

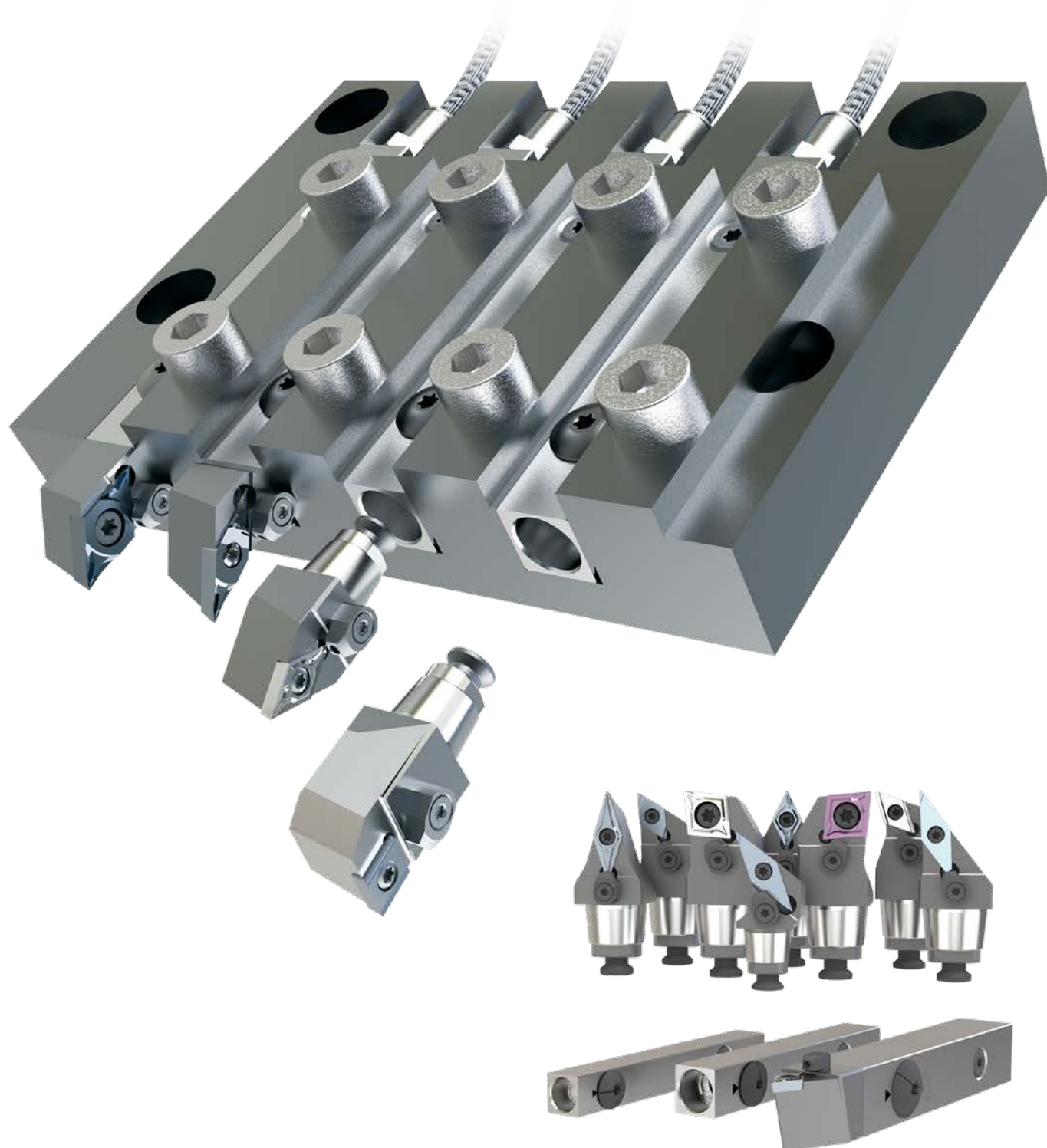
NEW

2026.10

B273E

MODULAR MICRO

QUICK-CHANGE SYSTEM FOR GANG-TYPE AUTOMATIC LATHES



 **MITSUBISHI MATERIALS**

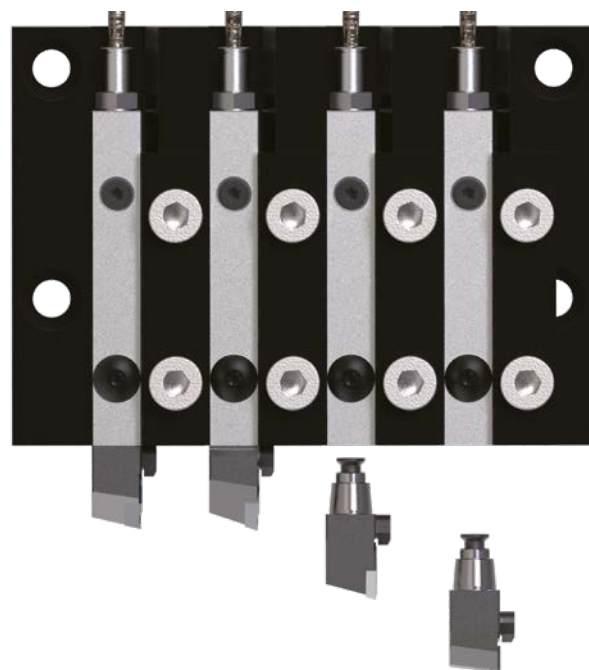
MODULAR MICRO

FASTER CHANGEOVER, MORE CUTTING TIME

In Swiss-type lathes, comb-type toolposts are widely used for external turning operations. However, tools mounted on these types of posts are typically a screw-on design, making insert replacement inside the machine impractical due to limited working space and the added risk of parts being dropped.

To address these difficulties, this system adopts a quick-change design that allows only the head to be attached and detached while keeping the shank mounted on the machine. This enables easy tool changes while ensuring repeatability within 5 μm , thereby enhancing process reliability.

By reducing setup time, this enables more effective cutting time that improves productivity. Modular Micro was developed with the aim of achieving these benefits.



QUICK-CHANGE REDUCES TOOL CHANGE SETUP TIME

BEFORE (CONVENTIONAL PROCESS)

- 1 Remove tool from toolpost (Loosen and remove multiple fixing bolts)
- 2 Replace insert and measure cutting edge position off the machine
- 3 Move the toolpost to the working position
- 4 Touch the cutting edge to the workpiece, align and clamp the tool
- 5 Enter offset values



Approx.
2 min

AFTER (QUICK-CHANGE SYSTEM)

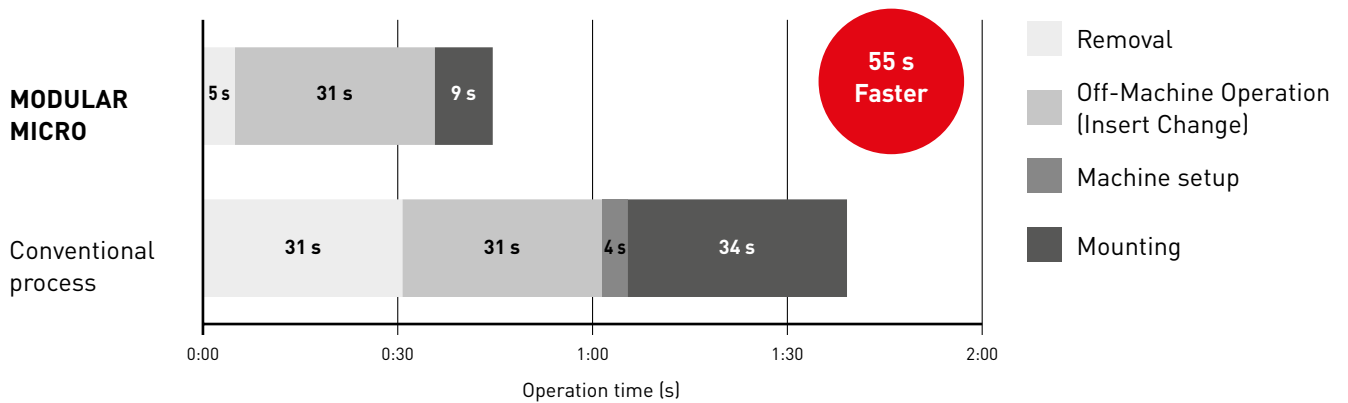
- 1 Remove the head in one action
- 2 Replace insert and measure cutting edge position off the machine
- 3 Install the head in one action
- 4 Enter offset values



Approx.
1 min

ACTUAL MEASUREMENT RESULTS

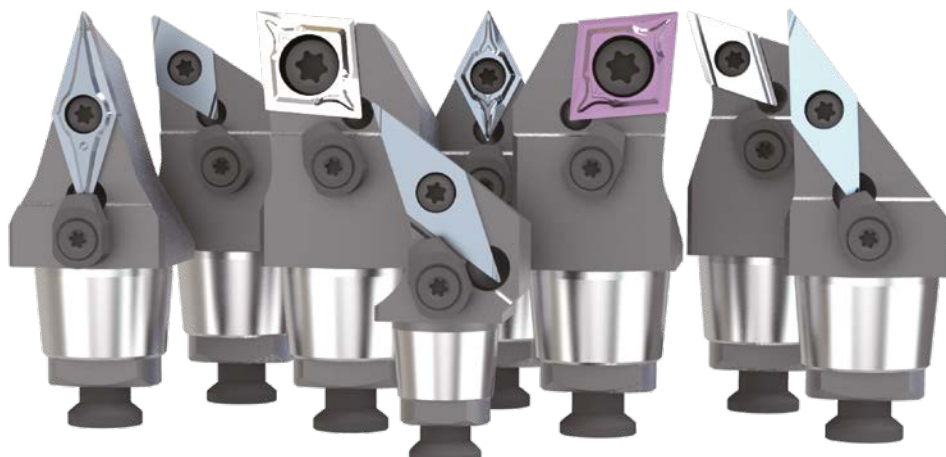
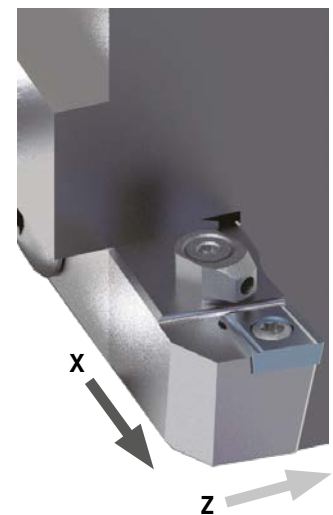
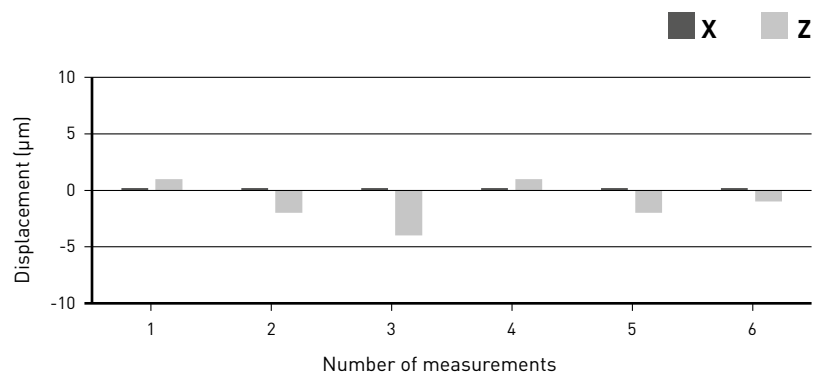
The time required for tool installation and removal is reduced, resulting in a significantly quicker setup time.



* Based on measurements by a 1-year operator

REPEATABILITY ACCURACY TEST

Accurate cutting edge positioning during repeated attachment/detachment due to the double face contact.



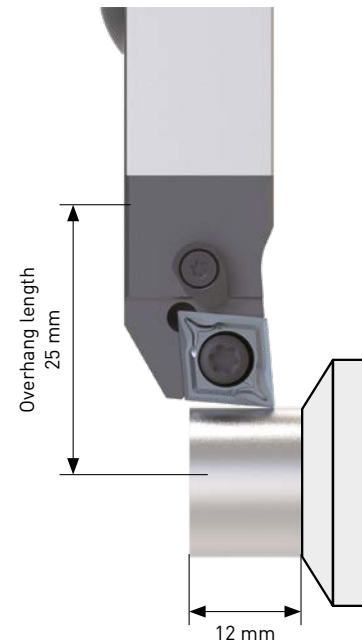
MODULAR MICRO

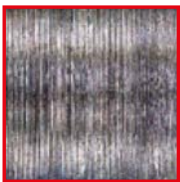
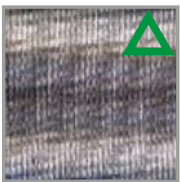
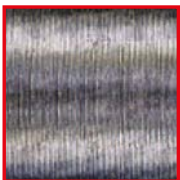
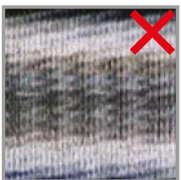
CUTTING PERFORMANCE

DIN 1.4301 / X5CrNi18-10: EXTERNAL TURNING CHATTER AND VIBRATION COMPARISON

Test results show that high-rigidity double face contact suppresses chatter and vibration that helps achieve excellent surface finishes.

Material	DIN 1.4301 / X5CrNi18-10 $\varnothing 16 \times 12$ mm
Shank	MM16-1616-C
Head	MM16-SCLCR09-C
Insert	CCGT09T302M-LS-P
Grade	MS7025
Vc (m/min)	60
fr (mm/rev.)	See table
ap (mm)	See table
Cutting mode	Wet Cutting (Oil)



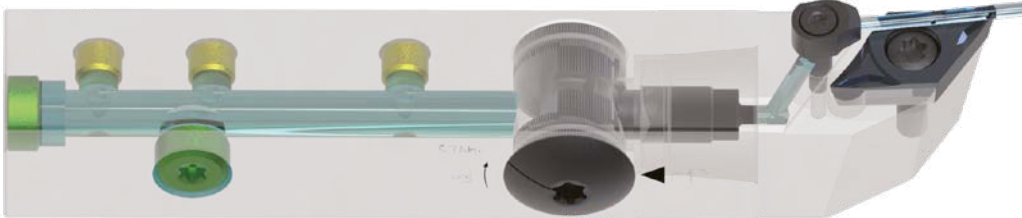
fr	ap	Modular Micro	Conventional A	Conventional B	Conventional C
0.05	1.5				
	2.0				
0.08	1.5				
	2.0				

COMPATIBLE WITH VARIOUS COOLANT SYSTEMS

Equipped with hose connection threaded holes (M8) on the side and rear, as well as direct coolant supply ports, enabling compatibility with various coolant systems.

Green: Hose Connection (M8)

Yellow: Direct Coolant Ports



DIRECT COOLANT COMPATIBLE

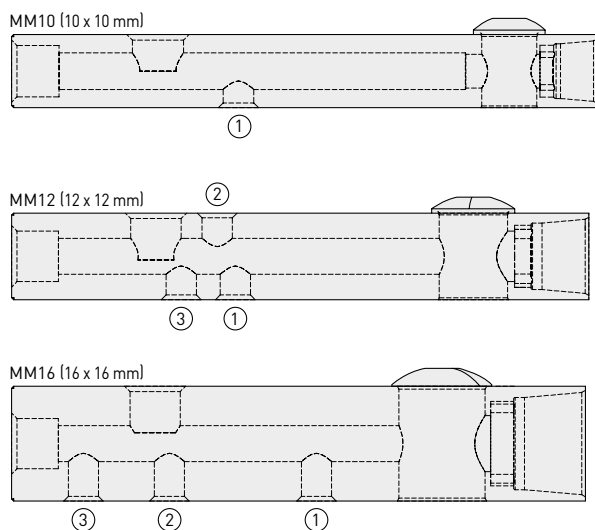
Modular Micro coolant supply ports are compatible with direct coolant turret systems of machine tools.

Machine tool manufacturer	Machine model	Shank size	Position no.
CITIZEN MACHINERY CO., LTD	Cincom L12	MM10	1
	Cincom L20	MM12	1
	Cincom L32	MM16	1
	Cincom M32	MM16	3
	Cincom D25	MM16	3
STAR MICRONICS CO., LTD	SB-16 III	MM12	3
	SD-26	MM16	3
TSUGAMI CORPORATION	BW269-329ZJ	MM16	2
	B026-32-III	MM16	2
	SS267-327-III	MM16	2

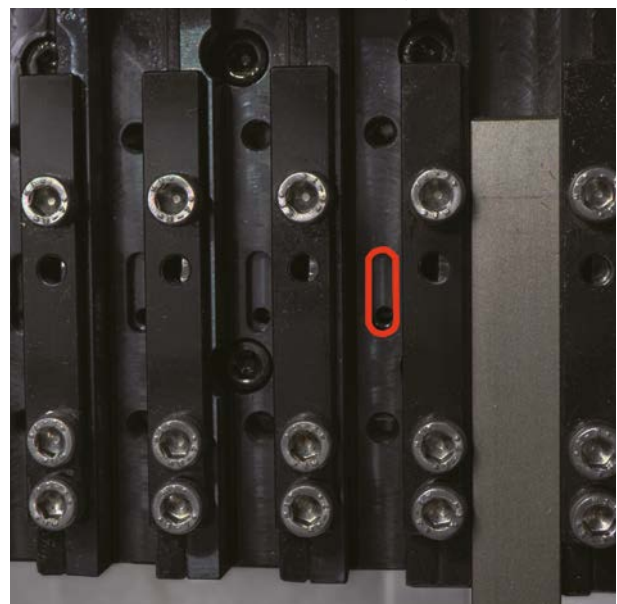
Status as of December 2025.

Based on use with standard turrets specified by machine tool manufacturers.

Direct coolant supply positions are based on standard overhang lengths defined by manufacturers.

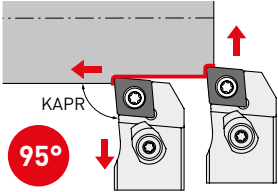
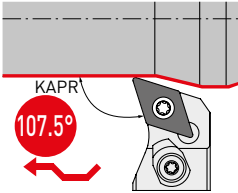
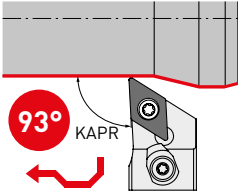
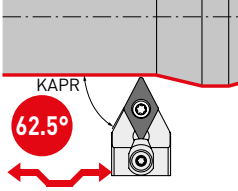
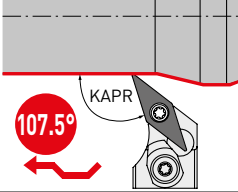
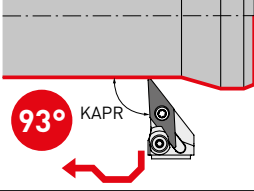
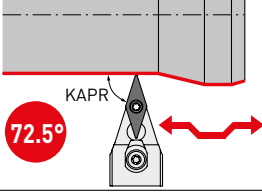


**COOLANT PORT LOCATIONS (EXAMPLE) –
CITIZEN MACHINERY CO., LTD**



MODULAR MICRO

HEAD SELECTION

Shank size	MM10 10 x 10 mm	MM12 12 x 12 mm	MM16 16 x 16 mm
LF (mm)	17.5	20.0	25.0
Application of Head Type	Insert Type		
	SCLC-R/L	CC ⁰⁰ 06 CC ⁰⁰ 09	CC ⁰⁰ 06 CC ⁰⁰ 09
	SDHC-R/L	DC ⁰⁰ 07	DC ⁰⁰ 07 DC ⁰⁰ 11
	SDJC-R/L	DC ⁰⁰ 07	DC ⁰⁰ 07 DC ⁰⁰ 11
	SDNC-N	DC ⁰⁰ 07	DC ⁰⁰ 07 DC ⁰⁰ 11
	SVH-R/L	VP ⁰⁰ 08	VB ⁰⁰ 11 VC ⁰⁰ 11
	SVJ-R/L	VP ⁰⁰ 08	VB ⁰⁰ 11 VC ⁰⁰ 11
	SWO-N	VP ⁰⁰ 08	VB ⁰⁰ 11 VC ⁰⁰ 11

MODULAR MICRO IDENTIFICATION

HEAD

Shank size	Insert shape	Insert clearance	Cutting length (mm)		
MM10	C RHOMBIC 80°	B 5° POSITIVE	IC (mm)	Type C	Type D Type V
MM12	D RHOMBIC 55°	C 7° POSITIVE	4.76		08
MM16	V RHOMBIC 35°	P 11° POSITIVE	6.35	06	07 11
			9.525	09	11

Ensure the shank and head are of the same shank size.

MM10	—	S	C	H	B	R	06	C
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Clamp structure	Cutting angle	Hand	Coolant hole
S Screw-on type	H 107.5°	R Right-hand	C With coolant hole
	J 93°	L Left-hand	
	L 95°	N Neutral	
	N 62.5°		
	V 72.5°		

SHANK

Shank size	Shank cross section H (mm)	
MM10	10	10.0
MM12	12	12.0
MM16	16	16.0

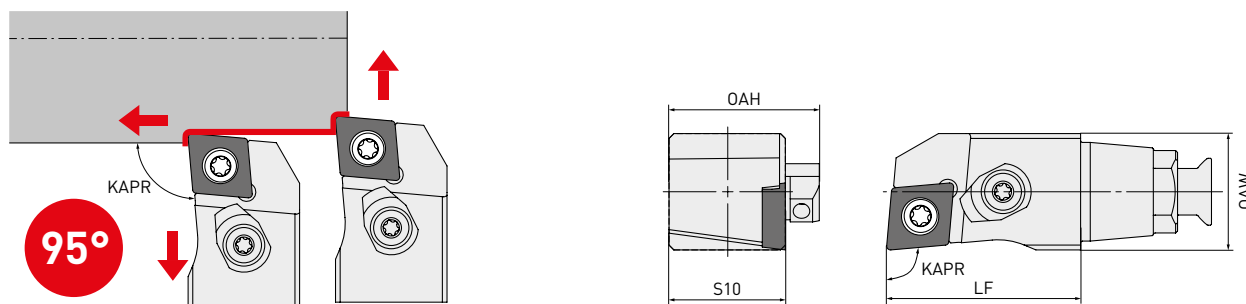
Ensure the shank and head are of the same shank size.

MM10	—	10	10	C
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Shank cross section B (mm)	Coolant hole
10 10.0	C With coolant hole
12 12.0	
16 16.0	

MODULAR MICRO HEAD

MM SCLC A WITH COOLANT HOLE



Right hand tool holder only

Order number	Stock	Insert number	LF	S10	OAW	OAH	Shank size
MM10-SCLCR/L06-C	●	CC00	0602	17.5	10	10	MM10
MM12-SCLCR/L06-C	●		0602	20	12	12	MM12
MM12-SCLCR/L09-C	●		09T3	20	12	13	MM12
MM16-SCLCR/L06-C	●		0602	25	16	16	MM16
MM16-SCLCR/L09-C	●		09T3	25	16	16	MM16

1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

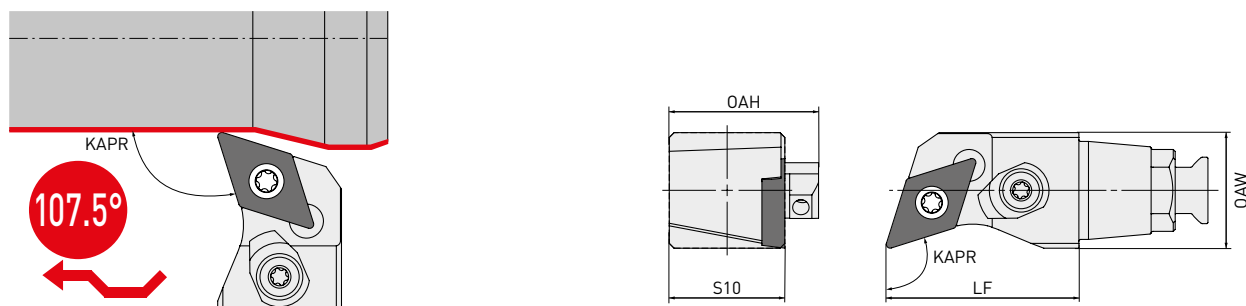
Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SCLCR/L06	MM10-SCLCR/L06	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY07F-X
MM12-SCLCR/L06	MM12-SCLCR/L06	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY07F-X
MM12-SCLCR/L09	MM12-SCLCR/L09	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY15F
MM16-SCLCR/L06	MM16-SCLCR/L06	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X
MM16-SCLCR/L09	MM16-SCLCR/L09	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY15F

^{*1} Torque [N • m]: MM-TS02 = 3.0, MM-TS03 = 0.9, MM-ppPL = 0.6, ISO 14581 M2x12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

MODULAR MICRO HEAD

MM SDHC A WITH COOLANT HOLE



Right hand tool holder only

Order number	Stock	Insert number	LF	S10	OAW	OAH	Shank size
MM10-SDHCR/L07-C	●	DC	0702	17.5	10	10	MM10
MM12-SDHCR/L07-C	●		0702	20	12	12	MM12
MM12-SDHCR/L11-C	●		11T3	20	12	15.5	MM12
MM16-SDHCR/L07-C	●		0702	25	16	16	MM16
MM16-SDHCR/L11-C	●		11T3	25	16	16	MM16

1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

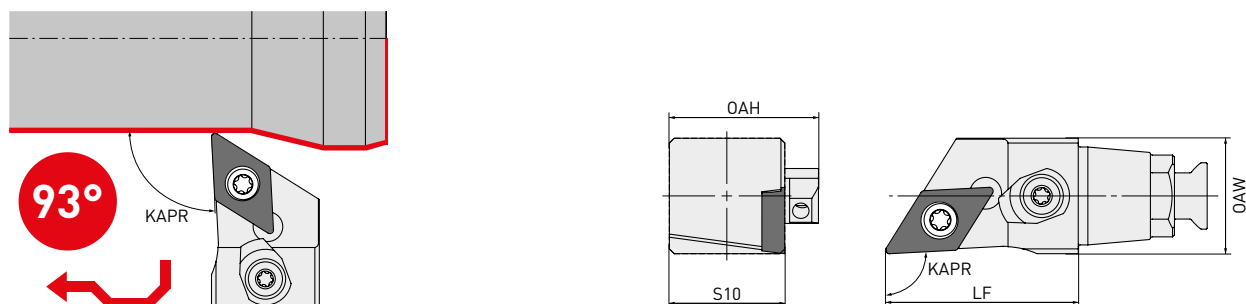
Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SDHCR/L07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY07F-X
MM12-SDHCR/L07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY07F-X
MM12-SDHCR/L11	MM-TS02	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY15F
MM16-SDHCR/L07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X
MM16-SDHCR/L11	MM-TS02	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY15F

^{*1} Torque [N • m]: MM-TS01 = 0.9, MM-TS02 = 3.0, MM-ppPL = 0.6, ISO 14581 M2x12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

MODULAR MICRO HEAD

MM SDJC A WITH COOLANT HOLE



Right hand tool holder only

Order number	Stock	Insert number	LF	S10	OAW	OAH	Shank size
MM10-SDJCR/L07-C	●	DC	0702	17.5	10	13.5	MM10
MM12-SDJCR/L07-C	●		0702	20	12	15.5	MM12
MM12-SDJCR/L11-C	●		11T3	20	12	15.5	MM12
MM16-SDJCR/L07-C	●		0702	25	16	19.5	MM16
MM16-SDJCR/L11-C	●		11T3	25	16	19.5	MM16

1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

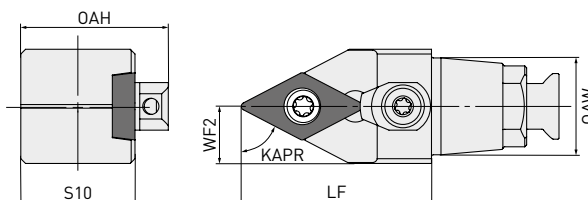
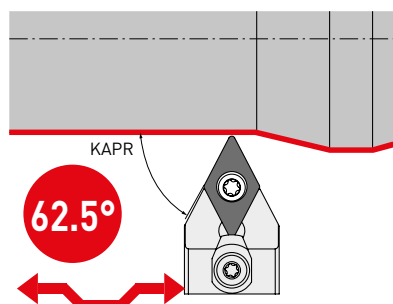
Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SDJCR/L07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY07F-X
MM12-SDJCR/L07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY07F-X
MM12-SDJCR/L11	MM-TS02	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY15F
MM16-SDJCR/L07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X
MM16-SDJCR/L11	MM-TS02	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY15F

^{*1} Torque [N • m]: MM-TS01 = 0.9, MM-TS02 = 3.0, MM-ppPL = 0.6, ISO 14581 M2 x 12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

MODULAR MICRO HEAD

MM SDNC A WITH COOLANT HOLE



Order number	Stock	Insert number	LF	WF2	S10	OAW	OAH	Shank size
MM10-SDNCN07-C	●	DC	0702	17.5	5	10	10	MM10
MM12-SDNCN07-C	●		0702	20	6	12	12	MM12
MM16-SDNCN07-C	●		0702	25	8	16	16	MM16
MM16-SDNCN11-C	●		11T3	25	8	16	16	MM16

1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

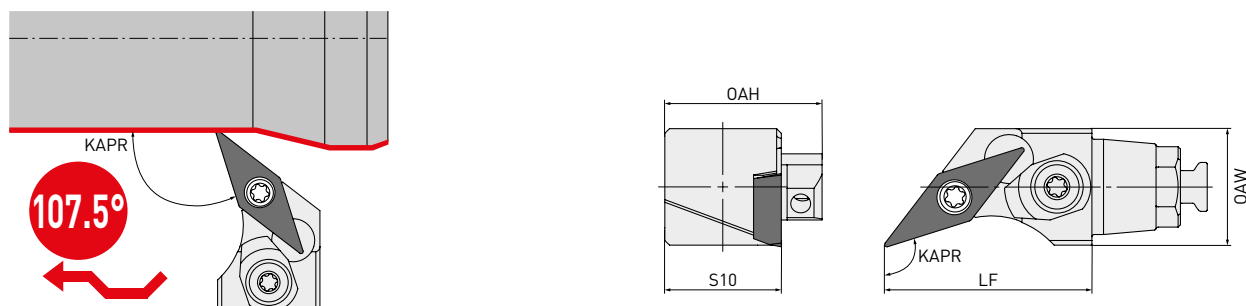
Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SDNCN07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY07F-X
MM12-SDNCN07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY07F-X
MM16-SDNCN07	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X
MM16-SDNCN11	MM-TS02	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY15F

^{*1} Torque (N • m): MM-TS01 = 0.9, MM-TS02 = 3.0, MM-ppPL = 0.6, ISO 14581 M2x12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

MODULAR MICRO HEAD

MM SVHB C P A WITH COOLANT HOLE



Right hand tool holder only

Order number	Stock	Insert number	LF	S10	OAW	OAH	Shank size	
MM10-SVHPR/L08-C	●	VP○○	0802	17.5	10	10	13.8	MM10
MM12-SVHBR/L11-C	●	VB○○	1103	20	12	13.5	15.5	MM12
MM12-SVHCR/L11-C	●	VC○○	1103	20	12	13.5	15.5	MM12
MM16-SVHBR/L11-C	●	VB○○	1103	25	16	16	19.5	MM16
MM16-SVHCR/L11-C	●	VC○○	1103	25	16	16	19.5	MM16
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1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

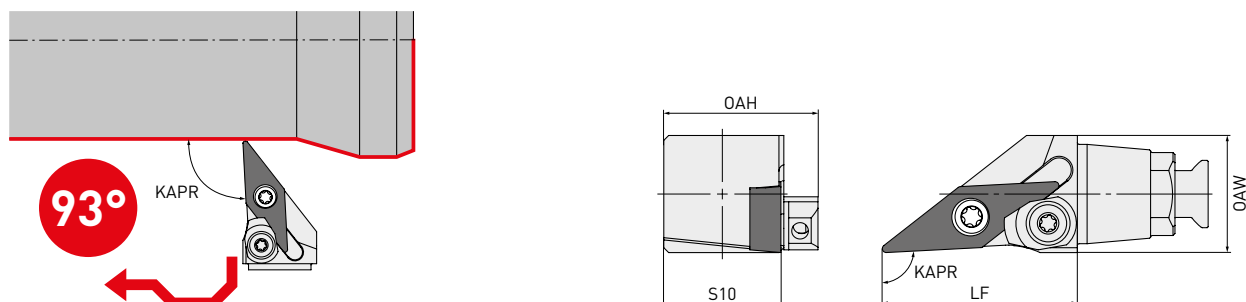
Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SVHP	MM-TS04	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY06F
MM12-SVH○	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY07F-X
MM16-SVH○	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X

^{*1} Torque [N • m]: MM-TS01 = 0.9, MM-TS04 = 0.6, MM-ppPL = 0.6, ISO 14581 M2x12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

MODULAR MICRO HEAD

MM SVJB C P A WITH COOLANT HOLE



Right hand tool holder only

Order number	Stock	Insert number	LF	S10	OAW	OAH	Shank size	
MM10-SVJPR/L08-C	●	VP○○	0802	17.5	10	10	13.8	MM10
MM12-SVJBR/L11-C	●	VB○○	1103	20	12	12	15.8	MM12
MM12-SVJCR/L11-C	●	VC○○	1103	20	12	12	15.8	MM12
MM16-SVJBR/L11-C	●	VB○○	1103	25	16	16	19.5	MM16
MM16-SVJCR/L11-C	●	VC○○	1103	25	16	16	19.5	MM16
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1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

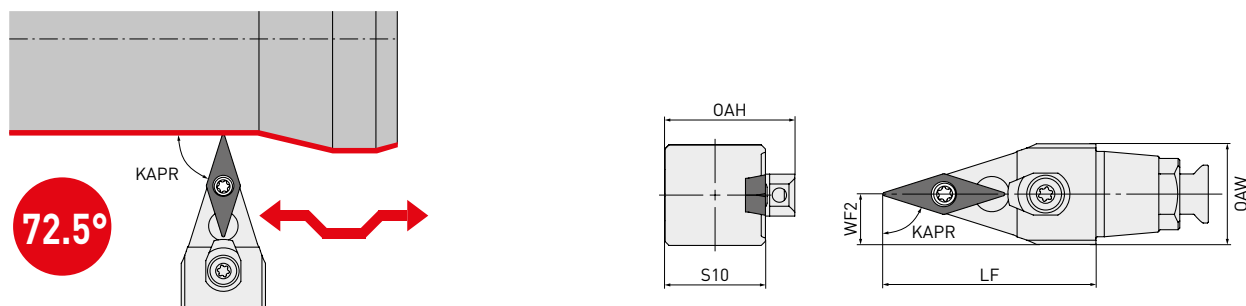
Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SVJP	MM-TS04	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY06F
MM12-SVJ○	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY07F-X
MM16-SVJ○	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X

^{*1} Torque [N • m]: MM-TS01 = 0.9, MM-TS04 = 0.6, MM-ppPL = 0.6, ISO 14581 M2x12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

MODULAR MICRO HEAD

MM SVVB C P A WITH COOLANT HOLE



Order number	Stock	Insert number	LF	WF2	S10	OAW	OAH	Shank size
MM10-SVVPN08-C	●	VP	0802	17.5	5	10	10	MM10
MM12-SVVPN08-C	●		0802	20	6	12	12	MM12
MM16-SVBN11-C	●	VB	1103	25	8	16	16	MM16
MM16-SVCN11-C	●	VC	1103	25	8	16	16	MM16

1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.

SPARE PARTS

Head type	Insert clamp screw ^{*1}	Nozzle clamp screw ^{*1*2} (Sold separately)	Coolant nozzle	Pull stud ^{*1}	Wrench (Sold separately)
MM10-SVVP	MM-TS04	ISO 14581 M2x12	MM-NZ02	MM-10PL	TKY06F
MM12-SVVP	MM-TS04	ISO 14581 M2x12	MM-NZ02	MM-12PL	TKY06F
MM16-SVVO	MM-TS01	ISO 14581 M2x12	MM-NZ02	MM-16PL	TKY07F-X

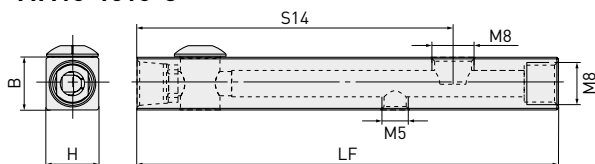
^{*1} Torque (N • m): MM-TS01 = 0.9, MM-TS04 = 0.6, MM-ppPL = 0.6, ISO 14581 M2x12 = 0.25

^{*2} Not supplied by our company. Use commercially available screws.

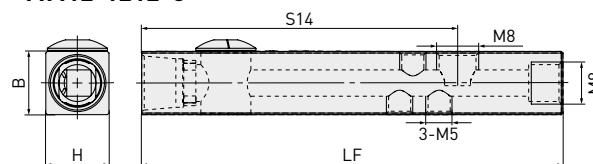
MODULAR MICRO HOLDER

MM WITH COOLANT HOLE

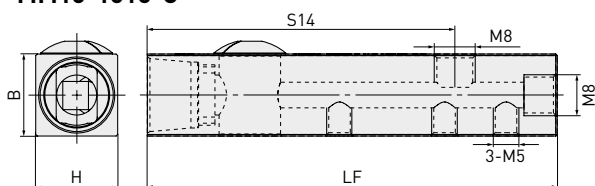
MM10-1010-C



MM12-1212-C



MM16-1616-C



Order number	Stock	H	B	LF	S14	Shank size
MM10-1010-C	●	10	10	80	60	MM10
MM12-1212-C	●	12	12	80	60	MM12
MM16-1616-C	●	16	16	80	60	MM16

1/1

1. Use head and shank of the same shank size.
2. This product is not plated. Anti-corrosion treatment is recommended.
3. The clamping cam features a head release mechanism.
When changing the head, hold it securely with one hand and operate the wrench carefully to prevent the head from ejecting.

SPARE PARTS

Shank type	Hose port plug	Clamping cam ^{*1}	Clamping cam o-ring	Direct coolant plug ^{*1*2} (Sold separately)	Torque wrench bit	Torque wrench ^{*1}
MM10-1010	MM-TSS01	MM-10ECC	MM10-OR	ISO 4026-M5x4	MM-T15	MM-10WR
MM12-1212	MM-TSS01	MM-12ECC	MM12-OR	ISO 4026-M5x4	MM-T15	MM-12WR
MM16-1616	MM-TSS01	MM-16ECC	MM16-OR	ISO 4026-M5x4	MM-T20	MM-16WR

^{*1} Torque (N • m): MM-10ECC, MM-10WR = 3.0, MM-12ECC, MM-12WR = 3.8, MM-16ECC, MM-16WR = 5.7

^{*2} Not supplied by our company. Use commercially available screws.

HOSE KIT

CURRENTLY AVAILABLE FOR MM16 SHANK SIZE ONLY

KITS FOR MM10 AND MM12 SHANKS WILL BE AVAILABLE SOON

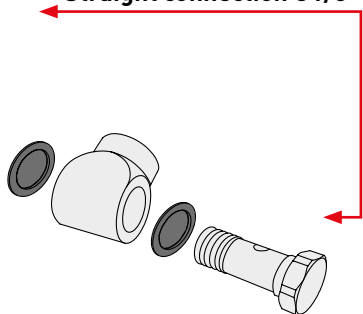
Hose kit is available for easy installation on automatic lathes.

Hoses and adapters can be freely selected according to connection specifications and setup conditions on machine side and tool side, supporting a wide range of lubrication layouts.

Push-in fitting hoses enable quick and secure connection by simple insertion, helping ensure smooth setup operations.

MACHINE-SIDE CONNECTOR

Straight connection G1/8"

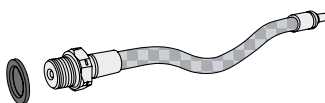


Banjo bolt connection G1/8"

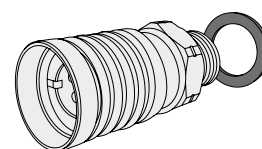
BJ-G1/8-G1/8-QC

HOSE

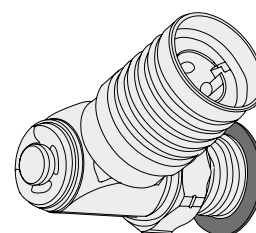
Order number	Hose length	Copper washer	Qty.
HOSE-G1/8-100-QC	102	WA-M10	1
HOSE-G1/8-200-QC	203	WA-M10	1



TOOL-SIDE CONNECTOR PUSH-IN FITTING



**Quick coupler M8x1
Straight**
CPLR-M8-01-QC



**Quick coupler M8x1
Elbow (Swivel Type)**
CPLR-M8-02-QC

HOSE KIT

Items in the table are supplied as a set with hose shown above.

Order number	Hose length	Machine-side connector	Banjo bolt set	Qty.	Copper washer	Qty.	Tool-side connector	Push-in fitting	Qty.	Copper washer	Qty.
QC-G1/8-M8-100BS	102	Straight-Banjo	BJ-G1/8-G1/8-QC	1	WA-M10	2	Straight	CPLR-M8-01-QC	1	WA-M8	1
QC-G1/8-M8-200BS	203	Straight-Banjo	BJ-G1/8-G1/8-QC	1	WA-M10	2	Straight	CPLR-M8-01-QC	1	WA-M8	1
QC-G1/8-M8-100BB	102	Straight-Banjo	BJ-G1/8-G1/8-QC	1	WA-M10	2	Elbow	CPLR-M8-02-QC	1	WA-M8	1
QC-G1/8-M8-200BB	203	Straight-Banjo	BJ-G1/8-G1/8-QC	1	WA-M10	2	Elbow	CPLR-M8-02-QC	1	WA-M8	1

1/1

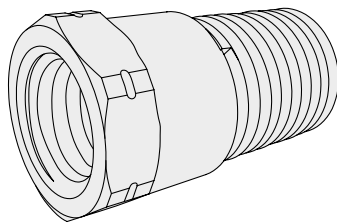
HOSE KIT

TOOL-SIDE CONNECTOR (SINGLE ITEM SALE)

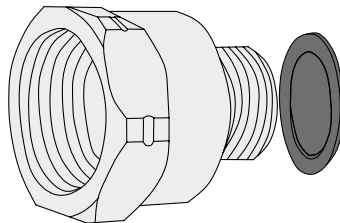
CONVERSION ADAPTER

Compatible with other series.

Order number	Copper washer	Qty.	Conversion type	Tool series name
AD-M8-R1/8	—	—	M8→R1/8"	GYS
AD-M8-M5	WA-M5	1	M8→M5	Micro-Mini Plus
AD-M8-M6	WA-M6	1	M8→M6	Micro-Mini Plus



AD-M8-R1/8



AD-M8-M5, AD-M8-M6

ONE-TOUCH FITTING

G1/8" one-touch fitting available for single-item purchase.

Order number	Tool-side connector	Copper washer	Qty.
CPLR-G1/8-01-QC	Straight	WA-M10	1
CPLR-G1/8-02-QC	Elbow	WA-M10	1

HOSE KIT

CUTTING-OFF AND GROOVING SYSTEM GW SERIES

COOLANT HOSE KIT

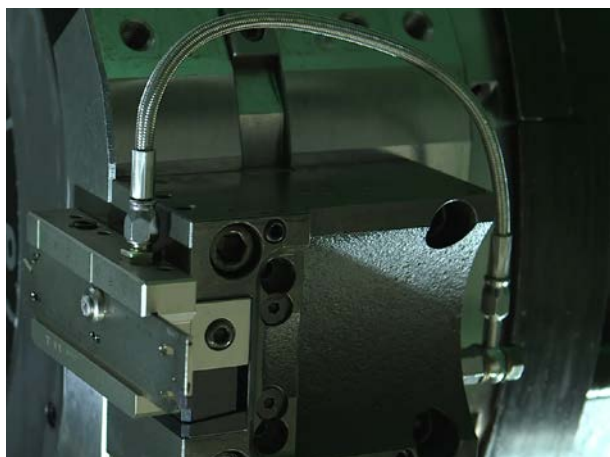
Connector type	Order number	Stock	Hose length	Kit details									
													
				Hose		Banjo adapter		Banjo bolt		Adapter		Washer	
				Code no.		Code no.	Qty.	Code no.	Qty.	Code no.	Qty.	Code no.	Qty.
Straight	CS-1/8-150SS	●	150	HOSE-1/8-150	—	—	—	—	AD-G1/8	2	WA-M10	2	
Straight	CS-1/8-200SS	●	200	HOSE-1/8-200	—	—	—	—	AD-G1/8	2	WA-M10	2	
Straight	CS-1/8-250SS	●	250	HOSE-1/8-250	—	—	—	—	AD-G1/8	2	WA-M10	2	
Straight	CS-1/8-300SS	●	300	HOSE-1/8-300	—	—	—	—	AD-G1/8	2	WA-M10	2	
Elbow Straight	CS-1/8-150BS	●	150	HOSE-1/8-150	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3	
Elbow Straight	CS-1/8-200BS	●	200	HOSE-1/8-200	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3	
Elbow Straight	CS-1/8-250BS	●	250	HOSE-1/8-250	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3	
Elbow Straight	CS-1/8-300BS	●	300	HOSE-1/8-300	AD-BM10	1	BB-G1/8	1	AD-G1/8	1	WA-M10	3	
Elbow	CS-1/8-150BB	●	150	HOSE-1/8-150	AD-BM10	2	BB-G1/8	2	—	—	WA-M10	4	
Elbow	CS-1/8-200BB	●	200	HOSE-1/8-200	AD-BM10	2	BB-G1/8	2	—	—	WA-M10	4	
Elbow	CS-1/8-250BB	●	250	HOSE-1/8-250	AD-BM10	2	BB-G1/8	2	—	—	WA-M10	4	
Elbow	CS-1/8-300BB	●	300	HOSE-1/8-300	AD-BM10	2	BB-G1/8	2	—	—	WA-M10	4	
1/1													

1/1

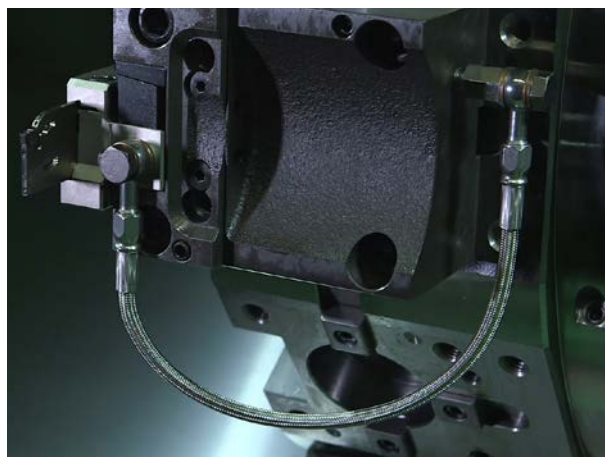
Connection thread: G1/8"

MOUNTING EXAMPLE

ELBOW STRAIGHT TYPE



ELBOW TYPE



SYMBOLS

 Recommended cutting conditions	MACHINING TYPE
NEW Completely new products or expansions released in the current Spring or Autumn product launch and are not included in the latest version of the General Catalogue.	 Roughing
NEW Products or expansions that have already been introduced in one of the previous Spring or Autumn product launches but are not included in the latest General Catalogue.	 Medium cutting
APPLICATION	 Light cutting
 Face milling	 Pre-finishing
 Chamfer milling	 Finishing
 Shoulder milling with R	 Fine-finishing
 Face milling close to a wall	TOOL MATERIAL
 Shoulder milling	 Ultra micro grain carbide Ultra micro grain carbide substrate material.
 Side milling	 Cubic boron nitride Mitsubishi Materials' original CBN material.
 Slot milling	 Ceramic For high speed efficient machining of super alloys due to the excellent high temperature strength property.
 Ramping	 High hardness powder metallurgy HSS High hardness powder metallurgy HSS substrate material.
 Pocket milling	 High grade high alloy HSS High grade high alloy HSS substrate material.
 Slot milling with R	 Cobalt high speed steel Cobalt high speed steel substrate material.
 Copy milling	 High speed steel High speed steel substrate material.
 T-Slot milling	

SYMBOLS

COATING



SMART MIRACLE coating

New smooth and dense coating technology for high efficiency milling of difficult to cut materials.



CRN coating

Newly developed CrN coating for Copper Electrodes machining.



Violet coating

Increased tool life of 2-3 times more than TiN coated products.



DP coating

New generation coating suitable for a wide range of materials.



MIRACLE coating

The original Miracle (Al,Ti)N coating. Also suitable for dry cutting.



[Al, Ti]N coating

[Al,Ti]N highly versatile application range.



[Al,Ti,Cr]N multi-layer coating

For carbon, alloy and hardened steels.



IMPACT MIRACLE coating

Single phase nano crystal coating technology has higher film hardness and heat resistance.



MIRACLE coating

The original MIRACLE (Al,Ti)N coating. Also suitable for dry cutting.



VFR coating

The [AlCrSi]N/[AlTiSi]N PVD multilayer coating is ideal for machining of extremely hard materials up to 70 HRC.



DLC coating

Hardness similar to CVD diamond coating achieved with high adhesion strength.



Diamond coating

Suitable for CFRP and CFRP-aluminium materials.



Diamond coating

Suitable for graphite machining.



Diamond coating

The original CVD diamond coating.



CVD Diamond coating

Unique multi-layer micro-grain diamond crystal control technology drastically improves wear resistance and smoothness.

CUTTING EDGE PROPERTIES



Sharp corner edge

Indicates the end mill has a sharp corner edge.



Gash land

Indicates the end mill cutting edge has a protective chamfer.



Rake angle



Helix angle

Indicates the helix angle of the end mill.



Point angle

Indicates the drill point angle.



Roughing flute geometry



Variable helix



Rounded gash



Corner angle

WEB THINNING



X type point geometry

X web thinning used at the drill point.



XR type point geometry

XR web thinning used at the drill point.



S type point geometry

Easy cutting geometry.



N type point geometry

Effective when the point web is thick.



Chipbreaker

SYMBOLS

TOLERANCES



Tolerance of taper angle
Indicates the tolerance of the taper angle.



R tolerance
Indicates the radial tolerance of a ball nose end mill.



R tolerance
Indicates the radial tolerance of the corner radius.



R tolerance
Indicates the radial tolerance of a cutter with a corner radius.



Outside diameter tolerance
Indicates the diameter tolerance of the end mill.



Peak tolerance
Indicates the tolerance for the end diameter.



Shank diameter tolerance



Shank diameter tolerance



Drill tolerance / diameter

COOLANT HOLES



External coolant



Internal coolant



Internal coolant



Centered, internal coolant hole



Radial, internal coolant holes



Internal coolant holes



Internal coolant holes

MEMO

MEMO

EUROPEAN SALES COMPANIES

GERMANY

MITSUBISHI MATERIALS TOOLS EUROPE GMBH
Comeniusstr. 2 . 40670 Meerbusch
Phone +49 2159 91890 . Fax +49 2159 918966
Email admin@mmchg.de

UK Office

MMC HARDMETAL UK LTD
1 Centurion Court, Centurion Way
Tamworth, B77 5PN
Phone +44 1827 312312
Email sales@mitsubishicarbide.co.uk

UK Deliveries / Returns

Unit 4 B5K Business Park, Quartz Close
Tamworth, B77 4GR

SPAIN

MITSUBISHI MATERIALS ESPAÑA, S.A.
Calle Emperador 2 . 46136 Museros / Valencia
Phone +34 96 1441711
Email comercial@mmevalencia.es

FRANCE

MMC METAL FRANCE S.A.R.L.
6, Rue Jacques Monod . 91400 Orsay
Phone +33 1 69 35 53 53 . Fax +33 1 69 35 53 50
Email mmfsales@mmc-metal-france.fr

POLAND

MMC HARDMETAL POLAND SP. Z O.O.
ul. Strzegomska 42B . 53-611 Wrocław . Millennium Tower II, 2 piętro, biuro nr 2.12
Phone +48 71335 1620 . Fax +48 71335 1621
Email sales@mitsubishicarbide.com.pl

ITALY

MMC ITALIA S.R.L.
Viale Certosa 144 . 20156 Milano
Phone +39 0293 77031 . Fax +39 0293 589093
Email info@mmc-italia.it

TURKEY

MITSUBISHI MATERIALS TOOLS EUROPE GMBH ALMANYA İZMİR MERKEZ ŞUBESİ
Adalet Mahallesi Anadolu Caddesi No: 41-1 . 15001 35530 Bayraklı / İzmir
Phone +90 232 5015000 . Fax +90 232 5015007
Email info@mmchg.com.tr

www.mmc-carbide.com

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