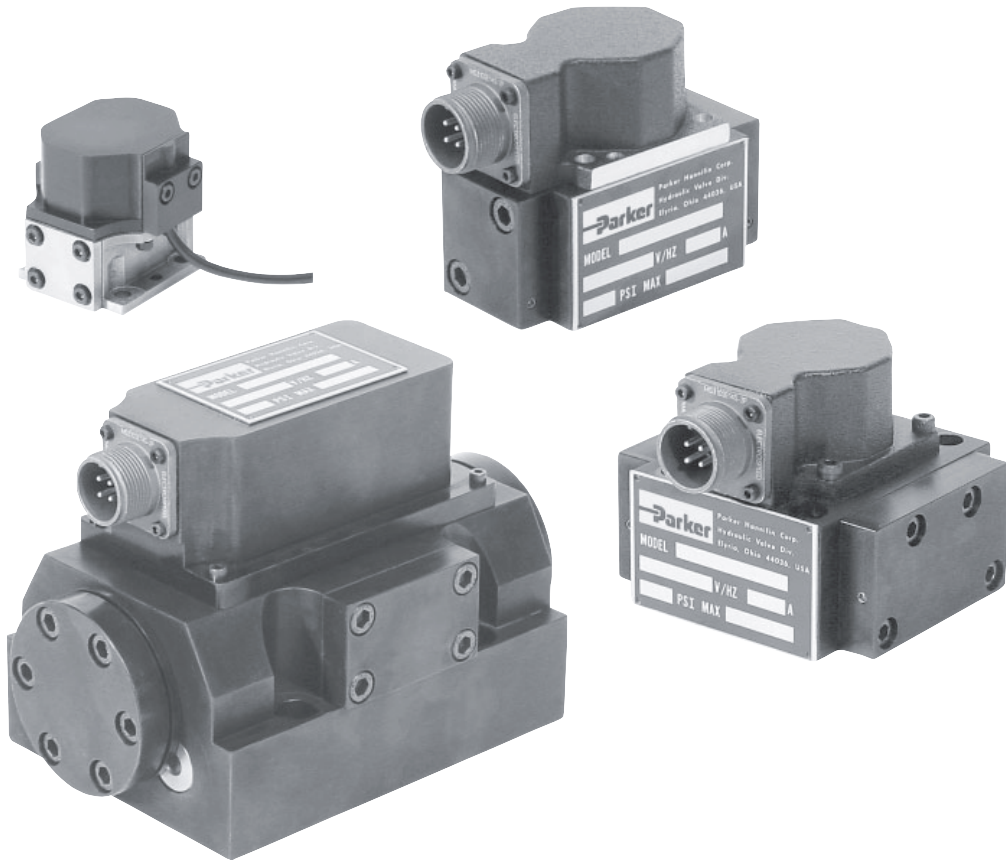




Bulletin HY14-1460-M1/US Installation Guide

Servovalves Series SE

Effective: April 1, 2004



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 **WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Flapper Nozzle Servovalves

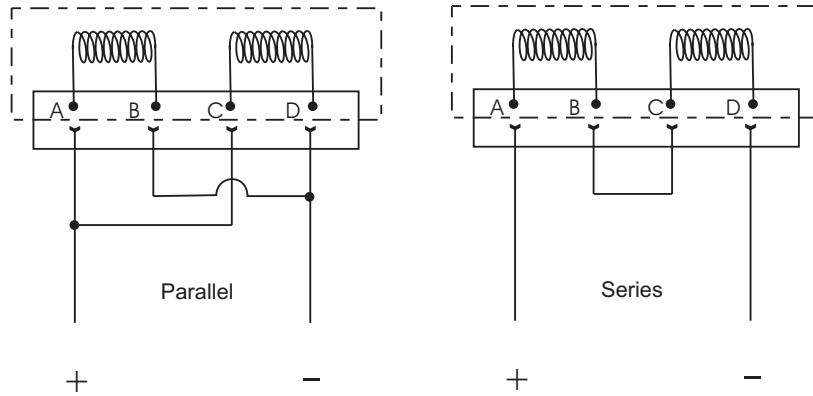
The Parker SE Series servovalves are two stage, 4-way, flapper and nozzle style servovalves. They have a wide range of flow ratings and a high performance spool and sleeve design. A special jewel feedback design enhances durability and prevents ball glitch problems, which can occur in other types of servovalves.

The SE Series are rated for 315 Bar (4500 PSI) service, except for models SEMT, SE2N, SE31 and SE60 valves are rated for 210 Bar (3000 PSI). Higher-pressure capability is available upon request.

Wiring

Installation Wiring Options (SE05, SE10, SE15, SE20, SE2N, SE31, SE60)

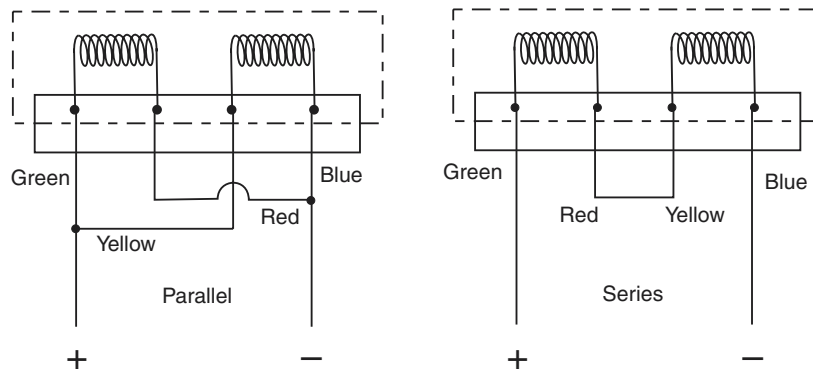
The SE05, SE10, SE15, SE20, SE2N, SE31 and the SE60 servovalves have two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.




Installation Wiring Options (SEMT)




The SEMT servovalve have two coils. When connecting the valve to a drive amplifier, the user's external wiring may put the coils either in parallel or in series as needed. Refer to the illustrations below and to the mounting pattern for this valve to insure proper control phasing.



Polarity shown connects flow from P to C2 port.

Installation Wiring Options (SE2E)


	Pin	Voltage Command	Current Command
Supply voltage +15/0/-15 VDC ±3% Ripple < 50 mV _{p-p}	A	+15 VDC $I_{max} = 200 \text{ mA}$	
	B	-15 VDC $I_{max} = 200 \text{ mA}$	
	C		
Command signal 	D	0...±10 VDC $R_e \geq 50 \text{ k}\Omega$	0...±10 mA $R_e \geq 1 \text{ k}\Omega$
	E		
Spool position output	F	0...±10 VDC load resistance 10 kΩ	0...±10 VDC load resistance 10 kΩ
Protective Earth	G		

	Pin	Voltage Command	Current Command
Supply voltage +24 VDC ±3% Ripple < 50 mV _{p-p}	A	+24 VDC $I_{max} = 200 \text{ mA}$	
	B		
	C	Not used	
Command signal 	D	0...±10 VDC $R_e \geq 50 \text{ k}\Omega$	0...±10 mA $R_e \geq 1 \text{ k}\Omega$
	E		
Spool position output	F	0...±10 VDC load resistance 10 kΩ	0...±10 VDC load resistance 10 kΩ
Protective Earth	G		

Spool stroke is proportional to command signal.
 +10 VDC to pin D causes 100% rated flow in the direction of P→C2, C1→R.

One input D or E must be connected to common if a single ended driver is used.

Connection cable to be 6-core, 0.75 mm² (0.03 in²), screened.
 External diameter 6.5~9.5 mm (0.26 - 0.37 in.).

Connect screening to  on supply side only.

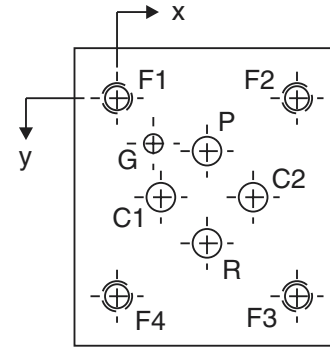
Mating connector is Parker number 5004072.
 A mating cable with connector is Parker number EHC158GE.



Mounting Surface

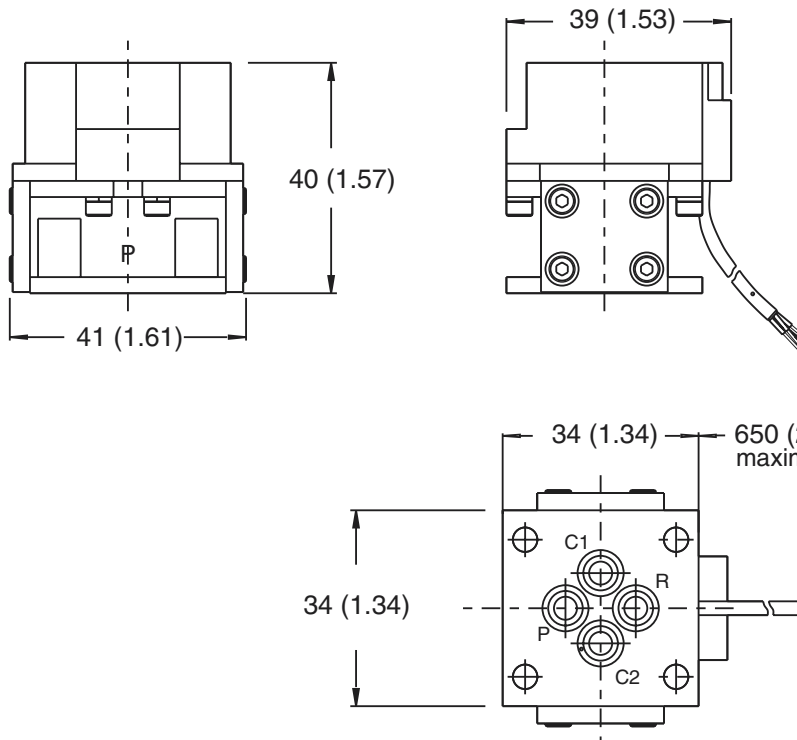
ISO 10372-01-01-0-92

1. The minimum engagement of mounting threads is 1.5D, where D is the screw diameter. The ISO recommended full-thread depth is 14 mm (0.551 inches). The minimum depth of hole G is 2 mm (0.079 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.



Metric Dimensions (millimeters)						(± 0.1 mm)			
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	∅ 3.8 max	∅ 3.8 max	∅ 3.8 max	∅ 3.8 max	∅ 2.5	M4	M4	M4	M4
x	11.9	5.8	11.9	18	4.8	0	23.8	23.8	0
y	7	13.1	19.2	13.1	6	0	0	26.2	26.2

U.S. Dimensions (inches)						(± 0.004 in.)			
Axis	P	C1	R	C2	G	F1	F2	F3	F4
	∅ 0.15 max	∅ 0.15 max	∅ 0.15 max	∅ 0.15 max	∅ 0.10	# 6 - 32	# 6 - 32	# 6 - 32	# 6 - 32
x	0.469	0.228	0.469	0.709	0.189	0	0.937	0.937	0
y	0.276	0.516	0.756	0.516	0.238	0	0	1.031	1.031

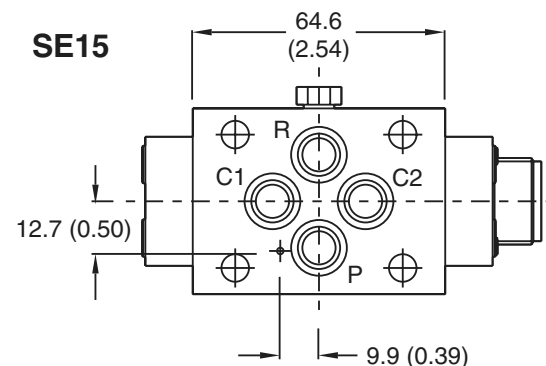
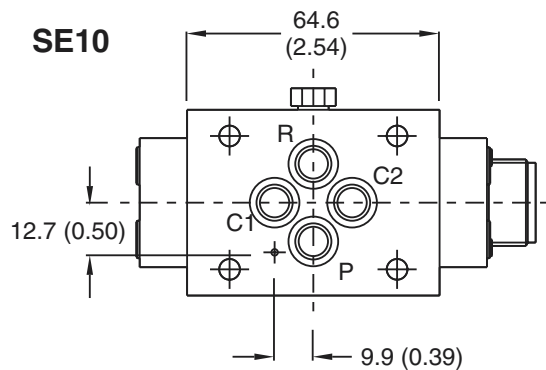
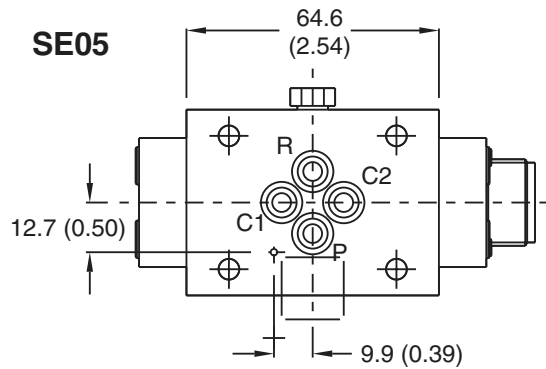
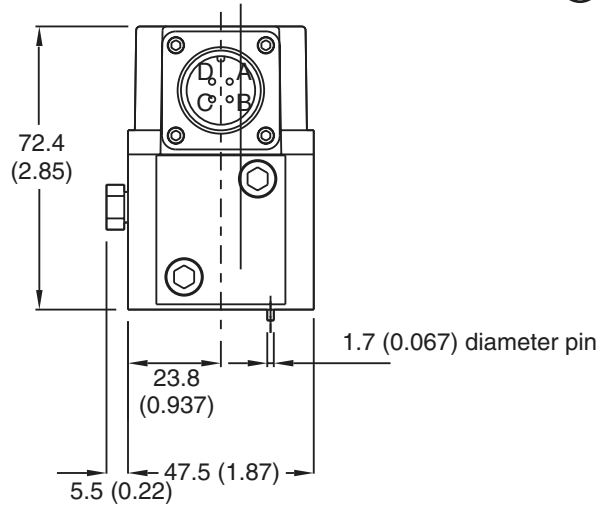
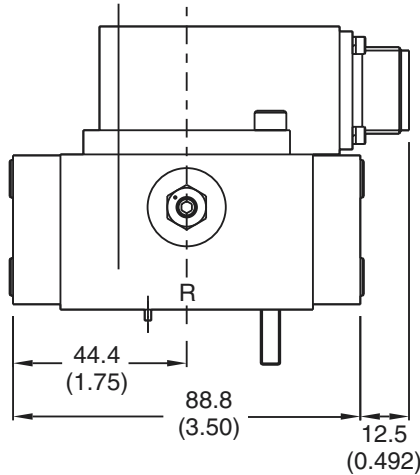


1. Recommended mounting bolts M4 x 10 mm, or #6-32 x 7/16" high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. Base O-Rings: 6 mm x 1 mm section, 70 durometer.



Inch equivalents for millimeter dimensions are shown in (**)

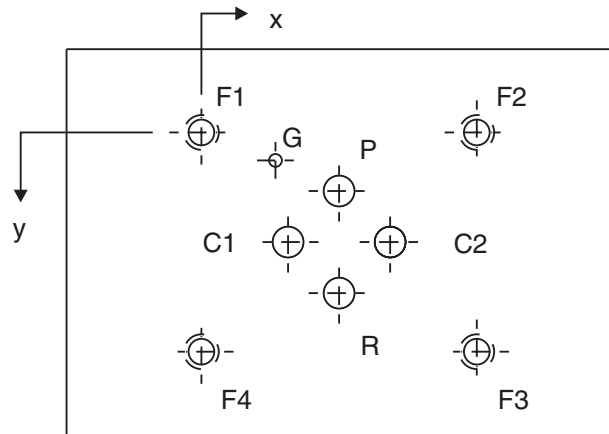
Inch equivalents for millimeter dimensions are shown in (**)



1. Suggested mounting bolts: For SE05 and SE10 use M5 x 60 mm or #10-32 x 2.25" long high tensile steel, socket-head cap screws. For SE15 use M6 x 60 mm or 1/4-20 x 2.25" long high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. 4-way electrical connector mates with MS3106E-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings:
SE05 use Parker 2011V-9 (7.66 mm I/D x 1.78 section)
SE10 use Parker 2012V-9 (9.25 mm I/D x 1.78 section)
SE15 use Parker 2013V-9 (10.83 mm I/D x 1.78 section)
4. Null adjust requires 10A/F ring spanner (10 mm box end wrench) and 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.
5. See mounting dimensions for port size and locations.

**Series SE05, SE10 and SE15
Mounting Surface**

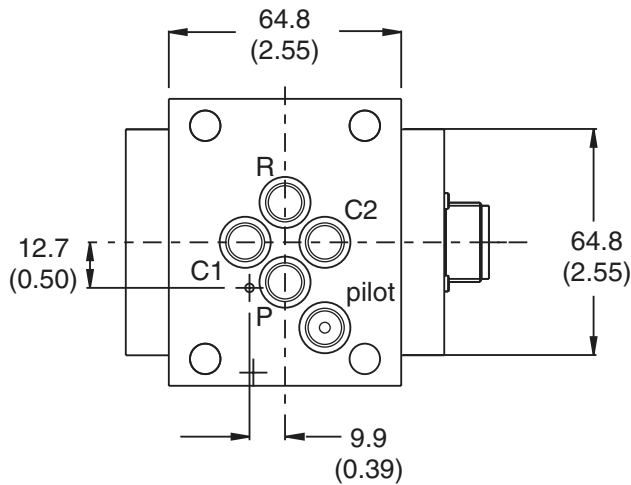
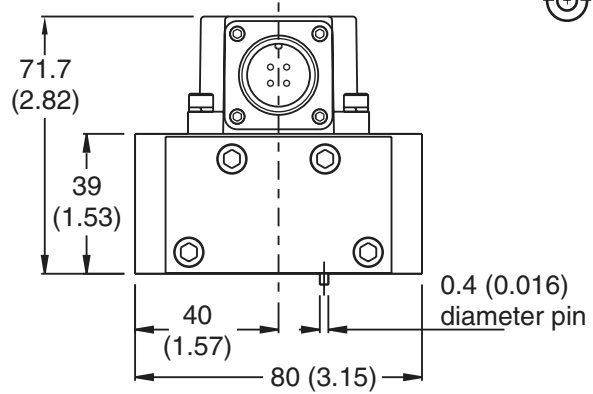
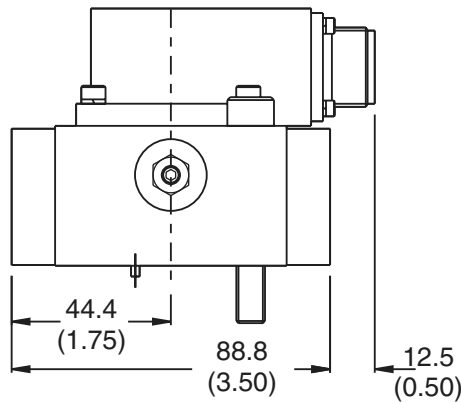
1. The recommended full-thread depth for SE05 / SE10 is 16 mm (0.630 inches) and for SE15 is 18 mm (0.709 inches).
The minimum depth of hole G is 4 mm (0.157 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.



Series	Metric Dimensions (millimeters)										
	Axis	P	C1	R	C2	G	F1	F2	F3	F4	port circle
SE05		ø 5 max	ø 5 max	ø 5 max	ø 5 max	ø 3.5	M5	M5	M5	M5	15.88
	x	21.4	13.5	21.4	29.3	11.5	0	42.8	42.8	0	
	y	9.2	17.1	25	17.1	4.4	0	0	34.2	34.2	
SE10		ø 7.5 max	ø 7.5 max	ø 7.5 max	ø 7.5 max	ø 3.5	M5	M5	M5	M5	19.81
	x	21.4	11.5	21.4	31.3	11.5	0	42.8	42.8	0	
	y	7.2	17.1	27	17.1	4.4	0	0	34.2	34.2	
SE15		ø 8 max	ø 8 max	ø 8 max	ø 8 max	ø 3.5	M6	M6	M6	M6	23.8
	x	21.4	9.5	21.4	33.3	11.5	0	42.8	42.8	0	
	y	5.1	17.1	29	17.1	4.4	0	0	34.2	34.2	

Series	U.S. Dimensions (inches)										
	Axis	P	C1	R	C2	G	F1	F2	F3	F4	port circle
SE05		ø 0.195 max	ø 0.195 max	ø 0.195 max	ø 0.195 max	ø 0.136	# 10 - 32	# 10 - 32	# 10 - 32	# 10 - 32	0.625
	x	0.843	0.531	0.843	1.153	0.453	0	1.685	1.685	0	
	y	0.362	0.673	0.984	0.673	0.173	0	0	1.347	1.347	
SE10		ø 0.290 max	ø 0.290 max	ø 0.290 max	ø 0.290 max	ø 0.14	# 10 - 32	# 10 - 32	# 10 - 32	# 10 - 32	0.78
	x	0.843	0.453	0.843	1.232	0.453	0	1.685	1.685	0	
	y	0.283	0.673	1.063	0.673	0.173	0	0	1.347	1.347	
SE15		ø 0.312 max	ø 0.312 max	ø 0.312 max	ø 0.312 max	ø 0.14	1/4 - 20	1/4 - 20	1/4 - 20	1/4 - 20	0.937
	x	0.843	0.374	0.843	1.311	0.453	0	1.685	1.685	0	
	y	0.201	0.673	1.142	0.673	0.173	0	0	1.347	1.347	

Inch equivalents for millimeter dimensions are shown in (**)

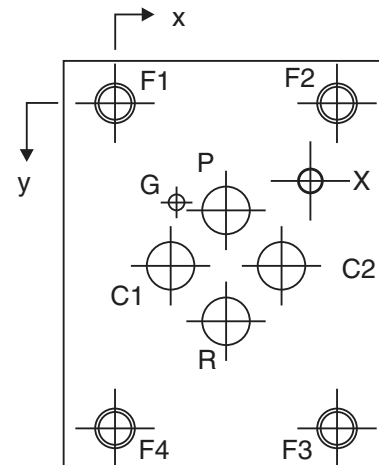


1. Suggested mounting bolts M8 x 60 mm or 5/16-18 x 2.25" long high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. The 4-way electrical connector mates with MS3106-14S-2S or equivalent. Is available at ±90° and 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 10.82 I/D x 1.78 section (2013N-9 or 2013V-9) 5 pcs.
4. Null adjust requires 10 A/F ring spanner (10 mm box end wrench) and 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.

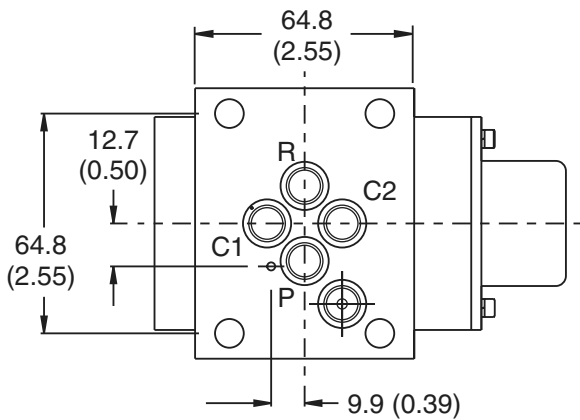
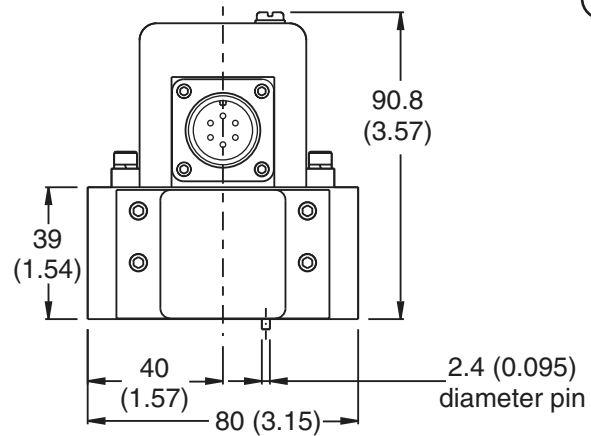
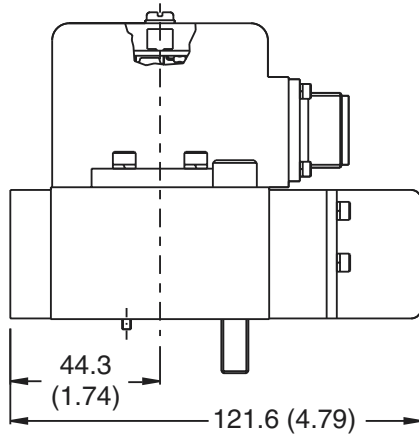
Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 inches).
The ISO recommended full-thread depth is 22 mm (0.866 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.

Metric Dimensions (millimeters)							(± 0.1 mm)			
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	∅ 8.2 max.	∅ 8.2 max.	∅ 8.2 max.	∅ 8.2 max.	∅ 3.5 max.	∅ 5	M8			
x	22.2	11.1	22.2	33.3	12.3	33.3	0	44.4	44.4	0
y	21.4	32.5	43.6	32.5	19.8	8.7	0	0	65	65
U.S. Dimensions (inches)							(± 0.004 in.)			
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	∅ 0.32 max.	∅ 0.32 max.	∅ 0.32 max.	∅ 0.32 max.	∅ 0.14 max.	∅ 0.2	5/16 - 18			
x	0.875	0.437	0.875	1.311	0.484	1.310	0	1.750	1.750	0.000
y	0.846	1.280	1.717	1.280	0.780	0.343	0	0	2.562	2.562



Inch equivalents for millimeter dimensions are shown in (**)

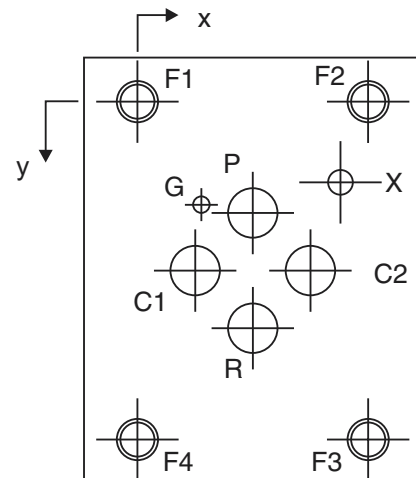


1. Suggested mounting bolts M8 x 60 mm or 5/16-18 x 2.25" long high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. The 7-pin electrical connector mates with Parker 5004072 connector or equivalent. The connector is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 10.82 I/D x 1.78 section (2013N-9 or 2013V-9) 5 pcs.
4. Null adjustment potentiometer.

Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 inches).
The ISO recommended full-thread depth is 22mm (0.866 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.

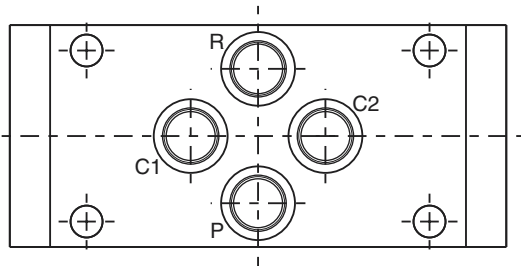
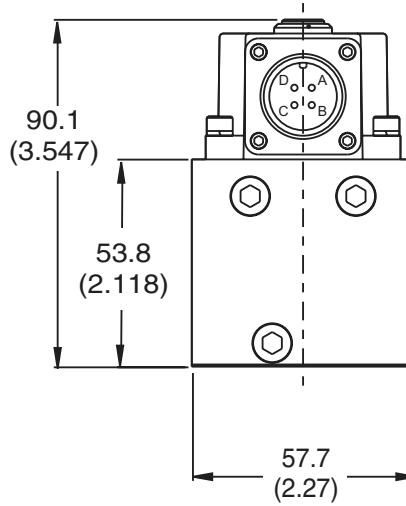
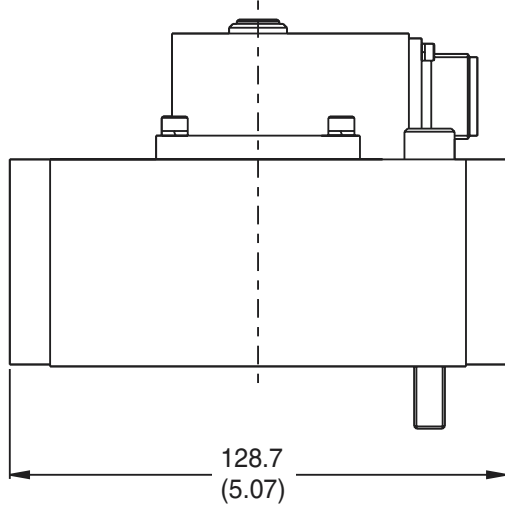
Metric Dimensions (millimeters)										
(± 0.1 mm)										
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	ø 8.2 max.	ø 8.2 max.	ø 8.2 max.	ø 8.2 max.	ø 3.5 max.	ø 5	M8	M8	M8	M8
x	22.2	11.1	22.2	33.3	12.3	33.3	0	44.4	44.4	0
y	21.4	32.5	43.6	32.5	19.8	8.7	0	0	65	65
U.S. Dimensions (inches)										
(± 0.004 in)										
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	ø 0.32 max.	ø 0.32 max.	ø 0.32 max.	ø 0.32 max.	ø 0.14 max.	ø 0.2	5/16 - 18			
x	0.875	0.437	0.875	1.311	0.484	1.310	0	1.750	1.750	0.000
y	0.846	1.280	1.717	1.280	0.780	0.343	0	0	2.562	2.562



Dimensions

**Servovalves
Series SE2N**

Inch equivalents for millimeter dimensions are shown in (**)

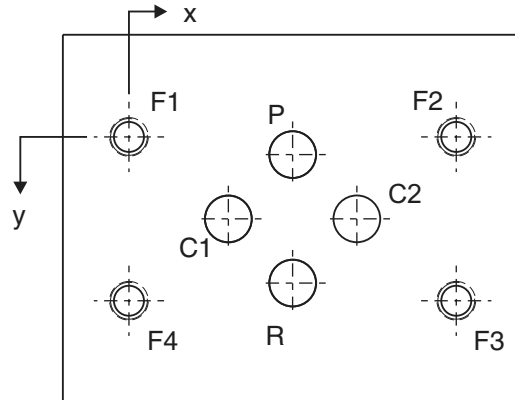


1. Suggested mounting bolts M8 x 70 mm or 5/16-18 x 2.75" long high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. The 4-way electrical connector mates with MS3106-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 14.6 I/D x 2.4 section
4. Null adjust requires 2.5 hexagon key. Flow out of C2 will increase with clockwise rotation of key.

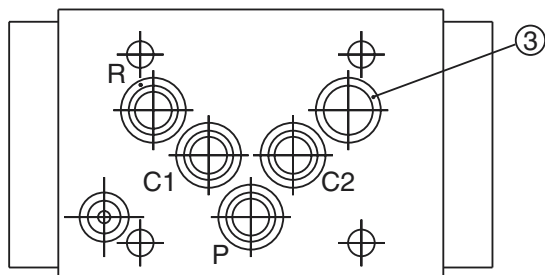
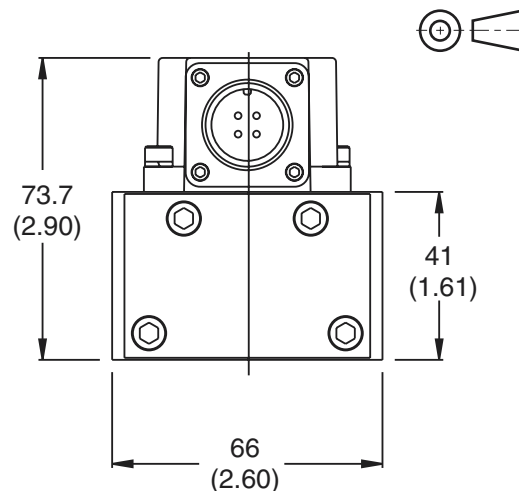
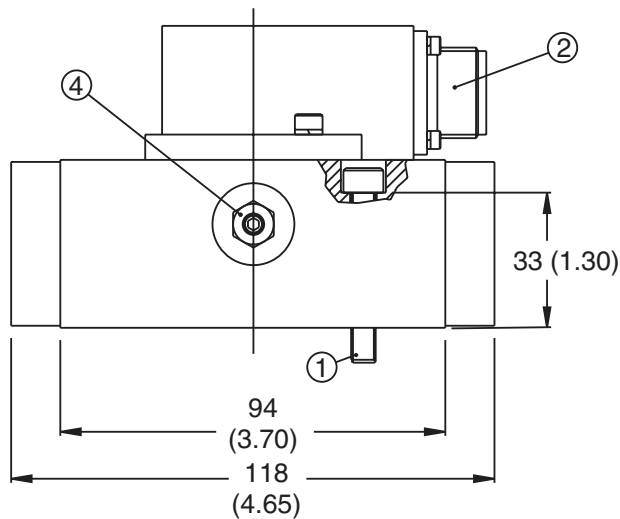
Mounting Surface

1. The recommended full-thread depth is 22 mm (0.866 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.

Metric Dimensions (millimeters) (± 0.1 mm)								
Axis	P	C1	R	C2	F1	F2	F3	F4
	∅ 12.7 max	∅ 12.7 max	∅ 12.7 max	∅ 12.7 max	M10	M10	M10	M10
x	44.5	27	44.5	61.9	0	88.9	88.9	0
y	4.8	22.3	39.7	22.3	0	0	44.5	44.5
U.S. Dimensions (inches) (± 0.004 in.)								
Axis	P	C1	R	C2	F1	F2	F3	F4
	∅ 0.5 max	∅ 0.5 max	∅ 0.5 max	∅ 0.5 max	3/8 - 16	3/8 - 16	3/8 - 16	3/8 - 16
x	1.750	1.063	1.750	2.437	0	3.500	3.500	0
y	0.189	0.876	1.563	0.876	0	0	1.750	1.750



Inch equivalents for millimeter dimensions are shown in (**)

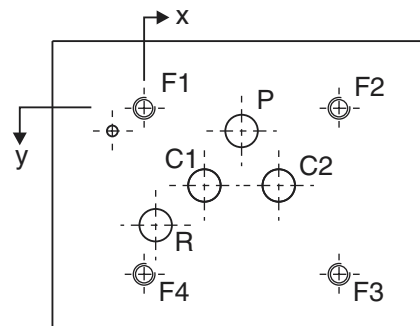


1. Suggested mounting bolts M6 x 50 mm or 1/4-20 x 2.25" long high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. The 4-pin electrical connector mates with MS3106E-14S-2S or equivalent. The valve connector is available at ±90° or 180° from the position shown.
3. Base O-Rings: 12 mm I.D. by 2.0 mm section, 90 durometer.
4. Null adjustment requires a 10 A/F ring spanner (10 mm box end wrench) and a 2.5 hexagon key. Flow out of C1 will increase with clockwise rotation of key.

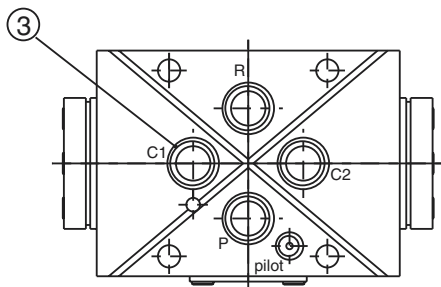
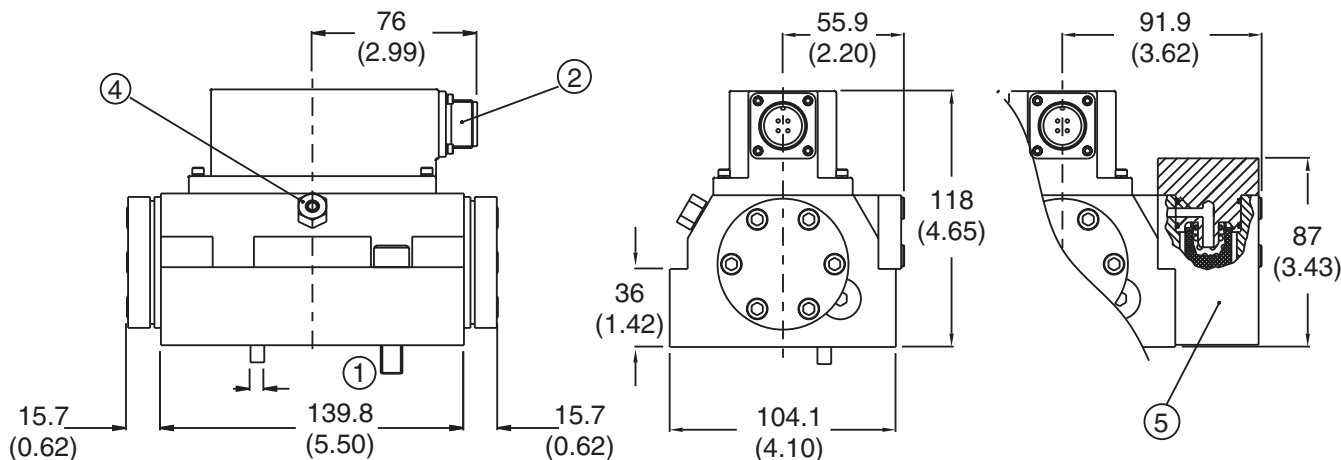
Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 inches).
Recommended full-thread depth is 18 mm (0.709 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.

Metric Dimensions (millimeters)										(± 0.1 mm)									
Axis	P	C1	R	C2	X	F1	F2	F3	F4										
	∅ 9 max	∅ 9 max	∅ 9 max	∅ 9 max	∅ 3	M6	M6	M6	M6										
x	27	16.7	3.2	37.3	-8.8	0	54	54											
y	6.3	21.4	32.4	21.4	6.3	0	0	46	46										
U.S. Dimensions (inches)										(± 0.004 in.)									
Axis	P	C1	R	C2	X	F1	F2	F3	F4										
	∅ 0.354 max	∅ 0.354 max	∅ 0.354 max	∅ 0.354 max	∅ 0.12	1/4 - 20	1/4 - 20	1/4 - 20	1/4 - 20										
x	1.063	0.657	0.126	1.469	-0.347	0	2.126	2.126	0										
y	0.248	0.843	1.275	0.843	0.248	0	0	1.811	1.811										



Inch equivalents for millimeter dimensions are shown in (**)

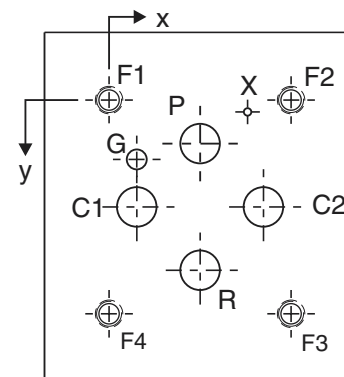


1. Suggested mounting bolts M10 x 60 mm or 3/8-16 x 2.375" long high tensile steel, socket-head cap screws (bolt mounting torque see Table 2).
2. 4-way electrical connector mates with MS3106E-14S-2S or equivalent. Is available at 180° to position shown (advise desired position at time of order).
3. Base O-Rings: 4 of Parker 2019V-7, 1 of Parker 2012V-7 (if external pilot is used).
4. Null adjust requires 12 A/F ring spanner (12 mm box end wrench) and a 3.0 hexagon key. Flow out of C2 will increase with clockwise rotation of key.
5. Optional field replaceable filter housing. Element P/N SRS1479.

Mounting Surface

1. The minimum depth of hole G is 2 mm (0.079 inches). Recommended full-thread depth is 30 mm (1.181 inches).
2. Surface roughness Ra < 0.8 µm [N6], as specified in ISO 468 and ISO 1302.
3. Surface flatness: 25 µm as specified in ISO 1101.

Metric Dimensions (millimeters)										
(± 0.1 mm)										
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	∅ 17.5 max	∅ 17.5 max	∅ 17.5 max	∅ 17.5 max	∅ 8	∅ 5 max.	M10	M10	M10	M10
x	36.5	11.1	36.5	61.9	11.1	55.6	0	73	73	0
y	17.4	42.8	68.2	42.8	23.7	4.7	0	0	85.7	85.7
U.S. Dimensions (inches)										
(± 0.004 in.)										
Axis	P	C1	R	C2	G	X	F1	F2	F3	F4
	∅ 0.688 max	∅ 0.688 max	∅ 0.688 max	∅ 0.688 max	∅ 0.39	∅ 0.20	3/8 - 16	3/8 - 16	3/8 - 16	3/8 - 16
x	1.437	0.437	1.437	2.437	0.437	2.187	0	2.875	2.875	0
y	0.687	1.687	2.687	1.687	0.937	0.187	0	0	3.375	3.375



Servo Valve Installation

For maximum valve and system component life, the hydraulic system should be flushed and filtered to an absolute filtration of 25 µm before installing the servo valve. A flushing valve should be used in place of the servo valve while cleaning the system. These blocks are available from Hydraulic Valve Division, as follows:

Series SE	Flushing Valve
SEMT	Consult factory
SE05 / SE10 / SE15	11-0500
SE20	1200127 (does not cover 5th port)
SE2E	1200127 (does not cover 5th port)
SE2N	Consult factory
SE31	D3L8CV
SE60	Consult factory

To keep contaminants from entering the servo valve and/or hydraulic system, keep the valve shipping cover in place until immediately prior to installation. Never leave the port surfaces uncovered and exposed to contamination. A permanent non-bypass filter should be installed in the system to assure that the valve receives a clean supply of oil. The valve should be mounted as close as possible to the actuator or motor. It can be mounted in any plane, but it is best to have the spool as nearly horizontal as possible. After installing the servo valve, it must be determined if the valve and its electronics are phased properly. This can be accomplished by noting servo valve response to a change in input command. If there is no servo valve response, the two pairs of electrical leads to the valve must be interchanged to correct an out-of-phase condition.

Dither

If the system resolution is not as precise as desired, it can sometimes be improved through the use of "dither". A small amplitude signal at a relatively high (200 Hz) frequency is superimposed on the valve command signal. This signal will cycle the valve preventing "silting" and "stiction". It should be noted however; that if the amplitude is high enough, or the frequency low enough, the actuator could respond to the signal in such a way that would wear the seals rapidly. Therefore, care should be exercised in setting the frequency and amplitude of the dither. If dither does not solve the problem, the feedback device may be the limiting factor, or the servo valve may be sized too large for the accuracy desired.

Servo Valve Maintenance

General

This section provides maintenance instructions for the SE Servo Valve Series.

Field disassembly of the servo valves should never be attempted.

Electrical Checkout

These instructions are for a standard valve. Valves should be checked to ±10% of the rated resistance of the valve. The resistance in ohms is given on the valve label.

Using a standard ohmmeter, check the servo valve coil resistance as follows:

Attach ohmmeter leads to pin A and pin B. Coil resistance should read between ±10% of rated value and check the same on pin C and D.

There shall be no continuity between either pin and servo valve case.

If coil resistance is not within ±10% of rated value, return the servo valve to the factory.

Back Pressure

During normal hydraulic system operation, back pressure in the return system (tank line) is approximately 25 PSI. Excessive back pressures due to clogged filters, system contamination, system out of trim, etc., impose undesired forces on system components and add significantly to the work required to move a load. Energy is being wasted and system components are being overworked. Back pressures in excess of 200 PSI should be investigated immediately and the discrepancies corrected.

Initial Checkout Procedure

- | | |
|--|---|
| <ol style="list-style-type: none"> Remove the electrical cable from the valve and connect pins A&B to a hand held power source. (1½ to 9 volt battery with a potentiometer to vary the input will be sufficient). Operate the valve with the hand held power source. | <p>If the indicated problem cannot be duplicated, the malfunction is more than likely in the wiring, controller or hydraulic system.</p> <ol style="list-style-type: none"> If the valve does exhibit the problem, refer to Table 1 for service suggestions. |
|--|---|

Table 1. Troubleshooting

Symptoms	Possible Causes	To Verify or Correct
Servo valve does not follow input command. (Actuator or motor is stopped.)	<ol style="list-style-type: none"> Open coil wire or open coil lead to connector pin. Totally plugged supply orifice or filter. Spool stuck. 	<ol style="list-style-type: none"> Check lead and coil resistance. If there is an “open”, remove the connector and check its solder joints. Resolder if required Return valve to factory. Return valve to factory.
Sluggish valve. (Servo valve output lags electrical command signal or it fails to meet its rated output.)	<ol style="list-style-type: none"> Partially plugged filter element, orifice or pilot valve. Low pilot supply pressure. Cylinder piston ring failure. Shorted coil. Low supply pressure. 	<ol style="list-style-type: none"> Return valve to factory. Check pilot supply pressure (should be equal to system pressure or higher.) Check cylinder (listen for bypassing sound.) Check coil resistance in Accordance with Maintenance Section, Electrical Checkout. Verify that the supply pressure to the valve falls within the range noted on the valve nameplate.
High null bias. (High input current required to maintain actuator or motor stationary.)	<ol style="list-style-type: none"> Incorrect null adjust. Partially plugged receiver. 	<ol style="list-style-type: none"> Adjust null per Servo valve Maintenance Section. Return to factory.
Output flow obtained from one port only. (Actuator hard over no response to servo command.)	<ol style="list-style-type: none"> Valve improperly phased. Plugged pilot valve receiver port. Spool stuck. 	<ol style="list-style-type: none"> Swap the two leads to the valve coil to change the polarity of the current to the coil. Return valve to factory. Return valve to factory.
Very high flow to cyl. Port with little or no current input.	<ol style="list-style-type: none"> Pilot valve malfunction. 	<ol style="list-style-type: none"> Return valve to factory.
Oscillation or hunting motion of actuator in the closed loop system.	<ol style="list-style-type: none"> Valve drive electronics gain set too or high or some other misadjustment. Sticky spool. 	<ol style="list-style-type: none"> Reset electronics. Investigate integral and proportional gain setting. Return valve to factory.

Table 2.				
Recommended Mounting torques for Servovalves in Nm				
Parker	Pressure	Bolt size	Manifold Material	
			Steel	Aluminum
SEMT	210	M4x10mm	3.2	2.24
SE05	315	M5x60mm	6.8	4.76
SE10	315	M5x60mm	6.8	4.76
SE15	315	M6x60mm	11.0	7.70
SE20	315	M8x60mm	27.0	18.90
SE2E	315	M8x60mm	27.0	18.90
SE2N	210	M8x70mm	27.0	18.90
SE31	315	M6x50mm	11.0	7.70
SE60	210	M10x60mm	54.0	37.80
Recommended Mounting torques for Servovalves in ft-lbs				
Parker	Pressure	Bolt size	Manifold Material	
			Steel	Aluminum
SEMT	210	#6-32x7/16"	2.3	1.6
SE05	315	#10-32x2.25"	6.0	4.0
SE10	315	#10-32x2.25"	6.0	4.0
SE15	315	1/4-20x2.25"	14.0	10.0
SE20	315	5/16-18x2.25"	28.0	20.0
SE2E	315	5/16-18x2.25"	28.0	20.0
SE2N	210	5/16-18x2.75"	28.0	20.0
SE31	315	1/4-20x2.00"	14.0	10.0
SE60	210	3/8-16x2.375"	50.0	35.0



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Bulletin HY14-1460-M1/US,
2M, 4/04, PHD