

Needle Valve Actuators

Model FRC - Electric, 24 VDC Flow Regulating Control/Shutoff

10V2, SW, SM, VM Series
Needle Valves to 60,000 psi (4140 bar)



Principle of Operation:

The need to remotely control process flow electrically using high pressure multi-turn needle valves has long been sought. Pneumatic control of this type is an engineering challenge and cost prohibitive. Parker Autoclave Engineers solves these issues with our FRC line of electric actuators. When mated to our Regulating Stem Needle Valves and sent a 4-20mA signal, this actuated valve system provides precise control when needed and even provides enough torque to close the valve when not needed. This valve/actuator combination is capable of controlling Liquid or Gas flows.

The FRC Electric Actuator uses a 4-20mA input signal to turn the valve a programmed amount of turns from fully closed to fully open (typically 5 turns) while also providing a position feedback using an independent 4-20mA signal. It is also capable of closing the valve completely when a 4mA signal is received. Should power be lost, the valve will freeze and "remember" its last position and will not need to be re-zeroed. The FRC actuator is designed to work with a number of Parker Autoclave Engineers Needle Valves from 1/8" to 3/4" tube sizes and up to 60,000 psi (4140 bar) using the Regulating Stem option - see individual valve brochures for Cv and Flow Curves.

Features:

- Designed for Multi-turn Needle Valves, tubing/pipe sizes 1/8" to 3/4"
- Precise, accurate control using Regulating Stem option.
- Operational Temperature Range: -40° to 160°F (-40° to 70°C) - Valve temperature not to exceed 600°F
- Closing Torque capable of up to 60,000 psi (4140 bar) operation
- Weatherproof or Explosionproof (CSA approved Cls 1, Div 1 Grps B, C & D)
- Maximum Rotation Speed: FRC1 = 4 sec/turn, FRC2 = 15 sec/turn (5 turn open/close)
- Weatherproof Enclosure is supplied with TURCK 5 position cable connector and 20' of cable



ENGINEERING YOUR SUCCESS.

Specifications and Ordering Guide:

Electric Actuator

Electrical Specifications:

- Electrical Input: 24VDC only, 72 Watt maximum
- Control Input: 4-20mA
- Position Feedback: Independent 4-20mA
- Position Detection: Hall Sensors
- Motor: BLDC brushless DC motor

Mechanical Specifications:

- Standard Enclosure - EPD Coated NEMA 4/IP65 Equivalent
- Optional Anodized Aluminum Explosion-Proof Enclosure, Nema 8/IP67, CSA Approved for Class 1, Division 1, Groups B, C, D / T6 Areas
- 500+ Positions per turn (+/- 0.25° Position Accuracy), 3243 Actuator Positions over Full Span
- Maximum Rotation Speed: #1 Actuator = 4 sec/turn (5 turn open/close), #2 Actuator (high torque) = 15 sec/turn (5 turn open/close)
- Actuator Operating Temperature -40°(-40°C) to 160°F(70°C), Valve Temperature not to exceed 600°F
- Actuator life Expectancy: 250,000 cycles
- Gears and Bearings are Lifetime Lubricated
- 20 ft. cable included with 6 pin/5 wire connector (FRC1 and FRC2 Weatherproof version only)
- Wiring Terminal, Maximum Wire Size: 18 Gauge

(To Terminate larger gauge wire, see Option Code XPFL below)

Position on Powerloss:

- Remembers Last Position
- Reseats Valve if Current is Between 3.0 and 4.16mA

Ordering Guide: (reference individual Valve Series brochure for exact valve detail)

Example Part Number:	20SM	9	8	8	2	-	FRC2X	TG
Ordering Parameters/Options:	Valve Series	Tube/Pipe Size (OD)	Seat	Stem Type	Body Pattern		Electric Flow Regulating Actuator	Valve Optionsr
Table Reference: (see below)	A	B	C	D	E		F	G

20SM9882-FRC2XTG = 20SM Series Needle Valve, 20,000 psi MAWP, 9/16" MP Cone and Thread, 2-way Angle/Replaceable Seat Valve, Flow Regulating On/Off Explosion Proof Actuator/High Torque, PTFE Glass packing to 600°F max.

A - Valve Series	
10V2 , SW, 10/15P, 15/20SM, 30VM, 60VM	

F - Electric Flow Regulating Actuator	
FRC1	Low Torque Valves - Indoor/Weather-Proof w/20ft cable
FRC2	High Torque Valves - Indoor/Weather-Proof w/20ft cable (SW8 15P8 10P12 15SM9&12 20SM9&12 Valve Sizes)
FRC1X	Low Torque Valves - Explosion-Proof: Div. 1, Class 1, Groups B, C, and D
FRC2X	High Torque Valves - Explosion-Proof: Div. 1, Class 1, Groups B, C, and D (SW8 15P8 10P12 15SM9&12 20SM9&12 Valve Sizes)

B - Tube/Pipe Size (limited to sizes shown below)	
2	1/8" (10V2 Series only)
4	1/4"
6	3/8"
8	1/2" (SW and P Series Valves Only)
9	9/16" (SM and VM Series Valves Only)
12	3/4" (P and SM Series Valves Only)

F - Electric Flow Regulating Actuator	
FRC1	Low Torque Valves - Indoor/Weather-Proof w/20ft cable
FRC2	High Torque Valves - Indoor/Weather-Proof w/20ft cable (SW8 15P8 10P12 15SM9&12 20SM9&12 Valve Sizes)
FRC1X	Low Torque Valves - Explosion-Proof: Div. 1, Class 1, Groups B, C, and D
FRC2X	High Torque Valves - Explosion-Proof: Div. 1, Class 1, Groups B, C, and D (SW8 15P8 10P12 15SM9&12 20SM9&12 Valve Sizes)

C - Seat: STD/Replaceable Type	
0	STD
8	Replaceable (Body Pattern 2 Only)

G - Valve Options: (600°F Maximum Valve Temperature)	
TG	PTFE Glass Packing to 600°F
B	Cryogenic 0 to -100°F
CSS	Coated Stem and Seat
K	Anti-Vibration Glands
SOG	NACE Approved Materials
XPFL	Pre-wired Flying Leads inside 1/2" NPT Class 1, Div 1 Groups B, C&D enclosure mounted outside actuator to splice wire gauges over size 18 for Class 1, Div 1 Groups B, C & D areas to terminate larger gauge wire "outside" enclosure.
Many other options available - see individual Valve Series Catalog or contact Factory.	

E - Body Pattern (see individual valve brochure for details)	
1	Straight
2	Angle
3	3-Way, 2 On-Pressure
4	3-Way, 1 On-Pressure

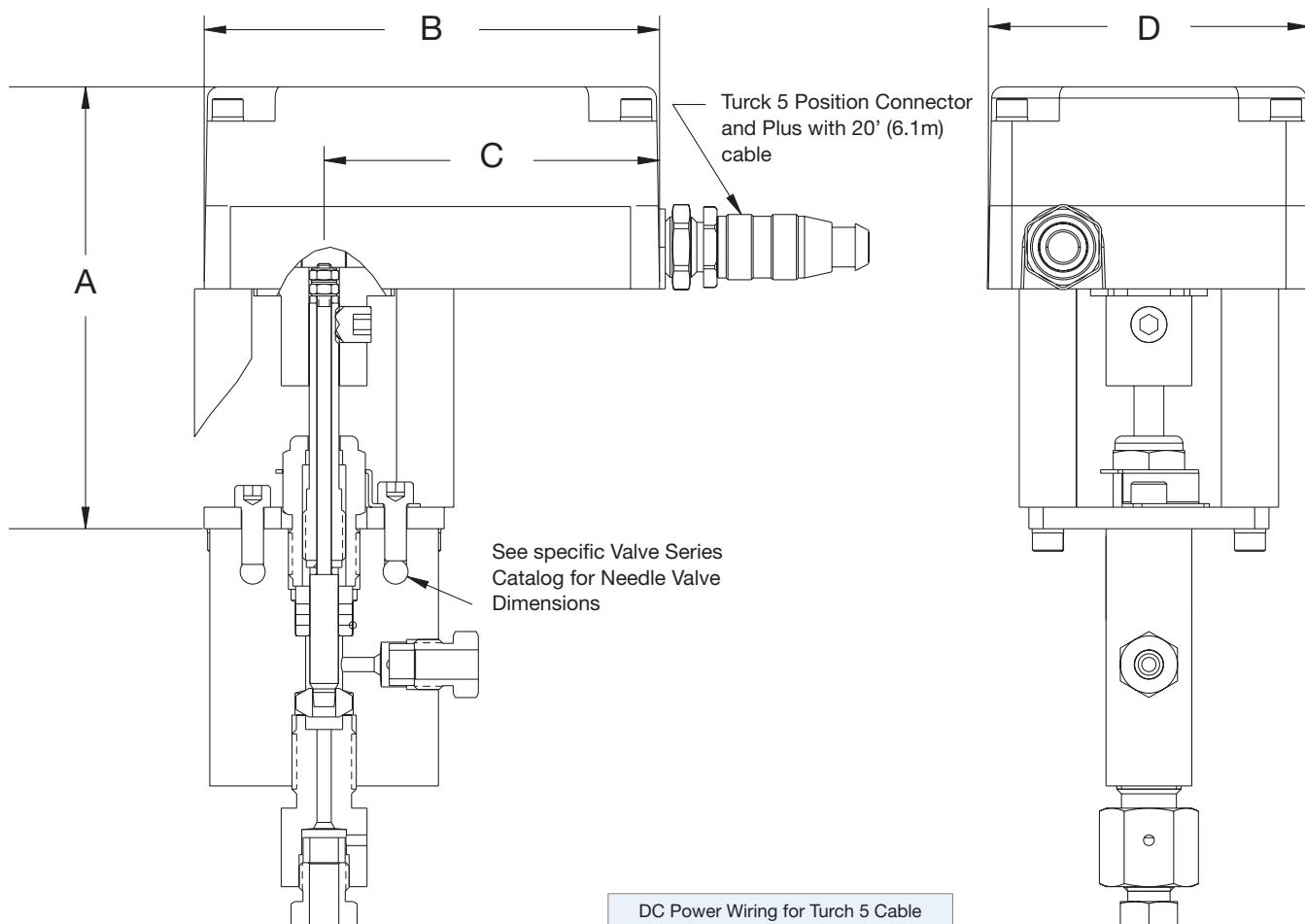
Note: Actuators can be rotated to any one of four compass locations. (requires zeroing function (re-seating)).

Dimensional information:

Electric Actuator: FRC1

Dimensional Information:

Valve Series	Dimensions: inches (mm)			
	A	B	C	D
1/4" & 3/8" NPT - P Series				
1/8", 1/4" & 3/8" Low Pressure - 10V/SW Series	3.87 (98)	3.98 (101.2)	3.00 (76.12)	2.80 (71)
1/4" & 3/8" Medium Pressure - 20SM Series				
1/4", 3/8" & 9/16" High Pressure - 30VM/60VM Series				



DC Power Wiring for Turch 5 Cable	
White	+24 VDC (72 Watt Max)
Black	Power Ground
Grey	Output Signal (4-20 mA)
Brown	Input Signal Ground
Blue	+Input Signal (4-20 mA)

Warning: Do not connect terminal 3 (Grey wire) directly or through a Multimeter, to ground. A sensing resistor of 50 ohms or more needs to be present or damage will occur.

Basic Repair Kits

For **Valves** - See specific Manual Valve brochure for valve repair parts and Manual Needle Valve IOM manual for instructions.

For **FRC1 Actuator** - Replace entire Actuator using Part Number AE002865

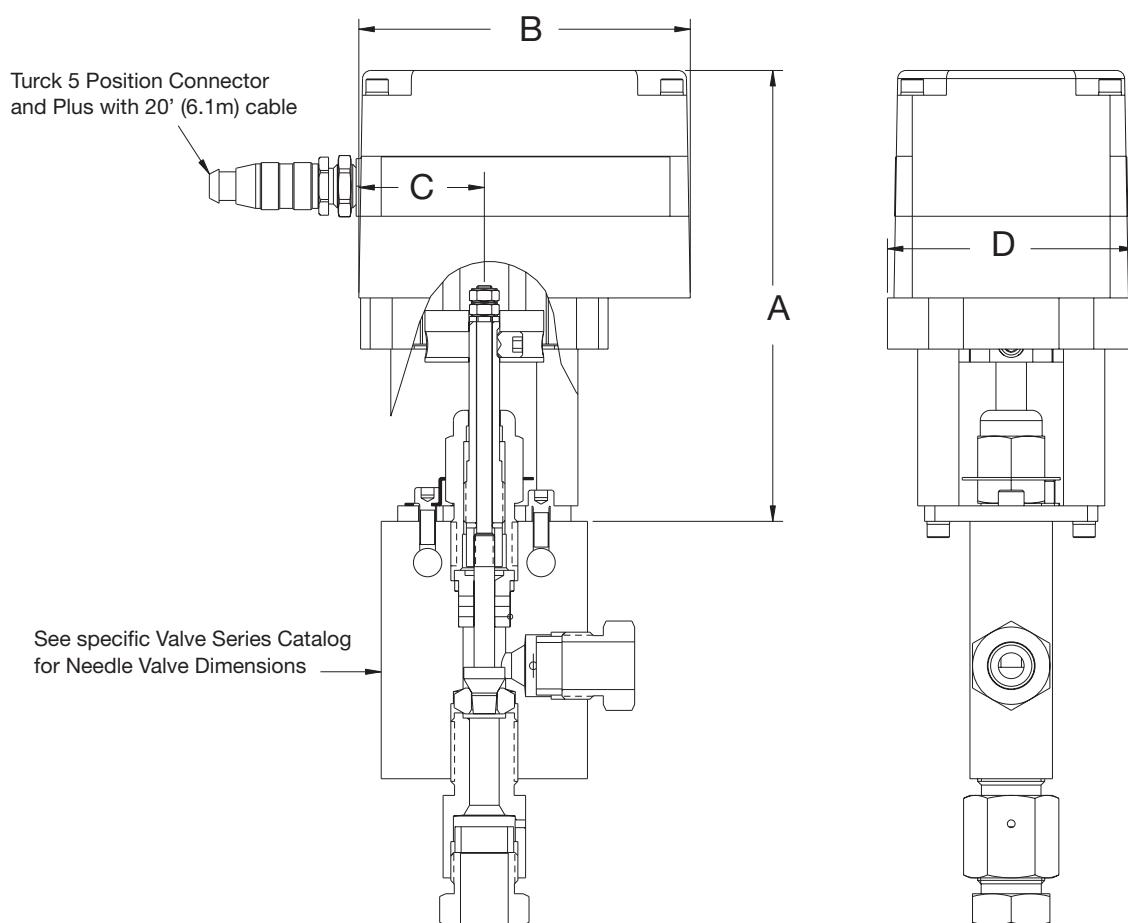
For **FRC1 Mounting Kit**: Part Number AE002867

Dimensional information:

Electric Actuator: FRC2

Dimensional Information:

Valve Series	Dimensions: inches (mm)			
	A	B	C	D
1/2" & 3/4" NPT - P Series 1/2" Low Pressure - SW Series 9/16" & 3/4" SM Series Medium Pressure	5.47 (139)	4.02 (102.0)	1.52 (39)	2.88 (73)



DC Power Wiring for Turch 5 Cable	
White	+24 VDC (72 Watt Max)
Black	Power Ground
Grey	Output Signal (4-20 mA)
Brown	Input Signal Ground
Blue	+Input Signal (4-20 mA)

Warning: Do not connect terminal 3 (Grey wire) directly or through a Multimeter, to ground. A sensing resistor of 50 ohms or more needs to be present or damage will occur.

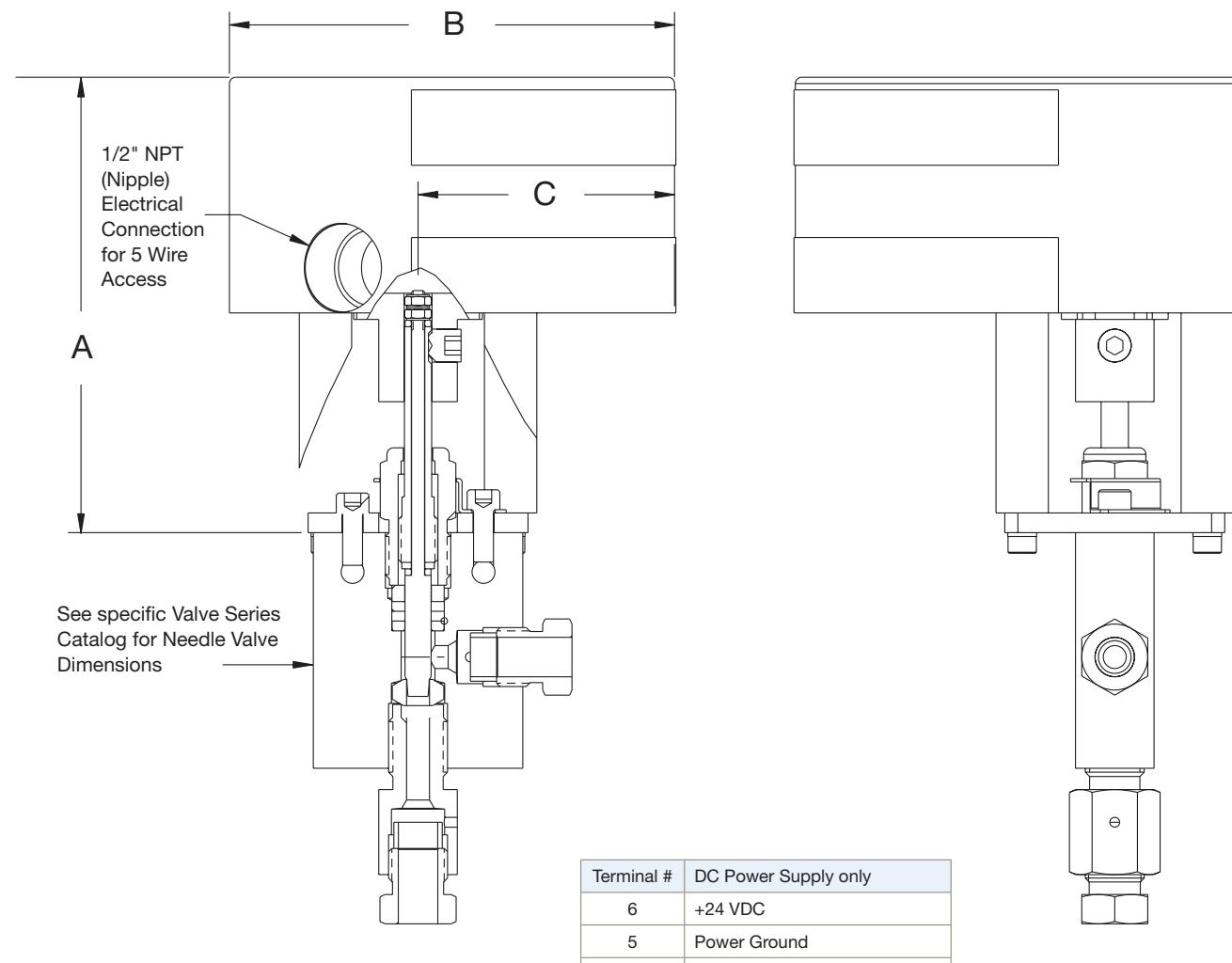
Basic Repair Kits
For Valves - See specific Manual Valve brochure for valve repair parts and Manual Needle Valve IOM manual for instructions.
For FRC2 Actuator - Replace entire Actuator using Part Number AE002865
For FRC2 Gear Reduction/Mounting Kit : Part Number AE002868

Dimensional information:

Electric Actuator: FRC1X

Dimensional Information:

Valve Series	Dimensions: inches (mm)		
	A	B	C
1/4" & 3/8" NPT - P Series			
1/8", 1/4" & 3/8" Low Pressure - 10V/SW Series	3.67 (93.2)	4.25 (108)	3.00 (76)
1/4" & 3/8" Medium Pressure - 20SM Series			
1/4", 3/8" & 9/16" High Pressure - 30VM/60VM Series			



Basic Repair Kits
For Valves - See specific Manual Valve brochure for valve repair parts and Manual Needle Valve IOM manual for instructions.
For FRC1X Explosion Proof Actuator - Replace entire Actuator using Part Number AE003534
For FRC1X Mounting Kit : Part Number AE002899

Terminal #	DC Power Supply only
6	+24 VDC
5	Power Ground
4	Output Signal (4-20 mA)
3	Not Connected
2	Isolated Input Signal GND
1	Isolated Input +Signal (4.30mA)

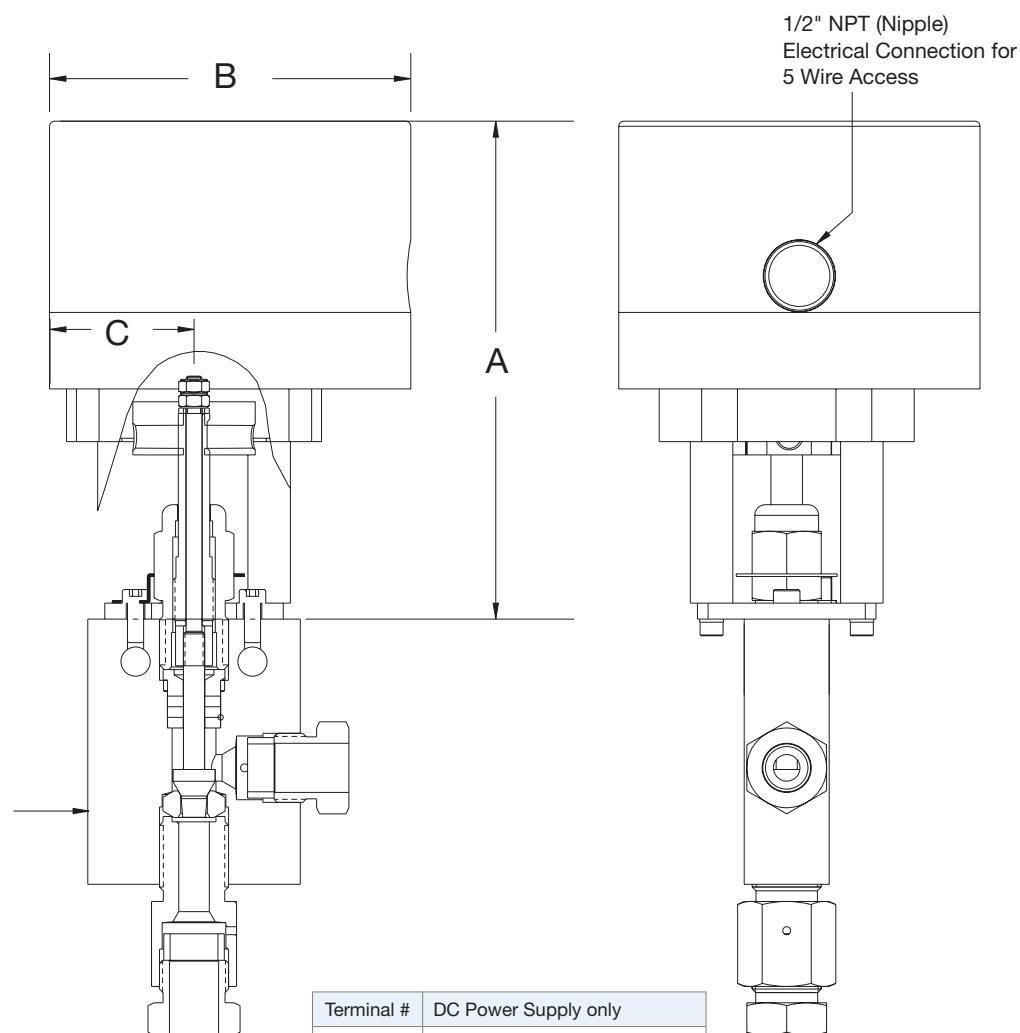
Warning: Do not connect terminal 4 directly or through a Multimeter, to ground. A sensing resistor of 50 ohms or more needs to be present or damage will occur.

Dimensional information:

Electric Actuator: FRC2X

Dimensional Information:

Valve Series	Dimensions: inches (mm)		
	A	B	C
1/2" & 3/4" NPT - P Series 1/2" Low Pressure - SW Series 9/16" & 3/4" SM Series Medium Pressure	5.57 (141.4)	4.25 (108)	3.00 (76)



Terminal #	DC Power Supply only
6	+24 VDC
5	Power Ground
4	Output Signal (4-20 mA)
3	Not Connected
2	Isolated Input Signal GND
1	Isolated Input +Signal (4.30mA)

Warning: Do not connect terminal 4 directly or through a Multimeter, to ground. A sensing resistor of 50 ohms or more needs to be present or damage will occur.

Basic Repair Kits

For **Valves** - See specific Valve brochure for valve repair parts and Manual Needle Valve IOM manual for instructions.

For **FRC2X Explosion Proof Actuator** - Replace entire Actuator using Part Number AE003534

For **FRC2X Gear Reduction/Mounting Kit**: Part Number AE003535

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	CLIMATE CONTROL	Agriculture Food, Beverage and Dairy Precision Cooling Transportation	Air Conditioning Life Sciences & Medical Processing	Co2 Controls Electronic Controllers Filter Driers Hand Shut-Off Valves Hose & Fittings	Pressure Regulating Valves Refrigerant Distributors Safety Relief Valves Solenoid Valves Thermostatic Expansion Valves
	ELECTRO-MECHANICAL	Aerospace Life Science & Medical Packaging Machinery Plastics Machinery & Converting Semiconductor & Electronics Factory Automation	Machine Tools Paper Machinery Primary Metals Textile Wire & Cable	AC/DC Drives & Systems Electric Actuators, Gantry Robots & Slides Electrohydrostatic Actuation Systems Electromechanical Actuation Systems Human Machine Interface	Linear Motors Stepper Motors, Servo Motors Drives & Controls Structural Extrusions
	FILTRATION	Food & Beverage Life Sciences Mobile Equipment Power Generation Transportation	Industrial Machinery Marine Oil & Gas Process	Analytical Gas Generators Compressed Air & Gas Filters Condition Monitoring Engine Air, Fuel & Oil Filtration & Systems	Hydraulic, Lubrication & Coolant Filters Process, Chemical, Water Microfiltration Filters Nitrogen, Hydrogen & Zero Air Generators
	FLUID and GAS HANDLING	Aerospace Agriculture Bulk Chemical Handling Construction Machinery Food & Beverage Fuel & Gas Delivery	Industrial Machinery Mobile Oil & Gas Transportation Welding	Brass Fittings & Valves Diagnostic Equipment Fluid Conveyance Systems Industrial Hose	PTFE & PFA Hose, Tubing & Plastic Fittings Rubber & Thermoplastic Hose & Couplings Tube Fittings & Adapters Quick Disconnects
	HYDRAULICS	Aerospace Aerial lift Agriculture Construction Machinery Forestry	Industrial Machinery Mining Oil & Gas Power Generation & Energy Truck Hydraulics	Diagnostic Equipment Hydraulic Cylinders & Accumulators Hydraulic Motors & Pumps Hydraulic Systems Hydraulic Valves & Controls	Power Take-Offs Rubber & Thermoplastic Hose & Couplings Tube Fittings & Adapters Quick Disconnects
	PNEUMATICS	Aerospace Conveyor & Material Handling Factory Automation Life Science & Medical	Machine Tools Packaging Machinery Transportation & Automotive	Air Preparation Brass Fittings & Valves Manifolds Pneumatic Accessories Pneumatic Actuators & Grippers Pneumatic Valves & Controls	Quick Disconnects Rotary Actuators Rubber & Thermoplastic Hose & Couplings Structural Extrusions Thermoplastic Tubing & Fittings Vacuum Generators, Cups & Sensors
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	SEALING and SHIELDING	Aerospace Chemical Processing Consumer Energy, Oil & Gas Fluid Power General Industrial	Information Technology Life Sciences Military Semiconductor Transportation	Dynamic Seals Elastomeric O-Rings Emi Shielding Extruded & Precision-Cut, Fabricated Elastomeric Seals	Homogeneous & Inserted Elastomeric Shapes High Temperature Metal Seals Metal & Plastic Retained Composite Seals Thermal Management

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