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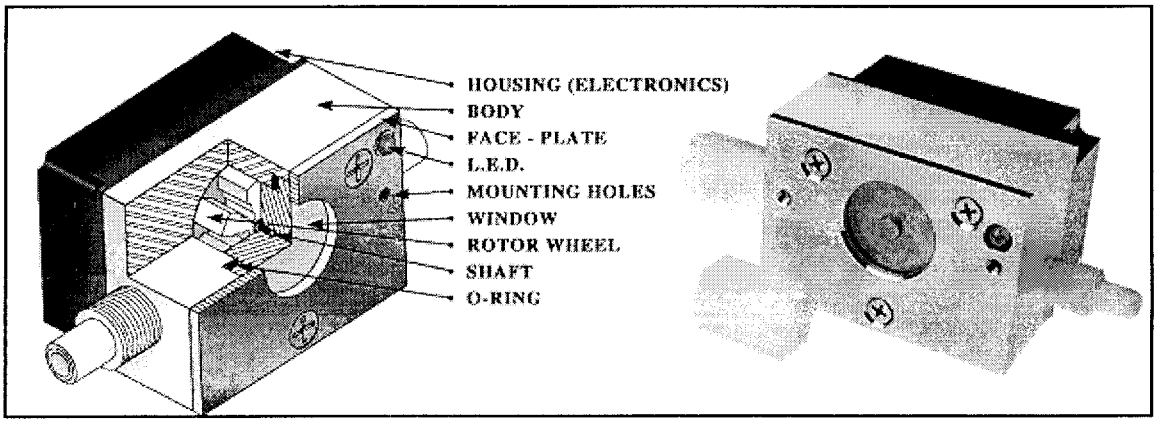
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Find the *Malema M-10000-S3053-50-001* at our website: ***Click HERE***

malema

Malema Engineering Corporation

Installation & Maintenance Sheet M-10000 Rotary Flow Meter



(Pictured is a Teflon M-10000 with flare fittings)

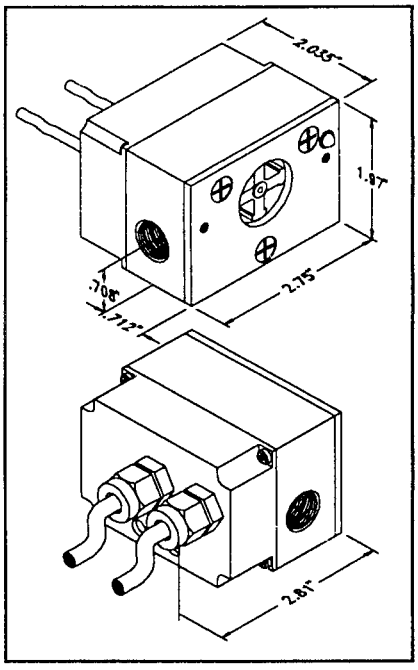
PRODUCT DESCRIPTION

The Malema M-10000 Rotary Flow Meter is an accurate, precise, feature-rich, cost effective flow meter designed for maximum flexibility in an industrial environment. The M-10000 is linear within ±2% full scale with a 10:1 turndown.

The M-10000 includes many "nice touches" that are often left out by other manufacturers, such as precision on-board voltage regulation, a 2 form C SPDT relay adjustable over the entire range, compact package, long lasting ceramic shaft and more.

INSTALLATION INSTRUCTIONS

MECHANICAL INSTALLATION



1. Unpack the unit, remove the shipping plugs from the fluid ports and the M-10000 flow meter is ready for installation.
2. The rotary wheel should turn freely around its shaft when air is gently puffed into one of the ports. Fluid flow through the M-10000 flow meter is *bidirectional*. The front face plate has two 8-32 mounting holes for optional panel mounting.
3. Teflon tape is recommended on the threaded fittings. Do not allow excess tape to break off into the flow meter's fluid ports and entangle around the shaft and rotor.
4. *The M-10000 flow meter must be installed with the shaft, upon which the rotor wheel spins, parallel to the ground.* The ports may be vertical or horizontal as long as the shaft is parallel to the ground.

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ELECTRICAL INSTALLATION

Signal output 0 - 10 volt and 4-20mA models.

Power Cable (2 wire Red and Black)
- Red: 12 - 24 VDC ±10% (Voltage Version)
  24 VDC ±10% (Current Version)
- Black: Ground

Output Cable (5 wire Red, Black, Brown, White and Green)
- Red: Analog signal output:
  Voltage: 0-10 or 0-5
  Current: 4-20mA
- Black: Signal Ground (Note signal ground is common with power ground.)

Relay
- Green: Relay Normally Open
- White: Relay Common
- Brown: Relay Normally Closed

The relay is a 2 Form C Single Pole Double Throw (SPDT) with 60 Watt rating.

UL/CSA Rating:
- 60 Watts maximum
- 20 A @ 30 VDC
- 0.3 A @ 110 VDC
- 0.5 A @ 125 VAC

Pulse Train Output Model

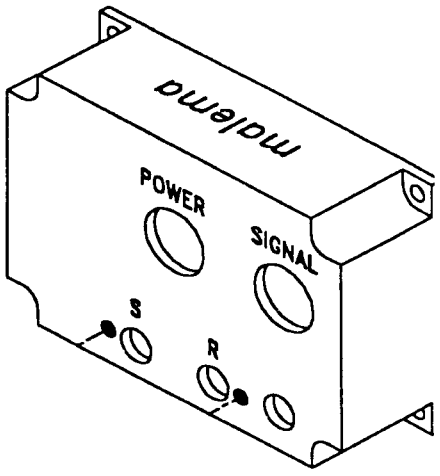
Single Cable (3 wire Red and Black)
- Red: 3.3 - 24 VDC
- Black: Ground
- Green: Pulse Train Signal Output (Signal Ground and Power Ground are Common)

CALIBRATION AND SET POINT ADJUSTMENT

The 0-10V output unit has three points of adjustment; signal span, linearization, and relay set point. The 4-20mA unit does not have a linearization adjustment. The pulse signal output unit has NO points of adjustment.

SPAN ADJUSTMENT: 0 - 10 VOLT AND 4 - 20 mA OUTPUT MODELS

NOTE: THE RELAY SET POINT ADJUSTMENT IS INDEPENDENT OF THE SPAN ADJUSTMENT. CHANGING THE SPAN DOES NOT AFFECT THE RELAY SET POINT.



1. The signal span is adjusted by a potentiometer accessible through a hole from the back of M-10000 flow meter next to where the cables exit the meter housing. The proper port is clearly marked on the rear housing of the meter with an S for span adjust.

2. Establish the designed maximum flow through the unit. For example, if the unit is 1-10 LPM model establish a flow rate of 10 LPM.

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3. Monitor the output signal with a multimeter or an equivalent device.

4. The output signal is increased by turning the potentiometer in a clockwise direction. It is reduced by turning the potentiometer counterclockwise.

RELAY ADJUSTMENT: 0 - 10 VOLT AND 4 - 20 mA OUTPUT MODELS

NOTE: THE RELAY SET POINT ADJUSTMENT IS INDEPENDENT OF THE SPAN ADJUSTMENT. CHANGING THE SPAN DOES NOT EFFECT THE RELAY SET POINT.

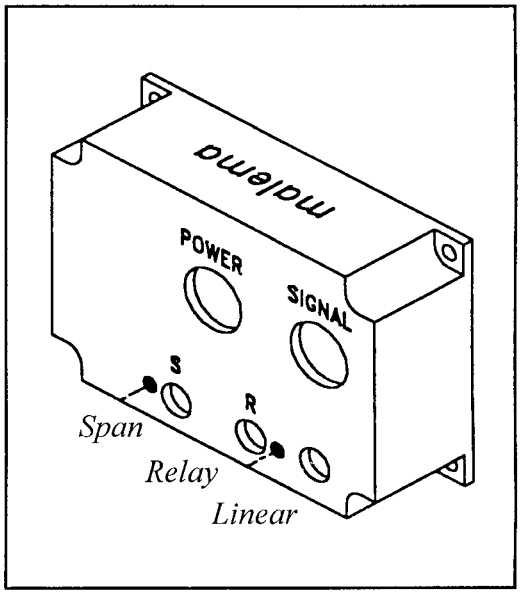
1. The Relay Set Point is adjusted by a potentiometer accessible through a hole from the back of the M-10000 flow meter next to where the cables exit from the meter. The proper port is clearly marked on the rear housing of the meter with an R for Relay Adjustment.

2. The Relay Set Point is monitored during adjustment via the LED indicating light. In the standard configuration the LED indicating light is RED when the fluid flow is below the Relay Set Point and is GREEN when the fluid flow is above the Relay Set Point.

3. Adjust fluid flow through the M-10000 flow meter to the desired set point flow rate.

4. If the LED indicating light is already GREEN, turn the Relay Set Point Potentiometer counterclockwise until the LED indicating light turns RED. Turn the Relay Set Point Potentiometer clockwise until the LED indicating light turns GREEN.

NOTE: The Relay Set Point circuitry has a designed set point hysteresis of 5% to prevent chattering of the relay at the set point.



ZERO ADJUSTMENT: ALL MODELS

The M-10000 flow meter is factory zeroed and does not require adjustment. If a zero calibration needs to be performed, it is recommended that the unit be returned to the factory. If the unit cannot be returned, contact the factory for detailed instructions on how to perform a zero calibration of the unit.

LINEARITY ADJUSTMENT: 0 - 10 VDC OUTPUT MODEL ONLY

1. The linearity adjustment and the span adjustment are not independent. Adjusting one potentiometer will affect the other.

2. Adjust the span as per the span adjustment procedure.

3. Establish the minimum designed flow rate through the unit. For example, if the unit is 1 - 10 LPM unit establish a flow rate of 1.0 LPM. Notice that 1 LPM is exactly 1/10 of 10 LPM. Locate the Linearity Adjustment Potentiometer to the right of the Relay Adjustment Potentiometer (marked with an R). The Linearity Adjustment Potentiometer has no letter marking. The potentiometer

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on the left marked S is the Span Adjustment Potentiometer. Adjust the Linearization Adjustment Potentiometer to read 1/10 of the output set during span adjustment. Repeat steps 2 and 3 as necessary until unit's output at the designed minimum flow rate is exactly 1/10 of the reading at the designed maximum flow rate.

4. For example, given a M-10000 flow rate with a flow range of 1 -10 LPM, the span is adjusted to read 10 VDC at 10 LPM in step 2 by use of the Span Adjustment Potentiometer. Then in step 3 the output is adjusted to read 1.0 VDC (1/10 of 10 VDC) at 1.0 LPM (1/10 of 10 LPM) by use of the Linearity Adjustment Potentiometer. As the two adjustment potentiometers are not independent, steps 2 and 3 should be repeated 2 or 3 times. In this example, readjust the span to read 10 VDC at 10 LPM and then readjust the linearity to read 1.0 VDC at 1.0 LPM.

Cleaning Fluid Path, Rotor and Rotor Cavity

If necessary the fluid flow path and the rotor / shaft assembly may be cleaned as follows:

1. Remove the front plate of the flow meter by unscrewing the three 8-32 1/2" screws that hold the plate to the body of the unit.

2. *Important: When removing the window in the next step all or none of the following components may also come out with the window: o-ring, shaft, and rotor. The window must be carefully removed so that these components do not "fall out".*

   The rotor contains magnets. The sensor will only pick up one side of the rotor (the side with the South Pole end of the magnets). If the rotor is flipped and is not reinstalled on the shaft in exactly the same orientation in which it was found, the unit will not work. If the flow meter does not work after cleaning, disassemble the meter per this procedure and "flip" the rotor on the shaft so the other side of the rotor faces the pickup.

3. Carefully remove the window. Carefully remove the shaft, rotor and o-ring. Note exactly which face of the rotor is facing which direction. The rotor must go back onto the shaft in exactly the same orientation in which it was found.

4. Clean rotor, shaft, window and fluid path as required. Reassemble unit. If unit does not work read step 3 above.

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