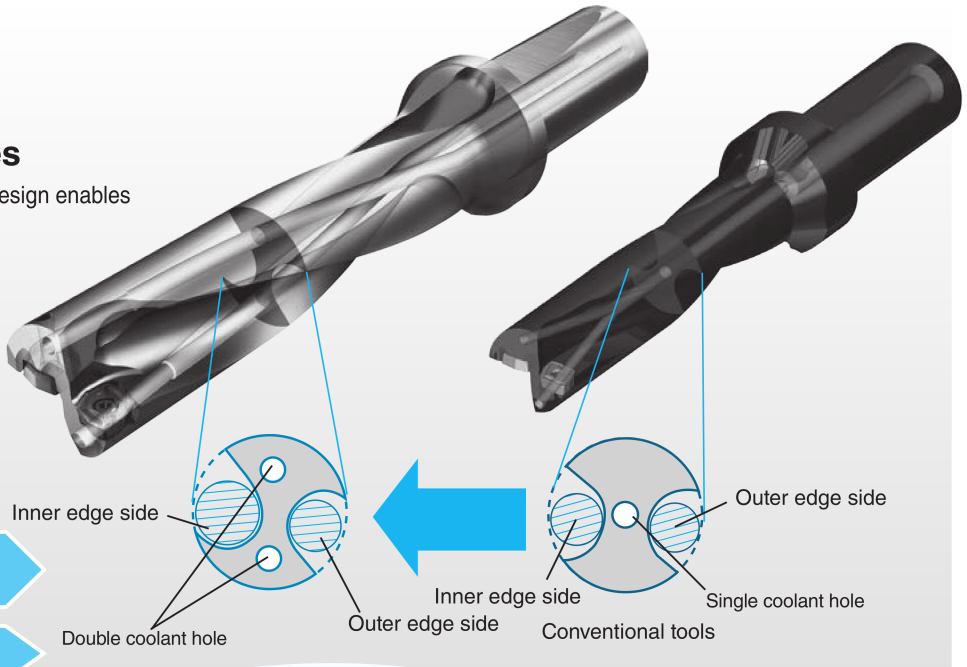
DRX enables stable and efficient drilling

Twisted Coolant Holes

Twisted Coolant Holes technology design enables

Superior Chip Evacuation



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

1.25 times higher cooling performance

The special alloy enables toolholder stability and increased reliability.

Three chipbreaker types

- Covers a variety of workpiece materials

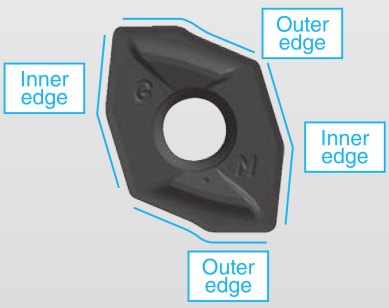
GM Chipbreaker
Carbon Steel, Cast Iron
General Purpose

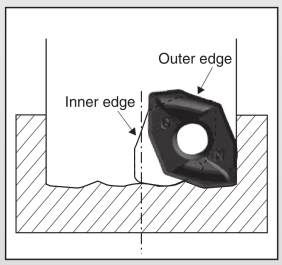
GH Chipbreaker
Hard materials,
interrupted drilling
Tough Edge

SM Chipbreaker
Stainless Steel,
Low Carbon Steel and
Non-ferrous Metals
Sharp cutting for deeper drilling

- Economical 4 edged type

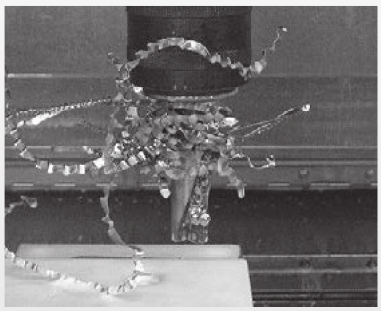
2 inner pocket cutting edges and 2 outer pocket cutting edges



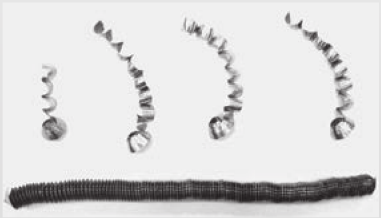


Positioning of outer edge and inner edge

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



Long entangled chips (Competitor A)

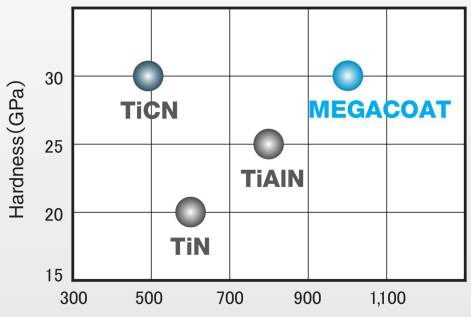


Chips by SM chipbreaker (SUS304)

MEGACOAT

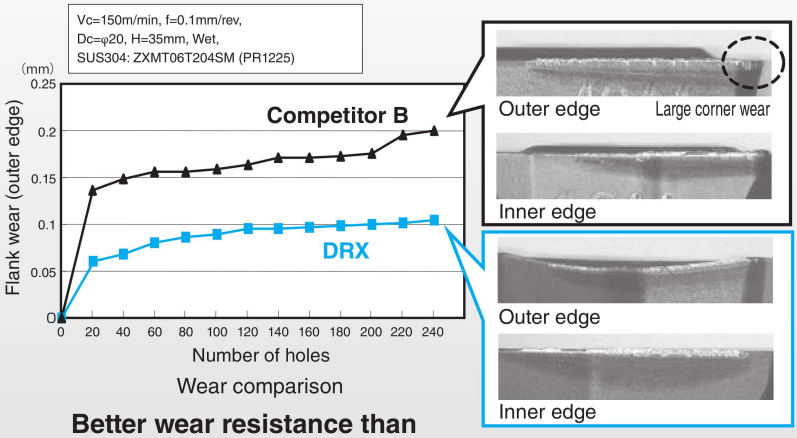
Four Insert Grades

(PR1230:for Steel, PR1225:for Stainless Steel / Low Carbon Steel, PR1210:for Cast Iron, GW15:for Non-ferrous Metals)



MEGACOAT's High oxidation resistance

MEGACOAT is used to enable longer Tool Life



Wear comparison

Better wear resistance than competitor B
Achieving long Tool Life

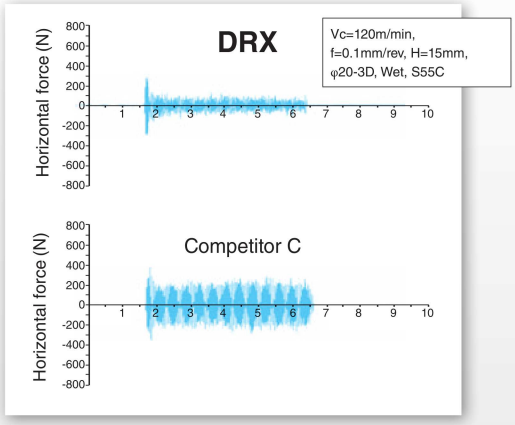
(Internal evaluation)

K

Drilling

High Precision: Balanced System

Vibration comparison

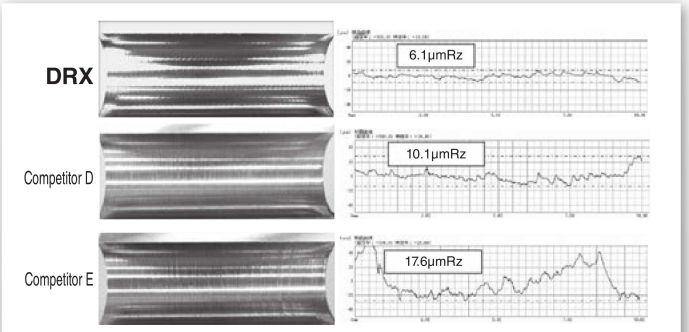


Less vibration due to well balanced at Drilling

Better finished surface

Finished surface comparison

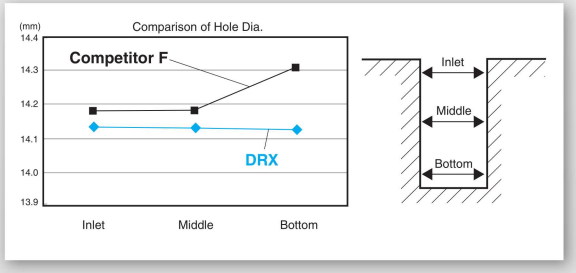
Vc=180m/min, f=0.15mm/rev, H=60mm (through hole),
φ20-3D, Wet, S45C, NC Lathe



Better finished surface than Competitor D and E

Possible to extend tool life of next process

Variation of Hole Dia.



Vc=180m/min, f=0.08mm/rev, H=56mm (blind hole),
φ14-4D, Wet, S50C

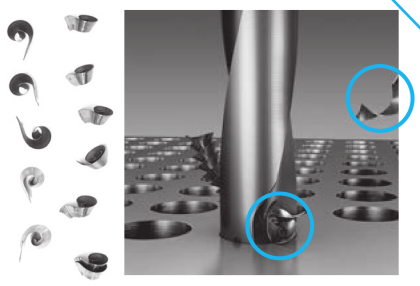
Comparing to competitor F, its excellent chip evacuation performance provides a maintained good balance and less variation in hole dia.
Drastically improved straight machining capability

(Internal evaluation)

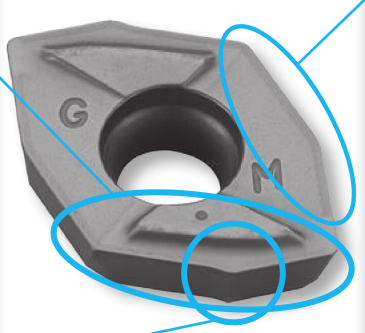
Covers a variety of workpiece materials with new chipbreaker

New chipbreaker features

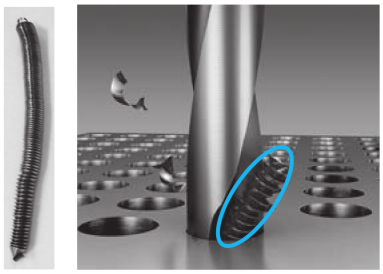
◆ Wider chipbreaker (outer edge)



small chips for better evacuation



◆ Flat chipbreaker (inner edge)

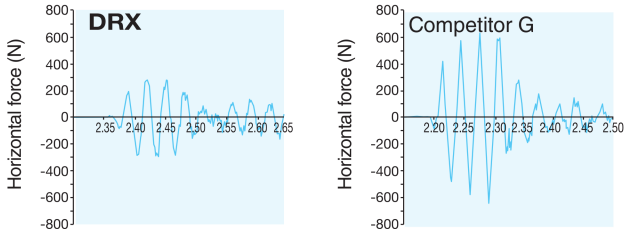


ideal continuous chips

◆ Sigmoid cutting edge (outer edge)

sigmoid outer cutting edge
↓
sharp cutting

Vc=120m/min, f=0.1mm/rev, H=15mm, φ20-3D, Wet, S55C



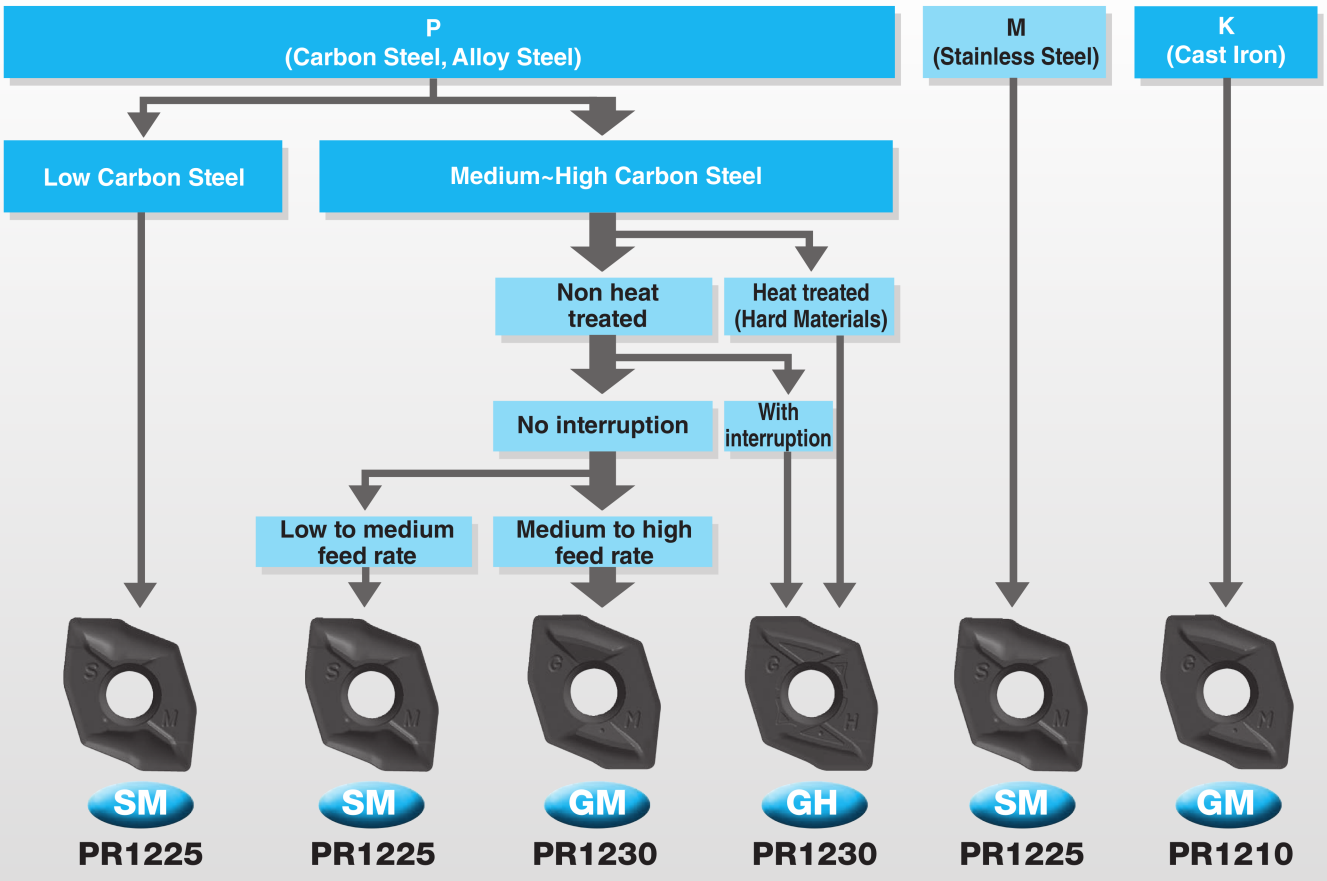
Cutting force comparison of outer edge at the start of drilling

Lowered impact force at the start

↓

Reduces sudden breakage

Chipbreaker selection

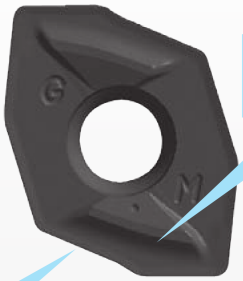


design developed through comprehensive technology

3 chipbreakers to cover various materials

GM Chipbreaker…General Purpose

for Steel:PR1230 **for Cast Iron:PR1210**



(1) Wider chipbreaker can cover variety of materials

(2) Good balance of cutting edge strength and sharp cutting

for general drilling

Optimized cutting edge strength, sharpness and chip control

GH Chipbreaker…Tough Edge

Hard materials, interrupted drilling:PR1230

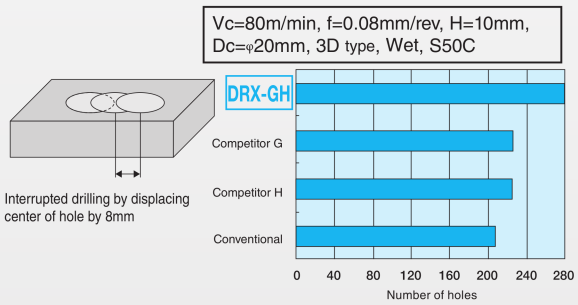
1st recommended chipbreaker for hard materials interrupted operation

Cutting edge strength oriented design of Chipbreaker

(2) Cutting edge strength oriented design

(1) Wider chipbreaker control breakage by pressed chips

·Fracture resistance comparison



Better fracture resistance than competitors

SM Chipbreaker…Sharp Cutting for Deeper Drilling

for Stainless Steel / Low Carbon Steel:PR1225

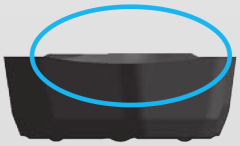
for Non-ferrous Metals:GW15

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

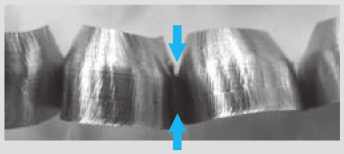
Sharp cutting with large rake angle
Stable chip control owing to newly designed chipbreaker and U-shaped cutting edge

(2) Sharp cutting with large rake angle

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



Outstanding chip control achieved by splitting chips from the leading edges

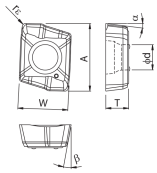
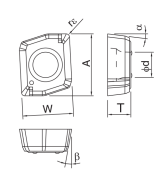
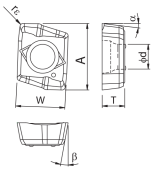
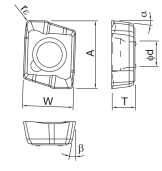
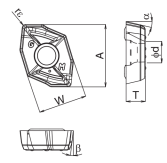
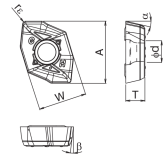
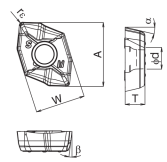


Chip breaking system of SM chipbreaker (Outer edge)

Applicable Inserts
(for DRX)

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

P	Carbon Steel / Alloy Steel	●	○			
	Mold Steel	●				
M	Stainless Steel	○	●			
K	Cast Iron			●		
N	Non-ferrous Metals				●	

Insert		Description	Dimension (mm)					Angle		MEGACOAT			Carbide	Applicable Toolholders Ref. to Page
			A	T	φd	W	rε	α	β	PR1230	PR1225	PR1210	GW15	
 For outer edge / General Purpose		ZXMT 030203GM-E	6.4	2.30	2.4	4.8	0.3	7°	10°	●		●		K40 K42 K44 K46
 For inner edge / General Purpose		ZXMT 030203GM-I	5.9	2.30	2.4	4.8	0.3	7°	10°	●	●	●	●	
 For outer edge / Tough Edge		ZXMT 030203GH-E	6.4	2.30	2.4	4.8	0.3	7°	10°	●				
 For outer edge / Sharp Cutting		ZXMT 030203SM-E	6.4	2.30	2.4	4.8	0.3	7°	10°		●		●	
 General Purpose		ZXMT 040203GM	6.2	2.60	2.4	5.1	0.3	13°	10°	●		●		K40 K41 K42 K43 K44 K45 K46
		05T203GM	7.3	2.76	2.5	5.5	0.3		7°	●		●		
		06T204GM	8.6	2.89	2.8	6.4	0.4			●		●		
		070305GM	10.2	3.24	3.0	8.0	0.5			●		●		
		09T306GM	12.2	4.03	3.6	9.6	0.6			●		●		
		11T306GM	14.5	4.06	4.6	11.6	0.6			●		●		
		140408GM	18.0	4.88	5.7	14.4	0.8			●		●		
		170608GM	22.1	6.58	6.8	17.7	0.8			●		●		
 Tough Edge		ZXMT 040203GH	6.2	2.60	2.4	5.1	0.3	13°	10°	●				
		05T203GH	7.3	2.76	2.5	5.5	0.3		7°	●				
		06T204GH	8.6	2.89	2.8	6.4	0.4			●				
		070305GH	10.2	3.24	3.0	8.0	0.5			●				
		09T306GH	12.2	4.03	3.6	9.6	0.6			●				
		11T306GH	14.5	4.06	4.6	11.6	0.6			●				
		140408GH	18.0	4.88	5.7	14.4	0.8			●				
		170608GH	22.1	6.58	6.8	17.7	0.8			●				
 Sharp Cutting / for Deeper Drilling		ZXMT 040203SM	6.2	2.60	2.4	5.1	0.3	13°	10°		●		●	
		05T203SM	7.3	2.76	2.5	5.5	0.3		7°		●		●	
		06T204SM	8.6	2.89	2.8	6.4	0.4				●		●	
		070305SM	10.2	3.24	3.0	8.0	0.5				●		●	
		09T306SM	12.2	4.03	3.6	9.6	0.6				●		●	
		11T306SM	14.5	4.06	4.6	11.6	0.6				●		●	
		140408SM	18.0	4.88	5.7	14.4	0.8				●		●	
		170608SM	22.1	6.58	6.8	17.7	0.8				●		●	

● : Std. Item

Suitable Chipbreaker (ZXMT)

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

★: 1st Choice ☆: 2nd Choice

How to select ZXMT03

ZXMT03 type (Drill Dia.: φ12~φ13)

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

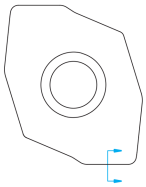
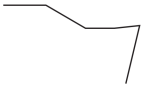
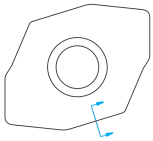
GM-E GH-E SM-E

·Inner edge

ZXMT030203GM-I

GM-I

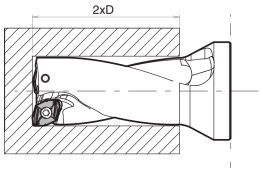
Features of the Chipbreaker

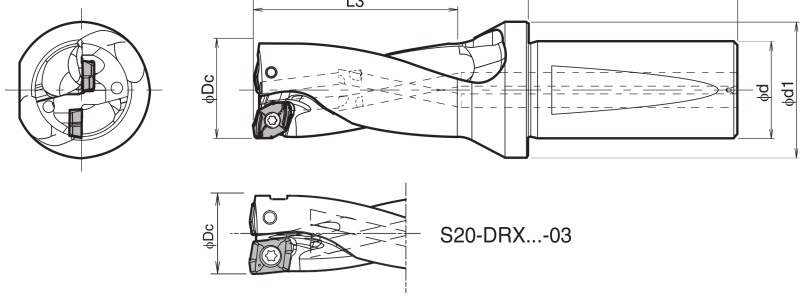
Chipbreaker			GM (General purpose)	GH (Tough Edge)	SM (Sharp Cutting / for Deeper Drilling)
Insert					
Features			1st. recommendation for carbon steel and alloy steel, 1st. recommendation for cast iron.	1st. recommendation for interrupted drilling and hard materials. Cutting edge strength oriented design.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

Indication of tool life of MagicDrill

How to judge tool life	Indication of judging tool life
Judgement of tool condition and insert wear	· When an insert is new the toolholder is slightly bent to the side during drilling. (therefore, the drill diameter is slightly bigger during drilling). Once drilling is finished, the toolholder will return back to normal size. No tool marks will appear on the finished surface (although this depends on workpiece and cutting condition: during external drilling slight tool mark might appear.) · When an insert is at the end of its tool life, Gradually the external corner part gets worn out, the toolholder does not bend slightly outwards, it starts to bend inwards. After the drilling is finished, the toolholder returns to the normal position. When taking off a toolholder under this condition the cutting edge of the insert creates external tool marks on the finished surface of the workpiece.
Checking hole diameter	When hole diameter is measured, suddenly it shows small diameter. In this case, a worn out insert can be the cause.
Checking the surface on the outlet side	If insert wear progresses, the burrs of penetrated hole entrance becomes bigger. This is a clear indication that the tool must be exchanged.
Variation of drilling noise	Light drilling noise at the beginning turns to brady noise which contains vibration noise.
Variation of vibration	As the end of tool life is getting closer, there is more vibration and the drilling noise changes. However, when drilling smaller diameters these factors are difficult to detect.

DRX (Drilling Depth:2×D)





S20-DRX...-03

2D

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts K38
S20 -DRX120M-2-03	●	2	12	88	45	24	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-2-03	●		12.5	89	46	25			+0.4			
-DRX130M-2-03	●		13	90	47	26			+0.3			
-DRX135M-2-04	●	2	13.5	91	48	27	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-2-04	●		14	92	49	28			+0.4			
-DRX145M-2-04	●		14.5	93	50	29			+0.3			
-DRX150M-2-04	●		15	94	51	30			+0.2			
S25 -DRX155M-2-05	●	2	15.5	109	55	31	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-2-05	●		16	110	56	32			+0.7			
-DRX165M-2-05	●		16.5	111	57	33			+0.5			
-DRX170M-2-05	●		17	112	58	34			+0.4			
-DRX175M-2-05	●		17.5	113	59	35			+0.3			
-DRX180M-2-05	●		18	114	60	36			+0.2			
-DRX185M-2-06	●	2	18.5	112	58	37	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-2-06	●		19	113	59	38			+0.8			
-DRX195M-2-06	●		19.5	114	60	39			+0.7			
-DRX200M-2-06	●		20	115	61	40			+0.5			
-DRX205M-2-06	●		20.5	116	62	41			+0.4			
-DRX210M-2-06	●		21	117	63	42			+0.3			
-DRX215M-2-06	●		21.5	118	64	43			+0.2			
-DRX220M-2-07	●	2	22	119	65	44	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-2-07	●		22.5	120	66	45			+1.0			
-DRX230M-2-07	●		23	121	67	46			+0.9			
-DRX235M-2-07	●		23.5	122	68	47			+0.8			
-DRX240M-2-07	●		24	123	69	48			+0.7			
-DRX245M-2-07	●		24.5	124	70	49			+0.5			
-DRX250M-2-07	●		25	125	71	50			+0.4			
-DRX255M-2-07	●		25.5	126	72	51			+0.3			
-DRX260M-2-07	●		26	127	73	52			+0.2			
S32 -DRX270M-2-09	●	2	27	136	77	54	32	41	+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		43	+0.8			
-DRX310M-2-09	●		31	144	85	62			+0.6			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions K48
Trouble shooting K47

● : Std. Item

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts K38
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	54	+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		54	+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		59	+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		59	+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		64	+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 drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions K48
Trouble shooting K47

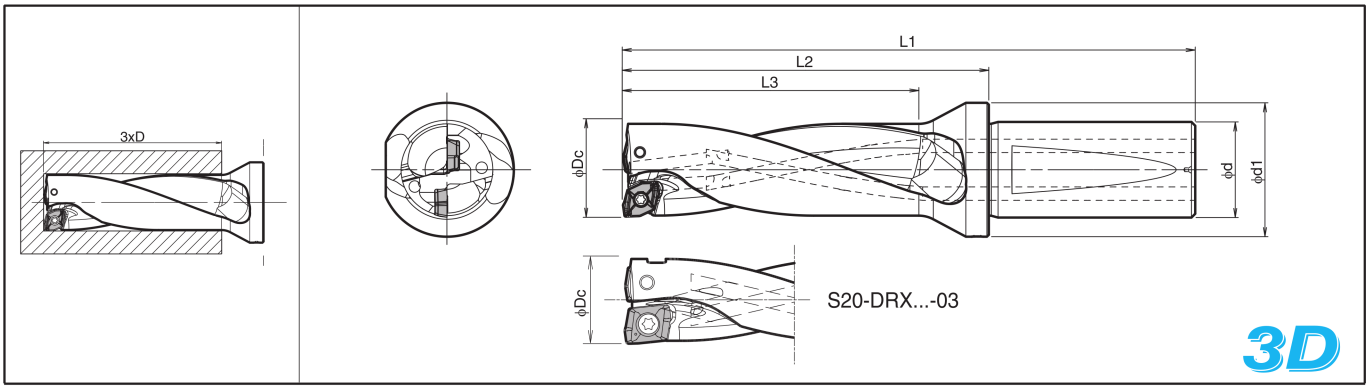
· Hole Dia. Tolerance (2D type)

Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+0.20 - 0.10
φ27~φ38	+0.25 - 0.15
φ39~φ60	+0.30 - 0.20

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

● : Std. Item

DRX (Drilling Depth:3×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
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	72	48			+0.7			
-DRX165M-3-05	●		16.5	127	73	49.5			+0.5			
-DRX170M-3-05	●		17	129	75	51			+0.4			
-DRX175M-3-05	●		17.5	130	76	52.5			+0.3			
-DRX180M-3-05	●		18	132	78	54			+0.2			
-DRX185M-3-06	●	2	18.5	131	77	55.5	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-3-06	●		19	132	78	57			+0.8			
-DRX195M-3-06	●		19.5	134	80	58.5			+0.7			
-DRX200M-3-06	●		20	135	81	60			+0.5			
-DRX205M-3-06	●		20.5	137	83	61.5			+0.4			
-DRX210M-3-06	●		21	138	84	63			+0.3			
-DRX215M-3-06	●		21.5	140	86	64.5			+0.2			
-DRX220M-3-07	●	2	22	141	87	66	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-3-07	●		22.5	142	88	67.5			+1.0			
-DRX230M-3-07	●		23	144	90	69			+0.9			
-DRX235M-3-07	●		23.5	145	91	70.5			+0.8			
-DRX240M-3-07	●		24	147	93	72			+0.7			
-DRX245M-3-07	●		24.5	148	94	73.5			+0.5			
-DRX250M-3-07	●		25	150	96	75			+0.4			
-DRX255M-3-07	●		25.5	151	97	76.5			+0.3			
-DRX260M-3-07	●		26	153	99	78			+0.2			
S32 -DRX265M-3-09	●	2	26.5	161	102	79.5	32	41	+1.7	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX270M-3-09	●		27	163	104	81			+1.6			
-DRX275M-3-09	●		27.5	164	105	82.5			+1.5			
-DRX280M-3-09	●		28	166	107	84			+1.3			
-DRX285M-3-09	●		28.5	167	108	85.5			+1.2			
-DRX290M-3-09	●		29	169	110	87			+1.1			
-DRX295M-3-09	●		29.5	170	111	88.5		43	+1.1			
-DRX300M-3-09	●		30	172	113	90			+0.8			
-DRX305M-3-09	●		30.5	173	114	91.5			+0.7			
-DRX310M-3-09	●		31	175	116	93			+0.6			
-DRX315M-3-09	●		31.5	176	117	94.5			+0.5			
S40 -DRX320M-3-11	●	2	32	201	132	96	40	54	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX330M-3-11	●		33	204	135	99			+1.9			
-DRX340M-3-11	●		34	207	138	102			+1.7			
-DRX350M-3-11	●		35	210	141	105			+1.4			
-DRX360M-3-11	●		36	213	144	108			+1.2			
-DRX370M-3-11	●		37	216	147	111			+0.9			
-DRX380M-3-11	●		38	219	150	114			+0.7			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ K48
Trouble shooting ➡ K47

● : Std. Item

● Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S40 -DRX390M-3-14	●		39	218	149	117			+2.8			
-DRX400M-3-14	●		40	221	152	120		54	+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		59	+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		59	+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		64	+1.5			
-DRX580M-3-17	●		58	272	203	174			+1.3			
-DRX590M-3-17	●		59	275	206	177			+1.0			
-DRX600M-3-17	●		60	278	209	180			+0.8			

·When offset drilling, reduce feed rate to 0.08mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ **K48**
Trouble shooting ➡ **K47**

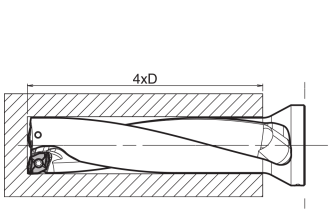
· Hole Dia. Tolerance (3D type)

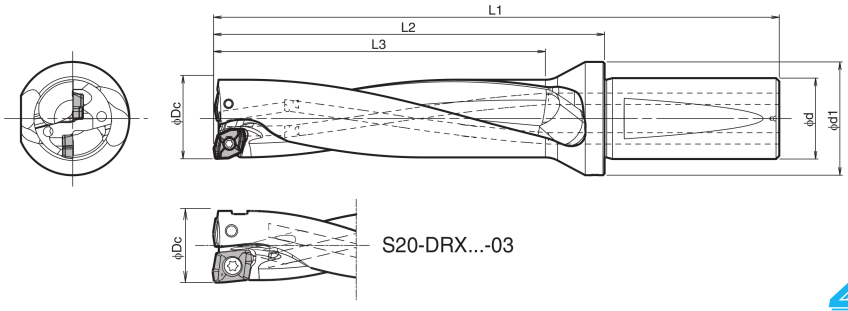
Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+0.20 - 0.10
φ26.5~φ38	+0.25 - 0.15
φ39~φ60	+0.30 - 0.20

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

● : Std. Item

DRX (Drilling Depth:4×D)





S20-DRX...-03

4D

Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S20 -DRX120M-4-03	●	2	12	112	69	48	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX125M-4-03	●		12.5	114	71	50			+0.4			
-DRX130M-4-03	●		13	116	73	52			+0.3			
-DRX135M-4-04	●	2	13.5	118	75	54	20	27	+0.5	SB-2042TRG	DTM-6	ZXMT040203□□
-DRX140M-4-04	●		14	120	77	56			+0.4			
-DRX145M-4-04	●		14.5	122	79	58			+0.3			
-DRX150M-4-04	●		15	124	81	60			+0.2			
S25 -DRX155M-4-05	●	2	15.5	140	86	62	25	32	+0.8	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX160M-4-05	●		16	142	88	64			+0.7			
-DRX165M-4-05	●		16.5	144	90	66			+0.5			
-DRX170M-4-05	●		17	146	92	68			+0.4			
-DRX175M-4-05	●		17.5	148	94	70			+0.3			
-DRX180M-4-05	●		18	150	96	72			+0.2			
-DRX185M-4-06	●	2	18.5	149	95	74	25	32	+0.9	SB-2250TR	DTM-7	ZXMT06T204□□
-DRX190M-4-06	●		19	151	97	76			+0.8			
-DRX195M-4-06	●		19.5	153	99	78			+0.7			
-DRX200M-4-06	●		20	155	101	80			+0.5			
-DRX205M-4-06	●		20.5	157	103	82			+0.4			
-DRX210M-4-06	●		21	159	105	84			+0.3			
-DRX215M-4-06	●		21.5	161	107	86			+0.2			
-DRX220M-4-07	●	2	22	163	109	88	25	33	+1.2	SB-2570TR	DTM-8	ZXMT070305□□
-DRX225M-4-07	●		22.5	165	111	90			+1.0			
-DRX230M-4-07	●		23	167	113	92			+0.9			
-DRX235M-4-07	●		23.5	169	115	94			+0.8			
-DRX240M-4-07	●		24	171	117	96			+0.7			
-DRX245M-4-07	●		24.5	173	119	98			+0.5			
-DRX250M-4-07	●		25	175	121	100			+0.4			
-DRX255M-4-07	●		25.5	177	123	102			+0.3			
-DRX260M-4-07	●		26	179	125	104			+0.2			
S32 -DRX270M-4-09	●	2	27	190	131	108	32	41	+1.6	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX280M-4-09	●		28	194	135	112			+1.3			
-DRX290M-4-09	●		29	198	139	116			+1.1			
-DRX300M-4-09	●		30	202	143	120		43	+0.8			
-DRX310M-4-09	●		31	206	147	124			+0.6			
S40 -DRX320M-4-11	●	2	32	223	154	128	40	49	+2.2	SB-4085TR	DTM-15	ZXMT11T306□□
-DRX330M-4-11	●		33	227	158	132			+1.9			
-DRX340M-4-11	●		34	231	162	136			+1.7			
-DRX350M-4-11	●		35	235	166	140			+1.4			
-DRX360M-4-11	●		36	239	170	144			+1.2			
-DRX370M-4-11	●		37	243	174	148			+0.9			
-DRX380M-4-11	●		38	247	178	152			+0.7			

·When offset drilling, reduce feed rate to 0.06mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ **K48**
Trouble shooting ➡ **K47**

● : Std. Item

● Toolholder Dimensions

4D

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S40 -DRX390M-4-14	●		39	257	188	156			+2.8			
-DRX400M-4-14	●		40	261	192	160		54	+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		59	+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		59	+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		64	+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 drilling, reduce feed rate to 0.06mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ **K48**
Trouble shooting ➡ **K47**

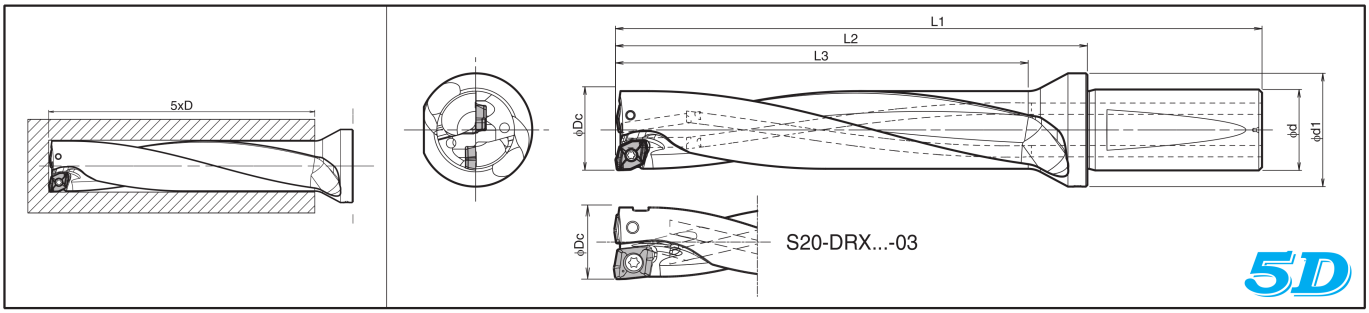
· Hole Dia. Tolerance (4D type)

Dc	Hole Dia. Tolerance (mm)
φ12~φ26	+ 0.25 - 0.10
φ27~φ38	+ 0.30 - 0.15
φ39~φ60	+ 0.35 - 0.20

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

● : Std. Item

DRX (Drilling Depth:5×D)



Toolholder Dimensions

Description	Std.	No. of Inserts	Dimension (mm) φDc	L1	L2	L3	φd	φd1	Max. Offset (Radial) (mm)	Spare Parts: Clamp Screw	Spare Parts: Wrench	Applicable Inserts ➡ K38
S20 -DRX120M-5-03	●	2	12	120	77	60	20	27	+0.5	SB-2042TRG	DTM-6	Outer edge ZXMT030203□□-E Inner edge ZXMT030203GM-I
-DRX130M-5-03	●		13	125	82	65			+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	104	80			+0.7			
-DRX170M-5-05	●	2	17	163	109	85	25	32	+0.4	SB-2045TR	DTM-6	ZXMT05T203□□
-DRX180M-5-05	●		18	168	114	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	131	110			+1.2			
-DRX230M-5-07	●		23	190	136	115			+0.9			
-DRX240M-5-07	●	2	24	195	141	120	25	33	+0.7	SB-2570TR	DTM-8	ZXMT070305□□
-DRX250M-5-07	●		25	200	146	125			+0.4			
-DRX260M-5-07	●		26	205	151	130			+0.2			
S32 -DRX270M-5-09	●		27	217	158	135			+1.6			
-DRX280M-5-09	●		28	222	163	140		41	+1.3			
-DRX290M-5-09	●	2	29	227	168	145	32		+1.1	SB-3080TR	DTM-10	ZXMT09T306□□
-DRX300M-5-09	●		30	232	173	150		43	+0.8			
-DRX310M-5-09	●		31	237	178	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		49	+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		54	+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		59	+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		59	+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		64	+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 drilling, reduce feed rate to 0.05mm/rev or less.
·Ref. to page **K49** for Adjustable Sleeve (SHE type).

Recommended Cutting Conditions ➡ K48
Trouble shooting ➡ K47

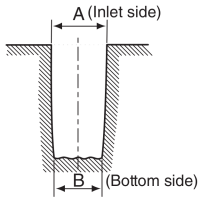
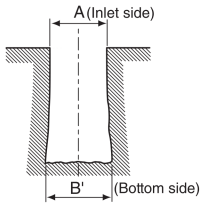
· Hole Dia. Tolerance (5D type)

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

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

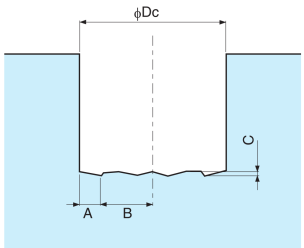
● : Std. Item

Trouble shooting (DRX)

Trouble condition	Condition		Cause	Countermeasures
Hole diameter is small (at hole bottom)		There is no problem for inlet, 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 Ref. to page **K48** for "Recommended Cutting Conditions"
Hole diameter becomes larger (at hole bottom)		There is no problem for inlet, 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 Ref. to page **K48** for "Recommended Cutting Conditions" · Check the core height Ref. to page **K50~K51**
Hole diameter is small (from the hole inlet)		Hole diameter is small from inlet. (At turning moment)	Inappropriate adjustment of hole diameter.	In case of using lathe machine, use X-axis and adjustment hole diameter. Ref. to page **K50**
			No core at internal edge. (No core remains)	Adjust the center height. Ref. to page **K50~K51**

MagicDrill (DRX) Hole Bottom Shape (mm)

φDc	A	B	C	φDc	A	B	C	φDc	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 within ±0.1mm depending on workpiece materials and cutting conditions)

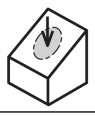
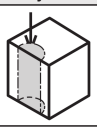
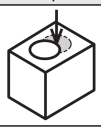
DRX Recommended Cutting Conditions (Coolant)

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

· Apply a sufficient amount of coolant.

★ : 1st Recommendation ☆ : 2nd Recommendation

Cutting Conditions by Application

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

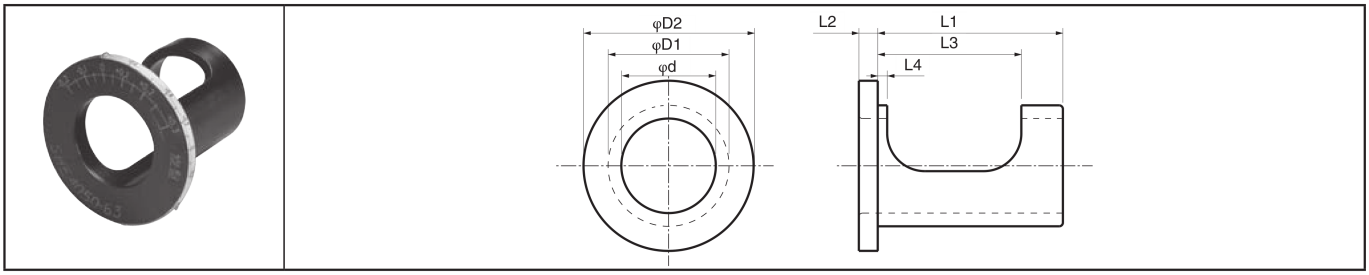
* Cutting width (Torus-shaped part) when drilling cored hole.

Drill type	2D~3D	4D	5D
Cutting width (Torus-shaped part)	0.1×Dc or less	Less than corner radius	Not recommended

◆ Max. Depth for Drilling with External Coolant

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

SHE



Sleeve Dimensions

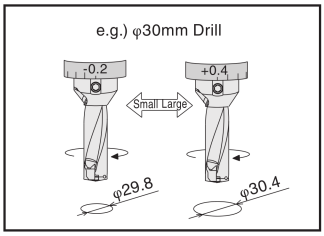
Description	Std.	Dimension (mm)							* Drill Dia. Adjustable Range	Center Height Adjustable Range
		φd	φD1	φD2	L1	L2	L3	L4		
SHE 2025-43	●	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
2532-48	●	25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
3240-53	●	32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
4050-63	●	40	50	74	63	6	49	3.0	+0.6~-0.2	+0.2~-0.2

· Diameter Adjustment Range adjusts the drill diameter.

● : Std. Item

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

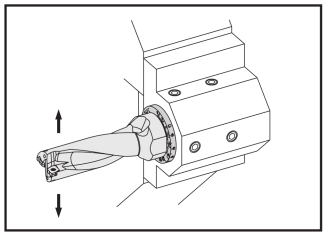
1. Diameter Adjustment ~For Machining Center~



● Diameter Adjustment Range (mm)

Shank Dia.	Adjustment Range
φ20	+0.4~-0.2
φ25	
φ32	
φ40	+0.6~-0.2

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



● Center Height Adjustment Range (mm)

Shank Dia.	Adjustment Range
φ20	+0.2~-0.15
φ25	
φ32	
φ40	+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 drill coolant plug. (Fig.1)

(2) When making the hole diameter larger, rotate the sleeve in (+) direction and to make it smaller, rotate the sleeve in (-) direction.

(3) When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery to rotate the sleeve.

(4) Using the bottom screw of the side-lock arbor, firmly tighten on the drill directly through the sleeve's window.
The upper screw should be tightened slightly so that the sleeve will not be damage.

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

DRX

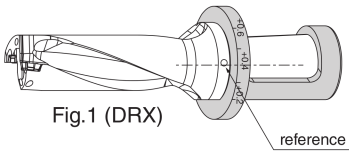


Fig.1 (DRX)

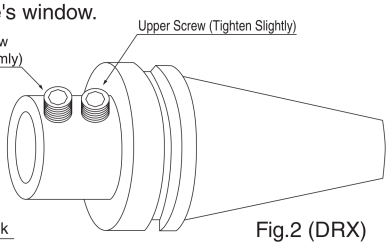


Fig.2 (DRX)

DRZ

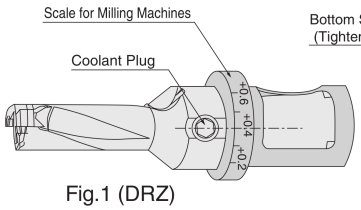


Fig.1 (DRZ)

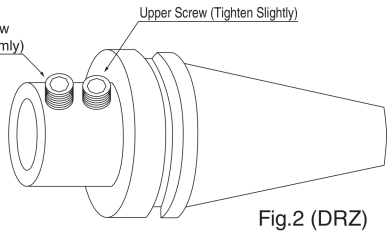


Fig.2 (DRZ)

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

2. Center-Height Adjustment for Lathes

Most Lathe problem occur due to Center Height Deviation.
The Center Height is appropriate if a core approximately 0.5mm diameter remains at the center of the end face. (Fig.3)
Center-height adjustment is necessary for the case as follows:

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

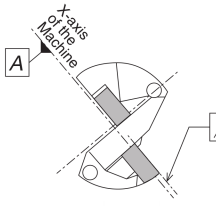


Fig.4

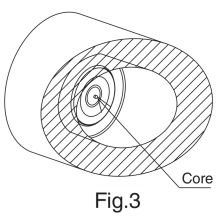


Fig.3

(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 on the flange periphery to rotate the sleeve.

(5) After Completing the adjustment, firmly tighten on the drill directly through the sleeve's window.

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

Lathe Installation

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

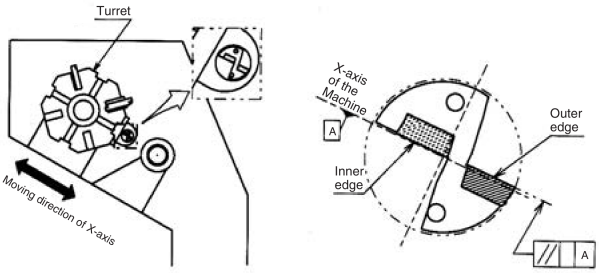


Fig.1 Installed to the Lathe

Drill Diameter Adjustment

1. Drill Diameter Adjustment
(1) Drill diameter is adjusted by moving X-axis.
The moving direction of the X-axis depends on the position of the toolholder.
(2) In case of making the hole diameter larger, slide the tool along the X-axis toward the outer insert side. (Fig.2, Fig.3)
For making the hole diameter smaller, slide the tool along the X-axis in the opposite direction.
(This movement of the axis is called “Offset”)
However, be sure not to make the hole diameter smaller than the drill diameter by 0.2mm or more. Otherwise, the toolholder will interfere with the drilled hole. (Fig.4)
e.g.) In case of using φ20 drill, the hole diameter must not be smaller than 19.8mm.

2. Offset Limit of the Drill Diameter
For the maximum limit of the drill diameter, refer to “Max. Offset (Radial)” in the Toolholder Dimensions table.
(The figure in the table shows how much it is possible the offset the drill in the radial direction.)
e.g.) In case of using φ20 drill, it is possible to make a hole up to φ21 since “Max. Offset (Radial)” is +0.5mm.

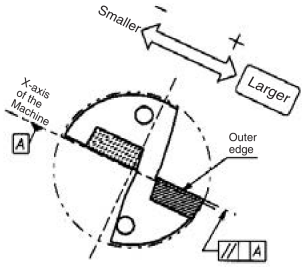


Fig.2 Outer insert Facing Up

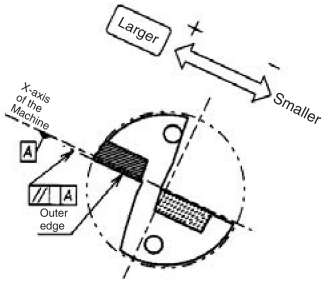


Fig.3 Outer insert Facing Down

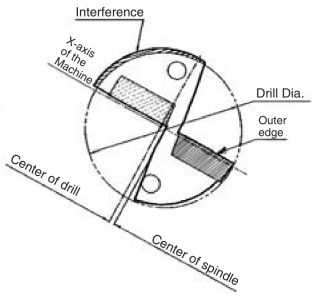


Fig.4 Excessive offset
(For Smaller Hole Diameter)

Center Height Adjustment

1. Center Height of the Inner Insert

When installing inner insert as shown in Fig.1, it will be set around 0.2mm below the Center of Spindle. (Fig.5)
This is the normal position of the center height and the drill is designed to be handled in this condition.
However, in case that the turret of the lathe is out of the center of Spindle, sometimes the inner insert may be set above the center, or excessively below the center.
For stable drilling, it is essential to check the Center Height carefully.

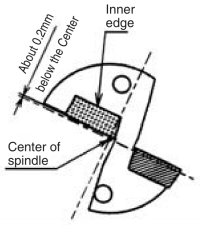


Fig.5 Front View of the Drill

2. How to Check the Center Height

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

If the center height is in the normal condition, the core about 0.5mm in diameter, will remain after drilling

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.

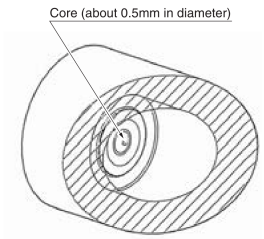


Fig.6 Center Core

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)

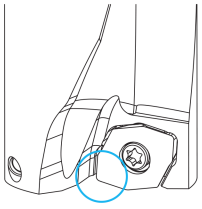


Fig.7 Insert breakage near the center of the drill

[How to Adjust]

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

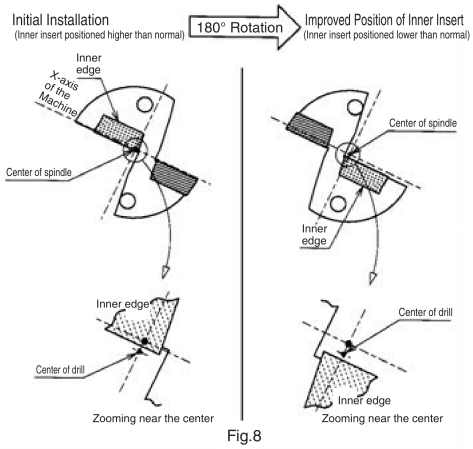


Fig.8

[How to Adjust]

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

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

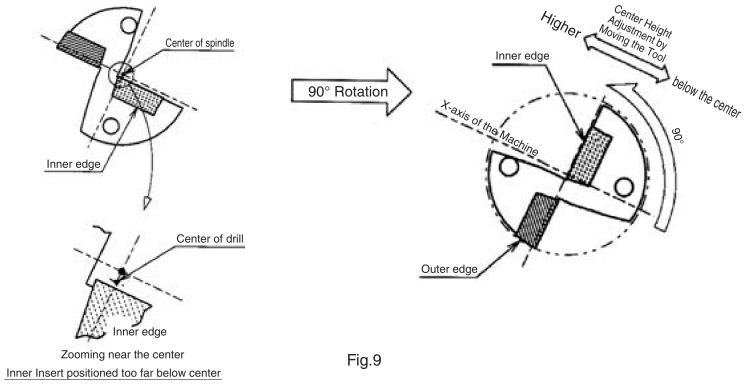


Fig.9

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

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

[How to Adjust]

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

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

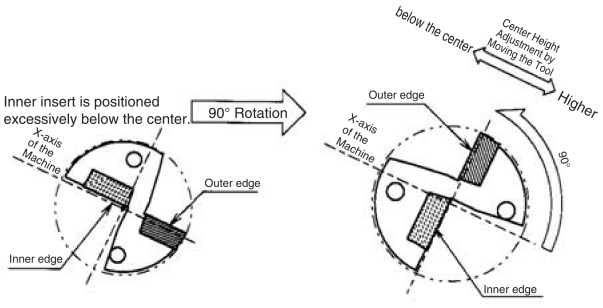
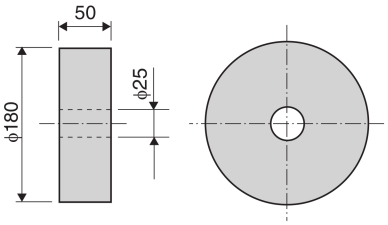


Fig.10

Case Studies

SKD62 (45HRC)

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



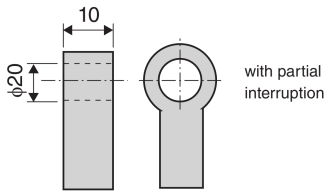
MagicDrill DRX	6 holes/edge
Competitor J	4 holes/edge (breakage)

150% of tool life

· MagicDrill DRX has 1.5 times longer life than Competitor J
Breakage is confirmed after machining 4 holes for Competitor J
Interrupted drilling is still possible after drilling 6 holes with MagicDrill DRX
· Finishing is not necessary because MagicDrill DRX provides a good finished surface.
(Evaluation by the user)

SUS303

·Vc=75m/min
·f=0.1mm/rev
·H=10mm (through hole)
·Wet (Internal coolant)
·S25-DRX200M-3-06
·ZXMT06T204SM
(PR1225)



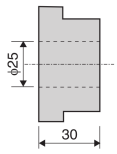
MagicDrill DRX	1,300 holes/edge
Competitor K	500 holes/edge

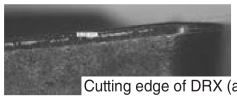
260% of tool life

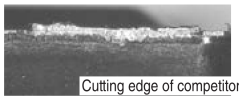
· MagicDrill DRX had no sudden breakage that occurred for Competitor K and achieved stable drilling with 2.6 times longer tool life.
(Evaluation by the user)

SCM420HV (Cold Forging)

·Vc=118m/min
·f=0.08mm/rev
(0.05 at the beginning)
·H=30mm (through hole)
·Wet (Internal coolant)
·S25-DRX250M-3-07
·ZXMT070305SM
(PR1225)




Cutting edge of DRX (after 400 holes)

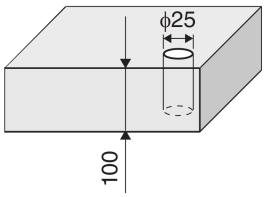

Cutting edge of competitors (after 400 holes)

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

· MagicDrill DRX had a good chip control and low adhesion for drilling of the same number comparing to Competitor L.
(Evaluation by the user)

SKT4 (42HRC)

·Vc=100m/min
·f=0.07~0.08mm/rev
·H=100mm (through hole)
·Wet (External Coolant)
·S25-DRX250M-4-07
·ZXMT070305GM
(PR1230)



Mold component φ25x100mm (through hole)
24 locations

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

50% reduction

· For deep hole drilling (4xD), MagicDrill DRX had no chip stuck and enabled drilling 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)