

USER'S GUIDE Installation & Operation Instructions

BETA METER ELECTROMAGNETIC FLOWMETER



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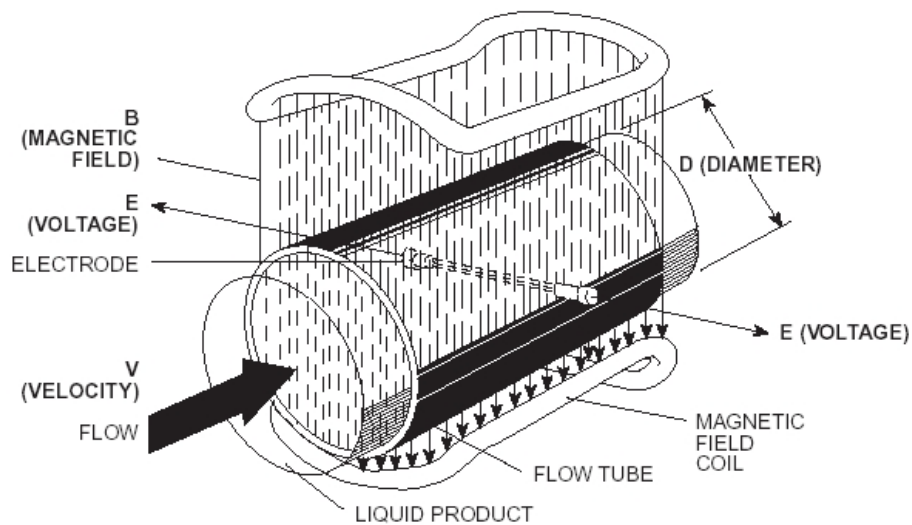
Introduction

The Safmag β -meter provides cost effective measurement of flowrate in applications where mechanical flowmeters are traditionally utilized. The design concept has focused on simplicity, whilst retaining all benefits associated with the use of an electromagnetic flowmeter.

The β -meter comprises a flowtube sensor and a display unit which is mounted remote from the sensor. The display unit utilises a high speed 16 bit microprocessor with 32 Kbyte flash memory. The flow total and flow rate are displayed on a LCD display.

Theory of Operation

The operation of an electromagnetic flowmeter is explained by reference to Faraday's law of electromagnetic induction. This law states that the voltage induced across an electrical conductor, as it moves at right angles through an electromagnetic field, is directly proportional to the velocity of that conductor through the field. Mathematically this statement is represented as shown below:



$$E = \text{constant} \times B \times L \times V$$

Where: E = the induced voltage

B = the electromagnetic field strength

L = the length of the conductor in the field

V = the velocity of the conductor (average velocity of the medium)

The volumetric flow of a conducting liquid or slurry is derived as follows:

Let L = D (the diameter of the meter)

Then E = constant \times B \times D \times V

Volumetric flow $Q = V \times A$ (where A is the Cross-sectional area of the pipe)

Combining the above equations it is seen that if field strength is held constant then $E = K \times Q$ (where K is a constant), thus the induced voltage is directly proportional to the volumetric flowrate.

Installation guides

Remote Electronics

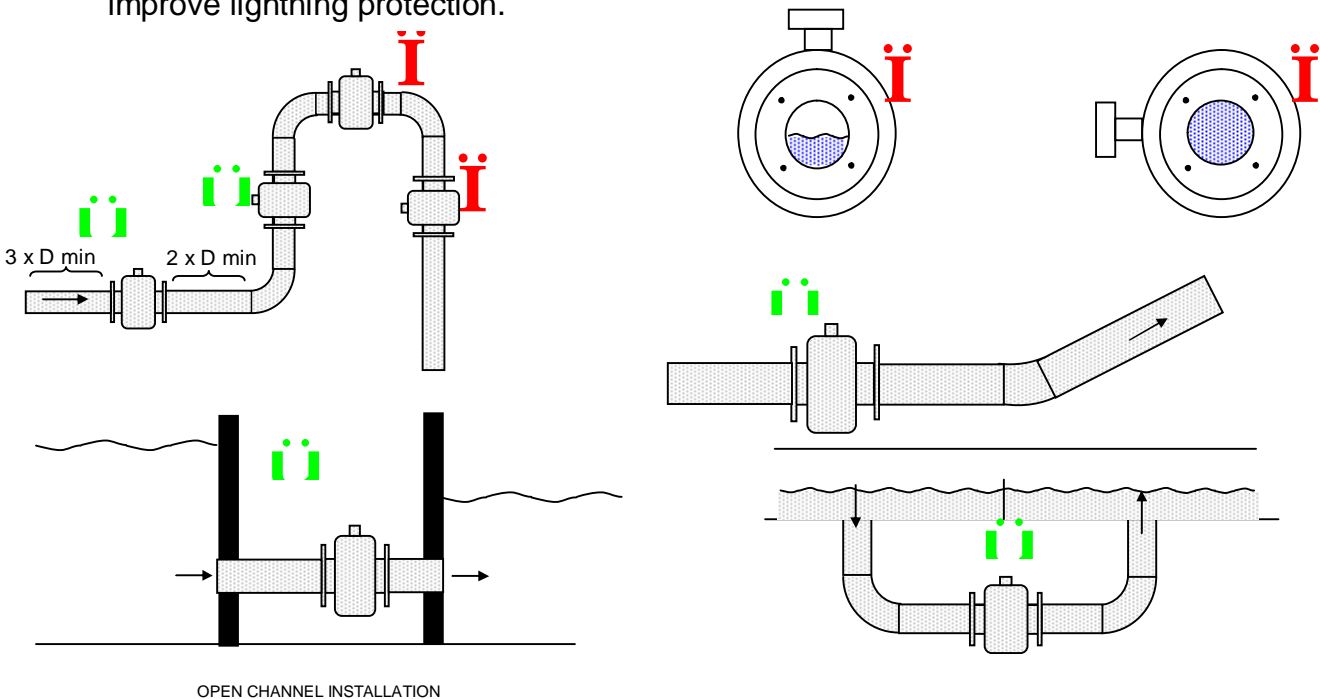
The remote electronics display may be mounted up to 100 metres from the meter body using SAFMAG cable. It should be mounted on the wall or a pipe stand. The display housings have dedicated points for mounting. **DO NOT** drill into the enclosure, this will void IP rating and warranty. Avoid direct sunlight on the LCD display as this can make it difficult to read and cause fading over time. If mounted in an area where there is exposure to direct sunlight it is advisable to mount the display facing south and provide shade. Avoid mounting the display in any area where there is a possibility of flooding.

Avoid mounting near VSD (variable speed drives) and motors.

The β -meter r is not rated for use in hazardous areas.

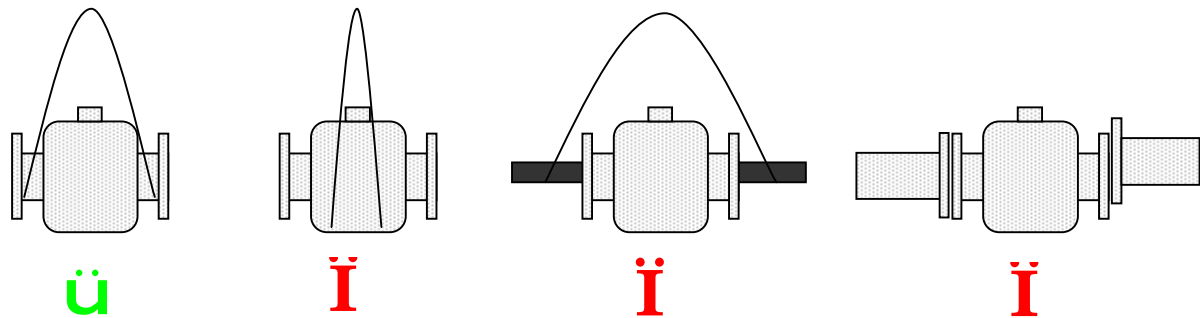
Flowtube (Sensor)

While installing the meter it is recommended to follow the arrow marking [\Rightarrow] on the flowmeter tube, which indicates the direction of flow. If the meter is installed in the opposite direction to that indicated by the arrow, the meter will read zero or reverse flow under all flow conditions. This situation can be remedied by reversing the wires marked **COIL** on the electronic board. The flowtube may be installed in horizontal or vertical pipelines. If installed horizontally, the measuring electrodes should be in the horizontal plane avoiding the possibility of bubbles in line. The flowtube should be **full of liquid at all times**. Install the flowtube with at least 3 pipe diameters of straight pipe upstream, and 2 pipe diameters downstream. Ensure that the gaskets do not protrude into the pipe. This could affect accuracy of the flowmeter. Flowtubes installed in non-conductive pipework (e.g. PVC HDPE) or lined pipework should have **earthing rings** installed and electrically bonded to the flowtube ground. Bonding the flowtube to earth spike will improve lightning protection.



Meter Body

The flowmeter should be lifted by a rope sling being passed around the outside of the meter or, in the case of the large meters the lifting lugs should be used. Never pass a cable or beam through the flowtube for lifting purposes, as this will damage the flowtube liner and render the meter unusable. Do not support the meter by its case.



Check for alignment and spacing of pipe work, as the meter should not be used to pull pipe work into alignment. Table overleaf gives face to face and overall dimensions for the various sizes and types of meter.

Place flange gaskets on the flange faces of the meter and position the meter between the flange faces of the piping. Gaskets should be cut 3 mm larger than the inside diameter of the pipe.

Insert bolts through the flanges and run washers and nuts onto the bolts. Check the piping for alignment and the gaskets for concentricity. Tighten the nuts evenly – do not over tighten as this may damage the liner. Bolt torque should be limited to that which will produce a positive seal.

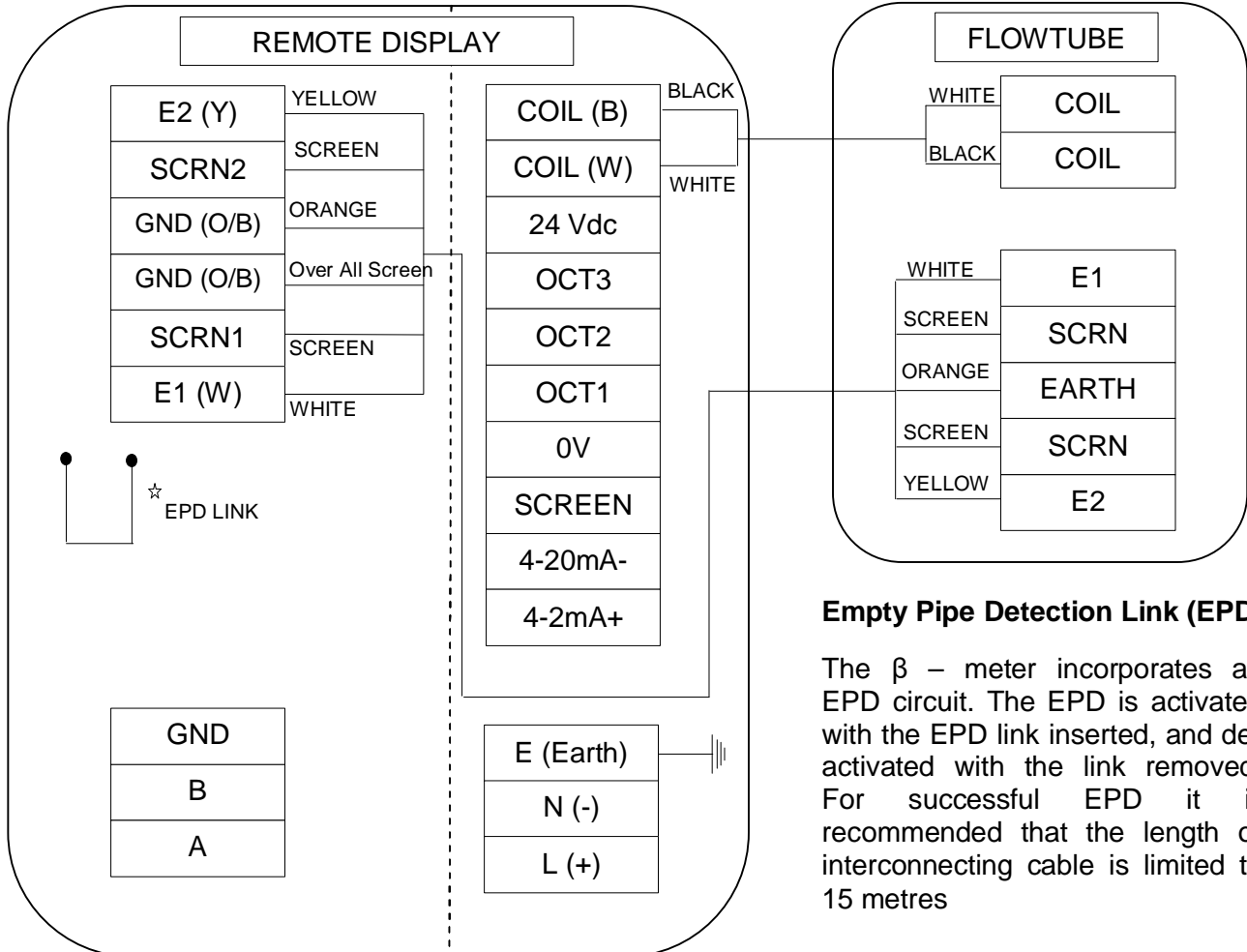
Application Guidelines

1. The velocity at maximum flow should be greater than 1 m/s. (select the meter size accordingly)
2. The minimum flow velocity the flowmeter will measure is 0,1m/s.
3. The maximum velocity the flowmeter will measure is 10 m/s
4. The conductivity of the liquid should be greater than 20 µs/cm.

FLOW RATE GUIDE

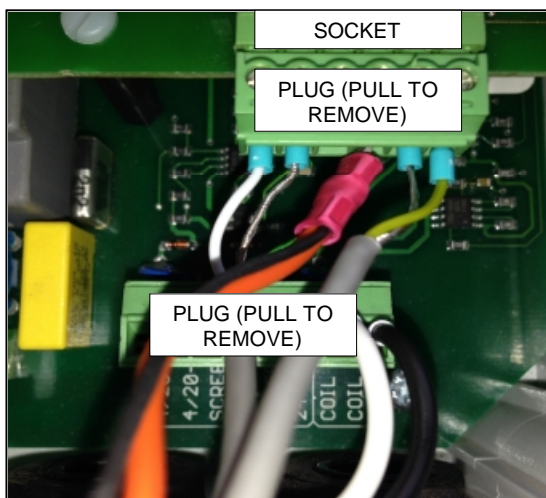
| PIPE SIZE (mm) | PIPE SIZE (INCH) | FLOWRATE @ 1m/s (3ft/s) | | | | FLOWRATE @ 10m/s (30ft/s) | | | |
|-------------------|---------------------|--------------------------|--------|-------|-----------|---------------------------|-------|--------|-----------|
| | | (l/s) | m3/hr | ft3/s | gal(US)/s | (l/s) | m3/hr | ft3/s | gal(US)/s |
| 10 | 0.4 | 0.08 | 0.28 | 0.003 | 0.02 | 0.78 | 2.82 | 0.03 | 0.21 |
| 15 | 0.6 | 0.18 | 0.64 | 0.006 | 0.05 | 1.76 | 6.36 | 0.06 | 0.46 |
| 25 | 1 | 0.5 | 1.8 | 0.02 | 0.13 | 5 | 18 | 0.18 | 1.32 |
| 40 | 1.6 | 1.25 | 4.5 | 0.04 | 0.33 | 12.5 | 45 | 0.44 | 3.30 |
| 50 | 2 | 2 | 7.2 | 0.07 | 0.53 | 20 | 72 | 0.71 | 5.28 |
| 65 | 2.6 | 3.3 | 11.9 | 0.12 | 0.87 | 33 | 118.8 | 1.17 | 8.72 |
| 80 | 3.2 | 5 | 18.0 | 0.18 | 1.32 | 50 | 180 | 1.77 | 13.2 |
| 100 | 4 | 8 | 28.8 | 0.28 | 2.11 | 80 | 288 | 2.83 | 21.1 |
| 125 | 5 | 12 | 43.2 | 0.42 | 3.17 | 120 | 432 | 4.24 | 31.7 |
| 150 | 6 | 18 | 64.8 | 0.64 | 4.75 | 180 | 648 | 6.36 | 47.5 |
| 200 | 8 | 31 | 111.6 | 1.09 | 8.19 | 310 | 1116 | 10.95 | 81.9 |
| 250 | 10 | 49 | 176.4 | 1.73 | 12.9 | 490 | 1764 | 17.30 | 129.4 |
| 300 | 12 | 70 | 252.0 | 2.47 | 18.5 | 700 | 2520 | 24.72 | 184.9 |
| 350 | 14 | 96 | 345.6 | 3.39 | 25.4 | 960 | 3456 | 33.90 | 253.5 |
| 400 | 16 | 125 | 450.0 | 4.41 | 33.0 | 1250 | 4500 | 44.14 | 330.1 |
| 450 | 18 | 159 | 572.4 | 5.62 | 42.0 | 1590 | 5724 | 56.15 | 419.9 |
| 500 | 20 | 196 | 705.6 | 6.92 | 51.8 | 1960 | 7056 | 69.22 | 517.6 |
| 600 | 24 | 283 | 1018.8 | 9.99 | 74.7 | 2830 | 10188 | 99.94 | 747.4 |
| 700 | 28 | 385 | 1386.0 | 13.60 | 101.7 | 3850 | 13860 | 135.96 | 1016.8 |
| 750 | 30 | 442 | 1591.2 | 15.61 | 116.7 | 4420 | 15912 | 156.09 | 1167.3 |
| 800 | 32 | 500 | 1800.0 | 17.66 | 132.1 | 5000 | 18000 | 176.57 | 1320.5 |

Wiring Diagram

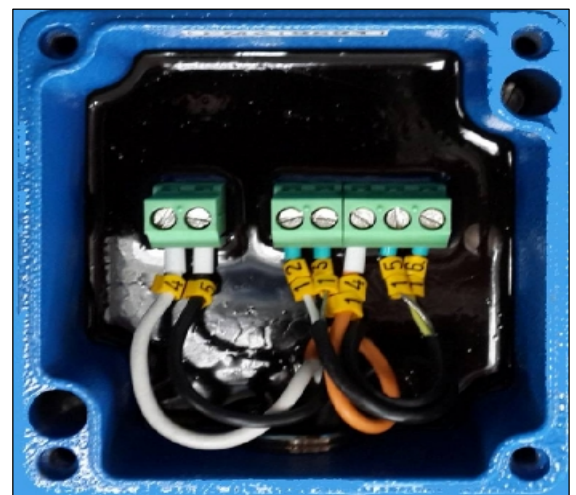


Empty Pipe Detection Link (EPD)

The β – meter incorporates an EPD circuit. The EPD is activated with the EPD link inserted, and deactivated with the link removed. For successful EPD it is recommended that the length of interconnecting cable is limited to 15 metres



Remote Display



Flowtube

General

The β -meter display/signal converter allows a fast response time for the sensors $\leq 150\text{NB}$. This is achieved by automatically selecting higher coil frequencies permitting faster update times for flow calculations.

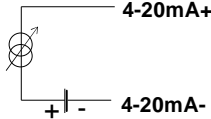
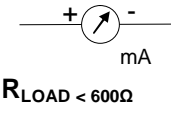
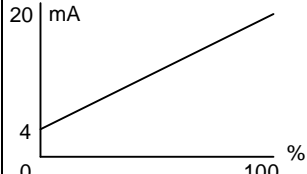
These features allow batching of small volumes and ensure an acceptable accuracy.

| Size | 50Hz Power Supply | | 60Hz Power Supply | |
|-----------|-------------------|-------------|-------------------|-------------|
| | Coil Frequency | Update Time | Coil Frequency | Update Time |
| 10-50mm | 12.5Hz | 80ms | 15.0Hz | 66.66ms |
| 51-150mm | 6.25Hz | 160ms | 7.5Hz | 133.33ms |
| 151-800mm | 3.125Hz | 320ms | 3.75Hz | 266.66ms |

Output Functions

4-20mA

- The 4 – 20mA output signal is proportional to the flow rate. 4mA = 0 flow rate. The full-scale value (i.e. 20mA) is the flow rate figure programmed into menu item M1_2.

| OUTPUT | BETA TERMINALS | EXT. CIRCUIT | SIGNAL |
|---------------------------------------|---|--|---|
| Flow rate Current Loop (Active) |  |  |  |

Open Collector Transistor

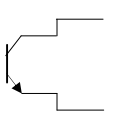
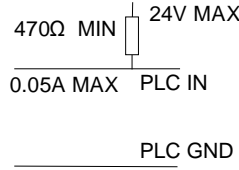
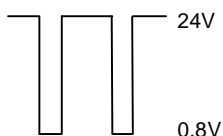
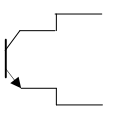
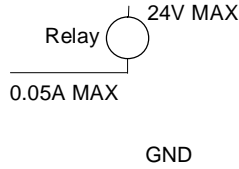
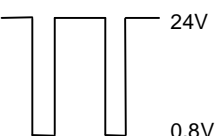
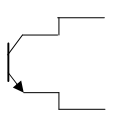

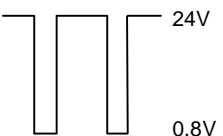
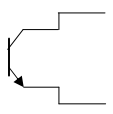
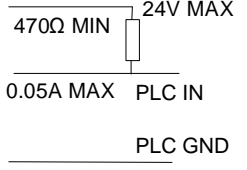
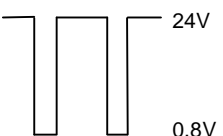
- The open collector transistor outputs OCT1, OCT2, and OCT3 are individually programmable for any of the following functions.
- Forward flow totaliser pulse output, Batch control function, No coil current alarm, Empty pipe alarm, Pulse output alarm (i.e. frequency > 1250Hz), Reverse flow alarm, Low flow rate alarm, High flow rate alarm

The output signal can be wired as

- open collector output between PULSE and 0V terminal
- 24V binary signal available between the 24Vdc terminal and the PULSE terminal.

Pulse Output

- Menu option **M2_5 volume/pulse** is used to determine the pulse frequency
- The pulse width is determined by the **M2_6 puls-width** programmed unless –
 - pulse frequency exceeds the coil frequency or
 - frequency cannot accommodate the programmed pulse width then output will change to pulses with equal mark space ratio.
- It is important to remember that the flow sensor size determines the coil's frequency.

| OCT 1/2/3 | | | |
|---|--|--|---|
| OUTPUT | BETA TERMINALS | EXT. CIRCUIT | SIGNAL |
| External supply and pull up resistor |  <p>OCT1/2/3 0V</p> |  <p>470Ω MIN 24V MAX 0.05A MAX PLC IN PLC GND</p> |  <p>PULSE – ISO GND 24V 0.8V</p> |
| External supply and relay/counter |  <p>OCT1/2/3 0V</p> |  <p>Relay 24V MAX 0.05A MAX GND</p> |  <p>PULSE – ISO GND 24V 0.8V</p> |
| Internal supply and relay/counter |  <p>24Vdc OCT1/2/3 0V</p> |  <p>Relay/ Mechanical Totaliser Etc. 0.05A MAX</p> |  <p>PULSE – ISO GND 24V 0.8V</p> |
| Internal supply and external pull up resistor |  <p>24Vdc OCT1/2/3 0V</p> |  <p>470Ω MIN 24V MAX 0.05A MAX PLC IN PLC GND</p> |  <p>PULSE – ISO GND 24V 0.8V</p> |

Keypad System

The β -meter has a 4-button programming system.

- The **MENU** button (**M**) is used to scroll through the menu structure.
- The **SAVE** button (**S**) is used to save entered changes to the flowmeter programme.
- The **▶** and **▲** buttons are used to change numbers and scroll through options.

Menu System / setup

The β -meter menu system is easy to use and designed for programming simplicity.

With the β -meter powered up the β -meter will test the flowtube sensor wiring and that liquid is present. If correct, the flow total and flow rate are displayed, if not an error message is displayed.

| |
|----------------------------------|
| <p>00000100 I 3.9768 I/s</p> |
|----------------------------------|

Line 1 = **Grand total** or **resettable** total
see **M1-6 total opts**
Line 2 = **Flow rate**

| |
|----------------------------------|
| <p>00010000 I 00000100 I</p> |
|----------------------------------|

Press **▲** to display grand and resettable totals
Press **▲** and **▶** together to reset resettable total

All set-up requirements are contained in the menus, and each item is stepped to by pressing the **M** button.

N.B. The new data is only stored if the **Save & exit** instruction is executed.

Totalisers

The β -meter has two totalisers

Grand totaliser is resettable to zero & selectable to a predetermined number only with password access.

Resettable totaliser is zeroed by pressing **▲** and **▶** together.

START PROGRAMMING - Press MENU

Main Menu

The Main Menu consists of **Batch?** (if selected), **Password?**, **Change?**, **Units?**, **Menu-1**, **Menu-2**, and **Save & exit**

Batch?

M-no S-yes

(only displayed if option selected)

Press **M** to continue or **S** to enter the Batch Menu.

Password?

Enter the required password. The flowmeter is shipped with the password 1000. (Default password = **1942**). The set-up can be viewed without the password, however, no changes can be saved at the **Save & exit** menu item and the error message **wrong password** is displayed.

Press **▶** repeatedly until cursor is under digit to be edited

Press **▲** repeatedly until desired value is displayed and **M** to continue

Change ?

1000

Provided the correct password was entered, a new password can now be entered. Enter the required password.

Press **▶** repeatedly until cursor is under digit to be edited

Press **▲** repeatedly until desired value is displayed

Press **M** to continue

Units?

Metric

Metric and **US** units of rate and total measurement are available.

Press **▲** until desired units are displayed and **M** to continue.

Menu-1

M-cont S-enter

Press **S** to enter or **M** to continue

Menu-2

M-cont S-enter

Press **S** to enter or **M** to continue

Save & exit

M-cont S-yes

Press **S** to save and exit or **M** to continue

Cal mode

M-cont S-enter

Press **S** to enter or **M** to continue (Cal mode is a hidden menu), see page 14.

Batching Function (Set **M1_8** to **batch** to activate batching, **NB!** use **Save & exit**)

From normal run mode press **M**

| | |
|---------------|--------------|
| Batch? | |
| M-no | S=yes |

Press **S** to enter the Batch Menu

| | |
|-------------------|----------------------|
| Batch Qty? | |
| 1000 | m³ |

Use **▶** and **▲** to move cursor and select Batch Quantity e.g. 1000m³ or 100l. Total units are programmable in **M1_5**. Press **S** to start, the external relay will now energise

| | | |
|----------|--------------|----------------------|
| B | 99,80 | m³ |
| | 50 | l/s |

= Remaining batch volume
= Flow rate

In batch mode a **B** is displayed on the first line of the display, and as the batch proceeds, the batch quantity counts down until it reaches zero.

| | | |
|---------------------|----------|----------------------|
| B | 0 | m³ |
| end of batch | | |

At zero the relay is de-energised and an **end of batch** message is displayed.

Stop Batch

During the batch, press **S** to stop the batch, relay will de-energise and press **S** again to restart, relay will energise.

Exit Batch

To exit the batch mode, press **S** to stop the batch, and then press **M** to exit. Stopping the batch will de-energise the relay, but if flow continues the batch quantity will continue to count down and show overrun with a negative value.

| | | |
|---------------------|------------|----------------------|
| B | -10 | m³ |
| end of batch | | |

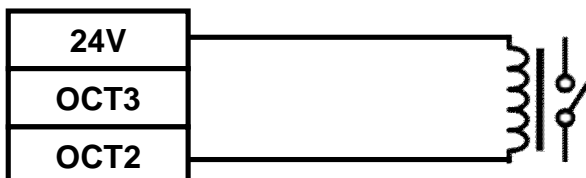
If flow continues the meter will continue counting, but will show a negative total, indicating the overrun.

| | | |
|---------------------|----------|----------------------|
| B | 0 | m³ |
| end of batch | | |

When the batch has finished, press **M** to return to normal run mode display,

| | |
|-------------------|----------------------|
| Batch Qty? | |
| 1000 | m³ |

or to repeat the previous batch quantity press **S** again. Use **▶** and **▲** to select Batch Quantity. Press **S** to start, the external relay will now energise



Wiring for external relay NB! 24V relay coil

MENU-1 Flow Data

M1_1 rate units
l/s

Press ▲ repeatedly until desired units are displayed and **M** to continue

M1_2 max flow
100l/s

Enter the maximum flow rate at which to output 20mA

Press ► repeatedly until cursor is under digit to be edited

Press ▲ repeatedly until desired value is displayed and **M** to continue

M1_3 alarm low
50 l/s

Enter the minimum flowrate at which the alarm will activate

Press ▲ repeatedly until cursor is under digit to be edited

Press ▲ repeatedly until desired value is displayed and **M** to continue

M1_4 alarm hi
100 _ l/s

Enter the maximum flowrate at which the alarm will activate

Press ▲ repeatedly until cursor is under digit to be edited

Press ▲ repeatedly until desired value is displayed and **M** to continue

M1_5 total units
m³

Select the unit you wish to totalise.

Press ► repeatedly until cursor is under digit to be edited

Press ▲ repeatedly until desired value is displayed and **M** to continue

M1_6 total opts
Grand total

Select between grand total and resettable total, the option selected appears as top line total in running mode. Press ▲ and ► together to reset resettable total whilst in run mode.

Press ▲ to select the option required and **M** to continue.

M1_7 clr total
Save total

Select between **clear tot** to clear the existing flow Grand total and **save tot** to keep the existing flow Grand total or **set tot** to set Grand flow total to a determined start value.

Press ▲ to select option required and **M** to continue.

| | |
|--------------|------------------------------------|
| M1_7b | set total 0000000 |
|--------------|------------------------------------|

This menu appears only after the **set tot** option has been selected in menu **M1_7 clr total?**.
Press ► repeatedly until cursor is under digit to be edited
Press ▲ repeatedly until desired value is displayed and **M** to continue.

| | | |
|-------------|---------------------------------|-----------|
| M1_8 | batch mode Yes | no |
|-------------|---------------------------------|-----------|

Press ▲ to select the option required and **M** to continue

| | |
|-------------|----------------------------------|
| M1_9 | damping minimum |
|-------------|----------------------------------|

Minimum, medium, maximum damping settings are available
Press ▲ to select the required value and **M** to continue

| | |
|--------------|----------------------------|
| M1_10 | cutoff 2% |
|--------------|----------------------------|

1%, 2%, 3%, 5% & 10% of full scale (i.e. Max flow setting) cutoff settings available
Select the level below which the β -meter will output no flow
Press ▲ to select the required value and **M** to continue to **Main Menu**

MENU - 2 Setup Data

M2_1 50/60Hz?
50Hz Operation

Select the appropriate mains frequency.
Press **▲** to select the option required and **M** to continue

M2_2 dia. mm
100.

Enter the Nominal Bore of the flowtube as displayed on its data plate.
Press **▶** repeatedly until cursor is under digit to be edited
Press **▲** repeatedly until desired value is displayed and **M** to continue

M2_3 K-value
1.002

Enter the calibration coefficient stamped on the flow tube.
Press **▶** repeatedly until cursor is under digit to be edited
Press **▲** repeatedly until desired value is displayed and **M** to continue

M2_4 sim% o/p
100.

The output current can be driven to any percentage of full scale by entering the desired value.
This facility can be used for testing the mA loop.
Press **▶** repeatedly until cursor is under digit to be edited
Press **▲** repeatedly until desired value is displayed and **M** to continue.

M2_5 volume/pls
1.000 I

Enter the required volume volume/pls.
Press **▶** repeatedly until cursor is under digit to be edited
Press **▲** repeatedly until desired value is displayed and **M** to continue.

M2_6 puls-width
20ms

The output pulse width can be varied to 125 ms max.
Press **▲** repeatedly until the desired value is displayed and **M** to continue
The pulse width is determined by the **M2_6** unless

1. pulse rate exceeds the coil frequency or
2. pulse rate cannot accommodate the programmed pulse width
in which case output will change to pulses with equal mark space ratio.

M2_7 OCT 1
pulse output

Press **▲** repeatedly until the desired option is displayed and **M** to continue
Each OCT output can be individually programmed for any or all the following functions-
totaliser pulse output, batch control function, no coil current alarm, empty pipe alarm, pulse o/p error (frequency > 1250Hz), reverse flow alarm, low flow alarm, high flow alarm.

M2_8 OCT 2
No coil current

Press **▲** repeatedly until the desired value is displayed and **M** to continue

M2_9 OCT 3
Empty pipe

Press **▲** repeatedly until the desired value is displayed and **M** to continue

M2_10 slave addr
1.0

Press **▶** repeatedly until cursor is under digit to be edited

Press **▲** repeatedly until the desired value is displayed and **M** to continue

Cal Mode (hidden menu)

Cal mode is a hidden menu, for the setup of the current output and calibration. To access this menu the correct password must be entered, Step through the main Menu until **Menu 2** is displayed, then press and hold **M** until **Cal Mode?** appears on the screen.

Cal Mode
M-cont **S-enter**

Press **S** to enter

M3_1 set 4mA
750

Connect an accurate milliamp meter to the current output terminals

Select a value that drives the output to 4mA (approx. 750)

Press **▶** repeatedly until cursor is under digit to be edited

Press **▲** repeatedly until desired value is displayed and **M** to continue

M3_2 set 20mA
3800

Connect an accurate milliamp meter to the current output terminals

Select a value that drives the output to 20mA (approx. 3800)

Press **▶** repeatedly until cursor is under digit to be edited

Press **▲** repeatedly until desired value is displayed and **M** to continue

NOTE:

Changes that are made to values in the menu system will only be saved when accessing the **Save & exit** menu and the **S** button is pressed.

MODBUS RTU (Optional)

The β -meter uses the MODBUS RTU protocol. This protocol defines a message structure that hosts and clients will recognize and use on the network over which they communicate. The MODBUS RTU uses a Master-Slave Query-Response Cycle in which the signal converter is the slave device.

Control Functions

The communications option supports the following function codes:

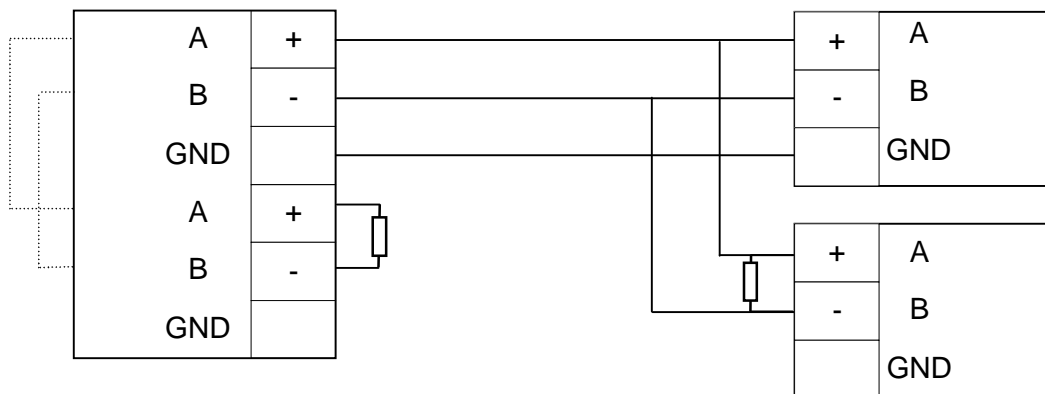
| CODE: | NAME: | DESCRIPTION: |
|-------|--------------------------------|---------------------------------------|
| 03 | Read holding registers (4xxxx) | Reads the value in a holding register |

Installation Overview

RS-485 may be multidropped up to 1200m and up to 32 units may be chained together. An optically isolated adapter is recommended at the PC. Terminators should be used to help improve the quality of electronic signals sent over the RS-485 serial wires. The RS-485 serial chain should be terminated at the beginning (RS-485 adaptor) and at the last device in the RS-485 serial chain. This is accomplished by connecting resistors (180 Ω) from (A) to (B) at the RS-485 port. A six way screw terminal is used up and down connected in the RS-485 serial chain.

External RS-485 Wiring (Master)

BETA4 Wiring (Slaves)



Setup

The MODBUS address is set up in **Menu2_11 slave address**. The address can be assigned 1 to 255.

| | |
|---------------|-------|
| Address | 1-100 |
| Baud rate: | 9600 |
| Data bits: | 8 |
| Stop bit: | 1 |
| Flow control: | None |
| Parity: | None |

Register and Coil Usage

| Data: | Register: | Access: | Type: | Offset | Length | Bit Arr. | 32BitTr |
|------------|-----------|---------|----------|--------|--------|----------|---------|
| Flow | 40001 | Read | Float 32 | 1 | 2 | 2,1,4,3 | Active |
| Total | 40003 | Read | Float 32 | 3 | 2 | 2,1,4,3 | Active |
| Resettable | 40005 | Read | Float 32 | 5 | 2 | 2,1,4,3 | Active |

Block Sizes

When connecting to a server, the maximum block sizes must be set as follows:

| | Max No of Registers |
|--------------------|---------------------|
| Holding Registers: | 3 |

The screenshot shows the 'Simply Modbus Master 6.4.1' interface. Key elements include:

- Mode:** RTU
- COM port:** 4
- Baud rate:** 9600
- Data bits:** 8
- Stop bits:** 1
- Parity:** none
- Slave ID:** 1
- First Register:** 40001
- No. of Regs:** 4
- Function code:** 3
- Minus offset:** 40001
- Register size:** 16 bit registers (checked)
- Results table:**

| register# | bytes | results | notes |
|-------------------|-----------|----------|-------|
| 32bit UINT 40001 | 0099 22FE | 10035966 | TOTAL |
| 32bit Float 40003 | 4075 0216 | 3.828252 | RATE |
- Request:** 01 03 00 00 00 04 44 09
- Response:** 01 03 08 22 FE 00 99 02 16 40 75 05 9E
- Expected response bytes:** 13
- Response time (seconds):** 0.1
- Fail in:** 2.0
- Time between sends:** 30.0
- RTS delay (ms):** 0

Example setup

Modbus RTU Master
Simply Modbus 6.4.1
Download @
<http://www.simplymodbus.ca>

Error/Warning Messages

| ERROR MESSAGE | ERROR | POSSIBLE SOLUTION |
|---|--|---|
| <ul style="list-style-type: none"> empty pipe | <ul style="list-style-type: none"> No liquid in flowtube Faulty electrode / coil cable | <ul style="list-style-type: none"> Fill pipe Repair / replace cable |
| <ul style="list-style-type: none"> no coil current | <ul style="list-style-type: none"> Faulty electrode / coil cable Faulty flowtube | <ul style="list-style-type: none"> Repair / replace cable Check coil resistance (approx. 40 ohms) |
| <ul style="list-style-type: none"> Reverse flow | <ul style="list-style-type: none"> Meter installed opposite / faulty coil cable | <ul style="list-style-type: none"> Swap the coil wires Repair / replace cable |
| <ul style="list-style-type: none"> Pulse o/p error | <ul style="list-style-type: none"> count-rate >1250Hz | <ul style="list-style-type: none"> Select larger volume/pulse |

Troubleshooting

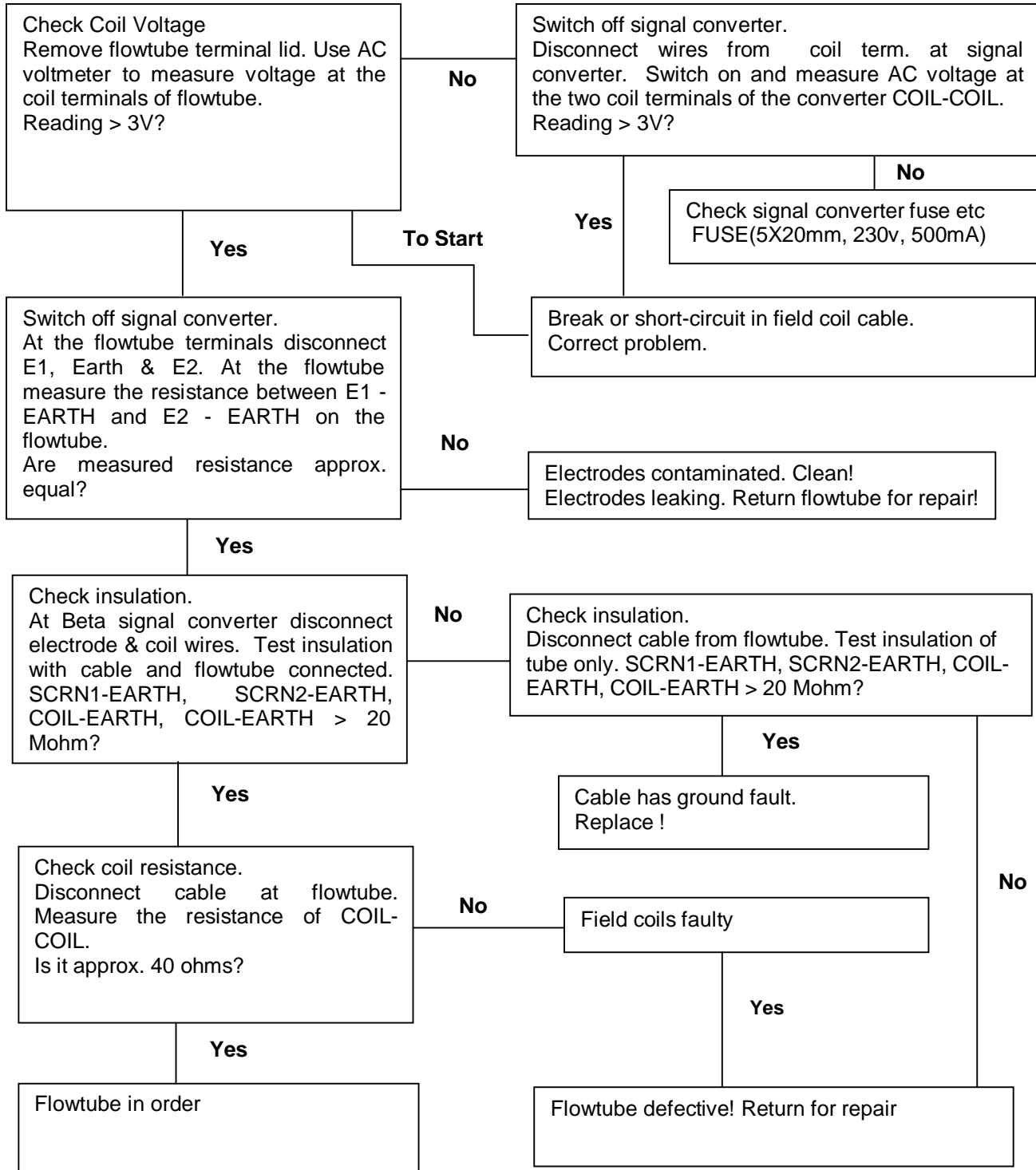
| PROBLEM | POSSIBLE SOLUTION |
|--|---|
| <i>Meter not reading</i> | |
| <ul style="list-style-type: none"> zero flow No flow Contaminated electrodes Leaking electrodes | <ul style="list-style-type: none"> Turn meter around or reverse coil wires Establish a flow Remove flowtube and clean electrodes Replace flowtube |
| <i>Meter reading lower/higher than expected</i> | |
| <ul style="list-style-type: none"> Incorrect setup data programmed Faulty display unit (signal converter) Leaking electrodes Rate overflow | <ul style="list-style-type: none"> Program correct setup data Replace display unit Replace flowtube Flowrate > 999 999 |

Features & Specifications

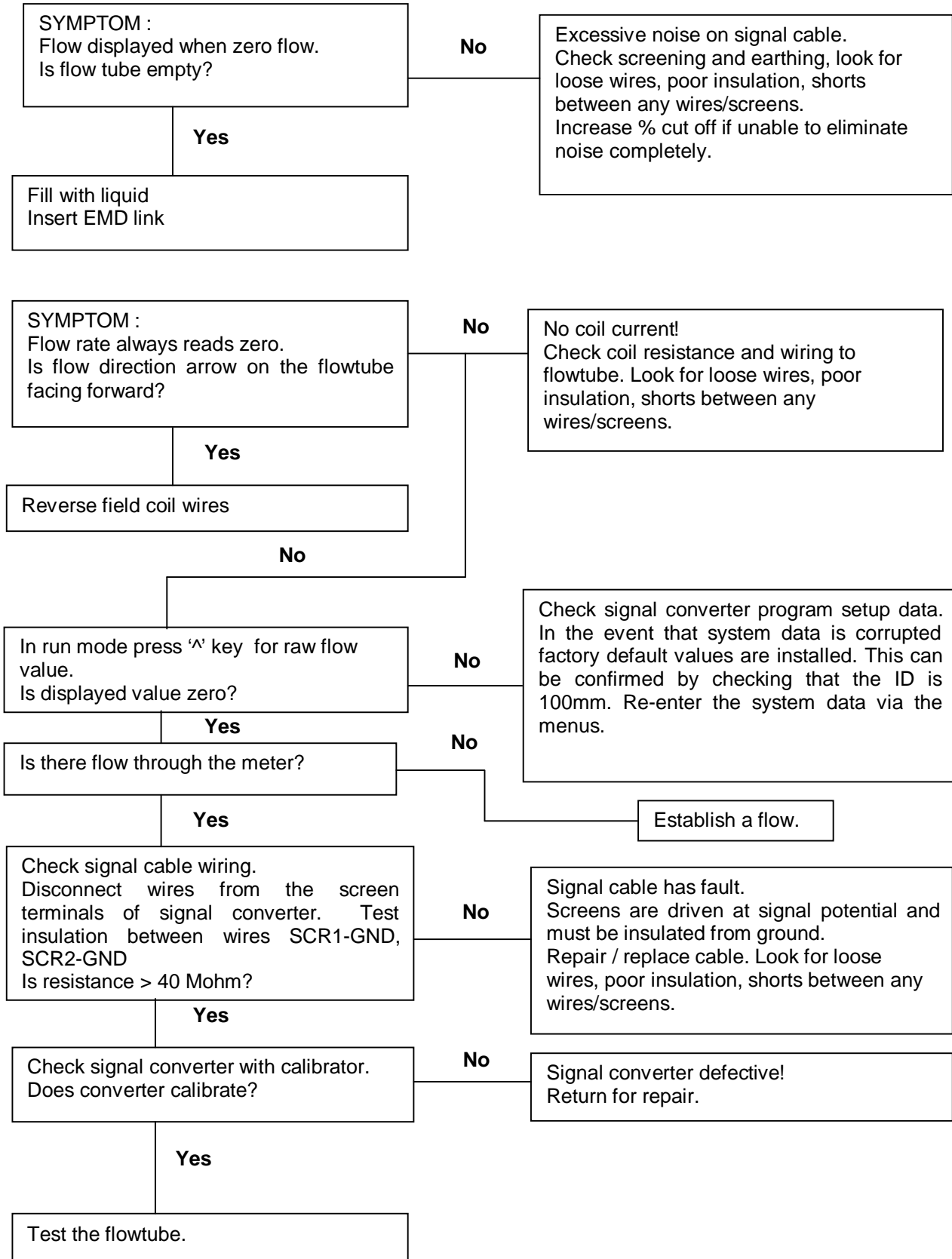
| | |
|---------------------|---|
| Sensor size | DN150..600 MXI PN 10/16 IP67, IP68 (optional) DN10..150 W PN 16 IP67, IP68 (optional) |
| Accuracy | +/- 0,5% of flow rate >0.5m/s |
| Repeatability | +/- 0,1% of flow rate >0.5m/s |
| Range | 0.1-10m/s |
| Response Time | 3 Selectable levels of damping |
| Transmitter/Display | β -meter remote wall mount IP67 |
| Model No. | BETA4 80-265VAC 50/60Hz BETA3 12-30VDC |
| Display enclosure | IP67 (NEMA 6) Polycarbonate Wall Mount 125 x 125 x 75mm HxWxD (5" x 5" x 3") |
| Power supply | 80-240Vac 50/60Hz <5VA 12-30Vdc <5W |
| Indication | Two-line rate and 2 x totals Displayed 2 x totals selectable resettable/grand total |
| Configuration | Supplied to customers spec or modified on site via easy to use menu structure with touch keypad |
| Units | Rate units: m/s, l/s, l/m, l/hr, m3/s, m3/m, m3/hr, ft/s, ft3/s, ft3/m, ft3/hr, USgps, USgpm, USgph, USmgd Total units: cl, dl, dal, hl, ml, l, m3, MI, ft3, 103ft3, 106ft3, USG, 103USG, 106USG |
| Outputs | Isolated open collector pulse x 3 24V auxiliary power supply Isolated active 4-20mA |
| Communication | Modbus RTU RS485 (optional) |
| Calibration | Standard 3-Point calibration certificate |
| Features | Batching control with OCT output Low Cost Non-intrusive No pressure loss No maintenance No moving parts Active empty pipe detection Integral spike suppression Password and tamper protection Error displays for easy diagnostics Easy to install |
| Options | GSM telemetry Installation Kit (Bolt sets & gaskets) Grounding rings (for lined or non-conductive pipe) |
| Standards | ISO 6817 First Edition 1992-12-01 Magflow design, CE Certified, IEC 60068-2-6 Vibration, IEC-60068-2-27 Shock |

Testing of Flowtube

Always switch off power source before connecting and disconnecting cables.



Testing (continued)



Warranty

Flowmetrix SA CC warrants to the purchaser that the equipment to be delivered hereunder will be free from defects in materials, workmanship and title and will be of the kind and quality designated in the proposal.

The foregoing warranty is exclusive and in lieu of all other warranties whether express or implied including any warranty of merchantability or of fitness for a particular purpose.

Warranties other than the above will only be effective if written and signed by an officer of Flowmetrix SA CC

If within 1 (one) year from the date of delivery, the equipment delivered hereunder does not meet the warranties specified above, Flowmetrix SA CC shall thereupon correct such defects, at its sole discretion, either by repairing or by replacing the instrument in its entirety.

The costs of returning the equipment to Flowmetrix SA CC and for the repaired or replaced item being returned to the purchaser shall be for the account of the purchaser.

The liability of Flowmetrix SA CC is conditioned upon the equipment covered hereunder being handled, installed, operated, maintained, stored or used, as the case may be, in strict accordance with the written instructions or technical direction supplied by Flowmetrix SA CC, and is further conditioned upon the purchasers prompt written notice (within 30 days) to Flowmetrix SA CC of such defects.

Flowmetrix SA CC makes no warranties which extend to the items covered hereby due to improper handling, installation, operation, maintenance, storage or use; abnormal or undisclosed environmental conditions; or operating or use in an otherwise improper manner.

The liability of Flowmetrix SA CC to the purchaser, except as to title, arising out of the supplying of the equipment or its use, under this warranty article, shall not, in any case, exceed the cost of correcting defects in the equipment as herein provided and upon the expiration of the warranty described herein, all such warranty liability shall terminate. The foregoing shall constitute sole warranty remedy of the purchaser and the sole warranty liability of Flowmetrix SA CC.

Goods Return Procedure

Damaged or defective equipment should be returned to the supplier prepaid. Do not return goods until written authorisation to do so has been obtained. Returned goods must have accompanying them a letter stating the following:

- Your company name and order number
- The contact person at your company
- Serial number and name of product
- Description of damage and cause if known
- Nature of any repair attempted by the user
- Type of repair, replacement or adjustment requested