OPERATING INSTRUCTIONS

ULTRAFLO™ UFDD
ULTRASONIC CLAMP-ON FLOW METER

Introduction

Please read carefully! No liability can be accepted for damage caused by improper use or installation of the UltraFlo™ Ultrasonic Flow Meter.

The UltraFlo™ UFDD Clamp-On Ultrasonic Flow Meter is the ideal flow meter with accurate, easy-to-use, easy-to-install digital doppler technology. The UltraFlo™ UFDD is offered in a portable flow meter design or permanent mount installation. Both are extremely rugged, reliable and durable. The flow meters are housed in a NEMA 4X fully sealed enclosure to withstand the most severe conditions. The patented Digital Doppler technology will measure just about any liquid or fluid from potable water to 30% thickened sludge and fly ash slurries. The easy to read LCD alpha-numeric display, versatile AC & DC power operation, digital communications, batch control and data log events are all packaged in an affordable industrial design. Because the UltraFlo™ UFDD sensors are clamped onto the outside of the pipe, the installation costs are a fraction of installed costs of traditional in-line flow meters. Plus, the sensors and electronics are immune to the process conditions regardless of process pressures, temperatures and build-up or scaling conditions. The Digital Doppler transducers will mount to just about any size pipe regardless of pipe wall thickness.

⚠ Safety Precautions

If you are unsure of the suitability of a UltraFlo™ Ultrasonic Flow Meter for installation, please consult your FLO-Corp representative for further information.

Flammable or Explosive Applications

FLO-CORP manufactures several different display models with different mounting and internal configurations. It is the user's responsibility to select a controller model that is appropriate for the application, install it properly, perform tests on the installed system, and maintain all components.

Disclaimer

The information contained in this document is subject to change without notice. FLO-CORP makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

Incorrect Wiring

FLO-CORP assumes no responsibility for users incorrectly wiring their UltraFlo™ Ultrasonic FLow Meter. Please refer to the wiring diagrams for correct wiring of the UltraFlo™ Ultrasonic Flow Meter.

DESCRIPTION

The UltraFlo™ UFDD Clamp-On Ultrasonic Flow Meter is the ideal flow meter with accurate, easy-to-use, easy-to-install digital doppler technology. The UltraFlo™ UFDD is offered in a portable flow meter design or permanent mount installation. Both are extremely rugged, reliable and durable. The flow meters are housed in a NEMA 4X fully sealed enclosure to withstand the most severe conditions. The patented Digital Doppler technology will measure just about any liquid or fluid from potable water to 30% thickened sludge and fly ash slurries. The easy to read LCD alpha-numeric display, versatile AC & DC power operation, digital communications, batch control and data log events are all packaged in an affordable industrial design. Because the UltraFlo™ UFDD sensors are clamped onto the outside of the pipe, the installation costs are a fraction of installed costs of traditional in-line flow meters. Plus, the sensors and electronics are immune to the process conditions regardless of process pressures, temperatures and build-up or scaling conditions. The Digital Doppler transducers will mount to just about any size pipe regardless of pipe wall thickness.

FEATURES & BENEFITS

- AC or DC operation, isolated, regulated, module.
- Smart LCD screen featuring high-resolution, 32 character, 2-line alphanumeric providing rate and totalization simultaneously - in Metric & English units.
- Splash proof NEMA 4X case protected from moister and caustic chemicals.
- Easy configuration for setup and operation with on-screen prompting, quick scrolling menus, display panel keypad, and color coded LED's.
- Non-invasive, submersible, clamp-on transducers
- RS232 Data Transfer Via DB9 Port or USB Terminal
- Batch Control – Scalable Pulse 12 VDC Nominal Isolated @ 50mA.
- Internal 12 VDC battery (Solar Panel optional).
- Portable & Fixed models available (Provided in NEMA 4X enclosures).
- Data Logger 2-32 Gb Flash Drive with cable and software (optional).

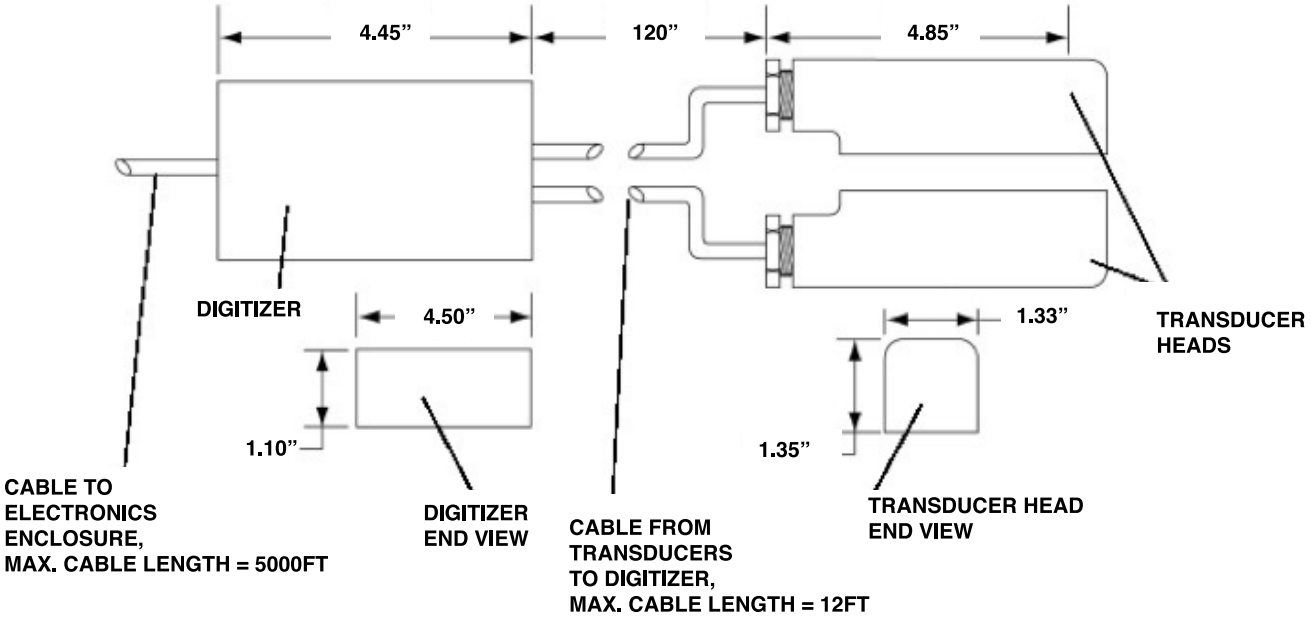
SPECIFICATION

Power	Nominal 150mA 220/117 VAC/12 VDC
Outputs	4-20mA (Max. z 1000 ohm) Digital Pulse Train (0-12V), Hi & Lo limit Alarms, RS232 & Batch Control
Flow Range (velocity) Volume Determined by Pipe ID	0.50 to 50.0 feet per second
Accuracy	+/- 1 %
Particle Limitations	Min: 35 ppm ; Max: 30% sludge
Max. Pressure	Based on Pipe Specification
Max. Temperature	300ºF
Pipe ID Range	½"- 999" Doppler
Standard Transducers	Fit pipe sizes 3/4" and larger pipe O.D.
Linearity	+/- 0.5 %
Repeatability	+/- 0.1 %

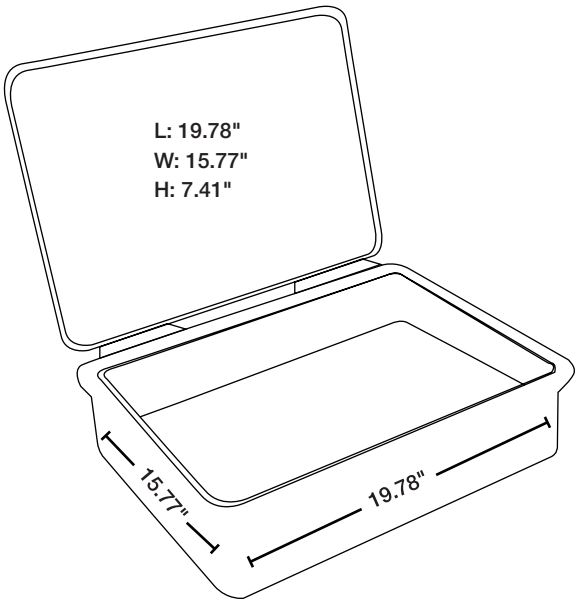
Dimensions	Portable: 19 x 15 x 7 Fixed: 10 x 8 x 6
Weight	Portable: 15 Lbs. Fixed: 6 Lbs.
LED Indicators	Green – Power Yellow – Echo Red – Hi/Low Alarm
Display	NEMA – 4X hinged (+4° F to +140° F)
Transducer	Submersible – Potted, PVDF (-70° F to +300° F)
Totalizer	12 digit LCD Lifetime Memory Backup.
Rate Meter	4 digit LCD Digital Bar Graph
Cable Length	0 to 5000 ft. 25 ft standard
Engineering Units	English & Metric

Specifications are subject to change without notice.

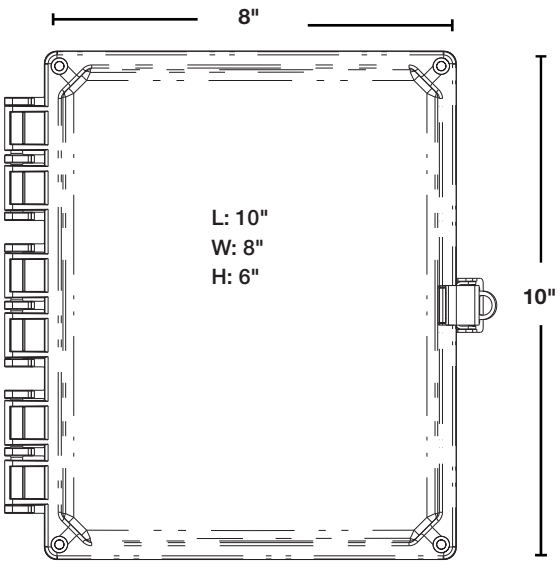
DIMENSIONS inches



PORTABLE UNIT



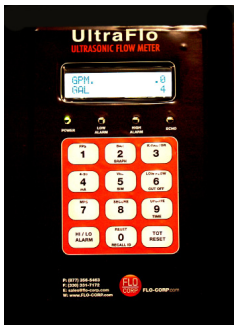
FIXED UNIT



THEORY OF OPERATION

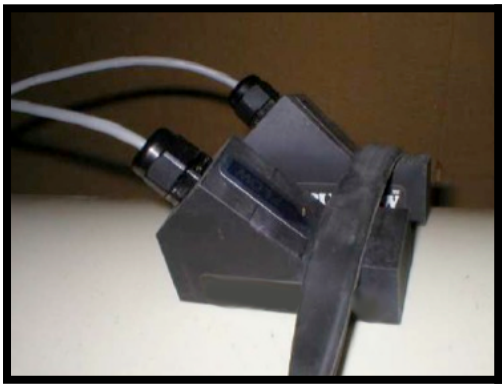
The UltraFlo™ Doppler ultrasonic flow meter measures flow velocity by sensing signals from reflective materials within a liquid and measuring the frequency shift due to the motion of these reflective materials. The Doppler effect states that the received frequency is a function of the transmitted frequency and the relative motion between transmitter and the receiver. The classic example of the Doppler effect is the train whistle increasing in pitch to the listener at the station as the train approaches, then decreasing in pitch as the train moves away from the station. To the person riding on the train, the pitch remains the same. The increasing pitch is due to phase-front compression and the decreasing pitch is due to phase-front expansion. The Doppler flow meter uses this effect to measure the velocity of a liquid through a pipe wall.

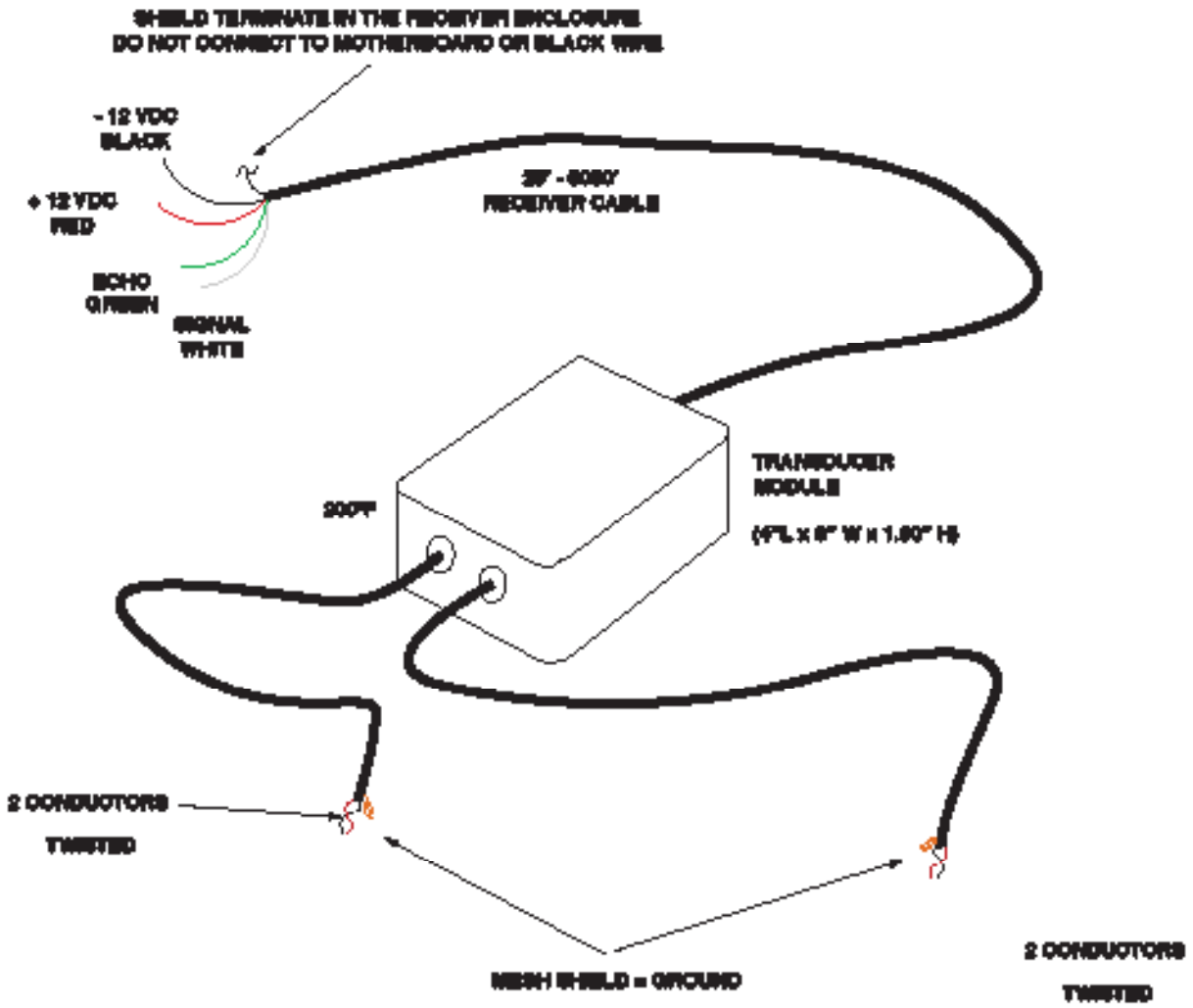
PORTABLE UNIT

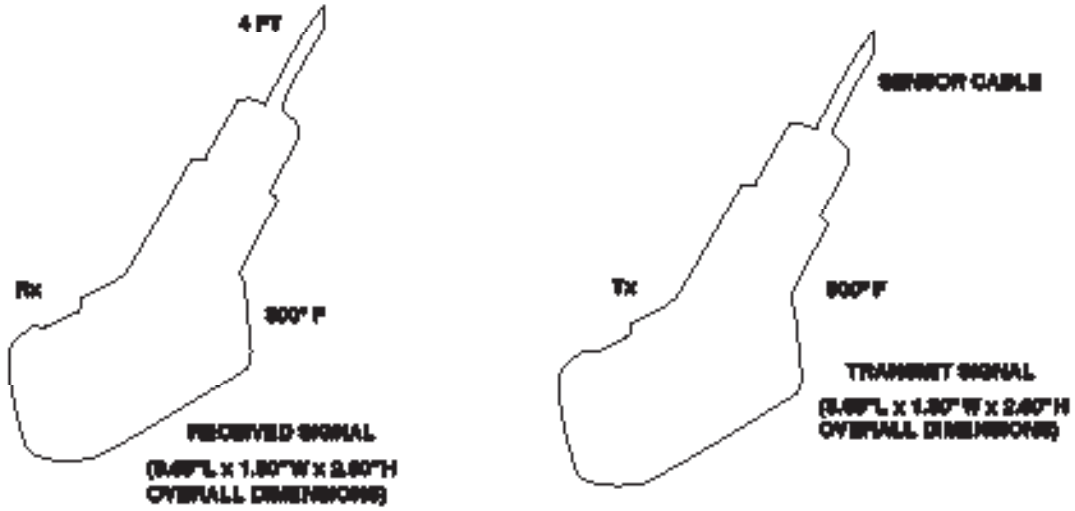


FIXED UNIT

TRANSDUCERS




SHIELD TERMINATE IN THE RECEIVER ENCLOSURE
DO NOT CONNECT TO MOTHERBOARD OR BLACK WIRE
- 12 VDC
BLACK
+ 12 VDC
RED
ECHO
GREEN
SIGNAL
WHITE
RECEIVER CABLE
TRANSDUCER
MODULE
200°F
2 CONDUCTORS
TWISTED
MESH SHIELD = GROUND
2 CONDUCTORS
TWISTED


4 FT
Rx
300° F
RECEIVED SIGNAL
SENSOR CABLE
Tx
300° F
TRANSMIT SIGNAL

SONIC REFLECTORS

The Doppler flow meter requires sonic reflectors in order to operate. These reflectors may consist of particles or air bubbles within the flow to be measured. Your readings may vary slightly with changes in concentration or size of these reflectors as well as the pipe condition and size.

Note: Glycerin is the only known industrial liquid today that is not sonically conductive.

The Doppler flow meter uses two similar transducers to sense flow in a pipe. These transducers are mounted on the outside of a pipe. This configuration presents no obstruction to flow, and will not cause associated pressure drops.

ACCURACY

The Doppler flow meter output signal is linear (as opposed to square root), which means that accuracy is not a function of flow rate. Within certain application limits, the meter is ideal because it is not affected by changes of pressure within the process nor by changes of viscosity, temperature, specific gravity, sound velocity, or electrical conductivity.

SUMMARY

The Doppler flow meter is a non-intrusive flow meter system which operates by sensing the frequency shifts of signals reflected from particles, air bubbles, or density differences within a liquid, producing a linear signal proportional to the flow of the liquid within the pipe.

- No pipe section is required to install the meter.
- The meter is not affected by changes in temperature, viscosity, specific gravity, or the speed of sound within the liquid.
- The liquid does not have to be electronically conductive.
- A minimum particle concentration of 35 ppm @ 40 micron of suspended solids or air bubbles is required.
- The reflector must have at least a 0.2% density difference than the liquid medium.
- For accurate volumetric measurement the pipe must be full at all times.
- The transducers are normally coupled to the outer pipe wall with greaser, sonic gel or epoxy.
- In order to obtain accurate measurements adequate upstream and downstream pipe runs are required.

Recommended straight-run requirements from any disturbance of flow are 10 diameters upstream and 20 diameters downstream.

ACCESSING PARTICLES OR AIR BUBBLES

The ultrasonic beam from the transducer is transmitted through the pipe wall into the liquid. The particles, air bubbles suspended in the liquid, have to be large enough to act as reflectors to return the signal back to the transducer so that a measurement may be taken. It is important to understand that the ultrasonic beam from the Doppler flow meter does not penetrate air very well. A few bubbles will not affect flow meter performance, but too many bubbles may cause the meter to malfunction.

Note: At a frequency of roughly 650 kHz, the minimum particle which can be sensed is 40 microns @ 35 parts per million (ppm) and at least 0.2% density difference from the liquid.

Attention:
The flow to be measured must always have a sufficient number of sonic reflectors of ample size in order to provide reflection of the transmitted sound. If the reflectors do not have sufficient density difference they will neither rise nor fall in the solution but remain suspended. The specific gravity will also affect the ability of a particle to reflect sound. A good example of a reflector is a sand particle or an air bubble. A poor example is algae or onion skins.

PROCESS CHANGES

Changes in the process may cause the meter to cease proper operation. For example, a doppler meter had been operating satisfactorily for a long time in a certain installation, and then suddenly it stopped functioning. The problem was eventually traced to a particle filter that had recently been placed before the transducers, effectively eliminating the reflectors from the stream.

Process changes in the other direction are also possible. The meter responds to bubbles up to a point, but if the liquid starts to foam there may be too many air bubbles to allow the ultrasonic beam to adequately penetrate the flow stream. This may cause the Doppler flow meter to produce erroneous flow readings. Similarly, a sludge may become too dense to allow proper penetration.

ACCESSING PIPE MATERIAL AND CONDITION

Doppler flow meter performance is best maximized by using piping that is sonically conductive. The Doppler flow meter assumes that the path by which the ultrasonic beam enters the pipe and returns to the transducer is ultrasonically homogenous, which means that you must use your flow meter with pipes with non-porous smooth pipe walls.

Concrete-lined pipes, old or crystallized cast iron pipes, hand-wrapped fiberglass pipe, and old piping with air inclusions do not exhibit the required homogeneity. Avoid using the Doppler flow meter for flow measurement on these pipes unless proper operation is proven by the manufacturer through demonstration.

Contact FLO-CORP for more information on an alternate meter if your application is not suitable for the Doppler flow meter.

Note: No clamp-on meter will operate properly if the liner is not solidly attached to the pipe wall because of the probability of an air gap.

PIPE VIBRATION

Moderate pipe vibration does not usually adversely affect the Doppler flow meter, since the vibration of the piping is at a significantly lower frequency than the ultrasonic beam used to measure flow. However, in situations where the transducer signal strength is low because of fluid, piping, or other environmental factors, measurement accuracy may be further decreased by pipe vibration. In these situations your display panel may register flow when there is none due to the vibration. If you can not bracket the pipe to reduce vibration, you may be able to rectify the problem by relocating the transducer to a pipe location with less vibration.

STRAIGHT RUN REQUIREMENTS

As with other flow meters such as vortex or magnetic flow meters, the Doppler flow meter needs a well-developed flow profile to ensure accurate flow measurement. To assure a well- developed profile, choose a measurement point on a long run of pipe well away from elbows, valves, pumps, flanges, and other possible sources of turbulence.

The ideal placement of the Doppler flow meter is with 20 diameters of straight run upstream and 10 diameters of straight run downstream between the transducers and any disturbance of the flow. Most typical flow meter applications use 10 diameters of straight run upstream and 5 diameters downstream from any disturbance of the flow.

However, when the measured fluid is too clean to provide the proper number of reflective particles, one may position the transducer near the pump or source of turbulence in such a manner as to obtain stable readings in a continuous flow full pipe situation. Using a transit time meter may be another viable option if the Doppler flow meter is not performing ideally. A point to remember is that turbulence is a non-linear function of flow, so turbulence can create reflected signals. Interpret readings near turbulent flows with caution.

Sources of turbulence are elbows, flanges, valves, orifices, wedges, pumps, pipe openings, and pipe irregularities (rust, corrosion, and buildup). Try to avoid vertical pipe runs (especially downhill pipe runs).

Transducer distance from turbulence and reading accuracy

UPSTREAM	DOWNSTREAM	% ACCURACY
20 Diameters	10 Diameters	±1% to 3% of full scale
10 Diameters	5 Diameters	±3% to 5% of full scale
5 Diameters	2 Diameters	±5% to 10% of full scale

Accuracy is dependant on flow profile, and is related to the percentage of sound reflectors and their size variation and distribution.

INSTALLATION PROCEDURES

After you have performed the pre-install check and determined that the Doppler flow meter will work for your application, follow these steps to install your meter.

To install the UltraFlo™ Ultrasonic Flow Meter.

1) Mount and connect the transducers
2) Mount and connect power to the electronics enclosure
3) Turn on power to the electronics enclosure using the motherboard rear panel switch on the (front panel for portable) and follow display panel for meter set up (see the "Operation" section for more information on configuring your meter for operation)

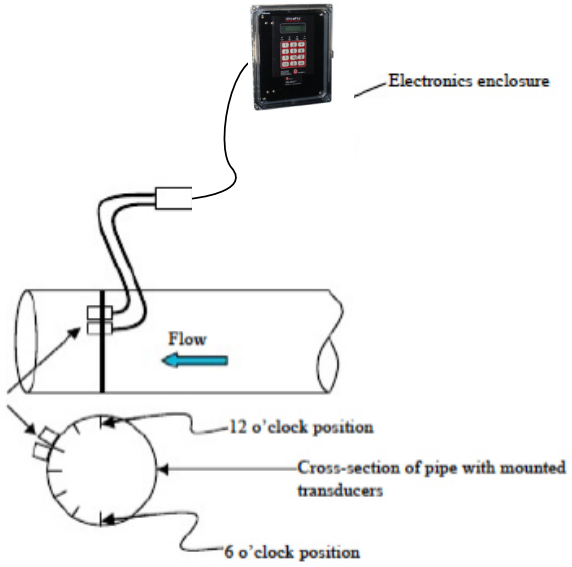
MOUNTING AND CONNECTING THE TRANSDUCERS

The clamp-on transducers are NEMA 6-rated and fully submersible.
(For continuous submersion secure sensors to pipe with approved epoxy.)

To Mount the Clamp-On Transducers to the Pipe:

1) Ensure the pipe surface is clean. Use sandpaper to remove all paint and scale from the pipe surface if necessary.
2) Apply sonic gel to the transducer lenses. For best results in most weather conditions and heat, use Dow Corning® High Vacuum Grease or the supplied Novagard® grease G661™.
3) Place the transducers side by side between 7 o' clock and 10 o'clock on the pipe. Place the transducers flush to the pipe, facing the same direction.

Note: Be careful with transducer placement. Air bubbles near the top of the pipe or sediment on the bottom of the pipe can hinder successful flow readings.



4) Use the supplied chain and bungee cord to strap the transducers in place, securing them tightly to the pipe.
5) Small pipes 2" - 1" diameter - mount sensors 90° apart. Pipes below 1" diameter - mount sensors 180° apart.

Attention:
Always apply sonic gel to the transducer lenses before placing on the pipe. The sonic gel must be used to transmit the energy from the transducer crystals through the pipe wall and into the flow to be measured.

To Connect the Transducers to the Electronics Enclosure:

1) Ensure AC or battery (DC) input power is turned off.
2) Connect the transducer cable to the electronics enclosure by routing the cable through the appropriate opening. Use a NEMA 4X cable gland and a cable backing nut to securely fasten the transducer cable to the electronics enclosure.
3) Connect the transducer wires to the processor board as shown in Figure 1 for correct placement. The transducer 4-wire connection is as follows:

- White = Digital signal output (0 V to 12 V pulse train)
- Green = Echo good logic signal (when used)
- Red = 12 VDC at 100 mA nominal power in
- Black = Ground / Common

Note: Do not connect bare shield wire to black (common / ground)

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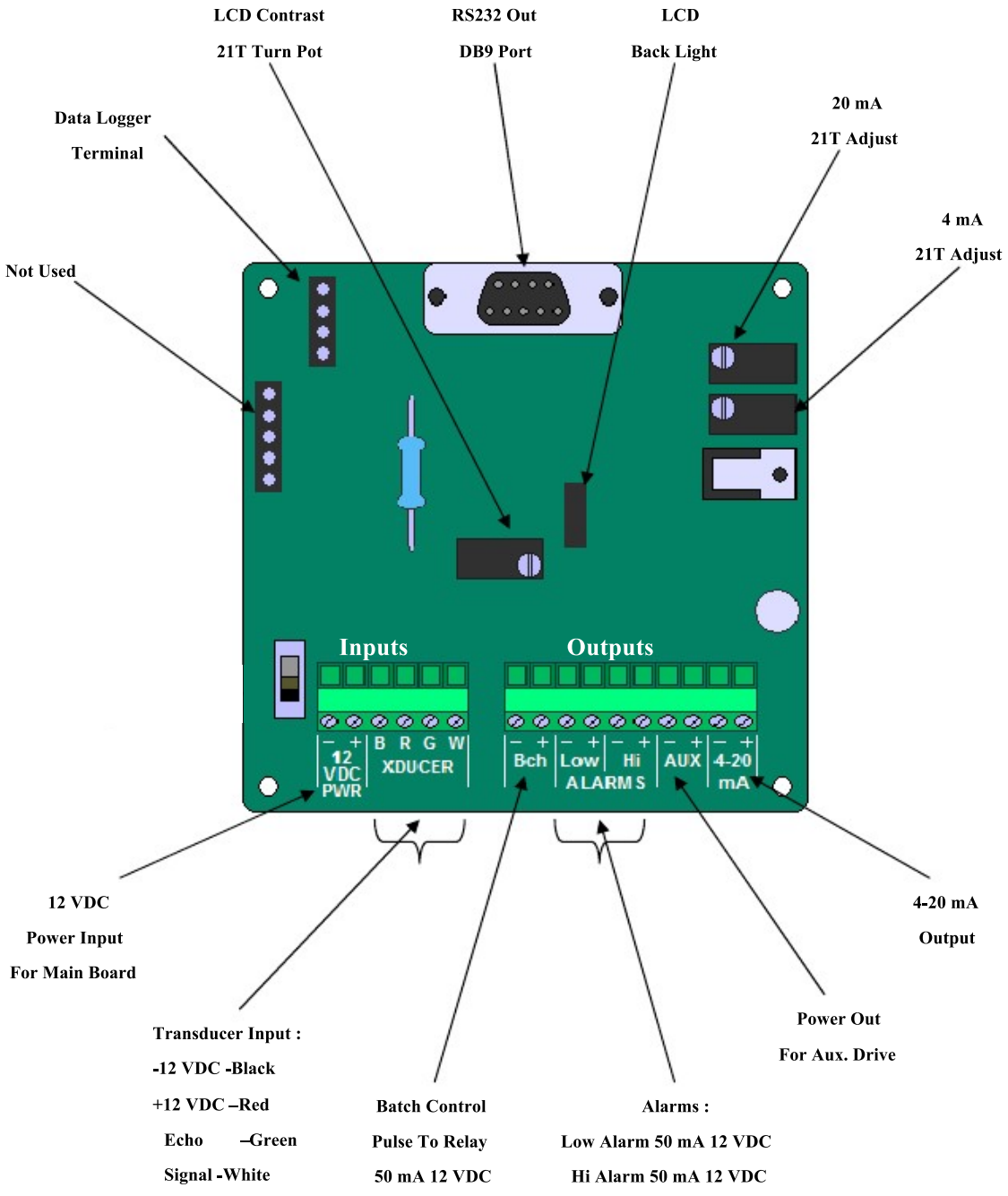
FIGURE 1: MAIN ELECTRONICS BOARD CONNECTIONS



MOUNTING AND CONNECTING POWER TO THE ELECTRONICS ENCLOSURE

The fixed Doppler flow meter model electronics enclosure is wall mounted for permanent installation. The portable meter model does not need to be mounted.

To Mount the Fixed Electronics Enclosure:

1) Locate the four mounting holes on the base of the electronics enclosure.
2) Using the reinforced holes in the enclosure base, securely mount the electronics enclosure to the wall.

To Connect Input Power to the Electronics Enclosure:
Note: You can either use AC power or DC/ battery power to operate your Doppler flow meter.

1) If you are using AC power: (wall module only)

• If not already connected, supply input power to the electronics enclosure by routing the power cable through the appropriate enclosure base opening.

• Use a NEMA 4X cable gland and a cable backing nut to securely fasten the input power cable to the electronics enclosure.

Plug AC Power Module into the appropriate outlet.

2) If you are using DC/ battery power:

• If not already connected, supply input power to the electronics enclosure by routing the power cable through the appropriate opening.

• If needed, connect the DC power cable wires to the 12 VDC PWR section of the processor board using Figure 1 as a guide.

• Use a NEMA 4X cable gland and a cable backing nut to securely fasten the input power cable to the electronics enclosure.

Attention:
If you are switching from AC (DC) power to battery power and your battery may need charging.

TO OPERATE YOUR DOPPLER FLOW METER FOR THE FIRST TIME

1) Complete all the steps in the Installation Procedures Section
2) Turn on power and observe the display panel LCD. The display will show the model name and number of the unit.
3) Following the prompts presented by the display panel LCD, and making your entries using the keypad, configure your unit for operation for English or Metric.

- The LCD screen displays SELECT RATE. Select the unit of measure for rate display: All rate selections may be displayed in seconds, minutes, hours, days, Time elements. (1=Sec 2=Min 3=Hr 4=Day)

KEY	SELECTION	DEFINITION
1	FPS	Feet Per Second
2	GAL	Gallon
3	CF	Cubic Feet
4	MG	Million Gallons
5	AF	Acre Feet
6	BL	Barrel 42 gal
7	MPS	Meters per second
8	LT	Liter
9	CM	Cubic Meter

If you select FPS, the flow meter will automatically begin measuring flow in feet per second. If you select keys 1 through 6, the LCD screen will ask that you enter your pipe ID in inches. If you select keys 7 through 9, the LCD screen will ask that you enter your pipe ID in millimeters. See the “Standard Pipe Data” section to estimate your pipe ID.

After you enter your rate time element, the LCD screen will then display SELECT TOTALIZER. Select the unit of measure for totalizer display:

KEY	SELECTION	DEFINITION
2	GAL	Gallon
3	CF	Cubic Feet
4	MG	Million Gallons
5	AF	Acre Feet
6	BL	Barrel 42 gal
8	LT	Liter
9	CM	Cubic Meter

After you enter your totalizer selection, the LCD screen will then display Enter Pipe ID. If you select keys 1 through 5, the LCD screen will ask that you enter your pipe ID in inches. If you select keys 6 through 7, the LCD screen will ask that you enter your pipe ID in millimeters. See the “Standard Pipe Data” section to estimate your pipe ID.

Your Doppler flow meter is now configured to measure the flow parameters you have set. After you set the flow reading parameters you need for your system, you can secure these settings so they are saved in the event of power loss to the electronics enclosure.

Note: To clear the rate and totalizer parameters you have set, select “0” reset or switch the power off using the on/ off switch on the display panel. Until settings are saved using Key # 8, “Secure On”, the security switch, turning off power clears all previously set parameters. When you turn on power again, the LCD screen
will prompt you to restart programming.

To Save Your Programmed Flow Reading Settings Using the Secure Function:

1) Complete setting the flow reading parameters

2) Press and hold key # 8 for 5 seconds until “Secure On” appears on the LCD display.

Note: If you need to change your programming, press and hold key # 8 .Secure. until “Secure Off” appears on the LCD display.

If you wish to further customize your flow meter system for operation in your process, continue on to “Advanced Configuration Options”.

IF YOU EXPERIENCE UNSTABLE READINGS
A steady display and solid illuminated Echo lamp indicates a good signal. An erratic display and/or a flashing Echo lamp indicates a poor signal. Reposition the transducer heads until readings are steady and the Echo lamp is illuminated solid or select another position to mount the sensors. Possible reasons for poor signals are:

- Partially full pipe
- Extreme aeration
- Insufficient suspended particles (minimum particle size and concentration are 40 microns at 35 ppm and greater than 0.2%
  density difference)
- Extreme turbulence
- Interference from electric motors or motor controllers

ADVANCED CONFIGURATION OPTIONS

The display panel keypad has a secondary menu for advanced configuration options (the keypad toggle menu). You may want to use this menu to set 4-20mA analog output, set up bar graph, select HI/LO alarm set points, and configure batch control. To access the secondary menu, press appropriate key until the display changes. To exit, press the key again.

- Figure 2 provides a visual reprentation of the toggle menu.

FIGURE 2: DISPLAY UNIT KEYPAD

Key	Selection	Functional Specifications
1	FPS	Feet per second/ clear pwr
2	Bar Graph	Analog 16 pt bar graph (n/a with batch)
3	K Factor	Select K factor while running
4	4-20 mA	Set up 4-20 mA analog output
5	Vel Sim	Velocity Simulator for systems test
6	Low Flow Cut Off	Set low flow cut off (maximum = 2.5 fps)
7	MPS	Meters per second/ clear pwr
8	Secure	Secure parameters On / Off
9	Update Time	Select 1sec, 10sec, Auto
0	Reset / Recall Pipe ID	Recall pipe ID/ configure batch/ system reset
	HI / LO ALARM	Set up HI/LO limit alarms/ reset cursor
	TOT RESET	Reset totalizer while running/ reset cursor

BEFORE SETTING ADVANCED PARAMETERS

The default setting for secondary keyboard functions is feet per second (fps), or meters per second (mps) if the flow meter is configured for metric units. Once the flow meter is operational and you wish to activate the analog bar graph, 4-20 mA output, batch control, high or low alarm, or low flow cut-off options, consult advanced parameter setting.

Sample parameter setting:

You have a velocity of 5 fps and you would like the 4-20 mA output to be 12 mA or 50% of scale. Push and hold the MA/4 key until the screen changes and then release the key. Enter a scale value of 10 fps via the keypad. The screen will automatically return the display to volumetric indication. The 4-20 mA output will read 12 mA at the terminal strip located on the right side of the main electronics circuit board. You may check your 4-20mA output setting via the bar graph.

Note: Never adjust any of the potentiometers on the main processor board. These settings are to be performed by authorized personnel only.

SETTING ADVANCED PARAMETERS

This section explains how to set advanced parameters using the keyboard on the front panel of the unit.

Bar Graph
To Set the Analog Bar Graph of Flow Rate: (n/a with batch)
1) Press the Bar Graph/2 key. Enter the desired full-scale flow rate in the indicated engineering unit.
2) To return to the rate and totalizer flow reading, press the Graph/2 key again.
3) To return to the graph, press the Graph/2 key again and select OK.

Batch Control
1) To configure batch control press “0” key and select Batch.
2) Select Enable and choose 1=Pulse, 2=Batch.
3) Select Batch volume in preselected engineering units.

K Factor (Correction Factor)
The default K Factor on the Doppler flow meter is set at 60 hZ/ fps for Doppler Sensors. For nearly all applications, this default K Factor setting should be adequate. There are only a few circumstances that might merit adjusting the default K Factor setting on your Doppler flow meter.

If the flow rate readings are not as expected, these are factors that may be contributing:
1) The meter is measuring flow with a high level of turbulence, which may be caused by too short of a straight run for proper transducer placement.
2) The liquid being measured has high viscosity, is too thick, or contains sound absorbing materials (for example, homogenous drilling mud or roofing tar).
If either of these conditions exist, and your flow readings appear inaccurate, then you may need to adjust the K Factor (correction factor) to get the desired flow rate.

Note: The K Factor is linear. Increase the K Factor to lower the flow rate or decrease the K Factor to increase the flow rate by the percentage that the flow is off.

Again, for most applications, the default K Factor setting ensures the most accurate reading by your Doppler flow meter. Consult the “Troubleshooting the Unit” section to troubleshoot inaccurate flow readings before making this adjustment.

To Set the K Factor:
1) Press the K FACTOR / 3 key.
2) Enter Hz/ FPS. If you want to keep the default setting, enter 060.
3) The LCD screen will return to the rate and totalizer flow reading.

Analog Output
To Set the Analog Output:
1. Press the MA/4 key Enter the full scale preselected engineering unit.
2. After the output level has been set, the LCD screen will return to the rate and totalizer flow reading.

Low Flow Cutoff
To Set the Low Flow Cutoff:
1. Press the FPS/1 or MPS/7 key to obtain the current reading in feet per second or meters per second. Press the key again to return to the flow reading parameters previously shown.

2. Press the LFC/6 key. Enter the cutoff in feet per second or meters per second. If you enter a parameter that is too high, the LCD screen will display the maximum allowable cutoff setting and then will return to the prompt for cutoff in feet per second.

3. After the low flow cutoff is set, the LCD screen will return to the rate and totalizer flow reading.

Meters per Second/Power Clear
To Read Meters Per Second:
1. Press the MPS/7 key. The LCD will show the flow reading in meters per second on the upper line of the LCD screen, replacing the rate parameter previously on the screen. The totalizer reading remains the same parameter.
2. To return to the previous flow rate reading, press the MPS/7 key again.

Update Time
To Set Update Time:
1) Press the UT/9 key. To enter the selection screen.
1 = 1 sec 2 = 10 sec 3 = auto;

"Auto" mode will update every second when the velocity change is >5%. When the flow stabilizes to < 5% change the update time resets to a 10 second running average.

2) Enter the update time in 1 second., 10 seconds , or Auto.

3) After the update time is set, the LCD screen will return to the rate and totalizer flow reading.

Hi/low Alarms
To Set the High/ Low Alarms:
1) Press the HI/LO ALARM key. Select Hi, Lo, or Both.
2) Next enter the high limit alarm in your preselected engineering unit.
3) Now enter the low limit alarm in your preselected engineering unit.
4) After the high and low alarm parameters are set, the LCD screen will return to the rate and totalizer flow reading.

Totalizer Reset
To Reset the Totalizer While the Unit is Running:
1) Press the TOT RESET key. The totalizer reading will return to zero.
2) The meter will begin taking totalizer readings from zero. The rate reading remains unchanged.

Ordering Information

FLO-CORP MODEL NUMBER BUILDER

For Assistance Call **877.356.5463**

Use the diagram below, working from left to right to construct your FLO-CORP Model Number.
Simply match the category number to the corresponding box number.

Example: UFDD-M-1-N4-P-N

UltraFlo™ Ultrasonic Doppler Flow Meter with 4-20mA, Hi/Lo Alarms, RS232 and Batch Control options in a NEMA 4X enclosure with a Portable Transportation Kit and no additional options.

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UFDD

Type (1)
M) Flow Meter
S) Flow Switch

Options (2)
1) 4-20mA, Hi/Lo Alarms, RS232, Batch Control
2) Rate & Total Only
3) Off/On 10 Amp Relay *(Flow Switch Only)*

Enclosure Rating
N4) NEMA 4X

Style
P) Portable Transportation Kit
F) Fixed Mounting Kit

Additional Options
N) None
D) Data Logger (1-32 GB Flash Drive USB)

Portable Transportation Kit

Fixed Mounting Kit

Ordering Notes:
(1) Select the best configuration based on your requirements
(2) Option (3) "Off/On 10 Amp Relay" can only be selected with the Flow Switch.