



INSTRUCTION MANUAL



MODEL MF200

THERMAL MASS FLOW METER

481-23, WOOMAN-DONG, PALDAL-GU, SUWON-CITY
GYUNGKI-DO 442-190, KOREA

611281 Revision B

Notice

This publication must be read in its entirety before performing any operation. Failure to understand and follow these instructions could result in serious personal injury and/or damage to the equipment. Should this equipment require repair or adjustment beyond the procedures given herein, contact the factory at :

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481-23, WOOMAN-DONG, PALDAL-GU, SUWON-CITY

GYUNGKI-DO 442-190, KOREA

TELEPHONE : 031-254-6653

FAX : 031-245-2286

EMAIL : FIELD BUS@UNITEL.CO.KR

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1. Introduction

1-1. Scope

This Instruction Manual describes the electrical and mechanical considerations involved with installing and maintaining the hardware associated with the Mostek MF200 Thermal Mass Flow meter.

This manual is divided into the following sections:

Introduction :

Installation :

Start up :

Preventive maintenance :

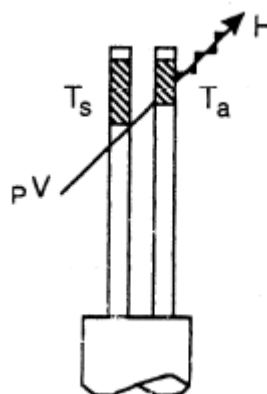
Troubleshooting

1-2. Product Description

Theory of Operation

The Model MF200 is an advanced thermal mass flow meter. The MF200 thermal sensor operates on the law that fluids absorb heat.

Therefore a heated sensor placed in an air or gas stream transfers heat in proportion to the stream's mass velocity. There are two sensors in different legs of a balanced bridge circuit, one sensor detects the fluid's temperature and second sensor is maintained at a constant temperature (constant dT) above the fluid's temperature. The energy applied to the heated sensor to keep this constant temperature difference is directly proportional to the mass of the flow velocity. The bridge circuit maintains accurate flow measurement over a large temperature and pressure range.



SENSOR ELEMENT

Mass Flow

The Model MF200 measures mass flow, an advantage over most flow meters, which measure volume flow rate. Volumetric flow is incomplete because temperature and pressure are unknown and must be measured by separately.

For example, the mass of a volume of gas depends on its temperature pressure. As temperature and pressure changes, the gas volume changes but not its mass.

Therefore a device measuring mass flow is independent of temperature and pressure. By defining a Standard at 0 degree C and 1 Atmosphere (14.7 psia), 1 Standard Cubic Meter of gas equal to the mass that is in 1 cubic meter of this gas at 0 degree C and 1 Atmosphere.

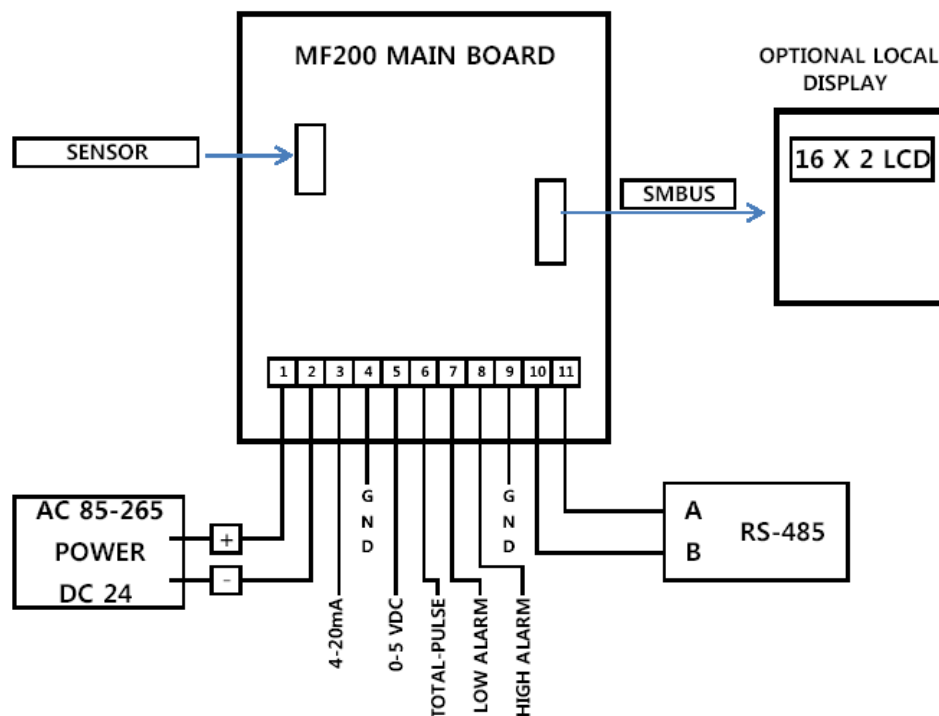
The model MF200 provides a direct measurement of Standard or Mass units with no additional temperature and pressure measurement required.

I/O Description

The MF200 comes with one industry standard 4–20 mA isolated analog output.

1-3. Block Diagram

The main part of MF200 Mass Flow Meter are : The MF200 main board, the sensor assembly, an optional front panel display. The two PCB's are mounted inside of the enclosure and The sensor assembly is mounted external to the enclosure.



1-4. Analog 4-20 mA output

One industry standard 4-20 mA isolated analog output is available to monitor flow.

1-5. Local Display Option

An optional front panel with a LCD display is available to display measured data. The display has a 16 x 2 Alphanumeric Characteristic Backlit LCD. The local display is wired to the MF200 electronics through rigid soldering.

1-6. Dimension Details

Figure 1-2 Dimension for Enclosure and Insertion Type Mounting

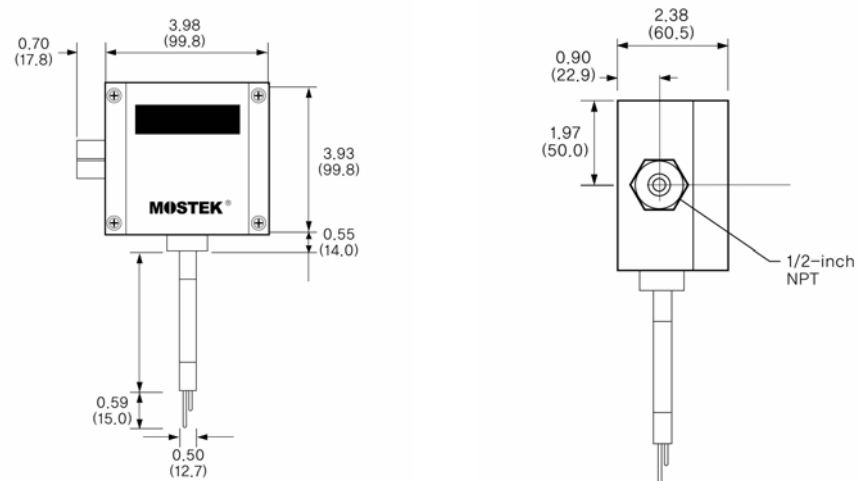
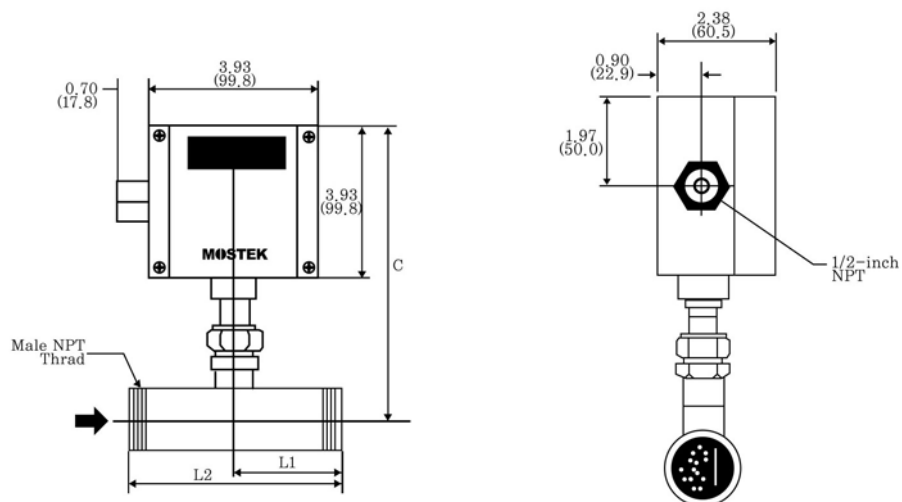


Figure 1-3 Dimension for Enclosure and NPT Flow Body Connection

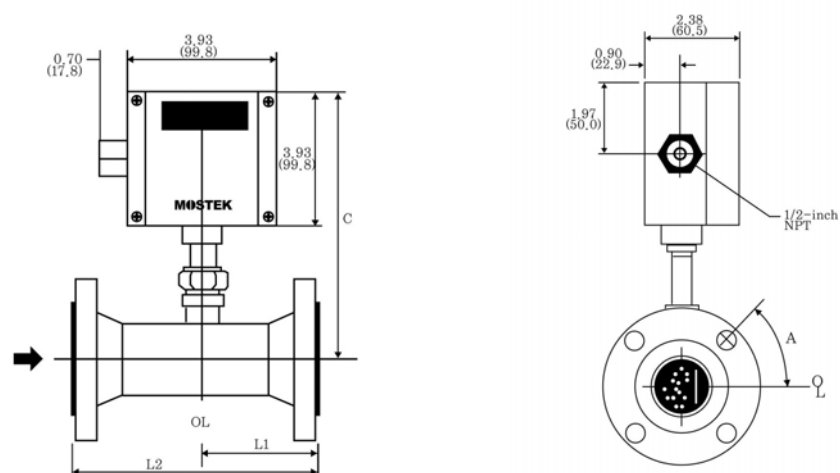


1/4-inch - 8 inch NPT Male connection

Note : Dimension in centimeter (In parenthese are in inch)

Flow Body Size	Dimension “L2”	Dimension “C”
1/4-INCH	14.70 (5.80)	20.70 (7.90)
1/2-INCH	30.50 (12.00)	20.70 (7.90)
3/4-INCH	30.50 (12.00)	20.70 (7.90)
1-INCH	30.50 (12.00)	20.70 (7.90)
1-1/2-INCH	30.50 (12.00)	20.70 (7.90)
2-INCH	30.50 (12.00)	20.70 (7.90)
2-1/2-INCH	45.70 (18.00)	22.00 (8.70)
3-INCH	45.70 (18.00)	22.00 (8.70)
4-INCH	45.70 (18.00)	22.00 (8.70)
6-INCH	61.00 (24.00)	25.00 (9.80)

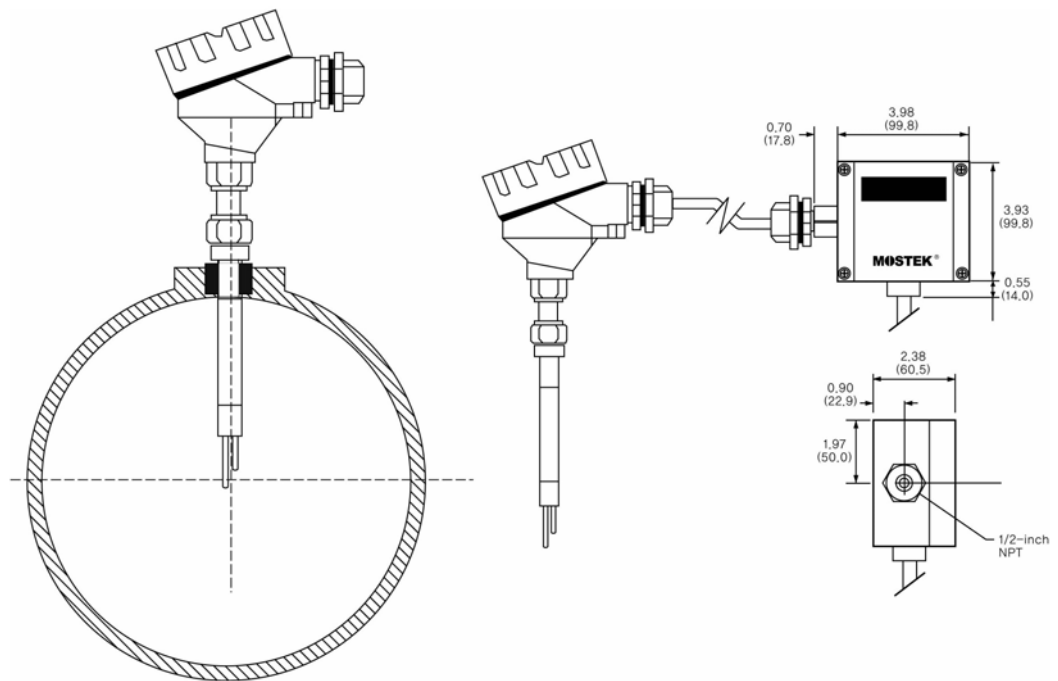
Figure 1-4 Dimension for Enclosure and Flange Flow Body Connection



Note : Dimension in centimeter (In parenthese are in inch)

Flow Body Size	Dimension “L2”	Dimension “C”
1/4-INCH	14.70 (5.80)	20.70 (7.90)
1/2-INCH	30.50 (12.00)	20.70 (7.90)
3/4-INCH	30.50 (12.00)	20.70 (7.90)
1-INCH	30.50 (12.00)	20.70 (7.90)
1-1/2-INCH	30.50 (12.00)	20.70 (7.90)
2-INCH	30.50 (12.00)	20.70 (7.90)
2-1/2-INCH	45.70 (18.00)	22.00 (8.70)
3-INCH	45.70 (18.00)	22.00 (8.70)
4-INCH	45.70 (18.00)	22.00 (8.70)
6-INCH	61.00 (24.00)	25.00 (9.80)

Figure 1-5 Dimension for Insertion Type Flow Meter

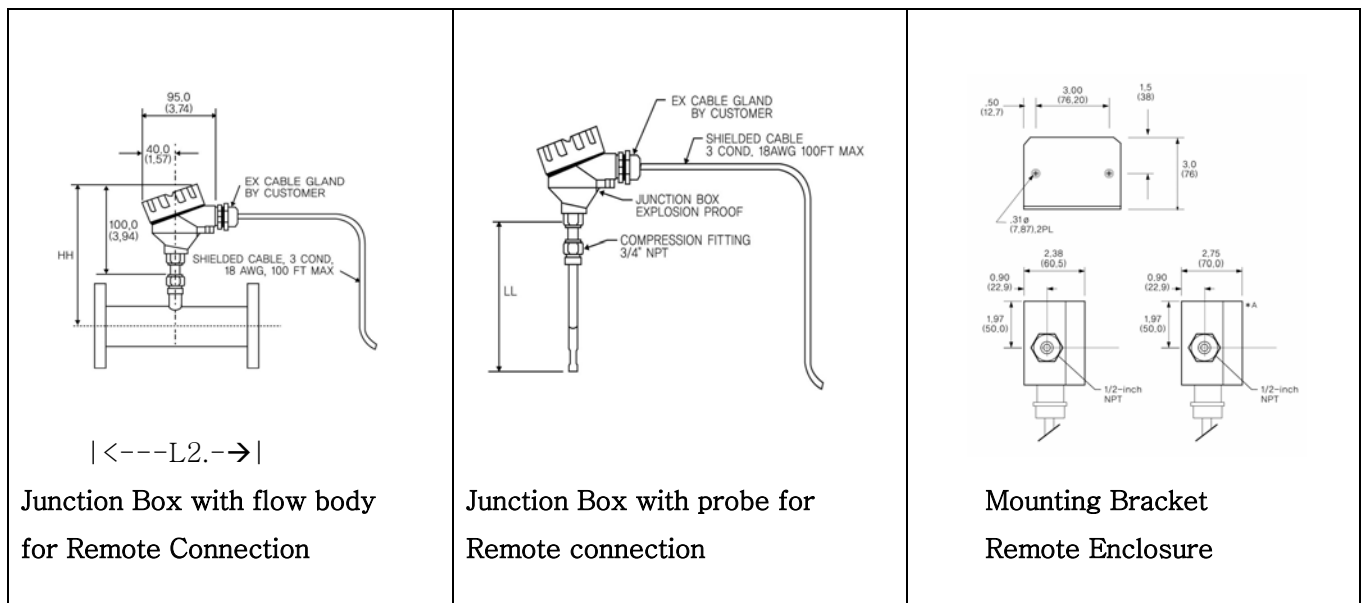


Dimension for Insertion Type Flow Meter

Note : Insertion Probe Dimension in centimeter (In parenthese are in inch)

Probe Length	Dimension "LL± 1 cm"	
10 L	10.0 (3.94)	
20 L	20.0 (7.88)	
30 L	30.0 (11.81)	
40 L	40.0 (15.74)	
50 L	50.0 (19.69)	
80 L	80.0 (31.50)	
100 L	100.0 (39.37)	
150 L	150.0 (59.06)	
180 L	180.0 (70.87)	

Figure 1-6 Dimension for Remote NEMA-4X Enclosure Flow Meter



Note : Dimension in centimeter (In parenthese are in inch)

Flow Body Size	Dimension “L2”	Dimension “HH”
1/4-INCH	14.70 (5.80)	20.70 (7.90)
1/2-INCH	30.50 (12.00)	20.70 (7.90)
3/4-INCH	30.50 (12.00)	20.70 (7.90)
1-INCH	30.50 (12.00)	20.70 (7.90)
1-1/2-INCH	30.50 (12.00)	20.70 (7.90)
2-INCH	30.50 (12.00)	20.70 (7.90)
2-1/2-INCH	45.70 (18.00)	22.00 (8.70)
3-INCH	45.70 (18.00)	22.00 (8.70)
4-INCH	45.70 (18.00)	22.00 (8.70)
6-INCH	61.00 (24.00)	25.00 (9.80)

2. Installation

2-1 Scope

This section describes how to install the MF200 flow meter and how to get started.

2-2 Insertion Style

2-2-1 Mounting – Insertion Style

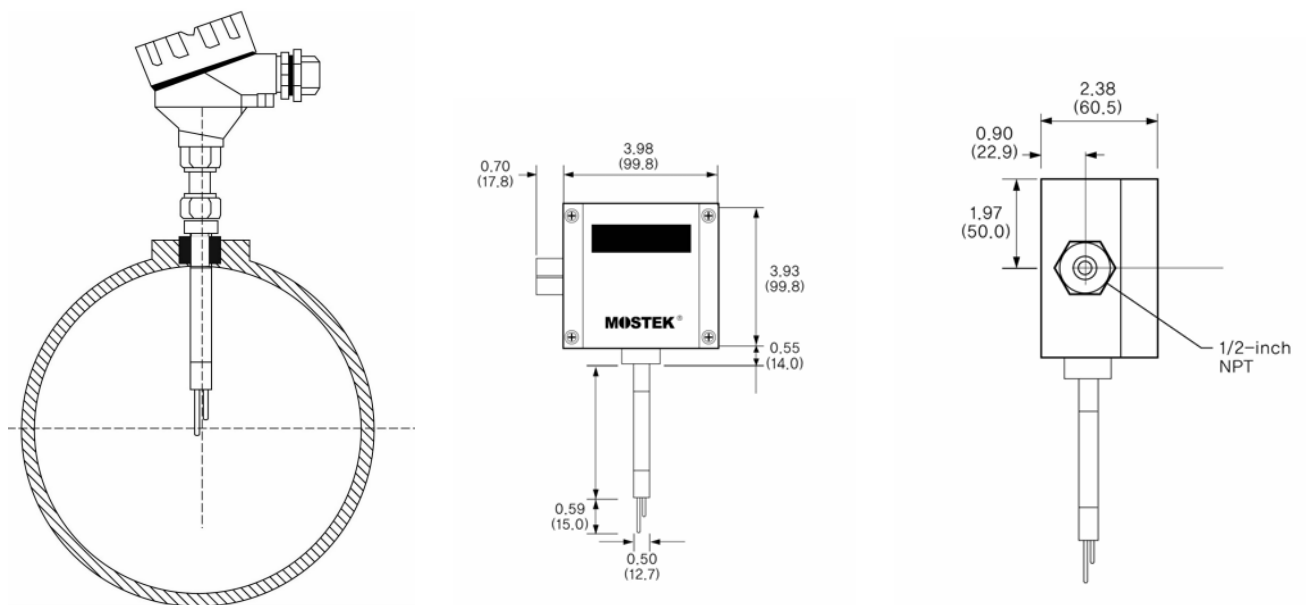
The Model MF200 is mounted through a 3/4-inch (or 1/2-inch) ID – 3/4-inch (or 1/2-inch) male NPT connector half coupling provided in the customer's pipe. Installation procedure must be a combination of end user's best engineering practices, in compliance with local codes, and manufacturer's recommendations.

Insertion style flow meters are not recommended for pipes smaller than 2 inch, however it can be used in smaller pipe than 2-inch pipe with special option. In this case purchaser must order with special option.

The following, general precautions should be observed:

- a. Exercise care during handling to avoid damaging the probe, sensor or enclosure .
- b. The enclosure cover must be closed except during installation.
- c. Mounting MF200 in direct sunlight can cause the temperature inside the enclosure to increase beyond design limits, resulting in failure of the LCD display and reduced component life. It is recommended that a sunshade be installed to avoid direct sunlight.

Figure 2-1 Insertion Style



2-2-2 Installation Depth

Note : Some flow meters are shipped with sensors that have equal length elements (see Figure 2-2). Others are shipped with the sensor elements that are offset (see Figure 2-3) . The sensor type supplied was selected at the factory to be the best suited for your application. Follow the appropriate sensor orientation instruction below.

- a. Install the compression fitting into 3/4-inch (or 1/2-inch) ID male NPT half coupling.
- b. When installing in a pipe equal to or larger than 2 inch, install the end of probe at the center line of the pipe and tighten the compression fitting nut. Refer to Figure 2-1.
- c. When installing into a 2-inch pipe carefully install the probe into the pipe as close as to the wall, but it should not be touched. Tighten the compression fitting nut.

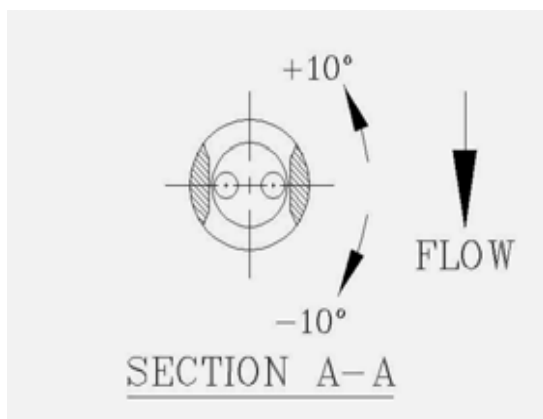
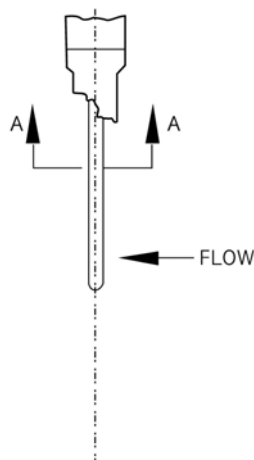
Caution : Once the compression fitting is locked onto the probe, the can be removed or rotated, but the insertion depth is locked in place.

2-2-3 Sensor Orientation

Equal length sensor elements:

Install flow meter with both sensor elements facing the flow stream within $\pm 10^\circ$ degree.

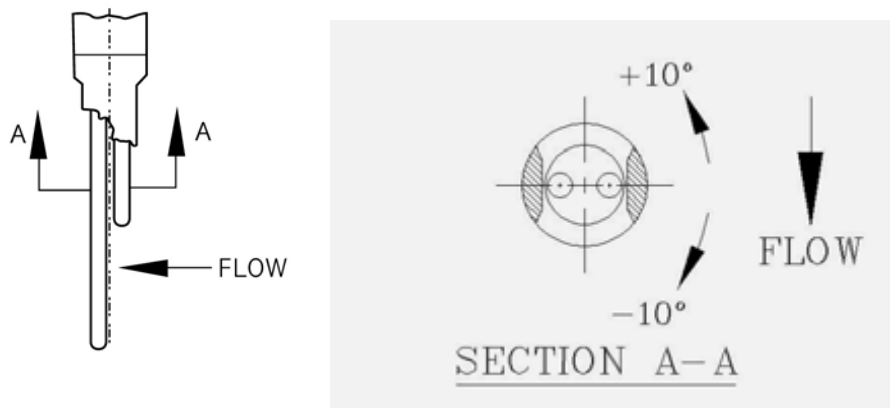
Figure 2-2 Equal Length Sensor Element



Unequal length sensor elements:

Install shorter sensor element upstream from the longer one.

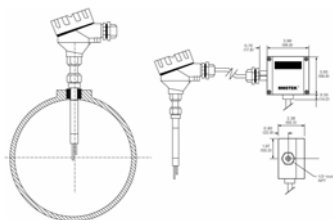
Figure 2-3 Unequal Length Sensor Elements



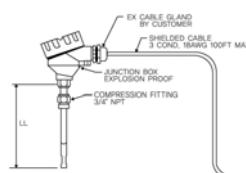
Note : In extreme low flow measurements (below 0.5 NMPS), convection heat from the longer probe can affect the shorter probe. In these applications, choose a mounting that prevents this from occurring (ex. Horizontal mounting)

2-2-4 Flow meter Placement – Insertion Flow meter

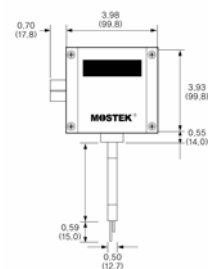
Install the Model MF200 Insertion style flow meter so that it is far enough away from bends in the pipe, obstructions, or changes in line sizes. (At least ten diameters upstream and five diameters downstream minimum) to ensure a consistent flow profile. Fifteen diameters of straight pipe upstream and five downstream is recommended. (To reduce the straight up-and-down pipe run Mostek will provide a special flow conditioners; Consult factory)



Cross sectional Pipe View of Insertion Flow Meter

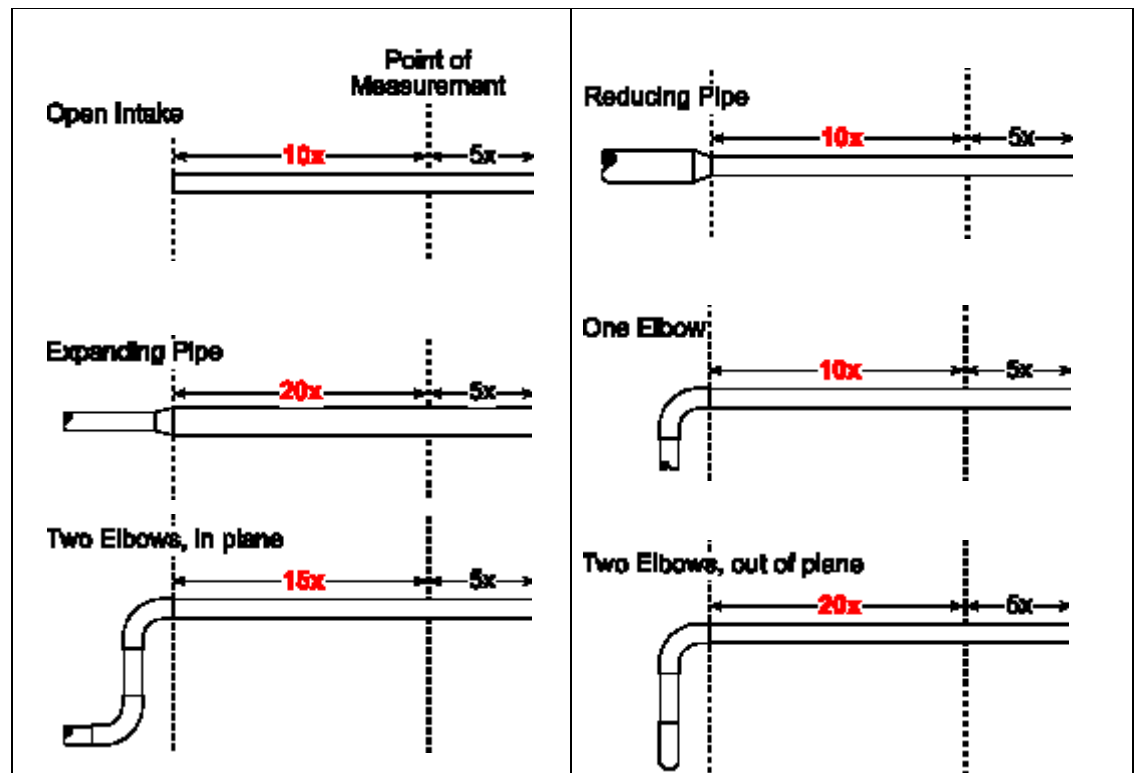


Remote Probe with Junction Box + Cable



Front View of Integral Insertion Flow Meter

Figure 2-4 Flow Meter Placement



2-3 Flow Body Style

To reduce the straight up-and-down pipe run all of MF200 In-line type will have an optional flow conditioner inside flow body (Consult factory).

2-3-1 Flow Meter Placement Flow Body Style

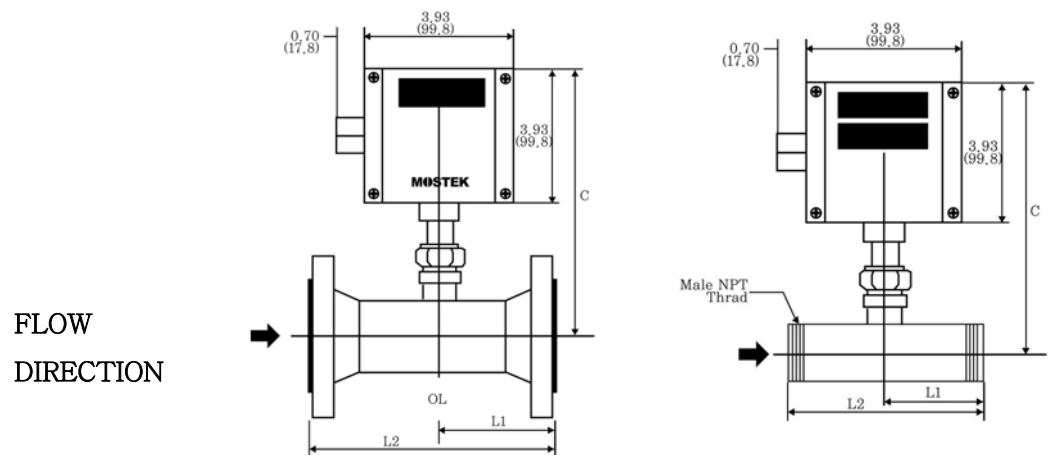
The Model MF200 is welded, threaded or flanged to the customer's pipe.

Care should be taken to ensure that the diameter of the mounting pipe is the same diameter as the Model MF200 flow body or errors in flow reading can occur. Installation procedure should be a combination of the end user's engineering practice, in compliance with local codes, and manufacturer's recommendation.

The following, general precautions should be observed:

- Exercise care during handling to avoid damaging the probe, sensor or enclosure .
- The enclosure cover must be closed except during installation.
- Mounting MF200 in direct sunlight can cause the temperature inside the enclosure to increase beyond design limits, resulting in failure of the LCD display and reduced component life. It is recommended that a sunshade be installed to avoid direct sunlight.
- Ensure that the arrow on the beneath on the enclosure is pointing in the direction of flow.

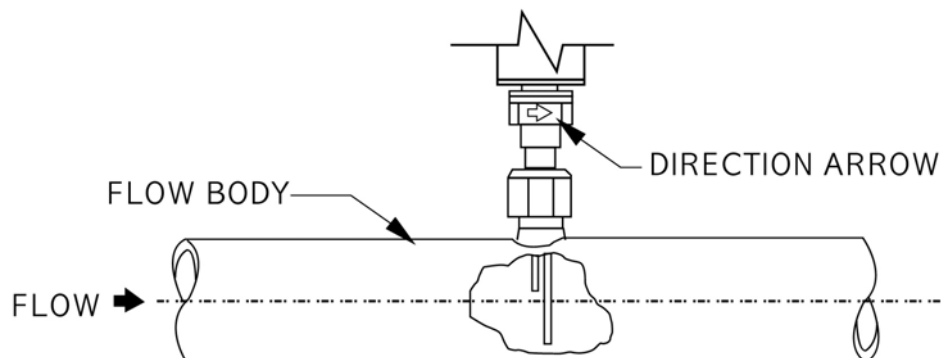
Figure 2-5 Flow Body Style



2-3-2 Flow Body Orientation

Install the flow body so that the arrow on the outside of the flow body is in the direction of flow. This will ensure the correct sensor orientation. Note : In extreme low flow measurement (below 0.5 NMPS), convection heat from the longer probe may affect the shorter probe (see Figure 2-3 View A-A). In these applications, choose a mounting orientation that prevents this from occurring (ex. Horizontal mounting)

Figure 2-6 Flow Body Orientation



3. Start Up

3-1. Scope

This section describes the steps needed to get the MF200 flow meter running.

3-2. Wiring

Warning ! All installation procedures must be performed with power off.

All plumbing and electrical installation of flow meters must be a combination of the end of end user's best engineering practices, in compliance with local codes, and the manufacturer's recommendation.

Wiring Installation

Wiring is accomplished by opening the front cover to expose the terminal block electronic circuit boards. Bring customer supplied wires into the enclosure through the conduit access on the top of the enclosure. Cut the wires for a 4-inch service loop. Use standard copper wire, no larger than 16-guage. If you are providing 24 VDC, connect the wires to connect TB1 terminal block (green color) being careful to connect with the correct polarity (+/-).

3-3 AC Power Input Wiring and Grounding

An external power supply must supply 95 – 265 VAC +/-10%. While opening the front cover there is a terminal block TB1 which accept the wirings and the maximum load ratio is 10 VA. The enclosure must be properly grounded with a quality earth ground to protect the electronics from the static discharges. It is recommended that 16 gauge, standard wire be used.

Be sure that MF200 offers AC 24 volt input power capability with same wiring method , the maximum load ratio is 7 VA.



Figure 3-1 Smart Electronic View inside Enclosure

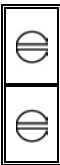
TB1 TERMINAL BLOCK			CONNECTION # OF TERMINAL BLOCK	FUNCTION
	+	1	TB1- 1	VAC HOT (BLACK)
	-	2	TB1-2	VAC NEUTRAL (WHITE)
Note : See figure 3-1 Smart Electronic View inside Enclosure				

Figure 3-2 AC INPUT WIRING

3-4 DC Power Input Wiring and Grounding

An external power supply must supply 24 VDC +/-10%, at one amp minimum.

The enclosure must be properly grounded with a quality earth ground to protect the electronics from the static discharges. It is recommended that 16 gauge, standard wire be used.

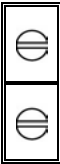
TB1 TERMINAL BLOCK			CONNECTION # OF TERMINAL BLOCK	FUNCTION
	+	1	TB1- 1	24 VDC +
	-	2	TB1-2	24 VDC -
Note : See figure 3-1 Smart Electronic View inside Enclosure The MF200 offer the DC input reverse polarity protection – operating.				

Figure 3-3 DC INPUT WIRING

Be sure that MF200 offers AC 24 volt input power capability with same wiring method , the maximum load ratio is 7 VA.

3-5 4 – 20 mA, 0-5 VDC, Pulse, Alarm, RS-485 Output Wiring

Bring the 4 to 20 mA wiring in through the conduit hub. Connect FLOW RATE 4 to 20 mA output to TB1 terminal block (green color), 3(+) & 4(-). It is recommended that 16 gauge standard shield wire be used. For other outputs please refer to the following.

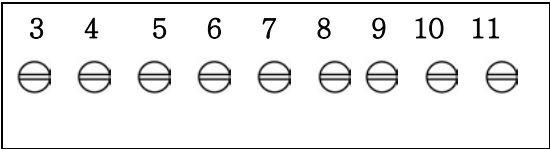
TB1 TERMINAL BLOCK	TB1 #	FUNCTION
	3	4-20 mA (+)
	4	Ground / Common
	5	0-5 VDC (+)
	6	Pulse (+)
	7	Low Alarm (+)
	8	High Alarm (+)
	9	Ground / Common
	10	RS-485 (B)
	11	RS-485 (A)
Note : See figure 3-1 Smart Electronic View inside Enclosure		

Figure 3-4 4-20 mA DC Output, Pulse, Hi-Lo Alarm , RS-485 wiring

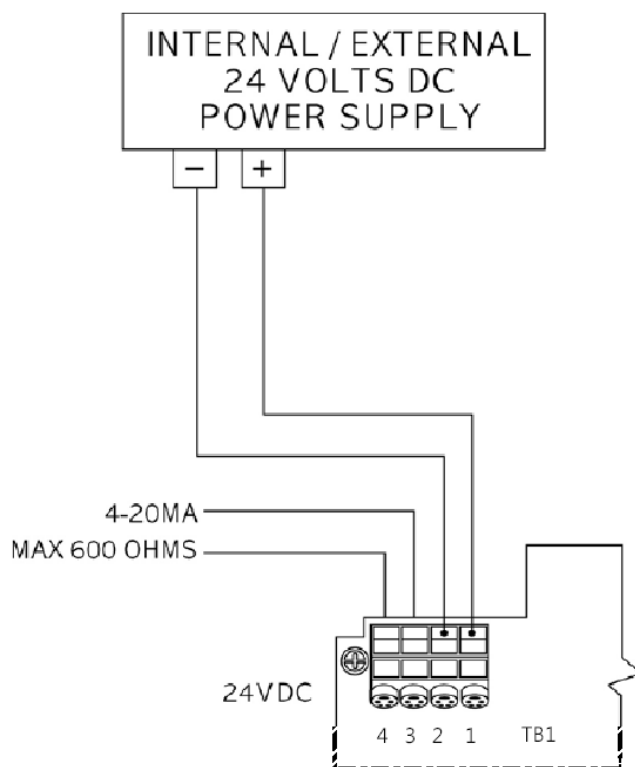


Figure 3-5 Isolated Wiring for the 4-20 mA Output

3-6 Remote Wiring Installation

Note : Remote wiring is only required when the Remote Electronics options is provided.

Connect sensor wires as follows: Red wire to terminal # 1 and blue wire to terminal # 2, and yellow wire to #3 and black wire to #4 (see Figure 3-6)

Connect other end to MF200's main board (default in terminal connected)

If you are using your own cable, make sure that the cable does not exceed 50 feet and has a wire resistance that does not exceed one ohm (22 AWG recommended).

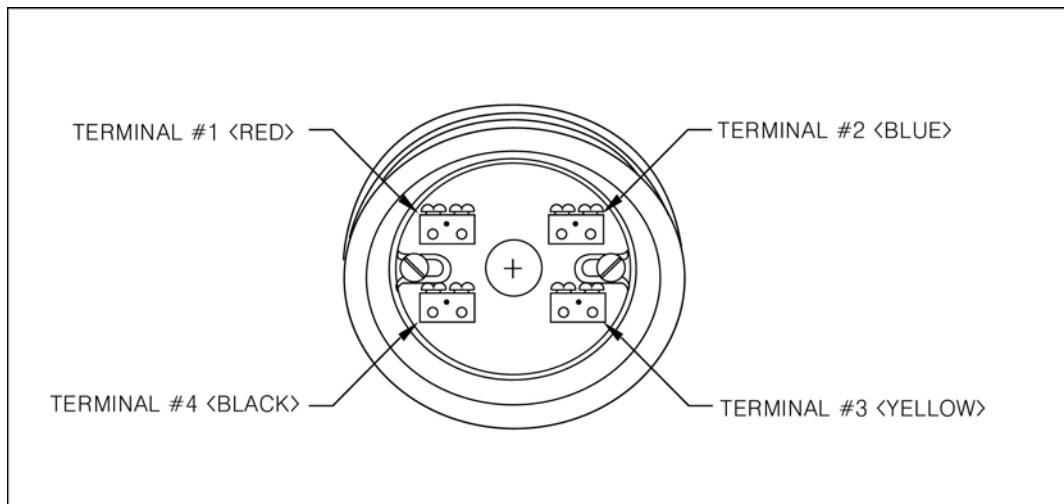
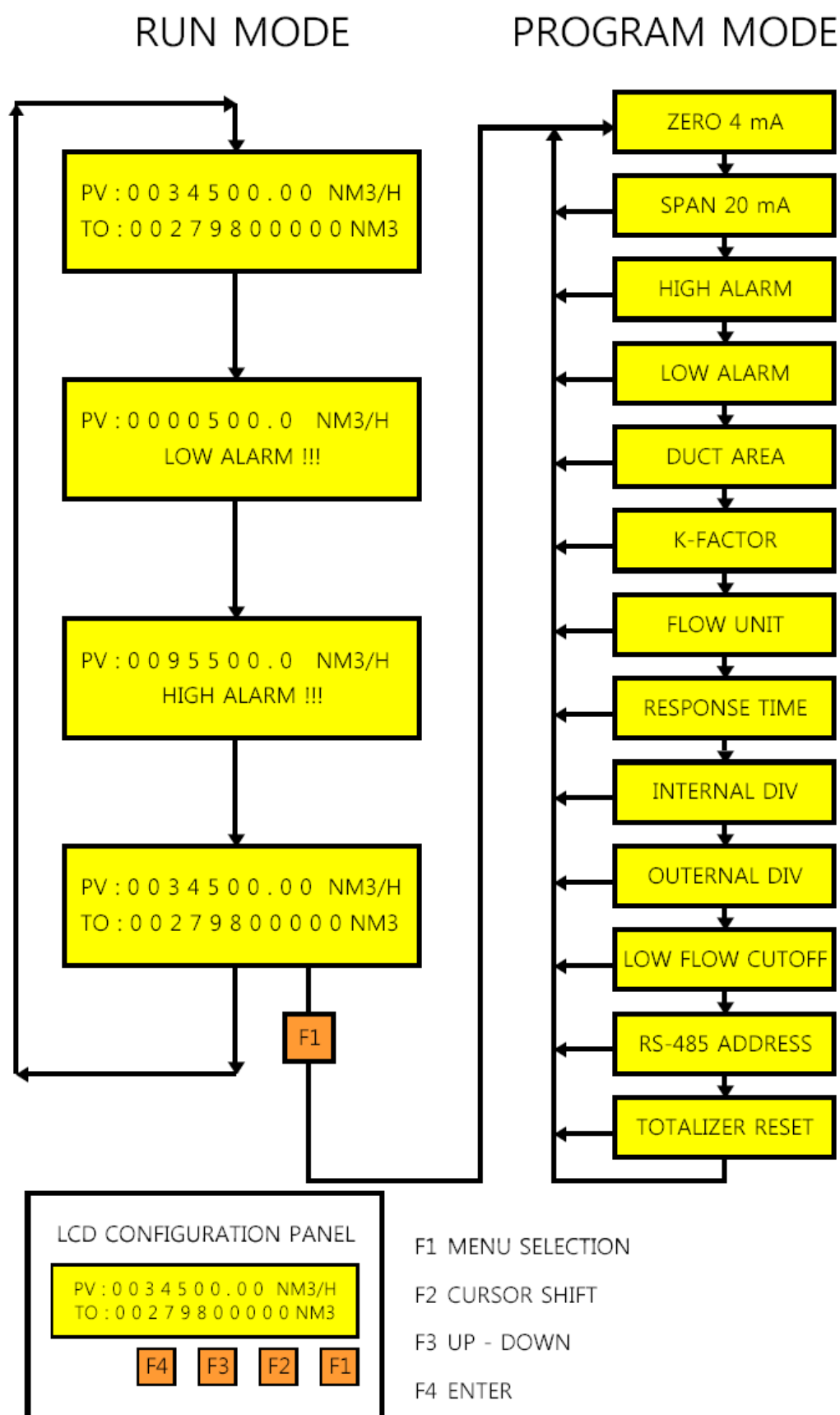


Figure 3-6 Remote wiring Junction Box (see also Figure 1-6)

4. Programming

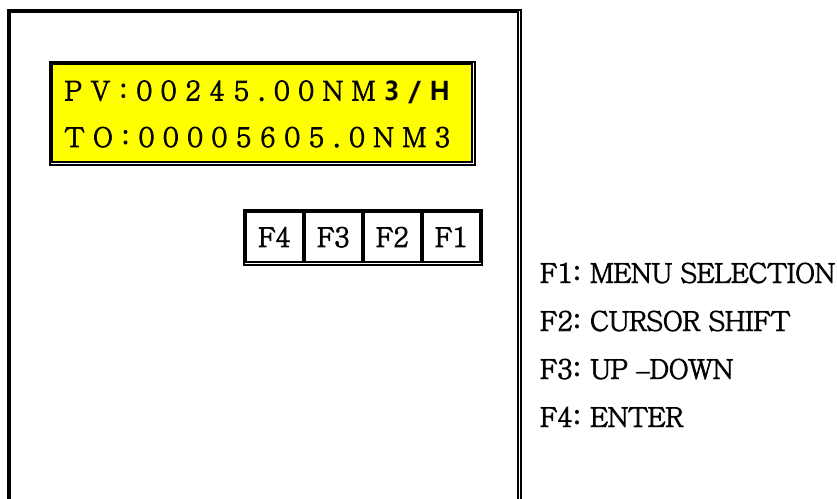
4-1. Program Main Menu



4-2. Programming using the Local Display

4-2-1 Entering the Programming Mode

To enter the programming mode, press F4 continuously and press F1 six(6) times in current normal display mode, and then you can enter into ZERO adjustment mode (1st sub-menu).

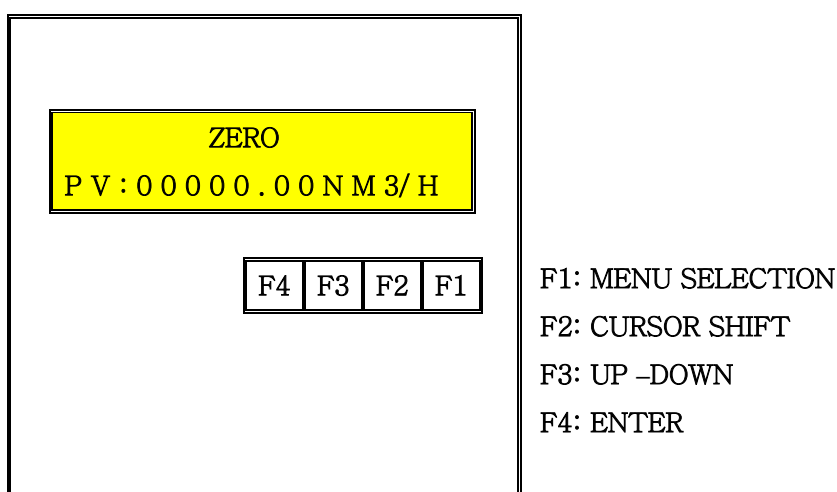


PV is a process variable (flow rate) and TO is a totalization.

Note : At any programming mode will automatically return to main normal screen if no key is pressed for 20 seconds.

4-2-2 Zero (4 mA) Setting

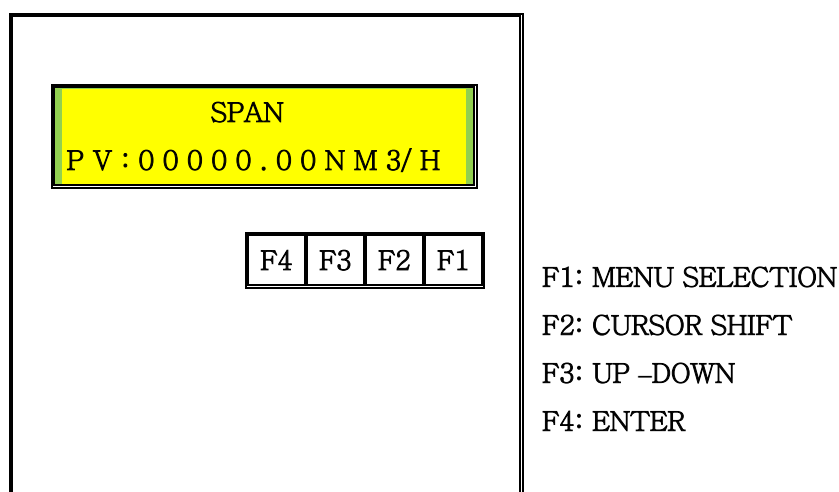
The 4-20 mA output indicates any flow rate that customer can select as long as the flow meter has been calibrated within that range. You can set 4 mA (zero) over the calibrated range.



Press F2 key for digit shift, and press F3 to increase or decrease number.
Press F4 for variable setting.

4-2-3 Span (20 mA) Setting

The 4-20 mA output indicates any flow rate that customer can select as long as the flow meter has been calibrated within that range. You can set 20 mA (span) over the calibrated range.



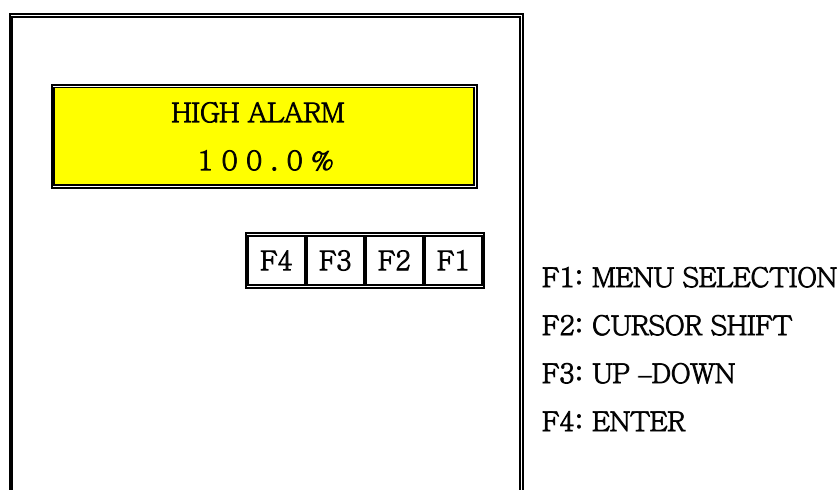
Press F2 key for digit shift, and press F3 to increase or decrease number.

Press F4 for variable setting.

After SPAN re-adjustment “ Pulse Dividing Setting “ in 4-2-10 should be necessarily required.

4-2-4 High Alarm Setting

This is the upper flow limit alarm value that can be associated with a discrete output. An alarm code is generated when the flow value exceeds this limit. If no checking is needed , this value should be set to a full span (20 mA , 100%). The High alarm is programmed independently.

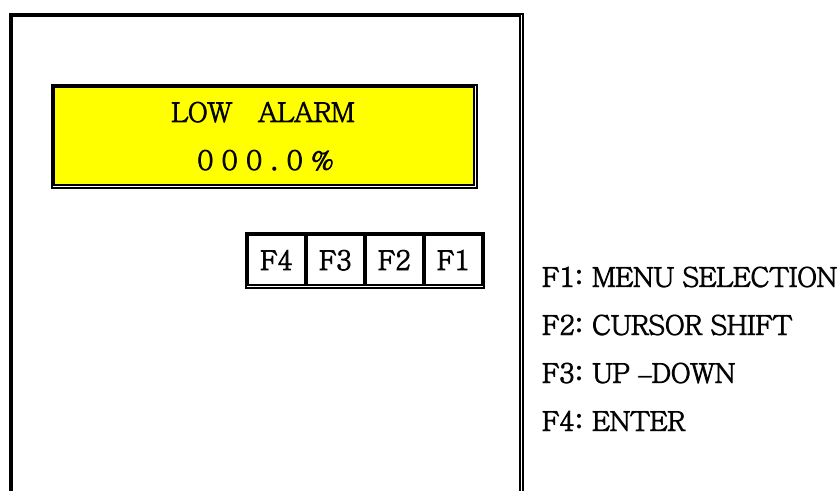


Press F2 key for digit shift, and press F3 to increase or decrease number.

Press F4 for variable setting.

4-2-5 Low Alarm Setting

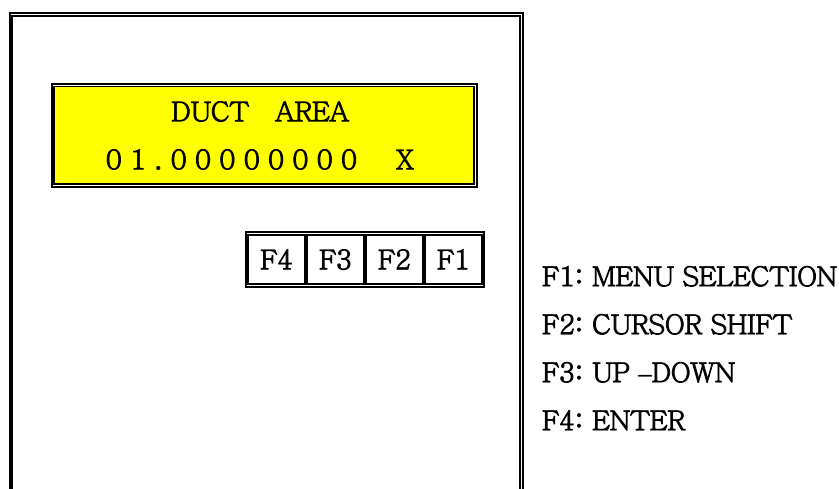
This is the lower flow limit alarm value that can be associated with a discrete output. An alarm code is generated when the flow value is below this limit. If no checking is needed, this value should be set to a zero (4 mA, 0%). The Low alarm is programmed independently



Press F2 key for digit shift, and press F3 to increase or decrease number.
Press F4 for variable setting.

4-2-6 Duct Cross Sectional Area Setting

Recommend this mode to use for calculation of different pipe sized flow rates. The customer should use when flow meter is calibrated with a velocity. The default setting at factory is 1.00 which is not actual duct cross sectional area expressed in unit of m² (square meter) or ft², (square feet) and this is only a virtual reference. Therefore duct area can incorporate when only number desired is entered. The cross sectional area is expressed in $Dcsa = (\pi r^2)$. In order for customer to determine the flow rate it may be calculated as the formula of $Q = \delta V \times A$. The maximum duct cross sectional area can be input is 30.00 m² or 30.00 ft².



Press F2 key for digit shift, and press F3 to increase or decrease number.
Press F4 for variable setting.

4-2-7 K – Factor Setting

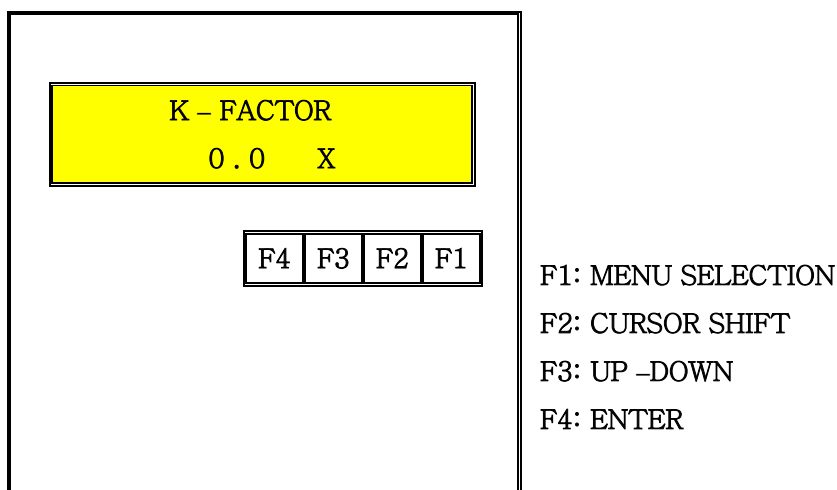
Change the calibration correction factor to compensate for flow profile disturbance or specific application conditions. The K-factor is a multiplication factor applied to the linearized flow signal. The user may set the K-factor individually for each flow range. Entering a K-factor is to adjust the meter's output without affecting the factory calibration curve.

Use K-factor calibration offset for an additional flow profile compensation (Flow rate initially indicated on the flow meter is the flow that came through the calibration by the factory)

K-factor 1.0 means the output value is not affected and is the factory default setting.

The customer may enter any number from 0.1 to 5.0.

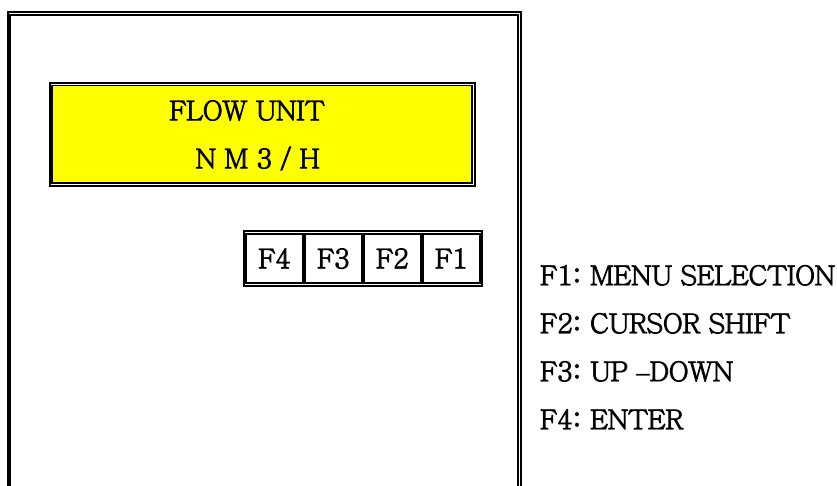
If current output shows 12 mA and user desires its changing to 18 mA K-factor can be calculated as $(18/12)=1.5$. In case of higher K-factor above 1.0 the full span may be high limited up to 25 mA. In order to set full span in display mode user can enter desired numeric value at SPAN mode.



Press F2 key for digit shift, and press F3 to increase or decrease number.

Press F4 for variable setting.

4-2-8 Flow Unit Setting



Press F2 key for digit shift, and press F3 for selection of engineering flow units.

The engineering flow units can be selected are of ; NM3/H, NM3/M, NM3/S, NL/M, NL/S, KG/H, KG/M, KG/S, NM/S, NF/S, SM/S, SF/S, M/S, F/S, SCF/H, SCF/M, SCF/S, SL/H, SL/M, SL/S, LB/H, LB/M, LB/S, M3/H, M3/M, M3/S, CF/H , CF/M, CF/S, L/H, L/M, L/S.

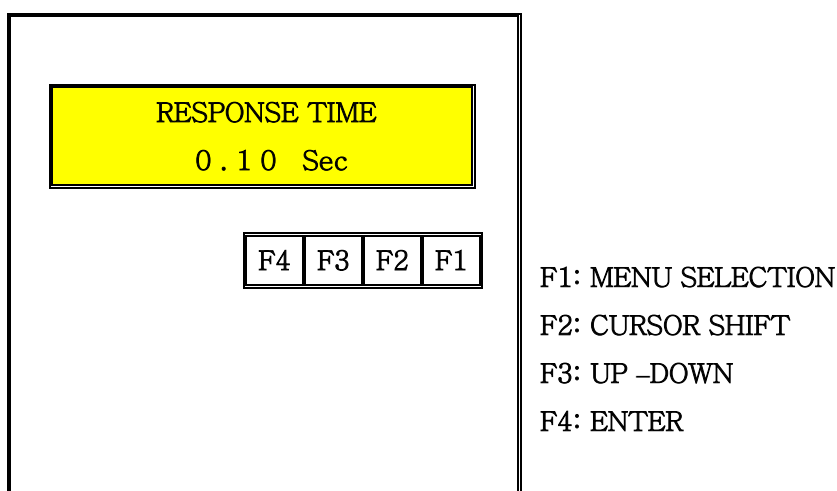
Press F4 for variable setting

At this mode by changing the engineering unit the flow rate displayed does not automatically change , but user can enter the SPAN (20 mA) mode to enter a changed number.

4-2-9 Response Time Setting

This mode is time response delay adjustment. This value can be set to 0.1 to 9.9 second delay.

Select from a low response for faster tracking , to a high response for smoother output.



Press F2 key for digit shift, and press F3 to increase or decrease number.

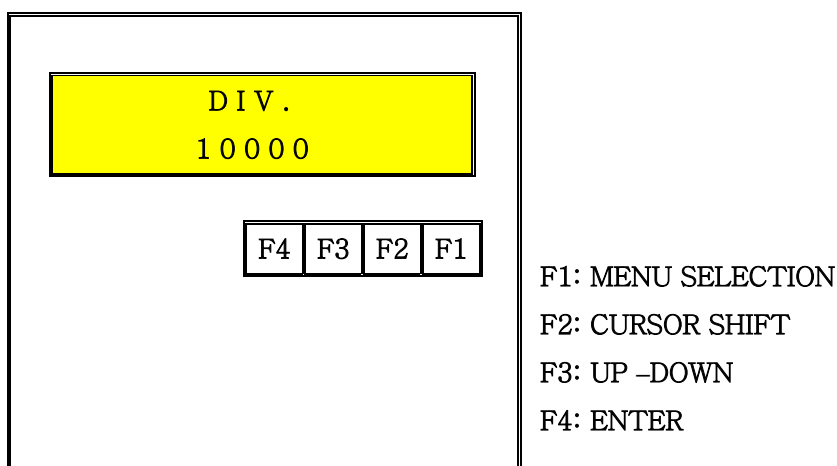
Press F4 for variable setting.

4-2-10 Pulse Dividing Setting for Internal Totalizer

This mode is the function of pulse dividing for internal totalization. When parameter is selected to 5000 the pulse speed is 1 sec. The flow meter's default pulse speed is selected at factory.

To calculate pulse speed desired may use the formula of Pulse speed= 5000 / (span / time (h,m,s)). For example the span is 5000 NM3/H , PS = 5000/ (5000/ 3600) = 3600 DIV

5000 NM3/M , PS = 5000/ (5000/ 60) = 60 DIV, 5000 NM3/S , PS = 5000/ (5000/ 1) = 1 DIV



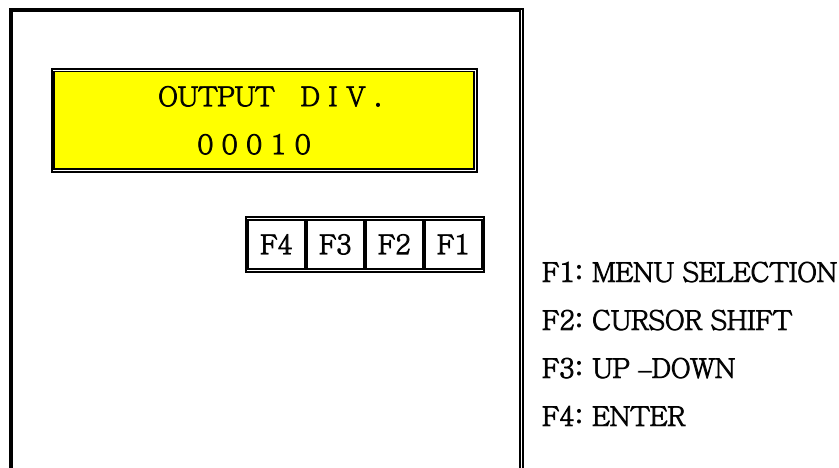
Press F2 key for digit shift, and press F3 to increase or decrease number.
Press F4 for variable setting.

4-2-11 Output Pulse Dividing Setting for Remote Totalizer

This mode is the function of pulse dividing (pulse scaling) for remote totalization.

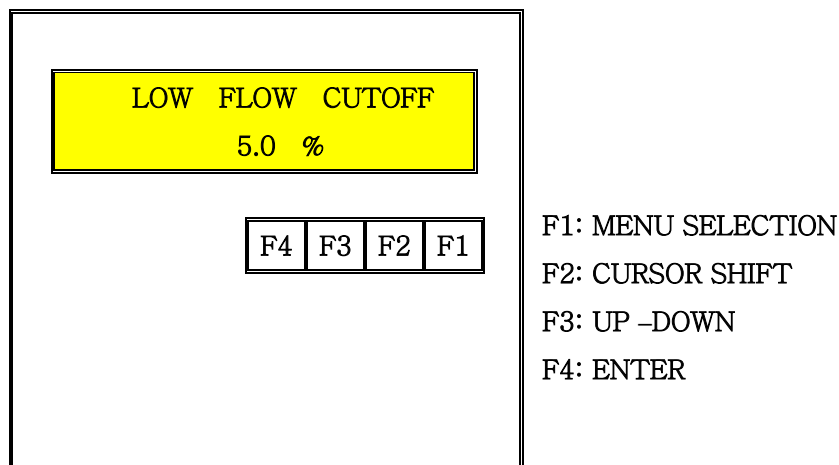
When parameter is selected to 10 the number of the pulse is 10 per flow unit. The flow meter's default the number of the pulse per unit is 1. Reversely the number of flow unit per pulse can then be calculated as $1 / (\text{Pulse/Unit})$.

For example If pulse per unit is 10, then unit per pulse is 0.1.



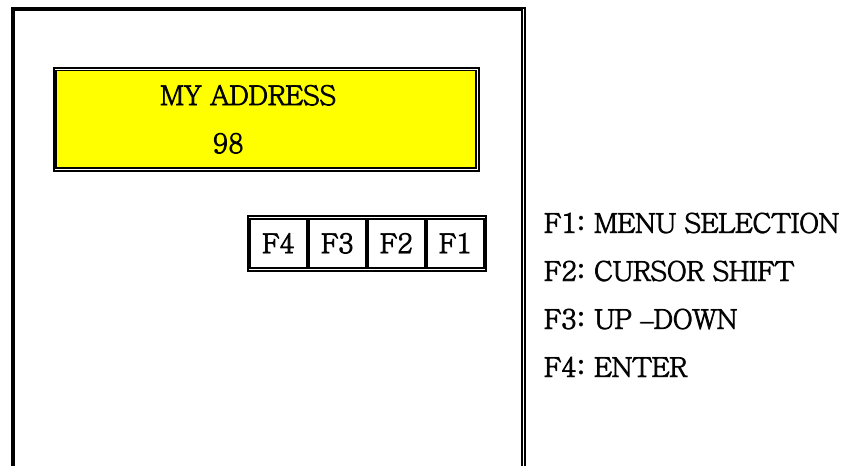
4-2-12 Low Flow Cutoff

This mode is the function of low flow rate filtering which can eliminate the flow rate from 0% to 10%. Factory default is 5.0% set. When this mode is set the flow signal within set value (0-10%) goes to 4mA as zero flow and display also indicate zero (0). As flow meter's sensor is very accurate so it can detect any small amount flow rate such as valve leakage, however customer want to remove this flow rate for process control, this mode is very useful.

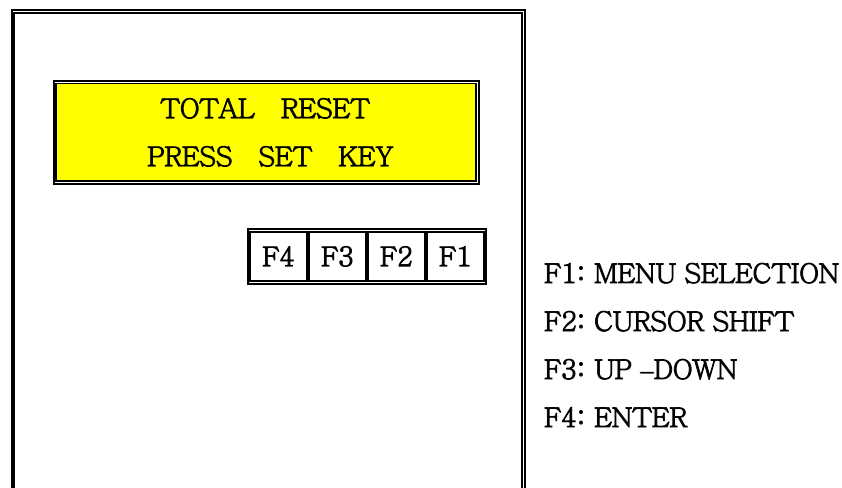


4-2-13 RS-485 Communication Device Address Input

This mode is the function of device address input for serial digital RS-485 communication. The HOST is ID98 and up to 97 devices can be addressed for multi-drop RS-485 serial communication. For more detail including RS-485 protocol please consult factory.



4-2-14 Totalizer Resetting



Press F4 for totalizer resetting.

Programming Initializing: Press continuously F3 and press F1, and then rebooting the power supply.

5. Preventative Maintenance

Warning ! : Before attempting any maintenance , take the necessary safety precautions before removing the probe from the duct (example : purge lines of toxic and/or explosive gas, depressurize, etc.)

Turn OFF input power before removing or installing a circuit board assembly from the enclosure.

5-1 Access to Electronics

After turning OFF the power, turn left four screws on the front cover to expose the terminal blocks(TB1) and main top electronic circuit boards.

Caution need to be exercised not to damage the pin connector of the LCD display board to the top main board.

5-2 Sensor Cleaning

Even though the sensor is insensitive to small amount of contamination, continued use in dirty environments will necessitate periodic cleaning. Remove the unit from duct, exposing the sensor elements.

If they are visibly dirty, clean them with water or alcohol (ethanol)and an artist's brush until they appear clean again. Even though the sensor elements are rugged and breakage resistant, avoid touching them with any solid object and use a light touch while cleaning them.

5-3 Broken or Damaged Probe

If the sensor is broken or damaged, the probe and electronics must be returned to the factory. A new sensor will be installed and calibrated. Refer to Section 6.2, Return Procedure.

5-4 Calibration

To insure continuing high accuracy of your Model MF200 Flow Meter, Mostek provides a full NIST, KTL traceable calibration.

6 Troubleshooting

Caution ! : The electronics, sensor and sensor interconnect wires supplied by Mostek are calibrated as a single precision mass flow meter. Interchanging sensors or sensor wiring will impair the accuracy of the flow meter.

If you experience any problem with your Model MF200 Flow Meter, call Mostek's Customer Service Department, Technical Assistance at (82-31-254-6653)

Problem	Possible Cause	Action
Unit will not power-up	a) No power input b) Bad power supply	a) Turn power on b) Verify 24 VDC input power
Velocity measurement seems low	a) Probe not oriented properly b) Sensor dirty	a) Orient probe per sec 2.2.3 b) Clean sensor per sec 5.2
Velocity measurement is erratic or fluctuating	a) Sensor dirty b) Sensor broken c) Probe not mounted securely d) Malfunction in flow meter e) Verify Installation guidelines (see Figure 2-4)	a) Clean sensor per sec 5.2 b) Return flow meter to Mostek for repair. Per sec 6.2 c) probe must be mounted securely without vibration d) Return flow meter to Mostek for repair. Per sec 6.2 e) Install meter according to guidelines

The following is a summary listing of problems occasionally encountered with the MF200 Thermal Mass Flow meter and it's installation.

1. Inadequate power source

For the models that are powered by 24 VDC, a 24VDC+/-1 VDC, 25-watt power supply is recommended. If the voltage supplied is not within this range or if the power supply is not rated for 25-watt minimum, a variety of problems can occur including inaccurate flow readings, dim display and faulty functions. The input voltage must be within the range of 23 to 25 VDC as measured at the power input terminal of the flow meter electronics.

2. Improper wiring connections for power and/or 4-20 mA output signal.

The MF200 requires a separate power source for the main board and one 4-20 mA output signal. Two wires supply 24 VDC power to the main board.

3. Improper 4-20 mA wiring

The MF200 flow meter can have the 4-20 mA signal connected in an " isolation configuration". In the isolated configuration, the customers signal receiving equipment (PLC, DCS, etc) powers the 4-20 mA loop.

4. Flow measurement seems inaccurate,

Check to ensure that the flow meter is installed so that the Flow Direction Arrow marked beneath of the enclosure is properly pointing in the direction of flow. Refer to Figure 2-6
If you have a Mostek Insertion Flow meter , check that the insertion depth of the sensor / probe is correct. The end of the probe should be adjusted as per section 2.2.2. Refer to Figure 2-1.

Ensure that there are a minimum of ten diameters of straight pipe upstream of the sensor and five diameters downstream. If complex flow disturbances are upstream of the sensor, extension of the straight pipe may be required. Contact Mostek for assistance.

5. Erratic flow reading especially a flow reading spiking high.

This is a symptom of moisture in the flow stream. Mostek flow meter is designed to work in relatively dry gas applications only. Contact Mostek to discuss resolution to this problem.

6. The MF200 Flow meter is not respond to flow

This problem could be caused by a number of items. Firstly check to ensure adequate power is supplied to the flow meter as described above. If things appear to be correct, an easy functional test can be performed. Carefully remove the probe and sensor from the pipe or flow body. Caution: The sensor is HOT. For the flow meters with a display and if the display is reading zero, blow on the sensor to see if a response occurs.

If nothing happens, take a damp rag or sponge and place a it in contact with the sensor. A reading should occur. Contact Mostek Customer Service with this information.

7. Display and/or 4–20 mA signal reading above zero when no flow is occurring in the pipe.

If reading is less than 5% of full scale, it is likely this is normal condition caused by convection flow caused by heated sensor. It does not mean that the zero of the instrument is improperly set. The Mostek sensor is extremely sensitive to gas flow and can even read the small flow caused by convection. If this is an unacceptable condition, please contact Mostek Customer Service for alternatives.

6.1 Replacements Parts

Front Panel Display Module

Probe & Sensor Assembly

6.2 Return Procedure

The Mostek Customer Service Department can be reached at (81)-(31-254-6653). Please have the model and serial number available when you call. If it becomes necessary to return a Model MF200 Mass Flow Meter to Mostek, obtain a Return Authorization Number from Customer Service Department.

Unless specially instructed to do otherwise, the entire flow meter must be returned, including all electronics.

Please include information describing the difficulties experienced, purchase order number under which the equipment was purchased, and a contact name and phone number .

Be sure to include complete return shipping instructions. We can not deliver to post office boxes. Ship to the following address.

MOSTEK

481-23, WOOMAN-DONG, PALDAL-GU, SUWON-CITY

GYUNGKI-DO 442-190, KOREA

TELEPHONE : 031-254-6653

FAX : 031-245-2286

WEBSITE : WWW.MOSTEK.CO.KR

EMAIL : FIELDBUS@UNITEL.CO.KR

Warranty

- (a) Mostek warrants that the products furnished under this agreement will be free from defects in material and workmanship for a periods of one year from the date of shipment. The customer shall provide notice of any defect to Mostek, within one week after the customer's discovery of such defect. The sole obligation and liability of Mostek , under this warranty shall be repair or replace, at its option, without cost to the customer, the defective product or part.
- (b) Upon request by Mostek, the product or part claimed to be defective shall immediately be returned at the customer's expense to Mostek. Replaced or repaired products or parts will be shipped to the customer at the expense of Mostek. Mostek shall have the right of final determination as to the existence and cause of defect.
- (c) There shall be no warranty or liability for any products or parts that have been subject to misuse, accident, negligence, failure of electric power or modification by the customer without the written approval by Mostek. Final determination of warranty eligibility shall be made by Mostek. If a warranty claim is considered invalid for any reason, the customer will be charged for service charge performed and expenses incurred by Mostek, in handling and shipping the returned unit.
- (d) The liability of Mostek shall be limited to replacing or repairing, at its option, any defective parts which are returned. Labor and related expenses incurred to install replacement pars are not covered by this warranty.
- (e) As to replacement parts supplied or repairs made during the original warranty period, the warranty period for the replacement or repaired part shall terminate with the termination of the warranty period of the original product or part.
- (f) The use of these products is under exclusive control of the purchaser and Mostek specially denies any responsibility for the calibration of units and/or accuracy of work performed or the safety of the system in which Mostek products is used. EXTERNAL SAFETY DEVICES MUST BE USED WITH THIS EQUIPMENT.
- (g) No warranty is made with respect to custom equipment or products produced to buyer's specifications except as specifically stated in writing by Mostek and contained in the agreement.
- (h) THE FOREGOING WARRANTY CONSTITUTES THE SOLE LIABILITY OF MOSTEK, AND THE CUSTOMER'S SOLE REMEDY WITH RESPECT TO THE PRODUCTS AND IS IN LIEU OF ALL OTHER WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, LIABILITIES, AND REMEDIES. EXCEPT AS THUS PROVIDED , MOSTEK, DISCLAIMS ALL WARANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE.

In no case are products to be returned without first obtaining permission and a Return Material Authorization number from Mostek.