

# ISM-4080

## Integrated Shutdown Module

### Submersible *Shutdown* with a Mechanical Leak Detector

- No False Alarms
- Multiple STPs
- Manifolded Pumping Systems
- Easily Tested
- Easy, Inexpensive Retrofits
- Automatic Line Tests
- Solenoid Control

**Station operators now have automatic notification of line leaks, not thermal problems. No more drive-off customers from thermal problems!**

### Automatic Line Repressurization

The ISM-4080 Integrated Shutdown Modules are built using the field proven technology of the ARM-4073 Automatic Repressurization Module. Auto-Repressurization technology (patent application), developed by **Vmi**, prevents leak detector false alarms. The ISM-4080 integrate Auto-Repressurization with real time pressure monitoring to determine when thermal contraction is occurring and compensation is required.

### Submersible Shutdown at Catastrophic Line Leak Detection

When the mechanical leak detector senses a leak, the turbine authorization is removed and alarm contacts are activated.

### Automatic Line Leak Test

The **ISM-4080** automatically monitors line leak tests before dispensing product *and* monitors Auto-Repressurization tests between dispensing cycles.

### Manifolded Pumping Systems

Controls multiple submersibles manifolded into one line! Brings manifolded pipe systems into compliance using a lead-lag submersible control for up to four manifolded submersibles. Custom configurations available.

### No Interference with Automatic Tank Testing

### Line Leak Monitoring Reports through Automatic Site Monitoring Equipment

### External Bypass Switch

### Sump Sensor Monitoring

Programming allows for automatic shutdown of the submersible pump if a sump sensor alarm is detected, or allows for alarm only response if a sump sensor is activated where submersible pump shutdown is not desirable (and not required).



Patent Application in Process • Designed and Manufactured in U.S.A.

**Truck Stops, Loading Racks, Manifolded Submersible Systems, Convenience Stores, Above-ground Storage Tanks, Unattended Card Lock Systems**

## **OVERVIEW**

### **ISM-4080 Integrated Shutdown Module**

Vmi has earned the reputation of building the best mechanical line leak detectors available. With the "99" series of mechanical leak detectors, Vmi continues to strengthen its technological lead by providing the most reliable line leak detection. These products perform the most reliable operation in the broadest range of fuel and piping systems, providing the longest service life, within the EPA mandated Catastrophic Line Leak Detection threshold of 3 gallons per hour @ 10 PSI.

In July of 2000, Vmi advanced the state of the art of mechanical line leak detection by introducing a way to eliminate thermal induced slow-flow, the Achilles heel of line leak detection. The introduction of the ARM-4073 Automatic Repressurization Module provided the ability to match a mechanical line leak detector and an Auto-Repressurization system to eliminate thermally induced false alarms for mechanical line leak detection without reducing leak detection sensitivity.

The **ISM Modules** take Auto-Repressurization technology to a new level, monitoring line pressure directly by tracking leak detector piston movement at all times. Monitoring line pressure through the mechanical line leak detector determines if the leak detector is open, establishes the appropriate time to repressurize the line, and allows the ability to determine when to disable the submersible pump for a detected line leak. The **ISM** line leak detection system continuously monitors the line and performs line leak checks anytime the pressure falls in the line, even when the submersible pump is off! Whether thermal contraction is occurring, a mechanical failure in the submersible pump (pressure relief or functional element), or a line leak, this system is at work. Station operators now have automatic notification of line leaks, not thermal problems. ***No more drive-off customers from thermal problems!***

Line leak detection generally takes longer today than in the past. Today's pipe delivery systems are usually longer, have more flexible connectors, and are often made of flexible material. Additionally, vapor entrapment due to thermal contraction adds to the problem. These conditions may result in a leak detector taking more than five seconds to open, resulting in slow flow (false alarms). The **ISM** compensates for these conditions. If line pressure falls below 12 PSI for any reason, enough time for the leak detector to reset is allowed to pass. After the delay time for the leak detector to reset (leak or thermal contraction) has passed, the delivery line is repressurized. During repressurization, a line test occurs detecting leaks or ensuring the delivery system is charged and ready to deliver fuel.

**Many manifolded piping systems, such as those seen at high volume stations and truck stops, have more than one submersible pump delivering fuel into a manifolded (single) pipe system. If these submersibles are allowed to start at the same time, they will not be capable of detecting a 3 GPH line leak. The ISM-4080 will authorize one pump first, allow one leak detector to search for a line leak, and then start the (additional) submersibles at delayed intervals.**

The **ISM** will control all fractional horsepower submersibles as well as Big Flow 3 and 5 horsepower submersibles.

In some jurisdictions, it is required that the submersible pump be disabled when the sump sensor alarm is activated or when a catastrophic line leak (3 GPH @ 10 PSI) is detected. The installation of the **ISM-4080** meets these requirements with or without a site monitoring system.

In other jurisdictions, full shutdown of the submersible pump is not required following the detection of a sump sensor alarm. Setup programming allows the **ISM-4080** to perform either an alarm only response when the sump sensor has been activated or a full shutdown of the submersible pump. Full shutdown of the submersible pump(s) is initiated in the event of catastrophic line leak detection.

To prevent the interruption of scheduled tank testing events, the **ISM** may be programmed to prevent Auto-Repressurization based on time of day.

### **Continuous Line leak Monitoring - Automatic Line Repressurization**

The **ISM-4080** automatically monitor **Vmi** mechanical line leak detectors. After an authorization is received, the leak detector must open before dispensing begins or the submersible is shut down. Between dispensing cycles, the **ISM** continuously monitors the line pressure. A line test/auto repressurization sequence is initiated every time line pressure falls below 12 PSI. The test (when passed) additionally recharges the delivery system, combating thermal contraction, keeping the line pressurized and ready for fuel delivery. Long pipe runs and flexible pipe systems are automatically compensated for, while preventing false alarms.

### **No New Wires to the Submersible Pump Sump Containment**

The **ISM-4080** modules monitor the Leak Detector Sensor (piston switch). The Leak Detector Sensor Housing is screwed into the **Vmi 99 Series - 99 LD-2000 or 99 LD-3000** mechanical line leak detector vent opening. An alternative vent is provided in the sensor housing. Only a single pair of wires is needed to monitor and discriminate between the Leak Detector Sensor and an (optional) single point, normally closed, intrinsically safe sump sensor. If a sump sensor has been previously installed in the sump, no new wire need be pulled for the installation of the **ISM-4080**. On new installations, separate wiring may be installed for both the sump sensor and the Leak Detector Sensor.

### **Manifolded Submersible Control**

Multiple submersibles into one line, all starting at the same time, overcome catastrophic line leak detection function. The installation of an **ISM** module (and piston sensor) allow multiple submersibles feeding into a single delivery line to be wired in such a manner to enable hourly catastrophic (3 GPH @ 10 PSI) testing. This is an inexpensive fix to a common problem.

### **Line Leak Monitoring Reports Through Automatic Site Monitoring Equipment Auxiliary Sensor Inputs**

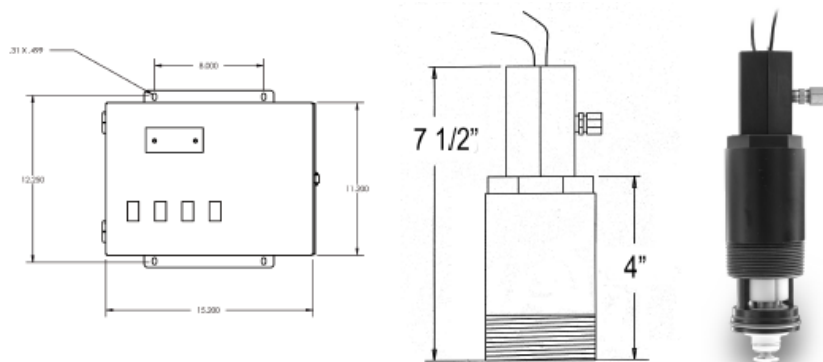
Low Pressure Alarms and Sump Alarms (optional) are detected and displayed on the **ISM** Module. Alarm reports may be monitored through the **ISM** only, or connected in parallel to a Site Monitoring System to provide for the remote reporting of alarms. Additionally, the alarm output contacts may be used with stand-alone audible or visual devices. Wiring diagrams are provided in the **ISM** Installation and Operation Manual.

### **No Interference with Automatic Tank Testing**

If tank monitoring (testing) equipment needs specific "quiet" times to perform testing, the **ISM** will provide uninterrupted test time, based upon time of day (programming set-up) or based on an AC or DC input signal from the site tank test equipment.

### **Works with **Vmi** "99" Series Mechanical Line Leak Detectors**

To allow **ISM** monitoring of the 99 LD-2000 the **ISM-4105\47** Leak Detector Sensor is required for retrofit and new installations. To allow **ISM** monitoring of the 99 LD-3000 Line Leak Detectors the **ISM-4106\47** Leak Detector Sensor is required for retrofit and new installations.



## **ISM-4080 is Sold in 2 Channel and 4 Channel Configurations**

### **ISM-4080-2, 2 Channel**

- (2) VAC In (Authorizations)
- (6) VAC Out (STP Relays, Solenoids, Alarms)
- (2) I.S. In (LD Piston Sensors)

### **ISM-4080-4, 4 Channel**

- (4) VAC In (Authorizations)
- (8) VAC Out (STP Relays, Solenoids, Alarms)
- (4) I.S. In (LD Piston Sensors)

#### **For Use With:**

- 99 LD-2000, 99 LD-3000 Mechanical Line Leak Detectors

#### **Leak Detector Sensor Housing, Part is constructed of:**

- 6061 T-6 Aluminum
- All Aluminum is Hard Anodized
- Viton O-rings are compatible with: Gasoline, Methanol and Ethanol (all blends through 100%),
- #1 or #2 Diesel, Kerosene, Jet A, JP-4, AV Gas, and Biodiesel
- Switch is approved for total immersion in above liquids.

#### **Leak Detector Sensor Housing Dimension:**

- Height: 3 1/2"

#### **ISM Controller Housing Dimensions:**

- Length: 12 1/2" • Width: 15 1/2" • Depth: 5 1/4"

#### **Input Voltage:**

- 115-230 VAC Universal Power Input

#### **Authorization Input Voltage Range:**

- 60 - 240 Vac

#### **Output Relay Rating:**

- Ready Relay for Staged Submersibles and Solenoid Valve Control 2 amp, 115/230
- Turbine Contactor Relay: 2 amp, 115/230
- External Alarm Relay: 2 amp, 115/230
- For use with intrinsically safe input, an isolation relay is needed.

#### **Sensor Input:**

- Piston Switch may share the same wire pair as a single pole, normally closed, sump sensor compatible with intrinsically safe circuitry. Intrinsically safe voltage and current supplied from the ISM-4080 to the Piston Switch and Sump Sensor Circuits, for hazardous locations, Class 1, Group D. Wiring for sensors shall not be in the same conduit as high voltage wiring, nor installed in any way as to allow sensor wiring to current that is not supplied by an intrinsically safe source.

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**ISM-4080 Controller: CSA Approval Pending**

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