FM200

FLOW / NO-FLOW MONITOR

INSTALLATION AND TECHNICAL MANUAL

120 VAC MODEL

6/1/2017

Maxi-Tronic, Inc.
417 Wards Corner Road
Loveland, OH 45140
513.398.2500
800.659.8250 FAX: 513.398.2536
info@maxitronic.com www.maxitronic.com

Introduction:

The FM200 Multi-Application Flow Monitor is very effective in monitoring FLOW / NO FLOW conditions in pipes, chutes, spouting, etc. Its unique ultrasonic sensing techniques make the FM200 versatile for almost any FLOW / NO FLOW application. The following are some of the unique advanced features that allow this product to exceed the industry standards.

FEATURES:

Control Unit

- Monitors movement of granular solids through a pipe or chute system.
- Sensor mounts externally to the outside of the pipe or chute. No drilling into the pipe. Thick PVC pipes may not be suitable for very fine or slow moving solids as they do not transfer sound effectively.
- Senses the presence or absence of solids in the air flow.
- 3 User selectable sensitivity ranges:
  - Low
  - Medium
  - High
- Sensitivity fine adjustment to suit the application.
- Monitors pipe systems from 1/2" to 60" or more diameter.
- Control Outputs:
  - TTL: 0-5 Volt
  - RS232: Low/High Output
  - Relay Contacts: N.O. and N.C. rated for 4 Amps at 125/250 VAC
- Stand-alone system
- Easy Installation
- No Maintenance, no moving parts.
- L.E.D. Indicators:
  - Flow=Green / No Flow=Red
- Housing: Polycarbonate with 10 PG knockouts: 5"x7"x3" (125mmx175mmx75mm)

Sensor

- Mounting Tabs for easy installation
- Prewired with 3' 18 ga. 2 conductor wire
- Low voltage 5VDC-200 MA Maximum
- Three Sensor Styles

OPTIONAL MODELS AVAILABLE

- NEMA 3/4/12 Enclosures
- NEMA 7/9 Enclosures
- Available also for 12VDC, 24 VAC, 220 VAC operation.

FM 200 WIRING

The FM 200 polycarbonate housing comes with 10 pg knockout conduit holes in the housing.

- All high voltage inputs above 24 volt AC should be routed into the housing through a ¾" (20mm) hole.
- All low voltage puts (TTL, RS232, and sensor) should be routed through a ½" (14mm) conduit hole.

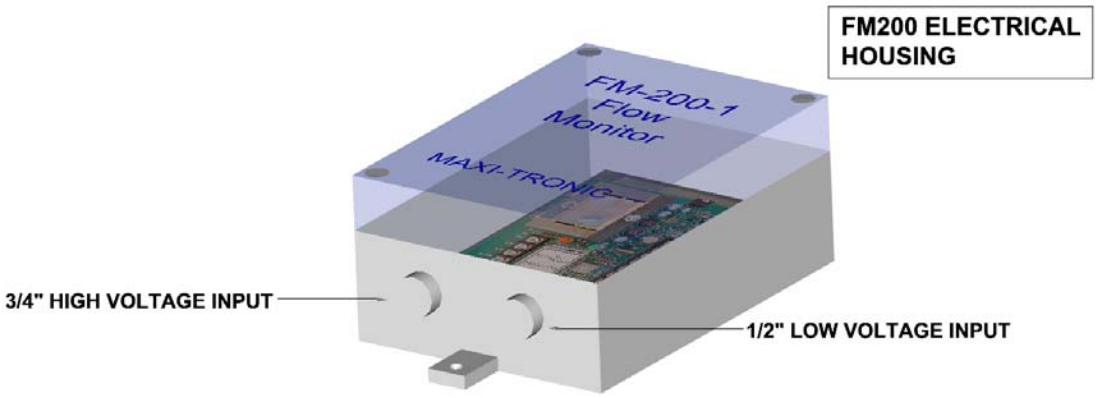

Figure 1

HIGH VOLTAGE INPUTS (See Fig. 2)
117VAC 50/60 HZ 1 Amp Connected on TB2 terminals:

- 117VAC (Hot) to **117VAC** terminal
- AC common to **AC COM** terminal
- Earth ground to **E GND** terminal

Note: E GND on TB2 terminal grounds the housing to prevent accidental electrical shock.

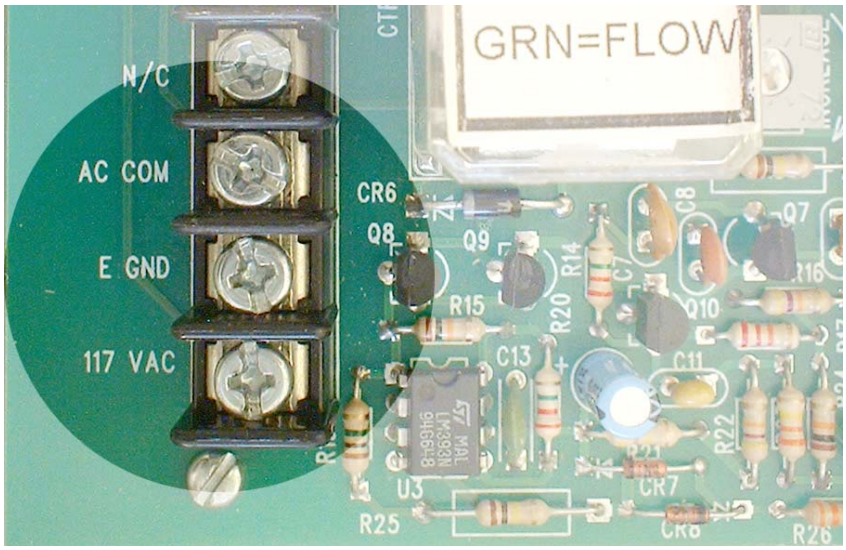

Figure 2

LOW VOLTAGE INPUTS (See Fig. 3)

Sensor Input:

- Connect the black (negative, #2) sensor lead to the "-" SENSOR terminal on TB1. The "-" lead (black or marked as "2") is electrically connected to the metal tip.
- Connect the other sensor lead (black or other color) to the "+" SENSOR terminal.
- The sensor cable pigtail should be a minimum of **18 AWG**, two (2) conductor stranded copper wire. Use 18 AWG for up to 500' (155m) and 16 GA up to 2000' (620m)
- Make **water-tight** connections when splicing the sensor wiring.

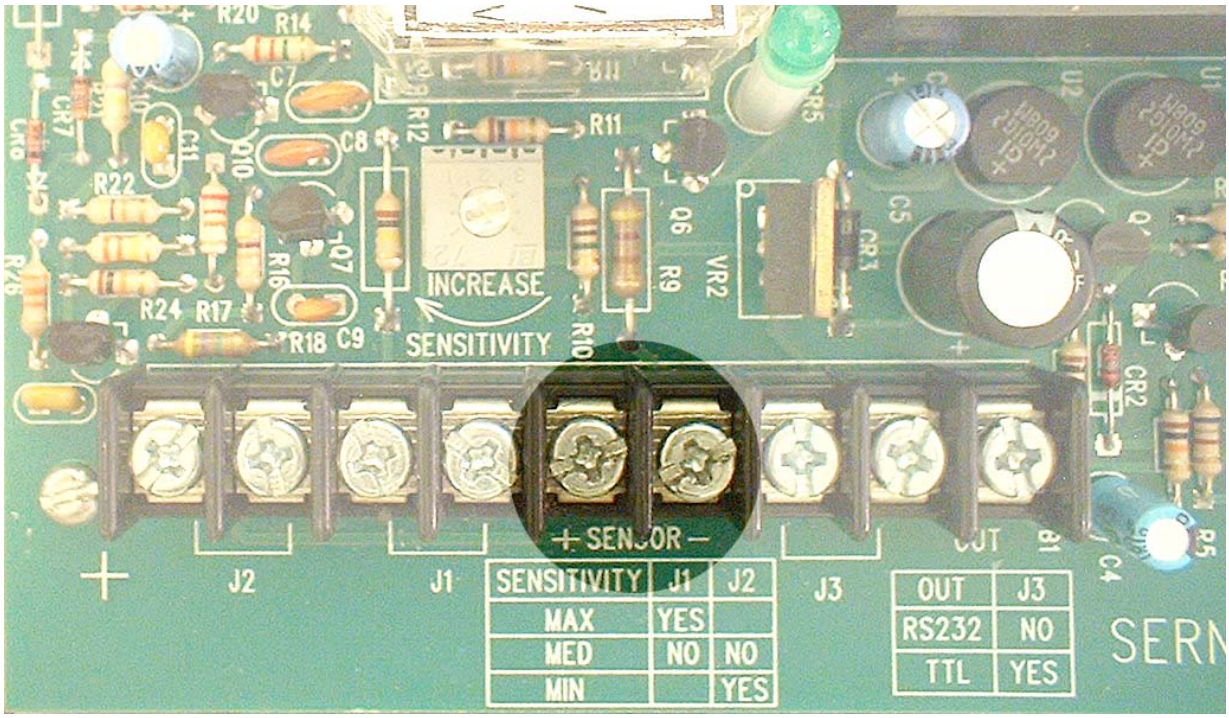

Figure 3

Relay Wiring:
See section on relay output configuration in FM 200 Installation Manual.

Logical Level Output Wiring:
See section on logic output in FM 200 Installation Manual.

SENSOR INSTALLATION

The FM 200 sensor is a poly housing with a 6' two conductor pigtail cable – see Fig. 4 for details.

TO INSTALL:

NOTE: Clean the surface area where the sensor is to be installed. Surface area does not have to be perfectly clean. The sensor is able to detect flow through most sheet metal. The sensor stud located at the bottom of the sensor housing must make solid contact with the surface of the area to be monitored.

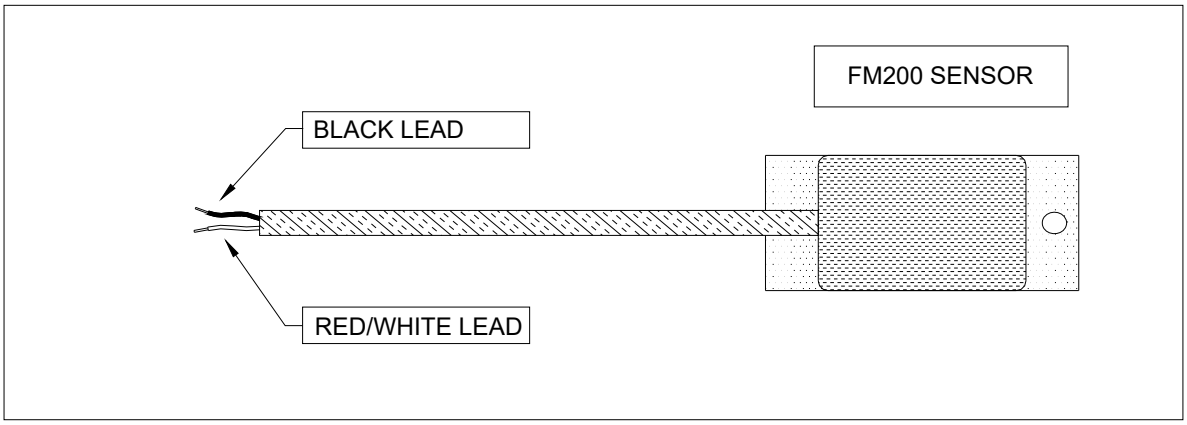

Figure 4

MOUNTING PROCEDURES FOR SENSOR:

FLAT SURFACE:

- Refer to mounting holes located at each end of sensor housing (Fig. 5)
- Mark mounting holes.
- Drill pilot holes for mounting screws.
- Screw sensor housing to flat surface.

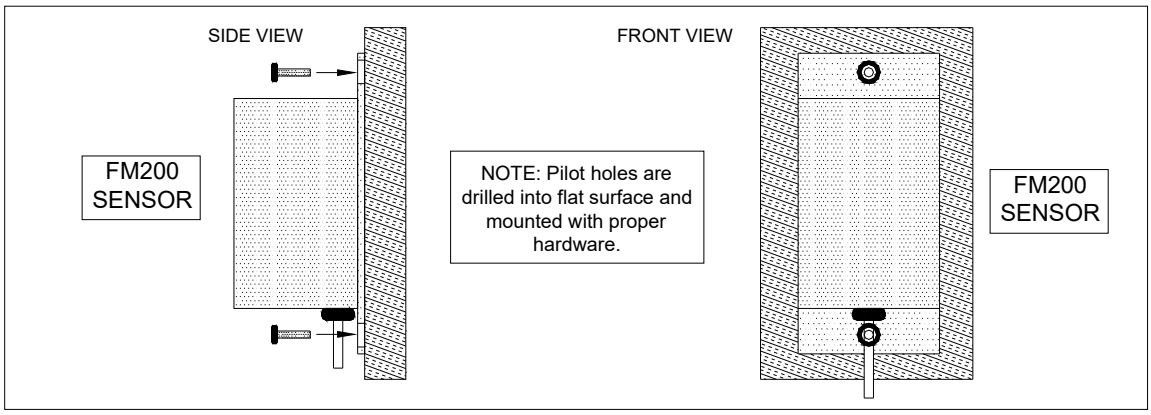

Figure 5

NON-FLAT SURFACE:

- Example: pipe
- Refer to mounting tabs located on each end of bottom of sensor housing (Fig. 6)
- Using strapping, clamps, etc. to secure the sensor housing so the sensing stud makes firm contact with the surface.

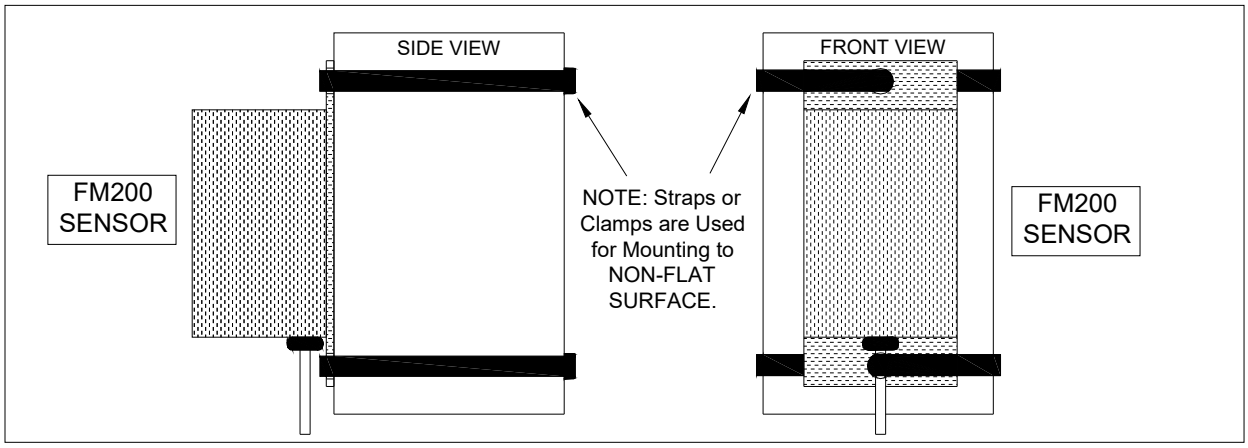

Figure 6

SENSOR LOCATION:

INSTALL SENSOR WHERE THE FLOW IS MOST TURBULENT. This will enhance detection of movement.

The area at the following points is ideal but the FM200 works well in most areas of flow:

- Pipe elbow
- Point where material drops into spouting or chutes
- Point where material drops from conveyor on the chute (Fig. 7)

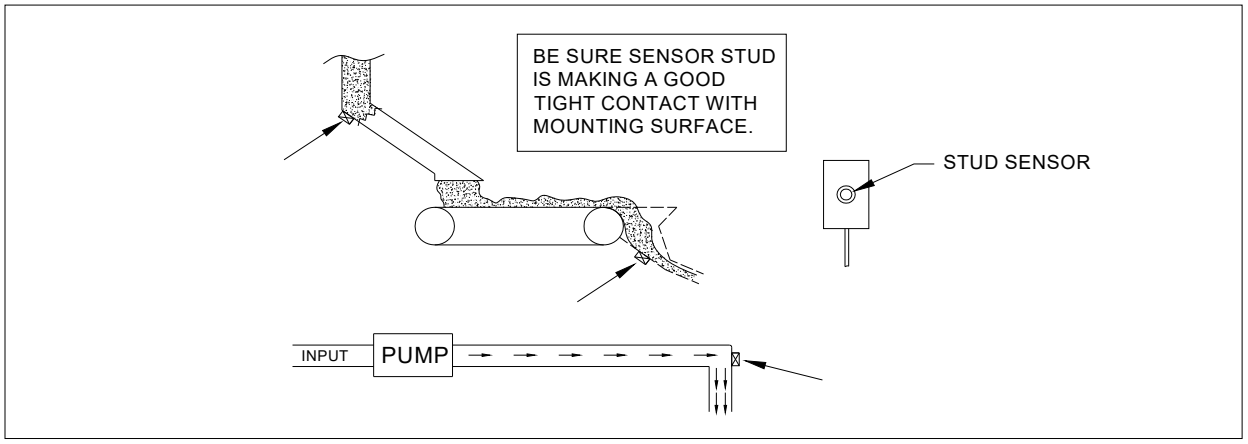

Figure 7

LOW LEVEL (LOGIC) OUTPUT WIRING PROCEDURE

Logic outputs come in two configurations:

- TTL Logic Output
- RS232 Logic Output

Logic outputs are connected between “Out” terminal and “Sensor” on TB1 terminal of the FM200 PCB (Fig. 8)

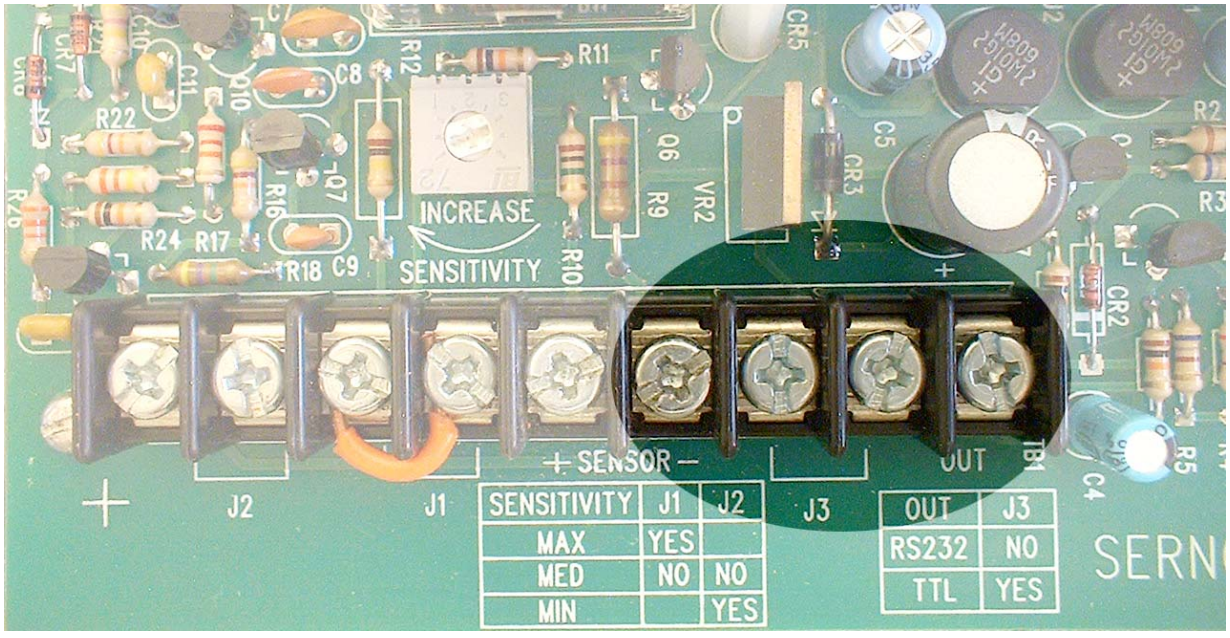

Figure 8

TTL LOGIC OUTPUT

To obtain a TTL Logic Output, install jumper J3 as indicated on the FM200 PCB.
NOTE: TTL voltage is either 0 VDC or +5 VDC between the "Out"(+) and the "Sensor"(-) on TB1.

FLOW INDICATION:

- The **RED** L.E.D. (NO/FLOW) indicator light will be lit to indicate no material flowing past the FM200 sensor. There will be a logic 0 VDC between "Out" (+) and the "Sensor" (-) on TB1.
- The **GREEN** L.E.D. (FLOW) indicator light will be lit to indicate material flowing past the FM200 sensor. There will be a logic +5 VDC between "Out" (+) and the "Sensor"(-) on TB1.

RS232 LOGIC OUTPUT

SPECIFICATION:

- Industry standard interface
- 5VDC minimum into 3K load

NOTE: to obtain an RS232 logical output do not install jumper J3 as indicated on FM200 PCB (Fig.8).

FLOW INDICATION:

- The **RED** L.E.D. (NO FLOW) indicator light will be lit to indicate no material flowing past the FM200 sensor.
  There will be a logic (-) –5VDC between "Out" (+) and the "Sensor" (-) on TB1.
- The **GREEN** L.E.D. (FLOW) indicator light will be lit to indicate material flowing past the FM 200 sensor.
  There will be a logic +5 VDC between "Out" (+) and the "Sensor" (-) on TB1.

NOTE: for proper logic input to your computer, consult your computer manual for the correct pin configuration for RS232 or TTL.

RELAY OUTPUT CONFIGURATION

SPECIFICATIONS:

CTR1 relay is rated to carry the following loads:

- 4 amp at 125 VAC
- 4 amp at 250 VAC
- 1/10 HP at 125 VAC
- 1/10 HP at 250 VAC
- 3 amp at 30 VDC

CONTACT LOCATIONS, TB2 (Fig. 9):

- COM = Common
- N/C = Normally closed
- N/O = Normally open

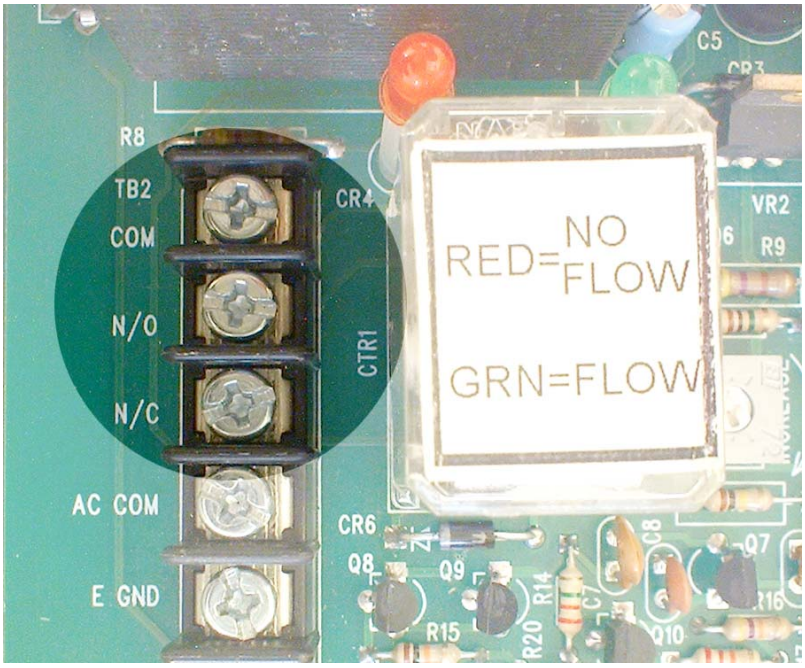

Figure 9

ELECTRICAL CONFIGURATION DIAGRAMS

NORMAL FLOW INDICATION (Fig.10)

NOTE: Contacts are shown below with 117 VAC applied to TB2 on FM200 PCB and flow indication mode is activated.

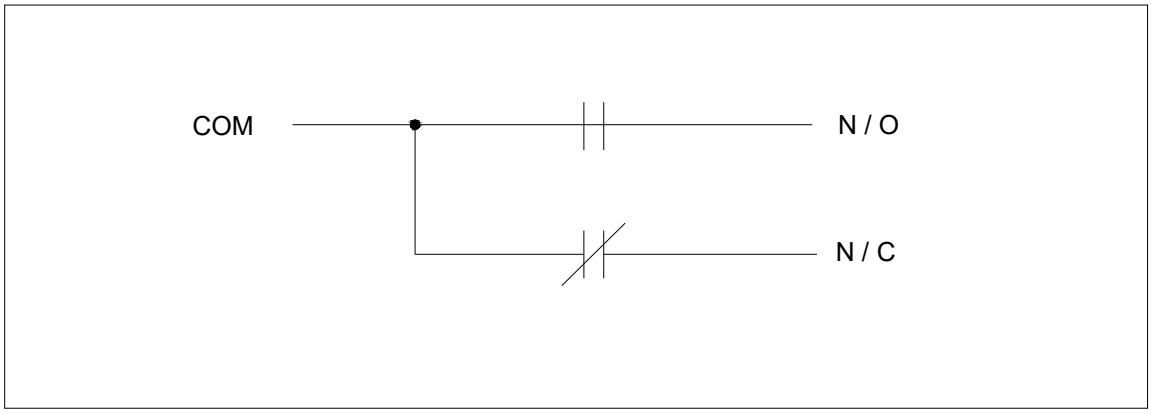

Figure 10

DECREASE FLOW INDICATION (Fig. 11)

NOTE: Contacts are shown below with 117 VAC alarm that will sound when material drops below preset flow amount while equipment supplying material is in the normal running mode.

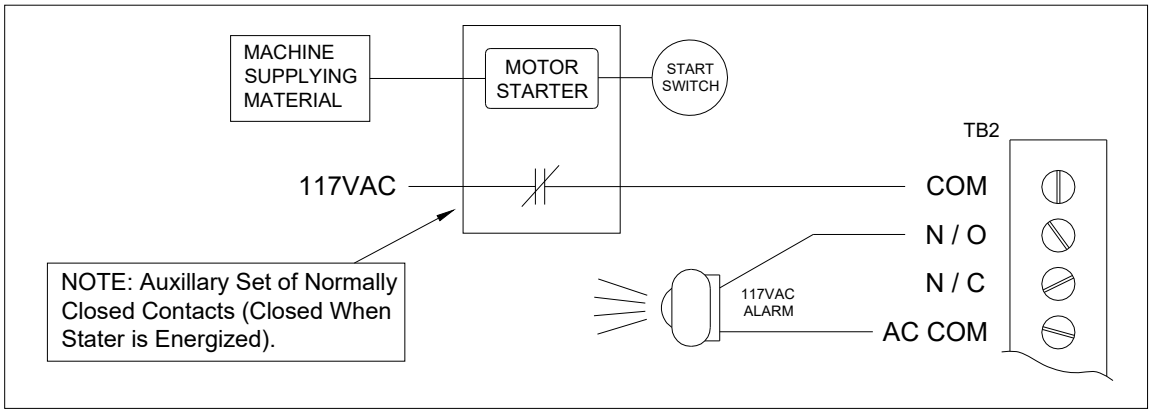

Figure 11

EQUIPMENT SHUTDOWN (Fig. 12 & 13)

NOTE: Contacts are shown below when a shut down mode is required on equipment if material drops below the preset flow level at the sensor.

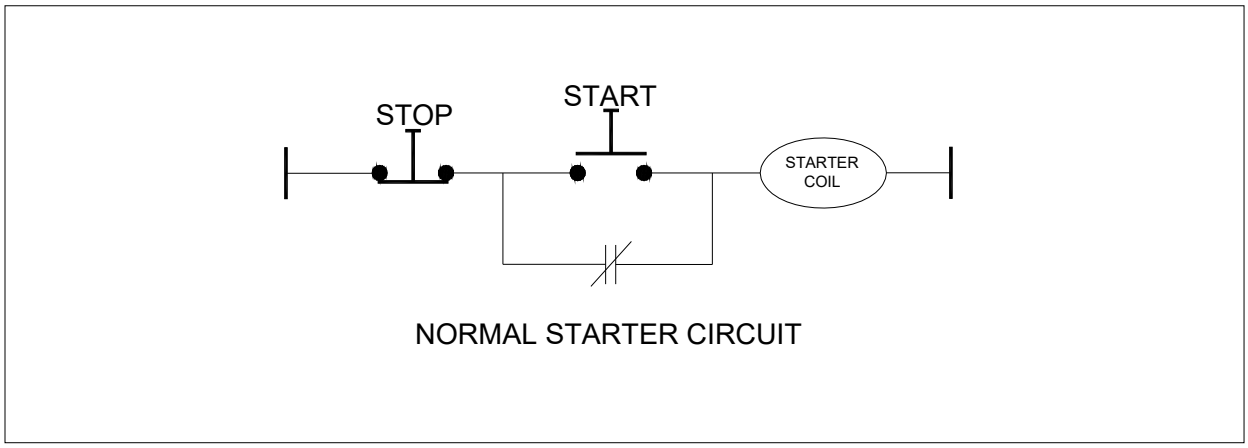

Figure 12

Before machine equipment supplying material that is being shut down can be started again, the following must be verified:

- Material is flowing past the FM200 sensor
- The Green L.E.D. (FLOW) indicator light will be lit showing material flow.
- As long as material continues to flow past the FM200 sensor above the preset rate, the machine equipment supplying material will continue to run. If the rate of material flow falls below the preset level, the relay will open and the machine equipment supplying the material will stop.

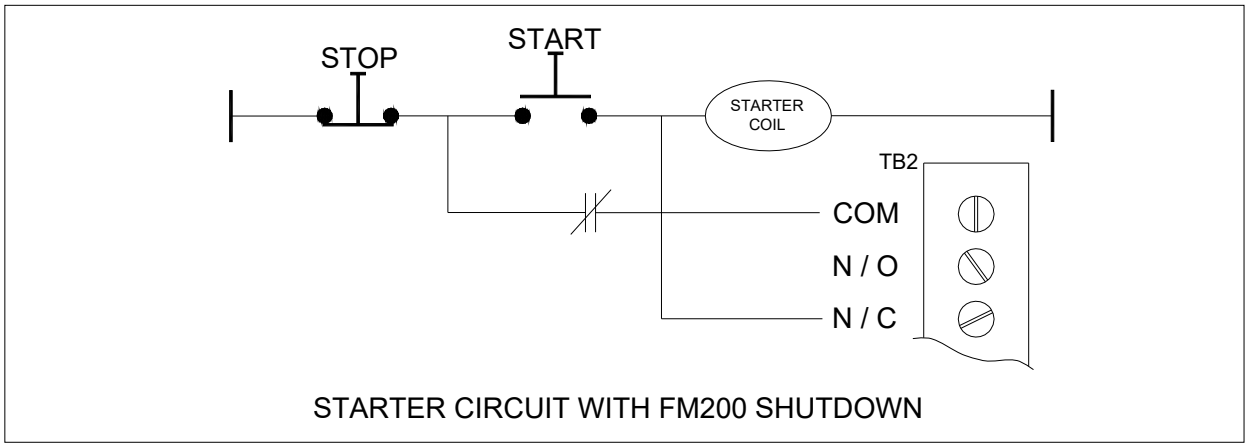

Figure 13

SENSITIVITY RANGE ADJUSTMENT FOR MATERIAL FLOW

The FM200 has (3) three sensitivity range inputs. These inputs are determined and selected by the user to suit his needs.

NOTE: The MAX range is preset when shipped from factory (jumper installed on J1).

SENSITIVITY RANGE SELECTION:

IMPORTANT: BEFORE ADDING OR REMOVING JUMPERS ON TB1, DISCONNECT 117VAC INPUT VOLTAGE ON TB2.

Minimum (low) range:	*	Install jumper J2 (only)
Medium range:	*	No jumpers installed (default)
Maximum (high) range:	*	Install jumper J1 (only)

Before selecting and adjusting sensitivity range for material flow, verify the following:

- Ensure 117VAC input voltage is connected correctly to TB2 “117 VAC” and “AC COM” terminals (Fig. 2).
- Ensure sensor is correctly installed and verify sensor is properly connected to TB1 (+) sensor (-) as indicated on FM200 PCB (see section on Sensor Installation).
- Verify a 1 Amp fuse is installed next to transformer.

ADJUSTING THE SENSITIVITY:

NOTE: The sensitivity range jumpers are factory preset to the MAXIMUM range.

PERFORM THE FOLLOWING: (Fig.15)

1. Turn sensitivity adjustment to full clockwise position
   - GREEN LED will light
2. Turn sensitivity counter-clockwise just until the RED LED lights.
   - If the GREEN LED stayed lit after turning Sensitivity adjustment fully counter-clockwise, remove jumper J1 (MEDIUM Sensitivity) and repeat the above process to check the sensitivity range.
   - If you performed the above steps and the RED LED still did not turn on, install Jumper J1 (MIN sensitivity) and repeat the above process to check the sensitivity range.
3. Start material flowing at the rate you wish to detect.
   - If the GREEN indicator turns on then you have the correct sensitivity range jumpers installed.
   - Make minor SENSITIVITY adjustments if needed to ensure proper operation.

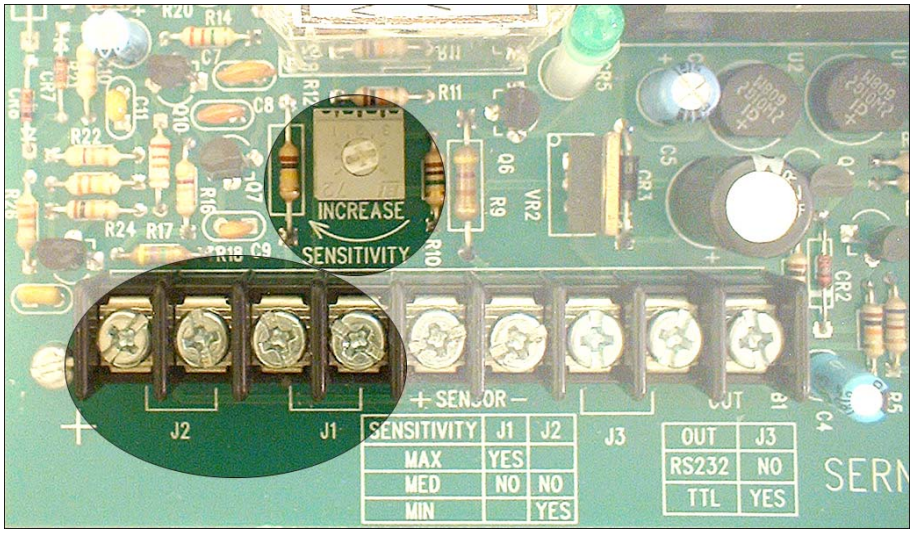

Figure 15

IMPORTANT: After selecting proper sensitivity range, proceed to calibration section.