

Drilling

375-402

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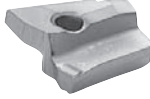



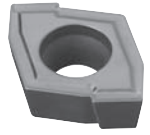



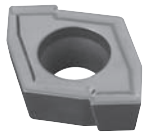
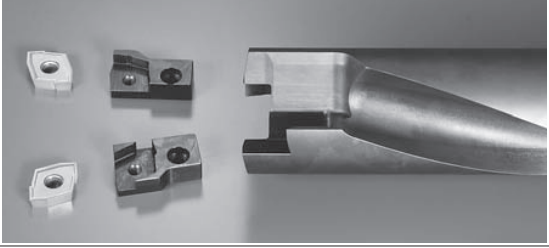

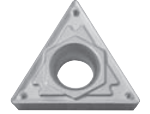




Cera-Drill 397-399

KSD	397
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Technical Information 400-402

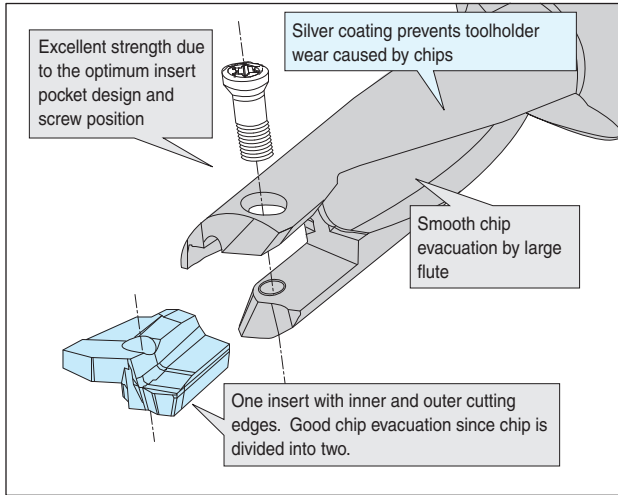
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Product Lineup

Description	Shape	Cutting Dia. (Cutting Depth)	Inserts	Features
DRS Small Diameter Magic Drill	 <p>Silver Coating</p>	$\phi .394 \sim \phi .492$ (3.5D)	Inner & Outer Edges on One Insert 	Chip Shape (Work Material: 1050) Cutting Dia. $\phi .394$ Chip from Outer Edge  Small Chips, Smooth Evacuation Chip from Inner Edge  Small Spiral Chips, Stable Evacuation
DRZ Magic Drill		$\phi .512 \sim \phi 2.32$ (2D,3D) $\phi .513 \sim \phi 2.00$ (4D) $\phi 1.06 \sim \phi 2.00$ (5D)	Inner & Outer Edges on One type of Insert (4 edges) 	Chip Shape (Work Material: 1050) Cutting Dia. $\phi .906$ Chip from Outer Edge  Chip from Inner Edge 
DRZ-CR Magic Drill w/ Cartridge (special)		$\phi 2.36 \sim$ (2D,3D,4D)	Inner & Outer Edges on One type of Insert (4 edges) 	Structure 
KSD Cera-Drill		$\phi .719 \sim \phi .844$		<ul style="list-style-type: none"> • Economical - Low cost per hole • Ideal for low horsepower machines • Cermet and coated carbide inserts available
KD Cera-Drill		$\phi .875 \sim \phi 4.000$		<ul style="list-style-type: none"> • Designed for drilling stacked plates and welded assemblies • Patented design reduces slug formation • Excellent chip control
KCD Cera-Drill		$\phi .865 \sim \phi 2.560$		<ul style="list-style-type: none"> • For enlarging pre-existing holes • 2-effective flutes allow high feed rates for improved productivity • Diameter of cartridge style ($\phi 1.360$-2.560) core drills can be adjusted by shimming cartridges

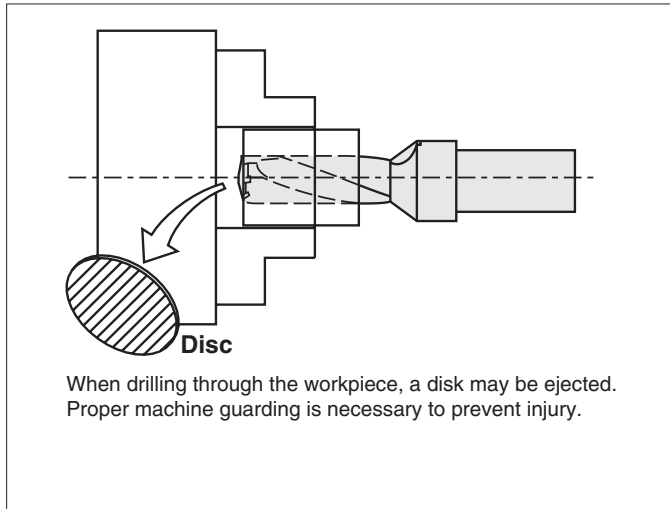
Features of Magic Drill

■ DRS: Small Diameter Magic Drill

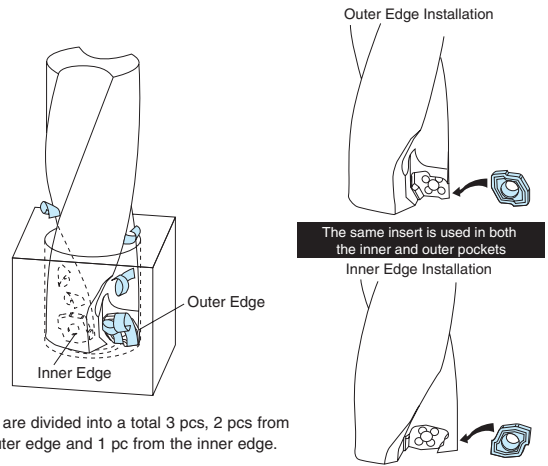


- ① 10mm dia. drilling with indexable insert
- ② Inner & outer edges on one insert. Easy replacement. Small chips and good evacuation
- ③ High-speed stable machining for high efficiency
- ④ Productivity improvement and significant cost reduction
- ⑤ Possible to drill into a slant face without pre-drilling

◆ Caution



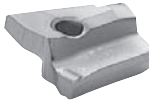
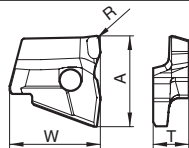
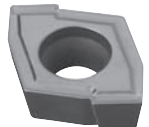
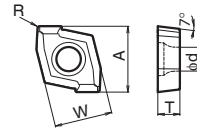

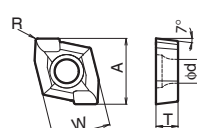
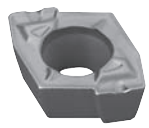
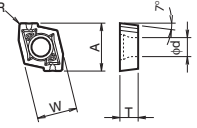

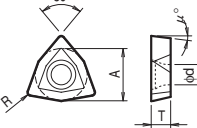
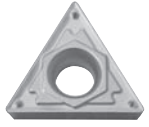
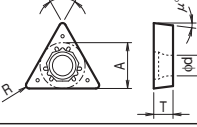
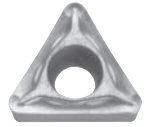
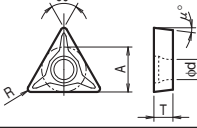
■ DRZ: Magic Drill



- ① Cost reduction by using an insert with 4 corners
- ② Suitable for various workpieces with a wide chipbreaker range
- ③ Special edge design to divide the chip into 3 pieces
- ④ Sharp cutting performance to prevent chattering. Good surface finish
- ⑤ Good chip evacuation, silent drilling and low cutting force design

Drilling Inserts

Drilling Inserts

Shape		Description	Dimension (inch)					Insert Grade										Ref. Page for Drill										
			A	T	φd	W	R	Coated Carbide																				
								Cermet	PVD Cermet	Coated Carbide									Carbide									
TN60	PV90	CR9025	PR510	PR660	PR730	PR915	PR930	PR905	KW10																			
 	DS 100	0.346	0.138	-	0.354	0.008				○	●												380					
	105	0.366	0.146	-	0.382	0.008				○	●																	
	110	0.386	0.154	-	0.394	0.008				○	●																	
	115	0.402	0.161	-	0.406	0.008				○	●																	
	120	0.425	0.169	-	0.429	0.010				○	●																	
 	ZCMT 050203	0.232	0.094	0.091	0.197	0.012				○	●	●	●	●	●	●	●	●	●	●	●	●	382					
	06T204	0.276	0.110	0.098	0.236	0.016				○	●	●	●	●	●	●	●	●	●	●	●	●		Thru				
	080304	0.381	0.125	0.114	0.323	0.016				○	●	●	●	●	●	●	●	●	●	●	●	●			393			
	10T304	0.473	0.156	0.173	0.409	0.016				○	●	●	●	●	●	●	●	●	●	●	●	●				393		
	12T306	0.562	0.156	0.220	0.504	0.024				○	●	●	●	●	●	●	●	●	●	●	●	●					393	
	150408	0.702	0.187	0.220	0.622	0.031				○	●	●	●	●	●	●	●	●	●	●	●	●						393
	200608	0.898	0.250	0.256	0.799	0.031				○	●	●	●	●	●	●	●	●	●	●	●	●						
  <p>For Deep Drilling</p>	ZCMT 050203SP	0.232	0.094	0.091	0.197	0.012				○	○	○	○	○	○	○	○	○	○	○	○	382						
	06T204SP	0.276	0.110	0.098	0.236	0.016				○	○	○	○	○	○	○	○	○	○	○	○		○	Thru				
	080304SP	0.381	0.125	0.114	0.323	0.016				○	○	○	○	○	○	○	○	○	○	○	○		○		393			
	10T304SP	0.473	0.156	0.173	0.409	0.016				○	○	○	○	○	○	○	○	○	○	○	○		393					
	12T304SP	0.562	0.156	0.220	0.504	0.016				○	○	○	○	○	○	○	○	○	○	○	○					○	393	
  <p>For Stainless Steel</p>	ZCMT 050203SU	0.232	0.094	0.091	0.197	0.012					●	○	○	○								393						
	ZCMT 06T204SU	0.276	0.110	0.098	0.236	0.016						●	○	○	○													
 	WCMT 050308	5/16	1/8	0.126	-	1/32	●	●	●			●	●									398						
	06T308	3/8	5/32	0.146	-	1/32	●	●	●			●	●											399				
 	TCMT 1.81.50.5HQ	7/32	3/32	0.094	-	0.008																397						
	1.81.51HQ	7/32	3/32	0.094	-	1/64	●																					
 	TCMT 1.81.52HP	7/32	3/32	0.094	-	1/32	●	●															397					

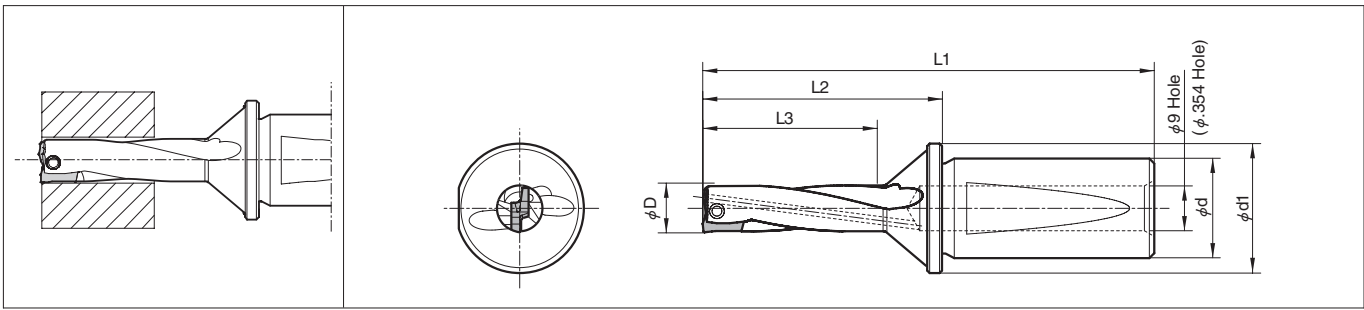
■ Suitable Chipbreakers (ZCMT)

Work Material	Insert Size Chipbreaker Cutting Depth	ZCMT05									ZCMT06									ZCMT08					
		Standard			SU			SP			Standard			SU			SP			Standard			SP		
		2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D	2D	3D	4D
Low Carbon Steel		☆	☆	-	-	-	-	★	★	★	☆	☆	-	☆	☆	☆	★	★	★	☆	☆	-	★	★	★
Carbon Steel		★	★	☆	-	-	-	☆	☆	★	★	★	☆	-	-	-	☆	☆	★	★	★	☆	☆	☆	★
Alloy Steel		★	★	☆	-	-	-	☆	☆	★	★	★	☆	-	-	-	☆	☆	★	★	★	☆	☆	☆	★
Tool Steel		★	★	☆	-	-	-	☆	☆	★	★	★	☆	-	-	-	☆	☆	★	★	★	☆	☆	☆	★
Stainless Steel (Austenitic)		☆	☆	-	☆	☆	-	★	★	★	-	-	-	★	★	★	☆	☆	☆	☆	☆	-	★	★	★
Cast Iron		★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	☆	☆	☆
Non-ferrous Metal		☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	★	★	★
Brass		★	★	★	-	-	-	☆	☆	☆	★	★	★	-	-	-	☆	☆	☆	★	★	★	☆	☆	☆
Titanium Alloy		☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	-	-	-	★	★	★	☆	☆	☆	★	★	★

Work Material	Insert Size Chipbreaker Cutting Depth	ZCMT10						ZCMT12						ZCMT15						ZCMT20		
		Standard			SP			Standard			SP			Standard			SP			Standard		
		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		★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	☆	☆	★
Tool Steel		★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	☆	☆	★
Stainless Steel (Austenitic)		☆	☆	-	★	★	★	☆	☆	-	★	★	★	☆	☆	-	★	★	★	★	★	★
Cast Iron		★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	☆	☆	☆
Non-ferrous Metal		☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	★	★	★
Brass		★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	☆	☆	☆
Titanium Alloy		☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	☆	☆	☆	★	★	★	★	★	★

· Standard chipbreakers may function better with interrupted cutting. ★ : 1st Recommendation ☆ : 2nd Recommendation
 · When machining aluminum, chips become long and hard to be discharged at the depth over 2D
 · For 5D type, Refer to 4D type

DRS



● Toolholder Dimensions

Description	Stock #	# of inserts	Unit	Dimension					Max. Offset (Radial)	Spare Parts			Applicable Insert P.378	
				φD	L1	L2	L3	φd		φd1	Insert Screw	Wrench		
S75 -DRS10035	●	1	inch	0.394 (10.0mm)	3.602	1.909	1.378	0.75	1.023	+ 0.008	SB-2080TR	FT-6	-	DS100
-DRS10537	●	1		0.413 (10.5mm)	3.657	1.964	1.457	0.75	1.023	+ 0.008				DS105
-DRS11038	●	1		0.433 (11.0mm)	3.759	2.066	1.516	0.75	1.023	+ 0.008				DS110
-DRS11540	●	1		0.453 (11.5mm)	3.828	2.135	1.594	0.75	1.023	+ 0.008	SB-2290TR	-	DT-7	DS115
-DRS12042	●	1		0.472 (12.0mm)	3.898	2.205	1.654	0.75	1.023	+ 0.008	SB-25100TR			DS120
-DRS12544	●	1		0.492 (12.5mm)	3.967	2.274	1.732	0.75	1.023	+ 0.008	DS120			
S20 -DRS10035	○	1	mm	10.0	92	49	35.0	20	26	+0.2	SB-2080TR	FT-6	-	DS100
-DRS10235	○	1		10.2	92	49	35.0	20	26	+0.2				DS105
-DRS10336	○	1		10.3	92	49	36.0	20	26	+0.2				DS110
-DRS10537	○	1		10.5	93	50	37.0	20	26	+0.2	SB-2290TR	-	DT-7	DS115
-DRS11038	○	1		11.0	96	53	38.5	20	26	+0.2	DS120			
-DRS11540	○	1		11.5	97	54	40.5	20	26	+0.2	DS120			
-DRS12042	○	1		12.0	99	56	42.0	20	26	+0.2	SB-25100TR	DS120		
-DRS12544	○	1		12.5	101	58	44.0	20	26	+0.2	DS120			

◆ DRS Recommended Cutting Conditions

Workpiece	Recommended Insert Grade (Cutting Speed SFM) PVD Coated		Feed Rate (ipr)
	PR510	PR660	
Low Carbon Steel		★ 270~330	.0024
Carbon Steel		★ 270~330	.003~.004
Alloy Steel		★ 270	.0016~.0024
Tool Steel		★ 270	.0016~.0024
Stainless Steel (Austenitic)		★ 230~270	.002~.0024
Cast Iron	★	270~330	.003~.004

★ : 1st Recommendation

- Apply a sufficient amount of coolant.
- If cutting speed is decreased too much from above condition, chip evacuation will deteriorate.
If the feed Rate is increased too much from above condition, inner edge chip evacuation will deteriorate.
If the feed Rate is decreased too much from above condition, outer edge chip evacuation will deteriorate.
- If chips become long and are entangled with the tool when low carbon steel cutting, increase the cutting speed to 400-500 SFM.
If this doesn't solved the problem, try peck feeding.
[How to peck feed]
(1)Cut .04-.08 in (2)Return .004 in (3)Repeat (1)and (2)

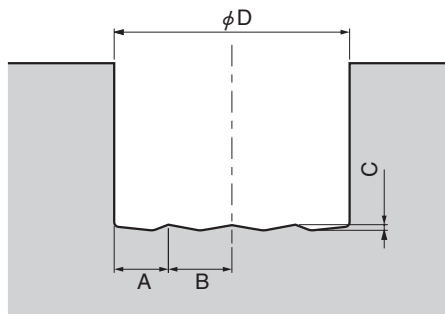
◆ Small Dia. Magic Drill (DRS)

·Hole Bottom Shape (inch)

φD	A	B	C
0.394	0.087	0.110	0.008
0.402	0.087	0.114	0.008
0.406	0.091	0.114	0.008
0.413	0.091	0.118	0.008
0.433	0.094	0.122	0.008
0.453	0.098	0.126	0.008
0.472	0.110	0.126	0.012
0.492	0.114	0.130	0.016

·Hole Bottom Shape (mm)

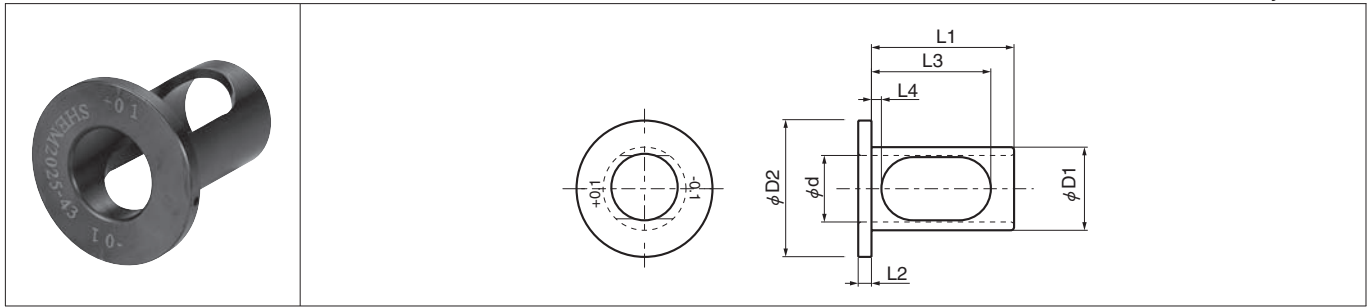
φD	A	B	C
10.0	2.2	2.80	0.2
10.2	2.2	2.90	0.2
10.3	2.3	2.85	0.2
10.5	2.3	2.95	0.2
11.0	2.4	3.10	0.2
11.5	2.5	3.25	0.2
12.0	2.8	3.20	0.3
12.5	2.9	3.35	0.4



● : Std. Stock ○ : World Express

SHEM

Diameter Adjustment



Sleeve Dimension

Description	Stock	Dimension (mm)							Dia. Adjustment Range (mm)
		ϕd	$\phi D1$	$\phi D2$	L1	L2	L3	L4	
SHEM 2025-43	○	20	25	41	43	4	36	3.0	+0.1, -0.1
2032-43	○	20	32	49	43	6	36	2.5	+0.1, -0.1

· Dia. Adjustment Range adjusts the cutting diameter.

How to Use

- SHEM is designed for only the Small Diameter Magic Drill.
- 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: 90° to the marking line on the sleeve (Fig.1)
- ② To adjust to a larger diameter, align the +0.1 mark on the sleeve with the flat on the drill shank. To adjust to a smaller diameter, align the -0.1 mark on the sleeve with the flat on the drill shank.
- ③ Tighten the bottom screw firmly which is directly touching the drill. Slightly tighten the upper screw which is directly touching the sleeve.

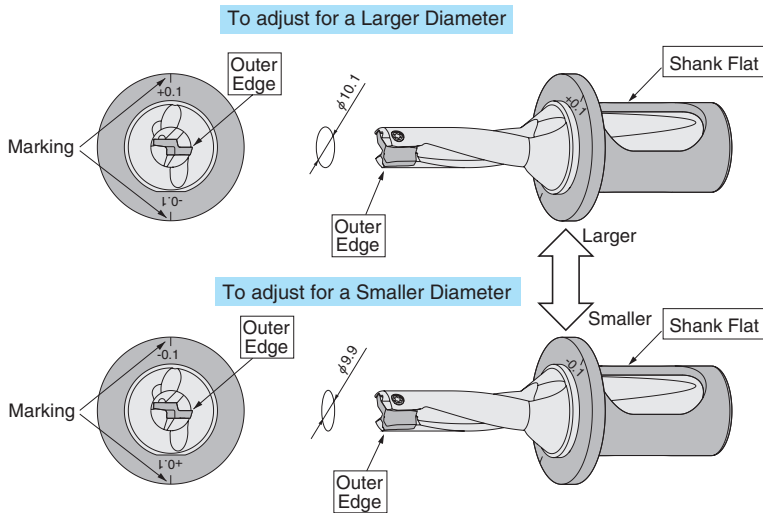


Fig.1 Diameter Adjustment Method (e.g.) φ10 Drill

Caution: Not for use with Collet Chuck type Arbor

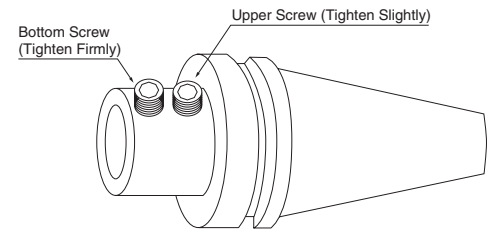
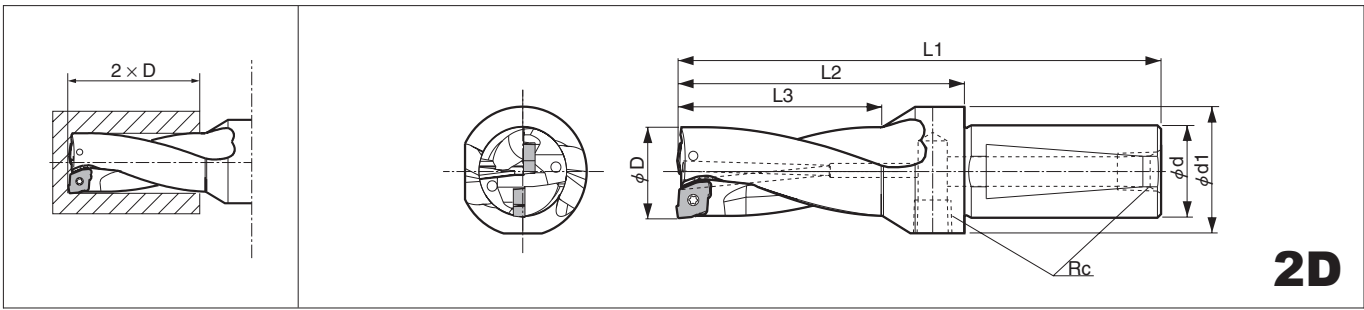


Fig. 2

DRZ (Drilling Depth : 2 × D) Inch Dimension



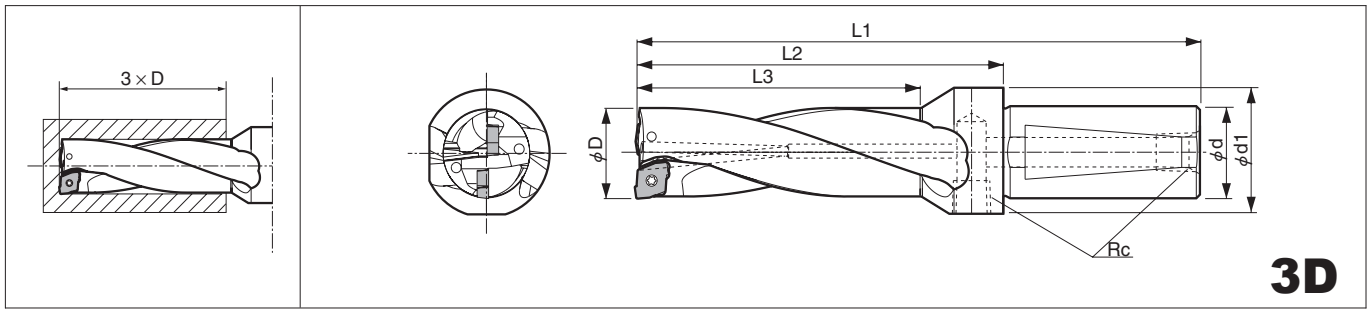
● Toolholder Dimensions

Description	Stock # of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert P.378		
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug			
S75 -DRZ5621125-05	● 2	0.562	3.87	2.18	1.125	0.75	1.06	1/8 NPT	+ 0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU		
S100 -DRZ6251250-06	●	0.625	4.52	2.39	1.250	1.00	1.26	1/8 NPT	+ 0.043	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU		
-DRZ6561312-06	●	0.656	4.52	2.39	1.312				+ 0.034						
-DRZ6881375-06	● 2	0.688	4.56	2.43	1.375				+ 0.027						
-DRZ7501500-06	●	0.750	4.73	2.61	1.500				+ 0.020						
-DRZ8121625-06	●	0.812	4.93	2.81	1.625				+ 0.014						
-DRZ8751750-08	●	0.875	5.02	2.90	1.750				1.30	1/8 NPT	+ 0.055	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP
-DRZ9381875-08	● 2	0.938	5.17	3.05	1.875				1.30	+ 0.043					
-DRZ10002000-08	●	1.000	5.24	3.11	2.000				1.38	+ 0.028					
-DRZ10622125-10	●	1.062	5.67	3.54	2.125				1.65	1/4 NPT	+ 0.098	SB-4085TR	DT-15	GP-2N	ZCMT10T304 ZCMT10T304SP
-DRZ11252250-10	●	1.125	5.74	3.62	2.250				1.65	+ 0.073					
-DRZ11882375-10	● 2	1.188	5.86	3.74	2.375	1.77	+ 0.067								
-DRZ12502500-10	●	1.250	5.92	3.79	2.500	1.77	+ 0.047								
S125 -DRZ13122625-12	●	1.312	6.82	4.10	2.625	1.25	2.17	1/4 NPT	+ 0.110	SB-5085TR	DT-20				
-DRZ13752750-12	●	1.375	6.98	4.27	2.750				+ 0.094						
-DRZ14382875-12	● 2	1.438	7.07	4.35	2.875				+ 0.078						
-DRZ15003000-12	●	1.500	7.19	4.47	3.000				+ 0.067						
-DRZ15623125-12	●	1.562	7.29	4.57	3.125				+ 0.047						
-DRZ16253250-15	●	1.625	7.34	4.62	3.250				2.17	1/4 NPT	+ 0.150	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ16883375-15	●	1.688	7.49	4.78	3.375				+ 0.138						
-DRZ17503500-15	●	1.750	7.57	4.85	3.500				+ 0.122						
-DRZ18123625-15	● 2	1.812	7.78	5.06	3.625				+ 0.106						
-DRZ18753750-15	●	1.875	7.97	5.26	3.750				2.36	1/4 NPT	+ 0.087				
-DRZ19383875-15	●	1.938	8.05	5.34	3.875	+ 0.070									
-DRZ20004000-15	●	2.000	8.05	5.34	4.000	+ 0.055									

· When offset machining, reduce feed rate to .003ipr or less

Recommended Cutting Conditions P.402

DRZ (Drilling Depth : 3 × D) Inch Dimension



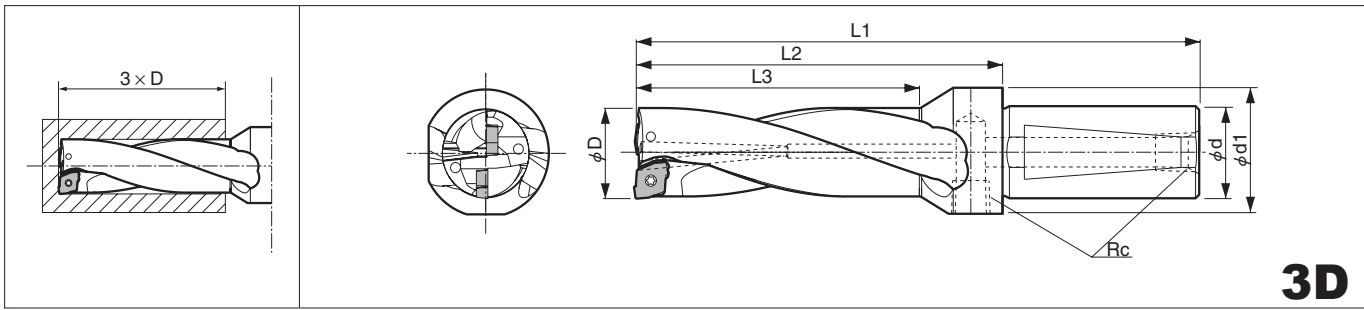
● Toolholder Dimensions

Description	Stock # of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Inserts P.378		
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug			
S75 -DRZ5621687-05	● 2	0.562	4.42	2.72	1.687	0.75	1.06	1/8 NPT	+ 0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU		
S100 -DRZ6251875-06	●	0.625	5.15	3.02	1.875	1.00	1.26	1/8 NPT	+ 0.043	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU		
-DRZ6561969-06	●	0.656	5.15	3.02	1.969				+ 0.034						
-DRZ6882062-06	● 2	0.688	5.23	3.10	2.062				+ 0.027						
-DRZ7502250-06	●	0.750	5.48	3.35	2.250				+ 0.020						
-DRZ8122438-06	●	0.812	5.76	3.64	2.438				+ 0.014						
-DRZ8752625-08	●	0.875	5.77	3.65	2.625				1.30	1/8 NPT	+ 0.055	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP
-DRZ9382814-08	● 2	0.938	5.89	3.76	2.814				1.30	+ 0.043					
-DRZ10003000-08	●	1.000	6.11	3.98	3.000				1.38	+ 0.028					
-DRZ10623187-10	●	1.062	6.81	4.49	3.187				1.65	1/4 NPT	+ 0.098	SB-4085TR	DT-15	GP-2N	ZCMT10T304 ZCMT10T304SP
-DRZ11253375-10	●	1.125	6.92	4.60	3.375				1.65	+ 0.073					
-DRZ11883562-10	● 2	1.188	7.12	4.80	3.562	1.77	+ 0.067								
-DRZ12503750-10	●	1.250	7.22	4.89	3.750	1.77	+ 0.047								
S125 -DRZ13123938-12	●	1.312	8.00	5.28	3.938	1.25	2.17	1/4 NPT	+ 0.110	SB-5085TR	DT-20				
-DRZ13754125-12	●	1.375	8.24	5.53	4.125				+ 0.094						
-DRZ14384312-12	● 2	1.438	8.37	5.65	4.312				+ 0.078						
-DRZ15004500-12	●	1.500	8.57	5.85	4.500				+ 0.067						
-DRZ15624688-12	●	1.562	8.69	5.97	4.688				+ 0.047						
-DRZ16254875-15	●	1.625	8.83	6.11	4.875				2.17	1/4 NPT	+ 0.150	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ16885062-15	●	1.688	8.93	6.21	5.062				+ 0.138						
-DRZ17505250-15	●	1.750	9.18	6.47	5.250				+ 0.122						
-DRZ18125438-15	● 2	1.812	9.47	6.75	5.438				+ 0.106						
-DRZ18755625-15	●	1.875	9.65	6.93	5.625				+ 0.087						
-DRZ19385812-15	●	1.938	9.86	7.15	5.812	2.36	1/4 NPT	+ 0.070	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP			
-DRZ20006000-15	●	2.000	9.88	7.17	6.000	+ 0.055									

· When offset machining, reduce feed rate to .003ipr or less

Recommended Cutting Conditions P.402

DRZ (Drilling Depth : 3 × D) Metric Diameter with Inch Shank



● Toolholder Dimensions




Description	Stock # of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert P.378
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug	
S75 -DRZ1339-05	●	0.512 (13.0mm)	4.27	2.58	1.54				+ 0.020				ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ135405-05	●	0.531 (13.5mm)	4.27	2.58	1.59				+ 0.020				
-DRZ1442-05	●	0.551 (14.0mm)	4.42	2.72	1.65				+ 0.020				
-DRZ145435-05	●	0.571 (14.5mm)	4.42	2.72	1.71	0.75	1.06	1/8 NPT	+ 0.020	SB-2045TR	FT-6	GP-1N	
-DRZ1545-05	●	0.591 (15.0mm)	4.52	2.83	1.77				+ 0.020				
-DRZ155465-05	●	0.610 (15.5mm)	4.52	2.83	1.83				+ 0.020				
S100 -DRZ1648-06	●	0.630 (16.0mm)	5.15	3.02	1.89				+ 0.043				ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ165495-06	●	0.650 (16.5mm)	5.15	3.02	1.95				+ 0.035				
-DRZ1751-06	●	0.669 (17.0mm)	5.23	3.10	2.01				+ 0.031				
-DRZ1854-06	●	0.709 (18.0mm)	5.36	3.23	2.13				+ 0.024				
-DRZ185555-06	●	0.728 (18.5mm)	5.36	3.23	2.19	1.00	1.26	1/8 NPT	+ 0.024	SB-2260TR	DT-7	GP-1N	
-DRZ1957-06	●	0.748 (19.0mm)	5.48	3.35	2.24				+ 0.020				
-DRZ195585-06	●	0.768 (19.5mm)	5.48	3.35	2.30				+ 0.020				
-DRZ2060-06	●	0.787 (20.0mm)	5.61	3.49	2.36				+ 0.020				
-DRZ2163-06	●	0.827 (21.0mm)	5.76	3.64	2.48				+ 0.008				
-DRZ215645-08	●	0.846 (21.5mm)	5.77	3.65	2.54				+ 0.071				
-DRZ2266-08	●	0.866 (22.0mm)	5.77	3.65	2.60				+ 0.063				
-DRZ225675-08	●	0.886 (22.5mm)	5.77	3.65	2.66				+ 0.055				
-DRZ2369-08	●	0.906 (23.0mm)	5.89	3.76	2.72	1.00	1.30	1/8 NPT	+ 0.051	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP
-DRZ2472-08	●	0.945 (24.0mm)	6.00	3.87	2.84				+ 0.043				
-DRZ2575-08	●	0.984 (25.0mm)	6.11	3.98	2.95				+ 0.031				
-DRZ2678-08	●	1.024 (26.0mm)	6.23	4.10	3.07				+ 0.024				

· When offset machining, reduce feed rate to .003ipr or less

Recommended Cutting Conditions P.402

● : Std. Stock ○ : World Express

● Metric Diameter with Inch Shank

Description	Stock # of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert P.378
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug	
													
S100 -DRZ2781-10	●	1.063 (27.0mm)	6.81	4.49	3.19		1.65		+ 0.098	SB-4085TR	DT-15	GP-1N	ZCMT10T304 ZCMT10T304SP
-DRZ2884-10	●	1.102 (28.0mm)	6.92	4.60	3.31		1.65		+ 0.087				
-DRZ2987-10	●	1.142 (29.0mm)	7.04	4.72	3.43	1.00	1.65	1/4 NPT	+ 0.079				
-DRZ3090-10	●	1.181 (30.0mm)	7.12	4.80	3.54		1.77		+ 0.067				
-DRZ3193-10	●	1.220 (31.0mm)	7.22	4.89	3.66		1.77		+ 0.059				
-DRZ3296-10	●	1.260 (32.0mm)	7.36	5.04	3.78		1.77		+ 0.047				
S125 -DRZ3399-12	●	1.299 (33.0mm)	8.00	5.28	3.90				+ 0.114	SB-5085TR	DT-20	GP-2N	ZCMT12T306 ZCMT12T304SP
-DRZ34102-12	●	1.338 (34.0mm)	8.15	5.44	4.02				+ 0.106				
-DRZ35105-12	●	1.378 (35.0mm)	8.24	5.53	4.13				+ 0.094				
-DRZ36108-12	●	1.418 (36.0mm)	8.37	5.65	4.25	1.25	2.17	1/4 NPT	+ 0.087				
-DRZ37111-12	●	1.457 (37.0mm)	8.46	5.74	4.37				+ 0.075				
-DRZ38114-12	●	1.496 (38.0mm)	8.57	5.85	4.49				+ 0.067				
-DRZ39117-12	●	1.535 (39.0mm)	8.69	5.97	4.61				+ 0.055				
-DRZ40120-12	●	1.575 (40.0mm)	8.74	6.03	4.72				+ 0.047				
-DRZ41123-15	●	1.614 (41.0mm)	8.83	6.11	4.84		2.17		+ 0.157	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
-DRZ42126-15	●	1.654 (42.0mm)	8.93	6.21	4.96		2.17		+ 0.146				
-DRZ43129-15	●	1.693 (43.0mm)	9.07	6.35	5.08		2.17		+ 0.138				
-DRZ44132-15	●	1.732 (44.0mm)	9.18	6.47	5.20		2.17		+ 0.126				
-DRZ45135-15	●	1.772 (45.0mm)	9.22	6.51	5.32	1.25	2.17	1/4 NPT	+ 0.118				
-DRZ46138-15	●	1.811 (46.0mm)	9.47	6.75	5.43		2.36		+ 0.106				
-DRZ47141-15	●	1.850 (47.0mm)	9.65	6.93	5.55		2.36		+ 0.098				
-DRZ48144-15	●	1.890 (48.0mm)	9.74	7.03	5.67		2.36		+ 0.087				
-DRZ49147-15	●	1.929 (49.0mm)	9.86	7.15	5.79		2.36		+ 0.079				
-DRZ50150-15	●	1.968 (50.0mm)	9.88	7.17	5.91		2.36		+ 0.067				

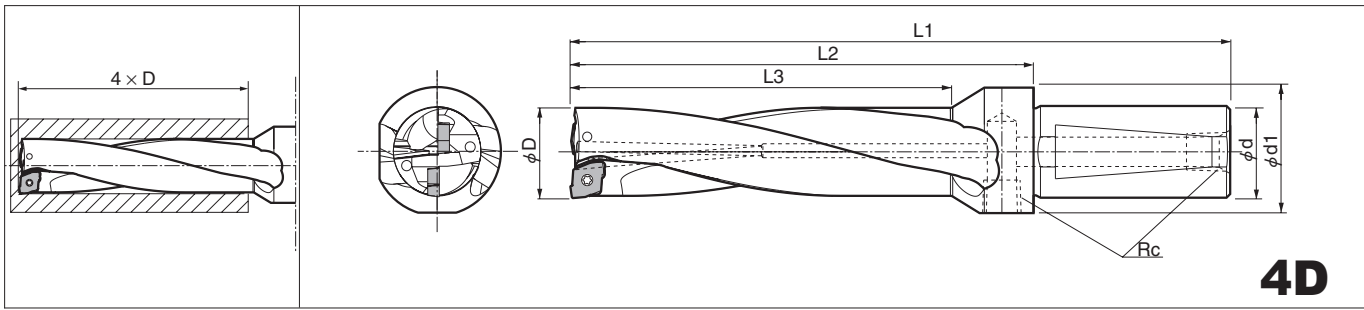
· When offset machining, reduce feed rate to .003ipr or less

Recommended Cutting Conditions  P.402

Drilling

Magic Drill

DRZ (Drilling Depth : 4 × D) Inch Dimension



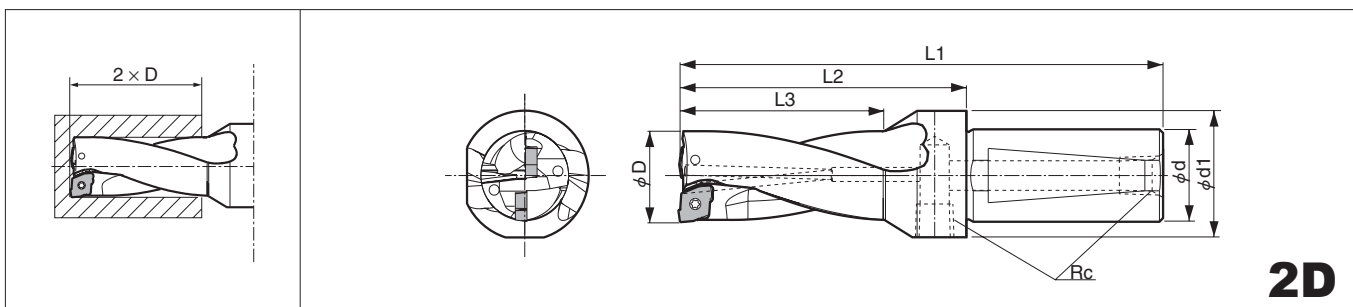
● Toolholder Dimensions

Description	Stock # of inserts	Dimension (inch)							Max. Offset (Radial)	Spare Parts			Applicable Insert P.378
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug	
S75 -DRZ5622250-05	● 2	0.562	5.77	3.27	2.25	0.75	1.06	1/8 NPT	+0.020	SB-2045TR	FT-6	GP-1N	ZCMT050203 ZCMT050203SP ZCMT050203SU
S100 -DRZ6252500-06	●	0.625	6.65	3.65	2.50	1.00	1.26	1/8 NPT	+0.043 +0.027 +0.020 +0.014	SB-2260TR	DT-7	GP-1N	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ6882750-06	● 2	0.688	6.74	3.74	2.75								
-DRZ7503000-06	●	0.750	7.07	4.07	3.00								
-DRZ8123250-06	●	0.812	7.39	4.39	3.25								
-DRZ8753500-08	●	0.875	7.56	4.56	3.50	1.00	1.30	1/8 NPT	+0.055 +0.043 +0.028	SB-2570TR	DT-8	GP-1N	ZCMT080304 ZCMT080304SP
-DRZ9383750-08	● 2	0.938	7.77	4.77	3.75								
-DRZ10004000-08	●	1.000	8.06	5.06	4.00								
S125 -DRZ10624250-10	●	1.062	8.55	5.55	4.25	1.00	1.65	1/4 NPT	+0.098 +0.073 +0.067 +0.047	SB-4085TR	DT-15	GP-2N	ZCMT10T304 ZCMT10T304SP
-DRZ11254500-10	● 2	1.125	8.84	5.84	4.50								
-DRZ11884750-10	●	1.188	8.98	5.98	4.75								
-DRZ12505000-10	●	1.250	9.30	6.30	5.00								
S125 -DRZ13125250-12	●	1.312	9.58	6.58	5.25	1.25	2.17	1/4 NPT	+0.110 +0.094 +0.078 +0.067 +0.047	SB-5085TR	DT-20	GP-2N	ZCMT12T306 ZCMT12T304SP
-DRZ13755500-12	●	1.375	9.91	6.91	5.50								
-DRZ14385750-12	● 2	1.438	10.07	7.07	5.75								
-DRZ15006000-12	●	1.500	10.35	7.35	6.00								
-DRZ15626250-12	●	1.562	10.50	7.50	6.25								
S125 -DRZ16256500-15	● 2	1.625	10.73	7.73	6.50	1.50	2.17	1/4 NPT	+0.150 +0.138 +0.122 +0.106 +0.087 +0.070 +0.055	SB-5085TR	DT-20	GP-2N	ZCMT150408 ZCMT150406SP
S150 -DRZ16886750-15	●	1.688	11.37	7.87	6.75								
-DRZ17507000-15	●	1.750	11.70	8.20	7.00								
-DRZ18127250-15	● 2	1.812	12.06	8.56	7.25								
-DRZ18757500-15	●	1.875	12.28	8.78	7.50								
-DRZ19387750-15	●	1.938	12.58	9.08	7.75								
-DRZ20008000-15	●	2.000	12.63	9.13	8.00								

· When offset machining, reduce feed rate to .003ipr or less

Recommended Cutting Conditions P.402

DRZ (Drilling Depth : 2 × D) Metric Dimension



● Toolholder Dimensions

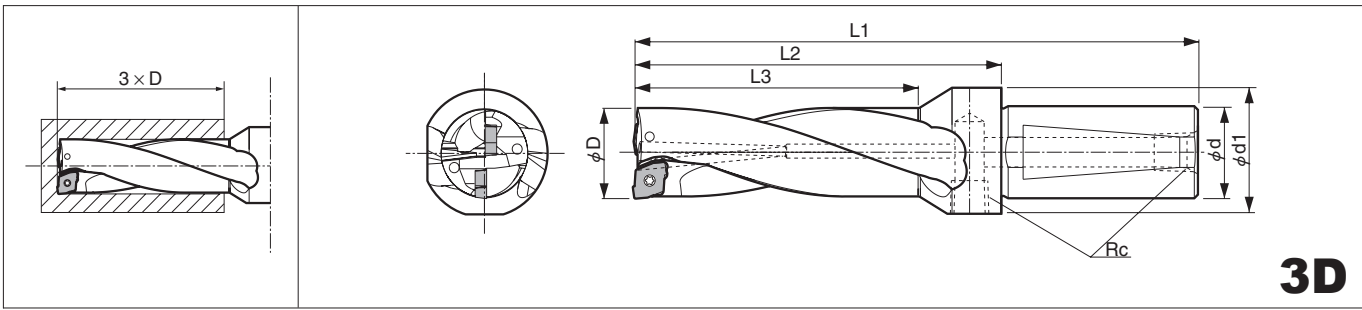
Description	Stock	No. of Insert	Dimension (mm)						Max. Offset (Radial)	Spare Parts			Applicable Insert ● P.378
			φD	L1	L2	L3	φd	φd1		Rc	Insert Screw	Wrench	
S20-DRZ1326-05	○	○	13	95	52	26			+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ1428-05	○	2	14	98	55	28	20	27	+0.5				
-DRZ1530-05	○	○	15	100	57	30			+0.5				
S25-DRZ1632-06	○	○	16	115	61	32			+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ1734-06	○	○	17	116	62	34			+0.8				
-DRZ1836-06	○	○	18	118	64	36	25	32	+0.6				
-DRZ1938-06	○	2	19	120	66	38			+0.5				
-DRZ2040-06	○	○	20	123	69	40			+0.5				
-DRZ2142-06	○	○	21	125	71	42			+0.2				
-DRZ2244-08	○	○	22	128	74	44		33	+1.6	SB-2570TR	DT-8	GP-1	ZCMT080304 ZCMT080304SP
-DRZ2346-08	○	○	23	130	76	46		33	+1.3				
-DRZ2448-08	○	2	24	131	77	48	25	35	+1.1				
-DRZ2550-08	○	○	25	133	79	50		35	+0.8				
-DRZ2652-08	○	○	26	135	81	52		35	+0.6				
S32-DRZ2754-10	○	○	27	149	90	54		42	+2.5				
-DRZ2856-10	○	○	28	151	92	56		42	+2.2				
-DRZ2958-10	○	○	29	153	94	58	32	42	+2.0				
-DRZ3060-10	○	2	30	154	95	60		45	+1.7				
-DRZ3162-10	○	○	31	155	96	62		45	+1.5				
-DRZ3264-10	○	○	32	158	99	64		45	+1.2				
-DRZ4080-12	○	2	40	175	116	80	32	55	+1.2	SB-5085TR	DT-20	GP-2	ZCMT12T306 ZCMT12T304SP
S40-DRZ3366-12	○	○	33	173	104	66			+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	40	55	+2.2				
-DRZ3774-12	○	2	37	181	112	74			+1.9				
-DRZ3876-12	○	○	38	183	114	76			+1.7				
-DRZ3978-12	○	○	39	185	116	78			+1.4				
-DRZ4080-12	○	○	40	185	116	80			+1.2				
-DRZ4182-15	○	○	41	186	117	82		55	+4.0				
-DRZ4284-15	○	○	42	188	119	84			+3.7				
-DRZ4386-15	○	○	43	190	121	86			+3.5	SB-5085TR	DT-20	GP-2	ZCMT150408 ZCMT150406SP
-DRZ4488-15	○	○	44	192	123	88			+3.2				
-DRZ4590-15	○	○	45	192	123	90			+3.0				
-DRZ4692-15	○	○	46	198	129	92			+2.7				
-DRZ4794-15	○	2	47	201	132	94	40		+2.5				
-DRZ4896-15	○	○	48	203	134	96			+2.2				
-DRZ4998-15	○	○	49	204	135	98			+2.0				
-DRZ50100-15	○	○	50	204	135	100		60	+1.7				
-DRZ51102-15	○	○	51	205	136	102			+1.2				
-DRZ52104-15	○	○	52	205	136	104			+1.0				
-DRZ53106-15	○	○	53	208	139	106			+0.7	SB-60130TR	DT-25	GP-2	ZCMT200608
-DRZ54108-20	○	○	54	214	145	108			+5.0				
-DRZ55110-20	○	○	55	215	146	110			+4.7				
-DRZ56112-20	○	○	56	217	148	112	40	65	+4.4				
-DRZ57114-20	○	2	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 f=0.08mm/rev (.003ipr) or less.

Recommended Cutting Conditions ● P.402

● : Std. Stock ○ : World Express

DRZ (Drilling Depth : 3 × D) Metric Dimension



● Toolholder Dimension




Description	Stock	No. of Insert	Dimension (mm)						Max. Offset (Radial)	Spare Parts			Applicable Insert ● P378							
			φD	L1	L2	L3	φd	φd1		Rc	Insert Screw	Wrench		Plug						
S20 -DRZ1339-05	○	2	13	108	65	39														
-DRZ135405-05	○		13.5	108	65	40.5														
-DRZ1442-05	○		14	112	69	42														
-DRZ145435-05	○		14.5	112	69	43.5	20	27	Rc1/8		SB-2045TR	FT-6	GP-1							ZCMT050203 ZCMT050203SP ZCMT050203SU
-DRZ1545-05	○		15	115	72	45														
-DRZ155465-05	○		15.5	115	72	46.5														
S25 -DRZ1648-06	○	2	16	131	77	48														
-DRZ165495-06	○		16.5	131	77	49.5														
-DRZ1751-06	○		17	133	79	51														
-DRZ175525-06	○		17.5	133	79	52.5														
-DRZ1854-06	○		18	136	82	54														
-DRZ185555-06	○		18.5	136	82	55.5	25	32	Rc1/8		SB-2260TR	DT-7	GP-1							ZCMT06T204 ZCMT06T204SP ZCMT06T204SU
-DRZ1957-06	○		19	139	85	57														
-DRZ195585-06	○		19.5	139	85	58.5														
-DRZ2060-06	○		20	143	89	60														
-DRZ205615-06	○		20.5	146	92	61.5														
-DRZ2163-06	○		21	146	92	63														
-DRZ215645-08	○		21.5	147	93	64.5														
-DRZ2266-08	○		22	147	93	66														
-DRZ225675-08	○		22.5	147	93	67.5														
-DRZ2369-08	○		23	150	96	69														
-DRZ235705-08	○		23.5	150	96	70.5														
-DRZ2472-08	○		24	152	98	72	25		Rc1/8		SB-2570TR	DT-8	GP-1							ZCMT080304 ZCMT080304SP
-DRZ245735-08	●		24.5	152	98	73.5														
-DRZ2575-08	○		25	155	101	75														
-DRZ255765-08	○		25.5	155	101	76.5														
-DRZ2678-08	○		26	158	104	78														
-DRZ265795-08	○		26.5	158	104	79.5														
S32 -DRZ2781-10	○	2	27	173	114	81														
-DRZ275825-10	○		27.5	173	114	82.5														
-DRZ2884-10	○		28	176	117	84														
-DRZ285855-10	○		28.5	176	117	85.5														
-DRZ2987-10	○		29	179	120	87														
-DRZ295885-10	○		29.5	179	120	88.5														
-DRZ3090-10	○		30	181	122	90	32		Rc1/4		SB-4085TR	DT-15	GP-2							ZCMT10T304 ZCMT10T304SP
-DRZ305915-10	○		30.5	181	122	91.5														
-DRZ3193-10	○		31	183	124	93														
-DRZ315945-10	○		31.5	183	124	94.5														
-DRZ3296-10	○		32	187	128	96														
-DRZ325975-10	○		32.5	187	128	97.5														
-DRZ3399-12	○		33	193	134	99														
-DRZ34102-12	○		34	197	138	102														
-DRZ35105-12	○		35	199	140	105														
-DRZ36108-12	○		36	203	144	108														
-DRZ37111-12	○		37	205	146	111														
-DRZ38114-12	○		38	208	149	114														
-DRZ39117-12	○		39	211	152	117														
-DRZ40120-12	○		40	212	153	120														

· When offset machining, reduce feed rate to f=0.08mm/rev (.003ipr) or less.

Recommended Cutting Conditions ● P.402

● : Std. Stock ○ : World Express

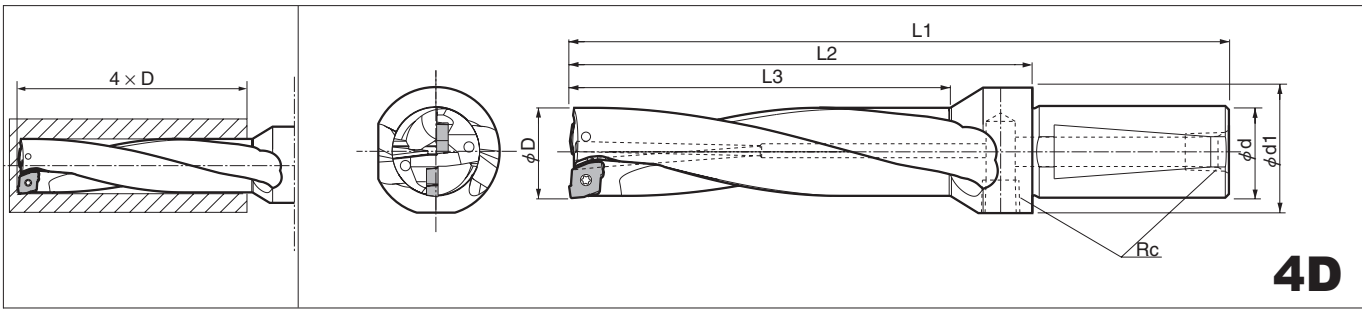
● Toolholder Dimension

Description	Stock No. of Insert	Dimension (mm)							Max. Offset (Radial)	Spare Parts			Applicable Insert ● P.378	
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug		
														
S40 -DRZ3399-12	○	33	203	134	99				+2.9				ZCMT12T306 ZCMT12T304SP	
-DRZ34102-12	○	34	207	138	102				+2.7					
-DRZ35105-12	○	35	209	140	105				+2.4					
-DRZ36108-12	○	36	213	144	108	40	55	Rc1/4	+2.2	SB-5085TR	DT-20	GP-2		
-DRZ37111-12	○	37	215	146	111				+1.9					
-DRZ38114-12	○	38	218	149	114				+1.7					
-DRZ39117-12	○	39	221	152	117				+1.4					
-DRZ40120-12	○	40	222	153	120				+1.2					
-DRZ41123-15	○	41	224	155	123				+4.0					ZCMT150408 ZCMT150406SP
-DRZ42126-15	○	42	227	158	126				+3.7					
-DRZ43129-15	○	43	230	161	129		55		+3.5					
-DRZ44132-15	○	44	233	164	132				+3.2					
-DRZ45135-15	○	45	234	165	135				+3.0					
-DRZ46138-15	○	46	241	172	138				+2.7					
-DRZ47141-15	○	47	245	176	141	40		Rc1/4	+2.5	SB-5085TR	DT-20	GP-2		
-DRZ48144-15	○	48	248	179	144				+2.2					
-DRZ49147-15	○	49	250	181	147				+2.0					
-DRZ50150-15	○	50	250	182	150		60		+1.7					
-DRZ51153-15	○	51	254	185	153				+1.2					
-DRZ52156-15	○	52	257	188	156				+1.0					
-DRZ53159-15	○	53	260	191	159				+0.7					
-DRZ54162-20	○	54	266	197	162				+5.0				ZCMT200608	
-DRZ55165-20	○	55	269	200	165				+4.7					
-DRZ56168-20	○	56	272	203	168	40	65	Rc1/4	+4.4	SB-60130TR	DT-20	GP-2		
-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 f=0.08mm/rev (.003ipr) or less.

Recommended Cutting Conditions ● P.402

DRZ (Drilling Depth : 4 × D) Metric Dimension



● Toolholder Dimensions




Description	Stock	No. of Insert	Dimension (mm)						Max. Offset (Radial)	Spare Parts			Applicable Insert ● P378	
			φD	L1	L2	L3	φd	φd1		Rc	Insert Screw	Wrench		Plug
S20 -DRZ1352-05	○	2	13	121	78	52			+0.5	SB-2045TR	FT-6	GP-1	ZCMT050203 ZCMT050203SP ZCMT050203SU	
-DRZ135540-05	○		13.5	123	79	54			+0.5					
-DRZ1456-05	○		14	126	83	56			+0.5					
-DRZ145580-05	○		14.5	127	84	58	20	27	Rc1/8					+0.5
-DRZ1560-05	○		15	130	87	60			+0.5					
-DRZ155620-05	○		15.5	131	88	62			+0.5					
S25 -DRZ1664-06	○	2	16	147	93	64			+1.1	SB-2260TR	DT-7	GP-1	ZCMT06T204 ZCMT06T204SP ZCMT06T204SU	
-DRZ165660-06	○		16.5	146	93	66			+0.9					
-DRZ1768-06	○		17	149	95	68			+0.8					
-DRZ175700-06	○		17.5	147	97	70			+0.7					
-DRZ1872-06	○		18	153	99	72			+0.6					
-DRZ185740-06	○		18.5	155	101	74	25	32	Rc1/8					+0.6
-DRZ1976-06	○		19	157	103	76			+0.5					
-DRZ195780-06	○		19.5	159	105	78			+0.5					
-DRZ2080-06	○		20	156	102	80			+0.5					
-DRZ205820-06	○		20.5	163	113	82			+0.2					
-DRZ2184-06	○		21	161	107	84			+0.2					
-DRZ215860-08	○	2	21.5	169	115	86			+1.8					SB-2570TR
-DRZ2288-08	○		22	169	115	88			+1.6					
-DRZ225900-08	○		22.5	169	115	90		33	+1.4					
-DRZ2392-08	○		23	173	119	92			+1.3					
-DRZ235940-08	○		23.5	173	118	94			+1.0					
-DRZ2496-08	○		24	176	122	96	25	35	Rc1/8	+1.1				
-DRZ245980-08	○		24.5	177	123	98		35	+0.9					
-DRZ25100-08	○		25	180	126	100		35	+0.8					
-DRZ2551020-08	○		25.5	181	127	102		36	+0.7					
-DRZ26104-08	○		26	184	130	104		35	+0.6					
-DRZ2651060-08	○		26.5	185	131	106		35	+0.5					
S32 -DRZ27108-10	○	2	27	200	141	108			+2.5	SB-4085TR	DT-15	GP-2	ZCMT10T304 ZCMT10T304SP	
-DRZ2751100-10	○		27.5	201	142	110			+2.3					
-DRZ28112-10	○		28	204	145	112		42	+2.2					
-DRZ2851140-10	○		28.5	204	146	114			+2.1					
-DRZ29116-10	○		29	208	149	116			+2.0					
-DRZ2951180-10	○		29.5	209	150	118			+1.8					
-DRZ30120-10	○		30	211	152	120	32		Rc1/4					+1.7
-DRZ3051220-10	○		30.5	212	153	122			+1.6					
-DRZ31124-10	○		31	214	155	124			+1.5					
-DRZ3151260-10	○		31.5	216	157	126		45	+1.3					
-DRZ32128-10	○		32	219	160	128			+1.2					
-DRZ3251300-10	○		32.5	220	161	130			+1.1					
-DRZ33132-12	○	2	33	236	167	132			+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	32	55	Rc1/4					+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 f=0.08mm/rev (.003ipr) or less.

Recommended Cutting Conditions ●P.402

● : Std. Stock ○ : World Express

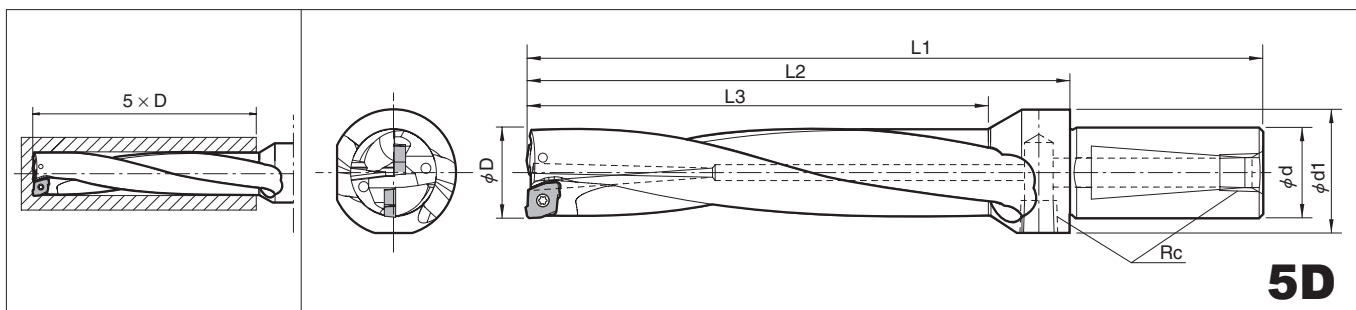
● Toolholder Dimensions

Description	Stock No. of Insert	Dimension (mm)							Max. Offset (Radial)	Spare Parts			Applicable Insert P.378	
		φD	L1	L2	L3	φd	φd1	Rc		Insert Screw	Wrench	Plug		
														
S40 -DRZ33132-12	○ 2	33	236	167	132				+2.9				ZCMT12T306 ZCMT12T304SP	
-DRZ34136-12	○ 2	34	241	172	136				+2.7					
-DRZ35140-12	○ 2	35	244	175	140				+2.4					
-DRZ36144-12	○ 2	36	249	180	144	40	55	Rc1/4	+2.2	SB-5085TR	DT-20	GP-2		
-DRZ37148-12	○ 2	37	252	183	148				+1.9					
-DRZ38152-12	○ 2	38	256	187	152				+1.7					
-DRZ39156-12	○ 2	39	260	191	156				+1.4					
-DRZ40160-12	○ 2	40	262	193	160				+1.2					
-DRZ41164-15	○ 2	41	265	196	164				+4.0					ZCMT150408 ZCMT150406SP
-DRZ42168-15	○ 2	42	269	200	168				+3.7					
-DRZ43172-15	○ 2	43	273	204	172		55		+3.5					
-DRZ44176-15	○ 2	44	277	208	176				+3.2					
-DRZ45180-15	○ 2	45	279	210	180	40		Rc1/4	+3.0	SB-5085TR	DT-20	GP-2		
-DRZ46184-15	○ 2	46	287	218	184				+2.7					
-DRZ47188-15	○ 2	47	292	223	188				+2.5					
-DRZ48192-15	○ 2	48	296	227	192		60		+2.2					
-DRZ49196-15	○ 2	49	300	231	196				+2.0					
-DRZ50200-15	○ 2	50	301	232	200				+1.7					

· When offset machining, reduce feed rate to $f=0.08\text{mm/rev}$ (.003ipr) or less.

Recommended Cutting Conditions P.402

DRZ (Drilling Depth : 5 × D) Metric Dimension



● Toolholder Dimensions

Description	Stock	No. of Insert	Dimension (mm)						Max. Offset (Radial)	Spare Parts			Applicable Insert ● P.378		
			phi D	L1	L2	L3	phi d	phi d1		Rc	Insert Screw	Wrench		Plug	
S32 -DRZ27135-10	○		27	227	168	135			+ 2.5				ZCMT10T304 ZCMT10T304SP		
-DRZ28140-10	○		28	232	173	140		42	+ 2.2						
-DRZ29145-10	○		29	237	178	145			+ 2.0	SB-4085TR	DT-15	GP-2			
-DRZ30150-10	○	2	30	241	182	150	32		+ 1.7						
-DRZ31155-10	○		31	245	186	155		45	+ 1.5						
-DRZ32160-10	○		32	251	192	160			+ 1.2						
S40 -DRZ33165-12	○		33	269	200	165			+ 2.9						ZCMT12T306 ZCMT12T304SP
-DRZ34170-12	○		34	275	206	170			+ 2.7				SB-5085TR	DT-20	
-DRZ35175-12	○		35	279	210	175			+ 2.4						
-DRZ36180-12	○		36	285	216	180	40	55	+ 2.2						
-DRZ37185-12	○		37	289	220	185			+ 1.9						
-DRZ38190-12	○	2	38	294	225	190			+ 1.7						
-DRZ39195-12	○		39	299	230	195			+ 1.4	SB-5085TR	DT-20	GP-2			
-DRZ40200-12	○		40	302	233	200			+ 1.2						
-DRZ41205-15	○		41	306	237	205			+ 4.0				SB-5085TR	DT-20	GP-2
-DRZ42210-15	○		42	311	242	210			+ 3.7						
-DRZ43215-15	○		43	316	247	215		55	+ 3.5						
-DRZ44220-15	○		44	321	252	220			+ 3.2						
-DRZ45225-15	○		45	324	255	225	40		+ 3.0						
-DRZ46230-15	○	2	46	333	264	230			+ 2.7	SB-5085TR	DT-20	GP-2			
-DRZ47235-15	○		47	339	270	235			+ 2.5						
-DRZ48240-15	○		48	344	275	240		60	+ 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 f=0.08mm/rev (.003ipr) or less.

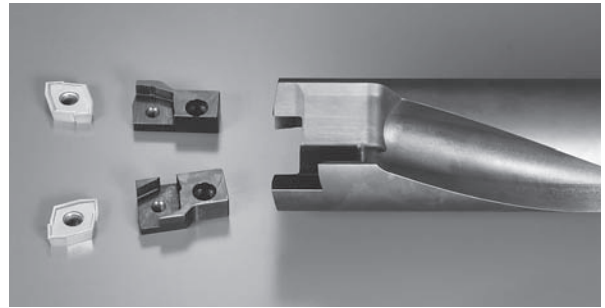
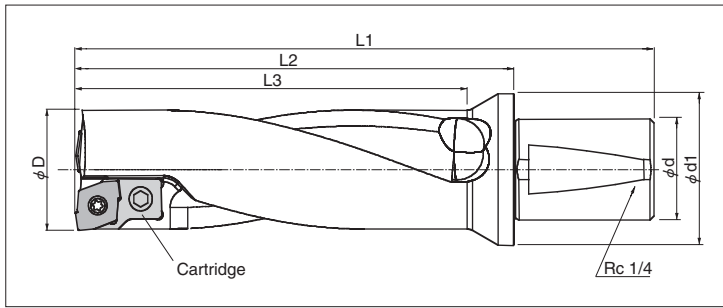
Recommended Cutting Conditions ● P.402

Magic Drill: Large Dia. ($\phi 2.36\text{in} \sim$)

● Magic Drill with large diameters (over 2.36in) are available as custom orders.

- Cartridge-type drill (DRZ-CR) for diameters over $\phi 2.36\text{in}$

DRZ-CR



● Toolholder Dimensions

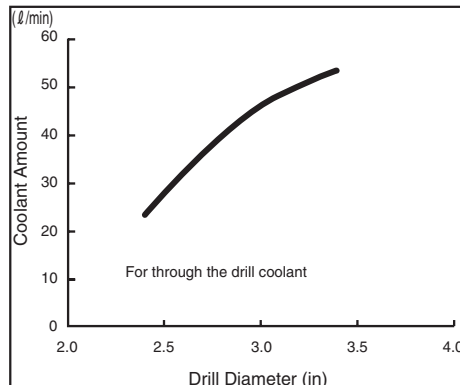
Description	Stock	Dimension (mm)						Max. Offset (Radial)	Spare Parts			Applicable Insert P.378		
		No. of Insert	ϕD	L1	L2	L3	ϕd		$\phi d1$	Cartridge			Insert Screw	Wrench
										For Outer Edge	For Inner Edge			
S40 -DRZ60180-20CR	●	2	60	286	217	195								
-DRZ65195-20CR	●	2	65	296	227	206	40	75	+3.0	DR20CR-OUT (1 pc)	DR20CR-IN (1 pc)	SB-60120TR	DT-25	ZCMT200608
-DRZ70210-20CR	●	2	70	308	239	220			+1.5					
									+0.2					
S50 -DRZ60180-20CR	○	2	60	286	217	195			+3.0	DR20CR-OUT (1 pc)	DR20CR-IN (1 pc)	SB-60120TR	DT-25	ZCMT200608
-DRZ65195-20CR	○	2	65	296	227	206	50	75	+1.5					
-DRZ70210-20CR	○	2	70	308	239	220			+0.2					
S50 -DRZ75225-12CR	●	4	75	330	261	225	50	80	No offset	DR12CR-OUT (2 pcs)	DR12CR-IN (2 pcs)	SB-5085TR	DT-20	ZCMT12T306
-DRZ80240-12CR	●	4	80	340	271	240								

Recommended Cutting Conditions P.402

● Cartridge

Description	Spare Parts		Description	Spare Parts	
	Clamp Screw	Wrench		Clamp Screw	Wrench
For Outer Edge (DR20CR-OUT)	HH6×12	LW-5	For Outer Edge (DR12CR-OUT)	HH4×12	LW-3
For Inner Edge (DR20CR-IN)			For Inner Edge (DR12CR-IN)		

◆ Drill Diameter and Recommended Coolant

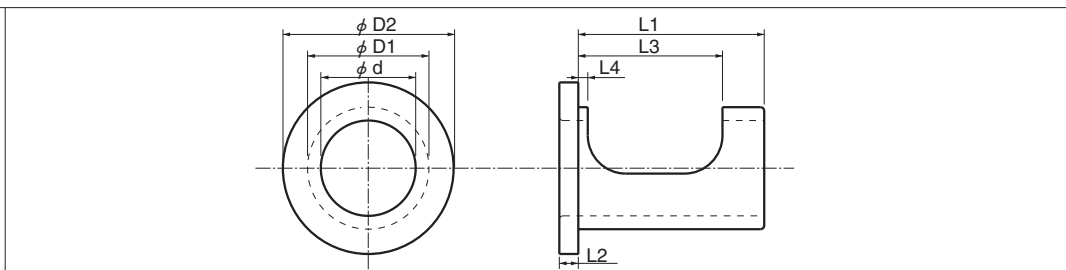


● : Std. Stock ○ : World Express

Adjustable Sleeve [for DRZ Magic Drill]

ASL / SHE

Diameter Adjustment / Center Height Adjustment



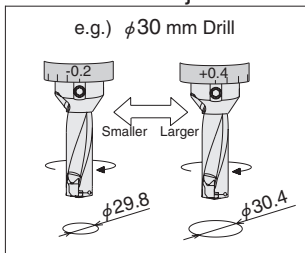
● Sleeve dimension (Use ASL for inch sizes, SHE for metric sizes)

Description	Stock	Unit	Dimension							Dia. Adjustment Range	Center Height Adjustment Range
			ϕd	$\phi D1$	$\phi D2$	L1	L2	L3	L4		
ASL 75100-175	●	inch	0.75	1.00	1.614	1.750	0.157	1.417	0.118	+ 0.016 ~ - 0.008	+0.008 ~ -0.006
	●		1.00	1.25	1.929	2.125	0.236	1.496	0.098	+ 0.016 ~ - 0.008	+0.008 ~ -0.006
	●		1.25	1.50	2.283	2.375	0.236	1.693	0.098	+ 0.016 ~ - 0.008	+0.008 ~ -0.006
SHE 2025-43	○	mm	20	25	41	43	4	36	3.0	+0.4~-0.2	+0.2~-0.15
	○		25	32	49	48	6	38	2.5	+0.4~-0.2	+0.2~-0.15
	○		32	40	58	53	6	43	2.5	+0.4~-0.2	+0.2~-0.15
	○		40	50	74	63	6	49	3.0	+0.4~-0.2	+0.3~-0.2

· Dia. adjustment range refers to the cutting diameter.

· ASL and SHE are only to be used with the Magic Drill (DRZ-type). Not recommended for the small dia. Magic Drill (DRS-type) because the adjustment range is too large.

1. Diameter Adjustment –For Machining Center–



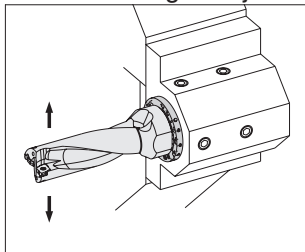
● Diameter Adjustment Range (ASL=inch)

Shank Dia.	Cutting Dia.	Range
.75	.512~.610	+.016~-0.008
1.00	.625~1.260	
1.25	1.299~2.00	

● Diameter Adjustment Range (SHE=mm)

Shank Dia.	Cutting Dia.	Range
$\phi 20$	$\phi 13\sim 15$	+0.4~-0.2
$\phi 25$	$\phi 16\sim 26$	
$\phi 32$	$\phi 27\sim 40$	
$\phi 40$	$\phi 33\sim 50$	

2. Center Height Adjustment –For Lathe Operation–



● Center Height Adjustment Range (ASL=inch)

Shank Dia.	Cutting Dia.	Range
.75	.512~.610	+.008~-0.006
1.00	.625~1.260	
1.25	1.299~2.00	

● Center Height Adjustment Range (SHE=mm)

Shank Dia.	Cutting Dia.	Range
$\phi 20$	$\phi 13\sim 15$	+0.2~-0.15
$\phi 25$	$\phi 16\sim 26$	
$\phi 32$	$\phi 27\sim 40$	
$\phi 40$	$\phi 33\sim 50$	

Adjustable Sleeve Drilling

● : Std. Stock ○ : World Express

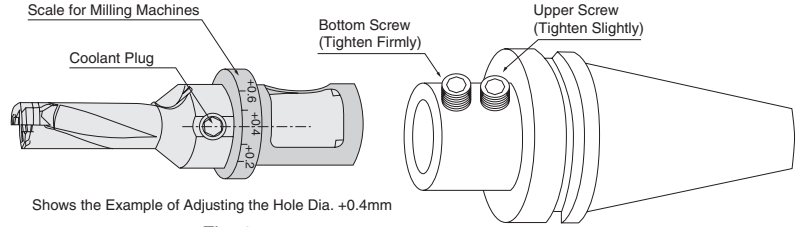
Adjustable Sleeve [for DRZ Magic Drill]

◆ How to Use the Adjustable Sleeve

1. Hole Diameter Adjustment when Drilling

- ① Align 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 to (+) direction and to make it smaller, rotate the sleeve to (-) direction
- ③ When rotating the sleeve, insert the wrench supplied with the drill into the hole on the flange periphery and rotate the sleeve
- ④ Using the bottom screw of the side-lock arbor, firmly tighten 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 available to collet chuck-type arbor
 Scale on the sleeve is the reference value.
 Check the actual cutting diameter after adjusting.



Shows the Example of Adjusting the Hole Dia. +0.4mm

Fig. 1

Fig. 2

2. Center-Height Adjustment for Lathes

Most of the problems encountered with a turning lathe are center-height deviations.

The center-height is appropriate if a core of about 0.5mm (.02") diameter remains at the center of the hole (Fig.3)

Center-height adjustment is necessary for the following cases:

- ◆ No Core remains
- ◆ Core Diameter is more than 1mm (.04")

- 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 (.04"), 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.

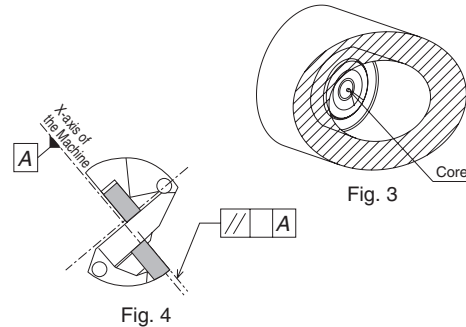


Fig. 3

Fig. 4

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.

Magic Drill Inch Dimension

◆ Magic Drill (DRZ) Hole Bottom Shape (Available for 2xD, 3xD, 4xD and 5xD type)

● Inch Size (inch)

ϕD	A	B	C	ϕD	A	B	C	ϕD	A	B	C
0.512		0.173	0.016	0.846		0.301	0.024	1.299		0.425	0.031
0.531		0.183	0.016	0.866		0.311	0.024	1.339		0.445	0.031
0.551	0.083	0.193	0.016	0.886		0.321	0.024	1.378		0.465	0.031
0.571		0.203	0.016	0.906		0.331	0.024	1.417	0.224	0.484	0.031
0.591		0.213	0.020	0.925	0.122	0.341	0.024	1.457		0.504	0.031
0.610		0.222	0.020	0.945		0.350	0.028	1.496	0.524	0.035	
0.630		0.209	0.024	0.965		0.360	0.028	1.535		0.543	0.035
0.650		0.219	0.024	0.984		0.370	0.028	1.575		0.563	0.035
0.669		0.228	0.024	1.004		0.380	0.028	1.614		0.551	0.039
0.689		0.238	0.024	1.024		0.390	0.028	1.654		0.571	0.039
0.709		0.248	0.024	1.043		0.400	0.028	1.693		0.591	0.039
0.728	0.106	0.258	0.028	1.063		0.374	0.028	1.732		0.610	0.039
0.748		0.268	0.028	1.083		0.384	0.028	1.772		0.630	0.039
0.768		0.278	0.028	1.102		0.394	0.028	1.811		0.650	0.039
0.787		0.287	0.028	1.122		0.404	0.028	1.850	0.256	0.669	0.039
0.807		0.297	0.028	1.142		0.413	0.028	1.890		0.689	0.043
0.827		0.307	0.031	1.161	0.157	0.423	0.028	1.929		0.709	0.043
				1.181		0.433	0.028	1.969		0.728	0.043
				1.201	0.443	0.028	2.008		0.748	0.043	
				1.220	0.453	0.031	2.047		0.768	0.043	
				1.240	0.463	0.031	2.087		0.787	0.043	
				1.260	0.472	0.031	2.126		0.728	0.047	
				1.280	0.482	0.031	2.165		0.748	0.047	
							2.205	0.335	0.768	0.047	
							2.244		0.787	0.047	
							2.283	0.807	0.047		
							2.323	0.827	0.047		

Chart above is for 2xD, 3xD, 4xD and 5xD drills

※ Figures above are nominal sizes.

(Varies from -0.004" to +0.004" depending on work material and cutting conditions)

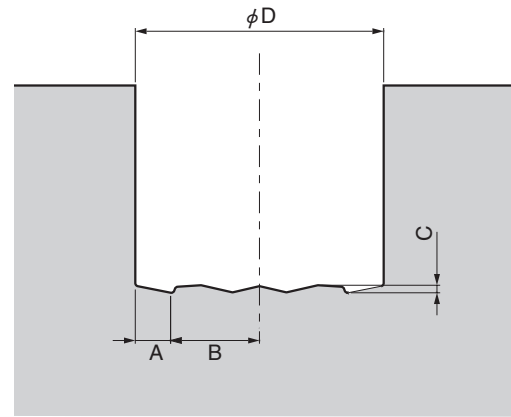
● Metric Size (mm)

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

Chart above is for 2xD, 3xD, 4xD and 5xD drills

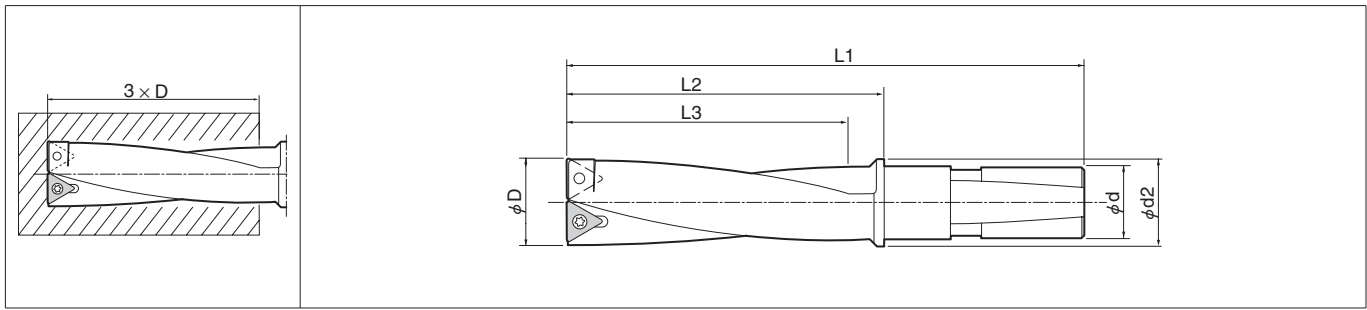
※ Figure above are nominal sizes.

(Varies from -0.1mm to +0.1mm depending on work material and cutting conditions)





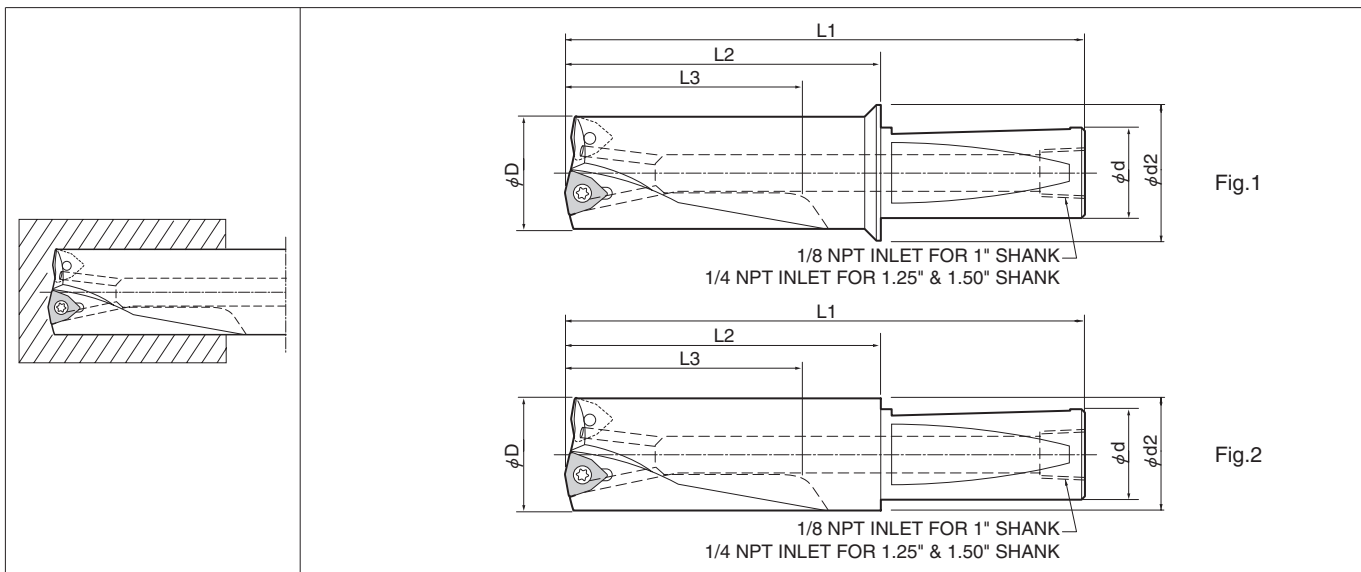
CERA-DRILL

KSD (Drilling Depth : 3 × D) Inch Dimension



● Toolholder Dimensions

Description	Stock No. of Insert	Dimension (inch)						Drawing	Spare Parts				Applicable Insert P.378	
		φD	L1	L2	L3	φd	φd2		Insert Screw	Wrench				
KSD -0719	●	0.719						-	 SCR05	 FT-7				TCMT1.8
-0734	●	0.734	4.406	2.656	2.156									
-0750	●	0.750				0.625	0.75							
-0766	●	0.766												
-0781	●	0.781	4.500	2.750	2.250									
-0797	●	0.797												
-0813	●	0.813	5.031	3.000	2.500									
-0828	●	0.828				0.750	1.00							
-0844	●	0.844	5.187	3.156	2.656									



● Toolholder Dimensions

Description	Stock	No. of Insert	Dimension (inch)					Drawing	Spare Parts				Applicable Insert P.378		
			φD	L1	L2	L3	φd		φd2	Insert Screw	Wrench				
KD -0875	●	2	0.875												
-0906	●	2	0.906												
-0938	●	2	0.938	4.78	2.50	1.75									
-0969	●	2	0.969												
-1000	●	2	1.000				1.00	1.35	Fig.1	SCR03	FT-9				WCMT05
-1031	●	2	1.031												
-1062	●	2	1.062												
-1094	●	2	1.094	5.16	2.88	2.125									
-1125	●	2	1.125												
-1156	●	2	1.156												
-1188	●	2	1.188	5.16	2.88	2.125									
-1219	●	2	1.219												
-1250	●	2	1.250												
-1281	●	2	1.281	5.53	3.25	2.50	1.00	1.35	Fig.1						
-1313	●	2	1.313												
-1344	●	2	1.344												
-1375	●	2	1.375	5.53	3.25	2.50		1.29		SCR30	FT-10				WCMT06
-1406	●	2	1.406					1.32							
-1438	●	2	1.438	5.78	3.50	2.75	1.00	1.35	Fig.2						
-1469	●	2	1.469					1.38							
-1500	●	2	1.500					1.41							
-1563	●	2	1.563	6.16	3.88	2.88	1.25	1.47							
-1625	●	2	1.625					1.54							
-1750	●	2	1.750	6.41	4.13	3.00		1.66							
-1938	●	2	1.938	6.78	4.50	3.38	1.25	1.85		SCR03	FT-9				WCMT05
-2000	●	2	2.000					1.91							
-2125	●	2	2.125	7.44	4.75	3.50		2.04							
-2188	●	2	2.188	7.81	5.12	3.88	1.50	2.10	Fig.2	SCR30	FT-10				WCMT06
-2500	●	2	2.500	8.19	5.50	4.25		2.41							
-2625	●	2	2.625					2.54							
-2750	●	2	2.750	11.25	8.00	6.50	2.00	2.66		SCR30	FT-10				WCMT06
-2875	●	2	2.875					2.79							
-3000	●	2	3.000	11.25	8.00	6.50		2.91							
-3125	●	2	3.125				2.00	3.04							
-3250	●	2	3.250	12.50	9.25	7.625		3.16							
-3375	●	2	3.375					3.29							
-3500	●	2	3.500	12.50	9.25	7.625	2.00	3.41	Fig.2	SCR30	FT-10				WCMT06
-3625	●	2	3.625	12.672	9.422	7.313		3.56							
-3750	●	2	3.750	13.000	9.750	8.000		3.66							
-3875	●	2	3.875	13.438	10.188	8.438	2.00	3.79							
-4000	●	2	4.000	13.438	10.188	8.563		3.91							

KCD Core Drill Inch Dimension

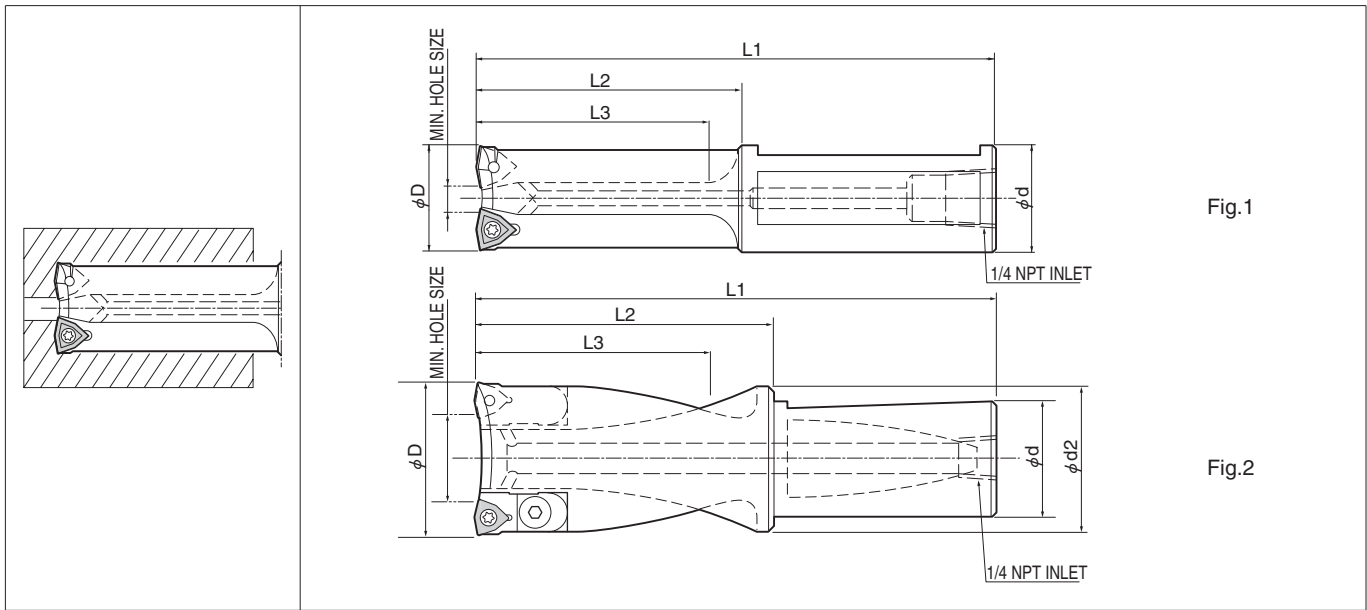


Fig.1

Fig.2

● Toolholder Dimensions

Description	Stock	No. of Insert	Dimension (inch)						Drawing	Spare Parts					Applicable Insert P.378		
			φ D	L1	L2	L3	φ d	φ d2		Min. Hole Size	Insert Screw	Wrench	Cartridge	MTG.Screw		Wrench	
KCD -0865	●	2	0.865	4.75	2.25	1.750	1.00	-	.240	Fig.1	SCR03	FT-9	-	-	-	WCMT05	
-0990	●		0.990	5.00	2.50	2.000											.365
-1115	●		1.115	5.50	3.00	2.500											
-1240	●		1.240	5.50	3.00	2.500											
KCD -1360C	●	1.36-1.46	6.25	3.50	2.750	1.25	1.27	.610	Fig.2	SCR30	FT-10	KCD-1C	MS 01-02	LW-4	WCMT06		
-1460C	●	1.46-1.56														1.37	.710
-1560C	●	1.56-1.66	1.47	.810													
-1660C	●	1.66-1.76			1.57	.910											
-1760C	●	1.76-1.86	1.67	1.010													
-1860C	●	1.86-1.96			1.77	1.110											
-1960C	●	1.96-2.06	1.87	1.210													
-2060C	●	2.06-2.16			1.97	1.310											
-2160C	●	2.16-2.26	2.07	1.410													
-2460C	●	2.46-2.56			2.37	1.710											

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 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)

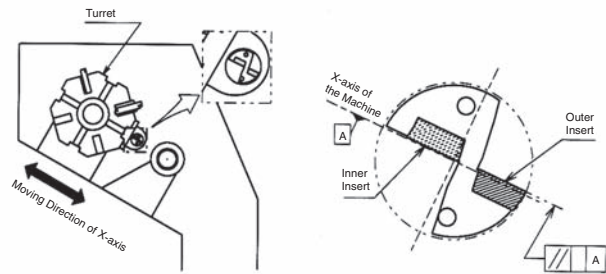


Fig.1 Installation to the Turning Lathe

Cutting Diameter Adjustment

1. Cutting Diameter Adjustment

- ① Cutting diameter is adjusted by moving the tool in the X-axis direction.

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

- ② For 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 (.008") or more.

Otherwise, the toolholder will interfere with the drilled hole. (Fig. 4)

e.g.) when using $\phi 20$ ($\phi .787$ ") drill, the hole diameter must not be smaller than 19.8mm (.780") .

2. Offset Limit of the Cutting Diameter

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

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

e.g.) In case of using $\phi 20$ ($\phi .787$ ") drill, it is possible to make a hole up to $\phi 2$ ($\phi .827$ ") since "Max. Offset (Radial)" is +0.5mm (.02") .

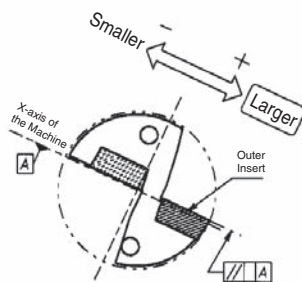


Fig. 2 Outer Insert Facing Up

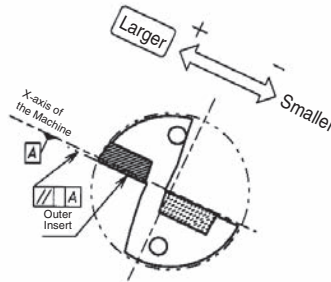


Fig. 3 Outer Insert Facing Down

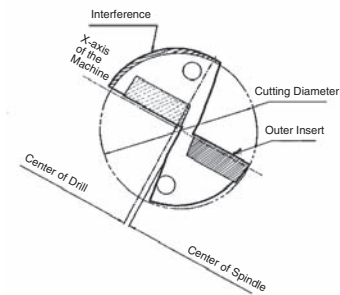


Fig. 4 Excessive Offset (For Smaller Hole Diameter)

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 (.008") below the Center line of the Spindle. (Fig. 5)

This is the normal position of the center height and the inner insert is designed to be set at this position.

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

For stable machining, it is essential to check the center height of the inner insert carefully.

2. How to Check the Center Height of Inner Insert

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

If the center height is in the normal condition, a core of about 0.5mm (.02") in diameter will remain after machining.

In the following case, it is necessary to adjust the center height.

- No core remains
- Core diameter is more than 1mm (.04")

For test cutting to check the center height, drill a shallow hole about 10mm (.40") in depth at low feed rate of less than 0.1mm/rev (.004ipr) .

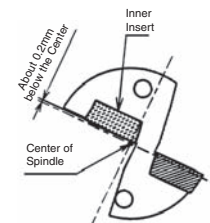


Fig. 5 Front View of the Drill

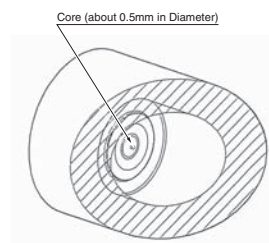


Fig. 6 Center Core

3. Center Height Adjustment

a) No Core or Cores with Small Diameter

This occurs when the inner insert is on or above the center.
In this case, adjustment is necessary since insert breakage is likely at the center of the drill. (Fig. 7)

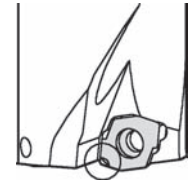


Fig. 7 Insert Breakage near the Center of Drill

Adjustments

① Install the drill rotated at the 180°. Most problems will be solved by this method.

② If the core diameter becomes too large after the above adjustment, install the drill 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 opposite direction (outer insert is positioned upper), the cutting diameter will become smaller, which may cause the drill body to interfere with the drilled hole.
The fundamental solution is to readjust the center position of the turret itself.

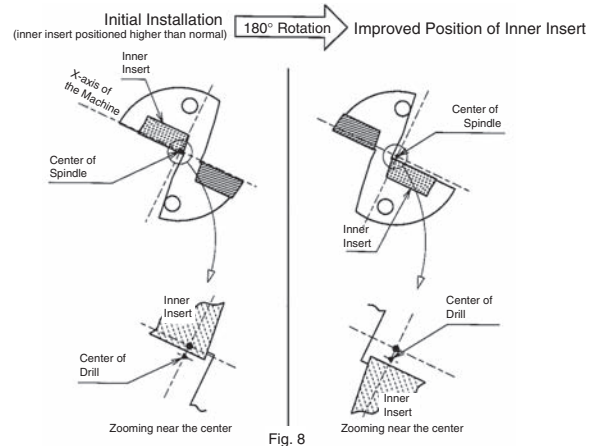


Fig. 8

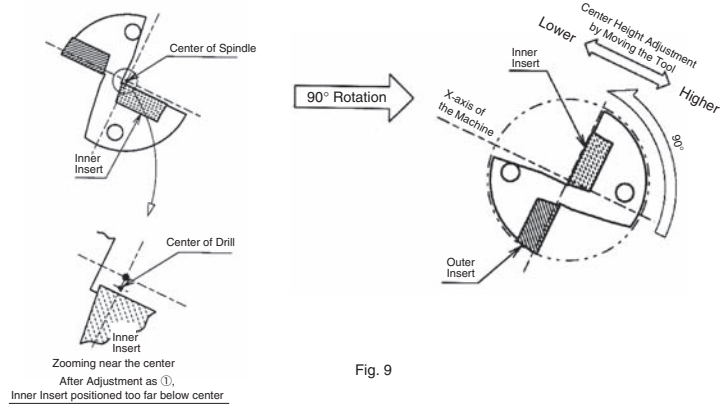


Fig. 9

b) Core with Excessively Large Diameter (More than 1mm/.04")

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

Adjustments

Install the drill rotating 90° counter-clockwise as shown in Fig.10 (outer insert is positioned upper), 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: 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 fundamental solution is to readjust the center position of the turret itself.

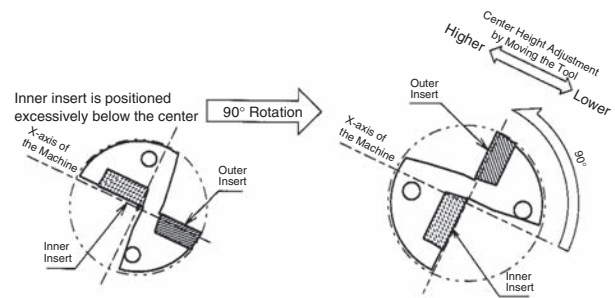


Fig. 10

Recommended Cutting Conditions

◆ Recommended Cutting Conditions (Coolant): DRZ type



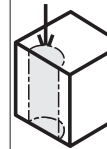
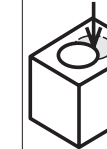
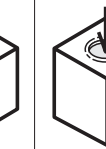


Work Material	Recommended Cutting Speed (SFM)						Cutting Dia. φD (inch)	Type (Drilling Depth)			
	PVD Coated					Carbide		2D	3D	4D	5D
	PR510	PR660	PR730	PR915	PR930	KW10					
	Standard	Standard SP SU	Standard SU	Standard	Standard SP	Standard SP		Feed Rate (ipr)			
Low Carbon Steel	-	★ 400~730	☆ 400~800	☆ 400~800	☆ 400~730	-	φ.512~φ.610	.0023~.004	.0023~.004	.0016~.003	-
							φ.630~φ.1.024	.003~.006	.003~.006	.0023~.0047	-
							φ.1.063~φ.1.968	.003~.007	.003~.007	.0023~.0047	.002~.0035
							φ.1.969~	.003~.007	.003~.007	.0038~.0047	.002~.0035
Carbon Steel	-	★ 330~530	☆ 400~600	☆ 400~600	☆ 330~530	-	φ.512~φ.610	.0023~.004	.0023~.004	.0016~.003	-
							φ.630~φ.1.024	.003~.006	.003~.006	.0023~.0047	-
							φ.1.063~φ.1.968	.003~.007	.003~.007	.0023~.0047	.002~.0035
							φ.1.969~	.003~.007	.003~.007	.0038~.0047	.002~.0035
Alloy Steel	-	★ 270~460	☆ 330~530	☆ 330~530	☆ 270~470	-	φ.512~φ.610	.0023~.004	.0023~.004	.0016~.003	-
							φ.630~φ.1.024	.003~.006	.003~.006	.0023~.0047	-
							φ.1.063~φ.1.968	.003~.007	.003~.007	.0023~.0047	.002~.0035
							φ.1.969~	.003~.007	.003~.007	.0038~.0047	.002~.0035
Tool Steel	-	☆ 230~430	☆ 270~50	★ 270~500	☆ 230~430	-	φ.512~φ.610	.0016~.003	.0016~.003	.0012~.0028	-
							φ.630~φ.1.024	.003~.0047	.0023~.004	.0023~.003	-
							φ.1.063~φ.1.968	.003~.006	.0023~.0047	.0023~.004	.0016~.0028
							φ.1.969~	.003~.006	.0023~.0047	.0023~.004	.0016~.0028
Stainless Steel (Austenitic)	-	★ 200~400	☆ 230~470	☆ 230~470	☆ 200~400	-	φ.512~φ.610	.0016~.003	.0016~.003	.0012~.0023	-
							φ.630~φ.1.024	.0023~.004	.0023~.004	.0016~.003	-
							φ.1.063~φ.1.968	.0023~.0047	.0023~.0047	.0016~.004	.0016~.0028
							φ.1.969~	.0023~.0047	.0023~.0047	.0016~.004	.0016~.0028
Gray Cast Iron	★ 330~500	-	-	-	-	☆ 330~400	φ.512~φ.610	.003~.0047	.003~.004	.0023~.003	-
							φ.630~φ.1.024	.004~.007	.004~.006	.003~.0047	-
							φ.1.063~φ.1.968	.004~.008	.004~.007	.003~.006	.0023~.004
							φ.1.969~	.004~.008	.004~.007	.003~.006	.0023~.004
Ductile Cast Iron	★ 270~400	-	-	-	-	☆ 270~330	φ.512~φ.610	.003~.0047	.003~.004	.0023~.003	-
							φ.630~φ.1.024	.004~.007	.004~.006	.003~.0047	-
							φ.1.063~φ.1.968	.004~.008	.004~.007	.003~.006	.002~.004
							φ.1.969~	.004~.008	.004~.007	.003~.006	.002~.004
Non-ferrous Metal	-	-	-	-	-	★ 660~2000	φ.512~φ.610	.0023~.0047	.0023~.004	.0016~.003	-
							φ.630~φ.1.024	.003~.007	.003~.006	.0023~.0047	-
							φ.1.063~φ.1.968	.003~.008	.003~.007	.0023~.006	.002~.004
							φ.1.969~	.003~.008	.003~.007	.0023~.006	.002~.004
Titanium Alloy	-	-	-	-	-	★ 130~230	φ.512~φ.610	.002~.0023	.002~.0023	.002~.0023	-
							φ.630~φ.1.024	.002~.0028	.002~.0028	.002~.0028	-
							φ.1.063~φ.1.968	.0023~.003	.0023~.003	.0023~.003	.0016~.002
							φ.1.969~	.0023~.003	.0023~.003	.0023~.003	.0016~.002

※ Apply sufficient amount of coolant

★ : 1st Recommendation ☆ : 2nd Recommendation

◆ Cutting Conditions by Application

(Work Material : 1050)

Application	Plain Surface	Slant Surface	Half Cylindrical	Hole Expansion	Concave Surface	Pre-drilled Surface	Stacked Plates	
Workpiece Shape								
	SFM	270	270	Not Recommended	Not Recommended	270	NA	NA
DRS	f (ipr)	.003	.0016	Not Recommended	Not Recommended	Concave Part .0016 Continuous Part .003	NA	NA
	SFM	400	400	400	400	400	NA	NA
DRZ	f (ipr)	.004	.002	.002	.002	Concave Part .002 Continuous Part .004	NA	NA
	Coolant	Yes	Yes	Yes	Yes	Yes	-	-