Axiom AMI
Advanced monitoring and control in nonincendive and general purpose applications

The Axiom AMI integrates solid state continuous sensing and pneumatic control to give long life and reliable performance in process applications. The AMI also features the capability for intermediate valve control and diagnostics to offer more cost saving benefits.

Advanced performance
The AMI features StoneL’s non-contact continuous position sensing system which eliminates shafts, bushings, and wear parts prone to failure. It also has an o-ring sealed pneumatic valve spool with pilot that is tolerant of contaminants found in most process plant air systems. The result of these design features is consistent reliable performance over the life of the automated valve system.

Corrosion-resistant
The AMI features an anodized epoxy-coated aluminum housing with a Lexan® cover to withstand corrosive process environments. The Lexan® cover may also be optionally fusion coated for organic solvents. Or an aluminum cover may be selected for special highly corrosive applications.

Wide variety of functions offer exceptional value
Select from standard SST sensors for conventional switching, NAMUR sensors for intrinsically safe applications or a broad array of communication options including AS-Interface, DeviceNet™ and Foundation Fieldbus. The Expeditor version provides the capability to offer additional value for special filling and flow dampening applications with intermediate control. And maintenance costs may be reduced using the diagnostic systems available with AS-Interface or in conventional 4-20 mA applications with the HART protocol.

Standard Lexan® polycarbonate cover
(Consult factory for optional aluminum cover)
Features

1. The Axiom is corrosion proof, temporarily submersible and suitable for use in hazardous areas. Designed for NEMA 4, 4X & 6; (IP67) Class I & II Div 2 nonincendive (Ex nA, Zone 2) and Class I & II Div 1 & 2 (Ex ia, Zones 0, 1, & 2) Intrinsically Safe.

2. High strength durable enclosure and pneumatic manifold are constructed of anodized aluminum and epoxy coated. Impact-resistant cover is made of high strength Lexan® polycarbonate. All fasteners are stainless steel.

3. High visibility mechanical and electronic indication confirm open and closed position and solenoid status for greater safety and convenience.

4. Universal voltage solenoid system operates on less than 0.6 watts of power and is burn out proof. Standard version will accept 24 VDC, 120 VAC or 240 VAC, reducing stocking requirements.

5. Electronic sensing, switching and communication components are sealed and potted inside function module to protect against residual moisture, vibration and corrosives.

6. High accuracy position sensor system is solid state with no moving wear points for highly reliable and precise position feedback.

7. Push button set points for open and closed accurately lock in position settings. Settings remain in place when power is removed and reapplied.

8. Integral pneumatic valve operates on standard plant air and will cycle most actuators in less than two seconds.

9. Wiring and maintenance access is quick and convenient for easy set-up and installation.

10. Internal manual pneumatic valve override is standard enabling local automated valve operation.

11. Standard 5-way, 2-position valve operates both double and single-acting actuators and features a rebreather to feed instrument air into spring side of actuator to keep out corrosives.

12. Axiom directly attaches to VDI/VDE 3845 (NAMUR) actuators and many others using a compact mounting manifold system (sold separately).
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.

**Special features**

- Pilot and main spool design offer long life, exceptional tolerance to dirty air, and tight shut-off.
- Spool and pilot valve may be conveniently removed and cleaned if large contaminants become lodged in the valve.
- Universal voltage solenoid system may be used for standard AC or DC applications.
- Five-way, two-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 set-up.

**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**

<table>
<thead>
<tr>
<th>Pneumatic valves</th>
<th>Pilot operated spool valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve design</td>
<td>Pilot operated spool valve</td>
</tr>
<tr>
<td>Pilot operator options</td>
<td>Solenoid coil or piezo</td>
</tr>
<tr>
<td>Configuration</td>
<td>Single pilot: 5-way, 2-position spring return</td>
</tr>
<tr>
<td></td>
<td>Dual pilot: 5-way, 2-position shuttle piston</td>
</tr>
<tr>
<td>Flow rating</td>
<td>0.70 Cv</td>
</tr>
<tr>
<td>Axiom porting</td>
<td>¼” NPT</td>
</tr>
<tr>
<td>Manifold porting</td>
<td>¼” NPT</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>40 to 120 psi (2.7 to 7.5 bar)</td>
</tr>
<tr>
<td>Filtration requirements</td>
<td>40 micron (Piezo, 30 micron)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>See pilot specifications below</td>
</tr>
<tr>
<td>Manual override</td>
<td>Internal momentary standard</td>
</tr>
<tr>
<td></td>
<td>External momentary available</td>
</tr>
<tr>
<td></td>
<td>External latching available</td>
</tr>
</tbody>
</table>

**Materials of construction**

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

**Piezo pilot (bus powered Foundation Fieldbus)**

<table>
<thead>
<tr>
<th>Filtration requirements</th>
<th>Dried/30 micron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>-10° to 60° C (14° to 140° F)</td>
</tr>
<tr>
<td>Electrical ratings</td>
<td>2 mA @ 6.5 VDC</td>
</tr>
</tbody>
</table>

**Solenoid pilot**

<table>
<thead>
<tr>
<th>Filtration requirements</th>
<th>40 micron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical ratings</td>
<td>0.6 watt @ 22 - 250 VAC/VDC</td>
</tr>
<tr>
<td></td>
<td>0.5 watt @ 24 VDC</td>
</tr>
<tr>
<td></td>
<td>0.5 watt @ 12 VDC (intrinsically safe)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-18° to 50° C (0° to 122° F)</td>
</tr>
<tr>
<td></td>
<td>-40° to 80° C (-40° to 176° F)</td>
</tr>
<tr>
<td>IS entity parameters</td>
<td>Ui = 28 VDC</td>
</tr>
<tr>
<td></td>
<td>Ii = 120 mA</td>
</tr>
<tr>
<td></td>
<td>Gi = 0</td>
</tr>
<tr>
<td></td>
<td>Li = 0</td>
</tr>
<tr>
<td></td>
<td>Pi = 1.0 watt</td>
</tr>
</tbody>
</table>
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 actuator adaptor and pneumatic 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.

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.
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

<table>
<thead>
<tr>
<th>SST switching sensors (33)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>(2) 2-wire solid state switches (NO)</td>
</tr>
<tr>
<td></td>
<td>(1) or (2) Solenoid power inputs</td>
</tr>
<tr>
<td>Operation</td>
<td>Normally open (solid state)</td>
</tr>
<tr>
<td>Maximum current continuous</td>
<td>0.10 amps</td>
</tr>
<tr>
<td>Minimum on current</td>
<td>2.0 mA</td>
</tr>
<tr>
<td>Maximum leakage current</td>
<td>0.5 mA</td>
</tr>
<tr>
<td>Voltage range</td>
<td>20 - 125 VAC/125 VDC</td>
</tr>
<tr>
<td>Maximum voltage drop</td>
<td>6.5 volts @ 10 mA, 7.0 volts @ 100 mA</td>
</tr>
<tr>
<td>Short circuit</td>
<td>Protected from direct application of up to 125 VAC/VDC</td>
</tr>
<tr>
<td>Solenoid input</td>
<td>22 - 130 VAC/VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SST switching sensors (35)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>(2) 2-wire solid state switches (NO)</td>
</tr>
<tr>
<td></td>
<td>(1) or (2) Solenoid power inputs</td>
</tr>
<tr>
<td>Operation</td>
<td>Normally open (solid state)</td>
</tr>
<tr>
<td>Maximum current continuous</td>
<td>0.10 amps</td>
</tr>
<tr>
<td>Minimum on current</td>
<td>2.0 mA</td>
</tr>
<tr>
<td>Maximum leakage current</td>
<td>0.5 mA</td>
</tr>
<tr>
<td>Voltage range</td>
<td>20 - 250 VAC; 8 - 250 VDC</td>
</tr>
<tr>
<td>Maximum voltage drop</td>
<td>6.5 volts @ 10 mA, 7.5 volts @ 100 mA</td>
</tr>
<tr>
<td>Short circuit</td>
<td>Protected from direct application of up to 125 VAC/VDC only</td>
</tr>
<tr>
<td>Solenoid input</td>
<td>20 - 250 VAC; 20 - 60 VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAMUR sensors (44)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>(2) NAMUR sensors (EN 60947-5-6; I.S.)</td>
</tr>
<tr>
<td></td>
<td>(1) or (2) Solenoid power inputs</td>
</tr>
<tr>
<td>Operation</td>
<td>Normally closed NAMUR sensors (solid state)</td>
</tr>
<tr>
<td>Current ratings</td>
<td>Target on I ≤ 1.0 mA</td>
</tr>
<tr>
<td></td>
<td>Target off I &gt; 2.1 mA</td>
</tr>
<tr>
<td>Voltage range</td>
<td>7 - 24 VDC</td>
</tr>
</tbody>
</table>

Wiring diagram

Single solenoid

Dual solenoid

Specify solenoid option _H

Dual solenoid option also available but not shown.
Specify solenoid option _E
### Valve Communication Terminal (VCT) specifications

<table>
<thead>
<tr>
<th>AS-Interface (96)</th>
<th>AS-Interface VCT with extended addressing (97)</th>
</tr>
</thead>
</table>
| Configuration | (2) Discrete sensor inputs  
  (2) Auxiliary discrete inputs  
  (2) Power outputs (solenoids) |
| Maximum current | 160 mA, both outputs combined  
  100 mA |
| Auxiliary inputs | 24 VDC @ 2 mA (self-powered)  
  24 VDC @ 2 mA (self-powered) |
| Outputs | 4 watts @ 24 VDC both outputs combined  
  2 watts @ 24 VDC |
| Outputs, voltage | 21 - 26 VDC  
  21 - 26 VDC |
| Configuration code | ID=F; ID=4 (4DI/2DO)  
  ID=A; ID=7 (4DI/2DO) |
| AS-i version | 3.0  
  3.0 |
| Devices per network | 31  
  62 |

#### Wiring diagram (96)

- 3 WIRE RTN
- AUX IN2
- AUX IN1
- AUX IN
- AS-i
- AS-i+

Specify solenoid option _D

#### Wiring diagram (97)

- 3 WIRE RTN
- AUX IN2
- AUX IN1
- AUX IN
- AS-i
- AS-i+

Specify solenoid option _D

### Valve Communication Terminal (VCT) with diagnostics

<table>
<thead>
<tr>
<th>AS-Interface (96) with diagnostics (D)</th>
<th>AS-Interface with Wireless Link (AMI96_ _ _ _ <em>W</em> _ models and AMI97)</th>
</tr>
</thead>
</table>
| Configuration | (2) Discrete position sensor inputs  
  (1) Low air supply pressure input  
  (1) Stuck valve/actuator input  
  (2) Remote sensor settings  
  (1) Power output (solenoid)  
  (1) Wink feature  
  (1) Parameter bit spring to open/close  
  (1) Peripheral fault bit (bad coil or stuck spool) |
| Maximum current | < 50 mA |
| Output | 0.5 watt @ 24 VDC |
| Outputs, voltage | 24 VDC |
| Configuration code | ID=F; ID=4 (4DI/4DO)  
  AMI96  
  AMI97 |
| AS-i version | 3.0  
  3.0 |
| Devices per network | 31  
  62 |

#### Wiring diagram (96) with diagnostics (D)

- 3 WIRE RTN
- AUX IN2
- AUX IN1
- AUX IN
- AS-i
- AS-i+

Specify solenoid option _D

#### Wiring diagram (96) and (97) with Wireless Link (W)

- 3 WIRE RTN
- AUX IN2
- AUX IN1
- AUX IN
- AS-i
- AS-i+

Specify solenoid option _D
Valve Communication Terminal (VCT) specifications

Foundation Fieldbus VCT, bus powered (93)

- Configuration
  - (2) Discrete sensor inputs
  - (2) Power outputs (solenoids)
  - Multiple DI/DO blocks or modified output block
- Outputs
  - 2 mA @ 6.5 VDC each; current limited to 2 mA (bus powered)
- Devices per network
  - Max of 16 devices recommended
- Wiring diagram
  - Specified solenoid option _A

Valve Communication Terminal (VCT) with diagnostics

HART (71) with diagnostics
- Local indication LEDs
  - Valve open, valve closed, solenoid power
- Special configuration attributes
  - Remote sensor settings
  - Wink
- Local diagnostic LEDs
  - High/low air pressure
  - Stuck valve/actuator
  - Bad coil
  - Stuck spool/pilot
- Position feedback
  - Current output: 4-20 mA
  - Voltage: 14 - 35 VDC (24 VDC nominal)
  - Loop resistance: 250 ohms (min) to 400 hms (max) at 24 VDC
- Pressure accuracy
  - +/- 1% of full scale
- Solenoid power
  - Conventional model 1D: 0.5 watt (0.02 amp @ 24 VDC)
  - Intrinsic safety model 1E: 0.5 watt (0.04 amp @ 12 VDC)
- HART version
  - 7.0
- Wiring diagram
  - Specified solenoid option 1D or 1E

Valve Communication Terminal (VCT) specifications

DeviceNet™ (92)

- Configuration
  - (2) Discrete sensor inputs
  - (2) Remote sensor settings
  - (2) Power outputs (solenoids)
- (1) Wink feature
- 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
- Other features
  - Predetermined output fail state
- Wiring diagram
  - Specified solenoid option _D

Expeditor specifications

Expeditor (80)

- Position feedback control (AI)
  - 4-20 mA loop, 9 - 35 VDC
- Intermediate position control (AC)
  - 4-20 mA loop, 9 - 35 VDC
- Position monitoring accuracy
  - +/- 1° of rotation
- Intermediate control accuracy
  - +/- 3° of rotation
- Solenoid voltage
  - 24 VDC (conventional models)
  - 12 VDC (Intrinsic safety models)
- Wiring diagram
  - Specified pneumatic valve option 2D or 2E

Sensing and communication module continued

Specify solenoid option 1D or 1E

Specify solenoid option _D

Specify solenoid option 1D or 1E
Position sensor and module

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.

C-module
Used in the Axiom platform, the C-module (continuous sensing) integrates a magnetic resistive sensor system to monitor exact valve position throughout the rotational range. Push button or remote open and closed position setting along with microprocessor based operation make this state-of-the-art system convenient, reliable, and smart.

Open and closed settings
Switches correspond to a particular valve position and are set using the push button panel on the module’s sealed membrane pad. Simply operate the actuator to the open position (using standard internal manual override) and push the “Set Open” button. Operate the actuator to the closed position and push the “Set Closed” button. Position settings remain locked in when power is removed and reapplied.

Visual indicator

Visual indicator designations
Clearly view valve position status from up to 75 feet with the Axiom’s visual indicator. The indicator’s rugged Lexan® construction makes it resistant to physical damage and tolerant to most corrosives.

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>0°</th>
<th>90°</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>RED CLOSED</td>
<td>GREEN OPEN</td>
</tr>
<tr>
<td>G</td>
<td>GREEN CLOSED</td>
<td>RED OPEN</td>
</tr>
<tr>
<td>1</td>
<td>A ← B</td>
<td>A ↓ B</td>
</tr>
<tr>
<td>2</td>
<td>A ← B</td>
<td>A ↓ B</td>
</tr>
<tr>
<td>X</td>
<td>Specialty configuration - please consult factory</td>
<td></td>
</tr>
</tbody>
</table>
Identify potential problems

- **Check air supply pressure**
  Alerts are activated if low or high levels exceed preset thresholds that would threaten pneumatic valve or actuator performance.

- **Determine solenoid condition**
  Voltage and current levels are monitored to determine the health of the solenoid coil whenever energized.

- **Local trouble-shooting display**
  Device LED array identifies problem sources for rapid trouble-shooting and maintenance at the valve/actuator site.

- **Monitor pneumatic spool and pilot valve operation**
  Pneumatic valve spool position is monitored to determine proper shifting performance when the solenoid is energized and de-energized.

- **Remote switch setting**
  Open and closed limit switch settings may be made with on-board push buttons or remotely through the control system.

- **Field identify with winking**
  To positively confirm the field device identity, the control room may initiate the Wink function that flashes both open and closed LEDs without affecting valve operation.

- **Stuck process valve/actuator**
  If the Axiom stalls in mid stroke and no Axiom problem sources are identified an alert will be energized to indicate the problem source is in the valve/actuator assembly.

**Diagnostic systems**

**Reduce plant downtime and cut maintenance costs**

The Axiom AS-Interface and HART models feature on-board diagnostics that predict potential automated valve malfunctions. As a result, plant downtime may be reduced by repairing automated valves during planned shutdowns instead of process operations. Should problems occur during process operation, maintenance personnel will be aided by rapidly locating failure causes, consequently speeding up valve repair and operation renewal.

**Axiom with AS-Interface diagnostics in AX & AMI (96)**

The AX and AMI (96) offers basic diagnostics for AS-Interface network applications that enable end use customers to increase uptime and reduce maintenance costs. Axiom AS-Interface diagnostic systems interface with any version 2.1 or greater masters/gateways.

**Electrical connections**

The Axiom with AS-Interface diagnostics uses standard (1-31) addressing with a 4DI/4DO profile to maximize the diagnostic data available via the network. Diagnostic units may be integrated on the same network as other AS-Interface devices.

**Control system interface**

Interface up to 31 Axiom units into your control system. Communication bits may be mapped into standard DCS or PLC as desired. No special software is required. See the StoneL FieldLink program for information about the cost saving benefits and easy installation of the AS-Interface protocol.
The AX71 and the AMI71 is a valve monitoring and control device for discrete quarter-turn automated valves. Used in conventional applications, it has the added capability of providing diagnostic information for the pilot solenoid, spool valve, and actuator. And, the device stores historical data on each open and closed operation.

**Excessive valve torque changes**

Open and closed breakaway actuator differential pressures are measured and compared to baseline levels during each operation. This enables operators to observe unusual pressure/torque level trends, which may ultimately lead to a malfunction.

**Erratic valve/actuator performance**

Total travel time and dead time (time between energizing and initial actuator movement) are measured during each operation, recorded, and compared to the baseline. This gives maintenance staff additional clues on potential automated valve problems.

**Easy control system integration**

**System connections**

Two, 2-wire connections attach to the control system to provide discrete solenoid control and continuous position monitoring. A standard 24 VDC discrete output (DO) powers and controls the solenoid valve. Intrinsically safe solenoid pilot may also be selected. A conventional 4-20 mA analog input (AI) provides continuous exact valve position feedback into the control system.

**HART signal**

The HART communication signal is overlaid on the 4-20 mA analog position monitoring input. The signal may be read via internal modem in the DCS system or external modem. External modems may transmit information to a DCS or to a remote PC via a hardwired or a wireless connection.

**Software integration**

Integration to various DCS or asset management systems may be achieved using open, standardized technologies such as enhanced EDDL (Electronic Device Description Language) or FDT/DTM (Field Device Tool/Device Type Manager). Most DCS vendors use one or both of these technologies, which provides open access to device intelligence and allows easy use of all features and benefits available from the Axiom HART device.
Axiom Expeditor

Improve process performance and prevent damage to equipment with intermediate control

With expanded control and monitoring capabilities, the Axiom Expeditor offers unparalleled value in batch processing applications. Below are a few examples of applications where the Axiom Expeditor may improve your plant operation.

**Fill control**
Fill tanks and hoppers rapidly and accurately. You can set the Axiom Expeditor to partially close the valve to reduce flow as the full level approaches. You get fast, economical “topping off” of every batch with a single valve sized for high flow rates, which may be throttled back at the end of the fill cycle.

**Fill, convenient set-up**
Calibration may be performed quickly and easily using the Axiom Expeditor’s readily accessible membrane control pad. By simply following the on-board instructions, with the unit powered up, all set-up procedures may be performed in a few easy steps and the actuator evaluated for proper stroke timing. During set-up, as mentioned above, the Axiom Expeditor automatically gages the speed of the actuator to determine if flow restrictors are needed. If full stroke is less than one second, flow restrictors (included with each Expeditor from the factory) are required to assure smooth, consistent intermediate control operation.

**Flow dampening**
The Axiom Expeditor allows valves to close using multiple steps, which inhibits water hammer resulting from a sudden full closure. You get prolonged valve and piping life, improved process flow performance and less potential for catastrophic failure.

**Thermal shock reduction**
By partially opening a standard discrete valve, steam lines are heated gradually; thus preventing thermal shock. Once lines are heated, full opening may occur minimizing any potential damage to steam lines. This is especially critical in CIP (clean-in-place) and SIP (steam-in-place) applications.
Simple operation and control system integration

- Full open and closed cycling is performed by energizing and de-energizing the discrete 24 VDC output (DO) from the control system.
- A preset intermediate position may be achieved by maintaining power from the discrete output (DO) and switching on the analog output (AO) at a preset level between 4 and 20 mA.
- Intermediate control is achieved by maintaining power from the discrete output (DO) and energizing the control system’s analog output (AO). By changing the AO signal, the Axiom control output will toggle the solenoids to the desired position within ±4% of full scale.
- The valve/actuator operates to the fail-safe position whenever the discrete output (DO) is de-energized.

Expeditor specifications

**Expeditor (80)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position feedback control (AI)</td>
<td>4-20 mA loop, 9 - 35 VDC</td>
</tr>
<tr>
<td>Intermediate position control (AO)</td>
<td>4-20 mA loop, 9 - 35 VDC</td>
</tr>
<tr>
<td>Position monitoring accuracy</td>
<td>+/- 1° of rotation</td>
</tr>
<tr>
<td>Intermediate control accuracy</td>
<td>+/- 3° of rotation</td>
</tr>
<tr>
<td>Solenoid voltage</td>
<td>24 VDC (conventional models)</td>
</tr>
<tr>
<td>Solenoid voltage</td>
<td>12 VDC (Intrinsic safety models)</td>
</tr>
<tr>
<td>Wiring diagram (80)</td>
<td></td>
</tr>
</tbody>
</table>

**Expeditor**

Specify pneumatic valve option 2D or 2E

**Expeditor specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle life</td>
<td>500,000 cycles (full cycles with intermediate position; cycle life may vary depending on intermediate toggling) Cycle life may be extended by installing solenoid spool service kit</td>
</tr>
<tr>
<td>Temperature rating</td>
<td>-18° to 50° C (0° to 122° F)</td>
</tr>
<tr>
<td>Supply pressure</td>
<td>40 psi (2.7 bar) minimum</td>
</tr>
<tr>
<td>Solenoid power</td>
<td>0.5 watt (0.02A @ 24 VDC)</td>
</tr>
<tr>
<td>Solenoid power</td>
<td>0.5 watt Intrinsically Safe (8.5) (0.04A @ 12 VDC)</td>
</tr>
</tbody>
</table>
With the new patent pending StoneL Wireless Link app you can remotely:

- Monitor and set open and closed switch positions
- Monitor and set the network address
- Operate solenoid valve(s) (if network- or power supply-enabled)
- Identify model and serial number (preset from factory)

Set up and operation

The Axiom AMI with Wireless Link is commissioned and set up identically to the standard AS-Interface unit. In addition, when powered up with a conventional power source or by the network, it may be accessed by standard iOS devices. The Axiom is accessed with the Bluetooth® Smart protocol using the StoneL Wireless Link application. Sequence of operation is:

1. Download the StoneL application from the App Store onto your device (free of charge)
2. Start the application in your Apple® device
3. All energized wireless modules in range will come up
4. Push wink to positively confirm the device you have linked (Axiom LEDs will flash)
5. Touch the specific Axiom ID/tag to link with your handheld.

You can then monitor all status and diagnostic information and make necessary information changes to the free form fields at any time. Switch settings, address changes, and solenoid operation may be performed only if network- or power supply-enabled. Other information may also be added to the free form fields.

Interfacing devices

Conventional Apple® devices may be used including:

- iPhone® Version 4S and above
- iPad® Version 3.0 and above
- iPad mini™ All

Contact StoneL regarding additional devices and special enclosures to make these devices suitable for use in hazardous locations.
Benefits of Wireless Link

1. Fast, convenient set-up for valve automation suppliers without special equipment.
2. Electronically enter and store key automated valve system information including:
   - End user tag number/information
   - Valve and actuator identification as well as Axiom model and serial number (Axiom information preset from factory)
   - Maintenance log.
3. Improve safety by easily accessing hard-to-reach automated valves without putting plant personnel at risk.
4. Reduce network commissioning time by accessing the VCT address and making changes if necessary.
5. Reduce maintenance time by monitoring valve cycle count, storing maintenance logs, and accessing multiple valves from one location.
6. Conveniently retrieve installation manuals and StoneL website when connected to internet.

Specifications

Standard specifications apply to Axiom AMI96_ _ _ _ _W_ _ models and AMI97.
Additional specifications for Wireless Link are as follows:

- **Protocol**: Bluetooth® Smart technology; Single mode (not compatible with Bluetooth® Classic)
- **Transmit power**: 4 dBm or ~2.5 milliwatts
- **Data rate**: 1Mbit/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 sight is not necessary.
- **Registrations**: FCC, IC, CE
- **CE compliance**: Exceeds industrial compliance standards
- **VCT identification**: VCTs in range will be displayed
- **VCT link**: One device accessed at a time between client (handheld device) and server (VCT). Each server accessed by one client at a time.
- **Application**: "StoneL Wireless Link" available from the App store
- **Handhelds**: Compatible with iPhone® and iPad® with iOS 8 or later

**AS-Interface with Wireless Link (AMI96_ _ _ _ _W_ _ models and AMI97)**

- **Configuration**: (2) Discrete sensor inputs, (2) Auxiliary discrete inputs, (2) Power outputs (solenoids)
- **Maximum current**: 170 mA
- **Auxiliary inputs**: 24 VDC @ 2 mA (self-powered)
- **Output**: 4 watts @ 24 VDC
- **Output voltage**: 24 VDC (+/- 10%)
- **Configuration code**: AMI96 ID=F; IO=4 (4DI/2DO)
  AMI97 ID=A; IO=7 (4DI/2DO)
- **AS-i version**: 3.0
- **Devices per network**: AMI96 31, AMI97 62

**Wiring diagram**

(96) and (97) with Wireless Link (W)

Specify solenoid option _D
# Model selector

**SERIES**  
AMI Nonincendive or intrinsically safe

## FUNCTIONS

### Sensor modules
- 33 SST NO sensor  
- 35 SST 240V Universal (NO sensor)  
- 44 NAMUR sensors intrinsically safe (EN 60947-5-4; I.S.)  
- 80 Expeditr

### Valve communication Terminals (VCTs)
- 71 4-20 mA with HART diagnostics  
- 92 DeviceNet™  
- 93 Foundation Fieldbus (bus powered; I.S.)  
- 96 AS-Interface

### PNEUMATIC VALVE

**No external override**
- 1H Single pilot, universal voltage solenoid  
- 1J Single pilot, 240 VAC (4.5 watts)  
- 1D Single pilot, 24 VDC (0.5 watt)  
- 1E Single pilot, 12 VDC intrinsically safe  
- 1B Single pilot, 1.8 W 24 VDC  
- 2H Dual pilot, universal voltage solenoid  
- 2D Dual pilot, 24 VDC (0.5 watt)  
- 2E Dual pilot, 12 VDC intrinsically safe  
- 1A Single piezo, intrinsically safe or standard  
- 2A Dual piezo, intrinsically safe or standard

**External override**
- 3H Single pilot, universal voltage solenoid  
- 3J Single pilot, 240 VAC (4.5 watts)  
- 3D Single pilot, 24 VDC (0.5 watt)  
- 3E Single pilot, 12 VDC intrinsically safe  
- 3B Single pilot, 1.8 W 24 VDC  
- 4H Dual pilot, universal voltage solenoid  
- 4D Dual pilot, 24 VDC (0.5 watt)  
- 4E Dual pilot, 12 VDC intrinsically safe  
- 3A Single piezo, intrinsically safe or standard  
- 4A Dual piezo, intrinsically safe or standard

**Latching external override**
- 5H Single pilot, universal voltage solenoid  
- 5J Single pilot, 240 VAC (4.5 watts)  
- 5D Single pilot, 24 VDC (0.5 watt)  
- 5E Single pilot, 12 VDC intrinsically safe  
- 5B Single pilot, 1.8 W 24 VDC

## ENCLOSURE

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

* Aluminum cover available [consult factory for special suffix]

## CONDUIT/CONNECTORS

- Standard  
- 02 (2) ½" NPT  
- 05 (2) M20  
- Mini-connectors  
- 10 (1) 4-pin  
- 11 (1) 5-pin  
- 19 (1) 6-pin  
- 20 (1) 7-pin  
- 21 (1) 8-pin  
- Micro-connectors  
- 13 (1) 4-pin  
- 15 (1) 5-pin  
- 17 (1) 6-pin  
- 18 (1) 8-pin

## CAPABILITIES

- S Standard  
- D Diagnostics (available with Function 96 or 71; single pilot only)  
- W Wireless Link (patent pending) (available with Function 96 or 97; single or dual pilot)

## VISUAL INDICATOR

[See chart on page 29]
- RA Red closed/green open  
- GA Green closed/red open  
- 1A Three-way flow path  
- 2A Three-way flow path  
- XA Special

## MODEL NUMBER

- Mounting hardware required and sold separately.
- Some models may include 5-digit identification suffix.
- Specify -T suffix for extended temperature.

*Special notes  
Extended temperature range for function “80” (Expeditr) -20°C to 80°C. Extended temperature is not an option for Function 93 and Piezo
### Specifications

<table>
<thead>
<tr>
<th>Material of construction</th>
<th>Epoxy-coated anodized aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual indicator</td>
<td>Lexan® polycarbonate</td>
</tr>
<tr>
<td>Fasteners and mounting adaptors</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>Pneumatic valve</td>
<td>See pneumatic valve specifications on page 24.</td>
</tr>
</tbody>
</table>

#### Temperature ratings (pneumatic valve dependent)

- **Piezo pilots (A):** -10° to 60° C (14° to 140° F)
- **Solenoid pilots (D, E, and H):** -18° to 50° C (0° to 122° F)
  - Extended temperature when ‘T’ suffix specified: -46° to 80° C (-40° to 176° F)

#### Position sensor system

- **Accuracy:** Within 1°
- **Repeatability:** Within 1°
- **Setting buffer:** 4° from setpoint
- **Deadband:** 6° from setpoint
- **Maximum rotational range:** 120°

### Ratings

#### Nonincendive (Ex n, Zone 2 or Class I and II, Div. 2)
- AMI models*: Functions 44 and 93*

#### Intrinsically safe (Ex ia, Zone 0 or Class I and II, Div. 1)
- AMI models*

### Enclosure protection

- NEMA 4, 4X and 6
- Ingress Protection 67

### Approvals*

- See Stonel.com/approvals

* Only models listed on Stonel’s official website are approved per specific rating.

### Operating life

- Pneumatic valve: 1 million cycles
  - Cycle life may be extended by installing solenoid spool service kit.

### Warranty

- Mechanical components: Two years
- Electronic components: Five years

### Dimensions (inches [mm])

- **1/4” NPT (3):** 3.87 in [98.43 mm]
- **1/2” NPT (2):** 6.21 in [158.76 mm]
- **1/4” NPT (2):** 2.47 in [62.88 mm]
- **2 3:** 1.88 in [47.73 mm]
- **4.08 in [103.63 mm] **