Intrinsically Safe Intelligent Control Module™ (ICM™) Product

ICM Products

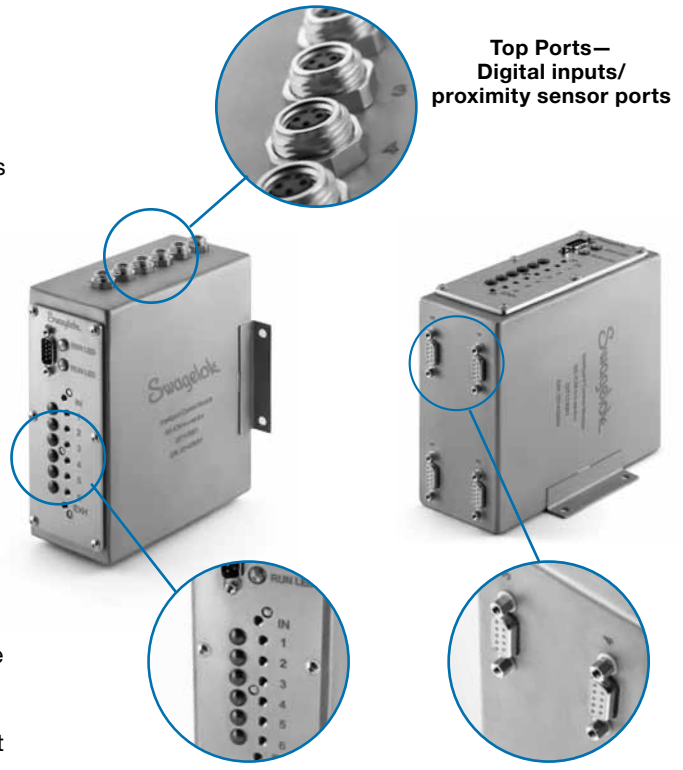
- Certified intrinsically safe design
- Accepts analog and digital inputs
- Built-in intrinsically safe power source
- Embedded script processor
- CANopen® network interface
- Integrates easily with conventional or Swagelok® modular platform components (MPC) systems

Swagelok

Intelligent Control Module (ICM) Product

The Swagelok Intelligent Control Module (ICM) product is an intrinsically safe (Class 1, Division 1 / ATEX Zone 0 rated) device that operates up to six pneumatic stream selection valves (4 valves simultaneously) designed to inject process samples or calibration fluids into an analyzer. The patent-pending ICM product has the following additional capabilities that coordinate the various elements of a sampling system to improve reliability, enhance safety, and increase confidence in your process analytic systems.

- Indicator LEDs for pilot valve/ sensor state, network status, and module status.
- CANopen interface: CANopen fieldbus interface communicates with analyzers or control systems.
- Analog inputs: Provide connection ports for
  - up to four analog output Swagelok intrinsically safe PTX series pressure and temperature transducers, or
  - up to eight 0 to 5 V sensor outputs and four 0 to 20 mA sensor outputs.
- Voltage boost: Boosts the bulk input voltage to 24 V to deliver intrinsically safe power to analog output sensors that require higher voltage.
- Embedded script processor: Allows the ICM product to execute programs/scripts written using a simple text editor. The ICM product compiles and stores them in non-volatile memory. This capability allows for stand-alone ICM product operation without a CANopen network controller.
- Proximity sensor interface: Monitors up to 6 intrinsically safe NAMUR proximity sensors to ensure proper valve actuation.
- Built-in temperature sensor for monitoring ambient temperature.
- Dedicated hardwire alert output allowing basic system monitoring even if the network is unavailable.



Patent Pending
Intelligent Control Module (ICM)

Technical Data

Operating Medium

Compressed air, lubricated or unlubricated, 40 µm filtration

Operating Pressure Range

40 to 116 psig (2.8 to 7.9 bar)

Operating Temperature

23 to 158°F (–5 to 70°C)

Storage Temperature

–4 to 158°F (–20 to 70°C)

Power

- Voltage input: 8.5 to 12 V (dc)
- Maximum current draw (without proximity sensors or other loads connected):
  - 225 mA at 12 V (dc), all four valves actuated
  - 265 mA at 8.5 V (dc), all four valves actuated

Power, cont.

- Maximum current draw (with six NAMUR proximity sensors and four 4 to 20 mA loop powered sensors connected):
  - 525 mA at 12 V (dc), all four valves actuated
  - 650 mA at 8.5 V (dc), all four valves actuated

Approvals / Compliance

- ANSI/NFPA Class I, Division 1, Groups A, B, C, D, Temperature class T4
- UL® Certifications
  - UL 913 - Edition 8
  - UL 60079-0 - Edition 6
  - UL 60079-11 - Edition 6
- cUL
  - CSA C22.2 NO. 157-92: Reaffirmed 2012
- ATEX
  - EN 60079-0:2012+A11:2013
  - EN 60079-11:2012
  - EN 60079-26:2007

Approvals / Compliance, cont.

- IEC
  - IEC 60079-0 - Edition 6
  - IEC 60079-11 - Edition 6
  - IEC 60079-26 - Edition 2
- CANopen Conformance Tested, vendor ID 916

Vibration / Shock Resistance

- Vibration: Sinusoidal Endurance IEC 60068-2-6:2007
- Shock: IEC 6068-2-27:1987

Electromagnetic Compatibility

- EN 61326-1:2013
  - RF Emissions: EN 55011
  - ESD Immunity: EN 61000-4-2
  - RF Immunity: EN 61000-4-3
  - EFT Immunity: EN 61000-4-4
  - Conducted Immunity: EN 61000-4-6

Technical Data

Analog Inputs

- 24 bit analog to digital converter with built-in temperature sensor
- Accuracy guaranteed over entire temperature range of 23 to 158°F (–5 to 70°C)
- Voltage Inputs
  - Two 0-5 V inputs per analog input port, total of eight inputs
  - Accuracy: 0.25 % of full scale
  - Input impedance: > 1E6 ohms
- Current Inputs
  - One 0-20 mA input per analog input port, total of four inputs
  - Accuracy: 0.25 % of full scale
  - Input impedance: 120 ohms

Digital Inputs

- Six inputs
- Direct support for NAMUR output sensors. Sensor power provided by the ICM product.

Digital Outputs

- One output accessible via the CANopen connector
- NAMUR style output
  - Low output value < 70 ohms
  - High output value > 20K ohms

Built-in Intrinsically Safe Power Source

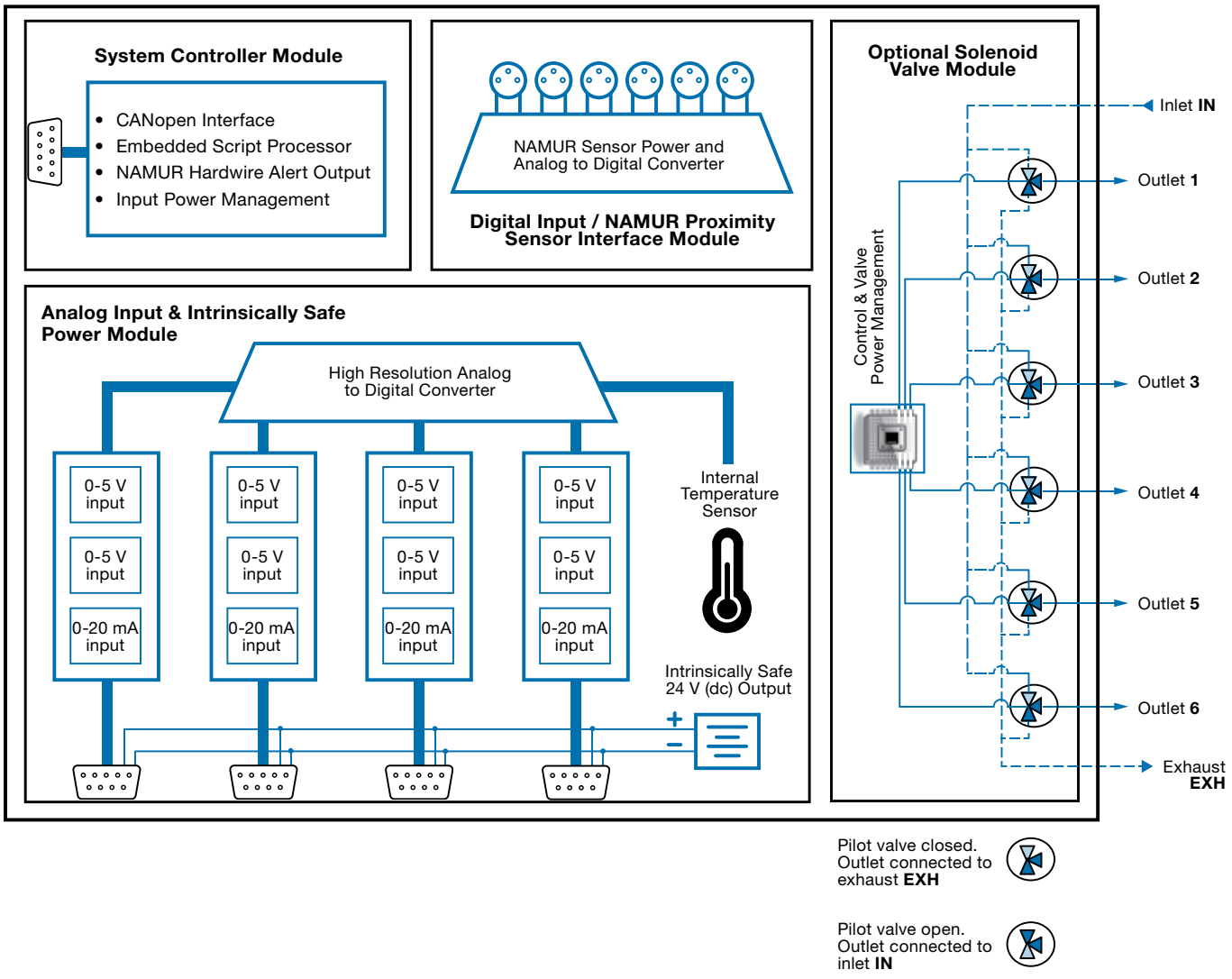
- Four output channels, one on each analog input port connector
- 24 V (dc), 5 % accurate
- Output impedance: 280 ohms
- Maximum current output per channel: 25 mA
- Automatic output disabled when current overload detected

Material of Construction

- Enclosure: 300 series stainless steel construction

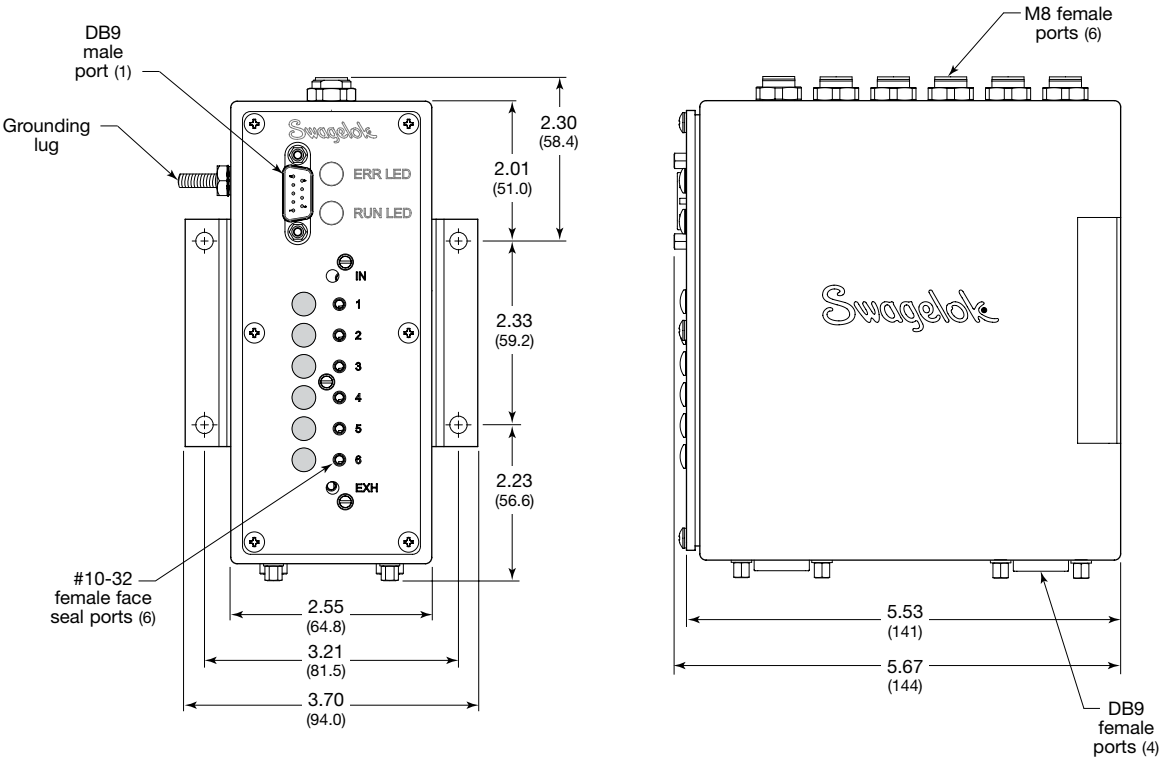
Operation

The schematic shows the powered-off state—all valves are closed. For complete information on ICM product setup and operation, see the Swagelok *Intelligent Control Module™ (ICM™), User's Manual,* MS-13-227. For complete ICM product programming information, see the Swagelok *Intelligent Control Module™ (ICM™) Reference Manual,* MS-13-228.



Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.



Ordering Information

Select an ordering number.

Pilot Valves	Ordering Number
No valves	SS-ICM-C-0-00-1-1
Six valves	SS-ICM-C-6-00-1-1

Accessories

Push-to-Connect Fittings

This kit contains eight 10-32 face-seal push-to-connect fittings to be used when connecting 1/8 in. plastic tubing to the ICM product. Ordering number: MS-VCM-KIT2

Intrinsically Safe Bulk Cable

Roll Length	Ordering Number
500 ft (152 m)	MS-SMRT-W-CABLE-500FT

Additional Products

For Swagelok intrinsically safe pressure and temperature transducers, see the *Intrinsically Safe Pressure and Temperature Transducers, PTX Series* catalog, MS-02-475.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

The software included in the ICM product is backed by a separate limited warranty. For a copy of the Swagelok® Embedded System End User License Agreement, contact your authorized Swagelok representative or see the *Intrinsically Safe Intelligent Control Module™ (ICM™) Product* user's manual, MS-13-227.

Safe Product Selection
When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Caution: Do not mix or interchange parts with those of other manufacturers.

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