Stonel™ Axiom™

Valve controller series
ANX

Installation, maintenance and
operating instructions

Table of contents

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.

1 General

1.1 Introduction

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

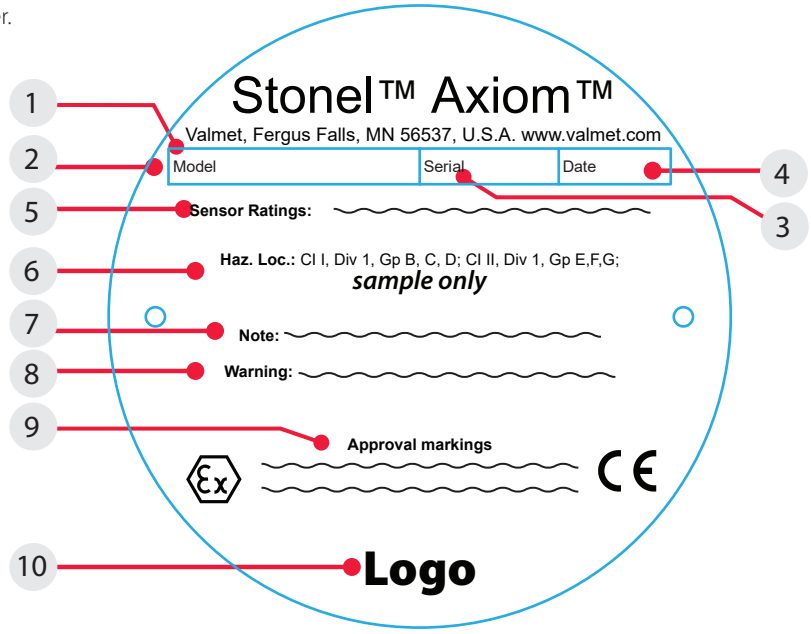
Note
The selection and use of this product in a specific application requires close consideration of detailed aspects. Due to the nature of the product, this manual cannot cover all the likely situations that may occur when installing, using, or servicing the product. If you are uncertain about the use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

1.2 Title plate markings

This 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 23 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.

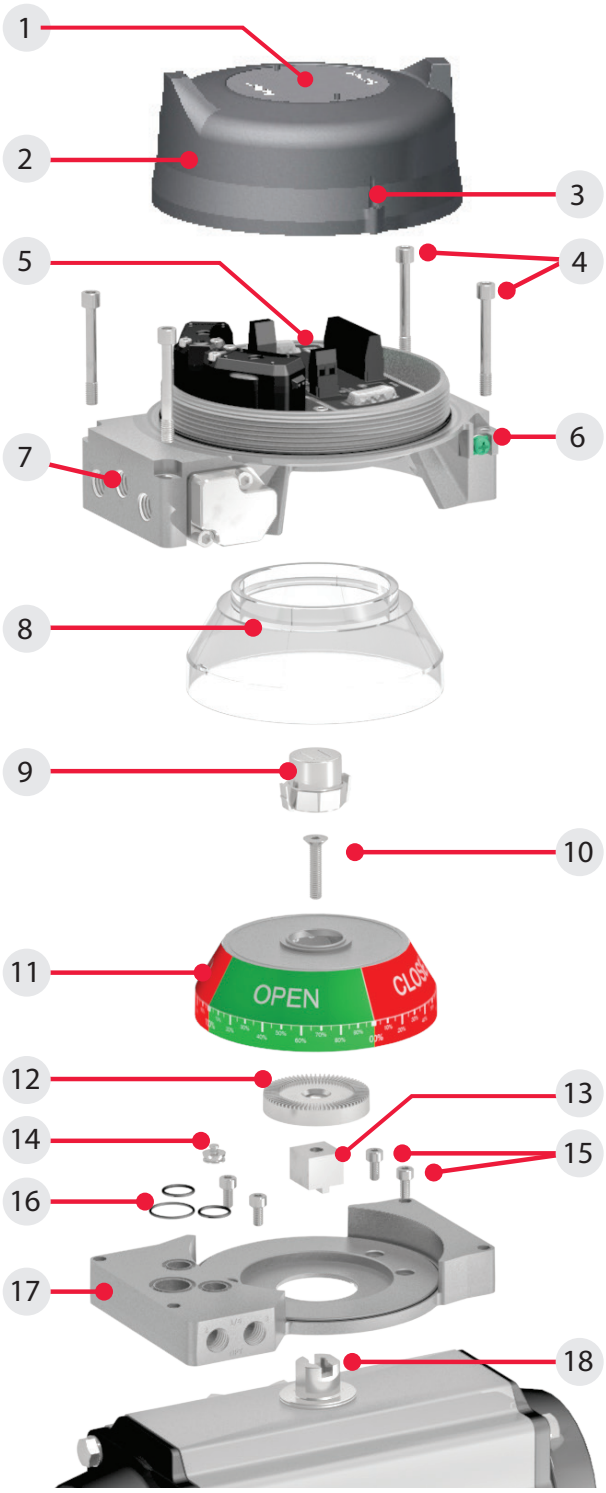
1.5 Safety precautions

Do not exceed the permitted values! Exceeding the permitted values marked on the product 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. Cover lock
4. Body screws
5. Internal ground lug
6. External ground lug
7. Body
8. Visual indicator cover
9. Trigger
10. Visual indicator drum retaining screw
11. Visual indicator drum
12. Visual indicator drum coupler
13. Visual indicator drive block
14. DA/SR plug
15. Air manifold plate mounting screws
16. Air manifold plate orifice o-rings
17. Air manifold plate
18. Actuator shaft



1.7 Specifications for all models

See page 10 for function specific details.

Specifications	
Materials of construction	
Housing & air manifold plate	Epoxy-coated anodized aluminum or CF3M stainless steel
Visual indicator drum	Polycarbonate
Visual indicator cover	Polycarbonate
Fasteners	Stainless steel
O-rings	Nitrile compound
Operating life	1 million cycles (0.8 Cv) 500,000 cycles (1.2 Cv)
Temperature range	-40° C to 80° C (-40° F to 176° F)
Enclosure protection	Type 4, 4X, and IP66
Warranty	
Sensing & communication module	Five years
Mechanical components	Five years
Unit weights	
Aluminum	2.83 kg / 6.25 lb
Stainless steel	7.78 kg / 17.15 lb
Unit dimensions	
Unit height Cover removal clearance	124.46 mm [4.90 in] 214.00 mm [5.80 in]
Position sensing	
Accuracy	Within 1°
Repeatability	Within 1°
Setting buffer	4° from set point *(Rotational distance from original set point where switch will energize on return stroke)*
Dead band	6° from set point *(Rotational distance from original set point where switch will de-energize)*
Max rotational range	120°
Terminal block specifications	
Recommended torque	4.42 in.lbs (0.5 Nm)
Conductor strip length	0.22 -0.25 in (5.5-6.5 mm)
Maximum wire size	30-12 AWG (0.5-2.5 mm^2)
Wire type	Stranded or solid
Environmental conditions	
Location	Indoor and outdoor
Maximum altitude	5000 m
Maximum humidity	90%
Pollution degree	4
Ratings and approvals*	See page 23 or manufacturer's official website
* Only models listed on manufacturer's official website are approved per specific rating.	

1.8 Pneumatic valve specifications

Specifications		
General pneumatic specifications		
Valve design	Pilot operated spool valve	
Configuration	Single pilot Dual pilot	5-way, 2-position, spring return 5-way, 2-position, shuttle piston
Flow rating	0.8 Cv (Kv = 0.69 based on flow m3/hr) 1.2 Cv (Kv = 1.04 based on flow m3/hr)	
Axiom porting	¼" NPT (0.8 Cv) ⅜" NPT (1.2 Cv)	
Manifold porting	¼" NPT	
Medium	Air or inert gas	
Medium temperature range (TS)	-40° C to 80° C	
Operating pressure	45 psi to 120 psi (3.1 to 8.2 bar)	
Operating temperature	-40° C to 80° C (-40° F to 176° F)	
Operating life	1 million cycles (0.8 Cv) 500,000 cycles (1.2 Cv)	
Manual override	Internal momentary Optional external momentary available Optional external latching available	
Material of construction		
Aluminum enclosure	Spool Body Seal spacers Spool seals O-rings End caps and fasteners	Nickel plated aluminum Epoxy coated anodized aluminum Polysulfone Nitrile compound Nitrile compound 316 stainless steel
Stainless steel enclosure	Spool Body Seal spacers Spool seals O-rings End caps and fasteners	Teflon-coated stainless steel 316L stainless steel Polysulfone Nitrile compound Nitrile compound 316 stainless steel
Solenoid coil specifications		
35S, 35W		
Operating voltage	20 - 250 VAC 50/60 Hz; 20 - 55 VDC	
Power consumption	12 mA @ 20 - 250 VAC (1.0 watt typical) 20 mA @ 20 - 55 VDC (0.5 watts typical)	
Inrush current	3.75 A @ 125 VAC (typical) 3.0 A @ 220 VAC (typical) 0.15 A @ 24 VDC (typical)	
Filtration requirements	50 microns	
45S	**(Intrinsically Safe)**	
Operating voltage	18 - 28 VDC	
Power consumption	0.3 watts	
Filtration requirements	50 microns	
Entity parameters	Ui=28 VDC, Ii=120 mA, Ci=3 nF, Li=0 mH, Pi=0.84 W	
92S, 92W, 97S , 97W, 98S & 98W	24 VDC	
Operating voltage	0.5 watts	
Power consumption	50 microns	
Filtration requirements		

1.9 Pneumatic valve schematics

Fig. 1 Single pilot spring return pneumatic valve on spring return actuator with rebreather open

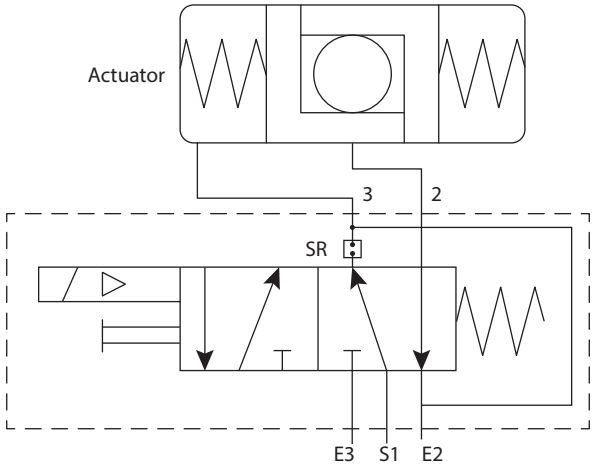


Fig. 2 Single pilot spring return pneumatic valve on double-acting actuator with rebreather closed

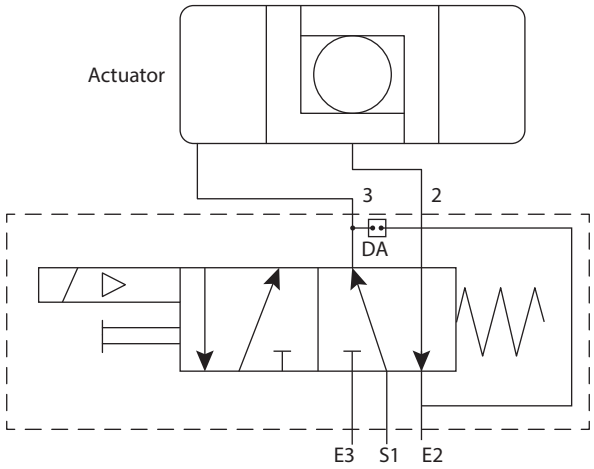
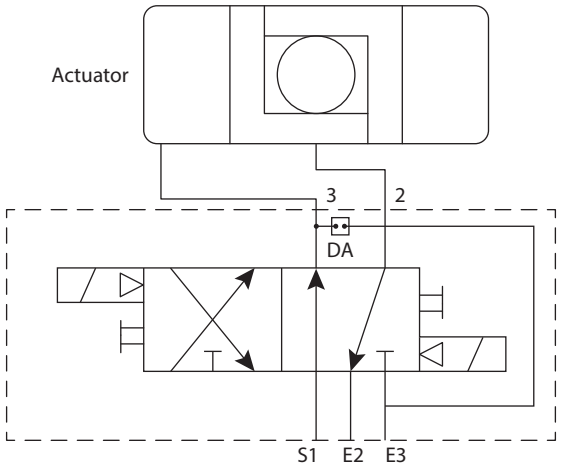
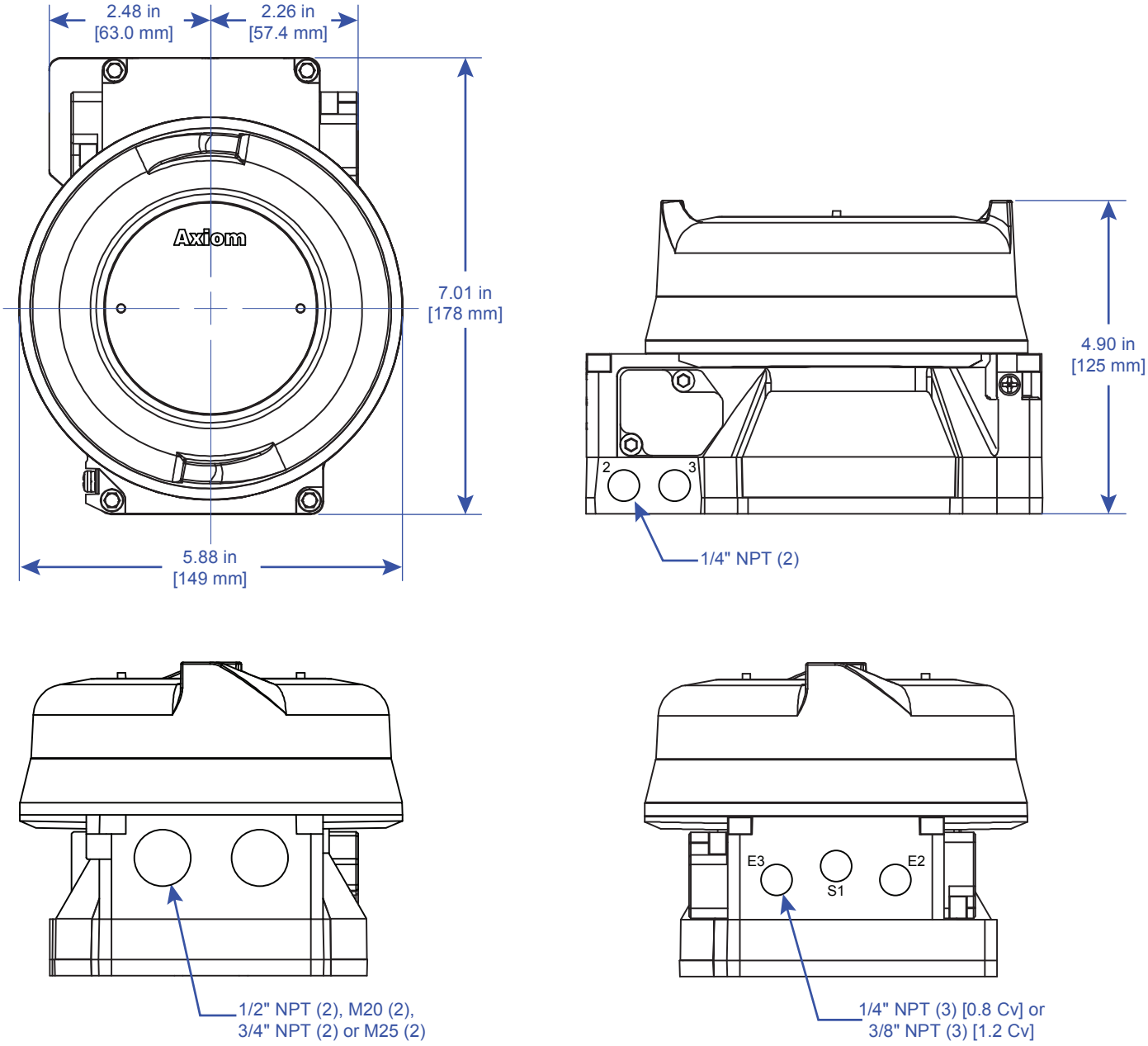


Fig. 3 Dual coil shuttle piston pneumatic valve



1.10 Dimensions



Note

The certified dimensional drawing for this product can be found at www.neles.com/stonel/technical-information/

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.
- It is recommended that thread lubricant or anti-seize be used on the product body screws (Item D) prior to assembly.
- In high cycle or high vibration applications, blue Loctite® may be used on the air manifold mounting screws (Item K) and the visual indicator drum retaining screw (Item F).
- It is highly recommended that exhaust ports E2 and E3 be fitted with low restriction mufflers or breather vent caps to prevent ingestion of water and debris into the pneumatic valve.
- Seal within 50 mm for Ex db installation or within 18 inches (0.45 m) for XP/DIP Ta <-25°C installation.

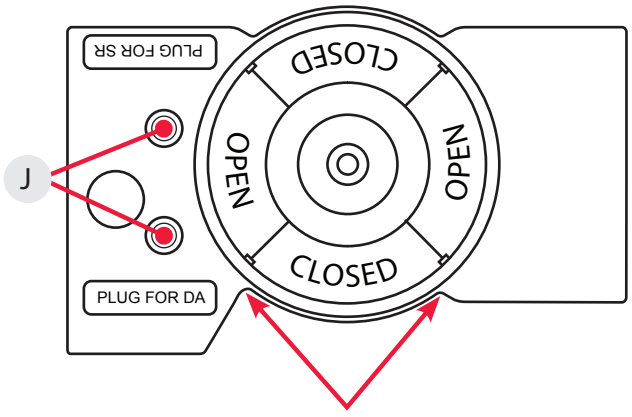
Caution: In order to maintain CE conformity, the Axiom housing shall be grounded to earth potential by one of the housing ground screws.

Steps

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

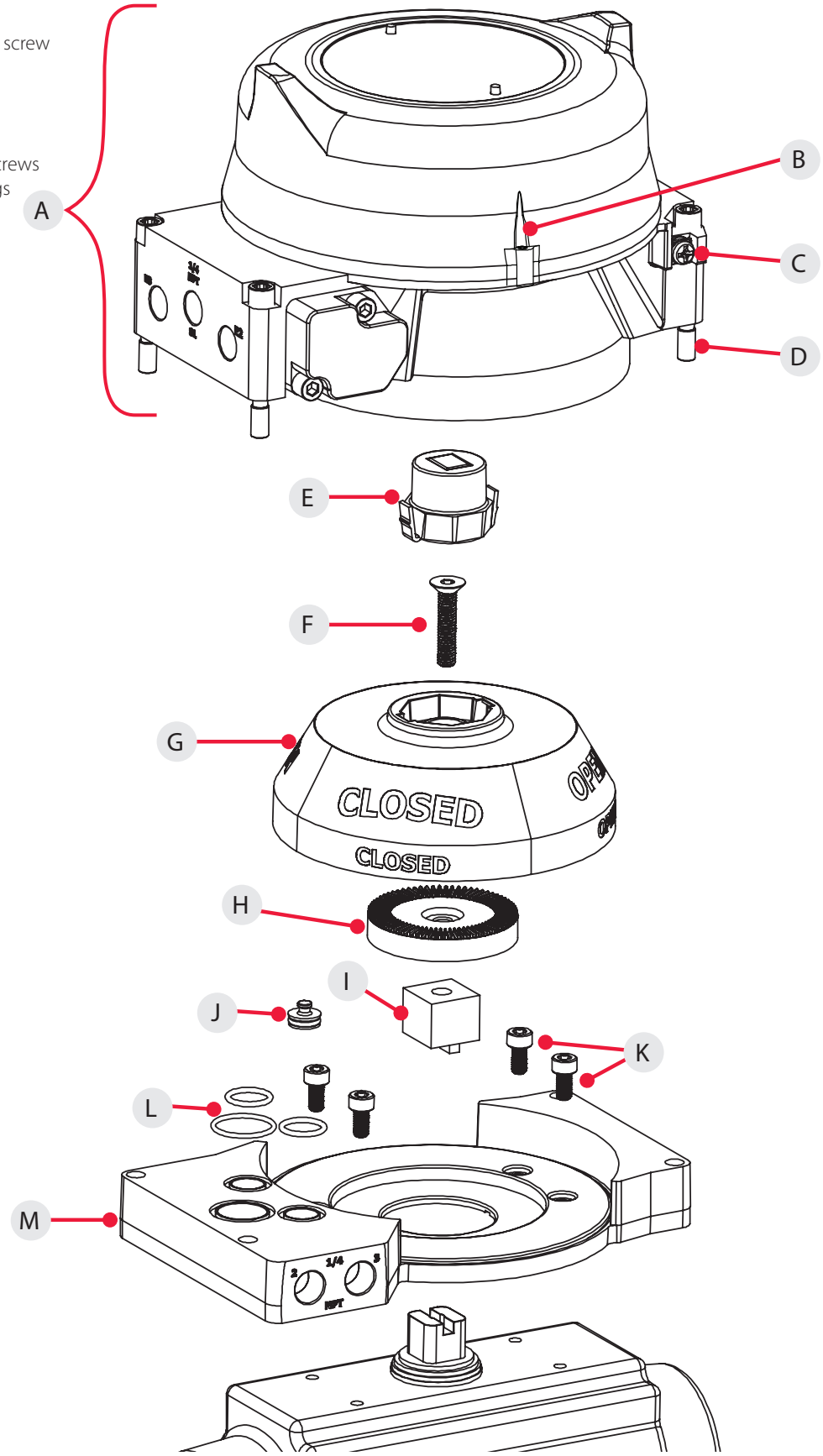
1. Determine if the actuator the unit is to be mounted on is double-acting (DA) or spring return (SR). Ensure the DA/SR plug (Item J) is in the corresponding port in the air manifold plate. (See detailed view of M below). If the DA/SR plug is in the incorrect position, gently remove p with a pair of pliers and insert into the proper orifice.
2. Locate the air manifold plate (Item M) and place on the actuator. Using an M4 allen wrench, fasten with the four air manifold mounting screws (Item K). Torque screws to 25 to 30 in.lbs (2.8 to 3.4 Nm).
3. Place visual indicator drive block (Item I) into slot in the actuator shaft. Place visual indicator drum coupler (Item H) onto the visual indicator drive block. Next, place the visual indicator drum (Item G) onto the visual indicator drum coupler. Align the holes in all three items with the threaded hole in the actuator shaft and fasten down with the visual indicator drum retaining screw (Item F). Leave screw loose in order to facilitate indexing of the visual indicator.
4. With the actuator in the closed position, center the visual indicator drum until the CLOSED quadrants are centered between the visual indicator cutouts on the air manifold plate. (See detailed view of M below). With an M4 allen wrench, tighten down with the visual indicator drum retaining screw. Torque screws to 15 to 20 in.lbs (1.7 to 2.3 Nm).
5. Place the trigger (Item E) into the visual indicator drum, aligning the locking tabs to the corresponding notches in the visual indicator drum. Press down on trigger until the locking tabs snap into place.
6. Verify air manifold plate orifice o-rings (Item L) are in place.
7. Set the unit body (Item A) in place. With an M5 allen wrench, torque the unit body screws (Item D) to 8 to 10 ft. lbs (10.8 to 13.5 Nm).
8. After all wiring and sensor setting procedures have been completed, install the unit cover and tighten.

Detailed view of M



2.2 Axiom ANX assembly figure

A. Axiom ANX unit
B. Cover lock setscrew
C. External ground lug (Internal ground lug provided)
D. Body screws (4)
E. Trigger
F. Visual indicator drum retaining screw
G. Visual indicator drum
H. Visual indicator drum coupler
I. Visual indicator drive block
J. DA/SR plug
K. Air manifold plate mounting screws
L. Air manifold plate orifice o-rings
M. Air manifold plate



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 manufacturer 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 distributer to maintain warranty and to ensure the safety and compliance of the equipment.

3.2 Installation

WARNING

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

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

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

Attention: If required, the housing can be grounded to earth potential by either the internal or external ground lug. (See Assembly drawing 1.6 items 5 and 6 on page 4)

Attention: In order to maintain enclosure type and IP ratings, cover shall be tightened by hand a minimum of 1/4 turn after cover engages o-ring. 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.
- Use field wiring rated at least 10 K (+10° C) above ambient temperature.

3.3 Prefilter removal procedure

WARNING

Secure electrical power and supply air to the unit prior to performing the Prefilter removal procedure.

1. Secure electrical power and supply air to the unit.
2. Loosen cover lock setscrew and remove the unit cover.
3. Remove pilot valve retaining screws located next to the pilot valve(s) with M2.5 allen wrench. (See image 1)
4. Loosen the two captive screws located in the internal air interface place with an M3 allen wrench. (See image 2)
5. Lift the internal air interface plate to expose the prefilter (see image 3).
6. Remove the prefilter with an M3 allen wrench, inspect and clean as necessary. (See image 4)
7. Re-install prefilter and torque to 25 to 30 in.lbs [2.8 to 3.4 Nm].
8. Re-install the internal air interface plate and torque screws to 25 to 30 in.lbs [2.8 to 3.4 Nm].
9. Re-install pilot valve(s) and retaining screws and torque to 15 to 20 in.lbs [1.7 to 2.2 Nm] Install unit cover and place unit back into service.

Image 1

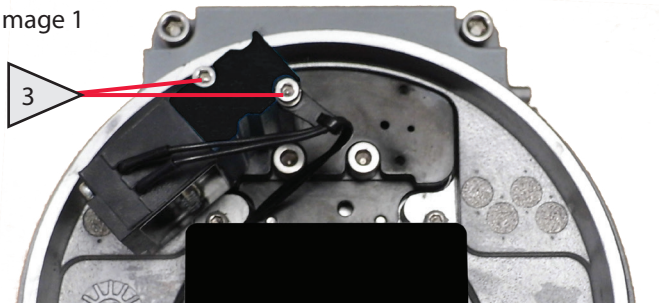


Image 2

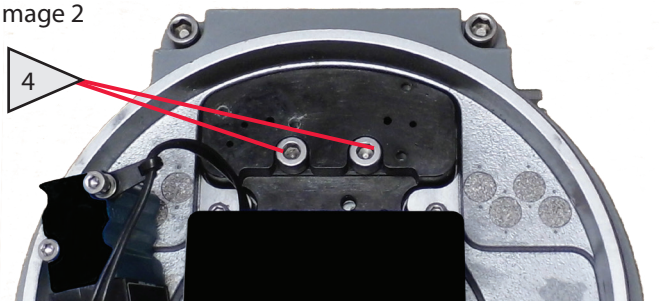


Image 3

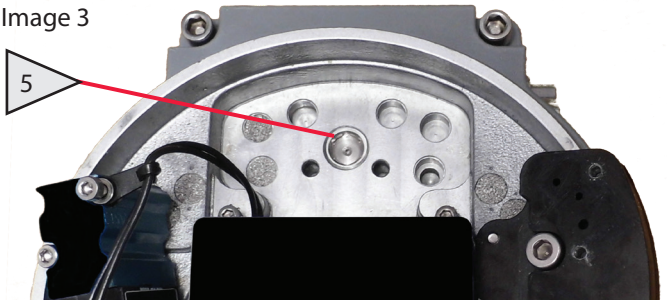
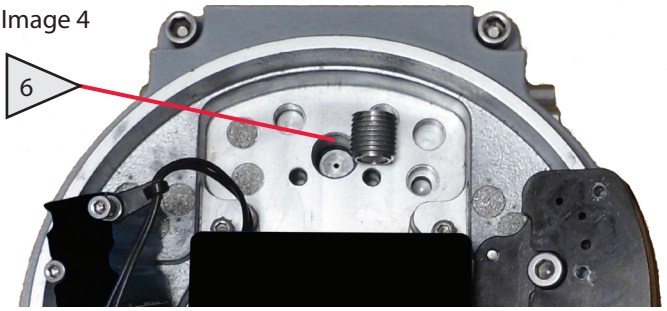


Image 4



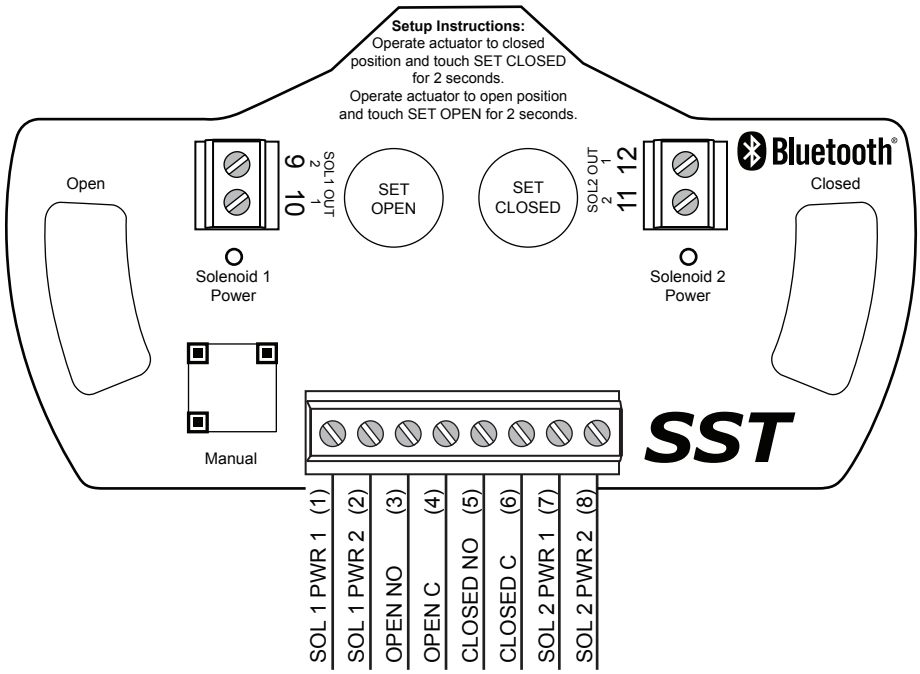
4 Function specific details

4.1 Sensor/switching modules

4.1.1 SST N.O. sensor (35S & 35W)

Specifications	
Configuration	(2) N.O. 2-wire solid state sensors
Voltage range	20 - 250 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 (AN35S); 0.60 mA (AN35W)
Maximum voltage drop	6.5 volts @ 10 mA 7.2 volts @ 100 mA
Circuit protection	Protected against short circuits and direct application of voltage with no load.

Wiring diagrams



4.1.1 SST N.O. sensor (35S & 35W) 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 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 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.
6. Setpoints are retained even after power is removed.

To electrically test solenoid, apply power to the SOL PWR IN terminals only.

Note

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

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

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. Does not change valve state indication in the control system.

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®

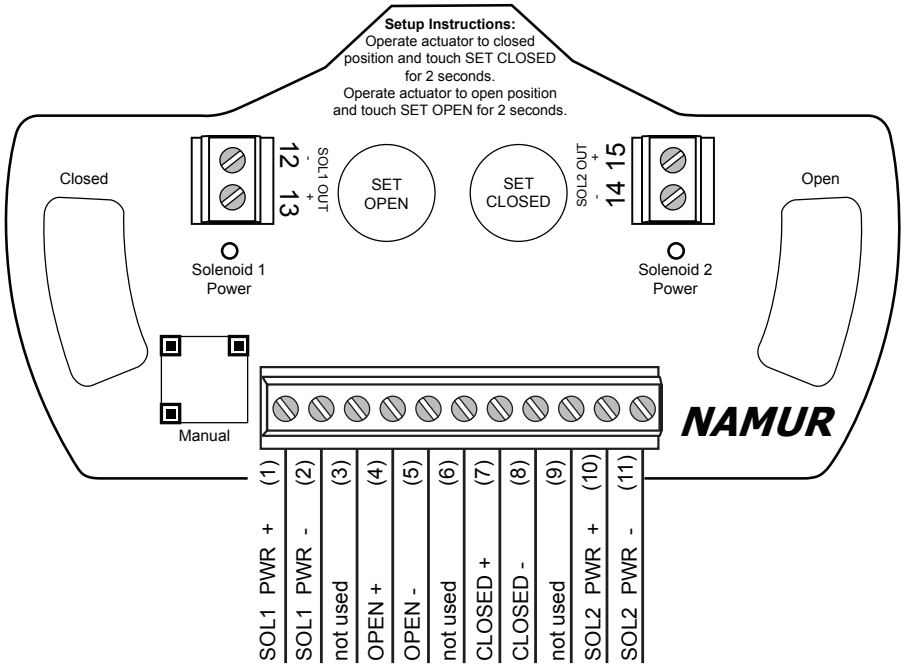
4.1 Sensor/switching modules

4.1.2 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 #105412 for proper intrinsic safe installation details. Find document in the Appendix on page 25.

Wiring diagrams



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.

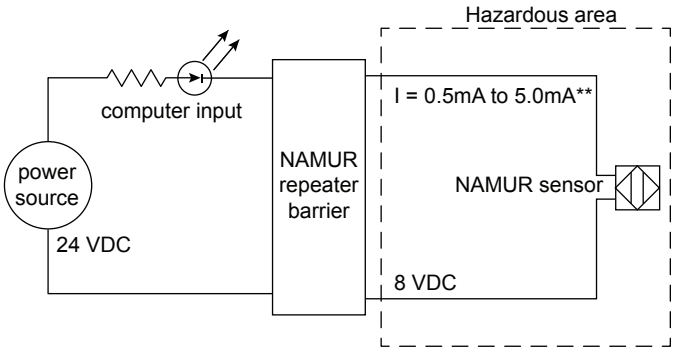
Note

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

4.1.2 NAMUR sensor (45S) continued

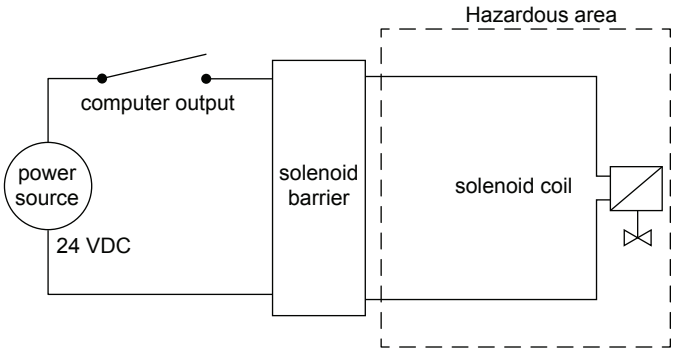
Typical basic intrinsically safe circuits

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



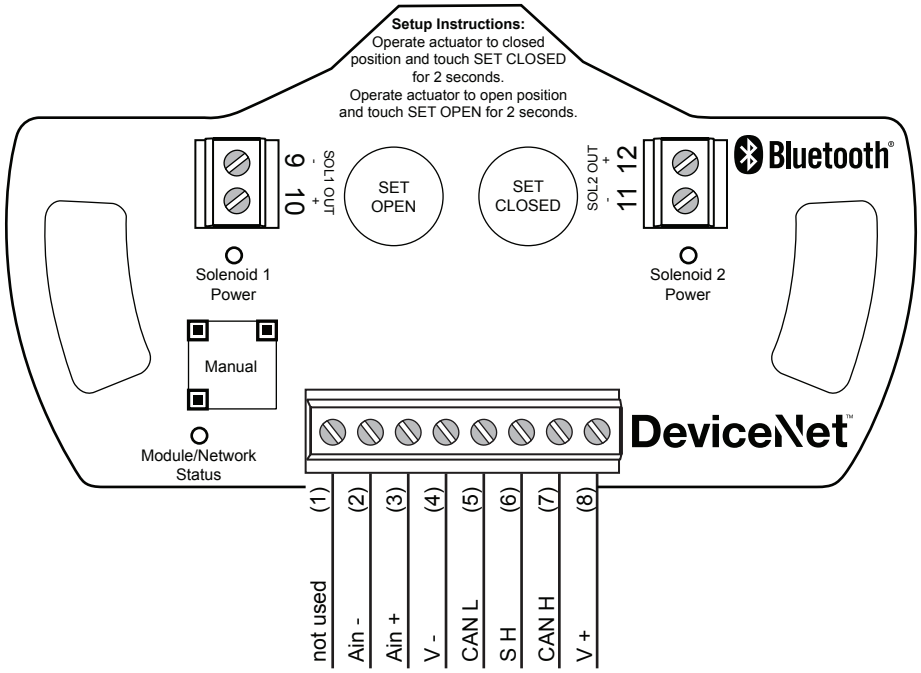
4.2 Valve communication terminals (VCT)

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: 35 mA @ 24 VDC; 57 mA @ 11 VDC
Current consumption (coil energized)	56 mA @ 24 VDC
Maximum output current	150 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

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®

Wiring diagrams



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

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.

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)	Output shorted
Flashing red (Minor Fault)	No magnet detected
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)	Internal sensor fault - sensor may need replacing
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

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.

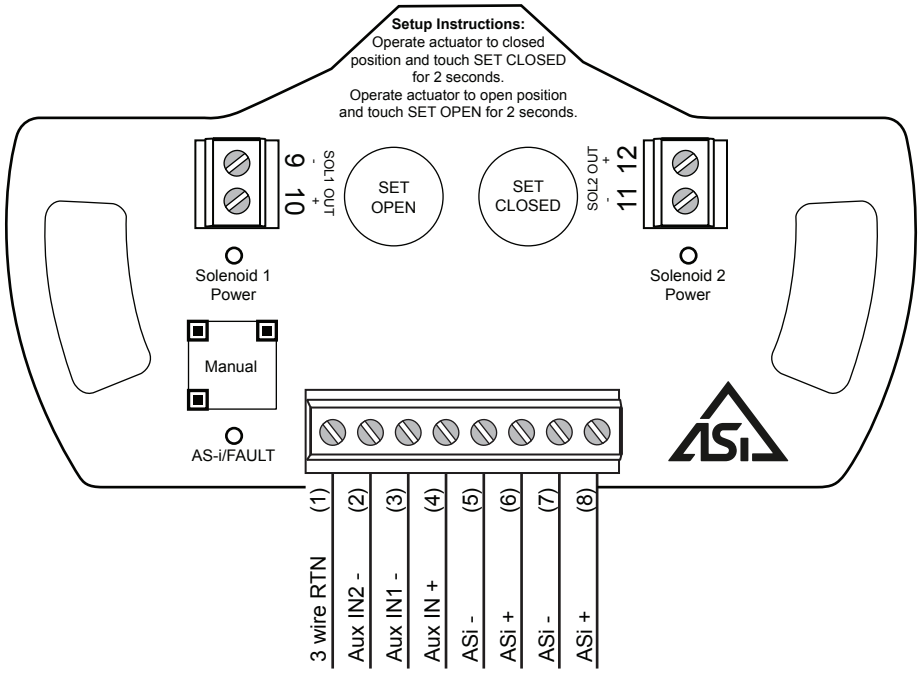
When input byte 0, bits 0 and 1 are both set to 1, this would indicate that the valve is both open and closed at the same time. This would be an abnormal or Fault condition.

4.2 Valve communication terminals (VCT)

4.2.2 VCT with AS-Interface communication (96S)

Specifications	
Communication protocol	AS-Interface v3.0
Configuration	(2) Discrete inputs (sensors) (2) Auxiliary discrete inputs (2) Discrete outputs (solenoid)
Input voltage	26.5-31.6 VDC (AS-I voltage)
Output voltage	24 VDC (+/- 10%)
Quiescent current	35 mA
Current consumption (coil energized)	56 mA
Maximum output current	100 mA (all outputs combined)
Default address	00
ID/IO codes	ID = F; IO = 4; ID1 = F; ID2 = E (S-4.F.E.)
Bit assignment Inputs Bit 0 = aux input 1 Bit 1 = aux input 2 Bit 2 = green LED / valve open Bit 3 = red LED / valve closed	 Outputs Bit 0 = not used Bit 1 = not used Bit 2 = OUT 1 Bit 3 = OUT 2

Wiring diagram



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.

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

4.2 Valve communication terminals (VCT)

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

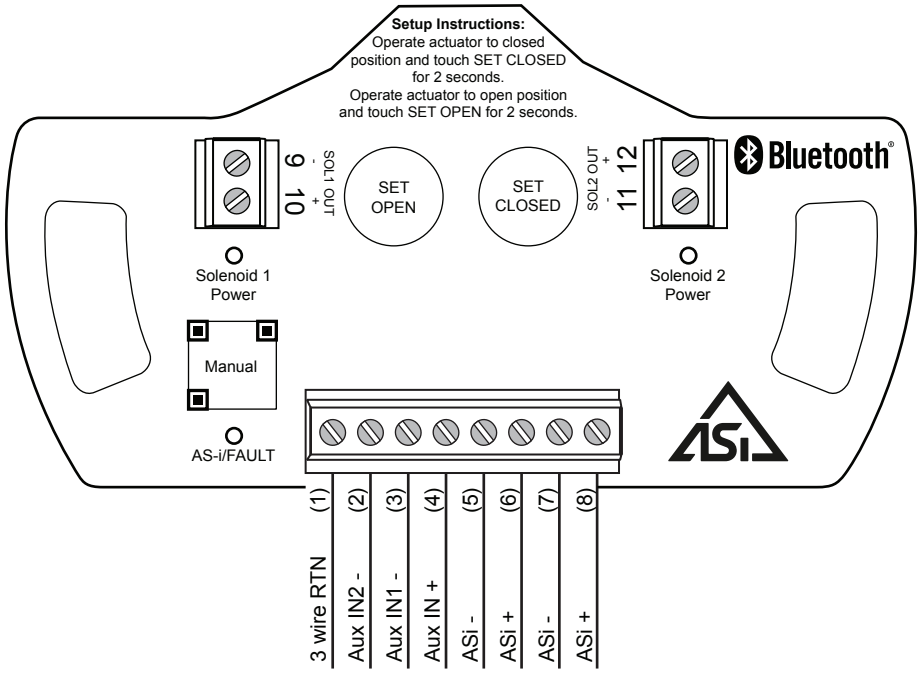
Specifications	
Communication protocol	AS-Interface v3.0
Configuration	(2) Discrete inputs (sensors) (2) Auxiliary discrete inputs (2) Discrete outputs (solenoid)
Input voltage	26.5-31.6 VDC (AS-I voltage)
Output voltage	24 VDC (+/- 10%)
Quiescent current	35 mA
Current consumption (coil energized)	56 mA
Maximum output current	100 mA (all outputs combined)
Default address	0A
ID/IO codes	ID = A; IO = 7; ID1 = F; ID2 = E (S-7.A.E.)

Bit assignment

Inputs	Outputs	Parameter
Bit 0 = red LED / valve closed	Bit 0 = OUT 1	Bit 0 = wink
Bit 1 = green LED / valve open	Bit 1 = OUT 2	Bit 1-3 = not used
Bit 2 = aux input 1	Bit 2 = wireless link enabled	
Bit 3 = aux input 2	Bit 3 = not available	

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®

Wiring diagram



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.

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

4.2 Valve communication terminals (VCT)

4.2.4 VCT with AS-Interface communication, ASi-5 (98S & 98W)

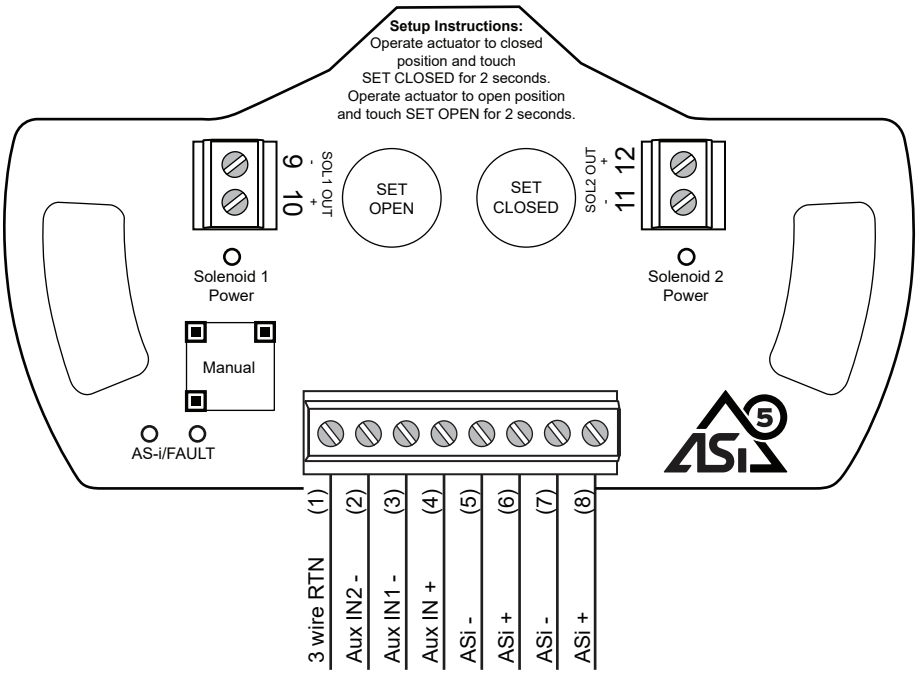
Specifications	
Communication protocol	AS-Interface v5
Configuration	(2) Discrete inputs (sensors) (2) Auxiliary discrete inputs (2) Discrete outputs (solenoid)
Input voltage	22.0-31.6 VDC (AS-I voltage)
Output voltage	24 VDC (+/- 10%)
Quiescent power	1.05 watts (33 mA @ 30 VDC)
Power consumption (coil energized)	1.65 watts (54 mA @ 30 VDC)
Maximum output current	100 mA (all outputs combined)
Default address	0
Profile code	0xE22004

Process data (IO) mapping

Bit #	Input	Output
0	Closed	Solenoid 1
1	Open	Solenoid 2
2	Aux In 1	Not used
3	Aux In 2	Not used
4	Cycle Count Threshold Exceeded	Set Closed (Hold 2 seconds)
5	Maximum Device Temperature Exceeded	Set Open (hold 2 seconds)
6	Minimum Device Temperature Exceeded	Wink
	"Other Alarms:	
7	(i.e. Magnet Missing or Shorted Solenoid)"	Wireless Link Unlocked
8	Maximum Open-to-Closed Stroke Time Alarm	Not used
9	Minimum Open-to-Closed Stroke Time Alarm	Not used
10	Beyond Closed Alarm	Not used
11	Fail to Reach Closed Alarm	Not used
12	Maximum Close-to-Open Stroke Time Alarm	Not used
13	Minimum Close-to-Open Stroke Time Alarm	Not used
14	Beyond Open Alarm	Not used
15	Fail to Reach Open Alarm	Wireless Link Radio Disabled

For a list of all Process, Parameters, System Commands and Events data, see ASIDD file.

Wiring diagram



4.2.4 VCT with AS-Interface communication, ASi-5 (98S & 98W) 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.

Caution: Power cycling unit with Output Bit DO 4 or Bit DO 5 set will cause the sensor(s) to set at that valve position. Ensure Output Bit DO 4 and Bit DO 5 are reset to 0 after performing a remote sensor setting.

Remote sensor setting feature

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

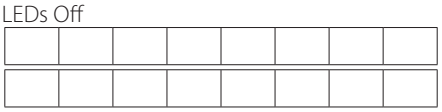
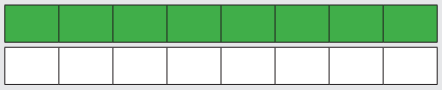
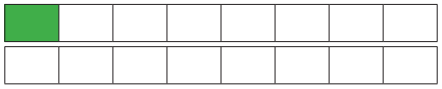
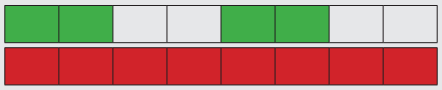
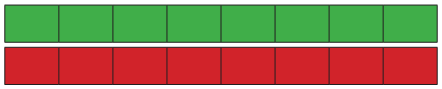
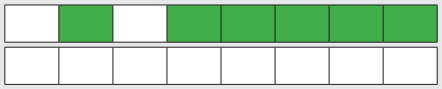
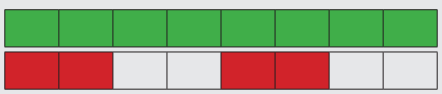
1. AS-Interface communications are required in order to remotely set the sensors. The unit must be addressed and correctly configured to be recognized by the Control System or the AS-Interface Gateway/Master.
2. With the valve/actuator in the Closed position, set Output Bit DO 4 to "1" for at least two seconds. This will set the Closed sensor to that valve/actuator position. Set Output Bit DO 4 back to "0"
3. With the valve/actuator in the Open position, set Output Bit DO 5 to "1" for at least two seconds. This will set the Open sensor to that valve/actuator position. Set Output Bit DO 5 back to "0"

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. Set Output Bit DO 6 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 DO 6 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 (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®

AS-i/FAULT LEDs States ** (1 box = 0.125 sec):	**Possible Cause:**	**Recommended Action:**
LEDs Off 	1) Unit does not have power.	1) Supply power
LEDs solid green 	1) Normal operation: Data communication is established.	
LED short green flash 	1) Energy Saving State Enabled: Outputs are de-energized to save power.	1) Disable energy saving on the device's Energy Saving Group.
LEDs solid red and flashing green 	1) No Data Exchange, Address = 0	1) Commission the device.
LEDs solid red and solid green 	1) No Data Exchange, Address > 0	1) Verify device is connected to host.
Short and long flash of green LED 	Diagnostic Request (Warning): 1) An Output has been forced via BLE. 2) Cycle count over threshold. 3) Stroke time over max limit, or under min limit. 4) Device temperature is outside of working range. 5) failure to arrive at open (valve left and returned to closed without having arrived at open.) 6) failure to arrive at closed (valve left and returned to open without having arrived at closed.) 7) Valve position is beyond the open setpoint. 8) Valve position is beyond the closed setpoint. 9) The target's magnetic field is low.	1) Lock Wireless Link to prevent overrides. 2) Reset the cycle count. 3) Check valve, actuator, device, and/or air supply for problems. 4) Verify the ambient temperature is within the device's ratings. 5) Check valve, actuator, device, and/or air supply for problems. 6) Check valve, actuator, device, and/or air supply for problems. 7) Check valve, actuator, device, and/or air supply for problems. Save the new open setpoint. 8) Check valve, actuator, device, and/or air supply for problems. Save the new closed setpoint. 9) Ensure magnet is properly installed. Check actuator for problems.
Red and Green LEDs alternate flash 	Periphery Fault (Critical): 1) The output is shorted. 2) A magnet is not detected in the visual indicator.	1) Remove short if present. 2) Ensure magnet is properly installed.
LEDs flashing red and solid green 	Periphery Fault (Defect / Error): 1) Magnetic sensor is malfunctioning.	1) Power cycle module, if fault is still present, replace module.
LEDs flash quickly together 	Identification: The host has sent an identification command to the device. Typically used to help locate a device.	

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.

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

AN/ANX 35W, 98W: Contains FCC ID: SQGBL651
AN/ANX 92W, AN/ANX 96W, AN/ANX 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.

AN/ANX 35W, 98W: Contains IC: 3147A-BL651
AN/ANX 92W, AN/ANX 96W, AN/ANX 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

SERIES

ANX Explosionproof

FUNCTIONS

Sensor/switching modules		Valve communication Terminals (VCTs)	
35S	SST Universal; 20 - 250 volt (NO sensor)	92S	DeviceNet™
35W	SST Universal; 20 - 250 volt (NO sensor) with wireless link	92W	DeviceNet™ with Wireless Link
45S	NAMUR module (EN 60947-5-6; I.S.)	96S	AS-Interface
		97S	AS-Interface with extended addressing
		97W	AS-Interface with extended addressing and Wireless Link
		98S	AS-Interface version 5
		98W	AS-Interface version 5 with Wireless Link

PNEUMATIC VALVE

1	Single pilot
2	Dual pilot
9	No solenoid

PNEUMATIC OVERRIDE

N	Internal momentary override only / 0.8 Cv
M	External momentary & internal override / 0.8 Cv
L	External latching & internal override / 0.8 Cv
E	Internal momentary override only / 1.2 Cv
Y	External momentary & internal override / 1.2 Cv
G	External latching & internal override / 1.2 Cv
X	Special

ENCLOSURE

Epoxy-coated aluminum		Stainless steel	
A	North American (NEC/CEC)	S	North American (NEC/CEC)
V	International (IEC)	T	International (IEC)
G	Brazil	M	Brazil
H	China	E	China
R	Russian	L	Russian

CONDUIT/CONNECTORS

Standard

02	(2) ½" NPT
05	(2) M20
08	(2) ¾" NPT
09	(2) M25

VISUAL INDICATOR

G	Green Closed/Red Open
R	Red Closed/Green Open
1	Three-way 1
2	Three-way 2
X	Special

BRANDING

A	Valmet/Stonel
M	Valmet/Neles

Model number example

ANX	35S	1	L	A	02	R	A	OPTIONAL
MODEL NUMBER								**PARTNERSHIP ID**

Mounting hardware required and sold separately.

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:
Axiom AN Series – Valve Position Monitors and Valve Communication Terminals
Axiom ANX Series – Valve Position Monitors and Valve Communication Terminals

Model - Type	Certificates / Directives / Standards	Marking
AN Series ANX Series	EU Type Examination Certificate FM18ATEX0063X ATEX 2014/34/EU EN IEC 60079-0:2018, EN 60079-11:2012 EMC 2014/30/EU EN 60947-5-2:2007/A1:2012	Ⓔx CE 2809 ATEX II 1 G Ex ia IIC T5 Ga ATEX II 1 G Ex ia IIC T6 Ga
AN Series ANX Series	IECEx Certificate of Conformity IECEx FMG 18.0023X IEC 60079-0:2017, IEC60079-11:2011	Ex ia IIC T5 Ga Ex ia IIC T6 Ga
ANX Series	EU Type Examination Certificate FM20ATEX00019X ATEX 2014/34/EU EN IEC 60079-0:2018, EN 60079-1:2014 EMC 2014/30/EU, LVD 2014/35/EU EN 60947-5-2:2007/A1:2012 EN 62026-2:2013, EN 62026-3:2009 RED 2014/53/EU EN 62026-2:2013, EN 62026-3:2009, 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 v2.2.2 (2019-07)	Ⓔx CE 2809 ATEX II 2 G Ex db IIC T5 Gb ATEX II 2 G Ex db IIC T6 Gb
ANX Series	IECEx Certificate of Conformity IECEx FMG 20.0024X IEC 60079-0:2017, IEC 60079-1:2014	Ex db IIC T5 Gb Ex db IIC T6 Gb
AN Series ANX Series	EMC 2014/30/EU, LVD 2014/35/EU EN 60947-5-2:2007/A1:2012 EN 62026-2:2013, EN 62026-3:2009 RED 2014/53/EU EN 62026-2:2013, EN 62026-3:2009, 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 v2.2.2 (2019-07)	CE

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

Quality Assurance Certificates:
ISO 9001:2015……...TUV SUD America Inc.
QAN FM20ATEXQ0008……FM Approvals (Notified Body Number 2809)
QAR GB/FME/QAR20.0004……FM Approvals (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, 1st February 2021

Bryan Beckman, Quality Manager
Authorized Person of the Manufacturer

105417revC

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

SPECIFIC CONDITIONS OF USE / MARKING

For AN and ANX Series – FM18ATEX0063X	
Specific Conditions of Use - Notes	**Marking**
1. Part of the enclosure may be constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth. 2. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.	ATEX II 1 G Ex ia IIC T5 Ga Ta = -40°C to +80°C ATEX II 1 G Ex ia IIC T6 Ga Ta = -40°C to +65°C

For AN and ANX Series – IECEx FMG 18.0023X	
Specific Conditions of Use - Notes	**Marking**
1. Part of the enclosure may be constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth. 2. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.	Ex ia IIC T5 Ga Ta = -40°C to +80°C Ex ia IIC T6 Ga Ta = -40°C to +65°C

For AN Series – FM16US0468X / FM16CA0215X	
Specific Conditions of Use - Notes	**Marking**
AN45Sbcdefg-h. Valve Position Monitor 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. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction. 3. 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. ANabcdefg-h. Valve Position Monitor When e = Connector, 10, 11, 13, 15, 18, 19, 20, 21 or 22 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. NOTE: See also Control Drawing 105412 for “IS” installation.	NI / I, II, III / 2 / ABCDFG NI / I / 2 / ABCD I / 2 / IIC IS / I, II, III / 1 / ADBCDEFG – 105412 IS / I / 1 / ADBCD – 105412 I / 0 / AEx ia IIC T5 – 105412 I / 0 / Ex ia IIC T5 – 105412

For ANX Series – FM20ATEX00019X	
Specific Conditions of Use - Notes	**Marking**
1. To minimize the risk of electrostatic sparking, the equipment shall be cleaned only with a damp cloth. 2. Consult the manufacturer if dimensional information on the flameproof joints is necessary. 3. Applications in atmospheres containing Carbon Disulphide (CS2) is not permitted.	ATEX II 2 G Ex db IIC T5 Gb (Ta = -40°C to +80°C) ATEX II 2 G Ex db IIC T6 Gb (Ta = -40°C to +65°C)

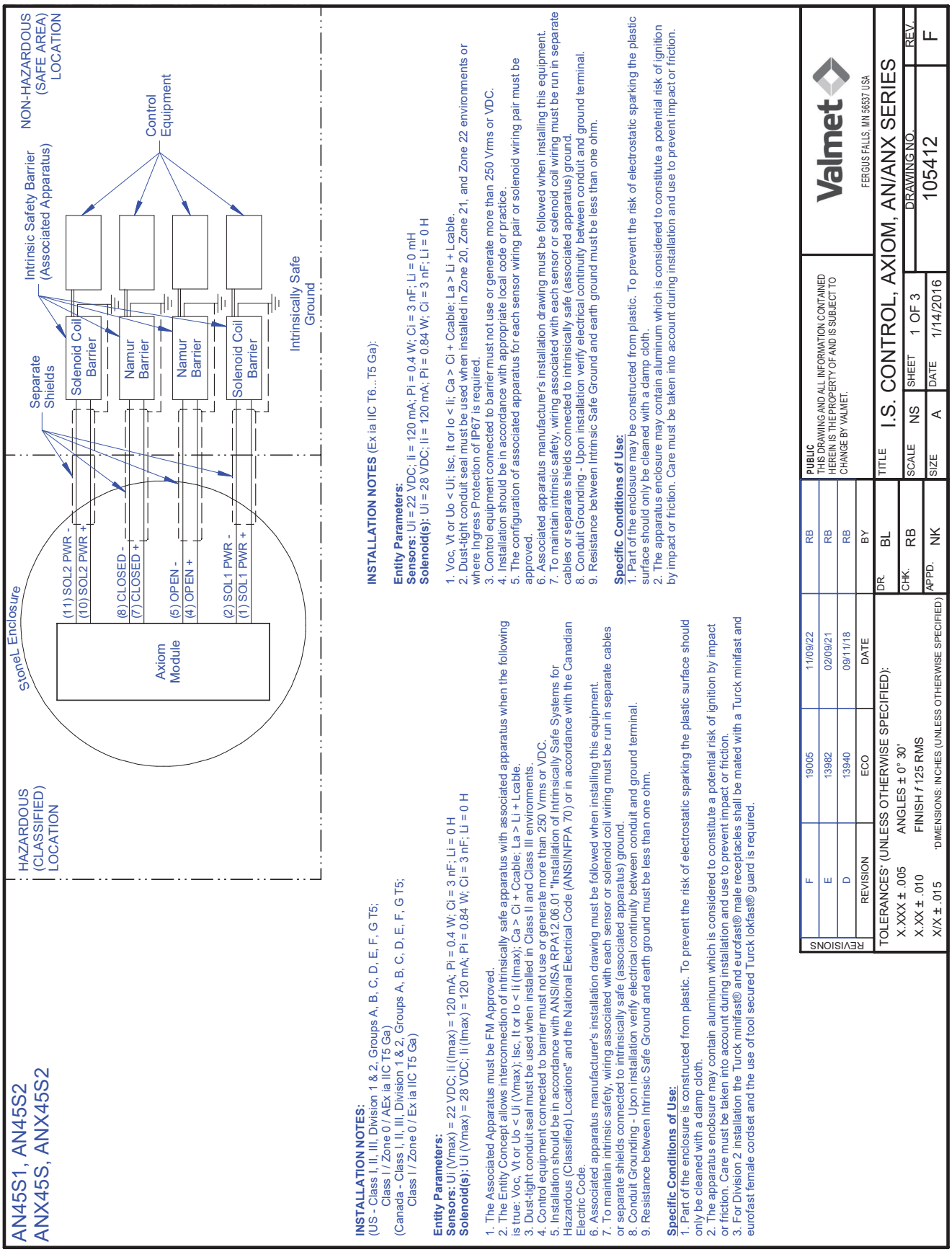
For ANX Series – IECEx FMG 20.0024X	
Specific Conditions of Use - Notes	**Marking**
1. To minimize the risk of electrostatic sparking, the equipment shall be cleaned only with a damp cloth. 2. Consult the manufacturer if dimensional information on the flameproof joints is necessary. 3. Applications in atmospheres containing Carbon Disulphide (CS2) is not permitted.	Ex db IIC T5 Gb (Ta = -40°C to +80°C) Ex db IIC T6 Gb (Ta = -40°C to +65°C)

For ANX Series – FM20US0073X / FM20CA0035X	
Specific Conditions of Use - Notes	**Marking**
1. To minimize the risk of electrostatic sparking, the equipment shall be cleaned only with a damp cloth. 2. Consult the manufacturer if dimensional information on the flameproof joints is necessary. 3. Applications in atmospheres containing Carbon Disulphide (CS2) is not permitted.	US/Canada - XP/DIP: CL I, II, III, DIV 1, GP B,C,D,E,F,G T5 US/Canada - NI: CL I, II, III, DIV 2, GP A,B,C,D,F,G T5 US - CL I / Zone 1 / AEx db IIC T5 Gb US - CL I / Zone 2 / IIC / T5 Canada - Ex db IIC T5 Gb

105417revC

8 Appendix

8.1 Controlled installation drawings



INSTALLATION NOTES:
(US - Class I, II, III, Division 1 & 2, Groups A, B, C, D, E, F, G T5;
Class I / Zone 0 / AEx ia IIC T5 Ga)
(Canada - Class I, II, III, Division 1 & 2, Groups A, B, C, D, E, F, G T5;
Class I / Zone 0 / Ex ia IIC T5 Ga)

Entity Parameters:
Sensors: Ui (Vmax) = 22 VDC; Ii (Imax) = 120 mA; Pi = 0.4 W; Ci = 3 nF; Li = 0 H
Solenoid(s): Ui (Vmax) = 28 VDC; Ii (Imax) = 120 mA; Pi = 0.84 W; Ci = 3 nF; Li = 0 H

1. The Associated Apparatus must be FM Approved.
2. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true: Voc, Vt or Uo < Ui (Vmax); Isc, It or Io < Ii (Imax); Ca > Ci + Ccable; La > Li + Lcable.
3. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
4. Control equipment connected to barrier must not use or generate more than 250 Vrms or VDC.
5. Installation should be in accordance with ANSI/ISA RPA12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70) or in accordance with the Canadian Electric Code.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

Specific Conditions of Use:
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. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
3. 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.

INSTALLATION NOTES (Ex ia IIC T6...T5 Ga):

Entity Parameters:
Sensors: Ui = 22 VDC; Ii = 120 mA; Pi = 0.4 W; Ci = 3 nF; Li = 0 mH
Solenoid(s): Ui = 28 VDC; Ii = 120 mA; Pi = 0.84 W; Ci = 3 nF; Li = 0 H

1. Voc, Vt or Uo < Ui; Isc, It or Io < Ii; Ca > Ci + Ccable; La > Li + Lcable.
2. Dust-tight conduit seal must be used when installed in Zone 20, Zone 21, and Zone 22 environments or where Ingress Protection of IP67 is required.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or VDC.
4. Installation should be in accordance with appropriate local code or practice.
5. The configuration of associated apparatus for each sensor wiring pair or solenoid wiring pair must be approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

Specific Conditions of Use:
1. Part of the enclosure may be constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.
2. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

REVISIONS				
REVISION	ECO	DATE	DR.	
D	13940	09/11/18		RB
E	13982	02/09/21		RB
F	19005	11/09/22		RB
TOLERANCES: (UNLESS OTHERWISE SPECIFIED):			CHK.	BL
X.XXX ± .005 ANGLES ± 0° 30'				RB
X.XX ± .010 FINISH *f* 125 RMS			APPD.	BY
X/X ± .015 *DIMENSIONS: INCHES (UNLESS OTHERWISE SPECIFIED)				NK

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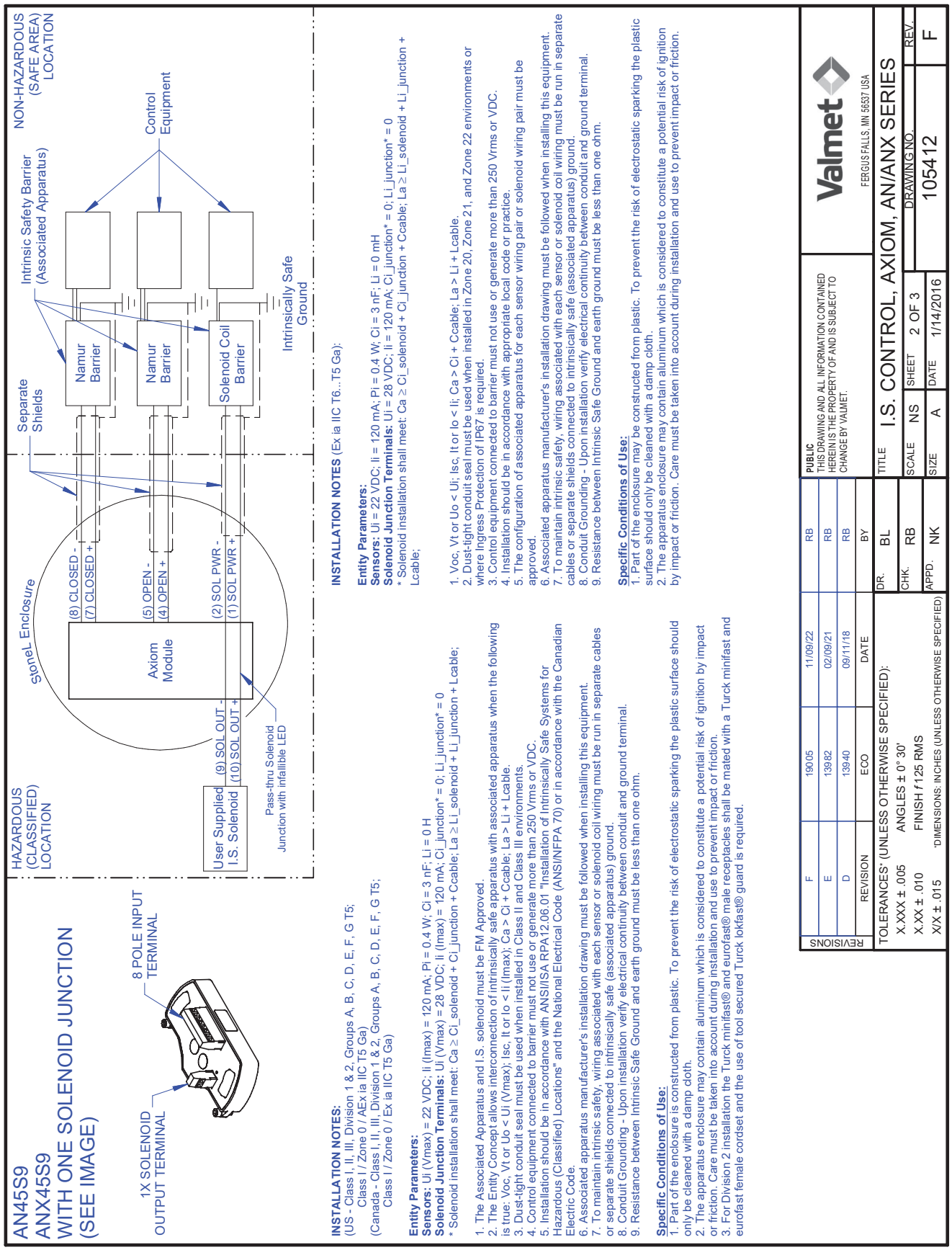
Valmet
FERGUS FALLS, MN 56537 USA

TITLE I.S. CONTROL, AXIOM, AN/ANX SERIES

SCALE	NS	SHEET	1 OF 3	DRAWING NO.	REV.
SIZE	A	DATE	1/14/2016	105412	F

8.1 Controlled installation drawings continued



INSTALLATION NOTES:
(US - Class I, II, III, Division 1 & 2, Groups A, B, C, D, E, F, G T5;
Class I / Zone 0 / AEx ia IIC T5 Ga)
(Canada - Class I, II, III, Division 1 & 2, Groups A, B, C, D, E, F, G T5;
Class I / Zone 0 / Ex ia IIC T5 Ga)

Entity Parameters:
Sensors: Ui (Vmax) = 22 VDC; Ii (Imax) = 120 mA; Pi = 0.4 W; Ci = 3 nF; Li = 0 H
Solenoid Junction Terminals: Ui (Vmax) = 28 VDC; Ii (Imax) = 120 mA; Ci_junction* = 0; Li_junction* = 0
* Solenoid installation shall meet: Ca ≥ Ci_solenoid + Ci_junction + Ccable; La ≥ Li_solenoid + Li_junction + Lcable;

1. The Associated Apparatus and I.S. solenoid must be FM Approved.
2. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true: Voc, Vt or Uo < Ui (Vmax); Isc, It or Io < Ii (Imax); Ca > Ci + Ccable; La > Li + Lcable.
3. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
4. Control equipment connected to barrier must not use or generate more than 250 Vrms or VDC.
5. Installation should be in accordance with ANSI/ISA RPA12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70) or in accordance with the Canadian Electric Code.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

Specific Conditions of Use:
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. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
3. 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.

INSTALLATION NOTES (Ex ia IIC T6...T5 Ga):

Entity Parameters:
Sensors: Ui = 22 VDC; Ii = 120 mA; Pi = 0.4 W; Ci = 3 nF; Li = 0 mH
Solenoid Junction Terminals: Ui = 28 VDC; Ii = 120 mA; Ci_junction* = 0; Li_junction* = 0
* Solenoid installation shall meet: Ca ≥ Ci_solenoid + Ci_junction + Ccable; La ≥ Li_solenoid + Li_junction + Lcable;

1. Voc, Vt or Uo < Ui; Isc, It or Io < Ii; Ca > Ci + Ccable; La > Li + Lcable.
2. Dust-tight conduit seal must be used when installed in Zone 20, Zone 21, and Zone 22 environments or where Ingress Protection of IP67 is required.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or VDC.
4. Installation should be in accordance with appropriate local code or practice.
5. The configuration of associated apparatus for each sensor wiring pair or solenoid wiring pair must be approved.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

Specific Conditions of Use:
1. Part of the enclosure may be constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.
2. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

REVISIONS			
REVISION	DATE	BY	
D	139.40	09/11/18	RB
E	139.82	02/09/21	RB
F	190.05	11/09/22	RB

TOLERANCES: (UNLESS OTHERWISE SPECIFIED):
X.XXX ± .005 ANGLES ± 0° 30'
X.XX ± .010 FINISH *f* 125 RMS
X/X ± .015 DIMENSIONS: INCHES (UNLESS OTHERWISE SPECIFIED)

DR. BL
CHK. RB
APPD. NK

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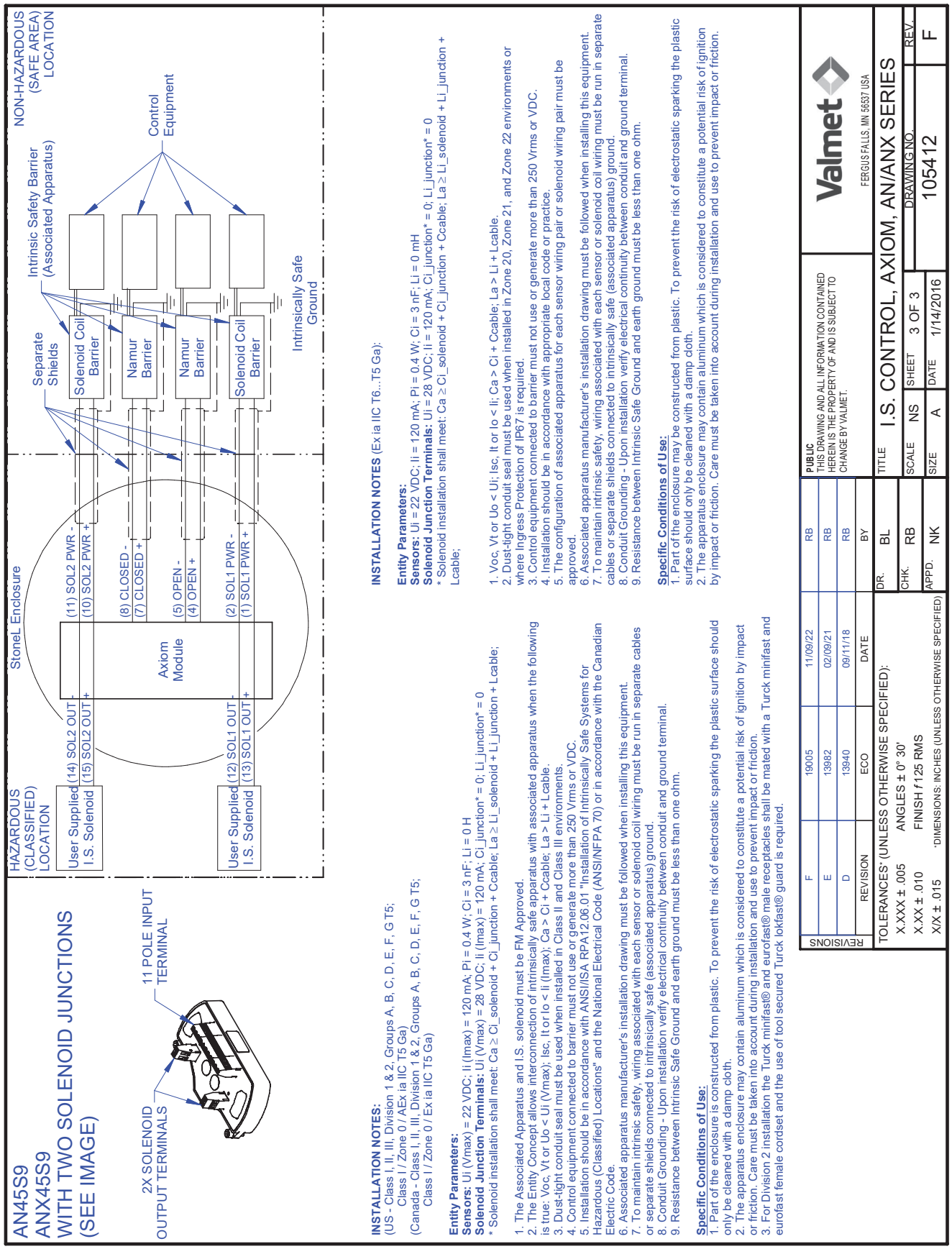
FERGUS FALLS, MN 56537 USA

TITLE I.S. CONTROL, AXIOM, AN/ANX SERIES
SCALE NS | SHEET 2 OF 3 | DRAWING NO. 105412 | REV. F
SIZE A | DATE 1/14/2016

8.1 Controlled installation drawings continued



INSTALLATION NOTES:
(US - Class I, II, III, Division 1 & 2, Groups A, B, C, D, E, F, G T5;
Class I / Zone 0 / AEx ia IIC T5 Ga)
(Canada - Class I, II, III, Division 1 & 2, Groups A, B, C, D, E, F, G T5;
Class I / Zone 0 / Ex ia IIC T5 Ga)

Entity Parameters:
Sensors: Ui (Vmax) = 22 VDC; Ii (Imax) = 120 mA; Pi = 0.4 W; Ci = 3 nF; Li = 0 H
Solenoid Junction Terminals: Ui (Vmax) = 28 VDC; Ii (Imax) = 120 mA; Ci_junction* = 0; Li_junction* = 0
* Solenoid installation shall meet: Ca ≥ Ci_solenoid + Ci_junction + Ccable; La ≥ Li_solenoid + Li_junction + Lcable;

1. The Associated Apparatus and I.S. solenoid must be FM Approved.
2. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus when the following is true: Voc, Vt or Uo < Ui (Vmax); Isc, It or Io < Ii (Imax); Ca > Ci + Ccable; La > Li + Lcable.
3. Dust-tight conduit seal must be used when installed in Class II and Class III environments.
4. Control equipment connected to barrier must not use or generate more than 250 Vrms or VDC.
5. Installation should be in accordance with ANSI/ISA RPA12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code (ANSI/NFPA 70) or in accordance with the Canadian Electric Code.
6. Associated apparatus manufacturer's installation drawing must be followed when installing this equipment.
7. To maintain intrinsic safety, wiring associated with each sensor or solenoid coil wiring must be run in separate cables or separate shields connected to intrinsically safe (associated apparatus) ground.
8. Conduit Grounding - Upon installation verify electrical continuity between conduit and ground terminal.
9. Resistance between Intrinsic Safe Ground and earth ground must be less than one ohm.

Specific Conditions of Use:
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. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.
3. 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 loktast® guard is required.

INSTALLATION NOTES (Ex ia IIC T6...T5 Ga):

Entity Parameters:
Sensors: Ui = 22 VDC; Ii = 120 mA; Pi = 0.4 W; Ci = 3 nF; Li = 0 mH
Solenoid Junction Terminals: Ui = 28 VDC; Ii = 120 mA; Ci_junction* = 0; Li_junction* = 0
* Solenoid installation shall meet: Ca ≥ Ci_solenoid + Ci_junction + Ccable; La ≥ Li_solenoid + Li_junction + Lcable;

1. Voc, Vt or Uo < Ui; Isc, It or Io < Ii; Ca > Ci + Ccable; La > Li + Lcable.
2. Dust-tight conduit seal must be used when installed in Zone 20, Zone 21, and Zone 22 environments or where Ingress Protection of IP67 is required.
3. Control equipment connected to barrier must not use or generate more than 250 Vrms or VDC.
4. Installation should be in accordance with appropriate local code or practice.
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2. The apparatus enclosure may contain aluminum which is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

REVISIONS				
REVISION	ECO	DATE	DR.	BY
F	19005	11/09/22		RB
E	13982	02/09/21		RB
D	13940	09/11/18		RB

TOLERANCES* (UNLESS OTHERWISE SPECIFIED):
X.XXX ± .005 ANGLES ± 0° 30'
X.XX ± .010 FINISH *f* 125 RMS
X/X ± .015 *DIMENSIONS: INCHES (UNLESS OTHERWISE SPECIFIED)

DR.	BL	
CHK.	RB	
APPD.	NK	

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TITLE I.S. CONTROL, AXIOM, AN/ANX SERIES

SCALE	NS	SHEET	3 OF 3	DRAWING NO.	REV.
SIZE	A	DATE	1/14/2016	105412	F

Valmet
FERGUS FALLS, MN 56537 USA

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