Bringing unsurpassed flowmetering to the Water and Waste-Water industries

Industry-specific design for the water and waste water industries in diameters from 15mm (1/2 in.) to 600mm (24 in.)

Wide flow range with ±0.25% accuracy

Extended low-flow capability to ensure measurement of minimal night flows

Low purchase and life costs

Submersible and buriable sensor
— inherently suitable for use in flooded environments
  Eliminates chambers and promotes very low installation costs

Designed, manufactured and calibrated to internationally accepted standards
— ISO 9001/NAMAS/NIST/NATA/GOST
  Ensures reliable, maintenance-free operation

Three internal totalizers:
Forward, reverse and net
Forward & reverse flowrates and comprehensive range of outputs:
current, pulse, data and HART
— single package satisfying all user display requirements
  Ensures compatibility with user’s control system requirements
Electromagnetic Flowmeter
MagMaster Loflo

Introduction

Setting the Standard
The MagMaster Loflo range, available in sizes 15mm to 600mm (1/2 in. to 24 in.), is designed specifically for use on the many diverse applications encountered in the water and waste-water industry.

The specification, features and user benefits offered by this range are based on ABB’s worldwide experience in this industry and they are all targeted specifically to the industry’s requirements.

Flow Performance
MagMaster Loflo has an extended operating flow range with ±0.25% accuracy over the majority of this extended range in both forward and reverse flow directions as standard.

Emphasis is placed on the low-flow region which is particularly important for the water industry. MagMaster Loflo sets new standards for low-flow capability and enables accurate measurement of previously unmetered night flows.

Submersible and Buriable
All MagMaster Loflo sensors have a rugged, robust construction to ensure a long, maintenance-free life under the arduous conditions experienced in the Water and Waste Industry. The sensors are, as standard, inherently submersible (IP68, NEMA 6P), thus ensuring suitability for installation in chambers and metering pits which are liable to flooding.

A unique feature of the MagMaster Loflo sensors is that all sizes are buriable. Installation merely involves excavating to the underground pipe, fitting the sensor, cabling back to the transmitter and then backfilling the hole. No metering chambers or pits are required and the overall low-cost installation is simple and fast.

Comprehensive Features
A wide range of features and user benefits are built into MagMaster as standard:

- bi-directional flow
- liquid sensing
- comprehensive test mode
- universal switch mode power supply (options are available for AC and DC supplies)
- self-diagnostics
- programmable multiple alarm capability

Assured Quality
MagMaster is designed and manufactured in accordance with international quality procedures (ISO 9001) and all flowmeters are calibrated on nationally-traceable calibration rigs to provide the end-user with complete assurance of both quality and performance of the meter.

Fully Featured Transmitters
MagMaster is offered with integral or remote transmitters, each being available with a choice of display, configuration and communication options to suit the application. Standard features include forward, reverse and net flow totalizers, flow rate, alarm monitoring and automatic self-diagnostics to ensure integrity. All data and values are in customer-defined units of measurement. System compatibility is assured with a choice of current, pulse, serial data and Smart HART communications.

MagMaster operating parameters may be set via local keypads, remote configurators or computers as appropriate. The software features multi-level password protection capability to prevent inadvertent programs or settings changes. Data is stored in non-volatile memory for greater than 10-year retention.

In the non-keypad variant, display data can only be changed using a magnetic wand. No operational parameters can be changed without the use of configurators and appropriate passwords.

New Performances Standards for Flow Measurement
Widest flow range, optimum accuracy and long term stable calibration mean that MagMaster LoFlo sets new performance standards in the water industry.

This unique low flow rate capability enables previously unrecordable minimal night flow rates to be metered; particularly important for bulk revenue and district metering applications.
Specification

Specification – Sensor

Sizes, Accuracies and Flow Rates (under reference conditions)

Flow rate in m³ h⁻¹

<table>
<thead>
<tr>
<th>Sizes DN</th>
<th>Max. Flow ±0.25%*</th>
<th>Min. Flow ±0.25%*</th>
<th>Transition Flow ±2.0%</th>
<th>Min Flow ±5.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1/2</td>
<td>3</td>
<td>0.08</td>
<td>0.009</td>
</tr>
<tr>
<td>20</td>
<td>3/4</td>
<td>5</td>
<td>0.13</td>
<td>0.015</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>7</td>
<td>0.18</td>
<td>0.021</td>
</tr>
<tr>
<td>40</td>
<td>1 1/2</td>
<td>20</td>
<td>0.50</td>
<td>0.06</td>
</tr>
<tr>
<td>50</td>
<td>2</td>
<td>30</td>
<td>0.75</td>
<td>0.09</td>
</tr>
<tr>
<td>65</td>
<td>2 1/2</td>
<td>50</td>
<td>1.25</td>
<td>0.15</td>
</tr>
<tr>
<td>80</td>
<td>3</td>
<td>80</td>
<td>2.0</td>
<td>0.24</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>120</td>
<td>3.0</td>
<td>0.36</td>
</tr>
<tr>
<td>150</td>
<td>6</td>
<td>300</td>
<td>7.5</td>
<td>0.90</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
<td>500</td>
<td>12.5</td>
<td>1.50</td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>800</td>
<td>20</td>
<td>2.40</td>
</tr>
<tr>
<td>300</td>
<td>12</td>
<td>1200</td>
<td>30</td>
<td>3.60</td>
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<td>350</td>
<td>14</td>
<td>1600</td>
<td>40</td>
<td>6.40</td>
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<td>400</td>
<td>16</td>
<td>2000</td>
<td>50</td>
<td>8.00</td>
</tr>
<tr>
<td>450</td>
<td>18</td>
<td>2600</td>
<td>60</td>
<td>10.40</td>
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<td>500</td>
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<td>3000</td>
<td>76</td>
<td>12.00</td>
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<td>24</td>
<td>5000</td>
<td>125</td>
<td>20.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.80</td>
</tr>
</tbody>
</table>

* Accuracy for sizes 15, 20 and 25 is ±0.35%

Accuracy (under forward flow reference conditions) as ‘Flow Rate’ table, plus the following:

Analog output

Additional <±0.01mA

Temperature effect

Transmitter

<±0.08% of reading/10°C

Analog output – Additional

<±0.08% of reading/10°C

Power supply variation

Negligible

Pressure effect

<0.15% over the operating range of the equipment

Pipe conditions

Pressure Loss

At Meter Maximum Flow

0.3 bar

At 50% of Meter Maximum Flow

0.075 bar
Electromagnetic Flowmeter
MagMaster Loflo

Wetted Materials
Screw End Meters
Brass, PPS and stainless steel 316L electrodes.
Flanged Meters
Lining
15 to 25mm – PPS
40 to 80mm – POMC
100 to 600mm – Elastomer (UKWFBS listed)
Electrodes – Stainless steel 316

Pressure Limitations
As flange rating
Screw end meters – 50 bar

Conductivity
>5µS cm⁻¹

Transmitter/Sensor Separation
<100m (328 ft)

Power consumption
<20VA

Environmental Protection (when installed, remote sensor only)
Rating: IP68/NEMA 6P to 10m (33 ft) depth
Buriable: To 5m (16 ft) depth

End Connections
Sizes ≤25mm (1 in.) male screw thread:
15mm – G 3/4 in. B3/4 in. NPSM
20mm – G 1 in B1 in NPSM
25mm – G 1 1/4 in. B1 1/4 in. NPSM
Sizes ≥40mm (1 1/2 in.) flanged to mate with:
ANSI B16-5 Class 150 (≤300mm only)
BS4504/ISO7005 – PN16, PN10
AS4087/14
AS2129 Table ‘C’ & ‘D’
BS10/AS2129 Table ‘D’ & ‘E’
JIS to B2210, 5k, 10k

Temperature Ranges

Ambient
-20°C (-4°F)
70°C (158°F)

Process
60°C (110°F)

Note. Alternative higher temperature versions available.
Sensor Sizes
15 to 25mm (1/2 to 1 in.) – Screw Ends

<table>
<thead>
<tr>
<th>Meter Size</th>
<th>Dimensions* mm (in.)</th>
<th>Connection</th>
<th>Approx. Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>A</td>
<td></td>
<td>kg</td>
</tr>
<tr>
<td>15</td>
<td>1/2</td>
<td>119 (4.7)</td>
<td>G 3/4 in. B or 3/4 in. NPSM</td>
</tr>
<tr>
<td>20</td>
<td>3/4</td>
<td>127 (5)</td>
<td>G 1 in. B or 1 in. NPSM</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>127 (5)</td>
<td>G 1 1/4 in. B or 1 1/4 in. NPSM</td>
</tr>
</tbody>
</table>

*Nominal dimensions

Remote Transmitter
Mounting Option Dimensions

Dimensions in mm (in.)

Note. See page 8 for Terminal Box and Transmitter dimensions.
Electromagnetic Flowmeter
MagMaster Loflo

Specification – Transmitter
Display (optional)

Programming Options
- Local hand-held configurator
- Integral keypad
- HART

Fully configurable
A choice of engineering parameters in engineering units e.g. flowrate, flow units, all outputs etc.

Liquid sensing
Ensures units read zero on empty pipe

Interchangeability
Transmitter/sensor can be changed without affecting performance

Self diagnostics
Ensures transmitter and sensor integrity

Test mode
Powerful commissioning aid. Exercises all outputs and displays, even without a connected sensor

Language
English, French, German, Spanish, Italian, Dutch, plus others on application

Temperature Ranges
Operating
- 60°C (140°F)
- −10°C (14°F)

Storage
- 75°C (167°F)
- −15°C (5°F)

Power Supply *

<table>
<thead>
<tr>
<th>Voltage Type</th>
<th>Voltage Range (V)</th>
<th>Frequency (Hz)</th>
<th>VA</th>
</tr>
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<tbody>
<tr>
<td>AC</td>
<td>95 to 250 nominal</td>
<td>47 to 440</td>
<td>&lt; 20</td>
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<tr>
<td>DC</td>
<td>11 to 40 maximum</td>
<td>-</td>
<td>&lt; 20</td>
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</table>

*Power supply fully isolated
**Electromagnetic Flowmeter**

**MagMaster Loflo**

**Environmental protection**

- IP65/NEMA4

**EMC Specification**

- Conforms to –
  
  - EMC Directive 89/336/EEC to 10 V/m

**Enclosure**

- Glass loaded polypropylene, polycarbonate window
- UL VO rated

**Electrical connections**

- 20 mm glands, or accepts
- 1/2 in. NPT connections

**Sensor Cable**

- ABB supplied standard and armored versions

**Outputs/Inputs**

Galvanic separation to 50V DC between analog, pulse/alarm and earth/ground

**Common**

- \( < 21 \text{mA}, \leq 16V \).
- \( < 800 \text{Hz}, < 35V \) open collector square wave, or fixed pulse width \( < 2.5s, \leq 250 \text{mA} \).
- \( < 35V, > 250 \text{mA} \) open collector.
- Contact closure or logic input.

**Optional (For Blind & 2-line display units)**

- RS232 (local only)
- 9-pin D-connector (PC compatible).
Overall Dimensions
Transmitter – Remote Mounting

Dimensions in mm (in.)

Transmitter – Integral (Mounted on Sensor)

Dimensions in mm (in.)

Terminal Box (Mounted on Sensor)

Dimensions in mm (in.)
Electrical Connections

Note: Remove any exposed black conductive layer from the inner insulation of both coaxial cables.
## Ordering Information

<table>
<thead>
<tr>
<th>Electromagnetic Flowmeter</th>
<th>Main Code</th>
<th>Optional Code</th>
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<tbody>
<tr>
<td>MM/G E</td>
<td>X</td>
<td>XXXX</td>
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<tr>
<td></td>
<td>X</td>
<td>X</td>
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<table>
<thead>
<tr>
<th>Country</th>
<th>Default Flange</th>
<th>Cable Entry</th>
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<tbody>
<tr>
<td>English</td>
<td>PN16</td>
<td>20mm</td>
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<tr>
<td>French</td>
<td>PN16</td>
<td>20mm</td>
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<td>German</td>
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<td>PN16</td>
<td>20mm</td>
</tr>
<tr>
<td>Dutch</td>
<td>PN16</td>
<td>20mm</td>
</tr>
<tr>
<td>USA</td>
<td>ANSI.150</td>
<td>1/2 in. NPT</td>
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<tr>
<td>Australia</td>
<td>AS4087/14</td>
<td>20mm</td>
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<table>
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<tr>
<th>End Connections – Flanged</th>
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<tbody>
<tr>
<td>mm</td>
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<td>15</td>
</tr>
<tr>
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</tr>
<tr>
<td>450</td>
</tr>
<tr>
<td>500</td>
</tr>
<tr>
<td>600</td>
</tr>
</tbody>
</table>

### Sensor/Electronic Display unit

- Sensor and Integral electronics (DN40 to DN300 only) 2
- Sensor and Remote Electronics 3

### Power Supply

- AC L
- DC P

### Transmitter Display Options

- 2-Line Display 0
- Blind 1
- 3-Line Display with Key Pad + earth ring for ≥DN100 G
- 2-Line Display with HART + earth ring for ≥DN100 H

### Cable Length (Supplied loose) – Remote Electronic Unit only

<table>
<thead>
<tr>
<th>Cable Length</th>
<th>Code</th>
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<tbody>
<tr>
<td>0m</td>
<td>0</td>
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<tr>
<td>10m</td>
<td>1</td>
</tr>
<tr>
<td>20m</td>
<td>2</td>
</tr>
<tr>
<td>30m</td>
<td>3</td>
</tr>
<tr>
<td>40m</td>
<td>4</td>
</tr>
<tr>
<td>50m</td>
<td>5</td>
</tr>
<tr>
<td>60m</td>
<td>6</td>
</tr>
<tr>
<td>70m</td>
<td>7</td>
</tr>
<tr>
<td>80m</td>
<td>8</td>
</tr>
<tr>
<td>100m</td>
<td>A</td>
</tr>
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</table>
### Electromagnetic Flowmeter

#### MagMaster Loflo

<table>
<thead>
<tr>
<th>Main Code</th>
<th>Optional Code</th>
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</thead>
<tbody>
<tr>
<td>MM/G E X</td>
<td>X X X X X X</td>
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</table>

#### Labeling/Construction

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<tr>
<th>ABB UK</th>
<th>0</th>
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<tbody>
<tr>
<td>ABB USA</td>
<td>1</td>
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#### Flange Style/End Connections

- Standard (see country digit on previous page) 0
- AS4087 Class 14 Flanges (40 to 600mm only) A
- AS2129 Table C Flanges (40 to 600mm only) C
- AS2129 Table D Flanges (40 to 600mm only) D
- ISO 7005 PN10 Flanged (40 to 600mm only) M
- ISO 7005 PN16 Flanged (40 to 600mm only) E
- ANSI B 16.5 Class 150 Flanged (40 to 600mm only) U
- BS10 Table D Flanged (40 to 600mm only) F
- BS10 Table E Flanged (40 to 600mm only) G
- JIS B2210, 5 k Flanged (40 to 600mm only) L
- JIS B2210, 10 k Flanged (40 to 600mm only) J
- Parallel thread ISO 228-1 Class B (15 to 25mm only) T
- Thread to NPSM (3/4 to 11/4 in. only) Y

#### Cable Entries

- Standard (see country digit). Cable not fitted/potted 0
- Standard (see country digit). Cable fitted/potted A
- 20mm Plastic Glands. Cable not fitted/potted 1
- 20mm Plastic Glands. Cable fitted/potted B
- 1/2 in. NPT (USA Only). Cable not fitted/potted 3
- 20mm armoured. Cable not fitted/potted 2
- 20mm armoured. Cable fitted/potted C

#### Fixed Digits

<table>
<thead>
<tr>
<th>Calibration</th>
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<tr>
<td>1 Point – no pressure test</td>
<td>0</td>
</tr>
<tr>
<td>1 Point – with pressure test</td>
<td>1</td>
</tr>
<tr>
<td>3 Point – no pressure test</td>
<td>2</td>
</tr>
<tr>
<td>3 Point – with pressure test</td>
<td>3</td>
</tr>
<tr>
<td>NAMAS + pressure test (≥250mm only)</td>
<td>4</td>
</tr>
<tr>
<td>3 Point – no pressure test, CalMaster fingerprint</td>
<td>5</td>
</tr>
<tr>
<td>3 Point – with pressure test, CalMaster fingerprint</td>
<td>6</td>
</tr>
</tbody>
</table>
Contact us

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

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