800**	36.7	86.7	85	1.7	8	●
8.05	**VAPDSD0805**	36.7	91.7	90	1.7	10	★
8.10	**VAPDSD0810**	36.7	91.7	90	1.7	10	★
8.15	**VAPDSD0815**	36.7	91.7	90	1.7	10	★
8.20	**VAPDSD0820**	36.7	91.7	90	1.7	10	★
8.25	**VAPDSD0825**	36.7	91.7	90	1.7	10	★
8.30	**VAPDSD0830**	36.7	91.7	90	1.7	10	★
8.35	**VAPDSD0835**	36.7	91.7	90	1.7	10	★
8.40	**VAPDSD0840**	36.7	91.7	90	1.7	10	★
8.45	**VAPDSD0845**	36.8	91.8	90	1.8	10	★
8.50	**VAPDSD0850**	36.8	91.8	90	1.8	10	●
8.55	**VAPDSD0855**	39.8	94.8	93	1.8	10	★
8.60	**VAPDSD0860**	39.8	94.8	93	1.8	10	★
8.65	**VAPDSD0865**	39.8	94.8	93	1.8	10	★
8.70	**VAPDSD0870**	39.8	94.8	93	1.8	10	★
8.75	**VAPDSD0875**	39.8	94.8	93	1.8	10	★
8.80	**VAPDSD0880**	39.8	94.8	93	1.8	10	★
8.85	**VAPDSD0885**	39.8	94.8	93	1.8	10	★
8.90	**VAPDSD0890**	39.8	94.8	93	1.8	10	★
8.95	**VAPDSD0895**	39.9	94.9	93	1.9	10	★
9.00	**VAPDSD0900**	39.9	94.9	93	1.9	10	●
9.10	**VAPDSD0910**	39.9	94.9	93	1.9	10	★
9.20	**VAPDSD0920**	39.9	94.9	93	1.9	10	★
9.30	**VAPDSD0930**	39.9	94.9	93	1.9	10	★
9.40	**VAPDSD0940**	40.0	95.0	93	2.0	10	★
9.50	**VAPDSD0950**	40.0	95.0	93	2.0	10	●
9.60	**VAPDSD0960**	43.0	98.0	96	2.0	10	★
9.70	**VAPDSD0970**	43.0	98.0	96	2.0	10	★
9.80	**VAPDSD0980**	43.0	98.0	96	2.0	10	★
9.90	**VAPDSD0990**	43.1	98.1	96	2.1	10	★
10.00	**VAPDSD1000**	43.1	98.1	96	2.1	10	●
10.10	**VAPDSD1010**	43.1	103.1	101	2.1	12	★
10.20	**VAPDSD1020**	43.1	103.1	101	2.1	12	★
10.30	**VAPDSD1030**	43.1	103.1	101	2.1	12	★
10.40	**VAPDSD1040**	43.2	103.2	101	2.2	12	★
10.50	**VAPDSD1050**	43.2	103.2	101	2.2	12	●
10.60	**VAPDSD1060**	43.2	103.2	101	2.2	12	★
10.70	**VAPDSD1070**	47.2	107.2	105	2.2	12	★
10.80	**VAPDSD1080**	47.2	107.2	105	2.2	12	★
10.90	**VAPDSD1090**	47.3	107.3	105	2.3	12	★
11.00	**VAPDSD1100**	47.3	107.3	105	2.3	12	●
11.10	**VAPDSD1110**	47.3	107.3	105	2.3	12	★
11.20	**VAPDSD1120**	47.3	107.3	105	2.3	12	★
11.30	**VAPDSD1130**	47.3	107.3	105	2.3	12	★
11.40	**VAPDSD1140**	47.4	107.4	105	2.4	12	★
11.50	**VAPDSD1150**	47.4	107.4	105	2.4	12	★
11.60	**VAPDSD1160**	47.4	107.4	105	2.4	12	★
11.70	**VAPDSD1170**	47.4	107.4	105	2.4	12	★
11.80	**VAPDSD1180**	47.4	107.4	105	2.4	12	★
11.90	**VAPDSD1190**	51.5	111.5	109	2.5	12	★
12.00	**VAPDSD1200**	51.5	111.5	109	2.5	12	●
12.10	**VAPDSD1210**	51.5	111.5	109	2.5	12	★
12.20	**VAPDSD1220**	51.5	111.5	109	2.5	12	★
12.30	**VAPDSD1230**	51.6	111.6	109	2.6	12	★
12.40	**VAPDSD1240**	51.6	111.6	109	2.6	12	★
12.50	**VAPDSD1250**	51.6	111.6	109	2.6	12	●
12.60	**VAPDSD1260**	51.6	111.6	109	2.6	12	★
12.70	**VAPDSD1270**	51.6	111.6	109	2.6	12	★
12.80	**VAPDSD1280**	51.7	111.7	109	2.7	12	★
12.90	**VAPDSD1290**	51.7	111.7	109	2.7	12	★
13.00	**VAPDSD1300**	51.7	111.7	109	2.7	12	★

VAPDS

Short, High precision

RECOMMENDED CUTTING CONDITIONS

Material	P		P	K	P	M	P	M
	Structural steel		Carbon steel Ck55 Alloy steel Cast iron		Alloy tool steel X210Cr12 (Low-hardness materials) Ferritic stainless steel X10CrAl18, X10CrAl13 Martensitic stainless steel X20Cr13, X10CrAl13		Alloy tool steel X40CrMoV51 (−40HRC) Precipitation hardening stainless steel X7CrNiAl177	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	18000	0.02	16000	0.02	9000	0.02	8200	0.02
1.0	12000	0.05	10000	0.05	6300	0.05	5500	0.04
2.0	6400	0.09	5500	0.09	3200	0.09	2900	0.05
3.0	4300	0.13	3700	0.13	2100	0.13	1900	0.06
4.0	3200	0.15	2800	0.15	1600	0.15	1400	0.08
5.0	2600	0.18	2200	0.18	1300	0.18	1100	0.10
6.0	2100	0.19	1800	0.19	1100	0.20	950	0.11
8.0	1600	0.24	1400	0.24	800	0.22	720	0.13
10.0	1300	0.28	1100	0.28	640	0.25	570	0.15
12.0	1100	0.34	930	0.34	530	0.30	480	0.17
13.0	980	0.36	860	0.36	490	0.32	440	0.19

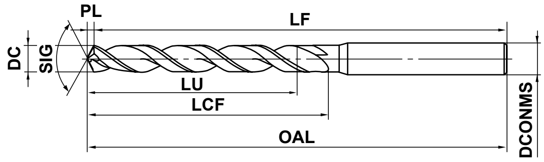
Note 1) Please reduce the revolution and feed rate when the workpiece clamping lacks rigidity or the machine has limitations.
Note 2) Please use a collet type drill chuck or a milling chuck.
Note 3) Use sufficient cutting fluid.
Note 4) When drilling holes greater than 4 x drill diameter hole depths, please use a peck feed.
Note 5) The above-mentioned cutting conditions are standard when using water-soluble cutting fluid.
Please reduce the revolutions when using non-water-soluble cutting fluid.

VAPDM

Medium, High precision

HG HSS V 118° DC<2 135° DC≥2

P M K N S H



*LU = LCF-2DC (Max 5×DC)

0.5≤DC≤3	3<DC≤6	6<DC≤10	10<DC≤18	18<DC≤30	30<DC≤32
0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033	0 −0.039

- ●Highly efficient drilling and long tool life have been achieved with the newly developed Violet coating.

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
0.50	**VAPDMD0050**	6.2	50.2	50	0.15	3	●
0.55	**VAPDMD0055**	6.2	50.2	50	0.17	3	★
0.60	**VAPDMD0060**	8.2	50.2	50	0.18	3	★
0.65	**VAPDMD0065**	8.2	50.2	50	0.20	3	★
0.70	**VAPDMD0070**	10.2	50.2	50	0.21	3	★
0.75	**VAPDMD0075**	10.2	50.2	50	0.23	3	★
0.80	**VAPDMD0080**	10.2	50.2	50	0.24	3	★
0.85	**VAPDMD0085**	10.3	50.3	50	0.26	3	★
0.90	**VAPDMD0090**	12.3	50.3	50	0.27	3	★
0.95	**VAPDMD0095**	12.3	50.3	50	0.29	3	★
1.00	**VAPDMD0100**	12.3	60.3	60	0.3	3	●
1.05	**VAPDMD0105**	12.3	60.3	60	0.3	3	★
1.10	**VAPDMD0110**	16.3	60.3	60	0.3	3	★
1.15	**VAPDMD0115**	16.4	60.4	60	0.4	3	★
1.20	**VAPDMD0120**	16.4	60.4	60	0.4	3	★
1.25	**VAPDMD0125**	16.4	60.4	60	0.4	3	★
1.30	**VAPDMD0130**	16.4	60.4	60	0.4	3	★
1.35	**VAPDMD0135**	18.4	60.4	60	0.4	3	★
1.40	**VAPDMD0140**	18.4	60.4	60	0.4	3	★
1.45	**VAPDMD0145**	18.4	60.4	60	0.4	3	★
1.50	**VAPDMD0150**	18.5	60.5	60	0.5	3	●
1.55	**VAPDMD0155**	20.5	60.5	60	0.5	3	★
1.60	**VAPDMD0160**	20.5	60.5	60	0.5	3	★
1.65	**VAPDMD0165**	20.5	60.5	60	0.5	3	★
1.70	**VAPDMD0170**	20.5	60.5	60	0.5	3	★
1.75	**VAPDMD0175**	20.5	60.5	60	0.5	3	★
1.80	**VAPDMD0180**	22.5	60.5	60	0.5	3	★
1.85	**VAPDMD0185**	22.6	60.6	60	0.6	3	★
1.90	**VAPDMD0190**	22.6	60.6	60	0.6	3	★
1.95	**VAPDMD0195**	23.6	60.6	60	0.6	3	★
2.00	**VAPDMD0200**	23.4	70.4	70	0.4	3	●
2.05	**VAPDMD0205**	23.4	70.4	70	0.4	3	★
2.10	**VAPDMD0210**	23.4	70.4	70	0.4	3	★

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
2.15	**VAPDMD0215**	23.5	70.5	70	0.5	3	★
2.20	**VAPDMD0220**	26.5	70.5	70	0.5	3	★
2.25	**VAPDMD0225**	26.5	70.5	70	0.5	3	★
2.30	**VAPDMD0230**	26.5	70.5	70	0.5	3	★
2.35	**VAPDMD0235**	26.5	70.5	70	0.5	3	★
2.40	**VAPDMD0240**	29.5	70.5	70	0.5	3	★
2.45	**VAPDMD0245**	29.5	70.5	70	0.5	3	★
2.50	**VAPDMD0250**	29.5	70.5	70	0.5	3	●
2.55	**VAPDMD0255**	29.5	70.5	70	0.5	3	★
2.60	**VAPDMD0260**	29.5	70.5	70	0.5	3	★
2.65	**VAPDMD0265**	29.6	70.6	70	0.6	3	★
2.70	**VAPDMD0270**	32.6	70.6	70	0.6	3	★
2.75	**VAPDMD0275**	32.6	70.6	70	0.6	3	★
2.80	**VAPDMD0280**	32.6	70.6	70	0.6	3	★
2.85	**VAPDMD0285**	32.6	70.6	70	0.6	3	★
2.90	**VAPDMD0290**	32.6	70.6	70	0.6	3	★
2.95	**VAPDMD0295**	32.6	70.6	70	0.6	3	★
3.00	**VAPDMD0300**	32.6	70.6	70	0.6	3	●
3.05	**VAPDMD0305**	35.6	85.6	85	0.6	4	★
3.10	**VAPDMD0310**	35.6	85.6	85	0.6	4	★
3.15	**VAPDMD0315**	35.7	85.7	85	0.7	4	★
3.20	**VAPDMD0320**	35.7	85.7	85	0.7	4	★
3.25	**VAPDMD0325**	35.7	85.7	85	0.7	4	★
3.30	**VAPDMD0330**	35.7	85.7	85	0.7	4	★
3.35	**VAPDMD0335**	35.7	85.7	85	0.7	4	★
3.40	**VAPDMD0340**	38.7	85.7	85	0.7	4	★
3.45	**VAPDMD0345**	38.7	85.7	85	0.7	4	★
3.50	**VAPDMD0350**	38.7	85.7	85	0.7	4	●
3.55	**VAPDMD0355**	38.7	85.7	85	0.7	4	★
3.60	**VAPDMD0360**	38.8	85.8	85	0.8	4	★
3.65	**VAPDMD0365**	38.8	85.8	85	0.8	4	★
3.70	**VAPDMD0370**	38.8	85.8	85	0.8	4	★
3.75	**VAPDMD0375**	42.8	85.8	85	0.8	4	★

● : Inventory maintained.　★ : Inventory maintained in Japan.

CUTTING CONDITIONS ➤ M180
TECHNICAL DATA ➤ P001

VAPDM

Medium, High precision

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
3.80	**VAPDMD0380**	42.8	85.8	85	0.8	4	★
3.85	**VAPDMD0385**	42.8	85.8	85	0.8	4	★
3.90	**VAPDMD0390**	42.8	85.8	85	0.8	4	★
3.95	**VAPDMD0395**	42.8	85.8	85	0.8	4	★
4.00	**VAPDMD0400**	42.8	85.8	85	0.8	4	●
4.05	**VAPDMD0405**	42.8	100.8	100	0.8	6	★
4.10	**VAPDMD0410**	42.9	100.9	100	0.9	6	★
4.15	**VAPDMD0415**	42.9	100.9	100	0.9	6	★
4.20	**VAPDMD0420**	42.9	100.9	100	0.9	6	★
4.25	**VAPDMD0425**	46.9	100.9	100	0.9	6	★
4.30	**VAPDMD0430**	46.9	100.9	100	0.9	6	★
4.35	**VAPDMD0435**	46.9	100.9	100	0.9	6	★
4.40	**VAPDMD0440**	46.9	100.9	100	0.9	6	★
4.45	**VAPDMD0445**	46.9	100.9	100	0.9	6	★
4.50	**VAPDMD0450**	46.9	100.9	100	0.9	6	●
4.55	**VAPDMD0455**	46.9	100.9	100	0.9	6	★
4.60	**VAPDMD0460**	47.0	101.0	100	1.0	6	★
4.65	**VAPDMD0465**	47.0	101.0	100	1.0	6	★
4.70	**VAPDMD0470**	47.0	101.0	100	1.0	6	★
4.75	**VAPDMD0475**	47.0	101.0	100	1.0	6	★
4.80	**VAPDMD0480**	52.0	101.0	100	1.0	6	★
4.85	**VAPDMD0485**	52.0	101.0	100	1.0	6	★
4.90	**VAPDMD0490**	52.0	101.0	100	1.0	6	★
4.95	**VAPDMD0495**	52.0	101.0	100	1.0	6	★
5.00	**VAPDMD0500**	52.0	101.0	100	1.0	6	●
5.05	**VAPDMD0505**	52.1	101.1	100	1.1	6	★
5.10	**VAPDMD0510**	52.1	101.1	100	1.1	6	★
5.15	**VAPDMD0515**	52.1	101.1	100	1.1	6	★
5.20	**VAPDMD0520**	52.1	101.1	100	1.1	6	★
5.25	**VAPDMD0525**	52.1	101.1	100	1.1	6	★
5.30	**VAPDMD0530**	52.1	101.1	100	1.1	6	★
5.35	**VAPDMD0535**	57.1	107.1	106	1.1	6	★
5.40	**VAPDMD0540**	57.1	107.1	106	1.1	6	★
5.45	**VAPDMD0545**	57.1	107.1	106	1.1	6	★
5.50	**VAPDMD0550**	57.1	107.1	106	1.1	6	●
5.55	**VAPDMD0555**	57.2	107.2	106	1.2	6	★
5.60	**VAPDMD0560**	57.2	107.2	106	1.2	6	★
5.65	**VAPDMD0565**	57.2	107.2	106	1.2	6	★
5.70	**VAPDMD0570**	57.2	107.2	106	1.2	6	★
5.75	**VAPDMD0575**	57.2	107.2	106	1.2	6	★
5.80	**VAPDMD0580**	57.2	107.2	106	1.2	6	★
5.85	**VAPDMD0585**	57.2	107.2	106	1.2	6	★
5.90	**VAPDMD0590**	57.2	107.2	106	1.2	6	★
5.95	**VAPDMD0595**	57.2	107.2	106	1.2	6	★
6.00	**VAPDMD0600**	57.2	107.2	106	1.2	6	●
6.05	**VAPDMD0605**	63.3	113.3	112	1.3	8	★
6.10	**VAPDMD0610**	63.3	113.3	112	1.3	8	★
6.15	**VAPDMD0615**	63.3	113.3	112	1.3	8	★
6.20	**VAPDMD0620**	63.3	113.3	112	1.3	8	★
6.25	**VAPDMD0625**	63.3	113.3	112	1.3	8	★
6.30	**VAPDMD0630**	63.3	113.3	112	1.3	8	★
6.35	**VAPDMD0635**	63.3	113.3	112	1.3	8	★
6.40	**VAPDMD0640**	63.3	113.3	112	1.3	8	★
6.45	**VAPDMD0645**	63.3	113.3	112	1.3	8	★
6.50	**VAPDMD0650**	63.4	113.4	112	1.4	8	●
6.55	**VAPDMD0655**	63.4	113.4	112	1.4	8	★
6.60	**VAPDMD0660**	63.4	113.4	112	1.4	8	★
6.65	**VAPDMD0665**	63.4	113.4	112	1.4	8	★
6.70	**VAPDMD0670**	63.4	113.4	112	1.4	8	★
6.75	**VAPDMD0675**	68.4	118.4	117	1.4	8	★
6.80	**VAPDMD0680**	68.4	118.4	117	1.4	8	★
6.85	**VAPDMD0685**	68.4	118.4	117	1.4	8	★
6.90	**VAPDMD0690**	68.4	118.4	117	1.4	8	★
6.95	**VAPDMD0695**	68.4	118.4	117	1.4	8	★
7.00	**VAPDMD0700**	68.5	118.5	117	1.5	8	●
7.05	**VAPDMD0705**	68.5	118.5	117	1.5	8	★
7.10	**VAPDMD0710**	68.5	118.5	117	1.5	8	★
7.15	**VAPDMD0715**	68.5	118.5	117	1.5	8	★
7.20	**VAPDMD0720**	68.5	118.5	117	1.5	8	★
7.25	**VAPDMD0725**	68.5	118.5	117	1.5	8	★
7.30	**VAPDMD0730**	68.5	118.5	117	1.5	8	★
7.35	**VAPDMD0735**	68.5	118.5	117	1.5	8	★
7.40	**VAPDMD0740**	68.5	118.5	117	1.5	8	★
7.45	**VAPDMD0745**	68.5	118.5	117	1.5	8	★
7.50	**VAPDMD0750**	68.6	118.6	117	1.6	8	●
7.55	**VAPDMD0755**	74.6	124.6	123	1.6	8	★
7.60	**VAPDMD0760**	74.6	124.6	123	1.6	8	★
7.65	**VAPDMD0765**	74.6	124.6	123	1.6	8	★
7.70	**VAPDMD0770**	74.6	124.6	123	1.6	8	★
7.75	**VAPDMD0775**	74.6	124.6	123	1.6	8	★
7.80	**VAPDMD0780**	74.6	124.6	123	1.6	8	★
7.85	**VAPDMD0785**	74.6	124.6	123	1.6	8	★
7.90	**VAPDMD0790**	74.6	124.6	123	1.6	8	★
7.95	**VAPDMD0795**	74.7	124.7	123	1.7	8	★
8.00	**VAPDMD0800**	74.7	124.7	123	1.7	8	●
8.05	**VAPDMD0805**	74.7	129.7	128	1.7	10	★
8.10	**VAPDMD0810**	74.7	129.7	128	1.7	10	★
8.15	**VAPDMD0815**	74.7	129.7	128	1.7	10	★
8.20	**VAPDMD0820**	74.7	129.7	128	1.7	10	★
8.25	**VAPDMD0825**	74.7	129.7	128	1.7	10	★
8.30	**VAPDMD0830**	74.7	129.7	128	1.7	10	★
8.35	**VAPDMD0835**	74.7	129.7	128	1.7	10	★
8.40	**VAPDMD0840**	74.7	129.7	128	1.7	10	★
8.45	**VAPDMD0845**	74.8	129.8	128	1.8	10	★
8.50	**VAPDMD0850**	74.8	129.8	128	1.8	10	●
8.55	**VAPDMD0855**	80.8	135.8	134	1.8	10	★
8.60	**VAPDMD0860**	80.8	135.8	134	1.8	10	★
8.65	**VAPDMD0865**	80.8	135.8	134	1.8	10	★
8.70	**VAPDMD0870**	80.8	135.8	134	1.8	10	★
8.75	**VAPDMD0875**	80.8	135.8	134	1.8	10	★

● : Inventory maintained. ★ : Inventory maintained in Japan.

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
8.80	**VAPDMD0880**	80.8	135.8	134	1.8	10	★
8.85	**VAPDMD0885**	80.8	135.8	134	1.8	10	★
8.90	**VAPDMD0890**	80.8	135.8	134	1.8	10	★
8.95	**VAPDMD0895**	80.9	135.9	134	1.9	10	★
9.00	**VAPDMD0900**	80.9	135.9	134	1.9	10	●
9.10	**VAPDMD0910**	80.9	135.9	134	1.9	10	★
9.20	**VAPDMD0920**	80.9	135.9	134	1.9	10	★
9.30	**VAPDMD0930**	80.9	135.9	134	1.9	10	★
9.40	**VAPDMD0940**	81.0	136.0	134	2.0	10	★
9.50	**VAPDMD0950**	81.0	136.0	134	2.0	10	●
9.60	**VAPDMD0960**	87.0	142.0	140	2.0	10	★
9.70	**VAPDMD0970**	87.0	142.0	140	2.0	10	★
9.80	**VAPDMD0980**	87.0	142.0	140	2.0	10	★
9.90	**VAPDMD0990**	87.1	142.1	140	2.1	10	★
10.00	**VAPDMD1000**	87.1	142.1	140	2.1	10	●
10.10	**VAPDMD1010**	87.1	147.1	145	2.1	12	★
10.20	**VAPDMD1020**	87.1	147.1	145	2.1	12	★
10.30	**VAPDMD1030**	87.1	147.1	145	2.1	12	★
10.40	**VAPDMD1040**	87.2	147.2	145	2.2	12	★
10.50	**VAPDMD1050**	87.2	147.2	145	2.2	12	●
10.60	**VAPDMD1060**	87.2	147.2	145	2.2	12	★
10.70	**VAPDMD1070**	94.2	154.2	152	2.2	12	★
10.80	**VAPDMD1080**	94.2	154.2	152	2.2	12	★
10.90	**VAPDMD1090**	94.3	154.3	152	2.3	12	★
11.00	**VAPDMD1100**	94.3	154.3	152	2.3	12	●
11.10	**VAPDMD1110**	94.3	154.3	152	2.3	12	★
11.20	**VAPDMD1120**	94.3	154.3	152	2.3	12	★
11.30	**VAPDMD1130**	94.3	154.3	152	2.3	12	★
11.40	**VAPDMD1140**	94.4	154.4	152	2.4	12	★
11.50	**VAPDMD1150**	94.4	154.4	152	2.4	12	●
11.60	**VAPDMD1160**	94.4	154.4	152	2.4	12	★
11.70	**VAPDMD1170**	94.4	154.4	152	2.4	12	★
11.80	**VAPDMD1180**	94.4	154.4	152	2.4	12	★
11.90	**VAPDMD1190**	101.5	161.5	159	2.5	12	★
12.00	**VAPDMD1200**	101.5	161.5	159	2.5	12	●
12.10	**VAPDMD1210**	101.5	161.5	159	2.5	12	★
12.20	**VAPDMD1220**	101.5	161.5	159	2.5	12	★
12.30	**VAPDMD1230**	101.6	161.6	159	2.6	12	★
12.40	**VAPDMD1240**	101.6	161.6	159	2.6	12	★
12.50	**VAPDMD1250**	101.6	161.6	159	2.6	12	●
12.60	**VAPDMD1260**	101.6	161.6	159	2.6	12	★
12.70	**VAPDMD1270**	101.6	161.6	159	2.6	12	★
12.80	**VAPDMD1280**	101.7	161.7	159	2.7	12	★
12.90	**VAPDMD1290**	101.7	161.7	159	2.7	12	★
13.00	**VAPDMD1300**	101.7	161.7	159	2.7	12	●
13.50	**VAPDMD1350**	102.8	162.8	160	2.8	16	●
14.00	**VAPDMD1400**	102.9	162.9	160	2.9	16	●
14.10	**VAPDMD1410**	107.9	167.9	165	2.9	16	★
14.20	**VAPDMD1420**	107.9	167.9	165	2.9	16	★
14.50	**VAPDMD1450**	108.0	168.0	165	3.0	16	●
15.00	**VAPDMD1500**	108.1	168.1	165	3.1	16	●
15.50	**VAPDMD1550**	113.2	173.2	170	3.2	16	★
15.60	**VAPDMD1560**	113.2	173.2	170	3.2	16	★
15.70	**VAPDMD1570**	113.3	173.3	170	3.3	16	★
16.00	**VAPDMD1600**	113.3	173.3	170	3.3	16	●
16.50	**VAPDMD1650**	113.4	178.4	175	3.4	20	●
17.00	**VAPDMD1700**	113.5	178.5	175	3.5	20	●
17.50	**VAPDMD1750**	118.6	183.6	180	3.6	20	●
17.60	**VAPDMD1760**	118.7	183.7	180	3.7	20	★
17.70	**VAPDMD1770**	118.7	183.7	180	3.7	20	★
18.00	**VAPDMD1800**	118.7	183.7	180	3.7	20	●
18.50	**VAPDMD1850**	123.8	188.8	185	3.8	20	★
19.00	**VAPDMD1900**	123.9	188.9	185	3.9	20	★
19.50	**VAPDMD1950**	124.0	189.0	185	4.0	20	★
19.60	**VAPDMD1960**	124.1	189.1	185	4.1	20	★
19.70	**VAPDMD1970**	124.1	189.1	185	4.1	20	★
20.00	**VAPDMD2000**	124.1	189.1	185	4.1	20	★
20.50	**VAPDMD2050**	129.3	204.3	200	4.3	25	●
21.00	**VAPDMD2100**	129.4	204.4	200	4.4	25	●
21.10	**VAPDMD2110**	129.4	204.4	200	4.4	25	★
21.20	**VAPDMD2120**	129.4	204.4	200	4.4	25	★
21.50	**VAPDMD2150**	129.5	204.5	200	4.5	25	★
22.00	**VAPDMD2200**	129.6	204.6	200	4.6	25	●
22.50	**VAPDMD2250**	134.7	209.7	205	4.7	25	★
23.00	**VAPDMD2300**	134.8	209.8	205	4.8	25	●
23.50	**VAPDMD2350**	134.9	209.9	205	4.9	25	★
24.00	**VAPDMD2400**	140.0	215.0	210	5.0	25	★
24.50	**VAPDMD2450**	140.1	215.1	210	5.1	25	★
25.00	**VAPDMD2500**	140.2	215.2	210	5.2	25	★
25.50	**VAPDMD2550**	145.3	225.3	220	5.3	32	●
26.00	**VAPDMD2600**	145.4	225.4	220	5.4	32	★
26.50	**VAPDMD2650**	145.5	225.5	220	5.5	32	★
27.00	**VAPDMD2700**	145.6	225.6	220	5.6	32	★
28.00	**VAPDMD2800**	145.8	225.8	220	5.8	32	★
29.00	**VAPDMD2900**	151.0	231.0	225	6.0	32	★
30.00	**VAPDMD3000**	151.2	231.2	225	6.2	32	★
31.00	**VAPDMD3100**	156.4	236.4	230	6.4	32	★
32.00	**VAPDMD3200**	161.6	241.6	235	6.6	32	★

VAPDM

Medium, High precision

RECOMMENDED CUTTING CONDITIONS (Standard drilling depth : 5 times or below the drill diameter)

Material	P		P	K	P	M	P	M
	Structural steel		Carbon steel Ck55 Alloy steel Cast iron		Alloy tool steel X210Cr12 (Low-hardness materials) Ferritic stainless steel X10CrAl18, X10CrAl13 Martensitic stainless steel X20Cr13, X10CrAl13		Alloy tool steel X40CrMoV51 (—40HRC) Precipitation hardening stainless steel X7CrNiAl177	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	17000	0.01	12800	0.01	8000	0.01	6600	0.01
1.0	11000	0.05	8300	0.05	5000	0.05	4100	0.04
2.0	6400	0.09	4800	0.09	2900	0.06	2400	0.05
3.0	4300	0.13	3200	0.13	1900	0.10	1600	0.06
4.0	3200	0.15	2400	0.15	1400	0.10	1200	0.08
5.0	2600	0.18	1900	0.18	1100	0.13	950	0.10
6.0	2100	0.19	1600	0.20	950	0.15	800	0.11
8.0	1600	0.24	1200	0.22	720	0.18	600	0.13
10.0	1300	0.28	950	0.25	570	0.21	480	0.15
12.0	1100	0.34	800	0.30	480	0.25	400	0.17
14.0	910	0.39	680	0.35	410	0.30	340	0.21
15.0	850	0.40	640	0.36	380	0.31	320	0.22
16.0	800	0.42	600	0.38	360	0.32	300	0.23
18.0	710	0.44	530	0.40	320	0.34	270	0.24
20.0	570	0.44	450	0.40	250	0.34	220	0.24
22.0	520	0.46	410	0.42	230	0.36	200	0.25
24.0	480	0.48	370	0.44	210	0.37	190	0.26
26.0	440	0.51	340	0.46	200	0.39	170	0.28
28.0	410	0.53	320	0.48	180	0.41	160	0.29
30.0	380	0.55	300	0.50	170	0.43	150	0.30
32.0	360	0.55	280	0.50	160	0.43	140	0.30

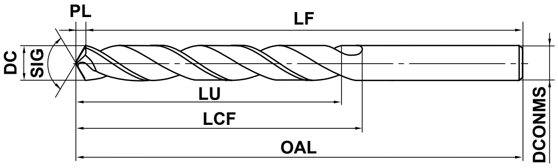
Note 1) Please reduce the revolution and feed rate when the workpiece clamping lacks rigidity or the machine has limitations.
Note 2) Please use a collet type drill chuck or a milling chuck.
Note 3) Use sufficient cutting fluid.
Note 4) When drilling holes greater than 4 x drill diameter hole depths, please use a peck feed.
Note 5) The above-mentioned cutting conditions are standard when using water-soluble cutting fluid.
Please reduce the revolutions when using non-water-soluble cutting fluid.

VSD

Straight shank

HSS V 110° DC<0.7 118° DC≥0.7 X DC<2 XR DC≥2

P M K N S H



∗LU = LCF-2DC

0.5≤DC≤1	1≤DC≤3	3<DC≤6	6<DC≤10	10<DC≤13
0 −0.010	0 −0.014	0 −0.018	0 −0.022	0 −0.027

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
0.5	VSDD0050	6.2	27.2	27	0.18	0.5	★
0.6	VSDD0060	7.2	30.2	30	0.21	0.6	●
0.7	VSDD0070	9.2	32.2	32	0.21	0.7	●
0.8	VSDD0080	10.2	34.2	34	0.24	0.8	●
0.9	VSDD0090	11.3	36.3	36	0.27	0.9	●
1.0	VSDD0100	12.3	40.3	40	0.3	1.0	●
1.1	VSDD0110	14.3	42.3	42	0.3	1.1	●
1.2	VSDD0120	16.4	42.4	42	0.4	1.2	●
1.3	VSDD0130	16.4	45.4	45	0.4	1.3	●
1.4	VSDD0140	18.4	48.4	48	0.4	1.4	●
1.5	VSDD0150	18.5	48.5	48	0.5	1.5	●
1.6	VSDD0160	20.5	50.5	50	0.5	1.6	●
1.7	VSDD0170	20.5	50.5	50	0.5	1.7	★
1.8	VSDD0180	22.5	52.5	52	0.5	1.8	●
1.9	VSDD0190	22.6	52.6	52	0.6	1.9	●
2.0	VSDD0200	23.6	55.6	55	0.6	2.0	●
2.1	VSDD0210	23.6	55.6	55	0.6	2.1	●
2.2	VSDD0220	26.7	58.7	58	0.7	2.2	●
2.3	VSDD0230	26.7	58.7	58	0.7	2.3	★
2.4	VSDD0240	29.7	61.7	61	0.7	2.4	★
2.5	VSDD0250	29.8	61.8	61	0.8	2.5	●
2.6	VSDD0260	29.8	64.8	64	0.8	2.6	★
2.7	VSDD0270	32.8	64.8	64	0.8	2.7	★
2.8	VSDD0280	32.8	67.8	67	0.8	2.8	●
2.9	VSDD0290	32.9	71.9	71	0.9	2.9	★
3.0	VSDD0300	32.9	71.9	71	0.9	3.0	●
3.1	VSDD0310	35.9	71.9	71	0.9	3.1	●
3.2	VSDD0320	36.0	72.0	71	1.0	3.2	●
3.3	VSDD0330	36.0	74.0	73	1.0	3.3	●
3.4	VSDD0340	39.0	74.0	73	1.0	3.4	●
3.5	VSDD0350	39.1	74.1	73	1.1	3.5	●
3.6	VSDD0360	39.1	77.1	76	1.1	3.6	★
3.7	VSDD0370	39.1	77.1	76	1.1	3.7	★
3.8	VSDD0380	43.1	77.1	76	1.1	3.8	★
3.9	VSDD0390	43.2	80.2	79	1.2	3.9	★
4.0	VSDD0400	43.2	84.2	83	1.2	4.0	●
4.1	VSDD0410	43.2	84.2	83	1.2	4.1	●
4.2	VSDD0420	43.3	84.3	83	1.3	4.2	●
4.3	VSDD0430	47.3	84.3	83	1.3	4.3	●
4.4	VSDD0440	47.3	87.3	86	1.3	4.4	★

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
4.5	VSDD0450	47.4	87.4	86	1.4	4.5	●
4.6	VSDD0460	47.4	87.4	86	1.4	4.6	★
4.7	VSDD0470	47.4	90.4	89	1.4	4.7	★
4.8	VSDD0480	52.4	90.4	89	1.4	4.8	●
4.9	VSDD0490	52.5	93.5	92	1.5	4.9	★
5.0	VSDD0500	52.5	93.5	92	1.5	5.0	●
5.1	VSDD0510	52.5	93.5	92	1.5	5.1	●
5.2	VSDD0520	52.6	96.6	95	1.6	5.2	●
5.3	VSDD0530	52.6	96.6	95	1.6	5.3	★
5.4	VSDD0540	57.6	96.6	95	1.6	5.4	★
5.5	VSDD0550	57.7	96.7	95	1.7	5.5	●
5.6	VSDD0560	57.7	99.7	98	1.7	5.6	★
5.7	VSDD0570	57.7	99.7	98	1.7	5.7	★
5.8	VSDD0580	57.7	99.7	98	1.7	5.8	★
5.9	VSDD0590	57.8	99.8	98	1.8	5.9	●
6.0	VSDD0600	57.8	103.8	102	1.8	6.0	●
6.1	VSDD0610	63.8	103.8	102	1.8	6.1	★
6.2	VSDD0620	63.9	103.9	102	1.9	6.2	●
6.3	VSDD0630	63.9	103.9	102	1.9	6.3	●
6.4	VSDD0640	63.9	106.9	105	1.9	6.4	★
6.5	VSDD0650	64.0	107.0	105	2.0	6.5	●
6.6	VSDD0660	64.0	107.0	105	2.0	6.6	★
6.7	VSDD0670	64.0	107.0	105	2.0	6.7	★
6.8	VSDD0680	69.0	107.0	105	2.0	6.8	●
6.9	VSDD0690	69.1	107.1	105	2.1	6.9	★
7.0	VSDD0700	69.1	107.1	105	2.1	7.0	●
7.1	VSDD0710	69.1	110.1	108	2.1	7.1	★
7.2	VSDD0720	69.2	110.2	108	2.2	7.2	★
7.3	VSDD0730	69.2	110.2	108	2.2	7.3	●
7.4	VSDD0740	69.2	113.2	111	2.2	7.4	★
7.5	VSDD0750	69.3	113.3	111	2.3	7.5	★
7.6	VSDD0760	75.3	113.3	111	2.3	7.6	★
7.7	VSDD0770	75.3	116.3	114	2.3	7.7	★
7.8	VSDD0780	75.3	116.3	114	2.3	7.8	★
7.9	VSDD0790	75.4	116.4	114	2.4	7.9	●
8.0	VSDD0800	75.4	116.4	114	2.4	8.0	●
8.1	VSDD0810	75.4	119.4	117	2.4	8.1	★
8.2	VSDD0820	75.5	119.5	117	2.5	8.2	★
8.3	VSDD0830	75.5	119.5	117	2.5	8.3	★
8.4	VSDD0840	75.5	123.5	121	2.5	8.4	★

Note 1) Less than Ø5-Ø1.9mm : 5 pcs/case, More than Ø2mm : 1 pcs/case.

● : Inventory maintained. ★ : Inventory maintained in Japan.

CUTTING CONDITIONS ➤ M182
TECHNICAL DATA ➤ P001

VSD

Straight shank

DC (mm)	Order Number	Dimensions (mm)					Stock
		LCF	OAL	LF	PL	DCONMS	
8.5	**VSDD0850**	75.6	123.6	121	2.6	8.5	●
8.6	**VSDD0860**	81.6	123.6	121	2.6	8.6	●
8.7	**VSDD0870**	81.6	123.6	121	2.6	8.7	●
8.8	**VSDD0880**	81.6	126.6	124	2.6	8.8	★
8.9	**VSDD0890**	81.7	126.7	124	2.7	8.9	★
9.0	**VSDD0900**	81.7	126.7	124	2.7	9.0	●
9.1	**VSDD0910**	81.7	126.7	124	2.7	9.1	★
9.2	**VSDD0920**	81.8	129.8	127	2.8	9.2	★
9.3	**VSDD0930**	81.8	129.8	127	2.8	9.3	★
9.4	**VSDD0940**	81.8	129.8	127	2.8	9.4	★
9.5	**VSDD0950**	81.9	129.9	127	2.9	9.5	●
9.6	**VSDD0960**	87.9	132.9	130	2.9	9.6	★
9.7	**VSDD0970**	87.9	132.9	130	2.9	9.7	★
9.8	**VSDD0980**	87.9	132.9	130	2.9	9.8	★
9.9	**VSDD0990**	88.0	133.0	130	3.0	9.9	★
10.0	**VSDD1000**	88.0	133.0	130	3.0	10.0	●
10.1	**VSDD1010**	88.0	136.0	133	3.0	10.1	★
10.2	**VSDD1020**	88.1	136.1	133	3.1	10.2	●
10.3	**VSDD1030**	88.1	136.1	133	3.1	10.3	●
10.4	**VSDD1040**	88.1	136.1	133	3.1	10.4	★
10.5	**VSDD1050**	88.2	140.2	137	3.2	10.5	●
10.6	**VSDD1060**	88.2	140.2	137	3.2	10.6	★
10.7	**VSDD1070**	95.2	140.2	137	3.2	10.7	★
10.8	**VSDD1080**	95.2	143.2	140	3.2	10.8	★
10.9	**VSDD1090**	95.3	143.3	140	3.3	10.9	★
11.0	**VSDD1100**	95.3	143.3	140	3.3	11.0	●
11.1	**VSDD1110**	95.3	143.3	140	3.3	11.1	★
11.2	**VSDD1120**	95.4	146.4	143	3.4	11.2	★
11.3	**VSDD1130**	95.4	146.4	143	3.4	11.3	★
11.4	**VSDD1140**	95.4	146.4	143	3.4	11.4	★
11.5	**VSDD1150**	95.5	146.5	143	3.5	11.5	★
11.6	**VSDD1160**	95.5	149.5	146	3.5	11.6	★
11.7	**VSDD1170**	95.5	149.5	146	3.5	11.7	★
11.8	**VSDD1180**	95.5	149.5	146	3.5	11.8	★
11.9	**VSDD1190**	102.6	149.6	146	3.6	11.9	★
12.0	**VSDD1200**	102.6	152.6	149	3.6	12.0	●
12.1	**VSDD1210**	102.6	152.6	149	3.6	12.1	★
12.2	**VSDD1220**	102.7	152.7	149	3.7	12.2	★
12.3	**VSDD1230**	102.7	152.7	149	3.7	12.3	★
12.4	**VSDD1240**	102.7	155.7	152	3.7	12.4	★
12.5	**VSDD1250**	102.8	155.8	152	3.8	12.5	★
12.6	**VSDD1260**	102.8	155.8	152	3.8	12.6	★
12.7	**VSDD1270**	102.8	155.8	152	3.8	12.7	★
12.8	**VSDD1280**	102.8	155.8	152	3.8	12.8	★
12.9	**VSDD1290**	102.9	155.9	152	3.9	12.9	★
13.0	**VSDD1300**	102.9	155.9	152	3.9	13.0	●

RECOMMENDED CUTTING CONDITIONS

Material	P				M		P	M
	Structural steel		Carbon steel Ck55		Stainless steel X20Cr13		Stainless steel X5CrNi1810 Tool steel X210Cr12 (Low-hardness materials) Heat-treated steel X40CrMoV51 (—40HRC)	
Cutting speed	40m/min		30m/min		20m/min		10—14m/min	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	15000	0.01	11250	0.01	7500	0.01	5620	0.01
1.0	10000	0.02	7500	0.02	5000	0.02	3750	0.02
1.5	8200	0.03	6150	0.03	4100	0.03	2800	0.03
2.0	6370	0.05	4780	0.05	3180	0.05	2200	0.04
3.0	4250	0.10	3180	0.10	2120	0.07	1400	0.06
4.0	3180	0.13	2390	0.13	1590	0.09	1100	0.08
5.0	2550	0.15	1910	0.15	1270	0.11	860	0.10
6.0	2120	0.18	1590	0.18	1060	0.13	720	0.11
7.0	1820	0.20	1360	0.20	910	0.14	610	0.12
8.0	1590	0.22	1190	0.21	800	0.15	540	0.13
9.0	1420	0.24	1060	0.22	710	0.17	480	0.14
10.0	1270	0.26	960	0.23	640	0.18	430	0.15
11.0	1160	0.28	870	0.24	580	0.19	390	0.16
12.0	1060	0.30	800	0.25	530	0.20	360	0.17
13.0	980	0.30	730	0.26	490	0.20	330	0.17

Note 1) Please reduce the revolutions when the workpiece clamping lacks rigidity.

Note 2) The above-mentioned cutting conditions are standard when using water-soluble cutting fluid.
Please reduce the revolutions when using non-water-soluble cutting fluid.

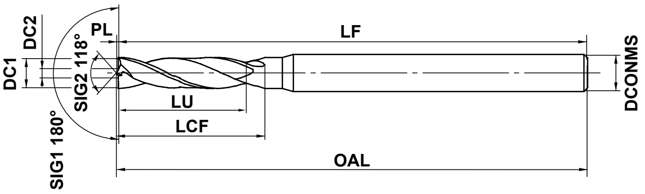
● : Inventory maintained.　★ : Inventory maintained in Japan.

VAPDSCB

Short flute length, High precision, For counter boring

P **M** **K** **N** S H

DC≤3	3<DC≤6	6<DC≤10	10<DC≤18	18<DC≤30	30<DC≤32
0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033	0 −0.039



*LU = LCF-2DC (Max 3×DC)

- Unique geometry offers high efficiency counter boring.
  Excellent chip breaking and flat counter bored surface.

DC1 (mm)	Order Number	Dimensions (mm)						Stock
		DC2	LCF	OAL	LF	PL	DCONMS	
2.0	**VAPDSCBD0200**	0.7	12	60.2	60	0.2	3	★
2.1	**VAPDSCBD0210**	0.7	12	60.2	60	0.2	3	★
2.2	**VAPDSCBD0220**	0.7	12	60.2	60	0.2	3	★
2.3	**VAPDSCBD0230**	0.7	13	60.2	60	0.2	3	★
2.4	**VAPDSCBD0240**	0.7	13	60.2	60	0.2	3	★
2.5	**VAPDSCBD0250**	0.7	13	60.2	60	0.2	3	★
2.6	**VAPDSCBD0260**	0.8	15	60.2	60	0.2	3	★
2.7	**VAPDSCBD0270**	0.8	15	60.2	60	0.2	3	★
2.8	**VAPDSCBD0280**	0.8	15	60.2	60	0.2	3	★
2.9	**VAPDSCBD0290**	0.8	15	60.2	60	0.2	3	★
3.0	**VAPDSCBD0300**	0.8	15	60.2	60	0.2	3	★
3.1	**VAPDSCBD0310**	0.8	17	70.2	70	0.2	4	★
3.2	**VAPDSCBD0320**	0.8	17	70.2	70	0.2	4	★
3.3	**VAPDSCBD0330**	0.8	19	70.2	70	0.2	4	★
3.4	**VAPDSCBD0340**	0.8	19	70.2	70	0.2	4	★
3.5	**VAPDSCBD0350**	0.8	19	70.2	70	0.2	4	★
3.6	**VAPDSCBD0360**	1.0	21	70.2	70	0.2	4	★
3.7	**VAPDSCBD0370**	1.0	21	70.2	70	0.2	4	★
3.8	**VAPDSCBD0380**	1.0	21	70.2	70	0.2	4	★
3.9	**VAPDSCBD0390**	1.0	21	70.2	70	0.2	4	★
4.0	**VAPDSCBD0400**	1.0	21	70.3	70	0.3	4	★
4.1	**VAPDSCBD0410**	1.0	21	80.3	80	0.3	6	★
4.2	**VAPDSCBD0420**	1.0	21	80.3	80	0.3	6	★
4.3	**VAPDSCBD0430**	1.0	23	80.3	80	0.3	6	★
4.4	**VAPDSCBD0440**	1.0	23	80.3	80	0.3	6	★
4.5	**VAPDSCBD0450**	1.0	23	80.3	80	0.3	6	★
4.6	**VAPDSCBD0460**	1.4	25	80.3	80	0.3	6	★
4.7	**VAPDSCBD0470**	1.4	25	80.3	80	0.3	6	★
4.8	**VAPDSCBD0480**	1.4	25	80.3	80	0.3	6	★
4.9	**VAPDSCBD0490**	1.4	25	80.3	80	0.3	6	★
5.0	**VAPDSCBD0500**	1.4	25	80.4	80	0.4	6	★
5.1	**VAPDSCBD0510**	1.4	25	80.4	80	0.4	6	★
5.2	**VAPDSCBD0520**	1.4	25	80.4	80	0.4	6	★
5.3	**VAPDSCBD0530**	1.4	25	80.4	80	0.4	6	★
5.4	**VAPDSCBD0540**	1.4	27	80.4	80	0.4	6	★
5.5	**VAPDSCBD0550**	1.4	27	80.4	80	0.4	6	★
5.6	**VAPDSCBD0560**	1.4	27	80.4	80	0.4	6	★
5.7	**VAPDSCBD0570**	1.4	27	80.4	80	0.4	6	★
5.8	**VAPDSCBD0580**	1.4	27	80.4	80	0.4	6	★
5.9	**VAPDSCBD0590**	1.4	27	80.4	80	0.4	6	★
6.0	**VAPDSCBD0600**	1.4	27	80.4	80	0.4	6	★
6.1	**VAPDSCBD0610**	1.4	30	80.4	80	0.4	8	★
6.2	**VAPDSCBD0620**	1.4	30	80.4	80	0.4	8	★
6.3	**VAPDSCBD0630**	1.4	30	80.4	80	0.4	8	★
6.4	**VAPDSCBD0640**	1.4	30	80.4	80	0.4	8	★
6.5	**VAPDSCBD0650**	1.4	30	80.4	80	0.4	8	★
6.6	**VAPDSCBD0660**	1.8	30	80.4	80	0.4	8	★
6.7	**VAPDSCBD0670**	1.8	30	80.4	80	0.4	8	★
6.8	**VAPDSCBD0680**	1.8	32	80.4	80	0.4	8	★
6.9	**VAPDSCBD0690**	1.8	32	80.4	80	0.4	8	★
7.0	**VAPDSCBD0700**	1.8	32	80.6	80	0.6	8	★
7.1	**VAPDSCBD0710**	1.8	32	80.6	80	0.6	8	★
7.2	**VAPDSCBD0720**	1.8	32	80.6	80	0.6	8	★
7.3	**VAPDSCBD0730**	1.8	32	80.6	80	0.6	8	★
7.4	**VAPDSCBD0740**	1.8	32	80.6	80	0.6	8	★
7.5	**VAPDSCBD0750**	1.8	32	80.6	80	0.6	8	★
7.6	**VAPDSCBD0760**	2.0	35	85.6	85	0.6	8	★
7.7	**VAPDSCBD0770**	2.0	35	85.6	85	0.6	8	★
7.8	**VAPDSCBD0780**	2.0	35	85.6	85	0.6	8	★
7.9	**VAPDSCBD0790**	2.0	35	85.6	85	0.6	8	★
8.0	**VAPDSCBD0800**	2.0	35	85.6	85	0.6	8	★
8.1	**VAPDSCBD0810**	2.0	35	90.6	90	0.6	10	★
8.5	**VAPDSCBD0850**	2.0	35	90.6	90	0.6	10	★
8.6	**VAPDSCBD0860**	2.8	38	93.6	93	0.6	10	★
8.8	**VAPDSCBD0880**	2.8	38	93.6	93	0.6	10	★
9.0	**VAPDSCBD0900**	2.8	38	93.8	93	0.8	10	★
9.1	**VAPDSCBD0910**	2.8	38	93.8	93	0.8	10	★
9.5	**VAPDSCBD0950**	2.8	38	93.8	93	0.8	10	★
9.6	**VAPDSCBD0960**	3.2	41	96.8	96	0.8	10	★
9.8	**VAPDSCBD0980**	3.2	41	96.8	96	0.8	10	★
10.0	**VAPDSCBD1000**	3.2	41	96.9	96	0.9	10	★
10.1	**VAPDSCBD1010**	3.2	41	101.9	101	0.9	12	★
10.3	**VAPDSCBD1030**	3.2	41	101.9	101	0.9	12	★
10.5	**VAPDSCBD1050**	3.2	41	101.9	101	0.9	12	★
10.8	**VAPDSCBD1080**	3.7	45	105.9	105	0.9	12	★
11.0	**VAPDSCBD1100**	3.7	45	105.9	105	0.9	12	★
11.1	**VAPDSCBD1110**	3.7	45	105.9	105	0.9	12	★
11.5	**VAPDSCBD1150**	3.7	45	105.9	105	0.9	12	★
11.8	**VAPDSCBD1180**	3.7	45	105.9	105	0.9	12	★
12.0	**VAPDSCBD1200**	3.7	49	109.9	109	0.9	12	★

CUTTING CONDITIONS ➤ M185
TECHNICAL DATA ➤ P001

VAPDSCB

Short flute length, High precision, For counter boring

DC1 (mm)	Order Number	Dimensions (mm)						Stock
		DC2	LCF	OAL	LF	PL	DCONMS	
12.5	VAPDSCBD1250	3.7	49	109.9	109	0.9	12	★
13.0	VAPDSCBD1300	4.2	49	110.1	109	1.1	12	★
13.5	VAPDSCBD1350	4.2	51	122.1	121	1.1	16	★
13.8	VAPDSCBD1380	4.2	51	122.1	121	1.1	16	★
14.0	VAPDSCBD1400	4.2	51	122.1	121	1.1	16	★
14.1	VAPDSCBD1410	5.5	58	124.1	123	1.1	16	★
14.2	VAPDSCBD1420	5.5	58	124.1	123	1.1	16	★
14.5	VAPDSCBD1450	5.5	58	124.1	123	1.1	16	★
14.8	VAPDSCBD1480	5.5	58	124.1	123	1.1	16	★
15.0	VAPDSCBD1500	5.5	58	124.3	123	1.3	16	★
15.5	VAPDSCBD1550	5.5	60	126.3	125	1.3	16	★
15.7	VAPDSCBD1570	5.5	60	126.3	125	1.3	16	★
15.8	VAPDSCBD1580	5.5	60	126.3	125	1.3	16	★
16.0	VAPDSCBD1600	5.5	60	126.3	125	1.3	16	★
17.0	VAPDSCBD1700	5.5	62	133.3	132	1.3	20	★
17.5	VAPDSCBD1750	5.5	63	134.6	133	1.6	20	★
17.6	VAPDSCBD1760	6.5	63	134.6	133	1.6	20	★
17.7	VAPDSCBD1770	6.5	63	134.6	133	1.6	20	★
17.8	VAPDSCBD1780	6.5	63	134.6	133	1.6	20	★
18.0	VAPDSCBD1800	6.5	63	134.6	133	1.6	20	★
18.1	VAPDSCBD1810	6.5	65	136.6	135	1.6	20	★
19.0	VAPDSCBD1900	6.5	65	136.6	135	1.6	20	★
19.8	VAPDSCBD1980	7.5	67	138.6	137	1.6	20	★
20.0	VAPDSCBD2000	7.5	67	138.8	137	1.8	20	★
20.1	VAPDSCBD2010	7.5	67	138.8	137	1.8	20	★
21.0	VAPDSCBD2100	7.5	75	166.8	165	1.8	25	★
22.0	VAPDSCBD2200	7.5	75	166.8	165	1.8	25	★
23.0	VAPDSCBD2300	7.5	80	171.8	170	1.8	25	★
24.0	VAPDSCBD2400	8.5	80	172.2	170	2.2	25	★
25.0	VAPDSCBD2500	8.5	85	182.2	180	2.2	25	★
26.0	VAPDSCBD2600	9.0	85	182.2	180	2.2	32	★
27.0	VAPDSCBD2700	9.0	95	192.2	190	2.2	32	★
28.0	VAPDSCBD2800	10.0	95	192.6	190	2.6	32	★
29.0	VAPDSCBD2900	10.0	100	197.6	195	2.6	32	★
30.0	VAPDSCBD3000	11.0	100	197.6	195	2.6	32	★
31.0	VAPDSCBD3100	11.0	105	202.6	200	2.6	32	★
32.0	VAPDSCBD3200	13.0	105	202.6	200	2.6	32	★

★ : Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

Material	P	N	P	K	P	M	P	M
	Structural steel, Aluminium alloy		Carbon steel Ck55, Alloy steel, Ductile Cast Iron		Alloy tool steel X210Cr12, (Low-hardness materials) Ferritic stainless steel, X10CrAl18, X10CrAl13 Martensitic stainless steel, X20Cr13, X10CrAl13		Alloy tool steel, X40CrMoV51 (−40HRC) Hardening stainless steel, X7CrNiAl177	
Drill Dia. **DC** (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
2.0	5600	0.07	4800	0.07	3200	0.07	2800	0.04
3.0	3700	0.10	3200	0.10	2100	0.10	1900	0.05
4.0	2800	0.12	2400	0.12	1600	0.12	1400	0.06
5.0	2200	0.14	1900	0.14	1300	0.14	1150	0.07
6.0	1850	0.15	1600	0.15	1050	0.15	950	0.08
8.0	1400	0.20	1200	0.20	800	0.20	720	0.10
10.0	1100	0.23	960	0.23	640	0.21	570	0.11
12.0	950	0.26	800	0.26	530	0.24	470	0.12
14.0	800	0.27	680	0.27	450	0.25	410	0.13
16.0	700	0.28	500	0.28	360	0.26	300	0.14
18.0	620	0.29	450	0.29	320	0.27	260	0.15
20.0	560	0.30	400	0.30	290	0.27	240	0.15
22.0	510	0.32	360	0.32	260	0.29	220	0.16
24.0	460	0.33	330	0.33	240	0.30	200	0.16
26.0	430	0.35	310	0.35	220	0.31	180	0.17
28.0	400	0.36	290	0.36	210	0.33	170	0.18
30.0	370	0.37	270	0.37	190	0.34	160	0.18
32.0	350	0.38	250	0.38	180	0.35	150	0.19

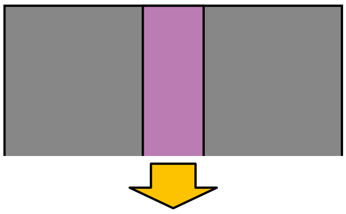
Note 1) The above cutting conditions are for drilling DCx3 hole depths without a pilot hole.
When drilling holes smaller than DCx1 hole depths, it is possible to increase the RPM by 20%.
Note 2) Drilling without a pilot hole is recommended.
If there is a pilot hole, the chips may not be broken. Use a peck feed when chip breaking is necessary.
Note 3) For counter boring of a sloped face, a carbide end mill is recommended.
Note 4) When machining austenitic stainless steels (X5CrNi1810), reduce the revolutions by 30 - 60% and reduce the feed rate by 40 - 60%.
Note 5) Please use a collet type drill chuck.
Note 6) Please reduce the revolution and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
Note 7) Use sufficient cutting fluid.
Note 8) The above-mentioned cutting conditions are a standard when using water-soluble cutting fluid.
Please reduce the revolutions when using non-water-soluble cutting fluid.

RECOMMENDED CUTTING METHOD

■ The VAPDSCB achieves high efficiency machining without chip jamming.

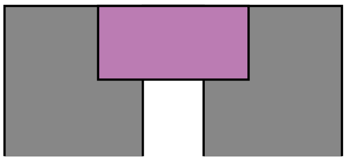
General cutting method

①Bolt hole drilling



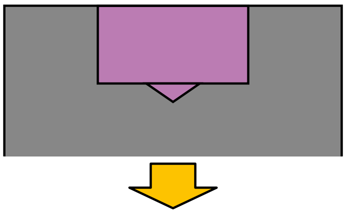
Chip geometry

②Counter boring



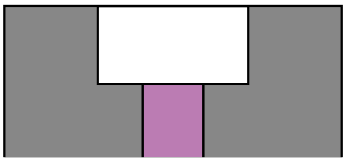
VAPDSCB cutting method

①Counter boring



Chip geometry

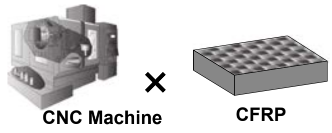
②Bolt hole drilling



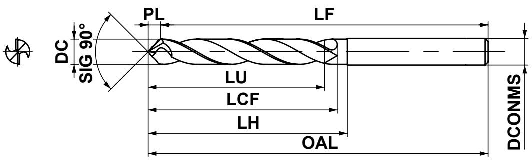
Note 1) When counter boring using the VAPDSCB, drilling with a pilot hole may produce continuous chips that can wrap around the tool.

MCC

P M K N S H **CFRP**



External Coolant



	3<DC≤6	6<DC≤10	10<DC≤18
	0 −0.018	0 −0.022	0 −0.027
	DCONMS=6	6<DCONMS≤10	10<DCONMS≤12
h6	0 −0.008	0 −0.009	0 −0.011

Hole Dia.		Drill Dia.		Hole Depth	Order Number	Grade	Dimensions (mm)						
* AWG	inch	DC (mm)	inch	(L/D)		DD2105	LU	LCF	LH	OAL	LF	PL	DCONMS
—	3/16	4.76	.1875	3	**MCC0476X03S060**	★	16.7	40	40	80	77.6	2.4	6
—	1/4	6.38	.251	3	**MCC0638X03S080**	★	22.3	50	50	90	86.8	3.2	8
—	5/16	7.96	.3125	3	**MCC0796X03S080**	★	27.9	50	50	90	86.0	4.0	8
—	3/8	9.55	.375	3	**MCC0955X03S100**	★	33.5	50	50	100	95.2	4.8	10
—	7/16	11.14	.4375	3	**MCC1114X03S120**	★	39.0	60	60	110	104.4	5.6	12

***AWG** : American Wire Gage

RECOMMENDED CUTTING CONDITIONS

Material		X			
		CFRP			
Drill Dia. **DC** (mm)	Drill Dia. **DC** (inch)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.−Max.) (mm/rev)	Feed rate (mm/min)
4.76	**.1875**	100	6700	0.08 (0.05−0.12)	540
6.38	**.251**	100	5000	0.1 (0.05−0.12)	500
7.96	**.3125**	100	4000	0.1 (0.05−0.12)	400
9.55	**.375**	100	3400	0.1 (0.05−0.12)	340
11.14	**.4375**	100	2900	0.1 (0.05−0.12)	290

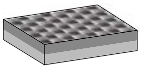
★ : Inventory maintained in Japan. ☐ : Non stock, produced to order only.

MCA

P M K **N** S H **CFRP+Al**

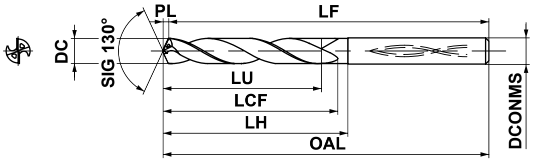
×

CNC Machine



CFRP+Al

Internal Coolant



	6<DC≤10
	0 －0.022
h6	6<DCONMS≤10
	0 －0.009

Hole Dia.		Drill Dia.		Hole Depth	Order Number	Grade	Dimensions (mm)						
AWG*	inch	DC (mm)	inch	(L/D)		DD2110	LU	LCF	LH	OAL	LF	PL	DCONMS
–	1/4	6.38	.251	5	**MCA0638X05S070**	☐	33.4	51	51	91	89.5	1.5	7
–	3/8	9.55	.375	5	**MCA0955X05S100**	☐	50.0	77	77	118	115.8	2.2	10

***AWG** : American Wire Gage

RECOMMENDED CUTTING CONDITIONS

Material		X				N			
		CFRP				Aluminum Alloy (Si<5%) ASTM AlMg1SiCu, ASTM Al-Zn6MgCu etc			
Drill Dia. **DC** (mm)	Drill Dia. **DC** (inch)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.–Max.) (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.–Max.) (mm/rev)	Feed rate (mm/min)
6.38	**.251**	100	5000	0.15 (0.10–0.20)	750	100	5000	0.03 (0.02–0.04)	150
9.55	**.375**	100	3400	0.15 (0.10–0.20)	680	100	3400	0.03 (0.02–0.04)	100

Note 1) We recommend to adjust cutting conditions for each material.

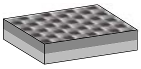
TECHNICAL DATA ➤ P001

MCT

P M K N **S** H **CFRP+Ti**

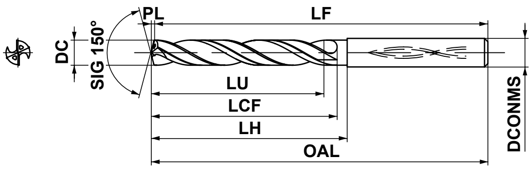
CNC Machine

×



CFRP+Ti

Internal Coolant



6<DC≤10	0 −0.022
6<DCONMS≤10	0 −0.009

Hole Dia.		Drill Dia.		Hole Depth	Order Number	Grade	Dimensions (mm)						
AWG*	inch	DC (mm)	inch	(L/D)		TF15	LU	LCF	LH	OAL	LF	PL	DCONMS
–	1/4	6.38	.251	5	**MCT0638X05S070**	☐	32.8	47	47	96	95.1	0.9	7
–	3/8	9.55	.375	5	**MCT0955X05S100**	☐	49.1	71	71	122	120.7	1.3	10

***AWG** : American Wire Gage

RECOMMENDED CUTTING CONDITIONS

Material		X				S				
		CFRP				Titanium Alloy Ti-6Al-4V etc.				
Drill Dia. **DC** (mm)	Drill Dia. **DC** (inch)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)	Feed rate (mm/min)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)	Feed rate (mm/min)	Peck machining (mm)
6.38	**.251**	100	5000	0.15 (0.10—0.20)	750	15	750	0.02 (0.01—0.03)	15	1
9.55	**.375**	100	3400	0.15 (0.10—0.20)	680	15	500	0.02 (0.01—0.03)	10	1

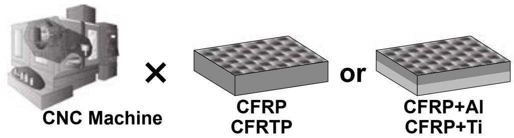
Note 1) This condition is for when internal air or mist is used.
Note 2) We recommend to adjust cutting conditions for each material.

☐ : Non stock, produced to order only.

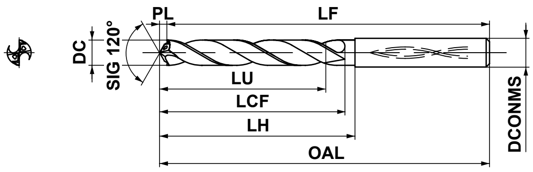
MCW

UWC DD 120° X

P M K **N** **S** H CFRP CFRTP CFRP+Al CFRP+Ti



Internal Coolant



6<DC≤10	0 −0.022
6<DCONMS≤10	0 −0.009

Hole Dia.		Drill Dia.		Hole Depth	Order Number	Grade		Dimensions (mm)						
AWG*	inch	DC (mm)	inch	(L/D)		HTi10	DD2110	LU	LCF	LH	OAL	LF	PL	DCONMS
—	1/4	6.38	.251	5	**MCW0638X05S070**	□	□	33.7	52	52	92	90.2	1.8	7
—	3/8	9.55	.375	5	**MCW0955X05S100**	□	□	50.6	73	73	119	116.2	2.8	10

***AWG** : American Wire Gage

RECOMMENDED CUTTING CONDITIONS

Material		X			
		CFRP			
Drill Dia. **DC** (mm)	Drill Dia. **DC** (inch)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)	Feed rate (mm/min)
6.38	**.251**	100	5000	0.15 (0.10—0.20)	750
9.55	**.375**	100	3400	0.15 (0.10—0.20)	680

Material		N					S				
		Aluminium Alloy (Si<5%) AlMg1SiCu, Al-Zn6MgCu etc.					Titanium Alloy Ti-6Al-4V etc.				
Drill Dia. **DC** (mm)	Drill Dia. **DC** (inch)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)	Feed rate (mm/min)	Peck machining (mm)	Cutting speed (m/min)	Revolution (min^{-1})	Feed (Min.—Max.) (mm/rev)	Feed rate (mm/min)	Peck machining (mm)
6.38	**.251**	100	5000	0.15 (0.10—0.20)	750	3	15	750	0.02 (0.01—0.03)	15	1
9.55	**.375**	100	3400	0.15 (0.10—0.20)	500	3	15	500	0.02 (0.01—0.03)	10	1

Note 1) This condition is for when internal air or mist is used.
Note 2) We recommend to adjust cutting conditions for each material.

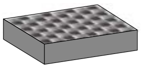
TECHNICAL DATA ➤ P001

MCCH

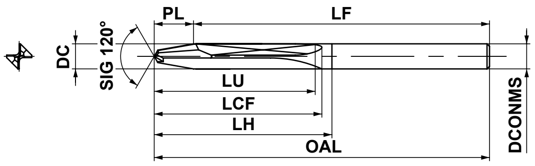
P M K **N** S H **CFRP**

Hand Tool

×



CFRP



	1≤DC≤3	3<DC≤6	6<DC≤10
	0 −0.014	0 −0.018	0 −0.022
h6	DCONMS=3	3<DCONMS≤6	6<DCONMS≤10
	0 −0.006	0 −0.008	0 −0.009

Hole Dia.		Drill Dia.		Hole Depth	Order Number	Grade	Dimensions (mm)						
AWG*	inch	DC (mm)	inch	(L/D)		DT2030	LU	LCF	LH	OAL	LF	PL	DCONMS
#40	–	2.5	.0985	15	**MCCH0250X15S030**	★	42.1	48	50	100	95.4	4.6	3
#30	–	3.26	.1285	10	**MCCH0326X10S040**	★	38.6	48	50	100	94.0	6.0	4
#20	–	4.1	.1615	8	**MCCH0410X08S050**	★	40.3	48	50	100	92.5	7.5	5
#11	–	4.86	.1915	5	**MCCH0486X05S050**	★	33.2	48	50	100	91.1	8.9	5
–	1/4	6.38	.251	3	**MCCH0638X03S070**	★	30.8	48	50	100	88.3	11.7	7
–	3/8	9.55	.375	2	**MCCH0955X02S100**	★	36.6	48	50	100	82.5	17.5	10

***AWG** : American Wire Gage

Note 1) Please check the Hand Tool manual for cutting conditions.

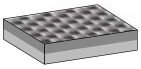
★ : Inventory maintained in Japan.

MCAH

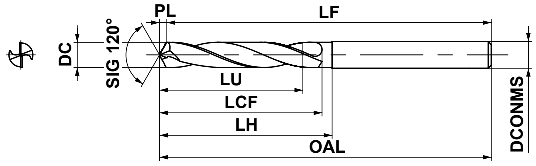
P M K **N** S H **CFRP+Al**

Hand Tool

×



CFRP+Al



	1≤DC≤3	3<DC≤6	6<DC≤10
	0 −0.014	0 −0.018	0 −0.022
	DCONMS=3	3<DCONMS≤6	6<DCONMS≤10
h6	0 −0.006	0 −0.008	0 −0.009

Hole Dia.		Drill Dia.		Hole Depth	Order Number	Grade	Dimensions (mm)						
AWG*	inch	**DC** (mm)	inch	(L/D)		**DT2030**	**LU**	**LCF**	**LH**	**OAL**	**LF**	**PL**	**DCONMS**
#40	–	2.5	.0985	15	**MCAH0250X15S030**	★	38.2	50	50	100	99.3	0.7	3
#30	–	3.26	.1285	15	**MCAH0326X15S040**	★	49.8	50	50	100	99.1	0.9	4
#20	–	4.1	.1615	10	**MCAH0410X10S050**	★	42.2	50	50	100	98.8	1.2	5
#11	–	4.86	.1915	8	**MCAH0486X08S050**	★	40.3	50	50	100	98.6	1.4	5
–	1/4	6.38	.251	5	**MCAH0638X05S070**	★	33.7	50	50	100	98.2	1.8	7
–	3/8	9.55	.375	3	**MCAH0955X03S100**	★	31.5	50	50	100	97.2	2.8	10

***AWG** : American Wire Gage
Note 1) Please check the Hand Tool manual for cutting conditions.

Exchangeable Head Reamer

RX1S

Simple to change head with high runout accuracy.

Optimum Head Design to Suit Coolant Flow

Helical Geometry for Component Through Hole Applications

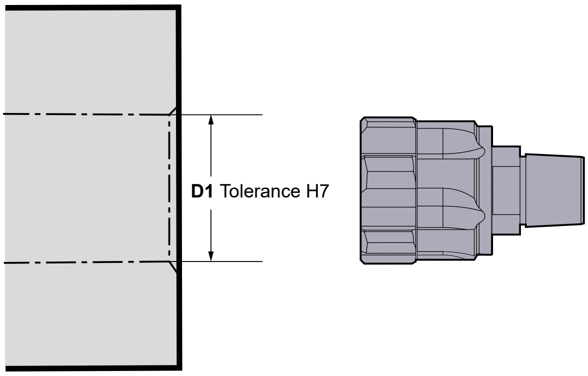
Side Coolant Holes in the Flutes

Straight Flute Geometry for Component Blind Holes

Centre Through Coolant Hole

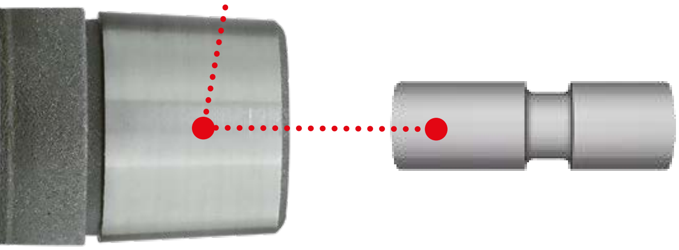
Easy to Use and enables Precision Hole Tolerance

H7 workpiece hole tolerance.



High Precision Mounting Mechanism

Double clamping by tapered surface and centre lock achieves high runout accuracy.



Solid Carbide Head

High Cutting Speeds Enables Elevated Performance

Lapped and Polished Cutting Edge

Excellent surface finish promotes good chip evacuation.

Short and Long Holder Options Available

X03

X05

For a Wide Range of Materials

The combination of highly versatile carbide substrate and PVD coating has achieved high precision reaming with a long tool life.

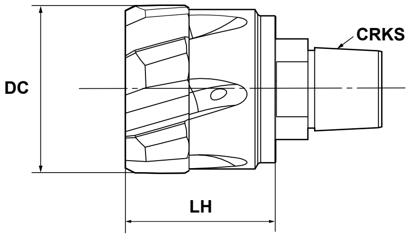
P	**M**	**K**	**S**
Steel	Stainless Steel	Cast Iron	Heat Resistant Alloy

Custom Made Options

Custom made, optimally designed reaming heads, with different hole tolerance classes, can be manufactured in 1 µm increments, in diameters (DC) 14 mm to 29 mm.

RX1S NEW

P M K N S H



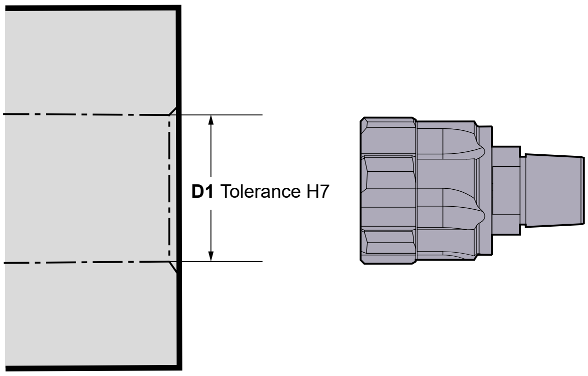
Type1

Helical Flute Head for Through Holes

With side coolant holes in the flutes

DC (mm)	Order Number	Stock	Number of Teeth	**LH** (mm)	**CRKS**	Type	Holder
		RP1010					
14	**RX1S14000H7DHTP1**	●	6	17.9	TP1	1	RX1SX◌◌S16ATP1
15	**RX1S15000H7DHTP1**	●	6	17.9	TP1	1	RX1SX◌◌S16ATP1
16	**RX1S16000H7DHTP2**	●	6	17.9	TP2	1	RX1SX◌◌S20ATP2
17	**RX1S17000H7DHTP2**	●	6	17.9	TP2	1	RX1SX◌◌S20ATP2
18	**RX1S18000H7DHTP3**	●	6	17.9	TP3	1	RX1SX◌◌S20ATP3
19	**RX1S19000H7DHTP3**	●	6	17.9	TP3	1	RX1SX◌◌S20ATP3
20	**RX1S20000H7DHTP4**	●	6	17.9	TP4	1	RX1SX◌◌S20ATP4
21	**RX1S21000H7DHTP4**	●	6	17.9	TP4	1	RX1SX◌◌S20ATP4
22	**RX1S22000H7DHTP4**	●	6	17.9	TP4	1	RX1SX◌◌S20ATP4
23	**RX1S23000H7DHTP5**	●	6	18.9	TP5	1	RX1SX◌◌S20ATP5
24	**RX1S24000H7DHTP5**	●	6	18.9	TP5	1	RX1SX◌◌S20ATP5
25	**RX1S25000H7DHTP5**	●	8	18.9	TP5	1	RX1SX◌◌S20ATP5
26	**RX1S26000H7DHTP5**	●	8	18.9	TP5	1	RX1SX◌◌S20ATP5
27	**RX1S27000H7DHTP5**	●	8	18.9	TP5	1	RX1SX◌◌S20ATP5
28	**RX1S28000H7DHTP6**	●	8	18.9	TP6	1	RX1SX◌◌S25ATP6
29	**RX1S29000H7DHTP6**	●	8	18.9	TP6	1	RX1SX◌◌S25ATP6

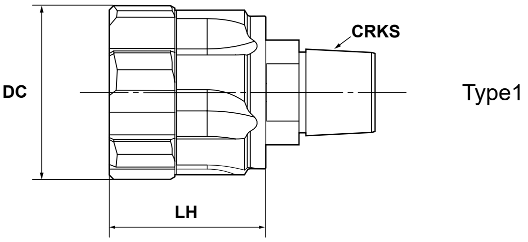
Note 1) The screw size CRKS for the fastening size of the holder and head must be the same.



● : Inventory maintained.

EXCHANGEABLE HEAD REAMER

RX1S NEW



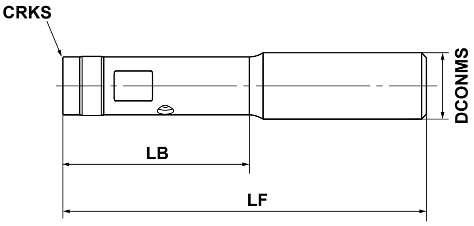
Straight Flute Head for Blind Holes

With centre through coolant hole

DC (mm)	Order Number	Stock	Number of Teeth	**LH** (mm)	**CRKS**	Type	Holder
		RP1010					
14	**RX1S14000H7DSTP1**	●	6	17.9	TP1	1	RX1SX◌◌S16ATP1
15	**RX1S15000H7DSTP1**	●	6	17.9	TP1	1	RX1SX◌◌S16ATP1
16	**RX1S16000H7DSTP2**	●	6	17.9	TP2	1	RX1SX◌◌S20ATP2
17	**RX1S17000H7DSTP2**	●	6	17.9	TP2	1	RX1SX◌◌S20ATP2
18	**RX1S18000H7DSTP3**	●	6	17.9	TP3	1	RX1SX◌◌S20ATP3
19	**RX1S19000H7DSTP3**	●	6	17.9	TP3	1	RX1SX◌◌S20ATP3
20	**RX1S20000H7DSTP4**	●	6	17.9	TP4	1	RX1SX◌◌S20ATP4
21	**RX1S21000H7DSTP4**	●	6	17.9	TP4	1	RX1SX◌◌S20ATP4
22	**RX1S22000H7DSTP4**	●	6	17.9	TP4	1	RX1SX◌◌S20ATP4
23	**RX1S23000H7DSTP5**	●	6	18.9	TP5	1	RX1SX◌◌S20ATP5
24	**RX1S24000H7DSTP5**	●	6	18.9	TP5	1	RX1SX◌◌S20ATP5
25	**RX1S25000H7DSTP5**	●	8	18.9	TP5	1	RX1SX◌◌S20ATP5
26	**RX1S26000H7DSTP5**	●	8	18.9	TP5	1	RX1SX◌◌S20ATP5
27	**RX1S27000H7DSTP5**	●	8	18.9	TP5	1	RX1SX◌◌S20ATP5
28	**RX1S28000H7DSTP6**	●	8	18.9	TP6	1	RX1SX◌◌S25ATP6
29	**RX1S29000H7DSTP6**	●	8	18.9	TP6	1	RX1SX◌◌S25ATP6

Note 1) The screw size CRKS for the fastening size of the holder and head must be the same.

● : Inventory maintained.



h6	12<DCONMS<16	20<DCONMS<25
	0 − 0.011	0 − 0.013

HOLDER

CRKS	Order Number	Stock	Dimensions (mm)				
			LB	LF	DCONMS	Min. Head **DC**	Max. Head **DC**
TP1	**RX1SX03S16ATP1**	●	35.0	91.0	16	14	15
TP1	**RX1SX05S16ATP1**	●	67.0	123.0	16	14	15
TP2	**RX1SX03S20ATP2**	●	39.0	99.0	20	16	17
TP2	**RX1SX05S20ATP2**	●	75.0	135.0	20	16	17
TP3	**RX1SX03S20ATP3**	●	45.0	106.0	20	18	19
TP3	**RX1SX05S20ATP3**	●	85.0	146.0	20	18	19
TP4	**RX1SX03S20ATP4**	●	51.5	113.5	20	20	22
TP4	**RX1SX05S20ATP4**	●	96.5	158.5	20	20	22
TP5	**RX1SX03S20ATP5**	●	65.5	130.5	20	23	27
TP5	**RX1SX05S20ATP5**	●	120.5	185.5	20	23	27
TP6	**RX1SX03S25ATP6**	●	80.5	152.5	25	28	29
TP6	**RX1SX05S25ATP6**	●	145.5	217.5	25	28	29

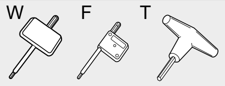
Note 1) The screw size CRKS for the fastening size of the holder and head must be the same.
Note 2) A wrench is not included with the holder.

SPARE PARTS

Holder Type			
	Clamp Screw	Drive Size	Torque (N•m)
RX1SX◌◌S16ATP1	RX1ST8TP1	T8	2
RX1SX◌◌S20ATP2	RX1ST10TP23	T10	3
RX1SX◌◌S20ATP3	RX1ST10TP23	T10	3
RX1SX◌◌S20ATP4	RX1ST15TP45	T15	5
RX1SX◌◌S20ATP5	RX1ST15TP45	T15	5
RX1SX◌◌S25ATP6	RX1ST25TP6	T25	9

Note 1) The packaging unit of replacement screws contains 1 piece.

PARTS SOLD SEPARATELY

Holder Type	
	Wrench
RX1SX◌◌S16ATP1	TKY08W
RX1SX◌◌S20ATP2	TKY10F
RX1SX◌◌S20ATP3	TKY10F
RX1SX◌◌S20ATP4	TKY15T
RX1SX◌◌S20ATP5	TKY15T
RX1SX◌◌S25ATP6	TKY25T

EXCHANGEABLE HEAD REAMER

RX1S NEW

RECOMMENDED CUTTING CONDITIONS

	Material	Properties	Cutting Speed (m/min)	Feed (mm/t.)	
				DC<20	DC≥20
P	Mild Steel (St44-2, C10 etc.)	Hardness ≤180HB	120 (90—155)	0.10—0.20	0.10—0.22
	Carbon Steel, Alloy Steel (CK45, 41CrMo4 etc.)	Hardness 180—280HB	120 (90—155)	0.10—0.20	0.10—0.22
	Carbon Steel, Alloy Steel (40CrNiMoA etc.)	Hardness 280—350HB	100 (75—130)	0.10—0.20	0.10—0.22
M	Austenitic Stainless Steel (X5CrNi18-10, X5CrNiMo17-12-2 etc.)	Hardness ≤200HB	20 (15—30)	0.08—0.15	0.08—0.18
	Ferritic Stainless Steel (X6Cr17 etc.)	—	40 (30—60)	0.08—0.18	0.08—0.20
	Duplex Stainless Steel (X2 CrNiMoN 22 5 3J1 etc.)	—	20 (15—30)	0.08—0.15	0.08—0.18
	Hardened Stainless Steel (17-4PH etc.)	—	40 (30—60)	0.08—0.18	0.08—0.20
K	Gray Cast Iron (GG-30 etc.)	Tensile Strength ≤350MPa	110 (80—130)	0.10—0.20	0.10—0.22
	Ductile Cast Iron (GJS-450-10 etc.)	Tensile Strength ≤450MPa	90 (65—110)	0.10—0.20	0.10—0.22
S	Heat Resistant Alloy (Inconel®718 etc.)	—	30 (20—40)	0.08—0.18	0.10—0.20
	Titanium Alloy (Ti-6Al-4V etc.)	—	30 (20—40)	0.08—0.18	0.10—0.20

FINISH MACHINING ALLOWANCE BY DIAMETER

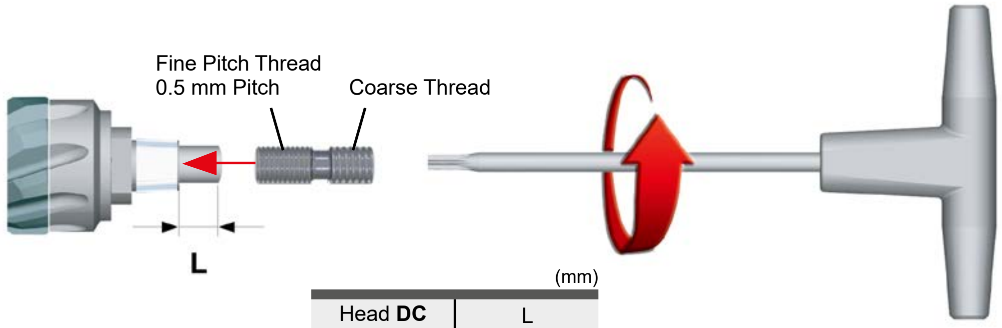
(mm)

DC	14≤DC<15	15≤DC<20	20≤DC≤29
Machining Allowance	0.15—0.30	0.15—0.35	0.20—0.40

HOW TO INSTALL THE HEAD

1

Use a Torx wrench to adjust the amount of protrusion according to the L dimension below.
The cutting edges are sharp so protective gloves should be worn.



(mm)

Head **DC**	L
14 — 27	5.5 — 6.0
28, 29	6.0 — 6.5

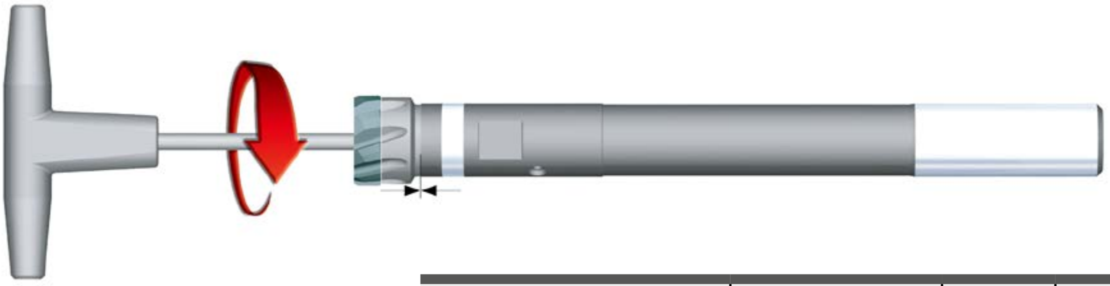
Torx wrench is not an accessory.

2

Insert the head into the holder.
At this time, a slight gap will be seen between the end face of the holder and the head.

3

Use a Torx wrench to tighten until the holder and head are firmly clamped.



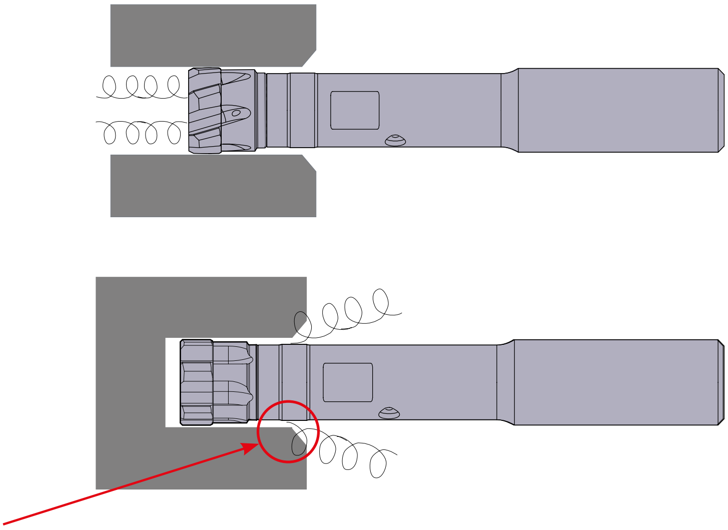
Holder Type	Clamp Screw	Drive Size	Torque (N•m)
RX1SX◌◌S16ATP1	RX1ST8TP1	T8	2
RX1SX◌◌S20ATP2, TP3	RX1ST10TP23	T10	3
RX1SX◌◌S20ATP4, TP5	RX1ST15TP45	T15	5
RX1SX◌◌S25ATP6	RX1ST25TP6	T25	9

Note 1) The packaging unit of replacement screws contains 5 pieces.

EXCHANGEABLE HEAD REAMER

OPERATIONAL GUIDANCE

- Please use a helical type head for through holes and a straight type head for blind holes.
  The helical type is designed to eject chips forward, and the straight type is designed to eject chips backwards.

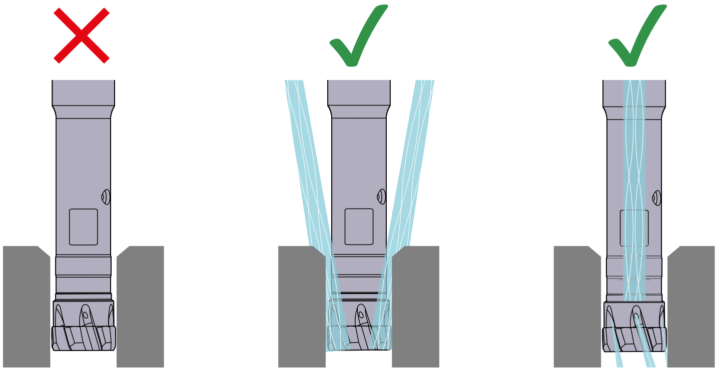


Helical Type

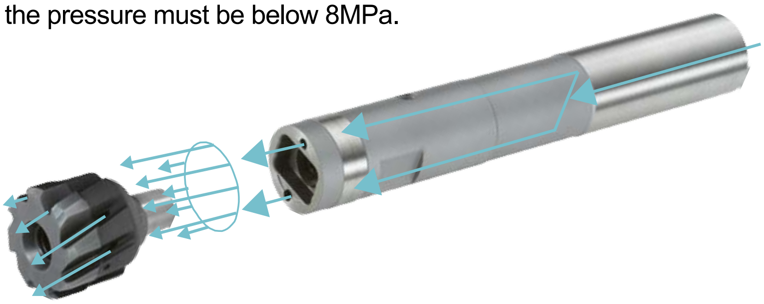
Straight Type

- It is recommend to chamfer the entrance of the pilot hole before reaming.
- When reaming, it is generally recommended to return the tool at the same feed rate.
- When setting the tool on the machine, the run-out accuracy of the cutting edge should be 5 μm or less.
- For the holder, we recommend a hydraulic chuck type.

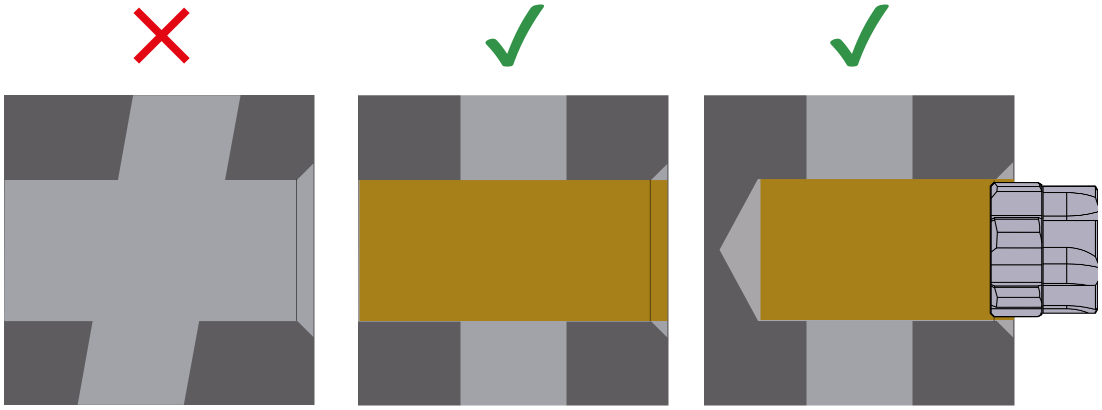
- The first recommendation for best results is to use internal through coolant, then external coolant. Dry cutting is not recommended.
  For blind holes, with external coolant, reaming beyond depths of DC x 3 is not recommended.



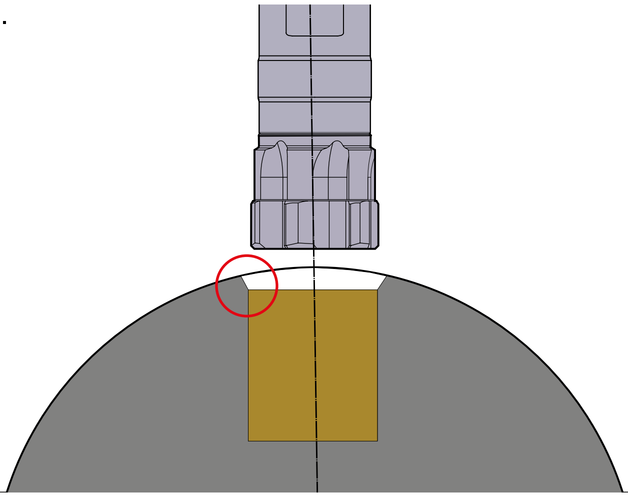
- For reaming with internal through coolant, the pressure must be below 8MPa.



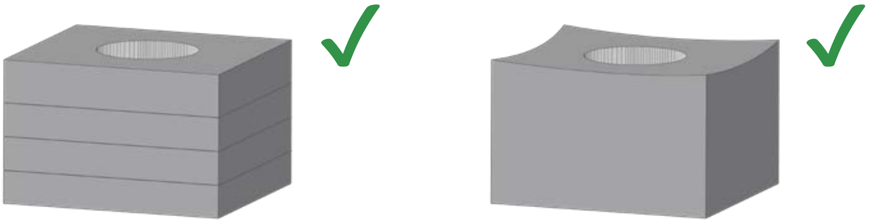
- Reaming diagonally intersecting holes is not recommended.



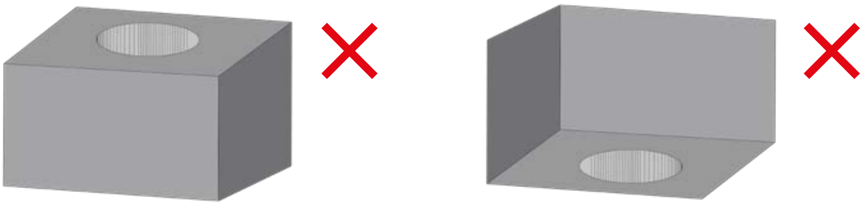
- Please chamfer cylindrical surfaces before reaming.



- Reaming with stacked plates and a concave centre is possible.



- Reaming is not recommended if the entrance/exit of the pilot hole is on an inclined surface.



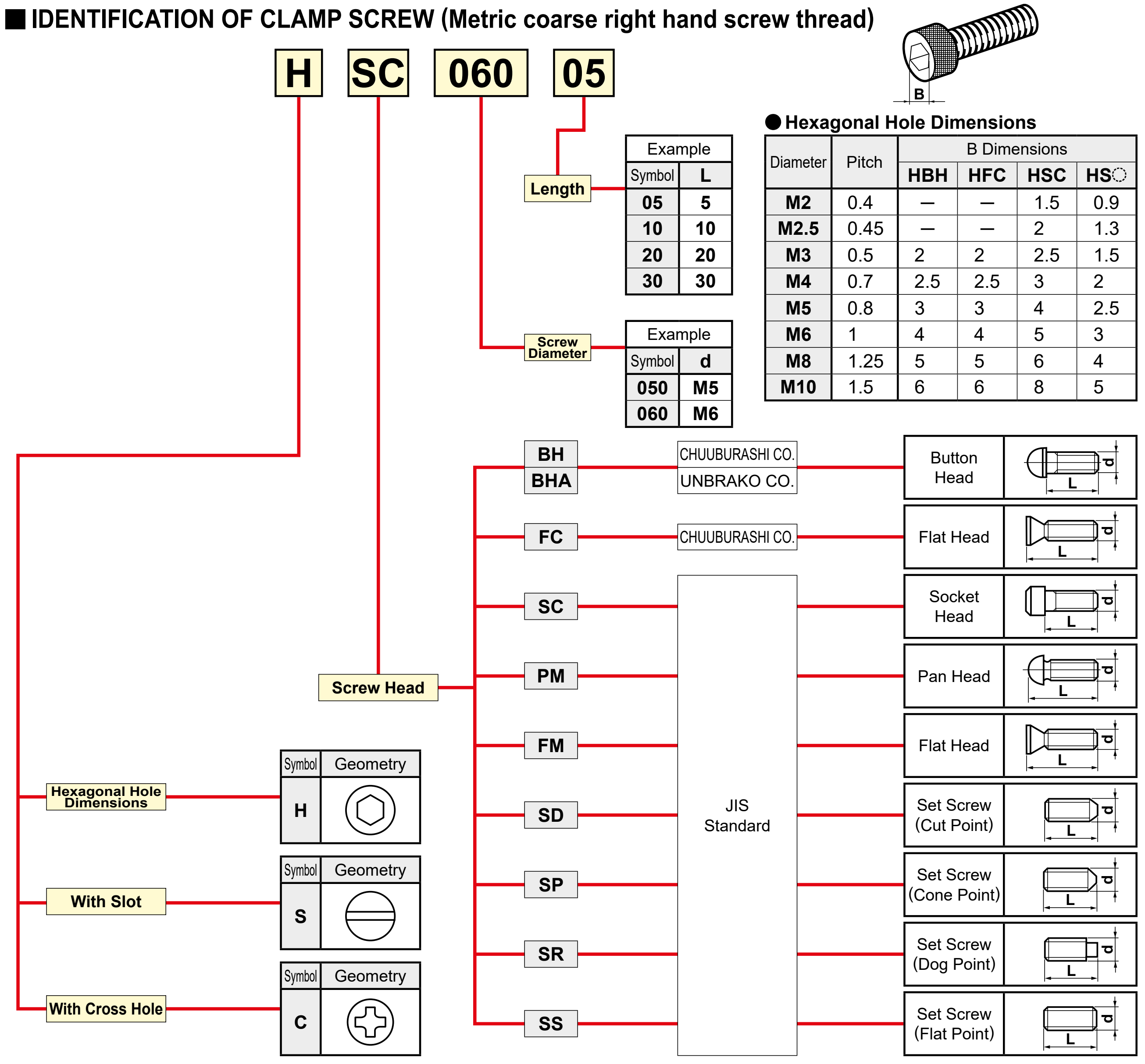
Memo

SPARE PARTS

IDENTIFICATION ················ N002
SPARE PARTS
  CLAMP SCREW ················ N003
  SET BOLT ················ N008
  ADJUSTMENT SCREW / NUT ················ N009
  SHIM ················ N010
  SHIM PIN AND CLAMP LEVER ················ N013
  LOCK PIN ················ N014
  CLAMP BRIDGE ················ N014
  BREAKER PIECE ················ N016
  ANTI SEIZE LUBRICANT ················ N017

IDENTIFICATION

■ IDENTIFICATION OF CLAMP SCREW (Metric coarse right hand screw thread)



Length

Example

Symbol	L
05	5
10	10
20	20
30	30

Screw Diameter

Example

Symbol	d
050	M5
060	M6

● Hexagonal Hole Dimensions

Diameter	Pitch	B Dimensions			
		HBH	HFC	HSC	HS◌
M2	0.4	–	–	1.5	0.9
M2.5	0.45	–	–	2	1.3
M3	0.5	2	2	2.5	1.5
M4	0.7	2.5	2.5	3	2
M5	0.8	3	3	4	2.5
M6	1	4	4	5	3
M8	1.25	5	5	6	4
M10	1.5	6	6	8	5

Screw Head

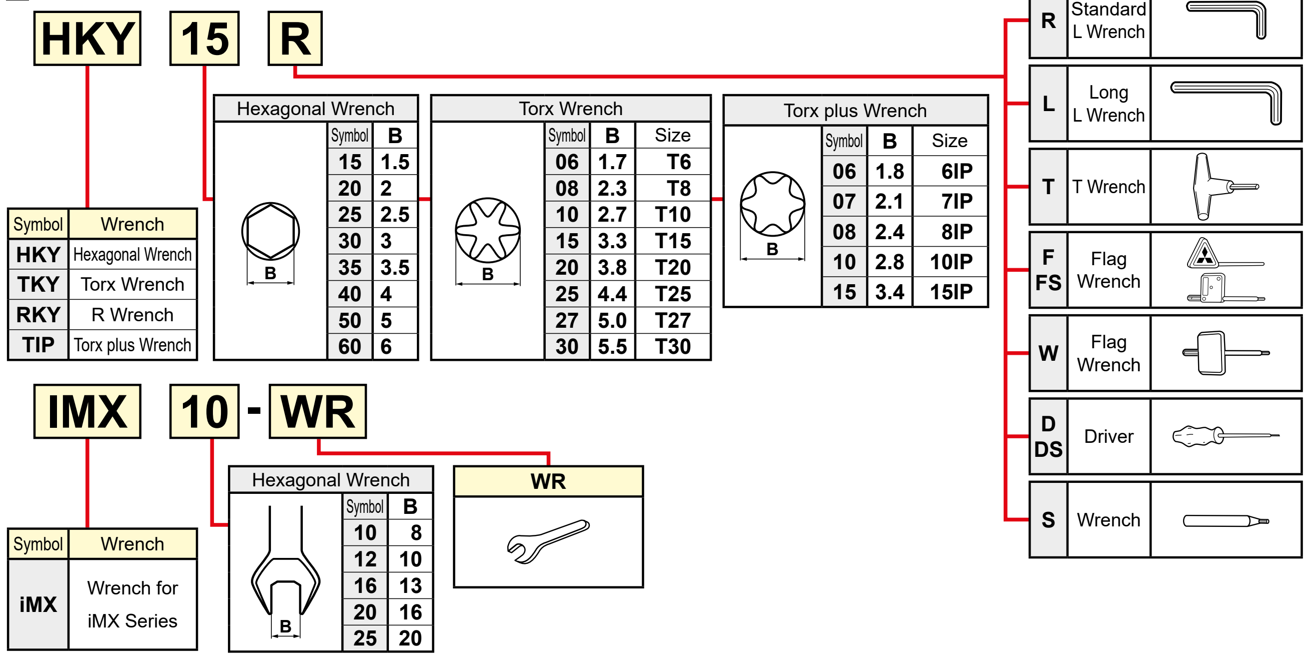
BH	CHUUBURASHI CO.	Button Head
BHA	UNBRAKO CO.	
FC	CHUUBURASHI CO.	Flat Head
SC	JIS Standard	Socket Head
PM		Pan Head
FM		Flat Head
SD		Set Screw (Cut Point)
SP		Set Screw (Cone Point)
SR		Set Screw (Dog Point)
SS		Set Screw (Flat Point)

Symbol	Geometry
H	⬡

Symbol	Geometry
S	⊖

Symbol	Geometry
C	✜

■ IDENTIFICATION OF WRENCH



Symbol	Wrench
HKY	Hexagonal Wrench
TKY	Torx Wrench
RKY	R Wrench
TIP	Torx plus Wrench

Hexagonal Wrench

Symbol	B
15	1.5
20	2
25	2.5
30	3
35	3.5
40	4
50	5
60	6

Torx Wrench

Symbol	B	Size
06	1.7	T6
08	2.3	T8
10	2.7	T10
15	3.3	T15
20	3.8	T20
25	4.4	T25
27	5.0	T27
30	5.5	T30

Torx plus Wrench

Symbol	B	Size
06	1.8	6IP
07	2.1	7IP
08	2.4	8IP
10	2.8	10IP
15	3.4	15IP

R	Standard L Wrench
L	Long L Wrench
T	T Wrench
F FS	Flag Wrench
W	Flag Wrench
D DS	Driver
S	Wrench

Symbol	Wrench
iMX	Wrench for iMX Series

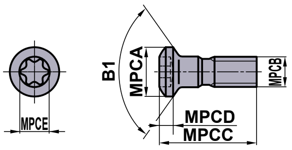
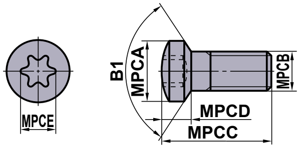
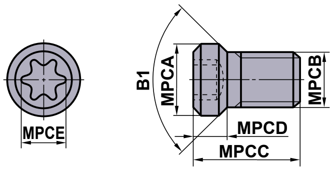
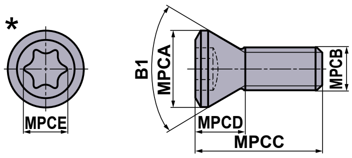
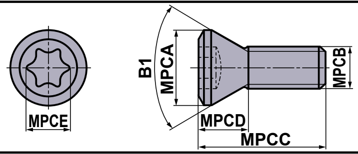
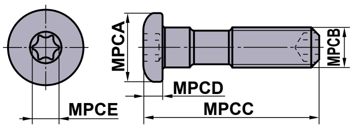
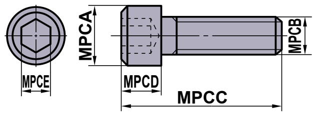
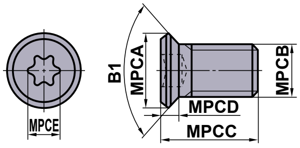
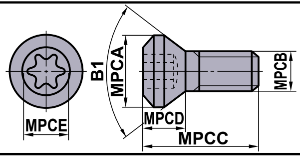
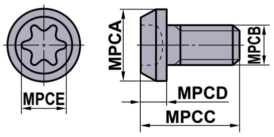
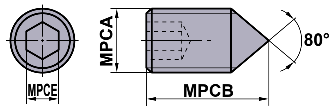
Hexagonal Wrench

Symbol	B
10	8
12	10
16	13
20	16
25	20

WR

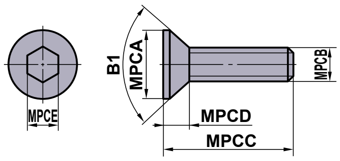
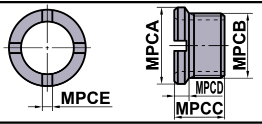
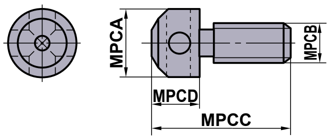
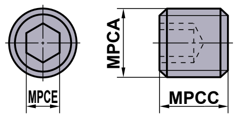
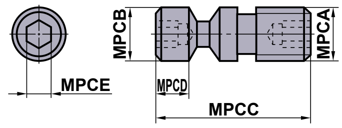
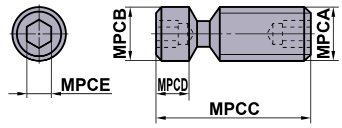
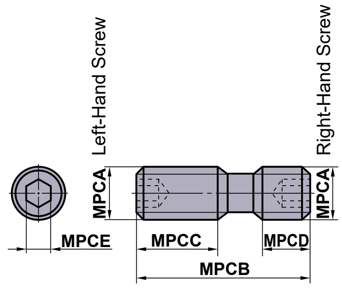
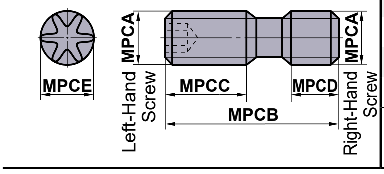
SPARE PARTS

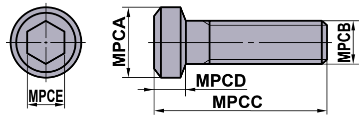
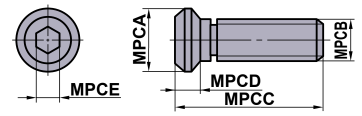
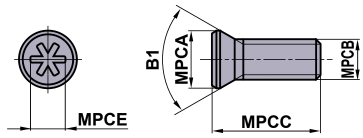
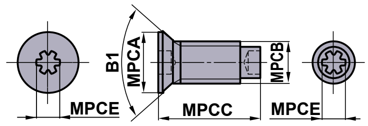
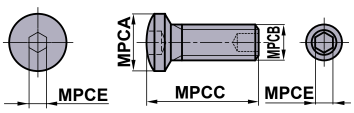
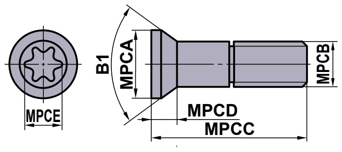
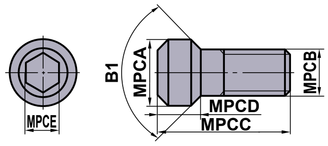
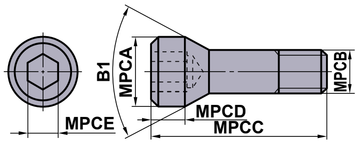
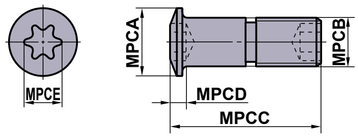
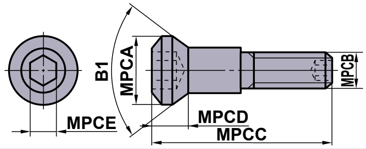
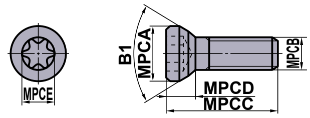
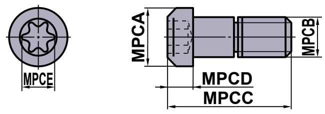
CLAMP SCREW

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**AJS3010T10**	5	M3×0.5	10	1.5	2.8	120°	T10	2.5	**Profile** Holder (➲C032) **AJX** (➲K194)
	AJS4012T15	7	M4×0.7	12	2.2	3.4	120°	T15	3.5	**AJX** (➲K194)
	AJS5014T25	8	M5×0.8	14	2.7	4.5	120°	T25	7.5	
	**BRS103**	5	M3×0.5	9.9	2.9	3.4	120°	T15	3.5	
	BRS105	8	M5×0.8	13.8	3.8	4.5	120°	T25	7.5	
	**CS200T**	3.2	M2×0.4	5	1.6	1.8	90°	T6	0.6	**F** Type Boring Bar (➲E028)
	CS250T	3.7	M2.5×0.45	6	1.8	2.4	90°	T8	1.0	**Milling Tools** Series (➲K001)
	*** CS250560T**	3.9	M2.5×0.45	5.2	2.5	2.4	60°	T8	1.0	**BRP** (➲K206)
	CS300590T	4.1	M3×0.5	5.5	2.1	2.4	90°	T8	1.0	
	CS300890T	4.1	M3×0.5	8	2.1	2.4	90°	T8	1.0	**DCCC** (➲K216)
	*** CS350860T**	5.5	M3.5×0.6	8.4	4.0	3.4	60°	T15	3.5	**MMTI** Type Boring Bar (➲G026) **BRP** (➲K206)
* 	**CS350990T**	4.8	M3.5×0.6	9	2.4	2.8	90°	T10	2.5	**DCCC** (➲K216)
	CS401160T	5.7	M4×0.7	11	4.5	3.4	60°	T15	3.5	
	CS401990T	6.0	M4×0.7	19	3.0	3.9	90°	T20	3.5	
	CS451190T	6.3	M4.5×0.75	11	2.9	3.9	90°	T20	5.0	**AL** Type Holder (➲C034)
	*** CS5015060T**	7.2	M5×0.8	15	2.4	3.9	60°	T20	5.0	**AHX640S** (➲K042)
	CS502190T	8.5	M5×0.8	21	4.0	5.1	90°	T27	7.5	
	**CSF401260T**	7.2	M4×0.5	12	5.2	3.9	60°	T20	5.0	**PMR** (➲K252)
	**DC0520T**	8.5	M5×0.8	22.5	2.5	3.4	—	T15	3.5	**DOUBLE CLAMP** Holder (➲C008)
	DC0621T	10.5	M6×1.0	25	4	3.9	—	T20	5.0	**DOUBLE CLAMP DIMPLE BAR** (➲E015)
										HSK Tool Holder (➲H001)
	**DKS4**	5.6	M4×0.7	18	3.5	3	—	—	3.3	
	**FC400890T**	5.6	M4×0.7	7.5	1.3	2.8	90°	T10	2.5	**AL** Type Holder (➲C035)
										AL Type Boring Bar (➲E043)
	**GY05016S**	8.7	M5×0.8	16	3.5	3.9	90°	T20	5.0	**GY** Series (➲F004)
	**GY06013M**	12	M6×1	18	5	5.6	—	T30	6.0	**GY** Series (➲F004)
	**HSP05008C**	M5×0.8	8	—	—	2.5	—	—	2.5	**MP** Type Holder (➲C019)

SPARE PARTS

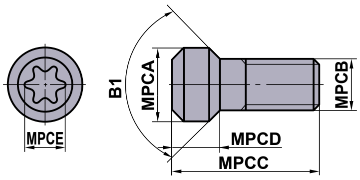
CLAMP SCREW

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	HY-A1	4.4	M3×0.5	7	2.1	2	82°	—	1.5	
	HY-V1	5.5	M3×0.5	7	2.5	2	82°	—	1.5	
	HY2	5.5	M3×0.5	10	2.5	2	82°	—	1.5	
	HY3	7	M3.5×0.6	12	2.9	2	82°	—	1.5	
	HY4	9.3	M5×0.8	16	3.6	3	82°	—	3.3	
	JSS6	6.9	M6×0.75	4.5	1.5	0.8	—	—	—	
	JSS7	8	M7×0.75	4.4	1.5	1	—	—	—	
	KS1	7	M4×0.7	14	5	—	—	—	—	
	KS2	10	M6×1	18	7	—	—	—	—	
	KS2S	10	M6×1	18	7	—	—	—	—	
	LLR1	M5×0.8	—	3.5	—	2.5	—	—	—	
	LLR2	M6×1	—	5	—	3	—	—	—	
  **LLCS103, LLCS105** **LLCS112, LLCS125** **LLCS205** The products with "*" do not have a hexagonal hole at the end marked **MPCB**. The products with "☆" do not have a hexagonal hole at the end marked **MPCA**.	☆ LLCS103	M3×0.5	4	11	4.6	2	—	—	1.5	
	* LLCS105	M5×0.8	M5×0.8	10	1.5	2	—	—	1.5	**P** Type Boring Bar (➲E038)
	LLCS106	M6×1	6	16.5	3.5	2.5	—	—	2.2	**HSK** Tool Holder (➲H001)
	* LLCS106S	M6×1	6	13.4	0.7	2.5	—	—	2.2	
	LLCS108	M8×1.25	8	21	6.5	3	—	—	3.3	
	* LLCS108S	M8×1.25	8	16.5	2	3	—	—	3.3	
	LLCS110	M10×1.5	10	29	8	4	—	—	7.0	
	LLCS112	M12×1	11.9	36.2	9	5	—	—	8.0	
	LLCS125	M5×0.8	M5×0.8	12	2	2	—	—	1.5	
	LLCS205	M5×0.8	M5×0.8	16	4	2	—	—	1.5	
	LLCS206	M6×1	6	26	13	2.5	—	—	2.2	
	LLCS208	M8×1.25	8	24	6.5	3	—	—	3.3	
	LLCS306	M6×1	6	21	4	2.5	—	—	2.2	
	LLCS310	M10×1	10	29	8	4	—	—	7.0	
	LLCS410	M10×1	10	30	6.6	4	—	—	7.0	
	LLCS508	M8×1	8	24	6.5	3	—	—	3.3	
	* LLCS508S	M8×1	8	20.5	3	3	—	—	3.3	
 *Without Hexagonal Hole on Right-Hand Screw	LS1	M6×1	22	8	8	3	—	—	5.0	
	LS2	M8×1	29	13	10	4	—	—	8.2	
	* LS4	M6×1	15	8	4	3	—	—	5.0	**Milling Tools** Series (➲K001)
	* LS5	M6×1	18	8	5	3	—	—	5.0	
	* LS6	M8×1	24	13	5	4	—	—	8.2	
	* LS7	M8×1	27	13	8	4	—	—	8.2	
	* LS8	M6×0.75	18	7	7	3	—	—	5.0	
	* LS9	M6×0.75	22	8	8	3	—	—	5.0	
	* LS10	M7×0.75	16	6	6	4	—	—	8.2	
	* LS11	M8×1	16	6	6	4	—	—	7.8	
	* LS12	M8×1	24	7	7	4	—	—	7.8	
	* LS16	M7×0.75	23	11	8	4	—	—	7.8	
	* LS20	M10×1.5	26	9	9	5	—	—	9.0	
	* LS21	M10×1.5	32	12	12	5	—	—	9.0	
	LS24	M8×1.25	24	8.5	8.5	4	—	—	7.8	
	LS25	M8×1	28.5	12.0	10.5	4	—	—	8.2	**DOUBLE CLAMP** Holder (➲C009)
	LS14T	M7×0.75	24	10	10	4.5	—	T25	8.0	
	LS15T	M7×0.75	18	7	7	4.5	—	T25	8.0	
	LS10TS	M7×0.75	13	6	4	4.5	—	T25	8.5	
	LS0622T	M6×0.75	22	8	8	3.4	—	T15	6.0	**AHX640W** (➲K049)

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**MGS6**	10	M6×1	26	4	5	—	—	9.0	**APX3000** (➲K146)
	**MHT1**	11	M8×1	18.5	3.5	4	—	—	8.7	
	**NS251**	3.6	M2.5×0.45	7	—	2.2	60°	—	0.7	**BTVH** (➲D016)
	NS401	5.8	M4×0.7	6	—	3.6	60°	—	3.5	**CTAH-S** (➲D020)
	**NS402W**	5.85	M4×0.7	10	—	2.2	60°	—	0.7	**CTAH** (➲D020) **CTBH** (➲D022)
	NS403W	5.85	M4×0.7	12	—	2.2	60°	—	0.7	
	NS404W	5.8	M4×0.7	10	—	2.2	90°	—	0.7	
	**NS501W**	8	M5×0.8	16	—	2.5	120°	—	2.2	**SMALL TOOLS** (➲D001)
	NS502W	8	M5×0.8	20	—	2.5	120°	—	2.2	
	**RS3008T**	4.3	M3×0.35	8.6	2	2.4	61°	T8	1.5	**SRF** (➲K228) **SUF** (➲K232)
	RS3510T	5	M3.5×0.35	10	2.3	2.8	61°	T10	2.5	
	RS4015T	6	M4×0.5	14	2.7	3.4	61°	T15	3.3	
	RS5020T	8.1	M5×0.5	16.4	3.6	3.9	61°	T20	5.0	
	RS6025T	9.5	M6×0.75	21.5	4.2	4.5	61°	T25	7.5	
	RS8030T	12	M8×0.75	25	5	5.6	61°	T30	10.0	
	**S1**	3.5	M2×0.4	5.5	2.2	1.5	92°	—	0.6	
	S3	4.5	M3×0.5	7.7	2.4	2	92°	—	1.5	
	S4	5.3	M4×0.7	8	1.8	2.5	62°	—	2.2	
	S5	6.8	M5×0.8	9	2.4	3	62°	—	3.3	
	**SD32**	12	M8×1.25	28	7.2	6	50°	—	9.5	
	SD40	12	M8×1.25	36	7.2	6	50°	—	9.5	
	SD50	16	M10×1.5	46	8.2	8	50°	—	1.0	
	SD63	16	M10×1.5	61	8.2	8	50°	—	1.0	
	**SETS51**	6.8	M5×0.8	14.8	1.5	3.4	—	T15	3.5	**MMTE** Type Holder (➲G019)
	SETS61	8	M6×1	20	1.8	3.9	—	T20	5.0	**MMTI** Type Boring Bar (➲G026)
										HSK Tool Holder (➲H001)
	**SLCS105**	10	M5×0.8	25	6.3	4	90°	—	7.0	**WP** Type Holder (➲C017)
	SLCS106	12	M6×1	32	6.2	4	90°	—	7.0	
	**SPS1**	8.5	M5×0.8	16	4	4.5	70°	T25	5.0	
	**SRS5**	6.7	M5×0.8	16	3.5	3.9	—	T20	5.0	

SPARE PARTS

CLAMP SCREW



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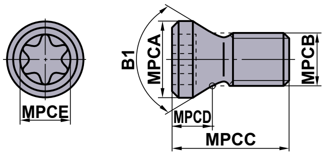

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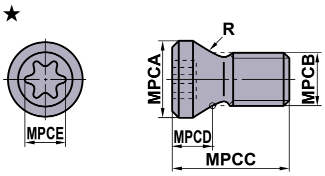

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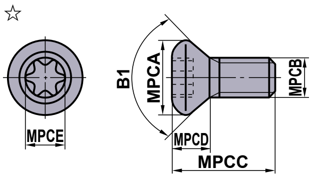
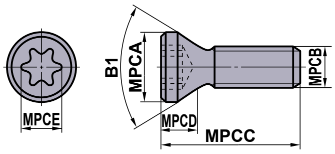
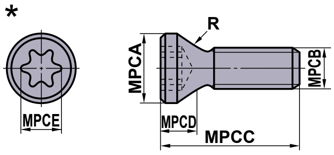
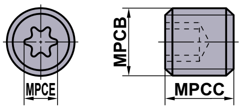
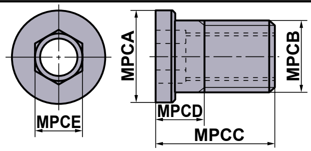
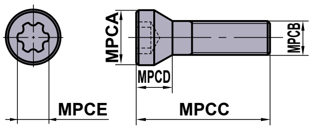
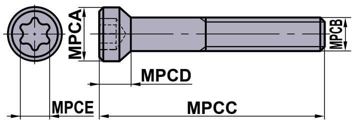
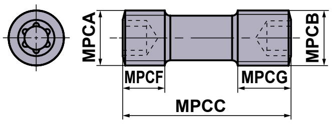


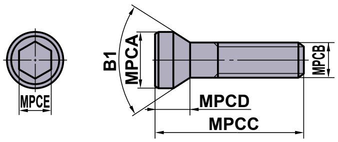
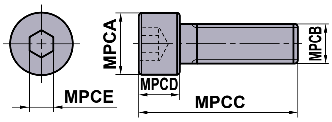
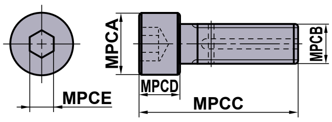
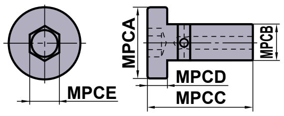
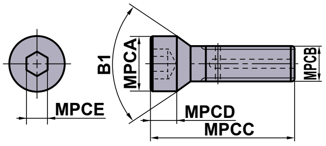
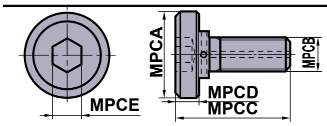
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	* **TS16**	2.5	M1.6×0.35	3.2	1.6	1.8	60°	T6	0.6	**MICRO-DEX** (➲E018)
	TS2	2.7	M2×0.4	4.6	1.4	1.8	60°	T6	0.6	
	* **TS2A**	2.7	M2×0.4	4.5	1.2	1.8	60°	T6	0.6	**AQX** (➲K186)
	TS2C	2.7	M2×0.4	3.8	1.4	1.8	60°	T6	0.6	
	☆ **TS2D**	3.8	M2×0.4	5.3	1.9	1.8	82°	T6	0.6	**DIMPLE BAR** (➲E007)
	TS21	2.7	M2×0.4	3.4	1.4	1.8	60°	T6	0.6	**F** Type Boring Bar (➲E030)
	* **TS22**	3.0	M2.2×0.45	5	1.2	1.8	60°	T6	0.6	**S** Type Boring Bar (➲E031)
	* **TS25**	3.3	M2.5×0.45	5.5	1.7	2.4	60°	T8	1.0	**AQX** (➲K186) **AJX** (➲K194)
	☆ **TS25D**	4.4	M2.5×0.45	6.2	2.2	2.4	82°	T8	1.0	**MMTI** Type Boring Bar (➲G026)
	* **TS25H**	3.6	M2.5×0.45	5.5	2	2.4	60°	T8	1.0	**SRM2** (➲K236)
	TS202	2.7	M2×0.4	5.5	1.8	1.8	60°	T6	0.6	
	TS253	3.3	M2.5×0.45	4.5	1.7	2.4	60°	T8	1.0	**Milling Tools** Series (➲K001)
	TS254	3.3	M2.5×0.45	7	1.7	2.4	60°	T8	1.0	**SMALL TOOLS** (➲D001) **PMF** (➲K250)
	* **TS255**	3.5	M2.5×0.45	7.5	1.6	2.4	60°	T8	1.0	**Profile Holder** (➲C032)
	TS3	3.9	M3×0.5	6	2	2.4	60°	T8	1.0	**TSMP** (➲K248)
	TS3D	5.0	M3×0.5	6	2.3	2.8	82°	T10	2.5	**DIMPLE BAR** (➲E007)
	* **TS3SB**	4.4	M3×0.5	8	2	2.4	80°	T8	1.5	**AXD4000** (➲K168)
	TS3SBS	4.4	M3×0.5	6.5	2	2.4	80°	T8	1.5	**AXD4000** (➲K168)
	☆ **TS31D**	4.8	M3×0.5	7.2	2.2	2.8	82°	T10	2.5	**DIMPLE BAR** (➲E007)
	* **TS32**	3.9	M3×0.5	7.5	2	2.4	60°	T8	2.0	**SRM2** (➲K236)
	* **TS33**	3.9	M3×0.5	6.7	2	2.4	60°	T8	1.5	**AQX** (➲K186) **AJX** (➲K194)
	TS35	4.8	M3.5×0.6	6.5	2.4	2.8	60°	T10	2.5	
	* **TS35D**	5.3	M3.5×0.6	12	2.8	3.4	60°	T15	3.5	**HSK** Tool Holder (➲H001)
	★ **TS35R**	5.7	M3.5×0.6	10	2.1	3.4	—	T15	3.5	**AHX440S** (➲K034) **AHX475S** (➲K038)
	TS351	4.8	M3.5×0.6	7.2	2.4	2.8	60°	T10	2.5	**AJX** (➲K194) **SRM2** (➲K236)
	TS352	4.8	M3.5×0.6	10	3	2.8	60°	T10	2.5	**VFX5** (➲K208)
	* **TS4SB**	5.8	M4×0.7	9	2.7	3.4	80°	T15	3.5	**AXD7000** (➲K180)
	* **TS4SBL**	5.8	M4×0.7	10.5	2.7	3.4	80°	T15	3.5	**GY** SERIES (➲F004) **AXD7000** (➲K180)
	TS4	5.4	M4×0.7	8	2.6	3.4	60°	T15	3.5	**CE/CF/CGSP** (➲K246) **TSMP** (➲K248)
	TS4D	5.6	M4×0.7	7.7	2.5	3.4	82°	T15	3.5	**DIMPLE BAR** (➲E007)
	TS42	5.4	M4×0.7	6	2.6	3.4	60°	T15	3.5	
	TS43	5.4	M4×0.7	10	2.6	3.4	60°	T15	3.5	**AJX** (➲K194) **BRP** (➲K206) **SRM2** (➲K236)
	TS44	5.4	M4×0.7	12	2.6	3.4	60°	T15	3.5	
	TS406	5.4	M4×0.7	15.5	2.6	3.4	60°	T15	3.5	
	TS407	5.4	M4×0.7	9	2.6	3.4	60°	T15	3.5	**AQX** (➲K186) **AJX** (➲K194)
	TS450	5.9	M4.5×0.75	13	3.6	3.9	60°	T20	5.0	**VFX6** (➲K212)
	TS5S	6.8	M5×0.8	9	2.9	4.5	80°	T25	7.5	
	TS5	6.8	M5×0.8	9	3.2	4.5	60°	T25	7.5	**SP** Holder (➲C024) **CE/CF/CGSP** (➲K246) **TSMP** (➲K248)
	TS5L	6.8	M5×0.8	15	2.9	4.5	80°	T25	7.5	
	★ **TS5R**	6.9	M5×0.8	12	3.5	3.9	—	T20	5.0	**WWX400** (➲K067) **WJX** (➲K085)
	TS52	6.8	M5×0.8	8	3.2	4.5	60°	T25	7.5	**CE/CF/CGSP** (➲K246)
	TS53	6.8	M5×0.8	16	3.2	4.5	60°	T25	7.5	
	TS54	6.8	M5×0.8	12	3.2	4.5	60°	T25	7.5	**AJX** (➲K194)
	TS55	6.8	M5×0.8	10.5	3.2	4.5	60°	T25	7.5	**GY** SERIES (➲F004) **AQX** (➲K186) **SPX** (➲K219) **SRM2** (➲K236)
	* **TS6S**	8.5	M6×1.0	13	4.4	5.6	60°	T30	10.0	**AQX** (➲K186) **SRM2** (➲K236)
	* **TS6**	8.5	M6×1.0	16	4.4	5.6	60°	T30	10.0	**SRM2** (➲K236)

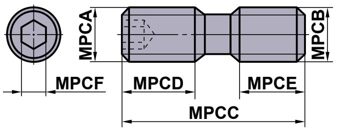
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**TPS20-1**	2.65	M2×0.4	4.7	2.4	1.8	60°	6IP	0.6	**MVX** (➲M158)
	TPS25	3.3	M2.5×0.45	5.5	1.7	2.1	60°	7IP	1.0	**APX3000** (➲K146) **MVX** (➲M158)
	TPS25-1	3.3	M2.5×0.45	6.5	1.7	2.1	60°	7IP	1.0	**APX3000** (➲K146)
	TPS27F1	3.7	M2.7×0.35	6.5	1.8	2.1	60°	7IP	1.0	**VPX200** (➲K099)
	TPS27F2	3.7	M2.7×0.35	8.0	1.8	2.1	60°	7IP	1.0	**VPX300** (➲K113)
	TPS3	3.9	M3×0.5	6.7	1.4	2.82	60°	10IP	1.0	**MVX** (➲M158)
* 	* **TPS3R**	4.6	M3×0.5	8.5	1.4	2.82	—	10IP	2.0	**WJX09** (➲K085)
	TPS3SB	4.4	M3×0.5	8	2.0	2.82	80°	10IP	3.0	**AXD4000A** (➲K176)
	TPS35	5.3	M3.5×0.6	11.5	2.8	3.4	60°	15IP	3.5	**ASX445** (➲K026) **ASX400** (➲K080) **PMR** (➲K252)
	TPS351	4.8	M3.5×0.6	7.2	1.4	2.82	60°	10IP	2.5	**MVX** (➲M158)
	TPS351B	5.1	M3.5×0.6	7.2	1.4	2.82	60°	10IP	2.5	**ARP** (➲K254)
	TPS4	5.3	M4×0.7	8	2.6	3.4	60°	15IP	3.5	**APX4000** (➲K153) **ARP** (➲K254) **MVX** (➲M158)
	TPS40F1	5.3	M4×0.5	10.5	2.8	3.4	60°	15IP	3.0	**VPX300** (➲K113)
	TPS43	5.3	M4×0.7	10	2.6	3.4	60°	15IP	4.0	**APX4000** (➲K153) **MVX** (➲M158)
	* **TPS4R**	6.4	M4×0.7	10.6	2.9	3.4	—	15IP	3.5	**WSX445** (➲K016)
	TPS54	6.8	M5×0.8	12	3.2	4.5	60°	25IP	7.5	**MVX** (➲M158)
	**TSS04005**	—	M4×0.7	5	—	2.4	—	T8	—	**PMF** (➲K250)
	TSS04505S	—	M4.5×0.7	5	—	3.5	—	T10	3.5	**FMAX** (➲K056)
	TSS05006	—	M5×0.8	6	—	2.8	—	T10	—	
	TSS06010	—	M6×1	10	—	3.9	—	T20	—	
	**WCS503507H**	6.3	M5×0.5	7	3.3	3.5	—	—	5.0	**ASX445** (➲K026) **ASX400** (➲K080) **PMR** (➲K252)
	WCS604010H	7.8	M6×0.75	10	4.1	4.0	—	—	7.0	**PMR** (➲K252)
	**WS203107TPS**	3.1	M2×0.25	7.3	1.7	1.8	60°	6IP	1.0	**STAW** (➲M139)
	WS203108TPS	3.1	M2×0.25	8.3	1.9	1.8	60°	6IP	1.0	
	WS253909TPS	3.9	M2.5×0.35	9.5	2.4	2.4	60°	8IP	2.0	
	WS304912TPS	4.9	M3×0.35	12	3.25	2.82	60°	10IP	2.5	
	**WS254012T**	4	M2.5×0.45	11.5	2.2	2.4	80°	T8	2.0	**TAW** (➲M148)
	WS254013T	4	M2.5×0.45	12.5	2.2	2.4	80°	T8	2.0	
	WS254014T	4	M2.5×0.45	13.5	2.2	2.4	80°	T8	2.0	
	WS254015T	4	M2.5×0.45	14.5	2.2	2.4	80°	T8	2.0	
	WS254016T	4	M2.5×0.45	15.5	2.2	2.4	80°	T8	2.0	
	WS304517T	4.5	M3×0.5	16.5	3.4	2.8	60°	T10	3.5	
	WS304518T	4.5	M3×0.5	17.5	3.4	2.8	60°	T10	3.5	
	WS355520T	5.5	M3.5×0.6	19.5	3.9	3.4	60°	T15	5.5	
	WS355521T	5.5	M3.5×0.6	20.5	3.9	3.4	60°	T15	5.5	
	WS406023T	6	M4×0.7	22.0	4.4	4.5	60°	T25	8.5	
	WS406024T	6	M4×0.7	23.0	4.4	4.5	60°	T25	8.5	
	WS508026T	8	M5×0.8	25.0	5.2	5.1	60°	T27	12.0	
	WS508027T	8	M5×0.8	26.0	5.2	5.1	60°	T27	12.0	

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCF	MPCG	B1			
	**RX1ST8TP1**	M4×0.7	M4×0.5	16.5	7.0	7.0	—	TX8	2.0	**RX1S** (➲M197)
	RX1ST10TP23	M5×0.8	M5×0.5	17.0	7.5	7.0	—	TX10	3.0	
	RX1ST15TP45	M6×1.0	M6×0.75	18.0	6.5	8.5	—	TX15	6.5	
	RX1ST25TP6	M10×1.5	M10×1.25	30.0	7.5	9.5	—	TX25	15.0	

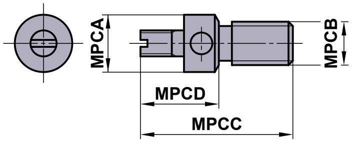
SPARE PARTS

SET BOLT

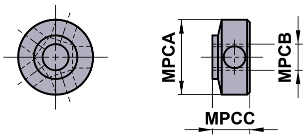
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**BOES101**	15	M10×1.5	45	10	8	60°	—	10.0	
	*** HSC08025H**	13	M8×1.25	33	8	5	—	—	24	**VPX200/300** (➔K099,K113) **ARP** (➔K254)
	HSC05030	8.5	M5×0.8	35	5	4	—	—	10	**APX3000/4000** (➔K146,K153)
	*** HSC08030H**	13	M8×1.25	38	8	5	—	—	24	**WSX445** (➔K016)
	HSC08045	13	M8×1.25	53	8	5	—	—	24	**VPX200/300** (➔K099,K113)
	HSC08040	13	M8×1.25	48	8	5	—	—	24	**WSX445** (➔K016)
	HSC08050	13	M8×1.25	58	8	5	—	—	24	**VPX200/300** (➔K099,K113)
	*** HSC10030H**	16	M10×1.5	40	10	6	—	—	40	**APX3000/4000** (➔K146,K153) **AJX** (➔K194) **WSX445** (➔K016)
	HSC10035	16	M10×1.5	45	10	6	—	—	44	**VFX5** (➔K208) **VFX6** (➔K212)
	**HSC10050**	16	M10×1.5	60	10	8	—	—	44	**APX3000/4000** (➔K146,K153) **VPX200/300** (➔K099,K113)
	HSC10055	16	M10×1.5	65	10	8	—	—	44	**VFX5** (➔K208)
	HSC10060	16	M10×1.5	70	10	8	—	—	44	**VPX200/300** (➔K099,K113)
	HSC10070	16	M10×1.5	80	10	8	—	—	44	**VPX200/300** (➔K099,K113) **ASPX** (➔K224)
	HSC12035	18	M12×1.75	47	12	10	—	—	80	**WSX445** (➔K016)
	*** HSC12035H**	18	M12×1.75	47	12	10	—	—	80	**APX3000/4000** (➔K146,K153) **AJX** (➔K194)
	HSC12040	18	M12×1.75	52	12	10	—	—	80	
	**HSC12045**	18	M12×1.75	57	12	10	—	—	80	**WSX445** (➔K016)
	HSC12060	18	M12×1.75	72	12	10	—	—	80	**VPX200/300** (➔K099,K113)
	HSC12070	18	M12×1.75	82	12	10	—	—	80	**APX3000/4000** (➔K146,K153) **AJX** (➔K194) **WSX445** (➔K016)
	HSC16040	24	M16×2	56	16	14	—	—	150	**WSX445** (➔K016)
	*** HSC16040H**	24	M16×2	56	16	14	—	—	150	**APX3000/4000** (➔K146,K153) **AJX** (➔K194)
	HSC16055	24	M16×2	71	16	14	—	—	150	**VPX200/300** (➔K099,K113)
	HSC16065	24	M16×2	81	16	14	—	—	150	**VPX200/300** (➔K099,K113)
	HSC16080	24	M16×2	96	16	14	—	—	150	
* With coolant hole.	**HSC20040**	30	M20×2.5	60	20	17	—	—	320	
	HSC20090	30	M20×2.5	110	20	17	—	—	320	
	**HSCX12030H**	24	M12×1.75	37	7	8	—	—	40	**FMAX** (➔K056)
	HSCX16035H	30	M16×2	44	9	12	—	—	100	
	HSCX20035H	36	M20×2.5	46	11	14	—	—	180	
	**HFF08033H**	11	M8×1.25	33	5	5	90°	—	8.2	**WJX09** (➔K085)
	HFF08043H	11	M8×1.25	43	5	5	90°	—	8.2	**AXD4000** (➔K168)
	**MBA16033H**	40	M16×2	43	10	14	—	—	150	**AHX640** (For Ø100) (➔K042) **WSX445** (➔K016) **APX4000** (➔K153) **AHX475S** (➔K038) **AHX640S** (➔K042) **AXD4000** (➔K168) **AXD7000** (➔K180) **AJX** (➔K194)
	MBA20040H	50	M20×2.5	54	14	17	—	—	320	

Geometry	Order Number	Dimensions (mm)						TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF		
	**HDS08030**	M8×0.75	M8×1.25	30	13.5	11.5	4	8.2	**BRP** (➔K206)
	HDS10031	M10×1.0	M10×1.5	31	14	12	5	9.0	**PMF** (➔K250)

LARGE ADJUSTMENT SCREW

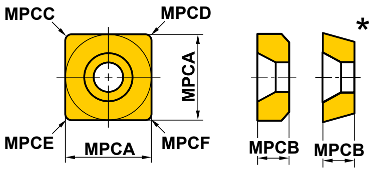
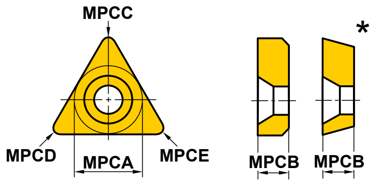
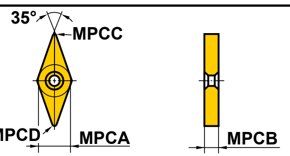
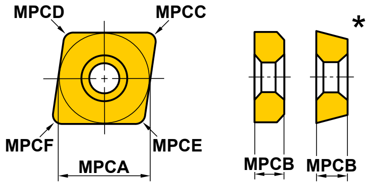
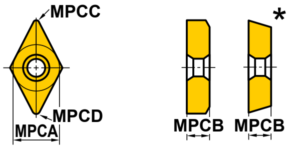
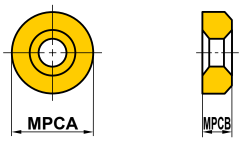
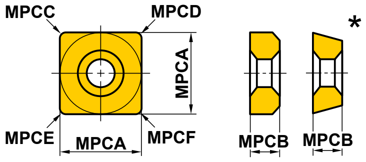
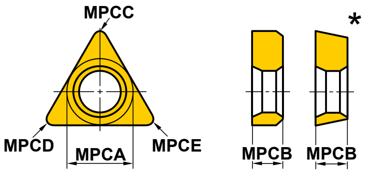
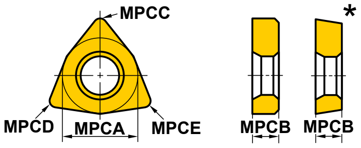
Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**KSS2**	6.6	M5×0.8	17.5	9	—	—	—	—	**FMAX** (➲K056)

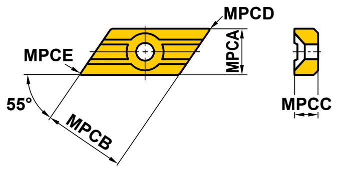
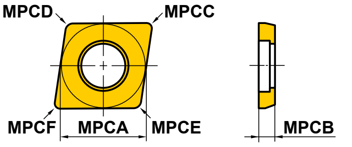
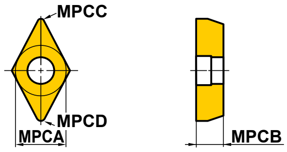
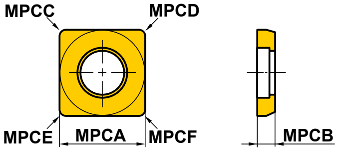
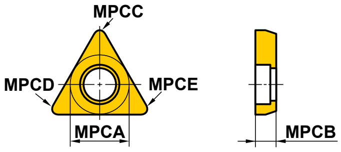
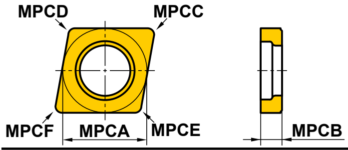
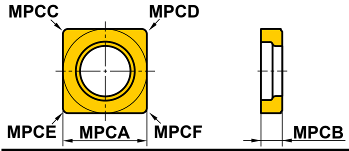
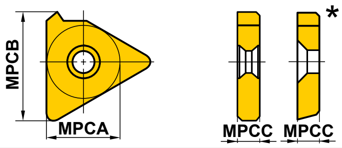
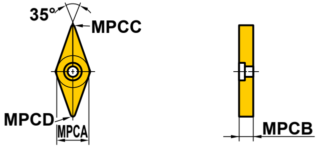
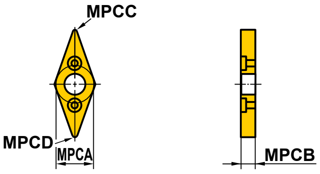
MICRO ADJUSTMENT NUT

Geometry	Order Number	Dimensions (mm)					Angle	MPCDS	TQ (N•m)	Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	B1			
	**KSN3**	8.6	M3×0.35	4.3	—	—	—	—	—	**FMAX** (➲K056)

SPARE PARTS

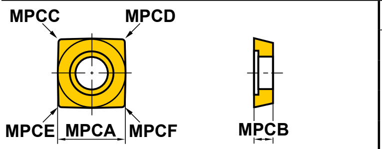
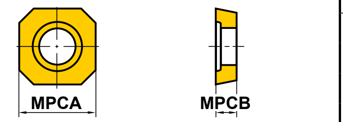
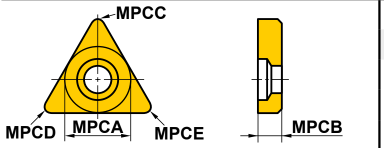
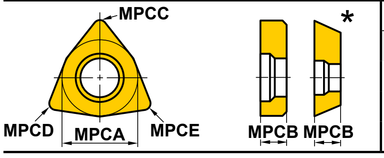
SHIM

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	* **PS42**	11.46	3.18	0.2	0.2	0.6	1.0	
	* **PT21**	5.11	2.38	0.2	0.2	0.6	–	**F** Type Boring Bar (➲E029)
	* **PT32**	8.28	3.18	0.2	0.2	0.6	–	
	* **PT42**	10.85	3.18	0.3	0.3	0.7	–	
	**DCSVN32**	9.52	3.18	0.8	1.2	–	–	**DOUBLE CLAMP** Holder (➲C019) **DOUBLE CLAMP DIMPLE BAR** (➲E017)
	**LLSCN3T3**	9.52	3.97	0.4	0.4	0.8	0.8	**LL** Type Holder (➲C008)
	LLSCN33	9.52	4.76	0.4	0.4	0.8	0.8	**LL** Type Holder (➲C008)
	LLSCN42	12.70	3.18	0.8	0.8	1.2	1.2	**DOUBLE CLAMP DIMPLE BAR** (➲E015)
	LLSCN53	15.87	4.76	1.2	1.2	1.6	1.6	**P** Type Boring Bar (➲E039)
	LLSCN63	19.05	4.76	1.2	1.2	1.6	1.6	**HSK** Tool Holder (➲H001)
	* **LLSCP42**	12.70	3.18	0.8	0.8	1.2	1.2	**DOUBLE CLAMP DIMPLE BAR** (➲E015)
	* **LLSCP63**	19.05	4.76	1.2	1.2	1.6	1.6	**P** Type Boring Bar (➲E039)
								HSK Tool Holder (➲H001)
	**LLSDN32**	9.52	3.18	0.8	1.2	–	–	**DOUBLE CLAMP** Holder (➲C010) **LL** Type Holder (➲C010) **DOUBLE CLAMP DIMPLE BAR** (➲E015) **P** Type Boring Bar (➲E039) **HSK** Tool Holder (➲H001)
	LLSDN42	12.70	3.18	0.8	1.2	–	–	
	LLSDN43	12.70	4.76	0.8	1.2	–	–	
	LLSDN53	15.87	4.76	1.2	1.6	–	–	
	* **LLSDP42**	12.70	3.18	0.8	1.2	–	–	**DOUBLE CLAMP DIMPLE BAR** (➲E015)
	**LLSRN103**	8.3	3.18	–	–	–	–	**LL** Type Holder (➲C026) **HSK** Tool Holder (➲H001)
	LLSRN123	9.8	3.18	–	–	–	–	
	LLSRN164	13.6	4.76	–	–	–	–	
	LLSRN204	17.3	4.76	–	–	–	–	
	LLSRN326	28.0	6.35	–	–	–	–	
	**LLSSN33**	9.52	4.76	0.8	0.8	1.2	1.2	**DOUBLE CLAMP DIMPLE BAR** (➲C014) **P** Type Boring Bar (➲E038)
	LLSSN42	12.70	3.18	0.8	0.8	1.2	1.6	
	LLSSN53	15.87	4.76	1.2	1.2	1.6	1.6	
	LLSSN63	19.05	4.76	1.2	1.2	1.6	2.0	
	LLSSN84	25.40	6.35	1.6	1.6	2.4	2.4	
	* **LLSSP42**	12.70	3.18	0.8	0.8	1.2	1.6	**DOUBLE CLAMP DIMPLE BAR** (➲E016)
	**LLSTE32**	7.6	3.18	0.4	0.4	0.4	–	**LL** Type Holder (➲C016) **DOUBLE CLAMP DIMPLE BAR** (➲E016) **P** Type Boring Bar (➲E038)
	LLSTN32	9.52	3.18	0.4	0.8	1.2	–	
	LLSTN33	9.52	4.76	0.4	0.8	1.2	–	
	LLSTN42	12.70	3.18	0.4	0.8	1.2	–	
	LLSTN53	15.87	4.76	0.8	1.2	1.6	–	
	* **LLSTP32**	9.52	3.18	0.4	0.8	1.2	–	
	**LLSWN32**	9.52	3.18	0.4	0.8	1.2	–	**LL** Type Holder (➲C022) **DOUBLE CLAMP** Holder (➲C022) **DOUBLE CLAMP DIMPLE BAR** (➲E017)
	LLSWN3T3	9.52	3.97	0.4	0.8	1.2	–	
	LLSWN42	12.70	3.18	0.4	0.8	1.2	–	
	* **LLSWP32**	9.52	3.18	0.4	0.8	1.2	–	
	* **LLSWP42**	12.70	3.18	0.4	0.8	1.2	–	

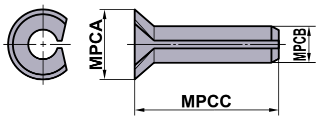
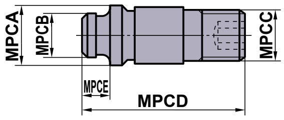
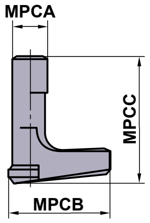
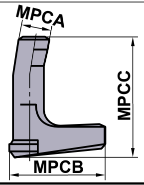
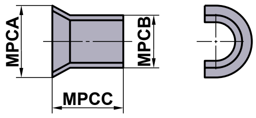
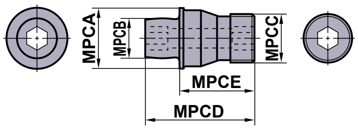
Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**MHS532R**	9.4	15.7	4.5	0.8	0.8	–	
 Hole position of this item is offset from centre.	**MLCP42**	12.58	3.18	1.2	1.2	1.2	1.2	**P** Type Boring Bar (➲E039)
 Hole position of this item is offset from centre.	**MLDP42**	12.56	3.18	1.2	1.2	–	–	**P** Type Boring Bar (➲E039)
 Hole position of this item is offset from centre.	**MLSP42**	12.63	3.18	1.2	1.2	1.2	1.2	**P** Type Boring Bar (➲E038)
 Hole position of this item is offset from centre.	**MLTP32**	9.50	3.18	1.2	1.2	1.2	–	**P** Type Boring Bar (➲E038)
	**MSCN63**	18.8	4.76	1.6	1.6	1.6	1.6	**DOUBLE CLAMP** Holder (➲C009) (For Heavy Cutting)
	**MSSN63**	18.8	4.76	1.6	1.6	1.6	1.6	**DOUBLE CLAMP** Holder (➲C012) (For Heavy Cutting)
	* **PT32T1R**	8.28	13.34	3.18	–	–	–	
	* **PT32T2R**	8.28	13.19	3.18	–	–	–	
	**PV321**	9.52	3.18	0.4	0.4	–	–	**MP** Type Holder (➲C019)
	PV322	9.52	3.18	0.8	0.8	–	–	
	PV323	9.52	3.18	1.2	1.2	–	–	
	**SPSVN32**	8.06	3.18	0.3	0.3	–	–	**SP** Type Holder (➲C030) **HSK** Tool Holder (➲H001)

SPARE PARTS

SHIM

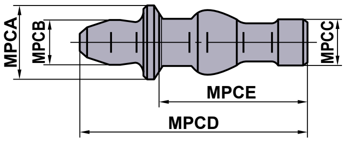
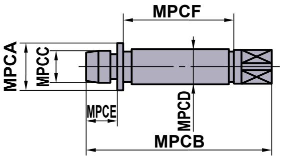
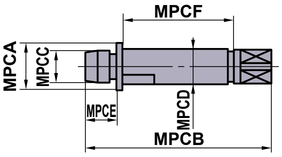
Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**STASX400N**	11.00	3.00	0.4	0.4	0.4	0.4	**ASX400** (➲K080)
	**STASX445N**	10.76	3.00	–	–	–	–	**ASX445** (➲K026)
	**WPSTN33**	9.3	4.76	0.8	0.4	1.2	–	**WP** Type Holder (➲C017)
	WPSTN43	12.50	4.76	0.8	0.4	1.2	–	
	* **WPSWC43**	12.50	4.76	0.4	0.8	1.2	–	
	WPSWN43	12.50	4.76	0.4	0.8	1.2	–	**WP** Type Holder (➲C023)

SHIM PIN AND CLAMP LEVER

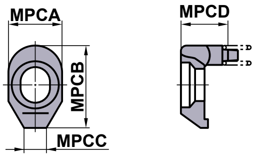
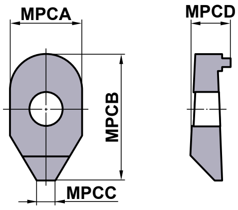
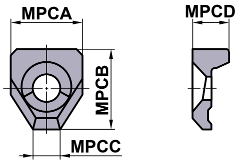
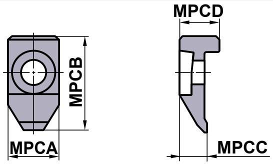
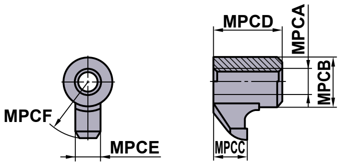
Geometry	Order Number	Dimensions (mm)					Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	
	**BCP141**	3.0	1.4	5.6	–	–	**SP** Type Holder (➲C030) **F** Type Boring Bar (➲E029) **HSK** Tool Holder (➲H013)
	BCP201	4.3	2	7.4	–	–	
	BCP202	4.3	2	6.4	–	–	
	**CCP33**	6.5	3.66	M5×0.8	18.5	3	**WP** Holder (➲C017)
	CCP34	7.5	5.0	M6×1.0	18.5	3	
	CCP44	7.5	5.0	M5×0.8	14.2	3	
	**LLCL12S**	2.1	9.3	5.6	–	–	**LL** Type Holder (➲C016) **P** Type Boring Bar (➲E039) **HSK** Tool Holder (➲H001)
	LLCL13	3.6	10	12.5	–	–	
	LLCL13S	3.6	10	7.8	–	–	
	LLCL14	4.7	13.4	13.2	–	–	
	LLCL14S	4.7	13.6	12.2	–	–	
	LLCL15	6.0	19	17	–	–	
	LLCL16	7.5	20.8	21	–	–	
	LLCL18	8.6	25.4	25.2	–	–	
	LLCL23	3.6	12.0	11.5	–	–	
	LLCL23S	3.6	11.6	9.5	–	–	
	LLCL24	4.7	16.2	14.8	–	–	
	LLCL25	6.0	17.1	17	–	–	
	**LLCL110**	3.0	10.7	11.6	–	–	
	LLCL112	3.5	13	13.5	–	–	
	LLCL116	4.5	18.5	18	–	–	
	LLCL120	5.6	20.3	19	–	–	
	LLCL125	6	24	24	–	–	
	LLCL132	8	30	27	–	–	
	**LLP13**	5.55	4.85	5.3	–	–	**LL** Type Holder (➲C008) **DOUBLE CLAMP** Holder (➲C008) **DOUBLE CLAMP DIMPLE BAR** (➲E015) **P** Type Boring Bar (➲E038) **HSK** Tool Holder (➲H001)
	LLP14	7.25	6.55	5.8	–	–	
	LLP15	8.8	8.05	8.6	–	–	
	LLP16	10.85	9.85	11.1	–	–	
	LLP18	15.35	13.05	12.0	–	–	
	LLP23	5.55	4.85	6.8	–	–	
	LLP24	7.25	6.55	9.1	–	–	
	**MP6**	11.9	7.8	M10×1	22.1	15	**DOUBLE CLAMP** Holder (➲C009) (For Heavy Cutting)

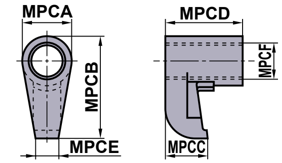
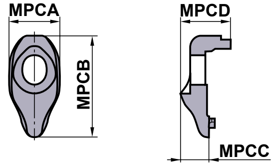
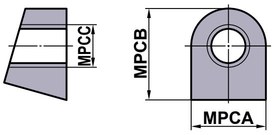
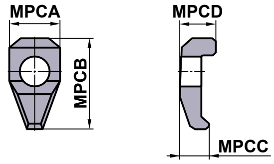
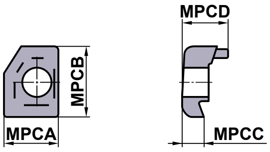
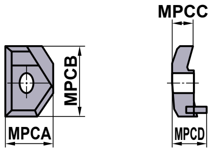
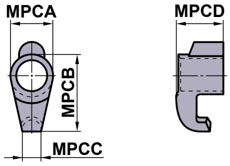
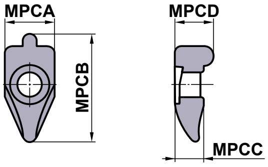
SPARE PARTS

LOCK PIN

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**P11S**	6	3.7	4	17	11.1	–	**MP** Type Holder (➲C019)
	P21S	7.5	4.9	4.5	17.2	11.5	–	
	**P221US**	4	18	2.11	3.5	3.3	7.7	
	**P333WS**	5.75	24	3.64	5.0	4.9	11.3	
	P434W	7.75	30	5.03	7.0	4.9	16.8	

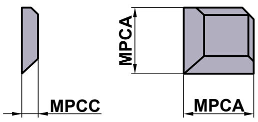
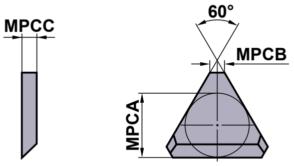
CLAMP BRIDGE

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**AMS3**	7	12	3	3.3	–	–	**Profile** Holder (➲C032) **AJX** (➲K196)
	AMS4	9	13.5	3	3.8	–	–	
	AMS5	10	15	3.5	5	–	–	
	**CA161**	13	20	6	8	–	–	
	**CCK13**	15	18.5	6	9	–	–	**WP** Type Holder (➲C017)
	CCK14	19	22	8	9.5	–	–	
	**CCTC1**	13	25	7	10.2	–	–	
	**CK231**	M6×1	8	4	7.5	4.5	9.5	
	CK232	M6×1	8	4.5	8	4.5	11.5	
	CK341	M8×1	11	5.5	13.5	6	13.5	
	CK342	M8×1	11	6	14	6	16.5	

Geometry	Order Number	Dimensions (mm)						Tool Holder
		MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	
	**CKW6**	10.9	22.5	9.2	16.8	5	M8×1	**DOUBLE CLAMP** Holder (➲C009) (For Heavy Cutting)
	**DCK2211**	11	22	6.57	11.1	–	–	**DOUBLE CLAMP** Holder (➲C008) **DOUBLE CLAMP DIMPLE BAR** (➲E015) **HSK** Tool Holder (➲H001)
	DCK2613	13	26.5	7.35	12.9	–	–	
	DCK3113	13	31	9	14.5	–	–	
	**KGC1**	12.0	15.0	M7×0.75	–	–	–	
	**LK1**	8	14.3	4.5	5.9	–	–	
	**MTK1R/L**	13	17.5	5	12	–	–	**MG** Type Holder (➲F132) **MT** Type Holder (➲G024) **HSK** Tool Holder (➲H001)
	**MTK2R/L**	18	28	7	14	–	–	
	**SETK51**	6.8	14.5	2.9	8	–	–	**MMTE** Type Holder (➲G019) **MMTI** Type Holder (➲G026) **HSK** Tool Holder (➲H001)
	SETK61	8.9	18.1	4.1	8.6	–	–	
	**SRK1R**	9.4	21	5.5	7.5	–	–	

SPARE PARTS

BREAKER PIECE

Geometry	Order Number	Dimensions (mm)					Tool Holder
		MPCA	MPCB	MPCC	IC	LBB	
	**CBS3D**	8.0	–	1.5	9.525	1.5	
	CBS4D	10.2	–	2.5	12.70	2.5	
	**CBT2N**	5.67	1.4	1.5	6.35	1.0	**F** Type Boring Bar (➲E029) *For positive inserts, the breaker width is 0.5mm larger than the figures in the list.
	CBT3F	8.53	1.4	2.5	9.525	1.5	
	CBT4N	11.07	1.4	2.5	12.70	2.5	

ANTI SEIZE LUBRICANT

ANTI SEIZE LUBRICANT

Shape	Order Number	Stock	Volume (g)
	**MK1K**	★	20
	**MK1KS**	★	3

★ : **Inventory maintained in Japan.**

Memo

TECHNICAL DATA

ISO13399 COMPLIANCE P002
TROUBLE SHOOTING FOR DRILLING P006
DRILL WEAR AND CUTTING EDGE DAMAGE P007
DRILL FEATURES AND SPECIFICATIONS P008
FORMULAE FOR DRILLING P011
METALLIC MATERIALS CROSS REFERENCE LIST P012
SURFACE ROUGHNESS P016
HARDNESS COMPARISON TABLE P017
FIT TOLERANCE TABLE (HOLE) P018
FIT TOLERANCE TABLE (SHAFT) P020
DRILL DIAMETERS FOR TAPPING P022
HEXAGON SOCKET HEAD BOLT HOLE SIZE P023
INTERNATIONAL SYSTEM OF UNITS P024

ISO13399 COMPLIANCE

List of Property Symbols Complying with ISO13399

Alphabetical

Source: ISO13399 standard
URL : https://www.iso.org/search/x/query/13399

ISO13399 Property Symbols	Content
ADJLX	Adjustment limit maximum
ADJRG	Adjustment range
ALF	Clearance angle radial
ALP	Clearance angle axial
AN	Clearance angle major
ANN	Clearance angle minor
APMX	Depth of cut maximum
AS	Clearance angle wiper edge
ASP	Adjusting screw protrusion
AZ	Plunge depth maximum
B	Shank width
BBD	Balanced by design
BCH	Corner chamfer length
BD	Body diameter
BDX	Body diameter maximum
BHCC	Bolt hole circle count
BHTA	Body half taper angle
BMC	Body material code
BS	Wiper edge length
BSR	Wiper edge radius
CASC	Cartridge size code
CB	Chip breaker face count
CBDP	Connection bore depth
CBMD	Chip breaker manufacturers designation
CBP	Chip breaker property
CCMS	Connection code machine side
CCWS	Connection code workpiece side
CCP	Chamfer corner property
CDI	Insert cutting diameter
CDX	Cutting depth maximum
CEATC	Tool cutting edge angle type code
CECC	Cutting edge condition code
CEDC	Cutting edge count
CF	Spot chamfer
CHW	Corner chamfer width
CICT	Cutting item count
CNC	Corner count
CND	Coolant entry diameter
CNSC	Coolant entry style code
CNT	Coolant entry thread size
CP	Coolant pressure
CRE	Spot radius
CRKS	Connection retention knob thread size
CSP	Coolant supply property
CTP	Coating property
CTX	Cutting point translation X-direction
CTY	Cutting point translation Y-direction
CUTDIA	Work piece parting diameter maximum
CUB	Connection unit basis
CW	Cutting width
CWX	Cutting width maximum
CXD	Coolant exit diameter

ISO13399 Property Symbols	Content
CXSC	Coolant exit style code
CZC	Connection size code
D1	Fixing hole diameter
DAH	Diameter access hole
DAXN	Axial groove outside diameter minimum
DAXX	Axial groove outside diameter maximum
DBC	Diameter bolt circle
DC	Cutting diameter
DCB	Connection bore diameter
DCBN	Connection bore diameter minimum
DCBX	Connection bore diameter maximum
DCC	Design configuration style code
DCCB	Counterbore diameter connection bore
DCIN	Cutting diameter internal
DCINN	Cutting diameter internal minimum
DCINX	Cutting diameter internal maximum
DCN	Cutting diameter minimum
DCON	Connection diameter
DCONMS	Connection diameter machine side
DCONWS	Connection diameter workpiece side
DCSC	Cutting diameter size code
DCSFMS	Contact surface diameter machine side
DCX	Cutting diameter maximum
DF	Flange diameter
DHUB	Hub diameter
DMIN	Minimum bore diameter
DMM	Shank diameter
DN	Neck diameter
DRVA	Drive angle
EPSR	Insert included angle
FHA	Flute helix angle
FHCSA	Fixing hole countersunk angle
FHCSD	Fixing hole countersunk diameter
FLGT	Flange thickness
FMT	Form type
FXHLP	Fixing hole property
GAMF	Rake angle radial
GAMN	Rake angle normal
GAMO	Rake angle orthogonal
GAMP	Rake angle axial
GAN	Insert rake angle
H	Shank height
HA	Thread height theoretical
HAND	Hand
HBH	Head bottom offset height
HBKL	Head back offset length
HBKW	Head back offset width
HBL	Head bottom offset length
HC	Thread height actual
HF	Functional height
HHUB	Hub height
HTB	Body height
IC	Inscribed circle diameter
IFS	Insert mounting style code
IIC	Insert interface code
INSL	Insert length
KAPR	Tool cutting edge angle
KCH	Corner chamfer angle

ISO13399 Property Symbols	Content
KRINS	Cutting edge angle major
KWW	Keyway width
KYP	Keyway property
L	Cutting edge length
LAMS	Inclination angle
LB	Body length
LBB	Chip breaker width
LBX	Body length maximum
LCCB	Counterbore depth connection bore
LCF	Length chip flute
LDRED	Reduced body diameter length
LE	Cutting edge effective length
LF	Functional length
LFA	a dimension on lf
LH	Head length
LPR	Protruding length
LS	Shank length
LSC	Clamping length
LSCN	Clamping length minimum
LSCX	Clamping length maximum
LTA	LTA length (length from MCS to CRP)
LU	Usable length
LUX	Usable length maximum
M	m-dimension
M2	Distance between the nominal inscribed circle and the corner of an insert that has the secondary included angle
MHA	Mounting hole angle
MHD	Mounting hole distance
MHH	Mounting hole height
MIID	Master insert identification
MTP	Clamping type code
NCE	Cutting end count
NOF	Flute count
NOI	Insert index count
NT	Tooth count
OAH	Overall height
OAL	Overall length
OAW	Overall width
PDPT	Profile depth insert
PDX	Profile distance ex
PDY	Profile distance ey
PFS	Profile style code
PL	Point length
PNA	Profile included angle
PRFRAD	Profile radius
PSIR	Tool lead angle
PSIRL	Cutting edge angle major left hand
PSIRR	Cutting edge angle major right hand
RAL	Relief angle left hand
RAR	Relief angle right hand
RCP	Rounded corner property
RE	Corner radius
REL	Corner radius left hand
RER	Corner radius right hand
RMPX	Ramping angle maximum
RPMX	Rotational speed maximum
S	Insert thickness
S1	Insert thickness total
SC	Insert shape code
SDL	Step diameter length
SIG	Point angle

ISO13399 Property Symbols	Content
SSC	Insert seat size code
SX	Shank cross section shape code
TC	Tolerance class insert
TCE	Tipped cutting edge code
TCTR	Thread tolerance class
TD	Thread diameter
THFT	Thread form type
THL	Threading length
THLGTH	Thread length
THSC	Tool holder shape code
THUB	Hub thickness
TP	Thread pitch
TPI	Threads per inch
TPIN	Threads per inch minimum
TPIX	Threads per inch maximum
TPN	Thread pitch minimum
TPT	Thread profile type
TPX	Thread pitch maximum
TQ	Torque
TSYC	Tool style code
TTP	Thread type
ULDR	Usable length diameter ratio
UST	Unit system
W1	Insert width
WEP	Wiper edge property
WF	Functional width
WF2	Distance between the cutting reference point and the front seating surface of a turning tool
WFS	Functional width secondary
WT	Weight of item
ZEFF	Face effective cutting edge count
ZEFP	Peripheral effective cutting edge count
ZNC	Cutting edge center count
ZNF	Face mounted insert count
ZNP	Peripheral mounted insert count

List of Reference Symbols Complying with ISO13399

ISO13399 Reference Symbols	Content
CIP	Coordinate system In Process
CRP	Cutting Reference Point
CSW	Coordinate System Workpiece side
MCS	Mounting Coordinate System
PCS	Primary Coordinate System

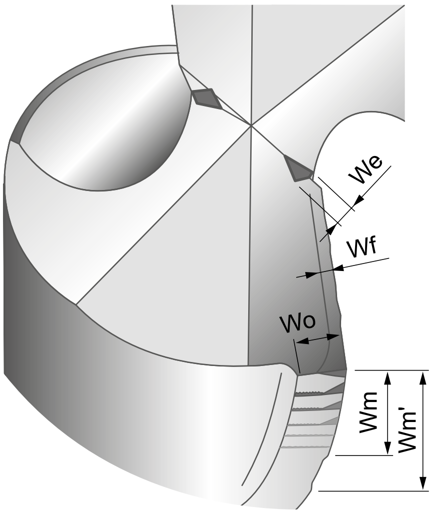
TROUBLE SHOOTING FOR DRILLING

Solution			Cutting Conditions									Style and Design of the Tool							Machine, Installation of Tool				
			Cutting speed	Feed	Lower feed at initial cutting	Lower feed when breaking through	Step feed	Increase accuracy of prep-hole and depth	Coolant			Chisel width	Honing width	Core thickness	Shorten flute length	Decrease lip height	Use internal coolant type drill	Change to a drill with X type thinning	Increase tool installation accuracy	Shorten tool overhang	Flat workpiece face	Increase work clamping rigidity	Reduce machine backlash and increase rigidity
Trouble		Factors	Up ↗ Down ↘						Increase oil ratio	Increase volume	Increase coolant pressure	Up ↗ Down ↘											
Deterioration of Tool Life	Drill breakage	Lack of drill rigidity												●↗	●								
		Improper cutting conditions		●↘																			
		Large deflection of the tool holder																	●				●
		Workpiece face is inclined																			●		
	Large wear at the peripheral cutting edge and along the land	Improper cutting conditions	●↘																				
		An increase in temperature at the cutting point							●	●							●						
		Poor run-out accuracy																	●				
	Chipping of the peripheral cutting edge	Improper cutting conditions		●↘			●																
		Large deflection of the tool holder																	●				●
		Chattering, vibration											●↘							●		●	●
	Chisel edge chipping	The chisel edge width is too wide										●↘											
		Poor entry			●																		
		Chattering, vibration											●↘							●		●	●
Deterioration of Hole Accuracy	Hole diameter increases	Lack of drill rigidity												●↗	●								
		Improper drill geometry														●							
	Hole diameter becomes smaller	An increase in temperature at the cutting point							●	●							●						
		Improper cutting conditions	●↘																				
		Improper drill geometry														●							
	Poor straightness	Lack of drill rigidity												●↗	●								
		Large deflection of the tool holder																	●				●
		Poor guiding properties						●															
	Poor hole positioning accuracy, roundness and surface finish	Lack of drill rigidity												●↗	●								
		Poor entry																●					
		Improper cutting conditions			●																		
		Large deflection of the tool holder																	●				●
Burrs	Burrs at the hole exit	Improper drill geometry											●↘										
		Improper cutting conditions				●																	
Poor Chip Dispersal	Long chips	Improper cutting conditions		●↗				●															
		Poor chip disposal								●	●			●↘			●						
	Chip jamming	Improper cutting conditions	●↘	●↘				●															
		Poor chip disposal								●	●			●↘			●						

DRILL WEAR AND CUTTING EDGE DAMAGE

■DRILL WEAR CONDITION

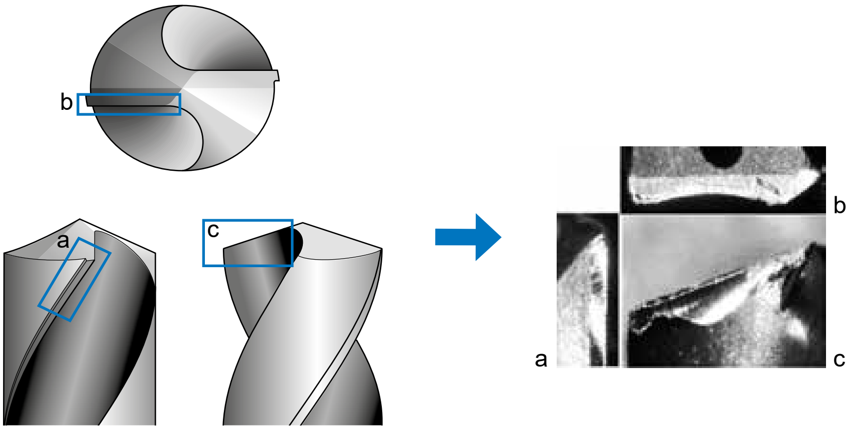
The table below shows a simple drawing depicting the wear of the cutting edge of a drill. The generation and the amount of wear differ according to the workpiece and cutting conditions used. But generally, the peripheral wear is largest and determines a drills' tool life. When regrinding, the flank wear at the point needs to be ground away completely. Therefore, if there is large wear more material needs to be ground away to renew the cutting edge.



We : **Chisel edge wear width**
Wf : **Flank Wear (The middle of the cutting edge)**
Wo : **Outer corner wear width**
Wm : **Margin wear width**
Wm' : **Margin wear width (Leading edge)**

■CUTTING EDGE DAMAGE

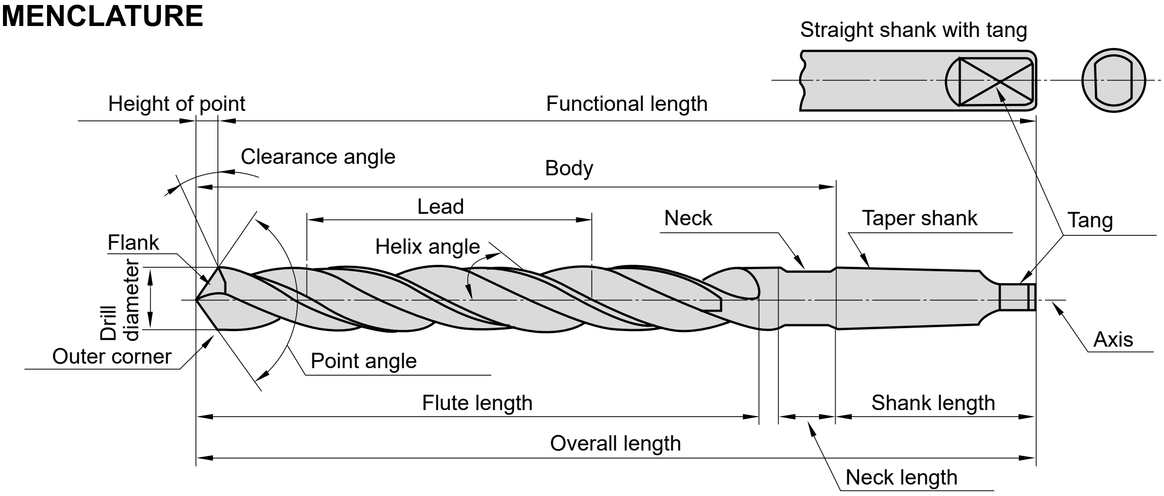
When drilling, the cutting edge of the drill can suffer from chipping, fracture and abnormal damage. In such cases, it is important to take a closer look at the damage, investigate the cause and take countermeasures.

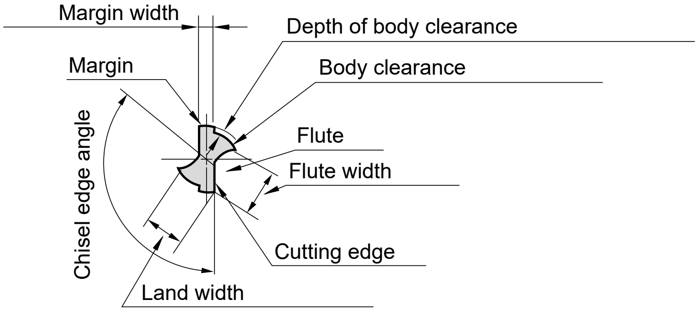


Cutting edge damage

DRILL FEATURES AND SPECIFICATION

■NOMENCLATURE





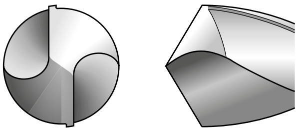
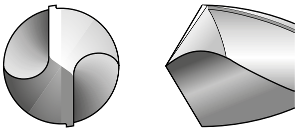
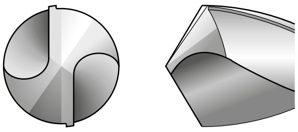
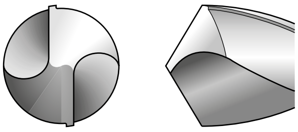
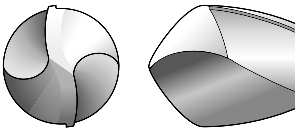
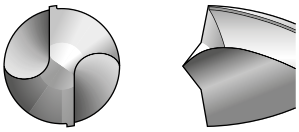
■SHAPE SPECIFICATION AND CUTTING CHARACTERISTICS

Helix Angle	It is the inclination of the flute with respect to the axial direction of a drill, which corresponds to the rake angle. The rake angle of a drill differs according to the position of the cutting edge, and it decreases greatly as the circumference approaches the centre. **High-hardness material Small ◀·· Rake angle ··▶ Large Soft material** (Aluminium, etc.)
Flute Length	It is determined by depth of hole, bush length and regrinding allowance. The influence on the tool life is great therefore it is necessary to minimize it as much as possible.
Point Angle	A standard point angle is 118° and can be changed to suit different applications. **Soft material with good machinability Small ◀·· Point angle ··▶ Large For hard material and high-efficiency machining**
Web Thickness	It is an important element that determines the rigidity and chip breaking performance of a drill. The web thickness is set according to applications. Small cutting resistance Low rigidity Good chip raking performance Machinable material **Thin ◀·· Web thickness ··▶ Thick** Large cutting resistance High rigidity Poor chip raking performance High-hardness material, cross hole drilling, etc.
Margin	The tip determines the drill diameter and functions as a drill guide during drilling. The margin width is determined in consideration of friction with a drilled hole. **Poor guiding performance Small ◀·· Margin width ··▶ Large Good guiding performance**
Diameter Back Taper	To reduce friction with the inside of the drilled hole, the portion of the flute from the tip to the shank is tapered slightly. The degree of taper is usually represented by the quantity of reduction in the diameter with respect to the flute length, which is approx. 0.04−0.1mm. It is set at a larger value for high-efficiency drills and the workpiece that tend to shrink after machining.

■CUTTING EDGE GEOMETRY AND ITS INFLUENCE

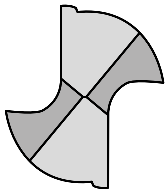
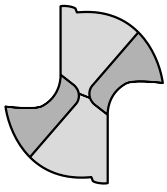
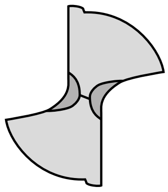
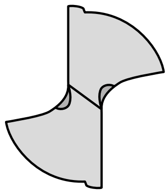
As shown in the table below, it is possible to select the most suitable cutting edge geometry for different applications. If the most suitable cutting edge geometry is selected then higher machining efficiency and higher hole accuracy can be obtained.

●Cutting Edge Shapes

Grinding Name	Shape	Features and Effect	Application
Conical		• The flank is conical and the clearance angle increases toward the centre of the drill.	• General Use
Flat		• The flank is flat. • Easy grinding.	• Mainly for small diameter drills.
Three Flank Angles		• As there is no chisel edge, the results are high centripetal force and minor hole oversize. • Requires a special grinding machine. • Surface grinding of three sides.	• For drilling operations that require high hole accuracy and positioning accuracy.
Spiral Point		• To increase the clearance angle near the centre of the drill, conical grinding combined with irregular helix. • S type chisel edge with high centripetal force and machining accuracy.	• For drilling that requires high accuracy.
Radial Lip		• The cutting edge is ground radial with the aim of dispersing load. • High machining accuracy and finished surface roughness. • For through holes, small burrs on the base. • Requires a special grinding machine.	• Cast Iron, Aluminium Alloy • For cast iron plates. • Steel
Centre Point Drill		• This geometry has two-stage point angle for better concentricity and a reduction in shock when exiting the workpiece.	• For thin sheet drilling.

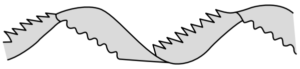
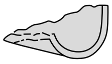
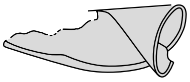
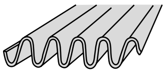
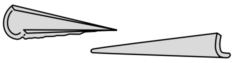
■WEB THINNING

The rake angle of the cutting edge of a drill reduces toward the centre, and it changes into a negative angle at the chisel edge. During drilling, the centre of a drill crushes the work, generating 50−70% of the cutting resistance. Web thinning is very effective for reduction in the cutting resistance of a drill, early removal of chips at the chisel edge and better initial bite.

Shape	 **X type**	 **XR type**	 **S type**	 **N type**
Features	The thrust load substantially reduces, and the initial bite performance improves. This shape is effective when the web is rather thick.	The biting performance is slightly inferior to that of X type, but the cutting edge is hard and the application range is wide.	Cutting is easy. This shape is generally used.	Effective when the web is comparatively thick.
Major Applications	General and deep hole drilling.	Long life. General materials and stainless steel drilling.	General drilling for steel, cast iron and non-ferrous metal.	Deep hole drilling.

DRILL FEATURES AND SPECIFICATION

■DRILLING CHIPS

Types of Chips	Shape	Features and Ease of Raking
Conical Spiral		Fan-shaped chips formed by the cutting edge are curved by the flute. Chips of this type are produced when drilling ductile material at small feed rates. If the chip breaks after several turns, the chip breaking performance is satisfactory.
Long Pitch		Long pitch chips exit without curling and will easily coil around the drill.
Fan		This is a chip broken by the drill flute and the wall of a drilled hole. It is generated when the feed rate is high.
Segment		A conical spiral chip that is broken just before the chip grows into the long-pitch shape by the wall of the drilled hole due to its insufficient ductility. Excellent chip disposal and chip discharge.
Zigzag		A chip that is buckled and folded because of the shape of flute and the characteristics of the material. It easily causes chip packing at the flute.
Needle		Chips broken by vibration or broken when brittle material is curled with a small radius. The breaking performance is comparatively satisfactory, but these chips can become closely packed.

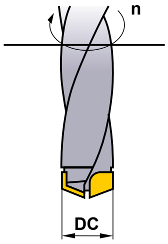
FORMULAS FOR DRILLING

■CUTTING SPEED (Vc)

$$\mathbf{Vc} = \frac{\pi \cdot DC \cdot n}{1000} \ (m/min)$$

Vc (m/min): Cutting Speed
π (3.14) : Pi
DC (mm) : Drill Diameter
n (min^{-1}) : Main Axis Spindle Speed

*Divide by 1,000 to change to m from mm.



(Example) What is the cutting speed when the main axis spindle speed is 1350 min^{-1} and drill diameter is 12 mm?

(Answer) Substitute π=3.14, DC=12, n=1350 into the formula

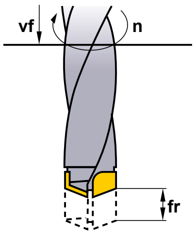
$$Vc = \frac{\pi \cdot DC \cdot n}{1000} = \frac{3.14 \times 12 \times 1350}{1000} = 50.9 m/min$$

The cutting speed is 50.9 m/min.

■FEED OF THE MAIN SPINDLE (Vf)

$$\mathbf{Vf = fr \cdot n (mm/min)}$$

Vf (mm/min) : Feed Speed of the Main Spindle (Z axis)
fr (mm/rev) : Feed per Revolution
n (min^{-1}) : Main Axis Spindle Speed



(Example) What is the spindle feed (Vf) when the feed per revolution is 0.2 mm/rev and the main axis spindle speed is 1350 min^{-1} ?

(Answer) Substitute fr=0.2, n=1350 into the formula

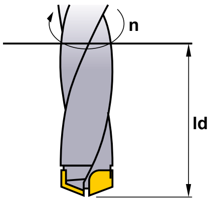
Vf = fr×n = 0.2×1350 = 270 mm/min

The spindle feed is 270 mm/min.

■DRILLING TIME (Tc)

$$Tc = \frac{ld \cdot i}{n \cdot fr}$$

Tc (min) : Drilling Time
n (min^{-1}) : Spindle Speed
ld (mm) : Hole Depth
fr (mm/rev) : Feed per Revolution
i : Number of Holes



(Example) What is the drilling time required for drilling a 30 mm length hole in alloy steel at a cutting speed of 50m/min and a feed 0.15 mm/rev ?

(Answer) Spindle Speed $n = \frac{50 \times 1000}{15 \times 3.14} = 1061.57 \ min^{-1}$

$$Tc = \frac{30 \times 1}{1061.57 \times 0.15} = 0.188$$

$$= 0.188 \times 60 \fallingdotseq 11.3 \ sec$$

METALLIC MATERIALS CROSS REFERENCE LIST

■CARBON STEEL

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
1.0038	RSt.37-2	4360 40 C	–	E 24-2 Ne	–	–	1311	STKM 12A STKM 12C	A570.36	15
1.0401	C15	080M15	–	CC12	C15, C16	F.111	1350	–	1015	15
1.0402	C22	050A20	2C	CC20	C20, C21	F.112	1450	–	1020	20
1.0715	9SMn28	230M07	1A	S250	CF9SMn28	F.2111 11SMn28	1912	SUM22	1213	Y15
1.0718	9SMnPb28	–	–	S250Pb	CF9SMnPb28	11SMnPb28	1914	SUM22L	12L13	–
1.0722	10SPb20	–	–	10PbF2	CF10Pb20	10SPb20	–	–	–	–
1.0736	9SMn36	240M07	1B	S300	CF9SMn36	12SMn35	–	–	1215	Y13
1.0737	9SMnPb36	–	–	S300Pb	CF9SMnPb36	12SMnP35	1926	–	12L14	–
1.1141	Ck15	080M15	32C	XC12	C16	C15K	1370	S15C	1015	15
1.1158	Ck25	–	–	–	–	–	–	S25C	1025	25
1.8900	StE380	4360 55 E	–	–	FeE390KG	–	2145	–	A572-60	–
1.0501	C35	060A35	–	CC35	C35	F.113	1550	–	1035	35
1.0503	C45	080M46	–	CC45	C45	F.114	1650	–	1045	45
1.0726	35S20	212M36	8M	35MF4	–	F210G	1957	–	1140	–
1.1157	40Mn4	150M36	15	35M5	–	–	–	–	1039	40Mn
1.1167	36Mn5	–	–	40M5	–	36Mn5	2120	SMn438(H)	1335	35Mn2
1.1170	28Mn6	150M28	14A	20M5	C28Mn	–	–	SCMn1	1330	30Mn
1.1183	Cf35	060A35	–	XC38TS	C36	–	1572	S35C	1035	35Mn
1.1191	Ck45	080M46	–	XC42	C45	C45K	1672	S45C	1045	Ck45
1.1213	C50	060A52	–	XC48TS	C53	–	1674	S50C	1050	50
1.0535	C55	070M55	9	–	C55	–	1655	–	1055	55
1.0601	C60	080A62	43D	CC55	C60	–	–	–	1060	60
1.1203	Ck55	070M55	–	XC55	C50	C55K	–	S55C	1055	55
1.1221	Ck60	080A62	43D	XC60	C60	–	1678	S58C	1060	60Mn
1.1274	Ck101	060A96	–	XC100	–	F.5117	1870	–	1095	–
1.1545	C105W1	BW1A	–	Y105	C36KU	F.5118	1880	SK3	W1	–
1.1545	C105W1	BW2	–	Y120	C120KU	F.515	2900	SUP4	W210	–

■ALLOY STEEL

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
1.0144	St.44.2	4360 43 C	–	E28-3	–	–	1412	SM400A, SM400B SM400C	A573-81	–
1.0570	St52-3	4360 50 B	–	E36-3	Fe52BFN Fe52CFN	–	2132	SM490A, SM490B SM490C	–	–
1.0841	St52-3	150M19	–	20MC5	Fe52	F.431	2172	–	5120	–
1.0904	55Si7	250A53	45	55S7	55Si8	56Si7	2085	–	9255	55Si2Mn
1.0961	60SiCr7	–	–	60SC7	60SiCr8	60SiCr8	–	–	9262	–
1.3505	100Cr6	534A99	31	100C6	100Cr6	F.131	2258	SUJ2	ASTM 52100	Gr15, 45G
1.5415	15Mo3	1501-240	–	15D3	16Mo3KW	16Mo3	2912	–	ASTM A204Gr.A	–
1.5423	16Mo5	1503-245-420	–	–	16Mo5	16Mo5	–	–	4520	–
1.5622	14Ni6	–	–	16N6	14Ni6	15Ni6	–	–	ASTM A350LF5	–
1.5662	X8Ni9	1501-509-510	–	–	X10Ni9	XBNi09	–	–	ASTM A353	–
1.5710	36NiCr6	640A35	111A	35NC6	–	–	–	SNC236	3135	–
1.5732	14NiCr10	–	–	14NC11	16NiCr11	15NiCr11	–	SNC415(H)	3415	–
1.5752	14NiCr14	655M13	36A	12NC15	–	–	–	SNC815(H)	3415, 3310	–
1.6523	21NiCrMo2	805M20	362	20NCD2	20NiCrMo2	20NiCrMo2	2506	SNCM220(H)	8620	–
1.6546	40NiCrMo22	311-Type 7	–	–	40NiCrMo2(KB)	40NiCrMo2	–	SNCM240	8740	–
1.6587	17CrNiMo6	820A16	–	18NCD6	–	14NiCrMo13	–	–	–	–
1.7015	15Cr3	523M15	–	12C3	–	–	–	SCr415(H)	5015	15Cr

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.7045	42Cr4	–	–	–	–	42Cr4	2245	SCr440	5140	40Cr
1.7176	55Cr3	527A60	48	55C3	–	–	–	SUP9(A)	5155	20CrMn
1.7262	15CrMo5	–	–	12CD4	–	12CrMo4	2216	SCM415(H)	–	–
1.7335	13CrMo4 4	1501-620Gr27	–	15CD3.5 15CD4.5	14CrMo45	14CrMo45	–	–	ASTM A182 F11, F12	–
1.7380	10CrMo910	1501-622 Gr31, 45	–	12CD9 12CD10	12CrMo9 12CrMo10	TU.H	2218	–	ASTM A182 F.22	–
1.7715	14MoV63	1503-660-440	–	–	–	13MoCrV6	–	–	–	–
1.8523	39CrMoV13 9	897M39	40C	–	36CrMoV12	–	–	–	–	–
1.6511	36CrNiMo4	816M40	110	40NCD3	38NiCrMo4(KB)	35NiCrMo4	–	–	9840	–
1.6582	34CrNiMo6	817M40	24	35NCD6	35NiCrMo6(KB)	–	2541	–	4340	40CrNiMoA
1.7033	34Cr4	530A32	18B	32C4	34Cr4(KB)	35Cr4	–	SCr430(H)	5132	35Cr
1.7035	41Cr4	530M40	18	42C4	41Cr4	42Cr4	–	SCr440(H)	5140	40Cr
1.7131	16MnCr5	(527M20)	–	16MC5	16MnCr5	16MnCr5	2511	–	5115	18CrMn
1.7218	25CrMo4	1717CDS110 708M20	–	25CD4	25CrMo4(KB)	55Cr3	2225	SCM420 SCM430	4130	30CrMn
1.7220	34CrMo4	708A37	19B	35CD4	35CrMo4	34CrMo4	2234	SCM432 SCCRM3	4137 4135	35CrMo
1.7223	41CrMo4	708M40	19A	42CD4TS	41CrMo4	42CrMo4	2244	SCM 440	4140 4142	40CrMoA
1.7225	42CrMo4	708M40	19A	42CD4	42CrMo4	42CrMo4	2244	SCM440(H)	4140	42CrMo 42CrMnMo
1.7361	32CrMo12	722M24	40B	30CD12	32CrMo12	F.124.A	2240	–	–	–
1.8159	50CrV4	735A50	47	50CV4	50CrV4	51CrV4	2230	SUP10	6150	50CrVA
1.8509	41CrAlMo7	905M39	41B	40CAD6 40CAD2	41CrAlMo7	41CrAlMo7	2940	–	–	–
1.2067	100Cr6	BL3	–	Y100C6	–	100Cr6	–	–	L3	CrV, 9SiCr
1.2419	105WCr6	–	–	105WC13	100WCr6 107WCr5KU	105WCr5	2140	SKS31 SKS2, SKS3	–	CrWMo
1.2713	55NiCrMoV6	BH224/5	–	55NCDV7	–	F.520.S	–	SKT4	L6	5CrNiMo
1.5662	X8Ni9	1501-509	–	–	X10Ni9	XBNi09	–	–	ASTM A353	–
1.5680	12Ni19	–	–	Z18N5	–	–	–	–	2515	–
1.6657	14NiCrMo134	832M13	36C	–	15NiCrMo13	14NiCrMo131	–	–	–	–
1.2080	X210Cr12	BD3	–	Z200C12	X210Cr13KU X250Cr12KU	X210Cr12	–	SKD1	D3 ASTM D3	Cr12
1.2601	X153CrMoV12	BD2	–	–	X160CrMoV12	–	–	SKD11	D2	Cr12MoV
1.2363	X100CrMoV5	BA2	–	Z100CDV5	X100CrMoV5	F.5227	2260	SKD12	A2	Cr5Mo1V
1.2344	X40CrMoV51 X40CrMoV51	BH13	–	Z40CDV5	X35CrMoV05KU X40CrMoV51KU	X40CrMoV5	2242	SKD61	H13 ASTM H13	40CrMoV5
1.2436	X210CrW12	–	–	–	X215CrW121KU	X210CrW12	2312	SKD2	–	–
1.2542	45WCrV7	BS1	–	–	45WCrV8KU	45WCrSi8	2710	–	S1	–
1.2581	X30WCrV93	BH21	–	Z30WCV9	X28W09KU	X30WCrV9	–	SKD5	H21	30WCrV9
1.2601	X165CrMoV12	–	–	–	X165CrMoW12KU	X160CrMoV12	2310	–	–	–
1.2833	100V1	BW2	–	Y1105V	–	–	–	SKS43	W210	V
1.3255	S 18-1-2-5	BT4	–	Z80WKCV	X78WCo1805KU	HS18-1-1-5	–	SKH3	T4	W18Cr4VCo5
1.3355	S 18-0-1	BT1	–	Z80WCV	X75W18KU	HS18-0-1	–	SKH2	T1	–
1.3401	G-X120Mn12	Z120M12	–	Z120M12	XG120Mn12	X120MN12	–	SCMnH/1	–	–
1.4718	X45CrSi93	401S45	52	Z45CS9	X45CrSi8	F.322	–	SUH1	HW3	X45CrSi93
1.3343	S6-5-2	4959BA2	–	Z40CSD10	15NiCrMo13	–	2715	SUH3	D3	–
1.3343	S6/5/2	BM2	–	Z85WDCV	HS6-5-2-2	F.5603	2722	SKH9, SKH51	M2	–
1.3348	S 2-9-2	–	–	–	HS2-9-2	HS2-9-2	2782	–	M7	–
1.3243	S6/5/2/5	BM35	–	6-5-2-5	HS6-5-2-5	F.5613	2723	SKH55	M35	–

METALLIC MATERIALS CROSS REFERENCE LIST

■STAINLESS STEEL (FERRITIC,MARTENSITIC)

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.4000	X7Cr13	403S17	–	Z6C13	X6Cr13	F.3110	2301	SUS403	403	OCr13 1Cr12
1.4001	X7Cr14	–	–	–	–	F.8401	–	–	–	–
1.4005	X12CrS13	416S21	–	Z11CF13	X12CrS13	F.3411	2380	SUS416	416	–
1.4006	X10Cr13	410S21	56A	Z10C14	X12Cr13	F.3401	2302	SUS410	410	1Cr13
1.4016	X8Cr17	430S15	60	Z8C17	X8Cr17	F.3113	2320	SUS430	430	1Cr17
1.4027	G-X20Cr14	420C29	56B	Z20C13M	–	–	–	SCS2	–	–
1.4034	X46Cr13	420S45	56D	Z40CM Z38C13M	X40Cr14	F.3405	2304	SUS420J2	–	4Cr13
1.4003	–	405S17	–	Z8CA12	X6CrAl13	–	–	–	405	–
1.4021	–	420S37	–	Z8CA12	X20Cr13	–	2303	–	420	–
1.4057	X22CrNi17	431S29	57	Z15CNi6.02	X16CrNi16	F.3427	2321	SUS431	431	1Cr17Ni2
1.4104	X12CrMoS17	–	–	Z10CF17	X10CrS17	F.3117	2383	SUS430F	430F	Y1Cr17
1.4113	X6CrMo17	434S17	–	Z8CD17.01	X8CrMo17	–	2325	SUS434	434	1Cr17Mo
1.4313	X5CrNi134	425C11	–	Z4CND13.4M	(G)X6CrNi304	–	2385	SCS5	CA6-NM	–
1.4724	X10CrA113	403S17	–	Z10C13	X10CrA112	F.311	–	SUS405	405	OCr13Al
1.4742	X10CrA118	430S15	60	Z10CAS18	X8Cr17	F.3113	–	SUS430	430	Cr17
1.4747	X80CrNiSi20	443S65	59	Z80CSN20.02	X80CrSiNi20	F.320B	–	SUH4	HNV6	–
1.4762	X10CrA124	–	–	Z10CAS24	X16Cr26	–	2322	SUH446	446	2Cr25N
1.4871	X53CrMnNiN219	349S54	–	Z52CMN21.09	X53CrMnNiN219	–	–	SUH35	EV8	5Cr2Mn9Ni4N
1.4521	X1CrMoTi182	–	–	–	–	–	2326	–	S44400	–
1.4922	X20CrMoV12-1	–	–	–	X20CrMoNi1201	–	2317	–	–	–
1.4542	–	–	–	Z7CNU17-04	–	–	–	–	630	–

■STAINLESS STEEL (AUSTENITIC)

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	JIS	AISI/SAE	GB
1.4306	X2CrNi1911	304S11	–	Z2CN18.10	X2CrNi18.11	–	2352	SUS304L	304L	OCr19Ni10
1.4350	X5CrNi189	304S11	58E	Z6CN18.09	X5CrNi1810	F.3551 F.3541 F.3504	2332	SUS304	304	OCr18Ni9
1.4305	X12CrNiS188	303S21	58M	Z10CNF18.09	X10CrNiS18.09	F.3508	2346	SUS303	303	1Cr18Ni9MoZr
–	–	304C12	–	Z3CN19.10	–	–	2333	SUS304L	–	–
1.4306	X2CrNi189	304S12	–	Z2CrNi1810	X2CrNi18.11	F.3503	2352	SCS19	304L	–
1.4310	X12CrNi177	–	–	Z12CN17.07	X12CrNi1707	F.3517	2331	SUS301	301	Cr17Ni7
1.4311	X2CrNiN1810	304S62	–	Z2CN18.10	–	–	2371	SUS304LN	304LN	–
1.4401	X5CrNiMo1810	316S16	58J	Z6CND17.11	X5CrNiMo1712	F.3543	2347	SUS316	316	0Cr17Ni11Mo2
1.4308	G-X6CrNi189	304C15	–	Z6CN18.10M	–	–	–	SCS13	–	–
1.4408	G-X6CrNiMo1810	316C16	–	–	–	F.8414	–	SCS14	–	–
1.4581	G-X5CrNiMoNb1810	318C17	–	Z4CNDNb1812M	XG8CrNiMo1811	–	–	SCS22	–	–
1.4429	X2CrNiMoN1813	–	–	Z2CND17.13	–	–	2375	SUS316LN	316LN	OCr17Ni13Mo
1.4404	–	316S13	–	Z2CND17.12	X2CrNiMo1712	–	2348	–	316L	–
1.4435	X2CrNiMo1812	316S13	–	Z2CND17.12	X2CrNiMo1712	–	2353	SCS16 SUS316L	316L	OCr27Ni12Mo3
1.4436	–	316S13	–	Z6CND18-12-03	X8CrNiMo1713	–	2343, 2347	–	316	–
1.4438	X2CrNiMo1816	317S12	–	Z2CND19.15	X2CrNiMo1816	–	2367	SUS317L	317L	OOCr19Ni13Mo
1.4539	X1NiCrMo	–	–	Z6CNT18.10	–	–	2562	–	UNS V 0890A	–
1.4541	X10CrNiTi189	321S12	58B	Z6CNT18.10	X6CrNiTi1811	F.3553 F.3523	2337	SUS321	321	1Cr18NI9Ti
1.4550	X10CrNiNb189	347S17	58F	Z6CNNb18.10	X6CrNiNb1811	F.3552 F.3524	2338	SUS347	347	1Cr18Ni11Nb
1.4571	X10CrNiMoTi1810	320S17	58J	Z6CNDT17.12	X6CrNiMoTi1712	F.3535	2350	–	316Ti	Cr18Ni12Mo2T
1.4583	X10CrNiMoNb1812	–	–	Z6CNDNb1713B	X6CrNiMoNb1713	–	–	–	318	Cr17Ni12Mo3Mb

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
1.4828	X15CrNiSi2012	309S24	–	Z15CNS20.12	X6CrNi2520	–	–	SUH309	309	1Cr23Ni13
1.4845	X12CrNi2521	310S24	–	Z12CN2520	X6CrNi2520	F.331	2361	SUH310	310S	OCr25Ni20
1.4406	X10CrNi18.08	–	58C	Z1NCDU25.20	–	F.8414	2370	SCS17	308	–
1.4418	X4CrNiMo165	–	–	Z6CND16-04-01	–	–	–	–	–	–
1.4568 1.4504	–	316S111	–	Z8CNA17-07	X2CrNiMo1712	–	–	–	17-7PH	–
1.4563	–	–	–	Z1NCDU31-27-03 Z1CNDU20-18-06AZ	–	–	2584 2378	–	NO8028 S31254	–
1.4878	X12CrNiTi189	321S32	58B, 58C	Z6CNT18.12B	X6CrNiTi18 11	F.3523	–	SUS321	321	1Cr18Ni9Ti

HEAT RESISTANT STEELS

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
1.4864	X12NiCrSi3616	–	–	Z12NCS35.16	–	–	–	SUH330	330	–
1.4865	G-X40NiCrSi3818	330C11	–	–	XG50NiCr3919	–	–	SCH15	HT, HT 50	–

GRAY CAST IRON

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
–	–	–	–	–	–	–	0100	–	–	–
–	GG 10	–	–	Ft 10 D	–	–	0110	FC100	No 20 B	–
0.6015	GG 15	Grade 150	–	Ft 15 D	G15	FG15	0115	FC150	No 25 B	HT150
0.6020	GG 20	Grade 220	–	Ft 20 D	G20	–	0120	FC200	No 30 B	HT200
0.6025	GG 25	Grade 260	–	Ft 25 D	G25	FG25	0125	FC250	No 35 B	HT250
–	–	–	–	–	–	–	–	–	No 40 B	–
0.6030	GG 30	Grade 300	–	Ft 30 D	G30	FG30	0130	FC300	No 45 B	HT300
0.6035	GG 35	Grade 350	–	Ft 35 D	G35	FG35	0135	FC350	No 50 B	HT350
0.6040	GG 40	Grade 400	–	Ft 40 D	–	–	0140	–	No 55 B	HT400
0.6660	GGL NiCr202	L-NiCuCr202	–	L-NC 202	–	–	0523	–	A436 Type 2	–

DUCTILE CAST IRON

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
0.7040	GGG 40	SNG 420/12	–	FCS 400-12	GS 370-17	FGE 38-17	07 17-02	FCD400	60-40-18	QT400-18
–	GGG 40.3	SNG 370/17	–	FGS 370-17	–	–	07 17-12	–	–	–
0.7033	GGG 35.3	–	–	–	–	–	07 17-15	–	–	–
0.7050	GGG 50	SNG 500/7	–	FGS 500-7	GS 500	FGE 50-7	07 27-02	FCD500	80-55-06	QT500-7
0.7660	GGG NiCr202	Grade S6	–	S-NC202	–	–	07 76	–	A43D2	–
–	GGG NiMn137	L-NiMn 137	–	L-MN 137	–	–	07 72	–	–	–
–	GGG 60	SNG 600/3	–	FGS 600-3	–	–	07 32-03	FCD600	–	QT600-3
0.7070	GGG 70	SNG 700/2	–	FGS 700-2	GS 700-2	FGS 70-2	07 37-01	FCD700	100-70-03	QT700-18

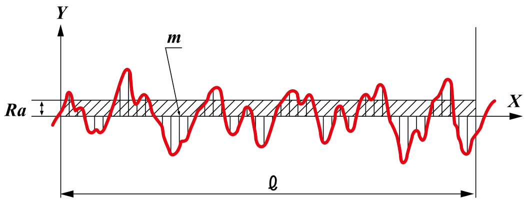
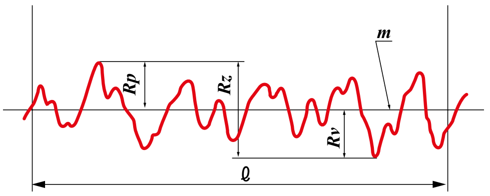
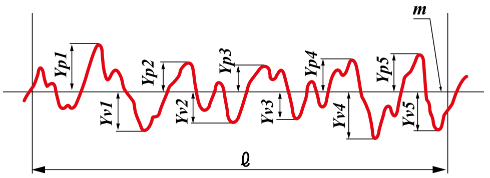
MALLEABLE CAST IRON

Germany		U.K.		France	Italy	Spain	Sweden	Japan	USA	China
W-nr.	**DIN**	**BS**	**EN**	**AFNOR**	**UNI**	**UNE**	**SS**	**JIS**	**AISI/SAE**	**GB**
–	–	8 290/6	–	MN 32-8	–	–	08 14	FCMB310	–	–
–	GTS-35	B 340/12	–	MN 35-10	–	–	08 15	FCMW330	32510	–
0.8145	GTS-45	P 440/7	–	Mn 450	GMN45	–	08 52	FCMW370	40010	–
0.8155	GTS-55	P 510/4	–	MP 50-5	GMN55	–	08 54	FCMP490	50005	–
–	GTS-65	P 570/3	–	MP 60-3	–	–	08 58	FCMP540	70003	–
0.8165	GTS-65-02	P 570/3	–	Mn 650-3	GMN 65	–	08 56	FCMP590	A220-70003	–
–	GTS-70-02	P 690/2	–	Mn 700-2	GMN 70	–	08 62	FCMP690	A220-80002	–

SURFACE ROUGHNESS

SURFACE ROUGHNESS

(From JIS B 0601-1994)

<table>
<tr><th>Type</th><th>Code</th><th>Determination</th><th>Determination Example (Figure)</th></tr>
<tr><td>Arithmetical Mean Roughness</td><td>Ra</td><td>Ra means the value obtained by the following formula and expressed in micrometer (µm) when sampling only the reference length from the roughness curve in the direction of the mean line, taking X-axis in the direction of mean line and Y-axis in the direction of longitudinal magnification of this sampled part and the roughness curve is expressed by y=f(x):
$Ra=\frac{1}{\ell}\int_{0}^{\ell}|f(x)|dx$</td><td>
</td></tr>
<tr><td>Maximum Height</td><td>Rz</td><td>Rz shall be that only when the reference length is sampled from the roughness curve in the direction of the mean line, the distance between the top profile peak line and the bottom profile valley line on this sampled portion is measured in the longitudinal magnification direction of roughness curve and the obtained value is expressed in micrometer (µm).
Note) When finding Rz, a portion without an exceptionally high peak or low valley, which may be regarded as a flaw, is selected as the sampling length.
$Rz=R_P+Rv$</td><td>
</td></tr>
<tr><td>Ten-Point Mean Roughness</td><td>RzJIS</td><td>RzJIS shall be that only when the reference length is sampled from the roughness curve in the direction of its mean line, the sum of the average value of absolute values of the heights of five highest profile peaks (Yp) and the depths of five deepest profile valleys (Yv) measured in the vertical magnification direction from the mean line of this sampled portion and this sum is expressed in micrometer (µm).
$Rz_{JIS}=\frac{(Yp1+Yp2+Yp3+Yp4+Yp5)+(Yv1+Yv2+Yv3+Yv4+Yv5)}{5}$</td><td>

Yp1,Yp2,Yp3,Yp4,Yp5 :altitudes of the five highest profile peaks of the sampled portion corresponding to the reference length l.
Yv1,Yv2,Yv3,Yv4,Yv5 :altitudes of the five deepest profile valleys of the sampled portion corresponding to the reference length l.</td></tr>
</table>

■RELATIONSHIP BETWEEN ARITHMETICAL MEAN (Ra) AND CONVENTIONAL DESIGNATION (REFERENCE DATA)

Arithmetical Mean Roughness Ra		Max. Height Rz	Ten-Point Mean Roughness RzJIS	Sampling Length for Rz • RzJIS l (mm)	Conventional Finish Mark
Standard Series	Cutoff Value λc (mm)	Standard Series			
0.012 a	0.08	0.05s	0.05z	0.08	▽▽▽▽
0.025 a	0.25	0.1 s	0.1 z		
0.05 a		0.2 s	0.2 z	0.25	
0.1 a	0.8	0.4 s	0.4 z		
0.2 a		0.8 s	0.8 z	0.8	
0.4 a		1.6 s	1.6 z		▽▽▽
0.8 a		3.2 s	3.2 z		
1.6 a		6.3 s	6.3 z		
3.2 a	2.5	12.5 s	12.5 z	2.5	▽▽
6.3 a		25 s	25 z		
12.5 a	8	50 s	50 z		▽
25 a		100 s	100 z	8	
50 a		200 s	200 z		–
100 a	–	400 s	400 z	–	

*The correlation among the three is shown for convenience and is not exact.
*Ra: The evaluation length of Rz and RzJIS is the cutoff value and sampling length multiplied by 5, respectively.

HARDNESS COMPARISON TABLE

HARDNESS CONVERSION NUMBERS OF STEEL

Brinell Hardness (**HB**), 10mm Ball,Load: 3000kgf		Vickers Hardness (HV)	Rockwell Hardness				Shore Hardness (HS)	Tensile Strength (Approx.) MPa
Standard Ball	Tungsten Carbide Ball		A Scale, Load: 60kgf, Diamond Point (HRA)	B Scale, Load: 100kgf, 1/16" Ball (HRB)	C Scale, Load: 150kgf, Diamond Point (HRC)	D Scale, Load: 100kgf, Diamond Point (HRD)		
—	—	940	85.6	—	68.0	76.9	97	—
—	—	920	85.3	—	67.5	76.5	96	—
—	—	900	85.0	—	67.0	76.1	95	—
—	(767)	880	84.7	—	66.4	75.7	93	—
—	(757)	860	84.4	—	65.9	75.3	92	—
—	(745)	840	84.1	—	65.3	74.8	91	—
—	(733)	820	83.8	—	64.7	74.3	90	—
—	(722)	800	83.4	—	64.0	73.8	88	—
—	(712)	—	—	—	—	—	—	—
—	(710)	780	83.0	—	63.3	73.3	87	—
—	(698)	760	82.6	—	62.5	72.6	86	—
—	(684)	740	82.2	—	61.8	72.1	—	—
—	(682)	737	82.2	—	61.7	72.0	84	—
—	(670)	720	81.8	—	61.0	71.5	83	—
—	(656)	700	81.3	—	60.1	70.8	—	—
—	(653)	697	81.2	—	60.0	70.7	81	—
—	(647)	690	81.1	—	59.7	70.5	—	—
—	(638)	680	80.8	—	59.2	70.1	80	—
—	630	670	80.6	—	58.8	69.8	—	—
—	627	667	80.5	—	58.7	69.7	79	—
—	—	677	80.7	—	59.1	70.0	—	—
—	601	640	79.8	—	57.3	68.7	77	—
—	—	640	79.8	—	57.3	68.7	—	—
—	578	615	79.1	—	56.0	67.7	75	—
—	—	607	78.8	—	55.6	67.4	—	—
—	555	591	78.4	—	54.7	66.7	73	2055
—	—	579	78.0	—	54.0	66.1	—	2015
—	534	569	77.8	—	53.5	65.8	71	1985
—	—	533	77.1	—	52.5	65.0	—	1915
—	514	547	76.9	—	52.1	64.7	70	1890
(495)	—	539	76.7	—	51.6	64.3	—	1855
—	—	530	76.4	—	51.1	63.9	—	1825
	495	528	76.3	—	51.0	63.8	68	1820
(477)	—	516	75.9	—	50.3	63.2	—	1780
—	—	508	75.6	—	49.6	62.7	—	1740
	477	508	75.6	—	49.6	62.7	66	1740
(461)	—	495	75.1	—	48.8	61.9	—	1680
—	—	491	74.9	—	48.5	61.7	—	1670
	461	491	74.9	—	48.5	61.7	65	1670
444	—	474	74.3	—	47.2	61.0	—	1595
—	—	472	74.2	—	47.1	60.8	—	1585
—	444	472	74.2	—	47.1	60.8	63	1585
429	429	455	73.4	—	45.7	59.7	61	1510
415	415	440	72.8	—	44.5	58.8	59	1460
401	401	425	72.0	—	43.1	57.8	58	1390
388	388	410	71.4	—	41.8	56.8	56	1330
375	375	396	70.6	—	40.4	55.7	54	1270
363	363	383	70.0	—	39.1	54.6	52	1220
352	352	372	69.3	(110.0)	37.9	53.8	51	1180
341	341	360	68.7	(109.0)	36.6	52.8	50	1130
331	331	350	68.1	(108.5)	35.5	51.9	48	1095
321	321	339	67.5	(108.0)	34.3	51.0	47	1060
311	311	328	66.9	(107.5)	33.1	50.0	46	1025
302	302	319	66.3	(107.0)	32.1	49.3	45	1005
293	293	309	65.7	(106.0)	30.9	48.3	43	970
285	285	301	65.3	(105.5)	29.9	47.6	—	950
277	277	292	64.6	(104.5)	28.8	46.7	41	925
269	269	284	64.1	(104.0)	27.6	45.9	40	895
262	262	276	63.6	(103.0)	26.6	45.0	39	875
255	255	269	63.0	(102.0)	25.4	44.2	38	850
248	248	261	62.5	(101.0)	24.2	43.2	37	825
241	241	253	61.8	100	22.8	42.0	36	800
235	235	247	61.4	99.0	21.7	41.4	35	785
229	229	241	60.8	98.2	20.5	40.5	34	765
223	223	234	—	97.3	(18.8)	—	—	—
217	217	228	—	96.4	(17.5)	—	33	725
212	212	222	—	95.5	(16.0)	—	—	705
207	207	218	—	94.6	(15.2)	—	32	690
201	201	212	—	93.8	(13.8)	—	31	675
197	197	207	—	92.8	(12.7)	—	30	655
192	192	202	—	91.9	(11.5)	—	29	640
187	187	196	—	90.7	(10.0)	—	—	620
183	183	192	—	90.0	(9.0)	—	28	615
179	179	188	—	89.0	(8.0)	—	27	600
174	174	182	—	87.8	(6.4)	—	—	585
170	170	178	—	86.8	(5.4)	—	26	570
167	167	175	—	86.0	(4.4)	—	—	560
163	163	171	—	85.0	(3.3)	—	25	545
156	156	163	—	82.9	(0.9)	—	—	525
149	149	156	—	80.8	—	—	23	505
143	143	150	—	78.7	—	—	22	490
137	137	143	—	76.4	—	—	21	460
131	131	137	—	74.0	—	—	—	450
126	126	132	—	72.0	—	—	20	435
121	121	127	—	69.8	—	—	19	415
116	116	122	—	67.6	—	—	18	400
111	111	117	—	65.7	—	—	15	385

Note 1) The above list is the same as that of AMS Metals Hand book with tensile strength in approximate metric value and Brinell hardness over a recommended range.
Note 2) 1MPa=1N/mm^2
Note 3) Figures in ( ) are rarely used and are included for reference. This list has been taken from JIS Handbook Steel I.

FIT TOLERANCE TABLE(HOLE)

Classification of Standard Dimensions (mm)		Class of Geometrical Tolerance Zone of Holes															
>	≤	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7
–	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0
14	18																
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0
24	30																
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0
40	50	+280 +180	+192 +130	+230 +130													
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0
65	80	+320 +200	+224 +150	+270 +150													
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0
100	120	+380 +240	+267 +180	+320 +180													
120	140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0
140	160	+440 +280	+310 +210	+370 +210													
160	180	+470 +310	+330 +230	+390 +230													
180	200	+525 +340	+355 +240	+425 +240	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0
200	225	+565 +380	+375 +260	+445 +260													
225	250	+605 +420	+395 +280	+465 +280													
250	280	+690 +480	+430 +300	+510 +300	+271 +190	+320 +190	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0
280	315	+750 +540	+460 +330	+540 +330													
315	355	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0
355	400	+910 +680	+540 +400	+630 +400													
400	450	+1010 +760	+595 +440	+690 +440	+327 +230	+385 +230	+480 +230	+198 +135	+232 +135	+290 +135	+108 +68	+131 +68	+165 +68	+60 +20	+83 +20	+40 0	+63 0
450	500	+1090 +840	+635 +480	+730 +480													

Note 1) Values shown in the upper portion of the respective boxes are the upper dimensional tolerance, while values shown in the lower portion are the lower dimensional tolerance.

Units : μm

Class of Geometrical Tolerance Zone of Holes																	
H8	**H9**	**H10**	**JS6**	**JS7**	**K6**	**K7**	**M6**	**M7**	**N6**	**N7**	**P6**	**P7**	**R7**	**S7**	**T7**	**U7**	**X7**
+14 0	+25 0	+40 0	±3	±5	0 −6	0 −10	−2 −8	−2 −12	−4 −10	−4 −14	−6 −12	−6 −16	−10 −20	−14 −24	–	−18 −28	−20 −30
+18 0	+30 0	+48 0	±4	±6	+2 −6	+3 −9	−1 −9	0 −12	−5 −13	−4 −16	−9 −17	−8 −20	−11 −23	−15 −27	–	−19 −31	−24 −36
+22 0	+36 0	+58 0	±4.5	±7	+2 −7	+5 −10	−3 −12	0 −15	−7 −16	−4 −19	−12 −21	−9 −24	−13 −28	−17 −32	–	−22 −37	−28 −43
+27 0	+43 0	+70 0	±5.5	±9	+2 −9	+6 −12	−4 −15	0 −18	−9 −20	−5 −23	−15 −26	−11 −29	−16 −34	−21 −39	– –	−26 −44	−33 −51 −38 −56
+33 0	+52 0	+84 0	±6.5	±10	+2 −11	+6 −15	−4 −17	0 −21	−11 −24	−7 −28	−18 −31	−14 −35	−20 −41	−27 −48	– −33 −54	−33 −54 −40 −61	−46 −67 −56 −77
+39 0	+62 0	+100 0	±8	±12	+3 −13	+7 −18	−4 −20	0 −25	−12 −28	−8 −33	−21 −37	−17 −42	−25 −50	−34 −59	−39 −64 −45 −70	−51 −76 −61 −86	–
+46 0	+74 0	+120 0	±9.5	±15	+4 −15	+9 −21	−5 −24	0 −30	−14 −33	−9 −39	−26 −45	−21 −51	−30 −60 −32 −62	−42 −72 −48 −78	−55 −85 −64 −94	−76 −106 −91 −121	–
+54 0	+87 0	+140 0	±11	±17	+4 −18	+10 −25	−6 −28	0 −35	−16 −38	−10 −45	−30 −52	−24 −59	−38 −73 −41 −76	−58 −93 −66 −101	−78 −113 −91 −126	−111 −146 −131 −166	–
+63 0	+100 0	+160 0	±12.5	±20	+4 −21	+12 −28	−8 −33	0 −40	−20 −45	−12 −52	−36 −61	−28 −68	−48 −88 −50 −90 −53 −93	−77 −117 −85 −125 −93 −133	−107 −147 −119 −159 −131 −171	–	–
+72 0	+115 0	+185 0	±14.5	±23	+5 −24	+13 −33	−8 −37	0 −46	−22 −51	−14 −60	−41 −70	−33 −79	−60 −106 −63 −109 −67 −113	−105 −151 −113 −159 −123 −169	–	–	–
+81 0	+130 0	+210 0	±16	±26	+5 −27	+16 −36	−9 −41	0 −52	−25 −57	−14 −66	−47 −79	−36 −88	−74 −126 −78 −130	–	–	–	–
+89 0	+140 0	+230 0	±18	±28	+7 −29	+17 −40	−10 −46	0 −57	−26 −62	−16 −73	−51 −87	−41 −98	−87 −144 −93 −150	–	–	–	–
+97 0	+155 0	+250 0	±20	±31	+8 −32	+18 −45	−10 −50	0 −63	−27 −67	−17 −80	−55 −95	−45 −108	−103 −166 −109 −172	–	–	–	–

FIT TOLERANCE TABLE(SHAFT)

Classification of Standard Dimensions (mm)		Class of Geometrical Tolerance Zone of Shafts														
>	≤	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7
−	3	− 140 − 165	− 60 − 85	− 20 − 34	− 20 − 45	− 14 − 24	− 14 − 28	− 14 − 39	− 6 − 12	− 6 − 16	− 6 − 20	− 2 − 6	− 2 − 8	0 − 4	0 − 6	0 − 10
3	6	− 140 − 170	− 70 − 100	− 30 − 48	− 30 − 60	− 20 − 32	− 20 − 38	− 20 − 50	− 10 − 18	− 10 − 22	− 10 − 28	− 4 − 9	− 4 − 12	0 − 5	0 − 8	0 − 12
6	10	− 150 − 186	− 80 − 116	− 40 − 62	− 40 − 76	− 25 − 40	− 25 − 47	− 25 − 61	− 13 − 22	− 13 − 28	− 13 − 35	− 5 − 11	− 5 − 14	0 − 6	0 − 9	0 − 15
10	14	− 150 − 193	− 95 − 138	− 50 − 77	− 50 − 93	− 32 − 50	− 32 − 59	− 32 − 75	− 16 − 27	− 16 − 34	− 16 − 43	− 6 − 14	− 6 − 17	0 − 8	0 − 11	0 − 18
14	18															
18	24	− 160 − 212	− 110 − 162	− 65 − 98	− 65 − 117	− 40 − 61	− 40 − 73	− 40 − 92	− 20 − 33	− 20 − 41	− 20 − 53	− 7 − 16	− 7 − 20	0 − 9	0 − 13	0 − 21
24	30															
30	40	− 170 − 232	− 120 − 182	− 80 − 119	− 80 − 142	− 50 − 75	− 50 − 89	− 50 − 112	− 25 − 41	− 25 − 50	− 25 − 64	− 9 − 20	− 9 − 25	0 − 11	0 − 16	0 − 25
40	50	− 180 − 242	− 130 − 192													
50	65	− 190 − 264	− 140 − 214	− 100 − 146	− 100 − 174	− 60 − 90	− 60 − 106	− 60 − 134	− 30 − 49	− 30 − 60	− 30 − 76	− 10 − 23	− 10 − 29	0 − 13	0 − 19	0 − 30
65	80	− 200 − 274	− 150 − 224													
80	100	− 220 − 307	− 170 − 257	− 120 − 174	− 120 − 207	− 72 − 107	− 72 − 126	− 72 − 159	− 36 − 58	− 36 − 71	− 36 − 90	− 12 − 27	− 12 − 34	0 − 15	0 − 22	0 − 35
100	120	− 240 − 327	− 180 − 267													
120	140	− 260 − 360	− 200 − 300	− 145 − 208	− 145 − 245	− 85 − 125	− 85 − 148	− 85 − 185	− 43 − 68	− 43 − 83	− 43 − 106	− 14 − 32	− 14 − 39	0 − 18	0 − 25	0 − 40
140	160	− 280 − 380	− 210 − 310													
160	180	− 310 − 410	− 230 − 330													
180	200	− 340 − 455	− 240 − 355	− 170 − 242	− 170 − 285	− 100 − 146	− 100 − 172	− 100 − 215	− 50 − 79	− 50 − 96	− 50 − 122	− 15 − 35	− 15 − 44	0 − 20	0 − 29	0 − 46
200	225	− 380 − 495	− 260 − 375													
225	250	− 420 − 535	− 280 − 395													
250	280	− 480 − 610	− 300 − 430	− 190 − 271	− 190 − 320	− 110 − 162	− 110 − 191	− 110 − 240	− 56 − 88	− 56 − 108	− 56 − 137	− 17 − 40	− 17 − 49	0 − 23	0 − 32	0 − 52
280	315	− 540 − 670	− 330 − 460													
315	355	− 600 − 740	− 360 − 500	− 210 − 299	− 210 − 350	− 125 − 182	− 125 − 214	− 125 − 265	− 62 − 98	− 62 − 119	− 62 − 151	− 18 − 43	− 18 − 54	0 − 25	0 − 36	0 − 57
355	400	− 680 − 820	− 400 − 540													
400	450	− 760 − 915	− 440 − 595	− 230 − 327	− 230 − 385	− 135 − 198	− 135 − 232	− 135 − 290	− 68 − 108	− 68 − 131	− 68 − 165	− 20 − 47	− 20 − 60	0 − 27	0 − 40	0 − 63
450	500	− 840 − 995	− 480 − 635													

Note 1) Values shown in the upper portion of the respective boxes are the upper dimensional tolerance, while values shown in the lower portion are the lower dimensional tolerance.

Units : μm

Class of Geometrical Tolerance Zone of Shafts															
h8	**h9**	**js5**	**js6**	**js7**	**k5**	**k6**	**m5**	**m6**	**n6**	**p6**	**r6**	**s6**	**t6**	**u6**	**x6**
0 − 14	0 − 25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+10 +4	+12 +6	+16 +10	+20 +14	—	+24 +18	+26 +20
0 − 18	0 − 30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+16 +8	+20 +12	+23 +15	+27 +19	—	+31 +23	+36 +28
0 − 22	0 − 36	±3	±4.5	±7	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10	+24 +15	+28 +19	+32 +23	—	+37 +28	+43 +34
0 − 27	0 − 43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12	+29 +18	+34 +23	+39 +28	—	+44 +33	+51 +40
															+56 +45
0 − 33	0 − 52	±4.5	±6.5	±10	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15	+35 +22	+41 +28	+48 +35	—	+54 +41	+67 +54
													+54 +41	+61 +48	+77 +64
0 − 39	0 − 62	±5.5	±8	±12	+13 +2	+18 +2	+20 +9	+25 +9	+33 +17	+42 +26	+50 +34	+59 +43	+64 +48	+76 +60	—
													+70 +54	+86 +70	
0 − 46	0 − 74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	+60 +41	+72 +53	+85 +66	+106 +87	—
											+62 +43	+78 +59	+94 +75	+121 +102	
0 − 54	0 − 87	±7.5	±11	±17	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	+73 +51	+93 +71	+113 +91	+146 +124	—
											+76 +54	+101 +79	+126 +104	+166 +144	
0 − 63	0 − 100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+88 +63	+117 +92	+147 +122	—	—
											+90 +65	+125 +100	+159 +134		
											+93 +68	+133 +108	+171 +146		
0 − 72	0 − 115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+106 +77	+151 +122	—	—	—
											+109 +80	+159 +130			
											+113 +84	+169 +140			
0 − 81	0 − 130	±11.5	±16	±26	+27 +4	+36 +4	+43 +20	+52 +20	+66 +34	+88 +56	+126 +94	—	—	—	—
											+130 +98				
0 − 89	0 − 140	±12.5	±18	±28	+29 +4	+40 +4	+46 +21	+57 +21	+73 +37	+98 +62	+144 +108	—	—	—	—
											+150 +114				
0 − 97	0 − 155	±13.5	±20	±31	+32 +5	+45 +5	+50 +23	+63 +23	+80 +40	+108 +68	+166 +126	—	—	—	—
											+172 +132				

DRILL DIAMETERS FOR TAPPING

●Metric Coarse Screw Thread

Nominal	Drill Diameter	
	HSS	Carbide
M1 ×0.25	0.75	0.75
M1.1×0.25	0.85	0.85
M1.2×0.25	0.95	0.95
M1.4×0.3	1.10	1.10
M1.6×0.35	1.25	1.30
M1.7×0.35	1.35	1.40
M1.8×0.35	1.45	1.50
M2 ×0.4	1.60	1.65
M2.2×0.45	1.75	1.80
M2.3×0.4	1.90	1.95
M2.5×0.45	2.10	2.15
M2.6×0.45	2.15	2.20
M3 ×0.5	2.50	2.55
M3.5×0.6	2.90	2.95
M4 ×0.7	3.3	3.4
M4.5×0.75	3.8	3.9
M5 ×0.8	4.2	4.3
M6 ×1.0	5.0	5.1
M7 ×1.0	6.0	6.1
M8 ×1.25	6.8	6.9
M9 ×1.25	7.8	7.9
M10 ×1.5	8.5	8.7
M11 ×1.5	9.5	9.7
M12 ×1.75	10.3	10.5
M14 ×2.0	12.0	12.2
M16 ×2.0	14.0	14.2
M18 ×2.5	15.5	15.7
M20 ×2.5	17.5	17.7
M22 ×2.5	19.5	19.7
M24 ×3.0	21.0	—
M27 ×3.0	24.0	—
M30 ×3.5	26.5	—
M33 ×3.5	29.5	—
M36 ×4.0	32.0	—
M39 ×4.0	35.0	—
M42 ×4.5	37.5	—
M45 ×4.5	40.5	—
M48 ×5.0	43.0	—

●Metric Fine Screw Thread

Nominal	Drill Diameter	
	HSS	Carbide
M1 ×0.2	0.80	0.80
M1.1×0.2	0.90	0.90
M1.2×0.2	1.00	1.00
M1.4×0.2	1.20	1.20
M1.6×0.2	1.40	1.40
M1.8×0.2	1.60	1.60
M2 ×0.25	1.75	1.75
M2.2×0.25	1.95	2.00
M2.5×0.35	2.20	2.20
M3 ×0.35	2.70	2.70
M3.5×0.35	3.20	3.20
M4 ×0.5	3.50	3.55
M4.5×0.5	4.00	4.05
M5 ×0.5	4.50	4.55
M5.5×0.5	5.00	5.05
M6 ×0.75	5.30	5.35
M7 ×0.75	6.30	6.35
M8 ×1.0	7.00	7.10
M8 ×0.75	7.30	7.35
M9 ×1.0	8.00	8.10
M9 ×0.75	8.30	8.35
M10 ×1.25	8.80	8.90
M10 ×1.0	9.00	9.10
M10 ×0.75	9.30	9.35
M11 ×1.0	10.0	10.1
M11 ×0.75	10.3	10.3
M12 ×1.5	10.5	10.7
M12 ×1.25	10.8	10.9
M12 ×1.0	11.0	11.1
M14 ×1.5	12.5	12.7
M14 ×1.0	13.0	13.1
M15 ×1.5	13.5	13.7
M15 ×1.0	14.0	14.1
M16 ×1.5	14.5	14.7
M16 ×1.0	15.0	15.1
M17 ×1.5	15.5	15.7
M17 ×1.0	16.0	16.1
M18 ×2.0	16.0	16.3
M18 ×1.5	16.5	16.7
M18 ×1.0	17.0	17.1
M20 ×2.0	18.0	18.3
M20 ×1.5	18.5	18.7
M20 ×1.0	19.0	19.1
M22 ×2.0	20.0	—
M22 ×1.5	20.5	—
M22 ×1.0	21.0	—
M24 ×2.0	22.0	—
M24 ×1.5	22.5	—
M24 ×1.0	23.0	—
M25 ×2.0	23.0	—
M25 ×1.5	23.5	—
M25 ×1.0	24.0	—
M26 ×1.5	24.5	—
M27 ×2.0	25.0	—
M27 ×1.5	25.5	—
M27 ×1.0	26.0	—
M28 ×2.0	26.0	—
M28 ×1.5	26.5	—
M28 ×1.0	27.0	—
M30 ×3.0	27.0	—
M30 ×2.0	28.0	—
M30 ×1.5	28.5	—
M30 ×1.0	29.0	—
M32 ×2.0	30.0	—
M32 ×1.5	30.5	—
M33 ×3.0	30.0	—
M33 ×2.0	31.0	—
M33 ×1.5	31.5	—
M35 ×1.5	33.5	—
M36 ×3.0	33.0	—
M36 ×2.0	34.0	—
M36 ×1.5	34.5	—
M38 ×1.5	36.5	—
M39 ×3.0	36.0	—
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M42 ×4.0	38.0	—
M42 ×3.0	39.0	—
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M45 ×1.5	43.5	—
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M48 ×3.0	45.0	—
M48 ×2.0	46.0	—
M48 ×1.5	46.5	—
M50 ×3.0	47.0	—
M50 ×2.0	48.0	—
M50 ×1.5	48.5	—

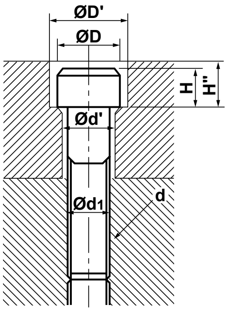
Note 1) Hole sizes should be measured since the accuracy of a drilled hole may change due to the drilling conditions, and if found to be inappropriate for a tapping hole, the drill diameter must be corrected accordingly.

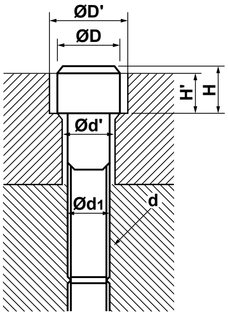
HEXAGON SOCKET HEAD BOLT HOLE SIZE

DIMENSIONS OF COUNTERBORING FOR HEXAGON SOCKET HEAD CAP SCREW AND BOLT HOLE

Unit : mm

Nominal dimensions of thread d	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
d_1	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
d'	3.4	4.5	5.5	6.6	9	11	14	16	18	20	22	24	26	30	33
D	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40	45
D'	6.5	8	9.5	11	14	17.5	20	23	26	29	32	35	39	43	48
H	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
H'	2.7	3.6	4.6	5.5	7.4	9.2	11	12.8	14.5	16.5	18.5	20.5	22.5	25	28
H"	3.3	4.4	5.4	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32





INTERNATIONAL SYSTEM OF UNITS

■UNIT CONVERSION TABLE for EASIER CHANGE into SI UNITS (Bold type Indicates SI unit)

●Pressure

Pa	**kPa**	**MPa**	bar	kgf/cm^2	atm	mmH$_2$O	mmHg or Torr
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}	7.50062×10^{-3}
1×10^{3}	1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}	9.86923×10^{-3}	1.01972×10^{2}	7.50062
1×10^{6}	1×10^{3}	1	1×10	1.01972×10	9.86923	1.01972×10^{5}	7.50062×10^{3}
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.01972	9.86923×10^{-1}	1.01972×10^{4}	7.50062×10^{2}
9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^{4}	7.35559×10^{2}
1.01325×10^{5}	1.01325×10^{2}	1.01325×10^{-1}	1.01325	1.03323	1	1.03323×10^{4}	7.60000×10^{2}
9.80665	9.80665×10^{-3}	9.80665×10^{-6}	9.80665×10^{-5}	1×10^{-4}	9.67841×10^{-5}	1	7.35559×10^{-2}
1.33322×10^{2}	1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1.31579×10^{-3}	1.35951×10	1

Note 1) 1Pa=1N/m^2

●Force

N	dyn	kgf
1	1×10^{5}	1.01972×10^{-1}
1×10^{-5}	1	1.01972×10^{-6}
9.80665	9.80665×10^{5}	1

●Stress

Pa	**MPa** or **N/mm^2**	kgf/mm^2	kgf/cm^2
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}
1×10^{6}	1	1.01972×10^{-1}	1.01972×10
9.80665×10^{6}	9.80665	1	1×10^{2}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

Note 1) 1Pa=1N/m^2

●Work / Energy / Quantity of Heat

J	kW•h	kgf•m	kcal
1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
3.600×10^{6}	1	3.67098×10^{5}	8.6000×10^{2}
9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
4.18605×10^{3}	1.16279×10^{-3}	4.26858×10^{2}	1

Note 1) 1J=1W•s, 1J=1N•m
1cal=4.18605J
(By the law of weights and measures)

●Power (Rate of Production / Motive Power) /Heat Flow Rate

W	kgf•m/s	PS	kcal/h
1	1.01972×10^{-1}	1.35962×10^{-3}	8.6000×10^{-1}
9.80665	1	1.33333×10^{-2}	8.43371
7.355×10^{2}	7.5×10	1	6.32529×10^{2}
1.16279	1.18572×10^{-1}	1.58095×10^{-3}	1

Note 1) 1W=1J/s, PS:French horse power
1PS=0.7355kW
1cal=4.18605J
(By the law of weights and measures)

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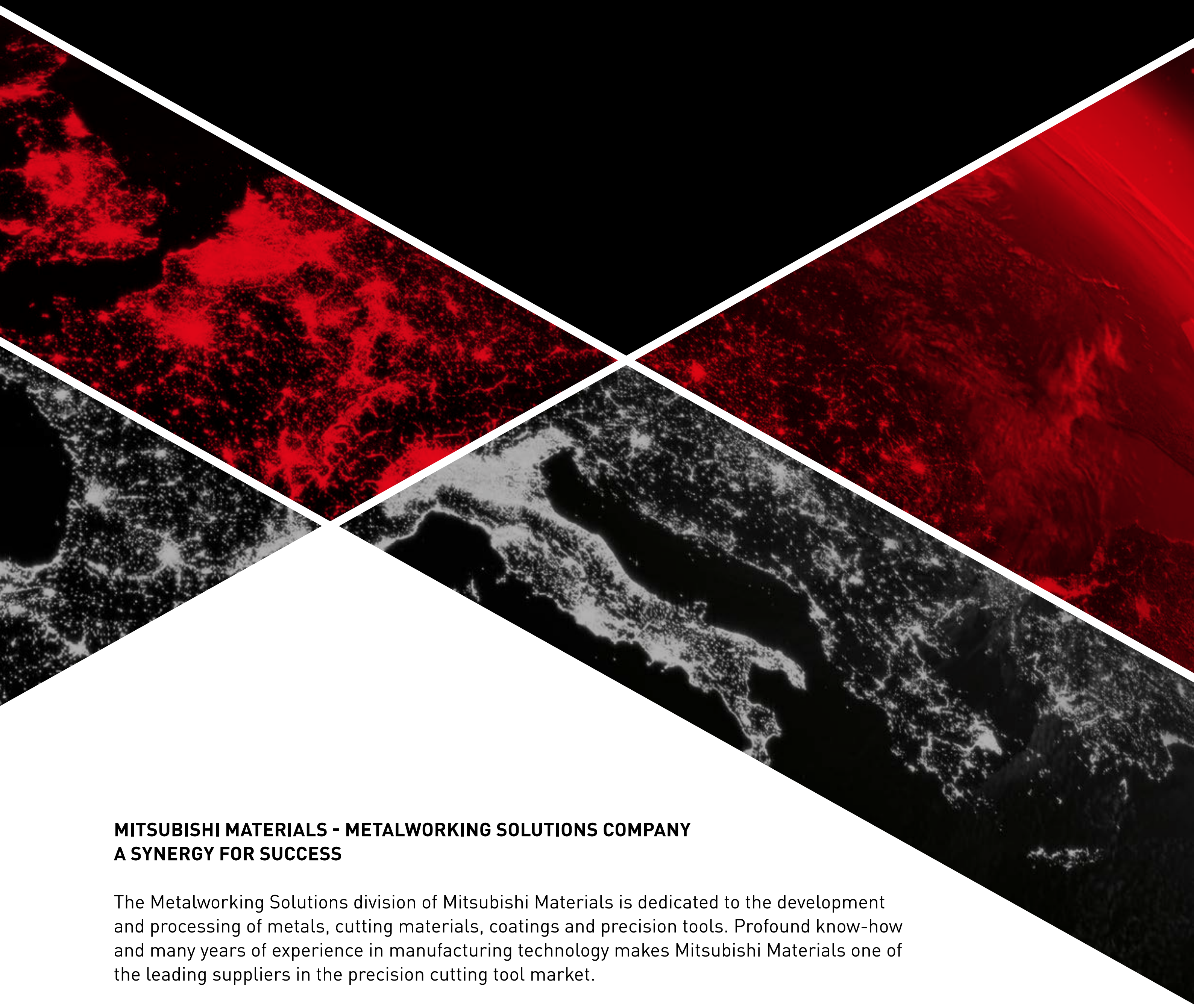

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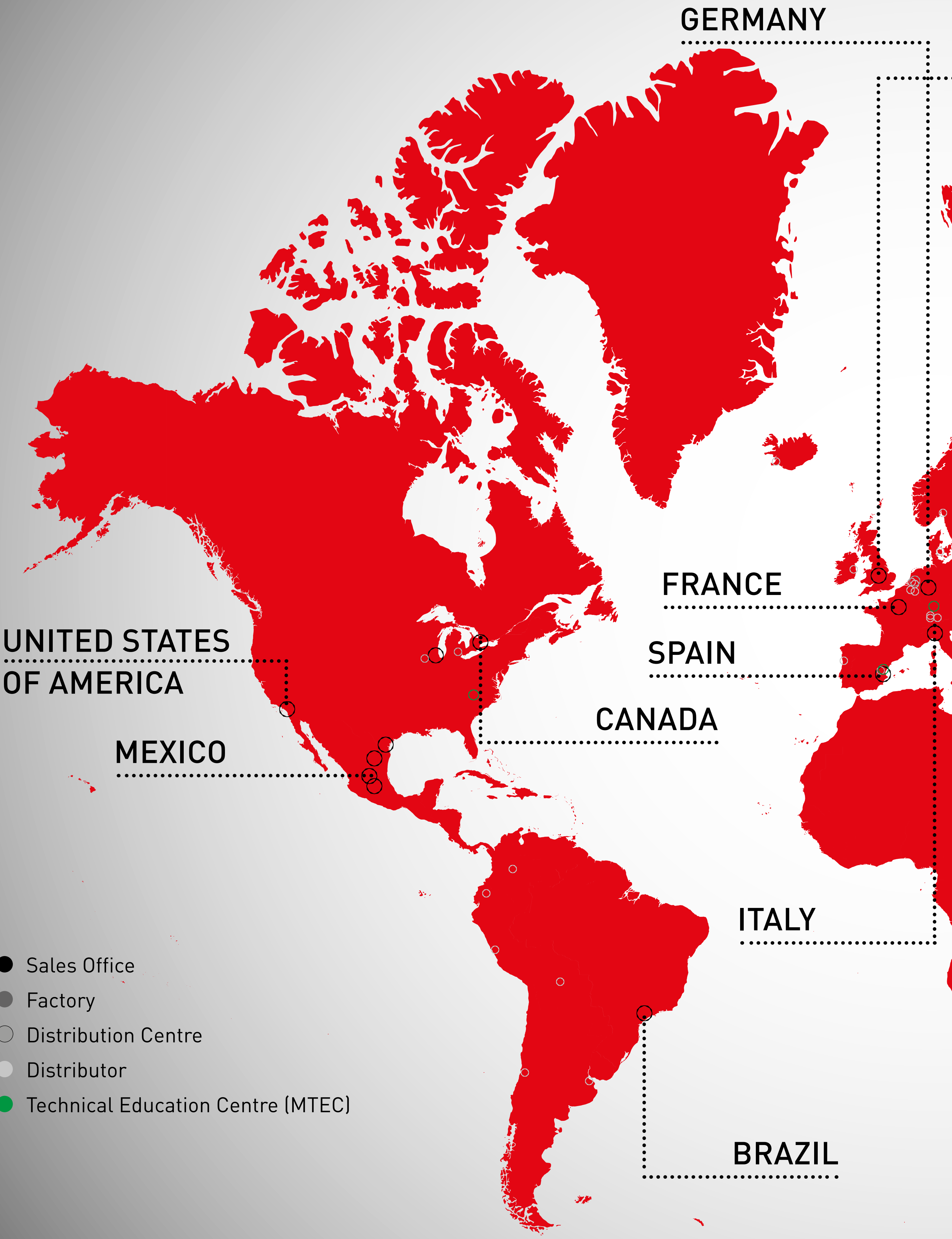

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