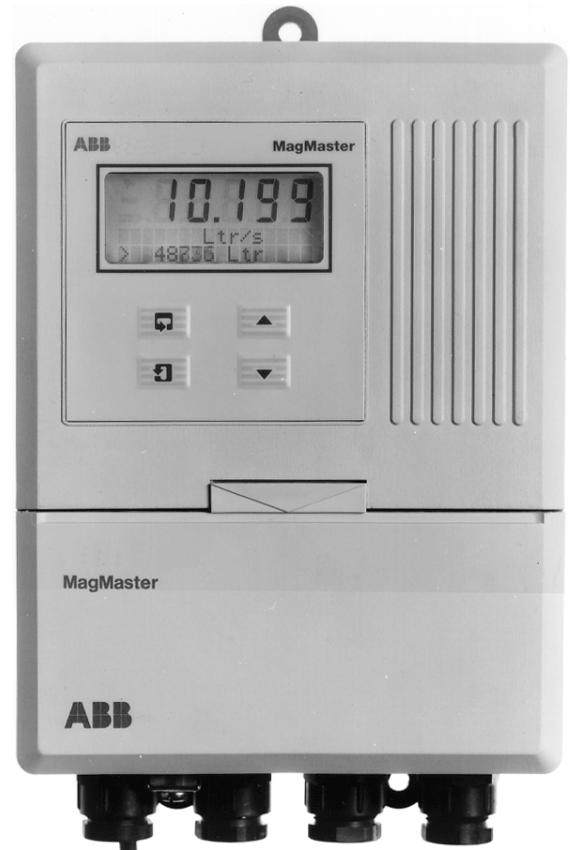


Field^{IT}
**Electro-Magnetic Flowmeters
Converters**
MagMaster

- **Pulsed DC technology incorporates benefits of AC systems**
- **Keypad configurable**
 - A choice of engineering parameters in engineering units e.g. flowrate, flow units, all outputs
- **Empty pipe detection**
 - insures units read zero on empty pipe
- **Interchangeable**
 - Converter/sensor can be changed without affecting performance
- **Advanced switching power supply**
 - 95 to 240V ac and 11 to 40V dc
- **Test mode and Self diagnostics**
 - provides powerful start up tool. Exercises all outputs and displays, even without a connected sensor
- **Multi-lingual**
 - English, Spanish, Italian, plus others upon request
- **Three internal totalizers: forward, reverse, net; Forward and reverse flowrates and comprehensive range of outputs : current, pulse, data, HART**
 - single package satisfying all user display requirements
 - insures compatibility with user's control system requirements
- **Two-Year Warranty**
- **FM / CSA Approved**
- **CalMaster enabled**



MagMaster Converters

Assured Quality

MagMaster converters are designed and manufactured in accordance with international quality procedures (ISO 9001) and all flowmeters are calibrated on nationally traceable calibrations rigs to provide the end user with complete assurance of both quality and performance of the meter. An indication of the quality is the two year warranty which is offered as standard.

Fully Featured Transmitters

MagMaster is available 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 insure 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 keypad, remote configurators or computers as appropriate. The software features multi-level password protection capability to prevent inadvertent program or setting changes. Data is stored in non-volatile memory for 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.

International Approvals

Alternative versions of MagMaster are available for general locations with FM Approval/CSA Certification and for Hazardous Area locations to CENELEC, FM, CSA and SAA Standards. No external safety barriers are required.

GENERAL SPECIFICATION

Programming Options

- Integral keypad with 3 line display (Standard)
- Local hand-held configurator
- HART
- Up to 1000m (3280ft) remote via serial communications and remote 1/4 DIN panel-mounted keypad/display unit

Environmental Protection: IP65/NEMA 4X.

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

Enclosure: Glass loaded polypropylene, polycarbonate window. UL VO rated.

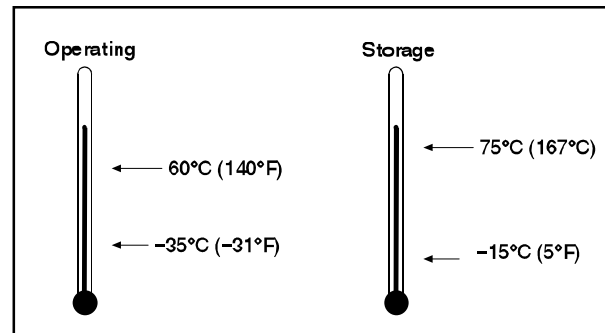
Electrical connections: Accepts 1/2 in NPT connections.

Sensor Cable: ABB supplied standard and waterproof versions.

Transmitter/Sensor Separation: 330 ft. (100m)
High Input Impedance

10¹⁵ ohm performance allows non-conductive coatings on the electrodes to be ignored. Eliminates the need for removable electrodes or electrode cleaners.

Temperature Ranges:



Supply Voltage*:

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

*Power supply fully isolated

SPECIFICATIONS

Configuration:

Transmitter may be integral with sensor for sizes 1/2 to 16-inches (400mm) or remote from sensor for all sizes.

Separation (remote transmitters):

The maximum cable length in feet is the lower of 330 feet (100m) or 15 x the conductivity ($\mu\text{S}/\text{cm}$). Longer lengths are special order.

Accuracy (under reference conditions):

See separate specifications for MagMaster sensors.

Display, Serial comms, Frequency output:

with MFE Series Sensors: $\pm 0.2\%$ of reading
with MFF Series Sensors: $\pm 0.15\%$ of reading
or ± 0.003 ft/sec (0.001m/s) (whichever is greater) up to a maximum velocity of >49 ft/sec (15m/s).

Analog output:

As Frequency output plus $\pm 0.008\text{mA}$.

Temperature effect:

Transmitter: Display, frequency output, Serial comms $< \pm 0.08\%$ of reading per 10°C .
Analog output – as frequency plus $< \pm 0.08\%$ of reading per 10°C .

Repeatability & Reproducibility:

$\pm 0.05\%$ or $\pm 0.0008\text{ft/s}$ ($\pm 0.25\text{mm/s}$), whichever is greater.

Power Supply Variation:

Negligible effect— within published specification.

Conductivity:

Liquids and slurries having a conductivity of not less than $5\mu\text{S}/\text{cm}$ ($5\mu\text{mho}/\text{cm}$).

Power consumption:

Less than 20VA.

Warm-up Time:

1 minute.

Calibration:

3 point, 8 point, witnessed, NIST/NAMAS (8- to 66-inch only), slurry calibration options.

Prime cable connection:

0.5 inch NPT--single opening. A single cable is available that provides for the coil drive and electrode signals. See Options.

Hazardous Area Certification(Remote mount only):

FM approved and CSA certified for Class I, Div. 2, Groups A, B, C, D hazardous locations, 0.5-24 inches (15-600 mm).

NOTE: FM approved sensors for hazardous locations include an intrinsic safety shunt circuit for the electrodes allowing for a Div. 1 rating inside the pipe. The circuit is located in the larger than standard terminal box housing. CSA certified sensors for hazardous locations may or may not include the circuit, depending on the rating inside the pipe. **Appropriate approved sensor must be selected.**

Meets:

Electrical safety: BS4743 Class 1. (IEC 348).
Vibration specification: BS2011 : Part 2.1Fc : 1983.

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.

HART Communications - see separate description.

Note: HART not available with keypad display

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: no display, but data can be read through serial communications or HART.

Internal Totalizer:

Resettable 9-digit for forward, reverse and net totals. Can be programmed to reset via external input.

Test Mode and Output Circuit Loop Verification:
After transmitter has been programmed, operation of the test mode will drive all outputs to programmed value to provide total system test.

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.

Self Diagnostic:
Transmitter confirms correct operation of hardware with fault diagnosis, eg. coil drive problems.

Empty Pipe Detection:
Programmable for conductivity trip point. Liquid level sensing results in drive to zero (i.e., empty pipe zero when electrodes are uncovered). For Process Mode only. Also can drive output to zero via external input in process or slurry mode.

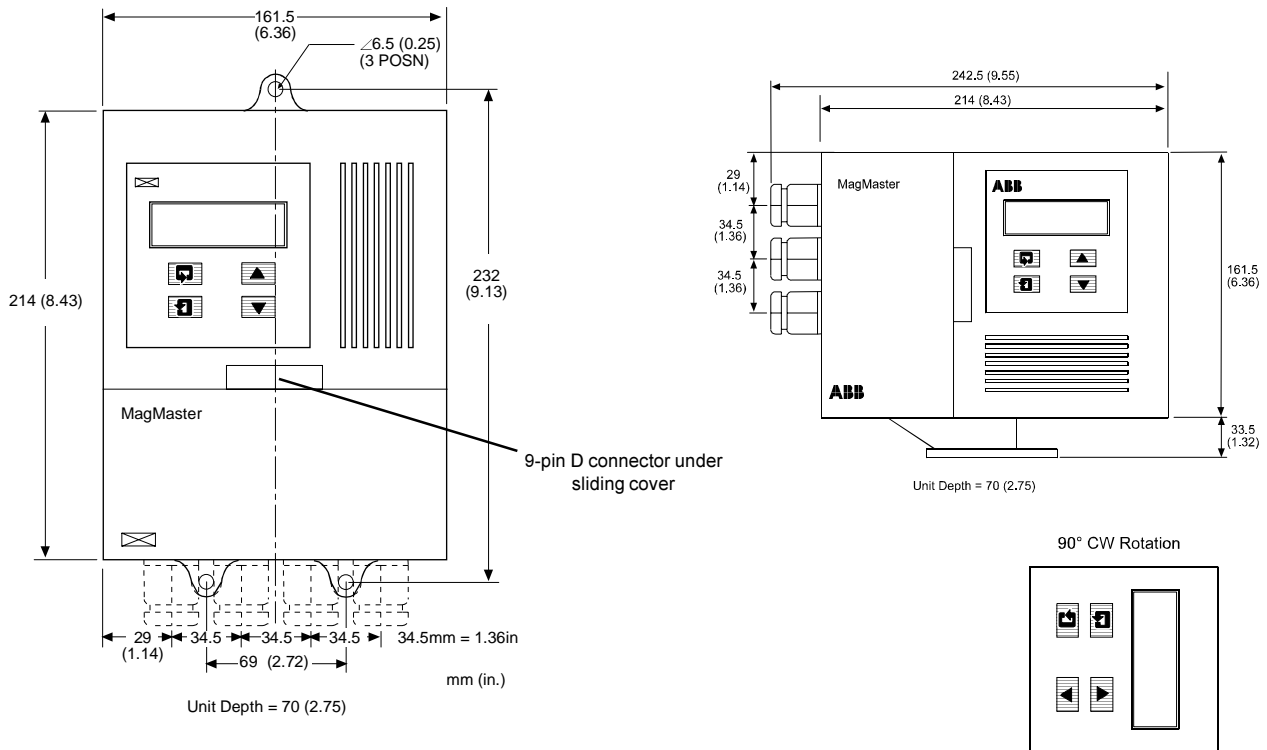
Interchangeability:
Transmitters are fully interchangeable with all sizes of MagMaster sensors and configurable on site. System specification not affected by transmitter change.

Time Constant:
Fully programmable from 1 to greater than 100 secs.

Test Equipment:
Flow signal simulators for testing and checking the electronic calibration of the MagMaster converter are available. See Options.

Retrofit
The MagMaster transmitter can be used to upgrade earlier version magnetic flowmeters, including the 1100L/1210L series. In addition, the MagMaster transmitter can be used as a replacement on other manufacturers sensing heads. Refer to the options section for restrictions and ordering information.

TRANSMITTER DIMENSIONS



Note. Sensor dimensions and Terminal Box dimensions in sensor specifications.

Model Number Designation

	MFE	4	04	05	06	07	08	09	10	11	12
Glanding											
Conduit entry: 0.5 in NPT		4									
Transmitter Type											
Sensor mounted MagMaster transmitter					EH						
Remote MagMaster transmitter					ER						
Power Supply											
95V to 240V ac nominal, 47 to 440Hz						1					
11V to 40V dc (maximum)						3					
Display											
3 Line Display with keypad (not available with RS422/423 or HART), Standard								4			
2 Line Display, Read Only Version								3			
Blind								0			
Output Options											
Standard outputs								0			
Dual current output (Not Available with Class I, Div 2 - 10th Characters 5, 6, 7 or 8)								1			
*HART Communications (Not available with RS422/423)								2			
RS423/422 serial data communications (Not Available with HART)								4			
RS423/422 serial data communications and dual current output (Not Available with HART)								5			
Transmitter Build Standard											
General Purpose (non-FM/CSA approved) (Note 5)								1			
General Purpose <u>Slurry</u> (non-FM/CSA approved) (Notes 1 & 5)								2			
FM approved, CSA certified, General Purpose (Notes 4 & 7)								3			
FM approved, CSA certified, General Purpose <u>Slurry</u> (Notes 1, 4 & 7)								4			
FM approved, CSA certified, Class I, Div 2, Groups A, B, C, D. Remote Mount Only. (Notes 4 & 6)								5			
FM approved, CSA certified, Class I, Div 2, Groups A,B,C,D. Remote Mount Only. <u>Slurry</u> . (Notes 1, 4 & 6)								6			
CSA certified, Class I, Div 2, Groups A, B, C, D (Notes 1 & 4)											
Non-incendive electrode circuit in sensor for Hazardous location.								7			
CSA certified, Class I, Div 2, Groups A, B, C, D <u>Slurry</u> (Notes 1 & 4)											
Non-incendive electrode circuit in sensor for Hazardous location.								8			
Display Orientation											
Not Required									0		
Standard									1		
90° CW standard									2		
Display Language											
English										1	
Spanish											4

Notes:

1. A slurry mode transmitter system must have a slurry electrode option (see sensor ordering codes).
2. When ordering a transmitter for a retrofit (Taylor 1100L, 1210L), customer must supply model and serial numbers of sensor. Limited to 12 inches.
3. For 1100T retrofit, order IB-17K241 retrofit instruction book.
4. 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.)
5. For MFF Series sensors, only Transmitter Build Standard 1 or 2 is available.
6. Sensor must have FM/CSA hazardous location rating with intrinsically safe electrodes.
7. Sensor must have FM/CSA non-hazardous location rating

Notes

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