

# PROFIRE VM80 User Manual



The PROFIRE VM80 is designed to provide precision flow control performance. It is ideal for applications that require higher level modulation and tighter temperature control.

# PROFIRE VM80

## Specifications

### Power Consumption

- Operates on 12 or 24 VDC power and responds proportionally to a 4-20mA control signal.
- DC power operation means it is ideal for use in low power sites (particularly remote areas).
- Average power consumption in a typical process control application is less than 2.0W (based on a measurement of 1.85W after a 5% movement every 25 seconds).

Description	Specifications	
Supply Voltage	<b>12 VDC</b>	<b>24VDC</b>
Idle Power	<i>1.1 W</i>	<i>1.2 W</i>
Average Power During Movement	<i>5.6 W</i>	<i>21.3 W</i>
Idle Current Draw	<i>90 mA</i>	<i>49 mA</i>
Average Current Draw	<i>750 mA</i>	<i>886 mA</i>
Max Current Draw	<i>2.3 A</i>	<i>1.1 A</i>

The resolution of the temperature control algorithm will determine the actual power consumption. The higher the frequency of valve position changes, the higher the power consumption will be. Minimizing valve position changes when possible on battery powered sites will help prevent battery depletion.

### System Specifications


Operating Temperature	-40°C to 55°C (-40°F to 131°F)
Duty Cycle	50%
Control Signal	4-20mA Current Loop
Operating Thrust	355 N (80lbf) at 12 VDC, 387 N (87 lbf) at 24 VDC
Stroke Speed	2.54 mm/s (0.1 inch/s)
Travel (Nominal)	12.7 mm (0.5 inch)
Wiring Connection	30 to 14 AWG
Conduit Connections	One 1/2" NPT
Enclosure Material	Aluminum (Yoke: 6061-T6, Cover: A356-T6)

### Approvals

The PROFIRE VM80 is certified by CSA for the following hazardous location and enclosure ratings (CSA Certificate No. 2014.2683637):

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## Hazardous Locations

Agency	Region	Protection Standard	Markings
	North America: Canada & USA	<b>Explosion Proof:</b> CSA C22.2 No. 30 / UL 1203	Class I, Division 1, Groups B, C, & D T4
		<b>Flame Proof:</b> CSA 60079-1 / ISA 60079-1	Class I, Zone 1, Aex d IIB + H2 T4 Gb
		<b>General:</b> CSA 60079-0 / FM 3600	

## Enclosure Ratings

Rating	Standards						
Type 4X	CSA C22.2 No. 94.1	UL 50	MMX-J-235/1-ANCE	CSA C22.2 No. 94.2	UL 50E	MMX-J-235/2-ANCE	NEMA 250
IP 66	C22.2 No. 60529 IEC 60529	IEC 60529					

## Additional Standards:

- ANSI/ISA 12.12.01
- CSA Std C22.2 No. 0
- CSA Std C22.2 No. 139
- CSA Std C22.2 No. 142
- CSA Std C22.2 No. 213
- CSA Std C22.2 No. 94
- UL 916
- UL Std No. 429

## Installation

### Safety Instructions

**Failure to observe the following points may result in death, personal injury, electrocution, property damage, product damage, and/or government fines.**

- Ensure VM80 Cover (23) is threaded on completely and securely before applying power to the actuator in hazardous locations.
- For explosion proof installations: installation of a conduit seal within 45.7cm (18 inches) of the VM80 and rigid metal conduit is required.
- Confirm that circuits are not live prior to installation or while performing any maintenance.
- Designs used must be approved by a qualified inspector and approved by the gas authority having jurisdiction at the site where the VM80 will be installed.
- Supply wire must be rated for a minimum of 120°C (248°F) or greater.
- This device is NOT intended for use as a safety shut-off valve.

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## Inspection

PROFIRE inspects and performs functional tests on all actuators prior to shipment. It is the responsibility of the customer to verify that all products are undamaged upon receipt. Please carefully inspect the shipment for damage prior to installation.

- Verify that there is no visible damage to actuator, drive train, Actuator Stem (4), Stem Clamp (17, 18) and Plug Stem (29).
- Check the Indicator Arm (15) for breakage.
- Make sure the Stem Clamp (17, 18) is secure if attached to a valve.
- In the event of damage during shipment, the customer should take pictures of the damaged packaging and/or product, and immediately contact their PROFIRE Sales Representative.

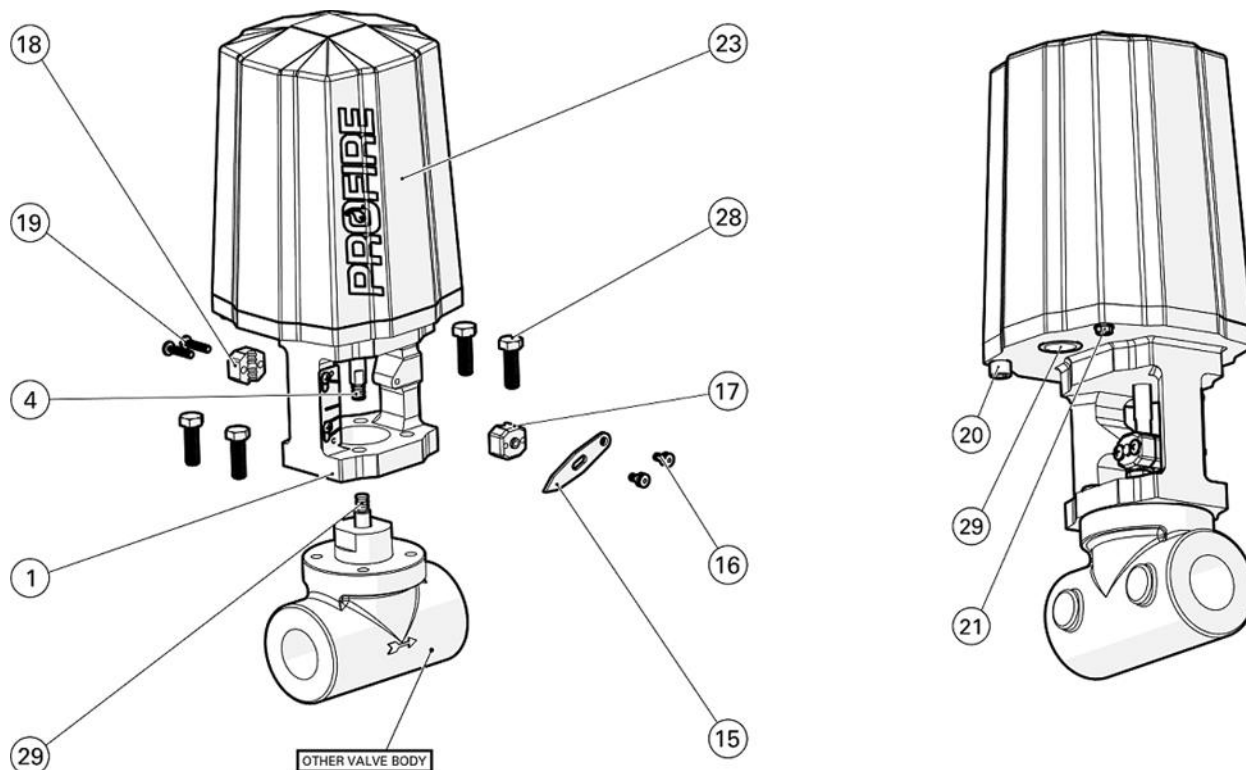
## Mounting Instructions

**NOTE:** If you are installing a complete valve (actuator and valve body), proceed to the Wiring Instructions section below (page 6).

- Ensure that the actuator is always mounted in an upright (vertical) position.
- Install the Actuator Assembly on the Valve Body Assembly so that the front of the Yoke (1) and the flow arrow on the Valve Body are facing you.  
**NOTE:** This will be the normal flow of the valve. If the piping requires flow in the opposite direction, mount the actuator 180 degrees opposite to make sure the stroke indicator is visible to the operators.
- Secure the Actuator to the Valve using the four Yoke Mounting Bolts (28) using a ½" wrench. Do not tighten bolts fully.
- Make sure the Actuator Stem (4) and valve Plug Stem (29) are touching. If needed, raise the Plug Stem (29) using a flat-blade screw driver.
- Place the Stem Clamp [Unthreaded – two holes] (18) on the back side of the stems making sure the grooves align.
- Place the Stem Clamp [Threaded – three holes] (17) on the front side of the stems and secure using the two Stem Clamp Screws (19) starting from the back side – do not tighten at this time.
- Install the Indicator Arm (15) with the two Indicator Arm Bolts (16) using a 3/32" hex drive. Place one bolt through the hinge hole of the Indicator Arm (15) and attach to the indicator mount on the right Yoke (1) leg. Place the other bolt through the slot in the middle of the Indicator Arm (15) and attach to the center hole of the Stem Clamp (17).
- Make sure the Stem Clamp (17, 18) is centered so that the Indicator Arm (15) is not bound, and tighten the Stem Clamp Screws (19).
- Tighten the Yoke Mounting Bolts (28).

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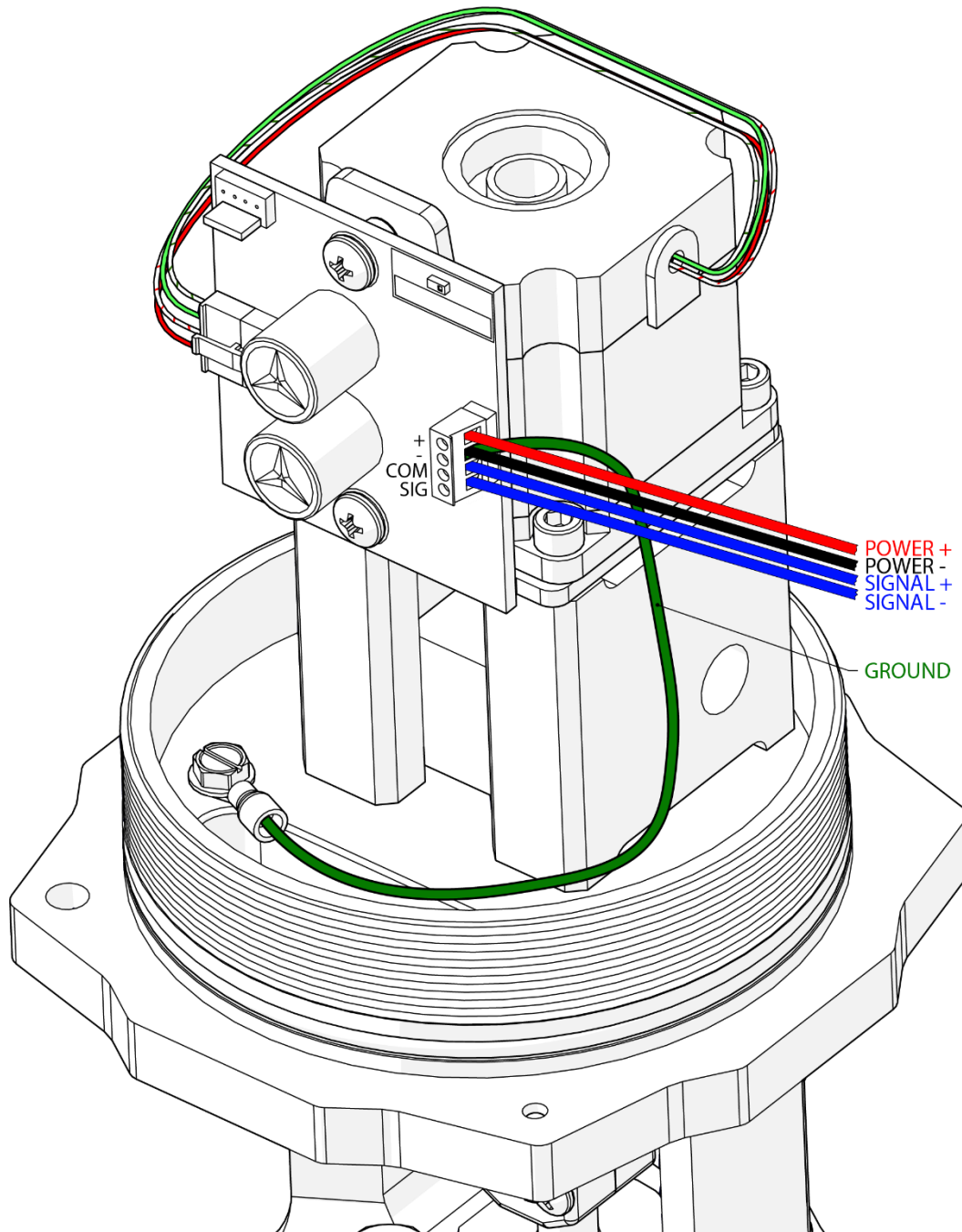
## Actuator Mounting (Figure 1)



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## Wiring Instructions (Figure 2)

- Remove Actuator Cover (23) by unthreading the Cover Locking Bolt (20) with a ¼" hex drive and then unthreading cover from Yoke (1).
- Wire VM80 as per the diagram below.



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**Table 1: Recommended Wire Gauge for All Wiring**

Signal	Description
Power +	12/24VDC POS (+) supply
Power -	12/24VDC NEG (-) supply and wire to external earth/chassis ground
Signal -	Signal ground reference
Signal +	4-20mA or 5v control signal

## Start-Up

Refer to Figures 1 and 2 (pages 5 and 6) while following these instructions:

- Replace the Actuator Cover (23), threading it on until it seats on the Yoke (1). Once the cover is seated, rotate back just enough to align the features, and secure by threading in the Cover Locking Bolt (20).
- Apply power to the power supply.  
**NOTE:** The motor should activate at this time and drive the valve to the zero position.
- Adjust the Stroke Indicator Plate (13) so that the Indicator Arm (15) points to the closed position and tighten the Indicator Plate Screws (14).
- Cycle the actuator open and closed to verify that it has been installed properly.  
**CAUTION:** Do not place fingers inside yoke opening during cycling as personal injury may occur.

## Troubleshooting

### Troubleshooting Quick Guide

If the issue cannot be resolved please contact a PROFIRE representative:

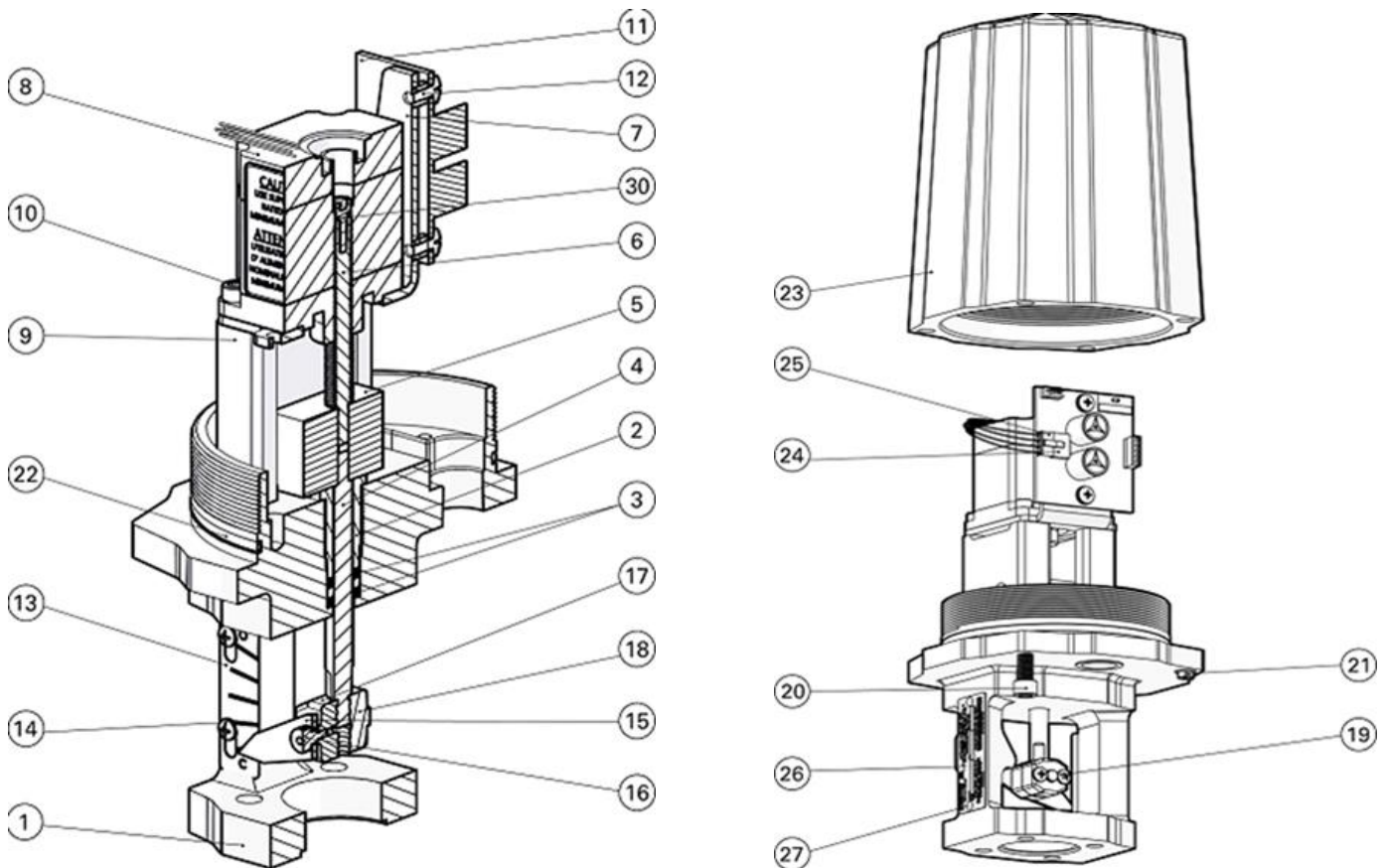
Issue	Possible Cause	Recommended Action
Actuator is not responding.	<i>Wiring incorrect. No signal. Driver has failed.</i>	<i>Check wiring and verify proper connections. Verify signal at source. Replace driver.</i>
Actuator moves erratically and does not position properly.	<i>Motor binding due to high friction. Signal is not conditioned properly. Motor is damaged.</i>	<i>Verify alignment of shafts. Install an isolated signal conditioner. Check motor for signs of physical damage; replace if needed.</i>
Actuator fails to close.	<i>Position in driver is not set properly. There is an obstruction in the valve.</i>	<i>Cycle power off and on, motor will close and reset to zero position in driver. Remove the valve from the line to verify that it seats properly.</i>

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## Maintenance

Failure to perform maintenance properly may void warranty and reduce suitability for use in the intended application. PROFIRE approved parts should be used and maintenance should only be performed by qualified individuals.

### VM80 Detailed Image (Figure 3)



1. Yoke	7. Driver Mounting Plate	13. Stroke Indicator Plate	19. Stem Clamp Screw (2)	25. Male Connector
2. Actuator Stem Guide	8. Motor	14. Indicator Plate Screw (2)	20. Cover Locking Bolt	26. Actuator ID Plate
3. Stem Seal X-Ring (2)	9. Motor Guide Mount (2)	15. Indicator Arm	21. Ground Screw (2)	27. ID Plate Screw (2)
4. Actuator Stem	10. Motor Mounting Screw (4)	16. Indicator Arm Bolt (2)	22. Cover O-Ring	28. Yoke Mounting Bolts (4)*
5. Actuator Guide Coupling	11. Driver	17. Stem Clamp, Threaded	23. Actuator Cover	29. 1/2" NP+ Conduit Port
6. Motor Drive Screw	12. Driver Mounting Screw (2)	18. Stem Clamp, Through	24. Female Connector	30. Motor Drive Screw Bolt
*Not indicated in drawing				



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## Replacing Seals

PROFIRE recommends the replacement of all O-rings and seals at regular intervals (approximately two years or whenever the seal is exposed due to maintenance).

It is recommended that all O-rings and seal rings are lubricated using Dow Corning MOLYKOTE® 111 compound or equivalent lubricant when replacing. Refer to Figure 3 and Figure 4.

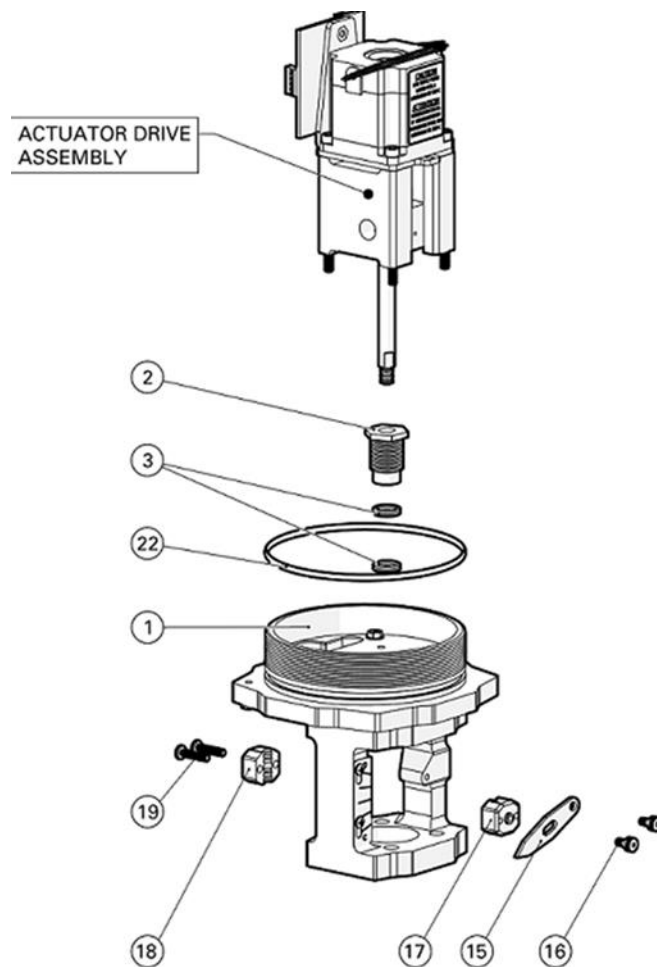
### Stem Seal X-Rings

Refer to Figures 3 and 4 (pages 8 and 10) while following these instructions:

- Make sure power is disconnected from the VM80 Actuator.
- Remove Actuator Cover (23) by unthreading the Cover Locking Bolt (20) with a ¼" hex drive, and then unthreading cover from Yoke (1).
- Disconnect the field wiring.
- Take off the Stem Clamp (17, 18) by removing the two Stem Clamp Screws (19).
- Remove the four Motor Mounting Screws (10) and lift the VM80 Drive Assembly straight out of the Yoke (1).
- Turn the Actuator Stem Guide (2) out using a 7/8" socket wrench.
- Remove the two Stem Seal X-Rings (3).
- Lubricate the two new Stem Seal X-Rings (3) and install by pressing them into the actuator stem bore in the base of the Yoke (1). Use finger or a blunt tool to make sure they are squarely in place.
- Clean threaded surface removing any lubricant from threads.
- Apply a small amount of Loctite 243 or equivalent thread locker to the upper portion (near the hex flats) of the Actuator Stem Guide (2) and thread into the actuator stem bore of the Yoke (1) using a 7/8" wrench until snug.
- Carefully insert the VM80 Drive Assembly into the Yoke (1) making sure the beveled edges of the Motor Guide Mounts (9) are to the front.
- The Actuator Stem (4) should slide through the two new seals with a little pressure. Do not use excessive force.
- Align the four Motor Mounting Screws (10) and secure using a 5/32" hex drive.
- Replace the Stem Clamp (17, 18) and secure with the two Stem Clamp Screws (19) making sure that the Indicator Arm (15) is not bound.
- Replace the plug-in Terminal P1 (Figure 7) in the Driver.

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## VM80 Seals (Figure 4)



### Cover O-Ring

- Inspect the Cover O-Ring (22) for damage (eg. – stretching) any time the Actuator Cover (23) is removed.
- Lubricate, and if necessary replace the Cover O-Ring (22).

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## Driver Replacements

### Warnings:

**Driver (11) should only be replaced with a PROFIRE approved part or warranty may be voided.**

**Driver (11) should only be replaced when the area is known to be non-hazardous, as electrical connections will be exposed.**

**Make sure power is turned off while making any wiring connections. Hot plugging the connections will damage the Driver (11) and void the warranty.**

- Ensure power is disconnected from the VM80.
- Remove the Actuator Cover (23) by unthreading the Cover Locking Bolt (20) with a ¼" hex drive and then unthreading cover from Yoke (1).
- Disconnect male connector (25) from female connector (24) on the Driver (11).
- Remove the two Driver Mounting Screws (12).
- Install the new Driver (11) using the two Driver Mounting Screws (12).
- Reconnect the male connector (25) and the female connector (24).

## Indicator Arm Replacement

The Indicator Arm (15) is designed to break away in the event of a blockage to movement. It will not affect valve performance. Replacement is accomplished by removing the two Indicator Arm Bolts (16) using a 3/32" hex drive and installing the new Indicator Arm using the two Indicator Arm Bolts (16).

## Contact Us

For support, service, or any questions or concerns, please contact us at:

**Toll Free: 855.776.3473**