

- **Wide flow range, highest accuracy**
 - sizes from 25 to 300mm (1 to 12 in.)
- **No pressure loss**
 - ideal for either low pressure systems or very high flowrates
- **Built-in multi-speed, multi-channel, dual-variable logger (option)**
 - remote reading using standard inductive pad or via radio link automatic meter reading system
- **Pressure sensor input (option)**
 - enables monitoring and logging of line pressure
- **Remote/Automatic meter reading**
 - remote reading using standard inductive pad or automatic meter reading via internal GSM mobile phone technology
- **Battery operation**
 - 3-year life
 - no external power supply required; for installation in remote locations
- **AC powered with optional battery backup**
 - continuous measurement even during power-down
- **'Fit and Flow™'**
 - simple to install; no on-site setup
- **Buriable sensor and submersible transmitter**
 - eliminates requirement for a chamber and ensures fast, low-cost installation
 - can be installed in flooded chambers



AquaMaster F
– integrated water measurement
system with no pressure loss

The Next Generation Commercial Water Flow Meter

AquaMaster™ F, available in sizes 25 to 300 mm (1 in. to 12 in.), is the total solution for flow measurement in the water industry wherever zero pressure loss is essential. Outstanding performance, innovative features and user benefits, coupled with low cost of ownership, ensures that AquaMaster F is the first choice for District Metering, Bulk Revenue, Trunk Mains and Treatment Works applications.

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

Based on ABB-proven technology, AquaMaster F is supported by the expertise of the world's leading flowmeter manufacturer with many pioneering advances in water flow metering over the last decade, such as AquaMag™ MagMaster™, AquaProbe™ and CalMaster™.

ABB operates accredited flow calibration facilities, both nationally and internationally, in the UK, Germany, USA, Australia and India. We also offer comprehensive, locally-based before-and after-sales support and service.

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

No External Power Required for Remote Locations

- Two internal batteries
- 3-year battery life (can be extended)
- 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. Two user-replaceable internal batteries provide a 3-year battery life, 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
- Irrigation systems
- Trunk mains
- Treatment works
- Fire service

New Performance Standards for Flow Measurement

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

This unique low flow rate capability enables previously unrecordable night flow rates to be metered in bulk revenue applications.

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

Logger Facility

The AquaMaster F transmitter can contain an optional multi-speed, multi-channel, dual-variable logger. The ability of the logger to run at two speeds simultaneously enables the user to investigate, in precise detail, the flow and pressure activity during a period of interest. The logger logs both flow and pressure via a direct digital transfer of data, thereby ensuring optimum accuracy and resolution of measurement. Traditional techniques of counting pulses over a short logging interval lead to 'quantization' effects corresponding to whole numbers of pulses on logger graphs. AquaMaster F eliminates such effects, averaging digitally over the selected logging interval. Such high resolution data enables step testing, leak detection and water network analysis.

The AquaMaster's internal loggers feature an advanced automatic time-synchronization feature that ensures operation on synchronized time boundaries, no matter what logging interval is set. This ensures all data, when combined with data from other meters, is synchronized precisely.

For revenue application, not only is the flow and pressure logged information available but there are also totalizer and tariff loggers, that log all volume totals (forward, reverse, net) and tariff readings totals at midnight every day. The inbuilt memory of 366 days keeps all records for one year. The readings stored are the precise register volumes and are not inferred by integration of pulses or other similar techniques.

Access to the loggers and logger configuration is security-protected by user-definable passwords.

Support Software

AquaMaster F is available with a range of industry standard third party software. These include:

Technolog™ [PMAC]

Primayer™ [Primeware]

OSI™ PI database

Hydreka Winfluid

Capula Beaver Valley [WADIS]

for downloading, management, analysis and display of data, either directly from the RS232 port or via telemetry. Separate Data Sheets are available describing these systems.

ABB also supply LogMaster, a simple-to-use PC software program that provides communication to the AquaMaster F. LogMaster enables full control and downloading of the on-board datalogger data. A file-saving facility enables data to be exported in CSV format for charting in spreadsheets, for example, Microsoft™ Excel or similar. It supports Vodafone Radiopad and GSM remote connection, with an address book, for full remote operation. LogMaster is Windows™ 98 & NT compatible and is available in a variety of different languages.

AquaMaster F also has on-board remote communication ability such as interfacing to an external Vodafone VVADS radiopad, or internal GSM and, of course, RS232 all of which enable the user to both collect data remotely and service the unit without leaving the office.

Transmitter

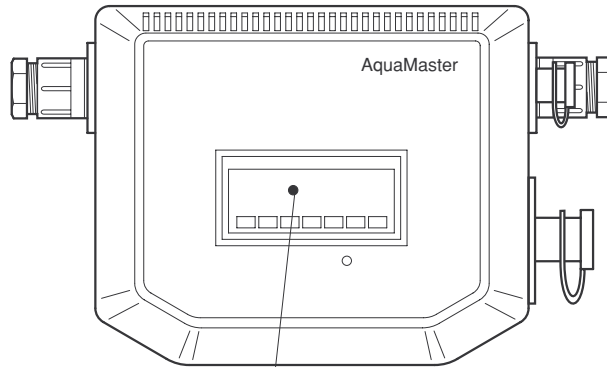
- Comprehensive display
- IP68 (NEMA6) rated – can be submersed in flooded pits
- Resettable or secure totals
- 8mm (0.3 in.) high displays for Totals (exceeds ISO4064 requirement)
- Tamper proof
- 3 outputs (forward & reverse pulses, pulses & direction and alarm)

Transmitter

The AquaMaster transmitter provides the most comprehensive range of information and flow data 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 information. Additionally, the display is available for top or side viewing (depending on the location of the meter) for easy reading in all locations.

The datalogger-equipped variant of the AquaMaster F has program memory technology that has been enhanced to allow this firmware to be upgraded in the field via a local serial port connection or a radio link (if fitted). This future-proofs AquaMasters, making enhancements, or new features, available to installed units.

The enclosure is an IP68 (NEMA6)-rated metal unit designed for integral or remote mounting and suitable for locations where submersion can occur.



9-Digit LCD Display

- Cyclic display*
- 8mm (0.31 in.) 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

Flow Units

Choice of flow units to match user requirements

5-Digit LCD Display

- Cyclic display*
- Flow rate
 - Time
 - Velocity

* Can be programmed to display required data only

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 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

Easy, Low Cost Installation

Irrespective of the location or installation requirements, AquaMaster F provides a cost-effective solution.

Both the Sensor and the Transmitter are fully submersible, enabling installation in flooded chambers and meeting the requirements of IP68 (NEMA6).

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, ensuring 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.

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

Specification

Battery-powered Meters – Flow Requirements per CEN pr 14154 and latest ISO 4064

Size		Q ₄	Q ₃	Q _{0.5%}	Q ₂	Q ₁	R
mm	in.	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	-
25	1.0	20 (88)	16 (70.4)	1.6 (7.04)	0.20 (0.88)	0.08 (0.35)	200
40	1.5	50 (220)	40 (176)	4 (17.6)	0.5 (2.2)	0.2 (0.88)	200
50	2	79 (347)	63 (277)	6 (26)	0.8 (3.5)	0.32 (1.4)	200
65	2.5	125 (550)	100 (440)	10 (44)	1.25 (5.5)	0.5 (2.2)	200
80	3	200 (880)	160 (700)	16 (70)	2.0 (8.8)	0.8 (3.5)	200
100	4	313 (1380)	250 (1100)	25 (110)	3.1 (13.6)	1.3 (5.7)	200
150	6	788 (3470)	630 (2770)	63 (277)	7.9 (34.8)	3.22 (14.1)	200
200	8	1250 (5500)	1000 (4400)	100 (440)	12.5 (55)	5.0 (22)	200
250	10	2000 (8810)	1600 (7040)	160 (704)	20 (58)	8.0 (35)	200
300	12	3125 (13760)	2500 (11010)	250 (1100)	31 (136)	12.5 (55)	200

AC-powered Meters – Flow Requirements per CEN pr 14154 and latest ISO 4064

Size		Q ₄	Q ₃	Q _{0.25%}	Q ₂	Q ₁	R
mm	in.	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	m ³ /h (Ugal/min)	-
25	1.0	20 (88)	16 (70.4)	1.1 (4.84)	0.06 (0.26)	0.025 (0.001)	630
40	1.5	50 (220)	40 (176)	2.7 (11.9)	0.16 (0.70)	0.063 (0.277)	630
50	2	79 (247)	63 (277)	4 (17.6)	0.3 (1.32)	0.1 (0.44)	630
65	2.5	125 (550)	100 (440)	7 (34)	0.4 (1.76)	0.16 (0.70)	630
80	3	200 (880)	160 (700)	11 (48)	0.6 (2.64)	0.25 (1.10)	630
100	4	313 (1380)	250 (1100)	17 (75)	1.0 (4.4)	0.4 (1.76)	630
150	6	788 (3470)	630 (2770)	42 (185)	2.5 (11)	1.0 (4.4)	630
200	8	1250 (5500)	1000 (4400)	67 (295)	4 (17.6)	1.6 (7)	630
250	10	2000 (8810)	1600 (7040)	107 (481)	6 (26)	2.5 (11)	630
300	12	3125 (13760)	2500 (11010)	167 (735)	10 (44)	4.0 (17.6)	630

...Specification

Sensor

Wetted materials

Lining

Suitable for potable water and waste water
(all materials UKWFBS listed)
Contact factory for non-standard materials

Electrodes – stainless steel 316L
Contact factory for non-standard materials

Flanges

Carbon steel

Pressure limitations

As flange rating

Environmental protection

IP68 (NEMA6) to 10m (32 ft) depth

Permanently buriable to 5m (16 ft) depth

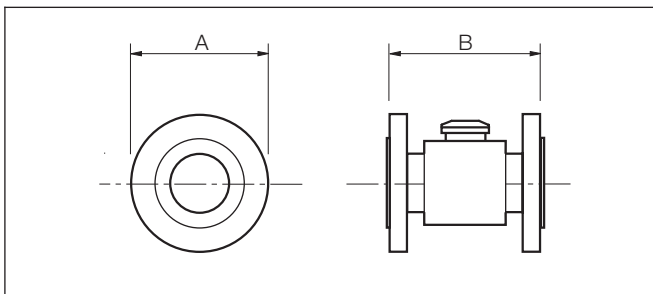
Conductivity

>50µS/cm

End Connections

ISO 7005 – PN10, PN16
ANSI B16.5 1.5 Class 150
ANSI/AWWA C207 Class B & D
AS 4087/14
AS4087/16

Nominal dimensions

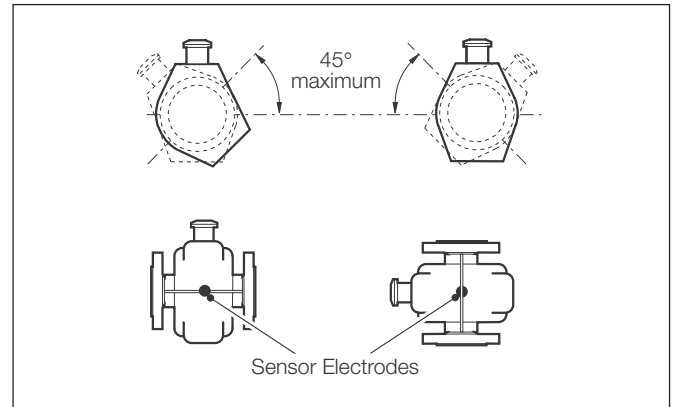


Meter Size		Dimensions mm (in.)		Approx. Weight	
mm	in.	A	B*	kg	lb
25	1	115 (4.5)	200 (7.9)	7	15
40	1.5	150 (5.9)	200 (7.9)	9	20
50	2	165 (6.5)	200 (7.9)	10	23
65	2.5	185 (7.3)	200 (7.9)	18	40
80	3	200 (7.9)	200 (7.9)	18	40
100	4	230 (9.0)	250 (9.8)	24	54
150	6	285 (11.2)	300 (11.8)	38	84
200	8	345 (13.6)	350 (13.8)	37	81
250	10	410 (16.1)	450 (17.7)	60	132
300	12	485 (19.1)	500 (19.7)	70	154

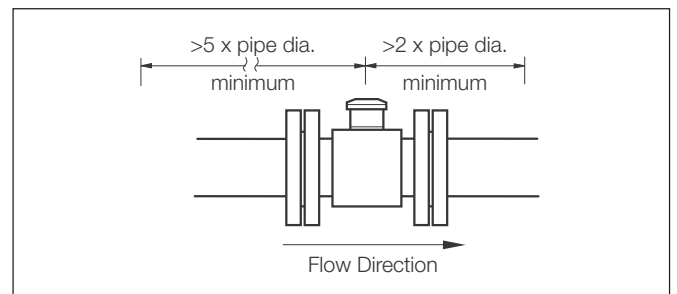
* DN25: +0 to -2mm

* DN50 to DN300: +0 to -3mm

Mounting



Pipe conditions



...Specification

Transmitter

Mounting

Integral with sensor
or
Remote up to 200m (650 ft)

Housing

Aluminium alloy with glass window. IP68 (NEMA6) to <2m (6 ft) depth for maximum of 9 months accumulated

Cable entries

20/16mm plastic glands
20mm armored
or
accepts 1/2 in. NPT threaded
or
military-style plug & socket

Sensor cable

ABB cable supplied as standard
SWA cable available on application

Power supply

Battery life @ 0 to 50°C (32 to 122°F)
1 battery – typically 1.2 years (can be extended)
2 batteries – typically 3 years (can be extended)

Battery life

Battery life is shorter with GSM, depending upon how frequently it is used and for what period. For example, used once per day for SMS automated reporting, the life of the two internal batteries would be typically 2.5 years; for a once-daily data download of a 15 minute data log, the life of the two batteries would typically be 2.2 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 bi-directional 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

Output 3 Alarm indicates any problems with the measurement or with power

Pulse output 50Hz maximum, 50% nominal duty cycle

Serial data communications

Local Port RS232 compatible via ABB lead (Option)

Remote Port (option) RS232 with RI, RTS and CTS handshaking for connection to a modem or computer

Telemetry applications using remote serial data communications

External Vodaphone VVADS Radio Pad

X25 compatible network interface via RP5, 6, 7 or similar radiopad

External PSTN modem

Modern PSTN modems that store configuration setup on non-volatile memory (for configuration information contact factory)

Internal GSM modem

Fully programmable schedule for Automated Meter Reading (maximum once per day)

GSM Antenna

Mounting

Integral with transmitter
or
Remote (1m [3 ft.] cable)

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 and always outside of any metal enclosure

Logger details

	Logger		
	1	2	3
Logger Function	Flow and Pressure	Flow and Pressure	Forward, Reverse & Net Flow Totals
No. of Records	8831	11361	366
Logging Interval	15 to 65500s (adjustable)		24 hours (fixed)
Typical Capacity	3 months @ 15 minutes	7 days @ 1 minute	1 year
Mode	Cyclic	Cyclic	Cyclic

Software Availability

Software	Direct (RS232)	Vodafone (Radiopad)	GSM (Circuit-switched data)	SMS (Text)
ABB LogMaster	✓	✓	✓	✗
Technolog (PMAC)	✓	✓	✗	✗
Primayer (Primeware)	✓	✓	✗	✗
OSI PI Database or Capula Beaver Valley (VVADIS)	✓	✓	✓	✗
Hydrecka (Winfluid)	✓	✓	✗	✗
Automated Meter Reading (via SMS Gateway)	✗	✗	✗	✓
Mobile Phone Text	✗	✗	✗	✓

...Specification

Response time (programmable)

Minimum

15s minimum (battery-powered)

Languages

English

French

German

Spanish

Italian

Dutch

Languages in certain models can be changed via Windows download program (contact factory)

Pressure system – external transducer (AquaMaster with logger only)

Pressure range absolute

10, 16 bar or 300 psi

Connection

Standard quick-fit male probe

MIL stye connector

Operating temperature range

-20 to 70°C (-4 to 158°F)

Accuracy (typical)

±0.4% of range

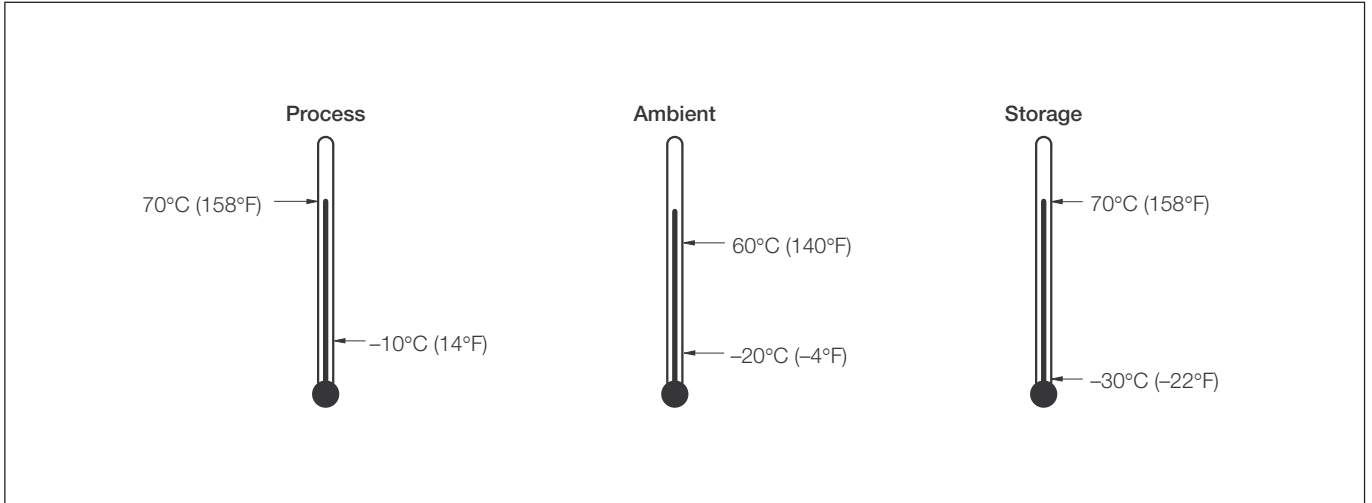
Thermal error band (typically 100°C [212°F])

±1.5% span

Cable length

1, 5, 10 or 20m (3, 16, 32 or 65 ft.)

Temperature Ranges



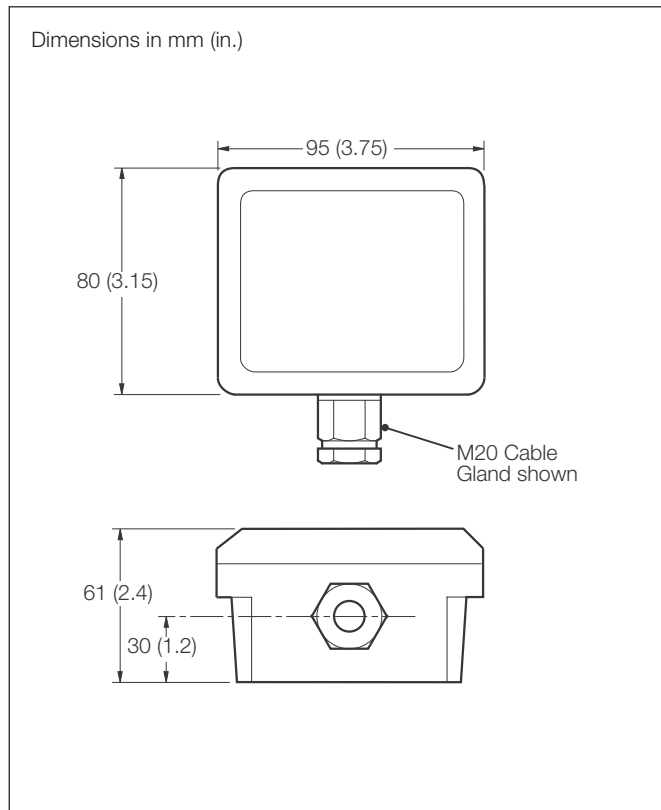
Default Settings Table

Configuration Parameter	Default European	Default North American
Pulse Factor	1	1
Pulse Units	m ³	Ugal
Totalizer Units	m ³	Ugal
Full Scale Flow	ISO 4064 Qn	ISO 4064 Qn
Flow Units	m ³ /h	MUGD
Velocity Units	m/s	ft/s
Date Format from Country Code	DDMMYY	MMDDYY
Flow Response Time (s)	3	3
Pressure Display Type	Gauge	Gauge
Display Flow Rate	Yes	Yes
Display Forward Total	Yes	Yes
Display Reverse Total	Yes	Yes
Display Net Total	No	No
Display Pressure	Yes (if ordered with Pressure Tx)	Yes (if ordered with Pressure Tx)
Display Date	No	No
Display Velocity	No	No
Pressure Upper Range (bar/psi)	16/232	16/232
Logger 1 Interval (s)	900	900
Logger 2 Interval (s)	60	20
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

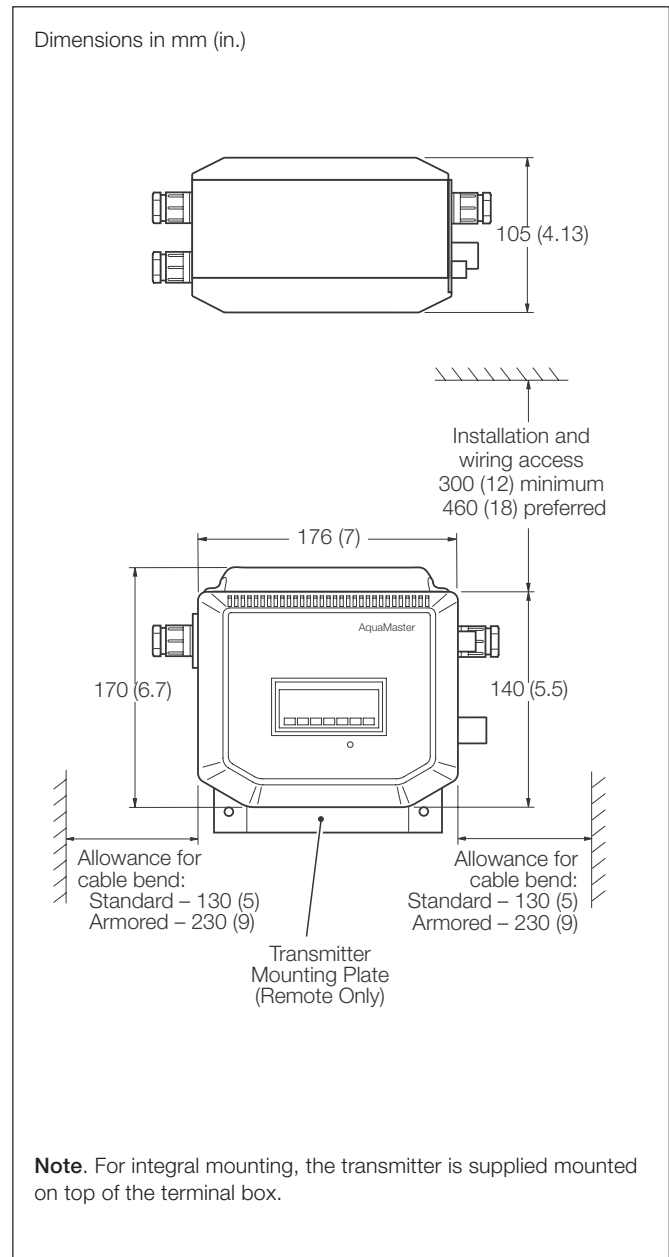
Overall Dimensions

Transmitter

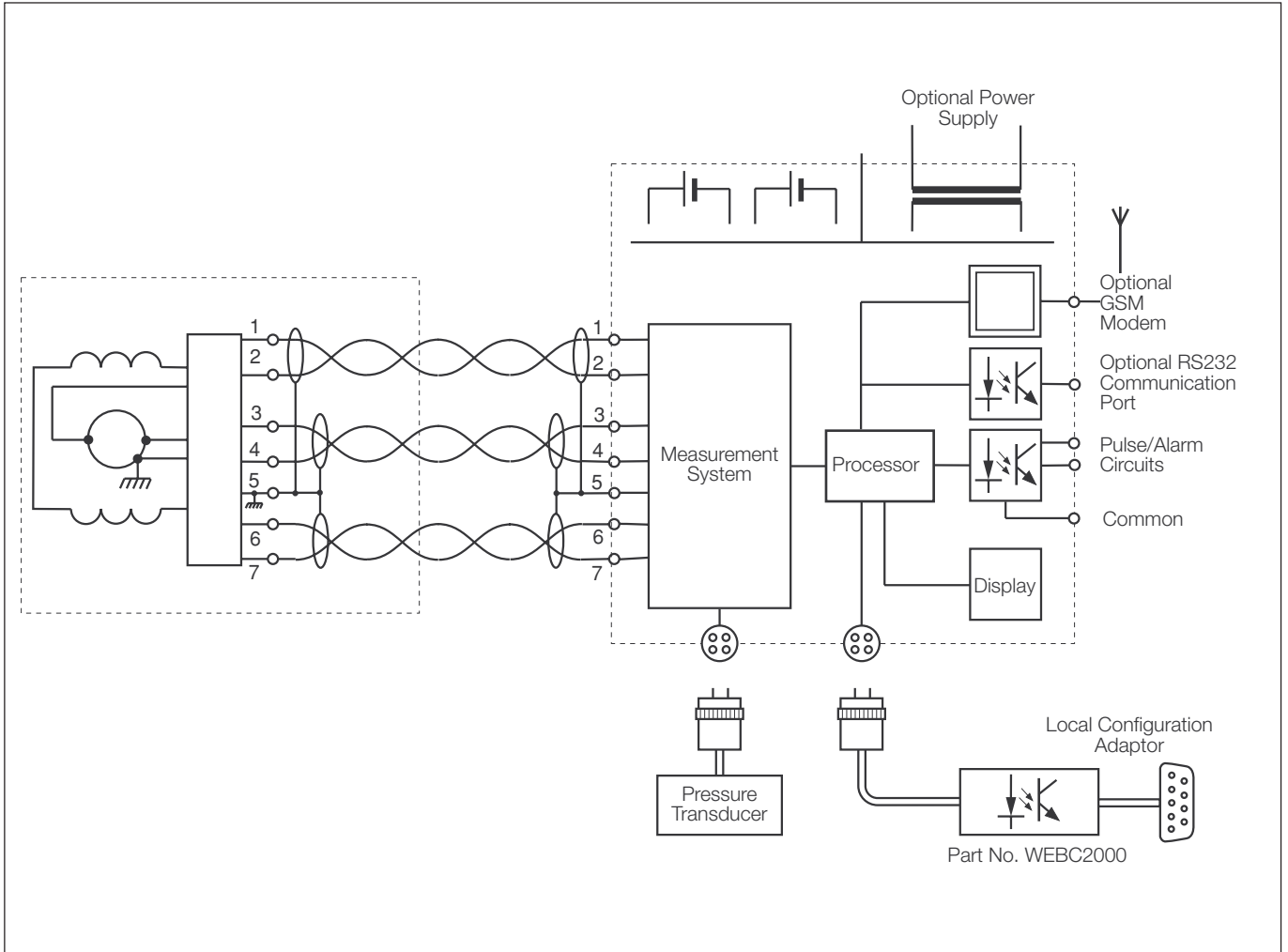
Terminal Box – Sensor Mounted



Transmitter



Connection Information



Ordering Information

AquaMaster Electronic Water Meter			Main Code				Additional Code													
Country	Default Flange (Type 25 to 300mm)	Default Cable Entry	MM/G F	X	XXXX	X	X	X	X	X	X	X	0	X	0	0	X	0	0	0
Australia	AS4087 Class 16	20mm		A																
Germany	ISO7005 PN16	20mm		D																
Spain	ISO7005 PN16	20mm		E																
France	ISO7005 PN16	20mm		F																
UK	ISO7005 PN16	20mm		G																
Holland	ISO7005 PN16	20mm		H																
Italy	ISO7005 PN16	20mm		I																
USA	ANSI B 16.5 Class 150	1/2 in. NPT		U																
Calibrated Bore																				
mm	in.																			
25	1				0025															
40	1.5				0040															
50	2				0050															
65	2.5				0065															
80	3				0080															
100	4				0100															
150	6				0150															
200	8				0200															
250	10				0250															
300	12				0300															
Electronic Display Unit Version and Mounting																				
Integral with sensor horizontal display, metal transmitter										1										
Integral with sensor vertical display, metal transmitter										2										
Remote from sensor, metal transmitter										3										
Power Supply																				
AC																				L
AC (with battery backup)																				A
Battery																				B
Options																				
With earthing rings (≥DN80)																				2
With earthing rings (≥DN80) and potting for transmitter termination wiring																				C
Cable Length																				
Not Required																				0
10m																				1
20m																				2
30m																				3
40m																				4
50m																				5
60m																				6
70m																				7
80m																				8
100m																				A
125m																				B
150m																				C
175m																				D
200m																				E

Main Code

Additional Code

MM/G F	X	XXXX	X	X	X	X
--------	---	------	---	---	---	---

X	X	X	0	X	0	0	X	X	X	X
---	---	---	---	---	---	---	---	---	---	---

Labelling/Construction										
ABB UK	0									
ABB USA	1									
Flange Style/End Connections										
As defined by Country digit (see page 14)	0									
AS4087 Class 14 Flanges (50 to 600mm [2 to 24 in.] only)	A									
AS4087 Class 16 Flanges (50 to 600mm [2 to 24 in.] only)	Z									
ISO7005 PN10 Flanged (40 to 600mm [1.5 to 24 in.] only)	M									
ISO7005 PN16 Flanged (40 to 600mm [1.5 to 24 in.] only)	E									
ANSI B16.5 Class 150 Flanged (1.5 to 12 in. only)	U									
Cable Entries										
As defined by Country digit (see page 14). Cable not fitted/potted to sensor	0									
20/16mm plastic glands. Cable not fitted/potted to sensor	1									
20/16mm plastic glands. Cable fitted/potted to sensor	B									
1/2 in. NPT(USA only). Cable not fitted/potted to sensor	3									
20mm armored. Cable not fitted/potted to sensor	2									
20mm armored. Cable fitted/potted to sensor	C									
MIL connector (sensor) + 16mm plastic glands. Cable fitted/potted to remote sensor	5									
MIL connector (sensor) + 19-way MIL connector +16mm plastic gland.										
Cable fitted/potted to remote sensor	6									
20mm armored (sensor) + 16mm plastic glands. Cable not fitted to sensor	7									
20mm armored (sensor) + 16mm plastic glands. Cable fitted/potted to sensor	D									
Not Used			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 with pressure test (≥250mm [10 in.] only)					4					
Not Used						0	0			
Communications Option										
Not Required									0	
Remote Port RS232 C									1	
ScanReader – no cable fitted									2	
ScanReader – 5m (16.25 ft.) cable fitted									3	
GSM Modem, with internal antenna									6	
GSM Modem, 1m (3.25 ft.) remote antenna (not fitted)									7	
GSM Modem, 5m (16.25 ft.) remote antenna (not fitted)									8	
Logger										
Not required										0
ABB Logger enabled for ABB Software										1
ABB Logger enabled for CPV Software										2
ABB Logger enabled for Technolog Software										3
ABB Logger enabled for Primayer Software										4
ABB Logger enabled for Hydreka Software										5
Pressure Transducer/Cable Length										
Not required										0
Remote 1m (3.25 ft.) cable										1
Remote 5m (16.25 ft.) cable										2
Remote 10m (32.5 ft.) cable										3
Remote 20m (65 ft.) cable										4
Remote, no transducer										Y
Pressure Transducer Span/Type										
Not required										0
10bar Absolute Transducer										1
16bar Absolute Transducer										2
300 psi Absolute Transducer										3

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Technolog™ is a trademark of PMAC
Primayer™ is a trademark of Primeware
OSJ™ is a trademark of PI database
Hydreka Winfluid
Capula Beaver Valley is a trademark of WADIS
Excel™ is a trademark of Microsoft Corp.
Windows 98 & NT™ are trademarks of Microsoft Corp.
Radiopad™ is a trademark of Vodaphone

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expertise in over 100 countries worldwide

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