

Drilling

K1~K89

Product Lineup

K2~K3

MagicDrill DRA

K4~K21

SS-DRA	Drilling Depth : 1.5 x DC type	Straight Shank	K10
SS-DRA	Drilling Depth : 3 x DC type	Straight Shank	K11
SS-DRA	Drilling Depth : 5 x DC type	Straight Shank	K12
SS-DRA	Drilling Depth : 8 x DC type	Straight Shank	K13
SF-DRA	Drilling Depth : 1.5 x DC type	Flanged Shank	K14
SF-DRA	Drilling Depth : 3 x DC type	Flanged Shank	K15
SF-DRA	Drilling Depth : 5 x DC type	Flanged Shank	K16
SF-DRA	Drilling Depth : 8 x DC type	Flanged Shank	K17
SF-DRA	Drilling Depth : 12 x DC type	Flanged Shank	K18

MagicDrill DRC

K22~K37

SS-DRC	Drilling Depth : 3 x DC type	Straight Shank	K25
SS-DRC	Drilling Depth : 5 x DC type	Straight Shank	K26
SS-DRC	Drilling Depth : 8 x DC type	Straight Shank	K27
Chamfering Attachment	for Straight Shank SS-DRC		K28
SF-DRC	Drilling Depth : 3 x DC type	Flanged Shank	K30
SF-DRC	Drilling Depth : 5 x DC type	Flanged Shank	K31
SF-DRC	Drilling Depth : 8 x DC type	Flanged Shank	K32

MagicDrill DRV

K38~K54

DRV	Drilling Depth : 2 x DC type	$\phi 12 \sim \phi 39$	K42
DRV	Drilling Depth : 3 x DC type	$\phi 12 \sim \phi 39$	K43
DRV	Drilling Depth : 4 x DC type	$\phi 12 \sim \phi 39$	K44
DRV	Drilling Depth : 5 x DC type	$\phi 12 \sim \phi 39$	K45
DRV	Drilling Depth : 6 x DC type	$\phi 12 \sim \phi 39$	K46

MagicDrill DRS & DRZ

K55~K69

DRS (MagicDrill Mini)		$\phi 10 \sim \phi 12.5$	K56
DRZ	Drilling Depth : 2 x DC type	$\phi 13 \sim \phi 59$	K58
DRZ	Drilling Depth : 3 x DC type	$\phi 13 \sim \phi 59$	K60
DRZ	Drilling Depth : 4 x DC type	$\phi 13 \sim \phi 50$	K62
DRZ	Drilling Depth : 5 x DC type	$\phi 27 \sim \phi 50$	K64
DRZ-CR	Cartridge type	$\phi 60 \sim$	K65

MagicDrill DRX

K70~K80

DRX		$\phi 12 \sim \phi 60$	K72
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MagicDrill DRW

K81~K85

DRW	Drilling Depth : 1 x DC type	$\phi 60 \sim \phi 100$	K82
DRW	Drilling Depth : 2 x DC type	$\phi 60 \sim \phi 100$	K82
DRW	Drilling Depth : 3 x DC type	$\phi 60 \sim \phi 100$	K83

Fine Micro Drill





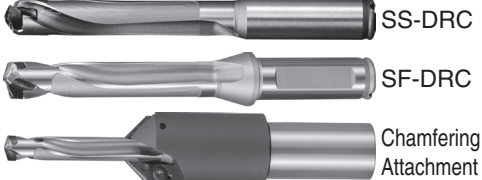









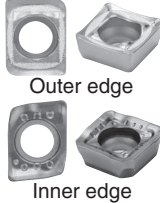














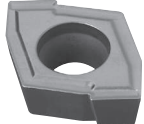






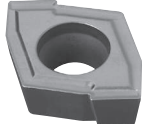















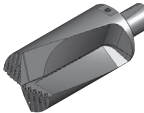
K86~K89

FDM			K86
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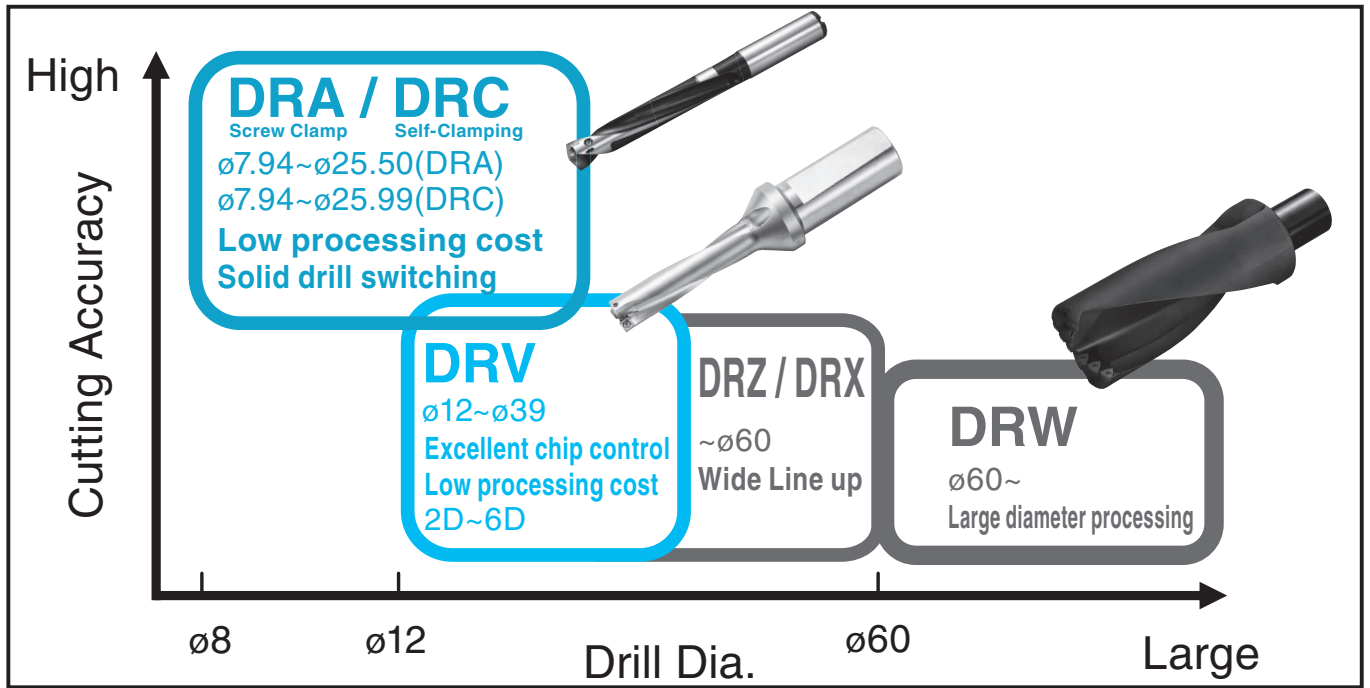


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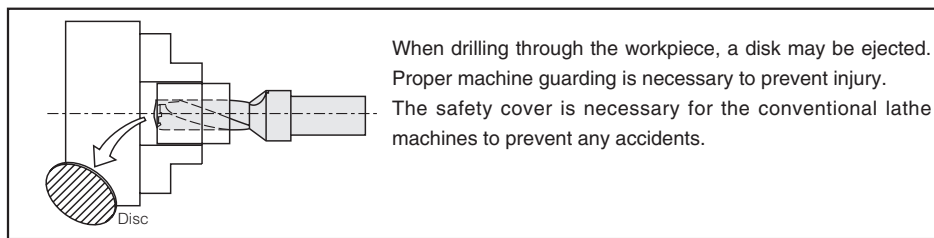
Product Lineup

Type	Shape	Drill Dia. (Drilling Depth)	Cutting Edge	Remarks
DRA 	 Screw Clamp	$\phi 7.94 \sim \phi 25.50$ (1.5D/3D/5D/8D) $\phi 12 \sim \phi 25.5$ (12D)	Module type with double edges 	Line up  SS-DRA SF-DRA
				Line up  SS-DRC SF-DRC Chamfering Attachment
DRC 	 Self-Clamping	$\phi 7.94 \sim \phi 25.99$ (3D/5D/8D)	Module type with double edges 	Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 20$ Chip from outer edge  Chip from inner edge 
				Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 10$ Chip from outer edge  Chip from inner edge 
DRV 	 Silver Coating	$\phi 12 \sim \phi 39$ (2D/3D/4D 5D/6D)	Individually designed Inner & Outer Edges  Outer edge Inner edge	Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 23$ Chip from outer edge  Chip from inner edge 
				Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 20$ Chip from outer edge  Chip from inner edge 
DRS [MagicDrill Mini] 	 Silver Coating	$\phi 10 \sim \phi 12.5$ (3.5D)	Inner & Outer Edges on One Insert 	Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 23$ Chip from outer edge  Chip from inner edge 
				Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 20$ Chip from outer edge  Chip from inner edge 
DRZ 	 DRZ  DRZ-CR	$\phi 13 \sim \phi 59$ (2D/3D) $\phi 13 \sim \phi 50$ (4D) $\phi 27 \sim \phi 50$ (5D)	Inner & Outer Edges on One Insert 	Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 12$ Chip from outer edge  Chip from inner edge 
				Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 24$ Chip from outer edge  Chip from inner edge 
DRZ-CR [Cartridge type] (Made to order) 		$\phi 60 \sim$ (2D/3D/4D)		Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 12$ Chip from outer edge  Chip from inner edge 
				Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 24$ Chip from outer edge  Chip from inner edge 
DRX 	 Silver Coating	$\phi 12$ $\phi 12.5$ $\phi 13$ (2D/3D/4D) $\phi 12, \phi 13$ (5D)	2 Cutting Edges per Insert  Outer edge Inner edge ZXMT03	Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 24$ Chip from outer edge  Chip from inner edge 
				Chip Shape (Workpiece Material : S50C) Drill Dia. $\phi 24$ Chip from outer edge  Chip from inner edge 
DRW (Made to order for some products) 		$\phi 60 \sim$ (1D/2D/3D)	Inner & Outer Edges on One Insert 	Custom-order item  BT integral arbor type is also available.
				Custom-order item  Maximum drilling diameter is $\phi 200$.

● MagicDrill Series Application Map



■ Caution



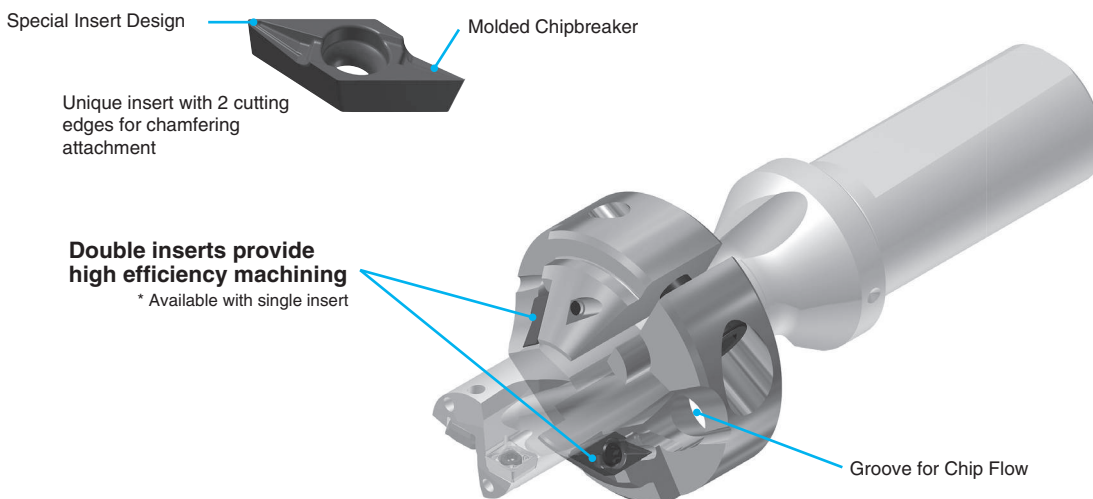
For MagicDrill DRV **Chamfering Attachment** Ⓞ K48

Excellent chip evacuation

Chip flow grooves are designed to follow the flutes of the drill body delivering excellent chip evacuation

High Chatter Vibration Resistance

Molded chipbreaker on chamfering insert reduces cutting force



Insert Grades	A
Turning Indexable Inserts	B
CBN & PCBN Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
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High Efficiency Modular Drill

MagicDrill **DRA**

Excellent hole accuracy with a low cutting force design

5 advantages to efficiently solve common drilling difficulties

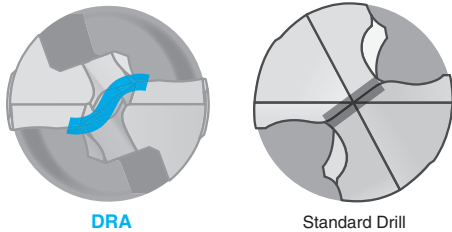
12D holder for deep hole drilling added to lineup (ø12~ø25.5)

1

Low cutting force design improves hole accuracy

Special chisel edge with S-curve reduces thrust force and controls vibration

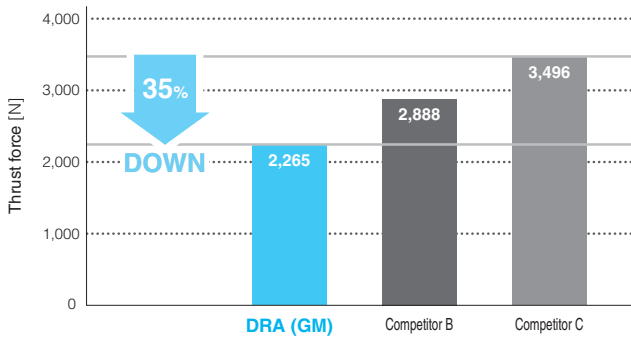
Cutting edge image



Cutting force Comparison

(Internal evaluation)

Cutting Conditions : Vc=120m/min, f=0.25mm/rev
Drill Dia. ø14, 5D Type, Drilling Depth 45mm, Wet
Workpiece Material : S50C

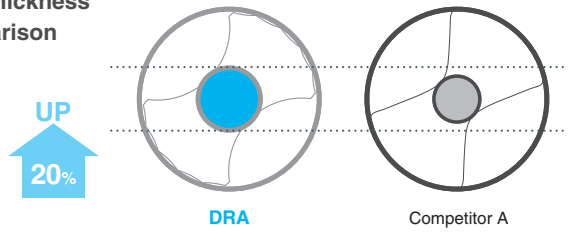


2

Optimal web thickness limits deflection

Improved hole accuracy by controlling drill deflection with a 20% thicker web compared with Competitor A

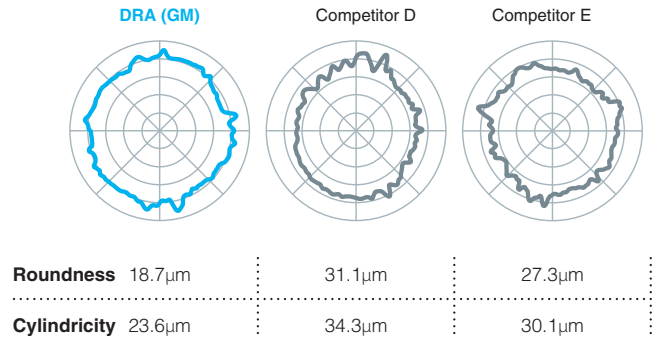
Web Thickness Comparison



Roundness · Cylindricity Comparison

(Internal evaluation)

Cutting Conditions : Vc=120m/min, f=0.3mm/rev
Drill Dia. ø14, 5D Type, Measurement point 55mm, Wet
Workpiece Material : S50C



3

Fine chip breaking even in deep hole drilling applications

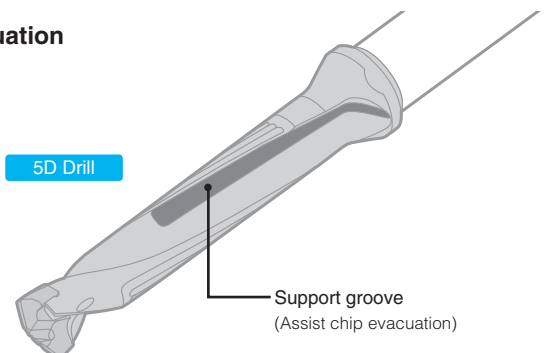
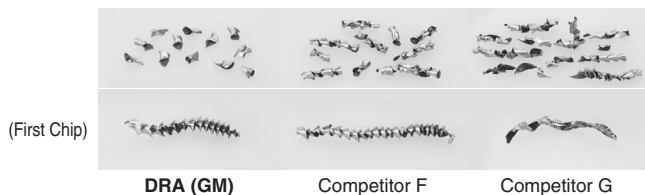
Optimized chip thinning for stable chip evacuation

Support groove with wider flute (5D, 8D) enables smooth chip evacuation

Chip Comparison

(Internal evaluation)

Cutting Conditions : Vc=60m/min, f=0.2mm/rev, Drill Dia. ø14, 5D Type Drilling Depth 70mm, Wet
Workpiece Material : SUS304



K

Drilling

DRA

DRC

DRV

DRS

DRZ

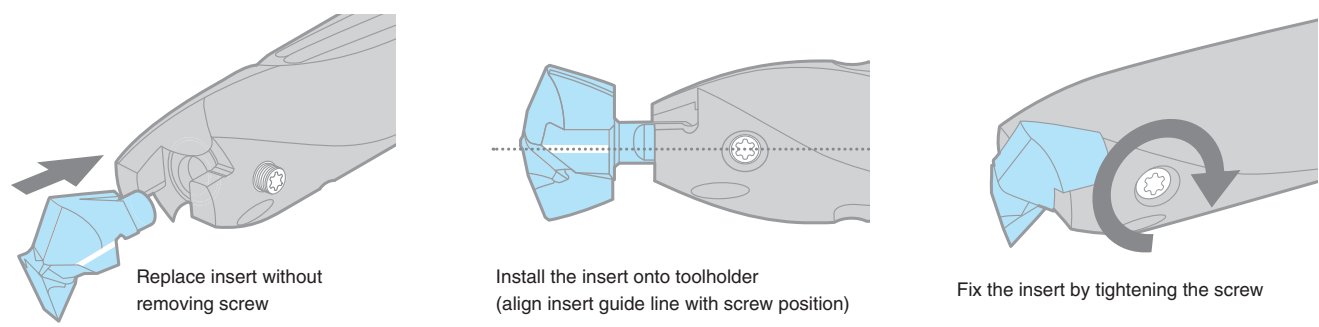
DRX

DRW

Fine Micro

4 Easy insert replacement

Replace insert without removing screw



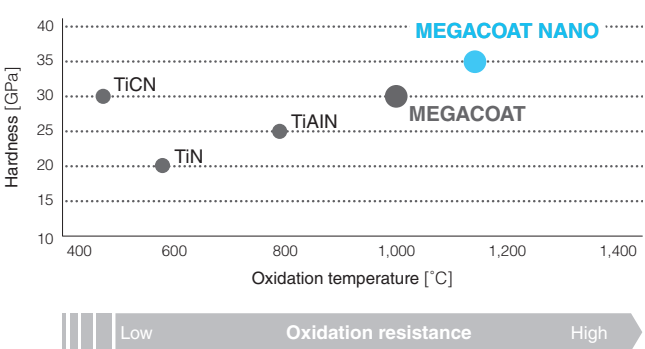
5 Long tool life and stable machining of various workpieces

MEGACOAT NANO grade PR1535 is used to machine various materials from steel to stainless steel, with the combination of a tough substrate and a special nano layer coating

Recommended Insert Grades

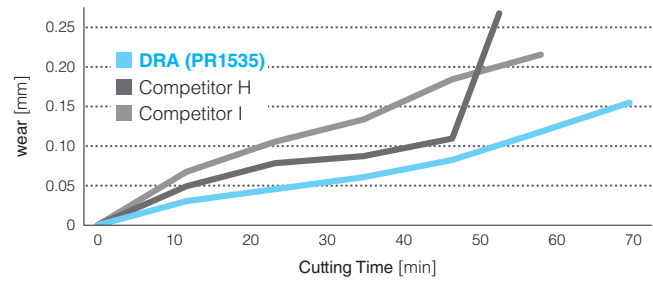
Steel, Stainless Steel	Cast Iron
PR1535	PR1525

Properties of PVD Coating



Wear Resistance Comparison

(Internal evaluation)

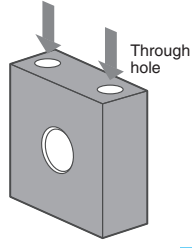


Cutting Conditions : Vc=100m/min, f=0.25mm/rev, Drill Dia. ø14, 5D Type, Drilling Depth 45mm, Wet Workpiece Material : SCM440H

Case Studies

Attachment SS400

Vc=70m/min (n=1,240min⁻¹)
f=0.23mm/rev (Vf=285mm/min)
Drilling Depth 100mm
Wet (Internal coolant)
With spot drilling
SF25-DRA180M-8
DA1800M-GM PR1535



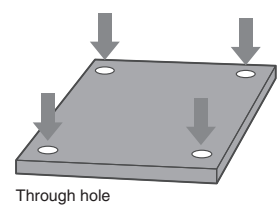
Cutting Time	DRA ø18-8D	45 sec	30% Cutting Time
	Competitor J ø18-7D (Modular Drill)	65 sec	

Competitor J applied a step feeding to avoid chip clogging. DRA controlled chip evacuation without pecking.

(User Evaluation)

Plate SUS304

Vc=60m/min (n=2,120min⁻¹)
f=0.12mm/rev (Vf=254mm/min)
Drilling Depth 15mm
Wet (Internal coolant)
SS10-DRA090M-3
DA0900M-GM PR1535



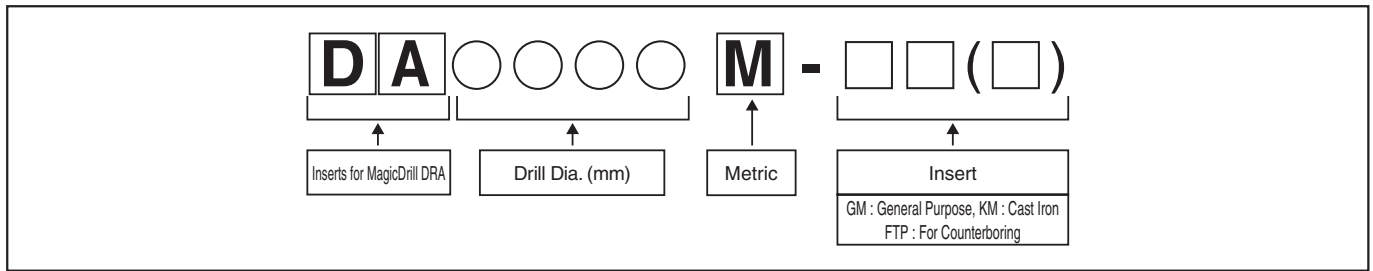
Number of holes	DRA ø9-3D	500 holes	Tool life x5
	Competitor K ø9-3D (Modular Drill)	100 holes	

DRA extended the tool life by 5 times compared to Competitor K. DRA maintained stable machining and excellent surface finish with less cutting noise.

(User Evaluation)

Inserts for MagicDrill DRA NEW

Description Identification System (Insert)



Applicable Inserts

General Purpose GM

Cast Iron KM

k8 tolerance

DC	k8 (mm)
7.94	+0.022
10.00	0
10.10	+0.027
18.00	0
18.10	+0.033
25.50	0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ⚡ K10~K17
	DC	PL	PR1535	PR1525	
DA 0794M-GM	7.94	1.34	●	●	SS10-DRA080M-○ SF12-DRA080M-○
0794M-KM		1.82	●	●	
DA 0800M-GM	8.00	1.35	●	●	
0800M-KM		1.85	●	●	
DA 0810M-GM	8.10	1.37	●	●	
0810M-KM		1.89	●	●	
DA 0820M-GM	8.20	1.38	●	●	
0820M-KM		1.93	●	●	
DA 0830M-GM	8.30	1.40	●	●	
0830M-KM		1.98	●	●	
DA 0840M-GM	8.40	1.42	●	●	
0840M-KM		2.02	●	●	
DA 0850M-GM	8.50	1.44	●	●	
0850M-KM		2.06	●	●	
DA 0860M-GM	8.60	1.46	●	●	
0860M-KM		2.10	●	●	
DA 0870M-GM	8.70	1.48	●	●	
0870M-KM		2.14	●	●	
DA 0880M-GM	8.80	1.49	●	●	
0880M-KM		2.19	●	●	
DA 0890M-GM	8.90	1.51	●	●	
0890M-KM		2.23	●	●	
DA 0900M-GM	9.00	1.52	●	●	
0900M-KM		2.02	●	●	
DA 0910M-GM	9.10	1.54	●	●	
0910M-KM		2.06	●	●	
DA 0920M-GM	9.20	1.56	●	●	
0920M-KM		2.11	●	●	
DA 0930M-GM	9.30	1.58	●	●	
0930M-KM		2.15	●	●	
DA 0940M-GM	9.40	1.59	●	●	
0940M-KM		2.19	●	●	
DA 0950M-GM	9.50	1.61	●	●	
0950M-KM		2.23	●	●	
DA 0960M-GM	9.60	1.63	●	●	
0960M-KM		2.27	●	●	
DA 0970M-GM	9.70	1.65	●	●	
0970M-KM		2.32	●	●	
DA 0980M-GM	9.80	1.67	●	●	
0980M-KM		2.36	●	●	
DA 0990M-GM	9.90	1.68	●	●	
0990M-KM		2.40	●	●	

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ⚡ K10~K17
	DC	PL	PR1535	PR1525	
DA 1000M-GM	10.00	1.70	●	●	SS12-DRA100M-○ SF16-DRA100M-○
1000M-KM		2.20	●	●	
DA 1010M-GM	10.10	1.72	●	●	
1010M-KM		2.24	●	●	
DA 1020M-GM	10.20	1.74	●	●	
1020M-KM		2.28	●	●	
DA 1030M-GM	10.30	1.75	●	●	
1030M-KM		2.32	●	●	
DA 1040M-GM	10.40	1.77	●	●	
1040M-KM		2.37	●	●	
DA 1050M-GM	10.50	1.79	●	●	
1050M-KM		2.41	●	●	
DA 1060M-GM	10.60	1.81	●	●	
1060M-KM		2.45	●	●	
DA 1070M-GM	10.70	1.83	●	●	
1070M-KM		2.49	●	●	
DA 1080M-GM	10.80	1.85	●	●	
1080M-KM		2.53	●	●	
DA 1090M-GM	10.90	1.86	●	●	
1090M-KM		2.57	●	●	
DA 1100M-GM	11.00	1.87	●	●	
1100M-KM		2.50	●	●	
DA 1110M-GM	11.10	1.89	●	●	
1110M-KM		2.54	●	●	
DA 1120M-GM	11.20	1.91	●	●	
1120M-KM		2.59	●	●	
DA 1130M-GM	11.30	1.92	●	●	
1130M-KM		2.63	●	●	
DA 1140M-GM	11.40	1.94	●	●	
1140M-KM		2.67	●	●	
DA 1150M-GM	11.50	1.96	●	●	
1150M-KM		2.71	●	●	
DA 1160M-GM	11.60	1.98	●	●	
1160M-KM		2.75	●	●	
DA 1170M-GM	11.70	2.00	●	●	
1170M-KM		2.80	●	●	
DA 1180M-GM	11.80	2.01	●	●	
1180M-KM		2.84	●	●	
DA 1190M-GM	11.90	2.03	●	●	
1190M-KM		2.88	●	●	

DA inserts are sold in 1 piece boxes

● : Std. Item

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➡ K10~K18	
	DC	PL	PR1535	PR1525		
DA 1200M-GM 1200M-KM	12.00	2.03	●	●	SS14-DRA120M-○ SF16-DRA120M-○	
		2.68	●	●		
DA 1210M-GM 1210M-KM	12.10	2.05	●	●		
		2.72	●	●		
DA 1220M-GM 1220M-KM	12.20	2.07	●	●		
		2.76	●	●		
DA 1230M-GM 1230M-KM	12.30	2.08	●	●		
		2.80	●	●		
DA 1240M-GM 1240M-KM	12.40	2.10	●	●		
		2.85	●	●		
DA 1250M-GM 1250M-KM	12.50	2.12	●	●		
		2.89	●	●		
DA 1260M-GM 1260M-KM	12.60	2.14	●	●	SS14-DRA125M-○ SF16-DRA125M-○	
		2.93	●	●		
DA 1270M-GM 1270M-KM	12.70	2.16	●	●		
		2.97	●	●		
DA 1280M-GM 1280M-KM	12.80	2.17	●	●		
		3.01	●	●		
DA 1290M-GM 1290M-KM	12.90	2.19	●	●		
		3.06	●	●		
DA 1300M-GM 1300M-KM	13.00	2.20	●	●		
		2.83	●	●		
DA 1310M-GM 1310M-KM	13.10	2.22	●	●		
		2.87	●	●		
DA 1320M-GM 1320M-KM	13.20	2.24	●	●	SS14-DRA130M-○ SF16-DRA130M-○	
		2.92	●	●		
DA 1330M-GM 1330M-KM	13.30	2.25	●	●		
		2.96	●	●		
DA 1340M-GM 1340M-KM	13.40	2.27	●	●		
		3.00	●	●		
DA 1350M-GM 1350M-KM	13.50	2.29	●	●		
		3.04	●	●		
DA 1360M-GM 1360M-KM	13.60	2.31	●	●		
		3.08	●	●		
DA 1370M-GM 1370M-KM	13.70	2.33	●	●		SS14-DRA135M-○ SF16-DRA135M-○
		3.13	●	●		
DA 1380M-GM 1380M-KM	13.80	2.35	●	●		
		3.17	●	●		
DA 1390M-GM 1390M-KM	13.90	2.36	●	●		
		3.21	●	●		
DA 1400M-GM 1400M-KM	14.00	2.33	●	●		
		3.04	●	●		
DA 1410M-GM 1410M-KM	14.10	2.34	●	●		
		3.09	●	●		
DA 1420M-GM 1420M-KM	14.20	2.36	●	●	SS16-DRA140M-○ SF16-DRA140M-○	
		3.13	●	●		
DA 1430M-GM 1430M-KM	14.30	2.38	●	●		
		3.17	●	●		
DA 1440M-GM 1440M-KM	14.40	2.40	●	●		
		3.21	●	●		
DA 1450M-GM 1450M-KM	14.50	2.42	●	●		
		3.25	●	●		
DA 1460M-GM 1460M-KM	14.60	2.43	●	●		SS16-DRA145M-○ SF16-DRA145M-○
		3.30	●	●		
DA 1470M-GM 1470M-KM	14.70	2.45	●	●		
		3.34	●	●		

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➡ K10~K18
	DC	PL	PR1535	PR1525	
DA 1480M-GM 1480M-KM	14.80	2.47	●	●	SS16-DRA145M-○ SF16-DRA145M-○
		3.38	●	●	
DA 1490M-GM 1490M-KM	14.90	2.49	●	●	
		3.42	●	●	
DA 1500M-GM 1500M-KM	15.00	2.52	●	●	SS16-DRA150M-○ SF20-DRA150M-○
		3.24	●	●	
DA 1510M-GM 1510M-KM	15.10	2.54	●	●	
		3.28	●	●	
DA 1520M-GM 1520M-KM	15.20	2.55	●	●	
		3.33	●	●	
DA 1530M-GM 1530M-KM	15.30	2.57	●	●	
		3.37	●	●	
DA 1540M-GM 1540M-KM	15.40	2.59	●	●	
		3.41	●	●	
DA 1550M-GM 1550M-KM	15.50	2.61	●	●	
		3.45	●	●	
DA 1560M-GM 1560M-KM	15.60	2.63	●	●	
		3.49	●	●	
DA 1570M-GM 1570M-KM	15.70	2.65	●	●	
		3.54	●	●	
DA 1580M-GM 1580M-KM	15.80	2.66	●	●	
		3.58	●	●	
DA 1590M-GM 1590M-KM	15.90	2.68	●	●	
		3.62	●	●	
DA 1600M-GM 1600M-KM	16.00	2.69	●	●	SS18-DRA160M-○ SF20-DRA160M-○
		3.43	●	●	
DA 1610M-GM 1610M-KM	16.10	2.71	●	●	
		3.47	●	●	
DA 1620M-GM 1620M-KM	16.20	2.73	●	●	
		3.51	●	●	
DA 1630M-GM 1630M-KM	16.30	2.75	●	●	
		3.55	●	●	
DA 1640M-GM 1640M-KM	16.40	2.76	●	●	
		3.60	●	●	
DA 1650M-GM 1650M-KM	16.50	2.78	●	●	
		3.64	●	●	
DA 1660M-GM 1660M-KM	16.60	2.80	●	●	
		3.68	●	●	
DA 1670M-GM 1670M-KM	16.70	2.82	●	●	
		3.72	●	●	
DA 1680M-GM 1680M-KM	16.80	2.84	●	●	
		3.76	●	●	
DA 1690M-GM 1690M-KM	16.90	2.86	●	●	
		3.81	●	●	
DA 1700M-GM 1700M-KM	17.00	2.86	●	●	SS18-DRA170M-○ SF20-DRA170M-○
		3.61	●	●	
DA 1710M-GM 1710M-KM	17.10	2.88	●	●	
		3.65	●	●	
DA 1720M-GM 1720M-KM	17.20	2.90	●	●	
		3.69	●	●	
DA 1730M-GM 1730M-KM	17.30	2.92	●	●	
		3.74	●	●	
DA 1740M-GM 1740M-KM	17.40	2.93	●	●	
		3.78	●	●	

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Inserts for MagicDrill DRA **NEW**

Applicable Inserts

General Purpose GM

Cast Iron KM

k8 tolerance

DC	k8 (mm)
7.94	+0.022
10.00	0
10.10	+0.027
18.00	0
18.10	+0.033
25.50	0

k8 is the dimension tolerance of the insert.
It is not the dimension tolerance of the hole diameter.

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders K10~K18
	DC	PL	PR1535	PR1525	
DA 1750M-GM	17.50	2.95	●	●	SS18-DRA170M-○ SF20-DRA170M-○
1750M-KM		3.82	●	●	
DA 1760M-GM	17.60	2.97	●	●	
1760M-KM		3.86	●	●	
DA 1770M-GM	17.70	2.99	●	●	
1770M-KM		3.90	●	●	
DA 1780M-GM	17.80	3.01	●	●	
1780M-KM		3.95	●	●	
DA 1790M-GM	17.90	3.03	●	●	
1790M-KM		3.99	●	●	
DA 1800M-GM	18.00	3.04	●	●	
1800M-KM		3.79	●	●	
DA 1810M-GM	18.10	3.06	●	●	
1810M-KM		3.83	●	●	
DA 1820M-GM	18.20	3.07	●	●	
1820M-KM		3.88	●	●	
DA 1830M-GM	18.30	3.09	●	●	
1830M-KM		3.92	●	●	
DA 1840M-GM	18.40	3.11	●	●	
1840M-KM		3.96	●	●	
DA 1850M-GM	18.50	3.13	●	●	
1850M-KM		4.00	●	●	
DA 1860M-GM	18.60	3.15	●	●	
1860M-KM		4.04	●	●	
DA 1870M-GM	18.70	3.17	●	●	
1870M-KM		4.08	●	●	
DA 1880M-GM	18.80	3.18	●	●	
1880M-KM		4.13	●	●	
DA 1890M-GM	18.90	3.20	●	●	
1890M-KM		4.17	●	●	
DA 1900M-GM	19.00	3.21	●	●	
1900M-KM		3.97	●	●	
DA 1910M-GM	19.10	3.23	●	●	
1910M-KM		4.01	●	●	
DA 1920M-GM	19.20	3.25	●	●	
1920M-KM		4.05	●	●	
DA 1930M-GM	19.30	3.27	●	●	
1930M-KM		4.09	●	●	
DA 1940M-GM	19.40	3.29	●	●	
1940M-KM		4.14	●	●	
DA 1950M-GM	19.50	3.30	●	●	
1950M-KM		4.18	●	●	
DA 1960M-GM	19.60	3.32	●	●	
1960M-KM		4.22	●	●	
DA 1970M-GM	19.70	3.34	●	●	
1970M-KM		4.26	●	●	

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders K10~K18
	DC	PL	PR1535	PR1525	
DA 1980M-GM	19.80	3.36	●	●	SS20-DRA190M-○ SF25-DRA190M-○
1980M-KM		4.30	●	●	
DA 1990M-GM	19.90	3.38	●	●	
1990M-KM		4.35	●	●	
DA 2000M-GM	20.00	3.37	●	●	
2000M-KM		4.20	●	●	
DA 2010M-GM	20.10	3.39	●	●	
2010M-KM		4.24	●	●	
DA 2020M-GM	20.20	3.41	●	●	
2020M-KM		4.28	●	●	
DA 2030M-GM	20.30	3.43	●	●	
2030M-KM		4.33	●	●	
DA 2040M-GM	20.40	3.45	●	●	
2040M-KM		4.37	●	●	
DA 2050M-GM	20.50	3.46	●	●	
2050M-KM		4.41	●	●	
DA 2060M-GM	20.60	3.48	●	●	
2060M-KM		4.45	●	●	
DA 2070M-GM	20.70	3.50	●	●	
2070M-KM		4.49	●	●	
DA 2080M-GM	20.80	3.52	●	●	
2080M-KM		4.54	●	●	
DA 2090M-GM	20.90	3.54	●	●	
2090M-KM		4.58	●	●	
DA 2100M-GM	21.00	3.54	●	●	
2100M-KM		4.38	●	●	
DA 2150M-GM	21.50	3.63	●	●	
2150M-KM		4.59	●	●	
DA 2200M-GM	22.00	3.71	●	●	
2200M-KM		4.55	●	●	
DA 2250M-GM	22.50	3.80	●	●	
2250M-KM		4.76	●	●	
DA 2300M-GM	23.00	3.87	●	●	
2300M-KM		4.74	●	●	
DA 2350M-GM	23.50	3.96	●	●	
2350M-KM		4.94	●	●	
DA 2400M-GM	24.00	4.04	●	●	
2400M-KM		4.91	●	●	
DA 2450M-GM	24.50	4.13	●	●	
2450M-KM		5.12	●	●	
DA 2500M-GM	25.00	4.20	●	●	
2500M-KM		5.08	●	●	
DA 2550M-GM	25.50	4.29	●	●	
2550M-KM		5.29	●	●	

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Drilling

DRA

DRC

DRV

DRS

DRZ

DRX

DRW

Fine Micro

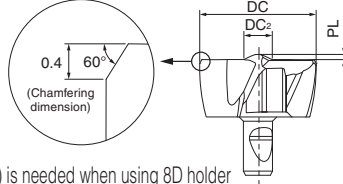
DA inserts are sold in 1 piece boxes

● : Std. Item

Applicable Inserts (FTP - Counterboring)



Uncut area remains in blind hole due to chamfer on the shoulder part



k8 tolerance

DC	k8 (mm)
8.00 ? 10.00	+0.022 0
10.10 ? 18.00	+0.027 0
18.10 ? 25.40	+0.033 0

k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the hole diameter.

*Applicable to 1.5D, 3D, 5D and 8D holders, Prepared hole (0.5D) is needed when using 8D holder

Description	Dimension (mm)			MEGACOAT NANO		Applicable Toolholders ● K10~K18
	DC	DC ₂	PL	PR1535	PR1525	
DA 0800M-FTP	8.00	2.90	0.40	●	●	SS10-DRA080M-○ SF12-DRA080M-○
DA 0830M-FTP	8.30			●	●	
DA 0850M-FTP	8.50			●	●	SS10-DRA085M-○ SF12-DRA085M-○
DA 0880M-FTP	8.80			●	●	
DA 0900M-FTP	9.00	3.00	0.43	●	●	SS10-DRA090M-○ SF12-DRA090M-○
DA 0930M-FTP	9.30			●	●	
DA 0950M-FTP	9.50			●	●	SS10-DRA095M-○ SF12-DRA095M-○
DA 1000M-FTP	10.00	3.30	0.46	●	●	SS12-DRA100M-○ SF16-DRA100M-○
DA 1030M-FTP	10.30			●	●	
DA 1050M-FTP	10.50			●	●	SS12-DRA105M-○ SF16-DRA105M-○
DA 1080M-FTP	10.80			●	●	
DA 1100M-FTP	11.00	3.40	0.50	●	●	SS12-DRA110M-○ SF16-DRA110M-○
DA 1150M-FTP	11.50			●	●	SS12-DRA115M-○ SF16-DRA115M-○
DA 1200M-FTP	12.00	3.70	0.53	●	●	SS14-DRA120M-○ SF16-DRA120M-○
DA 1250M-FTP	12.50			●	●	SS14-DRA125M-○ SF16-DRA125M-○
DA 1270M-FTP	12.70			●	●	
DA 1300M-FTP	13.00	3.90	0.56	●	●	SS14-DRA130M-○ SF16-DRA130M-○
DA 1350M-FTP	13.50			●	●	SS14-DRA135M-○ SF16-DRA135M-○
DA 1400M-FTP	14.00	4.20	0.60	●	●	SS16-DRA140M-○ SF16-DRA140M-○
DA 1450M-FTP	14.50			●	●	SS16-DRA145M-○ SF16-DRA145M-○
DA 1500M-FTP	15.00	4.40	0.65	●	●	SS16-DRA150M-○ SF20-DRA150M-○

Description	Dimension (mm)			MEGACOAT NANO		Applicable Toolholders ● K10~K18
	DC	DC ₂	PL	PR1535	PR1525	
DA 1550M-FTP	15.50	4.40	0.65	●	●	SS16-DRA150M-○ SF20-DRA150M-○
DA 1600M-FTP	16.00	4.60	0.70	●	●	SS18-DRA160M-○ SF20-DRA160M-○
DA 1650M-FTP	16.50			●	●	
DA 1700M-FTP	17.00	5.00	0.75	●	●	SS18-DRA170M-○ SF20-DRA170M-○
DA 1750M-FTP	17.50			●	●	
DA 1800M-FTP	18.00	5.00	0.80	●	●	SS20-DRA180M-○ SF25-DRA180M-○
DA 1850M-FTP	18.50			●	●	
DA 1900M-FTP	19.00	5.30	0.85	●	●	SS20-DRA190M-○ SF25-DRA190M-○
DA 1950M-FTP	19.50			●	●	
DA 2000M-FTP	20.00	5.70	0.90	●	●	SS25-DRA200M-○ SF25-DRA200M-○
DA 2050M-FTP	20.50			●	●	
DA 2100M-FTP	21.00	6.00	0.95	●	●	SS25-DRA210M-○ SF25-DRA210M-○
DA 2150M-FTP	21.50			●	●	
DA 2200M-FTP	22.00	6.40	1.00	●	●	SS25-DRA220M-○ SF25-DRA220M-○
DA 2250M-FTP	22.50			●	●	
DA 2300M-FTP	23.00	6.60	1.05	●	●	SS25-DRA230M-○ SF25-DRA230M-○
DA 2350M-FTP	23.50			●	●	
DA 2400M-FTP	24.00	6.80	1.10	●	●	SS25-DRA240M-○ SF25-DRA240M-○
DA 2450M-FTP	24.50			●	●	
DA 2500M-FTP	25.00	7.00	1.20	●	●	SS32-DRA250M-○ SF25-DRA250M-○
DA 2540M-FTP	25.40			●	●	

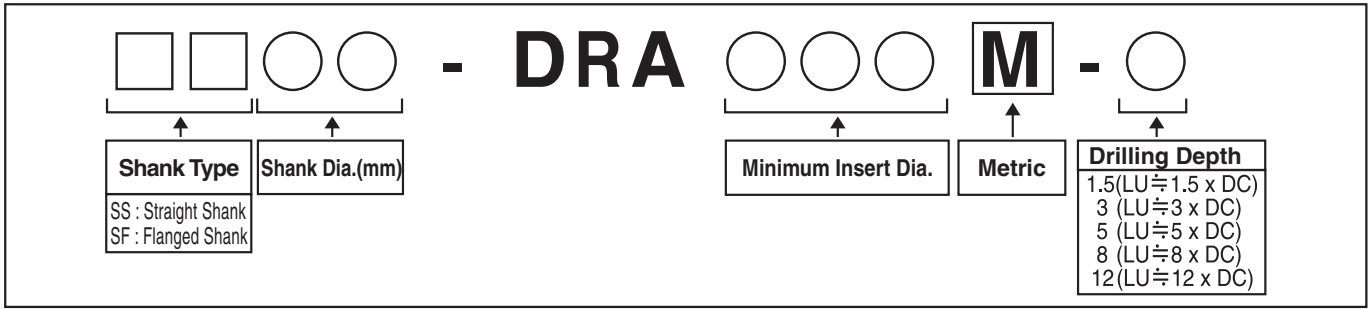
● : Std. Item

DA inserts are sold in 1 piece boxes

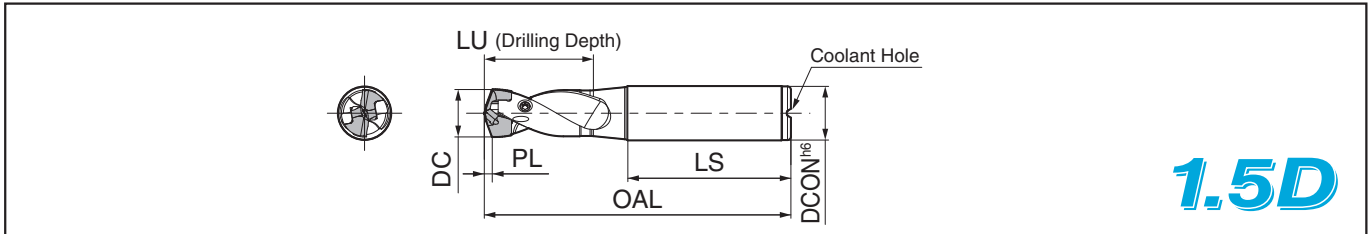
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Description Identification System (Toolholder)



SS-DRA (Drilling Depth : 1.5 x DC) **NEW**



* For PL indicates distance from drill point to corner edge ● K6-K9

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts		Applicable Inserts ● K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench	
		min.	max.							
SS10- DRA080M-1.5	●	7.94	8.49	10	66.2	12.8	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		67.5	13.5				DA0850M-...~DA0890M-...
	●	9.00	9.49		68.7	14.3				DA0900M-...~DA0940M-...
	●	9.50	9.99		70.0	15.0				DA0950M-...~DA0990M-...
SS12- DRA100M-1.5	●	10.00	10.49	12	76.2	15.8	45	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		77.5	16.5				DA1050M-...~DA1090M-...
	●	11.00	11.49		79.7	17.3				DA1100M-...~DA1140M-...
	●	11.50	11.99		81.0	18.0				DA1150M-...~DA1190M-...
SS14- DRA120M-1.5	●	12.00	12.49	14	82.2	18.8	48	HS-3048TRP	DTP-6	DA1200M-...~DA1240M-...
	●	12.50	12.99		83.5	19.5				DA1250M-...~DA1290M-...
	●	13.00	13.49		84.7	20.3				DA1300M-...~DA1340M-...
	●	13.50	13.99		86.0	21.0				DA1350M-...~DA1390M-...
SS16- DRA140M-1.5	●	14.00	14.49	16	90.2	21.8	50	HS-4067TRP	DTP-7	DA1400M-...~DA1440M-...
	●	14.50	14.99		91.5	22.5				DA1450M-...~DA1490M-...
	●	15.00	15.99		95.0	24.0				DA1500M-...~DA1590M-...
SS18- DRA160M-1.5	●	16.00	16.99	18	98.5	25.5	56	HS-4067TRP	DTP-7	DA1600M-...~DA1690M-...
	●	17.00	17.99		101.0	27.0				DA1700M-...~DA1790M-...
SS20- DRA180M-1.5	●	18.00	18.99	20	106.5	28.5	60	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		109.0	30.0				DA1900M-...~DA1990M-...
SS25- DRA200M-1.5	●	20.00	20.99	25	117.5	31.5	60	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...
	●	21.00	21.99		120.0	33.0				DA2100M-...~DA2150M-...
	●	22.00	22.99		123.5	34.5				DA2200M-...~DA2250M-...
	●	23.00	23.99		126.0	36.0				DA2300M-...~DA2350M-...
	●	24.00	24.99		128.5	37.5				DA2400M-...~DA2450M-...
SS32- DRA250M-1.5	●	25.00	25.50	32	135.0	39.0	60	HS-4067TRP	DTP-7	DA2500M-...~DA2550M-...

● : Std. Item

K

Drilling

DRA

DRC

DRV

DRS

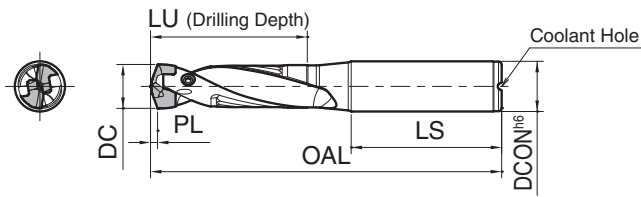
DRZ

DRX

DRW

Fine Micro

SS-DRA (Drilling Depth : 3 x DC)



For PL indicates distance from drill point to corner edge **K6-K9**

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts		Applicable Inserts K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench	
		min.	max.							
SS10- DRA080M-3	●	7.94	8.49	10	79	25.5	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		81	27.0				DA0850M-...~DA0890M-...
	●	9.00	9.49		83	28.5				DA0900M-...~DA0940M-...
	●	9.50	9.99		85	30.0				DA0950M-...~DA0990M-...
SS12- DRA100M-3	●	10.00	10.49	12	92	31.5	45	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		94	33.0				DA1050M-...~DA1090M-...
	●	11.00	11.49		97	34.5				DA1100M-...~DA1140M-...
	●	11.50	11.99		99	36.0				DA1150M-...~DA1190M-...
SS14- DRA120M-3	●	12.00	12.49	14	101	37.5	48	HS-3048TRP	DTP-6	DA1200M-...~DA1240M-...
	●	12.50	12.99		103	39.0				DA1250M-...~DA1290M-...
	●	13.00	13.49		105	40.5				DA1300M-...~DA1340M-...
	●	13.50	13.99		107	42.0				DA1350M-...~DA1390M-...
SS16- DRA140M-3	●	14.00	14.49	16	112	43.5	50	HS-4067TRP	DTP-7	DA1400M-...~DA1440M-...
	●	14.50	14.99		114	45.0				DA1450M-...~DA1490M-...
	●	15.00	15.99		119	48.0				DA1500M-...~DA1590M-...
SS18- DRA160M-3	●	16.00	16.99	18	124	51.0	56	HS-4067TRP	DTP-7	DA1600M-...~DA1690M-...
	●	17.00	17.99		128	54.0				DA1700M-...~DA1790M-...
SS20- DRA180M-3	●	18.00	18.99	20	135	57.0	60	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		139	60.0				DA1900M-...~DA1990M-...
SS25- DRA200M-3	●	20.00	20.99	25	149	63.0	60	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...
	●	21.00	21.99		153	66.0				DA2100M-...~DA2150M-...
	●	22.00	22.99		158	69.0				DA2200M-...~DA2250M-...
	●	23.00	23.99		162	72.0				DA2300M-...~DA2350M-...
	●	24.00	24.99		166	75.0				DA2400M-...~DA2450M-...
SS32- DRA250M-3	●	25.00	25.50	32	174	78.0	60	HS-4067TRP	DTP-7	DA2500M-...~DA2550M-...

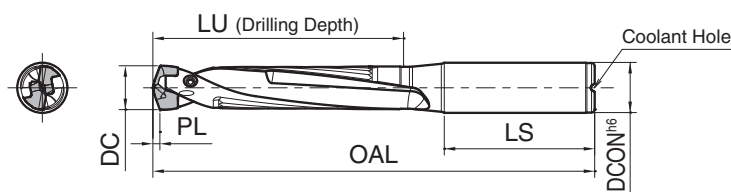
● : Std. Item

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SS-DRA (Drilling Depth : 5 x DC)



5D

For PL indicates distance from drill point to corner edge ● K6~K9

● Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts		Applicable Inserts ● K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench	
		min.	max.							
SS10- DRA080M-5	●	7.94	8.49	10	96	42.5	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		99	45.0				DA0850M-...~DA0890M-...
	●	9.00	9.49		102	47.5				DA0900M-...~DA0940M-...
	●	9.50	9.99		105	50.0				DA0950M-...~DA0990M-...
SS12- DRA100M-5	●	10.00	10.49	12	113	52.5	45	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		116	55.0				DA1050M-...~DA1090M-...
	●	11.00	11.49		120	57.5				DA1100M-...~DA1140M-...
	●	11.50	11.99		123	60.0				DA1150M-...~DA1190M-...
SS14- DRA120M-5	●	12.00	12.49	14	126	62.5	48	HS-3048TRP	DTP-6	DA1200M-...~DA1240M-...
	●	12.50	12.99		129	65.0				DA1250M-...~DA1290M-...
	●	13.00	13.49		132	67.5				DA1300M-...~DA1340M-...
	●	13.50	13.99		135	70.0				DA1350M-...~DA1390M-...
SS16- DRA140M-5	●	14.00	14.49	16	141	72.5	50	HS-4067TRP	DTP-7	DA1400M-...~DA1440M-...
	●	14.50	14.99		144	75.0				DA1450M-...~DA1490M-...
	●	15.00	15.99		151	80.0				DA1500M-...~DA1590M-...
SS18- DRA160M-5	●	16.00	16.99	18	158	85.0	56	HS-4067TRP	DTP-7	DA1600M-...~DA1690M-...
	●	17.00	17.99		164	90.0				DA1700M-...~DA1790M-...
SS20- DRA180M-5	●	18.00	18.99	20	173	95.0	60	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		179	100.0				DA1900M-...~DA1990M-...
SS25- DRA200M-5	●	20.00	20.99	25	191	105.0	56	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...
	●	21.00	21.99		197	110.0				DA2100M-...~DA2150M-...
	●	22.00	22.99		204	115.0				DA2200M-...~DA2250M-...
	●	23.00	23.99		210	120.0				DA2300M-...~DA2350M-...
	●	24.00	24.99		216	125.0				DA2400M-...~DA2450M-...
SS32- DRA250M-5	●	25.00	25.50	32	226	130.0	60	HS-4067TRP	DTP-7	DA2500M-...~DA2550M-...

K

Drilling

DRA

DRC

DRV

DRS

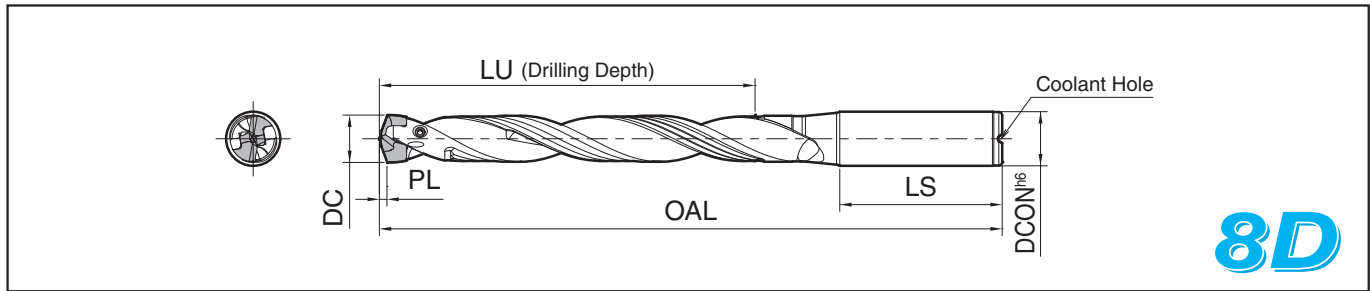
DRZ

DRX

DRW

Fine Micro

SS-DRA (Drilling Depth : 8 x DC)



For PL indicates distance from drill point to corner edge **K6~K9**

Toolholder Dimensions

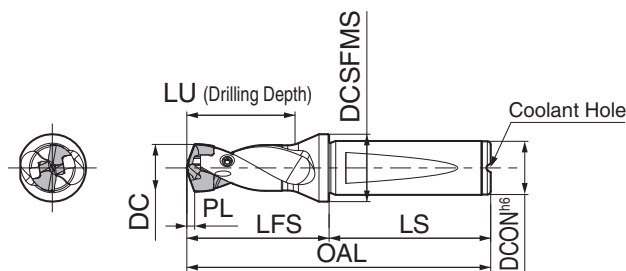
Description	Stock	Dimension (mm)						Spare Parts		Applicable Inserts K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench	
		min.	max.							
SS10- DRA080M-8	●	7.94	8.49	10	121	68.0	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		126	72.0				DA0850M-...~DA0890M-...
	●	9.00	9.49		130	76.0				DA0900M-...~DA0940M-...
	●	9.50	9.99		135	80.0				DA0950M-...~DA0990M-...
SS12- DRA100M-8	●	10.00	10.49	12	144	84.0	45	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		149	88.0				DA1050M-...~DA1090M-...
	●	11.00	11.49		154	92.0				DA1100M-...~DA1140M-...
	●	11.50	11.99		159	96.0				DA1150M-...~DA1190M-...
SS14- DRA120M-8	●	12.00	12.49	14	163	100.0	48	HS-3048TRP	DTP-6	DA1200M-...~DA1240M-...
	●	12.50	12.99		168	104.0				DA1250M-...~DA1290M-...
	●	13.00	13.49		172	108.0				DA1300M-...~DA1340M-...
	●	13.50	13.99		177	112.0				DA1350M-...~DA1390M-...
SS16- DRA140M-8	●	14.00	14.49	16	184	116.0	50	HS-4067TRP	DTP-7	DA1400M-...~DA1440M-...
	●	14.50	14.99		189	120.0				DA1450M-...~DA1490M-...
	●	15.00	15.99		199	128.0				DA1500M-...~DA1590M-...
SS18- DRA160M-8	●	16.00	16.99	18	209	136.0	56	HS-4067TRP	DTP-7	DA1600M-...~DA1690M-...
	●	17.00	17.99		218	144.0				DA1700M-...~DA1790M-...
SS20- DRA180M-8	●	18.00	18.99	20	230	152.0	60	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		239	160.0				DA1900M-...~DA1990M-...
SS25- DRA200M-8	●	20.00	20.99	25	254	168.0	60	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...
	●	21.00	21.99		263	176.0				DA2100M-...~DA2150M-...
	●	22.00	22.99		273	184.0				DA2200M-...~DA2250M-...
	●	23.00	23.99		282	192.0				DA2300M-...~DA2350M-...
	●	24.00	24.99		291	200.0				DA2400M-...~DA2450M-...
SS32- DRA250M-8	●	25.00	25.50	32	304	208.0	60	HS-4067TRP	DTP-7	DA2500M-...~DA2550M-...

● : Std. Item

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SF-DRA (Drilling Depth : 1.5 x DC) NEW



1.5D

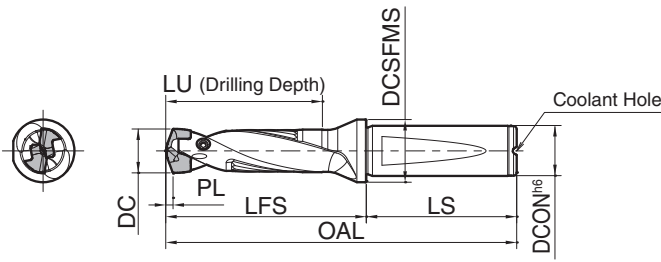
For PL indicates distance from drill point to corner edge ● **K6-K9**

Toolholder Dimensions

Description	Stock	Dimension (mm)								Spare Parts		Applicable Inserts ● K6-K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
		min.	max.									
SF12- DRA080M-1.5	●	7.94	8.49	12	71.2	26.2	12.8	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		72.5	27.5	13.5					DA0850M-...~DA0890M-...
	●	9.00	9.49		73.7	28.7	14.3					DA0900M-...~DA0940M-...
	●	9.50	9.99		75.0	30.0	15.0					DA0950M-...~DA0990M-...
SF16- DRA100M-1.5	●	10.00	10.49	16	79.2	31.2	15.8	48	20	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		80.5	32.5	16.5					DA1050M-...~DA1090M-...
	●	11.00	11.49		82.7	34.7	17.3					DA1100M-...~DA1140M-...
	●	11.50	11.99		84.0	36.0	18.0					DA1150M-...~DA1190M-...
	●	12.00	12.49		85.2	37.2	18.8					DA1200M-...~DA1240M-...
	●	12.50	12.99		86.5	38.5	19.5					DA1250M-...~DA1290M-...
	●	13.00	13.49		87.7	39.7	20.3					DA1300M-...~DA1340M-...
	●	13.50	13.99		89.0	41.0	21.0					DA1350M-...~DA1390M-...
	●	14.00	14.49		90.2	42.2	21.8					DA1400M-...~DA1440M-...
	●	14.50	14.99		91.5	43.5	22.5					DA1450M-...~DA1490M-...
SF20- DRA150M-1.5	●	15.00	15.99	20	97.0	47.0	24.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	●	16.00	16.99		100.5	50.5	25.5					DA1600M-...~DA1690M-...
	●	17.00	17.99		103.0	53.0	27.0					DA1700M-...~DA1790M-...
	●	18.00	18.99		112.5	56.5	28.5					DA1800M-...~DA1890M-...
SF25- DRA180M-1.5	●	18.00	18.99	25	112.5	56.5	28.5	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		115.0	59.0	30.0					DA1900M-...~DA1990M-...
	●	20.00	20.99		117.5	61.5	31.5					DA2000M-...~DA2090M-...
	●	21.00	21.99		120.0	64.0	33.0					DA2100M-...~DA2150M-...
	●	22.00	22.99		123.5	67.5	34.5					DA2200M-...~DA2250M-...
	●	23.00	23.99		126.0	70.0	36.0					DA2300M-...~DA2350M-...
	●	24.00	24.99		128.5	72.5	37.5					DA2400M-...~DA2450M-...
	●	25.00	25.50		131.0	75.0	39.0					DA2500M-...~DA2550M-...

● : Std. Item

SF-DRA (Drilling Depth : 3 x DC)



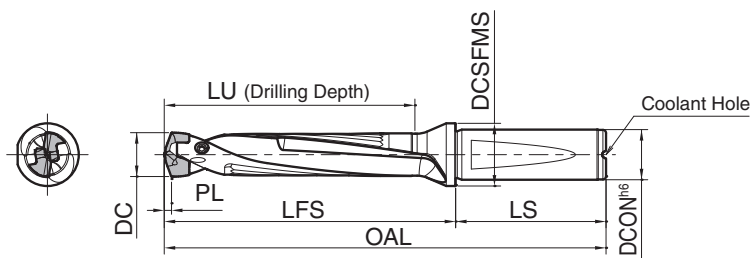
For PL indicates distance from drill point to corner edge **K6~K9**

Toolholder Dimensions

Description	Stock	Dimension (mm)								Spare Parts		Applicable Inserts K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
		min.	max.									
SF12- DRA080M-3 DRA085M-3 DRA090M-3 DRA095M-3	●	7.94	8.49	12	84	39	25.5	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		86	41	27.0					DA0850M-...~DA0890M-...
	●	9.00	9.49		88	43	28.5					DA0900M-...~DA0940M-...
	●	9.50	9.99		90	45	30.0					DA0950M-...~DA0990M-...
SF16- DRA100M-3 DRA105M-3 DRA110M-3 DRA115M-3 DRA120M-3 DRA125M-3 DRA130M-3 DRA135M-3 DRA140M-3 DRA145M-3	●	10.00	10.49	16	95	47	31.5	48	20	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		97	49	33.0					DA1050M-...~DA1090M-...
	●	11.00	11.49		100	52	34.5					DA1100M-...~DA1140M-...
	●	11.50	11.99		102	54	36.0					DA1150M-...~DA1190M-...
	●	12.00	12.49		104	56	37.5					DA1200M-...~DA1240M-...
	●	12.50	12.99		106	58	39.0			DA1250M-...~DA1290M-...		
	●	13.00	13.49		108	60	40.5			DA1300M-...~DA1340M-...		
	●	13.50	13.99		110	62	42.0			DA1350M-...~DA1390M-...		
	●	14.00	14.49		112	64	43.5			DA1400M-...~DA1440M-...		
	●	14.50	14.99		114	66	45.0			DA1450M-...~DA1490M-...		
SF20- DRA150M-3 DRA160M-3 DRA170M-3	●	15.00	15.99	20	121	71	48.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	●	16.00	16.99		126	76	51.0					DA1600M-...~DA1690M-...
	●	17.00	17.99		130	80	54.0					DA1700M-...~DA1790M-...
SF25- DRA180M-3 DRA190M-3 DRA200M-3 DRA210M-3 DRA220M-3 DRA230M-3 DRA240M-3 DRA250M-3	●	18.00	18.99	25	141	85	57.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		145	85	60.0					DA1900M-...~DA1990M-...
	●	20.00	20.99		149	93	63.0					DA2000M-...~DA2090M-...
	●	21.00	21.99		153	97	66.0					DA2100M-...~DA2150M-...
	●	22.00	22.99		158	102	69.0					DA2200M-...~DA2250M-...
	●	23.00	23.99		162	106	72.0					DA2300M-...~DA2350M-...
	●	24.00	24.99		166	110	75.0					DA2400M-...~DA2450M-...
	●	25.00	25.50		170	114	78.0					DA2500M-...~DA2550M-...

● : Std. Item

SF-DRA (Drilling Depth : 5 x DC)



5D

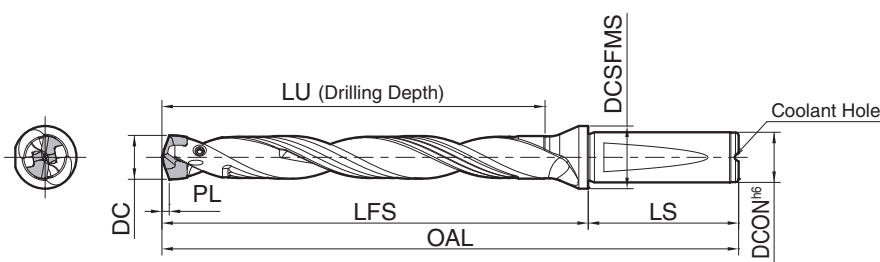
For PL indicates distance from drill point to corner edge **K6-K9**

Toolholder Dimensions

Description	Stock	Dimension (mm)								Spare Parts		Applicable Inserts K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
		min.	max.									
SF12- DRA080M-5	●	7.94	8.49	12	101	56	42.5	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		104	59	45.0					DA0850M-...~DA0890M-...
	●	9.00	9.49		107	62	47.5					DA0900M-...~DA0940M-...
	●	9.50	9.99		110	65	50.0					DA0950M-...~DA0990M-...
SF16- DRA100M-5	●	10.00	10.49	16	116	68	52.5	48	20	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		119	71	55.0					DA1050M-...~DA1090M-...
	●	11.00	11.49		123	75	57.5					DA1100M-...~DA1140M-...
	●	11.50	11.99		126	78	60.0					DA1150M-...~DA1190M-...
	●	12.00	12.49		129	81	62.5					DA1200M-...~DA1240M-...
	●	12.50	12.99		132	84	65.0					DA1250M-...~DA1290M-...
	●	13.00	13.49		135	87	67.5					DA1300M-...~DA1340M-...
	●	13.50	13.99		138	90	70.0					DA1350M-...~DA1390M-...
	●	14.00	14.49		141	93	72.5					DA1400M-...~DA1440M-...
	●	14.50	14.99		144	96	75.0					DA1450M-...~DA1490M-...
SF20- DRA150M-5	●	15.00	15.99	20	153	103	80.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	●	16.00	16.99		160	110	85.0					DA1600M-...~DA1690M-...
	●	17.00	17.99		166	116	90.0					DA1700M-...~DA1790M-...
SF25- DRA180M-5	●	18.00	18.99	25	179	123	95.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		185	129	100.0					DA1900M-...~DA1990M-...
	●	20.00	20.99		191	135	105.0					DA2000M-...~DA2090M-...
	●	21.00	21.99		197	141	110.0					DA2100M-...~DA2150M-...
	●	22.00	22.99		204	148	115.0					DA2200M-...~DA2250M-...
	●	23.00	23.99		210	154	120.0					DA2300M-...~DA2350M-...
	●	24.00	24.99		216	160	125.0					DA2400M-...~DA2450M-...
	●	25.00	25.50		222	166	130.0					DA2500M-...~DA2550M-...

● : Std. Item

SF-DRA (Drilling Depth : 8 x DC)



For PL indicates distance from drill point to corner edge **K6-K9**

Toolholder Dimensions

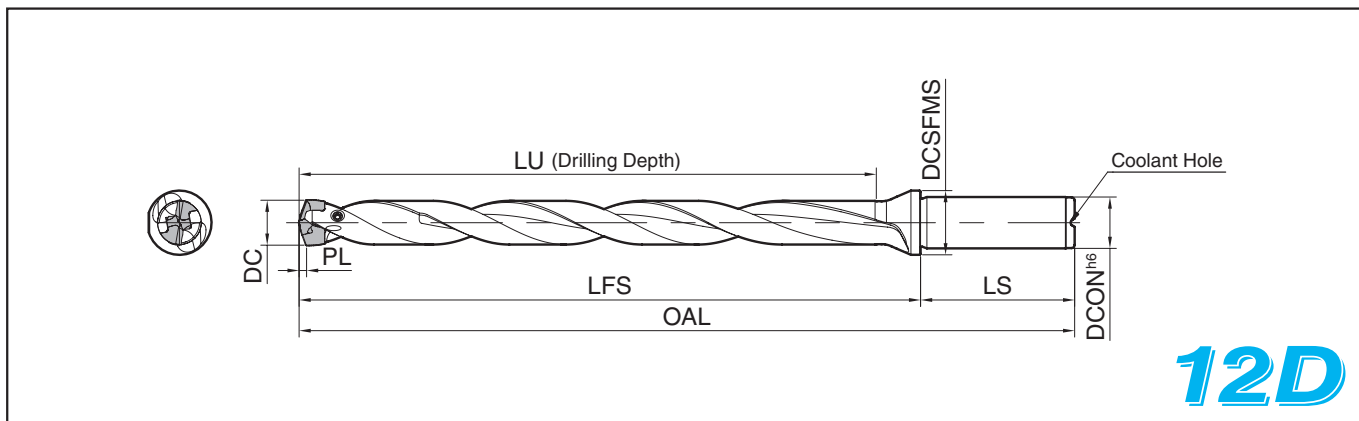
Description	Stock	Dimension (mm)								Spare Parts		Applicable Inserts K6~K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
		min.	max.									
SF12- DRA080M-8	●	7.94	8.49	12	126	81	68.0	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	●	8.50	8.99		131	86	72.0					DA0850M-...~DA0890M-...
	●	9.00	9.49		135	90	76.0					DA0900M-...~DA0940M-...
	●	9.50	9.99		140	95	80.0					DA0950M-...~DA0990M-...
SF16- DRA100M-8	●	10.00	10.49	16	147	99	84.0	48	20	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	●	10.50	10.99		152	104	88.0					DA1050M-...~DA1090M-...
	●	11.00	11.49		157	109	92.0					DA1100M-...~DA1140M-...
	●	11.50	11.99		162	114	96.0					DA1150M-...~DA1190M-...
	●	12.00	12.49		166	118	100.0					DA1200M-...~DA1240M-...
	●	12.50	12.99		171	123	104.0			DA1250M-...~DA1290M-...		
	●	13.00	13.49		175	127	108.0			DA1300M-...~DA1340M-...		
	●	13.50	13.99		180	132	112.0			DA1350M-...~DA1390M-...		
	●	14.00	14.49		184	136	116.0			DA1400M-...~DA1440M-...		
	●	14.50	14.99		189	141	120.0			DA1450M-...~DA1490M-...		
SF20- DRA150M-8	●	15.00	15.99	20	201	151	128.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	●	16.00	16.99		211	161	136.0					DA1600M-...~DA1690M-...
	●	17.00	17.99		220	170	144.0					DA1700M-...~DA1790M-...
SF25- DRA180M-8	●	18.00	18.99	25	236	180	152.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		245	189	160.0					DA1900M-...~DA1990M-...
	●	20.00	20.99		254	198	168.0					DA2000M-...~DA2090M-...
	●	21.00	21.99		263	207	176.0					DA2100M-...~DA2150M-...
	●	22.00	22.99		273	217	184.0					DA2200M-...~DA2250M-...
	●	23.00	23.99		282	226	192.0					DA2300M-...~DA2350M-...
	●	24.00	24.99		291	235	200.0					DA2400M-...~DA2450M-...
	●	25.00	25.50		300	244	208.0					DA2500M-...~DA2550M-...

● : Std. Item

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SF-DRA (Drilling Depth : 12 x DC)



For PL indicates distance from drill point to corner edge **K6-K9**

Toolholder Dimensions


Description	Stock	Dimension (mm)								Spare Parts		Applicable Inserts K7-K9
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
		min.	max.									
SF16- DRA120M-12	●	12.00	12.49	16	216	168	150.0	48	20	HS-2534TRP	FTP-5	DA1200M-...~DA1240M-...
	●	12.50	12.99		223	175	156.0					DA1250M-...~DA1290M-...
	●	13.00	13.49		229	181	162.0					DA1300M-...~DA1340M-...
	●	13.50	13.99		236	188	168.0					DA1350M-...~DA1390M-...
	●	14.00	14.49		242	194	174.0					DA1400M-...~DA1440M-...
	●	14.50	14.99		249	201	180.0					DA1450M-...~DA1490M-...
SF20- DRA150M-12	●	15.00	15.99	20	265	215	192.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	●	16.00	16.99		279	229	204.0					DA1600M-...~DA1690M-...
	●	17.00	17.99		292	242	216.0					DA1700M-...~DA1790M-...
SF25- DRA180M-12	●	18.00	18.99	25	312	256	228.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	●	19.00	19.99		325	269	240.0					DA1900M-...~DA1990M-...
	●	20.00	20.99		338	282	252.0					DA2000M-...~DA2090M-...
	●	21.00	21.99		351	295	264.0					DA2100M-...~DA2150M-...
	●	22.00	22.99		365	309	276.0					DA2200M-...~DA2250M-...
	●	23.00	23.99		378	322	288.0					DA2300M-...~DA2350M-...
	●	24.00	24.99		391	335	300.0					DA2400M-...~DA2450M-...
	●	25.00	25.50		404	348	312.0					DA2500M-...~DA2550M-...

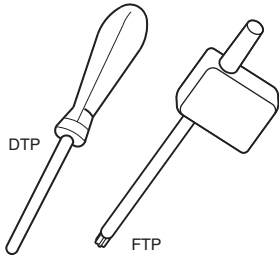
K

Drilling

- DRA
- DRC
- DRV
- DRS
- DRZ
- DRX
- DRW
- Fine Micro

Spare Parts

Clamp Screw	Description
	HS-2524TRP
	HS-2534TRP
	HS-3048TRP
	HS-4067TRP

Wrench	Description	Tightening Torque (N·m)
	FTP-5	0.5
	DTP-6	0.8
	DTP-7	1.2

Recommended Cutting Conditions

General Purpose GM / Cast Iron KM

General Purpose GM	Workpiece Material	Recommended Insert Grades / Cutting Speed (m/min)		n (min ⁻¹)	Drill Dia. DC (mm)						
		PR1535	PR1525		f (mm/rev)	ø8	ø11	ø14	ø18	ø22	ø25
		Low Carbon Steel	★		☆	n (min ⁻¹)	3,980 - 7,160	2,890 - 5,210	2,270 - 4,090	1,770 - 3,180	1,450 - 2,600
Carbon Steel	★	☆	n (min ⁻¹)	3,980 - 5,970	2,890 - 4,340	2,270 - 3,410	1,770 - 2,650	1,450 - 2,170	1,270 - 1,910		
										f (mm/rev)	0.12 - 0.24
Alloy Steel	★	☆	n (min ⁻¹)	2,790 - 4,780	2,030 - 3,470	1,590 - 2,730	1,240 - 2,120	1,010 - 1,740	890 - 1,530		
										f (mm/rev)	0.12 - 0.24
Mold Steel	★	☆	n (min ⁻¹)	1,990 - 3,580	1,450 - 2,600	1,140 - 2,050	880 - 1,590	720 - 1,300	640 - 1,150		
										f (mm/rev)	0.08 - 0.17
Stainless Steel	★	☆	n (min ⁻¹)	1,590 - 2,790	1,160 - 2,030	910 - 1,590	710 - 1,240	580 - 1,010	510 - 890		
										f (mm/rev)	0.1 - 0.24
*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5 x DC											
Gray Cast Iron	☆	★	n (min ⁻¹)	3,580 - 6,760	2,600 - 4,920	2,050 - 3,870	1,590 - 3,010	1,300 - 2,460	1,150 - 2,170		
										f (mm/rev)	0.14 - 0.29
Nodular Cast Iron	☆	★	n (min ⁻¹)	1,590 - 4,780	1,160 - 3,470	910 - 2,730	710 - 2,120	580 - 1,740	510 - 1,530		
										f (mm/rev)	0.12 - 0.24
Cast Iron KM	Gray Cast Iron	-	n (min ⁻¹)	3,580 - 6,760	2,600 - 4,920	2,050 - 3,870	1,590 - 3,010	1,300 - 2,460	1,150 - 2,170		
										f (mm/rev)	0.17 - 0.35
Nodular Cast Iron	-	n (min ⁻¹)	1,590 - 4,780	1,160 - 3,470	910 - 2,730	710 - 2,120	580 - 1,740	510 - 1,530			
									f (mm/rev)	0.12 - 0.24	0.17 - 0.36

Recommended cutting conditions above is for 1.5D/3D type.

As drilling depth increases (1.5D/3D → 5D → 8D → 12D), feed rates should be reduced.

Recommended feed rate : 1.5/3D type=100%, 5D type=80% or less, 8D/12D type=70% or less.

★:1st Recommendation ☆:2nd Recommendation

Counterboring FTP

Counterboring FTP	Workpiece Material	Recommended Insert Grades / Cutting Speed (m/min)		n (min ⁻¹)	Drill Dia. DC (mm)						
		PR1535	PR1525		f (mm/rev)	ø8	ø11	ø14	ø18	ø22	ø25
		Low Carbon Steel	★		☆	n (min ⁻¹)	3,150 - 6,000	2,300 - 4,350	1,800 - 3,400	1,400 - 2,650	1,150 - 2,200
Carbon Steel	★	☆	n (min ⁻¹)	3,150 - 4,750	2,300 - 3,450	1,800 - 2,700	1,400 - 2,100	1,150 - 1,750	1,000 - 1,500		
										f (mm/rev)	0.12 - 0.24
Alloy Steel	★	☆	n (min ⁻¹)	2,800 - 4,750	2,000 - 3,450	1,600 - 2,700	1,250 - 2,100	1,000 - 1,750	900 - 1,500		
										f (mm/rev)	0.12 - 0.24
Mold Steel	★	☆	n (min ⁻¹)	1,600 - 2,800	1,150 - 2,000	900 - 1,600	700 - 1,250	600 - 1,000	500 - 900		
										f (mm/rev)	0.08 - 0.17
Stainless Steel	★	☆	n (min ⁻¹)	1,600 - 2,800	1,150 - 2,000	900 - 1,600	700 - 1,250	600 - 1,000	500 - 900		
										f (mm/rev)	0.10 - 0.20
*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5 x DC											
Gray Cast Iron	☆	★	n (min ⁻¹)	2,800 - 5,600	2,000 - 4,050	1,600 - 3,200	1,250 - 2,500	1,000 - 2,000	900 - 1,800		
										f (mm/rev)	0.14 - 0.29
Nodular Cast Iron	☆	★	n (min ⁻¹)	1,600 - 4,000	1,150 - 2,900	900 - 2,750	700 - 1,750	600 - 1,450	500 - 1,250		
										f (mm/rev)	0.12 - 0.24

* The recommended cutting conditions are for drilling on plain surface

The conditions for drilling on slant hole shows the depth from the top of workpiece

Set the feed rate 50% or under when inclination angle is 30° or under.

Set the feed rate 30% or under when inclination angle is over 30°

Traversing is not recommended

Applicable to 1.5D,3D,5D,8D and 12D holders. Prepared hole (0.5xDC) is needed when using 8D/12D holder

★:1st Recommendation ☆:2nd Recommendation

Insert Grades
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MagicDrill DRA

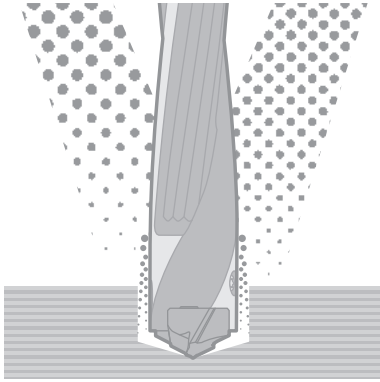
Coolant * Dry machining is not recommended.

1st Recommendation

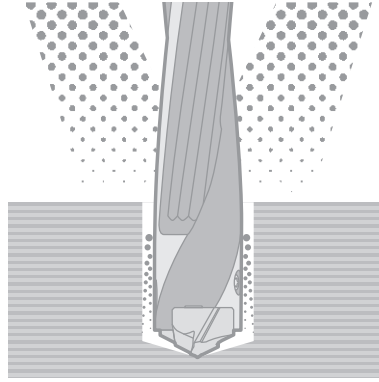
Internal coolant

Internal and external coolant is recommended

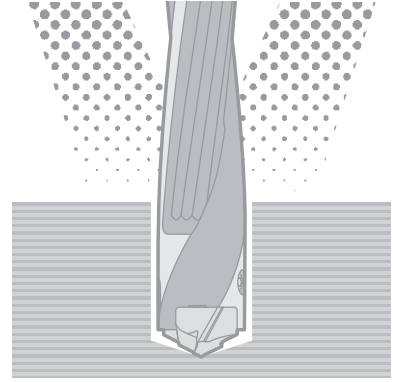
Drilling Depth Less than 1DC



Stainless steel, high feed rate



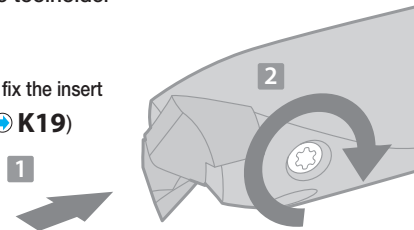
In case of external coolant



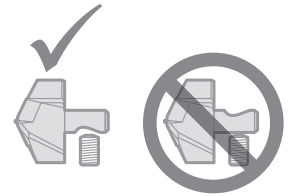
Lathe : 3DC or less
Vertical M/C : 1.5DC or less

How to attach inserts

- 1 Install insert onto the toolholder in the right direction
- 2 Tighten clamp screw to fix the insert (Tightening Torque **K19**)



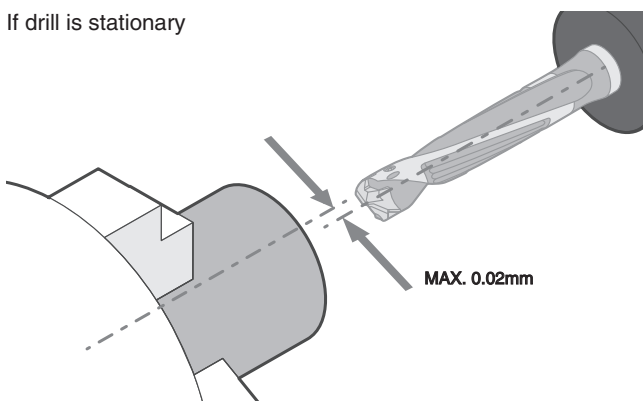
Be careful of the insert direction



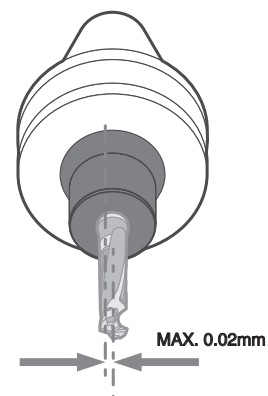
- * 1 Remove dust on insert pocket using air blow for every replacement.
- * 2 Make sure that the locating surfaces of the insert closely contacts the toolholder.

Core Deviation

If drill is stationary



If drill is rotating



This can be used with a boring sleeve and collet chuck, please be sure to set deviation amount 0.02mm or under between workpiece and drill.

Make sure to use arbor that is not deformed. Center of arbor deviation must be within 0.02mm.

K

Drilling

DRA

DRC

DRV

DRS

DRZ

DRX

DRW

Fine

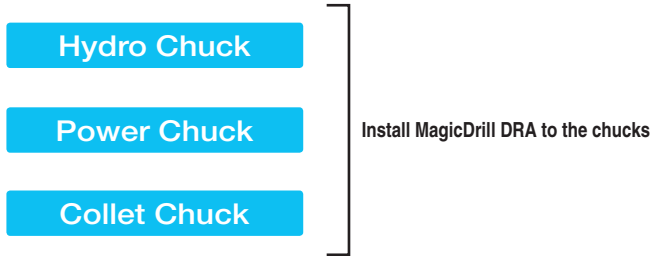
Micro

Cautions for installation on Machining Center

For installation of MagicDrill DRA

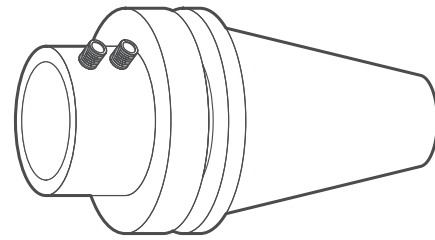
1st Choice

Hydro Chuck, Power Chuck, Collet Chuck, etc.



2nd Choice

Side lock arbor

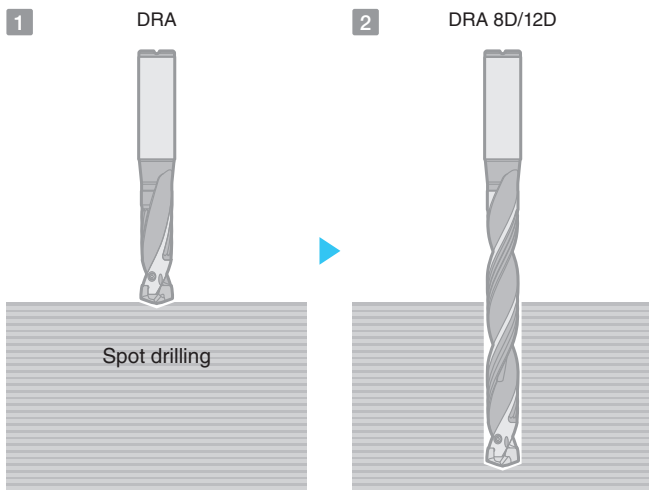


Example of side lock arbor

Cautions for machining with 8D/12D holder

Recommended machining

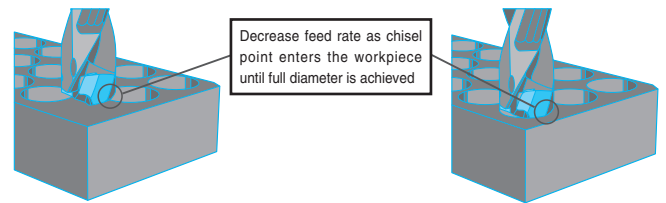
- 1 Make a center spot using DRA 1.5D/3D/5D type.
(Center spot should be at least half of cutting diameter)
- 2 Then drill the hole using DRA (8D/12D type).



Precautions for KM Chipbreaker

Machining on Casting Surface

Decrease feed to 0.15 mm/rev until full drill diameter has entered the workpiece



Applicable workpieces

Applications	Shape of Workpiece	Caution for machining
Plain Surface		1. When machining stainless steel, for hole depths of up to 0.5DC, keep feed rate at 0.15mm/rev or less. 2. Internal coolant is recommended for smooth chip removal. For stainless steel, the combination of internal and external coolant is recommended.
Stacked Plates		1. Fix stacked plates securely to ensure they do not slip while machining.
Concave Surface		1. When machining concave holes, set the feed rate at half of recommended feed or less for continuous hole machining. 2. Utilize a step feeding if chips are not broken short at the inlet.
Pipe Material		1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas. <div style="text-align: center;"> <p>Center portion machining *Curved surface portion machining</p> </div>

* Machining Possible with FTP and 1.5D toolholder

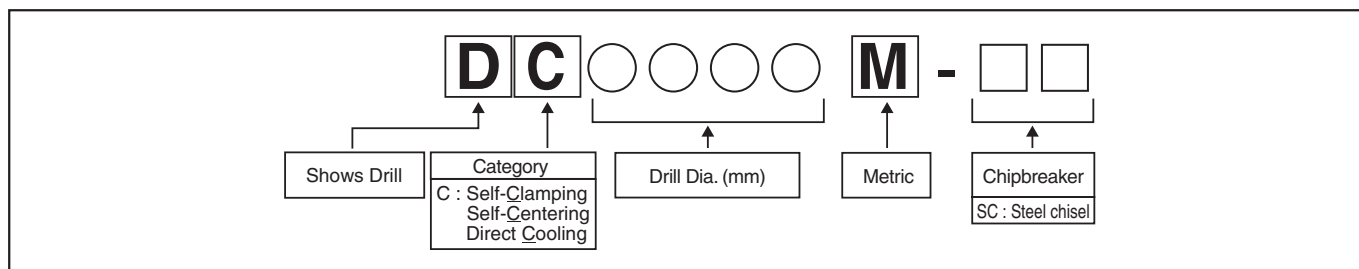
Not Recommended workpieces

Applications	Shape of Workpiece	Applications	Shape of Workpiece
*Hole Expansion		*Slant Surface	
Applications	Shape of Workpiece	Applications	Shape of Workpiece
Half Cylindrical		*Cored Hole	

* Machining Possible with FTP and 1.5D toolholder


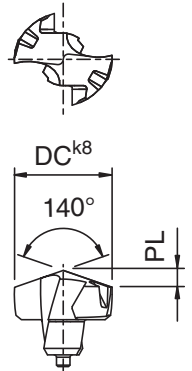
Inserts for MagicDrill DRC

Description Identification System (Insert)




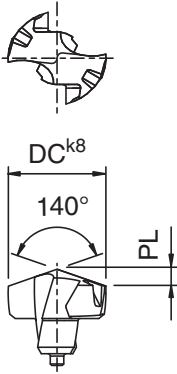
Insert Grades PR0315

PR0315 is tough super micro grain carbide grade with TiAlN coating, with excellent wear resistance and fracture resistance. It enables stable machining of carbon steel, alloy steel and cast iron.

Insert	Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholders K25~K27, K30~K32								
		DC	PL	PR0315									
  <p>DCk8</p> <p>140°</p> <p>PL</p> <p>k8 tolerance</p> <table border="1"> <thead> <tr> <th>DC</th> <th>k8(mm)</th> </tr> </thead> <tbody> <tr> <td>7.94 10.00</td> <td>+0.022 0</td> </tr> <tr> <td>10.10 18.00</td> <td>+0.027 0</td> </tr> <tr> <td>18.10 25.99</td> <td>+0.033 0</td> </tr> </tbody> </table> <p><small>k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the hole diameter.</small></p>	DC	k8(mm)	7.94 10.00	+0.022 0	10.10 18.00	+0.027 0	18.10 25.99	+0.033 0	DC 0794M-SC	7.94	1.37	●	SS10-DRC080M-○ SF12-DRC080M-○
	DC	k8(mm)											
	7.94 10.00	+0.022 0											
	10.10 18.00	+0.027 0											
	18.10 25.99	+0.033 0											
	DC 0800M-SC	8.00	1.38	●									
	DC 0810M-SC	8.10	1.40	●									
	DC 0820M-SC	8.20	1.42	●									
	DC 0830M-SC	8.30	1.43	●									
	DC 0840M-SC	8.40	1.45	●									
	DC 0850M-SC	8.50	1.47	●	SS10-DRC085M-○ SF12-DRC085M-○								
	DC 0860M-SC	8.60	1.48	●									
	DC 0870M-SC	8.70	1.50	●									
	DC 0880M-SC	8.80	1.52	●									
	DC 0890M-SC	8.90	1.54	●	SS10-DRC090M-○ SF12-DRC090M-○								
	DC 0900M-SC	9.00	1.55	●									
	DC 0910M-SC	9.10	1.57	●									
	DC 0920M-SC	9.20	1.59	●									
	DC 0930M-SC	9.30	1.61	●	SS10-DRC095M-○ SF12-DRC095M-○								
	DC 0940M-SC	9.40	1.62	●									
	DC 0950M-SC	9.50	1.64	●									
	DC 0960M-SC	9.60	1.66	●									
	DC 0970M-SC	9.70	1.67	●	SS12-DRC100M-○ SF16-DRC100M-○								
	DC 0980M-SC	9.80	1.69	●									
DC 0990M-SC	9.90	1.71	●										
DC 1000M-SC	10.00	1.72	●										
DC 1010M-SC	10.10	1.74	●	SS12-DRC105M-○ SF16-DRC105M-○									
DC 1020M-SC	10.20	1.76	●										
DC 1030M-SC	10.30	1.78	●										
DC 1040M-SC	10.40	1.80	●										
DC 1050M-SC	10.50	1.81	●	SS12-DRC110M-○ SF16-DRC110M-○									
DC 1060M-SC	10.60	1.83	●										
DC 1070M-SC	10.70	1.85	●										
DC 1080M-SC	10.80	1.86	●										
DC 1090M-SC	10.90	1.88	●	SS12-DRC115M-○ SF16-DRC115M-○									
DC 1100M-SC	11.00	1.90	●										
DC 1110M-SC	11.10	1.91	●										
DC 1120M-SC	11.20	1.93	●										
DC 1130M-SC	11.30	1.95	●	SS14-DRC120M-○ SF16-DRC120M-○									
DC 1140M-SC	11.40	1.97	●										
DC 1150M-SC	11.50	1.98	●										
DC 1160M-SC	11.60	2.00	●										
DC 1170M-SC	11.70	2.02	●	SS14-DRC120M-○ SF16-DRC120M-○									
DC 1180M-SC	11.80	2.04	●										
DC 1190M-SC	11.90	2.06	●										
DC 1200M-SC	12.00	2.07	●										
DC 1210M-SC	12.10	2.09	●	SS14-DRC120M-○ SF16-DRC120M-○									
DC 1220M-SC	12.20	2.11	●										
DC 1230M-SC	12.30	2.12	●										
DC 1240M-SC	12.40	2.14	●										

DC inserts are sold in 1 piece boxes

● : Std. Item

Insert	Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholders ● K25~K27, K30~K32									
		DC	PL	PR0315										
  <table border="1"> <caption>k8 tolerance</caption> <thead> <tr> <th>DC</th> <th>k8(mm)</th> </tr> </thead> <tbody> <tr> <td>7.94 } 10.00</td> <td>+0.022 0</td> </tr> <tr> <td>10.10 } 18.00</td> <td>+0.027 0</td> </tr> <tr> <td>18.10 } 25.99</td> <td>+0.033 0</td> </tr> </tbody> </table> <p>k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the hole diameter.</p>	DC	k8(mm)	7.94 } 10.00	+0.022 0	10.10 } 18.00	+0.027 0	18.10 } 25.99	+0.033 0	DC	1250M-SC	12.50	2.16	●	SS14-DRC125M-○ SF16-DRC125M-○
	DC	k8(mm)												
	7.94 } 10.00	+0.022 0												
	10.10 } 18.00	+0.027 0												
	18.10 } 25.99	+0.033 0												
	DC	1260M-SC	12.60	2.17	●									
	DC	1270M-SC	12.70	2.19	●									
	DC	1280M-SC	12.80	2.21	●									
	DC	1290M-SC	12.90	2.23	●									
	DC	1300M-SC	13.00	2.24	●	SS14-DRC130M-○ SF16-DRC130M-○								
	DC	1310M-SC	13.10	2.26	●									
	DC	1320M-SC	13.20	2.28	●									
	DC	1330M-SC	13.30	2.30	●									
	DC	1340M-SC	13.40	2.31	●									
	DC	1350M-SC	13.50	2.33	●	SS14-DRC135M-○ SF16-DRC135M-○								
	DC	1360M-SC	13.60	2.35	●									
	DC	1370M-SC	13.70	2.36	●									
	DC	1380M-SC	13.80	2.38	●									
	DC	1390M-SC	13.90	2.40	●									
	DC	1400M-SC	14.00	2.41	●	SS16-DRC140M-○ SF16-DRC140M-○								
	DC	1410M-SC	14.10	2.43	●									
	DC	1420M-SC	14.20	2.45	●									
	DC	1430M-SC	14.30	2.47	●									
	DC	1440M-SC	14.40	2.49	●									
	DC	1450M-SC	14.50	2.50	●	SS16-DRC145M-○ SF16-DRC145M-○								
	DC	1460M-SC	14.60	2.52	●									
	DC	1470M-SC	14.70	2.54	●									
	DC	1480M-SC	14.80	2.55	●									
	DC	1490M-SC	14.90	2.57	●									
	DC	1500M-SC	15.00	2.59	●	SS16-DRC150M-○ SF20-DRC150M-○								
	DC	1510M-SC	15.10	2.60	●									
	DC	1520M-SC	15.20	2.62	●									
	DC	1530M-SC	15.30	2.64	●									
	DC	1540M-SC	15.40	2.66	●									
	DC	1550M-SC	15.50	2.68	●									
DC	1560M-SC	15.60	2.70	●										
DC	1570M-SC	15.70	2.71	●										
DC	1580M-SC	15.80	2.73	●										
DC	1590M-SC	15.90	2.75	●										
DC	1600M-SC	16.00	2.76	●	SS18-DRC160M-○ SF20-DRC160M-○									
DC	1610M-SC	16.10	2.78	●										
DC	1620M-SC	16.20	2.80	●										
DC	1630M-SC	16.30	2.81	●										
DC	1640M-SC	16.40	2.83	●										
DC	1650M-SC	16.50	2.85	●										
DC	1660M-SC	16.60	2.87	●										
DC	1670M-SC	16.70	2.89	●										
DC	1680M-SC	16.80	2.90	●										
DC	1690M-SC	16.90	2.92	●										
DC	1700M-SC	17.00	2.93	●	SS18-DRC170M-○ SF20-DRC170M-○									
DC	1710M-SC	17.10	2.95	●										
DC	1720M-SC	17.20	2.97	●										
DC	1730M-SC	17.30	2.99	●										
DC	1740M-SC	17.40	3.00	●										
DC	1750M-SC	17.50	3.02	●										
DC	1760M-SC	17.60	3.04	●										
DC	1770M-SC	17.70	3.06	●										
DC	1780M-SC	17.80	3.08	●										
DC	1790M-SC	17.90	3.09	●										
DC	1800M-SC	18.00	3.10	●	SS20-DRC180M-○ SF25-DRC180M-○									
DC	1810M-SC	18.10	3.12	●										
DC	1820M-SC	18.20	3.14	●										
DC	1830M-SC	18.30	3.16	●										
DC	1840M-SC	18.40	3.18	●										
DC	1850M-SC	18.50	3.19	●										
DC	1860M-SC	18.60	3.21	●										
DC	1870M-SC	18.70	3.23	●										
DC	1880M-SC	18.80	3.25	●										
DC	1890M-SC	18.90	3.27	●										


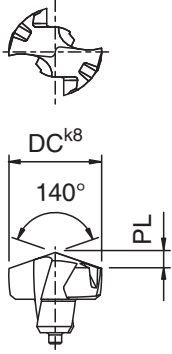
Insert Grades
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● : Std. Item

DC inserts are sold in 1 piece boxes

Inserts for MagicDrill DRC

Insert		Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholders ● K25~K27, K30~K32								
			DC	PL	PR0315									
  <p>k8 tolerance</p> <table border="1"> <thead> <tr> <th>DC</th> <th>k8(mm)</th> </tr> </thead> <tbody> <tr> <td>7.94 ┆ 10.00</td> <td>+0.022 0</td> </tr> <tr> <td>10.10 ┆ 18.00</td> <td>+0.027 0</td> </tr> <tr> <td>18.10 ┆ 25.99</td> <td>+0.033 0</td> </tr> </tbody> </table> <p><small>k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the hole diameter.</small></p>	DC	k8(mm)	7.94 ┆ 10.00	+0.022 0	10.10 ┆ 18.00	+0.027 0	18.10 ┆ 25.99	+0.033 0	DC	1900M-SC	19.00	3.28	●	SS20-DRC190M-○ SF25-DRC190M-○
	DC	k8(mm)												
	7.94 ┆ 10.00	+0.022 0												
	10.10 ┆ 18.00	+0.027 0												
	18.10 ┆ 25.99	+0.033 0												
	1910M-SC	19.10	3.29	●										
	1920M-SC	19.20	3.31	●										
	1930M-SC	19.30	3.33	●										
	1940M-SC	19.40	3.35	●										
	1950M-SC	19.50	3.37	●										
	1960M-SC	19.60	3.39	●										
	1970M-SC	19.70	3.40	●										
	1980M-SC	19.80	3.42	●										
	1990M-SC	19.90	3.44	●										
	DC	2000M-SC	20.00	3.45	●	SS25-DRC200M-○ SF25-DRC200M-○								
	2010M-SC	20.10	3.47	●										
	2020M-SC	20.20	3.48	●										
	2030M-SC	20.30	3.50	●										
	2040M-SC	20.40	3.52	●										
	2050M-SC	20.50	3.54	●										
	2060M-SC	20.60	3.56	●										
	2070M-SC	20.70	3.58	●										
	2080M-SC	20.80	3.59	●										
	2090M-SC	20.90	3.61	●										
	2099M-SC	20.99	3.63	●										
	DC	2100M-SC	21.00	3.62	●	SS25-DRC210M-○ SF25-DRC210M-○								
	2150M-SC	21.50	3.71	●										
	2200M-SC	22.00	3.79	●	SS25-DRC220M-○ SF25-DRC220M-○									
	2250M-SC	22.50	3.88	●										
	2300M-SC	23.00	3.97	●	SS25-DRC230M-○ SF25-DRC230M-○									
2350M-SC	23.50	4.06	●											
2400M-SC	24.00	4.14	●	SS25-DRC240M-○ SF25-DRC240M-○										
2450M-SC	24.50	4.23	●											
2500M-SC	25.00	4.31	●	SS32-DRC250M-○ SF25-DRC250M-○										
2550M-SC	25.50	4.40	●											
2599M-SC	25.99	4.49	●											

K

Drilling

DRA
DRC
DRV
DRS
DRZ
DRX
DRW
Fine
Micro

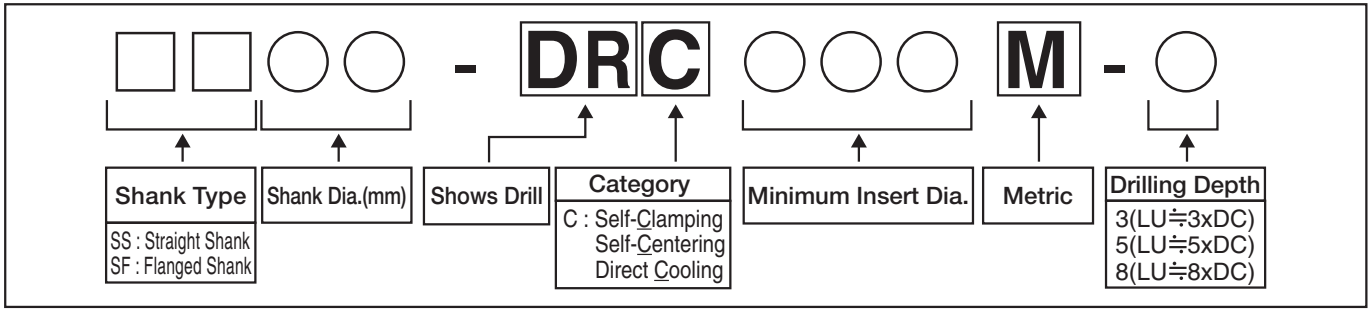
Q&A

- Q-1** Is re-grinding available?
- A-1** We don't recommend it. Grinding of edge nose chisel is not possible.
- Q-2** How large would the machining hole be to the insert diameter (DC)?
- A-2** The machining hole with SCM435, comparing to the insert diameter (DC), will be about +0.020~+0.040mm.

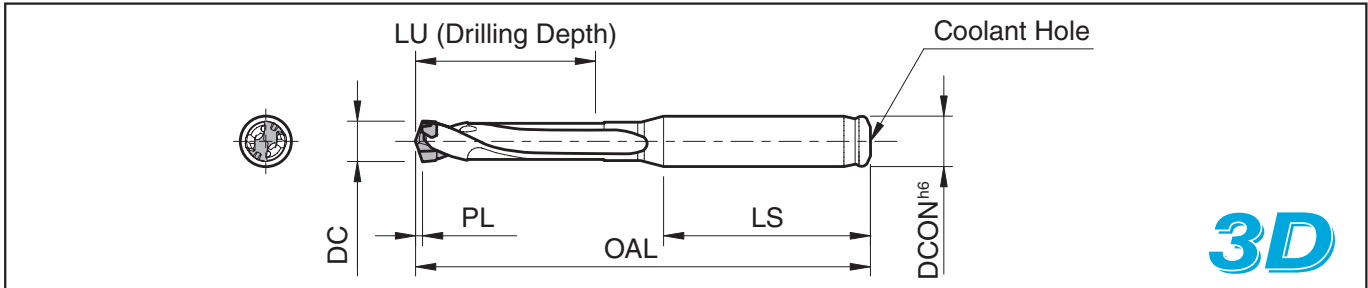
DC inserts are sold in 1 piece boxes

● : Std. Item

Description Identification System (Toolholder)



SS-DRC (Drilling Depth : 3 x DC)



For PL indicates distance from drill point to corner edge **K22-K24**

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts Wrench K33	Applicable Inserts K22~K24	Applicable chamfering Holder and Insert description	
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS			Holder	Insert
		min.	max.								
SS10- DRC080M-3	●	7.94	8.49	10	79	25.5	40	* WDRC17 (included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	●	8.50	8.99		81	27.0			DC0850M-SC~DC0890M-SC		
	●	9.00	9.49		83	28.5			DC0900M-SC~DC0940M-SC		
	●	9.50	9.99		85	30.0			DC0950M-SC~DC0990M-SC		
SS12- DRC100M-3	●	10.00	10.49	12	92	31.5	45	* WDRC17 (included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	●	10.50	10.99		94	33.0			DC1050M-SC~DC1090M-SC		
	●	11.00	11.49		96	34.5			DC1100M-SC~DC1140M-SC		
	●	11.50	11.99		98	36.0			DC1150M-SC~DC1190M-SC		
SS14- DRC120M-3	●	12.00	12.49	14	101	37.5	50	* WDRC17 (included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	CT12T3-45A
	●	12.50	12.99		103	39.0			DC1250M-SC~DC1290M-SC		
	●	13.00	13.49		105	40.5			DC1300M-SC~DC1340M-SC		
	●	13.50	13.99		107	42.0			DC1350M-SC~DC1390M-SC		
SS16- DRC140M-3	●	14.00	14.49	16	112	43.5	56	* WDRC17 (included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	-
	●	14.50	14.99		114	45.0			DC1450M-SC~DC1490M-SC		
	●	15.00	15.99		118	48.0			DC1500M-SC~DC1580M-SC		
SS18- DRC160M-3	●	16.00	16.99	18	122	51.0	60	-	DC1600M-SC~DC1690M-SC	S32-CH18	-
	●	17.00	17.99		127	54.0			DC1700M-SC~DC1790M-SC		
SS20- DRC180M-3	●	18.00	18.99	20	133	57.0	66	-	DC1800M-SC~DC1890M-SC	-	-
	●	19.00	19.99		137	60.0			DC1900M-SC~DC1990M-SC		
SS25- DRC200M-3	●	20.00	20.99	25	147	63.0	72	WDRC17	DC2000M-SC~DC2099M-SC	-	-
	●	21.00	21.99		151	66.0			DC2100M-SC~DC2150M-SC		
	●	22.00	22.99		156	69.0			DC2200M-SC~DC2250M-SC		
	●	23.00	23.99		160	72.0			DC2300M-SC~DC2350M-SC		
	●	24.00	24.99		164	75.0			DC2400M-SC~DC2450M-SC		
SS32- DRC250M-3	●	25.00	25.99	32	172	78.0	84	WDRC17	DC2500M-SC~DC2599M-SC	-	-

* Choose "WDRC17", when purchasing wrench only.

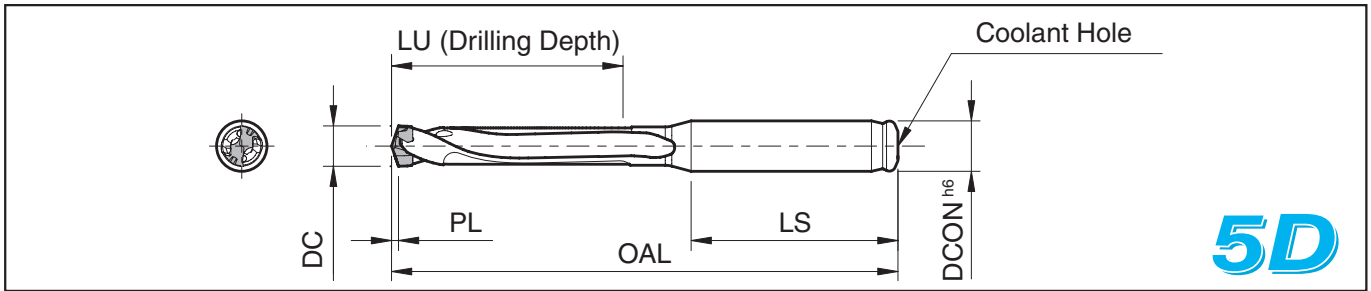
● : Std. Item

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MagicDrill DRC

SS-DRC (Drilling Depth : 5 x DC)



* For PL indicates distance from drill point to corner edge K22~K24

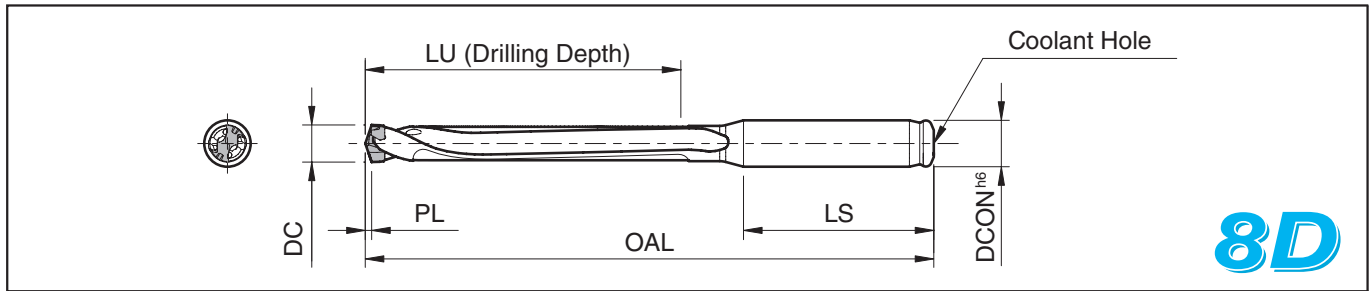
Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts	Applicable Inserts K22~K24	Applicable chamfering Holder and Insert description		
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS			Wrench K33	Holder	Insert
		min.	max.									
SS10- DRC080M-5	●	7.94	8.49	10	97	42.5	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC DC0850M-SC~DC0890M-SC DC0900M-SC~DC0940M-SC DC0950M-SC~DC0990M-SC	S32-CH10	CT08T2-45A	
	●	8.50	8.99		100	45.0						
	●	9.00	9.49		103	47.5						
	●	9.50	9.99		107	50.0						
SS12- DRC100M-5	●	10.00	10.49	12	115	52.5	45	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC DC1050M-SC~DC1090M-SC DC1100M-SC~DC1140M-SC DC1150M-SC~DC1190M-SC	S32-CH12		
	●	10.50	10.99		118	55.0						
	●	11.00	11.49		121	57.5						
	●	11.50	11.99		124	60.0						
SS14- DRC120M-5	●	12.00	12.49	14	127	62.5	48	* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC DC1250M-SC~DC1290M-SC DC1300M-SC~DC1340M-SC DC1350M-SC~DC1390M-SC	S32-CH14	CT12T3-45A	
	●	12.50	12.99		130	65.0						
	●	13.00	13.49		133	67.5						
	●	13.50	13.99		137	70.0						
SS16- DRC140M-5	●	14.00	14.49	16	143	72.5	50	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC DC1450M-SC~DC1490M-SC DC1500M-SC~DC1580M-SC	S32-CH16		
	●	14.50	14.99		146	75.0						
	●	15.00	15.99		152	80.0						
SS18- DRC160M-5	●	16.00	16.99	18	158	85.0	52	* WDRC17 (Included wrench : WDRC16)	DC1600M-SC~DC1690M-SC DC1700M-SC~DC1790M-SC	S32-CH18		
	●	17.00	17.99		165	90.0						
SS20- DRC180M-5	●	18.00	18.99	20	173	95.0	54	* WDRC17 (Included wrench : WDRC18)	DC1800M-SC~DC1890M-SC DC1900M-SC~DC1990M-SC	S32-CH20		
	●	19.00	19.99		179	100.0						
SS25- DRC200M-5	●	20.00	20.99	25	191	105.0	56	WDRC17	DC2000M-SC~DC2099M-SC DC2100M-SC~DC2150M-SC DC2200M-SC~DC2250M-SC DC2300M-SC~DC2350M-SC DC2400M-SC~DC2450M-SC	-	-	
	●	21.00	21.99		198	110.0						
	●	22.00	22.99		204	115.0						
	●	23.00	23.99		210	120.0						
	●	24.00	24.99		216	125.0						
SS32- DRC250M-5	●	25.00	25.99	32	227	130.0	60	* WDRC17 (Included wrench : WDRC20)	DC2500M-SC~DC2599M-SC			

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

SS-DRC (Drilling Depth : 8 x DC)



For PL indicates distance from drill point to corner edge **K22~K24**

Toolholder Dimensions

Description	Stock	Dimension (mm)						Spare Parts	Applicable Inserts K22~K24	Applicable chamfering Holder and Insert description		
		Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS			Wrench K33	Holder	Insert
		min.	max.									
SS10- DRC080M-8	●	7.94	8.49	10	122.5	68	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A	
	●	8.50	8.99		127.0	72						
	●	9.00	9.49		131.5	76						
	●	9.50	9.99		137.0	80						
SS12- DRC100M-8	●	10.00	10.49	12	146.5	84	45	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A	
	●	10.50	10.99		151.0	88						
	●	11.00	11.49		155.5	92						
	●	11.50	11.99		160.0	96						
SS14- DRC120M-8	●	12.00	12.49	14	164.5	100	48	* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	CT12T3-45A	
	●	12.50	12.99		169.0	104						
	●	13.00	13.49		173.5	108						
	●	13.50	13.99		179.0	112						
SS16- DRC140M-8	●	14.00	14.49	16	186.5	116	48	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	CT16T3-45A	
	●	14.50	14.99		191.0	120						
	●	15.00	15.99		200.0	128						
SS18- DRC160M-8	●	16.00	16.99	18	209.0	136	50	WDRC17	DC1600M-SC~DC1690M-SC	S32-CH18	CT18T3-45A	
	●	17.00	17.99		219.0	144						
SS20- DRC180M-8	●	18.00	18.99	20	230.0	152	50	WDRC17	DC1800M-SC~DC1890M-SC	S32-CH18	CT18T3-45A	
	●	19.00	19.99		239.0	160						
SS25- DRC200M-8	●	20.00	20.99	25	254.0	168	56	WDRC17	DC2000M-SC~DC2099M-SC	S32-CH18	CT18T3-45A	
	●	21.00	21.99		264.0	176						
	●	22.00	22.99		273.0	184						
	●	23.00	23.99		282.0	192						
	●	24.00	24.99		291.0	200						
SS32- DRC250M-8	●	25.00	25.99	32	305.0	208	60	WDRC17	DC2500M-SC~DC2599M-SC	S32-CH18	CT18T3-45A	

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

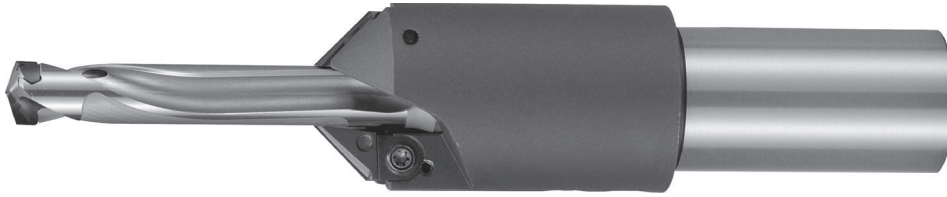
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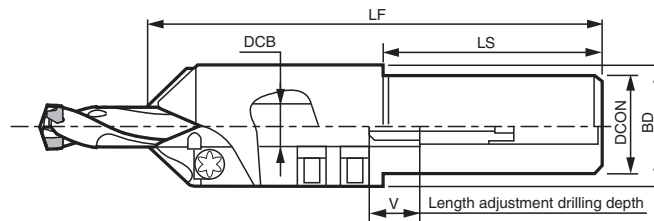
Chamfering Attachment

● Drilling and chamfering simultaneously

By using the chamfering attachment, the SS-DRC can drill and chamfer simultaneously.



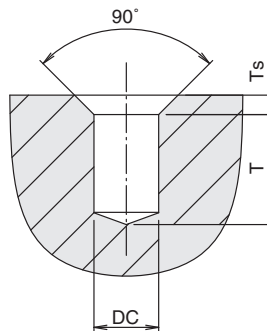
● Holder



Description	Stock	Applicable Drill Shank Dia. DCB	Dimension (mm)					Applicable Inserts	
			DCON	BD	LF	LS	V		
S20-CH10	●	10	32	20	29	122	52	17	CT08T2-45A
S32-CH12	●	12		32	38	133	62	21	
S32-CH14	●	14		40	137	16			
S32-CH16	●	16		42	141	19			
S32-CH18	●	18		47	144	15			

Note) Chamfering attachment is dedicated for Straight Shank SS-DRC.
It cannot be used for Flanged Shank SF-DRC.

● Drilling Depth and Chamfering Dimension



Drill Dia. (mm) DC		Drilling Depth (mm)						Chamfering dimension (mm) Ts		Applicable Chamfering Holder
		T(3D Drill)		T(5D Drill)		T(8D Drill)		Ts 100	Ts max.	
min.	max.	min.	max.	min.	max.	min.	max.			
ø7.94	ø8.49	11	19	21	37	47	63	2.5	5.0	S20-CH10
ø8.50	ø8.99	12	21	24	40	51	67			
ø9.00	ø9.49	12	23	27	43	56	72			
ø9.50	ø9.99	13	25	31	47	61	77	3.5	7.0	S32-CH12
ø10.00	ø10.49	13	26	28	49	60	81			
ø10.50	ø10.99	14	28	31	52	64	85			
ø11.00	ø11.49	14	30	34	55	69	90	4.0	8.0	S32-CH14
ø11.50	ø11.99	15	32	37	58	73	94			
ø12.00	ø12.49	15	30	41	56	79	94			
ø12.50	ø12.99	17	32	44	59	83	96	4.0	8.0	S32-CH16
ø13.00	ø13.49	19	34	47	62	88	103			
ø13.50	ø13.99	21	36	51	66	93	108			
ø14.00	ø14.49	19	37	50	68	94	112	4.0	8.0	S32-CH18
ø14.50	ø14.99	21	39	53	71	98	116			
ø15.00	ø15.99	25	43	59	77	107	125			
ø16.00	ø16.99	30	44	66	80	117	131	4.0	8.0	S32-CH18
ø17.00	ø17.99	35	49	73	87	127	141			

Ts 100 : Max. chamfering dimension at the full feed.
Ts max. : Max. chamfering dimension at a 50% feed reduction.
(Max. chamfering dimension of machining possible without step feeding)

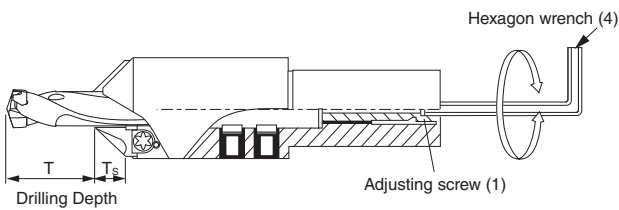
● : Std. Item

● Applicable Inserts

Insert		Description	Dimension (mm)		PVD Coated Carbide PR0315	Applicable Chamfering Holder
			W1	S		
	CT08T2-45A	8	2.83	●	S20-CH10	
	CT12T3-45A	12	3.98	●	S32-CH12 S32-CH18	

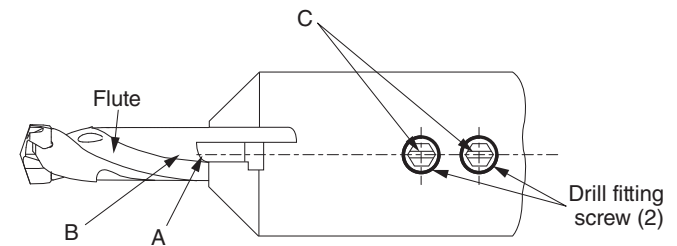
● Method to use DRC chamfering attachment

I. Drilling Depth adjustment



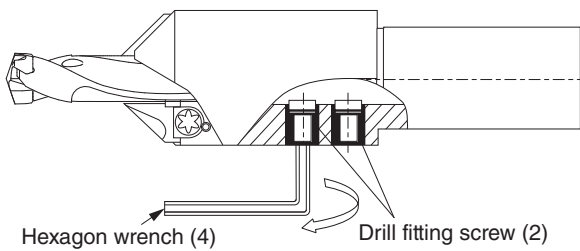
Insert drill into chamfering holder.
Next, temporarily attach the chamfering insert A.
Turn the adjusting screw (1) with the hexagon wrench (4) to set the drilling depth T.

II. Drill location check



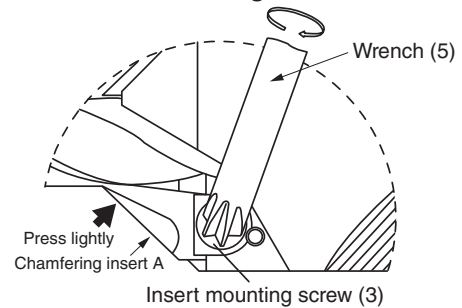
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

III. Fix the drill



Tighten the drill fitting screws (2) with the hexagon wrench (4).
(When using a torque wrench, please refer to the table below)

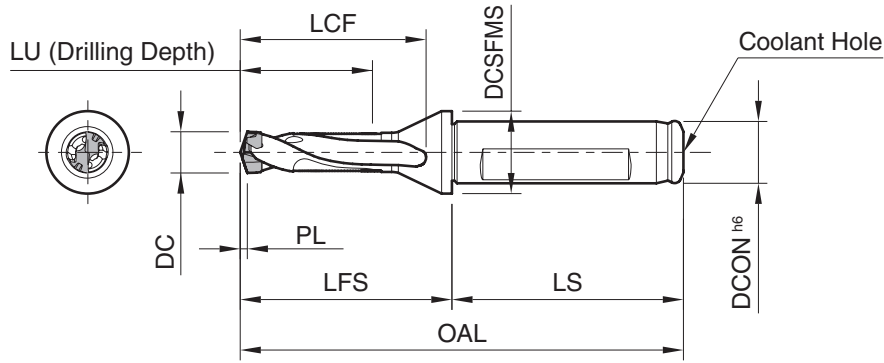
IV. Installation of the chamfering insert



Press the chamfering insert A lightly into the drill and tighten the insert mounting screw (3) with wrench (5).

Chamfering Holder	Tightening Torque [N·m]	Adjusting screw (1)	Drill fitting screw (2)	Insert mounting screw (3)	Hexagon wrench (4)	Wrench (5)
S20-CH10	10	AJ-6x38	FS-10	MT-3	LW-3	DT-9
S32-CH12	15	AJ-8x44-9.5	FS-12	MT-4	LW-4	DT-15
S32-CH14	20	AJ-10x46	FS-14		LW-5	
S32-CH16	30		FS-16			
S32-CH18	45		FS-18			

SF-DRC (Drilling Depth : 3 x DC)



* For PL indicates distance from drill point to corner edge K22-K24

Toolholder Dimensions

Description	Stock	Dimension (mm)									Spare Parts		Applicable Inserts K22-K24
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench K33		
		min.	max.										
SF12- DRC080M-3	●	7.94	8.49	12	86	41	35	26	45	16	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	
	●	8.50	8.99		88	43	37	27				DC0850M-SC~DC0890M-SC	
	●	9.00	9.49		90	45	39	29				DC0900M-SC~DC0940M-SC	
	●	9.50	9.99		92	47	41	30				DC0950M-SC~DC0990M-SC	
SF16- DRC100M-3	●	10.00	10.49	16	97	49	43	32	48	20	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	
	●	10.50	10.99		99	51	45	33				DC1050M-SC~DC1090M-SC	
	●	11.00	11.49		101	53	47	35				DC1100M-SC~DC1140M-SC	
	●	11.50	11.99		103	55	49	36			* WDRC17 (Included wrench : WDRC12)	DC1150M-SC~DC1190M-SC	
	●	12.00	12.49		106	58	52	38				DC1200M-SC~DC1240M-SC	
	●	12.50	12.99		108	60	54	39				DC1250M-SC~DC1290M-SC	
	●	13.00	13.49		110	62	56	41				DC1300M-SC~DC1340M-SC	
	●	13.50	13.99		112	64	58	42				DC1350M-SC~DC1390M-SC	
	●	14.00	14.49		114	66	60	44				DC1400M-SC~DC1440M-SC	
●	14.50	14.99	116	68	62	45	DC1450M-SC~DC1490M-SC						
SF20- DRC150M-3	●	15.00	15.99	20	122	72	66	48	50	25	* WDRC17 (Included wrench : WDRC14)	DC1500M-SC~DC1580M-SC	
	●	16.00	16.99		126	76	70	51				DC1600M-SC~DC1690M-SC	
	●	17.00	17.99		131	81	75	54				DC1700M-SC~DC1790M-SC	
SF25- DRC180M-3	●	18.00	18.99	25	141	85	79	57	56	32	WDRC17	DC1800M-SC~DC1890M-SC	
	●	19.00	19.99		145	89	83	60				DC1900M-SC~DC1990M-SC	
	●	20.00	20.99		149	93	87	63				DC2000M-SC~DC2099M-SC	
	●	21.00	21.99		153	97	91	66				DC2100M-SC~DC2150M-SC	
	●	22.00	22.99		158	102	96	69				DC2200M-SC~DC2250M-SC	
	●	23.00	23.99		162	106	100	72				DC2300M-SC~DC2350M-SC	
	●	24.00	24.99		166	110	104	75				DC2400M-SC~DC2450M-SC	
	●	25.00	25.99		170	114	108	78				DC2500M-SC~DC2599M-SC	

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

K

Drilling

DRA

DRC

DRV

DRS

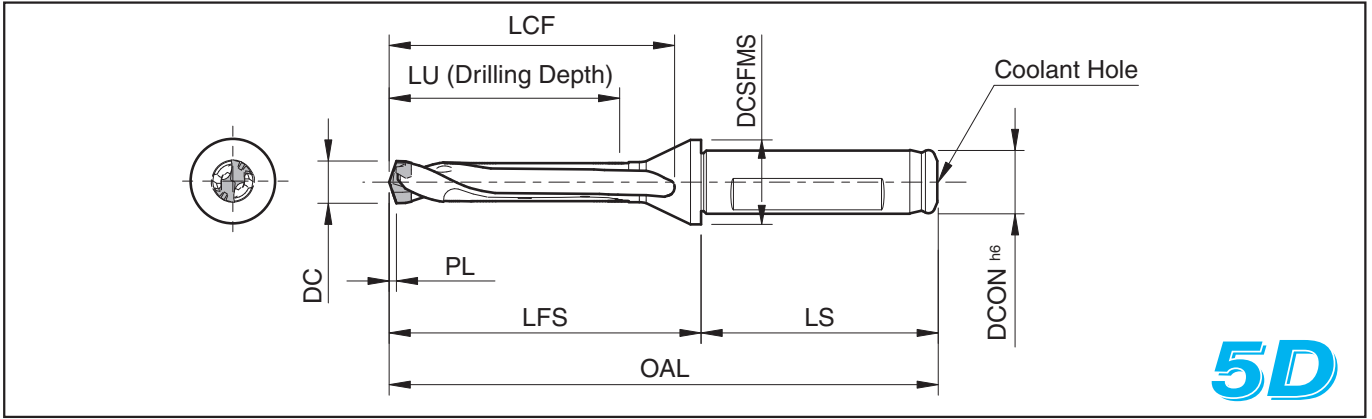
DRZ

DRX

DRW

Fine Micro

SF-DRC (Drilling Depth : 5 x DC)



For PL indicates distance from drill point to corner edge **K22-K24**

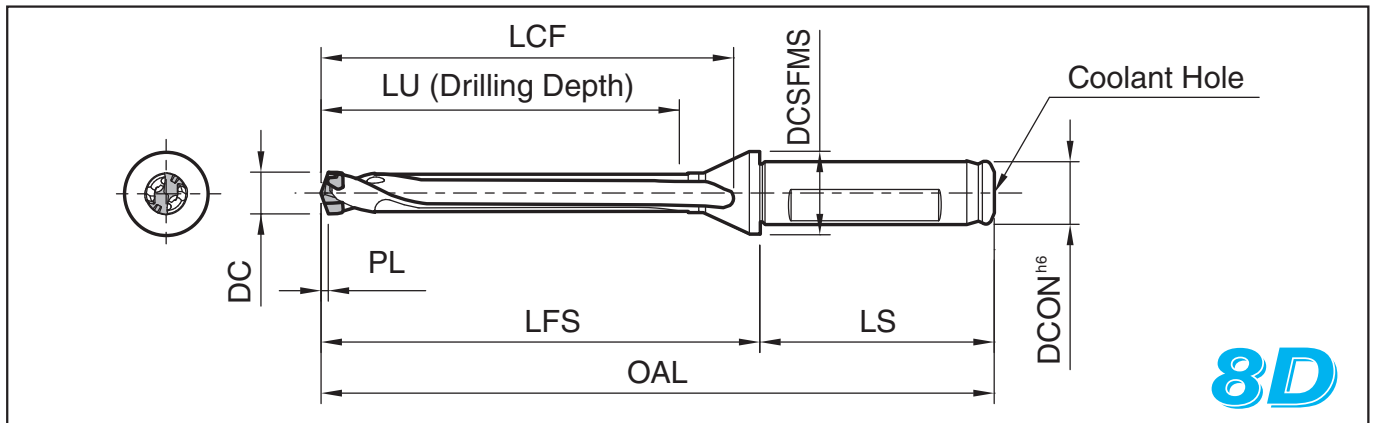
Toolholder Dimensions

Description	Stock	Dimension (mm)									Spare Parts	Applicable Inserts K22~K24
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench K33	
		min.	max.									
SF12- DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC
	●	8.50	8.99		107	62	56	45				DC0850M-SC~DC0890M-SC
	●	9.00	9.49		110	65	59	48				DC0900M-SC~DC0940M-SC
	●	9.50	9.99		114	69	63	50				DC0950M-SC~DC0990M-SC
SF16- DRC100M-5	●	10.00	10.49	16	120	72	66	53	48	20	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC
	●	10.50	10.99		123	75	69	55				DC1050M-SC~DC1090M-SC
	●	11.00	11.49		126	78	72	58				DC1100M-SC~DC1140M-SC
	●	11.50	11.99		129	81	75	60			* WDRC17 (Included wrench : WDRC12)	DC1150M-SC~DC1190M-SC
	●	12.00	12.49		132	84	78	63				DC1200M-SC~DC1240M-SC
	●	12.50	12.99		135	87	81	65				DC1250M-SC~DC1290M-SC
	●	13.00	13.49		138	90	84	68				DC1300M-SC~DC1340M-SC
	●	13.50	13.99		142	94	88	70				DC1350M-SC~DC1390M-SC
	●	14.00	14.49		145	97	91	73				DC1400M-SC~DC1440M-SC
●	14.50	14.99	148	100	94	75	DC1450M-SC~DC1490M-SC					
SF20- DRC150M-5	●	15.00	15.99	20	156	106	100	80	50	25	* WDRC17 (Included wrench : WDRC14)	DC1500M-SC~DC1580M-SC
	●	16.00	16.99		162	112	106	85				DC1600M-SC~DC1690M-SC
	●	17.00	17.99		169	119	113	90				DC1700M-SC~DC1790M-SC
SF25- DRC180M-5	●	18.00	18.99	25	181	125	119	95	56	32	WDRC17	DC1800M-SC~DC1890M-SC
	●	19.00	19.99		187	131	125	100				DC1900M-SC~DC1990M-SC
	●	20.00	20.99		193	137	131	105				DC2000M-SC~DC2099M-SC
	●	21.00	21.99		200	144	138	110				DC2100M-SC~DC2150M-SC
	●	22.00	22.99		206	150	144	115				DC2200M-SC~DC2250M-SC
	●	23.00	23.99		212	156	150	120				DC2300M-SC~DC2350M-SC
	●	24.00	24.99		218	162	156	125				DC2400M-SC~DC2450M-SC
	●	25.00	25.99		225	169	163	130				DC2500M-SC~DC2599M-SC

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

SF-DRC (Drilling Depth : 8 x DC)



For PL indicates distance from drill point to corner edge **K22-K24**

Toolholder Dimensions

Description	Stock	Dimension (mm)									Spare Parts Wrench K33	Applicable Inserts K22-K24
		Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS		
		min.	max.									
SF12- DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC
	●	8.50	8.99		134	89	83	72				DC0850M-SC~DC0890M-SC
	●	9.00	9.49		138	93	88	76				DC0900M-SC~DC0940M-SC
	●	9.50	9.99		144	99	93	80				DC0950M-SC~DC0990M-SC
SF16- DRC100M-8	●	10.00	10.49	16	151	103	97	84	48	20	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC
	●	10.50	10.99		156	108	102	88				DC1050M-SC~DC1090M-SC
	●	11.00	11.49		160	112	107	92				DC1100M-SC~DC1140M-SC
	●	11.50	11.99		165	117	111	96			DC1150M-SC~DC1190M-SC	
	●	12.00	12.49		169	121	116	100			* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC
	●	12.50	12.99		174	126	120	104				DC1250M-SC~DC1290M-SC
	●	13.00	13.49		178	130	124	108				DC1300M-SC~DC1340M-SC
	●	13.50	13.99		184	136	130	112			DC1350M-SC~DC1390M-SC	
	●	14.00	14.49		188	140	134	116			DC1400M-SC~DC1440M-SC	
●	14.50	14.99	193	145	139	120	* WDRC17 (Included wrench : WDRC14)	DC1450M-SC~DC1490M-SC				
SF20- DRC150M-8	●	15.00	15.99	20	204	154	148	128	50	25	* WDRC17 (Included wrench : WDRC14)	DC1500M-SC~DC1580M-SC
	●	16.00	16.99		213	163	157	136				DC1600M-SC~DC1690M-SC
	●	17.00	17.99		223	173	167	144				DC1700M-SC~DC1790M-SC
SF25- DRC180M-8	●	18.00	18.99	25	238	182	176	152	56	32	WDRC17	DC1800M-SC~DC1890M-SC
	●	19.00	19.99		247	191	185	160				DC1900M-SC~DC1990M-SC
	●	20.00	20.99		256	200	194	168				DC2000M-SC~DC2099M-SC
	●	21.00	21.99		266	210	204	176				DC2100M-SC~DC2150M-SC
	●	22.00	22.99		275	219	213	184				DC2200M-SC~DC2250M-SC
	●	23.00	23.99		284	228	222	192				DC2300M-SC~DC2350M-SC
	●	24.00	24.99		293	237	231	200				DC2400M-SC~DC2450M-SC
	●	25.00	25.99		303	247	241	208				DC2500M-SC~DC2599M-SC

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

K

Drilling

DRA

DRC

DRV

DRS


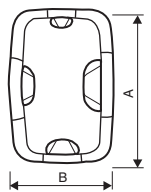

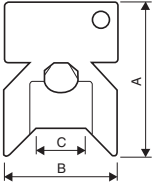
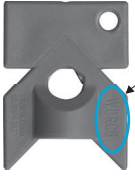
DRZ

DRX

DRW

Fine Micro

Wrench

Shape		Description	Dimension (mm)			Remarks
			A	B	C	
		WDR17	77	52	-	· WDR17(Multiple type wrench) has four insert entry points. If using an insert ranging from DC1700M-SC to DC2099M-SC, use the entry point printed as "ø17.00~ø20.99". · WDR17 can be used instead of WDR8-14 wrench.
		WDR8	43	33	ø10.2	 Description is printed in this area.
		WDR10			ø12.2	
		WDR12			ø14.2	
		WDR14			ø17.2	

Method to change MagicDrill DRC inserts

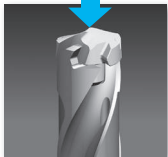
How to attach inserts



- (1) Fix drill holder on arbor. For insert exchange, fix arbor on the machine or set on toolpresetter.
- (2) Use compressed air to remove dust.



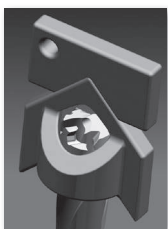
- (3) Install insert onto holder.
(Use gloves to protect your hand from any danger.)



- (4) Turn lightly in a clockwise direction.
(Use gloves to protect your hand from any danger.)



- (5) Align the wrench properly with the insert.



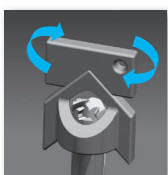
- (6) Make sure the wrench is aligned with the wrench slots on the insert.



(Improper alignment shown)

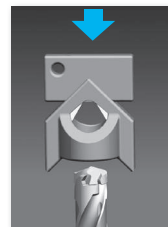


Slot for wrench

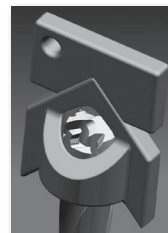


- (7) Turn the wrench in a slow counterclockwise direction.
- (8) Completed.

How to detach inserts



- (1) Use compressed air to remove dust.
- (2) Align the wrench properly with the insert.



- (3) Make sure the wrench is aligned with the wrench slots on the insert.



- (4) Turn the wrench in a counterclockwise direction.



- (5) Once lock is released, insert can be turned by fingers.
(Use gloves to protect your hand from any danger.)



- (6) Remove insert.
(Use gloves to protect your hand from any danger.)

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Cutting Conditions		Drill Dia. DC (mm)							Remarks
			Cutting Speed Vc (m/min)	n (min ⁻¹) f (mm/rev)	ø8	ø10	ø12	ø14	ø16	ø18	ø20	
Low Carbon Steel	SS400 S10C-S25C	125	120 - 180	n (min ⁻¹)	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	1,530 - 2,290
				f (mm/rev)	0.11 - 0.20	0.13 - 0.24	0.14 - 0.28	0.17 - 0.32	0.19 - 0.35	0.23 - 0.38	0.25 - 0.41	0.30 - 0.50
Carbon Steel	S30C-S58C (Annealed)	190	100 - 150	n (min ⁻¹)	3,980 - 5,970	3,180 - 4,780	2,650 - 3,980	2,270 - 3,410	1,990 - 2,990	1,770 - 2,650	1,590 - 2,390	1,270 - 1,910
				f (mm/rev)	0.13 - 0.24	0.15 - 0.29	0.17 - 0.33	0.19 - 0.36	0.22 - 0.41	0.25 - 0.46	0.28 - 0.48	0.32 - 0.60
	S30C-S58C (Heat treated)	250	80 - 120	n (min ⁻¹)	3,180 - 4,780	2,550 - 3,820	2,120 - 3,180	1,820 - 2,730	1,590 - 2,390	1,420 - 2,120	1,270 - 1,910	1,020 - 1,530
				f (mm/rev)	0.13 - 0.21	0.15 - 0.25	0.18 - 0.31	0.21 - 0.39	0.23 - 0.45	0.25 - 0.53	0.28 - 0.61	0.38 - 0.64
Alloy Steel	(Annealed)	180	70 - 95	n (min ⁻¹)	2,790 - 3,780	2,230 - 3,030	1,860 - 2,520	1,590 - 2,160	1,390 - 1,890	1,240 - 1,680	1,110 - 1,510	890 - 1,210
				f (mm/rev)	0.15 - 0.28	0.16 - 0.35	0.21 - 0.37	0.23 - 0.46	0.25 - 0.46	0.25 - 0.51	0.30 - 0.51	0.35 - 0.60
	(Heat treated)	275	70 - 95	n (min ⁻¹)	2,790 - 3,780	2,230 - 3,030	1,860 - 2,520	1,590 - 2,160	1,390 - 1,890	1,240 - 1,680	1,110 - 1,510	890 - 1,210
				f (mm/rev)	0.11 - 0.21	0.14 - 0.25	0.19 - 0.30	0.21 - 0.33	0.23 - 0.37	0.28 - 0.43	0.28 - 0.46	0.32 - 0.58
	(Heat treated)	300	60 - 90	n (min ⁻¹)	2,390 - 3,580	1,910 - 2,870	1,590 - 2,390	1,360 - 2,050	1,190 - 1,790	1,060 - 1,590	960 - 1,430	760 - 1,150
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.26	0.18 - 0.31	0.21 - 0.33	0.23 - 0.36	0.25 - 0.38	0.30 - 0.50
Stainless Steel	SUS304 SUS316	220	60 - 80	n (min ⁻¹)	2,390 - 3,180	1,910 - 2,550	1,590 - 2,120	1,360 - 1,820	1,190 - 1,590	1,060 - 1,420	960 - 1,270	760 - 1,020
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.26	0.18 - 0.31	0.21 - 0.33	0.23 - 0.36	0.25 - 0.38	0.28 - 0.42
	SUS630	300	50 - 70	n (min ⁻¹)	1,990 - 2,790	1,590 - 2,230	1,330 - 1,860	1,140 - 1,590	1,000 - 1,390	880 - 1,240	800 - 1,110	640 - 890
				f (mm/rev)	0.11 - 0.20	0.12 - 0.23	0.16 - 0.25	0.17 - 0.29	0.18 - 0.32	0.20 - 0.36	0.23 - 0.38	0.25 - 0.40
Gray Cast Iron	FC150-FC200	180	120 - 170	n (min ⁻¹)	4,780 - 6,770	3,820 - 5,410	3,180 - 4,510	2,730 - 3,870	2,390 - 3,380	2,120 - 3,010	1,910 - 2,710	1,530 - 2,170
				f (mm/rev)	0.17 - 0.32	0.20 - 0.37	0.23 - 0.43	0.27 - 0.48	0.30 - 0.55	0.33 - 0.61	0.33 - 0.61	0.40 - 0.74
	FC250-FC350	260	90 - 120	n (min ⁻¹)	3,580 - 4,780	2,870 - 3,820	2,390 - 3,180	2,050 - 2,730	1,790 - 2,390	1,590 - 2,120	1,430 - 1,910	1,150 - 1,530
				f (mm/rev)	0.14 - 0.25	0.16 - 0.31	0.19 - 0.35	0.23 - 0.42	0.26 - 0.47	0.28 - 0.53	0.30 - 0.58	0.36 - 0.70
Nodular Cast Iron	FCD400-FCD500	160	60 - 90	n (min ⁻¹)	2,390 - 3,580	1,910 - 2,870	1,590 - 2,390	1,360 - 2,050	1,190 - 1,790	1,060 - 1,590	960 - 1,430	760 - 1,150
				f (mm/rev)	0.14 - 0.25	0.16 - 0.30	0.19 - 0.35	0.22 - 0.40	0.24 - 0.45	0.28 - 0.51	0.28 - 0.56	0.34 - 0.67
	FCD600-FCD800	250	40 - 65	n (min ⁻¹)	1,590 - 2,590	1,270 - 2,070	1,060 - 1,730	910 - 1,480	800 - 1,290	710 - 1,150	640 - 1,040	510 - 830
				f (mm/rev)	0.10 - 0.19	0.12 - 0.22	0.14 - 0.25	0.16 - 0.31	0.19 - 0.35	0.23 - 0.51	0.25 - 0.53	0.30 - 0.60

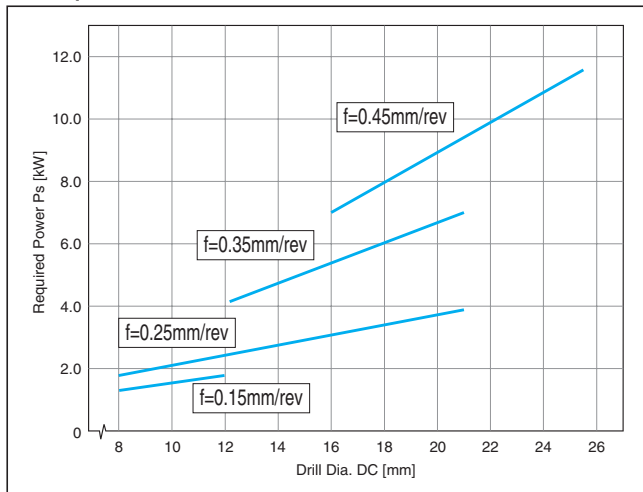
Coolant (See Page K35)

As drilling depth increases (3D→5D→8D), feed rates should be reduced.

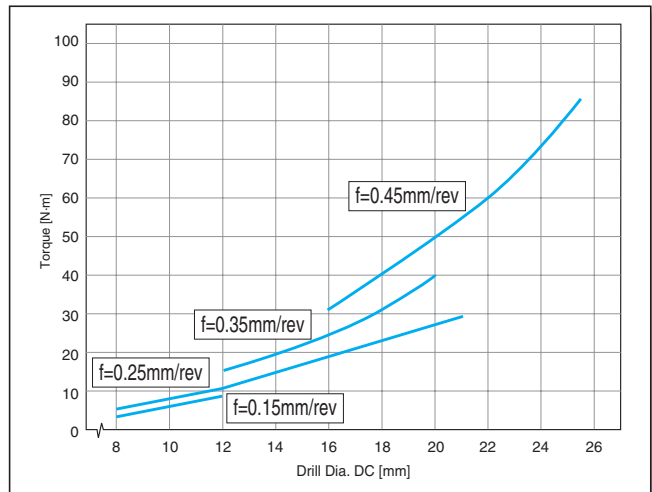
Reference charts

<Cutting Conditions> : Workpiece Material Heat treated steel (Hardness 240HB) Vc=80m/min, Wet

Required Power



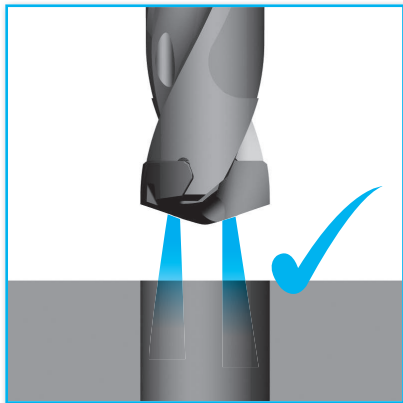
Torque


K

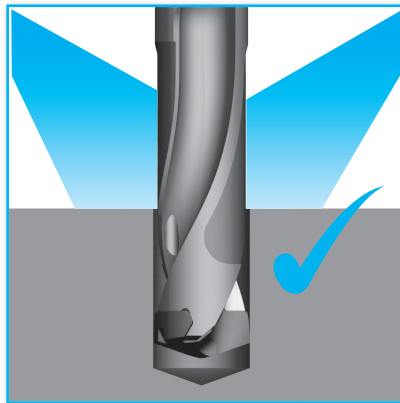
Drilling

 DRA
DRC
DRV
DRS
DRZ
DRX
DRW
Fine
Micro

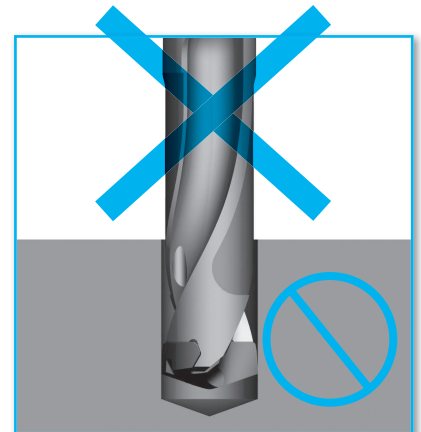
Coolant



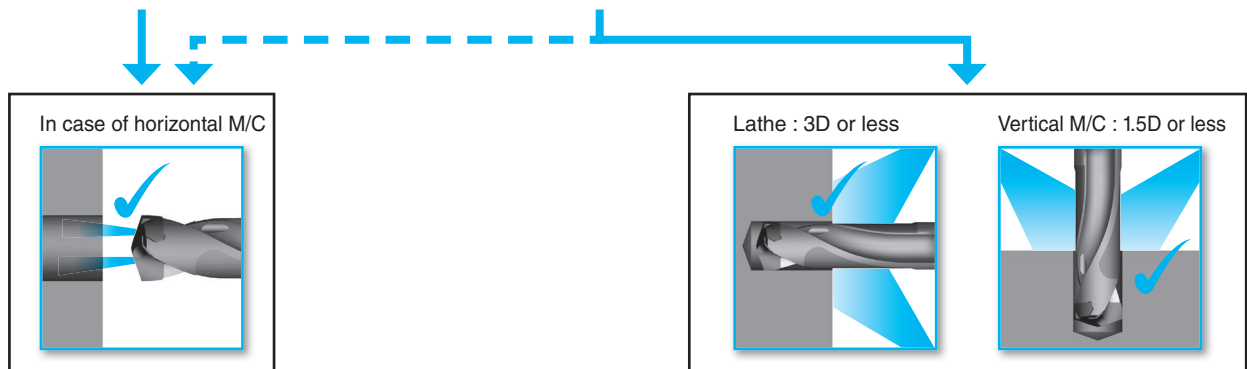
1) Internal coolant is recommended.



2) In case of using external coolant system



3) Dry machining is not recommended.

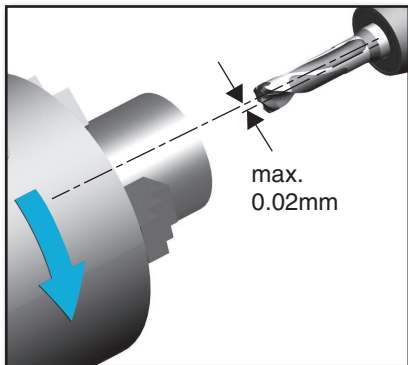


Internal coolant is recommended for horizontal machining center because external coolant may not sufficiently be applied to inside because the tool is revolving.

Precautions for use

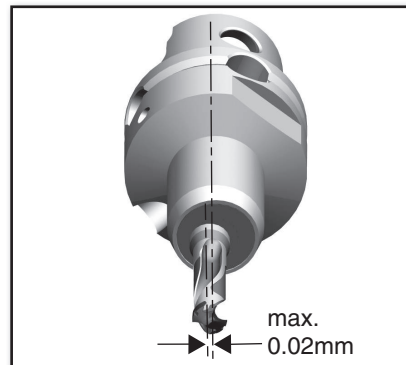
Core Deviation

1) If drill is stationary



This can be used with a boring sleeve (screw clamp) and collet chuck, please be sure to set deviation amount within 0.02mm between workpiece and drill.

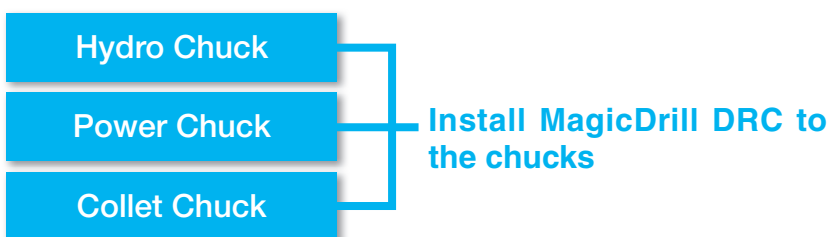
2) If drill is rotating



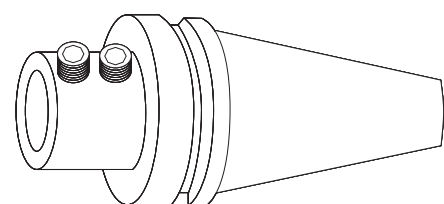
Make sure to use arbor that is not deformed. Center of arbor deviation must be within 0.02mm.

Cautions for installation on Machining Center

For installation of MagicDrill DRC,
1st Choice Hydro Chuck, Power Chuck, Collet Chuck, etc.
2nd Choice Side lock arbor



1st Choice



Example of side lock arbor
2nd Choice

Applicable workpieces

Applications	Shape of Workpiece	Caution for machining
Plain Surface		<ol style="list-style-type: none"> 1. Due to good chip control, step machining is not necessary for Low Carbon Steel. 2. When machining SUS304, for hole depths of more than 2.5D, utilize the step machining process. 3. In order to have smooth chip removal, we recommend internal coolant.
Stacked Plates		<ol style="list-style-type: none"> 1. Fix stacked plates securely to ensure so that they do not slip while machining.
Hole Expansion		<ol style="list-style-type: none"> 1. If the overlap amount is $1/3 \times DC$ or less, machining is possible.
Concave Surface		<ol style="list-style-type: none"> 1. When machining concave holes, set the feed rates at half or less than continuous hole machining.
Pipe Material		<ol style="list-style-type: none"> 1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas.

Not Recommended workpieces

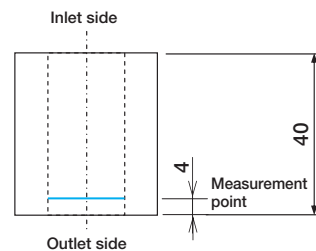
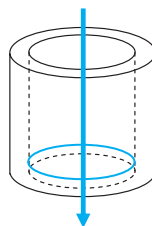
Applications	Shape of Workpiece
Slant Surface	
Half Cylindrical	
Cored Hole	

Comparison of Machining Precision

Cutting Condition and Measurement Point

<Cutting Conditions>

Workpiece Material	S45C
Vc	100m/min
f	0.2mm/rev, 0.3mm/rev
Drilling Depth H	Through hole (40mm)
Coolant	Wet (Internal coolant)
Tool	$\phi 14$ -3D type
Machine	M/C



Roundness

1) Roundness (f=0.2mm/rev)

Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
Roundness : 5.5 μ m	Roundness : 22.5 μ m	Roundness : 6.4 μ m	Roundness : 9.8 μ m	Roundness : 5.2 μ m

(Internal evaluation)

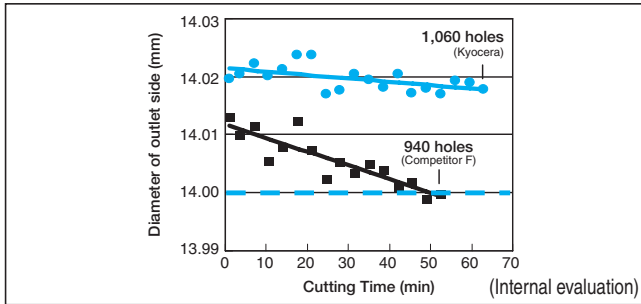
2) Roundness (f=0.3mm/rev)

Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
Roundness : 10.7 μ m	Roundness : 15.2 μ m	Roundness : 12.0 μ m	Roundness : 11.8 μ m	Roundness : 12.3 μ m

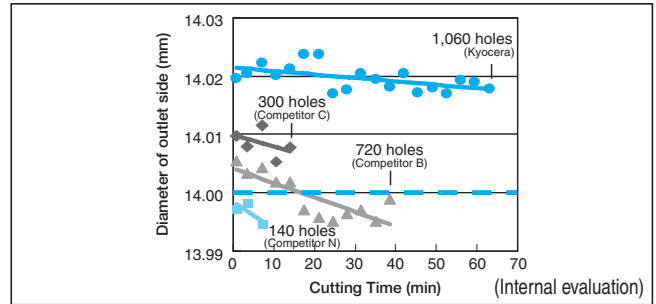
(Internal evaluation)

● Comparison of Hole Dia. (f=0.3mm/rev)

1) Comparison with indexable drill



2) Comparison with carbide solid drill



Q&A

Q-3 Drilling deep hole machining using DRC (8D type), dimension variation of diameters has occurred at inlet and far (outlet) side possibly due to deflection. Is there any countermeasure?

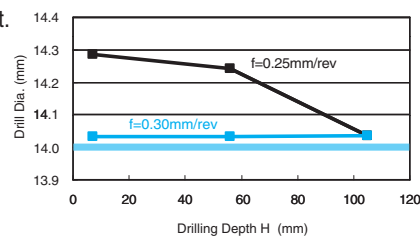
A-3 There are some countermeasures as follows to prevent deflection (to improve bite of drill).

Countermeasures 1

● Increasing the feed rate

Increasing the feed rate may keep the processing diameters constant. (Estimated rate: Current rate + 0.03 ~ 0.05 mm/rev)

<Cutting Conditions>
S55C Vc=80m/min H=112mm
f=0.25mm/rev → 0.30mm/rev
Wet (Internal coolant)
SS16-DRC140M-8
DC1400M-SC(PR0315)



If increasing the feed rate is not possible because rigidity of machine or clamp is weak.

Countermeasures 2

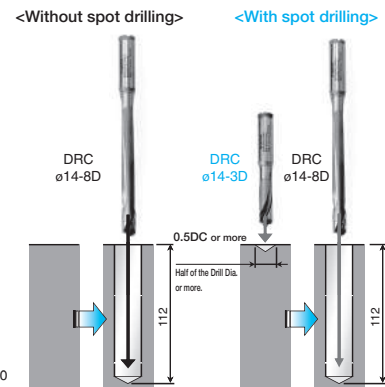
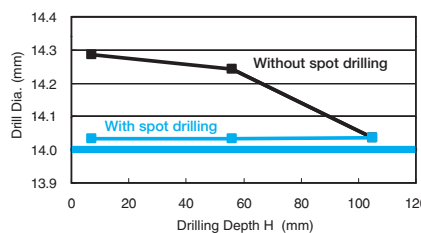
● Make a center spot

1) Make a center spot using the DRC drill or a commercially available center drill which has a vertex angle of about 140°.

(If the center drill can be modified, make its vertex angle larger than 140°)

2) Then drill the hole using the DRC drill (8D type).

<Cutting Conditions>
S55C Vc=80m/min
f=0.25mm/rev H=112mm
Wet (Internal coolant)
SS16-DRC140M-3
SS16-DRC140M-8
DC1400M-SC(PR0315)



Case Studies

S50C	
<ul style="list-style-type: none"> Flange Vc=97m/min (n=2,490min⁻¹) H=32mm f=0.3mm/rev (Vf=747mm/min) Wet (Internal coolant) DC1250M-SC (PR0315) 	
SS14-DRC120M-3	3,000 holes / insert
Competitor A	1,800 holes / drill
<p>Compared to competitor's drill A, MagicDrill DRC has reduced burr and reduced 10% of the power required or more. Tool life has also improved greatly.</p> <p>(User Evaluation)</p>	

SCM440	
<ul style="list-style-type: none"> Housing Vc=83m/min (n=2,400min⁻¹) H=32mm f=0.24mm/rev (Vf=576mm/min) Wet (Internal coolant) DC1100M-SC (PR0315) 	
SS12-DRC110M-3	2,400 holes / insert
Competitor B	2,000 holes / drill
<p>Compared to competitor's solid drill B, MagicDrill DRC has greatly reduced preparation time with its easy insert replacement feature. Also, the costs of spare tools for re-grinding has been reduced, and tool life has improved.</p> <p>(User Evaluation)</p>	

MagicDrill DRV

High Efficiency Indexable Insert Drill

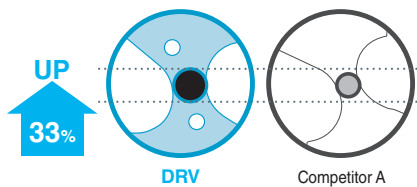
MagicDrill DRV

Economical Inserts with 4 Cutting Edges. Excellent Chip Evacuation with 6D Maximum Deep-Hole Drilling
High Speed and Highly Efficient Drilling Available with the Combination of a CVD Outer Insert and PVD Inner Insert

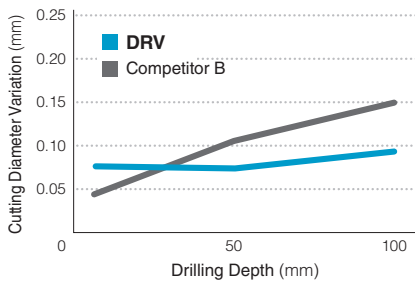
1 Excellent Drilling Precision with Less Variation in Cutting Diameter Up to 6D Drilling Capabilities with a Low Cutting Force Design

Optimal Web Thickness Reduces Chattering with a Low Cutting Force Design

Web Thickness Comparison (Internal evaluation)

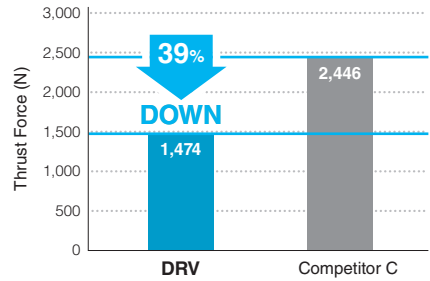


Comparison of Cutting Diameter Variation (Internal evaluation)



Cutting Conditions : $V_c = 150$ m/min, $f = 0.06$ mm/rev
Drill Dia. $\phi 20(5D)$, Wet Workpiece Material : S50C

Cutting Force Comparison (Internal evaluation)



Cutting Conditions : $V_c = 200$ m/min, $f = 0.12$ mm/rev
Drill Dia. $\phi 20(3D)$, Wet Workpiece Material : S50C

K

Drilling

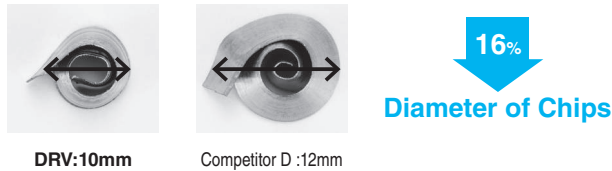
- DRA
- DRC
- DRV
- DRS
- DRZ
- DRX
- DRW
- Fine Micro

2 Unique Insert Design to Control Chip Flow

Outer edge Smooth Chip Evacuation with Compact Chips



Chip Shape Comparison of Outer Insert Cutting Edge (Internal evaluation)



Cutting Conditions : $V_c = 150$ m/min, $f = 0.06$ mm/rev, Drill Dia. $\phi 20(3D)$, Wet Workpiece Material : S50C

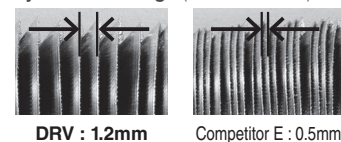
Inner edge Excellent Chip Evacuation with 6D Maximum Deep-Hole Drilling



Weight per Unit of Length for Chips Generated by the Inner Edge (Internal evaluation)



Pitch Comparison of Chips Generated by the Inner Edge (Internal evaluation)

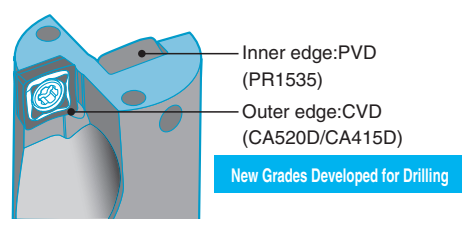


DOWN 47%

Weight of Chips

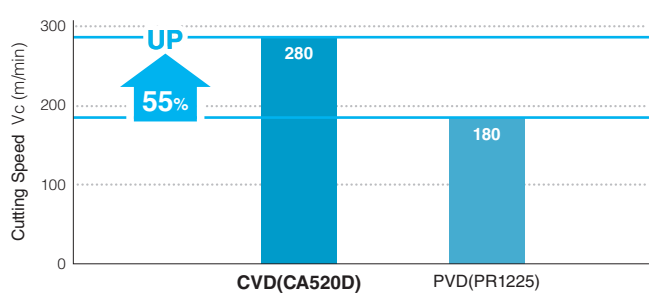
Cutting Conditions : $V_c = 250$ m/min, $f = 0.08$ mm/rev, Drill Dia. $\phi 20(5D)$, Wet Workpiece Material : SUS304

3 CVD Insert on the Outer Edge for Highly Efficient Drilling



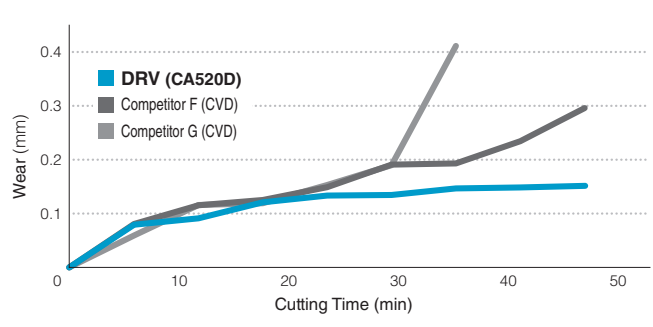
High Speed and Highly Efficient Machining Available with the Combination of CVD (Outer Edge) and PVD (Inner Edge) Inserts.

Recommended Cutting Speed (Maximum Value)



Drill Dia. $\phi 20(3D)$ Workpiece Material : S50C

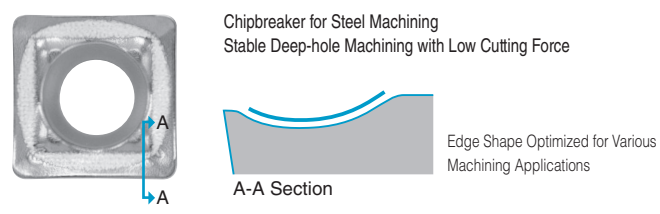
Wear Resistance Comparison (Internal evaluation)



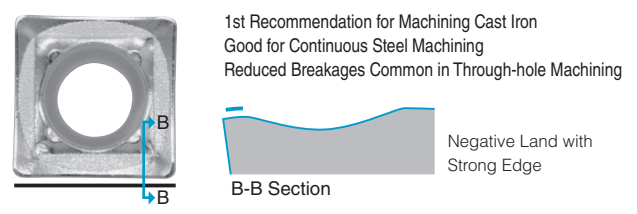
Cutting Conditions : $V_c = 200$ m/min, $f = 0.12$ mm/rev, Drill Dia. $\phi 20(3D)$, Wet Workpiece Material : SCM440H

4 Economical Inserts with 4 Cutting Edges 4 Types of Chipbreakers for Various Machining Applications

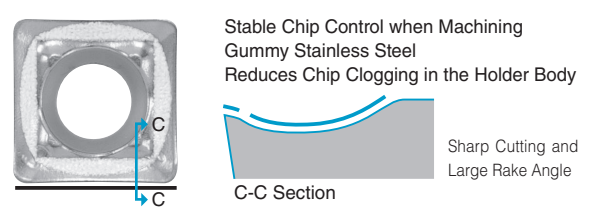
General Purpose GM Chipbreaker



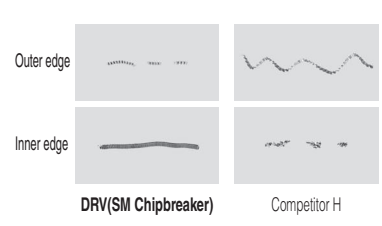
Tough Edge GH Chipbreaker



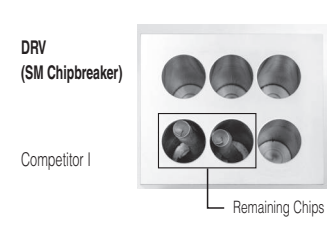
For Stainless Steel Machining SM Chipbreaker



Chip Control Comparison (Internal evaluation)



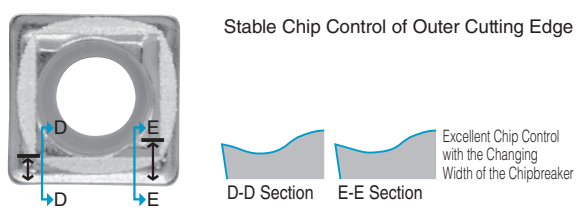
Comparison of Remaining Chips (Internal evaluation)



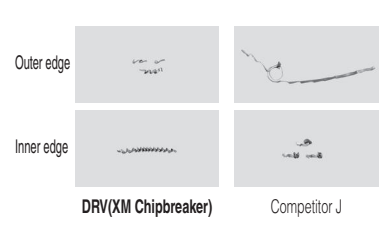
Cutting Conditions : $V_c = 100$ m/min, $f = 0.1$ mm/rev
Drill Dia. $\phi 20(3D)$, Drilling Depth 60 mm
Wet Workpiece Material : SUS304

Cutting Conditions : $V_c = 150$ m/min, $f = 0.08$ mm/rev
Drill Dia. $\phi 25(5D)$, Drilling Depth 98 mm
Wet Workpiece Material : SUS304

For Machining Soft Steel XM Chipbreaker



Chip Control Comparison (Internal evaluation)



Cutting Conditions : $V_c = 200$ m/min, $f = 0.12$ mm/rev
Drill Dia. $\phi 16(3D)$, Drilling Depth 48 mm
Wet Workpiece Material : SS400

Chipbreaker Selection Reference → K41

MagicDrill DRV

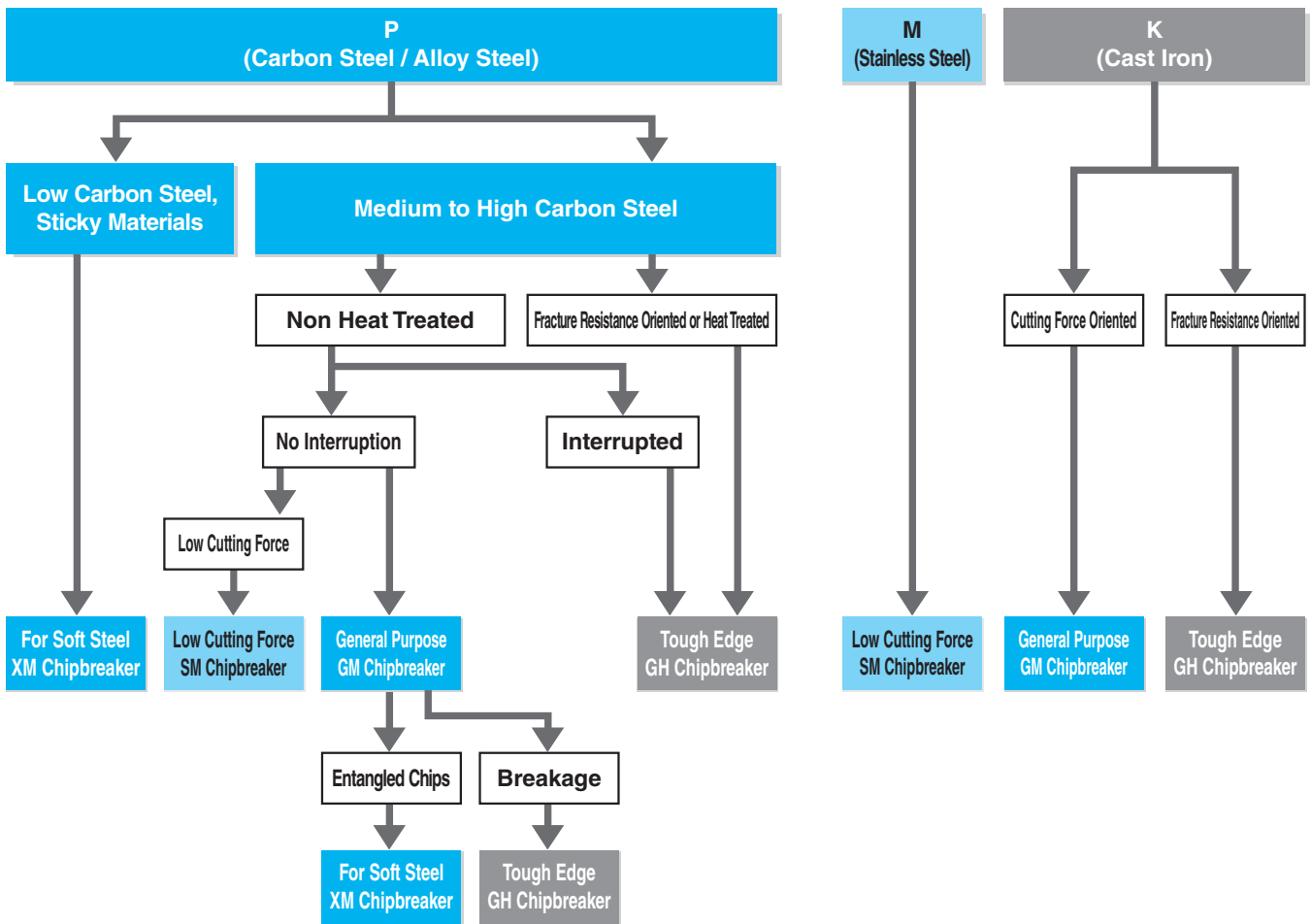
Applicable Inserts

Insert		Applications	Description	Dimension (mm)				Angle	Classification of usage				
				IC W1/L	S	D1	RE		P	Carbon Steel / Alloy Steel	☆	★	★
									M	Mold Steel	☆	★	★
								K	Cast Iron	☆	★	★	
									MEGACOAT	CVD Coated Carbide	MEGACOAT NANO		
									PR1225	CA520D	CA415D	PR1535	
 General Purpose	 W1, AN, RE, S, D1, L, IC	Outer edge	LCMT 030203-GM-E	4.40/5.54	2	2.3	0.3	7°	●	●	●		
			SCMT 040205-GM-E	4.80	2.2	2.4	0.5		●	●	●		
			050205-GM-E	5.25	2.6	2.4			●	●	●		
			060205-GM-E	6.40	2.8	2.9			●	●	●		
			070305-GM-E	7.65	3.2	3.5			●	●	●		
			090405-GM-E	9.10	4.1	4.0			●	●	●		
			110406-GM-E	11.00	4.5	4.6			0.6	●	●	●	
 Tough Edge	 S, AN, RE, D1, L, IC	Outer edge	SCMT 040205-GH-E	4.80	2.2	2.4	0.5	7°	●	●	●		
			050205-GH-E	5.25	2.6	2.4			●	●	●		
			060205-GH-E	6.40	2.8	2.9			●	●	●		
			070305-GH-E	7.65	3.2	3.5			●	●	●		
			090405-GH-E	9.10	4.1	4.0			●	●	●		
 For Soft Steel Machining	 S, AN, RE, D1, L, IC	Outer edge	SCMT 040205-XM-E	4.80	2.2	2.4	0.5	7°	●	●			
			050205-XM-E	5.25	2.6	2.4			●	●			
			060205-XM-E	6.40	2.8	2.9			●	●			
			070305-XM-E	7.65	3.2	3.5			●	●			
 For Stainless Steel Machining	 W1, AN, RE, S, D1, L, IC	Outer edge	LCMT 030203-SM-E	4.40/5.54	2	2.3	0.3	7°	●	●			
			SCMT 040205-SM-E	4.80	2.2	2.4	0.5		●	●			
			050205-SM-E	5.25	2.6	2.4			●	●			
			060205-SM-E	6.40	2.8	2.9			●	●			
			070305-SM-E	7.65	3.2	3.5			●	●			
			090405-SM-E	9.10	4.1	4.0			●	●			
110406-SM-E	11.00	4.5	4.6	0.6	●	●							
 General Purpose	 W1, AN, RE, S, D1, L, IC	Inner edge	LCMT 030205-GM-I	4.16/5.37	2	2.3	0.5	7°				●	
			SCMT 040209-GM-I	5.00	2.2	2.4	0.9					●	
			050210-GM-I	5.70	2.6	2.4	1.0					●	
			060210-GM-I	6.90	2.8	2.9						●	
			070310-GM-I	8.20	3.2	3.5						●	
			090410-GM-I	9.80	4.1	4.0						●	
			110410-GM-I	11.90	4.5	4.6						●	
 Tough Edge	 S, AN, RE, D1, L, IC	Inner edge	SCMT 040209-GH-I	5.00	2.2	2.4	0.9	7°				●	
			050210-GH-I	5.70	2.6	2.4	1.0					●	
			060210-GH-I	6.90	2.8	2.9						●	
			070310-GH-I	8.20	3.2	3.5						●	
 For Soft Steel Machining	 S, AN, RE, D1, L, IC	Inner edge	SCMT 040209-XM-I	5.00	2.2	2.4	0.9	7°				●	
			050210-XM-I	5.70	2.6	2.4	1.0					●	
			060210-XM-I	6.90	2.8	2.9						●	
			070310-XM-I	8.20	3.2	3.5						●	
			090410-XM-I	9.80	4.1	4.0						●	
 For Stainless Steel Machining	 W1, AN, RE, S, D1, L, IC	Inner edge	LCMT 030205-SM-I	4.16/5.37	2	2.3	0.5	7°				●	
			SCMT 040209-SM-I	5.00	2.2	2.4	0.9					●	
			050210-SM-I	5.70	2.6	2.4	1.0					●	
			060210-SM-I	6.90	2.8	2.9						●	
			070310-SM-I	8.20	3.2	3.5						●	
			090410-SM-I	9.80	4.1	4.0						●	
110410-SM-I	11.90	4.5	4.6					●					

* LCMT03*** is 2-edge insert

● : Std. Item

Chipbreaker Selection Chart

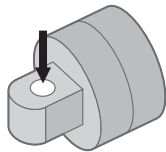


Case Studies

Case Studies

Housing SCM420

Vc = 125 m/min (n = 1,660 min⁻¹)
 f = 0.08 mm/rev (Vf = 133 mm/min)
 Drilling Depth 45 mm
 Wet (External coolant)
 S25-DRV240M-4-07
 SCMT070310GM-I PR1535
 SCMT070305GM-E PR1225



Cutting Time

DRV (ø24-4D)

16 sec

50%
or more
Cutting Time

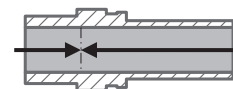
Competitor K (ø24-4D)

35 sec

Chattering and chip biting occurred in low rigidity workpiece of Competitor K. Speed was reduced to Vc = 60 m/min. DRV finely divided chips for stable machining at Vc = 125 m/min. (User Evaluation)

Nipple S20CF

Vc = 230 m/min (n = 3,330 min⁻¹)
 f = 0.13 mm/rev (Vf = 433 mm/min)
 Drilling Depth 60 mm (4D)
 30 mm (2D)
 Wet (Internal coolant)
 S25-DRV220M-4-06 (4D)
 S25-DRV220M-2-06 (2D)
 SCMT060210-GM-I PR1535
 SCMT060205-GM-E PR1225



Process 2
Drilling Depth 30 mm (2D)

Process 1
Drilling Depth 60 mm (4D)

Cutting Time

DRV (ø22-4D/2D)

12 sec

40%
Cutting Time

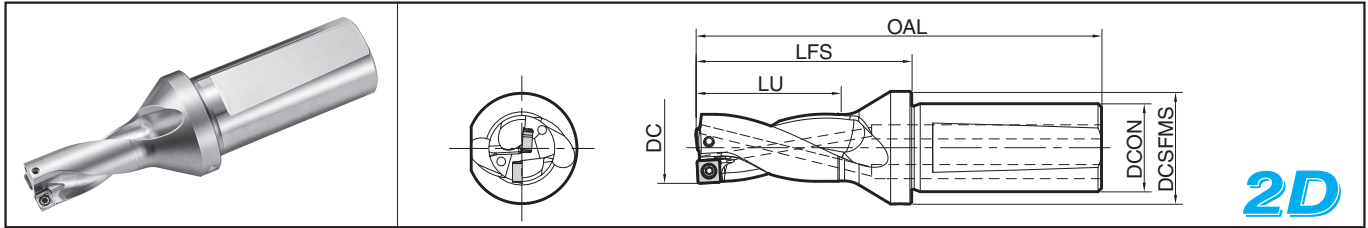
Competitor L (ø22-4D/2D)

20 sec

Chattering and deflection occurred with Competitor L. DRV showed stable machining and a shorter cutting time even when the cutting conditions were increased to 1.6 times or more. (User Evaluation)

MagicDrill DRV

DRV (Drilling Depth : 2 x DC)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➔ K40
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
											DTPM FTP	
S20-NEW DRV120M-2-03 DRV125M-2-03 DRV130M-2-03 DRV135M-2-03	●	2	12	82	39	24	20	27	+0.25 +0.20 +0.15 +0.10	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
DRV140M-2-04 DRV145M-2-04 DRV150M-2-04 DRV155M-2-04	●	2	14	92	49	28	20	27	+0.40 +0.35 +0.30 +0.25	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
S25- DRV160M-2-05 DRV165M-2-05 DRV170M-2-05 DRV175M-2-05 DRV180M-2-05 DRV185M-2-05	●	2	16	110	56	32	25	32	+0.40 +0.35 +0.30 +0.25 +0.20 +0.15	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
DRV190M-2-06 DRV195M-2-06 DRV200M-2-06 DRV205M-2-06 DRV210M-2-06 DRV215M-2-06 DRV220M-2-06	●	2	19	113	59	38	25	32	+0.65 +0.60 +0.55 +0.50 +0.45 +0.35 +0.30	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
DRV225M-2-07 DRV230M-2-07 DRV235M-2-07 DRV240M-2-07 DRV245M-2-07 DRV250M-2-07 DRV255M-2-07 DRV260M-2-07	●	2	22.5	120	66	45	25	32	+0.90 +0.80 +0.75 +0.70 +0.65 +0.60 +0.50 +0.45	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
S32- DRV270M-2-09 DRV280M-2-09 DRV290M-2-09 DRV300M-2-09 DRV310M-2-09 DRV320M-2-09	●	2	27	136	77	54	32	41	+1.05 +0.95 +0.85 +0.75 +0.60 +0.50	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
S40-NEW DRV330M-2-11 DRV340M-2-11 DRV350M-2-11 DRV360M-2-11 DRV370M-2-11 DRV380M-2-11 DRV390M-2-11	●	2	33	161	92	66	40	49	+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I

Recommended Cutting Conditions ➔ **K50**

Trouble shooting ➔ **K54**

· Hole Dia. Tolerance (2D type)

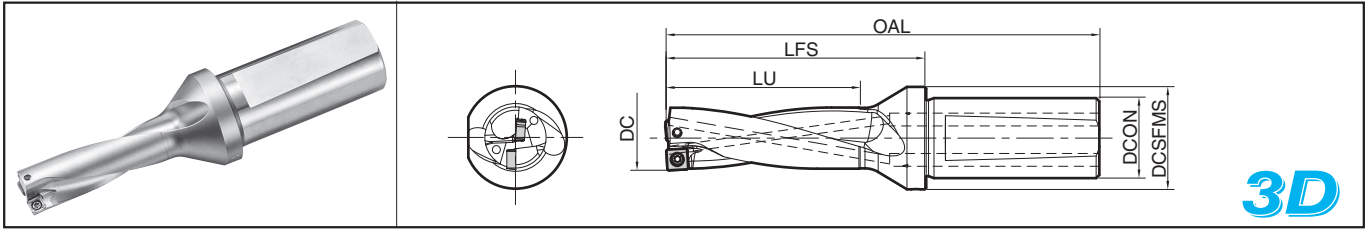
DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.30 0

* Above is numeric guideline.

It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRV (Drilling Depth : 3 x DC)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K40
			DC	OAL	LFS	LU	DCON	DCSFMS	Clamp Screw		Wrench		
S20-NEW DRV120M-3-03 DRV125M-3-03 DRV130M-3-03 DRV135M-3-03 DRV140M-3-04 DRV145M-3-04 DRV150M-3-04 DRV155M-3-04	●	2	12	94	51	36			+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I	
	●		12.5	96	53	37.5	20	27	+0.20				
	●		13	97	54	39			+0.15				
	●	13.5	99	56	40.5			+0.10					
	●	2	14	106	63	42	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I	
	●		14.5	108	65	43.5			+0.35				
●	15		109	66	45			+0.30					
●	15.5	111	68	46.5			+0.25						
S25- DRV160M-3-05 DRV165M-3-05 DRV170M-3-05 DRV175M-3-05 DRV180M-3-05 DRV185M-3-05 DRV190M-3-06 DRV195M-3-06 DRV200M-3-06 DRV205M-3-06 DRV210M-3-06 DRV215M-3-06 DRV220M-3-06 DRV225M-3-07 DRV230M-3-07 DRV235M-3-07 DRV240M-3-07 DRV245M-3-07 DRV250M-3-07 DRV255M-3-07 DRV260M-3-07	●	2	16	126	72	48			+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I	
	●		16.5	127	73	49.5	25	32	+0.35				
	●		17	129	75	51			+0.30				
	●	17.5	130	76	52.5			+0.25					
	●	18	132	78	54			+0.20					
	●	18.5	133	79	55.5			+0.15					
	●	2	19	132	78	57	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I	
	●		19.5	134	80	58.5			+0.60				
	●		20	135	81	60			+0.55				
	●	20.5	137	83	61.5			+0.50					
	●	21	138	84	63			+0.45					
	●	21.5	140	86	64.5			+0.35					
●	22	141	87	66			+0.30						
●	2	22.5	142	88	67.5	25	32	+0.90	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I		
●		23	144	90	69			+0.80					
●		23.5	145	91	70.5			+0.75					
●	24	147	93	72			+0.70						
●	24.5	148	94	73.5			+0.65						
●	25	150	96	75			+0.60						
●	25.5	151	97	76.5			+0.50						
●	26	153	99	78			+0.45						
S32- DRV265M-3-09 DRV270M-3-09 DRV275M-3-09 DRV280M-3-09 DRV285M-3-09 DRV290M-3-09 DRV295M-3-09 DRV300M-3-09 DRV305M-3-09 DRV310M-3-09 DRV315M-3-09 DRV320M-3-09	●	2	26.5	161	102	79.5			+1.15	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I	
	●		27	163	104	81	32	41	+1.05				
	●		27.5	164	105	82.5			+1.00				
	●	28	166	107	84			+0.95					
	●	28.5	167	108	85.5			+0.90					
	●	29	169	110	87			+0.85					
	●	29.5	170	111	88.5			+0.80					
	●	30	172	113	90			+0.75					
	●	30.5	173	114	91.5			+0.65					
	●	31	175	116	93			+0.60					
	●	31.5	176	117	94.5			+0.55					
	●	32	178	119	96			+0.50					
S40-NEW DRV330M-3-11 DRV340M-3-11 DRV350M-3-11 DRV360M-3-11 DRV370M-3-11 DRV380M-3-11 DRV390M-3-11	●	2	33	194	125	99			+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I	
	●		34	197	128	102	40	49	+1.15				
	●		35	200	131	105			+1.00				
	●	36	203	134	108			+0.90					
	●	37	206	137	111			+0.80					
	●	38	209	140	114			+0.65					
●	39	212	143	117			+0.55						

Recommended Cutting Conditions ● K50

Trouble shooting ● K54

· Hole Dia. Tolerance (3D type)

DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.30 0

* Above is numeric guideline.

It may vary depending on machines / workpieces / clamping status / cutting conditions.

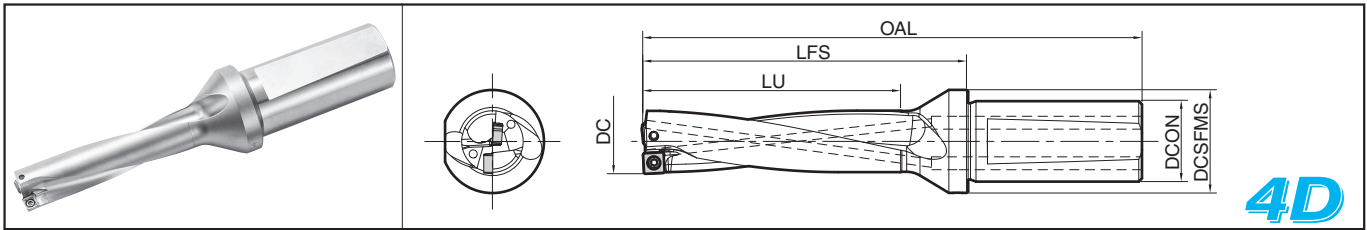
● : Std. Item

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MagicDrill DRV

DRV (Drilling Depth : 4 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➔ K40	
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench		
											DTPM  FTP 		
S20- NEW DRV120M-4-03 DRV125M-4-03 DRV130M-4-03 DRV135M-4-03 DRV140M-4-04 DRV145M-4-04 DRV150M-4-04 DRV155M-4-04	●	2	12 12.5 13 13.5	106 108 110 112	63 65 67 69	48 50 52 54		20	27	+0.25 +0.20 +0.15 +0.10	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
S25- DRV160M-4-05 DRV165M-4-05 DRV170M-4-05 DRV175M-4-05 DRV180M-4-05 DRV185M-4-05 DRV190M-4-06 DRV195M-4-06 DRV200M-4-06 DRV205M-4-06 DRV210M-4-06 DRV215M-4-06 DRV220M-4-06 DRV225M-4-07 DRV230M-4-07 DRV235M-4-07 DRV240M-4-07 DRV245M-4-07 DRV250M-4-07 DRV255M-4-07 DRV260M-4-07	●	2	16 16.5 17 17.5 18 18.5	142 144 146 148 150 152	88 90 92 94 96 98	64 66 68 70 72 74		25	32	+0.40 +0.35 +0.30 +0.25 +0.20 +0.15	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
S32- DRV270M-4-09 DRV280M-4-09 DRV290M-4-09 DRV300M-4-09 DRV310M-4-09 DRV320M-4-09	●	2	27 28 29 30 31 32	190 194 198 202 206 210	131 135 139 143 147 151	108 112 116 120 124 128		32	41	+1.05 +0.95 +0.85 +0.75 +0.60 +0.50	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
S40- NEW DRV330M-4-11 DRV340M-4-11 DRV350M-4-11 DRV360M-4-11 DRV370M-4-11 DRV380M-4-11 DRV390M-4-11	●	2	33 34 35 36 37 38 39	227 231 235 239 243 247 251	158 162 166 170 174 178 182	132 136 140 144 148 152 156		40	49	+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I

Recommended Cutting Conditions ➔ **K50**

Trouble shooting ➔ **K54**

· Hole Dia. Tolerance (4D type)

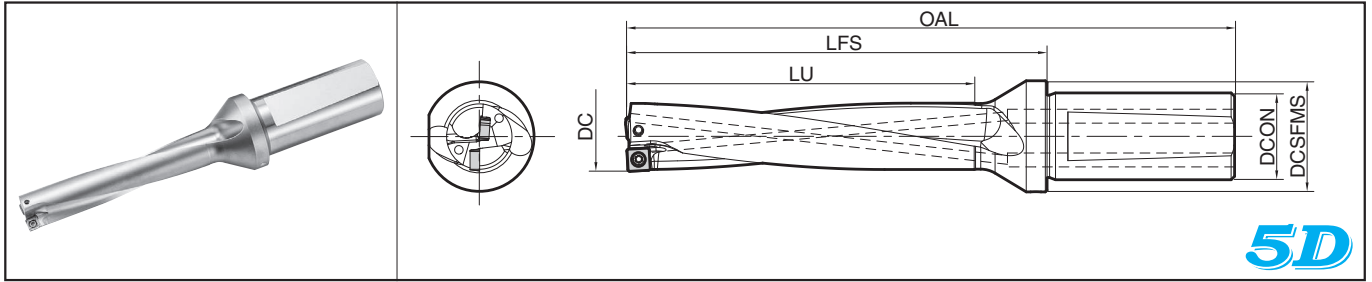
DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.35 0

* Above is numeric guideline.

It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item

DRV (Drilling Depth : 5 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➔ K40
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
S20- NEW DRV120M-5-03 DRV130M-5-03 DRV140M-5-04 DRV150M-5-04	●	2	12 13 14 15	118 123 134 139	75 80 91 96	60 65 70 75	20 20 20 20	27 27 27 27	+0.25 +0.15 +0.40 +0.30	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
S25- DRV160M-5-05 DRV170M-5-05 DRV180M-5-05 DRV190M-5-06 DRV200M-5-06 DRV210M-5-06 DRV220M-5-06 DRV230M-5-07 DRV240M-5-07 DRV250M-5-07 DRV260M-5-07	●	2	16 17 18 19 20 21 22 23 24 25 26	158 163 168 170 175 180 185 190 195 200 205	104 109 114 116 121 126 131 136 141 146 151	80 85 90 95 100 105 110 115 120 125 130	25 25 25 25 25 25 25 25 25 25 25	32 32 32 32 32 32 32 32 32 32 32	+0.40 +0.30 +0.20 +0.65 +0.55 +0.45 +0.30 +0.80 +0.70 +0.60 +0.45	SB-2041TRP SB-2555TRP SB-3060TRP	FTP-6 DTPM-8 DTPM-10	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
S32- DRV270M-5-09 DRV280M-5-09 DRV290M-5-09 DRV300M-5-09 DRV310M-5-09 DRV320M-5-09	●	2	27 28 29 30 31 32	217 222 227 232 237 242	158 163 168 173 178 183	135 140 145 150 155 160	32 32 32 32 32 32	41 41 41 41 41 41	+1.05 +0.95 +0.85 +0.75 +0.60 +0.50	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
S40- NEW DRV330M-5-11 DRV340M-5-11 DRV350M-5-11 DRV360M-5-11 DRV370M-5-11 DRV380M-5-11 DRV390M-5-11	●	2	33 34 35 36 37 38 39	260 265 270 275 280 285 290	191 196 201 206 211 216 221	165 170 175 180 185 190 195	40 40 40 40 40 40 40	49 49 49 49 49 49 49	+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I

Recommended Cutting Conditions ➔ **K50**
Trouble shooting ➔ **K54**

Hole Dia. Tolerance (5D type)

DC	Hole Dia. Tolerance (mm)
ø12-ø39	+0.35 0

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

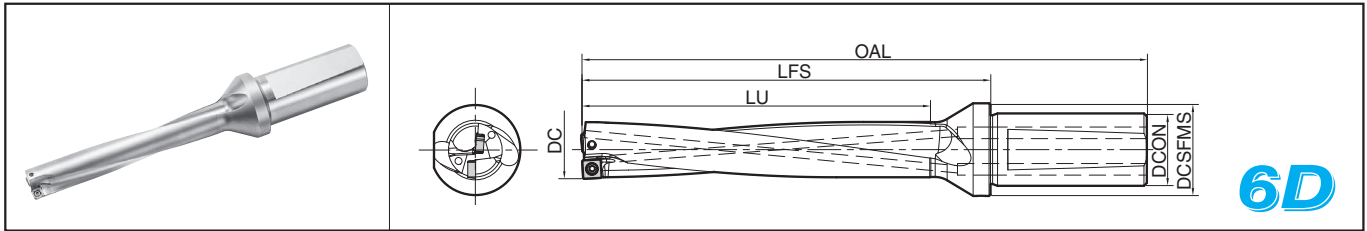
● : Std. Item

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MagicDrill DRV

DRV (Drilling Depth : 6 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➔ K40
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
S20- DRV120M-6-03 NEW DRV130M-6-03	●	2	12	130	87	72	20	27	+0.25 +0.15	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
DRV140M-6-04 DRV150M-6-04	●	2	14	148	105	84	20	27	+0.40 +0.30	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
S25- DRV160M-6-05 DRV170M-6-05 DRV180M-6-05	●	2	16	174	120	96	25	32	+0.40 +0.30 +0.20	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
DRV190M-6-06 DRV200M-6-06 DRV210M-6-06 DRV220M-6-06	●	2	19	189	135	114	25	32	+0.65 +0.55 +0.45 +0.30	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
DRV230M-6-07 DRV240M-6-07 DRV250M-6-07 DRV260M-6-07	●	2	23	213	159	138	25	32	+0.80 +0.70 +0.60 +0.45	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
S32- DRV270M-6-09 DRV280M-6-09 DRV290M-6-09 DRV300M-6-09 DRV310M-6-09 DRV320M-6-09	●	2	27	244	185	162	32	41	+1.05 +0.95 +0.85 +0.75 +0.60 +0.50	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
S40- DRV330M-6-11 NEW DRV340M-6-11 DRV350M-6-11 DRV360M-6-11 DRV370M-6-11 DRV380M-6-11 DRV390M-6-11	●	2	33	293	224	198	40	49	+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I

Recommended Cutting Conditions ➔ **K50**

Trouble shooting ➔ **K54**

· Hole Dia. Tolerance (6D type)

DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.45 0

* Above is numeric guideline.

It may vary depending on machines / workpieces / clamping status / cutting conditions.

K

Drilling

DRA

DRC

DRV

DRS

DRZ

DRX

DRW

Fine
Micro

● : Std. Item

Insert Grade Selection Guide

Select CVD for the outer edge when performing high speed and high efficiency drilling. Drilling for high efficiency, abrasion resistance and long tool life.
 Select PVD for the outer edge for stable drilling and a better surface finish.
 PVD is recommended for the outer edge when chattering occurs or drilling with lathe is not available, even if cutting conditions are increased.

1st Recommendation (High Speed and High Efficiency Drilling)

Outer edge : CVD (CA520D/CA415D)

Inner edge : PVD (PR1535)



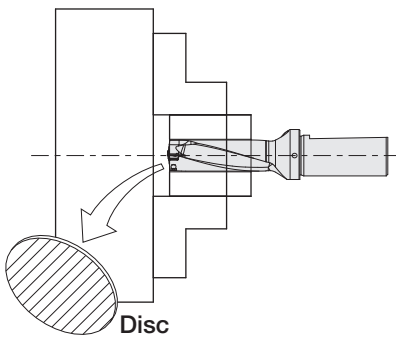
Stable Machining Oriented (1st Recommendation for Lathe Machining)

Outer edge : PVD (PR1225)

Inner edge : PVD (PR1535)



Caution



In case of through-hole drilling, disc may be generated and ejected outward when drilling a hole. Be sure to install covers to protect against dangers if using a machine without the covers including general-purpose lathes, etc.

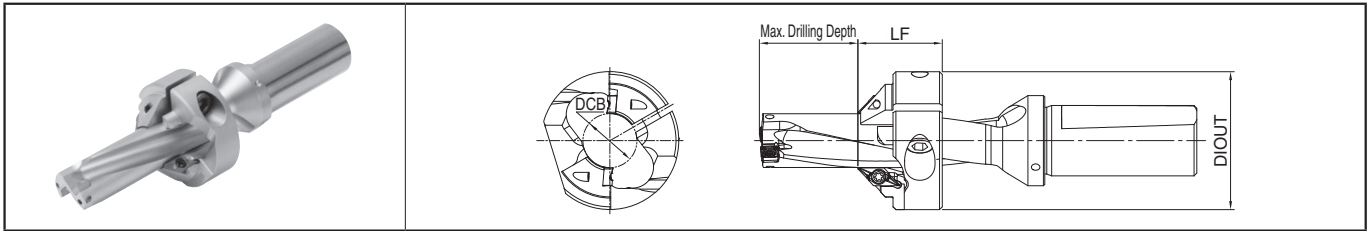
DRV Hole Bottom Shape (mm)

Insert Size	DC	A	Insert Size	DC	A	Insert Size	DC	A	Insert Size	DC	A						
03	12.0	0.70	06	19.0	1.2	07	22.5	1.2	09	26.5	1.2						
	12.5											20.0	23.0	27.0			
	13.0														20.5	23.5	27.5
	13.5																
04	14.0	1.0		21.5	24.5		28.5										
	14.5							25.0		29.0							
	15.0										25.5	29.5					
15.5	05	1.1		22.0	26.0		1.3	30.0		1.4							
16.0			30.5			31.0											
16.5									31.5		32.0						
17.0		1.2	33.0			1.5											
17.5							11	34.0	1.5								
18.0		35.0	1.6														
18.5	36.0			1.7													
					37.0	1.6											
	38.0	1.6															
			39.0	1.7													

Common for 2D, 3D, 4D, 5D, 6D type

* Above is numeric guideline. (Varies within ±0.1mm depending on workpiece materials and cutting conditions)

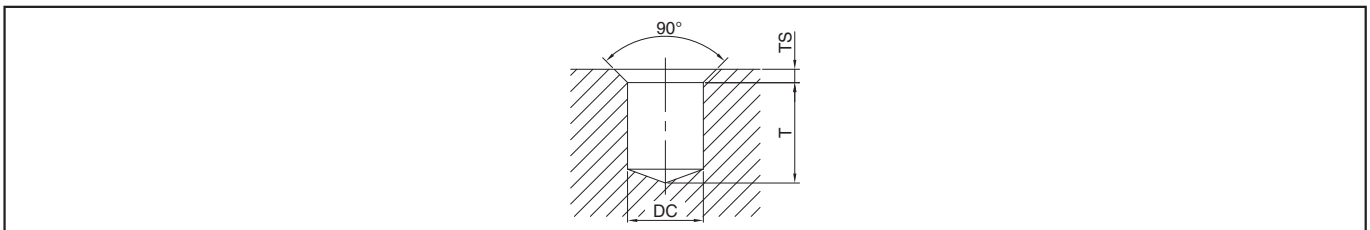
Chamfering Attachment



Toolholder Dimensions

Description	Stock	Applicable Drills	Dimension (mm)			Applicable Inserts	Spare Parts								
			DIOUT	DCB	LF		Clamp Screw	Wrench	Clamp Bolt	Wrench					
DRV-CH17	●	S25-DRV165M-○-05 S25-DRV170M-○-05	47	16.2	30	CH0503-45	SB-3080TR	FT-10	HH6X18	LW-5					
DRV-CH18	●	S25-DRV175M-○-05 S25-DRV180M-○-05	47	17.2	30										
DRV-CH19	●	S25-DRV185M-○-05 S25-DRV190M-○-06	49	18.2	30										
DRV-CH20	●	S25-DRV195M-○-06 S25-DRV200M-○-06	49	19.2	30										
DRV-CH21	●	S25-DRV205M-○-06 S25-DRV210M-○-06	49	20.2	30										
DRV-CH22	●	S25-DRV215M-○-06 S25-DRV220M-○-06	49	21.2	30										
DRV-CH23	●	S25-DRV225M-○-07 S25-DRV230M-○-07	51	22.2	30										
DRV-CH24	●	S25-DRV235M-○-07 S25-DRV240M-○-07	51	23.2	30										
DRV-CH25	●	S25-DRV245M-○-07 S25-DRV250M-○-07	53	24.2	30										
DRV-CH26	●	S25-DRV255M-○-07 S25-DRV260M-○-07	53	25.2	30										
DRV-CH27	●	S25-DRV265M-○-09 S32-DRV270M-○-09	64	26	35									HH8X20	LW-6

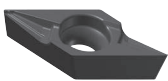
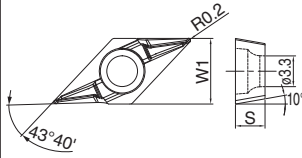
Max. Drilling Depth and Chamfering Dimension



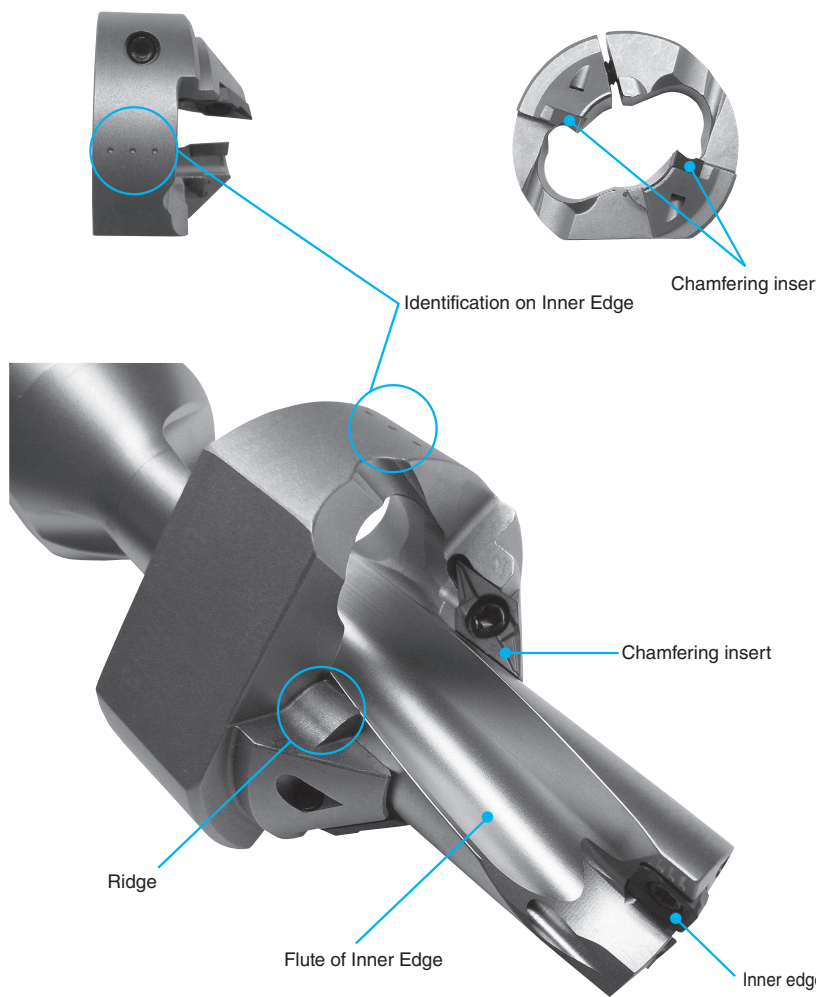
Drill Dia. (mm)	Max. Drilling Depth T (mm)						Max. chamfering dimension (mm)	Applicable Chamfering Attachment
	DC	2D Drill	3D Drill	4D Drill	5D Drill	6D Drill		
ø16.5		0.5	17	33.5	-	-	2.5	DRV-CH17
ø17		1.5	18.5	35.5	52.5	69.5		DRV-CH18
ø17.5		2.5	20	37.5	-	-		DRV-CH19
ø18		3.5	21.5	39.5	57.5	75.5		DRV-CH20
ø18.5		4.5	23	41.5	-	-		DRV-CH21
ø19		5.5	24.5	43.5	62.5	81.5		DRV-CH22
ø19.5		6.5	26	45.5	-	-		DRV-CH23
ø20		7.5	27.5	47.5	67.5	87.5		DRV-CH24
ø20.5		8.5	29	49.5	-	-		DRV-CH25
ø21		9.5	30.5	51.5	72.5	93.5		DRV-CH26
ø21.5		10.5	32	53.5	-	-		DRV-CH27
ø22		11.5	33.5	55.5	77.5	99.5		
ø22.5		12.5	35	57.5	-	-		
ø23		13.5	36.5	59.5	82.5	105.5		
ø23.5		14.5	38	61.5	-	-		
ø24		15.5	39.5	63.5	87.5	111.5		
ø24.5		16.5	41	65.5	-	-		
ø25		17.5	42.5	67.5	92.5	117.5		
ø25.5		18.5	44	69.5	-	-		
ø26		19.5	45.5	71.5	97.5	123.5		
ø26.5		-	47	-	-	-		
ø27		16.5	43.5	75.5	97.5	124.5		

● : Std. Item

● Applicable Inserts

Insert	Description	Dimension (mm)		MEGACOAT NANO	Applicable Chamfering Attachment	
		W1	S	PR1535		
		CH0503-45	7.05	3.18	●	DRV-CH○○

● How to Install Chamfering Attachment



Instructions

- 1) Install the attachment over the DRV body so that "... mark on the side of the attachment aligns with the inside flute edge (see image).
- 2) Adjust the position to avoid interference between the chamfering inserts, chamfering attachment ridges, and drill body flutes. Then fasten the clamp bolt with the recommended torque below.

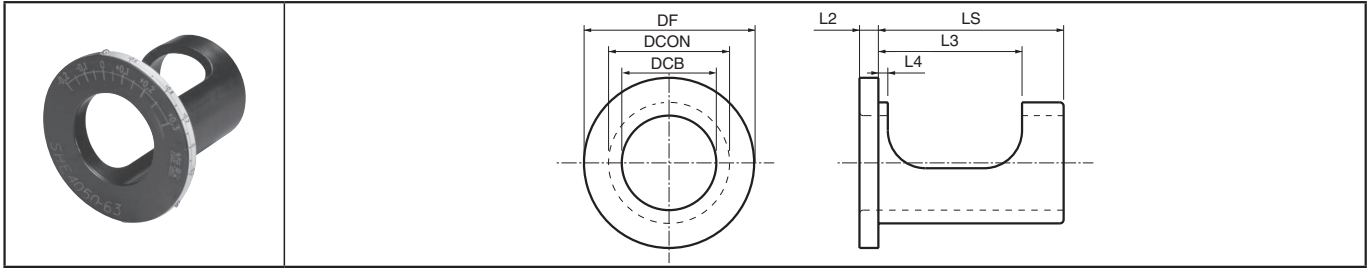
● Recommended tightening torque

Chamfering Attachment Description	Tightening Torque (N·m)	Clamp Bolt	Wrench
DRV-CH17~CH26	10	HH6X18	LW-5
DRV-CH27	14	HH8X20	LW-6

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Sleeve Dimensions

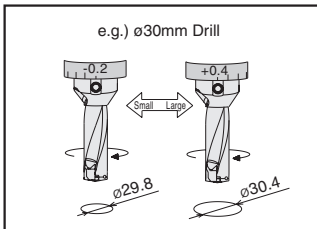
Description	Stock	Dimension (mm)							* Drill Dia. Adjustable Range	Center Height Adjustable Range
		DCB	DCON	DF	LS	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	50	74	63	6	49	3.0	+0.6~-0.2	+0.2~-0.2

· Diameter Adjustment Range adjusts the drill diameter.

· SHE type is for MagicDrill DRV / DRZ / DRX. It is not suitable for MagicDrill DRS, because large correction amount is required.

● : Std. Item

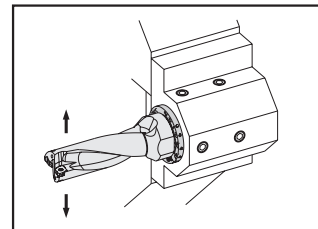
1. Diameter Adjustment ~For Machining Center~



● Diameter Adjustment Range (mm)

Shank Dia.	Adjustment Range
ø20	+0.4~-0.2
ø25	
ø32	+0.6~-0.2
ø40	

2. Center Height Adjustment ~Fewer problems owing to height adjustment for lathes-



● Center Height Adjustment Range (mm)

Shank Dia.	Adjustment Range
ø20	+0.2~-0.15
ø25	
ø32	+0.3~-0.2
ø40	

◆ How to Use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

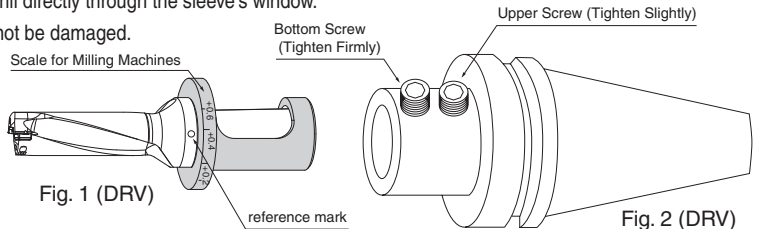
- Adjust the scale at the flange periphery of the sleeve to the reference mark (DRV/DRX) or the center of coolant plug (DRZ). (Fig. 1)
- When making the hole diameter larger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.
- When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
- Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.

The upper screw should be tightened slightly so that the sleeve will not be damaged.

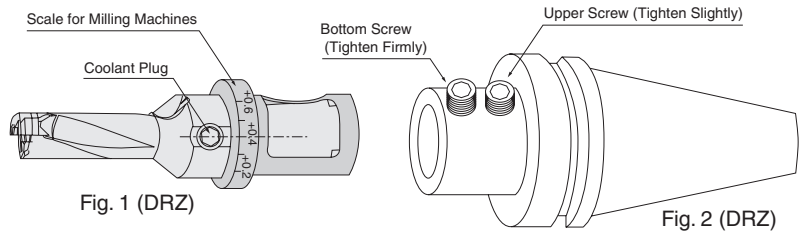
Caution :

- Not applicable for Collet Chuck type Arbor.
- Scale on the sleeve is the reference value.
- Check the actual hole diameter after adjusting.

DRV (DRX)



DRZ



(Example of Adjusting the Hole Dia. +0.4mm)

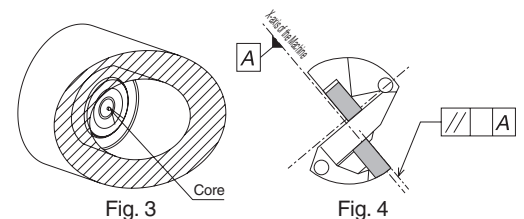
2. Center-Height Adjustment for Lathes

Most Lathe problem occur due to Center Height Deviation.

The Center Height is appropriate if a core approximately 0.5mm diameter remains at the center of the end face. (Fig. 3)

Center-height adjustment is necessary for the case as follows :

- ◆ No core remains or
- ◆ Core diameter is more than 1mm



- Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig. 4)
- Adjust the scale at the flange periphery of the sleeve to the reference mark (DRV/DRX) or the center of coolant plug (DRZ).
- When no core remains, rotate the sleeve to (+) direction to make the core larger, and when the core diameter is 1mm or more, rotate the sleeve to (-) direction to make the core smaller.
- When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
- After Completing the adjustment, firmly tighten on the drill directly through the sleeve's window.

Note : Depending on amount of the center height adjustment, the hole diameter may change. It is recommended that the hole diameter is checked after the center height adjustment.

Insert Grades
Turnable
Indexable Inserts
CNV & PCD Tools
External
Small Parts
Machining
Boring
Grooving
Cut-off
Threading
Drilling
Solid Tools
Milling
Tools for
Turning Mill
Spare Parts
Technical
Information
Index

Lathe Installation

- (1) The top face of the outer insert should be parallel to the X-axis to allow for offset cutting. (Drill diameter can be changed by moving X-axis.)
- (2) It is recommended to set the outer insert as shown in Fig. 1 with the outer insert facing the operator. (Fig. 1)
(It is also possible to use it by setting it in 180° reverse position)
If the lathe has two turrets, when installing the drill into the lower turret, the outer insert should be set to face the operator.
(It is also possible to use it by setting at 180° reverse position)

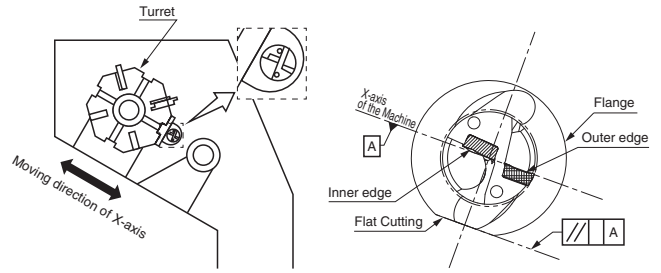


Fig. 1 Installed into the Lathe

Drill Diameter Adjustment

1. Drill Diameter Adjustment

- (1) Drill diameter is adjusted by moving X-axis.

The moving direction of the X-axis depends on the position of the toolholder.

- (2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig. 2, Fig. 3)

For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction.

(This movement of the axis is called "Offset")

However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm or more. Otherwise, the toolholder will interfere with the drilled hole. (Fig. 4)

e.g.) In case of using $\varnothing 20$ drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter

For the maximum limit of the drill diameter, refer to "Max. Offset (Radial)" in the Toolholder Dimensions table.

(The figure in the table shows how much it is possible the offset the drill in the radial direction.)

When using $\varnothing 20$ drill, for example, it is possible to make a hole up to $\varnothing 21.1$ since "Max. Offset (Radial)" is +0.55mm.

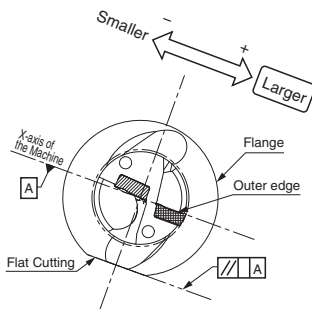


Fig. 2 Outer insert Facing Up

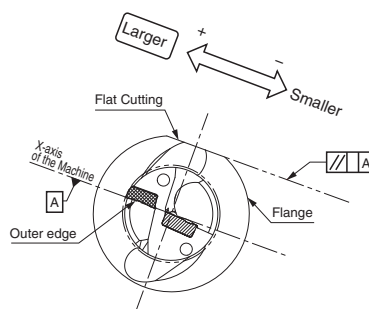


Fig. 3 Outer insert Facing Down

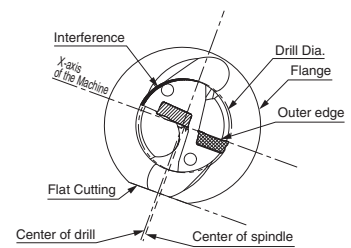


Fig. 4 Excessive offset (For Smaller Hole Diameter)

Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig. 1, it will be set around 0.05mm below the Center of Spindle. (Fig. 5)

This is the normal position of the center height and the drill is designed to be handled in this condition.

However, in case that the turret of the lathe is out of the center of Spindle, sometimes the inner insert may be set above the center, or excessively below the center.

For stable drilling, it is essential to check the Center Height carefully.

2. How to Check the Center Height

For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig. 6)

If the center height is in the normal position, a core about 0.5mm in diameter, will remain after machining.

Adjustment of center height is required if a large core diameter of 1mm or more remains.

* The drilled hole for verification purposes needs to be machined at approximately 10mm in depth and at a feed rate of 0.1mm/rev or lower.

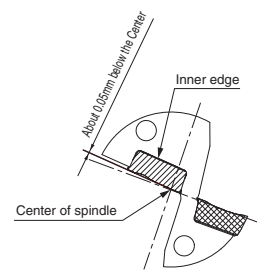


Fig. 5 Front View of the Drill

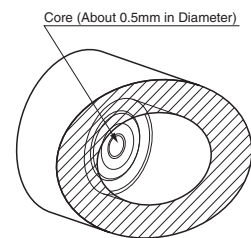


Fig. 6 Center Core

3. Center Height Adjustment

a) When there are no remaining cores and insert breakage near the center of the drill.

This happens when the inner insert is set above the center height. (Fig. 7)

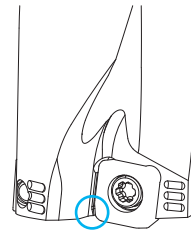


Fig. 7 Insert breakage near the center of the drill

[How to Adjust]

- Install the drill rotated 180°.
Most problems will be solved by this method. (Fig. 8)

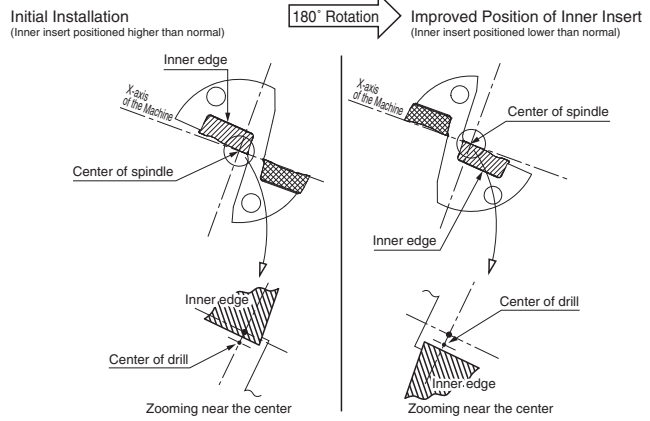


Fig. 8

[How to Adjust]

- If the core diameter becomes too large after the above adjustment, install the drill by rotating 90° counter-clockwise as shown in Fig. 9 (outer insert is positioned lower) and adjust the center height by moving the tool in the X-axis direction.

(However, this will make it impossible to adjust the cutting diameter.)

Caution : In case of installing the drill in the reverse direction (outer insert is positioned above), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.

The best solution is to readjust the center position of the turret itself.

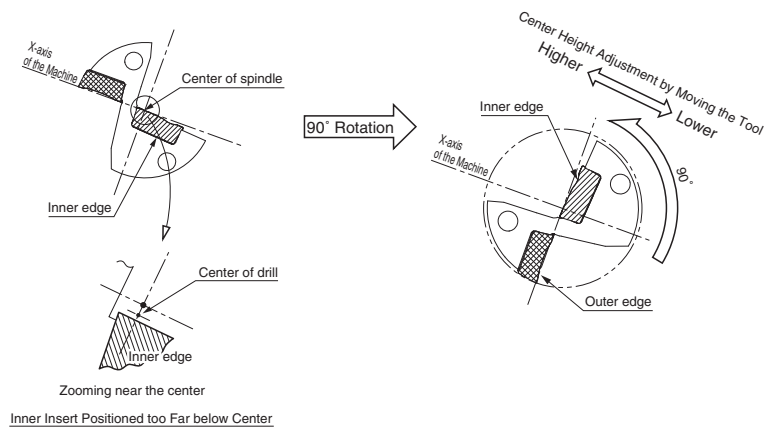


Fig. 9

b) Core with excessively large diameter (More than 1mm)

This occurs when the inner insert is excessively below the center.

This condition causes poor chip evacuation and an adjustment is required.

[How to Adjust]

Install the drill rotating 90° as shown in Fig. 10. (outer insert is positioned on the upper side) and adjust the center height by moving tool in the X-axis direction.

(However, this will make it impossible to adjust the cutting diameter.)

Caution : In case of installing the drill in the opposite direction (outer insert is positioned lower), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole.

The best solution is to readjust the center position of the turret itself.

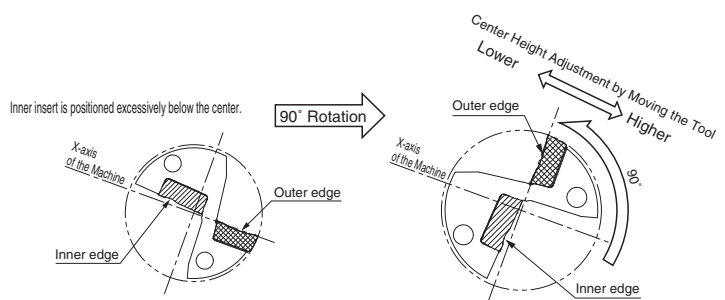


Fig. 10

Trouble shooting

Trouble shooting (DRV / DRS / DRZ / DRX)

Trouble condition	Condition	Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)	<p>A (Inlet side) B (Bottom side) $A > B$</p>	Chip jam (External or Internal edge chip stuck)	Change the cutting conditions <ul style="list-style-type: none"> · Increase the cutting speed · Lower the feed rate See page, K50, K56, K67, K80 for "Recommended Cutting Conditions".
Hole diameter becomes larger (at hole bottom)	<p>A (Inlet side) B' (Bottom side) $A < B'$</p>	Internal edge chip jam.	Change the cutting conditions <ul style="list-style-type: none"> · Increase the cutting speed · Lower the feed rate See page, K50, K56, K67, K80 for "Recommended Cutting Conditions". <ul style="list-style-type: none"> · Check the core height See page, K52-K53 (DRV) See page, K68-K69 (DRZ/DRX)
Hole diameter is small (from the hole inlet)		Hole diameter is small from inlet. (At turning moment)	Inappropriate adjustment of hole diameter. <ul style="list-style-type: none"> See page, K52 (DRV) See page, K68 (DRZ/DRX)
		No core at internal edge. (No core remains)	In case of using lathe machine, use X-axis and adjustment hole diameter. <ul style="list-style-type: none"> See page, K52 (DRV) See page, K68 (DRZ/DRX) Adjust the center height. <ul style="list-style-type: none"> See page, K52-K53 (DRV) See page, K68-K69 (DRZ/DRX)

Indication of tool life of MagicDrill (DRV / DRS / DRZ / DRX)

How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	<ul style="list-style-type: none"> •When an insert is new, The toolholder is slightly bent to the side during drilling. (therefore, the drill diameter is slightly bigger during drilling.) Once drilling is finished, the toolholder will return back to normal size. No tool marks will appear on the finished surface. (This depends on workpiece and cutting condition.) Slight tool mark might appear if cutting force on external dia. is too low.) •When an insert is at the end of its tool life, Gradually the external corner part gets worn out, the toolholder dose not bend slightly outwards, it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position. When taking off a toolholder under this condition the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause.
Checking the surface on the outlet side	If insert wear progresses, the burrs of penetrated hole entrance becomes bigger. This is a clear indication that the tool must be exchanged.
Variation of drilling noise	DRV / DRZ / DRX : Light drilling noise at the beginning turns to brady noise which contains vibration noise. DRS : Light drilling noise at the beginning turns to whir noise. Although, it is difficult to recognize DRV / DRZ / DRX type's smaller drill diameter or DRS type's variation of drilling noise because of main motor noise or coolant discharge noise.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

K

Drilling

DRA

DRC

DRV

DRS

DRZ

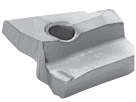
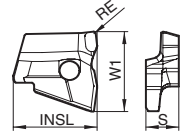
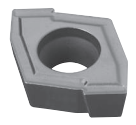
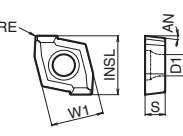

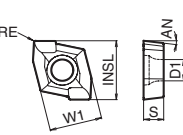

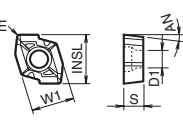
DRX

DRW

Fine Micro

Applicable Inserts (for DRS / DRZ)

Applicable Inserts (for DRS / DRZ)

Insert	Description	Dimension (mm)						Angle	MEGACOAT				Carbide	Applicable Toolholders See Page			
		INSL	S	D1	W1	RE	AN		PR1230	PR1225	PR1210	KW10					
															Classification of usage		
		● : 1st Choice		○ : 2nd Choice		(Steel; non heat treated)		P Carbon Steel / Alloy Steel		M Mold Steel		K Stainless Steel		N Cast Iron		N Non-ferrous Metals	
		DS 100	9.0	3.5	-	8.8	0.2	-	●	○	○		K56				
		105	9.7	3.7		9.3			●								
		110	10.0	3.9		9.8			●								
		115	10.3	4.1		10.2			●								
		120	10.9	4.3		10.8			●								
		ZCMT 050203	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	●	K56				
		06T204	7.0	2.80	2.5	6.0	0.4		●	●	●	●					
		080304	9.7	3.18	2.9	8.2	0.4		●	●	●	●					
		10T304	12.0	3.97	4.4	10.4	0.6		●	●	●	●					
		12T306	14.3	3.97	5.6	12.8	0.6		●	●	●	●					
		150408	17.8	4.76	5.6	15.8	0.8		●	●	●	●					
		200608	22.8	6.35	6.5	20.3	0.8		●	●	●	●					
		ZCMT 050203SP	5.9	2.38	2.3	5.0	0.3	7°	●	●		●	K58 K65				
		06T204SP	7.0	2.80	2.5	6.0	0.4		●	●		●					
		080304SP	9.7	3.18	2.9	8.2	0.4		●	●		●					
		10T304SP	12.0	3.97	4.4	10.4	0.6		●	●		●					
		12T304SP	14.3	3.97	5.6	12.8	0.6		●	●		●					
		150406SP	17.8	4.76	5.6	15.8	0.6		●	●		●					
		ZCMT 050203SU	5.9	2.38	2.3	5.0	0.3	7°	●	●							
		06T204SU	7.0	2.80	2.5	6.0	0.4		●	●							

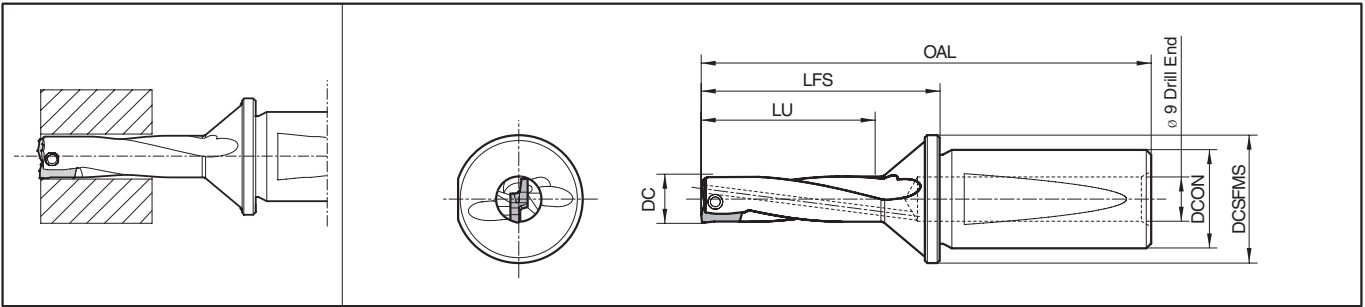
- * Features of SP Chipbreaker--1. Less cutting force with large rake angle
 2. Suitable for chip control of sticky materials such as stainless steel or soft steel.
 3. Larger size inserts have smaller corner-R(RE) than standard chipbreaker type and can reduce burrs.

Suitable Chipbreaker (ZCMT)

Workpiece Material	Insert Size	ZCMT05									ZCMT06									ZCMT08											
		Chipbreaker			Standard			SP			SU			Standard			SP			SU			Standard			SP					
		2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D			
Low Carbon Steel		☆	☆	-	★	★	★	-	-	-	☆	☆	-	★	★	★	☆	☆	☆	☆	☆	-	★	★	★						
Carbon Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★						
Alloy Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★						
Mold Steel		★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★	-	-	-	★	★	☆	☆	☆	★						
Stainless Steel		☆	☆	-	★	★	★	☆	☆	-	-	-	☆	☆	☆	★	★	★	☆	☆	-	★	★	★							
Cast Iron		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆						
Aluminum Alloys		☆	☆	★	★	★	★	-	-	-	☆	☆	★	★	★	★	-	-	-	☆	☆	★	★	★	★						
Brass		★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆						
Titanium Alloys		☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★						
Workpiece Material	Insert Size	ZCMT10									ZCMT12									ZCMT15									ZCMT20		
		Chipbreaker			Standard			SP			Standard			SP			Standard			SP			Standard								
		2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D			
Low Carbon Steel		☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	★	★	★			
Carbon Steel		★	★	☆	☆	☆	☆	★	★	★	☆	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆	☆	★	★	★	★				
Alloy Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆	☆	★	★	★	★				
Mold Steel		★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	☆	☆	☆	☆	☆	☆	★	★	★	★				
Stainless Steel		☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	☆	☆	-	-	★	★	★	★	★	★				
Cast Iron		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	★	★	★				
Aluminum Alloys		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★				
Brass		★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	★	★	★				
Titanium Alloys		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★				

- Standard chipbreakers (without symbol) may function better when interrupted drilling.
 · When drilling aluminum alloys, chips become long and difficult to be discharged at the depth over 2D.
 · 5D type is the same as 4D type.
 ★ : 1st Choice ☆ : 2nd Choice

DRS



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55	
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	Wrench		
S20 -DRS10035	●	1	10.0	92	49	35.0	20	26	+0.2	SB-2080TR	FT-6	-	DS100	
-DRS10336	●	1	10.3	92	49	36.0			+0.1					
-DRS10537	●	1	10.5	93	50	37.0			+0.2					
-DRS11038	●	1	11.0	96	53	38.5			+0.2	SB-2290TR	-	-		DS105
-DRS11540	●	1	11.5	97	54	40.5			+0.2					
-DRS12042	●	1	12.0	99	56	42.0			+0.4	SB-25100TR	-	DT-7		DS110
-DRS12544	●	1	12.5	101	58	44.0			+0.2					DS115
												DS120		

Trouble shooting ● K54

Cutting Conditions by Application

[Workpiece Material: S50C]

Applications	Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole	Stacked Plates	
Shape of Workpiece								
DRS	Vc (m/min)	80	80	Not recommended	Not recommended	80	Not recommended	Not Available
	f (mm/rev)	0.08	0.04	Not recommended	Not recommended	Concave Surface 0.04 Continuous Part 0.08	Not recommended	Not Available
Coolant (Internal)	Yes	Yes	-	-	Yes	-	-	

· In case of using external coolant system, chip evacuation will be bad. Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

DRS Recommended Cutting Conditions (Coolant)

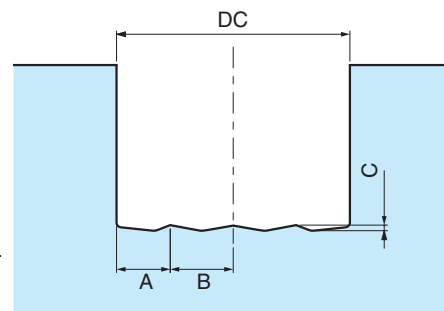
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)			f (mm/rev)
	MEGACOAT		PVD Coated Carbide	
	PR1230	PR1210	PR660	
Low Carbon Steel	★ 80~100	-	☆ 80~100	0.06
Carbon Steel	★ 80~100	-	☆ 80~100	0.08~0.1
Alloy Steel	★ 80	-	☆ 80	0.04~0.06
Mold Steel	★ 80	-	☆ 80	0.04~0.06
Stainless Steel (Austenitic related)	★ 70~80	-	☆ 70~80	0.05~0.06
Gray Cast Iron	-	★ 80~100	-	0.08~0.1

★ : 1st Recommendation ☆ : 2nd Recommendation

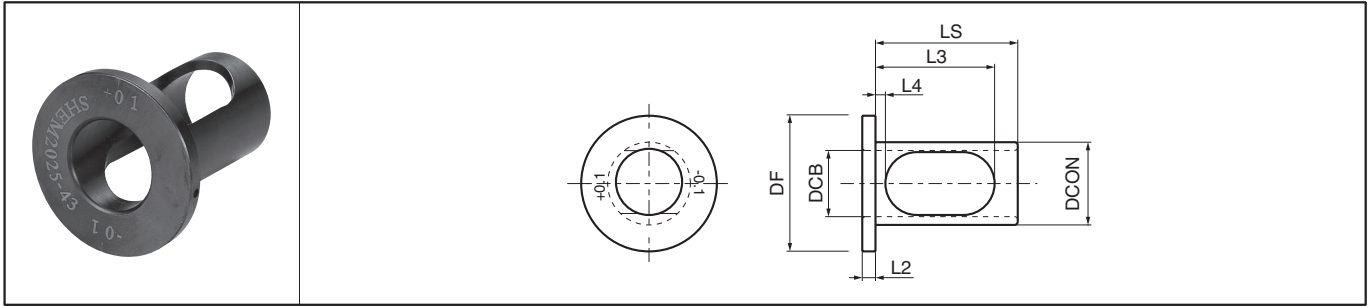
- Apply a sufficient amount of coolant.
- If cutting speed is decreased too much from above condition, chip evacuation performance will deteriorate.
If the feed rate is increased too much from above condition, inner edge chip evacuation will deteriorate.
If the feed rate is decreased too much from above condition, outer edge chip evacuation will deteriorate.
- If chips are too long when low carbon steel drilling, increased the cutting speed to 120~150m/min.
If this does not solve the problem, try step feeding.
[How to step feeding] (1) Cut 1~2mm (2) Return 0.1mm (3) Repeat (1) and (2)

DRS Hole Bottom Shape (mm)

DC	A	B	C
10.0	2.2	2.80	0.2
10.3	2.3	2.85	0.2
10.5	2.3	2.95	0.2
11.0	2.4	3.10	0.2
11.5	2.5	3.25	0.2
12.0	2.8	3.20	0.3
12.5	2.9	3.35	0.4



SHEM



Sleeve Dimensions

Description	Stock	Dimension (mm)							* Drill Dia. Adjustable Range
		DCB	DCON	DF	LS	L2	L3	L4	
SHEM 2025-43	●	20	25	41	43	4	36	3.0	+0.1, -0.1
2032-43	●		32	49		6		2.5	+0.1, -0.1

* Diameter Adjustment Range adjusts the drill diameter.

How to Use the Adjustable Sleeve

- SHEM is designed for only MagicDrill Mini (DRS)
- SHEM is for drill diameter adjustment only. (up to +0.1mm or -0.1mm)
- SHEM is not for center height adjustment like conventional adjustable sleeve (SHE)
- Apply SHEM when adjusting the hole diameter for pre-drilling before threading.

- (1) Set the outer edge horizontally with 90° to making line on the sleeve. (Fig. 1)
- (2) When making the hole diameter larger, align the +0.1 mark on the sleeve with the flat on the drill shank.
To adjust to smaller diameter, align the -0.1 mark on the sleeve with the flat on the drill shank. (Fig. 1)
- (3) Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.
The upper screw should be tightened slightly so that the sleeve will not be damaged. (Fig. 2)

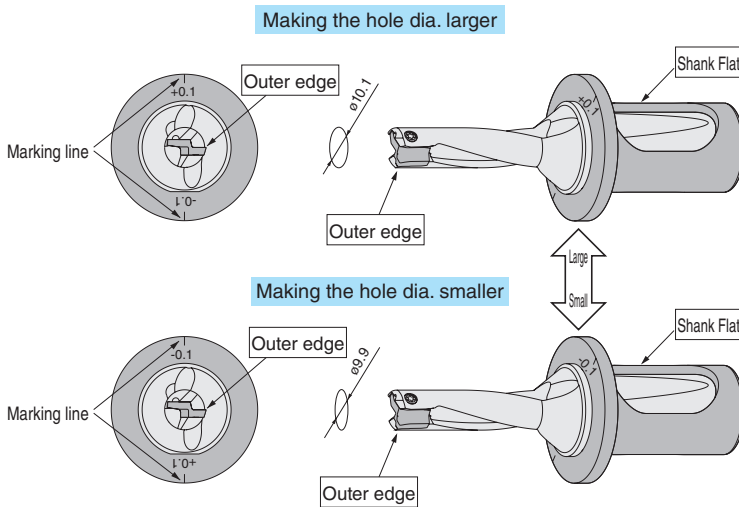


Fig. 1 Diameter Adjustment Method (e.g.) $\phi 10$ Drill

Caution : Not applicable for Collet Chuck type Arbor.

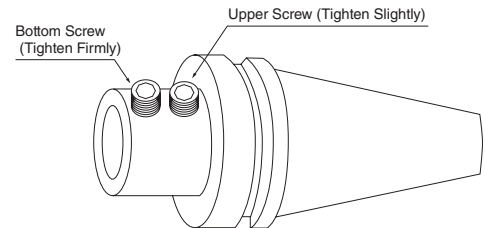
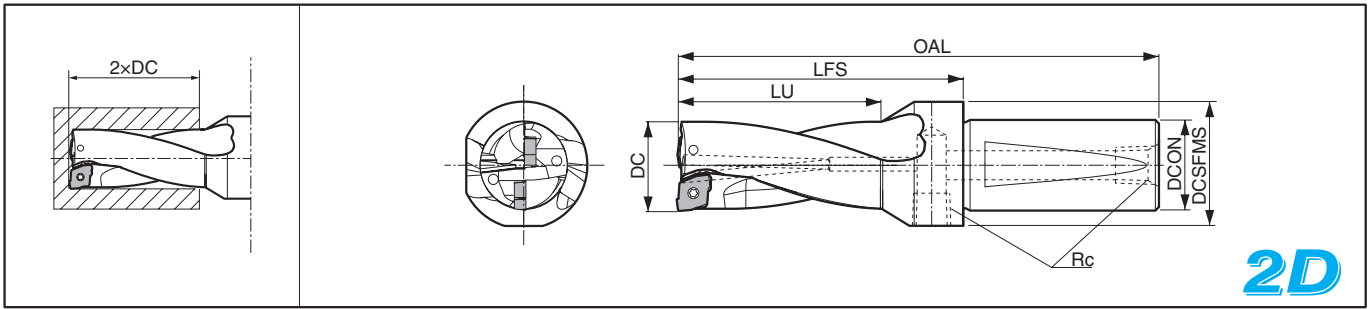


Fig. 2

MagicDrill DRZ

DRZ (Drilling Depth : 2 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Clamp Screw		Wrench FT DT	Plug		
S20 -DRZ1326-05	●	2	13	95	52	26	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU	
-DRZ135270-05	●		13.5	95	52	27									+0.5
-DRZ1428-05	●		14	98	55	28									+0.5
-DRZ145290-05	●		14.5	98	55	29									+0.5
-DRZ1530-05	●		15	100	57	30									+0.5
-DRZ155310-05	●		15.5	100	57	31									+0.5
S25 -DRZ1632-06	●	2	16	115	61	32	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU	
-DRZ165330-06	●		16.5	115	61	33									+0.9
-DRZ1734-06	●		17	116	62	34									+0.8
-DRZ175350-06	●		17.5	116	62	35									+0.7
-DRZ1836-06	●		18	118	64	36									+0.6
-DRZ185370-06	●		18.5	118	64	37									+0.6
-DRZ1938-06	●		19	120	66	38									+0.5
-DRZ195390-06	●		19.5	120	66	39									+0.5
-DRZ2040-06	●		20	123	69	40									+0.5
-DRZ205410-06	●		20.5	125	71	41									+0.3
-DRZ2142-06	●		21	125	71	42									+0.2
-DRZ215430-08	●		21.5	128	74	43									25
-DRZ2244-08	●	22	128	74	44	+1.6									
-DRZ225450-08	●	22.5	128	74	45	+1.4									
-DRZ2346-08	●	23	130	76	46	+1.3									
-DRZ235470-08	●	23.5	130	76	47	+1.2									
-DRZ2448-08	●	24	131	77	48	+1.1									
-DRZ245490-08	●	24.5	131	77	49	+0.9									
-DRZ2550-08	●	25	133	79	50	35	+0.8								
-DRZ255510-08	●	25.5	133	79	51		+0.7								
-DRZ2652-08	●	26	135	81	52		+0.6								
-DRZ265530-08	●	26.5	135	81	53		+0.5								
S32 -DRZ2754-10	●	2	27	149	90		54	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	
-DRZ275550-10	●		27.5	149	90		55								+2.3
-DRZ2856-10	●		28	151	92	56	+2.2								
-DRZ285570-10	●		28.5	151	92	57	+2.1								
-DRZ2958-10	●		29	153	94	58	+2.0								
-DRZ295590-10	●		29.5	153	94	59	+1.8								
-DRZ3060-10	●		30	154	95	60	+1.7								
-DRZ305610-10	●		30.5	154	95	61	45		+1.5						
-DRZ3162-10	●		31	155	96	62			+1.5						
-DRZ315630-10	●		31.5	155	96	63			+1.3						
-DRZ3264-10	●		32	158	99	64			+1.2						
-DRZ325650-10	●		32.5	158	99	65			+1.0						

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K67**
Trouble shooting **K50**

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55	
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc		Clamp Screw	Wrench	Plug		
S40 -DRZ3366-12	●	2	33	173	104	66	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP	
-DRZ3468-12	●		34	176	107	68									+2.7
-DRZ3570-12	●		35	177	108	70									+2.4
-DRZ3672-12	●		36	180	111	72									+2.2
-DRZ3774-12	●		37	181	112	74									+1.9
-DRZ3876-12	●		38	183	114	76									+1.7
-DRZ3978-12	●		39	185	116	78									+1.4
-DRZ4080-12	●		40	185	116	80									+1.2
-DRZ4182-15	●	2	41	186	117	82	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP	
-DRZ4284-15	●		42	188	119	84									+3.7
-DRZ4386-15	●		43	190	121	86									+3.5
-DRZ4488-15	●		44	192	123	88									+3.2
-DRZ4590-15	●		45	192	123	90									+3.0
-DRZ4692-15	●		46	198	129	92									+2.7
-DRZ4794-15	●		47	201	132	94		+2.5							
-DRZ4896-15	●		48	203	134	96		+2.2							
-DRZ4998-15	●		49	204	135	98		+2.0							
-DRZ50100-15	●		50	204	135	100		+1.7							
-DRZ51102-15	●		51	205	136	102		+1.2							
-DRZ52104-15	●		52	205	136	104		+1.0							
-DRZ53106-15	●	53	208	139	106	+0.7									
-DRZ54108-20	●	2	54	214	145	108	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608	
-DRZ55110-20	●		55	215	146	110									+4.7
-DRZ56112-20	●		56	217	148	112									+4.4
-DRZ57114-20	●		57	219	150	114									+4.1
-DRZ58116-20	●		58	221	152	116									+3.8
-DRZ59118-20	●		59	223	154	118									+3.5

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K67
Trouble shooting ● K50

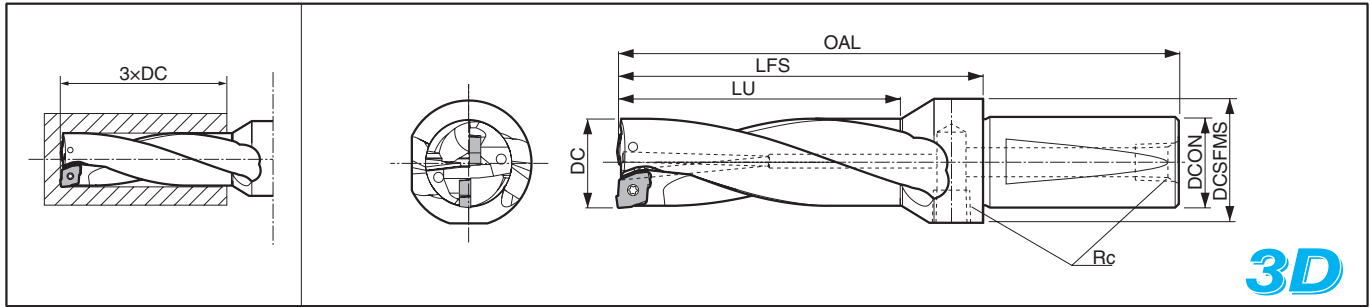
· Hole Dia. Tolerance (2D type)

DC	Hole Dia. Tolerance (mm)
φ13~φ26.5	+0.20 -0.10
φ27~φ40	+0.25 -0.15
φ41~φ59	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

MagicDrill DRZ

DRZ (Drilling Depth : 3 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)								Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55	
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc	Clamp Screw		Wrench FT DT	Plug			
S20 -DRZ1339-05 -DRZ135405-05 -DRZ1442-05 -DRZ145435-05 -DRZ1545-05 -DRZ155465-05	●	2	13	108	65	39	20	27	Rc1/8		+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU	
	●		13.5	108	65	40.5										+0.5
	●		14	112	69	42										+0.5
	●		14.5	112	69	43.5										+0.5
	●		15	115	72	45										+0.5
S25 -DRZ1648-06 -DRZ165495-06 -DRZ1751-06 -DRZ175525-06 -DRZ1854-06 -DRZ185555-06 -DRZ1957-06 -DRZ195585-06 -DRZ2060-06 -DRZ205615-06 -DRZ2163-06 -DRZ215645-08 -DRZ2266-08 -DRZ225675-08 -DRZ2369-08 -DRZ235705-08 -DRZ2472-08 -DRZ245735-08 -DRZ2575-08 -DRZ255765-08 -DRZ2678-08 -DRZ265795-08	●	2	16	131	77	48	25	32	Rc1/8		+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU	
	●		16.5	131	77	49.5										+0.9
	●		17	133	79	51										+0.8
	●		17.5	133	79	52.5										+0.7
	●		18	136	82	54										+0.6
	●		18.5	136	82	55.5										+0.6
	●		19	139	85	57										+0.5
	●		19.5	139	85	58.5										+0.5
	●		20	143	89	60										+0.5
	●		20.5	146	92	61.5										+0.3
	●		21	146	92	63										+0.2
	●		21.5	147	93	64.5										+1.8
	●		22	147	93	66										+1.6
●	22.5	147	93	67.5	+1.4											
●	23	150	96	69	+1.3											
●	23.5	150	96	70.5	+1.2											
●	24	152	98	72	+1.1											
●	24.5	152	98	73.5	+0.9											
●	25	155	101	75	+0.8											
●	25.5	155	101	76.5	+0.7											
●	26	158	104	78	+0.6											
●	26.5	158	104	79.5	+0.5											
S32 -DRZ2781-10 -DRZ275825-10 -DRZ2884-10 -DRZ285855-10 -DRZ2987-10 -DRZ295885-10 -DRZ3090-10 -DRZ305915-10 -DRZ3193-10 -DRZ315945-10 -DRZ3296-10 -DRZ325975-10 -DRZ3399-12 -DRZ34102-12 -DRZ35105-12 -DRZ36108-12 -DRZ37111-12 -DRZ38114-12 -DRZ39117-12 -DRZ40120-12	●	2	27	173	114	81	32	42	Rc1/4		+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP	
	●		27.5	173	114	82.5										+2.3
	●		28	176	117	84										+2.2
	●		28.5	176	117	85.5										+2.1
	●		29	179	120	87										+2.0
	●		29.5	179	120	88.5										+1.8
	●		30	181	122	90										+1.7
	●		30.5	181	122	91.5										+1.5
	●		31	183	124	93										+1.5
	●		31.5	183	124	94.5										+1.3
	●		32	187	128	96										+1.2
	●		32.5	187	128	97.5										+1.0
	●		33	193	134	99										+2.9
	●		34	197	138	102										+2.7
	●		35	199	140	105										+2.4
●	36	203	144	108	+2.2											
●	37	205	146	111	+1.9											
●	38	208	149	114	+1.7											
●	39	211	152	117	+1.4											
●	40	212	153	120	+1.2											




· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K67

Trouble shooting ● K50

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55							
			DC	OAL	LFS	LU	DCON	DCSFMS		Rc	Clamp Screw	Wrench		Plug						
																				
S40 -DRZ3399-12	●	2	33	203	134	99	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP						
-DRZ34102-12	●		34	207	138	102									+2.7					
-DRZ35105-12	●		35	209	140	105										+2.4				
-DRZ36108-12	●		36	213	144	108											+2.2			
-DRZ37111-12	●		37	215	146	111												+1.9		
-DRZ38114-12	●		38	218	149	114													+1.7	
-DRZ39117-12	●		39	221	152	117														+1.4
-DRZ40120-12	●		40	222	153	120														
-DRZ41123-15	●	2	41	224	155	123	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP						
-DRZ42126-15	●		42	227	158	126									+3.7					
-DRZ43129-15	●		43	230	161	129										+3.5				
-DRZ44132-15	●		44	233	164	132											+3.2			
-DRZ45135-15	●		45	234	165	135												+3.0		
-DRZ46138-15	●		46	241	172	138													+2.7	
-DRZ47141-15	●		47	245	176	141		60							+2.5					
-DRZ48144-15	●		48	248	179	144										+2.2				
-DRZ49147-15	●		49	250	181	147											+2.0			
-DRZ50150-15	●		50	251	182	150												+1.7		
-DRZ51153-15	●		51	254	185	153													+1.2	
-DRZ52156-15	●		52	257	188	156														+1.0
-DRZ53159-15	●	53	260	191	159	+0.7														
-DRZ54162-20	●	2	54	266	197	162	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608						
-DRZ55165-20	●		55	269	200	165									+4.7					
-DRZ56168-20	●		56	272	203	168										+4.4				
-DRZ57171-20	●		57	275	206	171											+4.1			
-DRZ58174-20	●		58	278	209	174												+3.8		
-DRZ59177-20	●		59	281	212	177													+3.5	

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K67
Trouble shooting ● K54

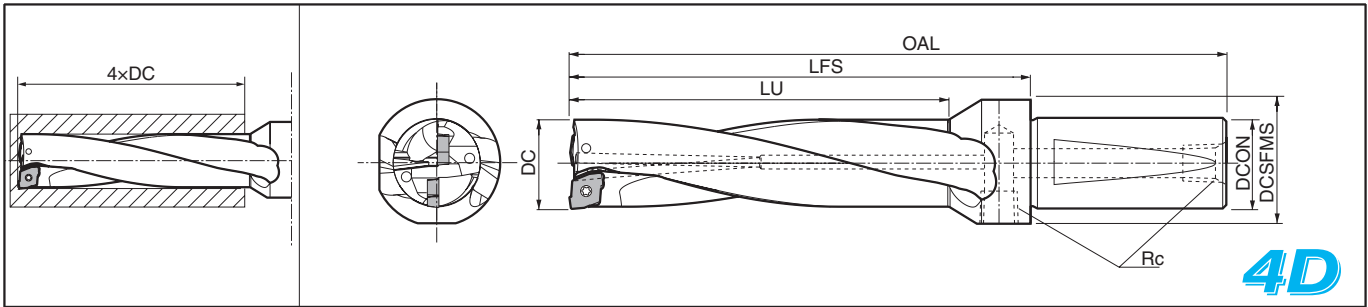
·Hole Dia. Tolerance (3D type)

DC	Hole Dia. Tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

MagicDrill DRZ

DRZ (Drilling Depth : 4 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55	
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc		Clamp Screw	Wrench FT DT	Plug		
S20 -DRZ1352-05 -DRZ135540-05 -DRZ1456-05 -DRZ145580-05 -DRZ1560-05 -DRZ155620-05	●	2	13	121	78	52	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU	
	●		13.5	121	78	54									+0.5
	●		14	126	83	56									+0.5
	●		14.5	126	83	58									+0.5
	●		15	130	87	60									+0.5
●	15.5	130	87	62	+0.5										
S25 -DRZ1664-06 -DRZ165660-06 -DRZ1768-06 -DRZ175700-06 -DRZ1872-06 -DRZ185740-06 -DRZ1976-06 -DRZ195780-06 -DRZ2080-06 -DRZ205820-06 -DRZ2184-06 -DRZ215860-08 -DRZ2288-08 -DRZ225900-08 -DRZ2392-08 -DRZ235940-08 -DRZ2496-08 -DRZ245980-08 -DRZ25100-08 -DRZ2551020-08 -DRZ26104-08 -DRZ2651060-08	●	2	16	147	93	64	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU	
	●		16.5	147	93	66									+0.9
	●		17	149	95	68									+0.8
	●		17.5	149	95	70									+0.7
	●		18	153	99	72									+0.6
	●		18.5	153	99	74									+0.6
	●		19	157	103	76									+0.5
	●		19.5	157	103	78									+0.5
	●		20	156	102	80									+0.5
	●		20.5	161	107	82									+0.3
	●		21	161	107	84									+0.2
	●		21.5	169	115	86									+1.8
●	22	169	115	88	+1.6										
●	22.5	169	115	90	+1.4										
●	23	173	119	92	+1.3										
●	23.5	173	119	94	+1.2										
●	24	176	122	96	+1.1										
●	24.5	176	122	98	+0.9										
●	25	180	126	100	+0.8										
●	25.5	180	126	102	+0.7										
●	26	184	130	104	+0.6										
●	26.5	184	130	106	+0.5										
S32 -DRZ27108-10 -DRZ2751100-10 -DRZ28112-10 -DRZ2851140-10 -DRZ29116-10 -DRZ2951180-10 -DRZ30120-10 -DRZ3051220-10 -DRZ31124-10 -DRZ3151260-10 -DRZ32128-10 -DRZ3251300-10 -DRZ33132-12 -DRZ34136-12 -DRZ35140-12 -DRZ36144-12 -DRZ37148-12 -DRZ38152-12 -DRZ39156-12 -DRZ40160-12	●	2	27	200	141	108	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP	
	●		27.5	200	141	110									+2.3
	●		28	204	145	112									+2.2
	●		28.5	204	145	114									+2.1
	●		29	208	149	116									+2.0
	●		29.5	208	149	118									+1.8
	●		30	211	152	120									+1.7
	●		30.5	211	152	122									+1.5
	●		31	214	155	124									+1.5
	●		31.5	214	155	126									+1.3
	●		32	219	160	128									+1.2
	●		32.5	219	160	130									+1.0
	●		33	226	167	132									+2.9
	●		34	231	172	136									+2.7
	●		35	234	175	140									+2.4
●	36	239	180	144	+2.2										
●	37	242	183	148	+1.9										
●	38	246	187	152	+1.7										
●	39	250	191	156	+1.4										
●	40	252	193	160	+1.2										
●	33	226	167	132	+2.9										
●	34	231	172	136	+2.7										
●	35	234	175	140	+2.4										
●	36	239	180	144	+2.2										
●	37	242	183	148	+1.9										
●	38	246	187	152	+1.7										
●	39	250	191	156	+1.4										
●	40	252	193	160	+1.2										




· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K67

Trouble shooting ● K54

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55		
			DC	OAL	LFS	LU	DCON	DCSFMS		Rc	Clamp Screw	Wrench		Plug	
															
S40 -DRZ33132-12	●	2	33	236	167	132	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP	
-DRZ34136-12	●		34	241	172	136									+2.7
-DRZ35140-12	●		35	244	175	140									+2.4
-DRZ36144-12	●		36	249	180	144									+2.2
-DRZ37148-12	●		37	252	183	148									+1.9
-DRZ38152-12	●		38	256	187	152									+1.7
-DRZ39156-12	●		39	260	191	156									+1.4
-DRZ40160-12	●		40	262	193	160									+1.2
-DRZ41164-15	●	2	41	265	196	164	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP	
-DRZ42168-15	●		42	269	200	168									+3.7
-DRZ43172-15	●		43	273	204	172									+3.5
-DRZ44176-15	●		44	277	208	176									+3.2
-DRZ45180-15	●		45	279	210	180									+3.0
-DRZ46184-15	●		46	287	218	184		+2.7							
-DRZ47188-15	●		47	292	223	188		+2.5							
-DRZ48192-15	●		48	296	227	192		+2.2							
-DRZ49196-15	●		49	300	231	196		+2.0							
-DRZ50200-15	●		50	301	232	200		+1.7							

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K67
Trouble shooting ● K54

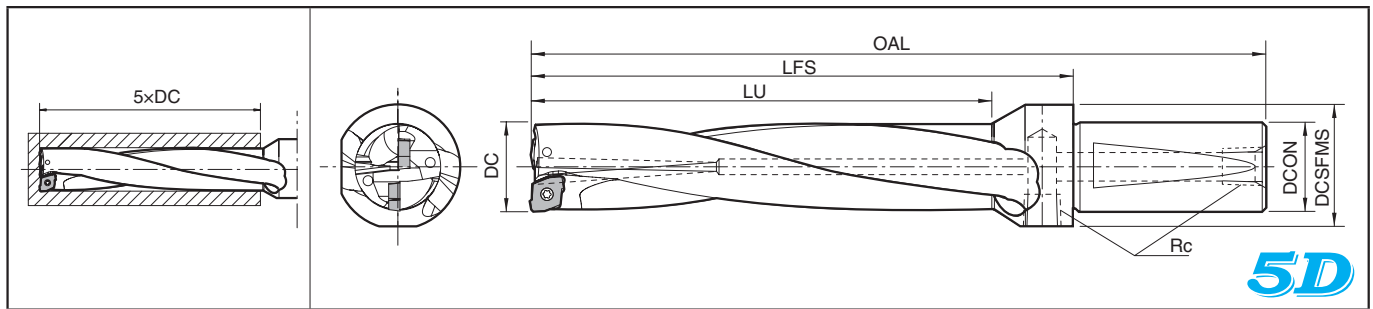
·Hole Dia. Tolerance (4D type)

DC	Hole Dia. Tolerance (mm)
ø13~ø26.5	+0.25 -0.10
ø27~ø40	+0.30 -0.15
ø41~ø50	+0.35 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

MagicDrill DRZ

DRZ (Drilling Depth : 5 x DC)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K55																													
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc		Clamp Screw	Wrench	Plug																														
S32 -DRZ27135-10 -DRZ28140-10 -DRZ29145-10 -DRZ30150-10 -DRZ31155-10 -DRZ32160-10	● ● ● ● ● ●	2	27	227	168	135	32	Rc1/4	+2.5 +2.2 +2.0 +1.7 +1.5 +1.2	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP																														
S40 -DRZ33165-12 -DRZ34170-12 -DRZ35175-12 -DRZ36180-12 -DRZ37185-12 -DRZ38190-12 -DRZ39195-12 -DRZ40200-12	● ● ● ● ● ● ● ●	2	33	269	200	165								40	55	Rc1/4	+2.9 +2.7 +2.4 +2.2 +1.9 +1.7 +1.4 +1.2	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP																						
-DRZ41205-15 -DRZ42210-15 -DRZ43215-15 -DRZ44220-15 -DRZ45225-15 -DRZ46230-15 -DRZ47235-15 -DRZ48240-15 -DRZ49245-15 -DRZ50250-15	● ● ● ● ● ● ● ● ● ●	2	41	306	237	205																40	55	Rc1/4	+4.0 +3.7 +3.5 +3.2 +3.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP														
			42	311	242	210																								60	Rc1/4	+2.7 +2.5 +2.2 +2.0 +1.7											
			43	316	247	215																																					
			44	321	252	220																																					
			45	324	255	225																																					
			46	333	264	230																																					
			47	339	270	235																																					
			48	344	275	240																																					
			49	349	280	245																																					
			50	351	282	250																																					

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K67
Trouble shooting ● K54

·Hole Dia. Tolerance (5D type)

DC	Hole Dia. Tolerance (mm)
ø27~ø40	+0.35 -0.15
ø41~ø50	+0.40 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

K

Drilling

DRA

DRC

DRV

DRS

DRZ

DRX

DRW

Fine
Micro

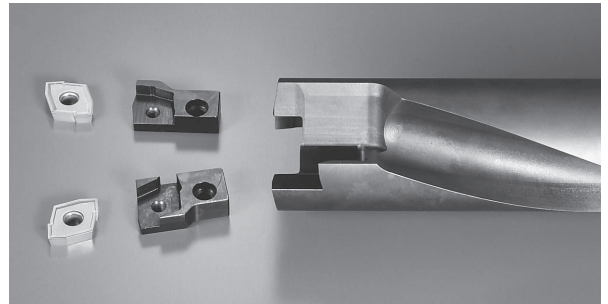
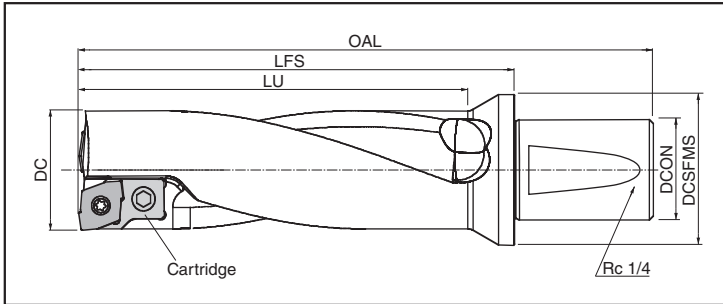
● : Std. Item

MagicDrill DRZ

MagicDrill for Large Dia. (ø60 or over)

● MagicDrill for large diameters (ø60 or over) are available as Custom Orders.
(Ask your regional sales staff for details such as drill dia. / shank type, etc.)

● DRZ-CR (Cartridge type)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts				Applicable Inserts ➔ K55	
			DC	OAL	LFS	LU	DCON	DCSFMS		Cartridge		Clamp Screw	Wrench		
										For outer edge	For inner edge				
S50 -DRZ60180-20CR	MTO	2	60	286	217	195	50	75	+3.0	DR20CR-OUT (1pc)	DR20CR-IN (1pc)	SB-60120TR	DT-25	ZCMT200608	
-DRZ65195-20CR	MTO	2	65	296	227	206									+1.5
-DRZ70210-20CR	MTO	2	70	308	239	220									
-DRZ75225-12CR	MTO	4	75	330	261	225	50	80	Offset N.A.	DR12CR-OUT (2pcs)	DR12CR-IN (2pcs)	SB-5085TR	DT-20	ZCMT12T306 ZCMT12T304SP	
-DRZ80240-12CR	MTO	4	80	340	271	240									

· Clamp screws for cartridges are included in toolholders : HH6X12 for DR20CR and HH4X12 for DR12CR.

Recommended Cutting Conditions ➔ K67

Insert Grades
Turnable
Indexable Inserts
CNC & PCO Tools
External
Small Parts
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DRZ Hole Bottom Shape (Common for 2 x DC, 3 x DC, 4 x DC, 5 x DC) (mm)

DC	A	B	C	DC	A	B	C	DC	A	B	C
13.0	2.1	4.4	0.4	21.5	3.1	7.7	0.6	33.0	5.7	10.8	0.8
13.5		4.7		22.0		7.9		34.0		11.3	
14.0		4.9		22.5		8.2		35.0		11.8	
14.5		5.2	23.0	8.4		36.0		12.3			
15.0		5.4	23.5	8.7		37.0		12.8			
15.5		5.7	24.0	8.9		38.0		13.3			
16.0	2.7	5.3	0.5	24.5	4.0	9.2	0.7	39.0	6.5	13.8	0.9
16.5		5.6		25.0		9.4		40.0		14.3	
17.0		5.8		25.5		9.7		41.0		14.0	
17.5		6.1	26.0	9.9		42.0		14.5			
18.0		6.3	26.5	10.2		43.0		15.0			
18.5		6.6	27.0	9.5		44.0		15.5			
19.0	6.8	27.5	9.8	45.0	16.0						
19.5	7.1	28.0	10.0	46.0	16.5						
20.0	7.3	28.5	10.3	47.0	17.0						
20.5	7.6	29.0	10.5	48.0	17.5						
21.0	7.8	29.5	10.8	49.0	18.0						
		30.0	11.0	50.0	18.5						
		30.5	11.3	51.0	19.0						
		31.0	11.5	52.0	19.5						
		31.5	11.8	53.0	20.0						
		32.0	12.0	54.0	18.5						
		32.5	12.3	55.0	19.0						
				56.0	19.5						
				57.0	20.0						
				58.0	20.5						
				59.0	21.0						

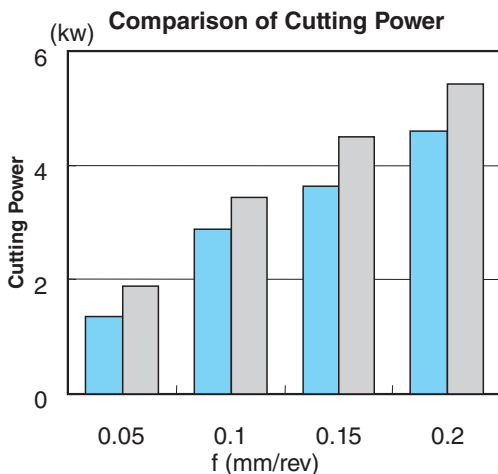
* Above is numeric guideline.
(Varies within ±0.1mm depending on workpiece materials and cutting conditions)

Cutting Power

ø20 Cutting Power Comparison

■ MagicDrill DRZ
■ Competitor A

Vc=100m/min, (n=1,600min⁻¹)
 ø20 Indexable Drill
 SCM415 Wet (Internal coolant)



Case Studies

MagicDrill Dia.	ø16	ø27		ø50	
Machine	Competitor A	Competitor B	Competitor C	Competitor D	
Machine Power	AC 5.5/7.5 kW	AC 5.5/7.5 kW	AC 5.5/7.5 kW	AC 7.5/11 kW	
Cutting Conditions	Vc (mm/min)	150	130 150	120	110 157
	f (mm/rev)	0.06	0.13	0.1	0.08 0.12
Workpiece Material	SS400	SCM435	SCM415	SS400	
Required Power (Load Meter Values)	60%	80% 95%	100%	60%	100%
Remarks	-	-	With conventional drill, limited up to ø40	-	

Formula for calculating required power (approximate value) **R43**

K

Drilling

- DRA
- DRC
- DRV
- DRS
- DRZ
- DRX
- DRW
- Fine Micro

Recommended Cutting Conditions

◆ DRZ Recommended Cutting Conditions (Coolant)





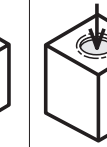
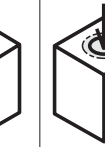

Workpiece Material	Recommended Insert Grades(Cutting Speed Vc: m/min)						Drill Dia. DC (mm)	Drill type (Drilling Depth)			
	MEGACOAT			PVD Coated Carbide	Carbide			2D	3D	4D	5D
	PR1230	PR1225	PR1210	PR660	PR830	KW10					
	Standard SP SU	Standard SP SU	Standard	Standard SP SU	Standard SP	Standard SP	f (mm/rev)				
Low Carbon Steel	★	☆	-	☆	☆	-	φ13~φ15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
	120~220	120~220	-	120~220	120~240	-	φ16~φ26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
							φ27~φ50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
							φ50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Carbon Steel	★	☆	-	☆	☆	-	φ13~φ15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
	100~160	100~160	-	100~160	120~180	-	φ16~φ26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
							φ27~φ50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
							φ50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Alloy Steel	★	☆	-	☆	☆	-	φ13~φ15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
	80~140	80~140	-	80~140	100~160	-	φ16~φ26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
							φ27~φ50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
							φ50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Mold Steel	★	☆	-	☆	☆	-	φ13~φ15.5	0.04~0.08	0.04~0.08	0.03~0.07	-
	70~130	70~130	-	70~130	80~150	-	φ16~φ26.5	0.08~0.12	0.06~0.10	0.06~0.08	-
							φ27~φ50	0.08~0.15	0.06~0.12	0.06~0.10	0.04~0.07
							φ50~	0.08~0.15	0.06~0.12	0.06~0.10	-
Stainless Steel (Austenitic related)	☆	★	-	☆	☆	-	φ13~φ15.5	0.04~0.08	0.04~0.08	0.03~0.06	-
	60~120	60~120	-	60~120	70~140	-	φ16~φ26.5	0.06~0.10	0.06~0.10	0.04~0.08	-
							φ27~φ50	0.06~0.10	0.06~0.12	0.04~0.10	0.04~0.07
							φ50~	0.06~0.12	0.06~0.12	0.04~0.10	-
Gray Cast Iron	-	-	★	-	-	☆	φ13~φ15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
			100~150	-	-	100~120	φ16~φ26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
							φ27~φ50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
							φ50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Nodular Cast Iron	-	-	★	-	-	☆	φ13~φ15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
			80~120	-	-	80~100	φ16~φ26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
							φ27~φ50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
							φ50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Non-ferrous Metals	-	-	-	-	-	★	φ13~φ15.5	0.06~0.12	0.06~0.10	0.04~0.08	-
						200~600	φ16~φ26.5	0.08~0.18	0.08~0.15	0.06~0.15	-
							φ27~φ50	0.08~0.20	0.08~0.18	0.06~0.15	0.05~0.10
							φ50~	0.08~0.20	0.08~0.18	0.06~0.15	-
Titanium Alloys	-	-	-	-	-	★	φ13~φ15.5	0.05~0.06	0.05~0.06	0.05~0.06	-
						40~70	φ16~φ26.5	0.05~0.07	0.05~0.07	0.05~0.07	-
							φ27~φ50	0.06~0.08	0.06~0.08	0.06~0.08	0.04~0.05
							φ50~	0.06~0.08	0.06~0.08	0.06~0.08	-

· Apply a sufficient amount of coolant.

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Cutting Conditions by Application

[Workpiece Material: S50C]

Applications	Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole	Stacked Plates
Shape of Workpiece							
DRZ	Cutting Speed Vc (m/min)	120	120	120	120	120	Not Available
	f (mm/rev)	0.1	0.05	0.05	0.05	Concave Surface 0.05 Continuous Part 0.1	*0.05 Not Available
Coolant (Internal)	Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* Cutting width (Torus-shaped part) when drilling cored hole. (Same as when using a Boring Bar).

Drill type	2D ~ 3D	4D ~ 5D
Cutting width (Torus-shaped part)	0.1 x DC or less	Not recommended

e.g.) In case of drilling using DRZ3090-10 (3 x DC)

(1) For milling, pre-drilled hole should be cut φ24 (φ30 - 0.1 x 30 x 2) or bigger

(2) For turning, ap should be set ap = 3mm (0.1 x 30) or under

◆ Max. Depth for Drilling with External Coolant

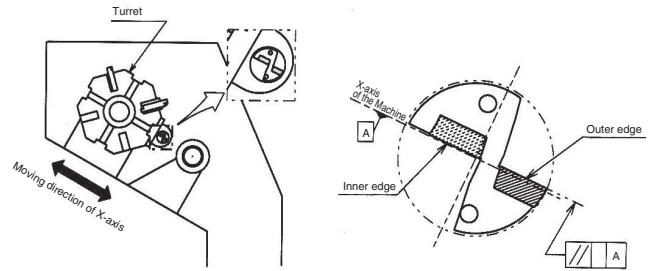
In case of using external coolant system, chip evacuation will be bad.

Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

Insert Grades
Turnable Inserts
CNC & PC Tools
External
Small Parts
Boring
Grooving
Cut-off
Threading
Drilling
Solid Tools
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Lathe Installation

- (1) The top face of the outer insert should be parallel to the X-axis to allow for offset machining. Drill diameter can be changed by moving X-axis.
- (2) It is recommended to set the outer insert as shown in Fig. 1 with the outer insert facing the operator. (It is also possible to use it by setting it in 180° reverse position) If the lathe has two turrets, when installing the drill into the lower turret, the outer insert should be set to face the operator. (It is also possible to use it by setting at 180° reverse position)



(Fig. 1) Installed to the Lathe

Drill Diameter Adjustment

1. Drill Diameter Adjustment

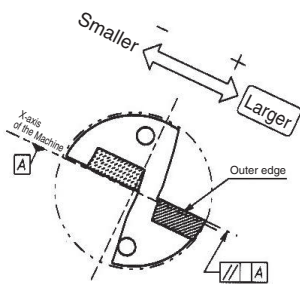
- (1) Drill diameter is adjusted by moving X-axis. The moving direction of the X-axis depends on the position of the toolholder.
- (2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig. 2, Fig. 3) For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction. (This movement of the axis is called "Offset") However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm or more. Otherwise, the toolholder will interfere with the drilled hole. (Fig. 4) e.g.) In case of using $\varnothing 20$ drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter

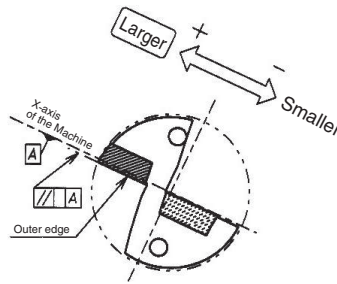
For the maximum limit of the drill diameter, refer to "Max. Offset (Radial)" in the Toolholder Dimensions table.

(The figure in the table shows how much it is possible the offset the drill in the radial direction.)

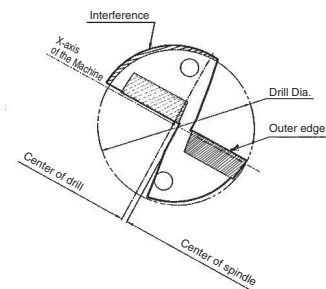
e.g.) In case of using $\varnothing 20$ drill, it is possible to make a hole up to $\varnothing 21$ since "Max. Offset (Radial)" is +0.5mm.



(Fig. 2) Outer insert Facing Up



(Fig. 3) Outer insert Facing Down



(Fig. 4) Excessive offset (For Smaller Hole Diameter)

Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig. 1, it will be set around 0.2mm below the Center of Spindle. (Fig. 5)

This is the normal position of the center height and the drill is designed to be handled in this condition.

However, in case that the turret of the lathe is out of the center of Spindle, sometimes the inner insert may be set above the center, or excessively below the center. For stable drilling, it is essential to check the Center Height carefully.

2. How to Check the Center Height

For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig. 6)

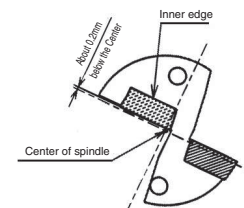
If the center height is in the normal position,

a core about 0.5mm in diameter, will remain after machining.

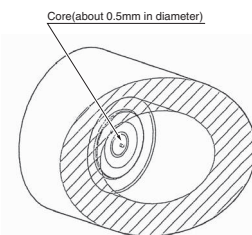
In the following cases, it is necessary to adjust the Center Height.

- No core remains
- Core diameter is more than 1mm

* The drilled hole for verification purposes needs to be machined at approximately 10mm in depth and at a feed rate of 0.1mm/rev or lower.



(Fig. 5) Front View of the Drill

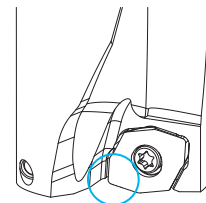


(Fig. 6) Center Core

3. Center Height Adjustment

a) No core remains / Core with Excessively Small Diameter

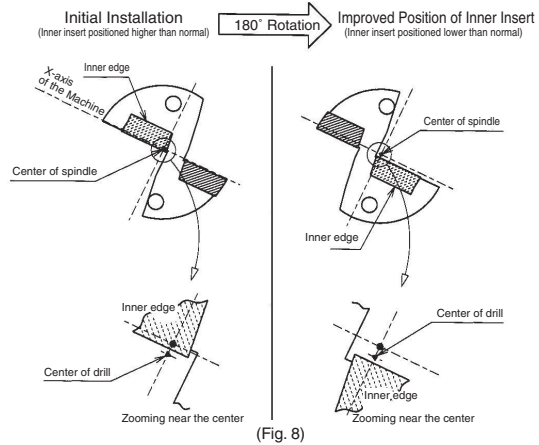
This happens when the Inner Insert is set above the Center Height. In this case, adjustment is necessary since insert breakage will be probable at the center of the drill. (Fig. 7)



(Fig. 7) Insert breakage near the center of the drill

[How to Adjust]

(1) Install the drill rotated 180°. Most problems will be solved by this method. (Fig. 8)

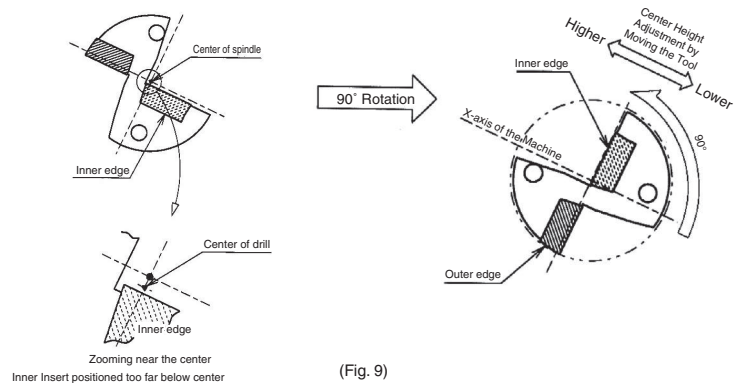


(Fig. 8)

[How to Adjust]

(2) If the core diameter becomes too large after the above adjustment, install the drill by rotating 90° counter-clockwise as shown in Fig. 9 (outer insert is positioned lower) and adjust the center height by moving the tool in the X-axis direction. (However, this makes it impossible to adjust the drill diameter)

Caution : In case of installing the drill in the reverse direction (outer insert is positioned above), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole. The best solution is to readjust the center position of the turret itself.



(Fig. 9)

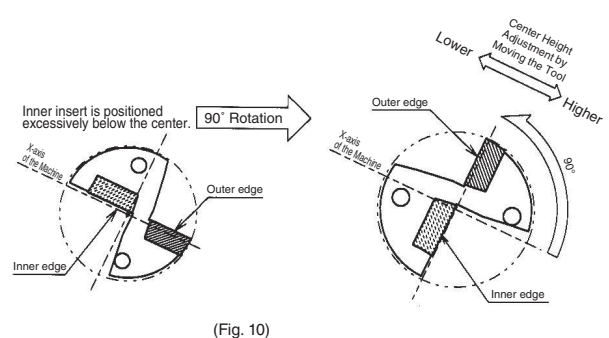
b) Core with excessively large diameter (More than 1mm)

This occurs when the inner insert is excessively below the center. This condition causes poor chip evacuation and an adjustment is required.

[How to Adjust]

Install the drill rotating 90° as shown in Fig. 10. (outer insert is positioned on the upper side) and adjust the center height by moving tool in the X-axis direction. (However, this makes it impossible to adjust the drill diameter)

Caution : In case of installing the drill in the opposite direction (outer insert is positioned lower), the hole diameter will become smaller, which may cause the drill body to interfere with the drilled hole. The best solution is to readjust the center position of the turret itself.










(Fig. 10)

Insert Grades	A
Turning Indexable Inserts	B
CBN & PCD Tools	C
External	D
Small Parts	E
Boring	F
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MagicDrill DRX

Applicable Inserts (for DRX)

Classification of usage ● : 1st Choice ○ : 2nd Choice (Steel; non heat treated)	P	Carbon Steel / Alloy Steel	●	○		
		Mold Steel	●			
	M	Stainless Steel	○	●		
	K	Cast Iron			●	
	N	Non-ferrous Metals				●

Insert	Description	Dimension (mm)					Angle		MEGACOAT			Carbide	Applicable Toolholders See Page	
		INSL	S	D1	W1	RE	AN	ANN	PR1230	PR1225	PR1210	GW15		
 For outer edge / General Purpose	ZXMT 030203GM-E	6.4	2.30	2.4	4.8	0.3	7°	10°	●		●		K72 K74 K76 K78	
 For inner edge / General Purpose	ZXMT 030203GM-I	5.9	2.30	2.4	4.8	0.3	7°	10°	●	●	●	●		
 For outer edge / Tough Edge	ZXMT 030203GH-E	6.4	2.30	2.4	4.8	0.3	7°	10°	●					
 For outer edge / Low Cutting Force	ZXMT 030203SM-E	6.4	2.30	2.4	4.8	0.3	7°	10°		●		●		
 General Purpose	ZXMT 040203GM	6.2	2.60	2.4	5.1	0.3	13°	10°	●		●			K72 K73 K74 K75 K76 K77 K78
	05T203GM	7.3	2.76	2.5	5.5	0.3		7°	●		●			
	06T204GM	8.6	2.89	2.8	6.4	0.4		●		●				
	070305GM	10.2	3.24	3.0	8.0	0.5		●		●				
	09T306GM	12.2	4.03	3.6	9.6	0.6		●		●				
	11T306GM	14.5	4.06	4.6	11.6	0.6		●		●				
	140408GM	18.0	4.88	5.7	14.4	0.8		●		●				
 Tough Edge	ZXMT 040203GH	6.2	2.60	2.4	5.1	0.3	13°	10°	●					
	05T203GH	7.3	2.76	2.5	5.5	0.3		7°	●					
	06T204GH	8.6	2.89	2.8	6.4	0.4		●						
	070305GH	10.2	3.24	3.0	8.0	0.5		●						
	09T306GH	12.2	4.03	3.6	9.6	0.6		●						
	11T306GH	14.5	4.06	4.6	11.6	0.6		●						
	140408GH	18.0	4.88	5.7	14.4	0.8		●						
 Low Cutting Force / for Deeper Drilling	ZXMT 040203SM	6.2	2.60	2.4	5.1	0.3	13°	10°		●		●		
	05T203SM	7.3	2.76	2.5	5.5	0.3		7°		●		●		
	06T204SM	8.6	2.89	2.8	6.4	0.4			●			●		
	070305SM	10.2	3.24	3.0	8.0	0.5			●			●		
	09T306SM	12.2	4.03	3.6	9.6	0.6			●			●		
	11T306SM	14.5	4.06	4.6	11.6	0.6			●			●		
	140408SM	18.0	4.88	5.7	14.4	0.8			●			●		
170608SM	22.1	6.58	6.8	17.7	0.8		●			●				

● : Std. Item

Suitable Chipbreaker (ZXMT)

Workpiece Material	Insert Type	ZXMT															
		Chipbreaker				GM				GH				SM			
	Drilling Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D
Low Carbon Steel		☆	☆	☆	☆									★	★	★	★
Carbon Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	★
Alloy Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	★
Mold Steel		☆	☆	☆	☆	★	★	★	★								
Stainless Steel														★	★	★	★
Cast Iron		★	★	★	★												
Aluminum Alloys														★	★	★	★
Brass														★	★	★	★
Titanium Alloys														★	★	★	★

★ : 1st Choice ☆ : 2nd Choice

How to select ZXMT03

ZXMT03 (Drill Dia. : $\phi 12 \sim \phi 13$)

- For outer edge, please select "-E" insert from three different chipbreakers for each application.
- For inner edge, please select "-I" insert (GM chipbreaker only).

-Outer edge

ZXMT030203 □□-E
GM-E GH-E SM-E

-Inner edge

ZXMT030203GM-I
GM-I

Features of the Chipbreaker

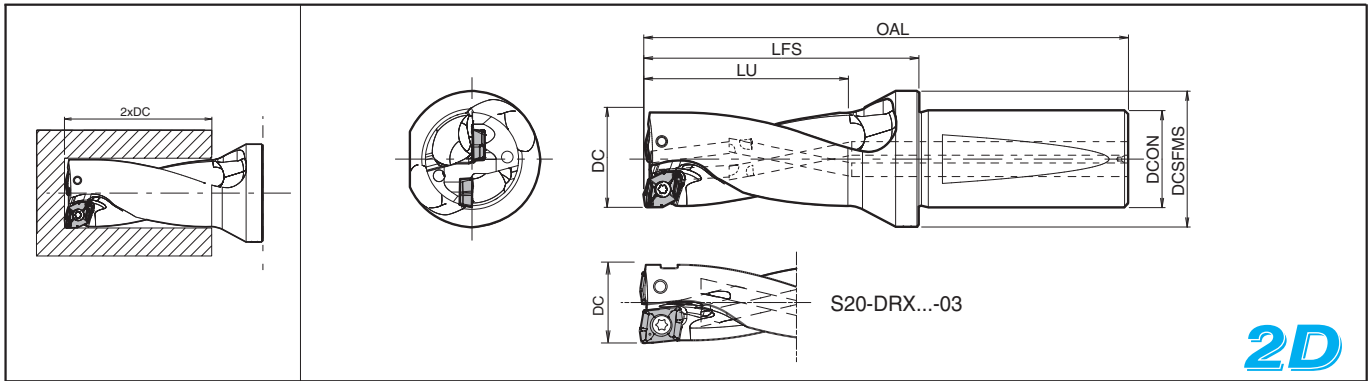
Chipbreaker		GM (General purpose)	GH (Tough Edge)	SM (Low Cutting Force / for Deeper Drilling)
Insert				
Features		1st. recommendation for carbon steel and alloy steel, 1st. recommendation for cast iron. Good balance of sharp cutting and cutting edge strength	1st. recommendation for interrupted drilling and hard materials. Cutting edge strength oriented design. Middle to high feed rates of steel drilling, GM Chipbreaker alternative.	Suitable for sticky materials such as stainless steel and low carbon steel. Low cutting force, prevents chattering. For low to medium feed rates of steel.
Outer edge side	 Wide chipbreaker	Chipbreaker Cross-section 	Chipbreaker Cross-section 	Chipbreaker Cross-section
	Chips from Outer edge			
Inner edge side	 Flat chipbreaker	Chipbreaker Cross-section 	Chipbreaker Cross-section 	Chipbreaker Cross-section
	Chips from Inner edge			
Workpiece Material		S50C	S50C	SUS304

Indication of tool life of MagicDrill



How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	<ul style="list-style-type: none"> When an insert is new, the toolholder is slightly bent to the side during drilling (therefore, the drill diameter is slightly bigger during drilling). Once drilling is finished, the toolholder will return back to normal size. No tool marks will appear on the finished surface (This depends on workpiece and cutting condition. Slight tool mark might appear if cutting force on external dia. is too low.) When an insert is at the end of its tool life, gradually the external corner part gets worn out. Also the toolholder does not bend slightly outwards, and it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position. When taking off a toolholder under this condition, the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause and it must be exchange.
Checking the surface on the outlet side	If insert wear progresses, the burrs of penetrated hole entrance becomes bigger. This is a clear indication that the tool must be exchanged.
Variation of drilling noise	Light drilling noise at the beginning turns to brady noise which contains vibration noise.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

MagicDrill DRX

DRX (Drilling Depth : 2 x DC)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K70
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw 	Wrench 	
S20 -DRX120M-2-03	○	2	12	88	45	24	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-2-03	○		12.5	89	46	25			+0.4			
-DRX130M-2-03	○		13	90	47	26			+0.3			
-DRX135M-2-04	○	2	13.5	91	48	27	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-2-04	○		14	92	49	28			+0.4			
-DRX145M-2-04	○		14.5	93	50	29			+0.3			
-DRX150M-2-04	○		15	94	51	30			+0.2			
S25 -DRX155M-2-05	○	2	15.5	109	55	31	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-2-05	○		16	110	56	32			+0.7			
-DRX165M-2-05	○		16.5	111	57	33			+0.5			
-DRX170M-2-05	○		17	112	58	34			+0.4			
-DRX175M-2-05	○		17.5	113	59	35			+0.3			
-DRX180M-2-05	○	18	114	60	36	+0.2						
-DRX185M-2-06	○	2	18.5	112	58	37	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-2-06	○		19	113	59	38			+0.8			
-DRX195M-2-06	○		19.5	114	60	39			+0.7			
-DRX200M-2-06	○		20	115	61	40			+0.5			
-DRX205M-2-06	○		20.5	116	62	41			+0.4			
-DRX210M-2-06	○		21	117	63	42			+0.3			
-DRX215M-2-06	○		21.5	118	64	43			+0.2			
-DRX220M-2-07	○	2	22	119	65	44	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-2-07	○		22.5	120	66	45			+1.0			
-DRX230M-2-07	○		23	121	67	46			+0.9			
-DRX235M-2-07	○		23.5	122	68	47			+0.8			
-DRX240M-2-07	○		24	123	69	48			+0.7			
-DRX245M-2-07	○		24.5	124	70	49			+0.5			
-DRX250M-2-07	○		25	125	71	50			+0.4			
-DRX255M-2-07	○		25.5	126	72	51			+0.3			
-DRX260M-2-07	○		26	127	73	52			+0.2			
S32 -DRX270M-2-09	○		2	27	136	77			54			
-DRX280M-2-09	○	28		138	79	56	+1.3					
-DRX290M-2-09	○	29		140	81	58	+1.1					
-DRX300M-2-09	○	30		142	83	60	+0.8					
-DRX310M-2-09	○	31		144	85	62	+0.6					

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K80
Trouble shooting ● K54

○ : Check Availability

K

Drilling

DRA

DRC

DRV

DRS


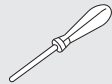
DRZ

DRX

DRW

Fine
Micro

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K70
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
												
S40 -DRX320M-2-11	○	2	32	169	100	64					ZXMT11T306□□	
-DRX330M-2-11	○		33	171	102	66						
-DRX340M-2-11	○		34	173	104	68						
-DRX350M-2-11	○		35	175	106	70	40	54	SB-4085TR	DTM-15		
-DRX360M-2-11	○		36	177	108	72						
-DRX370M-2-11	○		37	179	110	74						
-DRX380M-2-11	○		38	181	112	76						
-DRX390M-2-14	○		39	179	110	78						
-DRX400M-2-14	●	2	40	181	112	80		54			ZXMT140408□□	
-DRX410M-2-14	●		41	183	114	82						
-DRX420M-2-14	●		42	185	116	84						
-DRX430M-2-14	●		43	187	118	86	40		SB-5090TR	DT-20		
-DRX440M-2-14	●		44	189	120	88						
-DRX450M-2-14	●		45	191	122	90		59				
-DRX460M-2-14	●		46	193	124	92						
-DRX470M-2-14	●		47	195	126	94						
-DRX480M-2-17	●	2	48	194	125	96					ZXMT170608□□	
-DRX490M-2-17	●		49	196	127	98						
-DRX500M-2-17	●		50	198	129	100						
-DRX510M-2-17	●		51	200	131	102		59				
-DRX520M-2-17	●		52	202	133	104						
-DRX530M-2-17	●		53	204	135	106						
-DRX540M-2-17	●		54	206	137	108	40		SB-60120TR	DT-25		
-DRX550M-2-17	●		55	208	139	110						
-DRX560M-2-17	●	2	56	210	141	112					ZXMT170608□□	
-DRX570M-2-17	●		57	212	143	114		64				
-DRX580M-2-17	●		58	214	145	116						
-DRX590M-2-17	●		59	216	147	118						
-DRX600M-2-17	●		60	218	149	120						

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K80
Trouble shooting ● K54

· Hole Dia. Tolerance (2D type)

DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.20 -0.10
ø27~ø38	+0.25 -0.15
ø39~ø60	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

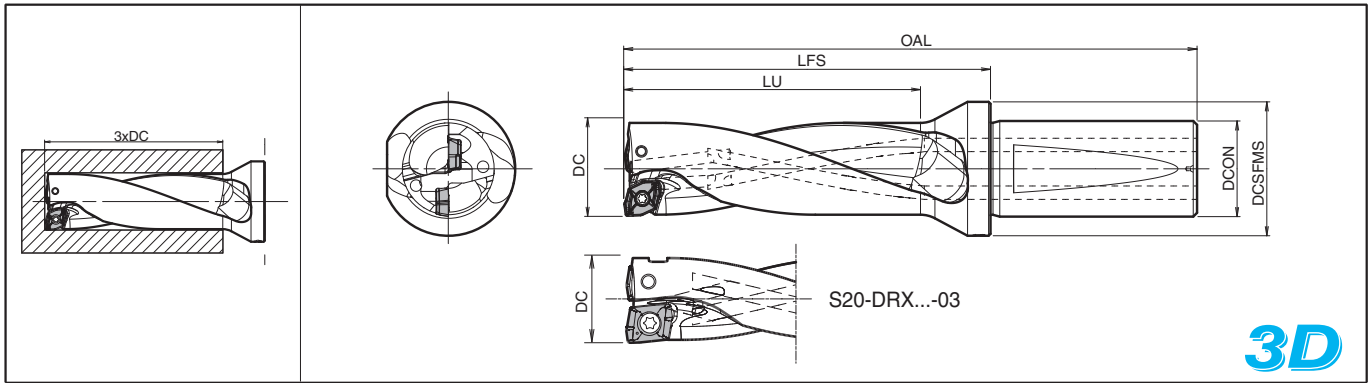
● : Std. Item
○ : Check Availability

Insert Grades
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
T

Turning
Indexable Inserts
CNC & PCO Tools
External
Small Parts
Machining
Boring
Grooving
Cut-off
Threading
Drilling
Solid Tools
Milling
Tools for Turning Mill
Spare Parts
Technical Information
Index

MagicDrill DRX

DRX (Drilling Depth : 3 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K70
			DC	OAL	LFS	LU	DCON	DCSFMS	Clamp Screw 		Wrench 		
S20 -DRX120M-3-03 -DRX125M-3-03 -DRX130M-3-03 -DRX135M-3-04 -DRX140M-3-04 -DRX145M-3-04 -DRX150M-3-04	○○○	2	12	100	57	36			+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I	
			12.5	102	59	37.5	20	27	+0.4				
			13	103	60	39			+0.3				
			13.5	105	62	40.5			+0.5				
			14	106	63	42	20	27	+0.4				
			14.5	108	65	43.5			+0.3				
15	109	66	45			+0.2							
S25 -DRX155M-3-05 -DRX160M-3-05 -DRX165M-3-05 -DRX170M-3-05 -DRX175M-3-05 -DRX180M-3-05	○○○	2	15.5	124	70	46.5			+0.8	SB-2045TR	DTM-6	ZXMT05T203□□	
			16	126	72	48	25	32	+0.7				
			16.5	127	73	49.5			+0.5				
			17	129	75	51			+0.4				
			17.5	130	76	52.5			+0.3				
			18	132	78	54			+0.2				
S25 -DRX185M-3-06 -DRX190M-3-06 -DRX195M-3-06 -DRX200M-3-06 -DRX205M-3-06 -DRX210M-3-06 -DRX215M-3-06	○○○	2	18.5	131	77	55.5			+0.9	SB-2250TR	DTM-7	ZXMT06T204□□	
			19	132	78	57	25	32	+0.8				
			19.5	134	80	58.5			+0.7				
			20	135	81	60			+0.5				
			20.5	137	83	61.5			+0.4				
			21	138	84	63			+0.3				
21.5	140	86	64.5			+0.2							
S25 -DRX220M-3-07 -DRX225M-3-07 -DRX230M-3-07 -DRX235M-3-07 -DRX240M-3-07 -DRX245M-3-07 -DRX250M-3-07 -DRX255M-3-07 -DRX260M-3-07	○○○	2	22	141	87	66			+1.2	SB-2570TR	DTM-8	ZXMT070305□□	
			22.5	142	88	67.5	25	33	+1.0				
			23	144	90	69			+0.9				
			23.5	145	91	70.5			+0.8				
			24	147	93	72			+0.7				
			24.5	148	94	73.5			+0.5				
25	150	96	75			+0.4							
25.5	151	97	76.5			+0.3							
26	153	99	78			+0.2							
S32 -DRX265M-3-09 -DRX270M-3-09 -DRX275M-3-09 -DRX280M-3-09 -DRX285M-3-09 -DRX290M-3-09 -DRX295M-3-09 -DRX300M-3-09 -DRX305M-3-09 -DRX310M-3-09 -DRX315M-3-09	○○○	2	26.5	161	102	79.5			+1.7	SB-3080TR	DTM-10	ZXMT09T306□□	
			27	163	104	81		41	+1.6				
			27.5	164	105	82.5			+1.5				
			28	166	107	84			+1.3				
			28.5	167	108	85.5			+1.2				
			29	169	110	87	32		+1.1				
29.5	170	111	88.5			+1.1							
30	172	113	90			+0.8							
30.5	173	114	91.5		43	+0.7							
31	175	116	93			+0.6							
31.5	176	117	94.5			+0.5							
S40 -DRX320M-3-11 -DRX330M-3-11 -DRX340M-3-11 -DRX350M-3-11 -DRX360M-3-11 -DRX370M-3-11 -DRX380M-3-11	○○○	2	32	201	132	96			+2.2	SB-4085TR	DTM-15	ZXMT11T306□□	
			33	204	135	99		54	+1.9				
			34	207	138	102			+1.7				
			35	210	141	105	40		+1.4				
			36	213	144	108			+1.2				
			37	216	147	111			+0.9				
38	219	150	114			+0.7							

· When offset drilling, reduce feed rate to 0.08mm/rev or less.

· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K80

Trouble shooting ● K54

○ : Check Availability

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K70							
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench								
S40 -DRX390M-3-14	○	2	39	218	149	117	40	54	+2.8	SB-5090TR	DT-20	ZXMT140408□□							
-DRX400M-3-14	●		40	221	152	120							59	+2.5					
-DRX410M-3-14	●		41	224	155	123									+2.3				
-DRX420M-3-14	●		42	227	158	126										+2.0			
-DRX430M-3-14	●		43	230	161	129											+1.8		
-DRX440M-3-14	●		44	233	164	132	+1.5												
-DRX450M-3-14	●		45	236	167	135		+1.3											
-DRX460M-3-14	●		46	239	170	138												+1.0	
-DRX470M-3-14	●		47	242	173	141													+0.8
-DRX480M-3-17	●		48	242	173	144													
-DRX490M-3-17	●	49	245	176	147	+3.5													
-DRX500M-3-17	●	50	248	179	150				+3.3										
-DRX510M-3-17	●	51	251	182	153					+3.0									
-DRX520M-3-17	●	52	254	185	156						+2.8								
-DRX530M-3-17	●	53	257	188	159							+2.5							
-DRX540M-3-17	●	54	260	191	162		+2.3												
-DRX550M-3-17	●	55	263	194	165			+2.0											
-DRX560M-3-17	●	56	266	197	168								+1.8						
-DRX570M-3-17	●	57	269	200	171									+1.5					
-DRX580M-3-17	●	58	272	203	174										+1.3				
-DRX590M-3-17	●	59	275	206	177	+1.0													
-DRX600M-3-17	●	60	278	209	180				+0.8										

- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K80
Trouble shooting ● K54

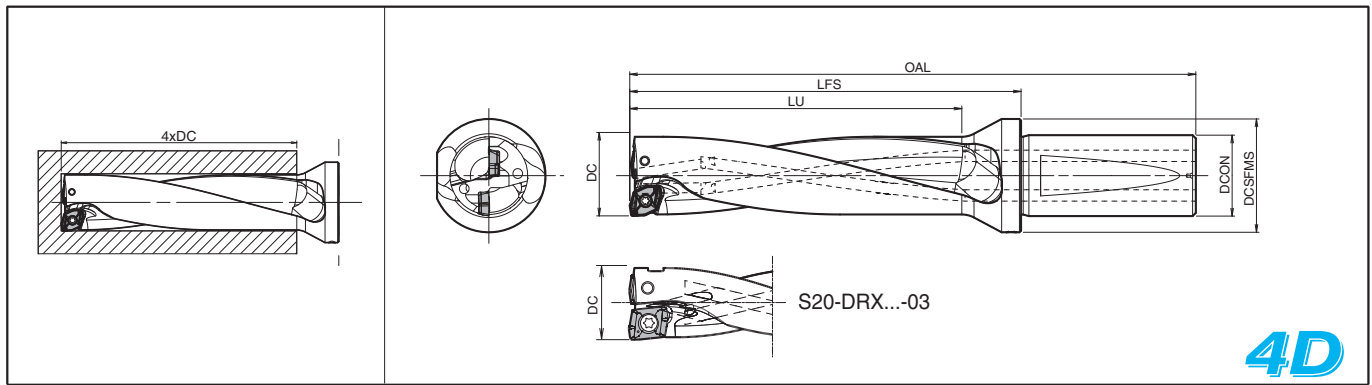
· Hole Dia. Tolerance (3D type)

DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.20 -0.10
ø26.5~ø38	+0.25 -0.15
ø39~ø60	+0.30 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

MagicDrill DRX

DRX (Drilling Depth : 4 x DC)



Toolholder Dimensions


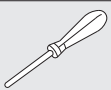
Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts K70
			DC	OAL	LFS	LU	DCON	DCSFMS	Clamp Screw		Wrench		
S20 -DRX120M-4-03	○	2	12	112	69	48	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I	
-DRX125M-4-03	○		12.5	114	71	50							+0.4
-DRX130M-4-03	○		13	116	73	52							+0.3
-DRX135M-4-04	○	2	13.5	118	75	54	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□	
-DRX140M-4-04	○		14	120	77	56							+0.4
-DRX145M-4-04	○		14.5	122	79	58							+0.3
-DRX150M-4-04	○		15	124	81	60							+0.2
S25 -DRX155M-4-05	○	2	15.5	140	86	62	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□	
-DRX160M-4-05	○		16	142	88	64							+0.7
-DRX165M-4-05	○		16.5	144	90	66							+0.5
-DRX170M-4-05	○		17	146	92	68							+0.4
-DRX175M-4-05	○		17.5	148	94	70							+0.3
-DRX180M-4-05	○		18	150	96	72							+0.2
-DRX185M-4-06	○	2	18.5	149	95	74	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□	
-DRX190M-4-06	○		19	151	97	76							+0.8
-DRX195M-4-06	○		19.5	153	99	78							+0.7
-DRX200M-4-06	○		20	155	101	80							+0.5
-DRX205M-4-06	○		20.5	157	103	82							+0.4
-DRX210M-4-06	○		21	159	105	84							+0.3
-DRX215M-4-06	○		21.5	161	107	86							+0.2
-DRX220M-4-07	○		2	22	163	109							88
-DRX225M-4-07	○	22.5		165	111	90	+1.0						
-DRX230M-4-07	○	23		167	113	92	+0.9						
-DRX235M-4-07	○	23.5		169	115	94	+0.8						
-DRX240M-4-07	○	24		171	117	96	+0.7						
-DRX245M-4-07	○	24.5		173	119	98	+0.5						
-DRX250M-4-07	○	25		175	121	100	+0.4						
-DRX255M-4-07	○	25.5		177	123	102	+0.3						
-DRX260M-4-07	○	26		179	125	104	+0.2						
S32 -DRX270M-4-09	○	2		27	190	131	108	32	41	+1.6	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX280M-4-09	○		28	194	135	112	+1.3						
-DRX290M-4-09	○		29	198	139	116	+1.1						
-DRX300M-4-09	○		30	202	143	120	+0.8						
-DRX310M-4-09	○		31	206	147	124	+0.6						
S40 -DRX320M-4-11	○	2	32	223	154	128	40	49	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□	
-DRX330M-4-11	○		33	227	158	132							+1.9
-DRX340M-4-11	○		34	231	162	136							+1.7
-DRX350M-4-11	○		35	235	166	140							+1.4
-DRX360M-4-11	○		36	239	170	144							+1.2
-DRX370M-4-11	○		37	243	174	148							+0.9
-DRX380M-4-11	○	38	247	178	152	+0.7							

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions **K80**
Trouble shooting **K54**

○ : Check Availability

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K70	
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench		
													
S40 -DRX390M-4-14	○	2	39	257	188	156	40	54	+2.8	SB-5090TR	DT-20	ZXMT140408□□	
-DRX400M-4-14	●		40	261	192	160							
-DRX410M-4-14	●		41	265	196	164							
-DRX420M-4-14	●		42	269	200	168							
-DRX430M-4-14	●		43	273	204	172	59	59					+1.8
-DRX440M-4-14	●		44	277	208	176							
-DRX450M-4-14	●		45	281	212	180							
-DRX460M-4-14	●		46	285	216	184							
-DRX470M-4-14	●		47	289	220	188							
S50 -DRX480M-4-17	●	2	48	290	221	192	50	59	+3.8	SB-60120TR	DT-25	ZXMT170608□□	
-DRX490M-4-17	●		49	294	225	196							
-DRX500M-4-17	●		50	298	229	200							
-DRX510M-4-17	●		51	302	233	204							
-DRX520M-4-17	●		52	306	237	208							
-DRX530M-4-17	●		53	310	241	212							64
-DRX540M-4-17	●		54	314	245	216							
-DRX550M-4-17	●		55	318	249	220							
-DRX560M-4-17	●		56	322	253	224							
-DRX570M-4-17	●		57	326	257	228							
-DRX580M-4-17	●		58	330	261	232							
-DRX590M-4-17	●		59	334	265	236							
-DRX600M-4-17	●		60	338	269	240							

· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K80
Trouble shooting ● K54

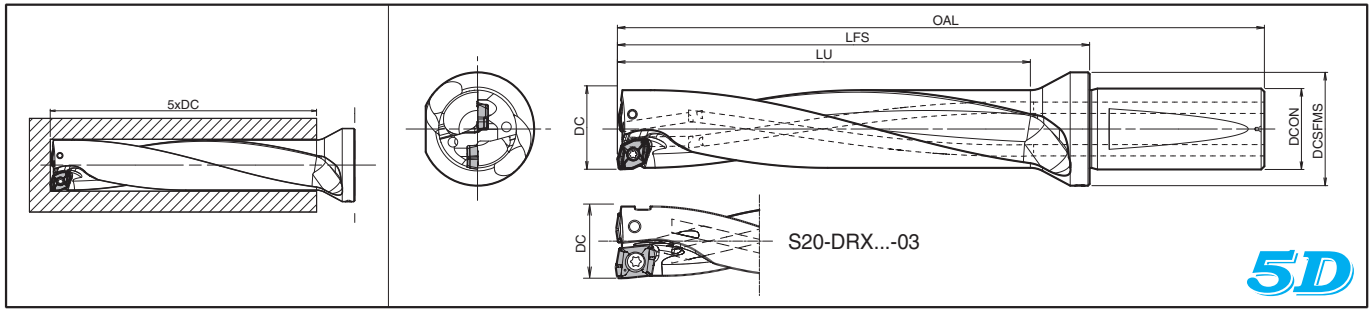
· Hole Dia. Tolerance (4D type)

DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.25 -0.10
ø27~ø38	+0.30 -0.15
ø39~ø60	+0.35 -0.20

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

MagicDrill DRX

DRX (Drilling Depth : 5 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K70
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
S20 -DRX120M-5-03 -DRX130M-5-03 -DRX140M-5-04 -DRX150M-5-04	○	2	12	120	77	60	20	27	+0.5 +0.3	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
S25 -DRX160M-5-05 -DRX170M-5-05 -DRX180M-5-05 -DRX190M-5-06 -DRX200M-5-06 -DRX210M-5-06 -DRX220M-5-07 -DRX230M-5-07 -DRX240M-5-07 -DRX250M-5-07 -DRX260M-5-07	○	2	16	158	104	80	25	32	+0.7 +0.4 +0.2	SB-2045TR	DTM-6	ZXMT05T203□□
S32 -DRX270M-5-09 -DRX280M-5-09 -DRX290M-5-09 -DRX300M-5-09 -DRX310M-5-09	○	2	27	217	158	135	32	41	+1.6 +1.3 +1.1 +0.8 +0.6	SB-3080TR	DTM-10	ZXMT09T306□□
S40 -DRX320M-5-11 -DRX330M-5-11 -DRX340M-5-11 -DRX350M-5-11 -DRX360M-5-11 -DRX370M-5-11 -DRX380M-5-11 -DRX390M-5-14 -DRX400M-5-14 -DRX410M-5-14 -DRX420M-5-14 -DRX430M-5-14 -DRX440M-5-14 -DRX450M-5-14 -DRX460M-5-14 -DRX470M-5-14	○	2	32	255	186	160	40	49	+2.2 +1.9 +1.7 +1.4 +1.2 +0.9 +0.7	SB-4085TR	DTM-15	ZXMT11T306□□
S50 -DRX480M-5-17 -DRX490M-5-17 -DRX500M-5-17 -DRX510M-5-17 -DRX520M-5-17 -DRX530M-5-17 -DRX540M-5-17 -DRX550M-5-17 -DRX560M-5-17 -DRX570M-5-17 -DRX580M-5-17 -DRX590M-5-17 -DRX600M-5-17	●	2	48	338	269	240	50	59	+3.8 +3.5 +3.3 +3.0 +2.8 +2.5 +2.3 +2.0 +1.8 +1.5 +1.3 +1.0 +0.8	SB-60120TR	DT-25	ZXMT170608□□

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page K51 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K80
Trouble shooting ● K54

Hole Dia. Tolerance (5D type)

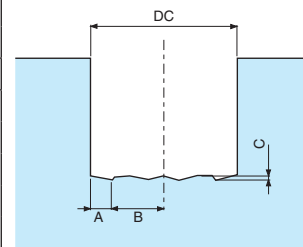
DC	Hole Dia. Tolerance(mm)	DC	Hole Dia. Tolerance(mm)	DC	Hole Dia. Tolerance(mm)
φ12~φ26	+0.30 -0.10	φ27~φ38	+0.35 -0.15	φ39~φ60	+0.40 -0.20

* The values shown in the left are only estimation.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

● : Std. Item
○ : Check Availability

◆ MagicDrill DRX Hole Bottom Shape (mm)

DC	A	B	C	DC	A	B	C	DC	A	B	C		
12.0	1.8	4.2	0.5	24.5	3.2	9.1	0.8	39.0	5.8	13.7	1.5		
12.5		4.5		25.0		9.3	0.9	40.0		14.2			
13.0		4.7		25.5		9.6		41.0		14.7			
13.5	2	4.8	0.5	26.0	3.9	9.8	1.0	42.0	7.1	15.2	1.6		
14.0		5.0		26.5		9.4		43.0		15.7			
14.5		5.3		27.0		9.6		44.0		16.2			
15.0		5.5		27.5		9.9		45.0		16.7			
15.5		5.8		28.0		10.1		46.0		17.2			
16.0		6.0		28.5		10.4		47.0		17.7			
16.5		6.3		29.0		10.6		48.0		16.9			
17.0	6.5	29.5	10.9	49.0	17.4								
17.5	6.8	30.0	11.1	50.0	17.9								
18.0	2.4	7.0	0.7	30.5	4.7	11.4	1.1	51.0	7.1	18.4	1.7		
18.5		6.9	0.7	31.0		11.6	1.1	52.0		18.9			
19.0		7.1		31.5		11.9		53.0		19.4			
19.5		7.4		32.0		11.3		54.0		19.9			
20.0		7.6		33.0		11.8		55.0		20.4			
20.5		7.9		34.0		12.3		56.0		20.9			
21.0		8.1		35.0		12.8		57.0		21.4			
21.5	8.4	36.0		13.3	58.0	21.9							
22.0	3.2	7.8	0.8	37.0	4.7	13.8	1.2	59.0	7.1	22.4	2.0		
22.5		8.1		38.0		14.3	1.3	60.0		22.9		2.1	
23.0		8.3		Common for 2D, 3D, 4D, 5D * Above is numeric guideline. (Varies within ±0.1mm depending on workpiece materials and cutting conditions)						23.4		2.1	
23.5		8.6								23.9		2.1	
24.0	8.8	24.4	2.1										



Insert Grades	A
Turning	B
Indexable Inserts	C
CBN & PCD Tools	D
External	E
Small Parts	F
Machining	G
Boring	H
Grooving	I
Cut-off	J
Threading	K
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Solid Tools	M
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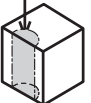




◆ DRX Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				Drill Dia. DC (mm)	Toolholder type								
	MEGACOAT			Carbide		2D~3D			4D			5D		
	PR1230	PR1225	PR1210	GW15		f (mm/rev)								
	GM GH	SM	GM	SM		GM	GH	SM	GM	GH	SM	GM	GH	SM
Low Carbon Steel	☆ 120-240	★ 120-240			φ12-φ15	0.06-0.10	0.06-0.10	0.04-0.10	0.05-0.08	0.05-0.08	0.04-0.08	0.04-0.07	0.04-0.07	0.04-0.08
			φ15.5-φ18	0.06-0.12	0.06-0.12	0.06-0.12	0.05-0.10	0.05-0.10	0.05-0.10	0.05-0.08	0.05-0.08	0.04-0.09		
			φ18.5-φ26	0.08-0.14	0.08-0.14	0.06-0.14	0.06-0.12	0.08-0.12	0.05-0.12	0.06-0.10	0.06-0.10	0.04-0.10		
			φ26.5-φ60	0.08-0.14	0.08-0.14	0.06-0.14	0.06-0.12	0.08-0.12	0.05-0.12	0.06-0.10	0.06-0.10	0.04-0.10		
Carbon Steel	★ 100-180	☆ 100-180			φ12-φ15	0.04-0.14	0.04-0.14	0.04-0.10	0.04-0.10	0.04-0.10	0.04-0.08	0.04-0.08	0.04-0.08	0.04-0.07
			φ15.5-φ18	0.06-0.16	0.06-0.16	0.06-0.12	0.05-0.12	0.05-0.12	0.05-0.10	0.05-0.10	0.05-0.10	0.05-0.08		
			φ18.5-φ26	0.08-0.20	0.08-0.20	0.06-0.14	0.07-0.16	0.07-0.16	0.05-0.12	0.06-0.12	0.06-0.12	0.05-0.10		
			φ26.5-φ60	0.08-0.20	0.08-0.20	0.06-0.14	0.07-0.16	0.07-0.16	0.05-0.12	0.06-0.12	0.06-0.12	0.05-0.10		
Alloy Steel	★ 100-160	☆ 100-160			φ12-φ15	0.04-0.14	0.04-0.14	0.04-0.10	0.04-0.10	0.04-0.10	0.04-0.08	0.04-0.08	0.04-0.08	0.04-0.07
			φ15.5-φ18	0.06-0.16	0.06-0.16	0.06-0.12	0.05-0.12	0.05-0.12	0.05-0.10	0.05-0.10	0.05-0.10	0.05-0.08		
			φ18.5-φ26	0.08-0.20	0.08-0.20	0.06-0.14	0.07-0.16	0.07-0.16	0.05-0.12	0.06-0.12	0.06-0.12	0.05-0.10		
			φ26.5-φ60	0.08-0.20	0.08-0.20	0.06-0.14	0.07-0.16	0.07-0.16	0.05-0.12	0.06-0.12	0.06-0.12	0.05-0.10		
Mold Steel	★ 80-150	☆ 80-150			φ12-φ15	0.04-0.08	0.04-0.08	0.04-0.08	0.04-0.07	0.04-0.07	0.04-0.07	0.04-0.06	0.04-0.06	0.04-0.06
			φ15.5-φ18	0.06-0.12	0.06-0.12	0.06-0.10	0.05-0.10	0.05-0.10	0.05-0.08	0.04-0.08	0.04-0.08	0.04-0.07		
			φ18.5-φ26	0.08-0.15	0.08-0.15	0.06-0.12	0.06-0.12	0.06-0.12	0.06-0.10	0.05-0.10	0.05-0.10	0.05-0.08		
			φ26.5-φ60	0.08-0.15	0.08-0.15	0.06-0.12	0.06-0.12	0.06-0.12	0.06-0.10	0.05-0.10	0.05-0.10	0.05-0.08		
Stainless Steel (Austenitic related)	☆ 70-140	★ 70-140			φ12-φ15	0.06-0.10	0.06-0.10	0.04-0.10	0.05-0.08	0.05-0.08	0.04-0.08	0.04-0.07	0.04-0.08	0.04-0.08
			φ15.5-φ18	0.06-0.10	0.06-0.10	0.06-0.12	0.05-0.08	0.05-0.08	0.05-0.11	0.04-0.07	0.04-0.07	0.04-0.10		
			φ18.5-φ26	0.08-0.12	0.08-0.12	0.06-0.14	0.07-0.10	0.07-0.10	0.06-0.12	0.07-0.10	0.07-0.10	0.06-0.12		
			φ26.5-φ60	0.08-0.12	0.08-0.12	0.06-0.14	0.07-0.10	0.07-0.10	0.06-0.12	0.07-0.10	0.07-0.10	0.06-0.12		
Gray Cast Iron			★ 100-150		φ12-φ15	0.08-0.14	-	-	0.06-0.12	-	-	0.04-0.10	-	-
	φ15.5-φ18	0.08-0.18	-	-	0.08-0.16	-	-	0.06-0.12	-	-	0.06-0.12	-	-	
	φ18.5-φ26	0.08-0.20	-	-	0.08-0.18	-	-	0.06-0.14	-	-	0.06-0.14	-	-	
	φ26.5-φ60	0.08-0.20	-	-	0.08-0.18	-	-	0.06-0.14	-	-	0.06-0.14	-	-	
Nodular Cast Iron			★ 80-120		φ12-φ15	0.08-0.12	-	-	0.06-0.10	-	-	0.04-0.08	-	-
	φ15.5-φ18	0.08-0.16	-	-	0.08-0.14	-	-	0.06-0.10	-	-	0.06-0.10	-	-	
	φ18.5-φ26	0.08-0.18	-	-	0.08-0.16	-	-	0.06-0.12	-	-	0.06-0.12	-	-	
	φ26.5-φ60	0.08-0.18	-	-	0.08-0.16	-	-	0.06-0.12	-	-	0.06-0.12	-	-	
Non-ferrous Metals				★ 200-600	φ12-φ15	-	-	0.06-0.12	-	-	0.05-0.10	-	-	0.04-0.08
	φ15.5-φ18	-	-	0.08-0.14	-	-	0.06-0.12	-	-	0.06-0.12	-	-	0.05-0.10	
	φ18.5-φ26	-	-	0.08-0.16	-	-	0.06-0.14	-	-	0.06-0.14	-	-	0.05-0.12	
	φ26.5-φ60	-	-	0.08-0.20	-	-	0.08-0.16	-	-	0.08-0.16	-	-	0.07-0.14	
Titanium Alloys				★ 40-70	φ12-φ15	-	-	0.05-0.08	-	-	0.04-0.07	-	-	0.04-0.06
	φ15.5-φ18	-	-	0.05-0.08	-	-	0.04-0.07	-	-	0.04-0.07	-	-	0.04-0.06	
	φ18.5-φ26	-	-	0.06-0.10	-	-	0.06-0.08	-	-	0.06-0.08	-	-	0.05-0.07	
	φ26.5-φ60	-	-	0.06-0.10	-	-	0.06-0.08	-	-	0.06-0.08	-	-	0.05-0.07	

Apply a sufficient amount of coolant.

★ : 1st Recommendation ☆ : 2nd Recommendation

■ Cutting Conditions by Application

Applications		Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Cored Hole*	Stacked Plates
Shape of Workpiece								
DRX	Cutting Speed Vc (m/min)	120	120	120	120	120	120	Not Available
	f (mm/rev)	0.1	0.05	0.05	0.05	Concave Surface 0.05 Continuous Part 0.1	0.05	Not Available
Coolant (Internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* Cutting width (Torus-shaped part) when drilling cored hole.

Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	0.1 x DC or less	Corner radius or less	Not recommended

◆ Max. Depth for Drilling with External Coolant

In case of using external coolant system, chip evacuation will be bad.

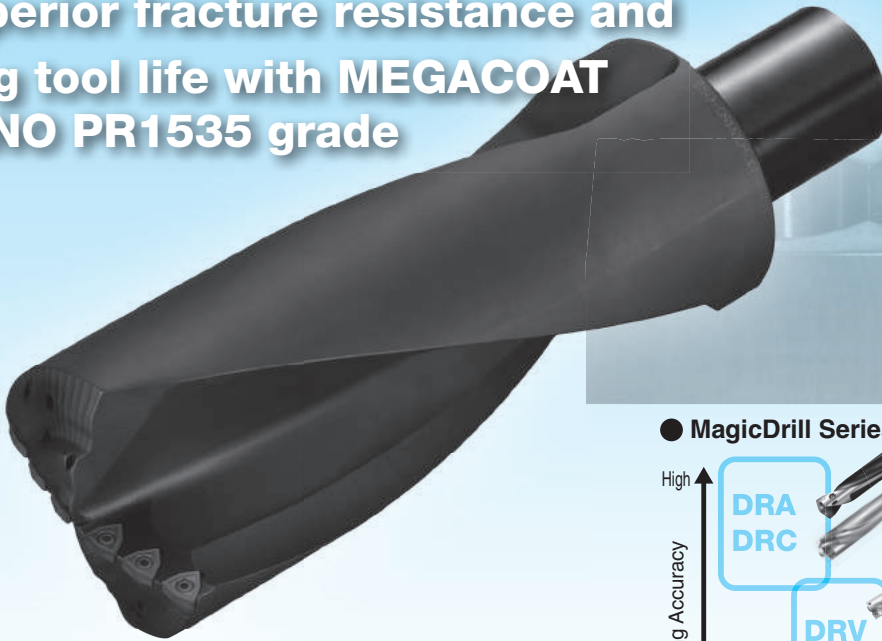
Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

Large Diameter MagicDrill

DRW

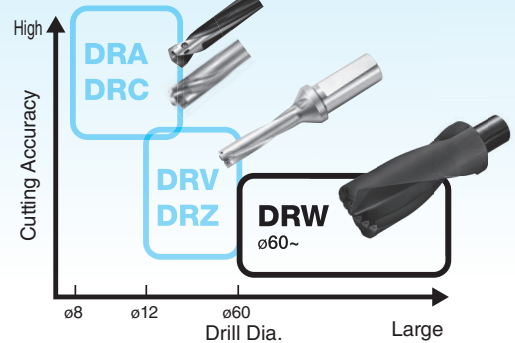
Features

- Sharp cutting
- Enhanced chip evacuation
- Superior fracture resistance and long tool life with MEGACOAT NANO PR1535 grade



Applicable diameter : $\phi 60 \sim \phi 100$
 Drilling Depth : 1D, 2D, 3D
 Use single type of insert.

● MagicDrill Series Application Map

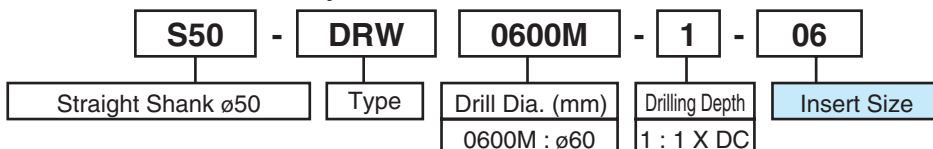


■ Applicable workpiece

Plain Surface	Stacked Plates	Hole Expansion	Slant Surface

* Hole expansion : Overlap amount of through hole must be 0.2 x DC or less.
 Expansion of blind holes is not possible because chips are built up in the next hole and will cause chip biting.

● Toolholder Identification System



Insert Grades	A
Turning Indexable Inserts	B
CBN & PCD Tools	C
External	D
Small Parts Machining	E
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DRW

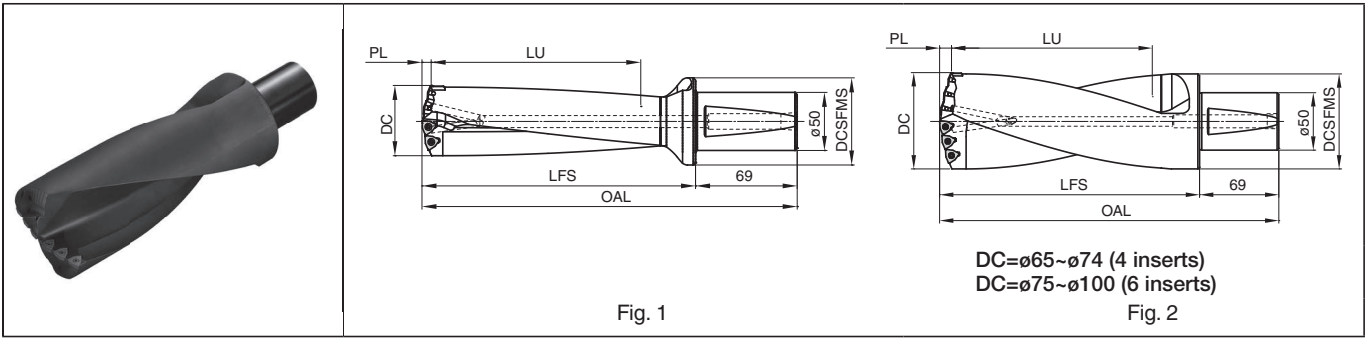


Fig. 1

Fig. 2

● Toolholder Dimensions (Drilling Depth : 1 x DC)

1D

● Toolholder Dimensions (Drilling Depth : 2 x DC)

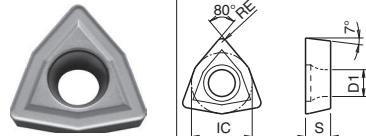
2D

Description	Stock	No. of Inserts	Dimension (mm)						Drawing
			DC	OAL	LFS	LU	PL	DCSFMS	
S50- DRW0600M-1-06	MTO	4	60	175	106	60	7.6	63	Fig. 1
DRW0610M-1-06	MTO		61	176	107	61	7.7	63	
DRW0620M-1-06	MTO		62	178	109	62	7.8	63	
DRW0630M-1-06	MTO		63	179	110	63	7.9	63	
DRW0640M-1-06	MTO		64	182	113	64	8.0	63	
DRW0650M-1-06	MTO		65	184	115	65	8.2	63	
DRW0660M-1-06	MTO		66	185	116	66	8.3	64	
DRW0670M-1-06	MTO		67	187	118	67	8.4	65	
DRW0680M-1-06	MTO		68	189	120	68	8.5	66	Fig. 2
DRW0690M-1-06	MTO		69	190	121	69	8.6	67	
DRW0700M-1-06	MTO		70	192	123	70	8.7	68	
DRW0710M-1-06	MTO		71	193	124	71	8.8	69	
DRW0720M-1-06	MTO		72	195	126	72	9.0	70	
DRW0730M-1-06	MTO		73	198	129	73	9.1	71	
DRW0740M-1-06	MTO		74	199	130	74	9.2	72	
S50- DRW0750M-1-06	MTO		6	75	201	132	75	9.3	
DRW0760M-1-06	MTO	76		203	134	76	9.4	74	
DRW0770M-1-06	MTO	77		204	135	77	9.5	75	
DRW0780M-1-06	MTO	78		206	137	78	9.7	76	
DRW0790M-1-06	MTO	79		207	138	79	9.8	77	
DRW0800M-1-06	MTO	80		207	138	80	9.9	78	
DRW0810M-1-06	MTO	81		208	139	81	9.9	79	
DRW0820M-1-06	MTO	82		210	141	82	9.9	80	
DRW0830M-1-06	MTO	83		210	141	83	9.9	81	
DRW0840M-1-06	MTO	84		210	141	84	9.9	82	
DRW0850M-1-06	MTO	85		211	142	85	10.5	83	
DRW0860M-1-06	MTO	86		213	144	86	10.5	84	
DRW0870M-1-06	MTO	87		215	146	87	10.5	85	
DRW0880M-1-06	MTO	88		216	147	88	10.5	86	
DRW0890M-1-06	MTO	89		218	149	89	10.5	87	
DRW0900M-1-06	MTO	90		219	150	90	11.0	88	
DRW0910M-1-06	MTO	91		220	151	91	11.0	89	
DRW0920M-1-06	MTO	92		222	153	92	11.0	90	
DRW0930M-1-06	MTO	93		223	154	93	11.0	91	
DRW0940M-1-06	MTO	94		225	156	94	11.0	92	
DRW0950M-1-06	MTO	95		226	157	95	11.6	93	
DRW0960M-1-06	MTO	96		228	159	96	11.6	94	
DRW0970M-1-06	MTO	97		228	159	97	11.6	95	
DRW0980M-1-06	MTO	98		230	161	98	11.6	96	
DRW0990M-1-06	MTO	99		231	162	99	11.6	97	
DRW1000M-1-06	MTO	100		232	163	100	12.2	98	

Description	Stock	No. of Inserts	Dimension (mm)						Drawing
			DC	OAL	LFS	LU	PL	DCSFMS	
S50- DRW0600M-2-06	●	4	60	235	166	120	7.6	63	Fig. 1
DRW0610M-2-06	MTO		61	237	168	122	7.7	63	
DRW0620M-2-06	MTO		62	240	171	124	7.8	63	
DRW0630M-2-06	MTO		63	242	173	126	7.9	63	
DRW0640M-2-06	MTO		64	246	177	128	8.0	63	
DRW0650M-2-06	●		65	249	180	130	8.2	63	
DRW0660M-2-06	MTO		66	251	182	132	8.3	64	
DRW0670M-2-06	MTO		67	254	185	134	8.4	65	
DRW0680M-2-06	MTO		68	257	188	136	8.5	66	Fig. 2
DRW0690M-2-06	MTO		69	259	190	138	8.6	67	
DRW0700M-2-06	●		70	262	193	140	8.7	68	
DRW0710M-2-06	MTO		71	264	195	142	8.8	69	
DRW0720M-2-06	MTO		72	267	198	144	9.0	70	
DRW0730M-2-06	MTO		73	271	202	146	9.1	71	
DRW0740M-2-06	●		74	273	204	148	9.2	72	
S50- DRW0750M-2-06	●		6	75	276	207	150	9.3	
DRW0760M-2-06	MTO	76		279	210	152	9.4	74	
DRW0770M-2-06	MTO	77		281	212	154	9.5	75	
DRW0780M-2-06	MTO	78		284	215	156	9.7	76	
DRW0790M-2-06	MTO	79		286	217	158	9.8	77	
DRW0800M-2-06	●	80		287	218	160	9.9	78	
DRW0810M-2-06	MTO	81		289	220	162	9.9	79	
DRW0820M-2-06	MTO	82		292	223	164	9.9	80	
DRW0830M-2-06	MTO	83		293	224	166	9.9	81	
DRW0840M-2-06	MTO	84		294	225	168	9.9	82	
DRW0850M-2-06	●	85		296	227	170	10.5	83	
DRW0860M-2-06	MTO	86		299	230	172	10.5	84	
DRW0870M-2-06	MTO	87		302	233	174	10.5	85	
DRW0880M-2-06	MTO	88		304	235	176	10.5	86	
DRW0890M-2-06	MTO	89		307	238	178	10.5	87	
DRW0900M-2-06	●	90		309	240	180	11.0	88	
DRW0910M-2-06	MTO	91		311	242	182	11.0	89	
DRW0920M-2-06	MTO	92		314	245	184	11.0	90	
DRW0930M-2-06	MTO	93		316	247	186	11.0	91	
DRW0940M-2-06	●	94		319	250	188	11.0	92	
DRW0950M-2-06	●	95		321	252	190	11.6	93	
DRW0960M-2-06	MTO	96		324	255	192	11.6	94	
DRW0970M-2-06	MTO	97		325	256	194	11.6	95	
DRW0980M-2-06	MTO	98		328	259	196	11.6	96	
DRW0990M-2-06	MTO	99		330	261	198	11.6	97	
DRW1000M-2-06	●	100		332	263	200	12.2	98	

● : Std. Item
MTO : Made to order

Applicable Inserts

Insert	Description	Dimension (mm)				MEGACOAT	MEGACOAT NANO	CVD Coated Carbide	Applicable Toolholders
		IC	S	D1	RE	PR1230	PR1535	CA6535	
	WCMT06T308	9.525	3.97	3.7	0.8	●	●	●	S50-DRW...-06
	WCMT050308	7.94	3.18	3.2		●			(Custom-order toolholder)

* WCMT050308 is for custom-order (ø22 or larger).

Toolholder Dimensions (Drilling Depth : 3 x DC)



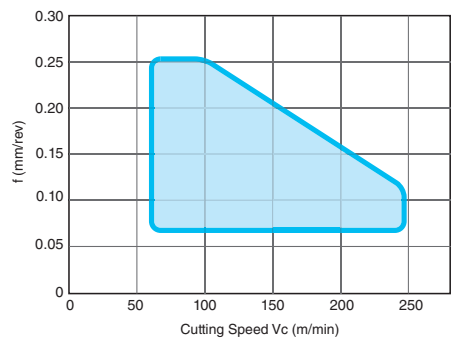
Description	Stock	No. of Inserts	Dimension (mm)						Drawing
			DC	OAL	LFS	LU	PL	DCSPMS	
S50- DRW0600M-3-06	●	4	60	295	226	180	7.6	63	Fig. 1
DRW0610M-3-06	MTO		61	298	229	183	7.7	63	
DRW0620M-3-06	MTO		62	302	233	186	7.8	63	
DRW0630M-3-06	MTO		63	305	236	189	7.9	63	
DRW0640M-3-06	MTO		64	310	241	192	8.0	63	
DRW0650M-3-06	●		65	314	245	195	8.2	63	
DRW0660M-3-06	MTO		66	317	248	198	8.3	64	
DRW0670M-3-06	MTO		67	321	252	201	8.4	65	
DRW0680M-3-06	MTO		68	325	256	204	8.5	66	
DRW0690M-3-06	MTO		69	328	259	207	8.6	67	
DRW0700M-3-06	●		70	332	263	210	8.7	68	
DRW0710M-3-06	MTO		71	335	266	213	8.9	69	
DRW0720M-3-06	MTO		72	339	270	216	9.0	70	
DRW0730M-3-06	MTO		73	344	275	219	9.1	71	
DRW0740M-3-06	●	74	347	278	222	9.2	72		
S50- DRW0750M-3-06	●	6	75	351	282	225	9.3	73	Fig. 2
DRW0760M-3-06	MTO		76	355	286	228	9.4	74	
DRW0770M-3-06	MTO		77	358	289	231	9.5	75	
DRW0780M-3-06	MTO		78	362	293	234	9.7	76	
DRW0790M-3-06	MTO		79	365	296	237	9.8	77	
DRW0800M-3-06	●		80	367	298	240	9.9	78	
DRW0810M-3-06	MTO		81	370	301	243	9.9	79	
DRW0820M-3-06	MTO		82	374	305	246	9.9	80	
DRW0830M-3-06	MTO		83	376	307	249	9.9	81	
DRW0840M-3-06	MTO		84	378	309	252	9.9	82	
DRW0850M-3-06	●		85	381	312	255	10.5	83	
DRW0860M-3-06	MTO		86	385	316	258	10.5	84	
DRW0870M-3-06	MTO		87	389	320	261	10.5	85	
DRW0880M-3-06	MTO		88	392	323	264	10.5	86	
DRW0890M-3-06	MTO		89	396	327	267	10.5	87	
DRW0900M-3-06	●		90	399	330	270	11.0	88	
DRW0910M-3-06	MTO		91	402	333	273	11.0	89	
DRW0920M-3-06	MTO		92	406	337	276	11.0	90	
DRW0930M-3-06	MTO		93	409	340	279	11.0	91	
DRW0940M-3-06	●		94	413	344	282	11.0	92	
DRW0950M-3-06	●		95	416	347	285	11.6	93	
DRW0960M-3-06	MTO		96	420	351	288	11.6	94	
DRW0970M-3-06	MTO		97	422	353	291	11.6	95	
DRW0980M-3-06	MTO		98	426	357	294	11.6	96	
DRW0990M-3-06	MTO		99	429	360	297	11.6	97	
DRW1000M-3-06	●		100	432	363	300	12.2	98	

Recommended Cutting Conditions

Workpiece Material	Cutting Speed Vc (m/min)	f (mm/rev)
Carbon Steel	80~200	0.07~0.25
Alloy Steel	80~160	0.07~0.25
Mold Steel	70~150	0.06~0.20
Gray Cast Iron	100~240	0.07~0.30
Nodular Cast Iron	80~150	0.07~0.25

- Apply enough amount of coolant (internal supply).
- Feed rate should be calculated as single insert.

Application Map (Carbon Steel / Alloy Steel)



Spare Parts

Description	Clamp Screw	Wrench
	S50-DRW...-06	SB-3592TR

Hole Dia. Tolerance

DC	Hole Dia. Tolerance (mm)
ø60~ø100	0~+0.4

* Above is numeric guideline.
It may vary depending on machines / workpieces / clamping status / cutting conditions.

Offset Drilling

Offset for DRW should be 0~+0.15mm in radius (0~+0.3mm in diameter).
Do not set it to a negative value to make the diameter smaller.

● : Std. Item
MTO : Made to order

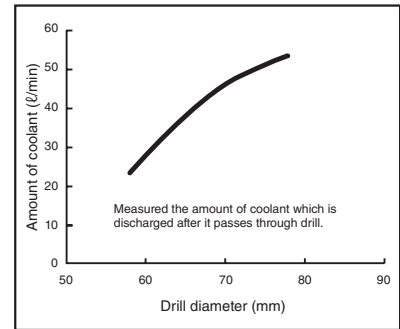
Inserts are sold in 10 piece boxes

Q-1 Is it possible to use external coolant?

A-1

External coolant is not recommended because the amount of chips will be enormous.
Use internal coolant.
See the graph of "Drill diameter and coolant amount".

◆ Drill diameter and coolant amount



Q-2 What level of spindle output is required?

A-2

Higher output is preferable.
What is important is enough torque rather than high spindle rate.
See the examples of required power as below.

Drill Dia.	Workpiece Material	Machine	Cutting Conditions	Spindle Power	*Required Power
ø75 (2D)	SCM415	M/C	Vc=130m/min (n=550min ⁻¹) f=0.12mm/rev (Vf=66mm/min)	22kW	60%
ø85 (2D)	SCM	M/C	Vc=150m/min (n=560min ⁻¹) f=0.1mm/rev (Vf=56mm/min)	30kW	85%
ø94 (2D)	S45C	NC lathe	Vc=120m/min (n=410min ⁻¹) f=0.1mm/rev (Vf=41mm/min)	20kW	100%
ø94 (2D)	SUS304	NC lathe	Vc=80m/min (n=270min ⁻¹) f=0.2mm/rev (Vf=54mm/min)	20kW	40%

* The required power was read on the load meter.

Q-3 The workpiece material is elastic and the chips are stretched and tangled. Is there any countermeasure?

A-3

When chips of elastic material are stretched and tangled, try "low rate + large feed", "high rate + small feed" or other settings.
Chips are usually stretched well between the inlet and 10mm inside, and not any more stretched further inside.
Therefore changing the condition of entrance only will also be effective.

- [Low cutting speed + Large feed]
This setting makes the chips thicker so that they easily break off.
e.g. Vc=80m/min, f=0.2~0.25mm/rev
- [High cutting speed + Small feed]
This setting makes the chips thinner and uses centrifugal force to cut them off.
e.g. Vc=200m/min, f=0.07~0.09mm/rev
- [Step machining at inlet]
e.g. Inlet~10mm deep : 1mm step drilling
e.g. 10mm deep or more : Vc=150m/min, f=0.15mm/rev (Continuous drilling)

Q-4 Chattering occurs. Is there any countermeasure?

A-4

Chattering usually occurs during chamfering and when the feed rate per revolution is not high enough.
Try changing the cutting conditions as follows.

- Increase the feed rate if it is small.
If the feed rate is f=0.06mm/rev, for example, increase it to f=0.08~0.12mm/rev.
Increasing the feed rate will improve chamfering and thus prevent chattering.
- If the cutting speed is too high, lower it to Vc=100~150m/min.
- If the chamfering point and pass-through point are not plain, or if the workpiece clamping rigidity is low, lower the feed rate to f=0.07~0.08mm/rev.
- If chattering occurs on the full contact surface (e.g. during step drilling), make adjustments by increasing the feed rate during chamfering or lowering the cutting speed.
Once chattering occurs during chamfering, it will continue through drilling.

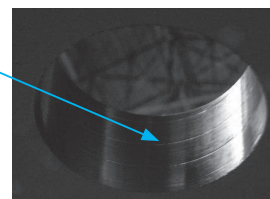
Q-5

Tool markings are made on the finished surface. Is there any countermeasure?

A-5

During processing, force of deflection is applied to the center of the drill.
 If the drill is just pulled out from the position where processing is finished, tool markings will be made.
 To prevent tool markings, perform offset before pulling out the drill.

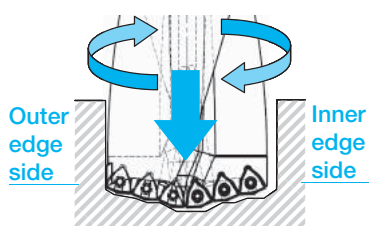
Tool marking



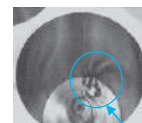
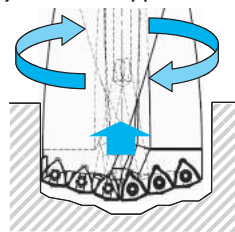
Example of tool marking

· How to prevent tool markings

(1) Drilling the hole (The spindle revolves)



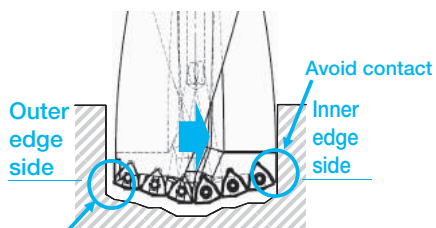
(2) Turn back approximately 0.5 mm (The spindle revolves)



Chips are adhering to the bottom when drilling stops.

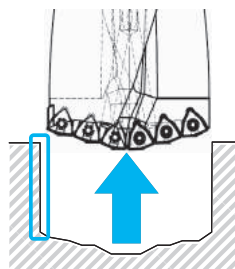
- Without turning back, chips remains adhering to the bottom.
- If offset (3) is performed without turning back, the bottom of drill contacts with the inner surface of hole.
- Turning back is necessary for blind holes but not for through holes.

(3) Stop revolution and perform offset (The spindle stops)



Make a clearance to prevent the tool from contacting when pulling out. (Approximately 0.1~0.2 mm)

(4) Pull out the drill



Tool markings are not made (or are only slight even if made).




Example of drilling program

```

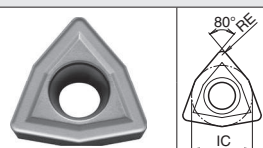
G90G54G0G43X0Y0Z100.0H10
S477M03
Z2.5M8
G01Z-80.0F48
Z-79.5M19 ← The spindle stops at the specified position
X0.2Y0.2
Z100.0M9
  
```

* The M code and X and Y moving directions are unique to the equipment.

DRW custom-order item Applicable drill dia. : $\phi 22 \sim \phi 200$

 <p>BT integral arbor type is also available.</p>	 <p>Max. $\phi 200$ is applicable</p>	<p><Standard item></p>  <p>Straight Shank (1D~3D)</p>
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● Applicable Inserts

Insert	Description	Dimension (mm)				MEGACOAT	MEGACOAT NANO	CVD Coated Carbide	Applicable Toolholders
		IC	S	D1	RE				
	WCMT06T308	9.525	3.97	3.7	0.8	●	●	●	S50-DRW...-06
	WCMT050308	7.94	3.18	3.2		●			(Custom-order toolholder)

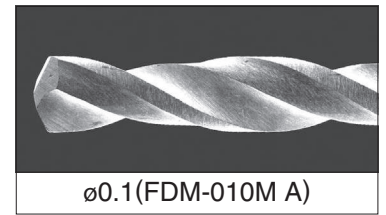
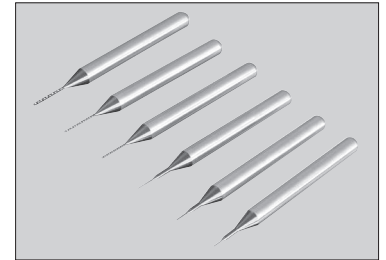
* WCMT050308 is for custom-order ($\phi 22$ or larger).

Fine Micro Drill

Features

1. High-grade cutting edge is realized by Kyocera prominent minute grind technology
2. Enables stable cutting edge strength and fracture resistance with tough super micro-grain carbide
3. More high efficiency and long tool life drilling is possible due to high performance special thin coating (FS coat)

* FS coat is abbreviation of fine surface. FS coat have superior surface smoothness and low wear coefficient. With its high wear resistance, FS coat is effective to improve sharp cutting and superior chip evacuation

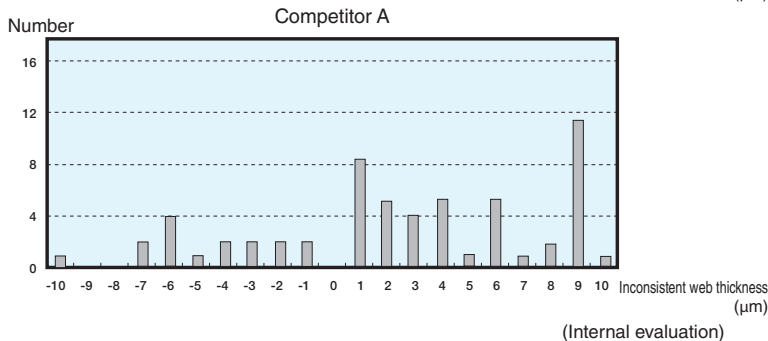
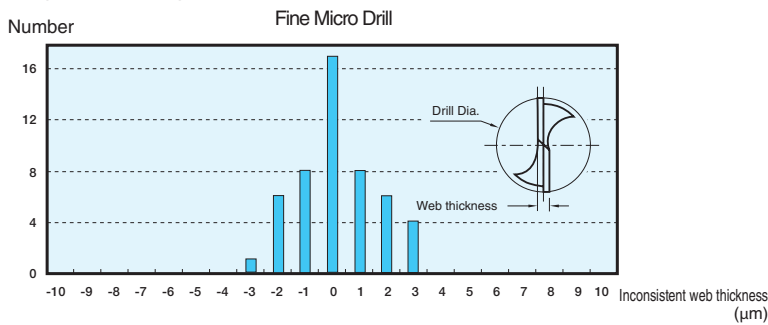


Drilling quality

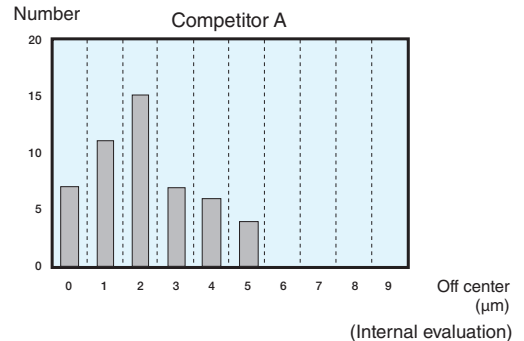
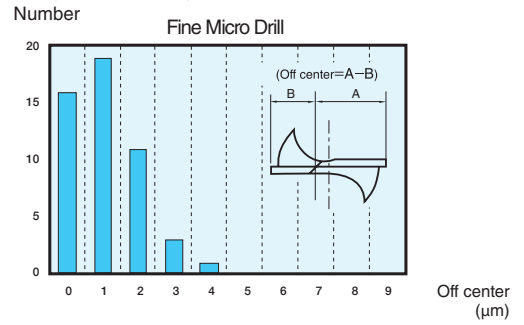
	Cutting edge condition		Burr condition on the exit side		Cutting Conditions Workpiece Material : SUS304 (t=0.5mm) Drill Dia. : $\phi 0.3\text{mm}$ FDM-030 (FSA) Cutting Speed: $V_c=10\text{m/min}$ ($n=10,600\text{min}^{-1}$) Feed : $f=0.001\text{mm/rev}$ Coolant : Wet (Water soluble coolant) Drilling Depth : 0.5mm (Through hole) Step feeding depth : 0.025mm/time Number of holes : 200 holes (Internal evaluation)
	Fine Micro Drill	Competitor A (Coated)	Fine Micro Drill	Competitor A (Coated)	
After drilling condition					

Comparison of cutting edge quality

● Comparison of inconsistent web thickness (Internal evaluation)
(Drill Dia. $\phi 0.3$)



● Comparison of inconsistent cutting edge center (Internal evaluation)
(Drill Dia. $\phi 0.3$)



K

Drilling

DRA
DRC
DRV
DRS
DRZ
DRX
DRW
Fine Micro

FDM-M (Shank Dia. $\phi 3$, Coated)

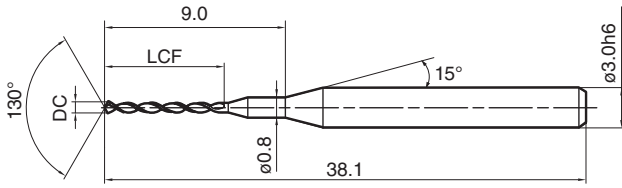


Fig. 1

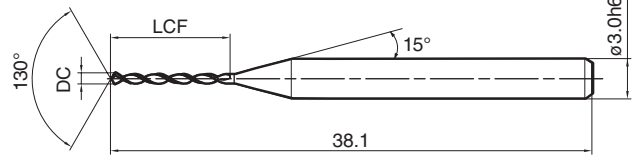


Fig. 2

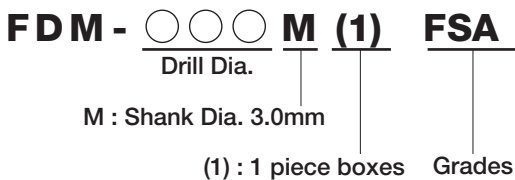
Drill Dia. DC Tolerance
 DC \leq 0.50(+0,-0.005)
 DC $>$ 0.50(+0,-0.007)

Helix Angle 30°

Description	Dimension (mm)		Drawing	Grades	
	Drill Dia.	Flute Length		Coated	
	DC	LCF		FSA	
FDM-010M(1)	0.10	1.3	Fig. 1	●	
FDM-011M(1)	0.11			●	
FDM-012M(1)	0.12	1.5		●	
FDM-013M(1)	0.13			●	
FDM-014M(1)	0.14	1.7		●	
FDM-015M(1)	0.15			●	
FDM-016M(1)	0.16	1.9		●	
FDM-017M(1)	0.17			●	
FDM-018M(1)	0.18	2.2		●	
FDM-019M(1)	0.19			●	
FDM-020M(1)	0.20	2.4		●	
FDM-021M(1)	0.21			●	
FDM-022M(1)	0.22	2.7		●	
FDM-023M(1)	0.23			●	
FDM-024M(1)	0.24	2.9		●	
FDM-025M(1)	0.25			●	
FDM-026M(1)	0.26	3.1	●		
FDM-027M(1)	0.27		●		
FDM-028M(1)	0.28	3.3	●		
FDM-029M(1)	0.29		●		
FDM-030M(1)	0.30	5.0	●		
FDM-031M(1)	0.31		●		

Description	Dimension (mm)		Drawing	Grades	
	Drill Dia.	Flute Length		Coated	
	DC	LCF		FSA	
FDM-032M(1)	0.32	5.0	Fig. 1	●	
FDM-033M(1)	0.33			●	
FDM-034M(1)	0.34			●	
FDM-035M(1)	0.35			●	
FDM-036M(1)	0.36	6.0	Fig. 2	●	
FDM-037M(1)	0.37			●	
FDM-038M(1)	0.38	6.0		●	
FDM-039M(1)	0.39			●	
FDM-040M(1)	0.40	7.0		●	
FDM-041M(1)	0.41			●	
FDM-042M(1)	0.42			●	
FDM-043M(1)	0.43			●	
FDM-044M(1)	0.44			●	
FDM-045M(1)	0.45			●	
FDM-046M(1)	0.46		●		
FDM-047M(1)	0.47		●		
FDM-048M(1)	0.48	8.0	●		
FDM-049M(1)	0.49		●		
FDM-050M(1)	0.50		●		
FDM-060M(1)	0.60		10.0	●	
FDM-070M(1)	0.70	●			
FDM-080M(1)	0.80		●		

● Identification System



● : Std. Item

The above description are sold in 1 piece boxes

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Fine Micro Drill

FDM-M (Shank Dia. $\phi 3$, Uncoated)

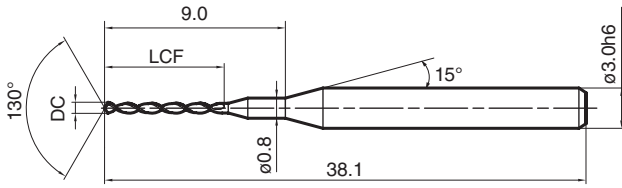


Fig. 1

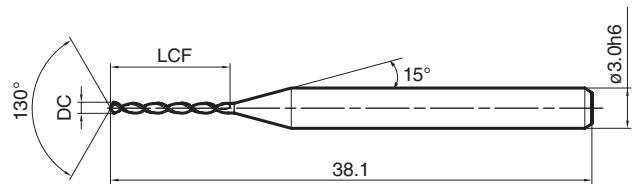


Fig. 2

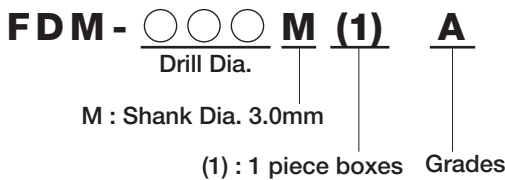
Drill Dia. DC Tolerance
 DC $\leq 0.50 (+0, -0.005)$
 DC $> 0.50 (+0, -0.007)$

Helix Angle 30°

Description	Dimension (mm)		Drawing	Grades	
	Drill Dia.	Flute Length		Uncoated	
	DC	LCF		A	
FDM-010M(1)	0.10	1.3	Fig. 1	●	
FDM-011M(1)	0.11			●	
FDM-012M(1)	0.12	1.5		●	
FDM-013M(1)	0.13			●	
FDM-014M(1)	0.14	1.7		●	
FDM-015M(1)	0.15			●	
FDM-016M(1)	0.16	1.9		●	
FDM-017M(1)	0.17			●	
FDM-018M(1)	0.18	2.2		●	
FDM-019M(1)	0.19			●	
FDM-020M(1)	0.20	2.4		●	
FDM-021M(1)	0.21			●	
FDM-022M(1)	0.22	2.7		●	
FDM-023M(1)	0.23			●	
FDM-024M(1)	0.24	2.9		●	
FDM-025M(1)	0.25			●	
FDM-026M(1)	0.26	3.1	●		
FDM-027M(1)	0.27		●		
FDM-028M(1)	0.28	3.3	●		
FDM-029M(1)	0.29		●		
FDM-030M(1)	0.30	5.0	●		
FDM-031M(1)	0.31		●		

Description	Dimension (mm)		Drawing	Grades		
	Drill Dia.	Flute Length		Uncoated		
	DC	LCF		A		
FDM-032M(1)	0.32	5.0	Fig. 1	●		
FDM-033M(1)	0.33			●		
FDM-034M(1)	0.34			●		
FDM-035M(1)	0.35			●		
FDM-036M(1)	0.36	6.0	Fig. 2	●		
FDM-037M(1)	0.37			●		
FDM-038M(1)	0.38			●		
FDM-039M(1)	0.39	6.0		Fig. 2	●	
FDM-040M(1)	0.40				●	
FDM-041M(1)	0.41	7.0			●	
FDM-042M(1)	0.42		●			
FDM-043M(1)	0.43		●			
FDM-044M(1)	0.44		●			
FDM-045M(1)	0.45	7.0	●			
FDM-046M(1)	0.46		●			
FDM-047M(1)	0.47		●			
FDM-048M(1)	0.48		●			
FDM-049M(1)	0.49	8.0	●			
FDM-050M(1)	0.50		●			
FDM-060M(1)	0.60		●			
FDM-070M(1)	0.70		10.0		●	
FDM-080M(1)	0.80	●				

● Identification System



K

Drilling

DRA

DRC

DRV

DRS

DRZ

DRX

DRW

Fine Micro

The above description are sold in 1 piece boxes

● : Std. Item

Recommended Cutting Conditions

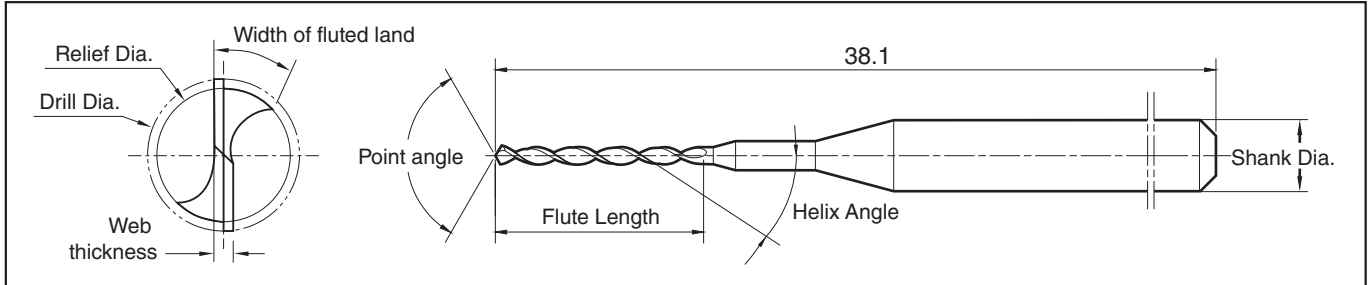
Custom-order item

● Non stock size are also available

- (1) Drill Dia. ($\phi 0.1\sim 0.8\text{mm}$)
- (2) Drill Dia. tolerance
- (3) Flute Length
- (4) Shank Dia. : $\phi 3.0 / \phi 3.175$
- (5) Please inform us about FSA (coated) or A (uncoated) and so on

Small change such as changing only flute length is available in short read time.

Ask us for the change such as point angle, helix angle, and so on.



Recommended Cutting Conditions

Drill Dia. (mm)	Carbon Steel / Alloy Steel		Stainless Steel		Cast Iron		Aluminum / Copper	
	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
0.10~0.19	2~6	0.0005~0.002	2~6	0.0003~0.001	2~10	0.0005~0.003	4~15	0.0005~0.003
0.20~0.29	4~10	0.001~0.004	4~10	0.0005~0.002	5~15	0.001~0.005	10~20	0.001~0.005
0.30~0.50	6~15	0.002~0.010	6~10	0.001~0.005	10~20	0.004~0.015	15~30	0.004~0.015
0.60~0.80	8~24	0.004~0.015	8~15	0.002~0.007	10~30	0.005~0.020	20~45	0.005~0.020

Cautions

- The above is guide. It may change depending on hardness of workpiece and machine condition.
- Apply coolant. Water-insoluble cutting oil is recommended.
- Use high precision chuck and use as short overhang length as possible.
- When drilling depth is more than 3D, utilize the step machining process.
Step depth is 10%~50% of drill diameter. When hole depth is deeper, shorten the step depth.

Case Studies

Free cutting prehardened steel		SK3		SUS316L	
<ul style="list-style-type: none"> · Plate · $n=16,000\text{min}^{-1}$ · $H=1\text{mm}$ (Through hole) · $Vf=22\text{mm/min}$ · Wet (Oil-base) · FDM-010M (A) ($\phi 0.10\text{mm}$) 	600 holes / pc	<ul style="list-style-type: none"> · Gauge · $n=10,000\text{min}^{-1}$ · $H=3.5\text{mm}$ · $Vf=100\text{mm/min}$ · Wet (Oil-base) · FDM-036M(FSA) ($\phi 0.36\text{mm}$) 	5,200 holes / pc	<ul style="list-style-type: none"> · Plate · $n=8,000\text{min}^{-1}$ · $H=2.7\text{mm}$ · $Vf=45\text{mm/min}$ · Wet (Oil-base) · XFDM-040 (FSA) ($\phi 0.40\text{mm}$) 	2,400 holes / pc
Fine Micro Drill Competitor B (Coated)	200 holes / pc (Broken)	Fine Micro Drill Competitor C (Coated)	4,000 holes / pc	Fine Micro Drill Competitor D (Coated High-speed steel)	300 holes / pc
· Competitor B is broken at 200 holes / pc · Regardless of uncoated(A), Fine micro drill achieved 3 times longer tool life compared with Competitor B (User Evaluation)		· Fine micro drill achieved 30% longer tool life compared with Competitor C (User Evaluation)		· Fine micro drill achieved 8 times longer tool life compared with Competitor D (User Evaluation)	

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