Rotary Cylinder

About the Product

1. Classification of the rotary cylinder (rotary actuator)

Rotary cylinder: An apparatus that transforms the energy of pressurized air into rotational movement

1) Vane type

The vane type is operated by the air pressure that operates on the hydraulic area of the fixed wall installed on the cylinder.

Single vane: 270° to 300°, Double vane; 70° to 120°, Triple vane; below 60°

Structurally, it's difficult to shut air completely.

2) Rack & pinion type

When the center that is geared to the rack gear linked directly to the piston, torque is acquired. The type is most efficient among rotary cylinders. It's easy to install cushions. Also, component forces are generated at the pressure angle of the rack gear. Also, friction increases because horizontal thrust on the backside of the gear or piston occurs, but efficiency of 80°to 90° could be obtained.

3) Screw type

When the stroke is enlarged as the straight movement changes to the rotational movement with the screw on the thrust axis in the middle, the rotational angle could be great, but the exterior should become larger. The efficiency ratio is about 80%.

4) Crank type

The linear movement changes to rotational movement by the crank. The angle of movement is limited to 110° structurally, and the rotational force changes according to the angle of movement.

5) Wheel gear & chain type (hydro type)

The chain linked to the cylinder piston arranged in parallel is geared to the wheel gear. With built-in oil on the part linked to the wheel gear, the type is used in processes that require quiet rotation. Greater than 90% efficiency is possible.

About the Product

2. Process of selecting rotary cylinder

1) Review of the size of the load

(1) Required torque when static power is required;

Ts = F x l (Nm) [F:The force which is demanded(n), l:From load center distance until in rotary center (m)]

(2) When the load changes

a) Calculation of the resistance torque

- When there is no change in load (horizontal use) K=2

- When there is change to the load (vertical use) K=5

b) Calculation of the acceleration torque

(i) Acceleration torque $Ta = 5 \times I \times (\Theta/t^2) \times 10^{-2} / 10{,}000$(Nm) [I : Inertial moment (Nm)]

[Θ: rotary actuator angle (rad), 90° = 1.5708(rad), 180° = 3.1416(rad), 270° = 4.7124(rad)]

(ii) The inertial momentum is calculated according to the shape and weight of the load.

(iii) Each acceleration is calculated.

$\alpha = \Theta/t(rad/s^2)$ [Θ: rotary actuator angle (rad), t : rotary actuator time]

c) Calculation of the required torque

$Tt = T_R + T_L$

In the angular rotational cylinder torque table, select the model that satisfies the equation .

2) Review of allowed energy

a) Calculation of the angular velocity

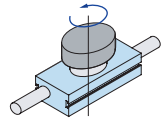
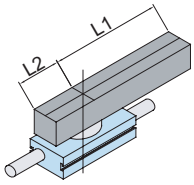
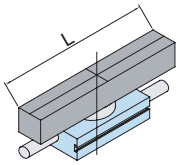
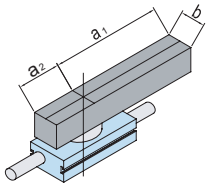
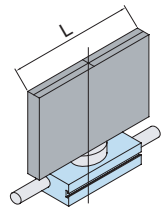
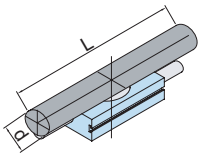
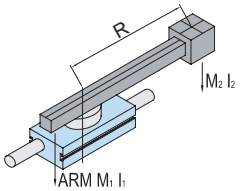
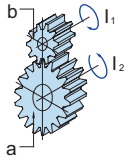
$\omega = \Theta/t(rad/s^2)$ [Θ: rotary actuator angle (rad), t : rotary actuator time]

b) Calculation of the inertial energy of the load

$E = 0.5 \times I \times \omega^2 \times 10^{-1}$ (mj) / 10,000 [I : Inertial moment (Nm)]

When the inertial energy of the load exceeds the allowable energy of the rotary cylinder type,
a mechanism to absorb the impact is required.

Rotary Cylinder

Outline	Require item	Moment of inertia : [Nm]
	d : Diameter [cm] M : Weight [kg]	$I=\frac{Mxd^2}{8}x0.00098$
	M1 : Weight of part L1[kg] M2 : Weight of part L2[kg]	$I=\frac{M_1 L_1^2 + M_2 L_2^2}{3}x0.00098$
	L : Length of bar M : Weight [kg]	$I=\frac{ML^2}{12}x0.00098$
	M1 : Weight of part a1[kg] M2 : Weight of part a2[kg]	$I=\frac{M_1(4a_1^2+b^2)+M_2(4a_2^2+b^2)}{12}x0.00098$
	M : Weight [kg]	$I=\frac{ML^2}{12}x0.00098$
	M : Weight [kg]	$I=\frac{M}{12}(\frac{d^2}{4}+\frac{L^2}{3})x0.00098$
	I1 :The moment of inertia which passes the center of the load located at the top and that parallels to the rotation axis I2 :The moment of inertia which located around the rotation axis of the arm M1 :Weight at the top of the object M2 :Weight of the arm R :Distance from the rotation axis to the center of gravity of the load at the top of the object	$I=I_1+M_2R^2+I_2x0.00098$
	I1 :Moment of inertia at the loading side I2 :Moment of inertia at the driving side	$I=I_2+(\frac{a}{b})^2 I_1 x0.00098$

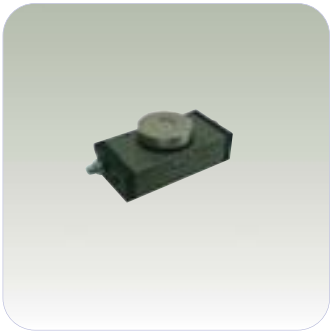
Rotary Cylinder

Single Type

SRJ Rack & Pinion Type

P=Air Pressure[bar]

Type	Rotation Angle	Practical Torque (Nm)	Max Payload (kg)		Weight (kg)	Page
			Radial	Thrust		
16	90° / 180°	0.093P	0.8	0.8	0.41 / 0.47	356
20	90° / 180°	0.184P	1.2	1.2	0.69 / 0.80	
25	90° / 180°	0.328P	3.5	3.5	1.17 / 1.37	
30	90° / 180°	0.608P	5.7	5.7	2.08 / 2.45	
40	90° / 180°	1.481P	15	12	3.62 / 4.33	

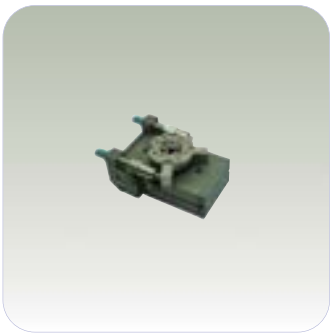


Double Type

SDRJ Rack & Pinion Type

P=Air Pressure[bar]

Type	Rotation Angle	Practical Torque (Nm)	Max Payload (kg)		Weight (kg)	Page
			Radial	Thrust		
16	90° / 180°	0.235P	8	8	0.86 / 0.82	362
20	90° / 180°	0.491P	12	10	2.20 / 2.10	
25	90° / 180°	1.040P	15	14	2.74 / 2.66	
30	90° / 180°	1.491P	16	16	3.88 / 3.76	
40	90° / 180°	3.169P	26	25	6.82 / 6.62	
50	90° / 180°	6.455P	32	30	11.71 / 11.60	
63	90° / 180°	14.715P	42	40	23.02 / 23.00	



Hydraulic

RJC

P=Air Pressure[bar]

Type	Rotation Angle	Practical Torque (Nm)	Max Payload (kg)		Weight (kg)	Page
			Radial	Thrust		
40	90° / 180°	3.139(P-1.4)	40	20	5.49 / 5.83	370
60	90° / 180°	9.908(P-1.3)	62	32	11.50 /12.00	
80	90° / 180°	19.228(P-0.9)	78	40	18.50 /20.00	

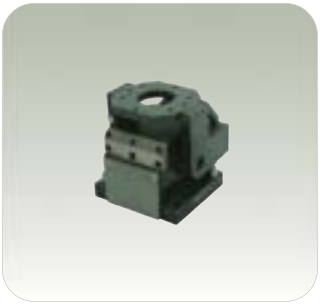
Rotary Cylinder

Swivel Unit

RTU Finger Attachable

P=Air Pressure[bar]

Type	Rotation Angle	Practical Torque (Nm)	Max Payload (kg)		Weight (kg)	Page
			Radial	Thrust		
25	90°	0.169P	1.2	0.6	0.68	376
40	90°	0.775P	1.9	1.2	1.97	
50	90°	1.413P	2.8	1.6	3.24	



RHU Finger Attachable

P=Air Pressure[bar]

Type	Rotation Angle	Practical Torque (Nm)	Max Payload (kg)		Weight (kg)	Page
			Radial	Thrust		
20	180°	0.510P	12	10	2.26	382
34	180°	1.275P	18	13	4.10	
40	180°	1.570P	20	15	6.80	
40N	180°	3.021P	24	21	8.84	

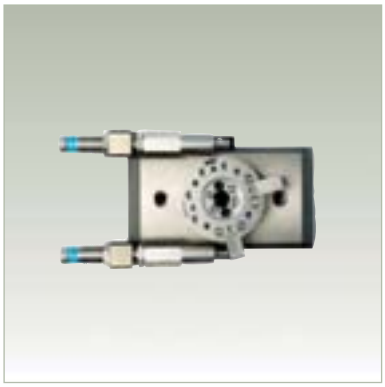
RHUM Finger Assembly

P=Air Pressure[bar]

Type	Rotation Angle	Practical Torque (Nm)	Max Payload (kg)		Weight (kg)	Page
			Radial	Thrust		
20	180°	0.510P	12	10		388
34	180°	1.275P	18	13		
40	180°	1.570P	20	15		
40N	180°	3.021P	24	21		

Rotary Cylinder

While the slide cylinder transports objects vertically and horizontally,
the rotary cylinder moves objects rotationally,
and the adjustment of the rotational angle is possible.

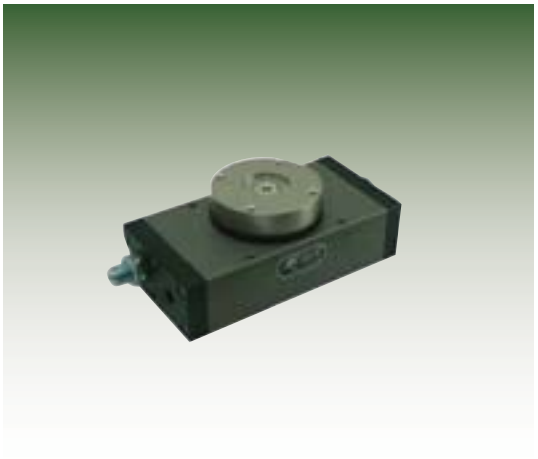


Rotary Cylinder

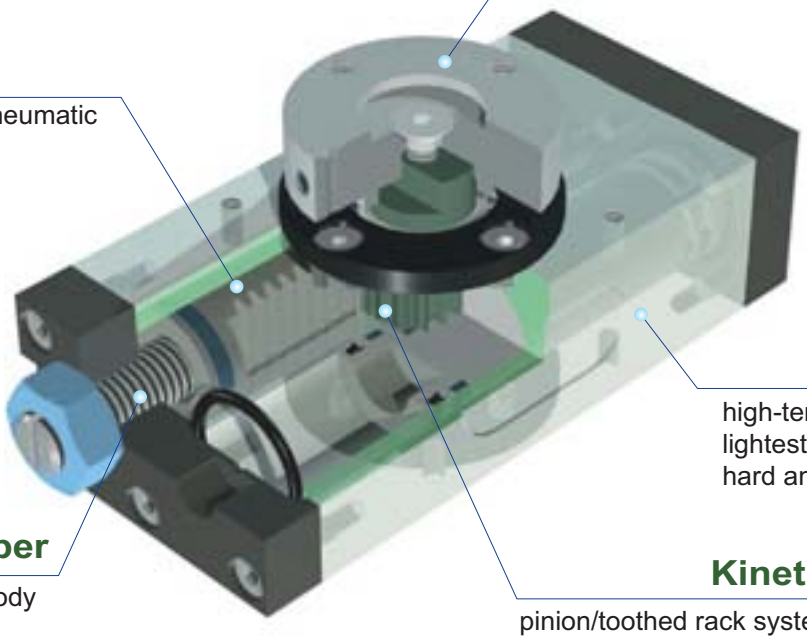
SRJ-16,20,25,30,40

Character

- Rotary actuator of rack & pinion type
- A built in wearing provide long unit life
- Low friction seal provide high torque with envelope ratio
- End stopper for precise angular position
  (Can use shock absorber instead of stopper)



Rack & pinion type



Rotation table
fast and economic positioning of the rotation table

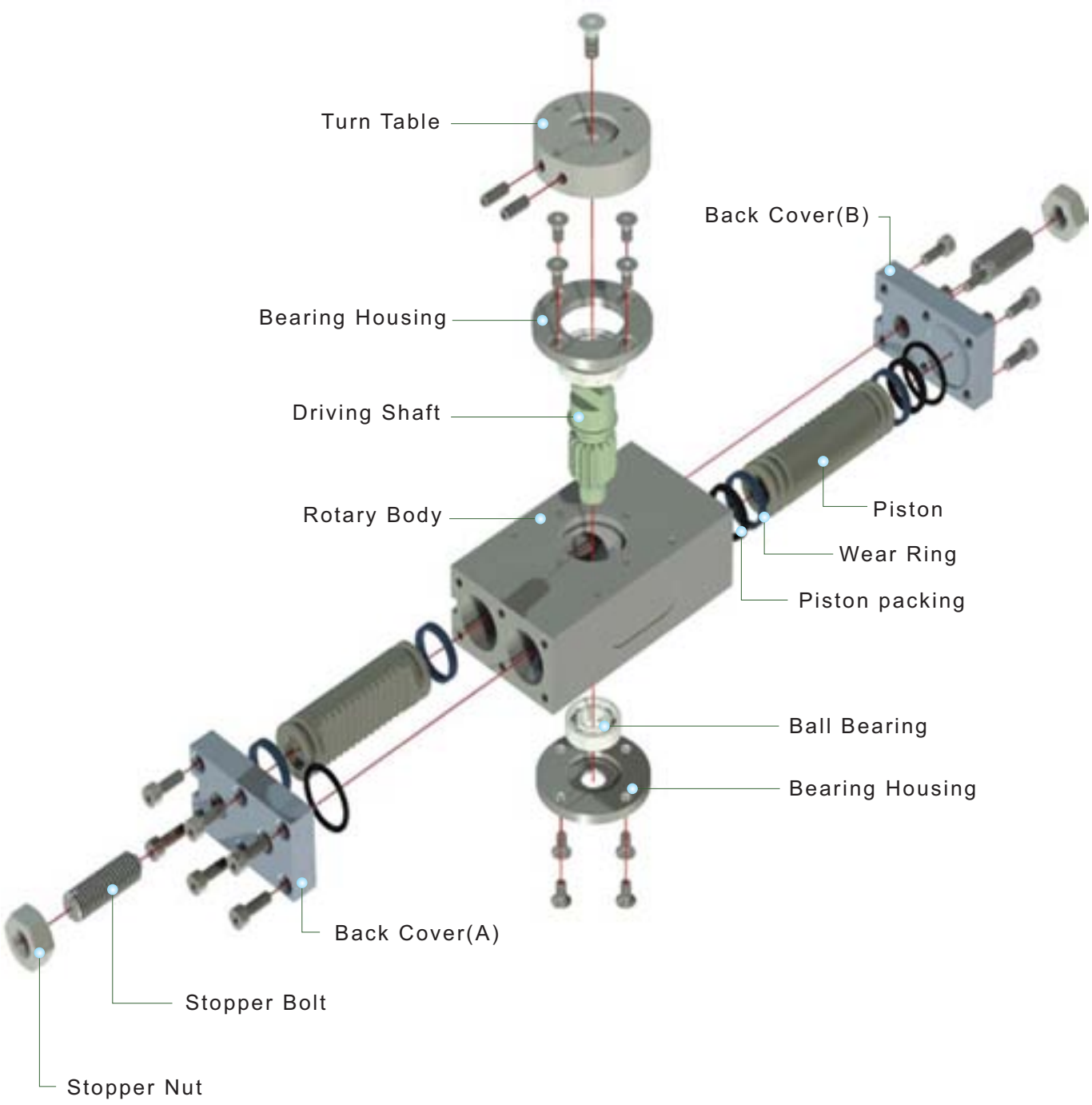
Drive
double acting pneumatic cylinder

Body
high-tensile aluminum body with lightest possible because of hard anodizing

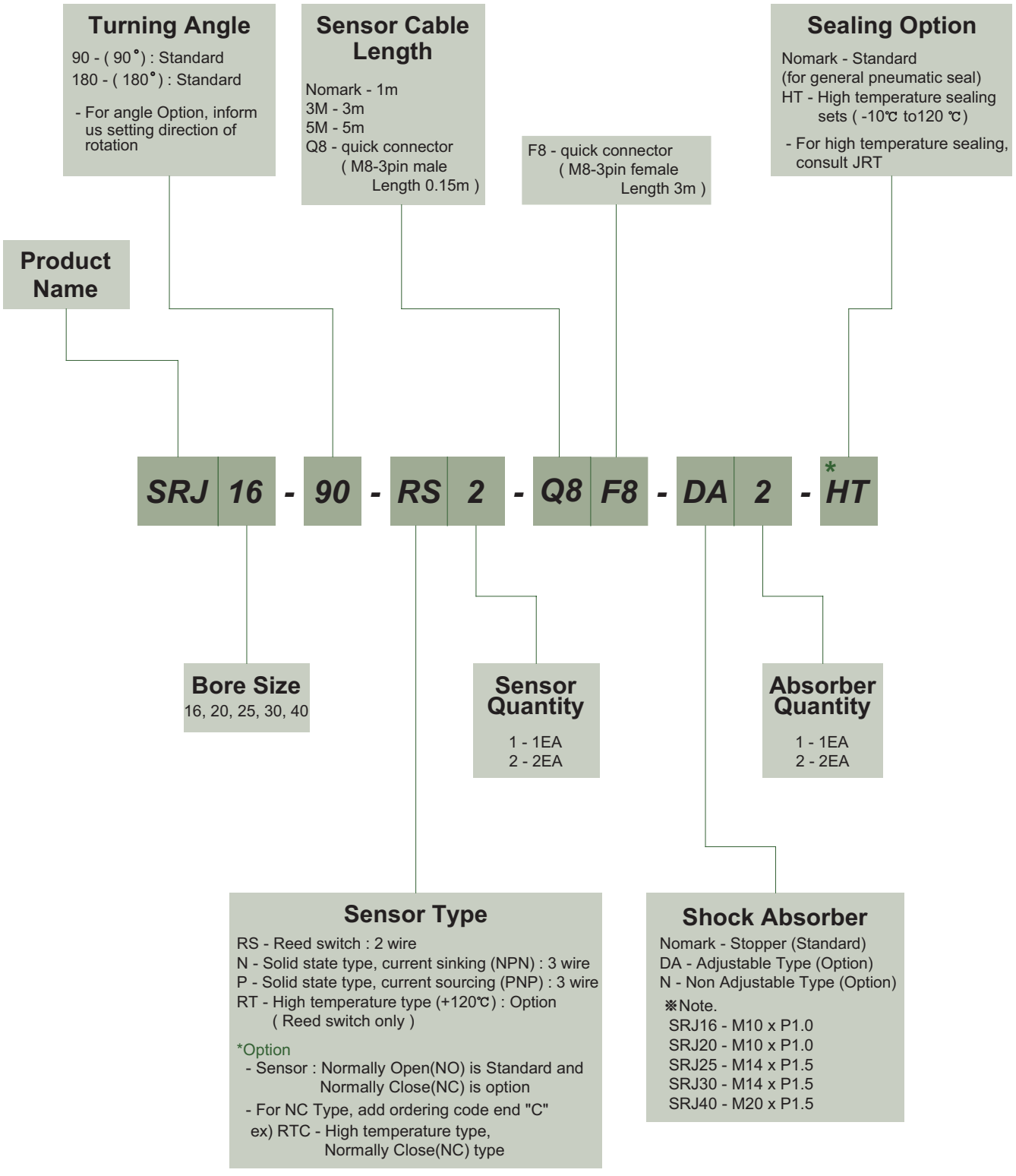
Stop damper
direct cylinder body position inquiry

Kinetics
pinion/toothed rack system for low tolerance transmission of drive power in one rotation movement

Exploded view



Ordering Code



The delivery of * mark option is longer than a standard, So inquire of JRT

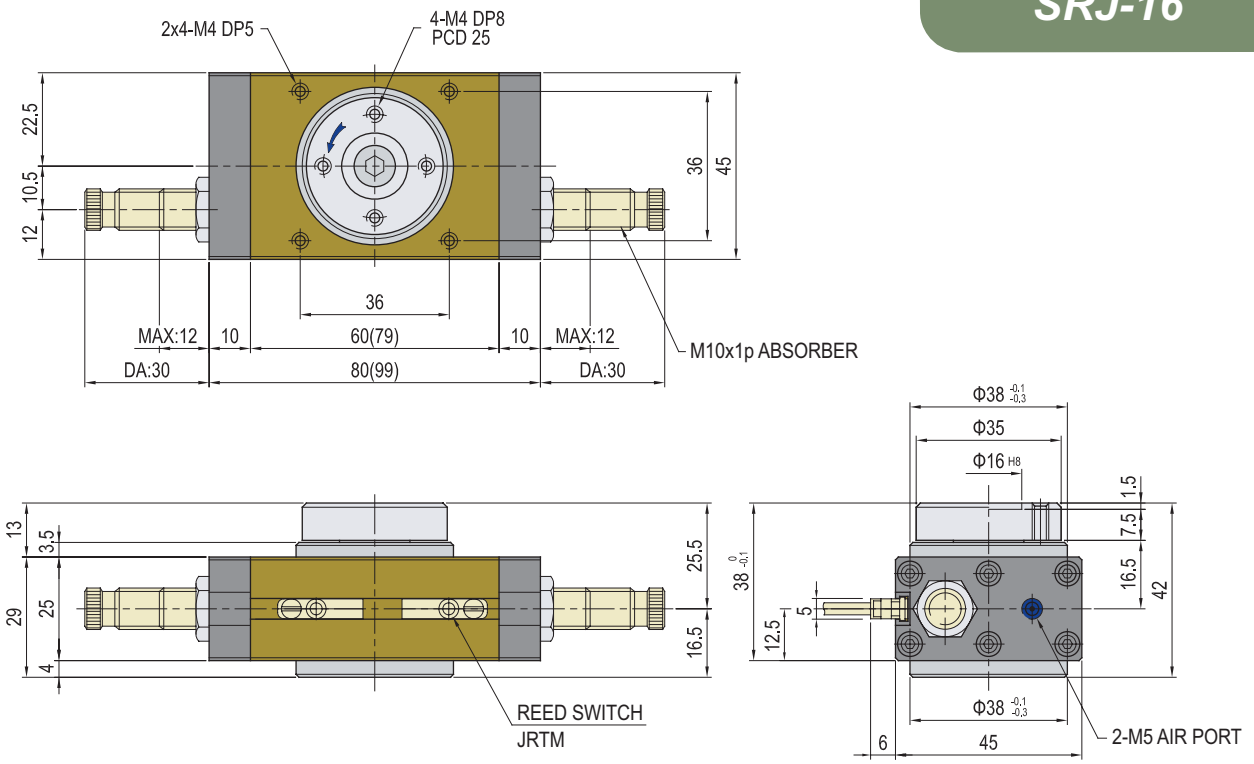
Specification

P=Air Pressure[bar]

Products Name	SRJ16	SRJ20	SRJ25	SRJ30	SRJ40	Unit
Actual Torque	0.093P	0.184P	0.327P	0.608P	1.480P	N.m
Radial payload	0.8	1.2	3.5	5.7	15	kg
Compress load(thrust)	0.8	1.2	3.5	5.7	15	kg
Tensile load(thrust)	0.6	1.0	3.0	4.5	8.0	kg
Weight(90°)	0.41	0.63	1.17	2.08	3.61	kg
Weight(180°)	0.47	0.80	1.37	2.45	4.33	kg
Turning Time(90°)	0.2 to 0.5	0.2 to 0.8	0.2 to 1.0	0.3 to 1.0	0.3 to 1.0	sec
Turning Time(180°)	0.3 to 0.7	0.3 to 1.0	0.3 to 1.5	0.5 to 1.5	0.5 to 1.5	sec
Fitting size	M5	PF(G) 1/8	PF(G) 1/8	PF(G) 1/8	PF(G) 1/8	
Air consumption(90°/180°)	3.8 / 7.6	7.4 / 14.8	13.1 / 26.2	24.3 / 48.6	59.2 / 118.4	cm^3
Cushion	Stopper or Absorber					
Repetition Accuracy	±0.1					degree
Operating pressure	3 to 7					bar
Ambient temperature	-5 to 60					℃
Lubrication	Needless					

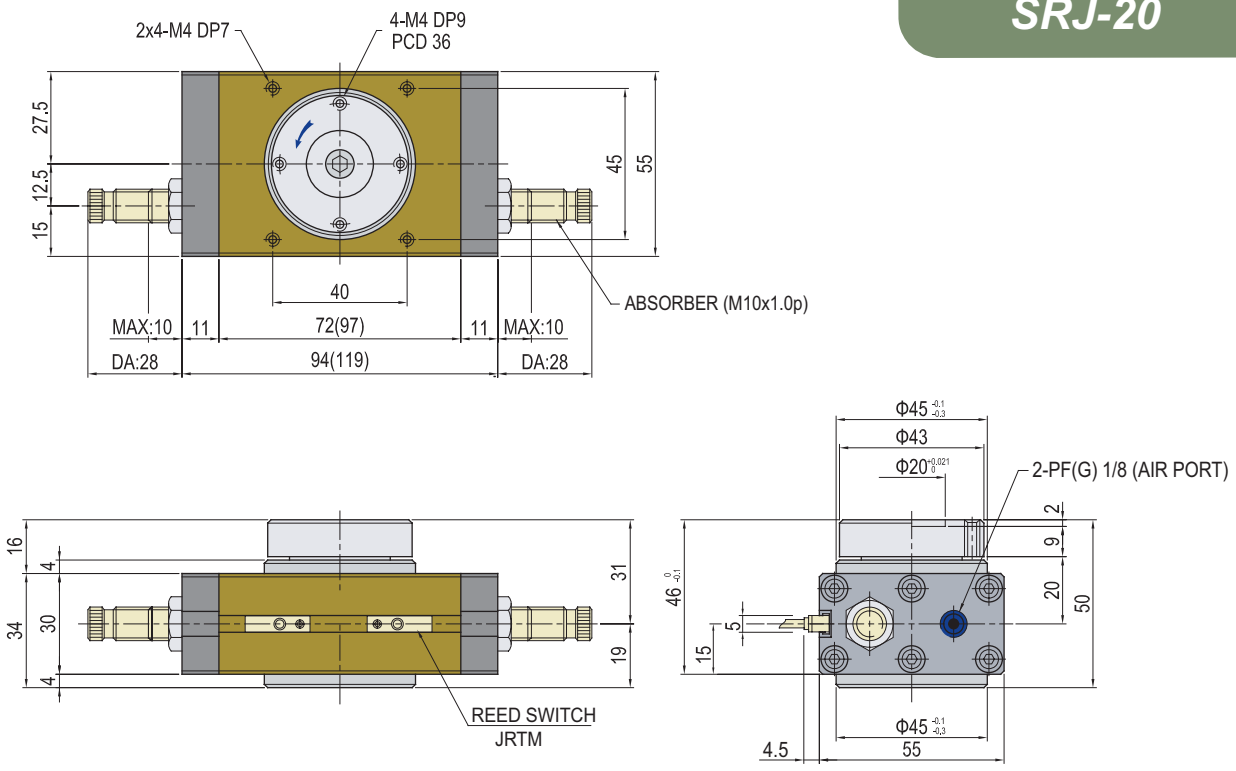
* After 100 consecutive strokes to end positions

SRJ-16



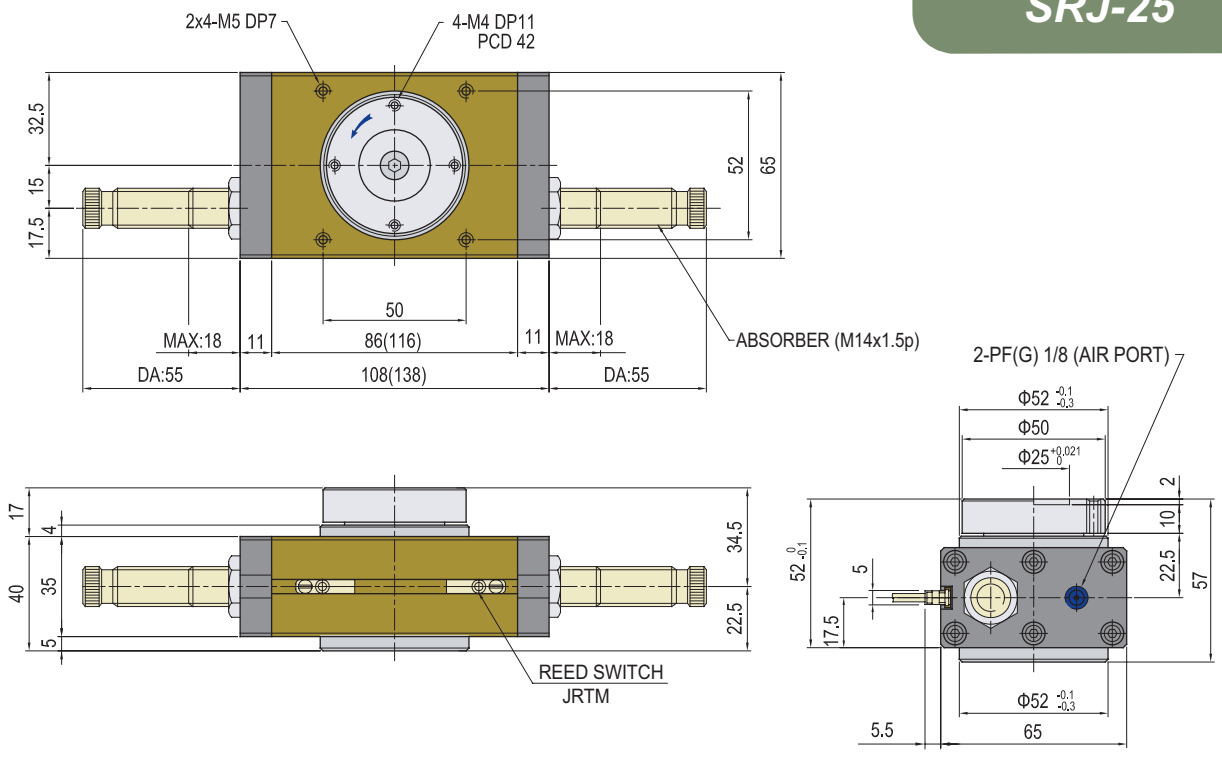
*for ( ) in number 180°

SRJ-20



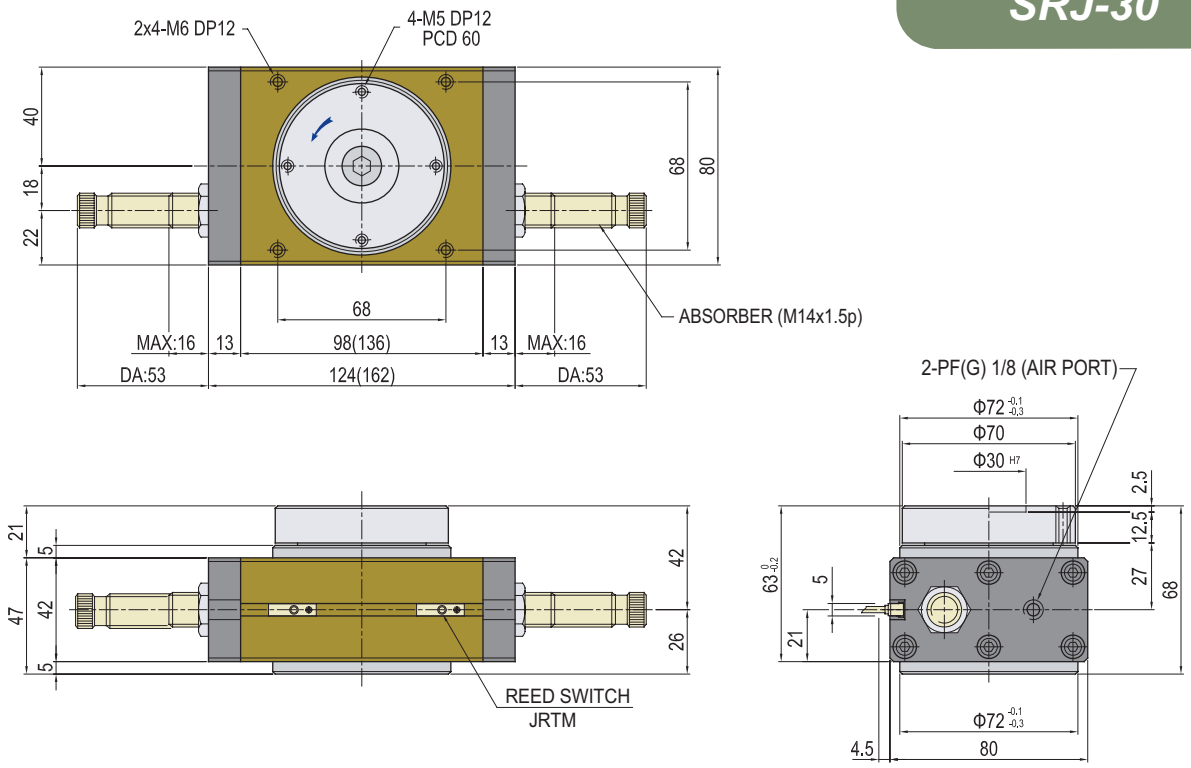
⋆for ( ) in number 180°

SRJ-25



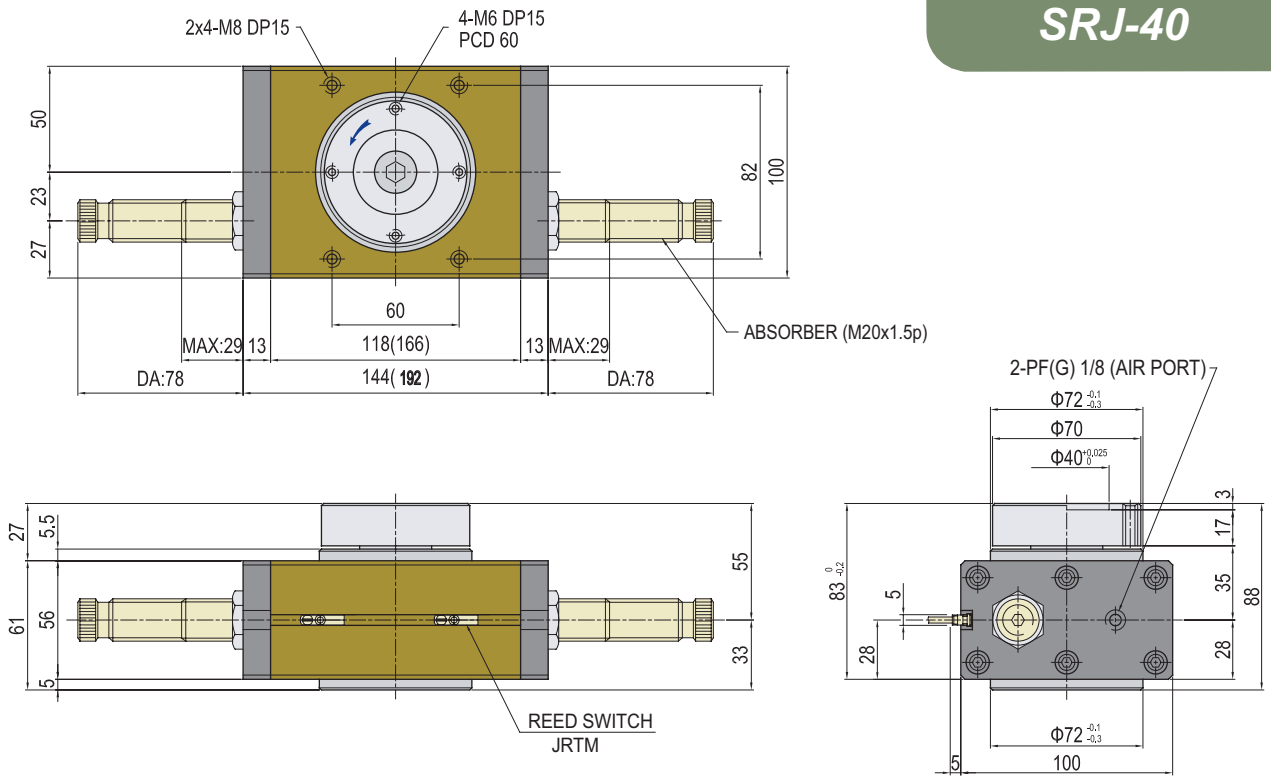
⋆for ( ) in number 180°

SRJ-30



⋆for ( ) in number 180°

SRJ-40



⋆for ( ) in number 180°

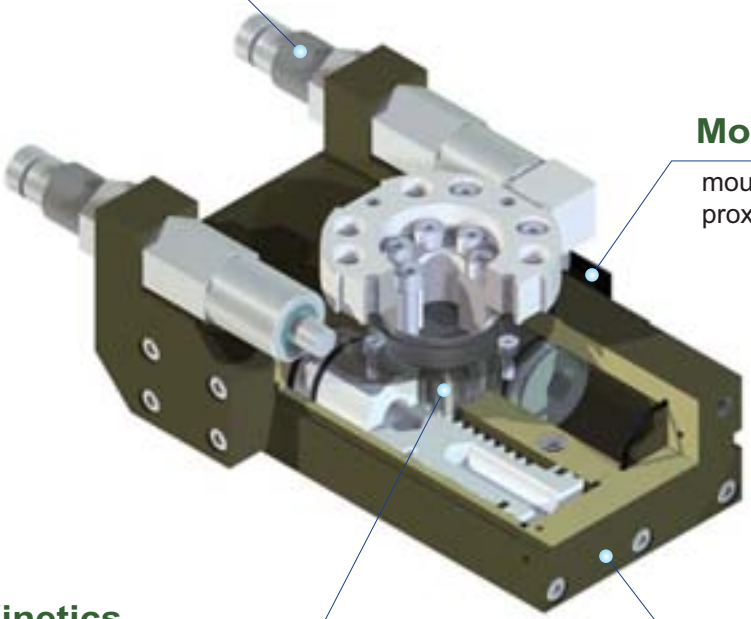
Rotary Cylinder

SDRJ-16,20,25,30,40,50,63

Character

- Rotary actuator of rack & pinion type with internal dual piston
- Saving power tube by center through bore & easy mount
- Identical stop power with a rotation power reduce rotation moment of inertia
- Integrated bracket to use a shoulder bolt key reduce the tolerance of end position

Rack & pinion type



Shock absorber

adjustable end rotary driving absorbency

Mounting block

mounting for inductive proximity switch

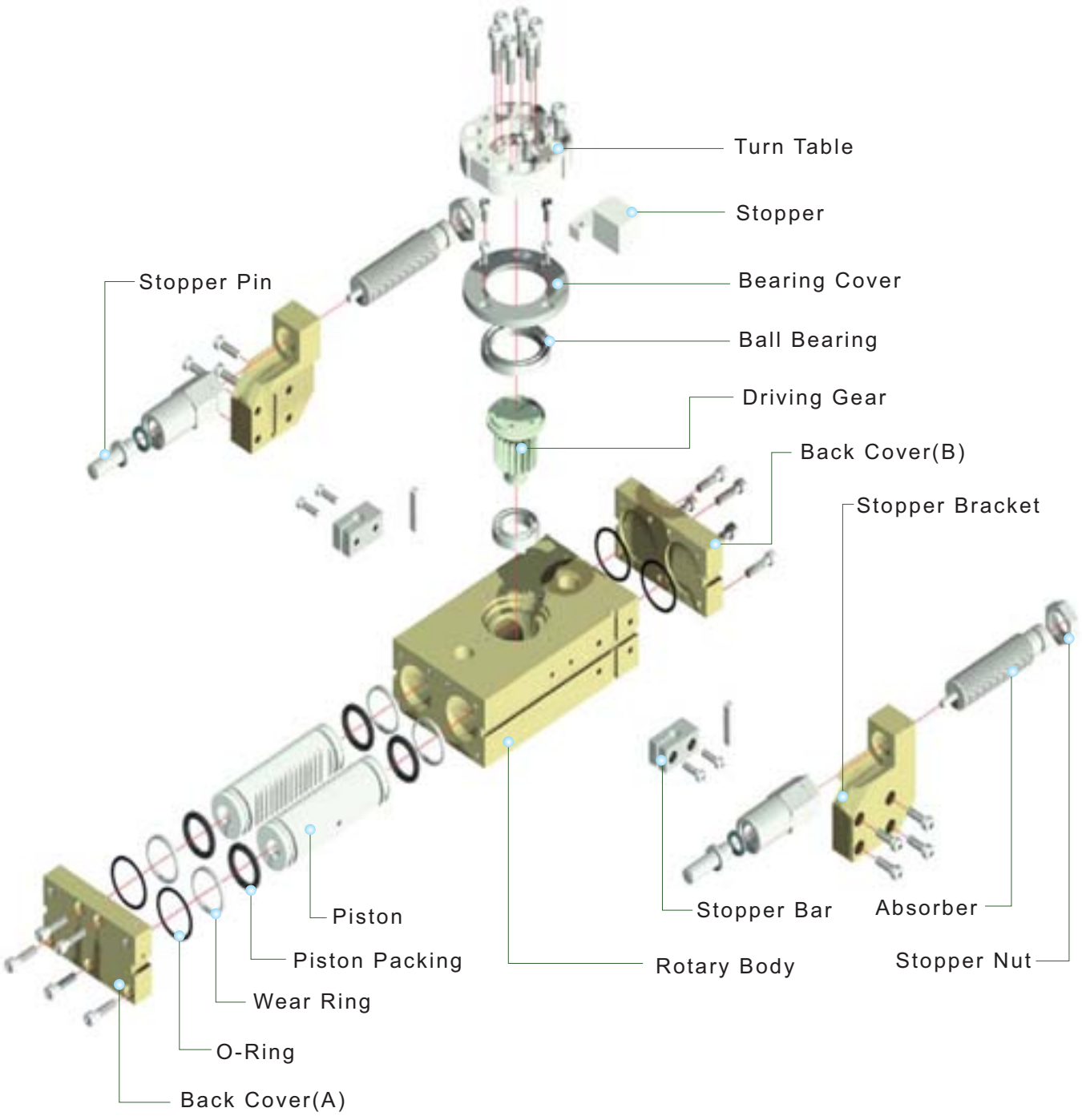
Kinetics

pinion/toothed rack system for low tolerance transmission of drive power in one rotation movement

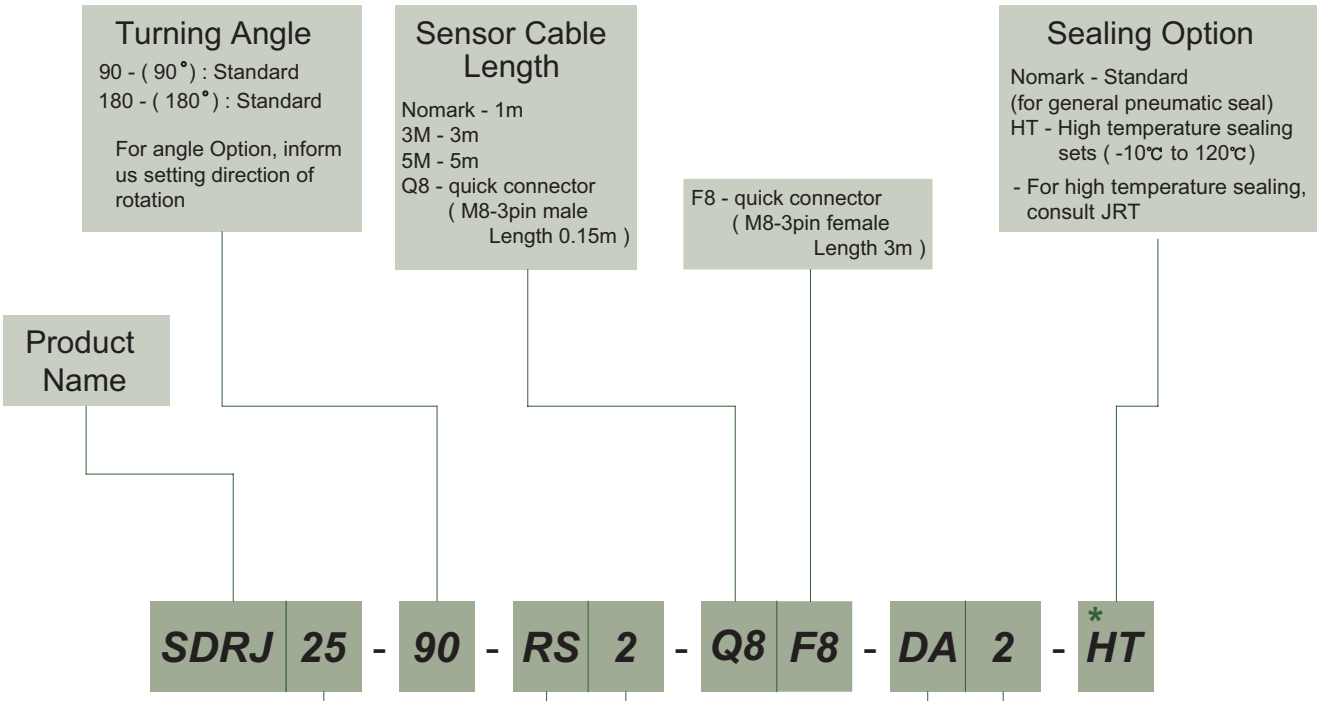
Body

high-tensile aluminum body with lightest possible because of hard anodizing

Exploded view



Ordering Code



Bore Size
16, 20, 25, 30, 40, 50, 63

Sensor Quantity
1 - 1EA
2 - 2EA

Absorber Quantity
1 - 1EA
2 - 2EA

Sensor Type
RS - Reed switch : 2 wire
N - Solid state type, current sinking (NPN) : 3 wire
P - Solid state type, current sourcing (PNP) : 3 wire
RT - High temperature type (+120℃) : Option (Reed switch only)
PS - Proximity Sensor(NPN) 8 x 30(mm)
PSP - Proximity Sensor(PNP) 8 x 30(mm)
PSS - Proximity Sensor(NPN) 8 x 16(mm)
PSSP - Proximity Sensor(PNP) 8 x 16(mm)
PSL - Proximity Sensor(NPN) 12 x 46(mm) (Only SDRJ50, SDRJ63)
PSLP - Proximity Sensor(PNP) 12 x 46(mm) (Only SDRJ50, SDRJ63)

*Option
- Sensor : Normally Open(NO) is Standard and Normally Close(NC) is option
- For NC Type, add ordering code end "C"
ex) RTC - High temperature type, Normally Close(NC) type

Shock Absorber
Nomark - Stopper (Option)
DA - Adjustable Type (Standard)
N - Non Adjustable Type (Option)

※Note.
SDRJ16 - M12 x P1.0
SDRJ20 - M14 x P1.5
SDRJ25 - M14 x P1.5
SDRJ30 - M20 x P1.5
SDRJ40 - M20 x P1.5
SDRJ50 - M27 x P3.0
SDRJ63 - M27 x P3.0

The delivery of * mark option is longer than a standard, So inquire of JRT

SDRJ

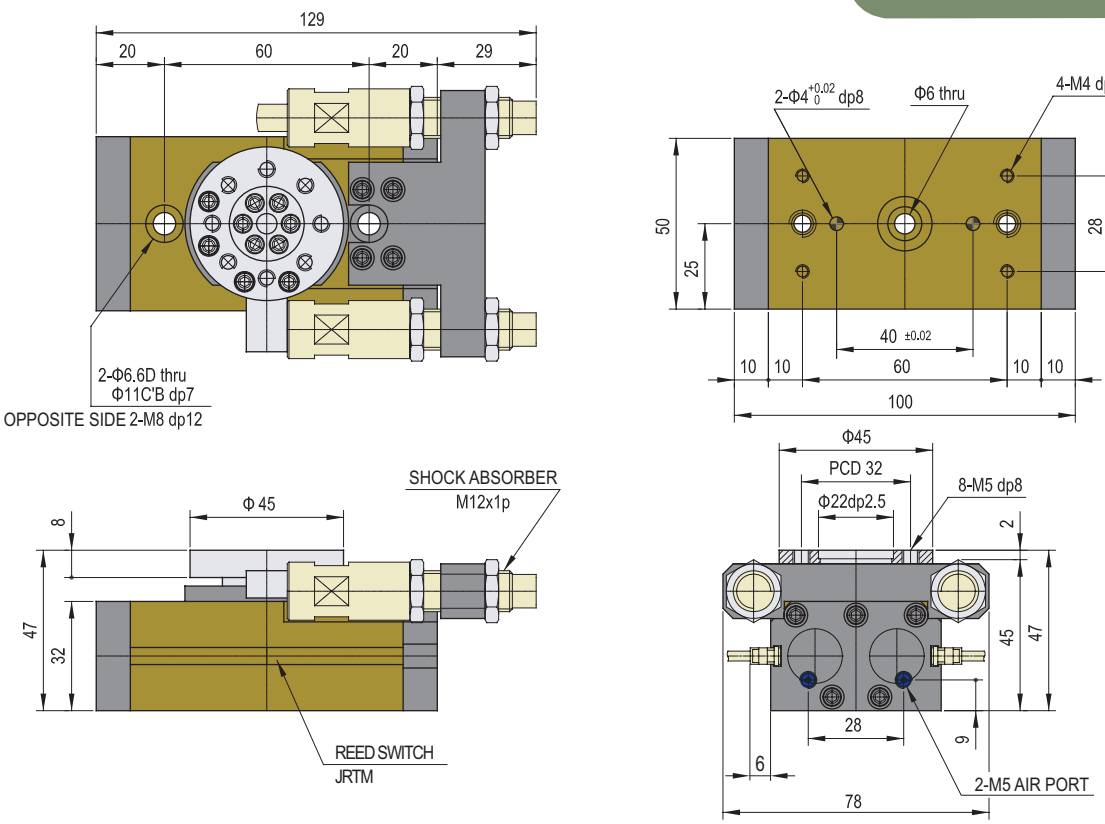
Specification

P=Air Pressure[bar]

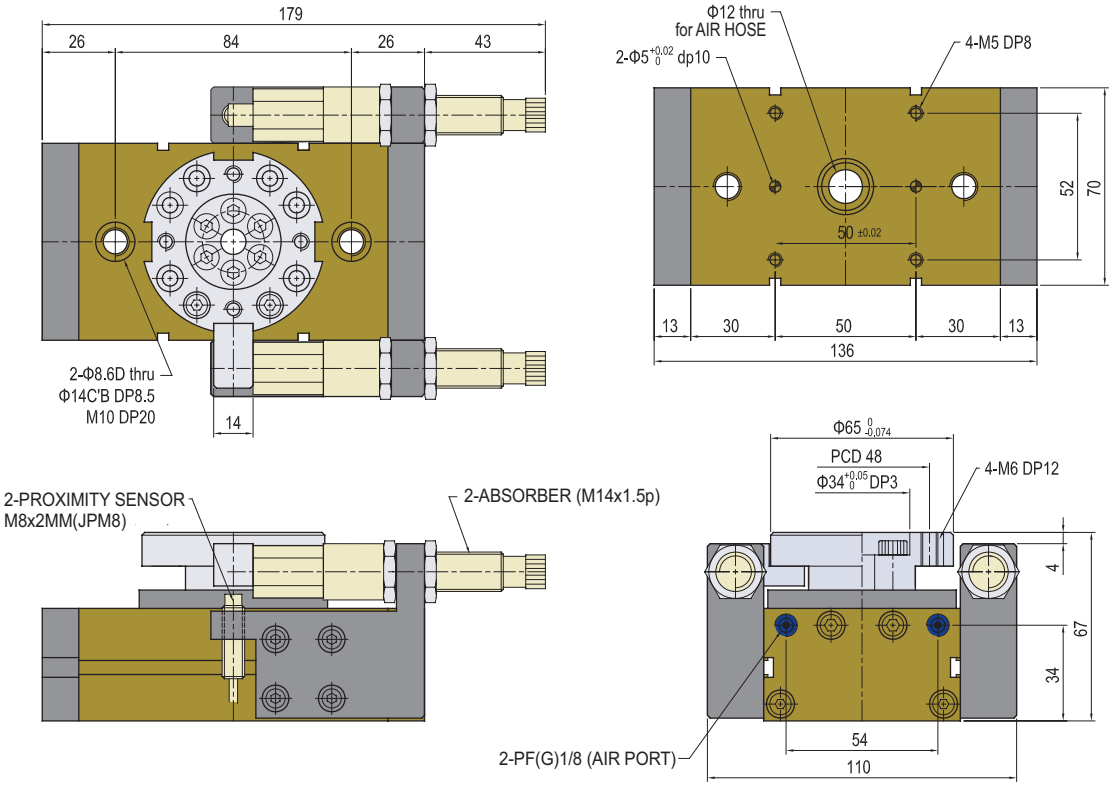
Products Name	SDRJ16	SDRJ20	SDRJ25	SDRJ30	SDRJ40	SDRJ50	SDRJ63	Unit
Actual Torque	0.235P	0.49P	1.039P	1.49P	3.165P	6.448P	14.7P	N.m
Radial payload	8	12	15	16	26	32	42	kg
Compress load(thrust)	8	10	14	16	25	30	40	kg
Tensile load(thrust)	7	9	10	12	20	26	32	kg
Weight(90°)	0.86	2.15	2.74	3.88	6.82	11.66	22.90	kg
Weight(180°)	0.82	2.11	2.66	3.76	6.62	11.60	22.50	kg
Turning Time(90°)	0.2 to 1.4	0.2 to 1.8	0.2 to 1.8	0.3 to 1.0	0.4 to 1.2	0.6 to 3.2	0.7 to 3.5	sec
Turning Time(180°)	0.3 to 1.0	0.3 to 1.0	0.3 to 1.0	0.4 to 1.2	0.5 to 1.4	0.7 to 3.5	0.8 to 3.7	sec
Fitting size	M5	PF(G) 1/8	PF(G) 1/8	PF(G) 1/8	PF(G) 1/8	PF(G) 1/8	PF(G) 1/4	
Air consumption(90°/180°)	8.8 / 17.7	19.7 / 39.5	41.6 / 83.2	66.6 /119.9	126.3 / 252.5	251.3 / 502.7	589.8/1179.6	cm^3
Cushion	Stopper or Absorber							
Repetition Accuracy	±0.1							degree
Operating pressure	3 to 7							bar
Ambient temperature	-5 to 60							℃
Lubrication	Needless							

* After 100 consecutive strokes to end positions

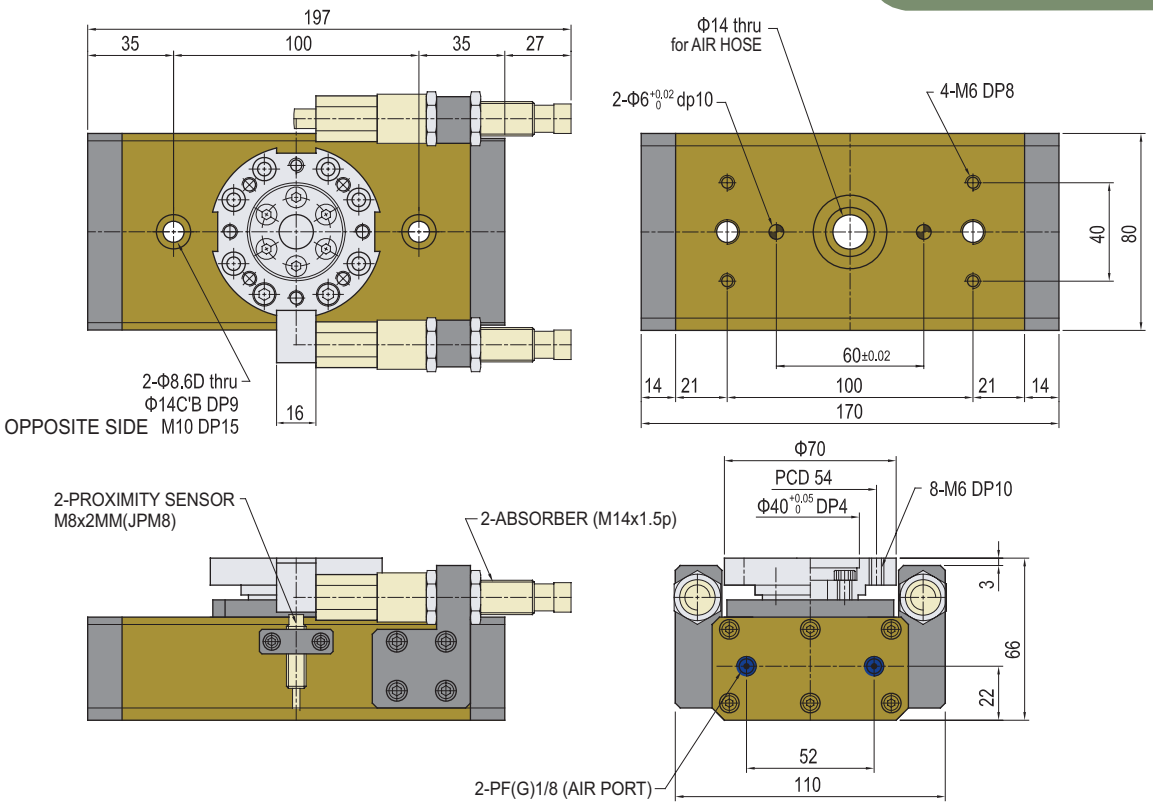
SDRJ-16



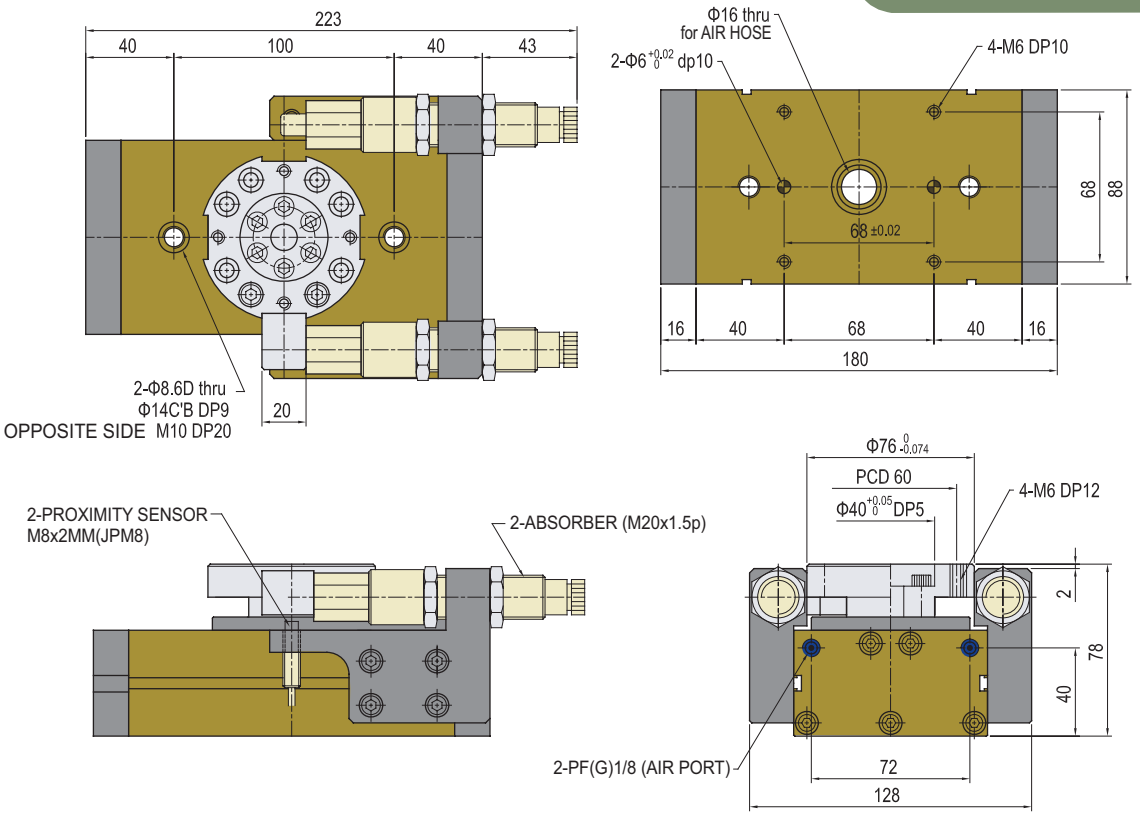
SDRJ-20



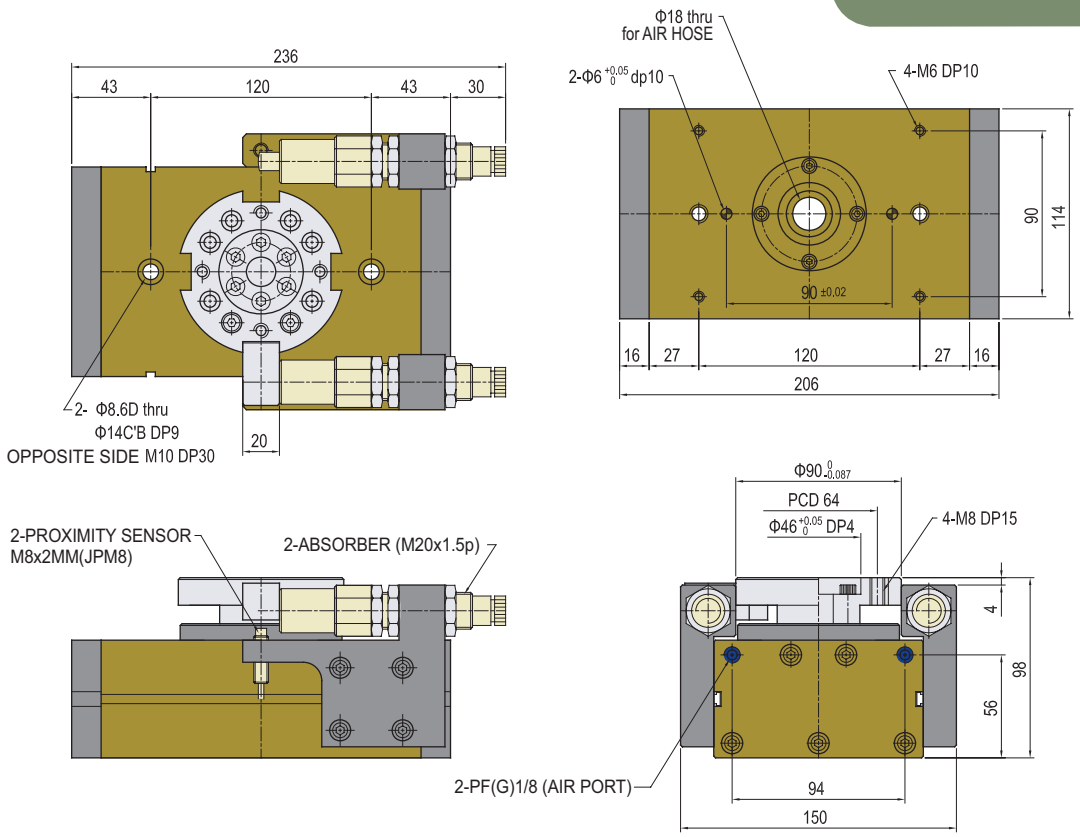
SDRJ-25



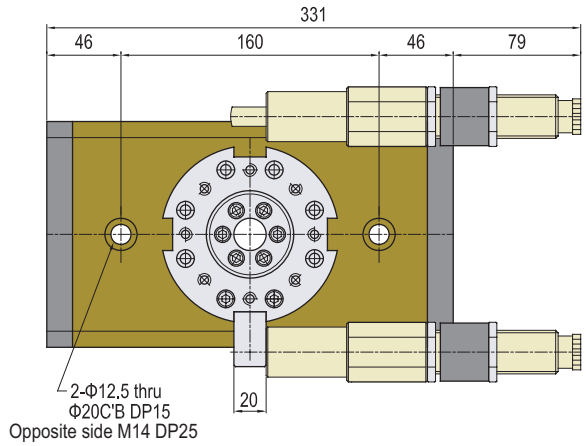
SDRJ-30

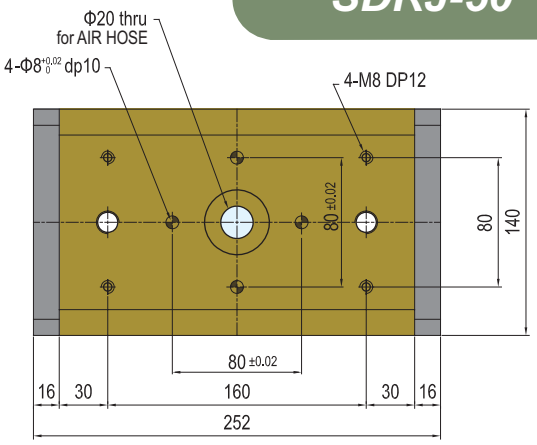


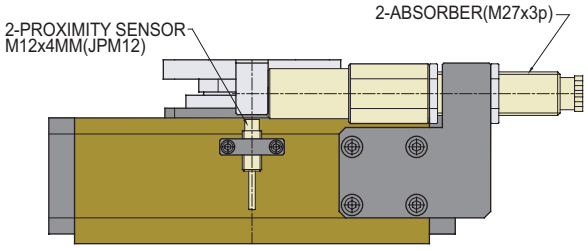
SDRJ-40

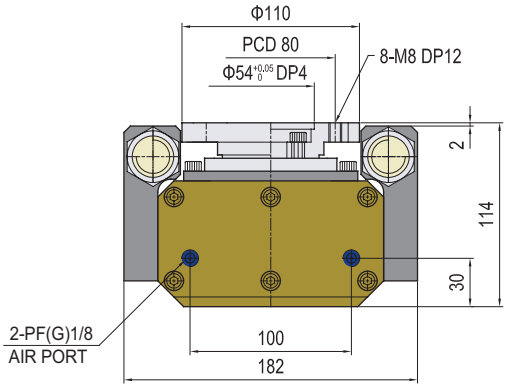


SDRJ-50

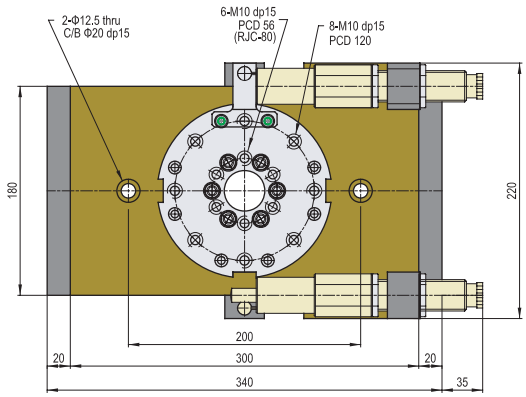


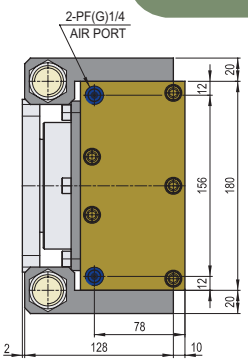


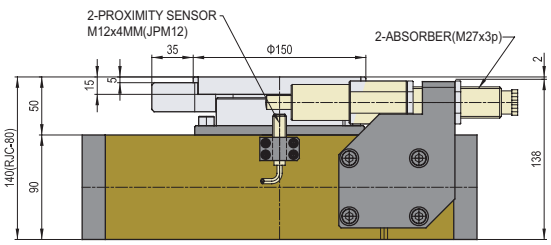


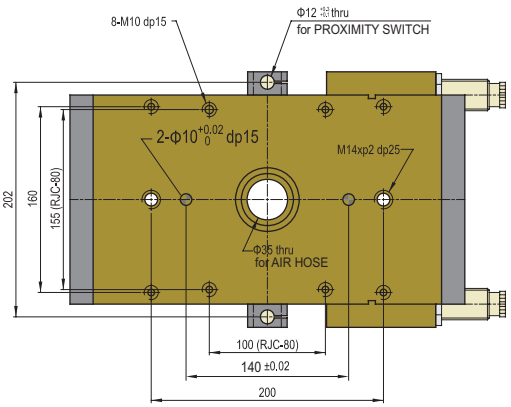


SDRJ-63









Notes

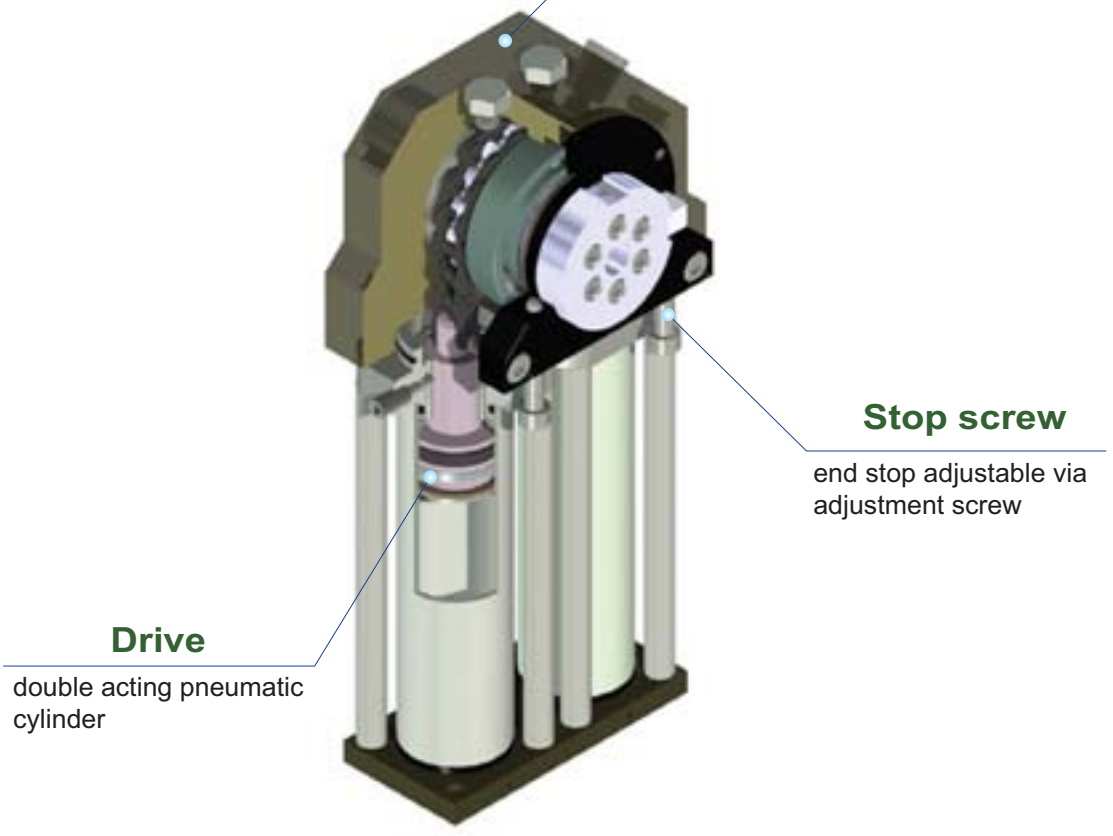
Rotary Cylinder

RJC-40,63,80

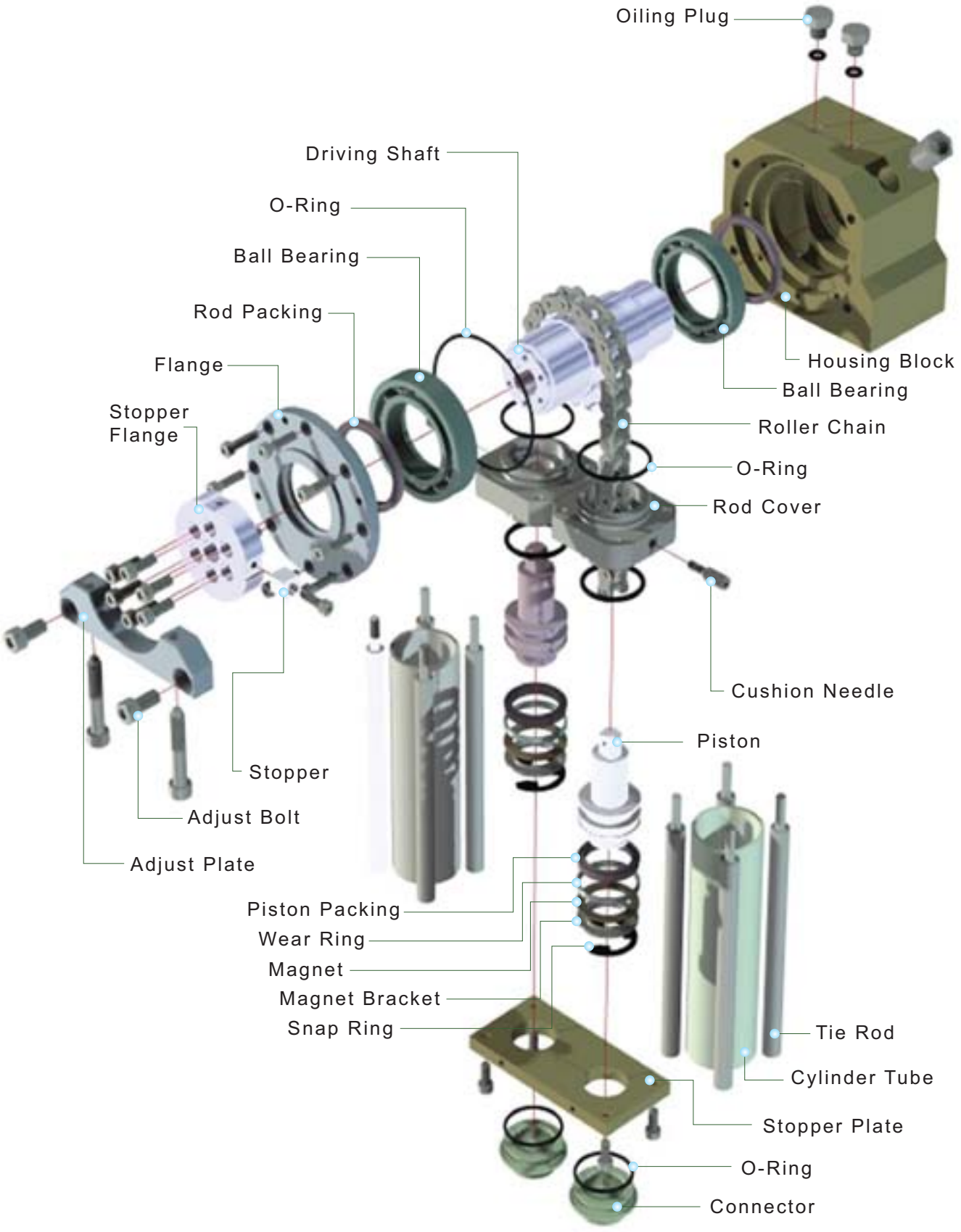
Character

- Rotary actuator of driving shaft coupled chain join piston type
- Built in hydro cushion reduce shock at end of rotation and increase road stopping capacity
- Smoothly rotation at field of low speed
- A driving shaft with center through bore assemble easily into a module
- Attention to select the position tap hole & direction of rotation

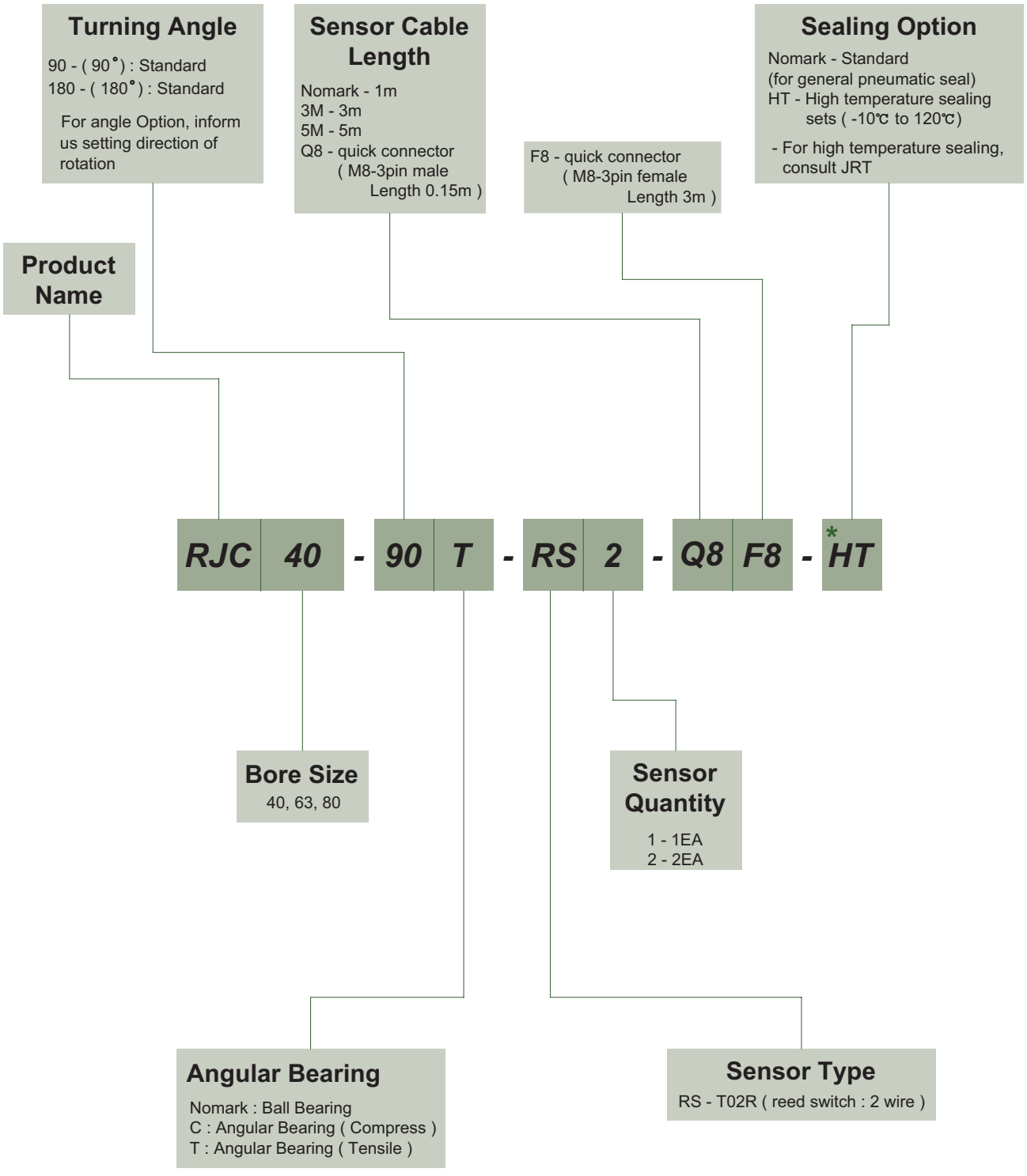
Air hydraulic



Exploded view



Ordering Code



*The delivery of * mark option is longer than a standard, So inquire of JRT*

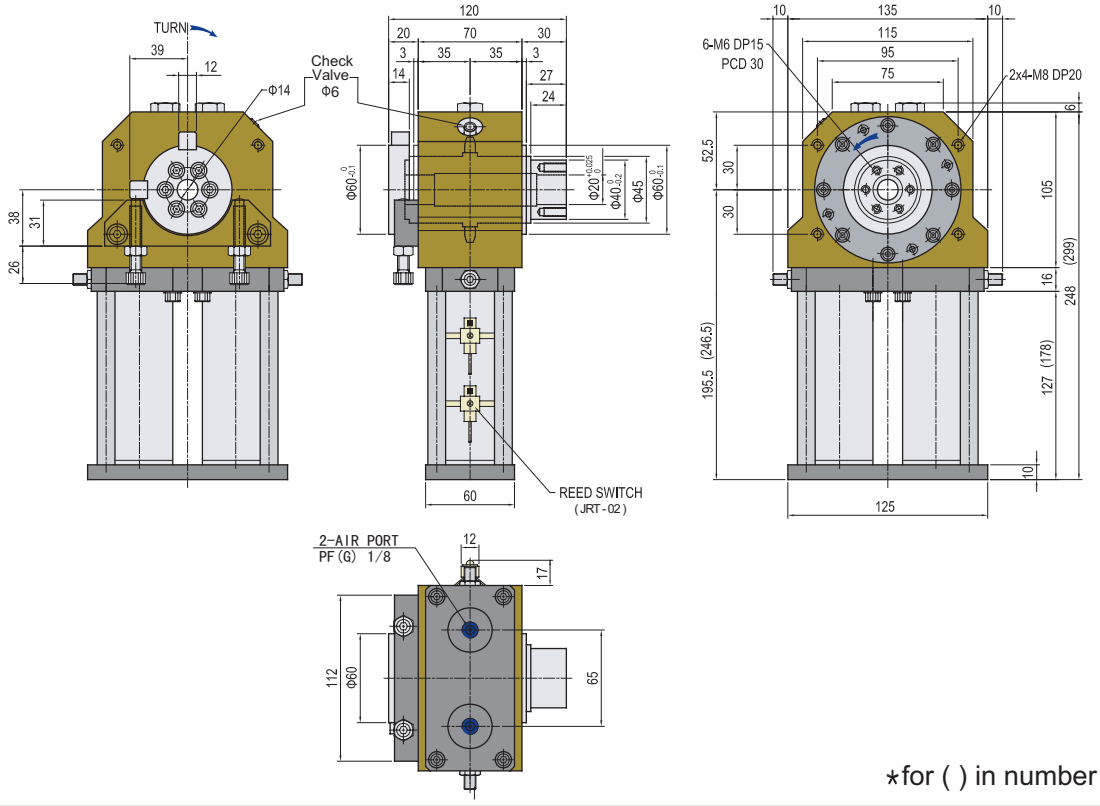
Specification

P=Air Pressure[bar]

Products Name	RJC40	RJC63	RJC80	Unit
Actual Torque	3.136(P-1.4)	9.898(P-1.3)	19.208(P-0.9)	N.m
Radial payload	40	62	78	kg
Compress load(thrust)	20	32	40	kg
Tensile load(thrust)	20	32	40	kg
Weight(90°)	6	11.5	18.5	kg
Weight(180°)	6.5	12	20	kg
Turning Time(90°)	0.5 to 2.5	0.7 to 3.5	1.5 to 4.0	sec
Turning Time(180°)	0.7 to 3.0	1.0 to 4.0	2.0 to 5.0	sec
Fitting size	PF(G) 1/8	PF(G) 1/4	PF(G) 1/4	
Air consumption(90°/180°)	127.7 / 255.3	395.9 / 791.8	766.0 / 1532.1	cm^3
Cushion	Absorber			
Repetition Accuracy	±0.1			degree
Operating pressure	3 to 7			bar
Ambient temperature	-5 to 60			℃
Lubrication	Needless			

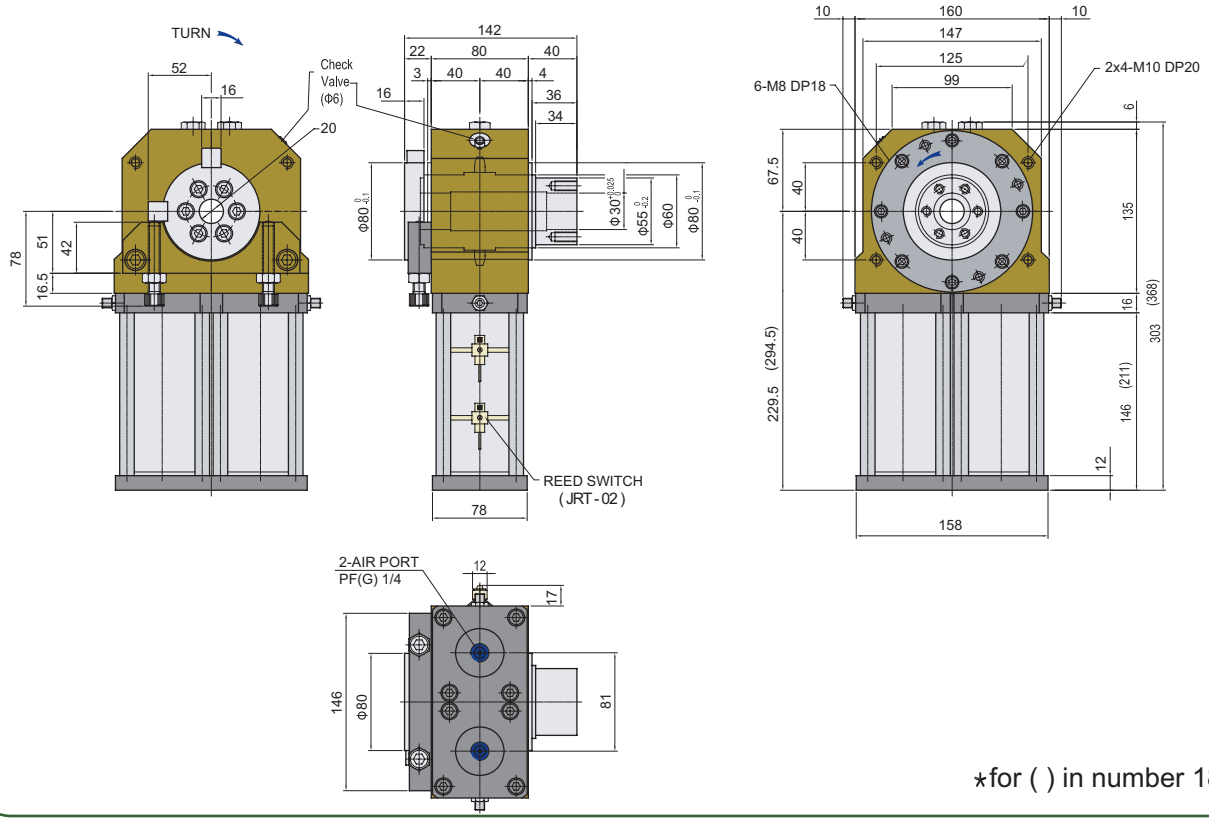
* After 100 consecutive strokes to end positions

RJC-40



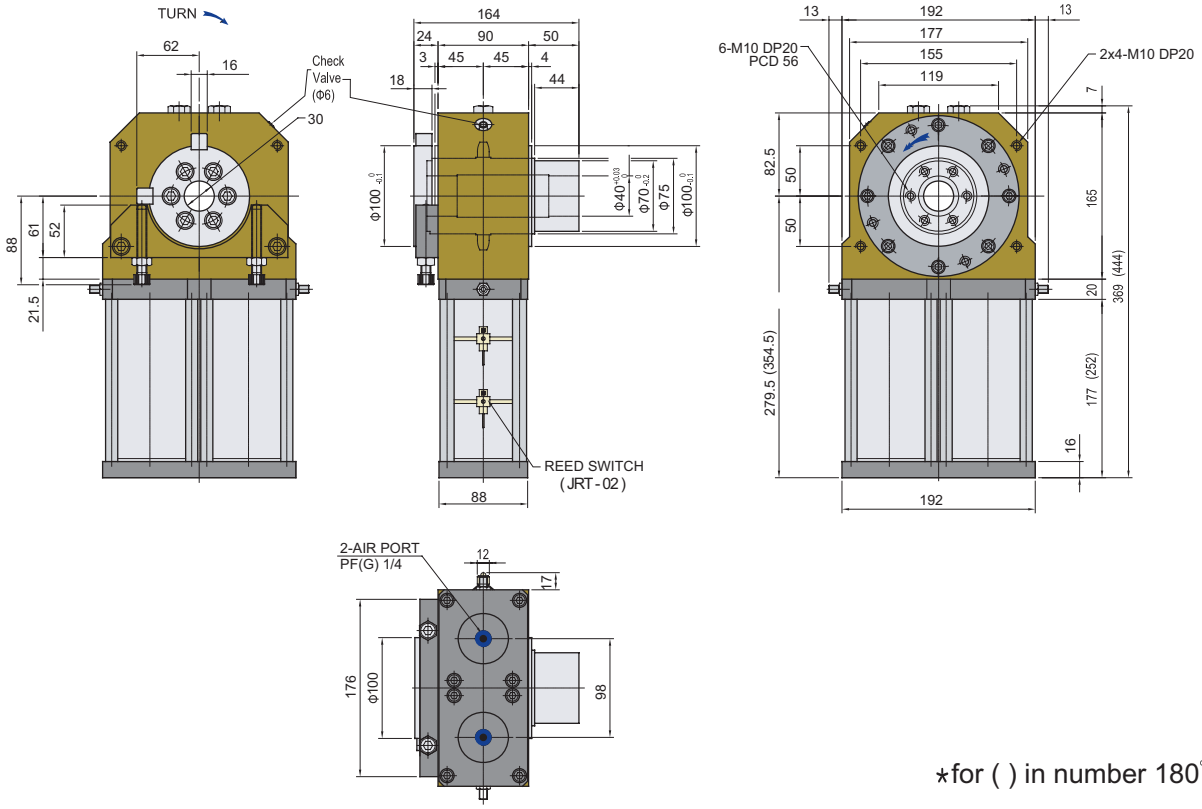
*for ( ) in number 180°

RJC-63



*for ( ) in number 180°

RJC-80



*for ( ) in number 180°

Notes

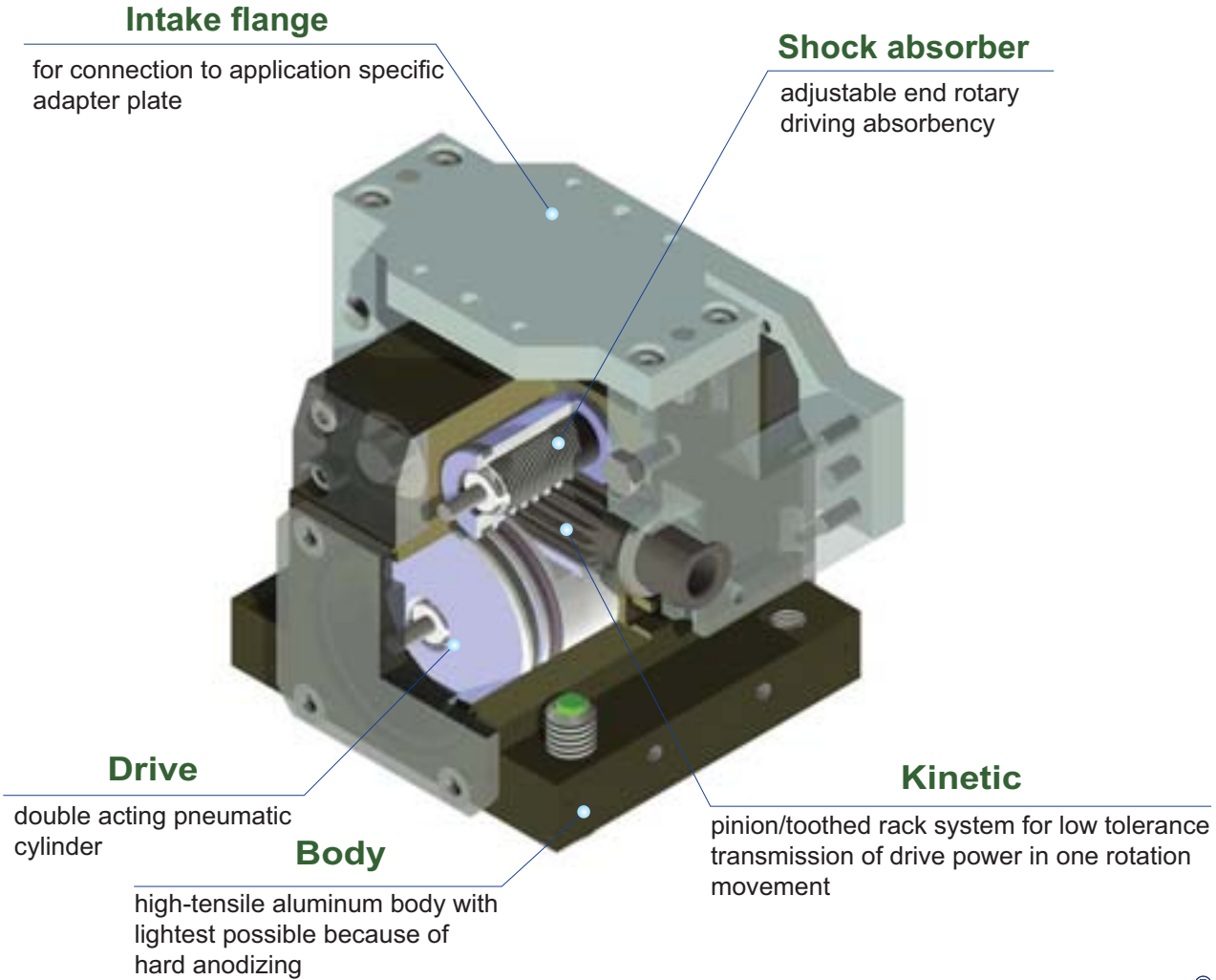
Rotary Cylinder

RTU-25,40,50

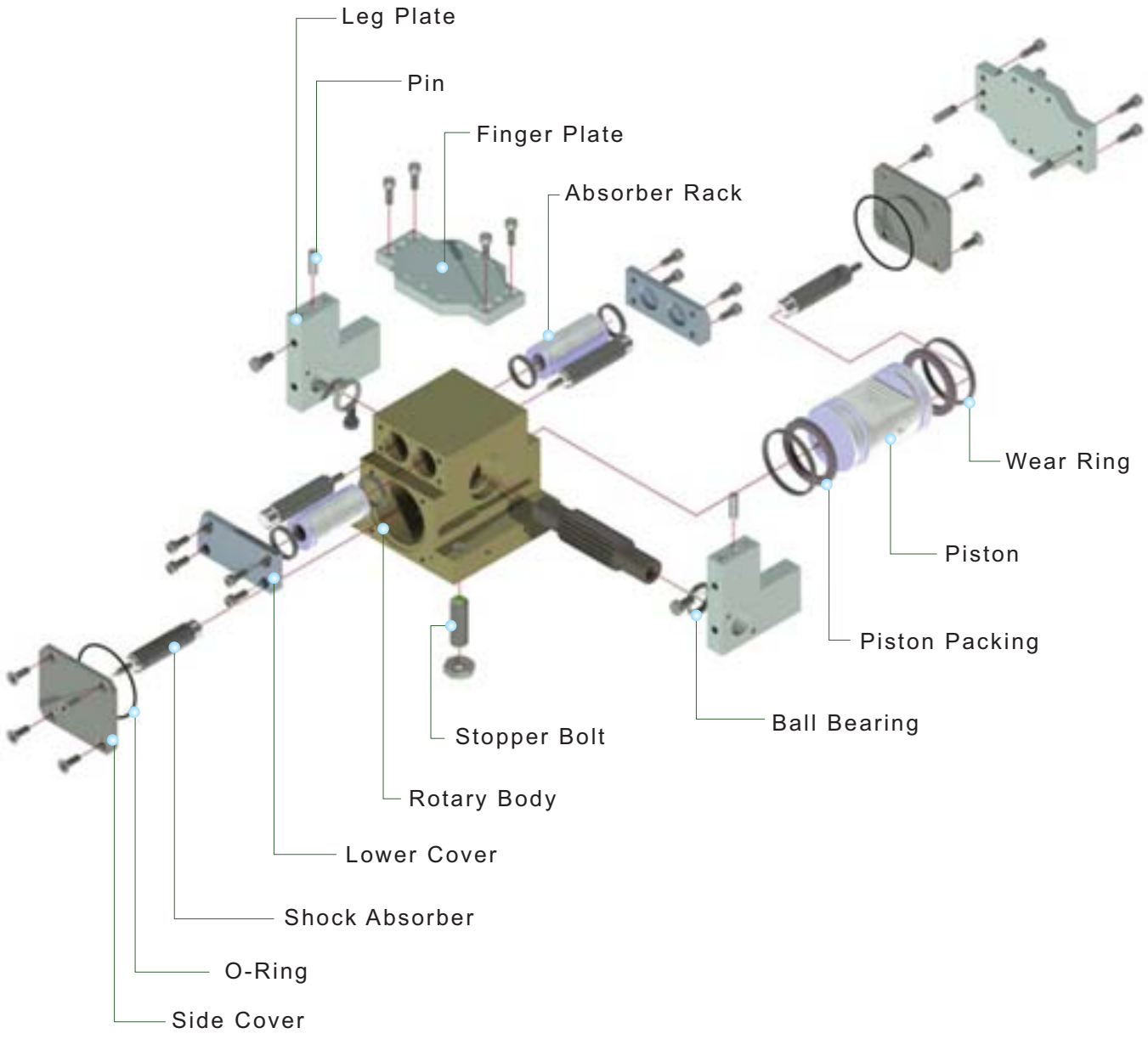
Character

- Rectangular rotary unit to be able to rotate two grippers rectangularly mounted unit
- In case of using with series AF30 or AF46, easy to assemble into a module
- Internal shock absorber reduce shock at end of rotation and increase road stopping capacity
- Light weight grippers (e.g. AF28D) to mount at unit is suitable

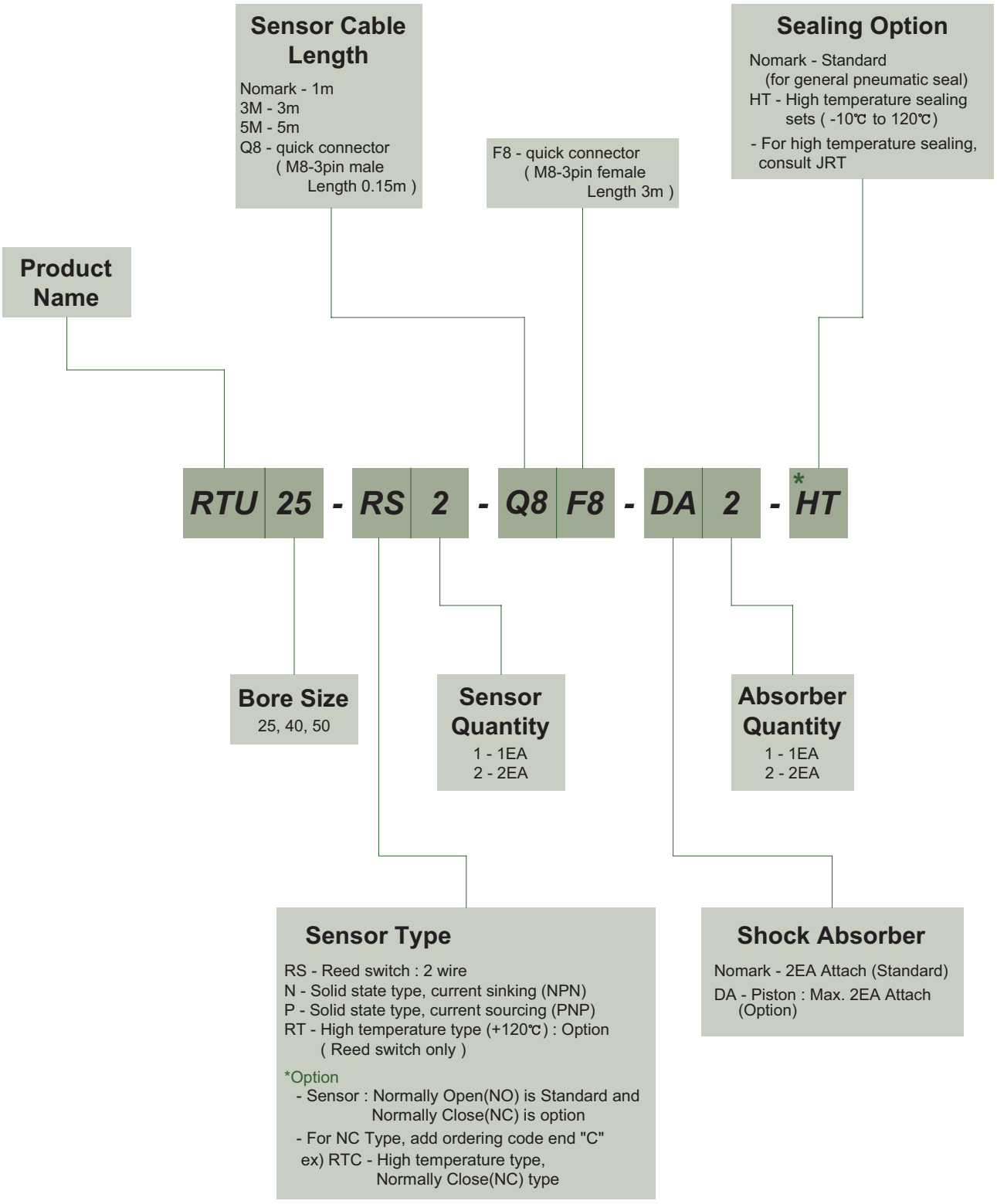
Finger attachable 90° swivel unit



Exploded view



Ordering Code



The delivery of * mark option is longer than a standard, So inquire of JRT

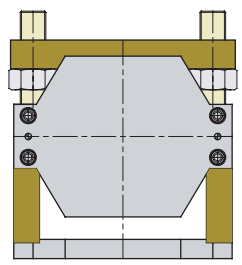
Specification

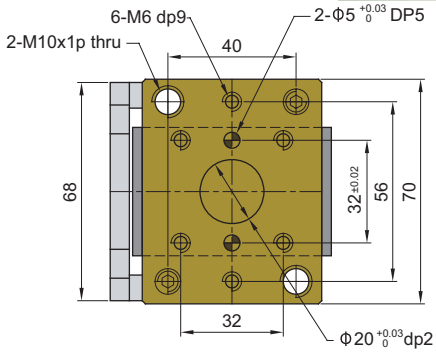
P=Air Pressure[bar]

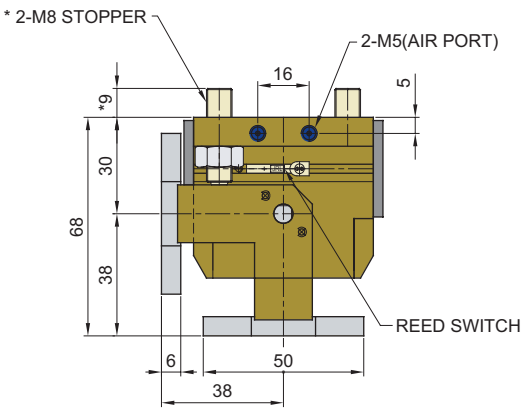
Products Name	RTU25	RTU40	RTU50	Unit
Actual Torque	0.169P	0.774P	1.411P	N.m
Radial payload	1.2	1.9	2.8	kg
Compress load(thrust)	0.6	1.2	1.6	kg
Weight	0.68	1.97	3.24	kg
Turning Time	0.5	0.8	1.0	sec
Fitting size	M5	M5	PF(G) 1/8	
Air consumption quantity	7.7	35.5	64.8	Cm^3
Cushion	Stopper or Absorber			
Repetition Accuracy	±0.1			degree
Operating pressure	3 to 7			bar
Ambient temperature	-5 to 60			℃
Lubrication	Needless			

* After 100 consecutive strokes to end positions

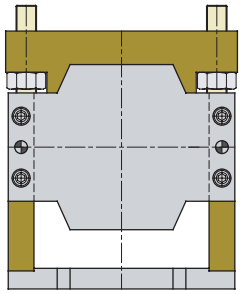
RTU-25

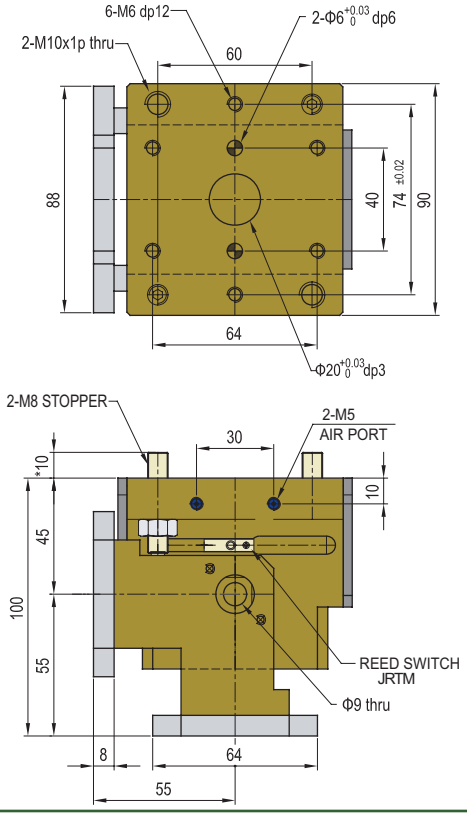




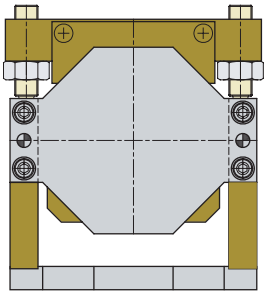


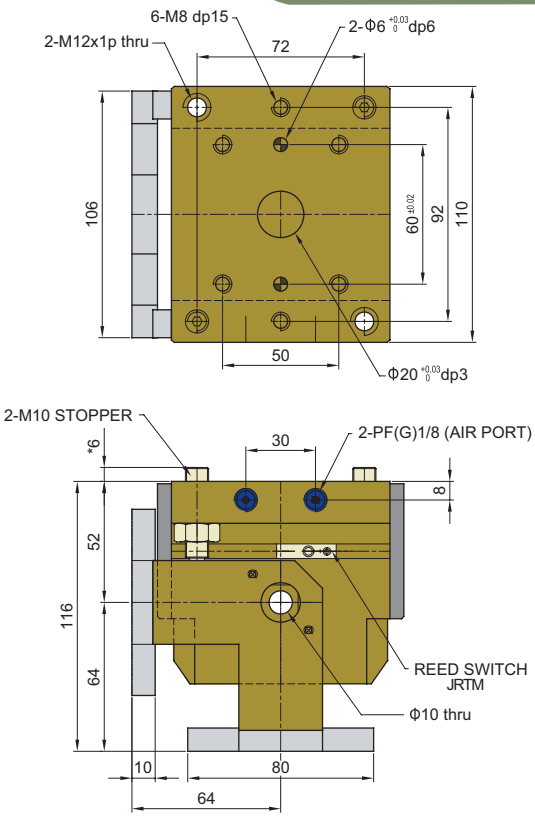
RTU-40




6-M6 dp12
2-M10x1p thru
2-Φ6 +0.03 0 dp6
60
88
40
74 ±0.02
90
64
Φ20 +0.03 0 dp3
2-M8 STOPPER
2-M5
AIR PORT
30
*10
10
45
100
55
REED SWITCH
JRTM
Φ9 thru
8
64
55

RTU-50




6-M8 dp15
2-M12x1p thru
2-Φ6 +0.03 0 dp6
72
106
60 ±0.02
92
110
50
Φ20 +0.03 0 dp3
2-M10 STOPPER
2-PF(G)1/8 (AIR PORT)
*6
30
8
52
116
64
REED SWITCH
JRTM
Φ10 thru
10
80
64

Notes

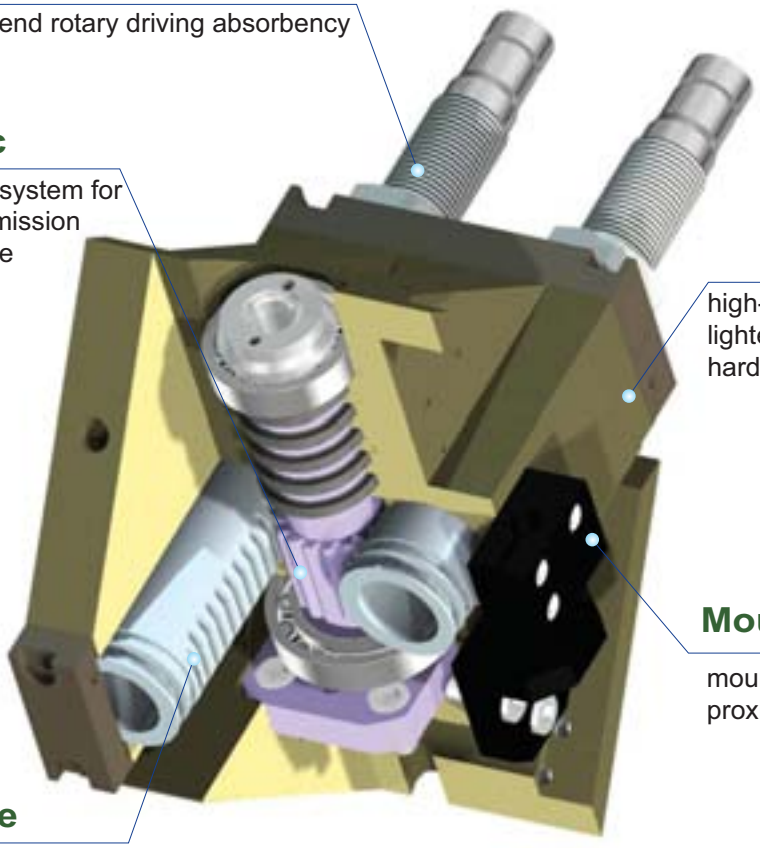
Rotary Cylinder

RHU-20,34,40,40N

Character

- Rotary unit of rack & pinion type with internal dual piston
- Identical stop power with a rotation power reduce rotation moment of inertia
- Integrated bracket to use a shoulder bolt key reduce the tolerance of end position
- In case of mounting with series AF30 or AF46, AF56N easy to assemble into a module
- Back side supply port prevent to twist of the power supply tube

Finger attachable swivel unit



Shock absorber

adjustable end rotary driving absorbency

Kinetic

pinion/toothed rack system for low tolerance transmission of drive power in one rotation movement

Body

high-tensile aluminum body with lightest possible because of hard anodizing

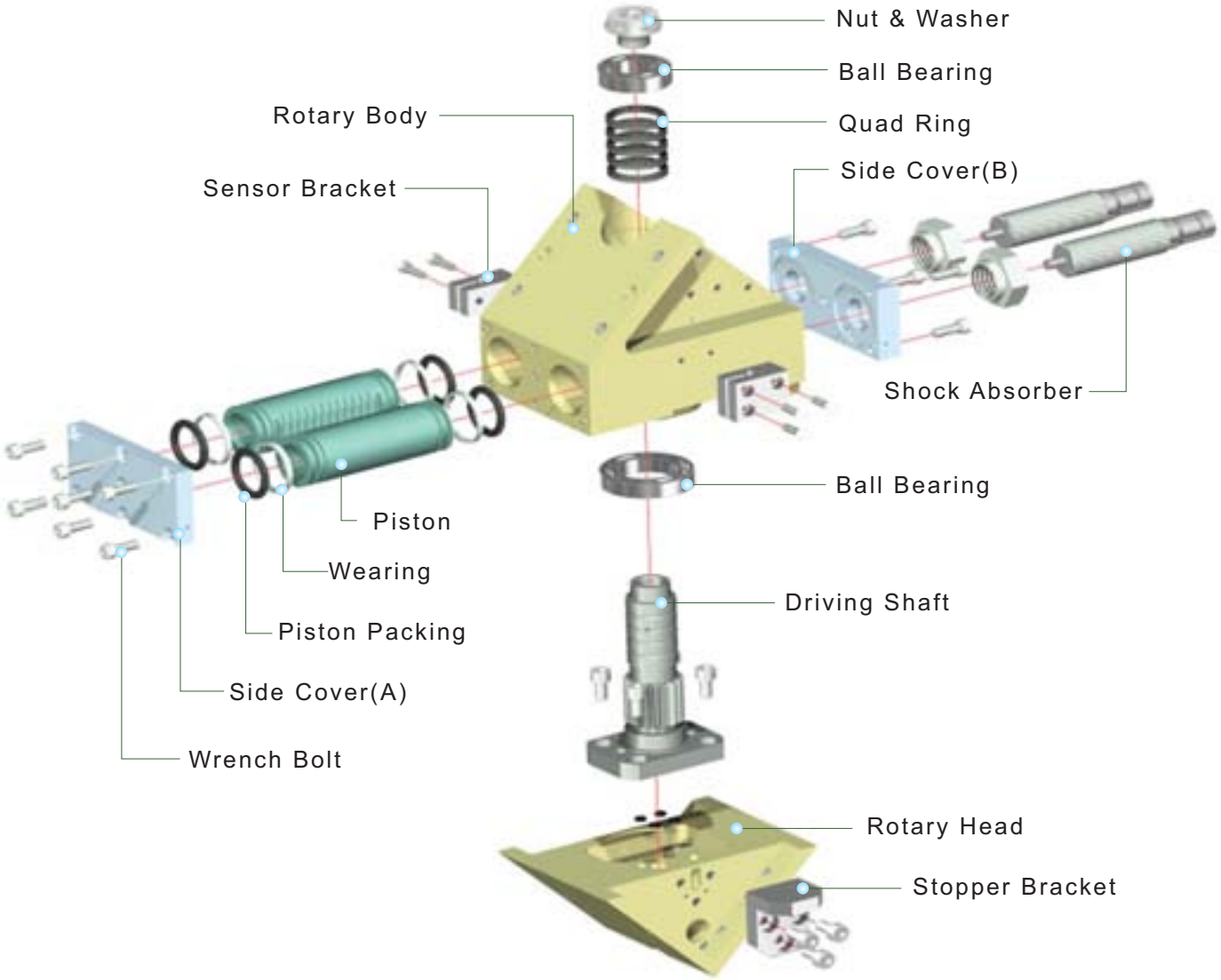
Mounting block

mounting for inductive proximity switch

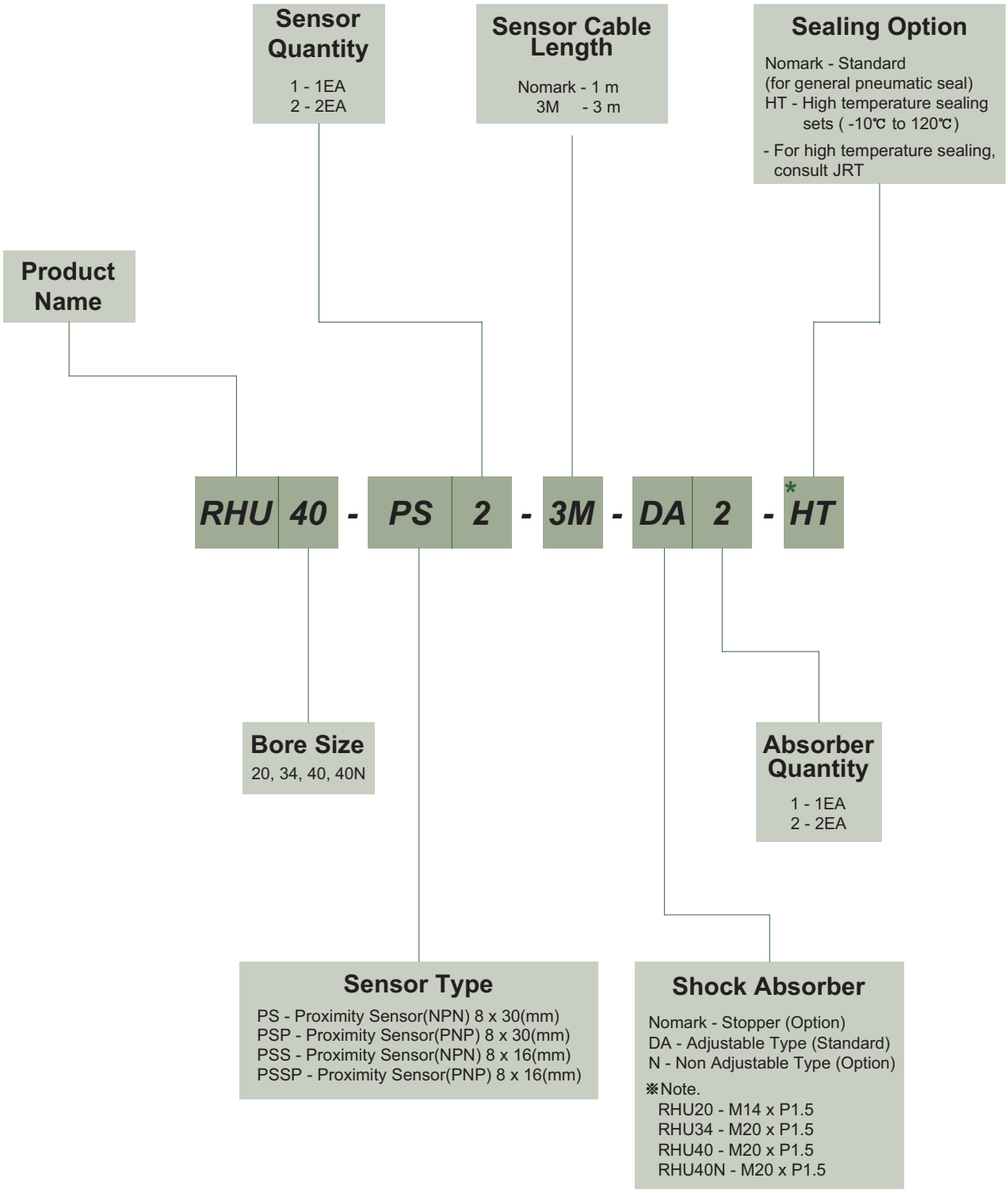
Drive

double acting pneumatic cylinder

Exploded view



Ordering Code



*The delivery of * mark option is longer than a standard, So inquire of JRT*

Specification

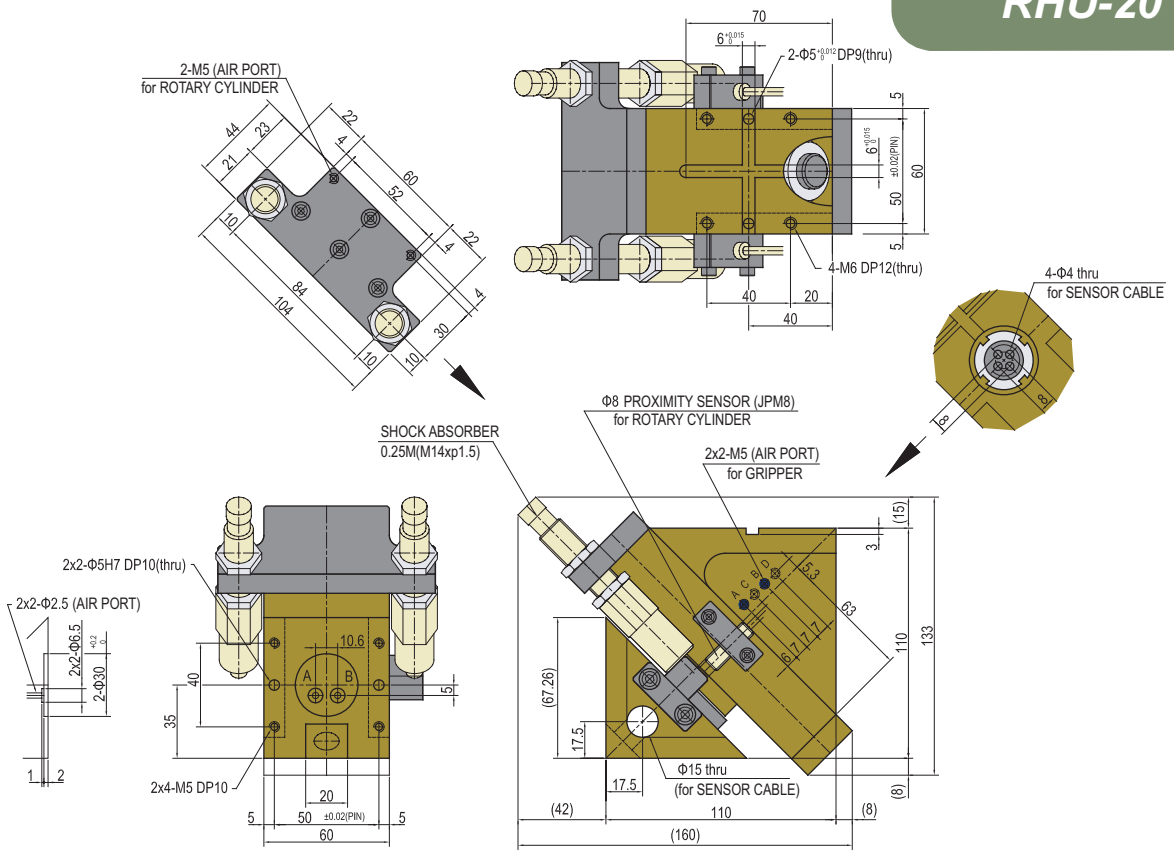
P=Air Pressure[bar]

Products Name	RHU20	RHU34	RHU40	RHU40N	Unit
Actual Torque	0.51P	1.274P	1.568P	3.018P	N.m
Radial payload	12	18	20	24	kg
Compress load(thrust)	10	13	15	21	kg
Tensile load(thrust)	10	13	15	21	kg
Weight	2.31	4.08	6.84	8.84	kg
Turning Time	0.3 to 1.0	0.4 to 1.2	0.5 to 1.5	0.8 to 2.0	sec
Fitting size	M5	M5,PF(G) 1/8	PF(G) 1/8	PF(G) 1/8	
Air consumption quantity	47.4	119.9	151.0	276.4	cm^3
Cushion	Absorber				
Repetition Accuracy	±0.1				degree
Operating pressure	3 to 7				bar
Ambient temperature	-5 to 60				℃
Lubrication	Needless				

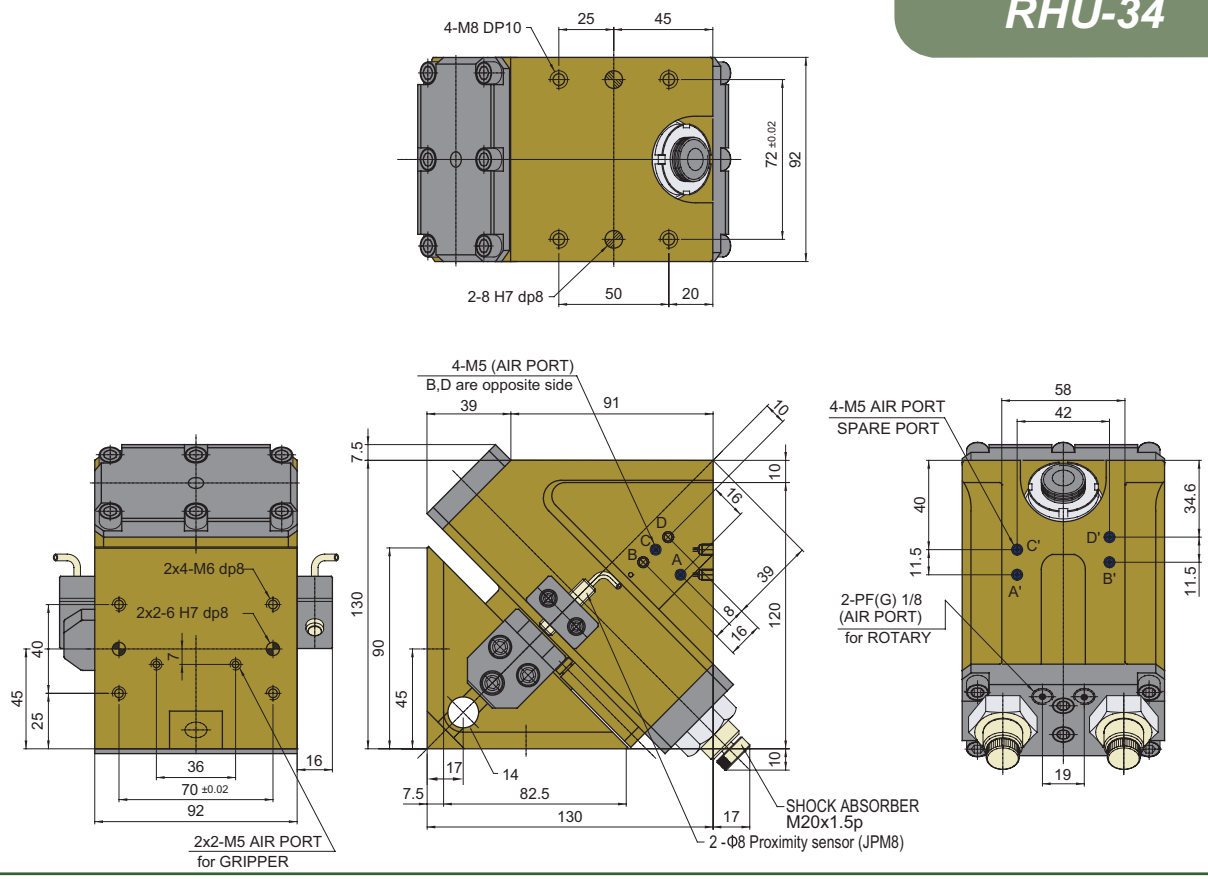
* After 100 consecutive strokes to end positions

Note

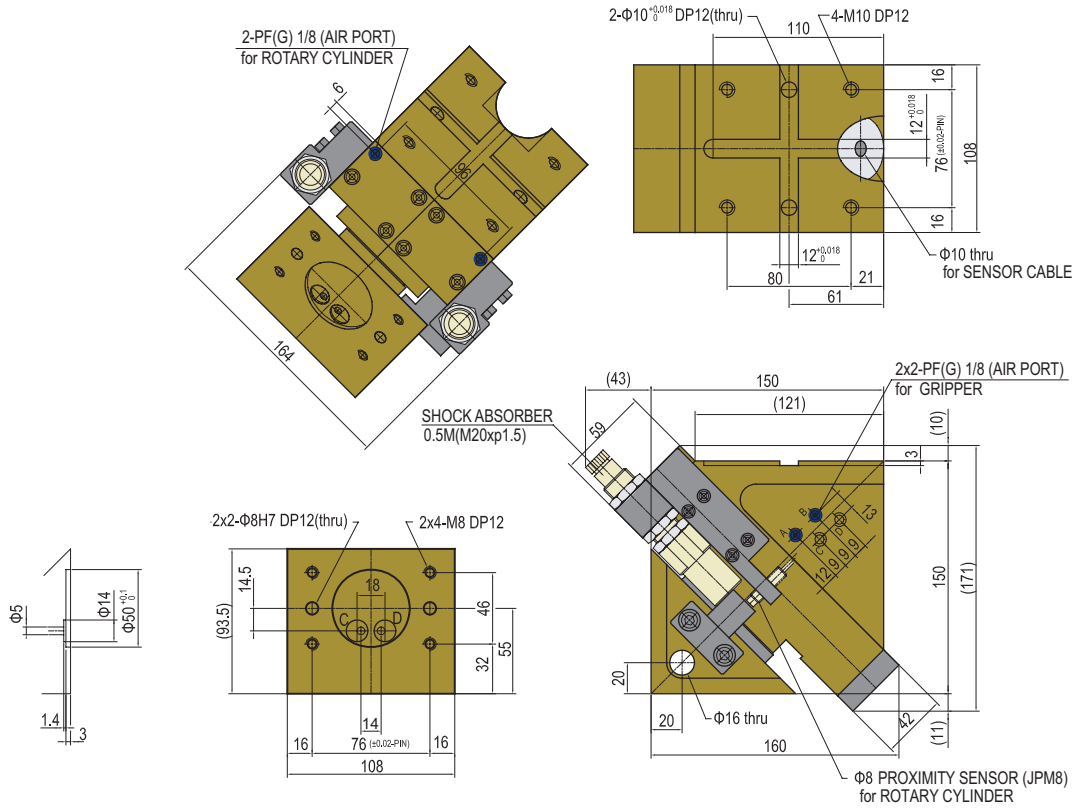
RHU-20


2-M5 (AIR PORT)
for ROTARY CYLINDER
2-Φ5 DP9(thru)
4-M6 DP12(thru)
4-Φ4 thru
for SENSOR CABLE
SHOCK ABSORBER
0.25M(M14xp1.5)
Φ8 PROXIMITY SENSOR (JPM8)
for ROTARY CYLINDER
2x2-M5 (AIR PORT)
for GRIPPER
2x2-Φ5H7 DP10(thru)
2x2-Φ2.5 (AIR PORT)
2x4-M5 DP10
Φ15 thru
(for SENSOR CABLE)

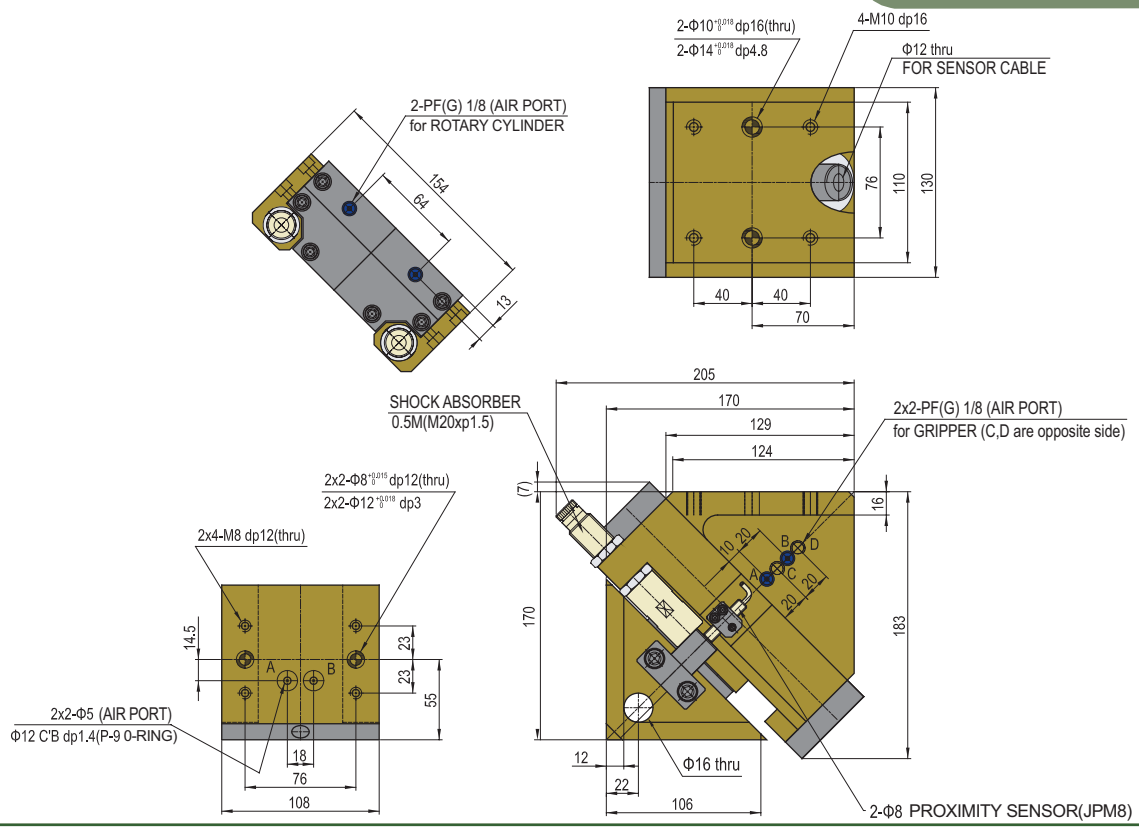
RHU-34


4-M8 DP10
2-8 H7 dp8
4-M5 (AIR PORT)
B,D are opposite side
2x4-M6 dp8
2x2-6 H7 dp8
2x2-M5 AIR PORT
for GRIPPER
SHOCK ABSORBER
M20x1.5p
2 -Φ8 Proximity sensor (JPM8)
4-M5 AIR PORT
SPARE PORT
2-PF(G) 1/8
(AIR PORT)
for ROTARY

RHU-40

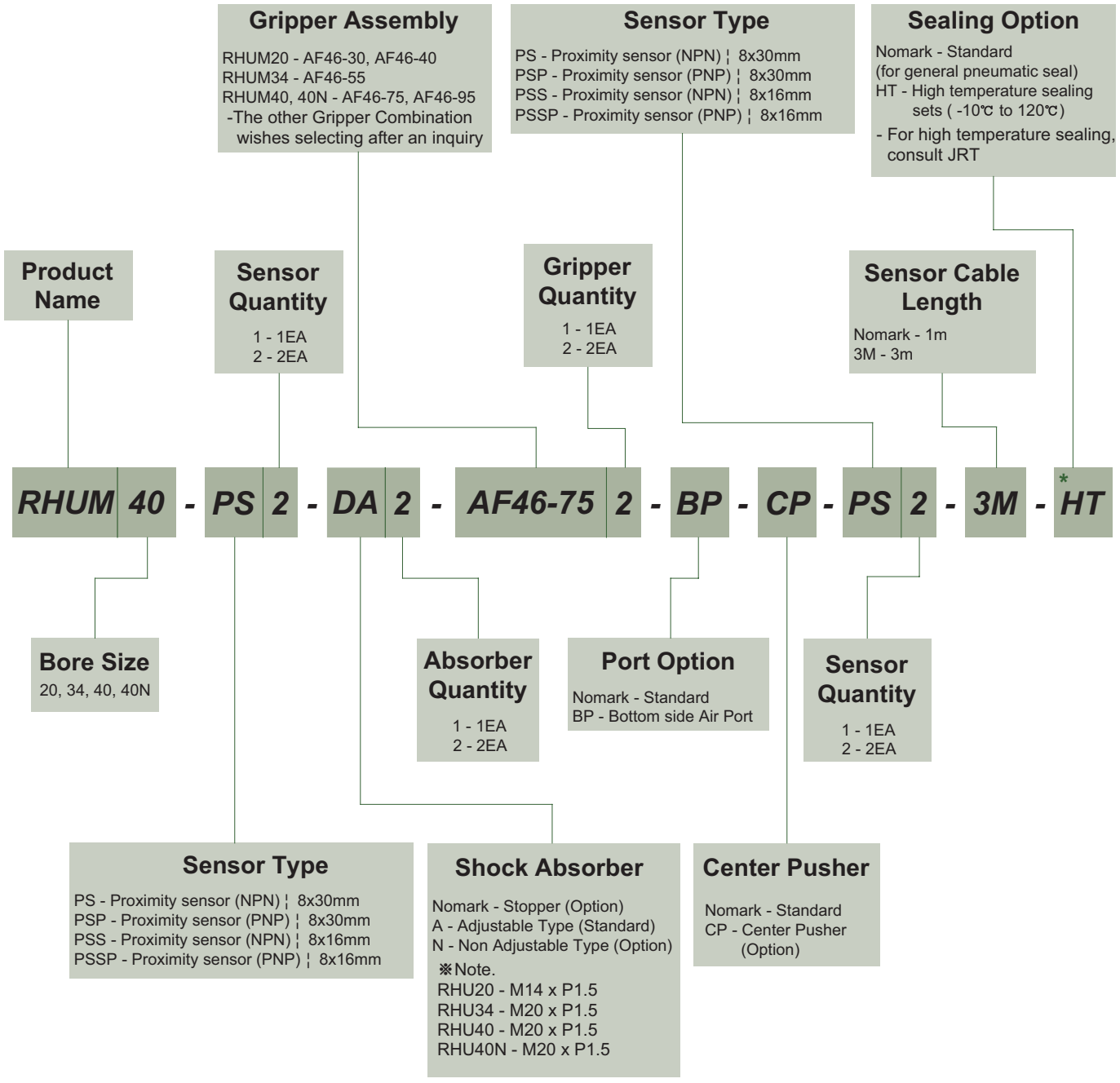


RHU-40N



RHUM&Gripper Assembly

Ordering Code

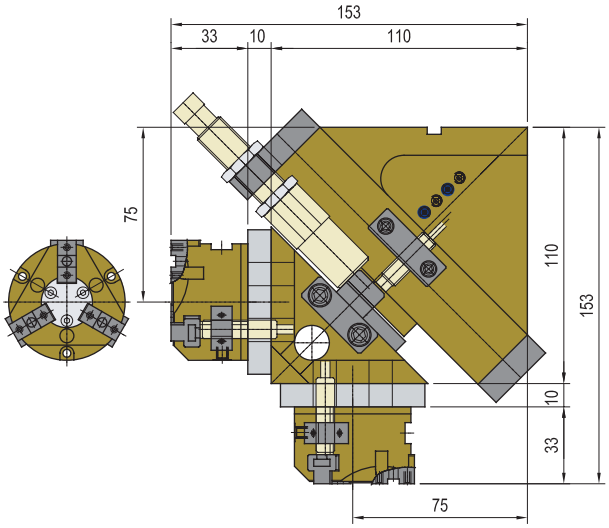


*The delivery of * mark option is longer than a standard, So inquire of JRT*

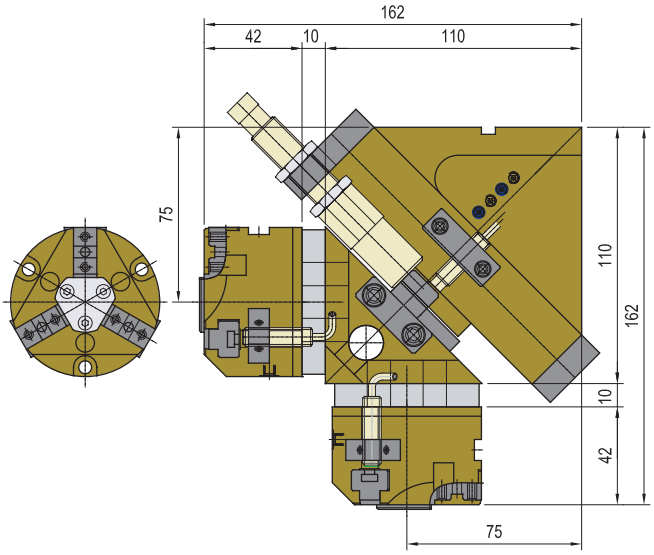
RHUM&Gripper Assembly

RHUM-20

1. Adapter attachment direction rotation gripper 180 degree direction change possibility
2. Turning head of the RHUM20 the semi-standard option specific is attaching



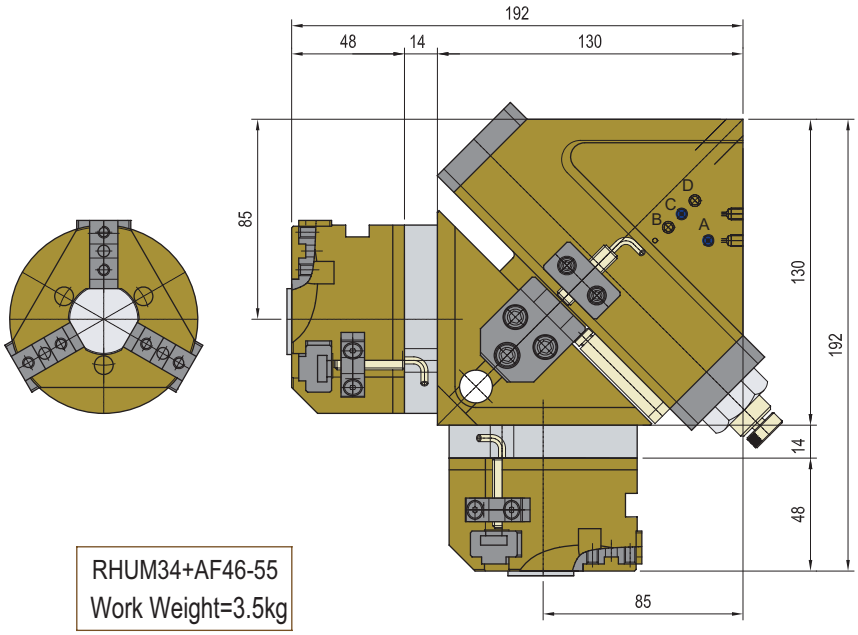
RHUM20+AF46-30
Work Weight=1.5kg



RHUM20+AF46-40
Work Weight=2kg

RHUM-34

1. Adapter attachment direction rotation gripper 180 degree direction change possibility
2. Turning head of the RHUM34 the semi-standard option specific is attaching

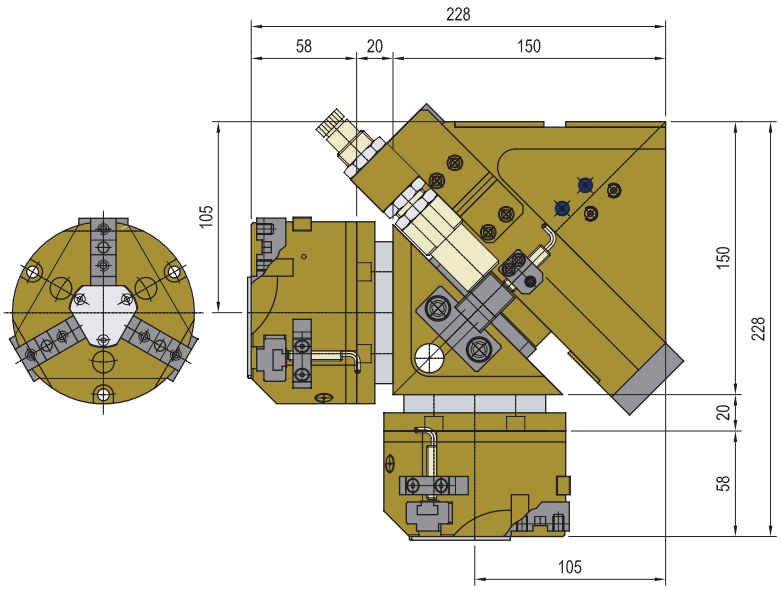


RHUM34+AF46-55
Work Weight=3.5kg

RHUM&Gripper Assembly

RHUM-40

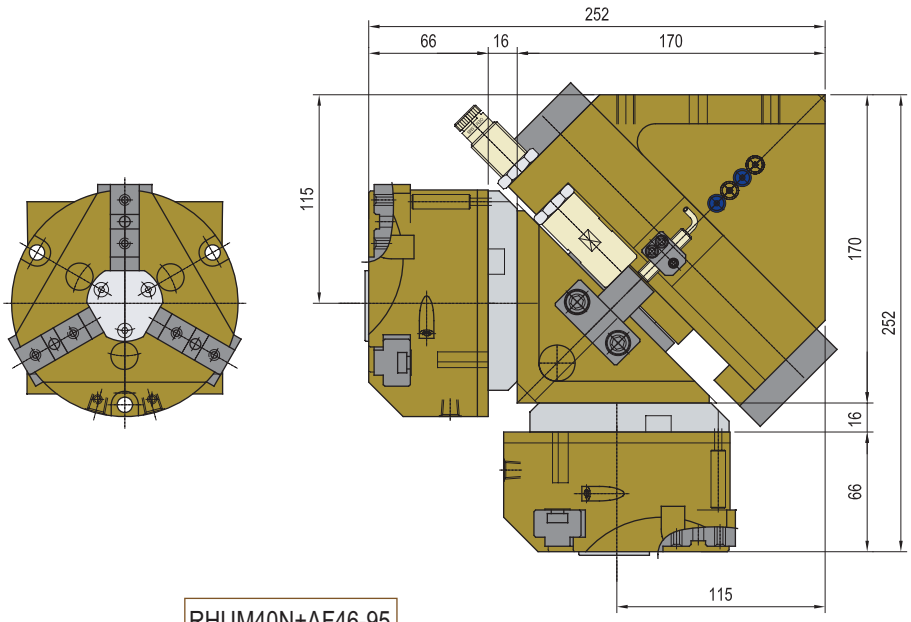
1. Adapter attachment direction rotation gripper 180 degree direction change possibility
2. Turning head of the RHUM40 the semi-standard option specific is attaching



RHUM40+AF46-75
Work Weight=5kg

RHUM-40N

1. Adapter attachment direction rotation gripper 180 degree direction change possibility
2. Turning head of the RHUM40N the semi-standard option specific is attaching



RHUM40N+AF46-95
Work Weight=8kg

Notes