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Indexable BTA

Deep Hole Drilling

Member IMC Group
Tungaloy
INDUSTRY 4.0

INDUSTRY 4.0
FEED the SPEED!

How to use this catalog

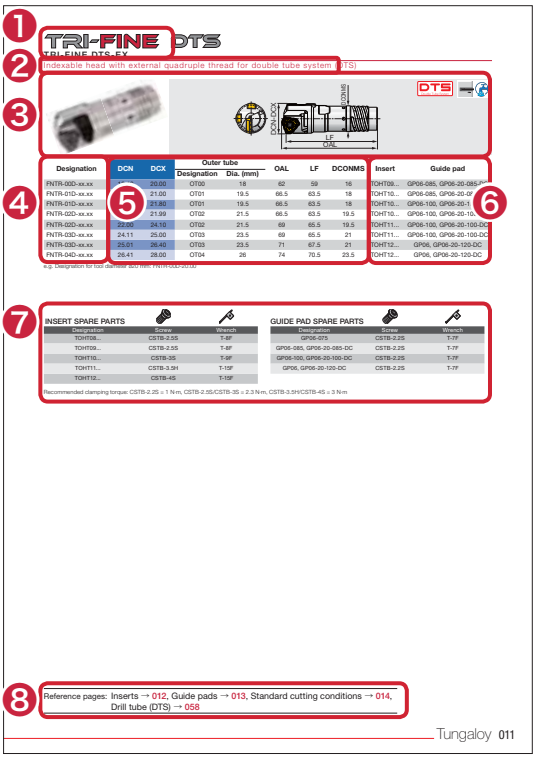
■ Option 1

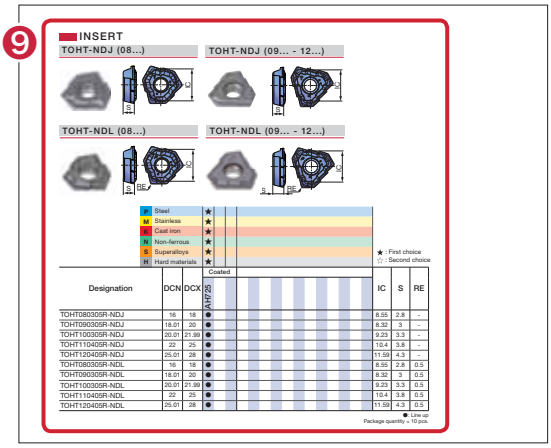
Use the information in Section ❷, ❸, ❹, or ❺ on each page to choose the tool size that is applicable to your operation. The applicable inserts and guide pads are indicated in the right columns in the drill size chart ❻, as well as in dedicated insert sections ❾.

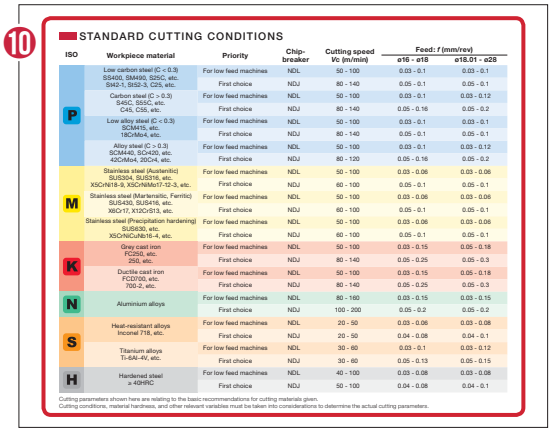
■ Option 2

Use **Drill Head Category** on pages **006** and **007** to find your desired drills.

Note: The products are arranged in increasing order of diameter.







❶ : Series name
❷ : Feature
❸ : Appearance and dimension drawing
❹ : Item designation
❺ : Dimension table
❻ : Applicable inserts and guide pads
❼ : Spare parts
❽ : Reference pages
❾ : Inserts
❿ : Standard cutting conditions

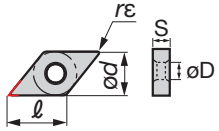
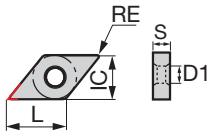
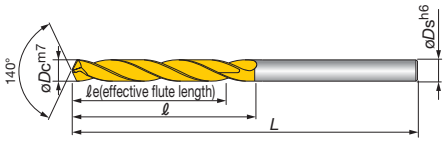
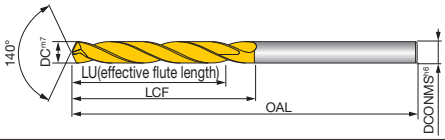
ISO13399 - Cutting tool data representation and exchange

What is ISO13399?

This *Indexable BTA Deep Hole Drilling* catalog is created in compliance with ISO 13399.

ISO13399 defines cutting tool data representation and exchange, allowing the accurate exchange of tooling data among computer aided applications that support and adhere to the standard, including CAD, CAM, CAE, PDM, PLM and tool management systems.

Shown below are examples of the ISO13399 symbols.

	Before	ISO13399
Insert		
Drill		

ISO13399 standardizes not only the format of 2D and 3D CAD data but also the tool dimension symbols (properties) and reference position information. This allows the tool information to be read and combined into NC programs and CAM software, regardless of any tool maker's data. In addition to General Catalog (paper catalog), we are also updating the symbols in e-catalog (electronic catalog on our website) to the properties conforming to ISO13399. The e-catalog also provides 2D and 3D CAD data in accordance with ISO13399 standard.

Drill

New symbol	Old symbol	Description
BD	***øD1, øD2, øD3***	Body external diameter
CICT	**z**	Number of inserts
CND	**-**	Oil hole diameter
CNT	**-**	Oil hole plug size
CRKS	***S***	Mounting screw size
DC	***øDc***	Machining diameter
DCONMS	***øDs***	Mounting part diameter on the machine
DCONWS	***øD, ød2***	Mounting part diameter on the workpiece
DCSFMS	***øD***	Connecting part diameter
KAPR	**κ**	Cutting edge angle
LCF	***ℓ***	Flute length
LF	***L*f**	Standard length (from the drill shoulder)
LPR	**-**	Parting length (from flange to tip)
LS	***ℓ*s**	Shank length
LU	***ℓ***	Machinable depth
NOF	**z**	Number of flutes
OAL	***L***	Overall length (from tip)
PL	**PL**	Distance from drill tip to shoulder
ZEFP	**Z eff**	Number of effective cutting edges on periphery

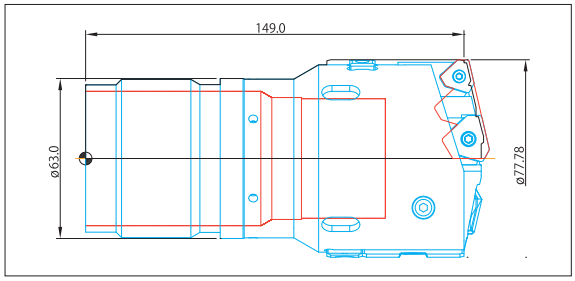
Insert

New symbol	Old symbol	Description
IC	***ød***	Inscribed circle diameter
INSL	**B**	Insert length
LE	**A**	Effective cutting edge length
RE	***r***	Corner radius
S	**T**	Thickness
W1	**-**	Insert width

Note:
- Symbols unspecified in ISO13399 standard and Tungaloy's original symbols are not included.
- The symbols still under discussion are included. Please note any change or addition may occur.

CAD data provided in e-catalog

● **2D data (DXF format file)**



Includes actual cutting edge curve (CUT layer) and body cross section (NOCUT layer).

● **3D data Light type (STP format file): Can be used to check tool path and interference.**

A rotating body model of an actual cutting edge curve and a body cross section.

● **3D data Detail type (STP format file): Can be used to create a new tool layout chart. (Can be combined with any insert model on a CAD software.)**

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INDUSTRY 4.0

Indexable BTA

Deep Hole Drilling

Counterboring, Trepanning

Drill Head Categories

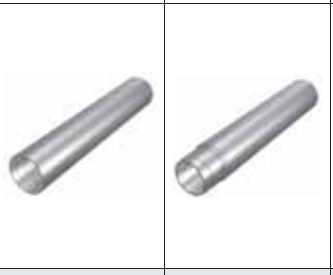
Indexable Drill Heads

Applications		STS (Single Tube System)			DTS (Double Tube System)		
		TRI-FINE	FINE-BEAM	UNIDEX	TRI-FINE	FINE-BEAM	UNIDEX
		FNTR	FNBM	KUSTS	FNTR-D	FNBM-D	KUDTS
Drill heads for solid drilling							
Drill diameter (mm)		ø16 - ø28	ø25 - ø65	ø38 - ø293.99	ø18.4 - ø28	ø25 - ø65	ø38 - ø183.99
Thread types	External quadruple thread	○	○	○	○	○	○
	Internal single thread	○	○	○	-	-	-
Hole tolerance		IT10	IT10	IT10	IT10	IT10	IT10
Surface finish Ra (μm)		2	2	3	2	2	3
Machines	Deep hole drilling machines	○	○	○	○	○	○
	NC machines	-	-	-	○	○	○
	Lathes	-	-	-	○	○	○
	Machining centers M/C	-	-	-	○	○	○
Workpiece materials	P Steel	★★★	★★★	★★★	★★★	★★★	★★★
	M Stainless	★★★	★★★	★★★	★★★	★★★	★★★
	K Cast iron	★★★	★★★	★★★	★★★	★★★	★★★
	N Non-ferrous	★★★	★★★	★★★	★★★	★★★	★★★
	S Superalloys	★★	★★	★★	★★	★★	★★
	H Hard materials (≥40HRC)	★★	★★	★★	★★	★★	★★
Insert type		TOHT	FBH / FBM	NPMX / TPMX	TOHT	FBH / FBM	NPMX / TPMX
Plus Cartridge and Guide pad +1 mm - +5 mm		-	-	○	-	-	○
Page		010	022	032 - 038	011	023	040 - 044

★★★ (Excellent) ◄—► ★ (Standard)

Drill Tube Categories

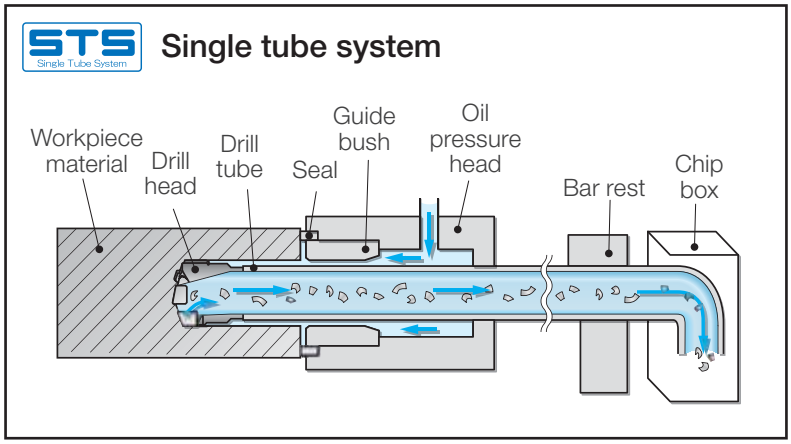
Drill Tubes

Applications				STS (Single Tube System)		DTS (Double Tube System)	
				ST	UB	OT	IT
Drill tubes							
Tube diameter (mm)				ø14 - ø274	ø13 - ø274	ø18 - ø166	ø10 - ø130
Thread type				Internal 4-start threads	External single-start threads	Internal 4-start threads	-
Drill heads	Indexable	For solid drilling	FNTR	○	○	○	○
			FNBM	○	○	○	○
			KUSTS	○	○	-	-
			KUDTS	-	-	○	○
		For counterboring	KUSTR	○	○	-	-
			KUDTR	-	-	○	○
		For trepanning	UTT	○	○	-	-
Drill diameter (mm)				ø15.6 - ø291.99	ø15.51 - ø293.99	ø18.4 - ø183.99	ø18.4 - ø183.99
Page				054	056	058	058

Single Tube System (STS) and Double Tube System (DTS)

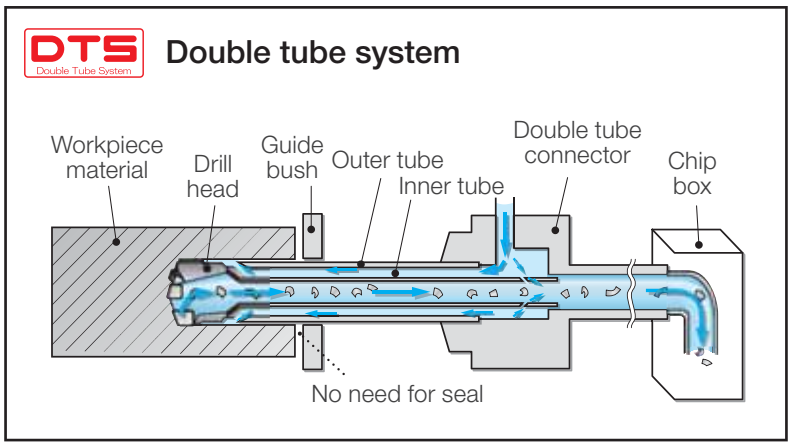
Single Tube System (STS)

The STS is also referred to as the BTA system in the deep hole drilling process.
A large volume of coolant is pumped under high pressure to the cutting area in the workpiece.
Chips are then forced out through the drill tube at the back and do not touch the workpiece providing an outstanding surface finish. STS is a stable method to create holes with high accuracy by using a dedicated drilling machine and a sealing with the workpiece.



Double Tube System (DTS)

The DTS is characterized by its two tube construction and is therefore known as the double tube system. A sealing system and pressure head, which is required in the Single Tube System (STS), is not necessary for the DTS and it is therefore suitable for conventional general purpose machines such as lathes or machining centers.
In general, because of less efficient chip evacuation than the STS, the recommended max drilling depth is 1000mm. The unique DTC-R tube connector that is capable of supplying high pressure coolant can, however, successfully achieve drilling depths of up to 2000mm.



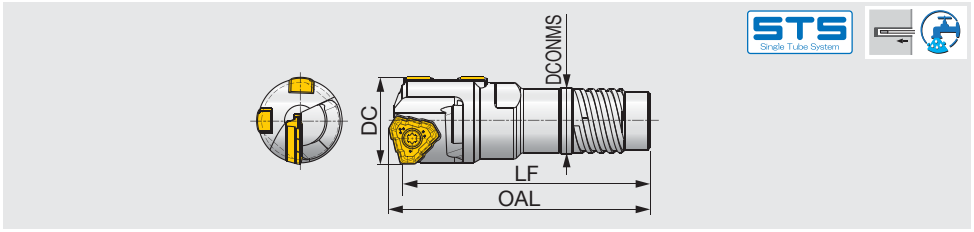
TRI-FINE

ø16 mm - ø28 mm

TRI-FINE STS

TRI-FINE STS-EX

Indexable head with external quadruple thread for single tube system (STS)

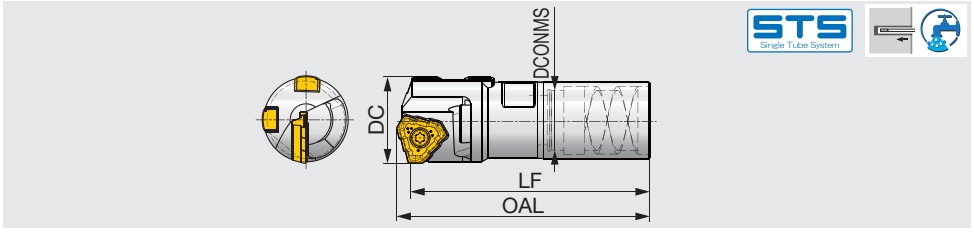


Designation	DC	Drill tube		OAL	LF	DCONMS	Insert	Guide pad
		Designation	Dia. (mm)					
FNTR-0097S-16.00	16	ST0097	14	57	55	12.6	TOHT08...	GP06-075, GP06-20-075-DC
FNTR-0098S-17.00	17	ST0098	15	57	55	13.6	TOHT08...	GP06-075, GP06-20-075-DC
FNTR-0000S-20.00	20	ST0000	17	59	56	15.5	TOHT09...	GP06-085, GP06-20-085-DC
FNTR-00S-21.00	21	ST00	18	63	60	16	TOHT10...	GP06-085, GP06-20-085-DC
FNTR-01S-22.00	22	ST01	20	69	65.5	18	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-01S-24.00	24	ST01	20	69	65.5	18	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-02S-25.00	25	ST02	22	69	65.5	19.5	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-02S-25.40	25.4	ST02	22	69	65.5	19.5	TOHT12...	GP06, GP06-20-120-DC
FNTR-02S-26.00	26	ST02	22	69	65.5	19.5	TOHT12...	GP06, GP06-20-120-DC
FNTR-03S-28.00	28	ST03	24	69	65.5	21	TOHT12...	GP06, GP06-20-120-DC

TRI-FINE STS

TRI-FINE STS-IN

Indexable head with internal single thread for single tube system (STS)

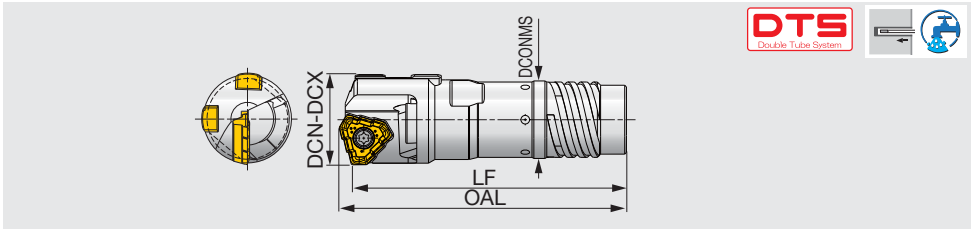


Designation	DC	Drill tube		OAL	LF	DCONMS	Insert	Guide pad
		Designation	Dia. (mm)					
FNTR-13N-1-16.00	16	UB13-1	13	55.5	53.5	10.8	TOHT08...	GP06-075, GP06-20-075-DC
FNTR-14N-2-18.00	18	UB14-2	14	55.5	53.5	12.1	TOHT08...	GP06-075, GP06-20-075-DC
FNTR-18N-20.00	20	UB18	18	61	58	14.5	TOHT09...	GP06-085, GP06-20-085-DC
FNTR-20N-22.00	22	UB20	20	63.5	60	16	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-20N-24.00	24	UB20	20	63.5	60	16	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-22N-25.00	25	UB22	22	63.5	60	17	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-22N-26.00	26	UB22	22	68.5	65	17	TOHT12...	GP06, GP06-20-120-DC
FNTR-24N-28.00	28	UB24	24	68.5	65	19	TOHT12...	GP06, GP06-20-120-DC

Reference pages: Inserts → 012, Guide pads → 013, Standard cutting conditions → 014, Drill tube (STS) → 054 -

TRI-FINE DTS-EX

Indexable head with external quadruple thread for double tube system (DTS)



Designation	DCN	DCX	Outer tube		OAL	LF	DCONMS	Insert	Guide pad
			Designation	Dia. (mm)					
FNTR-00D-xx.xx	18.40	20.00	OT00	18	62	59	16	TOHT09...	GP06-085, GP06-20-085-DC
FNTR-01D-xx.xx	20.01	21.00	OT01	19.5	66.5	63.5	18	TOHT10...	GP06-085, GP06-20-085-DC
FNTR-01D-xx.xx	21.01	21.80	OT01	19.5	66.5	63.5	18	TOHT10...	GP06-100, GP06-20-100-DC
FNTR-02D-xx.xx	21.81	21.99	OT02	21.5	66.5	63.5	19.5	TOHT10...	GP06-100, GP06-20-100-DC
FNTR-02D-xx.xx	22.00	24.10	OT02	21.5	69	65.5	19.5	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-03D-xx.xx	24.11	25.00	OT03	23.5	69	65.5	21	TOHT11...	GP06-100, GP06-20-100-DC
FNTR-03D-xx.xx	25.01	26.40	OT03	23.5	71	67.5	21	TOHT12...	GP06, GP06-20-120-DC
FNTR-04D-xx.xx	26.41	28.00	OT04	26	74	70.5	23.5	TOHT12...	GP06, GP06-20-120-DC

e.g. Designation for tool diameter ø20 mm: FNTR-00D-20.00

INSERT SPARE PARTS

Designation	Screw	Wrench
TOHT08...	CSTB-2.5S	T-8F
TOHT09...	CSTB-2.5S	T-8F
TOHT10...	CSTB-3S	T-9F
TOHT11...	CSTB-3.5H	T-15F
TOHT12...	CSTB-4S	T-15F

GUIDE PAD SPARE PARTS

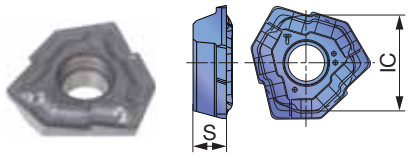
Designation	Screw	Wrench
GP06-075	CSTB-2.2S	T-7F
GP06-085, GP06-20-085-DC	CSTB-2.2S	T-7F
GP06-100, GP06-20-100-DC	CSTB-2.2S	T-7F
GP06, GP06-20-120-DC	CSTB-2.2S	T-7F

Recommended clamping torque: CSTB-2.2S = 1 N·m, CSTB-2.5S/CSTB-3S = 2.3 N·m, CSTB-3.5H/CSTB-4S = 3 N·m

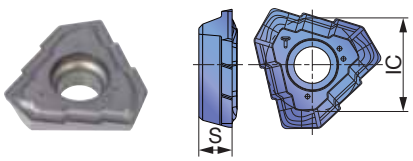
Reference pages: Inserts → 012, Guide pads → 013, Standard cutting conditions → 014, Drill tube (DTS) → 058

INSERT

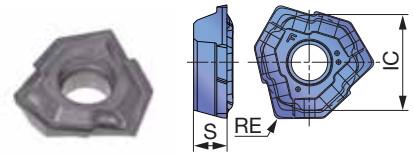
TOHT-NDJ (08...)



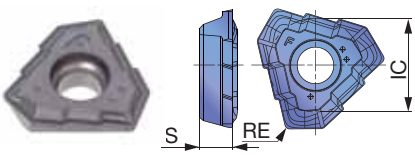
TOHT-NDJ (09... - 12...)



TOHT-NDL (08...)



TOHT-NDL (09... - 12...)



P	Steel	★
M	Stainless	★
K	Cast iron	★
N	Non-ferrous	★
S	Superalloys	★
H	Hard materials	★

★ : First choice
☆ : Second choice

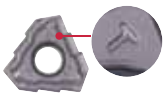
Designation	DCN	DCX	Coated	IC	S	RE
			AH725			
TOHT080305R-NDJ	16	18	●	8.55	2.8	-
TOHT090305R-NDJ	18.01	20	●	8.32	3	-
TOHT100305R-NDJ	20.01	21.99	●	9.23	3.3	-
TOHT110405R-NDJ	22	25	●	10.4	3.8	-
TOHT120405R-NDJ	25.01	28	●	11.59	4.3	-
TOHT080305R-NDL	16	18	●	8.55	2.8	0.5
TOHT090305R-NDL	18.01	20	●	8.32	3	0.5
TOHT100305R-NDL	20.01	21.99	●	9.23	3.3	0.5
TOHT110405R-NDL	22	25	●	10.4	3.8	0.5
TOHT120405R-NDL	25.01	28	●	11.59	4.3	0.5

●: Line up
Package quantity = 10 pcs.

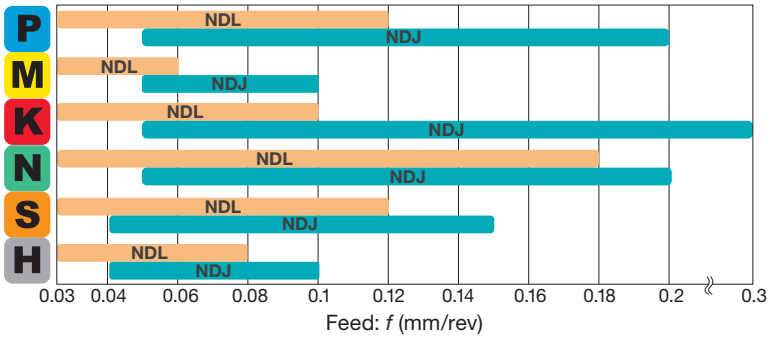
ISO classifications for Insert grades

	Grade	ISO area						
		10	15	20	25	30	35	40
P	AH725		■	■	■	■		
M	AH725			■	■	■		
K	AH725		■	■	■			
N	AH725		■	■	■			
S	AH725		■	■	■			
H	AH725			■	■	■		

Identifications for NDL and NDJ geometries

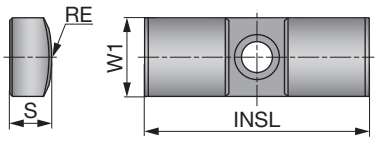
Chipbreaker	NDL	NDJ
Cutting edge strength	Strong	Very strong
ID on insert		

Recommended feed rates

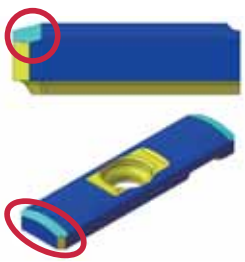


GUIDE PAD

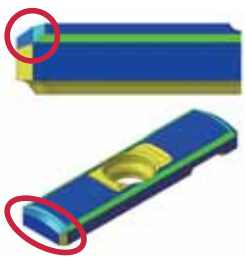
GP06



Single chamfer



Double chamfer (-DC)



Designation	DCN	DCX	Coated				W1	INSL	S	RE
			F1122	F2122	FH3125	FH3135				
GP06-075	16	18	▲	▲			6	20	3	7.5
GP06-20-075-DC	16	18				●	6	20	3	7.5
GP06-20-085-DC	18.01	21			●	●	6	20	3	8.5
GP06-085	18.01	21	▲	▲			6	20	3	8.5
GP06-20-100-DC	21.01	25			●	●	6	20	3	10
GP06-100	21.01	25	▲	▲			6	20	3	10
GP06-20-120-DC	25.01	28			●	●	6	20	3	12
GP06	25.01	28	▲	▲			6	20	3	12

●: To be released in 2020
●: Line up
▲: To be discontinued
Package quantity = 5 pcs.

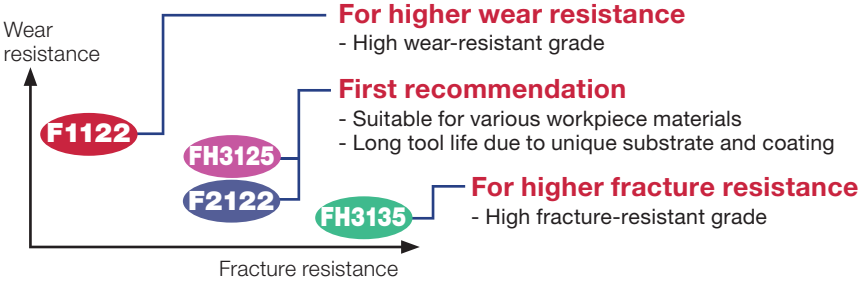
Grade recommendations

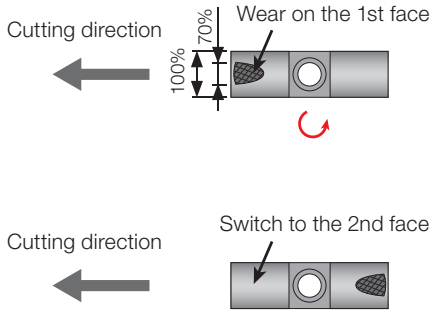
ISO	Oil coolant			Water based coolant		
	First choice	Second choice	Third choice	First choice	Second choice	Third choice
P	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
M	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-
K	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
N	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
S	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-
H	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-

Replacing guide pads

Guide pads are subject to wear, like inserts

- The guide pad can be used on two end faces.
- When the first face wears up to 70% of its width, reverse the guide pad to use the second face.
- Replace with a new guide pad when the second face wears out.





GP	06-085	F2122
Series	Size and RE	Grade

GP	06-20-085-DC	FH3135
Series	Size and RE	Grade

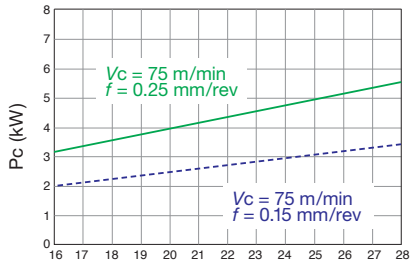
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Priority	Chip-breaker	Cutting speed *Vc* (m/min)	Feed: *f* (mm/rev)	
					ø16 - ø18	ø18.01 - ø28
P	Low carbon steel (C < 0.3) SS400, SM490, S25C, etc. St42-1, St52-3, C25, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.1	0.03 - 0.1
		First choice	NDJ	80 - 140	0.05 - 0.1	0.05 - 0.1
	Carbon steel (C > 0.3) S45C, S55C, etc. C45, C55, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.1	0.03 - 0.12
		First choice	NDJ	80 - 140	0.05 - 0.16	0.05 - 0.2
	Low alloy steel (C < 0.3) SCM415, etc. 18CrMo4, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.1	0.03 - 0.1
		First choice	NDJ	80 - 140	0.05 - 0.1	0.05 - 0.1
	Alloy steel (C > 0.3) SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.1	0.03 - 0.12
		First choice	NDJ	80 - 120	0.05 - 0.16	0.05 - 0.2
M	Stainless steel (Austenitic) SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.06	0.03 - 0.06
		First choice	NDJ	60 - 100	0.05 - 0.1	0.05 - 0.1
	Stainless steel (Martensitic, Ferritic) SUS430, SUS416, etc. X6Cr17, X12CrS13, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.06	0.03 - 0.06
		First choice	NDJ	60 - 100	0.05 - 0.1	0.05 - 0.1
	Stainless steel (Precipitation hardening) SUS630, etc. X5CrNiCuNb16-4, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.06	0.03 - 0.06
		First choice	NDJ	60 - 100	0.05 - 0.1	0.05 - 0.1
K	Grey cast iron FC250, etc. 250, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.15	0.05 - 0.18
		First choice	NDJ	80 - 140	0.05 - 0.25	0.05 - 0.3
	Ductile cast iron FCD700, etc. 700-2, etc.	For low feed machines	NDL	50 - 100	0.03 - 0.15	0.05 - 0.18
		First choice	NDJ	80 - 140	0.05 - 0.25	0.05 - 0.3
N	Aluminium alloys	For low feed machines	NDL	80 - 160	0.03 - 0.15	0.03 - 0.15
		First choice	NDJ	100 - 200	0.05 - 0.2	0.05 - 0.2
S	Heat-resistant alloys Inconel 718, etc.	For low feed machines	NDL	20 - 50	0.03 - 0.06	0.03 - 0.08
		First choice	NDJ	20 - 50	0.04 - 0.08	0.04 - 0.1
	Titanium alloys Ti-6Al-4V, etc.	For low feed machines	NDL	30 - 60	0.03 - 0.1	0.03 - 0.12
		First choice	NDJ	30 - 60	0.05 - 0.13	0.05 - 0.15
H	Hardened steel ≥ 40HRC	For low feed machines	NDL	40 - 100	0.03 - 0.08	0.03 - 0.08
		First choice	NDJ	50 - 100	0.04 - 0.08	0.04 - 0.1

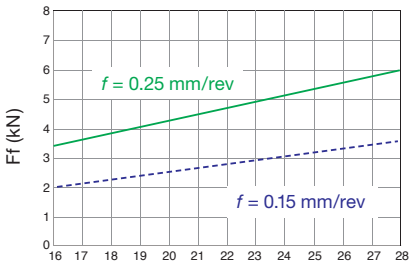
Cutting parameters shown here are relating to the basic recommendations for cutting materials given.
Cutting conditions, material hardness, and other relevant variables must be taken into considerations to determine the actual cutting parameters.

Machine setting for single tube system

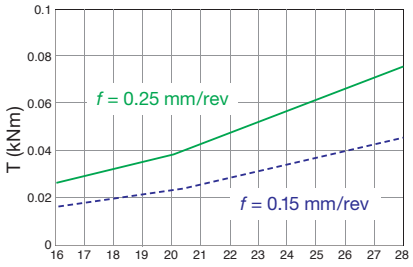
Net power



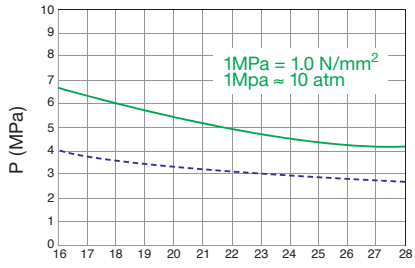
Feed force



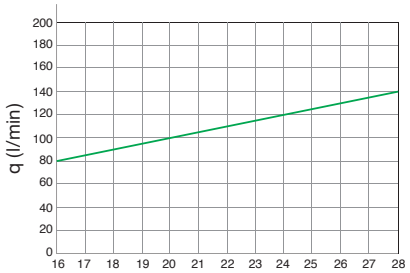
Torque



Coolant pressure

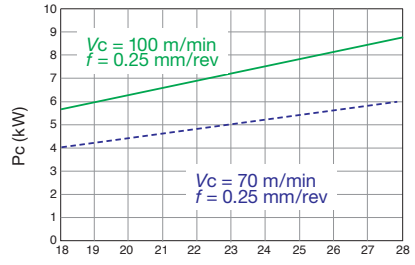


Coolant volume

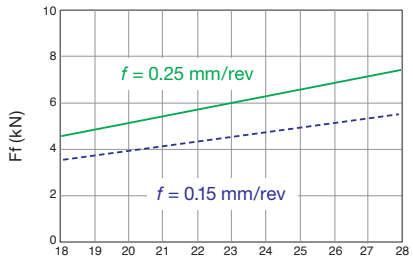


Machine setting for double tube system

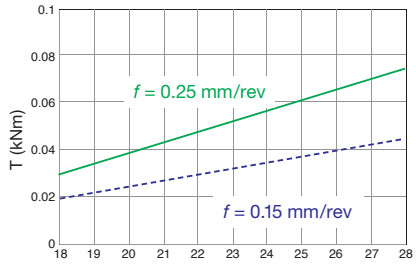
Net power



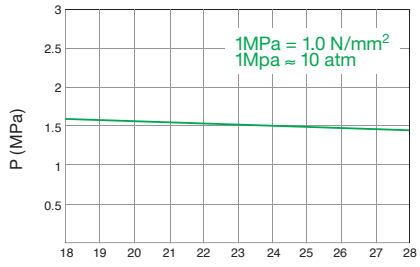
Feed force



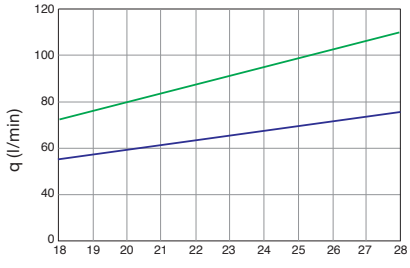
Torque



Coolant pressure



Coolant volume

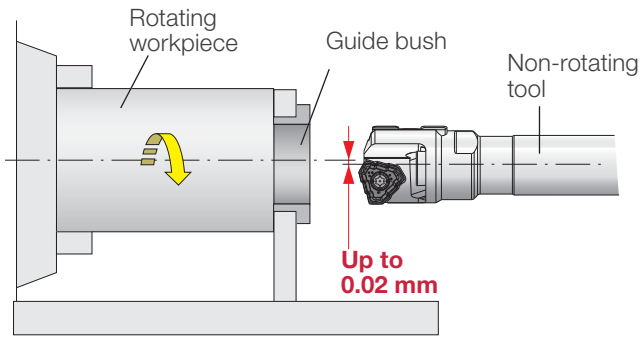


The above values should not be used as the exact recommendations. They may need modification depending on the machining conditions, materials, etc.

Machine setup

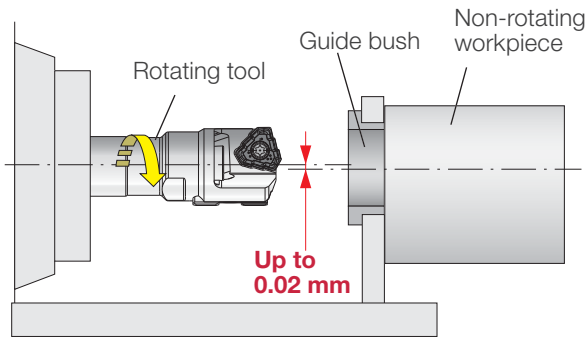
STS and DTS

Workpiece rotating system



- Only used when the workpiece and the tool axis are on the same line.
- Better hole straightness and wear resistance on guide bush are provided compared to the tool-rotating system.
- Keep the alignment between guide bush and spindle within 0.02 mm.

Tool rotating system



- Can be used when the workpiece and the tool axis are not on the same line.
- Keep the alignment between guide bush and spindle within 0.02 mm.

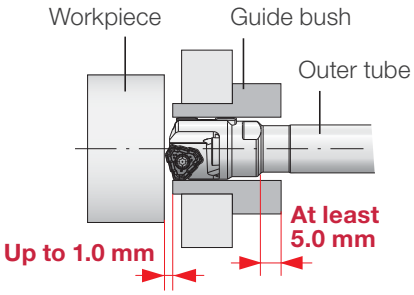
DTS

Positioning of outer tube and guide bush

Be sure to set the outer tube more than 5.0 mm into the guide bush to properly supply the coolant.

Positioning of workpiece material and guide bush

Sealing is not required for DTS because of the vacuum effect, but keep the gap between workpiece material and guide bush within 1.0 mm.



Guide bush

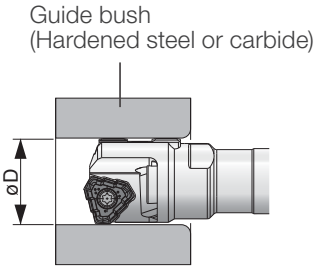
Tolerance

Guide bush tolerance should be G6 in order to keep consistent tool life and cutting accuracy. Diameters for G6 tolerance are shown on the right.

øD (mm)	G6 tolerance (mm)
16.00 - 18.00	+0.006 - +0.017
18.01 - 28.00	+0.007 - +0.020

Material

Guide bush material	System	Advantage
Hardened steel	Workpiece rotating	Economical
Carbide	Tool rotating Workpiece rotating	Long life of guide bush



Coolant

Temperature

The proper coolant temperature is 30 - 40 °C (90 - 100 °F).
If the temperature exceeds this range, the coolant will deteriorate easily and may shorten tool life and generate poor surface finish.

Filtration

The coolant must be filtered properly in order to protect guide pads and workpiece surface.

Water-soluble type

Around 10% (dilution rate 1/10) is recommended for the concentration of water-soluble coolant in order to protect guide pads.

Coolant

Successful deep hole drilling is achieved by an optimal combination of the tool, the machine, and the coolant. Coolant plays an essential role in achieving secure and cost-efficient deep hole drilling operations. Therefore, it is very important to choose the correct type of coolant and use it appropriately.

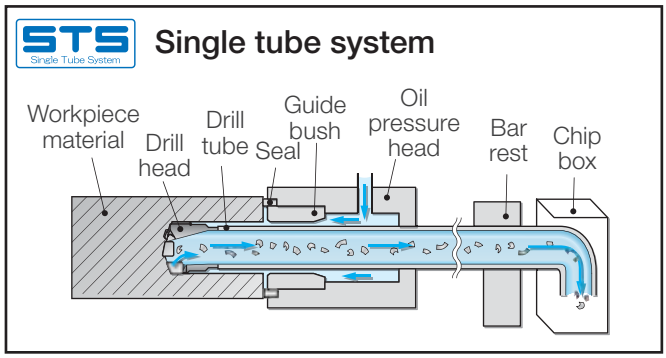
Coolant

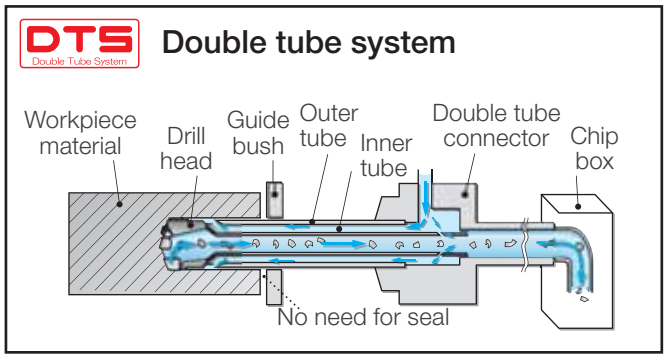
Coolant plays an essential role in lubricating tools, cooling cutting edges, chips, and guide pads, as well as evacuating chips when drilling. It also improves tool life, surface finish, and cutting accuracy when continuously supplied during the machining process.

1) Lubrication
Lubrication of cutting edges and guide pads is necessary in deep hole drilling. For efficient lubrication, it is recommended to use EP (Extreme Pressure) additives which contain sulfur or chlorine.

2) Temperature reduction
The ability to cool down the cutting edge and chips depends on such characteristics as thermal conductivity and relative heat. Coolant with good cooling ability increases tool life, but water-soluble coolant is not preferred in deep hole drilling because it reduces effectiveness. If water-soluble coolant is used, the recommended concentration is 10% (dilution rate 1/10) or more.

3) Chip evacuation
Coolant helps push chips through the back end of the boring bar (for STS) or inner tube (for DTS) until the chips are separated from the workpiece in general cutting conditions. The flow and the pressure of coolant are also important in order to control chip evacuation.





Coolant unit

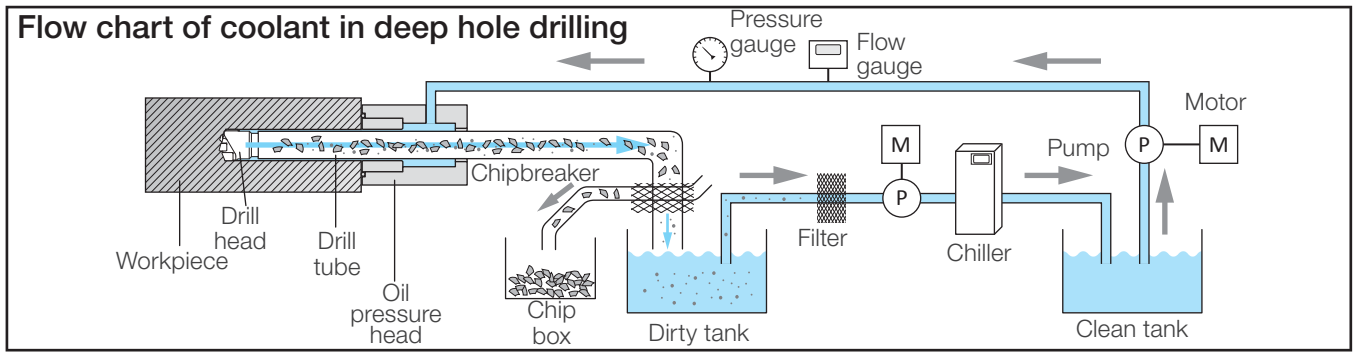
A coolant unit is also important to obtain the best effect from the coolant.

1) Coolant pressure and volume should be fixed and continuous.
An ideal coolant unit is the one which can set any valve of coolant pressure and volume and monitor the condition with gauges. A system that can detect trapped chips by a pressure gauge, and the screw pumps with an inverter controller are both recommended.

2) Coolant temperature should be maintained.
Coolant is heated by factors, such as:
- Cutting edge
- Friction on guide pad
- Contact time of heated chips and coolant
- Pump

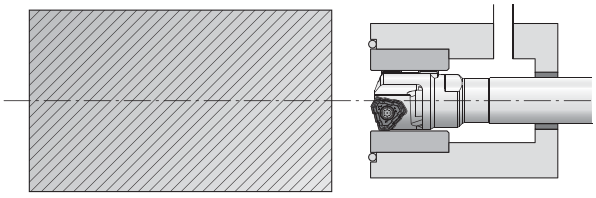
Maintaining coolant temperature is important to keeping stable cutting conditions, chip formation, and cutting accuracy. The temperature should be lower than 40 °C (100 °F) for EP additives to provide sufficient lubrication. Therefore, the coolant temperature should be kept between 30 - 40 °C (90 - 100 °F) throughout the cutting operation.

3) Filtering
Unwanted particles are contained in coolant after the cutting operations, thus filtration is necessary to remove them. The filter size should be selected carefully to catch particles but not EP additives. Filter size depends on the coolant, but around 10 - 20 µm is generally suggested. For iron-based workpieces, a magnetic separator is helpful as it decreases the frequency of filter maintenance.

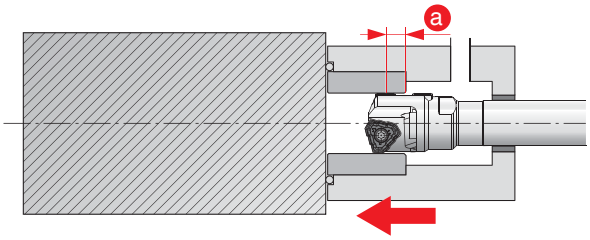


CNC drilling cycle operations

Use the CNC drilling cycle as instructed below in order to optimize the tool performance safely.

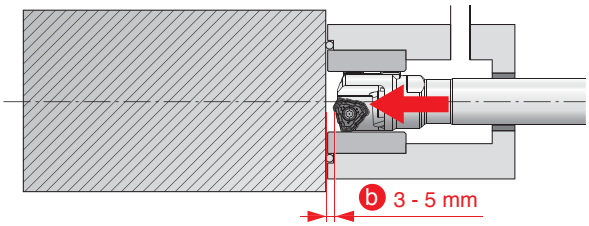


1. Start the CNC cycle operation



2. Move the oil pressure head and securely seal onto the face of the workpiece.

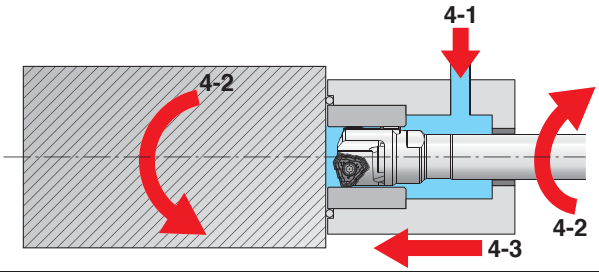
a Make sure to position the drill so that the guide pads remain inside the guiding bush when the pressure head is moved towards the workpiece face.



3. Move the BTA drill toward the workpiece

b Keep the drill 3 - 5 mm* off the face of the workpiece.

* If the machine allows this drill setting in Step 1, move on to Step 4.

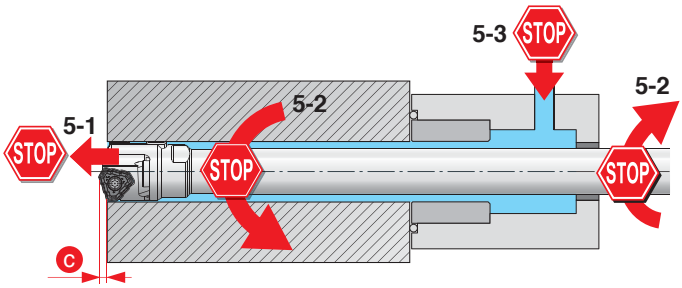


4. Start the cutting

4-1 Activate the coolant supply.

4-2 Start the rotation (of the drill, the workpiece, or the drill+workpiece).

4-3 Start the drill feed.



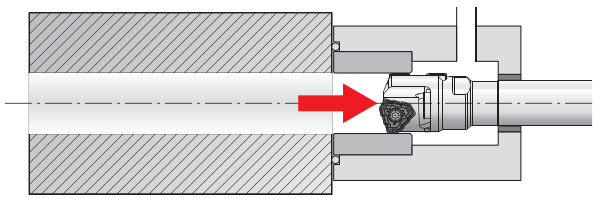
5. Stop the cutting

5-1 Stop the drill feed.

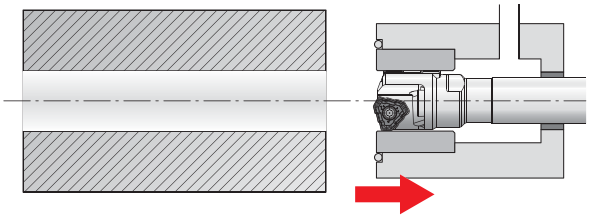
5-2 Stop the rotation.

5-3 Stop the coolant supply.

c Stop the cutting when the drill shoulder is completely through the end face of the workpiece.



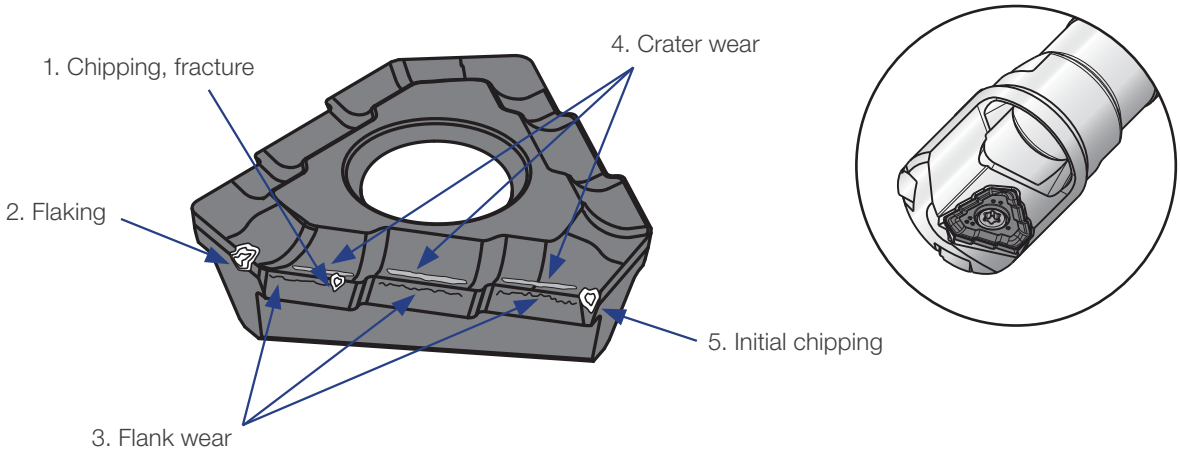
6. Return the drill to the starting point



7. Return the oil pressure head to the starting point

Troubleshooting for insert wear

Examples of trouble with cutting edge



Problem	Cause	Solution	
		Grade	Cutting conditions / other
Chipping, fracture	- Excessive vibration or impact - Torn away built-up edge	- Use a tough grade	- Reduce the feed rate - Eliminate the vibration
Flaking	- Excessive vibration or impact	- Use a tough grade	- Reduce the feed rate - Eliminate the vibration
Flank wear	- Cutting speed too high - Inadequate tool toughness	- Use a grade with high wear resistance - Use a coated grade	- Reduce the cutting speed - Reduce the feed rate - Use coolant properly
Crater wear	- Cutting speed too high - Feed rate too high - Inadequate tool toughness	- Use a grade with high wear resistance - Use a coated grade	- Reduce the cutting speed - Reduce the feed rate - Use coolant properly
Initial chipping	- Inappropriate guide bush or pilot hole - Misalignment	- Use a tough grade	- Adjust or change the guide bushing or pilot hole - Reduce the feed rate - Correct the misalignment

Cutting condition and chip form

Chip form in deep hole drilling

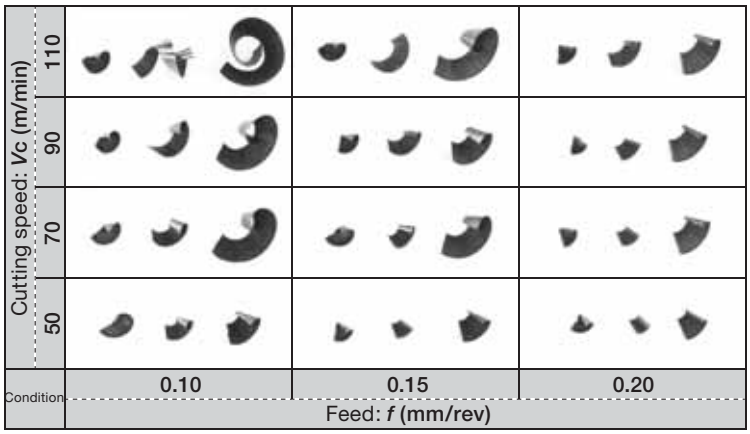
Chip form plays a key role in STS (Single tube system) and DTS (Double tube system) while large-volume and high-pressure coolant do so as well. Because chips are removed through the tube with coolant, proper chip formation is essential for smooth and steady evacuation.

How to decide the chip form

Generally, chip length should be 3 - 4 times its width, but tends to be longer with difficult-to-cut materials. In that case, chip evacuation will be improved by making chips thinner, usually by reducing the feed rate.
The graph below shows chip formation for different cutting speeds and feeds. Short chips are created by reducing the cutting speed or increasing the feed.

Chip formation

Chip formation is affected by multiple factors, such as workpiece material, chipbreaker geometry, cutting speed, feed, type of coolant, and coolant temperature. Suitable chip formation depends on cutting operation but is controllable by changing the cutting conditions.



Workpiece material: Low alloy steel (AISI4340)

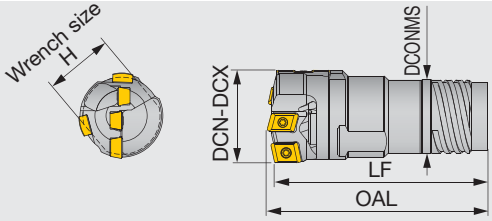
FINE-BEAM

ø25 mm - ø65 mm

FINE-BEAM STS

FINE-BEAM STS-EX

Direct mount indexable head with external quadruple thread for single tube system (STS), tool diameter: ø25 - ø65 mm



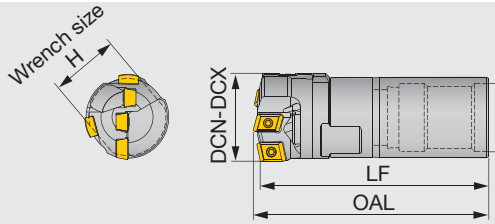
Designation	DCN	DCX	Drill tube		Drill head			
			Designation	Dia. (mm)	OAL	LF	DCONMS	H
FNBM-02S-xx.xx	25.00	26.40	ST02	22	73	70	19.5	22
FNBM-03S-xx.xx	26.41	28.70	ST03	24	73	70	21	23
FNBM-04S-xx.xx	28.71	31.00	ST04	26	78	75	23.5	24
FNBM-05S-xx.xx	31.01	33.30	ST05	28	78	75	25.5	27
FNBM-06S-xx.xx	33.31	36.20	ST06	30	83	80	28	29
FNBM-07S-xx.xx	36.21	39.60	ST07	33	93	90	30	32
FNBM-08S-xx.xx	39.61	43.00	ST08	36	99	95	33	35
FNBM-09S-xx.xx	43.01	47.00	ST09	39	104	100	36	38
FNBM-10S-xx.xx	47.01	51.70	ST10	43	104	100	39	41
FNBM-11S-xx.xx	51.71	56.20	ST11	47	114	110	43	46
FNBM-12S-xx.xx	56.21	60.60	ST12	51	120	115	47.5	50
FNBM-13S-xx.xx	60.61	65.00	ST13	56	120	115	51	55

e.g. Designation for tool diameter ø30.00 mm : FNBM-04S-30.00

FINE-BEAM STS

FINE-BEAM STS-IN

Direct mount indexable head with internal single thread for single tube system (STS), tool diameter: ø25 - ø65 mm



Designation	DCN	DCX	Drill tube		Drill head			
			Designation	Dia. (mm)	OAL	LF	DCONMS	H
FNBM-22N-xx.xx	25.00	26.99	UB22	22	73	70	20	19
FNBM-24N-xx.xx	27.00	28.70	UB24	24	73	70	22	21
FNBM-24N-xx.xx	28.71	29.99	UB24	24	73	70	22	24
FNBM-26N-xx.xx	30.00	31.99	UB26	26	78	75	24	24
FNBM-28N-xx.xx	32.00	33.99	UB28	28	78	75	26	26
FNBM-30N-xx.xx	34.00	36.99	UB30	30	93	90	27	28
FNBM-33N-xx.xx	37.00	39.99	UB33	33	98	95	30	30
FNBM-36N-xx.xx	40.00	43.00	UB36	36	104	100	33	32
FNBM-36N-xx.xx	43.01	43.99	UB36	36	104	100	33	36
FNBM-39N-xx.xx	44.00	46.99	UB39	39	109	105	37	36
FNBM-43N-xx.xx	47.00	51.99	UB43	43	109	105	41	36
FNBM-47N-xx.xx	52.00	56.99	UB47	47	114	110	44	46
FNBM-51N-xx.xx	57.00	60.60	UB51	51	120	115	49	46
FNBM-51N-xx.xx	60.61	60.99	UB51	51	120	115	49	50
FNBM-56N-xx.xx	61.00	65.00	UB56	56	120	115	53	54

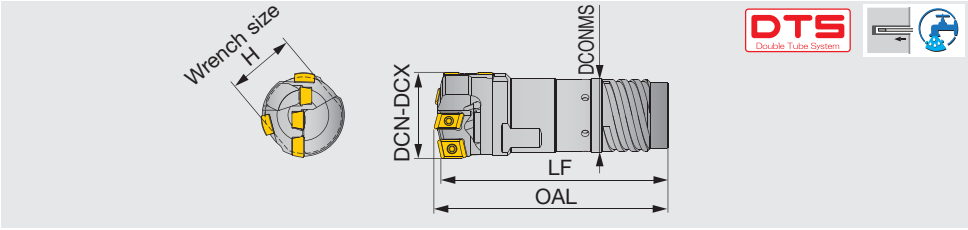
e.g. Designation for tool diameter ø30.00 mm : FNBM-26N-30.00

Reference pages: Spare parts → 024, Inserts → 026 - 027, Guide pads → 028, Standard cutting conditions → 029, Drill tube (STS) → 054 -

FINE-BEAM DTS

FINE-BEAM DTS-EX

Direct mount indexable head with external quadruple thread for double tube system (DTS), tool diameter: ø25 - ø65 mm



Designation	DCN	DCX	Outer tube		Drill head			
			Designation	Dia. (mm)	OAL	LF	DCONMS	H
FNBM-03D-xx.xx	25.00	26.40	OT03	23.5	73	70	21	22
FNBM-04D-xx.xx	26.41	28.70	OT04	26	78	75	23.5	23
FNBM-05D-xx.xx	28.71	31.00	OT05	28	78	75	25.5	24
FNBM-06D-xx.xx	31.01	33.30	OT06	30.5	83	80	28	27
FNBM-07D-xx.xx	33.31	36.20	OT07	33	93	90	30	29
FNBM-08D-xx.xx	36.21	39.60	OT08	35.5	99	95	33	32
FNBM-09D-xx.xx	39.61	43.00	OT09	39	104	100	36	35
FNBM-10D-xx.xx	43.01	47.00	OT10	42.5	104	100	39	38
FNBM-11D-xx.xx	47.01	51.70	OT11	46.5	114	110	43	41
FNBM-12D-xx.xx	51.71	56.20	OT12	51	120	115	47.5	46
FNBM-13D-xx.xx	56.21	60.99	OT13	55.5	120	115	51	50
FNBM-13D-xx.xx	61.00	65.00	OT13	55.5	120	115	51	55

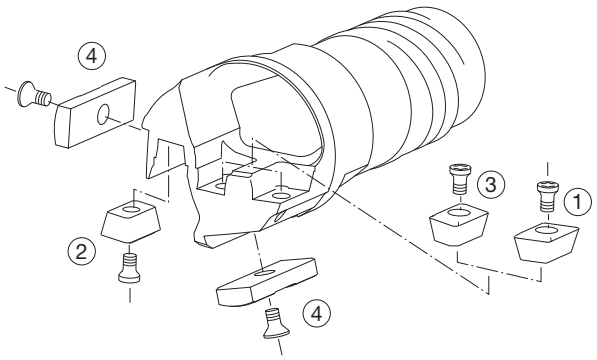
e.g. Designation for tool diameter ø30.00 mm : FNBM-05D-30.00

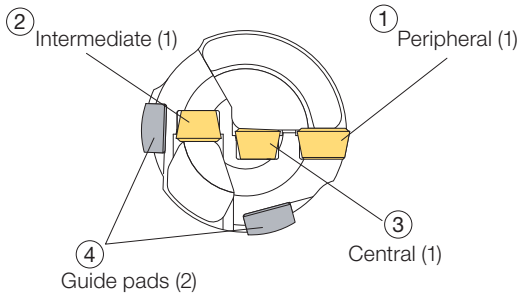
Reference pages: Spare parts → 024, Inserts → 026 - 027, Guide pads → 028, Standard cutting conditions → 029, Drill tube (DTS) → 058

SPARE PARTS

Tool diameter DCN - DCX (mm)	Insert									Guide pad		
	① Peripheral			② Intermediate			③ Central			④		
	Insert	Screw	Wrench	Insert	Screw	Wrench	Insert	Screw	Wrench	Guide pad	Screw	Wrench
25.00 - 28.00	FBH060304R-G-P	CSTB-2.2	T-7F	FBM060304R-G-I	CSTB-2.2	T-7F	FBM060308L-G-C	CSTB-2.2	T-7F	GP06	CSTB-2.2S	T-7F
	FBH060308R-HF-P	CSTB-2.2	T-7F	FBM060304R-HF-I	CSTB-2.2	T-7F	FBM060308L-HF-C	CSTB-2.2	T-7F	GP06	CSTB-2.2S	T-7F
28.01 - 29.99	FBH060304R-G-P	CSTB-2.2	T-7F	FBM060304R-G-I	CSTB-2.2	T-7F	FBM070408L-G-C	SR14-560-HG	T-8F	GP06	CSTB-2.2S	T-7F
	FBH060308R-HF-P	CSTB-2.2	T-7F	FBM060304R-HF-I	CSTB-2.2	T-7F	FBM070408L-HF-C	SR14-560-HG	T-8F	GP06	CSTB-2.2S	T-7F
30.00 - 35.00	FBH080404R-G-P	SR14-560-HG	T-8F	FBM070404R-G-I	SR14-560-HG	T-8F	FBM070408L-G-C	SR14-560-HG	T-8F	GP07	CSTB-3S	T-9F
	FBH080408R-HF-P	SR14-560-HG	T-8F	FBM070404R-HF-I	SR14-560-HG	T-8F	FBM070408L-HF-C	SR14-560-HG	T-8F	GP07	CSTB-3S	T-9F
35.01 - 38.00	FBH080404R-G-P	SR14-560-HG	T-8F	FBM070404R-G-I	SR14-560-HG	T-8F	FBM080408L-G-C	SR14-560-HG	T-8F	GP07	CSTB-3S	T-9F
	FBH080408R-HF-P	SR14-560-HG	T-8F	FBM070404R-HF-I	SR14-560-HG	T-8F	FBM080408L-HF-C	SR14-560-HG	T-8F	GP07	CSTB-3S	T-9F
38.01 - 39.00	FBH090404R-G-P	SR14-560-HG	T-8F	FBM070404R-G-I	SR14-560-HG	T-8F	FBM080408L-G-C	SR14-560-HG	T-8F	GP07	CSTB-3S	T-9F
	FBH090408R-HF-P	SR14-560-HG	T-8F	FBM070404R-HF-I	SR14-560-HG	T-8F	FBM080408L-HF-C	SR14-560-HG	T-8F	GP07	CSTB-3S	T-9F
39.01 - 41.00	FBH090404R-G-P	SR14-560-HG	T-8F	FBM070404R-G-I	SR14-560-HG	T-8F	FBM080408L-G-C	SR14-560-HG	T-8F	GP08	CSTB-3S	T-9F
	FBH090408R-HF-P	SR14-560-HG	T-8F	FBM070404R-HF-I	SR14-560-HG	T-8F	FBM080408L-HF-C	SR14-560-HG	T-8F	GP08	CSTB-3S	T-9F
41.01 - 44.00	FBH090404R-G-P	SR14-560-HG	T-8F	FBM080404R-G-I	SR14-560-HG	T-8F	FBM080408L-G-C	SR14-560-HG	T-8F	GP08	CSTB-3S	T-9F
	FBH090408R-HF-P	SR14-560-HG	T-8F	FBM080404R-HF-I	SR14-560-HG	T-8F	FBM080408L-HF-C	SR14-560-HG	T-8F	GP08	CSTB-3S	T-9F
44.01 - 45.00	FBH090404R-G-P	SR14-560-HG	T-8F	FBM080404R-G-I	SR14-560-HG	T-8F	FBM100408L-G-C	SR14-560-HG	T-8F	GP08	CSTB-3S	T-9F
	FBH090408R-HF-P	SR14-560-HG	T-8F	FBM080404R-HF-I	SR14-560-HG	T-8F	FBM100408L-HF-C	SR14-560-HG	T-8F	GP08	CSTB-3S	T-9F
45.01 - 47.00	FBH090404R-G-P	SR14-560-HG	T-8F	FBM080404R-G-I	SR14-560-HG	T-8F	FBM100408L-G-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
	FBH090408R-HF-P	SR14-560-HG	T-8F	FBM080404R-HF-I	SR14-560-HG	T-8F	FBM100408L-HF-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
47.01 - 51.00	FBH110404R-G-P	SR14-560-HG	T-8F	FBM080404R-G-I	SR14-560-HG	T-8F	FBM100408L-G-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
	FBH110408R-HF-P	SR14-560-HG	T-8F	FBM080404R-HF-I	SR14-560-HG	T-8F	FBM100408L-HF-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
51.01 - 54.00	FBH110404R-G-P	SR14-560-HG	T-8F	FBM100404R-G-I	SR14-560-HG	T-8F	FBM100408L-G-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
	FBH110408R-HF-P	SR14-560-HG	T-8F	FBM100404R-HF-I	SR14-560-HG	T-8F	FBM100408L-HF-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
54.01 - 57.00	FBH110404R-G-P	SR14-560-HG	T-8F	FBM100404R-G-I	SR14-560-HG	T-8F	FBM130408L-G-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
	FBH110408R-HF-P	SR14-560-HG	T-8F	FBM100404R-HF-I	SR14-560-HG	T-8F	FBM130408L-HF-C	SR14-560-HG	T-8F	GP10S	CSTB-3.5	T-15F
57.01 - 60.00	FBH110404R-G-P	SR14-560-HG	T-8F	FBM100404R-G-I	SR14-560-HG	T-8F	FBM130408L-G-C	SR14-560-HG	T-8F	GP12	CSTB-3.5	T-15F
	FBH110408R-HF-P	SR14-560-HG	T-8F	FBM100404R-HF-I	SR14-560-HG	T-8F	FBM130408L-HF-C	SR14-560-HG	T-8F	GP12	CSTB-3.5	T-15F
60.01 - 64.00	FBH130404R-G-P	SR14-560-HG	T-8F	FBM100404R-G-I	SR14-560-HG	T-8F	FBM130408L-G-C	SR14-560-HG	T-8F	GP12	CSTB-3.5	T-15F
	FBH130408R-HF-P	SR14-560-HG	T-8F	FBM100404R-HF-I	SR14-560-HG	T-8F	FBM130408L-HF-C	SR14-560-HG	T-8F	GP12	CSTB-3.5	T-15F
64.01 - 65.00	FBH130404R-G-P	SR14-560-HG	T-8F	FBM130404R-G-I	SR14-560-HG	T-8F	FBM130408L-G-C	SR14-560-HG	T-8F	GP12	CSTB-3.5	T-15F
	FBH130408R-HF-P	SR14-560-HG	T-8F	FBM130404R-HF-I	SR14-560-HG	T-8F	FBM130408L-HF-C	SR14-560-HG	T-8F	GP12	CSTB-3.5	T-15F

Drill heads come with clamping screws and wrenches but do not include inserts and guide pads.
Please purchase inserts and guide pads separately.
Recommended clamping torque: CSTB-2.2/CSTB-2.2S = 1 N·m, SR14-560-HG = 1.2 N·m, CSTB-2.5 = 1.3 N·m, CSTB-3S = 2.3 N·m, CSTB-3.5 = 3.5 N·m





G type chipbreaker	HF type chipbreaker
FBH060304R-G-P	FBH060308R-HF-P
FBH080404R-G-P	FBH080408R-HF-P
FBH090404R-G-P	FBH090408R-HF-P
FBH110404R-G-P	FBH110408R-HF-P
FBH130404R-G-P	FBH130408R-HF-P
FBM060304R-G-I	FBM060304R-HF-I
FBM070404R-G-I	FBM070404R-HF-I
FBM080404R-G-I	FBM080404R-HF-I
FBM100404R-G-I	FBM100404R-HF-I
FBM130404R-G-I	FBM130404R-HF-I
FBM060308L-G-C	FBM060308L-HF-C
FBM070408L-G-C	FBM070408L-HF-C
FBM080408L-G-C	FBM080408L-HF-C
FBM100408L-G-C	FBM100408L-HF-C
FBM130408L-G-C	FBM130408L-HF-C

The designation of insert with G type and HF type is different, even in the same shape.
Please refer to the table on the left to check the insert designation.
Both inserts can be mounted on the drill head.

Caution

The design of Fine-Beam heads is upgraded to eliminate tool damage when retracting the drill from the hole or guide bush.

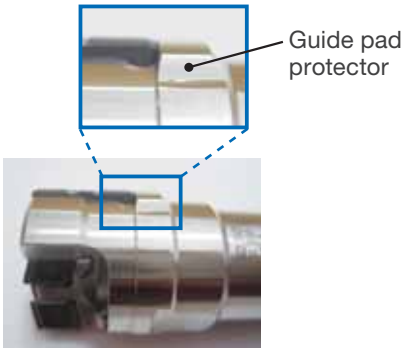
The insert clamping screw for the new drill head has a different thread profile from the conventional version. Always use the correct type of clamping screws as the use of a wrong screw type may cause a tool/machine damage. Please confirm the head type before ordering the screws by checking whether or not the drill head has a guide pad protector:

→ If the drill head has the guide pad protector: **New version**

→ If NO guide pad protector: **Conventional version**

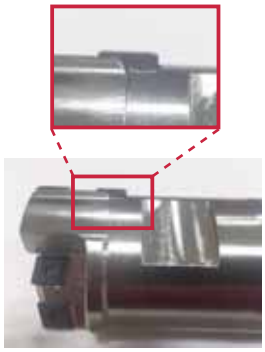
New

With guide pad protector



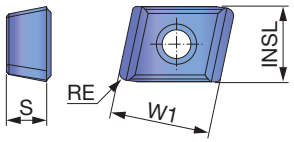
Conventional

Without guide pad protector



Tool diameter DCN - DCX (mm)	Peripheral insert		Intermediate insert		Central insert	
	Screw		Screw		Screw	
	New	Conventional	**New**	Conventional	**New**	Conventional
25.00-28.00	CSTB-2.2	CSTB-2.2	CSTB-2.2	CSTB-2.2	CSTB-2.2	CSTB-2.2
28.01-29.99	CSTB-2.2	CSTB-2.2	CSTB-2.2	CSTB-2.2	CSTB-2.2	CSTB-2.2
30.00-35.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
35.01-38.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
38.01-39.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
39.01-41.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
41.01-44.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
44.01-45.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
45.01-47.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
47.01-51.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
51.01-54.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
54.01-57.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
57.01-60.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
60.01-64.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5
64.01-65.00	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5	**SR14-560-HG**	CSTB2.5

FBM-C (Central insert)



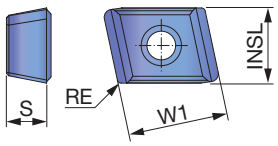
		UC1125	UC2220	UC3120	AH8015
P	Steel	☆	★	☆	☆
M	Stainless		☆	☆	★
K	Cast iron		★	☆	☆
N	Non-ferrous		★		☆
S	Superalloys		☆	☆	★
H	Hard materials		☆		★

★ : First choice
☆ : Second choice

Designation	INSL	W1	Coated				S	DCN	DCX	RE
			UC1125	UC2220	UC3120	AH8015				
FBM060308L-G-C	5.5	8		●	●	●	3	25	28	0.8
FBM060308L-HF-C	5.5	8		●		●	3	25	28	0.8
FBM070408L-G-C	6.5	10	●	●	●	●	4	28.1	35	0.8
FBM070408L-HF-C	6.5	10		●		●	4	28.1	35	0.8
FBM080408L-G-C	8	10	●	●	●	●	4	35.01	44	0.8
FBM080408L-HF-C	8	10		●		●	4	35.01	44	0.8
FBM100408L-G-C	9.5	10	●	●	●	●	4	44.01	54	0.8
FBM100408L-HF-C	9.5	10		●		●	4	44.01	54	0.8
FBM130408L-G-C	12.5	10	●	●	●	●	4	54.01	65	0.8
FBM130408L-HF-C	12.5	10		●		●	4	54.01	65	0.8

●: Line up

FBM-I (Intermediate insert)



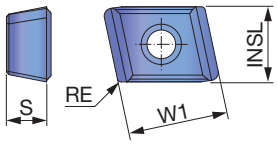
		UC1125	UC2220	UC3120	AH8015
P	Steel	☆	★	☆	☆
M	Stainless		☆	☆	★
K	Cast iron		★	☆	☆
N	Non-ferrous		★		☆
S	Superalloys		☆	☆	★
H	Hard materials		☆		★

★ : First choice
☆ : Second choice

Designation	INSL	W1	Coated				S	DCN	DCX	RE
			UC1125	UC2220	UC3120	AH8015				
FBM060304R-G-I	5.5	8		●	●	●	3	25	29.99	0.4
FBM060304R-HF-I	5.5	8		●		●	3	25	29.99	0.4
FBM070404R-G-I	6.5	10	●	●	●	●	4	30	41	0.4
FBM070404R-HF-I	6.5	10		●		●	4	30	41	0.4
FBM080404R-G-I	8	10	●	●	●	●	4	41.01	51	0.4
FBM080404R-HF-I	8	10		●		●	4	41.01	51	0.4
FBM100404R-G-I	9.5	10	●	●	●	●	4	51.01	64	0.4
FBM100404R-HF-I	9.5	10		●		●	4	51.01	64	0.4
FBM130404R-G-I	12.5	10	●	●	●	●	4	64.01	65	0.4
FBM130404R-HF-I	12.5	10		●		●	4	64.01	65	0.4

●: Line up

FBH-P (Peripheral insert)



P	Steel	★	☆	☆
M	Stainless	☆	☆	★
K	Cast iron	★	☆	☆
N	Non-ferrous	★		☆
S	Superalloys	☆	☆	★
H	Hard materials	☆		★

★ : First choice
☆ : Second choice

Designation	INSL	W1	Coated			S	DCN	DCX	RE
			UC2220	UC3120	AH8015				
FBH060304R-G-P	6	8	●	●		3	25	29.99	0.4
FBH060308R-G-P	6	8	●		●	3	25	29.99	0.8
FBH060308R-HF-P	6	8	●		●	3	25	29.99	0.8
FBH080404R-G-P	7.5	10	●	●		4	30	38	0.4
FBH080408R-G-P	7.5	10	●		●	4	30	38	0.8
FBH080408R-HF-P	7.5	10	●		●	4	30	38	0.8
FBH090404R-G-P	9	10	●	●		4	38.01	47	0.4
FBH090408R-G-P	9	10	●		●	4	38.01	47	0.8
FBH090408R-HF-P	9	10	●		●	4	38.01	47	0.8
FBH110404R-G-P	11	10	●	●		4	47.01	60	0.4
FBH110408R-G-P	11	10	●		●	4	47.01	60	0.8
FBH110408R-HF-P	11	10	●		●	4	47.01	60	0.8
FBH130404R-G-P	13	10	●	●		4	60.01	65	0.4
FBH130408R-G-P	13	10	●		●	4	60.01	65	0.8
FBH130408R-HF-P	13	10	●		●	4	60.01	65	0.8

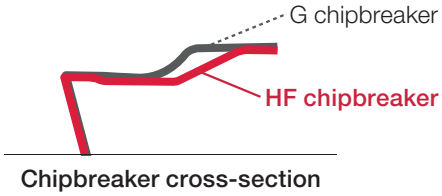
●: Line up

ISO classifications for Insert grades

	Grade	ISO area							
		5	10	15	20	25	30	35	40
P	AH8015			■	■	■	■	■	
	UC1125				■	■	■		
	UC2220			■	■	■	■	■	
	UC3120						■	■	■
M	AH8015		■	■	■	■	■		
	UC1125					■	■	■	
	UC2220		■	■	■	■	■		
	UC3120							■	■
K	AH8015			■	■	■			
	UC2220			■	■	■			
	UC3120				■	■	■		
N	AH8015			■	■	■			
	UC2220			■	■	■			
S	AH8015			■	■	■			
	UC2220			■	■	■			
	UC3120			■	■	■			
H	AH8015				■	■	■		
	UC2220				■	■	■		

Chipbreaker comparison

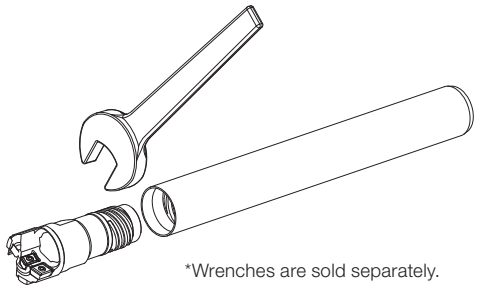
HF - Provides drilling stability at high feed rates



Chipbreaker cross-section

Note for mounting a drill head

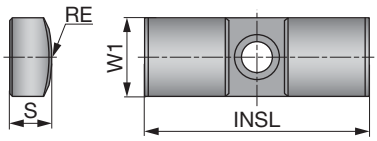
Please be sure to use a wrench for a drill head to be clamped firmly.



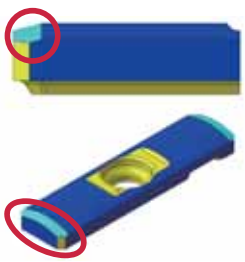
*Wrenches are sold separately.

GUIDE PAD

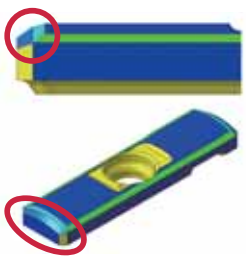
GP06, 07, 08, 10S, 12



Single chamfer



Double chamfer (-DC)



Designation	DCN	DCX	Coated				W1	INSL	S	RE
			F1122	F2122	FH3125	FH3135				
GP06	25	29.99	▲	▲			6	20	3	12
GP06-20-120-DC	25	29.99			●	●	6	20	3	12
GP07	30	39	▲	▲			7	20	3.5	12
GP07-20-120-DC	30	39			●	●	7	20	3.5	12
GP08	39.01	45	▲	▲			8	25	4.5	15.5
GP08-25-155-DC	39.01	45			●	●	8	25	4.5	15.5
GP10S	45.01	57	▲	▲			10	30	4.5	20
GP10-30-200-DC	45.01	57			●	●	10	30	4.5	20
GP12	57.01	65	▲	▲			12	35	5.5	25
GP12-35-250-DC	57.01	65			●	●	12	35	5.5	25

●: To be released in 2020
●: Line up
▲: To be discontinued
Package quantity = 5 pcs.

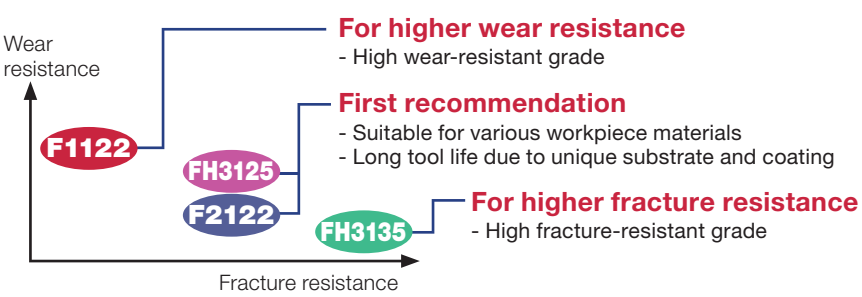
Grade recommendations

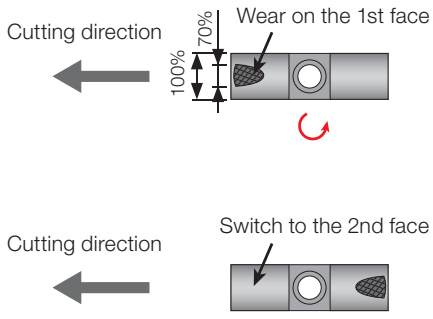
ISO	Oil coolant			Water based coolant		
	First choice	Second choice	Third choice	First choice	Second choice	Third choice
P	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
M	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-
K	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
N	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
S	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-
H	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-

Replacing guide pads

Guide pads are subject to wear, like inserts

- The guide pad can be used on two end faces.
- When the first face wears up to 70% of its width, reverse the guide pad to use the second face.
- Replace with a new guide pad when the second face wears out.





GP	06	F2122
Series	Size	Grade

GP	06-20-120-DC	FH3135
Series	Size and RE	Grade

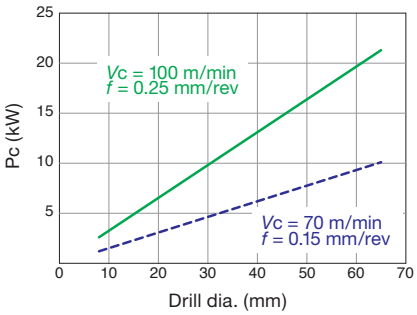
STANDARD CUTTING CONDITIONS

ISO	Workpiece materials				Hard-ness (HB)	Chip-breaker	Cutting speed Vc (m/min)	Feed : fn (mm/rev) Drill dia. (mm) 25.00 - 43.00	43.01 - 65.00
P	Carbon steel Casting steel High carbon steel Carbon tool steel	S10C - S25C, SS	0.10 - 0.25%C	Non-hardened	125	HF	70 - 130	0.11 - 0.41	0.14 - 0.45
					125	G	70 - 130	0.1 - 0.3	0.12 - 0.35
		S25C - S55C	0.25 - 0.25%C	Non-hardened	190	HF	70 - 130	0.11 - 0.41	0.14 - 0.45
					190	G	70 - 130	0.1 - 0.3	0.12 - 0.35
			0.25 - 0.25%C	Hardened and tempered	250	HF	70 - 130	0.11 - 0.41	0.14 - 0.45
					250	G	70 - 130	0.1 - 0.3	0.12 - 0.35
		SK	0.55 - 0.80%C	Non-hardened	220	HF	70 - 130	0.11 - 0.41	0.14 - 0.45
					220	G	70 - 130	0.1 - 0.3	0.12 - 0.35
			0.55 - 0.80%C	Hardened and tempered	300	HF	70 - 130	0.11 - 0.41	0.14 - 0.45
					300	G	70 - 130	0.1 - 0.3	0.12 - 0.35
	Low alloy steel Casting steel (alloying element < 5%)	SNC,DCr,SNCN SCM,SMn		Non-hardened	200	HF	70 - 120	0.11 - 0.41	0.20 - 0.45
					200	G	70 - 120	0.1 - 0.3	0.12 - 0.35
				Hardened and tempered	275	HF	55 - 110	0.11 - 0.41	0.20 - 0.45
					275	G	60 - 120	0.1 - 0.3	0.12 - 0.35
					300	HF	55 - 110	0.11 - 0.41	0.20 - 0.45
					300	G	60 - 120	0.1 - 0.3	0.12 - 0.35
					350	HF	55 - 110	0.11 - 0.41	0.20 - 0.45
					350	G	60 - 120	0.1 - 0.3	0.12 - 0.35
	High alloy steel Casting steel Tool steel	SNS,SKD,SKT SKH,SK		Non-hardened	200	HF	55 - 110	0.11 - 0.38	0.20 - 0.40
					200	G	70 - 130	0.1 - 0.3	0.12 - 0.35
				Hardened and tempered	325	HF	55 - 110	0.11 - 0.38	0.20 - 0.40
					325	G	70 - 130	0.1 - 0.3	0.12 - 0.35
M	Stainless steel	SUS430		Ferritic	200	HF	40 - 110	0.11 - 0.41	0.20 - 0.45
					200	G	70 - 130	0.1 - 0.3	0.12 - 0.35
		SUS410, 420J		Martensite	240	HF	40 - 110	0.11 - 0.41	0.20 - 0.45
					240	G	70 - 130	0.1 - 0.3	0.12 - 0.35
		SUS304, SUS316L		Austenite	180	HF	40 - 110	0.11 - 0.41	0.20 - 0.45
					180	G	70 - 130	0.1 - 0.3	0.12 - 0.35
K	Ductile cast iron	FCD400 - FCD450		Ferritic / Pearlitic	180	HF	50 - 110	0.11 - 0.38	0.24 - 0.41
					180	G	50 - 110	0.1 - 0.25	0.12 - 0.35
		FCD500 - FCD700		Pearlitic	260	HF	50 - 110	0.11 - 0.38	0.24 - 0.41
					260	G	50 - 110	0.1 - 0.25	0.12 - 0.35
	Grey cast iron	FC100 - FC200		Low tensile strength	160	HF	60 - 110	0.11 - 0.38	0.24 - 0.41
					160	G	60 - 110	0.1 - 0.25	0.12 - 0.35
		FC250 - FC350		High tensile strength	250	HF	60 - 110	0.11 - 0.38	0.24 - 0.41
					250	G	60 - 110	0.1 - 0.25	0.12 - 0.35
	Malleable cast iron	FCMB, FCMW		Ferritic	130	HF	80 - 120	0.11 - 0.38	0.24 - 0.41
					130	G	70 - 110	0.1 - 0.25	0.12 - 0.35
		FCMWP, FCMP		Pearlitic	230	HF	80 - 120	0.11 - 0.38	0.24 - 0.41
					230	G	70 - 110	0.1 - 0.25	0.12 - 0.35
N	Aluminium alloys Forging			Non-aged	60	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					60	G	65 - 130	0.1 - 0.25	0.12 - 0.35
				Soluted, Aged	100	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					100	G	65 - 130	0.08 - 0.23	0.12 - 0.27
	Aluminium alloys Casting		≤ 12% Si	Non-aged	75	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					75	G	65 - 130	0.08 - 0.23	0.12 - 0.27
				Soluted, Aged	90	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					90	G	65 - 130	0.08 - 0.23	0.12 - 0.27
			>12% Si	High silicon	130	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					130	G	65 - 130	0.08 - 0.23	0.12 - 0.27
	Copper alloys		>1% Pb	Free cutting copper	110	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					110	G	65 - 130	0.08 - 0.23	0.12 - 0.27
				Brass, Red brass	90	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					90	G	65 - 130	0.08 - 0.23	0.12 - 0.27
				Electrolytic copper	100	HF	65 - 150	0.09 - 0.33	0.24 - 0.35
					100	G	65 - 130	0.08 - 0.23	0.12 - 0.27
S	Nickel-based alloys		Fe base	Non-aged	200	HF	20 - 55	0.09 - 0.30	0.20 - 0.33
					200	G	20 - 50	0.08 - 0.23	0.12 - 0.27
				Soluted, Aged	280	HF	20 - 55	0.09 - 0.30	0.20 - 0.33
					280	G	20 - 50	0.08 - 0.23	0.12 - 0.27
			Ni / Co base	Non-aged	250	HF	20 - 55	0.09 - 0.30	0.20 - 0.33
					250	G	20 - 50	0.08 - 0.23	0.12 - 0.27
				Soluted, Aged	350	HF	20 - 55	0.09 - 0.30	0.20 - 0.33
					350	G	20 - 50	0.08 - 0.23	0.12 - 0.27
				Casted	320	HF	20 - 55	0.09 - 0.30	0.20 - 0.33
					320	G	20 - 50	0.08 - 0.23	0.12 - 0.27
	Titanium alloys		α		Rm400	HF	30 - 60	0.09 - 0.30	0.20 - 0.33
					Rm400	G	30 - 60	0.08 - 0.23	0.12 - 0.27
			α - β		Rm1050	HF	30 - 60	0.09 - 0.30	0.20 - 0.33
					Rm1050	G	30 - 60	0.08 - 0.23	0.12 - 0.27
H	Hardened steel	≥ 40HRC				HF	30 - 60	0.09 - 0.30	0.20 - 0.33
						G	30 - 60	0.08 - 0.23	0.12 - 0.27

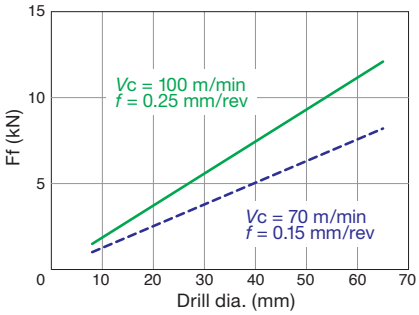
Cutting parameters shown here are relating to the basic recommendations for cutting materials given.
Cutting conditions, material hardness, and other relevant variables must be taken into considerations to determine the actual cutting parameters.

Machine setting for single tube system

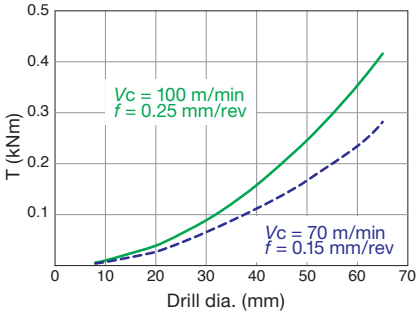
Net power



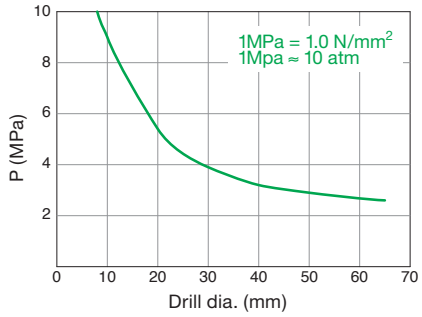
Feed force



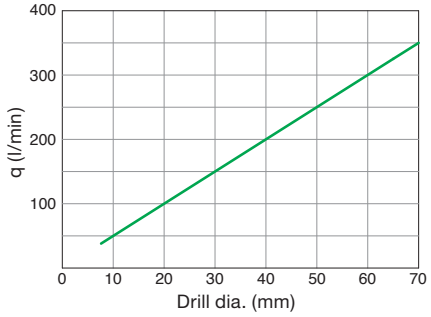
Torque



Coolant pressure

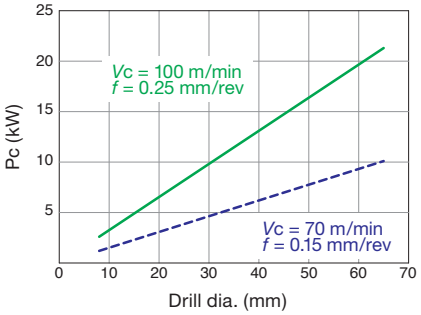


Coolant volume

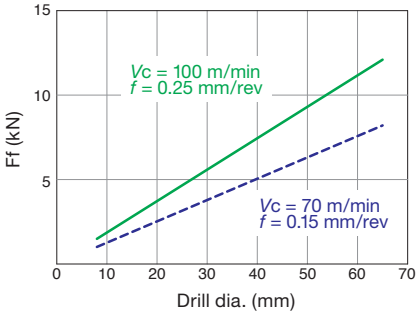


Machine setting for double tube system

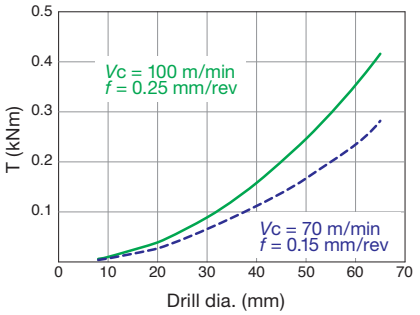
Net power



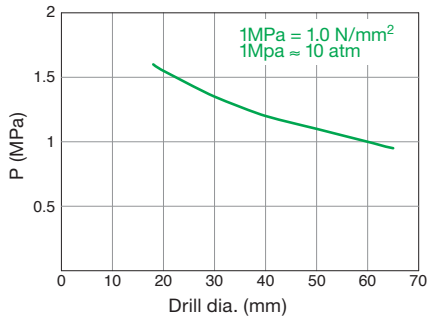
Feed force



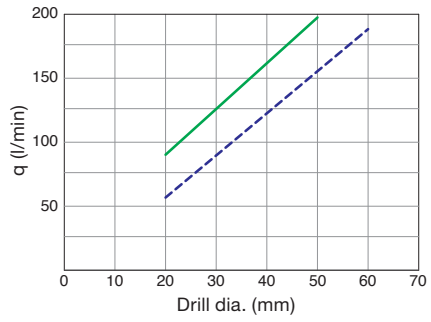
Torque



Coolant pressure



Coolant volume



The above values should not be used as the exact recommendations. They may need modification depending on the machining conditions, materials, etc.

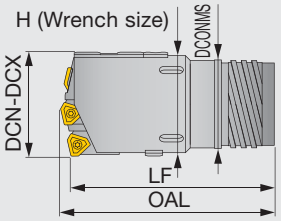
UNIDEX

ø38 mm - ø293.99 mm

UNIDEX STS

UNIDEX STS-EX

Indexable drill head with external quadruple thread for single tube system (STS), diameters adjustable, tool diameter ø38.00 - ø106.99 mm, CICT = 3



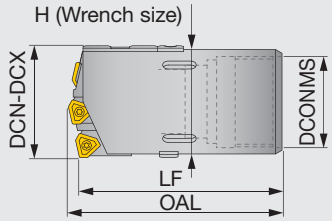
Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUSTS07E-xx.xx	38.00	39.60	3	ST07	33	90	85	30	37
KUSTS08E-xx.xx	39.61	43.00	3	ST08	36	91	85	33	40
KUSTS09E-xx.xx	43.01	47.00	3	ST09	39	101	95	36	43
KUSTS10E-xx.xx	47.01	51.70	3	ST10	43	102	95	39	48
KUSTS11E-xx.xx	51.71	56.20	3	ST11	47	107	100	43	52
KUSTS12E-xx.xx	56.21	60.60	3	ST12	51	118	110	47	57
KUSTS13E-xx.xx	60.61	65.00	3	ST13	56	119	110	51	61
KUSTS14E-xx.xx	65.00	66.99	3	ST14	56	159	150	52	63
KUSTS15E-xx.xx	67.00	72.99	3	ST15	62	159	150	58	69
KUSTS16E-xx.xx	73.00	79.99	3	ST16	68	160	150	63	76
KUSTS17E-xx.xx	80.00	86.99	3	ST17	75	191	180	70	83
KUSTS18E-xx.xx	87.00	99.99	3	ST18	82	193	180	77	96
KUSTS19E-xx.xx	100.00	106.99	3	ST19	94	193	180	89	102

e.g. Designation for tool diameter ø60 mm: KUSTS12E-60.00
Drill heads with the diameter ø92 mm or over have a top guide pocket (filler).
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

UNIDEX STS

UNIDEX STS-IN

Indexable drill head with internal single thread for single tube system (STS), diameters adjustable, tool diameter ø38.00 - ø106.99 mm, CICT = 3



Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUSTS33-xx.xx	38.00	39.99	3	UB33	33	85	80	30	37
KUSTS36-xx.xx	40.00	43.99	3	UB36	36	86	80	33	41
KUSTS39-xx.xx	44.00	46.99	3	UB39	39	96	90	37	43
KUSTS43-xx.xx	47.00	51.99	3	UB43	43	97	90	41	48
KUSTS47-xx.xx	52.00	56.99	3	UB47	47	107	100	44	53
KUSTS51-xx.xx	57.00	60.99	3	UB51	51	118	110	49	57
KUSTS56-xx.xx	61.00	67.99	3	UB56	56	119	110	53	64
KUSTS62-xx.xx	68.00	74.99	3	UB62	62	129	120	59	71
KUSTS68-xx.xx	75.00	80.99	3	UB68	68	161	150	65	77
KUSTS75-xx.xx	81.00	90.99	3	UB75	75	162	150	71	87
KUSTS82-xx.xx	91.00	98.99	3	UB82	82	162	150	79	95
KUSTS94-xx.xx	99.00	106.99	3	UB94	94	163	150	90	102

e.g. Designation for tool diameter ø60 mm: KUSTS51-60.00
Drill heads with the diameter ø92 mm or over have a top guide pocket (filler).
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

Reference pages: Screws, Wrenches → 033, Inserts → 045, Guide pad → 048, Standard cutting conditions → 049, Drill tube (STS) → 054 -

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral insert	Qty	Intermediate insert	Qty	Central insert	Qty
38 - 39.99	NPMX08**R...	1	NPMX08**R...	1	NPMX08**R...	1
40 - 44.99	TPMX14**R...	1	NPMX08**R...	1	NPMX08**R...	1
45 - 47.99	TPMX14**R...	1	NPMX08**R...	1	TPMX14**R...	1
48 - 51.99	TPMX14**R...	1	TPMX14**R...	1	TPMX14**R...	1
52 - 54.99	TPMX17**R...	1	TPMX14**R...	1	TPMX14**R...	1
55 - 57.99	TPMX17**R...	1	TPMX14**R...	1	TPMX17**R...	1
58 - 59.99	TPMX17**R...	1	TPMX17**R...	1	TPMX17**R...	1
60 - 63.99	TPMX17**R...	1	TPMX17**R...	1	TPMX17**R...	1
64 - 67.99	TPMX24**R...	1	TPMX17**R...	1	TPMX17**R...	1
68 - 77.99	TPMX17**R...	1	TPMX24**R...	1	TPMX24**R...	1
78 - 84.99	TPMX24**R...	1	TPMX24**R...	1	TPMX24**R...	1
85 - 91.99	TPMX28**R...	1	TPMX24**R...	1	TPMX24**R...	1
92 - 98.99	TPMX24**R...	1	TPMX28**R...	1	TPMX28**R...	1
99 - 106.99	TPMX28**R...	1	TPMX28**R...	1	TPMX28**R...	1

The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

SPARE PARTS



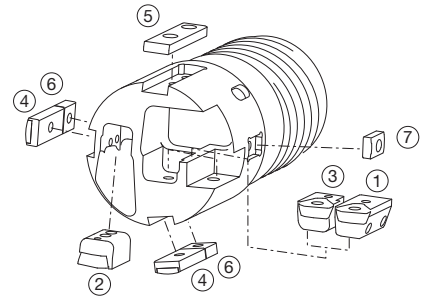


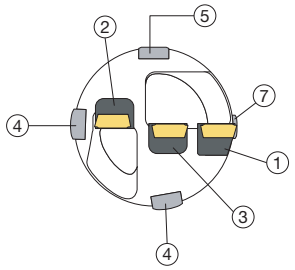


Tool diameter DCN-DCX (mm)	Cartridge			Guide pad							
	Peripheral	Intermediate	Central	Guide pad		Filler		Protector		Sub guide pad	
	Cartridge ①	Cartridge ②	Cartridge ③	④	Qty	⑤	Qty	⑥	Qty	⑦	Qty
38 - 39.99	OZ05R	IOZ05R	IOZ05R	GP08	2	-	-	GPT08	2	CUG08	1
40 - 44.99	OZ402 - 04	IOZ05R	IOZ05R	GP08	2	-	-	GPT08	2	CUG08	1
45 - 47.99	OZ402 - 04	IOZ05R	IOZ402 - 04	GP10	2	-	-	GPT10	2	CUG08	1
48 - 51.99	OZ402 - 04	IOZ402 - 04	IOZ402 - 04	GP10	2	-	-	GPT10	2	CUG08	1
52 - 54.99	OZ402 - 32	IOZ402 - 04	IOZ402 - 04	GP10	2	-	-	GPT10	2	CUG08	1
55 - 57.99	OZ402 - 32	IOZ402 - 04	IOZ402 - 32	GP10	2	-	-	GPT10	2	CUG08	1
58 - 59.99	OZ402 - 32	IOZ402 - 32	IOZ402 - 32	GP10	2	-	-	GPT10	2	CUG08	1
60 - 63.99	OZ402 - 32	IOZ402 - 32	IOZ402 - 32	GP14	2	-	-	GPT14	2	CUG08	1
64 - 67.99	OZ402 - 43	IOZ402 - 32	IOZ402 - 32	GP14	2	-	-	GPT14	2	CUG10	1
68 - 77.99	OZ402 - 32	IOZ402 - 43	IOZ402 - 43	GP14	2	-	-	GPT14	2	CUG10	1
78 - 84.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	GP14	2	-	-	GPT14	2	CUG10	1
85 - 91.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 43	GP14	2	-	-	GPT14	2	CUG10	1
92 - 98.99	OZ402 - 43	IOZ402 - 63	IOZ402 - 63	GP14	2	FILLER14	1	GPT14	2	CUG10	1
99 - 106.99	OZ402 - 63	IOZ402 - 63	IOZ402 - 63	GP18	2	FL18 - M	1	GPT18 - M	2	CUG14 - M	1

SCREWS, WRENCHES (CICT = 3)


Tool diameter DCN-DCX (mm)	Insert screw					
	Peripheral		Intermediate		Central	
	Cartridge ①		Cartridge ②		Cartridge ③	
	Screw	Wrench	Screw	Wrench	Screw	Wrench
38 - 39.99	CSTB-2.2	T-7D	CSTB-2.2	T-7D	CSTB-2.2	T-7D
40 - 44.99	CSTB-2.5	T-8D	CSTB-2.2	T-7D	CSTB-2.2	T-7D
45 - 47.99	CSTB-2.5	T-8D	CSTB-2.2	T-7D	CSTB-2.5	T-8D
48 - 51.99	CSTB-2.5	T-8D	CSTB-2.5	T-8D	CSTB-2.5	T-8D
52 - 54.99	CSTB-3.5D	T-9D	CSTB-2.5	T-8D	CSTB-2.5	T-8D
55 - 57.99	CSTB-3.5D	T-9D	CSTB-2.5	T-8D	CSTB-3.5D	T-9D
58 - 59.99	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D
60 - 63.99	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D
64 - 67.99	CSTB-4M	T-15D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D
68 - 77.99	CSTB-3.5D	T-9D	CSTB-4M	T-15D	CSTB-4M	T-15D
78 - 84.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D
85 - 91.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-4M	T-15D
92 - 98.99	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D
99 - 106.99	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 3)



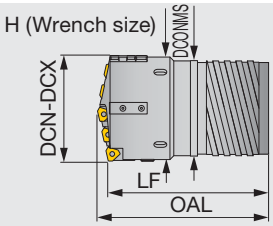

Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ②		Cartridge ③					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
38 - 39.99	LS1803RH	H2	AS0003-5	H1.5	CSTB-3	T-9D	CSTB-3	T-9D	CSTB-3S	T-9D	CSTB-3S	T-9D
40 - 44.99	LS1803.5RH	H2.5	AS0004-8	H2	CSTB-3	T-9D	CSTB-3	T-9D	CSTB-3S	T-9D	CSTB-3S	T-9D
45 - 47.99	LS1803.5RH	H2.5	AS0004-8	H2	CSTB-3	T-9D	CSTB-3.5	T-9D	CSTB-4S	T-15D	CSTB-3S	T-9D
48 - 51.99	LS1803.5RH	H2.5	AS0004-8	H2	CSTB-3.5	T-15D	CSTB-3.5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
52 - 54.99	LS1805RH	H3	AS0005-10	H2.5	CSTB-3.5	T-15D	CSTB-3.5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
55 - 57.99	LS1805RH	H3	AS0005-10	H2.5	CSTB-3.5	T-15D	CSTA-5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
58 - 59.99	LS1805RH	H3	AS0005-10	H2.5	CSTA-5	T-15D	CSTA-5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
60 - 63.99	LS1805RH	H3	AS0005-10	H2.5	CSTA-5	T-15D	CSTA-5	T-15D	CSTA-5S	T-15D	CSTB-3S	T-9D
64 - 67.99	LS1806RH	H4	AS0005-15	H2.5	CSTA-5	T-15D	CSTA-5	T-15D	CSTA-5S	T-15D	CSTB-3S	T-9D
68 - 77.99	LS1805RH	H3	AS0005-10	H2.5	LS1206	H3	LS1206	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
78 - 84.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
85 - 91.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3	LS1206	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
92 - 98.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206S	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
99 - 106.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3	LS1206S	H3	LS1206S	H3	CSTA-5S	T-15D

Recommended clamping torque: please see page 050.

UNIDEX STS

UNIDEX STS-EX

Indexable drill head with external quadruple thread for single tube system (STS), diameters adjustable, tool diameter ø107.00 - ø168.99 mm, CICT = 5



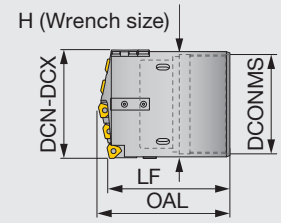
Designation	DCN	DCX	CICT	Drill tube		OAL	Drill head		
				Designation	Dia. (mm)		LF	DCONMS	H
KUSTS19E-xx.xx	107.00	111.99	5	ST19	94	197	180	89	107
KUSTS20E-xx.xx	112.00	123.99	5	ST20	106	221	205	101	119
KUSTS21E-xx.xx	124.00	135.99	5	ST21	118	222	205	113	131
KUSTS22E-xx.xx	136.00	147.99	5	ST22	130	223	205	125	143
KUSTS23E-xx.xx	148.00	159.99	5	ST23	142	245	225	137	155
KUSTS24E-xx.xx	160.00	168.99	5	ST24	154	246	225	149	164

e.g. Designation for tool diameter ø150 mm : KUSTS23E-150.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

UNIDEX STS

UNIDEX STS-IN

Indexable drill head with internal single thread for single tube system (STS), diameters adjustable, tool diameter ø107.00 - ø168.99 mm, CICT = 5



Designation	DCN	DCX	CICT	Drill tube		OAL	Drill head		
				Designation	Dia. (mm)		LF	DCONMS	H
KUSTS94-xx.xx	107.00	110.99	5	UB94	94	164	150	90	106
KUSTS106-xx.xx	111.00	122.99	5	UB106	106	165	150	102	118
KUSTS118-xx.xx	123.00	134.99	5	UB118	118	167	150	114	130
KUSTS130-xx.xx	135.00	148.99	5	UB130	130	168	150	126	144
KUSTS142-xx.xx	149.00	161.99	5	UB142	142	170	150	139	157
KUSTS154-xx.xx	162.00	168.99	5	UB154	154	211	190	151	164

e.g. Designation for tool diameter ø150 mm : KUSTS142-150.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral	Qty	Intermediate	Qty	Intermediate	Qty	Central	Qty
107.00 - 117.99	TPMX24**R...	1	TPMX17**R...	3	-		TPMX24**R...	1
118.00 - 135.99	TPMX24**R...	1	TPMX24**R...	3	-		TPMX24**R...	1
136.00 - 144.99	TPMX24**R...	1	TPMX24**R...	3	-		TPMX28**R...	1
145.00 - 150.99	TPMX24**R...	1	TPMX24**R...	2	TPMX28**R...	1	TPMX28**R...	1
151.00 - 156.99	TPMX28**R...	1	TPMX24**R...	2	TPMX28**R...	1	TPMX28**R...	1
157.00 - 162.99	TPMX28**R...	1	TPMX24**R...	1	TPMX28**R...	2	TPMX28**R...	1
163.00 - 168.99	TPMX28**R...	1	TPMX28**R...	3	-		TPMX28**R...	1

The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

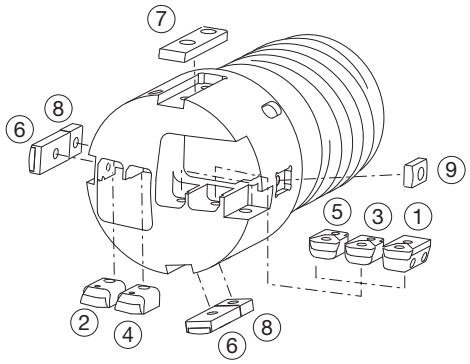
Reference pages: Screws, Wrenches → 035, Inserts → 045, Guide pad → 048, Standard cutting conditions → 049, Drill tube (STS) → 054 -

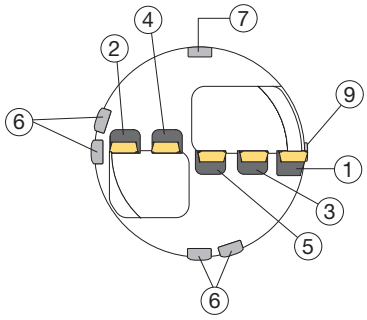
SPARE PARTS

Tool diameter DCN-DCX (mm)	Cartridge				
	Peripheral	Intermediate			Central
	Cartridge ①	Cartridge ②	Cartridge ③	Cartridge ④	Cartridge ⑤
107.00 - 117.99	OZ402 - 43	IOZ402 - 32	IOZ402 - 32	IOZ402 - 32	IOZ402 - 43
118.00 - 135.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43
136.00 - 144.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 63
145.00 - 150.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
151.00 - 156.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
157.00 - 162.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63
163.00 - 168.99	OZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63

SPARE PARTS

Tool diameter DCN-DCX (mm)	Guide pad							
	Guide pad		Filler		Protector		Sub guide pad	
	⑥	Qty	⑦	Qty	⑧	Qty	⑨	Qty
107.00 - 117.99	GP18	2	FL18 - M	1	GPT18 - M	2	CUG14 - M	1
118.00 - 135.99	GP18	2	FL18 - M	1	GPT18 - M	2	CUG14 - M	1
136.00 - 144.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
145.00 - 150.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
151.00 - 156.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
157.00 - 162.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
163.00 - 168.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 5)

Tool diameter DCN-DCX (mm)	Insert screw									
	Peripheral		Intermediate						Central	
	Cartridge ①		Cartridge ②		Cartridge ③		Cartridge ④		Cartridge ⑤	
	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
107.00 - 117.99	CSTB-4M	T-15D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-4M	T-15D
118.00 - 135.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D
136.00 - 144.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D
145.00 - 150.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
151.00 - 156.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
157.00 - 162.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
163.00 - 168.99	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D

SCREWS, WRENCHES (CICT = 5)

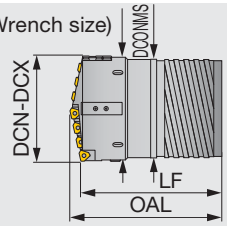
Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ② - ④		Cartridge ⑤					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
107.00 - 117.99	LS1806RH	H4	AS0005-15	H2.5	CSTA-5	T-15D	LS1206	H3	LS1206S	H3	CSTA-5S	T-15D
118.00 - 135.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206	H3	LS1206SSS	H3	CSTA-5S	T-15D
136.00 - 144.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206S	H3	LS1206SSS	H3	CSTA-5S	T-15D
145.00 - 150.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206S	H3	LS1206SSS	H3	CSTA-5S	T-15D
151.00 - 156.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
157.00 - 162.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
163.00 - 168.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D

Recommended clamping torque: please see page 050.

UNIDEX STS

UNIDEX STS-EX

Indexable drill head with external quadruple thread for single tube system (STS), diameters adjustable, tool diameter ø169.00 - ø232.99 mm, CICT = 7



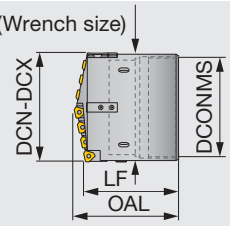
Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUSTS24E-xx.xx	169.00	171.99	7	ST24	154	246	225	149	167
KUSTS25E-xx.xx	172.00	183.99	7	ST25	166	247	225	161	179
KUSTS26E-xx.xx	184.00	195.99	7	ST26	178	267	245	173	191
KUSTS27E-xx.xx	196.00	207.99	7	ST27	190	270	245	185	203
KUSTS28E-xx.xx	208.00	219.99	7	ST28	202	271	245	197	215
KUSTS29E-xx.xx	220.00	231.99	7	ST29	214	293	265	208	227
KUSTS30E-xx.xx	232.00	232.99	7	ST30	226	293	265	220	228

e.g. Designation for tool diameter ø185 mm : KUSTS26E-185.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

UNIDEX STS

UNIDEX STS-IN

Indexable drill head with internal single thread for single tube system (STS), diameters adjustable, tool diameter ø169.00 - ø232.99 mm, CICT = 7



Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUSTS154-xx.xx	169.00	173.99	7	UB154	154	211	190	151	169
KUSTS166-xx.xx	174.00	185.99	7	UB166	166	213	190	163	181
KUSTS178-xx.xx	186.00	197.99	7	UB178	178	212	190	175	193
KUSTS190-xx.xx	198.00	209.99	7	UB190	190	215	190	187	205
KUSTS202-xx.xx	210.00	221.99	7	UB202	202	217	190	199	217
KUSTS214-xx.xx	222.00	232.99	7	UB214	214	218	190	211	228

e.g. Designation for tool diameter ø185 mm : KUSTS166-185.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral	Qty	Intermediate	Qty	Intermediate	Qty	Central	Qty
169.00 - 188.99	TPMX24**R...	1	TPMX24**R...	5	-		TPMX24**R...	1
189.00 - 196.99	TPMX24**R...	1	TPMX24**R...	5	-		TPMX28**R...	1
197.00 - 202.99	TPMX24**R...	1	TPMX24**R...	4	TPMX28**R...	1	TPMX28**R...	1
203.00 - 208.99	TPMX24**R...	1	TPMX24**R...	3	TPMX28**R...	2	TPMX28**R...	1
209.00 - 214.99	TPMX28**R...	1	TPMX24**R...	3	TPMX28**R...	2	TPMX28**R...	1
215.00 - 220.99	TPMX28**R...	1	TPMX24**R...	2	TPMX28**R...	3	TPMX28**R...	1
221.00 - 226.99	TPMX28**R...	1	TPMX24**R...	1	TPMX28**R...	4	TPMX28**R...	1
227.00 - 232.99	TPMX28**R...	1	TPMX28**R...	5	-		TPMX28**R...	1

The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

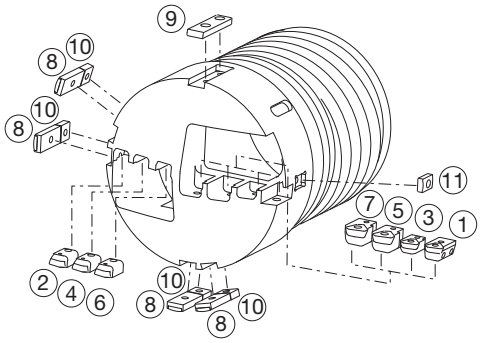
Reference pages: Screws, Wrenches → 037, Inserts → 045, Guide pad → 048, Standard cutting conditions → 049, Drill tube (STS) → 054 -

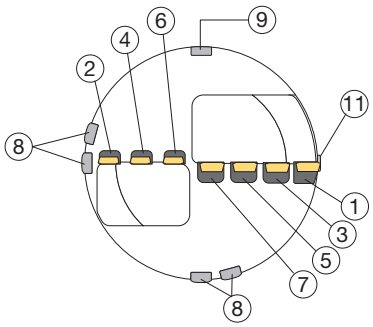
SPARE PARTS

Tool diameter DCN-DCX (mm)	Cartridge						
	Peripheral	Intermediate					Central
	Cartridge ①	Cartridge ②	Cartridge ③	Cartridge ④	Cartridge ⑤	Cartridge ⑥	Cartridge ⑦
169.00 - 188.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43
189.00 - 196.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 63
197.00 - 202.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
203.00 - 208.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
209.00 - 214.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
215.00 - 220.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63
221.00 - 226.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63
227.00 - 232.99	OZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63

SPARE PARTS

Tool diameter DCN-DCX (mm)	Guide pad							
	Guide pad		Filler		Protector		Sub guide pad	
	⑧	Qty	⑨	Qty	⑩	Qty	⑪	Qty
169.00 - 188.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
189.00 - 196.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
197.00 - 202.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
203.00 - 208.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
209.00 - 214.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
215.00 - 220.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
221.00 - 226.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
227.00 - 232.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 7)

Tool diameter DCN-DCX (mm)	Insert screw													
	Peripheral		Intermediate										Central	
	Cartridge ①		Cartridge ②		Cartridge ③		Cartridge ④		Cartridge ⑤		Cartridge ⑥		Cartridge ⑦	
	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
169.00 - 188.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D
189.00 - 196.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D
197.00 - 202.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
203.00 - 208.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
209.00 - 214.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
215.00 - 220.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
221.00 - 226.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
227.00 - 232.99	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D

SCREWS, WRENCHES (CICT = 7)

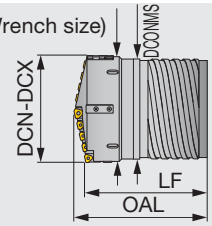
Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ② - ⑥		Cartridge ⑦					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
169.00 - 188.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3L	LS1206	H3L	LS1206SSS	H3	CSTA-5S	T-15D
189.00 - 196.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3L	LS1206S	H3L	LS1206SSS	H3	CSTA-5S	T-15D
197.00 - 202.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3L	LS1206S	H3L	LS1206SSS	H3	CSTA-5S	T-15D
203.00 - 208.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3L	LS1206S	H3L	LS1206SSS	H3	CSTA-5S	T-15D
209.00 - 214.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
215.00 - 220.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
221.00 - 226.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
227.00 - 232.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D

Recommended clamping torque: please see page 050.

UNIDEX STS

UNIDEX STS-EX

Indexable drill head with external quadruple thread for single tube system (STS), diameters adjustable, tool diameter ø233.00 - ø291.99 mm, CICT = 9



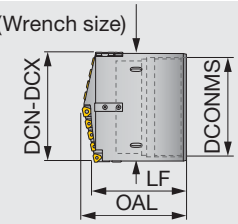
Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUSTS30E-xx.xx	233.00	243.99	9	ST30	226	294	265	220	239
KUSTS31E-xx.xx	244.00	255.99	9	ST31	238	294	265	232	251
KUSTS32E-xx.xx	256.00	267.99	9	ST32	250	322	290	244	263
KUSTS33E-xx.xx	268.00	279.99	9	ST33	262	323	290	256	275
KUSTS34E-xx.xx	280.00	291.99	9	ST34	274	325	290	268	287

e.g. Designation for tool diameter ø240 mm : KUSTS30E-240.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.
Larger sizes available upon request. Please contact your dealer for further information.

UNIDEX STS

UNIDEX STS-IN

Indexable drill head with internal single thread for single tube system (STS), diameters adjustable, tool diameter ø233.00 - ø293.99 mm, CICT = 9



Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUSTS214-xx.xx	233.00	233.99	9	UB214	214	217	190	211	229
KUSTS226-xx.xx	234.00	245.99	9	UB226	226	219	190	223	241
KUSTS238-xx.xx	246.00	257.99	9	UB238	238	221	190	235	253
KUSTS250-xx.xx	258.00	269.99	9	UB250	250	242	210	245	265
KUSTS262-xx.xx	270.00	281.99	9	UB262	262	244	210	259	277
KUSTS274-xx.xx	282.00	293.99	9	UB274	274	245	210	271	289

e.g. Designation for tool diameter ø240 mm : KUSTS226-240.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.
Larger sizes available upon request. Please contact your dealer for further information.

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral	Qty	Intermediate	Qty	Intermediate	Qty	Central	Qty
233.00 - 247.99	TPMX24**R...	1	TPMX24**R...	7	-		TPMX28**R...	1
248.00 - 253.99	TPMX28**R...	1	TPMX24**R...	7	-		TPMX28**R...	1
254.00 - 258.99	TPMX28**R...	1	TPMX24**R...	6	TPMX28**R...	1	TPMX28**R...	1
259.00 - 264.99	TPMX28**R...	1	TPMX24**R...	5	TPMX28**R...	2	TPMX28**R...	1
265.00 - 271.99	TPMX28**R...	1	TPMX24**R...	4	TPMX28**R...	3	TPMX28**R...	1
272.00 - 275.99	TPMX28**R...	1	TPMX24**R...	3	TPMX28**R...	4	TPMX28**R...	1
276.00 - 284.99	TPMX28**R...	1	TPMX24**R...	2	TPMX28**R...	5	TPMX28**R...	1
285.00 - 289.99	TPMX28**R...	1	TPMX24**R...	1	TPMX28**R...	6	TPMX28**R...	1
290.00 - 293.99	TPMX28**R...	1	TPMX28**R...	7	-		TPMX28**R...	1

The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

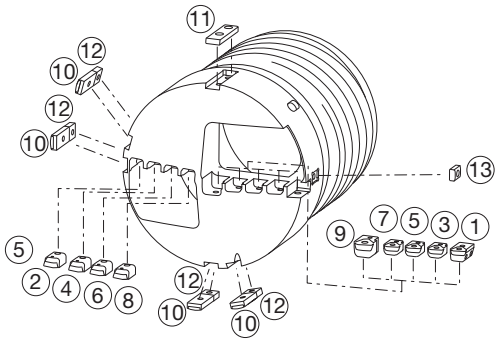
Reference pages: Screws, Wrenches → 039, Inserts → 045, Guide pad → 048, Standard cutting conditions → 049, Drill tube (STS) → 054 -

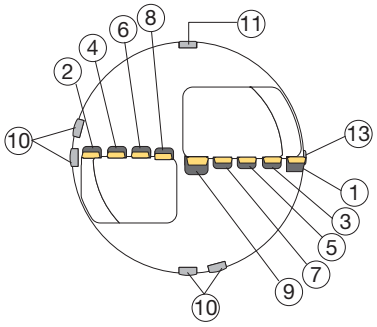
SPARE PARTS

Tool diameter DCN-DCX (mm)	Cartridge							
	Peripheral	Intermediate						
	Cartridge ①	Cartridge ②	Cartridge ③	Cartridge ④	Cartridge ⑤	Cartridge ⑥	Cartridge ⑦	Cartridge ⑧
233.00 - 247.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43
248.00 - 253.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43
254.00 - 258.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43
259.00 - 264.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43
265.00 - 271.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43
272.00 - 275.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63
276.00 - 284.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63
285.00 - 289.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63
290.00 - 293.99	OZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63

SPARE PARTS

Tool diameter DCN-DCX (mm)	Cartridge	Guide pad							
	Central	Guide pad		Filler		Protector		Sub guide pad	
	Cartridge ⑨	⑩	Qty	⑪	Qty	⑫	Qty	⑬	Qty
233.00 - 247.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
248.00 - 253.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
254.00 - 258.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
259.00 - 264.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
265.00 - 271.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
272.00 - 275.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
276.00 - 284.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
285.00 - 289.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
290.00 - 293.99	IOZ402 - 63	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 9)

Tool diameter DCN-DCX (mm)	Insert screw																	
	Peripheral		Intermediate														Central	
	Cartridge ①		Cartridge ②		Cartridge ③		Cartridge ④		Cartridge ⑤		Cartridge ⑥		Cartridge ⑦		Cartridge ⑧		Cartridge ⑨	
	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
233.00 - 247.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D
248.00 - 253.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D
254.00 - 258.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
259.00 - 264.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
265.00 - 271.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
272.00 - 275.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
276.00 - 284.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
285.00 - 289.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
290.00 - 293.99	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D

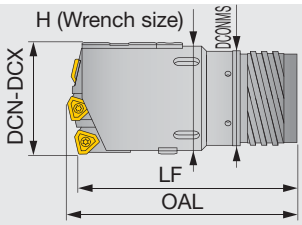
SCREWS, WRENCHES (CICT = 9)

Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ② - ⑧		Cartridge ⑨					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
233.00 - 247.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3L	LS1206S	H3L	LS1206SSS	H3	CSTA-5S	T-15D
248.00 - 253.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
254.00 - 258.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
259.00 - 264.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
265.00 - 271.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
272.00 - 275.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
276.00 - 284.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
285.00 - 289.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
290.00 - 293.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D

Recommended clamping torque: please see page 050.

UNIDEX DTS-EX

Indexable drill head with external quadruple thread for double tube system (DTS), diameters adjustable, tool diameter ø38 - ø106.99 mm, CICT = 3



Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUDTS08E-xx.xx	38.00	39.60	3	OT08	35.5	90	85	33	37
KUDTS09E-xx.xx	39.61	43.00	3	OT09	39	91	85	36	40
KUDTS10E-xx.xx	43.01	47.00	3	OT10	42.5	101	95	39	43
KUDTS11E-xx.xx	47.01	51.70	3	OT11	46.5	102	100	43	48
KUDTS12E-xx.xx	51.71	56.20	3	OT12	51	107	100	47	52
KUDTS13E-xx.xx	56.21	65.00	3	OT13	55.5	119	110	51	61
KUDTS14E-xx.xx	65.00	66.99	3	OT14	56	159	150	52	63
KUDTS15E-xx.xx	67.00	72.99	3	OT15	62	159	150	58	69
KUDTS16E-xx.xx	73.00	79.99	3	OT16	68	160	150	63	76
KUDTS17E-xx.xx	80.00	86.99	3	OT17	75	191	180	70	83
KUDTS18E-xx.xx	87.00	99.99	3	OT18	82	193	180	77	96
KUDTS19E-xx.xx	100.00	106.99	3	OT19	94	193	180	89	102

e.g. Designation for tool diameter ø60 mm: KUDTS13E-60.00
Drill heads with the diameter ø92 mm or over have a top guide pocket (filler).
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral insert	Qty	Intermediate insert	Qty	Central insert	Qty
38 - 39.99	NPMX08**R...	1	NPMX08**R...	1	NPMX08**R...	1
40 - 44.99	TPMX14**R...	1	NPMX08**R...	1	NPMX08**R...	1
45 - 47.99	TPMX14**R...	1	NPMX08**R...	1	TPMX14**R...	1
48 - 51.99	TPMX14**R...	1	TPMX14**R...	1	TPMX14**R...	1
52 - 54.99	TPMX17**R...	1	TPMX14**R...	1	TPMX14**R...	1
55 - 57.99	TPMX17**R...	1	TPMX14**R...	1	TPMX17**R...	1
58 - 59.99	TPMX17**R...	1	TPMX17**R...	1	TPMX17**R...	1
60 - 63.99	TPMX17**R...	1	TPMX17**R...	1	TPMX17**R...	1
64 - 67.99	TPMX24**R...	1	TPMX17**R...	1	TPMX17**R...	1
68 - 77.99	TPMX17**R...	1	TPMX24**R...	1	TPMX24**R...	1
78 - 84.99	TPMX24**R...	1	TPMX24**R...	1	TPMX24**R...	1
85 - 91.99	TPMX28**R...	1	TPMX24**R...	1	TPMX24**R...	1
92 - 98.99	TPMX24**R...	1	TPMX28**R...	1	TPMX28**R...	1
99 - 106.99	TPMX28**R...	1	TPMX28**R...	1	TPMX28**R...	1

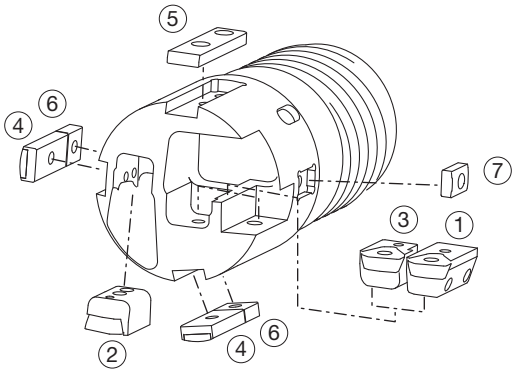
The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

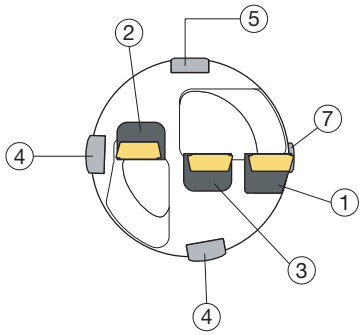
Reference pages: Screws, Wrenches → 041, Inserts → 045, Guide pad → 048, Standard cutting conditions → 049, Drill tube (DTS) → 058

SPARE PARTS

Tool diameter DCN-DCX (mm)	Cartridge			Guide pad							
	Peripheral	Intermediate	Central	Guide pad		Filler		Protector		Sub guide pad	
	Cartridge ①	Cartridge ②	Cartridge ③	④	Qty	⑤	Qty	⑥	Qty	⑦	Qty
38 - 39.99	OZ05R	IOZ05R	IOZ05R	GP08	2	-	-	GPT08	2	CUG08	1
40 - 44.99	OZ402 - 04	IOZ05R	IOZ05R	GP08	2	-	-	GPT08	2	CUG08	1
45 - 47.99	OZ402 - 04	IOZ05R	IOZ402 - 04	GP10	2	-	-	GPT10	2	CUG08	1
48 - 51.99	OZ402 - 04	IOZ402 - 04	IOZ402 - 04	GP10	2	-	-	GPT10	2	CUG08	1
52 - 54.99	OZ402 - 32	IOZ402 - 04	IOZ402 - 04	GP10	2	-	-	GPT10	2	CUG08	1
55 - 57.99	OZ402 - 32	IOZ402 - 04	IOZ402 - 32	GP10	2	-	-	GPT10	2	CUG08	1
58 - 59.99	OZ402 - 32	IOZ402 - 32	IOZ402 - 32	GP10	2	-	-	GPT10	2	CUG08	1
60 - 63.99	OZ402 - 32	IOZ402 - 32	IOZ402 - 32	GP14	2	-	-	GPT14	2	CUG08	1
64 - 67.99	OZ402 - 43	IOZ402 - 32	IOZ402 - 32	GP14	2	-	-	GPT14	2	CUG10	1
68 - 77.99	OZ402 - 32	IOZ402 - 43	IOZ402 - 43	GP14	2	-	-	GPT14	2	CUG10	1
78 - 84.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	GP14	2	-	-	GPT14	2	CUG10	1
85 - 91.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 43	GP14	2	-	-	GPT14	2	CUG10	1
92 - 98.99	OZ402 - 43	IOZ402 - 63	IOZ402 - 63	GP14	2	FILLER14	1	GPT14	2	CUG10	1
99 - 106.99	OZ402 - 63	IOZ402 - 63	IOZ402 - 63	GP18	2	FL18 - M	1	GPT18 - M	2	CUG14 - M	1

Filler is to protect a top guide pocket and included in the drill heads with ø92 mm or over.





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 3)

Tool diameter DCN-DCX (mm)	Insert screw					
	Peripheral		Intermediate		Central	
	Cartridge ①		Cartridge ②		Cartridge ③	
	Screw	Wrench	Screw	Wrench	Screw	Wrench
38 - 39.99	CSTB-2.2	T-7D	CSTB-2.2	T-7D	CSTB-2.2	T-7D
40 - 44.99	CSTB-2.5	T-8D	CSTB-2.2	T-7D	CSTB-2.2	T-7D
45 - 47.99	CSTB-2.5	T-8D	CSTB-2.2	T-7D	CSTB-2.5	T-8D
48 - 51.99	CSTB-2.5	T-8D	CSTB-2.5	T-8D	CSTB-2.5	T-8D
52 - 54.99	CSTB-3.5D	T-9D	CSTB-2.5	T-8D	CSTB-2.5	T-8D
55 - 57.99	CSTB-3.5D	T-9D	CSTB-2.5	T-8D	CSTB-3.5D	T-9D
58 - 59.99	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D
60 - 63.99	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D
64 - 67.99	CSTB-4M	T-15D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D
68 - 77.99	CSTB-3.5D	T-9D	CSTB-4M	T-15D	CSTB-4M	T-15D
78 - 84.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D
85 - 91.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-4M	T-15D
92 - 98.99	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D
99 - 106.99	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D

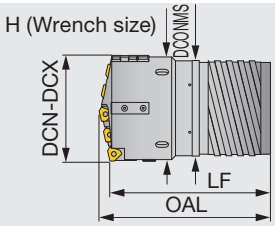
SCREWS, WRENCHES (CICT = 3)

Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ②		Cartridge ③					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
38 - 39.99	LS1803RH	H2	AS0003-5	H1.5	CSTB-3	T-9D	CSTB-3	T-9D	CSTB-3S	T-9D	CSTB-3S	T-9D
40 - 44.99	LS1803.5RH	H2.5	AS0004-8	H2	CSTB-3	T-9D	CSTB-3	T-9D	CSTB-3S	T-9D	CSTB-3S	T-9D
45 - 47.99	LS1803.5RH	H2.5	AS0004-8	H2	CSTB-3	T-9D	CSTB-3.5	T-9D	CSTB-4S	T-15D	CSTB-3S	T-9D
48 - 51.99	LS1803.5RH	H2.5	AS0004-8	H2	CSTB-3.5	T-15D	CSTB-3.5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
52 - 54.99	LS1805RH	H3	AS0005-10	H2.5	CSTB-3.5	T-15D	CSTB-3.5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
55 - 57.99	LS1805RH	H3	AS0005-10	H2.5	CSTB-3.5	T-15D	CSTA-5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
58 - 59.99	LS1805RH	H3	AS0005-10	H2.5	CSTA-5	T-15D	CSTA-5	T-15D	CSTB-4S	T-15D	CSTB-3S	T-9D
60 - 63.99	LS1805RH	H3	AS0005-10	H2.5	CSTA-5	T-15D	CSTA-5	T-15D	CSTA-5S	T-15D	CSTB-3S	T-9D
64 - 67.99	LS1806RH	H4	AS0005-15	H2.5	CSTA-5	T-15D	CSTA-5	T-15D	CSTA-5S	T-15D	CSTB-3S	T-9D
68 - 77.99	LS1805RH	H3	AS0005-10	H2.5	LS1206	H3	LS1206	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
78 - 84.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
85 - 91.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3	LS1206	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
92 - 98.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206S	H3	CSTA-5S	T-15D	CSTB-3S	T-9D
99 - 106.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3	LS1206S	H3	LS1206S	H3	CSTA-5S	T-15D

Recommended clamping torque: please see page 050.

UNIDEX DTS-EX

Indexable drill head with external quadruple thread for double tube system (DTS), diameters adjustable, tool diameter ø107.00 - ø168.99 mm, CICT = 5



Designation	DCN	DCX	CICT	Drill tube		Drill head			
				Designation	Dia. (mm)	OAL	LF	DCONMS	H
KUDTS19E-xx.xx	107.00	111.99	5	OT19	94	197	180	89	107
KUDTS20E-xx.xx	112.00	123.99	5	OT20	106	221	205	101	119
KUDTS21E-xx.xx	124.00	135.99	5	OT21	118	222	205	113	131
KUDTS22E-xx.xx	136.00	147.99	5	OT22	130	223	205	125	143
KUDTS23E-xx.xx	148.00	159.99	5	OT23	142	245	225	137	155
KUDTS24E-xx.xx	160.00	168.99	5	OT24	154	246	225	149	164

e.g. Designation for tool diameter ø150 mm : KUDTS23E-150.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral	Qty	Intermediate	Qty	Intermediate	Qty	Central	Qty
107.00 - 117.99	TPMX24**R...	1	TPMX17**R...	3	-		TPMX24**R...	1
118.00 - 135.99	TPMX24**R...	1	TPMX24**R...	3	-		TPMX24**R...	1
136.00 - 144.99	TPMX24**R...	1	TPMX24**R...	3	-		TPMX28**R...	1
145.00 - 150.99	TPMX24**R...	1	TPMX24**R...	2	TPMX28**R...	1	TPMX28**R...	1
151.00 - 156.99	TPMX28**R...	1	TPMX24**R...	2	TPMX28**R...	1	TPMX28**R...	1
157.00 - 162.99	TPMX28**R...	1	TPMX24**R...	1	TPMX28**R...	2	TPMX28**R...	1
163.00 - 168.99	TPMX28**R...	1	TPMX28**R...	3	-		TPMX28**R...	1

The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

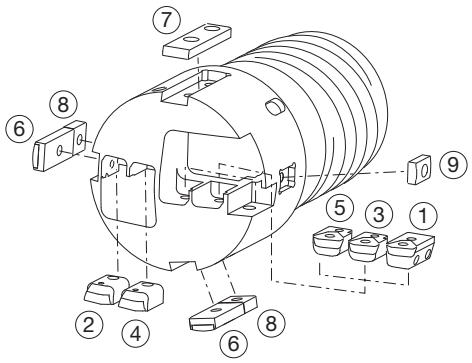
Reference pages: Screws, Wrenches → 043, Inserts → 045, Guide pad → 048, Standard cutting conditions → 049, Drill tube (DTS) → 058

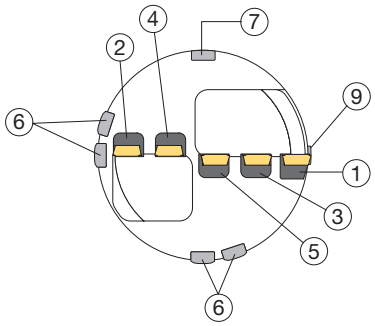
SPARE PARTS

Tool diameter DCN-DCX (mm)	Cartridge				
	Peripheral	Intermediate			Central
	Cartridge ①	Cartridge ②	Cartridge ③	Cartridge ④	Cartridge ⑤
107.00 - 117.99	OZ402 - 43	IOZ402 - 32	IOZ402 - 32	IOZ402 - 32	IOZ402 - 43
118.00 - 135.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43
136.00 - 144.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 63
145.00 - 150.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
151.00 - 156.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 43	IOZ402 - 63
157.00 - 162.99	OZ402 - 63	IOZ402 - 43	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63
163.00 - 168.99	OZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63	IOZ402 - 63

SPARE PARTS

Tool diameter DCN-DCX (mm)	Guide pad							
	Guide pad		Filler		Protector		Sub guide pad	
	⑥	Qty	⑦	Qty	⑧	Qty	⑨	Qty
107.00 - 117.99	GP18	2	FL18 - M	1	GPT18 - M	2	CUG14 - M	1
118.00 - 135.99	GP18	2	FL18 - M	1	GPT18 - M	2	CUG14 - M	1
136.00 - 144.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
145.00 - 150.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
151.00 - 156.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
157.00 - 162.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1
163.00 - 168.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 5)

Tool diameter DCN-DCX (mm)	Insert screw									
	Peripheral		Intermediate						Central	
	Cartridge ①		Cartridge ②		Cartridge ③		Cartridge ④		Cartridge ⑤	
	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
107.00 - 117.99	CSTB-4M	T-15D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-3.5D	T-9D	CSTB-4M	T-15D
118.00 - 135.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D
136.00 - 144.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D
145.00 - 150.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
151.00 - 156.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D
157.00 - 162.99	CSTB-5	T-20D	CSTB-4M	T-15D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D
163.00 - 168.99	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D	CSTB-5	T-20D

SCREWS, WRENCHES (CICT = 5)

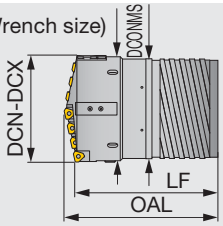
Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ② - ④		Cartridge ⑤					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
107.00 - 117.99	LS1806RH	H4	AS0005-15	H2.5	CSTA-5	T-15D	LS1206	H3	LS1206S	H3	CSTA-5S	T-15D
118.00 - 135.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206	H3	LS1206SSS	H3	CSTA-5S	T-15D
136.00 - 144.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206S	H3	LS1206SSS	H3	CSTA-5S	T-15D
145.00 - 150.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3	LS1206S	H3	LS1206SSS	H3	CSTA-5S	T-15D
151.00 - 156.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
157.00 - 162.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D
163.00 - 168.99	LS1806RH	H4	AS0006-15	H3	LS1206	H3L	LS1206S	H3L	LS1206S	H3	CSTA-5S	T-15D

Recommended clamping torque: please see page 050.

UNIDEX DTS

UNIDEX DTS-EX

Indexable drill head with external quadruple thread for double tube system (DTS), diameters adjustable, tool diameter ø169.00 - ø183.99 mm, CICT = 7



Designation	DCN	DCX	CICT	Outer tube		OAL	Drill head		
				Designation	Dia. (mm)		LF	DCONMS	H
KUDTS24E-xx.xx	169.00	171.99	7	OT24	154	246	225	149	167
KUDTS25E-xx.xx	172.00	183.99	7	OT25	166	247	225	161	179

e.g. Designation for tool diameter ø170 mm : KUDTS24E-170.00
Before drilling operation, please adjust Drill diameter. For diameter adjustment please see page 052.

INSERTS

Tool diameter DCN-DCX (mm)	Peripheral insert	Qty	Intermediate insert	Qty	Central insert	Qty
169.00 - 183.99	TPMX24**R...	1	TPMX24**R...	5	TPMX24**R...	1

The tool diameter can be increased up to 5 mm using the plus (+) spare parts. The expansion allowance depends on peripheral cartridge size. (see page 051 for details)
Drill heads come with cartridge, guide pad, filler, protector, sub guide pad, and wrench, but do not include inserts.

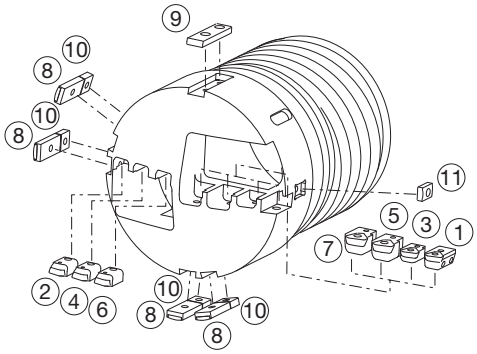
SPARE PARTS

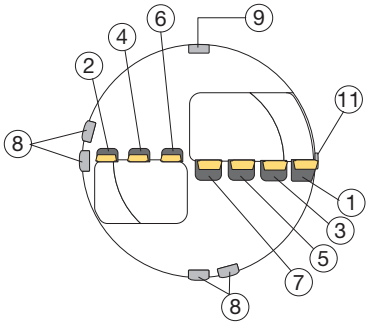

Tool diameter DCN-DCX (mm)	Cartridge						
	Peripheral	Intermediate					Central
	Cartridge ①	Cartridge ②	Cartridge ③	Cartridge ④	Cartridge ⑤	Cartridge ⑥	Cartridge ⑦
169.00 - 183.99	OZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43	IOZ402 - 43

SPARE PARTS




Tool diameter DCN-DCX (mm)	Guide pad							
	Guide pad		Filler		Protector		Sub guide pad	
	⑧	Qty	⑨	Qty	⑩	Qty	⑪	Qty
169.00 - 183.99	GP18	4	FL18 - M	1	GPT18 - M	4	CUG14 - M	1





Part positions may vary depending on the drill size.

SCREWS, WRENCHES (CICT = 7)


Tool diameter DCN-DCX (mm)	Insert screw													
	Peripheral		Intermediate										Central	
	Cartridge ①		Cartridge ②		Cartridge ③		Cartridge ④		Cartridge ⑤		Cartridge ⑥		Cartridge ⑦	
	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
169.00 - 183.99	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D	CSTB-4M	T-15D

SCREWS, WRENCHES (CICT = 7)




Tool diameter DCN-DCX (mm)	Cartridge screw								Guide pad screw			
	Peripheral				Intermediate		Central		Guide pad / Filler / Protector		Sub guide pad	
	Cartridge ①				Cartridge ② - ⑥		Cartridge ⑦					
	Screw	Wrench	Adj. screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench	Screw	Wrench
169.00 - 183.99	LS1806RH	H4	AS0005-15	H2.5	LS1206	H3L	LS1206	H3L	LS1206SSS	H3	CSTA-5S	T-15D

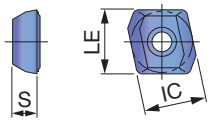
Recommended clamping torque: please see page 050.

Reference pages: Inserts → 045, Guide pad → 048,
Standard cutting conditions → 049, Drill tube (DTS) → 058

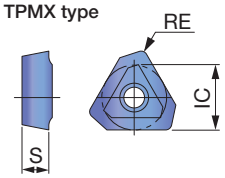
INSERT

NPMX**R, TPMX**R

NPMX type



TPMX type



P	Steel	☆	☆	☆	☆			★	☆	
M	Stainless	★			☆			☆	☆	
K	Cast iron	☆				☆		★	☆	
N	Non-ferrous	☆				☆		★		
S	Superalloys	★			☆		☆	☆	☆	
H	Hard materials	★						☆		

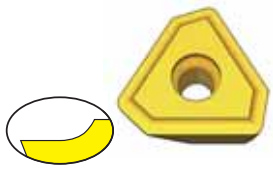
★ : First choice
☆ : Second choice

Designation	HAND	Coated								IC	S	RE	LE
		AH8015	UC1220	UC1125	UC1230	UC3215	UC3210	UC2220	UC3120				
NPMX080308R-G	R				●	●		●		8	3.18	-	8.362
NPMX080304R-B	R			●				●	●	8	3.18	-	8.362
TPMX140308R-G	R	●	●		●	●		●		8.45	3.5	0.8	-
TPMX140304R-B	R			●			●	●	●	8.45	3.5	0.4	-
TPMX140308R-B	R	●								8.45	3.5	0.8	-
TPMX140308R-DT	R							●		8.45	3.5	0.8	-
TPMX170408R-G	R	●	●		●	●		●		10.3	4	0.8	-
TPMX170404R-B	R			●			●	●	●	10.3	4	0.4	-
TPMX170408R-B	R	●								10.3	4	0.8	-
TPMX170408R-BG	R	●				●		●		10.3	4	0.8	-
TPMX170408R-DT	R							●		10.3	4	0.8	-
TPMX240512R-G	R	●	●		●	●		●		14.2	5.5	1.2	-
TPMX240504R-B	R			●			●	●	●	14.2	5.5	0.4	-
TPMX240512R-B	R	●								14.2	5.5	1.2	-
TPMX240512R-BG	R	●				●		●		14.2	5.5	1.2	-
TPMX240512R-DT	R							●		14.2	5.5	1.2	-
TPMX280716R-G	R	●	●		●	●		●		17	7.5	1.6	-
TPMX280708R-B	R			●			●	●	●	17	7.5	0.8	-
TPMX280716R-B	R	●								17	7.5	1.6	-
TPMX280716R-BG	R	●				●		●		17	7.5	1.6	-
TPMX280716R-DT	R							●		17	7.5	1.6	-

●: Line up

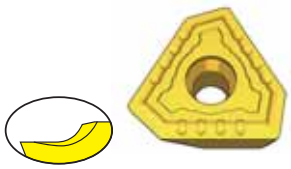
Chipbreaker

G



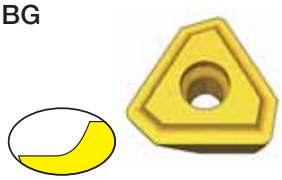
Versatile

B



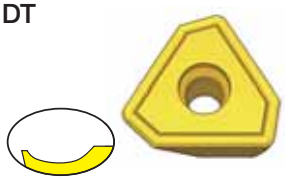
Good chip control for heat-resistant alloy

BG



Good chip control for difficult-to-cut steel

DT



Reduced cutting force

*Difficult-to-cut steel: Material that tends to produce long chips

ISO classifications for Insert grades

	Grade	ISO area							
		5	10	15	20	25	30	35	40
P	AH8015			■	■	■	■	■	
	UC1125				■	■	■		
	UC1220		■	■	■	■	■		
	UC1230				■	■	■	■	■
	UC2220			■	■	■	■	■	
	UC3120						■	■	■
M	AH8015		■	■	■	■	■		
	UC1230			■	■	■	■	■	
	UC2220		■	■	■	■	■		
	UC3120							■	■
K	AH8015			■	■	■			
	UC3120				■	■	■		
	UC3215		■	■	■				
N	AH8015			■	■	■			
	UC2220			■	■	■			
	UC3215		■	■	■				
S	AH8015			■	■	■			
	UC1230			■	■	■	■	■	
	UC2220			■	■	■			
	UC3120			■	■	■			
	UC3210	■	■	■					
H	AH8015				■	■	■		
	UC2220				■	■	■		

TPMX	140308	R	-	G	AH8015
Series	Size and RE	Hand		Chipbreaker	Grade

Cutting condition and chip form

Chip form in deep hole drilling

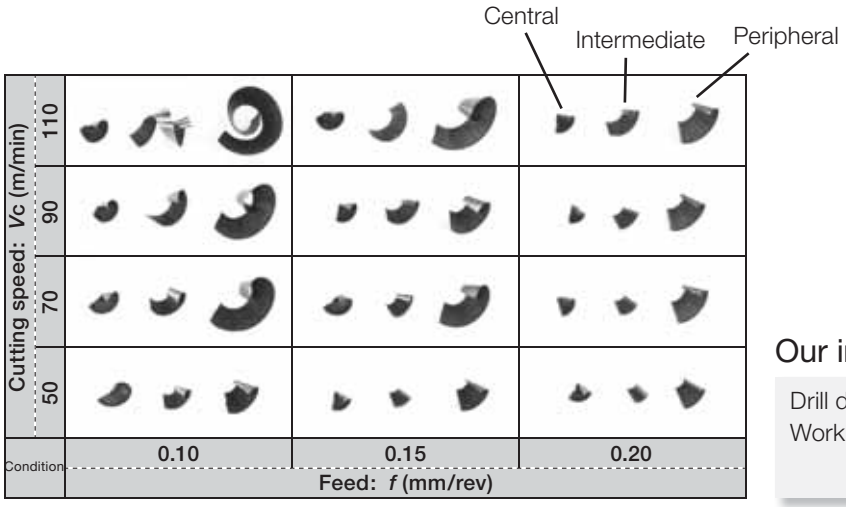
Chip form plays a key role in STS (Single tube system) and DTS (Double tube system) while large-volume and high-pressure coolant do so as well. Because chips are removed through the tube with coolant, proper chip formation is essential for smooth and steady evacuation.

How to decide the chip form

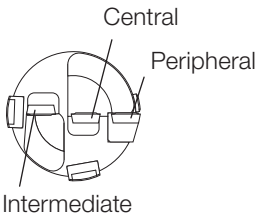
Generally, chip length should be 3 - 4 times its width, but tends to be longer with difficult-to-cut materials. In that case, chip evacuation will be improved by making chips thinner, usually by reducing the feed rate.
The graph below shows chip formation for different cutting speeds and feeds. Short chips are created by reducing the cutting speed or increasing the feed.

Chip formation

Chip formation is affected by multiple factors, such as workpiece material, chipbreaker geometry, cutting speed, feed, type of coolant, and coolant temperature. Suitable chip formation depends on cutting operation but is controllable by changing the cutting conditions.



From left to right in each box the order is central, intermediate and peripheral chip.



Our in-house test result

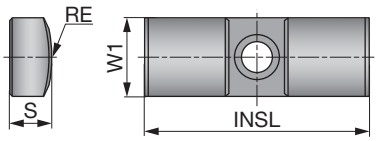
Drill diameter:	ø30.00 mm
Workpiece:	Low alloy steel AISI4340

CHIPBREAKER SELECTION CHART

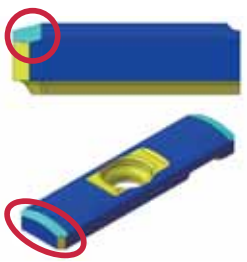
ISO	Workpiece materials	Chipbreaker		
		First choice	Troubleshooting	
			Fracture	Wear
P	Low carbon steel (C < 0.3) SS400, SM490, S25C, etc. St42-1, St52-3, C25, etc.	G UC2220 (NLX)	BG AH8015	B UC1125 (DLXT)
P	Carbon steel (C > 0.3) S45C, S55C, etc. C45, C55, etc.	G UC2220 (NLX)	G AH8015	B UC1125 (DLXT)
P	Low alloy steel (C < 0.3) SCM415, etc. 18CrMo4, etc.	G UC2220 (NLX)	BG AH8015	B UC1125 (DLXT)
P	Alloy steel (C > 0.3) SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc.	G UC2220 (NLX)	G AH8015	B UC1125 (DLXT)
M	Stainless steel (Austenitic) SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	G AH8015	B UC2220 (NLX)	B UC1125 (DLXT)
M	Stainless steel (Martensitic, Ferritic) SUS430, SUS416, etc. X6Cr17, X12CrS13, etc.	G AH8015	B UC2220 (NLX)	B UC1125 (DLXT)
M	Stainless steel (Precipitation hardening) SUS630, etc. X5CrNiCuNb16-4, etc.	G AH8015	B UC2220 (NLX)	B UC1125 (DLXT)
K	Grey cast iron FC250, etc. 250, etc.	G UC2220 (NLX)	G AH8015	B UC1125 (DLXT)
K	Ductile cast iron FCD700, etc. 700-2, etc.	G UC2220 (NLX)	G AH8015	B UC1125 (DLXT)
N	Aluminium alloys	G UC2220 (NLX)	G AH8015	B UC1125 (DLXT)
S	Heat-resistant alloys Inconel 718, etc.	B AH8015	B UC2220 (NLX)	B UC1125 (DLXT)
S	Titanium alloys Ti-6Al-4V, etc.	B AH8015	B UC2220 (NLX)	B UC1125 (DLXT)
H	Hardened steel ≥ 40HRC	B AH8015	B UC2220 (NLX)	B UC2220 (NLX)

GUIDE PAD

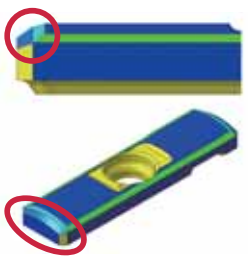
GP08, 10, 14, 18



Single chamfer



Double chamfer (-DC)



Designation	DCN	DCX	Coated				W1	INSL	S	RE
			F1122	F2122	FH3125	FH3135				
GP08	38	44.99	▲	▲			8	25	4.5	15.5
GP08-25-155-DC	38	44.99			●	●	8	25	4.5	15.5
GP10	45	59.99	▲	▲			10	35	6	20
GP10-35-200-DC	45	59.99			●	●	10	35	6	20
GP14	60	98.99		▲			14	40	7.5	25
GP14-40-250-DC	60	98.99			●	●	14	40	7.5	25
GP18	99	293.99		▲			18	40	9	30
GP18-40-300-DC	99	293.99			●	●	18	40	9	30

●: To be released in 2020
●: Line up
▲: To be discontinued
Package quantity = 5 pcs.

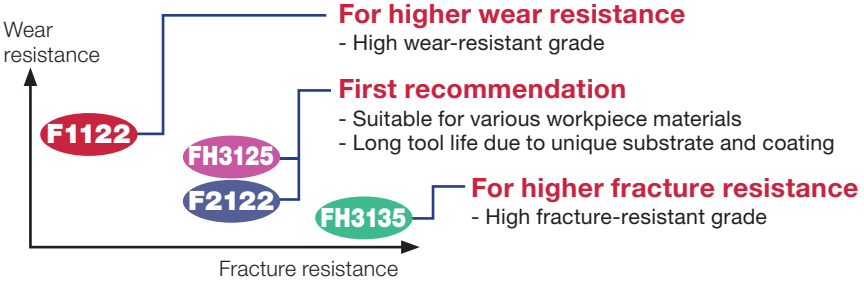
Grade recommendations

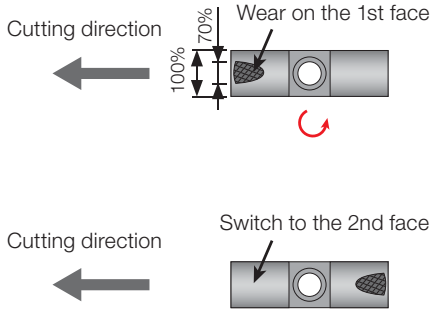
ISO	Oil coolant			Water based coolant		
	First choice	Second choice	Third choice	First choice	Second choice	Third choice
P	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
M	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-
K	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
N	F1122 FH3125	F2122	FH3135	FH3135	F2122 FH3125	-
S	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-
H	FH3135	F2122 FH3125	F1122	FH3135	F2122 FH3125	-

Replacing guide pads

Guide pads are subject to wear, like inserts

- The guide pad can be used on two end faces.
- When the first face wears up to 70% of its width, reverse the guide pad to use the second face.
- Replace with a new guide pad when the second face wears out.





GP	08	F2122
Series	Size	Grade

GP	08-25-155-DC	FH3135
Series	Size and RE	Grade

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Cutting speed *Vc* (m/min)	Feed: *f* (mm/rev) ø38.00 - ø39.99	ø40.00 - ø51.99	ø52.00 - ø63.99	ø64.00 - ø84.99	ø85 -
P	Low carbon steel (C < 0.3) SS400, SM490, S25C, etc. St42-1, St52-3, C25, etc.	60 - 120	0.08 - 0.15	0.1 - 0.2	0.13 - 0.23	0.15 - 0.25	0.18 - 0.3
	Carbon steel (C > 0.3) S45C, S55C, etc. C45, C55, etc.	60 - 120	0.1 - 0.2	0.15 - 0.25	0.18 - 0.28	0.2 - 0.3	0.2 - 0.35
	Low alloy steel (C < 0.3) SCM415, etc. 18CrMo4, etc.	60 - 120	0.08 - 0.15	0.1 - 0.2	0.13 - 0.23	0.15 - 0.25	0.18 - 0.3
	Alloy steel (C > 0.3) SCM440, SCr420, etc. 42CrMo4, 20Cr4, etc.	60 - 100	0.1 - 0.2	0.15 - 0.25	0.18 - 0.28	0.2 - 0.3	0.2 - 0.35
M	Stainless steel (Austenitic) SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	60 - 110	0.08 - 0.15	0.1 - 0.2	0.13 - 0.23	0.15 - 0.25	0.18 - 0.3
	Stainless steel (Martensitic, Ferritic) SUS430, SUS416, etc. X6Cr17, X12CrS13, etc.	60 - 110	0.08 - 0.15	0.1 - 0.2	0.13 - 0.23	0.15 - 0.25	0.18 - 0.3
	Stainless steel (Precipitation hardening) SUS630, etc. X5CrNiCuNb16-4, etc.	60 - 110	0.08 - 0.15	0.1 - 0.2	0.13 - 0.23	0.15 - 0.25	0.18 - 0.3
K	Grey cast iron FC250, etc. 250, etc.	80 - 140	0.2 - 0.3	0.2 - 0.3	0.24 - 0.32	0.24 - 0.32	0.25 - 0.4
	Ductile cast iron FCD700, etc. 700-2, etc.	80 - 140	0.2 - 0.3	0.2 - 0.3	0.24 - 0.32	0.24 - 0.32	0.25 - 0.4
N	Aluminium alloys	100 - 200	0.08 - 0.2	0.1 - 0.25	0.13 - 0.28	0.15 - 0.3	0.18 - 0.33
S	Heat-resistant alloys Inconel 718, etc.	20 - 50	0.06 - 0.13	0.08 - 0.18	0.13 - 0.23	0.13 - 0.23	0.15 - 0.28
	Titanium alloys Ti-6Al-4V, etc.	30 - 60	0.08 - 0.15	0.1 - 0.2	0.13 - 0.23	0.15 - 0.25	0.18 - 0.3
H	Hardened steel ≥ 40HRC	30 - 80	0.06 - 0.13	0.08 - 0.18	0.13 - 0.23	0.13 - 0.23	0.15 - 0.28

Cutting parameters shown here are relating to the basic recommendations for cutting materials given.
Cutting conditions, material hardness, and other relevant variables must be taken into considerations to determine the actual cutting parameters.

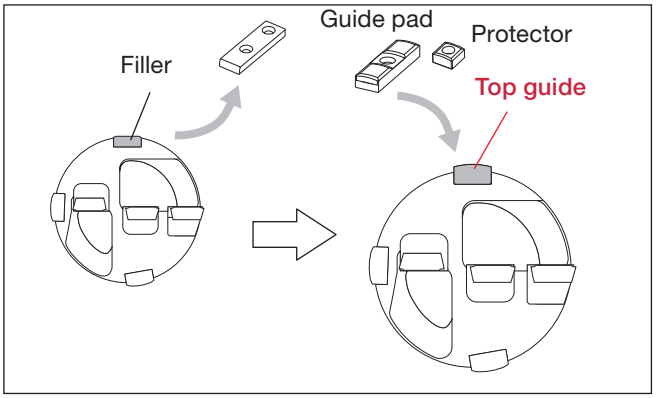
Guide pad

Top guide pad

DEEP HOLE MEISTER

Please replace the filler with the top guide pad when:

- High hole accuracy is required
- L/D (hole length-to-diameter) ratio is greater than 50:1
- Drilling a workpiece which has a tail stock hole
- The DOC required is greater than the range of the peripheral insert for counterboring. *See chart below.



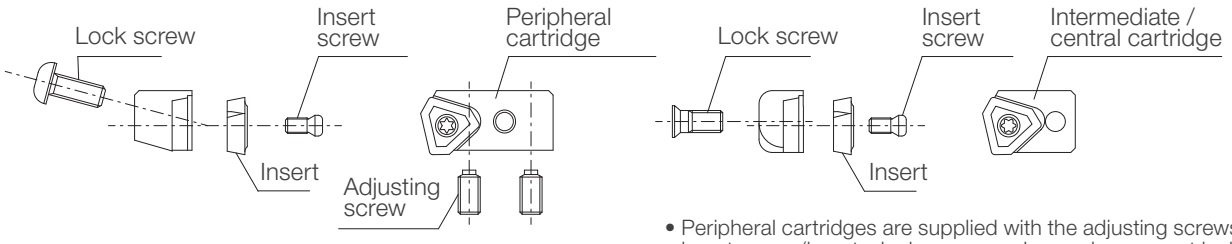
*Maximum DOC of peripheral insert

Cartridge	DOC (mm)	Guide pad
OZ402-04	6.4	GP08.../GP10...
OZ402-32	7.2	GP10.../GP14...
OZ402-43	10.4	GP14.../GP18...
OZ402-63	12.0	GP18...

For diameter less than 92 mm, the drill head is semi standard using the top guide pad.
Please contact your dealer for further information.

Replacement parts

Cartridges and inserts



- Peripheral cartridges are supplied with the adjusting screws and insert screw (inserts, lock screw, and wrenches are not included)
- Central and intermediate cartridges are supplied with insert screw (inserts, lock screw, and wrenches are not included)

Peripheral inserts and accessories

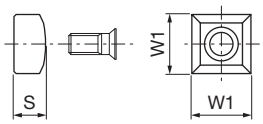
Cartridge	Insert	Insert screw	Wrench	Adjust screw	Wrench	Lock screw	Wrench
OZ05R	NPMX080308R-G	CSTB-2.2	T-7D	AS0003-5	H1.5	LS1803RH	H2
OZ402-04	TPMX140308R-G	CSTB-2.5	T-8D	AS0004-8	H2	LS1803.5RH	H2.5
OZ402-32	TPMX170408R-G	CSTB-3.5D	T-9D	AS0005-10	H2.5	LS1805RH	H3
OZ402-43	TPMX240512R-G	CSTB-4M	T-15D	AS0005-15	H2.5	LS1806RH	H4
OZ402-63	TPMX280716R-G	CSTB-5	T-20D	AS0006-15	H3	LS1806RH	H4

Central and intermediate inserts and accessories

Cartridge	Insert	Insert screw	Wrench	Lock screw	Wrench
IOZ05R	NPMX080308R-G	CSTB-2.2	T-7D	CSTB-3	T-9D
IOZ402-04	TPMX140308R-G	CSTB-2.5	T-8D	CSTB-3.5	T-15D
IOZ402-32	TPMX170408R-G	CSTB-3.5D	T-9D	CSTA-5	T-15D
IOZ402-43	TPMX240512R-G	CSTB-4M	T-15D	LS1206	H3 / H3L**
IOZ402-63	TPMX280716R-G	CSTB-5	T-20D	LS1206 / LS1206S*	H3 / H3L**

*LS1206S for central cartridge
**H3L for ø151.00 mm - ø320.00 mm

Guide pads and protectors



Guide pad	Lock screw	Wrench	Protector	Dimensions (mm)		Lock screw	Wrench
				W1	S		
GP08	CSTB-3S	T-9D	GPT08	8	4.5	CSTB-3S	T-9D
GP08-25-155-DC	CSTB-3S	T-9D	GPT08	8	4.5	CSTB-3S	T-9D
GP10	CSTB-4S	T-15D	GPT10	10	6	CSTB-4S	T-15D
GP10-35-200-DC	CSTB-4S	T-15D	GPT10	10	6	CSTB-4S	T-15D
GP14	CSTA-5S	T-15D	GPT14	14	7.5	CSTA-5S	T-15D
GP14-40-250-DC	CSTA-5S	T-15D	GPT14	14	7.5	CSTA-5S	T-15D
GP18	LS1206S / LS1206SSS ***	H3	GPT18-M	18	9	LS1206S	H3
GP18-40-300-DC	LS1206S / LS1206SSS ***	H3	GPT18-M	18	9	LS1206S	H3

***LS1206SSS for dimensional guide pad
(for diameter ø118.00 - ø150.99, ø169.00 - ø208.99 and ø233.00 - ø247.99 mm)

Recommended clamping torque

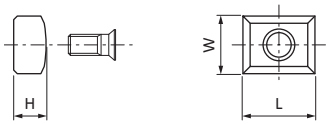
Screw	(N·m)
CSTA-5	3.5
CSTA-5S	3.5
CSTB-2.2	1
CSTB-2.5	1.3
CSTB-3	2.3
CSTB-3S	2.3

Screw	(N·m)
CSTB-3.5	3.5
CSTB-3.5D	2.3
CSTB-4M	3.5
CSTB-4S	3.5
CSTB-5	5
LS1206	3

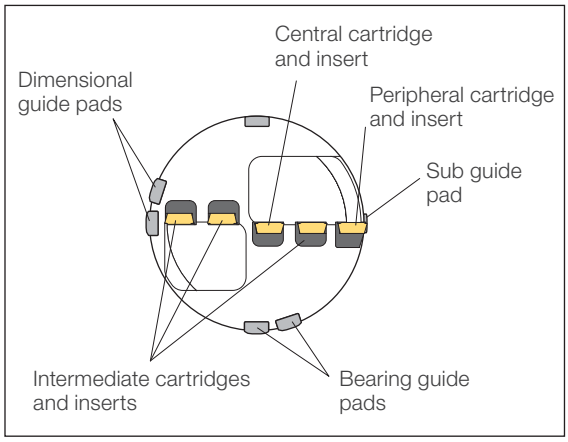
Screw	(N·m)
LS1206S	3
LS1206SSS	3
LS1803RH	2.2
LS1803.5RH	2.2
LS1805RH	3
LS1806RH	5

Replacement parts

Sub guide pad

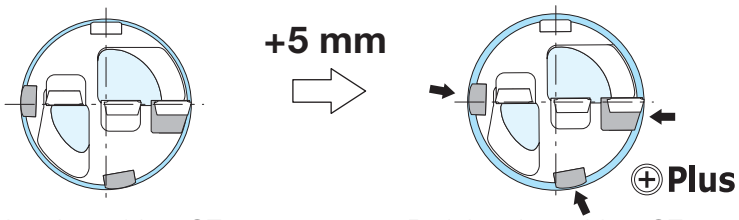


Guide pad	Dimensions (mm)			Lock screw	Wrench
	W	H	L		
CUG08	8	4.5	10	CSTB-3S	T-9D
CUG10	10	5	10	CSTB-3S	T-9D
CUG14-M	14	7	20	CSTA-5S	T-15D



⊕Plus Plus parts

One drill head can drill multiple size holes up to 5 mm larger than nominal diameter. Enlargement size can be determined by peripheral cartridge. e.g. drill heads using OZ402-32 peripheral cartridge can be enlarged up to 4 mm, while drill heads using OZ402-43 can be enlarged up to 5 mm.



Peripheral cartridge: OZ402-43
Guide pad: GP14

Peripheral cartridge: OZ402-43+5
Guide pad: GP14+5 B1042

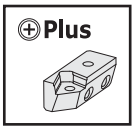
Note:
Not only peripheral cartridges but also guide pads must be used when enlarging the drill head diameter

Plus cartridge - OZ type

	+1 mm		+2 mm		+3 mm		+4 mm		+5 mm	
OZ05R	OZ05R+1	●	OZ05R+2	●	-		-		-	
OZ402-04	OZ402-04+1	●	OZ402-04+2	●	OZ402-04+3	●	-		-	
OZ402-32	OZ402-32+1	●	OZ402-32+2	●	OZ402-32+3	●	OZ402-32+4	●	-	
OZ402-43	OZ402-43+1	●	OZ402-43+2	●	OZ402-43+3	●	OZ402-43+4	●	OZ402-43+5	●
OZ402-63	OZ402-63+1	●	OZ402-63+2	●	OZ402-63+3	●	OZ402-63+4	●	OZ402-63+5	●

Ordering example: OZ402-04+2, 10 pcs

Plus cartridge - OX type



	+1 mm		+2 mm		+3 mm		+4 mm		+5 mm	
OX04R	OX04R+1	○	OX04R+2	○	OX04R+3	○	-		-	
OX32R	OX32R+1	○	OX32R+2	○	OX32R+3	○	OX32R+4	○	-	
OX43R	OX43R+1	○	OX43R+2	○	OX43R+3	○	OX43R+4	○	OX43R+5	○
OX63R	OX63R+1	○	OX63R+2	○	OX63R+3	○	OX63R+4	○	OX63R+5	○

Ordering example: OX32R+2, 10 pcs
OX cartridge is for reaming (close tolerance) and interchangable in the same pocket as OZ cartridge.

Plus guide pad

	+1 mm	Grade B1042	+2 mm	Grade B1042	+3 mm	Grade B1042	+4 mm	Grade B1042	+5 mm	Grade B1042
GP08	GP08+1	●	GP08+2	●	-		-		-	
GP10	GP10+1	●	GP10+2	●	GP08+3	●	GP10+4	●	-	
GP14	GP14+1	●	GP14+2	●	GP10+3	●	GP14+4	●	GP14+5	●
GP18	GP18+1	●	GP18+2	●	GP14+3	●	GP18+4	●	GP18+5	●

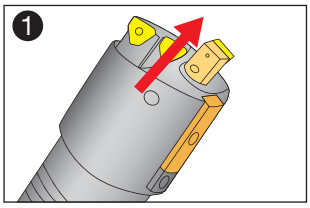
Ordering example: GP08+2 B1042, 10 pcs

● : Line up
○ : To be supplied on request

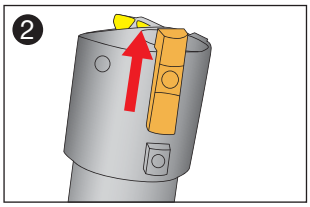
Drill diameter adjustment

Inserts have allowable size variations within the given tolerance range. Observe the following procedures to compensate the insert size variation after indexed to obtain the bore dimension required.

⚠ The drill head body and/or workpiece may be damaged if the drill diameter is not properly adjusted.



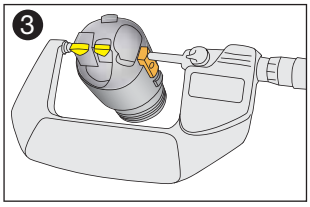
❶ Remove the intermediate cartridge to avoid interference with the guide screw.



❷ Slightly slide the dimensional guide pad to the position parallel to the peripheral insert.

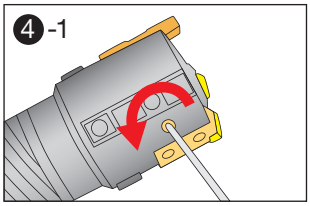
❷-1 Loosen the lock screw and slide the guide pad forward.

❷-2 Retighten the lock screw at the measuring position.



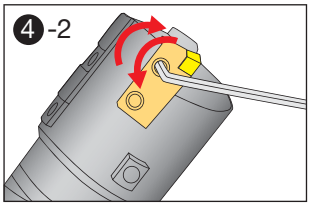
❸ Measure the diameter with micrometer.
Use an h8 tolerance unless otherwise required.

If the diameter needs further adjustments, go to Step ❹
If no adjustment is needed, go to Step ❺

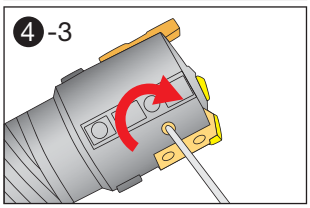


❹ Adjust the peripheral cartridge

❹-1 First loosen the lock screw of the peripheral cartridge and then tighten it slightly.



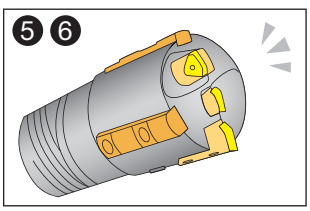
❹-2 Loosen or tighten the two adjusting screws on the cartridge to obtain the dimension required.



❹-3 Tighten the lock screw after adjustment is completed.

❹-4 Recheck the diameter with micrometer. Repeat from Step ❹-1 if further adjustment is needed.

⚠ Please make sure to tighten the lock screw firmly before using. If loose, the cartridge may move and cause serious damage during machining.



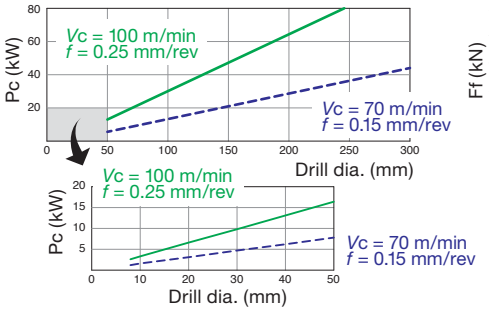
❺ Slide the dimensional guide pad back to the original position and tighten the lock screw.

❻ Replace the intermediate cartridge and tighten the lock screw.

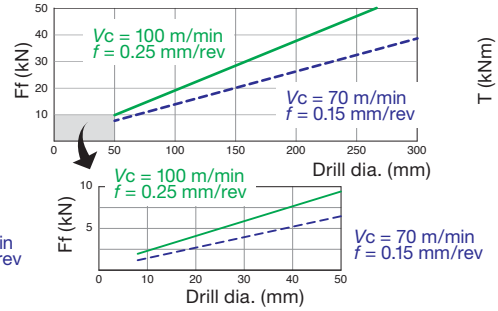
⚠ Please check all the lock screws are firmly tightened as they may come loose if vibration occurs during drilling.

Machine setting for single tube system

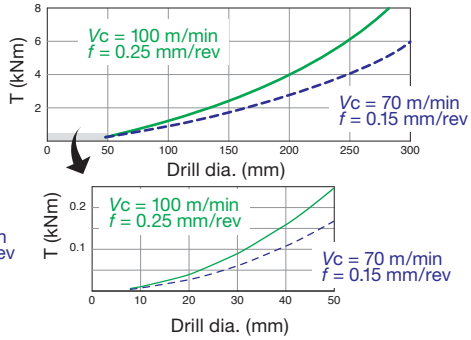
Net power



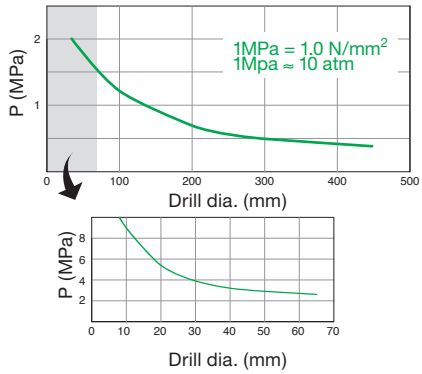
Feed force



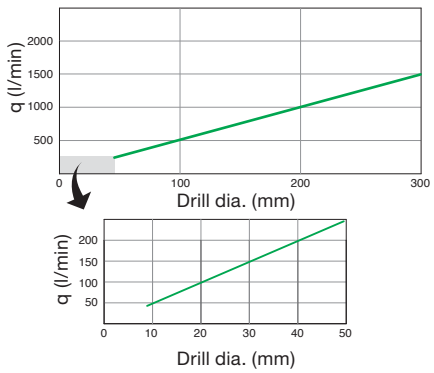
Torque



Coolant pressure

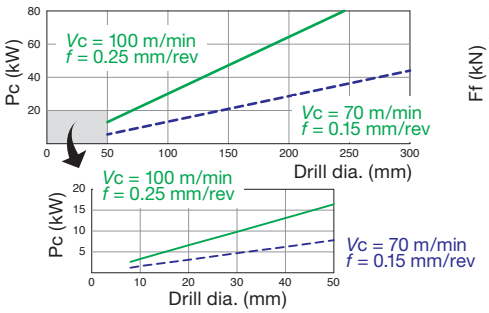


Coolant volume

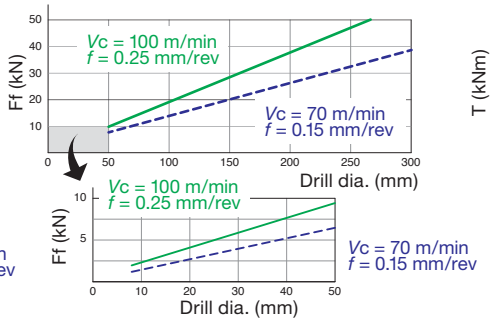


Machine setting for double tube system

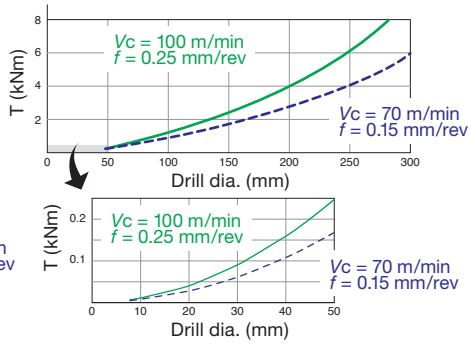
Net power



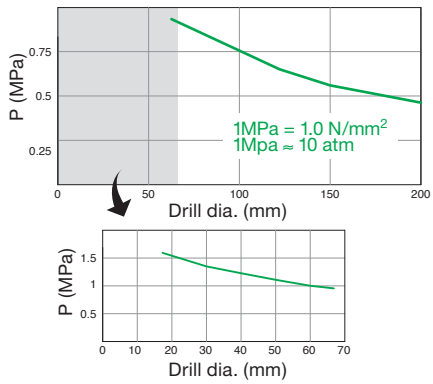
Feed force



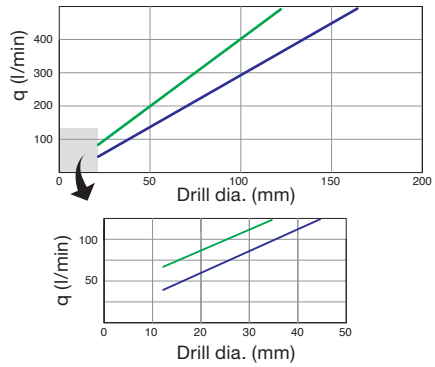
Torque



Coolant pressure



Coolant volume



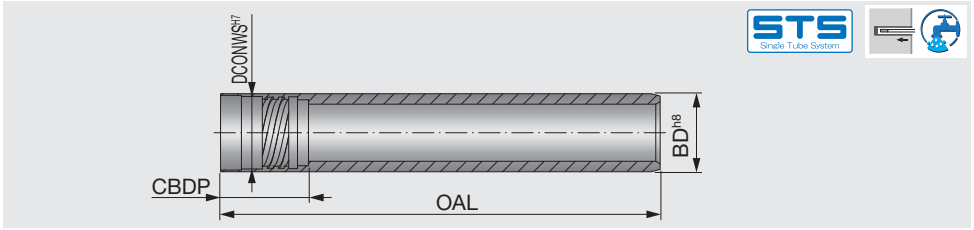
The above values should not be used as the exact recommendations. They may need modification depending on the machining conditions, materials, etc.

TUBES

ST STS

ST - for single tube system

Drill tube for single tube system (STS), internal thread type, double thread (tool dia. ≤ ø15.59 mm) or quadruple thread (tool dia. ≥ ø15.6 mm)



Designation	DCN-DCX	OAL 1600	OAL 2600	OAL Special length	BD	DCONWS	CBDP
ST0097	15.6 - 16.7	●		○	14	12.6	21
ST0098	16.71 - 17.7	●	●	○	15	13.6	21
ST0099	17.71 - 18.9	●	●	○	16	14.5	22
ST0000	18.91 - 20	●	●	○	17	15.5	22
ST00	20.01 - 21.8	●	●	○	18	16	27.5
ST01	21.81 - 24.1		●	○	20	18	30
ST02	24.11 - 26.4		●	○	22	19.5	30
ST03	26.41 - 28.7		●	○	24	21	30
ST04	28.71 - 31		●	○	26	23.5	33
ST05	31.01 - 33.3		●	○	28	25.5	33
ST06	33.31 - 36.2		●	○	30	28	33
ST07	36.21 - 39.6		●	○	33	30	40
ST08	39.61 - 43		●	○	36	33	40
ST09	43.01 - 47		●	○	39	36	40
ST10	47.01 - 51.7		●	○	43	39	40
ST11	51.71 - 56.2		●	○	47	43	44
ST12	56.21 - 60.6		●	○	51	47	44
ST13	60.61 - 65			○	56	51	44
ST14	65 - 66.99			○	56	52	75
ST15	67 - 72.99			○	62	58	75

Designation	DCN-DCX	OAL Special length	BD	DCONWS	CBDP
ST16	73 - 79.99	○	68	63	75
ST17	80 - 86.99	○	75	70	97
ST18	87 - 99.99	○	82	77	97
ST19	100 - 111.99	○	94	89	97
ST20	112 - 123.99	○	106	101	118
ST21	124 - 135.99	○	118	113	118
ST22	136 - 147.99	○	130	125	118
ST23	148 - 159.99	○	142	137	139
ST24	160 - 171.99	○	154	149	139
ST25	172 - 183.99	○	166	161	139
ST26	184 - 195.99	○	178	173	144
ST27	196 - 207.99	○	190	185	144
ST28	208 - 219.99	○	202	197	144
ST29	220 - 231.99	○	214	208	164
ST30	232 - 243.99	○	226	220	164
ST31	244 - 255.99	○	238	232	164
ST32	256 - 267.99	○	250	244	184
ST33	268 - 279.99	○	262	256	184
ST34	280 - 291.99	○	274	268	184

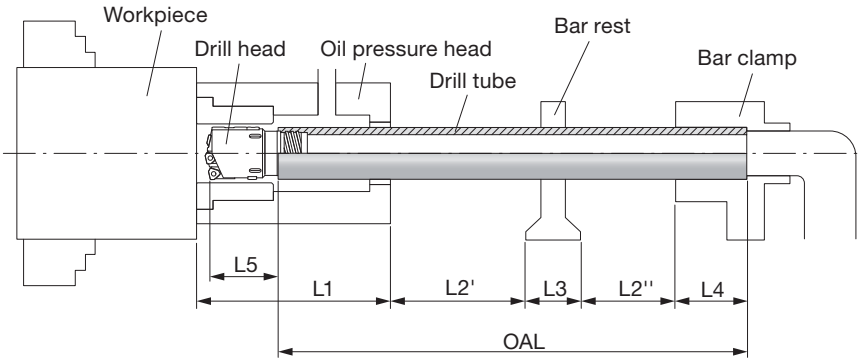
Please specify the length (L) when ordering.
e.g. For ø60 mm drill diameter / 2600 mm drill tube length: ST12X2600
The lengths that are not in the above will be available upon request.

● : Line up
○ : Item to be customized

Reference pages: Drill head → 010 (TRI-FINE STS-EX), 022 (FINE-BEAM STS-EX), 032 - (UNIDEX STS-EX)

Tube length for special drills

Drill tubes with non-standard lengths will be available upon request.
Please use the guide below to calculate the drill tube length.



OAL = Drill tube overall length
L1 = Oil pressure head length
L2 = Drilling depth (L2' + L2")
L3 = Bar rest length
L4 = Drill tube clamp length
L5 = Length from drill tube tip and peripheral edge tip

Drill tube length OAL = L1 + L2 + L3 + L4 - L5

TRI-FINE

DCN-DCX	L5
16 - 16.7	34
16.71 - 17.7	34
17.71 - 18.9	34
18.91 - 20	34
20.01 - 21.8	32.5
21.81 - 21.99	33.5
22 - 24.1	35.5
24.11 - 26.4	35.5
26.41 - 28	35.5

FINE-BEAM

DCN-DCX	L5
25 - 28.7	40
28.71 - 33.3	42
33.31 - 36.2	47
36.21 - 39.6	50
39.61 - 43	55
43.01 - 51.7	60
51.71 - 56.2	66
56.21 - 65	71

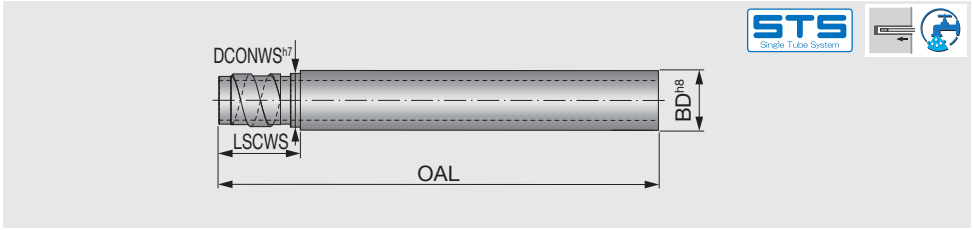
UNIDEX

DCN-DCX	L5
38 - 43	45
43.01 - 51.7	55
51.71 - 56.2	56
56.21 - 65	66
65 - 79.99	75
80 - 111.99	83
112 - 147.99	87
148 - 183.99	86
184 - 255.99	101
256 - 291.99	106

UB STS

UB - for single tube system

Drill tube for single tube system (STS), external thread type, single thread



Designation	DCN-DCX	OAL Special length	BD	DCONWS	LSCWS
UB13-1	15.51 - 16	○	13	12.4	23
UB13-2	16.01 - 16.5	○	13	12.7	23
UB14-1	16.51 - 17.25	○	14	13.4	23
UB14-2	17.26 - 18	○	14	13.7	23
UB15	18.01 - 19	○	15	14.4	23
UB16.5	19.01 - 19.99	○	16.5	15.4	23
UB18	20 - 21.99	○	18	16.5	26
UB20	22 - 24.99	○	20	19	26
UB22	25 - 26.99	○	22	20	26
UB24	27 - 29.99	○	24	22	26
UB26	30 - 31.99	○	26	24	26
UB28	32 - 33.99	○	28	26	26
UB30	34 - 36.99	○	30	27	41
UB33	37 - 39.99	○	33	30	41
UB36	40 - 43.99	○	36	33	41
UB39	44 - 46.99	○	39	37	41
UB43	47 - 51.99	○	43	41	41
UB47	52 - 56.99	○	47	44	41
UB51	57 - 60.99	○	51	49	41
UB56	61 - 67.99	○	56	53	41

Designation	DCN-DCX	OAL Special length	BD	DCONWS	LSCWS
UB62	68 - 74.99	○	62	59	41
UB68	75 - 80.99	○	68	65	71
UB75	81 - 90.99	○	75	71	71
UB82	91 - 98.99	○	82	79	71
UB94	99 - 110.99	○	94	90	71
UB106	111 - 122.99	○	106	102	71
UB118	123 - 134.99	○	118	114	71
UB130	135 - 148.99	○	130	126	71
UB142	149 - 161.99	○	142	139	71
UB154	162 - 173.99	○	154	151	86
UB166	174 - 185.99	○	166	163	86
UB178	186 - 197.99	○	178	175	86
UB190	198 - 209.99	○	190	187	86
UB202	210 - 221.99	○	202	199	86
UB214	222 - 233.99	○	214	211	86
UB226	234 - 245.99	○	226	223	86
UB238	246 - 257.99	○	238	235	86
UB250	258 - 269.99	○	250	247	121
UB262	270 - 281.99	○	262	259	121
UB274	282 - 293.99	○	274	271	121

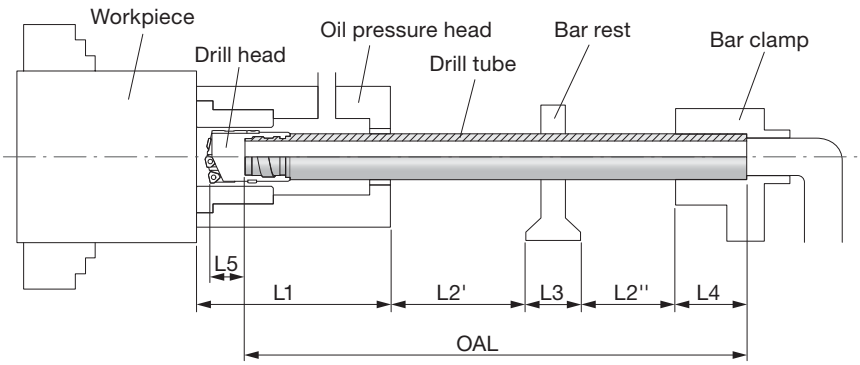
Please specify the length (L) when ordering.
e.g. For ø60 mm drill diameter / 2600 mm drill tube length: UB51X2600

○ : Item to be customized

Reference pages: Drill head → 010 (TRI-FINE STS-IN), 022 (FINE-BEAM STS-IN), 032 - (UNIDEX STS-IN)

Tube length for special drills

Please use the guide below to calculate the drill tube length.



OAL = Drill tube overall length
L1 = Oil pressure head length
L2 = Drilling depth (L2' + L2")
L3 = Bar rest length
L4 = Drill tube clamp length
L5 = Length from drill tube tip and peripheral edge tip

Drill tube length OAL = L1 + L2 + L3 + L4 - L5

TRI-FINE

DCN-DCX	L5
16 - 16.5	31.5
16.51 - 17.25	31.5
17.26 - 18	31.5
18.01 - 19	31.5
19.01 - 19.99	31.5
20 - 21.99	33
22 - 24.99	35
25	35
25.01 - 26.99	40
27 - 28	40

FINE-BEAM

DCN-DCX	L5
25 - 29.99	45
30 - 33.99	50
34 - 36.99	50
37 - 39.99	55
40 - 43.99	60
44 - 51.99	65
52 - 56.99	70
57 - 65	75

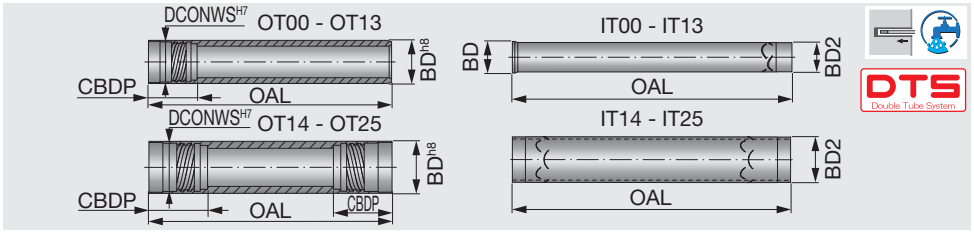
UNIDEX

DCN-DCX	L5
38 - 43.99	40
44 - 51.99	50
52 - 56.99	60
57 - 67.99	70
68 - 161.99	80
162 - 257.99	105
258 - 293.99	90

OT & IT DTS

OT & IT - for double tube system

Outer tube and inner tube for double tube system (DTS)



Outer tube (OT)

Designation	DCN-DCX	OAL Special length	BD	DCONWS	CBDP
OT00	18.4 - 20	○	18	16	27.5
OT01	20.01 - 21.8	○	19.5	18	30
OT02	21.81 - 24.1	○	21.5	19.5	30
OT03	24.11 - 26.4	○	23.5	21	30
OT04	26.41 - 28.7	○	26	23.5	33
OT05	28.71 - 31	○	28	25.5	33
OT06	31.01 - 33.3	○	30.5	28	33
OT07	33.31 - 36.2	○	33	30	40
OT08	36.21 - 39.6	○	35.5	33	40
OT09	39.61 - 43	○	39	36	40
OT10	43.01 - 47	○	42.5	39	40
OT11	47.01 - 51.7	○	46.5	43	44
OT12	51.71 - 56.2	○	51	47	44
OT13	56.21 - 65	○	55.5	51	44
OT14	65 - 66.99	○	56	52	75
OT15	70 - 72.99	○	62	58	75
OT16	73 - 79.99	○	68	63	75
OT17	80 - 86.99	○	75	70	97
OT18	87 - 99.99	○	82	77	97
OT19	100 - 111.99	○	94	89	97
OT20	112 - 123.99	○	106	101	118
OT21	124 - 135.99	○	118	113	118
OT22	136 - 147.99	○	130	125	118
OT23	148 - 159.99	○	142	137	139
OT24	160 - 171.99	○	154	149	139
OT25	172 - 183.99	○	166	161	139

Inner tube (IT)

Designation	DCN-DCX	OAL Special length	BD	BD2
IT00	18.4 - 20	○	12	10
IT01	20.01 - 21.8	○	14	12
IT02	21.81 - 24.1	○	15	13
IT03	24.11 - 26.4	○	16	14
IT04	26.41 - 28.7	○	18	16
IT05	28.71 - 31	○	20	18
IT06	31.01 - 33.3	○	22	20
IT07	33.31 - 36.2	○	24	22
IT08	36.21 - 39.6	○	26	24
IT09	39.61 - 43	○	29	27
IT10	43.01 - 47	○	32	30
IT11	47.01 - 51.7	○	35	32
IT12	51.71 - 56.2	○	39	36
IT13	56.21 - 65	○	43	40
IT14	65 - 66.99	○	-	40
IT15	70 - 72.99	○	-	44
IT16	73 - 79.99	○	-	48
IT17	80 - 86.99	○	-	54
IT18	87 - 99.99	○	-	60
IT19	100 - 111.99	○	-	70
IT20	112 - 123.99	○	-	80
IT21	124 - 135.99	○	-	80
IT22	136 - 147.99	○	-	95
IT23	148 - 159.99	○	-	100
IT24	160 - 171.99	○	-	120
IT25	172 - 183.99	○	-	130

○ : Item to be customized

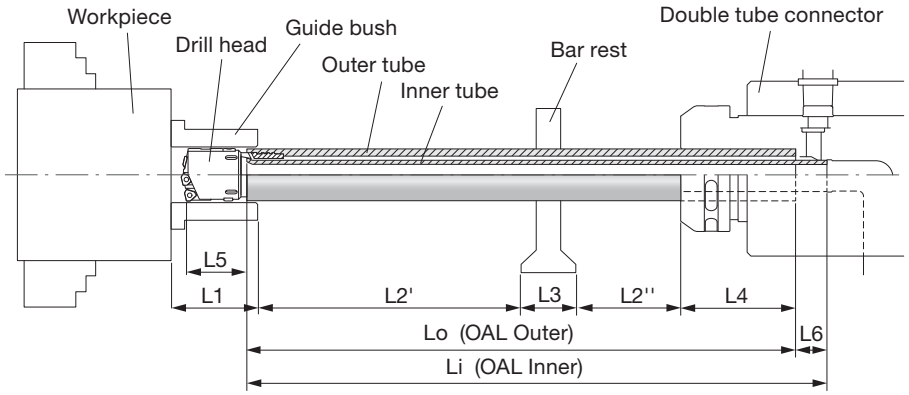
Please specify the length when ordering.
e.g. For ø60 mm drill diameter / 1070 mm drill outer tube length: OT13X1070
Please choose the inner tube length according to the guide below:

- tool diameter: ø18.40 - ø65.00 mm (OT00 - OT13) ..... Inner tube length = Outer tube length + 30 mm
- tool diameter: ø65.00 - ø123.99 mm (OT14 - OT20) ..... Inner tube length = Outer tube length + 190 mm
- tool diameter: ø124.00 - ø183.99 mm (OT21 - OT25) ..... Inner tube length = Outer tube length + 220 mm

Reference pages: Drill head → 011 (TRI-FINE DTS), 023 (FINE-BEAM DTS), 040 - (UNIDEX DTS)

Tube length for special drills

Please use the guide below to calculate the drill tube length.



Lo = Outer tube overall length
Li = Inner tube overall length
L1 = Guide bush length (or Pilot hole depth)
L2 = Drilling depth (L2' + L2")
L3 = Bar rest length
L4 = Length of outer tube in connector*
L5 = Length from drill tube tip and peripheral edge tip
L6 = Difference between outer tube length and inner tube length**

Outer tube overall length Lo = L1 + L2 + L3 + L4 - L5

Inner tube overall length Li = Lo + L6

DTC	L4*	L6**
DTC 4R (OT00 - OT13)	120	30
DTC 5R (OT14 - OT20)	0	190
DTC 6R (OT212 - OT25)	0	220
		(mm)

To facilitate a smooth drill entry into the workpiece, make sure that the drill is inside the guiding bush or pilot hole all the way up to 5 mm over the outer tube before starting the drilling.

TRI-FINE

DCN-DCX	L5
18.4 - 20	31.5
20.01 - 21.8	33.5
21.81 - 21.99	33.5
22 - 24.1	35.5
24.11 - 25	35.5
25.01 - 26.4	37.5
26.41 - 28	37.5

FINE-BEAM

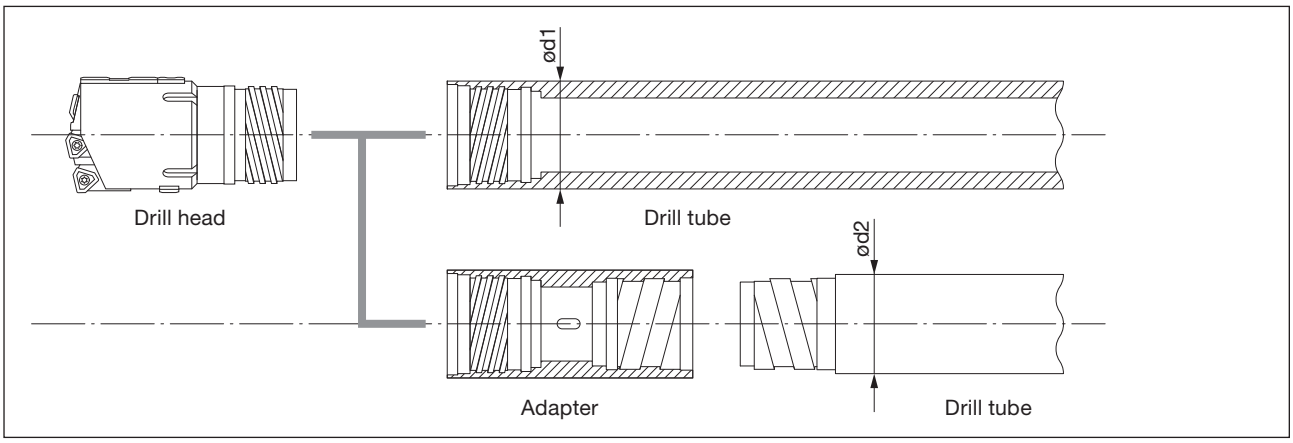
DCN-DCX	L5
25 - 26.4	40
26.41 - 31	42
31.01 - 33.3	47
33.31 - 36.2	50
36.21 - 39.6	55
39.61 - 47	60
47.01 - 51.7	66
51.71 - 65	71

UNIDEX

DCN-DCX	L5
38 - 43	45
43.01 - 47	55
47.01 - 51.7	51
51.71 - 56.2	56
56.21 - 65	66
65 - 79.99	75
80 - 111.99	83
112 - 147.99	87
148 - 183.99	86

Conversion adapter

Adapter for external thread - internal thread conversion



ød1 : Outer diameter of the tube that is applicable for the drill head
ød2 : Outer diameter of the tube that is connected with the adapter

ADPT- □ □ □ / □ □ □

- ød1
  - SS Single-start thread
  - TS 2-start thread
  - FS 4-start thread
- F Internal thread
- M External thread

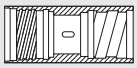
- ød2
  - SS Single-start thread
  - TS 2-start thread
  - FS 4-start thread
- F Internal thread
- M External thread

Designation example

For the conversion from ST11 to UB47

ADPT-F47FS/F47SS

ST11 UB47



*The adapters to change sizes available on request.

Counterboring, Trepanning

Counterboring Tools

Indexable Counterboring Heads

Applications		STS (Single Tube System)				DTS (Double Tube System)	
		KUSTR				KUDTR	
Drill head							
Drill diameter (mm)		ø25 - ø39.99	ø40 - ø291.99	ø25 - ø39.99	ø40 - ø293.99	ø25 - ø39.99	ø40 - ø183.99
Thread type	External quadruple thread	○	○	-	-	○	○
	Internal single thread	-	-	○	○	-	-
Hole tolerance		IT10	IT10	IT10	IT10	IT10	IT10
Surface finish Ra (μm)		2	2	2	2	2	2
Machine	Deep hole drilling machines	○	○	○	○	○	○
	NC machines	-	-	-	-	○	○
	Lathes	-	-	-	-	○	○
	Machining centers M/C	-	-	-	-	○	○
Workpiece material	P Steel	★★★	★★★	★★★	★★★	★★★	★★★
	M Stainless	★★★	★★★	★★★	★★★	★★★	★★★
	K Cast iron	★★★	★★★	★★★	★★★	★★★	★★★
	N Non-ferrous	★★★	★★★	★★★	★★★	★★★	★★★
	S Superalloys	★★	★★	★★	★★	★★	★★
	H Hard materials (≥40HRC)	★★	★★	★★	★★	★★	★★
Insert type*		IIS160	TPMX	IIS160	TPMX	IIS160	TPMX
Plus Cartridge and Guide pad +1 mm - +5 mm		-	○	-	○	-	○

★★★ (Excellent) ◄—► ★ (Standard)

*See page 066 for TPMX inserts and page 067 for IIS inserts.

Trepanning Tools

Indexable Trepanning Heads

Applications		STS (Single Tube System)	
		UTT	
Drill head			
Drill diameter (mm)		ø100 - ø328	ø100 - ø305.99
Thread type	External quadruple thread	○	-
	Internal single thread	-	○
Hole tolerance		IT10	IT10
Surface finish Ra (µm)		2	2
Machine	Deep hole drilling machines	○	○
	NC machines	-	-
	Lathes	-	-
	Machining centers M/C	-	-
Workpiece material	P Steel	★★★	★★★
	M Stainless	★★★	★★★
	K Cast iron	★★★	★★★
	N Non-ferrous	★★★	★★★
	S Superalloys	★★	★★
	H Hard materials (≥40HRC)	★★	★★
Insert type*		TPMX	TPMX
Plus Cartridge and Guide pad +1 mm - +5 mm		-	-

★★★ (Excellent) ◄—► ★ (Standard)

*See page 045 for UNIDEX inserts.

Outer thread type

STS Single Tube System DTS Double Tube System

Guide pad protector

Protects guide pad from damage when retracting tool after drilling

All thread types available

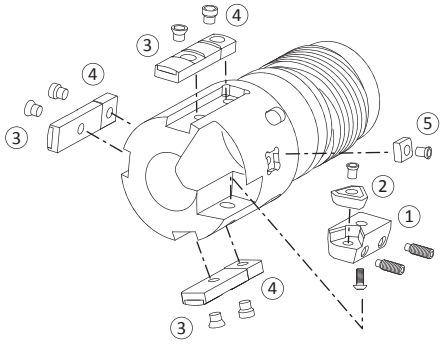
For both STS and DTS

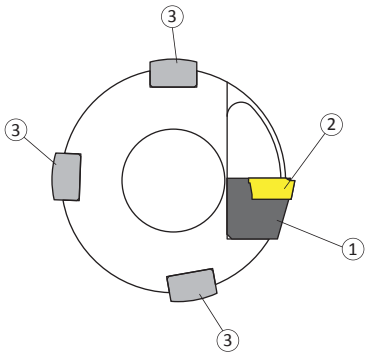
Adjustable cartridge

For diameter up to ø39.99 mm is adjusted with a ball

Sub guide pad

Stabilizes drill head inside guide bush





Part positions may vary depending on the drill size.

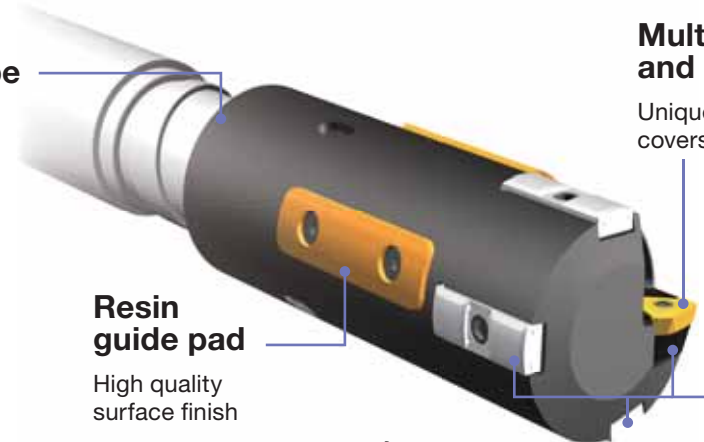
Inner thread type

STS Single Tube System

* For diameter ø40.00 mm and up

Thread type

For STS



Multiple insert grades and geometries*

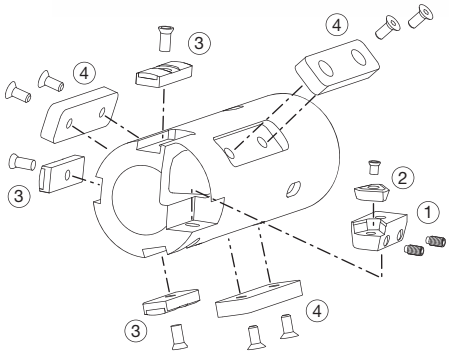
Uniquely designed TPMX insert covers wide application area

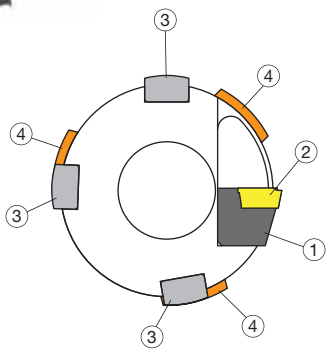
Drill diameter can be enlarged*

By exchanging only the peripheral cartridge and the guide pads the original head diameter can be increased up to 5 mm ⊕Plus

Resin guide pad

High quality surface finish



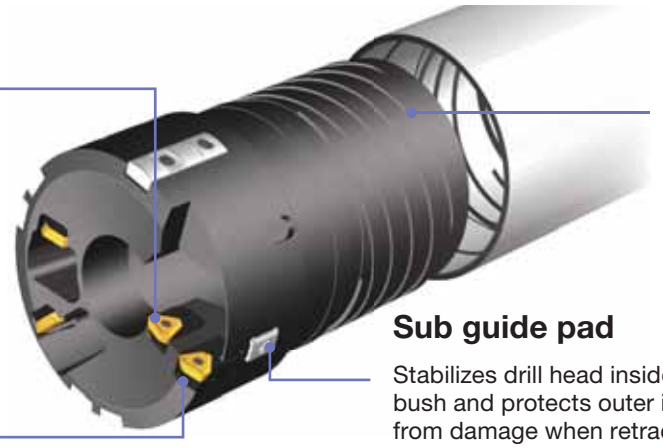


Part positions may vary depending on the drill size.

Outer thread type

Multiple insert grades and geometries

Uniquely designed TPMX insert covers wide application area



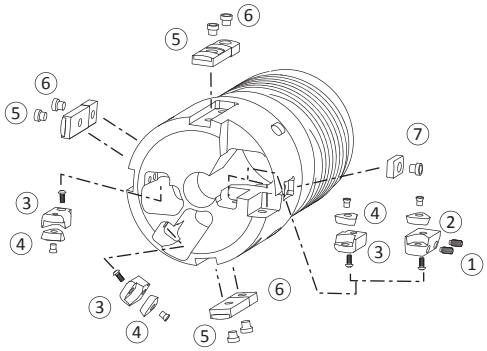
All thread types available

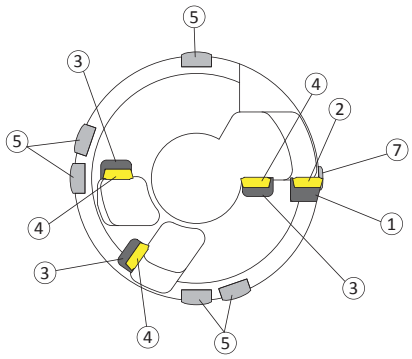
For STS
*Flange type also available upon request. Please contact us for more details.

Sub guide pad

Stabilizes drill head inside guide bush and protects outer insert from damage when retracting tool after drilling

Adjustable peripheral cartridge



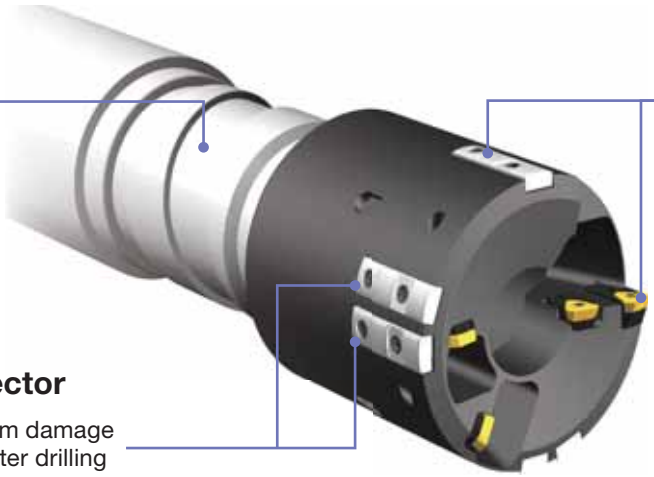


Part positions may vary depending on the drill size.

Inner thread type

All thread types available

For STS
*Flange type also available upon request. Please contact us for more details.

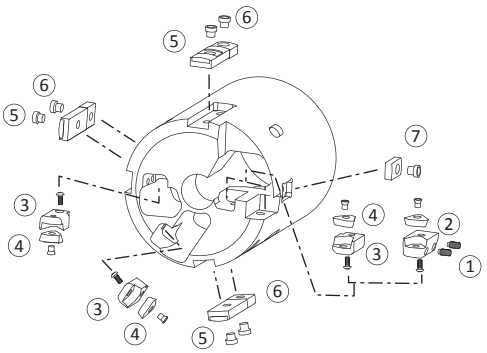


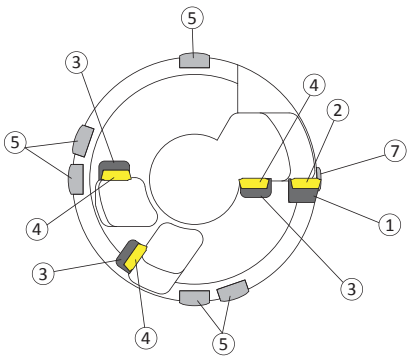
Optimized part layout

Covers entire drilling range with small variety of parts, for easy stock control.

Guide pad protector

Protects guide pad from damage when retracting tool after drilling



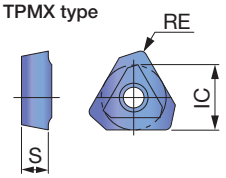


Part positions may vary depending on the drill size.

COUNTERBORING INSERTS

TPMX**L

TPMX type



P	Steel	☆	★	
M	Stainless	☆	☆	
K	Cast iron		★	☆
N	Non-ferrous		★	☆
S	Superalloys	☆	☆	
H	Hard materials		☆	

★ : First choice
☆ : Second choice

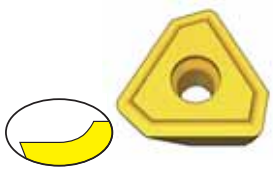
Designation	HAND	Coated			IC	S	RE
		UC1230	UC2220	UC3215			
TPMX140308L-G	L	●	●		8.45	3.5	0.8
TPMX170408L-G	L	●	●	●	10.3	4	0.8
TPMX170408L-BG	L		●		10.3	4	0.8
TPMX170408L-DT	L		●		10.3	4	0.8
TPMX240512L-G	L	●	●	●	14.2	5.5	1.2
TPMX240512L-BG	L		●		14.2	5.5	1.2
TPMX240512L-DT	L		●		14.2	5.5	1.2
TPMX280716L-G	L	●	●	●	17	7.5	1.6
TPMX280716L-BG	L		●		17	7.5	1.6

Use right-hand toolholders (R) with left-hand inserts (L).

●: Line up

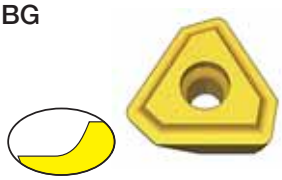
Chipbreaker

G



Versatile

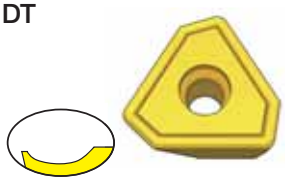
BG



Good chip control for difficult-to-cut steel

*Difficult-to-cut steel: Material that tends to produce long chips

DT



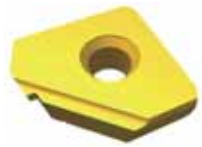
Reduced cutting force

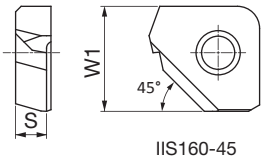
ISO classifications for Insert grades

	Grade	ISO area							
		5	10	15	20	25	30	35	40
P	UC1230								
	UC2220								
M	UC1230								
	UC2220								
K	UC2220								
	UC3215								
N	UC1230								
	UC2220								
	UC3215								
S	UC1230								
	UC2220								
H	UC2220								

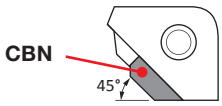
TPMX	140308	L	-	G	UC1230
Series	Size and RE	Hand		Chipbreaker	Grade

IIS





IIS160-45



IIS160-45CBN

P	Steel	★
M	Stainless	★
K	Cast iron	★ ☆
N	Non-ferrous	★
S	Superalloys	★ ☆
H	Hard materials	★ ☆
	Sintered metal	★

★ : First choice
☆ : Second choice

Designation	Coated	CBN	S	W1
	1122	BX480		
IIS160-45	○		2.8	9.5
IIS160-45CBN		○	2.8	9.5

○ : To be supplied on request

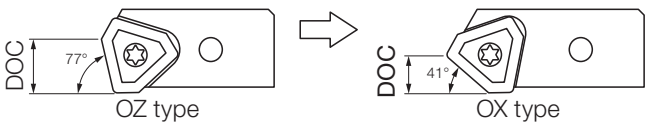
DEEP HOLE MEISTER

Advanced Technique

An indexable Counterboring Head is the first recommendation for counterboring, but ***UNIDEX*** can be used under the conditions below.

1 Small depth of cut (DOC)

Please use OX type for the peripheral cartridge.



OZ type

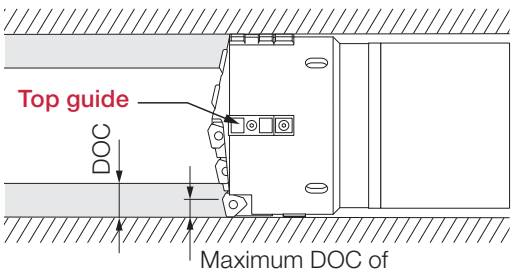
OX type

Please use a left hand type insert with a OX cartridge.

Cartridge	DOC (mm)	Insert	Cartridge	DOC (mm)	Insert
OZ402-04	6.4	TPMX140308R-G	OX04R	4.0	TPMX140308L-G
OZ402-32	7.2	TPMX170408R-G	OX32R	4.8	TPMX170408L-G
OZ402-43	10.4	TPMX240512R-G	OX43R	6.4	TPMX240512L-G
OZ402-63	12.0	TPMX280716R-G	OX63R	7.6	TPMX280716L-G

2 Depth of cut (DOC) is more than peripheral insert range

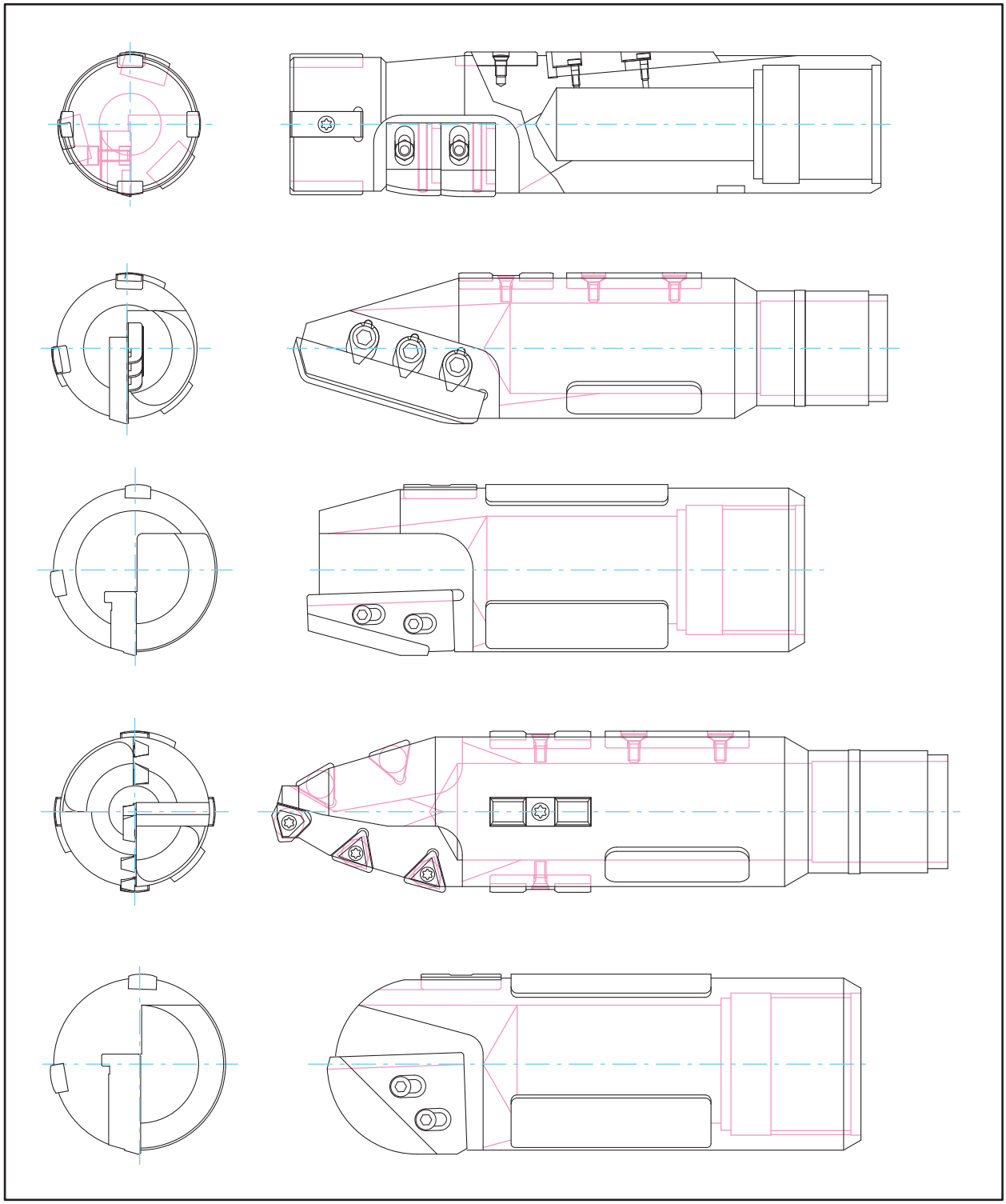
When the DOC exceeds the cutting area of the peripheral insert, the drill head may be unstable. In such cases replace the filler with a top guide pad.



Maximum DOC of peripheral insert

Special tooling

Various types of special tooling are available upon request.
Some examples are shown below.
Please contact your sales representative for further information.



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