

RCM Industries, Inc.

Series 1000 & 2000 Flo-Gard II™

Instruction Manual for Intrinsically Safe - Reed Switches

Option Code: -1S2-IS-LED or -2S2-IS-LED
-1S2-IS or -2S2-IS



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Direct Reading Differential Pressure Flowmeters

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Conforms to the following Standards:

EN 60079-0: 2009 - Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements

EN 60079-11: 2007 - Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”

EN 60079-26: 11: 2007 - Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga

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1.

Introduction

 **WARNING**
Failure to comply with the installation instructions provided in this manual could result in death or serious personal injury.

This installation instruction manual is provided with each Flo-Gard II™ ordered with the following option code designation:

- 1S2-IS (1-single pole double throw reed switch and intrinsic safe approval)
- 1S2-IS-LED (1-single pole double throw reed switch, intrinsic safe approval and 1-LED).

- 2S2-IS (2-single pole double throw reed switches and intrinsic safe approval).
- 2S2-IS-LED (2-single pole double throw reed switches, intrinsic safe approval and 2-LED's).

This product has been certified “intrinsically safe” when used with an approved barrier by the following recognized testing laboratories:

- Canadian Standards Association (CSA), Canada.
- KEMA is the issuer of the ATEX EC Type Examination Certificate.

 **CAUTION**
Only qualified, service trained personnel who are aware of the hazards should perform the connection of external wiring to this product.

“Intrinsic Safety” insures that a circuit operated under normal or specified fault conditions is not capable of causing ignition of the prescribed explosive atmosphere.

 **WARNING**
Potential spark hazard impact to the enclosure must be avoided when installed in a Zone 0 hazardous area per EN 60079-0.

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2.

Installation Planning

2.1 Installation Planning Considerations

Determine site selection and piping recommendations and damage prevention. Select a site which is convenient for viewing when ordered with the LED's and provides service access.

Do not exceed the pressure and temperature limits marked on the nameplate. Ratings are determined by the effects on the bellows, elastomer seals and electronics and/or switches.

Protect from freezing liquids, water hammer, surge and vibration.

3.

Specifications & Rating

3.1 Cable / Conduit Recommendation

Use NEC / CEC approved 20 AWG cable with 3 or 6 conductors with drain wire and CSA Certified watertight conduit or cable gland (not included). See below for cable / conduit recommendation.

Recommended:

Liquid Tight Strain Relief Connector & Grounding Locknut, multiconductor shielded communication cable – 20 AWG 7/28, CSA, UL Certified, CE, OSHA Acceptable.

Ratings:

3.2 Entity Parameters

- Vmax = 28V
- Imax = 110mA
- Pmax = 1.2W
- Ci = 0uF
- Li = 0uH

General Purpose

- Contact Rating 10W max
- Voltage 125Vac max
- 175Vdc max
- 0.35 Amp max switching
- Current 1.5 Amp max carry
- Hysteresis 13% F.S.

3.3 LED Rating:

- Voltage 0.50 Watts Metal Film Resistor
- 24V, 20mA

Rating based intrinsic safe approvals (Entity Parameters) and manufacturer specifications (General Purpose).

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5.

Conduit Connection & Wiring

5.0 Conduit Connection and Wiring (Flo-Gage) -1S2-IS-LED or -2S2-IS-LED

Important: Terminate shield inside outer housing but outside inner shield housing. Refer to Figure 1 for details. Select one of the following connection methods based on the option designation. 24Vdc power supply required (Option PS-24), not included. See control drawing # 6932 for details.

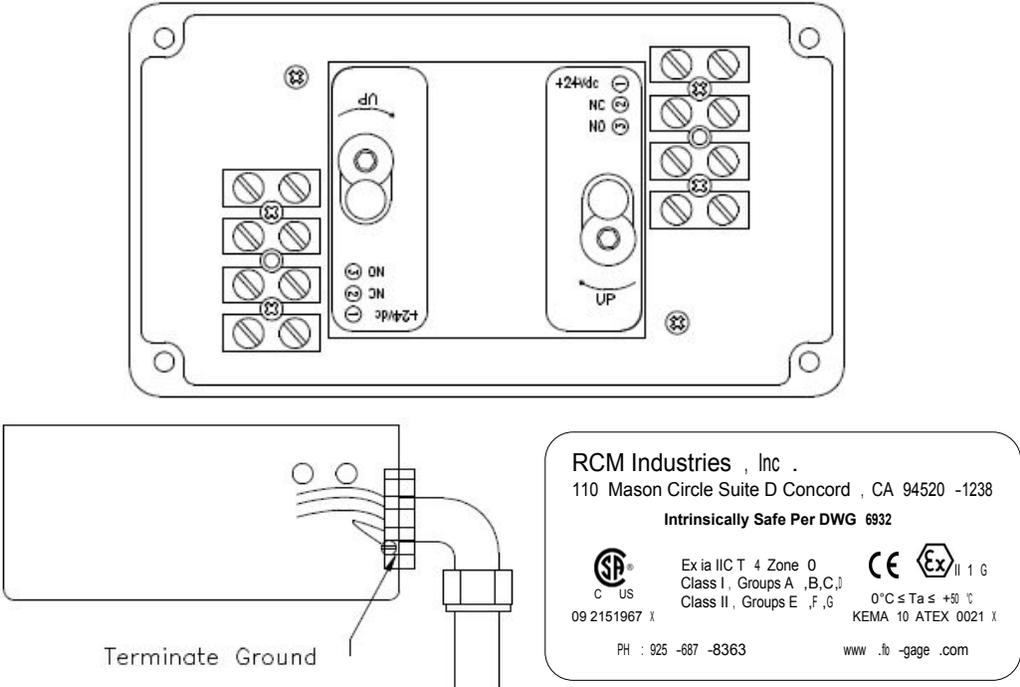
Connection for Switch # 1 (-1S2-IS-LED)

- 5.1 Connect the positive wire from 24Vdc power supply to terminal #1 (+ 24Vdc).
- 5.2 Low (Normally Closed Contact) – Connect Common (-) to terminal # 2 or Low (Normally Open Contact) – Connect Common (-) to terminal # 3.

Connection for Switch # 2 (-2S2-IS-LED)

- 5.3 Connect the positive wire from 24Vdc power supply to terminal #1 (+ 24Vdc).
- 5.4 High (Normally Closed Contact) – Connect Common (-) to terminal # 2 or High (Normally Open Contact) – Connect Common (-) to terminal # 3.

Refer to Figure 1 for details on connecting and setting switches.



Hazardous Location Labels – Option Code -1S2-LED-IS or -2S2-LED-IS

Figure 1

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5.

Control Drawing #6932

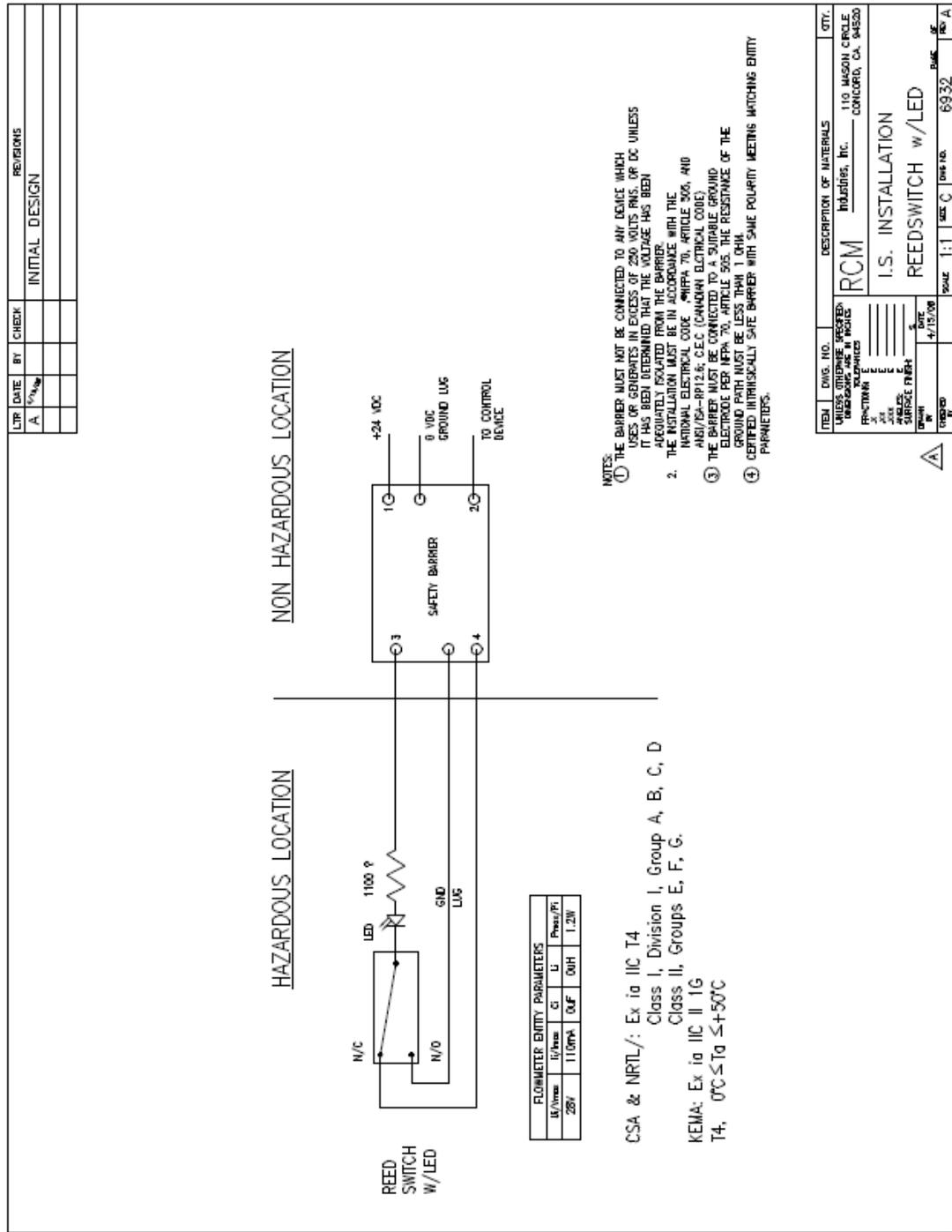


Figure 2

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6.0 Conduit Connection and Wiring (Flo-Gard II) -1S2-IS or -2S2-IS

6.

Conduit Connection & Wiring

Important: Terminate shield inside outer housing but outside inner shield housing. Refer to Figure 1 for details. Select one of the following connection methods based on the option designation. See control drawing # 6931 for details.

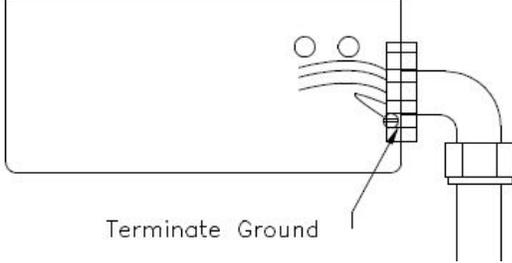
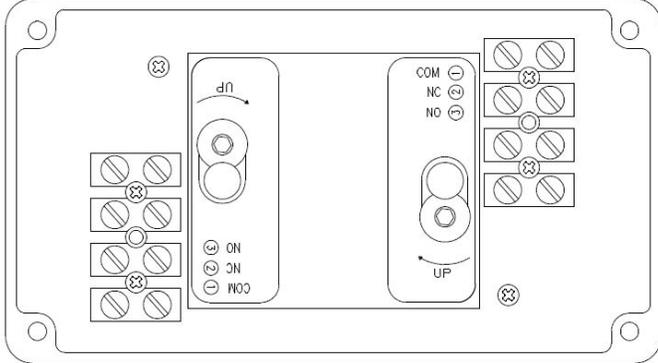
Connection for Switch # 1 (-1S2-IS)

- 6.1 Low (Normally Closed Contact) – Connect (COM) terminal #1 and (NC) terminal #2 or Low (Normally Open Contact) – Connect (COM) terminal #1 and (NO) terminal #3.

Connection for Switch # 2 (-2S2-IS)

- 6.2 High (Normally Closed Contact) – Connect (COM) terminal #1 and (NC) terminal #2 or High (Normally Open Contact) – Connect (COM) terminal #1 and (NO) terminal #3.

Refer to Figure 2 for details on connecting and setting switches.



RCM Industries, Inc.
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Intrinsically Safe Per DWG 6931

| | | |
|---|--|---|
|  <small>C US</small> 09 2151967 X | <small>AEx ia IIC T 4 Zone 0</small> <small>Class I, Groups A, B, C, D</small> <small>Class II, Groups E, F, G</small> |   <small>II 1 G</small> <small>0°C ≤ Ta ≤ +50 °C</small> <small>KEMA 10 ATEX 0021 X</small> |
|---|--|---|

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Figure 3

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6.
Control
Drawing #6931

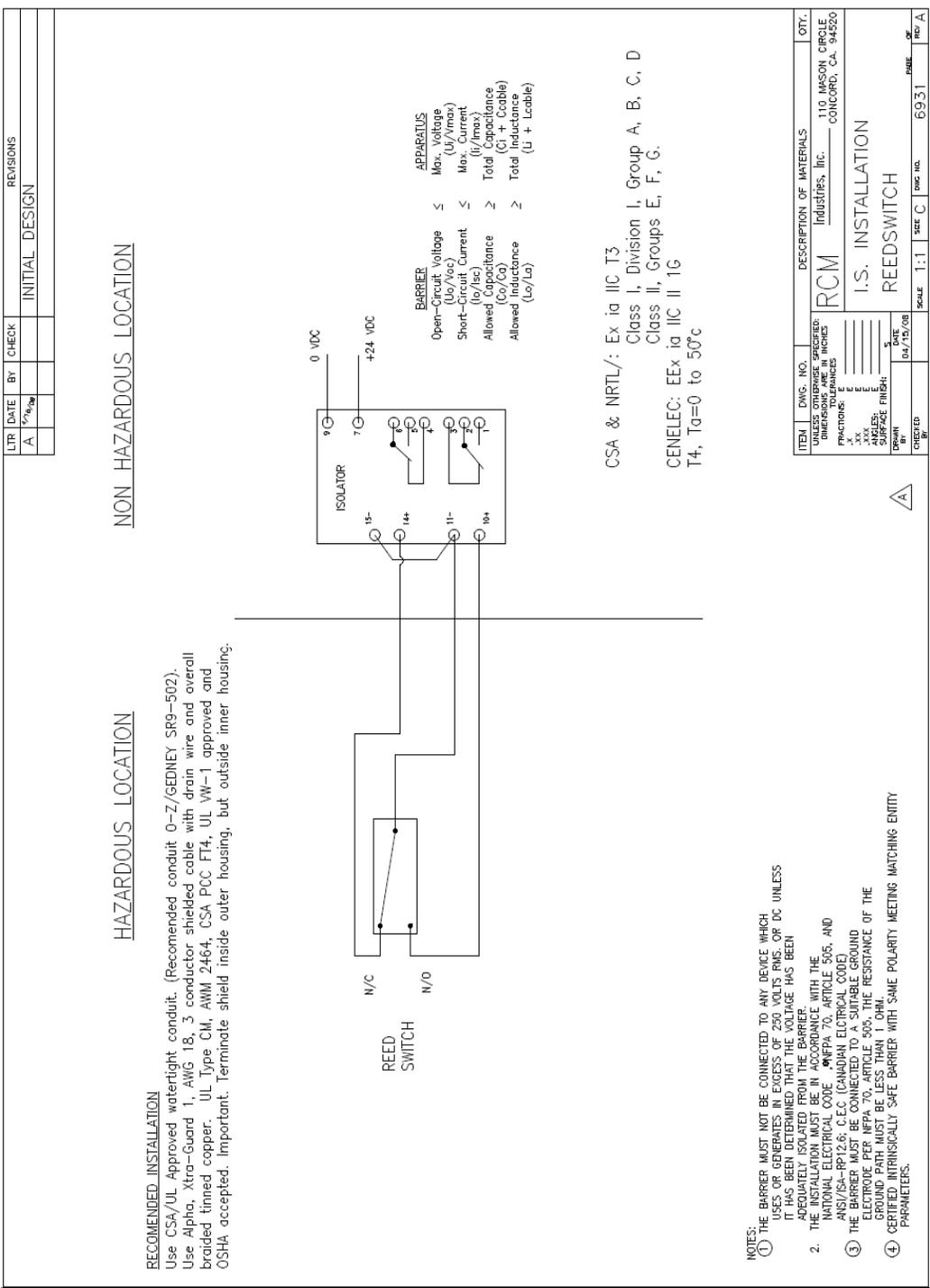


Figure 4

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Adjustments

Adjustments are made by rotating the adjustment screw clockwise to raise the set point or counterclockwise to lower the set point. Use the **Green** mark on the adjustment disc as a reference. Factory set at 30% of full scale for switch #1 and 95% of full scale for switch #2.

Important: Rotating clockwise moves the set point upscale. See chart below for % of full scale setting.

To set switches accurately, connect a continuity tester to common and the selected normally open or normally closed contact. Establish flow at the desired set point and turn the adjustment screw until switching occurs. Increase and decrease the flow rate and verify desired set point switching.

| Adjustment Screw Turns | % of Full Scale |
|------------------------|-----------------|
| 0 (factory setting) | 30 |
| 1/2 | 60 |
| 1 | 80 |
| 1 1/2 | 90 |
| 2 | 100 |

Calibration Procedure:

Re-calibration of the switches can be performed in the field using a continuity tester, multimeter with buzzer or indicator light.

Normally Open Contacts:

When wired using to the N.O. (Normally Open Contact) turn the adjustment screw clockwise until the switch stops, the light should be ON.

Turn the adjustment screw counterclockwise until the light goes OFF, continue turning the screw until the light just comes ON again and stop.

Turn the adjustment screw clockwise until the green dot (reference mark) is facing 3:00 o'clock (closest to the terminal strip). The light should be OFF this is approximately 30% of the full scale flow rate.

Important: Rotating clockwise moves the set point upscale.

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Normally Closed Contacts:

When wired using to the N.C. (Normally Closed Contact) turn the adjustment screw clockwise until the switch stops, the light should be OFF.

Turn the adjustment screw counterclockwise until the light comes ON, continue turning the screw until the light just goes OFF again and stop.

Turn the adjustment screw clockwise until the green dot (reference mark) is facing 3:00 o'clock (closest to the terminal strip). The light should be ON this is approximately 30% of the full scale flow rate.

Important: *Rotating clockwise moves the set point upscale.*

Repeat the above procedures when ordered with two switches (2S2 Option) refer to the adjustment chart 2.0 for the number of turns required to obtain 90% of the full scale flow rate. Replace the cover and secure using 4 #6-32 flat head screws.

Hazardous Location

The RCM Flo-Gard™ with the -1S2 or -2S2 switches are listed as “Intrinsically Safe” for Hazardous Locations. This means that the circuits within these flow meters are designed to be incapable of producing a spark or thermal effect that could ignite a mixture of flammable or combustible gases when properly installed in accordance with Hazardous Location requirements.

It does not mean that these flow meters are “Explosion Proof”. If proper safety precautions are not followed, or if the equipment is not installed properly, there is a serious potential for explosion. Be sure to review all safety precautions, installation, and wiring practices throughout this manual.



DANGER

Although some RCM products are designed and certified for installation in hazardous locations as defined by the National Electrical Code, many RCM products are not suitable for use in hazardous locations. It is the responsibility of the individuals who are installing the products in hazardous locations to determine the acceptability of the product for the environment. Additionally, to ensure safety, the installation of instrumentation in hazardous locations must be as per the manufacturer's control drawing specifications. Any modification to the instrumentation or the installation is not recommended and may result in life threatening injury and/or damage to facilities.

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Intrinsically Safe Installation Requirements

It is important that the installer of an Intrinsically Safe system reference the requirements of the authority having jurisdiction at the installation site. In the United States, reference should be made to Article 504 of the National Electric Code and ANSI/ISA RP 12.6. RCM flow meters that are approved intrinsically safe should be installed in accordance to these requirements and in accordance with the approved control drawings in the manual.

CAUTION

In order to have a fire or explosion, fuel, oxygen and a source of ignition must be present. An intrinsically safe system assumes the fuel and oxygen is present in the atmosphere, but the system is designed so the electrical energy or thermal energy of a particular instrument loop can never be great enough to cause ignition.

Intrinsically Safe System

Intrinsically safe apparatus never stand alone. Generally, it is part of a system in which the certified components are used to guarantee the safety of the system. A simplified schematic of an intrinsically safe system is shown below in figure 4.

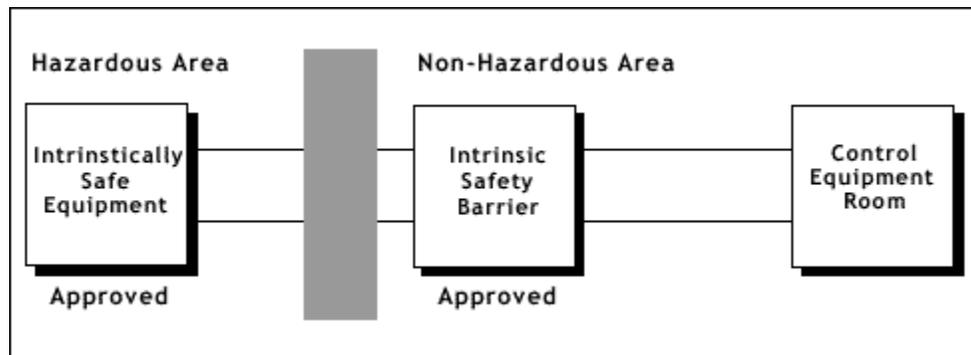


Figure 5

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Warranty

Our products are guaranteed to satisfy – period. Products may be returned within 30 days of receipt without restocking charges. (Expediting and freight charges are not refundable.) After the initial 30 day trial period, any returned merchandise, unless defective as defined in the Warranty, will be subject to a 20% restocking charge. Merchandise may be returned only with the permission of RCM Industries, Inc. Merchandise returned for credit is to be shipped with transportation charges prepaid. Credit allowed will be determined by the condition of merchandise returned. This credit can only be applied to future orders or to accounts outstanding at the time of issue of the credit memorandum. Prices and discounts are subject to change without notice. These terms and conditions supersede all previous terms and conditions.

RCM Industries, Inc. warrants the equipment manufactured by it to be free of defects in material and workmanship for a period of one year from shipment. RCM will repair or replace, at its option, any equipment which it determines to contain defective material or workmanship and will return said equipment to the purchaser, FOB factory shipping point. RCM Industries shall not be obligated to repair or replace equipment which has been repaired by others, abused, improperly installed, altered, or otherwise misused or damaged in any way. RCM Industries shall not be responsible for any dismantling, reassembly or reinstallation charges.

This warranty is in lieu of all other warranties, expressed or implied, and Buyer hereby waives all other warranties, guaranties, conditions or liabilities, expressed or implied, arising by law or otherwise (including without limitation any obligation of Seller with respect to any special, indirect, incidental or consequential damages, including damages claimed in connection with any rescission of this agreement by Buyer) and whether or not occasioned by Seller's negligence.

Specification may change without notice. The information we supply is believed to be accurate and reliable as of printing. However, we assume no responsibility for its use.

While we provide our customer with applications assistance through our literature and web site, it is up to the customer to determine the suitability of our products in a given application.

Contact our factory if you have questions regarding these terms and conditions at 1-800-flo-gage (356-4243) or www.flo-gage.com.

RCM Industries policy is to provide products and service which meet or exceed the expectations of our customer and all established requirements.

Our mission is to serve industrial and commercial customers with flow measuring products which are rugged and reliable, and easy to apply, and provide outstanding service and delivery commitments which are as reliable as our products.