

THE FLOWMASTER 250 MEASURES THE FLOW RATE AND THE PRESSURE AT EVERY WATER DRAWING OFF POINT

OPERATION MANUAL AND MAINTENANCE MANUAL

Flowmaster 250 and Flowmaster 400
incorporating model EMF-300E flow sensor



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I GETTING TO KNOW YOUR FLOWMASTER

I.1 INTRODUCTION

This portable flow and pressure test meter was developed in conjunction with UK and Irish Fire Brigades to meet the need for professional and easy appraisal of available pressure and flow at the service point.

The Flowmaster is now used by most UK and Irish fire services and has been exported to 50 countries. The Flowmaster meets the requirements of the JOIFF standard, 'Guideline for the testing of fire hydrants.

Our fire service customers use the Flowmaster to test hydrants and fire fighting equipment such as pumps, hoses, dry risers and branches. Customers from the water services use the Flowmaster when flushing to regulate the flow rate and to measure the volume discharged for use in leakage figure calculations.

The main features of the TSI Flowmaster are:

- Measures static pressure, residual pressure, instantaneous flow, total flow
- Fully portable
- Easy to use - simply attach to the fire hydrant outlet
- There are no moving parts in the sensor - eliminating breakdowns
- Easy to read digital display
- Convenient carrying handle
- Powered by internal, rechargeable battery pack
- Robust and durable

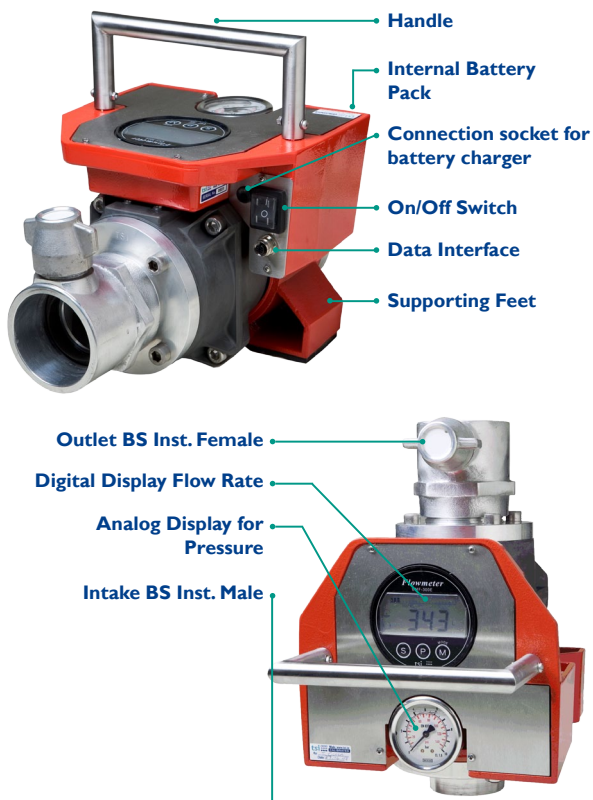


Fig. I.1 Main components of the Flowmaster

I.2 QUICK START GUIDE



1) Connect to hydrant



2) Turn ON



3) Open valve



4) Read pressure and flow

1.3 APPLICATIONS

1.3.1 MEASURING STATIC AND DYNAMIC PRESSURE AND FLOW RATE



Fig. 1.2 Testing underground fire hydrants

1.3.2 USING THE FLOWMASTER TO TEST A FIRE HYDRANT



Fig. 1.3 Testing pillar fire hydrants on high pressure ring main

1.3.3 USING THE FLOWMASTER TO TEST A FIRE PUMP



Fig. 1.4 Testing fire pump

1.3.4 USING THE FLOWMASTER TO TEST FIRE FIGHTING EQUIPMENT



Fig. 1.5 Testing a new branch

1.3.5 USING THE FLOWMASTER TO CONTROL FLOW VELOCITY DURING FLUSHING.



Fig. 1.6 Flushing



Fig. 1.7 Use totalise function of Flowmaster to record volume released during flushing for input to leakage figure records

1.4 EXPLANATION OF USER PANEL

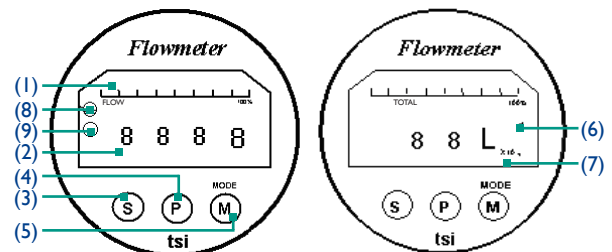


Fig. 1.8 User panel explanation

- (1) Bar graph display of flow reading
- (2) Digit display of flow reading
- (3) Set / Select switch
- (4) Plus switch used to increment setting in calibration mode
- (5) Mode / Minus switch:
 - Mode - selects between flow and totaliser operating modes
 - Minus - decrements setting in calibration mode
- (6) Indicates totaliser mode and volume
- (7) Totaliser range extender:

No. Display	Total as displayed
X 10	Multiply displayed volume by 10 to get total
X 100	Multiply displayed volume by 100 to get total
- (8) Flashes on and off to indicate there is no water in the sensor
- (9) Flashes on and off to indicate there may be dirt on the electrodes. Ignore this signal when there is no water in the sensor

2 SPECIFICATION

2.1 GENERAL

Weight	12.0 kg including battery pack & instantaneous adaptors
Dimensions	390 (L) x 240 (W) x 210 (H) mm
Power	Internal Battery Pack. DC 12V @ 250 mA
Case Material	Corrosion resistant LM25 aluminium
Operating Temp. Adaptors	-10°C ~ +50°C 2.5" BSPM or BS Instantaneous (4.0" BSPM for Flowmaster 400) 2.5" NST for USA and other adaptors available on request
Colour	Firemen Red & anodised aluminium

2.2 FLOWMETER

Sensor Type	Electromagnetic
Range	30 - 3,000 lpm carriage return By changing the sensor control pcb, range can be extended to 5,000 lpm
Resolution	50 ~ 750 l/min \pm 15 l/min 750 l/min ~ \pm 2%
Standard Functions	Flow reading Totaliser reading
Casing Material	Corrosion resistant ADC6-12 (JIS) aluminium (anodised)
Pressure rating	49 bar
Digital LCD display gauge	<ul style="list-style-type: none"> • 4 digits • 17.6mm high digits • Analog bar graph • Internal backlighting

2.3 PRESSURE GAUGE

Type	Bourdon Tube
Range	0 ~ 10 bar, \pm 1%. (0-7, 0-15, 0-20, 0-25 bar also supplied)
Dial	Analog type, 60 mm dial

2.4 BATTERY PACK

Battery Type	Nickel-metal hydride, NiMH
Rated Capacity	2.2 Ah (10 hours continuous operation)
Recharging	Mains operated recharger is supplied
In-car charger	Available as separate item

2.5 FLOWMASTER 400

Weight	15.0 kg including battery pack and 100mm fittings
Dimensions	510 (L) x 240 (W) x 210 (H) mm
Streamlined	Pressure loss is minimal thanks to the use of tapered adaptors from 65mm bore to 100mm adaptors
Adaptors	100mm French adaptors fitted onto 100mm BSPM Other adaptors available on request
Other specifications as per Flowmaster 250	



Fig. 2.1 Flowmaster 400

3 FLOWMASTER OPERATION

The pressure gauge does not need a power source to operate. Pressure measurements can be made with the flow meter in the OFF position.

The Flowmaster is ready to measure flow as soon as battery power is applied. Turn on the Flowmaster by pressing ON/OFF switch to “I” position. The Flowmaster can also be powered using an external 12V DC power source.

Following power_on, the flow meter begins a self test sequence lasting approximately 5 seconds and then automatically enters flow measurement mode. The typical flow meter display in flow measurement mode is as shown below.



Fig. 3.1 Flow meter display when ready for flow measurement, water is filling the pipe but is not flowing



Fig. 3.2 Flow meter display when ready for flow measurement, water is filling the pipe and is flowing

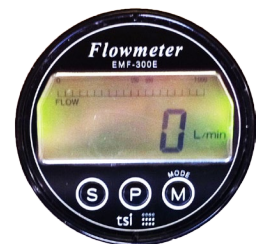
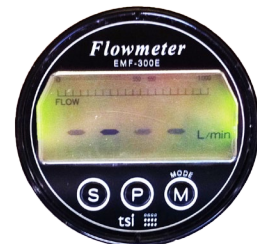
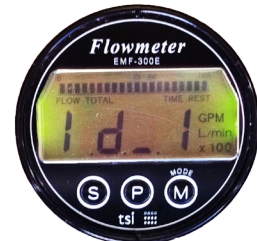
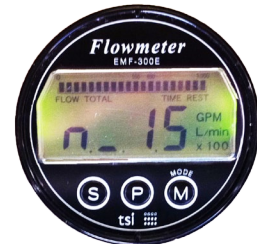
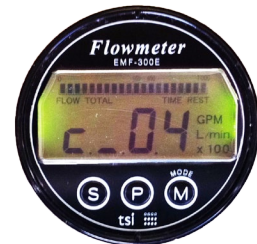


Fig. 3.3 Flow meter display when ready for flow measurement and there is no water in the pipe. Note the flashing symbols on the left side of the flowmeter gauge

The Flowmaster is now ready to make both flow and pressure measurements.

3.1 POWER ON SEQUENCE

The Flow meter backlight LEDs will turn on. After a few moments, the self-test mode will commence and the display sequence will be as shown below.



The final display in the sequence indicates that the self-test is complete and the Flow meter is in flow measurement mode.

3.2 TOTALISER FUNCTION

The flow meter has a built in totalising function. The volume of water that has passed through the flow meter is totaled and stored in internal memory.

Put the meter readout into totaliser mode by pressing the M (mode) switch once.

The volume reading is stored in flash memory and is does not return to zero even after power is turned off. Volume accumulates until a manual reset is carried out as explained in fig 3.2.3.



1) Press M (mode) switch once, to enter totaliser mode



2) Display shows total litres flown since last reset. Press M again to re-enter flow measurement mode



3) Re-set totaliser by pressing S and P switches simultaneously for at least one second and then releasing



4) Figure displayed will automatically re-set to zero

4 USING YOUR FLOWMASTER

The Flowmaster provides flow and pressure measurement functions. One of its primary uses is for the testing of hydrants. The procedures used for testing hydrants vary and depend on individual user requirements.



Fig. 4.1 Testing an underground hydrant using a standpipe. Photographs courtesy of Essex County Fire and Rescue Service.



Fig. 4.2 An example of a flow readout and a residual pressure reading. Photograph courtesy of Laois Fire Service.

The principal international standards for hydrant testing are The JOIFF Standard; “Guideline for flow and pressure testing of hydrants” and NFPA 291; “Fire flow testing and marking of hydrants”. The Flowmaster is an approved instrument meeting the instrument stipulations laid down in The JOIFF Standard and simplifies the measurement procedures outlined in NFPA 291. Please refer to these standards for further information



Fig. 4.3 Flow testing with ball valve to facilitate static and residual pressure measurements at Portlaoise Hospital. Photograph courtesy of Portlaoise Hospital Service

An operators guide for static and residual pressure measurements and for flow measurements is supplied on the following pages. This information is provided for guidance only. It is preferential that the Flowmaster user follow the guidelines provided by their organisation. A copy of The JOIFF Standard is available on request.



Fig. 4.4 Inline use of Flowmaster. Photograph courtesy of Essex County Fire and Rescue Service

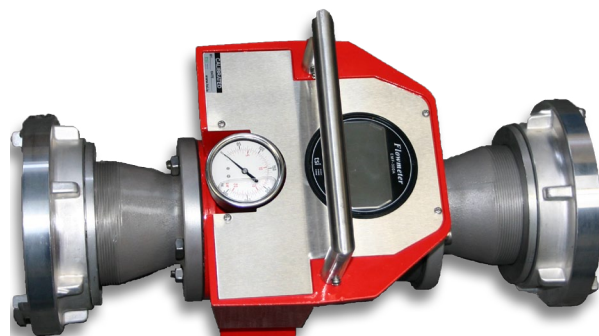


Fig. 4.5 Flowmaster with fittings for use with Hoselayers. Photograph courtesy of Greater Manchester Fire and Rescue Service

Additional information and video tutorials are available online. For demonstrations, click on links below:

- **Using the Flowmaster 250 to test a Hydrant**
- <http://www.youtube.com/watch?v=8EQOp5E3TJ8>
- **Using the Flowmaster 250 for Flushing**
- http://www.youtube.com/watch?v=Yu8b_UXd3Mk
- **Using the Flowmaster 250 to test a Canadian Hydrant (Hetek)**
- http://www.youtube.com/watch?v=a19GwFKkT9w&feature=player_embedded

Other tutorial videos are also available at www.tsi.ie

4.1 PRECAUTIONS

- ❗ **IMPORTANT – PLEASE READ THIS SECTION BEFORE USING YOUR FLOWMASTER**
- ❗ It is important to think safety first, especially when working with pressure.
- ❗ Please ensure the Flowmaster is securely attached to the service fitting (eg, hydrant outlet, pump, etc) before pressurizing.
- ❗ Please consider carefully the expected system pressures if you plan to use a length of hose between the service point and the Flowmaster, as shown in figure 4.6. For pressures exceeding 5 bar, the weight of the Flowmaster may not be sufficient to ensure the meter will remain on the ground. If service pressure exceeds 7 bar, the meter at the end of a hose will move freely in the air and this is very dangerous.



Fig. 4.6 Caution! Never allow the Flowmaster to be used in an open-ended position. It is essential to secure the Flowmaster so that it cannot move about freely

4.2 FLOW & RESIDUAL PRESSURE MEASUREMENT

- ❗ **Note 1**
Flow reading is generally taken after dirt and debris in the water stream have been exhausted and the water is clear. This will typically take 10 to 20 seconds.
- ❗ **Note 2**
Flow measurement can be taken without any attachment to the Flowmaster outlet.
- ❗ **Note 3**
When a residual pressure is required, an attachment such as a valve or hose length is placed on the Flowmaster outlet to create back pressure.



1) Attach the Flowmaster to the standpipe and switch it on



2) Attach valve, hose, etc. to create back pressure and to direct water to safe location



3) Open hydrant fully so water is flowing



4) Read flow (in l.p.m.) and pressure (in bar). When readings are taken, close hydrant fully

4.3 STATIC PRESSURE MEASUREMENT



- 1) Attach Flowmaster to standpipe.
- 2) Attach ball valve to exhaust side of Flowmaster. Ensure ball valve is partially open.
- 3) Crack open the hydrant slowly. All air will be expelled from the standpipe when water begins to drain from the ball valve. Close the ball valve.



- 4) Read static pressure (in bar).
- 5) When reading is taken, close hydrant fully.
- 6) Open the ball valve to exhaust pressure from the meter and standpipe. Remove the blanking plug and progress to flow test.

4.4 FLUSHING



- 1) Equipment required for flushing



- 2) Flowmaster connected to standpipe (through hose length)



- 3) Adjust valve position to achieve desired flow rate



- 4) Record volume discharged for inclusion in leakage figures

5 MAINTENANCE & TROUBLE-SHOOTING

5.1 BATTERY MAINTENANCE

Battery pack operating time is 10 hours continuous usage. The batteries can be recharged at any time using the mains charger supplied. Connect the battery charger to the Flowmaster battery charger socket. **It is better to top up charge the batteries at regular intervals than to allow them to discharge fully.** The batteries can be left on continuous charge when the Flowmaster is not in use. The batteries have an operating life of ten years and will need to be replaced thereafter. The operating time will reduce as the batteries age.

5.1.1 EFFECT OF CONTINUOUS METER USE ON BATTERY LIFE

The type of battery in use on the Flowmaster 250 is NiMH type. This battery type is designed for regular but intermittent use. It is not designed for deep discharge such as would happen were the Flowmaster repeatedly left powered on for eight to ten hours per day. In these circumstances, the battery life would be reduced to ten months. Battery replacement under these circumstances is not covered under warranty. Should your working procedures require that the Flowmaster is powered on for up to eight hours per day, please contact TSI Flowmeters Ltd and request an alternative battery technology.

5.1.2 TEST FOR RE-CHARGE REQUIREMENT

The flow measurement will become erratic if the battery voltage is too low. The readout may indicate zero even when water is flowing or the flow reading may vary considerably even though the flow stream is steady. Use a voltmeter to check the voltage level of the battery pack. If the voltage is less than 10V DC then immediate recharging is necessary. If the voltage is less than 12V DC then you will be able to use the Flowmaster for some time, but immediate top-up charging is recommended.

5.1.3 CHARGING THE BATTERIES

There are two Flowmaster battery charging sockets. One socket is located in the power panel located at the side of the Flowmaster. The other socket is located in the red casting on the other side of the Flowmaster. Connect the battery charger to one of the two sockets. Plug the charger into mains. Please refer to the battery charger instruction manual, document no. 5110A.



Fig. 5.1(a) Flowmaster battery charger socket (power panel)



Fig. 5.1(b) Flowmaster battery charger socket (casting)

5.2 FLOWMASTER MAINTENANCE

The Flowmaster is practically maintenance free. Periodically charge the batteries. TSI Flowmeters recommend charging the batteries after each use and once per month when the meter is not being used. Clean the electrodes (especially if the meter has been used with oily water) to ensure trouble free operation of the flowmaster.

Please avoid dropping the Flowmaster. Please use your hands to operate the switches and avoid use of screwdrivers. Please keep abrasive chemicals away from the exterior of the Flowmaster and wash the inner tube with clean water after flowing foam or seawater. The flow meter control electronics are in a waterproof compartment located beneath the display gauge. Please do not open this compartment. Breaking the seal will destroy the water-proof feature of this compartment and void warranty. Subsequent water ingress will damage the control electronics and lead to loss of flow measurement function.

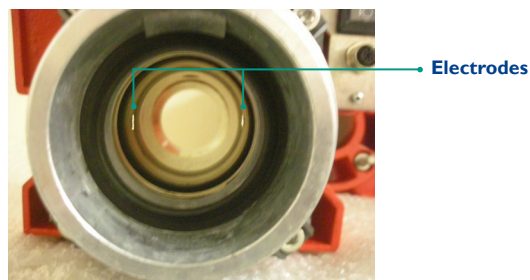


Fig. 5.2 Location of electrodes

5.2.1 CLEANING SENSOR ELECTRODES

The Flowmaster's flow gauge response is reduced if the electrodes are covered with a film of oil, dirt or rust. This can result in measurement error which is usually in the form of a lower than expected flow reading.

Clean the electrodes by brushing the inside of the pipe with a soft cloth or soft brush dipped in water. Use of a household handwash type dishwashing fluid is acceptable. If necessary, an alcohol or methanol based cleaning-agent may be used.

The electrodes should be cleaned periodically. The frequency of cleaning depends on the type of water being used. If clean tap water is used, then once a year is sufficient; if river water is used, then we recommend that they be cleaned every 6 months. If oily water has been used, then they should be cleaned immediately after use by running clean tap water.

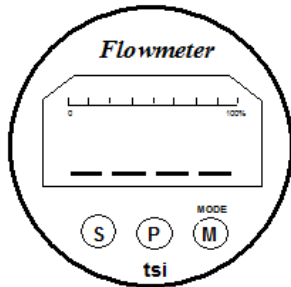
5.2.2 SCALE ADJUSTMENT

The Flowmaster is calibrated and the scale adjusted at the factory. Accurate measurements can be made immediately upon receipt of the unit. It is recommended that all measuring instruments are calibrated annually. If, perchance, the display does not seem to be accurate, then please check that the electrodes are clean.

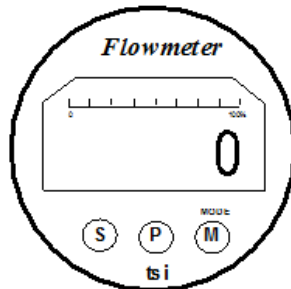
5.3 TROUBLE-SHOOTING

5.3.1 INCOMPLETE SELF-TEST SEQUENCE

Display goes through the Self-Test Sequence until this display -



Display does not reach this display of the Self-Test Sequence -



Possible Cause:

The Sensor part of the device and the Display part of the device are not in contact.

Action:

Check all cables are secure. If still not connected – please contact your local representative

*This condition may indicate that water ingress to the electronics compartment has damaged the control electronics. Please contact your local representative.

5.3.2 ERRATIC DISPLAY

Possible Cause:

The battery voltage is too low.

Action:

Charge the batteries.

5.3.3 READING NOT DISPLAYING

The power-on Self-test Sequence is okay, but there is no reading when water is flowing.

Possible Cause:

- 1) Batteries voltage is too low
- 2) No earth wire to battery
- 3) Unit is faulty

Action:

- 1) Charge or replace batteries
- 2) Replace earth wire between battery negative terminal and red casting
- 3) Return unit to Manufacturer

5.3.4 RECHARGING ISSUES

The unit will not charge or there are humming noises while trying to recharge.

Possible Cause:

Faulty battery charger or batteries are over-discharged and cannot recover.

Action:

Contact local representative for replacement charger or batteries. Generally speaking, if battery voltage falls below 6 volts DC, it will not recover.

5.4 CALIBRATION OF YOUR FLOWMASTER

Every TSI flow meter is tested and calibrated prior to shipping. A calibration label is attached to the top lid of the meter (Figures 5.3 and 5.4). The calibration date and the date on which the meter is due its next calibration are written on the label for your convenience.

The master meter at TSI is calibrated annually at the Irish National Test Centre. This ensures the readings obtained by the Test Equipment referred to on certificates issued by TSI Flowmeters Ltd are traceable to National and International standards

Annual calibration of the Flowmaster is recommended, particularly if the meter is used on a regular basis. Please return your meter to TSI Flowmeters Ltd for calibration.



Fig. 5.3 Calibration label on lid of Flowmaster

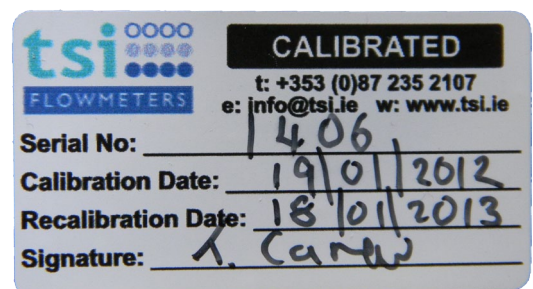
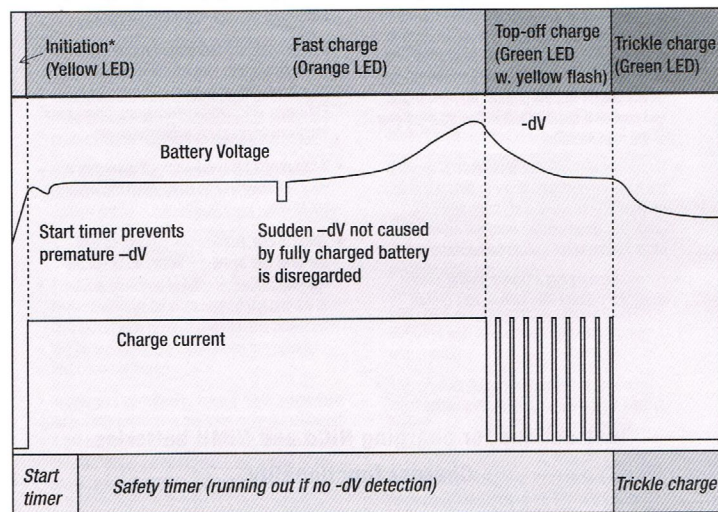


Fig. 5.4 Calibration label showing calibration date and re-calibration date

6 NiMH BATTERY CHARGER

6.1 MASCOT CHARGE DIAGRAM

Mascot CPM charge diagram



A new charge cycle starts by reconnecting battery at output or connecting/reconnecting mains

6.2 HOW TO USE THE CHARGER

How to use the charger

The charger is started by connecting the battery pack to the charger and then connecting the charger to the mains.

The LED (light emitting diode) will be yellow before the fast charge starts and the LED changes to orange. When the batteries are fully charged and the voltage drops because of the -dV signal from the batteries, the charger will go into a top-off charge mode before it goes over to trickle charge mode. During top-off charge the LED will be green with a short intermittent yellow light. When the top-off charge is completed, the charger will go into trickle charge mode and the LED will be green. The charge current is now reduced to a safe level, which allows the charger to stay connected to the NiCd batteries without damaging the batteries. NiMH batteries are not as well suited for trickle charge, and some battery manufacturers recommend that trickle charge

does not exceed 24 hours. If in doubt; contact the battery manufacturer for details.

If the safety timer runs out before -dV is detected, the charger will go directly to trickle charge mode (no top-off charge) and LED will be continuously green. If the battery voltage is far below normal, the charger will cut the fast charge current and go to trickle charge mode. The LED will then indicate "error" by flickering green and orange light.

If the mains input voltage is turned off, the charger will reset. When the mains input voltage is turned on again a new charge cycle will start.

If new batteries are to be connected, the charger must idle for approx 15 sec. to make sure all parameters in the microprocessor have been reset. When the charger has been reset the LED changes to yellow, and a new charge cycle can begin.

Charge cycle and LED indications

LED	MODE
YELLOW	Battery not connected
YELLOW	Battery initialisation and analysis
ORANGE	Fast charge
GREEN with intermittent YELLOW flash	Top-Off Charge
GREEN	Trickle Charge
Alternating ORANGE-GREEN	ERROR

When the mains is connected the LED will be orange for the first seconds and then turn to yellow when the initialisation and analysis starts. If a battery is connected, the actual charging will start a few seconds later when the LED changes to orange. After the start-timer period has run out (the first few minutes of the charge cycle when

the -dV detection is disabled), the LED will be green for approx. 8 seconds. This is a signal for testing and service only. When -dV has been detected, the start of the top-off charge is indicated with a green LED with intermittent yellow flashes. The LED is green during trickle charge.

7 ACCESSORIES

7.1 BALL VALVE WITH BS INST. M/F FITTINGS

The ball valve facilitates speedy and safe static pressure readings and creates back pressure for taking flow and residual pressure measurements.



Fig. 7.1 Ball Valve to facilitate static pressure measurements

7.2 TRANSPORT & STORAGE CASE

Transport case with castor wheels and extension handle. Weight 7kg.

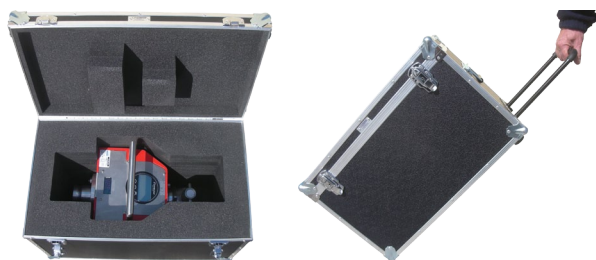


Fig. 7.2 Transport case (Model No. 34-2104)

7.3 ADAPTORS

A wide range of adaptors are available that allow the Flowmaster 250 to work with your pipework and fittings. The standard fitting supplied is to the internationally recognised 2.5" BSP male thread. Onto this can be mounted BS Inst. M/F, NH or NST M/F, Storz, Nor Kuppung, etc.



Fig. 7.3 Selection of adaptors available for use with the Flowmaster 250

We can also supply to 3/4" BSP male, 1" BSP male, 4" BSP male as standard items. These adaptors are tapered so as to minimize turbulence and fluid restriction, thereby ensuring minimum interruption to fluid flow and accurate measurements.

7.4 FLOW MONITORING SYSTEM

The flow monitoring system provides a data logging function on a PC or laptop of the flow rates measured by the Flowmaster. The flow monitoring system consists of an RS485 to RS232 converter that interfaces the flow meter to the PC or laptop, cables and software to capture and display flow data. Screenshots from PC software for use with the flow monitoring system are shown in Figure 6.4.

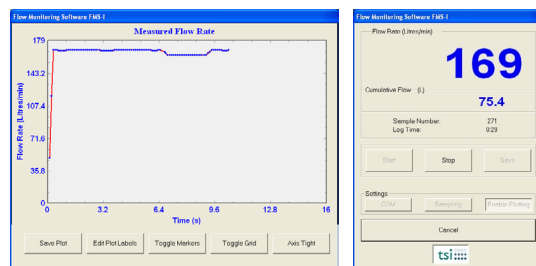


Fig. 7.4 Data interface and FMS software

7.5 REPLACEMENT BATTERY/MAINS CHARGER



Fig. 7.5 Replacement Battery Pack available



Fig. 7.6 Mains Battery Charger available



Fig. 7.7 In-car Charger available

7.6 UPGRADE TO A FLOWMASTER 250DL

The Flowmaster 250DL is the digital version of the Flowmaster 250 that has the added functionality of integrated data capture, data logging and test report generation, in addition to a large digital electronic flow rate display.

The Flowmaster 250DL enables verifiable test reports to be quickly and easily generated using the accompanying Flow Monitoring Software.

Up to 6 hours of data can be captured at 1 second intervals. Flowrates can be set that automatically start and stop the data logging, with an LED light to indicate when logging is in progress.

Data can either be logged directly to a PC or can be stored on the device for subsequent upload to PC via USB cable. The Flow Monitoring Software can then be used to conveniently manage the flow data logs and to generate detailed reports.



Fig. 7.8 Flowmaster 250DL

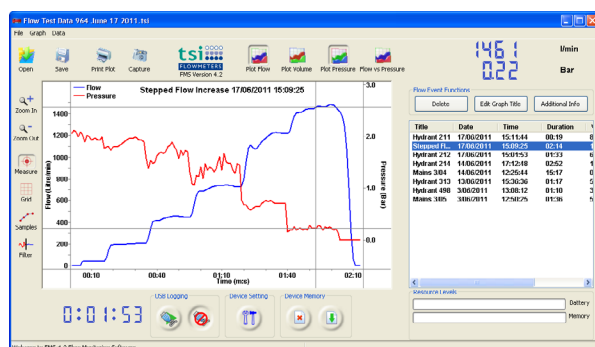


Fig. 7.9 Screen shot of flow monitoring software

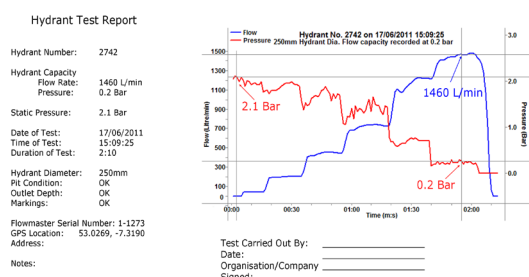


Fig. 7.10 Sample report format

8 LIMITED WARRANTY

TSI Flowmeters Ltd., of Unit 1, Portlaoise Enterprise Centre, Clonminam Business Park, Portlaoise, Co. Laois, R32VK07, Ireland (Warrantor), warrants to the original purchaser of the new fire protection equipment manufactured by Warrantor and to any person to whom such equipment is transferred, that such equipment shall be free from defects in materials and workmanship during the one (1) year period commencing upon the receipt of such equipment by the original purchaser thereof ("warranty period").

Warrantor's obligation under this warranty is specifically limited to replacing or repairing its fire protection equipment or parts thereof, which are shown by Warrantor's examination to be in a defective condition attributable hereunder to Warrantor. To qualify for this Warranty, alleged defective equipment MUST be returned to Warrantor at its above address, transportation charges prepaid, within a reasonable time after discovery of an alleged defect, and in no event later than thirty (30) days after the expiration of the warranty period. If, as a result of Warrantor's examination of returned equipment, Warrantor concludes that a product defect attributable hereunder to Warrantor exists, Warrantor shall cure such defect within a reasonable time, not to exceed forty-five (45) days after such examination. All expenses in curing such defect, except for transportation charges and shipping expenses incurred in delivering such equipment to Warrantor, shall be paid by Warrantor.

In the event that such equipment is found to be attributable hereunder to Warrantor and Warrantor is unable to provide replacement, or repair is not commercially practicable or cannot be timely made, Warrantor may elect to refund to claimant the purchase price of such equipment actually received by Warrantor, less reasonable depreciation, in complete discharge of its obligations hereunder. If Warrantor elects to comply with this warranty by means of such refund, as a condition precedent to such compliance, the claimant shall return such equipment to Warrantor free and clear of liens and other encumbrances.

THE ORIGINAL PURCHASER OF SUCH EQUIPMENT, AND PERSON TO WHOM SUCH EQUIPMENT IS TRANSFERRED, AND ANY PERSON WHO IS AN INTENDED OR UNINTENDED BENEFICIARY OF SUCH EQUIPMENT, SHALL NOT BE ENTITLED TO RECOVER FROM WARRANTOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR INJURY TO PERSON AND/OR PROPERTY RESULTING FROM ANY DEFECTIVE EQUIPMENT MANUFACTURED BY WARRANTOR.

Misuse or neglect (including failure to provide reasonable maintenance) of, or accident or unauthorised repairs or alterations to, such equipment, shall release and

discharge Warrantor from any obligations under this warranty or otherwise.

WARRANTOR EXPRESSLY LIMITS WITH RESPECT TO SUCH EQUIPMENT ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE TO THE WARRANTY PERIOD. AFTER EXPIRATION OF THE WARRANTY PERIOD, WARRANTOR EXPRESSLY DISCLAIMS WITH RESPECT TO SUCH EQUIPMENT ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. THERE IS NO WARRANTY OF ANY NATURE MADE BY WARRANTOR BEYOND THAT WHICH IS CONTAINED HEREIN.

Should Warrantor fail to meet with its obligations under this warranty, a claimant may sue Warrantor to secure its compliance with this warranty. No action to enforce this warranty or to otherwise secure recovery from Warrantor for any damages arising out of the fire protection equipment manufactured by Warrantor shall be commenced later than two (2) months from and after the date of the receipt of such equipment by the original purchaser thereof.

NO PERSON HAS AUTHORITY TO ENLARGE, AMEND, OR MODIFY THIS WARRANTY.

Warrantor reserves the right to change the parts or design of its products from time to time without notice, and with no obligation to maintain spare parts or to make corresponding changes in the products previously manufactured.



Declaration of Conformity

We: **TSI Flowmeters**

**Unit 1, Portlaoise Enterprise Centre,
Clonminam Business Park,
Portlaoise, Co. Laois, R32 VK07,
Ireland.**

Tel +353 (0)57 866 3852

declare under our sole responsibility that the product,

**Electromagnetic Flowmaster
Model 250**

to which this documentation relates, is in conformity with the provisions of the following directives:

**2001/95/EC General Product Safety
2006/95/EC Low Voltage Directive (LVD)
2004/108/EC Electromagnetic Compatibility Directive (EMC)**

The technical file is maintained at:

**TSI Flowmeters Ltd,
Unit 1, Portlaoise Enterprise Centre,
Clonminam Business Park,
Portlaoise, Co. Laois, R32 VK07,
Ireland.**

Date of Issue: 10th August 2009

Place of Issue: Portlaoise, Ireland

Name: **Tim Carew**

Title: **Managing Director**

Certificate of Calibration**Issued by:**

TSI Flowmeters Ltd

Unit 1, Portlaoise Enterprise Centre,
Clonminam Business Park,
Portlaoise, Co. Laois, R32 VK07,
Ireland.

Tel: +353 (0)57 866 3852

Email: info@tsi.ie

The readings obtained by the Test Equipment referred to on this certificate are traceable to National and International standards. Calibration Cert No. 6825CN.

Cert No.	Date of Issue	Order No.	Job No.
-01			

Company Name:

Details of Flowmeter Calibrated

Type of Meter: TSI Model EMF-300A Magflow

Serial No.

Date of Calibration:

Method of Test: Comparison with Master Flowmeter.

The zero offset was adjusted to read 0 lpm. Since this is the first calibration of a new flow meter there are no before service readings. The unit was calibrated at a flow rate of 500 lpm. This flow rate was maintained for five minutes and correct reading was observed on the unit. Totaliser readings were taken at one minute intervals; the maximum deviation observed was within the specified $\pm 2\%$ of master flow meter readings. Correct flow rate was verified for this calibration setting at 300, 400, 600 and 700 lpm.

Calibrated by:

TSI Flowmeters Ltd