



Axiom Explosionproof

Advanced performance and reliability in harsh environments

The Axiom explosionproof platform, available in epoxy-coated anodized aluminum or stainless steel, will withstand your most challenging plant environments. Its advanced position monitoring and integral pneumatic control offer the ultimate in reliability, convenience, and value.

Exceptional reliability

The Axiom is designed to perform reliably in adverse conditions. Its non-contact position sensing system, with fully potted and sealed electronics, is completely protected inside the water-tight explosionproof enclosure. The integral pneumatic control is tolerant of contaminants and able to operate on standard plant air. A rebreather capability is also standard, eliminating potential ingestion of outside contaminants into the spring side of single-acting actuators.

Space efficient design

The Axiom AX encloses all electrical components in an explosionproof compartment with less than 5" (130mm) clearance requirement above the top of the actuator. Additional clearance for cover removal is less than 2" (50mm) because there is no shaft to lift over. The automated valve spacing envelope is minimized without compromising performance or maintainability.

Universal application

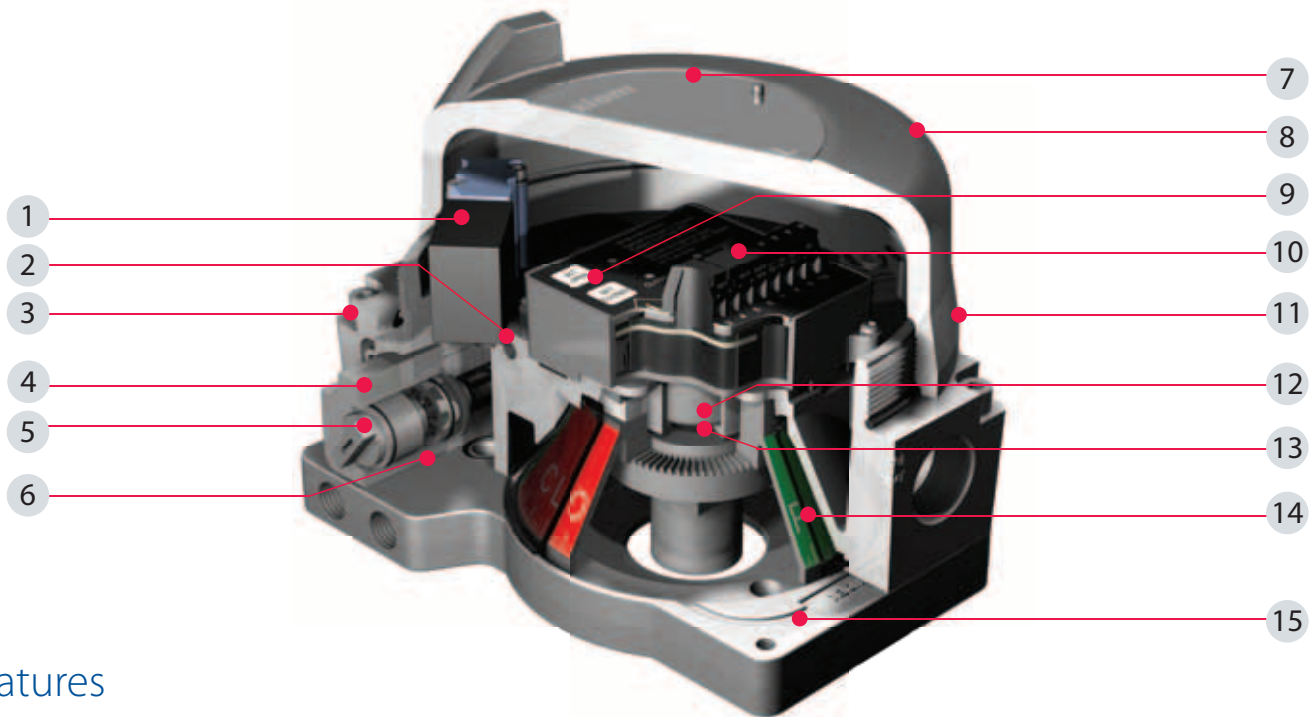
One conventional model will satisfy most applications with standard 20 to 125 VAC or VDC monitoring feedback and solenoid control. Standard models also feature high flow 5-way, 2-position pneumatic control suitable for both single- and double-acting actuation. Bus communication models offer the same pneumatic control and have pilots tuned for very low power consumption minimizing voltage drops on long cable runs.

Rugged construction

Choose from the robust epoxy-coated anodized aluminum or the 316 stainless steel enclosure designed for explosionproof applications. This platform is extremely durable and is also well-suited for use in corrosive, heavy washdown and high seas environments.

Axiom AX





Features

- Universal burn out proof solenoid** operates on less than 0.6 watts of power and standard version will accept 24 VDC or 120 VAC, reducing stocking requirements.
- Prefiltered pilot valve** provides additional protection from contaminants.
- Easy removal from automated valve package** is accomplished with captured stainless steel fasteners and unique modular design.
- Integral pneumatic valve** operates on standard plant air, will cycle most actuators in less than two seconds, and is modularized for easy clean out if fouling occurs.
- External pneumatic valve override** options are available enabling local automated valve operation. (Internal pilot momentary override is standard on all solenoids.)
- Standard 5-way, 2-position valve** operates both single- and double-acting actuators and features a standard rebreather to feed instrument air into spring side of actuator to keep out corrosives.
- Highest explosionproof ratings** suitable for use in Ex d IIC Zone I and Class I, Division 1 areas.
- Durable enclosure and manifold/mounting plate** are available in epoxy-coated anodized aluminum or 316 stainless steel. All fasteners, indicator couplers, and pneumatic valve end-caps are made of 316 stainless steel.
- Push button set points** for open and closed accurately lock in position settings which remain in place when power is removed and reapplied.
- Electronic components are sealed** and potted inside function module to protect against residual moisture, vibration, and corrosives.
- Rapid enclosure access** with the screw-on cover saves valuable maintenance and set-up time. The cover provides a vapor tight seal and allows entry to internal components in seconds.
- High accuracy position sensor system** is solid state with no moving wear points for highly reliable and precise position feedback.
- No bushings or shafts** will wear out. Electronic module, with magnetically driven position sensor, is fully isolated from the outside environment. Actuator wear causing shaft "wobble" will not affect monitoring performance.
- High visibility mechanical and electronic indication** confirms open/closed position and solenoid status for greater safety and convenience.
- Axiom directly attaches to VDI/VDE 3845 (Namur) sizes 1 and 2** actuator accessory patterns and may be readily adapted for other actuator applications.

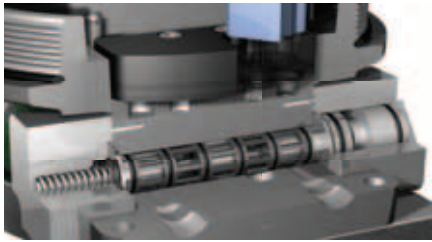


Stainless steel enclosure



Epoxy-coated aluminum enclosure

Pneumatic control



The Axiom’s pneumatic valve system consists of a low power pilot that drives the main high flow spool valve. Pilots may be selected for conventional or bus networking applications. Both stages of the pneumatic valve system have been designed for long life, high tolerance to air line contaminants, and ease of maintenance should components become fouled.

Features

- Pilot poppet and main spool design offer long life, exceptional tolerance to dirty air, and tight shut-off.
- Removable stainless steel sintered metal prefilter reduces potential for fouling pilot valve.
- Spool and pilot valve may be conveniently removed and cleaned if large contaminants become lodged in the valve.
- Universal solenoid may be used for standard AC or DC applications.
- 5-way, 2-position spring return configuration may be used for either single- or double-acting actuators. Dual coil shuttle piston versions are also available for fail-in-last position.
- Low power consumption of solenoid reduces current flow on bus networks enabling more units and longer distances on a single segment.
- Rebreather channels exhausted air from pressurized side of actuator into spring side, preventing ingestion of contaminated air from the environment that may corrode springs or actuator internals.
- Standard internal manual override enables convenient setup.

Dual pilot configuration

Dual pilot options may be selected for special applications such as shuttle piston for fail-in-last position. External manual override options are also readily available. For special valve configurations with non-standard manual override features please consult StoneL.



Specifications

Pneumatic valves

Valve design	Pilot operated spool valve
Pilot operator options	Solenoid coil or piezo
Configuration	Single pilot: 5-way, 2-position spring return Dual pilot: shuttle piston, 5-way, 2-position
Flow rating	0.70 Cv (Kv=0.60 based on flow unit m3/hr)
Porting	1/4" NPT
Operating pressure	40 to 120 psi (2.7 to 7.5 bar)
Filtration requirements	40 micron (Piezo, 30 micron)
Operating temperature	See pilot specifications below
Operating life	1 million cycles
Manual override	Internal momentary standard External momentary available External latching available.

Materials of construction

Aluminum enclosure	Spool: nickel-plated aluminum Body: epoxy-coated anodized aluminum Seal spacers: Polysulfone End caps and fasteners: 316 stainless steel Spool seals: nitrile compound O-rings: Buna-N compound
Stainless steel enclosure	Spool: nickel-plated Teflon-coated stainless steel Body: 316 stainless steel Seal spacers: Polysulfone End caps and fasteners: 316 stainless steel Spool seals: nitrile compound O-rings: Buna-N compound

Piezo pilot (bus powered Foundation Fieldbus)

Filtration requirements	Dried/30 micron
Operating temperature	-10° to 60° C (14° to 140° F)
Electrical ratings	_A option: 2 mA @ 6.5 VDC

Solenoid pilot

Filtration requirements	40 micron
Electrical ratings	_H option: 0.6 watt @ 22 VDC to 130 VAC _B option: 1.8 watt @ 24 VDC _D option: 0.5 watt @ 24 VDC _E option: 0.5 watt @ 12 VDC (intrinsically safe) _J option: 4.5 watts @ 240 VAC
AC current consumption	18 mA (1H or 2H)
Operating temperature	
Standard (S)	-18° to 50° C (0° to 122° F)
Extended (T)	-40° to 80° C (-40° to 176° F)

Manifold and mounting system

The mounting manifold system directly attaches the Axiom to the actuator and ports air from the pneumatic valve to the actuator.

Included in the manifold system are:

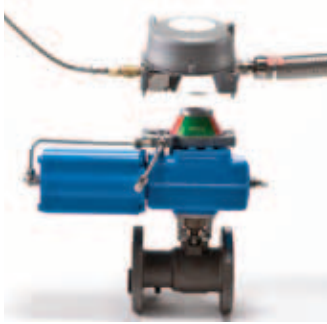
1. Actuator shaft adaptor and fastener.
2. Epoxy-coated anodized aluminum or stainless steel mounting plate manifold with o-rings and stainless steel fasteners.

The manifold system readily adapts to VDI/VDE 3845 Namur sizes 1 and 2. Special variations may be made for sizes 3, 4 and non-standardized quarter-turn actuator mounting patterns.

Modular mounting design cuts valve removal costs

The Axiom enclosure may be quickly and conveniently disconnected from the actuator. Electrical components and wiring, along with pneumatic supply, may remain attached to the explosionproof

enclosure while it is removed from the mounting/manifold plate (pneumatic supply should be shut off). Mounting/manifold with pneumatic tubing remains attached to the valve-actuator which then may be pulled out of line.

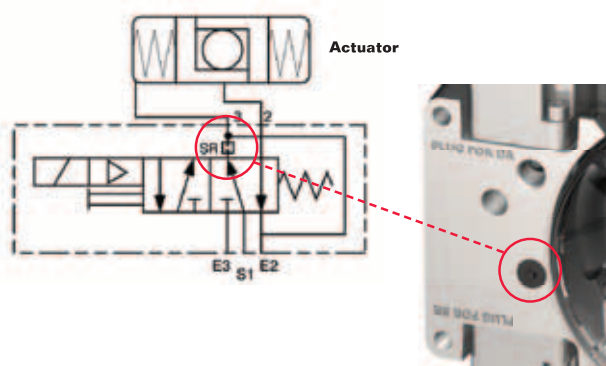


The mounting manifold system is specified and sold separately. Kits are specific to actuator manufacturer. For kit numbers visit: StoneL.com/mounting.

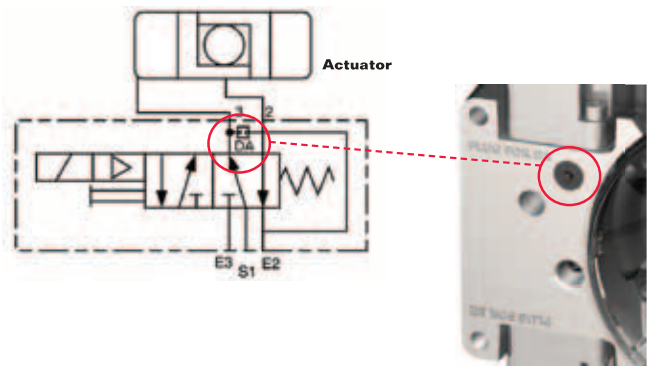
Actuator configuration

The same Axiom model is suitable for both single-acting and double-acting actuators. And the rebreather capability for single-acting is also standard. Field configuration may be made by conveniently removing and reinserting the pneumatic plug for the appropriate actuator type.

Spring return actuator



Double-acting actuator



Sensing and communication module

Overview

The Axiom platform has all position sensing, communication or switching integrated into StoneL's C-module. Users may set position switches conveniently and accurately on all modules. And easy to view instructions, along with LED indication, are boldly displayed on the module itself.



Switching and sensor specifications

SST switching sensors (33)

Configuration	(2) Two wire solid state switches (1) or (2) solenoid power input(s) ¹
Operation	Normally open (solid state)
Maximum current inrush	2.0 amps
Maximum current continuous	0.25 amps
Minimum on current	2.0 mA
Maximum leakage current	0.5 mA
Voltage range	20 to 125 VDC/125 VAC
Maximum voltage drop	7.0 volts @ 100 mA
Short circuit	Protected from direct application of up to 125 VDC/VAC
Solenoid input	See solenoid pilot specs (page 8)

SST wiring diagram (33) single solenoid

SST wiring diagram (33) dual solenoid

¹ Specify solenoid option "_H"

Switching and sensor specifications

Namur sensors (44)

Configuration	(2) Namur sensors (EN 60947-5-6; I.S.) (1) or (2) solenoid power input(s)
Current ratings	Target on I < 1.0 mA Target off I > 2.1 mA
Voltage range	7 to 24 VDC

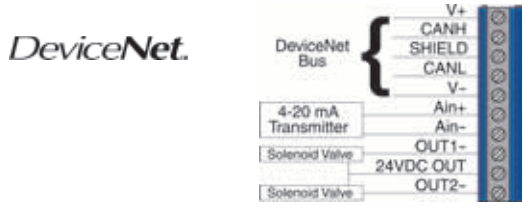


Namur wiring diagram (44)*




*Dual solenoid option also available but not shown.

Position sensor

The Axiom utilizes a magnetic resistive (Mag Res) sensor system that monitors exact valve position. The Mag Res sensor system is tolerant of lateral and vertical shaft movement which may be experienced in high cycle worn actuators without affecting rotational measurement. No cams, shafts or other mechanical apparatus are required that are prone to wear and binding.



Valve Communication Terminal (VCT) specifications	
DeviceNet (92)	
Configuration	(2) discrete inputs (open and closed) (2) power outputs (solenoids) (1) 4-20 mA auxiliary analog input, 10-bit resolution; no additional power source required
Transmission rate	Software selectable 125K, 250K or 500K baud
Messaging	Polling, cyclic and change of state
Outputs	4 watts @ 24 VDC both outputs combined
Outputs, voltage	24 VDC (with input voltage ranging from 10 to 24 VDC)
Other features	Predetermined output fail state
	
AS-Interface (96)	
Configuration	(2) discrete sensor inputs (2) auxiliary discrete inputs (2) power outputs (solenoids)
Maximum current	160 mA, both outputs combined
Auxiliary inputs	24 VDC @ 2 mA (self-powered)
Outputs	4 watts @ 24 VDC both outputs combined
Outputs, voltage	21 to 26 VDC
Configuration code	F4; user defined 4 in/2 out
AS-i version	3.0
Devices per network	31
	
Foundation Fieldbus VCT, Bus Powered (93)	
Configuration	(2) Discrete Inputs, DI (open and closed) (2) Discrete Outputs, DO (piezo valves) Multiple DI/DO blocks or modified output block
Outputs	2 mA @ 6.5 VDC each; current limited to 2mA (bus powered)
Devices per network	Max of 16 devices recommended
	

Valve Communication Terminal (VCT) specifications	
Modbus (95)	
Configuration	(2) discrete inputs (open and closed) (2) power outputs (solenoids) (1) 4-20 mA auxiliary input, 10-bit resolution
Analog input impedance	250 Ω
Outputs	4 watts @ 24 VDC both outputs combined
Outputs, voltage	24 VDC (with input voltage ranging from 10 to 24 VDC)
Transmission rate	Software selectable for 9.6, 19.6 or 38.4 kbits/sec
Transmission mode	RTU (Remote Terminal Unit)
Other features	Predetermined output fail state
	
AS-Interface VCT with extended addressing (97)	
Configuration	(2) discrete sensor inputs (2) auxiliary discrete inputs (1) power output (solenoid)
Maximum current	100 mA
Auxiliary inputs	24 VDC @ 2 mA (self-powered)
Output	2 watts @ 24 VDC
Output, voltage	21 to 26 VDC
Configuration code	A4; user defined 4 in/1 out
AS-i version	3.0
Devices per network	62
	
Foundation Fieldbus VCT, externally powered (94)	
Configuration	(2) Discrete Inputs, DI (open and closed) (2) Discrete Outputs, DO (solenoids) Multiple DI/DO blocks or modified output block
Outputs	4 watts @ 24 VDC both outputs combined; (externally powered)
Devices per network	Max of 16 devices recommended
	

Model selector

SERIES

AX Explosionproof

FUNCTION

Sensor/switching modules		Valve Communication Terminals (VCTs)	
33S	SST N.O. sensor (select pneumatic valve option 1H, 1J, 2H, or 2J)	92S	DeviceNet (select pneumatic valve option 1B, 1D, 2B, or 2D)
44S	Namur module (EN 60947-5-6; I.S.) (select pneumatic valve option 1E or 2E)	93S	Foundation Fieldbus (bus powered; I.S.) (select pneumatic valve option 1A or 2A)
		94S	Foundation Fieldbus (externally powered) (select pneumatic valve option 1B, 1D, 2B, or 2D)
		95S	Modbus (select pneumatic valve option 1B, 1D, 2B, or 2D)
		96S	AS-Interface (select pneumatic valve option 1B, 1D, 2B, or 2D)
		97S	AS-Interface with extended addressing (select pneumatic valve option 1D or 2D)

PNEUMATIC VALVE (Select single or dual)

Single solenoid		Dual solenoid	
1H	Universal 24 VDC/120 VAC	2H	Universal 24 VDC/120 VAC
1J	240 VAC solenoid	2J	240 VAC solenoid
1D	0.5 W 24 VDC solenoid	2D	0.5 W 24 VDC solenoid
1B	1.8 W 24 VDC solenoid	2B	1.8 W 24 VDC solenoid
1E	12 VDC IS solenoid	2E	12 VDC IS solenoid
1A	Piezo	2A	Piezo

OVERRIDE

N	Internal momentary override only
M	External momentary and internal override
L	External latching and internal override

PNEUMATIC TEMPERATURE

S	Standard
T	Extended (select pneumatic valve option _H, _J, _B, or _E)

ENCLOSURE

Epoxy-coated aluminum		Stainless steel	
A	North America	S	North America SS
V	International	T	International SS

CONDUIT/CONNECTORS

02	2 – 3/4" NPT
05	2 – M25

VISUAL INDICATOR**

RA	Red closed/green open
GA	Green closed/red open
1A	Three-way 1
2A	Three-way 2
XA	Special

MODEL NUMBER

Mounting hardware required and sold separately.

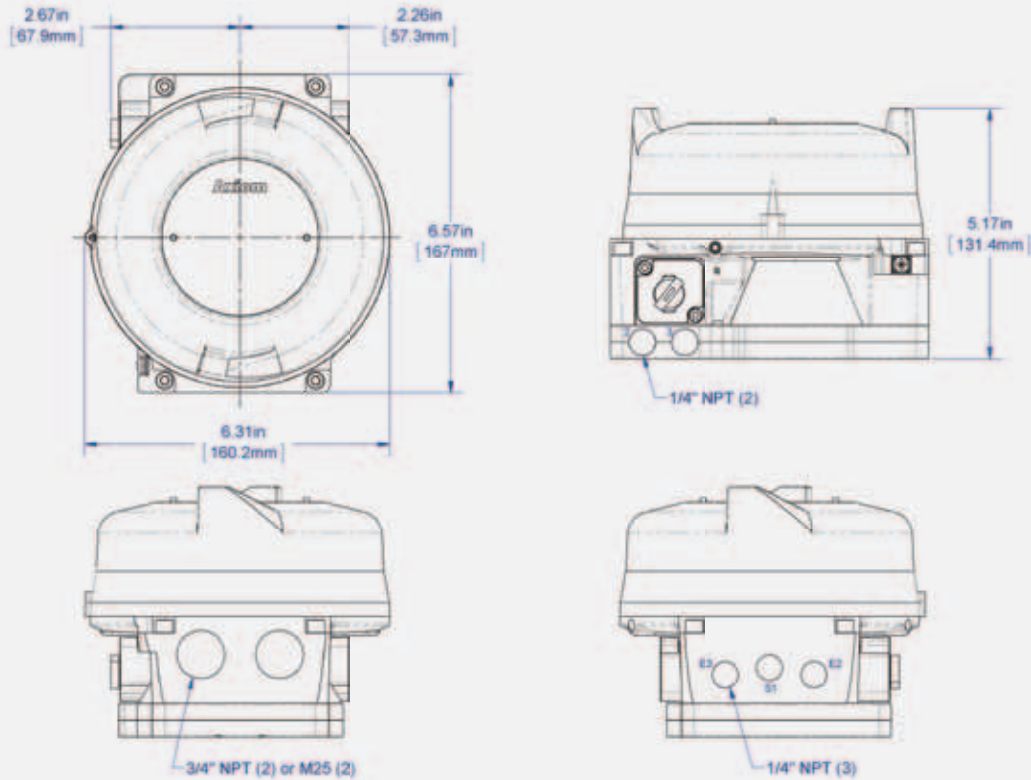
Model number example:

AX 96S 1D L S A 02 RA (optional) Partnership ID*

*Some models may include 5-digit suffix for partnership identification.

** See visual indication designations chart on page 31.

Dimensions Inches [mm]



Specifications	
Materials of construction	
Housing and mounting manifold	Epoxy-coated anodized aluminum or 316 stainless steel
Visual indicator	
Drum	Polysulfone
Lens	Lexan® polycarbonate
Fasteners and mounting adaptors	316 stainless steel
Pneumatic valve	See pneumatic valve specifications on page 8
Temperature ratings (pneumatic valve dependent)	
Piezo pilots (_A)	-10° to 60° C (14° to 140° F)
Solenoid pilots _B, _D, _E, _H and _J	
Standard (S)	-18° to 50° C (0° to 122° F)
Extended (T)	-40° to 80° C (-40° to 176° F)
Position sensor system	
Accuracy	Within 1°
Repeatability	Within 1°
Setting buffer	4° from set point <i>Rotational distance from original set point where switch will energize on return stroke.</i>
Dead band	6° from set point <i>Rotational distance from original set point where switch will de-energize.</i>
Maximum rotational range	120°

Operating life	
Pneumatic valve	1 million cycles <i>Cycle life may be extended by installing solenoid spool service kit ST604841.</i>
Warranty	
Mechanical components <i>(pneumatics included)</i>	Five years
Electronic components	Five years

Ratings	
Explosion proof <i>(Ex d, Zone 1 or Class I and II, Div. 1)</i>	AX models*
Nonincendive <i>(Ex n, Zone 2 or Class I and II, Div. 2)</i>	AX models*
Intrinsically safe <i>(Ex ia, Zone 0 or Class I and II, Div. 1)</i>	Functions 44 and 93*
Enclosure protection	
NEMA 4, 4X and 6	All models
Ingress Protection 65 and 67	All models
Approvals*	
See StoneL.com/approvals	
* Only models listed on StoneL's official web site are approved per specific rating.	