Prism™ PI by StoneL

Installation, Maintenance and Operating instructions

StoneL publication 105431revC

7 PI 70 en • 01/2021

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Read these instructions first!

These instructions provide information about safe handling and operation of the Prism PI by StoneL. 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 Prism PI series valve controllers. The Prism PI is designed to provide position feedback indication and pneumatic control of on/off automated valves.

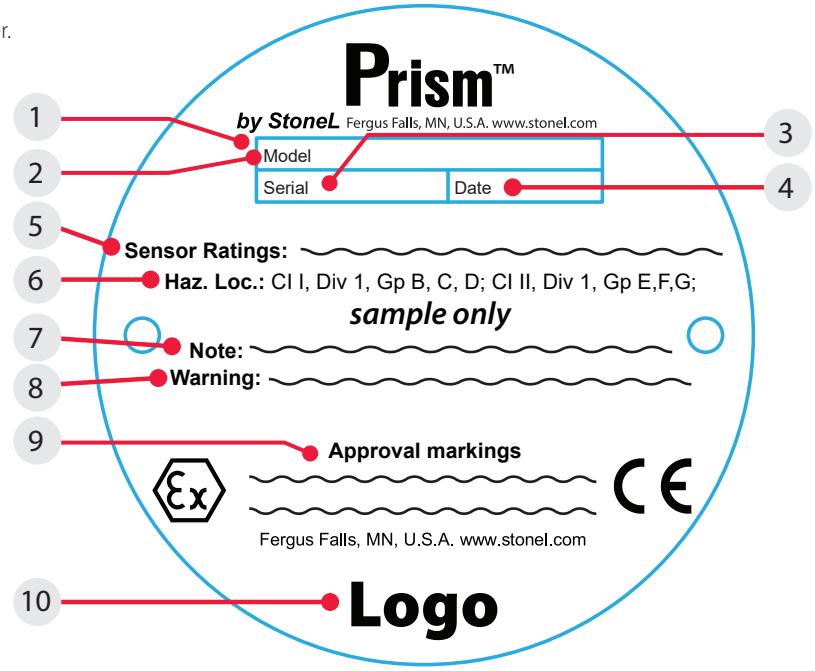
Note
The selection and use of the Prism PI in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the likely situations that may occur when installing, using, or servicing the Prism PI. If you are uncertain about the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

1.2 Title plate markings

The Prism PI 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 28 for specific product markings.



1.3 CE markings

The Prism PI by StoneL meets the requirements of European Directives and has been marked according to the directive.

1.4 Recycling and disposal

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

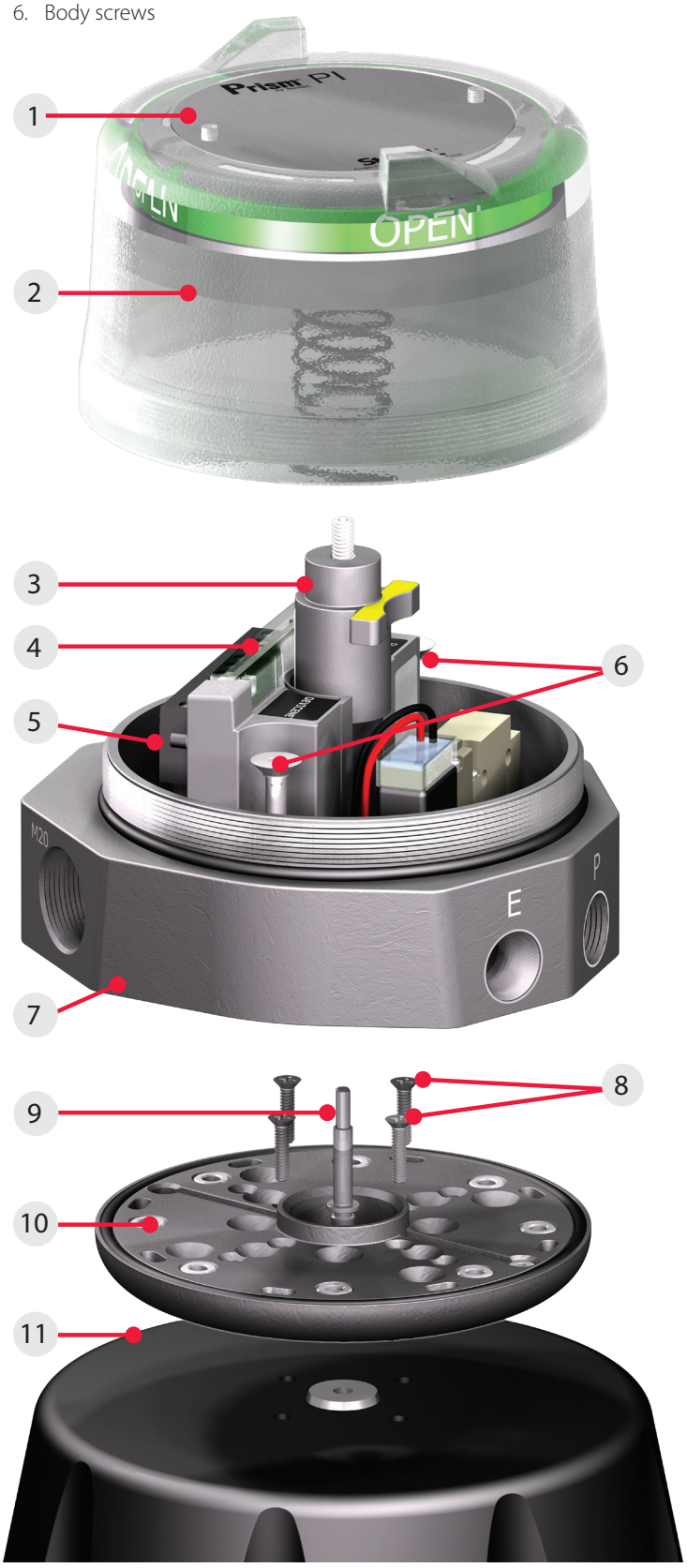
1.5 Safety precautions

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 ⅛" NPT porting	
Trigger (magnetic)	Polysulfone with black chromated zinc reinforcement	
Operating life	Over 1 million cycles	
Operating temperature range Unit without solenoid Unit with solenoid	 -20° C to 60° C (-4° F to 140 ° F) 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 Cover removal clearance	84.1 mm [3.31 in] 25 mm [1 in]
Standard stroke with visual indicator	Unit height Cover removal clearance	107.9 mm [4.01 in] 25 mm [1 in]
Long stroke	Unit height Cover removal clearance	163.3 mm [6.43 in] 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)	
Environmental conditions		
Location	Indoor and outdoor	
Maximum altitude	5000 m	
Maximum humidity	90%	
Pollution degree	4	
Ratings and approvals*	See page 28 or StoneL.com/approvals	

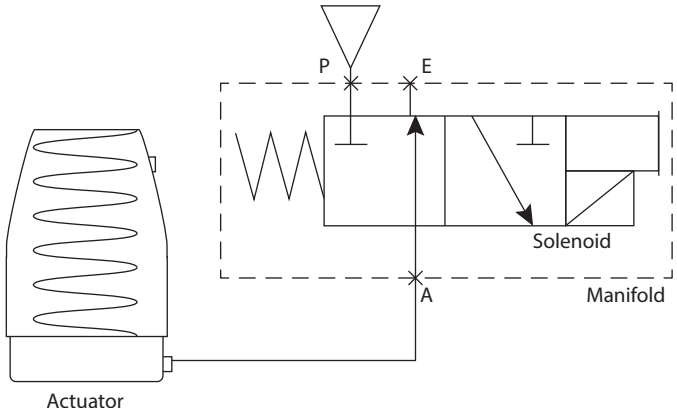
* Only models listed on StoneL's official website are approved per specific rating.

1.8 Pneumatic valve specifications

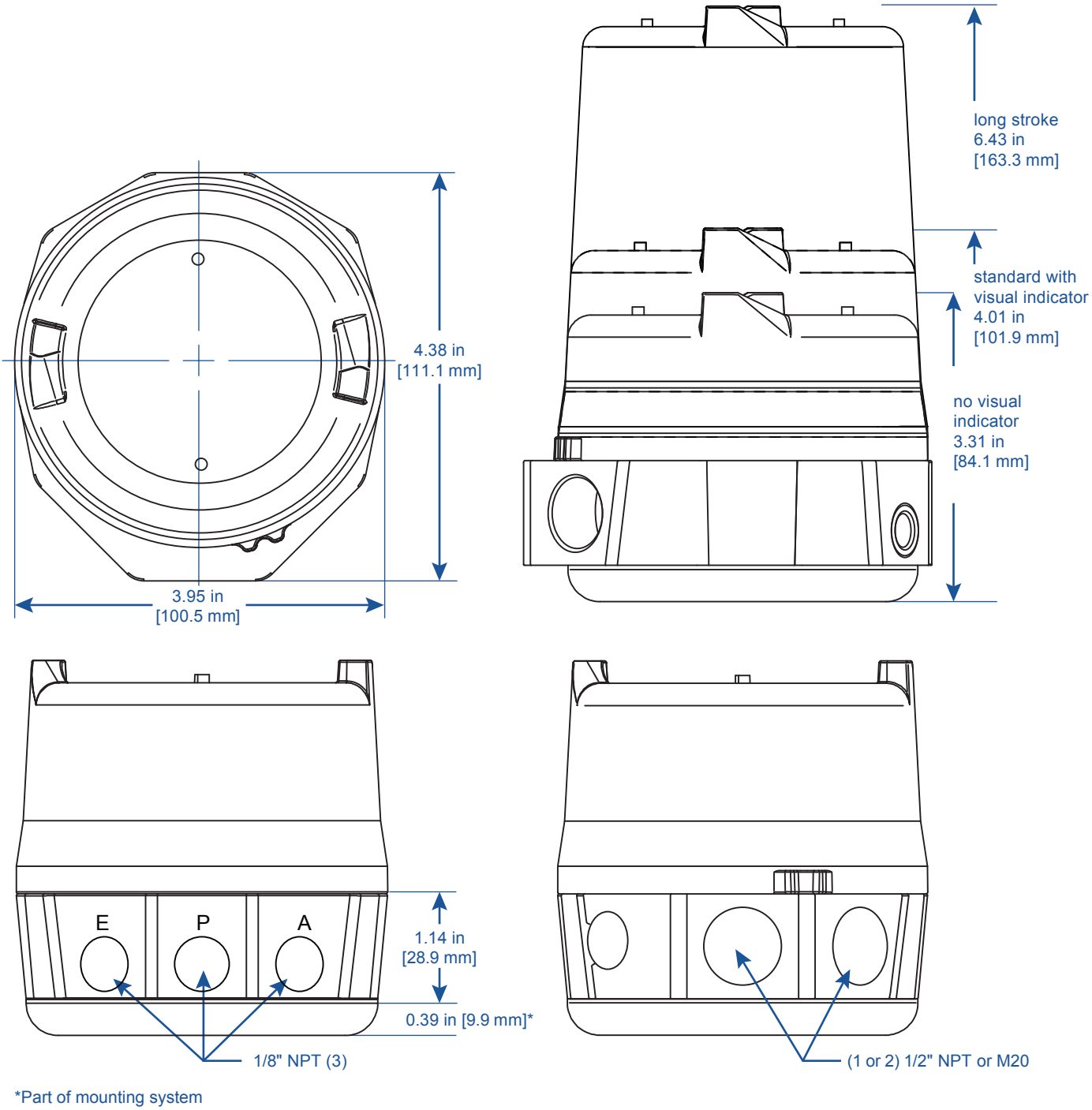
Specifications	
General pneumatic specifications	
Configuration	3-way, 2-position, spring return
Type	Direct acting
Porting	⅛" NPT (stainless steel reinforced)
Medium	Air or inert gas
Medium temperature range (TS)	-40° C to 80° C (-40° F to 176 ° F)
Operating pressure	25 psi to 120 psi (1.72 to 9.65 bar)
Operating life	1 million cycles
Manual override	Internal momentary
Solenoid coil specifications	
1K (33_, 92_, 96_, 97_)	
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
2K (80_, 81_,)	
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
1N (92_, 96_, 97_)	
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
1N (45_)	
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



Note

Prism PI certified dimensional drawing can be found under the download tab at www.stonel.com/en/products/valve-communication/prism-pi/

2 Assembly and mounting

2.1 Instructions

Special notes:

- Mounting of the Prism PI requires a StoneL mounting kit specific to the actuator the Prism PI 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 Prism PI mounting plate screws (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 Prism PI assembly figure on page 8 when performing mounting and assembly procedures. Prism PI unit and mounting kit are supplied separately. From Prism PI 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), Prism 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 Prism PI unit (Item A) onto the mounting plate in the orientation desired (Prism PI 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 ⅛" 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

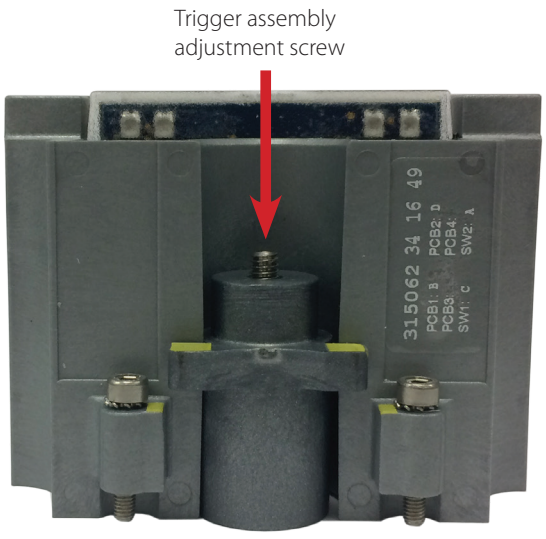
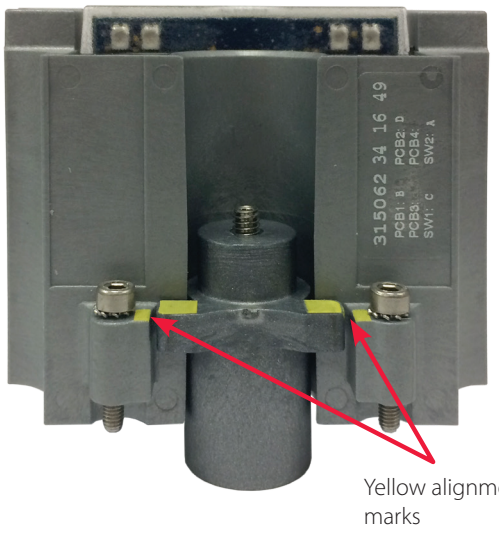
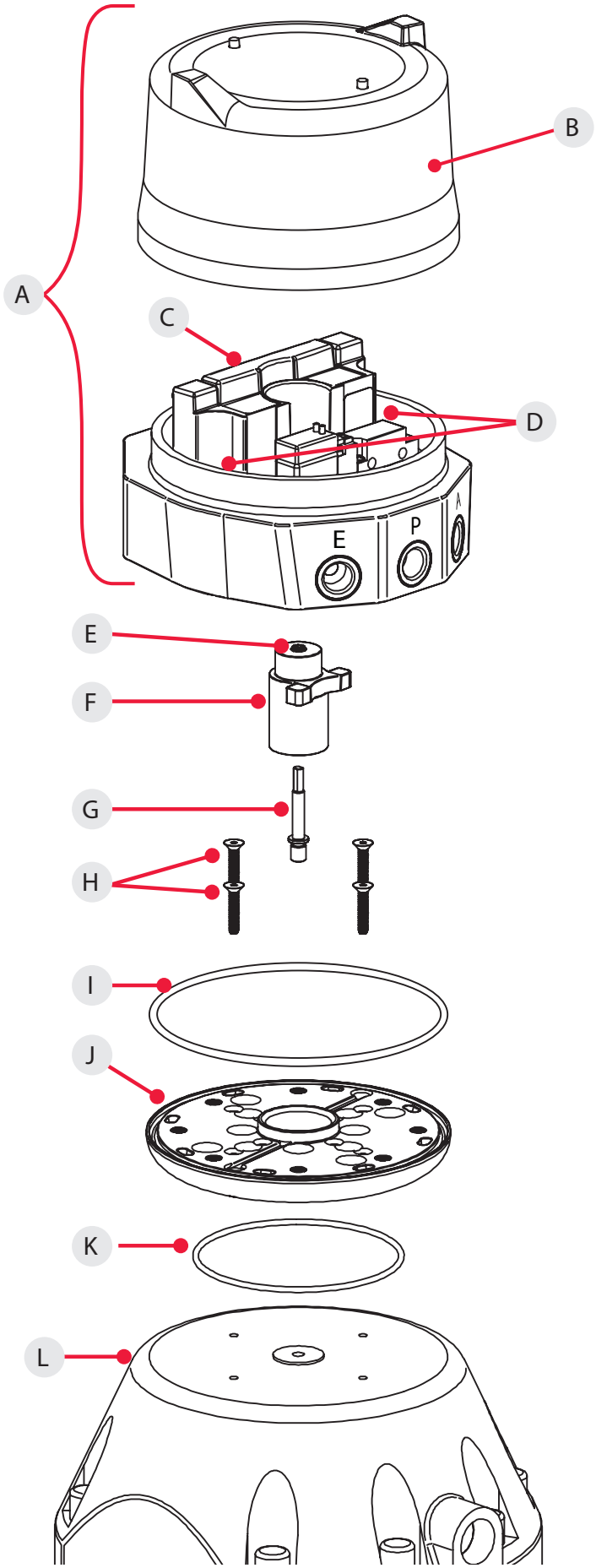


Fig. 2 Sensing module detail



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 Prism units 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 Prism units must be done by StoneL 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 StoneL 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 StoneL, the protection provided by it may be impaired.

Attention: If required, the Prism 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.

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.

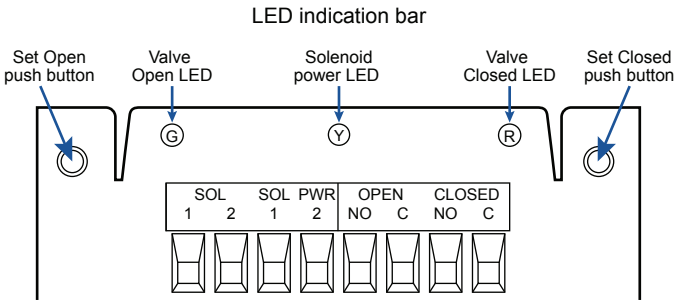
4 Function specific details

4.1 Sensor/switching modules

4.1.1 SST NO sensor (33S)

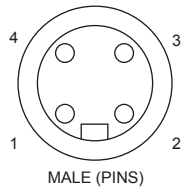
Specifications	
Configuration	(2) N.O. 2-wire solid state sensors
Voltage range	20 - 125 VAC 50/60 Hz; 20 - 125 VDC
Minimum on current	2.0 mA
Maximum continuous current	0.1 amps
Maximum leakage current	0.5 mA
Maximum voltage drop	6.5 volts @ 10 mA 7.0 volts @ 100 mA
Circuit protection	Protected against short circuits and direct application of voltage with no load.

Wiring diagrams



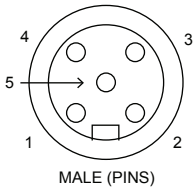
Common receptacle options pin-out

4-PIN MICRO CONNECTOR (M12)



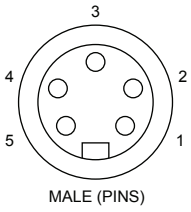
Pin	Signal
1	OPEN NO
2	CLOSED NO
3	CLOSED C
4	OPEN C

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



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.

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 Prism PI 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.

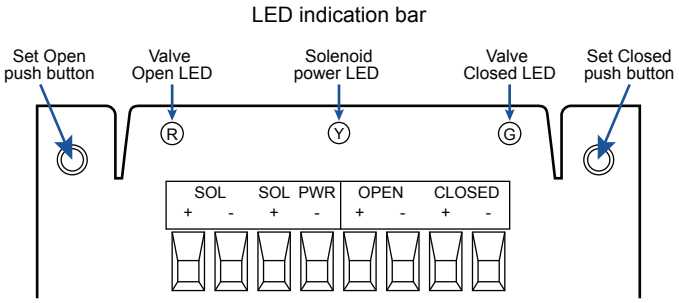
4.1 Sensor/switching modules

4.1.2 NAMUR sensor (45S)

Specifications		
Configuration	(2) NAMUR sensors (EN 60947-5-6; IS)	
Voltage range	5 - 25 VDC	
Current ratings	Target present Target absent	current < 1.0 mA current > 2.1 mA
Use with intrinsically safe repeater barrier. NAMUR sensors conform to EN 60947-5-6 standard.		

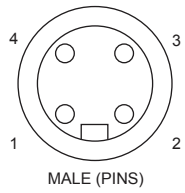
STOP Reference controlled installation drawing #105432 for proper intrinsic safe installation details. Find document in the Appendix on page 30 or at www.StoneL.com/en/products/prism/installation-manuals

Wiring diagrams



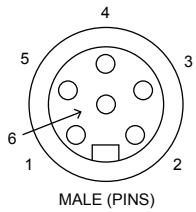
Common receptacle options pin-out

4-PIN MICRO CONNECTOR (M12)



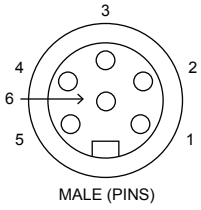
Pin	Signal
1	OPEN +
2	CLOSED +
3	CLOSED -
4	OPEN -

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



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

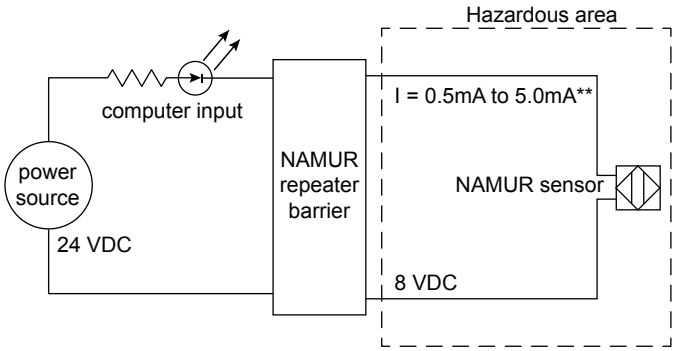
The Prism PI sensing module has the capability of changing the dead band of the open sensor from the factory setting of 30% of stroke to an expanded setting of 45%. It may be necessary to perform this procedure for applications in which the valve stroke varies between normal batch processing and SIP/CIP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

4.1.2 NAMUR sensor (45S) continued

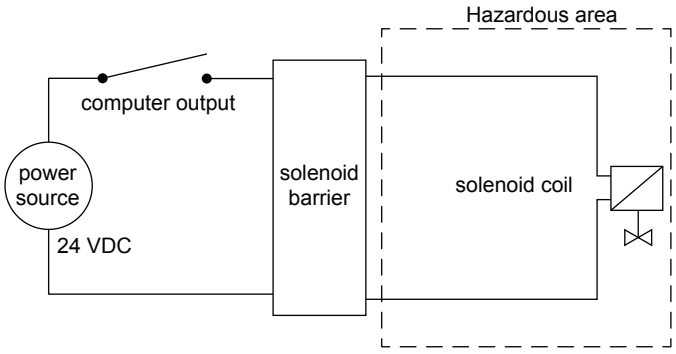
Typical basic intrinsically safe circuits

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

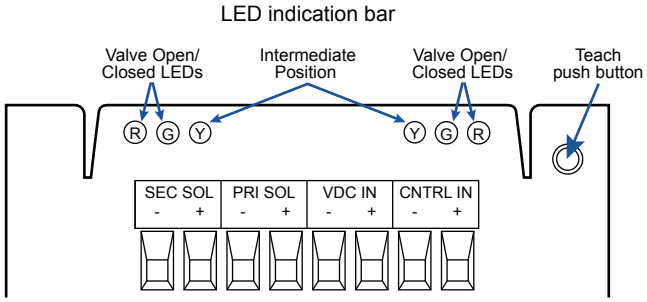


4.1 Sensor/switching modules

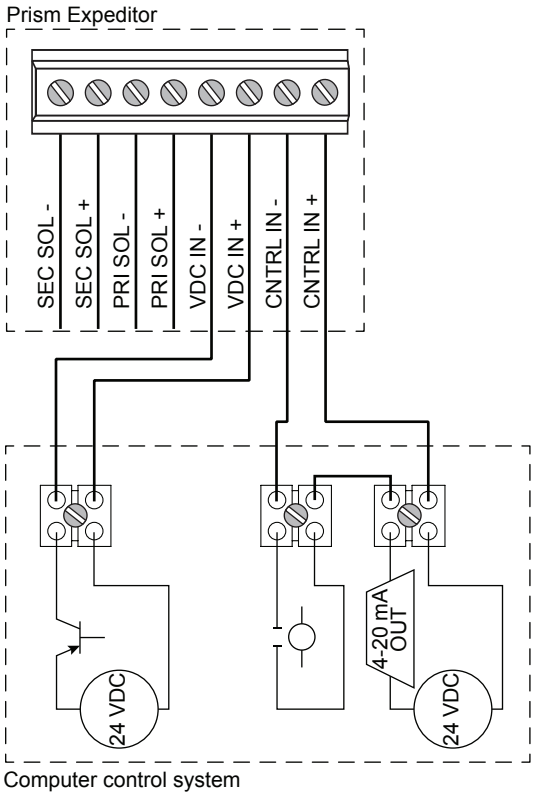
4.1.3 Expeditor, standard stroke (80S & 80W)

Specifications	
Position control (AO)	4-20 mA loop, 9-30 VDC (NAMUR NE 43 compliant)
Intermediate control range	20% - 80% 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 Prism Expeditor 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 drive valve to the 0% position and unlock the Wireless Link control override functionality. Wireless functionality allows remote monitoring, position control and TEACH capabilities. See page 22 for Wireless Link user guide.

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.

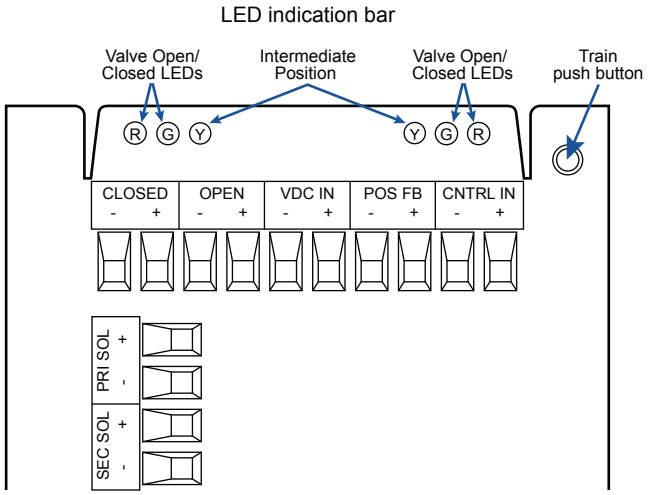
Specifications for Wireless Link	
Communication	*Bluetooth*® technology; single mode (not compatible with *Bluetooth*® Classic)
Frequency band	2.402-2.480 Ghz
Transmit power	4dBm or ~2.5 milliwatts
Data rate	1 Mbit/second; effective information transmit rate ~10 Kbits/second
Range	Up to 100 meters (330 feet) in free space. Range is reduced by obstructions between handheld device and Wireless Link VCT. Line of site is not necessary.
Registrations	FCC, IC, CE
CE compliance	Exceeds industrial compliance standards
VCT identification	VCTs in range will be displayed in order of signal strength
VCT link	One device accessed at a time between client (hand-held device) and server (VCT). 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® with iOS 8 or later

4.1 Sensor/switching modules

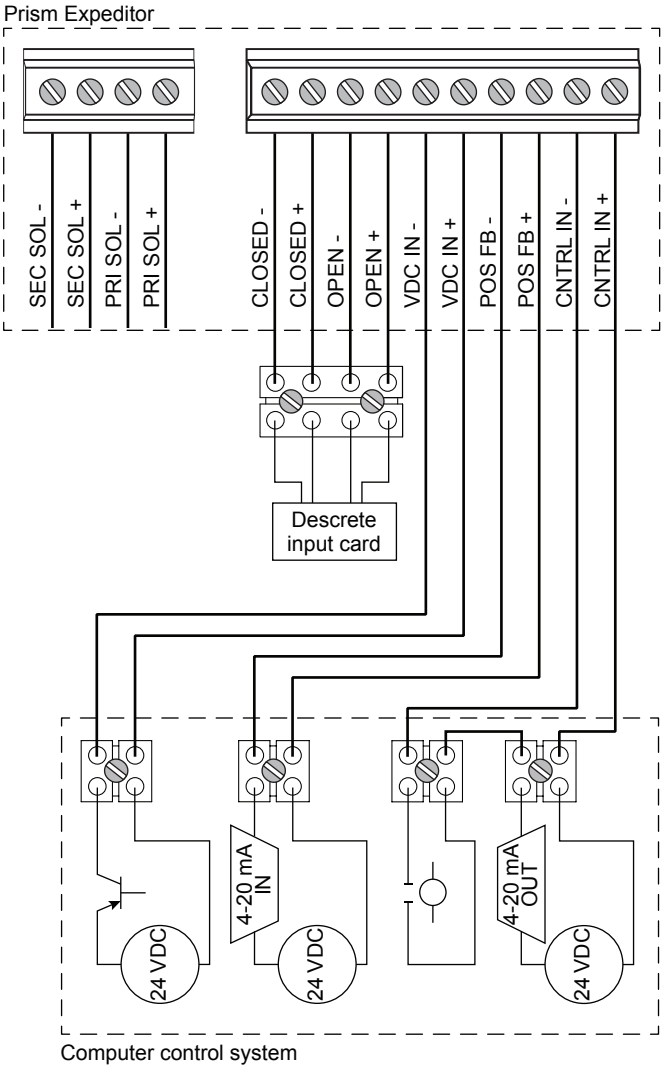
4.1.4 Expeditor, long stroke (81S & 81W)

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	20% - 80% of valve stroke	
Intermediate control accuracy	+/- 3 % of valve stroke	
Position feedback accuracy	+/- 1 % of valve stroke	
Maximum resistance load	Control Feedback	425 ohms @24 VDC 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



4.1.4 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 Prism Expeditor 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 Prism Expeditor long stroke 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 drive valve to the 0% position and unlock the Wireless Link control override functionality. Wireless functionality allows remote monitoring, position control and TEACH capabilities. See page 22 for Wireless Link user guide.

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.

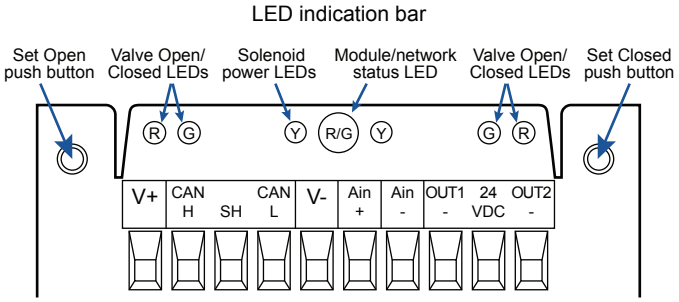
Specifications for Wireless Link	
Communication	*Bluetooth*® technology; single mode (not compatible with *Bluetooth*® Classic)
Frequency band	2.402-2.480 Ghz
Transmit power	4dBm or ~2.5 milliwatts
Data rate	1 Mbit/second; effective information transmit rate ~10 Kbits/second
Range	Up to 100 meters (330 feet) in free space. Range is reduced by obstructions between handheld device and Wireless Link VCT. Line of site is not necessary.
Registrations	FCC, IC, CE
CE compliance	Exceeds industrial compliance standards
VCT identification	VCTs in range will be displayed in order of signal strength
VCT link	One device accessed at a time between client (hand-held device) and server (VCT). 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® with iOS 8 or later

4.2 Valve communication terminals (VCT)

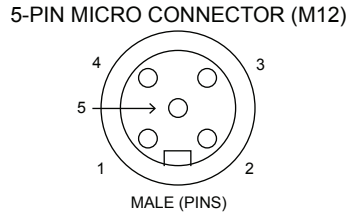
4.2.1 VCT with DeviceNet™ communication (92S & 92W)

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

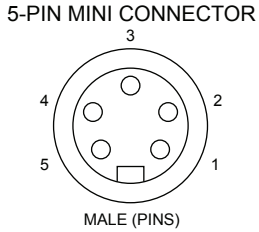
Wiring diagrams



Common receptacle options pin-out



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 Prism PI 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.

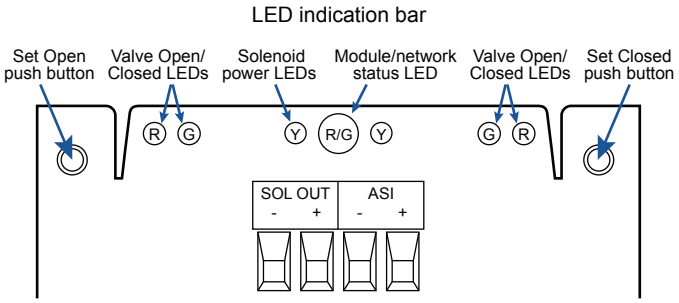
Specifications for Wireless Link	
Communication	*Bluetooth*® technology; single mode (not compatible with *Bluetooth*® Classic)
Frequency band	2.402-2.480 Ghz
Transmit power	4dBm or ~2.5 milliwatts
Data rate	1 Mbit/second; effective information transmit rate ~10 Kbits/second
Range	Up to 100 meters (330 feet) in free space. Range is reduced by obstructions between handheld device and Wireless Link VCT. Line of site is not necessary.
Registrations	FCC, IC, CE
CE compliance	Exceeds industrial compliance standards
VCT identification	VCTs in range will be displayed in order of signal strength
VCT link	One device accessed at a time between client (hand-held device) and server (VCT). 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® with iOS 8 or later

4.2 Valve communication terminals (VCT)

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

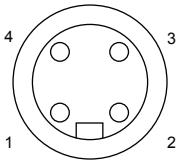
Specifications	
Communication protocol	AS-Interface v3.0
Configuration	(2) Discrete Inputs (sensors) (1) Discrete Output (solenoid)
Input voltage	26.5 - 31.6 VDC (AS-I voltage)
Output voltage	21-26 VDC
Quiescent current	35 mA
Current consumption (coil energized)	56 mA - 0.5 w coil (1N) 73 mA - 0.9 w 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 Bit 0 = not used Bit 1 = not used Bit 2 = green LED / valve open Bit 3 = red LED / valve closed	Outputs Bit 0 = set closed Bit 1 = set open Bit 2 = SOL OUT Bit 3 = wink
Specifications unique to 96W	
Bit assignment Inputs Bit 0 = red LED / valve closed Bit 1 = green LED / valve open Bit 2 = not used Bit 3 = not used	Outputs Bit 0 = SOL OUT Bit 1 = not used Bit 2 = wireless link enabled Bit 3 = not used Parameter Bit 0 = wink Bit 1-3 = not used

Wiring diagrams



Common receptacle options pin-out

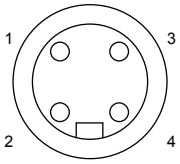
4-PIN MICRO CONNECTOR (M12)



MALE (PINS)

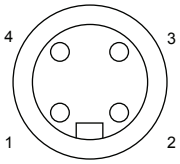
Pin	Signal
1	ASi +
2	not used
3	ASi -
4	not used

4-PIN MINI CONNECTOR



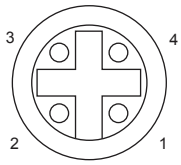
MALE (PINS)

4-PIN MICRO MALE / 4-PIN MICRO FEMALE



MALE (PINS)

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



FEMALE (SOCKETS)

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 Prism PI 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.

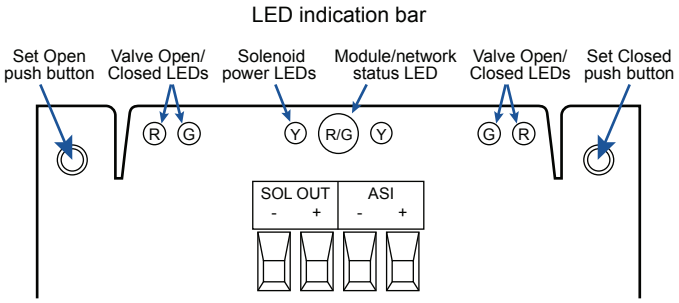
Specifications for Wireless Link	
Communication	*Bluetooth*® technology; single mode (not compatible with *Bluetooth*® Classic)
Frequency band	2.402-2.480 Ghz
Transmit power	4dBm or ~2.5 milliwatts
Data rate	1 Mbit/second; effective information transmit rate ~10 Kbits/second
Range	Up to 100 meters (330 feet) in free space. Range is reduced by obstructions between handheld device and Wireless Link VCT. Line of site is not necessary.
Registrations	FCC, IC, CE
CE compliance	Exceeds industrial compliance standards
VCT identification	VCTs in range will be displayed in order of signal strength
VCT link	One device accessed at a time between client (hand-held device) and server (VCT). 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® with iOS 8 or later

4.2 Valve communication terminals (VCT)

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

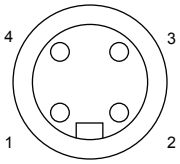
Specifications	
Communication protocol	AS-Interface v3.0
Configuration	(2) Discrete Inputs (sensors) (1) Discrete Output (solenoid)
Input voltage	26.5 - 31.6 VDC (AS-I voltage)
Output voltage	21-26 VDC
Quiescent current	35 mA
Current consumption (coil energized)	56 mA - 0.5 w coil (1N) 73 mA - 0.9 w 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 Bit 0 = not used Bit 1 = not used Bit 2 = green LED / valve open Bit 3 = red LED / valve closed	Outputs Bit 0 = not used Bit 1 = wink Bit 2 = SOL OUT Bit 3 = not available
Specifications unique to 97W	
Bit assignment Inputs Bit 0 = red LED / valve closed Bit 1 = green LED / valve open Bit 2 = not used Bit 3 = not used	Outputs Bit 0 = SOL OUT Bit 1 = not used Bit 2 = wireless link enabled Bit 3 = not available Parameter Bit 0 = wink Bit 1-3 = not used

Wiring diagrams



Common receptacle options pin-out

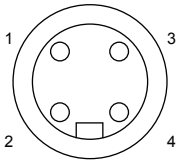
4-PIN MICRO CONNECTOR (M12)



MALE (PINS)

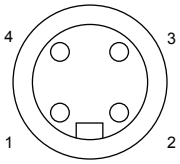
Pin	Signal
1	ASi +
2	not used
3	ASi -
4	not used

4-PIN MINI CONNECTOR



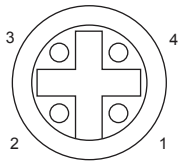
MALE (PINS)

4-PIN MICRO MALE / 4-PIN MICRO FEMALE



MALE (PINS)

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



FEMALE (SOCKETS)

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 Prism PI 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 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 Link VCT. Line of site is not necessary.
Registrations	FCC, IC, CE
CE compliance	Exceeds industrial compliance standards
VCT identification	VCTs in range will be displayed in order of signal strength
VCT link	One device accessed at a time between client (hand-held device) and server (VCT). 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® with iOS 8 or later

5 Wireless Link user guide

5.1 Getting started

Before using this guide, ensure that you have downloaded the most current version of the StoneL Wireless Link app to your iPhone® or iPad® from the App Store. It is an iPhone® app but designed to work with an iPad® as well. When searching the App Store on an iPad®, ensure that the drop-down menu at the top of search results page is set to "iPhone Only." Your iOS device must be running iOS 8 or later and be equipped with *Bluetooth*® technology to use the StoneL Wireless Link app. The app is not compatible with *Bluetooth*® Classic.
Make sure that your iOS device has its *Bluetooth*® capability turned on when attempting to use the StoneL Wireless Link app. This can be found under your iOS device's settings. To ensure that you have good *Bluetooth*® reception, keep your iOS device within 33 ft [10 m] of the module that you wish to connect to. The range of your *Bluetooth*® device may be affected by many things, including interference from other devices and physical obstructions.

WARNING
Upon disconnect or master disabling overrides, output forces will be removed and valve may cycle.

5.2 Home screen

Selecting a valve

After opening the StoneL Wireless Link app, you are directed to the home screen. This screen allows you to browse and select a specific automated valve when multiple valves are present.

1. All energized wireless modules within range of your iOS device will appear on the screen (Image 1). If no powered devices are within range, the device list will be blank.
2. To identify a specific valve when multiple valves are present, select the wink button next to the unit you wish to select (Item A). This will cause the module's LEDs to blink for 30 seconds, or until you press the "Stop Winking" button (Item B)
3. Choose a specific valve by selecting the row that relates to the unit you wish to select (Item C), this will direct you to the device detail screen.

Note
The list of devices present can be refreshed by swiping downward on the home screen.

Releasing a device

Once you have selected a device, it will be paired to your Apple device until you unpair it.

1. In order for another Apple device user to access control with their wireless link app, unpair your device by going back to the home screen/device list.

Menu

Selecting the menu (Item D) on the upper left corner of the home screen allows you access import and export features (Image 2).

1. The device list import allows you to import: valve tag number, device address, baud rate (if applicable), valve/actuator description and additional information from a CSV file.
2. The device list export allows you to export: valve tag number, device address, baud rate (if applicable), valve/actuator description, valve position, stroke time, cycle count data, and additional information to a CSV file.

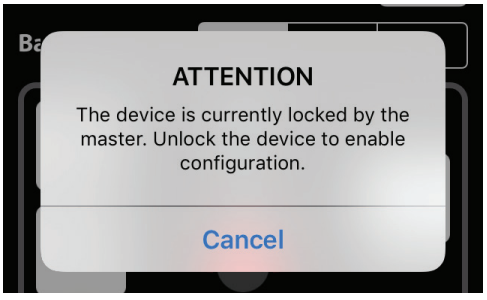
5.3 Locked screen

If the icons on the device detail screen appear grayed-out or unavailable to select, this means the master is still in control. (Image 3) Check to ensure that the power supply is set to IR addressing mode (AS-i only) or enable the control override bit for the device (AS-i DO Bit 2; DeviceNet™ Byte 0, Bit 7).

Image 1

Image 2

Image 3



5.4 Device detail screen

You can customize the tag for a device, change the address, change the baud rate (if applicable), force the solenoids on or off, cause the device to wink, and set the open/closed limits from the device detail screen (Image 4a, 4b, or 4c). .

Changing the device tag or address on a DeviceNet unit

1. To change the tag, edit the existing tag in the associated text field (Item E). The tag can be up to sixteen characters long.
2. To change the DeviceNet address, edit the existing address in the associated text field (Item G). The DeviceNet address for the 92W can be 1 to 63
    a. When changing the address, a warning screen will appear indicating this action could disrupt the process. Select cancel or continue.
    b. Select continue and alter the address via number pad and select done. A warning screen will appear indicating the choice to reset now or reset later. Resetting the device could disrupt the process.
    c. Selecting reset now will implement the address change of the device.
    d. Selecting reset later will not implement device address change until selecting reset slave (Item F) and will cause the device address to indicate pending status.
3. To change the device baud rate (Item H), select the desired rate from the choices. The device default baud rate is 125K.
    a. When changing the baud rate, a warning screen will appear indicating this action could disrupt the process. Select reset now or reset later.
    b. Selecting reset now will implement the change to the baud rate of the device.
    c. Selecting reset later will not implement the change to the baud rate of the device until selecting reset slave.
4. Selecting reset slave will cause a warning screen to appear indicating resetting the device could disrupt the process. Select continue to implement changes made to the device address and/or device baud rate.

Changing the device tag or address on an ASi unit

1. To change the tag, edit the existing tag in the associated text field (Item M). The tag can be up to sixteen characters long.
2. To change the AS-i address, edit the existing address in the associated text field (Item N). The AS-i address for the 97W can be 0A to 31A or 0B to 31B.
    a. When changing the address, a warning screen will appear indicating this action could disrupt the process. Select cancel or continue.
    b. Select continue and alter the address via number pad and select done.

Forcing the solenoids on/off

Forcing a solenoid on or off will override master control if wireless link overrides are enabled.

1. The solenoid control state is forced on or forced off when it is highlighted in orange (Item J).
    a. Warning screen will appear indicating this action could disrupt the process. Select cancel or continue.
    b. Select continue and when a solenoid is on, a yellow light will illuminate next to the solenoid (Item K).
    c. Select continue and when a solenoid is off, no light will illuminate next to the solenoid (Item L).

Image 4a - DeviceNet detail

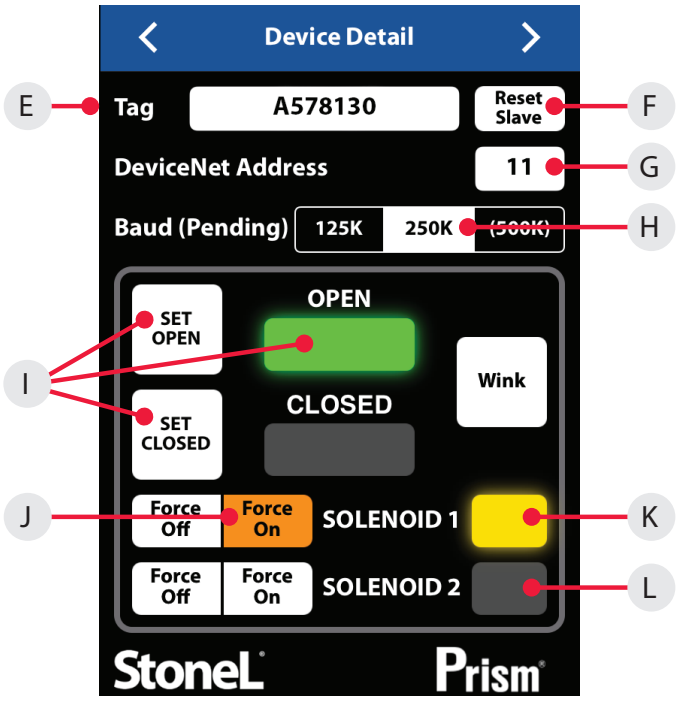


Image 4b - ASi detail

Setting the valve position

Forcing the solenoid on and off is one way of actuating the valve when setting the open and closed positions.

1. To set a valve to the closed position:
    a. Actuate the valve to the CLOSED position. This can be done by forcing the solenoid(s) on or off.
    b. Select set closed. A warning screen will appear indicating this action could disrupt the process. Select cancel or continue.
    c. Select continue and the red closed light will illuminate (Item I).
    d. The valve now remembers the current position as the closed position.
2. To set a valve to the open position:
    a. Actuate the valve to the OPEN position. This can be done by forcing the solenoid(s) on or off.
    b. Select set open. A warning screen will appear indicating this action could disrupt the process. Select cancel or continue.
    c. Select continue and the green open light will illuminate (Item I).
    d. The valve now remembers the current position as the open position.

5.4 Device detail screen continued

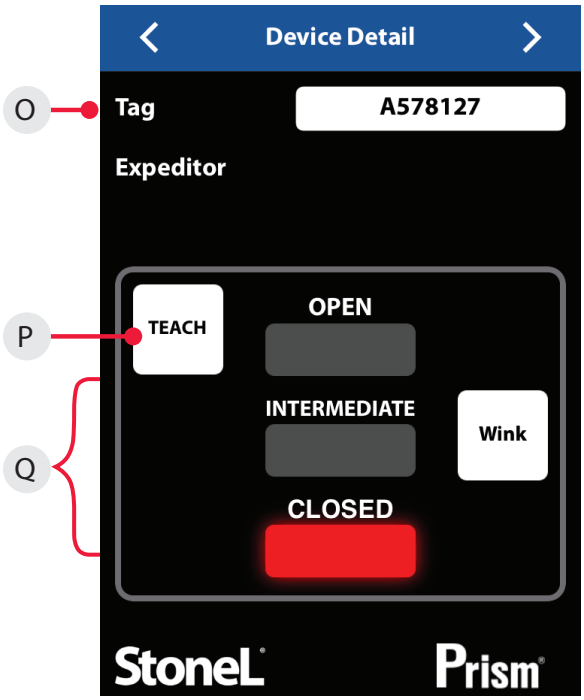
Changing the device tag on an expeditor unit

1. To change the tag, edit the existing tag in the associated text field (Item O). The tag can be up to sixteen characters long.

Calibrating the valve assembly

1. Actuate the valve to the CLOSED position.
2. Select teach (Item P). A warning screen will appear indicating this action could disrupt the process. Select cancel or continue.
3. Select continue. The valve will cycle open and closed one or more times while determining the valve operating characteristics.
4. Calibration will finish with the valve in the commanded position and the appropriate light illuminated (Item Q).
5. You can verify intermediate control functionality using the diagnostics screen (Image 6c).

Image 4c - Expeditor detail



5.5 More information screen

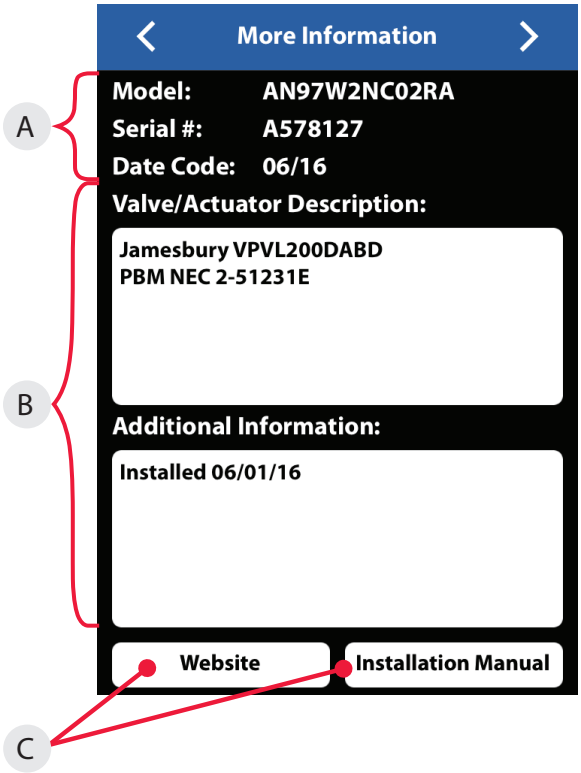
To see additional information about a specific valve, swipe right or use the arrows at the top of the device detail screen.

1. At the top of the more Information screen (Image 5), the unit model number, serial number, and date code are displayed (Item A). These are preset from the factory and cannot be changed.
2. There are two customizable text boxes titled "Valve/Actuator Description" and "Additional Information" where up to 160 characters can be added for user notes, such as maintenance or service records (Item B).

Website and instruction manual

The direct links to StoneL's website and the unit installation, Maintenance and Operating Instructions located on the bottom buttons of the More Information screen require an internet connection to access (Item C).

Image 5



5.6 Diagnostics screen

To see additional diagnostics about a specific valve, advance a page to the right using the arrows at the top of the more information screen.

1. The valve position information includes real time valve position, stroke time baseline, and stroke time of last cycle (AS-i only - Item D).
2. The valve cycle count is displayed and indicates how many cycles the valve has made since last reset (Item E). A cycle is considered to be a complete actuation of the valve. Selecting the reset button (Item G) will erase the cycle count and start counting again from 0.
3. The current temperature of the valve monitor is displayed; along with the temperature range of the valve since last reset (Item F). Selecting the reset button (Item H) will erase the historical temperature data and start a new period of temperature data collection.
4. If external switches are connected to the Aux 1 or Aux 2 inputs of the module, these switches can be monitored here. (AS-i only - Item J)
5. If an external 4-20mA loop powered device is connected to the auxiliary analog input of the module, the feedback signal can be monitored here. (DeviceNet only - Item K)
6. To verify intermediate control function (Expeditor only) select expeditor override input (Item N). Change the existing percentage in the associated text field to desired value. Select done and verify valve moves to indicated percentage displayed by valve position (Item L) and override 4-20 mA input (Item M).
7. The Error Status register (Item I) can display numerous faults that are detected by the module. This data is only available via the Wireless Link app and is not accessible from the bus network. The following is a list of errors/faults that can be detected and display on the iOS device:

Error status register		
DeviceNet only	**ASi only**	**Expeditor**
Bus protocol error	Output shorted	Output shorted
Major DeviceNet fault	Internal sensor fault	Internal sensor fault
Minor DeviceNet fault	No magnet detected	No magnet detected
DeviceNet timed-out	Bus protocol error	Input signal error
Pending DeviceNet change	No data exchange	
Duplicate address		
Bus-off fault		

Image 6a - ASi detail

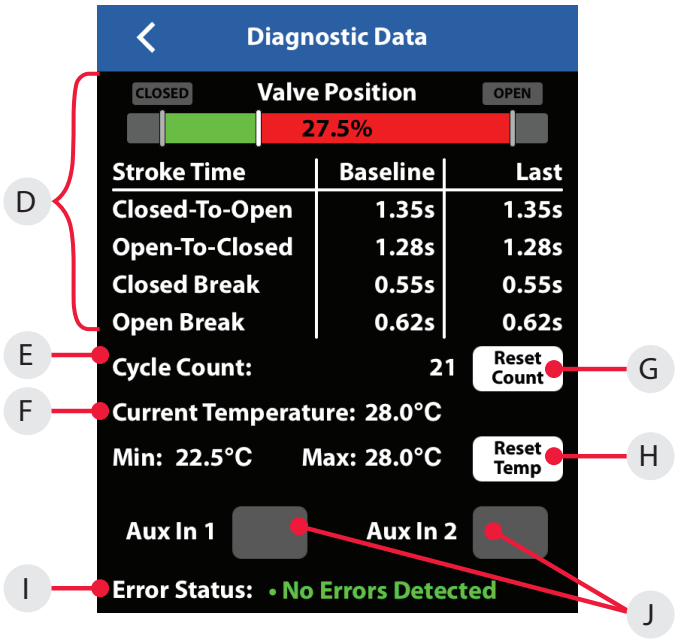


Image 6b - DeviceNet detail

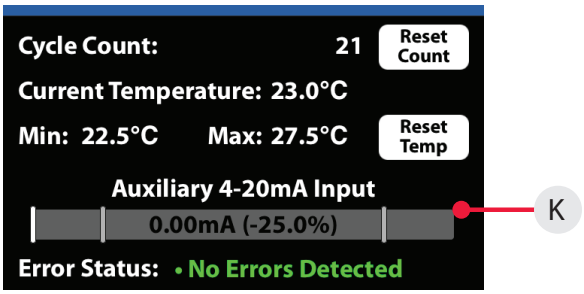
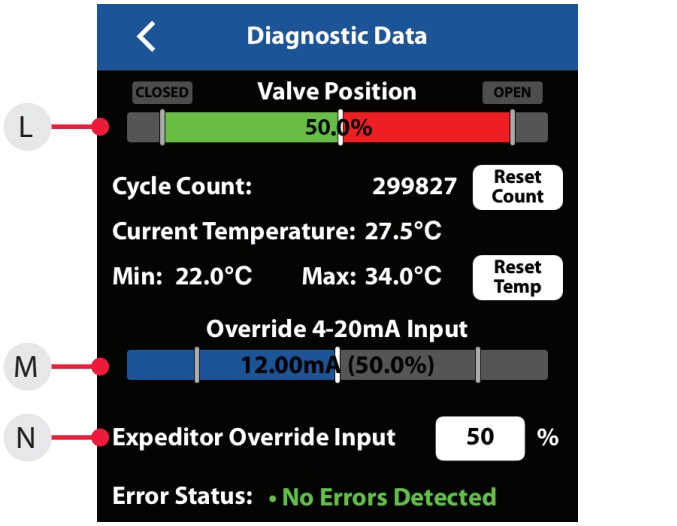


Image 6c - Expeditor detail



5.7 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.

Contains FCC ID: PI4BL600

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This equipment is in compliance with SAR for general population/uncontrolled exposure limits in ANSI/IEEE C95.1-1999 and had been tested in accordance with the measurement methods and procedures specified in OET Bulletin 65 Supplement C.

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

6 Model/Type code

Model selector

SERIES

PI Nonincendive or intrinsically safe

FUNCTIONS

Sensors modules

33S	(2) SST NO switching sensors
45S	(2) NAMUR sensor (EN 60947-5-6; I.S.)

Valve communication Terminals (VCTs)

92S	DeviceNet™
92W	DeviceNet™ with Wireless Link
96S	AS-Interface
96W	AS-Interface with Wireless Link
97S	AS-Interface with extended addressing
97W	AS-Interface with extended addressing and Wireless Link

Expeditor, standard stroke

80S	(1) 4-20mA AO for position control
80W	(1) 4-20mA AO for position control with Wireless Link

Expeditor, long stroke

81S	(1) 4-20mA AO for position control with (1) 4-20mA AI and (2) 24V DI for position feedback
81W	(1) 4-20mA AO for position control with (1) 4-20mA AI and (2) 24V DI for position feedback with Wireless Link

PNEUMATIC VALVE / TEMPERATURE

-20° C to 60° C / 0.1 Cv

11S	No pneumatic valve
1NS	Three-way voltage / power depends on function

-10° C to 50° C / 0.2 Cv

1KS	Three-way 24 VDC
1MS	Three-way 120 VAC
2KS	Dual three-way 24 VDC

ENCLOSURE

A	North American (NEC/CEC)
V	International (IEC)
L	Other

CONDUIT/CONNECTORS

Standard

01	(1) ½" NPT
02	(2) ½" NPT
04	(1) M20
05	(2) M20
08	(1) cable glands
09	(2) cable glands

Mini-connectors

10	(1) 4-pin
11	(1) 5-pin
19	(1) 6-pin

Micro-connectors (M12)

13	(1) 4-pin
14	(2) 4-pin
15	(1) 5-pin
17	(1) 6-pin

VISUAL INDICATOR

R	Green open
0	No indication

VALVE SIZE

S	Standard stroke - ¼" to 2" (3.2 mm to 28.5 mm; ⅛" to 1 ⅛" stroke)
L	Long stroke - ¼" to 6" (3.2 mm to 66.8 mm; ⅛" to 2 ⅝" stroke)

BRANDING

A	StoneL
M	Neles

Model number example

PI	33S	1KS	A	01	R	S	A	OPTIONAL

MODEL NUMBER — Mounting hardware required and sold separately.

PARTNERSHIP ID — Some models may include 5-digit identification suffix.

7 Regulatory, specific conditions of use, and product marking

DECLARATION OF CONFORMITY

Manufacturer:
Neles USA Inc. dba StoneL
26271 US Highway 59
Fergus Falls, Minnesota 56537 USA

Products:
Prism PI Series – Valve Position Monitors and Valve Communication Terminals

Model - Type	Certificates / Directives / Standards	Marking
PI Series	EU Type Examination Certificate FM18ATEX0043X ATEX 2014/34/EU EN 60079-0:2012+A11:2013, EN 60079-11:2012 EMC 2014/30/EU EN 60947-5-2:2007/A1:2012	Ex CE 2809 ATEX II 1 G Ex ia IIC T5 Ga ATEX II 1 D Ex ia IIIC T100°C Da
PI Series	IECEx Certificate of Conformity IECEx FMG 18.0017X IEC 60079-0:2011, IEC 60079-11:2011	Ex ia IIC T5 Ga Ex ia IIIC T100°C Da
PI Series	EMC 2014/30/EU, LVD 2014/35/EU EN 60947-5-2:2007/A1:2012 EN 62026-2:2013, EN 62026-3:2009, EN 61000-6-2:2005, EN 61000-6-4:2005, EN 61326-1:2013 RED 2014/53/EU EN 61326-1:2013, EN 61000-6-2:2005, EN 61000-6-4:2007, EN 62026-2:2013, EN 61010-2-201:2013/AC:2013, EN 62311:2008, EN 62479:2010, EN 301 489-1 v2.2.0 (2017-03), EN 301 489-17 v3.2.0 (2017-03), EN 300 328 v2.1.1 (2016-11)	CE

ATEX Notified Bodies for EU Type Examination Certificates:
FM Approvals Europe Ltd., Dublin, Ireland (Notified Body Number 2809)

We declare under our sole responsibility that the products, as described, are in conformity with the listed standards and directives.

Fergus Falls, 12th January 2021

Bryan Beckman, Quality Manager
Authorized Person of the Manufacturer

105455revB

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

SPECIFIC CONDITIONS OF USE / MARKING

For PI Series – FM18ATEX0043X	
Specific Conditions of Use - Notes	**Marking**
1. To prevent the risk of electrostatic sparking, the equipment enclosure shall be cleaned only with a damp cloth.	ATEX II 1 G Ex ia IIC T5 Ga Ta = -20°C to +60°C ATEX II 1 D Ex ia IIIC T100°C Da Ta = -20°C to +60°C

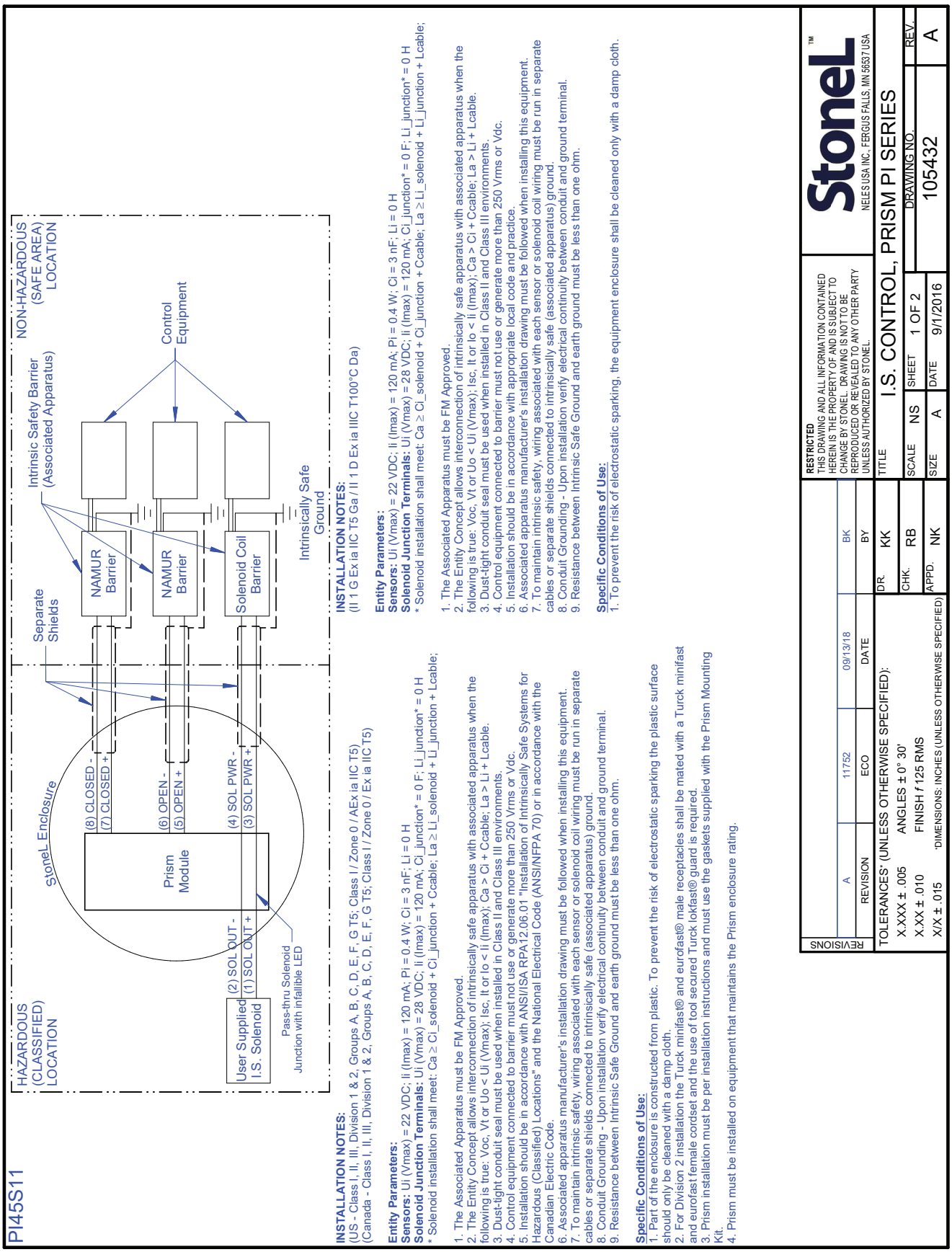
For PI Series – IECEx FMG 18.0017X	
Specific Conditions of Use - Notes	**Marking**
1. To prevent the risk of electrostatic sparking, the equipment enclosure shall be cleaned only with a damp cloth.	Ex ia IIC T5 Ga Ta = -20°C to +60°C Ex ia IIIC T100°C Da Ta = -20°C to +60°C

For PI Series – FM17US0170X / FM17CA0078X	
Specific Conditions of Use - Notes	**Marking**
1. Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth. 2. For Division 2 installation the Turck minifast® and eurofast® male receptacles shall be mated with a Turck minifast® and eurofast® female cordset and the use of tool secured Turck lokfast® guard is required. 3. Prism installation must be per installation instructions and must use the gaskets supplied with the Prism Mounting Kit. 4. Prism must be installed on equipment that maintains the Prism enclosure rating. Warning: Substitution of components may impair intrinsic safety or suitability for Division 2. Keep cover tight while circuits are alive. NOTE: See also Control Drawing 105432 for “IS” installation. 1. Une partie de l'enceinte est construite en plastique. Pour éviter les risques d'étincelles électrostatiques, la surface en plastique ne doit être nettoyée qu'avec un chiffon humide. 2. Pour l'installation de la Division 2, les réceptacles mâles Turck minifast® et eurofast® doivent être accouplés avec un cordon femelle Turck minifast® et eurofast® et l'utilisation d'un dispositif de protection Turck lokfast® est nécessaire. 3. L'installation du prisme doit être conforme aux instructions d'installation et doit utiliser les joints fournis avec le kit de montage Prism. 4. Prism doit être installé sur l'équipement qui maintient l'évaluation de l'enceinte Prism Avertissement: La substitution de composants peut nuire à la sécurité intrinsèque ou l'aptitude à la division 2. Gardez le couvercle bien fermé pendant que les circuits sont en vie. REMARQUE: Voir également le dessin de contrôle 105432 pour l'installation "IS".	US/Canada - IS: Class I, II, III, Div 1 & 2, GP A, B, C, D, E, F, G T5 US/Canada - NI: Class I, II, III, Div 2, GP A, B, C, D, E, F, G T5 US/Canada - Class I, Zone 2, IIC, T5 US - Class I, Zone 0, AEx ia IIC, T5 Canada - Class I, Zone 0, Ex ia IIC, T5 Install Per 105432

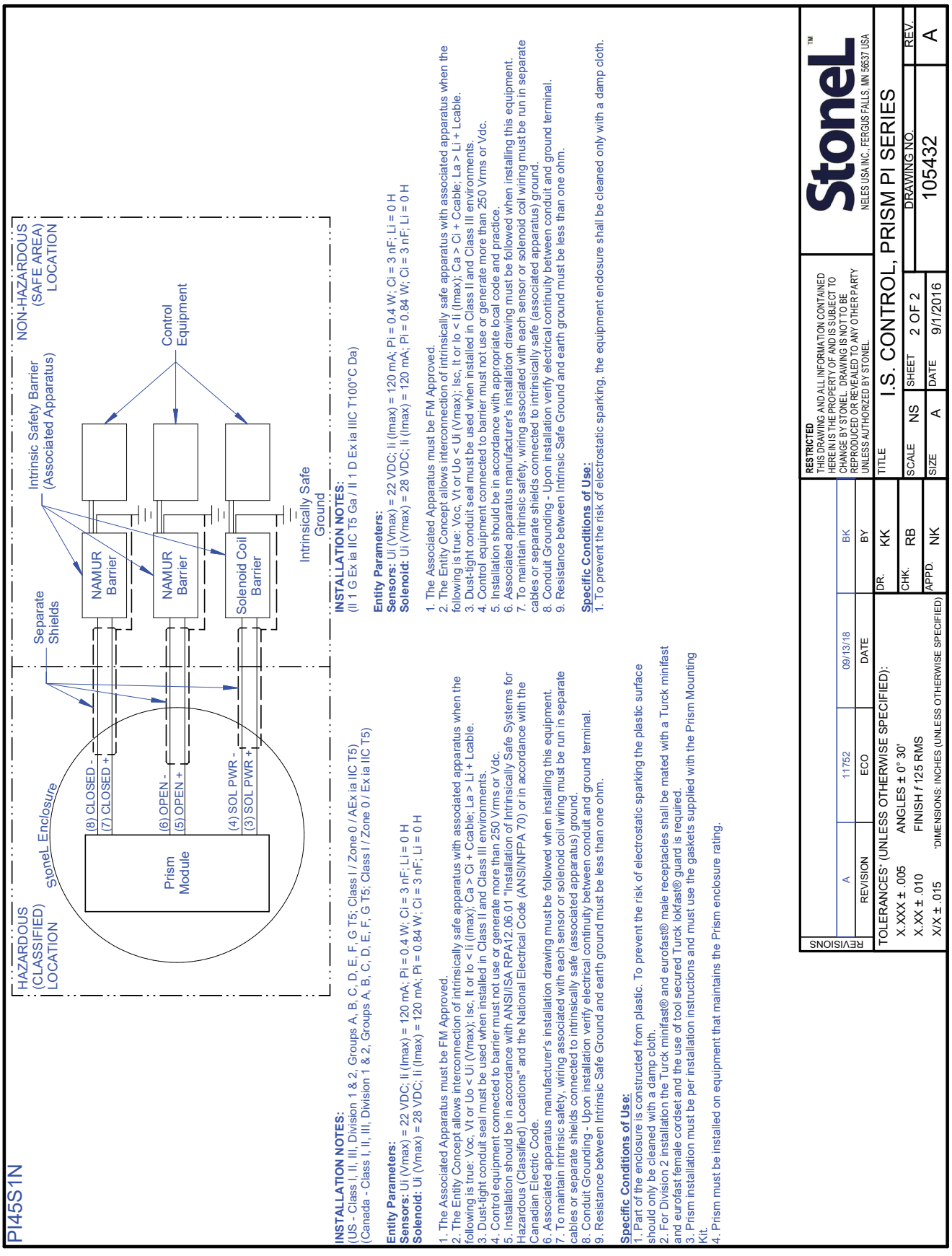
105455revB

8 Appendix

8.1 Controlled installation drawings



8.1 Controlled installation drawings continued



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Reinventing reliability