Bray®

Your Global Flow Control Partner

Series 50
Valve Status Monitor
Operation and Maintenance Manual

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Read and Follow These Instructions

Save These Instructions

1. Definition of Terms

WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Used without the safety alert symbol indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

2. Safety

This device left the factory in proper condition to be safely installed and operated in a hazard-free manner. The notes and warnings in this document must be observed by the user to ensure hazard-free operation of this device.

All necessary precautions need to be taken to prevent damage due to rough handling, impact, or improper storage. Do not use abrasive compounds to clean the device, or scrape its surfaces with any objects.

Configuration and setup procedures for this device are described in this manual. Proper configuration and setup are required for the safe operation of this device.

The control system in which this device is installed must have proper safeguards to prevent injury to personnel, or damage to equipment, should a failure of system components occur.

WARNING

Installation, commissioning, operation, and maintenance of the unit must be performed under strict observation of all applicable codes, standards and safety regulations.

The Valve Status Monitor must only be installed, commissioned, operated, and repaired by qualified personnel.

As per this document, a qualified person is one who is trained in:

1. The operation and maintenance of electrical equipment and systems in accordance with established safety practices.
2. Procedures to energize, de-energize, ground, tag, and lock electrical circuits and equipment in accordance with established safety practices.
3. The proper use and care of personal protective equipment (PPE) in accordance with established safety practices.

This document does not cover every detail about every version of the product described. It does not take into account every potential occurrence concerning the installation, operation, maintenance, and use of this device.

If situations transpire that are not documented in sufficient detail, please request the required information from the Bray Distributor or Representative responsible for your area.

3. Storage

Valve Status Monitors (VSM) are not weather-proof until properly installed on the valve or prepared for storage.

Bray cannot accept responsibility for deterioration caused on-site once the cover is removed.

Units are shipped with two metal screw-in plugs to prevent foreign matter from entering the unit. If the conduit entries are not used, these plugs should not be removed. Do not remove the screw-in plugs until it is time to wire into the unit.

To prevent condensation from forming inside these units, maintain a near constant external temperature and store in a well ventilated, clean, dry area away from vibration.

4. Commissioning

4.1. Mounting your VSM

NOTICE

a. Do not remove the screw-in conduit plugs until it is time to wire into the unit's terminal blocks.

b. Do not re-machine the conduit entry threads or create any new holes in the enclosure.

c. Do not tamper with or modify any exposed O-rings or gaskets.

Please ensure that you have all the necessary tools and equipment available to mount the Bray VSM before beginning installation. Locate the Bray mounting kit, containing mounting screws and gasket, if it was ordered with the VSM.

Follow the steps below to mount the VSM onto the actuator.

1. Attach the proper coupler or adapter to the actuator if necessary. It may be necessary to remove the factory-installed position indicator first.
2. Place a gasket on the actuator that matches the screw pattern.
3. Adjust the VSM cam shaft to align with the actuator shaft or coupling.
4. Mate the VSM with the actuator, and fully tighten the mounting screws to create a water-tight seal.

4.2. Wiring your VSM

⚠ WARNING

Turn off all power and lock out service panel before installing or modifying any electrical wiring.

NOTICE

a. A minimum of 18 AWG wire is recommended for all field wiring.

b. The terminals inside the VSM accept wire sizes ranging from 14 to 24 AWG.

c. The conduit connections must be properly sealed to maintain the weatherproof and explosion-proof integrity of the VSM enclosure.

1. Remove the cover of the VSM using an Allen hex wrench and place it in a safe location.
2. Remove the appropriate conduit plug(s) using an Allen hex wrench and place in a safe location.

Conduit Entries	
S50-04	2 x ½″ NPT or 2 x M20
S50-07	2 x ¾″ NPT or 2 x M25
Location	Side Wall

3. Install appropriate cable and conduit fittings required to meet application needs and VSM hazardous area classification requirements.
4. Terminate the field wiring according to the wiring diagram attached to the inside of the cover. Figure 1 shows a sample wiring diagram.

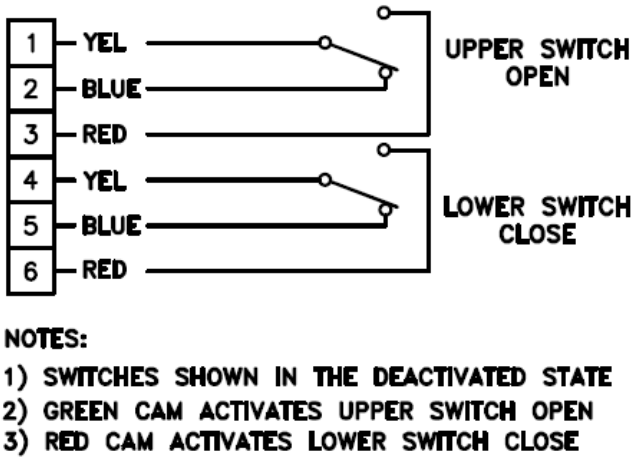

Figure 1. Wiring diagram for a Valve Status Monitor with 2 SPDT mechanical switches.

4.3. Setting Cams

A cam for each switch is mounted directly to the output shaft. Each cam is color coded – red adjustment screw matches red cam (valve closed indication), green screw matches green cam (valve open indication).

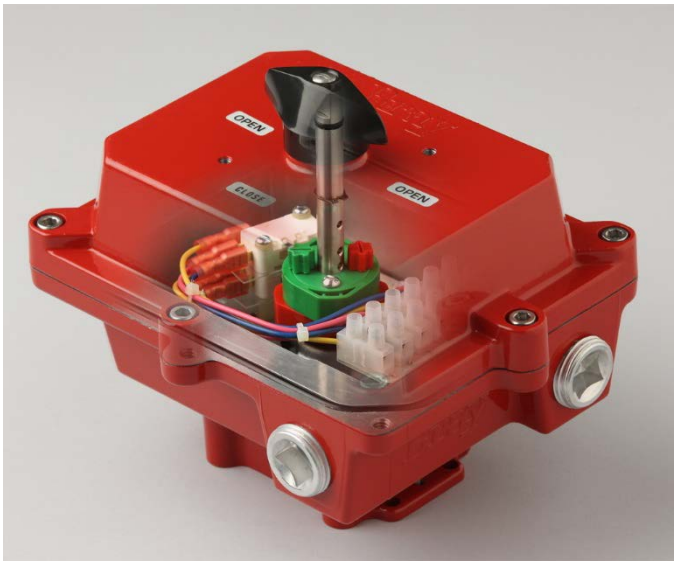

Figure 2. Series 50 cutaway showing the cams and switches.

The cams are infinitely and independently adjustable from the top by finger touch or regular screw driver with no special tools needed.

Follow the steps below to adjust the cams.

1. Manually operate the actuator until the valve reaches the desired ‘close’ position.
2. Loosen the cam locking screw as shown in figure below.

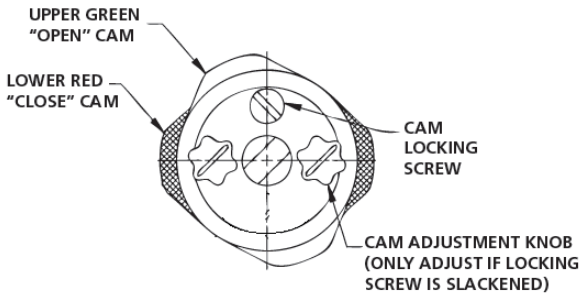

Figure 3. Top view of the cam shaft assembly.

3. Rotate the red cam adjustment knob by hand or with a flat head screwdriver until the red cam lobe activates (depresses) the ‘close’ switch from a clockwise direction.

   NOTE: It is possible that the rotation of one cam will move the other cam. If this occurs, hold the other knob or cam during adjustment.
4. Manually operate the actuator counterclockwise until the valve reaches the desired ‘open’ position.
5. Rotate the green cam adjustment knob until the green cam lobe activates (depresses) the ‘open’ switch from a counterclockwise direction.
6. After both cam adjustments have been completed, tighten the cam locking screw and reinstall the VSM cover. Make sure to fully tighten the cover screws to create a water-tight seal.

Notice

Do not use power tools to tighten the cover screws.

5. Switch Options

5.1. Mechanical Switches

For switching without the need for external power, nothing can beat the classic mechanical switch. Bray VSMs use V3 miniature snap action switches (also known by the trademarked name Micro Switches), an industry standard switch known for providing reliable operation.

Mechanical Switches	SPDT/SPST Standard	SPDT/SPST Gold Plated
Switch Ratings	125/250 VAC, 10A, 1/2 HP 125/250 VDC, 0.25A, Inductive 125/250 VDC, 0.5A, Resistive	125/250VAC, 0.1A
Max. Switches Available :		
50-04	SPDT: 2	SPDT: 2
50-07	SPDT:4,SPST:8	SPDT:4,SPST:8

5.2. 3-Wire DC Inductive Proximity Switches

For solid state switching, Bray VSMs use inductive proximity switches, which rely on the presence of metal targets. This is accomplished by using cams with metal targets inserted inside them.

These switches come in a 3-wire configuration, as they require external power to function. They are limited to DC applications, and are more sensitive to overvoltage and overcurrent than mechanical switches, so their listed ratings should be strictly followed.

Switch Ratings	PNP N.O.	NPN N.C.	PNP N.C.
Operating Voltage	10-30 VDC	10-30 VDC	10-30 VDC
Max. Load Current	100 mA	150 mA	200 mA
Current Consumption	15 mA	15 mA	15 mA
Leakage Current	10µA	10µA	10µA
Max. number of switches	4	4	4

5.3. 2-Wire AC Inductive Proximity Switches

The 3-wire inductive switches already covered are limited to applications using DC voltages. For AC voltages, Bray VSMs can be equipped with 2-wire AC inductive proximity switches, which have all the benefits of the DC proximity switches but are specifically designed to handle alternating current and voltage.

As with the DC proximity switches, these switches' ratings should be strictly adhered to if the full life of the switch is to be accomplished.

2-Wire Inductive Switches	120 VAC/VDC	220 VAC/VDC
Switch Ratings	20-140VAC 10-140VDC 5-200 mA	20-250VAC 10-300VDC 5-100 mA
Max. number of switches	4	4

5.4. Intrinsically Safe Proximity Switches

Bray VSMs are made to enter the most hazardous environments and continue functioning without endangering the personnel that rely on them. For environments where explosive gases and dusts are continually present, intrinsically safe switches are the only option available. These switches, when connected to an intrinsically safe rated barrier or isolator, limit the energy available for ignition.

2- Wire Namur/ Intrinsically Safe Switches	
Switch Ratings	5-25VDC, 15 mA max
Max. number of Switches	4

5.5. Reed Switches

These switches are similar to mechanical switches in that they break current flow by physically separating their contacts. However, like a proximity switch, they rely on a magnetic field to accomplish switching. Their contacts are on ferrous metal reeds, thin enough to react to nearby magnetic fields, enveloped in hermetically sealed glass. Reed switches found in Bray's VSMs are also potted and enclosed in a plastic housing for added protection of the glass envelope.

Switch Ratings	Reed Switches
Max. Load Current	.8A at 120VAC 3A at 28VDC
Max. Power Dissipation	100W
Max. number of Switches	2

5.6. GO™ Switches

GO™ Switches detect like a proximity switch and function like a limit switch. Sealed contacts, rugged housings, proximity detection, and snap action response make them viable replacements for traditional snap action switches.

Switch Ratings	GO™ Switches
Max. Load Current	4A at 120VAC 3A at 24VDC
Max. number of Switches	2

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