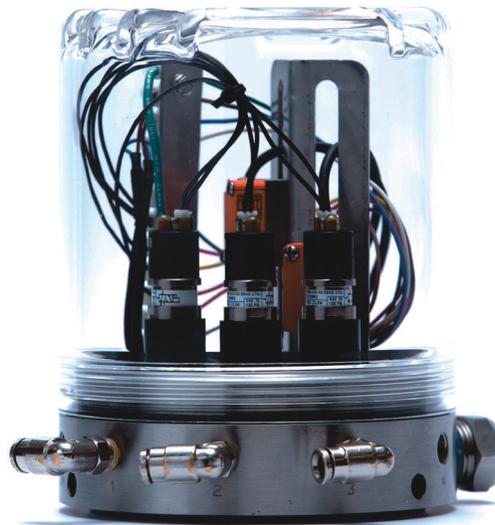


Control Tops

FOR WAUKESHA CHERRY-BURRELL® BRAND VALVES AND SWITCH-ONLY OPTIONS

FORM NO.: 95-03083 REVISION: 08/2019

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



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Warranty

LIMITED WARRANTY: Unless otherwise negotiated at the time of sale, SPX FLOW US, LLC (SPX FLOW) goods, auxiliaries and parts thereof are warranted to the original purchaser against defective workmanship and material for a period of twelve (12) months from date of installation or eighteen (18) months from date of shipment from factory, whichever expires first. If the goods or services do not conform to the warranty stated above, then as Buyer's sole remedy, SPX FLOW shall, at SPX FLOW's option, either repair or replace the defective goods or re-perform defective services. Third party goods furnished by SPX FLOW will be repaired or replaced as Buyer's sole remedy, but only to the extent provided in and honored by the original manufacturer's warranty. Unless otherwise agreed to in writing, SPX FLOW shall not be liable for breach of warranty or otherwise in any manner whatsoever for: (i) normal wear and tear; (ii) corrosion, abrasion or erosion; (iii) any good or services which, following delivery or performance by SPX FLOW, has been subjected to accident, abuse, misapplication, improper repair, alteration, improper installation or maintenance, neglect, or excessive operating conditions; (iv) defects resulting from Buyer's specifications or designs or those of Buyer's contractors or subcontractors other than SPX FLOW; or (v) defects resulting from the manufacture, distribution, promotion or sale of Buyer's products.

THE WARRANTIES CONTAINED HEREIN ARE THE SOLE AND EXCLUSIVE WARRANTIES AVAILABLE TO BUYER AND SPX FLOW HEREBY DISCLAIMS ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE FOREGOING REPAIR, REPLACEMENT AND RE-PERFORMANCE OBLIGATIONS STATE SPX FLOW'S ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS.

Shipping Damage or Loss

If equipment is damaged or lost in transit, file a claim at once with the delivering carrier. The carrier has a signed Bill of Lading acknowledging that the shipment has been received from SPX FLOW in good condition. SPX FLOW is not responsible for the collection of claims or replacement of materials due to transit shortage or damages.

Warranty Claim

Warranty claims must have a **Returned Material Authorization (RMA)** from the Seller or returns will not be accepted. Contact 800-252-5200 or 262-728-1900.

Claims for shortages or other errors must be made in writing to Seller within ten (10) days after delivery. This does not include transit shortage or damages. Failure to give such notice shall constitute acceptance and waiver of all such claims by Buyer.

Safety

READ AND UNDERSTAND THIS MANUAL PRIOR TO INSTALLING, OPERATING, OR SERVICING THIS EQUIPMENT

SPX FLOW recommends users of our equipment and designs follow the latest Industrial Safety Standards. At a minimum, these should include the industrial safety requirements established by:

1. Occupational Safety and Health Administration (OSHA)
2. National Fire Protection Association (NFPA)
3. National Electrical Code (NEC)
4. American National Standards Institute (ANSI)

⚠ WARNING

Severe injury or death can result from electrical shock, burn, or unintended actuation of equipment. Recommended practice is to disconnect and lockout industrial equipment from power sources, and release stored energy, if present. Refer to the National Fire Protection Association Standard No. NFPA70E, Part II and (as applicable) OSHA rules for Control of Hazardous Energy Sources (Lockout-Tagout) and OSHA Electrical Safety Related Work Practices, including procedural requirements for:

- Lockout-tagout
- Personnel qualifications and training requirements
- When it is not feasible to de-energize and lockout-tagout electrical circuits and equipment before working on or near exposed circuit parts

Before putting SPXFLOW equipment into operation, the operator shall analyze the application for all foreseeable risks, their likelihood to occur and the potential consequences of the identified risks as per ISO 31000 and ISO/IEC 31010 in their actual current version.

Locking and Interlocking Devices: These devices should be checked for proper working condition and capability of performing their intended functions. Make replacements only with the original equipment manufacturer's OEM renewal parts or kits. Adjust or repair in accordance with the manufacturer's instructions.

Periodic Inspection: Equipment should be inspected periodically. Inspection intervals should be based on environmental and operating conditions and adjusted as indicated by experience. At a minimum, an initial inspection within 3 to 4 months after installation is recommended. Inspection of the electrical control systems should meet the recommendations as specified in the National Electrical Manufacturers Association (NEMA) Standard No. ICS 1.3, Preventative Maintenance of Industrial Control and Systems Equipment, for the general guidelines for setting-up a periodic maintenance program.

Replacement Equipment: Use only replacement parts and devices recommended by the manufacturer to maintain the integrity of the equipment. Make sure the parts are properly matched to the equipment series, model, serial number, and revision level of the equipment.

Warnings and cautions are provided in this manual to help avoid serious injury and/or possible damage to equipment:

⚠ DANGER

*marked with a stop sign.
Immediate hazards which WILL result in severe personal injury or death.*

⚠ WARNING

*marked with a warning triangle.
Hazards or unsafe practices which COULD result in severe personal injury or death.*

⚠ CAUTION

*marked with a warning triangle.
Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.*

Care of Component Materials

NOTE: SPX FLOW recommends the use of an FDA-approved anti-seize compound on all threaded connections.

⚠ WARNING

Failure to comply with the Care of Component Materials could lead to bodily injury.

Stainless Steel Corrosion

Corrosion resistance is greatest when a layer of oxide film is formed on the surface of stainless steel. If film is disturbed or destroyed, stainless steel becomes much less resistant to corrosion and may rust, pit or crack.

Corrosion pitting, rusting and stress cracks may occur due to chemical attack. Use only cleaning chemicals specified by a reputable chemical manufacturer for use with stainless steel. Do not use excessive concentrations, temperatures or exposure times. Avoid contact with highly corrosive acids such as hydrofluoric, hydrochloric or sulfuric. Also avoid prolonged contact with chloride-containing chemicals, especially in presence of acid. If chlorine-based sanitizers are used, such as sodium hypochlorite (bleach), do not exceed concentrations of 150 ppm available chlorine, do not exceed contact time of 20 minutes, and do not exceed temperatures of 104°F (40°C).

Corrosion discoloration, deposits or pitting may occur under product deposits or under gaskets. Keep surfaces clean, including those under gaskets or in grooves or tight corners. Clean immediately after use. Do not allow equipment to set idle, exposed to air with accumulated foreign material on the surface.

Corrosion pitting may occur when stray electrical currents come in contact with moist stainless steel. Ensure all electrical devices connected to the equipment are correctly grounded.

Elastomer Seal Replacement Following Passivation

Passivation chemicals can damage product contact areas of this equipment. Elastomers (rubber components) are most likely to be affected. Always inspect all elastomer seals after passivation is completed. Replace any seals showing signs of chemical attack. Indications may include swelling, cracks, loss of elasticity or any other noticeable changes when compared with new components.

Care of Copolyester Covers on the WCB Control Top

Copolyester covers may be cleaned using a mild detergent and warm water. Be sure to clean the water regularly, as any entrapped dirt in the cleaning water can cause scratching. Use a soft or sponge cloth, and avoid applying pressure. Rinse thoroughly with clean water, and dry by blotting the residual water with a clean cloth or chamois. Do not rub the surface.

⚠ CAUTION

DO NOT use abrasive cleaners, window cleaning sprays, solvents (such as acetone, gasoline, benzene, lacquer thinner), or chlorinated solvents for cleaning control top covers. These agents will damage and/or attack the control top covers.

Introduction

NOTE: For valve information, please refer to the specific publication assigned to the type of valve you have. For additional product information, please see our web site at <http://www.spxflow.com/en/waukesha-cherry-burrell/>.

General Information

Information in this manual should be read by all personnel involved in installation, setup, operation and maintenance of for control tops for Waukesha Cherry-Burrell brand valves and switch-only options.

NOTE: In this manual, "stem-raised" is understood to be when the valve stem is fully retracted into the actuator. "Stem-lowered" is understood to be when the valve stem is fully extended out from the actuator.

Models and Specifications

Control tops are used with pneumatically-actuated valves to protect and deploy stem feedback switches and/or air solenoid valves. These washdown enclosures mount on top of the valve actuator. An indicator stem extends into the control top, providing a position measurement surface for the feedback switches.

This manual covers the WCB 2-piece control top, the Bürkert 8681 control top, the CU4 control top, and the Westlock 9881 & switch-only options for use with Waukesha Cherry-Burrell brand valves. The WCB 3-piece control top (O&M manual 95-03077) is obsolete but service parts are available. WCB 2-piece control tops are retrofit-able on all Waukesha Cherry-Burrell brand W-Series valves shipped since 1995. "W-Series" refers to the W60/W80, W70, and W90 Series valves.

The CU3 control top is covered in manual H329233, which is available from your local distributor.

The CU4 is covered in manual H323871:

http://www.spxflow.com/en/assets/pdf/APV_CU4%20DC_UK.pdf

The CU4 AS-interface is covered in manual H326406:

http://www.spxflow.com/en/assets/pdf/APV_CU4%20AS-i_UK.pdf.

The Bürkert 8681 manual is available online at www.burkert.com > Documentation >Type 8681.

Operating Parameters

WCB control tops are designed to work in a temperature environment of 32°F to 140°F (0°C to 60°C).

Bürkert 8681 control tops are designed to work in a temperature environment of -4°F to 158°F (-20°C to 70°C).

CU4 control tops are designed to work in a temperature environment of 14°F to 131°F (-10°C to 55°C).

NOTE: The designed environmental temperature ranges listed above apply only to the control top and do not apply to the valve itself. When operating in extreme environmental conditions, take the operating parameters of the valve into consideration as well. Refer to the appropriate valve manual for design ranges that apply to the valve.

Cleaning: WCB control tops are intended for normal exterior cleaning procedures. See "Care of Copolyester Covers on the WCB Control Top" on page 8 for more details.

Installation and Operation

Air Supply

The air supply must be 75 to 100 psi (5.2 to 6.9 bar).

Quality of Control Air to Control Top

⚠ CAUTION

Do not exceed the values listed.

WCB 2-Piece Control Top

Control Medium

Install the valves using dry, filtered air. Lubrication is not required. If using lubricated air, refer to the solenoid manufacturer's specifications.

Dust Content

Particle size: 5 microns max.
Particle Density: 5 mg/m³ max.
Quality class 3

Water Content

Dew point +35°F (+1.6°C)
Quality class 3
For applications at great elevations or at low ambient temperatures, the dew point changes.

Oil Content

(If possible, without oil)
Up to 25mg/m³ max. oil
Quality class 5

Bürkert 8681 Control Top

Control Medium

Oil-free and dry air, neutral gases
Quality classes in accordance with DIN/ISO 8573-1
(5 µm filter recommended)

Dust Content

Max. particle size 40µm
Max. particle density 10 mg/m³
Quality class 5

Water Content

Max. pressure dew point -20°C or min. 10°C below the lowest operating temperature
Quality class 3

Oil Content

Max. 25mg/m³
Quality class 5

CU4 Control Top

Control Medium

Quality class according to DIN/ISO 8573-1

Dust Content

Quality class 3

Max. particle size per m³ : 10000 of 0.5µm <d<1.0µm

500 of 1.0µm <d<5.0µm

Water Content

Quality class 4

Max. dew point temperature: +3°C

For installations at lower temperatures or at higher altitudes, consider additional measures to reduce the dew point pressure accordingly.

Oil Content

Quality class 1

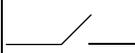
Max 0.01 mg/m³

Oil must be compatible with polyurethane elastomer materials.

Valve Stem Detection Conditions

The valve seats are part of an automatic fail-safe system preventing contamination of the product with cleaning or sanitizing solutions. Automatic fail-safe systems are unique to each particular installation. Typically, both blocking valve seats are properly seated in the blocked position before the mechanical cleaning system can be activated for the cleaning circuit containing the valve arrangement.

WCB 2-Piece Control Top

Valve Stem Detection Condition	Upper Switch (NO)	Lower Switch (NC)	Yoke Switch (NC)
Switch Symbol			
Valve Closed	0	1	1
Valve Open	1	0	0
Valve Closed with Upper Seat Clean *	0	1	0
Valve Closed with Lower Seat Clean *	0	0	1

* Seat lift during upper seat clean; seat push during lower seat clean, indicator stem lowers.

1 = Feedback, LED is lit

0 = No Feedback, LED is off.

Upper Switch: Sends an input signal when the valve is properly open.

Lower Switch: Sends an input signal when the valve is properly closed.

Yoke Switch: Sends an input signal when the upper seat is properly closed.

Bürkert 8681 Control Top

Valve Stem Detection Condition	S1	S2	S3	S4*	Top LED Indication
Valve Closed	1	0	0	0	Steady Red
Valve Open	0	1	0	1	Steady Green
Valve Closed with Upper Seat Clean	1	0	0	1	Fast Flashing Green
Valve Closed with Lower Seat Clean	0	0	1	0	Slow Flashing Green

* Normally Closed External Proximity Switch; LED is opposite of feedback signal.

1 = Feedback

0 = No Feedback

CU4 Control Top

Valve Stem Detection Condition	W71/W72RS/W73 Valves	
	Open Sensor (Upper)	Closed Sensor (Lower)
Valve Closed	0	1
Valve Open	1	0
Valve Closed with Upper Seat Clean	0	1
Valve Closed with Lower Seat Clean	0	0

1 = Feedback

0 = No Feedback

Installation and Operation of WCB 2-Piece Top

Reference for Figures 1 and 2

- | | |
|--|-------------------|
| A.V-Groove Plenum with air supply channels | F.Inside Diameter |
| B.Air-In | G.Top |
| C.Set screw | H.Side |
| D.Vent | I.Underside |
| E.Wire | J.O-Ring |
| | S.Solenoid Mount |

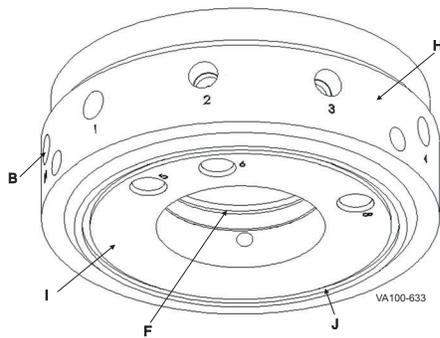


Figure 1 - Base Underside View

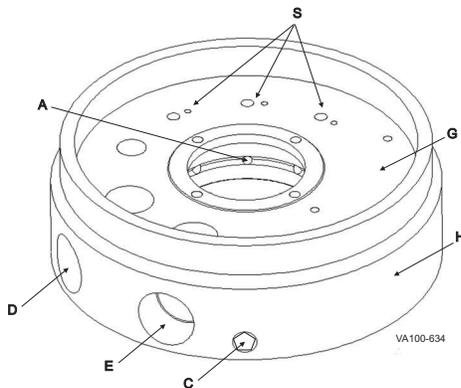


Figure 2 - Base Top View

NOTE: See page 31 for Bürkert, page 41 for Westlock/Tyco 9881, and page 41 for CU4.

Routing for Compressed Air, Vent and Wiring

See Figures 1, 2, and 3.

Compressed air is routed through the base from Air-In (item B) to a V-groove air-plenum (item A) in the inside diameter (item F). Supply channels from the plenum feed each of three (3) threaded solenoid mounts (item S) on top. An energized solenoid passes air to the adjacent, non-threaded outlet hole, feeding the corresponding side (item H) and underside (item I) air ports.

For air routing to the top of an actuator, for example, W60 Air-to-Lower, the side port is plugged, and the underside port uses a vent plug and o-ring to connect to the air connection on top of the actuator.

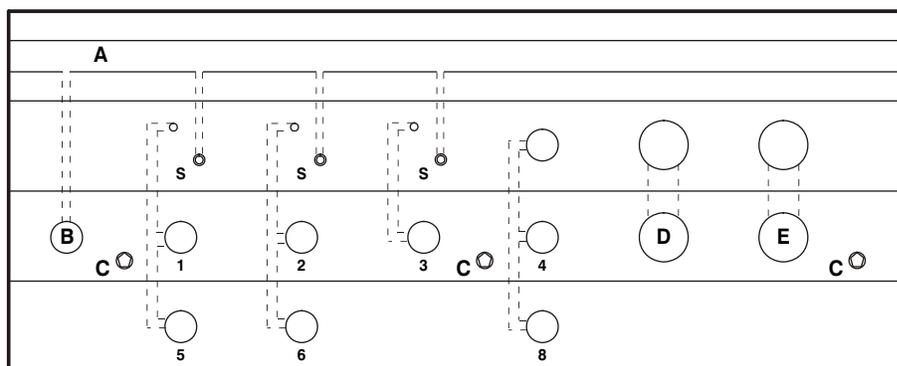
For air routed to the side of the actuator, for example W60 Air-to-Raise or the actuator sidewall for W70, the underside port is plugged and the side port is open.

For unused solenoid ports, both the side and underside ports are plugged, and the top threaded mount is plugged.

Vent air from the top of the actuator is routed through the control top base via underside port no. 8. A venting plug and o-ring are used to connect the actuator port to port no. 8. Vent air passes through the module to the side vent plug (item D) in the base.

Wiring is routed inside the control top from the side port (item H) to the joined top port. A cable strain relief or optional pin-connector is used on the side port.

Installation of the top is secured using three (3) setscrews (item C) in the side of the base.



VA100-632

Figure 3 - Routing for Compressed Air, Vent and Wiring

Solenoid Operation - WCB 2-Piece Top

Barrel -Type Solenoid

- 24VDC (5-25VDC) typically used on all valves
- Up to three (3) solenoids
- Ports in the base are numbered
- On single-seat valves, the air boost requires two (2) solenoids
- 120VAC (50-60Hz) solenoid is available

Operation

Solenoids direct compressed air through the ports in the base of the control top to drive the motion of the valve. For the solenoid to work correctly and achieve the required valve condition, specific ports must be open or plugged. Many configurations are possible. Table 1 and Table 2 list the appropriate configurations for W60/W80/W90 and W70 valves. Prior to startup, perform a functional test on each valve by applying compressed air.

Table 1: W60 / W80 / W90 Single Seat Solenoid and Port Arrangements

Valve Configuration	Solenoid Location			Port								Top Port	In Port
	1	2	3	1	2	3	4	5	6	8			
Single Seat - No Solenoid - AR	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Vent	Open	Plug
Single Seat - No Solenoid - AL & AA	Plug	Plug	Plug	Plug	Plug	Plug	Open	Plug	Plug	Plug	Vent	Plug	Plug
Single Seat - 1 Solenoid - AR	Solenoid	Plug	Plug	Open	Plug	Plug	Plug	Plug	Plug	Plug	Vent	Open	Open
Single Seat - 1 Solenoid - AL	Solenoid	Plug	Plug	Plug	Plug	Plug	Plug	Vent	Plug	Open	Open	Plug	Open
Single Seat - 2 Solenoids - Air Boost & AA	Solenoid	Solenoid	Plug	Open	Plug	Plug	Plug	Plug	Vent	Open	Open	Plug	Open
Single Seat 3 Pos. AR - 2 Solenoid	Solenoid	Solenoid	Plug	Open	Open	Plug	Plug	Plug	Plug	Vent	Open	Open	Open

Note: For W60 / W80 / W90 single seat valves:

AR = Air to raise actuator, AL = Air to lower actuator, AA = Air to air actuator

AR (2) Solenoids: Solenoid 1 = AR; Solenoid 2 = Air boost

AL (2) Solenoids: Solenoid 1 = Air boost; Solenoid 2 = AL

3-Position AR Actuator (2) Solenoids: Solenoid 1 = Valve open; Solenoid 2 = Mid-position

OPEN = Exposed to atmosphere or connected with air fitting

VENT = Aligned with vent plug and o-ring (p/n 119599+ & N70107) on the top side of the actuator

Table 2: W70 Series Mix Proof and W75RS PMO Solenoid and Port Arrangements

Valve Configuration	Solenoid Location			Port								Top Port	In Port
	1	2	3	1	2	3	4	5	6	8			
Mix Proof - No Solenoid	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Vent	Open	Plug
Mix Proof - 1 Solenoid	Solenoid	Plug	Plug	Open	Plug	Plug	Plug	Plug	Plug	Plug	Vent	Open	Open
Mix Proof - 2 Solenoids	Solenoid	Solenoid	Plug	Open	Open	Plug	Plug	Plug	Plug	Plug	Vent	Open	Open
Mix Proof - 3 Solenoids	Solenoid	Solenoid	Solenoid	Open	Open	Open	Plug	Plug	Plug	Plug	Vent	Open	Open
Mix Proof Radial Seal (RS) - No Solenoid	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Plug	Open	Plug	Plug
Mix Proof Radial Seal (RS) - 1 Solenoid	Solenoid	Plug	Plug	Open	Plug	Plug	Plug	Plug	Plug	Plug	Open	Plug	Open
Mix Proof Radial Seal (RS) - 2 Solenoids	Solenoid	Solenoid	Plug	Open	Open	Plug	Plug	Plug	Plug	Plug	Open	Plug	Open
Mix Proof Radial Seal (RS) - 3 Solenoids	Solenoid	Solenoid	Solenoid	Open	Open	Open	Plug	Plug	Plug	Plug	Open	Plug	Open
PMO - No Solenoid	Plug	Plug	Plug	Plug	Plug	Plug	Open	Plug	Plug	Plug	Open	Open	Plug
PMO - 1 Solenoid	Solenoid	Plug	Plug	Open	Plug	Plug	Open	Plug	Plug	Plug	Open	Open	Open
PMO - 2 Solenoids	Solenoid	Solenoid	Plug	Open	Open	Plug	Open	Plug	Plug	Plug	Open	Open	Open
PMO - 3 Solenoids	Solenoid	Solenoid	Solenoid	Open	Open	Open	Open	Plug	Plug	Plug	Open	Open	Open

Note: For all W-Series Mix Proof:

Solenoid 1 = Valve Open; Solenoid 2 = Upper seat lift; Solenoid 3 = Lower seat lift

Valves with yoke prox switch follow the PMO port arrangement.

NOTE: Arrangements are the same for proximity and micro switch configurations.

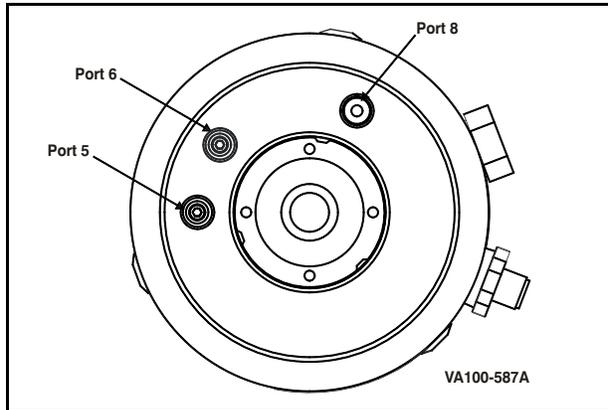


Figure 4 - Control Top Bottom View, Ports 5, 6, 8

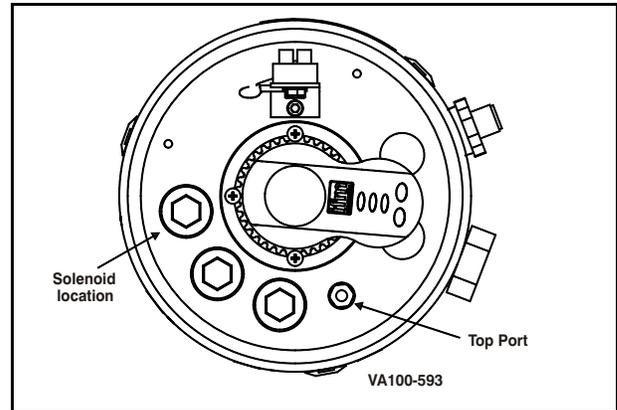


Figure 5 - Top View, No Solenoids

NOTE: To vent Ports 5, 6 or 8, use vent plug p/n 119599+ and o-ring p/n N70107.
 When plugging ports 5 or 6, use screw p/n 119626+ and washer p/n 120067+.

NOTE: When plugging solenoid location, use screw p/n 30-519 and washer p/n 17-111

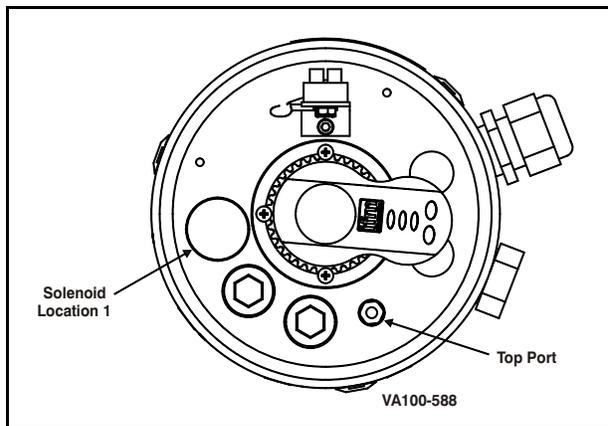


Figure 6 - Top View, (1) Solenoid

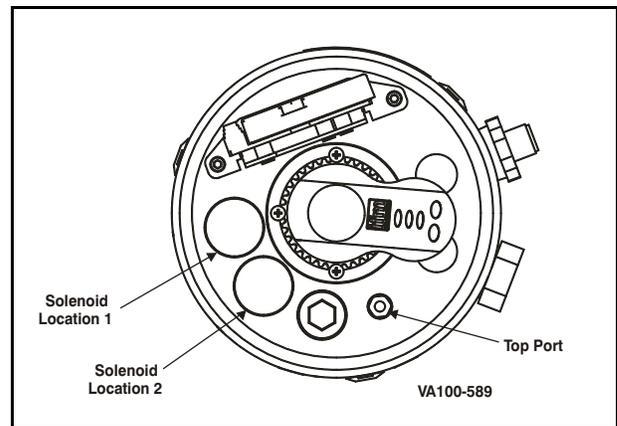


Figure 7 - Top View, (2) Solenoids

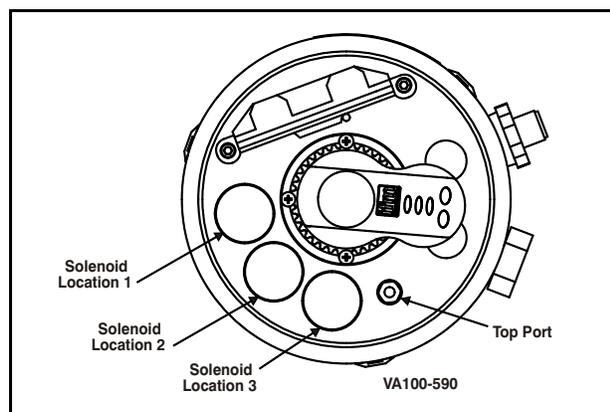


Figure 8 - Top View, (3) Solenoids

NOTE: To plug the top port, use plug p/n 78-73.

Wiring and Pin Instructions: Set & Forget Switch

NOTE: The Set & Forget Switch is available with 24VDC Power only

Page, Figure	Connection	Voltage
Page 16, Fig. 9	Strain Relief	DC
Page 17, Fig. 10	6 Pin Eurofast	DC
Page 17, Fig. 11	8 Pin Eurofast	DC
Page 18, Fig. 12	10 Pin Eurofast	DC
Page 18, Fig. 13	12 Pin Eurofast	DC
Page 19, Fig. 14	AS-i Wiring	DC
Page 19, Fig. 15	DeviceNet™ Wiring, Single Seat	DC
Page 20, Fig. 16	DeviceNet™ Wiring, Mix Proof	DC

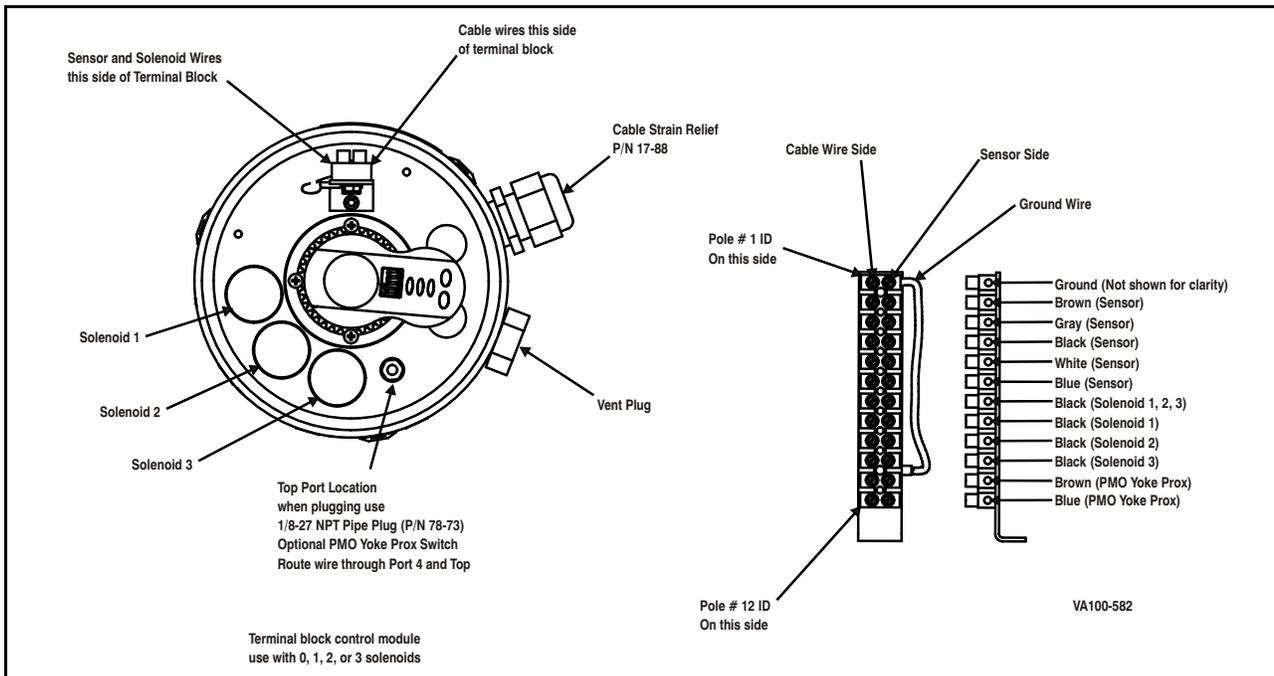


Figure 9 - Strain Relief

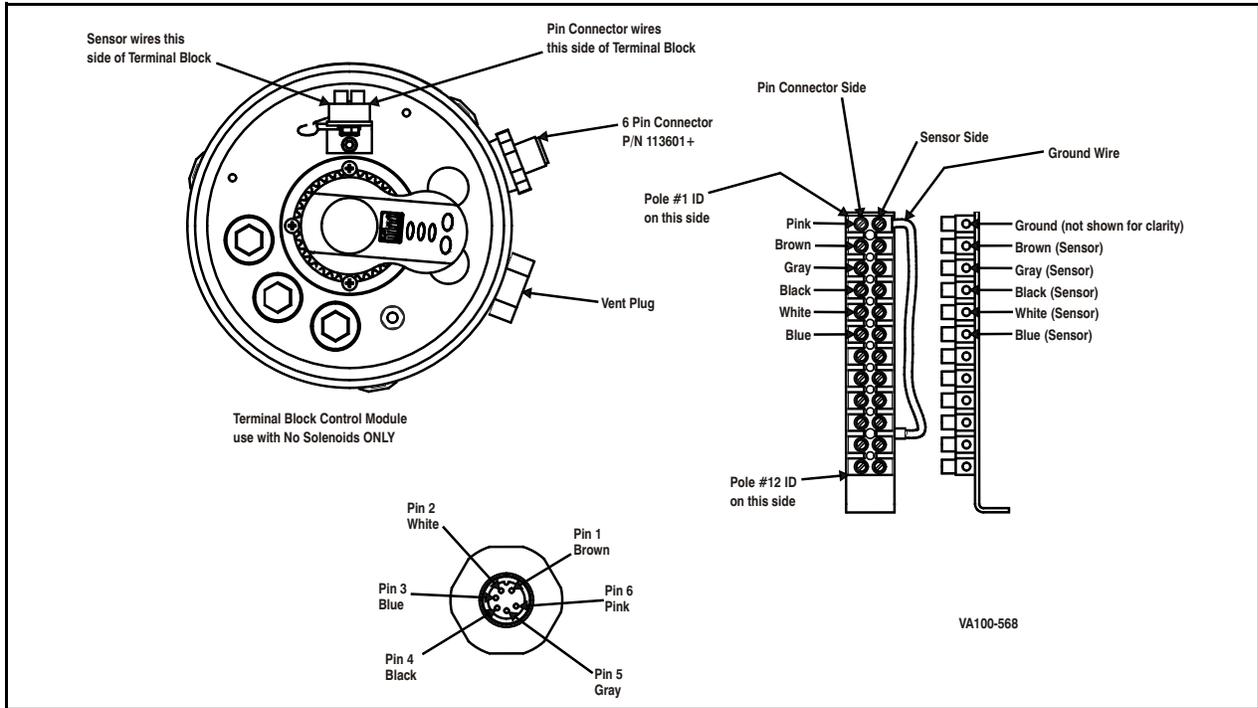


Figure 10 - 6-pin Eurofast wiring

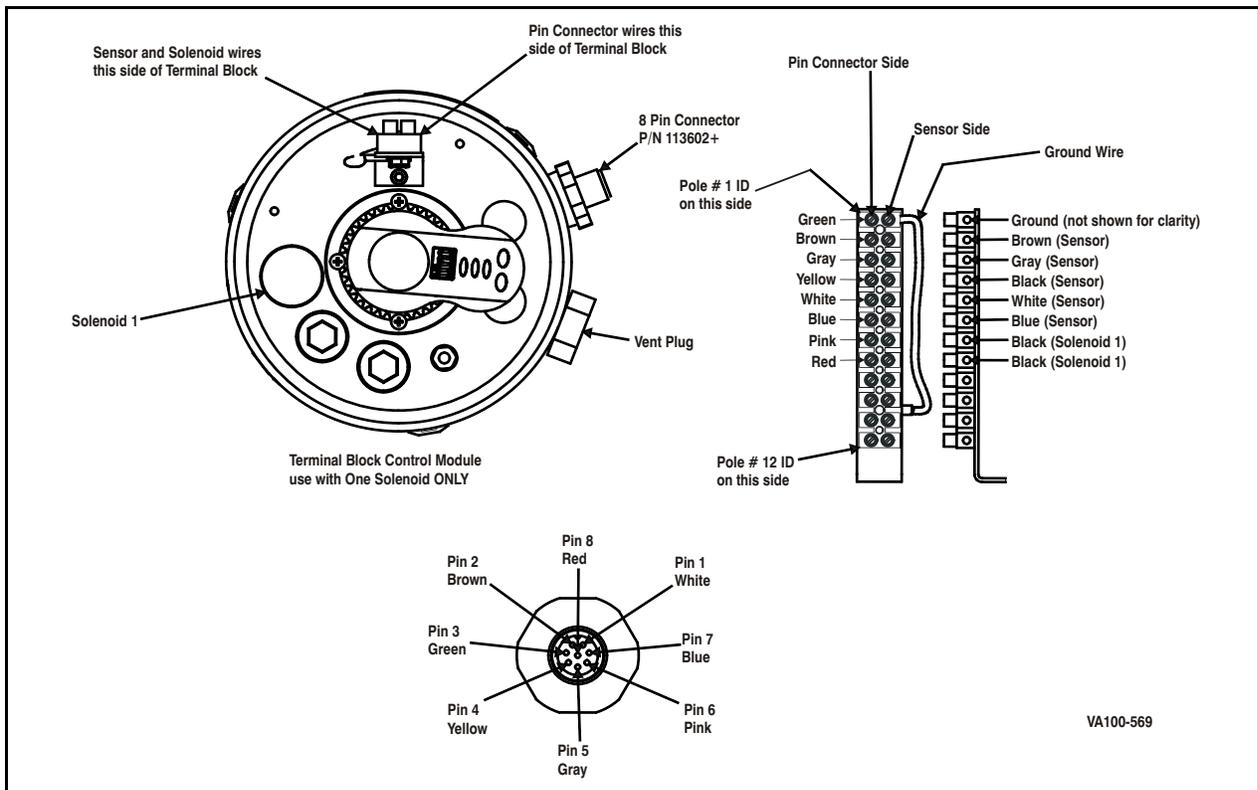


Figure 11 - 8-pin Eurofast wiring

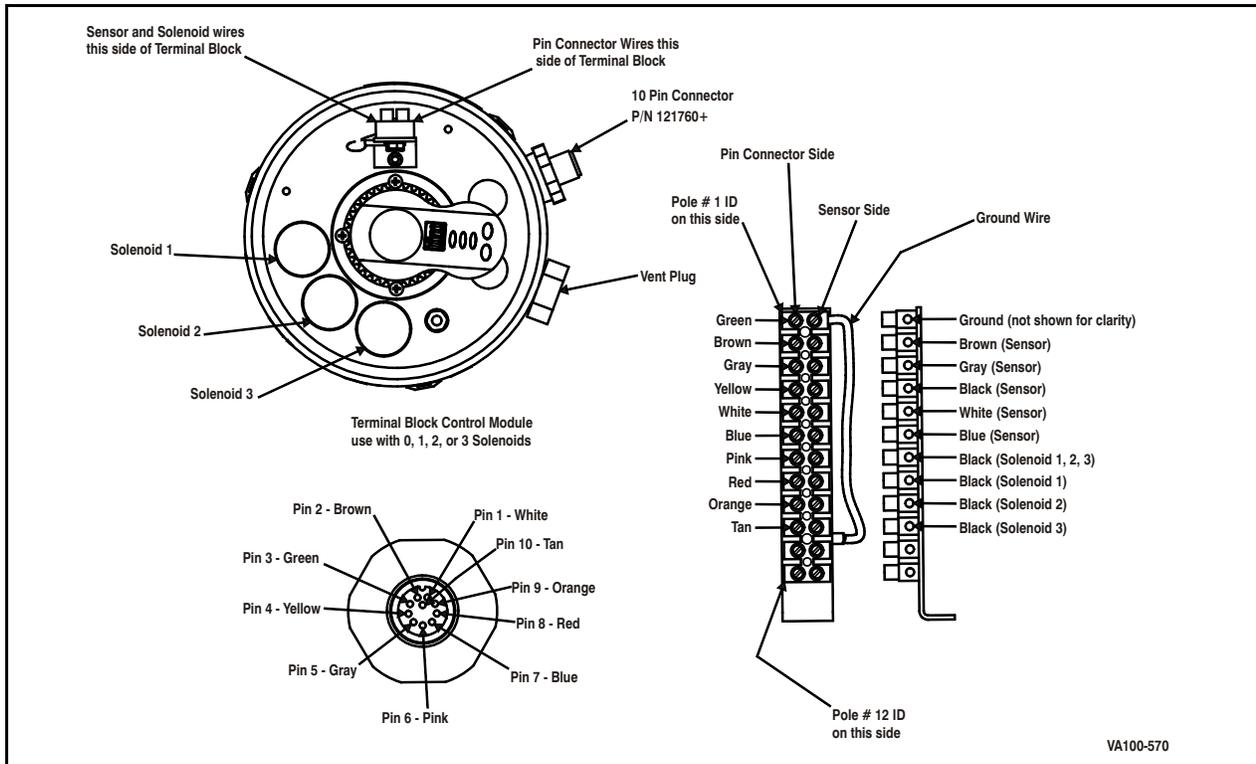


Figure 12 - 10-pin Eurofast wiring

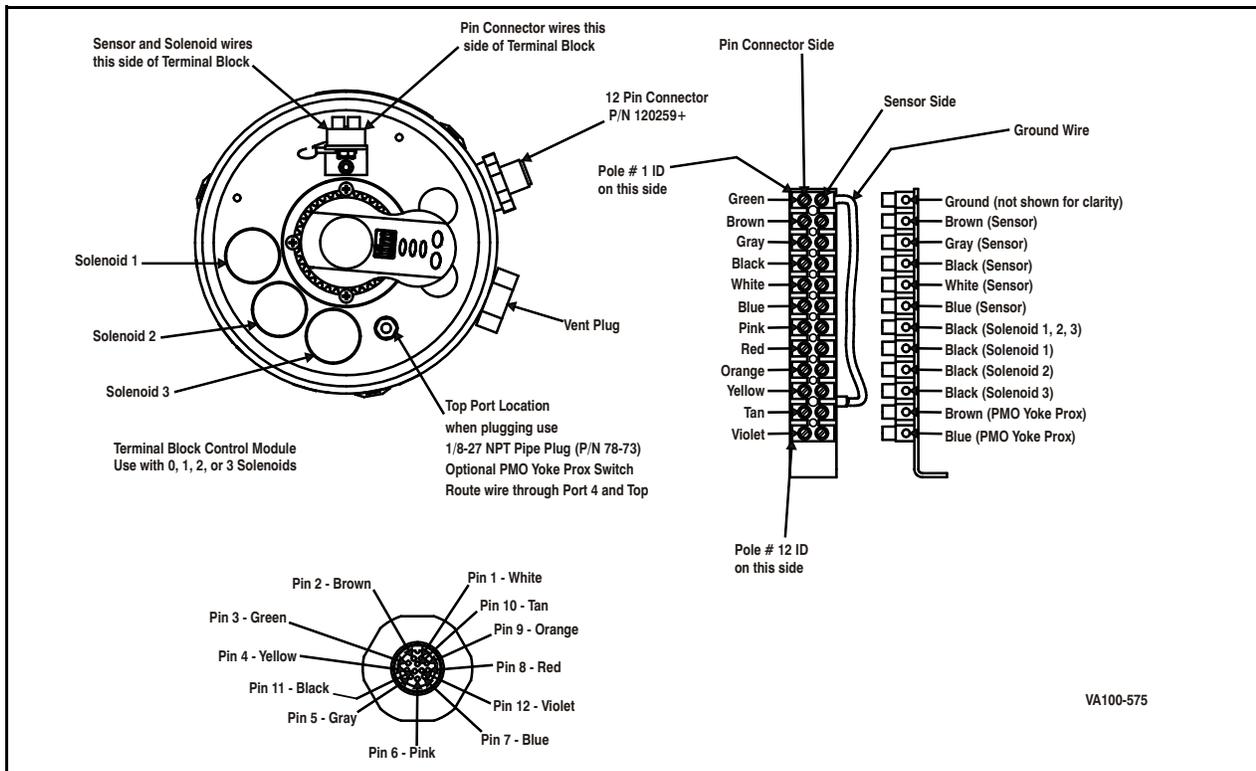


Figure 13 - 12-pin Eurofast wiring

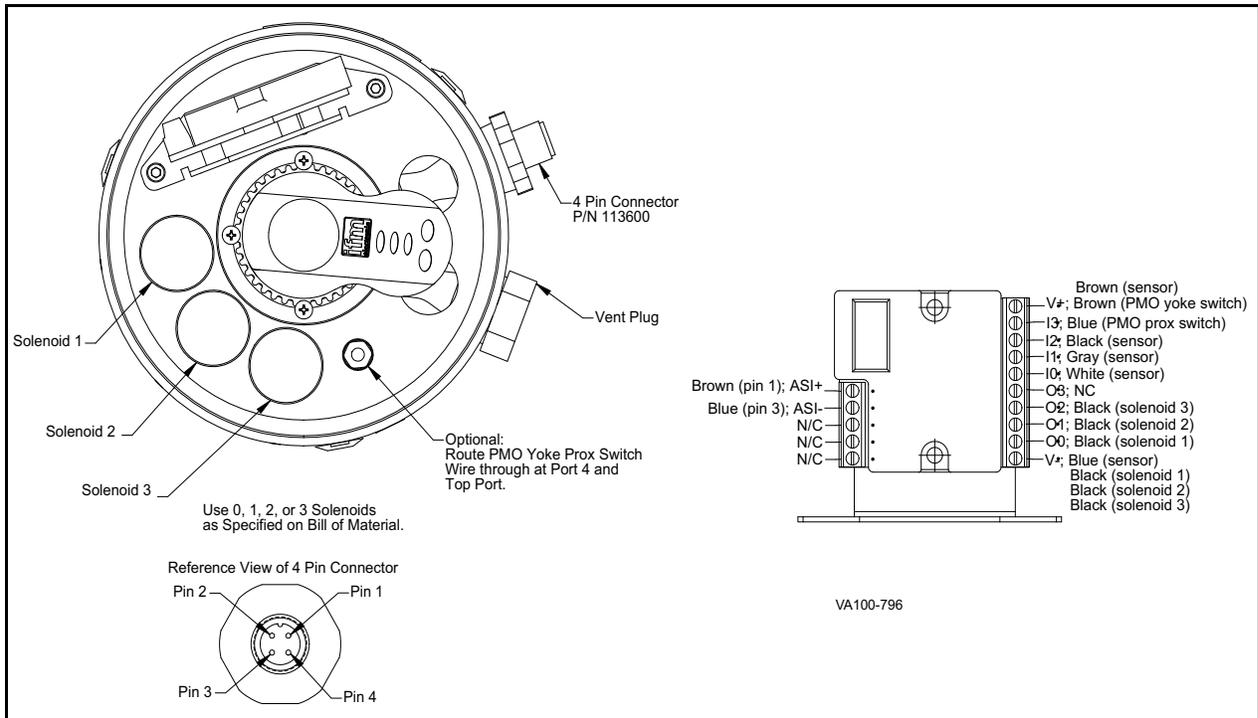


Figure 14 - AS-i Eurofast Wiring

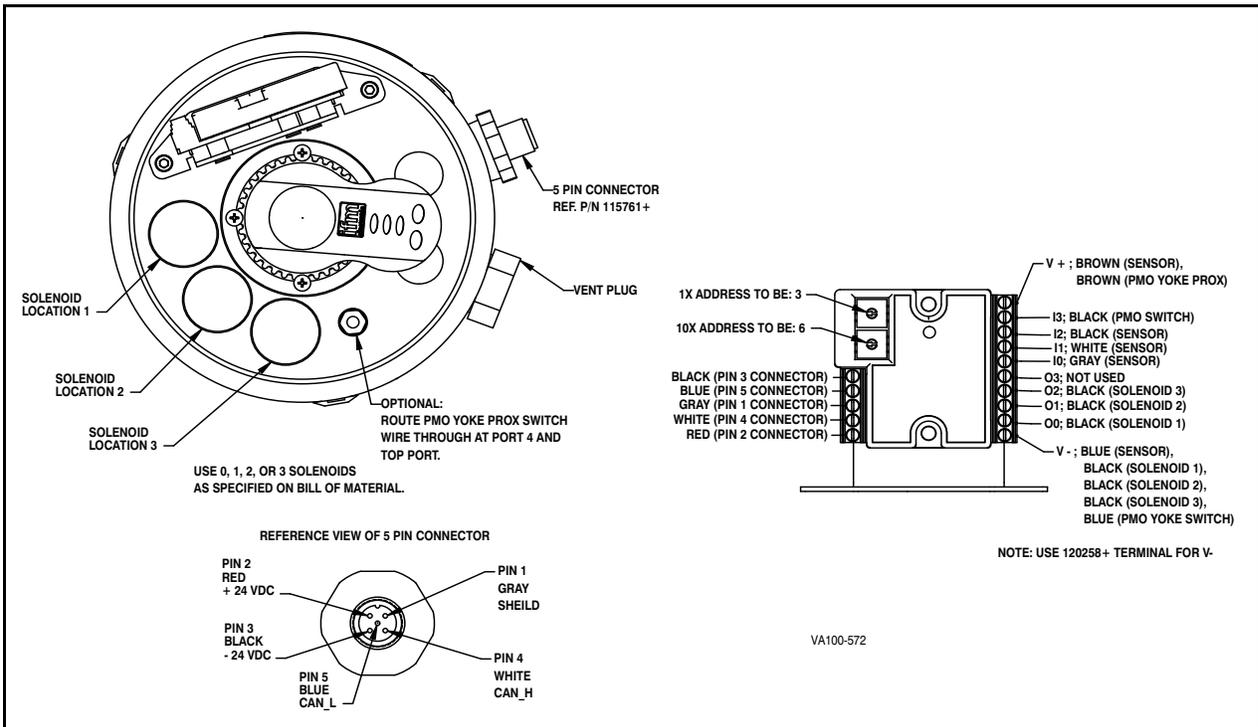


Figure 15 - DeviceNet™ Eurofast Wiring, Single-Seat

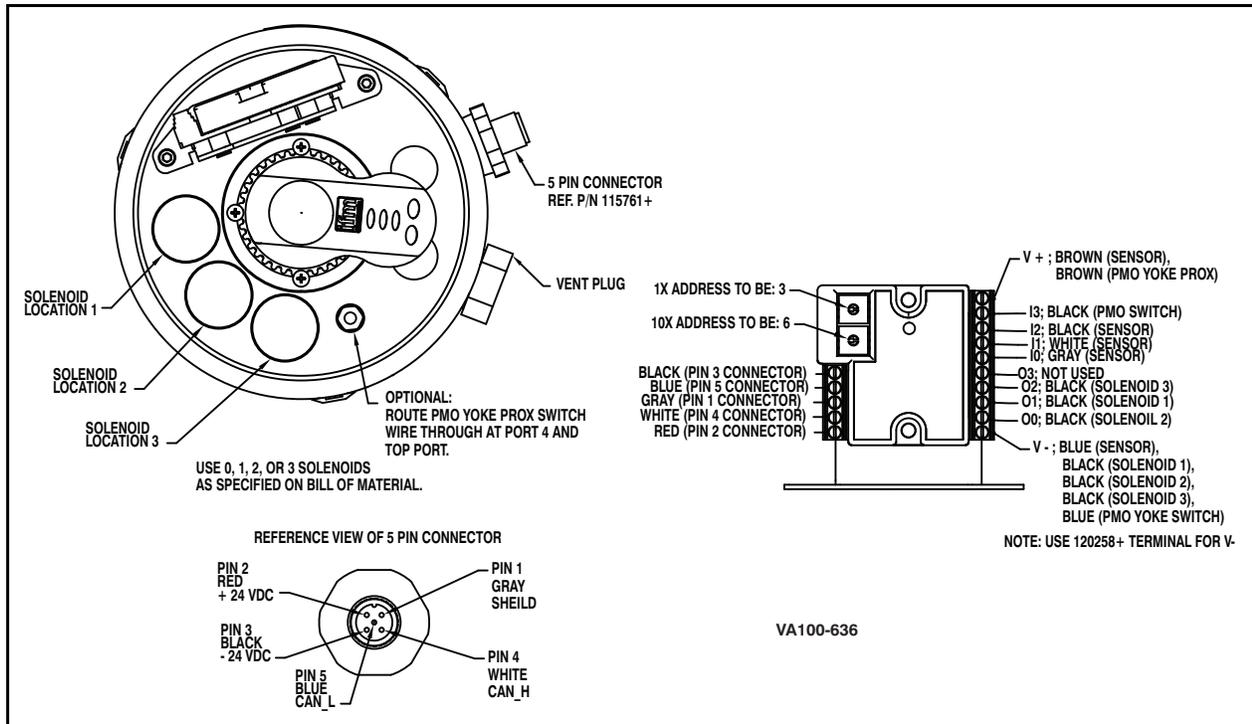


Figure 16 - DeviceNet™ Eurofast Wiring, Mix Proof

Wiring and Pin Instructions: Proximity and Micro Switches

Page, Figure	Specification Type	Pin Connector	Number of Solenoids	PMO Yoke Switch	3 Wire Proximity
Page 21, Fig. 17	Strain Relief Micro Switch	17-88	3	No	No
Page 21, Fig. 18	Strain Relief Proximity Switch	17-88	3	Yes	Yes
Page 22, Fig. 19	4-Pin Eurofast	113600+	0	No	No
Page 22, Fig. 20	4-Pin Eurofast with AS-i Card	113600+	3	Yes	No
Page 23, Fig. 21	5-Pin Eurofast	115761+	0	Yes	No
Page 23, Fig. 22	5-Pin Eurofast with DeviceNet™ Card, Single Seat	115761+	3	Yes	Yes
Page 24, Fig. 23	5-Pin Eurofast with DeviceNet™ Card, Mix Proof	115761+	3	Yes	Yes
Page 24, Fig. 24	6-Pin Eurofast	113601+	1	No	No
Page 25, Fig. 25	8-Pin Eurofast	113602+	3	No	No
Page 25, Fig. 26	8-Pin Eurofast with 3-Wire Proximity	113602+	1	No	Yes
Page 26, Fig. 27	10-Pin Eurofast	121760+	3	No	Yes
Page 26, Fig. 28	10-Pin Eurofast	121760+	3	Yes	No
Page 27, Fig. 29	12-Pin Eurofast	120259+	3	Yes	Yes
Page 27, Fig. 30	5-Pin Minifast	5512434+	0	Yes	No
Page 28, Fig. 31	6-Pin Minifast	113252+	1	No	No
Page 28, Fig. 32	7-Pin Minifast	108848+	2	No	No
Page 29, Fig. 33	8-Pin Minifast	122078+	3	No	No
Page 29, Fig. 34	9-Pin Minifast	122079+	3	Yes	No
Page 30, Fig. 35	10-Pin Minifast	122080+	3	No	Yes
Page 30, Fig. 36	10-Pin Minifast	122080+	3	Yes	No

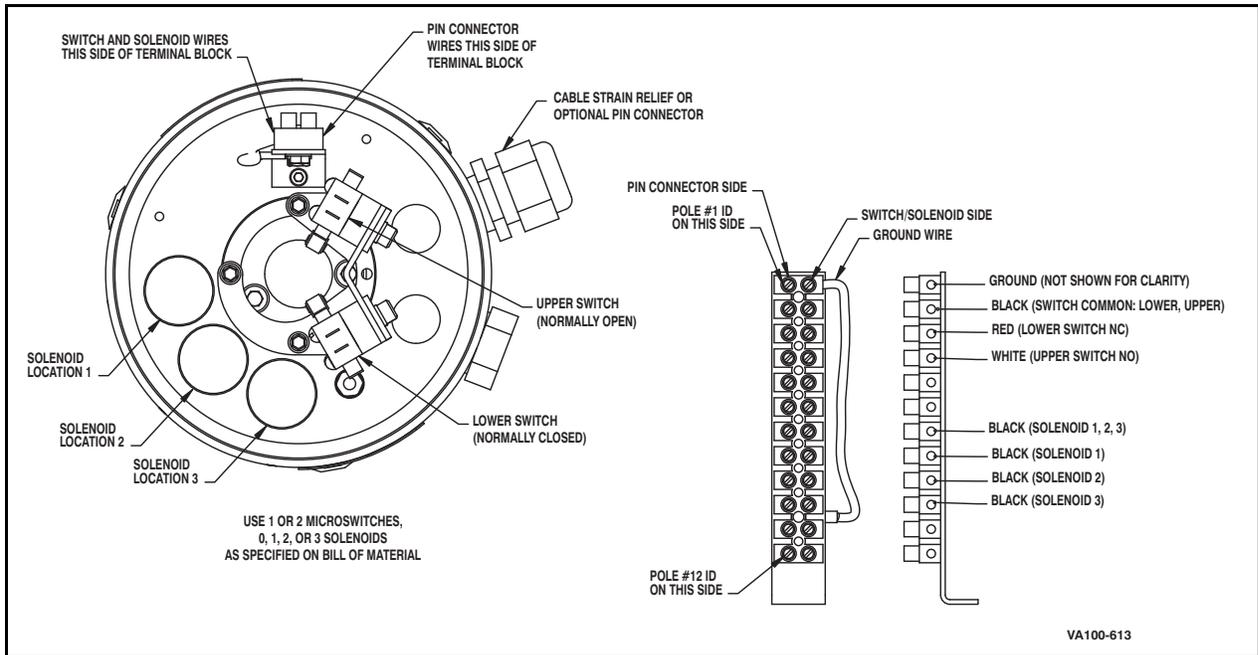


Figure 17 - Strain Relief Micro Switch

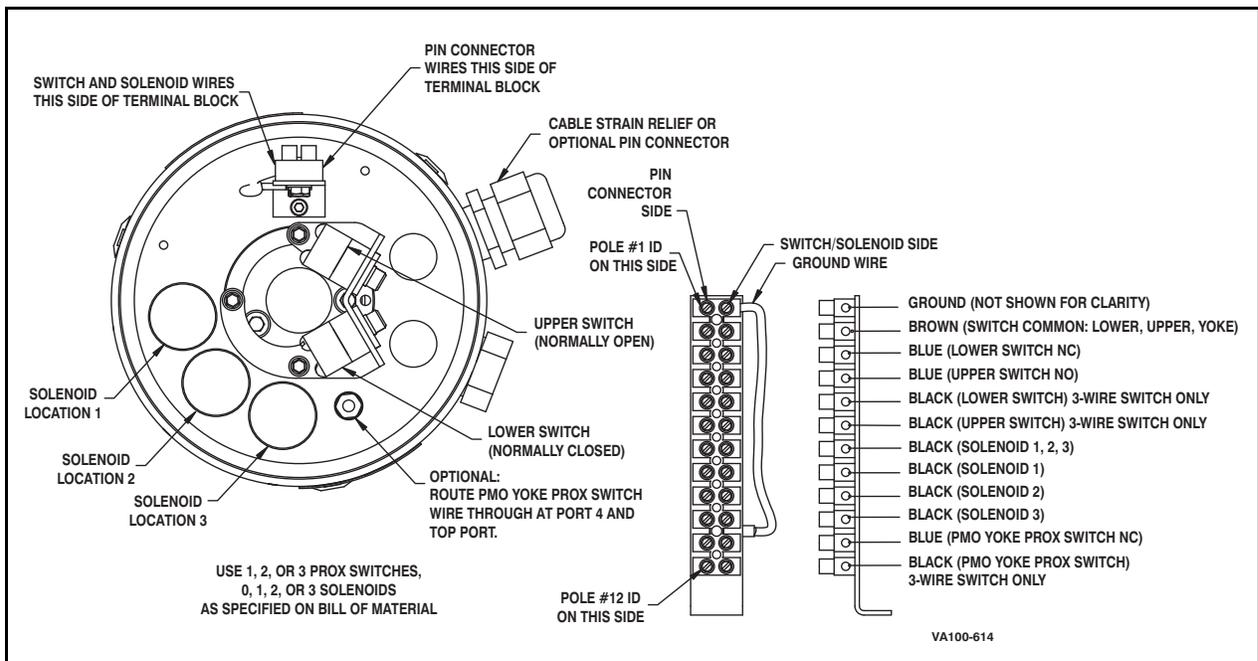


Figure 18 - Strain Relief Proximity Switch

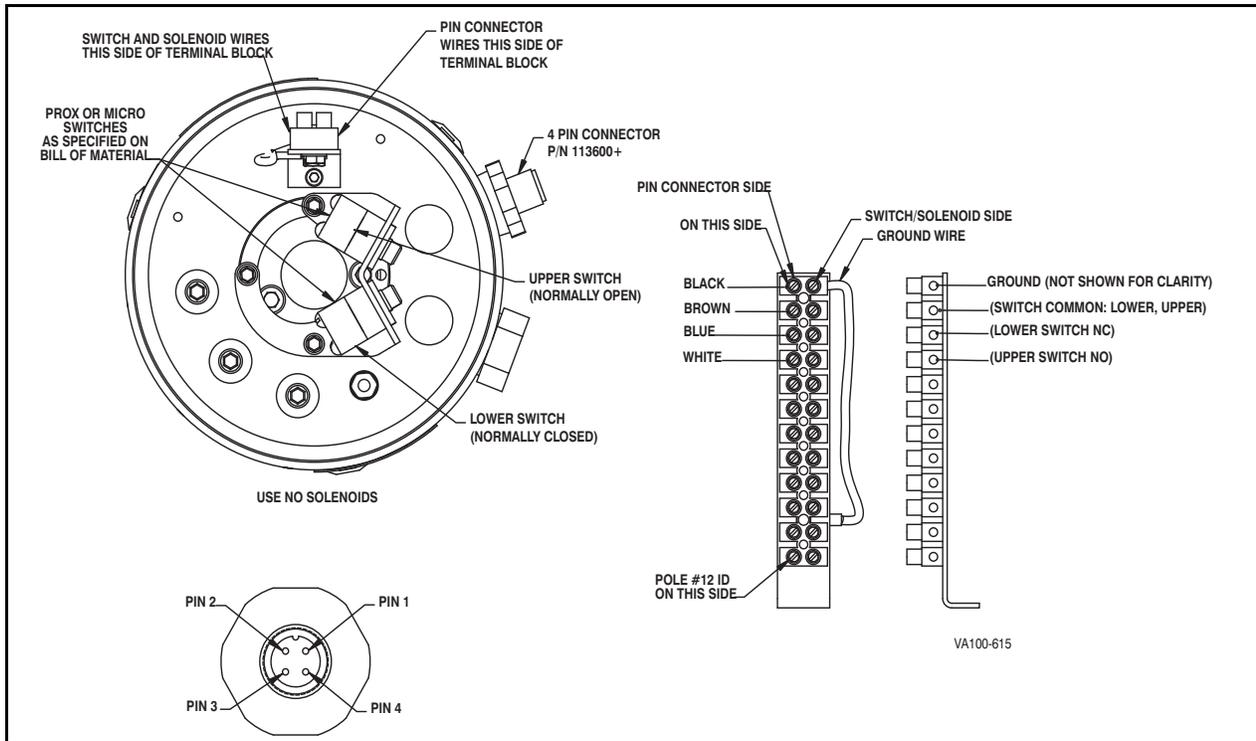


Figure 19 - 4-Pin Eurofast

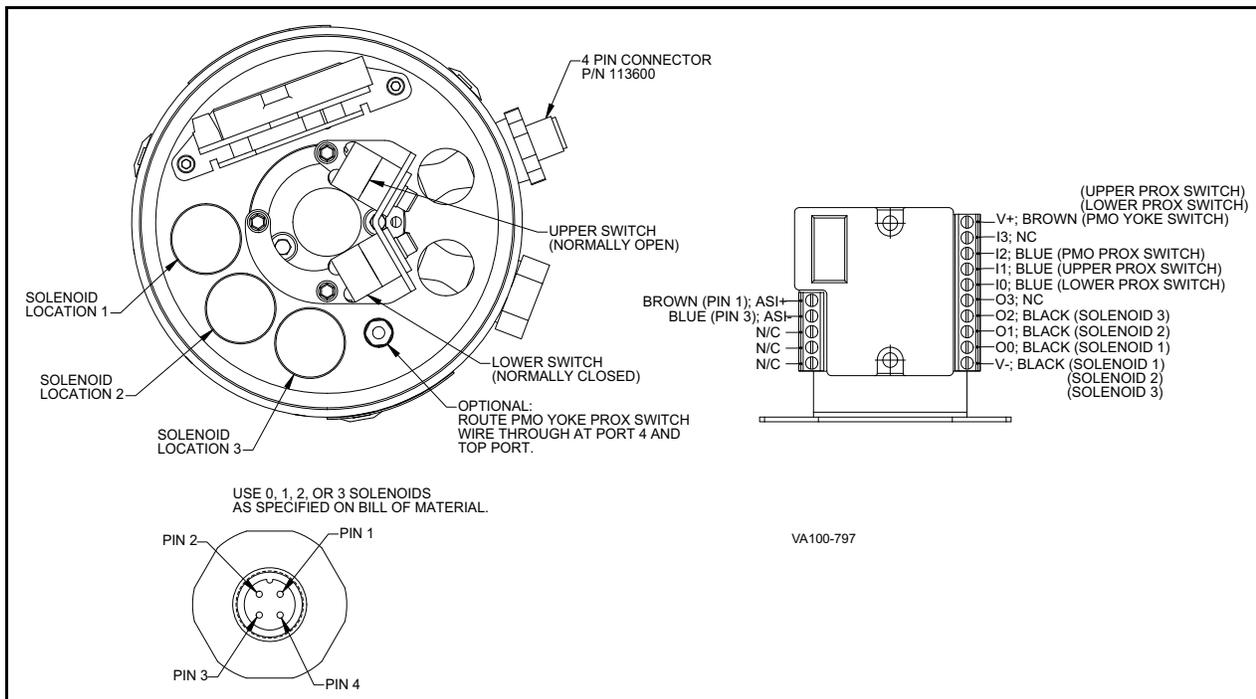


Figure 20 - 4-Pin Eurofast with AS-i Card

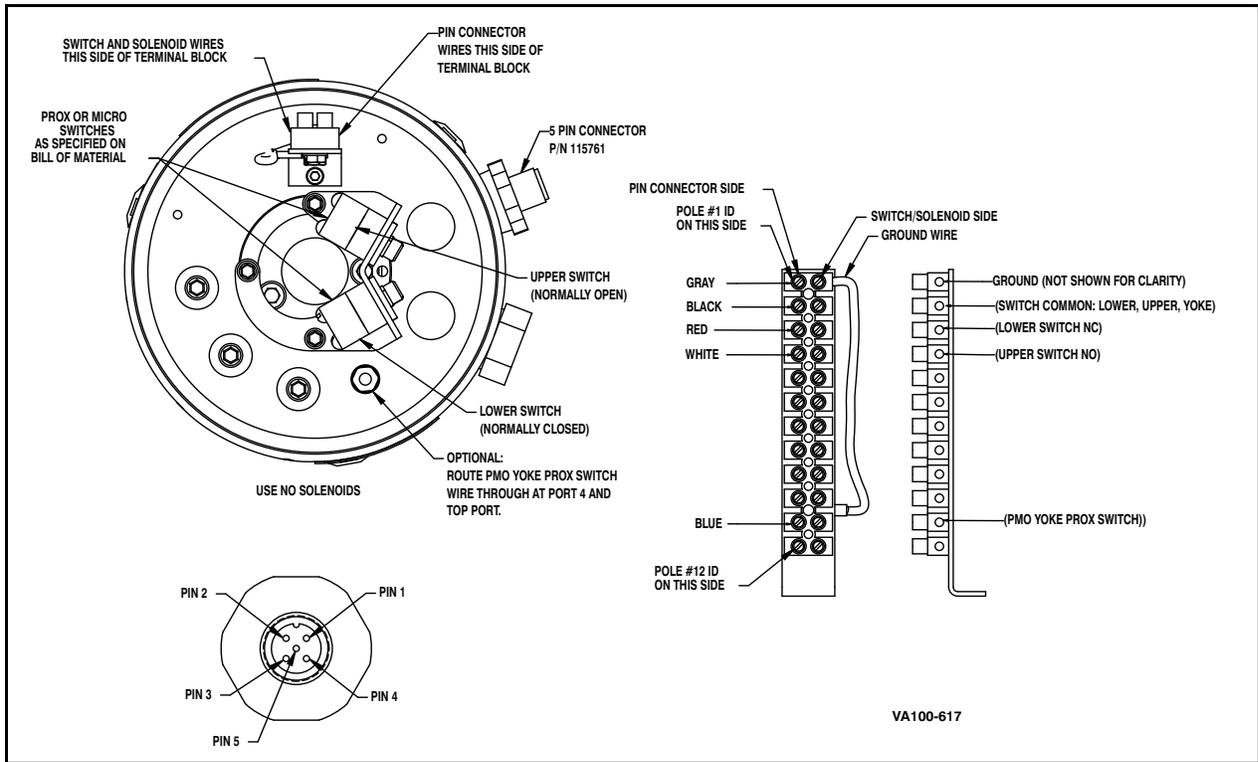


Figure 21 - 5-Pin Eurofast

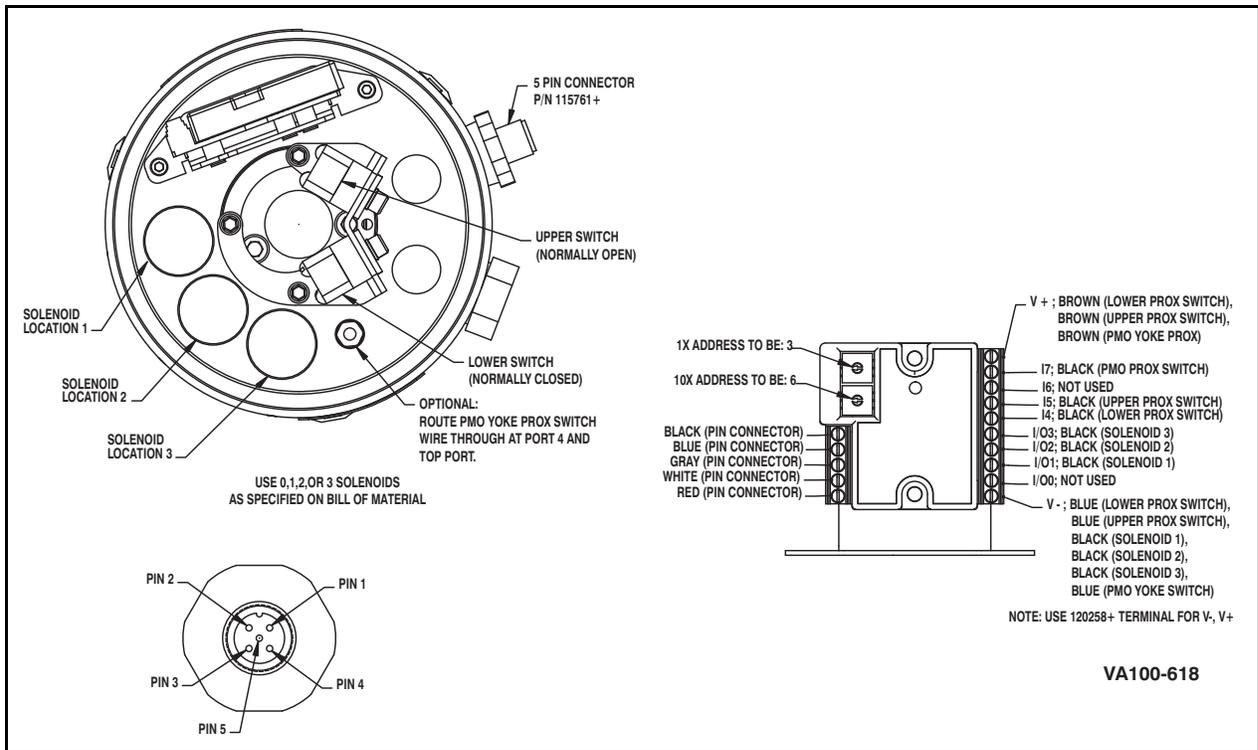


Figure 22 - 5-Pin Eurofast with DeviceNet™ Card, Single Seat

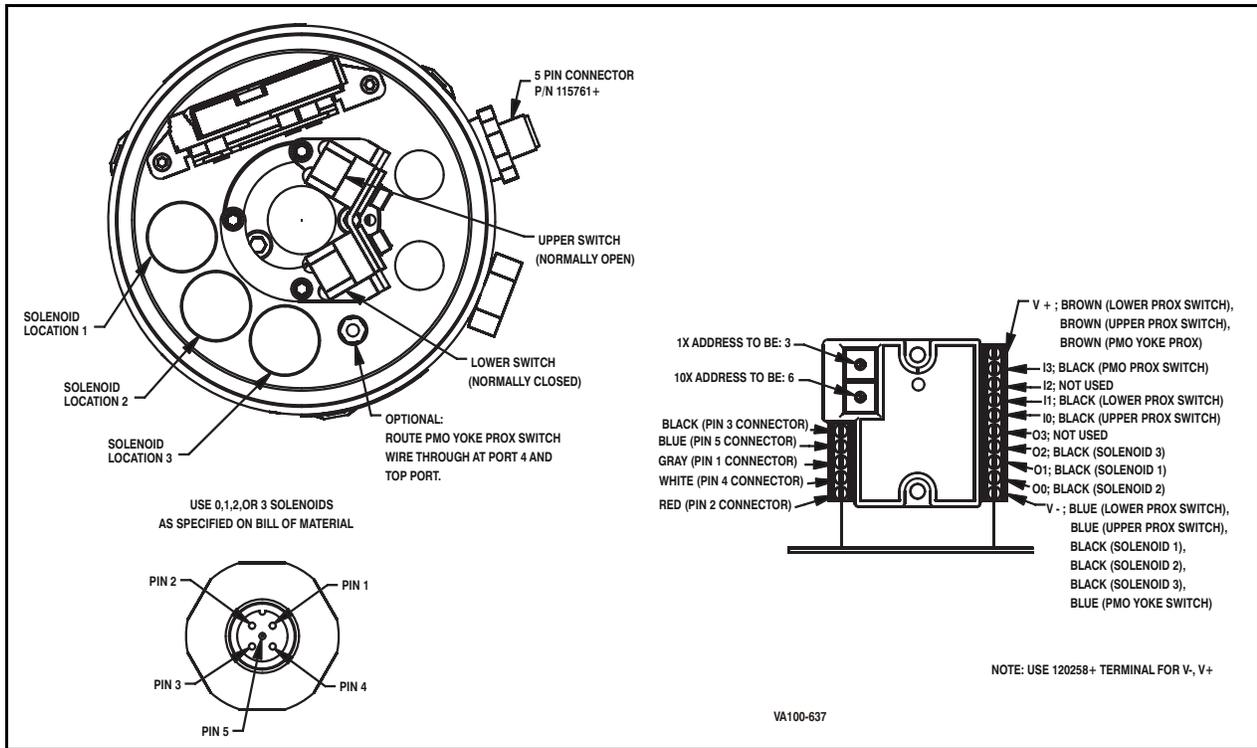


Figure 23 - 5-Pin Eurofast with DeviceNet™ Card, Mix Proof

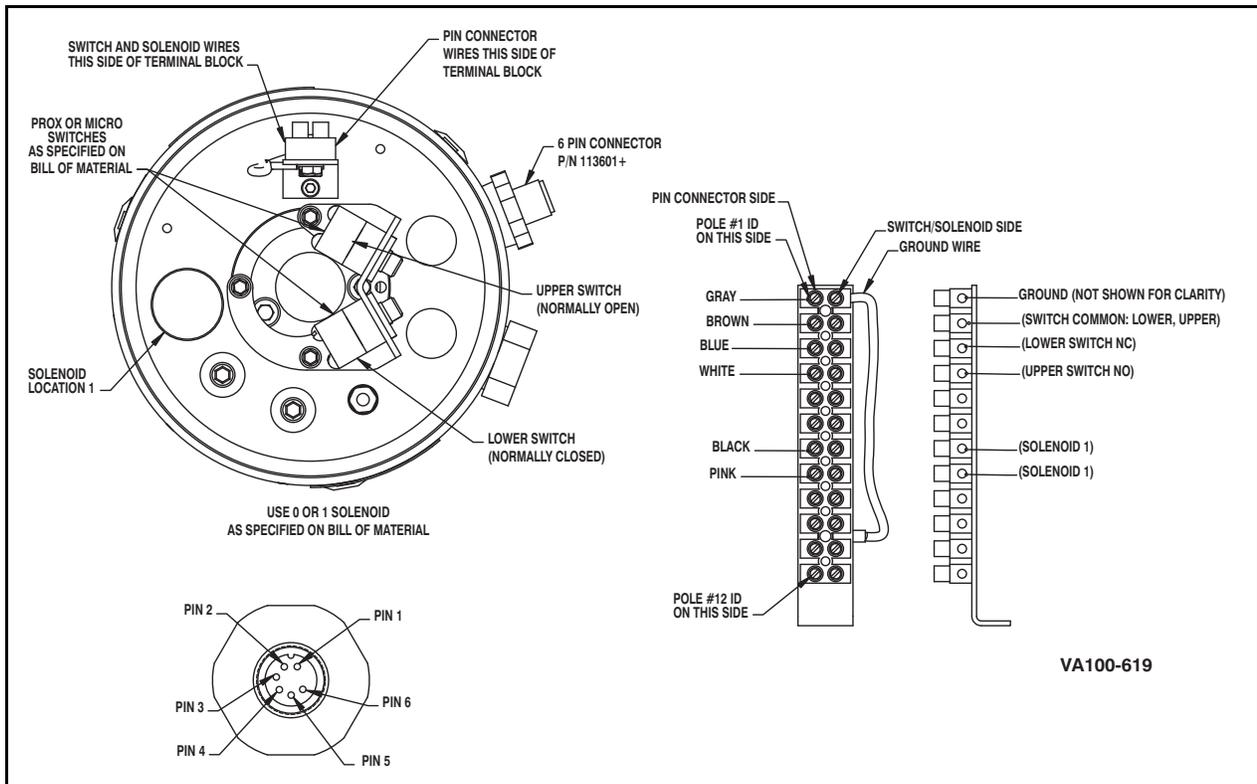


Figure 24 - 6-Pin Eurofast

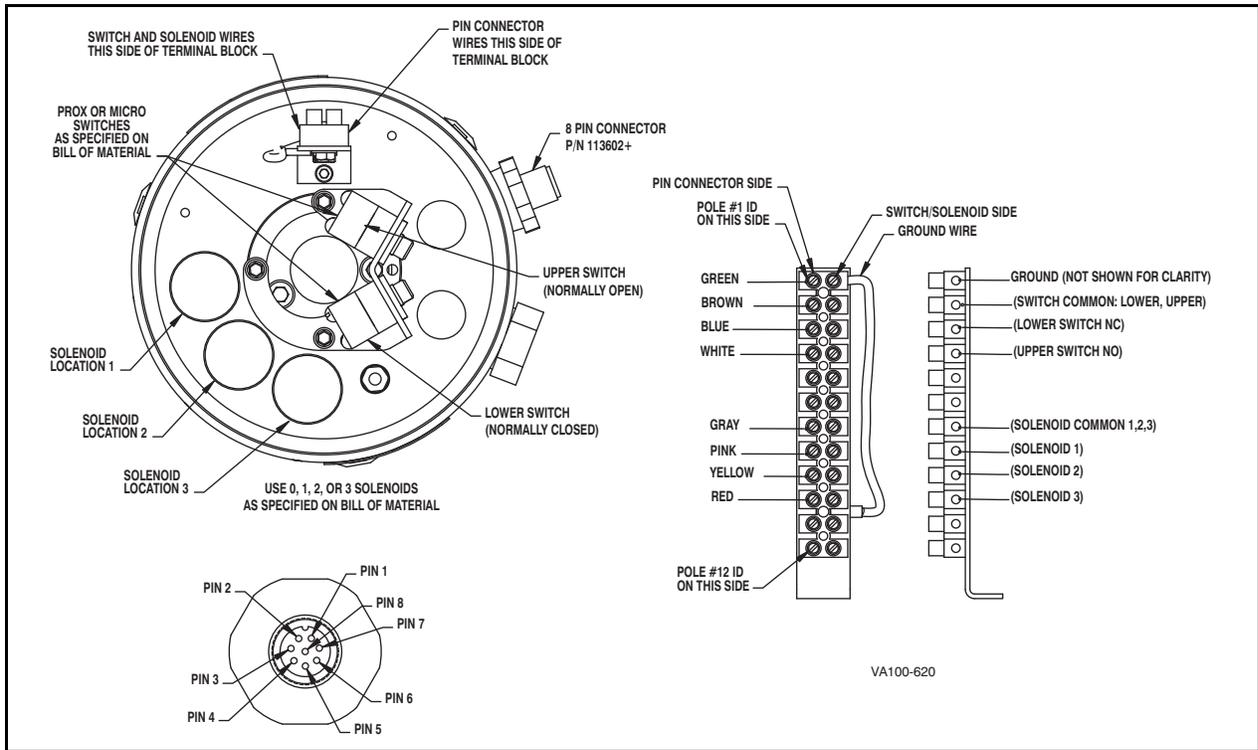


Figure 25 - 8-Pin Eurofast

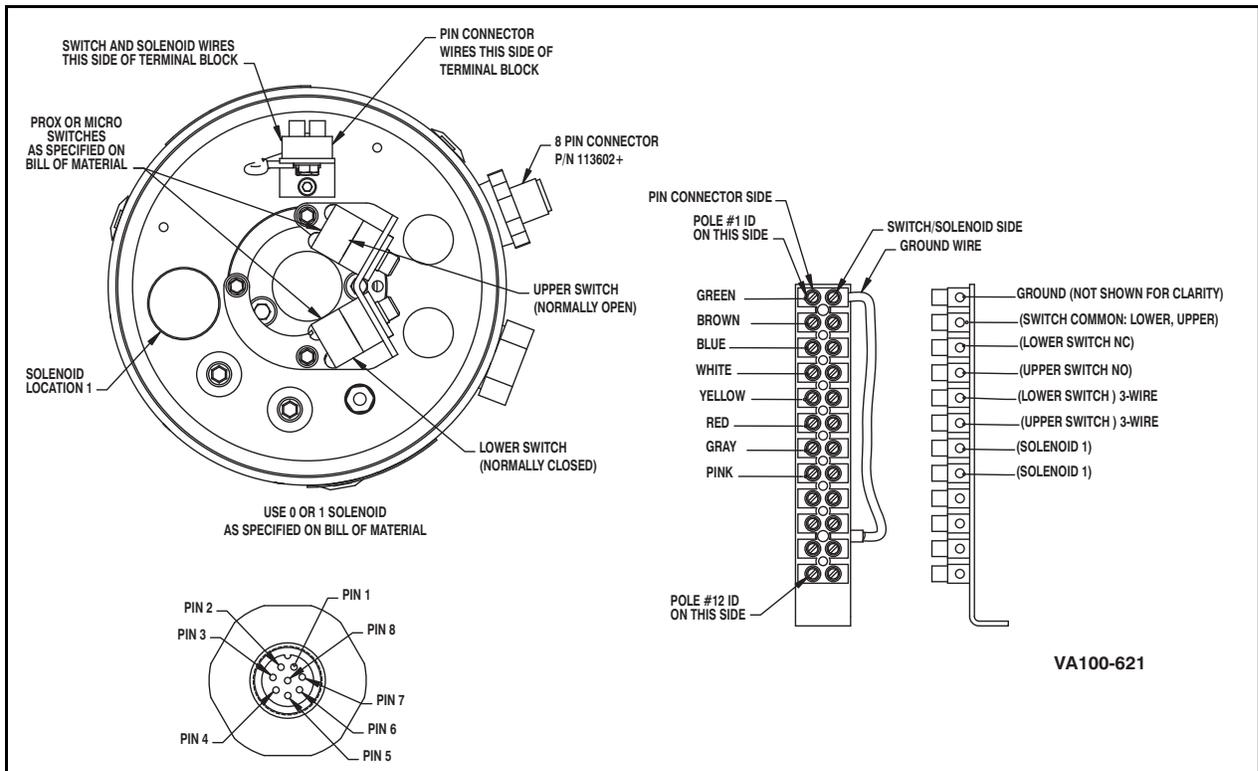


Figure 26 - 8-Pin Eurofast with 3-Wire Proximity

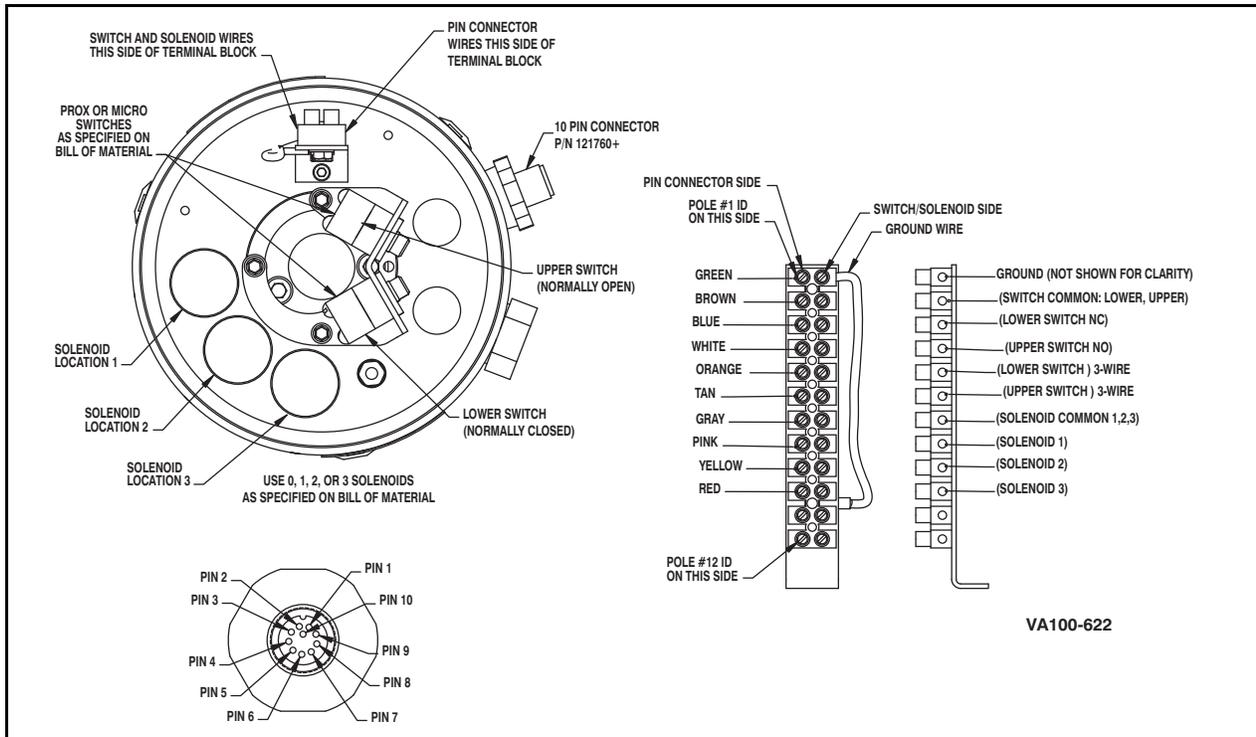


Figure 27 - 10-Pin Eurofast

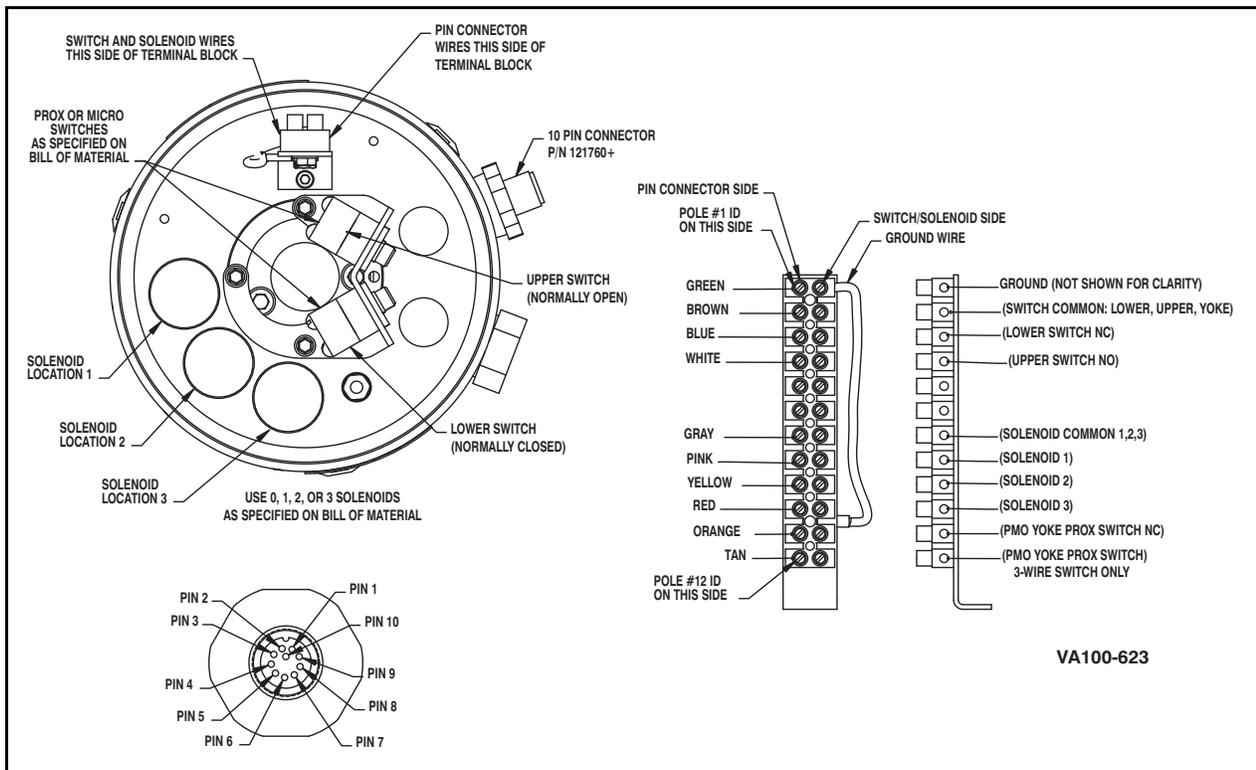


Figure 28 - 10-Pin Eurofast

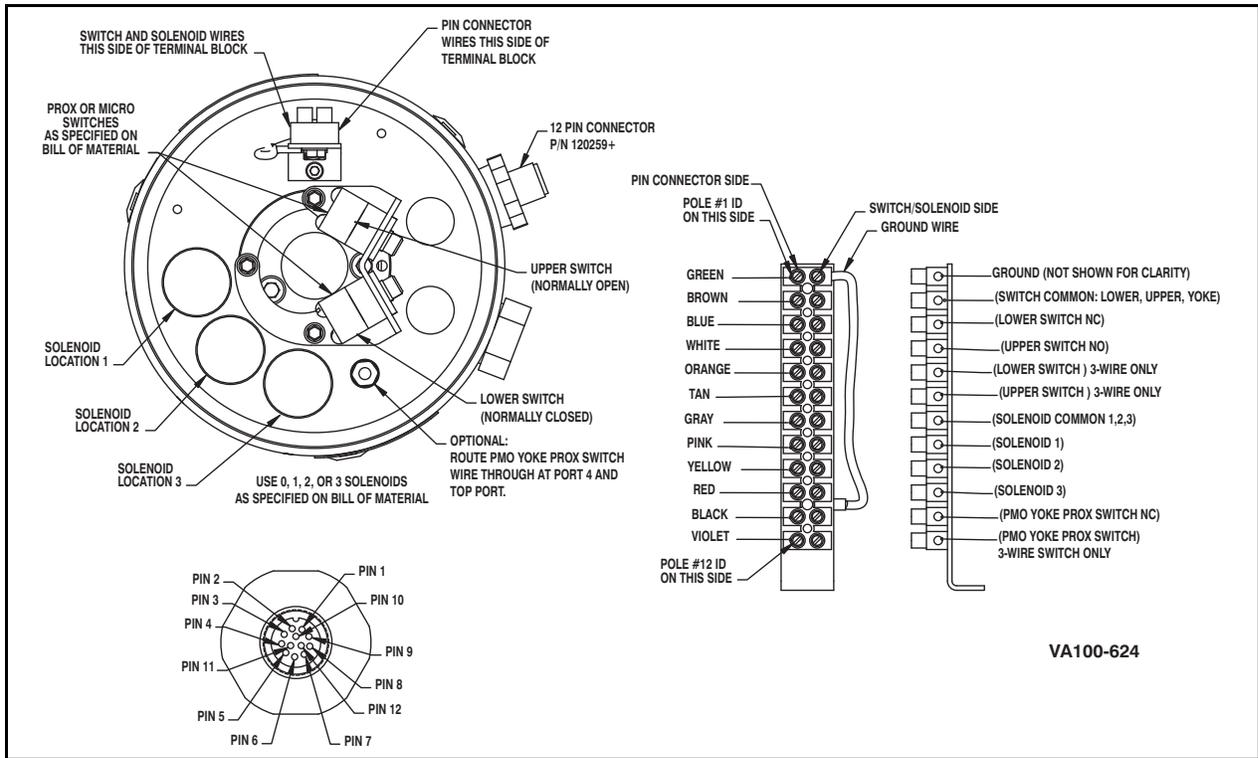


Figure 29 - 12-Pin Eurofast

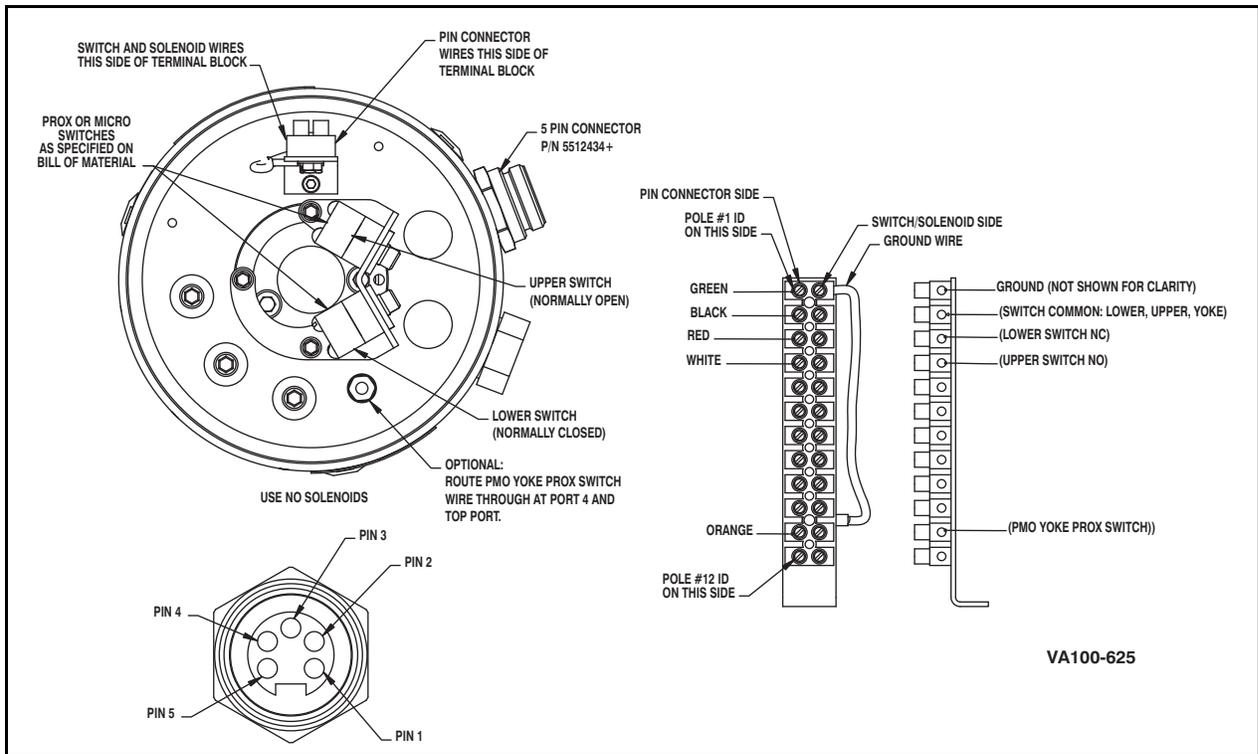


Figure 30 - 5-Pin Minifast

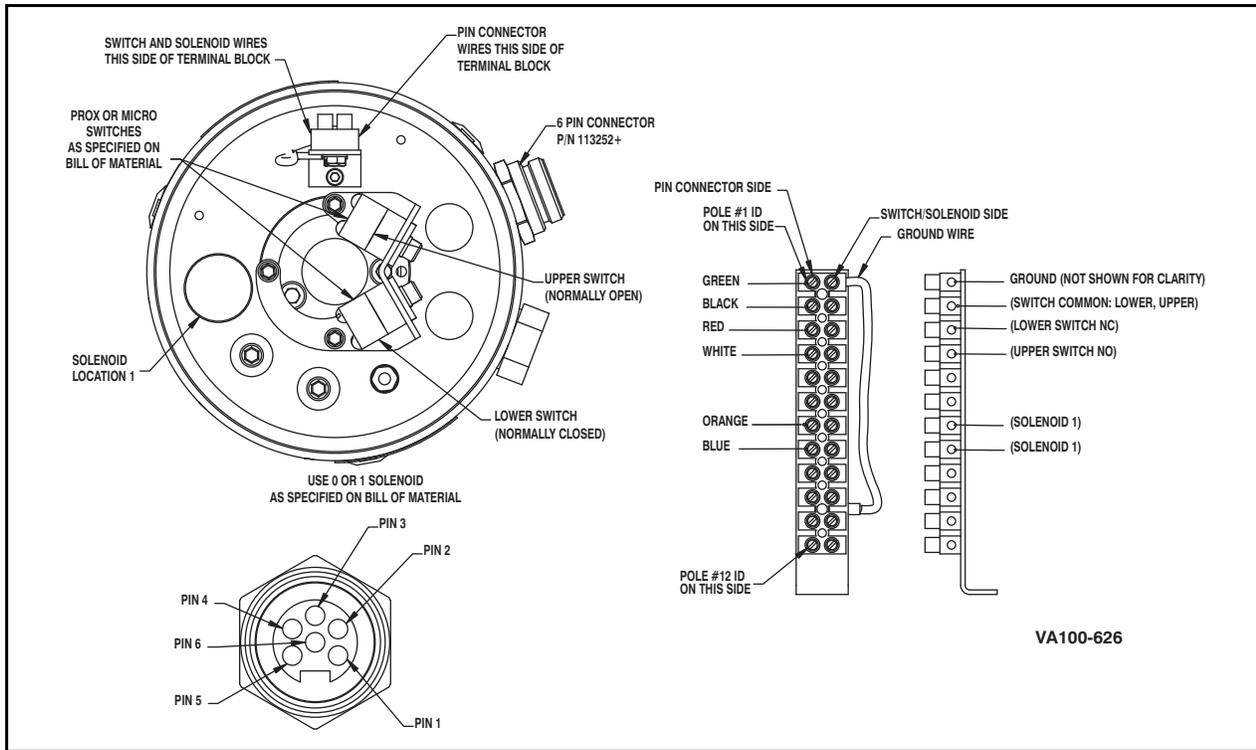


Figure 31 - 6-Pin Minifast

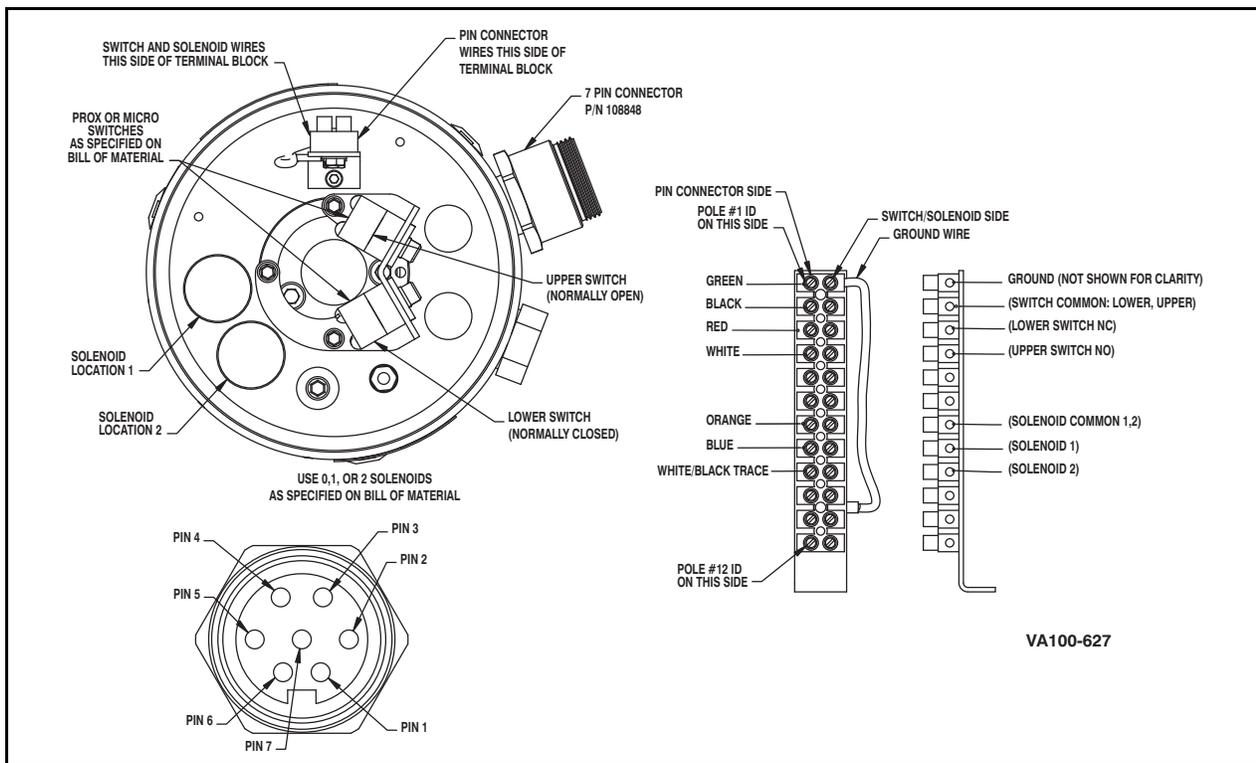


Figure 32 - 7-Pin Minifast

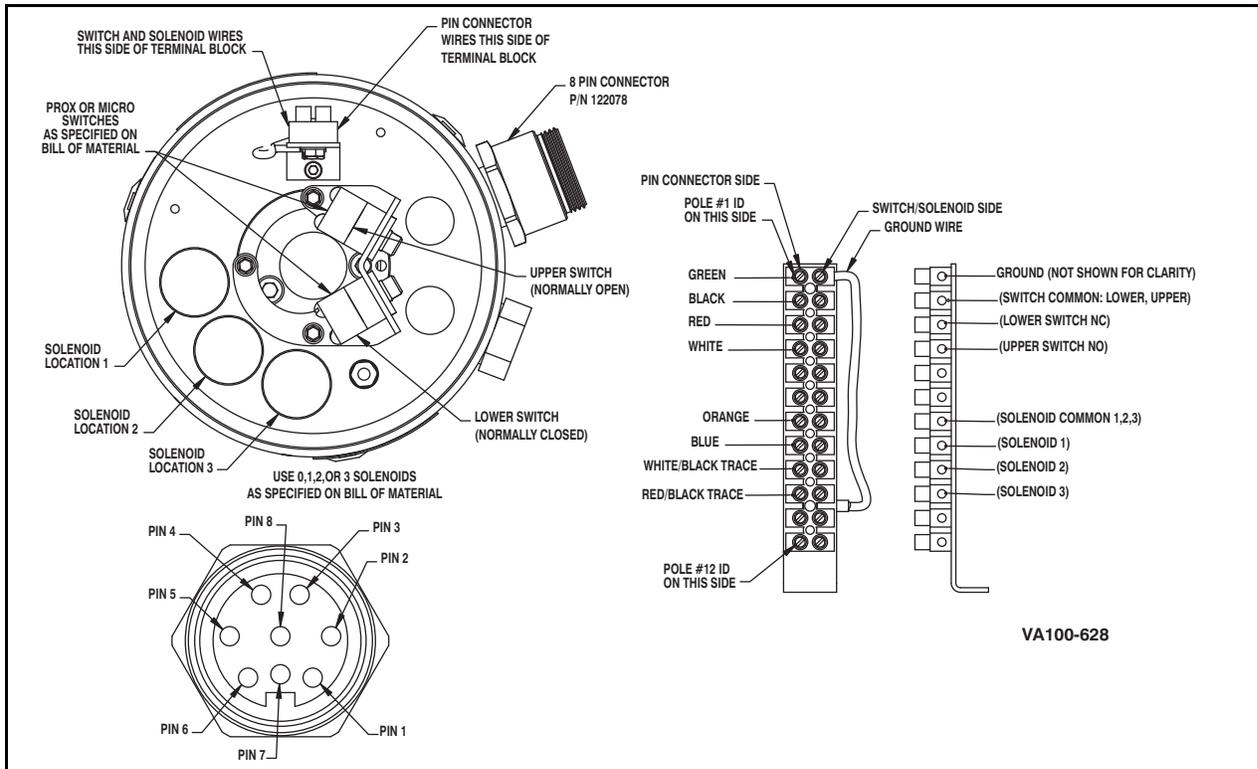


Figure 33 - 8-Pin Minifast

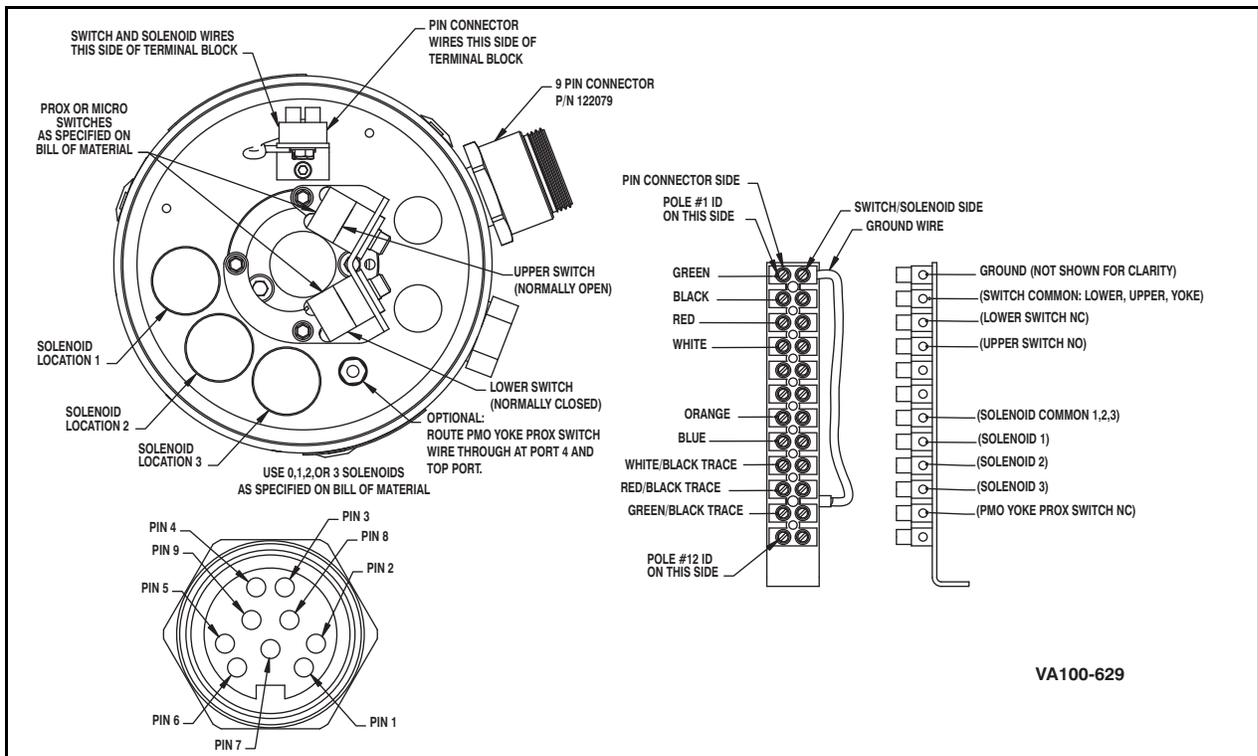


Figure 34 - 9-Pin Minifast

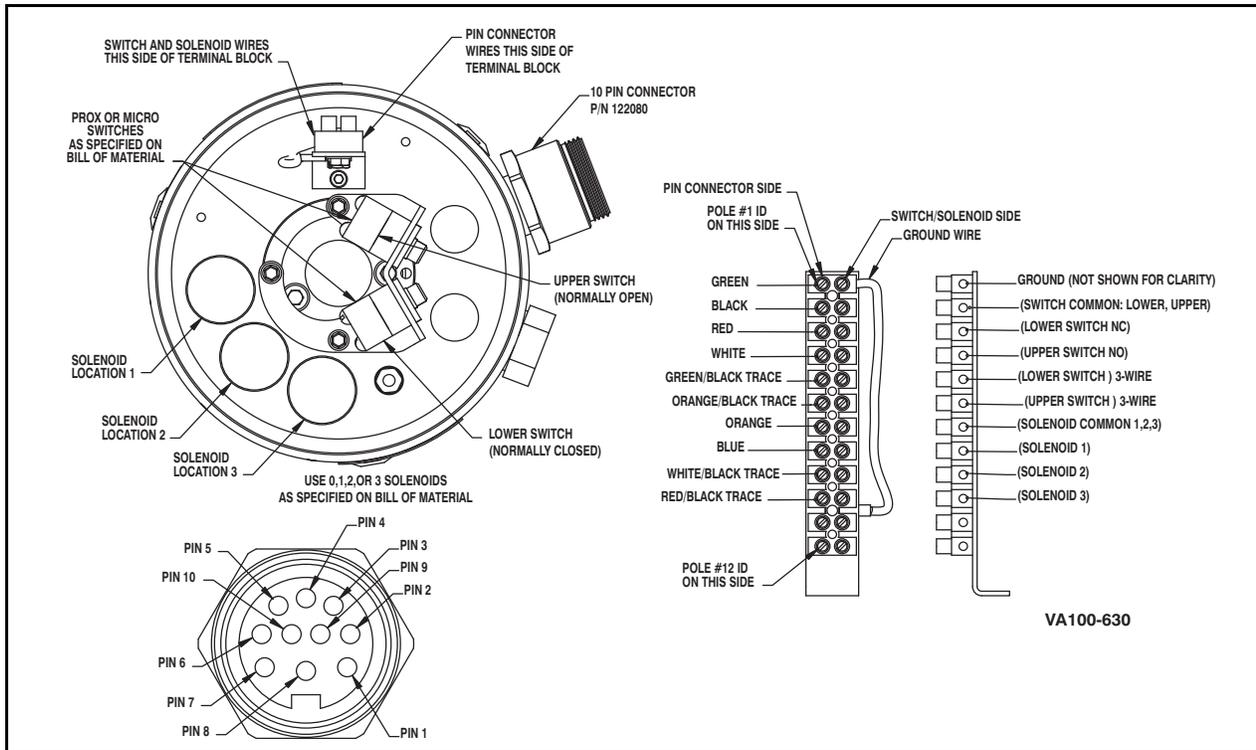


Figure 35 - 10-Pin Minifast

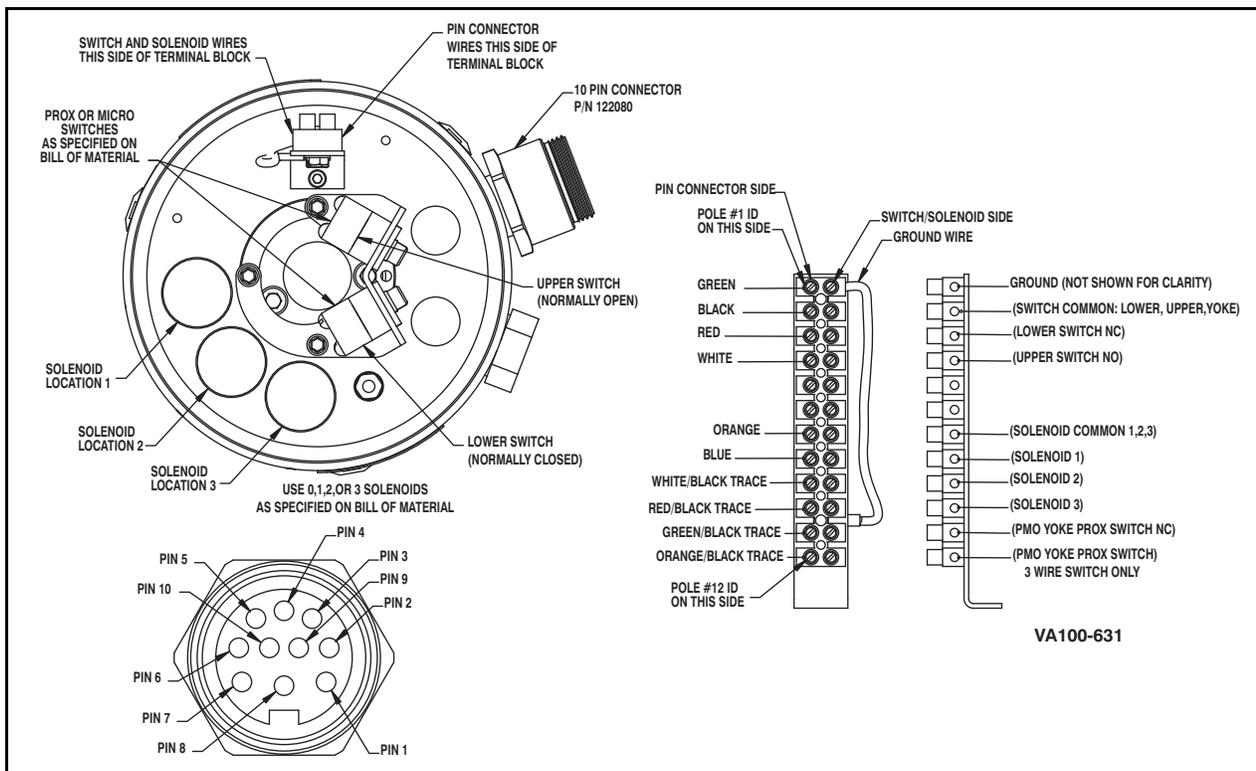


Figure 36 - 10-Pin Minifast

Installation and Operation of Bürkert 8681 Control Top

NOTE: The following information is taken from the Bürkert Quick-Start manual. The detailed description of the device can be found in the operating instructions for Control Head Type 8681. The operating instructions can be found online at www.burkert.com > Documentation > Type 8681.

Assembly

For the installation of the Control Head Type 8681 to a process valve, you will require a process valve-specific hub flange as an adapter. The hub flange must be adapted to the design of the process valve.

1. Mount the piston rod with the target on the process valve spindle. Observe reference dimensions!
2. Fasten the hub flange on the process valve. During this, observe central alignment and sealing conditions!
3. Check the secure fit of the sealing rings (in the upper and lower grooves).
4. Mount the control head on the hub flange (seamlessly 360° rotatable).
5. Secure the control head with the two locking screws (shoulder screws M5) in the middle groove of the hub flange (see operating instructions).

Pneumatic Installation

1. Connect the required working connections 2/A1 to 2/A3 (each according to model) with the corresponding connections on the process valve.
2. Connect the supply line to supply pressure connection 1/P (2.5 to 8 bar).
3. A silencer has already been mounted on the Exhaust Air Connection (3/R) in the supplied state.

Opening and Closing the Housing

Opening:

1. Loosen the plastic self-cutting screws or seal, if the housing has been secured.
2. Open the plastic hood by turning counterclockwise (all the way, approx. 1.5 cm).

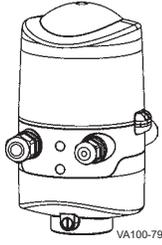
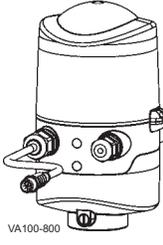
Closing:

1. Put the plastic hood on the lower part such that the inner lugs are positioned over the fastening grooves and the external sealing lugs are positioned almost over each other. Press the hood completely over the seal of the lower part.
2. Turn the hood by approx. 1.5 cm clockwise (meaning until the sealing lugs are positioned over each other).

NOTE: A seal or a hood safeguard using plastic self-cutting screws is required in the explosion-risk area!

24V DC Design

Connection Options

	
left: 1 x M16 x 1.5 cable gland for power supply and signals	left: 1 x M16 x 1.5 cable gland with multi-pole connection (M12 plug according to IEC 61076-2-101, 12-pole) on a cable of 8 cm length
right: 1 x M16 x 1.5 cable gland for external initiator	right: 1 x M16 x 1,5 cable gland for external initiator

Electrical Data

Power supply:	12 - 28 V DC, residual ripple 10%
Power consumption (standby current):	30 mA at 24 V DC
Solenoid valves:	
Power input per solenoid valve:	max. 0.8 W (0.9 W during activation)
Operating mode	Long-term operation (100%)
Central display of the switching states:	42 mA with a power supply of 24 V DC per illuminated display
Outputs/binary feedback signals:	S1 out - S4 out
Design:	Normally open contact, PNP output short-circuit-proof, with self-locking short-circuit protection
Switchable output current:	max. 100 mA per feedback signal
Option: Analog feedback signals	
Signal output:	S3 out (binary feedback signal S3 out not available)
Type:	Current source (4 to 20 mA)
Input / proximity switches (external initiator: S4 in):	
Power supply:	Voltage present at control head - 10%
Current carrying capacity, sensor power supply:	max. 90 mA; short-circuit protection
Design:	DC 2- and 3-conductor, NO or NC (factory setting NO), PNP output
Valve control inputs (Y1 - Y3):	
Signal level - active:	U > 10 V, max. 24V DC + 10%

Electrical Installation

Cable glands:

1. Open the housing.
2. Assemble connection cables for signals and power supply as well as for the external initiator.
3. Insert cables through the respective cable glands into the interior of the housing.
4. Secure the wires to the terminal strips according to the pin assignments depicted in Figure 37 on page 33.
5. Close the housing.
6. Ensure IP protection (dummy plugs)!

Terminal Strip Wiring

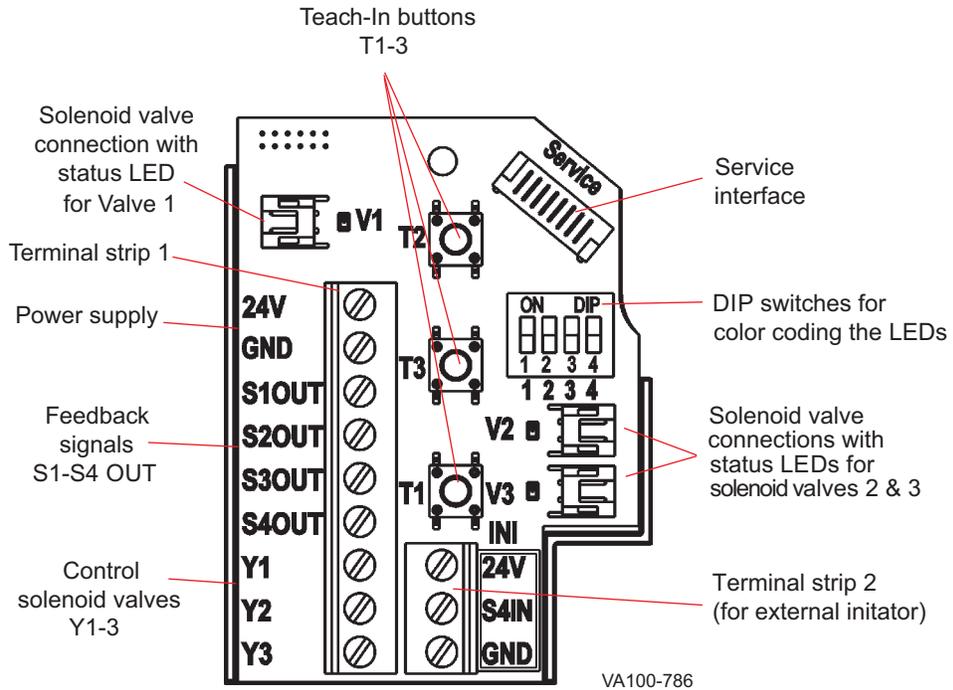


Figure 37 - 24 V DC Electronics Module Terminal Strip Configuration

Designation Terminal Strip	Configuration
24 V GND	Power supply 24V GND
S1 OUT S2 OUT S3 OUT S4 OUT	Output Position 1 Output Position 2 Output Position 3 External initiator output
Y1 Y2 Y3	Solenoid valve 1 input Solenoid valve 2 input Solenoid valve 3 input

Designation Terminal Strip	Configuration
24 V S4 IN GND	Power supply 24V for external initiator External initiator input GND external initiator

Cable gland with Multi-pole connection

Internal cabling work is not required for models with multi-pole connection. But you will require the correspondingly assembled cable sets with the pin assignments below.

An external initiator can be connected using the small 3-pin terminal strip 2 (see Figure 37 on page 33).

Input and output signals to the higher-level control (PLC.)

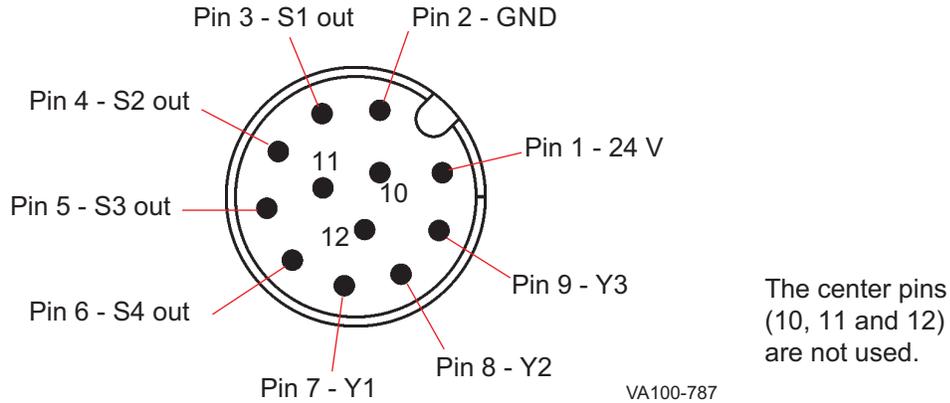
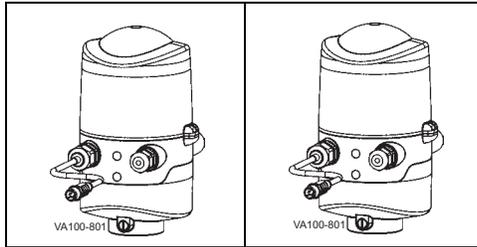


Figure 38 - 12-pole multi-pole connection

Pin	Designation	Configuration
1	24 V	Power supply 24V
2	GND	GND
3	S1 OUT	Output Position S1
4	S2 OUT	Output Position S2
5	S3 OUT	Output Position S3
6	S4 OUT	External initiator output S4
7	Y1	Solenoid valve 1 input
8	Y2	Solenoid valve 2 input
9	Y3	Solenoid valve 3 input
10 - 12		not used

(12-pole circular plug-in connector M12 x 0.75 - male, acc. to IEC 61076-2-101 — view onto the plug pins)

Connection Options



left connection:
1 x M16 x 1.5 cable gland with Multi-pole connection (M12 plug according to IEC 61076-2-101, 4-pole) on a cable of 8 or 80 cm length

right connection:
1 x M16 x 1,5 cable gland for external initiator

Electrical Data

Power supply:	
Standard: via AS-i (29.5-31.6 V DC acc. specification)	Option: externally (19.2 V DC to 31.6 V DC)
<p>VA100-802</p>	<p>VA100-804</p>
Setting the valve's power supply using jumpers on the AS-interface electronics module.	

AS-i Design

Maximum Length of the Bus Line

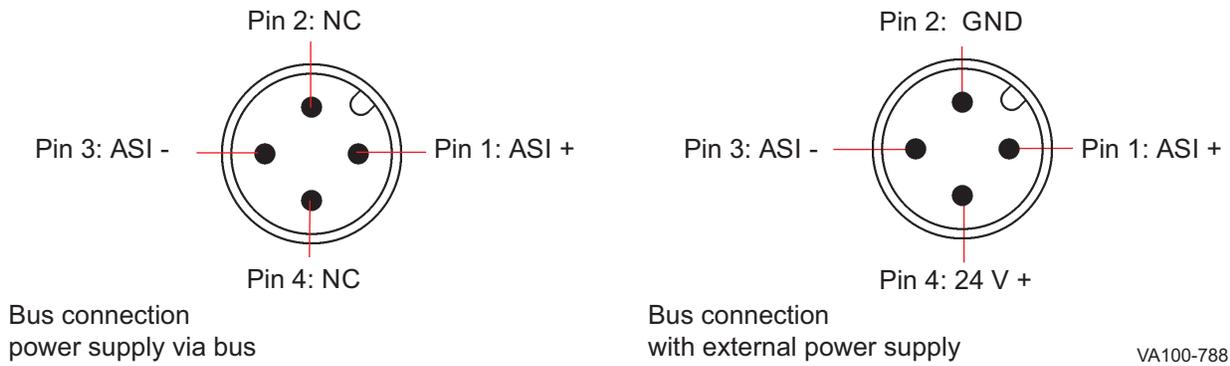
The bus cable may be a maximum of 100 m long. When designing the system, consider the length of the round cable leading directly to the control head (see example calculation in the operating instructions).

Number of Connectable Control Heads

In AS-interface® versions with extended addressing range (A/B slave), 1 master can communicate with 62 slaves. In AS-interface® versions with addressing range 31 slaves, a maximum of 31 control heads can be connected to a bus line (the address range restriction).

Input/proximity switches (external initiator: S4 in):	
Power supply:	AS-interface® voltage present at control head - 10%
Current carrying capacity, sensor power supply:	max. 30 mA; short-circuit protection
Design:	DC 2- and 3-conductor, NO or NC (factory setting NO), PNP output
Inputs (from master perspective):	3 binary feedback signals and external initiator
Outputs (from master perspective):	0 to 3 solenoid valves
Switching capacity:	max. 0.8 W via AS-interface®
Pull-in current:	30 mA or 0.9 W / 200 ms
Operating mode:	Long-term operation (100%)
Central display of the switching states:	
Power consumption:	max. 33 mA or 1 W per illuminated display (at 30.5 V AS-interface® voltage)
Power supply via AS-interface® bus:	
Power consumption from AS-interface®:	max. 200 mA (incl. external initiator with 30 mA)
Integrated short-circuit protection	
External Power Supply:	
Ext. power supply:	19.2 V DC to 31.6 V DC
Max. power consumption from external power supply:	≤ 110 mA at 24 V DC
Integrated short-circuit protection	

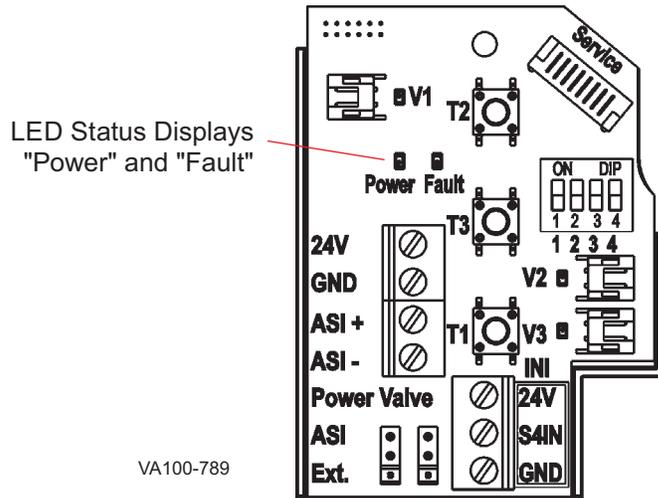
AS-interface®



VA100-788

Figure 39 - AS-interface® bus connection (power supply via bus / external power supply)

Pin	Configuration (supply via bus)	Configuration (external power supply)	Wire color
1	AS-interface®, ASI +	AS-interface®, ASI +	brown
2	not used	GND	white
3	AS-interface®, ASI -	AS-interface®, ASI -	blue
4	not used	24V +	black



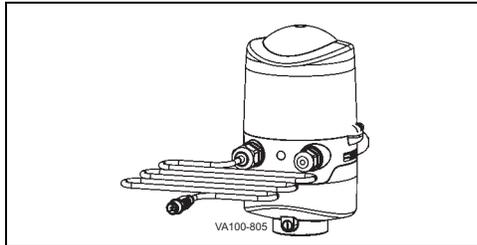
VA100-789

Figure 40 - AS-interface® Electronics Module - LED Status Displays

LED 1 "Power" (green)	LED 2 "Fault" (red)	Signalized status
off	off	Power OFF
on	on	No data traffic (expired Watch Dog at slave address does not equal 0)
on	off	OK
flashing	on	Slave address = 0
flashing	flashing	Sensor supply overloaded / manual actuation activated / untaught / maintenance request / smartphone software service mode

DeviceNet™ Design

Connection



left connection:

1 x M16 x 1.5 cable gland with Multi-pole connection (M12 plug according to IEC 61076-2-101. 5-pole) on a cable of 80 cm length

right connection:

1 x M16 x 1.5 cable gland for external initiator

DeviceNet™ Specification

EDS file:	8681.EDS
Icons:	8681.ICO
Baud rate:	Factory setting: 125 kBit/s
Address:	Factory setting: 63
Process data:	2 static input assemblies (Input: from the control head to the DeviceNet™ Master/Scanner) 1 static output assembly
Inputs:	3 discrete feedback signals of the position measuring system (pos. S1 - S3) 1 discrete feedback signal of the external initiators (S4) 1 analog position signal in mm Supply via DeviceNet™ string (11 to 25 V DC) Switch level high signal ≥ 5 V Switch level low signal ≤ 1.5 V
Outputs:	3 solenoid valves
Power consumption from the bus:	max. 5 W, (3 valves with each 0.8 W)

Length of the Bus line

The maximum total line length (sum of trunk lines and drop lines) of a network depends on the baud rate.

The maximum total line length (according to DeviceNet™ specification) is for:

Baud rate	Thick Cable	Thin Cable
125	500 m	100 m
250	250 m	100 m
500	100 m	100 m

The maximum drop line length is for:

Baud rate	Drop Line	Sum (in Network)
125	6 m	156 m
250	6 m	78 m
500	6 m	39 m

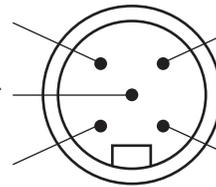
Electrical Data

Electrical power supply:	11 to 25 V DC (according to specification)
Max. power consumption:	200 mA at 24 V DC
Input/proximity switches (external initiator: S4 in):	
Power supply:	via DeviceNet™ power supply - 10%
Current carrying capacity, sensor power supply:	max. 30 mA
Design:	DC 2- and 3-conductor, NO contact, PNP output
Input current 1 signal:	$I_{\text{Sensor}} > 6.5 \text{ mA}$, limited internally to 10 mA
Input voltage 1 signal:	$U_{\text{Sensor}} > 10 \text{ V}$
Input current 0 signal:	$I_{\text{Sensor}} < 4 \text{ mA}$
Input voltage 0 signal:	$U_{\text{Sensor}} < 5 \text{ V}$
Inputs (from master perspective) / binary or analog feedback signals:	
The recovery of the 3 valve positions reported back binarily or of the analog position signals described in the manual, chapter "Position Measuring System."	
Outputs (from master perspective) / solenoid valves:	
Max. switching capacity:	1.0 W
Typ. continuous output:	0.8 W
Output reduction:	integrated via DeviceNet™ interface electronics
Pull-in current:	120 mA typ. / 200 ms (3 valves)
Holding current:	100 mA typ. at 24 V DC (3 valves)
Operating mode:	Long-term operation (100% operation)
Valve types:	6524
Central display of the switching states:	
Power consumption:	
Power supply via AS-interface® bus:	
Power consumption from DeviceNet™ at 24 V DC:	42 mA with 24 V DC power supply per illuminated display shown; Color switching: see in the manual, chapter "LED - Color Assignments"
Integrated short-circuit protection	

DeviceNet™

View of plug from the front onto the pins:

Pin 4: CAN_H
white
Pin 5: CAN_L
blue
Pin 1: Drain
(Shield)

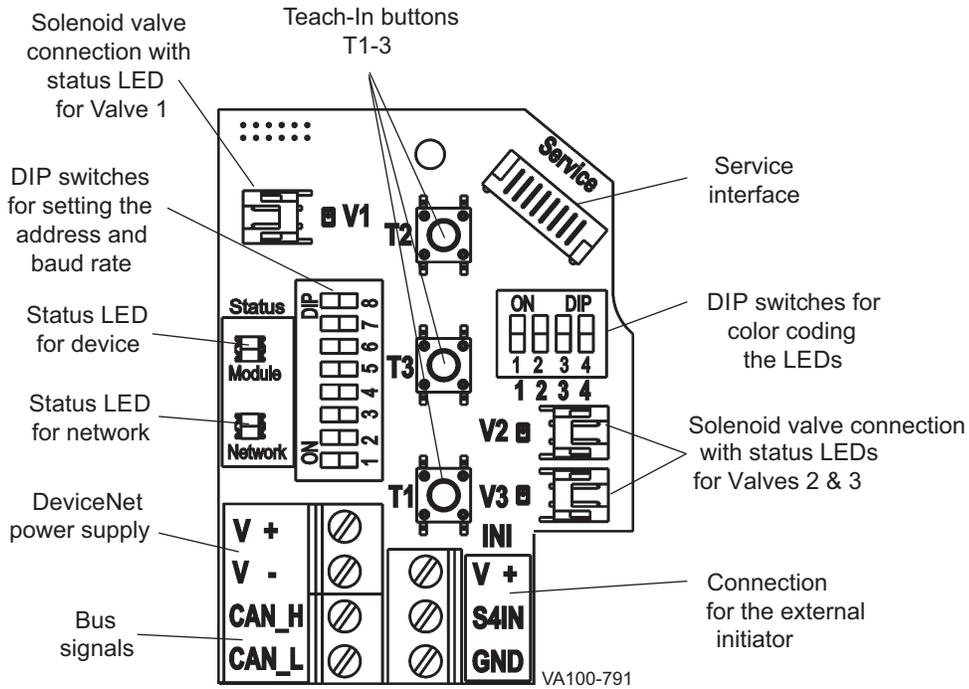


Pin 3: V-
black
Pin 2: V+
red

VA100-790

Figure 41 - Bus connection of DeviceNet™ with external power supply

Pin	1	2	3	4	5
Signal	Shielding	V +	V -	CAN_H	CAN_L



VA100-791

Figure 42 - DeviceNet™ electronics module

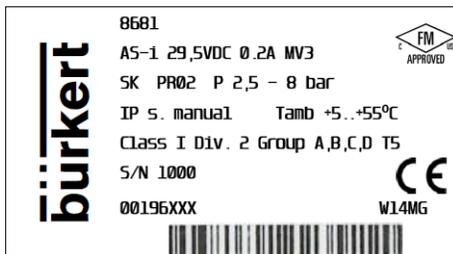
Designation Terminal Strip	Configuration
V +	DeviceNet™ Power supply
V -	DeviceNet™ Power supply
CAN_H	Bus signal CAN high
CAN_L	Bus signal CAN low

Designation Terminal Strip	Configuration
V +	Power supply for external initiator
S4 IN	External initiator input
GND	GND external initiator

NOTE: For use in hazardous areas
(Class I, Div. 2, Groups A, B, C & D, T5)



**Figure 43 - Label with type key
VAR=PR02**



**Figure 44 - Label with type key
Example**

Installation and Operation of CU4 Control Top

Class 1 Div 2 XP Option (must be specified at time of order) 8681 with variable part PR02

To avoid the risk of explosion, observe the following instructions when performing installation and maintenance in the hazardous area:

- In an explosive atmosphere, do not open the housing of the device when voltage is present.
- Use only cables and cable glands which are authorized for the particular application area and are screwed together according to the appropriate installation instructions.
- Observe the applicable safety regulations also for installation according to "ANSI/NFPA 70, NEC and CSA C22.1, CEC, Part I" per US and CAN electrical code.

The CU4 is covered in manual H323871:
http://www.spxflow.com/en/assets/pdf/APV_CU4%20DC_UK.pdf

The CU4 AS-interface is covered in manual H326406:
http://www.spxflow.com/en/assets/pdf/APV_CU4%20AS-i_UK.pdf

Installation and Operation of Explosion Proof Westlock/Tyco 9881 Control Top



Figure 45 - Explosion Proof Control Top

The control top has the following features and options:

- Rated for Class 1, Division 1, Groups B, C and D
- Two hermetically-sealed proximity sensors for position indication
- Optional external Explosion Proof ASCO solenoid for quick response actuation
 - 24V DC
 - 120V AC
- Stainless steel adapter mounting kit
- Low copper content aluminum enclosure which ensures robust performance in corrosive environments
- Thumbscrew adjustments which allow quick and easy hand setting of position sensors

Switch Setting Instructions For 9881

1. Stroke the actuator to the closed position. Turn both the black and red knobs of the triggering system clockwise until the triggers reach the top of the triggering system.
2. Turn the black knob counter-clockwise to set the lower Magnum switch.
3. Stroke the actuator to the open position. Turn the red knob of the triggering system counter-clockwise until the trigger reaches the bottom of the triggering system to eliminate the effect of the magnetic fields interacting. Then turn the red knob clockwise to set the upper Magnum switch.

NOTE: Operate the actuator from one extreme to the other several times to check switch operation.

4. Once the triggers are set, tighten the setscrews on both sides of the triggering system to lock the triggers in place.

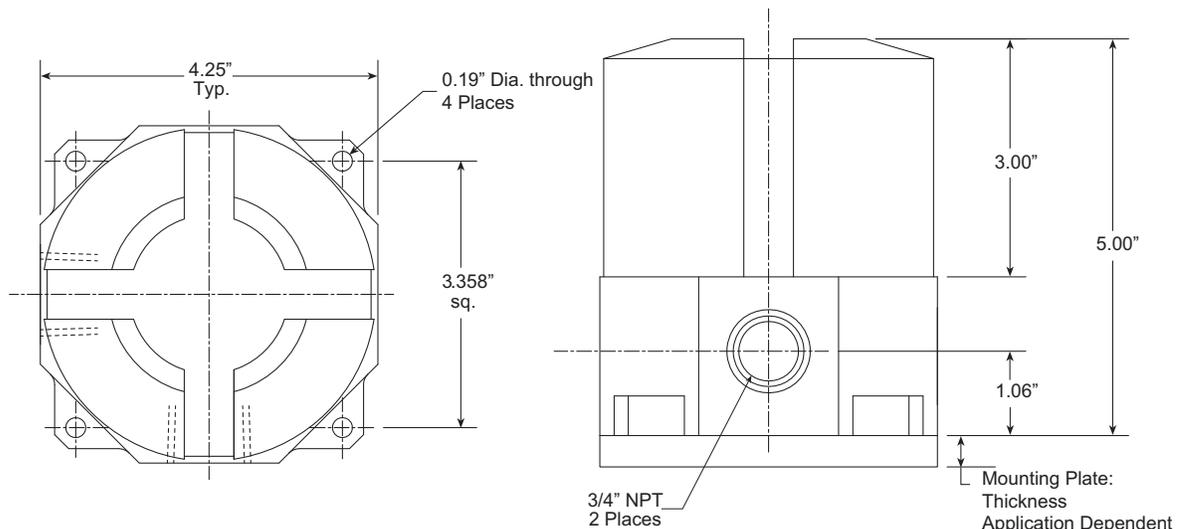


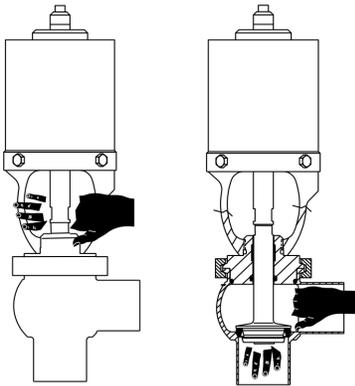
Figure 46 - Explosion Proof Westlock/Tyco Control Top Dimensions

Maintenance

Important Safety Tips

⚠ DANGER

Do not put a hand into the yoke or body of a pneumatically actuated valve.



VA100-359a

Figure 47 - Danger

Inspection

Detaching Valve and Control Top from Service

1. Drain all pipe system elements attached to the valve and, if necessary, clean or rinse.
2. Remove or block all fluid and gas lines to prevent any material from entering all pipe system elements attached to the valve.
3. Shut off the delivery of air, unless it is required for the removal of the valve stem/actuator assembly from the body.

⚠ CAUTION

Only an authorized electrician should disconnect power.

4. Disconnect the electrical supply and lock out all power. If the valve has a control top with a solenoid, the air and electric supply must remain ON until the valve is opened and the clamp removed. This will separate the stem/actuator assembly from the body.

Control tops require no special maintenance. However, visual inspections should be made between maintenance periods to check switches and confirm valve cycle operation.

Perform routine inspections frequently. See "Troubleshooting" on page 67.

Maintain an adequate stock of replacement parts. Set up specific inspection and servicing schedules to maintain efficiency and avoid unexpected shutdowns.

Inspect the switch settings and operation on a regular basis.

Maintenance Intervals

Maintenance intervals can only be determined by the user and the specific application, since they depend on the following conditions:

- Daily period of operation
- Switching frequency

Removal from Valve

The control top can be removed from the valve while the valve either remains connected to the piping system or is separately removed. Due to air requirements and system interlock integrity, do not keep the valve in service while removing the control top.

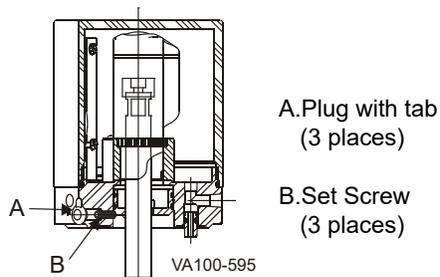


Figure 48 - WCB Control Top Removal

WCB Control Top

1. Disconnect the air.
2. Remove the (3) set screws behind the (3) plastic plugs with tabs at the base of the control top (Figure 48).
3. Lift off the control top, taking care not to strain or stretch the wiring connector.
4. If required, disconnect the electrical supply and lock out the power.

⚠ CAUTION

Only an authorized electrician should disconnect power.

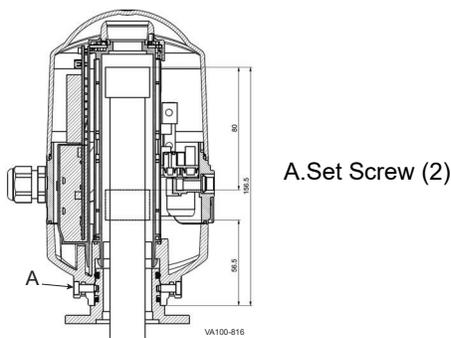


Figure 49 - Bürkert Control Top Removal

Bürkert 8681 Control Top

1. Disconnect the air.
2. Remove the (2) set screws behind the (2) plastic plugs with tabs at the base of the control top (Figure 49).
3. Lift off the control top, taking care not to strain or stretch the wiring connector.
4. If required, disconnect the electrical supply and lock out the power.

⚠ CAUTION

Only an authorized electrician should disconnect power.

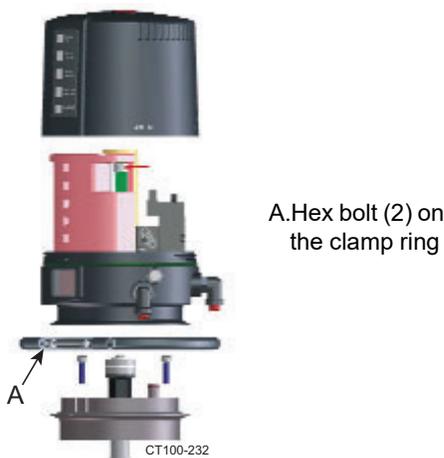


Figure 50 - CU4 Control Top Removal

CU4 Control Top

1. Disconnect the air.
2. Remove the (2) hex bolts on either side of the clamp ring at the base of the control top (Figure 50).
3. Lift off the control top, taking care not to strain or stretch the wiring connector.
4. If required, disconnect the electrical supply and lock out the power.

⚠ CAUTION

Only an authorized electrician should disconnect power.

Disassembly

NOTE: Does not apply to the Bürkert 8681 or CU4 Control Tops.

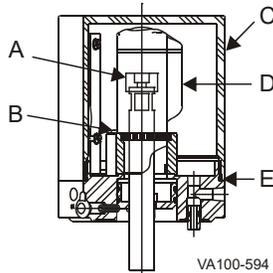
WCB Control Top

1. Remove the valve from service.
2. Shut off the delivery of air.
3. Disconnect the electrical supply and lock out all power.

CAUTION

Only an authorized electrician should disconnect power.

4. Unscrew the single-piece clear top (Figure 51, item C) and remove it.
5. To remove the solenoids, unscrew them from the base, being careful with the wires.
6. To remove the Set & Forget switch, (Figure 51, item D), disconnect wires then remove locking screws (Figure 51, item B).
7. Grasp the switch housing firmly and pull the switch up out of the sensor mount.
8. To disassemble the Proximity or Micro Switch mounts, disconnect the wires, then unscrew the round-head screws holding the switch to the switch blocks. See "WCB 2-Piece Control Top with Proximity or Micro Switches" on page 56, item 37.



- A.Stem & Target
- B.Locking Screws (3 Pieces)
- C.Single Piece Clear Top
- D.Set & Forget Switch
- E.O-Ring

Figure 51 - Control Top Switch

Assembly

NOTE: Does not apply to the Bürkert 8681 or CU4 Control Tops

WCB Control Top

Install in reverse order as described above.

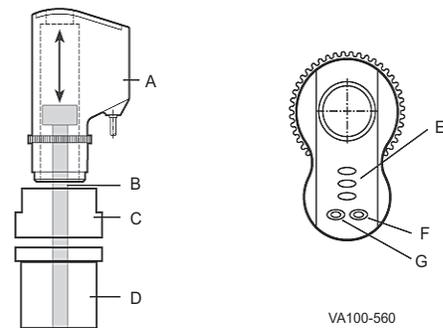
1. Referring to Figure 52 on page 45, insert the Set & Forget switch over the indicator stem and target, into the sensor mount, aligning the switch to the desired location, typically with the LEDs facing outward. Ensure a tight fit.
2. Install the locking screws (Figure 51, item B) at three locations and hand-tighten. Be careful not to over-tighten the locking screws.
3. To assemble the Proximity or Micro Switch mounts, install the switch blocks with cap screws (See Figure 62, page 52, item A) onto the mounting bracket.
4. Connect the wiring.
5. To install solenoids, first check that the o-ring at the solenoid base is in place. Thread the solenoid into the module base until metal-to metal contact is made. Do not over-tighten or strip the threads.
6. Connect the wiring.
7. Ensure that the cover top o-ring (Figure 51, item E) is in place. Replace if damaged.
8. Screw the single-piece, clear top (Figure 51, item C) onto the module base until the top bottoms out, being careful not to crimp the wiring.

WARNING

Only authorized electricians should terminate electrical wires.

Set & Forget Switch

All material in this section has been re-printed courtesy of IFM Efector.



- A.Sensor
B.Stem and Target
C.Sensor Mount
D.Actuator
E.3 LEDs Open, Seat, Close
F.Teach Button
G.Pos. Button

Figure 52 - Set & Forget Switch

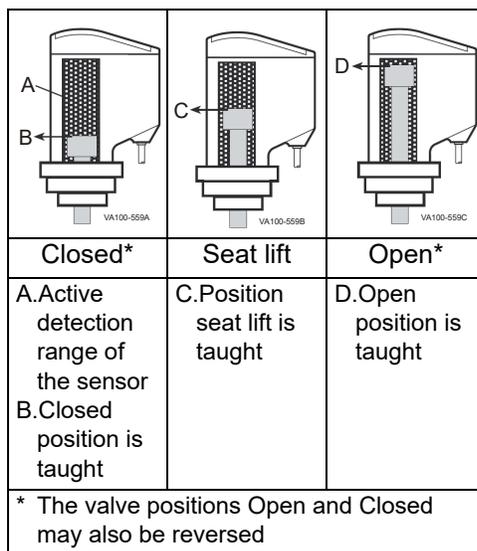


Figure 53 - Application Example

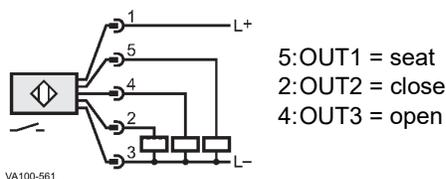


Figure 54 - Electrical Input Mapping

NOTE: In this manual, “stem-raised” is understood to be when the valve stem is fully retracted into the actuator. “Stem-lowered” is understood to be when the valve stem is fully extended out from the actuator.

Function and Features

The Set & Forget rising stem valve sensor is a continuous absolute linear measurement system with a measuring stroke of 3.15" (80mm). The sensor is used for position feedback for rising stem valves. For position detection, three programmable switch points can be freely selected in the measuring range. The position is signaled visually by 3 LEDs.

Description of Switch Function

- The sensor measures the upper edge of the valve spindle.
- Non-contact and wear-free detection of the valve positions: **closed**, **open** and the **position for seat lift** (for Mix Proof applications) during the cleaning process.
- It is also possible to monitor the state of the valve seals for W60/W80 series valves instead of the seat lift. Due to the high resolution of 0.2 mm, even slight changes can be detected.
- Easy and time-saving adjustment by means of “teaching” (reading) the valve positions: The “taught” valve positions are automatically assigned certain switching characteristics of the three outputs; several operating modes are available (see “Programming Guide: Single Seat Valves W60/W80/W90” on page 48 or “Programming Guide: Double Seat Valves W70 and W60 3-Position Actuator” on page 49).
- Monitored stroke (detection range) is 3.15" (80 mm). The condition “valve spindle outside detection range” is indicated.
- After adjustment, the unit can be electronically locked to prevent unauthorized manipulation.

Electrical connection

The unit must be connected by a qualified electrician. Observe all national and international regulations for the installation of electrical equipment. Disconnect power before connecting the unit as shown in Figure 54.

The Set & Forget switch is available for installation in the 2-Piece Control Top or in a switch-only configuration.

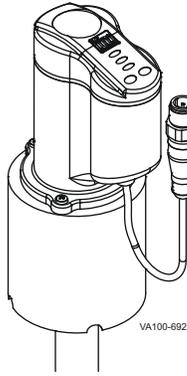


Figure 55 - Actuator

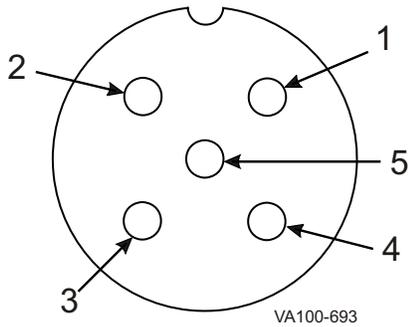


Figure 56 - 5-pin connector

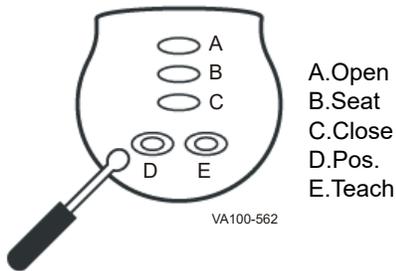


Figure 57 - Push Buttons

Switch-Only Option

The Set & Forget switch is mounted directly to the valve actuator using a mounting adapter. The body has an o-ring flange for sealing against water entry. The sensor and target stem is required on the actuator (Figure 55). All operations are the same as the module-mounted switch.

A vent at the base of the adapter allows air to escape in the event of an actuator seal failure and drainage of any condensed liquids. For a horizontal valve mount, the vent should be rotated downward. For an inverted installation, the switch cap can be removed or drilled as required.

Secure the adapter to the actuator with cap screws. Secure the switch to the adapter with screws, ensuring the proper placement of the o-ring. Do not over-tighten.

A 5-pin Eurofast male connector is standard (Figure 56). Refer to Figure 54 for input mapping.

Operation

The sensor is operated via the push buttons **Pos.** and **Teach.** To do so, press the buttons with a blunt object. See Figure 57.

CAUTION

Sharp objects may damage the buttons.

Programming

After mounting, adjust the unit to the valve positions to be detected (see programming guides). First, clarify your type of valve. The sensor differentiates between two types:

1. Valves with 2 operating positions (closed and open)
2. Valves with 3 operating positions (closed, open, and an intermediate position for either seat lifting or 3-position actuators).

For valves with 2 operating positions, the wear of the valve seals is monitored automatically. This function is not possible for detecting three operating positions.

The programming options are shown in the programming overview (Figure 58). After passing into the programming mode (Teach mode) the unit first expects the adjustment of the closed position; however, you can also start with any other position.

If, for example, the valve is already in the open position, start adjusting this position. To do so, press the Pos. button twice, thus skipping the adjustment of the closed position and the seat position. You can carry out the skipped adjustment steps afterwards.

Skipping a current programming step is also required if you use valves with only 2 operating positions for which the position seat lift is not available. If the position seat lift is not adjusted ("taught"), the unit automatically passes into an operating mode which monitors the wear of the valve seals (see Set-up/operation section).

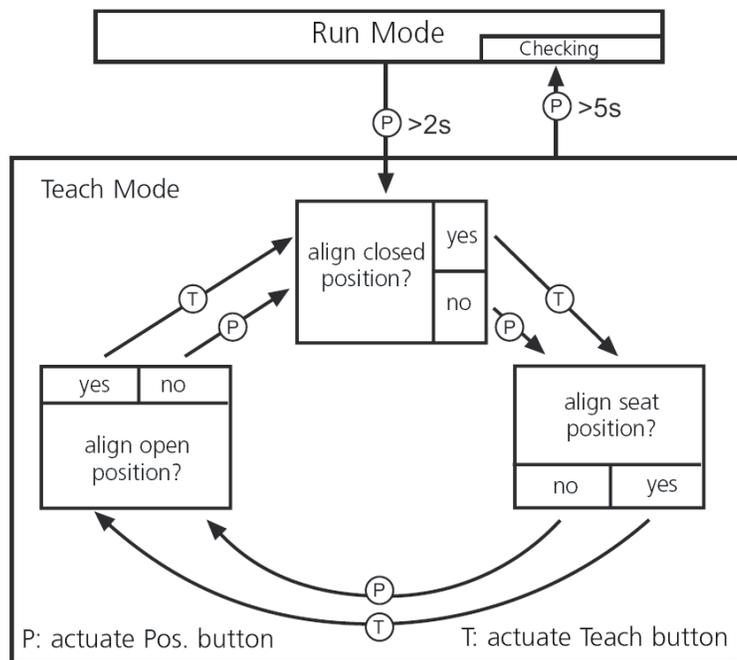
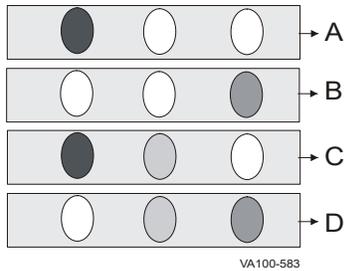


Figure 58 - Programming Overview



- A. Close Position (RED LED)
- B. Open Position (GREEN LED)
- C. Seat Wear Alarm LOWER (RED and YELLOW LED)
- D. Seat Wear Alarm UPPER (GREEN and YELLOW LED)

Figure 59 - W60/W80/W90 Output Conditions

Programming Guide: Single Seat Valves W60/W80/W90

Run Mode Display: After power up, the sensor goes automatically into run mode.

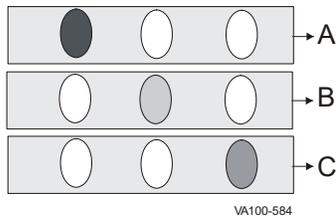
NOTE: A green blinking LED means that the sensor was powered up without a target present. Power down and power up with the target present. A red blinking LED means that the target is out of range. Re-position target within sensing area. No LED means no output has been triggered.

NOTE: The P button (Position) can be used to toggle between Red, Green, and Yellow. Use this button in case you want to first teach Valve Open. Seatlift is not used for Single Seat Valves. The default is set for the Closed position (RED LED) as starting point.

NOTE: The valve sensor can only be programmed when assembled to a functioning valve.

Programming Steps:

1	Press the Pos. push button for a minimum of 2 seconds.	➔	All LEDs flash 2x simultaneously. The unit is in the programming mode. Then only the LED "closed" is lit. The unit is now ready for the adjustment of the closed position.
2	Put the valve into the closed Pos. and press the Teach button.	➔	The LED "closed" goes out and the LED " seat " lights. The unit has stored the closed position and is now ready for the adjustment of the position seat lift (seat) .
3	Put the valve into the position seat lift and press the Teach button.	➔	The LED " open " lights. The unit is now ready for the adjustment of the open position.
4	Put the valve into the open position and press the Teach button.	➔	The LED " open " goes out and the LED "closed" lights again. The unit has now stored all positions.
5	Press the Pos. push button for a minimum of 5 seconds. After 5 seconds, the LED "open" flashes at about 2Hz.	➔	After releasing, all stored measured values are checked. If no errors are detected, all LEDs flash 2x simultaneously. The unit automatically quits the programming mode and immediately passes into the operating mode. If an error is found during the check, the LED " closed " flashes at about 8Hz. Acknowledge the error message by pressing the Pos. button and repeat the adjustment.



- A. Close Position (RED LED)
- B. Seat Lift Position (YELLOW LED)
- C. Open Position (GREEN LED)

Figure 60 - W70 and W60 3-Position Actuator Output Conditions

Programming Guide: Double Seat Valves W70 and W60 3-Position Actuator

Run Mode Display: After power up, the sensor goes automatically into run mode.

NOTE: A green blinking LED means that the sensor was powered up without a target present. Power down and power up with the target present. A red blinking LED means that the target is out of range. Re-position the target within the sensing area. No LED means no output has been triggered.

NOTE: The P button (Position) can be used to toggle between Red, Green, and Yellow. Use this button to first teach Valve Open or Valve Seatlift or 3rd position. The default is set for Close position (Red LED) as the starting point.

NOTE: The valve sensor can only be programmed when assembled to a functioning valve.

Programming Steps:

1	Press the Pos. push button for a minimum of 2 seconds.	➔	All LEDs flash 2x simultaneously. The unit is in the programming mode. Then only the LED "closed" is lit. The unit is now ready for the adjustment of the closed position.
2	Put the valve into the closed Pos. and press the Teach button.	➔	The LED "closed" goes out and the LED " seat " lights. The unit has stored the closed position and is now ready for the adjustment of the position seat lift (seat) .
3	Put the valve into the position seat lift and press the Teach button.	➔	The LED "seat" goes out and the LED " open " lights. The unit has stored the position seat lift and is now ready for the adjustment of the open position.
4	Put the valve into the open position and press the Teach button.	➔	The LED "open" goes out and the LED "closed" lights again. The unit has now stored all positions.
5	Press the Pos. push button for a minimum of 5 seconds. After 5 seconds, the LED "open" flashes at about 2 Hz.	➔	After releasing, all stored measured values are checked. If no errors are detected, all LEDs flash 2x simultaneously. The unit automatically quits the programming mode and immediately passes into the operating mode. If an error is found during the check, the LED " closed " flashes at about 8Hz. Acknowledge the error message by pressing the Pos. button and repeat the adjustment.

Locking/Unlocking

The unit can be locked electronically to prevent unintentional operations.

Press both adjustment push buttons simultaneously for at least 10s in the operating mode. After 10 seconds, each LED lights briefly one after the other. Then the unit is locked or unlocked.

In the locked state, operations are ignored. The factory default setting is Unlocked.

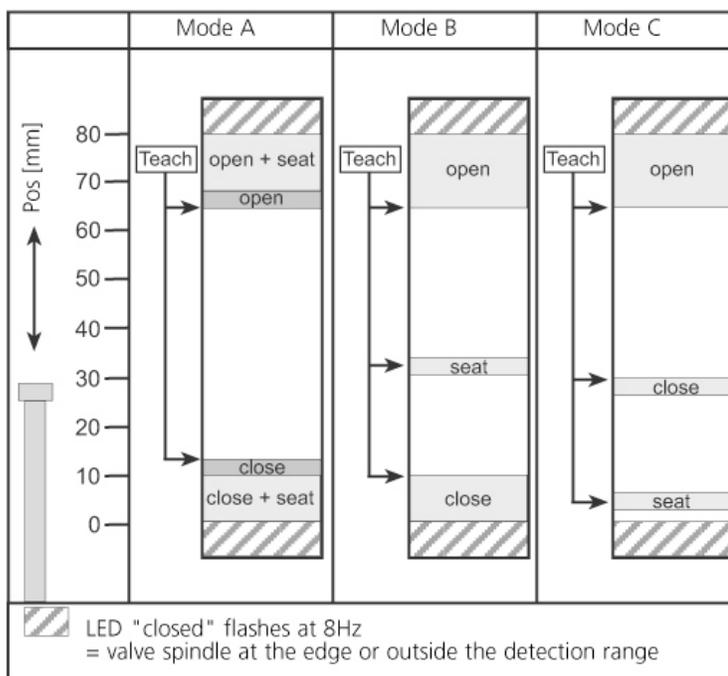
Set-up/Operation

After mounting, wiring and adjustment, check whether the unit operates correctly. If possible, put the valve into all available positions and check if the unit switches correctly and if the operations are correctly indicated by the LEDs.

Indication by LED for the different operating modes

The sensor has 3 operating modes which the sensor automatically generates depending on the programming:

- Mode A: For valves with 2 operating positions. The wear of the valve seals is monitored.
- Mode B: For valves with 3 operating positions. The position Seat clean (seat) is between the positions Closed and Open.
- Mode C: For valves with 3 operating positions. The position seat clean (seat) is outside the positions Closed and Open.



VA100-565

Figure 61 - Modes A-C

- When the LED at the zones marked in grey lights up, the output corresponding to this state is closed (switched). At the zones marked in white and outside the detection range (zones hatched diagonally), all outputs are open (not switched).
- All modes are also available when the open and closed positions are inverted. The sensor detects this automatically, and the assignment of the switching characteristics is carried out automatically.
- The open and closed zones are placed near the edge (the teach positions are at the edge of the zones). The seat zones are placed in the middle, symmetrically around the teach position.

- To monitor the **seal**, the open and closed zones in mode A are only 1.5 mm in width. The zones open+seat and closed+seat are immediately adjacent. In these zones both the outputs "open" and "seat" and the outputs "closed" and "seat" are switched simultaneously. **This signals wear of the valve seal!**
- In mode A, only the closed and open positions can be adjusted. Do not adjust the seat lift; please skip this program step by pressing the Pos. button. The sensor then automatically generates mode A.

Table 3: Error Messages

	LED	Error Description	Measure
during adjustment	close	Flashes at 8 Hz directly after leaving the programming mode = adjustment error! Taught position values are not within the detection range or positions are not permissible or plausible	Error message can be acknowledged by pressing the position button
during operation	close	Flashes at 8Hz = spindle head is at the edge or outside the detection range or spindle head is in non defined zones (white zones, see Figure 61 on page 50) for longer than 20 seconds	Check the position of the valve
	close	Flashes at 8Hz = fault in the electronics. Unlike the other error messages, this error message cannot be acknowledged or terminated.	Replace the sensor

Micro Switch

Features

- A mechanical switch using a lever arm and roller that is compressed or released by stem movement.
- AC/DC 24VDC or 110VAC
- The position of the actuator stem is felt by a roller

Proximity Switch

Features

- IP67 sealed, inductive coil switch
- AC/DC 24VDC or 110VAC
- The position of the actuator stem is detected by a sensor at the target printed on the switch

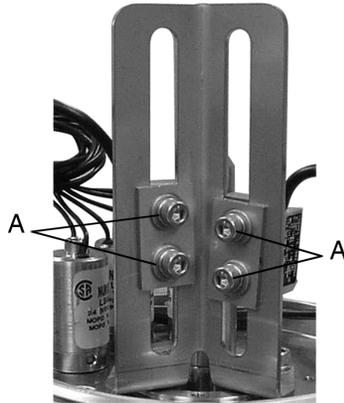


Figure 62 - Switch Adjustment

Switch Adjustment

NOTE: In this manual, “stem-raised” is understood to be when the valve stem is fully retracted into the actuator. “Stem-lowered” is understood to be when the valve stem is fully extended out from the actuator.

WCB control tops with proximity switches or micro-switches utilize a positive switching configuration to provide discrete inputs for each valve position.

Lower Switch 1 is normally closed (NC) and passing power when the stem is down. When the stem raises, switch 1 opens and power is stopped.

Upper Switch 2 is normally open (NO) and does not pass power when the stem is down. When the stem is fully raised, Upper Switch 2 closes and passes power.

Proximity switches are supplied with incorporated LEDs which light when power is passed and are inactive when power is stopped.

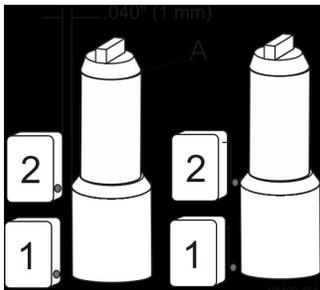


Figure 63 - Valve Open Adjustment

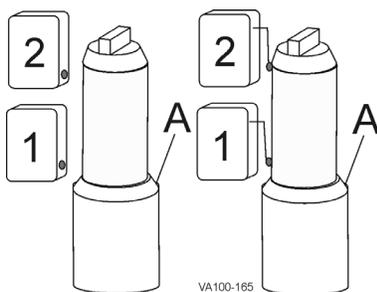


Figure 64 - Valve Closed Adjustment

1. Raise the stem to open, loosen the cap screws holding the switch blocks (Figure 62, item A) with a 9/64" allen wrench and slide the switches to set the distance between the switches and the stem shaft at .040" (1 mm) (Figure 63). If using a micro switch, place a .020" feeler gauge between the roller and the small diameter of the stem. Adjust the switch toward the stem until a “click” is heard.
2. Hand-tighten the cap screws (Figure 62, item A) to hold the switch position.
3. With the stem raised, adjust the vertical height of the upper switch target to slightly below the stem shoulder (Figure 63). Tighten the cap screws securely.
4. Lower the stem to close the valve and adjust the target of the lower switch to slightly above the stem shoulder (Figure 64). Tighten the cap screws securely.

NOTE: Switches should detect stem movement within 1/16 inch (0.062 in/1.58 mm)

⚠ CAUTION

Do not over-tighten.



VA100-798

Figure 65 - Quick-set Proximity Switch Gauge

Quick-set Proximity Switch Gauge Tool

This tool allows you to quickly set the upper and lower proximity switches available for all Waukesha Cherry-Burrell brand Single Seat and Mix Proof Valves.

The gauge sits on the stem and allows the proximity switches to be set to the correct vertical height and distance away from the stem to properly function.



[Maintenance video 1: Quick-set Proximity Switch Gauge for W-Series Single Seat and Mix Proof Valves](#)

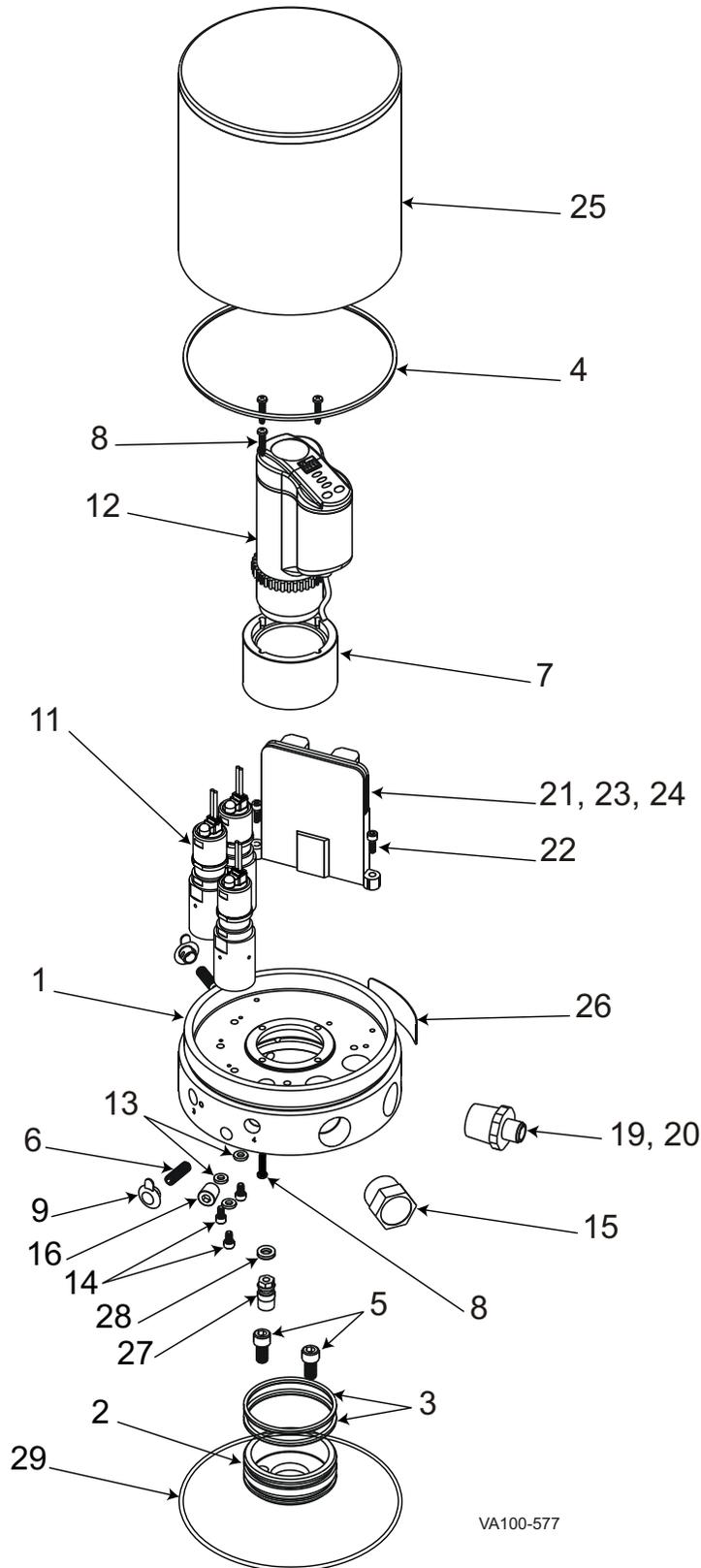
See page 66 for part numbers.

1. Place the gauge onto the indicator stem.
2. While holding down the gauge, firmly lift the loosened prox. switch against the flat on the gauge and up against the vertical stop.
3. Tighten the lower screw on the prox. switch, then the upper screw.
4. After establishing the height, carefully loosen the upper screw.
5. While holding the gauge firmly down onto the stem, and holding the switch against the gauge, loosen the lower screw. Then re-tighten the lower and upper screws.
6. Remove the gauge and check to see that the LEDs on the prox. switches activate in open and closed positions.

NOTE: When setting the prox. switch on Mix Proof valves with radial seals, the valves must be put in lower seat push position with the actuator pistons fully compressed down, to create positive stop

Parts Lists

WCB 2-Piece Set & Forget Control Top



WCB 2-Piece Set & Forget Control Top

Item #	Part Description	Part No.	Note
1	Base - w/ effector Clipp. Solenoid Control Module	119579+	
2	Mounting Cup - Control Module	119557+	
3	O-ring	N70134	
4	O-ring	N70157	
5	SCHS - 1/4-28 x .50", 18-8 SS	119625+	
6	Set Screw - 1/4-20 x .75", 18-8 SS, Cone Point	119624+	
7	Sensor Mount - Control Module	120218+	
8	Screw - #4-40 x .625" Plastite Phillips Pan Head	121658+	
9	Push in Plug w/ Tab, 3/8"	121659+	
11	Solenoid Valve - 24VDC - MAC	134500+	
	Solenoid Valve - 120VAC-S SERIES - MAC	135428+	
12	Sensor - Efeactor PNP	119747+	
13	Washer - #6 Nylon x .062"	120067+	
14	SHCS - 6-32 x .25", 18-8 SS	119626+	
15	Breather Plug	112470+	
16	Pipe Plug - 1/8-27 NPT	78-73	
17	Nylon Washer #10 u	17-111	1
18	SHCS - 10-32 x .25", 18-8 SS	30-519	1
19	Pin Connector (optional) See Wiring Schematics	Varies	
20	Cable Strain Relief (optional and not shown)	17-88	
21	Terminal Block Assembly	119645+	2
22	SHCS - 6-32 x .375", 18-8 SS I	119627+	3
23	AS-i Slave Card Legacy 31 Node	129898+	
	AS-i Slave Card Extended 62 Node	129899+	
24	DeviceNet™ Card - Interlink 4 in/4 out (optional)	123648+	
25	Cover Assembly - Standard Control Module	133085+	
	Cover Assembly - Long Stroke Control Module	119562+	
	Cover Assembly - S.S. Cover Control Module	126522+	
26	Warning Label	5902473+	
27	Vent Plug - Control Module	119599+	
28	O-ring	N70107	
29	O-ring	N70044	
n/s	Set & Forget Sensor Stem & Target; 4"/5" actuators	119677+	
	Set & Forget Sensor Stem & Target; 4"/6" long stroke actuators	119679+	
	Set & Forget Sensor Stem & Target; 6" single seat & Mix Proof actuators	119681+	

PL5027-CH80

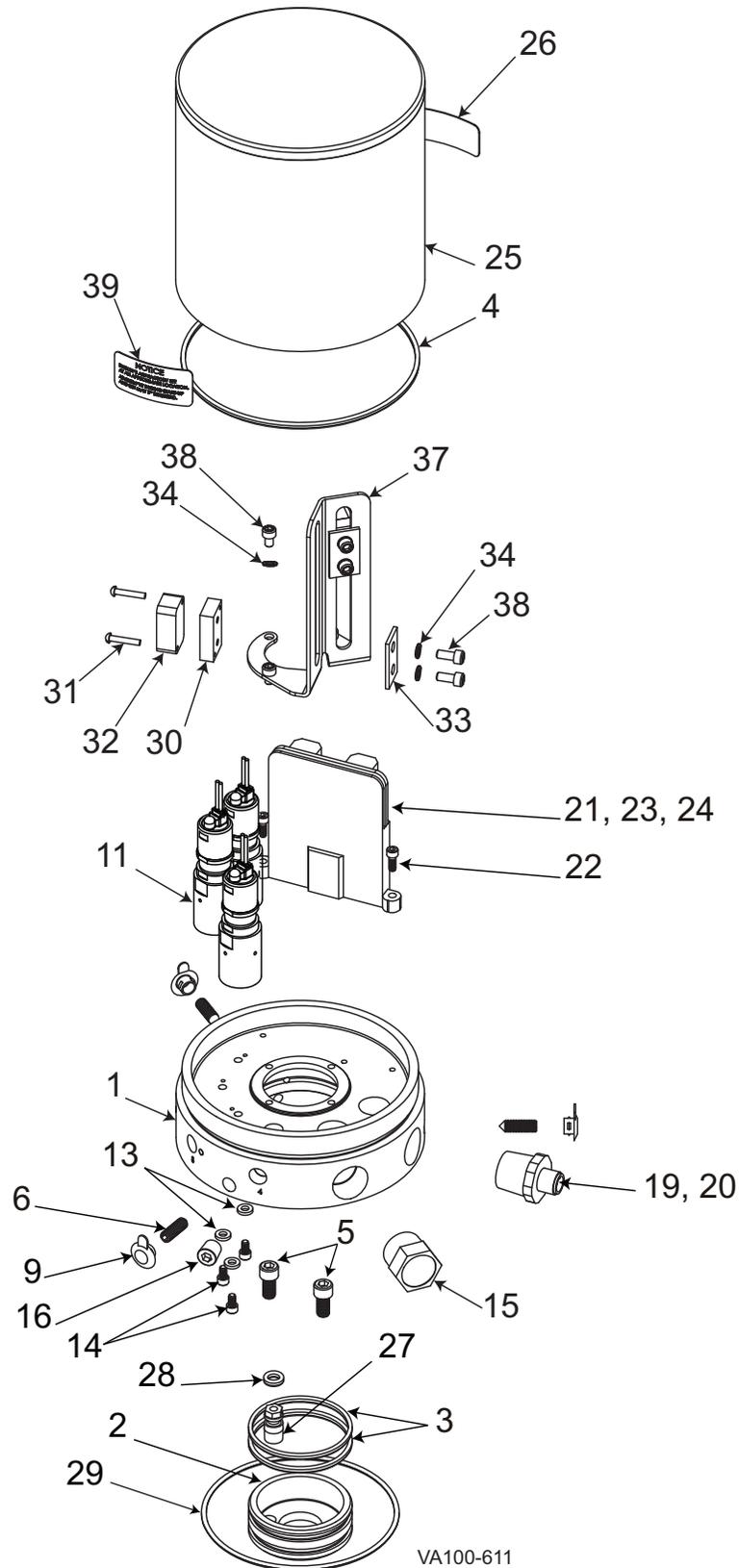
Notes:

1. Not shown - used to plug hole when solenoid not used.
2. Not shown - used in place of AS-i or DeviceNet™ Card.
3. Used for both Terminal Block Assembly and Control Cards.

n/s Not shown

Parts list shown is for valve with Set & Forget module. Necessary parts will vary depending on whether there is a terminal strip, AS-i, DeviceNet™, one solenoid, two solenoids, etc. Please contact factory for additional information.

WCB 2-Piece Control Top with Proximity or Micro Switches



WCB 2 Piece Control Top with Proximity or Micro Switches

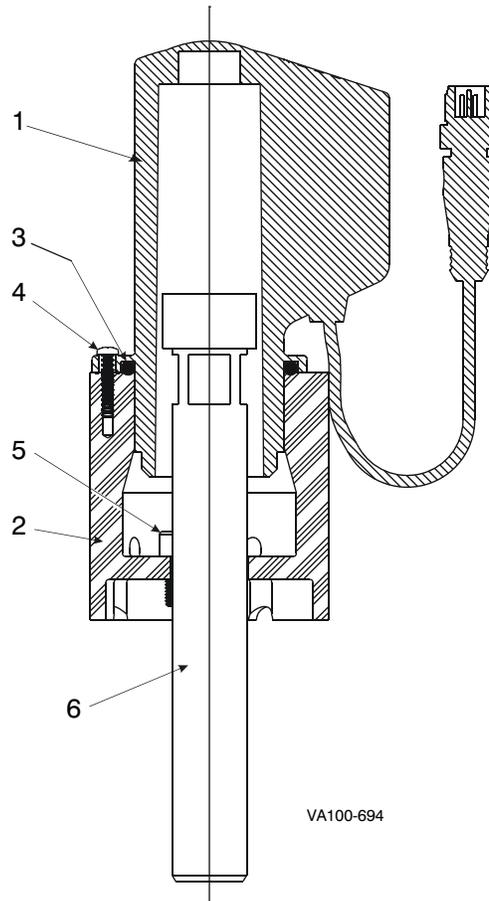
Item #	Part Description	Part No.	Note
1	Base - w/ effector Clipp. Solenoid Control Module	119579+	
2	Mounting Cup - Control Module	119557+	
3	O-ring	N70134	
4	O-ring	N70157	
5	SCHS - 1/4-28 x .50", 18-8 SS	119625+	
6	Set Screw - 1/4-20 x .75", 18-8 SS, Cone Point	119624+	
9	Push in Plug w/ Tab, 3/8"	121659+	
11	Solenoid Valve - 24VDC - MAC	134500+	
	Solenoid Valve - 120VAC-S SERIES - MAC	135428+	
13	Washer - #6 Nylon x .062"	120067+	
14	SHCS - 6-32 x .25", 18-8 SS	119626+	
15	Breather Plug	112470+	
16	Pipe Plug - 1/8-27 NPT	78-73	
17	Nylon Washer #10 u	17-111	1
18	SHCS - 10-32 x .25", 18-8 SS u	30-519	1
19	Pin Connector (Optional) Refer to Wiring Schematics	Varies	
20	Cable Strain Relief	17-88	
21	Terminal Block Assembly	119645+	2
22	SHCS - 6-32 x .375", 18-8 SS	119627+	3
23	AS-i Slave Card Legacy 31 Node	129898+	
	AS-i Slave Card Extended 62 Node	129899+	
24	DeviceNet™ Card - Interlink 4 in/4 out (optional)	123648+	
25	Cover Assembly - Standard Control Module	133085+	
	Cover - Long Stroke	119562+	
	Cover Assembly - S.S. Cover Control Module	126522+	
26	Warning Label	5902473+	
27	Vent Plug - Control Module	119599+	
28	O-ring	N70107	
29	O-ring	N70044	
30	Switch Block	116297+	
31	Screw - #4-40 RHMS x .62	30-69	
32	Upper Proximity Switch, 2-wire, normally open 24VDC/110VAC	115645+	
	Lower Proximity Switch, 2-wire, normally closed 24VDC/100VAC	115646+	
	Upper Proximity Switch, 3-wire, normally open, PNP 3W DC	117546+	
	Lower Proximity Switch, 3-wire, normally closed, PNP 3W DC	117545+	
33	Switch Plate	116296+	
34	Washer Lock, # 8, 18-8 Regular	43-20	
35	SHCS 8-32 x .375 18-8 SS	125719+	
36	Micro Switch	17-9	
37	Bracket-Micro Switch Mounting	121371+	
	Bracket - Proximity Switch	121370+	
38	SHCS 8-32 x .25 18-8 SS	30-176	
39	Label-Switch Adjustment-Rad	112094+	

PL5027-CH81

Notes:

1. Not shown - used to plug hole when solenoid not used.
2. Not shown - used in place of AS-i or DeviceNet™ Card.
3. Used for both Terminal Block Assembly and Control Cards.

Set & Forget Switch-Only



Item #	Description	Part No.
1	Set & Forget Switch-Only (PNP)	126078+
2	Adapter Mount	125463+
3	O-Ring	see note 1
4	Screws	121658+
5	Cap Screws	119625+
6	Stem for 126155+ kit	119677+
	Stem for 126156+ kit	119681+
	Stem for 126157+ kit	119679+

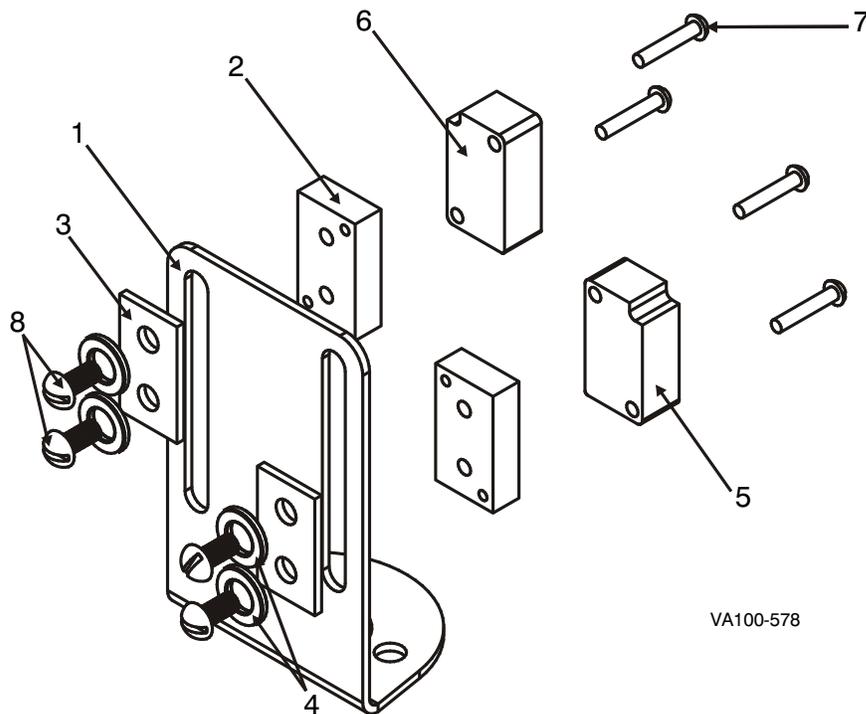
Kits (include switch, mount, hardware and stem)	
for 4" & 5" Single seat valve actuators	126155+
for 6" single seat & Mix Proof valve actuators	126156+
for use on long stroke actuators	126157+

PL5027-CH129

Note:

1. Supplied with the switch; not available separately.

Exterior Mount Proximity Switch



VA100-578

Item #	Description	Part No.	Notes
1	Bracket-Prox switch: W60	116295+	
	Bracket-Prox switch: W70	116294+	
	Bracket-Prox switch: Long Stroke	116293+	
	Bracket-Prox switch: Extra Long Stroke	120319+	
2	Switch Block	116297+	
3	Switch Plate	116296+	
4	Washer Plain #8 18/8 Narrow	43-26	
5	Proximity switch 24VDC / 110VAC (NC)	17-79	
6	Proximity switch 24VDC / 110VAC (NO)	17-72	
7	Screw - #4-40 RHMS x .62	30-69	
8	8-32 X .375 SRHMS 18-8	116298+	
9	1/4-28 X .375 SHCS 18-8	116299+	1
10	Washer plain 1/4 18-8 Narrow	43-144	1

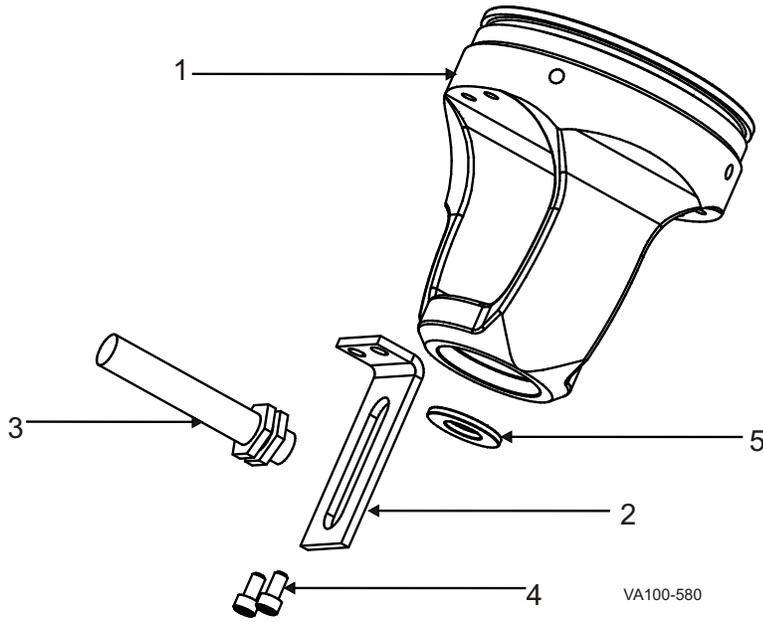
PL5027-CH82

Note:

1. Mounting bolts not shown, items 9 and 10



Valve Mount Proximity Switch



Item #	Description	Part No.	Note
1	Modified yoke for switch: 4" Actuator	110132+	
	Modified yoke for switch: 5" Actuator	112795+	
	Modified yoke for switch: 6" Actuator	114430+	
2	Mount Bracket	112794+	
3	Switch, Proximity 24VDC	17-73	1
	Switch, Proximity 110AC	17-67	2
4	Screws	30-575	
5	Washer, 4" and 5"	43-31	
	Washer, 6"	43-169	

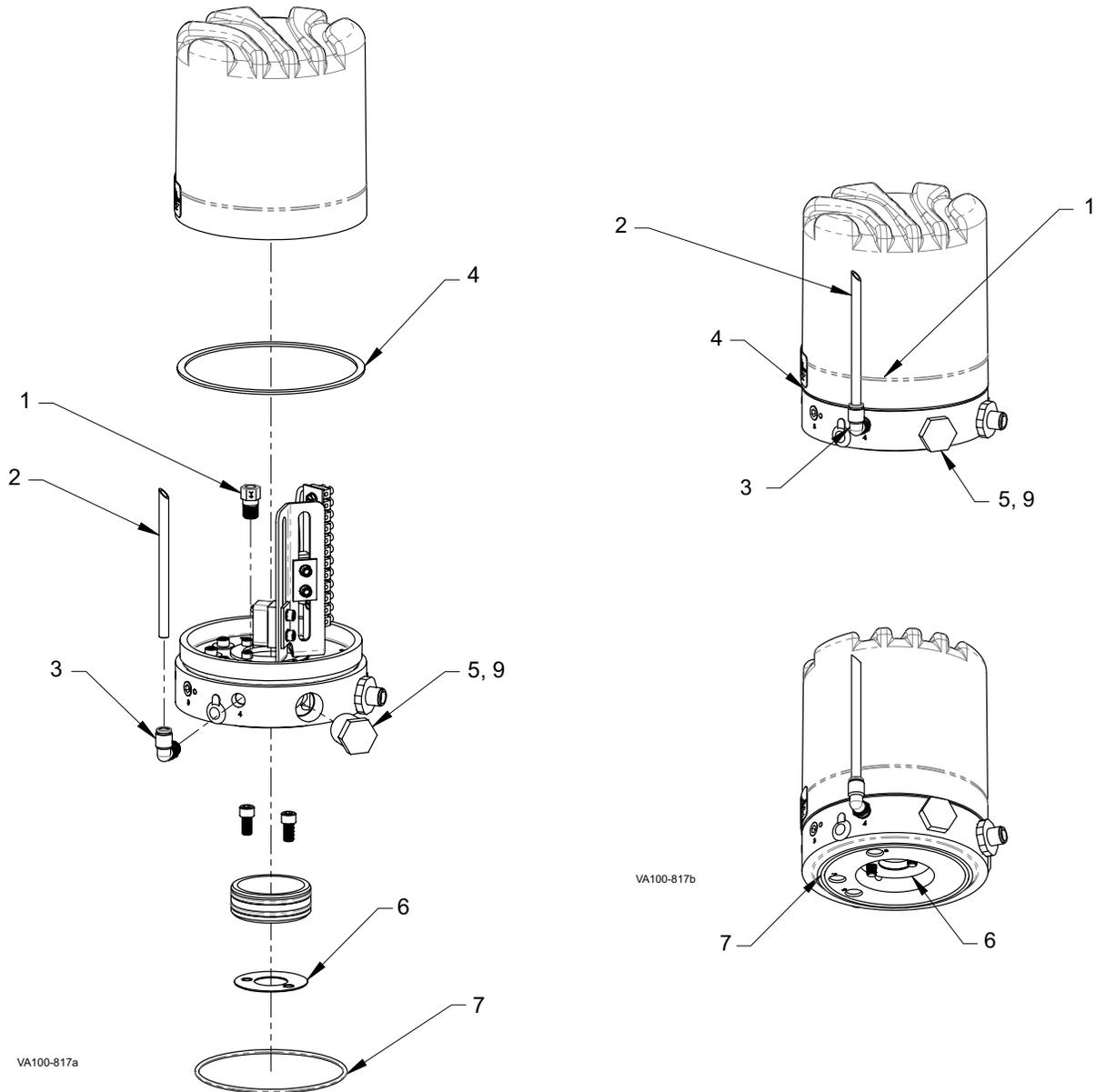
PL5027-CH83

Notes:

- 1. 24VDC: Programmable NO/NC by choice of wire termination
- 2. 110AC: Programmable NO ONLY

NEMA 6 Upgrade Kit for WCB 2-Piece Control Top

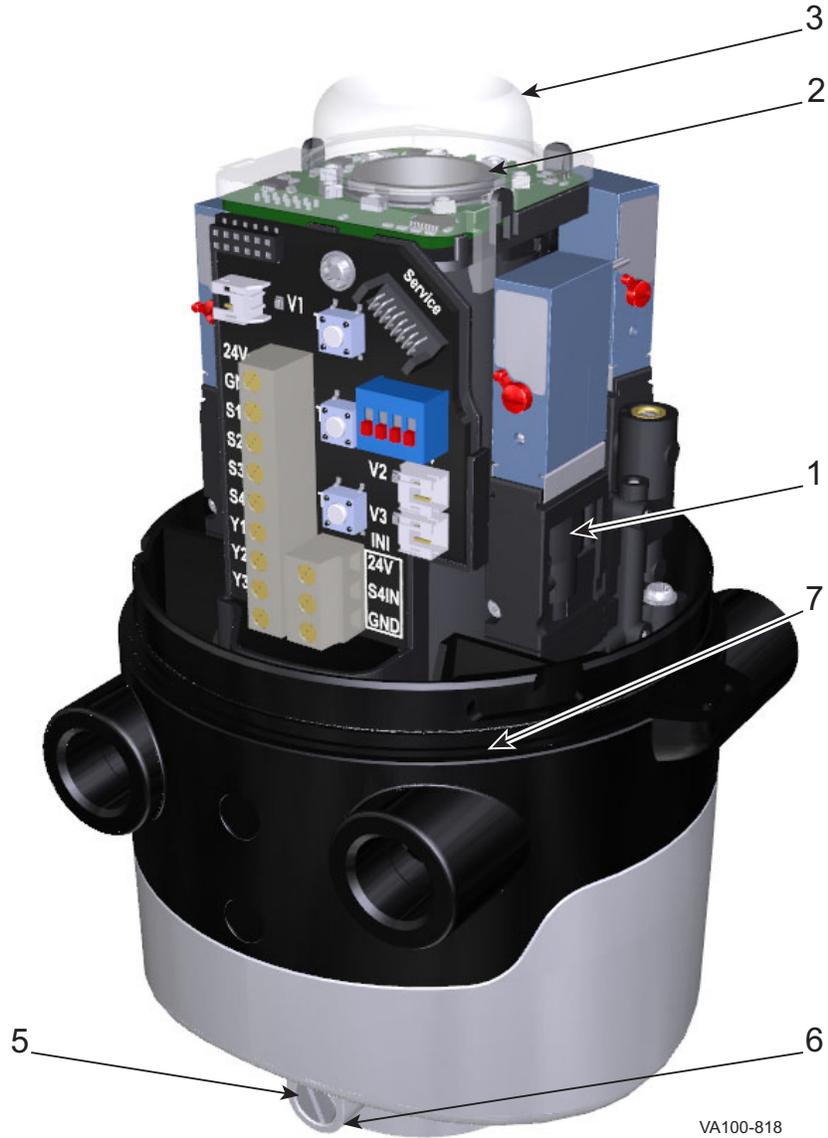
for upgrading from NEMA 4 to NEMA 6



Item #	Description	Qty.	Part No.
NEMA 6 Conversion Kit, contains part numbers below		1	132288+
1	Valve, Check - Vent To 1/8" NPT	1	132286+
2	Tube, Cut	1	132296+
3	Elbow-Swivel-90D 1/4"Tx1/8"Male NPT	1	78-157
4	Gasket, Control Top Cover Buna A70	1	132284+
5	Plug Plastic Threaded 1/2-NPT	1	133798+
6	Gasket, Control Top Cup Buna A70	1	132285+
7	O-Ring-154 FDA Nitrile/Buna	1	N70154
9	Connector 1/2" NPT X .095-.290 Blk Nylon	1	132287+

PL5027-CH196

Bürkert 8681 Parts



Item #	Description	Part No.
1	Solenoid Valve	135649+
2	Position sensor	135654+
3	Light Cap	135655+
N/S	Cover	135656+
5	Screw	135657+

Item #	Description	Part No.
6	Nut	135658+
7	Cover O-ring	135659+
N/S	Elbow	78-157
N/S	Muffler	131533+

PL5027-CH197

Note:
 N/S = Not shown
 Item 6: location of nut is shown.

Bürkert 8681 Adapter Kits and Tools

**To use a Bürkert 8681 Control Top with a Waukesha Cherry-Burrell Brand Actuator
(used on W60, W70, W80, and W90 Valves)**

Actuator Size	Adapter Kit	Notes
4" & 5" Single Seat	131535+	1, 3, 4
6" Single Seat	131536+	1, 3, 4
4" & 6 " Mix Proof	131536+	1, 3, 4

**To use a Bürkert 8681 Control Top with a Maintenance Free Actuator
(used on W60, W80, and W90 Valves)**

Actuator Size	Adapter Kit	Indicating Stem	Notes
A (74mm), B (110 mm) and C (165 mm)	131539+	131464+	2, 3, 4

**To use a Bürkert 8681 Control Top with a Linear (1/4 Turn) Actuator
(used on 300 Series 2-Way Ball Valves and 200 Series Butterfly Valves)**

Actuator Size	Adapter Kit	Notes
80 mm	131537+	1, 3, 4
125 mm, 165 mm	131538+	1, 3, 4

PL5027-CH198

Notes:

1. Indicating stem IS included.
2. Indicating stem is NOT included (indicating stem part # is listed).
3. Quantity 1 required of all items per valve
4. Control Top sold separately.

Bürkert 8681 Tools

Item #	Description	Part No.	Notes
N/S	USB Adapter Kit	132131+	1
N/S	Bluetooth Adapter Kit	132132+	2
N/S	Manual Override Tool	132133+	3

PL5027-CH201

Notes:

N/S = Not shown

1. USB Adapter Kit allows interface between a laptop and the control top
2. Bluetooth Adapter Kit allows wireless interface with a tablet or smartphone (NOT Apple compatible)
3. Manual Override Tool allows for local removal of the valve without opening the control top to energize the solenoid.



CU4 Control Top Adapter Kits

**To use a CU4 Control Top with a Waukesha Cherry-Burrell Brand Actuator
 (used on W60, W70, W80, and W90 Valves)**

Actuator Size	Adapter Kit	Indicating Stem	Adapter Plate	Adapter Plate SHCS	Notes
4" & 5" Single Seat	H320474	130390+	130391+	119625+ (x2)	2, 3, 4, 5
6" Single Seat	H320474	131216+	130391+	119625+ (x2)	2, 3, 4, 5
4" & 6 " Mix Proof	H320474	131216+	130391+	119625+ (x2)	2, 3, 4, 5

**To use a CU4 Control Top with a Maintenance Free Actuator
 (used on W60, W70, W80, and W90 Valves)**

Actuator Size	Adapter Kit	Notes
74 mm, 110 mm, 165 mm	H320474	1, 3, 5
110 mm Long Stroke, 165 mm Long Stroke	H330897	1, 3, 5

**To use a CU4 Control Top with a Linear (1/4 Turn) Actuator
 (used on 300 Series 2-Way Ball Valves and 200 Series Butterfly Valves)**

Actuator Size	Adapter Kit	Notes
80 mm	H320475	1, 3, 5
125 mm	H321987	1, 3, 5
165 mm	H321987	1, 3, 5

PL5027-CH199

Notes:

1. Indicating stem IS included in the adapter kit.
2. Indicating stem is NOT included in the adapter kit.
3. Quantity 1 required of all items per valve, unless otherwise noted.
4. Quantity 2 required of Adapter plate SHCS for the Waukesha Cherry-Burrell brand actuator.
5. Control Top sold separately.

Bürkert 8692 & 8694 Positioner Adapter Kits

**To use a Bürkert 8682 & 8694 Positioner
with a Waukesha Cherry-Burrell Brand Actuator
(used on W68, W88, and W98 Valves)**

Actuator Size	Adapter Kit	Notes
4" Single Seat	131640+	1, 2, 3
5" Single Seat	131641+	1, 2, 3
6" Single Seat	131642+	1, 2, 3

**To use a Bürkert 8682 & 8694 Positioner with a Maintenance Free Actuator
(used on W68, W88, and W98 Valves)**

Actuator Size	Adapter Kit	Notes
74 mm	137748+	1, 2, 3
110 mm	137749+	1, 2, 3
165 mm	137750+	1, 2, 3

**To use a Bürkert 8682 & 8694 Positioner with a Linear (1/4 Turn) Actuator
(used on 300 Series 2-Way Ball Valves and 200 Series Butterfly Valves)**

Actuator Size	Adapter Kit	Notes
80 mm, 125 mm	131089+	1, 2, 3

PL5027-CH200

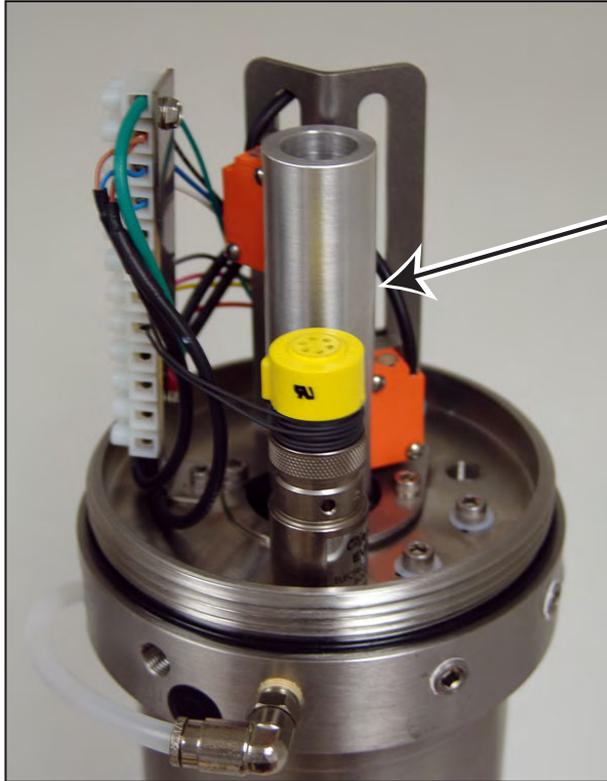
Notes:

1. Indicating stem IS included in the adapter kit.
2. Quantity 1 required of all items per valve
3. Positioner sold separately.



WCB Control Top Tools

Quick-Set Proximity Switch Gauge for WCB Control Top



VA100-798

Valve Model	Valve Size							Notes
	1"	1-1/2"	2"	2-1/2"	3"	4"	6"	
W61/W62/W63/W64/W65/W68 W81/W82/W83/W84/W85/W88 Standard Stroke	128222+						128562+	
W61/W63/W64 W81/W83/W84 Long Stroke	N/A	N/A	N/A	128561+	128565+	128562+		1
W62/W65 W82/W85 Long Stroke	N/A	N/A	N/A	128563+	128565+	128564+	N/A	
W91/W92/W93/W94/W98 Standard Stroke	128570+						N/A	
W71/W73/W72RS	N/A	128566+	128567+	128563+			128568+	
W75RS/CP	N/A	128218+					128569+	

PL5027-CH192

Notes:

1. All W61/W81-Y Bodies w/Extra Long Stroke use Gauge 128562+.

See "Quick-set Proximity Switch Gauge Tool" on page 53.

Troubleshooting

WCB 2-Piece Control Top

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Leaking Air		
Air leaking from between actuator and Control Top	Missing or damaged O-rings	Disassemble and remove Control Top, inspect air vent plug O-ring and mounting cup O-rings, replace if required.
	Wrong porting arrangement	Check porting and revise as required.
Air leaking from port in Control Top base.	Wrong porting arrangement	Check porting and revise as required.
Air leaking inside Control Top.	Solenoid valve gasket failure	Check solenoid O-ring. Replace or adjust as necessary.
Operation		
Valve fails to open	Air pressure too low	Set air pressure to 60psi (4 bar) for 4", 5", and 6" light spring actuator. For 6" standard spring, the pressure is 80 psi (5.5 bar)
	Control failure	Check control sequence. Check air supply.
	Vent blocked	Check control wiring and power source. Check actuator vent is not blocked.
Valve fails to close	Mechanical failure	Check for debris in valve. Check for loose stems.
Moisture in Control Top	Missing and/or damaged O-ring	Replace module O-ring.
	Top not screwed on	Ensure top is fully screwed down onto module base.
	Vent entry	Rotate vent down (horizontal mount) for draining. Plumb vent with down spool to deflect direct spray.
	Wire port entry	Tighten strain gauge grommet. Seal the wire-entry point.
Electrical		
Set & Forget		
No Valve "Closed" or "Open" indication LED	No Power	Check power connections.
	No output triggered	Check proper assembly of indicator stem and target. Reset the sensor.
Green blinking LED upon power up	No target present	Power down and power up with target present.
Red blinking LED upon power up	Target out of range	Re-position target within sensor area (by checking proper assembly)

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
Electrical		
Set & Forget, continued		
No Valve “Closed” or “Open” indication	Lower switch not adjusted properly	Adjust switch.
No Valve “Open” signal	Upper switch not adjusted properly	Adjust switch.
Erratic switch alarms	Control failure	Check control wiring and power source.
	Loose hardware	Check Set & Forget Sensor mounting and proper assembly of indicator stem and target.
Proximity or Micro Switches		
No Valve “Closed” or “Open” indication LED or signal	No Power	Check power connections.
	No Output Triggered	Check proper assembly of indicator stem and switch’s position.
Opposite “Closed” or “Open” Indication LED or signal	NO and NC switches in wrong position	Check and confirm NO switch is Upper and NC switch is Lower.
Erratic Switch Alarms	Switch not properly adjusted	Adjust switch. Condition often result of tight gap setting or adjustment too close to trigger point of stem.
	Loose wiring	Confirm wiring terminations.
	Hydraulic shock in valve	Check that hydraulic shock or other factor is not actually moving stem. Switch could be correct.
Loss of Switch Adjustment	Switch not properly adjusted	Adjust switch.
	Switch hardware not snugged sufficiently against vibration level	Snug switch hardware.
	Loose switch bracket	Tighten bracket mount.
	Loose Control Top	Tighten Control Top setscrews.
As-i and/or DeviceNet™ Cards		
No Indicator LED on card	No Power	Check power connections.
	Wrong wiring	Confirm proper wiring.
	Bad card	Replace card.
Flickering Indicator LED on card	Communication error	Check and confirm proper wiring. Confirm no wiring strands are shorted between terminals. Consult Controls Engineer.
	Bad Card	Replace card.

CU4 Control Top

PROBLEM	SUGGESTED ACTION
Valve position is not indicated	Re-adjust Hall sensors.
	Check fastening of magnetic operating cam.
	Check cabling of the Hall sensors to the electronic module.
Feedback via proximity switches is missing	Check positioning of proximity switches.
	Check operating voltage.
	Check cabling to the electronic module.
LED indication is missing	Check operating voltage.
	Check cabling to the electronic module.

Control Unit CU41 installed on Butterfly valves

Movement of valve flap is missing with actuated solenoid valve.	Check if right control unit is installed.
	Check label in type window of control unit: CU41-T-Direct Connect (1 EMV/solenoid valve)
	Check valve movement with manual at solenoid valve.
	Check cabling between electronic module and solenoid valve.
	Check compressed air (min. 6 bar).
	Bore for transfer of control air to turning actuator must be open.
Air leakage at lower side of adapter.	Check O-rings of adapter.

Control Unit CU41 installed on Single seat and Double seat valves

Valve position movement is missing with actuated solenoid valve.	Check if right control unit is installed.
	Check label in type window of control unit: CU41-S-Direct Connect (1 EMV/solenoid valve)
	Check valve movement with manual at solenoid valve.
	Check cabling between electronic module and solenoid valve.
	Check compressed air (min. 6 bar).
	Check control air connection between the CU41 and the valve actuator.

Control Unit CU43 installed on Double seat valves

Valve position movement is missing with actuated solenoid valve.	Check if right control unit is installed.
	Check label in type window of control unit: CU43-M-Direct Connect (3 EMV/solenoid valves)
	Check valve movement with manual at solenoid valve.
	Check cabling between electronic module and solenoid valve.
	Check compressed air (min. 6 bar).
	Check control air connection between the CU43 and the DA3 valve actuator

See corresponding CU4 manual for additional information.

The CU4 is covered in manual H323871: http://www.spxflow.com/en/assets/pdf/APV_CU4%20DC_UK.pdf, and the CU4 AS-interface is covered in manual H326406: http://www.spxflow.com/en/assets/pdf/APV_CU4%20AS-i_UK.pdf.

Bürkert 8681 Control Top

PROBLEM	POSSIBLE CAUSE	SUGGESTED ACTION
No feedback signal	Position of the position measuring system (Teach-In) not appropriate for the spindle	Perform / repeat the Teach-In procedure (for more information see Bürkert 8681 manual, "Setting the Position Measuring System (Teach-In)")
	Setting of the external initiators incorrect	Set the external initiator according to the respective operating instructions.
	No or faulty associated feedback signals or external initiator	Set the connections according to the pin and plug configurations described in these operating instructions (for the respective voltage and communication variant).
	Target is not mounted on the process valve's spindle or target faulty	Check the target for correct mounting and condition (for more information see Bürkert 8681 manual, "Position measuring system data").
Feedback signal is "lost" in system operation	Position in the limit range of the feedback field	Repeat the Teach-In procedure (for more information, see Bürkert 8681 manual, "Setting the Position Measuring System (Teach-In)")
		Check the process valve end positions during operation against the end positions in non-operative state of the system
		Check the pressure supply.
Valve output 2/A1 cannot be switched off with the control	Magnetic manual control is still activated	Deactivate the manual control - compare to Bürkert 8681 manual, "Magnetic manual control"
Valve outputs cannot be switched off by the control	Mechanical manual control at the solenoid valve is still activated	Deactivate the mechanical manual controls on the solenoid valves - see Bürkert 8681 manual, "Mechanical manual control"
Faults are signaled by means of LEDs	Possible causes may vary depending on the version	Refer to the corresponding descriptions of the respective communication variant in the operating instructions (see Bürkert 8681 manual, "Blinking pattern & fault signaling")
No or faulty function of the process valves	No electrical power supply or communication for the control head	Check the power supply and the communication settings (also refer to detailed descriptions of the respective versions in the Bürkert 8681 manual)
	No or insufficient pneumatic supply of the control head	Check the pressure supply and ensure that supply is sufficient
Incorrect function of the process valves	Confused pneumatic connection lines	Check the correct pneumatic connection of the control head to the process valve (for fluid diagrams, see Bürkert 8681 manual, "Fluid diagrams, and the operating instructions of the corresponding process valves")
	Valves not correctly connected on electronics module	Check the correct electrical connection of the solenoid valves (see Bürkert 8681 manual, 24 V DC electronics module figure)

NOTE: See Bürkert 8681 manual (www.burkert.com > Documentation > type 8681) for a

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