

## Junction module (JM)



StoneL's Junction Module (JM) enclosure is an environmentally hardened platform which is suitable for use in the most extreme corrosive and hazardous process environments. The JM features a wide variety of bus networking capabilities for protocols used in the process industries. Because of its flexibility and functionality it has become an essential building block for bus network users in the processing industries.

### No seal-offs in Division 1 & 2 hazardous areas

Eliminate costly seal fittings in Class I & II Division 1 & 2 areas when installing bus networks using StoneL's JM enclosures. Because the JM enclosure has passed special pressure piling tests simulating the extreme pressures caused by remote conduit ignition, no seal offs are required in either Div 1 or Div 2 areas.

### Keep bus energized during maintenance in Division 1 areas

FM approved factory-sealed leads are available for the drop leg of the switched drop connector. In Division 1 areas the conduit must not be opened to atmosphere when wires are energized. However, with factory-sealed leads no energized wires are exposed to the atmosphere when the drop leg is opened or removed for maintenance even though the bus trunk remains energized.



JM with switched drop

## Features



### 1. Rugged enclosure

This enclosure is constructed of durable, marine grade anodized aluminum with two coats of epoxy. Optional clear polycarbonate cover enables observation of circuit status without opening the enclosure.

### 2. Hazardous approval ratings

JM may be used in explosionproof and general purpose applications.

### 3. Quick access

Screw-on cover enables convenient access to the enclosure.

### 4. Vapor tight and submersible

Rated for IP67 and NEMA 4, 4X and 6, the JM withstands rigorous washdowns and corrosive environments.

### 5. Wide variety of functions

Select from drop connectors, switched drop connectors, relay modules, I/O modules, power conditioners, and special module configurations.

### 6. Compact design

JM's size minimizes space requirements for wiring and conduit layout.

### 7. Convenient wiring

Experience quick and secure wiring with the clearly labeled, top insertion terminal strips.



DeviceNet



MODBUS

PROFIBUS

## JM enclosure functions

### Drop connectors

Drop connectors enable individual spurs to be conveniently wired to the bus trunk. They are available in either passive or protected versions.

Passive drop connectors directly connect bus and spur wiring via standard pre-labeled wire terminals.

Protected drop connectors include a solid state protection circuit which detects a fault condition on the spur and isolates the spur from the bus. Bus operation is unaffected yet the bus master will be able to detect the faulted spur. Local LED indication may be viewed through the clear Lexan cover indicating a fault condition.



### Specifications

Protocols	AS-Interface, DeviceNet, Foundation Fieldbus, Profibus-PA, Profibus-DP and Modbus
Passive	JMT models (AS-i, DN, MB/PB-DP and FF/PB-PA)
Protected	JMP models (AS-i and FF/PB-PA)
Protected (2 drops)	JMD models (AS-i and FF/PB-PA)
Maximum voltage	35VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	Passive: negligible Protected: <1V
Trip current (drop)	Passive: no trip current (AS-i, FF/PB-PA and MB/PB-DP) Protected: 40mA (FF/PB-PA) Protected: 240mA (AS-i)
Holding current (after trip)	Protected: 28mA
Reset current level	Protected: current falls below 28mA
Maximum devices per drop	Passive: no limit Protected: 1
Current consumption	None

### Switched drop connectors

Each spur may be individually energized or de-energized using the switched drop connector. Protection circuitry comes standard in the drop connection providing fault protection for the bus while the spur is energized. The JM switched drop connector may be locked and/or tagged out assuring safe working conditions for the maintenance of field device(s) attached to the spur while the bus remains energized. The bold on and off labeling may be seen clearly up to 20 feet away, making bus status clearly viewable in the plant environment.



### Specifications



Protocols	AS-Interface, DeviceNet, Foundation Fieldbus, Profibus-PA, Profibus-DP, & Modbus
Protected	JMS models (AS-i & FF/PB-PA)
Power protected	JMS models (DN & MB/PB-DP)
Maximum voltage	35VDC
Maximum current (trunk)	8 amps
Voltage drop (trunk)	Negligible
Voltage drop (drop)	<1V
Trip current (drop)	40mA (FF/PB-PA) 240mA (AS-i) 200mA (DN & MB/PB-DP)
Holding current (after trip)	28mA
Reset current level	Current falls below 28mA
Maximum devices per drop	1
Current consumption	None

## JM enclosure functions

### I/O modules

Interface field devices into the bus network in hazardous environments with JM I/O modules. Connect analog 4 to 20mA instrumentation inputs and outputs or discrete inputs and outputs to the module and take advantage of incredible installation savings.





Specifications for I/O modules				
Protocol		<i>DeviceNet™</i>		<b>MODBUS</b>
Models	JMM96 JMM97 (extended addressing)	JMM92	JMM93 (bus powered) JMM94 (externally powered)	JMM95
AS-Interface profile	JMM96: ID = F, I/O = 7 (4DI, 4DO) JMM97: ID = A, I/O = 7 (4DI, 3DO)			
Discrete inputs	(4) 3mA @ 28VDC gold contact mechanical, low power reed, or proximity sensor	(2) 7mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor	(2) 6.5 VDC <.045mA, must be low power dry contact capable of operating at <.045mA @ 6.5VDC or solid state pnp capable of operating at 6.5VDC and <1mA	(2) 7mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs	JMM96: (4) 28VDC (4 Watts total power available) JMM97: (3) 28VDC (4 Watts total power available)	(2) 24 VDC (4 watts total power available)	JMM93: (2) 6.5 VDC 2mA. Suitable for StoneL piezo valve JMM94: (2) 24 VDC (4 watts total power)	(2) 24VDC (4 watts total power available)
Analog input		(1) Analog (4-20mA) input 10-bit resolution (0.1%)	JMM94: (1) analog (4-20mA) input 10-bit resolution (0.1%)	(1) analog (4-20mA) input 10-bit resolution (0.1%)
Analog output			JMM94: (1) analog (4-20mA) output 10-bit resolution (0.1%)	
Operating voltage	AS-Interface voltage	24 VDC via DeviceNet voltage	9 to 32 VDC via Foundation Fieldbus voltage	24 VDC
Current consumption	<40mA (with no outputs energized)	<60mA (with no outputs energized)	<17mA	<20 mA (no outputs energized and no analog input)
Indication	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)
External voltage			JMM94: 24 VDC via external power	
Data rate	167 kb/s	125, 250, 500 kb/s	31.25 kb/s	9,600, 19,200, 38,400 baud (software settable)

## JM enclosure functions

### Relay modules

Independent or Interlocked relay modules are integrated with each of the I/O modules to provide high power output switching capabilities. (AS-Interface, DeviceNet, Modbus and Foundation Fieldbus externally powered I/O modules are available with relay outputs.) The 2-DO from the I/O modules drive the two relays providing high power switching operation to separate high power circuits. All other functions of the I/O modules remain the same.



Specifications for relay modules				
Protocol		<i>DeviceNet™</i>		<b>MODBUS</b>
Models: independent	JMR96 JMR97 (extended addressing)	JMR92	JMR94 (externally powered)	JMR95
Models: interlocking	JMI96 JMI97 (extended addressing)	JMI92	JMI94 (externally powered)	JMI95
AS-Interface profile	JM_96 ID = F, I/O = 7 (4DI, 4DO) JM_97 ID = A, I/O = 7 (4DI, 3DO)			
Discrete inputs	(4) 3mA @ 28VDC gold contact mechanical, low power reed, or proximity sensor	(2) 7mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor	(2) 6.5 VDC <.045mA, must be low power dry contact capable of operating at <.045mA@6.5VDC or solid state pnp capable of operating at 6.5VDC and <1mA	(2) 7mA @ 24 VDC gold contact mechanical, low power reed, or proximity sensor
Discrete outputs (relay)				
independent	(2) 120/250VAC fused @ 2A independent for other AC loads	(2) 120/250VAC @ 2A independent for other AC loads	(2) 120/250VAC @ 2A independent for other AC loads	(2) 120/250VAC @ 2A independent for other AC loads
interlocking	(2) 120/250VAC fused @ 2A interlocked for motor operation	(2) 120/250VAC @ 2A interlocked for motor operation	(2) 120/250VAC @ 2A interlocked for motor operation	(2) 120/250VAC @ 2A interlocked for motor operation
Bus powered outputs	96: (2) 28VDC (4 Watts total power available) 97: (1) 28VDC (4 Watts total power available)			
Analog input		(1) analog (4-20mA) input 10-bit resolution (0.1%)	(1) analog (4-20mA) input 10-bit resolution (0.1%)	(1) analog (4-20mA) input 10-bit resolution (0.1%)
Analog output			(1) analog (4-20mA) output 10-bit resolution (0.1%)	
Operating voltage	AS-Interface voltage	24 VDC via DeviceNet voltage	9 to 32 VDC via Foundation Fieldbus voltage	24 VDC
Current consumption	<40mA (with no outputs energized)	<60mA (with no outputs energized)	<17mA	<20 mA (no outputs energized and no analog input)
Indication	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)	(2) LEDs indicate discrete input status (red/green)
External voltage (analog I/O)			24 VDC via external power	
External voltage (relay outputs)	Up to 250 VAC; 30 VDC	Up to 250 VAC; 30 VDC	Up to 250 VAC; 30 VDC	Up to 250 VAC; 30 VDC

## JM enclosure functions

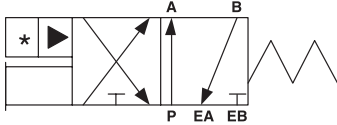
### I/O modules with integral solenoid valve

An integral Cyclone™ pneumatic valve may be selected that is electrically sized to be compatible with the I/O module outputs. An ultra low power piezo valve which may be driven directly from the bus-powered Foundation Fieldbus module is also available. Total power consumption with the piezo and FF module is less than 16mA, maximizing the number of units on any one segment!

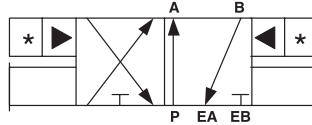


### Schematics

#### Spring return



#### Shuttle piston



### Specifications, JMM models

Configuration	Single pilot, 5-way 2-position spring return or double pilot, 5-way 2-position shuttle piston
Flow rating	0.7 Cv (10.7 Kv)
Porting	1/4" NPT
Operating pressure	25 to 120 psi (1.7 to 7.5 bar)
Operating life	1 million cycles
Valve body material	360 brass or 303 stainless steel
<b>Solenoid pilot</b>	
Current requirement	75mA @ 24VDC
Operating temperature	-18° to +50° C (-4° to 122° F)
Filtration requirement	40 micron
<b>Piezo pilot</b>	
Current requirement	2mA @6.5 VDC
Operating temperature	-10° to +60° C (+14° to 140° F)
Filtration requirement	5 micron, Dried
Approvals	Ex ia IIC T6

## Special modules, JMX models

A variety of other functions are available with the JM. The following options provide essential networking capabilities in hazardous or general purpose environments.

### Bus-powered Foundation Fieldbus with Hawkeye sensors

StoneL has developed ultra-low power Hawkeye sensors which are fully functional with the FF bus-powered module. For applications with linear operators, or for those requiring point sensing discrete inputs in the process environment, this is an ideal solution.



### AS-Interface combination repeater and power conditioner

AS-Interface combination repeater and power conditioner extends your network length easily in hazardous and general purpose locations.



### AS-Interface power conditioner

Power for two-wire bus networks must be decoupled from the communication signal for proper operation. With the JM power conditioner, the power supply may be located in a safe area with the power conditioner located in the field. Distance from the power supply to the power conditioner does not add to effective bus length.

### AS-Interface repeater

This repeater extends the usable length of the AS-Interface network by 100 meters. The repeater requires one (1) AS-Interface power supply or an AS-Interface power conditioner.

### Specifications

#### Foundation Fieldbus with Hawkeye sensors

Models	JMX04
Discrete inputs	(2) 6.5 VDC <.045mA, must be low power dry contact capable of operating at <.045mA @ 6.5VDC or solid state pnp capable of operating at 6.5VDC and <1mA
Discrete outputs	(2) 6.5 VDC 2mA. Suitable for StoneL piezo valve
Operating voltage	9 to 32 VDC via Foundation Fieldbus voltage
Current consumption	<17mA
Indication	(2) LEDs indicate discrete input status (red/green)

#### AS-Interface power conditioner

Models	JMX01 and JMX02 (redundant) JMX05 and JMX06 (daisy chain)
Connection	Redundant inputs (diode protection) Daisy chain inputs (common terminals)
Max voltage	35 VDC
Max current	3 amps
Input voltage	26 VDC to 32 VDC
Indication	Green LED indicates bus power is good (>= 26V) Red LED indicates bus power is low (<26V)

#### AS-Interface repeater

Models	JMX00, JMX01 and JMX06
Operating voltage	AS-Interface voltage
Operating current	60mA (per segment) 120mA total
AS-Interface cycle time	0.15ms X (AS-Interface slaves +1)
Indication	Green LED indicates bus power on each segment

## JM specifications and ratings

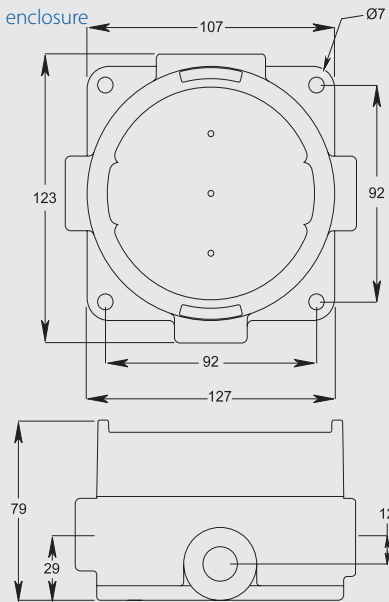
Materials of construction	
Housing and cover	Marine grade anodized aluminum with epoxy-coating
Elastomer seals	Buna-N
Fasteners	Stainless steel
Clear cover	Lexan® Polycarbonate
Enclosure protection	NEMA 4, 4X, 6 and IP 67
Hazardous area ratings	Class I Groups B, C, D Division 1 and 2 Class II Groups E, F, G Division 1 and 2
Approvals	Most models FM approved; CSA approved

Temperature ratings	
Switched drop connectors, drop connectors, and power conditioners	-40° to +80°C (-40° to +176°F)
I/O and relay modules	-40° to +80°C (-40° to +176°F)
I/O w/pneumatic valve	See pneumatic valve section
Special modules	See special modules section

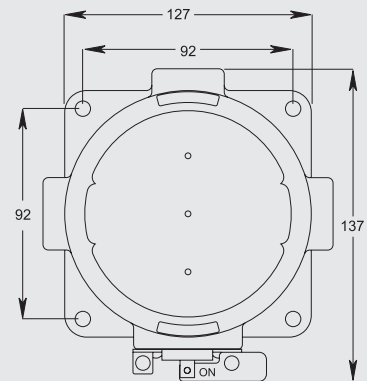
Warranty	
Complete assemblies	Two years

### Dimensions (mm)

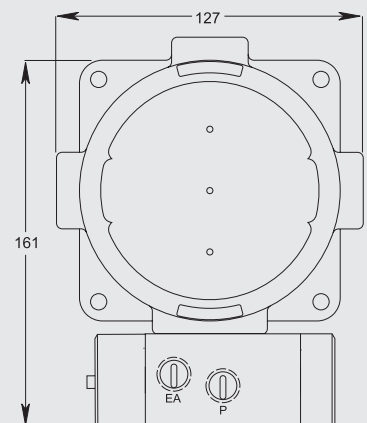
Standard enclosure



Switched drop connector enclosure



Enclosure with pneumatic valve



**Model selector**

**SERIES**

JM Junction Module

**FUNCTION**

**Drop connectors**

**Passive**

T01 AS-i; 1-2  
 T03 DeviceNet; 1-2  
 T05 Modbus & Profibus-DP; 1-2  
 T07 FF-H1 & Profibus-PA; 1-2

**Protected**

P01 FF & Profibus-PA; 1-1  
 P03 AS-i (240mA); 1-1  
 D11 (2) FF & Profibus-PA; 1-1  
 D13 (2) AS-i (240mA); 1-1  
 P04 DeviceNet; 1-1 (power protected)

**Switched protected**

S01 FF & Profibus-PA (40mA); 1-1  
 S03 AS-i (240mA); 1-1  
 S04 DeviceNet; 1-1 (power protected)  
 S05 Modbus & Profibus-DP; 1-1 (power protected)

**PNEUMATIC VALVE**

11 No pneumatic valve

**COVER TYPE**

C Clear Lexan®  
 E Epoxy-coated aluminum

**CONDUIT ENTRIES**

3 (3) 1/2" NPT  
 6 (3) M20  
 9 (3) 3/4" NPT  
 Z (3) 1/2" NPT with potted drop leads  
 N (4) 1/2" NPT  
 M (4) M20  
 T (4) 3/4" NPT

**MODEL NUMBER**

**Partnership ID\***

Model number example:

JM T01 11 E N

(optional)

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

**Model selector**

**SERIES**

JM Junction Module

**FUNCTION**

**I/O modules**

M92 DeviceNet; 2-DI, 2-DO, 1-AI  
 M93 FF-H1 (bus powered); 2-DI, 2-DO  
 M94 FF-H1 (externally powered); 2-DI, 2-DO, 1-AI, 1AO  
 (select pneumatic valve option 11)  
 M95 Modbus; 2-DI, 2-DO, 1-AI  
 M96 AS-i; 4-DI, 4-DO  
 M97 AS-i; 4-DI, 3-DO (extended addressing)

**PNEUMATIC VALVE**

11 No pneumatic valve  
 2H 1-Solenoid, 2-position, 5-way, brass <sup>1</sup>  
 2B 1-Solenoid, 2-position, 5-way, stainless steel <sup>1</sup>  
 2L 2-Solenoid, 2-position, 5-way, brass <sup>1</sup>  
 2E 2-Solenoid, 2-position, 5-way, stainless steel <sup>1</sup>  
 3G 1-Piezo, 2-position, 5-way, brass <sup>2</sup>  
 3A 1-Piezo, 2-position, 5-way, stainless steel <sup>2</sup>  
<sup>1</sup> Use with M92, M95, M96 or M97 functions  
<sup>2</sup> Use with M93 functions

**COVER TYPE**

C Clear Lexan®  
 E Epoxy-coated aluminum

**CONDUIT ENTRIES**

3 (3) 1/2" NPT  
 6 (3) M20  
 9 (3) 3/4" NPT  
 N (4) 1/2" NPT (select pneumatic valve option 11)  
 M (4) M20 (select pneumatic valve option 11)  
 T (4) 3/4" NPT (select pneumatic valve option 11)

**MODEL NUMBER**

**Partnership ID\***

Model number example:

JM M93 3G C 3

(optional)

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

**Model selector**

**SERIES**

JM Junction Module

**FUNCTION**

**Relay modules**

**Independent relays**

R92 DeviceNet; 2-DI, 2-DO (relay), 1-AI  
 R94 FF (externally powered); 2-DI, 2-DO (relay), 1-AI, 1-AO  
 R95 Modbus; 2-DI, 2-DO (relay), 1-AI  
 R96 AS-i; 4-DI, 2-DO, 2-DO (relay)  
 R97 AS-i; 4-DI, 1-DO, 2-DO (relay) *(extended addressing)*

**Interlocking relays**

I92 DeviceNet; 2-DI, 2-DO (relay), 1-AI  
 I94 FF (externally powered); 2-DI, 2-DO (relay), 1-AI, 1-AO  
 I95 Modbus; 2-DI, 2-DO (relay), 1-AI  
 I96 AS-i; 4-DI, 2-DO, 2-DO (relay)  
 I97 AS-i; 4-DI, 1-DO, 2-DO (relay) *(extended addressing)*

**PNEUMATIC VALVE**

11 No pneumatic valve

**COVER TYPE**

C Clear Lexan®  
 E Epoxy-coated aluminum

**CONDUIT ENTRIES**

3 (3) 1/2" NPT  
 6 (3) M20  
 9 (3) 3/4" NPT  
 N (4) 1/2" NPT  
 M (4) M20  
 T (4) 3/4" NPT

**MODEL NUMBER**      **Partnership ID\***

Model number example:

JM R92 11 C N

(optional)

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

**Model selector**

**SERIES**

JM Junction Module

**FUNCTION**

**Special function modules**

X00 AS-i; repeater  
 X01 AS-i; (1) repeater and (1) power conditioner (redundant)  
 X02 AS-i; power conditioner (redundant)  
 X04 FF (bus powered); I/O module with (2) FF Hawkeye point sensors  
 X05 AS-i; power conditioner (daisy chain)  
 X06 AS-i; (1) repeater and (1) power conditioner (daisy chain)  
 000 empty housing  
 B12 (12) point terminal block

**PNEUMATIC VALVE**

11 No pneumatic valve

**COVER TYPE**

C Clear Lexan®  
 E Epoxy-coated aluminum

**CONDUIT ENTRIES**

3 (3) 1/2" NPT  
 6 (3) M20  
 9 (3) 3/4" NPT  
 N (4) 1/2" NPT  
 M (4) M20  
 T (4) 3/4" NPT

**MODEL NUMBER**      **Partnership ID\***

Model number example:

JM X04 11 C N

(optional)

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