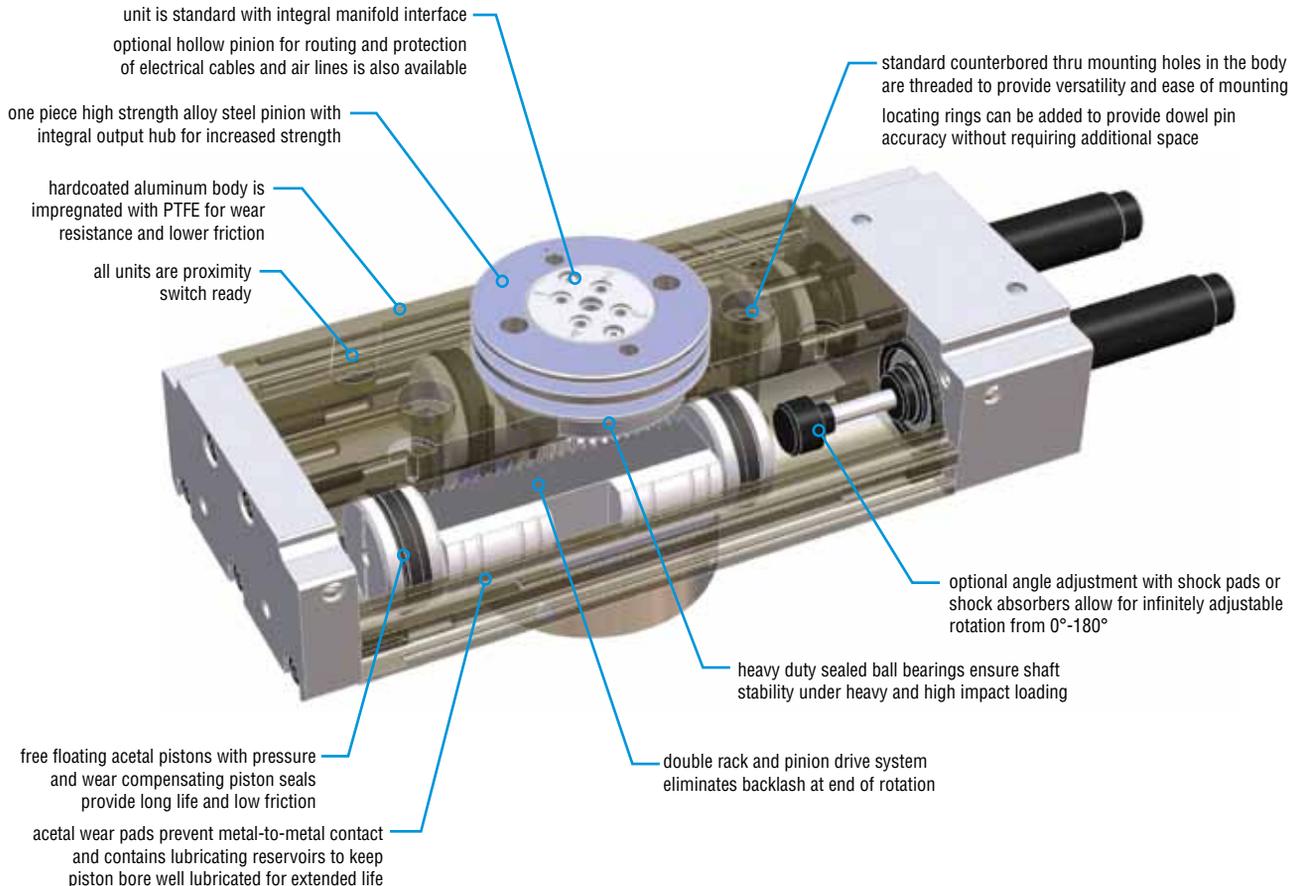


## HIGH FORCE PNEUMATIC ROTARY ACTUATOR

### Major Benefits

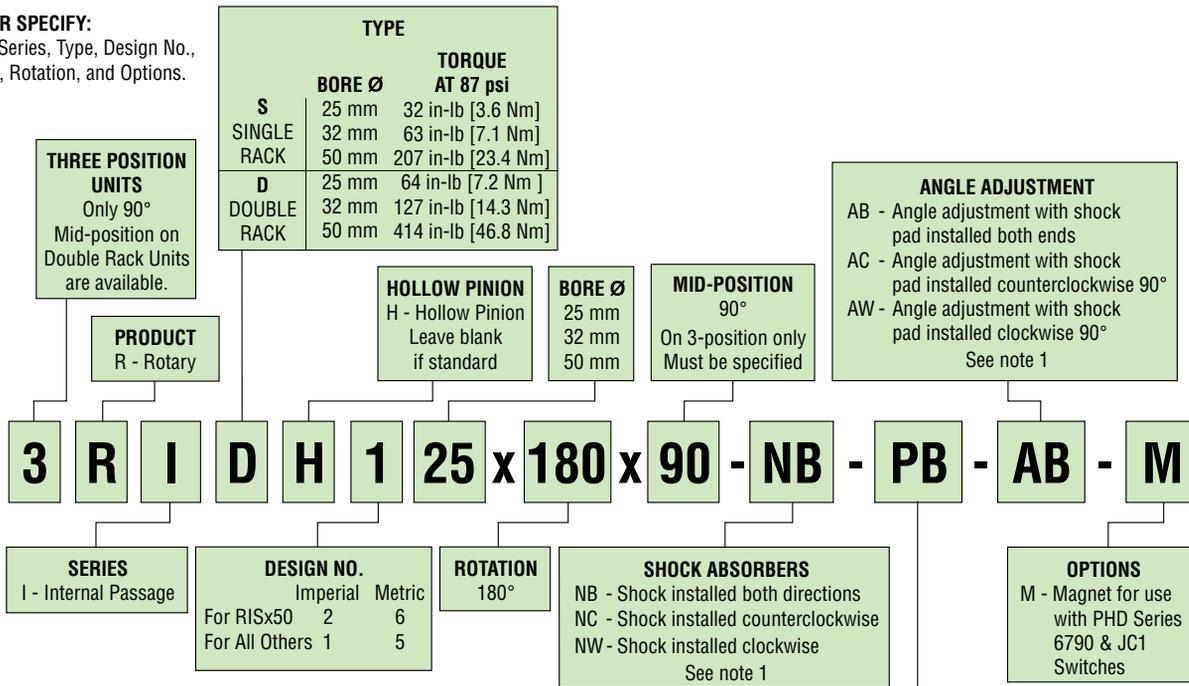
- High torque
- High axial and radial bearing load
- Thru hole shaft for built-in air communication ports



# ORDERING DATA: SERIES RI ROTARY ACTUATOR

## TO ORDER SPECIFY:

Product, Series, Type, Design No., Bore Size, Rotation, and Options.



## NOTES:

- 1) Either optional angle adjustments or shock absorbers **must** be ordered on all units. (Either option is mandatory.)
- 2) Switches and switch bracket kits must be ordered separately. See Options for complete switch information.

UNIT SIZE	ROTATION SPEED CONTROL KIT NO.
Rlx125	70695-01
Rlx525	70696-01
Rlx132	70695-03
Rlx532	70696-03
RIDx150	70695-03
RIDx550	70696-03
RISx250	70695-03
RISx650	70696-03

NOTE: One flow control fitting per kit

UNIT SIZE	SHOCK ABSORBER KIT NO.
RISxx25	69146
RIDxx25	69153
RISxx32	69147
RIDxx32	69154
RISxx50	75423
RIDxx50	69156

UNIT SIZE	PORTING PLATE KIT NUMBER
Rlx125	71972
Rlx525	71997
Rlx132	71973
Rlx532	71998
RID150	71975
RID550	72000
RIS250	71975
RIS650	72000

Kits include: 1 Porting Plate,  
2 Locating Rings,  
4 Fasteners, Required O-Rings

## ROTATION SPEED CONTROL VALVE

PB - Rotational Speed Controls both directions  
PC - Rotational Speed Controls counterclockwise  
PW - Rotational Speed Controls clockwise



Options may affect unit length. See dimensional pages and option information details.



Refer to this product's online catalog in the product section for complete information including related dimensions and additional specifications. See link at bottom of this page.

## SERIES 6790 & JC1 SWITCHES

PART NO.	DESCRIPTION
67902-1-05	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, 5 m cable
JC1SDN-5	NPN (Sink) Solid State, 10-30 VDC, 5 m cable
JC1SDP-5	PNP (Source) Solid State, 10-30 VDC, 5 m cable
67922-1	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, Quick Connect
JC1SDN-K	NPN (Sink) Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source) Solid State, 10-30 VDC, Quick Connect
67929-2	PNP (Source) or NPN (Sink) Reed, 65-120 VAC, Quick Connect

NOTE: See Switches and Sensors section for additional switch information and complete specification. Switches must be ordered separately.

## SERIES 6790 & JC1SDx CORDSET CHART

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 m cable
63549-05	M8, 3 pin, Straight Female Connector, 5 m cable

NOTE: Cordsets must be ordered separately.



## CAD & Sizing Assistance

Use PHD's free online Product Sizing and CAD Configurator at [www.phdinc.com/myphd](http://www.phdinc.com/myphd)

# ENGINEERING DATA: SERIES RI ROTARY ACTUATOR

SPECIFICATIONS	SERIES RI
OPERATING PRESSURE	20 to 100 psi [1.4 to 6.8 bar]
OPERATING TEMPERATURE	-20° to 160°F [-29° to 71°C]
RATED LIFE	5 million cycles
ROTATIONAL TOLERANCE	Nominal rotation +13° to -180° with angle adjustment
BACKLASH AT END OF ROTATION*	0°
LUBRICATION	Factory lubricated for rated life
MAINTENANCE	Field repairable

**NOTE:** \*Angle adjustment screw must be engaged or adjusted to achieve 0° backlash

SIZE	ROTATION/ MID ROT	BASE WEIGHT		BORE DIAMETER		DISPLACEMENT VOLUME/deg		THEORETICAL TORQUE OUTPUT		ROTATIONAL VELOCITY MAX deg/sec	MAX AXIAL BEARING LOAD		MAX RADIAL BEARING LOAD	
		lb	kg	in	mm	in <sup>3</sup>	cm <sup>3</sup>	in-lb/psi	Nm/bar		lb	N	lb	N
RISxx25	180°	3.0	1.36			.006	.098	.37	.61	180°/.13				
RIDxx25	180°	3.5	1.59	.984	25	.012	.196	.74	1.21	180°/.23	292	1300	572	2546
3RIDxx25	180°/90°	4.1	1.86			.014	.229	.37	.61	180°/.23				
RISxx32	180°	7.6	3.44			.012	.196	.73	1.20	180°/.11				
RIDxx32	180°	8.0	3.63	1.260	32	.024	.393	1.45	2.38	180°/.28	511	2275	1206	5365
3RIDxx32	180°/90°	9.6	4.36			.027	.442	.73	1.20	180°/.28				
RISxx50	180°	14.3	6.48			.041	.671	2.38	3.90	180°/.13				
RIDxx50	180°	15.0	6.80	1.969	50	.082	1.343	4.76	7.80	180°/.28	697	3100	1850	8229
3RIDxx50	180°/90°	17.6	7.98			.092	1.507	2.38	3.90	180°/.28				

## MANIFOLD PINION SPECIFICATIONS

UNIT SIZE	NUMBER OF PASSAGES	FLOW THROUGH PASSAGES @ 87 psi [6 bar]		CENTER THROUGH HOLE DIAMETER	
		CFM	Liter/Min	in	mm
		RISx25	4	1	28.3
RIDx25	4	1	28.3	0.197	5
RISx32	6	1.3	36.8	0.276	7
RIDx32	6	1.3	36.8	0.276	7
RISx50	8	1.5	42.5	0.433	11
RIDx50	8	1.5	42.5	0.433	11

## BACKLASH SPECIFICATIONS

UNIT SIZE	BACKLASH MID ROTATION	REPEATABILITY +/- (degrees)	BACKLASH THREE POSITION	REPEATABILITY THREE POSITION
	(degrees)		UNIT (degrees)	UNIT (degrees)
RISxx25	.26	0.14	—	—
RIDxx25	.26	0.53	1.25	0.16
RISxx32	.23	0.42	—	—
RIDxx32	.23	0.94	0.65	0.10
RISxx50	.21	0.12	—	—
RIDxx50	.21	0.35	0.40	0.06

## ROTATION RATE TABLE

UNIT SIZE	ROTATION RATES at 87 psi (seconds maximum)		
	SHOCK PAD	SPEED CONTROL	
		SHOCK	SHOCK
RISxx25	0.13	0.18	0.18
RIDxx25	0.23	0.41	0.23
RISxx32	0.11	0.11	0.31
RIDxx32	0.28	0.30	0.32
RISxx50	0.13	0.22	0.29
RIDxx50	0.28	0.40	0.78

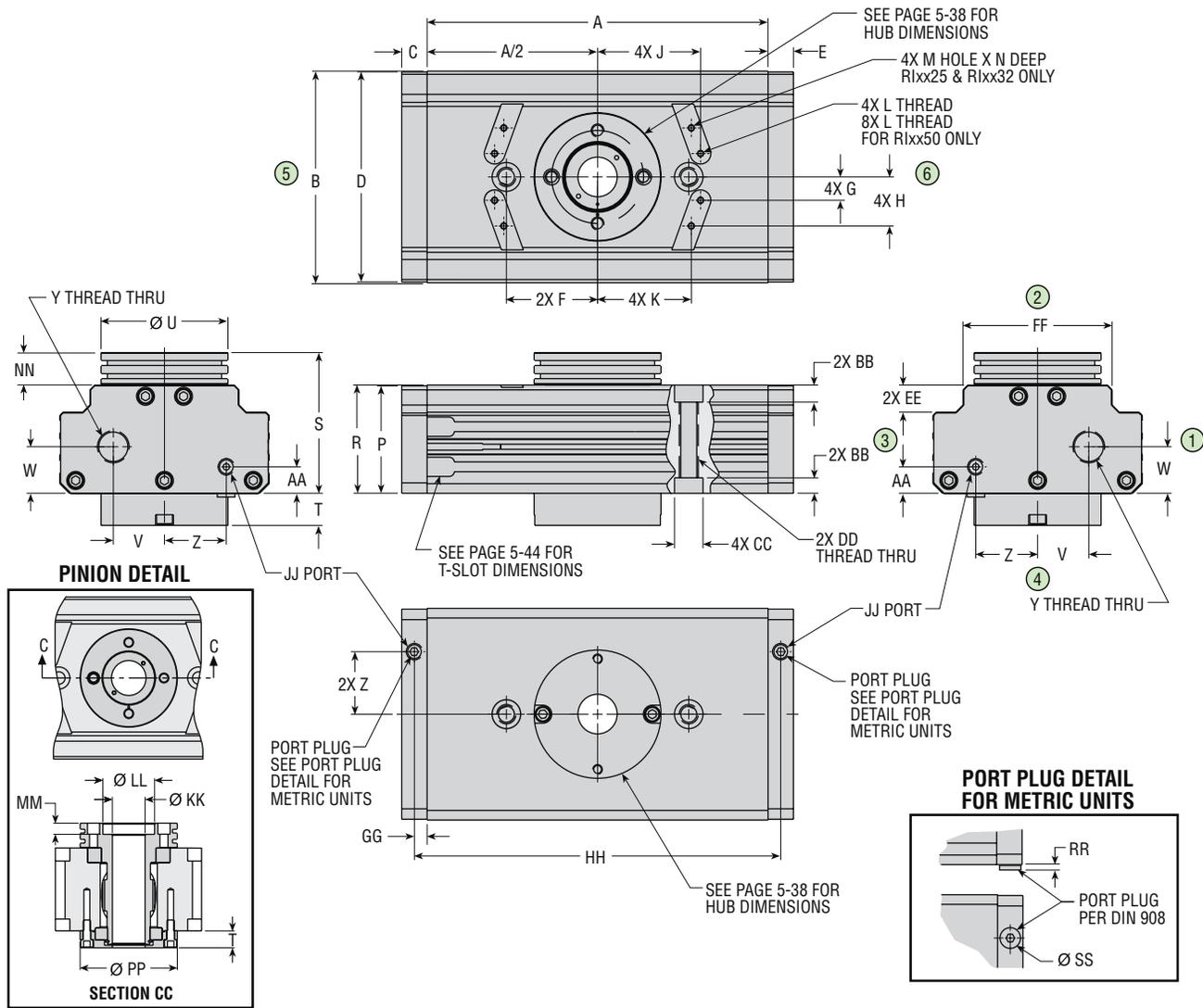
(No load conditions)



## Sizing & Application Assistance

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# DIMENSIONS: SERIES RISH ROTARY ACTUATOR SINGLE RACK



UNIT SIZE	LETTER DIMENSION																
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T
RISH125	5.425	3.071	.472	3.031	.472	1.477	.406	.738	1.823	1.698	M3 x 0.5	.102	.098	1.398	1.417	1.889	.417
RISH525	[137.8]	[78.0]	[12.0]	[77.0]	[12.0]	[37.5]	[10.3]	[18.7]	[46.3]	[43.1]	M3 x 0.5	[2.6]	[2.5]	[35.5]	[36.0]	[48.0]	[10.6]
RISH132	6.384	3.858	.630	3.819	.630	1.969	.758	1.070	2.004	1.838	M3 x 0.5	.102	.118	1.890	1.909	2.519	.374
RISH532	[162.2]	[98.0]	[16.0]	[97.0]	[16.0]	[50.0]	[19.3]	[27.2]	[50.9]	[46.7]	M3 x 0.5	[2.6]	[3.0]	[48.0]	[48.5]	[64.0]	[9.5]
RISH250	8.464	5.197	.630	5.157	.630	2.264	.575	1.204	2.557	2.328	M4 x 0.7	—	—	2.638	2.657	3.454	.543
RISH650	[215.0]	[132.0]	[16.0]	[131.0]	[16.0]	[57.5]	[14.6]	[30.6]	[64.9]	[59.1]	M4 x 0.7	—	—	[67.0]	[67.5]	[87.7]	[13.8]

UNIT SIZE	LETTER DIMENSION														
	U	V	W	Y	Z	AA	BB	CC	CC TOL±	DD	EE	FF	GG	HH	JJ
RISH125	1.969	.731	.618	M14 x 1.5	.709	.394	.197	.4715	.0004	5/16-24	.157	2.283	.197	5.819	10-32
RISH525	[50.0]	[18.6]	[15.7]	M14 x 1.5	[18.0]	[10.0]	[5.0]	[11.98]	[.01]	M8 x 1.25	[4.0]	[58.0]	[5.0]	[147.8]	M5 x 0.8
RISH132	2.520	.888	.854	M20 x 1.5	.787	.650	.197	.4715	.0004	5/16-24	.236	2.598	.315	7.014	1/8-27 NPT
RISH532	[64.0]	[22.6]	[21.7]	M20 x 1.5	[20.0]	[16.5]	[5.0]	[11.98]	[.01]	M8 x 1.25	[6.0]	[66.0]	[8.0]	[178.2]	1/8-28 BSPP
RISH250	3.150	1.270	1.142	M25 x 1.5	1.535	.650	.419	.7077	.0004	1/2-20	.666	3.701	.315	9.094	1/8-27 NPT
RISH650	[80.0]	[32.2]	[29.0]	M25 x 1.5	[39.0]	[16.5]	[10.6]	[17.98]	[.01]	M12 x 1.75	[16.9]	[94.0]	[8.0]	[231.0]	1/8-28 BSPP

UNIT SIZE	LETTER DIMENSION						
	Ø PP	Ø KK	Ø LL	MM	NN	RR	SS
RISH125	2.244	.677	1.063	.236	.472	—	—
RISH525	[57.0]	[17.2]	[27.0]	[6.0]	[12.0]	—	—
RISH132	2.677	.846	1.339	.276	.610	—	—
RISH532	[68.0]	[21.5]	[34.0]	[7.0]	[15.5]	[2.5]	[15.0]
RISH250	3.150	1.060	1.676	.354	.797	—	—
RISH650	[80.0]	[26.9]	[42.6]	[9.0]	[20.2]	[2.5]	[15.0]

**NOTES:**

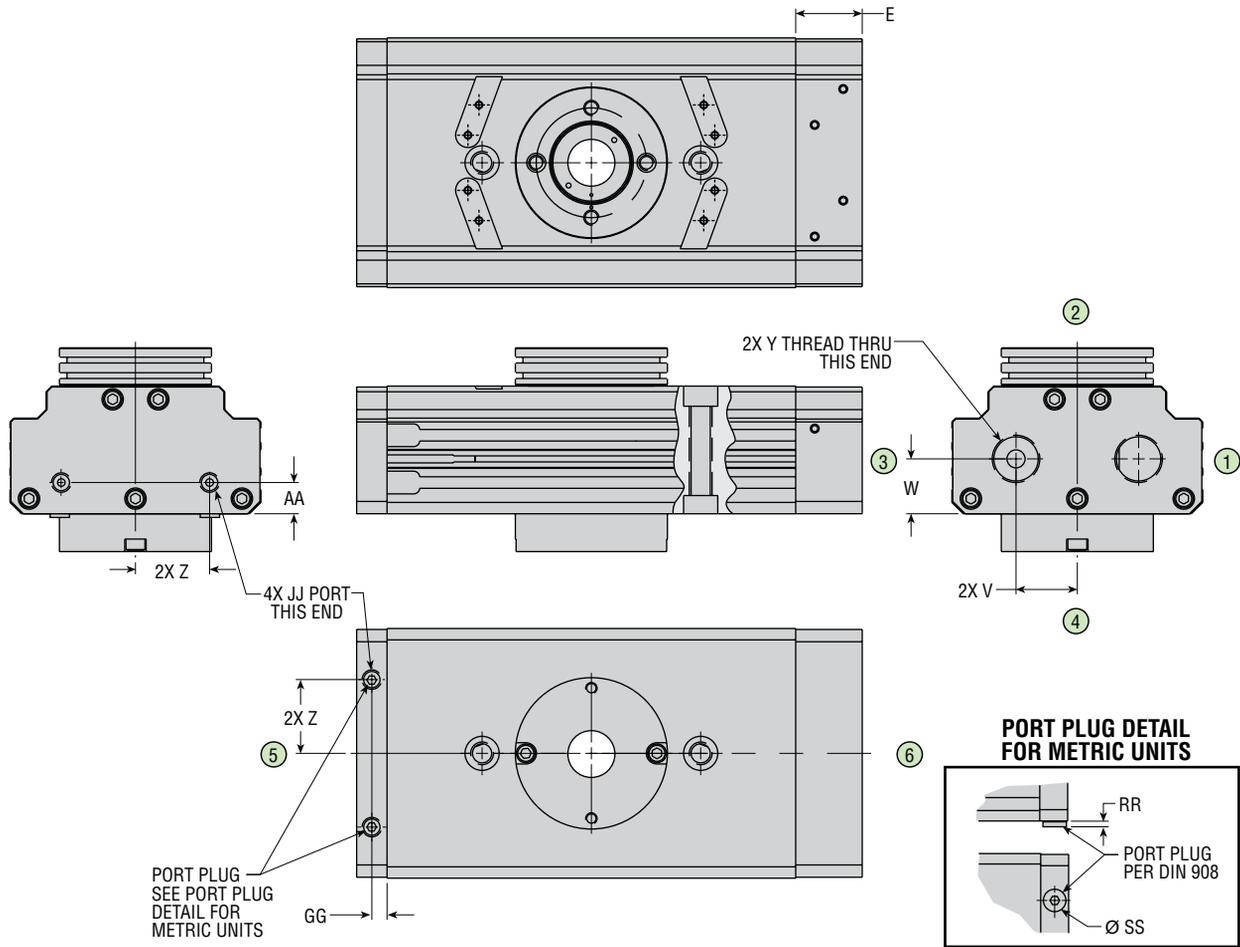
- 1) POSITIONS INDICATED BY CIRCLED NUMBERS.
- 2) PINION AND HUB SHOWN AT MID ROTATION.
- 3) METRIC INFORMATION SHOWN IN [ ].



**CAD & Sizing Assistance**

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# DIMENSIONS: SERIES RIDH ROTARY ACTUATOR DOUBLE RACK



UNIT SIZE	LETTER DIMENSION									
	E	V	W	Y	Z	AA	GG	JJ	RR	SS
RIDH125	1.280	.731	.618	M14 x 1.5	.709	.394	.197	10-32	—	—
RIDH525	[32.5]	[18.6]	[15.7]	M14 x 1.5	[18.0]	[10.0]	[5.0]	M5 x 0.8	—	—
RIDH132	1.378	.888	.854	M20 x 1.5	.787	.650	.315	1/8-27 NPT	—	—
RIDH532	[35.0]	[22.6]	[21.7]	M20 x 1.5	[20.0]	[16.5]	[8.0]	1/8-28 BSPP	[2.5]	[15.0]
RIDH150	1.378	1.270	1.142	M25 x 1.5	1.535	.650	.315	1/8-27 NPT	—	—
RIDH550	[35.0]	[32.2]	[29.0]	M25 x 1.5	[39.0]	[16.5]	[8.0]	1/8-28 BSPP	[2.5]	[15.0]

**NOTES:**

- 1) POSITIONS INDICATED BY CIRCLED NUMBERS.
- 2) PINION AND HUB SHOWN AT MID ROTATION.
- 3) FOR DIMENSIONS NOT GIVEN SEE RISH SINGLE RACK DIMENSION SEE PREVIOUS PAGE.
- 4) METRIC INFORMATION SHOWN IN [ ].



## CAD & Sizing Assistance

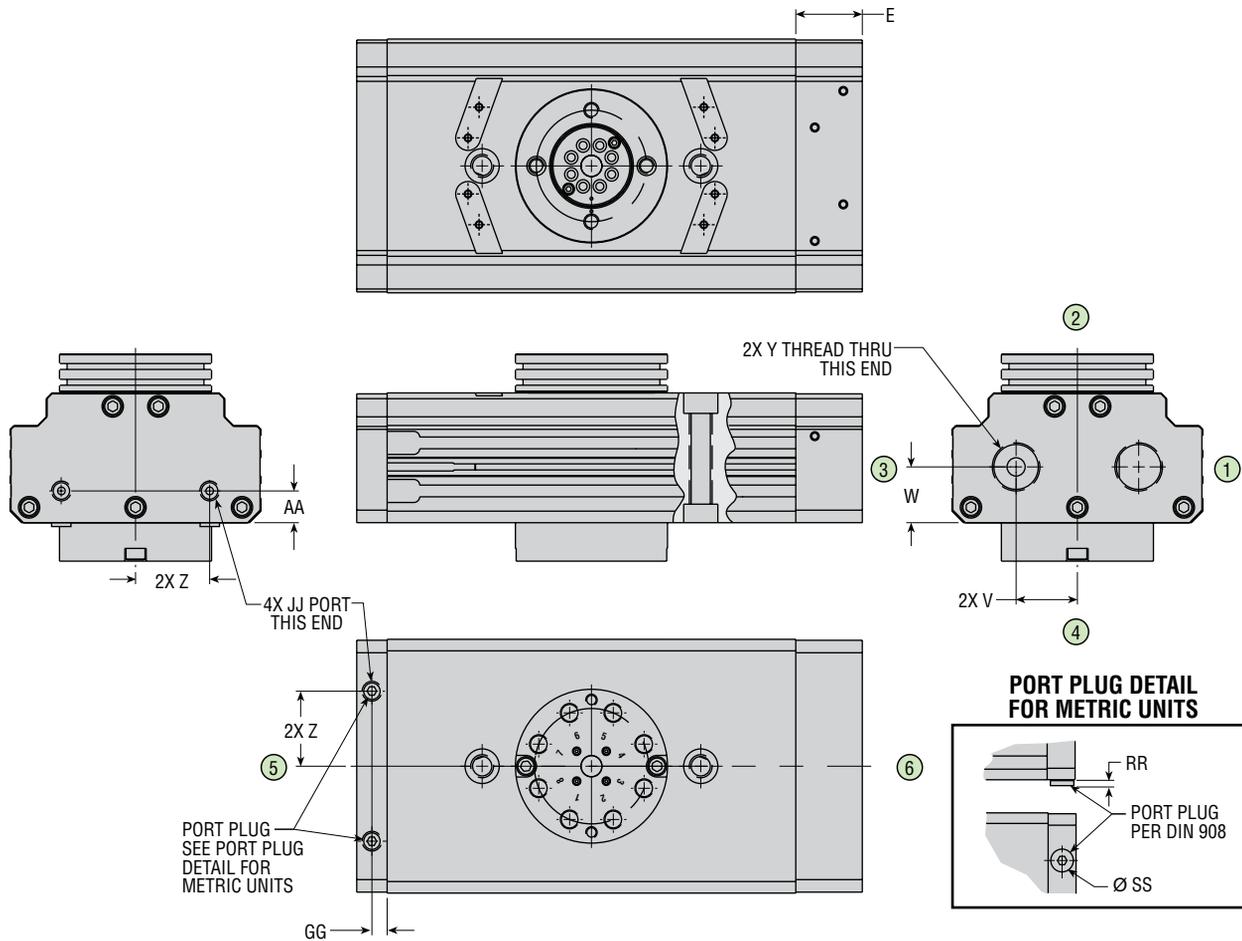
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# DIMENSIONS: SERIES RID ROTARY ACTUATOR DOUBLE RACK



UNIT SIZE	LETTER DIMENSION									
	E	V	W	Y	Z	AA	GG	JJ	RR	SS
RID125	1.280	.731	.618	M14 x 1.5	.709	.394	.197	10-32	—	—
RID525	[32.5]	[18.6]	[15.7]	M14 x 1.5	[18.0]	[10.0]	[5.0]	M5 x 0.8	—	—
RID132	1.378	.888	.854	M20 x 1.5	.787	.650	.315	1/8-27 NPT	—	—
RID532	[35.0]	[22.6]	[21.7]	M20 x 1.5	[20.0]	[16.5]	[8.0]	1/8-28 BSPP	[2.5]	[15.0]
RID150	1.378	1.270	1.142	M25 x 1.5	1.535	.650	.315	1/8-27 NPT	—	—
RID550	[35.0]	[32.2]	[29.0]	M25 x 1.5	[39.0]	[16.5]	[8.0]	1/8-28 BSPP	[2.5]	[15.0]

## NOTES:

- 1) POSITIONS INDICATED BY CIRCLED NUMBERS.
- 2) PINION AND HUB SHOWN AT MID ROTATION.
- 3) FOR DIMENSIONS NOT GIVEN SEE RIS SINGLE RACK DIMENSION SEE PREVIOUS PAGE.
- 4) METRIC INFORMATION SHOWN IN [ ].



## CAD & Sizing Assistance

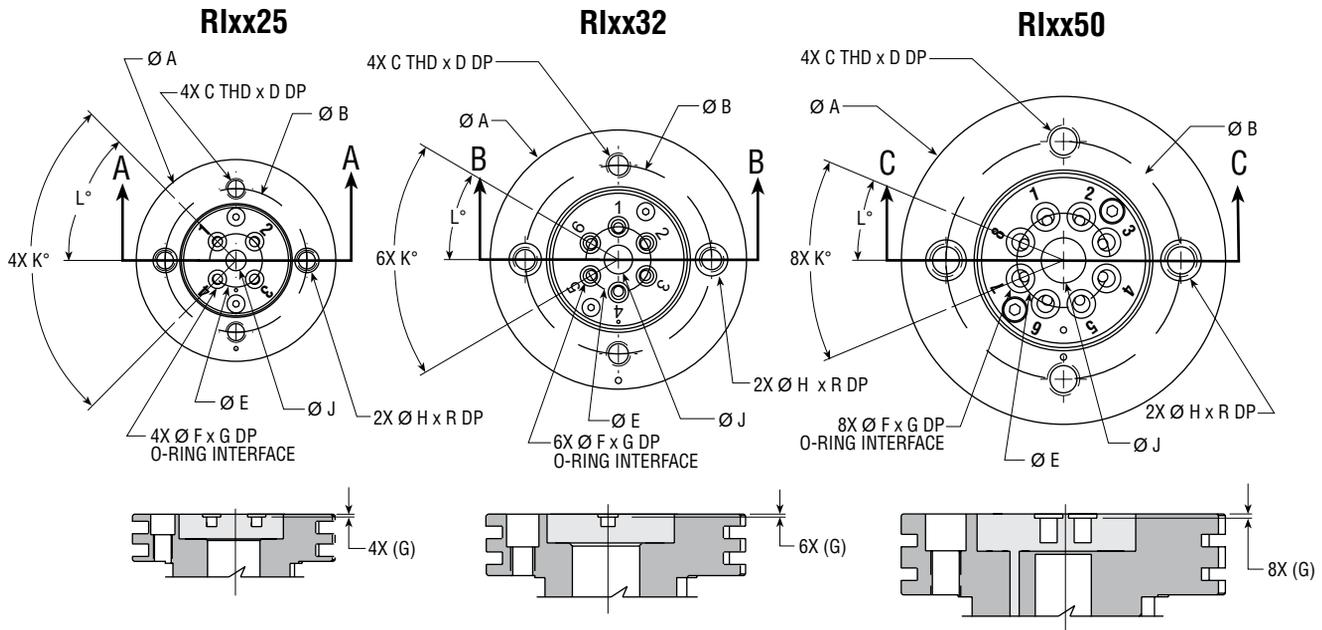
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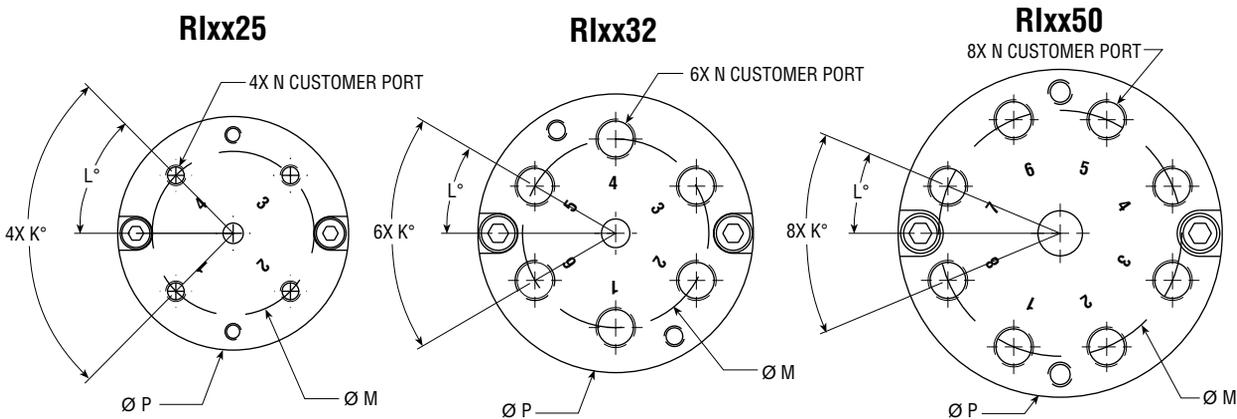
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# DIMENSIONS: SERIES RI ROTARY ACTUATOR OUTPUT HUB

## PRESSURE OUTPUT HUB O-RING INTERFACE



## PRESSURE INPUT PORT INTERFACE



UNIT SIZE	LETTER DIMENSION																
	A	A TOL ±	B	C	D	E	F	G	H	H TOL ±	J	K°	L°	M	N	P	R
RIS125 & RID125	1.969	.002	1.378	10-32	.472	.512	.177	.026	.2355	.0003	.197	90.0	45.0	1.575	10-32	2.244	.197
RIS525 & RID525	[50]	[.05]	[35.0]	M5 x 0.8	[12.0]	[13.0]	[4.5]	[.7]	[5.98]	[.008]	[5.0]	90.0	45.0	[40.0]	M5 x 0.8	[57.0]	[5.0]
RIS132 & RID132	2.520	.002	1.811	1/4-28	.610	.630	.197	.026	.3147	.0003	.276	60.0	30.0	1.811	1/8-27 NPT	2.677	.315
RIS532 & RID532	[64.0]	[.05]	[46.0]	M6 x 1.0	[15.5]	[16.0]	[5.0]	[.7]	[7.99]	[.008]	[7.0]	60.0	30.0	[46.0]	1/8-28 BSPP	[68.0]	[8.0]
RIS250 & RID150	3.150	.002	2.283	5/16-24	.797	.906	.276	.039	.3940	.0003	.433	45.0	22.5	2.362	1/8-27 NPT	3.150	.354
RIS650 & RID550	[80.0]	[.05]	[58.0]	M8 x 1.25	[20.2]	[23.0]	[7.0]	[1.0]	[10.01]	[.008]	[11.0]	45.0	22.5	[60.0]	1/8-28 BSPP	[80.0]	[9.0]

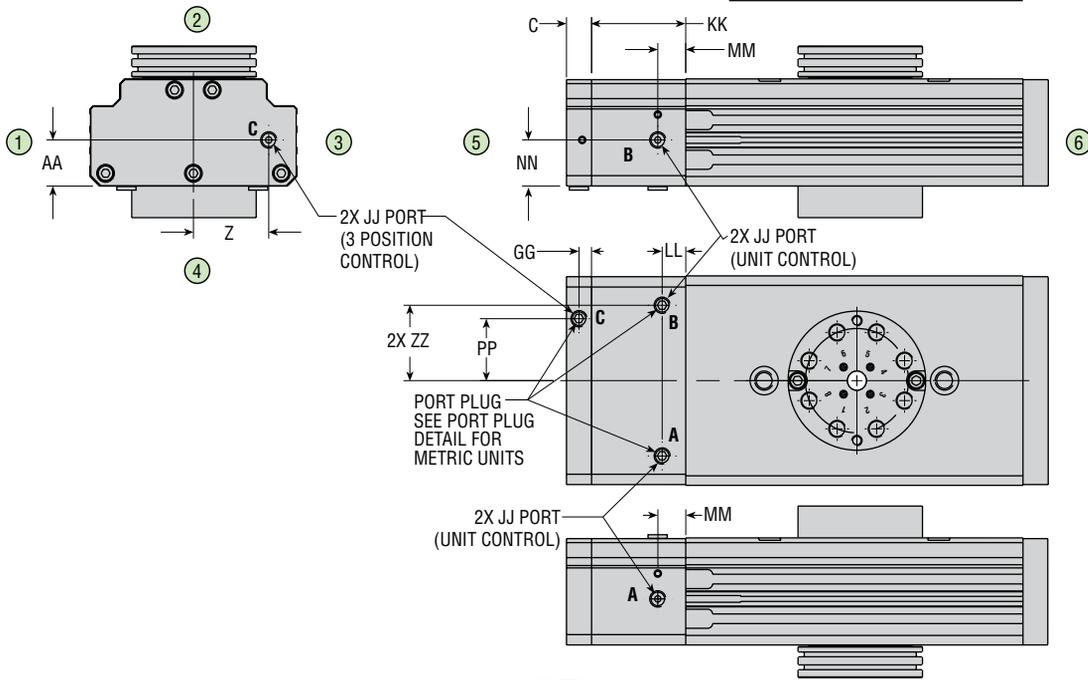
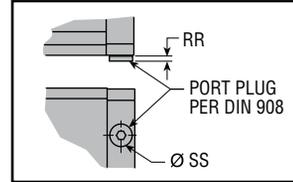
**NOTES:**  
 1) PINION AND HUB SHOWN AT MID ROTATION.  
 2) METRIC INFORMATION SHOWN IN [ ].

# DIMENSIONS: 3-POSITION RI ROTARY ACTUATOR

## DOUBLE RACK SIZE 25, 32, & 50

FOR DIMENSIONS NOT SHOWN HERE:  
SERIES RIxH SEE PAGES 5-34 AND 5-35  
SERIES RIx SEE PAGES 5-36 AND 5-37

### PORT PLUG DETAIL FOR METRIC UNITS



#### NOTES:

- 1) PORT POSITIONS INDICATED BY CIRCLED NUMBERS.
- 2) PINION AND HUB SHOWN AT MID ROTATION.
- 3) PORTS "A" AND "B" MUST BE PRESSURIZED IMMEDIATELY BEFORE MOVING TO OR FROM THE MID-POSITION TO ALLOW CORRECT FLOW CONTROL AND FUNCTION.

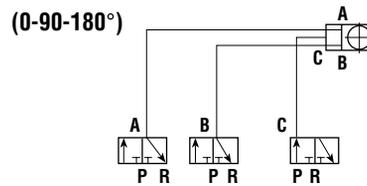
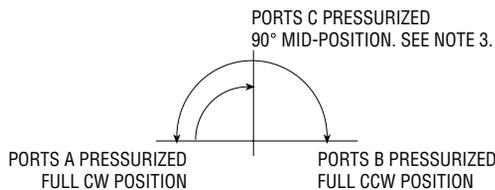
UNIT SIZE	LETTER DIMENSION								
	AA	JJ	KK	LL	MM	NN	RR	SS	ZZ
3RID125	.618	10-32	1.496	.354	.354	.618	—	—	.807
3RID525	[15.7]	M5 x 0.8	[38.0]	[9.0]	[9.0]	[15.7]	—	—	[20.5]
3RID132	.854	1/8-27 NPT	1.965	.492	.571	.854	—	—	1.161
3RID532	[21.7]	1/8-28 BSPP	[49.9]	[12.5]	[14.5]	[21.7]	[2.5]	[15.0]	[29.5]
3RID150	1.142	1/8-27 NPT	2.362	.591	.701	1.142	—	—	1.870
3RID550	[29.0]	1/8-28 BSPP	[60.0]	[15.0]	[17.8]	[29.0]	[2.5]	[15.0]	[47.5]

METRIC INFORMATION SHOWN IN [ ].

### DOUBLE RACK DIMENSIONS

UNIT SIZE	LETTER DIMENSION			
	C	Z	GG	PP
3RID125	.472	.709	.197	.295
3RID525	[12.0]	[18.0]	[5.0]	[7.5]
3RID132	.630	1.496	.315	.472
3RID532	[16.0]	[38.0]	[8.0]	[12.0]
3RID150	.630	1.890	.315	1.535
3RID550	[16.0]	[48.0]	[8.0]	[39.0]

METRIC INFORMATION SHOWN IN [ ].



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# OPTIONS: SERIES RI ROTARY ACTUATOR

**AB** ANGLE ADJUSTMENTS WITH SHOCK PAD INSTALLED BOTH ENDS

**AC** ANGLE ADJUSTMENTS WITH SHOCK PAD INSTALLED COUNTERCLOCKWISE 90°

**AW** ANGLE ADJUSTMENTS WITH SHOCK PAD INSTALLED CLOCKWISE 90°

Angle adjustment options and/or shock absorber options must be ordered on each unit. Both provide mechanical stops and angle adjustment of -90° from both ends of rotation.

The standard rotation for Series RI is 180°. The ability to adjust over a wide range eliminates the need to order special units for specific angles of rotation.

The angle adjustment screw has a shock pad as standard providing quiet actuator operation in less demanding applications. In more demanding applications, the optional shock absorbers should be specified to handle the higher energy dissipation.

**NB** SHOCK ABSORBER INSTALLED BOTH DIRECTIONS

**NC** SHOCK ABSORBER INSTALLED COUNTERCLOCKWISE DIRECTION

**NW** SHOCK ABSORBER INSTALLED CLOCKWISE DIRECTION

Either angle adjustment options and/or shock absorber options must be ordered on each unit. Both provide mechanical stops and angle adjustment of -90° from both ends of rotation.

The shock absorber options provide maximum deceleration control and rotational stopping ability. The -NB, -NC, and -NW options provide the Rotary Actuator with the shock absorber factory installed in the Series RI Rotary Actuator. See PHD Sizing Catalog for details on unit stopping capacity with installed shock absorbers. Reference the Shock Absorber Specifications Chart for nominal effective angle of rotation in each direction.



Options may affect unit length. See dimensional pages and option information details.



Refer to this product's online catalog in the product section for complete information including related dimensions and additional specifications. See link at bottom of this page.

**PB** ROTATION SPEED CONTROL BOTH DIRECTIONS

**PC** ROTATION SPEED CONTROL COUNTERCLOCKWISE DIRECTION

**PW** ROTATION SPEED CONTROL CLOCKWISE DIRECTION

The PHD Series RI offers optional external compact flow control fittings for adjusting output hub rotation speed. The speed of the hub is controlled by regulating the cylinder exhaust. The control fittings are unidirectional flow control valves where intake air flows freely through the flow control and exhaust is metered out through an adjustment screw. Intake capacity is slightly greater than the full open exhaust capacity, enabling maximum variation of hub rotation speed.

The PHD Series RI flow control fittings are mounted directly to the caps and provide an integral tube fitting connection. They also swivel 360° around the ports, easing tube routing installation. Rotational velocities are adjusted and maintained by the captivated fine adjustment screw with a locking nut to ensure precise velocity control and repeatability in output hub rotation speed.

**NOTE:** Flow control fitting is effective between 15 to 100 psi [1.0 to 7.0 bar] and from 5° to 160°F [-15° to 71.1°C].

**M** MAGNETS FOR PHD 6790 & JC1 SWITCHES

This option equips the rotary actuator with magnets on the rack for use with PHD Series 6790 and JC1 Switches. These switches mount easily to the actuator using the switch slots in the sides of the body.

PHD Series 6790 and JC1 Switches are designed specifically to provide an input signal to various types of programmable controllers or logic systems. See Switches and Sensors section for complete switch specifications.

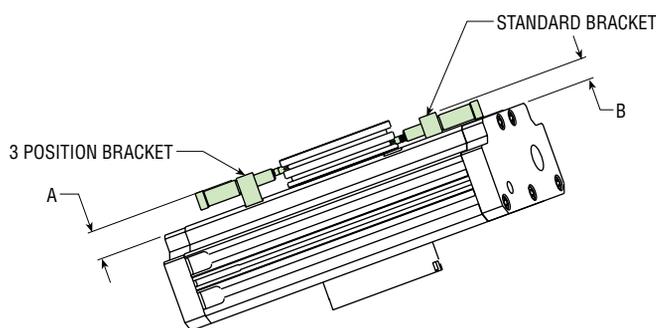
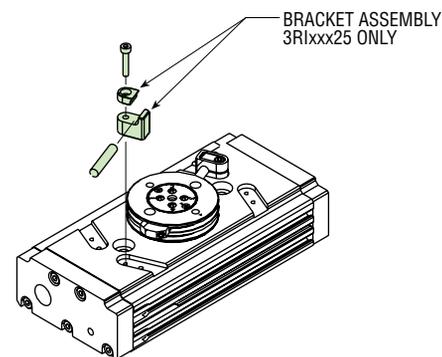
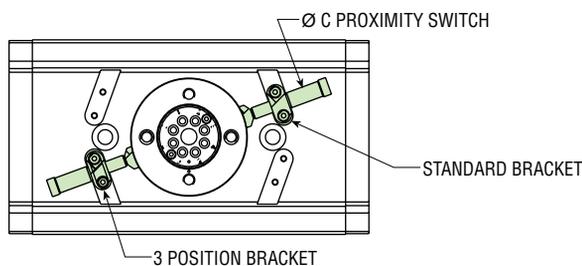
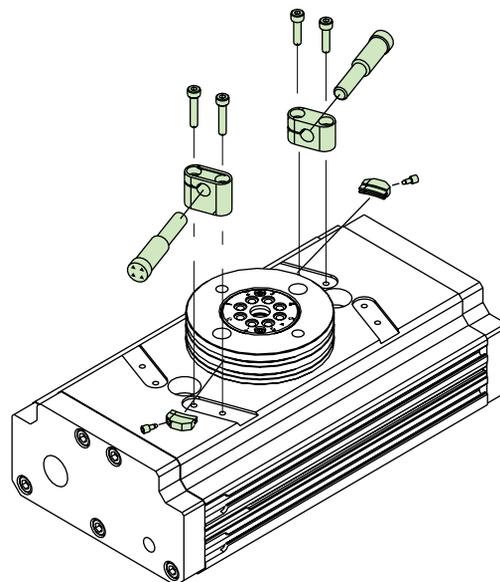
# ACCESSORIES: SERIES RI ROTARY ACTUATOR

## EXTERNAL PROXIMITY SWITCHES

This accessory provides for the external mounting of round metal sensing proximity switches. One switch mounting kit is required per switch and includes the plastic bracket with the required mounting hardware. A steel switch target is also included in each external proximity switch mounting kit.

The Series RI body accepts up to four external proximity switches. The typical application requires two switch mounting kits, however, if the three position model has been ordered, the three position switch bracket kit must also be ordered. This kit utilizes the top target groove in the hub and therefore positions the proximity switch higher from the body.

Proximity switches are supplied by the customer, see chart below for switch diameter specifications, dimension C.



VIEW AA

UNIT SIZE	LETTER DIMENSION		
	A	B	C
RIxx125	.456	.413	.197
RIxx525	[11.6]	[10.5]	[5.0]
RIxx132	.571	.452	.197
RIxx532	[14.5]	[11.5]	[5.0]
RIxx150	.748	.571	.315
RIxx550	[19.0]	[14.5]	[8.0]

METRIC INFORMATION SHOWN IN [ ].

UNIT SIZE	STANDARD PROXIMITY KIT NO.
RIxxx25	69181
RIxxx32	69182
RIxxx50	69184

STANDARD PROXIMITY KITS INCLUDE:  
 1 TARGET ASSEMBLY  
 - 1 CAM PIN  
 - 1 TARGET  
 1 BRACKET OR BRACKET ASSEMBLY WITH REQUIRED MOUNTING HARDWARE

UNIT SIZE	3 POSITION PROXIMITY KIT NO.
3 RIDxx25	70207
3 RIDxx32	70208
3 RIDxx50	70209

3 POSITION PROXIMITY KITS INCLUDE:  
 1 TARGET ASSEMBLY  
 - 1 CAM PIN  
 - 1 TARGET  
 1 BRACKET OR BRACKET ASSEMBLY WITH REQUIRED MOUNTING HARDWARE

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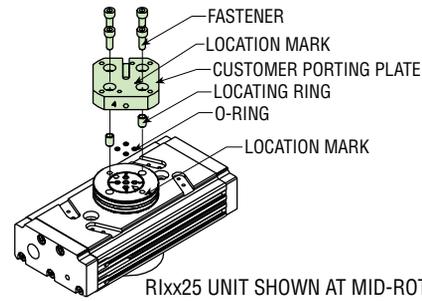
# ACCESSORIES: SERIES RI ROTARY ACTUATOR

## PORTING PLATE

This accessory provides a convenient conversion from the manifold output hub interface to a threaded port interface. It allows the use of the manifold hub feature of the Series RI Rotary Actuator, without the need to drill communication holes through the attached tooling. It also allows the plumbing of secondary actuators using the fittings and tubing of your choice.

The Porting Plate is made from 6061-T6 aluminum and is machined on all sides ensuring flat and parallel mounting surfaces. Four drilled and tapped holes are provided to attach your tooling. Location accuracy is maintained through the use of locating rings and dowel pin holes.

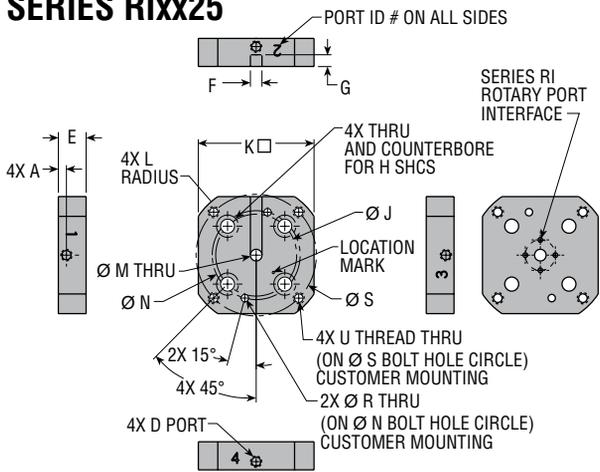
The Porting Plate also features numbered ports corresponding to the rotary actuator input ports. A location mark keeps proper port alignment simple during assembly.



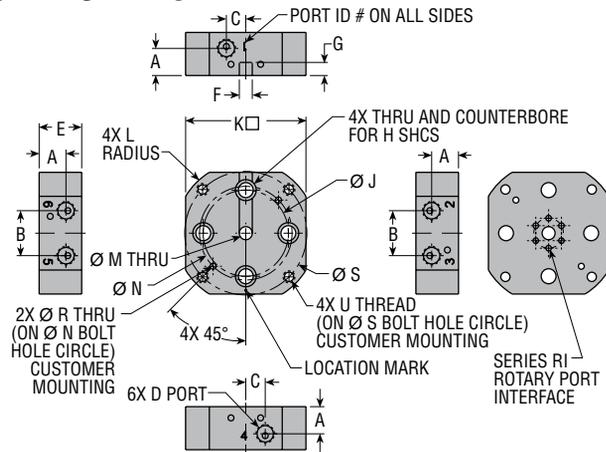
UNIT	KIT NUMBER	SCREW SIZE (SHCS)	REQUIRED SCREW TORQUE	
			in-lb	Nm
RIS125 & RID125	71972	10-32 x .5	75	8.5
RIS525 & RID525	71997	M5 x 0.8 x 12	75	8.5
RIS132 & RID132	71973	1/4-28 x .75	150	16.9
RIS532 & RID532	71998	M6 x 1.0 x 22	150	16.9
RIS250 & RID150	71975	5/16-24 x .875	250	28.2
RIS650 & RID550	72000	M8 x 1.25 x 25	250	28.2

KITS INCLUDE: 1 PORTING PLATE, 2 LOCATING RINGS, 4 FASTENERS, REQUIRED O-RINGS

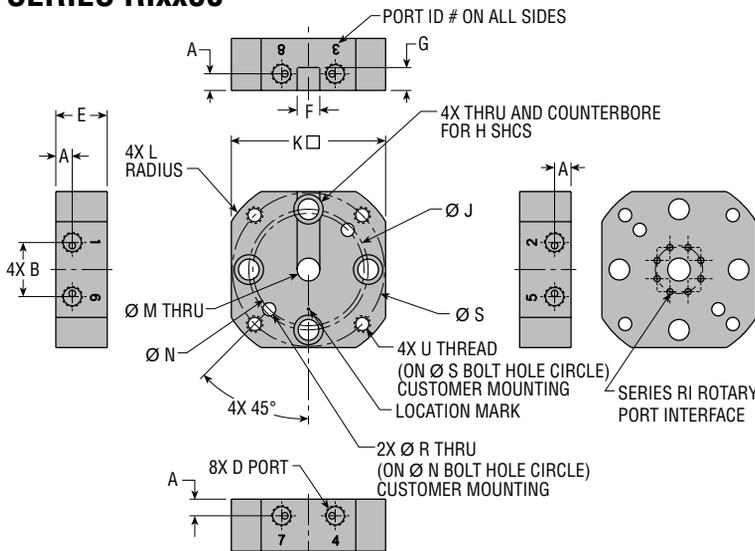
## SERIES R1xx25



## SERIES R1xx32



## SERIES R1xx50



UNIT SIZE	LETTER DIMENSION					
	A	B	C	D	E	F
RIS125 & RID125	.138	—	—	10-32	.472	.197
RIS525 & RID525	[3.5]	—	—	[M5 x 0.8]	[12.0]	[5.0]
RIS132 & RID132	.571	.945	.413	1/8 NPT	.906	.276
RIS532 & RID532	[14.5]	[24.0]	[10.5]	[1/8 BSPP]	[23.0]	[7.0]
RIS250 & RID150	.315	1.024	—	1/8 NPT	.984	.433
RIS650 & RID550	[8.0]	[26.0]	—	[1/8 BSPP]	[25.0]	[11.0]

UNIT SIZE	LETTER DIMENSION					
	G	H	J	K	L	M
RIS125 & RID125	.197	10-32	1.378	1.969	1.181	.197
RIS525 & RID525	[5.0]	[M5 x 0.8]	[35.0]	[50.0]	[30.0]	[5.0]
RIS132 & RID132	.276	1/4-28	1.811	2.559	1.496	.276
RIS532 & RID532	[7.0]	[M6 x 1.0]	[46.0]	[65.0]	[38.0]	[7.0]
RIS250 & RID150	.433	5/16-24	2.283	2.953	1.732	.433
RIS650 & RID550	[11.0]	[M8 x 1.25]	[58.0]	[75.0]	[44.0]	[11.0]

UNIT SIZE	LETTER DIMENSION			
	N	R	S	U
RIS125 & RID125	1.496	.1252	2.047	10-24
RIS525 & RID525	[38.0]	[3.005]	[52.0]	[M5 x 0.8]
RIS132 & RID132	1.969	.1252	2.598	1/4-20
RIS532 & RID532	[50.0]	[3.005]	[66.0]	[M6 x 1.0]
RIS250 & RID150	2.126	.2503	2.913	5/16-18
RIS650 & RID550	[54.0]	[6.007]	[74.0]	[M8 x 1.25]

METRIC INFORMATION SHOWN IN [ ].

# ACCESSORIES: SERIES RI ROTARY ACTUATOR

## MANIFOLD O-RING SEAL KIT

This accessory provides the necessary o-rings to fit the manifold hub of the Series RI Rotary Actuator. This allows the rotary actuator to easily interface to customer supplied tooling. The o-rings are 70 durometer, Buna-N rubber.

## MANIFOLD O-RING SEAL KIT SPECIFICATIONS

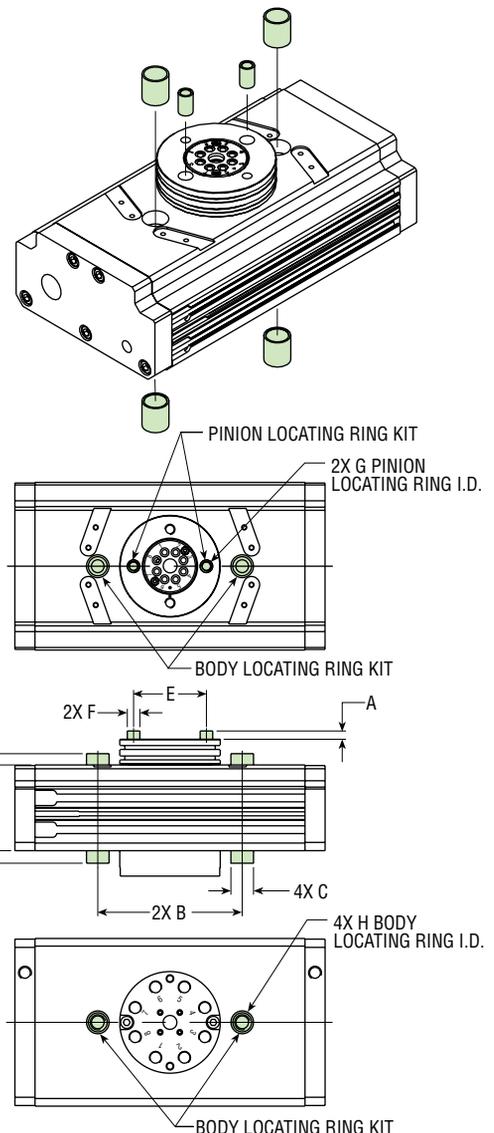
UNIT SIZE	O-RING MANIFOLD KIT NO.	NUMBER OF O-RINGS IN KIT	O-RING SIZE
RIxx25	69202	10	2 mm I.D. x 1 mm C.S.
RIxx32	69203	10	3 mm I.D. x 1 mm C.S.
RIxx50	69205	10	4 mm I.D. x 1.5 mm C.S.

## LOCATION RINGS

These accessories provide accurate body and hub positioning. The location sleeve fits into either the top or bottom H7 tolerance counter bore holes on the PHD Series RI body or hub. They provide dowel pin accuracy without requiring the additional space for a dowel. Location rings allow either through bolt or tapped body mounting to be used. The mounting bolt is placed through the location ring, simultaneously securing and locating the mating parts.

The body locating ring kit consist of two hardened and ground steel sleeves sized to press into the H7 tolerance counter bored holes on either the top or bottom of the Series RIS body.

The hub locating ring kit consists of two hardened and ground steel sleeves, sized to press into the hub counter bores located on the top of the Series RI hub.



UNIT SIZE	LETTER DIMENSION									
	A	B	Ø C	C TOL.	D	E	Ø F	F TOL.	Ø G	Ø H
RIxx125	.118	2.953	.472	+0.002/-0.005	.236	1.378	.236	+0.001/-0.007	.197	.354
RIxx525	[3.0]	[75.0]	[12.0]	+[.005]/- [.013]	[6.0]	[35.0]	[6.0]	+[.003]/- [.018]	[5.0]	[9.0]
RIxx132	.079	3.937	.472	+0.002/-0.005	.236	1.811	.315	+0.001/-0.007	.252	.354
RIxx532	[2.0]	[100.0]	[12.0]	+[.005]/- [.013]	[6.0]	[46.0]	[8.0]	+[.003]/- [.018]	[6.4]	[9.0]
RIxx150	.079	4.528	.709	-0.002/-0.006	.349	2.283	.394	+0.001/-0.007	.315	.591
RIxx550	[2.0]	[115.0]	[18.0]	- [.005]/- [.015]	[8.9]	[58.0]	[10.0]	+[.003]/- [.018]	[8.0]	[15.0]

METRIC INFORMATION SHOWN IN [ ].

**NOTE:** LOCATING RINGS ARE TO BE PRESSED INTO BODY AND PINION

UNIT SIZE	BODY LOCATING RING KIT NO.
RIxx25	69210
RIxx32	69210
RIxx50	69212

BODY LOCATING RING KITS INCLUDE 2 LOCATING RINGS

UNIT SIZE	PINION LOCATING RING KIT NO.
RIxx25	69216
RIxx32	69217
RIxx50	69219

PINION LOCATING RING KITS INCLUDE 2 LOCATING RINGS

All dimensions are reference only unless specifically tolerated.

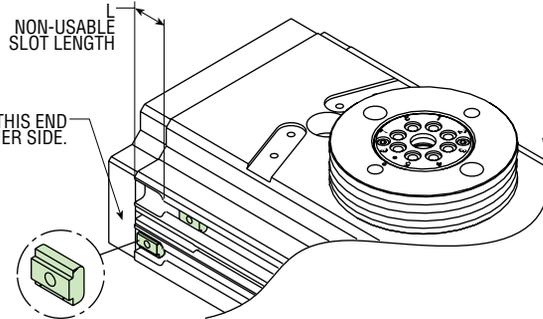
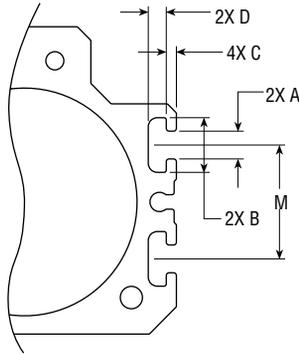
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# ACCESSORIES: SERIES RI ROTARY ACTUATOR

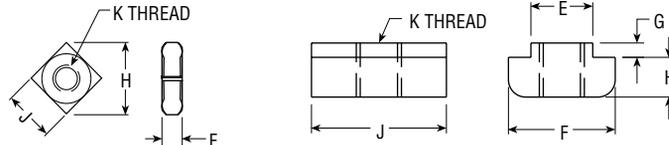
## T-NUTS

T-nuts allow the rotary actuator to be mounted from the side of the unit. T-nuts can be positioned at any point along the t-slot grooves which are 90° to the pinion hub.

### SLOT DIMENSIONS TYPICAL BOTH SIDES (POSITION 1 & 3)



### NUT DIMENSIONS



Size 25

Sizes 32 & 50

UNIT SIZE	SLOT DIMENSION				NUT DIMENSIONS							NUT PART NO.	
	A	B	C	D	E	F	G	H	J	K	L		M
Rlxx125	.177	.315	.079	.138	—	.125	—	.389	.275	M4 x 0.7	.472	.630	3204-051-01
Rlxx525	[4.5]	[8.0]	[2.0]	[3.5]	—	[3.2]	—	[9.8]	[7]		[12.0]	[16.0]	
Rlxx132	.240	.472	.088	.157	.216	.374	.050	.137	.472	M4 x 0.7	.669	.787	63759-xx
Rlxx532	[6.1]	[12.0]	[2.2]	[4.0]	[5.5]	[9.5]	[1.3]	[3.5]	[12.0]		[17.0]	[20.0]	
Rlxx150	.240	.472	.088	.157	.216	.374	.050	.137	.472	M4 x 0.7	.669	.984	63759-xx
Rlxx550	[6.1]	[12.0]	[2.2]	[4.0]	[5.5]	[9.5]	[1.3]	[3.5]	[12.0]		[17.0]	[25.0]	

METRIC INFORMATION SHOWN IN [ ].

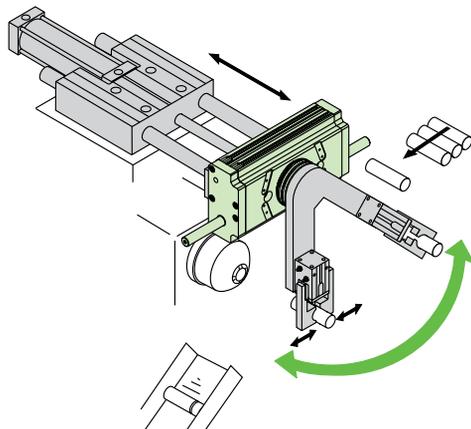
-xx = -00 INDICATES STANDARD PLATING

-03 INDICATES -Z1 PLATING

## APPLICATION EXAMPLES

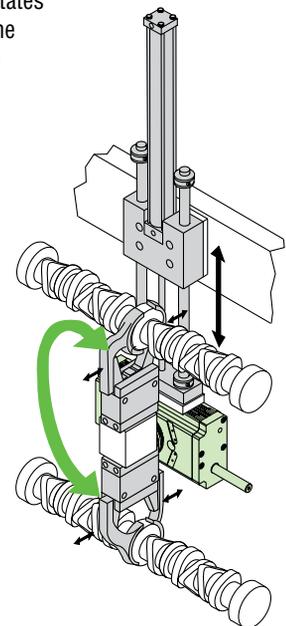
### LATHE LOADER

In this application, a combination of a slide, two grippers, and a rotary actuator load and unload parts from a lathe. One Series 190 Gripper grasps a blank part on a holding rack while another Series 190 Gripper grasps a finished part in the lathe. A Series SK Slide extends out, and the finished part is removed from the lathe while the blank part is removed from the holding rack. A Series RI Rotary Actuator then rotates clockwise. The slide retracts, the blank part is loaded into the lathe, and the finished part is released into a holding bin. The Series RI Rotary Actuator is beneficial for this application due to its high torque output and the capability of routing airlines and switch cables through the pinion. This feature eliminates any external airlines, which could wear or sever causing catastrophic damage.



### CAM SHAFT FINISHING PROCESS

In this application, two grippers are combined with a Series RI Rotary Actuator to load and unload cam shafts into a grinding machine for finishing. First a Series SK Slide, mounted to a gantry, will provide the reaching motion as a Series 5300 Gripper picks up the unfinished cam shaft. The Series RI Rotary Actuator rotates the grasped cam to the top position. The gantry then cycles back to the grinding machine, the second gripper is extended down into the machine to pick up the finished cam shaft, the slide retracts, the rotary actuator rotates the grippers and shafts, and the unfinished cam is loaded into the machine. Finally the finished cam shaft is moved and placed in a completion tray on a conveyor. The Series RI Rotary Actuator is ideal for this application due to its high torque output and the capability of routing airlines and switch cables through the pinion.



All dimensions are reference only unless specifically tolerated.

# OPTIONS: SERIES RI ROTARY ACTUATOR



## ANGLE ADJUSTMENTS WITH SHOCK PAD INSTALLED BOTH ENDS



## ANGLE ADJUSTMENTS WITH SHOCK PAD INSTALLED COUNTERCLOCKWISE 90°



## ANGLE ADJUSTMENTS WITH SHOCK PAD INSTALLED CLOCKWISE 90°

Angle adjustment options and/or shock absorber options must be ordered on each unit. Both provide mechanical stops and angle adjustment of -90° from both ends of rotation.

The standard rotation for Series RI is 180°. The ability to adjust over a wide range eliminates the need to order special units for specific angles of rotation.

The angle adjustment screw has a shock pad as standard providing quiet actuator operation in less demanding applications. In more demanding applications, the optional shock absorbers should be specified to handle the higher energy dissipation.

UNIT SIZE	LETTER DIMENSION			
	A	B	C	D
RISx125	.200	2.578	.551	.770
RISx525	[5.1]	[65.5]	[14.0]	[19.6]
RISx132	.240	3.392	.787	1.100
RISx532	[6.1]	[86.2]	[20.0]	[27.9]
RISx250	.310	3.373	.984	1.360
RISx650	[7.9]	[85.7]	[25.0]	[34.5]

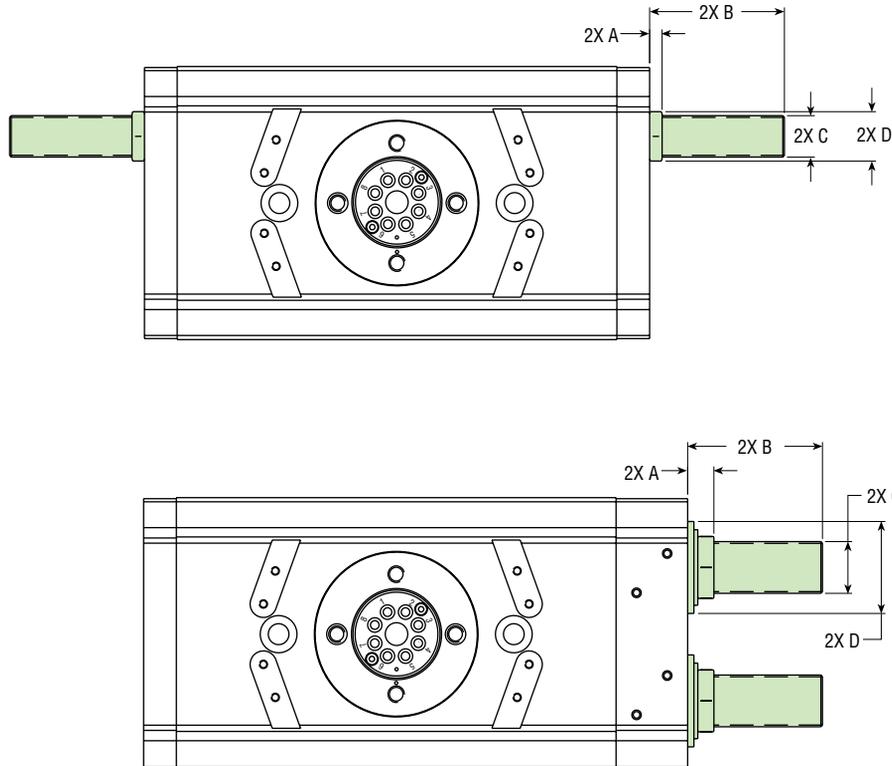
METRIC INFORMATION SHOWN IN [ ].

UNIT SIZE	LETTER DIMENSION			
	A	B	C	D
RIDx125	.369	1.770	.551	1.094
RIDx525	[9.4]	[45.0]	[14.0]	[27.8]
RIDx132	.424	2.644	.787	1.375
RIDx532	[10.8]	[67.2]	[20.0]	[34.9]
RIDx150	.505	2.625	.984	1.750
RIDx550	[12.8]	[66.7]	[25.0]	[44.5]

METRIC INFORMATION SHOWN IN [ ].

UNIT SIZE	ANGLE ADJUSTMENT KIT NO. *
RISxx25	69223-01
RIDxx25	69230-01
RISxx32	69226-01
RIDxx32	69231-01
RISxx50	75424-01
RIDxx50	69233-01

\*ANGLE ADJUSTMENT KITS INCLUDE:  
 FOR RISxx UNITS - 1 ANGLE ADJUSTMENT SCREW AND 1 NUT  
 FOR RIDxx UNITS - 1 ANGLE ADJUSTMENT SCREW, 1 NUT,  
 1 THREAD SEAL AND 1 SEAL WASHER  
 1 KIT REQUIRED PER END OF ADJUSTMENT DESIRED.



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# OPTIONS: SERIES RI ROTARY ACTUATOR



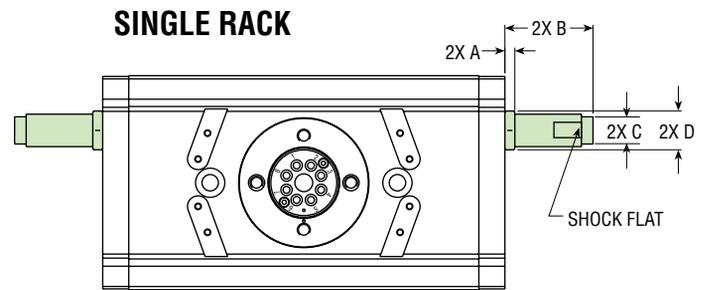
**SHOCK ABSORBER INSTALLED BOTH DIRECTIONS**



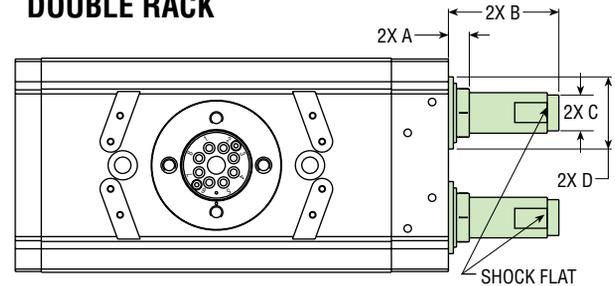
**SHOCK ABSORBER INSTALLED COUNTERCLOCKWISE DIRECTION**



**SHOCK ABSORBER INSTALLED CLOCKWISE DIRECTION**



**SINGLE RACK**



UNIT	LETTER DIMENSION			
	A	B	C	D
RIS125	.200	2.847	.470	.770
RIS525	[5.1]	[72.3]	[11.9]	[19.6]
RIS132	.240	3.263	.660	1.100
RIS532	[6.1]	[82.9]	[16.8]	[27.9]
RIS250	.310	3.924	.870	1.360
RIS650	[7.9]	[99.7]	[22.1]	[34.5]

METRIC INFORMATION SHOWN IN [ ].

UNIT	LETTER DIMENSION			
	A	B	C	D
RID125	.369	2.039	.470	1.094
RID525	[9.4]	[51.8]	[11.9]	[27.8]
RID132	.424	2.515	.660	1.375
RID532	[10.8]	[63.9]	[16.8]	[34.9]
RID150	.505	3.176	.870	1.750
RID550	[12.8]	[80.7]	[22.1]	[44.5]

METRIC INFORMATION SHOWN IN [ ].

## SHOCK ABSORBER SPECIFICATIONS

UNIT SIZE	SHOCK ABSORBER KIT NO.	THREAD TYPE	STROKE		SHOCK ABSORBER WEIGHT		KINETIC ENERGY LOAD		SHOCK ABSORBER LENGTH		ACROSS SHOCK FLATS		SHOCK ABSORBER EFFECTIVE ANGLE
			mm	in	lb	kg	in-lb	Nm	in	mm	in	mm	
RISxx25	69146	M14 x 1.5	.42	10.7	.12	.05	150	17	4.00	101.6	.47	11.9	50
RIDxx25	69153	M14 x 1.5	.42	10.7	.12	.05	150	17	4.00	101.6	.47	11.9	50
RISxx32	69147	M20 x 1.5	.625	15.9	.28	.13	225	25	4.67	118.6	.69	17.5	60
RIDxx32	69154	M20 x 1.5	.625	15.9	.28	.13	360	40	4.67	118.6	.69	17.5	60
RISxx50	75423	M25 x 1.5	.91	23.1	.76	.34	600	68	5.51	140.0	.88	22.4	70
RIDxx50	69156	M25 x 1.5	.91	23.1	.76	.34	1200	136	5.51	140.0	.88	22.4	70

SHOCK ABSORBERS KITS INCLUDE:

FOR RISxx UNITS - 1 SHOCK AND 1 NUT

FOR RIDxx UNITS - 1 SHOCK, 1 NUT, 1 THREAD SEAL, AND 1 SEAL WASHER

1 KIT REQUIRED PER END OF ADJUSTMENT DESIRED

**NOTE:** The shock absorber doubles as the rotation adjustment. Shock absorbers or angle adjustment option **must** be installed in the rotary actuator prior to operating the unit. Operation of units without installed shocks or angle adjustment can damage the units and void any and all warranties. Only shock absorbers specified

by PHD should be used in Series RI Rotary Actuators. The use of any other shock absorbers will affect actuator performance and life expectancy.

**PHD recommends replacing shocks every 1,000,000 cycles to maintain peak actuator performance and life.**

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# OPTIONS: SERIES RI ROTARY ACTUATOR

**PB** ROTATION SPEED CONTROL BOTH DIRECTIONS

**PC** ROTATION SPEED CONTROL COUNTERCLOCKWISE DIRECTION

**PW** ROTATION SPEED CONTROL CLOCKWISE DIRECTION

The PHD Series RI offers optional external compact flow control fittings for adjusting output hub rotation speed. The speed of the hub is controlled by regulating the cylinder exhaust. The control fittings are unidirectional flow control valves where intake air flows freely through the flow control and exhaust is metered out through an adjustment screw. Intake capacity is slightly greater than the full open exhaust capacity, enabling maximum variation of hub rotation speed.

The PHD Series RI flow control fittings are mounted directly to the caps and provide an integral tube fitting connection. They also swivel 360° around the ports, easing tube routing installation. Rotational velocities are adjusted and maintained by the captivated fine adjustment screw with a locking nut to ensure precise velocity control and repeatability in output hub rotation speed.

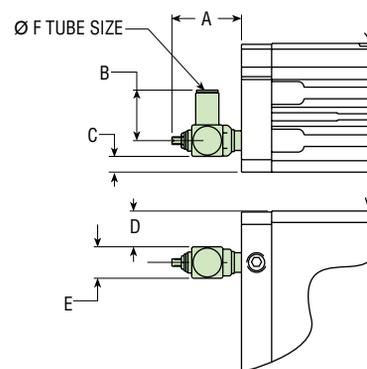
**NOTE:** Flow control fitting is effective between 15 to 100 psi [1.0 to 7.0 bar] and from 5° to 160°F [-15° to 71.1°C].

UNIT SIZE	LETTER DIMENSION					
	A	B	C	D	E	F
Rlxx125	.984	.827	.197	.630	.394	.156
Rlxx525	[25.0]	[21.0]	[5.0]	[16.0]	[10.0]	[4.0]
Rlxx132	1.614	1.043	.069	.817	.650	.250
Rlxx532	[41.0]	[26.5]	[1.8]	[20.8]	[16.5]	[6.4]
Rlxx150	1.693	1.043	.069	.743	.650	.250
Rlxx550	[43.0]	[26.5]	[1.8]	[18.9]	[16.5]	[6.4]

METRIC INFORMATION SHOWN IN [ ].

UNIT SIZE	ROTATION SPEED CONTROL KIT NO.
Rlxx125	70695-01
Rlxx525	70696-01
Rlxx132	70695-03
Rlxx532	70696-03
Rlxx150	70695-03
Rlxx550	70696-03

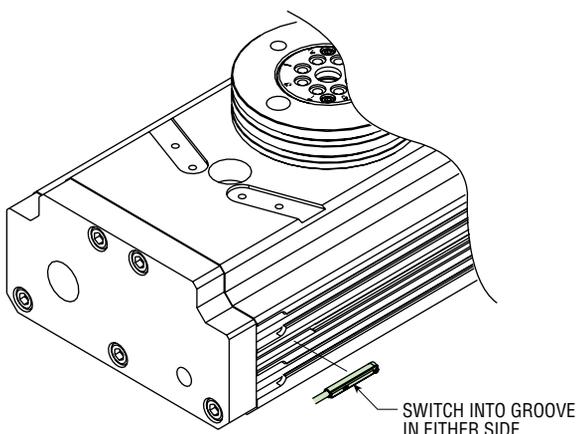
1 KIT REQUIRED PER END OF ADJUSTMENT DESIRED  
**NOTE:** ONE FLOW CONTROL FITTING PER KIT



**M** MAGNETS FOR PHD 6790 & JC1 SWITCHES

This option equips the rotary actuator with magnets on the rack for use with PHD Series 6790 and JC1 Switches. These switches mount easily to the actuator using the switch slots in the sides of the body.

PHD Series 6790 and JC1 Switches are designed specifically to provide an input signal to various types of programmable controllers or logic systems. **See Switches and Sensors section for complete switch specifications.**



## SERIES 6790 & JC1 SWITCHES

PART NO.	DESCRIPTION
67902-1-05	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, 5 m cable
JC1SDN-5	NPN (Sink) Solid State, 10-30 VDC, 5 m cable
JC1SDP-5	PNP (Source) Solid State, 10-30 VDC, 5 m cable
67922-1	PNP (Source) or NPN (Sink) Reed, 4.5-30 VDC, Quick Connect
JC1SDN-K	NPN (Sink) Solid State, 10-30 VDC, Quick Connect
JC1SDP-K	PNP (Source) Solid State, 10-30 VDC, Quick Connect
67929-2	PNP (Source) or NPN (Sink) Reed, 65-120 VAC, Quick Connect

**NOTE:** See Switches and Sensors section for additional switch information and complete specification.

## SERIES 6790 & JC1SDx CORDSET CHART

PART NO.	DESCRIPTION
63549-02	M8, 3 pin, Straight Female Connector, 2 m cable
63549-05	M8, 3 pin, Straight Female Connector, 5 m cable

## TORQUE CHART

SWITCH	TORQUE
6790	16 in-oz [.11 Nm]
JC1SDx	Hand tighten clockwise until switch is securely retained. Do not overtighten.

All dimensions are reference only unless specifically tolerated.