

Series 7000 & 8000 Flo-Gage™

Instruction Manual for Intrinsically Safe - Reed Switches

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

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



ATEX



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Direct Reading Differential Pressure Flowmeters

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RCM Industries, Inc.

Series 7000 & 8000 Flo-Gage™

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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-Gage™ ordered with the following option code designation:

- 1S2-IS-LED (1-single pole double throw reed switch, LED indicator & intrinsic safe approvals).
- 1S2-IS (1-single pole double throw reed switch & intrinsic safe approvals).

- 2S2-IS-LED (2-single pole double throw reed switches, LED indicators & intrinsic safe approvals).
- 2S2-IS (2-single pole double throw reed switches & intrinsic safe approvals).

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

Place the flow meter per section 2, page 2 of the Installation, Operation and Maintenance Manual (M1) for details regarding site selection and piping recommendations and damage prevention. Select a site which is convenient for viewing and provides service access from the front and rear.

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.

3.1 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

V_{max} = 28V
I_{max} = 110mA
P_{max} = 1.2W
C_i = 0uF
L_i = 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).

3.

Specifications & Rating

Series 7000 & 8000 Flo-Gage™

4.

Conduit Connection & Wiring (Flo-Gage)

4.0 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.

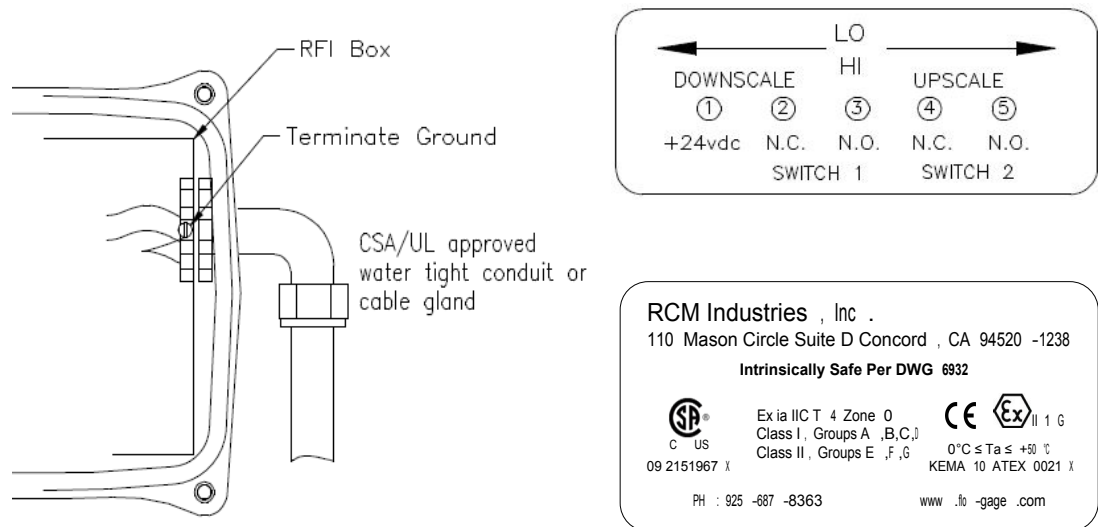
Connection for Switch # 1 (-1S2-IS-LED)

- 4.1 Connect the positive (+) wire from the 24Vdc power supply to terminal #1.
- 4.2 Low (Normally Closed Contact) – Connect 24Vdc (-) to terminal # 2 (NC) or Low (Normally Open Contact) – Connect 24Vdc (-) to terminal # 3 (NO).

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

- 4.3 High (Normally Open Contact) – Connect 24Vdc (-) to terminal # 4 (NC) or High (Normally Closed Contact) – Connect 24Vdc (-) to terminal # 5 (NO).

Refer to Figure 1 for details on connecting and setting switches. Refer to page 12 for calibration instructions.



Conduit Connection & Hazardous Location Labels

Figure 1

4.

Control Drawing #6932

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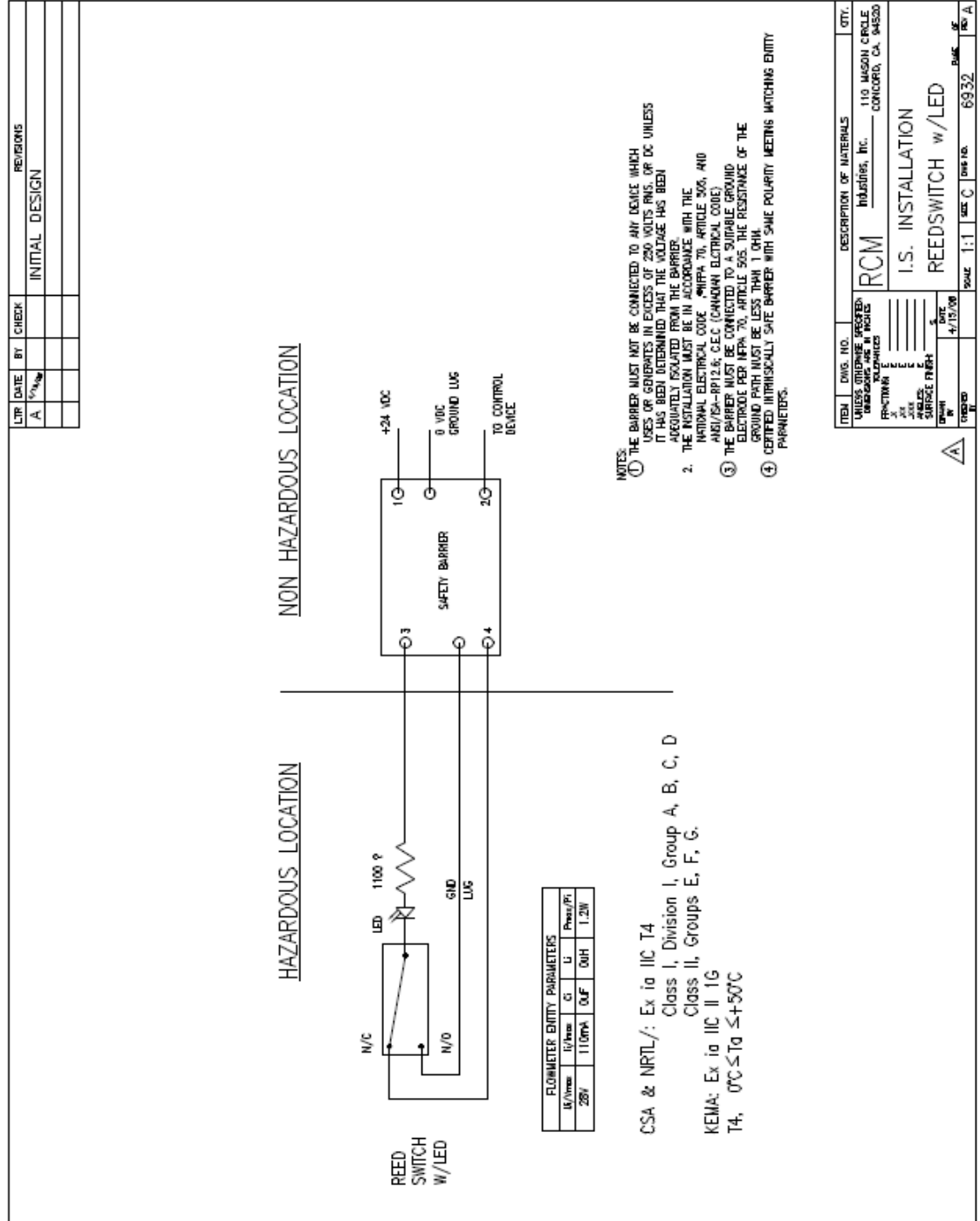


Figure 2

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

5.

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.

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

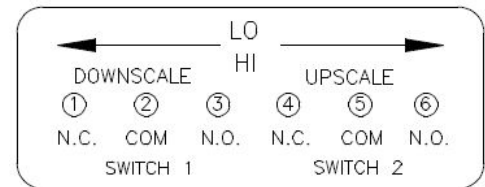
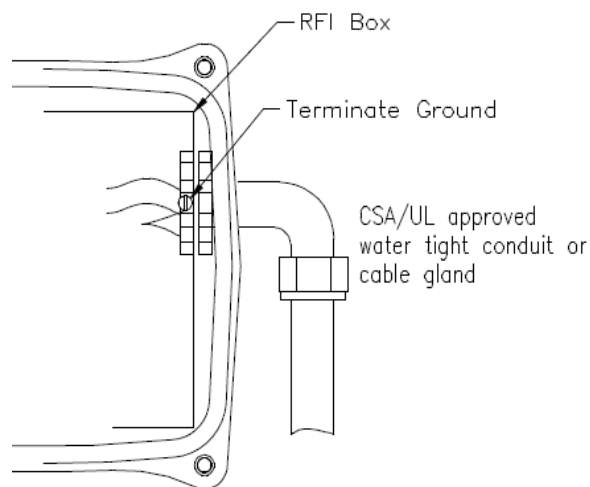
- 5.1 Low (Normally Closed Contact) – Connect (NC) terminal #1 and (COM) terminal #2 or
 Low (Normally Open Contact) – Connect (COM) terminal #2 and (NO) terminal #3.

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


- 5.2 High (Normally Open Contact) – Connect (NC) terminal #4 and (COM) terminal #5 or
 High (Normally Closed Contact) – Connect (COM) terminal # 5 and (NO) terminal #6.



Refer to Figure 1 for details on connecting and setting switches. Refer to page 13 for calibration instructions.

Conduit Connection & Wiring (Flo-Gage)



RCM Industries, Inc.
 110 Mason Circle Suite D Concord, CA 94520 -1238
 Intrinsically Safe Per DWG 6931

 Ex ia IIC T 4 Zone 0
 Class I, Groups A, B, C, D
 Class II, Groups E, F, G
 09 2151967 X

  II 1 G
 0°C ≤ Ta ≤ +50 °C
 KEMA 10 ATEX 0021 X

PH : 925 -687 -8363 www .lo -gage .com

Conduit Connection & Hazardous Location Labels

Figure 3

5.

Control Drawing #6931

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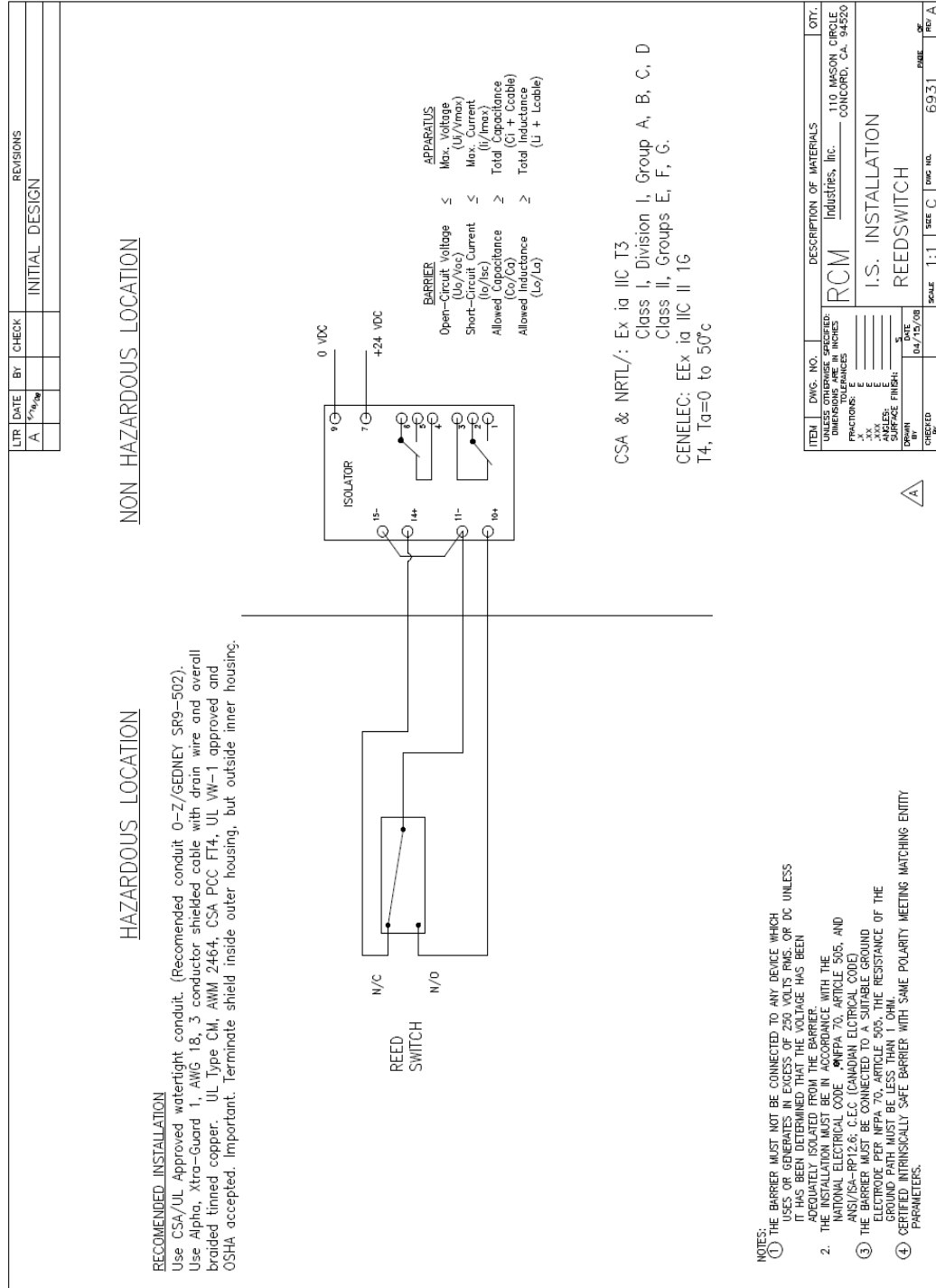


Figure 4

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The RCM Flo-Gage™ the -1S2 or -2S2 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.

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.

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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.

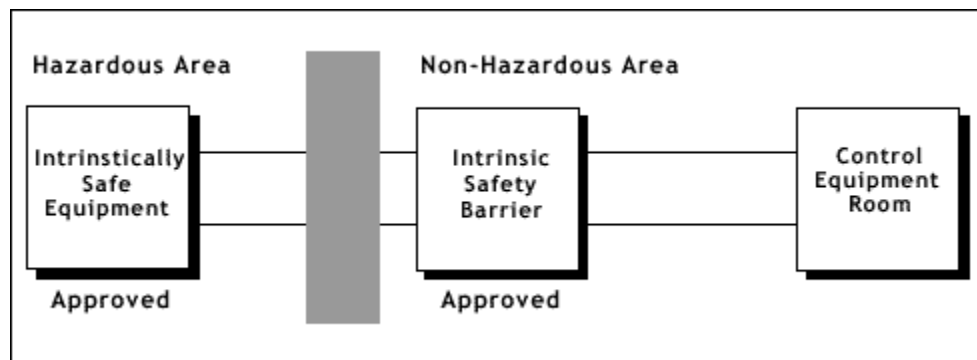


Figure 5

Approvals

Intrinsic safety equipment must have been tested and approved by an independent agency to assure its safety. The customer should specify the type of approval required for their particular application. The most common Agencies involved are as follows:

Country Agency

- USA – FM, UL
- Canada – CSA
- Netherlands – KEMA
- Germany – PTB
- Italy – CESI
- Great Britain – BASEEFA

EC Type Examination Atex requirements for Europe and CENELEC approval.

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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.

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Instructions for Setting Reed Switches w/LED's

1. Check the flow meter mechanical zero. Pointer should point to the zero reference mark on the dial with no flow. See installation, Operation and Maintenance Manual (M1) page 4 for re-zeroing instructions.
2. Remove the back cover plate to gain access to the reed switches. Loosen the 2 adjustment clamp screws to the point where when moving the reed switches there is some resistance. Refer to figure 4 for details.
3. Use the LED(s) provided to check continuity when making adjustments to the reed switches changing the factory set point.
4. Move the lever to the desired flow rate or by establishing the desired flow rate through the flow meter (preferred method). Caution: When moving the pointer using the lever method, do not flex the lever forward or backward as this will distort the set point.
5. With the pointer at the desired set point, gently slide the reed switch until the LED changes state (On/OFF). The set point range window should indicate a partial or complete green mark. (When viewed from the rear, move the switch right for upscale and left for downscale). The green mark represents the 30% to 90% adjustable range.
6. Check new set point by moving the lever or establishing flow to verify that switching occurs at the desired flow rate. Minor adjustments of the switch may be necessary to “fine tune” to the desired set point. Tighten the adjustment clamp screws taking care not to over tighten as over tightening may break the switch.
7. Replace the back cover plate and adjustment of the reed switch is now complete. (Contact the factory for set points above or below the adjustable range).

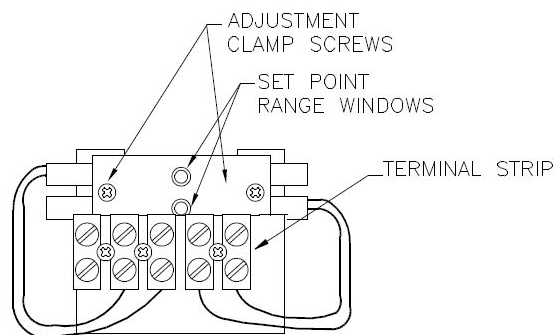


Figure 6

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Instructions for Setting Reed Switches without LED's

1. Check the flow meter mechanical zero. Pointer should point to the zero reference mark on the dial with no flow. See installation, Operation and Maintenance Manual (M1) page 4 for re-zeroing instructions.
2. Remove the back cover plate to gain access to the reed switches. Loosen the 2 adjustment clamp screws to the point where when moving the reed switches there is some resistance. Refer to figure 5 for details.
3. Use a buzzer or continuity tester when making adjustments to the reed switches.
4. Move the lever to the desired flow rate or by establishing the desired flow rate through the flow meter (preferred method). Caution: When moving the pointer using the lever method, do not flex the lever forward or backward as this will distort the set point.
5. With the pointer at the desired set point, gently slide the reed switch until the buzzer changes state (On/OFF). The set point range window should indicate a partial or complete green mark. (When viewed from the rear, move the switch right for upscale and left for downscale). The green mark represents the 30% to 90% adjustable range.
6. Check new set point by moving the lever or establishing flow to verify that switching occurs at the desired flow rate. Minor adjustments of the switch may be necessary to “fine tune” to the desired set point. Tighten the adjustment clamp screws taking care not to over tighten as over tightening may break the switch.
7. Replace the back cover plate and adjustment of the reed switch is now complete. (Contact the factory for set points above or below the adjustable range).

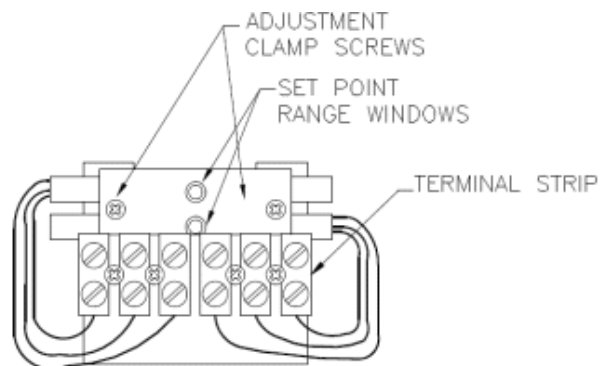


Figure 7