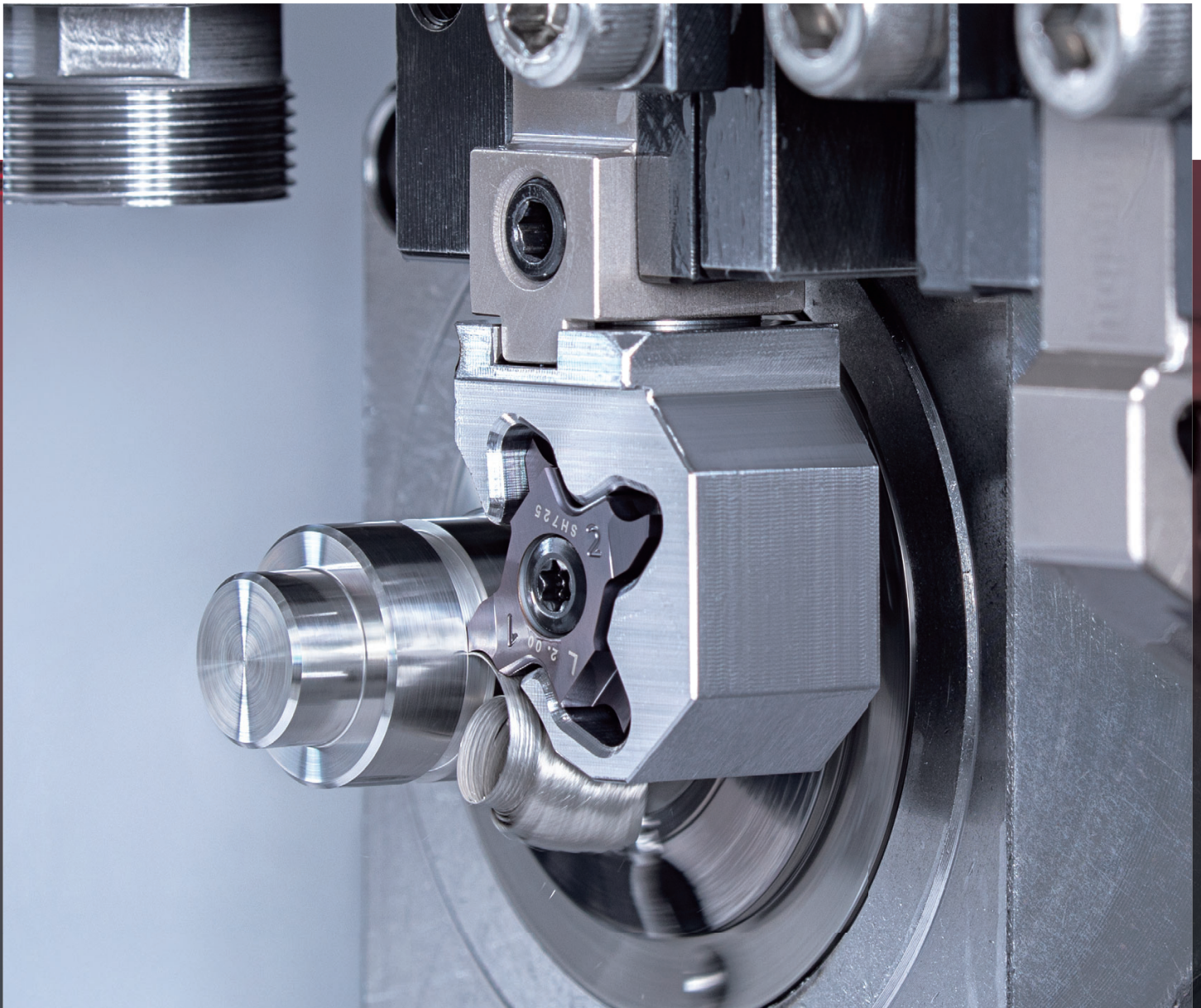


Exchangeable head turning tool system for Swiss machines

MODUM^{INI}TURN

Tungaloy Report No. 541S1-G

New Y-axis exchangeable heads for optimal cutting and chip evacuation



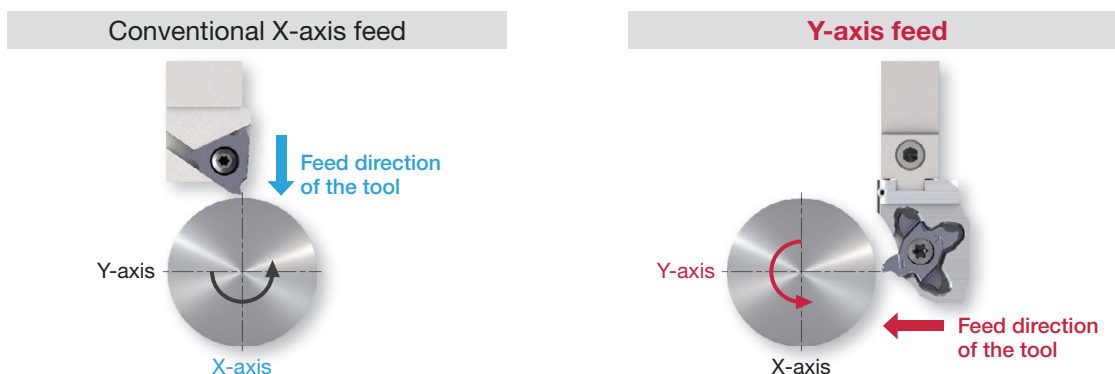


Exchangeable head turning tool system for Swiss machines

- ModuMini-Turn now includes Y-axis cutting heads
- Chip entanglements can permanently be eliminated by feeding the tool in the Y-axis direction

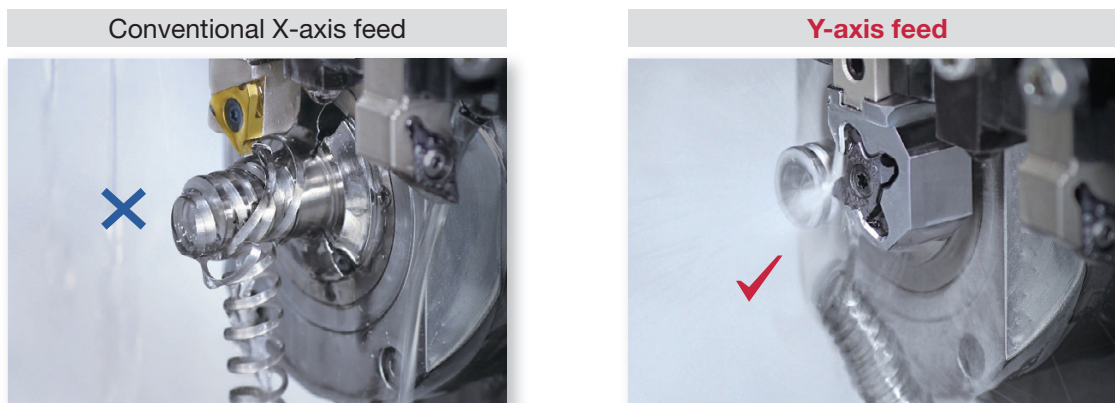
What is Y-axis feed

A machining method that moves the gang slide in the Y-axis direction, instead of traditional X-axis direction



Benefits of Y-axis feed

- 1 No chip entanglements — Chips are directed downward and away from the cutting zone

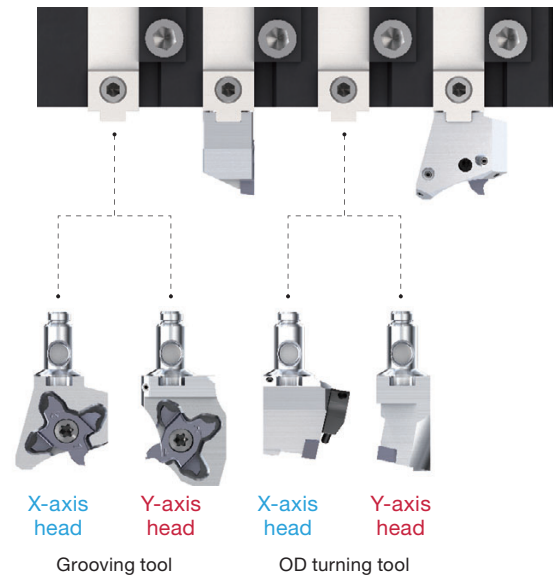


- 2 High part precision and quality — The cutting tool absorbs the cutting force in the strongest, longitudinal direction of the cutting tool, providing tool stability



ModuMini-Turn features

- The cutting heads can be swapped while the holder remains in the gang slide
- Easy handling for reduced downtime
- Y-axis cutting heads and X-axis cutting heads are easily interchangeable



Y-axis cutting head features

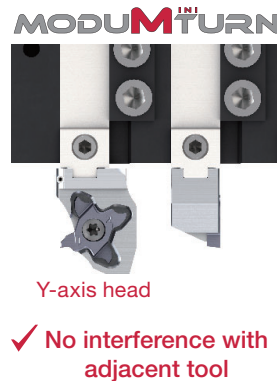
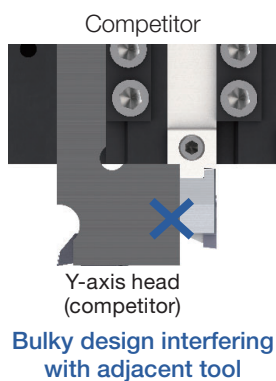
- 1 Various types of cutting heads with high-pressure through-coolant capability are available



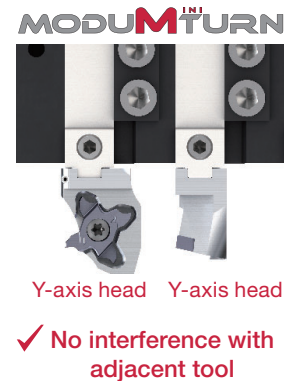
All cutting heads are available with high pressure through-coolant supply

- 2 Compact cutting head design enables side-by-side locations of Y-axis cutting heads

- No tool slots on the gang slide are unusable thanks to the slim head design



- A pair of Y-axis heads can be located side by side on the slide

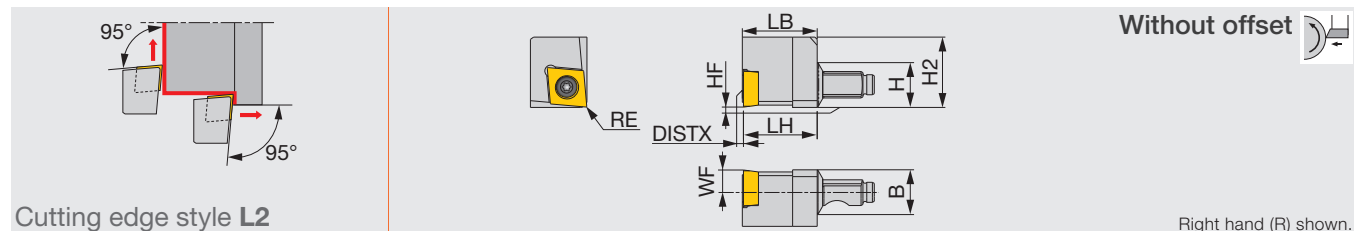


MODULAR HEADS

QC12-JSCL2CR-Y

J-SERIES

Screw-on Y-axis turning modular head with 95° approach angle, for positive 80° rhombic inserts



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSCL2CR09-Y	12	12	19.5	0	6	19.8	18.6	0.3	0.2	CC**09T3...	1.2

*Torque: Recommended clamping torque (N-m)

**RE: Standard corner radius

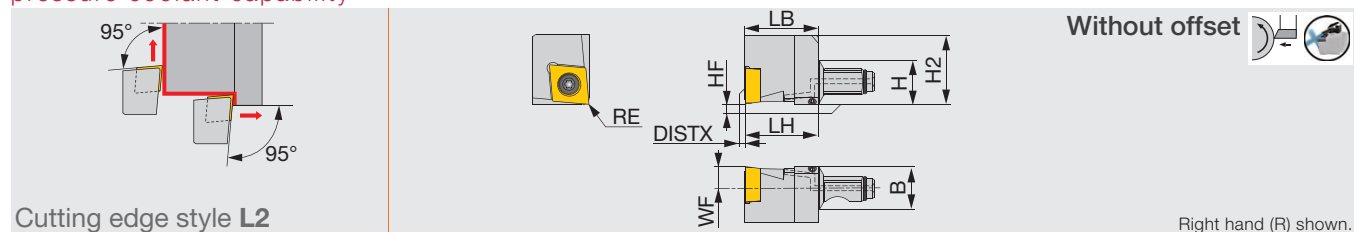
SPARE PARTS

Designation	Clamping screw	Wrench
QC12-JSCL2CR09-Y	CSTB-4SD	T-8F

QC12-JSCL2CR-Y-CHP

J-SERIES

Screw-on Y-axis turning modular head with 95° approach angle, for positive 80° rhombic inserts, with high pressure coolant capability



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSCL2CR09-Y-CHP	12	12	19.5	0	6	19.8	18.6	0.3	0.2	CC**09T3...	1.2

Through-coolant head

*Torque: Recommended clamping torque (N-m)

**RE: Standard corner radius

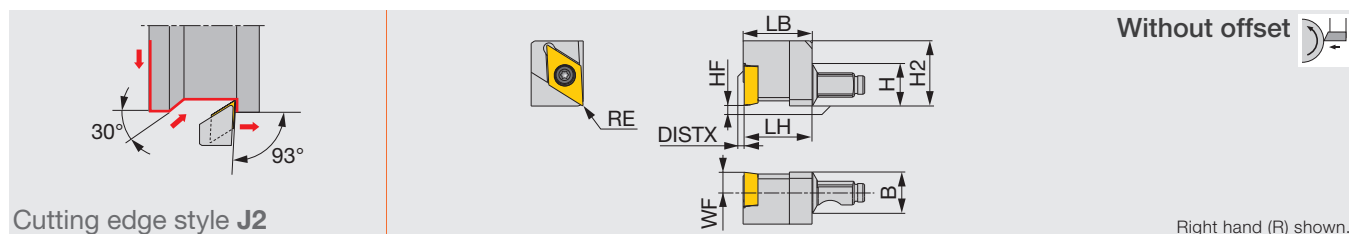
SPARE PARTS

Designation	Clamping screw	Wrench	O-ring
QC12-JSCL2CR09-Y-CHP	CSTB-4SD	T-8F	ORSS-0454.5X1.0NBR70

QC12-JSDJ2CR-Y

J-SERIES

Screw-on Y-axis turning modular head with 93° approach angle, for positive 55° rhombic inserts



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSDJ2CR11-Y	12	12	19.5	0	6	19.8	18.7	0.3	0.2	DC**11T3...	1.2

*Torque: Recommended clamping torque (N·m)

**RE: Standard corner radius

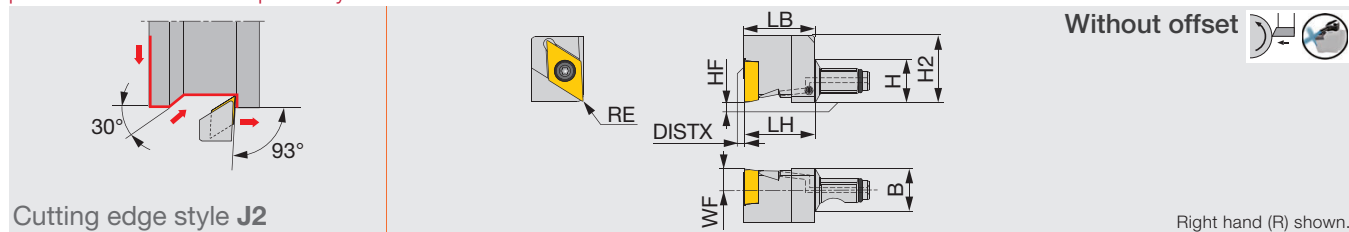
SPARE PARTS

Designation	Clamping screw	Wrench
QC12-JSDJ2CR11-Y	CSTB-4SD	T-8F

QC12-JSDJ2CR-Y-CHP

J-SERIES

Screw-on Y-axis turning modular head with 93° approach angle, for positive 55° rhombic inserts, with high pressure coolant capability



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSDJ2CR11-Y-CHP	12	12	19.5	0	6	19.8	18.7	0.3	0.2	DC**11T3...	1.2

Through-coolant head

*Torque: Recommended clamping torque (N·m)

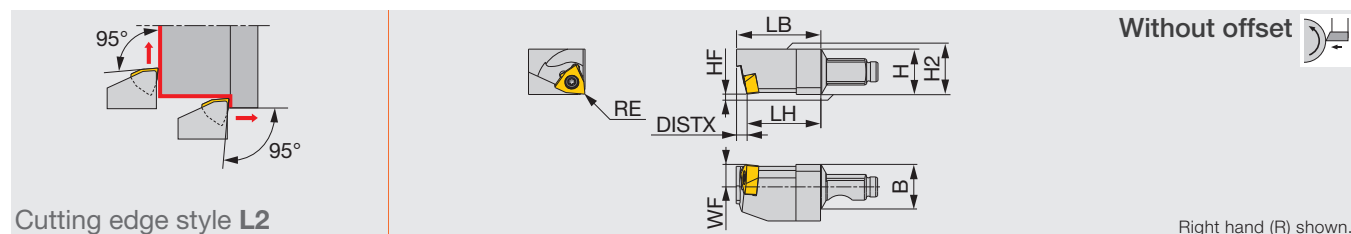
**RE: Standard corner radius

SPARE PARTS

Designation	Clamping screw	Wrench	O-ring
QC12-JSDJ2CR11-Y-CHP	CSTB-4SD	T-8F	ORSS-0454.5X1.0NBR70

QC12-JSWL2XR-Y

Screw-on Y-axis turning modular head with 95° approach angle, for WXGU inserts



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSWL2XR04-Y	12	12	19.5	0	6	22.3	12	2.8	0.2	WXGU0403**L...	0.9

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

*Torque: Recommended clamping torque (N·m)

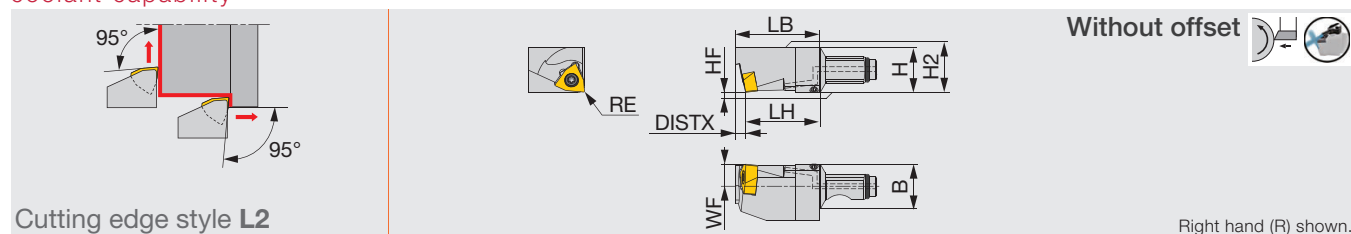
**RE: Standard corner radius

SPARE PARTS

Designation	Clamping screw	Wrench
QC12-JSWL2XR04-Y	SR34-514	T-7F

QC12-JSWL2XR-Y-CHP

Screw-on Y-axis turning modular head with 95° approach angle, for WXGU inserts, with high pressure coolant capability



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSWL2XR04-Y-CHP	12	12	19.5	0	6	22.3	12	2.8	0.2	WXGU0403**L...	0.9

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

Through-coolant head

*Torque: Recommended clamping torque (N·m)

**RE: Standard corner radius

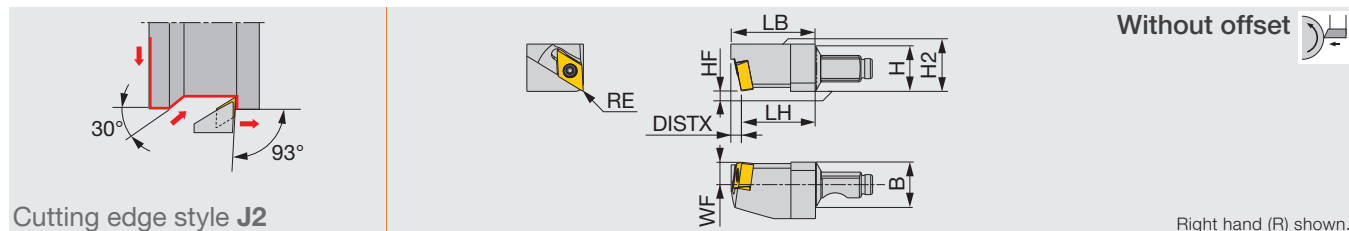
SPARE PARTS

Designation	Clamping screw	Wrench	O-ring
QC12-JSWL2XR04-Y-CHP	SR34-514	T-7F	ORSS-0454.5X1.0NBR70

QC12-JSDJ2XR-Y

MINIFURN

Screw-on Y-axis turning modular head with 93° approach angle, for DX*U inserts



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSDJ2XR07-Y	12	12	19.5	0	6	22.3	12.5	2.8	0.2	DX*U0703**L...	0.9

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

*Torque: Recommended clamping torque (N·m)

**RE: Standard corner radius

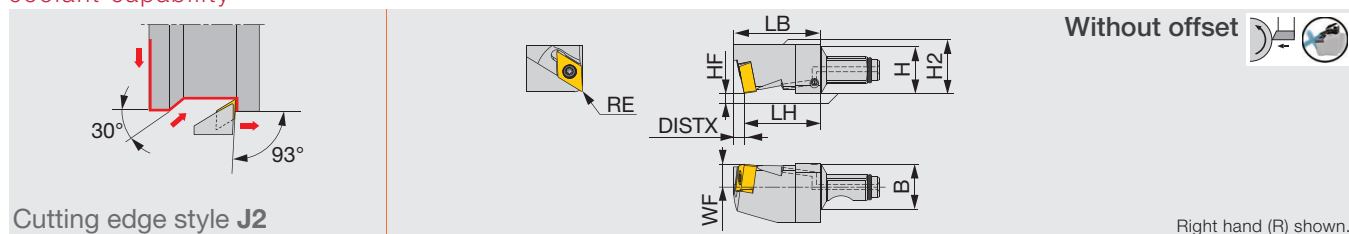
SPARE PARTS

Designation	Clamping screw	Wrench
QC12-JSDJ2XR07-Y	SR34-514	T-7F

QC12-JSDJ2XR-Y-CHP

MINIFURN

Screw-on Y-axis turning modular head with 93° approach angle, for DX*U inserts, with high pressure coolant capability



Designation	H	B	LH	HF	WF	LB	H2	DISTX	RE**	Insert	Torque*
QC12-JSDJ2XR07-Y-CHP	12	12	19.5	0	6	22.3	12.5	2.8	0.2	DX*U0703**L...	0.9

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

Through-coolant head

*Torque: Recommended clamping torque (N·m)

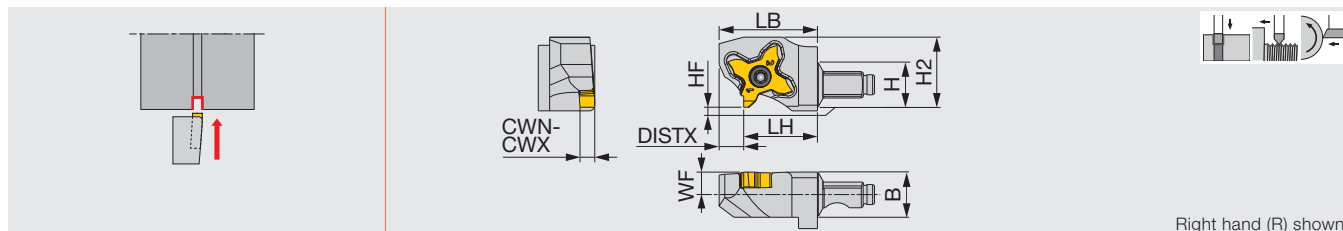
**RE: Standard corner radius

SPARE PARTS

Designation	Clamping screw	Wrench	O-ring
QC12-JSDJ2XR07-Y-CHP	SR34-514	T-7F	ORSS-0454.5X1.0NBR70

QC12-STCR-Y

Y-axis turning modular head for external grooving and threading



Designation	CWN	CWX	H	B	LH	HF	WF	LB	H2	DISTX	Insert	Torque*
QC12-STCR18-Y	0.33	3	12	12	19.5	0	6	26	18.6	6.5	TC*18R...	1.2

The right hand insert (R) is used for the right hand toolholder (R).
*Torque: Recommended clamping torque (N-m)

SPARE PARTS

Designation	Clamping screw	Wrench
QC12-STCR18-Y	CSTC-4L100DL	T-1008/5

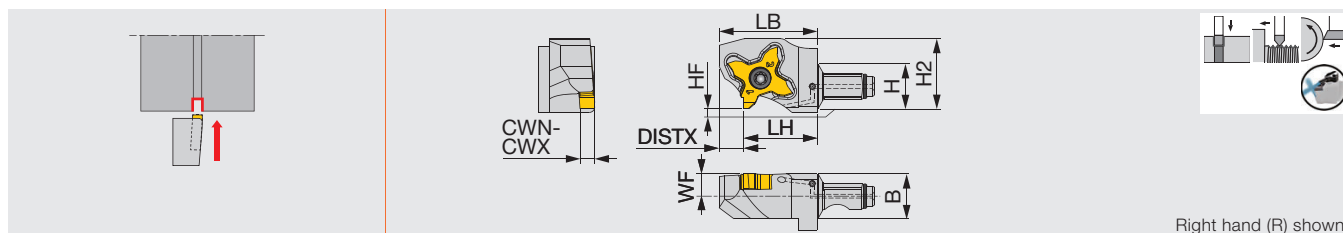
Right-hand insert



TC*18R...

QC12-STCR-Y-CHP

Y-axis turning modular head for external grooving and threading, with high pressure coolant capability



Designation	CWN	CWX	H	B	LH	HF	WF	LB	H2	DISTX	Insert	Torque*
QC12-STCR18-Y-CHP	0.33	3	12	12	19.5	0	6	26	18.6	6.5	TC*18R...	1.2

The right hand insert (R) is used for the right hand toolholder (R).
Through-coolant head

*Torque: Recommended clamping torque (N-m)

SPARE PARTS

Designation	Clamping screw	Wrench	O-ring
QC12-STCR18-Y-CHP	CSTC-4L100DL	T-1008/5	ORSS-0454.5X1.0NBR70

Right-hand insert

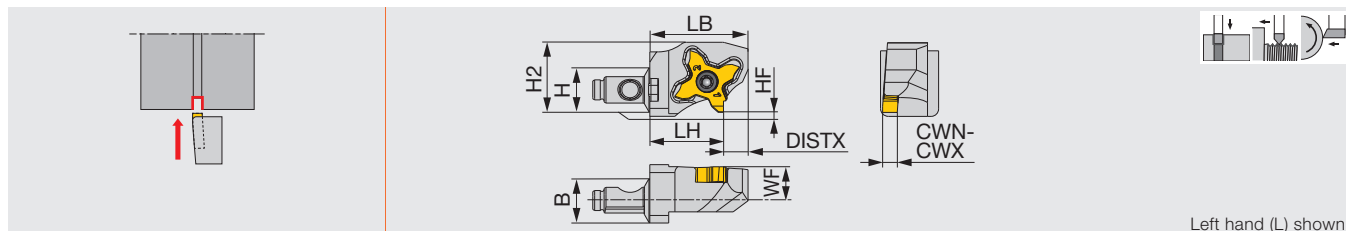


TC*18R...

QC12-STCL-Y

TETRAMCUT

Y-axis turning modular head for external grooving and threading



Designation	CWN	CWX	H	B	LH	HF	WF	LB	H2	DISTX	Insert	Torque*
QC12-STCL18-Y	0.33	3	12	12	19.5	0	9	26	18.6	6.5	TC*18L...	1.2

The left hand insert (L) is used for the left hand toolholder (L).

*Torque: Recommended clamping torque (N-m)

SPARE PARTS

Designation	Clamping screw	Wrench
QC12-STCL18-Y	CSTC-4L100DR	T-1008/5

Left-hand insert

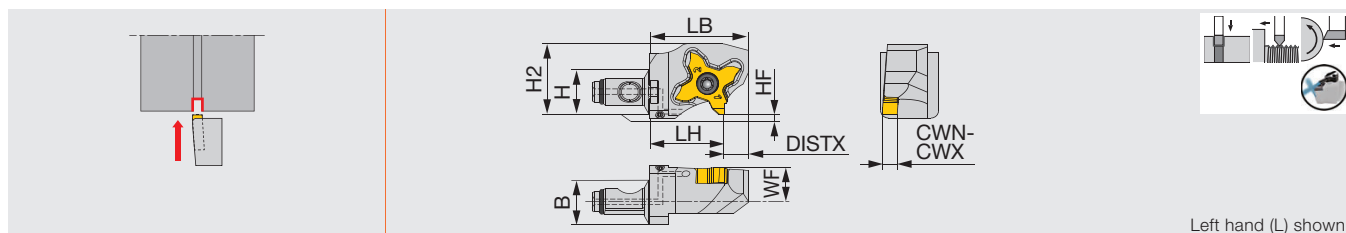


TC*18L...

QC12-STCL-Y-CHP

TETRAMCUT

Y-axis turning modular head for external grooving and threading, with high pressure coolant capability



Designation	CWN	CWX	H	B	LH	HF	WF	LB	H2	DISTX	Insert	Torque*
QC12-STCL18-Y-CHP	0.33	3	12	12	19.5	0	9	26	18.6	6.5	TC*18L...	1.2

The left hand insert (L) is used for the left hand toolholder (L).

Through-coolant head

*Torque: Recommended clamping torque (N-m)

SPARE PARTS

Designation	Clamping screw	Wrench	O-ring
QC12-STCL18-CHP	CSTC-4L100DR	T-1008/5	ORSS-0454.5X1.0NBR70

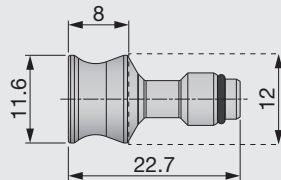
Left-hand insert



TC*18L...

QC12-STOPPER

Protective plug for shank



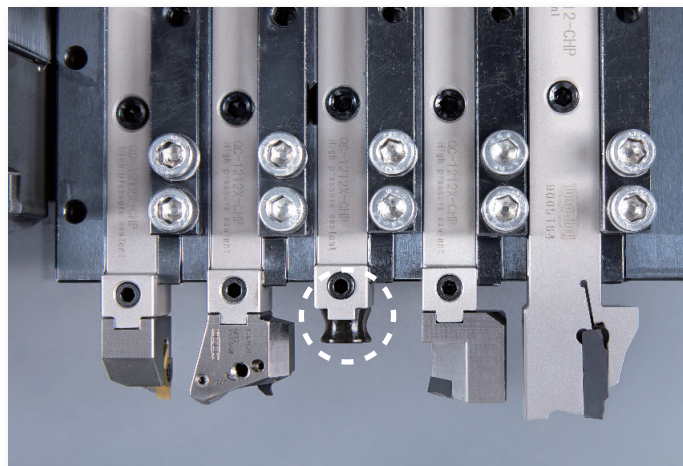
Designation

QC12-STOPPER

SPARE PARTS



Designation	O-ring
QC12-STOPPER	ORSS-0454.5X1.0NBR70

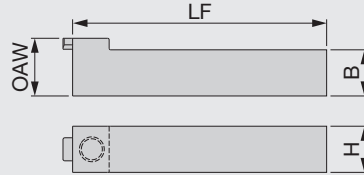


The cutting head located in the feed direction of the Y-axis tool can be removed to make room for machining larger-sized barstock. If this is the case, attach the plug to the shank to protect the coupling surface from chips, as well as prevent coolant leakage during machining.

SHANKS

QC-1212

Shank for modular heads



Designation	H	B	LF	OAW	Torque*
QC-1212F	12	12	65	15	3
QC-1212X	12	12	100	15	3

*Torque: Recommended clamping torque (N-m)

SPARE PARTS



Designation	Clamping screw	Wrench
QC-1212*	SRM6X0.5-26977	P-3

QC-1212-CHP

Shank for modular heads, with high pressure coolant capability

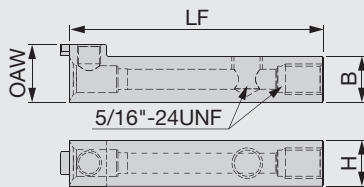


Fig.1

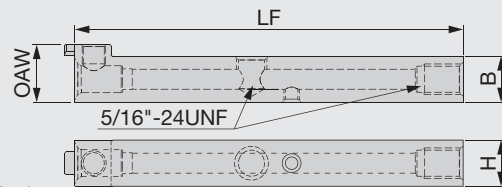


Fig.2

Designation	H	B	LF	OAW	Torque*	Fig.
QC-1212F-CHP	12	12	65	15	3	1
QC-1212X-CHP ⁽¹⁾	12	12	100	15	3	2

(1) Compatible to the direct internal coolant supply system without the use of external coolant hose.
Through-coolant shank

*Torque: Recommended clamping torque (N-m)

SPARE PARTS

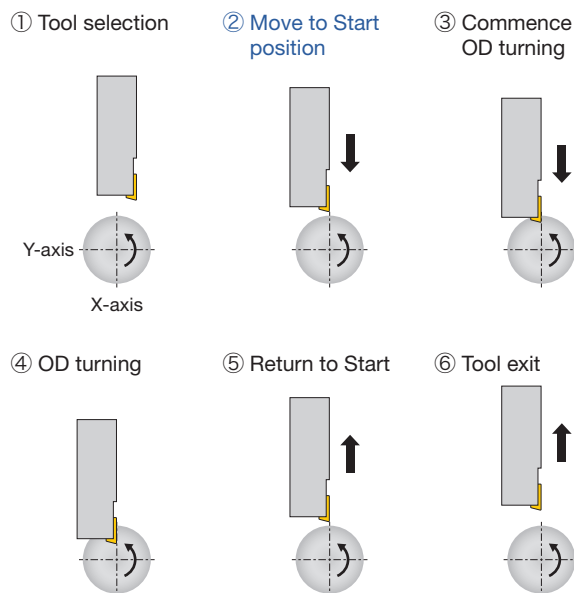


Designation	Clamping screw	Wrench	Coolant plug	Wrench	DirectJet plug	Wrench
QC-1212F-CHP	SRM6X0.5-26977	P-3	SR5/16UNFTL360	P-4	-	-
QC-1212X-CHP	SRM6X0.5-26977	P-3	SR5/16UNFTL360	P-4	SSH4-6-TB	P-2

Cautions when using Y-axis cutting heads

Machining procedures

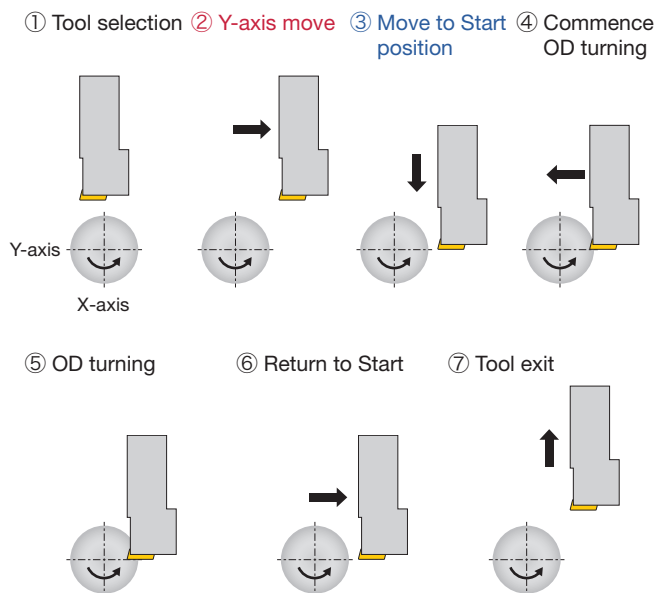
Conventional X-axis machining



Programming sample

- ① T0200 Tool selection
- ② G00 X13.0 Z0 T2 Move to start position
- ③ G01 X10.0 F0.1 Commence OD turning
- ④ Z5.0 F0.05 OD turning
- ⑤ X13.0 Return to start position
- ⑥ G00X20.0 Tool exit

Y-axis machining



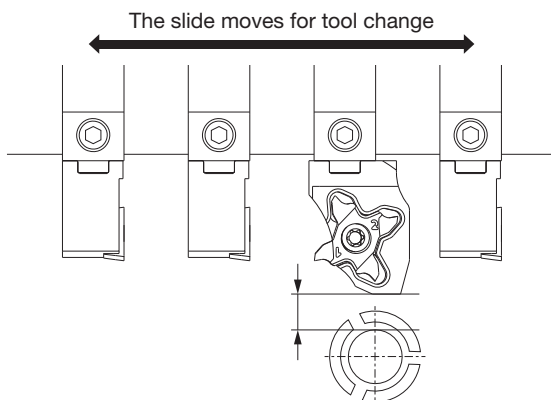
Programming sample

- ① T0200 Tool selection
- ② G00 Y13.0 Z0 T2 Move the Y-axis
- ③ X0 Move to start position
- ④ G01 Y10.0 F0.1 Commence OD turning
- ⑤ Z5.0 F0.05 OD turning
- ⑥ Y13.0 Return to start position
- ⑦ G00X20.0 Tool exit

Note) Ensure to first move ② Y-axis before ③ moving to the start position.

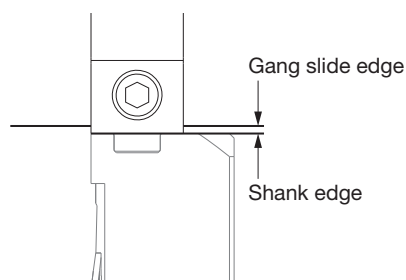
Difference in tool overhang

Due to the difference in overhang from conventional X-axis tools, Y-axis tool needs special attention to avoid collision with the workpiece during the slide movement. To ensure safety, program so that the cutting head stays clear from the workpiece.



Caution when installing the shank on the gang slide

To ensure secure tool coupling, install the shank on the gang slide so that the shank edge protrudes 0.5 mm or more from the edge of the slide unit. Make sure that the cutting head and the slide unit are NOT in contact.



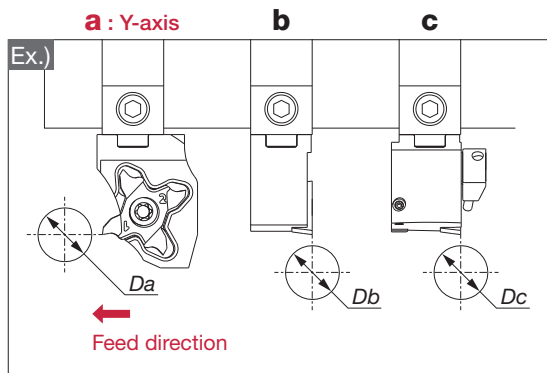
● Reduction of machinable barstock diameters

Depending on the Y-axis cutting tool's location and orientation on the gang tool slide, machinable barstock diameter may vary. To avoid tool collision and damage with the workpiece, check the machinable barstock size in the list below before using Y-axis cutting head.

Note: The values in the list are calculated, provided that the cutting tools on the slide are all accurately set to the equal tool length before operation.

A When there is no tool located in the feed direction of Y-axis tool

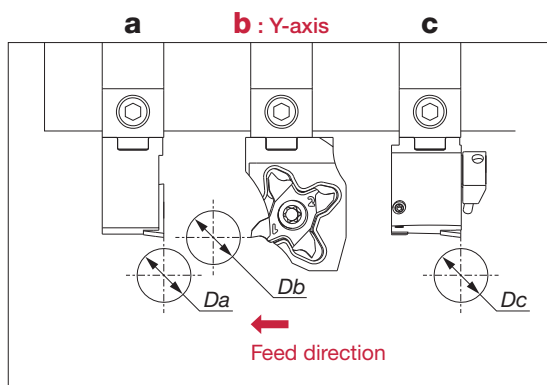
Ex.) Y-axis tool is located at the very end of the slide facing outward



Tool position	a	b	c
Cutting head type	Y-axis head	X-axis head	X-axis head
Machinable barstock dia.	No restriction for the D_a value	$D_b = \varnothing 70 \text{ mm}$	No restriction for the D_c value

B When there is a tool located in the feed direction of the Y-axis tool

B-1: When X-axis tool is in the Y-axis feed direction



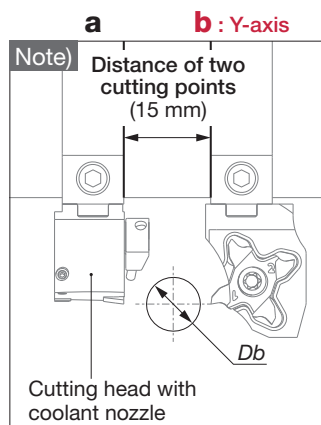
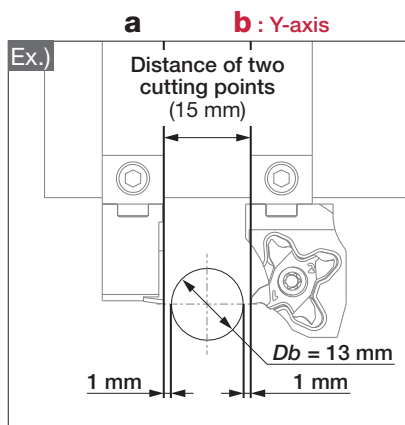
Tool position	a	b	c
Cutting head type	X-axis head	Y-axis head	X-axis head
Machinable barstock dia.	No restriction for the D_a value	See below for the D_b value	$D_c = \varnothing 70 \text{ mm}$

Calculation for D_b

$D_b = \text{Distance between the cutting points} - 2 \text{ mm (for the holder clearances)}$

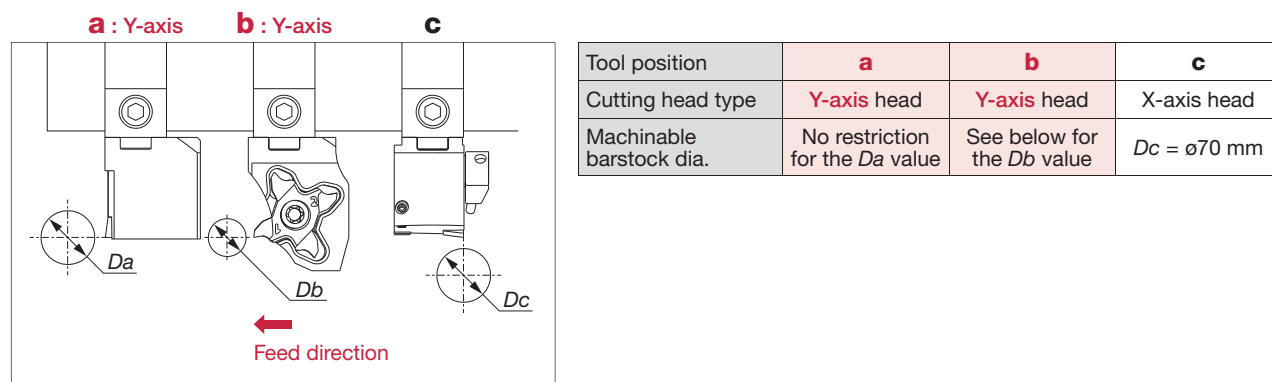
Ex.) Given that the two cutting points are 15 mm apart,

$$D_b = 15 - 2 = \varnothing 13 \text{ mm}$$



Note) When Y-axis tool is adjacent to a tool with coolant nozzle, a collision may occur even if a proper distance is maintained between the tools. For such tool setup, always use precautionary measures to avoid interference before starting the operation.

B-2: When another Y-axis tool is in the Y-axis feed direction



Calculation for D_b

D_b = Distance between the two cutting points – Max head width – 2 mm (for the clearances)

Max head width = Head width (H2) – Shank width (B)

See the catalog for the tool's H2 and B sizes.

Ex.) Given: the cutting point distance = 15 mm

Using QC12-JSCL2CR09-Y-CHP as the adjacent tool (H2 = 18.6 mm, B = 12 mm)

$$D_b = 15 - (18.6 - 12) - 2 = \phi 6.4 \text{ mm}$$

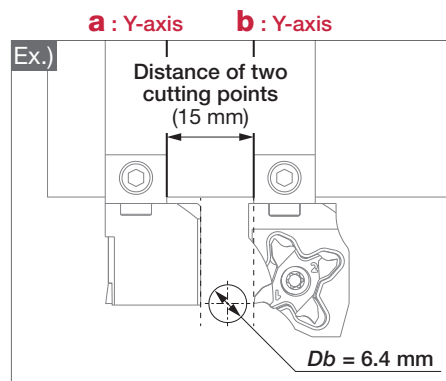


Chart sheet for the D_b values when using ModuMini-Turn Y-axis cutting head

Y-axis cutting head	Distance between the two tools (mm)	H2 (mm)	Shank width B (mm)	Machinable barstock dia. D_b (mm)
QC12-JSCL2CR09-Y (-CHP)	15	18.6	12	$\phi 6.4$
QC12-JSDJ2CR11-Y (-CHP)		18.7	12	$\phi 6.3$
QC12-JSWL2XR04-Y (-CHP)		12	12	$\phi 13$
QC12-JSDJ2XR07-Y (-CHP)		12.5	12	$\phi 12.5$
QC12-STCR/L18-Y (-CHP)		18.6	12	$\phi 6.4$
QC12-STOPPER		-	12	$\phi 21$

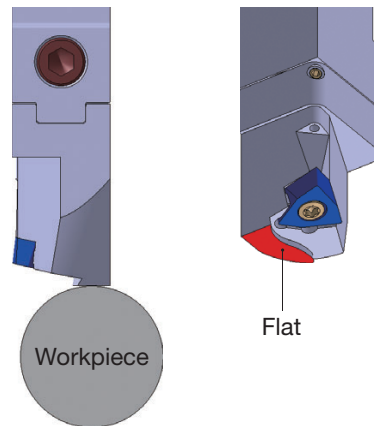
■ Cutting point offset in the radial (X-axis) direction

● Setting Method

To offset the cutting point position in the radial (X-axis) direction during the tool setup, lower the flat (the red-colored area) of the cutting head to contact the workpiece, then compensate the tool position by offsetting the program for the distance between the flat and the cutting point (see the list below for the offset values).

Presetting

- Bring the flat into contact with the workpiece and preset the value for the radial (X-axis) direction.



Programming

- The offset values for the cutting point are shown in the list below.
- Set the offset value in the machining program to compensate the cutting point position.

	Offset values for Y-axis cutting head types		
	J-SERIES	MINIFURN	TETRAMCUT
Y-axis cutting head			
	QC12-JSCL2CR09-Y (-CHP) QC12-JSDJ2CR11-Y (-CHP)	QC12-JSDJ2XR07-Y (-CHP) QC12-JSWL2XR04-Y (-CHP)	QC12-STCR/L18-Y (-CHP)
DISTX Offset value for the cutting point	0.3 mm (Ref.)	2.8 mm (Ref.)	6.5 mm (Ref.)

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