

Stonel™ Prism™

Valve controller series
PI33W General Purpose

Installation, maintenance and
operating instructions



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Read these instructions first!

These instructions provide information about safe handling and operation of the valve controller. If you require additional assistance, please contact the manufacturer or manufacturer's representative. Addresses and phone numbers are printed on the back cover.

Save these instructions.

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1 General

1.1 Introduction

This manual incorporates the Installation, Maintenance and Operation (IMO) instructions for the Stonel™ Prism™ series valve controllers. The product is designed to provide position feedback indication and pneumatic control of on/off automated valves.

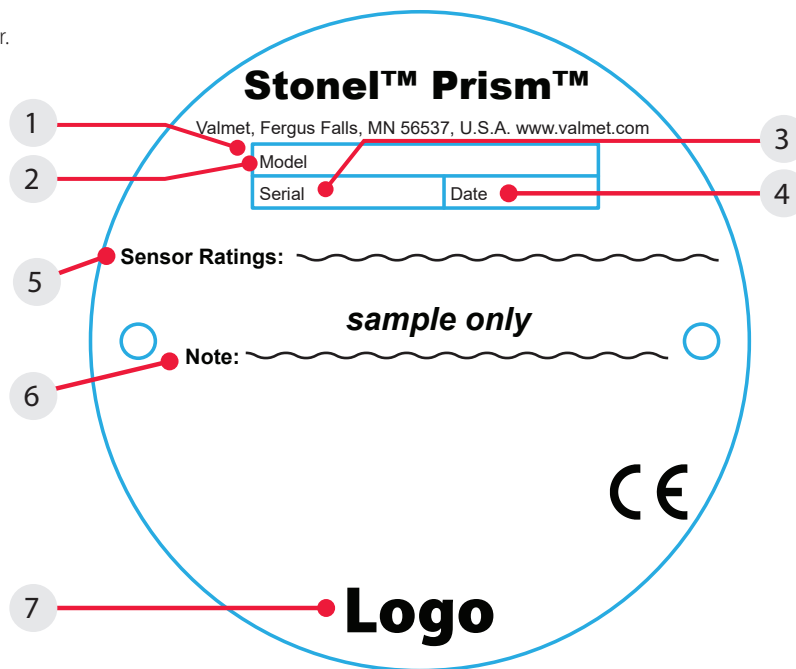
Note

The selection and use of this product in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the likely situations that may occur when installing, using, or servicing the product. If you are uncertain about the use of this device, or its suitability for your intended use, please contact the factory for assistance.

1.2 Title plate markings

The product has an identification plate attached to the cover.

1. Identification plate markings:
2. Model
3. Serial number
4. Date
5. Electrical rating(s)
6. Note
7. Logo



1.3 CE markings

This product meets the requirements of European Directives and has been marked according to the directive.

1.4 Recycling and disposal

Most of the product parts can be recycled if sorted according to material. In addition, separate recycling and disposal instructions are available from us. This product can also be returned to us for recycling and disposal for a fee.

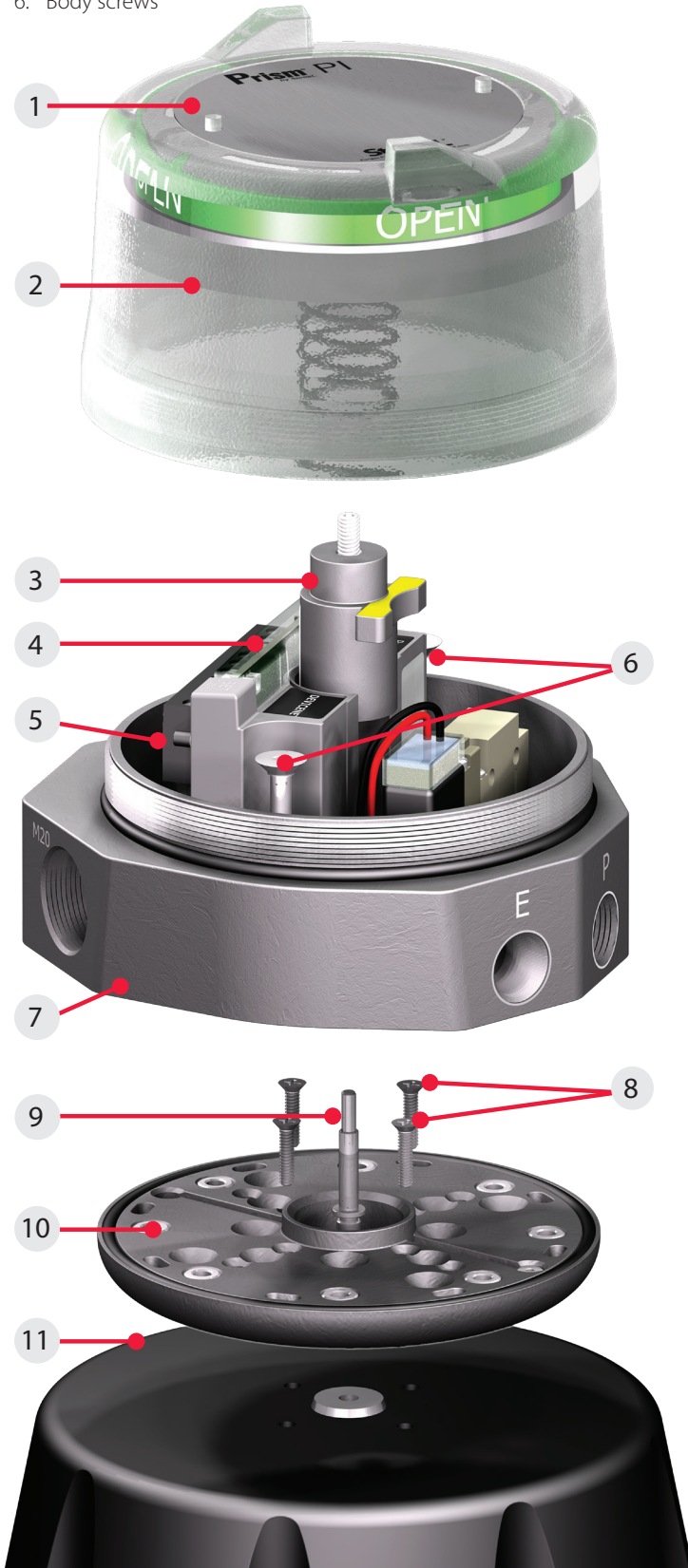
1.5 Safety precautions

Do not exceed the permitted values! Exceeding the permitted values marked on the limit switch may cause damage to the switch and to equipment attached to the switch and could lead to uncontrolled pressure release in the worst case. Damage to the equipment and personal injury may result.

To prevent ignition of hazardous atmospheres, replace cover before energizing the electrical circuits. Keep cover tightly closed when in operation.

1.6 Assembly drawing

- 1. Title plate
- 2. Cover
- 3. Trigger
- 4. Sensing module
- 5. Internal ground lug
- 6. Body screws
- 7. Body
- 8. Mounting screws
- 9. Trigger assembly shaft
- 10. Mounting plate
- 11. Actuator



1.7 Specifications for all models

See page 10 for function specific details.

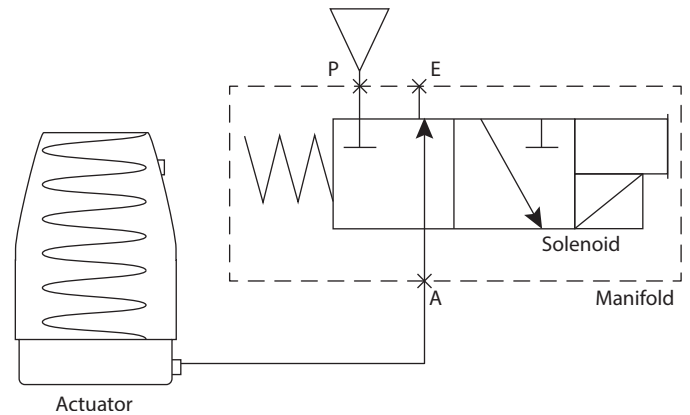
| Specifications | | |
|---------------------------------------|--|--|
| Materials of construction | | |
| Cover | Clear polycarbonate | |
| Housing & mounting system | Fiber reinforced polycarbonate and stainless steel | |
| Fasteners | Stainless steel | |
| Mounting system | Fiber reinforced polycarbonate and stainless steel | |
| Seals | Buna N | |
| Valve manifold | Polycarbonate with stainless steel reinforced 1/8" NPT porting | |
| Trigger (magnetic) | Polysulfone with black chromated zinc reinforcement | |
| Operating life | Over 1 million cycles | |
| Operating temperature range | | |
| Unit without solenoid | -20° C to 60° C (-4° F to 140° F) | |
| Unit with solenoid | See 1.8 Pneumatic valve specifications | |
| Enclosure protection | | |
| | Type 4, 4X, 6 and IP66 / IP67 | |
| Warranty | | |
| Sensing & communication module | Five years | |
| Mechanical components | Two years | |
| Unit weights | | |
| Standard stroke | 0.77 kg / 1.7 lb | |
| Long stroke | 0.95 kg / 2.1 lb | |
| Unit dimensions | | |
| Standard stroke no visual indicator | Unit height | 84.1 mm [3.31 in] |
| | Cover removal clearance | 25 mm [1 in] |
| Standard stroke with visual indicator | Unit height | 107.9 mm [4.01 in] |
| | Cover removal clearance | 25 mm [1 in] |
| Long stroke | Unit height | 163.3 mm [6.43 in] |
| | Cover removal clearance | 70 mm [2.75 in] |
| Position sensing | | |
| Accuracy | 1.0 mm [0.04 in] | |
| Repeatability | 0.5 mm [0.02 in] | |
| Setting buffer (factory settings) | Open | - 25% of stroke length |
| | Closed | - 25% of stroke length up to 3.2 mm [0.125 in] |
| Deadband (factory settings) | Open | - 30% of stroke length (variable; based on actual stroke) |
| | Closed | - 30% of stroke length or 3.8 mm [0.15 in] (whichever is less) |
| | | |
| Terminal block specification | | |
| Recommended torque | 4.42 in.lbs (0.5 Nm) | |
| Conductor strip length | 0.22 -0.25 in (5.5-6.5 mm) | |
| Maximum wire size | 30-12 AWG (0.5-2.5 mm ²) | |
| Wire type | Stranded or solid | |
| Environmental conditions | | |
| Location | Indoor and outdoor | |
| Maximum altitude | 5000 m | |
| Maximum humidity | 90% | |
| Pollution degree | 4 | |

1.8 Pneumatic valve specifications

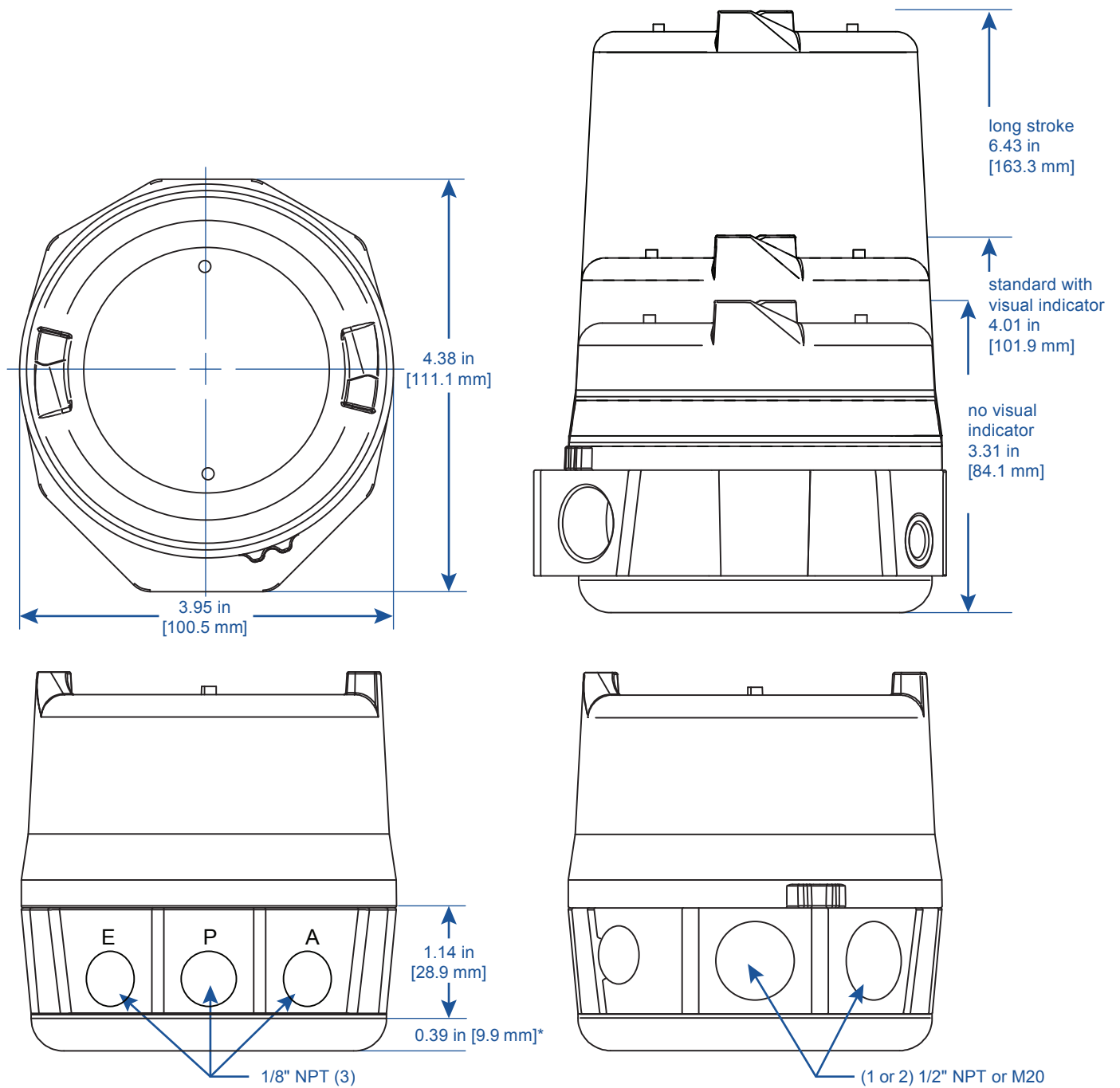
| Specifications | |
|---|--|
| General pneumatic specifications | |
| Configuration | 3-way, 2-position, spring return |
| Type | Direct acting |
| Porting | 1/8" NPT (stainless steel reinforced) |
| Medium | Air or inert gas |
| Medium temperature range (TS) | -40° C to 80° C (-40° F to 176 ° F) |
| Operating pressure | 25 psi to 120 psi (1.72 to 9.65 bar) |
| Operating life | 1 million cycles |
| Manual override | Internal momentary |
| Solenoid coil specifications | |
| 1K (33_) | |
| Operating voltage | 24 VDC |
| Power consumption | 1.0 watt |
| Flow rating | 0.2 Cv (Kv = 0.17 based on flow m3/hr) |
| Operating temperature | -10° C to 50° C (14° F to 122° F) |
| Filtration requirements | 40 microns |
| 1M (33_) | |
| Operating voltage | 120 VAC 50/60 Hz |
| Power consumption | 1.0 watt |
| Flow rating | 0.2 Cv (Kv = 0.17 based on flow m3/hr) |
| Operating temperature | -10° C to 50° C (14° F to 122° F) |
| Filtration requirements | 40 microns |
| 1N (33_) | |
| Operating voltage | 20 - 125 VAC 50/60 Hz; 20 - 55 VDC |
| Power consumption | 12 mA @ 20 - 125 VAC (1.0 watt typical) 20 mA @ 20 - 55 VDC (0.5 watts typical) |
| Flow rating | 0.1 Cv (Kv = 0.08 based on flow m3/hr) |
| Inrush current | 3.75 A @ 125 VAC (typical) 0.15 A @ 24 VDC (typical) |
| Operating temperature | -20° C to 60° C (-4° F to 140 ° F) |
| Filtration requirements | 50 microns |

1.9 Pneumatic valve schematics

3-way, 2-position, direct acting



1.10 Dimensions



*Part of mounting system

Note

The certified dimensional drawing for this product can be found on manufacturer's website.

2 Assembly and mounting

2.1 Instructions

Special notes:

- Mounting of the product requires a Stonel mounting kit specific to the actuator the product is to be mounted to.
- In high cycle or high vibration applications, blue Loctite® may be used on the Trigger shaft threads (Item G) and the mounting plate fasteners (Item H).
- It is highly recommended that exhaust port E be fitted with a low restriction muffler or breather vent cap to prevent ingestion of water or debris into the pneumatic valve.

Steps

Refer to assembly figure on page 8 when performing mounting and assembly procedures. The unit and mounting kit are supplied separately. From the unit shipping container, ensure items A and F are present. From the mounting kit, ensure items G, H, I, and J are present.

1. From the mounting kit package, locate the trigger shaft (Item G), mounting plate (Item J), and mounting plate fasteners (Item H). Ensure unit O-ring (Item I) and mounting plate O-ring (Item K) are present in the mounting plate.
2. Thread the trigger shaft into the actuator (Item L) (it is recommended that a drop of blue Loctite® be used on the trigger shaft threads). Tighten to approximately 15 - 20 in.lbs (1.7 - 2.3 Nm) with a small adjustable wrench.
3. Place the mounting plate onto the actuator and fasten down with provided screws (2-4). (use of blue Loctite® on these screws is optional). Tighten to approximately 15 - 20 in.lbs (1.7 - 2.3 Nm).
4. Take off cover (Item B) and remove the trigger assembly (Item F) from within the unit.
5. Place the unit (Item A) onto the mounting plate in the orientation desired (body can be rotated on the mounting plate in 45° increments). Tighten the two body screws (Item D) with a M3 allen wrench to approximately 25 - 30 in.lbs (2.8 - 3.4Nm).
6. Back out the trigger assembly adjustment screw (Item E) approximately $\frac{1}{8}$ " with a M2 allen and place the trigger assembly into the corresponding slot of the sensing module (Item C), with a finger, press down firmly onto the trigger assembly shaft (See Detail - Fig. 1).
7. Turn the trigger assembly adjustment screw until the yellow marks on the trigger assembly are flush with the yellow marks on the sensing module (See Detail - Fig. 2) To remove trigger assembly from shaft, turn in adjustment screw until released.
8. After all wiring and sensor setting procedures have been completed, re-install cover and place unit in service.

Fig. 1 Trigger assembly detail

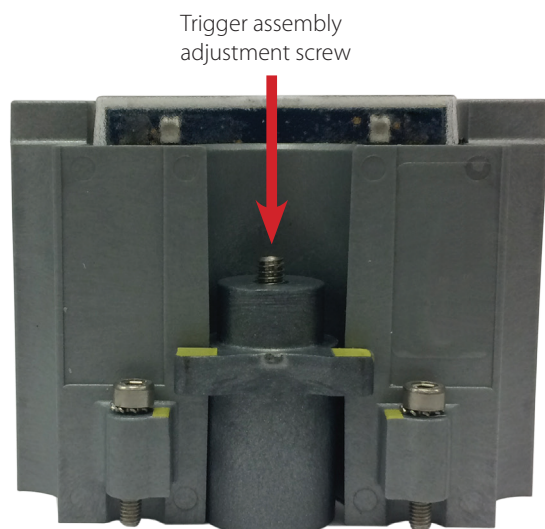
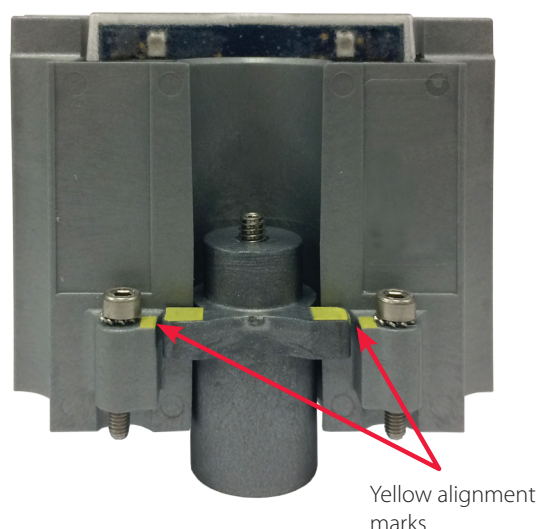
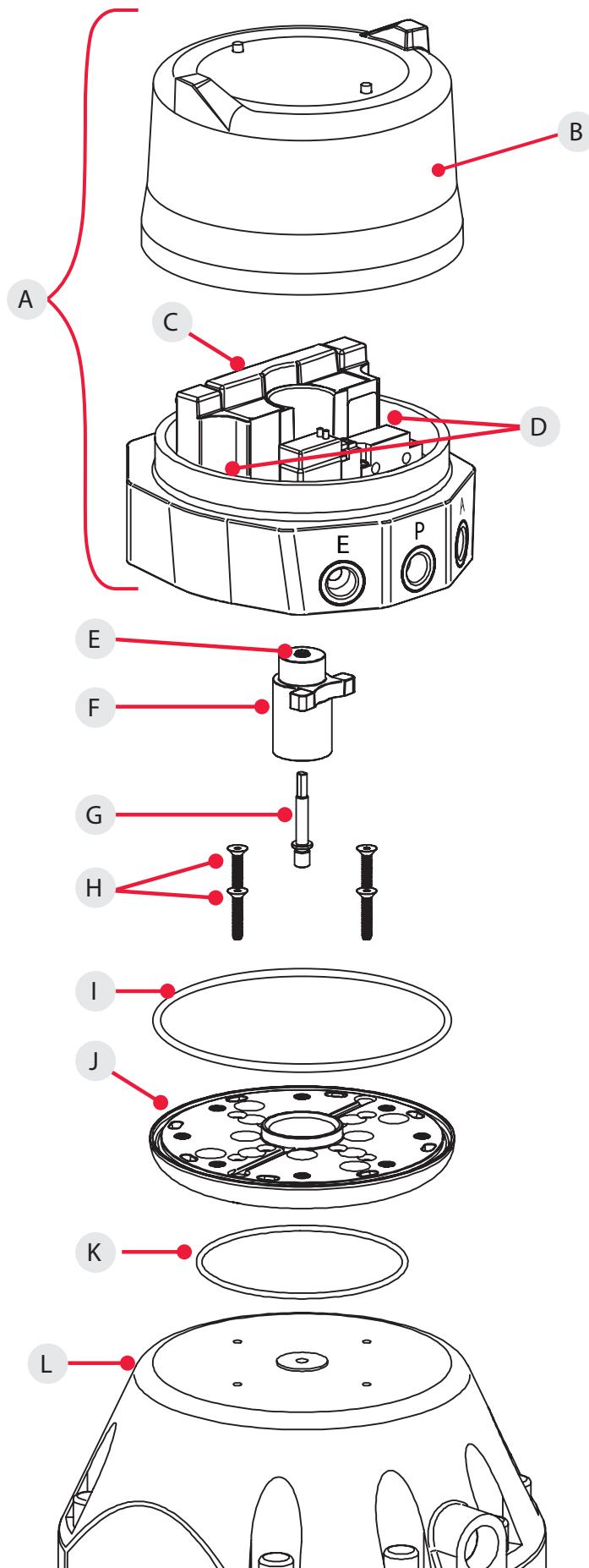


Fig. 2 Sensing module detail



2.2 Prism PI assembly figure

- A. Prism unit
- B. Cover
- C. Sensing module
- D. Body screws (2)
- E. Trigger assembly adjustment screw
- F. Trigger assembly
- G. Trigger shaft
- H. Mounting plate fasteners
- I. Unit O-ring
- J. Mounting plate
- K. Mounting plate O-ring
- L. Actuator



3 Maintenance, repair and installation

3.1 Maintenance and repair

No routine maintenance of this equipment is required when installed in environments for which they are designed. If installed in severe environments, pneumatic components may require replacement at more frequent intervals for maximum performance. Repair of the unit must be done by the factory or by qualified personnel that are knowledgeable about the installation of electromechanical equipment in hazardous areas. All parts needed for repair must be purchased through a factory authorized distributor to maintain warranty and to ensure the safety and compliance of the equipment.

3.2 Installation

WARNING

Solenoid power supplied must be limited with a fuse or circuit breaker rated to 2 Amps maximum.



Caution: To maintain safety, only power supplies that provide Double/Reinforced insulation, such as those with PELV/SELV outputs, shall be used. (As applicable)



Attention: If the unit is used in a manner not specified by the manufacturer, the protection provided by it may be impaired.



Attention: If required, the housing can be grounded to earth potential by the internal lug. (See Assembly drawing 1.6 item 5 on page 4)

Field wiring

- It is the responsibility of the installer, or end user, to install this product in accordance with the National Electrical Code (NFPA 70) or any other national or regional code defining proper practices.
- This product comes shipped with conduit covers in an effort to protect the internal components from debris during shipment and handling. It is the responsibility of the receiving and/or installing personnel to provide appropriate permanent sealing devices to prevent the intrusion of debris or moisture when stored or installed outdoors.

4 Function specific details

4.1 Sensor/switching modules

4.1.1 SST NO sensor (33W)

| Specifications | |
|----------------------------|--|
| Configuration | (2) N.O. 2-wire solid state sensors |
| Voltage range | 20 - 125 VAC 50/60 Hz; 20 - 125 VDC |
| Minimum on current | 2.0 mA |
| Maximum continuous current | 0.1 amps |
| Maximum leakage current | 0.50 mA (PI33S); 0.60 mA (PI33W) |
| Maximum voltage drop | 6.5 volts @ 10 mA 7.0 volts @ 100 mA |
| Circuit protection | Protected against short circuits and direct application of voltage with no load. |



Caution: A series load resistor must be used when bench testing in order to ensure proper module operation.

Bench test procedure and sensor setting instructions

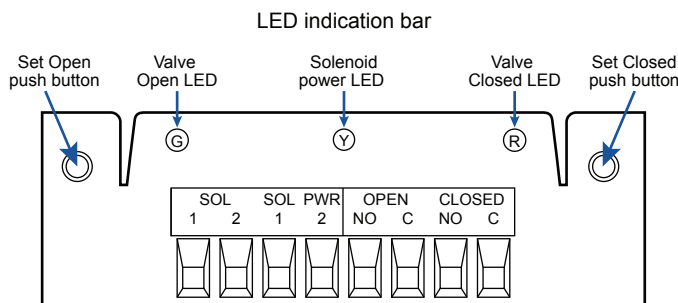
Power must be applied to both sensors to ensure proper circuit operation. Use a 24 VDC power supply with series load resistor, (2K - 6K Ω), connected to the 24 VDC+.

1. Connect 24 VDC+ to the CLOSED C (common) and OPEN C (common) terminals. Connect 24 VDC- to the CLOSED NO and OPEN NO terminals.
 2. Operate actuator to the closed position.
 3. Press and hold SET CLOSED button until the red LED is lit (2 seconds). Release button.
 4. Operate actuator to the open position.
 5. Press and hold SET OPEN button until the green LED is lit (2 seconds). Release button.
 6. Setpoints are retained even after power is removed.
- To electrically test solenoid, apply power to the SOL PWR 1 and SOL PWR 2 terminals only.

Note

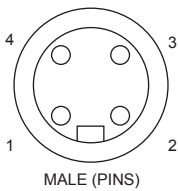
If using only one of the sensors for valve position feedback, the closed sensor (red) must be used.

Wiring diagrams



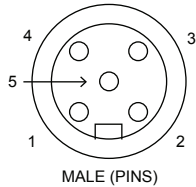
Common receptacle options pin-out

4-PIN MICRO CONNECTOR (M12)



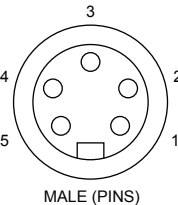
| Pin | Signal |
|-----|-----------|
| 1 | OPEN NO |
| 2 | CLOSED NO |
| 3 | CLOSED C |
| 4 | OPEN C |

5-PIN MICRO CONNECTOR (M12)



| Pin | No solenoid |
|-----|-------------|
| 1 | CLOSED C |
| 2 | CLOSED NO |
| 3 | not used |
| 4 | OPEN NO |
| 5 | OPEN C |

5-PIN MINI CONNECTOR

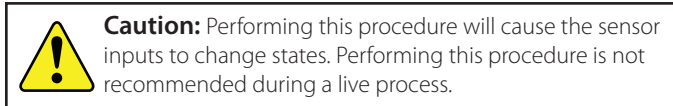


| Pin | With solenoid |
|-----|---------------|
| 1 | OPEN/CLOSED C |
| 2 | CLOSED NO |
| 3 | OPEN NO |
| 4 | SOL PWR 2 |
| 5 | SOL PWR 1 |

Specifications for Stonel Wireless Link

| | |
|-----------------------|---|
| Communication | Bluetooth® technology; single mode (not compatible with Bluetooth® Classic) |
| Frequency band | 2.402-2.480 Ghz |
| Transmit power | 4dBm or ~2.5 milliwatts |
| Data rate | 1 Mbit/second; effective information transmit rate ~10 Kbits/second |
| Range | Up to 100 meters (330 feet) in free space. Range is reduced by obstructions between handheld device and wireless capable device. Line of site is not necessary. |
| Registrations | FCC, IC, CE |
| CE compliance | Exceeds industrial compliance standards |
| Device identification | Devices in range will be displayed in order of signal strength |
| Device link | One device accessed at a time between client (handheld device) and server (wireless capable device). Each server accessed by one client at a time |
| Application | Stonel Wireless Link available from the App store |
| Hand-helds | Compatible with iPhone® and iPad® |

4.1.1 SST NO sensor (33W) continued



Expanded dead band setting feature

The unit sensing module has the capability of changing the dead band of the open sensor from the factory setting of 30% of stroke to an expanded setting of 45%. It may be necessary to perform this procedure for applications in which the valve stroke varies between normal batch processing and SIP/CIP evolutions.

1. Ensure the open and closed sensors have been set before running this procedure. Valve can be in either the open or closed position.
2. With power applied to the Sensing Module press and hold both SET OPEN and SET CLOSED buttons until the red and green LEDs flash (five seconds). Release buttons.
3. Press and hold SET OPEN button until the green LED is lit (one second). Release button. Open sensor now has a 45% dead band.
4. To revert back to the factory default of 30% dead band, press and hold both SET OPEN and SET CLOSED buttons until the red and green LEDs flash (five seconds). Release buttons.
5. Press and hold SET CLOSED button until red LED is lit (one second). Release button.
6. Settings are retained even after power is removed.

5 Stonel Wireless Link app

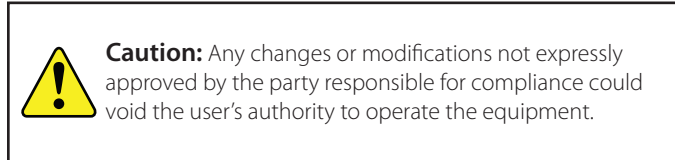
5.1 Federal Communication Commission (FCC) statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



PI 33W: Contains FCC ID: SQGBL651

FCC Radiation Exposure Statement

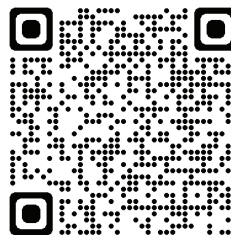
The product complies with the US portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

5.2 User guide

The User guide is available

1. By selecting the Menu option in the app
2. At <https://www.valmet.com/flowcontrol/stonel-wireless-link-user-guide>, and
3. By scanning this QR code.



6 Model/Type code

| Model selector | | | | | | | | |
|---|---|-------------------------------|---|----|---|---|--|----------|
| SERIES | | | | | | | | |
| PI | General purpose | | | | | | | |
| FUNCTIONS | | | | | | | | |
| Sensors modules | | | | | | | | |
| 33W | (2) SST NO switching sensors with Wireless Link | | | | | | | |
| PNEUMATIC VALVE / TEMPERATURE | | | | | | | | |
| -20° C to 60° C / 0.1 Cv | | | | | | | | |
| 11S | No pneumatic valve | | | | | | | |
| -10° C to 50° C / 0.2 Cv | | | | | | | | |
| 1NS | Three-way voltage / power depends on function | | | | | | | |
| 1KS | Three-way 24 VDC | | | | | | | |
| 1MS | Three-way 120 VAC | | | | | | | |
| ENCLOSURE | | | | | | | | |
| A | North American | | | | | | | |
| V | International | | | | | | | |
| CONDUIT/CONNECTORS | | | | | | | | |
| Standard | Mini-connectors | Micro-connectors (M12) | | | | | | |
| 01 (1) ½" NPT | 10 (1) 4-pin | 13 (1) 4-pin | | | | | | |
| 02 (2) ½" NPT | 11 (1) 5-pin | 15 (1) 5-pin | | | | | | |
| 04 (1) M20 | 19 (1) 6-pin | 17 (1) 6-pin | | | | | | |
| 05 (2) M20 | | | | | | | | |
| 08 (1) cable glands | | | | | | | | |
| 09 (2) cable glands | | | | | | | | |
| VISUAL INDICATOR | | | | | | | | |
| R | Green open | 0 No indication | | | | | | |
| VALVE SIZE | | | | | | | | |
| S | Standard stroke - ¼" to 2" (3.2 mm to 28.5 mm; ¼" to 1 ⅞" stroke) | | | | | | | |
| L | Long stroke - ¼" to 6" (3.2 mm to 66.8 mm; ¼" to 2 ⅞" stroke) | | | | | | | |
| BRANDING | | | | | | | | |
| A | Valmet/Stonel | | | | | | | |
| M | Valmet/Neles | | | | | | | |
| Model number example | | | | | | | | |
| PI | 33W | 1NS | A | 01 | R | S | A | OPTIONAL |
| MODEL NUMBER | | | | | | | PARTNERSHIP ID | |
| Mounting hardware required and sold separately. | | | | | | | Some models may include 5-digit identification suffix. | |

Valmet Flow Control Oy

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