

MagMaster Electromagnetic flowmeter

MagMaster to WaterMaster electronics upgrade



Introduction

These instructions describe how to upgrade an existing MagMaster MF/F flowmeter (DN80 to DN1600) installation with remote transmitter for use with the new remote WaterMaster transmitter.

This guide should be read in conjunction with the following publications:

- WaterMaster FET100 User Guide, OI/FET100-EN
- WaterMaster Programming Guide, IM/WMP

The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

Quality Control

The UKAS Calibration Laboratory No. 0255 is just one of the ten flow calibration plants operated by the Company and is indicative of our dedication to quality and accuracy.



UKAS Calibration Laboratory No. 0255

Contents

- 1 Electrical Installation 2**
 - 1.1 Configuration DIP Switches 2

- 2 MagMaster Sensor Cable 3**
 - 2.1 MagMaster Sensor Cable Wiring to WaterMaster Transmitter 3
 - 2.1.1 Sensor Coil Resistance 3

- 3 Programming & Configuration 4**
 - 3.1 Accessing the Programming Menus 4
 - 3.2 Programming Menu – Sensor Setup 4

1 Electrical Installation

Note. These upgrade instructions and the use of WaterMaster with existing MagMaster sensors is supported only on the MF/F product code style of sensors, not the MF/E type.

Install the WaterMaster transmitter in accordance with User Guide, OI/FET100-EN.

1.1 Configuration DIP Switches

Remove the transmitter cartridge as detailed in the User Guides, OI/FET100-EN.

The transmitter backplane PCB contains 3 DIP switches as shown in Fig. 1.1.

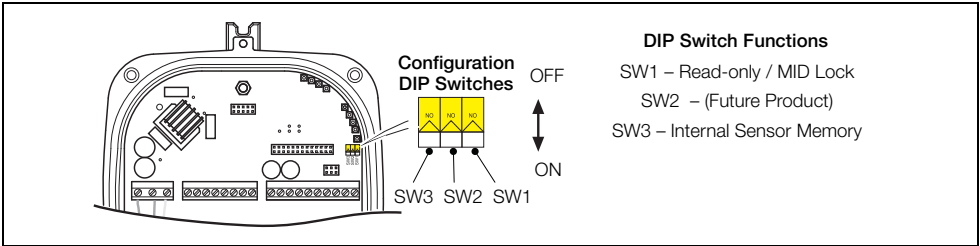


Fig. 1.1 Configuration DIP Switches

For retrofit applications the flowmeter sensor memory, that contains all the sensor-related calibration factors and settings, is not present on the older MagMaster style of flowmeter sensors. For these flowmeters this 'sensor memory' is switched to use the fitted memory on the backplane PCB of the WaterMaster. This must be turned on using SW3.

SW3 – Defines the 'Sensor Memory' EEPROM location

OFF= Remote sensor memory

ON = Use Integral transmitter sensor memory

For WaterMaster electronics working with MagMaster sensors (also called 'Retrofit' units) set the DIP switches as shown in Fig. 1.2. Leave SW1 & SW2 unaltered as they are not part of the retrofit upgrade detailed here.

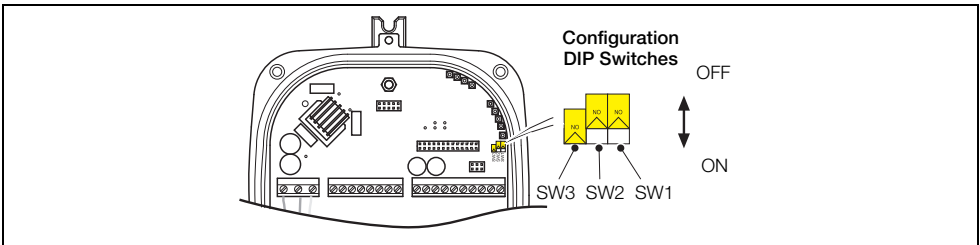


Fig. 1.2 Configuration DIP Switches

Note. The backplane-fitted 'sensor memory' enables the transmitter cartridge to be changed in a repair situation (all the settings are retained on the backplane when a new transmitter cartridge is fitted). If the transmitter enclosure is replaced for any reason, re-install the new transmitter (refer to OI/FET100-EN) and perform all of the retrofit procedures detailed in this publication (IM/MM2WM-EN).

2 MagMaster Sensor Cable

2.1 MagMaster Sensor Cable Wiring to WaterMaster Transmitter

Check the wiring of the sensor cable carefully to ensure good, clean connections. Ensure there are no stray strands of wire and all terminals are tight.

Fig. 2.1 Shows the wiring of the sensor cable to the remote WaterMaster electronics.

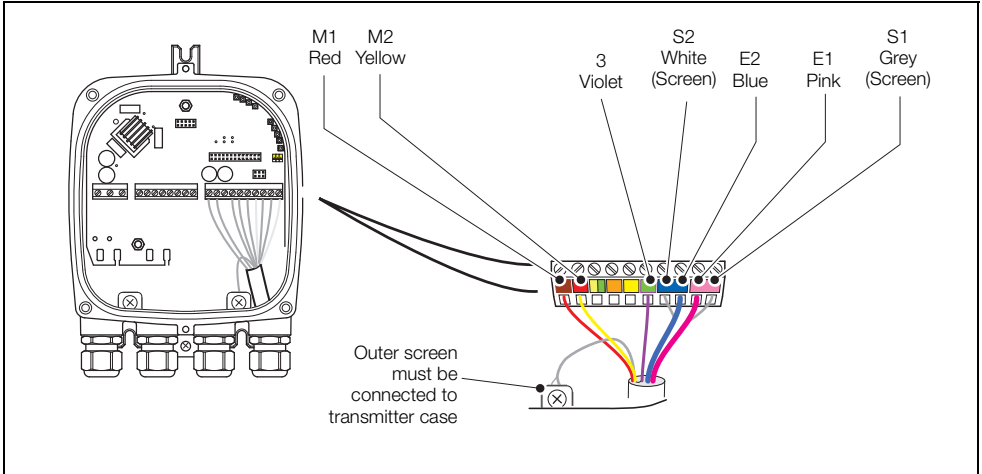


Fig. 2.1 Sensor Cable Connections at Transmitter Terminal Block – Standard System

Caution.

- Do NOT reverse the inner / signal [E1, E2] and outer / screen [S1, S2] cores of the coaxial cables.
- Ensure the black anti-microphonic layer in the grey and white screened cables is removed.

2.1.1 Sensor Coil Resistance

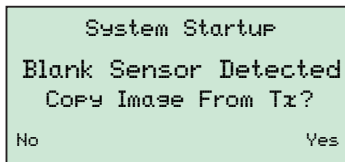
WaterMaster transmitter requires a minimum sensor coil resistance of 15 Ω for correct operation. The coil resistance can be measured between M1 and M2 with the meter turned off.

Note. An alarm on the WaterMaster display indicates if the coil resistance is too low for the WaterMaster transmitter to operate. For the MF/F flowmeter sensor this alarm should not occur. Contact ABB Service if it does.

3 Programming & Configuration

3.1 Startup

The first time power is applied the HMI screen displays the following message:

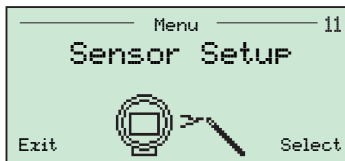


Press 'No'. This screen does not appear on subsequent power up.

3.2 Accessing the Programming Menus

Refer to WaterMaster Programming Guide (IM/WMP) and login at Advanced security level.


3.3 Programming Menu – Sensor Setup



The 'Sensor Setup' programming menu enables the WaterMaster electronics to be 'Retro-Fitted' to MagMaster MF/F sensors.

For retrofit applications an extra menu (Sensor Setup) appears at the end of the menu tables; it is not present on factory-calibrated WaterMaster flowmeters. Note that after completing configuration of the retrofit installation, this menu disappears.

If this menu is not present and you are unable to configure the necessary calibration factors below, contact ABB Service.

Note. When [Cal. Status] = Not Complete,  alarm appears on the display and 'S110.034 Sensor setup not complete' alarm appears in the active alarms list.

The 'Sensor Setup' menu (while visible) enables the setting of items such as the [Sensor Type], [Sensor Size] and calibration [Span Ss] and [Zero Sz] at 'Advanced' level access. These items are normally editable only at 'Service' level and are hidden after setup.

[Sensor Setup]

[Sensor Type] Type of Flow Sensor, set to WM Full Bore:

[Probe]*	[DE4]*
[Process]*	[DE2]*
[Hygienic]*	[Process OIML]*
[WM Reduced Throat]*	[Hygienic OIML]*
[WM Full Bore]	[No Sensor]*

*Do not use these settings

[Sensor Setup] continued

[Sensor Size (Bore)] Nominal bore size of flow sensor in mm:

[DN1]*	[DN65]*	[DN760]
[DN1_5]*	[DN80]	[DN800]
[DN2]*	[DN100]	[DN900]
[DN3]*	[DN125]*	[DN1000]
[DN4]*	[DN150]	[DN1050]
[DN6]*	[DN200]	[DN1100]
[DN8]*	[DN250]	[DN1200]
[DN10]*	[DN300]	[DN1400]
[DN15]*	[DN350]	[DN1500]
[DN20]*	[DN400]	[DN1600]
[DN25]*	[DN450]	[DN1800]*
[DN32]*	[DN500]	[DN2000]*
[DN40]*	[DN600]	[DN2200]*
[DN50]*	[DN700]	[Special]*

*Do not use these settings as they are not supported by the upgrade.

[Sensor Cal Mode] Calibration Mode used for sensor, set to WaterMaster.

[WaterMaster]
[ProcessMaster]*

*Do not use these settings

[Span Ss] Calibration Span of the attached flow sensor – equivalent to MagMaster Cal Fact 1.

1. Refer to Table 3.1, page 6 to calculate WaterMaster Span Ss value from MagMaster Cal Fact 1 (Snsr Fact 1). This Cal Fact 1 is identified on the data label, identified as 'Cal 1'. It is also available on the meter calibration certificate.
2. Multiply the MagMaster Cal Fact 1 by the 'Cal Fact 1 to Ss Multiplier' to find the Span Ss value.
3. Enter the correct Span Ss % value as calculated.
4. Ensure flow is present in the sensor.
5. If the flow reads in the wrong direction, enter the span as a negative value (for example, -123.45 % instead of 123.45 %).

[Zero Sz] Calibration Zero Offset of the attached flow sensor – equivalent to MagMaster Cal Fact 2.

This is identified on the MagMaster sensor data label as 'Cal. 2/3/4'. The zero value is the first number – for example, 'Cal. 2'.

1. Refer to Table 3.1, page 6 to calculate WaterMaster Zero Sz value from MagMaster Cal Fact 2 (Snsr Fact 2).
2. Multiply the MagMaster Cal Fact 2 by the 'Cal Fact 2 to Sz Multiplier' to find the Zero Sz value.
3. Enter the correct Zero Sz value as calculated.

MF/F DN	Cal Fact 1 to Ss Multiplier	Cal Fact 2 to Sz Multiplier
80	102.3	0.1
100	102.0	0.1
150	101.9	0.1
200	101.8	0.1
250	103.8	0.1
300	103.1	0.1
350	104.9	0.1
400	104.5	0.1
450	104.0	0.1
500	105.0	0.1
600	105.4	0.1
700	105.4	0.1
760	101.4	0.1
800	101.2	0.1
900	101.9	0.1
1000	101.8	0.1
1050	101.8	0.1
1100	101.8	0.1
1200	101.8	0.1
1400	101.8	0.1
1500	101.8	0.1
1600	101.8	0.1

Table 3.1 WaterMaster Span Ss Values

[Sensor Setup] continued

[Trim St] Calibration 'trim' adjustment in % applied to the main span [Span Ss].
Is set to 0.000%.

[Mains Frequency] Frequency of the local AC mains / line supply voltage (for noise rejection).
[50 Hz]
[60 Hz]

Set as per the local AC mains / line supply. It must also be set for DC versions.

[Drive Mode] Coil Excitation mode to be used for flow sensor.
Dependent on sensor size. Refer to table below for correct value to set. If this value is altered, the WaterMaster transmitter reboots automatically. After reboot, re-login and continue setup.

[Coil Measurement F] Frequency to use for sensor coil diagnostic measurements.
Dependent on sensor size. Ensure the 'Drive Mode' is set first. Refer to Table 3.2 for the correct value to enter.

Sensor Size	Drive Mode	Coil Measurement F
< DN350	5A	40 Hz
DN350	5A	20 Hz
DN400	5A	20 Hz
DN450	5A	20 Hz
DN500	5A	20 Hz
DN600	7A	8 Hz
DN700	7A	8 Hz
DN760	7A	8 Hz
DN800	7A	8 Hz
DN900	7A	8 Hz
DN1000	7A	8 Hz
DN1200	7A	8 Hz
DN1400	7A	8 Hz
DN1600	7A	8 Hz

Table 3.2 Drive Mode and Coil Measurement Frequency

[Sensor Setup] continued

[Coil Current] The current to be used for sensor coil drive.
All systems using WaterMaster electronics must be set to 180 mA.
[180mA].

[Sensor Calibration]

[First Cal. Date] Date of first calibration.
For retro-fit units set to date on calibration certificate (if known) or set to the date of installing the WaterMaster Transmitter. The date format can be set to user preferences – refer to IM/WMP.

[Last Cal. Date] Date of last calibration. For retro-fit units set to date of installing WaterMaster transmitter

[Last Cal. Location] Set to Location of last calibration. Set to Stonehouse.

[Stonehouse] [Warminster]* [Shanghai]* []*

[Gottingen]* [Moorebank]* [Burlington]*

*Do not use these settings

[Sv] Calibration correction factor.

Set to Zero for retro-fit sensors.

0.000

[Sc] Calibration correction factor.

Set to Zero for retro-fit sensors.

0.000

[Cal. Status] Status of calibration settings for this flowmeter.

Caution. Changing this setting to [Calibrated] causes the 'Sensor Setup' menu to disappear. This sensor calibration data (type, size, span, zero, etc.) is then LOCKED. Modification is then possible only by ABB Service engineers.

Only when programming of calibration settings is complete, fully checked and the flowmeter is working correctly adjust this setting to 'Calibrated'.

The 'Sensor Setup Not Complete' alarm should now disappear.

Upgrade of the MagMaster sensor is now complete.

Further programming or troubleshooting of the flowmeter can be achieved as normal via the keypad (refer to the WaterMaster Programming Guide, IM/WMP).

Products and customer support

Automation Systems

For the following industries:

- Chemical & Pharmaceutical
- Food & Beverage
- Manufacturing
- Metals and Minerals
- Oil, Gas & Petrochemical
- Pulp and Paper

Drives and Motors

- AC and 6 Drives, AC and DC Machines, AC Motors to 1kV
- Drive Systems
- Force Measurement
- Servo Drives

Controllers & Recorders

- Single and Multi-loop Controllers
- Circular Chart and Strip Chart Recorders
- Paperless Recorders
- Process Indicators

Flexible Automation

- Industrial Robots and Robot Systems

Flow Measurement

- Electromagnetic Flowmeters
- Mass Flowmeters
- Turbine Flowmeters
- Wedge Flow Elements

Marine Systems & Turbochargers

- Electrical Systems
- Marine Equipment
- Offshore Retrofit and Refurbishment

Process Analytics

- Process Gas Analysis
- Systems Integration

Transmitters

- Pressure
- Temperature
- Level
- Interface Modules

Valves, Actuators and Positioners

- Control Valves
- Actuators
- Positioners

Water, Gas & Industrial Analytics Instrumentation

- pH, Conductivity and Dissolved Oxygen Transmitters and Sensors
- Ammonia, Nitrate, Phosphate, Silica, Sodium, Chloride, Fluoride, Dissolved Oxygen and Hydrazine Analyzers
- Zirconia Oxygen Analyzers, Katharometers, Hydrogen Purity and Purge-gas Monitors, Thermal Conductivity

Customer support

We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

UK

ABB Limited

Tel: +44 (0)1453 826661

Fax: +44 (0)1453 829671

USA

ABB Inc.

Tel: +1 215 674 6000

Fax: +1 215 674 7183

Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification.

Periodic checks must be made on the equipment's condition. In the event of a failure under warranty, the following documentation must be provided as substantiation:

- A listing evidencing process operation and alarm logs at time of failure.
- Copies of all storage, installation, operating and maintenance records relating to the alleged faulty unit.

ABB Limited

Process Automation

Oldends Lane
Stonehouse
Gloucestershire GL10 3TA
UK

Tel: +44 1453 826 661

Fax: +44 1453 829 671

ABB Inc.

Process Automation

125 E. County Line Road
Warminster
PA 18974
USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183

www.abb.com

Note

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents in whole or in parts – is forbidden without prior written consent of ABB.

Copyright© 2011 ABB

All rights reserved

IM/MIM2MW-EN Rev. A 12.11