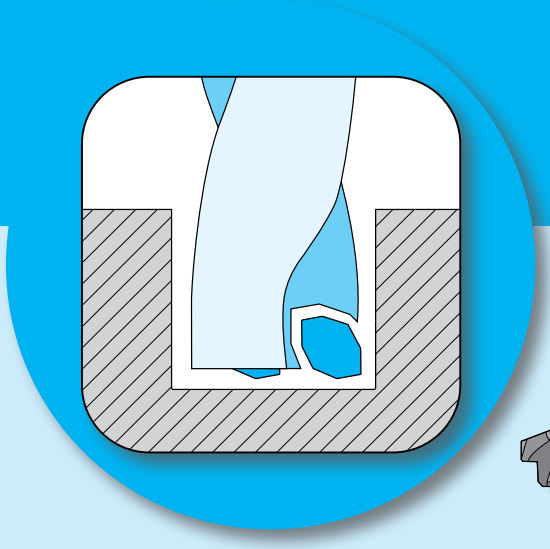


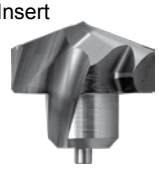
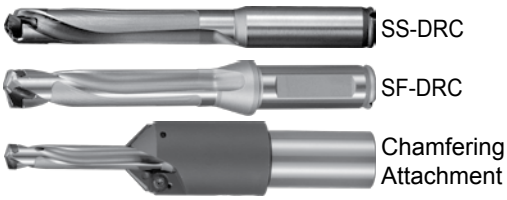
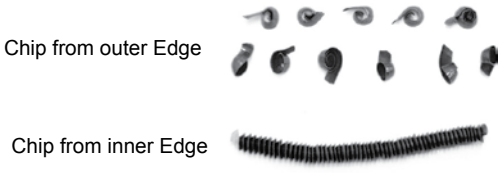
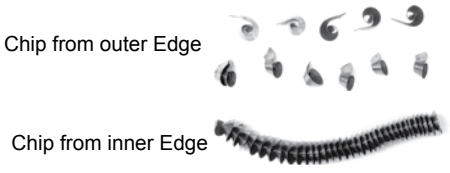
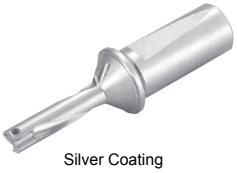
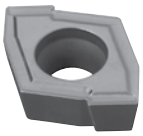
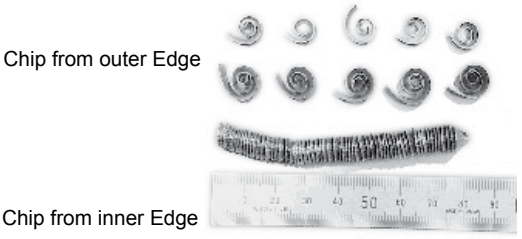
Drilling

K1~K58

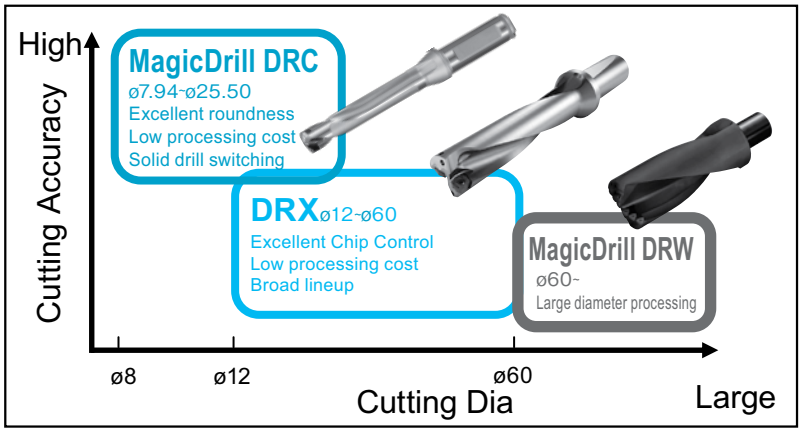
K

MagicDrill

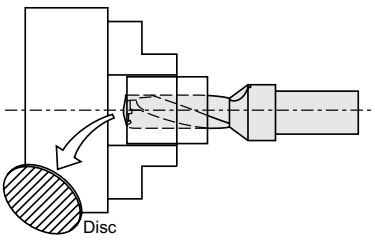
Product Lineup

Type	Shape	Cutting Dia (Cutting Depth)	Cutting Edge	Remarks
DRC [MagicDrill] K3		ø7.94~ø25.50 (3D / 5D / 8D)	Inner & Outer Edges on One Insert 	Line up  SS-DRC SF-DRC Chamfering Attachment
DRX [MagicDrill] K20	 Silver Coating	ø12 ø12.5 ø13 (2D / 3D / 4D) ø12, ø13 (5D)	Two Cutting Edges per Insert  Outer Edge Inner Edge ZXMT03	Chip Shape (Work Material: S50C) Cutting Dia. ø12  Chip from outer Edge Chip from inner Edge
		ø13.5~ø60 (2D / 3D / 4D) ø14~ø60 (5D)	Inner & Outer Edges on One Insert  ZXMT	Chip Shape (Work Material: C50) Cutting Dia. ø24  Chip from outer Edge Chip from inner Edge
DRS [MagicDrill Mini] K40	 Silver Coating	ø10~ø12.5 (3.5D)	Inner & Outer Edges on One Insert 	Chip Shape (Work Material: C50) Cutting Dia. ø10  Chip from outer Edge Chip from inner Edge
DRZ K42	 DRZ DRZ-CR	ø13~ø59 (2D, 3D) ø13~ø50 (4D) ø27~ø50 (5D)	Inner & Outer Edges on One Insert 	Chip Shape (Work Material: C50) Cutting Dia. ø23  Chip from outer Edge Chip from inner Edge
DRZ-CR [Cartridge type] (Made to order) K49		ø60~ (2D / 3D / 4D)		
DRW (Made to order) K53		ø60~ (1D / 2D / 3D)	Inner & Outer Edges on One Insert 	 BT integral arbor type is also available.  Drilling diameter ø200 is also possible.

MagicDrill Series Application Map



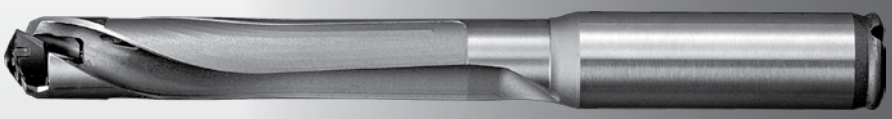
Caution



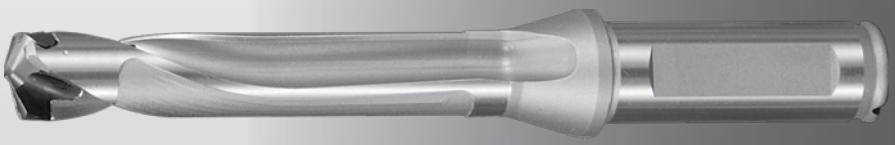
When drilling through the workpiece, a disk may be ejected.
Proper machine guarding is necessary to prevent injury
The safety cover is necessary for the conventional lathe machines to prevent any accidents.

High efficiency drill module Cutting Dia(ø7.94~ø25.50) Cutting Depth(3D / 5D / 8D)

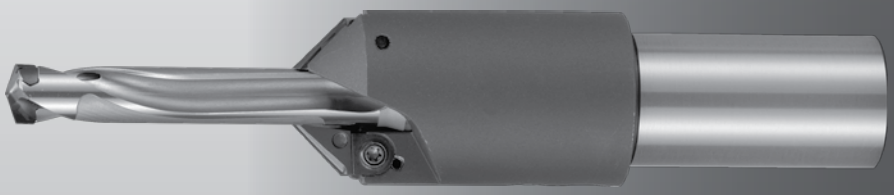
Straight Shank
SS-DRC



Flanged Shank DRC
SF-DRC



SS-DRC
+ Chamfering attachment

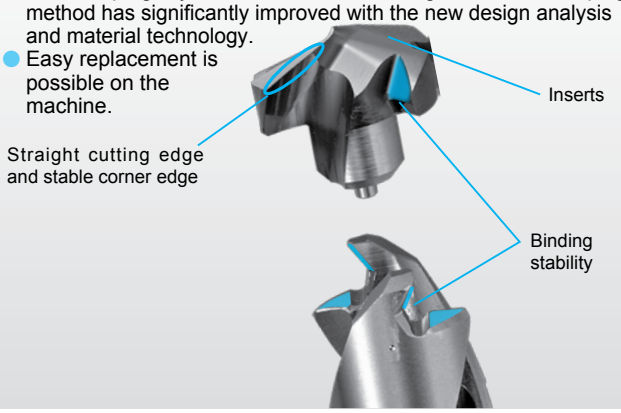


High efficiency | High feed rate | High reliability | High quality

4 unique characteristics of DRC type MagicDrills improve productivity as well as reduce machining cost by high speed and high feed rate machining.

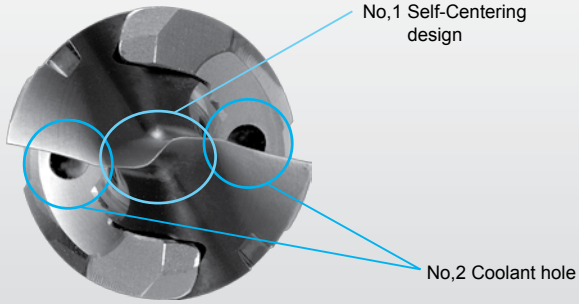
Advantages 1. Self-Clamping design

- The clamp rigidity and resistance of the MagicDrills self-clamping method has significantly improved with the 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.



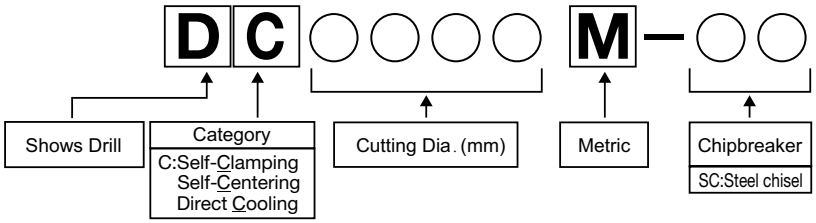
Advantages 3. Multiple Helical Angle Flute design

- 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.

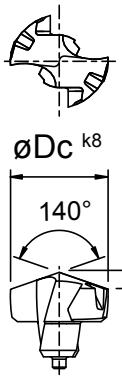
Description identification system (Insert)



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	
	DC	0794M-SC	7.94	1.44	●	SS10-DRC080M-O SF12-DRC080M-O
		0800M-SC	8.00	1.46	●	
		0810M-SC	8.10	1.47	●	
		0820M-SC	8.20	1.49	●	
		0830M-SC	8.30	1.51	●	
		0840M-SC	8.40	1.53	●	
	DC	0850M-SC	8.50	1.55	●	SS10-DRC085M-O SF12-DRC085M-O
		0860M-SC	8.60	1.56	●	
		0870M-SC	8.70	1.58	●	
		0880M-SC	8.80	1.60	●	
		0890M-SC	8.90	1.62	●	
	DC	0900M-SC	9.00	1.64	●	SS10-DRC090M-O SF12-DRC090M-O
		0910M-SC	9.10	1.66	●	
		0920M-SC	9.20	1.67	●	
		0930M-SC	9.30	1.69	●	
		0940M-SC	9.40	1.71	●	
	DC	0950M-SC	9.50	1.73	●	SS10-DRC095M-O SF12-DRC095M-O
		0960M-SC	9.60	1.75	●	
		0970M-SC	9.70	1.76	●	
		0980M-SC	9.80	1.78	●	
		0990M-SC	9.90	1.80	●	
	DC	1000M-SC	10.00	1.82	●	SS12-DRC100M-O SF16-DRC100M-O
		1010M-SC	10.10	1.84	●	
		1020M-SC	10.20	1.86	●	
		1030M-SC	10.30	1.87	●	
		1040M-SC	10.40	1.89	●	
	DC	1050M-SC	10.50	1.91	●	SS12-DRC105M-O SF16-DRC105M-O
		1060M-SC	10.60	1.93	●	
		1070M-SC	10.70	1.95	●	
		1080M-SC	10.80	1.96	●	
		1090M-SC	10.90	1.98	●	
	DC	1100M-SC	11.00	2.00	●	SS12-DRC110M-O SF16-DRC110M-O
		1110M-SC	11.10	2.02	●	
		1120M-SC	11.20	2.04	●	
		1130M-SC	11.30	2.06	●	
		1140M-SC	11.40	2.07	●	
	DC	1150M-SC	11.50	2.09	●	SS12-DRC115M-O SF16-DRC115M-O
		1160M-SC	11.60	2.11	●	
		1170M-SC	11.70	2.13	●	
		1180M-SC	11.80	2.15	●	
		1190M-SC	11.90	2.16	●	
	DC	1200M-SC	12.00	2.18	●	SS14-DRC120M-O SF16-DRC120M-O
		1210M-SC	12.10	2.20	●	
		1220M-SC	12.20	2.22	●	
		1230M-SC	12.30	2.24	●	
		1240M-SC	12.40	2.26	●	



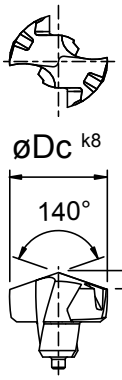
k8 tolerance

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

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

DC inserts are sold in 1 piece boxes

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Insert	Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholder ➡K7~K9, K12~K14
			øDc	Lp	PR0315	
	DC	1250M-SC	12.50	2.27	●	SS14-DRC125M-O SF16-DRC125M-O
		1260M-SC	12.60	2.29	●	
		1270M-SC	12.70	2.31	●	
		1280M-SC	12.80	2.33	●	
		1290M-SC	12.90	2.35	●	
	DC	1300M-SC	13.00	2.36	●	SS14-DRC130M-O SF16-DRC130M-O
		1310M-SC	13.10	2.38	●	
		1320M-SC	13.20	2.40	●	
		1330M-SC	13.30	2.42	●	
		1340M-SC	13.40	2.44	●	
	DC	1350M-SC	13.50	2.46	●	SS14-DRC135M-O SF16-DRC135M-O
		1360M-SC	13.60	2.47	●	
		1370M-SC	13.70	2.49	●	
		1380M-SC	13.80	2.51	●	
		1390M-SC	13.90	2.53	●	
	DC	1400M-SC	14.00	2.55	●	SS16-DRC140M-O SF16-DRC140M-O
		1410M-SC	14.10	2.56	●	
		1420M-SC	14.20	2.58	●	
		1430M-SC	14.30	2.60	●	
		1440M-SC	14.40	2.62	●	
	DC	1450M-SC	14.50	2.64	●	SS16-DRC145M-O SF16-DRC145M-O
		1460M-SC	14.60	2.66	●	
		1470M-SC	14.70	2.67	●	
		1480M-SC	14.80	2.69	●	
		1490M-SC	14.90	2.71	●	
	DC	1500M-SC	15.00	2.73	●	SS16-DRC150M-O SF20-DRC150M-O
		1510M-SC	15.10	2.75	●	
		1520M-SC	15.20	2.76	●	
		1530M-SC	15.30	2.78	●	
		1540M-SC	15.40	2.80	●	
		1550M-SC	15.50	2.82	●	
		1560M-SC	15.60	2.84	●	
		1570M-SC	15.70	2.86	●	
		1580M-SC	15.80	2.87	●	
	DC	1600M-SC	16.00	2.91	●	SS18-DRC160M-O SF20-DRC160M-O
		1610M-SC	16.10	2.93	●	
		1620M-SC	16.20	2.95	●	
		1630M-SC	16.30	2.96	●	
		1640M-SC	16.40	2.98	●	
		1650M-SC	16.50	3.00	●	
		1660M-SC	16.60	3.02	●	
		1670M-SC	16.70	3.04	●	
		1680M-SC	16.80	3.06	●	
		1690M-SC	16.90	3.07	●	
	DC	1700M-SC	17.00	3.09	●	SS18-DRC170M-O SF20-DRC170M-O
		1710M-SC	17.10	3.11	●	
		1720M-SC	17.20	3.13	●	
		1730M-SC	17.30	3.15	●	
		1740M-SC	17.40	3.16	●	
		1750M-SC	17.50	3.18	●	
		1760M-SC	17.60	3.20	●	
		1770M-SC	17.70	3.22	●	
		1780M-SC	17.80	3.24	●	
		1790M-SC	17.90	3.26	●	
	DC	1800M-SC	18.00	3.27	●	SS20-DRC180M-O SF25-DRC180M-O
		1810M-SC	18.10	3.29	●	
		1820M-SC	18.20	3.31	●	
		1830M-SC	18.30	3.33	●	
		1840M-SC	18.40	3.35	●	
		1850M-SC	18.50	3.36	●	
		1860M-SC	18.60	3.38	●	
		1870M-SC	18.70	3.40	●	
		1880M-SC	18.80	3.42	●	
		1890M-SC	18.90	3.44	●	

k8 tolerance

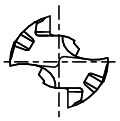
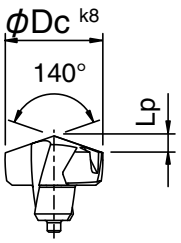
øDc	k8(mm)
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.50	+0.033 0

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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DC inserts are sold in 1 piece boxes

MagicDrill® Insert for DRC

Insert		Description		Dimension (mm)		PVD Coated Carbide	Applicable Toolholder
				øDc	Lp	PR0315	K7~K9, K12~K14
	  k8 tolerance	DC	1900M-SC	19.00	3.46	●	SS20-DRC190M-O SF25-DRC190M-O
			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
		NEW	2150M-SC	21.50	3.91	●	
		NEW	2200M-SC	22.00	4.00	●	SS25-DRC220M-O SF25-DRC220M-O
		NEW	2250M-SC	22.50	4.09	●	
		NEW	2300M-SC	23.00	4.18	●	SS25-DRC230M-O SF25-DRC230M-O
		NEW	2350M-SC	23.50	4.27	●	
		NEW	2400M-SC	24.00	4.37	●	SS25-DRC240M-O SF25-DRC240M-O
		NEW	2450M-SC	24.50	4.46	●	
		NEW	2500M-SC	25.00	4.55	●	SS32-DRC250M-O SF25-DRC250M-O
		NEW	2550M-SC	25.50	4.64	●	

øDc	k8(mm) NEW
7.94 ~ 10.00	+0.022 0
10.10 ~ 18.00	+0.027 0
18.10 ~ 25.50	+0.033 0

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

Q&A

Q-1 Is re-grinding available?

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

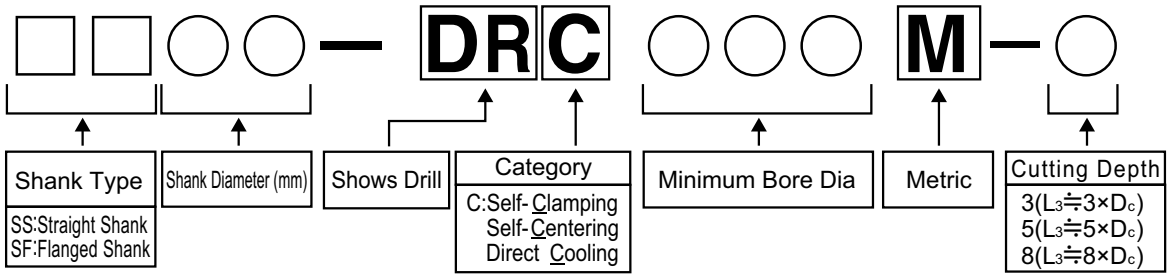
Q-2 How large would the cutting hole be to the insert diameter (øDc)?

A-2 The machining hole with SCM 435, comparing to the insert diameter(øDc), will be about +0.020~+0.040mm.

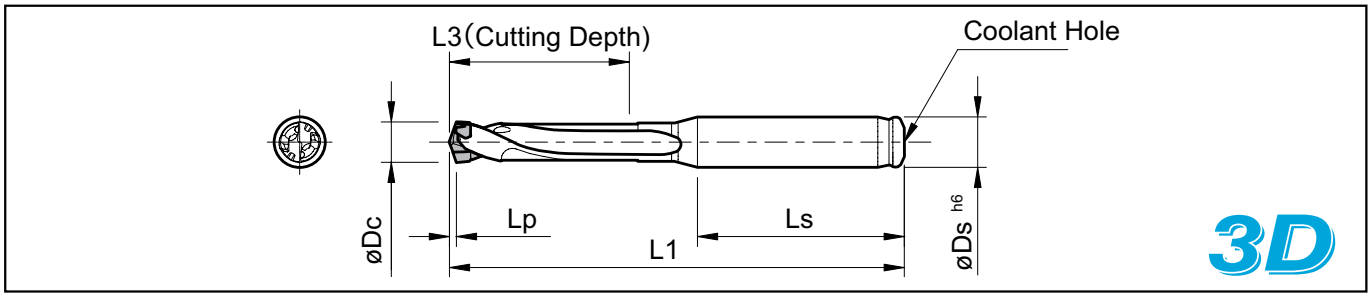
DC inserts are sold in 1 piece boxes

● : Std. Item

Description Identification System (Toolholder)



SS-DRC (Cutting Depth: 3×D)



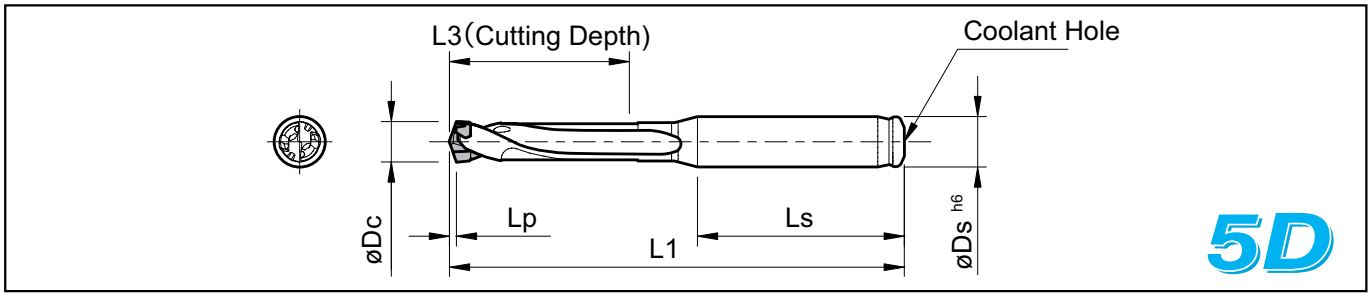
· For Lp indicates distance from drill point to corner edge, see ➡ K4~K6

Toolholder Dimension

Description		Std.	Dimensions (mm)						Spare Parts	Applicable Inserts ➡K4~K6	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls	Wrench see ➡ K15		Toolholder	Insert
			min.	max.								
SS10-	DRC080M-3	●	7.94	8.49	10	79	25.5	40	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-3	●	8.50	8.99		81	27.0			DC0850M-SC~DC0890M-SC		
	DRC090M-3	●	9.00	9.49		83	28.5			DC0900M-SC~DC0940M-SC		
	DRC095M-3	●	9.50	9.99		85	30.0			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-3	●	10.00	10.49	12	92	31.5	45	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-3	●	10.50	10.99		94	33.0			DC1050M-SC~DC1090M-SC		
	DRC110M-3	●	11.00	11.49		96	34.5			DC1100M-SC~DC1140M-SC		
	DRC115M-3	●	11.50	11.99		98	36.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-3	●	12.00	12.49	14	101	37.5		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-3	●	12.50	12.99		103	39.0			DC1250M-SC~DC1290M-SC		
	DRC130M-3	●	13.00	13.49		105	40.5			DC1300M-SC~DC1340M-SC		
	DRC135M-3	●	13.50	13.99		107	42.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-3	●	14.00	14.49	16	112	43.5	48	WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-3	●	14.50	14.99		114	45.0			DC1450M-SC~DC1490M-SC		
	DRC150M-3	●	15.00	15.99		118	48.0			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-3	●	16.00	16.99	18	122	51.0			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-3	●	17.00	17.99		127	54.0	49	WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-3	●	18.00	18.99	20	133	57.0	51		DC1800M-SC~DC1890M-SC	-	-
	DRC190M-3	●	19.00	19.99		137	60.0			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-3	●	20.00	20.99	25	147	63.0	57		DC2000M-SC~DC2099M-SC		
NEW	DRC210M-3	●	21.00	21.99		151	66.0	56		DC2100M-SC~DC2150M-SC		
NEW	DRC220M-3	●	22.00	22.99		156	69.0			DC2200M-SC~DC2250M-SC		
NEW	DRC230M-3	●	23.00	23.99		160	72.0			DC2300M-SC~DC2350M-SC		
NEW	DRC240M-3	●	24.00	24.99		164	75.0			DC2400M-SC~DC2450M-SC		
NEW	SS32- DRC250M-3	●	25.00	25.50	32	172	78.0	60		DC2500M-SC~DC2550M-SC		

● : Std. Item

SS-DRC (Cutting Depth: 5×D)



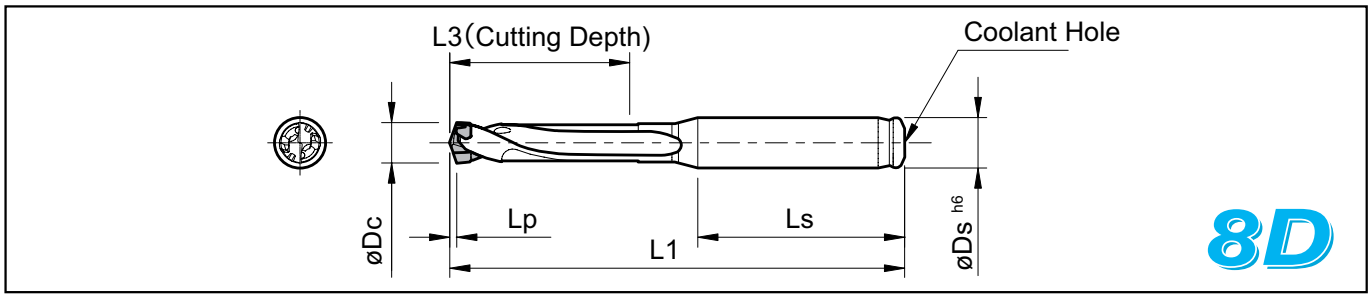
· For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimension

Description		Std.	Dimensions (mm)						Spare Parts	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls	Wrench see K15		Toolholder	Insert
			min.	max.								
SS10-	DRC080M-5	●	7.94	8.49	10	97	42.5	40	WDRC8 (WDRC17)	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	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-5	●	10.50	10.99		118	55.0			DC1050M-SC~DC1090M-SC		
	DRC110M-5	●	11.00	11.49		121	57.5			DC1100M-SC~DC1140M-SC		
	DRC115M-5	●	11.50	11.99		124	60.0			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-5	●	12.00	12.49	14	127	62.5		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-5	●	12.50	12.99		130	65.0			DC1250M-SC~DC1290M-SC		
	DRC130M-5	●	13.00	13.49		133	67.5			DC1300M-SC~DC1340M-SC		
	DRC135M-5	●	13.50	13.99		137	70.0			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-5	●	14.00	14.49	16	143	72.5	48	WDRC14 (WDRC17)	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			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-5	●	17.00	17.99		165	90.0	49	WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-5	●	18.00	18.99	20	173	95.0	51		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	57		DC2000M-SC~DC2099M-SC		
NEW	DRC210M-5	●	21.00	21.99		198	110.0	56		DC2100M-SC~DC2150M-SC		
NEW	DRC220M-5	●	22.00	22.99		204	115.0			DC2200M-SC~DC2250M-SC		
NEW	DRC230M-5	●	23.00	23.99		210	120.0			DC2300M-SC~DC2350M-SC		
NEW	DRC240M-5	●	24.00	24.99		216	125.0			DC2400M-SC~DC2450M-SC		
NEW	SS32- DRC250M-5	●	25.00	25.50	32	227	130.0	60		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

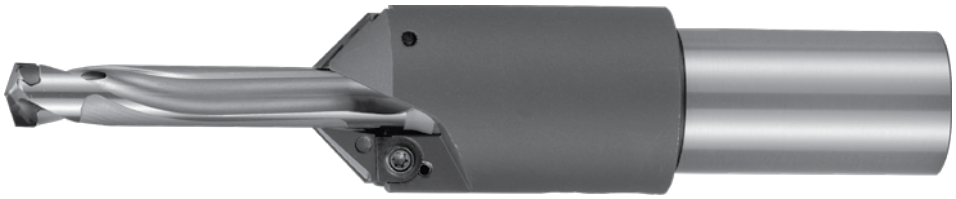
Description		Std.	Dimensions (mm)						Spare Parts	Applicable Inserts K4~K6	Applicable chamfering Holder and Insert description	
			Applicable Insert Dia. øDc		øDs (h6)	L1	L3	Ls	Wrench see K15		Toolholder	Insert
			min.	max.								
SS10-	DRC080M-8	●	7.94	8.49	10	122.5	68	40	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC	S20-CH10	CT08T2-45A
	DRC085M-8	●	8.50	8.99		127.0	72			DC0850M-SC~DC0890M-SC		
	DRC090M-8	●	9.00	9.49		131.5	76			DC0900M-SC~DC0940M-SC		
	DRC095M-8	●	9.50	9.99		137.0	80			DC0950M-SC~DC0990M-SC		
SS12-	DRC100M-8	●	10.00	10.49	12	146.5	84	45	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC	S32-CH12	CT12T3-45A
	DRC105M-8	●	10.50	10.99		151.0	88			DC1050M-SC~DC1090M-SC		
	DRC110M-8	●	11.00	11.49		155.5	92			DC1100M-SC~DC1140M-SC		
	DRC115M-8	●	11.50	11.99		160.0	96			DC1150M-SC~DC1190M-SC		
SS14-	DRC120M-8	●	12.00	12.49	14	164.5	100		WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC	S32-CH14	
	DRC125M-8	●	12.50	12.99		169.0	104			DC1250M-SC~DC1290M-SC		
	DRC130M-8	●	13.00	13.49		173.5	108			DC1300M-SC~DC1340M-SC		
	DRC135M-8	●	13.50	13.99		179.0	112			DC1350M-SC~DC1390M-SC		
SS16-	DRC140M-8	●	14.00	14.49	16	186.5	116	48	WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC	S32-CH16	
	DRC145M-8	●	14.50	14.99		191.0	120			DC1450M-SC~DC1490M-SC		
	DRC150M-8	●	15.00	15.99		200.0	128			DC1500M-SC~DC1580M-SC		
SS18-	DRC160M-8	●	16.00	16.99	18	209.0	136			DC1600M-SC~DC1690M-SC	S32-CH18	
	DRC170M-8	●	17.00	17.99		219.0	144	49	WDRC17	DC1700M-SC~DC1790M-SC		
SS20-	DRC180M-8	●	18.00	18.99	20	230.0	152	51		DC1800M-SC~DC1890M-SC	-	-
	DRC190M-8	●	19.00	19.99		239.0	160			DC1900M-SC~DC1990M-SC		
SS25-	DRC200M-8	●	20.00	20.99	25	254.0	168	57		DC2000M-SC~DC2099M-SC		
NEW	DRC210M-8	●	21.00	21.99		264.0	176	56		DC2100M-SC~DC2150M-SC		
NEW	DRC220M-8	●	22.00	22.99		273.0	184			DC2200M-SC~DC2250M-SC		
NEW	DRC230M-8	●	23.00	23.99		282.0	192			DC2300M-SC~DC2350M-SC		
NEW	DRC240M-8	●	24.00	24.99		291.0	200			DC2400M-SC~DC2450M-SC		
NEW	SS32- DRC250M-8	●	25.00	25.50	32	305.0	208	60		DC2500M-SC~DC2550M-SC		

● : Std. Item

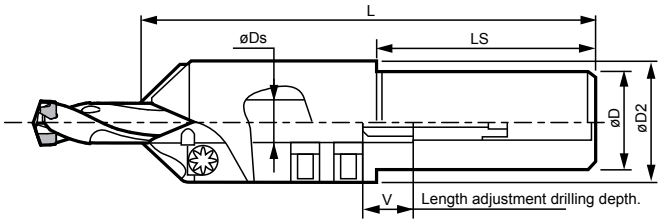
Chamfering attachment

Drilling and chamfering simultaneously

By using the chamfering attachment, the SS-DRC can perform drilling and chamfering in parallel.



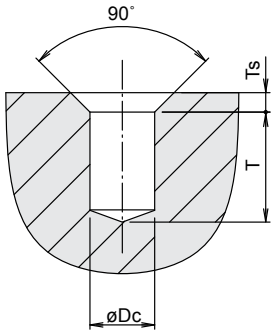
●Toolholder



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

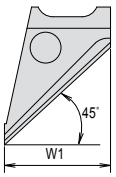


Cutting Dia (mm)		Cutting Depth (mm)						Chamfering dimension (mm)		Applicable Toolholders
øDc		T (3D Drill)		T (5D Drill)		T (8D Drill)		Ts		
min	max	min	max	min	max	min	max	Ts 100	Ts max	
ø7.94	ø8.49	11	19	21	37	47	63	2.5	5.0	**S20-CH10**
ø8.50	ø8.99	12	21	24	40	51	67			
ø9.00	ø9.49	12	23	27	43	56	72			
ø9.50	ø9.99	13	25	31	47	61	77			
ø10.00	ø10.49	13	26	28	49	60	81	3.5	7.0	**S32-CH12**
ø10.50	ø10.99	14	28	31	52	64	85			
ø11.00	ø11.49	14	30	34	55	69	90			
ø11.50	ø11.99	15	32	37	58	73	94			
ø12.00	ø12.49	15	30	41	56	79	94	4.0	8.0	**S32-CH14**
ø12.50	ø12.99	17	32	44	59	83	96			
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)

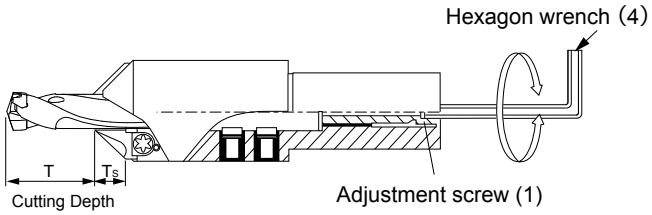
● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Applicable chamfering Inserts

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

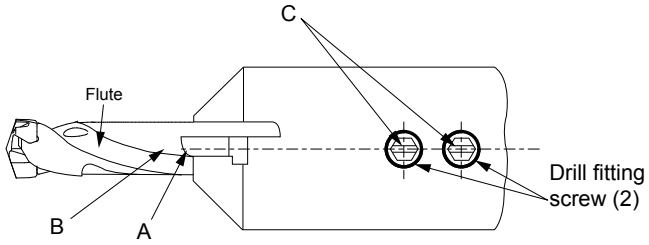
Method to use DRC chamfering attachment

Ⅰ. Drilling depth adjustment



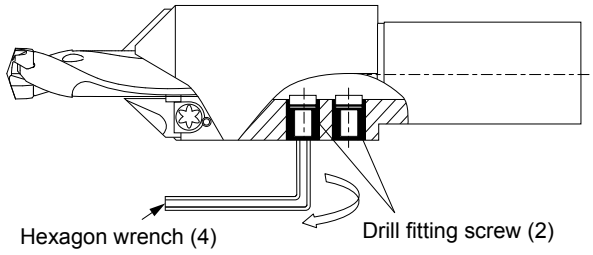
Insert drill into chamfering attachment.
Next, temporarily attach the chamfering insert A.
Turn the adjusting screw (1) with the hexagon wrench (4) to set the drilling depth T.

Ⅱ. Drill location check



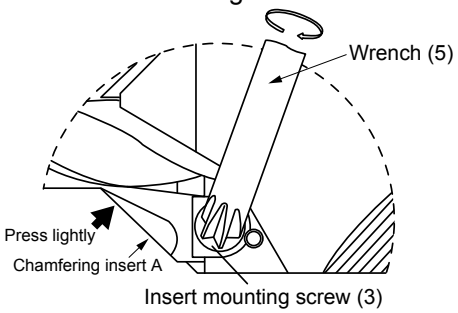
Rotate the drill so that the lower end of the chamfering insert A is aligned with the body clearance B of the drill.
Set it so that slot C and the drill fitting screws (2) are lined up as shown in the figure above.

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



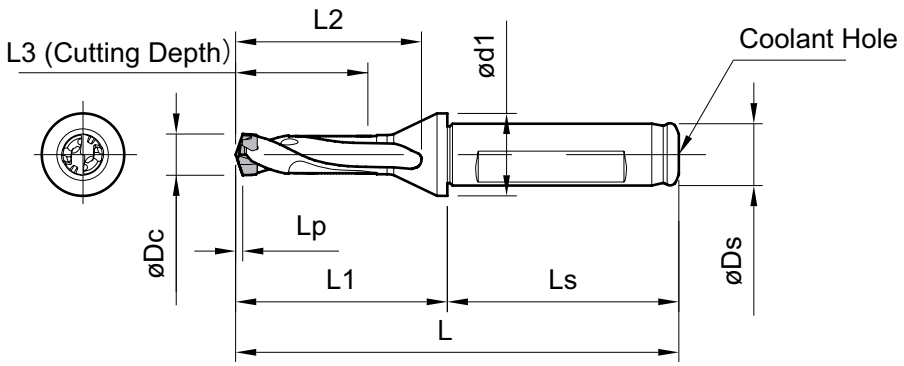
Press the chamfering insert A lightly into the drill and tighten the insert mounting screw (3) with wrench (5).

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		DT-15
S32-CH14	20	AJ-10×46	FS-14		LW-4	
S32-CH16	30		FS-16			
S32-CH18	45		FS-18		LW-5	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes

SF-DRC (Cutting Depth: 3×D)



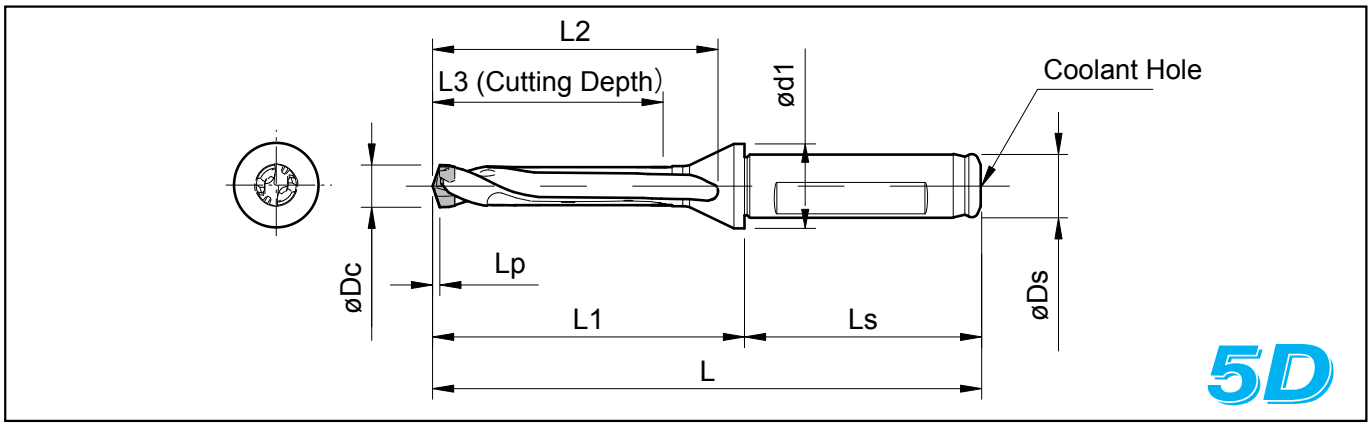
· For Lp indicates distance from drill point to corner edge, see K4~K6

Toolholder Dimension

Description		Std.	Dimensions (mm)									Spare Parts	Applicable Inserts K4~K6
			Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1	Wrench see K15	
			min.	max.									
SF12-	DRC080M-3	●	7.94	8.49	12	86	41	35	26	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-3	●	8.50	8.99		88	43	37	27				DC0850M-SC~DC0890M-SC
	DRC090M-3	●	9.00	9.49		90	45	39	29				DC0900M-SC~DC0940M-SC
	DRC095M-3	●	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	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-3	●	10.50	10.99		99	51	45	33				DC1050M-SC~DC1090M-SC
	DRC110M-3	●	11.00	11.49		101	53	47	35				DC1100M-SC~DC1140M-SC
	DRC115M-3	●	11.50	11.99		103	55	49	36				DC1150M-SC~DC1190M-SC
	DRC120M-3	●	12.00	12.49		106	58	52	38			WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-3	●	12.50	12.99		108	60	54	39				DC1250M-SC~DC1290M-SC
	DRC130M-3	●	13.00	13.49		110	62	56	41				DC1300M-SC~DC1340M-SC
	DRC135M-3	●	13.50	13.99		112	64	58	42				DC1350M-SC~DC1390M-SC
	DRC140M-3	●	14.00	14.49		114	66	60	44			WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-3	●	14.50	14.99		116	68	62	45				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-3	●	15.00	15.99	20	122	72	66	48	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-3	●	16.00	16.99		126	76	70	51				DC1600M-SC~DC1690M-SC
	DRC170M-3	●	17.00	17.99		131	81	75	54				DC1700M-SC~DC1790M-SC
SF25-	DRC180M-3	●	18.00	18.99	25	141	85	79	57	56	32	WDRC17	DC1800M-SC~DC1890M-SC
	DRC190M-3	●	19.00	19.99		145	89	83	60				DC1900M-SC~DC1990M-SC
	DRC200M-3	●	20.00	20.99		149	93	87	63				DC2000M-SC~DC2099M-SC
NEW	DRC210M-3	●	21.00	21.99		153	97	91	66				DC2100M-SC~DC2150M-SC
NEW	DRC220M-3	●	22.00	22.99		158	102	96	69				DC2200M-SC~DC2250M-SC
NEW	DRC230M-3	●	23.00	23.99		162	106	100	72				DC2300M-SC~DC2350M-SC
NEW	DRC240M-3	●	24.00	24.99		166	110	104	75				DC2400M-SC~DC2450M-SC
NEW	DRC250M-3	●	25.00	25.50		170	114	108	78				DC2500M-SC~DC2550M-SC

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

SF-DRC (Cutting Depth: 5×D)



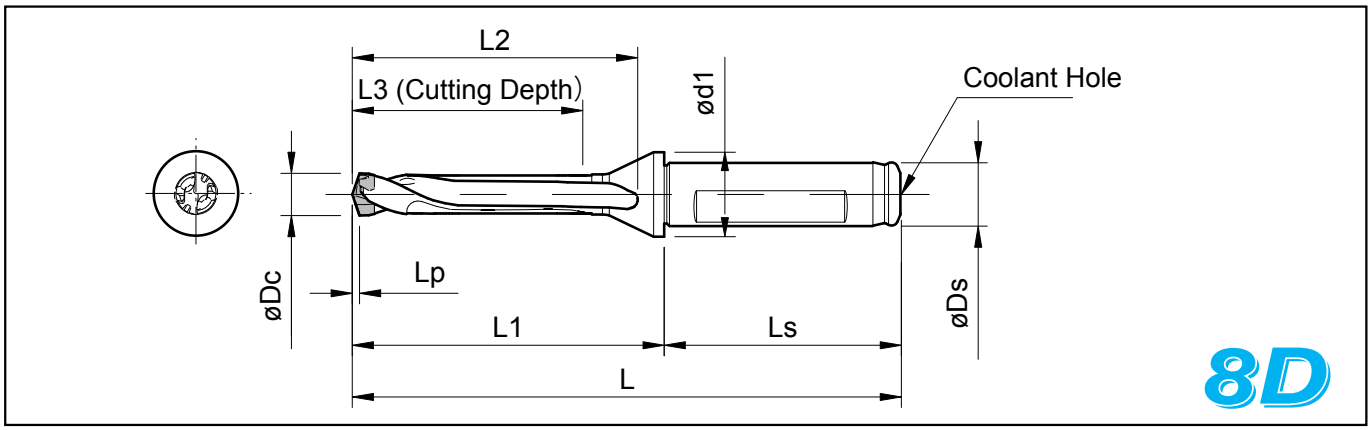
· For Lp indicates distance from drill point to corner edge, see K4~K6

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 K15	
			min.	max.									
SF12-	DRC080M-5	●	7.94	8.49	12	104	59	53	43	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-5	●	8.50	8.99		107	62	56	45				DC0850M-SC~DC0890M-SC
	DRC090M-5	●	9.00	9.49		110	65	59	48				DC0900M-SC~DC0940M-SC
	DRC095M-5	●	9.50	9.99		114	69	63	50				DC0950M-SC~DC0990M-SC
SF16-	DRC100M-5	●	10.00	10.49	16	120	72	66	53	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-5	●	10.50	10.99		123	75	69	55				DC1050M-SC~DC1090M-SC
	DRC110M-5	●	11.00	11.49		126	78	72	58				DC1100M-SC~DC1140M-SC
	DRC115M-5	●	11.50	11.99		129	81	75	60				DC1150M-SC~DC1190M-SC
	DRC120M-5	●	12.00	12.49		132	84	78	63			WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-5	●	12.50	12.99		135	87	81	65				DC1250M-SC~DC1290M-SC
	DRC130M-5	●	13.00	13.49		138	90	84	68				DC1300M-SC~DC1340M-SC
	DRC135M-5	●	13.50	13.99		142	94	88	70				DC1350M-SC~DC1390M-SC
	DRC140M-5	●	14.00	14.49		145	97	91	73			WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-5	●	14.50	14.99		148	100	94	75				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-5	●	15.00	15.99	20	156	106	100	80	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-5	●	16.00	16.99		162	112	106	85				DC1600M-SC~DC1690M-SC
	DRC170M-5	●	17.00	17.99		169	119	113	90				DC1700M-SC~DC1790M-SC
SF25-	DRC180M-5	●	18.00	18.99	25	181	125	119	95	56	32	WDRC17	DC1800M-SC~DC1890M-SC
	DRC190M-5	●	19.00	19.99		187	131	125	100				DC1900M-SC~DC1990M-SC
	DRC200M-5	●	20.00	20.99		193	137	131	105				DC2000M-SC~DC2099M-SC
NEW	DRC210M-5	●	21.00	21.99		200	144	138	110				DC2100M-SC~DC2150M-SC
NEW	DRC220M-5	●	22.00	22.99		206	150	144	115				DC2200M-SC~DC2250M-SC
NEW	DRC230M-5	●	23.00	23.99		212	156	150	120				DC2300M-SC~DC2350M-SC
NEW	DRC240M-5	●	24.00	24.99		218	162	156	125				DC2400M-SC~DC2450M-SC
NEW	DRC250M-5	●	25.00	25.50		225	169	163	130				DC2500M-SC~DC2550M-SC

● : Std. Item

SF-DRC (Cutting Depth: 8×D)



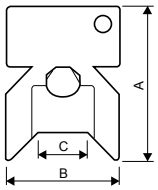
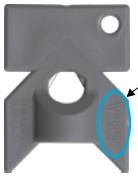
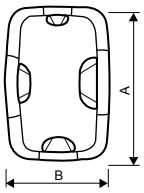
· For Lp indicates distance from drill point to corner edge, see ➡ K4~K6

Toolholder Dimension

Description		Std.	Dimensions (mm)								Spare Parts	Applicable Inserts ➡ K4~K6
			Applicable Insert Dia. øDc		øDs (h6)	L	L1	L2	L3	Ls	ød1	Wrench see ➡ K15	
			min.	max.									
SF12-	DRC080M-8	●	7.94	8.49	12	129	84	79	68	45	16	WDRC8 (WDRC17)	DC0794M-SC~DC0840M-SC
	DRC085M-8	●	8.50	8.99		134	89	83	72				DC0850M-SC~DC0890M-SC
	DRC090M-8	●	9.00	9.49		138	93	88	76				DC0900M-SC~DC0940M-SC
	DRC095M-8	●	9.50	9.99		144	99	93	80				DC0950M-SC~DC0990M-SC
SF16-	DRC100M-8	●	10.00	10.49	16	151	103	97	84	48	20	WDRC10 (WDRC17)	DC1000M-SC~DC1040M-SC
	DRC105M-8	●	10.50	10.99		156	108	102	88				DC1050M-SC~DC1090M-SC
	DRC110M-8	●	11.00	11.49		160	112	107	92				DC1100M-SC~DC1140M-SC
	DRC115M-8	●	11.50	11.99		165	117	111	96				DC1150M-SC~DC1190M-SC
	DRC120M-8	●	12.00	12.49		169	121	116	100			WDRC12 (WDRC17)	DC1200M-SC~DC1240M-SC
	DRC125M-8	●	12.50	12.99		174	126	120	104				DC1250M-SC~DC1290M-SC
	DRC130M-8	●	13.00	13.49		178	130	124	108				DC1300M-SC~DC1340M-SC
	DRC135M-8	●	13.50	13.99		184	136	130	112				DC1350M-SC~DC1390M-SC
	DRC140M-8	●	14.00	14.49		188	140	134	116			WDRC14 (WDRC17)	DC1400M-SC~DC1440M-SC
	DRC145M-8	●	14.50	14.99		193	145	139	120				DC1450M-SC~DC1490M-SC
SF20-	DRC150M-8	●	15.00	15.99	20	204	154	148	128	50	25		DC1500M-SC~DC1580M-SC
	DRC160M-8	●	16.00	16.99		213	163	157	136				DC1600M-SC~DC1690M-SC
	DRC170M-8	●	17.00	17.99		223	173	167	144			WDRC17	DC1700M-SC~DC1790M-SC
SF25-	DRC180M-8	●	18.00	18.99	25	238	182	176	152	56	32		DC1800M-SC~DC1890M-SC
	DRC190M-8	●	19.00	19.99		247	191	185	160				DC1900M-SC~DC1990M-SC
	DRC200M-8	●	20.00	20.99		256	200	194	168				DC2000M-SC~DC2099M-SC
NEW	DRC210M-8	●	21.00	21.99		266	210	204	176				DC2100M-SC~DC2150M-SC
NEW	DRC220M-8	●	22.00	22.99		275	219	213	184				DC2200M-SC~DC2250M-SC
NEW	DRC230M-8	●	23.00	23.99		284	228	222	192				DC2300M-SC~DC2350M-SC
NEW	DRC240M-8	●	24.00	24.99		293	237	231	200				DC2400M-SC~DC2450M-SC
NEW	DRC250M-8	●	25.00	25.50		303	247	241	208				DC2500M-SC~DC2550M-SC

● : Std. Item

Wrench

Shape		Description	Dimensions (mm)			Remarks
			A	B	C	
		**WDRC8**	43	33	ø10.2	
		WDRC10			ø12.2	
		WDRC12			ø14.2	
		WDRC14			ø17.2	
		**WDRC17**	77	52	-	·WDRC17(Multiple type wrench) has four insert entry points. If using an insert ranging from DC1700M-SC to DC2099M-SC, use the entry point printed as “ø17.00~ø20.99”. ·WDRC17 can be used instead of WDRC8~14 wrench.

Method to change DRC type MagicDrill inserts

How to attach inserts

① Fix drill holder on arbor.
For insert exchange, fix arbor on the machine or set on toolpresetter.
② Remove dust using air blow.

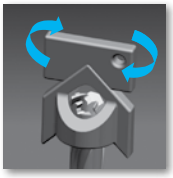
③ Install insert onto holder.
(Use gloves to protect your hand from any danger.)

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

⑤ Align the wrench properly with the insert.

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

(Improper alignment shown)

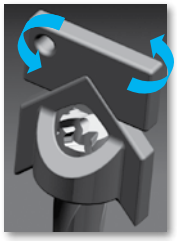


⑦ Turn the wrench in a slow counterclockwise direction.
⑧ Completed.

How to detach inserts

① Remove dust from insert using air blower.
② Align the wrench properly with the insert.

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



④ Turn the wrench in a counterclockwise direction.

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

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

Recommended Cutting Conditions

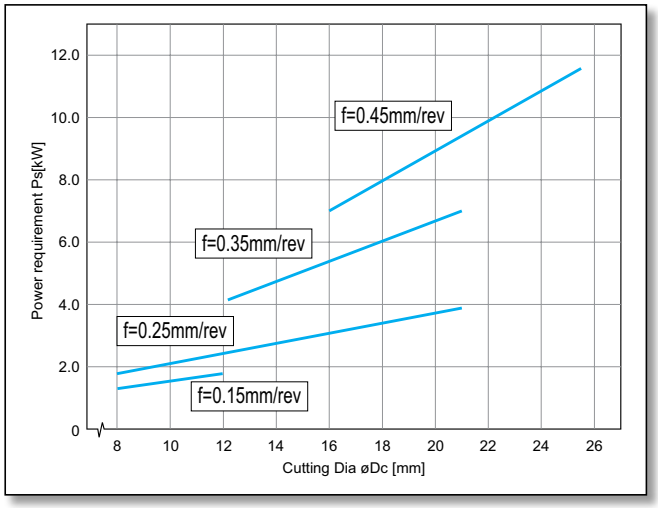
Workpiece Material		Hardness (HB)	Cutting conditions: Cutting Speed Vc(m/min)	Cutting conditions: Spindle Revolution n (min⁻¹) / Feed Rate f (mm/rev)	Cutting Dia øDc (mm) ø8	ø10	ø12	ø14	ø16	ø18	ø20	ø25	Remarks
Low-carbon Steel	SS400 S10C~S25C	125	120 - 180	n (min⁻¹)	4,780 - 7,170	3,820 - 5,730	3,180 - 4,780	2,730 - 4,090	2,390 - 3,580	2,120 - 3,180	1,910 - 2,870	1,530 - 2,290	Coolant (See K17)
				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	

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

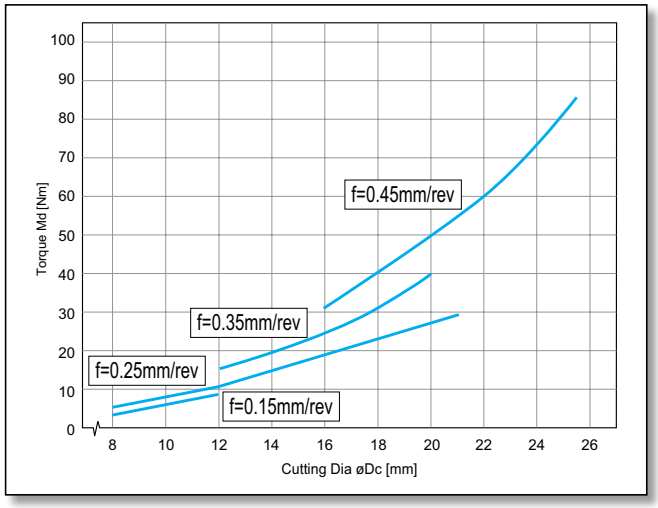
Reference charts

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

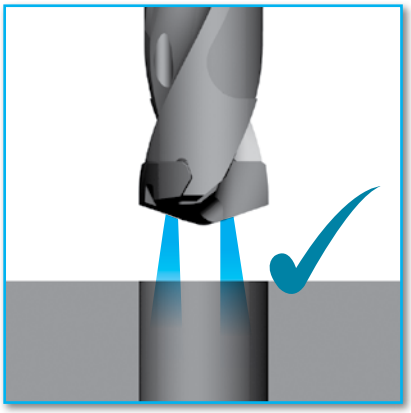
Power requirement



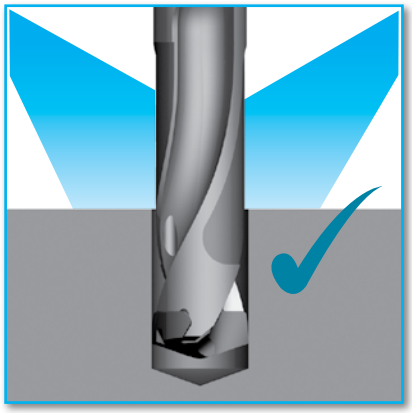
Torque



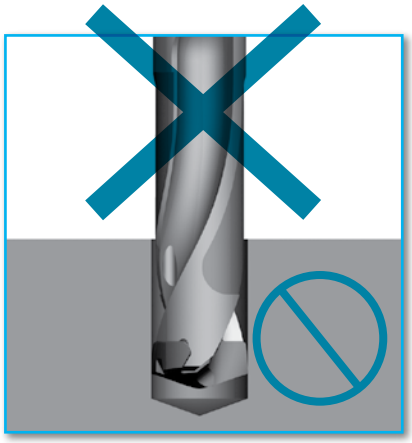
Coolant



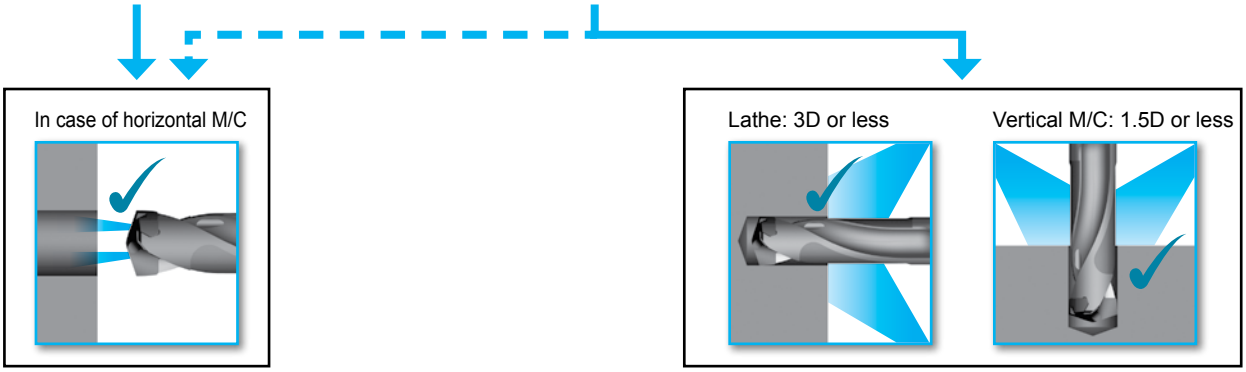
1) Internal coolant is recommended.



2) In case of external coolant



3) Dry cutting is not recommended.

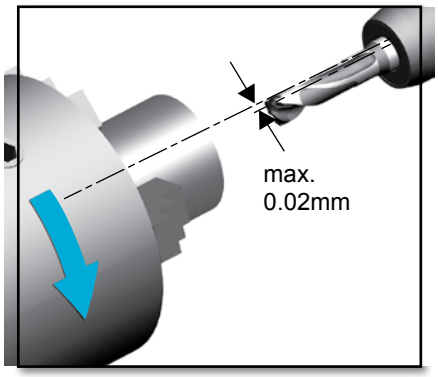


Internal coolant is recommended for horizontal machining center because external coolant may not sufficiently be applied to inside because the tool is revolving.

Precautions for use

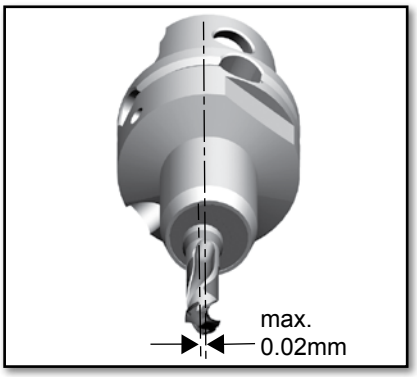
● Core Deviation

1) If drill is stationary



This is usable for 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.

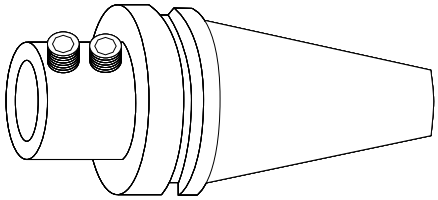
Cautions for installation on Machining Center

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.

Hydro Chuck
Power Chuck
Collet Chuck

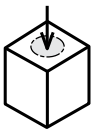
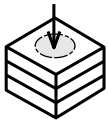
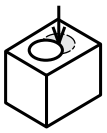
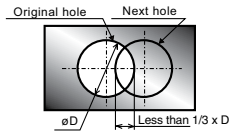
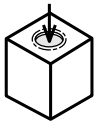
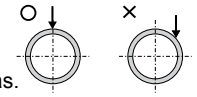
Install MagicDrill DRC to above chuck

1st Recommendation

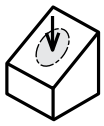
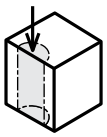
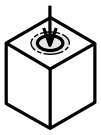


Example of side lock arbor
2nd Recommendation

Applicable workpiece

Application	Shape of Workpiece	Caution for machining
Plain Surface		1. Due to good chip control, step machining is not necessary for Soft Steel like SS400. 2. When machining SUS304, for hole depths of more than 2.5D, utilize the step machining process. 3. In order to have smooth chip removal, we recommend internal coolant.
Stacked Plates		1. Fix stacked plates securely to ensure they do not slip while machining.
Hole Expansion		1. If the overlap amount is less than 1/3 x D, machining is possible. 
Concave Surface		1. When machining concave holes set the feed rates at half or less than continuous hole machining.
Pipe Material		1. Hole machining above the centerline of the pipe is possible. 2. Do not machine on curved surface areas. 

Not Recommended workpieces

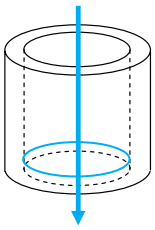
Application	Shape of Workpiece
Slant Surface	
Half Cylindrical	
Cored Hole	

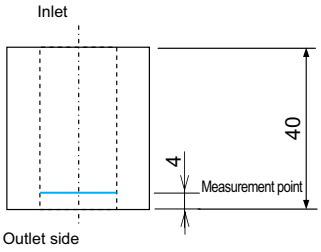
Comparison of Cutting Precision

Cutting Condition and Measurement Point

<Cutting conditions>

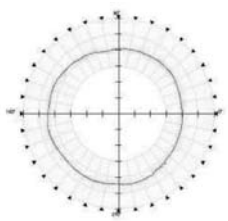
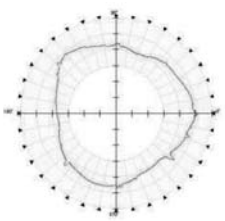
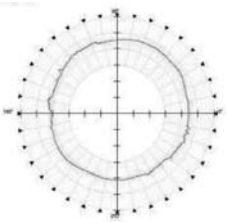
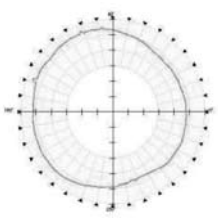
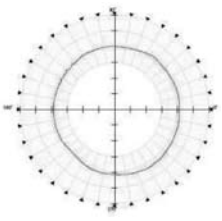
Workpiece Material	C45 (S45C)
Vc (m/min)	100
f (mm/rev)	0.2mm/rev, 0.3mm/rev
Drilling depth H (mm)	Through hole (40mm)
Coolant	Wet (Internal coolant)
Tool	ø14 × 3D type
Machine	M/C



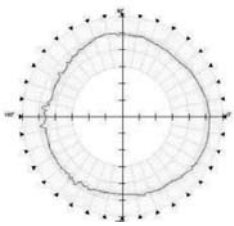
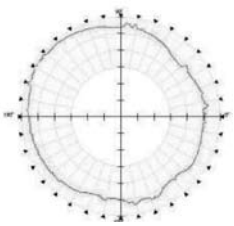
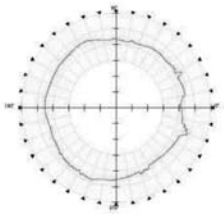
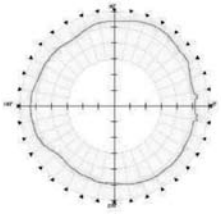
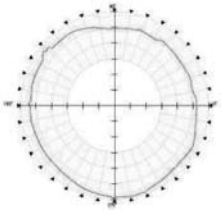


Roundness

1) Roundness (f=0.2mm/rev)

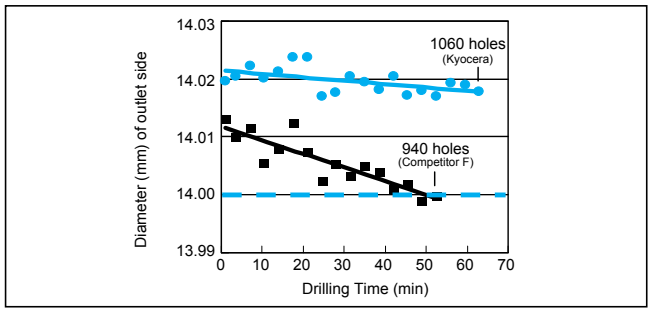
Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness: 5.5 µm	Roundness: 22.5µm	Roundness: 6.4µm	Roundness: 9.8µm	Roundness: 5.2µm

2) Roundness (f=0.3mm/rev)

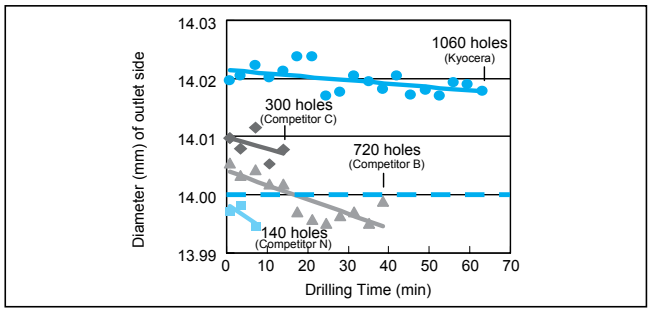
Indexable drill		Carbide solid drill		
Kyocera	Competitor F	Competitor B	Competitor C	Competitor N
				
Roundness: 10.7µm	Roundness: 15.2µm	Roundness: 12.0µm	Roundness: 11.8µm	Roundness: 12.3µm

Drilling Diameter (f = 0.3 mm/rev)

1) Comparison with indexable drill



2) Comparison with carbide solid drill



Q&A

Q-3 In 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?

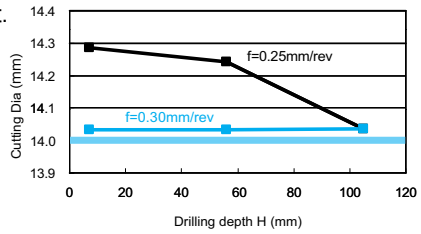
A-3 There are some countermeasures as follows to prevent deflection (to improve bite of drill).

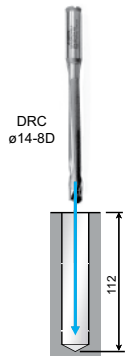
Countermeasures 1

● 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

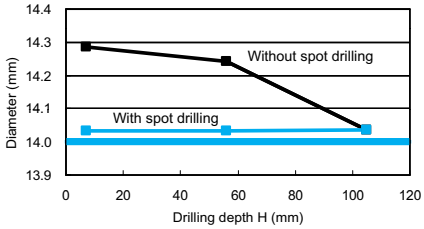
Countermeasures 2

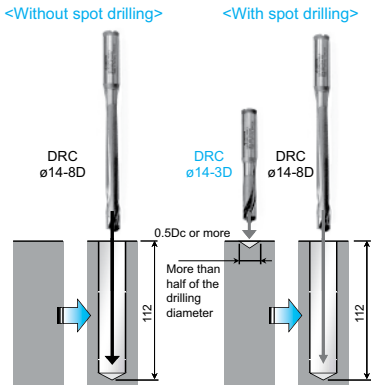
● Making a center spot

1) Make a center spot using the DRC drill or a commercially available center drill whose vertex angle is 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)

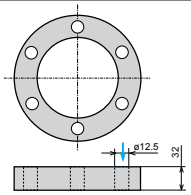




Case Studies

C50 (S50C)

- Flange
- Vc=97m/min (n=2,490min^{-1})
- H=32mm
- f=0.3mm/rev (Vf=747mm/min)
- Wet (Internal Coolant)
- DC1250M-SC (PR0315)



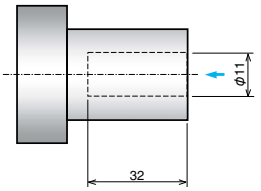
SS14-DRC120M-3	3,000holes/insert
Competitor A	1,800holes/drill

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)

- 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.

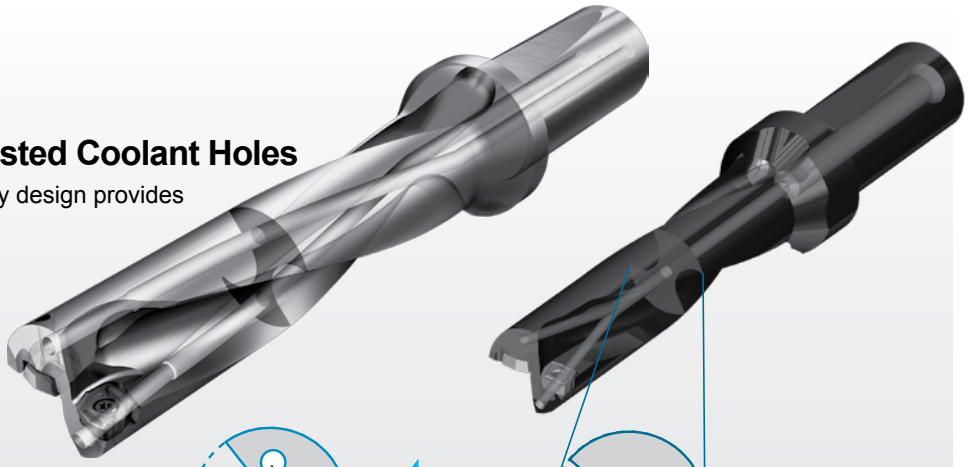
(Evaluation by the user)

DRX provides you stable and efficient drilling

New Technology: Twisted Coolant Holes

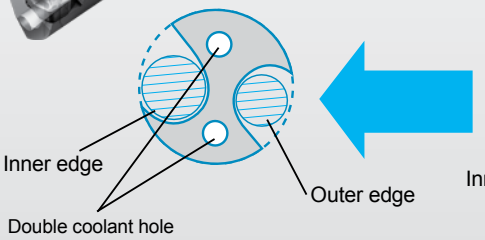
Twisted Coolant Hole technology design provides

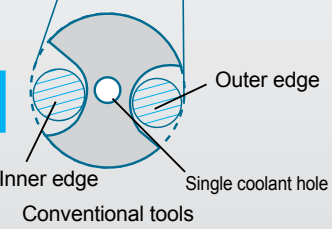
Superior Chip Evacuation



The flute space of internal cutting edge side providing increased chip evacuation.

The coolant performance is 1.25 times

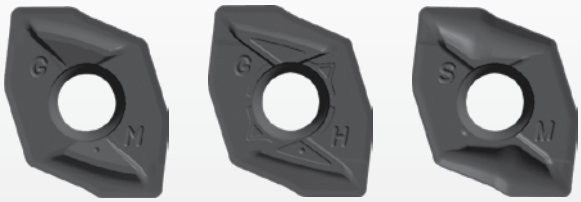




The special alloy provides tool holder rigidity and increased reliability.

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

- Covers a variety of workpiece materials



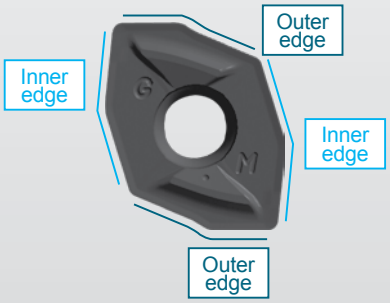
GM Chipbreaker
Carbon Steel,Cast Iron
General Purpose

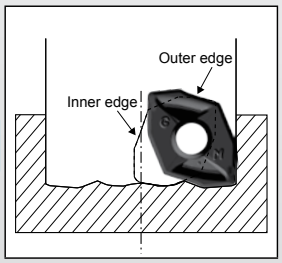
GH Chipbreaker
for hard materials
Edge strengthened type

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

- Economical 4 edge type

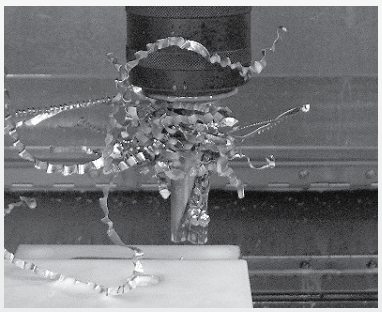
2 inner pocket cutting edges and 2 outer pocket cutting edges





positioning of outer edge and inner edge

- Sticky chip troubles of stainless steel or low carbon steel workpiece are solved.

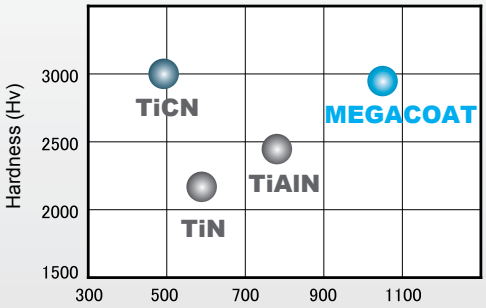


Long entangled chips (competitor A)

Chips by SM chipbreaker (SUS304)

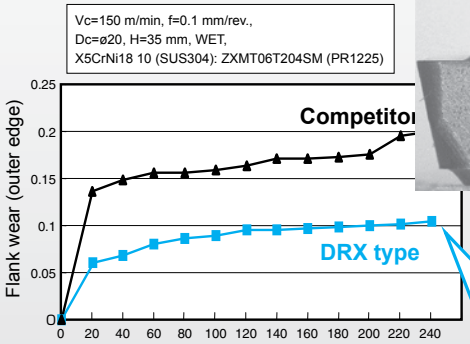
New Insert Grade: The three grades are coming

(PR1230: for Steel, PR1225: for Stainless Steel / Low Carbon Steel, PR1210: fo



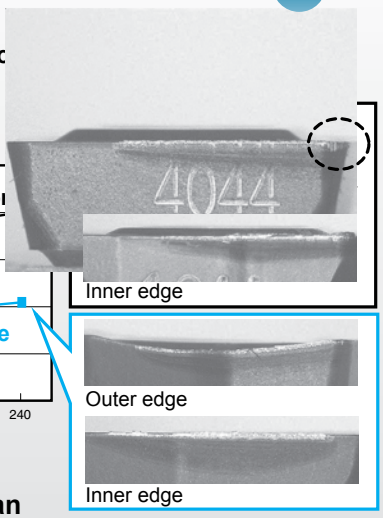
MEGACOAT's High oxidation resistance

MEGACOAT is adopted to enable Longer Tool Life



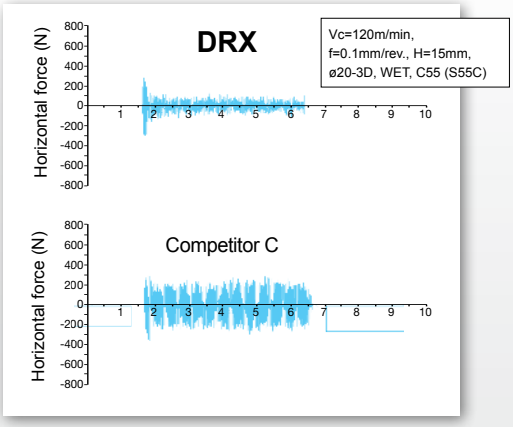
Wear comparison

Better wear resistance than competitor B Achieving long Tool Life



High Precision: Balanced System

Vibration comparison

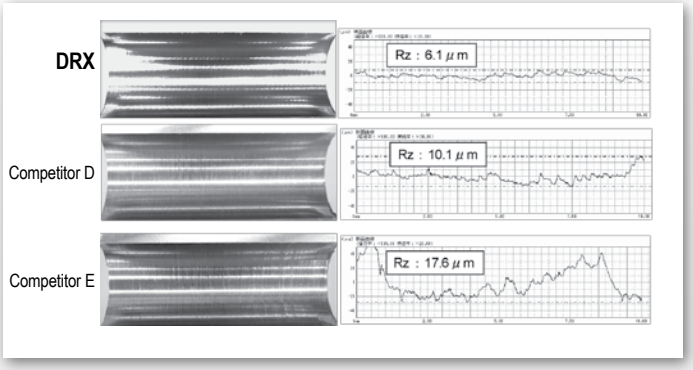


Less vibration due to well balanced at Drilling

Better finishing surface

Finished surface comparison

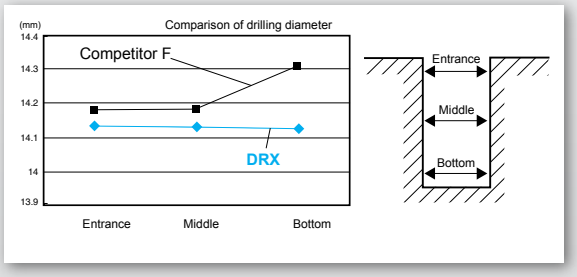
Vc=180m/min, f=0.15mm/rev., H=60mm (through hole), ø20-3D, WET, C45 (S45C), NC Lathe



Better finished surface than Competiror D and E

Possible to extend tool life of next process

Variation of drilling diameter



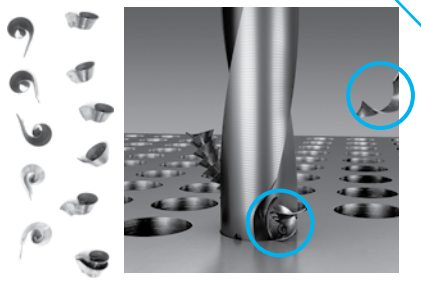
Vc=180m/min, f=0.08mm/rev., H=56mm (blind hole), ø14-4D, WET, C50

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

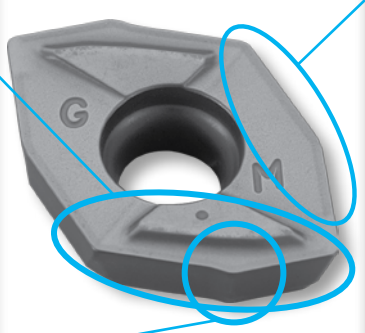
Covers a variety of workpiece materials with new chipbreaker

New chipbreaker features

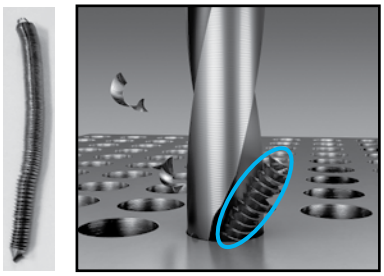
◆Wider chipbreaker (outer edge)



small chips for better evacuation

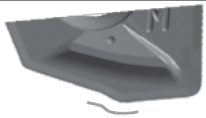


◆Flat chipbreaker (inner edge)



ideal continuous chips

◆Sigmoid cutting edge (outer edge)

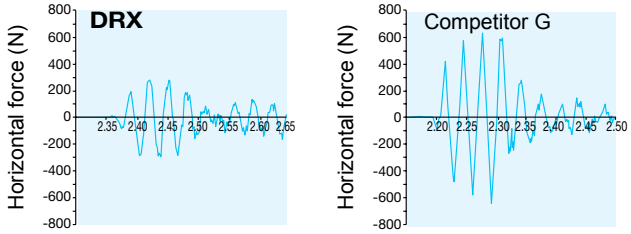


sigmoid outer cutting edge

↓

sharp cutting

Vc=120m/min, f=0.1mm/rev., H=15mm, ø20-3D, WET, C55 (S55C)



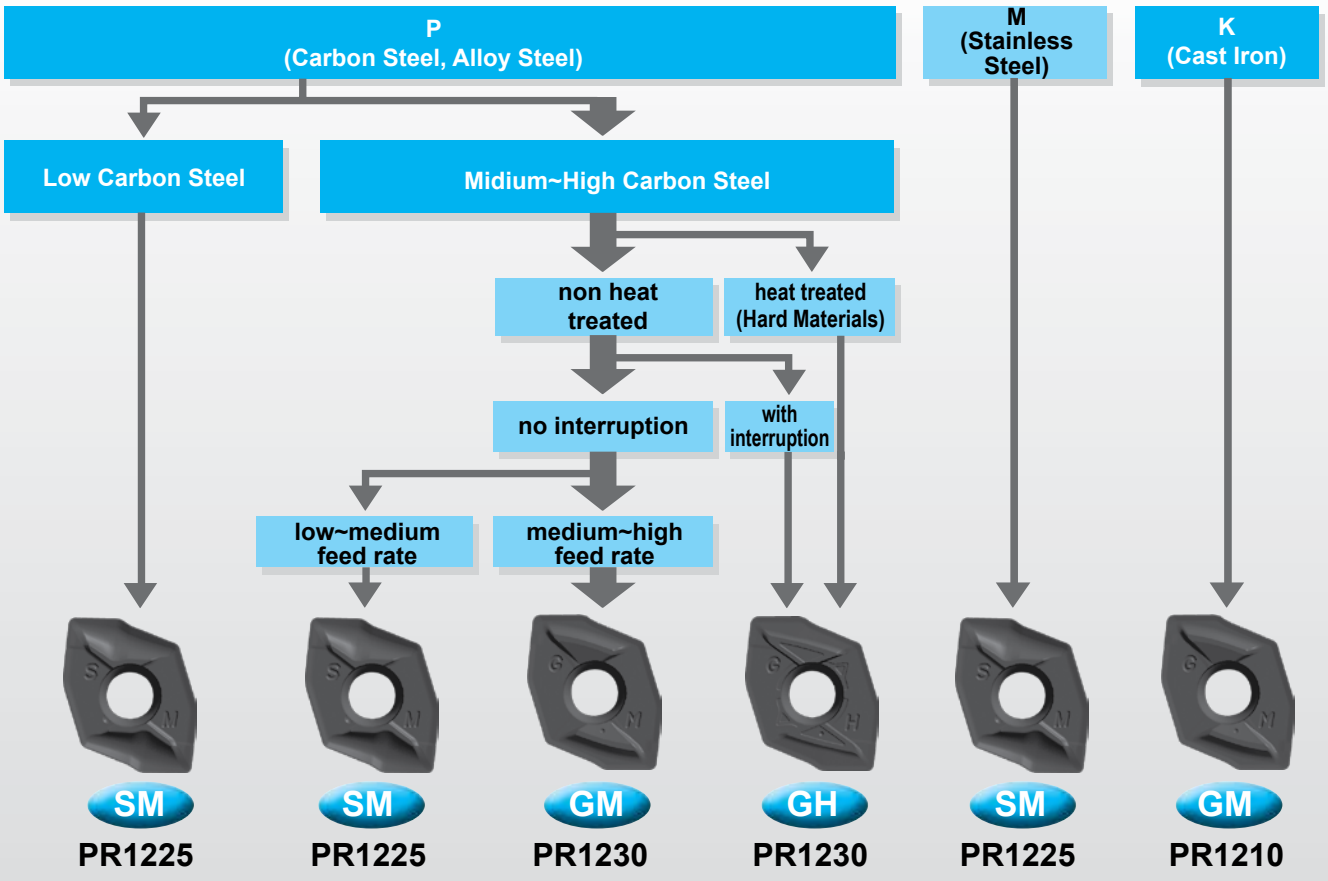
Cutting force comparison of outer edge at the start of drilling

Lowered impact force at the start

↓

Reduce sudden breakage at the start

Chipbreaker selection

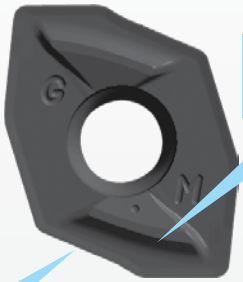


design developed through comprehensive technology

● 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

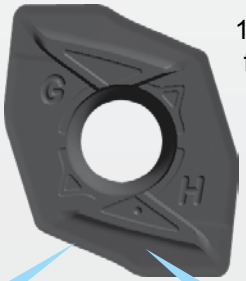
② Achieved good balance of cutting edge strength and sharp cutting

for general cutting

Optimized cutting edge strength, sharpness and chip control

◆ GH Chipbreaker…Tough Edge

For hard materials, interrupted machining: PR1230



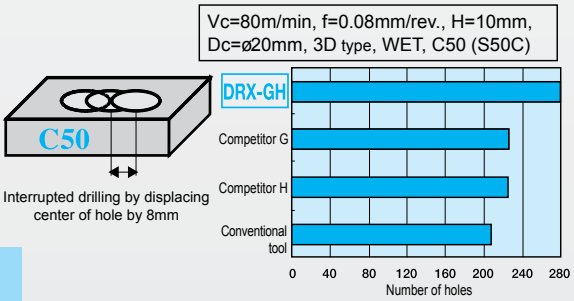
1st recommended chipbreaker for hard materials interrupted operation

Cutting edge strength oriented design of Chipbreaker

① Wider chipbreaker control breakage by pressed chips

② Cutting edge strength oriented design

• Chipping resistance comparison



Better chipping resistance than competitors

◆ SM Chipbreaker…Sharp Cutting, for Deeper Drilling

For Stainless Steel, Low Carbon Steel: PR1225

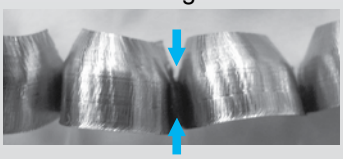
For deep drilling of difficult to control chips materials such as stainless steel and low carbon steel

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

② Sharp cutting by large rake angle

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

Outstanding chip control achieved by splitting chips from the enter edges



Chip breaking system of SM chipbreaker (Outer edge)

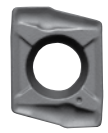
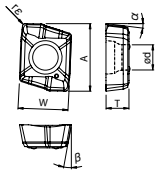
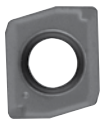
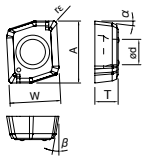
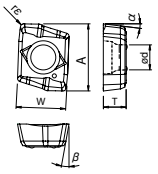
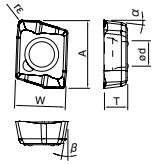
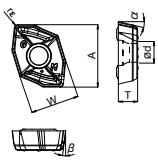
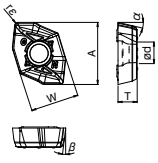
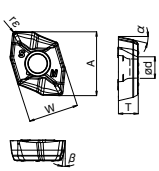
K

Drilling

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°	10°	●		●		
		05T203GM	7.3	2.74	2.5	5.5	0.3		7°	●		●		
		06T204GM	8.6	2.89	2.8	6.4	0.4			●		●		
		070305GM	10.2	3.24	3.0	8.0	0.5			●		●		
		09T306GM	12.2	4.03	3.6	9.6	0.6			●		●		
		11T306GM	14.5	4.06	4.6	11.6	0.6			●		●		
		140408GM	18.0	4.88	5.7	14.4	0.8			●		●		
		170608GM	22.1	6.58	6.8	17.7	0.8			●		●		
		ZXMT 040203GH	6.2	2.60	2.4	5.1	0.3	13°	10°	●				K26 K27 K28 K29 K30 K31 K32
		05T203GH	7.3	2.74	2.5	5.5	0.3		7°	●				
		06T204GH	8.6	2.89	2.8	6.4	0.4			●				
		070305GH	10.2	3.24	3.0	8.0	0.5			●				
		09T306GH	12.2	4.03	3.6	9.6	0.6			●				
		11T306GH	14.5	4.06	4.6	11.6	0.6			●				
		140408GH	18.0	4.88	5.7	14.4	0.8			●				
		170608GH	22.1	6.58	6.8	17.7	0.8			●				
		ZXMT 040203SM	6.2	2.60	2.4	5.1	0.3	13°	10°		●		●	
		05T203SM	7.3	2.74	2.5	5.5	0.3		7°		●		●	
		06T204SM	8.6	2.89	2.8	6.4	0.4				●		●	
		070305SM	10.2	3.24	3.0	8.0	0.5				●		●	
		09T306SM	12.2	4.03	3.6	9.6	0.6				●		●	
		11T306SM	14.5	4.06	4.6	11.6	0.6				●		●	
		140408SM	18.0	4.88	5.7	14.4	0.8				●		●	
		170608SM	22.1	6.58	6.8	17.7	0.8				●		●	

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

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 : ø12 ~ ø13)

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

・Outer edge

ZXMT030203○○-E

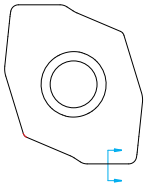
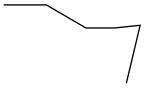
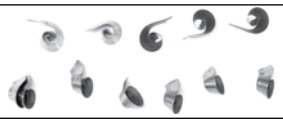
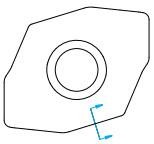
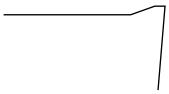
GM-E GH-E SM-E

・Inner Edge

ZXMT030203GM-I

GM-I

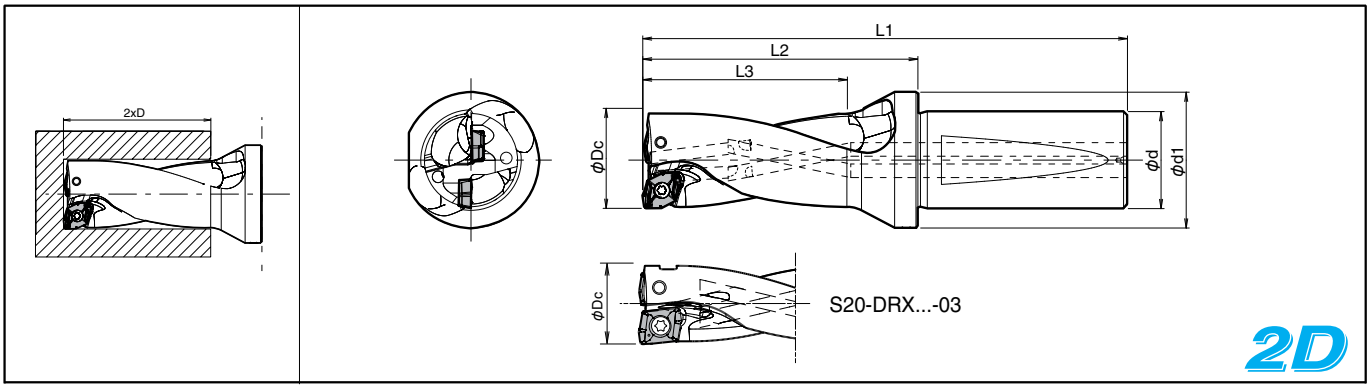
Advantages of the Chipbreaker

Chipbreaker			GM	GH	SM
Insert					
Advantages			1st. recommendation for carbon steel and alloy steel,1st. recommendation for cast iron.	1st. recommendation for interrupted machining and hard materials. Cutting edge strength oriented design.	Suitable for sticky materials such as stainless steel and low carbon steel
			Good balance of sharp cutting and cutting edge strength	Middle to high feed rates of steel machining, GM Chipbreaker alternative	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 of tool life of MagicDrill

How to judge tool life	Indication of judging tool life
Generation status of tool mark involving with insert wearness	• When an insert is new, A holder is slightly bend external side during cutting. (It is designed that cutting diameter is slightly bigger during cutting.) Once cutting is finished, a holder will be back to normal size and smaller than cutting diameter. Tool mark will not be appeared on the finishing surface. (Although depends on workpiece and cutting condition, cutting power which generates external direction, slightly tool mark might be appeared.) • When an insert is at the end of tool life, Gradually external corner part is getting wear, cutting resistance which is generated in inside, a holder will be not bend, on the contrary it will be bend inside. Once cutting is finished, a holder will be back to normal. Pulling off a holder under this condition, external edge touches on finishing surface and tool mark will be on its finishing surface.
Tracing cutting diameter	When cutting diameter is measured, suddenly it shows small diameter. In this case, an insert can be judged the end of tool life.
Generating status of at the exit side	If insert wear progress. Burrs of penetrated hole entrance (Pulling out burrs) will be bigger and identified as the insert has reached at the end of tool life.
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, vibration is getting larger and cutting noise is getting change. However, same as vibration and cutting noise, it is difficult to identify for small cutting diameter type.

DRX (Cutting Depth:2×D)



Toolholder Dimensions

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

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K24
S40 -DRX320M-2-11	●		32	169	100	64			+2.2			
-DRX330M-2-11	●		33	171	102	66			+1.9			
-DRX340M-2-11	●		34	173	104	68			+1.7			
-DRX350M-2-11	●	2	35	175	106	70	40	55	+1.4	SB-4085TR	DTM-15	ZXMT11T306○○
-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			
-DRX390M-2-14	●		39	179	110	78			+2.8			
-DRX400M-2-14	●		40	181	112	80		55	+2.5			
-DRX410M-2-14	●		41	183	114	82			+2.3			
-DRX420M-2-14	●		42	185	116	84			+2.0			
-DRX430M-2-14	●	2	43	187	118	86	40		+1.8	SB-5090TR	DT-20	ZXMT140408○○
-DRX440M-2-14	●		44	189	120	88			+1.5			
-DRX450M-2-14	●		45	191	122	90		60	+1.3			
-DRX460M-2-14	●		46	193	124	92			+1.0			
-DRX470M-2-14	●		47	195	126	94			+0.8			
-DRX480M-2-17	●		48	194	125	96			+3.8			
-DRX490M-2-17	●		49	196	127	98			+3.5			
-DRX500M-2-17	●		50	198	129	100		60	+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	●	2	54	206	137	108	40		+2.3	SB-60120TR	DT-25	ZXMT170608○○
-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		65	+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**

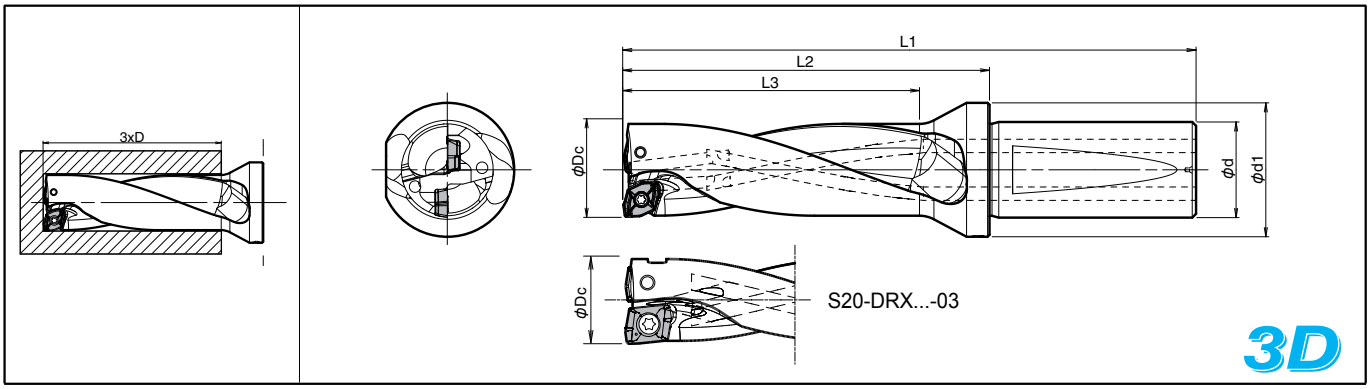
・Cutting Tolerance (2D type)

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.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRX (Cutting Depth:3×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K24
S20 -DRX120M-3-03	●	2	12	100	57	36	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203○○-E Inner Edge ZXMT030203GM-I
-DRX125M-3-03	●		12.5	102	59	37.5			+0.4			
-DRX130M-3-03	●		13	103	60	39			+0.3			
-DRX135M-3-04	●	2	13.5	105	62	40.5	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203○○
-DRX140M-3-04	●		14	106	63	42			+0.4			
-DRX145M-3-04	●		14.5	108	65	43.5			+0.3			
-DRX150M-3-04	●		15	109	66	45			+0.2			
S25 -DRX155M-3-05	●	2	15.5	124	70	46.5	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203○○
-DRX160M-3-05	●		16	126	71	48			+0.7			
-DRX165M-3-05	●		16.5	127	73	49.5			+0.5			
-DRX170M-3-05	●		17	129	74	51			+0.4			
-DRX175M-3-05	●		17.5	130	76	52.5			+0.3			
-DRX180M-3-05	●		18	132	77	54			+0.2			
-DRX185M-3-06	●	2	18.5	131	77	55.5	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204○○
-DRX190M-3-06	●		19	132	78	57			+0.8			
-DRX195M-3-06	●		19.5	134	80	58.5			+0.7			
-DRX200M-3-06	●		20	135	81	60			+0.5			
-DRX205M-3-06	●		20.5	137	83	61.5			+0.4			
-DRX210M-3-06	●		21	138	84	63			+0.3			
-DRX215M-3-06	●		21.5	140	86	64.5			+0.2			
-DRX220M-3-07	●	2	22	141	86	66	25	35	+1.2	SB-2570TR	DTM-8	ZXMT070305○○
-DRX225M-3-07	●		22.5	142	88	67.5			+1.0			
-DRX230M-3-07	●		23	144	89	69			+0.9			
-DRX235M-3-07	●		23.5	145	91	70.5			+0.8			
-DRX240M-3-07	●		24	147	92	72			+0.7			
-DRX245M-3-07	●		24.5	148	94	73.5			+0.5			
-DRX250M-3-07	●		25	150	95	75			+0.4			
-DRX255M-3-07	●		25.5	151	97	76.5			+0.3			
-DRX260M-3-07	●		26	153	98	78			+0.2			
S32 -DRX265M-3-09	●	2	26.5	161	102	79.5	32	42	+1.7	SB-3080TR	DTM-10	ZXMT09T306○○
-DRX270M-3-09	●		27	163	103	81			+1.6			
-DRX275M-3-09	●		27.5	164	105	82.5			+1.5			
-DRX280M-3-09	●		28	166	106	84			+1.3			
-DRX285M-3-09	●		28.5	167	108	85.5			+1.2			
-DRX290M-3-09	●		29	169	109	87			+1.1			
-DRX295M-3-09	●		29.5	170	111	88.5		45	+1.1			
-DRX300M-3-09	●		30	172	112	90			+0.8			
-DRX305M-3-09	●		30.5	173	114	91.5			+0.7			
-DRX310M-3-09	●		31	175	115	93			+0.6			
-DRX315M-3-09	●		31.5	176	117	94.5			+0.5			
S40 -DRX320M-3-11	●	2	32	201	132	96	40	55	+2.2	SB-4085TR	DTM-15	ZXMT11T306○○
-DRX330M-3-11	●		33	204	135	99			+1.9			
-DRX340M-3-11	●		34	207	138	102			+1.7			
-DRX350M-3-11	●		35	210	141	105			+1.4			
-DRX360M-3-11	●		36	213	144	108			+1.2			
-DRX370M-3-11	●		37	216	147	111			+0.9			
-DRX380M-3-11	●		38	219	150	114			+0.7			

・When offset 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	●		39	218	149	117			+2.8			
-DRX400M-3-14	●		40	221	152	120		55	+2.5			
-DRX410M-3-14	●		41	224	155	123			+2.3			
-DRX420M-3-14	●		42	227	158	126			+2.0			
-DRX430M-3-14	●	2	43	230	161	129	40		+1.8	SB-5090TR	DT-20	ZXMT140408 ○○
-DRX440M-3-14	●		44	233	164	132			+1.5			
-DRX450M-3-14	●		45	236	167	135		60	+1.3			
-DRX460M-3-14	●		46	239	170	138			+1.0			
-DRX470M-3-14	●		47	242	173	141			+0.8			
-DRX480M-3-17	●		48	242	173	144			+3.8			
-DRX490M-3-17	●		49	245	176	147			+3.5			
-DRX500M-3-17	●		50	248	179	150		60	+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	●	2	54	260	191	162	40		+2.3	SB-60120TR	DT-25	ZXMT170608 ○○
-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		65	+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**

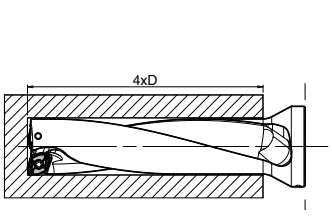
・Cutting Tolerance (3D type)

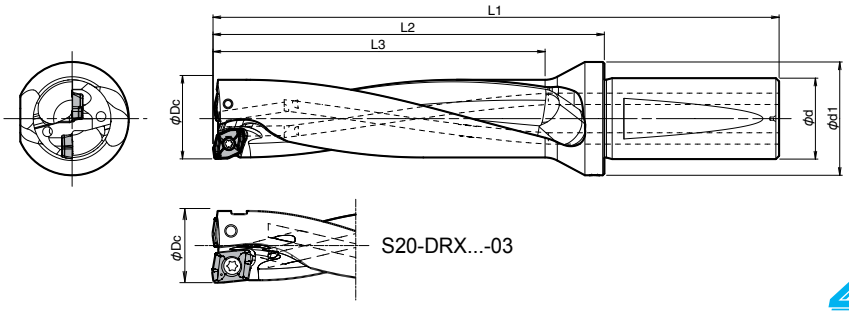
Dc	Cutting Tolerance (mm)
ø12 ~ ø26	+0.20 -0.10
ø26.5 ~ ø38	+0.25 -0.15
ø39 ~ ø60	+0.30 -0.20

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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRX (Cutting Depth:4×D)





4D

Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K24
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		45	+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) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K24
S40 -DRX390M-4-14	●		39	257	188	156			+2.8			
-DRX400M-4-14	●		40	261	192	160		55	+2.5			
-DRX410M-4-14	●		41	265	196	164			+2.3			
-DRX420M-4-14	●		42	269	200	168			+2.0			
-DRX430M-4-14	●	2	43	273	204	172	40		+1.8	SB-5090TR	DT-20	ZXMT140408 ○○
-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	●		48	290	221	192			+3.8			
-DRX490M-4-17	●		49	294	225	196			+3.5			
-DRX500M-4-17	●		50	298	229	200		60	+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	●	2	54	314	245	216	50		+2.3	SB-60120TR	DT-25	ZXMT170608 ○○
-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**

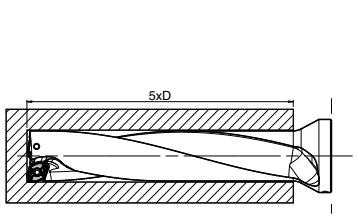
・Cutting Tolerance (4D type)

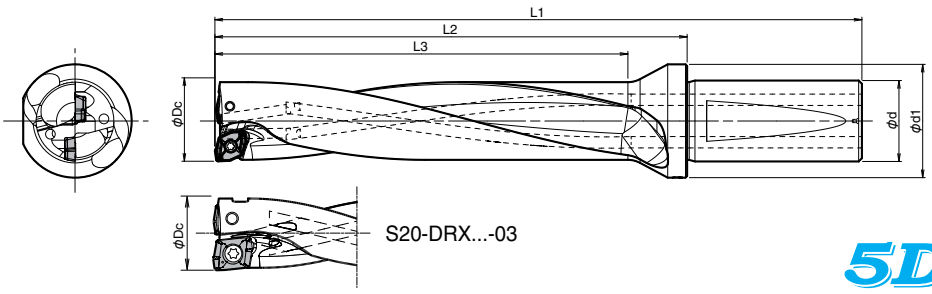
Dc	Cutting Tolerance (mm)
ø12 ~ ø26	+0.25 -0.10
ø27 ~ ø38	+0.30 -0.15
ø39 ~ ø60	+0.35 -0.20

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

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRX (Cutting Depth: 5×D)





5D

Toolholder Dimension

Description	Std.	No. of Insert	Dimensions (mm) øDc	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➔ K24
S20 -DRX120M-5-03	●	2	12	124	81	60	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203○○-E Inner Edge ZXMT030203GM-I
-DRX130M-5-03	●		13	129	86	65			+0.3			
-DRX140M-5-04	●	2	14	134	91	70	20	27	+0.4	SB-2042TRG	DTM-6	ZXMT040203○○
-DRX150M-5-04	●		15	139	96	75			+0.2			
S25 -DRX160M-5-05	●		16	158	103	80			+0.7			
-DRX170M-5-05	●	2	17	163	108	85	25	32	+0.4	SB-2045TR	DTM-6	ZXMT05T203○○
-DRX180M-5-05	●		18	168	113	90			+0.2			
-DRX190M-5-06	●		19	170	116	95			+0.8			
-DRX200M-5-06	●	2	20	175	121	100	25	32	+0.5	SB-2250TR	DTM-7	ZXMT06T204○○
-DRX210M-5-06	●		21	180	126	105			+0.3			
-DRX220M-5-07	●		22	185	130	110			+1.2			
-DRX230M-5-07	●		23	190	135	115			+0.9			
-DRX240M-5-07	●	2	24	195	140	120	25	32	+0.7	SB-2570TR	DTM-8	ZXMT070305○○
-DRX250M-5-07	●		25	200	145	125			+0.4			
-DRX260M-5-07	●		26	205	150	130			+0.2			
S32 -DRX270M-5-09	●		27	217	157	135			+1.6			
-DRX280M-5-09	●		28	222	162	140		42	+1.3			
-DRX290M-5-09	●	2	29	227	167	145	32		+1.1	SB-3080TR	DTM-10	ZXMT09T306○○
-DRX300M-5-09	●		30	232	172	150		45	+0.8			
-DRX310M-5-09	●		31	237	177	155			+0.6			
S40 -DRX320M-5-11	●		32	255	186	160			+2.2			
-DRX330M-5-11	●		33	260	191	165			+1.9			
-DRX340M-5-11	●		34	265	196	170			+1.7			
-DRX350M-5-11	●	2	35	270	201	175		50	+1.4	SB-4085TR	DTM-15	ZXMT11T306○○
-DRX360M-5-11	●		36	275	206	180			+1.2			
-DRX370M-5-11	●		37	280	211	185			+0.9			
-DRX380M-5-11	●		38	285	216	190			+0.7			
-DRX390M-5-14	●		39	296	227	195			+2.8			
-DRX400M-5-14	●		40	301	232	200		55	+2.5			
-DRX410M-5-14	●		41	306	237	205			+2.3			
-DRX420M-5-14	●		42	311	242	210			+2.0			
-DRX430M-5-14	●	2	43	316	247	215	40		+1.8	SB-5090TR	DT-20	ZXMT140408 ○○
-DRX440M-5-14	●		44	321	252	220			+1.5			
-DRX450M-5-14	●		45	326	257	225		60	+1.3			
-DRX460M-5-14	●		46	331	262	230			+1.0			
-DRX470M-5-14	●		47	336	267	235			+0.8			
S50 -DRX480M-5-17	●		48	338	269	240			+3.8			
-DRX490M-5-17	●		49	343	274	245			+3.5			
-DRX500M-5-17	●		50	348	279	250		60	+3.3			
-DRX510M-5-17	●		51	353	284	255			+3.0			
-DRX520M-5-17	●		52	358	289	260			+2.8			
-DRX530M-5-17	●		53	363	294	265			+2.5			
-DRX540M-5-17	●	2	54	368	299	270	50		+2.3	SB-60120TR	DT-25	ZXMT170608 ○○
-DRX550M-5-17	●		55	373	304	275			+2.0			
-DRX560M-5-17	●		56	378	309	280			+1.8			
-DRX570M-5-17	●		57	383	314	285		65	+1.5			
-DRX580M-5-17	●		58	388	319	290			+1.3			
-DRX590M-5-17	●		59	393	324	295			+1.0			
-DRX600M-5-17	●		60	398	329	300			+0.8			

・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**

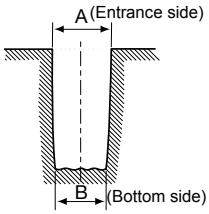
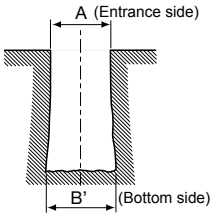
・Cutting Tolerance (5D type)

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.

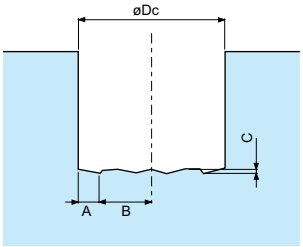
● : Std. Item

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 ・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 ・Increase the cutting speed ・Lower the feed rate See page ➡ **K34** for "Recommended Cutting Conditions" ・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**
			Core up for 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	0.9	40.0		14.2	
13.0		4.7		25.5		9.6		41.0		14.7	
13.5	2	4.8	0.5	26.0		9.8		42.0		15.2	
14.0		5.0		26.5	3.9	9.4	1.0	43.0		15.7	
14.5		5.3		27.0		9.6		44.0		16.2	
15.0		5.5		27.5		9.9		45.0		16.7	
15.5		5.8	0.6	28.0		10.1		46.0		17.2	
16.0		6.0		28.5		10.4		47.0		17.7	1.6
16.5		6.3		29.0		10.6		48.0	7.1	16.9	1.7
17.0		6.5		29.5		10.9		49.0		17.4	
17.5		6.8		30.0		11.1	1.1	50.0		17.9	
18.0		7.0	0.7	30.5		11.4		51.0		18.4	
18.5	2.4	6.9	0.7	31.0		11.6		52.0		18.9	
19.0		7.1		31.5		11.9	1.2	53.0		19.4	
19.5		7.4		32.0	4.7	11.3	1.1	54.0		19.9	
20.0		7.6		33.0		11.8		55.0		20.4	1.8
20.5		7.9		34.0		12.3		56.0		20.9	
21.0		8.1	0.8	35.0		12.8		57.0		21.4	1.9
21.5		8.4		36.0		13.3	1.2	58.0		21.9	2.0
22.0	3.2	7.8	0.8	37.0		13.8	1.3	59.0		22.4	
22.5		8.1		38.0		14.3		60.0		22.9	2.1
23.0		8.3									
23.5		8.6									
24.0		8.8									



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)

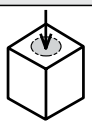
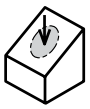
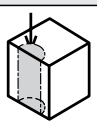
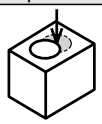
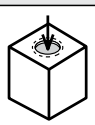
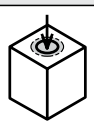
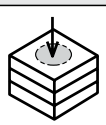
DRX Recommended Cutting Conditions (Coolant)

Workpiece Material	Recommended Insert Grade (Cutting Speed : m/min) MEGACOAT PR1230 GM GH	PR1225 SM	PR1210 GM	Carbide GW15 SM	Cutting Dia. øDc (mm)	Toolholder Type 2D~3D f (mm/rev) GM	GH	SM	4D GM	GH	SM	5D GM	GH	SM
Low Carbon Steel	☆ 120-240	★ 120-240			ø12~ø15	0.06~0.10	0.06~0.10	0.04~0.10	0.05~0.08	0.05~0.08	0.04~0.08	0.04~0.07	0.04~0.07	0.04~0.08
					ø15.5~ø18	0.06~0.12	0.06~0.12	0.06~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08	0.05~0.08	0.04~0.09
					ø18.5~ø26	0.08~0.14	0.08~0.14	0.06~0.14	0.06~0.12	0.08~0.12	0.05~0.12	0.06~0.10	0.06~0.10	0.04~0.10
					ø26.5~ø60	0.08~0.14	0.08~0.14	0.06~0.14	0.06~0.12	0.08~0.12	0.05~0.12	0.06~0.10	0.06~0.10	0.04~0.10
Carbon Steel	★ 100-180	☆ 100-180			ø12~ø15	0.04~0.14	0.04~0.14	0.04~0.10	0.04~0.10	0.04~0.10	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					ø15.5~ø18	0.06~0.16	0.06~0.16	0.06~0.12	0.05~0.12	0.05~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					ø18.5~ø26	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
					ø26.5~ø60	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
Alloy steel	★ 100-160	☆ 100-160			ø12~ø15	0.04~0.14	0.04~0.14	0.04~0.10	0.04~0.10	0.04~0.10	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					ø15.5~ø18	0.06~0.16	0.06~0.16	0.06~0.12	0.05~0.12	0.05~0.12	0.05~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					ø18.5~ø26	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
					ø26.5~ø60	0.08~0.20	0.08~0.20	0.06~0.14	0.07~0.16	0.07~0.16	0.05~0.12	0.06~0.12	0.06~0.12	0.05~0.10
Die Steel	★ 80-150	☆ 80-150			ø12~ø15	0.04~0.08	0.04~0.08	0.04~0.08	0.04~0.07	0.04~0.07	0.04~0.07	0.04~0.06	0.04~0.06	0.04~0.06
					ø15.5~ø18	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08	0.04~0.08	0.04~0.08	0.04~0.07
					ø18.5~ø26	0.08~0.15	0.08~0.15	0.06~0.12	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08
					ø26.5~ø60	0.08~0.15	0.08~0.15	0.06~0.12	0.06~0.12	0.06~0.12	0.06~0.10	0.05~0.10	0.05~0.10	0.05~0.08
Stainless Steel	☆ 70-140	★ 70-140			ø12~ø15	0.06~0.10	0.06~0.10	0.04~0.10	0.05~0.08	0.05~0.08	0.04~0.08	0.04~0.07	0.04~0.08	0.04~0.08
					ø15.5~ø18	0.06~0.10	0.06~0.10	0.06~0.12	0.05~0.08	0.05~0.08	0.05~0.11	0.04~0.07	0.04~0.07	0.04~0.10
					ø18.5~ø26	0.08~0.12	0.08~0.12	0.06~0.14	0.07~0.10	0.07~0.10	0.06~0.12	0.07~0.10	0.07~0.10	0.06~0.12
					ø26.5~ø60	0.08~0.12	0.08~0.12	0.06~0.14	0.07~0.10	0.07~0.10	0.06~0.12	0.07~0.10	0.07~0.10	0.06~0.12
Gray Cast Iron			★ 100-150		ø12~ø15	0.08~0.14	~	~	0.06~0.12	~	~	0.04~0.10	~	~
					ø15.5~ø18	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
					ø18.5~ø26	0.08~0.20	~	~	0.08~0.18	~	~	0.06~0.14	~	~
					ø26.5~ø60	0.08~0.20	~	~	0.08~0.18	~	~	0.06~0.14	~	~
Nodular Cast Iron			★ 80-120		ø12~ø15	0.08~0.12	~	~	0.06~0.10	~	~	0.04~0.08	~	~
					ø15.5~ø18	0.08~0.16	~	~	0.08~0.14	~	~	0.06~0.10	~	~
					ø18.5~ø26	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
					ø26.5~ø60	0.08~0.18	~	~	0.08~0.16	~	~	0.06~0.12	~	~
Non-ferrous Metals				★ 200-600	ø12~ø15	~	~	0.06~0.12	~	~	0.05~0.10	~	~	0.04~0.08
					ø15.5~ø18	~	~	0.08~0.14	~	~	0.06~0.12	~	~	0.05~0.10
					ø18.5~ø26	~	~	0.08~0.16	~	~	0.06~0.14	~	~	0.05~0.12
					ø26.5~ø60	~	~	0.08~0.20	~	~	0.08~0.16	~	~	0.07~0.14
Titanium Alloys				★ 40-70	ø12~ø15	~	~	0.05~0.08	~	~	0.04~0.07	~	~	0.04~0.06
					ø15.5~ø18	~	~	0.05~0.08	~	~	0.04~0.07	~	~	0.04~0.06
					ø18.5~ø26	~	~	0.06~0.10	~	~	0.06~0.08	~	~	0.05~0.07
					ø26.5~ø60	~	~	0.06~0.10	~	~	0.06~0.08	~	~	0.05~0.07

• Apply a sufficent 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 Continuous part 0.1	0.05	Not Available
Coolant (internal)		Yes	Yes	Yes	Yes	Yes	Yes	Not Available

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

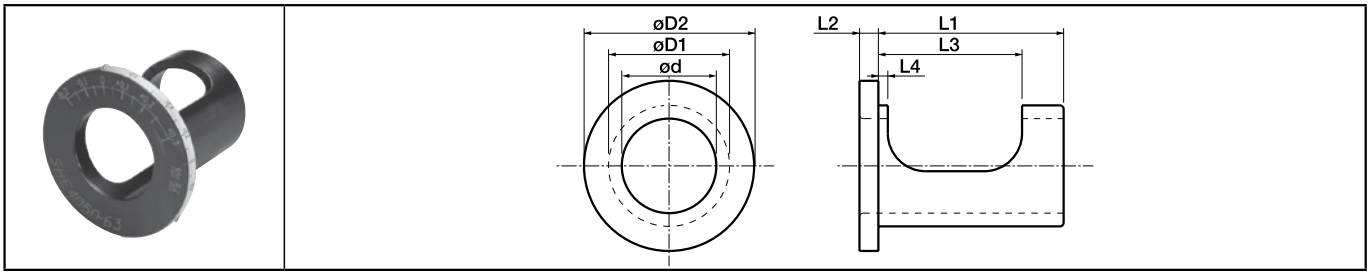
Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	1/10XD or less	less than corner radius	Not Recommended

◆ 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

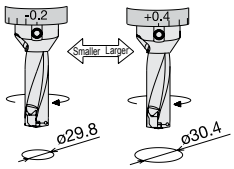
Description	Std.	Dimension (mm)							* Cutting Dia. Adjustable Range	Center Height Adjustable Range
		ød	øD1	øD2	L1	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	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~

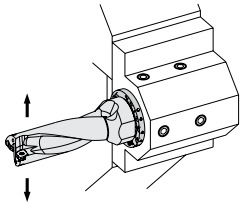
e.g.) ø30mm Drill



● Diameter Adjustment Range (mm)

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

2. Center Height Adjustment ~Relief trouble by height adjustment at lathes~



● Center Height Adjustment Range (mm)

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

How to use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

① Adjust the scale at the flange periphery of the sleeve to the center of the coolant plug of the drill. (Fig.1)
② When making the hole diameter bigger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.
③ When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.
④ Using the bottom screw of the side-lock arbor, firmly tignten 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.

DRX

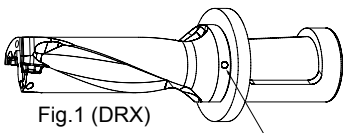


Fig.1 (DRX)

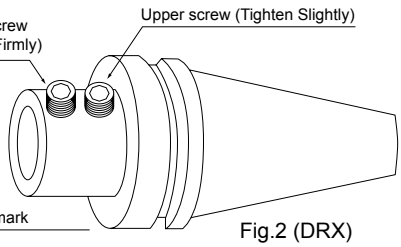


Fig.2 (DRX)

DRZ

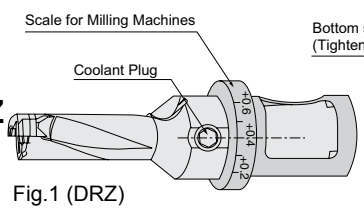


Fig.1 (DRZ)

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

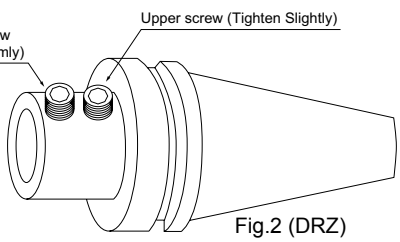


Fig.2 (DRZ)

2. Center-Height Adjustment for Lathes

Most Lathe problem occur with Center Height Deviation.
The Center Height is appropriate if a core approximatately 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

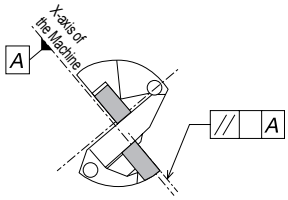


Fig.4

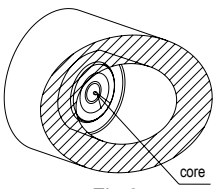


Fig.3

① Align the drill with the outer insert face parallel to the X-axis of the tool turret. (Fig.4)
② Align the scale (for the lathe) on the flange face of the sleeve to the center of the drill coolant plug.
③ 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.
④ When rotating the sleeve, insert the wrench supplied with the drill into the hole at the flange periphery and rotate the sleeve.
⑤ 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.

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 180° reverse position)
In the case of the lathe with two turrets, when installing the drill to the lower turret, the outer insert should be set so as to face the operator.
(It is also possible to use it by setting at 180° reverse position)

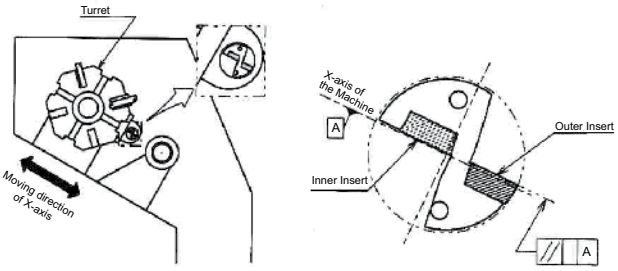


Fig.1 Installed to the Lathe

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 ø20 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 ø20 drill, it is possible to make a hole up to ø21 since “Max. Offset (Radial)” is +0.5mm.

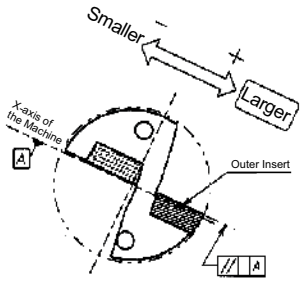


Fig.2 Outer insert Facing Up

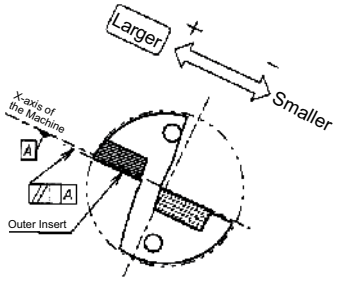


Fig.3 Outer insert Facing Down

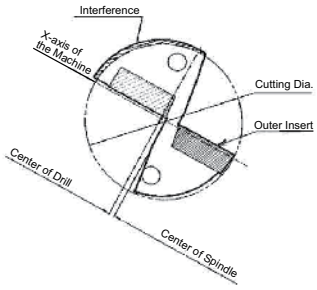


Fig.4 Excessive offset (For Smaller Hole Diameter)

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.

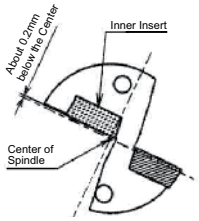


Fig.5 Front View of the Drill

2. How to Check the Center Height
For checking the center height of the inner insert, see the core which remains at the center of the end face of the drilled hole. (Fig.6)
If the center height is in the normal 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.

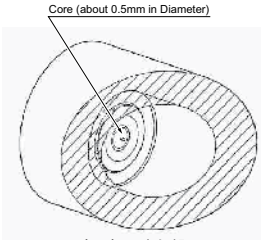


Fig.6 Center Core

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)

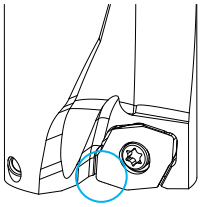


Fig.7 Insert breakage near the center of the drill

[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.

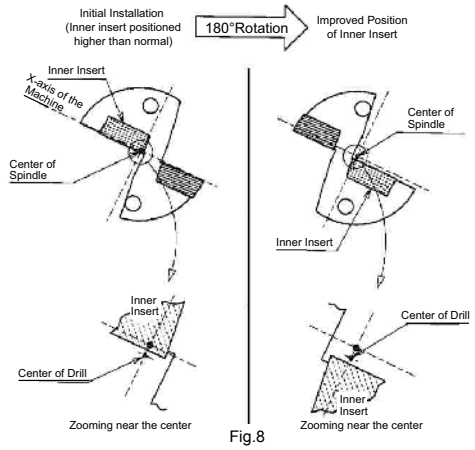


Fig.8

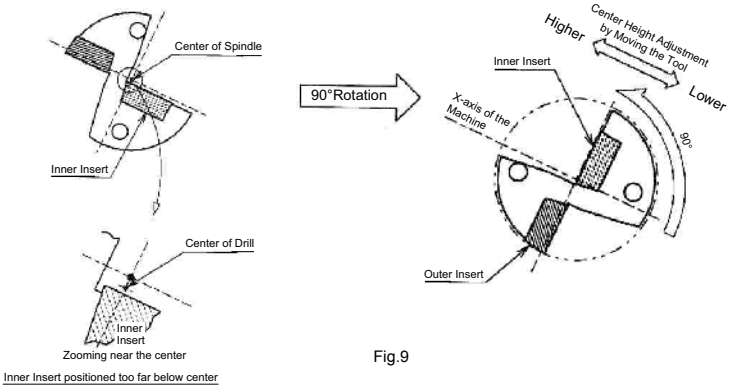


Fig.9

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.

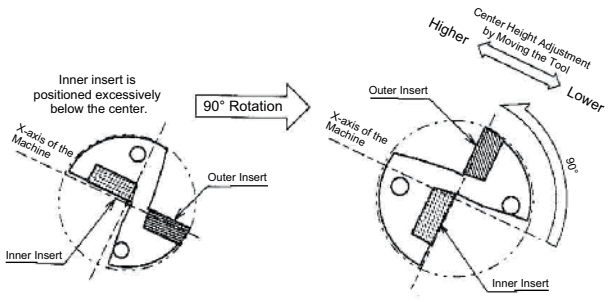
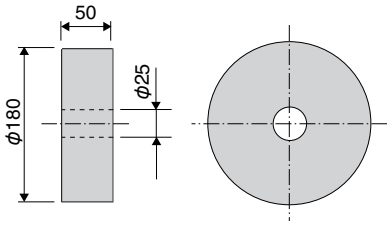


Fig.10

Case Studies

X40CrMoV51 (SKD62(45HRC))

- Vc=60 m/min
- f=0.05 mm/rev
- H=50 mm (through hole)
- Wet (Internal Coolant)
- ZXMT070305GH (PR1230)
- S25-DRX250M-4-07



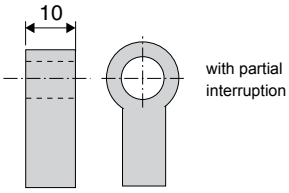
MagicDrill DRX	6 holes/edge
Competitor J	4 holes/edge (breakage)

150% of tool life

Results
- 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)

- 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

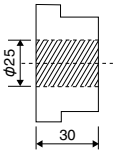
260% of tool life

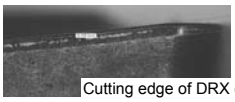
Results
- MagicDrill DRX had no sudden breakage that occurred for Competitor K and achieved stable machining with 2.6 times longer tool l life.

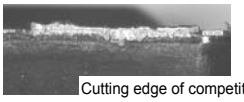
(Evaluation by the user)

SCM420HV (Cold Forging)

- 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




Cutting edge of DRX (after 400 holes)


Cutting edge of competitors (after 400 holes)

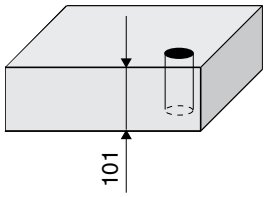
MagicDrill DRX	Less adhesion, continue to use even after 400 holes
Competitor L	Large adhesion (after 400 holes)

Results
- MagicDrill DRX had a good chip control and low adhesion for machining of the same number comparing to Competitor L.

(Evaluation by the user)

55NiCrMoV6 (SKT4(42HRC))

- 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 ø25x101mm (through hole) 24 locations

MagicDrill DRX	Machining time : 28 min./pc
Conventional tool M	Machining time: 58 min./pc

50% reduction

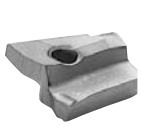
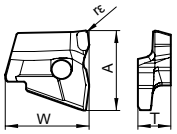
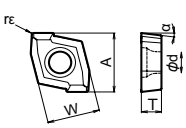
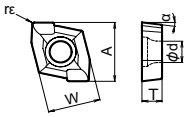
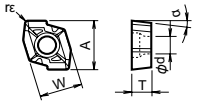
Results
- For deep hole machining (4xD), MagicDrill DRX had no chip stuck and enabled machining without step feeding (machining time was reduced in half) despite use of external coolant
- MagicDrill DRX has improved 3 times longer tool life than Conventional tool M

(Evaluation by the user)

Applicable Inserts for DRS / DRZ

Applicable Inserts
(for DRS / DRZ)

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

Shape	Description		Dimension (mm) A	T	ød	W	rε	Angle (°) α	MEGA COAT PR1230	PR1225	PR1210	PVD Coated Carbide PR660	PR830	PR915	PR1025	PR930	PR905	Carbide KW10	Ref. Page for Toolholder
		DS 100	8.8	3.5		9.0			●		●	●					●		
		105	9.3	3.7		9.7	0.2		●		●	●					●		
		110	9.8	3.9	-	10.0		-	●		●	●					●		K40
		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		●	●	●	●	●	●	●	●	●	●	
		06T204	7.0	2.80	2.5	6.0			●	●	●	●	●	●	●	●	●	●	
		080304	9.7	3.18	2.9	8.2	0.4		●	●	●	●	●	●	●	●	●	●	
		10T304	12.0	3.97	4.4	10.4		7°	●	●	●	●	●	●	●	●	●	●	
		12T306	14.3	3.97	5.6	12.8	0.6		●	●	●	●	●	●	●	●	●	●	
		150408	17.8	4.76	5.6	15.8			●	●	●	●	●	●	●	●	●	●	
		200608	22.8	6.35	6.5	20.3	0.8		●			●	●	●		●		●	
 For Sharp Cutting / Deep drilling		ZCMT 050203SP	5.9	2.38	2.3	5.0	0.3		●	●		●	●		●	●		●	
		06T204SP	7.0	2.80	2.5	6.0			●	●		●	●		●	●		●	K42
		080304SP	9.7	3.18	2.9	8.2	0.4	7°	●	●		●	●		●	●		●	~
		10T304SP	12.0	3.97	4.4	10.4			●	●		●	●		●	●		●	K48
		12T304SP	14.3	3.97	5.6	12.8			●	●		●	●		●	●		●	
		150406SP	17.8	4.76	5.6	15.8	0.6		●	●		●	●		●	●		●	
 For Stainless Steel		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 (rε) than standard chipbreaker type and can reduce burrs.

Suitable Chipbreaker (ZCMT)

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

Workpiece Material	Insert Size	ZCMT10								ZCMT12								ZCMT15								ZCMT20		
	Chipbreaker	Standard				SP				Standard				SP				Standard				SP				Standard		
	Cutting Depth	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		☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	☆	☆	☆	☆	★	★	★	★	★	★	★

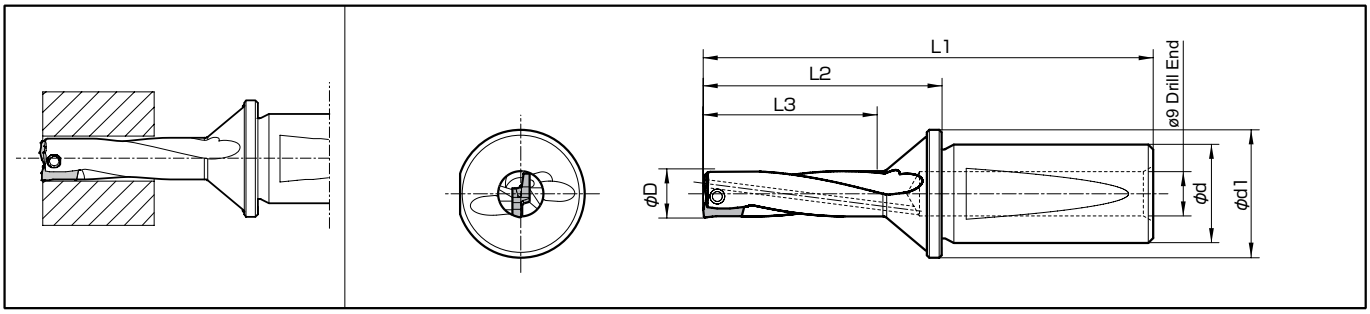
★ : 1st. Recommendation ☆ : 2nd. Recommendation

・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.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

Inserts are sold in 10 piece boxes

DRS

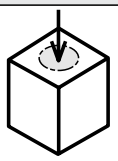
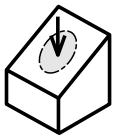
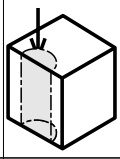
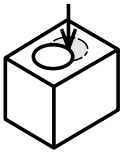
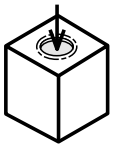
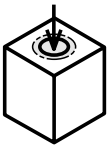
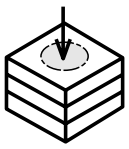


Toolholder Dimensions

Description	Std.	Number of Flutes	Dimension (mm) øD	L1	L2	L3	ød	ød1	Radial Direction Offset Applicable Range (mm)	Spare Parts Clamp Screw	Wrench	Wrench	Applicable Insert K39
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				DS105
-DRS11038	●	1	11.0	96	53	38.5			+0.2	SB-2290TR			DS110
-DRS11540	●	1	11.5	97	54	40.5			+0.2				DS115
-DRS12042	●	1	12.0	99	56	42.0			+0.4	SB-25100TR	-	DT-7	DS120
-DRS12544	●	1	12.5	101	58	44.0			+0.2				

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
DRS	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)

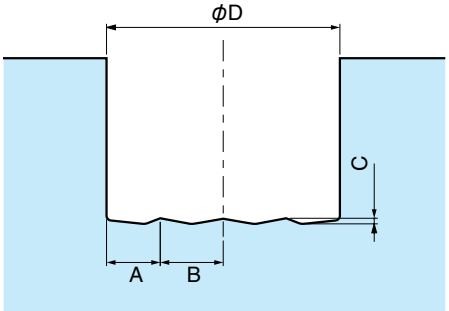
Workpiece Material	Recommended Grade (Vc m/min) MEGACOAT PR1230	PR1210	PVD Coated Carbide PR660	PP905	Feed Rate (mm/rev)
Low Carbon Steel	★ 80~100	-	☆ 80~100	-	0.06
Carbon Steel	★ 80~100	-	☆ 80~100	-	0.08~0.1
Alloy Steel	★ 80	-	☆ 80	-	0.04~0.06
Mold Steel	★ 80	-	☆ 80	-	0.04~0.06
Stainless Steel (Austenitic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

★ : 1st Recommendation ☆ : 2nd Recommendation

1. Apply a sufficent amount of coolant.
2. If cutting speed is decreased too much from above condition, chip evacuation performance will deteriorate.
   If the feed rate is increased too much from above condition, inner edge chip evacuation will deteriorate.
   If the feed rate is decreased too much from above condition, outer edge chip evacuation will deteriorate.
3. If chips are too long when low carbon steel 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)

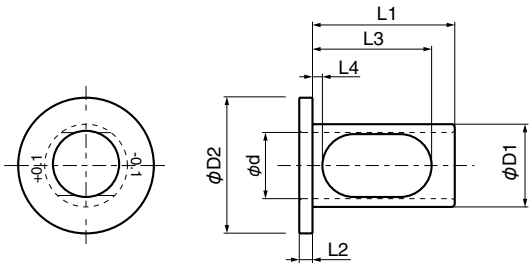
øD	A	B	C
10.0	2.2	2.80	0.2
10.3	2.3	2.85	0.2
10.5	2.3	2.95	0.2
11.0	2.4	3.10	0.2
11.5	2.5	3.25	0.2
12.0	2.8	3.20	0.3
12.5	2.9	3.35	0.4



● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

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

SHEM



Sleeve Dimensions

Description	Std.	Dimension (mm)							*Dia. Adjustment Range
		ød	øD1	øD2	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	+0.1, -0.1

・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.

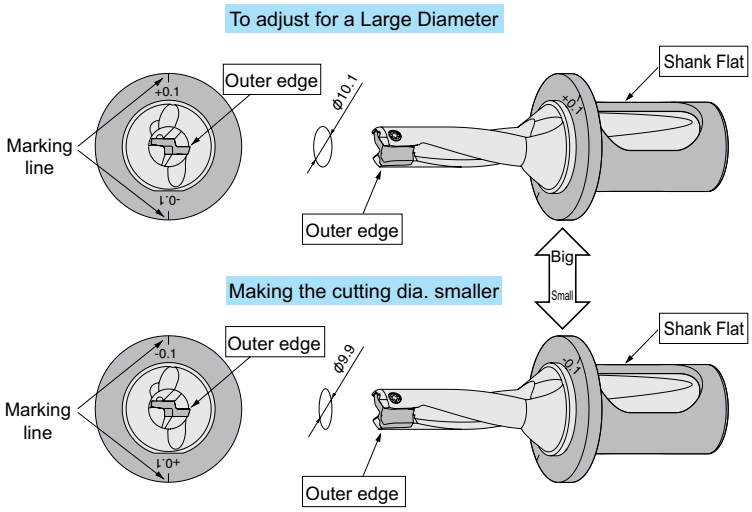


Fig.1 Diameter Adjustment Method (e.g.) ø10 Drill

Caution: Not for use with Collet Chuck type Arbor.

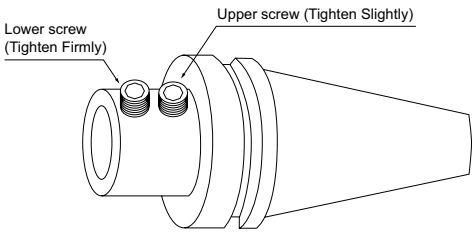
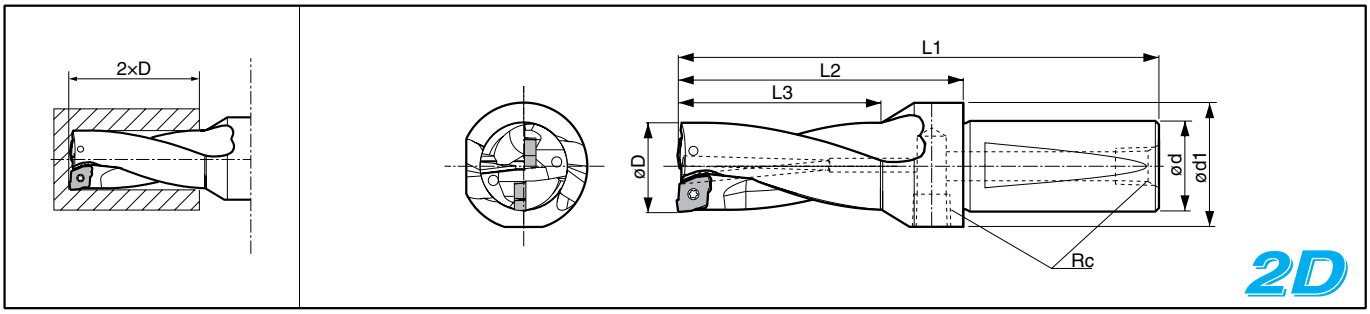


Fig.2

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 2×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts K39
S20 -DRZ1326-05	●	2	13	95	52	26	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135270-05	●		13.5	95	52	27				+0.5				
-DRZ1428-05	●		14	98	55	28				+0.5				
-DRZ145290-05	●		14.5	98	55	29				+0.5				
-DRZ1530-05	●		15	100	57	30				+0.5				
-DRZ155310-05	●		15.5	100	57	31				+0.5				
S25 -DRZ1632-06	●	2	16	115	61	32	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165330-06	●		16.5	115	61	33				+0.9				
-DRZ1734-06	●		17	116	62	34				+0.8				
-DRZ175350-06	●		17.5	116	62	35				+0.7				
-DRZ1836-06	●		18	118	64	36				+0.6				
-DRZ185370-06	●		18.5	118	64	37				+0.6				
-DRZ1938-06	●		19	120	66	38				+0.5				
-DRZ195390-06	●		19.5	120	66	39				+0.5				
-DRZ2040-06	●		20	123	69	40				+0.5				
-DRZ205410-06	●		20.5	125	71	41				+0.3				
-DRZ2142-06	●		21	125	71	42				+0.2				
-DRZ215430-08	●	2	21.5	128	74	43	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2244-08	●		22	128	74	44				+1.6				
-DRZ225450-08	●		22.5	128	74	45				+1.4				
-DRZ2346-08	●		23	130	76	46				+1.3				
-DRZ235470-08	●		23.5	130	76	47				+1.2				
-DRZ2448-08	●		24	131	77	48		35		+1.1				
-DRZ245490-08	●		24.5	131	77	49				+0.9				
-DRZ2550-08	●		25	133	79	50				+0.8				
-DRZ255510-08	●		25.5	133	79	51				+0.7				
-DRZ2652-08	●		26	135	81	52				+0.6				
-DRZ265530-08	●		26.5	135	81	53				+0.5				
S32 -DRZ2754-10	●	2	27	149	90	54	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-DRZ275550-10	●		27.5	149	90	55				+2.3				
-DRZ2856-10	●		28	151	92	56				+2.2				
-DRZ285570-10	●		28.5	151	92	57				+2.1				
-DRZ2958-10	●		29	153	94	58				+2.0				
-DRZ295590-10	●		29.5	153	94	59				+1.8				
-DRZ3060-10	●		30	154	95	60		45		+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				+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 R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K39
S40 -DRZ3366-12	●	2	33	173	104	66	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ3468-12	●		34	176	107	68				+2.7				
-DRZ3570-12	●		35	177	108	70				+2.4				
-DRZ3672-12	●		36	180	111	72				+2.2				
-DRZ3774-12	●		37	181	112	74				+1.9				
-DRZ3876-12	●		38	183	114	76				+1.7				
-DRZ3978-12	●		39	185	116	78				+1.4				
-DRZ4080-12	●		40	185	116	80				+1.2				
-DRZ4182-15	●	2	41	186	117	82	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ4284-15	●		42	188	119	84				+3.7				
-DRZ4386-15	●		43	190	121	86				+3.5				
-DRZ4488-15	●		44	192	123	88				+3.2				
-DRZ4590-15	●		45	192	123	90				+3.0				
-DRZ4692-15	●		46	198	129	92		60		+2.7				
-DRZ4794-15	●		47	201	132	94				+2.5				
-DRZ4896-15	●		48	203	134	96				+2.2				
-DRZ4998-15	●		49	204	135	98				+2.0				
-DRZ50100-15	●		50	204	135	100				+1.7				
-DRZ51102-15	●		51	205	136	102				+1.2				
-DRZ52104-15	●		52	205	136	104				+1.0				
-DRZ53106-15	●		53	208	139	106				+0.7				
-DRZ54108-20	●	2	54	214	145	108	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55110-20	●		55	215	146	110				+4.7				
-DRZ56112-20	●		56	217	148	112				+4.4				
-DRZ57114-20	●		57	219	150	114				+4.1				
-DRZ58116-20	●		58	221	152	116				+3.8				
-DRZ59118-20	●		59	223	154	118				+3.5				

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

For recommended cutting conditions, see page ➡ K51

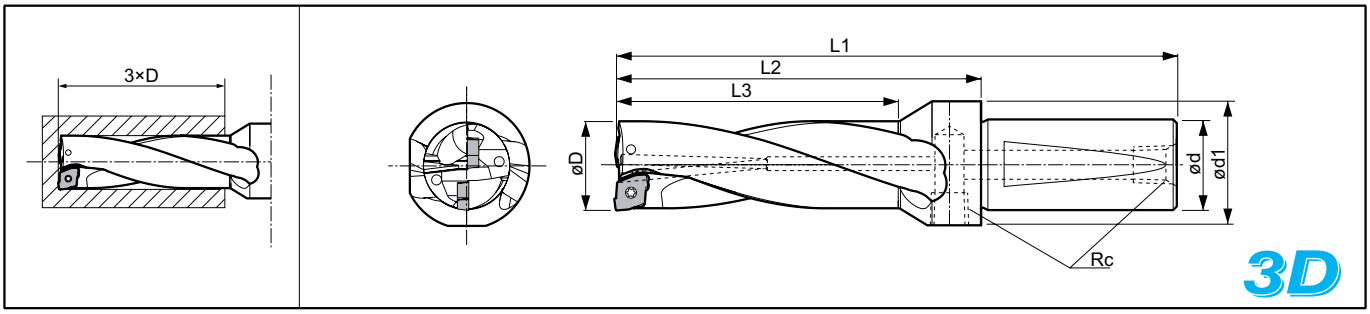
・Cutting tolerance (2D type)

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.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 3×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts (K39)
S20 -DRZ1339-05	●	2	13	108	65	39	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	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				+0.5				
-DRZ1545-05	●		15	115	72	45				+0.5				
-DRZ155465-05	●		15.5	115	72	46.5				+0.5				
S25 -DRZ1648-06	●	2	16	131	77	48	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-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				+0.6				
-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	●	2	21.5	147	93	64.5	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2266-08	●		22	147	93	66				+1.6				
-DRZ225675-08	●		22.5	147	93	67.5				+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		35		+1.1				
-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				+0.7				
-DRZ2678-08	●		26	158	104	78				+0.6				
-DRZ265795-08	●		26.5	158	104	79.5				+0.5				
S32 -DRZ2781-10	●	2	27	173	114	81	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	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				+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		45		+1.7				
-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				+1.3				
-DRZ3296-10	●		32	187	128	96				+1.2				
-DRZ325975-10	●		32.5	187	128	97.5				+1.0				
-DRZ3399-12	●	2	33	193	134	99	32	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	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				+1.9				
-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 R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➔ K39
S40 -DRZ3399-12	●	2	33	203	134	99	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●		34	207	138	102				+2.7				
-DRZ35105-12	●		35	209	140	105				+2.4				
-DRZ36108-12	●		36	213	144	108				+2.2				
-DRZ37111-12	●		37	215	146	111				+1.9				
-DRZ38114-12	●		38	218	149	114				+1.7				
-DRZ39117-12	●		39	221	152	117				+1.4				
-DRZ40120-12	●		40	222	153	120				+1.2				
-DRZ41123-15	●	2	41	224	155	123	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42126-15	●		42	227	158	126				+3.7				
-DRZ43129-15	●		43	230	161	129				+3.5				
-DRZ44132-15	●		44	233	164	132				+3.2				
-DRZ45135-15	●		45	234	165	135				+3.0				
-DRZ46138-15	●		46	241	172	138		60		+2.7				
-DRZ47141-15	●		47	245	176	141				+2.5				
-DRZ48144-15	●		48	248	179	144				+2.2				
-DRZ49147-15	●		49	250	181	147				+2.0				
-DRZ50150-15	●		50	251	182	150				+1.7				
-DRZ51153-15	●		51	254	185	153				+1.2				
-DRZ52156-15	●		52	257	188	156				+1.0				
-DRZ53159-15	●		53	260	191	159				+0.7				
-DRZ54162-20	●	2	54	266	197	162	40	65	Rc1/4	+5.0	SB-60120TR	DT-25	GP-2	ZCMT200608
-DRZ55165-20	●		55	269	200	165				+4.7				
-DRZ56168-20	●		56	272	203	168				+4.4				
-DRZ57171-20	●		57	275	206	171				+4.1				
-DRZ58174-20	●		58	278	209	174				+3.8				
-DRZ59177-20	●		59	281	212	177				+3.5				

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

For recommended cutting conditions, see page ➔ K51

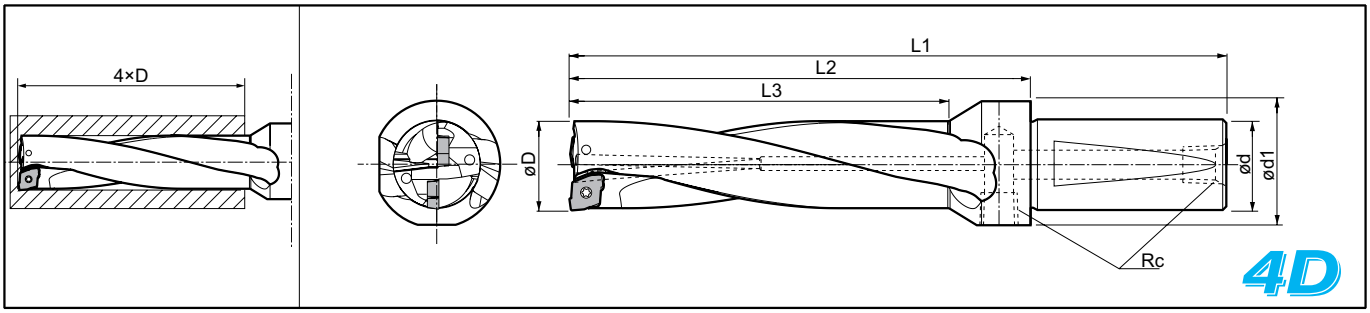
・Cutting tolerance (3D type)

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.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 4×D)



● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K39
S20 -DRZ1352-05	●	2	13	121	78	52	20	27	Rc1/8	+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-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	●	2	16	147	93	64	25	32	Rc1/8	+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-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	●	2	21.5	169	115	86	25	33	Rc1/8	+1.8	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-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		35		+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	●	2	27	200	141	108	32	42	Rc1/4	+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP
-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		45		+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	●	2	33	226	167	132	32	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-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 R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

● Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K39
S40 -DRZ33132-12	●	2	33	236	167	132	40	55	Rc1/4	+2.9	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
-DRZ34136-12	●		34	241	172	136				+2.7				
-DRZ35140-12	●		35	244	175	140				+2.4				
-DRZ36144-12	●		36	249	180	144				+2.2				
-DRZ37148-12	●		37	252	183	148				+1.9				
-DRZ38152-12	●		38	256	187	152				+1.7				
-DRZ39156-12	●		39	260	191	156				+1.4				
-DRZ40160-12	●		40	262	193	160				+1.2				
-DRZ41164-15	●	2	41	265	196	164	40	55	Rc1/4	+4.0	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ42168-15	●		42	269	200	168				+3.7				
-DRZ43172-15	●		43	273	204	172				+3.5				
-DRZ44176-15	●		44	277	208	176				+3.2				
-DRZ45180-15	●		45	279	210	180				+3.0				
-DRZ46184-15	●		46	287	218	184				+2.7				
-DRZ47188-15	●		47	292	223	188				+2.5				
-DRZ48192-15	●		48	296	227	192		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

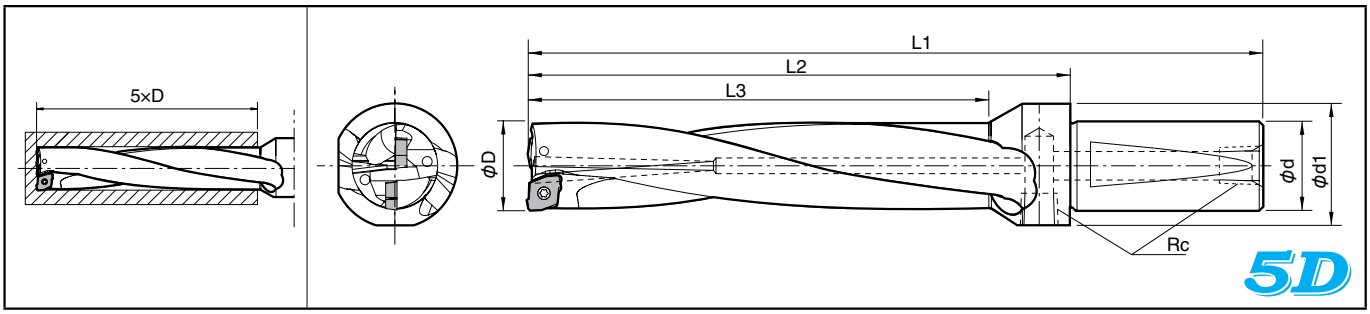
• Cutting tolerance (4D type)

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.

● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

DRZ (Cutting Depth: 5×D)



Toolholder Dimensions

Description	Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Rc	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Wrench	Plug	Applicable Inserts ➡ K39
S32 -DRZ27135-10	●	2	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		45		+1.7				
-DRZ31155-10	●		31	245	186	155				+1.5				
-DRZ32160-10	●		32	251	192	160				+1.2				
S40 -DRZ33165-12	●	2	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	●	2	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		60		+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)

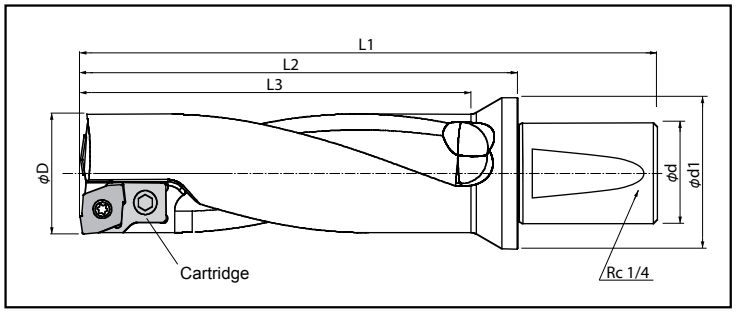
D	Cutting tolerance (mm)
ø27~ø40	+0.35 -0.15
ø41~ø50	+0.40 -0.20

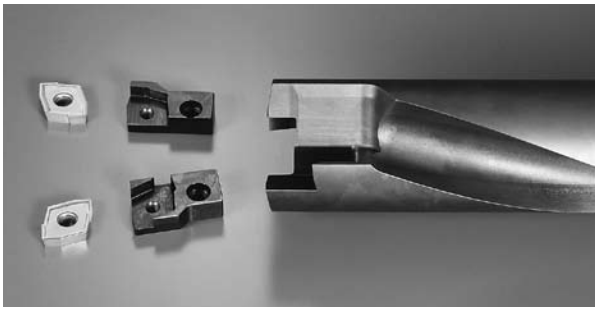
* Figures above are numeric guidelines.
It may vary depending on machines / work materials / clamp status / cutting conditions.

MagicDrill for Large Dia (over 60mm)

- **MagicDrill for large diameters (over ø59) 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 ø60mm.**

DRZ-CR





Toolholder Dimensions

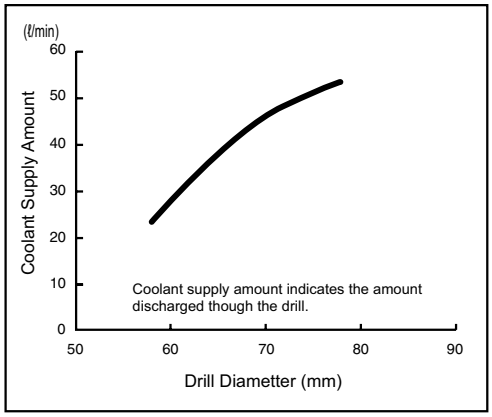
Description		Std.	No. of Insert	Dimension (mm) øD	L1	L2	L3	ød	ød1	Max. Offset (Radial) (mm)	Spare Parts: Cartridge for Outer Edge	Spare Parts: Cartridge for Inner Edge	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts K39
S50	-DRZ60180-20CR		2	60	286	217	195	50	75	+3.0	DR20CR-OUT (1 pc)	DR20CR-IN (1 pc)	SB-60120TR	DT-25	ZCMT200608
	-DRZ65195-20CR		2	65	296	227	206			+1.5					
	-DRZ70210-20CR		2	70	308	239	220			+0.2					
	-DRZ75225-12CR		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		4	80	340	271	240								

For recommended cutting conditions, see page K51

Cartridge

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

Drill diameter and Coolant

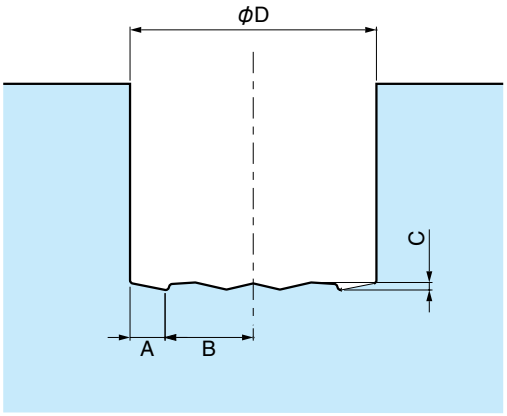


● : Std. Item ○ : Check Availability R : Std. Item (R-hand Only) L : Std. Item (L-hand Only)

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

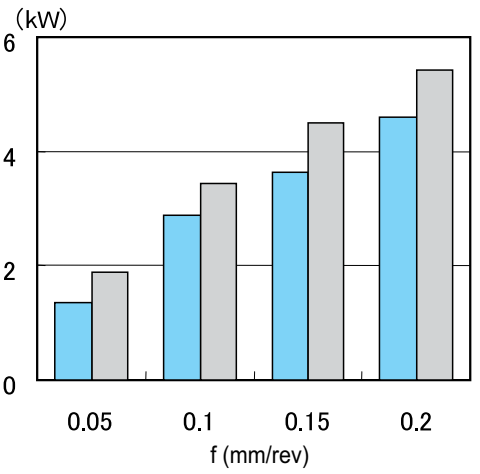
øD	A	B	C	øD	A	B	C	øD	A	B	C
13.0	2.1	4.4	0.4	21.5	3.1	7.7	0.6	33.0	5.7	10.8	0.8
13.5		4.7		22.0		7.9		34.0		11.3	
14.0		4.9		22.5		8.2		35.0		11.8	
14.5		5.2	0.5	23.0		8.4		36.0		12.3	
15.0		5.4		23.5		8.7		37.0		12.8	
15.5		5.7		24.0		8.9	0.7	38.0		13.3	0.9
16.0	2.7	5.3	0.6	24.5		9.2		39.0		13.8	
16.5		5.6		25.0		9.4		40.0		14.3	
17.0		5.8		25.5		9.7		41.0	6.5	14.0	1.0
17.5		6.1		26.0		9.9		42.0		14.5	
18.0		6.3		26.5		10.2		43.0		15.0	
18.5		6.6	0.7	27.0	4.0	9.5	0.7	44.0		15.5	
19.0		6.8		27.5		9.8		45.0		16.0	
19.5		7.1		28.0		10.0		46.0		16.5	
20.0		7.3		28.5		10.3		47.0		17.0	
20.5		7.6		29.0		10.5		48.0		17.5	1.1
21.0		7.8	0.8	29.5		10.8		49.0		18.0	
				30.0		11.0		50.0		18.5	
				30.5		11.3		51.0		19.0	
				31.0		11.5	0.8	52.0		19.5	
				31.5		11.8		53.0		20.0	
				32.0		12.0		54.0	8.5	18.5	1.2
				32.5		12.3		55.0		19.0	
								56.0		19.5	
								57.0		20.0	
								58.0		20.5	
								59.0		21.0	

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



Required Power

■ ø20 Cutting Power Comparison



■ 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	Vc (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)

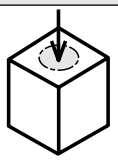
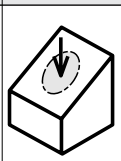
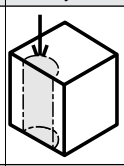
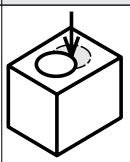
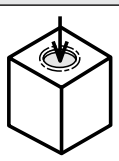
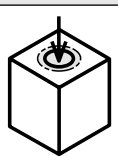
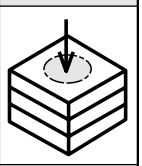
Workpiece Material	Recommended Grade (Vc m/min)										Cutting Diameter øD (mm)	Holder Type (Cutting Depth)			
	MEGACOAT			PVD Coated Carbide						Carbide		2D	3D	4D	5D
	PR1230	PR1225	PR1210	PR660	PR830	PR915	PR1025	PR930	PR905	KW10		f (mm/rev)			
	Standard SP SU	Standard SP SU	Standard	Standard SP SU	Standard SP	Standard	Standard SP SU	Standard SP	Standard	Standard SP					
Low-carbon Steel	★ 120-220	☆ 120-220	-	☆ 120-220	☆ 120-240	☆ 120-240	☆ 120-220	☆ 120-220	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	–
											ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	–
											ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
											ø50~	0.08~0.18	0.08~0.15	0.06~0.12	–
Carbon Steel	★ 100-160	☆ 100-160	-	☆ 100-160	☆ 120-180	☆ 120-180	☆ 100-160	☆ 100-160	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	–
											ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	–
											ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
											ø50~	0.08~0.18	0.08~0.15	0.06~0.12	–
Alloy Steel	★ 80-140	☆ 80-140	-	☆ 80-140	☆ 100-160	☆ 100-160	☆ 80-140	☆ 80-140	-	-	ø13~ø15.5	0.06~0.10	0.06~0.10	0.04~0.08	–
											ø16~ø26.5	0.08~0.15	0.08~0.15	0.06~0.12	–
											ø27~ø50	0.08~0.18	0.08~0.15	0.06~0.12	0.05~0.09
											ø50~	0.08~0.18	0.08~0.15	0.06~0.12	–
Mold Steel	★ 70-130	☆ 70-130	-	☆ 70-130	☆ 80-150	☆ 80-150	☆ 70-130	☆ 70-130	-	-	ø13~ø15.5	0.04~0.08	0.04~0.08	0.03~0.07	–
											ø16~ø26.5	0.08~0.12	0.06~0.10	0.06~0.08	–
											ø27~ø50	0.08~0.15	0.06~0.12	0.06~0.10	0.04~0.07
											ø50~	0.08~0.15	0.06~0.12	0.06~0.10	–
Stainless Steel	☆ 60-120	★ 60-120	-	☆ 60-120	☆ 70-140	☆ 70-140	☆ 60-120	☆ 60-120	-	-	ø13~ø15.5	0.04~0.08	0.04~0.08	0.03~0.06	–
											ø16~ø26.5	0.06~0.10	0.06~0.10	0.04~0.08	–
											ø27~ø50	0.06~0.10	0.06~0.12	0.04~0.10	0.04~0.07
											ø50~	0.06~0.12	0.06~0.12	0.04~0.10	–
Gray Cast Iron	-	-	★ 100-150	-	-	-	-	-	☆ 100-150	☆ 100-120	ø13~ø15.5	0.08~0.12	0.08~0.10	0.06~0.08	–
											ø16~ø26.5	0.10~0.18	0.10~0.15	0.08~0.12	–
											ø27~ø50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
											ø50~	0.10~0.20	0.10~0.18	0.08~0.15	–
Nodular Cast Iron	-	-	★ 80-120	-	-	-	-	-	☆ 80-120	☆ 80-100	ø13~ø15.5	0.08~0.12	0.08~0.10	0.06~0.08	–
											ø16~ø26.5	0.10~0.18	0.10~0.15	0.08~0.12	–
											ø27~ø50	0.10~0.20	0.10~0.18	0.08~0.15	0.06~0.10
											ø50~	0.10~0.20	0.10~0.18	0.08~0.15	–
Non-ferrous Metals	-	-	-	-	-	-	-	-	-	★ 200-600	ø13~ø15.5	0.06~0.12	0.06~0.10	0.04~0.08	–
											ø16~ø26.5	0.08~0.18	0.08~0.15	0.06~0.15	–
											ø27~ø50	0.08~0.20	0.08~0.18	0.06~0.15	0.05~0.10
											ø50~	0.08~0.20	0.08~0.18	0.06~0.15	–
Titanium Alloys	-	-	-	-	-	-	-	-	-	★ 40-70	ø13~ø15.5	0.05~0.06	0.05~0.06	0.05~0.06	–
											ø16~ø26.5	0.05~0.07	0.05~0.07	0.05~0.07	–
											ø27~ø50	0.06~0.08	0.06~0.08	0.06~0.08	0.04~0.05
											ø50~	0.06~0.08	0.06~0.08	0.06~0.08	–

・Apply a sufficient amount of coolant.

★: 1st Recommendation ☆: 2nd Recommendation

Cutting Conditions by Application

(Workpiece Material: 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	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 for prepared hole workpiece (Same as using likewise Boring Bar).

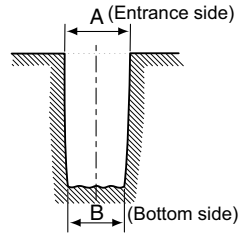
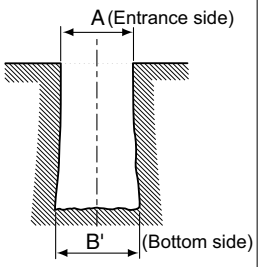
Drill type	2D~3D type	4D~5D type
ap	0.1×D or less	Not recommended

e.g.) In case of cutting using DRZ3090-10 (3×D type)
① For milling, prepared hole should be cut bigger than ø24 (ø30-0.1x30x2)
② For turning, ap should be set under ap = 3mm (0.1x30)

For ap in case of using outer coolant system

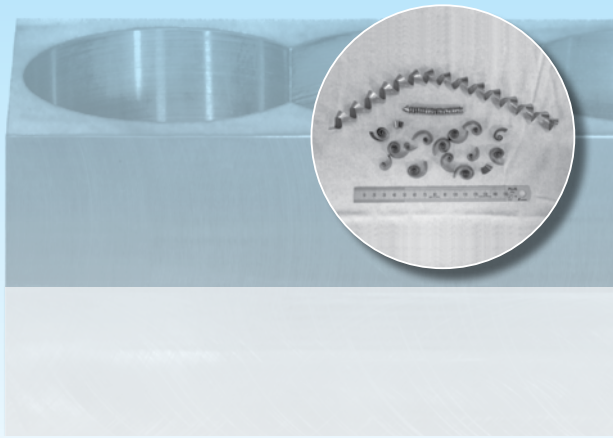
• In case of using outer coolant system, chip evacuation will be bad.
Therefore ap should be measured within 1.5times (1.5xD) of cutting diameter (øD).

Troubleshooting

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 • 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)		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 • Increase the cutting speed • Lower the feed rate See page ➡ **K34, K40** or **K51** for "Recommended Cutting Conditions". • 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**
			Core up for internal edge. (No core remains)	Adjust the core height. See page ➡ **K36~K37**

Indication of tool life of MagicDrill

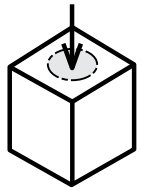
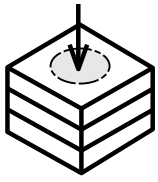
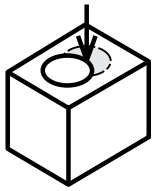
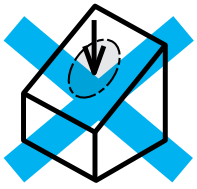
How to judge tool life	Indication of judging tool life
Generation status of tool mark involving with insert wearness	• When an insert is new, A holder is slightly bend external side during cutting. (It is designed that cutting diameter is slightly bigger during cutting.) Once cutting is finished, a holder will be back to normal size and smaller than cutting diameter. Tool mark will not be appeared on the finishing surface. (Although depends on workpiece and cutting condition, cutting power which generates external direction, slightly tool mark might be appeared.) • When an insert is at the end of tool life, Gradually external corner part is getting wear, cutting resistance which is generated in inside, a holder will be not bend, on the contrary it will be bend inside. Once cutting is finished, a holder will be back to normal. Pulling off a holder under this condition, external edge touches on finishing surface and tool mark will be on its finishing surface.
Tracing cutting diameter	When cutting diameter is measured, suddenly it shows small diameter. In this case, an insert can be judged the end of tool life.
Generating status of at the exit side	If insert wear progress. Burrs of penetrated hole entrance (Pulling out burrs) will be bigger and identified as the insert has reached at the end of tool life.
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 whir 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, vibration is getting larger and cutting noise is getting change. However, same as vibration and cutting noise, it is difficult to identify for small cutting diameter type.



Use single type of insert.

ø8 ø12 ø60
Cutting Dia
Large

Possible Drilling Applications

Plain Surface	Stacked Plates	Hole expansion	Slant Surface
			

* Hole expansion: Overlap amount of through hole must be 1/5D (0.2XøDc) or less.
Expansion of blind holes is not possible because chips are built up in the next hole and will cause chip biting.

Toolholder Identification System

S50	-	DRW	0600M	-	1	-	06
Straight Shank ø50		Type	Cutting Dia (mm) 0600M : ø60		Cutting Depth 1 : 1×D		Insert Size

DRW (Cutting Depth : 1×D)

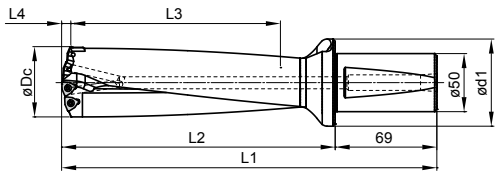
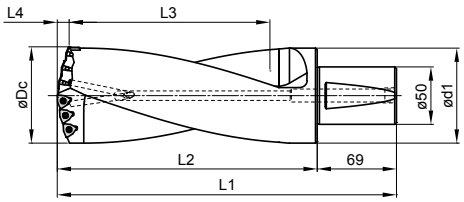


Fig.1



øDc=ø65~ø74 (4 inserts)
øDc=ø75~ø100 (6 inserts)

Fig.2

1D

Toolholder Dimension (Cutting Depth : 1×D)

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

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

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 K57
	
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.

MTO : Made to order

DRW (Cutting Depth : 2×D)

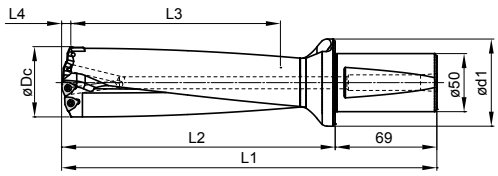
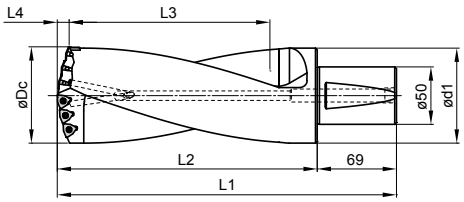


Fig.1



øDc=ø65~ø74 (4 inserts)
øDc=ø75~ø100 (6 inserts)

Fig.2

2D

Toolholder Dimension (Cutting Depth : 2×D)

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

Description		Std.	No. of Insert	Dimension (mm)						Shape
				øDc	L1	L2	L3	L4	ød1	
S50-	DRW0800M-2-06	MTO	6	80	287	218	160	9.9	78	Fig.2
	DRW0810M-2-06	MTO		81	289	220	162	9.9	79	
	DRW0820M-2-06	MTO		82	292	223	164	9.9	80	
	DRW0830M-2-06	MTO		83	293	224	166	9.9	81	
	DRW0840M-2-06	MTO		84	294	225	168	9.9	82	
	DRW0850M-2-06	MTO		85	296	227	170	10.5	83	
	DRW0860M-2-06	MTO		86	299	230	172	10.5	84	
	DRW0870M-2-06	MTO		87	302	233	174	10.5	85	
	DRW0880M-2-06	MTO		88	304	235	176	10.5	86	
	DRW0890M-2-06	MTO		89	307	238	178	10.5	87	
	DRW0900M-2-06	MTO		90	309	240	180	11.0	88	
	DRW0910M-2-06	MTO		91	311	242	182	11.0	89	
	DRW0920M-2-06	MTO		92	314	245	184	11.0	90	
	DRW0930M-2-06	MTO		93	316	247	186	11.0	91	
	DRW0940M-2-06	MTO		94	319	250	188	11.0	92	
	DRW0950M-2-06	MTO		95	321	252	190	11.6	93	
	DRW0960M-2-06	MTO		96	324	255	192	11.6	94	
	DRW0970M-2-06	MTO		97	325	256	194	11.6	95	
	DRW0980M-2-06	MTO		98	328	259	196	11.6	96	
	DRW0990M-2-06	MTO		99	330	261	198	11.6	97	
	DRW1000M-2-06	MTO		100	332	263	200	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 ➡ K57
	
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.

MTO : Made to order

DRW (Cutting Depth : 3×D)

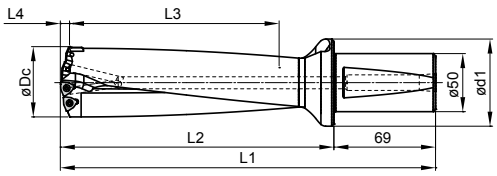
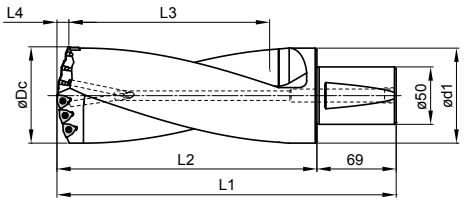


Fig.1



øDc=ø65~ø74 (4 inserts)
øDc=ø75~ø100 (6 inserts)

Fig.2

3D

Toolholder Dimension (Cutting Depth : 3×D)

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

Description		Std.	No. of Insert	Dimension (mm)						Shape
				øDc	L1	L2	L3	L4	ød1	
S50-	DRW0800M-3-06	MTO	6	80	367	298	240	9.9	78	Fig.2
	DRW0810M-3-06	MTO		81	370	301	243	9.9	79	
	DRW0820M-3-06	MTO		82	374	305	246	9.9	80	
	DRW0830M-3-06	MTO		83	376	307	249	9.9	81	
	DRW0840M-3-06	MTO		84	378	309	252	9.9	82	
	DRW0850M-3-06	MTO		85	381	312	255	10.5	83	
	DRW0860M-3-06	MTO		86	385	316	258	10.5	84	
	DRW0870M-3-06	MTO		87	389	320	261	10.5	85	
	DRW0880M-3-06	MTO		88	392	323	264	10.5	86	
	DRW0890M-3-06	MTO		89	396	327	267	10.5	87	
	DRW0900M-3-06	MTO		90	399	330	270	11.0	88	
	DRW0910M-3-06	MTO		91	402	333	273	11.0	89	
	DRW0920M-3-06	MTO		92	406	337	276	11.0	90	
	DRW0930M-3-06	MTO		93	409	340	279	11.0	91	
	DRW0940M-3-06	MTO		94	413	344	282	11.0	92	
	DRW0950M-3-06	MTO		95	416	347	285	11.6	93	
	DRW0960M-3-06	MTO		96	420	351	288	11.6	94	
	DRW0970M-3-06	MTO		97	422	353	291	11.6	95	
	DRW0980M-3-06	MTO		98	426	357	294	11.6	96	
	DRW0990M-3-06	MTO		99	429	360	297	11.6	97	
	DRW1000M-3-06	MTO		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 K57
	
S50-DRW…-06	WCMT06T308

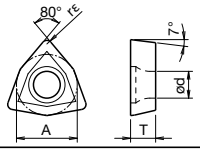
Recommended Cutting Conditions K57

• 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.

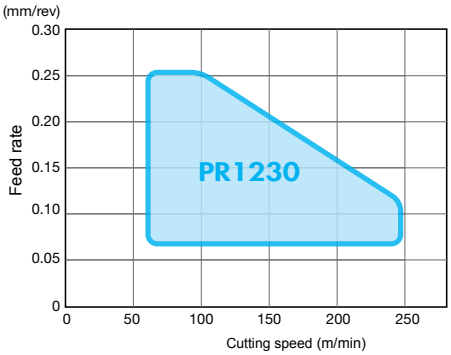
MTO : Made to order

Applicable Inserts

Shape		Description	Dimension (mm) A	T	ød	rε	Angle (°) α	MEGACOAT PR1230	Applicable Toolholder
		**WCMT06T308**	9.525	3.97	3.7	0.8	7°	●	**S50-DRW…-06**
		WCMT050308	7.94	3.18	3.2			○	(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

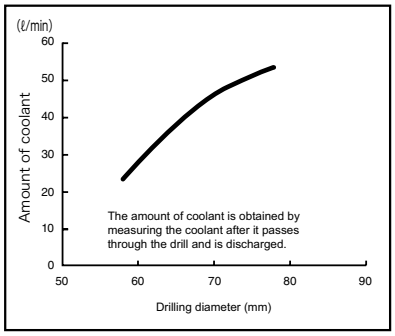
・Apply enough amount of coolant (internal supply).
・Feed rate should be calculated as single insert.

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”.

◆ **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	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

Inserts are sold in 10 piece boxes.

● : Std. Item
○ : Std. Item (Check the delivery schedule.)

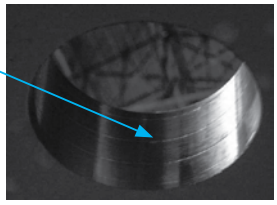
Q&A

・[High rate + Small feed]
This setting makes the chips thinner and uses centrifugal force to cut them off.
E.g. Vc=200m/min、f=0.07 ～ 0.09mm/rev
・[Step machining at entrance]
E.g. Entrance to 10 mm deep: 1 mm step machining
E.g. 10 mm deep or more: Vc = 150 m/min, f = 0.15 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.

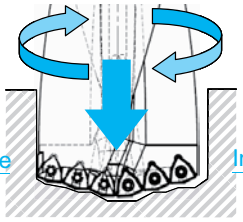
Tool marking



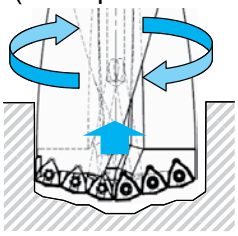
Example of tool marking

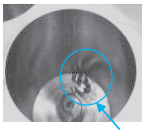
・How to prevent tool markings

① Drill the hole. (The spindle revolves.)



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

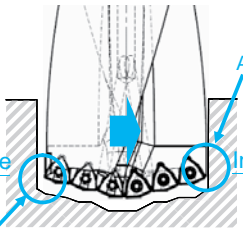




Chips are adhering to the bottom when drilling stops.

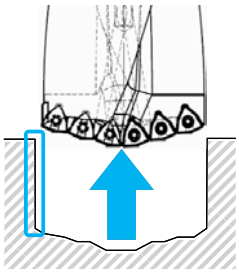
·Without turning back, chips remains adhering to the bottom.
·If offset ③ is performed without turning back, the bottom of drill contacts with the inner surface of hole.
·Turning back is necessary for blind holes but not for through holes.

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



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

④ Pull out the drill.



Example of drilling program

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

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

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

Q-5 Chattering occurs. Is there any countermeasure?

A-5 Chattering usually occurs in chamfering and when the feed rate per revolution is not enough.
Try changing the drilling conditions as follows.

・Increase the feed rate if it is small.
If the feed rate is f = 0.06 mm/rev, for example, increase it to f = 0.08 to 0.12 mm/rev.
Increasing the feed rate will improve chamfering and thus prevent chattering.

・If the cutting speed is too high, lower it to Vc = 100 to 150 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 ~ 0.08 mm/rev.

・If chattering occurs at the full contact surface (e.g. in step machining), make adjustment by increasing the feed rate at chamfering or lowering the cutting speed.
Once chattering occurs in chamfering, it will continue through drilling.