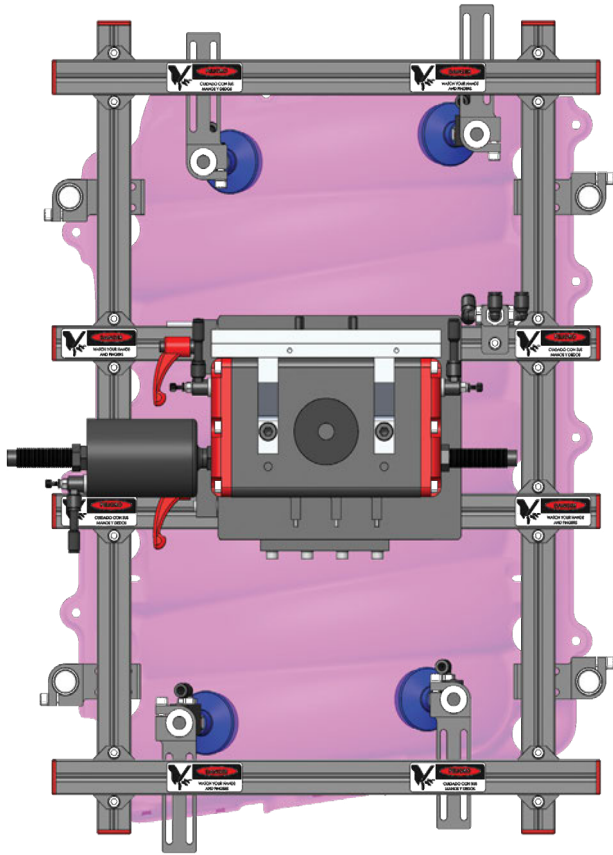
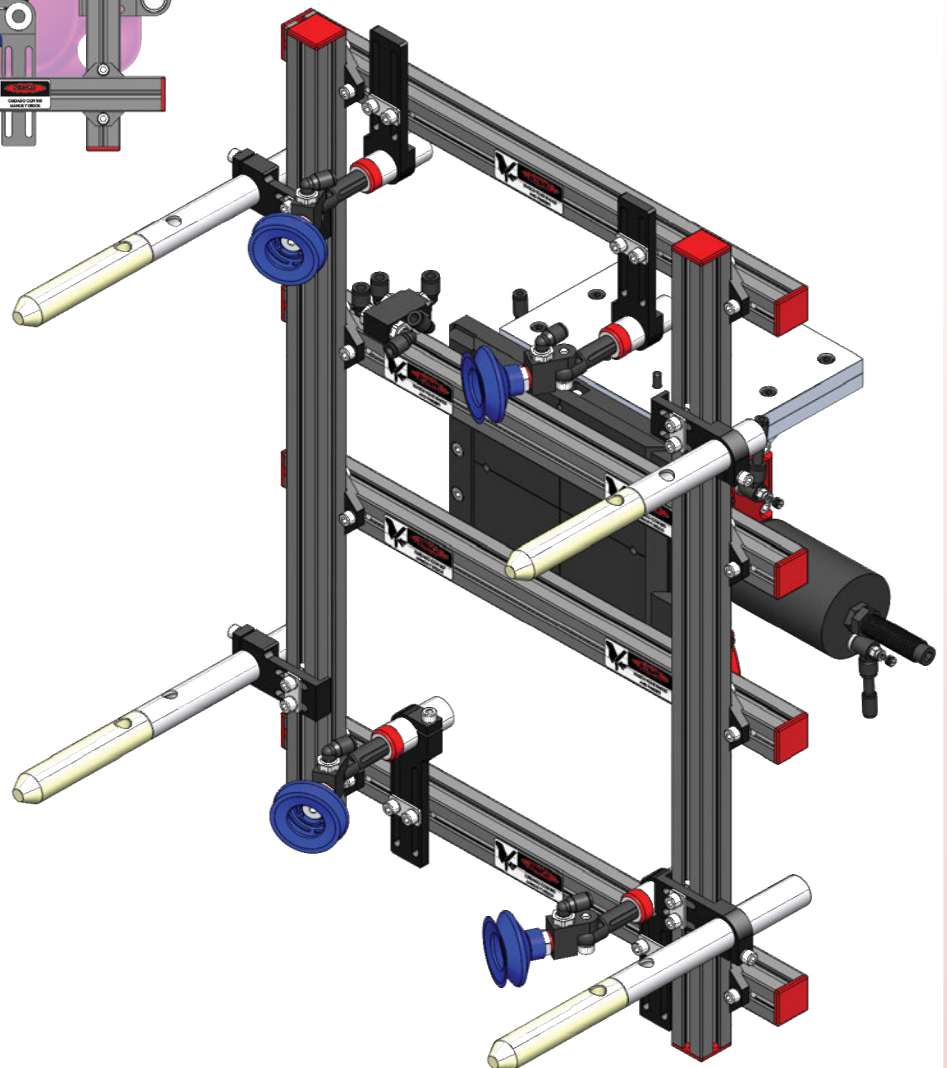


EOAT Design and Build Service



From the simplest to the most complex EOAT, EMI specializes in designing and building customized End-of-Arm-Tooling— **Priced Competitively.**

Get started by sending us a sample part or 3D part file and a completed datasheet (see page 1082). Our experienced EOAT engineers will design a tool for you and provide you 3D CAD renderings at no cost or obligation. We'll also provide pricing for the tool should you want to purchase the EOAT completely assembled.



Rotary Overview

Rotary Actuators p.798

- Rack and pinion swiveling mechanism
- Adjustable stroke
- High torque
- Sensor ready



Electric Rotary Actuators

p.616



- Capable of 90° or 180° rotation
- Same features as the electric grippers
- Sensor ready
- 10 million cycles maintenance free

Two-Position Rotary Actuators

p.806



- Two-position swiveling mechanism
- High-dampening performance
- Adjustable positions
- Sensor ready

Three-Position Rotary Actuators

p.808



- Three-position swiveling mechanism
- High-dampening performance
- Adjustable positions
- Sensor ready

Rotary Indexing Tables

p.818



- 4, 6, or 8-position indexing tables
- Counter clockwise option
- High torque
- Sensor ready

Intermediate Stopping

p.804



- The intermediate stopping unit RTD is a stroke reducer, acting against the rack of the swiveling unit RT, by a piston rod.
- When not pressurized a spring keeps the RTD piston rod against the RT rack.

Low-Profile Rotary Actuators

p.820



- Low profile, high torque from elliptical piston
- Disc style and shaft styles available
- Separate cushion, angle, backlash adjustments
- Sensor ready

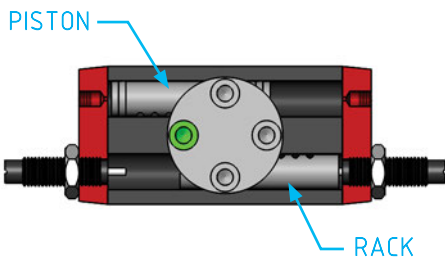
Swiveling Rotary – RT

- Rack and pinion patented movement.
- Continuously adjustable stroke.
- Large ball bearings on the shaft.
- Thru-hole in the pinion.
- Optional rubber bumpers or hydraulic shock-absorber.
- Optional sensors available.
- We recommend the use of exhaust flow controls (not included) to achieve the desired speed. See page 801.

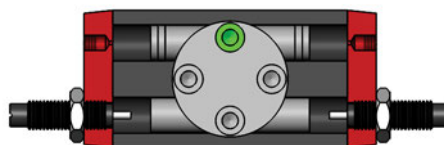


Part#	RT-10	RT-12	RT-20	RT-25	RT-35	RT-45	RT-63
Quick#	6571	6572	6573	6574	6575	6576	6577
Price	\$390.00	\$402.00	\$458.00	\$505.00	\$627.00	\$815.00	\$1,041.00
Weight	235g	560g	965g	1680g	2475g	5250g	8185g
Medium	Filtered, lubricated / non lubricated compressed air						
Pressure range	22–116 psi						
Maximum swiveling angle	190°						
Theoretical torque at 87 psi	2.5 in-lbf	5 in-lbf	17.5 in-lbf	35 in-lbf	69 in-lbf	148 in-lbf	349 in-lbf
Max. working frequency	3Hz	3Hz	2Hz	2Hz	2Hz	2Hz	1Hz
Swiveling time without load	0.05s	0.06s	0.11s	0.19s	0.08s	0.16s	0.23s
Max repeatability tolerance w/ shock-absorber	±0.02°	±0.02°	±0.02°	±0.02°	±0.02°	±0.02°	±0.02°

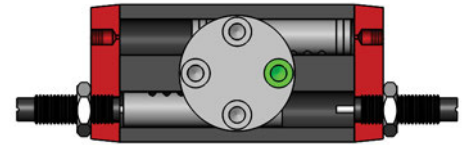
Rack and Piston at 0°



Rack and Piston at 90°



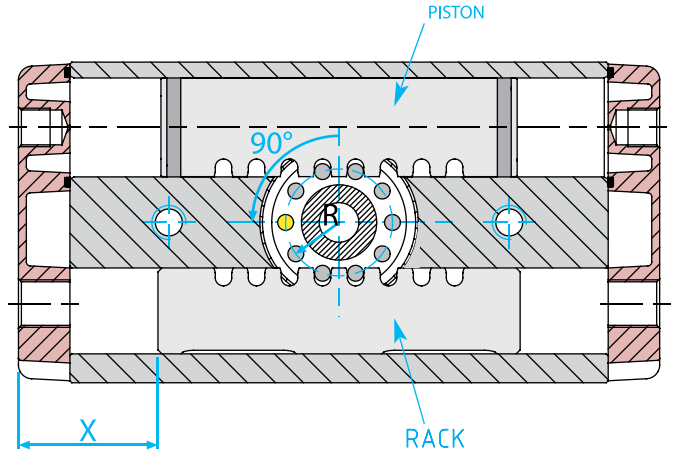
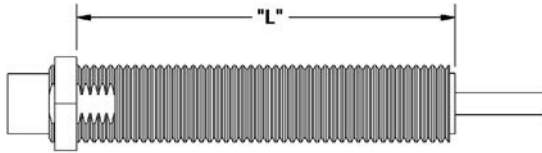
Rack and Piston at 180°



Swiveling Rotary – RT

End stroke accessories

For the stroke adjustment you can use hydraulic shock-absorbers, rubber bumpers (FGD), or only grub screws, according with the kinetic energy the unit has to bear. NEVER USE THE SWIVELING UNIT WITHOUT STROKE ADJUSTERS.



Part#	RT-10	RT-12	RT-20	RT-25	RT-35	RT-45	RT-63
Quick#	6571	6572	6573	6574	6575	6576	6577
Thread size (shock absorber / bumper)	M8x1	M10x1	M12x1	M12x1	M14x1.5	M20x1.5	M25x1.5
"X" Shock length needed to keep rack at 90° (mm)	18.5	24	27.5	35.5	37	53.5	60
Rack movement per degree of RT rotation	0.1047	0.1417	0.1802	0.2317	0.2296	0.2976	0.3571

Ace Hydraulic Shock-Absorbers

Quick#	6619	-	6627	6627	6359	6705	Call
Part#	MC10MH	-	MC-75M3NB-111	MC-75M3NB-111	SC190-HD-M4	MC225MH2	MC600MH2
Price	\$63.60	-	\$162.89	\$162.89	\$160.00	\$135.46	Call
Shock thread length "L" (mm)	20	-	42	42	55	62	93

Enidine Hydraulic Shock-Absorbers

Quick#	-	6621	6628	6628	6509	6624	6645
Part#	-	TK10M-1-SP18482	ECO-15MF-4	ECO-15MF-4	ECO-25-MC-4	ECO-50-MC-3	ECO-100-MF-4
Price	-	\$83.00	\$69.75	\$69.75	\$104.00	\$81.25	\$135.00
Shock thread length "L" (mm)	-	27	38	38	68	82	85

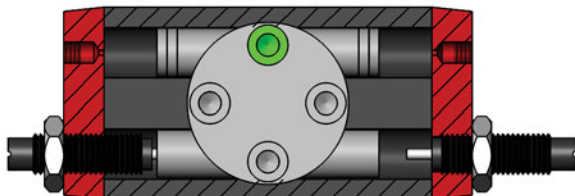
Gimatic "FGD" Rubber Bumpers

Quick#	6620	6622	6623	-	-	-	-
Part#	FGD0830	FGD1030	FGD1235	-	-	-	-
Price	\$7.29	\$7.58	\$7.95	-	-	-	-
Bumper thread length "L" (mm)	27	27	30	-	-	-	-

NEVER USE SWIVELING UNIT WITHOUT STROKE ADJUSTERS

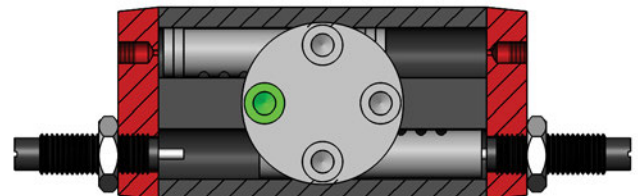
Shock placement method #1

One shock holds rack at 90°, while the other shock can be adjusted to achieve desired rotation. This method may be necessary on some rotations below 90°.

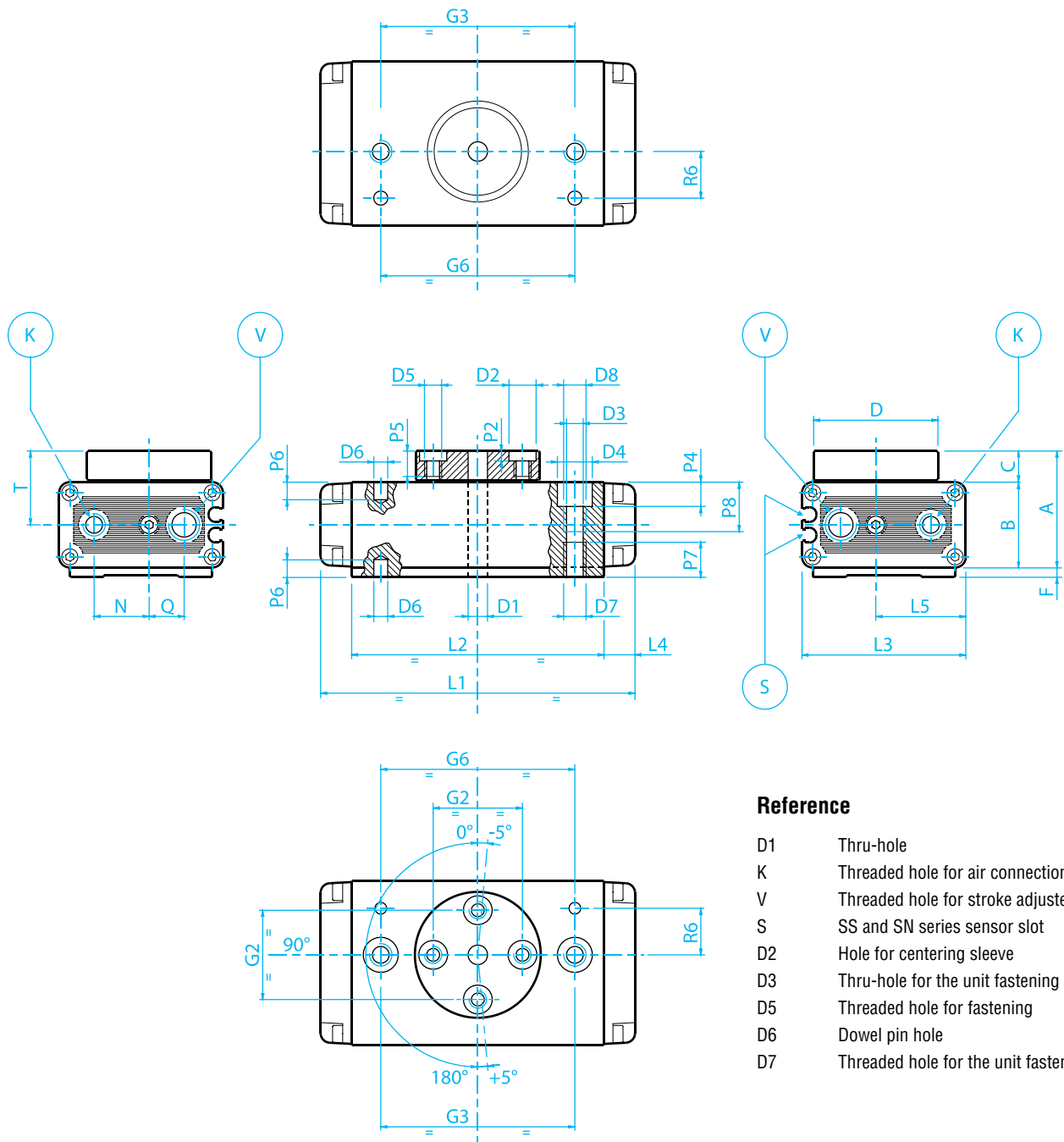


Shock placement method #2

One shock holds rack at 0°, while the other shock can be adjusted to achieve desired rotation. This method may be necessary on some rotations above 90°.



Swiveling Rotary – RT



Reference

- D1 Thru-hole
- K Threaded hole for air connection
- V Threaded hole for stroke adjuster
- S SS and SN series sensor slot
- D2 Hole for centering sleeve
- D3 Thru-hole for the unit fastening
- D5 Threaded hole for fastening
- D6 Dowel pin hole
- D7 Threaded hole for the unit fastening



Swiveling Rotary – RT

	RT-10	RT-12	RT-20	RT-25	RT-35	RT-45	RT-63
	6571	6572	6573	6574	6575	6576	6577
A	29.75	45	49	59	71	90.5	108.5
B	21.75	32	39	45	57	72	90
C	8	10	10	14	14	18.5	18.5
D	ø32	ø45	ø45	ø65	ø65	ø100	ø100
D1	ø5	ø6	ø8	ø10	ø12	ø18	ø20
D2	ø7 H8	ø7 H8	ø7 H8	ø9 H8	ø9 H8	ø15 H8	ø15 H8
D3	ø4.3	ø5.2	ø5.2	ø6.8	ø6.8	ø10.5	ø10.5
D4	ø9	ø11	ø11	ø15	ø15	ø19	ø19
D5	M4	M4	M4	M5	M5	M8	M8
D6	ø3 H8	ø4 H8	ø4 H8	ø6 H8	ø6 H8	ø8 H8	ø8 H8
D7	M5	M6	M6	M8	M8	M12	M12
D8	M5	M6	M6	M8	M8	M12	M12
F	2.75	/	/	/	/	/	/
G2	23 ±0.02	31.5 ±0.02	31.5 ±0.02	50 ±0.02	50 ±0.02	76 ±0.02	76 ±0.02
G3	50	59	72	86	86	140	140
G6	50 ±0.02	59 ±0.02	72 ±0.02	86 ±0.02	86 ±0.02	140 ±0.02	140 ±0.02
K	M5	M5	M5	G1/8	G1/8	G1/4	G1/4
L1	81	108	130	162	170	230	265
L2	65	88	110	136	140	180	215
L3	38	50	65	81	100	120	150
L4	8	10	10	13	15	25	25
L5	19	25	32.5	40.5	53	64	87
N	10	13	16	24	28.5	37	48.5
P2	2.5	2.5	2.5	3	3	3.5	3.5
P4	6	6	6	10	10	13	13
P5	6.5	8	8	12	12	16	16
P6	3	4	4	6	6	8	8
P7	24.5	12	12	14	18	24	24
P8	24.5	12	12	14	18	24	24
Q	9	13	16	20.5	22	26	27
R6	12 ±0.02	13 ±0.02	13 ±0.02	25 ±0.02	25 ±0.02	30 ±0.02	30 ±0.02
V	M8x1	M10x1	M12x1	M12x1	M14x1.5	M20x1.5	M25x1.5
T	19	26	29.5	36.5	42.5	54.5	63.5



#300

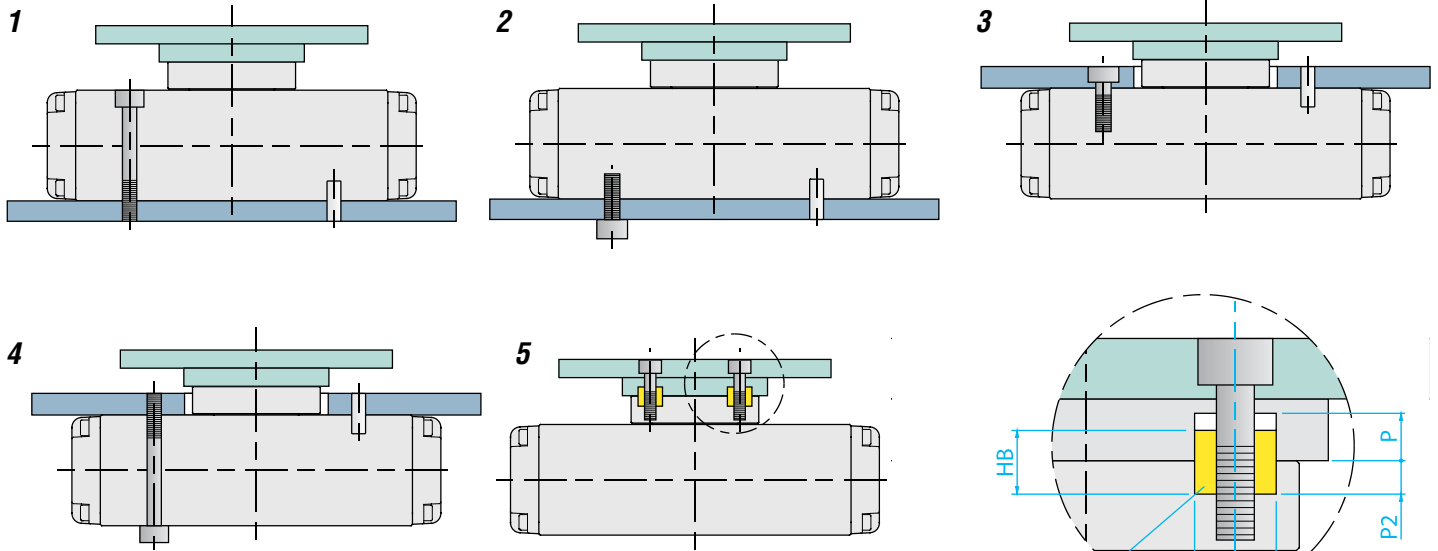
Exhaust Control

Quick#	Part#	Thread	Tubing ØD	For	Price
300	GSF-FCE-M504	M5	4	RT-10, RT-12, RT-20, ITSC-16...	\$11.70
301	GSF-FCE-M506	M5	6	RT-10, RT-12, RT-20, ITSC-16...	\$14.90
302	GSF-FCE-G806	G1/8"	6	RT-25, RT-35	\$14.90
433	GSF-FCE-G1406	G1/4"	6	RT-45, RT-63, ITSC-45...	\$19.08

Swiveling Rotary – RT

Mounting

The swiveling unit can be fastened to a static or a moving part. When on a moving part, you must pay attention to the forces created by inertia over the unit and its load. Use the four sleeves provided in the packaging to center the rotating load on the pinion.

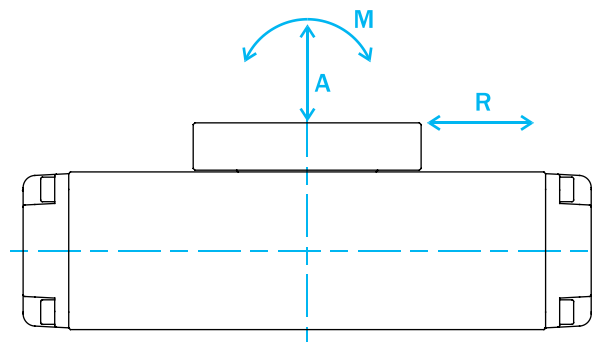


	RT-10	RT-12	RT-20	RT-25	RT-35	RT-45	RT-63
SLEEVE BC	RT-20-15		RT-35-15		RT-63-15		
DB	Ø7 h8	Ø7 h8	Ø7 h8	Ø9 h8	Ø9 h8	Ø15 h8	Ø15 h8
HB	5	5	5	6	6	7	7
P	3	3	3	3.5	3.5	4	4
P2	2.5	2.5	2.5	3	3	3.5	3.5

SLEEVE BC

Safety loads

Check the table for maximum permitted loads. Excessive loads or kinetic energy can damage the unit, cause functioning troubles and endanger the safety of the operator. Use flow controllers (not supplied) to get the right speed. Periodically check the efficiency of the shock-absorbers and replace them immediately if their damping performances decrease.



Reference:

Force: N x 0.225=lbf

Torque: Nm x 8.850=in-lbf

Torque: Ncm x 0.089=in-lbf

Pressure: bar x 14.5=psi

See also: Call our Engineering Department for assistance

	RT-10	RT-12	RT-20	RT-25	RT-35	RT-45	RT-63
A	232N	375N	650N	800N	800N	1075N	1550N
R	279N	450N	780N	960N	960N	1290N	1860N
M	4.7Nm	9.7Nm	22Nm	34Nm	42Nm	84Nm	143Nm

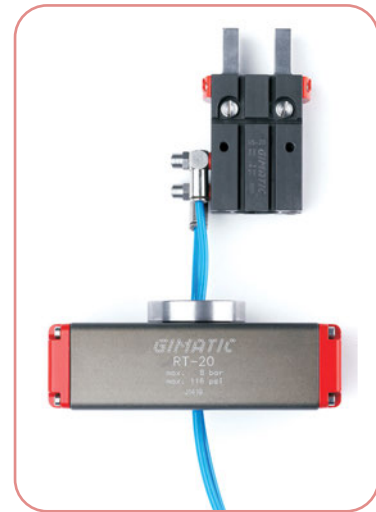
Swiveling Rotary – RT

Compressed air feeding

The compressed-air feeding must be accomplished on the lateral air ports (K) with fittings and hoses (not supplied).

The compressed air must be filtered from 5 to 40µm. Maintain the medium selected at the start, lubricated or not, for the complete service life of the swiveling unit.

The pneumatic circuit must be pressurized progressively, to avoid uncontrolled movements.



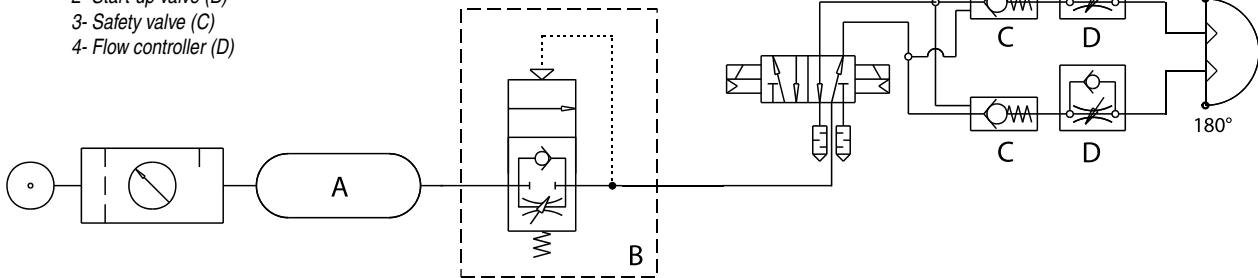
Pneumatic circuit

Possible problems on a compressed air circuit:

- 1- Pressure variation
- 2- Pressurizing with empty cylinder
- 3- Sudden pressure black-out
- 4- Excessive speed

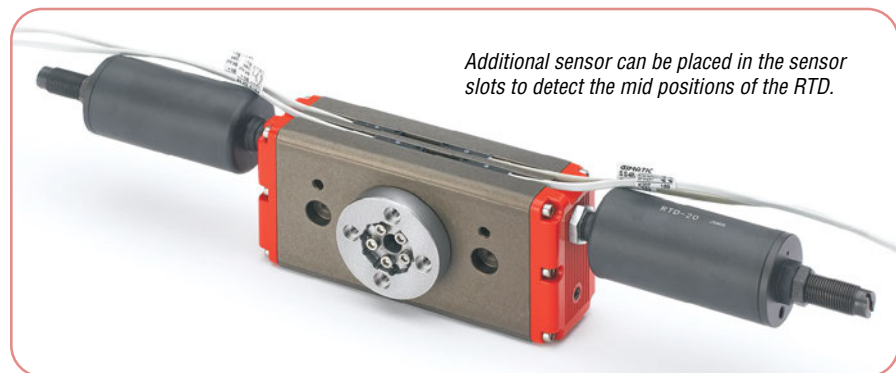
Possible solutions:

- 1- Compressed air storage (A)
- 2- Start-up valve (B)
- 3- Safety valve (C)
- 4- Flow controller (D)



Sensors

The operating position can be checked by sensors (optional) that detect the inner magnet. Therefore, a nearby large mass of ferromagnetic material or intense magnetic fields may cause sensing troubles.



Quick#	Part#	Signal	Connection	Price
3-wire, 90° Lead exit SN type Sensor				
6278	SN4N225G	PNP	2.5m lead	\$27.19
6357	SN4M225G	NPN	2.5m lead	\$27.19
6277	SN3N203G	PNP	0.3m lead with M8 male Connector	\$31.16
6356	SN3M203G	NPN	0.3m lead with M8 male Connector	\$31.16
3-wire, Straight SS type Sensor				
1882	SS4N225G	PNP	2.5m lead	\$27.20
1883	SS4M225G	NPN	2.5m lead	\$27.20
6282	SS3N203G	PNP	0.3m lead with M8 male Connector	\$31.16
1884	SS3M203G	NPN	0.3m lead with M8 male Connector	\$31.16

Intermediate Stopping Unit – RTD

The intermediate stopping unit RTD is a stroke reducer, acting against the rack of the swiveling unit RT by a piston rod.

The RTD piston bore is larger than RT and, pressurized at the same pressure, it stops in the middle of the RT stroke. When not pressurized, a spring keeps the RTD piston rod against the RT rack.



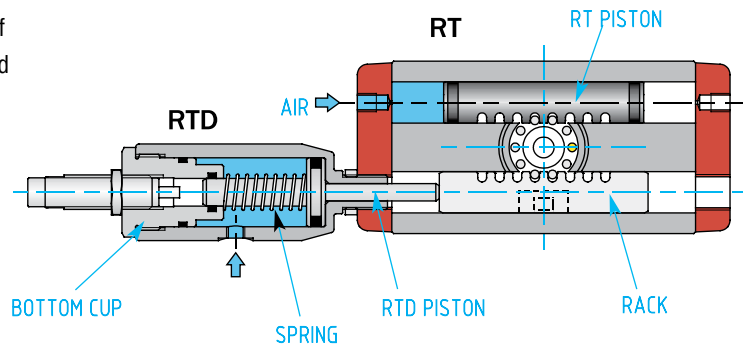
Part#	RTD-10	RTD-12	RTD-20	RTD-25	RTD-35	RTD-45	RTD-63
Quick#	6790	6791	6792	6793	6794	6795	6796
Price	\$152.00	\$164.00	\$189.00	\$202.00	\$226.00	\$273.00	\$365.00
Medium	Filtered, lubricated / non lubricated, compressed air						
Max. pressure range	116 psi						
Stroke for 90°	9.42mm	12.75mm	16.22mm	20.85mm	20.66mm	26.78mm	32.14mm
Piston bore Ø	15mm	20mm	30mm	35mm	50mm	63mm	80mm
Consumption each stroke	2cm ³	7cm ³	21cm ³	37cm ³	74cm ³	154cm ³	339cm ³
Weight	55g	100g	190g	300g	450g	1000g	1675g
To be used with:	RT-10	RT-12	RT-20	RT-25	RT-35	RT-45	RT-63

Use Quick#s for easy online ordering.

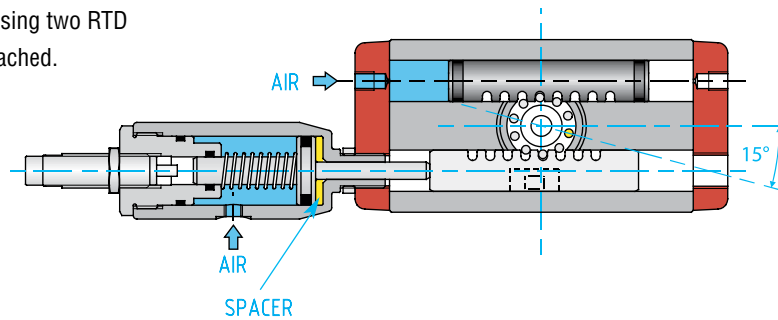


Intermediate Stopping Unit – RTD

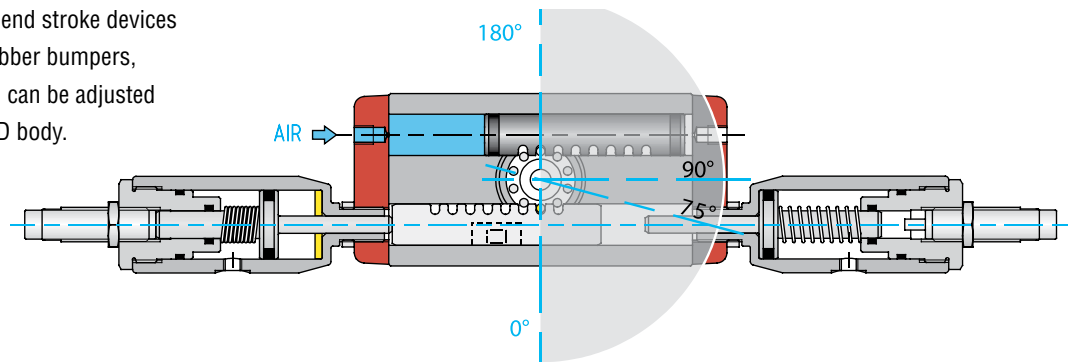
The RTD stroke can be modified by spacers in front of the piston, so that the intermediate stop can be moved in a different position. To mount a spacer the RTD must be open to extract the piston.



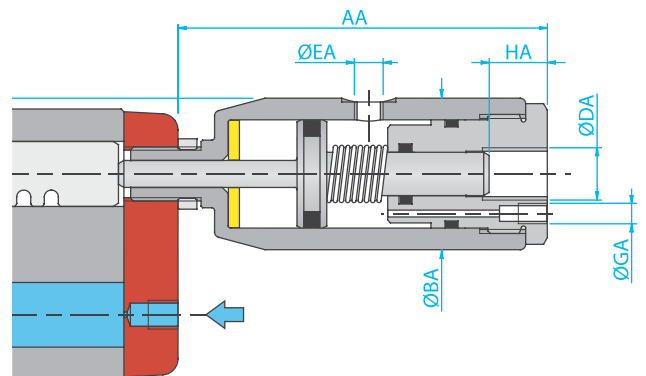
Two intermediate stops are possible using two RTD units, so that four positions can be reached.



The external end stroke positions can be adjusted ($0^\circ \pm 5^\circ$ or $180^\circ \pm 5^\circ$) by the same end stroke devices used in the RT (shock-absorbers, rubber bumpers, grub screws). The mid-stop position can be adjusted ($90^\circ \pm 5^\circ$) by moving the whole RTD body.



	RTD-10	RTD-12	RTD-20	RTD-25	RTD-35	RTD-45	RTD-63
AA	48.8	68.3	85.3	97.8	96	124.6	143.6
BA	Ø23	Ø28	Ø36	Ø44	Ø56	Ø70	Ø89
CA	20.5	27	34	42.5	50	61	71.5
DA	M8x1	M10x1	M12x1	M12x1	M14x1.5	M20x1.5	M25x2.5
EA	(n°3)M5	(n°3) M5	/	/	/	/	/
GA	/	/	M5	M5	G1/8	G1/4	G1/4
L5	19	25	32.5	40.5	53	64	87
HA	7.2	10.7	11.8	14	15.9	21.7	27.4



Two-Position Swiveling Rotary – R

- Suitable for 90° and 180° rotation angles.
- Shock-absorbers.
- Integrated rotating distributor of compressed air.
- Air feeding possible directly from the mounting plate.
- Optional sensors on page 815.



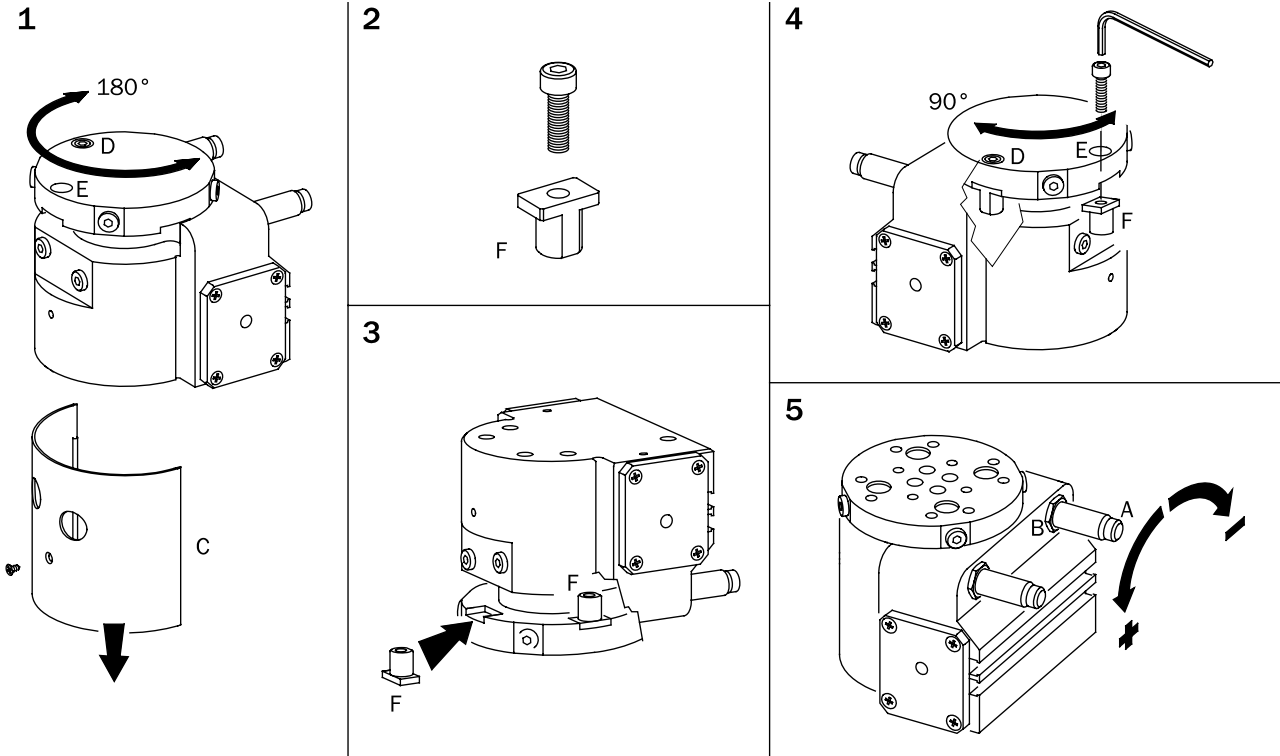
Part#	R20		R32		R63	
Quick#	6264		6265		6267	
Price	\$728.00		\$905.00		\$1,309.00	
Weight	400g		1100g		2800g	
Medium	Filtered lubricated / non lubricated compressed air					
Pressure range	30–116 psi					
Swiveling angle	90°	180°	90°	180°	90°	180°
Swiveling time without load	0.09s	0.017s	0.08s	0.15s	0.2s	0.3s
Theoretical torque at 87 psi	10 in-lbf		38 in-lbf		199 in-lbf	
180° angle adjustment	±8°		±8°		±8°	
Maximum repeatability tolerance	±0.02°		±0.02°		±0.02°	

Use Quick#s for easy online ordering.

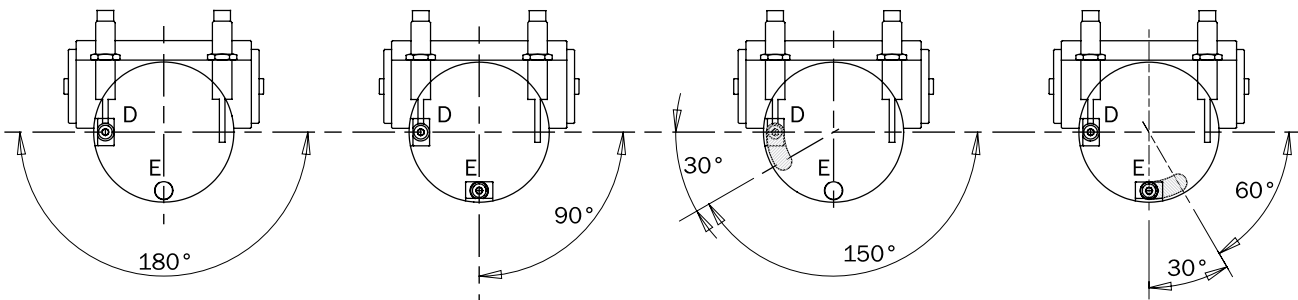
Two-Position Swiveling Rotary – R

Rotation angle

The units R20, R32 and R63 are supplied with one end-stroke block (F) in the seat (D). In this configuration they get a 180° rotation angle. However, a second block is supplied in the product packaging: mounting it in the seat (E), it reduces the stroke at 90°. It is necessary to remove the protection (C), before mounting the second block. Glue the screw of the second block by an anaerobic adhesive (medium resistance). At the end, the rotation angle can be further adjusted by changing the position of the shock-absorbers (A), after loosening the nuts (B). Each shock-absorber can change the end-stroke position of about ±4°.



To get other angles, it is necessary to build end-stroke blocks (not supplied) with a proper shape.



See page 810 for dimensions.

Three-Position Swiveling Rotary – R

- Suitable for 90° and 180° rotation angles.
- Cushioned end-stroke in every position.
- Air feeding possible directly from the mounting plate.
- Optional sensors on page 815.



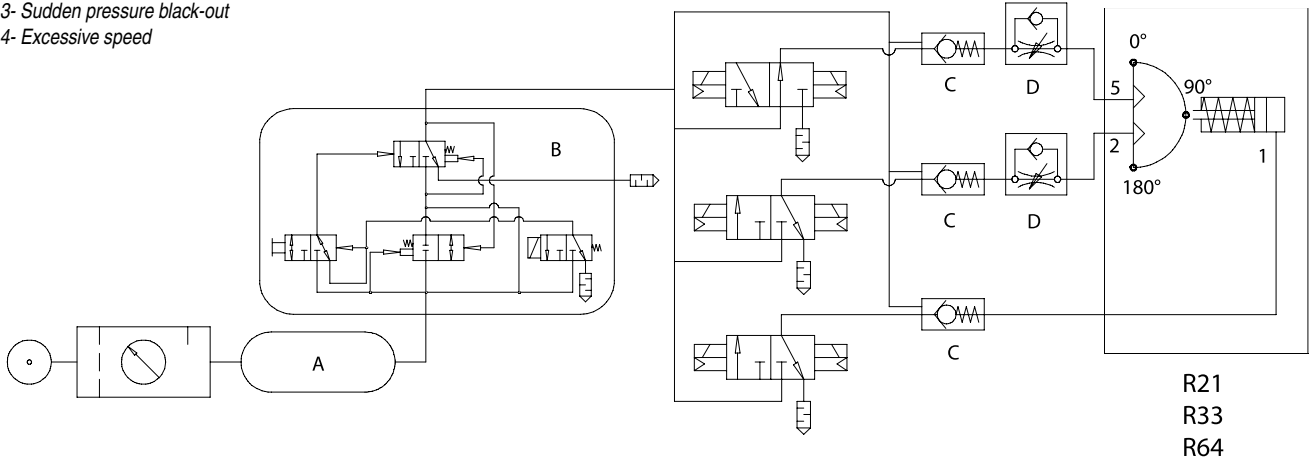
Part#	R21		R33		R64	
Quick#	6558		6266		6268	
Price	\$1,124.00		\$1,317.00		\$1,577.00	
Weight	500g		1200g		3200g	
Medium	Filtered lubricated / non lubricated compressed air					
Pressure range	44–116 psi					
Swiveling angle	90°	180°	90°	180°	90°	180°
Swiveling time without load	0.09s	0.017s	0.08s	0.15s	0.2s	0.3s
Theoretical torque at 87 psi	10 in-lbf		38 in-lbf		199 in-lbf	
180° angle adjustment	±8°		±8°		±8°	
Maximum repeatability tolerance	±0.02°		±0.02°		±0.02°	

Three-Position Swiveling Rotary – R

Pneumatic circuit

Possible problems on a compressed air circuit:

- 1- Pressure variation
- 2- Pressurizing with empty cylinder
- 3- Sudden pressure black-out
- 4- Excessive speed



Compressed air feeding

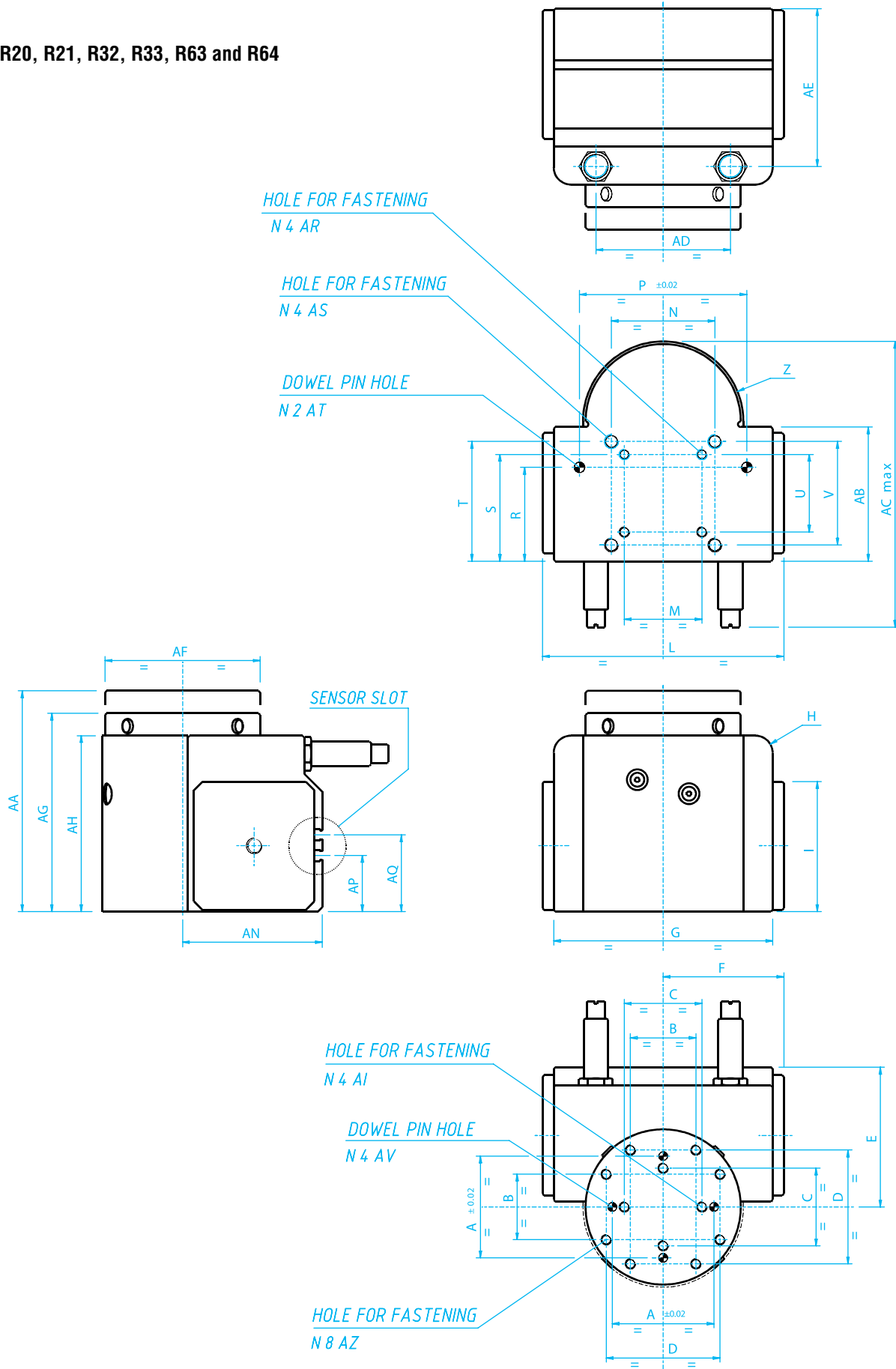
The compressed air feeding can be accomplished on the lateral air ports with fittings and tubes (not supplied), or directly on the bottom air ports, through the mounting plate. As all the air ports are plugged, it is necessary to remove only the plugs where the compressed air is needed. The air ports identified with the same number are communicating.

*Fittings Available
on page 1043*



Swiveling Rotary – R

R20, R21, R32, R33, R63 and R64



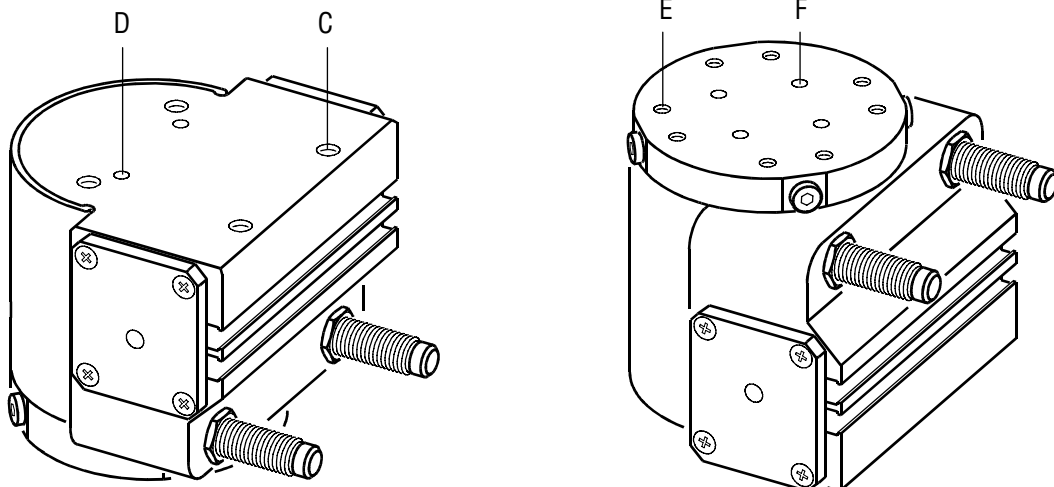
Swiveling Rotary – R

Part#	R20	R21	R32	R33	R63	R64
Quick#	6264	6558	6265	6266	6267	6268
A	30.4	30.4	30.4	30.4	59	59
B	21	21	27	27	38	-
C	-	-	-	-	45	45
D	37	37	48	48	66	66
E	32	32	47	47	81	81
F	35	35	49	49	70	70
G	64.5	64.5	90	90	127	127
H	R5	R5	R8	R8	R10	R10
I	36	36	44.5	44.5	75.4	75.4
L	70	70	98	98	140	140
M	-	-	-	-	45	45
N	34	34	45	45	60	60
P	30.4	30.4	30.4	30.4	97	97
R	32	32	47	47	54.5	54.5
S	-	-	-	-	62	62
T	40.5	40.5	52.5	52.5	69.5	69.5
U	-	-	-	-	45	45
V	34	34	45	45	60	60
Z	R 26	R 26	R 36	R 36	R 46.5	R 46.5
AA	-	71	-	92	-	134
AB	30.4	30.4	45	45	77.9	77.9
AC	58	58	105	105	165.7	165.7
AD	42	42	60	60	78	78
AE	43	43	59	59	91.5	91.5
AF	ø50	ø50	ø70	ø70	ø90	ø90
AG	59	-	78	-	115	-
AH	51	51	67.5	67.5	102	102
AI	-	-	-	-	M6 x 12mm	M6 x 12mm
AN	32	32	47	47	81	81
AP	14	14	20.5	20.5	40	40
AQ	23	23	29.5	29.5	-	-
AR	-	-	-	-	M6 x 10mm	M6 x 10mm
AS	M4 x 8mm	M4 x 8mm	M6 x 10mm	M6 x 10mm	M8 x 14mm	M8 x 14mm
AT	ø3 H8 x 6mm	ø3 H8 x 6mm	ø3 H8 x 6mm	ø3 H8 x 6mm	ø6 H8x8	ø6 H8x8
AV	ø3 H8 x 6mm	ø3 H8 x 6mm	ø3 H8 x 6mm	ø3 H8 x 6mm	ø5 H8 x 8mm	ø5 H8 x 8mm
AZ	M3 x 6mm	M3 x 6mm	M4 x 10mm	M4 x 10mm	M6 x 12mm	M6 x 12mm

Fastening

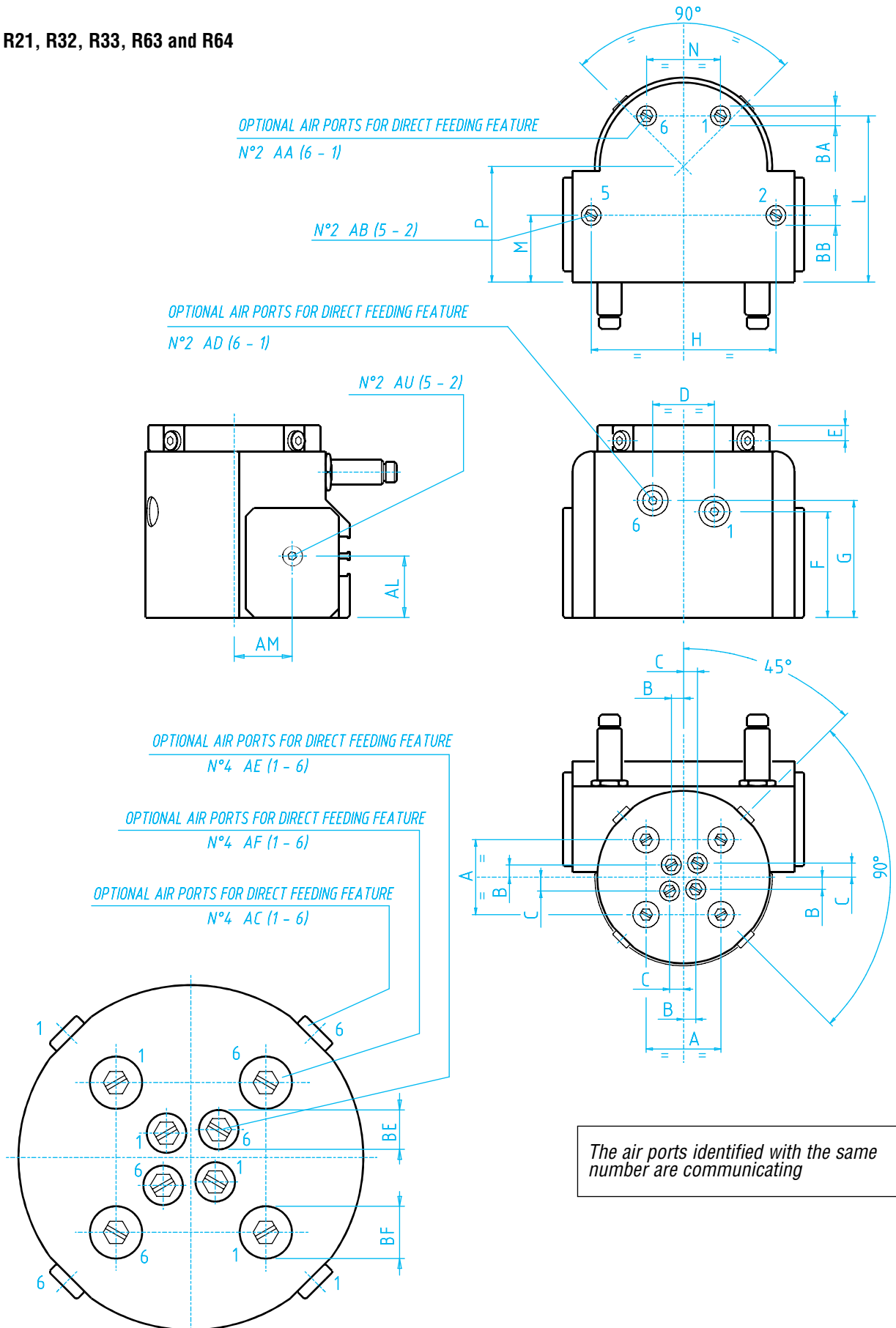
The swiveling actuator must be fastened by four screws in the threaded holes (C) and centered by two dowel pins in the holes (D).

The rotating load must be fastened on the disc using at least four threaded holes (E) and at least two dowel pin holes (F).



Swiveling Rotary – R

R20, R21, R32, R33, R63 and R64

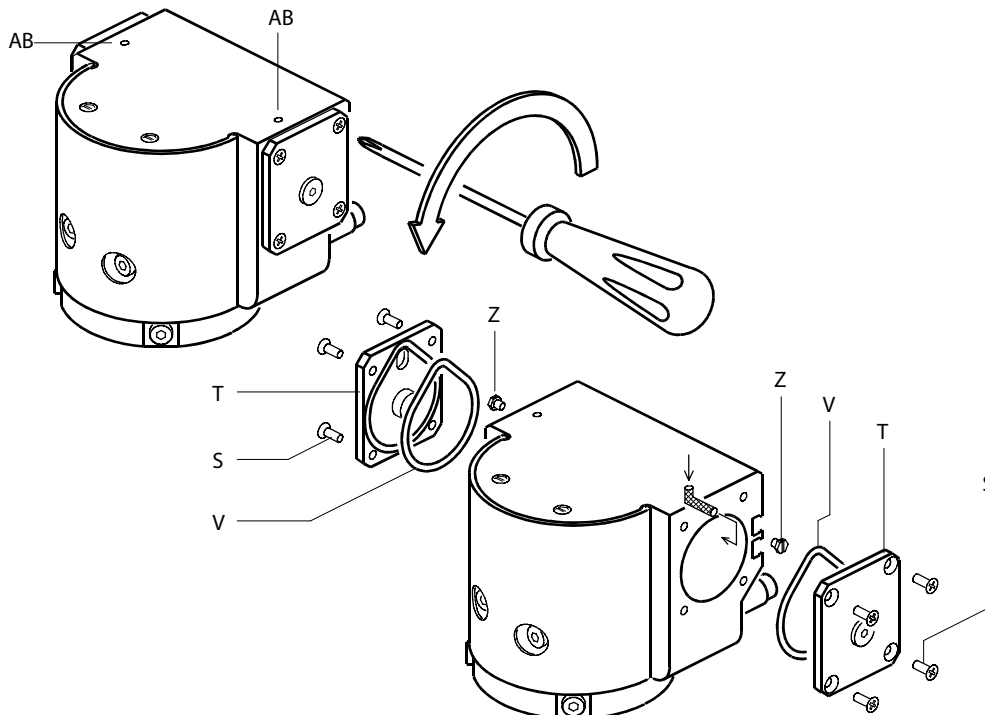


Swiveling Rotary – R

Part#	R20	R21	R32	R33	R63	R64
Quick#	6264	6558	6265	6266	6267	6268
A	24	-	30.4	-	48	-
B	2.7	-	4.9	-	6.2	-
C	3.4	-	5.7	-	7.25	-
D	13	13	25	25	30	30
E	4.5	-	6.25	-	7.5	-
F	32	32	43	43	68.35	68.35
G	37.7	-	47.5	-	76.45	-
H	52	52	75	75	109	109
L	46	46	67.5	67.5	103.5	103.5
M	17	17	27.1	27.1	39.5	39.5
N	13	13	30	30	30	30
P	32	32	47	47	81	81
AA	M3	M3	M3	M3	M5	M5
AB	M3	M3	ø2	ø2	M3	M3
AC	M3	-	M5	-	M5	-
AD	M3	-	M5	-	M5	-
AE	M3	-	M3	-	M3	-
AF	M3	-	M3	-	M3	-
AL	18.5	18.5	25	25	38.15	38.15
AM	15	15	23.5	23.5	41.5	41.5
AU	M5	M5	M5	M5	G 1/8	G 1/8
BA	ø6	ø6	ø6	ø6	ø9	ø9
BB	ø6	ø6	-	-	ø6	ø6
BE	ø5.5	-	ø6	-	ø6	-
BF	ø9.4 x 1.3mm	-	ø9.4 x 1.3mm	-	ø9.4 x 1.3mm	-

Warning

The direct feeding of the rotary units R32 and R33 from the bottom air ports (AB) is possible only by removing the plugs (Z) placed behind the covers (T). When reassembling the covers pay attention to the correct position of the gaskets (V), before placing the screws (S).



Three-Position Swiveling Rotary – R

Rotating distributor

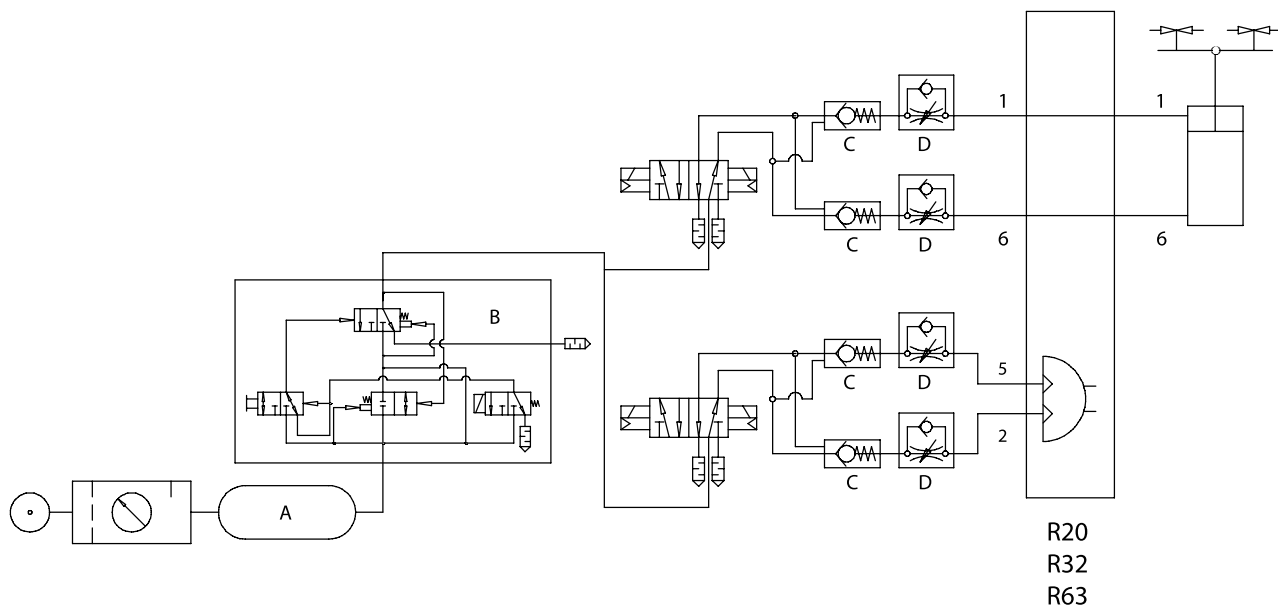
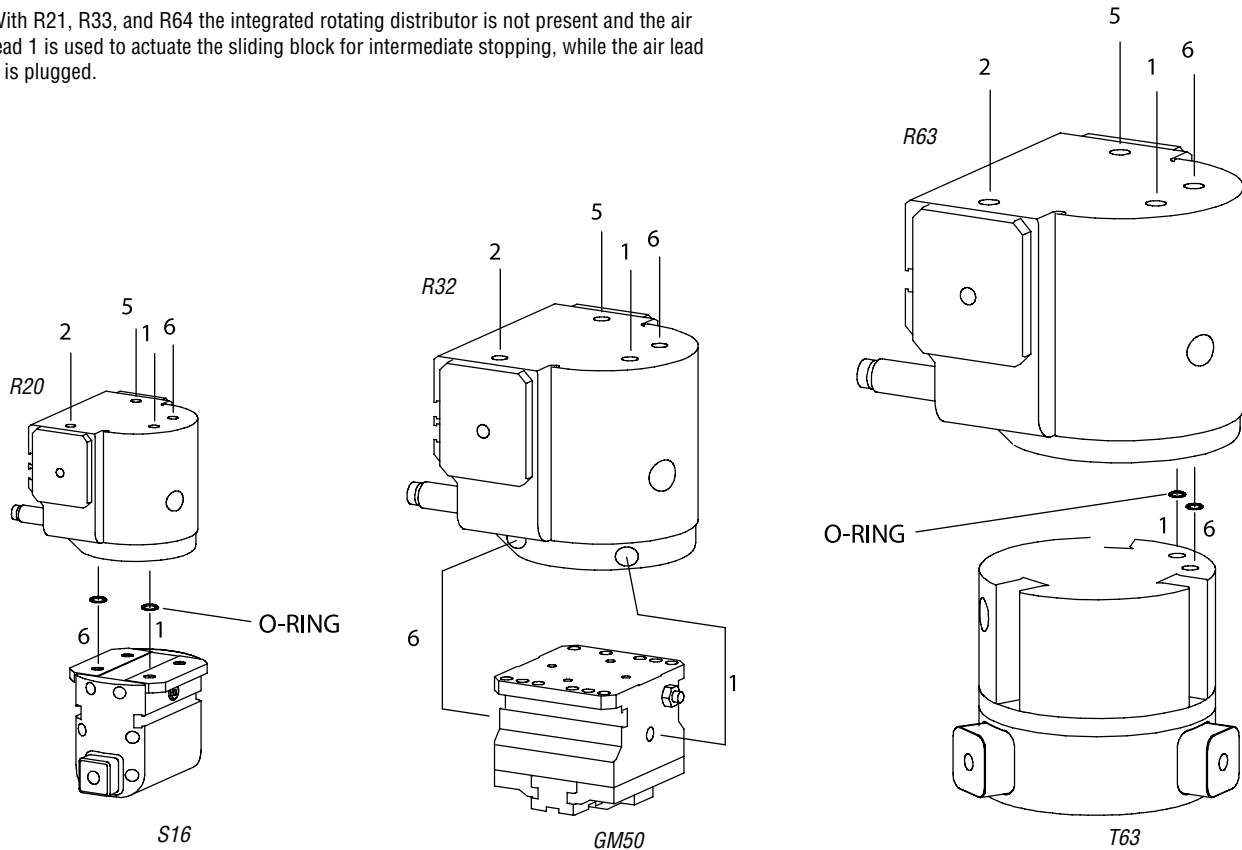
With the R20, R32 and R63 the integrated rotating distributor of compressed air, with two leads (1 and 6), feeds compressed air to the pneumatic devices on the disc without the use of hoses.

S16 and T30 can be fitted directly on R20 the grippers.

T40, GM-0025/6/7 and GM-0050/1/2 on R32 grippers.

S32 and T63 on R63 grippers.

With R21, R33, and R64 the integrated rotating distributor is not present and the air lead 1 is used to actuate the sliding block for intermediate stopping, while the air lead 6 is plugged.



Three-Position Swiveling Rotary – R

Sensors

The operating position can be checked by sensors (optional), that detect the inner magnet. Close proximity to a large mass of ferromagnetic material or intense magnetic fields may cause sensing troubles.



					R-20	R-32	R-63	R-21	R-33	R64
Quick#	Part#	Signal	Connection	Price						
3-Wire, 'T' Slot Sensors										
6273	SC4N225G	PNP	2.5m lead	\$30.30	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6455	SC3N203G	PNP	.3m lead & M8	\$34.62	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
792	SL4N225G	PNP	2.5m lead	\$27.19	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
793	SL4M225G	NPN	2.5m lead	\$27.19	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6274	SL3N203G	PNP	.3m lead & M8	\$31.16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6456	SL3M203G	NPN	.3m lead & M8	\$31.16	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-Wire, 'C' Slot Sensors										
1882	SS4N225G	PNP	2.5m lead	\$27.19	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)
1883	SS4M225G	NPN	2.5m lead	\$27.19	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)
6282	SS3N203G	PNP	.3m lead & M8	\$31.16	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)
1884	SS3M203G	NPN	.3m lead & M8	\$31.16	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)	<input checked="" type="checkbox"/> (*)
7440	K-SENS	*Must purchase separately	\$4.82		*Allows 'C' channel sensors to work in 'T' channel slots					



Three-Position Swiveling Rotary – R

Rotation angle

R21, R33 and R64 are swivelling units with three positions: 0°, 90° and 180°.

These movements are possible:

From 0° to 180°.

From 180° to 0°.

From 0° to 90°.

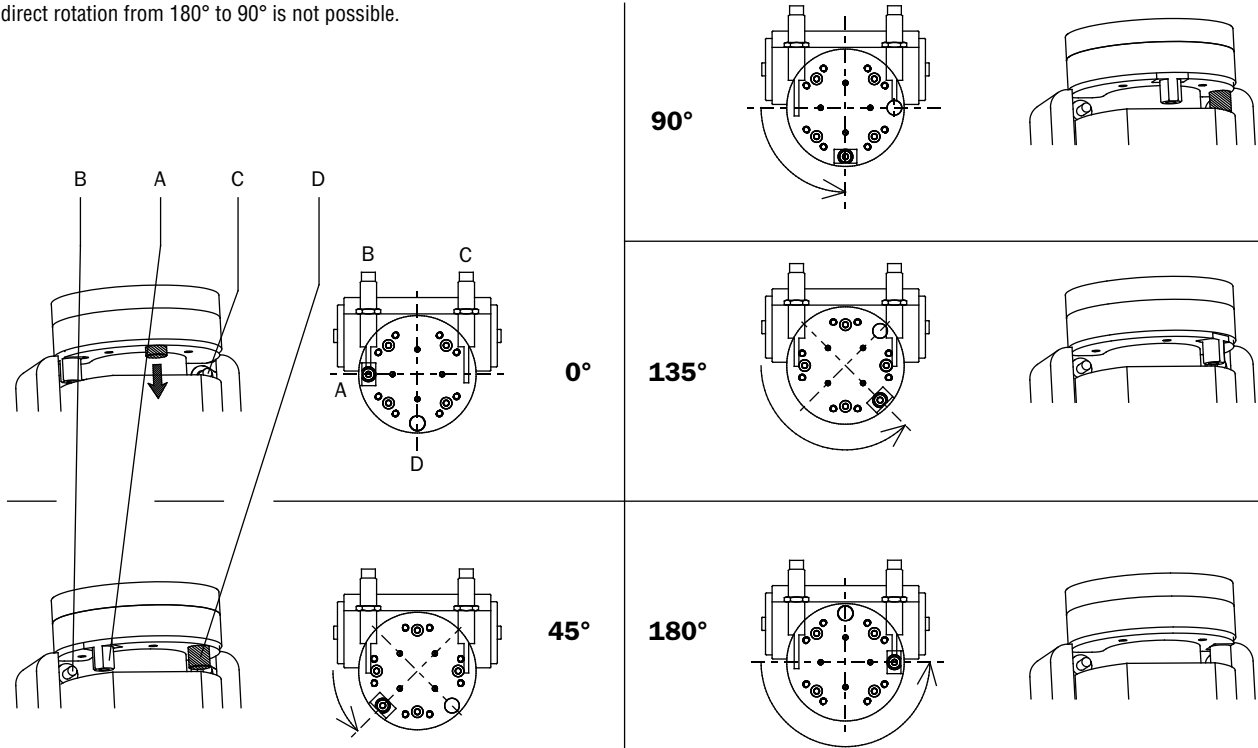
From 90° to 0°.

From 90° to 180°, before to retract the moving block (D), the pressure must be balanced on both sides of the piston.

The direct rotation from 180° to 90° is not possible.

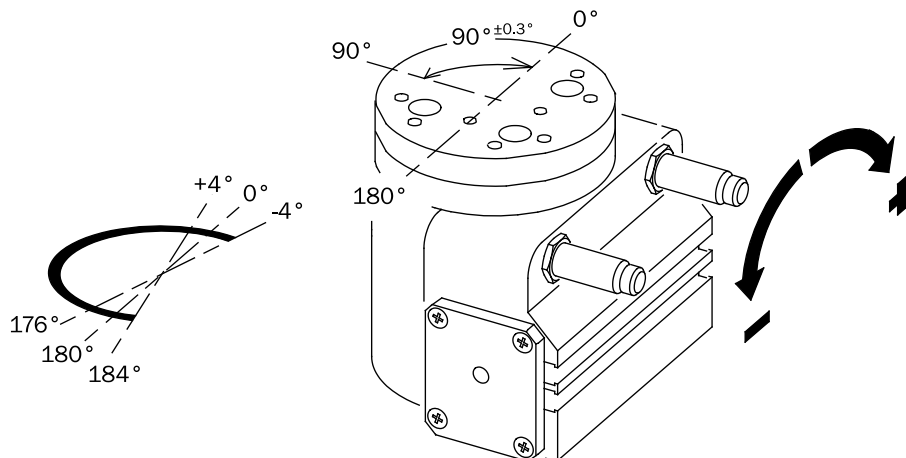
The fixed block (A) gives the end-stroke at 0° against the shock-absorber (B) and at 180° against the shock-absorber (C), the moving block (D) at 90° against the shock-absorber (C).

The moving block (D) can't be put out between 70° to 180°.



You can adjust of about $\pm 4^\circ$ on both sides the 180° angle, by the shock-absorbers.

It is not possible to adjust the 90° (tolerance $\pm 0.3^\circ$) angle.



Three-Position Swiveling Rotary – R

Safety loads

Check the table for maximum permitted loads. Excessive forces or torques can damage the unit, cause functioning troubles, endanger the safety of the operator.

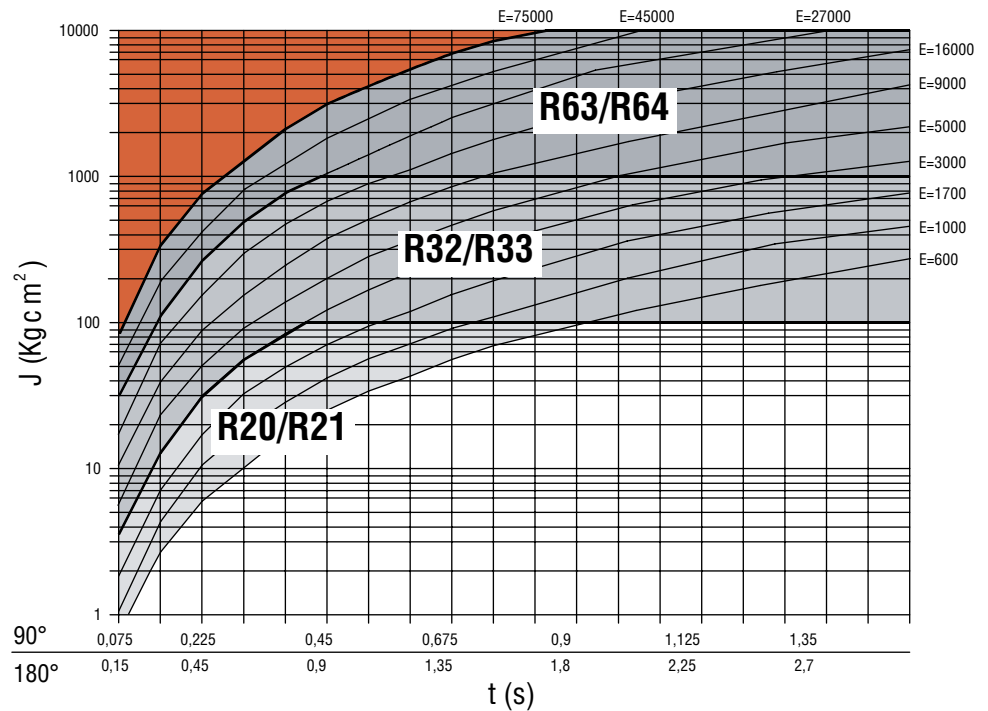
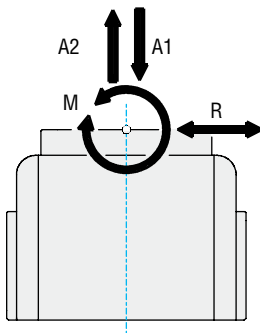
Reference:

- A1 and A2 (N): maximum axial loads, compressive and tractive.
- R (N): maximum radial load.
- M (Nm): maximum bending torque.
- J (kgcm²): moment of inertia of the rotating loads.
- t (s): swiveling time (for 90° and 180°).
- E (kgcm²/s²): kinetic energy dissipated by the shock absorber each shock.
- Eh (kgcm²/s²): kinetic energy dissipated by the shock absorber per hour.
- Nh: number of shocks per hour per shock absorber.

Reference:

- Force: N x 0.225=lbf
- Torque: Nm x 8.850=in-lbf
- Torque: Ncm x 0.089=in-lbf
- Pressure: bar x 14.5=psi
- See also: Call our Engineering Department for assistance

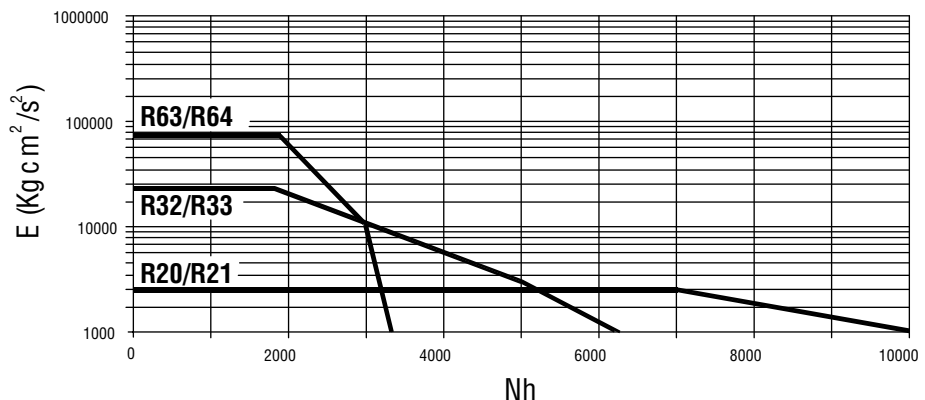
	R20/R21	R32/R33	R63/R64
A1	230N	650N	1100N
A2	140N	245N	800N
R	180N	810N	1500N
M	5Nm	12Nm	32Nm
E max	3000 kgcm ² /s ²	27000 kgcm ² /s ²	75000 kgcm ² /s ²
Eh	(E+3000) x Nh	(E+10 ⁴) x Nh	(E+10 ⁵) x Nh
Eh max	40 x 10 ⁶ kgcm ² /s ²	67.8 x 10 ⁶ kgcm ² /s ²	34 x 10 ⁷ kgcm ² /s ²



ENERGY PER SHOCK

- 90°: $E=4.935xJ/t^2$
- 180°: $E=19.74xJ/t^2$

ENERGY PER HOUR

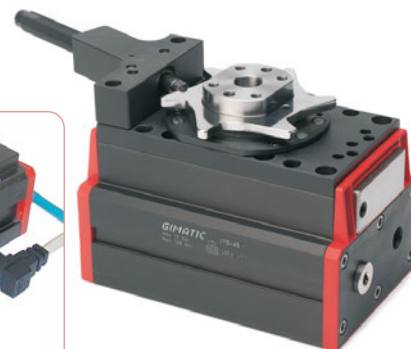


Index Tables – ITSC

- Available in two sizes with 4, 6 or 8 positions.
- Available in clockwise or counter clockwise (ending -A).
- High torque
- Suitable for heavy loads.
- Thru-hole for cables and hoses.
- We recommend the use of exhaust flow controls (not included) to achieve the desired speed. See page 801.
- Shock absorbers and cam crown for ITSC-45.. are recommended for dissipating kinetic energy and are not included.



ITSC-16... with sensor



ITSC-45... with shock absorber

Clockwise	Part#	ITSC-164	ITSC-166	ITSC-168	ITSC-454	ITSC-456	ITSC-458
	Quick#	6155	6157	6159	6161	6163	6165
Counter-clock	Part#	ITSC-164A	ITSC-166A	ITSC-168A	ITSC-454A	ITSC-456A	ITSC-458A
	Quick#	6156	6158	6160	6162	6164	6166
Price		\$489.00	\$489.00	\$489.00	\$1,067.00	\$1,067.00	\$1,067.00
Swiveling angle		4x90°	6x60°	8x45°	4x90°	6x60°	8x45°
Weight		320g	320g	320g	3900g	3900g	3900g
Medium		Filtered lubricated / non lubricated compressed					
Pressure range		36–116 psi					
Air consumption		8 cm ³ x 90°	7 cm ³ x 60°	7 cm ³ x 45°	159 cm ³ x 90°	146 cm ³ x 60°	136 cm ³ x 45°
Indexing time without load		0.10s x 90°	0.08s x 60°	0.06s x 45°	0.15s x 90°	0.12s x 60°	0.09s x 45°
Theoretical torque at 87 psi		12 in-lbf	15 in-lbf	16 in-lbf	203 in-lbf	234 in-lbf	250 in-lbf
Angular precision		±0.12°					
Positioning repeatability (360°)		±0.02°					
Shock absorber		-	-	-	6167	6167	6177
Cam crown		-	-	-	6168	6169	6170

Shock-absorbers: Accessories for ITSC...45... are available to dissipate kinetic energy by means of one or two shock-absorbers. They allow shorter indexing times. Dimensional drawings for these parts can be found on our website by searching by quick number.



Part#	ITSC-45-DE	ITSC-45-S4	ITSC-45-S6	ITSC-45-S8
Quick#	6167	6168	6169	6170
Description	shock absorber with housing	4-cam crown	6-cam crown	8-cam crown
Weight	290g	90g	105g	120g
To use on:	ITSC-45...	ITSC-454, ITSC-454-A	ITSC-456, ITSC-456-A	ITSC-458, ITSC-458-A
Price	\$363.00	\$72.28	\$72.28	\$72.28

Sensors: The operating position can be checked by sensors (optional). These sensors will detect the magnets on the pistons inside. Therefore a near large mass of ferromagnetic material or intense magnetic fields may cause sensing troubles.

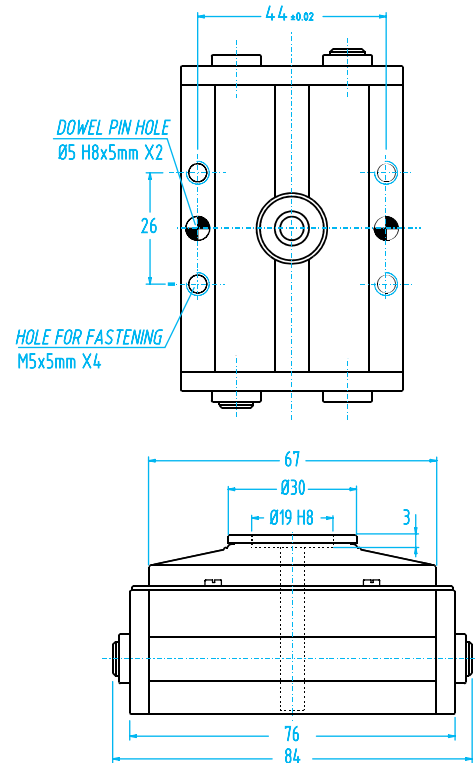
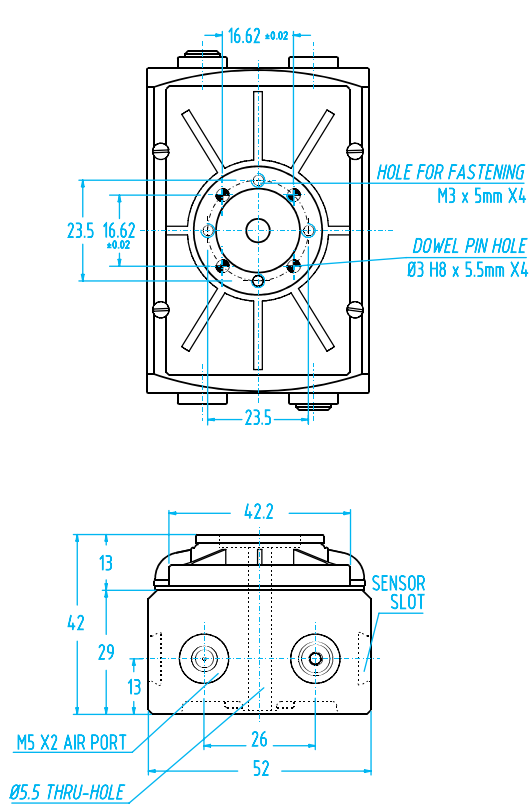
Quick#	Part#	Signal	Description	Price
6126	CB3N2-G	PNP	3 Wire CB Style REED w/ M8 Connection	\$22.88
1794	CB3M2-G	NPN		\$22.88

See page 1003 for more information about CB3.. sensors

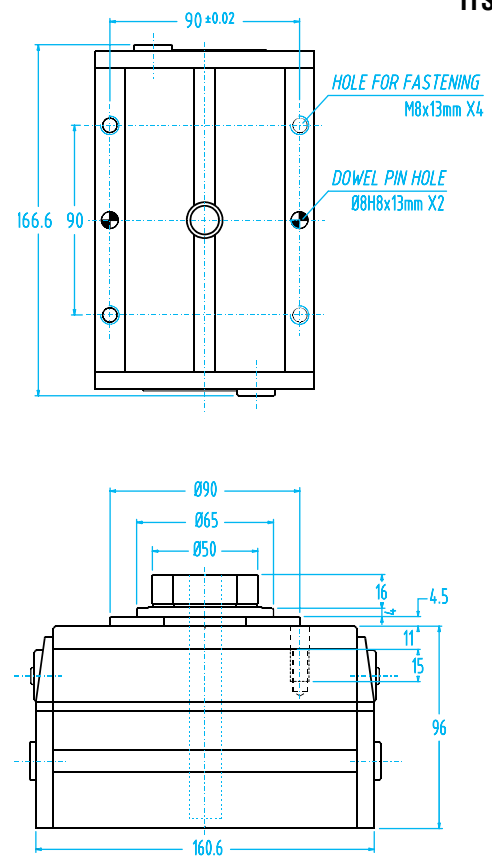
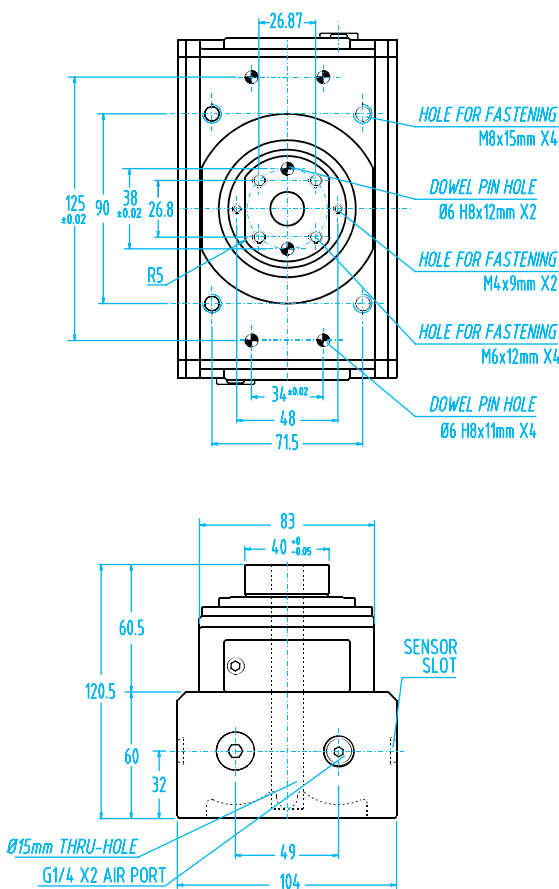
For more information see www.EMlcorp.com

Index Tables – ITSC

(Dimensioned drawing reduced to fit)



ITSC-16...



ITSC-45...

Harmo® Rotary Actuators – Shaft Style

- Low-profile, high-torque from elliptical position.
- Separate cushion, angle, and backlash adjustments.
- Sensor ready.
- Air connections are M5 - Full dimensional drawings found online.



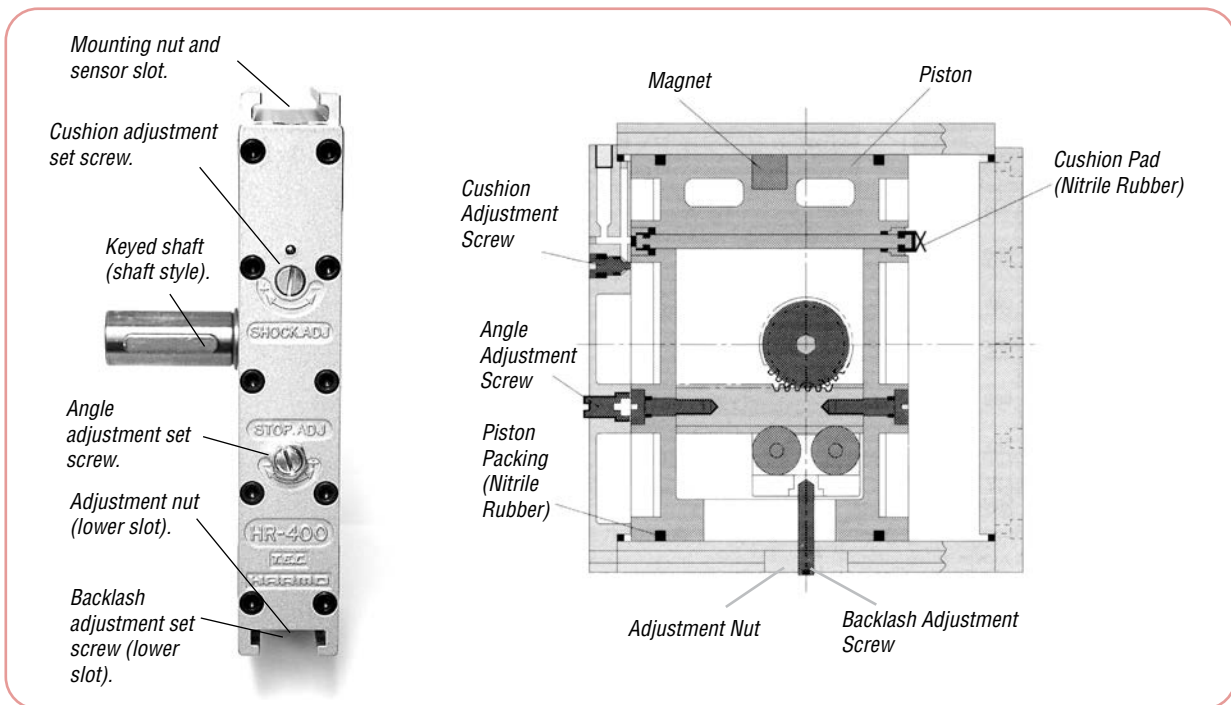
Harmo Rotary Actuators - Shaft Style

Quick#	Part#	Rotation	Torque	Allowable Radial Load (lbf)	Allowable Thrust Load (lbf)	Weight	Price
1105	GSG-HR200-90	0–90°–95°	16.8 in-lb	5.96	5.96	400g	\$355.00
1106	GSG-HR400-90	0–90°–95°	52.8 in-lb	10.14	5.96	850g	\$360.00
722	GSG-HR400-180	0–180°–185°	52.8 in-lb	10.14	5.96	1050g	\$390.01
Order Sensors Separately							
6126	CB3N2G	PNP, 3-Wire CB Style Sensor with M8 Connector					\$22.00
1794	CB3M2G	NPN, 3-Wire CB Style Sensor with M8 Connector					\$22.00

Note: Rotary Actuators come with Sensor Adaptor Bracket.

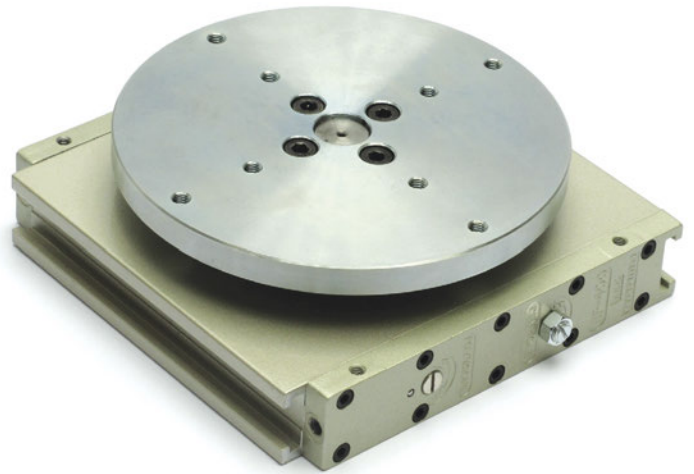
Mounting Nuts (4 per pack - dimensions found online)

Quick#	Part#	Fits Size	Price
725	GSG-HR200-MH	200	\$42.00
726	GSG-HR400-MH	400	\$43.00



Harmo® Rotary Actuators – Disk Style

- Feature ultra-thin size and high power because they utilize a long elliptical piston
- The internal rack and pinion are made of steel for long life and precise operation
- Separate adjustments provide control for cushion, angle, and backlash
- Speed control valves are available
- An internal magnet is standard on all units for sensing
- Air connections are M5 - Full dimensional drawings found online.



Harmo Rotary Actuators - Disk Style

Quick#	Part#	Rotation	Torque	Allowable Radial Load (lbf)	Allowable Thrust Load (lbf)	Weight	Price
723	GSG-HR200-90D	0–90°–95°	16.8 in-lb	5.96	5.96	600g	\$443.00
1109	GSG-HR400-90D	0–90°–95°	52.8 in-lb	10.14	5.96	1600g	\$448.00
724	GSG-HR400-180D	0–180°–185°	52.8 in-lb	10.14	5.96	1800g	\$478.01
Order Sensors Separately							
6126	CB3N2-G	PNP, 3-Wire CB Style Sensor with M8 Connector					\$22.00
1794	CB3M2-G	NPN, 3-Wire CB Style Sensor with M8 Connector					\$22.00

Note: Rotary Actuators come with Sensor Adaptor Bracket.

Mounting Nuts (4 per pack - dimensions found online)

Quick#	Part#	Fits Size	Price
725	GSG-HR200-MH	200	\$42.00
726	GSG-HR400-MH	400	\$43.00

*Fittings Available
on page 1043*

