

- **Unrivalled, fully traceable flow performance, $\pm 0.2\%$ accuracy. Operable flow range: 1000 : 1**
 - ensures precise revenue measurement; superior process control
- **Approved hygienic/sanitary design with choice of connections**
 - allows clean-in-place and total flexibility of installation
- **Designed and manufactured to internationally accepted standards ISO 9001, 3A, FDA (PMO), USDA**
 - ensures reliable, maintenance-free operation
- **Fully-featured transmitter with comprehensive display and output options, including HART**
 - allows easy integration into other systems and clear operator interface
- **Corrosion free polypropylene transmitter enclosure NEMA4X/IP65**
 - suitable for all brewing, food, pharmaceutical and dairy environments
- **2 Year Warranty**



***MagMaster
Electronic Magnetic Sensor -
Hygienic/Sanitary***

INTRODUCTION

Setting the Standard

MagMaster – the high performance flowmeter – is now available in a hygienic/sanitary version for food processing and pharmaceutical applications. MagMaster is designed for use in dairies, breweries, pharmaceutical and liquid food processing markets and it takes hygienic/sanitary flowmetering to new levels of capability and performance. The new range brings to these industries a proven level of performance which is unsurpassed in electromagnetic flow measurement.

Unrivalled Performance

MagMaster provides reliable measurement from high capacity down to virtually zero flow rates. Its potential operating flow range of 1000:1 enables previously unregistered minimal flows to be metered with an accuracy of $\pm 0.2\%$ of reading or $\pm 0.001\text{m/s}$ (0.0033ft/s) (whichever is the greater). Users can now achieve more precise revenue measurement and superior process control.

Hygienic/sanitary Design

MagMaster's wide temperature, hygienic/sanitary design eliminates germ traps and is suitable for CIP (Clean-in-Place) using chemical cleansers, hot water and steam rinses. All external crevices have been eliminated from the sensor to ensure easy and effective hose-down.

Designed/Manufactured to International Standards

MagMaster conforms to a wide range of national and international standards to meet hygienic/sanitary requirements for measurement and food processing legislation. These include: 3A licensed, FDA (PMO), USDA, FM and CSA general purpose. The meter's PTFE lining is approved and its housing is designed to be compatible with a hygienic/sanitary environment.



Picture of Sensors and Transmitter

Flexible Installation

The new range is available in sizes from 20mm (0.75in.) to 80mm (3in.) – the latter size also being available with 100mm (4in.) mating couplings. The standard installation connections are tri-clamp, ISO 2852 or DIN 11851 male screw connectors.

Tough in Service

The new range of meters is extremely robust and can withstand the stresses of being installed in a tanker and also accommodates the widely differing operating conditions encountered in liquid food and pharmaceutical applications.

Fully Featured Transmitters

There is a choice between the 'Industrial Reference' MagMaster keypad transmitter and the hygienic/sanitary version. The hygienic/sanitary version minimizes germ traps, thus facilitating cleaning. The external local communication connector is omitted and a hygienic/sanitary terminal cover is fitted to the front of the unit. The transmitter is tamper-proof (wire locking screws) thus ensuring integrity of measurement.

Configuration Methods:

All configurations are user defined and password protected. The configuration is stored in non-volatile memory with a 10 year retention. The transmitter is fully programmed before shipping. Reprogramming can be easily done on site using the following methods:

Keypad - can be used to access and change all menu parameters using four membrane keys and 3-line display.

RS232 - with a 9-pin data connection for local hand-held terminal or computer (null modem Lap Link cable required). Software such as ProComm Plus, Windows, or PC Tools required.

RS423/RS422 - for remote serial communication.

HART Communications - see transmitter specification.

Displays:

Keypad: 3-Line, 16 character, backlit display with large 1/2" numerals for flowrate and two lines for engineering units, totalizers, alarm status, velocity and percent of range.

2-Line: 16-character, read only display for flowrate (in a choice of engineering units and % of range), totalized flow, forward, reverse and net totals, alarm conditions, flow velocity, and percent of range. Display is scrolled and reset by magnetic reed switches actuated by a magnetic wand.

Blind: read only configuration through serial communications or HART.

Easy-to-Use – Simple to Interface

Both transmitters feature three internal totalizers covering forward, reverse and net flow in a wide range of volumetric units. A wide choice of outputs – analog, pulse, serial data, HART, etc. – ensures compatibility with the control system requirements. Installation of the system is simplified by the universal power supply (available for a.c. or d.c. supplies) which enables the system to be used over very wide ranges of voltage with no manual voltage selection being required.

Maintaining the Standard

MagMaster is designed and manufactured in accordance with international quality procedures (ISO 9001) and all flowmeters are calibrated on nationally traceable calibration

GENERAL SPECIFICATION

Sizes:

Size		Flow Range (US g/min)		
mm	in.	† Minimum	Maximum	Standard Calibration
20	0.75	0.02	1.6	1.1
25	1	0.03	2.2	2.1
40	1.5	0.20	15.0	8.0
50	2	0.30	31.1	10.0
63	2.5	0.53	52.5	15.0
80	3	0.90	79.0	22.5
100†	4	1.90	156	32.5

*DIN only.

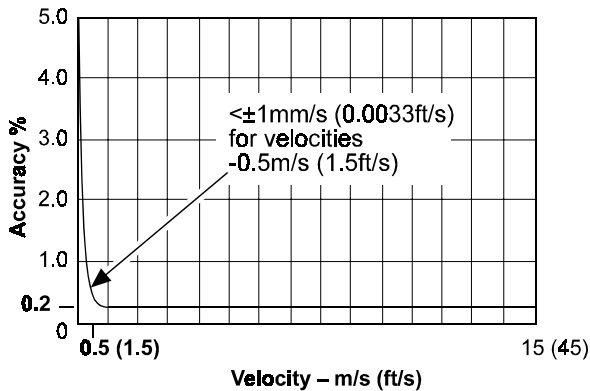
† For accuracy see graph below.

‡ 100mm/4inch couplings with 80mm/3inch sensor

Transmitter/Sensor

Separation: <328ft (100m)

Accuracy (under reference conditions)



Analog output: Additional <math>< \pm 0.008 \text{ mA}</math>.

Temperature effect:

Transmitter: <math>< \pm 0.08\% \text{ of reading}/10^\circ\text{C}</math>
 Analog output – Additional <math>< \pm 0.08\% \text{ of reading}/10^\circ\text{C}</math>
 Sensor: <math>< \pm 0.02\% \text{ of rate}/10^\circ\text{C}</math>

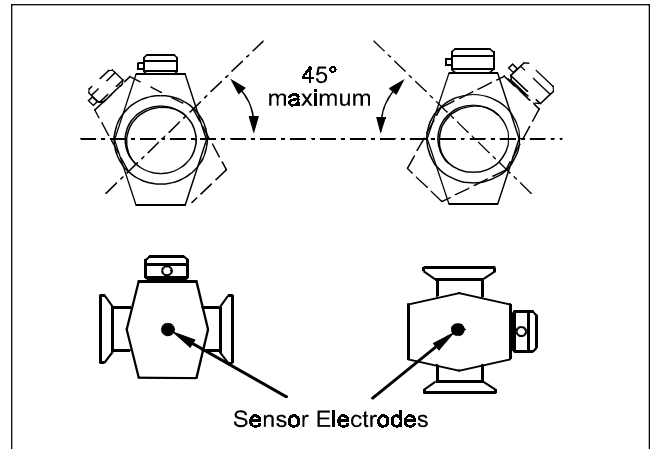
Repeatability and Reproducibility:

<math>< \pm 0.05\%</math> or <math>< \pm 0.25 \text{ mm/s}</math>, whichever is the greater.

Power supply variation:

Negligible.

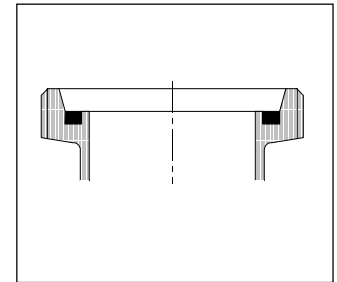
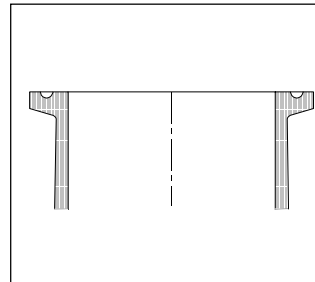
Mounting:



Connections:

Tri-clamp ISO 2852

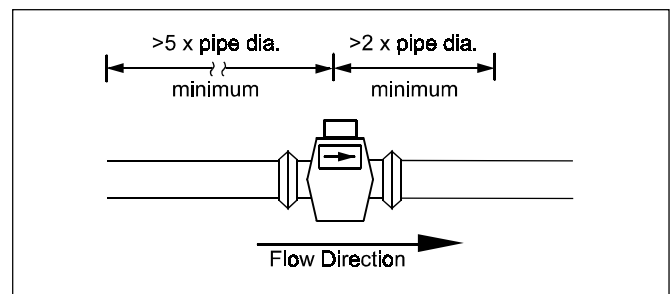
Threaded DIN 11851.



Straight pipe requirements

FDA Requirement: 10 pipe diameters upstream and downstream

Power consumption: <math>< 20 \text{ VA}</math>.



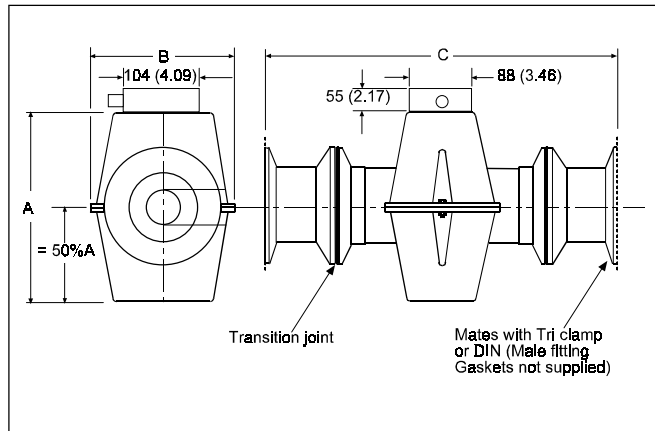
Conductivity: $\ge 5 \mu\text{S/cm}$.

SENSOR SPECIFICATION

Sizes:

Size mm (in.)	Dimensions - mm (in.)			Approx. Weight	
	A	B	C	kg	lb
20 (0.75)	174 (6.85)	140 (5.50)	285 (11.22)	7	15
25 (1)	174 (6.85)	140 (5.50)	285 (11.22)	7	15
40 (1.5)	210 (8.27)	176 (6.90)	284 (11.18)	9	20
50 (2)	210 (8.27)	176 (6.90)	284 (11.18)	10	22
65 (2.5)	280 (11.02)	219 (8.60)	312 (12.28)	13	29
80 (3)	280 (11.02)	219 (8.60)	312 (12.28)	13	29
100 (4) *	280 (11.02)	219 (8.60)	505 (19.9)	14	31

* 100mm/4inch couplings with 80mm/3inch sensor.



Materials:

Item	Material
Metering tube & fittings	Stainless steel 316
Lining	PTFE (complies with FDA & 3A regulations)
Gaskets (Transition joints)	Nitrile rubber: 105 C (221 F)
	EPDM: 135 C (275 F)
Electrodes	Stainless steel 316
	Hastelloy C
Sensor & terminal box housings	White nylon-coated aluminium

Pressure Limitations:

Size mm (In.)	Pressure – bar(lb/in ²)	
	Minimum*	Maximum
20 to 65 (0.75 to 2.5)	0.25 (3.75)	17 (250)
80 (3) 100 (4)	0.25 (3.75)	11 (160)

*Absolute

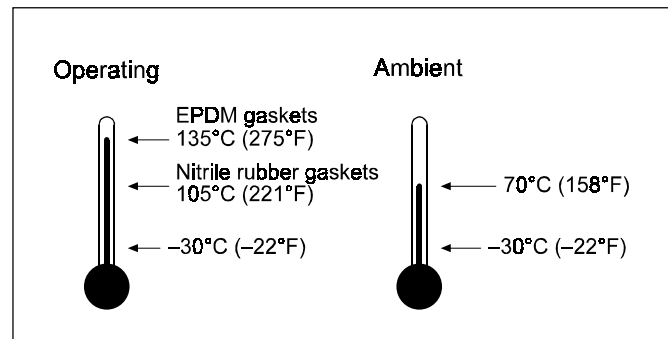
Environmental Protection

(when installed): IP65/NEMA 4X

Approvals/Licenses:

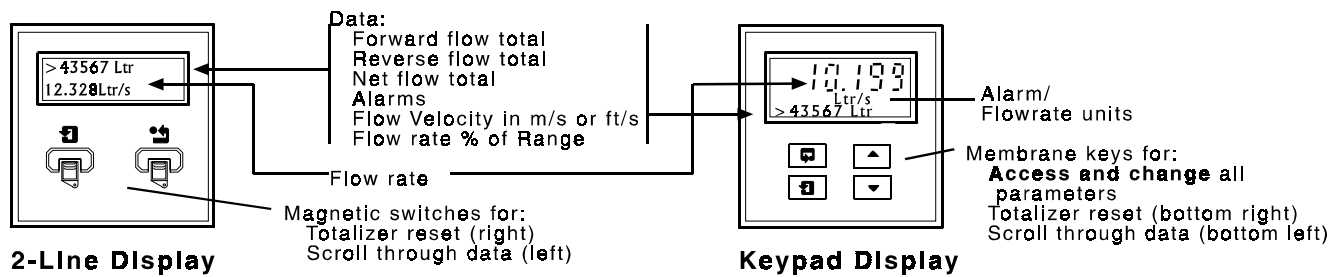
3A;
FDA (PMO);
FM/CSA
USDA

Temperature Ranges:



TRANSMITTER SPECIFICATION

Display (optional):



Power Supply:

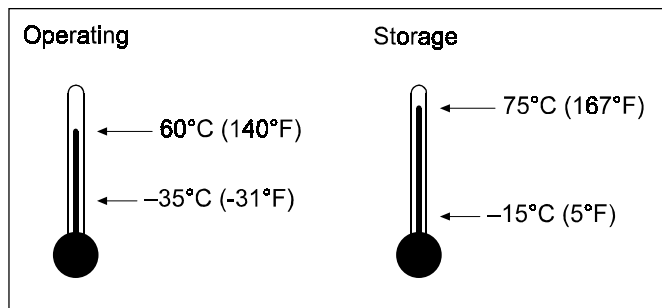
Voltage Type	Voltage Range (V) Absolute rating	Frequency (Hz)	VA
a.c.	85 to 265	47 to 440	<20
d.c.	11 to 40	-	<20

Electrical connections: 0.5in. NPT. (Face seals required).

Standard features common to **all** transmitters:

- <21mA, ≤16V Output
- Forward, Reverse Pulse Output
 <800 Hz, <35V open collector
 Square wave, or fixed pulse width <2.5s, <250mA
- Choice of 9 alarms <35V, <250mA
- Totalizer reset
- Dual range selection
- Output hold
- Zero output

Temperature Ranges:



Industrial Keypad:

- Dual mA (Optional)
- RS232 (Standard)

Hygienic/Sanitary

(No external RS232 port. Laptop or hand held organizer required to change menu parameters via internal connection.):

- Optional Dual mA
- HART

Environmental protection:

IP65/NEMA 4X.

Approvals:

Electrical safety – BS4743 Class 1. (IEC 348).
 FM and CSA applied for.

Blind/2-Line:

- HART (Optional)
- or
- RS422/423 (Optional)
 - Dual mA (Optional)
 - RS232 (Standard)

EMC Specification:

Conforms to –
 EMC Directive 89/336/EEC

Outputs/Inputs:

Galvanic separation to 50Vd.c. between analog, pulse/ alarm and earth/ground.

Enclosure:

Glass loaded polypropylene, polycarbonate window, polycarbonate terminal cover (Hygienic/sanitary version).

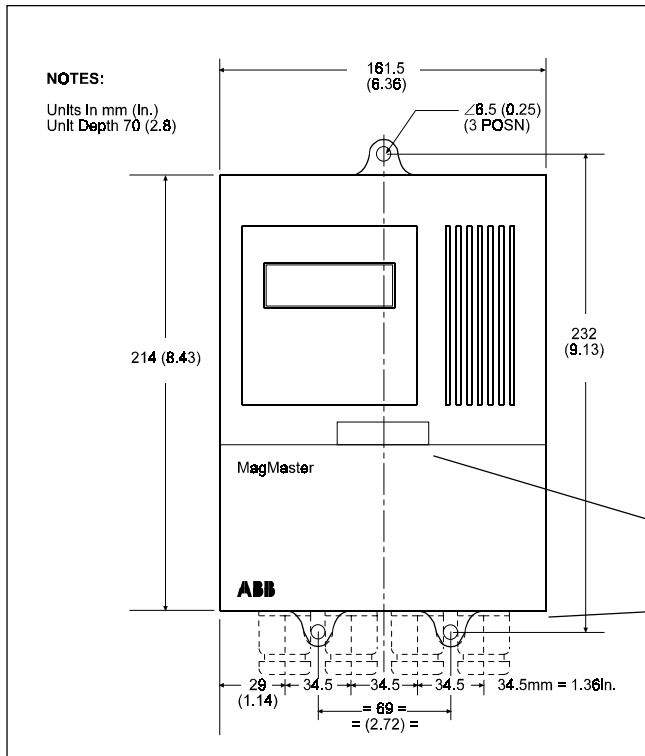
HART Communications:

The MagMaster transmitter HART option allows communications via the HART field communications protocol using a communications device connected to points located anywhere in the 4-20mA current output circuit wiring. MagMaster also supports a multi-drop system and permits up to 15 MagMasters on a single pair of wires without losing the 4-20Ma signals on the individual meters. The unit can be configured with universal HART communications such as the Rosemount 275 or 268 (version 6 or higher). HART burst mode is also supported, enabling regular transmission of selected data.

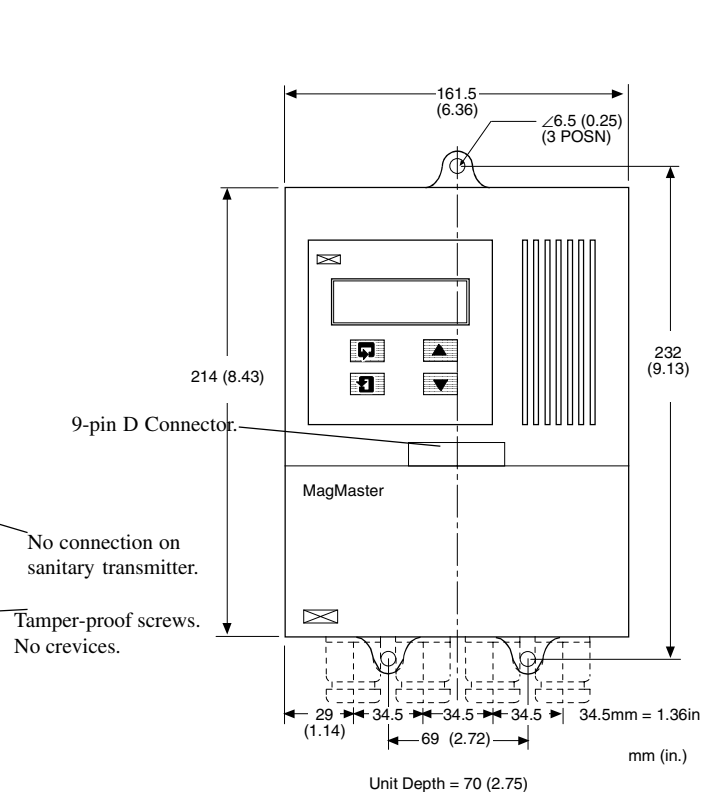
User re-programmable	Local hand-held configurator programming e.g. Psion 3, etc.
Fully configurable	A choice of engineering parameters in engineering units, e.g. flowrate, flow units, all outputs, etc.
Empty pipe sensing	Ensures units read zero on empty pipe.
Interchangeability	Transmitter can be changed 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.
Multi-lingual	Displays, Programming and Prompts available in English, French, German, Spanish, Italian - other languages on application

TRANSMITTER DIMENSIONS

DIMENSIONS (mm)
Sanitary Transmitter (remote)
(standard display orientation shown)

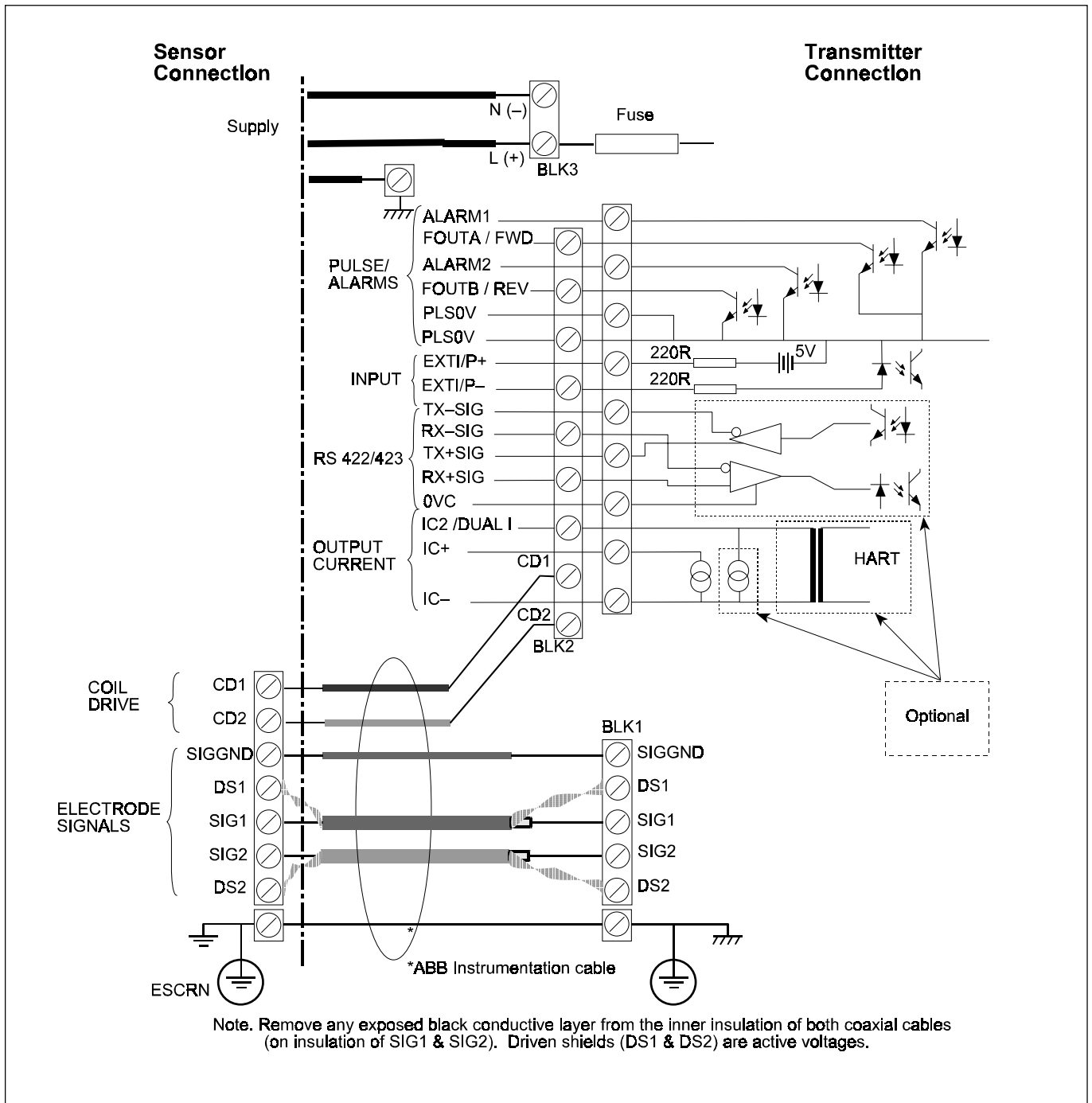


DIMENSIONS (mm)
Keypad Industrial Transmitter (remote)
(standard display orientation Keypad shown)



Transmitter Weight:
3.2 lb. (1.5 kg)

CONNECTION INFORMATION



Model Number Designation

	M	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Bore Size															
Transmitter Only		00													
0.75 in (20mm) DIN Sanitary Fitting Only		75													
1.0 in (25mm)		01													
1.5 in (40mm)		15													
2.0 in (50mm)		02													
2.5 in (65mm)		25													
3.0 in (80mm)		03													
3.0 in (80mm) with 4" (100mm) Sanitary Fitting		34													
End Connections															
None or Transmitter Only		0													
Sanitary, Mates with Tri-Clamp, ISO 2852, 1" to 4" (25 mm to 100 mm) (Standard)		G													
Sanitary, Mates with DIN 11851, 0.75" to 3" (20 mm to 80 mm)		H													
Lining Materials															
Transmitter only		0													
PTFE Liner		A													
Electrodes															
Transmitter only		0													
316 Stainless Steel (Standard)		1													
Hastelloy C		2													
Sensor Construction															
Transmitter only		0													
ABB standard. Non-hazardous location		1													
FM approved, CSA certified for non-hazardous locations. (see note 5)		8													
Accessories															
None or Transmitter only		0													
Gaskets for Transition joint - Nitrile Rubber (BUNA - N) (Std)		A													
Gaskets for Transition joint - EPDM		B													
Calibration															
None or Transmitter only		0													
Standard 3-point calibration		1													
8-point calibration		2													
Witnessed 8-point calibration		4													
Slurry calibration (required with 11th character S and F)		5													
Custom calibration		9													
CalMaster Fingerprint		J													
Sensor Options															
None or Transmitter only		0													
Cable fitted to sensor and potted (order cable from Options section)		1													
Transmitter Type															
Remote transmitter, Process mode															R
Remote transmitter, Slurry mode															S
Sanitary Remote Transmitter, Process Mode (Only available with 14th characters 6, 7 & 8)															D
Sanitary Remote Transmitter, Slurry Mode (Only available with 14th characters 6, 7 & 8)															F
Power Supply															
Sensor only															0
95V ac to 240V ac															1
11V dc to 40V dc															3
Display and Language															
No display, English language software or sensor only															0
Display - standard orientation, English language software															3
Display - 90° CW orientation from standard, English language software															4
Keypad w/display-standard orientation w/English language (Not available with HART or RS422/RS423)															K
Keypad w/display - 90° CW orientation w/English language (Not available with HART or RS422/RS423)															L

Model Number Designation

M 02 03 04 05 06 07 08 09 10 11 12 13 14 15

Output Options

Standard Transmitters

Standard outputs or sensor only	0
Dual current output	1
HART Communications and Standard Outputs (English language software only)	2
RS423/422 serial data communications (Not Available with Keypad or HART)	4
RS423/422 serial data communications and dual current output (Not Available with Keypad or HART)	5

Sanitary Transmitters (See Note 4) (Not Available with Keypad or HART)

Standard Outputs	6
Dual Current Output	7

Transmitter Build Standard

None - sensor only	0
ABB standard	A
FM approved, CSA certified, general purpose (See Note 5) (Use with 7th character 8)	3

OPTIONS (specify as separate item on order)

Cable, sensor/transmitter (list number of feet)

Standard	STT3350
Submersible-Waterproof (Do not use with FM-approved, CSA-certified instruments)	STT3500
Armored (Do not use with FM-approved, CSA-certified instruments)	STT3300
Pipe-mounting bracket kit	155S997
Flow Utilities and Communication Software (3.5" disk).	
Computer download/upload parameters.	166S291
Factory Upgrade to Keypad. (Net price, No Discount)	SK20707
Configurator (PSION Series 3 palm top computer and serial communications cable)	MFE-CONFIG
Standard flow signal simulator/calibrator for transmitter with leads	MFE-SIM
Null Modem Cable for laptops. 9-pin female to 9-pin female connectors.	
Length is 3 meters (9.84 feet).	WEBC0003
Instruction Manual for MagMaster (one included with each meter purchased).	IM/MAGMAS
Instruction book for retrofitting/replacing 1100T transmitter that is installed with 1100L/1210L sensors (available up through 12 inches only, otherwise call factory)	IB-17K241

Base Price of Transmitter only. See Characters 12 and 14 for options with additions to base price.

Transmitter only with Keypad. See notes 1, 2 and 5.	M00000000R1K0A
Transmitter only with 2-Line Display. See notes 1, 2 and 5.	M00000000R130A
Sanitary Transmitter only with 2-Line Display. See notes 1, 2 and 5.	M00000000D136A
Standard Transmitter only, Blind. See notes 1, 2 and 5.	M00000000R100A
Sanitary Transmitter only, Blind. See notes 1, 2 and 5.	M00000000D106A

Sensor only. Specify using 0's for characters 12 through 15.

Choose appropriate characters 2 through 11.

List price = MagMaster system price less price of standard blind transmitter.	M01GA11A10D0000
--	-----------------

Notes:

- When ordering a transmitter replacement or for a retrofit, customer must supply model and serial numbers of sensor through 12 inches. 1100L/1210L only. Call for other sizes.
- For 1100T retrofit, order IB-17K241 retrofit instruction book.
- Use a "9" in the catalog number to signify special feature in the character position.
- All sanitary transmitters are supplied with RS423/422 serial data communication capability and an internal 9-pin RS232 adapter connector that can be used for local configuration (i.e. MFE-CONFIG). There is no external connector. The keypad is not available in this version.
- FM approved, CSA certified sensors or transmitter must be part of an approved/certified MagMaster **system**. Not approved/certified when transmitter is used with 1100L and 1210L series sensors.
- Adder does not apply when sensor only is ordered.