

Data Sheet

SS/MMLF Issue 6

Electromagnetic Flowmeter

MagMaster Loflo

- Industry-specific design for the water and waste water industries in diameters from 15mm (1/2 in.) to 600mm (24in.)
- Wide flow range with $\pm 0.25\%$ 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



MagMaster Loflo – bringing unsurpassed flowmetering to the Water and Waste-Water industries

ABB

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 $\pm 0.25\%$ 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 unmetred 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

Sensor

Sizes, Accuracies and Flow Rates
(under reference conditions)

Flow rate in m³ h⁻¹

| Sizes DN | | Max.Flow ±0.25%* | Min. Flow ±0.25%* | Transition Flow ±2.0% | Min Flow ±5.00% |
|----------|-------|---------------------|----------------------|-----------------------------|--------------------|
| mm | in | | | | |
| 15 | 1/2 | 3 | 0.08 | 0.009 | 0.004 |
| 20 | 3/4 | 5 | 0.13 | 0.015 | 0.006 |
| 25 | 1 | 7 | 0.18 | 0.021 | 0.009 |
| 40 | 1 1/2 | 20 | 0.50 | 0.06 | 0.025 |
| 50 | 2 | 30 | 0.75 | 0.09 | 0.038 |
| 65 | 2 1/2 | 50 | 1.25 | 0.15 | 0.063 |
| 80 | 3 | 80 | 2.0 | 0.24 | 0.10 |
| 100 | 4 | 120 | 3.0 | 0.36 | 0.15 |
| 150 | 6 | 300 | 7.5 | 0.90 | 0.38 |
| 200 | 8 | 500 | 12.5 | 1.50 | 0.63 |
| 250 | 10 | 800 | 20 | 2.40 | 1.00 |
| 300 | 12 | 1200 | 30 | 3.60 | 1.50 |
| 350 | 14 | 1600 | 40 | 6.40 | 2.80 |
| 400 | 16 | 2000 | 50 | 8.00 | 3.50 |
| 450 | 18 | 2600 | 66 | 10.40 | 4.60 |
| 500 | 20 | 3000 | 76 | 12.00 | 5.30 |
| 600 | 24 | 5000 | 125 | 20.00 | 8.80 |

* 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

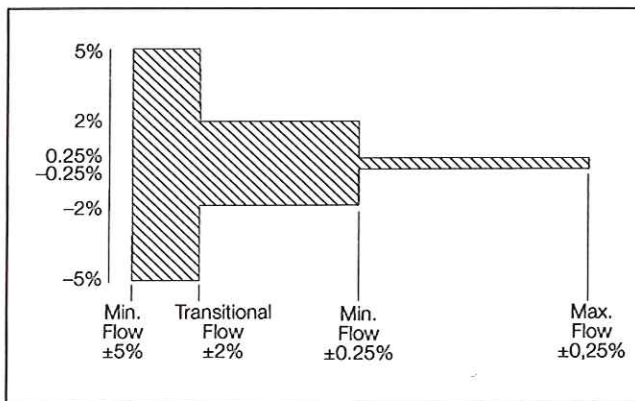
Transmitter
<±0.08% of reading/10°C

Analog output - Additional
<±0.08% of reading/10°C

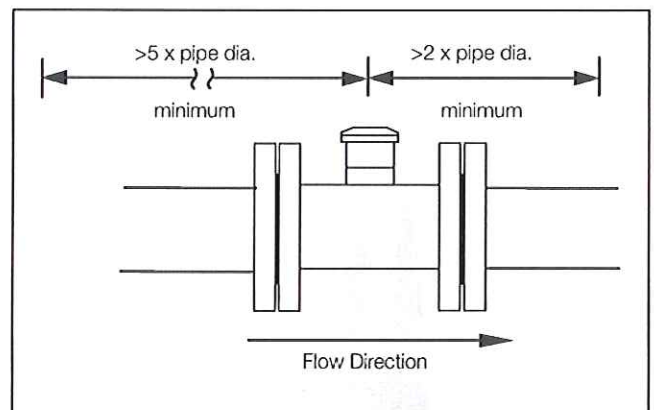
Power supply variation
Negligible

Pressure effect
<0.15% over the operating range of the equipment

Flow Ranges



Pipe conditions



Pressure Loss

| | |
|------------------------------|-----------|
| At Meter Maximum Flow | 0.3 bar |
| At 50% of Meter Maximum Flow | 0.075 bar |

Electromagnetic Flowmeter
MagMaster Loflo

SS/MMLF Issue 6

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. B 3/4 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

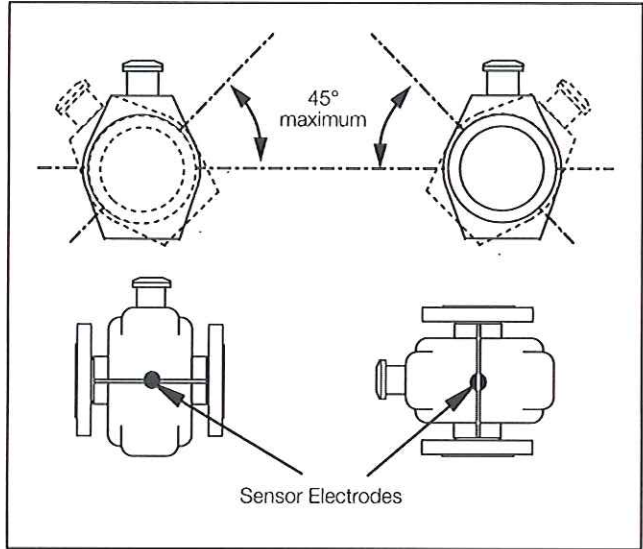
AS4087/14

AS2129 Table 'C' & 'D'

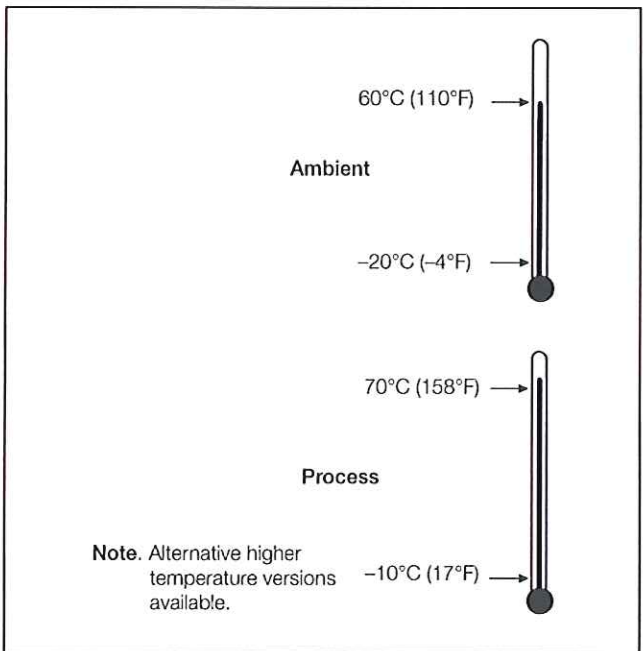
BS10/AS2129 Table 'D' & 'E'

JIS to B2210, 5k, 10k

Mounting



Temperature Ranges



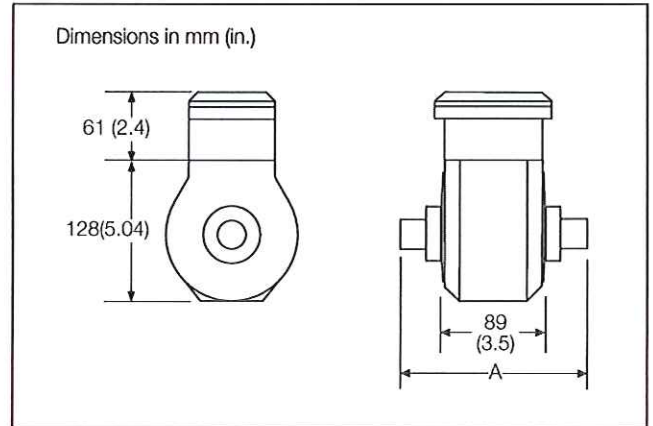
Sensor Sizes

15 to 25mm (1/2 to 1 in.) – Screw Ends

| Meter Size | | Dimensions* mm (in.) | | Connection | Approx. Weight | |
|------------|-----|----------------------|--|---------------------------------|----------------|----|
| mm | in. | A | | | kg | lb |
| 15 | 1/2 | 119 (4.7) | | G 3/4 in. B or 3/4 in. NPSM | 2.5 | 5 |
| 20 | 3/4 | 127 (5) | | G 1 in. B or 1 in. NPSM | 2.5 | 5 |
| 25 | 1 | 127 (5) | | G 1 1/4 in. B or 1 1/4 in. NPSM | 2.5 | 5 |

*Nominal dimensions

Remote Transmitter Mounting Option Dimensions

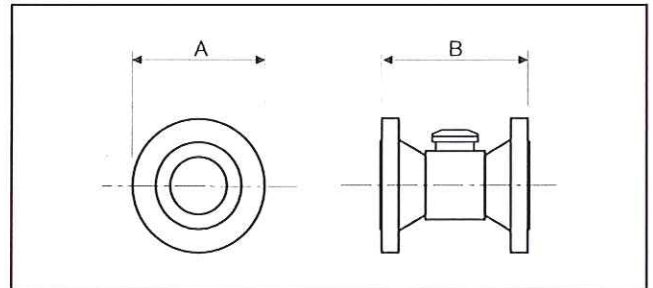


40 to 300mm (1 1/2 to 12 in.) – Flanged

| Meter Size | | Dimensions* mm (in.) | | Approx. Weight | | Max. End Loading | |
|------------|-------|----------------------|------------|----------------|-----|------------------|--------|
| mm | in. | A** | B | kg | lb | kN | lb |
| 40 | 1 1/2 | 176 (7) | 200 (7.9) | 11 | 24 | - | - |
| 50 | 2 | 176 (7) | 200 (7.9) | 12 | 27 | - | - |
| 65 | 2 1/2 | 219 (8.6) | 200 (7.9) | 13 | 29 | - | - |
| 80 | 3 | 219 (8.6) | 200 (7.9) | 18 | 40 | - | - |
| 100 | 4 | 230.5 (9.8) | 250 (9.8) | 15 | 33 | 100 | 23000 |
| 150 | 6 | 281 (11.8) | 300 (11.8) | 31 | 68 | 190 | 43000 |
| 200 | 8 | 402 (15.8) | 350 (13.8) | 48 | 106 | 270 | 61000 |
| 250 | 10 | 440 (17.3) | 450 (17.7) | 75 | 165 | 390 | 89000 |
| 300 | 12 | 480 (18.9) | 500 (19.7) | 112 | 247 | 540 | 123000 |

*Nominal dimensions

**Dimensions are approximate and varying depending on flange type

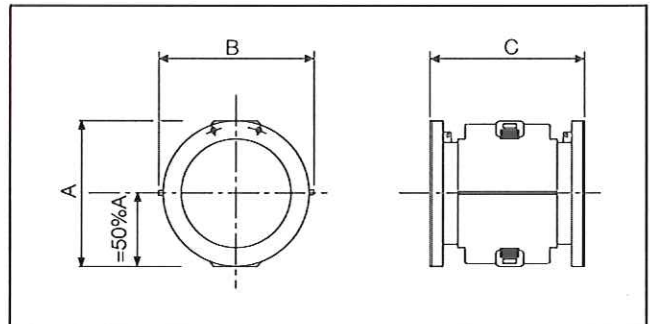


350 to 600mm (14 to 24 in.) – Flanged

| Meter Size | | Dimensions* mm (in.) | | | Approx. Weight | |
|------------|----|----------------------|------------|------------|----------------|-----|
| mm | in | A** | B | C | kg | lb |
| 350 | 14 | 513 (20.2) | 520 (20.5) | 550 (21.7) | 100 | 220 |
| 400 | 16 | 570 (22.4) | 576 (22.7) | 600 (23.6) | 115 | 253 |
| 450 | 18 | 632 (24.9) | 627 (24.7) | 698 (27.5) | 160 | 352 |
| 500 | 20 | 686 (27.0) | 679 (26.7) | 768 (30.2) | 217 | 455 |
| 600 | 24 | 772 (30.4) | 770 (30.3) | 918 (36.1) | 315 | 693 |

*Nominal dimensions

**Dimensions are approximate and varying depending on flange type



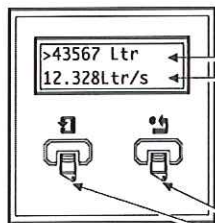
Note. See page 8 for Terminal Box and Transmitter dimensions.

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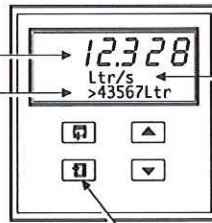
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Transmitter
Display (optional)

2-Line Display Version



Keypad Version



Forward flow total
Reverse flow total
Net flow total
Alarms
Flow Velocity in m/s or ft/s
Flow Rate % of Range

Flow rate

Magnetic switches
for totalizer reset &
to scroll through all
parameters

Alarm/
Flowrate units

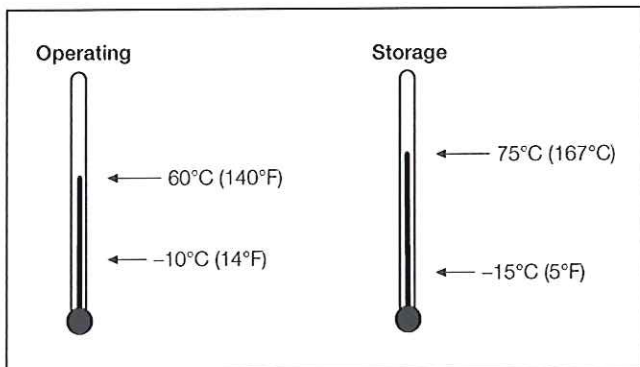
Membrane keys for access,
adjustment of all parameters,
totalizer reset and to scroll
through all parameters

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



Power Supply *

| Voltage Type | Voltage Range (V) | Frequency (Hz) | VA |
|--------------|-------------------|----------------|------|
| AC | 95 to 250 nominal | 47 to 440 | < 20 |
| DC | 11 to 40 maximum | - | < 20 |

*Power supply fully isolated

Electromagnetic Flowmeter
MagMaster Loflo

SS/MMLF Issue 6

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

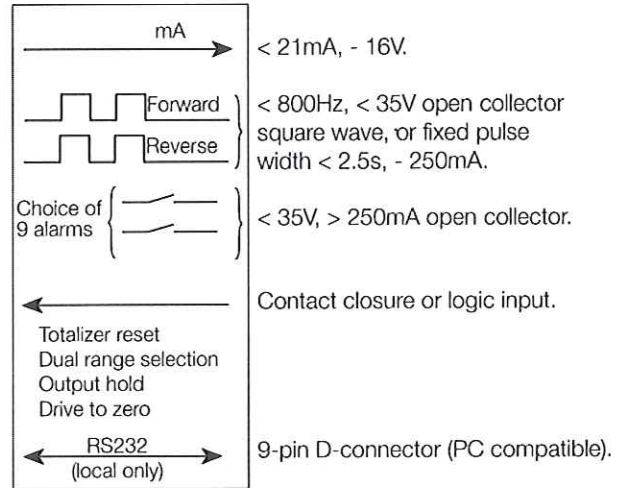
ABB supplied standard and armored versions



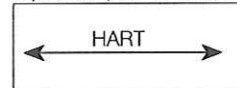
Outputs/Inputs

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

Common



Optional (For Blind & 2-line display units)

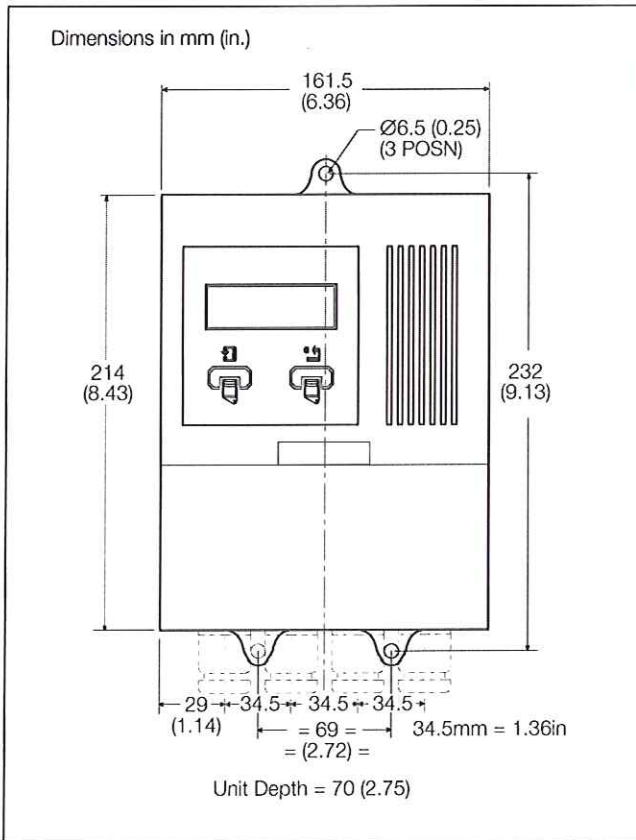


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MagMaster Loflo

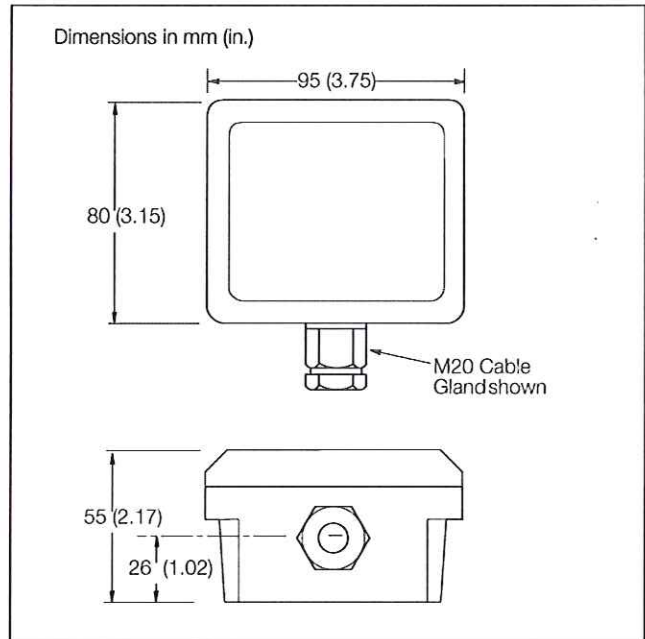
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Overall Dimensions

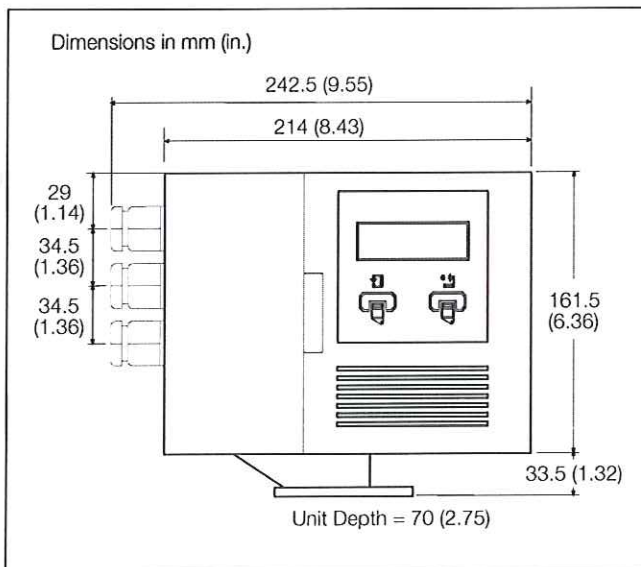
Transmitter – Remote Mounting



Terminal Box (Mounted on Sensor)



Transmitter – Integral (Mounted on Sensor)

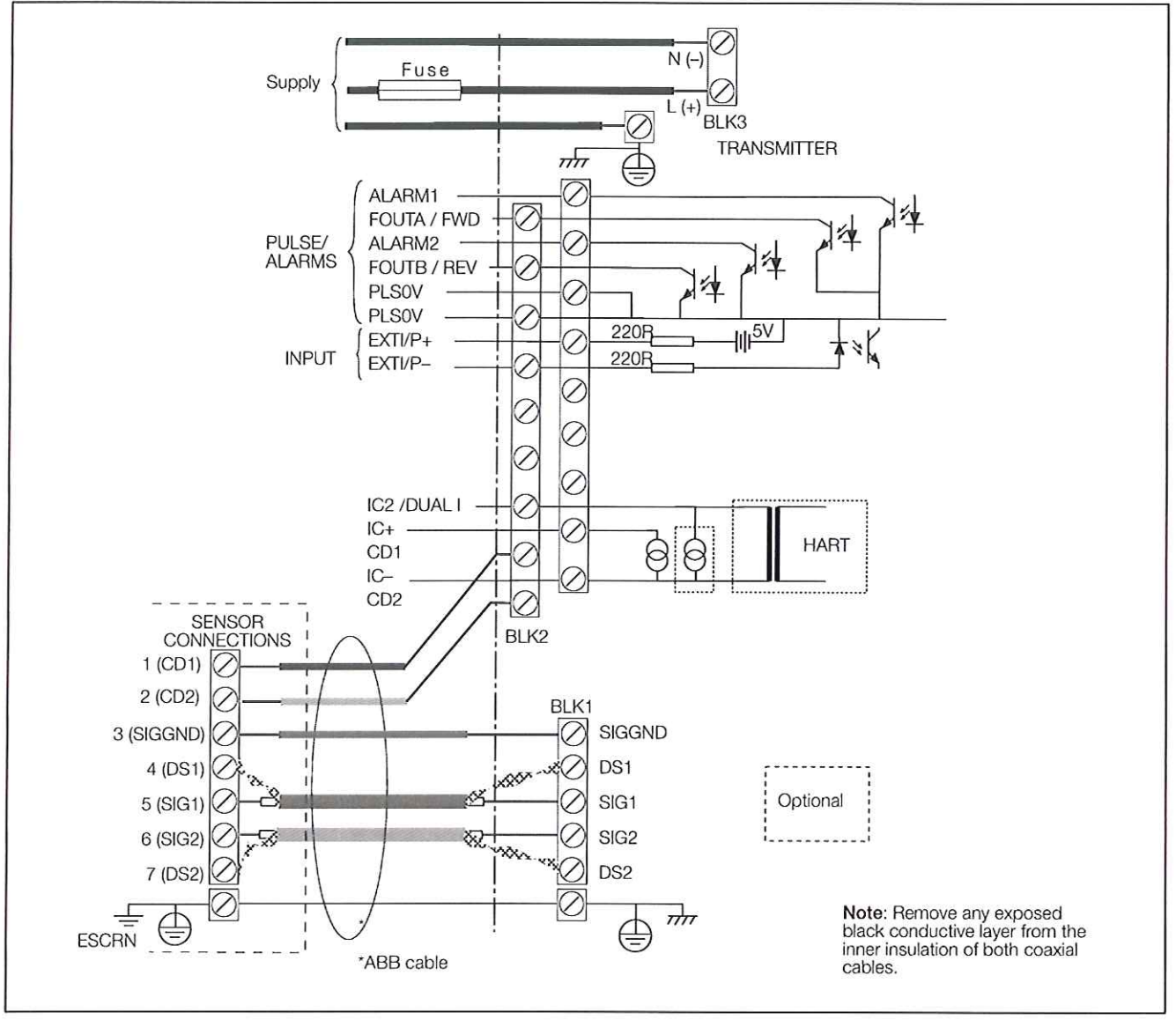


25.08.09 3D

KH-BI PINS 73.1

5.9

Electrical Connections



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SS/MMLF Issue 6

Ordering Information

| Electromagnetic Flowmeter | | | Main Code | | | | | | Optional Code | | | | | |
|--|-----------------------|--------------------|-----------|------|------|---|---|---|---------------|---|---|---|---|---|
| | | | MM/G E | X | XXXX | X | X | X | X | X | X | 0 | X | |
| Country | Default Flange | Cable Entry | | | | | | | | | | | | |
| UK | PN16 | 20mm | G | | | | | | | | | | | |
| France | PN16 | 20mm | F | | | | | | | | | | | |
| Germany | PN16 | 20mm | D | | | | | | | | | | | |
| Spain | PN16 | 20mm | E | | | | | | | | | | | |
| Italy | PN16 | 20mm | I | | | | | | | | | | | |
| Holland | PN16 | 20mm | H | | | | | | | | | | | |
| USA | ANSI.150 | 1/2 in. NPT | U | | | | | | | | | | | |
| Australia | AS4087/14 | 20mm | A | | | | | | | | | | | |
| Calibrated Bore | | | | | | | | | | | | | | |
| mm | in. | | | | | | | | | | | | | |
| 15 | (5/8) | | | 0015 | | | | | | | | | | |
| 20 | (3/4) | | | 0020 | | | | | | | | | | |
| 25 | (1) | | | 0025 | | | | | | | | | | |
| 40 | (1 1/2) | | | 0040 | | | | | | | | | | |
| 50 | (2) | | | 0050 | | | | | | | | | | |
| 65 | (2 1/2) | | | 0065 | | | | | | | | | | |
| 80 | (3) | | | 0080 | | | | | | | | | | |
| 100 | (4) | | | 0100 | | | | | | | | | | |
| 150 | (6) | | | 0150 | | | | | | | | | | |
| 200 | (8) | | | 0200 | | | | | | | | | | |
| 250 | (10) | | | 0250 | | | | | | | | | | |
| 300 | (12) | | | 0300 | | | | | | | | | | |
| 350 | (14) | | | 0350 | | | | | | | | | | |
| 400 | (16) | | | 0400 | | | | | | | | | | |
| 450 | (18) | | | 0450 | | | | | | | | | | |
| 500 | (20) | | | 0500 | | | | | | | | | | |
| 600 | (24) | | | 0600 | | | | | | | | | | |
| Sensor/Electronic Display unit | | | | | | | | | | | | | | |
| Sensor and Integral electronics (DN40 to DN300 only) | | | | | | | | | | | | | | |
| Sensor and Remote Electronics | | | | | | | | | | | | | | |
| Power Supply | | | | | | | | | | | | | | |
| AC | | | | | | | | | | | | | | |
| DC | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | |
| Not required on sensor-mounted transmitter | | | | | | | | | | | | | | |
| 0m | | | | | | | | | | | | | | 0 |
| 10m | | | | | | | | | | | | | | 1 |
| 20m | | | | | | | | | | | | | | 2 |
| 30m | | | | | | | | | | | | | | 3 |
| 40m | | | | | | | | | | | | | | 4 |
| 50m | | | | | | | | | | | | | | 5 |
| 60m | | | | | | | | | | | | | | 6 |
| 70m | | | | | | | | | | | | | | 7 |
| 80m | | | | | | | | | | | | | | 8 |
| 100m | | | | | | | | | | | | | | A |

25.08.09 3D

KH-BI PINS P3.1

S.11

Electromagnetic Flowmeter
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SS/MMLF Issue 6

| Electromagnetic Flowmeter | Main Code | | | | | | | Optional Code | | | | |
|--|-----------|---|------|---|---|---|---|---------------|---|---|---|---|
| | MM/G E | X | XXXX | X | X | X | X | X | X | 0 | X | |
| Labelling/Construction | | | | | | | | | | | | |
| ABB UK | | | | | | | | | | 0 | | |
| ABB USA | | | | | | | | | | 1 | | |
| 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 1 1/4 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 armored. Cable not fitted/potted | | | | | | | | | | | | 2 |
| 20mm armored. Cable fitted/potted | | | | | | | | | | | | C |
| Fixed Digits | | | | | | | | | | | | 0 |
| Calibration | | | | | | | | | | | | |
| 1 Point - no pressure test | | | | | | | | | | | | 0 |
| 1 Point - with pressure test | | | | | | | | | | | | 1 |
| 3 Point - no pressure test | | | | | | | | | | | | 2 |
| 3 Point -with pressure test | | | | | | | | | | | | 3 |
| NAMAS + pressure test (≥250mm only) | | | | | | | | | | | | 4 |
| 3 Point - no pressure test, CalMaster fingerprint | | | | | | | | | | | | 5 |
| 3 Point - with pressure test, CalMaster fingerprint | | | | | | | | | | | | 6 |