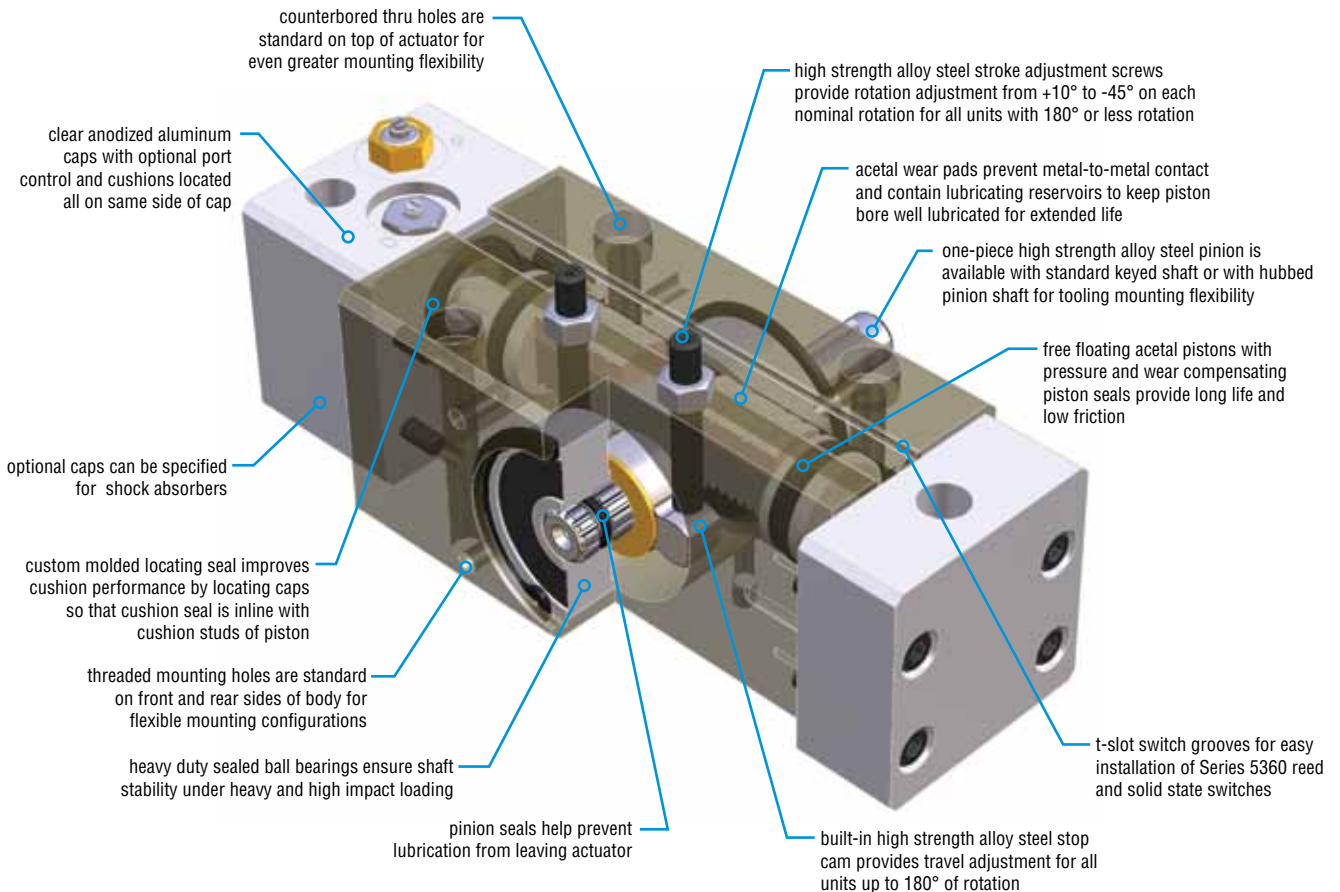


HIGH LOAD PNEUMATIC ROTARY ACTUATOR

Major Benefits

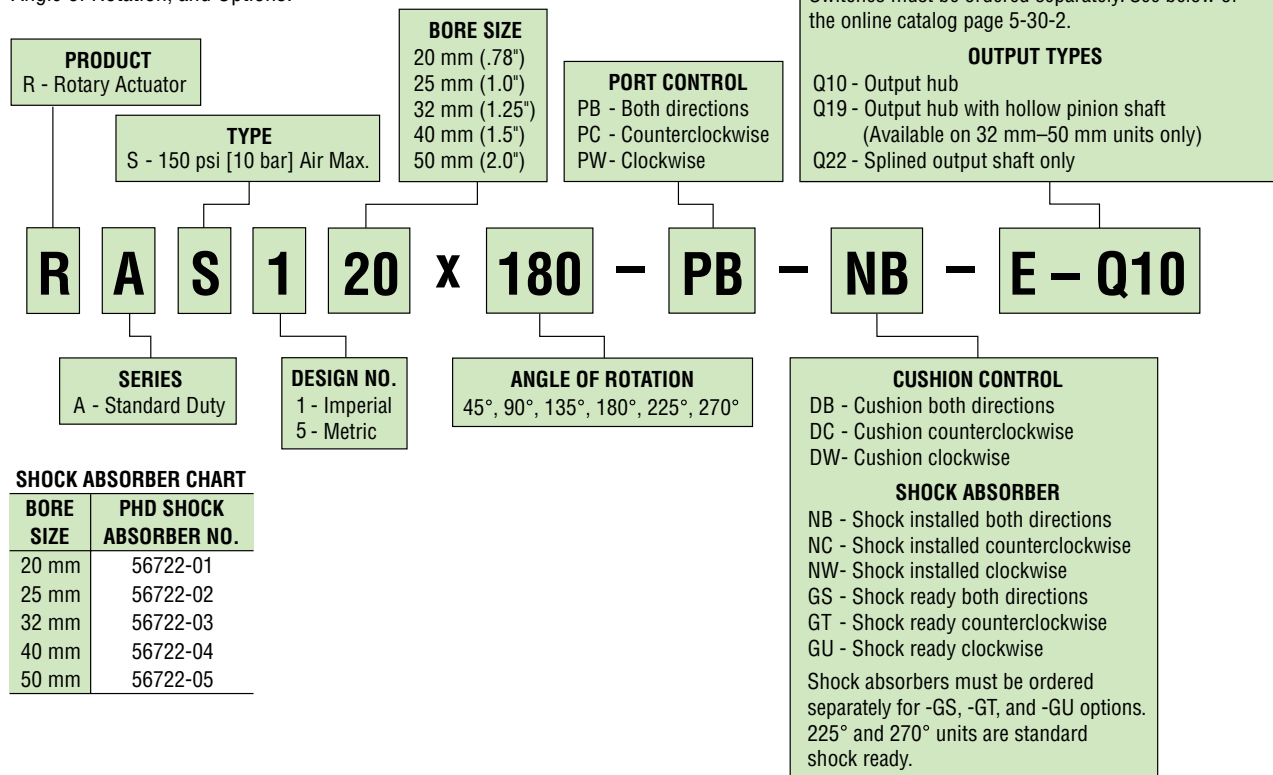
- Full featured rotary
- High axial and radial bearing loads
- Zero backlash at ends of rotation
- Wide variety of options and accessories



ORDERING DATA: SERIES RA ROTARY ACTUATORS

TO ORDER SPECIFY:

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



SHOCK ABSORBER CHART

BORE SIZE	PHD SHOCK ABSORBER NO.
20 mm	56722-01
25 mm	56722-02
32 mm	56722-03
40 mm	56722-04
50 mm	56722-05

SERIES 5360 MAGNETORESISTIVE SWITCHES

PART NO.	COLOR	DESCRIPTION
53605-1-02	Black	NPN 6-24 VDC, 2 m cable
53606-1-02	Orange	PNP 6-24 VDC, 2 m cable
53625-1	Black	NPN 6-24 VDC, Quick Connect
53626-1	Orange	PNP 6-24 VDC, Quick Connect



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 5360 REED SWITCHES

PART NO.	COLOR	DESCRIPTION
53603-1-02	Yellow	NPN (Sink) 4.5-24 VDC, 2 meter cable
53604-1-02	Red	PNP (Source) 4.5-24 VDC, 2 meter cable
53623-1	Yellow	NPN (Sink) 4.5-24 VDC, Quick Connect
53624-1	Red	PNP (Source) 4.5-24 VDC, Quick Connect

SERIES 5360 HALL EFFECT SWITCHES

PART NO.	COLOR	DESCRIPTION
53602-2-02	White	Sink or Source Type 4.5-24 VDC, 2 meter cable
53609-2-02	Green	AC Type 110-120 VAC with Current Limit, 2 meter cable
53622-2	White	Sink or Source Type VDC, Quick Connect
53629-2	Green	AC Type 110-120 VAC, Quick Connect with Current Limit

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



CAD & Sizing Assistance

Use PHD's free online Product Sizing and CAD Configurator at www.phdinc.com/myphd

ENGINEERING DATA: SERIES RA ROTARY ACTUATORS

SPECIFICATIONS	SERIES RA
OPERATING PRESSURE	20 to 150 psi [1.4 to 10 bar]
OPERATING TEMPERATURE	-20° to 180°F [-29° to 82°C]
RATED LIFE	10 million cycles
ROTATIONAL TOLERANCE	Nominal rotation +10° to -45° with angle adjustments
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	BASE WEIGHT		BORE DIAMETER		DISPLACEMENT VOLUME/DEG		THEORETICAL TORQUE OUTPUT		ROTATIONAL VELOCITY	MAX AXIAL BEARING LOAD		MAX RADIAL BEARING LOAD		DISTANCE BETWEEN BEARINGS	
		lb	kg	in	mm	in³/°	mm³/°	in-lb/psi	Nm/bar	deg/sec	lb	N	lb	N	in	mm
20	45°/90°	1.80	.82													
	135°/180°	1.80	.82	.787	20	.002	32.77	.097	.16	180°/.05	97	431	376	1672	1.34	34.0
	225°/270°	2.30	1.04													
25	45°/90°	2.40	1.09													
	135°/180°	2.80	1.27	.984	25	.004	65.55	.190	.31	180°/.05	118	524	453	2015	1.61	40.9
	225°/270°	3.60	1.63													
32	45°/90°	4.30	1.95													
	135°/180°	4.90	2.22	1.260	32	.007	114.71	.415	.68	180°/.05	182	809	640	2846	1.94	49.3
	225°/270°	6.50	2.94													
40	45°/90°	7.70	3.49													
	135°/180°	8.80	3.99	1.575	40	.014	229.42	.779	1.28	180°/.075	237	1054	746	3318	2.56	65.0
	225°/270°	11.80	5.35													
50	45°/90°	11.60	5.26													
	135°/180°	12.80	5.81	1.969	50	.027	442.45	1.522	2.49	180°/.075	325	1445	966	4296	2.90	73.6
	225°/270°	17.70	8.03													

RA

STANDARD ANGLE ADJUSTMENT

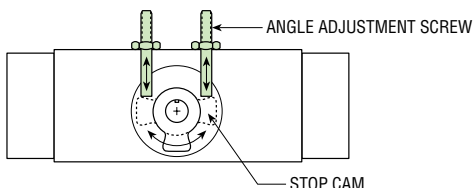
All PHD Series RA Rotary Actuators are supplied as standard with built-in adjustable angle stops. Together these mechanical positive stops provide an adjustment range of +10°, -45° on each nominal angle of rotation (see Table 1). (+5°, -22-1/2° from each end.)

Units with rotations of 180° or less utilize adjusting screws in the top of the actuator which stop against a stop cam attached to the pinion shaft (see Illustration A). Units with rotations of 225° and 270° use angle adjustment screws located in the end caps which stop against the auxiliary lower rack (see Illustration B). When 225° or 270° units are ordered with optional shock absorbers, the shock absorbers double as the angle adjustment screws.

The ability to adjust over such a wide range eliminates the need to order special units for specific angles of rotation. The range of nominal rotations and the +10°, -45° adjustments provide a total rotation range of 0° to 280° across the Series RA Rotary Actuator line.

NOTE: Cushions are effective for approximately the last 40°

ILLUSTRATION A
0°-180° ROTATIONS

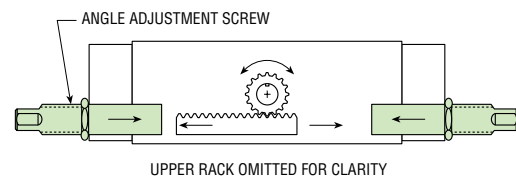


of rotation each direction. The cushion angle will decrease by the same amount that the nominal rotation is reduced by the angle adjustment. Consult PHD for non-standard angles of rotation if cushions are required.

TABLE 1

ROTATION ORDERED	STANDARD ADJUSTMENT RANGE
45°	0° through 55°
90°	45° through 100°
135°	90° through 145°
180°	135° through 190°
225° or 270°	180° through 280°

ILLUSTRATION B
181°-270° ROTATIONS

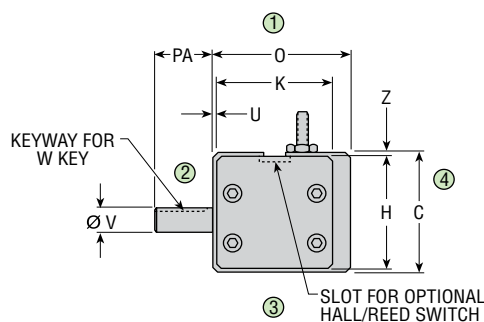
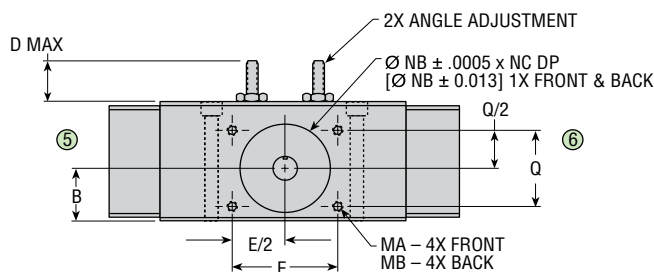
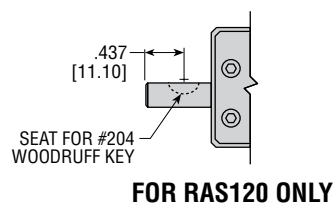
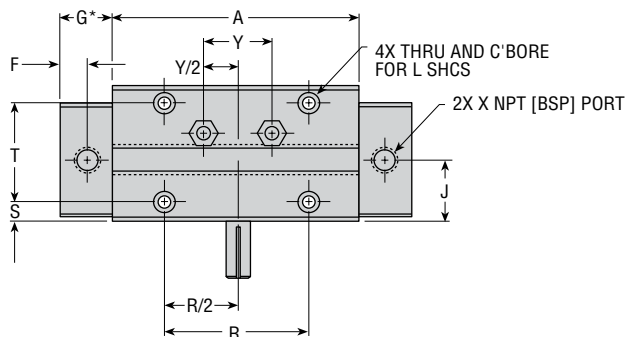


Sizing & Application Assistance

Use PHD's free online Product Sizing Application or view the Product Sizing Catalog at: www.phdinc.com/apps/sizing

DIMENSIONS: SERIES RA ROTARY ACTUATORS

45°, 90°, 135°, or 180° ROTATION UNITS



NOTES:

- 1) *G DIMENSION INCREASES WITH CUSHION OPTION. SEE ONLINE CATALOG PAGE 5-30-1.
- 2) KEYWAY SHOWN AT MID-ROTATION
- 3) NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN mm.
- 4) CIRCLED NUMBERS INDICATE POSITION

BORE SIZE	NOMINAL ROTATION	A	B	C	D	E	F	G	H	J	K
20 mm	45° OR 90°	3.524 [89.5]	.807	1.831	.604	1.574	.394	.768	1.712	.91	1.732
	135° OR 180°	3.760 [95.0]	[20.5]	[46.5]	[15.34]	[40.0]	[10.0]	[19.5]	[43.5]	[23.0]	[44.0]
25 mm	45° OR 90°	3.819 [97.0]	.983	2.224	.724	1.772	.394	.768	2.087	1.01	1.929
	135° OR 180°	4.508 [114.5]	[25.0]	[56.5]	[18.39]	[45.0]	[10.0]	[19.5]	[53.0]	[25.5]	[49.0]
32 mm	45° OR 90°	4.606 [117.0]	1.161	2.697	.920	2.166	.394	.768	2.559	1.18	2.264
	135° OR 180°	5.650 [143.5]	[29.5]	[68.5]	[23.37]	[55.0]	[10.0]	[19.5]	[65.0]	[30.0]	[57.5]
40 mm	45° OR 90°	5.256 [133.5]	1.516	3.366	.977	2.558	.472	.945	3.228	1.57	3.071
	135° OR 180°	6.476 [164.5]	[38.5]	[85.5]	[24.82]	[65.0]	[12.0]	[24.0]	[82.0]	[39.75]	[78.0]
50 mm	45° OR 90°	6.300 [160.0]	1.674	3.918	1.191	2.952	.472	.945	3.720	1.74	3.346
	135° OR 180°	7.343 [186.5]	[42.5]	[99.5]	[30.25]	[75.0]	[12.0]	[24.0]	[94.5]	[44.25]	[85.0]

BORE SIZE	L	MA	MB	NB	NC	O	PA	Q	R	S
20 mm	#10	10-24 x .281	10-24 x .375	1.3785	.085	2.047	1.000	1.180	2.166	.276
	[M5]	[M5 x 0.8 x 7]	[M5 x 0.8 x 12.5]	[35.014]	[2.16]	[52.0]	[25.0]	[30.0]	[55.0]	[7.0]
25 mm	#10	10-24 x .285	10-24 x .500	1.4572	.080	2.362	1.250	1.378	2.362	.295
	[M5]	[M5 x 0.8 x 7]	[M5 x 0.8 x 12.5]	[37.013]	[2.03]	[60.0]	[30.0]	[35.0]	[60.0]	[7.5]
32 mm	1/4	1/4-20 x .250	1/4-20 x .500	1.8509	.100	2.835	1.500	1.772	2.952	.335
	[M6]	[M6 x 1.0 x 7.5]	[M6 x 1.0 x 15]	[47.013]	[2.54]	[72.0]	[40.0]	[45.0]	[75.0]	[8.5]
40 mm	5/16	5/16-18 x .437	5/16-18 x .750	2.0477	.115	3.544	1.750	2.164	3.346	.394
	[M8]	[M8 x 1.25 x 12]	[M8 x 1.25 x 20]	[52.012]	[2.92]	[90.0]	[42.5]	[55.0]	[85.0]	[10.0]
50 mm	3/8	3/8-16 x .375	3/8-16 x .750	2.4414	.125	3.976	2.000	2.362	3.936	.452
	[M10]	[M10 x 1.5 x 10]	[M10 x 1.5 x 20]	[62.012]	[3.17]	[101.0]	[55.0]	[60.0]	[100.0]	[11.5]

BORE SIZE	T	U	V	W KEY	X NPT [BSP]	Y	Z
20 mm	1.496	.04	.375/.374	SEE ABOVE	1/8	1.004	.06
	[38.0]	[1.0]	[10 (h8)]	[3 mm SQ. x 20 mm]	[1/8]	[25.5]	[1.5]
25 mm	1.772	.04	.4727/.4714	1/8 SQ. x 1.125	1/8	1.124	.08
	[45.0]	[1.0]	[12 (h8)]	[4 mm SQ. x 25 mm]	[1/8]	[28.5]	[2.0]
32 mm	2.165	.05	.625/.624	3/16 SQ. x 1.250	1/8	1.458	.08
	[55.0]	[1.2]	[16 (h8)]	[5 mm SQ. x 32 mm]	[1/8]	[37.0]	[2.0]
40 mm	2.756	.03	.750/.749	3/16 SQ. x 1.500	1/8	1.598	.08
	[70.0]	[0.8]	[17 (h8)]	[5 mm SQ. x 35 mm]	[1/8]	[40.6]	[2.0]
50 mm	3.071	.07	.875/.874	3/16 SQ. x 1.750	1/4	1.984	.10
	[78.0]	[1.8]	[22 (h8)]	[6 mm SQ. x 45 mm]	[1/4]	[50.4]	[2.5]

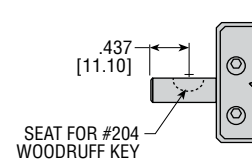
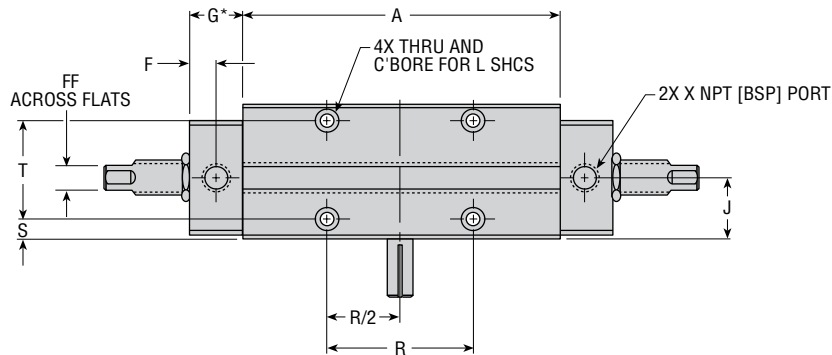


CAD & Sizing Assistance

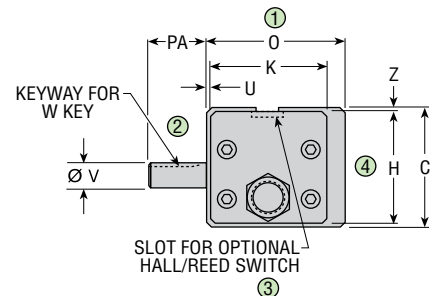
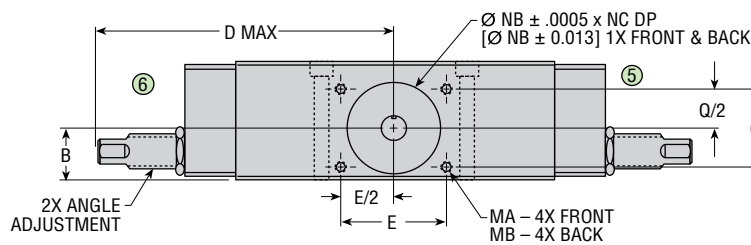
Use PHD's free online Product Sizing and CAD Configurator at www.phdinc.com/myphd

DIMENSIONS: SERIES RA ROTARY ACTUATORS

225° or 270° ROTATION UNITS



FOR RAS120 ONLY



NOTES:

- *G DIMENSION INCREASES WITH CUSHION OPTION. SEE ONLINE CATALOG PAGE 5-30-1.
- KEYWAY SHOWN AT MID-ROTATION
- NUMBERS IN [] ARE FOR METRIC UNITS AND ARE IN MM.
- CIRCLED NUMBERS INDICATE POSITION

BORE SIZE	NOMINAL ROTATION	A	B	C	D	E	F	G	H	J	K
20 mm	225° OR 270°	4.390 [111.5]	.807 [20.5]	1.831 [46.5]	4.39 [111.5]	1.574 [40.0]	.394 [10.0]	.768 [19.5]	1.712 [43.5]	.91 [23.0]	1.732 [44.0]
25 mm	225° OR 270°	5.295 [134.5]	.983 [25.0]	2.224 [56.5]	5.06 [128.5]	1.772 [45.0]	.394 [10.0]	.768 [19.5]	2.087 [53.0]	1.01 [25.5]	1.929 [49.0]
32 mm	225° OR 270°	6.693 [170.0]	1.161 [29.5]	2.697 [68.5]	5.87 [149.1]	2.166 [55.0]	.394 [10.0]	.768 [19.5]	2.559 [65.0]	1.18 [30.0]	2.264 [57.5]
40 mm	225° OR 270°	7.736 [196.5]	1.516 [38.5]	3.366 [85.5]	6.66 [169.1]	2.558 [65.0]	.472 [12.0]	.945 [24.0]	3.228 [82.0]	1.57 [39.75]	3.071 [78.0]
50 mm	225° OR 270°	8.917 [226.5]	1.674 [42.5]	3.918 [99.5]	7.32 [186.0]	2.952 [75.0]	.472 [12.0]	.945 [24.0]	3.720 [94.5]	1.74 [44.25]	3.346 [85.0]

BORE SIZE	L	MA	MB	NB	NC	O	PA	Q	R	S
20 mm	#10 [M5]	10-24 x .281 [M5 x 0.8 x 7]	10-24 x .375 [M5 x 0.8 x 12.5]	1.3785 [35.014]	.085 [2.16]	2.047 [52.0]	1.000 [25.0]	1.180 [30.0]	2.166 [55.0]	.276 [7.0]
25 mm	#10 [M5]	10-24 x .285 [M5 x 0.8 x 7]	10-24 x .500 [M5 x 0.8 x 12.5]	1.4572 [37.013]	.080 [2.03]	2.362 [60.0]	1.250 [30.0]	1.378 [35.0]	2.362 [60.0]	.295 [7.5]
32 mm	1/4 [M6]	1/4-20 x .250 [M6 x 1.0 x 7.5]	1/4-20 x .500 [M6 x 1.0 x 15]	1.8509 [47.013]	.100 [2.54]	2.835 [72.0]	1.500 [40.0]	1.772 [45.0]	2.952 [75.0]	.335 [8.5]
40 mm	5/16 [M8]	5/16-18 x .437 [M8 x 1.25 x 12]	5/16-18 x .750 [M8 x 1.25 x 20]	2.0477 [52.012]	.115 [2.92]	3.544 [90.0]	1.750 [42.5]	2.164 [55.0]	3.346 [85.0]	.394 [10.0]
50 mm	3/8 [M10]	3/8-16 x .375 [M10 x 1.5 x 10]	3/8-16 x .750 [M10 x 1.5 x 20]	2.4414 [62.012]	.125 [3.17]	3.976 [101.0]	2.000 [55.0]	2.362 [60.0]	3.936 [100.0]	.452 [11.5]

BORE SIZE	T	U	V	W KEY	X NPT [BSP]	Z	FF
20 mm	1.496 [38.0]	.04 [1.0]	.375/.374 [10 (h8)]	SEE ABOVE [3 mm SQ. x 20 mm]	1/8 [1/8]	.06 [1.5]	.39 [10.0]
25 mm	1.772 [45.0]	.04 [1.0]	.4727/.4714 [12 (h8)]	1/8 SQ. x 1.125 [4 mm SQ. x 25 mm]	1/8 [1/8]	.08 [2.0]	.47 [12.0]
32 mm	2.165 [55.0]	.05 [1.2]	.625/.624 [16 (h8)]	3/16 SQ. x 1.250 [5 mm SQ. x 32 mm]	1/8 [1/8]	.08 [2.0]	.71 [18.0]
40 mm	2.756 [70.0]	.03 [0.8]	.750/.749 [17 (h8)]	3/16 SQ. x 1.500 [5 mm SQ. x 35 mm]	1/8 [1/8]	.08 [2.0]	.91 [23.0]
50 mm	3.071 [78.0]	.07 [1.8]	.875/.874 [22 (h8)]	3/16 SQ. x 1.750 [6 mm SQ. x 45 mm]	1/4 [1/4]	.10 [2.5]	.91 [23.0]



CAD & Sizing Assistance

Use PHD's free online Product Sizing and CAD Configurator at www.phdinc.com/myphd

All dimensions are reference only unless specifically toleranced.

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OPTIONS: SERIES RA ROTARY ACTUATORS

PB

**PORT CONTROL®
BOTH DIRECTIONS**

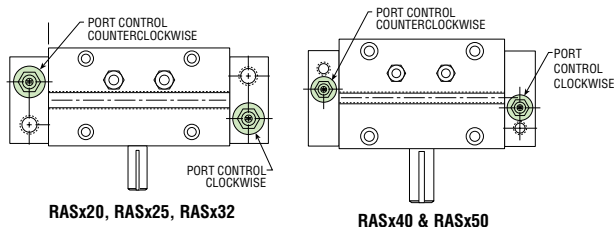
PC

**PORT CONTROL® COUNTERCLOCKWISE
DIRECTION**

PW

**PORT CONTROL®
CLOCKWISE DIRECTION**

PHD Port Control® is a built-in flow control valve for controlling the speed through complete shaft rotation. The Port Control® is based on the “meter-out” principle and features an adjustable needle in a cartridge with an external check seal.



DB

CUSHION BOTH DIRECTIONS

DC

**CUSHION COUNTERCLOCKWISE
DIRECTION**

DW

CUSHION CLOCKWISE DIRECTION

PHD Cushions allow smooth deceleration at the end of rotation.

NB

**SHOCK ABSORBER INSTALLED
BOTH DIRECTIONS**

NC

**SHOCK ABSORBER INSTALLED
COUNTERCLOCKWISE DIRECTION**

NW

**SHOCK ABSORBER INSTALLED
CLOCKWISE DIRECTION**

The hydraulic shock absorber options are designed for the maximum in deceleration control and rotational stopping ability. The -NB, -NC, and -NW options provide the rotary actuator with the hydraulic shock absorber installed in the appropriate location(s). See PHD Product Sizing Catalog for details on unit stopping capacity with built-in shock absorbers.

M

**MAGNETS FOR PHD SOLID STATE
HALL EFFECT SWITCHES**

E

**MAGNETS FOR PHD SOLID STATE
MAGNETORESISTIVE SWITCHES**

I

MAGNETS FOR PHD REED SWITCHES

This option equips the rotary actuator with magnets on the rack for use with PHD Series 5360 Switches. These switches mount easily to the actuator using the “T” slot in the top of the body.

PHD Series 5360 Switches are designed specifically to provide an input signal to various types of programmable controllers or logic systems. See Switches and Sensors section for information on the Series 5360 Switches.

GS

**SHOCK ABSORBER READY
BOTH DIRECTIONS**

GT

**SHOCK ABSORBER READY
COUNTERCLOCKWISE DIRECTION**

GU

**SHOCK ABSORBER READY
CLOCKWISE DIRECTION**

The -GS, -GT, and -GU options should only be used if the shock absorber(s) is to be supplied separately from the rotary actuator. These options provide a unit that has provisions for installing hydraulic shock absorbers but have no shock absorbers included.

Q10

OUTPUT HUB

This option provides an output hub in place of the conventional pinion shaft. The hub includes four thru holes counterbored from one surface and threaded from the other, allowing easy mounting of fixturing, tooling, or other actuators requiring a flat surface area. The hub can be removed to allow custom machining for specific mounting needs. The hub hole pattern can be oriented in 22.5° increments. Separate hubs are available in a kit complete with all hardware.

Q19

**OUTPUT HUB WITH HOLLOW PINION
SHAFT**

This option provides an output hub with a hollow pinion shaft in place of the standard pinion shaft. The hub has four thru holes counterbored from one surface and threaded from the other, allowing easy mounting of fixturing, tooling, or other actuators requiring a flat surface area. The pinion shaft is hollow for feeding pneumatic or electrical lines from the back of the rotary actuator to the output hub. The hub can be removed to allow custom machining for specific mounting needs. It can also be rotated in 22.5° rotations. Kinetic energy ratings are reduced by 10% for this option.



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.

Q22

SPLINED OUTPUT SHAFT ONLY

This option provides a splined pinion shaft that is ready to attach output hubs as in -Q10 option. (No hub supplied).

OPTIONS: SERIES RA ROTARY ACTUATORS



**PORT CONTROL®
BOTH DIRECTIONS**



**PORT CONTROL®
COUNTERCLOCKWISE DIRECTION**



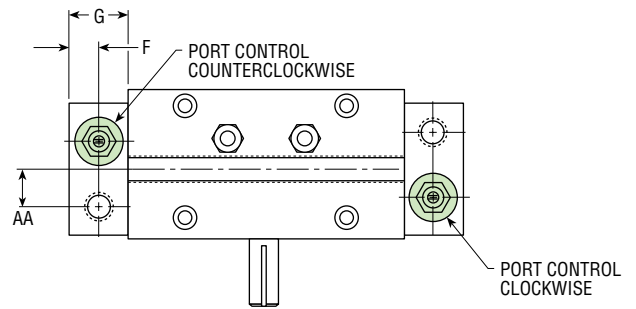
**PORT CONTROL®
CLOCKWISE DIRECTION**

PHD Port Control® is a built-in flow control valve for controlling the speed through complete shaft rotation. The Port Control® is based on the “meter-out” principle and features an adjustable needle in a cartridge with an external check seal. The self-locking needle has micrometer threads and is adjustable under pressure. It determines the orifice size which controls the exhaust flow rate of the actuator. The check seal expands while air is exhausting from the actuator, forcing the air to exhaust past the adjustable needle. The check seal collapses to allow a free flow of incoming air. The PHD Port Control® saves space and eliminates the cost of fittings and installation for external flow control valves.

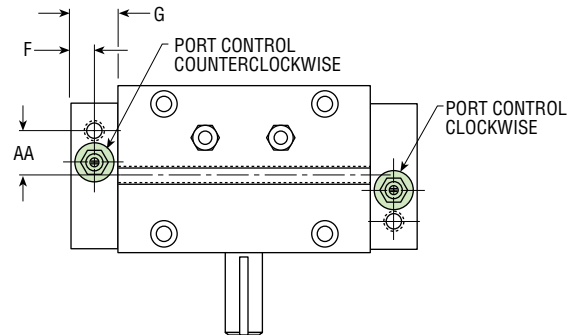
NOTE: Port Control® may not be effective below operating pressures of 10 psi [.7 bar].

BORE SIZE	F	G	AA
20 mm	.394 [10.0]	.768 [19.5]	.374 [9.5]
25 mm	.394 [10.0]	.768 [19.5]	.374 [9.5]
32 mm	.394 [10.0]	.768 [19.5]	.374 [9.5]
40 mm	.472 [12.0]	.945 [24.0]	.965 [24.5]
50 mm	.472 [12.0]	.945 [24.0]	1.083 [27.5]

Numbers in [] are for metric units and are in mm.



RASx20, RASx25, RASx32



RASx40 & RASx50



CUSHION BOTH DIRECTIONS

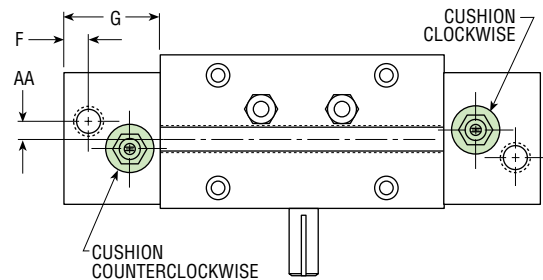


**CUSHION
COUNTERCLOCKWISE DIRECTION**



**CUSHION
CLOCKWISE DIRECTION**

PHD Cushions allow for smooth deceleration at the end of rotation. When the cushion operates, the remaining volume of air in the actuator must exhaust past an adjustable needle, which controls the deceleration of the pinion shaft. The effective length of the cushion is approximately 40° of rotation at the end of full nominal rotation. The use of angle adjustment screws to reduce the angle of rotation has a direct effect on the length of cushion engagement. Example: 5° of angle reduction on one end will reduce cushion engagement by 5° on that end of rotation.



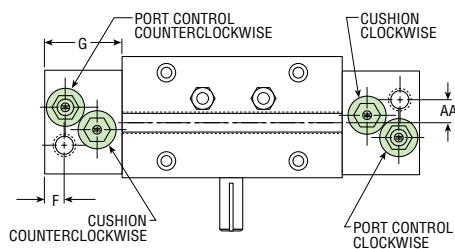
BORE SIZE	F	G	AA
20 mm	.315 [8.0]	1.280 [32.5]	.118 [3.0]
25 mm	.315 [8.0]	1.280 [32.5]	.118 [3.0]
32 mm	.315 [8.0]	1.280 [32.5]	.118 [3.0]
40 mm	.394 [10.0]	1.378 [35.0]	—
50 mm	.394 [10.0]	1.378 [35.0]	—

Numbers in [] are for metric units and are in mm.

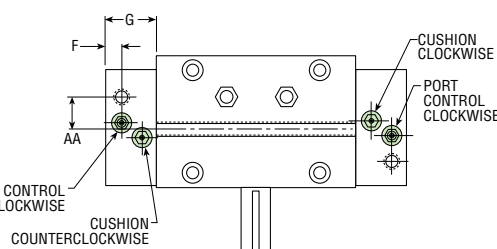
All dimensions are reference only unless specifically toleranced.

OPTIONS: SERIES RA ROTARY ACTUATORS

PORT CONTROL® AND CUSHION LOCATIONS



RASx20, RASx25, RASx32, RASx40



RASx50

BORE SIZE	F	G	AA
20 mm	.335 [8.5]	1.280 [32.5]	.374 [9.5]
25 mm	.335 [8.5]	1.280 [32.5]	.374 [9.5]
32 mm	.335 [8.5]	1.280 [32.5]	.374 [9.5]
40 mm	.394 [10.0]	1.378 [35.0]	.453 [11.5]
50 mm	.453 [11.5]	1.378 [35.0]	1.083 [27.5]

Numbers in [] are for metric units and are in mm.

E MAGNETS FOR PHD SOLID STATE HALL EFFECT SWITCHES

This option equips the rotary actuator with magnets on the rack for use with PHD Series 5360 Hall Effect Switches. These switches mount easily to the actuator using the “T” slot in the top of the body.

PART NO.	COLOR	DESCRIPTION
53603-1-02	Yellow	NPN (Sink) 4.5-24 VDC, 2 meter cable
53604-1-02	Red	PNP (Source) 4.5-24 VDC, 2 meter cable
53623-1	Yellow	NPN (Sink) 4.5-24 VDC, Quick Connect
53624-1	Red	PNP (Source) 4.5-24 VDC, Quick Connect

M MAGNETS FOR PHD REED SWITCHES

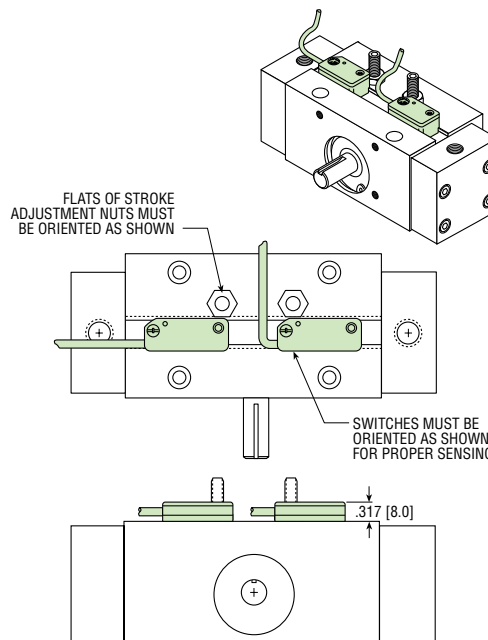
This option equips the rotary actuator with magnets on the rack for use with PHD Series 5360 Reed Switches. These switches mount easily to the actuator using the “T” slot in the top of the body.

PART NO.	COLOR	DESCRIPTION
53602-2-02	White	Sink or Source Type 4.5-24 VDC, 2 meter cable
53609-2-02	Green	AC Type 110-120 VAC with Current Limit, 2 meter cable
53622-2	White	Sink or Source Type VDC, Quick Connect
53629-2	Green	AC Type 110-120 VAC, Quick Connect with Current Limit

I MAGNETS FOR PHD SOLID STATE MAGNETORESISTIVE SWITCHES

This option equips the rotary actuator with magnets on the rack for use with PHD Magnetoresistive Switches. These switches mount easily to the actuator using the “T” slot in the top of the body.

PART NO.	COLOR	DESCRIPTION
53605-1-02	Black	NPN 6-24 VDC, 2 m cable
53606-1-02	Orange	PNP 6-24 VDC, 2 m cable
53625-1	Black	NPN 6-24 VDC, Quick Connect
53626-1	Orange	PNP 6-24 VDC, Quick Connect



PHD Series 5360 Hall Effect and Reed Switches are designed specifically to provide an input signal to various types of programmable controllers or logic systems. **See Switches and Sensors section for information on the Series 5360 Switches.**

NOTE: When mounting switches on the 20 mm and 25 mm bore units with rotations up to 180°, see the drawing above. Minimum rotation on a 20 mm bore unit with two switches is 45°.

All dimensions are reference only unless specifically toleranced.

OPTIONS: SERIES RA ROTARY ACTUATORS



SHOCK ABSORBER INSTALLED BOTH DIRECTIONS



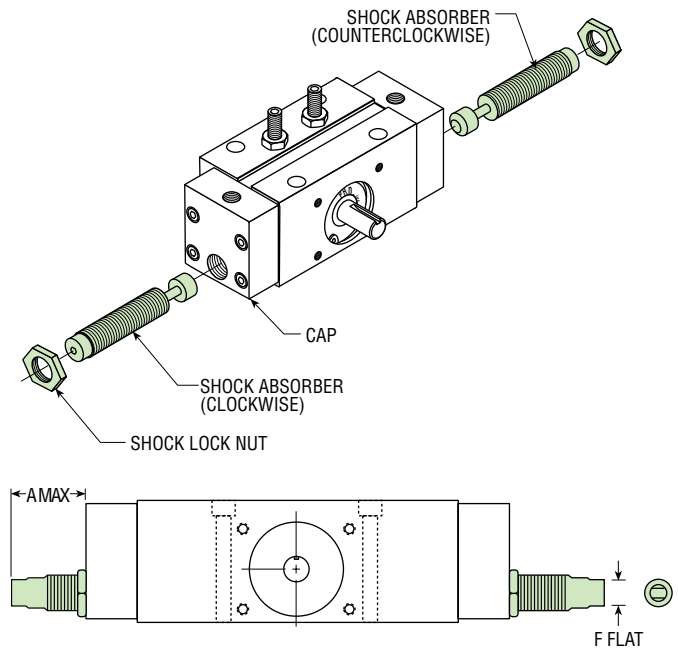
SHOCK ABSORBER INSTALLED COUNTERCLOCKWISE DIRECTION



SHOCK ABSORBER INSTALLED CLOCKWISE DIRECTION

The hydraulic shock absorber options are designed for the maximum in deceleration control and rotational stopping ability. The -NB, -NC, and -NW options provide the rotary actuator with the hydraulic shock absorber installed in the appropriate location(s). See PHD Product Sizing Catalog for details on unit stopping capacity with built-in shock absorbers. Shock absorbers are nominally effective for 45° of rotation each direction.

NOTE: The shock absorber doubles as the rotation adjustment on units with rotations greater than 180°.



SHOCK ABSORBER SPECIFICATIONS

BORE SIZE	PHD SHOCK ABSORBER		STROKE		SHOCK ABSORBER WEIGHT		KINETIC ENERGY LOAD		A MAX.		F FLATS	
	NUMBER	THREAD TYPE	in	mm	lb	kg	in-lb	Nm	in	mm	in	mm
20	56722-01	M12 x 1	.39	10.0	.11	.05	3.3	.36	2.25	57.2	.31	8
25	56722-02	M14 x 1.5	.42	10.7	.13	.06	9.3	1.05	2.37	60.2	.47	11.9
32	56722-03	M20 x 1.5	.25	6.35	.34	.15	21.3	1.71	2.41	61.2	.69	17.5
40	56722-04*	M25 x 1.5	.5	12.7	.67	.3	45.0	5.1	3.38	85.7	.88	22.4
50	56722-05*	M25 x 1.5	.5	12.7	.67	.3	87.9	9.94	3.44	87.4	.88	22.4

*These shock absorbers have an adjustment feature. (See PHD Product Sizing Catalog for details).



SHOCK ABSORBER READY BOTH DIRECTIONS

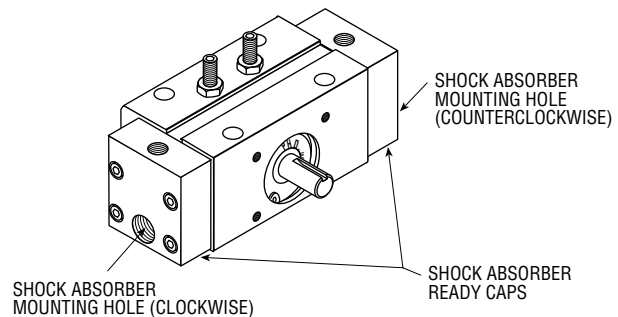


SHOCK ABSORBER READY COUNTERCLOCKWISE DIRECTION



SHOCK ABSORBER READY CLOCKWISE DIRECTION

The -GS, -GT, and -GU options should only be used if the shock absorber(s) is to be supplied separately from the rotary actuator. These options provide a unit that has provisions for installing hydraulic shock absorbers but have no shock absorbers included. See PHD Product Sizing Catalog for details on unit stopping capacity with built-in shock absorbers.



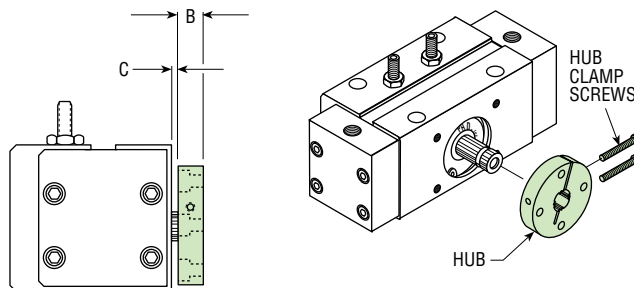
NOTE: The shock absorber doubles as the rotation adjustment on units with rotations greater than 180°. Shock absorbers **must** be installed in the rotary actuator prior to operating the unit. Operation of units with shock absorber ready options without installed shocks can damage the units and void any and all warranties. Only shock absorbers specified by PHD should be used in Series RA Rotary Actuators. The use of any other shock absorbers will affect actuator performance and life expectancy.

All dimensions are reference only unless specifically toleranced.

OPTIONS: SERIES RA ROTARY ACTUATORS

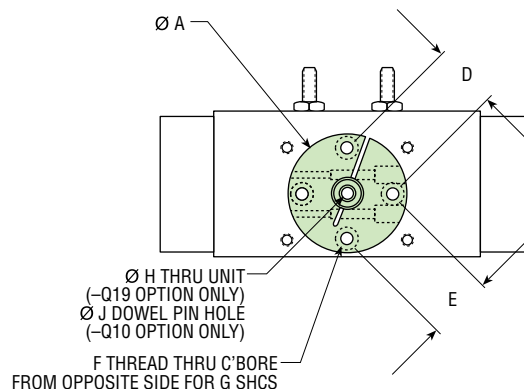
Q10 OUTPUT HUB

This option provides an output hub in place of the conventional pinion shaft. The hub includes four thru holes counterbored from one surface and threaded from the other, allowing easy mounting of fixturing, tooling, or other actuators requiring a flat surface area. The hub is manufactured from alloy aluminum and comes assembled to a specially designed low profile pinion shaft. The hub can be removed to allow custom machining for specific mounting needs. The hub hole pattern can be oriented in 22.5° increments. Separate hubs are available in a kit complete with all hardware. See chart below.



Q19 OUTPUT HUB WITH HOLLOW PINION SHAFT

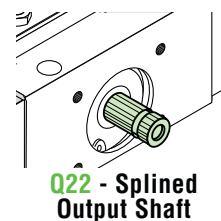
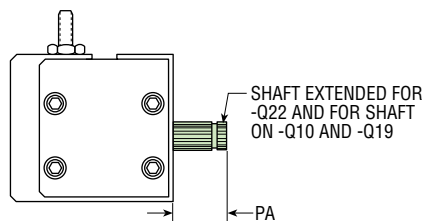
This option provides an output hub with a hollow pinion shaft in place of the standard pinion shaft. The hub has four thru holes counterbored from one surface and threaded from the other, allowing easy mounting of fixturing, tooling, or other actuators requiring a flat surface area. The pinion shaft is hollow for feeding pneumatic or electrical lines from the back of the rotary actuator to the output hub. The hub is manufactured from alloy aluminum and comes assembled to a specially designed low profile pinion shaft. The hub can be removed to allow custom machining for specific mounting needs. It can also be rotated in 22.5° rotations. Kinetic energy ratings are reduced by 10% for this option.



NOTE: Available on 32 mm, 40 mm, and 50 mm units.

Q22 SPLINED OUTPUT SHAFT ONLY

This option provides a splined pinion shaft that is ready to attach output hubs as in -Q10 option. (No hub supplied).



HUB REPLACEMENT KITS

BORE SIZE	FINISHED HUB KIT	
	IMPERIAL	METRIC
20 mm	57651-2721-1	57658-2771-1
25 mm	57652-2731-1	57659-2781-1
32 mm	57653-2741-1	57660-2791-1
40 mm	57654-2751-1	57661-2801-1
50 mm	57655-2761-1	57662-2811-1

BORE SIZE	A	B	C	D	E	F	G	H	J	PA
20 mm	1.535 [39.0]	.374 [9.5]	.100 [2.5]	.787 [20.0]	.787 [20.0]	8-32 [M4 x 0.7]	#4 [M3]	—	.1264 x .25 DP [3.21 x 6.4 DP]	.474 [12.0]
25 mm	1.772 [45.0]	.374 [9.5]	.100 [2.5]	.945 [24.0]	.945 [24.0]	10-32 [M5 x 0.8]	#6 [M4]	—	.1264 x .25 DP [3.21 x 6.4 DP]	.474 [12.0]
32 mm	2.165 [55.0]	.492 [12.5]	.100 [2.5]	1.102 [28.0]	1.102 [28.0]	1/4-28 [M6 x 1.0]	#10 [M4]	.276 [7.0]	.2514 x .50 DP [6.39 x 12.7 DP]	.592 [15.0]
40 mm	2.717 [69.0]	.492 [12.5]	.100 [2.5]	1.398 [35.5]	1.398 [35.5]	1/4-28 [M8 x 1.25]	#10 [M6]	.315 [8.0]	.2514 x .50 DP [6.39 x 12.7 DP]	.590 [15.0]
50 mm	2.953 [75.0]	.748 [19.0]	.100 [2.5]	1.575 [40.0]	1.575 [40.0]	7/16-20 [M10 x 1.5]	3/8 [M8]	.394 [10.0]	.2514 x .50 DP [6.39 x 12.7 DP]	.848 [21.5]

Numbers in [] are for metric units and are in mm.

All dimensions are reference only unless specifically toleranced.