

Roller gear index table

model
MDF



Pascal
www.pascaleng.co.jp

Roller gear index table model **MDF**



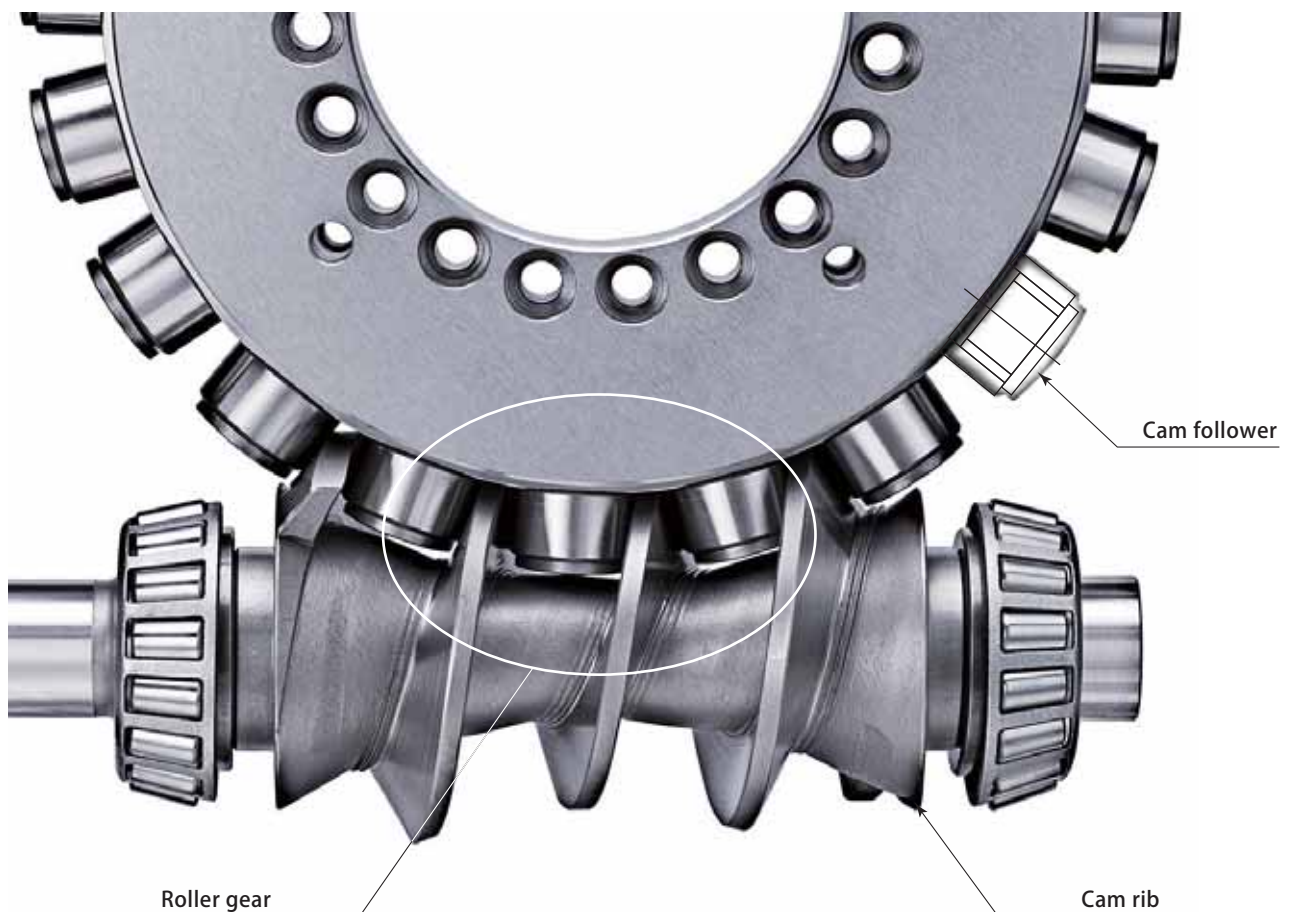
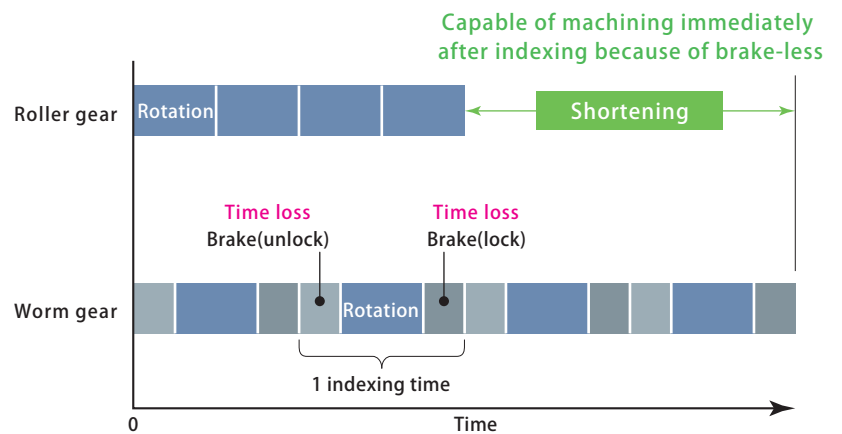
Roller gear index table model MDF



Support table model MDS

Maintenance-free and high speed indexing

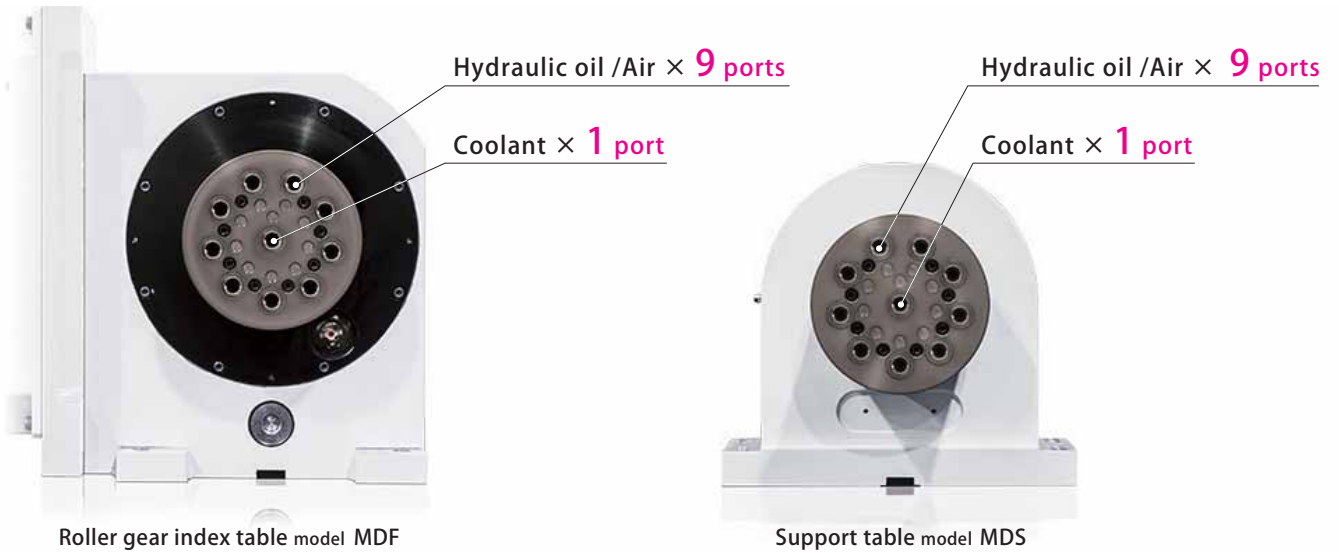
- **Rolling transmission** of roller gear can keep initial accuracy for a long time which provides maintenance-free circumstances compared with **the sliding transmission** by means of worm gear.
- The cam rib of roller gear and cam followers make contacts in a preloaded state and there is no backlash between the two. It enables high speed indexing with no brake, which allows excellent productivity by reducing tact time in machining operation.



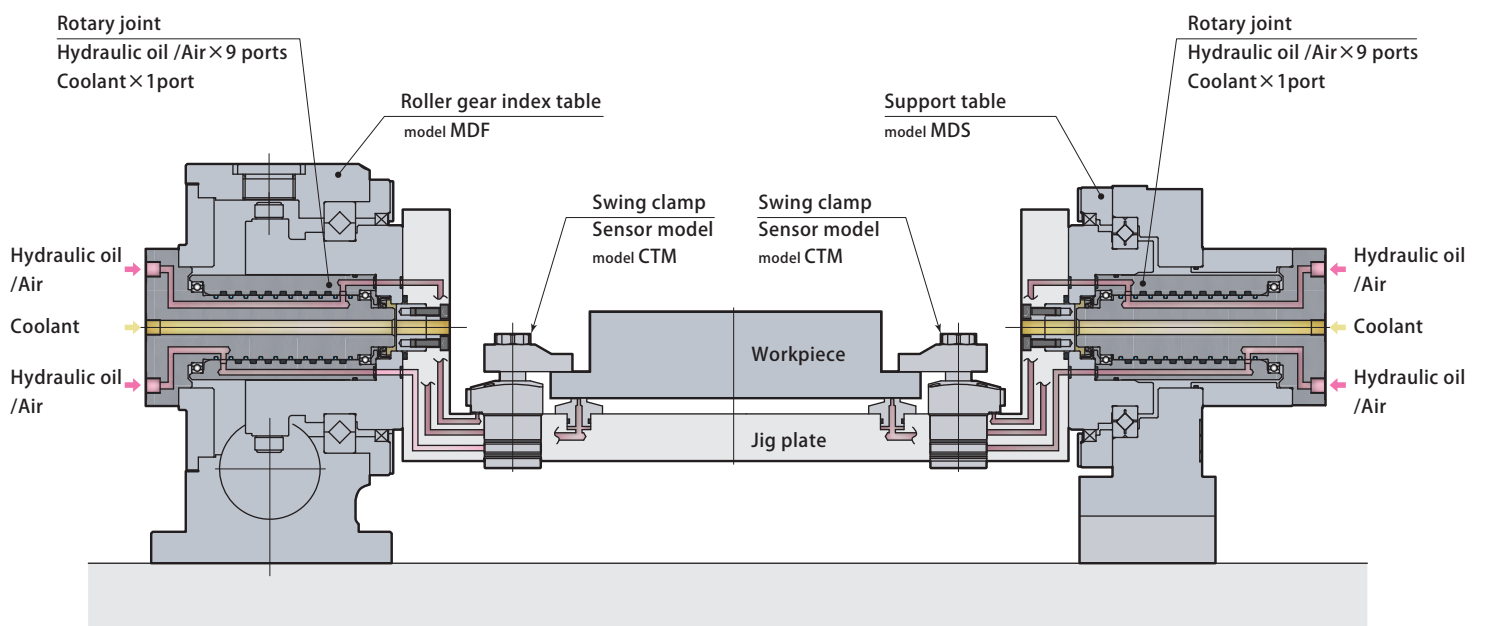
Rotary joint

Index table 7MPa 9 ports for hydraulic oil and air connection, 1 port for coolant connection are provided

Support table 7MPa 9 ports for hydraulic oil and air connection, 1 port for coolant connection are provided



By combining Pascal 7MPa rotary joint with model MDX, compact hydraulic clamp cylinders are applicable which can realize simple and downsized hydraulic fixture mountable on the table. Also max 18 ports of rotary joint is available and the clamp cylinders with sensing function can be used to achieve high grade of machining operation.



Compact body

Unit : mm

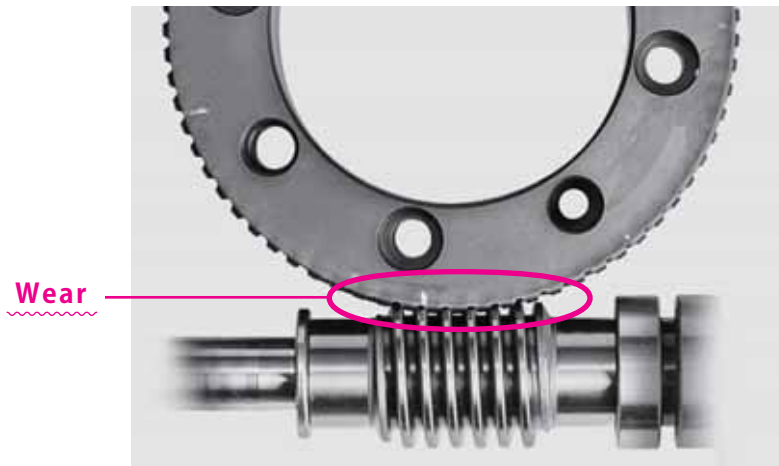


Support table

The worm gear causes abrasive wear because of sliding friction.

The roller gear can keep machining accuracy for a long time, however the worm gear results an abrasive wear and it causes backlash between the worm wheel and shaft and leads to machining failure and degrading index accuracy, therefore a periodical inspection and backlash adjustment must be required.

The roller gear is maintenance-free and it can operate with high accuracy for a long time.



Endurance test

As a result of endurance test of roller gear table and 3 types of worm gear tables with unbalanced weight, a large increase amount of lost motion was seen in the worm gear table.

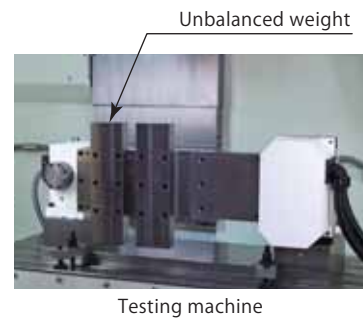
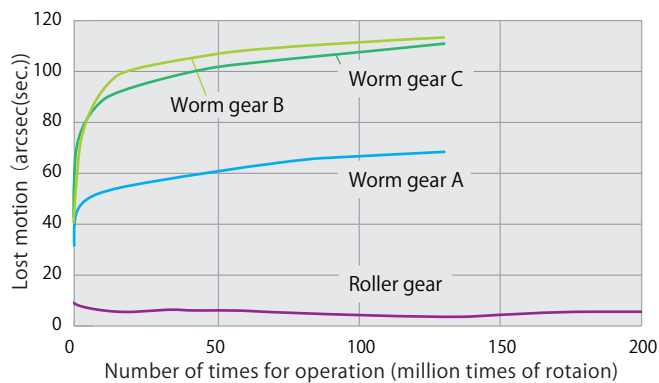
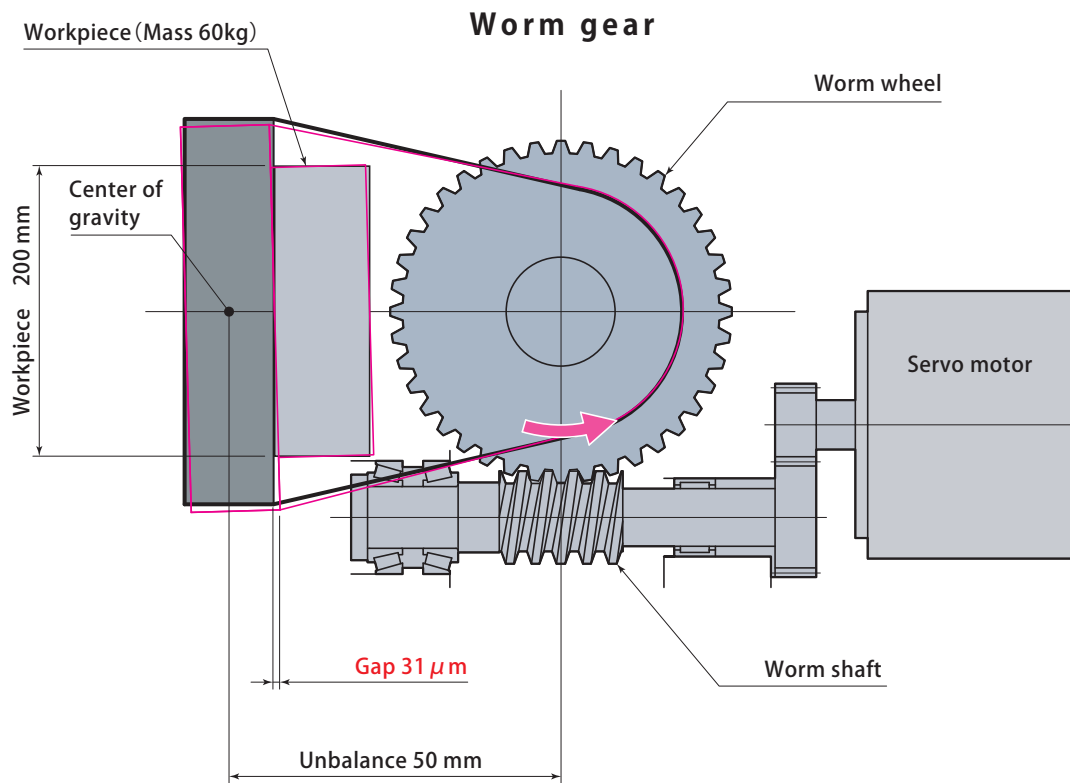


Table	Roller gear	Worm gear A	Worm gear B	Worm gear C	
Load					
Mass	kg	97	60		
Moment of Inertia	kg · m ²	2.1	0.7		
Unbalance torque	Nm	77	30		
Condition of operation					
Speed of movement	rpm	50	22.2		
Acceleration and deceleration time	sec	0.15	0.15		
Lost motion					
Initial stage	(arcsec(sec.))	9	36	48	58
After 1 million rotation	(arcsec(sec.))	8	67	112	109
Increased amount	(arcsec(sec.))	0	31	64	51

- CW direction 4×90° indexing (1 rotation) and after that CCW direction 4×90° indexing (1 rotation) is repeated as movement cycle.
- The lost motion includes not only backlash also mechanical torsion called elastic deformation.

Position gap of workpiece due to degradation in accuracy of worm gear

In case that the workpiece with mass 60kg and unbalance 50mm is rotated 1 million times,
the increase amount of lost motion for worm gear is 64 arcsec(sec.)
and 31 μ m of position gap occurs.



The increase amount of lost motion for roller gear table is 0 arcsec(sec.) in the same test.

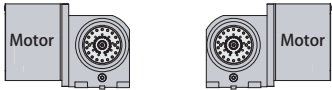
When high speed indexing the cradle with uneven load on the vertical machining center, machining accuracy can not be kept for a long time due to the abrasive wear of worm gear.

Model designation

MD **F** 130 **R** - **R** **F**

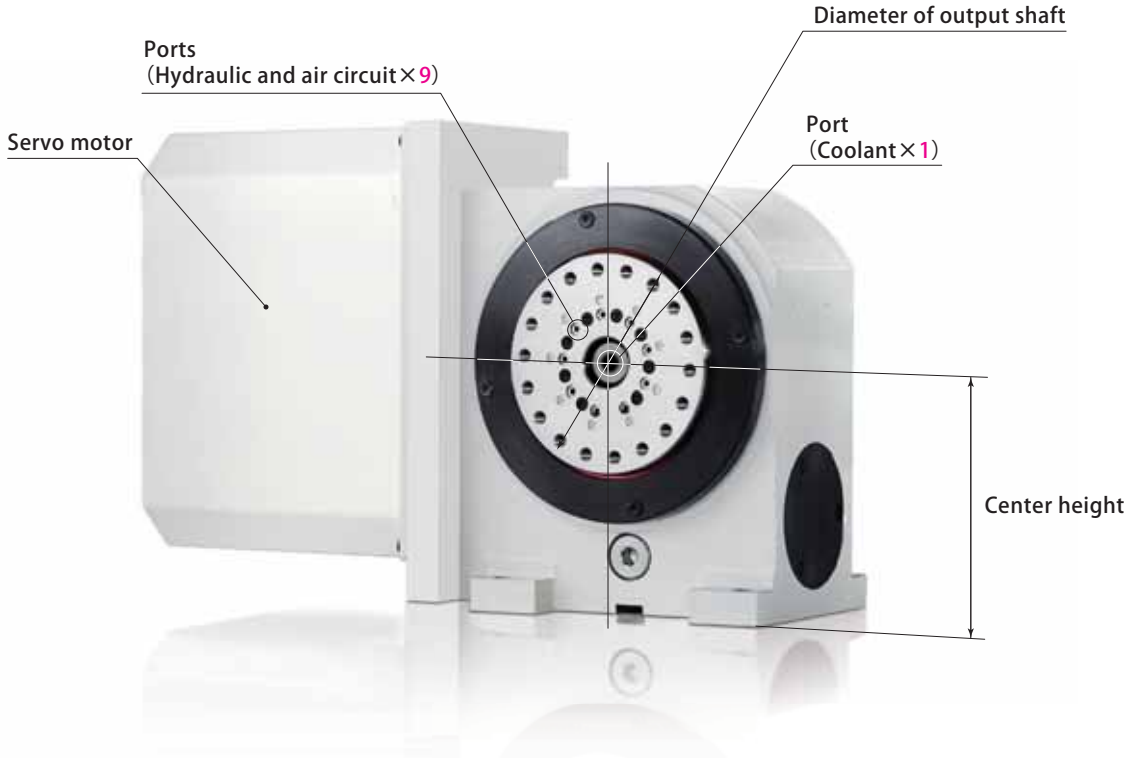
1 Motor mounting position

L : Left **R** : Right



2 Rotary joint

R : Built-in (Nil) : None



MDF Specifications

Model		MDF130 □-RF	MDF130 □-F
		With 9 ports Rotary joint	No rotary joint
Diameter of output shaft	mm	ø130	
Center height	mm	150	
Diameter of output shaft(mouth)	mm	ø30H7	
Mass	kg	50	45
Total reduction ratio		1/60	
Maximum number of revolutions	rpm	50 (Number of motor rotations 3000rpm)	
Servo motor		FANUC αiF4/5000	
Index accuracy	arcsec(sec)	±20	
Repeatability	arcsec(sec)	10 *	
Lubrication		Oil bath	
Operating temperature	°C	0 ~ 40	
Allowable loading capacity (When rotating)			
Allowable payload	No Support table	kg	80
	With Support table	kg	160
Moment of Inertia	kg·m ²	0.6	
Rotation torque	Nm	200	
Allowable load capacity (When machining)			
Radial load	kN	6	
Loaded torque	Nm	346	
Loaded moment	Nm	600	

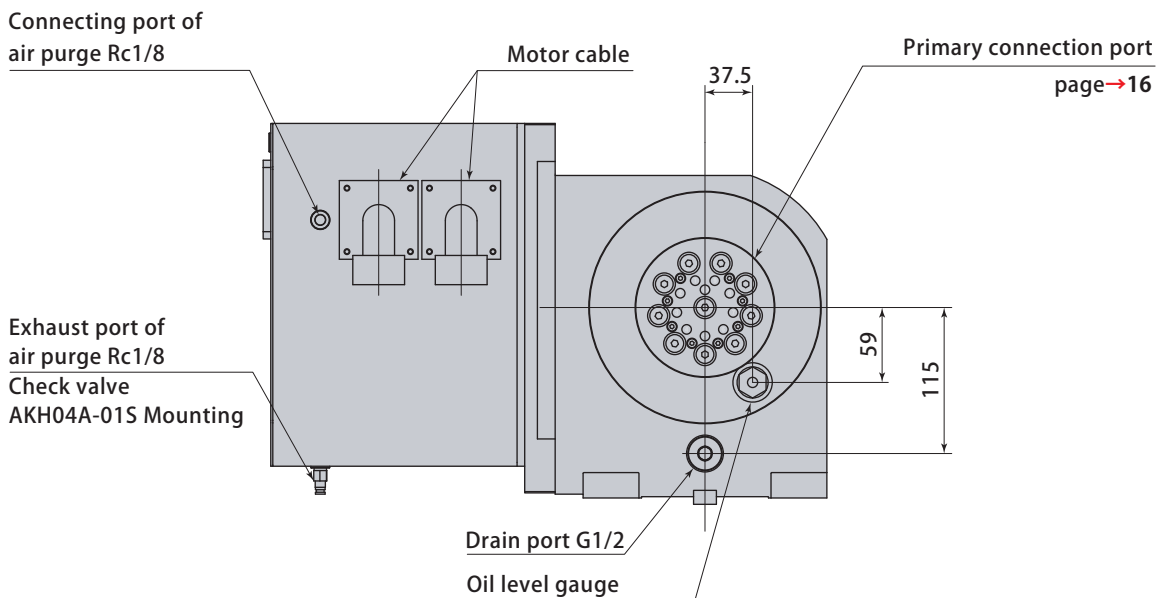
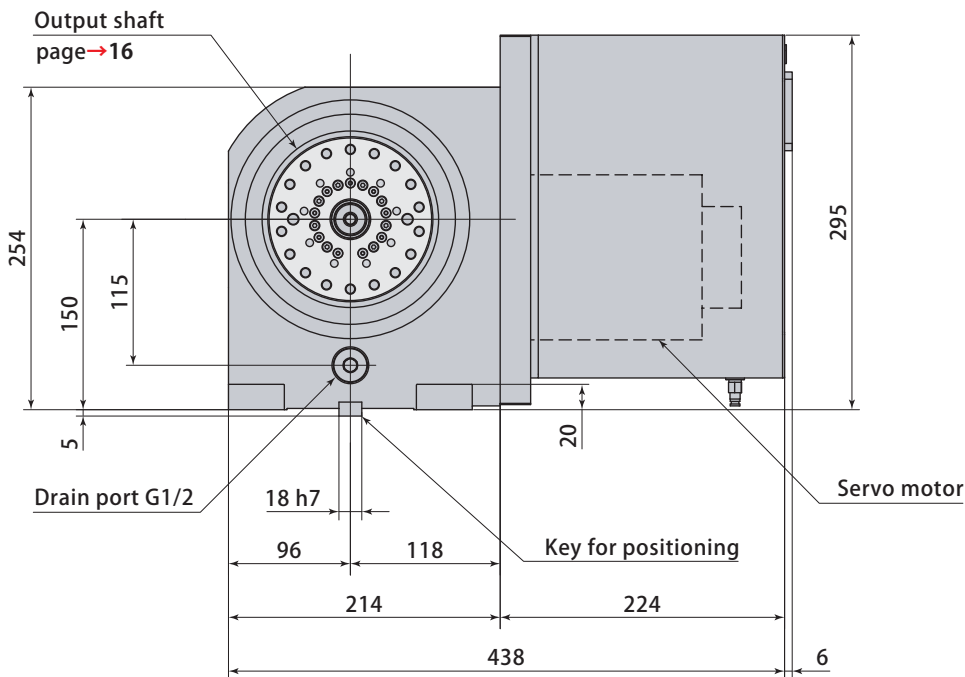
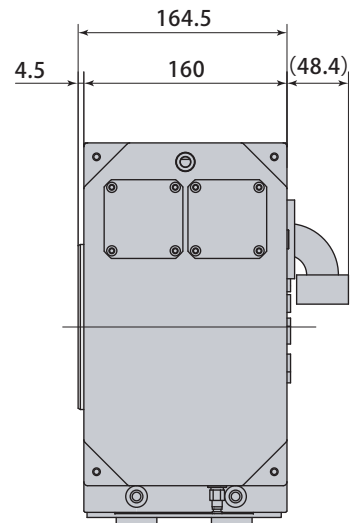
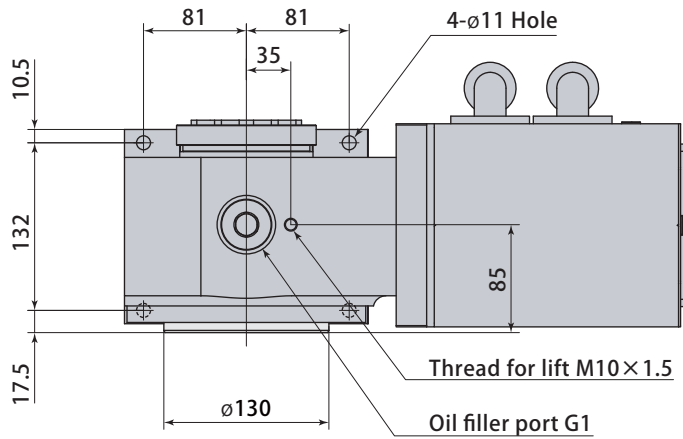
* The figure indicates 0.0048mm displacement at the point of 100mm off from output shaft.

Specifications of rotary joint

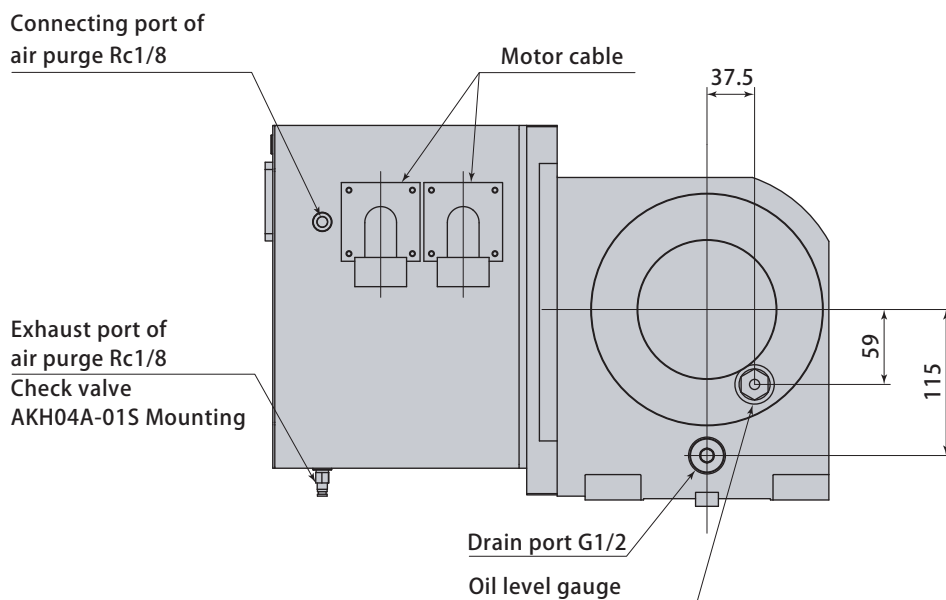
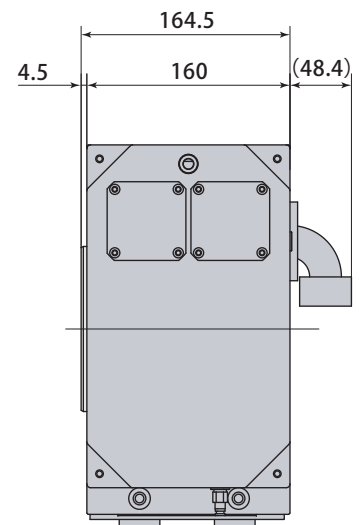
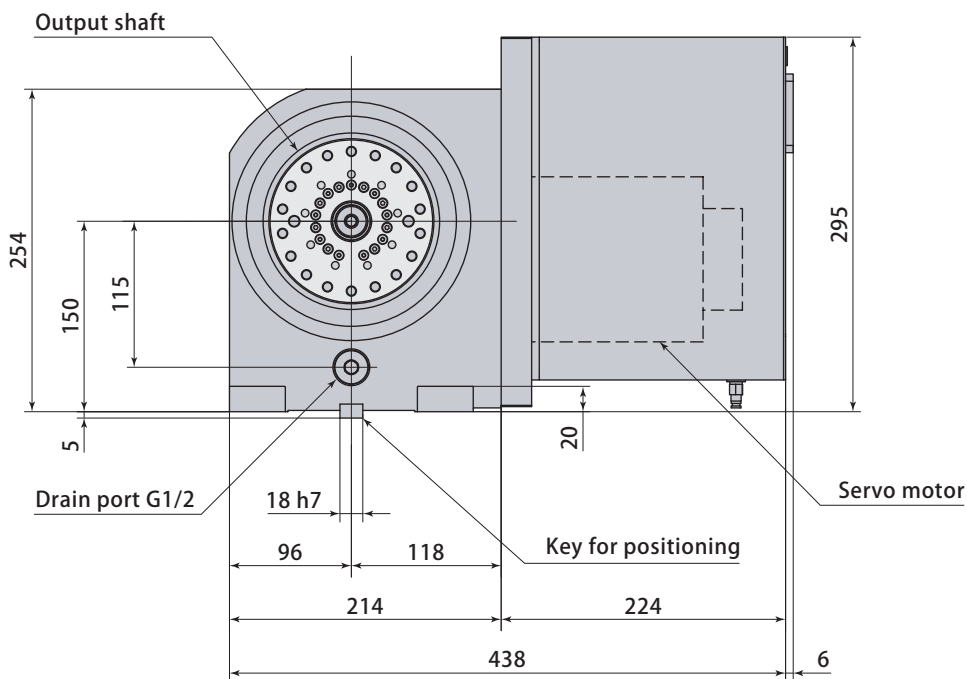
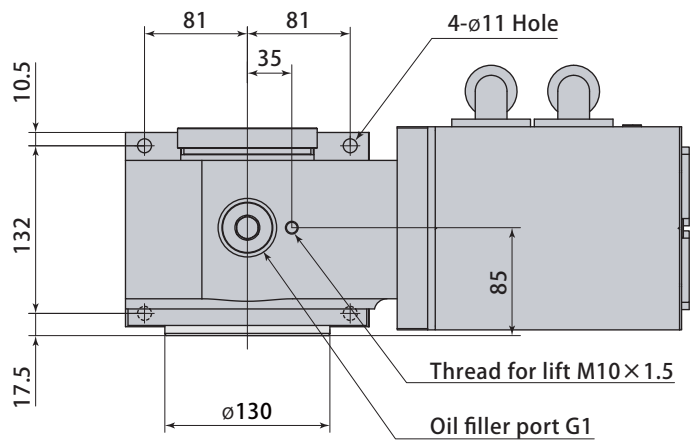
Ports		9+1 ports
Hydraulic and air circuit	Number of circuits	9 ports
	Working fluid	General mineral based hydraulic oil(ISO-VG32 equivalent) / Air
	Max. working pressure	MPa 7
	Piping port	G1/8
Cutting fluid	Number of circuits	1 circuit (in the center)
	Max. working pressure	MPa 0.3
	Piping port	G1/8

- In case that air is used for rotary joint, use of lubricator is recommendable.
- In case that working fluid is used, leakage of oil film to the adjacent circuit occurs inside the rotary joint. When both the working fluid and air are used, provide a drain circuit between the hydraulic circuit and air circuit. (In case of the air circuit which allows leakage of oil film, there is no need to provide a drain circuit.)
- Supply the cutting fluid which is filtered to connecting port of cutting fluid.
- Purge air to prevent intrusion of coolant into the inside of motor cover. Supply dried clean air to connecting port of air purge. (Recommendation purge pressure 0.02MPa and flow volume 15L/min.) And make sure to open the exhaust port of air purge.
- The allowable moment of inertia is value for Max. number of rotation.
- The radial load, loaded torque and loaded moment are included in loading mass.
- The loaded torque shall be 40% of time duty and less than 30sec.
- No brake is provided to the motor and the table stop position cannot be held.Special MDX including the servo motor with brake is available upon request to hold the stop position when servo is OFF. Consult Pascal for more details.

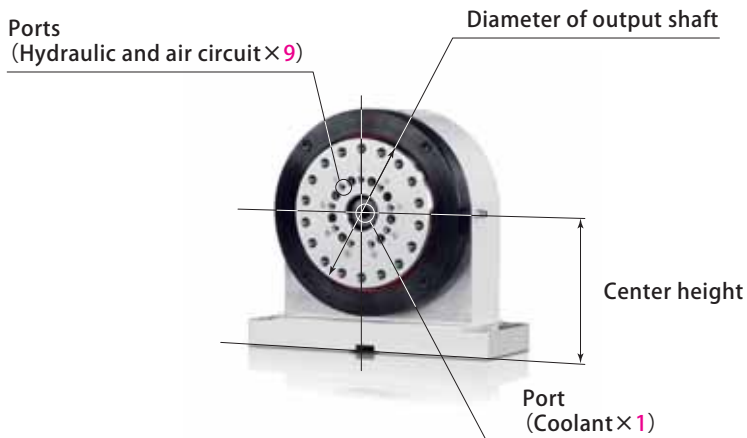
With 9 ports Rotary Joint



No Rotary Joint



MDS Specifications



Model designation

MD **S** **130** - **R9**

Rotary joint ●
R9 : Built-in (Hydraulic and air circuit 9 ports)
R3 : Built-in (Hydraulic and air circuit 3 ports)
 (Nil) : None

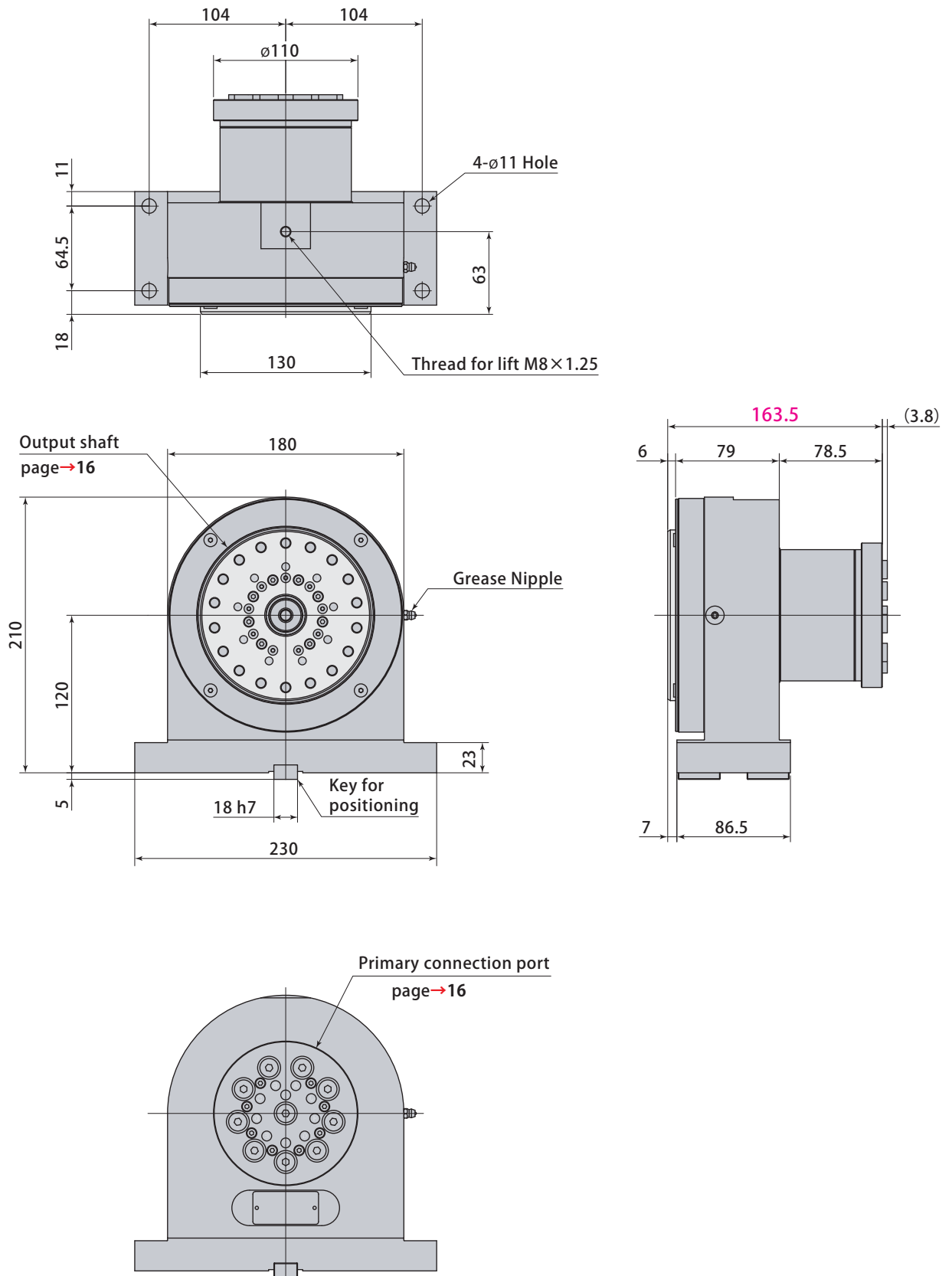
Model		MDS130-R9	MDS130-R3	MDS130
		9 ports	3 ports	No rotary joint
Diameter of output shaft	mm	ø130		
Center height	mm	120		
Diameter of output shaft(mouth)	mm	ø30H7		
Mass	kg	17	14	12
Lubrication		Grease lubrication		
Operating temperature	°C	0 ~ 40		

Rotary joint Specifications

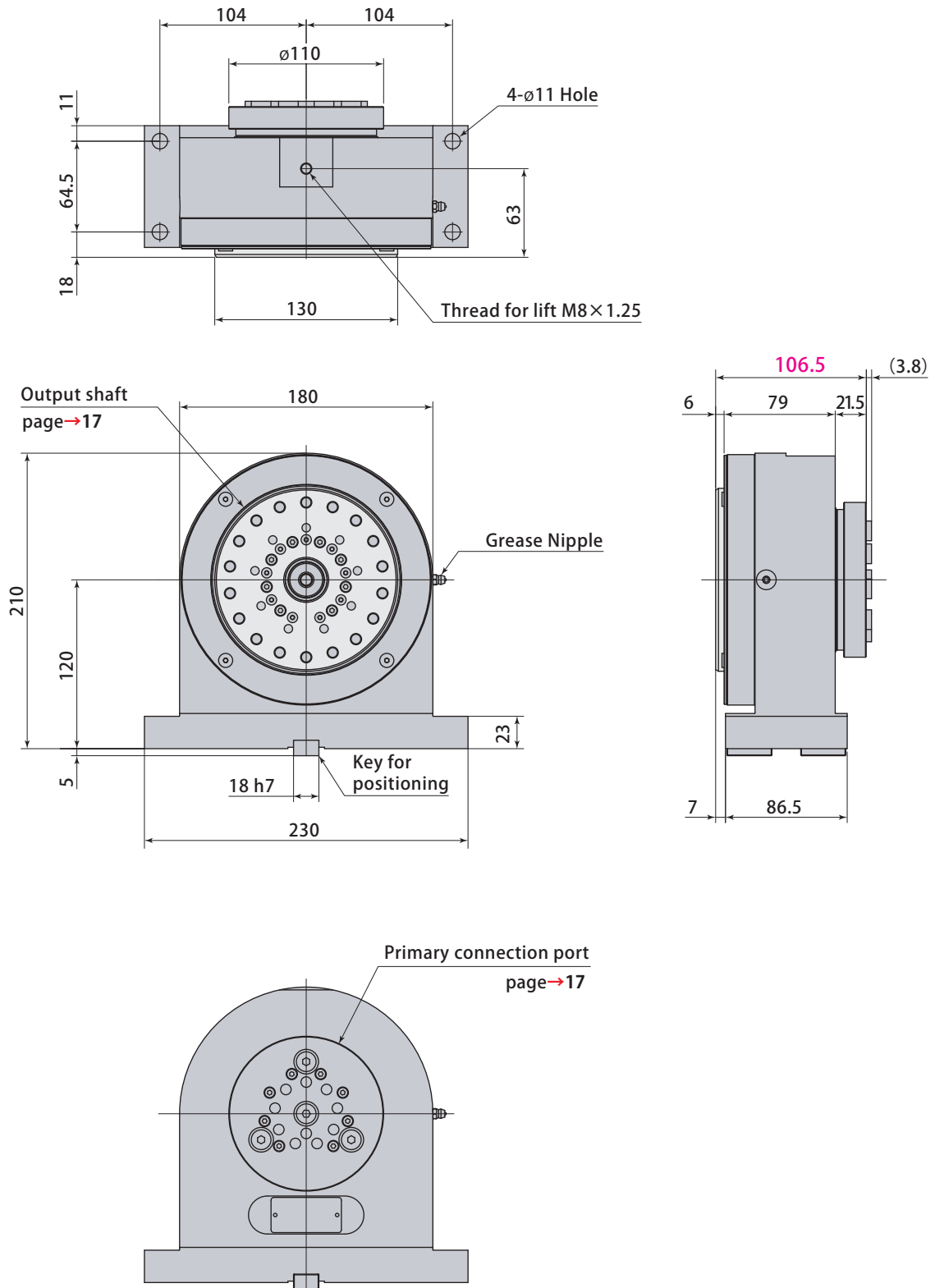
Ports		9+1 ports	3+1 ports
Hydraulic and air circuit	Number of circuits	9 ports	3 ports
	Working fluid	General mineral based hydraulic oil(ISO-VG32 equivalent) / Air	
	Max. working pressure	MPa	7
	Piping port	G1/8	
Cutting fluid	Number of circuits	1 circuit (in the center)	
	Max. working pressure	MPa	0.3
	Piping port	G1/8	

- In case that air is used for rotary joint, use of lubricator is recommendable.
- In case that working fluid is used, leakage of oil film to the adjacent circuit occurs inside the rotary joint. When both the working fluid and air are used, provide a drain circuit between the hydraulic circuit and air circuit. (In case of the air circuit which allows leakage of oil film, there is no need to provide a drain circuit.)
- Supply the cutting fluid which is filtered to connecting port of cutting fluid.

With 9 ports Rotary Joint



With 3 ports Rotary Joint



No Rotary Joint

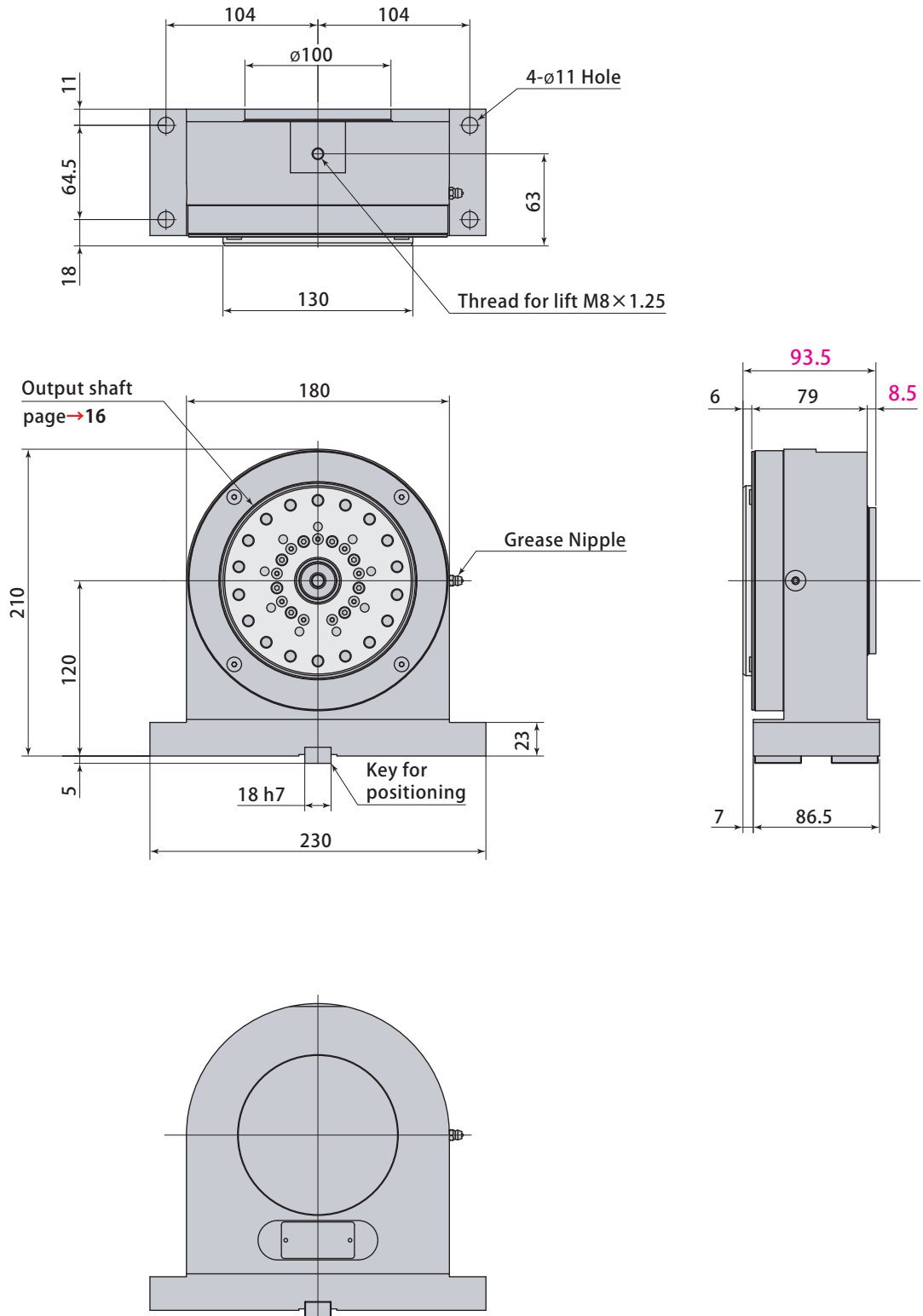
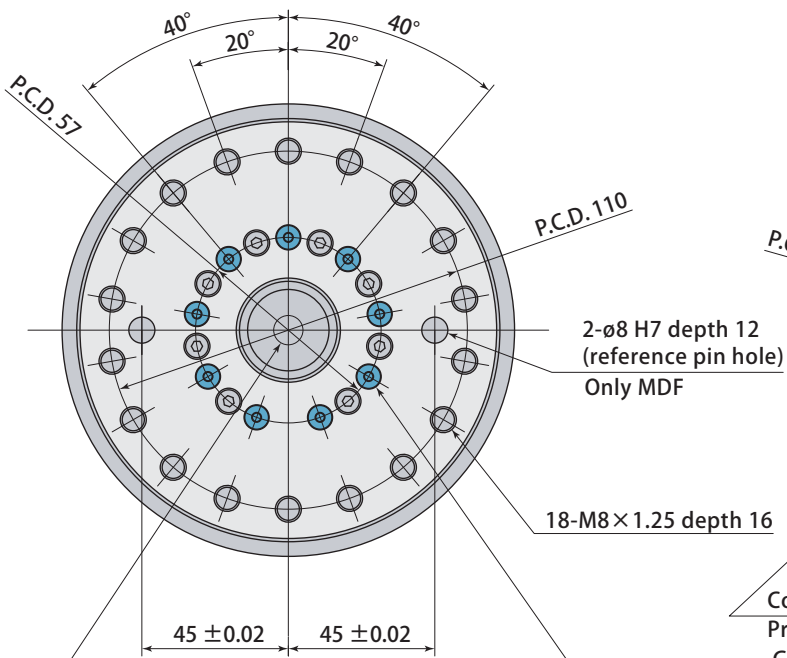


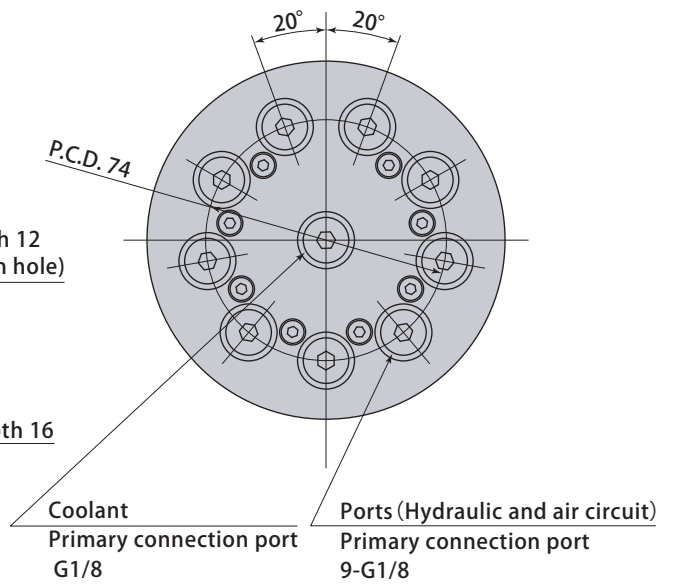
Table face ((MDF130R-RF/MDS130-R9) Dimensions

MDF / MDS common

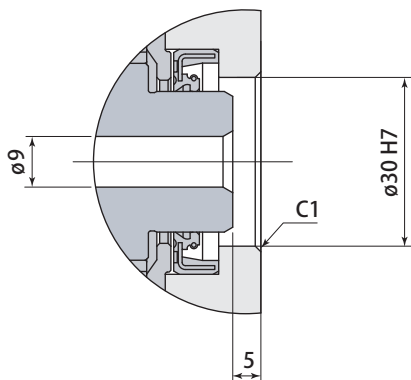
Output shaft



Primary connection port



Coolant connection port



Secondary connectoin port (9 ports)

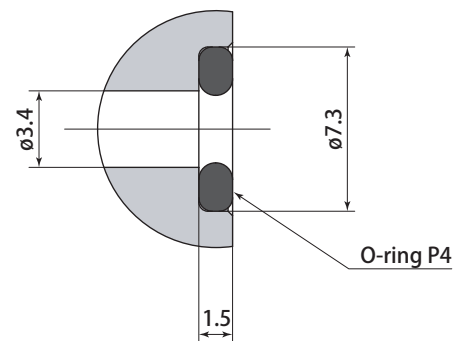
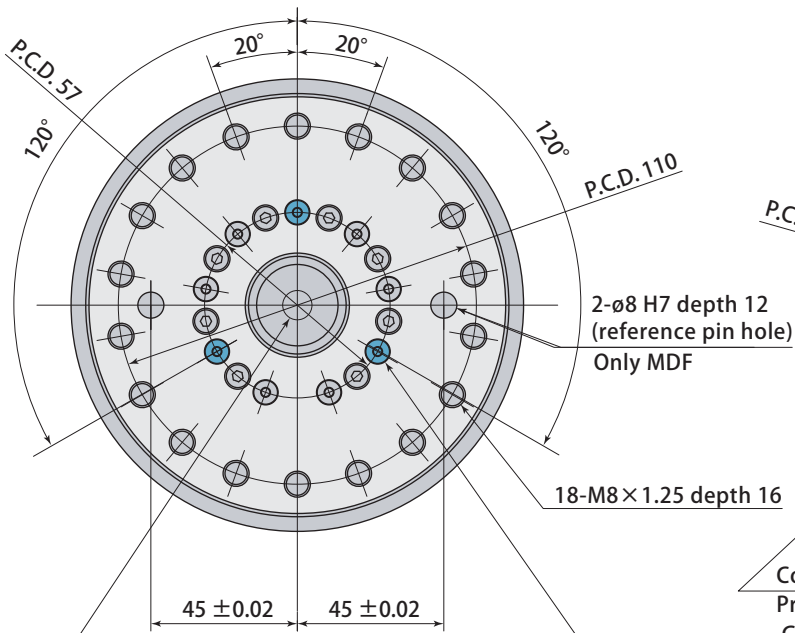


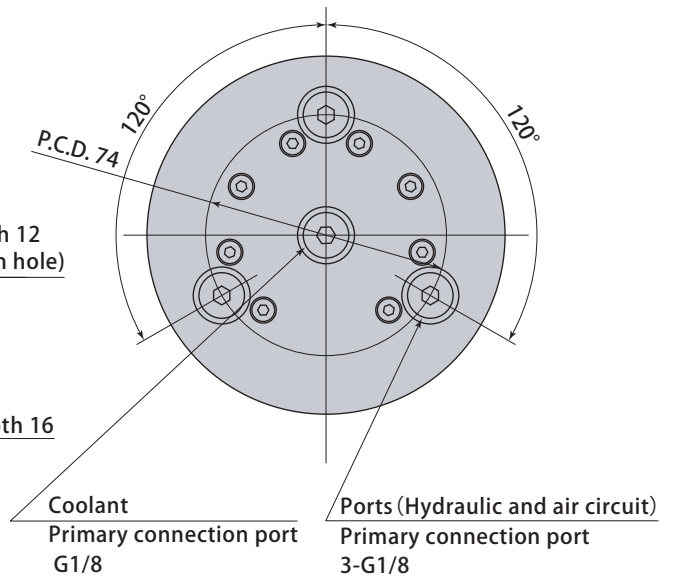
Table face (MDS130-R3) Dimensions

MDS

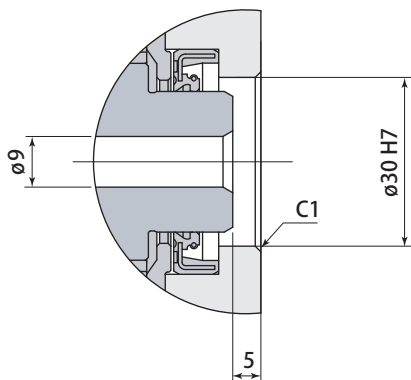
Output shaft



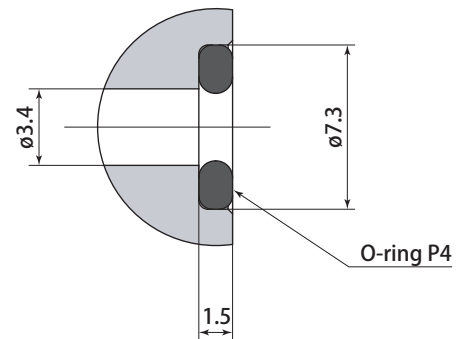
Primary connection port



Coolant connection port



Secondary connectoin port (3 ports)



Pascal

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