

# Stonel™ Prism™

Valve controller series

PI30S, PI30W, 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.

Subject to change without notice.

All trademarks are property of their respective owners.

# 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.

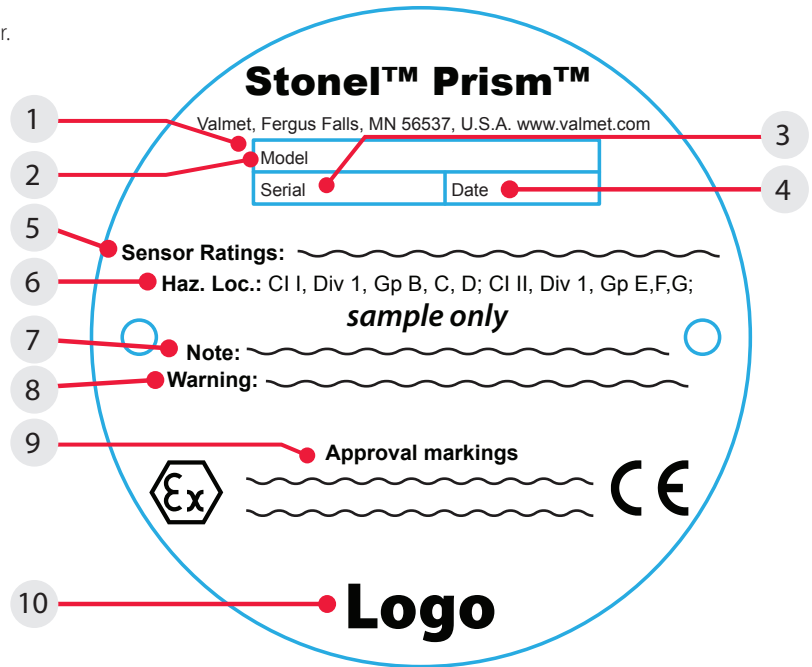
## 1.2 Title plate markings

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. Protection class information\*
7. Note
8. Warning
9. Approval markings\*
10. Logo

### Note

\* See page 27 for specific product markings.



## 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

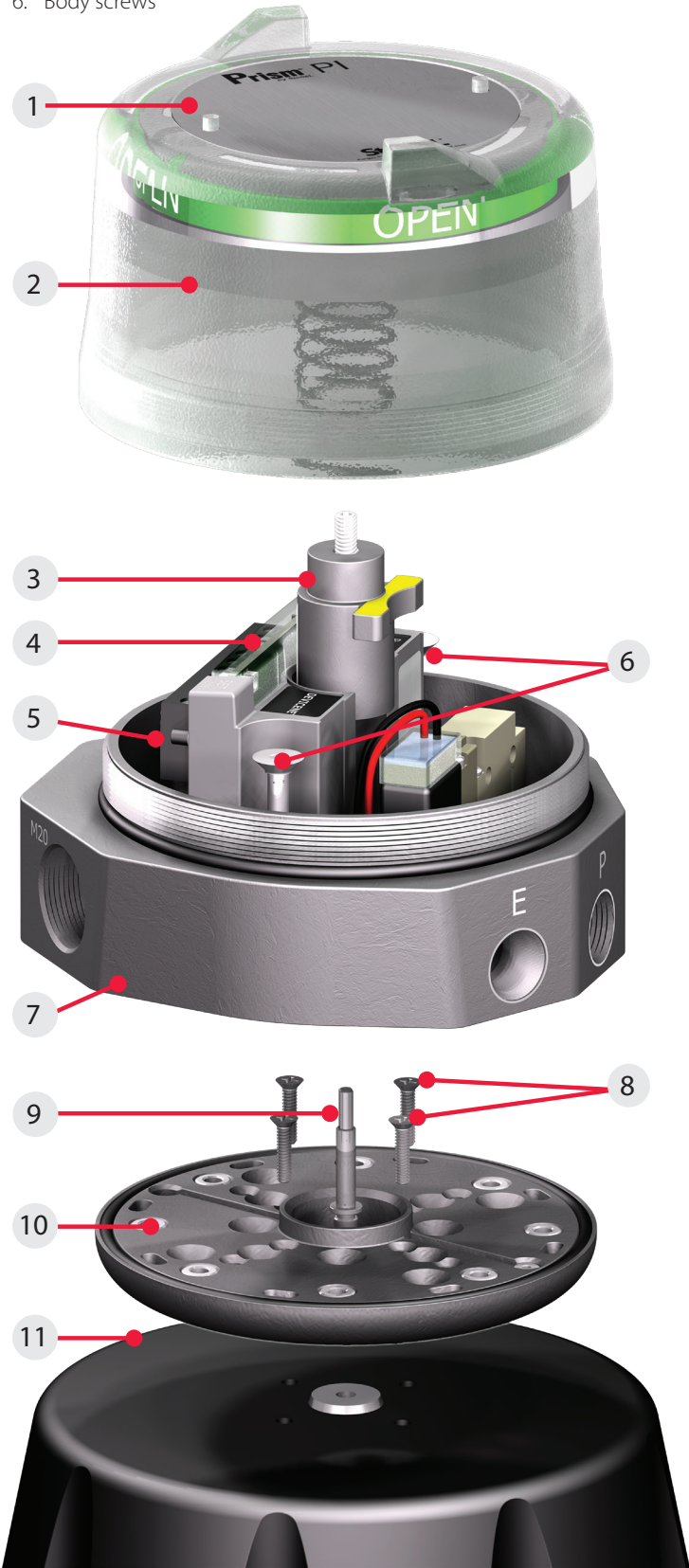
6. Body screws
7. Body

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.

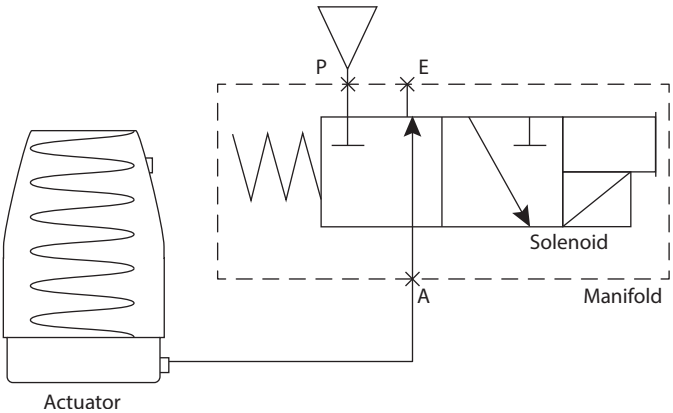
Specifications		
Materials of construction		
Cover	Clear polycarbonate	
Housing & mounting system	Fiber reinforced polycarbonate and stainless steel	
Fasteners	Stainless steel	
Mounting system	Fiber reinforced polycarbonate and stainless steel	
Seals	Buna N	
Valve manifold	Polycarbonate with stainless 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 mm2)	
Wire type	Stranded or solid	
Environmental conditions		
Location	Indoor and outdoor	
Maximum altitude	5000 m	
Maximum humidity	90%	
Pollution degree	4	
Ratings and approvals*	See page 27 or manufacturer's official website	
* Only models listed are approved per specific rating.		

1.8 Pneumatic valve specifications

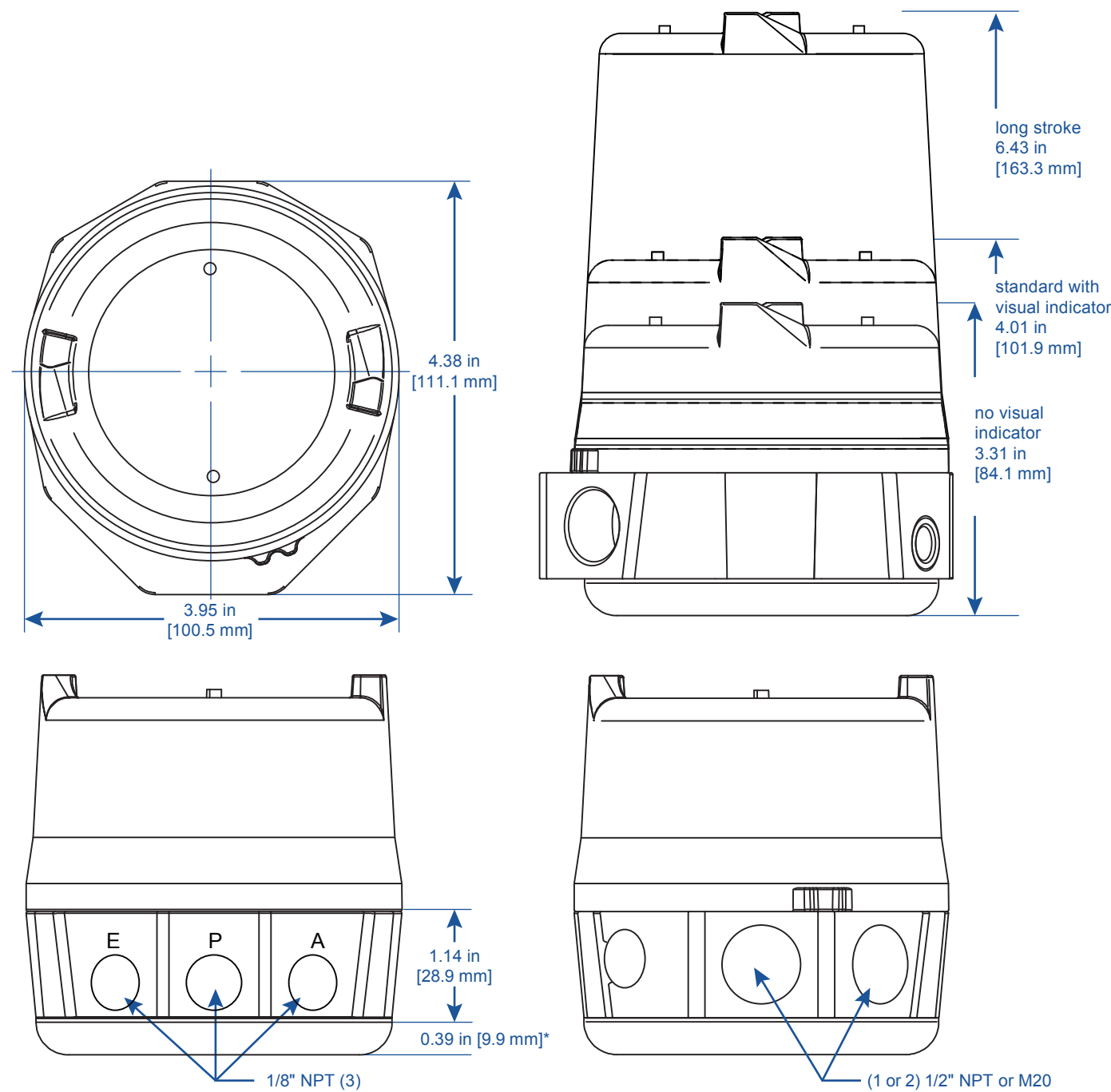
Specifications	
General pneumatic specifications	
Configuration	3-way, 2-position, spring return
Type	Direct acting
Porting	1/8" NPT (stainless steel reinforced)
Medium	Air or inert gas
Medium temperature range (TS)	-40° C to 80° C (-40° F to 176 ° F)
Operating pressure	25 psi to 120 psi (1.72 to 9.65 bar)
Operating life	1 million cycles
Manual override	Internal momentary
Solenoid coil specifications	
<b>1K (30_, 33_, 92_, 96_, 97_)</b>	
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
<b>2K (80_, 81_)</b>	
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
<b>1M (33_)</b>	
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
<b>1N (33_)</b>	
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
<b>1N (30_, 92_, 96_, 97_)</b>	
Operating voltage	24 VDC
Power consumption	0.5 watts
Flow rating	0.1 Cv (Kv = 0.08 based on flow m3/hr)
Operating temperature	-20° C to 60° C (-4° F to 140 ° F)
Filtration requirements	50 microns
<b>1N (45_)</b>	
Operating voltage	18 - 28 VDC
Power consumption	0.3 watts
Flow rating	0.1 Cv (Kv = 0.08 based on flow m3/hr)
Operating temperature	-20° C to 60° C (-4° F to 140 ° F)
Filtration requirements	50 microns
Entity parameters	Ui=28 VDC, Ii=120 mA, Ci=3 nF, Li=0 mH, Pi=0.84 W

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

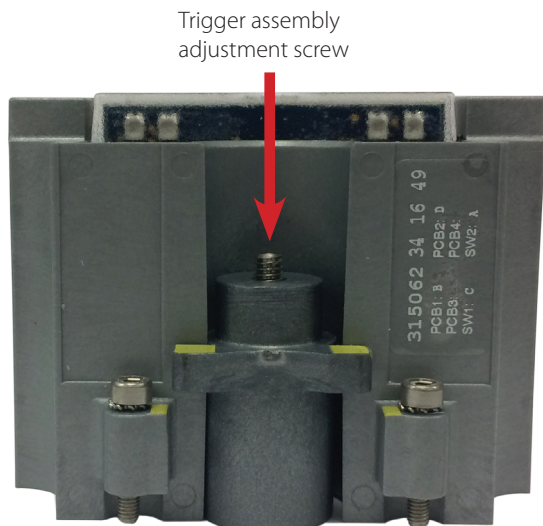
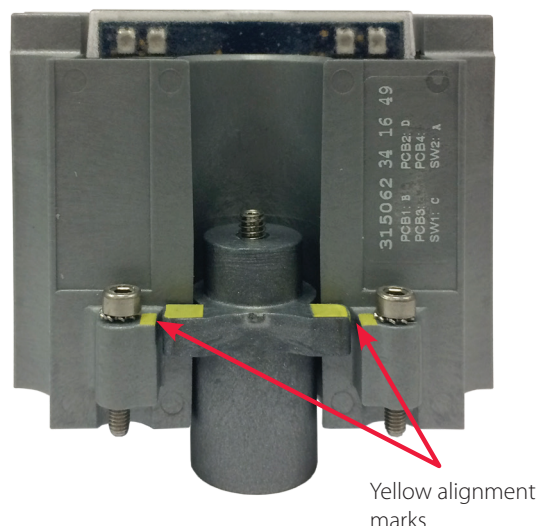
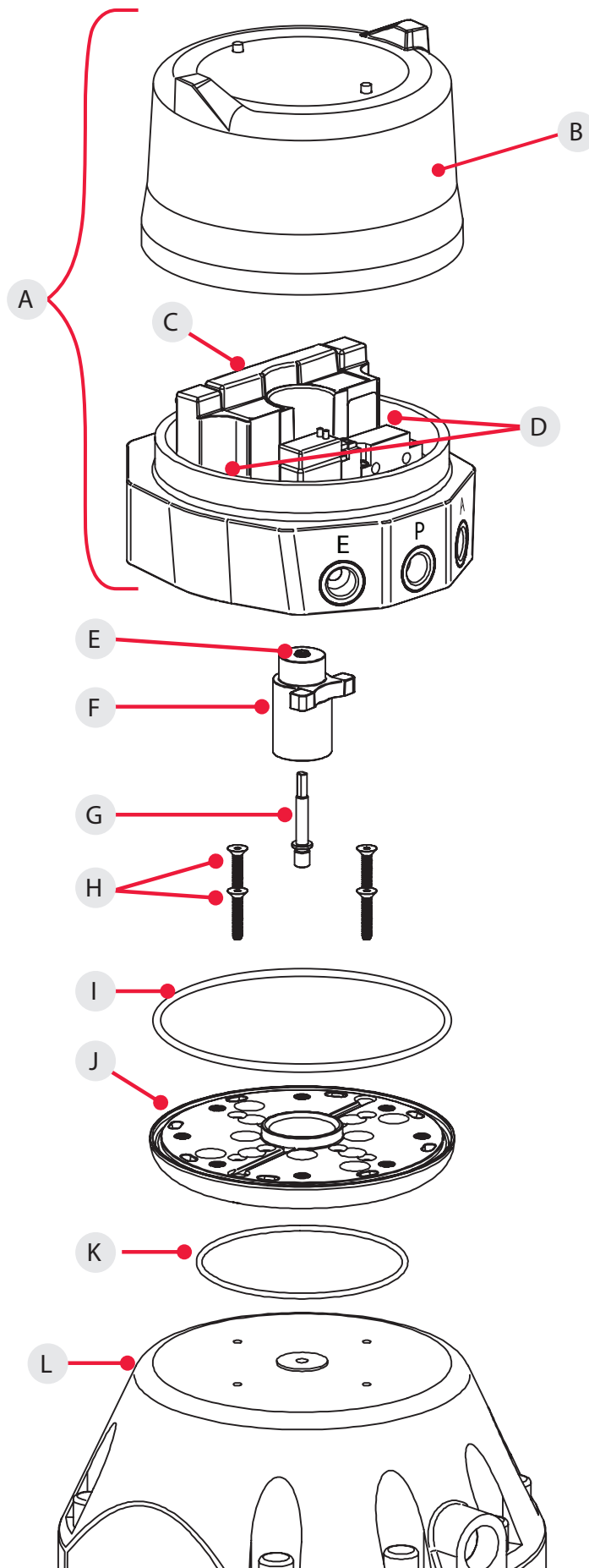


Fig. 2 Sensing module detail



## 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.

#### WARNING

Depending on operational and installation factors (air pressure, actuator size, muffler, etc.) the pneumatic exhaust may release a sound pressure level in excess of 100 dBA. It is recommended that a noise-reducing muffler is fitted to the exhaust and/or protective earpieces are used when in proximity to the device. It is recommended that the sound pressure level is measured after installation to verify the effectiveness of any noise-reducing muffler.

#### WARNING

Movement of the trigger assembly by the valve/actuator may cause a pinch hazard. Ensure hands and fingers are clear from the trigger assembly

### 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)



**Attention:** In order to maintain enclosure type and IP ratings, cover shall be tightened by hand until it stops on the surface of the base not to exceed 10 ft. lbs (13.5 Nm). Do not use any tool to tighten the cover.

#### 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.



**Attention:** Use field wiring rated at least 10 K (+10°C) above ambient temperature.

### 3.3 Special conditions of use

For units with quick connect receptacles, when installed in Division 2 areas, an appropriate FM approved mating cord must be used in conjunction with tamper proof guard at the mating point that requires a tool to remove, rendering the connection not normally arcing.

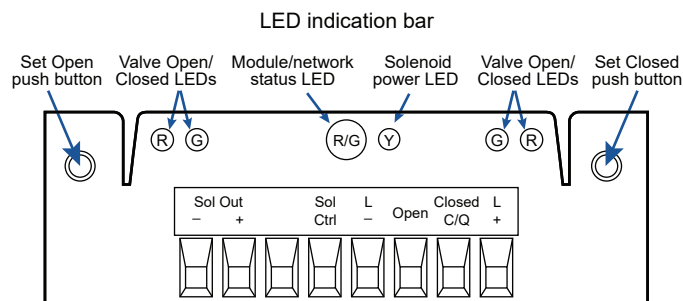
## 4 Function specific details

### 4.1 Sensor/switching modules

#### 4.1.1 IO-Link, 3 wire PNP / NPN switching sensors (30S & 30W)

Specifications	
Configuration	(2) 24 VDC N.O. solid state sensors. Self-learning outputs for NPN/PNP/Sinking/ Sourcing PLC input cards.
	(1) 24 VDC output for internal/external solenoid. Self-learning control input for NPN/PNP/Sinking/ Sourcing PLC output cards.
Voltage range	18 - 30 VDC
Minimum on current	2.0 mA
Maximum continuous current	0.1 amps
Maximum leakage current	0.0
Maximum voltage drop	0.1 volts @ 10 mA 0.5 volts @ 100 mA
Operating power (1 LED "ON" Solenoid "OFF")	0.7 watts
Operating power (coil energized)	1N solenoid: 1.5 watts (Notice: for 80 ms after energizing solenoid, operating power increases to 4.8 watts max.) 1K solenoid: 1.7 watts External 2 watt solenoid: 2.9 watts
Circuit protection	Protected against short circuits and direct application of voltage with no load.
Output Specifications	
Solenoid input voltage	18 - 30 VDC
Solenoid output voltage	24 VDC
Solenoid output current	85 mA
Solenoid output power	2.0 watts
Circuit protection	External solenoid output is short circuit protected
Wireless link features (30W)*	Allows Set Open / Set Closed Advanced configuration Stroke times (Only functions when attached to external solenoid) Valve Position graph Lifetime Cycle Count (non-resettable)

#### Wiring diagrams



\* Unlocking the wireless link features (30W only)

By default, in SIO mode, the device is unlocked until any of the signals (Open/Closed/Solenoid) are wired to a PLC/DCS card, at which time it locks and cannot be unlocked until unwired and power cycled. In IO-Link mode, enable the Wireless Link Unlocked bit. The default setting may be modified by end user via the Fail-safe features.

#### Bench test procedure and sensor setting instructions

##### WARNING

Do not apply external power to the SOL OUT +/- terminals. This will cause permanent damage to the unit.



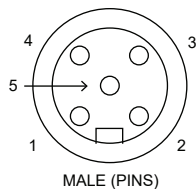
**Caution:** Performing this procedure will cause the sensor inputs to change states. Performing this procedure is not recommended during a live process.



**Attention:** Open and closed set-points are not included in IO-Link Data Storage; therefore, sensor must have set-points saved after installation on valve.

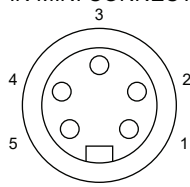
#### Common receptacle options pin-out

##### 5-PIN MICRO CONNECTOR (M12)



MALE (PINS)

##### 5-PIN MINI CONNECTOR



MALE (PINS)

Pin	Signal
1	L +
2	OPEN
3	L -
4	CLOSED C/Q
5	SOL CTRL

To test sensors, use a 24 VDC power supply. No series load resistor is required.

1. Apply power across the L+ and L- terminal points. (No power required on open/closed terminals.)
2. Save set-points
  - Operate actuator to the CLOSED position.
  - Press and hold SET CLOSED button until red LED is lit (2 seconds). Release button.
  - Operate actuator to the OPEN position.
  - Press and hold SET OPEN button until green LED is lit (2 seconds). Release button.
3. Setpoints are retained even after power is removed.
4. To electrically test solenoid output, connect Solenoid Control Signal terminal to L+ or L-. The Solenoid Output will activate.

#### Note

If using only one of the sensors for valve position feedback, either sensor may be used independently.

#### Note

Consult factory for additional quick connector options..

#### 4.1.1 IO-LINK, 3 wire PNP / NPN switching sensors (30S & 30W) 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.

##### Output Fail-Safes

###### General Fail-Safes

The unit supports parameters for configuration of fail-safes of the Process Data Outputs. By default, these fail-safe settings are disabled (Enable Output Fail-safe parameter, index 268), and the external solenoid output is controlled by the state of the Solenoid Control Signal pin (in SIO mode).

If the Enable Output Fail-safe parameter is set to "true", then the fail-safe state of each output is determined by the bitwise combination of two parameters: Output Substitution Mode (index 258) and Output Substitution Value (index 259).

Use Fail-Safes (Global to all bits)	Substitution Mode for each output bit	Substitution Value for each output bit	Result
0	Don't care	Don't care	Use SIO Mode
1	1	0	Fail-Off
1	1	1	Fail-On
1	0	Don't care	Hold Last Valid Value

##### Wireless Link Fail Safe Configuration

The 30W unit defaults from the factory to have the Wireless Link radio enabled and unlocked whenever only L+ and L- terminals are wired. Fail-safe settings can be changed by using the Wireless Link app "Advanced Configuration" page, or via the IO-Link parameters for Output Substitution Mode and Output Substitution Value (using bits 6 and 7 to disable radio and unlock respectively).

Module Status LED	
Module Status	Fault description
LED off	Device does not have power
Solid green	Normal operation
Flashing green	Device does not have connection to IO-Link host or input / output cards
Flashing red	Output shorted No magnet detected The Open or Closed output signal is shorted Excessive device temperature Low supply voltage Internal sensor fault - sensor may need replacing Cycle count alarm active Stroke time alarm active Failure to arrive at end point alarm active Valve position beyond setpoint alarm active Forced output alarm active

IO-Link Process Data Mapping		
Bit #	Input	Output
0	Closed	Output 1
1	Open	Reserved
2	Reserved	Wink
3	Reserved	Set Closed (hold 2 seconds)
4	Cycle count over limit	Set Open (hold 2 seconds)
5	Temperature over limit	Reserved
6	Temperature under limit	Wireless Link Radio Disabled (30W only)
7	Other alarms	Wireless Link Unlocked (30W only)
For a list of all Process, Parameters, System Commands and Events data, see IODD file.		

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 IO-LINK, 3 wire PNP / NPN switching sensors (30S &30W) continued

Typical basic installation

Wiring considerations

The pins L+ (24V+) and L- (0V) provide power for the unit's sensor circuitry and solenoid output. These pins should be wired to the same 24 VDC (18-30 VDC) source used for field wiring connections of the input / output card(s). There is no isolation between L+ / L- pins to the signal pins. The power supply used must be able to provide enough power/current for the unit's circuitry plus current required for the signals and external solenoid

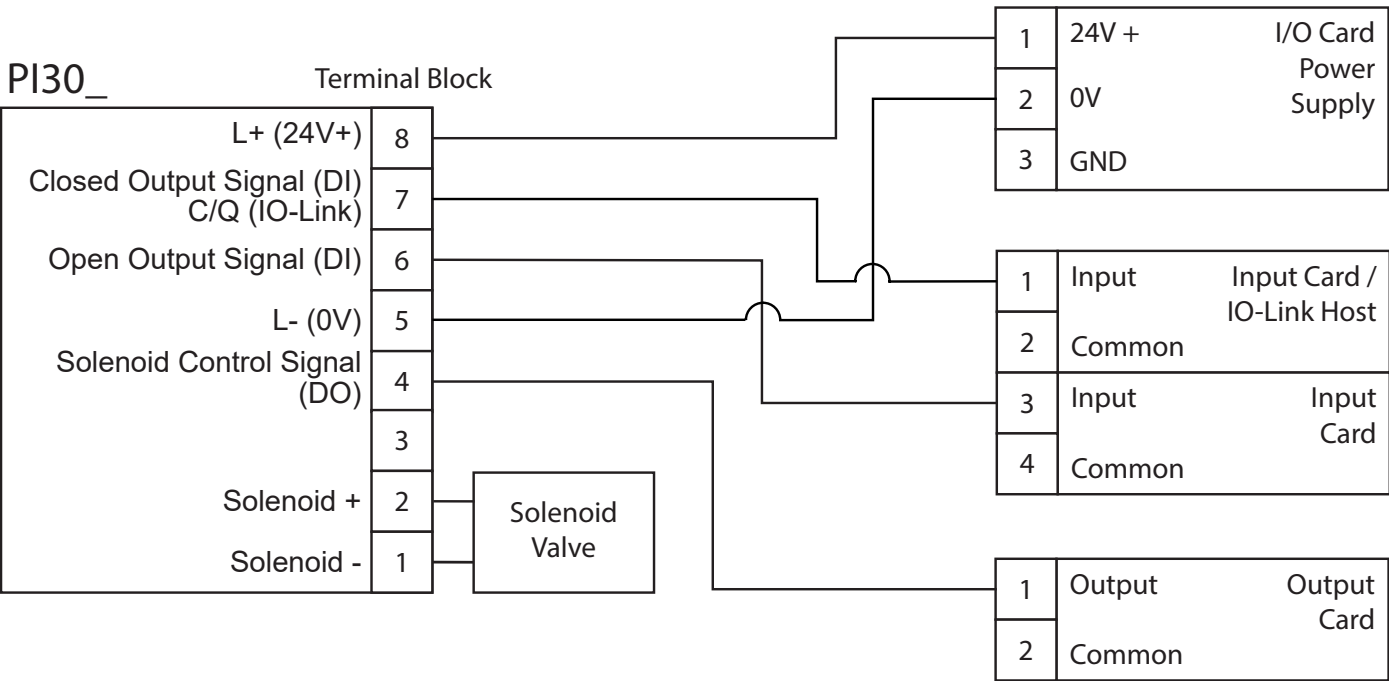
The open and closed signal pins should be wired to the input card's signal input terminal. No connection to the common terminal is required.

The solenoid control signal pin should be wired to the output card's output (switched) terminal. No connection to the common terminal is required.

Self-learning signals

Every time power is cycled to L+ / L-, the device will test the signal wires to learn what type of input and/or output card(s) are wired to each signal. If a signal is open-circuit, the device will continue to test it until a card is detected. If the open or closed signal is short-circuited, the device will retest the signal once the short circuit is removed.

Like most solid-state sensors, some current restrictive input cards may detect a momentary ON state while the device is booting. Most input cards (especially those designed for solid-state sensors) will not experience an ON state during boot up.



### 4.1.2 SST NO sensor (33S & 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

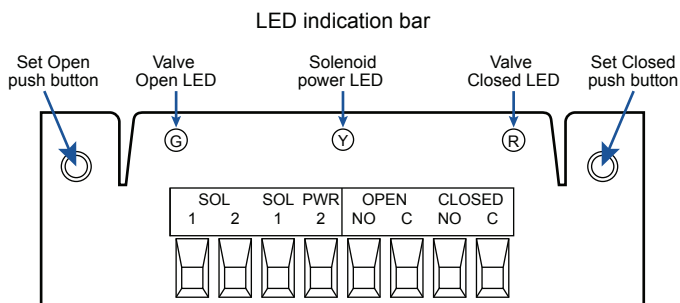
Power must be applied to both sensors to ensure proper circuit operation. Use a 24 VDC power supply with series load resistor, (2K - 6K  $\Omega$ ), connected to the 24 VDC+.

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

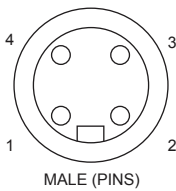
If using only one of the sensors for valve position feedback, the closed sensor (red) must be used.

#### Wiring diagrams



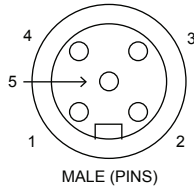
#### Common receptacle options pin-out

##### 4-PIN MICRO CONNECTOR (M12)



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

##### 5-PIN MICRO CONNECTOR (M12)

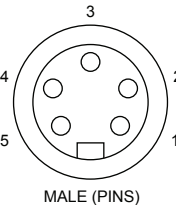


Pin	No solenoid
1	CLOSED C
2	CLOSED NO
3	not used
4	OPEN NO
5	OPEN C

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

##### 5-PIN MINI CONNECTOR



#### 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 (hand-held 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®

### 4.1.2 SST NO sensor (33S & 33W) continued



**Caution:** Performing this procedure will cause the sensor inputs to change states. Performing this procedure is not recommended during a live process.

#### 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.

## 4.1 Sensor/switching modules

### 4.1.3 NAMUR sensor (45S)

#### Specifications

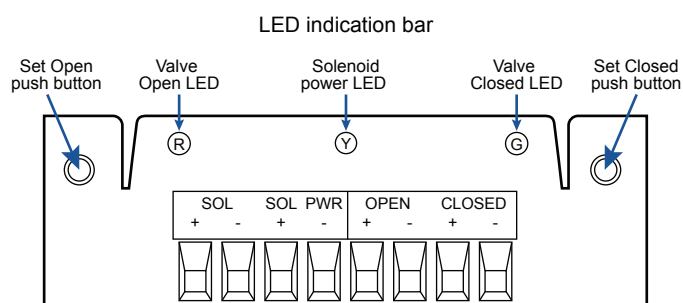
Configuration	(2) NAMUR sensors (EN 60947-5-6; IS)	
Voltage range	5 - 25 VDC	
Current ratings	Target present	current < 1.0 mA
	Target absent	current > 2.1 mA

Use with intrinsically safe repeater barrier. NAMUR sensors conform to EN 60947-5-6 standard.



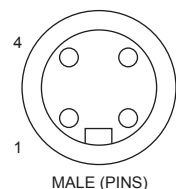
Reference controlled installation drawing #105432 for proper intrinsic safe installation details. Find document in the Appendix on page 29.

#### Wiring diagrams



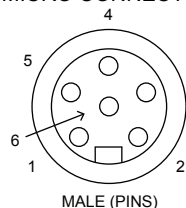
#### Common receptacle options pin-out

##### 4-PIN MICRO CONNECTOR (M12)



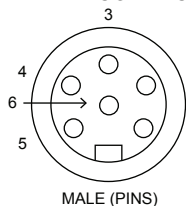
Pin	Signal
1	OPEN +
2	CLOSED +
3	CLOSED -
4	OPEN -

##### 6-PIN MICRO CONNECTOR (M12)



Pin	Signal
1	OPEN +
2	OPEN -
3	SOL PWR +
4	CLOSED +
5	CLOSED -
6	SOL PWR -

##### 6-PIN MINI CONNECTOR





### 4.1.3 NAMUR sensor (45S) continued

#### 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. A series load resistor is not required when bench testing.

1. Connect 24 VDC+ to the CLOSED + and OPEN + terminals. Connect 24 VDC- to the CLOSED - and OPEN - terminals.
2. Operate actuator to the closed position.
3. Press and hold SET CLOSED button until Closed LED is lit (2 seconds). Release button.
4. Operate actuator to the open position.
5. Press and hold SET OPEN button until Open LED is lit (2 seconds). Release button. Both Open and Closed LEDs will be lit during mid-travel.
6. Setpoints are retained even after power is removed.

#### Note

If using only one of the sensors for valve position feedback, the Closed sensor must be used.



**Caution:** Performing this procedure will cause the sensor inputs to change states. Performing this procedure is not recommended during a live process.

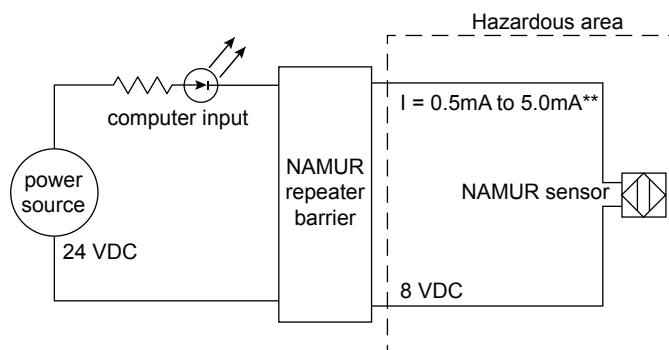
#### Expanded dead band setting feature

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.

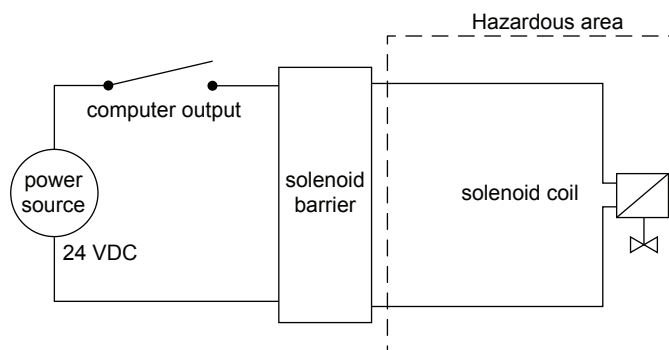
#### Typical basic intrinsically safe circuits

##### NAMUR sensor circuit



\*\* Barrier off state (target off): current in NAMUR sensor circuit >2.1 mA  
Barrier on state (target on): current in NAMUR sensor circuit <1.0 mA

##### Solenoid circuit

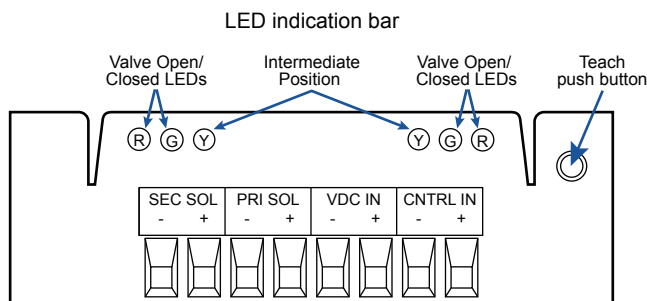


## 4.1 Sensor/switching modules

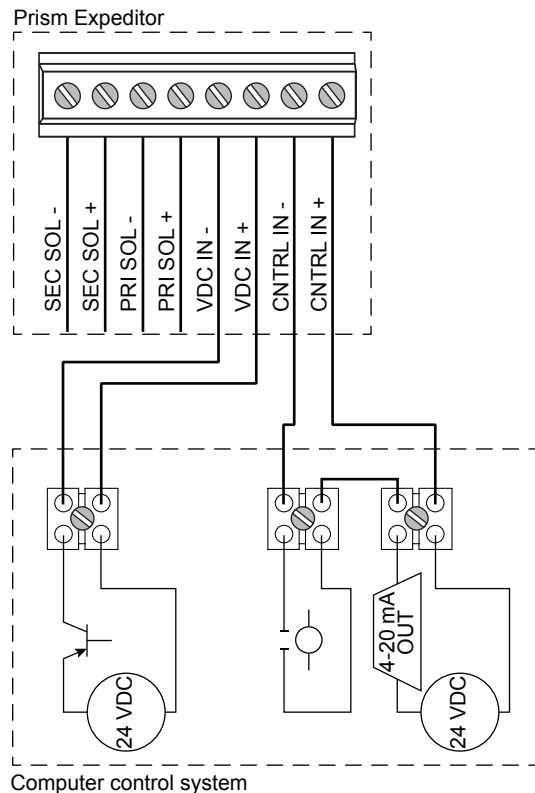
### 4.1.4 Expeditor, standard stroke (80S & 80W)

Specifications	
Position control (AO)	4-20 mA loop, 9-30 VDC (NAMUR NE 43 compliant)
Intermediate control range	5% - 95% of valve stroke
Intermediate control accuracy	+/- 3 % of valve stroke
Maximum resistance load	425 ohms @ 24 VDC
Solenoid voltage	24 VDC
Solenoid power	100 mA
Refresh rate	100 ms
LED states	4.0 - 7.1 mA = red LED / valve closed 7.2 - 16.8 mA = yellow LED / intermediate state 16.9 - 20 mA = green LED / valve open
Cycle life	500,000 cycles (full cycles with intermediate positioning, cycle life may vary depending on intermediate toggling)

### Wiring diagrams



### Basic installation example



### WARNING

Do not apply external power to the primary or secondary solenoid terminals. This will cause permanent damage to the unit.

### Description of operation

The Prism Expeditor is a valve monitoring and control package for linear actuators that provides open/closed and intermediate positioning functionality. Basic operation and intermediate control is accomplished by 24 VDC and a 4-20 mA output signal from a control system.

### Basic operation

The expeditor function module is powered through the VDC IN terminals and 24 VDC must be present in order to calibrate the unit. The CNTRL IN signal is also required for basic operation of the unit. To stroke the valve fully closed position, apply a 4 mA signal. To stroke the valve fully open, apply a 20 mA signal.

### Intermediate position control

Intermediate positioning is accomplished by varying the 4-20 mA signal between 7.2 mA and 16.8 mA.

### Note

Applying an out of range 4-20 mA signal (< 3.4 mA or > 21.1 mA) will de-energize solenoids and unlock the wireless control override functionality. Wireless functionality allows remote monitoring, position control and TEACH capabilities. See page 25.

### WARNING

Valve/actuator will automatically stroke while performing this procedure. Ensure hands are clear from the trigger assembly.



**Caution:** Read all instructions prior to performing this procedure.

### Calibration

The VDC IN terminals must be connected to a 24 VDC power source and unit connected to supply air.

1. Actuate the valve to the 0% position, red LED will be lit.
2. Press and hold the TEACH button for 2 seconds. The valve will cycle open and closed one or more times while determining the valve operating characteristics. The red, green, and yellow LEDs will flash intermittently during these cycles.
3. Calibration will finish with the valve at the commanded position and the appropriate LED will be lit.

### 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 (hand-held 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

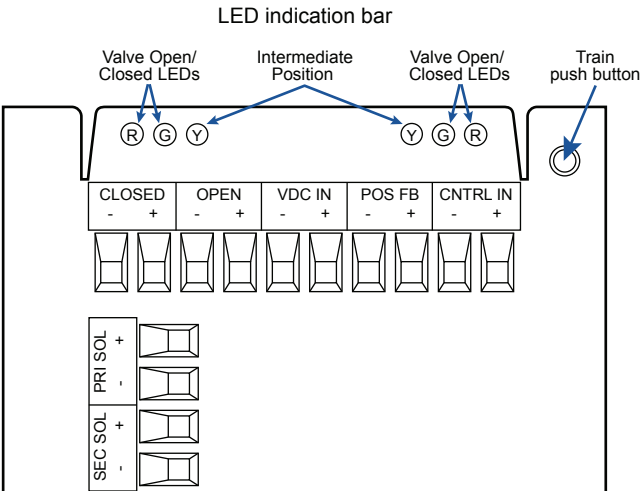
Sensor/switching modules

4.1.5

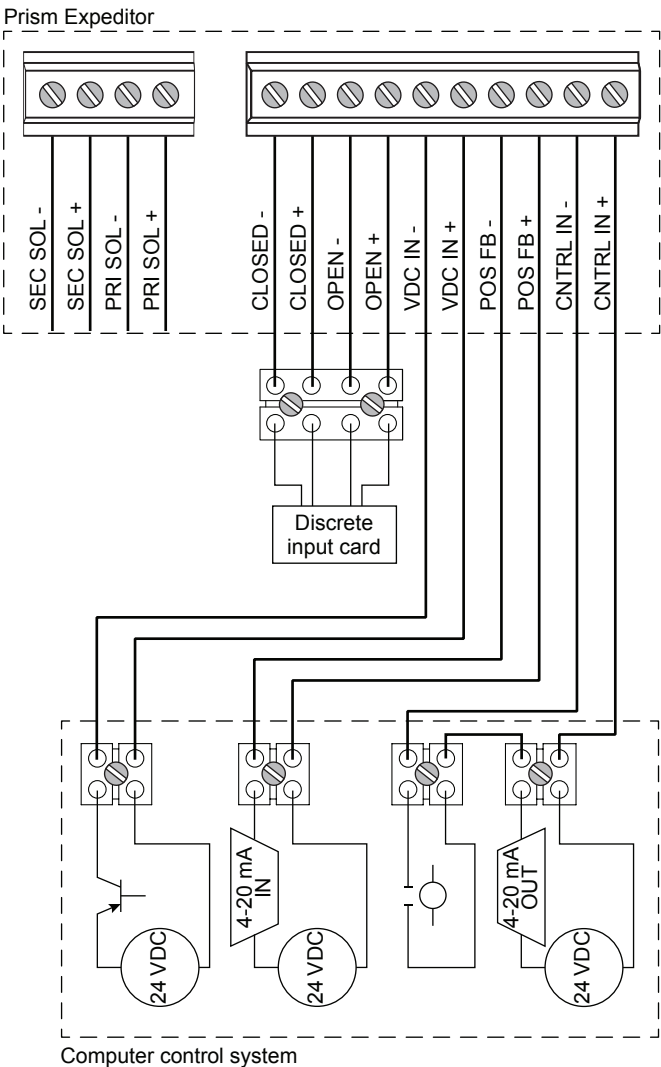
Expeditor, long stroke (81S & 81W)

Specifications		
Position control (AO)	4-20 mA loop, 9-30 VDC (NAMUR NE 43 compliant)	
Position feedback (AI)	4-20 mA loop, 9-30 VDC (NAMUR NE 43 compliant)	
Discrete feedback	(2) N.O. 2-wire solid state sensors	
	voltage range	5-30 VDC
	maximum current	20 mA
Intermediate control range	5% - 95% of valve stroke	
Intermediate control accuracy	+/- 3 % of valve stroke	
Position feedback accuracy	+/- 1 % of valve stroke	
Maximum resistance load	Control	425 ohms @24 VDC
	Feedback	730 ohms @ 24 VDC
Solenoid voltage	24 VDC	
Solenoid power	100 mA	
Refresh rate	100 ms	
LED states	4.0 - 7.1 mA = red LED / valve closed	
	7.2 - 16.8 mA = yellow LED / intermediate state	
	16.9 - 20 mA = green LED / valve open	
Cycle life	500,000 cycles (full cycles with intermediate positioning, cycle life may vary depending on intermediate toggling)	

Wiring diagrams



Basic installation example



### 4.1.5 Expeditor, long stroke (81S & 81W) continued

#### WARNING

Do not apply external power to the primary or secondary solenoid terminals. This will cause permanent damage to the unit.

#### Description of operation

The Prism Expeditor is a valve monitoring and control package for linear actuators that provides open/closed, intermediate positioning, and valve position feedback functionality. Basic operation and intermediate control is accomplished by 24 VDC and a 4-20 mA output signal from a control system.

#### Basic operation

The expeditor function module is powered through the VDC IN terminals and 24 VDC must be present in order to calibrate the unit. The CNTRL IN signal is also required for basic operation of the unit. To stroke the valve fully closed position, apply a 4 mA signal. To stroke the valve fully open, apply a 20 mA signal.

#### Intermediate position control

Intermediate positioning is accomplished by varying the 4-20 mA signal between 7.2 mA and 16.8 mA.

#### Position feedback

The unit long stroke option provides two different valve position feedback signals, a 4-20 mA signal and two discrete sensor signals for valve open and valve closed.

Connect a 4-20 mA input signal to the POS FB terminals to monitor valve position. Connect to the CLOSED and OPEN terminals to monitor valve position from the two discrete sensors.

#### Note

Applying an out of range 4-20 mA signal (< 3.4 mA or > 21.1 mA) will de-energize solenoids and unlock the wireless control override functionality. Wireless functionality allows remote monitoring, position control and TEACH capabilities. See page 25.

#### WARNING

Valve/actuator will automatically stroke while performing this procedure. Ensure hands are clear from the trigger assembly.



**Caution:** Read all instructions prior to performing this procedure.

#### Calibration

The VDC IN terminals must be connected to a 24 VDC power source and unit connected to supply air.

1. Actuate the valve to the 0% position, red LED will be lit.
2. Press and hold the TEACH button for 2 seconds. The valve will cycle open and closed one or more times while determining the valve operating characteristics. The red, green, and yellow LEDs will flash intermittently during these cycles.
3. Calibration will finish with the valve at the commanded position and the appropriate LED will be lit.

#### Specifications for Stonel Wireless Link

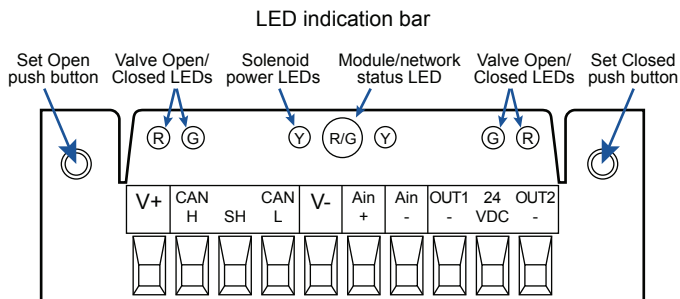
Communication	Bluetooth® technology; single mode (not compatible with Bluetooth® Classic)
Frequency band	2.402-2.480 Ghz
Transmit power	4dBm or ~2.5 milliwatts
Data rate	1 Mbit/second; effective information transmit rate ~10 Kbits/second
Range	Up to 100 meters (330 feet) in free space. Range is reduced 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 (hand-held 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®

## 4.2 Valve communication terminals (VCT)

### 4.2.1 VCT with DeviceNet™ communication (92S & 92W)

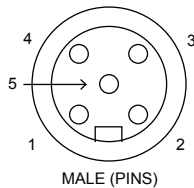
Specifications	
Communication protocol	DeviceNet™
Configuration	(2) Discrete inputs (sensors) (1) Auxiliary analog input (4-20 mA) (2) Discrete outputs (solenoids)
Input voltage	11 - 25 VDC via DeviceNet™ network
Output voltage	24 VDC
Analog input impedance	254 ohms
Quiescent current	No analog input, no outputs energized: 45 mA @ 24 VDC; 69 mA @ 11 VDC
Current consumption (coil energized)	66 mA @ 24 VDC - 0.5 w coil (1N) 83 mA @ 24 VDC - 0.9 w coil (1K)
Maximum output current	167 mA (all outputs combined)
Default address	63 (software assigned)
Default baud rate	125K (software selectable 125K, 250K or 500K baud)
Messaging	Polling, cyclic and change of state
DeviceNet™ type	100
Bit mapping	
Inputs (3 bytes)	
Byte 0, bit 0 = red LED / valve closed	
Byte 0, bit 1 = green LED / valve open	
Byte 0, bit 7 = fault bit	
Byte 1, bits 8-15 = 4-20 mA analog input	
Byte 2, bits 16-23 = 4-20 mA analog input (4-20 mA analog input 0-10,000 scaling)	
Outputs (1 byte)	
Byte 0, bit 0 = solenoid 1	
Byte 0, bit 1 = solenoid 2	
Byte 0, bit 2 = wink	
Byte 0, bit 3 = remote set closed	
Byte 0, bit 4 = remote set open	
Byte 0, bit 7 = wireless link enabled	

### Wiring diagrams

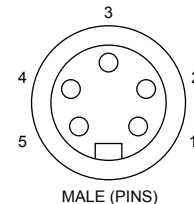


### Common receptacle options pin-out

#### 5-PIN MICRO CONNECTOR (M12)



#### 5-PIN MINI CONNECTOR



Pin	Signal
1	Shield
2	V +
3	V -
4	CAN H
5	CAN L

### WARNING

Do not apply external power to the output terminals. This will cause permanent damage to the unit.



**Attention:** Any external auxiliary device connected to the VCT module shall be ground isolated.

### Bench test procedure and sensor setting instructions

To test sensors, use a 24 VDC power supply. No series load resistor is required.

1. Apply power across the V+ and V- terminal points.
2. Operate actuator to the closed position.
3. Press and hold SET CLOSED button until red LED is lit (2 seconds). Release button.
4. Operate actuator to the open position.
5. Press and hold SET OPEN button until green LED is lit (2 seconds). Release button.
6. Setpoints are retained even after power is removed.

A functioning DeviceNet™ network is required to test communications and solenoids.



**Caution:** Performing this procedure will cause the sensor inputs to change states. Performing this procedure is not recommended during a live process.

### 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.

### Module/Network Status LED status

DeviceNet™ status LED	Fault description
LED off	Device not powered, or is alone on the bus
Solid green	Device is online and allocated to a master
Flashing green	Device is online, but not allocated to a master
Flashing red (Minor Fault)	Communication to protocol controller has failed
Flashing red (Minor Fault)	Connection to DeviceNet™ master has timed-out
Flashing red (Minor Fault)	Address/baud switches are not equal to currently online values
Solid red (Major Fault)	Device has detected another device on the bus with the same DeviceNet™ address
Solid red (Major Fault)	Device has detected a CAN network Bus-off fault

## 4.2.1 VCT with DeviceNet™ communication (92S & 92W) continued



**Caution:** Power cycling unit with Byte 0, Bit 3 or Bit 4 set will cause the sensor(s) to set at that valve position. Ensure Byte 0, Bit 3 and Bit 4 are reset to 0 after performing a remote sensor setting.

### Remote sensor setting feature

The Remote Sensor Setting feature provides the capability of setting the closed and open sensors remotely from the control system.

1. DeviceNet™ communications are required in order to remotely set the sensors. The unit must be addressed and correctly configured to be recognized by the control system.
2. With the valve/actuator in the closed position, set byte 0, bit 3 to "1" for at least two seconds. This will set the closed sensor to that valve/actuator position. Set byte 0, bit 3 back to "0"
3. With the valve/actuator in the open position, set Byte 0, Bit 4 to "1" for at least two seconds. This will set the open sensor to that valve/actuator position. Set byte 0, bit 4 back to "0"

### Wink feature

The Wink feature provides the capability of setting the closed or open LEDs to simultaneously flash or wink at a 2 Hz rate. This feature aids in physically locating the unit on the network.

1. DeviceNet™ communications are required in order to set the Wink feature. The unit must be addressed and correctly configured to be recognized by the control system.
2. Set byte 0, bit 2 to "1" in the desired unit. Once the correct unit has been physically located on the network, indicated by the winking of the LEDs, set byte 0 bit 2 back to "0". Performing this function will not change the closed and open sensor setpoints.

### Fault Bit (input byte 0, bit 7)

The Fault Bit will set to a 1 when input byte 0, bits 0 and 1 are set to 1 or 0 at the same time.

When input byte 0, bits 0 and 1 are both set to 1, this would indicate that the valve is both open and closed at the same time. This would be an abnormal or Fault condition.

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 (hand-held 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®

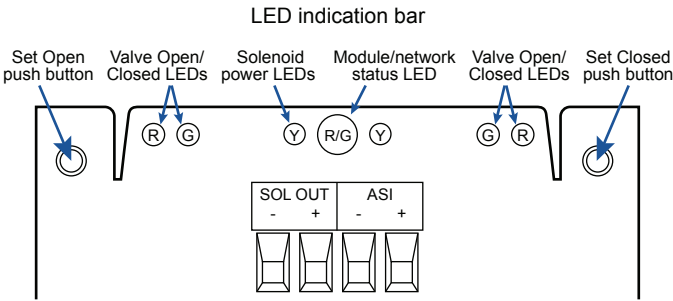


4.2 Valve communication terminals (VCT)

4.2.2 VCT with AS-Interface communication (96S & 96W)

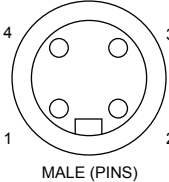
Specifications		
Communication protocol	AS-Interface v3.0	
Configuration	(2) Discrete Inputs (sensors) (1) Discrete Output (solenoid)	
Input voltage	26.5 - 31.6 VDC (AS-I voltage)	
Output voltage	21-26 VDC	
Quiescent current	35 mA	
Current consumption (coil energized)	56 mA - 0.5 w coil (1N) 73 mA - 0.9 w coil (1K)	
Maximum output current	167 mA	
Default address	00	
ID/IO codes	ID = F; IO = 7; ID1 = F; ID2 = E (S-7.F.E.)	
Specifications unique to 96S		
Bit assignment		
Inputs	Outputs	
Bit 0 = not used	Bit 0 = set closed	
Bit 1 = not used	Bit 1 = set open	
Bit 2 = green LED / valve open	Bit 2 = SOL OUT	
Bit 3 = red LED / valve closed	Bit 3 = wink	
Specifications unique to 96W		
Bit assignment		
Inputs	Outputs	Parameter
Bit 0 = red LED / valve closed	Bit 0 = SOL OUT	Bit 0 = wink
Bit 1 = green LED / valve open	Bit 1 = not used	Bit 1-3 = not used
Bit 2 = not used	Bit 2 = wireless link enabled	
Bit 3 = not used	Bit 3 = not used	

Wiring diagrams



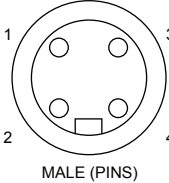
Common receptacle options pin-out

4-PIN MICRO CONNECTOR (M12)

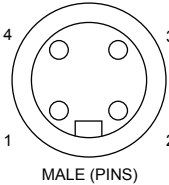


Pin	Signal
1	ASi +
2	not used
3	ASi -
4	not used

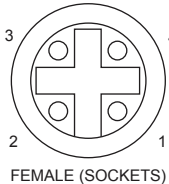
4-PIN MINI CONNECTOR



4-PIN MICRO MALE / 4-PIN MICRO FEMALE



Pin	Signal
1	ASi +
2	not used
3	ASi -
4	not used



Pin	Signal
1	not used
2	not used
3	OUT 1 -
4	OUT 1 +

## 4.2.2 VCT with AS-Interface communication (96S & 96W) continued

### WARNING

Do not apply external power to the output terminals. This will cause permanent damage to the unit.

### Bench test procedure and sensor setting instructions

To test sensors, use a 24 VDC power supply. No series load resistor is required.

1. Apply power across the ASi+ and ASi- terminal points.
2. Operate actuator to the CLOSED position.
3. Press and hold SET CLOSED button until red LED is lit (2 seconds). Release button.
4. Operate actuator to the OPEN position.
5. Press and hold SET OPEN button until green LED is lit (2 seconds). Release button.
6. Setpoints are retained even after power is removed.

A functioning AS-Interface network is required to test communications and solenoid.



**Caution:** Performing this procedure will cause the sensor inputs to change states. Performing this procedure is not recommended during a live process.

### 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.

### Power/Fault LED status

AS-i status LED	Fault description
LED off	Device does not have power
Solid green	Normal operation
Flashing red/green	Output shorted
Flashing red/green	No magnet detected
Flashing red/green	Internal sensor fault - sensor may need replacing
Flashing yellow/red	No data exchange (device address = 0)
Solid red	No data exchange

### Remote sensor setting feature (96S only)

This feature provides the capability of setting the Closed and Open sensors remotely from the Control System or from the AS-Interface Gateway/Master.

1. AS-Interface communications are required in order to remotely set the sensors. The unit must be addressed and correctly configured to be recognized by the Control System or the AS-Interface Gateway/Master.
2. With the valve/actuator in the closed position, set Output Bit 1 (DO 0) to "1" for at least two seconds. This will set the Closed sensor to that valve/actuator position. Set Output Bit 1 (DO 0) back to "0"
3. With the valve/actuator in the open position, set Output Bit 2 (DO 1) to "1" for at least two seconds. This will set the Open sensor to that valve/actuator position. Set Output Bit 2 (DO 1) back to "0"

### AS-Interface Wink feature

This feature provides the capability of setting the CLOSED and OPEN LEDs to simultaneously flash or "wink". This feature aids in physically locating the unit on the network.

1. AS-Interface communications are required in order to set the "Wink" feature. The unit must be addressed and correctly configured to be recognized by the Control System or the AS-Interface Gateway/Master.
2. Wink feature bit settings differ for 96S and 96W.
  - a. For 96S units, set Output Bit 4 (DO3) to "1" in the desired unit. Once the correct unit has been physically located on the network, indicated by the "winking" of the CLOSED and OPEN LEDs, set Output Bit 4 (DO3) back to "0". Performing this function will not change the Closed and Open sensor setpoints.
  - b. For 96W units, set parameter Bit 0 to "1" in the desired unit. Once the correct unit has been physically located on the network, indicated by the "winking" of the CLOSED and OPEN LEDs, set parameter Bit 0 back to "0". Performing this function will not change the Closed and Open sensor setpoints.

### Specifications for Stonel Wireless Link

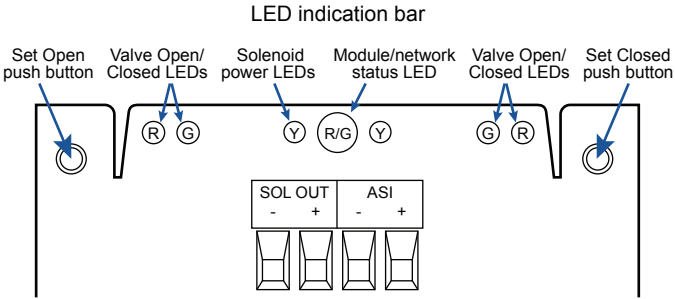
Communication	Bluetooth® technology; single mode (not compatible with Bluetooth® Classic)
Frequency band	2.402-2.480 Ghz
Transmit power	4dBm or ~2.5 milliwatts
Data rate	1 Mbit/second; effective information transmit rate ~10 Kbits/second
Range	Up to 100 meters (330 feet) in free space. Range is reduced 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®

4.2 Valve communication terminals (VCT)

4.2.3 VCT with AS-Interface communication and extended addressing (97S & 97W)

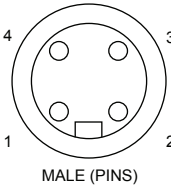
Specifications		
Communication protocol	AS-Interface v3.0	
Configuration	(2) Discrete Inputs (sensors) (1) Discrete Output (solenoid)	
Input voltage	26.5 - 31.6 VDC (AS-I voltage)	
Output voltage	21-26 VDC	
Quiescent current	35 mA	
Current consumption (coil energized)	56 mA - 0.5 w coil (1N) 73 mA - 0.9 w coil (1K)	
Maximum output current	167 mA	
Default address	0A	
ID/IO codes	ID = A; IO = 7; ID1 = F; ID2 = E (S-7.A.E.)	
Specifications unique to 97S		
Bit assignment		
Inputs	Outputs	
Bit 0 = not used	Bit 0 = not used	
Bit 1 = not used	Bit 1 = wink	
Bit 2 = green LED / valve open	Bit 2 = SOL OUT	
Bit 3 = red LED / valve closed	Bit 3 = not available	
Specifications unique to 97W		
Bit assignment		
Inputs	Outputs	Parameter
Bit 0 = red LED / valve closed	Bit 0 = SOL OUT	Bit 0 = wink
Bit 1 = green LED / valve open	Bit 1 = not used	Bit 1-3 = not used
Bit 2 = not used	Bit 2 = wireless link enabled	
Bit 3 = not used	Bit 3 = not available	

Wiring diagrams



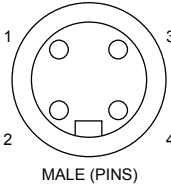
Common receptacle options pin-out

4-PIN MICRO CONNECTOR (M12)

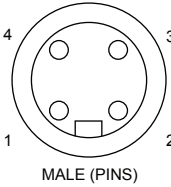


Pin	Signal
1	ASi +
2	not used
3	ASi -
4	not used

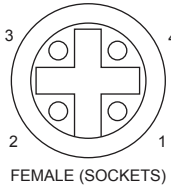
4-PIN MINI CONNECTOR



4-PIN MICRO MALE / 4-PIN MICRO FEMALE



Pin	Signal
1	ASi +
2	not used
3	ASi -
4	not used



Pin	Signal
1	not used
2	not used
3	OUT 1 -
4	OUT 1 +

### 4.2.3 VCT with AS-Interface communication and extended addressing (97S & 97W) continued

#### WARNING

Do not apply external power to the output terminals. This will cause permanent damage to the unit.

#### Bench test procedure and sensor setting instructions

To test sensors, use a 24 VDC power supply. No series load resistor is required.

1. Apply power across the ASi+ and ASi- terminal points.
  2. Operate actuator to the CLOSED position.
  3. Press and hold SET CLOSED button until red LED is lit (2 seconds). Release button.
  4. Operate actuator to the OPEN position.
  5. Press and hold SET OPEN button until green LED is lit (2 seconds). Release button.
  6. Setpoints are retained even after power is removed.
- A functioning AS-Interface network is required to test communications and solenoid.



**Caution:** Performing this procedure will cause the sensor inputs to change states. Performing this procedure is not recommended during a live process.

#### 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.

#### Power/Fault LED status

AS-i status LED	Fault description
LED off	Device does not have power
Solid green	Normal operation
Flashing red/green	Output shorted
Flashing red/green	No magnet detected
Flashing red/green	Internal sensor fault - sensor may need replacing
Flashing yellow/red	No data exchange (device address = 0)
Solid red	No data exchange

#### AS-Interface Wink feature

This feature provides the capability of setting the CLOSED and OPEN LEDs to simultaneously flash or “wink”. This feature aids in physically locating the unit on the network.

1. AS-Interface communications are required in order to set the “Wink” feature. The unit must be addressed and correctly configured to be recognized by the Control System or the AS-Interface Gateway/Master.
2. Wink feature bit settings differ for 97S and 97W.
  - a. For 97S units, set Output Bit 1 (DO2) to “1” in the desired unit. Once the correct unit has been physically located on the network, indicated by the “winking” of the CLOSED and OPEN LEDs, set Output Bit 1 (DO2) back to “0”. Performing this function will not change the Closed and Open sensor setpoints.
  - b. For 97W units, set parameter Bit 0 to “1” in the desired unit. Once the correct unit has been physically located on the network, indicated by the “winking” of the CLOSED and OPEN LEDs, set parameter Bit 0 back to “0”. Performing this function will not change the Closed and Open sensor setpoints.

#### 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®

## 5 Stonel Wireless Link app

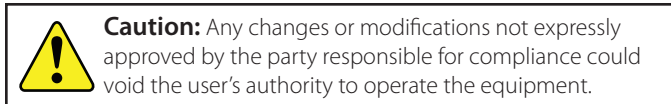
### 5.1 Federal Communication Commission (FCC) statement

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 30W, 33W: Contains FCC ID: SQGBL651

PI 80W, PI 81W, PI 92W, PI 96W, PI 97W: Contains FCC ID: PI4BL600

### 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 ISED Canada (IC) statement

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage;
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

PI 30W, 33W: Contains IC: 3147A-BL651

PI 80W, PI 81W, PI 92W, PI 96W, PI 97W: Contains IC: 1931B-BL600

### Radiation Exposure Statement

The product complies with the Canada 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.

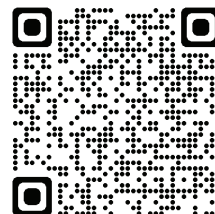
### Déclaration d'exposition aux radiations

Le produit est conforme aux limites d'exposition pour les appareils portables RF pour les Etats-Unis et le Canada établies pour un environnement non contrôlé. Le produit est sûr pour un fonctionnement tel que décrit dans ce manuel. La réduction aux expositions RF peut être augmentée si l'appareil peut être conserve aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la plus faible si une telle fonction est disponible.

### 5.3 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			
<b>SERIES</b>			
PI Nonincendive or intrinsically safe			
<b>FUNCTIONS</b>			
<b>Sensors modules</b>		<b>Valve communication Terminals (VCTs)</b>	
30S	(2) 24 VDC N.O. solid state sensors [self-learning outputs for NPN/PNP/Sinking/Sourcing PLC input cards] and (1) 24 VDC output for internal/external solenoid [Self-learning control input for NPN/PNP/Sinking/Sourcing PLC output cards.]	92S	DeviceNet™
		92W	DeviceNet™ with Wireless Link
		96S	AS-Interface
		96W	AS-Interface with Wireless Link
30W	(2) 24 VDC N.O. solid state sensors [self-learning outputs for NPN/PNP/Sinking/Sourcing PLC input cards] and (1) 24 VDC output for internal/external solenoid [Self-learning control input for NPN/PNP/Sinking/Sourcing PLC output cards.] with Wireless Link	97S	AS-Interface with extended addressing
		97W	AS-Interface with extended addressing and Wireless Link
33S	(2) SST NO switching sensors		
33W	(2) SST NO switching sensors with Wireless Link		
45S	(2) NAMUR sensor (EN 60947-5-6; I.S.)		
<b>Expeditor, standard stroke</b>		<b>Expeditor, long stroke</b>	
80S	(1) 4-20mA AO for position control	81S	(1) 4-20mA AO for position control with (1) 4-20mA AI and (2) 24V DI for position feedback
80W	(1) 4-20mA AO for position control with Wireless Link	81W	(1) 4-20mA AO for position control with (1) 4-20mA AI and (2) 24V DI for position feedback with Wireless Link
<b>PNEUMATIC VALVE / TEMPERATURE</b>			
<b>-20° C to 60° C / 0.1 Cv</b>		<b>-10° C to 50° C / 0.2 Cv</b>	
11S	No pneumatic valve	1KS	Three-way 24 VDC
1NS	Three-way voltage / power depends on function	1MS	Three-way 120 VAC
		2KS	Dual three-way 24 VDC
<b>ENCLOSURE</b>			
A	North American (NEC/CEC)		
V	International (IEC)		
L	Other		
<b>CONDUIT/CONNECTORS</b>			
<b>Standard</b>	<b>Mini-connectors</b>	<b>Micro-connectors (M12)</b>	
01 (1) ½" NPT	10 (1) 4-pin	13	(1) 4-pin
02 (2) ½" NPT	11 (1) 5-pin	14	(2) 4-pin
04 (1) M20	19 (1) 6-pin	15	(1) 5-pin
05 (2) M20		17	(1) 6-pin
08 (1) cable glands			
09 (2) cable glands			
<b>VISUAL INDICATOR</b>			
R	Green open	0	No indication
<b>VALVE SIZE</b>			
S	Standard stroke - ¼" to 2" (3.2 mm to 28.5 mm; ⅛" to 1 ⅞" stroke)		
L	Long stroke - ¼" to 6" (3.2 mm to 66.8 mm; ⅛" to 2 ⅞" stroke)		
<b>BRANDING</b>			
A	Valmet/Stonel		
M	Valmet/Neles		
Model number example			
PI	33S	1KS	A 01 R S A
<b>MODEL NUMBER</b>		<b>OPTIONAL PARTNERSHIP ID</b>	
Mounting hardware required and sold separately.		Some models may include 5-digit identification suffix.	



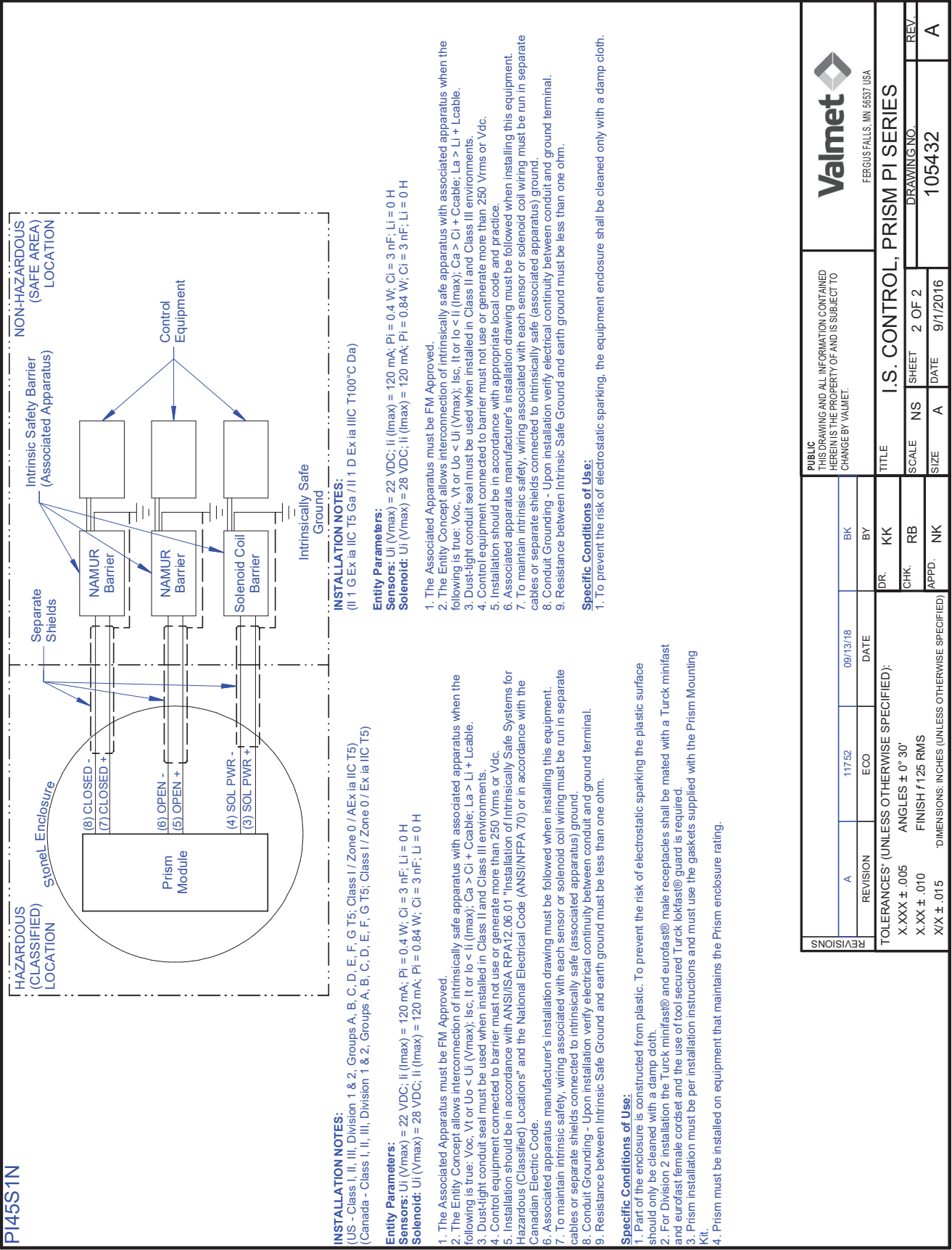
## 7 Regulatory, specific conditions of use, and product marking

**7      Regulatory, specific conditions of use, and product marking continued**

## 8.1 Controlled installation drawings



8.1 Controlled installation drawings continued





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