

# AquaMaster™ Electronic Water Meter

AquaMaster – the smart solution for potable applications



#### Widest flow range, highest accuracy

- measures minimal night flows and peak day flows

#### OIML R49 approved

- type approved to OIML R49 Class 1 and Class 2 for any pipe orientation

#### Install in any location

- OIML R49 approved with zero diameter upstream and downstream straight pipe lengths

#### Backward-compatible

- comprehensive range of adaptors for connection to existing AquaMaster sensors

#### Sealed for life transmitter

- all input / outputs via external IP68 plug-and-socket connections

#### Optional integral multi-speed, multichannel, dual-variable logger

- high precision, high resolution datalogging

#### Logged data transmitted via SMS text message

- facilitates automated handling of logged data from a network of flow meters

#### Battery and mains operation

- up to 5-year battery life
- also available, IP67 mains-powered transmitter

## The Next Generation Commercial Water Flow Meter

AquaMaster, available in sizes 15 to 600 mm (1/2 to 24 in.), is the total solution for flow measurement in the water industry. Outstanding performance, innovative features and user benefits, coupled with low cost of ownership ensures that AquaMaster is the first choice for District Metering, Bulk Revenue, Trunk Mains and Treatment Works applications.

AquaMaster has been designed specifically for the water industry in response to its stringent demands for enhanced metering capability; enabling ever more efficient and cost effective operation and compliance with increasing legislative requirements.

Based on ABB proven technology, AquaMaster is supported by the expertise of ABB – the world's leading flowmeter manufacturer with many pioneering advances in water flow metering over the last decade, for example AquaMag™, MagMaster™, AquaProbe™ and CalMaster™. ABB operates national and internationally accredited flow calibration facilities in the UK, USA, Germany, Australia and India. We also offer comprehensive, locally-based before- and after-sales support and service.

In addition to high measurement performance the AquaMaster offers reading of totalizers via the industry-standard inductive pad reader or via radio link automatic meter reading system. The radio link enables easy access to billing information without the need to physically read the meter display.

### No External Power Required for Remote Locations

- No external power supply
- Up to 5-year battery life
- Site-replaceable batteries
- Unique battery management system gives a battery replacement window in excess of 1 year, with no flat-battery interruption to measurement.

AquaMaster is the ideal solution for locations where there is no external power. Replaceable batteries provide a battery life of up to 5 years, thus eliminating the high cost of providing a mains supply to the meter.

AquaMaster's extended battery life is achieved through new technology design.

AC-powered units have optional battery backup to ensure no loss of flow measurement during power down periods.

## Typical Applications

- Bulk revenue
- District metering
- Trunk mains
- Treatment works



The AquaMaster Explorer is a new design of battery-powered transmitter for the AquaMaster range of flowmeters. It has a stainless steel housing with a thermoplastic outer and the assembly is sealed-for-life to IP68 as standard. The unit incorporates plug & socket connections for all inputs and outputs. In addition it derives its power from a similarly-sealed external battery pack that provides an extended battery life of typically 5 years, that can be extended further at the cost of a slight deterioration in system performance.

### Remote Access via Mobile Phone Technology

- Remote access to logger data over GSM network by SMS text message
- Remote configuration, status monitoring and preventive maintenance
- Diagnostics and configuration, via standard GSM mobile phone
- Automated reporting of metering data via SMS text
- SMS data accessible via industry-standard SMS Gateways capable of exporting data using Windows DDE, OLE, XML etc.
- Allows remote software upgrades / enhancements

## New Performance Standards for Flow Measurement

With the widest flow range, optimum accuracy and long term stable calibration, AquaMaster sets new performance standards in the water industry.

The performance is OIML R49 type approved (DN40 – DN300) to the latest Class 1 and Class 2 accuracies with a tighter accuracy above  $Q_{0.5}$  % and  $Q_{0.25}$  % (Fig. 1).

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.

The clear bore of the AquaMaster eliminates the possibility of damage by particulate matter and the absence of moving and wearing components ensures that this unique level of performance is maintained long term.

The unique design of the AquaMaster sensor conditions the flow profile in the measuring section so that distortions in the flow profile, either upstream or downstream, are flattened. The result is excellent in situ meter performance, even with very bad hydraulic installation conditions.

Hydraulic disturbance tests conducted during OIML R49 type approval confirmed a guaranteed accuracy to Class 1 and Class 2, even with flow disturbers bolted directly on the meter, either upstream or downstream at OD.

AquaMaster has been type examined and conforms to EU Measuring Instrument Directive (MID).

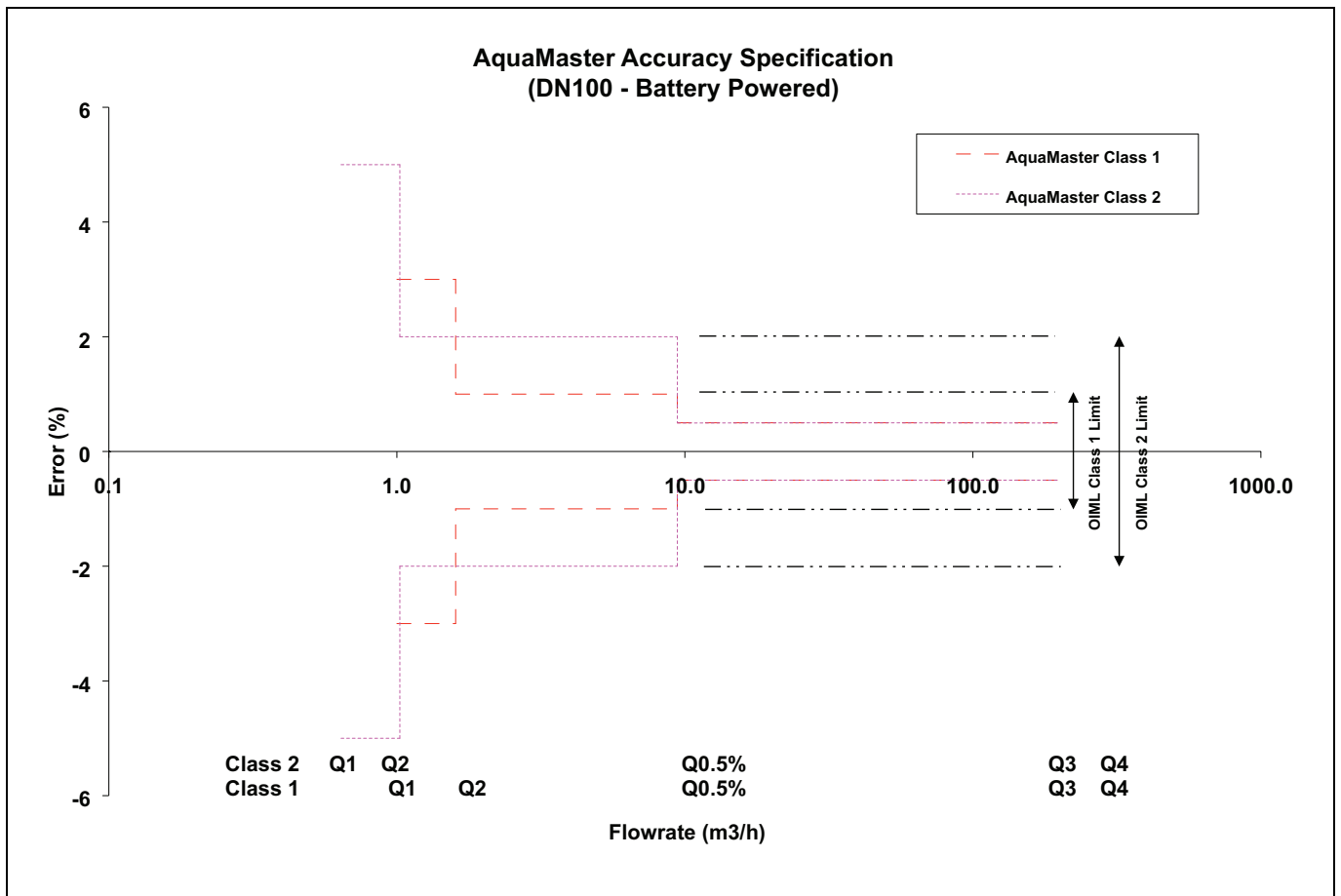


Fig. 1 AquaMaster specification to OIML R49

## Transmitter

- Comprehensive display
- Submersible for use in flooded chambers rated IP68 (NEMA6)
- Resettable or secure totals
- 8mm high displays for Totals (exceeds ISO 4064 requirements)
- All connections via Plug & Socket
- Tamper resistant
- 3 outputs (forward and reverse pulse, or pulses, direction and alarm)

The AquaMaster Transmitter provides the most comprehensive range of flow data and information currently available to the water industry. If all the data is not required, the unit can be configured so that only the required values are displayed, thus ensuring simple reading with no superfluous data.

The transmitter can be mounted directly onto the AquaMaster sensor or remotely from it. For integrally-mounted units, a new mounting system positions the display such that it is visible from both the top and the side.

The AquaMaster's program memory or firmware uses reprogrammable Flash memory technology that has been enhanced to allow this firmware to be upgraded in the field (integral data logger versions only), via a local serial port connection or via GSM, if fitted. This future-proofs AquaMaster, making enhancements or new features available to installed units.

## Standard Tariff Setting

AquaMaster incorporates a multiple tariff feature where the accumulated flow volume is routed to one of two 8-digit signed tariffs; tariff A and tariff B, depending on time and date. It is fully programmable by the user for time of day, day of week or date during the year. These user-defined times / dates can be combined in a variety of modes as illustrated in the tables below to produce the following tariff regimes.

## Weekly Cycle Defined

Mode	Tariff A	Tariff B
1	Day time during weekend	Night time at weekend + day and night during week
2	Day time during week	Night time during week + day and night during weekend
3	All day times	All night times
4	Night time during weekend	Day time during weekend + day and night during week
5	Day and night during weekend	Day and night during week
6	Day time during weekend + night time during weekend	Night time during week + day time during weekend
7	All day times + night time during weekend	Night time during week

## Yearly Cycle Defined

Mode	Tariff A	Tariff B
1	Day time during summer	Night time during summer + day and night during winter
2	Day time during winter	Night time during winter + day and night during summer
3	All day times	All night times
4	Night time during summer	Day time during summer + day and night during winter
5	Day and night during summer	Day and night during winter
6	Day time during winter + night time during summer	Night time during winter + day time during summer
7	All day times + night time during summer	Night time during winter

### 9-Digit LCD Display

- Cyclic display\*
- 8mm High
  - Forward total
  - Reverse total
  - Net total
  - Date
  - Tariff Total

Tariff Indicator



Status Indicators

- Battery A low
- Fault
- Empty pipe
- Battery B low
- Mains off

Choice of Flow Units to match user requirement

### 5-Digit LCD Display

- Cyclic display\*
- Flow rate
  - Time
  - Velocity

\* Can be programmed to display required values only

### Easy, Low Cost Installation

No matter what the location or installation requirements, AquaMaster provides a cost-effective solution.

Both the sensor and the Transmitter are fully submersible, enabling installation in flooded chambers.

In addition, the sensor is buriable, thus eliminating the need for a chamber. Installation merely involves excavating to the pipeline, fitting the sensor and back filling the hole, to ensure very fast, low cost installation. The associated Transmitter is then located in the most convenient position for the user.

The elimination of bypasses and ancillary items such as strainers, enables the installation cost to be kept to an absolute minimum.

Installation requirement of OD upstream and downstream removes concern over where to install a sensor, whilst delivering the highest performance.

These factors, together with the innovative 'Fit and Flow™' system, ensure foolproof installation with total user confidence.

### Fit and Flow

- No need to match sensor and Transmitter
- Fast, reliable installation
- Foolproof, no errors
- Sensor stores all calibration factors, site settings, serial numbers etc.
- Volume totalizer and tariff values backed-up in sensor for total security
- Multiple, programmable password levels stored for measurement security



*Underground Installation of AquaMaster*

## Specification – Sensor

### Battery-powered Meters – Flow Requirements to OIML R49

				AquaMaster OIML Class 2 Specification			AquaMaster OIML Class 1 Specification			
Size		Q <sub>4</sub>	Q <sub>3</sub>	Q <sub>(0.5%)</sub>	Q <sub>2</sub>	Q <sub>1</sub>	R	Q <sub>2</sub>	Q <sub>1</sub>	R
mm	in.	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)		m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	
15	1/2	5 (22)	4 (18)	0.24 (1.05)	0.026 (0.110)	0.016 (0.070)	250	0.04 (0.176)	0.025 (0.11)	160
20	3/4	7.9 (34.8)	6.3 (28)	0.37 (1.62)	0.04 (0.176)	0.025 (0.110)	250	0.063 (0.277)	0.04 (0.176)	160
25	1	12.5 (55)	10 (44)	0.6 (2.64)	0.064 (0.281)	0.04 (0.176)	250	0.1 (0.44)	0.063 (0.277)	160
40*	1 1/2	31 (138)	25 (110)	1.5 (6.6)	0.16 (0.704)	0.1 (0.44)	250	0.25 (1.10)	0.16 (0.704)	160
50*	2	50 (220)	40 (176)	2.4 (10.56)	0.26 (1.14)	0.16 (0.70)	250	0.4 (1.76)	0.25 (1.10)	160
65	2 1/2	79 (347)	63 (277)	3.7 (16.29)	0.40 (1.76)	0.25 (1.10)	250	0.63 (2.77)	0.4 (1.76)	160
80*	3	125 (550)	100 (440)	5.9 (25.97)	0.64 (2.81)	0.4 (1.76)	250	1 (4.40)	0.63 (2.77)	160
100*	4	200 (880)	160 (700)	9.4 (41.38)	1.0 (4.4)	0.64 (2.81)	250	1.6 (7.04)	1 (4.40)	160
125	5	313 (1378)	250 (1100)	14.7 (64.72)	1.6 (7.04)	1.0 (4.4)	250	2.5 (11)	1.6 (7.04)	160
150*	6	500 (2200)	400 (1760)	23.5 (103.46)	2.56 (11.27)	1.6 (7.04)	250	4 (17.61)	2.5 (11)	160
200*	8	788 (3470)	630 (2770)	37 (162.90)	4.0 (17.61)	2.5 (8.8)	250	6.3 (27.73)	3.9 (17.17)	160
250*	10	1250 (5500)	1000 (4400)	60 (260)	6.4 (28.18)	4 (17.6)	250	10 (44)	6.3 (27.73)	160
300*	12	2000 (8810)	1600 (7040)	90 (400)	10.2 (44.91)	6.4 (28.18)	250	16 (70.44)	10 (44)	160
350	14	2000 (8810)	1600 (7040)	110 (484.3)	16 (70.44)	10 (44.02)	160	41 (180.5)	25 (110)	63
400	16	3125 (13760)	2500 (11010)	170 (748.48)	25 (110)	15.6 (68.68)	160	63 (277.4)	40 (176)	63
450	18	3125 (13760)	2500 (11007)	170 (748.48)	25 (110)	15.6 (68.68)	160	63 (277.4)	40 (176)	63
500	20	5000 (22010)	4000 (17610)	270 (1188.72)	40 (176.11)	25 (110)	160	100 (440.3)	63.5 (279.6)	63
600	24	7875 (34670)	6300 (27740)	420 (1849.20)	63 (277.38)	39 (171.71)	160	160 (704.4)	100 (440.3)	63

\* OIML R49 version available to Class 1 and Class 2

**Note.** OIML R49–1 allow Class 1 only for meters with Q<sub>3</sub> ≥ 100 m<sup>3</sup>/h. Meters outside this range were tested to Class 1 accuracy and passed.

## AC-powered Meters – Flow Requirements to OIML R49

					AquaMaster OIML Class 2 Specification			AquaMaster OIML Class 1 Specification		
Size		Q <sub>4</sub>	Q <sub>3</sub>	Q <sub>(0.25%)</sub>	Q <sub>2</sub>	Q <sub>1</sub>	R	Q <sub>2</sub>	Q <sub>1</sub>	R
mm	in.	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)		m <sup>3</sup> / h (Ugal / min)	m <sup>3</sup> / h (Ugal / min)	
15	1/2	5 (22)	4 (18)	0.11 (0.48)	0.010 (0.044)	0.006 (0.026)	630	0.016 (0.070)	0.010 (0.04)	400
20	3/4	7.9 (35)	6.3 (28)	0.18 (0.79)	0.016 (0.070)	0.010 (0.044)	630	0.025 (0.11)	0.016 (0.070)	400
25	1	12.5 (55)	10 (44)	0.29 (1.27)	0.025 (0.11)	0.016 (0.070)	630	0.04 (0.176)	0.025 (0.11)	400
40*	1 1/2	31 (138)	25 (110)	1.5 (6.6)	0.063 (0.28)	0.040 (0.176)	630	0.1 (0.44)	0.063 (0.28)	400
50*	2	50 (220)	40 (176)	1.5 (6.6)	0.1 (0.44)	0.063 (0.277)	630	0.16 (0.70)	0.1 (0.44)	400
65	2 1/2	79 (247)	63 (277)	1.8 (6.2)	0.16 (0.7)	0.1 (0.44)	630	0.25 (1.10)	0.16 (0.70)	400
80*	3	125 (550)	100 (440)	3 (13.2)	0.3 (1.32)	0.16 (0.70)	630	0.4 (1.76)	0.25 (1.10)	400
100*	4	200 (880)	160 (700)	4.6 (20.25)	0.41 (1.8)	0.25 (1.10)	630	0.64 (2.82)	0.4 (1.76)	400
125	5	313 (1378)	250 (1100)	7.1 (31.26)	0.63 (2.77)	0.40 (1.76)	630	1.0 (4.40)	0.63 (2.77)	400
150*	6	500 (2200)	400 (1760)	11.4 (50.19)	1 (4)	0.63 (12.77)	630	1.6 (7.04)	1.0 (4.40)	400
200*	8	788 (3470)	630 (2770)	18 (79.25)	1.6 (7)	1.0 (4.40)	630	2.5 (11)	1.6 (7.04)	400
250*	10	1250 (5500)	1000 (4400)	29 (127.7)	2.5 (11)	1.6 (7.04)	630	4 (17.6)	2.5 (11)	400
300*	12	2000 (8810)	1600 (7040)	46 (202)	4.1 (18)	2.5 (11)	630	6.4 (28.18)	4 (17.6)	400
350	14	2000 (8810)	1600 (7040)	80 (352)	6.4 (28.18)	4 (17.6)	400	12.8 (56.35)	8 (35.22)	200
400	16	3125 (13760)	2500 (11007)	125 (550)	10 (44)	6.3 (27.73)	400	20 (88.05)	12.5 (55.03)	200
450	18	3125 (13760)	2500 (11007)	125 (550)	10 (44)	6.3 (27.73)	400	20 (88.05)	12.5 (55.03)	200
500	20	5000 (22010)	4000 (17610)	200 (880)	16 (70.44)	10 (44)	400	32 (140.9)	20 (88.05)	200
600	24	7875 (34760)	6300 (27740)	315 (1387)	25.2 (110.9)	15.8 (69.56)	400	50.4 (221.9)	31.5 (138.7)	200

\* OIML R49 version available to Class 1 and Class 2

**Note.** OIML R49–1 allow Class 1 only for meters with Q<sub>3</sub> ≥ 100 m<sup>3</sup>/h. Meters outside this range were tested to Class 1 accuracy and passed.



## Wetted Materials

### Screw-end meters

Brass

### Flanged meters

Electrodes – stainless steel 316L

### Lining

Suitable for potable water (WRAS listed), ACS (except DN65)

### Pressure limitations

As flange rating

PN25 Max Process Temp 50 °C

PN40 Max Process Temp 40 °C

OIML / MID Approved Meters 16 bar

### Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

### Conductivity

>50 µS / cm

## OIML R49 Approval

### Size range and flow specification

See specification table

### Accuracy class

1 and 2

### Environmental class

T50 0.1 °C to 50 °C (32.18 °F to 122 °F)

### Pressure loss class

< 0.63 bar

### Minimum upstream pipe

0 D

### Minimum downstream pipe

0 D

### Orientation

Any

### MID Approval

Approved to directive 2004/22/EC

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## End Connections

### Thread-end connections

15 mm – G 3/4 in. B 3/4 in. NPSM

20 mm – G 1 in. B 1 in. NPSM

25 mm – G 1 1/4 in. B 1 1/4 in. NPSM

### 40 to 300 mm (1.5 to 12 in.) flanged

EN1092-1 / ISO 7005 – PN10, PN16, PN25

ANSI B16.5 Class 150

AS 2129 Tables C, D, E and F

AS 4087 PN14, PN16, PN21

JIS to BS2210, 10k

### 350 to 600 mm (14 to 24 in.) flanged

EN1092-1 / ISO 7005 – PN10, PN16, PN25

AS 4087 PN14, PN16, PN21

AS 2129 Tables C, D, E and F

ANSI B16.5 Class 150

JIS to B2210 5k and 10k



## Specification – Transmitter

### AquaMaster Transmitter

#### Transmitter Mounting

Remote or integral

#### Cable Length

Remote 200 m (650 ft)

#### Housing

IP67 (NEMA 6P) Aluminum Alloy with Glass Window

#### Electrical connections

20 mm glands (plastic or armored), or accepts 1/2 in. NPT threaded or military-style plug & socket

#### Sensor cable

ABB cable supplied as standard

Special cable available on application

SWA cable available on application

#### Power supply

Battery life @ 0 to 50 °C (32 to 122 °F)

1 battery – typically 1.2 years

2 batteries – typically 3 years

Type	Voltage range (V) Absolute Rating	Frequency (Hz)	VA
AC	85 to 265	47 to 440	<10
Battery	3.6 (Lithium)	–	–

#### Pulse and alarm outputs

Three bidirectional solid state switches with common isolation  
±35V DC 50mA

Output 1 Forward only, or forward plus reverse pulses

Output 2 Reverse pulses or direction indicator

Pulse output 50 Hz maximum, 50 % nominal duty cycle

Output 3 Alarm indicates any problem with the measurement or unit power

#### Serial data communications

Local Port RS232 compatible via ABB lead (Option)

Remote Port (Option) RS232 with RI, RTS and CTS handshaking

### Explorer Transmitter

#### Mounting

Directly on sensor

or

Remote up to 200 m (650 ft)

#### Housing

IP68 (NEMA 6P)

Stainless steel housing in a Thermoplastic outer cover with window, encapsulated with polyurethane-based resin.

#### Electrical connections

IP68 plug & socket

#### Sensor cable

ABB cable supplied as standard

SWA cable available (via adaptor box) on application

#### External battery pack

IP68 (NEMA 6P)

Battery life @ 0 to 45 °C (32 to 113 °F) typically 5 years

Extended life is possible to give, say, 6 years with a small degradation in response time and slightly increased measurement uncertainty (contact ABB for details).

Battery life is shorter with GSM, depending on how frequently it is used and for what period. For example, used once per day for SMS automated reporting of data logged at 15 minute intervals, the life of a battery pack would be typically reduced to approximately 4 years.

#### Pulse and alarm outputs

Three bidirectional solid state switches with common isolation

±35 V DC 50mA

Output 1 Forward only, or forward plus reverse pulses

Output 2 Reverse pulses, or direction indicator

Output 3 Alarm indicates any problem with measurement or with power

Pulse output 50 Hz maximum, 50 % nominal duty cycle

#### Serial data communications

Local Port RS232 compatible via ABB lead (Option)

## Encoder Interface (non-logging versions only)

### Function

Remote reading of totalizer and serial no.

### Protocol

ABB encoder

### Connections

2-wire for inductive pads (max. cable length 80 m [260 ft])

3-wire for AMR

### Compatible readers

Severn Trent Services Smart reader

ABB or Elster SR100 and SR50

Logicon Versaprobe

Itron ERT

### Compatible inductive pads

Starpad

ABB

## Telemetry applications using remote serial data communications

Internal GSM modem Dual Band GSM; fully programmable schedule for battery operation and Automated Meter Reading

## Pressure System – External Transducer

### Pressure range

16 bar Abs.

### Connection

Standard quick-fit male probe connector via an adapter cable

### Operating temperature range

-20 (ambient) to 70 °C (-4 to 158 °F)

**Caution.** Protect the sample and transducer from freezing.

### Accuracy (typical)

±0.4 % of range

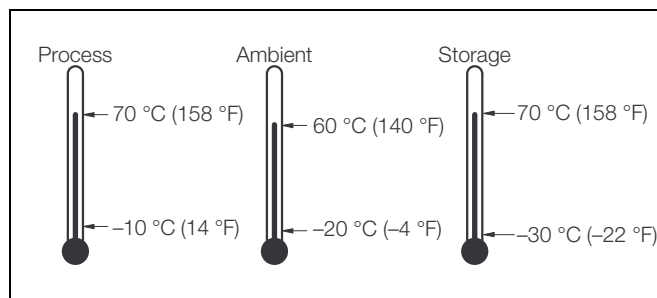
### Thermal error band (typically 100 °C [212 °F])

±1.5 % span

### Cable length

5 or 10 m (16 or 33 ft)

## Temperature Ranges



**Note.** Operation outside ambient temperature limits of 0 to 45 °C (32 to 113 °F) reduces battery capacity and shortens battery life.

## Response Time (Programmable)

### Minimum

1 s (mains-powered)

15 s (battery-powered)

### Languages

English

French

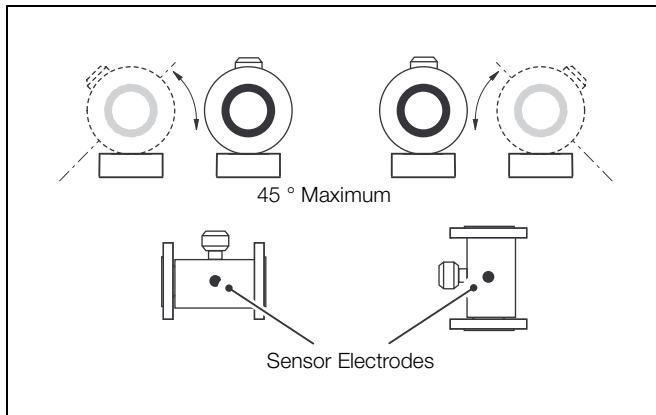
German

Spanish

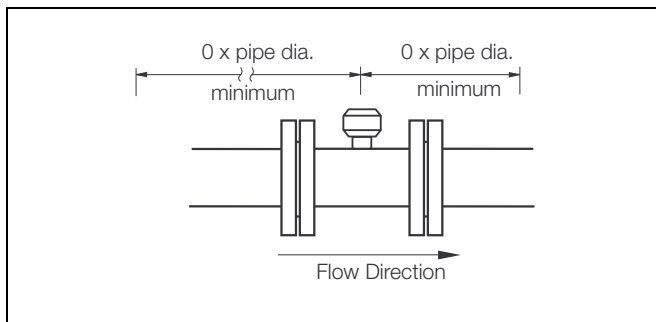
Italian

Dutch

## Mounting



## Pipe Conditions



## Pressure Loss

Flow Rate	Pressure Loss in bar (psi)
Q <sub>3</sub>	<0.63 (9.1)
Q <sub>3/2</sub>	<0.16 (2.3)

## Logger details (option)

	Logger		
	1	2	3
Logger Function	Flow & Pressure	Flow & Pressure	Forward, Reverse, Tariffs & Net Flow Totals
No. of Records	8831	11361	366
Logging Interval	15 to 65500 s (adjustable)		24 hr (fixed)
Typical Capacity	3 months @15 min	~7 days @ 1 min	1 year
Mode	Cyclic	Cyclic	Cyclic
Use ABB LogMaster	✓	✓	✓
Use Technolog (PMAC)	✓	✓	✗
Use Primayer Primeware	✓	✓	✗
Use OSI PI Database / CBV (WADIS) System	✓	✓	✗

## GSM Antenna (option)

### Mounting

Integral with transmitter or remote.

### Antenna environmental

IP66 (NEMA4) waterproof for accidental submersion

(Note. The GSM does not operate with integral antenna under water).

General advice is to mount the antenna as high as possible, always outside of any metal enclosure and not under the surface of the ground.

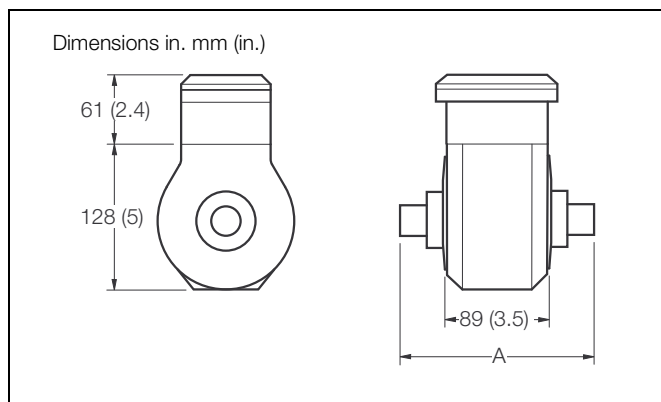
## Default Settings Table

Configuration Parameter	Default European	Default North American
Pulse Factor	1	1
Pulse Units	m <sup>3</sup>	Ugal
Totalizer Units	m <sup>3</sup>	Ugal
Full Scale Flow	Q <sub>3</sub>	Q <sub>3</sub>
Flow Units	m <sup>3</sup> / h	MUGD
Velocity Units	m / s	ft / s
Date Format from Country Code	DDMMYY	MMDDYY
Flow Response Time (s)	3	3
Display Flow Rate	Yes	Yes
Display Forward Total	Yes	Yes
Display Reverse Total	Yes	Yes
Display Net Total	No	No
Display Date	No	No
Display Velocity	No	No
Output Option Pulse Forward	Pulses Forward	Pulses Forward
Output Option Pulse Reverse	Pulses Reverse	Pulses Reverse
Profile Factor	1	1
Probe Insertion Factor	1	1

## Sensor Specification (Nominal Dimensions)

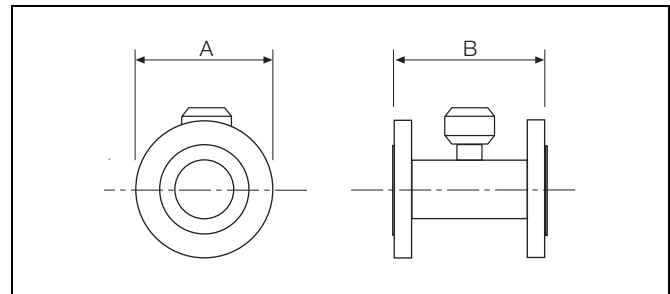
### 15 to 25 mm (1/2 to 1 in.) – Screw Ends

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



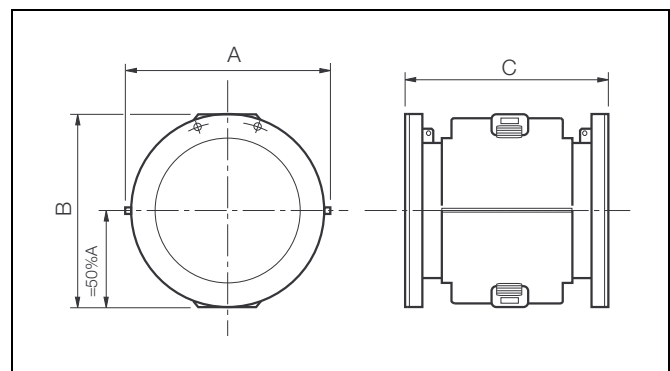
### 40 to 300 mm (1 1/2 to 12 in.) – Flanged

Meter Size		Dimensions mm (in.)		Approx. Weight	
mm	in.	A	B	kg	lb
40	1 1/2	150 (5.9)	200 (7.9)	11	24
50	2	165 (6.5)	200 (7.9)	12	27
65	2 1/2	219 (8.6)	200 (7.9)	13	29
80	3	200 (7.9)	200 (7.9)	18	40
100	4	220 (8.6)	250 (9.8)	25	55
150	6	285 (11.2)	300 (11.8)	31	68
200	8	340 (13.3)	350 (13.8)	48	106
250	10	405 (15.9)	450 (17.7)	75	165
300	12	460 (18.1)	500 (19.7)	112	247

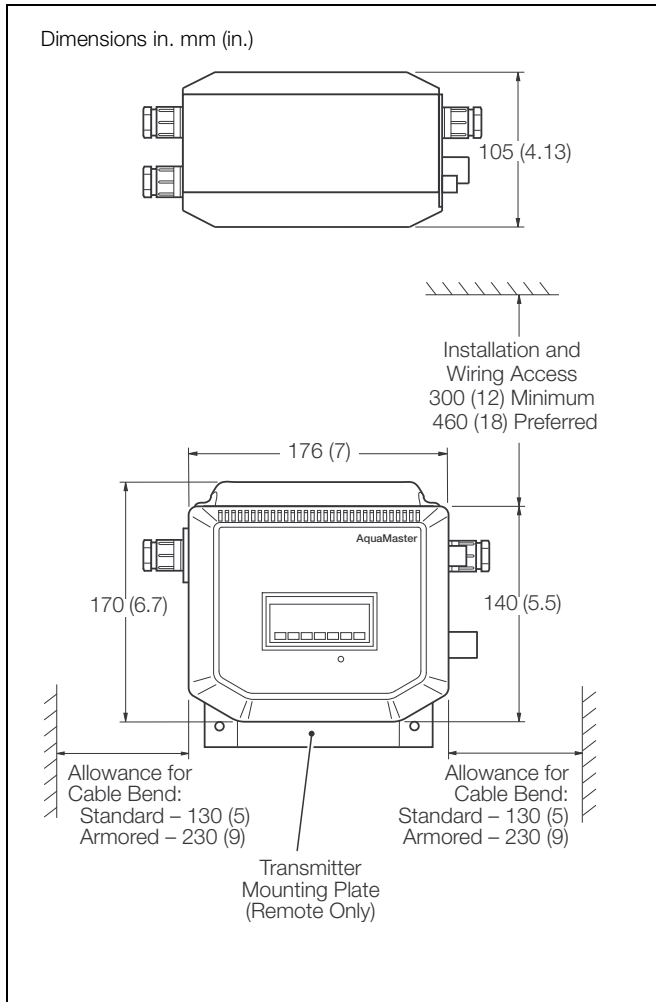


### 350 to 600 mm (14 to 24 in.) – Flanged

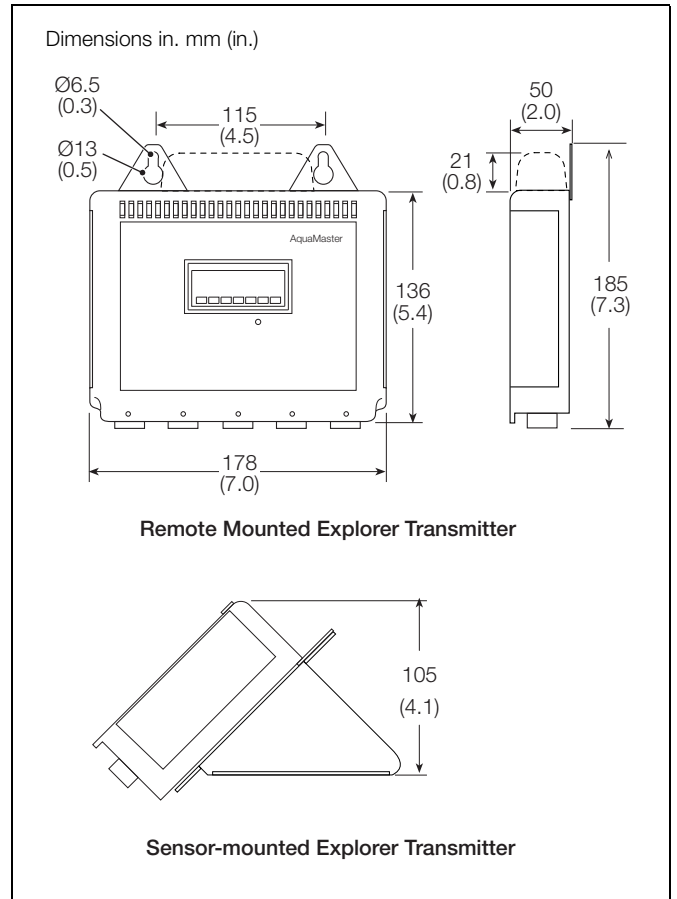
Meter Size		Dimensions mm (in.)			Approx. Weight	
mm	in.	A	B	C	kg	lb
350	14	513 (20.2)	520 (20.5)	550 (21.7)	100	220
400	16	570 (22.4)	576 (22.7)	600 (23.6)	115	253
450	18	632 (24.9)	627 (24.7)	698 (27.5)	160	352
500	20	686 (27.0)	679 (26.7)	768 (30.2)	217	455
600	24	772 (30.4)	770 (30.3)	918 (36.1)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



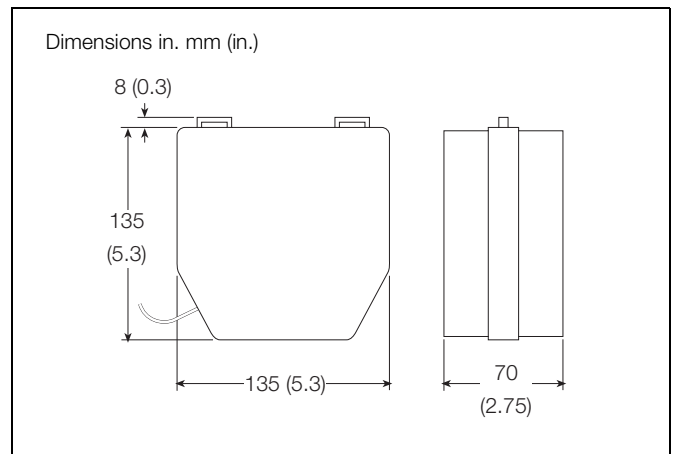
**Overall Dimensions**  
AquaMaster Transmitter



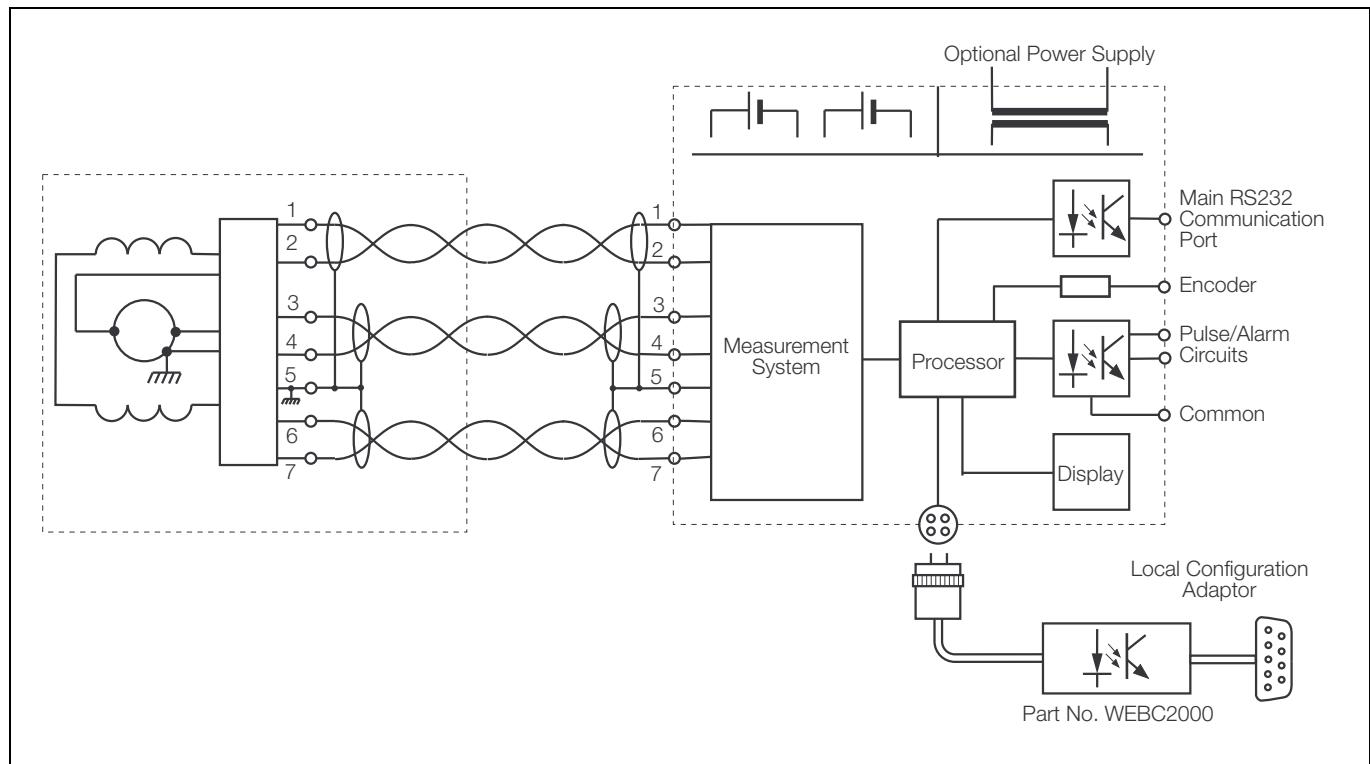
**Explorer Transmitter**



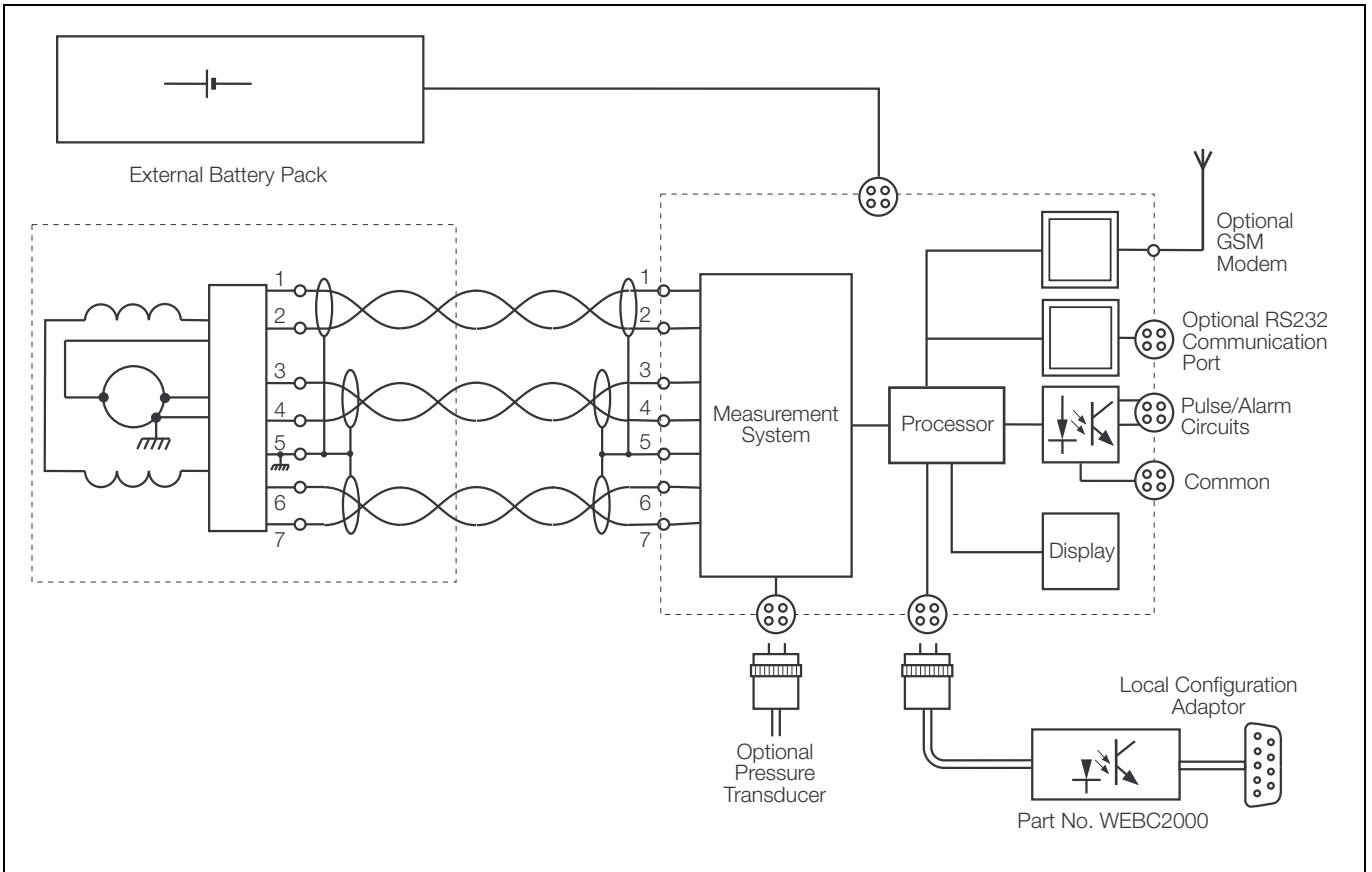
**Explorer Battery Pack**



## Electrical Connections



AquaMaster Transmitter



Explorer Transmitter



## Ordering Information – AquaMaster

AquaMaster Electronic Water Meter				Main Code					Optional Code															
Country	Default Flange Type 40 to 600 mm	Default Flange Type 3 to 25 mm	Default Cable Entry	MM / G A	X	XXXX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Australia	AS4087 PN16	Threaded ISO 228	20 mm																					
Germany	ISO7005 PN16	Threaded ISO 228	20 mm																					
Spain	ISO7005 PN16	Threaded ISO 228	20 mm																					
France	ISO7005 PN16	Threaded ISO 228	20 mm																					
UK	ISO7005 PN16	Threaded ISO 228	20 mm																					
Holland	ISO7005 PN16	Threaded ISO 228	20 mm																					
Italy	ISO7005 PN16	Threaded ISO 228	20 mm																					
USA	ANSI B 16.5 Class 150	Threaded NPSM	1/2 in. NPT																					
<b>Calibrated Bore</b>																								
<b>mm</b>	<b>in.</b>																							
15	5/8																							
20	3/4																							
25	1																							
40	1 1/2																							
50	2																							
65	2 1/2																							
80	3																							
100	4																							
125	5																							
150	6																							
200	8																							
250	10																							
300	12																							
350	14																							
400	16																							
450	18																							
500	20																							
600	24																							
<b>Transmitter Version and Mounting</b>																								
Remote from Sensor																								
Close-coupled with Sensor, Horizontal Display, Metal Transmitter (DN40 to 600)																								
Close-coupled with Sensor, Vertical Display, Metal Transmitter (DN40 to 600)																								
Close-coupled Sensor only, to suit Explorer Transmitter (DN40 to 600, Transmitter ordered separately under code AM/E)																								
Remote Sensor only, to suit Explorer Transmitter (DN40 to 600, Transmitter ordered separately under code AM/E)																								
<b>Power Supply</b>																								
AC																								
AC (with Battery Backup)																								
DC																								
<b>Options</b>																								
With Earthing Rings																								
With Earthing Rings and Potting for Transmitter Termination Wiring																								
<b>Cable Length</b>																								
Not Required																								
10 m																								
20 m																								
30 m																								
40 m																								
50 m																								

Continued on next page.

AquaMaster Electronic Water Meter	Main Code							Optional Code											
	MM	G	A	X	XXXX	X	X	X	X	X	X	0	X	X	0	X	X	X	X
<b>Labelling / Construction</b>																			
ABB UK												0							
ABB USA												1							
<b>Flange Style / End Connections</b>																			
As defined by Country digit (see page 13)																			0
AS4087 PN14 (40-600mm [1.5 to 24in])																			A
AS4087 PN16 (50 to 600 mm [2 to 24 in.])																			Z
AS4087 PN21 (50 to 600 mm [2 to 24 in.])																			B
AS2129 Table C (40 to 600 mm [1.5 to 24 in.])																			C
AS2129 Table D (40-600mm [1.5 to 24in])																			D
AS2129 Table E (40 to 80 mm [1.5 to 3 in.])																			H
AS2129 Table F (40 to 80 mm [1.5 to 3 in.])																			R
ISO7005 / EN1092-1 PN10 (40 to 600 mm [1.5 to 24 in.])																			M
ISO7005 / EN1092-1 PN16 (40 to 600 mm [1.5 to 24 in.])																			E
ISO7005 / EN1092-1 PN25 (40 to 600 mm [1.5 to 24 in.]) **																			N
ISO7005 / EN1092-1 PN40 (40 to 200 mm [1.5 to 8 in.]) ***																			P
ANSI B 16.5 Class 150 (1.5 to 12 in. only)																			U
JIS B2210, 5k (350 to 600 mm [14 to 24in])																			L
JIS B2210, 10k (40 to 600 mm [1.5 to 24 in.])																			J
Parallel thread to ISO228-1 Class B (15 to 25 mm [5/8 to 1 in.])																			T
Threaded to NPSM (5/8 to 1 in.)																			Y
<b>Cable Entries</b>																			
As defined by Country digit (see page 13). Cable not fitted / potted to sensor																			0
20 mm plastic glands. Cable not fitted / potted to sensor																			1
20 mm plastic glands. Cable fitted / potted to sensor																			B
1/2 in. NPT (USA Only). Cable not fitted / potted to sensor																			3
20 mm armored. Cable not fitted / potted to sensor																			2
20 mm armored. Cable fitted / potted to sensor																			C
MIL connector (sensor) + 20 mm plastic glands. Cable fitted / potted to remote sensor																			5
MIL Connectors (sensor) + 7-way MIL connector (output) + 16 mm plastic gland, Cable fitted / potted to remote sensor																			4
MIL connector (sensor) + 19-way MIL connector (output) + 16 mm plastic gland. Cable fitted / potted to remote sensor																			6
20 mm armored (sensor) + 20 mm plastic glands. Cable not fitted to sensor																			7
20 mm armored (sensor) + 20 mm plastic glands. Cable fitted / potted to sensor																			D
Not Used																			0
<b>Calibration</b>																			
Not Required (Transmitter Only)																			0
Class 2 Calibration, OIML* R49, 3 Point, No pressure test																			2
Class 1 Calibration, OIML* R49, 3 Point, No pressure test																			B
Class 2 Calibration, OIML* R49, with CalMaster 2 fingerprint																			P
Class 1 Calibration, OIML* R49, with CalMaster 2 fingerprint																			C
Class 2 Extended Range Calibration, MID*, with CalMaster 2 fingerprint																			E
Class 1 Extended Range Calibration, MID*, with CalMaster 2 fingerprint																			D
<b>Construction</b>																			
Standard																			0
ACS Approved																			F
Not Used																			0
<b>Communications Option</b>																			
Not required																			0
Remote port RS232 C																			1
ABB encoder interface																			2
ABB encoder interface with 5m cable																			3
GSM Modem, with internal antenna																			6
GSM Modem, 1m remote antenna (not fitted)																			7

\* OIML and MID options are available only in DN40, DN50, DN80, DN100, DN150, DN200, DN250 and DN300

Continued on next page.

\*\* Process Temp limited to 40 °C

\*\*\* Process Temp limited to 50 °C

AquaMaster Electronic Water Meter	Main Code							Optional Code										
	MM / G A	X	XXXX	X	X	X	X	X	X	X	0	X	X	0	X	X	X	X
<b>Logger / Protocol</b>																		
None																		0
Internal Logger																		1
Internal Logger – BVS																		2
Internal Logger – Technolog																		3
Internal Logger – Primayer																		4
Internal Logger SMS – ABB Logger Server																		7
Internal Logger SMS – Areal Topkapi Server																		A
Internal Logger SMS – Ecotech																		B
Internal Logger SMS – Hydrocomp																		D
Internal Logger SMS – Autochart																		C
<b>Pressure Transducer/Cable Length</b>																		
Not required																		0
Remote 5m (16.5 ft.) cable																		2
Remote 10m (33 ft.) cable																		3
Remote, no transducer																		Y
<b>Pressure Transducer Span/Type</b>																		
Not required																		0
16bar Absolute Transducer																		2

### Ordering Information – Explorer Transmitter

<b>AquaMaster Electronic Water Meter</b>	<b>AM / E</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Power Supply</b>										
Remote Battery (supplied)		B								
<b>Logger / Protocol</b>										
None			0							
Internal Logger			1							
Internal Logger – BVS			2							
Internal Logger – Technolog			3							
Internal Logger – Primayer			4							
Internal Logger SMS – ABB Logger Server			7							
Internal Logger SMS – Areal Topkapi Server			A							
Internal Logger SMS – Autochart			C							
<b>Comms Options</b>										
None				0						
GSM Integral Antenna				1						
GSM Remote Antenna (1 m [3.2 ft] cable)				3						
<b>Language</b>										
English						0				
German						D				
Spanish						E				
French						F				
Dutch						H				
Italian						I				
<b>Pressure Span</b>										
None							0			
16 Bar Abs							2			
<b>Pressure Transducer</b>										
None								0		
5 m (16.5 ft) Cable								1		
10 m (33 ft) Cable								2		
<b>Labelling</b>										
Standard									0	
<b>Explosion Protection Certification</b>										
FM/AWWA Fire Service										1
MID										2
<b>Connections</b>										
MIL Style										M

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