FaraMag™ *mag meter*

FM500 MODELS

IMPORTANT NOTE: For the most up-to-date version of this manual, please visit www.h2flow.net/product-literature

Operating Manual (EN)

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1. *description*

The induction FM500 is designed for measuring both clean and waste water in water management applications.

The product is characterized by high accuracy and stability of flow rate measurement in whole range of flow rates from 0.33 to 33 ft/s in both directions for liquids ≥ 10μs/cm.

Measured values are displayed on a large graphical display, which is a standard component of the instrument as well as a keyboard and three programmable isolated outputs for remote transmission of measure values. Two of these outputs can be used as pulse or status outputs and the third one as an active current output. The standard delivery also includes an internal data logger and RS232 communication port.

A GSM module for remote data reading via SMS text message can be ordered as an option.

Setting of flow meter parameters is performed using the keyboard and intuitive display menu or using service software via the RS232 communication port.

2. *flow ranges*

GPM	PIPE DIAMETER (inches)							
	1"	2"	3"	4"	6"	8"	10"	12"
Minimum	0.79	3.17	7.93	12.68	28.53	50.72	79.25	111
Maximum	79	317	793	1,268	2,853	5,072	7,925	11,095
	14"	16"	20"	24"	28"	32"	36"	40"
Minimum	152	198	317	444	610	793	1,007	1,244
Maximum	15,216	19,813	31,700	44,380	61,023	79,251	100,649	124,425

NOTE: Please consult the factory for accurate flow range data for models smaller than 1-inch in diameter and larger than 40-inches in diameter.

3. technical data

| TECHNICAL DATA	
NOMINAL DIAMETER	1/2" TO 40" (larger diameters available upon request. Please contact factory)
PRESSURE RATING	145 psi (PN10) and 232 psi (PN16) 363 psi (PN25) and 580 psi (PN40)
TUBING CONNECTION	ANSI Flanges (optional DIN 2633)
MEASURING TUBE INTERNAL COATING	Rubber, PTFE
SENSING ELECTRODES	316L AISI stainless steel, Hastelloy 2 x measuring / 1 x indication of empty tube / 1 x ground
FLOW RANGE	0.29 - 31,700 GPM
MEASUREMENT ERROR	±0.25% of the measured value from 1.64 - 32.8 ft/s ±1.0% of the measured value from 0.33 - 1.64 ft/s
STORAGE TEMPERATURE	32 - 113°F (0 - 45°C)
WORKING TEMPERATURE	14 - 194°F (-10 - 90°C) for Hard Rubber lining -22 - 302°F (-30 - 150°C) for PTFE lining
VOLTAGE	230VAC (standard); 12/24 VAC/VDC (optional)
INPUT POWER	10 VA max.
OUTPUTS	1 x programmable multi-functional (pulse, status), isoluated (relay, load 125 V - /1A or 30V/2A) 1 x programmalbe multi-functional (pulse, status), isolated (transistor NPN, load 30V/50mA max.) 1 x programmable active current (0-20mA / 4-20mA, load ≤500)Ω 1 x RS232
COMMUNICATION	RS232, keyboard, permanently backlit graphical display, SMS via internal GSM module
DATALOGGER	capable of recording up to 100 samples
PROTECTION	IP67: sensor / IP65: converter (compact version) IP67/68: sensor / IP65: converter (remote version)

NOTE: FaraMag utilizes a standard 230VAC 12/24/VAC/VDC power supply. An optional 12/24/VAC/VDC that needs to be plugged into a standard receptacle is also available. The power supply cord should be firmly inserted into the receptacle. Contact the factory for additional information about power supply options.
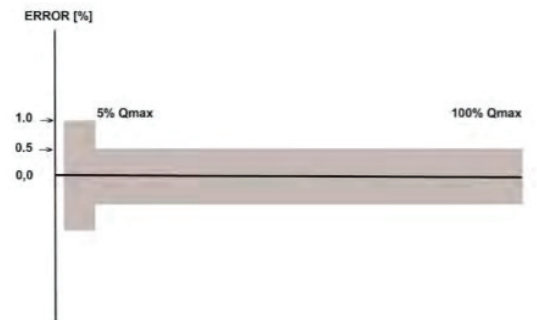
4. dimensions

In the table below, the dimensions of the remote sensor version are shown. For the compact version, repace the "A" dimension (for the connection box) with the height of the electronic unit.

ANSI version flanges meet the requirements of the ANSI B 16.5 standard. DIN version flanges comply with regulations of standard EN1092.
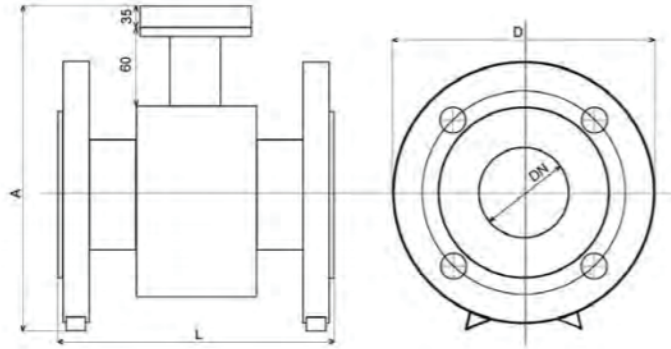
DIMENSIONS OF THE SENSOR (remote version, ANSI flanges)				
Diameter (Inches)	L	A	D	Weight lbs. (kg)
	Inches (mm)			
0.5	5.90 (150)	5.71 (145)	3.5 (88.9)	6.6 (3.0)
0.75	5.90 (150)	5.90 (150)	3.90 (98.6)	7.7 (3.5)
1	5.90 (150)	6.10 (155)	4.25 (108)	8.8 (4.0)
1.25	5.90 (150)	8.66 (220)	4.62 (117.3)	10.6 (4.8)
1.5	5.90 (150)	9.06 (230)	5.0 (127)	11.0 (5)
2	7.87 (200)	9.45 (240)	6.0 (152)	17.6 (8)
2.5	7.87 (200)	10.23 (260)	7.0 (178)	19.8 (9)
3	7.87 (200)	10.83 (275)	7.5 (191)	24.3 (11)
4	9.84 (250)	11.81 (300)	9.0 (229)	33.1 (15)
5	9.84 (200)	13.19 (335)	10 (254)	44.9 (19)
6	11.81 (300)	14.17 (360)	11 (279)	55.7 (23)
8	13.78 (350)	16.93 (430)	13.5 (343)	81.6 (37)
10	15.75 (400)	18.90 (480)	16 (406)	105.8 (48)
12	19.69 (500)	19.21 (488)	19 (483)	156.5 (71)
14	19.69 (500)	23.43 (595)	21 (533)	185.2 (84)
16	23.62 (600)	25.39 (645)	23.5 (597)	249.1 (113)
20	23.62 (600)	29.53 (750)	27.5 (699)	392.4 (178)
24	PLEASE CONSULT FACTORY FOR ACCURATE WEIGHTS & DIMENSIONS			
28				
32				
36				
40				

5. *installation note*

If the instrument has been disconnected from it's power supply for a period of more than 6 months, the internal clock battery may be empty. It is recommended to check the time and date when putting the instrument into operation after extensive downtime.

The battery will be automatically charged after the instrument has been connected to the power supply.

6. *location*

To ensure that the instrument functions correctly, the measuring section of the induction flow meter sensor - measuring tube - has to be completely flooded with the measured liquid and the measuring section cannot be influenced by any disturbing elements, such as valves, pumps, bends or sharp deviations in the tubing section.

Please observe the following instructions when installing the flow meter into the tubing:

1. If the system includes pumps, never place the flow meter sensor into the pump intake (A).

2. Place the flow meter sensor into the lowest point of the horizontal part of the tubing or into the ascendant tubing (B); never place the sensor into the tubing in the flow top-down direction (C).

3. Ensure that steady (straight) parts of tubing are a minimum of 5 x inches before the instrument and 3 x inches behind the instrument (D).

4. Tubing reductions with a slope up to 8º are considered straight (E).

5. Prevent the instrument from being exposed to vibrations or direct sunlight (F).

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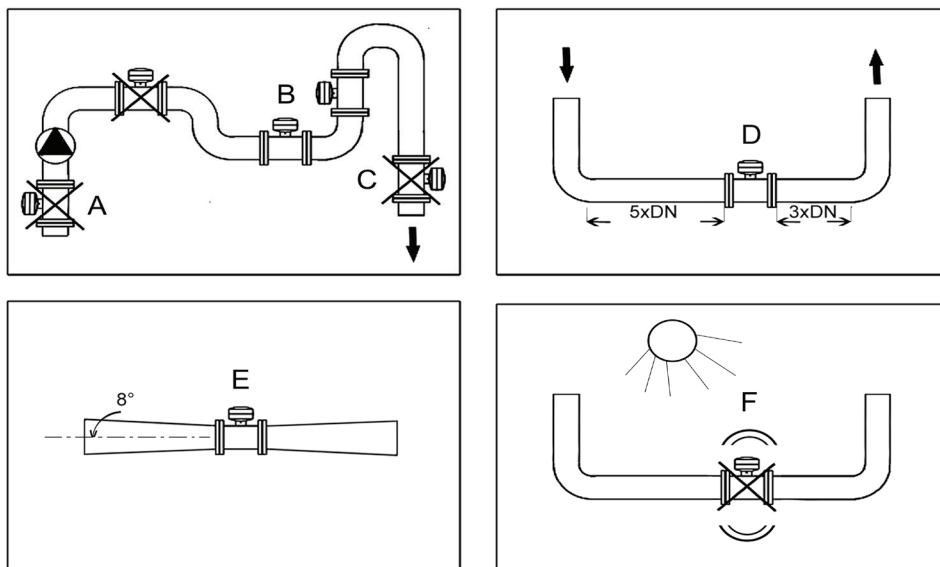
7. electrical connections

⚠ CAUTION ⚠

PLEASE BE AWARE THAN AN INDUCTION FLOW METER IS AN ELECTRONIC DEVICE; THE FOLLOWING STEPS SHOULD BE PERFORMED BY A QUALIFIED ELECTRICIAN!
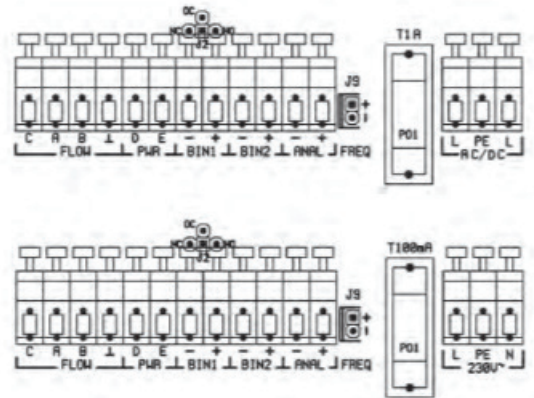
1. Ensure that the flow sensor frame is connected to ground (⏚); it is recommended that the ground terminal at the outside of the sensor is used for this purpose. This will prevent against undesirable interference, particularly for detached versions when shielding the link cable between the sensor and electronic unit while connected to the frame.

    Remove the upper cover of the instrument to gain access to terminals for the power cable and the signal cables.
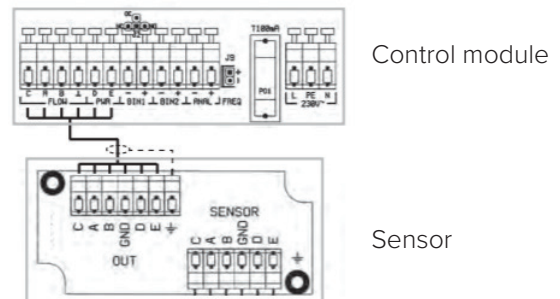
TERMINAL BLOCKS	
Terminal	Description
FLOW C	tube flooding indication electrode
FLOW A	measuring electrode
FLOW B	measuring electrode
FLOW ⏚	ground terminal of the sensor
PWR D	solenoid
PWR E	solenoid
BIN1	programmable multi-functional output
BIN2	programmable multi-functional output
ANAL	programmable analog output
FREQ	frequency output (for calibration only)
230 V L	phase conductor 230V / 60 Hz
230 V PE	protective conductor
230 V N	neutral conductor 230V / 60 Hz
AC/DC L	supply conductor +/-
AC/DC PE	protective conductor
AC/DC L	supply conductor +/-
PO1	protective fuse 100 mA design with 230 V/50 Hz supply protective fuse 1A design with AC/DC supply

COMPACT VERSION

REMOTE VERSION

Control module

Sensor

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2. Connect the flow sensor link cable to ABCDE ⏚ terminals. (Not applicable for compact version, where the sensor was connected in factory).

   Terminal blocks on the sensor and on the electronic unit are labeled identically, so terminals A - A, B -B, C - C, D - D, E - E, ⏚ - GND have to be interconnected. Connect the shielding of the link cable only on the side of the sensor to the ground terminal on the terminal block of the sensor. Standard length of the link cable between the sensor and the electronic unit is 6 meters. The link cable is included in delivery. The standard length of the interconnection cable between the sensor and the electronic unit is 20 feet. The interconnection cable is included as standard with the product.

   Maximum length of the link cable is 82 feet (optional). The link cable should be always connected before the power supply is connected to the transducer.

   If the power cable has already been connected to the transducer, connecting and disconnecting of the link cable when the transducer is under voltage is prohibited.

3. The induction flow meter is powered by mains voltage 230V / 60Hz connected to the power supply terminal block labelled as **L - PE - N**, or by low voltage 12 VDC or 24 VAC connected to terminals labeled **L - PE - L**.

   The polarity of supply conductors makes no difference in case of using the 12 V DC power supply.

   Connect the power cable to the terminals.

   The induction flow meter does not have its own ON-OFF switch, so it must be fused and switched ON-OFF in another device, such as a switchboard.

   The protection of electric circuits is ensured by protective fuse T100mA, or 1A for the 12 - 24 V version, located next to the power terminals.

   Switch power supply on only after the sensor link cable and external device signal cables are connected!

4. Connect external devices that utilize current output or pulse outputs to terminals **BIN1**, **BIN2**, and **ANAL**. All outputs are isolated.

8. *instrument start*

1. When the power supply is switched on, the instrument display shows step-by-step messages **POWER ON** and **TEST INT CL 1** to **TEST INT CL 30**.

2. After completing internal tests, the instrument enters to measuring mode. Basic data includes immediate flow rate and total volume in positive and negative flow directions.

   To display the next page, press the ▷ button. This page displays the difference between total volumes **DELTA V**, total operating hours from initial start of the instrument and the value of the maximum flow rate **100%FLOW**. The next page displays the highest and the lowest immediate flow rate reached at a particular measuring point.

3. Briefly press the **EXE** button to display the last line of the data logger. The line number is displayed in the upper-right corner and its maximum value is 100. Press the △ or ▽ button to scroll up or down a line in the display.

   The data logger line (one screen of display) shows time data (date, hour, minute) and total volumes in particular time.

   In addition to this data, the instrument will also display one of the following optional values:

Immediate flow rate	**Q**
Maximum flow rate reached during particular period	**MAX**
Minimum flow rate reached during particular period	**MIN**
Average flow rate reached during particular period	**AVR** (Average)

Briefly press the **EXE** button to return the instrument to basic mode. The instrument will automatically return to basic mode after approximately 60 seconds of inactivity.

9. *instrument configuration*

This manual describes configuration of only those parameters that are useful to be changed when the instrument is used in a typical way.

We do not recommend changing of parameters other than those mentioned in this manual.

Detailed description of software is included in technical documentation for service engineers.

Press the **EXE** button and hold it for approximately 3 seconds to switch the instrument from 'Measuring Mode' to 'Main Menu Mode'.

A.   Menu options, commands

Main menu options are displayed in sixteen lines.

You may select the English, Italian, Spanish, or German language for communication. English is pre-set as standard.

Use the following keys to select an option:

▽   scroll down by one line

△   scroll up by one line

◁   move to the left by one position; also returns to the beginning of the menu in the main menu

▷   move to the right by one position; also shifts to the end of the menu in the main menu

EXE   confirm selection

Cursor is blinking in the position of the option selected

| MAIN MENU OPTIONS			
RETURN	Return to previous	LANUGAGE	Language selection (English, Italian, Spanish, German)
ANALOG OUTPUT	Configuration of analog output	PULSE OUTPUTS	Configuration of multi-functional (pulse) outputs
COMPARATOR	Selection of logical functions for multi-functional (pulse) outputs	FREQUENCY OUT.	Configuration of frequency output
DAMPING	Instrument damping	COMMUNICATION	Configuration of communication ports (RS232, GSM modem)
DATALOGGER	Configuration of internal data logger	SIMULATION	Flow simulation
SENSOR	Downloading of sensor calibration parameters, setting of the flow range measured	MEASUREMENT	Permit to measure the flow in negative direction, setting of the zero flow zone, configuration of the empty tubing detection function
TIME	Configuration of internal real-time clock	PASSWORD	Password setting
DISPLAY	Selection of immediate flow rate units and displayed decimal places of counters	SERVICE	Counter reset, check of the AD transducer function, information on software version

B.   Multi-functional outputs

The flow meter is equipped with two multi-functional outputs. Relay or optotransistor contacts are connected to BIN1 terminals, while BIN2 terminals are used for optotransistor only. Use jumper NC-OC-NO above BIN1 terminals to set their function.

a) Output works as optotransistor

b) Relay contacts are normally open

c) Relay contacts are normally closed

Outputs can function as:

a) Pulse transmitter

- of total volume in positive direction imp V+
- of total volume in negative direction imp V-
- of total volume in both directions imp V

b) Status output
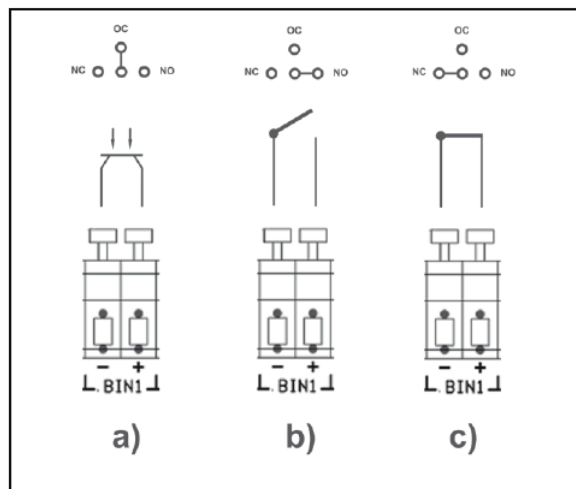
B-1.   Pulse setting

Volumes 0.1 l, 1 l, 10 l, 100 l, 1 m3, 10 m3, 100 m3 and widths 10 ms, 20 ms, 40 ms, 80 ms, 160 ms, 320 ms, can be assigned to transmitted pulses.

⚠ WARNING ⚠

THE FLOW METER TRANSMITS THE NUMBER OF PULSES CORRESPONDING TO THE LIQUID QUANTITY FLOWED DURING A MEASURING CYCLE OF 640 MS. PULSE CAN BE ASSIGNED ONLY SUCH VOLUME AND WIDTH SO THAT THE NUMBER OF TRANSMITTED PULSES DURING TIME UNIT IS REAL! INCORRECT SETTING IS INDICATED BY AN ERROR MESSAGE. DISPLAY SHOWS THE CODE E5.

1. Use the cursor keys to select the option **PULSE OUTPUTS** from the main menu and confirm your selection with the **EXE** key. A sub menu will be displayed.

2. Select **PULSE WIDTH** under options ms/imp1(2) and assign required volume to the pulse under option l/imp (2).

3. Select option **OUT1** (output to terminals 1 - 2) or **OUT2** (output to terminals 3 - 4) and confirm your selection with the **EXE** key.

4. Select **V+** from menu (output transmits pulses only for flow in positive direction), **V-** (output transmits pulses only for flow in negative direction) or **V** (output transmits pulses for both directions) and confirm by pressing the **EXE** key.

5. Select the **RETURN** option to complete the set-up.

The instrument will ask if you want to save the new parameters by displaying the text **SAVE SETUP?** To confirm, select **YES**. The flow meter will save the new parameters and switch to normal display mode. If **NO** is selected, parameters will not be saved.

The instrument will switch to display mode and begin working with the new parameters until it is switched off. When the instrument is switched on again, it will work with the original/default parameters.

B-2. Status report setting

1. Use cursor keys to select the option **PULSE OUTPUTS** from the main menu and confirm your selection by pressing the **EXE** button. A submenu will be displayed.

2. Select the option **OUT1** (output to terminals 1 - 2) or **OUT2** (output to terminals 3 - 4) and confirm your selection by pressing the **EXE** button.

3. Select the option **COMP1(2)** from menu (to assign status function to output) and confirm by pressing the **EXE** button. If status function **COMP1(2)** is assigned to outputs, further setting of this function will be performed under the option **COMPARATOR** in the main menu.

4. Select and confirm this option to display the submenu with direct setting of flow levels for changing of output status (submenu options Qa, Qb), mode indicating active status of the output **COMP1(2)** (e.g., Q<Qa) and hysthersis.

HYST. Complete this setting in the same manner described in Section B-1, paragraph 4.

C. Analog output

The flow meter is equipped with programmable active current output on terminals **ANAL**. The output can be configured for 4-20 mA or 0 - 20 mA.

1. Use cursor keys to select the option **ANALOG OUTPUT** from the main menu and confirm your selection by pressing the **EXE** button. A submenu will be displayed.

2. Select the option **Ia** and confirm your selection by pressing the **EXE** button.

3. In the submenu, select the mode of current output: **4 - 20 mA**, **0 - 20 mA**, or **OFF** (if the output is to be disabled) and confirm by pressing the **EXE** button.

4. Use the option **OUTPUT** to select whether the current output is is to be enabled only for positive flow direction (Q+), only for negative flow direction (Q-), or for both flow directions (Q) and confirm by pressing the **EXE** button.

5. In the submenu option **MAX**, use command **EDIT** and press the **EXE** button to enable editing of the flow rate value corresponding with the current value for 20 mA. Use the cursor keys to set flow rate value in l/s and confirm by pressing the **EXE** button.

6. Select the **RETURN** option to complete the setup.

The instrument will ask if you want to save new parameters by displaying the text **SAVE SETUP?**. Select **YES** to confirm. The flow meter will save the new parameters and switch to the normal display mode. If **NO** is selected, parameters will not be saved.

The instrument will switch to display mode and work with the new parameters until it is switched off. When the instrument is switched on again, it will use the original/default parameters.

D.   Display

Measuring units and decimal point position are set by default in the factory and correspond to the size of the flow meter.

If this default setting does not conform to your requirements, you can change it in the main menu using the **DISPLAY** option, and in the submenu using by selecting **UNIT** (units of immediate flow rate) and **DECIMAL POINT** (selection of places after the decimal point for flowed quantity).

E.   Damping

Adverse effect of sudden changes of flow rate or laminar flow disturbances in measuring section of the instrument (e.g., due to fittings, bends or pumps) sensed by the instrument and causing sudden changes of displayed values or oscillations of current output can be eliminated by setting of instrument damping.

1.   Use cursor keys to select the option **DAMPING** from the main menu and confirm your selection with the **EXE** button. A submenu will be displayed.
2.   Select option **TIME** and confirm your selection by pressing the **EXE** button.
3.   Select **TIME CONSTANT** from the submenu and confirm it by pressing the **EXE** button. Generally, the longer the time constant is, the more stable the value is on the display and on the outputs; however, this option is also slower to respond to flow changes, i.e., with time constant of 5 seconds, the instrument responds to an immediate drop of flow and displays zero flow rate only after 5 seconds.
4.   Select the option **MODE** and confirm by pressing the **EXE** button. Select **LINEAR** if damping is to be linear or **AVERAGE** if it should be calculated from several saples depending on selected time constant. Confirm your selection by pressing the **EXE** button.
5.   In option **ZONE**, select the command **EDIT** and press the **EXE** key to enable editing of bandwidth above and below stead flow mean value in which damping should occur. Use the cursor keys to set numeric value in l/s and confirm it by pressing the **EXE** button.
6.   Select the **RETURN** option to complete the setup.

The instrument will ask if you want to save new parameters by displaying the text **SAVE SETUP?**. Select **YES** to confirm. The flow meter will save the new parameters and switch to the normal display mode. If **NO** is selected, parameters will not be saved.

The instrument will switch to display mode and work with the new parameters until it is switched off. When the instrument is switched on again, it will use the original/default parameters.

F.   Dead band setting

Basic dead band of the instrument near the zero flow rate is 0.1 l/s. This dead band can be changed so that it would be possible to suppress undesirable flow rate values occurring due to liquid surges and vibrations in tubing at the zero flow rate.

⚠ WARNING ⚠

EXTENSION OF THE DEAD BAND INCREASES MEASUREMENT ERROR AT LOW FLOW RATES. HENCE, PARASITIC MOVEMENTS OF LIQUID SHOULD BE ELIMINATED FIRST.

1. Use the cursor keys to select the option **MEASUREMENT** from the main menu and confirm your selection with the **EXE** button.
2. Under the **ZERO** option, select the command **EDIT** and press the **EXE** button to edit the band size in l/s, in which no flow rate is to be registered. Use the cursor keys to set the numeric value in v l/s and confirm with the **EXE** button.
3. Select the option **RETURN** to complete the set up.

The instrument will ask if you want to save the new parameters by displaying the text **SAVE SETUP?**. Select **YES** to confirm and the flow meter will save the new parameters and switch to normal display mode. If **NO** is selected, parameters will not be saved.

The instrument will switch to display mode and work with the new parameters until it is switched off. When the instrument is switched on again, it will use the original/default parameters.

G.   Datalogger

The internal datalogger enables recording of measured values in chosen intervals (either periodically or one at a time) and their storing in the instrument's memory.

Stored values can be subsequently read on the display or on a PC via the RS232 communication link.

The datalogger records the following parameters by default: total volume in positive direction V+, total volume in negative direction V-, instrument status at the moment of reading Exx, and real time at the moment of reading t.

Alternatively, you can choose to record one of the following additional values: immediate flow rate Q, maximum flow rate during chosen interval MAX, minimum flow rate during chosen interval MIN or average flow rate during chosen interval AVR.

All samples containing the above mentioned data are stored in memory as a single record.

Capacity of the sample memory is 100 records. Samples are recorded step-by-step and they are assigned addresses from 1 to 100. After 100 samples have been recorded, the oldest sample with address '1' is deleted, memory is readdressed and the new sample is inserted to address '100'. The memory content is not corrupted if power failure occurs.

Sample recording can be set with fixed intervals from 15 to 107 minutes (e.g., every 15 minutes after datalogger start) regardless of real time or using a time mask (e.g., datalogger starts each Friday at 15:00 and measurement interval takes 2 hours).

G1. Datalogger setting without time mask

1. Use the cursor keys to select the option **DATALOGGER** from the main menu and confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

2. Select the option **MASK** and confirm your selection by pressing the **EXE** button.

3. A time mask is displayed. The time mask is disabled if it is in format xx - xx - xx   xx : xx (day - month - year   hrs. : mins.). If any position shows a character other than 'x', select the **EDIT** command and use the cursor keys to correct it to x. Use the command **RETURN** to return to the sub-menu.

4. Select the **VAR** option and confirm your selection by pressing the **EXE** button. In the menu, select one of the optional values to be recorded (immediate flow rate Q, maximum flow rate during chosen interval MAX, minimum flow rate during chosen interval MIN, or average flow rate during chosen interval AVERAGE). The selected option will be marked with an asterisk (*). Use the **RETURN** command to return to the sub-menu.

5. Select the option **PER** and confirm your selection by pressing the **EXE** button. Use the **EDIT** command to enable interval editing in minutes. Enter the interval length and use the **RETURN** command to return to the sub-menu.

6. Select **START**. The **RUN** option should be marked with an asterisk *; this means that the datalogger is operating.

7. Select the **RETURN** option to complete the set up.

The instrument will ask if you want to save the new parameters by displaying the text **SAVE SETUP?**. Select **YES** to confirm and the flow meter will save the new parameters and switch to normal display mode. If **NO** is selected, parameters will not be saved.

The instrument will switch to display mode and work with the new parameters until it is switched off. When the instrument is switched on again, it will use the original/default parameters.

G2. Datalogger setting with time mask (using real time)

1. Use the cursor keys to select the option **DATALOGGER** from the main menu and confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

2. Select the option **MASK** and confirm your selection by pressing the **EXE** button.

3. A time mask is displayed. The time mask is disabled if it is in format xx - xx - xx   xx : xx (day - month - year   hrs. : mins.). Select the **EDIT** command and use the cursor keys to set the required time mask format. Use the command **RETURN** to return to the sub-menu.

4. Select the **VAR** option and confirm your selection by pressing the **EXE** button. In the menu, select one of the optional values to be recorded (immediate flow rate Q, maximum flow rate during chosen interval MAX, minimum flow rate during chosen interval MIN, or average flow rate during chosen interval AVERAGE). The selected option will be marked with an asterisk (*). Use the **RETURN** command to return to the sub-menu.

5. Select the option **PER** and confirm your selection by pressing the **EXE** button. Use the **EDIT** command to enable interval editing in minutes. Enter the interval length and use the **RETURN** command to return to the sub-menu.

6. Select **START**. The **RUN** option should be marked with an asterisk *; this means that the datalogger is operating.

7. Select the **RETURN** option to complete the set up.

The instrument will ask if you want to save the new parameters by displaying the text **SAVE SETUP?**. Select **YES** to confirm and the flow meter will save the new parameters and switch to normal display mode. If the datalogger is set in this way, it will start recording in accordance with the time mask and records measured values during interval PER; time intervals between individual records correspond to time mask setting.

G-3. Examples of time mask setting

- xx - xx - xx   xx : 00   recording starts every rounded hour
- 15 - xx - xx   11 : 30   recording starts every 15th day in month at 11:30
- 15 - 11 - xx   11 : 30   recording starts every 15th November at 11:30
- 15 - 11 - 19   11 : 30   recording starts only on 15 . 11 . 2019 at 11:30
- x1 - xx - xx   11 : 30   recording starts each Monday at 11:30
- x2 - xx - xx   11 : 30   recording starts each Tuesday at 11:30
- x3 - xx - xx   11 : 30   recording starts each Wednesday at 11:30
- x4 - xx - xx   11 : 30   recording starts each Thursday at 11:30
- x5 - xx - xx   11 : 30   recording starts each Friday at 11:30
- x6 - xx - xx   11 : 30   recording starts each Saturday at 11:30
- x0 - xx - xx   11 : 30   recording starts each Sunday at 11:30

G4. Datalogger sub-menu

SUB-MENU OPTIONS			
RETURN	Return to previous menu	RUN*	Datalogger operating
STOP	Datalogger stop	START	Datalogger start with deleting previous samples
PER	Time interval setting	MASK	Time mask configuration
VAR	Selecting of optional values		

H.   Function of the third electrode

The instrument is equipped with a sensing electrode as standard, which is located in the upper part of the measuring tube section, and is used to indicate flooding of the measuring tube section by liquid.

This third electrode can work in three modes.

a)   If the measuring tube section is empty or not entirely flooded, i.e., the electrode is not in contact with liquid, measurement is locked and instrument displays zero flow rate. At the same time, character Z is displayed in the lower-left corner of the display indicating that the lock function has been enabled.

1.   Select the **MEASUREMENT** option from the main menu and confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

2.   Select the **LOCK** command under the option **EMPTY PIPE** in order to activate the above described function.

NOTE: The above described function is set by default in the factory and does not need to be set in most cases.

b)   If the measuring tube section is empty or not entirely flooded, i.e., the electrode is not in contact with the liquid, measurement is not locked and this situation is only indicated. The instrument displays flow rate and, at the same time, character Z is displayed in the lower-left corner of the display to indicate that this function has been enabled.

1.   Select the **MEASUREMENT** option from the main menu and confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

2.   Select the **ALARM** command under the option **EMPTY PIPE** to activate the above described function.

c)   Function of the third electrode can be completely disabled.

1.   Select the **MEASUREMENT** option from the main menu and confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

2.   Select command **OFF** under the option **EMPTY PIPE** to activate the above described function.

I.   Password setting

A password can be set to prevent unauthorized persons from gaining access to the configuration menu.

1.   Use the cursor keys to select the **PASSWORD** option from the main menu. Confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

2.   Select the **NEW** command and press the **EXE** key to enable password editing. The password may consist of up to eight characters. Use the cursor keys to set your password and confirm by pressing the **EXE** button.

3.   Select the **RETURN** option to complete the set up.

The instrument will ask if you want to save the new parameters by displaying the text **SAVE SETUP?**. Select **YES** to confirm and the flow meter will save the new parameters and switch to normal display mode. If **NO** is selected, parameters will not be saved.

The instrument will switch to display mode and work with the new parameters until it is switched off. When the instrument is switched on again, it will use the original/default parameters.

J.   GSM module activation

The instrument can be equipped with an optional GSM module, allowing remote data reading using SMS messages in cellular phone networks.

Prior to activation of this function, switch the instrument off and insert a SIM card into it. Use a cellular phone to cancel the function of PIN request for this SIM card. Then install an external antenna (included with your flow meter).

1. After the power supply is turned on, the instrument will display the message **POWER ON** and then **GSM INIT...** indicating that the instrument recognizes the internal GSM module. The starting procedure will not be performed with standard messages from **INTERNAL TEST INT CL 1** to **INTERNAL TEST INT CL 30**.

2. Use the cursor keys to select the option **COMMUNICATION** from the main menu and confirm your selection by pressing the **EXE** button. A sub-menu will be displayed.

3. Select the **GSM** command and press the **EXE** key to display the next sub-menu. Select the **INIT** option and confirm your selection by pressing the **EXE** button. The message **GSM INIT...OK** will be shown on the instrument display.

4. Select the **RETURN** option to complete the set up.

The instrument is ready for sending SMS messages. Send SMS messages in format F3(space)DATA from your cellular phone to the number of the SIM card installed in the flow meter to enable reading of data. The instrument will respond by sending SMS messages to the number of the cellular phone it received the enabling SMS from.

The first indication in a received SMS message gives the total volume in positive flow direction, the second indication gives total volume in negative flow direction, the next value is the information on the immediate flow rate at the moment of reading, followed by the information on total operating time and any possible errors.

10. *troubleshooting*

PROBLEM	SOLUTION
Sample	• Solution 1 • Solution 2
Sample	• Solution
Sample	• Solution 1 • 2 • 3 • 4 • 5 • 6

PROBLEM	SOLUTION
Sample	• Solution 1 • Solution 2
Sample	• Solution
Sample	• Solution 1 • 2 • 3 • 4 • 5 • 6

11. *notes*

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12. *warranty*

IMPORTANT, PLEASE READ AND KEEP THIS DOCUMENT ON RECORD.

Definition
H2flow Controls, Inc., warrants the FaraMag product for 3-years from its date of supply from H2flow Controls, Inc. or its stocking Distributor. In the event that the product experiences a premature failure due to defective workmanship or materials, H2flow will, at its discretion, replace either the failed component(s) or the complete FaraMag unit. H2flow shall not be responsible for third-party labor or any consequential losses. Damage caused by improper installation, misuse or exposure to hazardous or corrosive chemicals, will not be covered by this warranty.

Eligibility
This warranty extends to the original purchaser only or to the end-user client of an H2flow Controls Inc. authorized affiliate.

How to obtain service
To obtain service under the terms of this warranty, the customer is required to notify H2flow Controls Inc. before the expiration of the warranty period and to return the item in accordance with H2flow Controls Inc's product return policy. Any product returned for warranty repair must be accompanied by a full fault report specifying the symptoms and the conditions under which the fault occurs. Should H2flow Controls Inc. incur additional cost as a result of a failure to complete the appropriate paperwork, an administrative charge may be levied.

Exclusions
This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate care. H2flow Controls Inc. shall not be obligated to provide service under this warranty if:
a) damage has been caused by a failure to make a full and proper inspection of the product (as described by the documentation enclosed with the product at the time of shipment) on initial receipt of the product following shipment;
b) damage has been caused by the attempts of individuals, other than H2flow Controls Inc. staff to repair or service the product;
c) damage has been caused by the improper use of the product, including but not limited to, breakage or damage to the instrument sensors or cracking of the instrument display, exposing the display to sunlight or corrosive chemicals, the splicing or cutting of cables or wires unless explicitly instructed to do so during the installation process. General misuse of the product.

Charges
Under cover of this warranty, H2flow Controls Inc. will pay the carriage and insurance charges for the shipment of defective product back to H2flow Controls Inc. and for its return to the client's original site of dispatch except when:
a) H2flow Controls Inc's product return policy has not been followed.
b) product failure is caused by any of the exclusions described at paragraph 4 above, when the customer will be liable for the full cost of the repair (parts and labor) plus all carriage and insurance costs to and from H2flow Controls Inc's premises.
c) the product is damaged in transit and a contributory cause is inadequate packaging. It is the customer's responsibility to ensure that the packaging used to return equipment to H2flow Controls Inc. is the same, or has equivalent protective qualities, to that used to ship the product to the customer in the first instance. Any damage resulting from the use of inadequate packaging will nullify H2flow Controls Inc's obligations under this warranty.
Should the customer's product be damaged in transit following a repair at H2flow Controls Inc's site, a
full photographic record of the damage must be obtained (packaging and the product) to support any claim for recompense. Failure to present this evidence may limit H2flow Controls Inc's obligations under this warranty.

THIS WARRANTY IS GIVEN BY H2FLOW CONTROLS INC. IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE. H2FLOW CONTROLS INC SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES. WE SPECIFICALLY DISCLAIM ANY AND ALL WARRANTIES TO CUSTOMERS OF THE CUSTOMER. THE CUSTOMER'S SOLE REMEDY FOR ANY BREACH OF WARRANTY IS THE REPAIR OR REPLACEMENT, AT H2FLOW CONTROLS INC'S DISCRETION, OF THE FAILED PRODUCT.