

Drilling

K1~K99

Product Lineup

K2~K3

MagicDrill DRA

K4~K25

SS-DRA	Drilling Depth : 1.5 x DC type Straight Shank	K12
SS-DRA	Drilling Depth : 3 x DC type Straight Shank	K13
SS-DRA	Drilling Depth : 5 x DC type Straight Shank	K14
SS-DRA	Drilling Depth : 8 x DC type Straight Shank	K15
Chamfering Attachment	for Straight Shank SS-DRA	K16
SF-DRA	Drilling Depth : 1.5 x DC type Flanged Shank	K18
SF-DRA	Drilling Depth : 3 x DC type Flanged Shank	K19
SF-DRA	Drilling Depth : 5 x DC type Flanged Shank	K20
SF-DRA	Drilling Depth : 8 x DC type Flanged Shank	K21
SF-DRA	Drilling Depth : 12 x DC type Flanged Shank	K22

MagicDrill DRC

K26~K41

SS-DRC	Drilling Depth : 3 x DC type Straight Shank	K29
SS-DRC	Drilling Depth : 5 x DC type Straight Shank	K30
SS-DRC	Drilling Depth : 8 x DC type Straight Shank	K31
Chamfering Attachment	for Straight Shank SS-DRC	K32
SF-DRC	Drilling Depth : 3 x DC type Flanged Shank	K34
SF-DRC	Drilling Depth : 5 x DC type Flanged Shank	K35
SF-DRC	Drilling Depth : 8 x DC type Flanged Shank	K36

MagicDrill DRV

K42~K64

DRV	Drilling Depth : 2 x DC type $\phi 12 \sim \phi 60$	K46
DRV	Drilling Depth : 3 x DC type $\phi 12 \sim \phi 60$	K48
DRV	Drilling Depth : 4 x DC type $\phi 12 \sim \phi 60$	K50
DRV	Drilling Depth : 5 x DC type $\phi 12 \sim \phi 60$	K52
DRV	Drilling Depth : 6 x DC type $\phi 12 \sim \phi 60$	K54

MagicDrill DRS & DRZ

K65~K79

DRS (MagicDrill Mini)	$\phi 10 \sim \phi 12.5$	K66
DRZ	Drilling Depth : 2 x DC type $\phi 13 \sim \phi 59$	K68
DRZ	Drilling Depth : 3 x DC type $\phi 13 \sim \phi 59$	K70
DRZ	Drilling Depth : 4 x DC type $\phi 13 \sim \phi 50$	K72
DRZ	Drilling Depth : 5 x DC type $\phi 27 \sim \phi 50$	K74
DRZ-CR	Cartridge type $\phi 60 \sim$	K75

MagicDrill DRX

K80~K90

DRX	$\phi 12 \sim \phi 60$	K82
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MagicDrill DRW

K91~K95

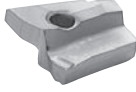
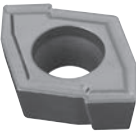
DRW	Drilling Depth : 1 x DC type $\phi 60 \sim \phi 100$	K92
DRW	Drilling Depth : 2 x DC type $\phi 60 \sim \phi 100$	K92
DRW	Drilling Depth : 3 x DC type $\phi 60 \sim \phi 100$	K93

Fine Micro Drill

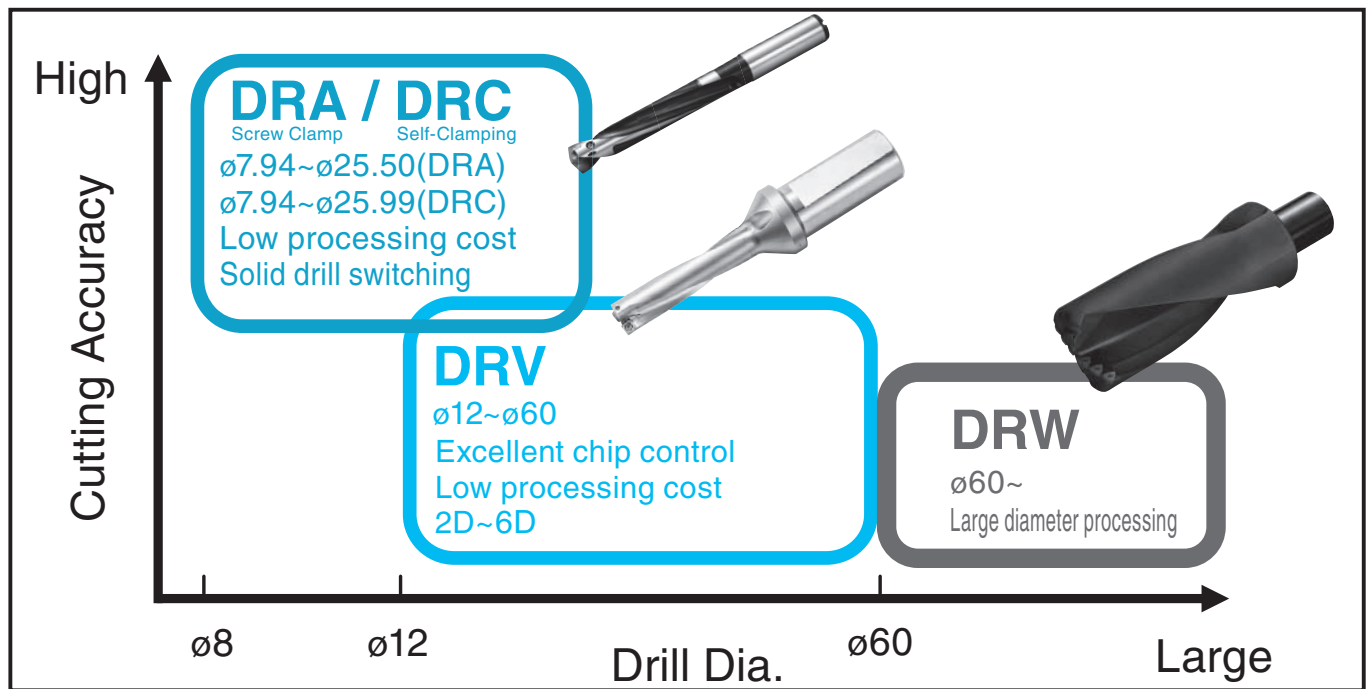
K96~K99

FDM		K96
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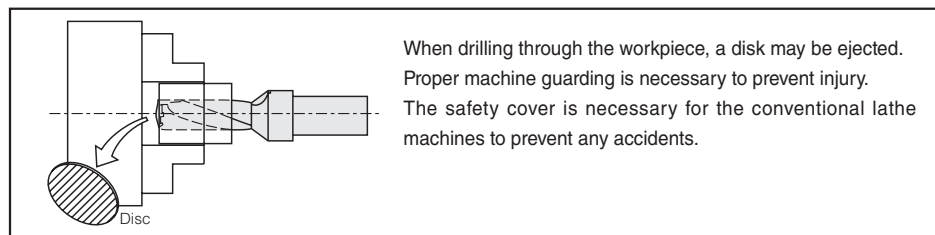
Product Lineup

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  Chamfering Attachment
DRC 	 Self-Clamping	$\phi 7.94 \sim \phi 25.99$ (3D/5D/8D)	Module type with double edges 	Line up  SS-DRC  SF-DRC  Chamfering Attachment
DRV 	 Silver Coating	$\phi 12 \sim \phi 60$ (2D/3D/4D 5D/6D)	Individually designed Inner & Outer Edges  Outer edge  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. $\phi 10$ Chip from outer edge  Chip from inner edge 
DRZ 	 DRZ	$\phi 13 \sim \phi 59$ (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. $\phi 23$ Chip from outer edge  Chip from inner edge 
DRZ-CR [Cartridge type] (Made to order) 	 DRZ-CR	$\phi 60 \sim$ (2D/3D/4D)		
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. $\phi 12$ Chip from outer edge  Chip from inner edge 
		$\phi 13.5 \sim \phi 60$ (2D/3D/4D) $\phi 14 \sim \phi 60$ (5D)	Inner & Outer Edges on One Insert  ZXMT	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.  Maximum drilling diameter is $\phi 200$.

● MagicDrill Series Application Map



■ Caution

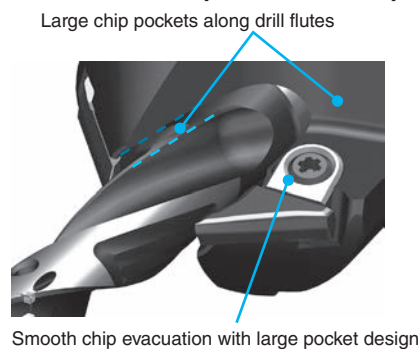
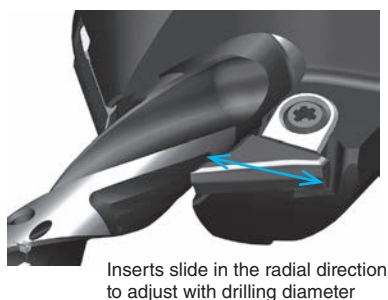


For MagicDrill DRA

Chamfering Attachment ➡ K16

·Excellent stability and chip evacuation

Easy-to-adjust chamfering insert slides in radial direction with a clamp structure that provides good chip evacuation



·Fully Adjustable for a Wide Range of Drilling Depths



Insert Grades	A
Turning Indexable Inserts	B
CBN & CVD 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
Spare Parts	P
Technical Information	R
Index	T

MagicDrill DRA

Excellent hole accuracy with a low cutting force design

5 advantages to efficiently solve common drilling difficulties

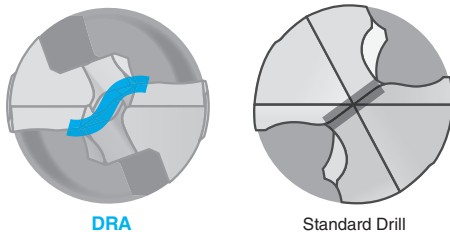
12D holder for deep hole drilling added to lineup (ø12~ø25.5)

1

Low cutting force design improves hole accuracy

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

Cutting edge image

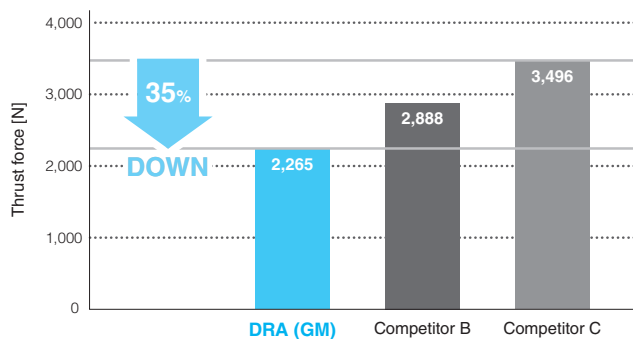


DRA

Standard Drill

Cutting Force Comparison
(Internal evaluation)

Cutting Conditions : $V_c=120\text{m/min}$, $f=0.25\text{mm/rev}$
Drill Dia.ø14, 5D Type, Drilling Depth 45mm, Wet
Workpiece Material : S50C

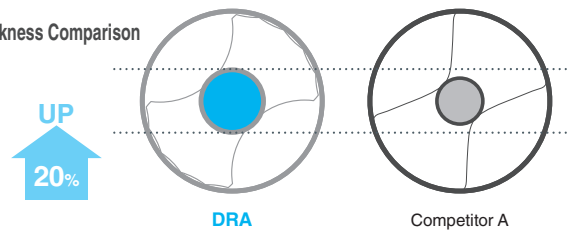


2

Optimal web thickness limits deflection

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

Web Thickness Comparison

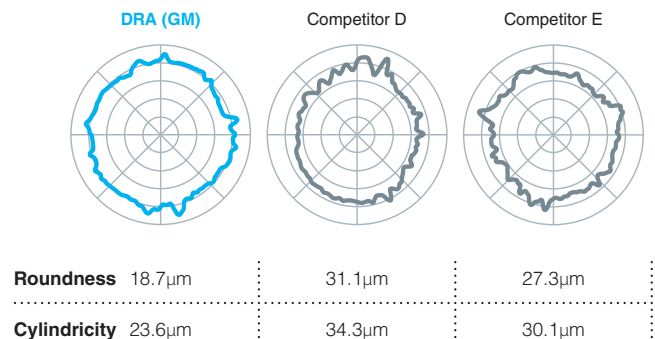


DRA

Competitor A

Roundness · Cylindricity Comparison
(Internal evaluation)

Cutting Conditions : $V_c=120\text{m/min}$, $f=0.3\text{mm/rev}$
Drill Dia.ø14, 5D Type, Measurement point 55mm, Wet
Workpiece Material : S50C



3

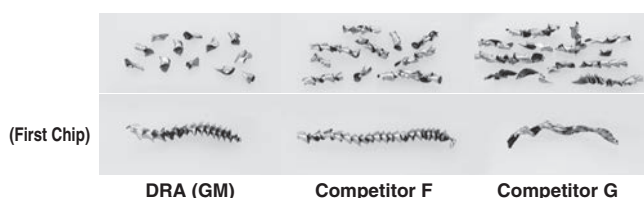
Fine chip breaking even in deep hole drilling applications

Optimized chip thinning for stable chip evacuation

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

Chip Comparison
(Internal evaluation)

Cutting Conditions : $V_c=60\text{m/min}$, $f=0.2\text{mm/rev}$, Drill Dia.ø14,
5D Type Drilling Depth 70mm, Wet
Workpiece Material : SUS304

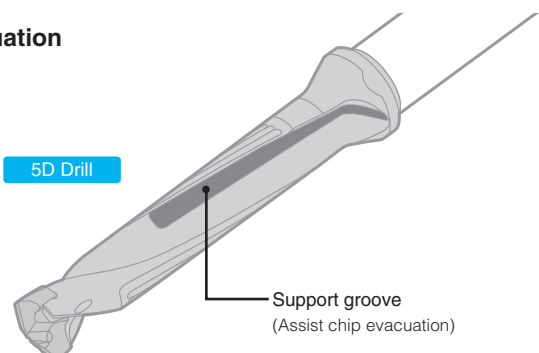


DRA (GM)

Competitor F

Competitor G

5D Drill

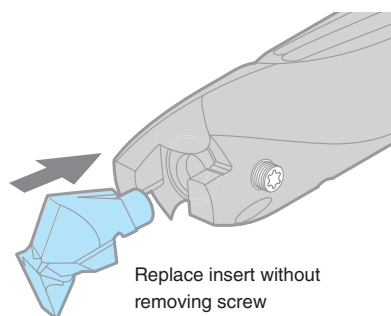


Support groove
(Assist chip evacuation)

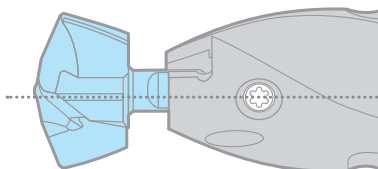
4

Easy insert replacement

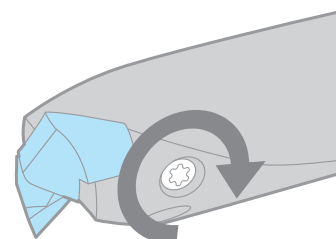
Replace insert without removing screw



Replace insert without removing screw



Install the insert onto toolholder
(align insert guide line with screw position)



Fix the insert by tightening the screw

5

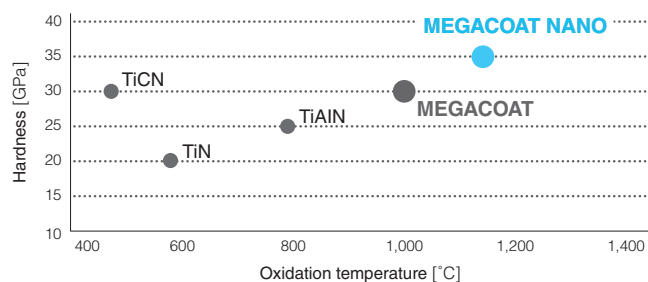
Long tool life and stable machining of various workpieces

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

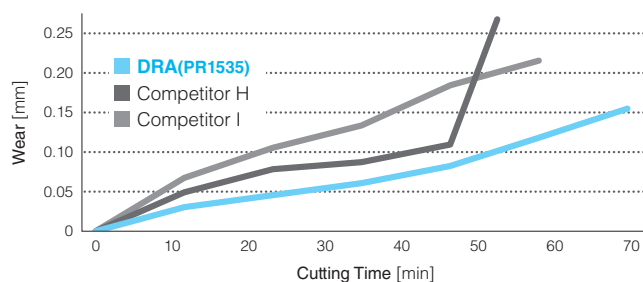
Steel, Stainless Steel	Cast Iron
PR1535	PR1525

Properties of PVD Coating



Wear Resistance Comparison

(Internal evaluation)

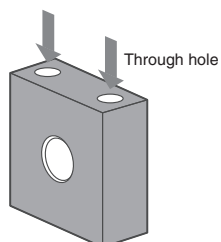


Cutting Conditions : $V_c=100\text{m/min}$, $f=0.25\text{mm/rev}$, Drill Dia. $\phi 14$, 5DType, Drilling Depth 45mm, Wet Workpiece Material : SCM440H

Case Studies

Attachment SS400

$V_c=70\text{m/min}$ ($n=1,240\text{min}^{-1}$)
 $f=0.23\text{mm/rev}$ ($V_f=285\text{mm/min}$)
 Drilling Depth 100mm
 Wet (Internal coolant)
 With spot drilling
 SF25-DRA180M-8
 DA1800M-GM PR1535



Cutting Time

DRA $\phi 18\text{-}8\text{D}$

45 sec

30% Cutting Time

Competitor J $\phi 18\text{-}7\text{D}$
 (Modular Drill)

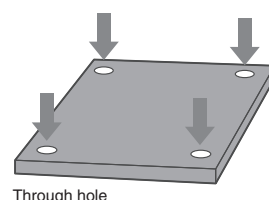
65 sec

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

(User Evaluation)

Plate SUS304

$V_c=60\text{m/min}$ ($n=2,120\text{min}^{-1}$)
 $f=0.12\text{mm/rev}$ ($V_f=254\text{mm/min}$)
 Drilling Depth 15mm
 Wet (Internal coolant)
 SS10-DRA090M-3
 DA0900M-GM PR1535



Number of holes

DRA $\phi 9\text{-}3\text{D}$

500 holes

Tool life

x 5

Competitor K $\phi 9\text{-}3\text{D}$
 (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)

High Efficiency Modular Drill

DRA

High Precision Insert for Steel Machining

HQP

Improved Centripetal Forces with Special Two-step Bottom

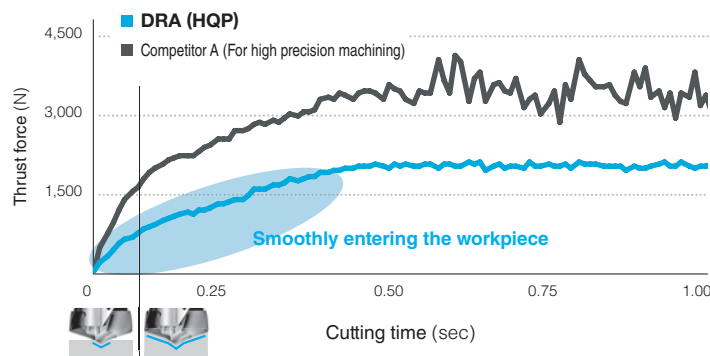
Excellent Cylindricity, Roundness and Surface Finish in Steel Machining

1

Improved Centripetal Forces Delivers High-precision Machining Capabilities for both Machining Centers and Lathes

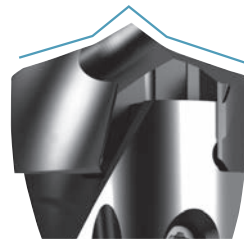
Special two-step bottom, large rake angle and double margin design reduce initial shock for higher-precision machining

Cutting force comparison when entering the workpiece (Internal evaluation)



Cutting Conditions : $V_c = 100$ m/min, $f = 0.25$ mm/rev, $H = 30$ mm, Wet Workpiece : S50C $\phi 16$ (3D)

Special Two-step Bottom



Large Rake Angle



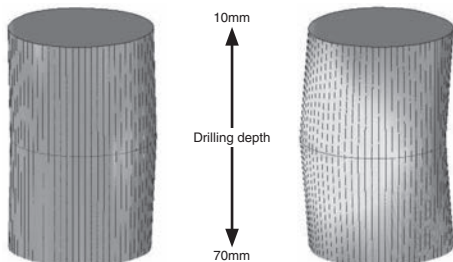
Double Margin

Cylindricity and roundness comparison (Internal evaluation)

Machining Center (BT50)

DRA (HQP)

Competitor A (For high precision machining)



Cylindricity : $19\mu\text{m}$
Roundness : $17\mu\text{m}$ (70mm)

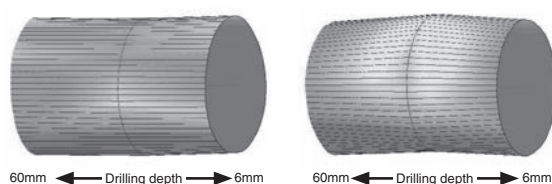
Cylindricity : $52\mu\text{m}$
Roundness : $19\mu\text{m}$ (70mm)

Cutting Conditions : $V_c = 100$ m/min, $f = 0.25$ mm/rev, $H = 80$ mm, Wet Workpiece : S50C $\phi 16$ (5D)

Lathes

DRA (HQP)

Competitor B (For high precision machining)



Cylindricity : $19\mu\text{m}$
Roundness : $9\mu\text{m}$ (60mm)

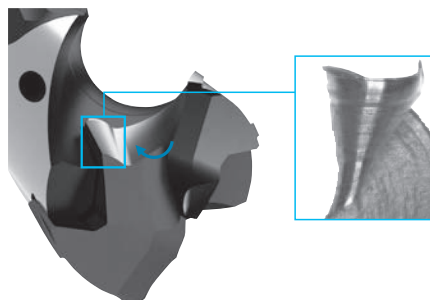
Cylindricity : $71\mu\text{m}$
Roundness : $12\mu\text{m}$ (60mm)

Cutting Conditions : $V_c = 120$ m/min, $f = 0.3$ mm/rev, $H = 65$ mm, Wet Workpiece : SCM435 $\phi 13$ (5D)

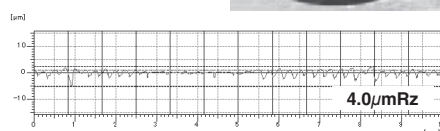
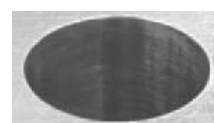
2

Excellent Surface Finish with Unique Flute Shape

Controlled chips reduce scratches on the hole wall



Hole wall surface finish comparison (Internal evaluation)



Cutting Conditions : $V_c = 100$ m/min, $f = 0.25$ mm/rev, $H = 80$ mm, Wet Workpiece : S50C $\phi 16$ (5D)



K

Drilling

DRA

DRC

DRV

DRS

DRZ

DRX

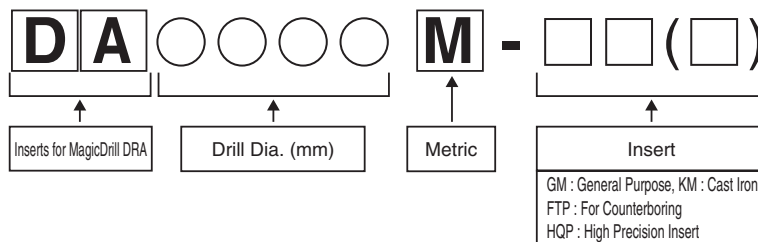
DRW

Fine

Micro

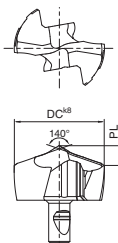
Inserts for MagicDrill DRA NEW

Description Identification System (Insert)



Applicable Inserts

High Precision Insert HQP



k8 tolerance

DC	k8 (mm)
7.94 10.00	+0.022 0
10.10 18.00	+0.027 0
18.10 19.90	+0.033 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 K12~K22
	DC	PL		
DA 0794M-HQP	7.94	1.90	●	SS10-DRA080M-○ SF12-DRA080M-○
0800M-HQP	8.00	1.91	●	
0810M-HQP	8.10	1.93	●	
0820M-HQP	8.20	1.94	●	
0830M-HQP	8.30	1.96	●	
0840M-HQP	8.40	1.98	●	SS10-DRA085M-○ SF12-DRA085M-○
DA 0850M-HQP	8.50	1.99	●	
0860M-HQP	8.60	2.01	●	
0870M-HQP	8.70	2.03	●	
0880M-HQP	8.80	2.05	●	
0890M-HQP	8.90	2.06	●	SS10-DRA090M-○ SF12-DRA090M-○
DA 0900M-HQP	9.00	2.19	●	
0910M-HQP	9.10	2.21	●	
0920M-HQP	9.20	2.22	●	
0930M-HQP	9.30	2.24	●	
0940M-HQP	9.40	2.26	●	SS10-DRA095M-○ SF12-DRA095M-○
DA 0950M-HQP	9.50	2.27	●	
0960M-HQP	9.60	2.29	●	
0970M-HQP	9.70	2.31	●	
0980M-HQP	9.80	2.32	●	
0990M-HQP	9.90	2.34	●	SS12-DRA100M-○ SF16-DRA100M-○
DA 1000M-HQP	10.00	2.35	●	
1010M-HQP	10.10	2.36	●	
1020M-HQP	10.20	2.38	●	
1030M-HQP	10.30	2.40	●	
1040M-HQP	10.40	2.41	●	SS12-DRA105M-○ SF16-DRA105M-○
DA 1050M-HQP	10.50	2.43	●	
1060M-HQP	10.60	2.44	●	
1070M-HQP	10.70	2.46	●	
1080M-HQP	10.80	2.47	●	
1090M-HQP	10.90	2.49	●	SS12-DRA110M-○ SF16-DRA110M-○
DA 1100M-HQP	11.00	2.65	●	
1110M-HQP	11.10	2.67	●	
1120M-HQP	11.20	2.68	●	
1130M-HQP	11.30	2.70	●	
1140M-HQP	11.40	2.72	●	SS12-DRA115M-○ SF16-DRA115M-○
DA 1150M-HQP	11.50	2.73	●	
1160M-HQP	11.60	2.75	●	
1170M-HQP	11.70	2.76	●	
1180M-HQP	11.80	2.78	●	
1190M-HQP	11.90	2.80	●	SS14-DRA120M-○ SF16-DRA120M-○
DA 1200M-HQP	12.00	2.79	●	
1210M-HQP	12.10	2.81	●	
1220M-HQP	12.20	2.82	●	
1230M-HQP	12.30	2.84	●	
1240M-HQP	12.40	2.86	●	SS14-DRA125M-○ SF16-DRA125M-○
DA 1250M-HQP	12.50	2.87	●	
1260M-HQP	12.60	2.89	●	
1270M-HQP	12.70	2.91	●	
1280M-HQP	12.80	2.92	●	
1290M-HQP	12.90	2.94	●	SS14-DRA130M-○ SF16-DRA130M-○
DA 1300M-HQP	13.00	2.98	●	
1310M-HQP	13.10	2.99	●	
1320M-HQP	13.20	3.01	●	

● : Std. Item

Description	Dimension (mm)		MEGACOAT NANO	Applicable Toolholders K12~K22
	DC	PL		
DA 1330M-HQP	13.30	3.02	●	SS14-DRA130M-○ SF16-DRA130M-○
1340M-HQP	13.40	3.04	●	
DA 1350M-HQP	13.50	3.06	●	SS14-DRA135M-○ SF16-DRA135M-○
1360M-HQP	13.60	3.07	●	
1370M-HQP	13.70	3.09	●	
1380M-HQP	13.80	3.10	●	
1390M-HQP	13.90	3.12	●	
DA 1400M-HQP	14.00	3.11	●	SS16-DRA140M-○ SF16-DRA140M-○
1410M-HQP	14.10	3.12	●	
1420M-HQP	14.20	3.14	●	
1430M-HQP	14.30	3.16	●	
1440M-HQP	14.40	3.17	●	
DA 1450M-HQP	14.50	3.19	●	SS16-DRA145M-○ SF16-DRA145M-○
1460M-HQP	14.60	3.21	●	
1470M-HQP	14.70	3.22	●	
1480M-HQP	14.80	3.24	●	
1490M-HQP	14.90	3.25	●	
DA 1500M-HQP	15.00	3.33	●	SS16-DRA150M-○ SF20-DRA150M-○
1510M-HQP	15.10	3.35	●	
1520M-HQP	15.20	3.36	●	
1530M-HQP	15.30	3.38	●	
1540M-HQP	15.40	3.39	●	
1550M-HQP	15.50	3.41	●	
1560M-HQP	15.60	3.42	●	
1570M-HQP	15.70	3.44	●	
1580M-HQP	15.80	3.46	●	
1590M-HQP	15.90	3.47	●	SS18-DRA160M-○ SF20-DRA160M-○
DA 1600M-HQP	16.00	3.55	●	
1610M-HQP	16.10	3.57	●	
1620M-HQP	16.20	3.58	●	
1630M-HQP	16.30	3.60	●	
1640M-HQP	16.40	3.62	●	
1650M-HQP	16.50	3.63	●	
1660M-HQP	16.60	3.65	●	
1670M-HQP	16.70	3.66	●	
1680M-HQP	16.80	3.68	●	SS18-DRA170M-○ SF20-DRA170M-○
1690M-HQP	16.90	3.69	●	
DA 1700M-HQP	17.00	3.73	●	
1710M-HQP	17.10	3.75	●	
1720M-HQP	17.20	3.77	●	
1730M-HQP	17.30	3.78	●	
1740M-HQP	17.40	3.80	●	
1750M-HQP	17.50	3.81	●	
1760M-HQP	17.60	3.83	●	
1770M-HQP	17.70	3.84	●	SS20-DRA180M-○ SF25-DRA180M-○
1780M-HQP	17.80	3.86	●	
1790M-HQP	17.90	3.88	●	
DA 1800M-HQP	18.00	3.97	●	
1810M-HQP	18.10	3.98	●	
1820M-HQP	18.20	4.00	●	
1830M-HQP	18.30	4.02	●	
1840M-HQP	18.40	4.03	●	
1850M-HQP	18.50	4.05	●	
1860M-HQP	18.60	4.06	●	SS20-DRA190M-○ SF25-DRA190M-○
1870M-HQP	18.70	4.08	●	
1880M-HQP	18.80	4.09	●	
1890M-HQP	18.90	4.11	●	
DA 1900M-HQP	19.00	4.20	●	
1910M-HQP	19.10	4.22	●	
1920M-HQP	19.20	4.23	●	
1930M-HQP	19.30	4.25	●	
1940M-HQP	19.40	4.26	●	
1950M-HQP	19.50	4.28	●	
1960M-HQP	19.60	4.29	●	
1970M-HQP	19.70	4.31	●	
1980M-HQP	19.80	4.33	●	
1990M-HQP	19.90	4.34	●	

DA inserts are sold in 1 piece boxes

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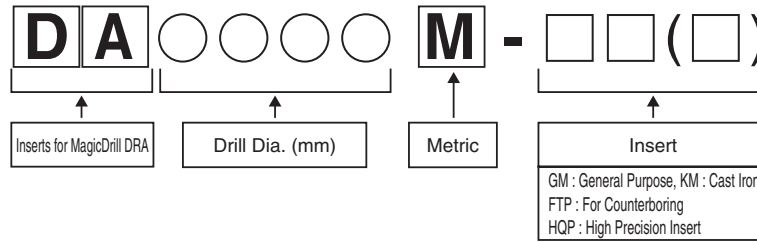
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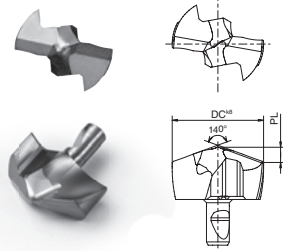
Inserts for MagicDrill DRA

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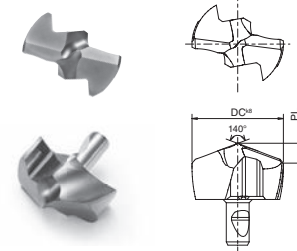


Applicable Inserts

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 K12~K21
	DC	PL	PR1535	PR1525	
DA 0794M-GM	7.94	1.34	●	●	SS10-DRA080M-○ SF12-DRA080M-○
DA 0794M-KM		1.82	●	●	
DA 0800M-GM	8.00	1.35	●	●	
DA 0800M-KM		1.85	●	●	
DA 0810M-GM	8.10	1.37	●	●	SS10-DRA085M-○ SF12-DRA085M-○
DA 0810M-KM		1.89	●	●	
DA 0820M-GM	8.20	1.38	●	●	
DA 0820M-KM		1.93	●	●	
DA 0830M-GM	8.30	1.40	●	●	SS10-DRA090M-○ SF12-DRA090M-○
DA 0830M-KM		1.98	●	●	
DA 0840M-GM	8.40	1.42	●	●	
DA 0840M-KM		2.02	●	●	
DA 0850M-GM	8.50	1.44	●	●	SS10-DRA095M-○ SF12-DRA095M-○
DA 0850M-KM		2.06	●	●	
DA 0860M-GM	8.60	1.46	●	●	
DA 0860M-KM		2.10	●	●	
DA 0870M-GM	8.70	1.48	●	●	SS10-DRA100M-○ SF12-DRA100M-○
DA 0870M-KM		2.14	●	●	
DA 0880M-GM	8.80	1.49	●	●	
DA 0880M-KM		2.19	●	●	
DA 0890M-GM	8.90	1.51	●	●	SS10-DRA105M-○ SF12-DRA105M-○
DA 0890M-KM		2.23	●	●	
DA 0900M-GM	9.00	1.52	●	●	
DA 0900M-KM		2.02	●	●	
DA 0910M-GM	9.10	1.54	●	●	SS10-DRA110M-○ SF12-DRA110M-○
DA 0910M-KM		2.06	●	●	
DA 0920M-GM	9.20	1.56	●	●	
DA 0920M-KM		2.11	●	●	
DA 0930M-GM	9.30	1.58	●	●	SS10-DRA115M-○ SF12-DRA115M-○
DA 0930M-KM		2.15	●	●	
DA 0940M-GM	9.40	1.59	●	●	
DA 0940M-KM		2.19	●	●	
DA 0950M-GM	9.50	1.61	●	●	SS10-DRA120M-○ SF12-DRA120M-○
DA 0950M-KM		2.23	●	●	
DA 0960M-GM	9.60	1.63	●	●	
DA 0960M-KM		2.27	●	●	
DA 0970M-GM	9.70	1.65	●	●	SS10-DRA125M-○ SF12-DRA125M-○
DA 0970M-KM		2.32	●	●	
DA 0980M-GM	9.80	1.67	●	●	
DA 0980M-KM		2.36	●	●	
DA 0990M-GM	9.90	1.68	●	●	SS10-DRA130M-○ SF12-DRA130M-○
DA 0990M-KM		2.40	●	●	

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders K12~K21
	DC	PL	PR1535	PR1525	
DA 1000M-GM	10.00	1.70	●	●	SS12-DRA100M-○ SF16-DRA100M-○
DA 1000M-KM		2.20	●	●	
DA 1010M-GM	10.10	1.72	●	●	
DA 1010M-KM		2.24	●	●	
DA 1020M-GM	10.20	1.74	●	●	SS12-DRA105M-○ SF16-DRA105M-○
DA 1020M-KM		2.28	●	●	
DA 1030M-GM	10.30	1.75	●	●	
DA 1030M-KM		2.32	●	●	
DA 1040M-GM	10.40	1.77	●	●	SS12-DRA110M-○ SF16-DRA110M-○
DA 1040M-KM		2.37	●	●	
DA 1050M-GM	10.50	1.79	●	●	
DA 1050M-KM		2.41	●	●	
DA 1060M-GM	10.60	1.81	●	●	SS12-DRA115M-○ SF16-DRA115M-○
DA 1060M-KM		2.45	●	●	
DA 1070M-GM	10.70	1.83	●	●	
DA 1070M-KM		2.49	●	●	
DA 1080M-GM	10.80	1.85	●	●	SS12-DRA120M-○ SF16-DRA120M-○
DA 1080M-KM		2.53	●	●	
DA 1090M-GM	10.90	1.86	●	●	
DA 1090M-KM		2.57	●	●	
DA 1100M-GM	11.00	1.87	●	●	SS12-DRA125M-○ SF16-DRA125M-○
DA 1100M-KM		2.50	●	●	
DA 1110M-GM	11.10	1.89	●	●	
DA 1110M-KM		2.54	●	●	
DA 1120M-GM	11.20	1.91	●	●	SS12-DRA130M-○ SF16-DRA130M-○
DA 1120M-KM		2.59	●	●	
DA 1130M-GM	11.30	1.92	●	●	
DA 1130M-KM		2.63	●	●	
DA 1140M-GM	11.40	1.94	●	●	SS12-DRA135M-○ SF16-DRA135M-○
DA 1140M-KM		2.67	●	●	
DA 1150M-GM	11.50	1.96	●	●	
DA 1150M-KM		2.71	●	●	
DA 1160M-GM	11.60	1.98	●	●	SS12-DRA140M-○ SF16-DRA140M-○
DA 1160M-KM		2.75	●	●	
DA 1170M-GM	11.70	2.00	●	●	
DA 1170M-KM		2.80	●	●	
DA 1180M-GM	11.80	2.01	●	●	SS12-DRA145M-○ SF16-DRA145M-○
DA 1180M-KM		2.84	●	●	
DA 1190M-GM	11.90	2.03	●	●	
DA 1190M-KM		2.88	●	●	

DA inserts are sold in 1 piece boxes

● : Std. Item

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➡ K12~K22
	DC	PL	PR1535	PR1525	
DA 1200M-GM 1200M-KM	12.00	2.03 2.68	●	●	SS14-DRA120M-○ SF16-DRA120M-○
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 2.93	●	●	SS14-DRA125M-○ SF16-DRA125M-○
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 2.92	●	●	SS14-DRA130M-○ SF16-DRA130M-○
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 3.13	●	●	
DA 1380M-GM 1380M-KM	13.80	2.35 3.17	●	●	SS14-DRA135M-○ SF16-DRA135M-○
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 3.13	●	●	
DA 1430M-GM 1430M-KM	14.30	2.38 3.17	●	●	
DA 1440M-GM 1440M-KM	14.40	2.40 3.21	●	●	SS16-DRA140M-○ SF16-DRA140M-○
DA 1450M-GM 1450M-KM	14.50	2.42 3.25	●	●	
DA 1460M-GM 1460M-KM	14.60	2.43 3.30	●	●	
DA 1470M-GM 1470M-KM	14.70	2.45 3.34	●	●	

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders ➡ K12~K22
	DC	PL	PR1535	PR1525	
DA 1480M-GM 1480M-KM	14.80	2.47 3.38	●	●	SS16-DRA145M-○ SF16-DRA145M-○
DA 1490M-GM 1490M-KM	14.90	2.49 3.42	●	●	
DA 1500M-GM 1500M-KM	15.00	2.52 3.24	●	●	SS16-DRA150M-○ SF20-DRA150M-○
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 3.43	●	●	SS18-DRA160M-○ SF20-DRA160M-○
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 3.61	●	●	SS18-DRA170M-○ SF20-DRA170M-○
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	●	●	

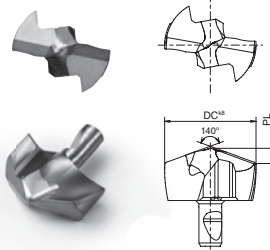
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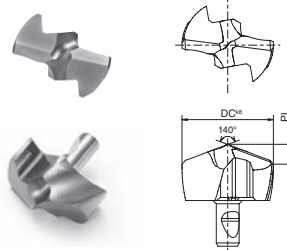
Inserts for MagicDrill DRA

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 K12~K22
	DC	PL	PR1535	PR1525	
DA 1750M-GM 1750M-KM	17.50	2.95 3.82	●	●	SS18-DRA170M-○ SF20-DRA170M-○
DA 1760M-GM 1760M-KM	17.60	2.97 3.86	●	●	
DA 1770M-GM 1770M-KM	17.70	2.99 3.90	●	●	
DA 1780M-GM 1780M-KM	17.80	3.01 3.95	●	●	
DA 1790M-GM 1790M-KM	17.90	3.03 3.99	●	●	
DA 1800M-GM 1800M-KM	18.00	3.04 3.79	●	●	SS20-DRA180M-○ SF25-DRA180M-○
DA 1810M-GM 1810M-KM	18.10	3.06 3.83	●	●	
DA 1820M-GM 1820M-KM	18.20	3.07 3.88	●	●	
DA 1830M-GM 1830M-KM	18.30	3.09 3.92	●	●	
DA 1840M-GM 1840M-KM	18.40	3.11 3.96	●	●	
DA 1850M-GM 1850M-KM	18.50	3.13 4.00	●	●	
DA 1860M-GM 1860M-KM	18.60	3.15 4.04	●	●	
DA 1870M-GM 1870M-KM	18.70	3.17 4.08	●	●	
DA 1880M-GM 1880M-KM	18.80	3.18 4.13	●	●	
DA 1890M-GM 1890M-KM	18.90	3.20 4.17	●	●	SS20-DRA190M-○ SF25-DRA190M-○
DA 1900M-GM 1900M-KM	19.00	3.21 3.97	●	●	
DA 1910M-GM 1910M-KM	19.10	3.23 4.01	●	●	
DA 1920M-GM 1920M-KM	19.20	3.25 4.05	●	●	
DA 1930M-GM 1930M-KM	19.30	3.27 4.09	●	●	
DA 1940M-GM 1940M-KM	19.40	3.29 4.14	●	●	
DA 1950M-GM 1950M-KM	19.50	3.30 4.18	●	●	
DA 1960M-GM 1960M-KM	19.60	3.32 4.22	●	●	
DA 1970M-GM 1970M-KM	19.70	3.34 4.26	●	●	

Description	Dimension (mm)		MEGACOAT NANO		Applicable Toolholders K12~K22
	DC	PL	PR1535	PR1525	
DA 1980M-GM 1980M-KM	19.80	3.36 4.30	●	●	SS20-DRA190M-○ SF25-DRA190M-○
DA 1990M-GM 1990M-KM	19.90	3.38 4.35	●	●	
DA 2000M-GM 2000M-KM	20.00	3.37 4.20	●	●	SS25-DRA200M-○ SF25-DRA200M-○
DA 2010M-GM 2010M-KM	20.10	3.39 4.24	●	●	
DA 2020M-GM 2020M-KM	20.20	3.41 4.28	●	●	
DA 2030M-GM 2030M-KM	20.30	3.43 4.33	●	●	
DA 2040M-GM 2040M-KM	20.40	3.45 4.37	●	●	
DA 2050M-GM 2050M-KM	20.50	3.46 4.41	●	●	
DA 2060M-GM 2060M-KM	20.60	3.48 4.45	●	●	
DA 2070M-GM 2070M-KM	20.70	3.50 4.49	●	●	
DA 2080M-GM 2080M-KM	20.80	3.52 4.54	●	●	
DA 2090M-GM 2090M-KM	20.90	3.54 4.58	●	●	
DA 2100M-GM 2100M-KM	21.00	3.54 4.38	●	●	SS25-DRA210M-○ SF25-DRA210M-○
DA 2150M-GM 2150M-KM	21.50	3.63 4.59	●	●	
DA 2200M-GM 2200M-KM	22.00	3.71 4.55	●	●	SS25-DRA220M-○ SF25-DRA220M-○
DA 2250M-GM 2250M-KM	22.50	3.80 4.76	●	●	
DA 2300M-GM 2300M-KM	23.00	3.87 4.74	●	●	SS25-DRA230M-○ SF25-DRA230M-○
DA 2350M-GM 2350M-KM	23.50	3.96 4.94	●	●	
DA 2400M-GM 2400M-KM	24.00	4.04 4.91	●	●	SS25-DRA240M-○ SF25-DRA240M-○
DA 2450M-GM 2450M-KM	24.50	4.13 5.12	●	●	
DA 2500M-GM 2500M-KM	25.00	4.20 5.08	●	●	SS32-DRA250M-○ SF25-DRA250M-○
DA 2550M-GM 2550M-KM	25.50	4.29 5.29	●	●	

DA inserts are sold in 1 piece boxes

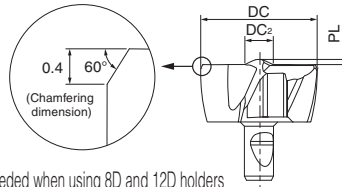
● : Std. Item

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, 8D and 12D holders, Prepared hole (0.5D) is needed when using 8D and 12D holders

Description	Dimension (mm)			MEGACOAT NANO		Applicable Toolholders K12~K22
	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			●	●	
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			●	●	
DA 1000M-FTP	10.00			●	●	
DA 1030M-FTP	10.30	3.30	0.46	●	●	SS12-DRA100M-○ SF16-DRA100M-○
DA 1050M-FTP	10.50			●	●	
DA 1080M-FTP	10.80			●	●	
DA 1100M-FTP	11.00			●	●	
DA 1150M-FTP	11.50	3.40	0.50	●	●	SS12-DRA110M-○ SF16-DRA110M-○
DA 1200M-FTP	12.00			●	●	
DA 1250M-FTP	12.50			●	●	
DA 1270M-FTP	12.70			●	●	
DA 1300M-FTP	13.00	3.90	0.56	●	●	SS14-DRA120M-○ SF16-DRA120M-○
DA 1350M-FTP	13.50			●	●	
DA 1400M-FTP	14.00			●	●	
DA 1450M-FTP	14.50			●	●	
DA 1500M-FTP	15.00	4.20	0.60	●	●	SS16-DRA135M-○ SF16-DRA135M-○
DA 1550M-FTP	15.50			●	●	
DA 1600M-FTP	16.00			●	●	
DA 1650M-FTP	16.50			●	●	
DA 1700M-FTP	17.00	5.00	0.75	●	●	SS18-DRA140M-○ SF20-DRA140M-○
DA 1750M-FTP	17.50			●	●	
DA 1800M-FTP	18.00			●	●	
DA 1850M-FTP	18.50			●	●	
DA 1900M-FTP	19.00	5.30	0.85	●	●	SS20-DRA150M-○ SF25-DRA150M-○
DA 1950M-FTP	19.50			●	●	
DA 2000M-FTP	20.00			●	●	
DA 2050M-FTP	20.50			●	●	
DA 2100M-FTP	21.00	5.70	0.90	●	●	SS25-DRA160M-○ SF20-DRA160M-○
DA 2150M-FTP	21.50			●	●	
DA 2200M-FTP	22.00			●	●	
DA 2250M-FTP	22.50			●	●	
DA 2300M-FTP	23.00	6.00	0.95	●	●	SS18-DRA170M-○ SF20-DRA170M-○
DA 2350M-FTP	23.50			●	●	
DA 2400M-FTP	24.00			●	●	
DA 2450M-FTP	24.50			●	●	
DA 2500M-FTP	25.00	6.40	1.00	●	●	SS20-DRA180M-○ SF25-DRA180M-○
DA 2540M-FTP	25.40			●	●	
DA 2550M-FTP	25.50			●	●	
DA 2580M-FTP	25.80			●	●	

Description	Dimension (mm)			MEGACOAT NANO		Applicable Toolholders K12~K22
	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			●	●	

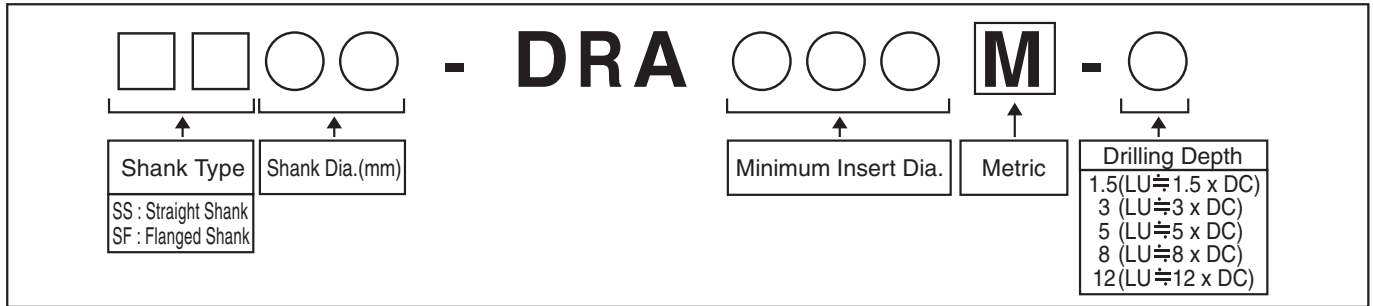
● : Std. Item

DA inserts are sold in 1 piece boxes

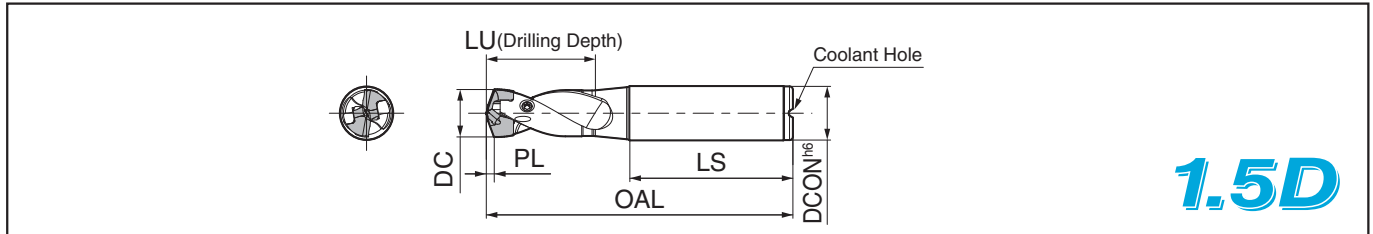
Insert Grades
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Description Identification System (Toolholder)



SS-DRA (Drilling Depth : 1.5 x DC)



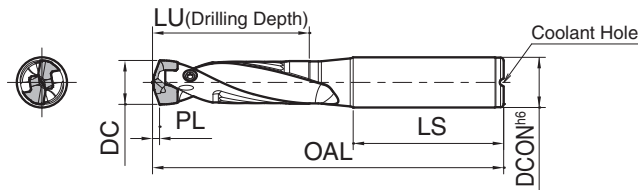
For PL indicates distance from drill point to corner edge **K7~K11**

Toolholder Dimensions

Description		Stock	Dimension (mm)					Spare Parts		Applicable Inserts 🔄 K7~K11	Applicable Chamfering Holder and Insert Description		
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw		Wrench	Holder	Insert
			min.	max.									
SS10-	DRA080M-1.5	●	7.94	8.49	10	66.2	12.8	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...	S20-CH10 -DRA	CT12T3 -45DA
	DRA085M-1.5	●	8.50	8.99		67.5	13.5				DA0850M-...~DA0890M-...		
	DRA090M-1.5	●	9.00	9.49		68.7	14.3				DA0900M-...~DA0940M-...		
	DRA095M-1.5	●	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-...	S32-CH12 -DRA	
	DRA105M-1.5	●	10.50	10.99		77.5	16.5				DA1050M-...~DA1090M-...		
	DRA110M-1.5	●	11.00	11.49		79.7	17.3				DA1100M-...~DA1140M-...		
	DRA115M-1.5	●	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-...	S32-CH14 -DRA	
	DRA125M-1.5	●	12.50	12.99		83.5	19.5				DA1250M-...~DA1290M-...		
	DRA130M-1.5	●	13.00	13.49		84.7	20.3				DA1300M-...~DA1340M-...		
	DRA135M-1.5	●	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-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16 -DRA	
	DRA145M-1.5	●	14.50	14.99		91.5	22.5				DA1450M-...~DA1490M-...		
	DRA150M-1.5	●	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-...	S32-CH18 -DRA	
	DRA170M-1.5	●	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-...	S32-CH20 -DRA	
	DRA190M-1.5	●	19.00	19.99		109.0	30.0				DA1900M-...~DA1990M-...		
SS25-	DRA200M-1.5	●	20.00	20.99	25	117.5	31.5	56	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...	-	-
	DRA210M-1.5	●	21.00	21.99		120.0	33.0				DA2100M-...~DA2150M-...		
	DRA220M-1.5	●	22.00	22.99		123.5	34.5				DA2200M-...~DA2250M-...		
	DRA230M-1.5	●	23.00	23.99		126.0	36.0				DA2300M-...~DA2350M-...		
	DRA240M-1.5	●	24.00	24.99		128.5	37.5				DA2400M-...~DA2450M-...		
SS32-	DRA250M-1.5	●	25.00	25.50	32	135.0	39.0	60			DA2500M-...~DA2550M-...		

● : Std. Item

SS-DRA (Drilling Depth : 3 x DC)

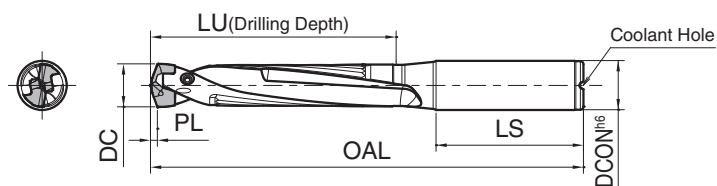


For PL indicates distance from drill point to corner edge **K7~K11**

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts		Applicable Inserts 🔄 K7~K11	Applicable Chamfering Holder and Insert Description 🔄 K16	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench		Holder	Insert
			min.	max.									
SS10-	DRA080M-3	●	7.94	8.49	10	79	25.5	40	HS-2524TRP		DA0794M-...~DA0840M-...	S20-CH10 -DRA	CT12T3 -45DA
	DRA085M-3	●	8.50	8.99		81	27.0				DA0850M-...~DA0890M-...		
	DRA090M-3	●	9.00	9.49		83	28.5				DA0900M-...~DA0940M-...		
	DRA095M-3	●	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-...	S32-CH12 -DRA	
	DRA105M-3	●	10.50	10.99		94	33.0				DA1050M-...~DA1090M-...		
	DRA110M-3	●	11.00	11.49		97	34.5				DA1100M-...~DA1140M-...		
	DRA115M-3	●	11.50	11.99		99	36.0				DA1150M-...~DA1190M-...		
SS14-	DRA120M-3	●	12.00	12.49	14	101	37.5				DA1200M-...~DA1240M-...	S32-CH14 -DRA	
	DRA125M-3	●	12.50	12.99		103	39.0				DA1250M-...~DA1290M-...		
	DRA130M-3	●	13.00	13.49		105	40.5				DA1300M-...~DA1340M-...		
	DRA135M-3	●	13.50	13.99		107	42.0				DA1350M-...~DA1390M-...		
SS16-	DRA140M-3	●	14.00	14.49	16	112	43.5	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16 -DRA	
	DRA145M-3	●	14.50	14.99		114	45.0				DA1450M-...~DA1490M-...		
	DRA150M-3	●	15.00	15.99		119	48.0				DA1500M-...~DA1590M-...		
SS18-	DRA160M-3	●	16.00	16.99	18	124	51.0				DA1600M-...~DA1690M-...	S32-CH18 -DRA	
	DRA170M-3	●	17.00	17.99		128	54.0				DA1700M-...~DA1790M-...		
SS20-	DRA180M-3	●	18.00	18.99	20	135	57.0	50			DA1800M-...~DA1890M-...	S32-CH20 -DRA	
	DRA190M-3	●	19.00	19.99		139	60.0				DA1900M-...~DA1990M-...		
SS25-	DRA200M-3	●	20.00	20.99	25	149	63.0	56	HS-4067TRP	DTP-7	DA2000M-...~DA2090M-...	-	-
	DRA210M-3	●	21.00	21.99		153	66.0				DA2100M-...~DA2150M-...		
	DRA220M-3	●	22.00	22.99		158	69.0				DA2200M-...~DA2250M-...		
	DRA230M-3	●	23.00	23.99		162	72.0				DA2300M-...~DA2350M-...		
	DRA240M-3	●	24.00	24.99		166	75.0				DA2400M-...~DA2450M-...		
SS32-	DRA250M-3	●	25.00	25.50	32	174	78.0	60			DA2500M-...~DA2550M-...		

SS-DRA (Drilling Depth : 5 x DC)



5D

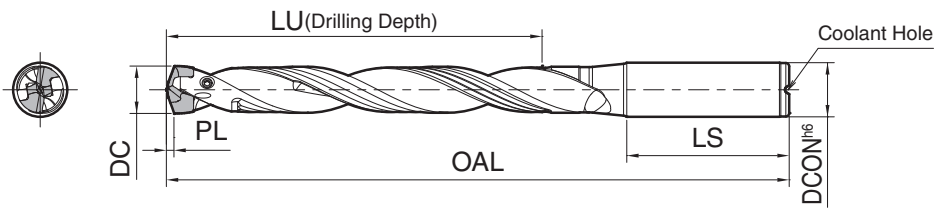
For PL indicates distance from drill point to corner edge K7~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)					Spare Parts		Applicable Inserts 🌀 K7~K11	Applicable Chamfering Holder and Insert Description 🌀 K16		
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw		Wrench	Holder	Insert
			min.	max.									
SS10-	DRA080M-5	●	7.94	8.49	10	96	42.5	40	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...	S20-CH10 -DRA	CT12T3 -45DA
	DRA085M-5	●	8.50	8.99		99	45.0				DA0850M-...~DA0890M-...		
	DRA090M-5	●	9.00	9.49		102	47.5				DA0900M-...~DA0940M-...		
	DRA095M-5	●	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-...	S32-CH12 -DRA	
	DRA105M-5	●	10.50	10.99		116	55.0				DA1050M-...~DA1090M-...		
	DRA110M-5	●	11.00	11.49		120	57.5				DA1100M-...~DA1140M-...		
	DRA115M-5	●	11.50	11.99		123	60.0				DA1150M-...~DA1190M-...		
SS14-	DRA120M-5	●	12.00	12.49	14	126	62.5	45	HS-2534TRP	FTP-5	DA1200M-...~DA1240M-...	S32-CH14 -DRA	
	DRA125M-5	●	12.50	12.99		129	65.0				DA1250M-...~DA1290M-...		
	DRA130M-5	●	13.00	13.49		132	67.5				DA1300M-...~DA1340M-...		
	DRA135M-5	●	13.50	13.99		135	70.0				DA1350M-...~DA1390M-...		
SS16-	DRA140M-5	●	14.00	14.49	16	141	72.5	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16 -DRA	
	DRA145M-5	●	14.50	14.99		144	75.0				DA1450M-...~DA1490M-...		
	DRA150M-5	●	15.00	15.99		151	80.0				DA1500M-...~DA1590M-...		
SS18-	DRA160M-5	●	16.00	16.99	18	158	85.0	48	HS-3048TRP	DTP-6	DA1600M-...~DA1690M-...	S32-CH18 -DRA	
	DRA170M-5	●	17.00	17.99		164	90.0				DA1700M-...~DA1790M-...		
SS20-	DRA180M-5	●	18.00	18.99	20	173	95.0	50	HS-3048TRP	DTP-6	DA1800M-...~DA1890M-...	S32-CH20 -DRA	
	DRA190M-5	●	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-...	-	-
	DRA210M-5	●	21.00	21.99		197	110.0				DA2100M-...~DA2150M-...		
	DRA220M-5	●	22.00	22.99		204	115.0				DA2200M-...~DA2250M-...		
	DRA230M-5	●	23.00	23.99		210	120.0				DA2300M-...~DA2350M-...		
	DRA240M-5	●	24.00	24.99		216	125.0				DA2400M-...~DA2450M-...		
	DRA250M-5	●	25.00	25.50		32	226				130.0		

● : Std. Item

SS-DRA (Drilling Depth : 8 x DC)

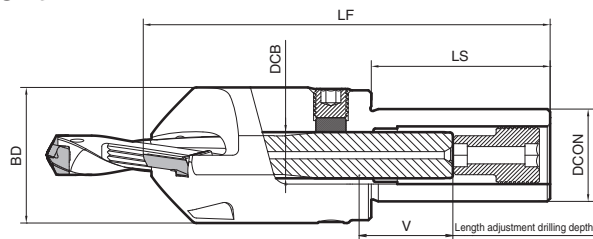


For PL indicates distance from drill point to corner edge **K7~K11**

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts		Applicable Inserts 🔄 K7~K11	Applicable Chamfering Holder and Insert Description 🔄 K16	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Clamp Screw	Wrench		Holder	Insert
			min.	max.									
SS10- DRA080M-8	●	7.94	8.49	10	121	68.0	40	HS-2524TRP		DA0794M-...~DA0840M-...	S20-CH10 -DRA	CT12T3 -45DA	
	●	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-...	S32-CH12 -DRA		
	●	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				DA1200M-...~DA1240M-...	S32-CH14 -DRA		
	●	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	48	HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...	S32-CH16 -DRA		
	●	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				DA1600M-...~DA1690M-...	S32-CH18 -DRA		
	●	17.00	17.99		218	144.0				DA1700M-...~DA1790M-...			
SS20- DRA180M-8	●	18.00	18.99	20	230	152.0	50			DA1800M-...~DA1890M-...	S32-CH20 -DRA		
	●	19.00	19.99		239	160.0				DA1900M-...~DA1990M-...			
SS25- DRA200M-8	●	20.00	20.99	25	254	168.0	56	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			DA2500M-...~DA2550M-...			

Chamfering Attachment



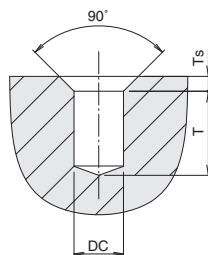
Holder

Description	Stock	Applicable Drill Shank Dia. DCB	Dimension (mm)					Applicable Inserts
			DCON	BD	LF	LS	V(Max.)	
S20-CH10-DRA	●	10	20	39	110	52	18	CT12T3-45DA
S32-CH12-DRA	●	12	32	43	130	62	24	
S32-CH14-DRA	●	14	32	45	130	62	24	
S32-CH16-DRA	●	16	32	47	141	62	24	
S32-CH18-DRA	●	18	32	49	145	62	24	
S32-CH20-DRA	●	20	32	53	150	62	24.5	

Applicable Inserts

Insert	Description	MEGACOAT NANO	Dimension (mm)	
		PR1535	W1	S
	CT12T3-45DA	●	13.54	3.97

Drilling Depth and Chamfering Dimension



Drill Dia. (mm) DC		Drilling Depth (mm)						Chamfering dimension (mm)		Applicable Chamfering Holder
		T(3D Drill)		T(5D Drill)		T(8D Drill)				
min.	max.	min.	max.	min.	max.	min.	max.	Ts	Ts max.	
7.94	8.49	12.5	20	18	36	43	60	2.5	8	S20-CH10-DRA
8.50	8.99	12.5	21.5	21.5	38.5	48	64			
9.00	9.49	12.5	23	24	41	52	68			
9.50	9.99	12.5	24.5	27.5	43.5	57.5	72.5			
10.00	10.49	15.5	26	22	46	52	76	4	8	S32-CH12-DRA
10.50	10.99	16	27.5	24.5	48.5	56	80			
11.00	11.49	16.5	29	27	51	60	84			
11.50	11.99	17.5	30.5	29.5	53.5	64	88			
12.00	12.49	18	32	32	56	68	92	4	8	S32-CH14-DRA
12.50	12.99	19	34	35	59	72.5	96.5			
13.00	13.49	19.5	35.5	37.5	61.5	76	100			
13.50	13.99	20	36.5	39.5	63.5	80	104			
14.00	14.49	21	38.5	42.5	66.5	84.5	108.5	4	8	S32-CH16-DRA
14.50	14.99	21.5	40	45	69	88.5	112.5			
15.00	15.99	22.5	41.5	47.5	71.5	92.5	116.5			
16.00	16.99	24	44.5	52.5	76.5	100.5	124.5	4	8	S32-CH18-DRA
17.00	17.99	25.5	47.5	57.5	81.5	108.5	132.5			
18.00	18.99	27.5	51	64	87	121	141	4	8	S32-CH20-DRA
19.00	19.99	29.5	54	69	92	129	149			

Ts : Maximum chamfer depth with recommended cutting conditions for DRA

Ts max. : Adjusting cutting conditions, such as reducing feed to 50% and/or lower cutting speed, is required.

● : Std. Item

Inserts are sold in 10 piece boxes

Spare Parts

Chamfering Holder	Adjustment Screw		For Fixing Drills					For Mounting Inserts		
			Clamp	Clamp Screw		Plunge Screw	Clamp	Clamp Screw	Wrench	
Description		Hexagon hole two side widths			Hexagon hole two side widths	Tightening Torque (N·m)				
S20-CH10-DRA	AJ-12X22	6	CP-CH10	HS8X8	4	12	BNP6	C09N	W6X18N	DTM-15
S32-CH12-DRA	AJ-16X30		CP-CH12			15				
S32-CH14-DRA	AJ-20X30	8	CP-CH14	HS10X10	5	20				
S32-CH16-DRA			CP-CH16			30				
S32-CH18-DRA	AJ-22X35	10	CP-CH18	HS12X10	6	30				
S32-CH20-DRA			CP-CH20			45				

Method to use DRA chamfering attachment

1. Mount DRA drill into the chamfering attachment.



fig. 1 Install the DRA

2. Install an insert and tighten temporarily with clearance between the cutting edge and DRA body.

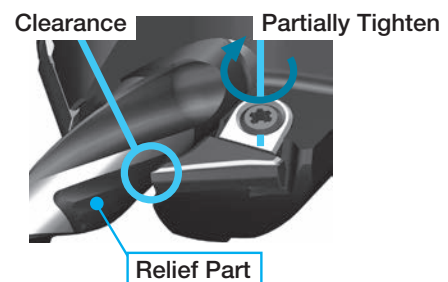


fig. 2 Install Inserts

3. Adjust drilling depth by turning adjustment screw with hexagon wrench

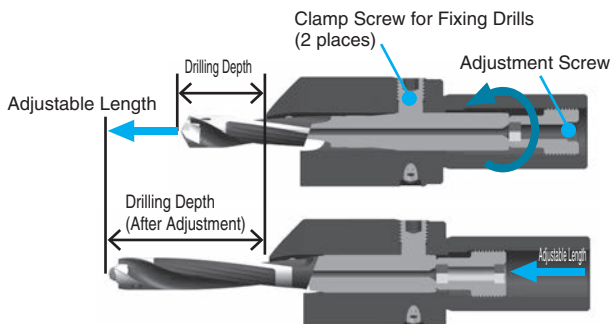


fig. 3 Adjustment of Drilling Depth

4. Align the flute edge and black relief part of the drill to the position shown in Fig.4 by rotating the DRA drill.

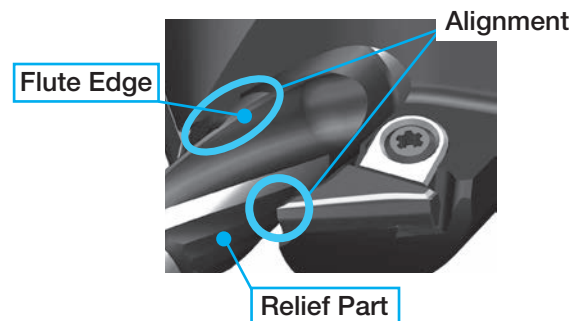


fig. 4 DRA Alignment

5. Fasten the two clamp screws for DRA (See table 1. for recommended torque)

Table 1 Recommended Torque

Chamfering Attachment	Clamp Screw	
	Recommended Torque (N·m)	Hexagon hole two side widths (mm)
S20-CH10-DRA	12	4
S32-CH12-DRA	15	
S32-CH14-DRA	20	5
S32-CH16-DRA	30	6
S32-CH18-DRA	30	
S32-CH20-DRA	45	8

Cautions

- Chamfering attachment is dedicated for Straight Shank SS-DRA. It cannot be used for Flanged Shank SF-DRA.
- Chamfering requires two chamfering inserts. Using one insert is not recommended.
- Only fully remove clamp screws when replacing them.

6. Tighten the inserts while lightly pressing the edge of insert against the relief part. (Recommended Torque 3.5N·m)

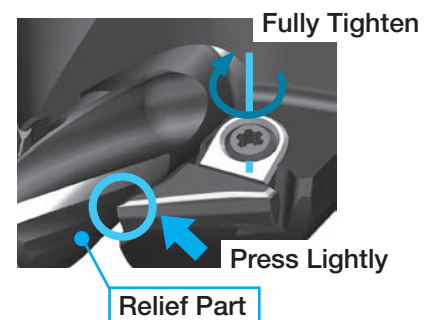
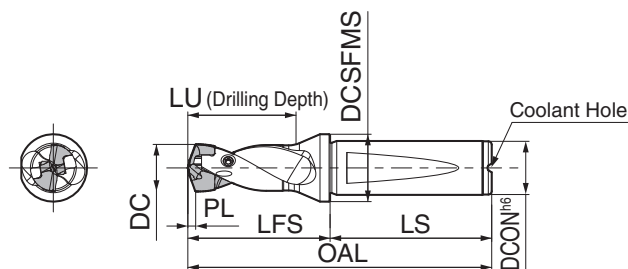


fig. 5 Fully Tighten

- Clamps and clamp screws for mounting inserts need to be replaced regularly
- Screw locking adhesive is applied to adjustment screw. The effect will eventually wear off if the screws are used for a long time. Regular replacement is recommended.
- Please do not operate the plunge screws.

SF-DRA (Drilling Depth : 1.5 x DC)



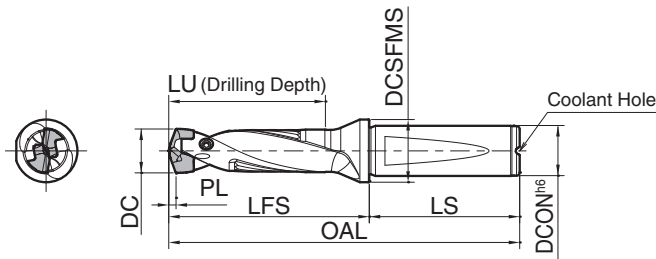
1.5D

For PL indicates distance from drill point to corner edge **K7-K11**

Toolholder Dimensions

Description		Stock	Dimension (mm)								Spare Parts		Applicable Inserts 🔧 K7~K11						
			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		DA0794M-...~DA0840M-...						
	DRA085M-1.5	●	8.50	8.99		72.5	27.5	13.5					DA0850M-...~DA0890M-...						
	DRA090M-1.5	●	9.00	9.49		73.7	28.7	14.3					DA0900M-...~DA0940M-...						
	DRA095M-1.5	●	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-...						
	DRA105M-1.5	●	10.50	10.99		80.5	32.5	16.5					DA1050M-...~DA1090M-...						
	DRA110M-1.5	●	11.00	11.49		82.7	34.7	17.3					DA1100M-...~DA1140M-...						
	DRA115M-1.5	●	11.50	11.99		84.0	36.0	18.0					DA1150M-...~DA1190M-...						
	DRA120M-1.5	●	12.00	12.49		85.2	37.2	18.8					DA1200M-...~DA1240M-...						
	DRA125M-1.5	●	12.50	12.99		86.5	38.5	19.5					DA1250M-...~DA1290M-...						
	DRA130M-1.5	●	13.00	13.49		87.7	39.7	20.3					DA1300M-...~DA1340M-...						
	DRA135M-1.5	●	13.50	13.99		89.0	41.0	21.0					DA1350M-...~DA1390M-...						
	DRA140M-1.5	●	14.00	14.49		90.2	42.2	21.8			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...						
	DRA145M-1.5	●	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			DA1500M-...~DA1590M-...
		DRA160M-1.5	●	16.00		16.99		100.5					50.5	25.5					DA1600M-...~DA1690M-...
DRA170M-1.5		●	17.00	17.99	103.0	53.0		27.0	DA1700M-...~DA1790M-...										
SF25-	DRA180M-1.5	●	18.00	18.99	25	112.5	56.5	28.5	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...						
	DRA190M-1.5	●	19.00	19.99		115.0	59.0	30.0					DA1900M-...~DA1990M-...						
	DRA200M-1.5	●	20.00	20.99		117.5	61.5	31.5					DA2000M-...~DA2090M-...						
	DRA210M-1.5	●	21.00	21.99		120.0	64.0	33.0					DA2100M-...~DA2150M-...						
	DRA220M-1.5	●	22.00	22.99		123.5	67.5	34.5					DA2200M-...~DA2250M-...						
	DRA230M-1.5	●	23.00	23.99		126.0	70.0	36.0					DA2300M-...~DA2350M-...						
	DRA240M-1.5	●	24.00	24.99		128.5	72.5	37.5					DA2400M-...~DA2450M-...						
	DRA250M-1.5	●	25.00	25.50		131.0	75.0	39.0					DA2500M-...~DA2550M-...						

SF-DRA (Drilling Depth : 3 x DC)



3D

For PL indicates distance from drill point to corner edge K7-K11

Toolholder Dimensions

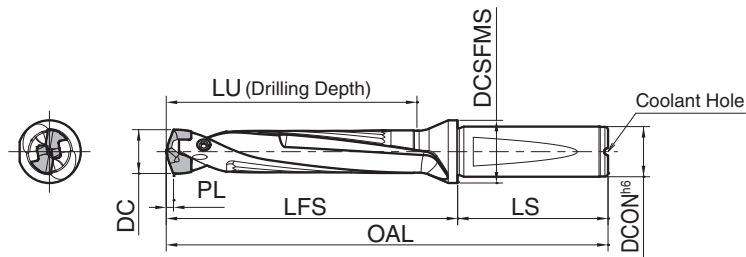
Description		Stock	Dimension (mm)								Spare Parts		Applicable Inserts 🔩 K7~K11
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LU	LS	DCSFMS	Clamp Screw	Wrench	
			min.	max.									
SF12-	DRA080M-3	●	7.94	8.49	12	84	39	25.5	45	16	HS-2524TRP	FTP-5	DA0794M-...~DA0840M-...
	DRA085M-3	●	8.50	8.99		86	41	27.0					DA0850M-...~DA0890M-...
	DRA090M-3	●	9.00	9.49		88	43	28.5					DA0900M-...~DA0940M-...
	DRA095M-3	●	9.50	9.99		90	45	30.0					DA0950M-...~DA0990M-...
SF16-	DRA100M-3	●	10.00	10.49	16	95	47	31.5	48	20	HS-2534TRP	FTP-5	DA1000M-...~DA1040M-...
	DRA105M-3	●	10.50	10.99		97	49	33.0					DA1050M-...~DA1090M-...
	DRA110M-3	●	11.00	11.49		100	52	34.5					DA1100M-...~DA1140M-...
	DRA115M-3	●	11.50	11.99		102	54	36.0					DA1150M-...~DA1190M-...
	DRA120M-3	●	12.00	12.49		104	56	37.5					DA1200M-...~DA1240M-...
	DRA125M-3	●	12.50	12.99		106	58	39.0					DA1250M-...~DA1290M-...
	DRA130M-3	●	13.00	13.49		108	60	40.5					DA1300M-...~DA1340M-...
	DRA135M-3	●	13.50	13.99		110	62	42.0					DA1350M-...~DA1390M-...
	DRA140M-3	●	14.00	14.49		112	64	43.5			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...
	DRA145M-3	●	14.50	14.99		114	66	45.0					DA1450M-...~DA1490M-...
SF20-	DRA150M-3	●	15.00	15.99	20	121	71	48.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	DRA160M-3	●	16.00	16.99		126	76	51.0					DA1600M-...~DA1690M-...
	DRA170M-3	●	17.00	17.99		130	80	54.0					DA1700M-...~DA1790M-...
SF25-	DRA180M-3	●	18.00	18.99	25	141	85	57.0	56	32	HS-4067TRP	DTP-7	DA1800M-...~DA1890M-...
	DRA190M-3	●	19.00	19.99		145	89	60.0					DA1900M-...~DA1990M-...
	DRA200M-3	●	20.00	20.99		149	93	63.0					DA2000M-...~DA2090M-...
	DRA210M-3	●	21.00	21.99		153	97	66.0					DA2100M-...~DA2150M-...
	DRA220M-3	●	22.00	22.99		158	102	69.0					DA2200M-...~DA2250M-...
	DRA230M-3	●	23.00	23.99		162	106	72.0					DA2300M-...~DA2350M-...
	DRA240M-3	●	24.00	24.99		166	110	75.0					DA2400M-...~DA2450M-...
	DRA250M-3	●	25.00	25.50		170	114	78.0					DA2500M-...~DA2550M-...

● : Std. Item

Insert Grades
Turning
Indexable Inserts
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Machining
Boring
Grooving
Cut-off
Threading
Drilling
Solid Tools
Milling
Tools for
Turning Mill
Spare Parts
Technical
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SF-DRA (Drilling Depth : 5 x DC)



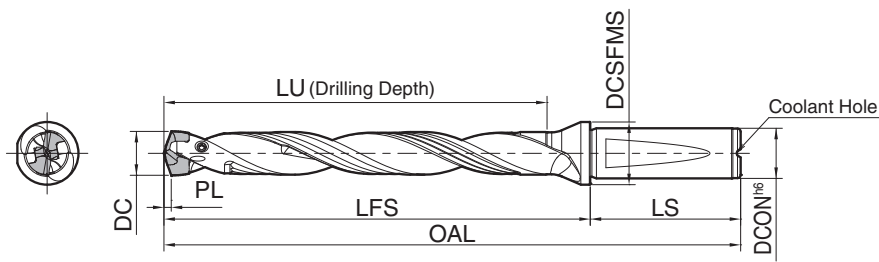
5D

For PL indicates distance from drill point to corner edge **K7~K11**

Toolholder Dimensions

Description		Stock	Dimension (mm)								Spare Parts		Applicable Inserts 🌀 K7~K11
			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-...
	DRA085M-5	●	8.50	8.99		104	59	45.0					DA0850M-...~DA0890M-...
	DRA090M-5	●	9.00	9.49		107	62	47.5					DA0900M-...~DA0940M-...
	DRA095M-5	●	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		DA1000M-...~DA1040M-...
	DRA105M-5	●	10.50	10.99		119	71	55.0					DA1050M-...~DA1090M-...
	DRA110M-5	●	11.00	11.49		123	75	57.5					DA1100M-...~DA1140M-...
	DRA115M-5	●	11.50	11.99		126	78	60.0					DA1150M-...~DA1190M-...
	DRA120M-5	●	12.00	12.49		129	81	62.5					DA1200M-...~DA1240M-...
	DRA125M-5	●	12.50	12.99		132	84	65.0					DA1250M-...~DA1290M-...
	DRA130M-5	●	13.00	13.49		135	87	67.5					DA1300M-...~DA1340M-...
	DRA135M-5	●	13.50	13.99		138	90	70.0					DA1350M-...~DA1390M-...
	DRA140M-5	●	14.00	14.49		141	93	72.5			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...
	DRA145M-5	●	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	DRA1500M-...~DA1590M-...	
	DRA160M-5	●	16.00	16.99		160	110	85.0				DA1600M-...~DA1690M-...	
	DRA170M-5	●	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-...
	DRA190M-5	●	19.00	19.99		185	129	100.0					DA1900M-...~DA1990M-...
	DRA200M-5	●	20.00	20.99		191	135	105.0					DA2000M-...~DA2090M-...
	DRA210M-5	●	21.00	21.99		197	141	110.0					DA2100M-...~DA2150M-...
	DRA220M-5	●	22.00	22.99		204	148	115.0					DA2200M-...~DA2250M-...
	DRA230M-5	●	23.00	23.99		210	154	120.0					DA2300M-...~DA2350M-...
	DRA240M-5	●	24.00	24.99		216	160	125.0					DA2400M-...~DA2450M-...
	DRA250M-5	●	25.00	25.50		222	166	130.0					DA2500M-...~DA2550M-...

SF-DRA (Drilling Depth : 8 x DC)



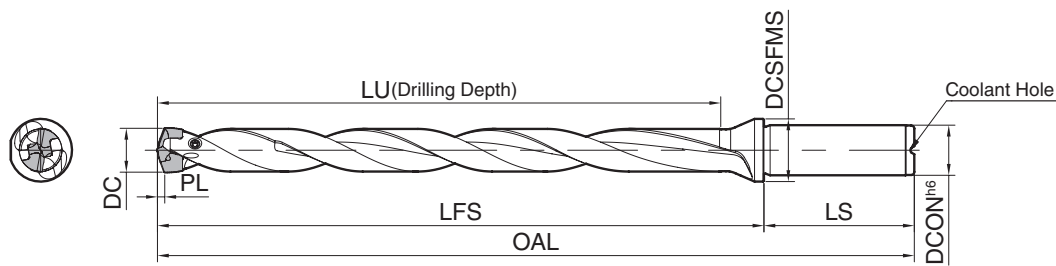
For PL indicates distance from drill point to corner edge **K7~K11**

Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts		Applicable Inserts 🌀 K7~K11						
			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-...					
	DRA085M-8	●	8.50	8.99		131	86	72.0					DA0850M-...~DA0890M-...					
	DRA090M-8	●	9.00	9.49		135	90	76.0					DA0900M-...~DA0940M-...					
	DRA095M-8	●	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-...					
	DRA105M-8	●	10.50	10.99		152	104	88.0					DA1050M-...~DA1090M-...					
	DRA110M-8	●	11.00	11.49		157	109	92.0					DA1100M-...~DA1140M-...					
	DRA115M-8	●	11.50	11.99		162	114	96.0					DA1150M-...~DA1190M-...					
	DRA120M-8	●	12.00	12.49		166	118	100.0					DA1200M-...~DA1240M-...					
	DRA125M-8	●	12.50	12.99		171	123	104.0					DA1250M-...~DA1290M-...					
	DRA130M-8	●	13.00	13.49		175	127	108.0					DA1300M-...~DA1340M-...					
	DRA135M-8	●	13.50	13.99		180	132	112.0					DA1350M-...~DA1390M-...					
	DRA140M-8	●	14.00	14.49		184	136	116.0			HS-3048TRP	DTP-6	DA1400M-...~DA1440M-...					
	DRA145M-8	●	14.50	14.99		189	141	120.0					DA1450M-...~DA1490M-...					
	DRA150M-8	●	15.00	15.99		20	201	151					128.0	50	25	HS-3048TRP	DTP-6	DA1500M-...~DA1590M-...
	DRA160M-8	●	16.00	16.99			211	161					136.0					DA1600M-...~DA1690M-...
DRA170M-8	●	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-...					
	DRA190M-8	●	19.00	19.99		245	189	160.0					DA1900M-...~DA1990M-...					
	DRA200M-8	●	20.00	20.99		254	198	168.0					DA2000M-...~DA2090M-...					
	DRA210M-8	●	21.00	21.99		263	207	176.0					DA2100M-...~DA2150M-...					
	DRA220M-8	●	22.00	22.99		273	217	184.0					DA2200M-...~DA2250M-...					
	DRA230M-8	●	23.00	23.99		282	226	192.0					DA2300M-...~DA2350M-...					
	DRA240M-8	●	24.00	24.99		291	235	200.0					DA2400M-...~DA2450M-...					
	DRA250M-8	●	25.00	25.50		300	244	208.0					DA2500M-...~DA2550M-...					

SF-DRA (Drilling Depth : 12 x DC)

NEW



12D

For PL indicates distance from drill point to corner edge ● K7,K9~K11

Toolholder Dimensions

Description		Stock	Dimension (mm)							Spare Parts		Applicable Inserts 🌀 K7,K9~K11	
			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-...
	DRA125M-12	●	12.50	12.99		223	175	156.0					DA1250M-...~DA1290M-...
	DRA130M-12	●	13.00	13.49		229	181	162.0					DA1300M-...~DA1340M-...
	DRA135M-12	●	13.50	13.99		236	188	168.0					DA1350M-...~DA1390M-...
	DRA140M-12	●	14.00	14.49		242	194	174.0			DA1400M-...~DA1440M-...		
	DRA145M-12	●	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-...
	DRA160M-12	●	16.00	16.99		279	229	204.0					DA1600M-...~DA1690M-...
	DRA170M-12	●	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-...
	DRA190M-12	●	19.00	19.99		325	269	240.0					DA1900M-...~DA1990M-...
	DRA200M-12	●	20.00	20.99		338	282	252.0					DA2000M-...~DA2090M-...
	DRA210M-12	●	21.00	21.99		351	295	264.0					DA2100M-...~DA2150M-...
	DRA220M-12	●	22.00	22.99		365	309	276.0					DA2200M-...~DA2250M-...
	DRA230M-12	●	23.00	23.99		378	322	288.0					DA2300M-...~DA2350M-...
	DRA240M-12	●	24.00	24.99		391	335	300.0					DA2400M-...~DA2450M-...
	DRA250M-12	●	25.00	25.50		404	348	312.0					DA2500M-...~DA2550M-...

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

● : Std. Item

◆ Recommended Cutting Conditions

High Precision Insert for Steel **HQP**

High Precision Insert for Steel HQP	Workpiece Material	Recommended Insert Grades / Cutting Speed (m/min)	n (min ⁻¹)	Drill Dia. DC (mm)				Remarks
		PR1525	f (mm/rev)	ø8	ø11	ø14	ø19	
	Low Carbon Steel	80 - 180	n (min ⁻¹)	3,180 - 7,160	2,310 - 5,210	1,810 - 4,090	1,410 - 3,180	Coolant
			f (mm/rev)	0.12 - 0.24	0.12 - 0.28	0.16 - 0.32	0.16 - 0.36	
	Carbon Steel	80 - 150	n (min ⁻¹)	3,180 - 7,160	2,310 - 5,210	1,810 - 4,090	1,410 - 3,180	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.28	0.16 - 0.32	0.16 - 0.36	
	Alloy Steel	70 - 120	n (min ⁻¹)	2,790 - 4,780	2,030 - 3,470	1,590 - 2,730	1,240 - 2,120	
			f (mm/rev)	0.12 - 0.24	0.12 - 0.28	0.16 - 0.32	0.16 - 0.36	
	Mold Steel	50 - 90	n (min ⁻¹)	1,990 - 3,580	1,450 - 2,600	1,140 - 2,050	880 - 1,590	
f (mm/rev)			0.08 - 0.17	0.08 - 0.2	0.11 - 0.23	0.11 - 0.26		

Caution : Recommended cutting conditions above is for 1.5D/3D type. As drilling depth increases (1.5D/3D→5D→8D→12D), feed rates need to be set lower than the recommended values.
Recommended feed rate : 1.5D/3D type=100%, 5D type=80% or less, 8D/12D type=70% or less

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)						Remarks
		PR1535	PR1525	f (mm/rev)	ø8	ø11	ø14	ø18	ø22	ø25	
	Low Carbon Steel	★ 100 - 180	☆ 100 - 180	n (min ⁻¹)	3,980 - 7,160	2,890 - 5,210	2,270 - 4,090	1,770 - 3,180	1,450 - 2,600	1,270 - 2,290	Coolant
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Carbon Steel	★ 100 - 150	☆ 100 - 150	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	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Alloy Steel	★ 70 - 120	☆ 70 - 120	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	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Mold Steel	★ 50 - 90	☆ 50 - 90	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	0.08 - 0.22	0.11 - 0.25	0.11 - 0.28	0.14 - 0.32	0.14 - 0.32	
Stainless Steel	★ 40 - 70	☆ 40 - 70	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	0.1 - 0.24	0.12 - 0.3	0.15 - 0.3	0.15 - 0.3	0.15 - 0.35		
*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5 x DC											
Cast Iron KM	Gray Cast Iron	☆ 90 - 170	★ 90 - 170	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	0.14 - 0.37	0.19 - 0.43	0.19 - 0.45	0.24 - 0.45	0.24 - 0.45	
	Nodular Cast Iron	☆ 40 - 120	★ 40 - 120	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	0.12 - 0.31	0.16 - 0.36	0.16 - 0.4	0.2 - 0.45	0.2 - 0.45	
	Gray Cast Iron	-	90 - 170	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	0.19 - 0.42	0.23 - 0.53	0.25 - 0.60	0.32 - 0.60	0.32 - 0.60	
Nodular Cast Iron	-	40 - 120	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	0.21 - 0.48	0.24 - 0.60	0.27 - 0.60	0.27 - 0.60		

*Recommended cutting conditions above is for 1.5D/3D type. As drilling depth increases (1.5D/3D→5D→8D→12D), cutting speed and feed rates need to be set lower than the recommended values.

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

Recommended cutting speed and feed rate: 8D type=80% or less, 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)						Remarks
		PR1535	PR1525	f (mm/rev)	ø8	ø11	ø14	ø18	ø22	ø25	
	Low Carbon Steel	★ 80 - 150	☆ 80 - 150	n (min ⁻¹)	3,150 - 6,000	2,300 - 4,350	1,800 - 3,400	1,400 - 2,650	1,150 - 2,200	1,000 - 1,900	Coolant
				f (mm/rev)	0.12 - 0.24	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.20 - 0.45	0.20 - 0.45	
	Carbon Steel	★ 80 - 120	☆ 80 - 120	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	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.20 - 0.45	0.20 - 0.45	
	Alloy Steel	★ 70 - 120	☆ 70 - 120	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	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.20 - 0.40	0.20 - 0.45	
	Mold Steel	★ 40 - 70	☆ 40 - 70	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	0.08 - 0.22	0.11 - 0.25	0.11 - 0.28	0.14 - 0.30	0.14 - 0.32	
Stainless Steel	★ 40 - 70	☆ 40 - 70	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	0.10 - 0.20	0.10 - 0.24	0.15 - 0.24	0.15 - 0.24	0.15 - 0.28		
*Feed Rate 0.15 mm/rev or less is recommended until drilling depth reaches 0.5 x DC											
Gray Cast Iron	☆ 70 - 140	★ 70 - 140	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	0.14 - 0.37	0.19 - 0.43	0.19 - 0.45	0.24 - 0.45	0.24 - 0.45		
Nodular Cast Iron	☆ 40 - 100	★ 40 - 100	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	0.12 - 0.31	0.16 - 0.36	0.16 - 0.40	0.2 - 0.45	0.2 - 0.45		

*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.

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

Recommended cutting speed and feed rate: 8D type=80% or less, 12D type=70% or less

★ : 1st Recommendation

☆ : 2nd Recommendation

Insert Grades	A
Turning	B
CBN & PCD 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
Spare Parts	P
Technical Information	R
Index	T

MagicDrill DRA

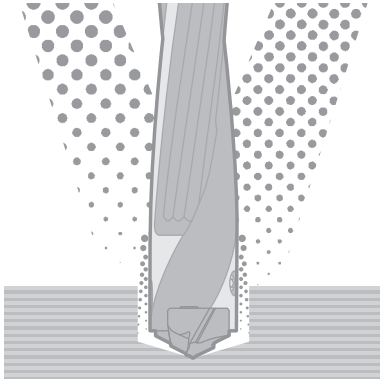
Coolant * Dry machining is not recommended.

1st Recommendation

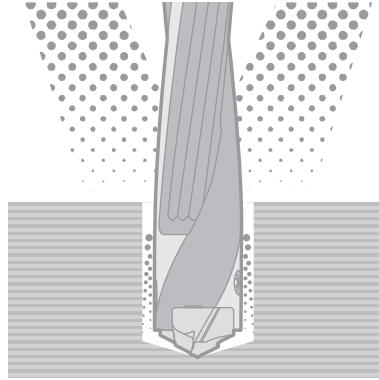
Internal coolant

Internal and external coolant is recommended

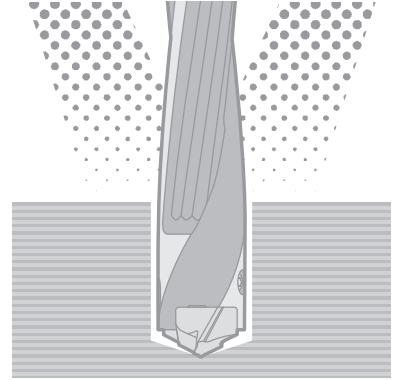
Drilling Depth Less than 1DC



Stainless Steel, high feed rate



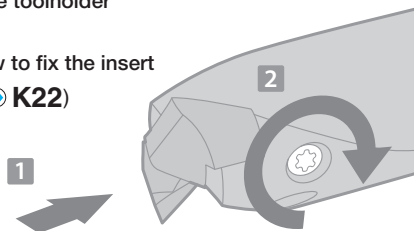
In case of external coolant



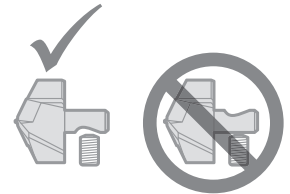
Lathe : 3DC or less
Vertical M/C : 1.5DC or less

How to attach inserts

- 1 Install insert onto the toolholder in the right direction
- 2 Tighten clamp screw to fix the insert
(Tightening Torque **K22**)



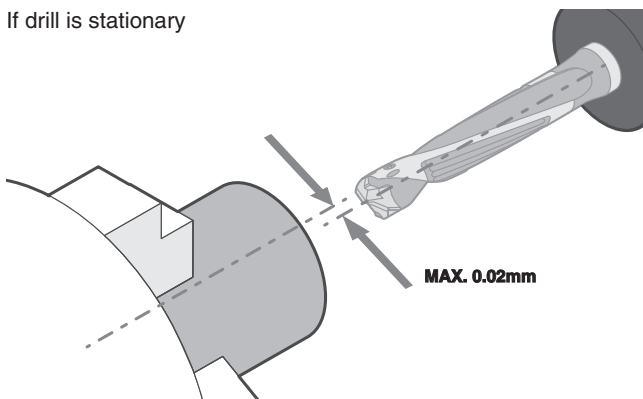
Be careful of the insert direction



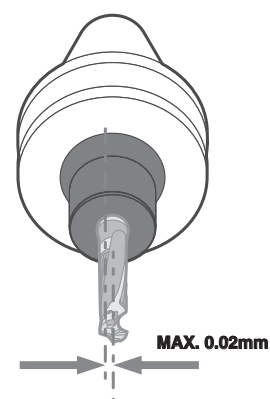
- * 1 Remove dust on insert pocket using air blow for every replacement.
- * 2 Make sure that the locating surfaces of the insert closely contacts the toolholder.

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

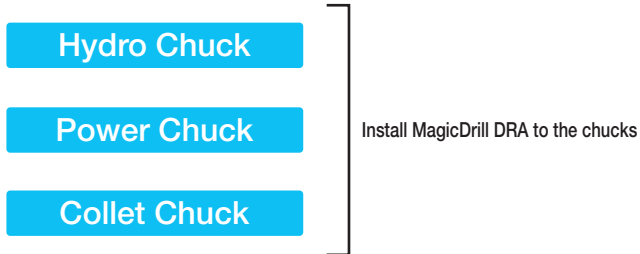
Fine
Micro

Cautions for installation on Machining Center

For installation of MagicDrill DRA

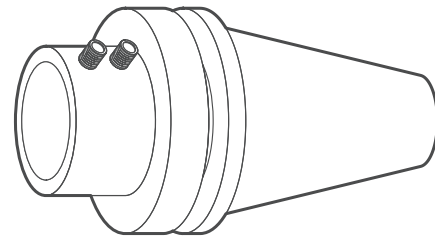
1st Choice

Hydro Chuck, Power Chuck, Collet Chuck, etc.



2nd Choice

Side lock arbor

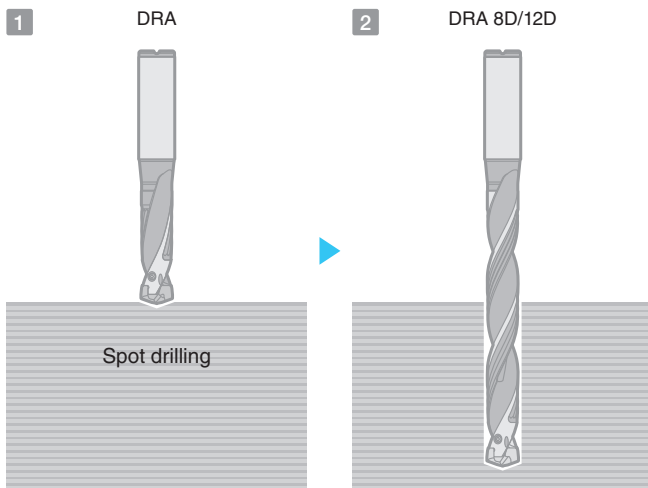


Example of side lock arbor

Cautions for machining with 8D/12D holder

Recommended machining

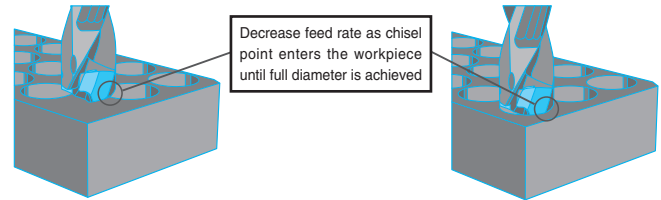
- 1 Make a center spot using DRA 1.5D/3D/5D type.
(Center spot should be at least half of cutting diameter)
- 2 Then drill the hole using DRA (8D/12D type).



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. Center portion machining *Curved surface portion machining

* Machining Possible with FTP and 1.5D toolholder

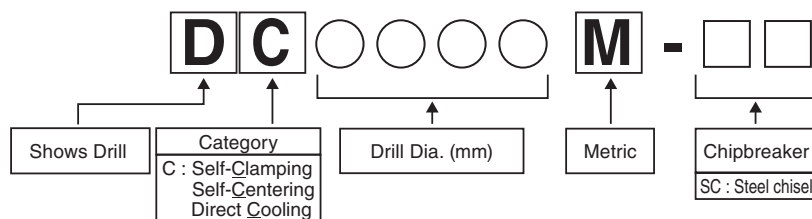
Not Recommended workpieces

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

* Machining Possible with FTP and 1.5D toolholder

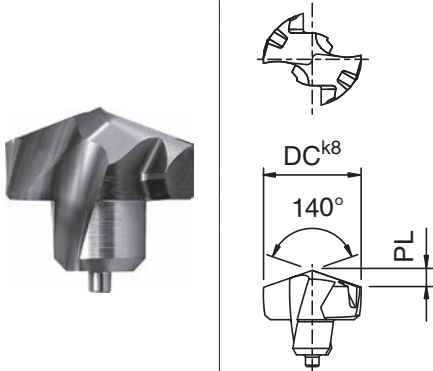
Inserts for MagicDrill DRC

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 K29~K31, K34~K36
		DC	PL	PR0315	
	DC 0794M-SC	7.94	1.37	●	SS10-DRC080M-○ SF12-DRC080M-○
	0800M-SC	8.00	1.38	●	
	0810M-SC	8.10	1.40	●	
	0820M-SC	8.20	1.42	●	
	0830M-SC	8.30	1.43	●	
	0840M-SC	8.40	1.45	●	SS10-DRC085M-○ SF12-DRC085M-○
	DC 0850M-SC	8.50	1.47	●	
	0860M-SC	8.60	1.48	●	
	0870M-SC	8.70	1.50	●	
	0880M-SC	8.80	1.52	●	
	0890M-SC	8.90	1.54	●	SS10-DRC090M-○ SF12-DRC090M-○
	DC 0900M-SC	9.00	1.55	●	
	0910M-SC	9.10	1.57	●	
	0920M-SC	9.20	1.59	●	
	0930M-SC	9.30	1.61	●	
	0940M-SC	9.40	1.62	●	SS10-DRC095M-○ SF12-DRC095M-○
	DC 0950M-SC	9.50	1.64	●	
	0960M-SC	9.60	1.66	●	
	0970M-SC	9.70	1.67	●	
	0980M-SC	9.80	1.69	●	
	0990M-SC	9.90	1.71	●	SS12-DRC100M-○ SF16-DRC100M-○
	DC 1000M-SC	10.00	1.72	●	
	1010M-SC	10.10	1.74	●	
	1020M-SC	10.20	1.76	●	
	1030M-SC	10.30	1.78	●	
	1040M-SC	10.40	1.80	●	SS12-DRC105M-○ SF16-DRC105M-○
	DC 1050M-SC	10.50	1.81	●	
	1060M-SC	10.60	1.83	●	
	1070M-SC	10.70	1.85	●	
	1080M-SC	10.80	1.86	●	
	1090M-SC	10.90	1.88	●	SS12-DRC110M-○ SF16-DRC110M-○
	DC 1100M-SC	11.00	1.90	●	
	1110M-SC	11.10	1.91	●	
	1120M-SC	11.20	1.93	●	
	1130M-SC	11.30	1.95	●	
	1140M-SC	11.40	1.97	●	SS12-DRC115M-○ SF16-DRC115M-○
	DC 1150M-SC	11.50	1.98	●	
	1160M-SC	11.60	2.00	●	
	1170M-SC	11.70	2.02	●	
	1180M-SC	11.80	2.04	●	
	1190M-SC	11.90	2.06	●	SS14-DRC120M-○ SF16-DRC120M-○
	DC 1200M-SC	12.00	2.07	●	
	1210M-SC	12.10	2.09	●	
	1220M-SC	12.20	2.11	●	
	1230M-SC	12.30	2.12	●	
	1240M-SC	12.40	2.14	●	

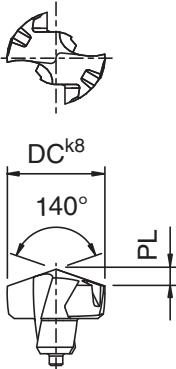
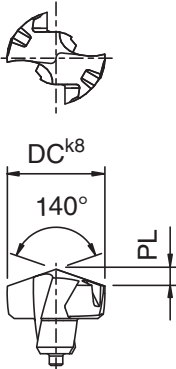
k8 tolerance

DC	k8(mm)
7.94 10.00	+0.022 0
10.10 18.00	+0.027 0
18.10 25.99	+0.033 0

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

DC inserts are
sold in 1 piece boxes

● : Std. Item

Insert		Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholders ➡ K29~K31, K34~K36
			DC	PL	PR0315	
 		DC 1250M-SC	12.50	2.16	●	SS14-DRC125M-○ SF16-DRC125M-○
		1260M-SC	12.60	2.17	●	
		1270M-SC	12.70	2.19	●	
		1280M-SC	12.80	2.21	●	
		1290M-SC	12.90	2.23	●	
		DC 1300M-SC	13.00	2.24	●	SS14-DRC130M-○ SF16-DRC130M-○
		1310M-SC	13.10	2.26	●	
		1320M-SC	13.20	2.28	●	
		1330M-SC	13.30	2.30	●	
		1340M-SC	13.40	2.31	●	
		DC 1350M-SC	13.50	2.33	●	SS14-DRC135M-○ SF16-DRC135M-○
		1360M-SC	13.60	2.35	●	
		1370M-SC	13.70	2.36	●	
		1380M-SC	13.80	2.38	●	
		1390M-SC	13.90	2.40	●	
		DC 1400M-SC	14.00	2.41	●	SS16-DRC140M-○ SF16-DRC140M-○
		1410M-SC	14.10	2.43	●	
		1420M-SC	14.20	2.45	●	
		1430M-SC	14.30	2.47	●	
		1440M-SC	14.40	2.49	●	
		DC 1450M-SC	14.50	2.50	●	SS16-DRC145M-○ SF16-DRC145M-○
		1460M-SC	14.60	2.52	●	
		1470M-SC	14.70	2.54	●	
		1480M-SC	14.80	2.55	●	
		1490M-SC	14.90	2.57	●	
		DC 1500M-SC	15.00	2.59	●	SS16-DRC150M-○ SF20-DRC150M-○
		1510M-SC	15.10	2.60	●	
		1520M-SC	15.20	2.62	●	
		1530M-SC	15.30	2.64	●	
		1540M-SC	15.40	2.66	●	
		1550M-SC	15.50	2.68	●	
		1560M-SC	15.60	2.70	●	
		1570M-SC	15.70	2.71	●	
		1580M-SC	15.80	2.73	●	
		DC 1600M-SC	16.00	2.76	●	
		1610M-SC	16.10	2.78	●	SS18-DRC160M-○ SF20-DRC160M-○
		1620M-SC	16.20	2.80	●	
		1630M-SC	16.30	2.81	●	
		1640M-SC	16.40	2.83	●	
		1650M-SC	16.50	2.85	●	
		1660M-SC	16.60	2.87	●	
		1670M-SC	16.70	2.89	●	
		1680M-SC	16.80	2.90	●	
		1690M-SC	16.90	2.92	●	
		DC 1700M-SC	17.00	2.93	●	SS18-DRC170M-○ SF20-DRC170M-○
		1710M-SC	17.10	2.95	●	
		1720M-SC	17.20	2.97	●	
		1730M-SC	17.30	2.99	●	
		1740M-SC	17.40	3.00	●	
		1750M-SC	17.50	3.02	●	
		1760M-SC	17.60	3.04	●	
		1770M-SC	17.70	3.06	●	
		1780M-SC	17.80	3.08	●	
		1790M-SC	17.90	3.09	●	
		DC 1800M-SC	18.00	3.10	●	SS20-DRC180M-○ SF25-DRC180M-○
		1810M-SC	18.10	3.12	●	
		1820M-SC	18.20	3.14	●	
		1830M-SC	18.30	3.16	●	
		1840M-SC	18.40	3.18	●	
		1850M-SC	18.50	3.19	●	
		1860M-SC	18.60	3.21	●	
		1870M-SC	18.70	3.23	●	
		1880M-SC	18.80	3.25	●	
		1890M-SC	18.90	3.27	●	

k8 tolerance

DC	k8(mm)
7.94 └ 10.00	+0.022 0
10.10 └ 18.00	+0.027 0
18.10 └ 25.99	+0.033 0

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

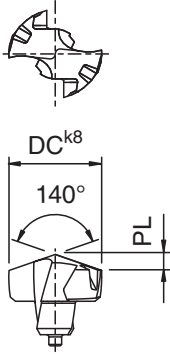
● : Std. Item

DC inserts are
sold in 1 piece boxes

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Inserts for MagicDrill DRC

Insert		Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholders 🔵K29~K31, K34~K36								
			DC	PL	PR0315									
  k8 tolerance <table><tr><th>DC</th><th>k8(mm)</th></tr><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></table> k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the hole diameter.	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	●											

Q&A

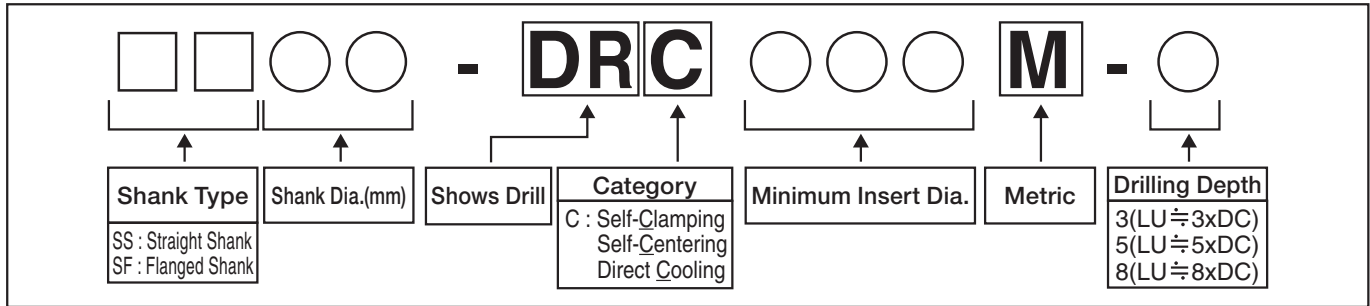
Q-1 Is re-grinding available?

A-1 We don't recommend it. Grinding of edge nose chisel is not possible.

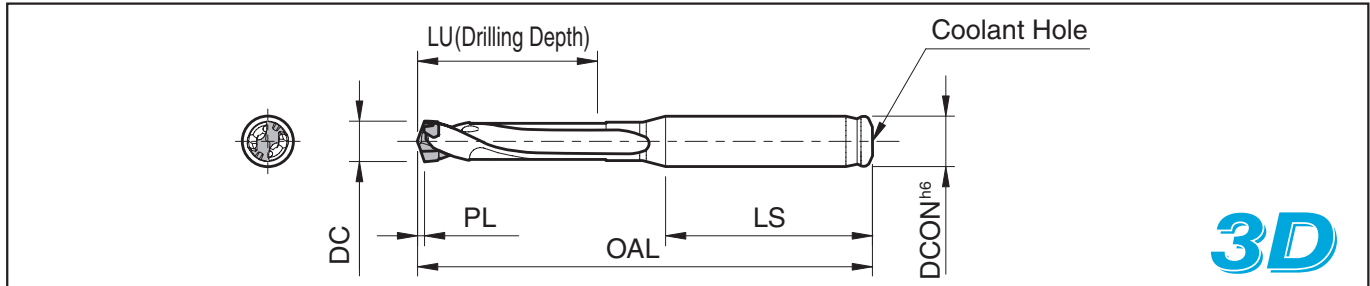
Q-2 How large would the machining hole be to the insert diameter (DC)?

A-2 The machining hole with SCM435, comparing to the insert diameter (DC), will be about +0.020~+0.040mm.

Description Identification System (Toolholder)



SS-DRC (Drilling Depth : 3 x DC)



For PL indicates distance from drill point to corner edge **K26~K28**

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts	Applicable Inserts 🔩 K26~K28	Applicable Chamfering Holder and Insert Description	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Wrench 🔩 K37		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
	DRC085M-3	●	8.50	8.99		81	27.0			DC0850M-SC~DC0890M-SC		
	DRC090M-3	●	9.00	9.49		83	28.5			DC0900M-SC~DC0940M-SC		
	DRC095M-3	●	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
	DRC105M-3	●	10.50	10.99		94	33.0			DC1050M-SC~DC1090M-SC		
	DRC110M-3	●	11.00	11.49		96	34.5			DC1100M-SC~DC1140M-SC		
	DRC115M-3	●	11.50	11.99		98	36.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-3	●	12.00	12.49	14	101	37.5	48	* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-3	●	12.50	12.99		103	39.0			DC1250M-SC~DC1290M-SC		
	DRC130M-3	●	13.00	13.49		105	40.5			DC1300M-SC~DC1340M-SC		
	DRC135M-3	●	13.50	13.99		107	42.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-3	●	14.00	14.49	16	112	43.5	50	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-3	●	14.50	14.99		114	45.0			DC1450M-SC~DC1490M-SC		
	DRC150M-3	●	15.00	15.99		118	48.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-3	●	16.00	16.99	18	122	51.0	56	WDRC17	DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-3	●	17.00	17.99		127	54.0			DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-3	●	18.00	18.99	20	133	57.0	60	WDRC17	DC1800M-SC~DC1890M-SC	-	-
	DRC190M-3	●	19.00	19.99		137	60.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-3	●	20.00	20.99	25	147	63.0	60	WDRC17	DC2000M-SC~DC2099M-SC	-	-
	DRC210M-3	●	21.00	21.99		151	66.0			DC2100M-SC~DC2150M-SC		
	DRC220M-3	●	22.00	22.99		156	69.0			DC2200M-SC~DC2250M-SC		
	DRC230M-3	●	23.00	23.99		160	72.0			DC2300M-SC~DC2350M-SC		
	DRC240M-3	●	24.00	24.99		164	75.0			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-3	●	25.00	25.99	32	172	78.0	60	WDRC17	DC2500M-SC~DC2599M-SC	-	-

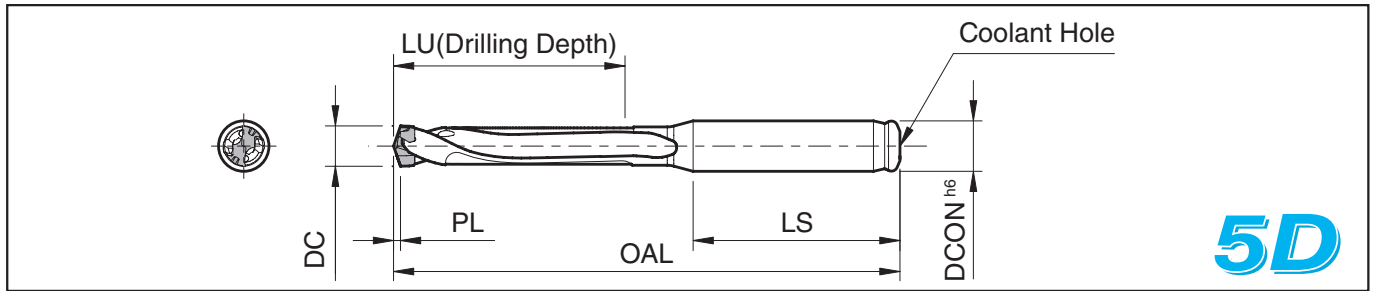
* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

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SS-DRC (Drilling Depth : 5 x DC)



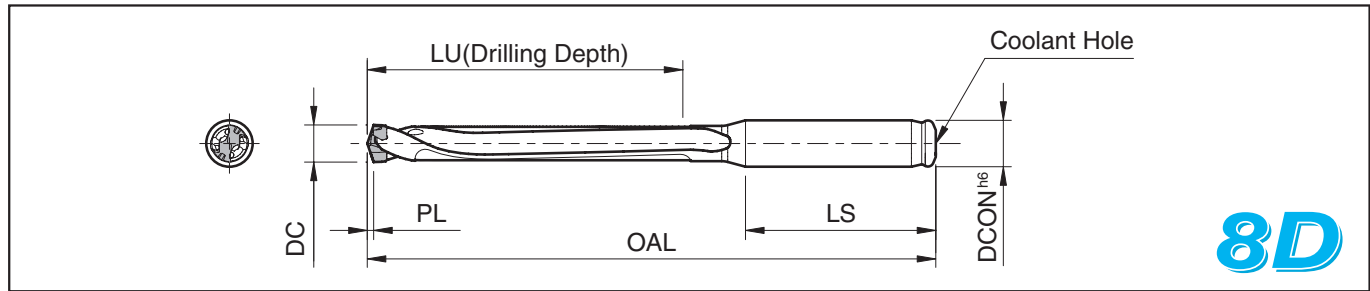
For PL indicates distance from drill point to corner edge **K26~K28**

Toolholder Dimensions

Description		Stock	Dimension (mm)						Spare Parts	Applicable Inserts 🌀 K26~K28	Applicable Chamfering Holder and Insert Description	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Wrench 🌀 K37		Holder	Insert
			min.	max.								
SS10-	DRC080M-5	●	7.94	8.49	10	97	42.5	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-5	●	8.50	8.99		100	45.0			DC0850M-SC~DC0890M-SC		
	DRC090M-5	●	9.00	9.49		103	47.5			DC0900M-SC~DC0940M-SC		
	DRC095M-5	●	9.50	9.99		107	50.0			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-5	●	10.00	10.49	12	115	52.5	45	* WDRC17 (Included wrench : WDRC10)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-5	●	10.50	10.99		118	55.0			DC1050M-SC~DC1090M-SC		
	DRC110M-5	●	11.00	11.49		121	57.5			DC1100M-SC~DC1140M-SC		
	DRC115M-5	●	11.50	11.99		124	60.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-5	●	12.00	12.49	14	127	62.5	48	* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-5	●	12.50	12.99		130	65.0			DC1250M-SC~DC1290M-SC		
	DRC130M-5	●	13.00	13.49		133	67.5			DC1300M-SC~DC1340M-SC		
	DRC135M-5	●	13.50	13.99		137	70.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-5	●	14.00	14.49	16	143	72.5	48	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-5	●	14.50	14.99		146	75.0			DC1450M-SC~DC1490M-SC		
	DRC150M-5	●	15.00	15.99		152	80.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-5	●	16.00	16.99	18	158	85.0	56	WDRC17	DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-5	●	17.00	17.99		165	90.0			DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-5	●	18.00	18.99	20	173	95.0	50	WDRC17	DC1800M-SC~DC1890M-SC	-	-
	DRC190M-5	●	19.00	19.99		179	100.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-5	●	20.00	20.99	25	191	105.0	56		DC2000M-SC~DC2099M-SC		
	DRC210M-5	●	21.00	21.99		198	110.0			DC2100M-SC~DC2150M-SC		
	DRC220M-5	●	22.00	22.99		204	115.0			DC2200M-SC~DC2250M-SC		
	DRC230M-5	●	23.00	23.99		210	120.0			DC2300M-SC~DC2350M-SC		
	DRC240M-5	●	24.00	24.99		216	125.0			DC2400M-SC~DC2450M-SC		
SS32-	DRC250M-5	●	25.00	25.99	32	227	130.0	60		DC2500M-SC~DC2599M-SC		

* Choose "WDRC17", when purchasing wrench only.

SS-DRC (Drilling Depth : 8 x DC)



For PL indicates distance from drill point to corner edge **K26~K28**

Toolholder Dimensions

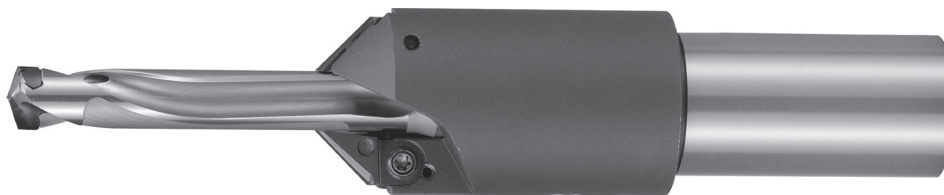
Description		Stock	Dimension (mm)						Spare Parts	Applicable Inserts 🌀 K26~K28	Applicable Chamfering Holder and Insert Description	
			Applicable Insert Dia. DC		DCON (h6)	OAL	LU	LS	Wrench 🌀 K37		Holder	Insert
			min.	max.								
SS10- DRC080M-8	●	7.94	8.49	10	122.5	68	40	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A	
	●	8.50	8.99		127.0	72			DC0850M-SC~DC0890M-SC			
	●	9.00	9.49		131.5	76			DC0900M-SC~DC0940M-SC			
	●	9.50	9.99		137.0	80			DC0950M-SC~DC0990M-SC			
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			DC1050M-SC~DC1090M-SC			
	●	11.00	11.49		155.5	92			DC1100M-SC~DC1140M-SC			
	●	11.50	11.99		160.0	96			DC1150M-SC~DC1190M-SC			
SS14- DRC120M-8	●	12.00	12.49	14	164.5	100	48	* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	S32-CH14		
	●	12.50	12.99		169.0	104			DC1250M-SC~DC1290M-SC			
	●	13.00	13.49		173.5	108			DC1300M-SC~DC1340M-SC			
	●	13.50	13.99		179.0	112			DC1350M-SC~DC1390M-SC			
SS16- DRC140M-8	●	14.00	14.49	16	186.5	116	48	* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	S32-CH16		
	●	14.50	14.99		191.0	120			DC1450M-SC~DC1490M-SC			
	●	15.00	15.99		200.0	128			DC1500M-SC~DC1580M-SC			
SS18- DRC160M-8	●	16.00	16.99	18	209.0	136	50		DC1600M-SC~DC1690M-SC	S32-CH18		
	●	17.00	17.99		219.0	144			DC1700M-SC~DC1790M-SC			
SS20- DRC180M-8	●	18.00	18.99	20	230.0	152	50		DC1800M-SC~DC1890M-SC			
	●	19.00	19.99		239.0	160			DC1900M-SC~DC1990M-SC			
SS25- DRC200M-8	●	20.00	20.99	25	254.0	168	56	WDRC17	DC2000M-SC~DC2099M-SC	-	-	
	●	21.00	21.99		264.0	176			DC2100M-SC~DC2150M-SC			
	●	22.00	22.99		273.0	184			DC2200M-SC~DC2250M-SC			
	●	23.00	23.99		282.0	192			DC2300M-SC~DC2350M-SC			
	●	24.00	24.99		291.0	200			DC2400M-SC~DC2450M-SC			
SS32- DRC250M-8	●	25.00	25.99	32	305.0	208	60		DC2500M-SC~DC2599M-SC			

* Choose "WDRC17", when purchasing wrench only.

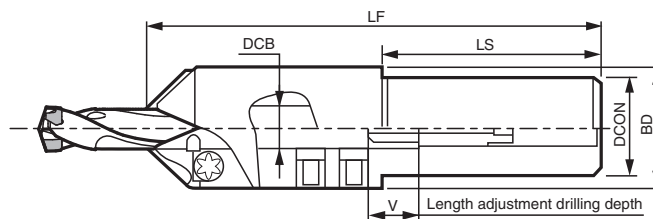
Chamfering Attachment

Drilling and chamfering simultaneously

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



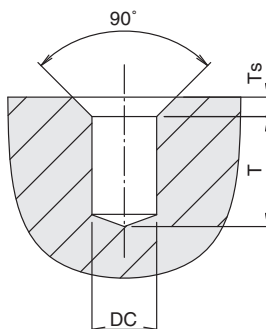
Holder



Description	Stock	Applicable Drill Shank Dia. DCB	Dimension (mm)					Applicable Inserts
			DCON	BD	LF	LS	V	
S20-CH10	●	10	20	29	122	52	17	CT08T2-45A
S32-CH12	●	12	32	38	133	62	21	CT12T3-45A
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

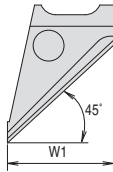


Drill Dia. (mm) DC		Drilling Depth (mm)						Chamfering dimension (mm) Ts		Applicable Chamfering Holder
		T (3D Drill)		T (5D Drill)		T (8D Drill)		Ts 100	Ts max.	
min.	max.	min.	max.	min.	max.	min.	max.			
7.94	8.49	11	19	21	37	47	63	2.5	5.0	S20-CH10
8.50	8.99	12	21	24	40	51	67			
9.00	9.49	12	23	27	43	56	72			
9.50	9.99	13	25	31	47	61	77			
10.00	10.49	13	26	28	49	60	81	3.5	7.0	S32-CH12
10.50	10.99	14	28	31	52	64	85			
11.00	11.49	14	30	34	55	69	90			
11.50	11.99	15	32	37	58	73	94			
12.00	12.49	15	30	41	56	79	94	4.0	8.0	S32-CH14
12.50	12.99	17	32	44	59	83	96			
13.00	13.49	19	34	47	62	88	103			
13.50	13.99	21	36	51	66	93	108			
14.00	14.49	19	37	50	68	94	112	4.0	8.0	S32-CH16
14.50	14.99	21	39	53	71	98	116			
15.00	15.99	25	43	59	77	107	125			
16.00	16.99	30	44	66	80	117	131			
17.00	17.99	35	49	73	87	127	141	4.0	8.0	S32-CH18

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)

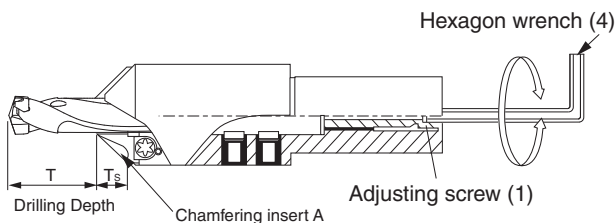
● : Std. Item

● Applicable Inserts

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

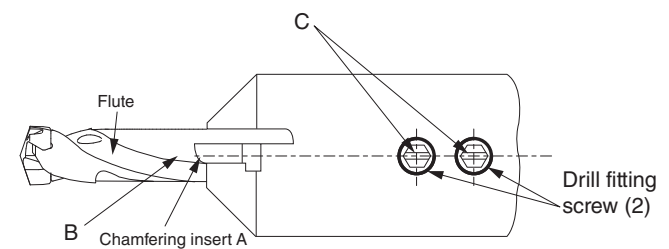
● Method to use DRC chamfering attachment

I. Adjustment of Drilling Depth



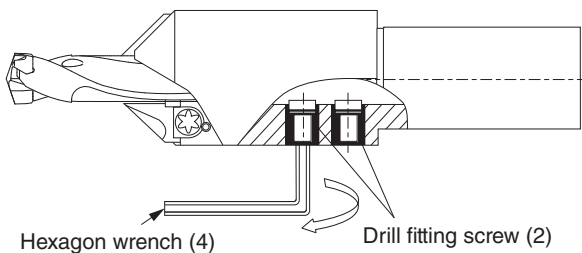
Insert drill into chamfering holder.
Next, temporarily attach the chamfering insert A.
Turn the adjusting screw (1) with the hexagon wrench (4) to set the drilling depth T.

II. Drill location check



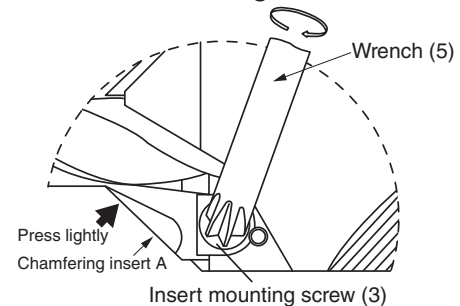
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

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)

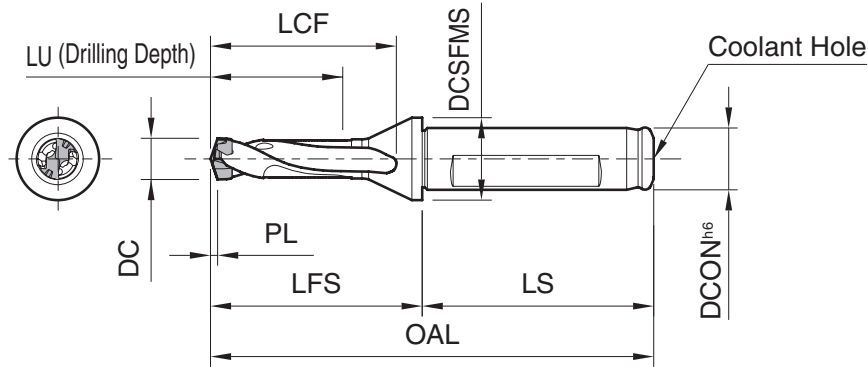
IV. Installation of the chamfering insert



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-6×38	FS-10	MT-3	LW-3	DT-9
S32-CH12	15	AJ-8×44-9.5	FS-12	MT-4	LW-4	DT-15
S32-CH14	20	AJ-10×46	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 K26~K28

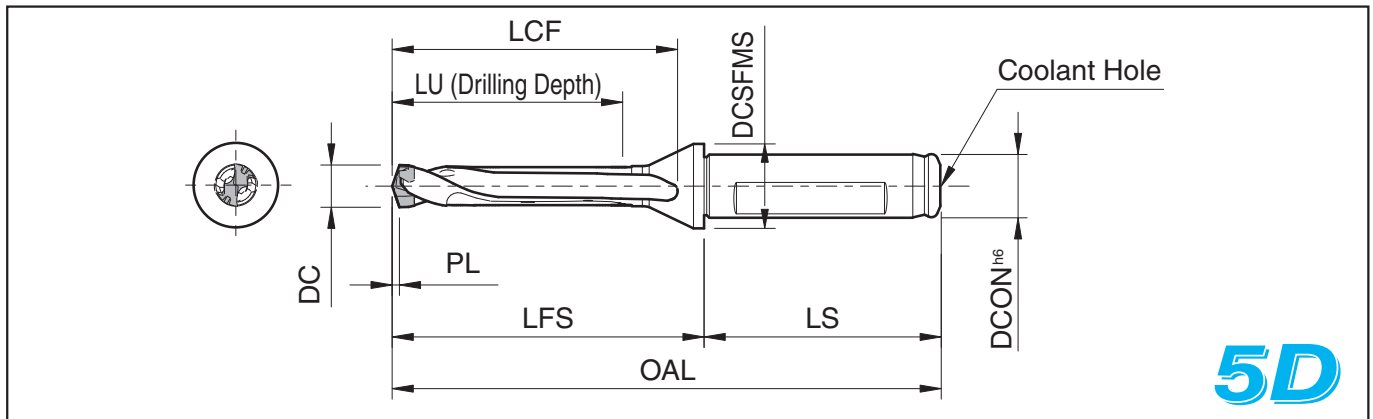
Toolholder Dimensions

Description		Stock	Dimension (mm)									Spare Parts		Applicable Inserts 🔩 K26~K28		
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench 🔩 K37				
			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				DC1150M-SC~DC1190M-SC				
	●	12.00	12.49		106	58	52	38			* WDRC17 (Included wrench : WDRC12)	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			* WDRC17 (Included wrench : WDRC14)	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	DC1500M-SC~DC1580M-SC
		●	16.00		16.99		126	76				70	51			
●		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

SF-DRC (Drilling Depth : 5 x DC)



For PL indicates distance from drill point to corner edge K26-K28

Toolholder Dimensions

Description		Stock	Dimension (mm)									Spare Parts		Applicable Inserts ⚙️ K26~K28
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench ⚙️ K37		
			min.	max.										
SF12-	DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC	
	DRC085M-5	●	8.50	8.99		107	62	56	45				DC0850M-SC~DC0890M-SC	
	DRC090M-5	●	9.00	9.49		110	65	59	48				DC0900M-SC~DC0940M-SC	
	DRC095M-5	●	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	
	DRC105M-5	●	10.50	10.99		123	75	69	55				DC1050M-SC~DC1090M-SC	
	DRC110M-5	●	11.00	11.49		126	78	72	58				DC1100M-SC~DC1140M-SC	
	DRC115M-5	●	11.50	11.99		129	81	75	60				DC1150M-SC~DC1190M-SC	
	DRC120M-5	●	12.00	12.49		132	84	78	63			* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC	
	DRC125M-5	●	12.50	12.99		135	87	81	65				DC1250M-SC~DC1290M-SC	
	DRC130M-5	●	13.00	13.49		138	90	84	68				DC1300M-SC~DC1340M-SC	
	DRC135M-5	●	13.50	13.99		142	94	88	70				DC1350M-SC~DC1390M-SC	
	DRC140M-5	●	14.00	14.49		145	97	91	73			* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC	
	DRC145M-5	●	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	
	DRC160M-5	●	16.00	16.99		162	112	106	85				DC1600M-SC~DC1690M-SC	
	DRC170M-5	●	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	
	DRC190M-5	●	19.00	19.99		187	131	125	100				DC1900M-SC~DC1990M-SC	
	DRC200M-5	●	20.00	20.99		193	137	131	105				DC2000M-SC~DC2099M-SC	
	DRC210M-5	●	21.00	21.99		200	144	138	110				DC2100M-SC~DC2150M-SC	
	DRC220M-5	●	22.00	22.99		206	150	144	115				DC2200M-SC~DC2250M-SC	
	DRC230M-5	●	23.00	23.99		212	156	150	120				DC2300M-SC~DC2350M-SC	
	DRC240M-5	●	24.00	24.99		218	162	156	125				DC2400M-SC~DC2450M-SC	
	DRC250M-5	●	25.00	25.99		225	169	163	130				DC2500M-SC~DC2599M-SC	

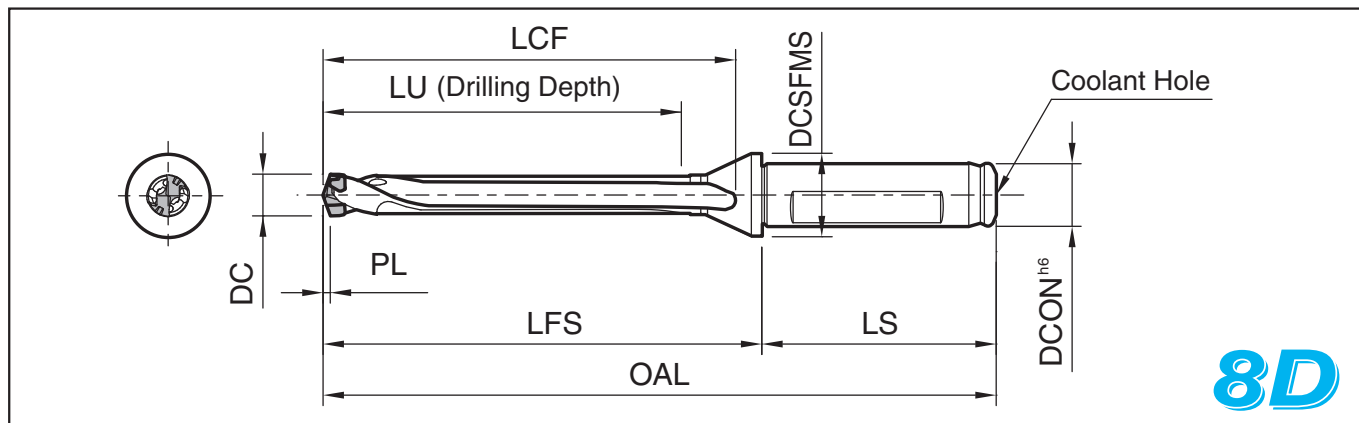
* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

Insert Grades
Turning
Indexable Inserts
CEN & CDD Tools
External
Small Parts
Machining
Boring
Grooving
Cut-off
Threading
Drilling
Solid Tools
Milling
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SF-DRC (Drilling Depth : 8 x DC)



For PL indicates distance from drill point to corner edge K26~K28

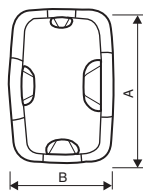
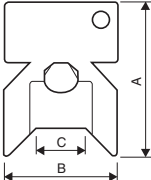
Toolholder Dimensions

Description		Stock	Dimension (mm)									Spare Parts		Applicable Inserts 🔩 K26~K28				
			Applicable Insert Dia. DC		DCON (h6)	OAL	LFS	LCF	LU	LS	DCSFMS	Wrench 🔩 K37						
			min.	max.														
SF12-	DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	* WDRC17 (Included wrench : WDRC8)	DC0794M-SC~DC0840M-SC					
	DRC085M-8	●	8.50	8.99		134	89	83	72				DC0850M-SC~DC0890M-SC					
	DRC090M-8	●	9.00	9.49		138	93	88	76				DC0900M-SC~DC0940M-SC					
	DRC095M-8	●	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					
	DRC105M-8	●	10.50	10.99		156	108	102	88				DC1050M-SC~DC1090M-SC					
	DRC110M-8	●	11.00	11.49		160	112	107	92				DC1100M-SC~DC1140M-SC					
	DRC115M-8	●	11.50	11.99		165	117	111	96				DC1150M-SC~DC1190M-SC					
	DRC120M-8	●	12.00	12.49		169	121	116	100			* WDRC17 (Included wrench : WDRC12)	DC1200M-SC~DC1240M-SC					
	DRC125M-8	●	12.50	12.99		174	126	120	104				DC1250M-SC~DC1290M-SC					
	DRC130M-8	●	13.00	13.49		178	130	124	108				DC1300M-SC~DC1340M-SC					
	DRC135M-8	●	13.50	13.99		184	136	130	112				DC1350M-SC~DC1390M-SC					
	DRC140M-8	●	14.00	14.49		188	140	134	116			* WDRC17 (Included wrench : WDRC14)	DC1400M-SC~DC1440M-SC					
	DRC145M-8	●	14.50	14.99		193	145	139	120				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
		DRC160M-8	●	16.00		16.99		213	163				157	136				DC1600M-SC~DC1690M-SC
DRC170M-8		●	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					
	DRC190M-8	●	19.00	19.99		247	191	185	160				DC1900M-SC~DC1990M-SC					
	DRC200M-8	●	20.00	20.99		256	200	194	168				DC2000M-SC~DC2099M-SC					
	DRC210M-8	●	21.00	21.99		266	210	204	176				DC2100M-SC~DC2150M-SC					
	DRC220M-8	●	22.00	22.99		275	219	213	184				DC2200M-SC~DC2250M-SC					
	DRC230M-8	●	23.00	23.99		284	228	222	192				DC2300M-SC~DC2350M-SC					
	DRC240M-8	●	24.00	24.99		293	237	231	200				DC2400M-SC~DC2450M-SC					
	DRC250M-8	●	25.00	25.99		303	247	241	208				DC2500M-SC~DC2599M-SC					

* Choose "WDRC17", when purchasing wrench only.

● : Std. Item

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	
		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)

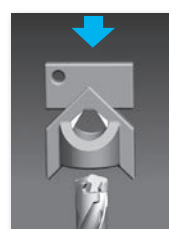


Slot for wrench



- (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

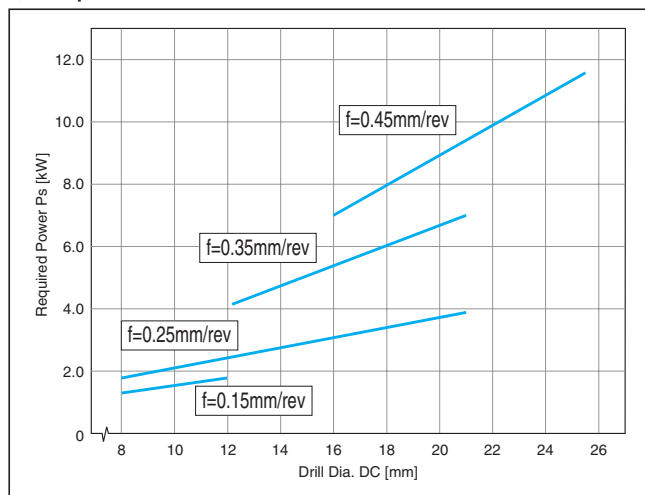
Workpiece Material		Hardness (HB)	Cutting Conditions		Drill Dia. DC (mm)								Remarks
			Cutting Speed Vc (m/min)	n (min ⁻¹)	ø8	ø10	ø12	ø14	ø16	ø18	ø20	ø25	
				f (mm/rev)									
Low Carbon Steel	SS400 S10C~S25C	125	120 - 180	n (min ⁻¹)	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	1,530 - 2,290	Coolant (See PageK39)
				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	
		300	50 - 75	n (min ⁻¹)	1,990 - 2,990	1,590 - 2,390	1,330 - 1,990	1,140 - 1,710	1,000 - 1,490	880 - 1,330	800 - 1,190	640 - 960	
				f (mm/rev)	0.11 - 0.19	0.12 - 0.23	0.16 - 0.28	0.21 - 0.32	0.23 - 0.35	0.25 - 0.41	0.28 - 0.41	0.32 - 0.45	
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	
		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	
		350	50 - 75	n (min ⁻¹)	1,990 - 2,990	1,590 - 2,390	1,330 - 1,990	1,140 - 1,710	1,000 - 1,490	880 - 1,330	800 - 1,190	640 - 960	
				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	0.28 - 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	

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

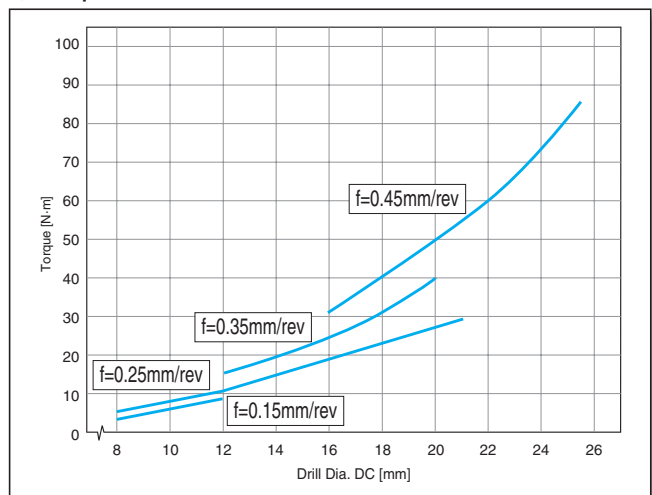
Reference charts

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

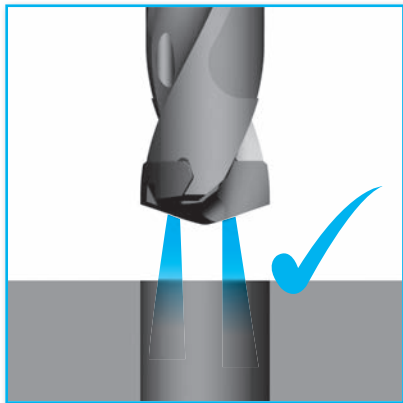
Required Power



Torque



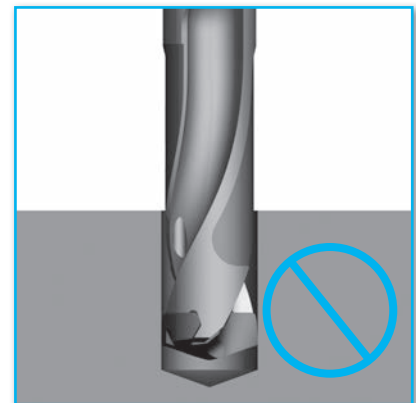
Coolant



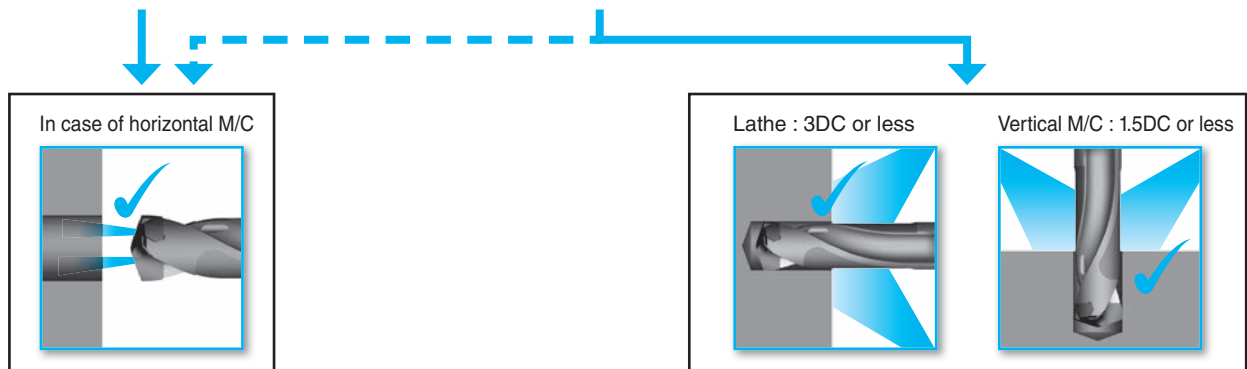
1) Internal coolant is recommended.



2) In case of using external coolant system



3) Dry machining is not recommended.

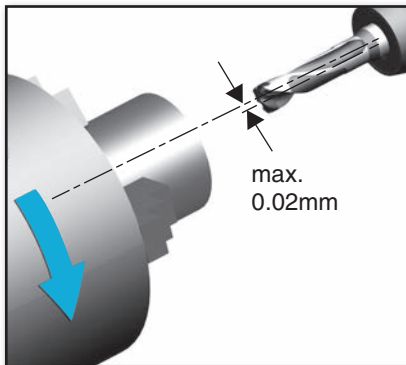


Internal coolant is recommended for horizontal machining center because external coolant may not sufficiently be applied to inside because the tool is revolving.

Precautions for use

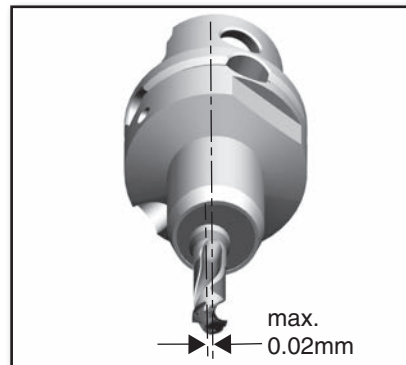
Core Deviation

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.

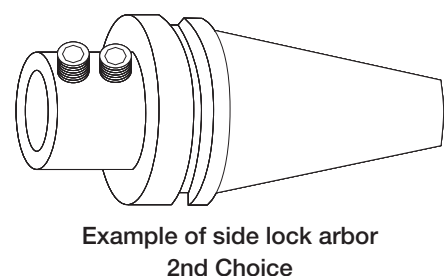
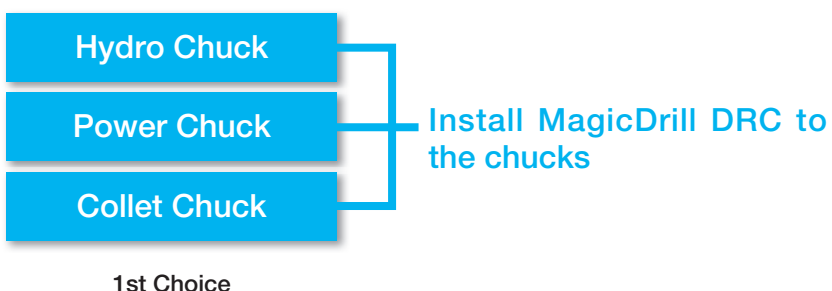
2) If drill is rotating



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

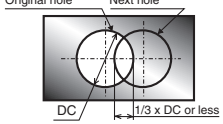
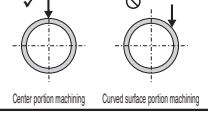
Cautions for installation on Machining Center

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

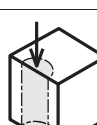


Example of side lock arbor
2nd Choice

Applicable workpieces

Applications	Shape of Workpiece	Caution for machining
Plain Surface		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		1. Fix stacked plates securely to ensure so that they do not slip while machining.
Hole Expansion		1. If the overlap amount is $1/3 \times DC$ or less, machining is possible. 
Concave Surface		1. When machining concave holes, set the feed rates at half or less than continuous hole machining.
Pipe Material		1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas. 

Not Recommended workpieces

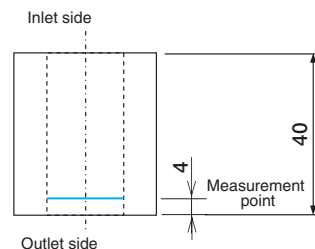
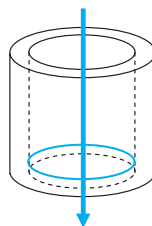
Applications	Shape of Workpiece
Slant Surface	
Half Cylindrical	
Cored Hole	

Comparison of Machining Precision

Cutting Condition and Measurement Point

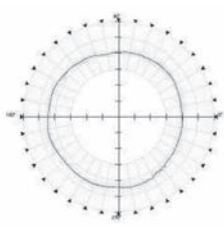
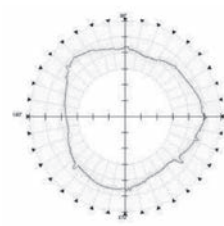
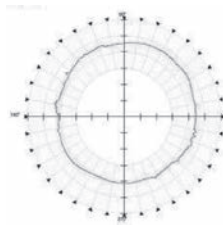
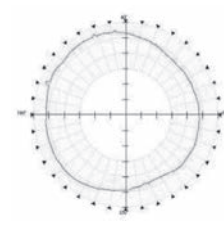
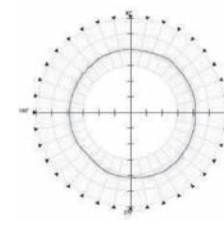
<Cutting Conditions>

Workpiece Material	S45C
Vc	100m/min
f	0.2mm/rev, 0.3mm/rev
Drilling Depth H	Through hole (40mm)
Coolant	Wet (Internal coolant)
Tool	φ14-3D type
Machine	M/C



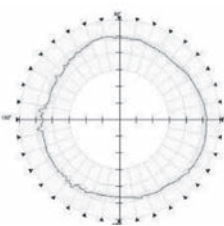
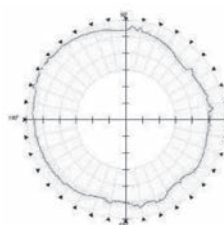
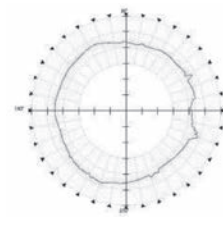
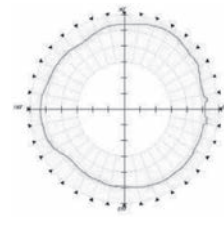
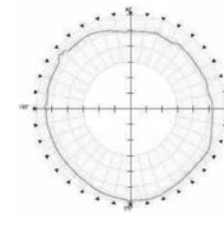
Roundness

1) Roundness (f=0.2mm/rev)

Indexable drill		Carbide solid drill		
KYOCERA	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness : 5.5μm	Roundness : 22.5μm	Roundness : 6.4μm	Roundness : 9.8μm	Roundness : 5.2μm

(Internal evaluation)

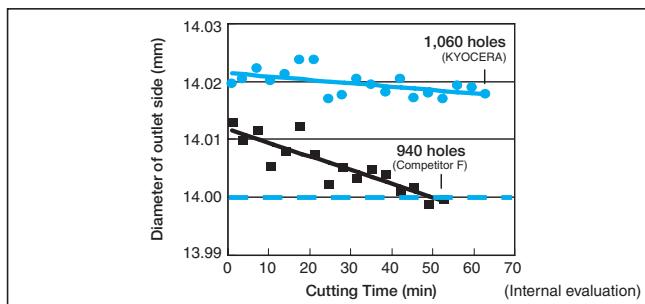
2) Roundness (f=0.3mm/rev)

Indexable drill		Carbide solid drill		
KYOCERA	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness : 10.7μm	Roundness : 15.2μm	Roundness : 12.0μm	Roundness : 11.8μm	Roundness : 12.3μm

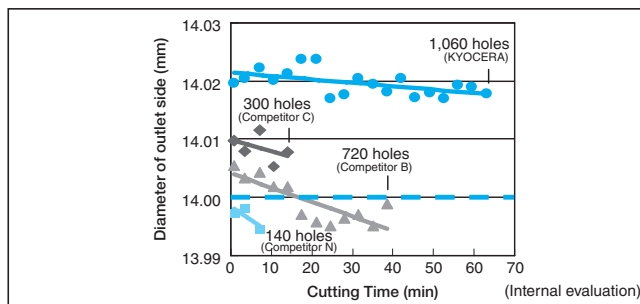
(Internal evaluation)

● 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).

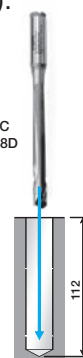
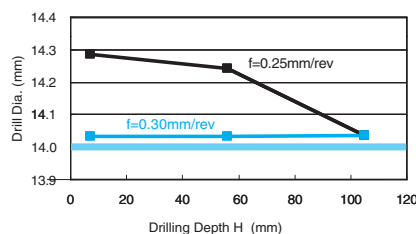
Countermeasures 1

● 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

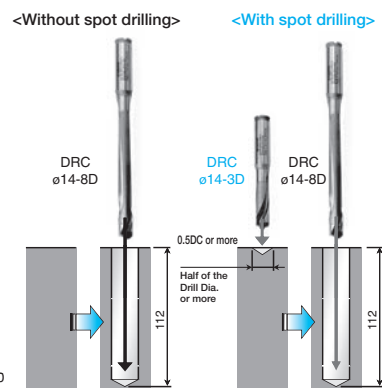
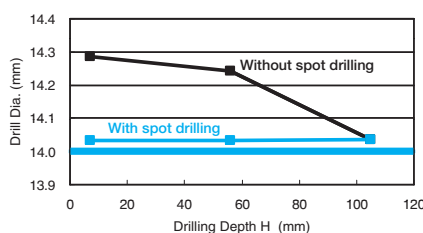
● Make a center spot

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	
- 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
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. (User Evaluation)	

SCM440	
- 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
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. (User Evaluation)	

MagicDrill DRV

Economical Inserts with 4 Cutting Edges. Excellent Chip Evacuation with 6D Maximum Deep-Hole Drilling

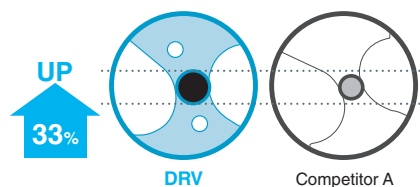
High Speed and Highly Efficient Drilling Available with the Combination of a CVD Outer Insert and PVD Inner Insert

1

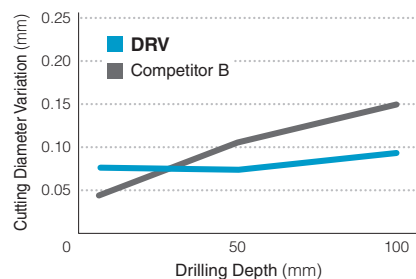
Excellent Drilling Precision with Less Variation in Cutting Diameter Up to 6D Drilling Capabilities with a Low Cutting Force Design

Optimal Web Thickness Reduces Chattering with a Low Cutting Force Design

Web Thickness Comparison (Internal evaluation)

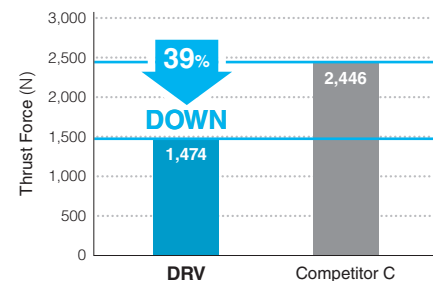


Comparison of Cutting Diameter Variation (Internal evaluation)



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

2

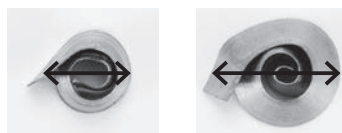
Unique Insert Design to Control Chip Flow

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

16%
Diameter of Chips

Inner edge

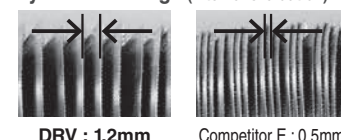
Excellent Chip Evacuation as well as Less Wear Resistance with Reduced Chips Weight



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)



47%
Weight of Chips

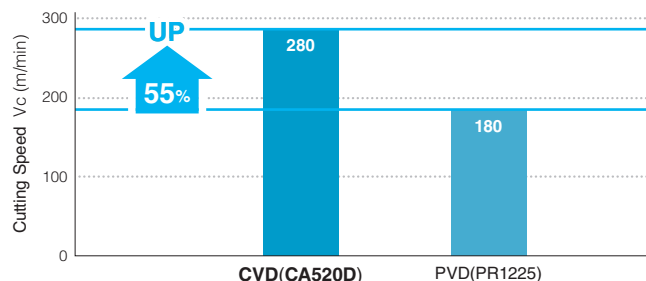
Cutting Conditions : $V_c = 250$ m/min, $f = 0.08$ mm/rev, Drill Dia. $\phi 20(5D)$, Wet Workpiece Material : SUS304

3

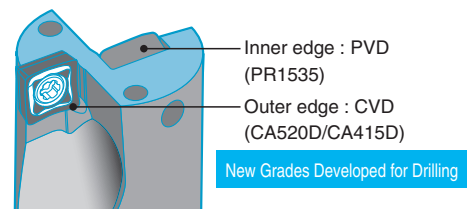
CVD Insert on the Outer Edge for Highly Efficient Drilling

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

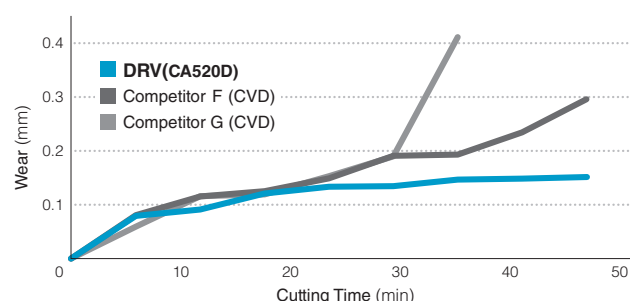
Recommended Cutting Speed (Maximum Value)



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



Wear Resistance Comparison (Internal evaluation)



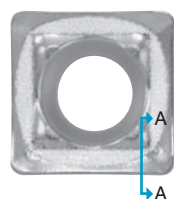
Cutting Conditions : $V_c = 200$ m/min, $f = 0.12$ mm/rev, Drill Dia. $\phi 20(3D)$, Wet Workpiece Material : SCM440H

4

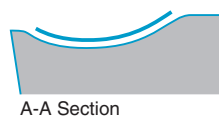
Economical Inserts with 4 Cutting Edges

4 Types of Chipbreakers for Various Machining Applications

General Purpose GM Chipbreaker

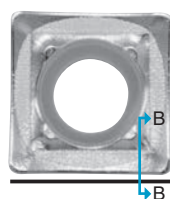


Chipbreaker for Steel Machining
Stable Deep-hole Machining with Low Cutting Force

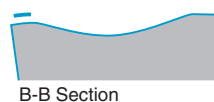


Edge Shape Optimized for Various Machining Applications

Tough Edge GH Chipbreaker

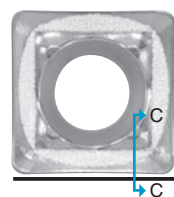


1st Recommendation for Machining Cast Iron
Good for Continuous Steel Machining
Reduced Breakages Common in Through-hole Machining

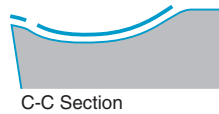


Negative Land with Strong Edge

For Stainless Steel Machining SM Chipbreaker

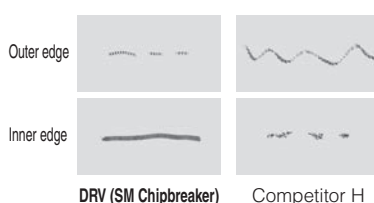


Stable Chip Control when Machining Gummy Stainless Steel
Reduces Chip Clogging in the Holder Body



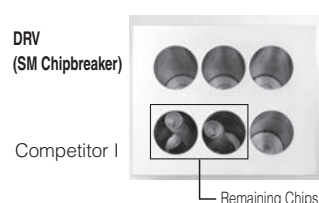
Sharp Cutting and Large Rake Angle

Chip Control Comparison (Internal evaluation)



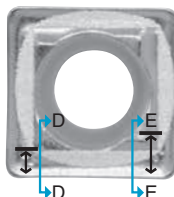
Cutting Conditions : $V_c = 100$ m/min, $f = 0.1$ mm/rev
Drill Dia. $\phi 20(3D)$, Drilling Depth 60 mm
Wet Workpiece Material : SUS304

Comparison of Remaining Chips (Internal evaluation)

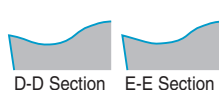


Cutting Conditions : $V_c = 150$ m/min, $f = 0.08$ mm/rev
Drill Dia. $\phi 25(5D)$, Drilling Depth 98 mm
Wet Workpiece Material : SUS304

For Machining Soft Steel XM Chipbreaker

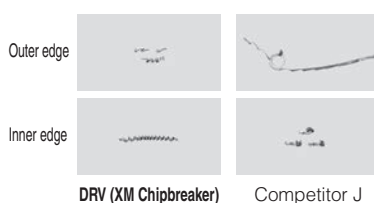


Stable Chip Control of Outer Cutting Edge



Excellent Chip Control with the Changing Width of the 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 Chart → K44

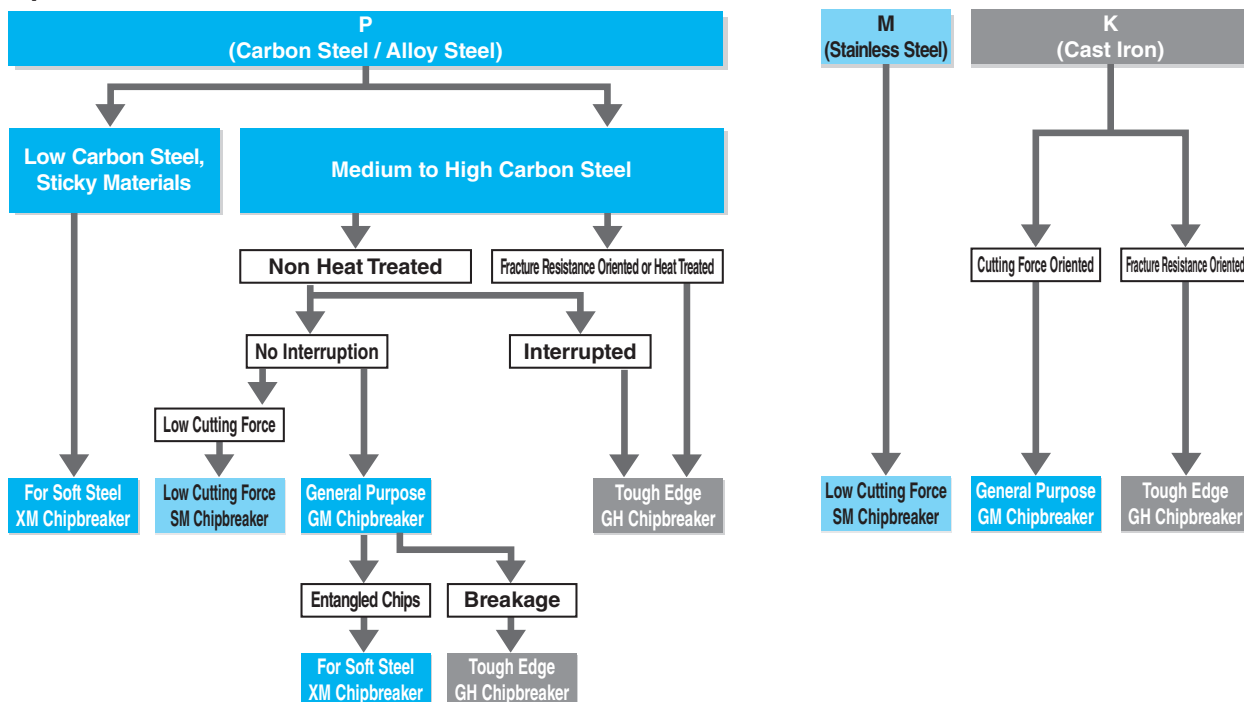
Insert Grades	A
Turning	B
CAN & RCD Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
Threading	J
Drilling	K
Solid Tools	L
Milling	M
Tools for Turning Mill	N
Spare Parts	P
Technical Information	R
Index	T

Applicable Inserts (Outer edge)

Applicable Inserts (Outer edge)		Classification of usage ★:High Speed and Highly Efficient Drilling ☆:Stable Machining Oriented		P	Carbon Steel / Alloy Steel		☆	★								
				Mold Steel		☆	★									
				M	Stainless Steel		☆	★								
				K	Cast Iron		☆		★							
Insert		Applications	Description	Dimension (mm)				Angle	MEGACOAT		CVD Coated Carbide		MEGACOAT NANO			
				IC W1/L	S	D1	RE	AN	PR1225	CA520D	CA415D	PR1535				
 General Purpose	NEW	Outer edge	LCMT 030203-GM-E	4.40/5.54	2.0	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	●	●	●			
			140508-GM-E	13.80	5.0	5.7				0.8	●	●	●			
			170608-GM-E	16.80	6.58	6.9					●	●	●			
			LCMT 030203-GH-E	4.40/5.54	2.0	2.3				0.3	7°		●	●	●	
SCMT 040205-GH-E	4.80		2.2	2.4	0.5	●	●	●								
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		●	●	●								
110406-GH-E	11.00		4.5	4.6		0.6	●	●	●							
140508-GH-E	13.80		5.0	5.7		0.8	●	●	●							
170608-GH-E	16.80		6.58	6.9			●	●	●							
 Tough Edge	NEW		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	●	●									
		090405-XM-E	9.10	4.1	4.0	●	●									
		110406-XM-E	11.00	4.5	4.6	0.6	●				●					
		140508-XM-E	13.80	5.0	5.7	0.8	●				●					
		170608-XM-E	16.80	6.58	6.9		●				●					
		 For Soft Steel Machining	NEW	LCMT 030203-SM-E	4.40/5.54	2.0	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	●		●							
140508-SM-E	13.80			5.0	5.7	0.8	●		●							
170608-SM-E	16.80			6.58	6.9		●		●							
 For Stainless Steel Machining	NEW									7°						

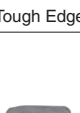
* LCMT03*** is 2-edge insert

Chipbreaker Selection Chart



● : Std. Item

Applicable Inserts (Inner edge)

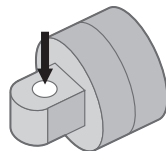
Insert		Applications	Description	Dimension (mm)				Angle	MEGACOAT	CVD Coated Carbide	MEGACOAT NANO	★
				IC W1/L	S	D1	RE					
 General Purpose		Inner edge	LCMT 030205-GM-I	4.16/5.37	2.0	2.3	0.5	7°				★
			SCMT 040209-GM-I	5.00	2.2	2.4	0.9					
 Tough Edge		Inner edge	LCMT 030205-GH-I	4.16/5.37	2.0	2.3	0.5	7°				★
			SCMT 040209-GH-I	5.00	2.2	2.4	0.9					
 For Soft Steel Machining		Inner edge	LCMT 030205-XM-I	4.16/5.37	2.0	2.3	0.5	7°				★
			SCMT 040209-XM-I	5.00	2.2	2.4	0.9					
 For Stainless Steel Machining		Inner edge	LCMT 030205-SM-I	4.16/5.37	2.0	2.3	0.5	7°				★
			SCMT 040209-SM-I	5.00	2.2	2.4	0.9					

* LCMT03*** is 2-edge insert

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

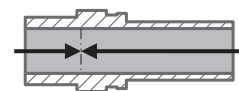
Competitor K (ø24-4D)

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

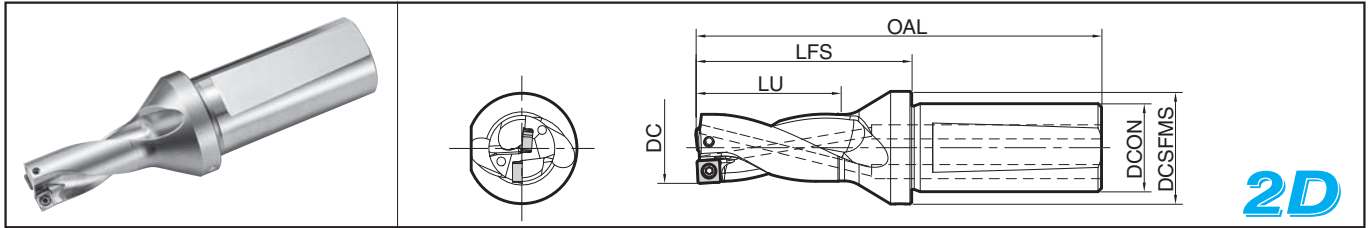
Competitor L (ø22-4D/2D)

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 ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
												
S20- DRV120M-2-03 DRV125M-2-03 DRV130M-2-03 DRV135M-2-03 DRV140M-2-04 DRV145M-2-04 DRV150M-2-04 DRV155M-2-04	●	2	12	82	39	24	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
	●		12.5	83	40	25			+0.20			
	●		13	84	41	26			+0.15			
	●		13.5	85	42	27			+0.10			
	●	2	14	92	49	28	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
	●		14.5	93	50	29			+0.35			
	●		15	94	51	30			+0.30			
	●		15.5	95	52	31			+0.25			
S25- DRV160M-2-05 DRV165M-2-05 DRV170M-2-05 DRV175M-2-05 DRV180M-2-05 DRV185M-2-05 DRV190M-2-06 DRV195M-2-06 DRV200M-2-06 DRV205M-2-06 DRV210M-2-06 DRV215M-2-06 DRV220M-2-06 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	16	110	56	32	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
	●		16.5	111	57	33			+0.35			
	●		17	112	58	34			+0.30			
	●		17.5	113	59	35			+0.25			
	●	2	18	114	60	36	25	32	+0.20	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
	●		18.5	115	61	37			+0.15			
	●		19	113	59	38			+0.65			
	●		19.5	114	60	39			+0.60			
	●	2	20	115	61	40	25	32	+0.55	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
	●		20.5	116	62	41			+0.50			
	●		21	117	63	42			+0.45			
	●		21.5	118	64	43			+0.35			
	●	2	22	119	65	44	25	32	+0.30	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
	●		22.5	120	66	45			+0.90			
	●		23	121	67	46			+0.80			
	●		23.5	122	68	47			+0.75			
	●	2	24	123	69	48	25	32	+0.70	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
	●		24.5	124	70	49			+0.65			
	●		25	125	71	50			+0.60			
	●		25.5	126	72	51			+0.50			
	●	2	26	127	73	52	25	32	+0.45	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
	●		26.5	128	74	53			+0.40			
	●		27	129	75	54			+0.35			
	●		27.5	130	76	55			+0.30			
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	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
	●		28	138	79	56			+0.95			
	●		29	140	81	58			+0.85			
	●		30	142	83	60			+0.75			
	●		31	144	85	62			+0.60			
	●		32	146	87	64			+0.50			
S40- 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	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
	●		34	163	94	68			+1.15			
	●		35	165	96	70			+1.00			
	●		36	167	98	72			+0.90			
	●		37	169	100	74			+0.80			
	●		38	171	102	76			+0.65			
	●		39	173	104	78			+0.55			

• When offset drilling, reduce feed rate to 0.08mm/rev or less.
• See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**

Trouble shooting ➡ **K64**

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw 	Wrench 	
S40- DRV400M-2-14 NEW DRV410M-2-14 DRV420M-2-14 DRV430M-2-14 DRV440M-2-14 DRV450M-2-14 DRV460M-2-14 DRV470M-2-14 DRV480M-2-14 DRV490M-2-14	●	2	40	181	112	80			+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
	●		41	183	114	82			+1.60			
	●		42	185	116	84		49	+1.50			
	●		43	187	118	86			+1.40			
	●		44	189	120	88			+1.30			
	●		45	191	122	90			+1.15			
	●		46	193	124	92			+1.05			
	●		47	195	126	94		54	+0.95			
	●		48	197	128	96			+0.80			
	●		49	199	130	98			+0.70			
DRV500M-2-17 DRV510M-2-17 DRV520M-2-17 DRV530M-2-17 DRV540M-2-17 DRV550M-2-17 DRV560M-2-17 DRV570M-2-17 DRV580M-2-17 DRV590M-2-17 DRV600M-2-17	●	2	50	198	129	100			+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	●		51	200	131	102			+1.95			
	●		52	202	133	104			+1.85			
	●		53	204	135	106		59	+1.75			
	●		54	206	137	108			+1.65			
	●		55	208	139	110			+1.50			
	●		56	210	141	112			+1.40			
	●		57	212	143	114			+1.30			
	●		58	214	145	116		64	+1.15			
	●		59	216	147	118			+1.05			
	●		60	218	149	120			+0.95			

- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**
Trouble shooting ➡ **K64**

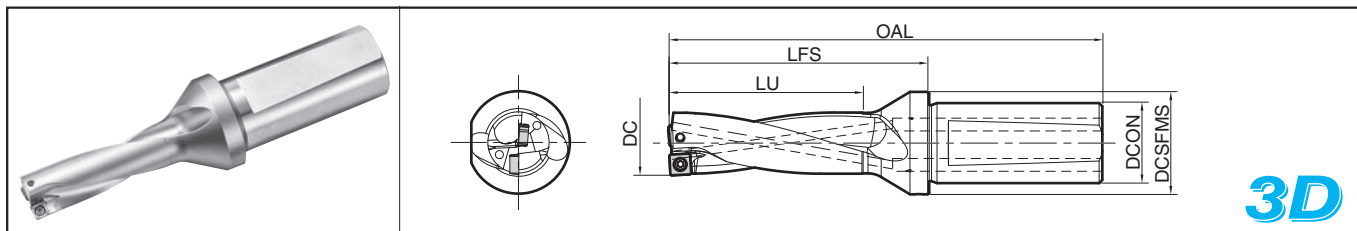
· Hole Dia. Tolerance (2D type)

DC	Hole Dia. Tolerance (mm)
ø12 - ø60	+0.30 0

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

MagicDrill DRV

DRV (Drilling Depth : 3 x DC)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)	
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench		
											DTPM  FTP		
S20- DRV120M-3-03 DRV125M-3-03 DRV130M-3-03 DRV135M-3-03	● ● ● ●	2	12 12.5 13 13.5	94 96 97 99	51 53 54 56	36 37.5 39 40.5	20	27	+0.25 +0.20 +0.15 +0.10	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I	
	● ● ● ●		14 14.5 15 15.5	106 108 109 111	63 65 66 68	42 43.5 45 46.5			+0.40 +0.35 +0.30 +0.25				
	● ● ● ●		16 16.5 17 17.5	126 127 129 130	72 73 75 76	48 49.5 51 52.5			+0.40 +0.35 +0.30 +0.25				
	● ● ● ●		18 18.5	132 133	78 79	54 55.5			+0.20 +0.15				
S25- DRV160M-3-05 DRV165M-3-05 DRV170M-3-05 DRV175M-3-05 DRV180M-3-05 DRV185M-3-05	● ● ● ● ● ●	2	16 16.5 17 17.5 18 18.5	126 127 129 130 132 133	72 73 75 76 78 79	48 49.5 51 52.5 54 55.5	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	
	● ● ● ● ● ●		19 19.5 20 20.5 21 21.5 22	132 134 135 137 138 140 141	78 80 81 83 84 86 87	57 58.5 60 61.5 63 64.5 66			+0.65 +0.60 +0.55 +0.50 +0.45 +0.35 +0.30				
	● ● ● ● ● ● ● ●		22.5 23 23.5 24 24.5 25 25.5 26	142 144 145 147 148 150 151 153	88 90 91 93 94 96 97 99	67.5 69 70.5 72 73.5 75 76.5 78			25 32				+0.90 +0.80 +0.75 +0.70 +0.65 +0.60 +0.50 +0.45
	● ● ● ● ● ● ● ●		26.5 27 27.5 28 28.5 29 29.5 30 30.5 31 31.5 32	161 163 164 166 167 169 170 172 173 175 176 178	102 104 105 107 108 110 111 113 114 116 117 119	79.5 81 82.5 84 85.5 87 88.5 90 91.5 93 94.5 96			32 41				+1.15 +1.05 +1.00 +0.95 +0.90 +0.85 +0.80 +0.75 +0.65 +0.60 +0.55 +0.50
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 27 27.5 28 28.5 29 29.5 30 30.5 31 31.5 32	161 163 164 166 167 169 170 172 173 175 176 178	102 104 105 107 108 110 111 113 114 116 117 119	79.5 81 82.5 84 85.5 87 88.5 90 91.5 93 94.5 96	32	41	+1.15 +1.05 +1.00 +0.95 +0.90 +0.85 +0.80 +0.75 +0.65 +0.60 +0.55 +0.50	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I	
	● ● ● ● ● ● ● ● ● ● ● ●		33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117			+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.60 +0.55				
	● ● ● ● ● ● ● ● ● ● ● ●		33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117			+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.60 +0.55				
	● ● ● ● ● ● ● ● ● ● ● ●		33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117			+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.60 +0.55				
S40- DRV330M-3-11 DRV340M-3-11 DRV350M-3-11 DRV360M-3-11 DRV370M-3-11 DRV380M-3-11 DRV390M-3-11	● ● ● ● ● ● ●	2	33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117	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	
	● ● ● ● ● ● ●		33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117			+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55				
	● ● ● ● ● ● ●		33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117			+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55				
	● ● ● ● ● ● ●		33 34 35 36 37 38 39	194 197 200 203 206 209 212	125 128 131 134 137 140 143	99 102 105 108 111 114 117			+1.25 +1.15 +1.00 +0.90 +0.80 +0.65 +0.55				

- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K58**

Trouble shooting ➡ **K64**

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw 	Wrench 	
S40- DRV400M-3-14 NEW DRV410M-3-14 DRV420M-3-14 DRV430M-3-14 DRV440M-3-14 DRV450M-3-14 DRV460M-3-14 DRV470M-3-14 DRV480M-3-14 DRV490M-3-14	●	2	40	221	152	120			+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
	●		41	224	155	123			+1.60			
	●		42	227	158	126		49	+1.50			
	●		43	230	161	129			+1.40			
	●		44	233	164	132			+1.30			
	●		45	236	167	135			+1.15			
	●		46	239	170	138			+1.05			
	●		47	242	173	141		54	+0.95			
	●		48	245	176	144			+0.80			
	●		49	248	179	147			+0.70			
DRV500M-3-17 DRV510M-3-17 DRV520M-3-17 DRV530M-3-17 DRV540M-3-17 DRV550M-3-17 DRV560M-3-17 DRV570M-3-17 DRV580M-3-17 DRV590M-3-17 DRV600M-3-17	●	2	50	248	179	150			+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	●		51	251	182	153			+1.95			
	●		52	254	185	156			+1.85			
	●		53	257	188	159		59	+1.75			
	●		54	260	191	162			+1.65			
	●		55	263	194	165			+1.50			
	●		56	266	197	168			+1.40			
	●		57	269	200	171			+1.30			
	●		58	272	203	174		64	+1.15			
	●		59	275	206	177			+1.05			
	●		60	278	209	180			+0.95			

· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K58
Trouble shooting ➡ K64

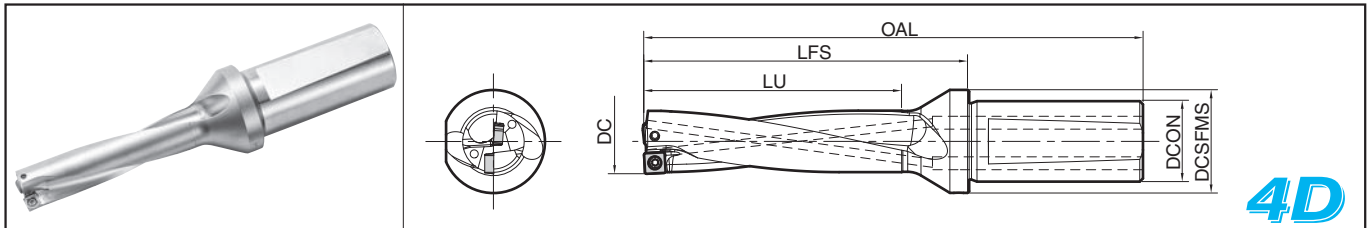
· Hole Dia. Tolerance (3D type)

DC	Hole Dia. Tolerance (mm)
ø12 - ø60	+0.30 0

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

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 ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
											 FTP	
S20- 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	106	63	48	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
	●		12.5	108	65	50			+0.20			
	●		13	110	67	52			+0.15			
	●		13.5	112	69	54			+0.10			
	●	2	14	120	77	56	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
	●		14.5	122	79	58			+0.35			
	●		15	124	81	60			+0.30			
	●		15.5	126	83	62			+0.25			
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	142	88	64	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
	●		16.5	144	90	66			+0.35			
	●		17	146	92	68			+0.30			
	●		17.5	148	94	70			+0.25			
	●		18	150	96	72			+0.20			
	●	2	18.5	152	98	74	25	32	+0.15	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
	●		19	151	97	76			+0.65			
	●		19.5	153	99	78			+0.60			
	●		20	155	101	80			+0.55			
	●		20.5	157	103	82			+0.50			
	●	2	21	159	105	84	25	32	+0.45	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
	●		21.5	161	107	86			+0.35			
	●		22	163	109	88			+0.30			
	●		22.5	165	111	90			+0.90			
	●		23	167	113	92			+0.80			
	S32- DRV270M-4-09 DRV280M-4-09 DRV290M-4-09 DRV300M-4-09 DRV310M-4-09 DRV320M-4-09	●	2	23.5	169	115	94	32	41	+0.75	SB-3573TRP	DTPM-10
●		24		171	117	96	+0.70					
●		24.5		173	119	98	+0.65					
●		25		175	121	100	+0.60					
●		25.5		177	123	102	+0.50					
●		26		179	125	104	+0.45					
S40- DRV330M-4-11 DRV340M-4-11 DRV350M-4-11 DRV360M-4-11 DRV370M-4-11 DRV380M-4-11 DRV390M-4-11		●	2	27	190	131	108	40	49	+1.05	SB-4086TRP	DTPM-15
	●	28		194	135	112	+0.95					
	●	29		198	139	116	+0.85					
	●	30		202	143	120	+0.75					
	●	31		206	147	124	+0.60					
	●	32		210	151	128	+0.50					
	●	33		227	158	132	+1.25					
	●	34	231	162	136	+1.15						
●	2	35	235	166	140	40	49	+1.00	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I	
●		36	239	170	144			+0.90				
●		37	243	174	148			+0.80				
●		38	247	178	152			+0.65				
●	39	251	182	156	+0.55							

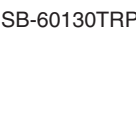
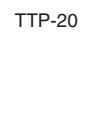
· When offset drilling, reduce feed rate to 0.06mm/rev or less.
· See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K58

Trouble shooting ● K64

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw 	Wrench 	
S40- DRV400M-4-14 NEW DRV410M-4-14 DRV420M-4-14 DRV430M-4-14 DRV440M-4-14 DRV450M-4-14 DRV460M-4-14 DRV470M-4-14	●	2	40	261	192	160	40	49	+1.75			Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
	●		41	265	196	164			+1.60			
	●		42	269	200	168			+1.50			
	●		43	273	204	172			+1.40			
	●		44	277	208	176	50	54	+1.30			
	●		45	281	212	180			+1.15			
	●		46	285	216	184			+1.05			
	●		47	289	220	188			+0.95			
S50- DRV480M-4-14 NEW DRV490M-4-14	●	2	48	293	224	192	50	59	+0.80			Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	●		49	297	228	196			+0.70			
S50- DRV500M-4-17 NEW DRV510M-4-17 DRV520M-4-17 DRV530M-4-17 DRV540M-4-17 DRV550M-4-17 DRV560M-4-17 DRV570M-4-17 DRV580M-4-17 DRV590M-4-17 DRV600M-4-17	●	2	50	298	229	200	50	59	+2.10			Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	●		51	302	233	204			+1.95			
	●		52	306	237	208			+1.85			
	●		53	310	241	212			+1.75			
	●		54	314	245	216			+1.65			
	●		55	318	249	220			+1.50			
	●		56	322	253	224	64	64	+1.40			
	●		57	326	257	228			+1.30			
	●		58	330	261	232			+1.15			
	●		59	334	265	236			+1.05			
	●		60	338	269	240			+0.95			

· When offset drilling, reduce feed rate to 0.06mm/rev or less.

· See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K58

Trouble shooting ➡ K64

· Hole Dia. Tolerance (4D type)

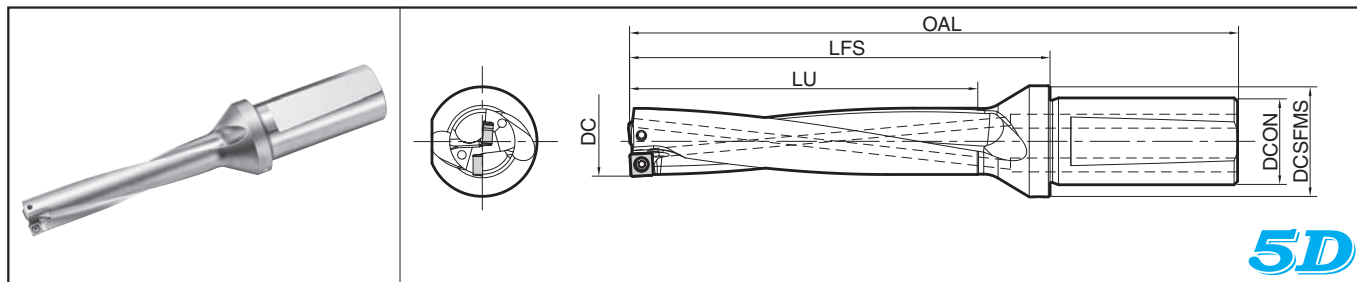
DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.35 0
ø40 - ø60	+0.40 0

* Above is numeric guideline.

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

MagicDrill DRV

DRV(Drilling Depth : 5 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Clamp Screw	Wrench	
											 DTPM FTP	
S20- DRV120M-5-03	●	2	12	118	75	60	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I
DRV130M-5-03	●		13	123	80	65	20	27	+0.15			
DRV140M-5-04	●	2	14	134	91	70	20	27	+0.40	SB-2037TRP	FTP-6	Outer edge SCMT040205-□□-E Inner edge SCMT040209-□□-I
DRV150M-5-04	●		15	139	96	75	20	27	+0.30			
S25- DRV160M-5-05	●	2	16	158	104	80	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I
DRV170M-5-05	●		17	163	109	85	25	32	+0.30			
DRV180M-5-05	●	2	18	168	114	90	25	32	+0.20	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
DRV190M-5-06	●		19	170	116	95	25	32	+0.65			
DRV200M-5-06	●	2	20	175	121	100	25	32	+0.55	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I
DRV210M-5-06	●		21	180	126	105	25	32	+0.45			
DRV220M-5-06	●	2	22	185	131	110	25	32	+0.30	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
DRV230M-5-07	●		23	190	136	115	25	32	+0.80			
DRV240M-5-07	●	2	24	195	141	120	25	32	+0.70	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
DRV250M-5-07	●		25	200	146	125	25	32	+0.60			
DRV260M-5-07	●	2	26	205	151	130	25	32	+0.45	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I
S32- DRV270M-5-09	●		27	217	158	135	32	41	+1.05	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
DRV280M-5-09	●	2	28	222	163	140	32	41	+0.95			
DRV290M-5-09	●		29	227	168	145	32	41	+0.85	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
DRV300M-5-09	●	2	30	232	173	150	32	41	+0.75			
DRV310M-5-09	●		31	237	178	155	32	41	+0.60	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I
DRV320M-5-09	●		32	242	183	160	32	41	+0.50			
S40- DRV330M-5-11	●	2	33	260	191	165	40	49	+1.25	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
DRV340M-5-11	●		34	265	196	170	40	49	+1.15			
DRV350M-5-11	●	2	35	270	201	175	40	49	+1.00	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
DRV360M-5-11	●		36	275	206	180	40	49	+0.90			
DRV370M-5-11	●	2	37	280	211	185	40	49	+0.80	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I
DRV380M-5-11	●		38	285	216	190	40	49	+0.65			
DRV390M-5-11	●		39	290	221	195	40	49	+0.55			

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K58

Trouble shooting ➡ K64

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw 	Wrench 	
S40- DRV400M-5-14 NEW DRV410M-5-14 DRV420M-5-14 DRV430M-5-14 DRV440M-5-14 DRV450M-5-14 DRV460M-5-14 DRV470M-5-14	●	2	40	301	232	200	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I
	●		41	306	237	205			+1.60			
	●		42	311	242	210			+1.50			
	●		43	316	247	215			+1.40			
	●		44	321	252	220	50	54	+1.30			
	●		45	326	257	225			+1.15			
	●		46	331	262	230			+1.05			
	●		47	336	267	235			+0.95			
S50- DRV480M-5-14 NEW DRV490M-5-14	●	2	48	341	272	240	50	59	+0.80	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	●		49	346	277	245			+0.70			
S50- DRV500M-5-17 NEW DRV510M-5-17 DRV520M-5-17 DRV530M-5-17 DRV540M-5-17 DRV550M-5-17 DRV560M-5-17 DRV570M-5-17 DRV580M-5-17 DRV590M-5-17 DRV600M-5-17	●	2	50	348	279	250	50	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I
	●		51	353	284	255			+1.95			
	●		52	358	289	260			+1.85			
	●		53	363	294	265			+1.75			
	●		54	368	299	270			+1.65			
	●		55	373	304	275			+1.50			
	●		56	378	309	280	64		+1.40			
	●		57	383	314	285			+1.30			
	●		58	388	319	290			+1.15			
	●		59	393	324	295			+1.05			
	●		60	398	329	300			+0.95			

· When offset drilling, reduce feed rate to 0.05mm/rev or less.
· See page K60 for Adjustable Sleeve (SHE).

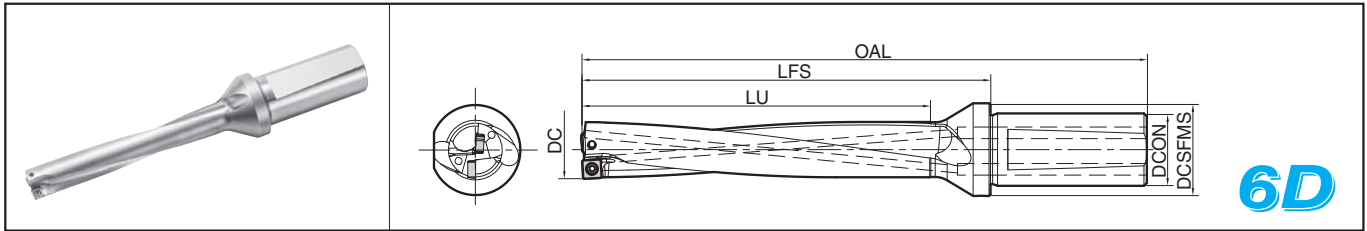
Recommended Cutting Conditions ➡ K58
Trouble shooting ➡ K64

· Hole Dia. Tolerance (5D type)

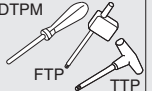
DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.35 0
ø40 - ø60	+0.40 0

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

DRV(Drilling Depth : 6 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➡ K44 (Outer edge) K45 (Inner edge)
			DC	OAL	LFS	LU	DCON	DCSfMS	Clamp Screw		Wrench		
											 FTP TTP		
S20- DRV120M-6-03 DRV130M-6-03 DRV140M-6-04 DRV150M-6-04	●	2	12	130	87	72	20	27	+0.25	SB-2037TRP	FTP-6	Outer edge LCMT030203-□□-E Inner edge LCMT030205-□□-I	
	●		13	136	93	78			+0.15				
	●	2	14	148	105	84	20	27	+0.40				
	●		15	154	111	90			+0.30				
S25- DRV160M-6-05 DRV170M-6-05 DRV180M-6-05 DRV190M-6-06 DRV200M-6-06 DRV210M-6-06 DRV220M-6-06 DRV230M-6-07 DRV240M-6-07 DRV250M-6-07 DRV260M-6-07	●	2	16	174	120	96	25	32	+0.40	SB-2041TRP	FTP-6	Outer edge SCMT050205-□□-E Inner edge SCMT050210-□□-I	
	●		17	180	126	102			+0.30				
	●		18	186	132	108			+0.20				
	●	2	19	189	135	114	25	32	+0.65	SB-2555TRP	DTPM-8	Outer edge SCMT060205-□□-E Inner edge SCMT060210-□□-I	
	●		20	195	141	120			+0.55				
	●		21	201	147	126			+0.45				
	●		22	207	153	132	+0.30						
	●	2	23	213	159	138	25	32	+0.80	SB-3060TRP	DTPM-10	Outer edge SCMT070305-□□-E Inner edge SCMT070310-□□-I	
	●		24	219	165	144			+0.70				
	●		25	225	171	150			+0.60				
●		26	231	177	156	+0.45							
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	SB-3573TRP	DTPM-10	Outer edge SCMT090405-□□-E Inner edge SCMT090410-□□-I	
	●		28	250	191	168			+0.95				
	●		29	256	197	174			+0.85				
	●		30	262	203	180			+0.75				
	●		31	268	209	186			+0.60				
	●		32	274	215	192			+0.50				
S40- DRV330M-6-11 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	SB-4086TRP	DTPM-15	Outer edge SCMT110406-□□-E Inner edge SCMT110410-□□-I	
	●		34	299	230	204			+1.15				
	●		35	305	236	210			+1.00				
	●		36	311	242	216			+0.90				
	●		37	317	248	222			+0.80				
	●		38	323	254	228			+0.65				
	●		39	329	260	234			+0.55				
S40-NEW DRV400M-6-14 DRV410M-6-14 DRV420M-6-14 DRV430M-6-14 DRV440M-6-14 DRV450M-6-14	●	2	40	341	272	240	40	49	+1.75	SB-50120TRPH	TTP-20	Outer edge SCMT140508-□□-E Inner edge SCMT140510-□□-I	
	●		41	347	278	246			+1.60				
	●		42	353	284	252			+1.50				
	●		43	359	290	258			+1.40				
	●		44	365	296	264			+1.30				
	●		45	371	302	270			+1.15				
S50-NEW DRV500M-6-17 DRV550M-6-17 DRV600M-6-17	●	2	50	398	329	300	50	59	+2.10	SB-60130TRP	TTP-20	Outer edge SCMT170608-□□-E Inner edge SCMT170610-□□-I	
	●		55	428	359	330		+1.50					
	●		60	458	389	360		64	+0.95				

• When offset drilling, reduce feed rate to 0.04mm/rev or less.
• See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K58
Trouble shooting ➡ K64

• Hole Dia. Tolerance (6D type)

DC	Hole Dia. Tolerance (mm)
ø12 - ø39	+0.45 0
ø40 - ø60	+0.50 0

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

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.

High Speed and Highly Efficient Drilling

Outer edge : CVD (CA520D/CA415D)

Inner edge : PVD (PR1535)

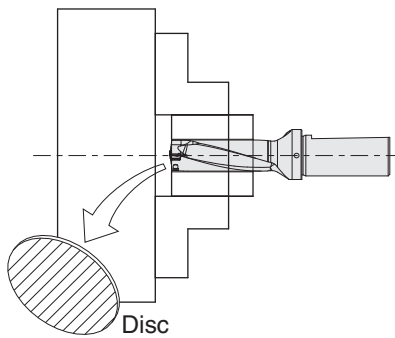
Stable Machining Oriented (1st Recommendation for Lathe Machining)

Outer edge : PVD (PR1225)

Inner edge : PVD (PR1535)



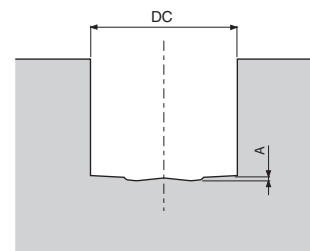
Caution



When drilling through the workpiece, a disk may be ejected.
Proper machine guarding is necessary to prevent injury.

DRV Hole Bottom Shape (mm)

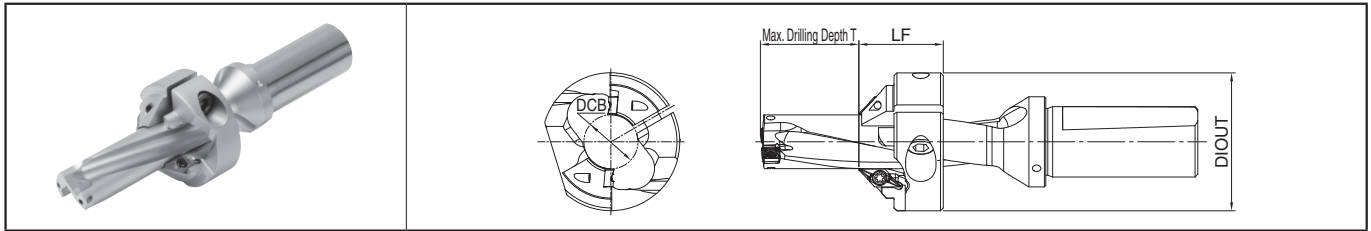
Insert Size	DC	A	Insert Size	DC	A	Insert Size	DC	A	Insert Size	DC	A
03	12.0	0.70	06	19.0	1.2	09	26.5	1.2	14	40.0	1.9
	12.5			19.5			27.0			41.0	
	13.0			20.0	1.3		27.5	1.3		42.0	2.0
	13.5			20.5			28.0			43.0	
04	14.0	1.0		21.0			1.3			28.5	
	14.5			21.5	1.4			29.0		2.1	
	15.0			22.0				29.5			45.0
	15.5			22.5			30.0	46.0			
05	16.0	1.1	07	23.0	1.2	11	30.5	1.4	17	47.0	2.2
	16.5			23.5			31.0			48.0	
	17.0			24.0			1.5	31.5		2.0	
	17.5	24.5		1.3	32.0			50.0			
	18.0	25.0			33.0		1.5	51.0		2.1	
	18.5	25.5			34.0			52.0			
		26.0		35.0	1.6		53.0	2.2			
				36.0			54.0				
			37.0	1.6			55.0			2.2	
			38.0		56.0						
				39.0	1.7	57.0	2.3				
						58.0		2.4			
							59.0			2.4	
							60.0				



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

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

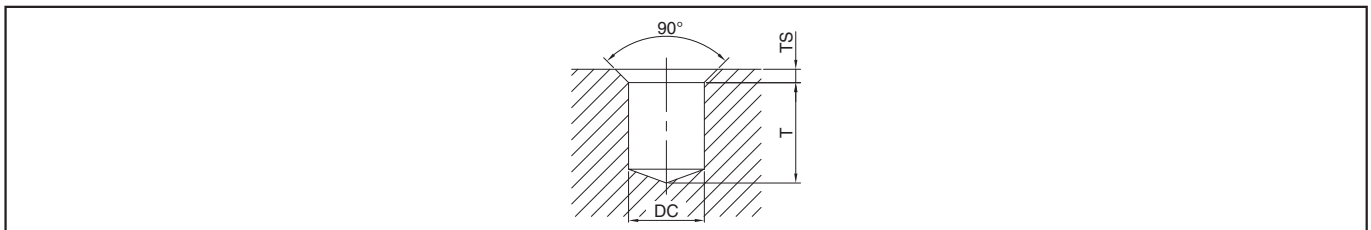
Chamfering Attachment



Toolholder Dimensions

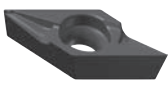
Description	Stock	Applicable Drills	Dimension (mm)			Applicable Inserts	Spare Parts			
			DIOUT	DCB	LF		Clamp Screw	Wrench	Clamp Bolt	Wrench
DRV-CH17	●	S25-DRV165M-○-05 S25-DRV170M-○-05	47	16.2	30	CH0503-45	SB-3080TR	FT-10	HH6X18	LW-5
DRV-CH18	●	S25-DRV175M-○-05 S25-DRV180M-○-05	47	17.2	30					
DRV-CH19	●	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	●	S32-DRV265M-○-09 S32-DRV270M-○-09	64	26	35				HH8X20	LW-6

Max. Drilling Depth and Chamfering Dimension

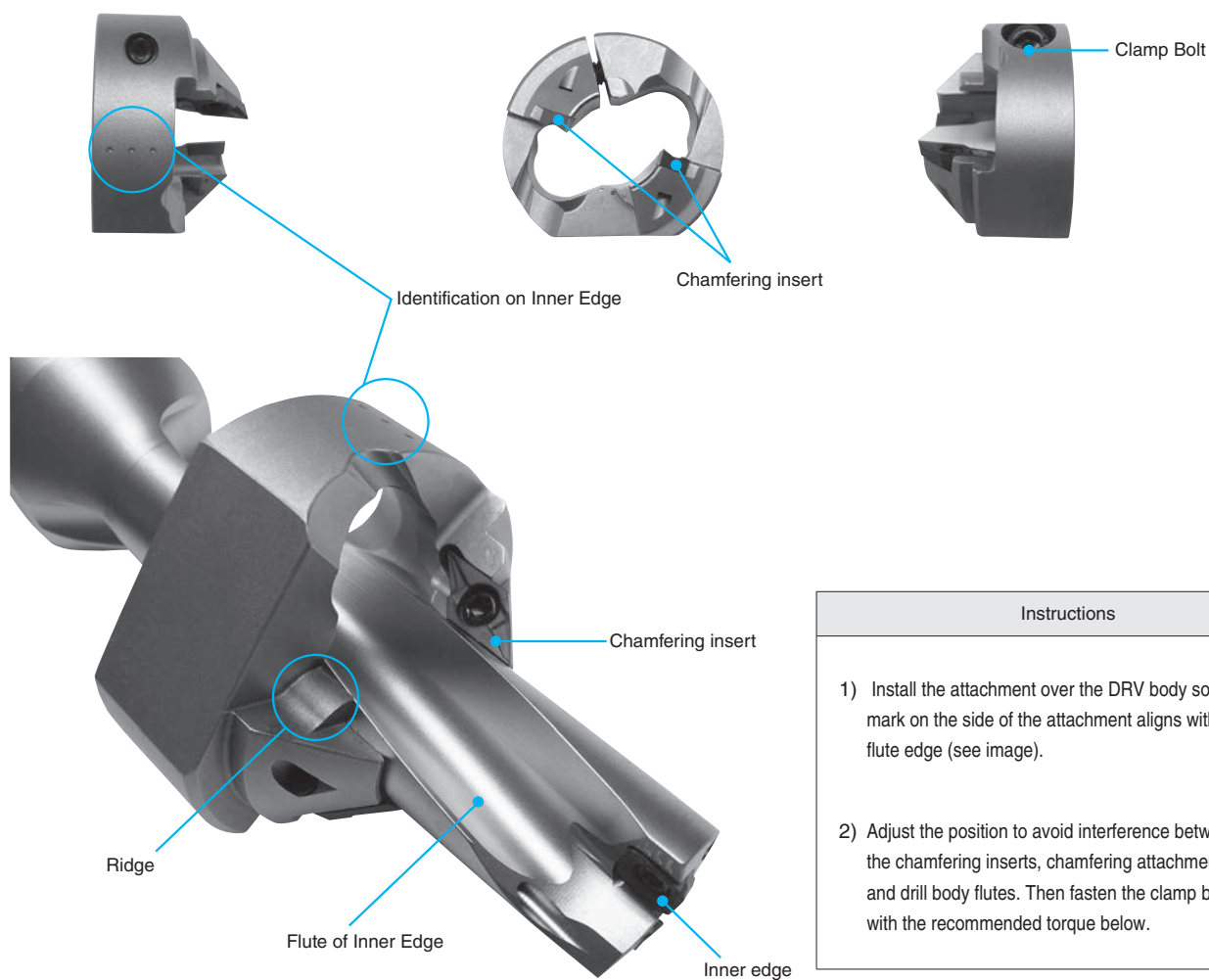


Drill Dia. (mm)	Max. Drilling Depth T (mm)						Max. Chamfering Dimension (mm)	Applicable Chamfering Attachment
	DC	2D Drill	3D Drill	4D Drill	5D Drill	6D Drill		
16.5	0.5	17	33.5	-	-	-	2.5	DRV-CH17
17	1.5	18.5	35.5	52.5	69.5	-		DRV-CH18
17.5	2.5	20	37.5	-	-	-		DRV-CH19
18	3.5	21.5	39.5	57.5	75.5	-		DRV-CH20
18.5	4.5	23	41.5	-	-	-		DRV-CH21
19	5.5	24.5	43.5	62.5	81.5	-		DRV-CH22
19.5	6.5	26	45.5	-	-	-		DRV-CH23
20	7.5	27.5	47.5	67.5	87.5	-		DRV-CH24
20.5	8.5	29	49.5	-	-	-		DRV-CH25
21	9.5	30.5	51.5	72.5	93.5	-		DRV-CH26
21.5	10.5	32	53.5	-	-	-		DRV-CH27
22	11.5	33.5	55.5	77.5	99.5	-		
22.5	12.5	35	57.5	-	-	-		
23	13.5	36.5	59.5	82.5	105.5	-		
23.5	14.5	38	61.5	-	-	-		
24	15.5	39.5	63.5	87.5	111.5	-		
24.5	16.5	41	65.5	-	-	-		
25	17.5	42.5	67.5	92.5	117.5	-		
25.5	18.5	44	69.5	-	-	-		
26	19.5	45.5	71.5	97.5	123.5	-		
26.5	-	47	-	-	-	-		
27	16.5	43.5	75.5	97.5	124.5	-		

● Applicable Inserts

Insert	Description	Dimension (mm)		MEGACOAT NANO	Applicable Chamfering Attachment
		W1	S		
	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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◆ DRV Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades(Cutting Speed Vc: m/min)										Drill Dia. DC (mm)	Drill type							
	PVD Coated Carbide				CVD Coated Carbide							2D , 3D				4D			
	PR1225				CA520D							f (mm/rev)							
	GM	GH	XM	SM	GM	GH	XM	SM	GM	GH		GM	GH	XM	SM				
Low Carbon Steel	-	-	★ 120-200	☆ 120-200	-	-	★ 150-280	☆ 150-280	-	-	ø12-ø13.5	-	-	-	0.04-0.06	-	-	-	0.04-0.06
			ø14-ø15.5	-			-	0.04-0.09			0.04-0.07	-	-	0.04-0.08	0.04-0.07				
			ø16-ø18.5	-			-	0.04-0.10			0.04-0.08	-	-	0.04-0.08	0.04-0.08				
			ø19-ø22	-			-	0.04-0.12			0.04-0.08	-	-	0.04-0.10	0.04-0.08				
			ø22.5-ø26	-			-	0.04-0.14			0.06-0.10	-	-	0.04-0.12	0.05-0.10				
			ø26.5-ø32	-			-	0.06-0.14			0.06-0.10	-	-	0.04-0.12	0.05-0.10				
			ø33-ø39	-			-	0.06-0.14			0.06-0.10	-	-	0.06-0.12	0.05-0.10				
			ø40-ø60	-			-	0.06-0.16			0.08-0.12	-	-	0.06-0.16	0.05-0.10				
Carbon Steel	★ 100-180	☆ 100-180	☆ 100-180	☆ 100-180	★ 150-280	☆ 150-280	☆ 150-280	☆ 150-280	-	-	ø12-ø13.5	0.04-0.14	0.04-0.14	-	0.04-0.10	0.04-0.10	0.04-0.10	-	0.04-0.08
											ø14-ø15.5	0.04-0.14	0.04-0.14	0.04-0.10	0.04-0.10	0.04-0.10	0.04-0.10	0.04-0.08	0.04-0.08
											ø16-ø18.5	0.06-0.16	0.06-0.16	0.06-0.12	0.06-0.12	0.05-0.12	0.05-0.12	0.04-0.10	0.05-0.10
											ø19-ø26	0.08-0.20	0.08-0.20	0.06-0.14	0.06-0.14	0.07-0.16	0.07-0.16	0.04-0.12	0.05-0.12
											ø26.5-ø32	0.08-0.20	0.08-0.20	0.06-0.14	0.06-0.14	0.07-0.16	0.07-0.16	0.04-0.12	0.05-0.12
											ø33-ø39	0.08-0.20	0.08-0.20	0.06-0.16	0.06-0.14	0.07-0.16	0.07-0.16	0.06-0.14	0.05-0.12
											ø40-ø60	0.08-0.20	0.08-0.20	0.06-0.18	0.06-0.14	0.07-0.16	0.07-0.16	0.06-0.16	0.05-0.12
											Alloy Steel	★ 100-160	☆ 100-160	☆ 100-160	-	★ 140-220	☆ 140-220	☆ 140-220	-
ø14-ø15.5	0.04-0.14	0.04-0.14	-	-	0.04-0.10	0.04-0.10	-	-											
ø16-ø18.5	0.06-0.16	0.06-0.16	-	-	0.05-0.12	0.05-0.12	-	-											
ø19-ø26	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-											
ø26.5-ø32	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-											
ø33-ø39	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-											
ø40-ø60	0.08-0.20	0.08-0.20	-	-	0.07-0.16	0.07-0.16	-	-											
Mold Steel	☆ 80-150	★ 80-150	-	-	☆ 130-210	★ 130-210	-	-	-	-									
											ø14-ø15.5	0.04-0.08	0.04-0.08	-	-	0.04-0.07	0.04-0.07	-	-
											ø16-ø18.5	0.06-0.12	0.06-0.12	-	-	0.05-0.10	0.05-0.10	-	-
											ø19-ø26	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											ø26.5-ø32	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											ø33-ø39	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											ø40-ø60	0.08-0.15	0.08-0.15	-	-	0.06-0.12	0.06-0.12	-	-
											Stainless Steel (Austenitic related)	-	-	-	★ 70-140	-	-	-	★ 140-200
ø14-ø15.5	-	-	-	0.04-0.10	-	-	-	0.04-0.08											
ø16-ø18.5	-	-	-	0.06-0.12	-	-	-	0.05-0.11											
ø19-ø26	-	-	-	0.06-0.14	-	-	-	0.06-0.12											
ø26.5-ø32	-	-	-	0.06-0.14	-	-	-	0.06-0.12											
ø33-ø39	-	-	-	0.06-0.14	-	-	-	0.06-0.12											
ø40-ø60	-	-	-	0.06-0.14	-	-	-	0.06-0.12											
Gray Cast Iron	☆ 100-150	★ 100-150	-	-	-	-	-	-	☆ 150-220	★ 150-220									
											ø14-ø15.5	0.08-0.14	0.08-0.14	-	-	0.06-0.12	0.06-0.12	-	-
											ø16-ø18.5	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-
											ø19-ø26	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											ø26.5-ø32	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											ø33-ø39	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											ø40-ø60	0.08-0.20	0.08-0.20	-	-	0.08-0.18	0.08-0.18	-	-
											Nodular Cast Iron	☆ 80-120	★ 80-120	-	-	-	-	-	-
ø14-ø15.5	0.08-0.12	0.08-0.12	-	-	0.06-0.10	0.06-0.10	-	-											
ø16-ø18.5	0.08-0.16	0.08-0.16	-	-	0.08-0.14	0.08-0.14	-	-											
ø19-ø26	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-											
ø26.5-ø32	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-											
ø33-ø39	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-											
ø40-ø60	0.08-0.18	0.08-0.18	-	-	0.08-0.16	0.08-0.16	-	-											

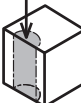
◆ DRV Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grades(Cutting Speed Vc: m/min)										Drill Dia. DC (mm)	Drill type								
	PVD Coated Carbide					CVD Coated Carbide						5D				6D				
	PR1225					CA520D						f (mm/rev)								
	GM	GH	XM	SM		GM	GH	XM	SM			GM	GH	XM	SM	GM	GH	XM	SM	
Low Carbon Steel	★	☆	★	☆	-	-	★	☆	-	-	ø12-ø13.5	-	-	-	0.03-0.05	-	-	-	0.03-0.05	
											ø14-ø15.5	-	-	0.04-0.07	0.04-0.06	-	-	0.04-0.06	0.04-0.06	
											ø16-ø18.5	-	-	0.04-0.08	0.04-0.06	-	-	0.04-0.06	0.04-0.06	
											ø19-ø22	-	-	0.04-0.10	0.04-0.07	-	-	0.04-0.07	0.04-0.07	
											ø22.5-ø26	-	-	0.04-0.12	0.04-0.08	-	-	0.04-0.08	0.04-0.07	
											ø26.5-ø32	-	-	0.04-0.12	0.04-0.08	-	-	0.04-0.08	0.04-0.07	
											ø33-ø39	-	-	0.05-0.12	0.04-0.10	-	-	0.04-0.09	0.04-0.08	
											ø40-ø60	-	-	0.06-0.14	0.04-0.10	-	-	0.06-0.12	0.04-0.08	
Carbon Steel	★	☆	☆	☆	★	☆	☆	☆	-	-	ø12-ø13.5	0.04-0.08	0.04-0.08	-	0.04-0.07	0.03-0.05	0.03-0.05	-	0.03-0.05	
											ø14-ø15.5	0.04-0.08	0.04-0.08	0.04-0.07	0.04-0.07	0.04-0.06	0.04-0.06	0.04-0.06	0.04-0.06	
											ø16-ø18.5	0.05-0.10	0.05-0.10	0.05-0.08	0.05-0.08	0.05-0.08	0.05-0.08	0.05-0.07	0.05-0.07	
											ø19-ø26	0.06-0.12	0.06-0.12	0.05-0.10	0.05-0.10	0.06-0.10	0.06-0.10	0.05-0.08	0.05-0.08	
											ø26.5-ø32	0.06-0.12	0.06-0.12	0.05-0.12	0.05-0.10	0.06-0.10	0.06-0.10	0.05-0.08	0.05-0.08	
											ø33-ø39	0.06-0.12	0.06-0.12	0.05-0.12	0.05-0.10	0.06-0.10	0.06-0.10	0.05-0.08	0.05-0.08	
											ø40-ø60	0.06-0.12	0.06-0.12	0.06-0.12	0.05-0.10	0.06-0.10	0.06-0.10	0.06-0.10	0.05-0.08	
											Alloy Steel	★	☆	☆	-	★	☆	☆	-	-
ø14-ø15.5	0.04-0.08	0.04-0.08	-	-	0.04-0.06	0.04-0.06	-	-												
ø16-ø18.5	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-												
ø19-ø26	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
ø26.5-ø32	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
ø33-ø39	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
ø40-ø60	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
Mold Steel	☆	★	-	-	☆	★	-	-	-	-										
											ø14-ø15.5	0.04-0.06	0.04-0.06	-	-	0.04-0.05	0.04-0.05	-	-	
											ø16-ø18.5	0.04-0.08	0.04-0.08	-	-	0.04-0.06	0.04-0.06	-	-	
											ø19-ø26	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-	
											ø26.5-ø32	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-	
											ø33-ø39	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-	
											ø40-ø60	0.05-0.10	0.05-0.10	-	-	0.05-0.08	0.05-0.08	-	-	
											Stainless Steel (Austenitic related)	-	-	-	★	-	-	-	-	★
ø14-ø15.5	-	-	-	0.04-0.08	-	-	-	0.04-0.06												
ø16-ø18.5	-	-	-	0.04-0.10	-	-	-	0.04-0.09												
ø19-ø26	-	-	-	0.06-0.12	-	-	-	0.06-0.10												
ø26.5-ø32	-	-	-	0.06-0.12	-	-	-	0.06-0.10												
ø33-ø39	-	-	-	0.06-0.12	-	-	-	0.06-0.10												
ø40-ø60	-	-	-	0.06-0.12	-	-	-	0.06-0.10												
Gray Cast Iron	☆	★	-	-	-	-	-	-	-	☆										
											ø14-ø15.5	0.04-0.10	0.04-0.10	-	-	0.04-0.08	0.04-0.08	-	-	
											ø16-ø18.5	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-	
											ø19-ø26	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-	
											ø26.5-ø32	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-	
											ø33-ø39	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-	
											ø40-ø60	0.06-0.14	0.06-0.14	-	-	0.06-0.12	0.06-0.12	-	-	
											Nodular Cast Iron	☆	★	-	-	-	-	-	-	-
ø14-ø15.5	0.04-0.08	0.04-0.08	-	-	0.04-0.06	0.04-0.06	-	-												
ø16-ø18.5	0.06-0.10	0.06-0.10	-	-	0.06-0.08	0.06-0.08	-	-												
ø19-ø26	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
ø26.5-ø32	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
ø33-ø39	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												
ø40-ø60	0.06-0.12	0.06-0.12	-	-	0.06-0.10	0.06-0.10	-	-												

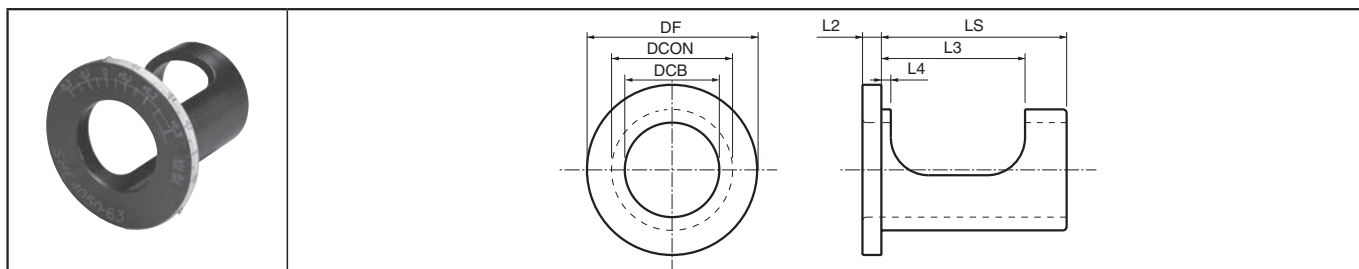
· Internal Coolant is Recommended

★ : 1st Recommendation ☆ : 2nd Recommendation

■ Cutting Conditions by Application

Applications	Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Cored Hole	Concave Surface	Stacked Plates
Shape of Workpiece							
Cutting Speed Vc (m/min)	See recommended cutting conditions above.						120 (PVD insert is recommended for outer edge.)
f (mm/rev)	See recommended cutting conditions above.						Half of the above recommended conditions is recommended.
Coolant (Internal coolant)	Yes						Not

SHE



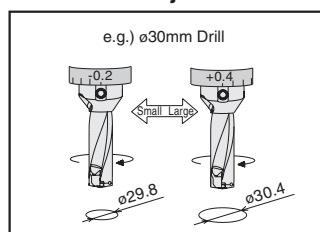
● Sleeve Dimensions

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.

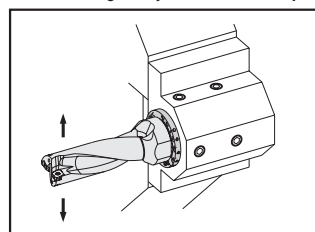
1. Diameter Adjustment ~For Machining Center~



● Diameter Adjustment Range (mm)

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

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	
ø40	+0.3~-0.2

◆ How to Use the Adjustable Sleeve

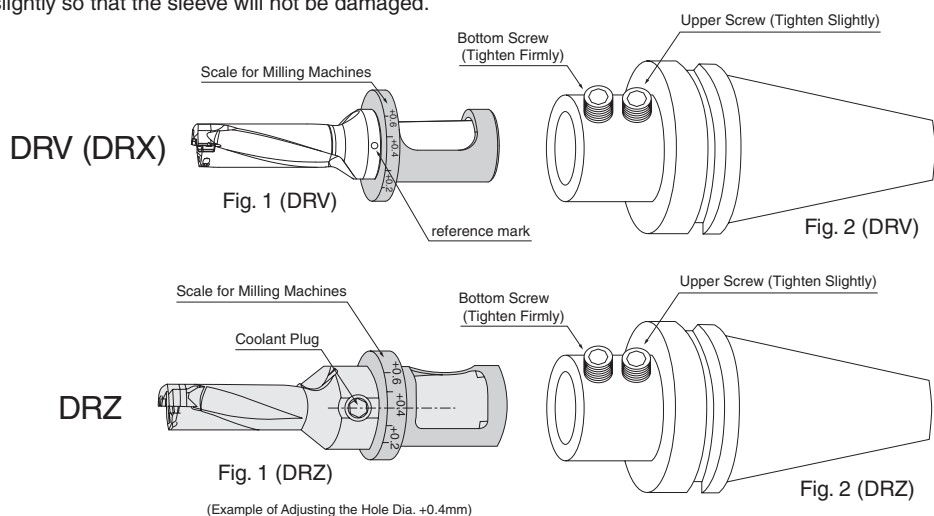
1. Hole Diameter Adjustment when Drilling

- (1) 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)
- (2) When making the hole diameter larger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.
- (3) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
- (4) 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.



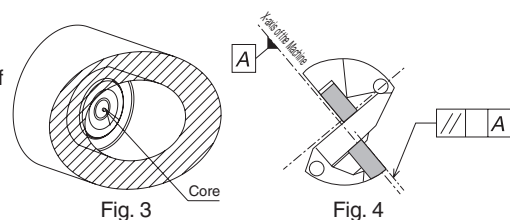
2. Center-Height Adjustment for Lathes

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



- (1) Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig. 4)
- (2) Adjust the scale at the flange periphery of the sleeve to the reference mark (DRV/DRX) or the center of coolant plug (DRZ).
- (3) 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.
- (4) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
- (5) 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.

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)

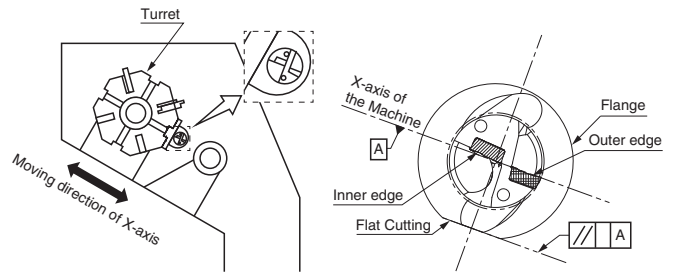


Fig. 1 Installed into the Lathe

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

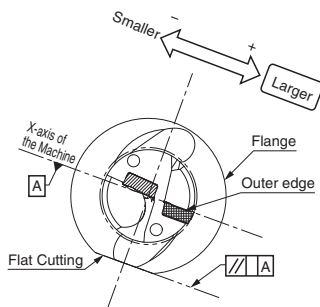


Fig. 2 Outer insert Facing Up

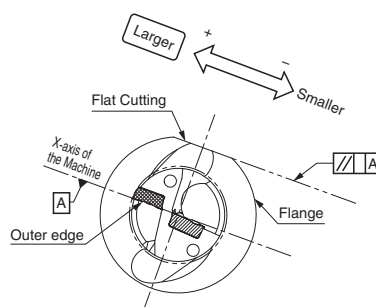


Fig. 3 Outer insert Facing Down

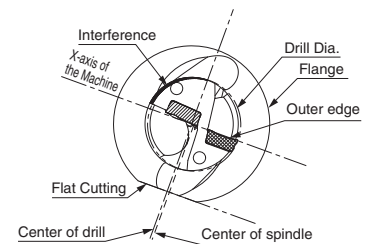


Fig. 4 Excessive offset (For Smaller Hole Diameter)

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 1 mm or more remains.

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

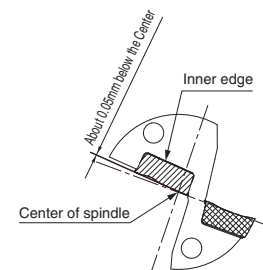


Fig. 5 Front View of the Drill

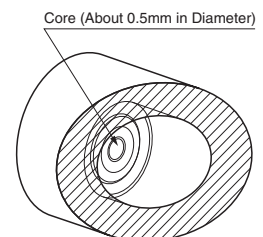


Fig. 6 Center Core

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)

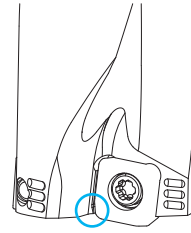


Fig. 7 Insert breakage near the center of the drill

[How to Adjust]

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

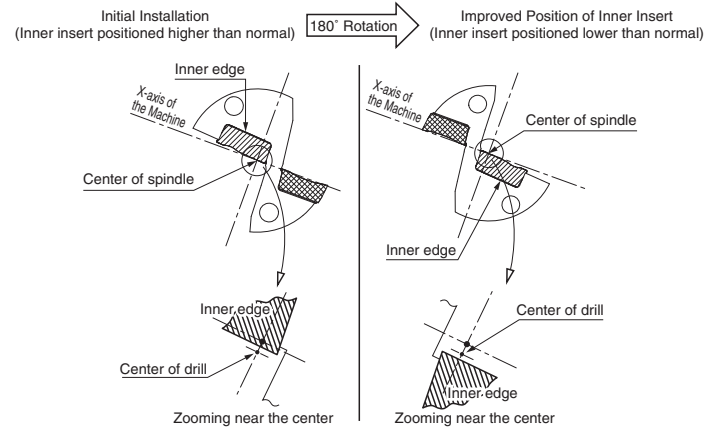


Fig. 8

[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 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.

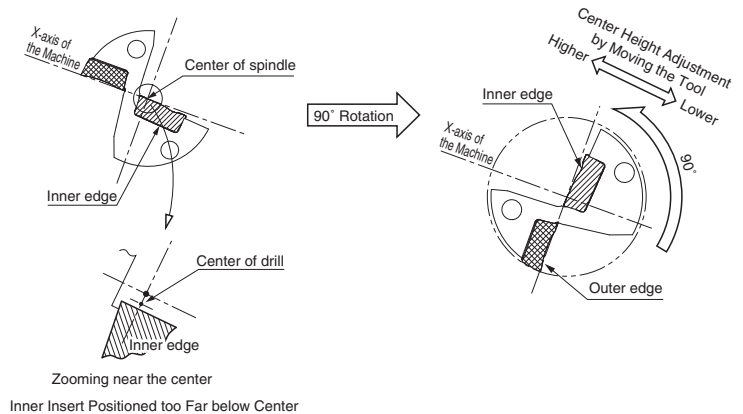


Fig. 9

- 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.

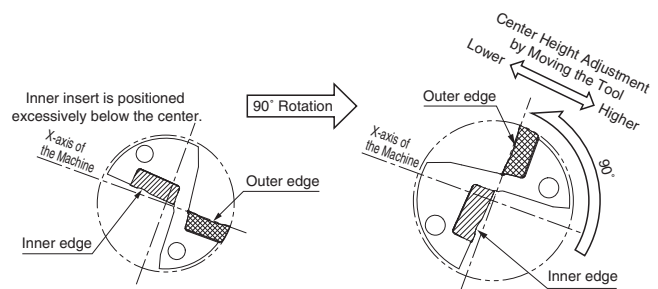


Fig. 10

Trouble shooting

Trouble shooting (DRV / DRS / DRZ / DRX)

Trouble condition	Condition	Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)	A (Inlet side) B (Bottom side) $A > B$ There is no problem for inlet, however gradually hole diameter is getting smaller at the bottom.	Chip jam (External or Internal edge chip stuck)	Change the cutting conditions · Increase the cutting speed · Lower the feed rate See page, K58, K59, K66, K77, K90 for "Recommended Cutting Conditions".
Hole diameter becomes larger (at hole bottom)	A (Inlet side) B' (Bottom side) $A < B'$ There is no problem for inlet, however gradually hole diameter is getting larger at the bottom.	Internal edge chip jam.	Change the cutting conditions · Increase the cutting speed · Lower the feed rate See page, K58, K59, K66, K77, K90 for "Recommended Cutting Conditions". · Check the core height K62-K63 (DRV) K78-K79 (DRZ/DRX)
Hole diameter is small (from the hole inlet)		Hole diameter is small from inlet. (At turning moment)	Inappropriate adjustment of hole diameter. K62 (DRV) K78 (DRZ/DRX)
		No core at internal edge. (No core remains)	Adjust the center height. K62-K63 (DRV) K78-K79 (DRZ/DRX)

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

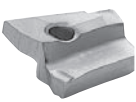
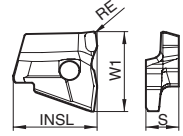
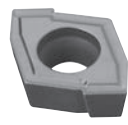
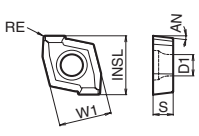
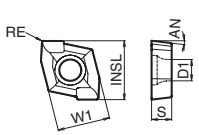
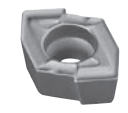
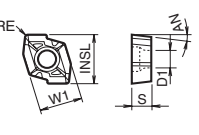
How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	• When an insert is new, The toolholder is slightly bent to the side during drilling. (therefore, the drill diameter is slightly bigger during drilling.) Once drilling is finished, the toolholder will return 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 whirl 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.

Applicable Inserts (for DRS / DRZ)

Applicable Inserts (for DRS / DRZ)

Classification of usage
● : 1st Choice
○ : 2nd Choice
(Steel; non heat treated)

P	Carbon Steel / Alloy Steel
M	Mold Steel
K	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		PR1230	PR1225	PR1210	KW10		
		DS 100		9.0	3.5	8.8	0.2	●	○	○	○	K66	Turning Insert Grades Indexable Inserts CN & PCD Tools
		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	●	●	●	●	Small Parts Machining
		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	●	●	●	●	Boring Grooving Cut-off Threading
		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	●	●	●	●	
		150406SP		17.8	4.76	5.6	15.8	0.6	●	●	●	●	
		ZCMT 050203SU		5.9	2.38	2.3	5.0	0.3	●	●	●	●	External Machining
		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)

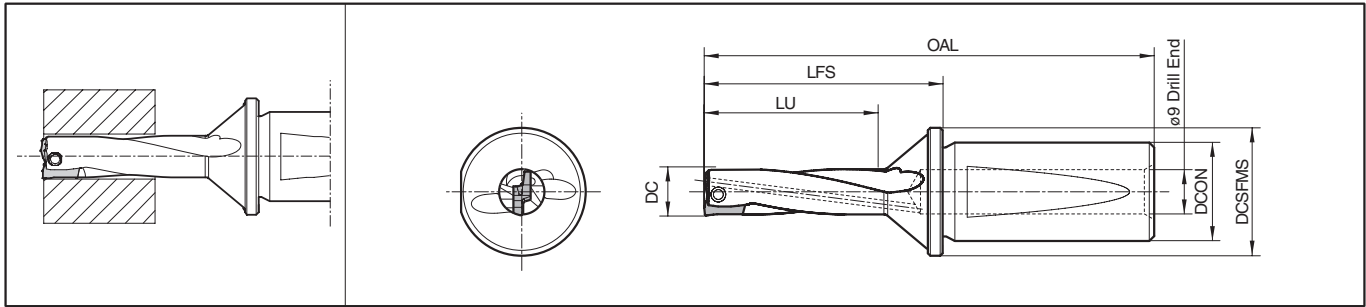
Workpiece Material	Insert Size	ZCMT05									ZCMT06									ZCMT08								
	Chipbreaker	Standard			SP			SU			Standard			SP			SU			Standard			SP					
	Drilling Depth	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D						
Low Carbon Steel		☆	☆	-	★	★	★	-	-	-	☆	☆	-	★	★	★	☆	☆	☆	☆	☆	-	★	★	★			
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		
	Drilling Depth	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

● : Std. Item

DRS



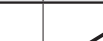
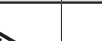
Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts K65
			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				DS105
-DRS10537	▲	1	10.5	93	50	37.0			+0.2				DS110
-DRS11038	▲	1	11.0	96	53	38.5			+0.2	SB-2290TR	-	DT-7	DS115
-DRS11540	▲	1	11.5	97	54	40.5			+0.2				DS120
-DRS12042	▲	1	12.0	99	56	42.0			+0.4	SB-25100TR	-	DT-7	DS120
-DRS12544	▲	1	12.5	101	58	44.0			+0.2				DS120

Trouble shooting K64

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	Not recommended	Not Available
						Continuous Part 0.08		
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)

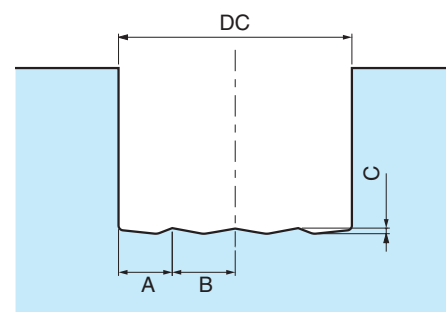
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)		f (mm/rev)
	MEGACOAT		
	PR1230	PR1210	
Low Carbon Steel	★ 80~100	-	0.06
Carbon Steel	★ 80~100	-	0.08~0.1
Alloy Steel	★ 80	-	0.04~0.06
Mold Steel	★ 80	-	0.04~0.06
Stainless Steel (Austenitic related)	★ 70~80	-	0.05~0.06
Gray Cast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

★ : 1st Recommendation ☆ : 2nd Recommendation

1. Apply a sufficient amount of coolant.
2. 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.
3. 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)

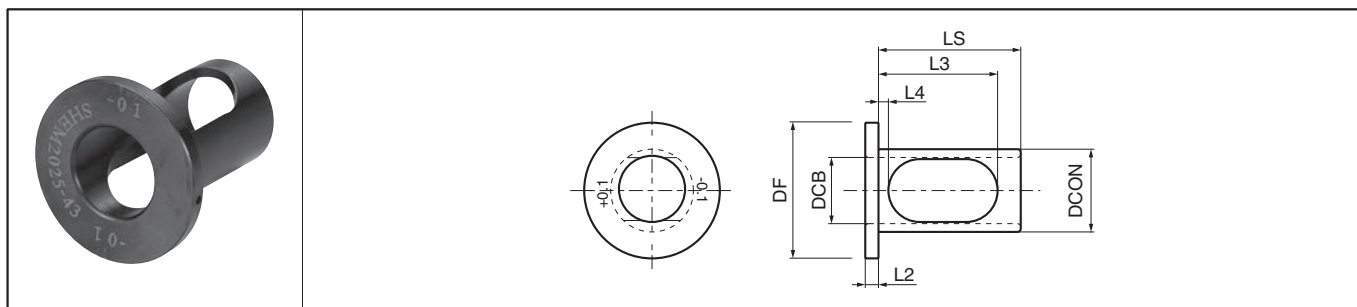
DRS Hole Bottom Shape (mm)

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



▲ : To be replaced by a new product

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)

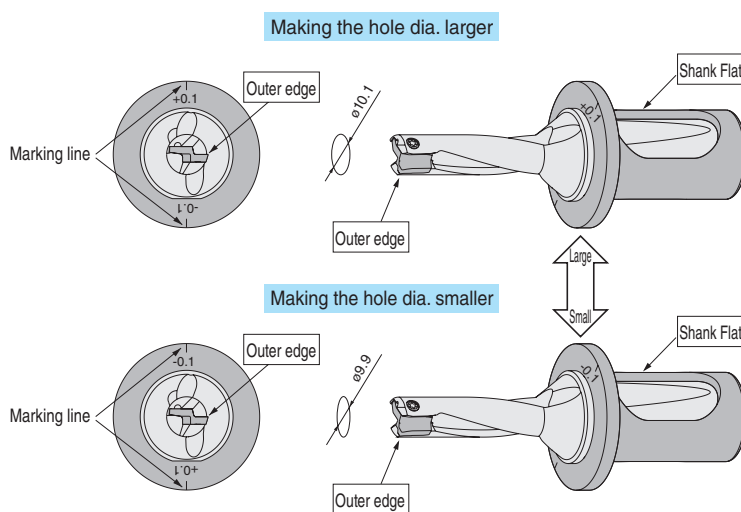


Fig. 1 Diameter Adjustment Method (e.g.) $\phi 10$ Drill

Caution : Not applicable for Collet Chuck type Arbor.

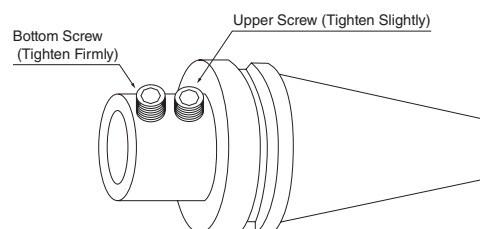


Fig. 2

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ➡ K65
			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		60		+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 K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K77

Trouble shooting ● K64

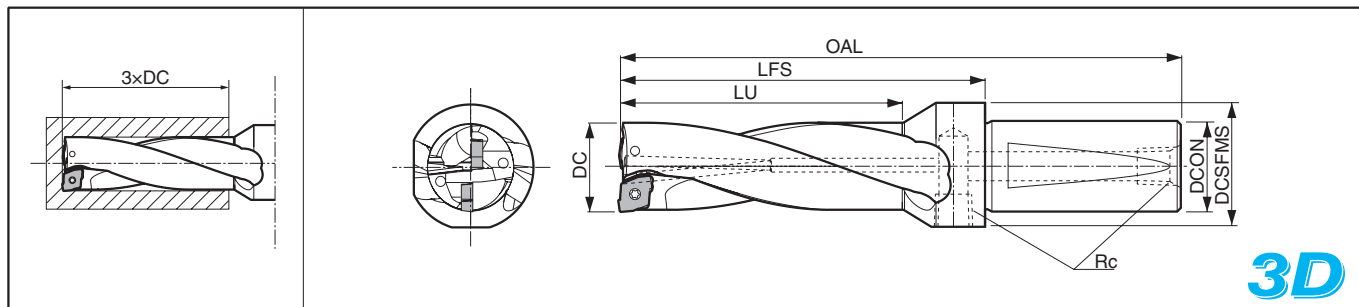
· Hole Dia. Tolerance (2D type)

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 : 3 x DC)



● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts  K65	
			DC	OAL	LFS	LU	DCON	DCSFMS		Rc	Clamp Screw	Wrench		Plug
												 DT		
S20 -DRZ1339-05 -DRZ135405-05 -DRZ1442-05 -DRZ145435-05 -DRZ1545-05 -DRZ155465-05	● ● ● ● ● ●	2	13 13.5 14 14.5 15 15.5	108 108 112 112 115 115	65 65 69 69 72 72	39 40.5 42 43.5 45 46.5	20	27	Rc1/8	+0.5 +0.5 +0.5 +0.5 +0.5 +0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
S25 -DRZ1648-06 -DRZ165495-06 -DRZ1751-06 -DRZ175525-06 -DRZ1854-06 -DRZ185555-06 -DRZ1957-06 -DRZ195585-06 -DRZ2060-06 -DRZ205615-06 -DRZ2163-06	● ● ● ● ● ● ● ● ● ● ●	2	16 16.5 17 17.5 18 18.5 19 19.5 20 20.5 21	131 131 133 133 136 136 139 139 143 146 146	77 77 79 79 82 82 85 85 89 92 92	48 49.5 51 52.5 54 55.5 57 58.5 60 61.5 63	25	32	Rc1/8	+1.1 +0.9 +0.8 +0.7 +0.6 +0.6 +0.5 +0.5 +0.5 +0.3 +0.2	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ215645-08 -DRZ2266-08 -DRZ225675-08 -DRZ2369-08 -DRZ235705-08 -DRZ2472-08 -DRZ245735-08 -DRZ2575-08 -DRZ255765-08 -DRZ2678-08 -DRZ265795-08	● ● ● ● ● ● ● ● ● ● ●	2	21.5 22 22.5 23 23.5 24 24.5 25 25.5 26 26.5	147 147 147 150 150 152 152 155 155 158 158	93 93 93 96 96 98 98 101 101 104 104	64.5 66 67.5 69 70.5 72 73.5 75 76.5 78 79.5	25	33 35	Rc1/8	+1.8 +1.6 +1.4 +1.3 +1.2 +1.1 +0.9 +0.8 +0.7 +0.6 +0.5	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
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	● ● ● ● ● ● ● ● ● ● ● ●	2	27 27.5 28 28.5 29 29.5 30 30.5 31 31.5 32 32.5	173 173 176 176 179 179 181 181 183 183 187 187	114 114 117 117 120 120 122 122 124 124 128 128	81 82.5 84 85.5 87 88.5 90 91.5 93 94.5 96 97.5	32	42 45	Rc1/4	+2.5 +2.3 +2.2 +2.1 +2.0 +1.8 +1.7 +1.5 +1.5 +1.3 +1.2 +1.0	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ3399-12 -DRZ34102-12 -DRZ35105-12 -DRZ36108-12 -DRZ37111-12 -DRZ38114-12 -DRZ39117-12 -DRZ40120-12	● ● ● ● ● ● ● ●	2	33 34 35 36 37 38 39 40	193 197 199 203 205 208 211 212	134 138 140 144 146 149 152 153	99 102 105 108 111 114 117 120	32	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

- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K77

Trouble shooting ➡ **K64**

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts 
			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				+1.2				
-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	60	+2.7						
-DRZ47141-15	●		47	245	176	141		+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 K60 for Adjustable Sleeve (SHE).

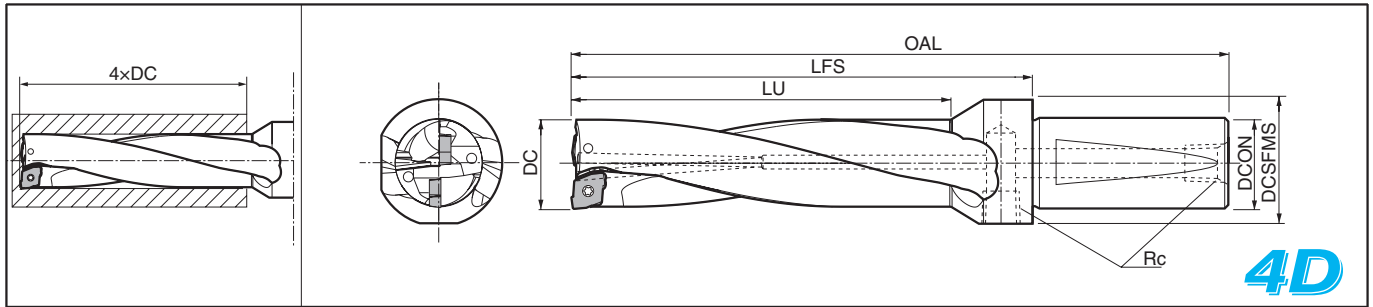
Recommended Cutting Conditions ● K77
Trouble shooting ● K64

• 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.

DRZ (Drilling Depth : 4 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts  K65
			DC	OAL	LFS	LU	DCON	DCSFMS	Rc		Clamp Screw	Wrench	Plug	
												FT  DT		
S20 -DRZ1352-05 -DRZ135540-05 -DRZ1456-05 -DRZ145580-05 -DRZ1560-05 -DRZ155620-05	     	2	13 13.5 14 14.5 15 15.5	121 121 126 126 130 130	78 78 83 83 87 87	52 54 56 58 60 62	20	27	Rc1/8	+0.5 +0.5 +0.5 +0.5 +0.5 +0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
S25 -DRZ1664-06 -DRZ165660-06 -DRZ1768-06 -DRZ175700-06 -DRZ1872-06 -DRZ185740-06 -DRZ1976-06 -DRZ195780-06 -DRZ2080-06 -DRZ205820-06 -DRZ2184-06	          	2	16 16.5 17 17.5 18 18.5 19 19.5 20 20.5 21	147 147 149 149 153 153 157 157 156 161 161	93 93 95 95 99 99 103 103 102 107 107	64 66 68 70 72 74 76 78 80 82 84	25	32	Rc1/8	+1.1 +0.9 +0.8 +0.7 +0.6 +0.6 +0.5 +0.5 +0.5 +0.3 +0.2	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ215860-08 -DRZ2288-08 -DRZ225900-08 -DRZ2392-08 -DRZ235940-08 -DRZ2496-08 -DRZ245980-08 -DRZ25100-08 -DRZ2551020-08 -DRZ26104-08 -DRZ2651060-08	          	2	21.5 22 22.5 23 23.5 24 24.5 25 25.5 26 26.5	169 169 169 173 173 176 176 180 180 184 184	115 115 115 119 119 122 122 126 126 130 130	86 88 90 92 94 96 98 100 102 104 106	25	33 35	Rc1/8	+1.8 +1.6 +1.4 +1.3 +1.2 +1.1 +0.9 +0.8 +0.7 +0.6 +0.5	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
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	           	2	27 27.5 28 28.5 29 29.5 30 30.5 31 31.5 32 32.5	200 200 204 204 208 208 211 211 214 214 219 219	141 141 145 145 149 149 152 152 155 155 160 160	108 110 112 114 116 118 120 122 124 126 128 130	32	42 45	Rc1/4	+2.5 +2.3 +2.2 +2.1 +2.0 +1.8 +1.7 +1.5 +1.5 +1.3 +1.2 +1.0	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ33132-12 -DRZ34136-12 -DRZ35140-12 -DRZ36144-12 -DRZ37148-12 -DRZ38152-12 -DRZ39156-12 -DRZ40160-12	       	2	33 34 35 36 37 38 39 40	226 231 234 239 242 246 250 252	167 172 175 180 183 187 191 193	132 136 140 144 148 152 156 160	32	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

• When offset drilling, reduce feed rate to 0.06mm/rev or less.
• See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K77

Trouble shooting ● K64

● : Std. Item

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts  K65
			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 **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K77

Trouble shooting ● K64

· Hole Dia. Tolerance (4D type)

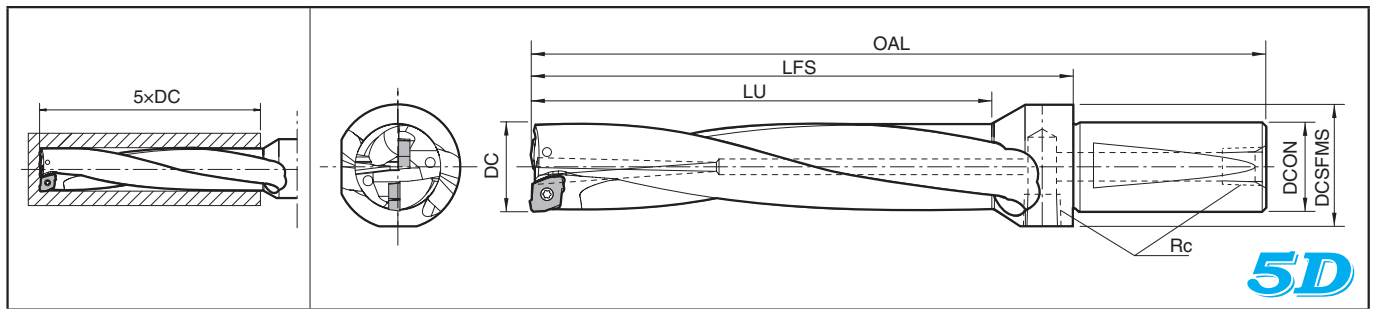
DC	Hole Dia. Tolerance (mm)
ø13~ø26.5	+0.25 -0.10
ø27~ø40	+0.30 -0.15
ø41~ø50	+0.35 -0.20

* 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  K65
			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 28 29 30 31 32	227 232 237 241 245 251	168 173 178 182 186 192	135 140 145 150 155 160	32	42 45	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 -DRZ41205-15 -DRZ42210-15 -DRZ43215-15 -DRZ44220-15 -DRZ45225-15 -DRZ46230-15 -DRZ47235-15 -DRZ48240-15 -DRZ49245-15 -DRZ50250-15	                	2	33 34 35 36 37 38 39 40	269 275 279 285 289 294 299 302	200 206 210 216 220 225 230 233	165 170 175 180 185 190 195 200	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
	         	2	41 42 43 44 45 46 47 48 49 50	306 311 316 321 324 333 339 344 349 351	237 242 247 252 255 264 270 275 280 282	205 210 215 220 225 230 235 240 245 250	40	55 60	Rc1/4	+4.0 +3.7 +3.5 +3.2 +3.0 +2.7 +2.5 +2.2 +2.0 +1.7	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP

• When offset drilling, reduce feed rate to 0.05mm/rev or less.
• See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K77

Trouble shooting ● K64

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

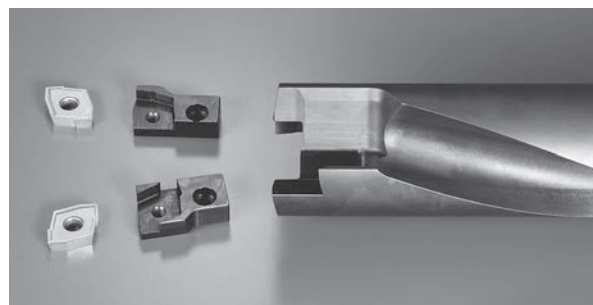
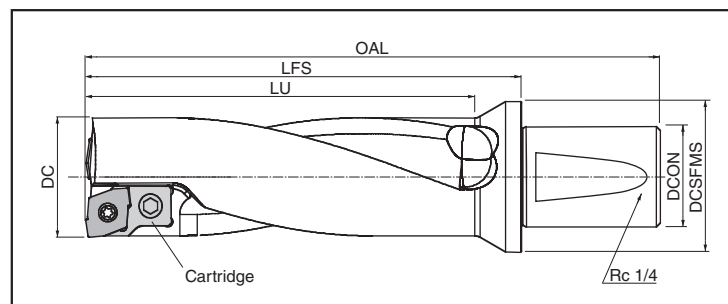
● : Std. Item

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  K65
			DC	OAL	LFS	LU	DCON	DCSFMS		Cartridge		Clamp Screw 	Wrench 	
										 For outer edge	 For inner edge			
S50 -DRZ60180-20CR -DRZ65195-20CR -DRZ70210-20CR -DRZ75225-12CR -DRZ80240-12CR	MTO	2	60	286	217	195	50	75	+3.0 +1.5 +0.2	DR20CR-OUT (1pc)	DR20CR-IN (1pc)	SB-60120TR	DT-25	ZCMT200608
	MTO	2	65	296	227	206								
	MTO	2	70	308	239	220								
	MTO	4	75	330	261	225	50	80	Offset N.A.	DR12CR-OUT (2pcs)	DR12CR-IN (2pcs)	SB-5085TR	DT-20	ZCMT12T306 ZCMT12T304SP
	MTO	4	80	340	271	240								

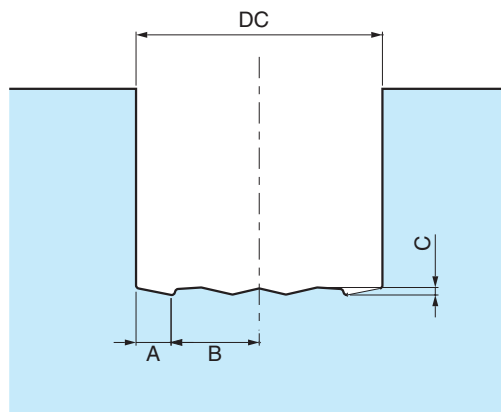
· Clamp screws for cartridges are included in toolholders : HH6X12 for **DR20CR** and HH4X12 for **DR12CR**.

Recommended Cutting Conditions ➡ K77

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	0.5	23.0		8.4	36.0	12.3							
15.0		5.4		23.5		8.7	37.0	12.8							
15.5	2.7	5.7	0.6	24.0	4.0	8.9	0.7	38.0	6.5	13.3	0.9				
16.0		5.3		24.5		9.2		39.0		13.8					
16.5		5.6		25.0		9.4		40.0		14.3					
17.0		5.8		0.7		25.5	9.7	41.0		14.0	1.0				
17.5		6.1				26.0	9.9	42.0		14.5					
18.0	2.7	6.3	0.7	26.5	4.0	10.2	0.7	43.0	8.5	15.0		1.1			
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		0.8		28.0	10.0	46.0		16.5	1.2				
20.0		7.3				28.5	10.3	47.0		17.0					
20.5	2.7	7.6	0.8	29.0	4.0	10.5	0.8	48.0	8.5	17.5		1.1			
21.0		7.8		29.5		10.8		49.0		18.0					
* Above is numeric guideline. (Varies within ±0.1mm depending on workpiece materials and cutting conditions)				30.0		4.0		11.0		0.8	50.0		8.5	18.5	1.2
				30.5			11.3	51.0			19.0				
				31.0			11.5	52.0			19.5				
				31.5	11.8		0.8	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										

The diagram shows a cross-section of a stepped cylindrical part. The total diameter is labeled DC. The part has a central section of diameter A and two outer sections of diameter B. The height of the central section is labeled C. The part is shown in a light blue color.



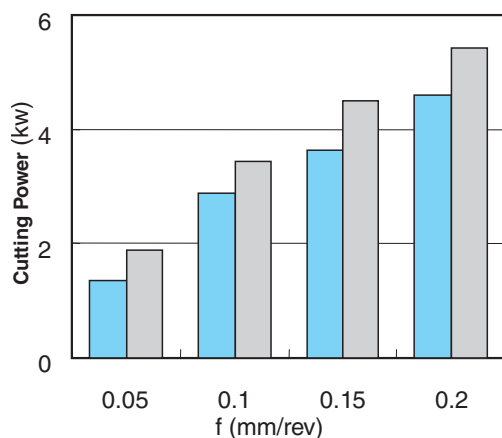
Cutting Power

ø20 Cutting Power Comparison

- MagicDrill DRZ
- Competitor A

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

Comparison of Cutting Power



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	-	

Recommended Cutting Conditions

◆ DRZ Recommended Cutting Conditions (Coolant)

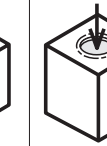
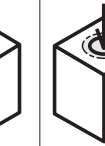
Workpiece Material	Recommended Insert Grades (Cutting Speed Vc: m/min)				Drill Dia. DC (mm)	Drill type (Drilling Depth)			
	MEGACOAT			Carbide		2D	3D	4D	5D
	PR1230	PR1225	PR1210	KW10		f (mm/rev)			
Low Carbon Steel	★ 120~220	☆ 120~220	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
					ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
					ø50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Carbon Steel	★ 100~160	☆ 100~160	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
					ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
					ø50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Alloy Steel	★ 80~140	☆ 80~140	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
					ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
					ø50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Mold Steel	★ 70~130	☆ 70~130	-	-	ø13~ø15.5	0.04~0.08	0.04~0.08	0.03~0.07	-
					ø16~ø26.5	0.08~0.12	0.06~0.10	0.06~0.08	-
					ø27~ø50	0.08~0.15	0.06~0.12	0.06~0.10	0.04~0.07
					ø50~	0.08~0.15	0.06~0.12	0.06~0.10	-
Stainless Steel (Austenitic related)	☆ 60~120	★ 60~120	-	-	ø13~ø15.5	0.04~0.08	0.04~0.08	0.03~0.06	-
					ø16~ø26.5	0.06~0.10	0.06~0.10	0.04~0.08	-
					ø27~ø50	0.06~0.10	0.06~0.12	0.04~0.10	0.04~0.07
					ø50~	0.06~0.12	0.06~0.12	0.04~0.10	-
Gray Cast Iron	-	-	★ 100~150	☆ 100~120	ø13~ø15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
					ø16~ø26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
					ø27~ø50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
					ø50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Nodular Cast Iron	-	-	★ 80~120	☆ 80~100	ø13~ø15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
					ø16~ø26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
					ø27~ø50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
					ø50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Non-ferrous Metals	-	-	-	★ 200~600	ø13~ø15.5	0.06~0.12	0.06~0.10	0.04~0.08	-
					ø16~ø26.5	0.08~0.18	0.08~0.15	0.06~0.15	-
					ø27~ø50	0.08~0.20	0.08~0.18	0.06~0.15	0.05~0.10
					ø50~	0.08~0.20	0.08~0.18	0.06~0.15	-
Titanium Alloys	-	-	-	★ 40~70	ø13~ø15.5	0.05~0.06	0.05~0.06	0.05~0.06	-
					ø16~ø26.5	0.05~0.07	0.05~0.07	0.05~0.07	-
					ø27~ø50	0.06~0.08	0.06~0.08	0.06~0.08	0.04~0.05
					ø50~	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	*0.05	Not Available
					Concave Surface 0.05		
					Continuous Part 0.1		
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 ø24 (ø30 - 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

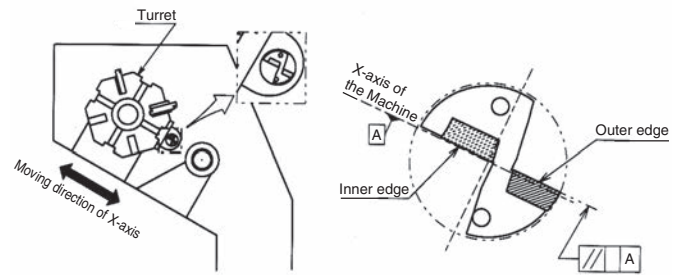
In case of using external coolant system, chip evacuation will be bad. Therefore ap should be measured within 1.5 times (1.5 x DC) of drill diameter (DC).

Insert Grades
Turning
Infeedable Inserts
CEN & RCD Tools
External
Small Parts
Machining
Boring
Grooving
Cut-off
Threading
Drilling
Solid Tools
Milling
Tools for
Turning Mill
Spare Parts
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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

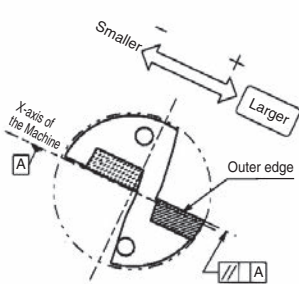
- (1) Drill diameter is adjusted by moving X-axis.
The moving direction of the X-axis depends on the position of the toolholder.
- (2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig. 2, Fig. 3)
For making the hole diameter smaller, slide 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 $\phi 20$ drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter

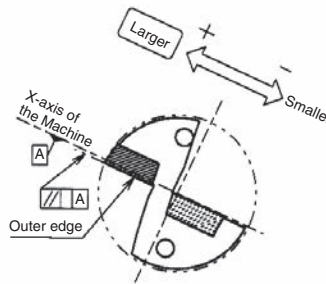
For the maximum limit of the drill diameter, refer to "Max. Offset (Radial)" in the Toolholder Dimensions table.

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

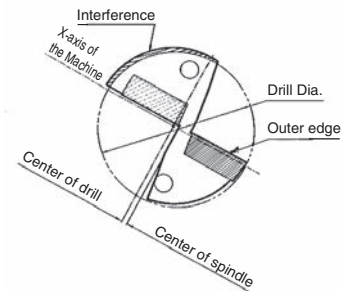
e.g.) In case of using $\phi 20$ drill, it is possible to make a hole up to $\phi 21$ since "Max. Offset (Radial)" is +0.5mm.



(Fig. 2) Outer insert Facing Up



(Fig. 3) Outer insert Facing Down



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

Center Height Adjustment

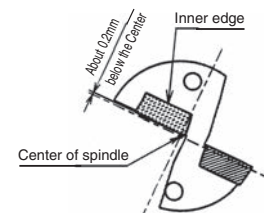
1. Center Height of the Inner Insert

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**.



(Fig. 5) Front View of the Drill

2. How to Check the Center Height

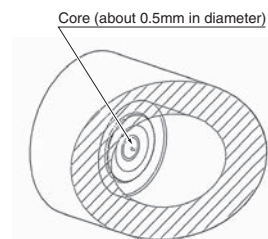
For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig. 6)

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 10 mm in depth and at a feed rate of 0.1 mm/rev or lower.

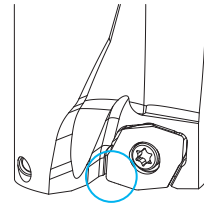


(Fig. 6) Center Core

3. Center Height Adjustment

a) No core remains / Core with Excessively Small Diameter

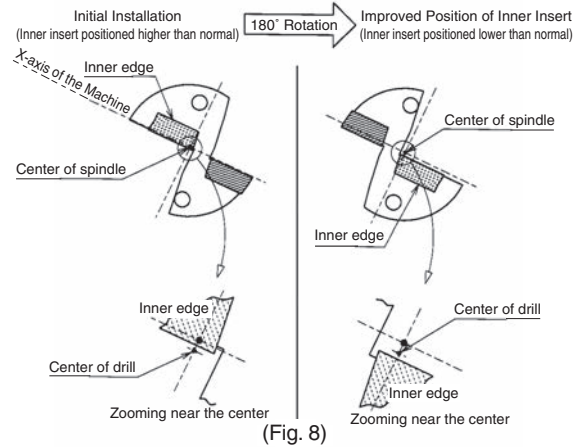
This happens when the Inner Insert is set above the Center Height.
In this case, adjustment is necessary since insert breakage will be probable at the center of the drill. (Fig. 7)



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

[How to Adjust]

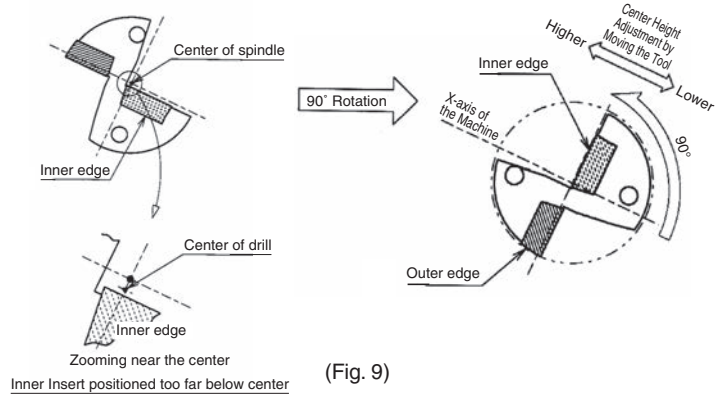
- (1) Install the drill rotated 180°.
Most problems will be solved by this method. (Fig. 8)



(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.



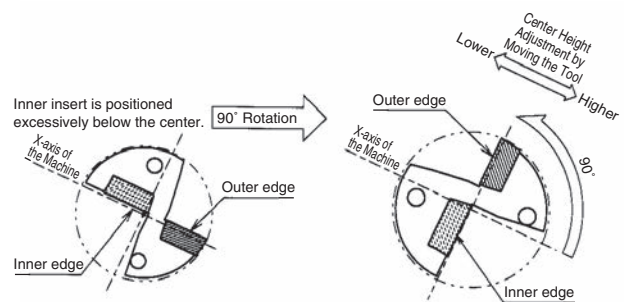
(Fig. 9)

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.



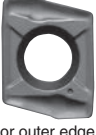
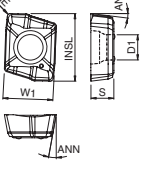
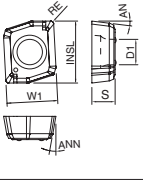
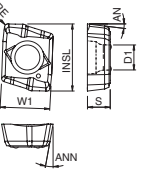
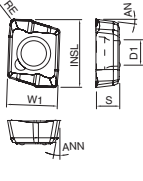
(Fig. 10)

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				●

Applicable Toolholders
See Page

Insert	Description	Dimension (mm)					Angle		MEGACOAT				Carbide
		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°	●		●		
 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°	●		●		
	05T203GM	7.3	2.76	2.5	5.5	0.3		7°	●		●		
	06T204GM	8.6	2.89	2.8	6.4	0.4		7°	●		●		
	070305GM	10.2	3.24	3.0	8.0	0.5		7°	●		●		
	09T306GM	12.2	4.03	3.6	9.6	0.6		7°	●		●		
	11T306GM	14.5	4.06	4.6	11.6	0.6		7°	●		●		
	140408GM	18.0	4.88	5.7	14.4	0.8		7°	●		●		
	170608GM	22.1	6.58	6.8	17.7	0.8		7°	●		●		
 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		7°	●				
	070305GH	10.2	3.24	3.0	8.0	0.5		7°	●				
	09T306GH	12.2	4.03	3.6	9.6	0.6		7°	●				
	11T306GH	14.5	4.06	4.6	11.6	0.6		7°	●				
	140408GH	18.0	4.88	5.7	14.4	0.8		7°	●				
	170608GH	22.1	6.58	6.8	17.7	0.8		7°	●				
 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		7°		●		●	
	070305SM	10.2	3.24	3.0	8.0	0.5		7°		●		●	
	09T306SM	12.2	4.03	3.6	9.6	0.6		7°		●		●	
	11T306SM	14.5	4.06	4.6	11.6	0.6		7°		●		●	
	140408SM	18.0	4.88	5.7	14.4	0.8		7°		●		●	
	170608SM	22.1	6.58	6.8	17.7	0.8		7°		●		●	

K82
K84
K86
K88

K82
K83
K84
K85
K86
K87
K88

Suitable Chipbreaker (ZXMT)

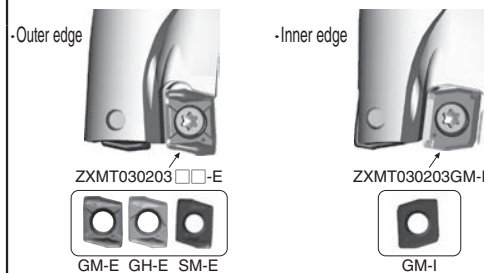
Workpiece Material	Insert Type	ZXMT											
	Chipbreaker	GM				GH				SM			
	Drilling Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D
Low Carbon Steel		☆	☆	☆	☆					★	★	★	★
Carbon Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Alloy Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Mold Steel		☆	☆	☆	☆	★	★	★	★				
Stainless Steel										★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

★ : 1st Choice ☆ : 2nd Choice

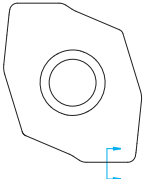
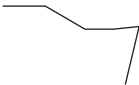
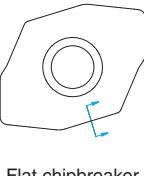
How to select ZXMT03

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

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



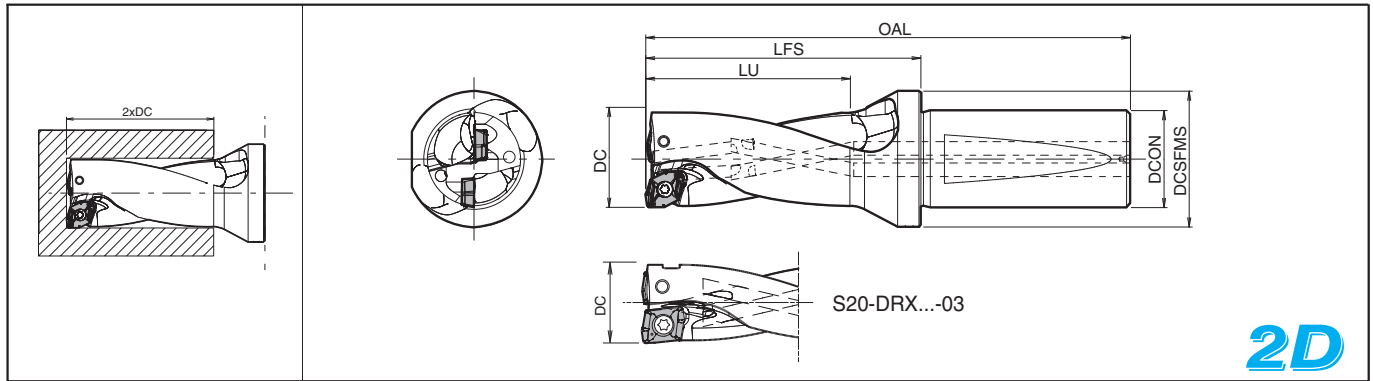
Features of the Chipbreaker

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.	1st. recommendation for interrupted drilling and hard materials. Cutting edge strength oriented design.	Suitable for sticky materials such as stainless steel and low carbon steel.
			Good balance of sharp cutting and cutting edge strength	Middle to high feed rates of steel drilling, GM Chipbreaker alternative.	Low cutting force, prevents chattering. For low to medium feed rates of steel.
Outer edge side	 Wide chipbreaker	Chipbreaker Cross-section			
		Chips from Outer edge			
Inner edge side	 Flat chipbreaker	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	- 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	As the wear of the insert progresses, burrs at the through-hole outlet increase when exiting the hole. This is a clear indication that the tool needs to be replaced.
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.

DRX (Drilling Depth : 2 x DC)



2D

Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Spare Parts		Applicable Inserts K80
			DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Clamp Screw	Wrench	
S20 -DRX120M-2-03	▲	2	12	88	45	24			+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-2-03	▲		12.5	89	46	25	20	27	+0.4			
-DRX130M-2-03	▲		13	90	47	26			+0.3			
-DRX135M-2-04	▲	2	13.5	91	48	27			+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-2-04	▲		14	92	49	28	20	27	+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			+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-2-05	▲		16	110	56	32	25	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	▲	2	18	114	60	36			+0.2	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX185M-2-06	▲		18.5	112	58	37	25	32	+0.9			
-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	25	32	+0.4			
-DRX210M-2-06	▲	2	21	117	63	42			+0.3	SB-2570TR	DTM-8	ZXMT070305□□
-DRX215M-2-06	▲		21.5	118	64	43			+0.2			
-DRX220M-2-07	▲		22	119	65	44			+1.2			
-DRX225M-2-07	▲		22.5	120	66	45	25	33	+1.0			
-DRX230M-2-07	▲		23	121	67	46			+0.9			
-DRX235M-2-07	▲	2	23.5	122	68	47			+0.8	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX240M-2-07	▲		24	123	69	48	25	33	+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	▲	2	26	127	73	52			+0.2	SB-3080TR	DTM-10	ZXMT09T306□□
S32 -DRX270M-2-09	▲		27	136	77	54			+1.6			
-DRX280M-2-09	▲		28	138	79	56	32	41	+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			

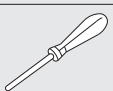
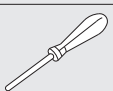
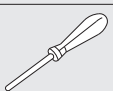
· When offset drilling, reduce feed rate to 0.08mm/rev or less.
· See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions K90

Trouble shooting K64

▲ : To be replaced by a new product

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts 
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
												
S40 -DRX320M-2-11 -DRX330M-2-11 -DRX340M-2-11 -DRX350M-2-11 -DRX360M-2-11 -DRX370M-2-11 -DRX380M-2-11	▲	2	32	169	100	64	40	54	+2.2			ZXMT11T306□□
	▲		33	171	102	66			+1.9			
	▲		34	173	104	68			+1.7			
	▲		35	175	106	70			+1.4			
	▲		36	177	108	72			+1.2			
	▲		37	179	110	74			+0.9			
	▲		38	181	112	76			+0.7			
-DRX390M-2-14 -DRX400M-2-14 -DRX410M-2-14 -DRX420M-2-14 -DRX430M-2-14 -DRX440M-2-14 -DRX450M-2-14 -DRX460M-2-14 -DRX470M-2-14	▲	2	39	179	110	78	40	54	+2.8			ZXMT140408□□
	▲		40	181	112	80			+2.5			
	▲		41	183	114	82			+2.3			
	▲		42	185	116	84			+2.0			
	▲		43	187	118	86		59	+1.8			
	▲		44	189	120	88			+1.5			
	▲		45	191	122	90			+1.3			
	▲		46	193	124	92			+1.0			
	▲		47	195	126	94			+0.8			
	-DRX480M-2-17 -DRX490M-2-17 -DRX500M-2-17 -DRX510M-2-17 -DRX520M-2-17 -DRX530M-2-17 -DRX540M-2-17 -DRX550M-2-17 -DRX560M-2-17 -DRX570M-2-17 -DRX580M-2-17 -DRX590M-2-17 -DRX600M-2-17		▲	2	48	194			125			
▲		49	196		127	98	+3.5					
▲		50	198		129	100	+3.3					
▲		51	200		131	102	+3.0					
▲		52	202		133	104	+2.8					
▲		53	204		135	106	+2.5					
▲		54	206		137	108	+2.3					
▲		55	208		139	110	+2.0					
▲		56	210		141	112	64	+1.8				
▲		57	212		143	114		+1.5				
▲		58	214		145	116		+1.3				
▲		59	216		147	118		+1.0				
▲		60	218		149	120		+0.8				

- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ K90

Trouble shooting ➡ K64

· Hole Dia. Tolerance (2D type)

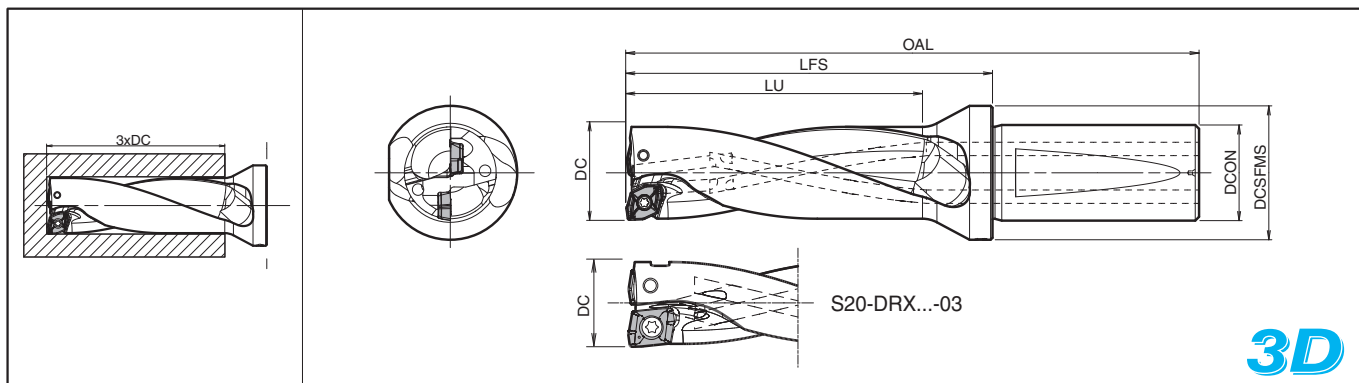
DC	Hole Dia. Tolerance (mm)
ø12~ø26	+0.20 -0.10
ø27~ø38	+0.25 -0.15
ø39~ø60	+0.30 -0.20

* Above is numeric guideline.

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

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  K80	
			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	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I	
	▲		12.5	102	59	37.5			+0.4				
	▲		13	103	60	39			+0.3				
	-DRX135M-3-04	▲	2	13.5	105	62	40.5	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
	-DRX140M-3-04	▲		14	106	63	42			+0.4			
	-DRX145M-3-04	▲		14.5	108	65	43.5			+0.3			
	-DRX150M-3-04	▲		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 -DRX185M-3-06 -DRX190M-3-06 -DRX195M-3-06 -DRX200M-3-06 -DRX205M-3-06 -DRX210M-3-06 -DRX215M-3-06 -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	15.5	124	70	46.5	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□	
	▲		16	126	72	48			+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				
	-DRX185M-3-06	▲	2	18.5	131	77	55.5	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
	-DRX190M-3-06	▲		19	132	78	57			+0.8			
	-DRX195M-3-06	▲		19.5	134	80	58.5			+0.7			
	-DRX200M-3-06	▲		20	135	81	60			+0.5			
	-DRX205M-3-06	▲		20.5	137	83	61.5			+0.4			
	-DRX210M-3-06	▲		21	138	84	63			+0.3			
	-DRX215M-3-06	▲	21.5	140	86	64.5	+0.2						
	-DRX220M-3-07	▲	2	22	141	87	66	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
	-DRX225M-3-07	▲		22.5	142	88	67.5			+1.0			
	-DRX230M-3-07	▲		23	144	90	69			+0.9			
	-DRX235M-3-07	▲		23.5	145	91	70.5			+0.8			
	-DRX240M-3-07	▲		24	147	93	72			+0.7			
-DRX245M-3-07	▲	24.5		148	94	73.5	+0.5						
-DRX250M-3-07	▲	25		150	96	75	+0.4						
-DRX255M-3-07	▲	25.5		151	97	76.5	+0.3						
-DRX260M-3-07	▲	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			32			
	-DRX270M-3-09		▲	27	163	104	81	+1.6					
	-DRX275M-3-09		▲	27.5	164	105	82.5	+1.5					
	-DRX280M-3-09		▲	28	166	107	84	+1.3					
	-DRX285M-3-09		▲	28.5	167	108	85.5	+1.2					
	-DRX290M-3-09		▲	29	169	110	87	+1.1	43				
	-DRX295M-3-09		▲	29.5	170	111	88.5	+1.1					
	-DRX300M-3-09		▲	30	172	113	90	+0.8					
	-DRX305M-3-09		▲	30.5	173	114	91.5	+0.7					
	-DRX310M-3-09		▲	31	175	116	93	+0.6					
	-DRX315M-3-09		▲	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	40	54	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□	
	-DRX330M-3-11		▲	33	204	135			99				+1.9
	-DRX340M-3-11		▲	34	207	138			102				+1.7
	-DRX350M-3-11		▲	35	210	141			105				+1.4
	-DRX360M-3-11		▲	36	213	144			108				+1.2
	-DRX370M-3-11		▲	37	216	147			111				+0.9
	-DRX380M-3-11		▲	38	219	150			114				+0.7

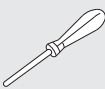
- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ➡ **K90**

Trouble shooting ➡ K64

▲ : To be replaced by a new product

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts  K80
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
												
S40 -DRX390M-3-14 -DRX400M-3-14 -DRX410M-3-14 -DRX420M-3-14 -DRX430M-3-14 -DRX440M-3-14 -DRX450M-3-14 -DRX460M-3-14 -DRX470M-3-14 -DRX480M-3-17 -DRX490M-3-17 -DRX500M-3-17 -DRX510M-3-17 -DRX520M-3-17 -DRX530M-3-17 -DRX540M-3-17 -DRX550M-3-17 -DRX560M-3-17 -DRX570M-3-17 -DRX580M-3-17 -DRX590M-3-17 -DRX600M-3-17	▲ 											

- When offset drilling, reduce feed rate to 0.08mm/rev or less.
- See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K90

Trouble shooting ● K64

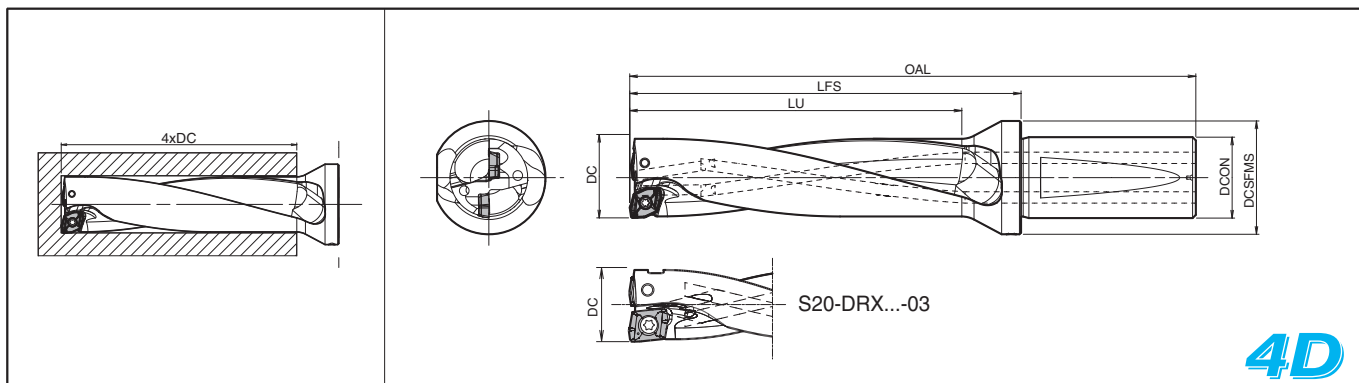
• Hole Dia. Tolerance (3D type)

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)



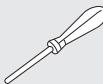
● Toolholder Dimensions

[illegible]Recommended Cutting Conditions ➡ **K90**

Trouble shooting ➡ **K64**

▲ : To be replaced by a new product

● Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts  K80
			DC	OAL	LFS	LU	DCON	DCSFMS		Clamp Screw	Wrench	
												
S40 -DRX390M-4-14 -DRX400M-4-14 -DRX410M-4-14 -DRX420M-4-14 -DRX430M-4-14 -DRX440M-4-14 -DRX450M-4-14 -DRX460M-4-14 -DRX470M-4-14	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	2	39 40 41 42 43 44 45 46 47	257 261 265 269 273 277 281 285 289	188 192 196 200 204 208 212 216 220	156 160 164 168 172 176 180 184 188	40	54 59	+2.8 +2.5 +2.3 +2.0 +1.8 +1.5 +1.3 +1.0 +0.8	SB-5090TR	DT-20	ZXMT140408 □□
S50 -DRX480M-4-17 -DRX490M-4-17 -DRX500M-4-17 -DRX510M-4-17 -DRX520M-4-17 -DRX530M-4-17 -DRX540M-4-17 -DRX550M-4-17 -DRX560M-4-17 -DRX570M-4-17 -DRX580M-4-17 -DRX590M-4-17 -DRX600M-4-17	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	2	48 49 50 51 52 53 54 55 56 57 58 59 60	290 294 298 302 306 310 314 318 322 326 330 334 338	221 225 229 233 237 241 245 249 253 257 261 265 269	192 196 200 204 208 212 216 220 224 228 232 236 240	50	59 64	+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 0.06mm/rev or less.
· See page **K60** for Adjustable Sleeve (SHE).

Recommended Cutting Conditions ● K90

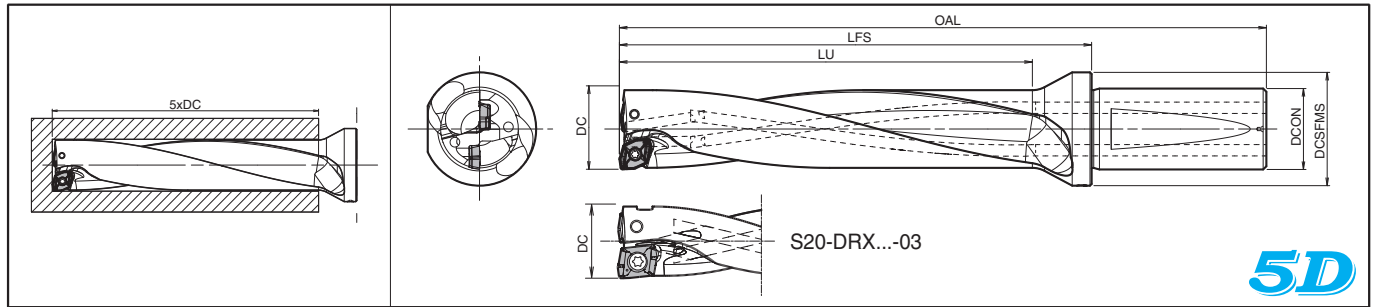
Trouble shooting ● K64

· 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.

DRX (Drilling Depth : 5 x DC)



Toolholder Dimensions

Description	Stock	No. of Inserts	Dimension (mm)							Spare Parts		Applicable Inserts K80
			DC	OAL	LFS	LU	DCON	DCSFMS	Max. Offset (Radial) (mm)	Clamp Screw	Wrench	
S20 -DRX120M-5-03	▲	2	12	120	77	60	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX130M-5-03	▲		13	125	82	65	20	27	+0.3			
-DRX140M-5-04	▲	2	14	134	91	70	20	27	+0.4	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX150M-5-04	▲		15	139	96	75	20	27	+0.2			
S25 -DRX160M-5-05	▲	2	16	158	104	80	25	32	+0.7	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX170M-5-05	▲		17	163	109	85	25	32	+0.4			
-DRX180M-5-05	▲	2	18	168	114	90	25	32	+0.2	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-5-06	▲		19	170	116	95	25	32	+0.8			
-DRX200M-5-06	▲	2	20	175	121	100	25	32	+0.5	SB-2570TR	DTM-8	ZXMT070305□□
-DRX210M-5-06	▲		21	180	126	105	25	32	+0.3			
-DRX220M-5-07	▲	2	22	185	131	110	25	33	+1.2	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX230M-5-07	▲		23	190	136	115	25	33	+0.9			
-DRX240M-5-07	▲	2	24	195	141	120	25	33	+0.7	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX250M-5-07	▲		25	200	146	125	25	33	+0.4			
-DRX260M-5-07	▲	2	26	205	151	130	25	33	+0.2	SB-5090TR	DT-20	ZXMT140408□□
S32 -DRX270M-5-09	▲		27	217	158	135	32	41	+1.6			
-DRX280M-5-09	▲	2	28	222	163	140	32	41	+1.3	SB-5090TR	DT-20	ZXMT140408□□
-DRX290M-5-09	▲		29	227	168	145	32	41	+1.1			
-DRX300M-5-09	▲	2	30	232	173	150	32	43	+0.8	SB-60120TR	DT-25	ZXMT170608□□
-DRX310M-5-09	▲		31	237	178	155	32	43	+0.6			
S40 -DRX320M-5-11	▲	2	32	255	186	160	40	49	+2.2	SB-60120TR	DT-25	ZXMT170608□□
-DRX330M-5-11	▲		33	260	191	165	40	49	+1.9			
-DRX340M-5-11	▲	2	34	265	196	170	40	49	+1.7	SB-60120TR	DT-25	ZXMT170608□□
-DRX350M-5-11	▲		35	270	201	175	40	49	+1.4			
-DRX360M-5-11	▲	2	36	275	206	180	40	49	+1.2	SB-60120TR	DT-25	ZXMT170608□□
-DRX370M-5-11	▲		37	280	211	185	40	49	+0.9			
-DRX380M-5-11	▲	2	38	285	216	190	40	49	+0.7	SB-60120TR	DT-25	ZXMT170608□□
-DRX390M-5-14	▲		39	296	227	195	40	49	+2.8			
-DRX400M-5-14	▲	2	40	301	232	200	40	54	+2.5	SB-60120TR	DT-25	ZXMT170608□□
-DRX410M-5-14	▲		41	306	237	205	40	54	+2.3			
-DRX420M-5-14	▲	2	42	311	242	210	40	54	+2.0	SB-60120TR	DT-25	ZXMT170608□□
-DRX430M-5-14	▲		43	316	247	215	40	54	+1.8			
-DRX440M-5-14	▲	2	44	321	252	220	40	54	+1.5	SB-60120TR	DT-25	ZXMT170608□□
-DRX450M-5-14	▲		45	326	257	225	40	54	+1.3			
-DRX460M-5-14	▲	2	46	331	262	230	40	54	+1.0	SB-60120TR	DT-25	ZXMT170608□□
-DRX470M-5-14	▲		47	336	267	235	40	54	+0.8			
S50 -DRX480M-5-17	▲	2	48	338	269	240	50	59	+3.8	SB-60120TR	DT-25	ZXMT170608□□
-DRX490M-5-17	▲		49	343	274	245	50	59	+3.5			
-DRX500M-5-17	▲	2	50	348	279	250	50	59	+3.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX510M-5-17	▲		51	353	284	255	50	59	+3.0			
-DRX520M-5-17	▲	2	52	358	289	260	50	59	+2.8	SB-60120TR	DT-25	ZXMT170608□□
-DRX530M-5-17	▲		53	363	294	265	50	59	+2.5			
-DRX540M-5-17	▲	2	54	368	299	270	50	59	+2.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX550M-5-17	▲		55	373	304	275	50	59	+2.0			
-DRX560M-5-17	▲	2	56	378	309	280	50	59	+1.8	SB-60120TR	DT-25	ZXMT170608□□
-DRX570M-5-17	▲		57	383	314	285	50	59	+1.5			
-DRX580M-5-17	▲	2	58	388	319	290	50	59	+1.3	SB-60120TR	DT-25	ZXMT170608□□
-DRX590M-5-17	▲		59	393	324	295	50	59	+1.0			
-DRX600M-5-17	▲	2	60	398	329	300	50	59	+0.8	SB-60120TR	DT-25	ZXMT170608□□

• When offset drilling, reduce feed rate to 0.05mm/rev or less.
• See page K60 for Adjustable Sleeve (SHE).

Recommended Cutting Conditions K90

Trouble shooting K64

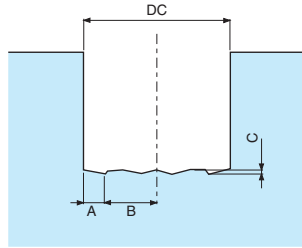
Hole Dia. Tolerance (5D type)

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.

▲ : To be replaced by a new product

◆ 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		15.2				
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	0.6	28.5		10.4	1.1	47.0	17.7	1.6				
16.5		6.3		29.0		10.6		48.0	16.9	1.7				
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		7.0	0.7	30.5	11.4	1.1	51.0	18.4						
18.5	2.4	6.9	0.7	31.0	11.6	1.2	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	0.8	33.0	11.8		1.1	55.0	20.4	1.8				
20.5		7.9		34.0	12.3	56.0		20.9						
21.0		8.1		35.0	12.8	57.0		21.4	1.9					
21.5		8.4		36.0	13.3	58.0	21.9	2.0						
22.0	3.2	7.8	0.8	37.0	13.8	1.3	59.0		22.4					
22.5		8.1		38.0	14.3		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)										
23.5		8.6												
24.0		8.8												

Insert Grades
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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			ø12~ø15	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
					ø15.5~ø18	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
					ø18.5~ø26	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
					ø26.5~ø60	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			ø12~ø15	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
					ø15.5~ø18	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
					ø18.5~ø26	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
					ø26.5~ø60	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			ø12~ø15	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
					ø15.5~ø18	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
					ø18.5~ø26	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
					ø26.5~ø60	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			ø12~ø15	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
					ø15.5~ø18	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
					ø18.5~ø26	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
					ø26.5~ø60	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			ø12~ø15	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
					ø15.5~ø18	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
					ø18.5~ø26	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
					ø26.5~ø60	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		ø12~ø15	0.08~0.14	-	-	0.06~0.12	-	-	0.04~0.10	-	-
					ø15.5~ø18	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
					ø18.5~ø26	0.08~0.20	-	-	0.08~0.18	-	-	0.06~0.14	-	-
					ø26.5~ø60	0.08~0.20	-	-	0.08~0.18	-	-	0.06~0.14	-	-
Nodular Cast Iron			★ 80-120		ø12~ø15	0.08~0.12	-	-	0.06~0.10	-	-	0.04~0.08	-	-
					ø15.5~ø18	0.08~0.16	-	-	0.08~0.14	-	-	0.06~0.10	-	-
					ø18.5~ø26	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
					ø26.5~ø60	0.08~0.18	-	-	0.08~0.16	-	-	0.06~0.12	-	-
Non-ferrous Metals			★ 200-600		ø12~ø15	-	-	0.06~0.12	-	-	0.05~0.10	-	-	0.04~0.08
					ø15.5~ø18	-	-	0.08~0.14	-	-	0.06~0.12	-	-	0.05~0.10
					ø18.5~ø26	-	-	0.08~0.16	-	-	0.06~0.14	-	-	0.05~0.12
					ø26.5~ø60	-	-	0.08~0.20	-	-	0.08~0.16	-	-	0.07~0.14
Titanium Alloys			★ 40-70		ø12~ø15	-	-	0.05~0.08	-	-	0.04~0.07	-	-	0.04~0.06
					ø15.5~ø18	-	-	0.05~0.08	-	-	0.04~0.07	-	-	0.04~0.06
					ø18.5~ø26	-	-	0.06~0.10	-	-	0.06~0.08	-	-	0.05~0.07
					ø26.5~ø60	-	-	0.06~0.10	-	-	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

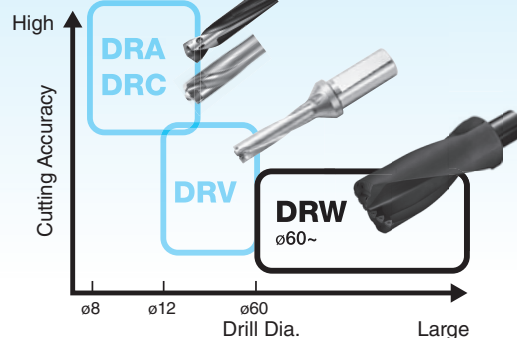
Features

- 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 $0.2 \times DC$ or less.

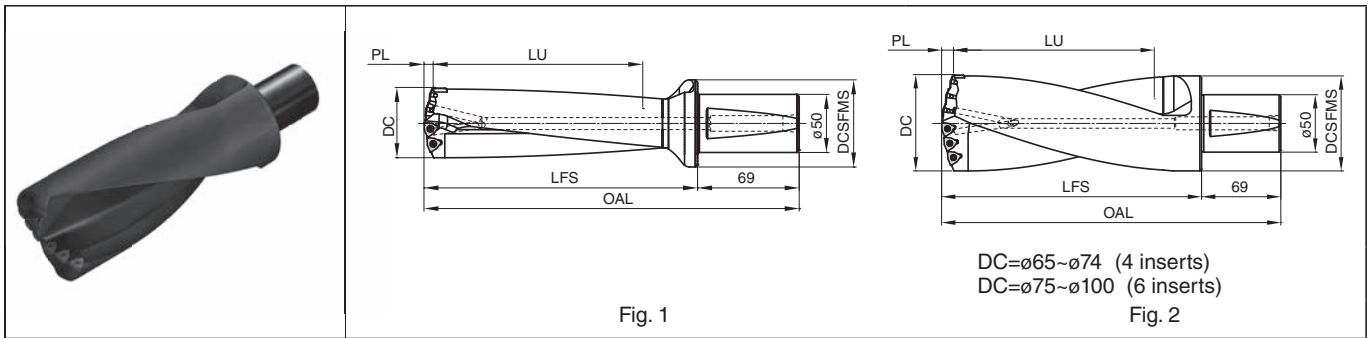
Expansion of blind holes is not possible because chips are built up in the next hole and will cause chip biting.

● Toolholder Identification System

S50	-	DRW		0600M	-	1	-	06
Straight Shank $\phi 50$		Type		Drill Dia. (mm)		Drilling Depth		Insert Size
				0600M : $\phi 60$		1 : 1 X DC		

Insert Grades	A
Turning Indexable Inserts	B
CBN & CDD Tools	C
External	D
Small Parts Machining	E
Boring	F
Grooving	G
Cut-off	H
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Drilling	K
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DRW



● Toolholder Dimensions (Drilling Depth : 1 x DC)

1D

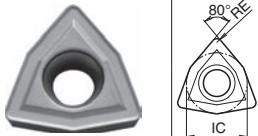
Description	Stock	No. of Inserts	Dimension (mm)						Drawing
			DC	OAL	LFS	LU	PL	DCSFMS	
S50- DRW0600M-1-06	MTO	4	60	175	106	60	7.6	63	Fig. 1
DRW0610M-1-06	MTO		61	176	107	61	7.7	63	
DRW0620M-1-06	MTO		62	178	109	62	7.8	63	
DRW0630M-1-06	MTO		63	179	110	63	7.9	63	
DRW0640M-1-06	MTO		64	182	113	64	8.0	63	
DRW0650M-1-06	MTO		65	184	115	65	8.2	63	
DRW0660M-1-06	MTO		66	185	116	66	8.3	64	Fig. 2
DRW0670M-1-06	MTO		67	187	118	67	8.4	65	
DRW0680M-1-06	MTO		68	189	120	68	8.5	66	
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	73	Fig. 2
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	

● Toolholder Dimensions (Drilling Depth : 2 x DC)

2D

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	Fig. 2
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	
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	73	Fig. 2
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	

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)



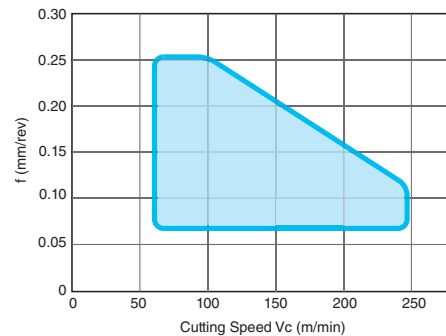
Description		Stock	No. of Inserts	Dimension (mm)						Drawing
				DC	OAL	LFS	LU	PL	DCSPMS	
S50-	DRW0600M-3-06	●	4	60	295	226	180	7.6	63	Fig. 1
	DRW0610M-3-06	MTO		61	298	229	183	7.7	63	
	DRW0620M-3-06	MTO		62	302	233	186	7.8	63	
	DRW0630M-3-06	MTO		63	305	236	189	7.9	63	
	DRW0640M-3-06	MTO		64	310	241	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	Fig. 2
	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	DT-10

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~+0.15 mm in radius (0~+0.3 mm 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

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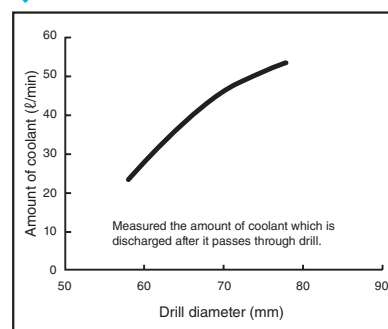
Q-1

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)	Alloy Steel	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.

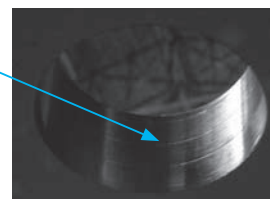
Q-5

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.

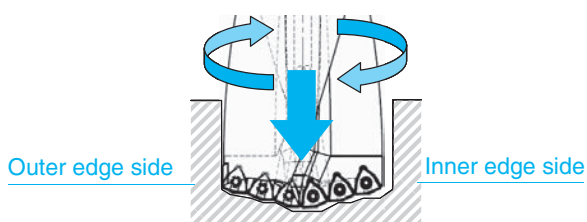
Tool marking



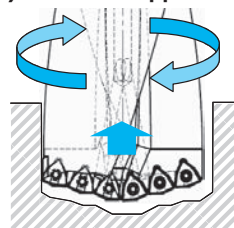
Example of tool marking

· How to prevent tool markings

(1) Drilling the hole (The spindle revolves)



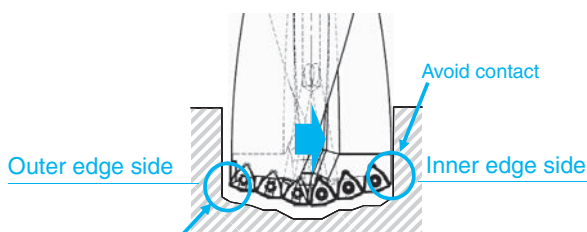
(2) Turn back approximately 0.5 mm (The spindle revolves)



Chips are adhering to the bottom when drilling stops.

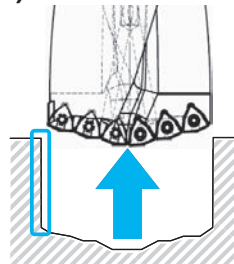
- Without turning back, chips remains adhering to the bottom.
- If offset (3) is performed without turning back, the bottom of drill contacts with the inner surface of hole.
- Turning back is necessary for blind holes but not for through holes.

(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
X0.2Y0.2 stops at the
Z100.0M9 specified position
```

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

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

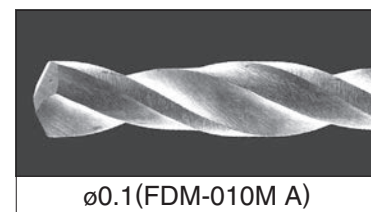
BT integral arbor type is also available.	<Standard item> Straight Shank (1D~3D)
--	---

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 ($\phi 22$ or larger).

- 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)



	Cutting edge condition		Burr condition on the exit side	
	Fine Micro Drill	Competitor A (Coated)	Fine Micro Drill	Competitor A (Coated)
After drilling condition				

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)

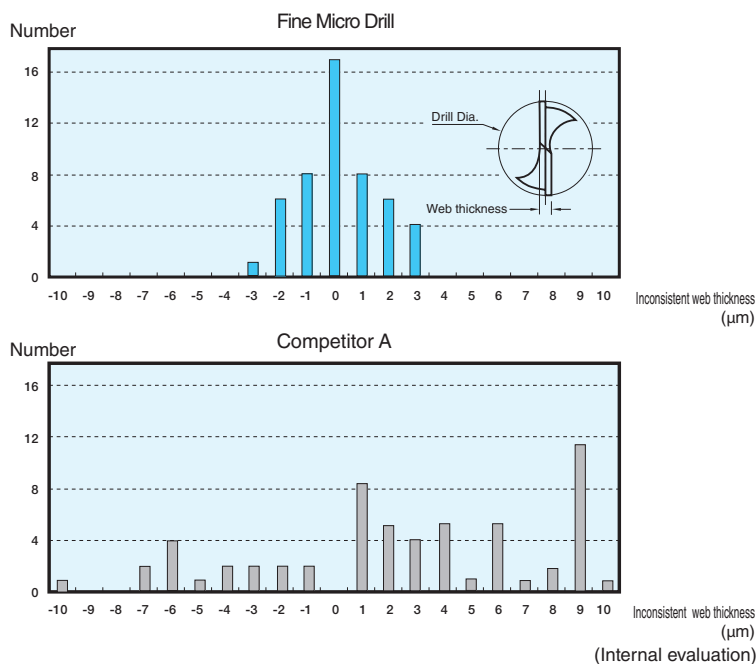
Drilling Depth : 0.5mm (Through hole)

Step feeding depth : 0.025 mm/time

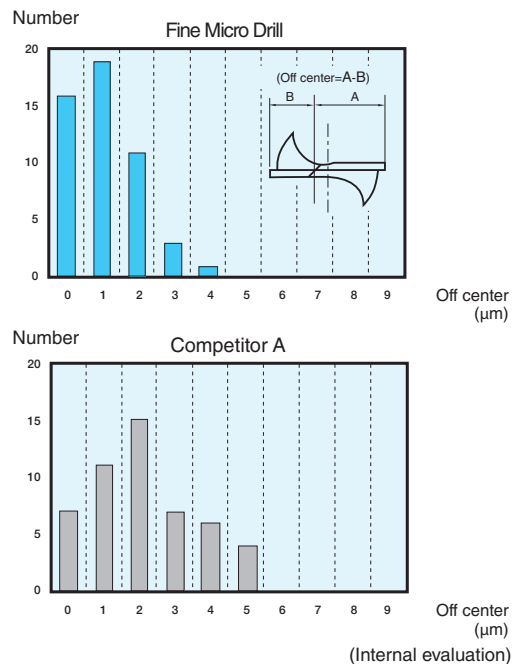
Number of holes : 200 holes

(Internal evaluation)

● Comparison of inconsistent web thickness (Drill Dia. $\varnothing 0.3$)



- Comparison of inconsistent cutting edge center (Drill Dia. $\phi 0.3$)



FDM-M (Shank Dia. ø3, Coated)

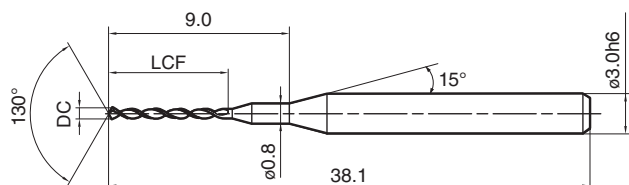


Fig. 1

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

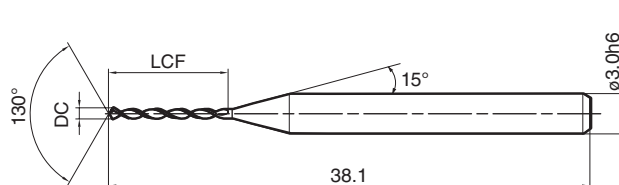


Fig. 2

Helix Angle 30°

Description	Dimension (mm)		Drawing	Grades
	Drill Dia.	Flute Length		Coated
				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
				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			●
FDM-039M(1)	0.39	6.0		●
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			●
FDM-049M(1)	0.49		●	
FDM-050M(1)	0.50	●		
FDM-060M(1)	0.60	8.0	●	
FDM-070M(1)	0.70		●	
FDM-080M(1)	0.80		10.0	●

Identification System

FDM - ○ ○ ○ M (1) FSA

Drill Dia.

M : Shank Dia. 3.0mm

(1) : 1 piece boxes

Grades

Fine Micro Drill

FDM-M (Shank Dia. ø3, Uncoated)

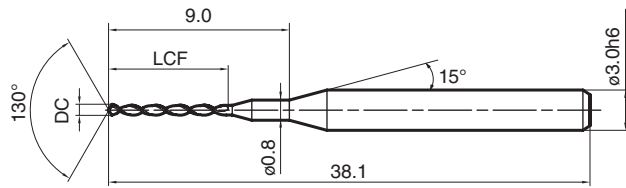


Fig. 1

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

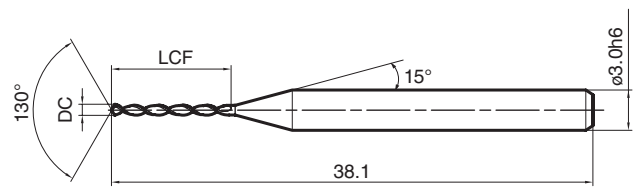


Fig. 2

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		●	
FDM-037M(1)	0.37			●	
FDM-038M(1)	0.38			●	
FDM-039M(1)	0.39	6.0		●	
FDM-040M(1)	0.40			●	
FDM-041M(1)	0.41	7.0	Fig. 2	●	
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			●	
FDM-049M(1)	0.49			●	
FDM-050M(1)	0.50			●	
FDM-060M(1)	0.60	8.0		●	
FDM-070M(1)	0.70			●	
FDM-080M(1)	0.80	10.0		●	

Identification System

FDM - ○○○ M (1) A

Drill Dia.

M : Shank Dia. 3.0mm

(1) : 1 piece boxes

Grades

● : Std. Item

Recommended Cutting Conditions

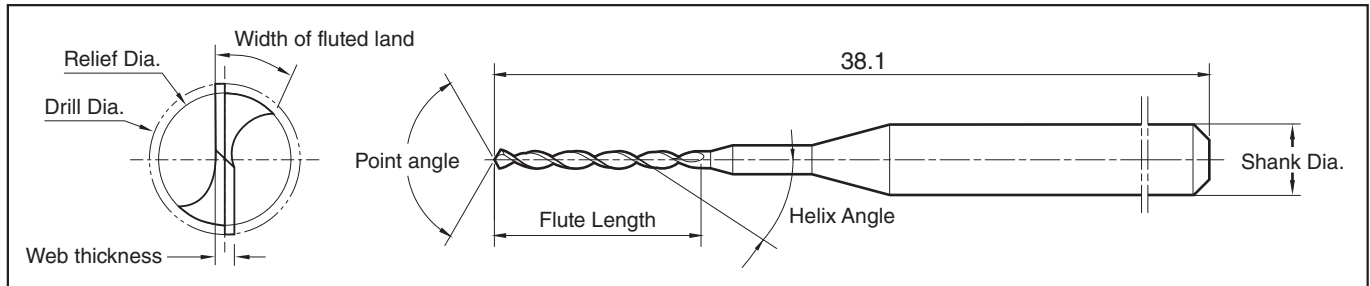
Custom-order item

Non stock size are also available

- (1) Drill Dia.
- (2) Drill Dia. tolerance
- (3) Flute Length
- (4) Shank Dia.
- (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

	Carbon Steel / Alloy Steel		Stainless Steel		Cast Iron		Aluminum / Copper	
Drill Dia. (mm)	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	
- Plate $n=16,000\text{min}^{-1}$ $H=1\text{mm}$ (Through hole) $V_f=22\text{mm/min}$ - Wet (Oil-base) - FDM-010M (A) ($\phi 0.10\text{mm}$)		- Gauge $n=10,000\text{min}^{-1}$ $H=3.5\text{mm}$ $V_f=100\text{mm/min}$ - Wet (Oil-base) - FDM-036M (FSA) ($\phi 0.36\text{mm}$)		- Plate $n=8,000\text{min}^{-1}$ $H=2.7\text{mm}$ $V_f=45\text{mm/min}$ - Wet (Oil-base) - XFDM-040 (FSA) ($\phi 0.40\text{mm}$)	
Fine Micro Drill	600 holes / pc	Fine Micro Drill	5,200 holes / pc	Fine Micro Drill	2,400 holes / pc
Competitor B (Coated)	200 holes / pc (Broken)	Competitor C (Coated)	4,000 holes / pc	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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