XHGS / PHT Type

■ General Features

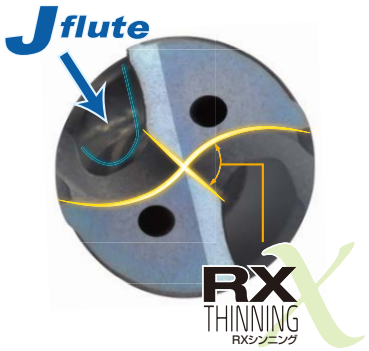
Super MultiDrill XHGS type, a next-generation drill special for deep hole drilling, features stable chip control and improved strength to further enhance efficiency of deep hole drilling.

■ Characteristics

● Deep hole drilling
- · New groove shape (J flute) with improved chip control stability when drilling deep holes
- · Drill to depths 20x drill diameter at high efficiency of v_f=1,000mm/min (ø5 equivalent to S48C)
- · The application of a special thinning shape (RX thinning) reduces cutting resistance during high efficiency drilling.

● Long tool life
- · Special DEX coating provides long tool life with a wide variety of work materials.
- · Improved chip evacuation makes it possible to reduce spindle load fluctuation, ensuring stable, long tool life.

● Environmentally-friendly
- · Compatible with the MQL (Minimum Quantity Lubrication) system.
- · Compatible with dual-fluid mist (simultaneous spray of oil and water)



■ Series

Application	Series	Diameter Range (mm)	Hole Depth (L/D)	Remarks
Deep Hole Drilling	MDW□□□□XHGS12 Type	ø2.5 to 16.0	Up to 12	28 items in stock
	MDW□□□□XHGS15 Type	ø2.5 to 14.0	Up to 15	68 items in stock
	MDW□□□□XHGS20 Type	ø2.5 to 12.0	Up to 20	64 items in stock
	MDW□□□□XHGS25 Type	ø2.5 to 10.0	Up to 25	16 items in stock
	MDW□□□□XHGS30 Type	ø2.5 to 9.0	Up to 30	14 items in stock
Guide Hole Drilling	MDW□□□□PHT Type	ø2.5 to 16.0	Up to 2	72 items in stock

■ Application Examples

● Automotive Component (Equivalent to S380)

Tool : ø5.0 x 115mm (PHT type) ø5.0 x 170mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.5MPa, Volume approx. 4cc/h)
Cutting Conditions : v_c=80m/min f=0.28mm/rev H=85mm/Holes (3 Per Unit)
Tool Life : 500 Units (113m/reg)

● Automotive Component (Equivalent to S43C)

Tool : ø6.0 x 170mm (PHT type) ø6.0 x 230mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.5MPa, Volume approx. 40cc/h)
Cutting Conditions : v_c=80m/min f=0.18mm/rev H=110mm/Holes (4 Per Unit)
Tool Life : 150 Units (113m/reg)

● Automotive Component (Equivalent to FCD700)

Tool : ø5.0 x 105mm (PHT type) ø5.0 x 155mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.4MPa, Volume approx. 4cc/h)
Cutting Conditions : v_c=50m/min f=0.18mm/rev H=60mm/Holes (5 Per Unit)
Tool Life : 400 Units (120m/reg)

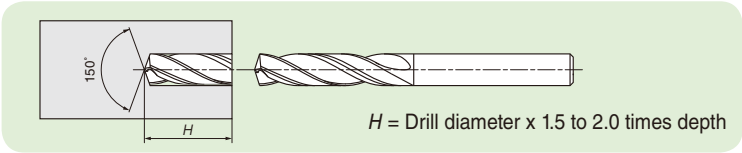
● Machine Component (Equivalent to S45C)

Tool : ø6.0 x 90mm (PHT type) ø6.0 x 145mm (XHGS type)
Equipment : Horizontal single-axis NC machine
Coolant Supply : MQL (Air pressure 0.5MPa, Volume approx. 60cc/h)
Cutting Conditions : v_c=80m/min f=0.20mm/rev H=62mm/Holes (3 Per Unit)
Tool Life : 550 Units (104m/reg)

■ Recommended Drilling Method

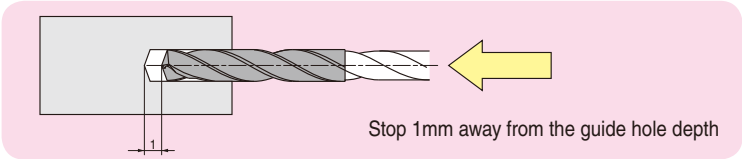
(1) Drill a guide hole using the dedicated PHT type

● Select the same nominal diameter for the dedicated guide hole drill PHT type as the deep hole drill XHGS type.
(The guide drill diameter is designed +0.02 mm to +0.05 mm larger than the long drill diameter)



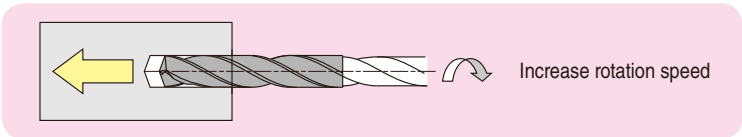
(2) Feed the deep hole drill XHGS type through the guide hole at low rotation speed

● Rotation Speed : 500min^{-1}
● Feed Rate : 1,000 to 2,000mm/min



* If the drill is inserted into the guide hole at the set cutting speed, peripheral run-out may cause shoulder damage to the drill.

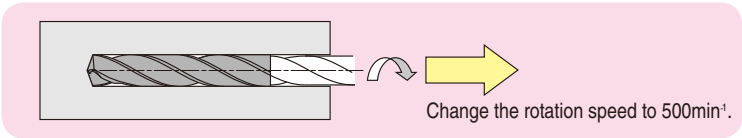
(3) Increase rotation speed until the set cutting speed is reached, and start normal drilling operation



* When using an NC machine, you may be instructed to begin normal drilling operation before the set rotation speed is reached, so it is recommended to enter a dwell instruction before normal drilling operation is instructed.

(4) After drilling, rotation speed is reduced and the drill is retracted from the work material

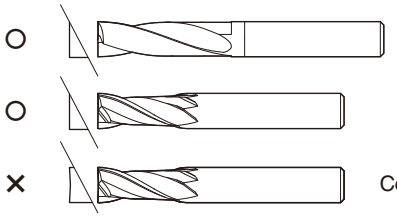
● Rotation Speed : 500min^{-1} Feed Rate : 1,000 to 2,000mm/min



* Retracting a drill from the work material at a high rotation speed is dangerous as doing so may result in breakage due to run-out.

(5) Other Notes

● A flat base should be prepared when the surface for the guide tool is slanted.



Spot facing using an endmill or flat multidrill MDF type (see page J26)

Concave endmills cannot be used

● When the deep hole drill exits through an angled surface, decrease the feed rate to f=0.05mm/rev just before drilling through.

■ Coolant

(1) Internal coolant supply

● Use JIS A1 class 1 oil or equivalent (emulsion).
● Pump pressure Steel: 1.5 to 2.0MPa (Cooling effect increases at higher pressures, affecting chips/wear)
Cast iron & aluminium alloy: 4.0 to 6.0MPa (Priority on cooling)

(2) Internal MQL

● Air pressure : 0.5MP higher
● Discharge volume : It is recommended to set the maximum discharge volume possible on the machine.
* Consult the manufacturer before using with aluminium alloy.

(3) Internal dual-liquid mist

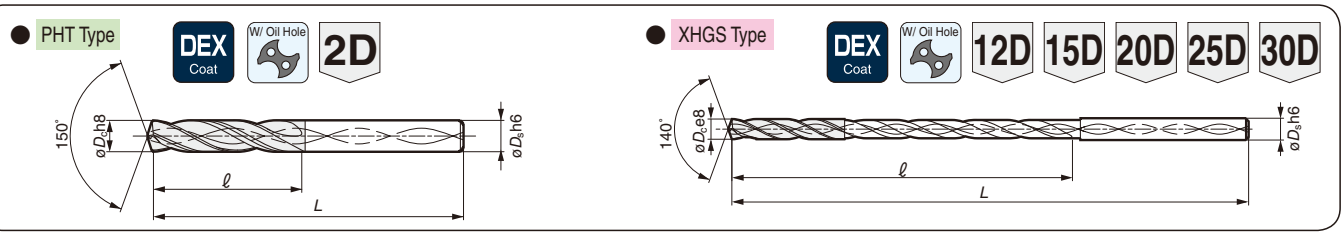
● Air pressure : 0.5MP higher
● Discharge volume : It is recommended to use the optimum value of the machine when drilling.

XHGS / PHT Type

Internal Coolant Supply (XHGS Type / PHT Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○		○			○	○			

● PHT Type



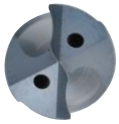
● XHGS Type

● Diameter ø2.5 to ø7.0mm

Diameter øDc (mm)	Shank øDs (mm)	Dedicated Guide Hole PHT Type				High Efficiency Deep Hole Drill XHGS Type													
		Cat. No.	Stock	Dimensions (mm)		Cat. No.	Hole Depth: 12D			Hole Depth: 15D			Hole Depth: 20D			Hole Depth: 25D			Hole Depth: 30D		
				L	ℓ	12, 15, 20, 25, 30 ↘	Stock 12	L	ℓ	Stock 15	L	ℓ	Stock 20	L	ℓ	Stock 25	L	ℓ	Stock 30	L	ℓ
2.5	3.0	MDW 0250PHT	●	68	15	MDW 0250XHGS□□	●	91	43	●	98	50	●	111	63	●	123	75	●	136	88
2.6		MDW 0260PHT	●			MDW 0260XHGS□□				●			●								
2.7		0270PHT	●			0270XHGS□□				●			●								
2.8	3.0	0280PHT	●	68	17.5	0280XHGS□□		99	51	●	108	60	●	123	75		138	90		153	105
2.9		0290PHT	●			0290XHGS□□				●			●								
3.0		0300PHT	●			0300XHGS□□	●			●			●			●			●		
3.1		MDW 0310PHT	●			MDW 0310XHGS□□				●			●								
3.2		0320PHT	●			0320XHGS□□				●			●								
3.3		0330PHT	●		20	0330XHGS□□		108	60	●	118	70	●	136	88		153	105		171	123
3.4		0340PHT	●			0340XHGS□□				●			●								
3.5	4.0	0350PHT	●	72		0350XHGS□□	●			●			●			●			●		
3.6		MDW 0360PHT	●			MDW 0360XHGS□□				●			●								
3.7		0370PHT	●			0370XHGS□□				●			●								
3.8		0380PHT	●		22.5	0380XHGS□□		116	68	●	128	80	●	148	100		168	120		188	140
3.9		0390PHT	●			0390XHGS□□				●			●								
4.0		0400PHT	●			0400XHGS□□	●			●			●			●			●		
4.1		MDW 0410PHT	●			MDW 0410XHGS□□				●			●								
4.2		0420PHT	●			0420XHGS□□				●			●								
4.3		0430PHT	●		25	0430XHGS□□		127	77	●	140	90	●	163	113		185	135		208	158
4.4		0440PHT	●			0440XHGS□□				●			●								
4.5	5.0	0450PHT	●	80		0450XHGS□□	●			●			●			●			●		
4.6		MDW 0460PHT	●			MDW 0460XHGS□□				●			●								
4.7		0470PHT	●			0470XHGS□□				●			●								
4.8		0480PHT	●		27.5	0480XHGS□□		135	85	●	150	100	●	175	125		200	150		225	175
4.9		0490PHT	●			0490XHGS□□				●			●								
5.0		0500PHT	●			0500XHGS□□	●			●			●			●			●		
5.1		MDW 0510PHT	●			MDW 0510XHGS□□				●			●								
5.2		0520PHT	●			0520XHGS□□				●			●								
5.3		0530PHT	●		27.5	0530XHGS□□		146	94	●	162	110	●	192	140		217	165		245	193
5.4		0540PHT	●			0540XHGS□□				●			●								
5.5	6.0	0550PHT	●	82		0550XHGS□□	●			●			●			●			●		
5.6		MDW 0560PHT	●			MDW 0560XHGS□□				●			●								
5.7		0570PHT	●			0570XHGS□□				●			●								
5.8		0580PHT	●		30	0580XHGS□□		154	102	●	172	120	●	202	150		232	180		262	210
5.9		0590PHT	●			0590XHGS□□				●			●								
6.0		0600PHT	●			0600XHGS□□	●			●			●			●			●		
6.1		MDW 0610PHT	●			MDW 0610XHGS□□				●			●								
6.2		0620PHT	●			0620XHGS□□				●			●								
6.3		0630PHT	●		32.5	0630XHGS□□		164	111	●	183	130	●	216	163		248	195		281	228
6.4		0640PHT	●			0640XHGS□□				●			●								
6.5	7.0	0650PHT	●	88		0650XHGS□□	●			●			●			●			●		
6.6		MDW 0660PHT	●			MDW 0660XHGS□□				●			●								
6.7		0670PHT	●			0670XHGS□□				●			●								
6.8		0680PHT	●		35	0680XHGS□□		172	119	●	193	140	●	228	175		263	210		298	245
6.9		0690PHT	●			0690XHGS□□				●			●								
7.0		0700PHT	●			0700XHGS□□	●			●			●			●			●		

Please indicate 12, 15, 20, 25 or 30 in the □□ when ordering. (Example: MDW 0600XHGS12)

Grade: XHGS Type ACX70
PHT Type ACX20

XHGS Type  PHT Type 

Internal Coolant Supply (XHGS Type / PHT Type)

Carbon Steel, Alloy Steel		Tempered Steel	Hardened Steel		Stainless steel	Ti Alloy	Heat-resistant steels	Cast Iron	Ductile Cast Iron	Aluminium Alloy	Copper alloy	Composite CFRP
Up to 0.28%	From 0.29%		Up to 45HRC	From 46HRC								
○	◎	◎	○		○			○	○			

● PHT Type

● XHGS Type

● Diameter ø7.1 to ø16.0mm

Diameter $øD_c$ (mm)	Shank $øD_s$ (mm)	Dedicated Guide Hole PHT Type Cat. No.	Stock	Dimensions (mm) L	ℓ	High Efficiency Deep Hole Drill XHGS Type Cat. No. 12,15,20,25,30	Hole Depth: 12D Stock 12	Dimensions (mm) L	ℓ	Hole Depth: 15D Stock 15	Dimensions (mm) L	ℓ	Hole Depth: 20D Stock 20	Dimensions (mm) L	ℓ	Hole Depth: 25D Stock 25	Dimensions (mm) L	ℓ	Hole Depth: 30D Stock 30	Dimensions (mm) L	ℓ
7.1	8.0	MDW 0710PHT	●	94	37.5	MDW 0710XHGS□□		182	128	●	204	150	●	242	188		279	225		317	263
7.2		0720PHT	●			0720XHGS□□				●			●								
7.3		0730PHT	●			0730XHGS□□				●			●								
7.4		0740PHT	●			0740XHGS□□				●			●								
7.5		0750PHT	●			0750XHGS□□	●			●			●			●			●		
7.6	8.0	MDW 0760PHT	●	94	40.0	MDW 0760XHGS□□		190	136	●	214	160	●	254	200		294	240		334	280
7.7		0770PHT	●			0770XHGS□□				●			●								
7.8		0780PHT	●			0780XHGS□□				●			●								
7.9		0790PHT	●			0790XHGS□□				●			●								
8.0		0800PHT	●			0800XHGS□□	●			●			●			●			●		
8.5	9.0	MDW 0850PHT	●	100	42.5	MDW 0850XHGS□□	●	200	145	●	225	170	●	268	213	●	310	255	●	353	298
9.0		MDW 0900PHT	●		45.0	MDW 0900XHGS□□	●	208	153	●	235	180	●	280	225	●	325	270	●	370	315
9.5	10.0	MDW 0950PHT	●	106	47.5	MDW 0950XHGS□□	●	218	162	●	246	190	●	294	238	●	341	285			
10.0		MDW 1000PHT	●		50.0	MDW 1000XHGS□□	●	226	170	●	256	200	●	306	250	●	356	300			
10.5	11.0	MDW 1050PHT	●	116	52.5	MDW 1050XHGS□□	●	240	179	●	271	210	●	324	263						
11.0		MDW 1100PHT	●		55.0	MDW 1100XHGS□□	●	248	187	●	281	220	●	336	275						
11.5	12.0	MDW 1150PHT	●	122	57.5	MDW 1150XHGS□□	●	258	196	●	292	230	●	350	288						
12.0		MDW 1200PHT	●		60.0	MDW 1200XHGS□□	●	266	204	●	302	240	●	362	300						
12.5	13.0	MDW 1250PHT	●	128	62.5	MDW 1250XHGS□□	●	276	213	●	313	250									
13.0		MDW 1300PHT	●		65.0	MDW 1300XHGS□□	●	284	221	●	323	260									
13.5	14.0	MDW 1350PHT	●	134	67.5	MDW 1350XHGS□□	●	294	230	●	334	270									
14.0		MDW 1400PHT	●		70.0	MDW 1400XHGS□□	●	302	238	●	344	280									
14.5	15.0	MDW 1450PHT	●	140	72.5	MDW 1450XHGS□□	●	312	247												
15.0		MDW 1500PHT	●		75.0	MDW 1500XHGS□□	●	320	255												
15.5	16.0	MDW 1550PHT	●	146	77.5	MDW 1550XHGS□□	●	330	264												
16.0		MDW 1600PHT	●		80.0	MDW 1600XHGS□□	●	338	272												

Please indicate 12, 15, 20, 25 or 30 in the □□ when ordering. (Example: MDW 0710XHGS30)

Grade: XHGS Type ACX70
PHT Type ACX20
Greyed items: Inquire about production.

■ Made to Order Items: Inquire about production of drills in tool diameters and lengths not listed above or not in stock.

- Length: Can be made in lengths up to 400 mm (Some lengths are not possible due to drill diameter)
- Diameter: ø2.5 to ø20 mm
- Work material: Standard stocked items may be used for general steel and alloy steel but we recommend and provide optimized tools designed for the material.

■ Recommended Cutting Conditions

(v_c: Cutting Speed m/min f: Feed Rate mm/rev)

Drill Diameter $øD_c$ (mm)	Cutting Conditions	Soft Steel (Up to 200HB)	General Steel (Up to 250HB)	Alloy Steel (Up to 300HB)	Hardened Steel (Up to 40HRC)	Cast Iron FC·FCD
Up to ø3.0	v_c	50 - **60** - 80	60 - **80** - 100	40 - **55** - 70	30 - **40** - 50	40 - **55** - 70
	f	0.12 - **0.15** - 0.20	0.12 - **0.15** - 0.20	0.10 - **0.13** - 0.16	0.06 - **0.08** - 0.12	0.15 - **0.18** - 0.23
Up to ø5.0	v_c	50 - **60** - 80	60 - **80** - 100	50 - **60** - 70	30 - **45** - 55	50 - **60** - 70
	f	0.15 - **0.20** - 0.25	0.15 - **0.23** - 0.30	0.12 - **0.15** - 0.20	0.08 - **0.10** - 0.14	0.17 - **0.25** - 0.35
Up to ø10.0	v_c	50 - **70** - 90	60 - **80** - 110	50 - **65** - 80	30 - **50** - 60	50 - **65** - 80
	f	0.20 - **0.25** - 0.30	0.20 - **0.25** - 0.32	0.15 - **0.20** - 0.25	0.10 - **0.15** - 0.20	0.25 - **0.28** - 0.35
Up to ø16.0	v_c	60 - **80** - 100	60 - **90** - 120	50 - **65** - 80	40 - **55** - 70	50 - **65** - 80
	f	0.25 - **0.30** - 0.35	0.25 - **0.30** - 0.35	0.15 - **0.23** - 0.27	0.12 - **0.15** - 0.23	0.25 - **0.30** - 0.35

Note: Use lower speed when using MQL coolant, and higher speed when using internal coolant or dual-liquid mist.

Min. - **Optimum** - Max.