



**HUB Series - Hydraulic Unibody
 Hydraulic Rack & Pinion
 Rotary Actuators**

Market Segments and Applications	A2
Features	A3
Common Part Numbers	A4-A7
Ordering Information	A8-A9
Specifications	A10
Engineering Data	A11
Dimensional Data	A12-A15
Process Valve Mounting and Shaft Table	A16-A17
Options	
Cross-over Vent Module	A18
Counter-balance Valve Module	A19
D03 Directional Control Valve Ready	A20
Feedback and Visual Indicator	A21-A26

A

**Rack & Pinion
 Actuators**

**HUB
 Series**

**LTR
 Series**

**HTR
 Series**

**M
 Series**

			Product Series					
			HUB	LTR	HTR	M	Tork-Mor	
			Market/Segment	Typical Application(s)				
A	Rack & Pinion Actuators	Aerospace	Water bomb, tank door actuation		●			
		Aggregate	Granite block rollover			●		
		Aluminum	Automation				●	
		Automation	Mounting, Processing, Flood gate actuation, End of arm tooling	●	●	●		●
		Automotive	Automation, Clamping, Tube bending			●		●
		Conveyor	Swing & rotate		●	●		●
		Entertaining	Pool gate actuation, Robotic joint motion					●
		Fluid Management & Flow Control	Power plants			●	●	
		Industrial	Automation, Clamping					●
		Machine Builders	End of arm tooling			●		
		Marine/Offshore	Boomslewer, Submersible			●	●	
		Mining	Mobile longhole drilling, Tunnel boring	●		●	●	
		Mobile	Fire truck ladder rotation, Aerial lift basket, X-ray boom rotation, Forklift handling & storage, Refuse tipper	●	●	●	●	
		Nuclear	Door actuation				●	
		Oil & Gas	Process valve actuation	●		●		
		Oil Industry Machinery	Clamping, Lockout	●				●
		Paper & Pulp	Walking beam				●	
		Plastics	Blow molding, Injection molding			●		●
		Rubber	Mixing			●	●	
		Solar	Panel rotation			●		
Space	Rocket launch tower				●			
Steel & Casting	Ladle Tilt, Coil Box, Steel Booming, Pipe fabrication			●	●	●		
Testing Equipment	Flight Simulators, Cycle loading, Tensile test Machines			●		●		
Transportation	Bus wheelchair ramp		●					
Water Management	Valve Actuation	●		●				
Welding	Weld gun indexing, Clamping					●		
HUB Series	LTR Series	HTR Series	M Series	Market Segments/Applications				

HUB Series

WEAR BANDS (HUB075 & HUB100)
 Filled PTFE bands (std) precisely position pistons and prevent side loading from scoring cylinder bores.

PISTON SEALS
 Piston lip seals made from abrasion resistant 4300 polyurethane for reliable service. These seals offer a wide temperature range so that this product may be used in a wide variety of applications. Piston seals can be inspected and replaced without disconnecting the load from the shaft. (Employ proper safety practices to prevent damage to people or equipment.)

RACK & PINION made from through hardened, high strength alloy steels for long and durable service life.

TAPERED ROLLER BEARINGS are designed to support large external axial and radial loads applied to the shaft.

PINION SEALS
 Dual lobed seal of abrasion resistant materials seals effectively with minimum wear at dynamic conditions.

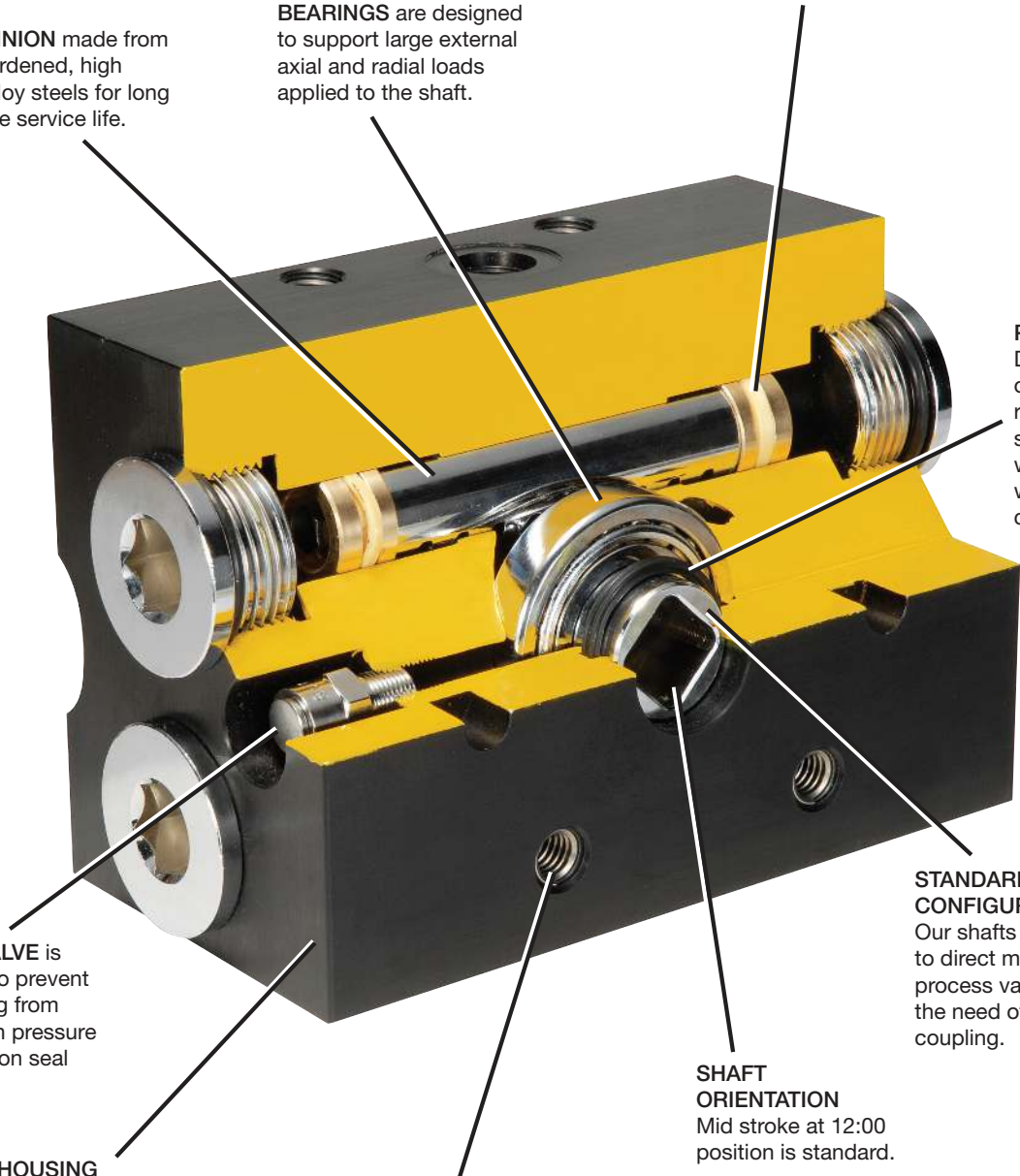
RELIEF VALVE is designed to prevent the housing from seeing high pressure due to piston seal bypass.

HOUSING
 Anodized aluminum housing is designed to minimize external fitting and plumbing connections and rugged enough for the harsh outside environment.

THREADED MOUNTING HOLES
 Our standard mounting uses four tapped holes re-inforced with stainless steel inserts on the customer mounting face of the housing. Both inch and metric (ISO 5211) are available and provide direct mounting to a wide range of process valves.

SHAFT ORIENTATION
 Mid stroke at 12:00 position is standard.

STANDARD SHAFT CONFIGURATIONS
 Our shafts are designed to direct mount to various process valves without the need of additional coupling.



A

**Rack & Pinion
 Actuators**

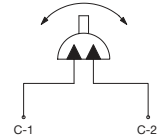
**HUB
 Series**

**LTR
 Series**

**HTR
 Series**

**M
 Series**

HUB Series



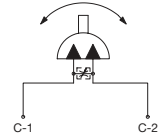
SAE #6 ports - pages A10 & A11 for additional information

A	Rack & Pinion
	Actuators
	HUB Series
LTR Series	
HTR Series	
M Series	

Torque output (in-lb)	Imperial/Metric	Mounting pattern	Shaft size (female square)	Feedback	Visual indication	Part number		
1,800	Imperial	3.25"	.625"	None	None	HUB018-090ZZ-A1B12BZZA		
7,500	Imperial	5.00"	.875"			HUB075-090ZZ-B1D12BZZA		
10,000	Imperial	5.00"	1.125"			HUB100-090ZZ-B1F12BZZA		
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6C12BZZA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6E12BZZA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6J12BZZA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6L12BZZA		
1,800	Imperial	3.25"	.625"			None	Line on shaft	HUB018-090ZZ-A1B12BZAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D12BZAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F12BZAA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6C12BZAA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6E12BZAA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6J12BZAA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6L12BZAA				
1,800	Imperial	3.25"	.625"	Rotary Linear Potentiometer (RLPO)*	Line on shaft			HUB018-090ZZ-A1B12BAAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D12BAAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F12BAAA
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6C12BAAA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6E12BAAA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6J12BAAA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6L12BAAA		
1,800	Imperial	3.25"	.625"			Stonel*	Green on/ Red off	HUB018-090ZZ-A1B12BCCA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D12BCCA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F12BCCA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6C12BCCA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6E12BCCA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6J12BCCA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6L12BCCA				

* Additional feedback information on pages A21 thru A26.

HUB Series



SAE #6 ports with cross-over vent module - pages A10, A11 & A18 for additional information

Torque output (in-lb)	Imperial/ Metric	Mounting pattern	Shaft size (female square)	Feedback	Visual indication	Part number		
1,800	Imperial	3.25"	.625"	None	None	HUB018-090ZZ-A1B1BBZZA		
7,500	Imperial	5.00"	.875"			HUB075-090ZZ-B1D1BBZZA		
10,000	Imperial	5.00"	1.125"			HUB100-090ZZ-B1F1BBZZA		
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6C1BBZZA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6E1BBZZA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6J1BBZZA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6L1BBZZA		
1,800	Imperial	3.25"	.625"			None	Line on shaft	HUB018-090ZZ-A1B1BBZAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D1BBZAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F1BBZAA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6C1BBZAA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6E1BBZAA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6J1BBZAA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6L1BBZAA				
1,800	Imperial	3.25"	.625"	Rotary Linear Potentiometer (RLPO)*	Line on shaft			HUB018-090ZZ-A1B1BBAAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D1BBAAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F1BBAAA
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6C1BBAAA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6E1BBAAA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6J1BBAAA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6L1BBAAA		
1,800	Imperial	3.25"	.625"			Stonel*	Green on/ Red off	HUB018-090ZZ-A1B1BBCCA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D1BBCCA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F1BBCCA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6C1BBCCA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6E1BBCCA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6J1BBCCA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6L1BBCCA				

* Additional feedback information on pages A21 thru A26.

A

Rack & Pinion Actuators

HUB Series

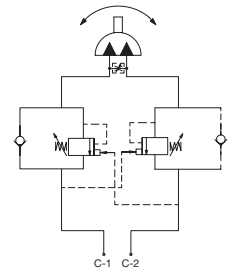
LTR Series

HTR Series

M Series



HUB Series



SAE #6 ports with counter-balance valve module - pages A10, A11 & A19 for additional information

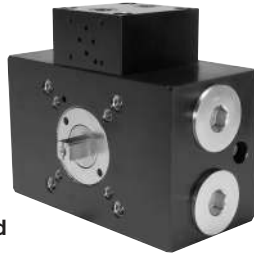
A	Rack & Pinion Actuators
	HUB Series
	LTR Series
HTR Series	
M Series	

Torque output (in-lb)	Imperial/ Metric	Mounting pattern	Shaft size (female square)	Feedback	Visual indication	Part number		
1,800	Imperial	3.25"	.625"	None	None	HUB018-090ZZ-A1B1DBZZA		
7,500	Imperial	5.00"	.875"			HUB075-090ZZ-B1D1DBZZA		
10,000	Imperial	5.00"	1.125"			HUB100-090ZZ-B1F1DBZZA		
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6C1DBZZA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6E1DBZZA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6J1DBZZA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6L1DBZZA		
1,800	Imperial	3.25"	.625"			None	Line on shaft	HUB018-090ZZ-A1B1DBZAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D1DBZAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F1DBZAA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6C1DBZAA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6E1DBZAA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6J1DBZAA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6L1DBZAA				
1,800	Imperial	3.25"	.625"	Rotary Linear Potentiometer (RLPO)*	Line on shaft			HUB018-090ZZ-A1B1DBAAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D1DBAAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F1DBAAA
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6C1DBAAA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6E1DBAAA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6J1DBAAA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6L1DBAAA		
1,800	Imperial	3.25"	.625"			Stonel*	Green on/ Red off	HUB018-090ZZ-A1B1DBCCA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1D1DBCCA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1F1DBCCA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6C1DBCCA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6E1DBCCA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6J1DBCCA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6L1DBCCA				

* Additional feedback information on pages A21 thru A26.



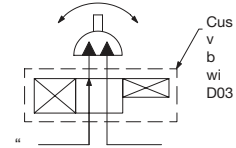
HUB Series



Without solenoid valve (standard)



Shown with solenoid valve for reference only.



SAE #6 ports with D03 directional control valve ready - pages A10, A11 & A20 for additional information

Torque output (in-lb)	Imperial/ Metric	Mounting pattern	Shaft size (female square)	Feedback	Visual indication	Part number		
1,800	Imperial	3.25"	.625"	None	None	HUB018-090ZZ-A1BA2BZZA		
7,500	Imperial	5.00"	.875"			HUB075-090ZZ-B1DA2BZZA		
10,000	Imperial	5.00"	1.125"			HUB100-090ZZ-B1FA2BZZA		
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6CA2BZZA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6EA2BZZA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6JA2BZZA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6LA2BZZA		
1,800	Imperial	3.25"	.625"			None	Line on shaft	HUB018-090ZZ-A1BA2BZAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1DA2BZAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1FA2BZAA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6CA2BZAA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6EA2BZAA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6JA2BZAA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6LA2BZAA				
1,800	Imperial	3.25"	.625"	Rotary Linear Potentiometer (RLPO)*	Line on shaft			HUB018-090ZZ-A1BA2BAAA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1DA2BAAA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1FA2BAAA
1,800	Metric	70 mm	11 mm			HUB018-090ZZ-K6CA2BAAA		
1,800	Metric	70 mm	14 mm			HUB018-090ZZ-K6EA2BAAA		
7,500	Metric	102 mm	22 mm			HUB075-090ZZ-L6JA2BAAA		
10,000	Metric	140 mm	27 mm			HUB100-090ZZ-N6LA2BAAA		
1,800	Imperial	3.25"	.625"			Stonel*	Green on/ Red off	HUB018-090ZZ-A1BA2BCCA
7,500	Imperial	5.00"	.875"					HUB075-090ZZ-B1DA2BCCA
10,000	Imperial	5.00"	1.125"					HUB100-090ZZ-B1FA2BCCA
1,800	Metric	70 mm	11 mm	HUB018-090ZZ-K6CA2BCCA				
1,800	Metric	70 mm	14 mm	HUB018-090ZZ-K6EA2BCCA				
7,500	Metric	102 mm	22 mm	HUB075-090ZZ-L6JA2BCCA				
10,000	Metric	140 mm	27 mm	HUB100-090ZZ-N6LA2BCCA				

* Additional feedback information on pages A21 thru A26.

A

Rack & Pinion Actuators

HUB Series

LTR Series

HTR Series

M Series



HUB **075** - **090** **Z** **Z** - **B** **1D** **12** **B** **A** **A** **A**

A
 Rack & Pinion
 Actuators
 HUB
 Series
 LTR
 Series
 HTR
 Series
 M
 Series

Rotary Actuator Series	
HUB	Hydraulic Unibody

Torque Output at 3000 PSI	
018	1,800 in-lb - .875 in bore (double rack)
075	7,500 in-lb - 1.5 in bore (double rack)
100	10,000 in-lb - 1.5 in bore (double rack)

Degrees Rotation	
090	90 Degrees

Cushion	
Z	None (std)

Stroke Adjusters	
Z	None (std)

Process Valve Mounting Pattern	
A	3.25 in (018 only), Imperial
B	5.00 in (075 and 100 only), Imperial
K	70 mm (018 only), Metric
L	102 mm (075 only), Metric
N	140 mm (100 only), Metric

See **TABLE 1** for proper combinations, additional information on page A16.

Shaft Configuration & Size	
1B	.625 in female square (018 only), Imperial
1D	.875 in female square (075 only), Imperial
1F	1.125 in female square (100 only), Imperial
6C	11 mm female square (018 only), Metric
6E	14 mm female square (018 only), Metric
6J	22 mm female square (075 only), Metric
6L	27 mm female square (100 only), Metric

See **TABLE 1** for proper combinations, additional information on page A17.

Port Type or Direct Mount Valve Modules	
12	SAE #6 straight thread
1B	SAE #6 straight thread with cross-over vent valve
1D	SAE #6 straight thread with counter-balance valve (pilot ratio 7:1)
A2	SAE #6 straight thread with D03 directional control valve ready (valve not included)

See **TABLE 2** for valves included with each option, additional information on pages A18 thru A20.

Seals	
B	4300 Polyurethane

Feedback	
A	Rotary linear potentiometer (RLPO), 0-40 VDC, position right (standard)
B	Rotary linear potentiometer (RLPO), 0-40 VDC, position left
C	StoneL, SST dual module
D	StoneL, 4-20 mA position transmitter
E	StoneL, SST dual module & 4-20 mA position transmitter
Z	No feedback

See **TABLE 3** for proper combinations, additional information on pages A21 thru A26.

Visual Indication	
A	Line on shaft (standard)
C	Color indicator (green on / red off)
Z	No feedback

See **TABLE 3** for proper combinations, additional information on pages A21 thru A26.

Engineering Level	
A	Current engineering level

How to build a Unibody - easy as 1, 2, 3 HUB075-090ZZ-B1D12BAAA

1. **All white font digits** of the HUB part number above are fixed and **never change**
2. To make the proper selection for the remaining digits **refer to the Tables below** that match the digit color.
3. Each table will show **only** the possible combinations of digits that can be placed together.

TABLE 1

		PROCESS VALVE MOUNTING PATTERN			
		HUB018	HUB075	HUB100	
SHAFT CONFIGURATION & SIZE	A	3.25 in	5.00 in		
	1B	.625 in	•		
	1D	.875 in		•	
	1F	1.125 in			
		K	70 mm	102 mm	140 mm
		L			
	N				
	6C	11 mm	•		
	6E	14 mm	•		
	6J	22 mm		•	
	6L	27 mm		•	

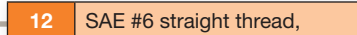
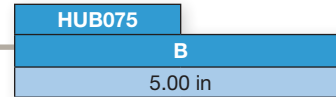


TABLE 2

		DIRECT MOUNT VALVE MODULES			
		Thread ports only	Cross-over vent valve included	Counter-balance valve included	Solenoid valve ready included
PORT TYPE	12	SAE #6 straight thread	•		
	1B	SAE #6 straight thread with cross-over vent valve		•	
	1D	SAE #6 straight thread with counter-balance valve (pilot ratio 7:1)		•	•
	A2	SAE #6 straight thread with D03 directional control valve ready (valve not incl)			•

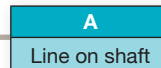
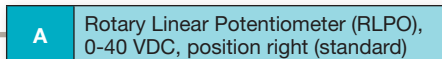


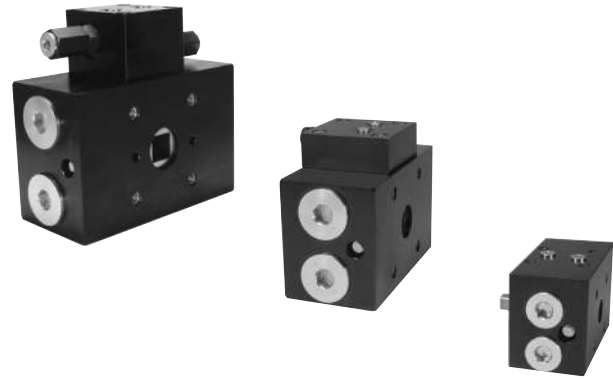
TABLE 3

		VISUAL INDICATION		
		A	C	Z
FEEDBACK	A	Line on shaft	Color indicator (green on / red off)	No visual indication
	B	•		
	C		•	
	D		•	
	E		•	
	Z	No feedback	•	•

HUB 075 -090ZZ- B 1D 12 B A A A

A	Rack & Pinion Actuators
HUB Series	
LTR Series	
HTR Series	
M Series	

The Hydraulic Unibody Series (HUB) actuator is a single piece housing/cylinder design that is able to perform in the harshest environmental conditions. Built with a hard coat anodized housing and through hardened, high strength alloy steel pinion and racks, this product is ideal for numerous applications where weather can be a factor. The HUB Series is designed with several add-on valve modules for lower overall integration costs, as well as, an increase in product performance. Multiple feedback and visual indication options are also available.



- Rack and pinion design provides excellent efficiency characteristics and minimizes HPU Size
- Direct mounting design to numerous process valves allows for minimal integration cost
- Integrated valve module options are available for increased performance and reduced plumbing cost
 - Cross-over vent module - allows for flow between both cylinder ports, thus allowing free rotation.
 - Counter-balance valve module with Cross-over vent - designed for load holding in both directions and preventing a run-away load situation from occurring. Also allows for flow between both cylinder ports.
 - D03 Solenoid ready module - manifold block directly mounted to actuator for reduced plumbing and increase in performance
- Numerous linear and positional feedback and visual indication options available
- Environmentally rugged for reliable performance in harsh conditions

Operating information

Maximum operating pressure:	3000 PSI (207 bar)
Standard rotation:	90°
Rotational tolerance:	-0°, +2°
Output torques @:	3000 PSI (207 bar) 1800 in-lb to 10,000 in-lb
Maximum breakaway pressure:	70 PSIG (4.8 bar)
Mounting orientation:	unrestricted
Operating temperature range:	Nitrile seals -40°F to 180°F (-40°C to 82°C)
Standard timing:	12:00 position at midstroke. See pages A12 through A15 for details.
Recommended filtration:	ISO class 17/14 or cleaner

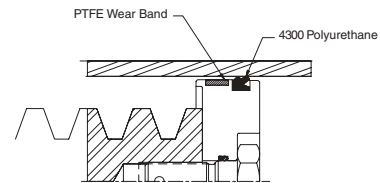
Output Torque Table

Double Rack Model	Maximum Pressure Rating PSI (bar)	Actual Output Torque in-lb (Nm) at Specified Pressure			Gear Train Rating Durability ⁽¹⁾ lbf-inch ⁽²⁾ PSID ⁽³⁾	Maximum Angular Backlash Minutes	Standard Rotation Degrees	Displacement in ³ (cm ³)	Standard Unit Weight lb (kg)	
		1000 PSI (69 bar)	2000 PSI (138 bar)	3000 PSI (207 bar)						
HUB018	3000 (207)	600 (68)	1200 (136)	1800 (203)	850	1420	45	90	1.13 (19)	10 (4.5)
HUB075	3000 (207)	2500 (283)	5000 (565)	7500 (848)	3330	1350	40	90	4.86 (79)	23 (10.4)
HUB100	3000 (207)	3300 (373)	6600 (746)	10000 (1130)	5725	1720	30	90	6.25 (102)	29 (13.2)

1. The durability is defined as the capacity of the gear set to support the stated load without fatigue related gear surface damage. Use the durability rating for high production duty of 1 million cycles and/or high speed applications (180° in less than three seconds or more than one cycle per minute).
2. Durability rated output torque.
3. Pressure differential between the inlet and outlet ports (non shock).

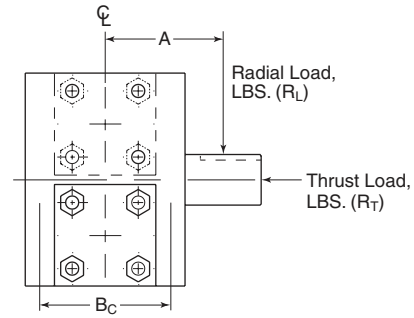
Seal Materials

Effective filtration is vital to the long life and satisfactory performance of a rotary actuator. If the piston seals of a rack and pinion rotary are worn or damaged, fluid which leaks past the piston will enter the gear housing. In the event of internal leakage into the gear housing, the pressure relief valve protects the shaft seal.



Seal class	Seal type	Wear ring type	Fluid medium	Temperature range	Pressure range	Filtration
Standard type 1	4300 Polyurethane U-cup	Filled PTFE	General purpose, Petroleum-based fluids	-40°F to 180°F (-40°C to 82°C)	3000 PSI 207 bar	Minimum ISO class 17/14 Cleanliness level

Bearing Load Capacities



Dynamic¹ Bearing Load Capacities vs. Operating Pressure

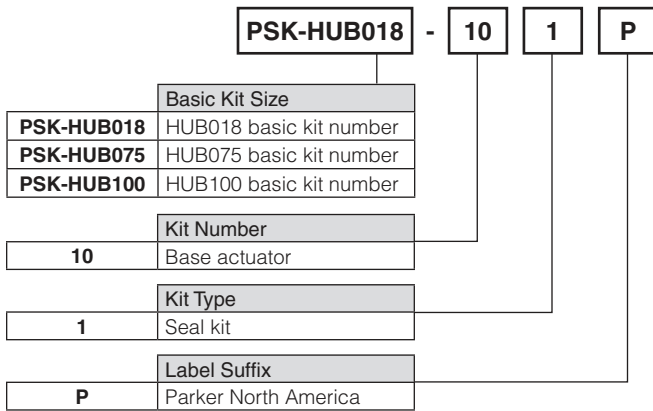
Model	Radial Load (lbs.) R_L (per bearing) @			Thrust Load (lbs.) R_T @			Bearing Centers (B_c)	Overhung Moment (in-lb) $R_L \times (A+B_c/2)$ @		
	1000 PSID (69 bar)	2000 PSID (138 bar)	3000 PSID (207 bar)	1000 PSID (69 bar)	2000 PSID (138 bar)	3000 PSID (207 bar)		1000 PSID (69 bar)	2000 PSID (138 bar)	3000 PSID (207 bar)
HUB018	4030 (278)	4030 (278)	4030 (278)	2790 (192)	2790 (192)	2790 (192)	0.62	2499 (172)	2499 (172)	2499 (172)
HUB075	6750 (465)	6750 (465)	6750 (465)	3830 (264)	3830 (264)	3830 (264)	1.06	7155 (493)	7155 (493)	7155 (493)
HUB100	8560 (590)	8560 (590)	8560 (590)	4460 (308)	4460 (308)	4460 (308)	1.02	8731 (602)	8731 (602)	8731 (602)

- NOTES: 1. Static bearing load capacities = dynamic values x 1.5
 2. Values listed are "Bearing" moment capacities. Standard male shaft sizes do not provide 4:1 design factor at these operating conditions. Larger shaft sizes are available. Consult factory for further details.

Lubrication

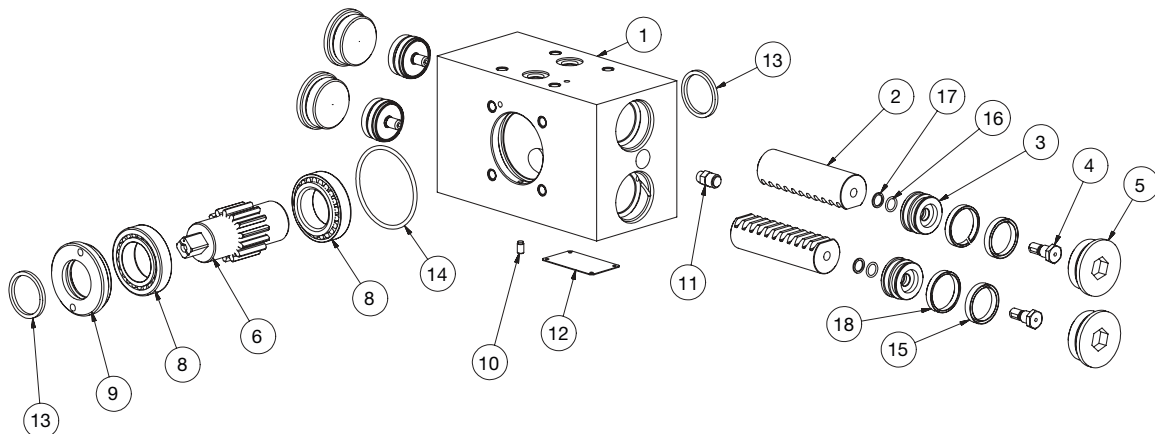
Low speed, high torque applications typically require class 5 or class 6 lubrication provisions. Parker rotary actuators are assembled with TEXACO MOLYTEX EP (2) extreme pressure grease. This grease should be replaced with each major overhaul.

Base Kit Ordering Information



Item #	Description	Qty	Item #	Description	Qty
1	Housing	1	11	Relief Valve	1
2	Rack	2	12	Name Plate	1
3*	Piston	4	13*	Quad Ring	2
4*	Rack Bolt	4	14*	O-ring	1
5	Plug, SAE	4	15*	Piston Seal	4
6	Pinion	1	16*	O-ring	4
8	Bearing	2	17*	Back-up Ring	4
9	Bearing Cap	1	18*	Wear Band (075 & 100 only)	4
10	SHSS	1			

* Items included in seal kit.

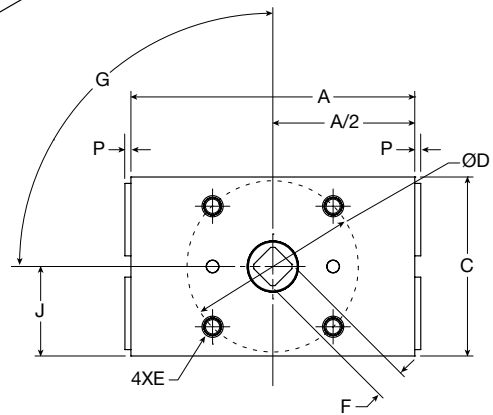
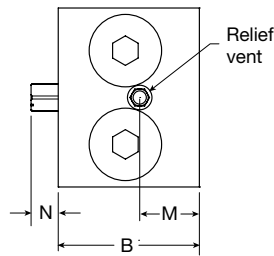
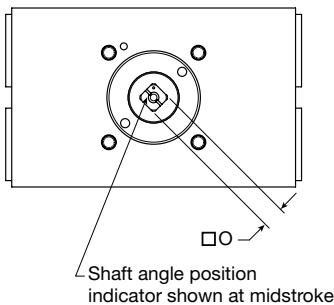
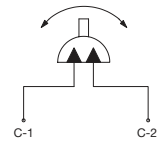
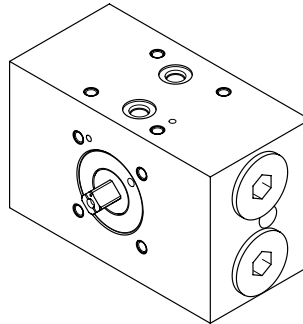
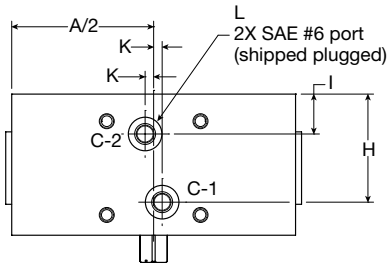


A
 Rack & Pinion Actuators
 HUB Series
 LTR Series
 HTR Series
 M Series

HUB Series

SAE #6 ports

A
 Rack & Pinion
 Actuators
 HUB
 Series
 LTR
 Series
 HTR
 Series
 M
 Series



HUB075 series shown above.

Dimensions, inch (mm)

Model	A	B	C	D	E†	F	D	E†	F	G	H	I	J
HUB018	6.18 (156.9)	3.20 (81.3)	4.13 (104.9)	3.250	3/8-16 X .56 Deep	.625 Nominal	70	M8 X 12 Deep	11 or 14mm	90°	2.39 (6.07)	1.01 (25.6)	1.81 (46.05)
HUB075	8.33 (211.6)	4.14 (105.2)	5.25 (133.4)	5.000	1/2-13 X .50 Deep	.875 Nominal	102	M10 X 15 Deep	22mm	90°	3.17 (80.5)	1.17 (29.7)	2.63 (66.80)
HUB100	9.50 (241.3)	4.14 (105.2)	6.00 (152.4)	5.000	1/2-13 X .50 Deep	1.13 Nominal	140	M16 X 24 Deep	27mm	90°	3.17 (80.5)	1.17 (29.7)	3.00 (76.20)
Model	K	L	M	N	O	P							
HUB018	0.25 (6.4)	SAE #6	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)							
HUB075	0.25 (6.4)	SAE #6	0.87 (22.1)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)							
HUB100	0.25 (6.4)	SAE #6	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)							

Imperial housings and shafts only.

Metric housing and shafts only.

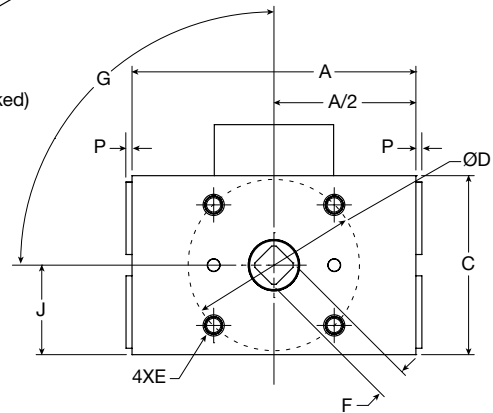
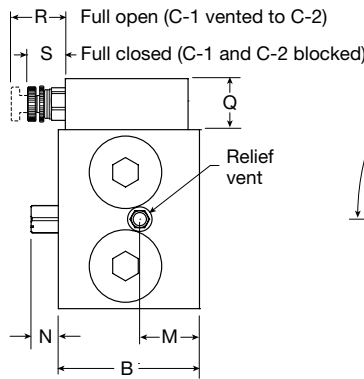
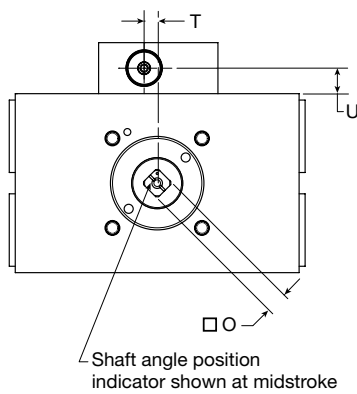
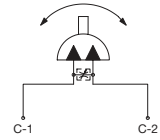
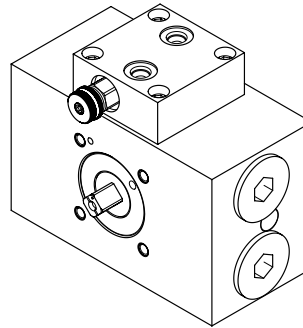
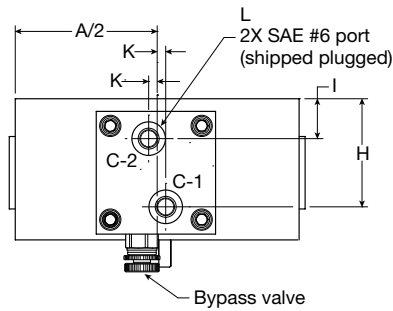
† Thread depth is for Helicoil hole depth may be longer.

2D & 3D CAD for all variations available for download at www.parker.com/pneu/hub



HUB Series

SAE #6 ports with cross-over vent module



HUB075 series shown above.

Dimensions, inch (mm)

Model	A	B	C	D	E†	F	D	E†	F	G	H	I	J
HUB018	6.18 (156.9)	3.20 (81.3)	4.13 (104.9)	3.250	3/8-16 X .56 Deep	.625 Nominal	70	M8 X 12 Deep	11 or 14mm	90°	2.30 (58.42)	1.01 (25.65)	1.83 (46.48)
HUB075	8.33 (211.6)	4.14 (105.2)	5.25 (133.4)	5.000	1/2-13 X .50 Deep	.875 Nominal	102	M10 X 15 Deep	22mm	90°	3.17 (80.5)	1.17 (29.7)	2.63 (66.80)
HUB100	9.50 (241.3)	4.14 (105.2)	6.00 (152.4)	5.000	1/2-13 X .50 Deep	1.13 Nominal	140	M16 X 24 Deep	27mm	90°	3.17 (80.5)	1.17 (29.7)	3.00 (76.20)
Model	K	L	M	N	O	P	Q	R	S	T	U		
HUB018	0.25 (6.4)	SAE #6	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	1.50 (38.1)	1.45 (36.8)	1.25 (31.7)	0.38 (9.6)	0.75 (19.1)		
HUB075	0.25 (6.4)	SAE #6	0.87 (22.1)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	1.50 (38.1)	1.45 (36.8)	1.25 (31.7)	0.42 (10.67)	0.75 (19.1)		
HUB100	0.25 (6.4)	SAE #6	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	1.50 (38.1)	1.45 (36.8)	1.25 (31.7)	0.42 (10.67)	0.75 (19.1)		

Imperial housings and shafts only.

Metric housing and shafts only.

† Thread depth is for Helicoil hole depth may be longer.

2D & 3D CAD for all variations available for download at www.parker.com/pneu/hub



A

**Rack & Pinion
 Actuators**

**HUB
 Series**

**LTR
 Series**

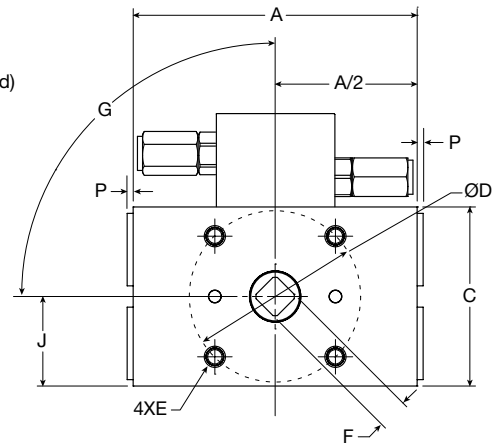
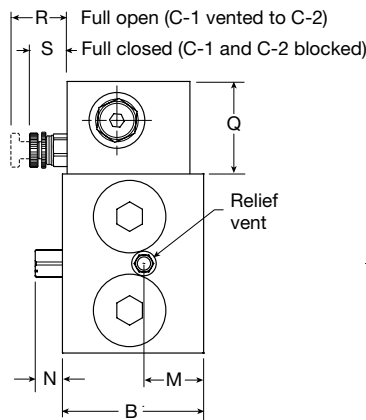
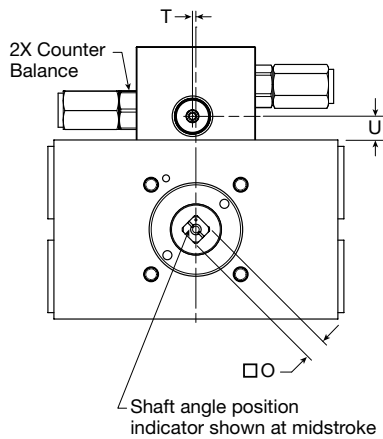
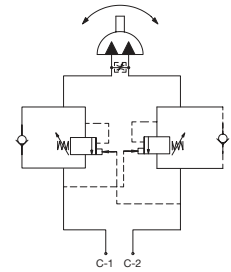
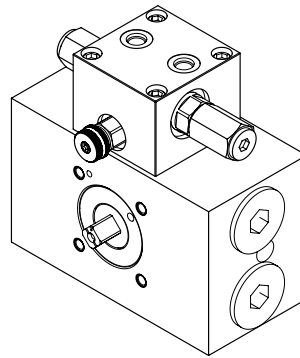
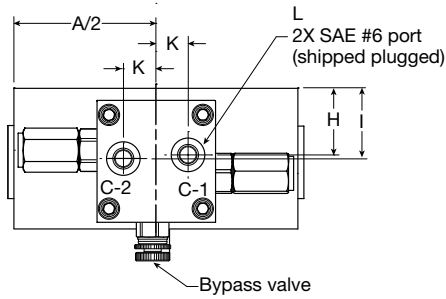
**HTR
 Series**

**M
 Series**

HUB Series

SAE #6 ports with counter-balance valve module

A
 Rack & Pinion
 Actuators
 HUB
 Series
 LTR
 Series
 HTR
 Series
 M
 Series



HUB075 series shown above.

Dimensions, units (mm)

Model	A	B	C	D	E†	F	D	E†	F	G	H	I	J	K	L
HUB018	6.18 (156.9)	3.20 (81.3)	4.13 (104.9)	3.250	3/8-16 X .56 Deep	.625 Nominal	70	M8 X 12 Deep	11 or 14mm	90°	1.53 (38.9)	1.66 (42.16)	1.81 (45.97)	0.68 (17.27)	SAE #6
HUB075	8.33 (211.6)	4.14 (105.2)	5.25 (133.4)	5.000	1/2-13 X .50 Deep	.875 Nominal	102	M10 X 15 Deep	22mm	90°	1.97 (50.0)	2.07 (52.6)	2.63 (66.80)	0.80 (20.3)	SAE #6
HUB100	9.50 (241.3)	4.14 (105.2)	6.00 (152.4)	5.000	1/2-13 X .50 Deep	1.13 Nominal	140	M16 X 24 Deep	27mm	90°	1.97 (50.0)	2.07 (52.6)	3.00 (76.20)	0.80 (20.3)	SAE #6
Model	M	N	O	P	Q	R	S	T	U						
HUB018	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	2.73 (69.3)	1.45 (36.8)	1.25 (31.7)	0.1 (2.5)	0.80 (20.3)						
HUB075	0.87 (22.1)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	2.73 (69.3)	1.45 (36.8)	1.25 (31.7)	0.1 (2.5)	0.69 (17.5)						
HUB100	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	2.73 (69.3)	1.45 (36.8)	1.25 (31.7)	0.1 (2.5)	0.69 (17.5)						

Imperial housings and shafts only.

Metric housing and shafts only.

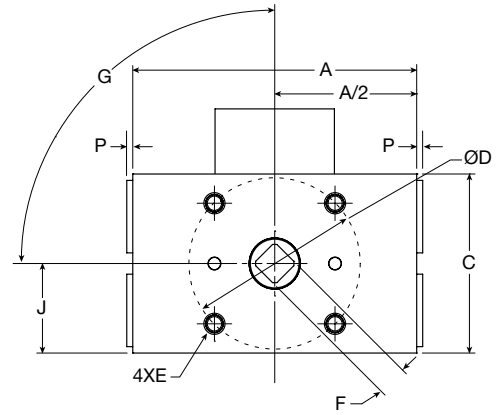
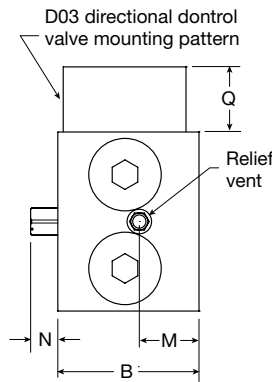
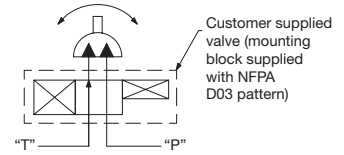
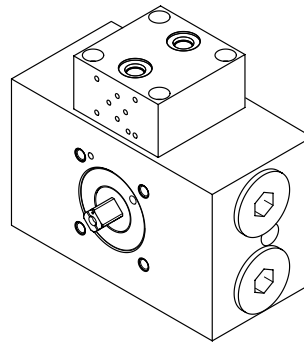
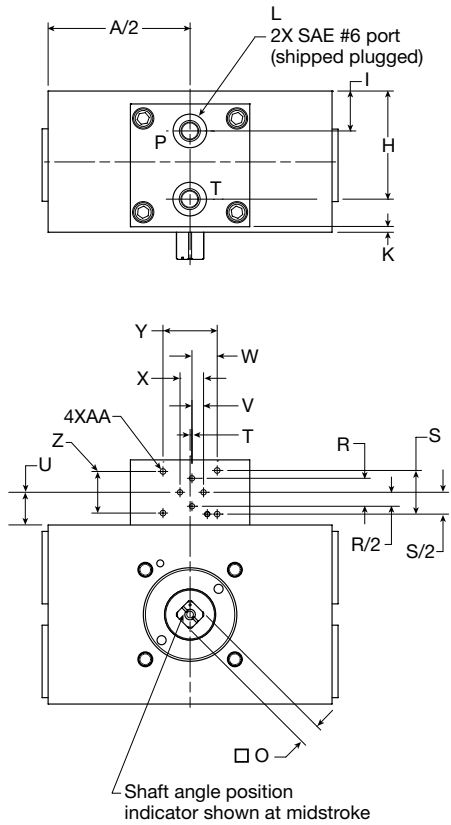
† Thread depth is for Helicoil hole depth may be longer.

2D & 3D CAD for all variations available for download at www.parker.com/pneu/hub



HUB Series

SAE #6 ports with D03 directional control valve ready



Dimensions, inches (mm)

Model	A	B	C	D	E†	F	D	E†	F	G	H	I	J	K	L
HUB018	6.18 (156.9)	3.20 (81.3)	4.13 (104.9)	3.250	3/8-16 X .56 Deep	.625 Nominal	70	M8 X 12 Deep	11 or 14mm	90°	2.4 (60.96)	1.0 (25.40)	3.09 (78.5)	0.1 (2.54)	SAE #6
HUB075	8.33 (211.6)	4.14 (105.2)	5.25 (133.4)	5.000	1/2-13 X .50 Deep	.875 Nominal	102	M10 X 15 Deep	22mm	90°	3.2 (81.3)	1.2 (30.48)	4.16 (105.7)	0.1 (2.54)	SAE #6
HUB100	9.50 (241.3)	4.14 (105.2)	6.00 (152.4)	5.000	1/2-13 X .50 Deep	1.13 Nominal	140	M16 X 24 Deep	27mm	90°	3.2 (81.3)	1.2 (30.48)	4.75 (120.6)	0.1 (2.54)	SAE #6
Model	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
HUB018	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	2.10 (53.3)	0.82 (20.8)	1.28 (35.5)	0.055 (1.39)	0.95 (24.1)	0.34 (8.63)	0.74 (18.8)	0.69 (17.5)	1.59 (40.4)	1.22 (30.99)	M5 X 10mm Deep
HUB075	0.87 (22.1)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	1.90 (48.3)	0.82 (20.8)	1.28 (35.5)	0.055 (1.39)	0.95 (24.1)	0.34 (8.63)	0.74 (18.8)	0.69 (17.5)	1.59 (40.4)	1.22 (30.99)	M5 X 10mm Deep
HUB100	0.80 (20.3)	0.8 (20.3)	0.63 (16.0)	0.2 (5.1)	1.90 (48.3)	0.82 (20.8)	1.28 (35.5)	0.055 (1.39)	0.95 (24.1)	0.34 (8.63)	0.74 (18.8)	0.69 (17.5)	1.59 (40.4)	1.22 (30.99)	M5 X 10mm Deep

Imperial housings and shafts only.

Metric housing and shafts only.

Reference only - see D03 specifications for exact dimensions.

† Thread depth is for Helicoil hole depth may be longer.

2D & 3D CAD for all variations available for download at www.parker.com/pneu/hub

A

Rack & Pinion Actuators

HUB Series

LTR Series

HTR Series

M Series



Unibody Process Valve Mounting Table

	Unibody Size (4, 5, 6)	Process Valve & Shaft Config (14, 15, 16)	Process Valve						Pattern Size	Mounting Hole Dia	Shaft Configuration	Female (Square or DD) Size	
			ABZ	WECO	SPM	Demco	VDI/VDE 3845 ISO 5211	Fisher					Econosto
A Rack & Pinion Actuators	Imperial 018	A1B		X	X				3.250	3/8-16	Female Square	0.625	
		A2A	X								Female DD	0.563 x 0.375	
		A2B				X					Female DD	0.625 x 0.375	
		A2C	X								Female DD	0.625 x 0.438	
		A2F				X					Female DD	0.838 x 0.500	
	075	B1D		X	X				5.000	1/2-13	Female Square	0.875	
		B2F				X					Female DD	0.838 x 0.500	
		B2G	X								Female DD	0.875 x 0.625	
		B2H				X					Female DD	0.963 x 0.625	
	HUB Series 100	B1F		X	X				5.000	1/2-13	Female Square	1.13	
B2J					X			Female DD			1.338 x 0.75		
Metric 018	J6C					X		50	M6	Female Square	11		
	J6E					X				Female Square	14		
	K6C					X	X	70	M8	Female Square	11		
	K6E					X	X			X	Female Square	14	
	K7E					X					Female DD	18.1 x 14.0	
	075	L6C						X	102	M10	Female Square	11	
		L6E					X	X			Female Square	14	
		L6G					X				Female Square	17	
		L6H					X	X			Female Square	19	
		L6J					X	X			X	Female Square	22
L7J						X					Female DD	28.2 x 22.0	
M6E							X	125			M12	Female Square	14
M6G						X						Female Square	17
M6H					X	X	Female Square		19				
M6J					X	X	Female Square		22				
100	N6H						X	140	M16	Female Square	19		
	N6J					X	X			Female Square	22		
	N6L					X	X			Female Square	27		
	N7L					X			Female DD	36.2 x 27.0			
	R6H						X	165	M20	Female Square	19		
	R6J						X			Female Square	22		
	R6L					X	X			Female Square	27		

Others available upon request.

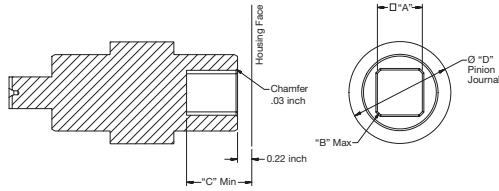
For additional process valves not shown, consult factory for proper mounting considerations.

Part numbers are standard.

These options are available upon request. Consult factory for additional information, pricing and leadtime.

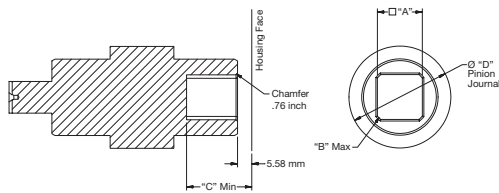
Shaft Options

**Female Square (Imperial) –
 Option 1**



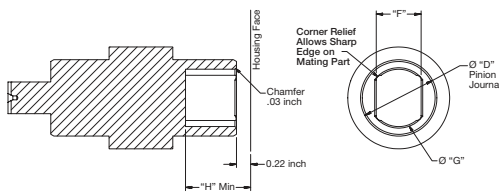
Unibody Size (4, 5, 6)	Shaft Config & Size (14, 15, 16)	A (inch)		B (inch)	C (inch)	D (inch)	
		Dim	Tol			Dim	Tol
018	A1B	0.625	+0.005 / +.007	0.06	1.32	0.999	+0 / -.001
075	B1D	0.875	+0.005 / +.007	0.04	1.42	1.499	+0 / -.001
100	B1F	1.125	+0.005 / +.007	0.04	1.42	1.780	+0 / -.001

**Female Square (Metric) –
 Option 6**



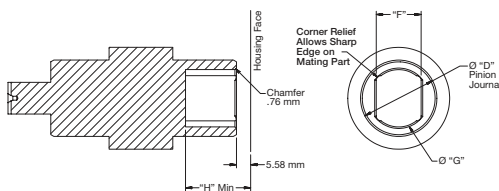
Unibody Size (4, 5, 6)	Shaft Config & Size (14, 15, 16)	A (mm)		B (mm)	C (mm)	D (inch)	
		Dim	Tol			Dim	Tol
018	K6C	11	+0.13 / +.18	1.0	23.6	0.999	+0 / -.001
	K6D	12	+0.13 / +.18	1.0	26.0	0.999	+0 / -.001
	K6E	14	+0.13 / +.18	1.1	29.0	0.999	+0 / -.001
	K6F	16	+0.13 / +.18	1.1	29.0	0.999	+0 / -.001
075	L6C	11	+0.13 / +.18	1.0	23.6	1.499	+0 / -.001
	L6E	14	+0.13 / +.18	1.1	29.0	1.499	+0 / -.001
	L6G	17	+0.13 / +.18	1.1	29.0	1.499	+0 / -.001
	L6H	19	+0.13 / +.18	1.2	29.0	1.499	+0 / -.001
100	L6J	22	+0.13 / +.18	1.4	31.0	1.499	+0 / -.001
	N6H	19	+0.13 / +.18	1.2	29.0	1.780	+0 / -.001
	N6J	22	+0.13 / +.18	1.4	31.0	1.780	+0 / -.001
	N6L	27	+0.13 / +.18	1.4	32.6	1.780	+0 / -.001
100	R6H	19	+0.13 / +.18	1.2	29.0	1.780	+0 / -.001
	R6J	22	+0.13 / +.18	1.4	31.0	1.780	+0 / -.001
	R6L	27	+0.13 / +.18	1.4	32.6	1.780	+0 / -.001

**Female Double D (Imperial) –
 Option 2**



Unibody Size (4, 5, 6)	Shaft Config & Size (14, 15, 16)	F (inch)		G (inch)		H (inch)	D (inch)	
		Dim	Tol	Dim	Tol		Dim	Tol
018	A2A	0.375	+0.003 / +.005	0.500	+0.005 / +.007	1.32	0.999	+0 / -.001
	A2B	0.375	+0.003 / +.005	0.563	+0.005 / +.007	1.32	0.999	+0 / -.001
	A2C	0.375	+0.003 / +.005	0.625	+0.005 / +.007	1.32	0.999	+0 / -.001
	A2D	0.438	+0.003 / +.005	0.625	+0.005 / +.007	1.32	0.999	+0 / -.001
	A2F	0.500	+0.003 / +.005	0.838	+0.005 / +.007	1.32	0.999	+0 / -.001
075	B2F	0.500	+0.003 / +.005	0.838	+0.005 / +.007	1.40	1.499	+0 / -.001
	B2G	0.625	+0.003 / +.005	0.875	+0.005 / +.007	1.40	1.499	+0 / -.001
	B2H	0.625	+0.003 / +.005	0.963	+0.005 / +.007	1.40	1.499	+0 / -.001
100	B2H	0.625	+0.003 / +.005	0.963	+0.005 / +.007	1.40	1.780	+0 / -.001
	B2J	0.750	+0.003 / +.005	1.338	+0.005 / +.007	1.40	1.780	+0 / -.001

**Female Double D (Metric) –
 Option 7**



Unibody Size (4, 5, 6)	Shaft Config & Size (14, 15, 16)	F (mm)		G (mm)		H (mm)	D (inch)	
		Dim	Tol	Dim	Tol		Dim	Tol
018	K7E	14	+0.08 / +.13	18.1	+0.13 / +.18	25.6	0.999	+0 / -.001
075	L7J	22	+0.08 / +.13	28.2	+0.13 / +.18	39.6	1.499	+0 / -.001
100	N7L	27	+0.08 / +.13	36.2	+0.13 / +.18	48.6	1.780	+0 / -.001

Others available upon request.
 Customer is responsible for proper sizing and selection of mating shaft.

- Part numbers are standard.
- These options are available upon request. Consult factory for additional information, pricing and leadtime.

A

Rack & Pinion Actuators

HUB Series

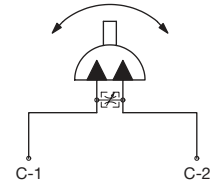
LTR Series

HTR Series

M Series

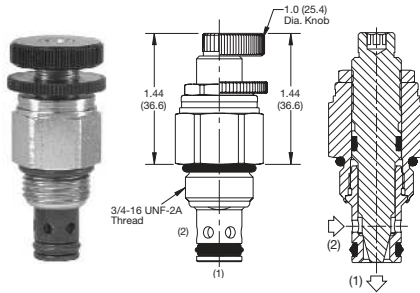
Technical Data

The HUB Cross-over module is designed to allow free flow between ports C-1 and C-2 when open. This module can be ordered at the same time as the base actuator (as one finished good part number) or later with an upgrade kit. Similar to the HUB actuator, this module is designed with a hard coat anodized housing that is reliable in harsh environmental conditions. This module also utilizes Parker's proven needle valve cartridge product from Hydraulic Cartridge Systems Division.



Cartridge Features

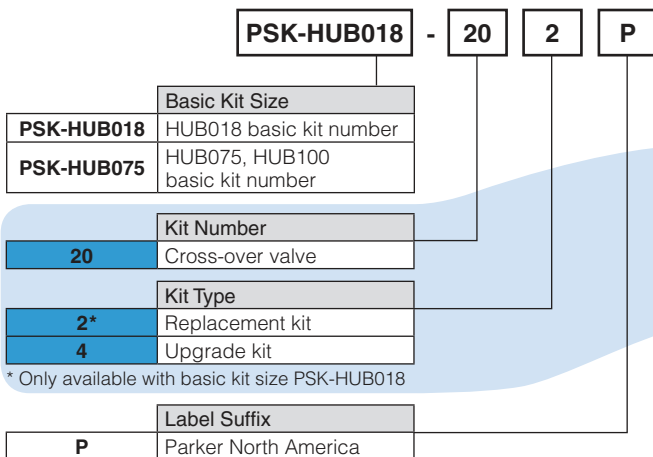
- Hardened, precision ground parts for durability
- Compact size for reduced space requirements
- Fine adjustment needle with locking nut
- Polyurethane "D"-Ring eliminates backup rings and prevents hydrolysis
- All external parts zinc plated



Operating information

Maximum operating pressure:	3000 PSI (207 bar)
Cartridge material:	All parts steel, operating parts hardened steel
Operating temperature range:	-40°F to 180°F (-45°C to 82°C)
Fluid compatibility / viscosity:	Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)
Filtration:	ISO code 16/13 SAE Class 4 or better

Kit Ordering Information



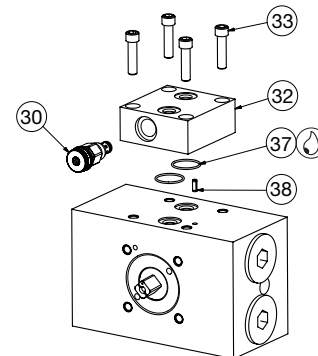
SEE TABLE FOR ALL POSSIBLE KIT COMBINATIONS

Item #	Description	Qty
30	Cross-over vent valve	1
32A	Cross-over vent block, size 018	1
32B	Cross-over vent block, size 075, 100	1
33	Cap screw	4
37	O-ring	2
38	3/16 x 3/4, SS spring pin	1

Cross-over Vent Module Kit Table

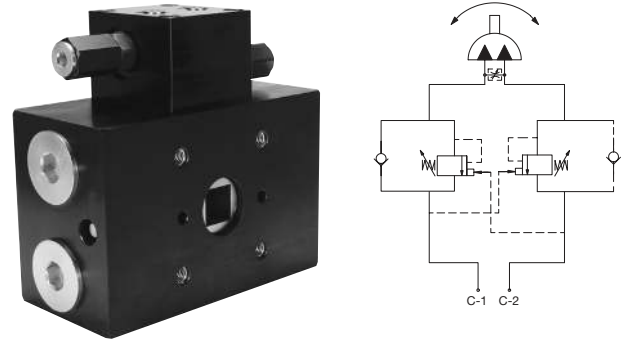
		ORIGINAL ACTUATOR PURCHASED			
		12	1B	1D	A2
HUB Kit Number & Type	202	Base unit	with Cross-over module	with C-balance module	with Sol ready module
	204	Cross-over Valve Replacement Kit	30	30	
		Cross-over Valve Upgrade Kit	30, 32, 33 (4), 37 (2), 38		

Item numbers and quantities included in each kit.



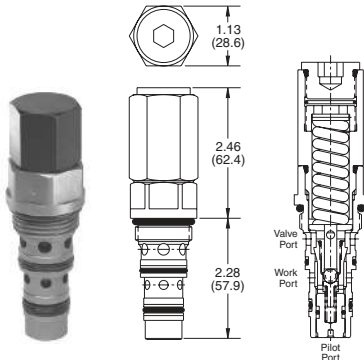
Technical Data

The HUB Counter-balance module with Cross-over vent is designed for load holding in both directions of actuation and prevents a run-away load situation from occurring. This module is available as part of a finish good actuator or can be integrated in the field with an upgrade kit. As with all other HUB options, this module is designed with a hard coat aluminum housing for durability in harsh conditions. The Counter-balance module also includes the cross-over functionality that was described on pages A18-A19. Similarly, this module allows free flow between ports C-1 and C-2 of the actuator when the needle valve is backed out. This module also incorporates Parker's proven valve technology from Hydraulic Cartridge Systems Division for the counter-balance valve.



Cartridge Features

- Conical Poppet design provides longer metering stroke for stable operation
- Hardened seat provides reliable load holding
- Tamper resistant cap for added safety and security
- All external parts zinc plated
- Non-vented Counter-balance with adjustability

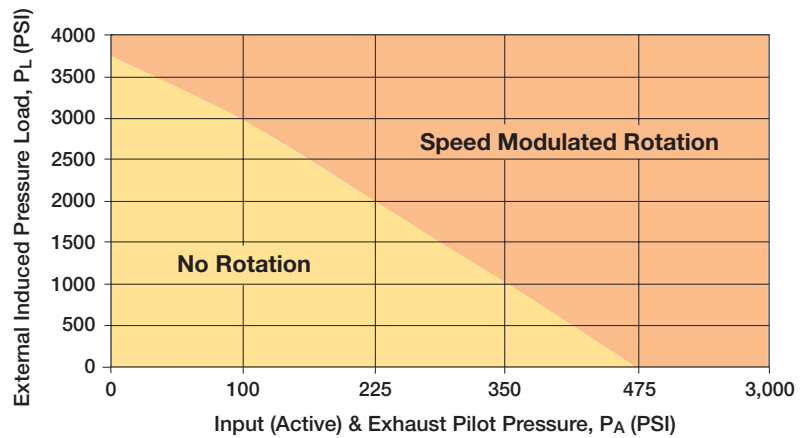
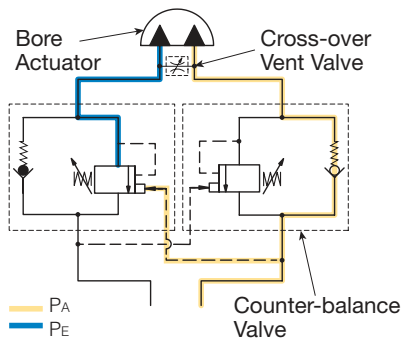


Operating information

Maximum operating pressure:	3000 PSI (207 bar)
Leakage at 150 SSU (32 cSt):	5 drops/min. (.33 cc/mm) @ 80% of thermal crack pressure
Cartridge material:	All parts steel, operating parts hardened steel
Operating temperature range:	Nitrile -40°F to 180°F (-45°C to 82°C)
Fluid compatibility / viscosity:	Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)
Filtration:	ISO code 16/13 SAE Class 4 or better

A
Rack & Pinion Actuators
HUB Series
LTR Series
HTR Series
M Series

Movement of actuator with counter-balance valves

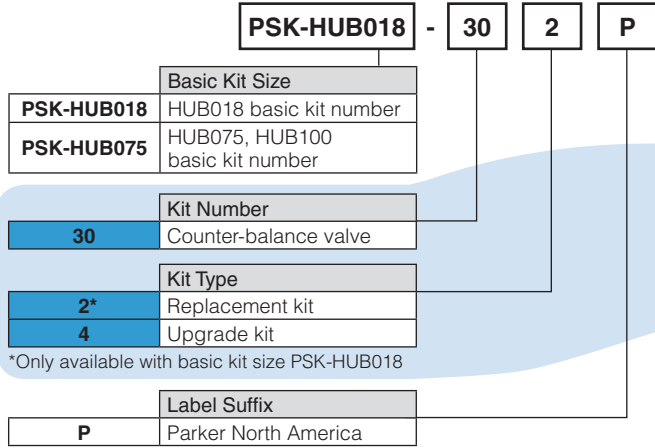


PA Input (active) & exhaust pilot pressure (psi)
 PE Sum of pressures in exhaust chamber (psi)
 PL External induced pressure load (psi)
 PR Reaction pressure in exhaust chamber from PA (psi)

$P_R = P_A + P_{friction}$
 $P_E = P_L + P_R$



Counter-balance Module Kit Ordering Information

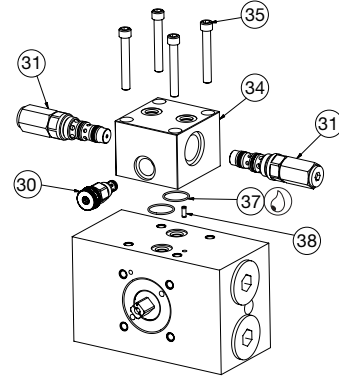


SEE TABLE FOR ALL POSSIBLE KIT COMBINATIONS

Item #	Description	Qty
30	Cross-over vent valve	1
31	Counter-balance valve	2
34A	Cross-over / Counter-balance valve block, size 018	1
34B	Cross-over / Counter-balance valve block, size 075, 100	1
35	Cap screw	4
37	O-ring	2
38	3/16 x 3/4, SS spring pin	1

Counter-balance Valve Module Kit Table		ORIGINAL ACTUATOR PURCHASED			
		12	1B	1D	A2
HUB Kit Number & Type	302			31 (1)	
	304	30, 31 (2), 34, 35 (4), 37 (2), 38			

Item numbers and quantities included in each kit.



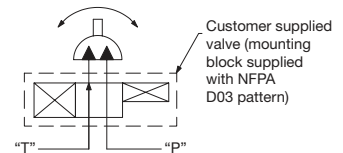
D03 Directional Control Valve Ready Technical Data

The HUB solenoid ready module is a hard coated anodized aluminum block that allows for D03 valves to be mounted directly to the actuator. This option is ideal for applications with limited available space. The reduced plumbing required is also a cost savings during integration. Similar to the HUB's other options, this module can be ordered as part of the original actuator or added on later with an upgrade kit.

Operating information

Maximum operating pressure:	3000 PSI (207 bar)
Mounting orientation:	Unrestricted
Operating temperature range:	-40°F to 180°F (-45°C to 82°C)

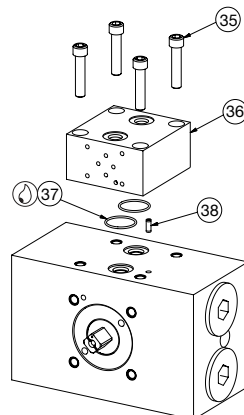
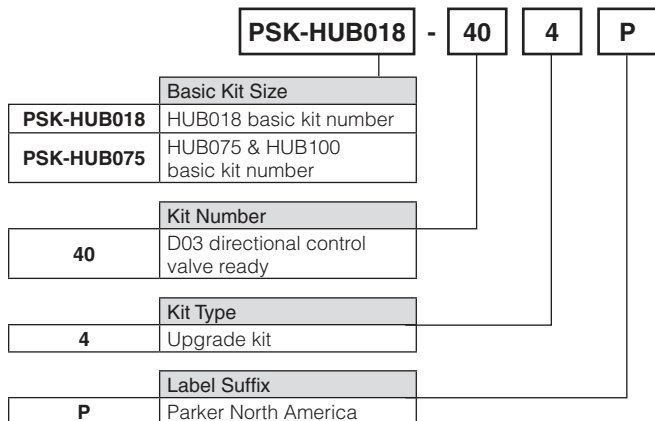
Without solenoid valve (standard)



Shown with solenoid valve for reference only.



D03 Directional Control Valve Ready Kit Ordering Information



Item #	Description	Qty
35	Cap screw	4
36A	Solenoid block, size 018	1
36B	Solenoid block, size 075, 100	1
37	O-ring	2
38	3/16 x 3/4, SS spring pin	1

Rotary Linear Potentiometer Feedback

0-40 VDC linear position feedback (RLPO)

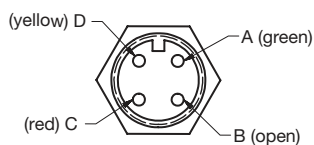
Parker's 0-40 VDC linear position feedback solution is accurate, reliable, and designed to handle the harshest environmental conditions. The robust hard coat anodized aluminum construction and electroless nickel plated (ENP) steel components make this feedback option ideal for use in corrosive outside environments. With a low profile design, this solution is perfect for applications where space is a premium.

- **Environmentally rugged** – Hard coat anodized aluminum module and electroless nickel plated (ENP) steel components that are designed to withstand the harshest environmental conditions.
- **Direct mounting to output shaft** – Cam coupled design provides precision rotation position for accurate feedback.
- **Low profile design** - Clearance above the actuator is critical in many systems. The Parker RLPO feedback module has a less than 2" height requirement.
- **Redundancy capabilities for additional safety requirements** – Additional plugged port located opposite the RLPO unit that can be used for a second RLPO unit.

Specifications

Electrical	
Resistance values	10 K ohms
Resistance tolerance (standard)	± 15%
Linearity tolerance (standard)	± 2%
Resolution	Essentially infinite (<0.01 mm)
Output smoothness	< 0.1% against input voltage
Power @ 40°	0.2W
Temperature coefficient of element	40 ppm/K
Contact resistance variation	< 2%
Insulation resistance	> 1,000 Mohm @ 500 VDC
Dielectric strength	1 minute @ 500 VAC
Maximum wiper current	1mA
Recommended wiper current	< 1µA

Receptacle Pin Layout



Potentiometer Linear Motion

Compact linear motion potentiometer features long life with high resolution conductive plastic element. Shaft spring to ensure the shaft is fully extracted for repeatability and reliability.

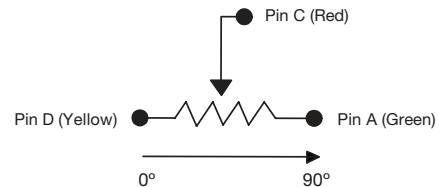
Operating information

Operating temperature range:	-13°F to 221°F (-25°C to 105°C)
Storage temperature:	-40°F to 257°F (-40°C to 125°C)
IP protection grade	IP67
Connector material:	Stainless steel
Connector type:	4 pin w/ 7/8-20 UNEF (based on MIL-DTL-5015)

Mechanical

Mechanical stroke (mm)	7.0
Life expectancy, shaft cycles	20 million
Vibration	15 g/10 Hz to 2,000 Hz
Shock	50 g/11ms

Wiring Diagram



Typical valve position	Resistance (KΩ)	
	Pin D - common Pin A - positive Across D to C	Pin D - positive Pin A - common Across A to C
0°	7.2	2.9
90°	1	9.2

Stonel®

Valve Communication Solutions **Quartz**

Dual module solid state or 4-20 mA position feedback

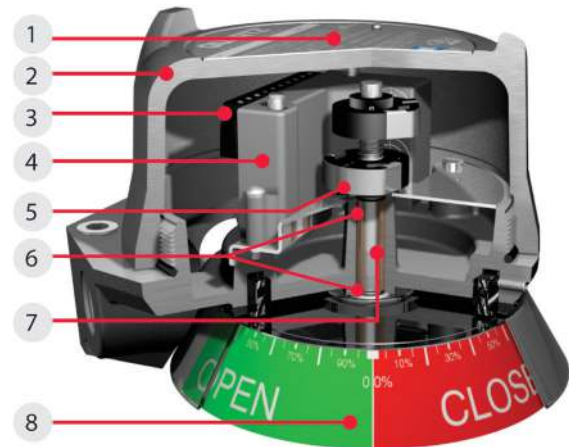
The Stonel Quartz series is durable, corrosion-resistant, and versatile, making it ideal for most of your process valve monitoring requirements. The robust epoxy coated anodized aluminum construction makes this platform extremely durable and well suited for use in corrosive, heavy wash down environments. This versatile platform adapts to a wide variety of valve systems. The QX explosion proof version is offered as the standard that will be provided from the factory fully mounted and positioned. Nonincendive and intrinsically options are available upon request.

The explosion-proof, water tight and corrosion-resistant enclosure is approved for use in div. 1/zone 1 hazardous areas.

- 1. Enclosure optimized for environment** – Explosion proof, water tight and corrosion resistant cover
- 2. Rapid enclosure access** – Screw-on cover allows quick enclosure access, saving you valuable maintenance and set-up time. The cover provides a vapor tight seal and allows entry to internal components in less than five seconds.
- 3. Faster wiring** – Pre-wired and labeled terminal strip enables quick, convenient attachment of field wires.
- 4. Wide variety of switching & communication** – Dual module sensors and communication standard, as well as, continuous signal output available in a 4 to 20 mA position transmitter.
- 5. Quick set cams are easy to adjust** – Touch and tune switch settings allow you to make adjustments in seconds without the use of tools.
- 6. Dual shaft o-ring seals eliminate corrosion** – Top inner and bottom outer shaft o-rings seal the drive bushing from both external corrosives and internal contaminants that enter the enclosure.
- 7. Special drive bushing assures long cycle life** – The oil impregnated bronze bushing maintains smooth operation and eliminates the potential for shaft seizure due to actuator shaft eccentricity.
- 8. Space saving visual indication** – Visual indicator offers excellent view ability without sacrificing accessibility or adding to space requirements.

Space saving low profile design

Clearance above the actuator is critical in complex piping systems. The Quartz series clearly displays valve position and encloses all electrical components in an explosion proof compartment with less than 5" clearance requirement.



For more information regarding this product series please visit Stonel's website – www.Stonel.com

StoneL Valve Communication

Dual module system

The Quartz series is available with the dual module as one of its various configurations. Two solid state sensors and/ or communications and other electronics are sealed in for the ultimate in reliability and convenience.

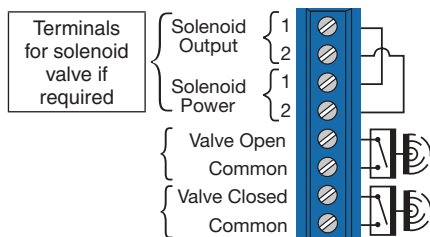


Specifications - Switching and sensors

SST switching sensors (C)	
Configuration	(2) SST solid state sensors Wire termination for one solenoid
Operation	NO/NC (cam selectable)
Maximum current inrush	2.0 amps @ 125 VAC / VDC
Maximum current continuous	0.3 amps @ 125 VAC / VDC
Minimum on current	2.0 mA
Maximum leakage current	0.5 mA
Voltage range	8 to 125 VDC 24 to 125 VAC
Maximum voltage drop	6.5 volts @ 10 mA 7.0 volts @ 100 mA

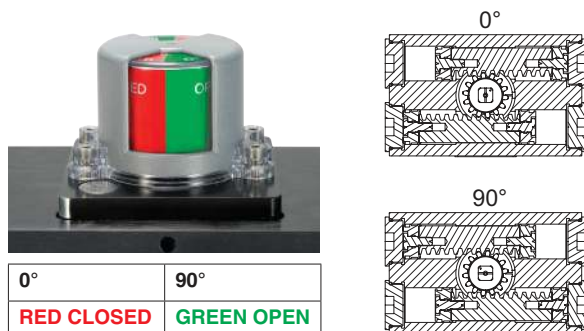
Wiring diagram (C)

SST



Visual Indicators

Available with the Quartz Series or as a stand-alone unit. Clearly view valve position status from up to 75 feet. The indicator's rugged polycarbonate construction makes it resistant to physical damage and tolerant to most corrosives.



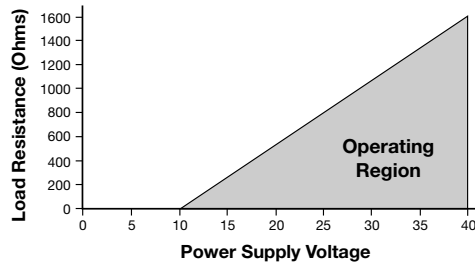
For more information regarding this product series please visit StoneL's website – www.StoneL.com

Position transmitter - 4 to 20 mA

Position transmitters provide a precise 4 to 20 mA signal on a two-wire DC loop. Control valves and dampers are accurately monitored through their range of travel offering assurance of exact valve position at all times.



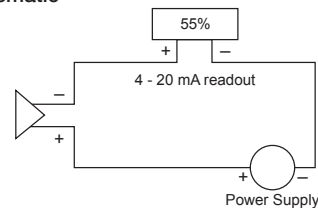
Load Curve



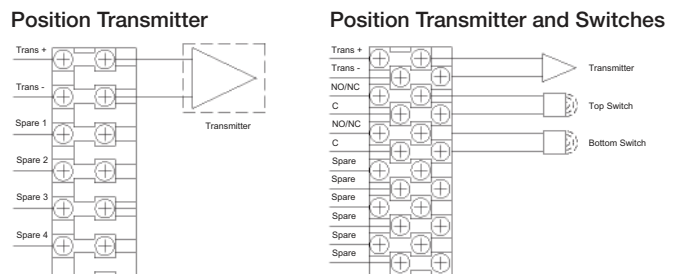
Specifications - Position transmitter

Position transmitter (D, E)	
Output	2-wire 4 to 20 mA
Supply source	10 to 40 VDC
Span range	35° to 270° (adjustable) Consult factory for special requirements
Maximum loading	700 ohm @ 24 VDC
Linearity error	+/- 0.85" maximum
Cycle life	2 million rotations
Vibration tolerance	Acceptable

Electrical schematic



Wiring diagram (D, E)



A	Rack & Pinion Actuators
HUB	HUB Series
LTR	LTR Series
HTR	HTR Series
M	M Series

A
 Rack & Pinion
 Actuators
 HUB
 Series
 LTR
 Series
 HTR
 Series
 M
 Series

Feedback Options Table		A, B	C	D	E	
Description		RLPO Potentiometer	StoneL Quartz, SST dual module	StoneL Quartz, 4-20 mA position transmitter	StoneL Quartz, SST dual module with 4-20 mA position transmitter	
Replacement kit part numbers (SENSOR ONLY)		PSK-HUB018-502P	PSK-HUB018-512P	PSK-HUB018-522P	PSK-HUB018-532P	
Upgrade kit part numbers - conversion from an existing actuator with no feedback to one with feedback			PSK-HUB018-514P	PSK-HUB018-524P	PSK-HUB018-534P	
			PSK-HUB075-514P	PSK-HUB075-524P	PSK-HUB075-534P	
			PSK-HUB100-514P	PSK-HUB100-524P	PSK-HUB100-534P	
Max electrical load		0.2W @ 70°C	0.3A @ 125 VAC/VDC	700 Ohms @ 24 VDC	Same option as C & D	
Sensor technology		Potentiometer	Solid State Sensors	Potentiometer	Solid State Sensors with Potentiometer	
Input		10-40 VDC	8-125 VDC, 24-125 VAC	10-40 VDC	Same option as C & D	
Output		0-40V range (FRP)	EOS	4-20 mA signal on two wire DC loop (FRP)	Same option as C & D	
Connection		4 pin, 7/8"-20 UNEF	Terminal block thru 3/4" & 1/2" NPT conduit holes			
Approvals / Compliance Standards		IP67	●	●	●	
		Intrinsically safe		●		
		Explosion proof		●	●	●
		Other	NEMA 4, 4X & 6	NEMA 4, 4X & 6	NEMA 4, 4X & 6	NEMA 4, 4X & 6
Temp Range		-13°F to 221°F (-25°C to 105°C)	-40°F to 176°F (-40°C to 80°C)	-40°F to 176°F (-40°C to 80°C)	-40°F to 176°F (-40°C to 80°C)	
Visual Indication Options Available with each Feedback Option		Line on shaft	●			
		green on/red off	Consult factory	●	●	●

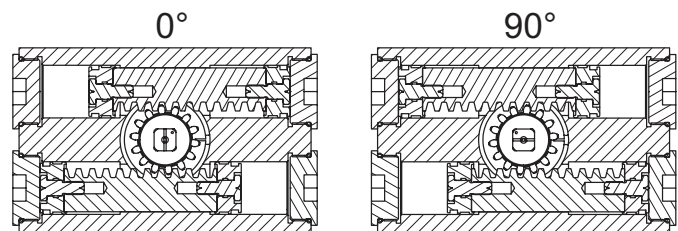
Note: Cables are not available for purchase.

FRP = Full Range Position

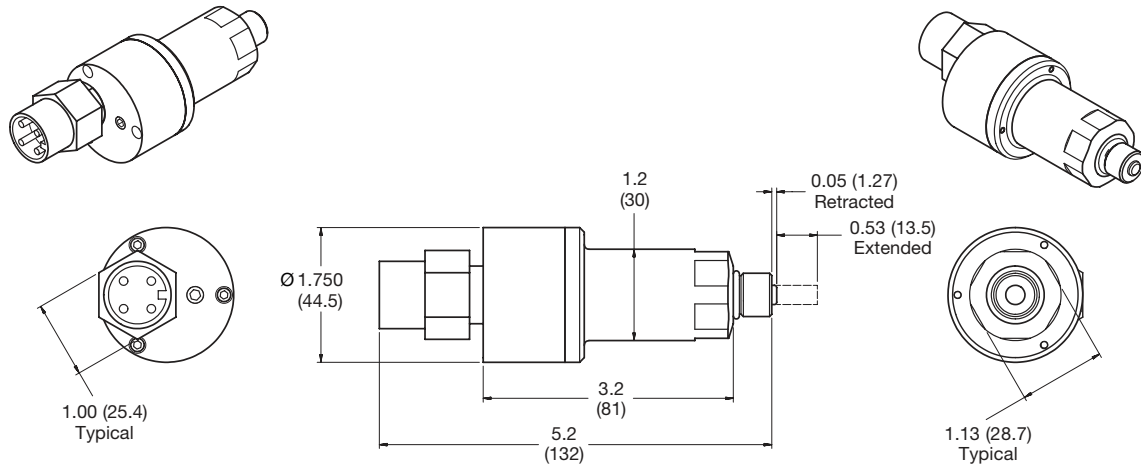
EOS = End of Stroke

Visual Indicator Options Table		C
Description		Color indicator
Replacement kit part number (VISUAL INDICATOR ONLY)		PSK-HUB018-702P*
Upgrade kit part numbers - conversion from an existing actuator with no visual indicator to one with visual indicator		PSK-HUB018-704P
		PSK-HUB075-704P
		PSK-HUB100-704P

*Visual indicator replacement kit does not include bracket or hardware.

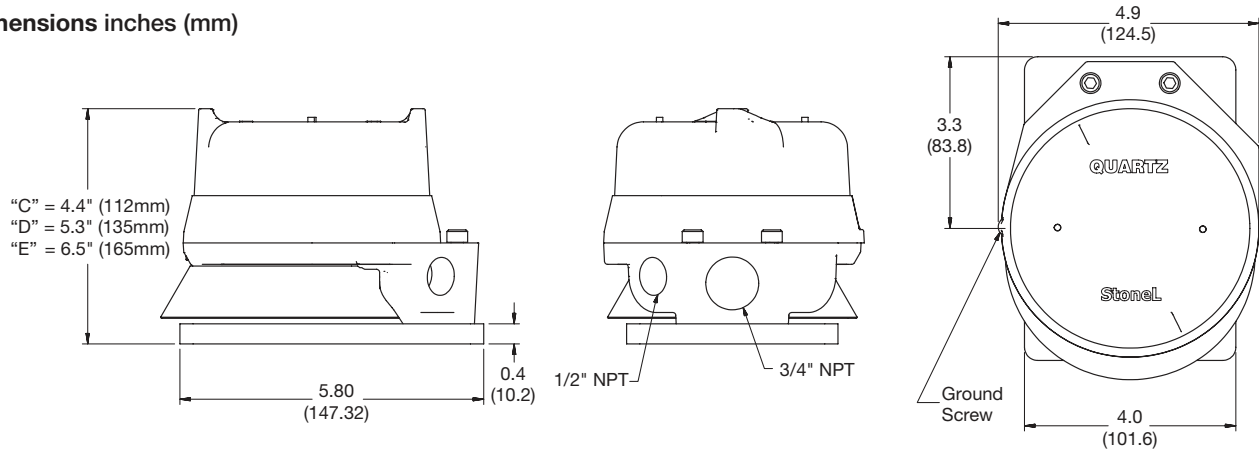


Rotary Linear Potentiometer
 (Feedback option A & B)



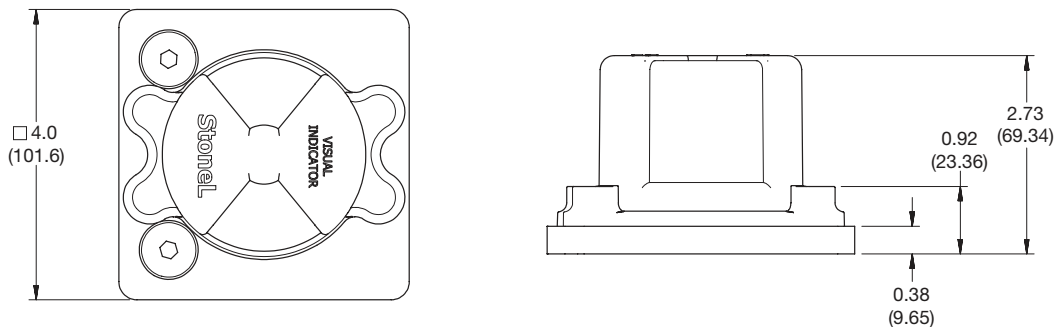
StoneL - Quartz
 (Feedback option C, D & E)

Dimensions inches (mm)



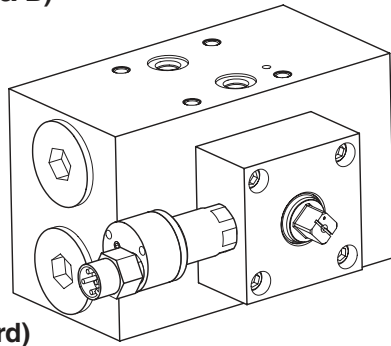
NOTE: Cover height varies based on model number.

StoneL - stand alone visual indicator
 (Visual Indication option C)

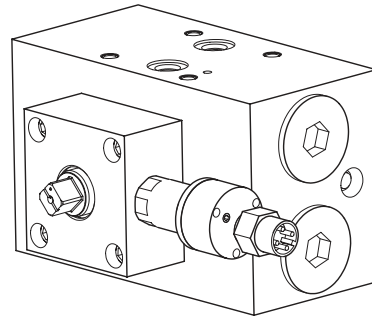


A
Rack & Pinion Actuators
HUB Series
LTR Series
HTR Series
M Series

Rotary Linear Potentiometer
 (Feedback option A & B)

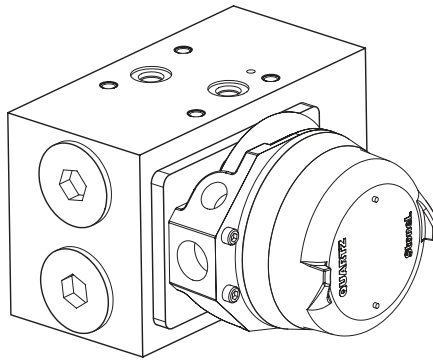


Option A (Standard)

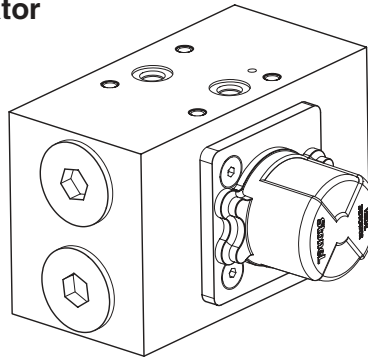


Option B

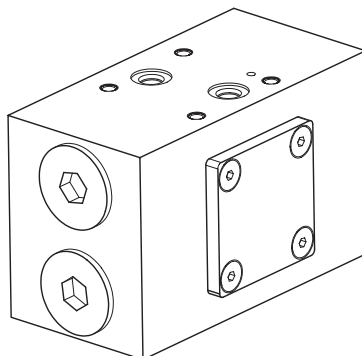
StoneL - Quartz
 (Feedback option C, D & E)



StoneL Stand Alone Visual Indicator
 (Feedback option Z and
 Visual indicator option C)



No Visual Indicator
 (Feedback option Z and
 Visual indicator option Z)



A	Rack & Pinion Actuators
HUB	Series
LTR	Series
HTR	Series
M	Series