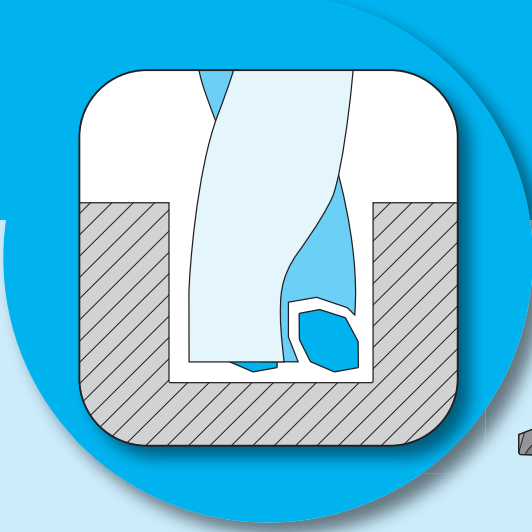


Drilling

K1~K58



K

Product Lineup

K2

MagicDrill DRC

K3~K19

SS-DRC	Cutting Depth: 3×D type	Straight Shank	K7
SS-DRC	Cutting Depth: 5×D type	Straight Shank	K8
SS-DRC	Cutting Depth: 8×D type	Straight Shank	K9
Chamfering Attachment	Straight Shank For SS-DRC type		K10
SF-DRC	Cutting Depth: 3×D type	Flanged Shank	K12
SF-DRC	Cutting Depth: 5×D type	Flanged Shank	K13
SF-DRC	Cutting Depth: 8×D type	Flanged Shank	K14



MagicDrill DRX

K20~K38

DRX	Cutting Depth: 2×D type	ø12~ø60	K26
DRX	Cutting Depth: 3×D type	ø12~ø60	K28
DRX	Cutting Depth: 4×D type	ø12~ø60	K30
DRX	Cutting Depth: 5×D type	ø12~ø60	K32



MagicDrill DRS & DRZ

K39~K52

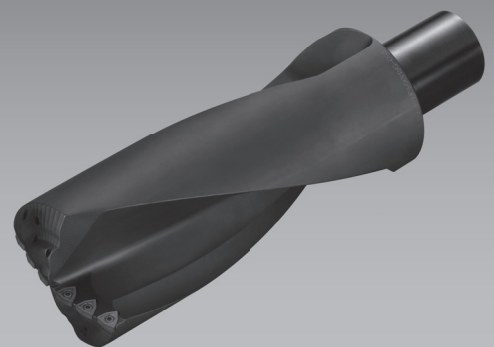
DRS Mini		ø10~ø12.5	K40
DRZ	Cutting Depth: 2×D type	ø13~ø59	K42
DRZ	Cutting Depth: 3×D type	ø13~ø59	K44
DRZ	Cutting Depth: 4×D type	ø13~ø50	K46
DRZ	Cutting Depth: 5×D type	ø27~ø50	K48
DRZ-CR	Cartridge type	ø60~	K49



MagicDrill DRW

K53~K58

DRW	Cutting Depth: 1×D type	ø60~ø100	K54
DRW	Cutting Depth: 2×D type	ø60~ø100	K55
DRW	Cutting Depth: 3×D type	ø60~ø100	K56

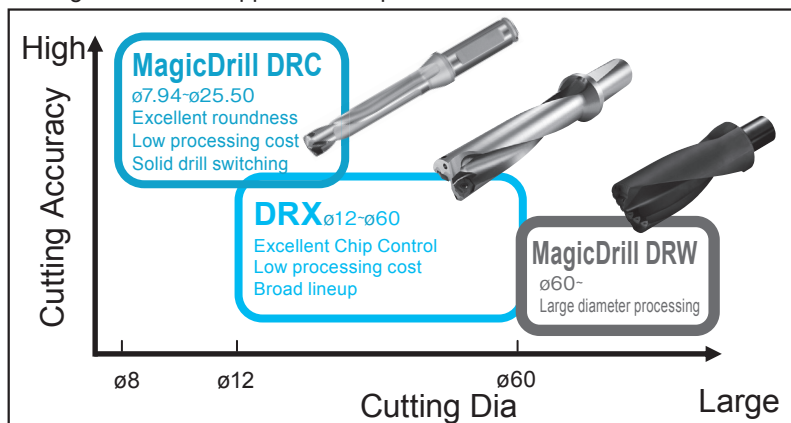


Product Lineup

Type	Shape	Cutting Dia (Cutting Depth)	Cutting Edge	Remarks
DRC [MagicDrill] Ⓢ K3		$\phi 7.94 \sim \phi 25.50$ (3D / 5D / 8D)	Inner & Outer Edges on One Insert 	Line up
DRX [MagicDrill] Ⓢ K20		$\phi 12$ $\phi 12.5$ $\phi 13$ (2D / 3D / 4D)	Two Cutting Edges per Insert 	Chip Shape (Work Material: S50C) Cutting Dia. $\phi 12$ Chip from outer Edge
		$\phi 12, \phi 13$ (5D)	Outer Edge Inner Edge ZXMT03 	Chip from inner Edge
DRS [MagicDrill Mini] Ⓢ K40		$\phi 10 \sim \phi 12.5$ (3.5D)	Inner & Outer Edges on One Insert 	Chip Shape (Work Material: C50) Cutting Dia. $\phi 10$ Chip from outer Edge
		Silver Coating	$\phi 13.5 \sim \phi 60$ (2D / 3D / 4D) $\phi 14 \sim \phi 60$ (5D)	Inner & Outer Edges on One Insert
DRZ Ⓢ K42		$\phi 13 \sim \phi 59$ (2D, 3D) $\phi 13 \sim \phi 50$ (4D) $\phi 27 \sim \phi 50$ (5D)	Inner & Outer Edges on One Insert 	Chip Shape (Work Material: C50) Cutting Dia. $\phi 23$ Chip from outer Edge
		DRZ-CR [Cartridge type] (Made to order) Ⓢ K49	$\phi 60 \sim$ (2D / 3D / 4D)	
DRW (Made to order) Ⓢ K53		$\phi 60 \sim$ (1D / 2D / 3D)	Inner & Outer Edges on One Insert 	<p>BT integral arbor type is also available.</p> <p>Drilling diameter $\phi 200$ is also possible.</p>

K
Drilling

MagicDrill Series Application Map

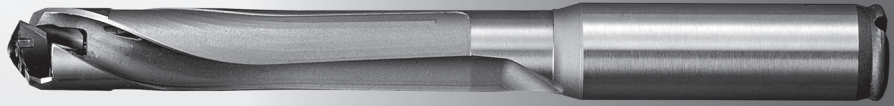


Caution

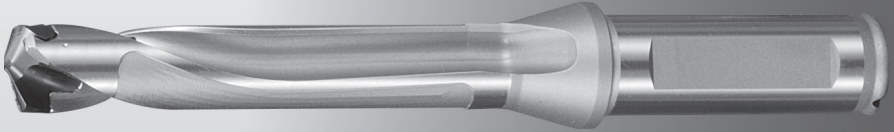
When drilling through the workpiece, a disk may be ejected. Proper machine guarding is necessary to prevent injury. The safety cover is necessary for the conventional lathe machines to prevent any accidents.

High efficiency drill module Cutting Dia(φ7.94~φ25.50) Cutting Depth(3D / 5D / 8D)

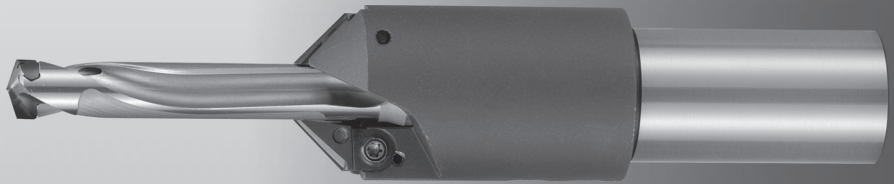
Straight Shank
SS-DRC



Flanged Shank DRC
SF-DRC



SS-DRC
+ Chamfering attachment



High efficiency

High feed rate

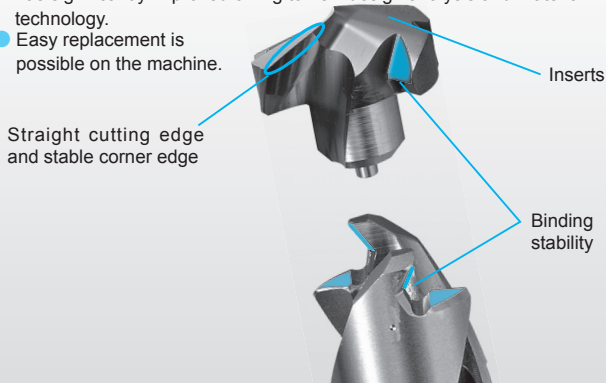
High reliability

High quality

4 unique characteristics of DRC type MagicDrills improve productivity as well as reduce machining costs owing to high speed and high feed rate machining.

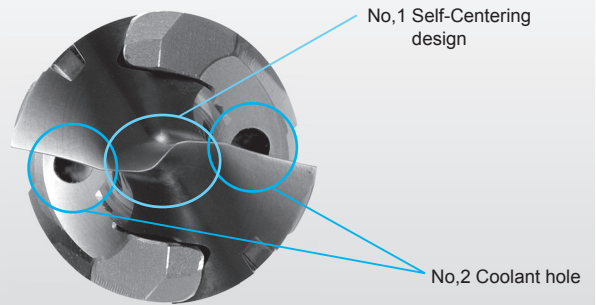
Advantages 1. Self-Clamping design

- The clamp rigidity and resistance of the Magic Drills self-clamping method has significantly improved owing to new design analysis and material technology.
- Easy replacement is possible on the machine.



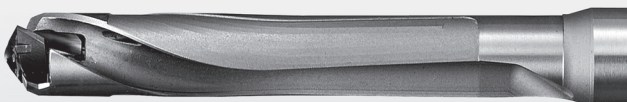
Advantages 2. Self-Clamping design

- The S curve geometry of the tip known as the "Self-Centering design" enables smooth drilling, lower cutting forces and a high quality hole surface.



Advantages 3. Multiple Helical Angle Flute design

- Provides superior drill body stiffness and chip evacuation.



Advantages 4. Direct Cooling design

- The coolant is fed directly into the inserts cutting face, cooling the top of the drill and preventing chip adhesion, which allows for quick and smooth chip evacuation.



K

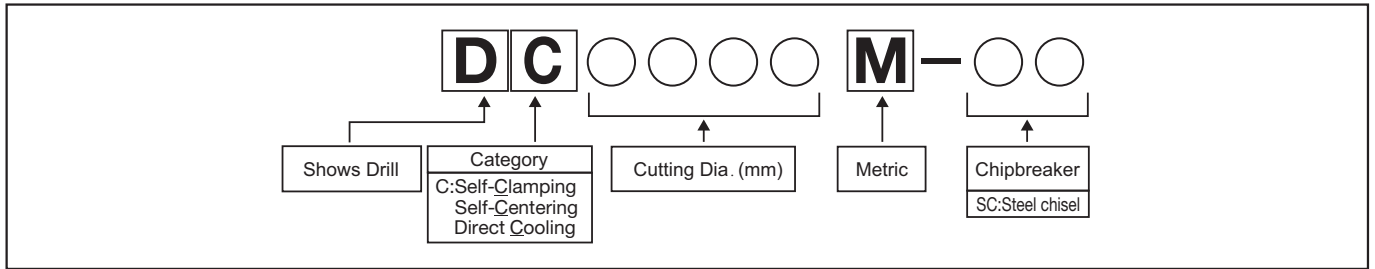


Drilling



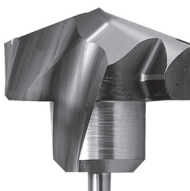
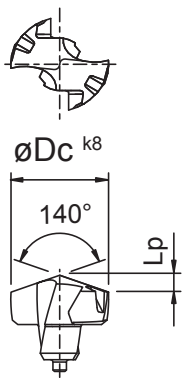
MagicDrill® Insert for DRC

Description identification system (Insert)




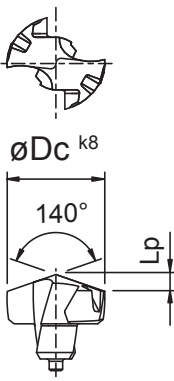
Insert Grades PR0315

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 Toolholder K7-K9, K12-K14															
		øDc	Lp	PR0315																
  <p>140°</p> <p>øDc k8</p> <p>Lp</p> <p>k8 tolerance</p> <table border="1"> <thead> <tr> <th>øDc</th> <th>k8(mm)</th> </tr> </thead> <tbody> <tr> <td>7.94</td> <td>+0.022</td> </tr> <tr> <td>10.00</td> <td>0</td> </tr> <tr> <td>10.10</td> <td>+0.027</td> </tr> <tr> <td>18.00</td> <td>0</td> </tr> <tr> <td>18.10</td> <td>+0.033</td> </tr> <tr> <td>25.50</td> <td>0</td> </tr> </tbody> </table> <p>k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the cutting diameter.</p>	øDc	k8(mm)	7.94	+0.022	10.00	0	10.10	+0.027	18.00	0	18.10	+0.033	25.50	0	DC	0794M-SC	7.94	1.44	●	SS10-DRC080M-O SF12-DRC080M-O
	øDc	k8(mm)																		
	7.94	+0.022																		
	10.00	0																		
	10.10	+0.027																		
	18.00	0																		
	18.10	+0.033																		
	25.50	0																		
	DC	0800M-SC	8.00	1.46	●															
	DC	0810M-SC	8.10	1.47	●															
	DC	0820M-SC	8.20	1.49	●															
	DC	0830M-SC	8.30	1.51	●															
	DC	0840M-SC	8.40	1.53	●															
	DC	0850M-SC	8.50	1.55	●	SS10-DRC085M-O SF12-DRC085M-O														
	DC	0860M-SC	8.60	1.56	●															
	DC	0870M-SC	8.70	1.58	●															
	DC	0880M-SC	8.80	1.60	●															
	DC	0890M-SC	8.90	1.62	●															
	DC	0900M-SC	9.00	1.64	●	SS10-DRC090M-O SF12-DRC090M-O														
	DC	0910M-SC	9.10	1.66	●															
	DC	0920M-SC	9.20	1.67	●															
	DC	0930M-SC	9.30	1.69	●															
	DC	0940M-SC	9.40	1.71	●															
	DC	0950M-SC	9.50	1.73	●	SS10-DRC095M-O SF12-DRC095M-O														
	DC	0960M-SC	9.60	1.75	●															
	DC	0970M-SC	9.70	1.76	●															
	DC	0980M-SC	9.80	1.78	●															
	DC	0990M-SC	9.90	1.80	●															
	DC	1000M-SC	10.00	1.82	●	SS12-DRC100M-O SF16-DRC100M-O														
	DC	1010M-SC	10.10	1.84	●															
	DC	1020M-SC	10.20	1.86	●															
	DC	1030M-SC	10.30	1.87	●															
	DC	1040M-SC	10.40	1.89	●															
	DC	1050M-SC	10.50	1.91	●	SS12-DRC105M-O SF16-DRC105M-O														
	DC	1060M-SC	10.60	1.93	●															
	DC	1070M-SC	10.70	1.95	●															
	DC	1080M-SC	10.80	1.96	●															
	DC	1090M-SC	10.90	1.98	●															
	DC	1100M-SC	11.00	2.00	●	SS12-DRC110M-O SF16-DRC110M-O														
	DC	1110M-SC	11.10	2.02	●															
DC	1120M-SC	11.20	2.04	●																
DC	1130M-SC	11.30	2.06	●																
DC	1140M-SC	11.40	2.07	●																
DC	1150M-SC	11.50	2.09	●	SS12-DRC115M-O SF16-DRC115M-O															
DC	1160M-SC	11.60	2.11	●																
DC	1170M-SC	11.70	2.13	●																
DC	1180M-SC	11.80	2.15	●																
DC	1190M-SC	11.90	2.16	●																
DC	1200M-SC	12.00	2.18	●	SS14-DRC120M-O SF16-DRC120M-O															
DC	1210M-SC	12.10	2.20	●																
DC	1220M-SC	12.20	2.22	●																
DC	1230M-SC	12.30	2.24	●																
		1240M-SC	12.40	2.26	●															

DC inserts are sold in 1 piece boxes

● : Std. Item □ : Check Availability


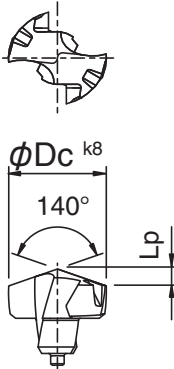
Insert	Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholder ● K7~K9, K12~K14									
		øDc	Lp	PR0315										
  <p>øDc k8</p> <p>140°</p> <p>Lp</p> <table border="1" data-bbox="360 1758 572 2027"> <caption>k8 tolerance</caption> <thead> <tr> <th>øDc</th> <th>k8(mm)</th> </tr> </thead> <tbody> <tr> <td>7.94 } 10.00</td> <td>+0.022 0</td> </tr> <tr> <td>10.10 } 18.00</td> <td>+0.027 0</td> </tr> <tr> <td>18.10 } 25.50</td> <td>+0.033 0</td> </tr> </tbody> </table> <p>k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the cutting diameter.</p>	øDc	k8(mm)	7.94 } 10.00	+0.022 0	10.10 } 18.00	+0.027 0	18.10 } 25.50	+0.033 0	DC	1250M-SC	12.50	2.27	●	SS14-DRC125M-O SF16-DRC125M-O
	øDc	k8(mm)												
	7.94 } 10.00	+0.022 0												
	10.10 } 18.00	+0.027 0												
	18.10 } 25.50	+0.033 0												
	DC	1260M-SC	12.60	2.29	●									
	DC	1270M-SC	12.70	2.31	●									
	DC	1280M-SC	12.80	2.33	●									
	DC	1290M-SC	12.90	2.35	●									
	DC	1300M-SC	13.00	2.36	●	SS14-DRC130M-O SF16-DRC130M-O								
	DC	1310M-SC	13.10	2.38	●									
	DC	1320M-SC	13.20	2.40	●									
	DC	1330M-SC	13.30	2.42	●									
	DC	1340M-SC	13.40	2.44	●									
	DC	1350M-SC	13.50	2.46	●	SS14-DRC135M-O SF16-DRC135M-O								
	DC	1360M-SC	13.60	2.47	●									
	DC	1370M-SC	13.70	2.49	●									
	DC	1380M-SC	13.80	2.51	●									
	DC	1390M-SC	13.90	2.53	●									
	DC	1400M-SC	14.00	2.55	●	SS16-DRC140M-O SF16-DRC140M-O								
	DC	1410M-SC	14.10	2.56	●									
	DC	1420M-SC	14.20	2.58	●									
	DC	1430M-SC	14.30	2.60	●									
	DC	1440M-SC	14.40	2.62	●									
	DC	1450M-SC	14.50	2.64	●	SS16-DRC145M-O SF16-DRC145M-O								
	DC	1460M-SC	14.60	2.66	●									
	DC	1470M-SC	14.70	2.67	●									
	DC	1480M-SC	14.80	2.69	●									
	DC	1490M-SC	14.90	2.71	●									
	DC	1500M-SC	15.00	2.73	●	SS16-DRC150M-O SF20-DRC150M-O								
	DC	1510M-SC	15.10	2.75	●									
	DC	1520M-SC	15.20	2.76	●									
	DC	1530M-SC	15.30	2.78	●									
	DC	1540M-SC	15.40	2.80	●									
	DC	1550M-SC	15.50	2.82	●									
	DC	1560M-SC	15.60	2.84	●									
	DC	1570M-SC	15.70	2.86	●									
	DC	1580M-SC	15.80	2.87	●									
	DC	1590M-SC	15.90	2.89	●									
	DC	1600M-SC	16.00	2.91	●	SS18-DRC160M-O SF20-DRC160M-O								
	DC	1610M-SC	16.10	2.93	●									
	DC	1620M-SC	16.20	2.95	●									
	DC	1630M-SC	16.30	2.96	●									
	DC	1640M-SC	16.40	2.98	●									
	DC	1650M-SC	16.50	3.00	●									
DC	1660M-SC	16.60	3.02	●										
DC	1670M-SC	16.70	3.04	●										
DC	1680M-SC	16.80	3.06	●										
DC	1690M-SC	16.90	3.07	●										
DC	1700M-SC	17.00	3.09	●	SS18-DRC170M-O SF20-DRC170M-O									
DC	1710M-SC	17.10	3.11	●										
DC	1720M-SC	17.20	3.13	●										
DC	1730M-SC	17.30	3.15	●										
DC	1740M-SC	17.40	3.16	●										
DC	1750M-SC	17.50	3.18	●										
DC	1760M-SC	17.60	3.20	●										
DC	1770M-SC	17.70	3.22	●										
DC	1780M-SC	17.80	3.24	●										
DC	1790M-SC	17.90	3.26	●										
DC	1800M-SC	18.00	3.27	●	SS20-DRC180M-O SF25-DRC180M-O									
DC	1810M-SC	18.10	3.29	●										
DC	1820M-SC	18.20	3.31	●										
DC	1830M-SC	18.30	3.33	●										
DC	1840M-SC	18.40	3.35	●										
DC	1850M-SC	18.50	3.36	●										
DC	1860M-SC	18.60	3.38	●										
DC	1870M-SC	18.70	3.40	●										
DC	1880M-SC	18.80	3.42	●										
DC	1890M-SC	18.90	3.44	●										

● : Std. Item □ : Check Availability

DC inserts are sold
in 1 piece boxes



MagicDrill® Insert for DRC

Insert	Description	Dimension (mm)		PVD Coated Carbide	Applicable Toolholder K7~K9, K12~K14									
		øDc	Lp	PR0315										
  <table border="1" data-bbox="360 974 572 1243"> <thead> <tr> <th>øDc</th> <th>k8(mm)</th> </tr> </thead> <tbody> <tr> <td>7.94 ?</td> <td>+0.022 0</td> </tr> <tr> <td>10.10 ?</td> <td>+0.027 0</td> </tr> <tr> <td>18.10 ?</td> <td>+0.033 0</td> </tr> </tbody> </table> <p data-bbox="360 1249 572 1321">k8 is the dimension tolerance of the insert. It is not the dimension tolerance of the cutting diameter.</p>	øDc	k8(mm)	7.94 ?	+0.022 0	10.10 ?	+0.027 0	18.10 ?	+0.033 0	DC	1900M-SC	19.00	3.46	●	SS20-DRC190M-O SF25-DRC190M-O
	øDc	k8(mm)												
	7.94 ?	+0.022 0												
	10.10 ?	+0.027 0												
	18.10 ?	+0.033 0												
	1910M-SC	19.10	3.47	●										
	1920M-SC	19.20	3.49	●										
	1930M-SC	19.30	3.51	●										
	1940M-SC	19.40	3.53	●										
	1950M-SC	19.50	3.55	●										
	1960M-SC	19.60	3.56	●										
	1970M-SC	19.70	3.58	●										
	1980M-SC	19.80	3.60	●										
	1990M-SC	19.90	3.62	●										
	DC	2000M-SC	20.00	3.64	●	SS25-DRC200M-O SF25-DRC200M-O								
	2010M-SC	20.10	3.66	●										
	2020M-SC	20.20	3.67	●										
	2030M-SC	20.30	3.69	●										
	2040M-SC	20.40	3.71	●										
	2050M-SC	20.50	3.73	●										
	2060M-SC	20.60	3.75	●										
	2070M-SC	20.70	3.77	●										
	2080M-SC	20.80	3.78	●										
	2090M-SC	20.90	3.80	●										
	2099M-SC	20.99	3.82	●										
	DC	2100M-SC	21.00	3.82	●	SS25-DRC210M-O SF25-DRC210M-O								
	2150M-SC	21.50	3.91	●										
	2200M-SC	22.00	4.00	●	SS25-DRC220M-O SF25-DRC220M-O									
	2250M-SC	22.50	4.09	●										
	2300M-SC	23.00	4.18	●	SS25-DRC230M-O SF25-DRC230M-O									
2350M-SC	23.50	4.27	●											
2400M-SC	24.00	4.37	●	SS25-DRC240M-O SF25-DRC240M-O										
2450M-SC	24.50	4.46	●											
2500M-SC	25.00	4.55	●	SS32-DRC250M-O SF25-DRC250M-O										
2550M-SC	25.50	4.64	●											

K



Drilling

Q&A

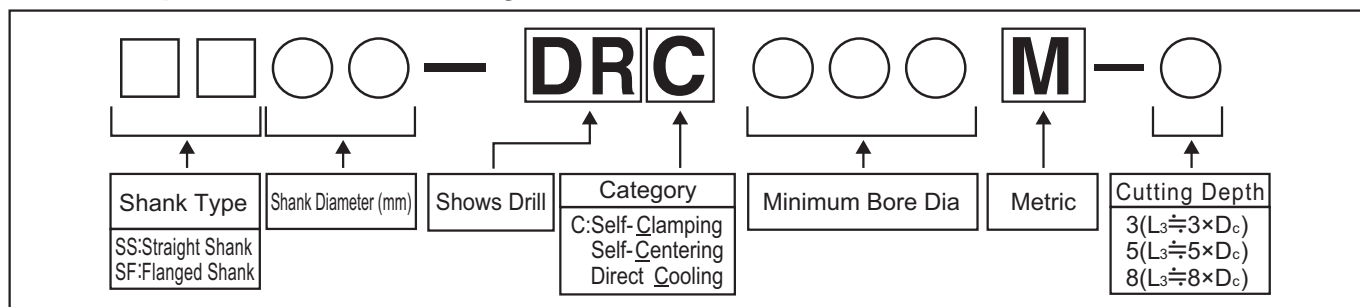
- Q-1** Is re-grinding possible?
- A-1** We don't recommend it. Grinding of edge nose chisel is not possible.
- Q-2** How large would the cutting hole be to the insert diameter (øDc)?
- A-2** The machining hole with SCM 435, comparing to the insert diameter(øDc), will be about +0.020~+0.040mm.

K6

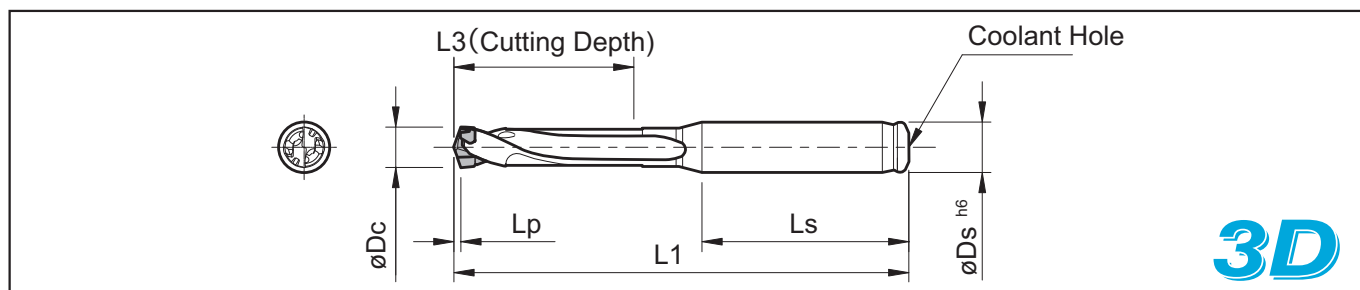
DC inserts are sold in 1 piece boxes

● : Std. Item

Description Identification System (Toolholder)



SS-DRC (Cutting Depth: 3×D)



For Lp, indicates distance from drill point to corner edge, see [K4~K6](#)

Toolholder Dimension

Description	Std.	Dimensions (mm)					Spare Parts Wrench see K15	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description	
		Applicable Insert Dia. øDc		øDs (h6)	L1	L3			Ls	Toolholder
min.	max.									
SS10- DRC080M-3	●	7.94	8.49	10	79	25.5	40	WDRC8 (WDRC17)	S20-CH10	CT08T2-45A
	●	8.50	8.99		81	27.0				
	●	9.00	9.49		83	28.5				
	●	9.50	9.99		85	30.0				
SS12- DRC100M-3	●	10.00	10.49	12	92	31.5	45	WDRC10 (WDRC17)	S32-CH12	CT12T3-45A
	●	10.50	10.99		94	33.0				
	●	11.00	11.49		96	34.5				
	●	11.50	11.99		98	36.0				
SS14- DRC120M-3	●	12.00	12.49	14	101	37.5	48	WDRC12 (WDRC17)	S32-CH14	CT12T3-45A
	●	12.50	12.99		103	39.0				
	●	13.00	13.49		105	40.5				
	●	13.50	13.99		107	42.0				
SS16- DRC140M-3	●	14.00	14.49	16	112	43.5	49	WDRC14 (WDRC17)	S32-CH16	CT16T3-45A
	●	14.50	14.99		114	45.0				
	●	15.00	15.99		118	48.0				
SS18- DRC160M-3	●	16.00	16.99	18	122	51.0	50	WDRC16 (WDRC17)	S32-CH18	CT18T3-45A
	●	17.00	17.99		127	54.0				
SS20- DRC180M-3	●	18.00	18.99	20	133	57.0	51	WDRC18 (WDRC17)	S32-CH20	CT20T3-45A
	●	19.00	19.99		137	60.0				
SS25- DRC200M-3	●	20.00	20.99	25	147	63.0	56	WDRC17	-	-
	●	21.00	21.99		151	66.0				
	●	22.00	22.99		156	69.0				
	●	23.00	23.99		160	72.0				
	●	24.00	24.99		164	75.0				
SS32- DRC250M-3	●	25.00	25.50	32	172	78.0	60	WDRC17	-	-

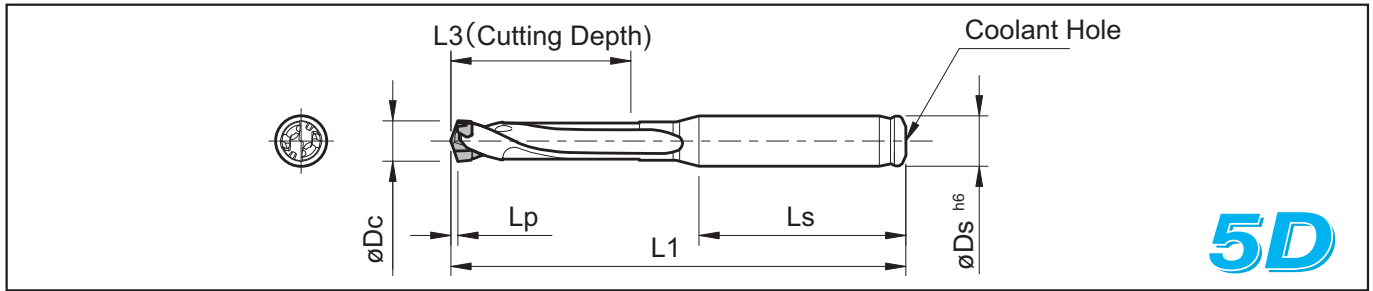
● : Std. Item



Drilling



SS-DRC (Cutting Depth: 5×D)



· For Lp, indicates distance from drill point to corner edge, see **K4~K6**

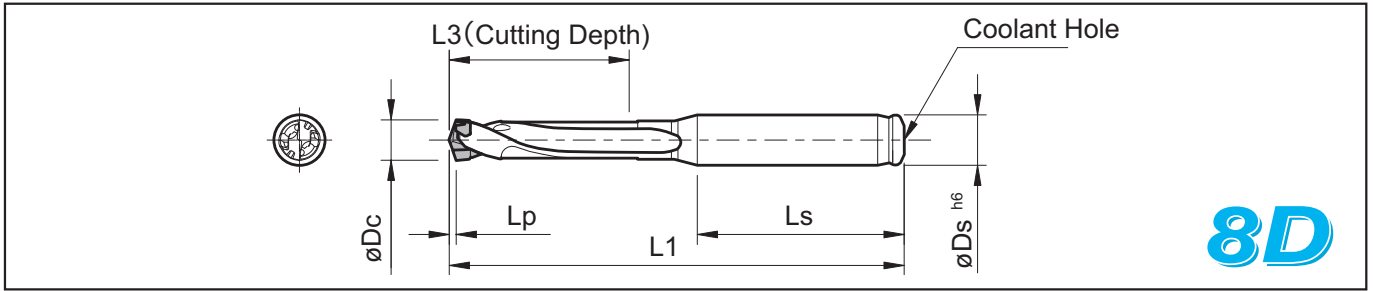
● Toolholder Dimension

Description	Std.	Dimensions (mm)					Spare Parts Wrench see K15	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description			
		Applicable Insert Dia. øDc		øDs (h6)	L1	L3			Ls	Toolholder	Insert	
		min.	max.									
SS10- DRC080M-5	●	7.94	8.49	10	97	42.5	40	WDR8 (WDR17)	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	WDR10 (WDR17)	DC1000M-SC~DC1040M-SC	S32-CH12		
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	WDR12 (WDR17)	DC1200M-SC~DC1240M-SC	S32-CH14	CT12T3-45A	
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	WDR14 (WDR17)	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	49	WDR16 (WDR17)	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	51	WDR18 (WDR17)	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	WDR20 (WDR17)	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	25.50	32	227	130.0	60	WDR25 (WDR17)	DC2500M-SC~DC2550M-SC			

● : Std. Item



SS-DRC (Cutting Depth: 8×D)



• For Lp, indicates distance from drill point to corner edge See **K4~K6**

Toolholder Dimension

Description	Std.	Dimensions (mm)						Spare Parts Wrench see K15	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description	
		Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls			Toolholder	Insert
		min.	max.								
SS10- DRC080M-8	●	7.94	8.49	10	122.5	68	40	WDR8 (WDR17)	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	WDR10 (WDR17)	DC1000M-SC~DC1040M-SC	S32-CH12	
	●	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	WDR12 (WDR17)	DC1200M-SC~DC1240M-SC	S32-CH14	CT12T3-45A
	●	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	WDR14 (WDR17)	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	49	WDR16 (WDR17)	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	51	WDR18 (WDR17)	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	WDR20 (WDR17)	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	25.50	32	305.0	208	60	WDR25 (WDR17)	DC2500M-SC~DC2550M-SC		

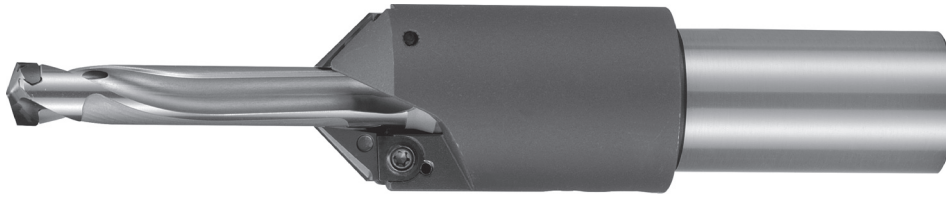
● : Std. Item



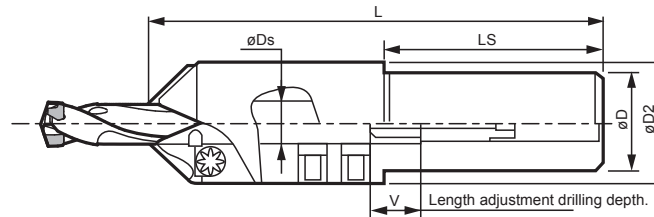
Chamfering attachment

● Drilling and chamfering simultaneously

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



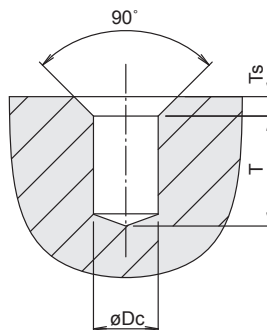
● Toolholder



Description	Std.	Applicable Drill Shank Dia. øDs	Dimensions (mm)					Applicable Inserts
			øD	øD2	L	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 type.
It cannot be used for Flanged Shank SF-DRC type.

● Drilling and chamfering depths


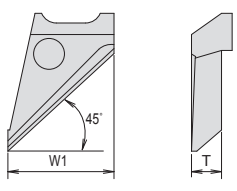


Cutting Dia (mm)		Cutting Depth (mm)						Chamfering dimension (mm)		Applicable Toolholders
øDc		T (3D Drill)		T (5D Drill)		T (8D Drill)		Ts		
min	max	min	max	min	max	min	max	Ts 100	Ts max	
ø7.94	ø8.49	11	19	21	37	47	63	2.5	5.0	S20-CH10
ø8.50	ø8.99	12	21	24	40	51	67			
ø9.00	ø9.49	12	23	27	43	56	72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

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

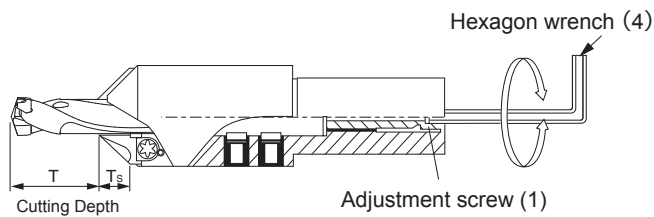
● : Std. Item □ : Check Availability

● Applicable chamfering Inserts

Insert		Description	Dimensions (mm)		PVD Coated Carbide PR0315	Applicable Toolholders
			W1	T		
		CT08T2-45A	8	2.83	●	S20-CH10
		CT12T3-45A	12	3.98	●	S32-CH12 ↓ S32-CH18

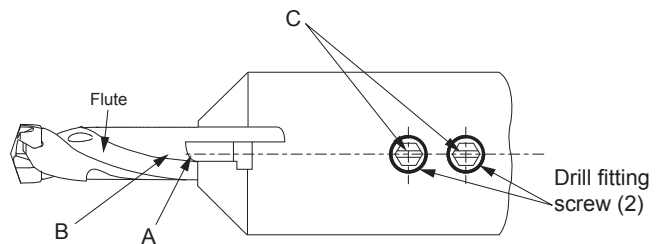
● Method to use DRC chamfering attachment

I. Drilling depth adjustment



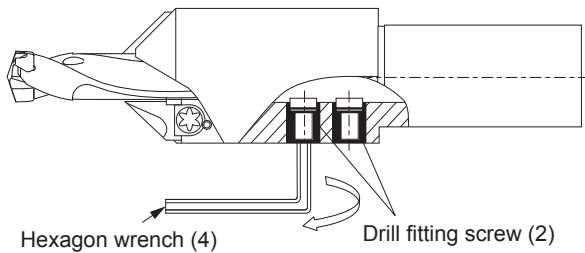
Insert drill into chamfering attachment.
Next, temporarily attach the chamfering insert A.
Turn the adjusting screw (1) with the hexagon wrench (4) to set the drilling depth T.

II. Drill location check



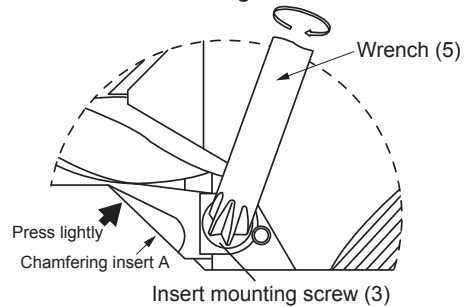
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

III. Fix the drill



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

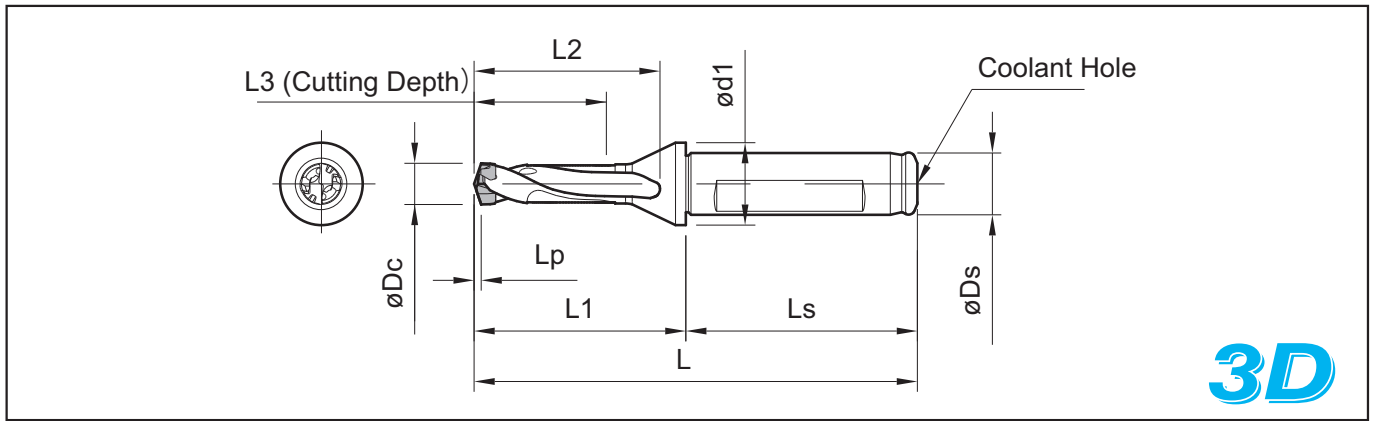
IV. Installation of the chamfering insert



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

Chamfering attachment	Tightening Torque [Nm]	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
S32-CH14	20	AJ-10×46	FS-14			
S32-CH16	30		FS-16			
S32-CH18	45		FS-18			

SF-DRC (Cutting Depth: 3×D)



· For Lp, indicates distance from drill point to corner edge, see [K4~K6](#)

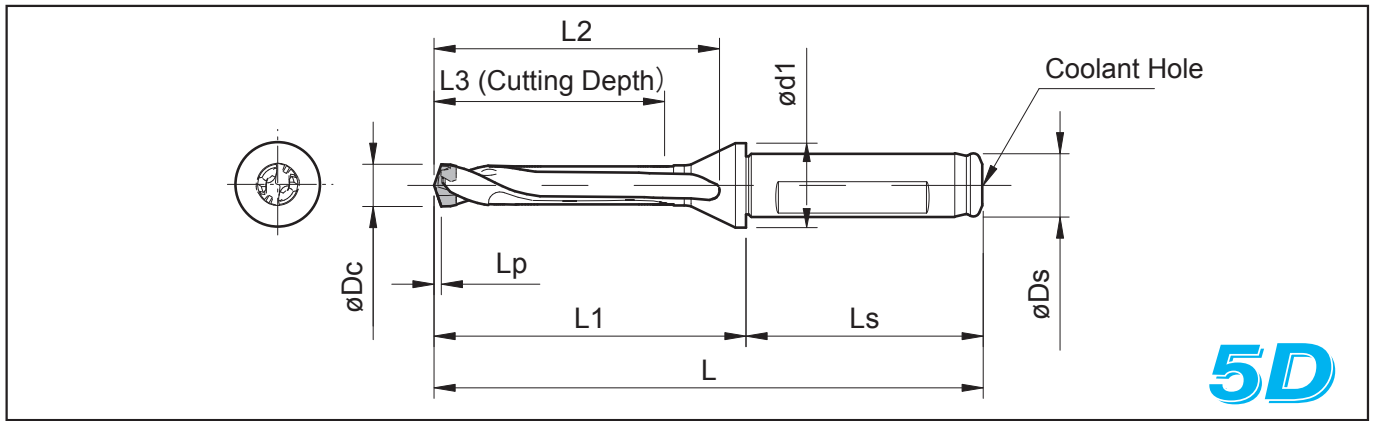
● Toolholder Dimension

Description	Std.	Dimensions (mm)									Spare Parts	Applicable Inserts ● K4~K6	
		Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1			
		min.	max.										
SF12- DRC080M-3	●	7.94	8.49	12	86	41	35	26	45	16	WDR8 (WDR17)	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	WDR10 (WDR17)	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			WDR12 (WDR17)	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				WDR14 (WDR17)	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	WDR14 (WDR17)	DC1500M-SC~DC1580M-SC	
	●	16.00	16.99		126	76	70	51				DC1600M-SC~DC1690M-SC	
	●	17.00	17.99		131	81	75	54				DC1700M-SC~DC1790M-SC	
SF25- DRC180M-3	●	18.00	18.99	25	141	85	79	57	56	32	WDR17	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	25.50		170	114	108	78				DC2500M-SC~DC2550M-SC	

● : Std. Item □ : Check Availability



SF-DRC (Cutting Depth: 5×D)



· For Lp, indicates distance from drill point to corner edge, see **K4~K6**

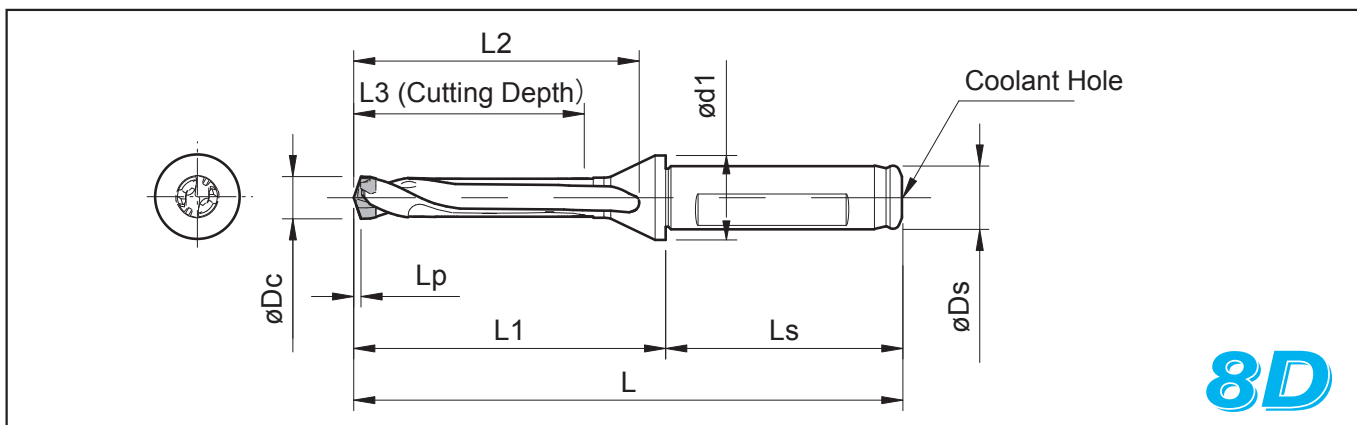
Toolholder Dimension

Description	Std.	Dimensions (mm)									Spare Parts	Applicable Inserts K4~K6	
		Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1			Wrench see K15
		min.	max.										
SF12- DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	WDR8 (WDR17)	DC0794M-SC~DC0840M-SC	
	●	8.50	8.99		107	62	56	45				DC0850M-SC~DC0890M-SC	
	●	9.00	9.49		110	65	59	48				DC0900M-SC~DC0940M-SC	
	●	9.50	9.99		114	69	63	50				DC0950M-SC~DC0990M-SC	
SF16- DRC100M-5	●	10.00	10.49	16	120	72	66	53	48	20	WDR10 (WDR17)	DC1000M-SC~DC1040M-SC	
	●	10.50	10.99		123	75	69	55				DC1050M-SC~DC1090M-SC	
	●	11.00	11.49		126	78	72	58				DC1100M-SC~DC1140M-SC	
	●	11.50	11.99		129	81	75	60				DC1150M-SC~DC1190M-SC	
	●	12.00	12.49		132	84	78	63			WDR12 (WDR17)	DC1200M-SC~DC1240M-SC	
	●	12.50	12.99		135	87	81	65				DC1250M-SC~DC1290M-SC	
	●	13.00	13.49		138	90	84	68				DC1300M-SC~DC1340M-SC	
	●	13.50	13.99		142	94	88	70				DC1350M-SC~DC1390M-SC	
	●	14.00	14.49		145	97	91	73				WDR14 (WDR17)	DC1400M-SC~DC1440M-SC
	●	14.50	14.99		148	100	94	75					DC1450M-SC~DC1490M-SC
SF20- DRC150M-5	●	15.00	15.99	20	156	106	100	80	50	25	WDR14 (WDR17)	DC1500M-SC~DC1580M-SC	
	●	16.00	16.99		162	112	106	85				DC1600M-SC~DC1690M-SC	
	●	17.00	17.99		169	119	113	90				DC1700M-SC~DC1790M-SC	
SF25- DRC180M-5	●	18.00	18.99	25	181	125	119	95	56	32	WDR17	DC1800M-SC~DC1890M-SC	
	●	19.00	19.99		187	131	125	100				DC1900M-SC~DC1990M-SC	
	●	20.00	20.99		193	137	131	105				DC2000M-SC~DC2099M-SC	
	●	21.00	21.99		200	144	138	110				DC2100M-SC~DC2150M-SC	
	●	22.00	22.99		206	150	144	115				DC2200M-SC~DC2250M-SC	
	●	23.00	23.99		212	156	150	120				DC2300M-SC~DC2350M-SC	
	●	24.00	24.99		218	162	156	125				DC2400M-SC~DC2450M-SC	
	●	25.00	25.50		225	169	163	130				DC2500M-SC~DC2550M-SC	

● : Std. Item



SF-DRC (Cutting Depth: 8×D)



· For Lp, indicates distance from drill point to corner edge, see [K4~K6](#)


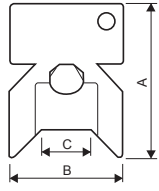


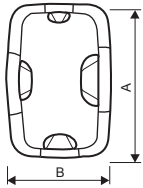
● Toolholder Dimension

Description	Std.	Dimensions (mm)									Spare Parts Wrench see K15	Applicable Inserts K4~K6	
		Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1			
		min.	max.										
SF12- DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	WDR8 (WDR17)	DC0794M-SC~DC0840M-SC	
	●	8.50	8.99		134	89	83	72				DC0850M-SC~DC0890M-SC	
	●	9.00	9.49		138	93	88	76				DC0900M-SC~DC0940M-SC	
	●	9.50	9.99		144	99	93	80				DC0950M-SC~DC0990M-SC	
SF16- DRC100M-8	●	10.00	10.49	16	151	103	97	84	48	20	WDR10 (WDR17)	DC1000M-SC~DC1040M-SC	
	●	10.50	10.99		156	108	102	88				DC1050M-SC~DC1090M-SC	
	●	11.00	11.49		160	112	107	92				DC1100M-SC~DC1140M-SC	
	●	11.50	11.99		165	117	111	96				DC1150M-SC~DC1190M-SC	
	●	12.00	12.49		169	121	116	100			WDR12 (WDR17)	DC1200M-SC~DC1240M-SC	
	●	12.50	12.99		174	126	120	104				DC1250M-SC~DC1290M-SC	
	●	13.00	13.49		178	130	124	108				DC1300M-SC~DC1340M-SC	
	●	13.50	13.99		184	136	130	112				DC1350M-SC~DC1390M-SC	
	●	14.00	14.49		188	140	134	116				WDR14 (WDR17)	DC1400M-SC~DC1440M-SC
	●	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	WDR14 (WDR17)	DC1500M-SC~DC1580M-SC	
	●	16.00	16.99		213	163	157	136				DC1600M-SC~DC1690M-SC	
	●	17.00	17.99		223	173	167	144				DC1700M-SC~DC1790M-SC	
SF25- DRC180M-8	●	18.00	18.99	25	238	182	176	152	56	32	WDR17	DC1800M-SC~DC1890M-SC	
	●	19.00	19.99		247	191	185	160				DC1900M-SC~DC1990M-SC	
	●	20.00	20.99		256	200	194	168				DC2000M-SC~DC2099M-SC	
	●	21.00	21.99		266	210	204	176				DC2100M-SC~DC2150M-SC	
	●	22.00	22.99		275	219	213	184				DC2200M-SC~DC2250M-SC	
	●	23.00	23.99		284	228	222	192				DC2300M-SC~DC2350M-SC	
	●	24.00	24.99		293	237	231	200				DC2400M-SC~DC2450M-SC	
	●	25.00	25.50		303	247	241	208				DC2500M-SC~DC2550M-SC	

● : Std. Item



Wrench

Shape		Description	Dimensions (mm)			Remarks
			A	B	C	
		WDR C8	43	33	∅10.2	 Description is printed in this area.
		WDR C10			∅12.2	
		WDR C12			∅14.2	
		WDR C14			∅17.2	
		WDR C17	77	52	-	·WDR C17(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 "∅17.00~∅20.99". ·WDR C17 can be used instead of WDR C8~14 wrench.

Method to change DRC type MagicDrill inserts

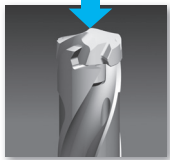
How to attach inserts



- Fix drill holder on arbor.
For insert exchange, fix arbor on the machine or set on toolpresetter.
- Remove dust using air blow.



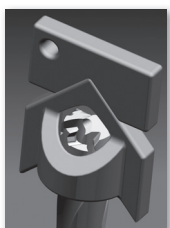
- Install insert onto holder.
(Use gloves to protect your hand from any danger.)



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



- Align the wrench properly with the insert.



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



(Improper alignment shown)

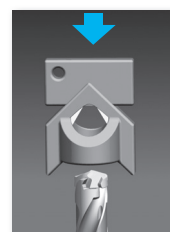


Slot for wrench



- Turn the wrench in a slow counterclockwise direction.
- Completed.

How to detach inserts



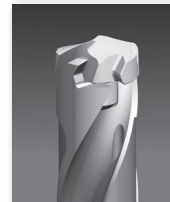
- Use compressed air to remove dust.
- Align the wrench properly with the insert.



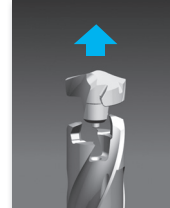
- Make sure the wrench is aligned with the wrench slots on the insert.



- Turn the wrench in a counterclockwise direction.



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



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

K



Drilling

Recommended Cutting Conditions

Workpiece Material		Hardness (HB)	Cutting conditions		Cutting Dia ϕD_c (mm)							Remarks
			Cutting Speed V_c (m/min)	Spindle Revolution n (min^{-1}) Feed Rate f (mm/rev)	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 14$	$\phi 16$	$\phi 18$	$\phi 20$	
Low-carbon Steel	SS400 S10C~S25C	125	120 - 180	n (min^{-1})	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	1,530 - 2,290
				f (mm/rev)	0.11 - 0.20	0.13 - 0.24	0.14 - 0.28	0.17 - 0.32	0.19 - 0.35	0.23 - 0.38	0.25 - 0.41	0.30 - 0.50
Carbon Steel	S30C~S58C (Annealed)	190	100 - 150	n (min^{-1})	3,980 - 5,970	3,180 - 4,780	2,650 - 3,980	2,270 - 3,410	1,990 - 2,990	1,770 - 2,650	1,590 - 2,390	1,270 - 1,910
				f (mm/rev)	0.13 - 0.24	0.15 - 0.29	0.17 - 0.33	0.19 - 0.36	0.22 - 0.41	0.25 - 0.46	0.28 - 0.48	0.32 - 0.60
	S30C~S58C (Heat treated)	250	80 - 120	n (min^{-1})	3,180 - 4,780	2,550 - 3,820	2,120 - 3,180	1,820 - 2,730	1,590 - 2,390	1,420 - 2,120	1,270 - 1,910	1,020 - 1,530
				f (mm/rev)	0.13 - 0.21	0.15 - 0.25	0.18 - 0.31	0.21 - 0.39	0.23 - 0.45	0.25 - 0.53	0.28 - 0.61	0.38 - 0.64
	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	SCM, SCr etc. (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
	SCM, SCr etc. (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

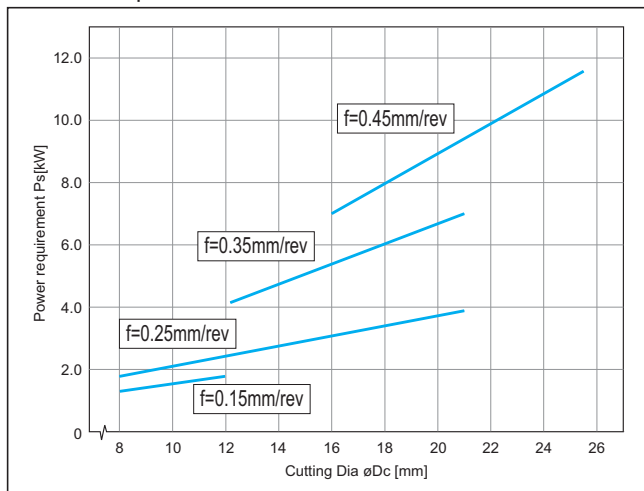
Coolant (See K17)

- Internal coolant is recommended. In case of external coolant, cutting depth must be $3 \times D$ or less.
- The longer drilling depth gets ($3D \rightarrow 5D \rightarrow 8D$), the lower of the recommended feed rate should be set for f .

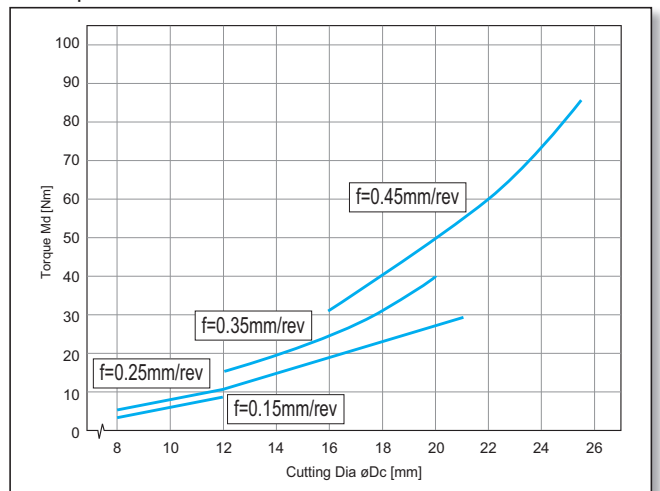
Reference charts

<Cutting conditions> : Workpiece Material Heat treated steel (Hardness 240HB) $V_c=80\text{m/min}$, Wet

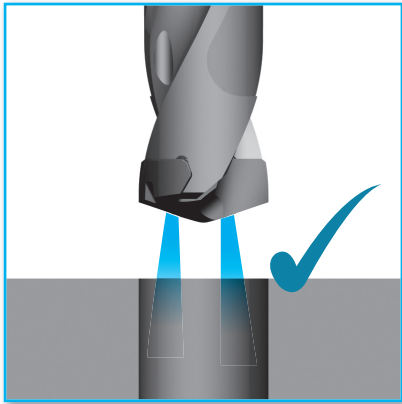
● Power requirement



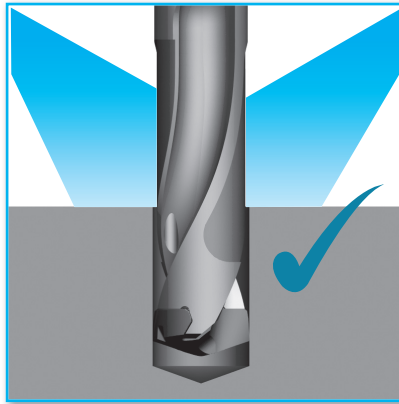
● Torque



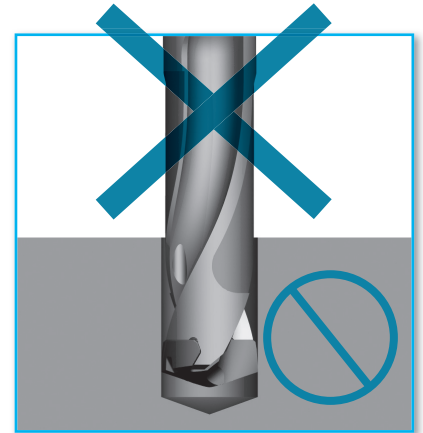
Coolant



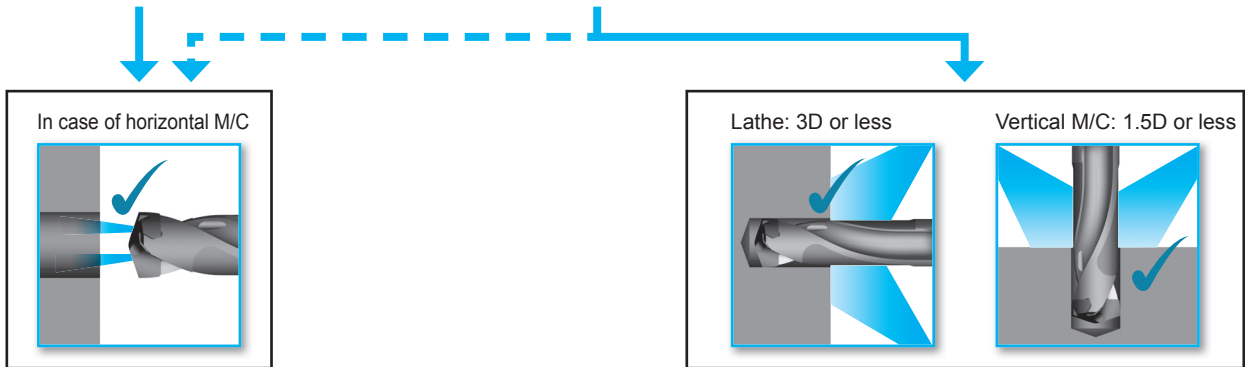
1) Internal coolant is recommended.



2) In case of external coolant



3) Dry cutting is not recommended.

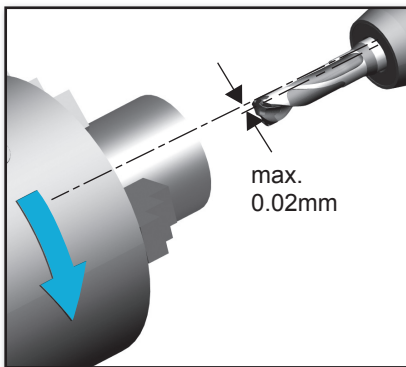


Internal coolant is recommended for horizontal machining center because external coolant may not sufficiently be applied to inside because the tool is revolving.

Precautions for use

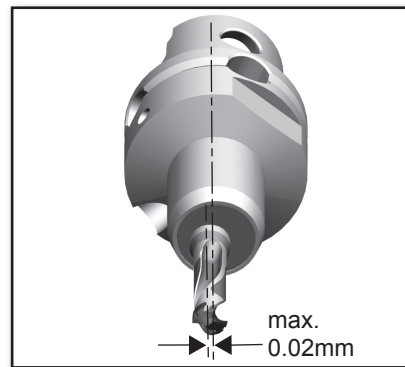
Core Deviation

1) If drill is stationary



This is to be used with a boring sleeve (screw clamp) and colletchuck, please be sure to set deviation amount under 0.02mm between workpiece and drill.

2) If drill is rotating

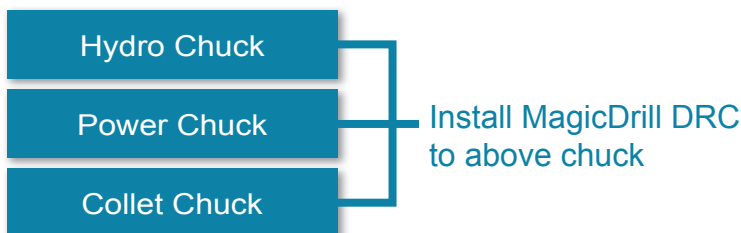


Make sure to use arbor that is not deformed. Center of arbor deviation must be within 0.02mm.

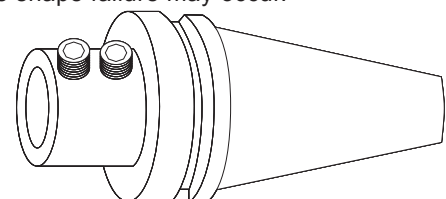
Cautions for installation on Machining Center

For installation of DRC type MagicDrill, use Hydro Chuck, Power Chuck, Collet Chuck, etc.

For side lock arbor, tool life is shortened due to drilling center deviation. Hole shape failure may occur.



1st Recommendation



Example of side lock arbor
2nd Recommendation

Applicable workpiece

Application	Shape of Workpiece	Caution for machining
Plain Surface		<ol style="list-style-type: none"> Due to good chip control, step machining is not necessary for Soft Steel like SS400. When machining SUS304, for hole depths of more than 2.5D, utilize the step machining process. In order to have smooth chip removal, we recommend internal coolant.
Stacked Plates		<ol style="list-style-type: none"> Fix stacked plates securely to ensure they do not slip while machining.
Hole Expansion		<ol style="list-style-type: none"> If the overlap amount is less than $1/3 \times D$, machining is possible.
Concave Surface		<ol style="list-style-type: none"> When machining concave holes set the feed rates at half or less than continuous hole machining.
Pipe Material		<ol style="list-style-type: none"> Hole machining above the centerline of the pipe is possible. Do not machine on curved surface areas.

Not Recommended workpieces

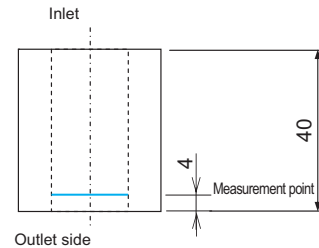
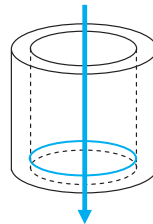
Application	Shape of Workpiece
Slant Surface	
Half Cylindrical	
Cored Hole	

Comparison of Cutting Precision

Cutting Condition and Measurement Point

<Cutting conditions>

Workpiece Material	C45 (S45C)
Vc (m/min)	100
f (mm/rev)	0.2mm/rev, 0.3mm/rev
Drilling depth H (mm)	Through hole (40mm)
Coolant	Wet (Internal coolant)
Tool	$\phi 14 \times 3D$ type
Machine	M/C



Roundness

1) Roundness (f=0.2mm/rev)

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

2) Roundness (f=0.3mm/rev)

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

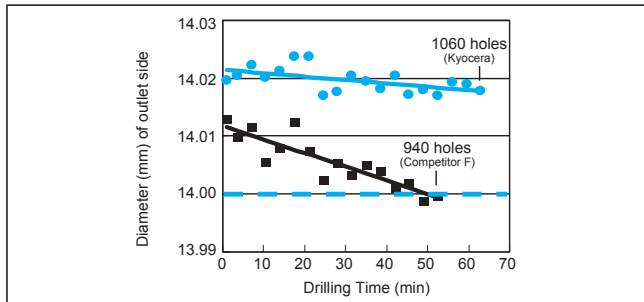
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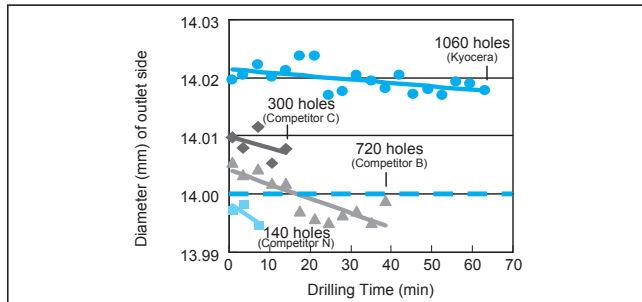
Drilling

● Drilling Diameter (f = 0.3 mm/rev)

1) Comparison with indexable drill



2) Comparison with carbide solid drill



Q&A

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

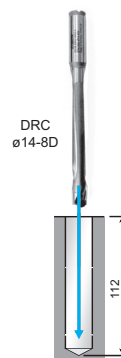
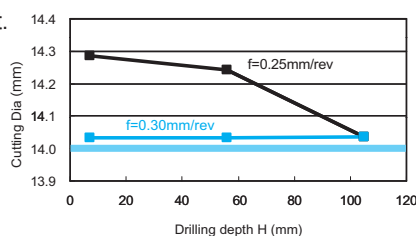
A-3 There are some countermeasures as follows to prevent deflection (to improve bite of drill).

Countermeasures 1

● Increasing the feed rate

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

<Cutting conditions>
C55 (S55C) Vc=80m/min H=112mm
f=0.25mm/rev → 0.30 mm/rev
Wet (Internal coolant)
SS16-DRC140M-8
DC1400M-SC (PR0315)



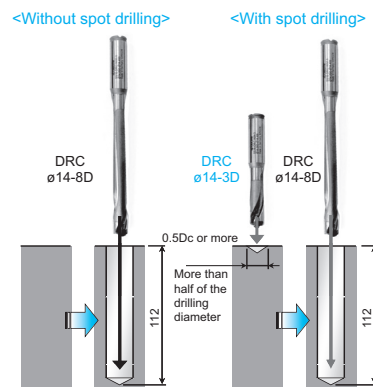
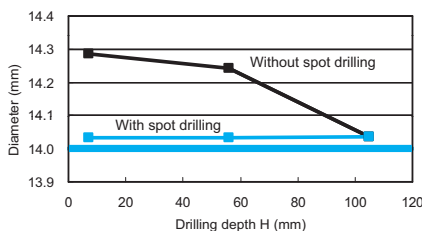
If increasing the feed rate is not possible because rigidity of machine or clamp is weak

Countermeasures 2

● Making 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

C50 (S50C)	
<ul style="list-style-type: none"> • Flange • Vc=97m/min (n=2,490min⁻¹) • H=32mm • f=0.3mm/rev (Vf=747mm/min) • Wet (Internal Coolant) • DC1250M-SC (PR0315) 	
SS14-DRC120M-3	3,000holes/insert
Competitor A	1,800holes/drill
Compared to competitor's drill A, MagicDrill DRC type has reduced burr and reduced more than 10% of the power required. Tool life has also improved greatly. (Evaluation by the user)	

42CrMo4 (SCM440)	
<ul style="list-style-type: none"> • Housing • Vc=83m/min (n=2,400min⁻¹) • H=32mm • f=0.24mm/rev (Vf=576mm/min) • Wet (Internal Coolant) • DC1100M-SC (PR0315) 	
SS12-DRC110M-3	2,400holes/insert
Competitor B	2,000holes/drill
Compared to competitor's solid drill B, MagicDrill DRC type 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. (Evaluation by the user)	

DRX enables stable and efficient drilling

New Technology: Twisted Coolant Holes

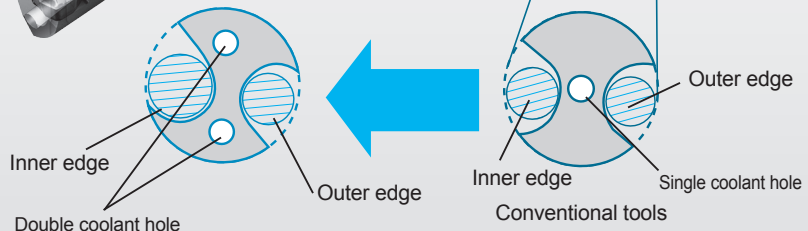
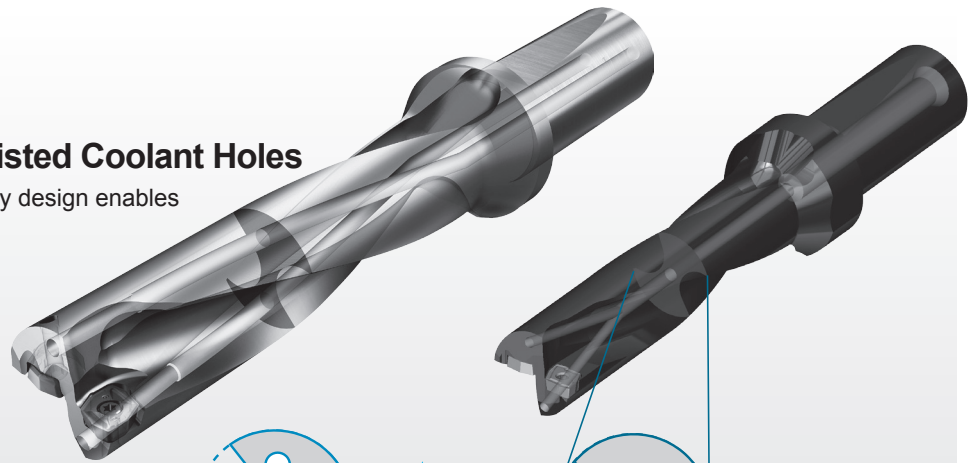
Twisted Coolant Hole technology design enables



Superior Chip Evacuation

Better chip evacuation through the flute space of the internal cutting edge

1.25 times higher cooling performance



The special alloy enables toolholder stability and increased reliability.

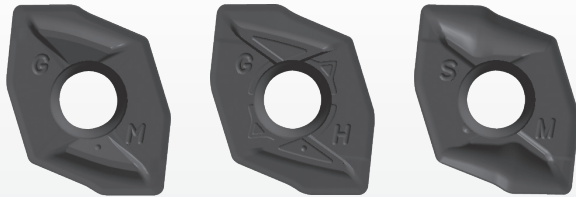
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Drilling

Chipbreaker design with new concept: The three chipbreakers are now coming

Covers a variety of workpiece materials

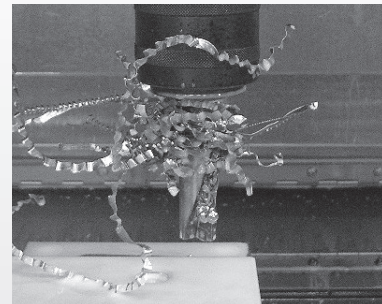


GM Chipbreaker
Carbon Steel, Cast Iron
General Purpose

GH Chipbreaker
for hard materials
Edge strengthened
type

SM Chipbreaker
Stainless Steel, Low
Carbon Steel Sharp
cutting for deeper drilling

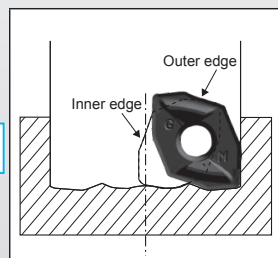
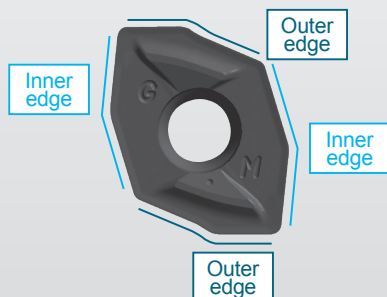
The problem of sticky chip trouble when machining stainless steel or low carbon steel workpieces is solved.



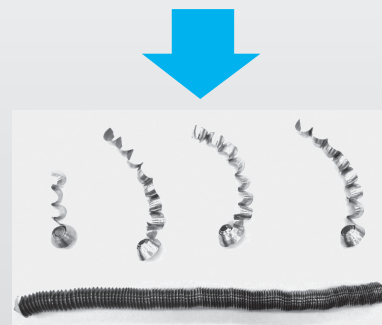
Long entangled chips (competitor A)

Economical 4 edged type

2 inner pocket cutting edges and 2 outer pocket cutting edges

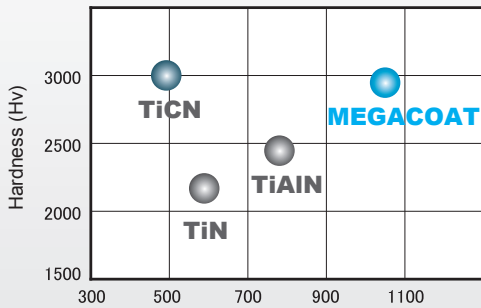


positioning of outer edge and inner edge



Chips by SM chipbreaker (SUS304)

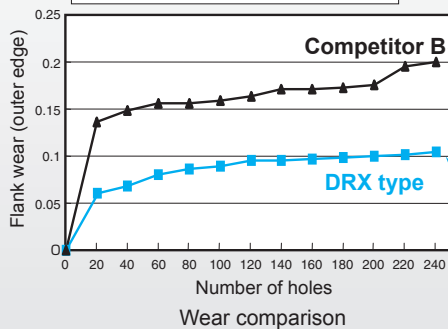
Three Insert Grades: (PR1230: for Steel, PR1225: for Stainless Steel / Low Carbon Steel, PR1210: for Cast Iron)



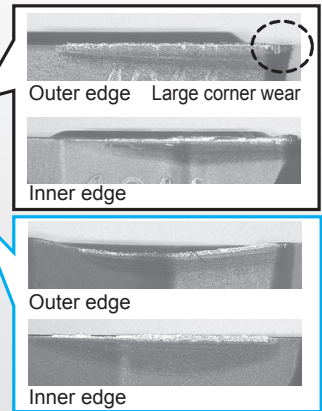
MEGACOAT's High oxidation resistance

MEGACOAT
is used to enable longer
Tool Life

Vc=150 m/min, f=0.1 mm/rev.,
Dc=ø20, H=35 mm, WET,
X5CrNi18 10 (SUS304): ZXMT06T204SM (PR1225)

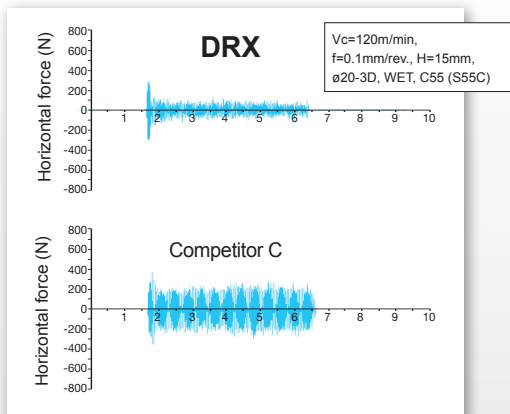


Better wear resistance than competitor B
Achieving long Tool Life



High Precision: Balanced System

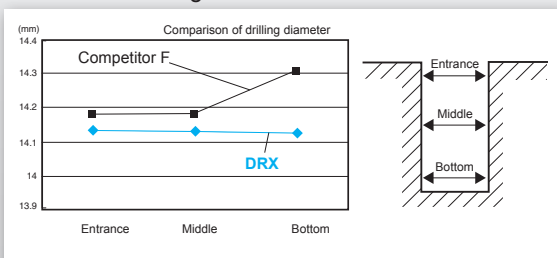
Vibration comparison



Less vibration due to good balance during Drilling

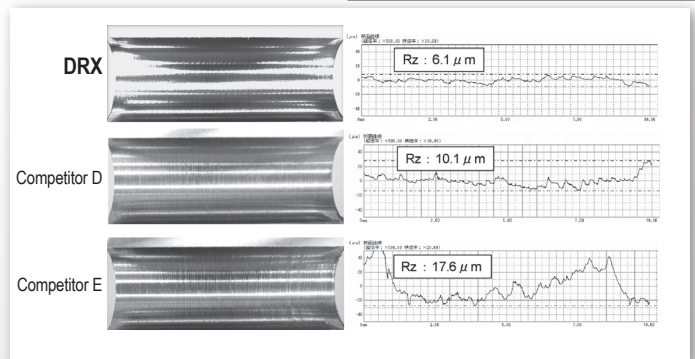
Better finishing surface

Variation of drilling diameter



Finished surface comparison

Vc=180m/min, f=0.15mm/rev., H=60mm (through hole), ø20-3D, WET, C45 (S45C), NC Lathe



Better finished surface than Competitor D and E

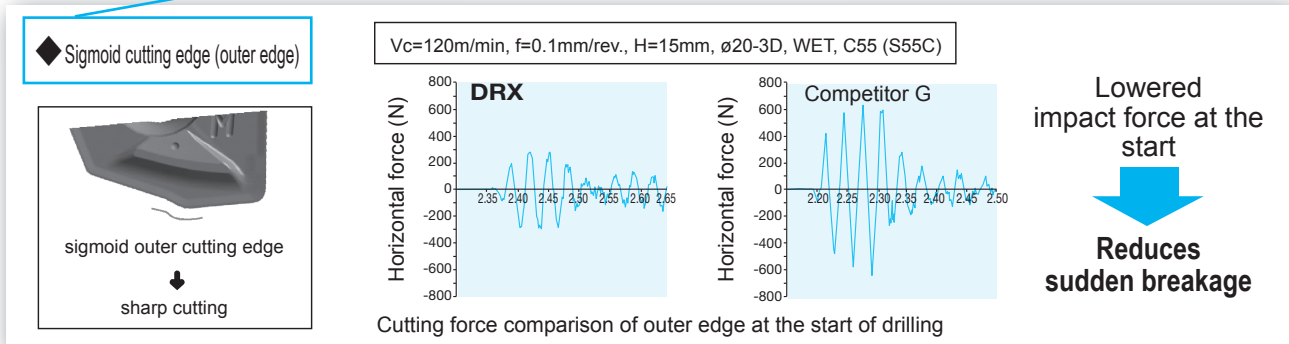
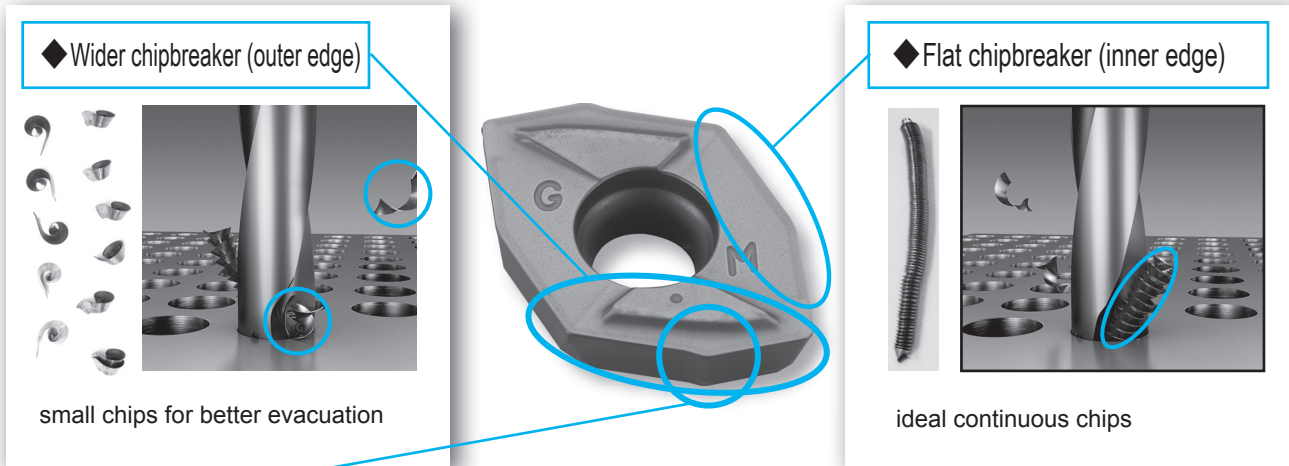
Possible to extend tool life of next process

Vc=180m/min, f=0.08mm/rev., H=56mm (blind hole), ø14-4D, WET, C50

Compared to competitor F, its excellent chip evacuation performance provides a maintained good balance and less variation in cutting dia. Drastically improved straight machining capability

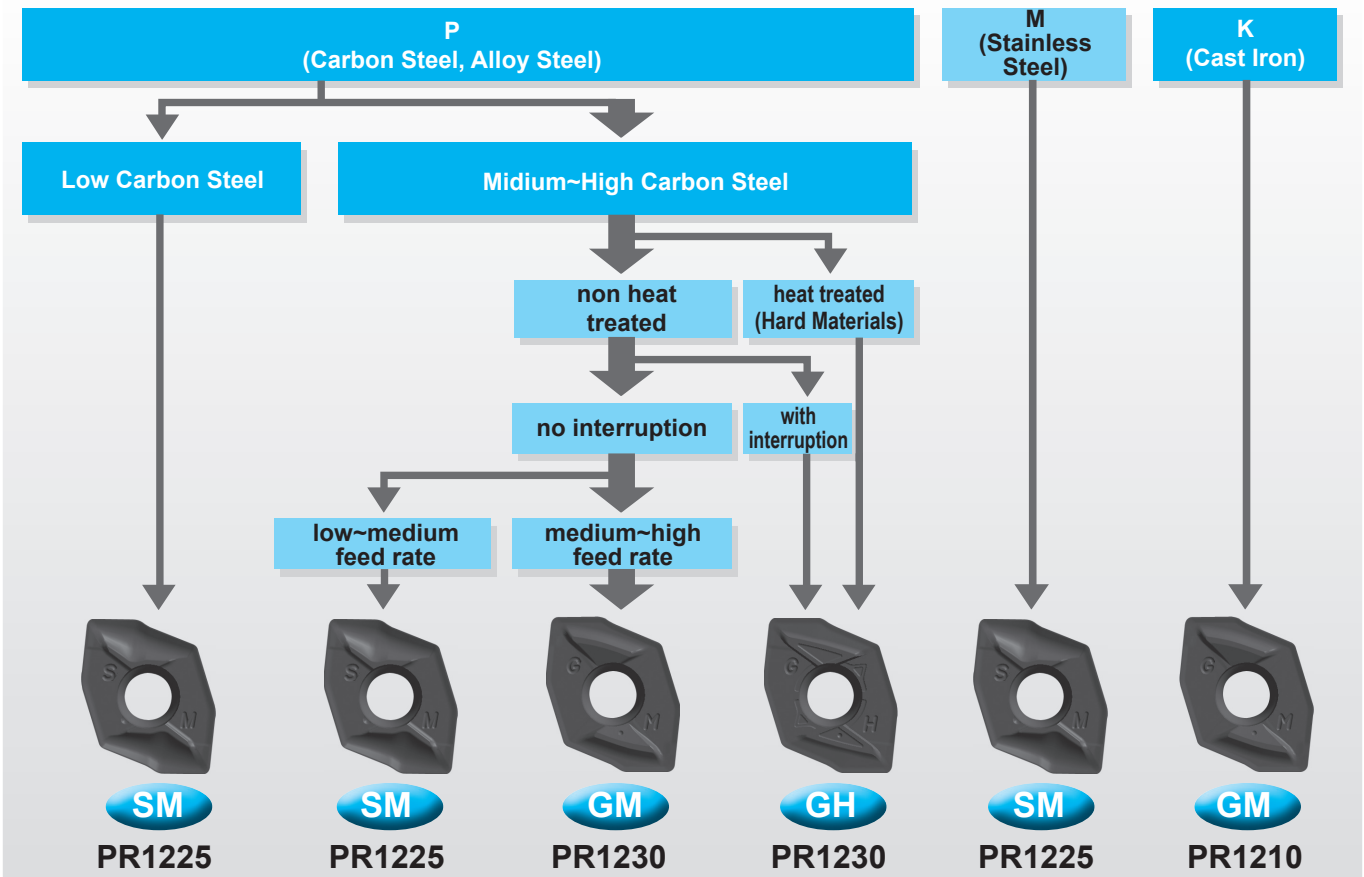
Covers a variety of workpiece materials with new chipbreaker

New chipbreaker features



K
Drilling

Chipbreaker selection



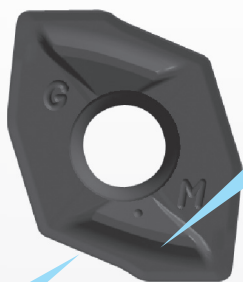
design developed through comprehensive technology

● 3 chipbreakers to cover various materials

◆ GM Chipbreaker...General Cutting

For Steel: PR1230

For Cast Iron: PR1210



① Wider chipbreaker can cover variety of materials

② Good balance of cutting edge strength and sharp cutting

for general cutting



Optimized cutting edge strength, sharpness and chip control

◆ GH Chipbreaker...Tough Edge



1st recommended chipbreaker for hard materials interrupted operation

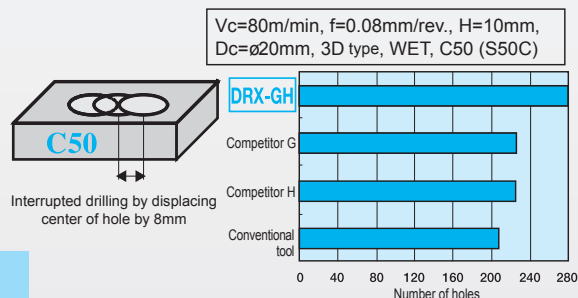
Cutting edge strength oriented design of Chipbreaker

② Cutting edge strength oriented design

① Wider chipbreaker control breakage by pressed chips

For hard materials, interrupted machining: PR1230

• Chipping resistance comparison



Better chipping resistance than competitors

◆ SM Chipbreaker...Sharp Cutting, for Deeper Drilling

For Stainless Steel, Low Carbon Steel: PR1225



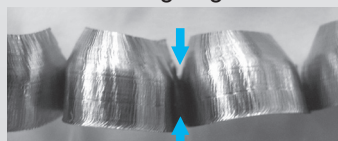
For deep drilling of difficult to control chip materials such as stainless steel and low carbon steel

Sharp cutting with large rake angle
Stable chip control owing to newly designed chipbreaker and U-shaped cutting edge

② Sharp cutting by large rake angle

① U-shaped cutting edge
Breaks chips by creating cracks from both ends

Outstanding chip control achieved by splitting chips from the leading edges



Chip breaking system of SM chipbreaker (Outer edge)



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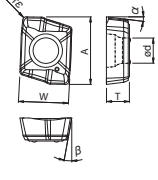

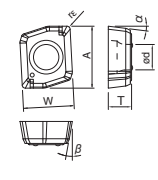

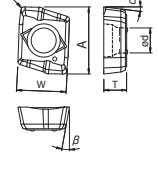

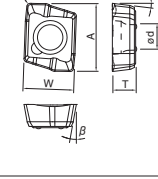





Drilling

MagicDrill® DRX

Applicable Inserts (for DRX)

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

Insert	Description	Dimension (mm)					Angle (°)		MEGACOAT			Carbide	Ref. Page for Toolholder
		A	T	ød	W	rε	α	β	PR1230	PR1225	PR1210	GW15	
 For outer edge	 ZXMT 030203GM-E	6.5	2.30	2.4	4.8	0.3	7°	10°	●		●		K26 K28 K30 K32
 For inner edge	 ZXMT 030203GM-I	5.9	2.30	2.4	4.8	0.3	7°	10°	●	●	●	●	
 For outer edge	 ZXMT 030203GH-E	6.5	2.30	2.4	4.8	0.3	7°	10°	●				
 For outer edge	 ZXMT 030203SM-E	6.5	2.30	2.4	4.8	0.3	7°	10°		●		●	
	ZXMT 040203GM	6.2	2.60	2.4	5.1	0.3	13°	7°	10°	●		●	K26 K27 K28 K29 K30 K31 K32
	05T203GM	7.3	2.74	2.5	5.5	0.3			●		●		
	06T204GM	8.6	2.89	2.8	6.4	0.4			●		●		
	070305GM	10.2	3.24	3.0	8.0	0.5			●		●		
	09T306GM	12.2	4.03	3.6	9.6	0.6			●		●		
	11T306GM	14.5	4.06	4.6	11.6	0.6			●		●		
	140408GM	18.0	4.88	5.7	14.4	0.8			●		●		
	170608GM	22.1	6.58	6.8	17.7	0.8			●		●		
	ZXMT 040203GH	6.2	2.60	2.4	5.1	0.3	13°	7°	10°	●			K26 K27 K28 K29 K30 K31 K32
	05T203GH	7.3	2.74	2.5	5.5	0.3			●				
	06T204GH	8.6	2.89	2.8	6.4	0.4			●				
	070305GH	10.2	3.24	3.0	8.0	0.5			●				
	09T306GH	12.2	4.03	3.6	9.6	0.6			●				
	11T306GH	14.5	4.06	4.6	11.6	0.6			●				
	140408GH	18.0	4.88	5.7	14.4	0.8			●				
	170608GH	22.1	6.58	6.8	17.7	0.8			●				
	ZXMT 040203SM	6.2	2.60	2.4	5.1	0.3	13°	7°	10°		●	●	K26 K27 K28 K29 K30 K31 K32
	05T203SM	7.3	2.74	2.5	5.5	0.3				●		●	
	06T204SM	8.6	2.89	2.8	6.4	0.4				●		●	
	070305SM	10.2	3.24	3.0	8.0	0.5				●		●	
	09T306SM	12.2	4.03	3.6	9.6	0.6				●		●	
	11T306SM	14.5	4.06	4.6	11.6	0.6				●		●	
	140408SM	18.0	4.88	5.7	14.4	0.8				●		●	
	170608SM	22.1	6.58	6.8	17.7	0.8				●		●	

● : Std. Item □ : Check Availability

Suitable Chipbreaker (ZXMT)

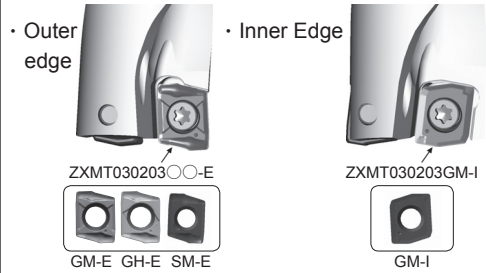
Workpiece Material	Insert	ZXMT type											
	Chipbreaker	GM				GH				SM			
	Cutting Depth	2D	3D	4D	5D	2D	3D	4D	5D	2D	3D	4D	5D
Low-carbon Steel		☆	☆	☆	☆					★	★	★	★
Carbon Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Alloy Steel		★	★	★	☆	☆	☆	☆	☆	☆	☆	☆	★
Mold Steel		☆	☆	☆	☆	★	★	★	★				
Stainless Steel										★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

★ : 1st Recommendation ☆ : 2nd Recommendation

How to select ZXMT03

ZXMT03 type (Cutting Dia : $\phi 12 \sim \phi 13$)

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



Advantages of the Chipbreaker

Chipbreaker			GM	GH	SM
Insert					
Advantages			1st. recommendation for carbon steel and alloy steel, 1st. recommendation for cast iron. Good balance of sharp cutting and cutting edge strength	1st. recommendation for interrupted machining and hard materials. Cutting edge strength oriented design. Middle to high feed rates of steel machining, GM Chipbreaker alternative	Suitable for sticky materials such as stainless steel and low carbon steel Sharp cutting, prevents chattering. For low to medium feed rates of steel.
Outer edge	 Wide chipbreaker	Cross-section			
		Chips from Outer edge			
Inner edge	 Flat chipbreaker	Cross-section			
		Chips from Inner edge			
Workpiece Materials			C50 (S50C)	C50 (S50C)	X5CrNi18 10 (SUS304)

Indication for tool life of MagicDrill

How to judge tool life	Indication for judging tool life
Judgment of tool condition and insert wear	<ul style="list-style-type: none"> When an insert is new the holder is slightly bent to the side during cutting (therefore, the cutting diameter is slightly bigger during cutting). Once cutting is finished, the holder will return back to normal size. No tool marks will appear on the finished surface (although this depends on workpiece and cutting condition: during external machining slight tool marks might appear). When an insert is at the end of its tool life, Gradually the external corner part gets worn out, the holder does not bend slightly outwards - it starts to bend inwards. After the cutting is finished, the holder returns to the normal position. When taking off a holder under this condition the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking cutting diameter	When cutting diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause.
Checking the surface on the exit side	If insert wear progresses the burrs of penetrated hole entrances become bigger. This is a clear indication that the tool must be exchanged.
Variation of cutting noise	Light cutting 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 cutting noise changes. However, when machining smaller diameters these factors are difficult to detect.

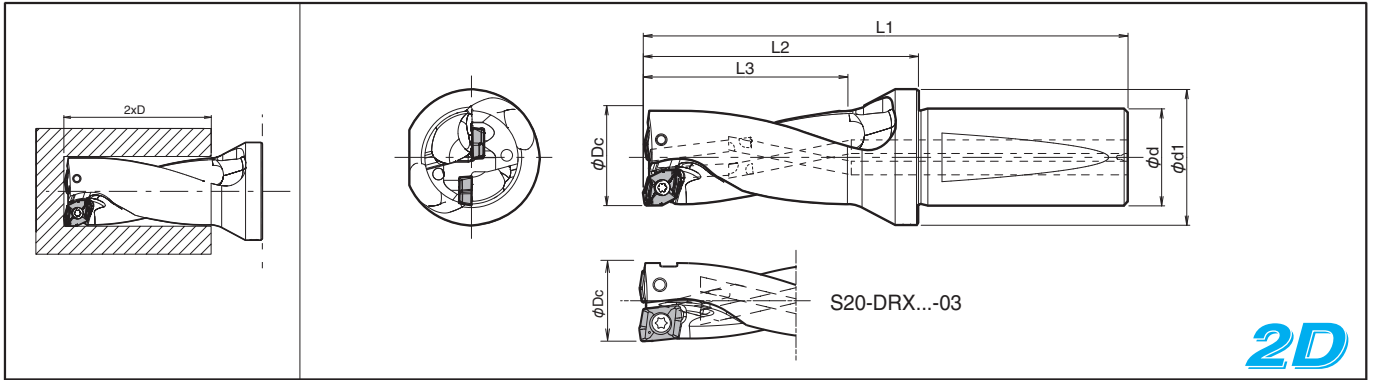
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Drilling

MagicDrill® DRX

DRX (Cutting Depth:2×D)



● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K24							
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench								
S20 -DRX120M-2-03	●	2	12	88	45	24	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203 ○○-E Inner Edge ZXMT030203GM-I							
-DRX125M-2-03	●		12.5	89	46	25							+0.4						
-DRX130M-2-03	●		13	90	47	26								+0.3					
-DRX135M-2-04	●	2	13.5	91	48	27	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203 ○○							
-DRX140M-2-04	●		14	92	49	28							+0.4						
-DRX145M-2-04	●		14.5	93	50	29								+0.3					
-DRX150M-2-04	●		15	94	51	30							+0.2						
S25 -DRX155M-2-05	●	2	15.5	109	55	31	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203 ○○							
-DRX160M-2-05	●		16	110	56	32							+0.7						
-DRX165M-2-05	●		16.5	111	57	33								+0.5					
-DRX170M-2-05	●		17	112	58	34							+0.4						
-DRX175M-2-05	●		17.5	113	59	35								+0.3					
-DRX180M-2-05	●		18	114	60	36							+0.2						
-DRX185M-2-06	●	2	18.5	112	58	37	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204 ○○							
-DRX190M-2-06	●		19	113	59	38							+0.8						
-DRX195M-2-06	●		19.5	114	60	39								+0.7					
-DRX200M-2-06	●		20	115	61	40							+0.5						
-DRX205M-2-06	●		20.5	116	62	41								+0.4					
-DRX210M-2-06	●		21	117	63	42							+0.3						
-DRX215M-2-06	●		21.5	118	64	43								+0.2					
-DRX220M-2-07	●		22	119	65	44							25		35	+1.2	SB-2570TR	DTM-8	ZXMT070305 ○○
-DRX225M-2-07	●		22.5	120	66	45								+1.0					
-DRX230M-2-07	●		23	121	67	46													
-DRX235M-2-07	●	23.5	122	68	47	+0.8													
-DRX240M-2-07	●	24	123	69	48		+0.7												
-DRX245M-2-07	●	24.5	124	70	49	+0.5													
-DRX250M-2-07	●	25	125	71	50		+0.4												
-DRX255M-2-07	●	25.5	126	72	51	+0.3													
-DRX260M-2-07	●	26	127	73	52		+0.2												
S32 -DRX270M-2-09	●	2	27	136	77	54	32	42	+1.6	SB-3080TR	DTM-10	ZXMT09T306 ○○							
-DRX280M-2-09	●		28	138	79	56							+1.3						
-DRX290M-2-09	●		29	140	81	58								+1.1					
-DRX300M-2-09	●		30	142	83	60							+0.8						
-DRX310M-2-09	●		31	144	85	62								+0.6					


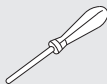
· When offset machining, reduce feed rate to 0.08mm/rev. or less.
· See K33 for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ● K34

For trouble shooting, see page ● K33

● : Std. Item □ : Check Availability

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K24
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
												
S40 -DRX320M-2-11	●	2	32	169	100	64	40	55	+2.2	SB-4085TR	DTM-15	ZXMT11T306○○
-DRX330M-2-11	●		33	171	102	66			+1.9			
-DRX340M-2-11	●		34	173	104	68			+1.7			
-DRX350M-2-11	●		35	175	106	70			+1.4			
-DRX360M-2-11	●		36	177	108	72			+1.2			
-DRX370M-2-11	●		37	179	110	74			+0.9			
-DRX380M-2-11	●	38	181	112	76	+0.7	40	55	SB-5090TR	DT-20	ZXMT140408○○	
-DRX390M-2-14	●	39	179	110	78	+2.8						
-DRX400M-2-14	●	40	181	112	80	+2.5						
-DRX410M-2-14	●	41	183	114	82	+2.3						
-DRX420M-2-14	●	42	185	116	84	+2.0						
-DRX430M-2-14	●	43	187	118	86	+1.8						
-DRX440M-2-14	●	44	189	120	88	+1.5						
-DRX450M-2-14	●	45	191	122	90	+1.3						
-DRX460M-2-14	●	46	193	124	92	+1.0						
-DRX470M-2-14	●	47	195	126	94	+0.8						
-DRX480M-2-17	●	2	48	194	125	96	40	60	+3.8	SB-60120TR	DT-25	ZXMT170608○○
-DRX490M-2-17	●		49	196	127	98			+3.5			
-DRX500M-2-17	●		50	198	129	100			+3.3			
-DRX510M-2-17	●		51	200	131	102			+3.0			
-DRX520M-2-17	●		52	202	133	104			+2.8			
-DRX530M-2-17	●		53	204	135	106			+2.5			
-DRX540M-2-17	●		54	206	137	108			+2.3			
-DRX550M-2-17	●		55	208	139	110			+2.0			
-DRX560M-2-17	●		56	210	141	112			+1.8			
-DRX570M-2-17	●		57	212	143	114			+1.5			
-DRX580M-2-17	●	58	214	145	116	+1.3						
-DRX590M-2-17	●	59	216	147	118	+1.0						
-DRX600M-2-17	●	60	218	149	120	+0.8						

- When offset machining, reduce feed rate to 0.08mm/rev. or less.
- See K33 for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ● K34

For trouble shooting, see page ● K33

• Cutting Tolerance (2D type)

Dc	Cutting 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 / clamp status / cutting conditions.

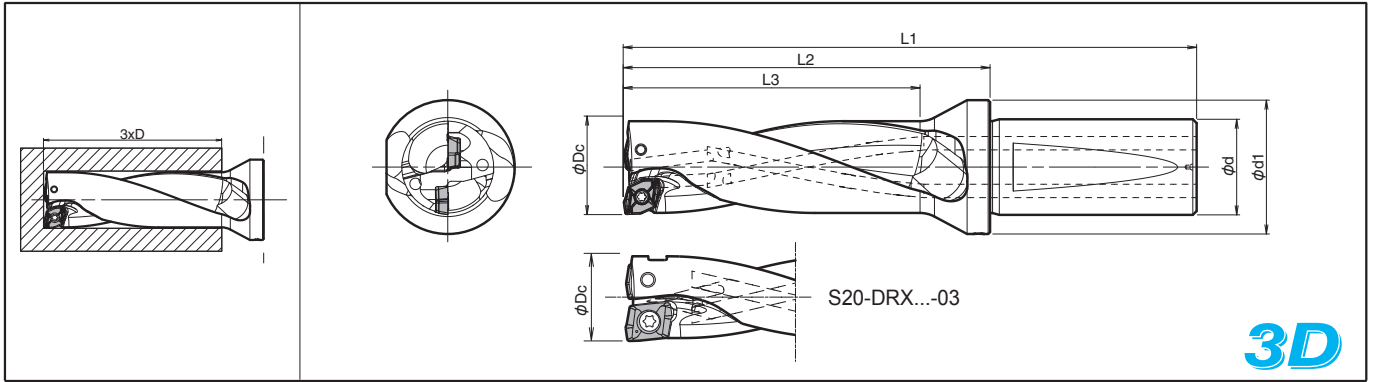
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Drilling

MagicDrill® DRX

DRX (Cutting Depth:3×D)



● Toolholder Dimensions


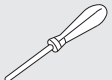
Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K24
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
S20 -DRX120M-3-03 -DRX125M-3-03 -DRX130M-3-03 -DRX135M-3-04 -DRX140M-3-04 -DRX145M-3-04 -DRX150M-3-04	●	2	12	100	57	36	20	27	+0.5 +0.4 +0.3	SB-2042TRG	DTM-6	Outer edge ZXMT030203 ○○-E Inner Edge ZXMT030203GM-I
	●		12.5	102	59	37.5						
	●	13	103	60	39	20	27	+0.5 +0.4 +0.3 +0.2	SB-2042TRG	DTM-6	ZXMT040203 ○○	
	●	13.5	105	62	40.5							
	●	14	106	63	42	25	32	+0.8 +0.7 +0.5 +0.4 +0.3 +0.2	SB-2045TR	DTM-6	ZXMT05T203 ○○	
	●	14.5	108	65	43.5							
●	15	109	66	45	25	32	+0.9 +0.8 +0.7 +0.5 +0.4 +0.3 +0.2	SB-2250TR	DTM-7	ZXMT06T204 ○○		
●	15.5	124	70	46.5								
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	+0.5 +0.4 +0.3 +0.2	SB-2045TR	DTM-6	ZXMT05T203 ○○
	●		16	126	71	48						
	●	16.5	127	73	49.5	25	32	+1.2 +1.0 +0.9 +0.8 +0.7 +0.5 +0.4 +0.3 +0.2	SB-2570TR	DTM-8	ZXMT070305 ○○	
	●	17	129	74	51							
	●	17.5	130	76	52.5	32	42	+1.7 +1.6 +1.5 +1.3 +1.2 +1.1 +1.1 +0.8 +0.7 +0.6 +0.5	SB-3080TR	DTM-10	ZXMT09T306 ○○	
	●	18	132	77	54							
	●	18.5	131	77	55.5	32	45	+2.2 +1.9 +1.7 +1.4 +1.2 +0.9 +0.7	SB-4085TR	DTM-15	ZXMT11T306 ○○	
	●	19	132	78	57							
	●	19.5	134	80	58.5	40	55	+0.6 +0.5				
	●	20	135	81	60							
	●	20.5	137	83	61.5	42	45	+0.7 +0.6 +0.5				
	●	21	138	84	63							
	●	21.5	140	86	64.5	42	45	+0.6 +0.5				
	●	22	141	86	66							
●	22.5	142	88	67.5	42	45	+0.6 +0.5					
●	23	144	89	69								
●	23.5	145	91	70.5	42	45	+0.6 +0.5					
●	24	147	92	72								
●	24.5	148	94	73.5	42	45	+0.6 +0.5					
●	25	150	95	75								
●	25.5	151	97	76.5	42	45	+0.6 +0.5					
●	26	153	98	78								
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	42	+1.7 +1.6 +1.5 +1.3 +1.2 +1.1 +1.1 +0.8 +0.7 +0.6 +0.5	SB-3080TR	DTM-10	ZXMT09T306 ○○
	●		27	163	103	81						
	●	27.5	164	105	82.5	42	45	+0.6 +0.5				
	●	28	166	106	84							
	●	28.5	167	108	85.5	42	45	+0.6 +0.5				
	●	29	169	109	87							
	●	29.5	170	111	88.5	42	45	+0.6 +0.5				
	●	30	172	112	90							
	●	30.5	173	114	91.5	42	45	+0.6 +0.5				
●	31	175	115	93								
●	31.5	176	117	94.5	42	45	+0.6 +0.5					
●	32	177	117	94.5								
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	55	+2.2 +1.9 +1.7 +1.4 +1.2 +0.9 +0.7	SB-4085TR	DTM-15	ZXMT11T306 ○○
	●		33	204	135	99						
	●	34	207	138	102	40	55	+0.6 +0.5				
	●	35	210	141	105							
	●	36	213	144	108	40	55	+0.6 +0.5				
	●	37	216	147	111							
●	38	219	150	114	40	55	+0.6 +0.5					
●	38	219	150	114								

• When offset machining, reduce feed rate to 0.08mm/rev. or less.
• See K35 for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ● K34
For trouble shooting, see page ● K33

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K24
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
												
S40 -DRX390M-3-14	●	2	39	218	149	117	40	55	+2.8	SB-5090TR	DT-20	ZXMT140408 ○○
-DRX400M-3-14	●		40	221	152	120			+2.5			
-DRX410M-3-14	●		41	224	155	123			+2.3			
-DRX420M-3-14	●		42	227	158	126			+2.0			
-DRX430M-3-14	●		43	230	161	129			+1.8			
-DRX440M-3-14	●		44	233	164	132			+1.5			
-DRX450M-3-14	●		45	236	167	135			+1.3			
-DRX460M-3-14	●		46	239	170	138			+1.0			
-DRX470M-3-14	●		47	242	173	141			+0.8			
-DRX480M-3-17	●	2	48	242	173	144	40	60	+3.8	SB-60120TR	DT-25	ZXMT170608 ○○
-DRX490M-3-17	●		49	245	176	147			+3.5			
-DRX500M-3-17	●		50	248	179	150			+3.3			
-DRX510M-3-17	●		51	251	182	153			+3.0			
-DRX520M-3-17	●		52	254	185	156			+2.8			
-DRX530M-3-17	●		53	257	188	159			+2.5			
-DRX540M-3-17	●		54	260	191	162			+2.3			
-DRX550M-3-17	●		55	263	194	165			+2.0			
-DRX560M-3-17	●		56	266	197	168			+1.8			
-DRX570M-3-17	●		57	269	200	171			+1.5			
-DRX580M-3-17	●		58	272	203	174			+1.3			
-DRX590M-3-17	●		59	275	206	177			+1.0			
-DRX600M-3-17	●	60	278	209	180	+0.8						

- When offset machining, reduce feed rate to 0.08mm/rev. or less.
- See K33 for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ● K34

For trouble shooting, see page ● K33

• Cutting Tolerance (3D type)

Dc	Cutting 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 / clamp status / cutting conditions.

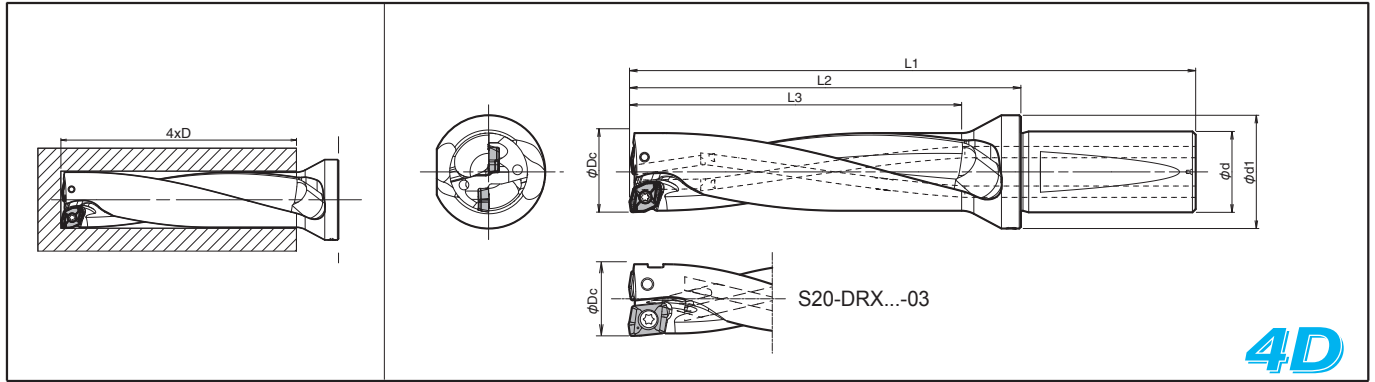
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Drilling


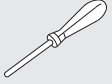
MagicDrill® DRX

DRX (Cutting Depth:4×D)



4D

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ➔ K24								
			øDc	L1	L2	L3	ød	ød1		 Clamp Screw	 Wrench									
S20 -DRX120M-4-03	●	2	12	112	69	48	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203 ○○-E Inner Edge ZXMT030203GM-I								
-DRX125M-4-03	●		12.5	114	71	50							+0.4							
-DRX130M-4-03	●		13	116	73	52							+0.3							
-DRX135M-4-04	●	2	13.5	118	75	54	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203 ○○								
-DRX140M-4-04	●		14	120	77	56							+0.4							
-DRX145M-4-04	●		14.5	122	79	58							+0.3							
-DRX150M-4-04	●		15	124	81	60							+0.2							
S25 -DRX155M-4-05	●	2	15.5	140	86	62	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203 ○○								
-DRX160M-4-05	●		16	142	87	64							+0.7							
-DRX165M-4-05	●		16.5	144	90	66							+0.5							
-DRX170M-4-05	●		17	146	91	68							+0.4							
-DRX175M-4-05	●		17.5	148	94	70							+0.3							
-DRX180M-4-05	●		18	150	95	72							+0.2							
-DRX185M-4-06	●	2	18.5	149	95	74	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204 ○○								
-DRX190M-4-06	●		19	151	97	76							+0.8							
-DRX195M-4-06	●		19.5	153	99	78							+0.7							
-DRX200M-4-06	●		20	155	101	80							+0.5							
-DRX205M-4-06	●		20.5	157	103	82							+0.4							
-DRX210M-4-06	●		21	159	105	84							+0.3							
-DRX215M-4-06	●		21.5	161	107	86							+0.2							
-DRX220M-4-07	●		2	22	163	108							88	25	35	+1.2	SB-2570TR	DTM-8	ZXMT070305 ○○	
-DRX225M-4-07	●			22.5	165	111							90							+1.0
-DRX230M-4-07	●			23	167	112							92							+0.9
-DRX235M-4-07	●	23.5		169	115	94	+0.8													
-DRX240M-4-07	●	24		171	116	96	+0.7													
-DRX245M-4-07	●	24.5		173	119	98	+0.5													
-DRX250M-4-07	●	25		175	120	100	+0.4													
-DRX255M-4-07	●	25.5		177	123	102	+0.3													
-DRX260M-4-07	●	26		179	124	104	+0.2													
S32 -DRX270M-4-09	●	2		27	190	130	108	32	42	+1.6	SB-3080TR	DTM-10	ZXMT09T306 ○○							
-DRX280M-4-09	●		28	194	134	112	+1.3													
-DRX290M-4-09	●		29	198	138	116	+1.1													
-DRX300M-4-09	●		30	202	142	120	+0.8													
-DRX310M-4-09	●		31	206	146	124	+0.6													
S40 -DRX320M-4-11	●	2	32	223	154	128	40	50	+2.2	SB-4085TR	DTM-15	ZXMT11T306 ○○								
-DRX330M-4-11	●		33	227	158	132							+1.9							
-DRX340M-4-11	●		34	231	162	136							+1.7							
-DRX350M-4-11	●		35	235	166	140							+1.4							
-DRX360M-4-11	●		36	239	170	144							+1.2							
-DRX370M-4-11	●		37	243	174	148							+0.9							
-DRX380M-4-11	●		38	247	178	152							+0.7							


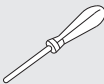
• When offset machining, reduce feed rate to 0.06mm/rev. or less.
• See **K35** for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ➔ **K34**

For trouble shooting, see page ➔ **K33**

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K24
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
												
S40 -DRX390M-4-14	●	2	39	257	188	156	40	55	+2.8	SB-5090TR	DT-20	ZXMT140408 ○○
-DRX400M-4-14	●		40	261	192	160			+2.5			
-DRX410M-4-14	●		41	265	196	164			+2.3			
-DRX420M-4-14	●		42	269	200	168			+2.0			
-DRX430M-4-14	●		43	273	204	172			+1.8			
-DRX440M-4-14	●		44	277	208	176	+1.5					
-DRX450M-4-14	●		45	281	212	180	60	+1.3				
-DRX460M-4-14	●		46	285	216	184	+1.0					
-DRX470M-4-14	●		47	289	220	188	+0.8					
S50 -DRX480M-4-17	●	2	48	290	221	192	50	60	+3.8	SB-60120TR	DT-25	ZXMT170608 ○○
-DRX490M-4-17	●		49	294	225	196			+3.5			
-DRX500M-4-17	●		50	298	229	200			+3.3			
-DRX510M-4-17	●		51	302	233	204			+3.0			
-DRX520M-4-17	●		52	306	237	208			+2.8			
-DRX530M-4-17	●		53	310	241	212			+2.5			
-DRX540M-4-17	●		54	314	245	216	+2.3					
-DRX550M-4-17	●		55	318	249	220	+2.0					
-DRX560M-4-17	●		56	322	253	224	+1.8					
-DRX570M-4-17	●		57	326	257	228	65	+1.5				
-DRX580M-4-17	●		58	330	261	232	+1.3					
-DRX590M-4-17	●		59	334	265	236	+1.0					
-DRX600M-4-17	●	60	338	269	240	+0.8						

- When offset machining, reduce feed rate to 0.08mm/rev. or less.
- See K33 for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page ● K34

For trouble shooting, see page ● K33

• Cutting Tolerance (4D type)

Dc	Cutting 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 / clamp status / cutting conditions.

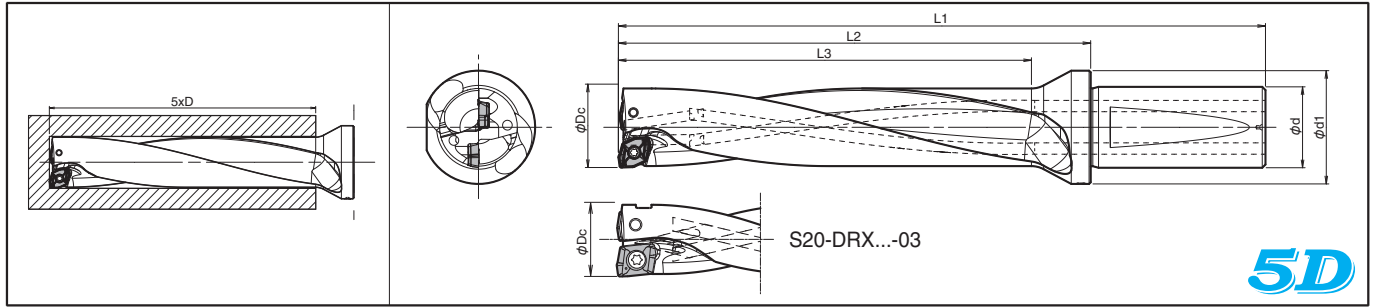
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Drilling

MagicDrill® DRX

DRX (Cutting Depth: 5×D)



Toolholder Dimension

Description	Std.	No. of Insert	Dimensions (mm)						Max. Offset (Radial) (mm)	Spare Parts		Applicable Inserts ● K24
			øDc	L1	L2	L3	ød	ød1		Clamp Screw	Wrench	
S20 -DRX120M-5-03 -DRX130M-5-03 -DRX140M-5-04 -DRX150M-5-04	●	2	12 13 14 15	124 129 134 139	81 86 91 96	60 65 70 75	20 20	27 27	+0.5 +0.3 +0.4 +0.2	SB-2042TRG	DTM-6	Outer edge ZXMT030203○○-E Inner Edge ZXMT030203GM-I
S25 -DRX160M-5-05 -DRX170M-5-05 -DRX180M-5-05 -DRX190M-5-06 -DRX200M-5-06 -DRX210M-5-06 -DRX220M-5-07 -DRX230M-5-07 -DRX240M-5-07 -DRX250M-5-07 -DRX260M-5-07	●	2	16 17 18 19 20 21 22 23 24 25 26	158 163 168 170 175 180 185 190 195 200 205	103 108 113 116 121 126 130 135 140 145 150	80 85 90 95 100 105 110 115 120 125 130	25 25	32 32	+0.7 +0.4 +0.2 +0.8 +0.5 +0.3 +1.2 +0.9 +0.7 +0.4 +0.2	SB-2045TR SB-2250TR SB-2570TR	DTM-6 DTM-7 DTM-8	ZXMT05T203○○ ZXMT06T204○○ ZXMT070305○○
S32 -DRX270M-5-09 -DRX280M-5-09 -DRX290M-5-09 -DRX300M-5-09 -DRX310M-5-09	●	2	27 28 29 30 31	217 222 227 232 237	157 162 167 172 177	135 140 145 150 155	32 32	42 45	+1.6 +1.3 +1.1 +0.8 +0.6	SB-3080TR	DTM-10	ZXMT09T306○○
S40 -DRX320M-5-11 -DRX330M-5-11 -DRX340M-5-11 -DRX350M-5-11 -DRX360M-5-11 -DRX370M-5-11 -DRX380M-5-11 -DRX390M-5-14 -DRX400M-5-14 -DRX410M-5-14 -DRX420M-5-14 -DRX430M-5-14 -DRX440M-5-14 -DRX450M-5-14 -DRX460M-5-14 -DRX470M-5-14	●	2	32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47	255 260 265 270 275 280 285 296 301 306 311 316 321 326 331 336	186 191 196 201 206 211 216 227 232 237 242 247 252 257 262 267	160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235	40 40	50 55 60	+2.2 +1.9 +1.7 +1.4 +1.2 +0.9 +0.7 +2.8 +2.5 +2.3 +2.0 +1.8 +1.5 +1.3 +1.0 +0.8	SB-4085TR SB-5090TR	DTM-15 DT-20	ZXMT11T306○○ ZXMT140408○○
S50 -DRX480M-5-17 -DRX490M-5-17 -DRX500M-5-17 -DRX510M-5-17 -DRX520M-5-17 -DRX530M-5-17 -DRX540M-5-17 -DRX550M-5-17 -DRX560M-5-17 -DRX570M-5-17 -DRX580M-5-17 -DRX590M-5-17 -DRX600M-5-17	●	2	48 49 50 51 52 53 54 55 56 57 58 59 60	338 343 348 353 358 363 368 373 378 383 388 393 398	269 274 279 284 289 294 299 304 309 314 319 324 329	240 245 250 255 260 265 270 275 280 285 290 295 300	50 50	60 65	+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 machining, reduce feed rate to 0.05mm/rev. or less.
• See K35 for Adjustable Sleeve (SHE type).

For recommended cutting conditions, see page **K34**

For trouble shooting, see page **K33**

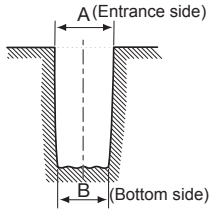
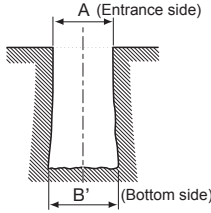
Cutting Tolerance (5D type)

Dc	Cutting Tolerance (mm)	Dc	Cutting Tolerance (mm)	Dc	Cutting Tolerance (mm)
ø12~ø26	+0.30 -0.10	ø27~ø38	+0.35 -0.15	ø39~ø60	+0.40 -0.20

* The values shown in the left are only estimation.
These guideline numbers may be variable depending on machines, workpieces, clamping conditions and cutting conditions.

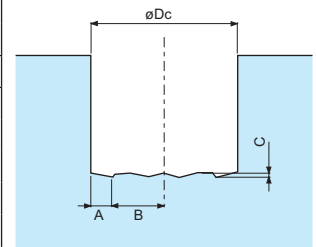
● : Std. Item

Troubleshooting (DRX)

Trouble condition	Condition		Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)		There is no problem for entrance, however gradually hole diameter is getting smaller at the bottom. $A > B$	Chip jam (External or Internal edge chip stuck)	Change the cutting conditions <ul style="list-style-type: none"> • Increase the cutting speed • Lower the feed rate See page K34 for "Recommended Cutting Conditions"
Hole diameter becomes larger (at hole bottom)		There is no problem for entrance, however gradually hole diameter is getting larger at the bottom. $A < B'$	Internal edge chip jam.	Change the cutting conditions <ul style="list-style-type: none"> • Increase the cutting speed • Lower the feed rate See page K34 for "Recommended Cutting Conditions" <ul style="list-style-type: none"> • Check the core height See page K36~K37
Hole diameter is small (from the hole entrance)		Hole diameter is small from entrance. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. See page K36
			No core at internal edge. (No core remains)	Adjust the core height. See page K36~K37

◆ MagicDrill (DRX) Hole Bottom Shape (mm)

øDc	A	B	C	øDc	A	B	C	øDc	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		40.0		14.2		
13.0		4.7		25.5		9.6		41.0		14.7		
13.5	2	4.8	0.5	26.0	3.9	9.8	1.0	42.0	7.1	15.2	1.6	
14.0		5.0		26.5		9.4		43.0		15.7		
14.5		5.3		27.0		9.6		44.0		16.2		
15.0	2	5.5	0.6	27.5	4.7	9.9	1.1	45.0	7.1	16.7	1.7	
15.5		5.8		28.0		10.1		46.0		17.2		
16.0		6.0		28.5		10.4		47.0		17.7		
16.5	2.4	6.3	0.7	29.0	4.7	10.6	1.1	48.0	7.1	16.9	1.8	
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	3.2	7.0	0.7	30.5	4.7	11.4	1.2	51.0	7.1	18.4	1.9	
18.5		6.9		31.0		11.6		52.0		18.9		
19.0		7.1		31.5		11.9		53.0		19.4		
19.5	3.2	7.4	0.8	32.0	4.7	11.3	1.1	54.0	7.1	19.9	2.0	
20.0		7.6		33.0		11.8		55.0		20.4		
20.5		7.9		34.0		12.3		56.0		20.9		
21.0	3.2	8.1	0.8	35.0	4.7	12.8	1.2	57.0	7.1	21.4	2.1	
21.5		8.4		36.0		13.3		58.0		21.9		
22.0		7.8		37.0		13.8		59.0		22.4		
22.5	3.2	8.1	0.8	38.0	4.7	14.3	1.3	60.0	7.1	22.9	2.1	
23.0		8.3		Common for 2×D, 3×D, 4×D, 5×D type * Figures above are nominal sizes (Varies from -0.1mm to +0.1mm depending on work material and cutting conditions)								
23.5		8.6										
24.0	8.8											





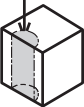




DRX Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grade (Cutting Speed : m/min)				Cutting Dia. ϕ 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			ϕ 12~ ϕ 15	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
					ϕ 15.5~ ϕ 18	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
					ϕ 18.5~ ϕ 26	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
					ϕ 26.5~ ϕ 60	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			ϕ 12~ ϕ 15	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
					ϕ 15.5~ ϕ 18	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	0.05~0.08	
					ϕ 18.5~ ϕ 26	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
					ϕ 26.5~ ϕ 60	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			ϕ 12~ ϕ 15	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
					ϕ 15.5~ ϕ 18	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	0.05~0.08	
					ϕ 18.5~ ϕ 26	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
					ϕ 26.5~ ϕ 60	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
Die Steel	★ 80-150	☆ 80-150			ϕ 12~ ϕ 15	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
					ϕ 15.5~ ϕ 18	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
					ϕ 18.5~ ϕ 26	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
					ϕ 26.5~ ϕ 60	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	☆ 70-140	★ 70-140			ϕ 12~ ϕ 15	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
					ϕ 15.5~ ϕ 18	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
					ϕ 18.5~ ϕ 26	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
					ϕ 26.5~ ϕ 60	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		ϕ 12~ ϕ 15	0.08~0.14	~	~	0.06~0.12	~	~	0.04~0.10	~	~
					ϕ 15.5~ ϕ 18	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
					ϕ 18.5~ ϕ 26	0.08~0.20	~	~	0.08~0.18	~	~	0.06~0.14	~	~
					ϕ 26.5~ ϕ 60	0.08~0.20	~	~	0.08~0.18	~	~	0.06~0.14	~	~
Nodular Cast Iron			★ 80-120		ϕ 12~ ϕ 15	0.08~0.12	~	~	0.06~0.10	~	~	0.04~0.08	~	~
					ϕ 15.5~ ϕ 18	0.08~0.16	~	~	0.08~0.14	~	~	0.06~0.10	~	~
					ϕ 18.5~ ϕ 26	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
					ϕ 26.5~ ϕ 60	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
Non-ferrous Metals			★ 200-600		ϕ 12~ ϕ 15	~	~	0.06~0.12	~	~	0.05~0.10	~	~	0.04~0.08
					ϕ 15.5~ ϕ 18	~	~	0.08~0.14	~	~	0.06~0.12	~	~	0.05~0.10
					ϕ 18.5~ ϕ 26	~	~	0.08~0.16	~	~	0.06~0.14	~	~	0.05~0.12
					ϕ 26.5~ ϕ 60	~	~	0.08~0.20	~	~	0.08~0.16	~	~	0.07~0.14
Titanium Alloys			★ 40-70		ϕ 12~ ϕ 15	~	~	0.05~0.08	~	~	0.04~0.07	~	~	0.04~0.06
					ϕ 15.5~ ϕ 18	~	~	0.05~0.08	~	~	0.04~0.07	~	~	0.04~0.06
					ϕ 18.5~ ϕ 26	~	~	0.06~0.10	~	~	0.06~0.08	~	~	0.05~0.07
					ϕ 26.5~ ϕ 60	~	~	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		Flat Surface	Slanted Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates
Workpiece Shape								
DRX type	Cutting Speed (m/min)	120	120	120	120	120	120	Not Available
	Feed Rate (mm/rev)	0.1	0.05	0.05	0.05	Concave part 0.05	0.05	Not Available
Coolant (internal)		Yes	Yes	Yes	Yes	Continuous part 0.1	Yes	Not Available

* Cutting width (Torus-shaped part) when machining pre-drilled surface

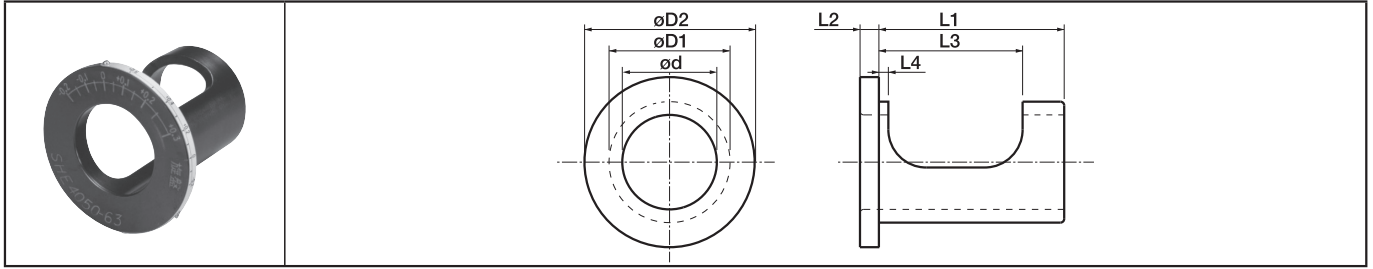
Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	1/10XD or less	less than corner radius	Not Recommended

◆ Max. Depth for Machining with Outer Coolant

When machining with outer coolant, Max. depth should be 1.5 times of the cutting diameter.

Adjustable Sleeve [DRX / DRZ for cutting dia. / center height adjustment]

SHE



Sleeve Dimensions

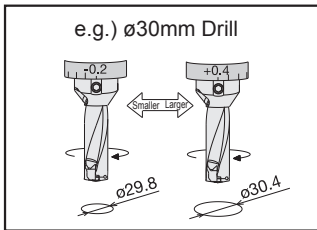
Description	Std.	Dimension (mm)							* Cutting Dia. Adjustable Range	Center Height Adjustable Range
		ϕd	$\phi D1$	$\phi D2$	L1	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	50	74	63	6	49	3.0	+0.6~-0.2	+0.2~-0.2

• Diameter Adjustment Range adjusts the cutting diameter.

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

● : Std. item
□ : Check Availability

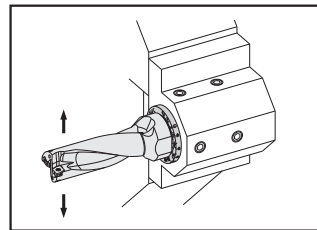
1. Diameter Adjustment ~For Machining Center~



● Diameter Adjustment Range (mm)

Shank Dia.	Adjustment Range
$\phi 20$	+0.4~-0.2
$\phi 25$	
$\phi 32$	
$\phi 40$	+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
$\phi 20$	+0.2~-0.15
$\phi 25$	
$\phi 32$	
$\phi 40$	+0.3~-0.2

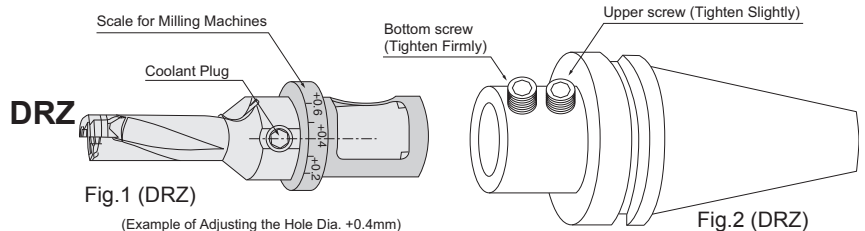
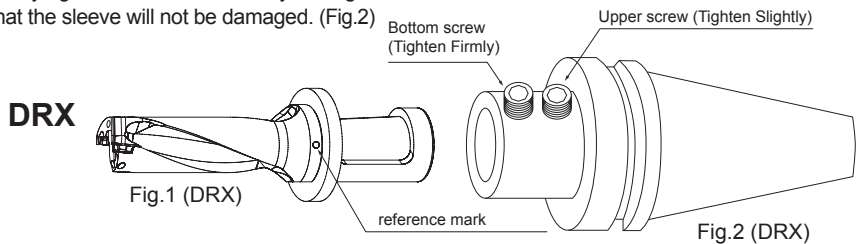
◆ How to use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

- Adjust the scale at the flange periphery of the sleeve to the center of the coolant plug of the drill. (Fig.1)
- When making the hole diameter bigger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.
- When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
- Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window. The upper screw should be tightened slightly so that the sleeve will not be damaged. (Fig.2)

Caution:

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



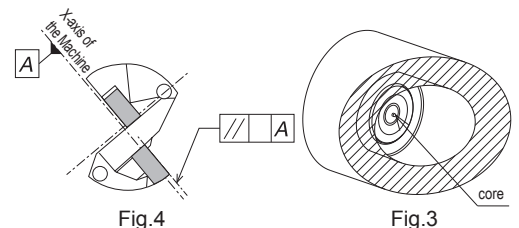
2. Center-Height Adjustment for Lathes

Most Lathe problems 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
- ◆ Core diameter is more than 1mm

- Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig.4)
- Align the scale (for the lathe) on the flange face of the sleeve to the center of the drill coolant plug.
- When no core remains, rotate the sleeve to (+) direction to make the core larger, and when the core diameter is more than 1mm, rotate the sleeve to (-) direction to make the core smaller.
- When rotating the sleeve, insert the wrench supplied with the drill into the hole of the flange and then rotate the sleeve.
- After Completing the adjustment, tighten the drill directly through the window on the sleeve.

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.



K
Drilling

Lathe Installation

- ① The top face of the outer insert should be parallel to the X-axis to allow for offset cutting.
- 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)

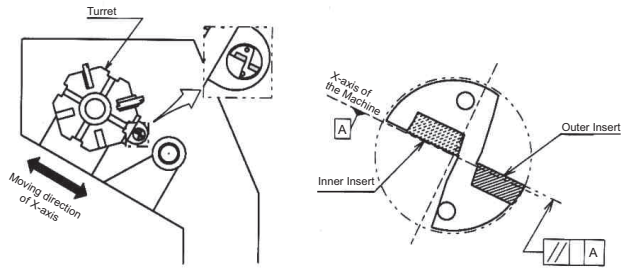


Fig.1 Installed to the Lathe

Cutting Diameter Adjustment

1. Cutting Diameter Adjustment

- ① The moving direction of the X-axis movement 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 Cutting Diameter

For the maximum limit of the cutting diameter, refer to "Max. Offset (Radial)" in the Toolholder Dimension 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.

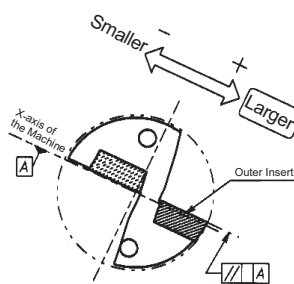


Fig.2 Outer insert Facing Up

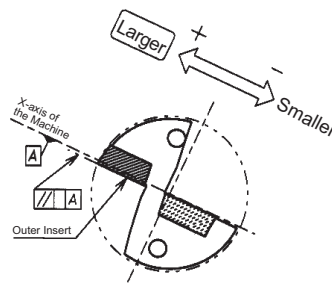


Fig.3 Outer insert Facing Down

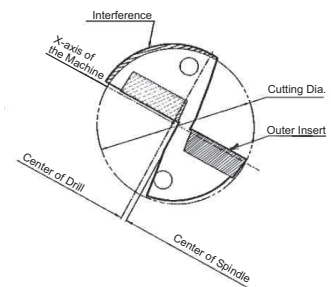


Fig.4 Excessive offset (For Smaller Hole Diameter)

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

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

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

* To test the Center Height, drill a shallow hole about 10mm in depth at low feed rate, less than 0.1mm/rev.

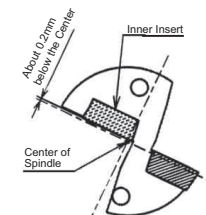


Fig.5 Front View of the Drill

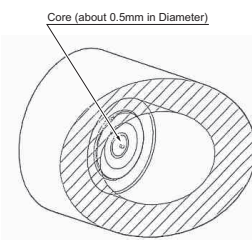


Fig.6 Center Core

3. Center Height Adjustment

a) No core remains / Core with Excessively Small Diameter

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

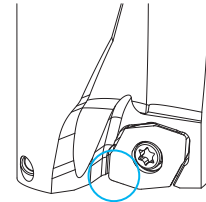


Fig.7 Insert breakage near the center of the drill

[How to Adjust]

- ① Install the drill rotated 180°. Most problems will be solved by this method. (Fig.8)
- 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 cutting diameter)
Caution: In case of installing the drill in the reverse direction (outer insert is positioned above), the cutting 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.

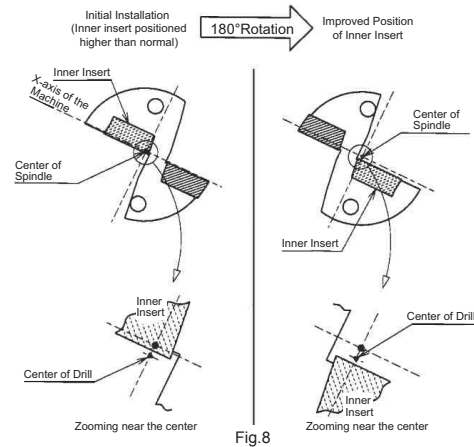


Fig.8

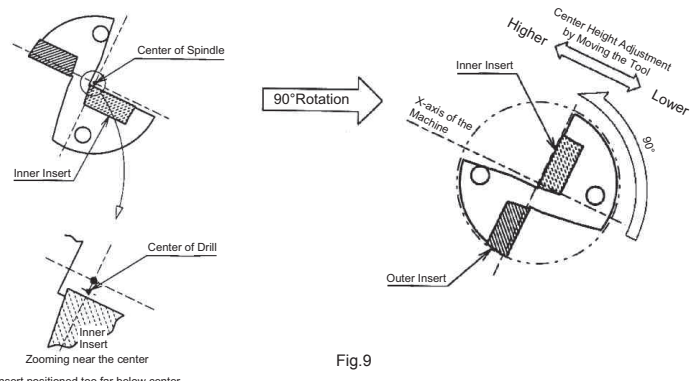


Fig.9

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 cutting diameter)
Caution: When installing the drill in the opposite direction (outer insert is positioned lower), the cutting 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.

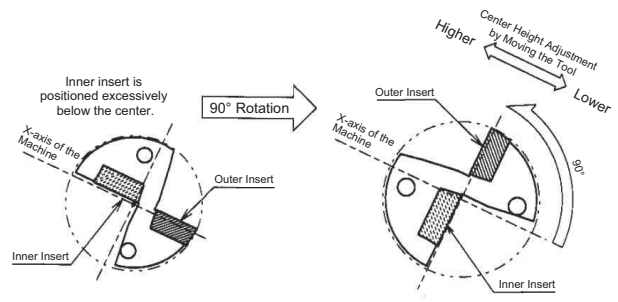


Fig.10

Case Studies

X40CrMoV51 (SKD62 (45HRC))	
<ul style="list-style-type: none"> Vc=60 m/min f=0.05 mm/rev H=50 mm (through hole) Wet (Internal Coolant) ZXMT070305GH (PR1230) S25-DRX250M-4-07 	
MagicDrill DRX	6 holes/edge
Competitor J	4 holes/edge (breakage)
<p>Results</p> <ul style="list-style-type: none"> MagicDrill DRX has 1.5 times longer life than Competitor J Breakage is confirmed after machining 4 holes for Competitor J Interrupted machining is still possible after cutting 6 holes with MagicDrill DRX Finishing is not necessary because MagicDrill DRX provides a good finished surface (Evaluation by the user) 	

X10CrNiS18 9 (SUS303)	
<ul style="list-style-type: none"> Vc=75 m/min f=0.1 mm/rev H=10 mm (through hole) Wet (Internal Coolant) ZXMT06T204SM (PR1225) S25-DRX200M-3-06 	
MagicDrill DRX	1300 holes/edge
Competitor K	500 holes/edge
<p>Results</p> <ul style="list-style-type: none"> MagicDrill DRX had no sudden breakage that occurred for Competitor K and achieved stable machining with 2.6 times longer tool life. 	

SCM420HV (Cold Forging)	
<ul style="list-style-type: none"> Vc=118 m/min f=0.08 mm/rev (0.05 at the beginning) H=30 mm (through hole) Wet (Internal Coolant) ZXMT070305SM (PR1225) S25-DRX250M-3-07 	
	<p>Cutting edge of DRX (after 400 holes)</p>
	<p>Cutting edge of competitors (after 400 holes)</p>
MagicDrill DRX	Less adhesion, continue to use even after 400 holes
Competitor L	Large adhesion (after 400 holes)
<p>Results</p> <ul style="list-style-type: none"> MagicDrill DRX had a good chip control and low adhesion for machining of the same number comparing to Competitor L. 	

55NiCrMoV6 (SKT4 (42HRC))	
<ul style="list-style-type: none"> Vc=100 m/min f=0.07~0.08 mm/rev H=101 mm (through hole) Wet (External Coolant) ZXMT070305GM (PR1230) S25-DRX250M-4-07 	
	Mold component $\phi 25 \times 101$ mm (through hole) 24 locations
MagicDrill DRX	Machining time : 28 min./pc
Conventional tool M	Machining time: 58 min./pc
<p>Results</p> <ul style="list-style-type: none"> For deep hole machining (4xD), MagicDrill DRX had no chip stuck and enabled machining without step feeding (machining time was reduced in half) despite use of external coolant MagicDrill DRX has improved 3 times longer tool life than Conventional tool M 	

K

Drilling

Applicable Inserts for DRS / DRZ

Applicable Inserts (for DRS / DRZ)

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

Shape	Description	Dimension (mm)					Angle (°)	MEGA COAT			PVD Coated Carbide					Ref. Page for Toolholder				
		A	T	ød	W	ℓ		α	PR1230	PR1225	PR1210	PR660	PR830	PR915	PR1025		PR930	PR905	KW10	
	DS	100	8.8	3.5	-	9.0	0.2	-	●	○	○	○								
	105	9.3	3.7	9.7		●			○	○	○									
	110	9.8	3.9	10.0		●			○	○	○									
	115	10.2	4.1	10.3		●			○	○	○									
	120	10.8	4.3	10.9	0.25	●	○	○	○											
	ZCMT	050203	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	●	●	●	●	●	●	●		
	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	●		●	●	●	●	●	●	●	●	●	●		
<p>For Sharp Cutting / Deep drilling</p>	ZCMT	050203SP	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	●	●	●	●	●	●			
	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	●		●	●	●	●	●	●	●	●	●			
<p>For Stainless Steel</p>	ZCMT	050203SU	5.9	2.38	2.3	5.0	0.3	7°	●	●	●	●	●	●	●	●	●			
	06T204SU	7.0	2.80	2.5	6.0	0.4	●		●	●	●	●	●	●	●	●	●			

- * Features of SP Chipbreaker...1. Less cutting resistance due to 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 (ℓ) than standard chipbreaker type and can reduce burrs.

Suitable Chipbreaker (ZCMT)

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

- Standard chipbreakers (without symbol) may function better with interrupted cutting.
- When machining aluminum, chips become long and difficult to be discharged at the depth over 2D.
- 5D type is the same as 4D type.

★ : 1st. Recommendation ☆ : 2nd. Recommendation

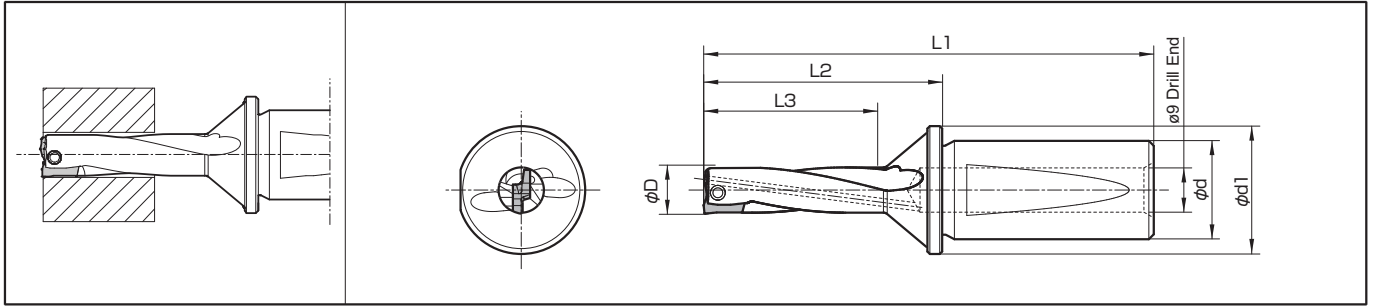
● : Std. Item □ : Check Availability

Inserts are sold in 10 piece boxes



Drilling

DRS



Toolholder Dimensions

Description	Std.	Number of Flutes	Dimension (mm)					Radial Direction Offset Applicable Range (mm)	Spare Parts			Applicable Insert ● K39		
			øD	L1	L2	L3	ød		ød1	Clamp Screw	Wrench		Wrench	
S20-DRS10035	●	1	10.0	92	49	35.0	20	26	+0.2	SB-2080TR	FT-6	-	DS100	
-DRS10336	●	1	10.3	92	49	36.0			+0.1					
-DRS10537	●	1	10.5	93	50	37.0			+0.2					
-DRS11038	●	1	11.0	96	53	38.5			+0.2	SB-2290TR	-	-		DS105
-DRS11540	●	1	11.5	97	54	40.5			+0.2					DS110
-DRS12042	●	1	12.0	99	56	42.0			+0.4	SB-25100TR	-	DT-7		DS115
-DRS12544	●	1	12.5	101	58	44.0			+0.2					DS120

Cutting Conditions by Application

(Workpiece: C50)

Applications	Flat Surface	Slanted Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates	
Workpiece Shape								
DRS	Cutting speed (m/min)	80	80	Not recommended	Not recommended	80	Not recommended	Not Available
	Feed Rate (mm/rev)	0.08	0.04	Not recommended	Not recommended	Concave part 0.04 Continuous part 0.08	Not recommended	Not Available
Coolant (Internal)	Yes	Yes	-	-	Yes	-	Not Available	

* When machining with outer coolant, Max. depth should be 1.5 times (1.5XD) of the cutting diameter (øD) because chip evacuation performance drops.

DRS Recommended Cutting Conditions (Coolant)

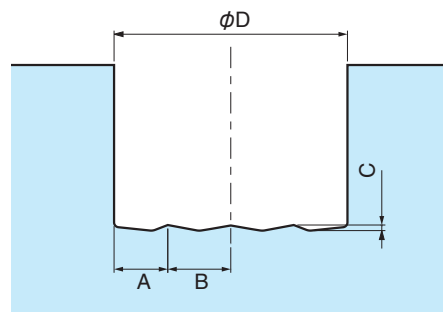
Workpiece Material	Recommended Grade (Vc m/min)				Feed Rate (mm/rev)
	MEGACOAT		PVD Coated Carbide		
	PR1230	PR1210	PR660	PP905	
Low Carbon Steel	★ 80~100	-	☆ 80~100	-	0.06
Carbon Steel	★ 80~100	-	☆ 80~100	-	0.08~0.1
Alloy Steel	★ 80	-	☆ 80	-	0.04~0.06
Mold Steel	★ 80	-	☆ 80	-	0.04~0.06
Stainless Steel (Austenitic related)	★ 70~80	-	☆ 70~80	-	0.05~0.06
Gray Cast Iron	-	★ 80~100	-	☆ 80~100	0.08~0.1

★ : 1st Recommendation ☆ : 2nd Recommendation

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

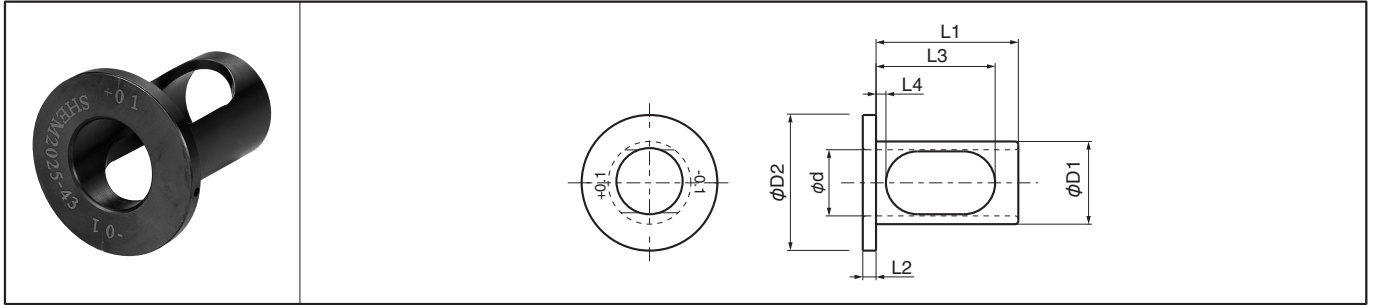
DRS Hole Bottom Shape (mm)

øD	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



Adjustable Sleeve [DRS MagicDrill Mini] Mini for cutting dia. adjustment]

SHEM



Sleeve Dimensions

Description	Std.	Dimension (mm)							*Dia. Adjustment Range
		φd	φD1	φD2	L1	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	

* Diameter Adjustment Range adjusts the cutting diameter.

How to use

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

- ① Set the outer edge horizontally with 90° to making line on the sleeve. (Fig.1)
- ② To adjust to larger diameter, 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.
- ③ Tighten the bottom screw firmly which is directly touching the drill.
Slightly tighten the upper screw which is directly touching the sleeve.

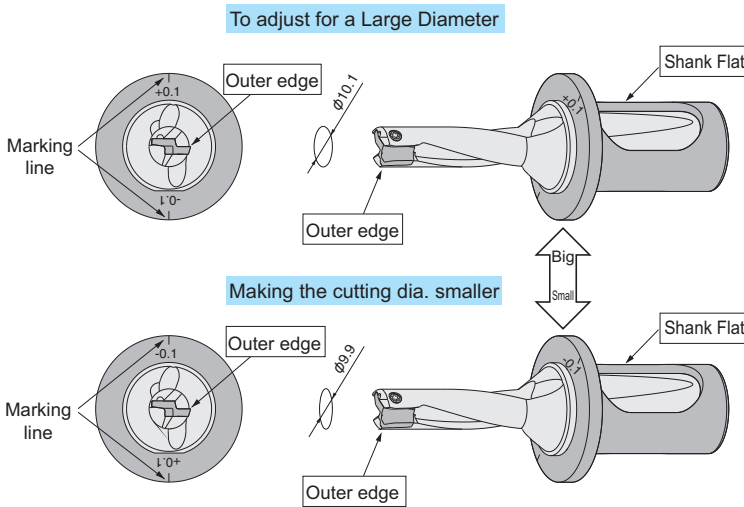


Fig.1 Diameter Adjustment Method (e.g.) φ10 Drill

Caution: Not for use with Collet Chuck type Arbor.

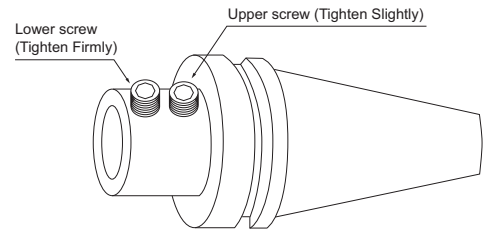
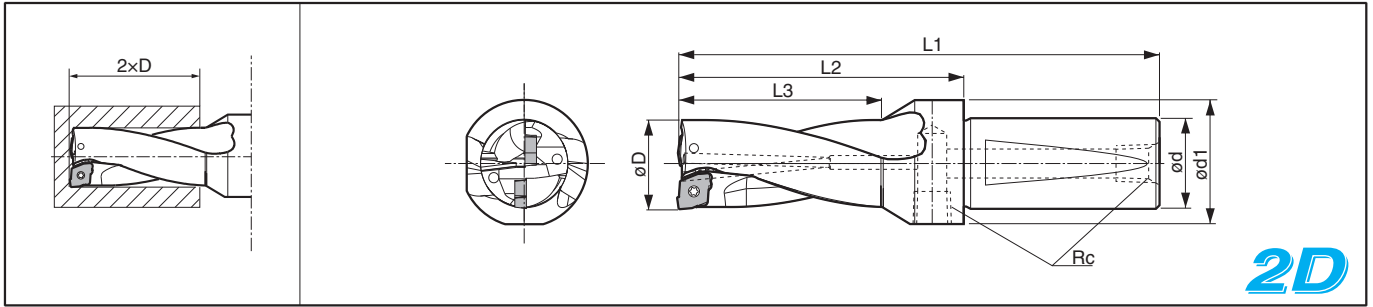


Fig.2

MagicDrill® DRZ

DRZ (Cutting Depth: 2×D)



Toolholder Dimensions




Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw 	Wrench FT 	Plug 	
S20-DRZ1326-05	●	13	95	52	26				+0.5				ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135270-05	●	13.5	95	52	27				+0.5				
-DRZ1428-05	●	14	98	55	28				+0.5				
-DRZ145290-05	●	14.5	98	55	29	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	
-DRZ1530-05	●	15	100	57	30				+0.5				
-DRZ155310-05	●	15.5	100	57	31				+0.5				
S25-DRZ1632-06	●	16	115	61	32				+1.1				ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165330-06	●	16.5	115	61	33				+0.9				
-DRZ1734-06	●	17	116	62	34				+0.8				
-DRZ175350-06	●	17.5	116	62	35				+0.7				
-DRZ1836-06	●	18	118	64	36				+0.6				
-DRZ185370-06	●	18.5	118	64	37	25	32	Rc1/8	+0.6	SB-2260TR	DT-7	GP-1	
-DRZ1938-06	●	19	120	66	38				+0.5				
-DRZ195390-06	●	19.5	120	66	39				+0.5				
-DRZ2040-06	●	20	123	69	40				+0.5				
-DRZ205410-06	●	20.5	125	71	41				+0.3				
-DRZ2142-06	●	21	125	71	42				+0.2				
-DRZ215430-08	●	21.5	128	74	43				+1.8				
-DRZ2244-08	●	22	128	74	44		33		+1.6				
-DRZ225450-08	●	22.5	128	74	45				+1.4				
-DRZ2346-08	●	23	130	76	46				+1.3				
-DRZ235470-08	●	23.5	130	76	47				+1.2				
-DRZ2448-08	●	24	131	77	48	25		Rc1/8	+1.1	SB-2570TR	DT-8	GP-1	
-DRZ245490-08	●	24.5	131	77	49				+0.9				
-DRZ2550-08	●	25	133	79	50				+0.8				
-DRZ255510-08	●	25.5	133	79	51		35		+0.7				
-DRZ2652-08	●	26	135	81	52				+0.6				
-DRZ265530-08	●	26.5	135	81	53				+0.5				
S32-DRZ2754-10	●	27	149	90	54				+2.5				ZCMT10T304 ZCMT10T304SP
-DRZ275550-10	●	27.5	149	90	55				+2.3				
-DRZ2856-10	●	28	151	92	56		42		+2.2				
-DRZ285570-10	●	28.5	151	92	57				+2.1				
-DRZ2958-10	●	29	153	94	58				+2.0				
-DRZ295590-10	●	29.5	153	94	59	32		Rc1/4	+1.8	SB-4085TR	DT-15	GP-2	
-DRZ3060-10	●	30	154	95	60				+1.7				
-DRZ305610-10	●	30.5	154	95	61				+1.5				
-DRZ3162-10	●	31	155	96	62				+1.5				
-DRZ315630-10	●	31.5	155	96	63		45		+1.3				
-DRZ3264-10	●	32	158	99	64				+1.2				
-DRZ325650-10	●	32.5	158	99	65				+1.0				

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

For recommended cutting conditions, see page [K51](#)

● : Std. Item □ : Check Availability

● Toolholder Dimensions

Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw	Wrench	Plug	
													
S40-DRZ3366-12	●	33	173	104	66				+2.9				ZCMT12T306 ZCMT12T304SP
-DRZ3468-12	●	34	176	107	68				+2.7				
-DRZ3570-12	●	35	177	108	70				+2.4				
-DRZ3672-12	●	36	180	111	72	40	55	Rc1/4	+2.2	SB-5085TR	DT-20	GP-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	●	41	186	117	82				+4.0				ZCMT150408 ZCMT150406SP
-DRZ4284-15	●	42	188	119	84				+3.7				
-DRZ4386-15	●	43	190	121	86		55		+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	40		Rc1/4	+2.5	SB-5085TR	DT-20	GP-2	
-DRZ4896-15	●	48	203	134	96				+2.2				
-DRZ4998-15	●	49	204	135	98				+2.0				
-DRZ50100-15	●	50	204	135	100		60		+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	●	54	214	145	108				+5.0				ZCMT200608
-DRZ55110-20	●	55	215	146	110				+4.7				
-DRZ56112-20	●	56	217	148	112				+4.4				
-DRZ57114-20	●	57	219	150	114	40	65	Rc1/4	+4.1	SB-60120TR	DT-25	GP-2	
-DRZ58116-20	●	58	221	152	116				+3.8				
-DRZ59118-20	●	59	223	154	118				+3.5				

• When offset machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ● K51

• Cutting tolerance (2D type)

Dc	Cutting tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

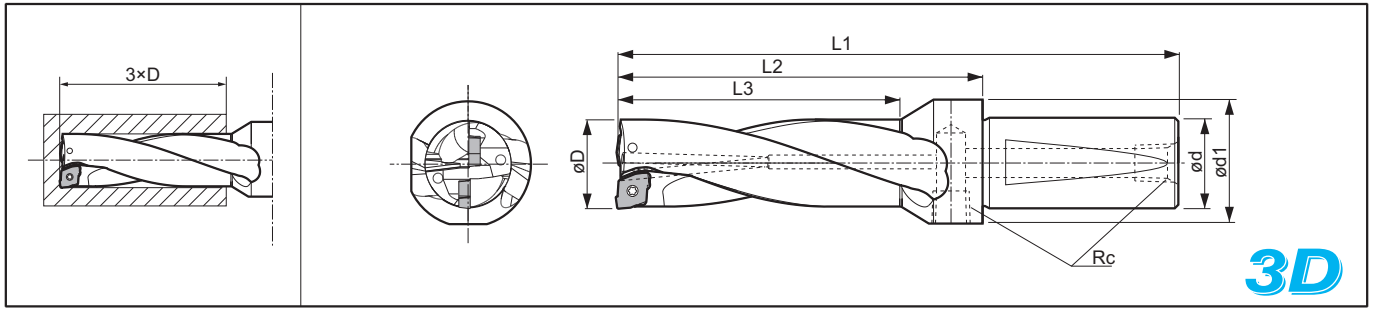
* Figures above are numeric guidelines.

It may vary depending on machines / work materials / clamp status / cutting conditions.



MagicDrill® DRZ

DRZ (Cutting Depth: 3×D)



● Toolholder Dimensions




Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw	Wrench FT DT	Plug	
S20-DRZ1339-05	●	13	108	65	39				+0.5				ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135405-05	●	13.5	108	65	40.5				+0.5				
-DRZ1442-05	●	14	112	69	42				+0.5				
-DRZ145435-05	●	14.5	112	69	43.5	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	
-DRZ1545-05	●	15	115	72	45				+0.5				
-DRZ155465-05	●	15.5	115	72	46.5				+0.5				
S25-DRZ1648-06	●	16	131	77	48				+1.1				ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165495-06	●	16.5	131	77	49.5				+0.9				
-DRZ1751-06	●	17	133	79	51				+0.8				
-DRZ175525-06	●	17.5	133	79	52.5				+0.7				
-DRZ1854-06	●	18	136	82	54				+0.6				
-DRZ185555-06	●	18.5	136	82	55.5	25	32	Rc1/8	+0.6	SB-2260TR	DT-7	GP-1	
-DRZ1957-06	●	19	139	85	57				+0.5				
-DRZ195585-06	●	19.5	139	85	58.5				+0.5				
-DRZ2060-06	●	20	143	89	60				+0.5				
-DRZ205615-06	●	20.5	146	92	61.5				+0.3				
-DRZ2163-06	●	21	146	92	63				+0.2				
-DRZ215645-08	●	21.5	147	93	64.5				+1.8				
-DRZ2266-08	●	22	147	93	66				+1.6				
-DRZ225675-08	●	22.5	147	93	67.5		33		+1.4				
-DRZ2369-08	●	23	150	96	69				+1.3				
-DRZ235705-08	●	23.5	150	96	70.5				+1.2				
-DRZ2472-08	●	24	152	98	72	25		Rc1/8	+1.1	SB-2570TR	DT-8	GP-1	
-DRZ245735-08	●	24.5	152	98	73.5				+0.9				
-DRZ2575-08	●	25	155	101	75				+0.8				
-DRZ255765-08	●	25.5	155	101	76.5		35		+0.7				
-DRZ2678-08	●	26	158	104	78				+0.6				
-DRZ265795-08	●	26.5	158	104	79.5				+0.5				
S32-DRZ2781-10	●	27	173	114	81				+2.5				ZCMT10T304 ZCMT10T304SP
-DRZ275825-10	●	27.5	173	114	82.5				+2.3				
-DRZ2884-10	●	28	176	117	84				+2.2				
-DRZ285855-10	●	28.5	176	117	85.5		42		+2.1				
-DRZ2987-10	●	29	179	120	87				+2.0				
-DRZ295885-10	●	29.5	179	120	88.5				+1.8				
-DRZ3090-10	●	30	181	122	90	32		Rc1/4	+1.7	SB-4085TR	DT-15	GP-2	
-DRZ305915-10	●	30.5	181	122	91.5				+1.5				
-DRZ3193-10	●	31	183	124	93				+1.5				
-DRZ315945-10	●	31.5	183	124	94.5		45		+1.3				
-DRZ3296-10	●	32	187	128	96				+1.2				
-DRZ325975-10	●	32.5	187	128	97.5				+1.0				
-DRZ3399-12	●	33	193	134	99				+2.9				ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●	34	197	138	102				+2.7				
-DRZ35105-12	●	35	199	140	105				+2.4				
-DRZ36108-12	●	36	203	144	108				+2.2				
-DRZ37111-12	●	37	205	146	111	32	55	Rc1/4	+1.9	SB-5085TR	DT-20	GP-2	
-DRZ38114-12	●	38	208	149	114				+1.7				
-DRZ39117-12	●	39	211	152	117				+1.4				
-DRZ40120-12	●	40	212	153	120				+1.2				

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

For recommended cutting conditions, see page ● K51

● : Std. Item □ : Check Availability

● Toolholder Dimensions

Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw	Wrench	Plug	
													
S40-DRZ3399-12	●	33	203	134	99				+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	40	55	Rc1/4	+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	●	41	224	155	123				+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42126-15	●	42	227	158	126		55		+3.7				
-DRZ43129-15	●	43	230	161	129				+3.5				
-DRZ44132-15	●	44	233	164	132				+3.2				
-DRZ45135-15	●	45	234	165	135				+3.0				
-DRZ46138-15	●	46	241	172	138				+2.7				
-DRZ47141-15	●	47	245	176	141	40		Rc1/4	+2.5				
-DRZ48144-15	●	48	248	179	144				+2.2				
-DRZ49147-15	●	49	250	181	147		60		+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	●	54	266	197	162				+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55165-20	●	55	269	200	165				+4.7				
-DRZ56168-20	●	56	272	203	168	40	65	Rc1/4	+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 machining, reduce feed rate to 0.08mm/rev. or less.

For recommended cutting conditions, see page ● K51

• Cutting tolerance (3D type)

D	Cutting tolerance (mm)
ø13~ø26.5	+0.20 -0.10
ø27~ø40	+0.25 -0.15
ø41~ø59	+0.30 -0.20

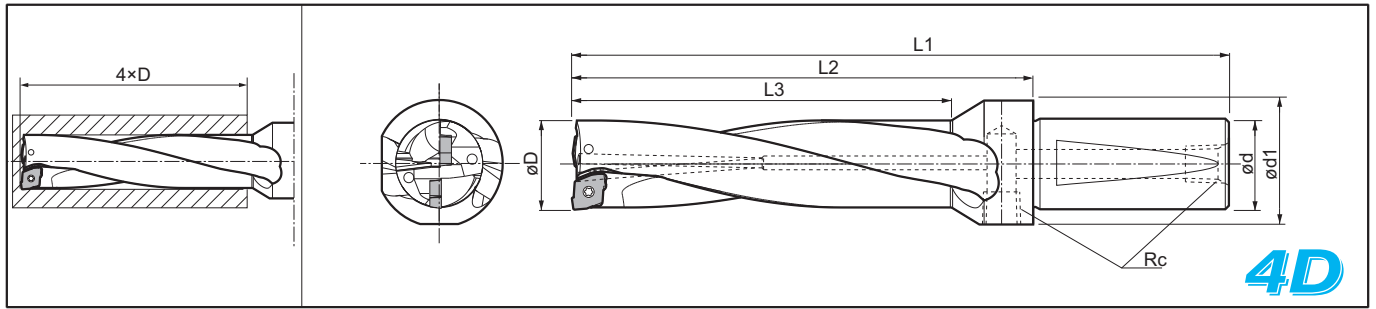
* Figures above are numeric guidelines.

It may vary depending on machines / work materials / clamp status / cutting conditions.



MagicDrill® DRZ

DRZ (Cutting Depth: 4×D)



Toolholder Dimensions

Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw	Wrench FT DT	Plug	
S20-DRZ1352-05	●	13	121	78	52				+0.5				
-DRZ135540-05	●	13.5	121	78	54				+0.5				
-DRZ1456-05	●	14	126	83	56				+0.5				
-DRZ145580-05	●	14.5	126	83	58				+0.5				
-DRZ1560-05	●	15	130	87	60				+0.5				
-DRZ155620-05	●	15.5	130	87	62				+0.5				
S25-DRZ1664-06	●	16	147	93	64				+1.1				
-DRZ165660-06	●	16.5	147	93	66				+0.9				
-DRZ1768-06	●	17	149	95	68				+0.8				
-DRZ175700-06	●	17.5	149	95	70				+0.7				
-DRZ1872-06	●	18	153	99	72				+0.6				
-DRZ185740-06	●	18.5	153	99	74				+0.6				
-DRZ1976-06	●	19	157	103	76				+0.5				
-DRZ195780-06	●	19.5	157	103	78				+0.5				
-DRZ2080-06	●	20	156	102	80				+0.5				
-DRZ205820-06	●	20.5	161	107	82				+0.3				
-DRZ2184-06	●	21	161	107	84				+0.2				
-DRZ215860-08	●	21.5	169	115	86				+1.8				
-DRZ2288-08	●	22	169	115	88				+1.6				
-DRZ225900-08	●	22.5	169	115	90				+1.4				
-DRZ2392-08	●	23	173	119	92				+1.3				
-DRZ235940-08	●	23.5	173	119	94				+1.2				
-DRZ2496-08	●	24	176	122	96				+1.1				
-DRZ245980-08	●	24.5	176	122	98				+0.9				
-DRZ25100-08	●	25	180	126	100				+0.8				
-DRZ2551020-08	●	25.5	180	126	102				+0.7				
-DRZ26104-08	●	26	184	130	104				+0.6				
-DRZ2651060-08	●	26.5	184	130	106				+0.5				
S32-DRZ27108-10	●	27	200	141	108				+2.5				
-DRZ2751100-10	●	27.5	200	141	110				+2.3				
-DRZ28112-10	●	28	204	145	112				+2.2				
-DRZ2851140-10	●	28.5	204	145	114				+2.1				
-DRZ29116-10	●	29	208	149	116				+2.0				
-DRZ2951180-10	●	29.5	208	149	118				+1.8				
-DRZ30120-10	●	30	211	152	120				+1.7				
-DRZ3051220-10	●	30.5	211	152	122				+1.5				
-DRZ31124-10	●	31	214	155	124				+1.5				
-DRZ3151260-10	●	31.5	214	155	126				+1.3				
-DRZ32128-10	●	32	219	160	128				+1.2				
-DRZ3251300-10	●	32.5	219	160	130				+1.0				
-DRZ33132-12	●	33	226	167	132				+2.9				
-DRZ34136-12	●	34	231	172	136				+2.7				
-DRZ35140-12	●	35	234	175	140				+2.4				
-DRZ36144-12	●	36	239	180	144				+2.2				
-DRZ37148-12	●	37	242	183	148				+1.9				
-DRZ38152-12	●	38	246	187	152				+1.7				
-DRZ39156-12	●	39	250	191	156				+1.4				
-DRZ40160-12	●	40	252	193	160				+1.2				




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

For recommended cutting conditions, see page **K51**

● : Std. Item □ : Check Availability



● Toolholder Dimensions

Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ● K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw	Wrench	Plug	
													
S40 -DRZ33132-12	●	33	236	167	132				+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	40	55	Rc1/4	+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	●	41	265	196	164			+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP	
-DRZ42168-15	●	42	269	200	168		55	Rc1/4					+3.7
-DRZ43172-15	●	43	273	204	172			+3.5					
-DRZ44176-15	●	44	277	208	176			+3.2					
-DRZ45180-15	●	45	279	210	180	40		+3.0					
-DRZ46184-15	●	46	287	218	184			+2.7					
-DRZ47188-15	●	47	292	223	188			+2.5					
-DRZ48192-15	●	48	296	227	192		60	+2.2					
-DRZ49196-15	●	49	300	231	196			+2.0					
-DRZ50200-15	●	50	301	232	200			+1.7					

• When offset machining, reduce feed rate to 0.06mm/rev. or less.

For recommended cutting conditions, see page ● K51

• Cutting tolerance (4D type)

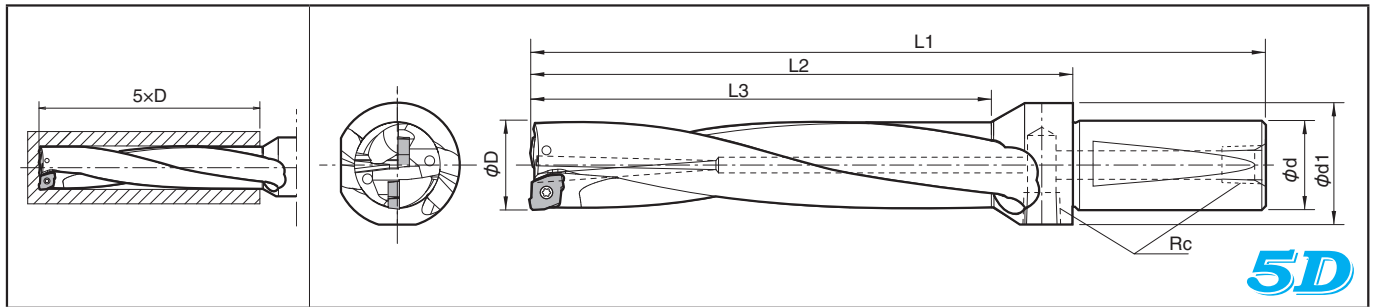
D	Cutting tolerance (mm)
ø13~ø26.5	+0.25 -0.10
ø27~ø40	+0.30 -0.15
ø41~ø50	+0.35 -0.20

* Figures above are numeric guidelines.




It may vary depending on machines / work materials / clamp status / cutting conditions.



DRZ (Cutting Depth: 5×D)



Toolholder Dimensions

Description	Std. No. of Insert	Dimension (mm)							Max. Offset (Radial) (mm)	Spare Parts			Applicable Inserts ➔ K39
		øD	L1	L2	L3	ød	ød1	Rc		Clamp Screw 	Wrench 	Plug 	
S32-DRZ27135-10	●	27	227	168	135	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ28140-10	●	28	232	173	140				+2.2				
-DRZ29145-10	●	29	237	178	145				+2.0				
-DRZ30150-10	●	30	241	182	150				+1.7				
-DRZ31155-10	●	31	245	186	155				+1.5				
-DRZ32160-10	●	32	251	192	160				+1.2				
S40-DRZ33165-12	●	33	269	200	165	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34170-12	●	34	275	206	170				+2.7				
-DRZ35175-12	●	35	279	210	175				+2.4				
-DRZ36180-12	●	36	285	216	180				+2.2				
-DRZ37185-12	●	37	289	220	185				+1.9				
-DRZ38190-12	●	38	294	225	190				+1.7				
-DRZ39195-12	●	39	299	230	195	+1.4							
-DRZ40200-12	●	40	302	233	200	+1.2							
-DRZ41205-15	●	41	306	237	205	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42210-15	●	42	311	242	210				+3.7				
-DRZ43215-15	●	43	316	247	215				+3.5				
-DRZ44220-15	●	44	321	252	220				+3.2				
-DRZ45225-15	●	45	324	255	225				+3.0				
-DRZ46230-15	●	46	333	264	230				+2.7				
-DRZ47235-15	●	47	339	270	235	+2.5							
-DRZ48240-15	●	48	344	275	240	+2.2							
-DRZ49245-15	●	49	349	280	245	+2.0							
-DRZ50250-15	●	50	351	282	250	+1.7							

• When offset machining, reduce feed rate to 0.05mm/rev. or less.

For recommended cutting conditions, see page ➔ K51

• Cutting tolerance (5D type)

D	Cutting tolerance (mm)
ø27~ø40	+0.35 -0.15
ø41~ø50	+0.40 -0.20

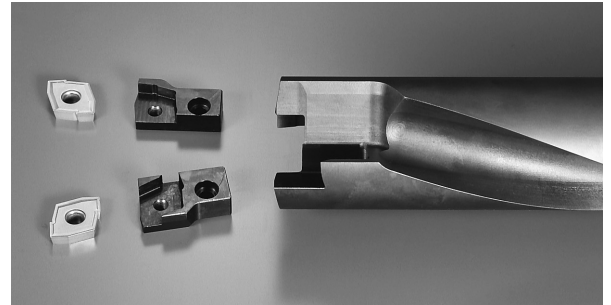
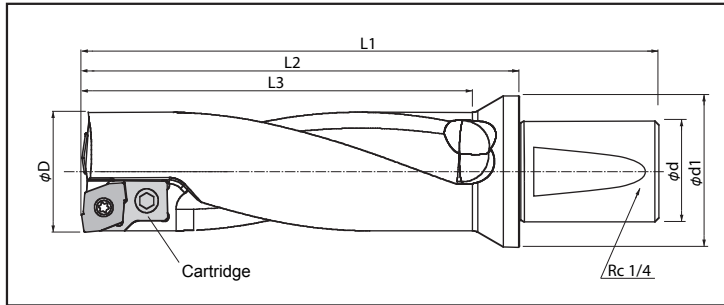
* Figures above are numeric guidelines.

It may vary depending on machines / work materials / clamp status / cutting conditions.

MagicDrill for Large Dia (over 60mm)

- MagicDrill for large diameters (over $\phi 59$) are available as Custom Orders.
(Ask your regional sales staff for details such as cutting dia. / shank type, etc.)
- Cartridge-type drill (DRZ-CR type) for diameters over $\phi 60$ mm.

DRZ-CR



Toolholder Dimensions

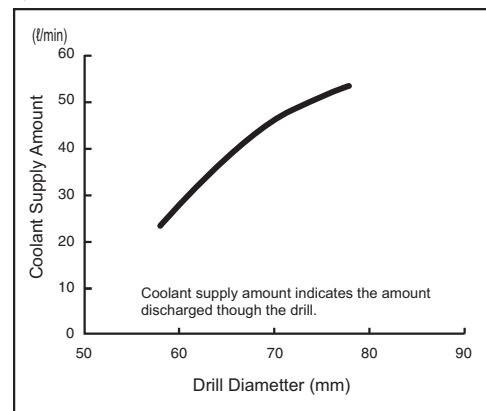
Description	Std.	No. of Insert	Dimension (mm)						Max. Offset (Radial) (mm)	Spare Parts				Applicable Inserts ● K39	
			øD	L1	L2	L3	ød	ød1		Cartridge		Clamp Screw	Wrench		
										for Outer Edge	for Inner Edge				
S50-DRZ60180-20CR	<input type="checkbox"/>	2	60	286	217	195	50	75	+3.0	DR20CR-OUT (1 pc)	DR20CR-IN (1 pc)	SB-60120TR	DT-25	ZCMT200608	
-DRZ65195-20CR	<input type="checkbox"/>	2	65	296	227	206									+1.5
-DRZ70210-20CR	<input type="checkbox"/>	2	70	308	239	220									+0.2
-DRZ75225-12CR	<input type="checkbox"/>	4	75	330	261	225	50	80	Offset N.A.	DR12CR-OUT (2 pc)	DR12CR-IN (2 pc)	SB-5085TR	DT-20	ZCMT12T306 ZCMT12T304SP	
-DRZ80240-12CR	<input type="checkbox"/>	4	80	340	271	240									

For recommended cutting conditions, see page ● K51

Cartridge

Spare Parts			
Cartridge		Cartridge Clamp Screw	Wrench
for Outer Edge	for Inner Edge		
DR20CR-OUT	DR20CR-IN	HH6×12	LW-5
DR12CR-OUT	DR12CR-IN	HH4×12	LW-3

◆ Drill diameter and Coolant



All DRZ-CR drills are made to order

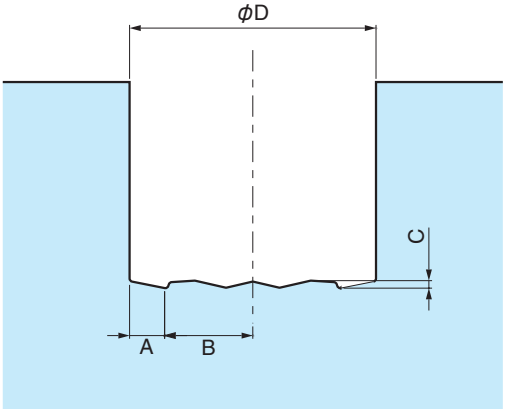
● : Std. Item □ : Check Availability

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Drilling

DRZ Hole Bottom Shape (Available for 2xD, 3xD, 4xD, 5xD type) (mm)

øD	A	B	C	øD	A	B	C	øD	A	B	C
13.0		4.4		21.5		7.7		33.0		10.8	
13.5		4.7	0.4	22.0		7.9		34.0		11.3	
14.0	2.1	4.9		22.5		8.2	0.6	35.0		11.8	0.8
14.5		5.2		23.0		8.4		36.0	5.7	12.3	
15.0		5.4	0.5	23.5	3.1	8.7		37.0		12.8	
15.5		5.7		24.0		8.9		38.0		13.3	
16.0		5.3		24.5		9.2		39.0		13.8	0.9
16.5		5.6		25.0		9.4		40.0		14.3	
17.0		5.8	0.6	25.5		9.7	0.7	41.0		14.0	
17.5		6.1		26.0		9.9		42.0		14.5	
18.0		6.3		26.5		10.2		43.0		15.0	
18.5	2.7	6.6		27.0		9.5		44.0		15.5	1.0
19.0		6.8		27.5		9.8		45.0		16.0	
19.5		7.1	0.7	28.0		10.0		46.0		16.5	
20.0		7.3		28.5		10.3	0.7	47.0	6.5	17.0	
20.5		7.6		29.0		10.5		48.0		17.5	
21.0		7.8	0.8	29.5	4.0	10.8		49.0		18.0	
				30.0		11.0		50.0		18.5	1.1
				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	8.5	19.5	1.2
								57.0		20.0	
								58.0		20.5	
								59.0		21.0	

* Above amount is standard value
(Varies within ±0.1mm depending on workpiece materials and cutting conditions)



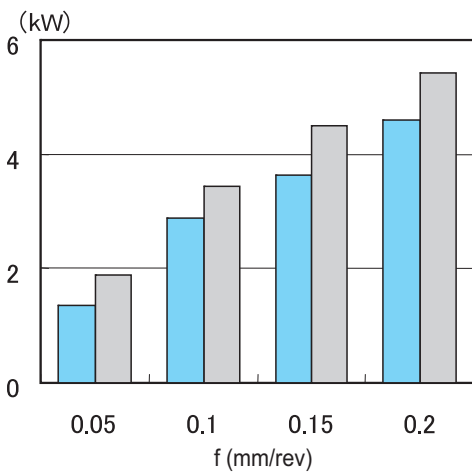
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Required Power

ø20 Cutting Power Comparison

■ MagicDrill
■ Competitor A

$V_c = 100 \text{ m/min}$, ($n = 1600 \text{ min}^{-1}$)
 $\phi 20$ Drill
 15CrMo5 Internal coolant supply



Case Study

MagicDrill Dia.	ø16	ø27	ø50	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 5.5 / 7.5 kW	
Cutting Conditions	V_c (m/min)	150	130 150	120	110 157
	f (mm/rev)	0.06	0.13	0.1	0.08 0.12
Workpiece Material	1.0040 - St42-2	1.7220 - 34CrMo4	1.7262 - 15CrMo5	1.0040 - St42-2	
Required Power (Load Meter values)	60%	80% 95%	100%	60% 100%	
Remarks	-	-	With conventional drill, limited up to ø40	-	

Formula for calculating required power (approximate value) ➔ R33

Recommended Cutting Conditions

DRZ Recommended Cutting Conditions (Coolant)

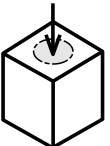
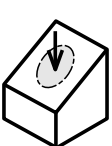
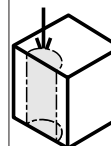
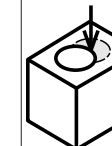
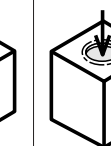
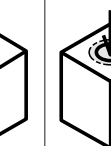
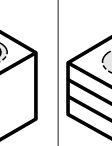
Workpiece Material	Recommended Grade (Vc m/min)										Cutting Diameter ϕ D (mm)	Holder Type (Cutting Depth)			
	MEGACOAT			PVD Coated Carbide						Carbide		2D	3D	4D	5D
	PR1230	PR1225	PR1210	PR660	PR830	PR915	PR1025	PR930	PR905	KW10					
	Standard SP SU	Standard SP SU	Standard	Standard SP SU	Standard SP	Standard	Standard SP SU	Standard SP	Standard	Standard SP					
Low-carbon Steel	★	☆	-	☆	☆	☆	☆	☆	-	-	ϕ 13~ ϕ 15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
	120~220	120~220	-	120~220	120~240	120~240	120~220	120~220	-	-	ϕ 16~ ϕ 26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
											ϕ 27~ ϕ 50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
											ϕ 50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Carbon Steel	★	☆	-	☆	☆	☆	☆	☆	-	-	ϕ 13~ ϕ 15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
	100~160	100~160	-	100~160	120~180	120~180	100~160	100~160	-	-	ϕ 16~ ϕ 26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
											ϕ 27~ ϕ 50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
											ϕ 50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Alloy Steel	★	☆	-	☆	☆	☆	☆	☆	-	-	ϕ 13~ ϕ 15.5	0.06~0.10	0.06~0.10	0.04~0.08	-
	80~140	80~140	-	80~140	100~160	100~160	80~140	80~140	-	-	ϕ 16~ ϕ 26.5	0.08~0.15	0.08~0.15	0.06~0.12	-
											ϕ 27~ ϕ 50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
											ϕ 50~	0.08~0.18	0.08~0.15	0.06~0.12	-
Mold Steel	★	☆	-	☆	☆	☆	☆	☆	-	-	ϕ 13~ ϕ 15.5	0.04~0.08	0.04~0.08	0.03~0.07	-
	70~130	70~130	-	70~130	80~150	80~150	70~130	70~130	-	-	ϕ 16~ ϕ 26.5	0.08~0.12	0.06~0.10	0.06~0.08	-
											ϕ 27~ ϕ 50	0.08~0.15	0.06~0.12	0.06~0.10	0.04~0.07
											ϕ 50~	0.08~0.15	0.06~0.12	0.06~0.10	-
Stainless Steel	☆	★	-	☆	☆	☆	☆	☆	-	-	ϕ 13~ ϕ 15.5	0.04~0.08	0.04~0.08	0.03~0.06	-
	60~120	60~120	-	60~120	70~140	70~140	60~120	60~120	-	-	ϕ 16~ ϕ 26.5	0.06~0.10	0.06~0.10	0.04~0.08	-
											ϕ 27~ ϕ 50	0.06~0.10	0.06~0.12	0.04~0.10	0.04~0.07
											ϕ 50~	0.06~0.12	0.06~0.12	0.04~0.10	-
Gray Cast Iron	-	-	★	-	-	-	-	-	☆	☆	ϕ 13~ ϕ 15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
			100~150						100~150	100~120	ϕ 16~ ϕ 26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
											ϕ 27~ ϕ 50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
											ϕ 50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Nodular Cast Iron	-	-	★	-	-	-	-	-	☆	☆	ϕ 13~ ϕ 15.5	0.08~0.12	0.08~0.10	0.06~0.08	-
			80~120						80~120	80~100	ϕ 16~ ϕ 26.5	0.10~0.18	0.10~0.15	0.08~0.12	-
											ϕ 27~ ϕ 50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
											ϕ 50~	0.10~0.20	0.10~0.18	0.08~0.15	-
Non-ferrous Metals	-	-	-	-	-	-	-	-	-	★	ϕ 13~ ϕ 15.5	0.06~0.12	0.06~0.10	0.04~0.08	-
										200~600	ϕ 16~ ϕ 26.5	0.08~0.18	0.08~0.15	0.06~0.15	-
											ϕ 27~ ϕ 50	0.08~0.20	0.08~0.18	0.06~0.15	0.05~0.10
											ϕ 50~	0.08~0.20	0.08~0.18	0.06~0.15	-
Titanium Alloys	-	-	-	-	-	-	-	-	-	★	ϕ 13~ ϕ 15.5	0.05~0.06	0.05~0.06	0.05~0.06	-
										40~70	ϕ 16~ ϕ 26.5	0.05~0.07	0.05~0.07	0.05~0.07	-
											ϕ 27~ ϕ 50	0.06~0.08	0.06~0.08	0.06~0.08	0.04~0.05
											ϕ 50~	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: C50)

Applications	Flat Surface	Slanted Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates
Workpiece Shape							
DRZ type	Cutting Speed (m/min)	120	120	120	120	120	Not Available
	Feed Rate (mm/rev)	0.1	0.05	0.05	0.05	Concave Part 0.05 Continuous Part 0.1	*0.05 Not Available
Coolant (Internal)	Yes	Yes	Yes	Yes	Yes	Yes	Not Available

* For ap, in case of cutting pre-drilled workpieces (same as when using a Boring Bar).

Drill type	2D~3D type	4D~5D type
ap	0.1×D or less	Not recommended

e.g.) In case of cutting using DRZ3090-10 (3×D type)

① For milling, pre-drilled hole should be cut bigger than ϕ 24 (ϕ 30-0.1x30x2)

② For turning, ap should be set under ap = 3mm (0.1x30)

◆ For ap in case of using outer coolant system

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

Therefore ap should be measured within 1.5times (1.5xD) of cutting diameter (ϕ D).



Troubleshooting

Trouble condition	Condition	Cause	Countermeasures
Hole diameter becomes smaller (at hole bottom)	<p>A (Entrance side) B (Bottom side) $A > B$</p>	There is no problem for entrance, however gradually hole diameter is getting smaller at the bottom.	Chip jam (External or Internal edge chip stuck) Change the cutting conditions <ul style="list-style-type: none"> • Increase the cutting speed • Lower the feed rate See page K34, K40 or K51 for "Recommended Cutting Conditions".
Hole diameter becomes larger (at hole bottom)	<p>A (Entrance side) B' (Bottom side) $A < B'$</p>	There is no problem for entrance, however gradually hole diameter is getting larger at the bottom.	Internal edge chip jam. Change the cutting conditions <ul style="list-style-type: none"> • Increase the cutting speed • Lower the feed rate See page K34, K40 or K51 for "Recommended Cutting Conditions". <ul style="list-style-type: none"> • Check the core height See page K36~K37
Hole diameter is small (from the hole entrance)		Hole diameter is small from entrance. (At turning moment)	Inappropriate adjustment of hole diameter. In case of using lathe machine, use X-axis and adjustment hole diameter. See page K36
		No core at internal edge. (No core remains)	Adjust the core height. See page K36~K37

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Drilling

Indication of tool life of MagicDrill

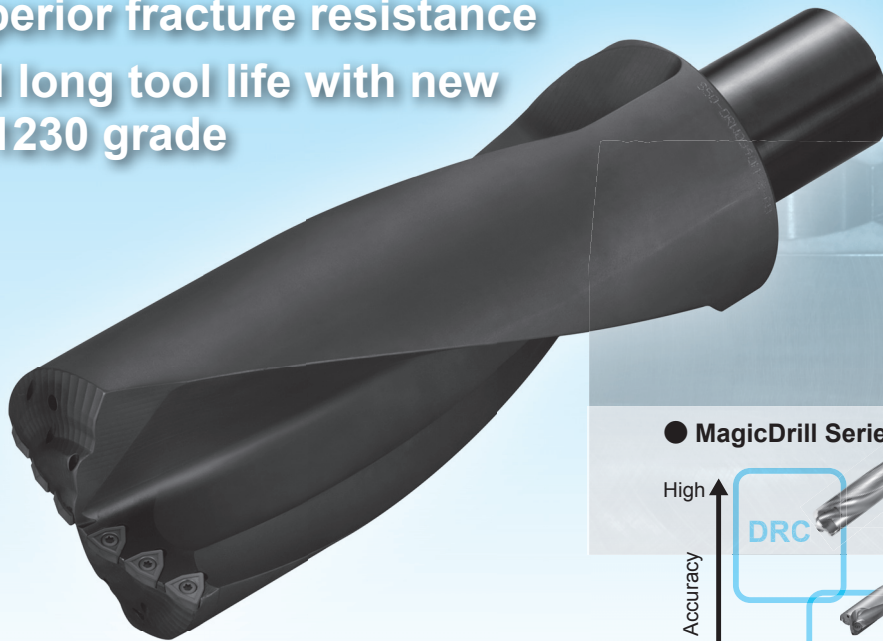
How to judge tool life	Indication of judging tool life
Judgment of tool condition and insert wear	<ul style="list-style-type: none"> • When an insert is new, the holder is slightly bent to the side during cutting (therefore, the cutting diameter is slightly bigger during cutting). Once cutting is finished,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

Large Diameter MagicDrill® DRW

DRW

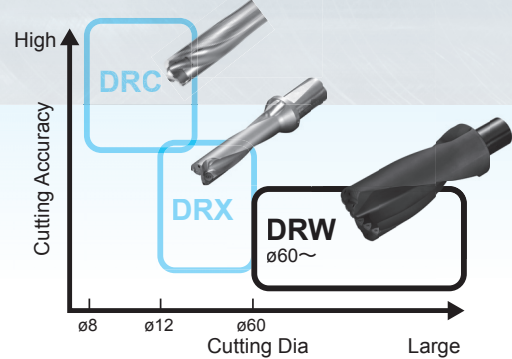
Advantages

- Sharp cutting
- Enhanced chip evacuation
- Superior fracture resistance and long tool life with new PR1230 grade



Applicable diameter: $\varnothing 60$ to $\varnothing 100$ (Max. $\varnothing 200$ is possible)
 Cutting Depth: 1D, 2D, 3D (Max. 5D is possible)
 Use single type of insert.

● MagicDrill Series Application Map



K



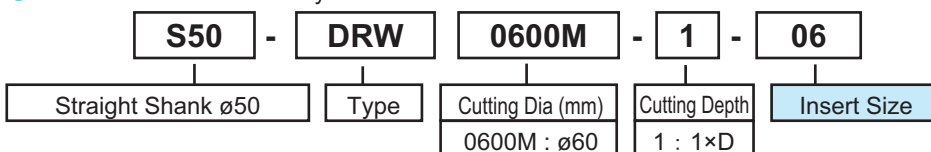
Drilling

Possible Drilling Applications

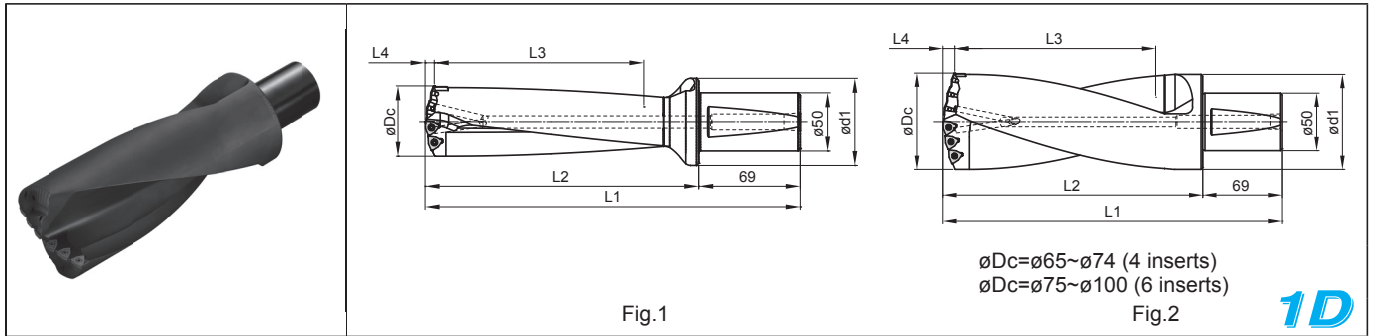
Plain Surface	Stacked Plates	Hole expansion	Slant Surface

* Hole expansion: Overlap amount of through hole must be $1/5D$ ($0.2X\varnothing Dc$) 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



DRW (Cutting Depth : 1×D)



Toolholder Dimension (Cutting Depth : 1×D)

Description	Std.	No. of Insert	Dimension (mm)						Shape
			øDc	L1	L2	L3	L4	ød1	
S50- DRW0600M-1-06	<input type="checkbox"/>	4	60	175	106	60	7.6	63	Fig.1
DRW0610M-1-06	<input type="checkbox"/>		61	176	107	61	7.7	63	
DRW0620M-1-06	<input type="checkbox"/>		62	178	109	62	7.8	63	
DRW0630M-1-06	<input type="checkbox"/>		63	179	110	63	7.9	63	
DRW0640M-1-06	<input type="checkbox"/>		64	182	113	64	8.0	63	
DRW0650M-1-06	<input type="checkbox"/>		65	184	115	65	8.2	63	
DRW0660M-1-06	<input type="checkbox"/>		66	185	116	66	8.3	64	
DRW0670M-1-06	<input type="checkbox"/>		67	187	118	67	8.4	65	Fig.2
DRW0680M-1-06	<input type="checkbox"/>		68	189	120	68	8.5	66	
DRW0690M-1-06	<input type="checkbox"/>		69	190	121	69	8.6	67	
DRW0700M-1-06	<input type="checkbox"/>		70	192	123	70	8.7	68	
DRW0710M-1-06	<input type="checkbox"/>		71	193	124	71	8.8	69	
DRW0720M-1-06	<input type="checkbox"/>		72	195	126	72	9.0	70	
DRW0730M-1-06	<input type="checkbox"/>		73	198	129	73	9.1	71	
DRW0740M-1-06	<input type="checkbox"/>	74	199	130	74	9.2	72	Fig.2	
S50- DRW0750M-1-06	<input type="checkbox"/>	6	75	201	132	75	9.3		73
DRW0760M-1-06	<input type="checkbox"/>		76	203	134	76	9.4		74
DRW0770M-1-06	<input type="checkbox"/>		77	204	135	77	9.5		75
DRW0780M-1-06	<input type="checkbox"/>		78	206	137	78	9.7		76
DRW0790M-1-06	<input type="checkbox"/>		79	207	138	79	9.8		77

Description	Std.	No. of Insert	Dimension (mm)						Shape
			øDc	L1	L2	L3	L4	ød1	
S50- DRW0800M-1-06	<input type="checkbox"/>	6	80	207	138	80	9.9	78	Fig.2
DRW0810M-1-06	<input type="checkbox"/>		81	208	139	81	9.9	79	
DRW0820M-1-06	<input type="checkbox"/>		82	210	141	82	9.9	80	
DRW0830M-1-06	<input type="checkbox"/>		83	210	141	83	9.9	81	
DRW0840M-1-06	<input type="checkbox"/>		84	210	141	84	9.9	82	
DRW0850M-1-06	<input type="checkbox"/>		85	211	142	85	10.5	83	
DRW0860M-1-06	<input type="checkbox"/>		86	213	144	86	10.5	84	
DRW0870M-1-06	<input type="checkbox"/>		87	215	146	87	10.5	85	
DRW0880M-1-06	<input type="checkbox"/>		88	216	147	88	10.5	86	
DRW0890M-1-06	<input type="checkbox"/>		89	218	149	89	10.5	87	
DRW0900M-1-06	<input type="checkbox"/>		90	219	150	90	11.0	88	
DRW0910M-1-06	<input type="checkbox"/>		91	220	151	91	11.0	89	
DRW0920M-1-06	<input type="checkbox"/>		92	222	153	92	11.0	90	
DRW0930M-1-06	<input type="checkbox"/>		93	223	154	93	11.0	91	
DRW0940M-1-06	<input type="checkbox"/>		94	225	156	94	11.0	92	
DRW0950M-1-06	<input type="checkbox"/>		95	226	157	95	11.6	93	
DRW0960M-1-06	<input type="checkbox"/>		96	228	159	96	11.6	94	
DRW0970M-1-06	<input type="checkbox"/>		97	228	159	97	11.6	95	
DRW0980M-1-06	<input type="checkbox"/>		98	230	161	98	11.6	96	
DRW0990M-1-06	<input type="checkbox"/>		99	231	162	99	11.6	97	
DRW1000M-1-06	<input type="checkbox"/>	100	232	163	100	12.2	98		

Spare Parts

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

Cutting Tolerance

Dc	Cutting Tolerance (mm)
ø60~ø100	0~+0.4

* Listed tolerance is guideline numbers.

These guideline numbers may be variable depending on machines, workpieces, clamping conditions and cutting conditions.

Applicable Inserts

Toolholder Description	Applicable Inserts
	S50-DRW...-06

Recommended Cutting Conditions

Offset Machining

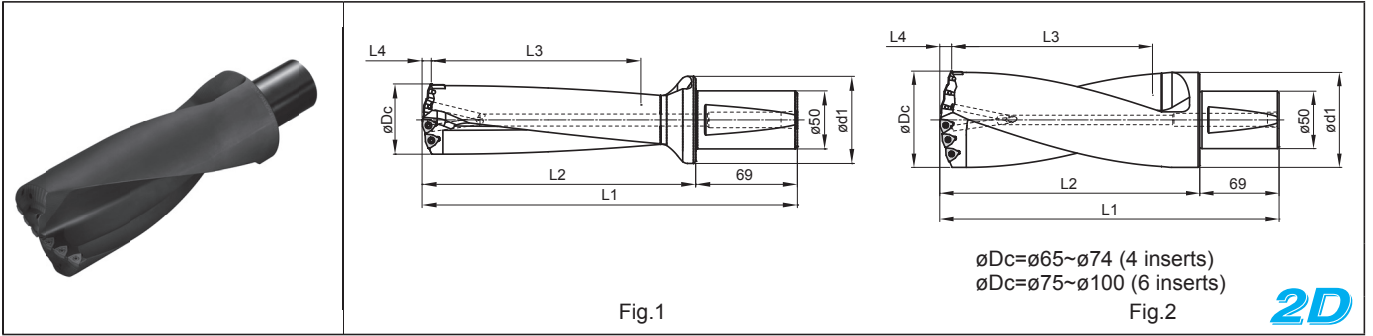
Offset for DRW type should be 0 to +0.15 mm in radius (0 to +0.3 mm in diameter).

Do not set it to a negative value to make the diameter smaller.

All DRW drills are made to order

: Check Availability

DRW (Cutting Depth : 2×D)



● Toolholder Dimension (Cutting Depth : 2×D)

Description	Std.	No. of Insert	Dimension (mm)						Shape
			øDc	L1	L2	L3	L4	ød1	
S50- DRW0600M-2-06	<input type="checkbox"/>	4	60	235	166	120	7.6	63	Fig.1
DRW0610M-2-06	<input type="checkbox"/>		61	237	168	122	7.7	63	
DRW0620M-2-06	<input type="checkbox"/>		62	240	171	124	7.8	63	
DRW0630M-2-06	<input type="checkbox"/>		63	242	173	126	7.9	63	
DRW0640M-2-06	<input type="checkbox"/>		64	246	177	128	8.0	63	
DRW0650M-2-06	<input type="checkbox"/>		65	249	180	130	8.2	63	
DRW0660M-2-06	<input type="checkbox"/>		66	251	182	132	8.3	64	
DRW0670M-2-06	<input type="checkbox"/>		67	254	185	134	8.4	65	Fig.2
DRW0680M-2-06	<input type="checkbox"/>		68	257	188	136	8.5	66	
DRW0690M-2-06	<input type="checkbox"/>		69	259	190	138	8.6	67	
DRW0700M-2-06	<input type="checkbox"/>		70	262	193	140	8.7	68	
DRW0710M-2-06	<input type="checkbox"/>		71	264	195	142	8.8	69	
DRW0720M-2-06	<input type="checkbox"/>		72	267	198	144	9.0	70	
DRW0730M-2-06	<input type="checkbox"/>		73	271	202	146	9.1	71	
DRW0740M-2-06	<input type="checkbox"/>	74	273	204	148	9.2	72	Fig.2	
S50- DRW0750M-2-06	<input type="checkbox"/>	6	75	276	207	150	9.3		73
DRW0760M-2-06	<input type="checkbox"/>		76	279	210	152	9.4		74
DRW0770M-2-06	<input type="checkbox"/>		77	281	212	154	9.5		75
DRW0780M-2-06	<input type="checkbox"/>		78	284	215	156	9.7		76
DRW0790M-2-06	<input type="checkbox"/>		79	286	217	158	9.8	77	

Description	Std.	No. of Insert	Dimension (mm)						Shape
			øDc	L1	L2	L3	L4	ød1	
S50- DRW0800M-2-06	<input type="checkbox"/>	6	80	287	218	160	9.9	78	Fig.2
DRW0810M-2-06	<input type="checkbox"/>		81	289	220	162	9.9	79	
DRW0820M-2-06	<input type="checkbox"/>		82	292	223	164	9.9	80	
DRW0830M-2-06	<input type="checkbox"/>		83	293	224	166	9.9	81	
DRW0840M-2-06	<input type="checkbox"/>		84	294	225	168	9.9	82	
DRW0850M-2-06	<input type="checkbox"/>		85	296	227	170	10.5	83	
DRW0860M-2-06	<input type="checkbox"/>		86	299	230	172	10.5	84	
DRW0870M-2-06	<input type="checkbox"/>		87	302	233	174	10.5	85	
DRW0880M-2-06	<input type="checkbox"/>		88	304	235	176	10.5	86	
DRW0890M-2-06	<input type="checkbox"/>		89	307	238	178	10.5	87	
DRW0900M-2-06	<input type="checkbox"/>		90	309	240	180	11.0	88	
DRW0910M-2-06	<input type="checkbox"/>		91	311	242	182	11.0	89	
DRW0920M-2-06	<input type="checkbox"/>		92	314	245	184	11.0	90	
DRW0930M-2-06	<input type="checkbox"/>		93	316	247	186	11.0	91	
DRW0940M-2-06	<input type="checkbox"/>		94	319	250	188	11.0	92	
DRW0950M-2-06	<input type="checkbox"/>		95	321	252	190	11.6	93	
DRW0960M-2-06	<input type="checkbox"/>		96	324	255	192	11.6	94	
DRW0970M-2-06	<input type="checkbox"/>		97	325	256	194	11.6	95	
DRW0980M-2-06	<input type="checkbox"/>		98	328	259	196	11.6	96	
DRW0990M-2-06	<input type="checkbox"/>		99	330	261	198	11.6	97	
DRW1000M-2-06	<input type="checkbox"/>	100	332	263	200	12.2	98		

● Spare Parts

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

● Cutting Tolerance

Dc	Cutting Tolerance (mm)
ø60~ø100	0~+0.4

* Listed tolerance is guideline numbers.

These guideline numbers may be variable depending on machines, workpieces, clamping conditions and cutting conditions.

● Applicable Inserts

Toolholder Description	Applicable Inserts
	S50-DRW...-06

Recommended Cutting Conditions

: Check Availability

• Offset Machining

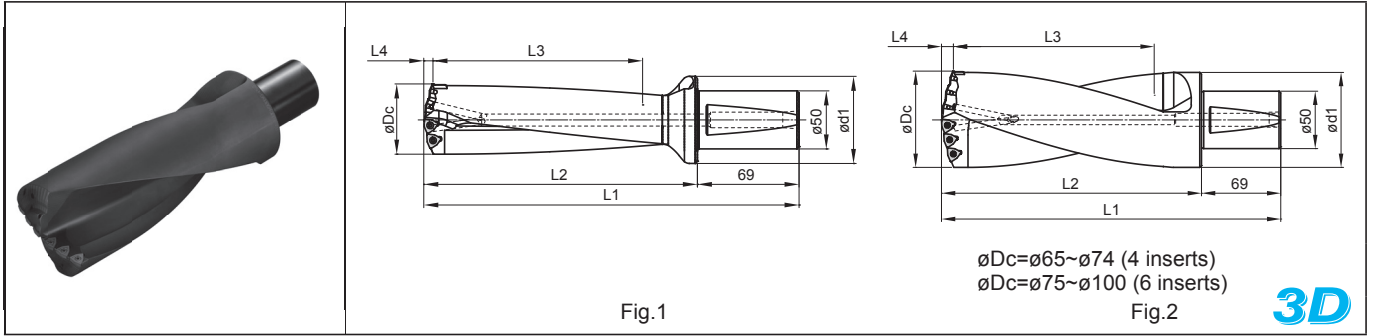
Offset for DRW type should be 0 to +0.15 mm in radius (0 to +0.3 mm in diameter).

Do not set it to a negative value to make the diameter smaller.

All DRW drills are made to order



DRW (Cutting Depth : 3×D)



Toolholder Dimension (Cutting Depth : 3×D)

Description	Std.	No. of Insert	Dimension (mm)							Shape
			øDc	L1	L2	L3	L4	ød1		
S50- DRW0600M-3-06	<input type="checkbox"/>	4	60	295	226	180	7.6	63	Fig.1	
DRW0610M-3-06	<input type="checkbox"/>		61	298	229	183	7.7	63		
DRW0620M-3-06	<input type="checkbox"/>		62	302	233	186	7.8	63		
DRW0630M-3-06	<input type="checkbox"/>		63	305	236	189	7.9	63		
DRW0640M-3-06	<input type="checkbox"/>		64	310	241	192	8.0	63		
DRW0650M-3-06	<input type="checkbox"/>		65	314	245	195	8.2	63		
DRW0660M-3-06	<input type="checkbox"/>		66	317	248	198	8.3	64		
DRW0670M-3-06	<input type="checkbox"/>		67	321	252	201	8.4	65	Fig.2	
DRW0680M-3-06	<input type="checkbox"/>		68	325	256	204	8.5	66		
DRW0690M-3-06	<input type="checkbox"/>		69	328	259	207	8.6	67		
DRW0700M-3-06	<input type="checkbox"/>		70	332	263	210	8.7	68		
DRW0710M-3-06	<input type="checkbox"/>		71	335	266	213	8.9	69		
DRW0720M-3-06	<input type="checkbox"/>		72	339	270	216	9.0	70		
DRW0730M-3-06	<input type="checkbox"/>		73	344	275	219	9.1	71		
DRW0740M-3-06	<input type="checkbox"/>	74	347	278	222	9.2	72			
S50- DRW0750M-3-06	<input type="checkbox"/>	6	75	351	282	225	9.3	73	Fig.2	
DRW0760M-3-06	<input type="checkbox"/>		76	355	286	228	9.4	74		
DRW0770M-3-06	<input type="checkbox"/>		77	358	289	231	9.5	75		
DRW0780M-3-06	<input type="checkbox"/>		78	362	293	234	9.7	76		
DRW0790M-3-06	<input type="checkbox"/>		79	365	296	237	9.8	77		

Description	Std.	No. of Insert	Dimension (mm)							Shape
			øDc	L1	L2	L3	L4	ød1		
S50- DRW0800M-3-06	<input type="checkbox"/>	6	80	367	298	240	9.9	78	Fig.2	
DRW0810M-3-06	<input type="checkbox"/>		81	370	301	243	9.9	79		
DRW0820M-3-06	<input type="checkbox"/>		82	374	305	246	9.9	80		
DRW0830M-3-06	<input type="checkbox"/>		83	376	307	249	9.9	81		
DRW0840M-3-06	<input type="checkbox"/>		84	378	309	252	9.9	82		
DRW0850M-3-06	<input type="checkbox"/>		85	381	312	255	10.5	83		
DRW0860M-3-06	<input type="checkbox"/>		86	385	316	258	10.5	84		
DRW0870M-3-06	<input type="checkbox"/>		87	389	320	261	10.5	85		
DRW0880M-3-06	<input type="checkbox"/>		88	392	323	264	10.5	86		
DRW0890M-3-06	<input type="checkbox"/>		89	396	327	267	10.5	87		
DRW0900M-3-06	<input type="checkbox"/>		90	399	330	270	11.0	88		
DRW0910M-3-06	<input type="checkbox"/>		91	402	333	273	11.0	89		
DRW0920M-3-06	<input type="checkbox"/>		92	406	337	276	11.0	90		
DRW0930M-3-06	<input type="checkbox"/>		93	409	340	279	11.0	91		
DRW0940M-3-06	<input type="checkbox"/>		94	413	344	282	11.0	92		
DRW0950M-3-06	<input type="checkbox"/>		95	416	347	285	11.6	93		
DRW0960M-3-06	<input type="checkbox"/>		96	420	351	288	11.6	94		
DRW0970M-3-06	<input type="checkbox"/>		97	422	353	291	11.6	95		
DRW0980M-3-06	<input type="checkbox"/>		98	426	357	294	11.6	96		
DRW0990M-3-06	<input type="checkbox"/>		99	429	360	297	11.6	97		
DRW1000M-3-06	<input type="checkbox"/>	100	432	363	300	12.2	98			

Spare Parts

Description	Clamp Screw	Wrench
S50-DRW...-06	SB-3592TR	FT-10

Cutting Tolerance

Dc	Cutting Tolerance (mm)
ø60~ø100	0~+0.4

* Listed tolerance is guideline numbers.

These guideline numbers may be variable depending on machines, workpieces, clamping conditions and cutting conditions.

Applicable Inserts

Toolholder Description	Applicable Inserts
S50-DRW...-06	WCMT06T308

Recommended Cutting Conditions **K57**

Offset Machining


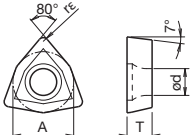
Offset for DRW type should be 0 to +0.15 mm in radius (0 to +0.3 mm in diameter).

Do not set it to a negative value to make the diameter smaller.

All DRW drills are made to order

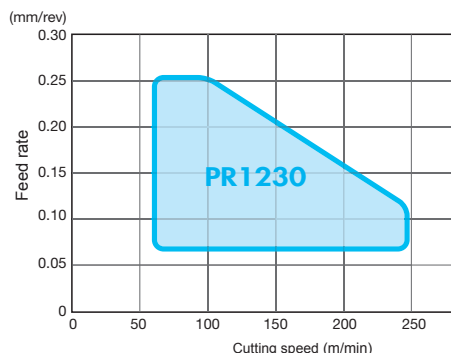
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Applicable Inserts

Shape		Description	Dimension (mm)				Angle (°)		MEGACOAT PR1230	Applicable Toolholder
			A	T	ød	rε	α			
		WCMT06T308	9.525	3.97	3.7	0.8	7°	<input type="checkbox"/>	S50-DRW...-06	
		WCMT050308	7.94	3.18	3.2			<input type="checkbox"/>	(Custom-order toolholder)	

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

Application Map (Carbon Steel / Alloy Steel)



Recommended condition

Workpiece material	Cutting speed (m/min)	Feed rate (mm/rev)
Carbon steel (S45C)	80~200	0.07~0.25
Alloy steel (SCM435)	80~160	0.07~0.25
Mold steel (SKD11)	70~150	0.06~0.20
Gray cast iron (FC250)	100~240	0.07~0.30
Nodular cast iron (FCD400)	80~150	0.07~0.25

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

Q&A

Q-1

Is it possible to use outer coolant?

A-1

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

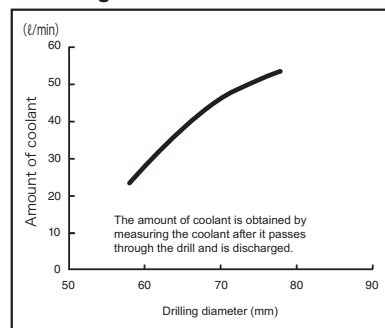
Q-2

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.

Drilling diameter and coolant amount



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

* The required power was read on the load meter.

Q-3

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

A-3

When chips of elastic material are stretched and tangled, try "low rate + large feed", "high rate + small feed" or other settings.
Chips are usually stretched well between the entrance and 10 mm inside, and not any more stretched further inside. Therefore changing the condition of entrance only will also be effective.
• [Low rate + Large feed]
This setting makes the chips thicker so that they easily break off.
E.g. Vc=80 m/min, f=0.2 to 0.25 mm/rev

: Check Availability

Inserts are sold in
10 piece boxes.

K



Drilling

K57

Q&A

- [High rate + Small feed]
This setting makes the chips thinner and uses centrifugal force to cut them off.
E.g. $V_c=200\text{m/min}$, $f=0.07 \sim 0.09\text{mm/rev}$
- [Step machining at entrance]
E.g. Entrance to 10 mm deep: 1 mm step machining
E.g. 10 mm deep or more: $V_c = 150 \text{ m/min}$, $f = 0.15 \text{ mm/rev}$ (Continuous machining)

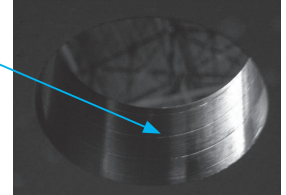
Q-4

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

A-4

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.

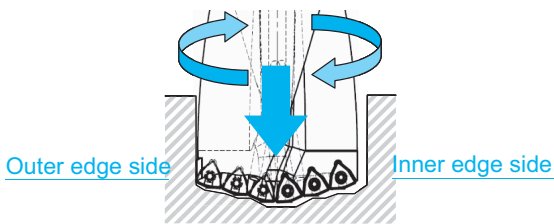
Tool marking



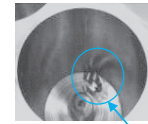
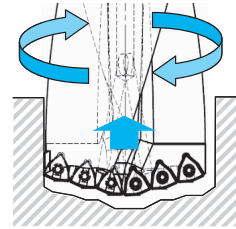
Example of tool marking

• How to prevent tool markings

① Drill the hole. (The spindle revolves.)



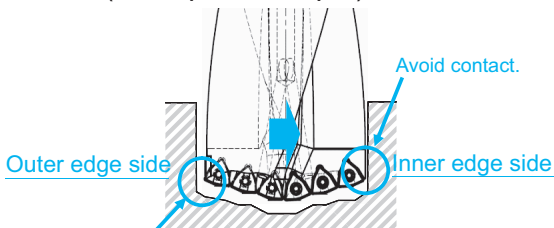
② Turn back approximately 0.5 mm. (The spindle revolves.)



Chips are adhering to the bottom when drilling stops.

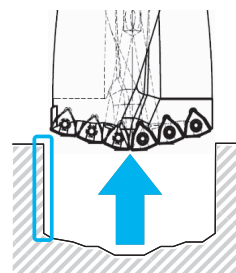
- Without turning back, chips remains adhering to the bottom.
- If offset ③ is performed without turning back, the bottom of drill contacts with the inner surface of hole.
- Turning back is necessary for blind holes but not for through holes.

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



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

④ Pull out the drill.



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

Example of drilling program

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

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

Q-5

Chattering occurs. Is there any countermeasure?

A-5

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

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