Queensland Urban Utilities

SP302 - Progress Road Pump Station

Operation & Maintenance Manual
Contract Number BW50080-04/05

Manuals Cover Pages

Created 12/09/2006

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[1] VSD = Variable Speed Drive

SP302.TXT

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Program v1.00 (30/08/1999) (WIN-PC)
File Produced : 20/04/2006 11:56:21 AM

** Display Menu **
------------------
Display Mode       = 0
Display Resolution = 1

** Flow Menu **
---------------
Flow Range      = 300.00000
Flow Units      = Ltr
Flow Multiplier = x1
Flow Time       = s
Flow Response   = 3
Flow Probe Ins  = 1.00000
Flow Probe Prof = 1.00000
Flow Cutoff     = 3

** Analog Menu **
-----------------
Analog FSD     = 20
Analog Zero    = 4
Analog Dir Fwd = 1
Analog Dir Rev = 0
Analog No. 2   = 100.00000

** Pulse Menu **
----------------
Pulse Factor = 0.00999
Pulse Cutoff = 0
Pulse Max    = 800
Pulse Idle   = 1
Pulse Size   = 0

** Totaliser Menu **
--------------------
Totaliser Units      = Ltr
Totaliser Multiplier = k
Totaliser Clear Enab = 0

** Alarm No.1 Menu **
---------------------
Alarm No.1 Idle     = 1
Alarm No.1 Enable   = 1
Alarm No.1 Fault    = 1
Alarm No.1 Forward  = 0
Alarm No.1 Reverse  = 0
Alarm No.1 Cutoff   = 0
Alarm No.1 MtSensor = 1
Alarm No.1 Hi       = 0
Alarm No.1 Lo       = 0
Alarm No.1 Analog   = 0
Alarm No.1 Pulse    = 0

** Alarm No.2 Menu **
---------------------
Alarm No.2 Idle     = 1
Alarm No.2 Enable   = 1
Alarm No.2 Fault    = 0
Alarm No.2 Forward  = 0
Alarm No.2 Reverse  = 1
Alarm No.2 Cutoff   = 0
Alarm No.2 MtSensor = 0
Alarm No.2 Hi       = 0
Alarm No.2 Lo       = 0
Alarm No.2 Analog   = 0
```

SP302.TXT

```
Alarm No.2 Pulse    = 0

** Alarm Trip Menu **
---------------------
Alarm Trip Hi   = 110
Alarm Trip Lo   = -110
Alarm Trip Hyst = 1
Alarm Trip Disp = 0

** Input Menu **
----------------
Input Clr
Input Idle  = 0

** MtSensor Menu **
-------------------
MtSensor Trip = 50

** Sensor Menu **
-----------------
Sensor Number   = P/53295/2/2
Sensor Tag      = 5492212
Sensor Size     = 300
Sensor FACTOR 1 = 1.39052
Sensor FACTOR 2 = -8
Sensor FACTOR 3 = 5
Sensor FACTOR 4 = 1.00000

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BYPASS.TXT

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Program v1.00 (30/08/1999) (WIN-PC)
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Display Mode       = 0
Display Resolution = 1

** Flow Menu **
---------------
Flow Range      = 300.00000
Flow Units      = Ltr
Flow Multiplier = x1
Flow Time       = s
Flow Response   = 3
Flow Probe Ins  = 1.00000
Flow Probe Prof = 1.00000
Flow Cutoff     = 3

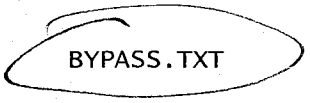
** Analog Menu **
-----------------
Analog FSD     = 20
Analog Zero    = 4
Analog Dir Fwd = 1
Analog Dir Rev = 0
Analog No. 2   = 100.00000

** Pulse Menu **
----------------
Pulse Factor = 0.00101
Pulse Cutoff = 0
Pulse Max    = 800
Pulse Idle   = 1
Pulse Size   = 0

** Totaliser Menu **
--------------------
Totaliser Units      = Ltr
Totaliser Multiplier = k
Totaliser Clear Enab = 0

** Alarm No.1 Menu **
---------------------
Alarm No.1 Idle     = 1
Alarm No.1 Enable   = 1
Alarm No.1 Fault    = 1
Alarm No.1 Forward  = 0
Alarm No.1 Reverse  = 0
Alarm No.1 Cutoff   = 0
Alarm No.1 MtSensor = 1
Alarm No.1 Hi       = 0
Alarm No.1 Lo       = 0
Alarm No.1 Analog   = 0
Alarm No.1 Pulse    = 0

** Alarm No.2 Menu **
---------------------
Alarm No.2 Idle     = 1
Alarm No.2 Enable   = 1
Alarm No.2 Fault    = 0
Alarm No.2 Forward  = 0
Alarm No.2 Reverse  = 1
Alarm No.2 Cutoff   = 0
Alarm No.2 MtSensor = 0
Alarm No.2 Hi       = 0
Alarm No.2 Lo       = 0
Alarm No.2 Analog   = 0
```

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Alarm No.2 Pulse    = 0

** Alarm Trip Menu **
---------------------
Alarm Trip Hi   = 110
Alarm Trip Lo   = -110
Alarm Trip Hyst = 1
Alarm Trip Disp = 0

** Input Menu **
----------------
Input Clr
Input Idle  = 0

** MtSensor Menu **
-------------------
MtSensor Trip = 50

** Sensor Menu **
-----------------
Sensor Number   = P/54156/14/1
Sensor Tag      = 317-200-FTR
Sensor Size     = 200
Sensor FACTOR 1 = 1.51308
Sensor FACTOR 2 = 0
Sensor FACTOR 3 = 5
Sensor FACTOR 4 = 1.00000

<<== END OF FILE ==>>
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Instruction Manual

IM/MM/SF_8

Electromagnetic Flowmeters

MagMaster™

Factory Mutual System Approved

Cenelec/ATEX

The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The UKAS Calibration Laboratory No. 0255 is just one of the ten flow calibration plants operated by the Company, and is indicative of our dedication to quality and accuracy.

EN ISO 9001:2000

Cert. No. Q5907

EN 29001 (ISO 9001)

Lenno, Italy – Cert. No. 9/90A

Sonehouse, U.K.

0255

Electrical Safety

This instrument complies with the requirements of CEI/IEC 61010-1:2001-2 "Safety requirements for electrical equipment for measurement, control, and laboratory use". If the instrument is used in a manner NOT specified by the Company, the protection provided by the instrument may be impaired.

Symbols

One or more of the following symbols may appear on the instrument labelling:

	**Warning** – Refer to the manual for instructions
	**Caution** – Risk of electric shock
	Protective earth (ground) terminal
	Earth (ground) terminal

	Direct current supply only
	Alternating current supply only
	Both direct and alternating current supply
	The equipment is protected through double insulation

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Communications Department.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

CONTENTS

1 INTRODUCTION

MagMasterTM is a range of high performance electromagnetic flowmeters for the measurement of electrically conductive fluids and slurries, and is normally supplied as a calibrated system, with the transmitter factory configured to a supplied full-bore or insertion probe sensor.

A wide range of options is available to suit most applications, including:

Integral or remote transmitter.

Insertion Probes.

Approved Versions, including:

Hazardous area operation.

HART™ communication protocol.

PROFIBUS DP communication protocol.

Warning. For MagMaster Approved / Hazardous Versions read in conjunction with IM/MM-BK1.

Warning.

- Installation and maintenance must only be carried out by suitably trained personnel.
- All relevant sections of this manual must be read before selecting a location.
- Safety requirements of this equipment, any associated equipment and the local environment must be taken into consideration.
- The installation and use of this equipment must be in accordance with relevant national and local standards.

2 MECHANICAL INSTALLATION

2.1 Unpacking

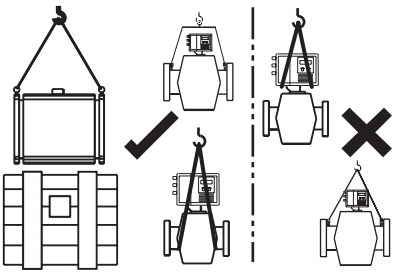


Fig. 2.1 Unpacking

2.2 Installation Conditions

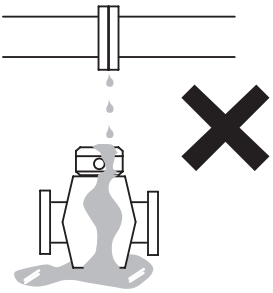


Fig. 2.2 Spillage

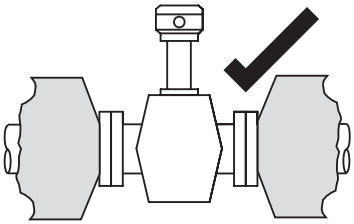


Fig. 2.3 Lagging (High Temperature)

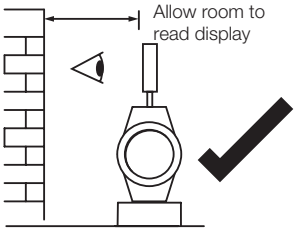


Fig. 2.4 Siting

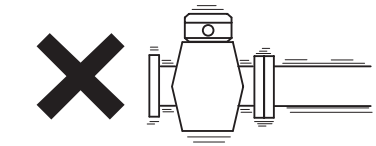


Fig. 2.5 Vibration

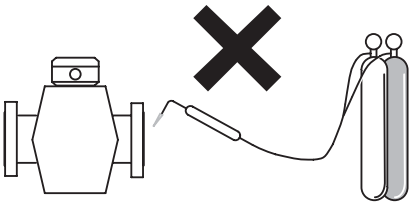


Fig. 2.6 Localised Heat

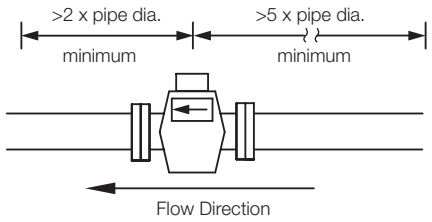


Fig. 2.7 Straight Pipe Requirements

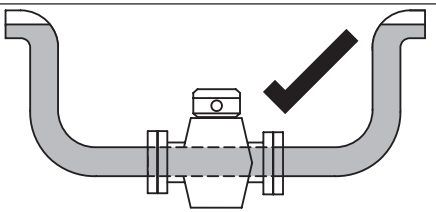


Fig. 2.8 Fluid Level

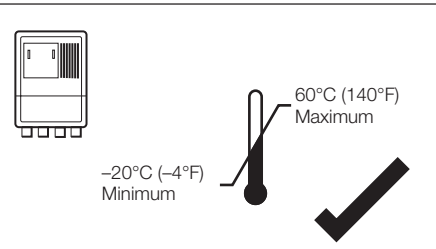


Fig. 2.9 Within Temperature Limits

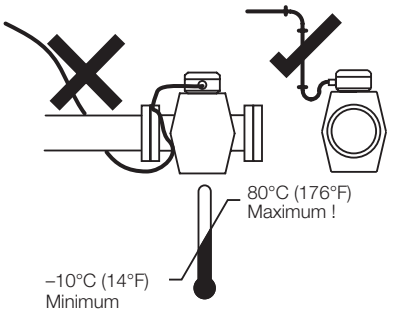


Fig. 2.10 Cable Routing

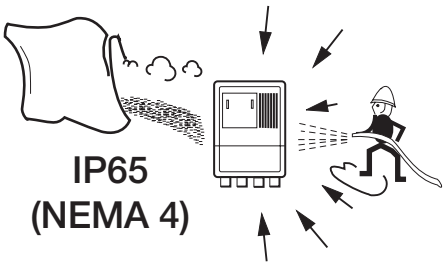


Fig. 2.11 Within Environmental Rating

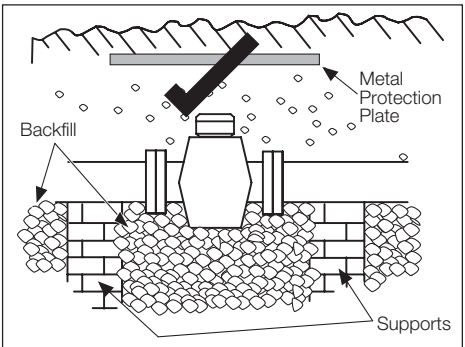


Fig. 2.12 Underground

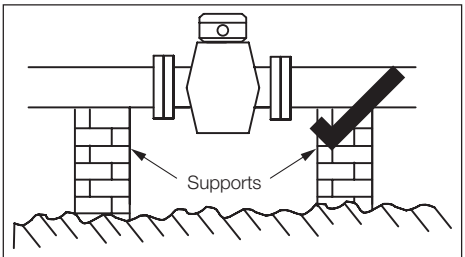


Fig. 2.13 Above Ground

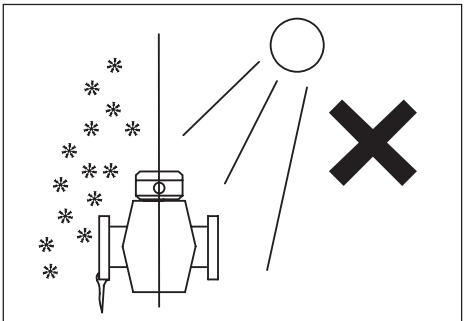


Fig. 2.14 Temperature Difference

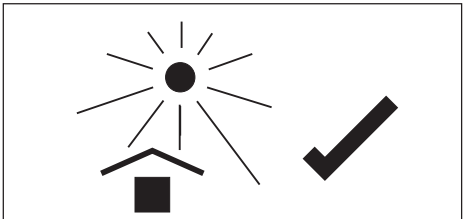
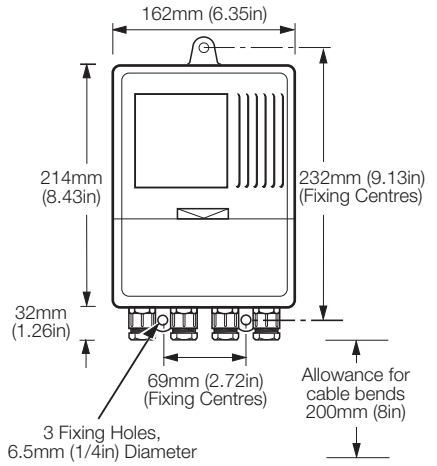


Fig. 2.15 Shade

2.3 Mechanical Installation

2.3.1 Transmitters



Caution. Do not overtighten fixings, especially on an uneven surface.

Fig. 2.16 Dimensions

2.3.2 Sensors

Caution.

- Do NOT exceed the maximum working pressure marked on the equipment.
- Use stainless steel (austenitic) bolts, studs and nuts for flanged sensors below 200mm.

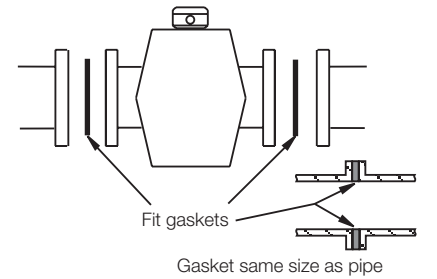
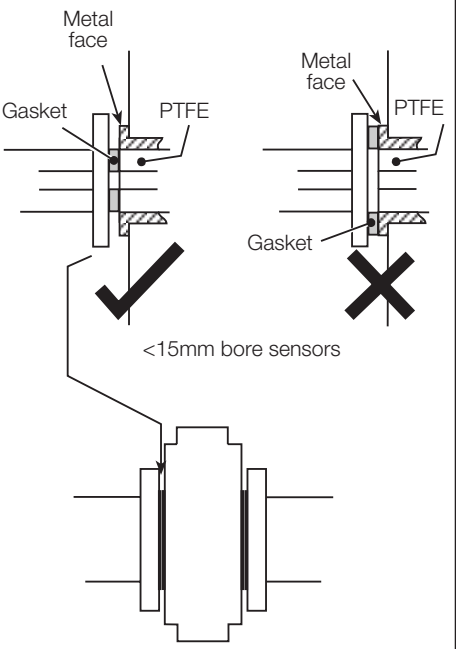


Fig. 2.17 Gasket Fitting



Caution. For wafer type sensors of <15mm bore, the fluid seal must be made against the PTFE. Otherwise use a full face gasket.

Fig 2.18 Wafer Type Sensors

3 ELECTRICAL INSTALLATION

3.1 Grounding (Fig. 3.1, 3.2)

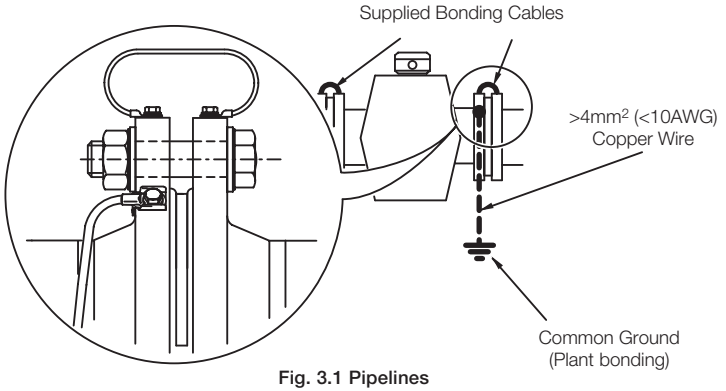


Fig. 3.1 Pipelines

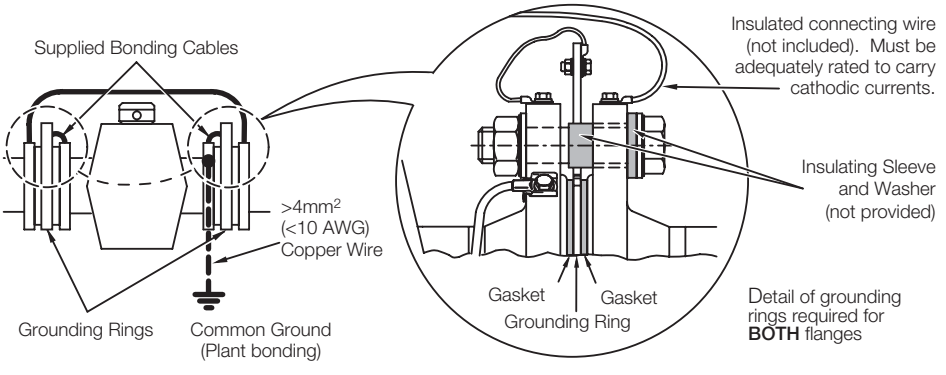


Fig. 3.2 Pipelines with Cathodic Protection

3.2 Cables

3.2.1 Cable (Remote Versions only)

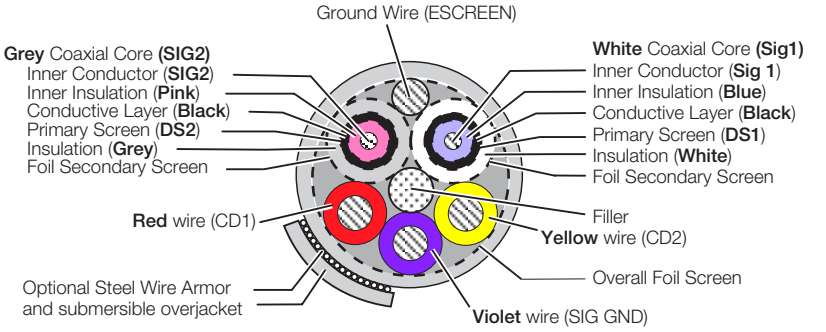


Fig. 3.3 Cable Identification

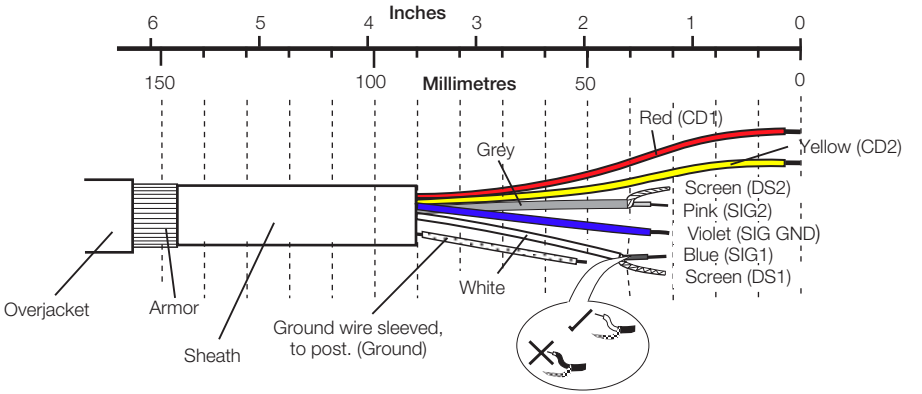


Fig. 3.4 Cable Preparation

3.2.2 Cable (Alternative Type – North American Wiring Practice)

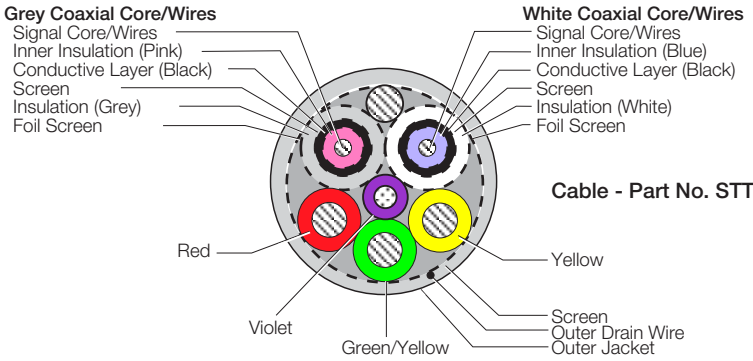


Fig. 3.5 Cable Identification (North American Wiring Practice)

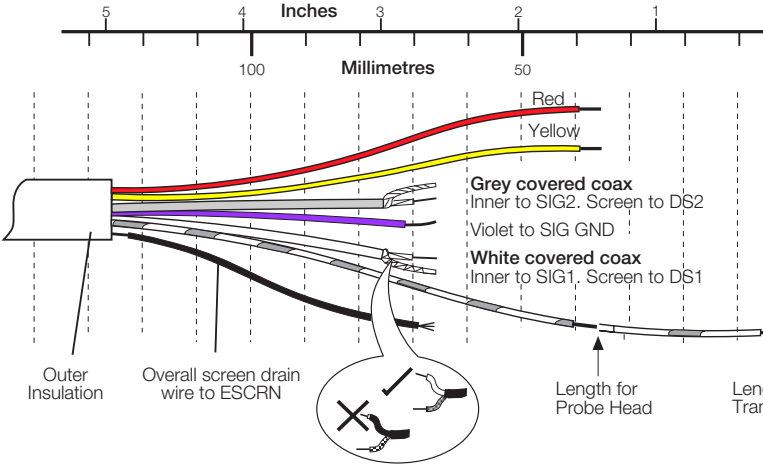


Fig. 3.6 Cable Preparation (North American Wiring Practice)

3.2.3 Cable Glands (IEC Installation Practice)

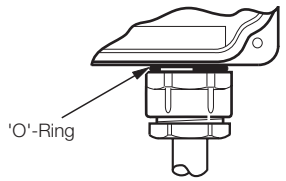


Fig. 3.7 Cable Gland
(IEC Installation Practice)

Warning.

- Rigid conduit must not be fitted to the transmitter.
- Transmitter conduit adaptors must incorporate a face seal.

3.2.4 Conduit Adapters and Cable Glands (North American – 0.5in)

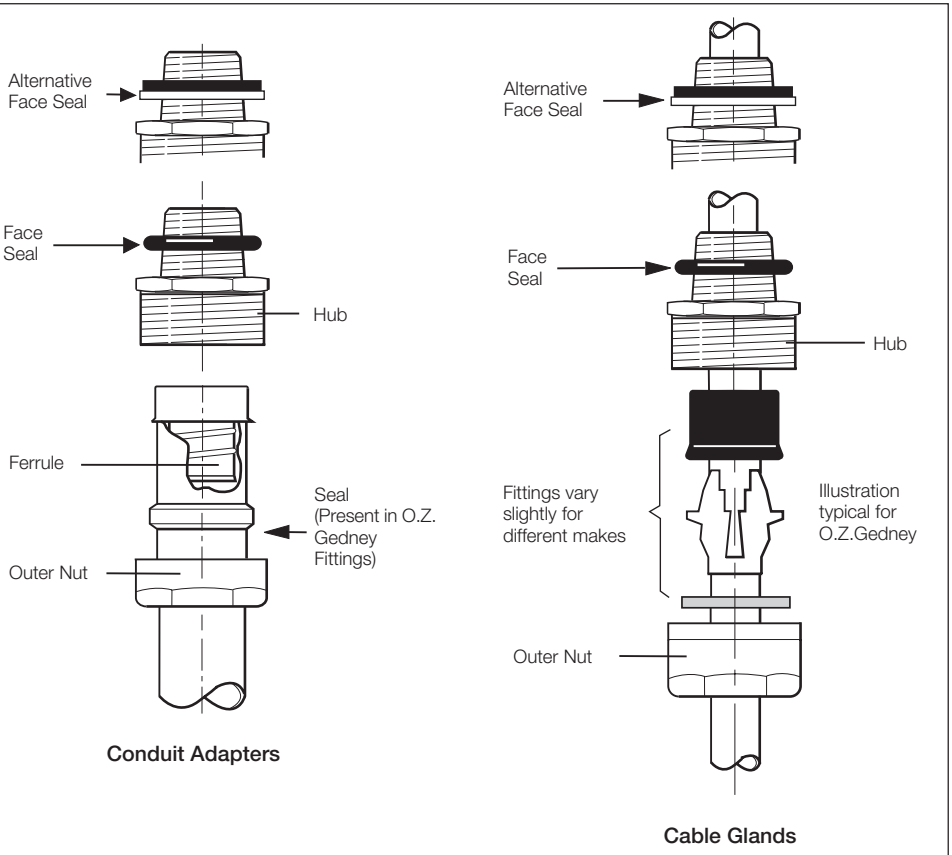


Fig. 3.8 Conduit Adapters and Cable Glands

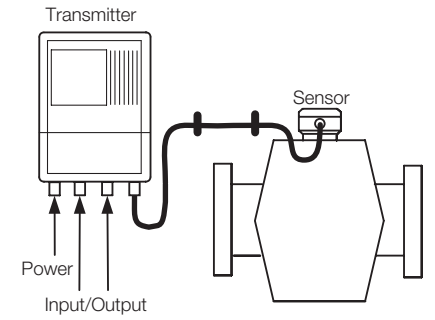


Fig. 3.9 Connection Requirements

3.3 Connection Requirements

The transmitter and sensor are supplied as a matched system. Check serial numbers to ensure they are matched.

3.3.1 Sensors

Remote sensors are usually supplied with an integral cable and potted connections. If the sensor has been supplied unpotted, connections must also be made to the sensor terminal box and then potted on completion with the supplied potting material – See Appendix A.

Caution. (Remote versions)

- Remove any exposed black conductive layer from under coaxial screens.
- Make connections only as shown.
- Sleeve all bare wiring.
- Twist RED and YELLOW cores lightly together.
- Twist WHITE and GREY coaxial cables lightly together.
- Maintain Environmental Protection at all times.
- Conduit connections must provide cable entry sealing.

Information. (Remote versions)

- Refer to ENVIRONMENTAL PROTECTION (Appendix A).
- Internal appearance of Terminal Box may vary from that shown.

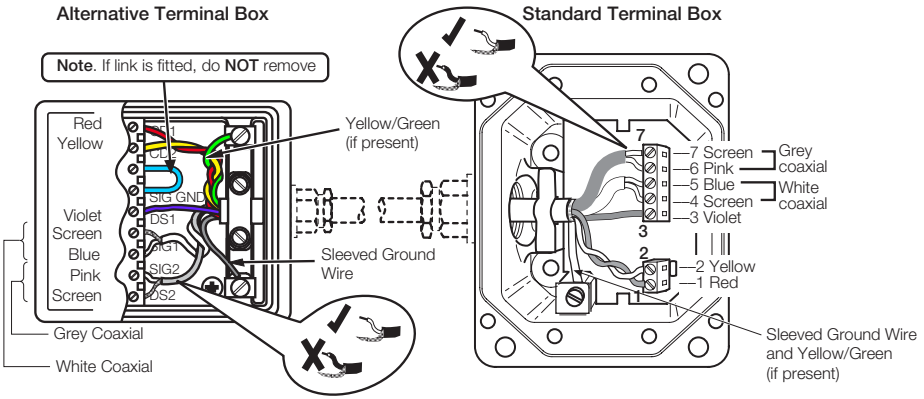


Fig. 3.10 Sensor Terminal Box Connections (Remote version)

...3 ELECTRICAL INSTALLATION

3.3.2 Transmitters (All versions)

Caution. Unused cable entries must be blanked with the permanent blanking plugs supplied with the transmitters.

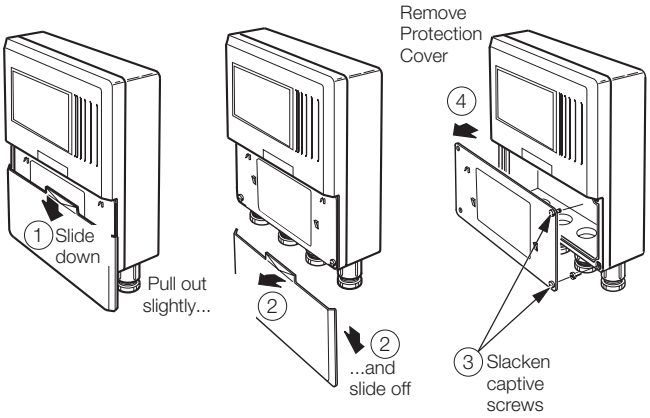


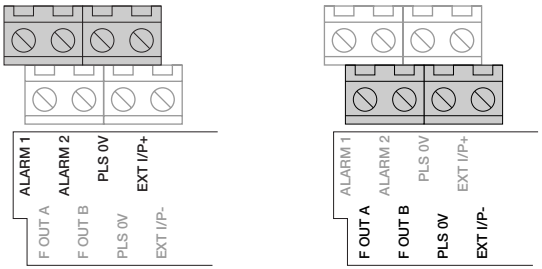
Fig. 3.11 Transmitter Connection Terminal

Caution.

- Remove any exposed black conductive layer from the inner insulation of both coaxial cables.
- Substitute sensor cable of any kind is not acceptable.
- Do not make connections except as shown.
- Twist cable pairs together as shown.
- Sleeve ALL bare wires.
- Sensor cable may only be joined using company supplied junction box - available separately.

Terminal Identification

Each terminal block has two parallel rows of connectors. The corresponding label for each connector is printed on the board as shown in fig 3.12.



Caution. It is important that all wires are correctly connected to their corresponding terminal.

Fig 3.12 Terminal Identification

...3.3.2 Transmitters (All versions)

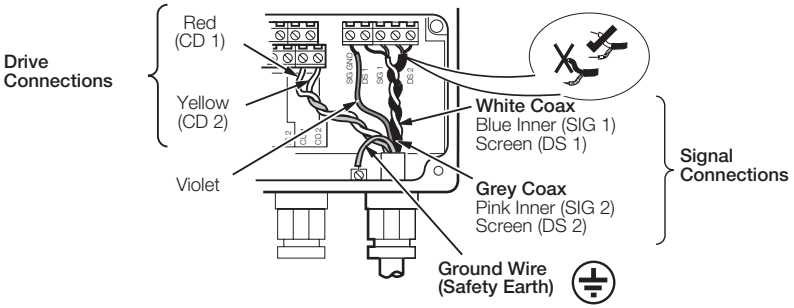


Fig. 3.13 Sensor Cable Connections at the Transmitter (Remote version)

North American Wiring Practice

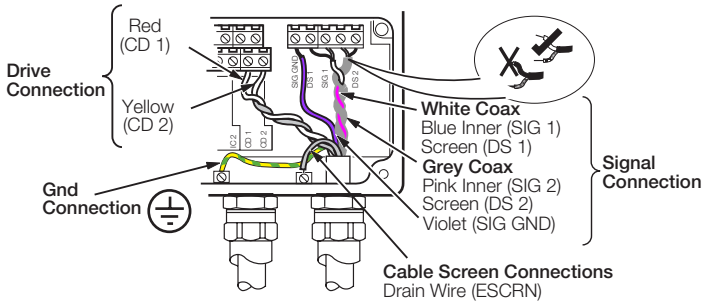


Fig. 3.14 Sensor Cable Connections at the Transmitter (North American Wiring Practice)

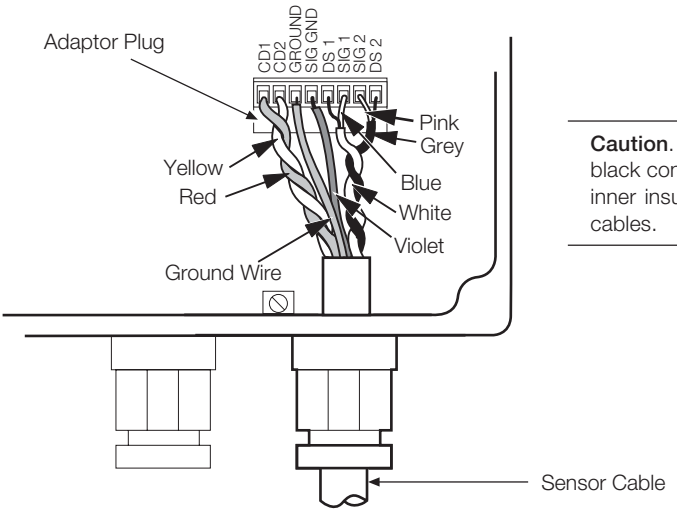
...3 ELECTRICAL INSTALLATION

3.3.3 Alternate Wiring Configuration

Some later transmitters have an alternative (plug-and-socket) sensor wiring configuration (see Fig. 3.15)

This connector may be either an integral part of the termination area or, alternatively, part of the CalMaster adapter board. The wiring of both these variants is the same.

To wire the adaptor plug, carefully pull off the plug from the adaptor board, connect the wires (using a screwdriver with a 2.5mm blade to tighten the terminal screws) and replace the plug.



Caution. Remove any exposed black conductive layer from the inner insulation of both coaxial cables.

Fig 3.15 Fitting the Sensor Wiring onto the Adaptor

3.4 Input/Output Connections

Caution.

- Refer to SPECIFICATION for Input/Output ratings.
- Inductive loads must be suppressed or clamped to limit voltage swings
- Capacitive loads must be inrush current limited.
- Hazardous area requirements are not considered in the following pages.

3.4.1 Frequency Outputs – Fig. 3.16

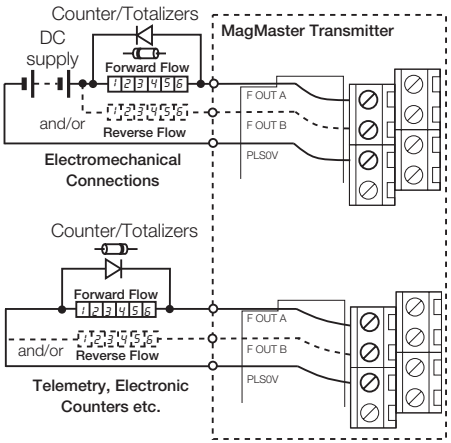


Fig. 3.16 Frequency Output Connections

3.4.3 PLC Interface – Fig. 3.18

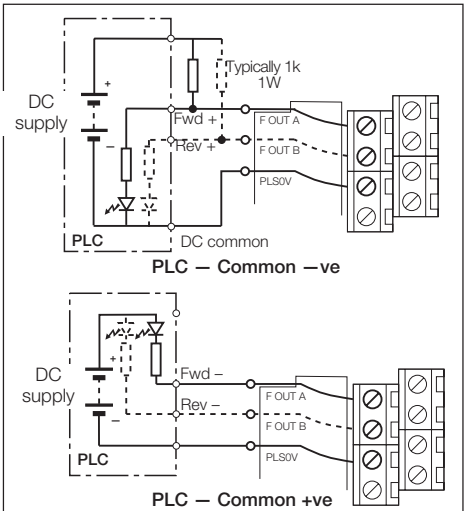
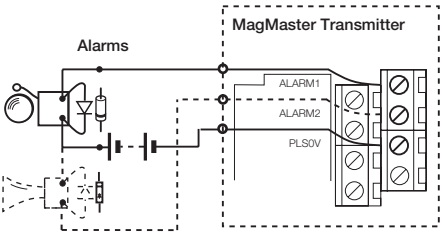


Fig. 3.18 PLC Interface

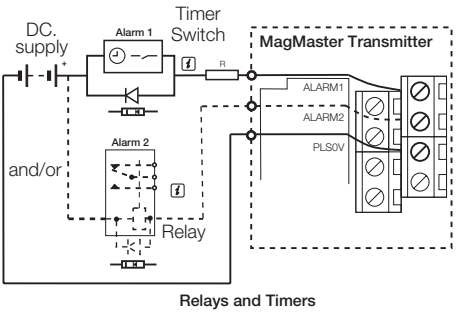
3.4.2 Alarm Outputs – Fig. 3.17

Information.

- Inductive loads may be suppressed by diodes (D) – 1N4004 or similar.
- Inrush currents are limited to 1 Amp by resistor R – e.g. 27Ω 1W for 24V systems.
- Operation of outputs is programmable – see Configuration Manual for details.
- Frequency and Alarm outputs share a common return with contact input.
- External isolators not normally required, as the pulse, alarm and contact circuits are electrically separated from all other Magmaster connections.



Information. Relay and Timer Switch shown for example only. Connect as required.



Relays and Timers

Fig. 3.17 Alarm Output Connections

…3 ELECTRICAL INSTALLATION

3.4.4 Contact Input – Fig 3.19

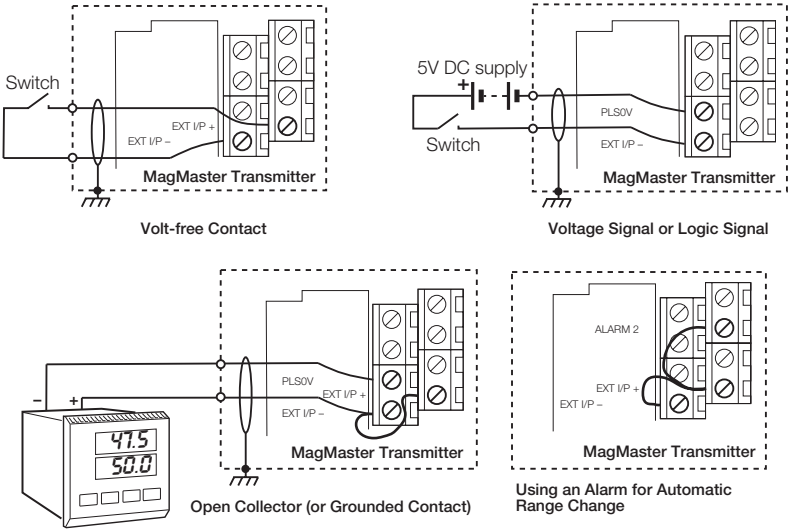
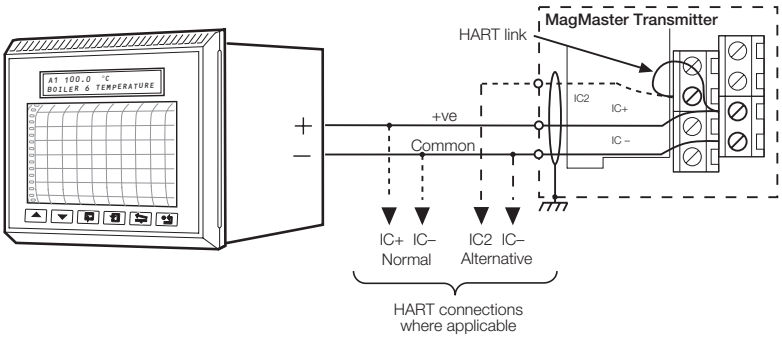


Fig. 3.19 Contact Input Connections

3.4.5 Current Output – Fig. 3.20 and 3.21

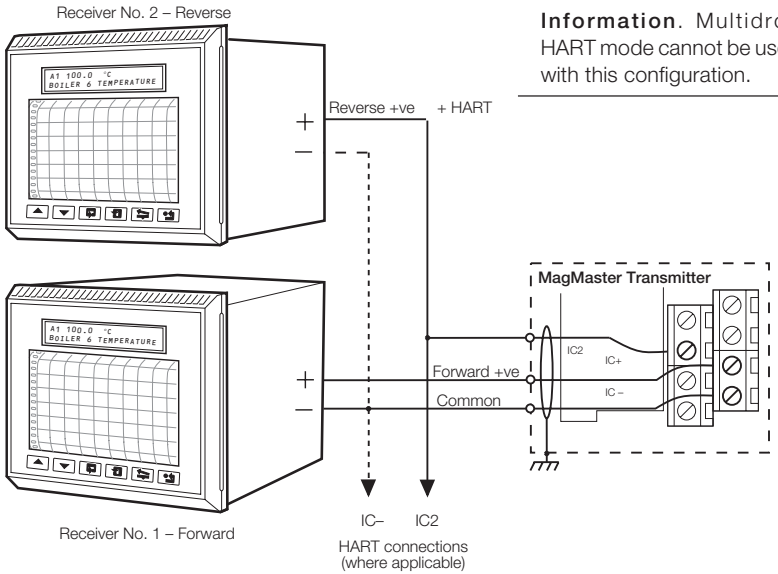
Information.

- Output is fully programmable – see Programming Guide.
- Output is electrically separated from all other MagMaster connections.
- External isolators are not normally required and may significantly limit accuracy if used.



Information. For Multidrop HART installations, remove 'HART Link' and connect HART systems directly to IC2: this allows the analog output function to be retained.

Fig. 3.20 Current Output Connections: Standard



Information. Multidrop HART mode cannot be used with this configuration.

Fig. 3.21 Current Output Connections: Dual Current Option

...3 ELECTRICAL INSTALLATION

3.4.6 Computer Connection – Fig. 3.22 and 3.23

Information. RS422/423 option is electrically isolated from all other MagMaster connections.

MagMaster TERMINALS		RS422 Connection NAME	APPLE Connector (8 Pin MC)
TX-SIG	CONNECT TO	RX DATA -	5
TX+SIG		RX DATA +	8
RX-SIG		TX DATA -	3
RX+SIG		TX DATA +	6
0VC		SIGNAL GROUND	4
–		DCD, DTR (Link together)	7, 1 (Link together)
–			
–		DSR	2

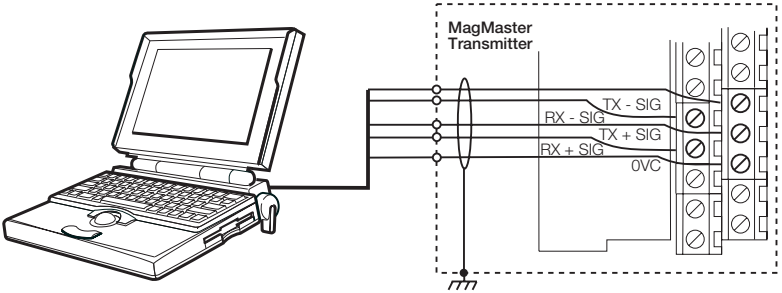


Fig. 3.22 RS 422 Connections (Balanced)

MagMaster TERMINALS		RS232 Name	9-Pin PC Connector	25-Pin PC Connector	Hygienic Adaptor Cable
TX-SIG	CONNECT TO	RXD	2	3	Red
TX+SIG		–	–	–	–
RX-SIG		TXD	3	2	Blue
RX+SIG		GND (linked)	5 (linked)	7 (linked)	Yellow
0VC					Green
–		DTR (link)	4 (link)	20 (link)	–
–		DSR (together)	6 (together)	6 (together)	–
–		RTS (link)	7 (link)	4 (link)	–
–		CTS (together)	8 (together)	5 (together)	–

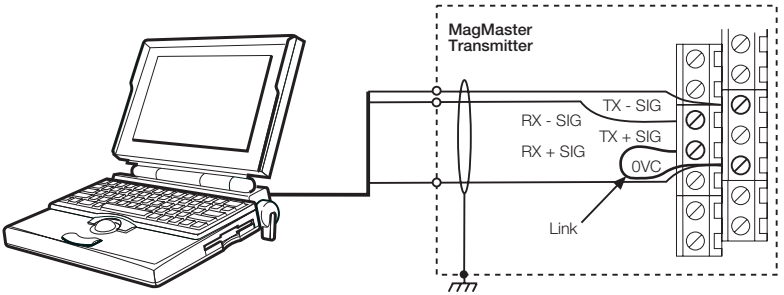


Fig. 3.23 RS 423 Connections (Single Ended or RS 232)

3.4.7 Power Supply Connections – Fig. 3.24 and 3.25

Warning.

- DISCONNECT THE SUPPLY FROM ANY CABLES BEING TERMINATED ON THE TRANSMITTER.
- Electrical installation and earthing (grounding) must be in accordance with relevant national and local standards.

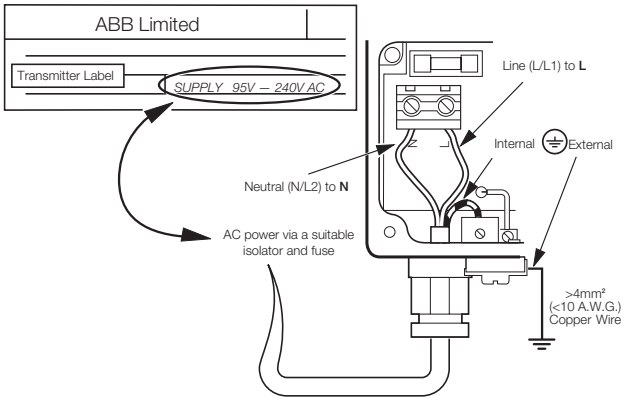


Fig. 3.24 Power Supply Connections (AC Version Transmitter)

Note. On some AC-powered board variants the replaceable cartridge-type line fuse is omitted. A thermal solid-state fuse is fitted but may be located elsewhere on the board.

...3 ELECTRICAL INSTALLATION

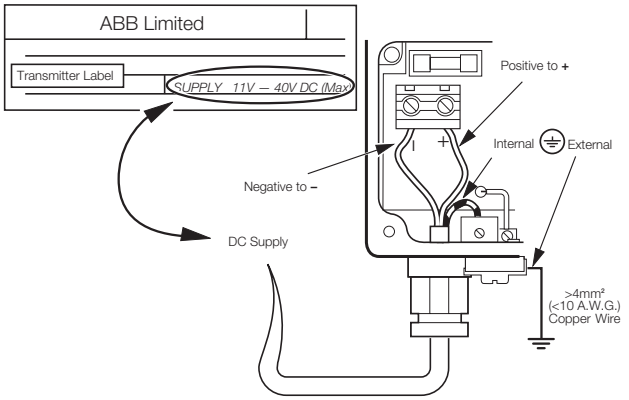


Fig. 3.25 Power Supply Connections (DC Version Transmitter)

3.4.8 Profibus Connections

Refer to the separate manual (IM/MM/PBS) for details.

4 STARTUP AND OPERATION

Warning.

- Ensure Plant Safety while configuring, at all times.
- The 9-way D-Type Serial Link is not isolated. Ensure that it is NOT connected to power earth (ground), with cathodically protected systems.

4.1 Startup

Switch on the power supply to the flowmeter, and if a transmitter with display has been ordered, the flow rate will be shown on the display as shown in Fig. 4.1 or 4.2.

Sequential application of the provided magnetic wand to the left hand icon in the transmitter display area, or by pressing the button on the keypad versions or the remote display, steps the display through the following sequence:

% (Flow Rate % of Range)

> (Forward flow total value)

< (Reverse flow total value)

* (Net flow total value)

Alm (Active alarms)

Vel (Flow Velocity in m/s or ft/s)

Any alarms are displayed sequentially if more than one alarm is present.

Application of the wand to the right hand icon, or pressing the keypad button, resets the totaliser display, if this facility is enabled.

Information.

- For the use of local or remote serial communication, and configuration, see the Quick Reference Programming Guide or the main MagMaster manual.
- For all versions supporting HART™, see the main MagMaster manual.

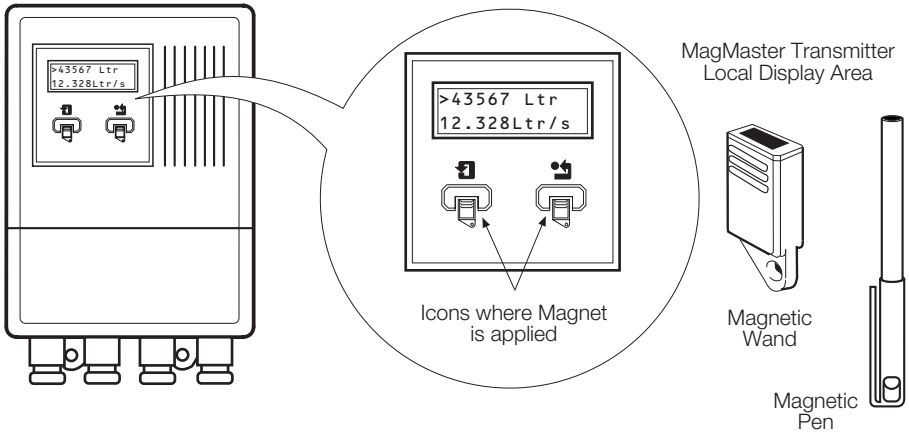
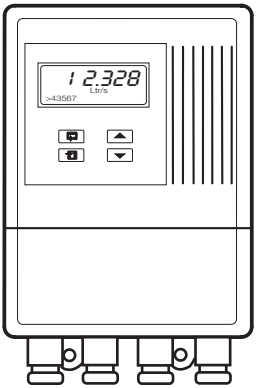


Fig. 4.1 Location of Controls (Non-Keypad Version)

...4 STARTUP AND OPERATION



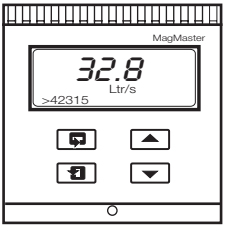


Fig. 4.2 Location of Controls (Keypad Versions)

APPENDIX A – ENVIRONMENTAL PROTECTION

Warning.

- Potting materials are toxic – use suitable safety precautions.
- Read the manufacturers instructions carefully before preparing the potting material.
- The remote sensor terminal box connections must be potted immediately on completion to prevent the ingress of moisture.
- Check all connections before potting – see ELECTRICAL INSTALLATION.
- Do not overfill the terminal box or allow the potting material to come into contact with the 'O' ring or groove.
- Do not let potting material enter conduit, if used.

SPECIFICATION

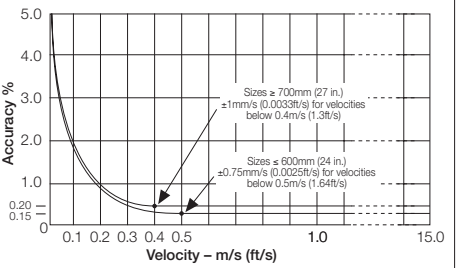
Specification – Sensor

Sizes

Sizes mm (in.)	Flow Range	
	Minimum	Maximum*
	m ³/h (US g/min)	m ³/h (US g/min)
15 (0.6)	0.005 (0.021)	6 (28)
20 (0.8)	0.009 (0.038)	11 (50)
25 (1)	0.014 (0.059)	17 (77)
40 (1.6)	0.035 (0.15)	45 (197)
50 (2)	0.053 (0.23)	71 (311)
65 (2.5)	0.089 (0.40)	119 (525)
80 (3)	0.136 (0.59)	181 (796)
100 (4)	0.21 (0.94)	283 (1243)
150 (6)	0.47 (2.10)	640 (2797)
200 (8)	0.84 (3.73)	1130 (4974)
250 (10)	1.32 (5.83)	1770 (7771)
300 (12)	1.91 (8.4)	2540 (11190)
350 (14)	2.60 (11)	3460 (15230)
400 (16)	3.39 (15)	4520 (19890)
450 (18)	4.29 (19)	5730 (25180)
500 (20)	5.3 (23)	7070 (31090
600 (24)	7.6 (33)	10180 (44760)
700 (28)	14 (46)	13850 (60920)
760 (30)	16 (52)	15900 (69930)
800 (31)	18 (60)	18100 (79560
900 (35)	23 (75)	22900 (100700)
1000 (39)	28 (93)	28300 (124300)
1050 (41)	31 (112)	34200 (150400)
1200 (47)	41 (134)	40700 (179000)
1400 (55)	55 (182)	55400 (243700)
1500 (59)	64 (208)	63600 (279700)
1600 (63)	72 (238)	72400 (318300)
1800 (71)	92 (302)	91600 (402800)
2000 (79)	113 (372)	113100 (497400)
2200 (87)	136 (451)	137000 (602000)

* Based on 10ms^{-1} (33fts^{-1}), but instrument capability in excess of 15ms^{-1} (50fts^{-1})

Accuracy (under forward flow reference conditions)



Analog output	Additional < ±0.008mA
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

…Specification – Sensor

Wetted Material

Lining

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

Electrodes

Stainless steel 316
Contact factory for non-standard materials

Flanges

Carbon steel

Pressure limitations

≤600mm as flange rating

≥700mm 6, 10 or 16 bar

Environmental protection

IP68 (NEMA6)

Buriable to 5m (16 ft) depth

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

≥5µS/cm

End connections

PN6	ANSI B16-5 Class 150
PN10	ANSI/AWWA C207 Class B & D
PN16	AS2129 Table 'C'
	or BS10/AS2129 Table 'D' & 'E'

Electronic Display Unit

Mounting

Integral with sensor

OR

Remote up to 100m (325 ft)
Longer lengths available on request

Housing

IP65 (NEMA4)

Glass-loaded polypropylene, polycarbonate window ULVO rated

Electrical connections

20mm glands, or accepts
½ in. NPT connections

Sensor cable

ABB cable supplied as standard

Armored version available on request

Power supply*

Voltage Type	Voltage Range (V) Absolute rating	Frequency (Hz)	VA
AC	85 to 265	47 to 440	<20
DC	11 to 40	–	<20

*Power supply fully isolated

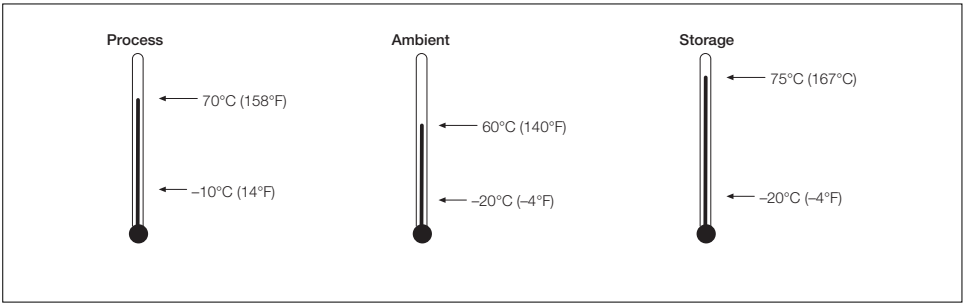
Liquid Sensing

Drives output to zero with an empty pipe

Languages

Operation in English, French, German, Spanish, Italian, Dutch plus others on application

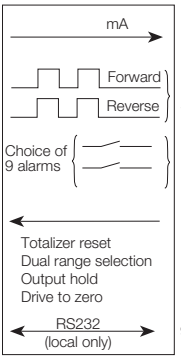
Temperature Ranges



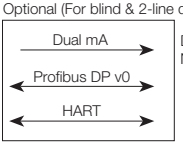
...SPECIFICATION

Output/Inputs

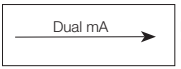
Common



Optional (For blind & 2-line display units)

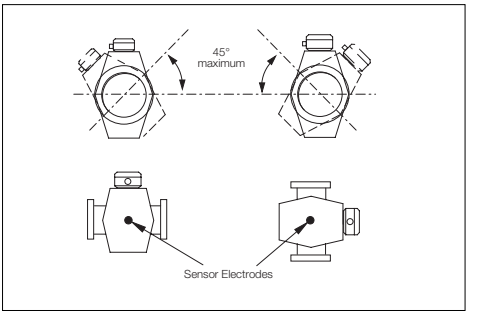


Optional (For keypad units)

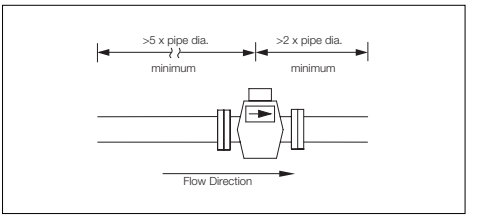


Galvanic isolation to 50V DC between analog pulse/alarm and earth/ground

Mounting



Pipe Connections



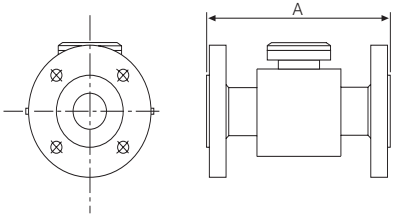
Sensor Specification (nominal dimensions)

15 to 2200mm (0.5 to 84 in.)

Meter Size mm	Flange Size			Length A mm (in.)	Approximate Weight kg (lb)
	Metric Flanges (DN)	BS10 Flanges (in.)	AWWA C207 Flanges (NPS)		
15	15*	1/2	1/2	200 (7.9)*	7 (15)
20	20*	3/4	3/4		
25	25*	1	1		
40	40*	1 1/2	1 1/2		9 (20)
50	50*	2	2		10 (23)
65	65*	2 1/2	2 1/2		18 (40)
80	80*	3	3		18 (40)
100	100*	4	4	250 (9.8)*	24 (54)
150	150*	6	6	300 (11.8)*	38 (84)
200	200**	8	8	350 (13.8)**	37 (81)
250	250**	10	10	450 (17.7)**	60 (132)
300	300**	12	12	500 (19.7)**	70 (154)
350	350**	14	14	550 (21.7)**	100 (220)
400	400**	16	16	600 (23.6)**	115 (253)
450	450**	18	18	698 (27.5)**	160 (352)
500	500**	20	20	768 (30.2)**	217 (455)
600	600**	24	24	918 (36.1)**	315 (693)
700	700***	27	28	700 (27.6)***	430 (945)
760	760***	30	30	762 (30)***	
800	800***	–	–	800 (31.5)***	
900	900***	36	36	900 (35.4)***	540 (1190)
1000	1000***	39	39	1000 (39.4)***	720 (1585)
1050	1050***	42	42	1067 (42)***	880 (1930)
1200	1200***	48	48	1200 (47.2)***	1000 (2160)
1400	1400***	54	54	1400 (55.1)***	1450 (3190)
1500	1500***	60	60	1524 (59)***	1370 (3000)
1600	1600***	66	66	1600 (63)***	2000 (4400)
1800	1800***	72	72	2250 (88.6)***	2400 (5280)
2000	2000***	78	78	2500 (98.4)***	3200 (7040)
2200	2200***	84	84	2750 (110)***	4200 (9300)

*Tolerance +0/–3mm
**Tolerance +0/–5mm
***Typical tolerance +0/–10mm

Dimensions in mm (in.)



SS/MAG/WW Issue 12

NOTES

NOTES…

...NOTES

PRODUCTS & CUSTOMER SUPPORT

Products

Automation Systems
- *for the following industries:*
  - Chemical & Pharmaceutical
  - Food & Beverage
  - Manufacturing
  - Metals and Minerals
  - Oil, Gas & Petrochemical
  - Pulp and Paper

Drives and Motors
- *AC and DC Drives, AC and DC Machines, AC Motors to 1kV*
- *Drive Systems*
- *Force Measurement*
- *Servo Drives*

Controllers & Recorders
- *Single and Multi-loop Controllers*
- *Circular Chart and Strip Chart Recorders*
- *Paperless Recorders*
- *Process Indicators*

Flexible Automation
- *Industrial Robots and Robot Systems*

Flow Measurement
- *Electromagnetic Flowmeters*
- *Mass Flow Meters*
- *Turbine Flowmeters*
- *Flow Elements*

Marine Systems & Turbochargers
- *Electrical Systems*
- *Marine Equipment*
- *Offshore Retrofit and Referbishment*

Process Analytics
- *Process Gas Analysis*
- *Systems Integration*

Transmitters
- *Pressure*
- *Temperature*
- *Level*
- *Interface Modules*

Valves, Actuators and Positioners
- *Control Valves*
- *Actuators*
- *Positioners*

Water, Gas & Industrial Analytics Instrumentation
- *ph, Conductivity, and Dissolved Oxygen Transmitters and Sensors*
- *Ammonia, Nitrate, Phosphate, Silica, Sodium, Chloride, Fluoride, Dissolved Oxygen and Hydrazine Analyzers.*
- *Zirconia Oxygen Analyzers, Katharometers, Hydrogen Purity and Purge-gas Monitors, Thermal Conductivity.*

Customer Support

We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

United Kingdom
ABB Limited
Tel: +44 (0)1453 826661
Fax: +44 (0)1453 829671

United States of America
ABB Inc
Tel: +1 215 674 6000
Fax: +1 215 674 7183

Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification.
Periodic checks must be made on the equipment's condition. In the event of a failure under warranty, the following documentation must be provided as substantiation:

1. A listing evidencing process operation and alarm logs at time of failure.
2. Copies of all storage, installation, operating and maintenance records relating to the alleged faulty unit.

ABB has Sales & Customer Support expertise in over 100 countries worldwide

www.abb.com

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

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IM/MM/SF Issue 8

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FUNCTIONS OF KEYS

↵ *RETURNS (or ENTER, EXE, etc.)*

- **Scrolls through main menu or submenu**

Read 1> + ↵ → Disp 2>

Flow Rng 1> + ↵ → Flow Unit 2>

- **Enters default or confirms existing value.**

Login En 1> 0? + ↵ → Login En 1> 0

1 ↵ *ALPHANUMERIC plus RETURN*

- **Selects menu (or submenu) item and advances to its first submenu**

Read 1> + 5 ↵ → Anlg Fsd 1>

Anlg Fsd 1> + 3 ↵ → Anlg Dir Fwd 1>

- **Keystrokes can be combined as a shortcut**

Read 1> 5 3 ↵ → Anlg Dir Fwd 1>

- **Selects submenu and displays current value**
  A '?' indicates current value is configurable

Anlg Fsd 1> + 1 ↵ → Anlg Fsd 1> 20?

- **Enters selected value at '?' prompt**

Anlg Fsd 1> 20? + 9 ↵ → Anlg Fsd 1> 9

- **Note. In some submenus, 1 = select, 0 = deselect**

Q ↵ *QUIT plus RETURN*

- **In main menu, exits system (Security access reverts to Level 0)**

Read 1> + Q ↵ → Bye

- **In submenu, returns to top of main menu, or parent submenu**

Flow Rng 1> + Q ↵ → Read 1>

Flow Unit Ltr 1> Q ↵ Flow Rng 1>

ESC *ESCAPE*

- **In any menu or submenu, returns to top of main menu**

Flow Unit Ltr 1 + ESC → >

CONFIGURATION PROCEDURE

Main Menu	Submenus	Description
ABB Process ‡ MagMaster V 1.10 17/05/93		*Indicates model variant software version, date ‡ or 'Slurry'*
READ		
Read 1>	Read Flow 1>	*Flow rate in selected units*
	Read % 2>	*Flow rate in % of range*
	Read Fwd 3>	*Total in forward totalizer‡*
	Read Rev 4>	*Total in reverse totalizer‡*
	Read Net 5>	*Net total (fwd minus rev)*
	Read Alm 6>	*Current active alarms*
	** Read Vel 7>	*True flow velocity in m/sec, or ft/sec if flow units are in UGal or ft^3*
	‡ *Resettable to 0 if Tot ClrEn is set.*	
DISPLAY OPTIONS		
Disp 2>	Disp Mode 1>	*0 = Single line display* *1 = Double line display* *2 = New line for each update (for printers, etc.)*
	Disp Res 2>	*Resolution of flow display* *Enter number of decimal places required (max. = 6)*
PASSWORDS		
See information in Security Access section for detailed description		
Login 3>	Login En 1>	*Current Security level* *0 = default* *For default passwords Enter 'user' for Level 1, 'engineer' for Level 2.* ***Note**: enter these passwords in ALL lower case*
	** Login Key 2>	*Changes Level 1 password*
	** Login Key 3>	*Changes Level 2 password*
FLOW MEASUREMENT*		
Flow 4>	# Flow Rng 1>	*Enter 100% primary range in selected units*
	Flow Unit 2>	*Enter '1' ONE place only* *Ltr 1> Litres* *m^3 2> Cubic meters* *IGal 3> Imperial gal* *UGal 4> US gallons* *ft^3 5> Cubic feet*

Main Menu	Submenus	Description
Flow 4>	Flow Mult 3>	*Enter '1' ONE place only* *m 1> Thousandths* *c 2> Hundredths* *3> Unity* *h 4> Hundreds* *k 5> Thousands* *M 6> Millions*
	Flow Time 4>	*Enter '1' ONE place only* *s 1> Seconds* *Min 2> Minutes* *Hr 3> Hours* *Dy 4> Days* *Wk 5> Weeks*
	Flow Rspns 5>	*Nominal time constant for output in seconds.* *Enter display setting value.* *Display Setting / Seconds* *0 / 0.6* *1 / 1* *2 / 2* *3 / 3* *4 / 4* *5 / 8* *6 / 15* *7 / 30* *8 / 60* *9 / 120*
	Flow Probe 6> # Ins 1>	*Insertion factor*
	# Prof 2>	*Profile correction factor*
Note. The two factors above must be set to 1.0 if not used.		
	Flow % 7>	*Present flow as % of primary range.*
	** Flow Cutoff 8>	*Minimum flow velocity in mm/sec, below which all outputs set to zero.*
ANALOG OUTPUT*		
Anlg 5>	Anlg Fsd 1>	*Enter 0 to 21. Output current in mA for 100% flow*
	Anlg Zero 2>	*Enter 0 to 21. Output current in mA for 0% flow*
	Anlg Dir 3>	*Enter '1' to select* *Select both parameters for bidirectional flow* *Fwd 1> Current responds to forward flow* *Rev 2> Current responds to reverse flow*
	Anlg No2 4>	*Secondary range as % of primary range*
	Anlg mA 5>	*Present output current, mA*
	Anlg HART**	*HART Variant only, see full manual*

Main Menu	Submenus	Description
PULSE OUTPUT*		
Pls 6>	# Pls Fact 1>	*Enter output pulses per flow volume unit*
	Pls Cutoff 2>	*Flow rate in % of primary range, below which pulse output and totalizer stop*
	Pls Max 3>	*Maximum output freq. in Hz*
	Pls Hz 4>	*Frequency in Hz*
	** Pls Idle 5>	*Pulse output in idle (off)*
	** Pls Size 6>	*Enter pulse width in msec (will round up to nearest 10msec)* *0 = square wave*
TOTALIZER*		
Tot 7>	Tot Unit 1>	*See Flow Unit 2> for parameters*
	Tot Mult 2>	*See Flow Mult 3> for parameters*
	Tot ClrEn 3>	*Enables totalizer reset function from terminal, transmitter display or input contact*
ALARMS*		
Alm 8>	Alm No1 1>	*Any combination of alarms* *1 = Select 0 = Deselect* *Idle 1> Idle state* *En 2> 0 = Disabled 1 = Enabled* *Fault 3> Measurement fault* *Fwd 4> Forward flow* *Rev 5> Reverse flow* *Cutoff 6> Pulse output cutoff* *Mtsnsr 7> Empty sensor* *Hi 8> High flow* *Lo 9> Low flow* *Anlg A> Analog output overrange* *Pls B> Pulse output overrange*
	Alm No2 2>	*Same parameters as No.1* *Factory default – Rev flow enabled, required for dual current option*
	Alm Trip 3>	*Hi 1> High flow trip-point, % range* *Lo 2> Low flow trip-point % range* *Hyst 3> Hysteresis* *Disp 4> Enables display of Hi and Lo Alarms*

Main Menu	Submenus	Description
INPUT CONTACT*		
Input 9>	Input Analg 1>	*Enter '1' to select. Active level selects second analog range*
	Input Clr 2>	*Active level resets all totalizers*
	Inpt Hld 3>	*Active level holds flowmeter flow value*
	Inpt Zero 4>	*Active level selects downscale drive*
	** Inpt Idle 5>	*Enter inactive state of input contact* *1 = Hi normal, 0 = Lo normal*
EMPTY PIPE DETECTION**		
Mtsnsr A>	Mtsnsr Trip 1>	*Enter empty pipe detector trip threshfold* ***Note**. Set to zero for a 'slurry' MagMaster*
	Mtsnsr mV 2>	*Measured indication used for empty pipe trip. When valve below 'trip' threshold then all outputs driven to zero*
SENSOR DATA AND CALIBRATION**		
Snsr B>	Snsr No 1>	*Serial number of sensor*
	Snsr Tag 2>	*Tag number of sensor*
	Snsr Size 3>	*Calibrated bore (mm)*
	Snsr Vel 4>	*Present velocity in sensor*
	Snsr Fact 5>	*1>, 2>, 3>, 4> = calibration data. Same as on sensor data label*
SYSTEM TEST**		
Test C>	Test Mode 1>	*If '1', transmitter is in test mode. Self-cancels after 30min. if no entry made*
	# Test Flow 2>	*Present flow rate. In test mode, any value may be entered manually*
	Test % 3>	*Flow rate in %‡*
	Test Hz 4>	*Output frequency in Hz‡*
	Test mA 5>	*Output current in mA‡*
	Test Vel 6>	*Flow velocity in sensor ‡*
	Test Alm 7>	*Current active alarms‡* *Clr = none*
	Test Txv 8>	*Flow velocity, uncorrected for sensor calibration*
	‡ *Calculated from Test Flow 2*	

**Requires Level 1 access* ***Requires Level 2 access*

 # The maximum no. must not exceed 21000. The value entered may display with a small error, e.g. 1.900 may display as 1.899. 1.900 is used in calculation

INTRODUCTION

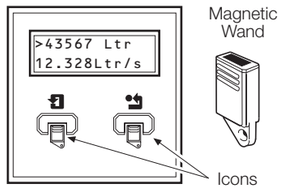
The Magmaster™ provides high-precision electromagnetic flow metering for conductive fluids of >5µS/cm, in sizes of 2.5 to 2200mm (0.1 to 86 in.). It has state-of-the-art accuracy, repeatability and rangeability.

The MagMaster offers a choice of liners and electrodes, flange or wafer tubes, integral or remote electronics and an optional keypad display.

Standard outputs include fully-programmable analog output (0 to 21mA), dual pulse (forward and reverse), dual alarm (flow rate, fault conditions, etc) and a RS232 connection. Optional outputs include dual analog and RS422/423.

The MagMaster has been designed to eliminate traditional noisy signals in slurry applications. It has multiple self-monitoring and diagnostic functions , and a comprehensive test mode to test the system without interrrupting the process or power.

SIMPLE READ AND RESET



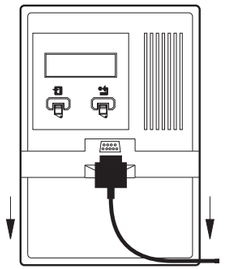
- Top line of display indicates flow totals, velocity, % of range and alarm status. Second line shows flow rate.
- Applying wand to the left icon steps the top line display through this sequence:

>	Forward flow total
<	Reverse flow total
*	Net flow total
Alm	Alarms in sequence ('Alm Clr' when no alarms are activated)
Vel	Flow velocity
%	Flow rate as % of full scale range

- Applying wand to right icon resets the flow total displayed on the top line if parameter 73 (Tot Clr En) is enabled
- For keypad/display version, see separate Quick Reference Guide.

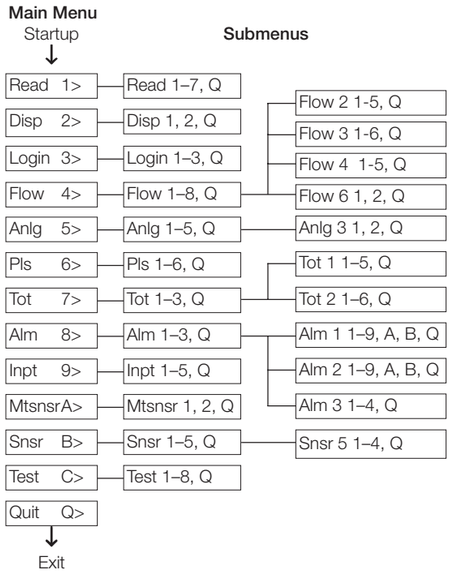
CONFIGURATION

1. Set up serial communications* on terminal or PC
2. For PC use a laplink/null modem cable. A cable is available from ABB .
3. Connect terminal cable to transmitter's D-connector as shown
4. Press RETURN or equivalent (ENTER, EXE, etc).



*Serial communications setup	
Baud rate	4800
Data bits	8
Stop bits	1
Parity	None
Handshake	None

RELATIONSHIP OF MENUS



SECURITY ACCESS

Any of three security levels can be selected. In Levels 0 and 1, the operator is restricted to certain menus as listed below. In Level 2, the operator has full access to all menus and can change passwords.

1>	Read flow parameters, etc.	Level 0
2>	Set display options	Level 0
3>	Security access, passwords	Level 0
4>	Set flow parameters	Level 1
5>	Analog output	Level 1
6>	Pulse output	Level 1
7>	Set totalizer parameters	Level 1
8>	Alarm operation	Level 1
9>	Input contact	Level 1
A>	Empty pipe detection	Level 2
B>	Sensor data and calibration	Level 2
C>	Test operation	Level 2

Quick Reference Programming Guide

MagMaster™
Electromagnetic Flowmeters

IM/MM/QRG2 Issue 5

ABB has Sales & Customer Support expertise in over 100 countries worldwide

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Quick Reference Guide

MagMaster™ Electromagnetic Flowmeters

Keypad Version

IM/MM/QRG Issue 3 (12.04)

ABB Limited
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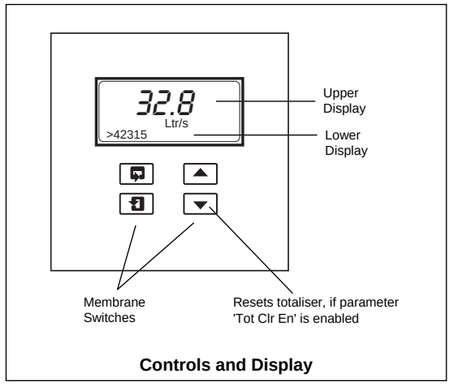
CONTROLS AND DISPLAY



Controls and Display

Upper display gives continual update of flow rate in selected units.

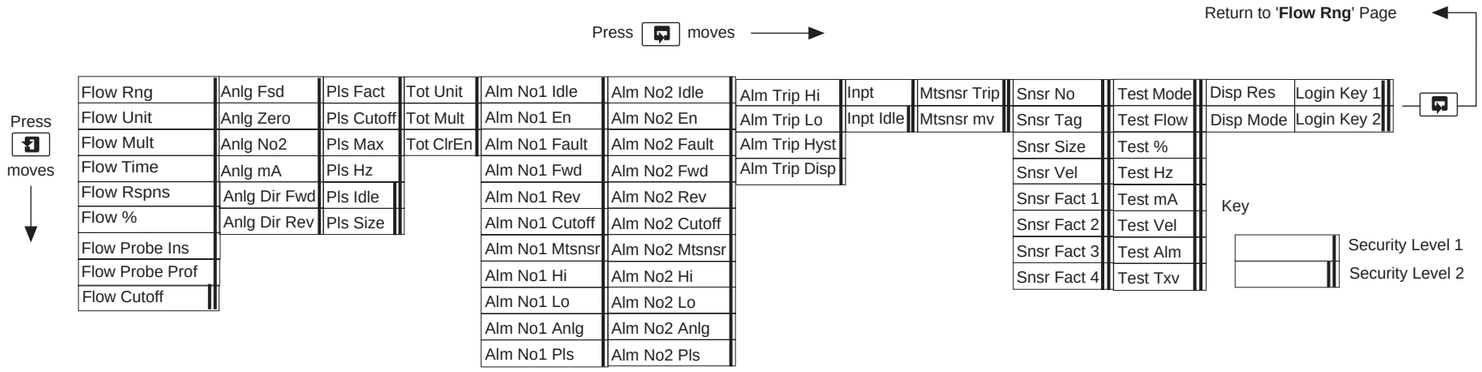
By pressing the ◧ key, the lower display steps through the following sequence:

>	Forward flow total value.
<	Reverse flow total value
*****	Net flow total value
Alm	Active alarms – Any alarms are displayed sequentially if more than one alarm is present. 'Alm Clr' is displayed when no alarms are present.
Vel	Flow Velocity
%	% of Flow Range.

Pressing the ▼ key resets the flow total displayed on the upper display, if parameter 'Tot Clr En' is enabled.

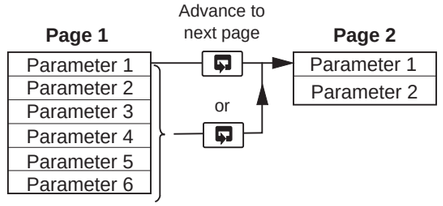
Pressing the ◨ key accesses the **Login** Parameter where it is necessary to enter a security code before any other parameters can be accessed – see **SECURITY ACCESS.**

MENU LAYOUT

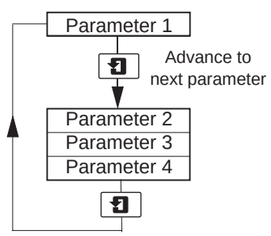


CONTROLS AND DISPLAY

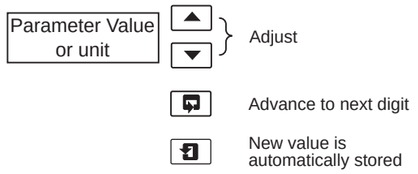
A – Advancing to Next Page



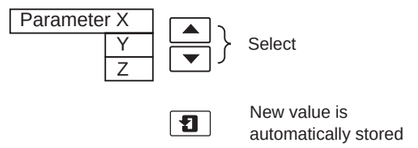
B – Moving Between Parameters



C – Adjusting and Storing a Parameter Value



D – Selecting and Storing a Parameter Choice



Depressing this switch for 5 seconds and then releasing it will exit the menu system and return to normal operating mode.

SECURITY ACCESS

Two security code levels, 1 and 2, are available, and are each accessed with a five digit number.

User Code Level 1 default number is 10760.

Engineer Code Level 2 default number is 56360.

Parameters accessible by the two levels are shown above.

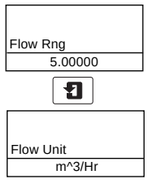
At the flashing cursor on the first digit of the Login code number, press either ▲ or ▼ membrane switches to reach the required digit.

To set this digit and pass to the next digit, depress the ◨ switch. Continue until all digits have been set, and depress the ◧ switch to enter the complete code.

If an incorrect value is entered, access to subsequent programming pages is prevented and the display reverts to the **Operating Page**.

PARAMETER CHANGES

When a parameter is selected, which holds one or more variable units e.g. 'Flow Unit' parameter which can be Liters, Cubic meters, Gallons etc., proceed as follows to change the units: ('Flow Rng' selected).



'Flow Unit' selected

Press ▲ or ▼ switch to change the units.

Note. The existing units will flash at the first depression of the ▲ or ▼ switch, and further switch depressions will change the type of units displayed.

Depressing the ↵ switch will now enter the newly selected units.

This type of action is similar for all variable units.

Where numerical values are to be changed, initial depression of the ▲ or ▼ switches cause the first of five digits to be highlighted by a flashing cursor. Change the value with the ▲ and ▼ switches, the particular digit with the ↔ switch, and enter the final selection with the ↵ switch.

PROGRAMMING

The correct security level **MUST** be selected – see **SECURITY ACCESS**.

Select the parameter to read the value, or to change it as necessary. All 'live' data displayed is updated each second.

Use the ↔ key to move between pages.

Use the ↵ key to move between parameters.

The ▲ and ▼ keys change displayed values and units.

The ↵ key will accept the chosen value or unit.

FLOW MEASUREMENT

PARAMETER	DESCRIPTION
Flow Rng	Enter main full scale (100%) flow range (Upper Range Value) in selected flow units. **#**
Flow Unit	Select Units as required. **Ltr** (Liters) **m^3** (Cubic Meters) **IGal** (Imp Gals) **UGal** (U.S. Gals) **ft^3** (Cubic Feet)
Flow Mult	Select multiplier as required. **m** (0.001) **c** (0.01) **x1** (1) **h** (100) **k** (1000) **M** (1000000)
Flow Time	Select time units as required. **s** (Second) **Min** (Minute) **Hr** (Hour) **Dy** (Day) **Wk** (Week)
Flow Rspns	Nominal Time Constant for output. Enter Display Setting from table below for time constant required.

Display Setting	Seconds
2	2
3	3
4	4
5	8
6	15
7	30
8	60
9	120

Flow %	Present flow as % of range.
Flow Probe Ins	Probe Insertion Factor.
Flow Probe Prof	Probe Profile Factor
Flow Cutoff	Flow velocity in mm/sec. below which flow set to 0.

ANALOG OUTPUT

PARAMETER	DESCRIPTION
Anlg Fsd	Enter output current in mA for 100% flow (0 ≤ FSD ≤ 21)
Anlg Zero	Enter output current in mA for 0% flow (0 ≤ ZERO ≤ 21)
Anlg No2	Full scale flow range for 2nd analog range, as % of main flow range.
Anlg mA	Present output current (mA)
Anlg Dir Fwd	Output responds to forward flow if set to '1'. **§**
Anlg Dir Rev	Output responds to reverse flow if set to '1'. **§**

OUTPUT PULSE

PARAMETER	DESCRIPTION
Pls Fact	Enter required output pulses per flow volume unit.#
Pls Cutoff	Flow rate (%) below which pulse output and totaliser cease to operate.
Pls Max	Maximum output frequency in Hz.
Pls Hz	Display of present output frequency in Hz (live value).
Pls Idle	Idle state for Pulse Output with no output pulse (e.g. at zero flow). 0 = Low (output transistor ON) 1 = High (output transistor OFF)
Pls Size	Enter output pulse width in msecs. (Value will be rounded up to nearest 10ms). Set to '0' for square wave output.

TOTALIZER

PARAMETER	DESCRIPTION
Tot Unit	Select totaliser measurement units.
Tot Mult	Select multiplier units required.
Tot ClrEn	Enter '1' to enable totaliser reset function to be used from front panel.

ALARMS

PARAMETER	DESCRIPTION
Alarm No1 Idle	Idle state for alarm output. With no alarm active: 0 = Low (O/P transistor ON) 1 = High (O/P transistor OFF)
Alm No1 En	0 = Alarm output disabled (set to idle state). 1 = Alarm output enabled.
Alm No1 Fault	Alarm occurs for System fault.
Alm No1 Fwd	Alarm occurs for forward flow.
Alm No1 Rev	Alarm occurs for reverse flow.
Alm No1 Cutoff	Alarm occurs for Pulse Output Cutoff.
Alm No1 Mtsnsr	Alarm occurs for empty sensor.
Alm No1 Hi	Alarm occurs for Flow ≥ 'Alm Trip Hi'.
Alm No1 Lo	Alarm occurs for Flow ≤ 'Alm Trip Lo'.
Alm No1 Anlg	Alarm occurs for Analogue Output over range.
Alm No1 Pls	Alarm occurs for Pulse Output over range.

ALARMS (CONTD.)

PARAMETER	DESCRIPTION
Alarm No2 Idle	Identical to, but independent of Alarm No1 above.
Alarm No2 Pls	Alarm occurs for Pulse Output over range.

PARAMETER	DESCRIPTION
Alarm trip Hi	High flow alarm trip point as % of range.
Alarm Trip Lo	Low flow alarm trip point as % of range.
Alm Trip Hyst	Enter hysteresis for alarms as % of range.
Alm Trip Disp	Set to '1' if Hi/Lo Alarms are to be displayed.

INPUT CONTACT

PARAMETER	DESCRIPTION
Inpt	Set up external logic input function: **'Zero'** sets flowrate output to zero. **'Hld'** holds flowmeter output value. **'Clr'** resets all totalizers. **'Anlg'** selects Anlg No2 Range.
Inpt Idle	Enter inactive state of input contact: '1' for Hi normal '0' for Lo normal.

EMPTY PIPE DETECTION

PARAMETER	DESCRIPTION
Mtsnsr Trip	Set empty pipe detector trip threshold.
Mtsnsr mV	Measured value related to fluid conductivity.

SENSOR CALIBRATION

PARAMETER	DESCRIPTION
Snsr No	Serial No. (Up to 13 characters)
Snsr Tag	Tag No. (If required).
Snsr Size	Sensor calibrated bore (mm).
Snsr Vel	Display of present velocity.
Snsr Fact 1	Sensor calibration data – should agree with sensor data label
Snsr Fact 2	
Snsr Fact 3	
Snsr Fact 4	

TEST MODE

PARAMETER	DESCRIPTION
Test Mode	Set to '1' to enable.
Test Flow	Displays present flowrate. If in **'Test Mode'**, any value may be entered manually. ‡
Test %	Flowrate as a percentage
Test Hz	Output Frequency
Test mA	Output Current
Test Vel	Flow Velocity in sensor
Test Alm	Shows present active alarms sequentially. ('Clr' indicates no alarms are active). **Ø**
Test Txv	Live flow velocity (uncorrected for sensor calibration).

DISPLAY RESOLUTION

PARAMETER	DESCRIPTION
Disp Res	Enter number of decimal places required on flow display (0 to 5).
Disp Mode	Serial Communication display mode (Read Only) – attempts to edit this parameter result in display of 'Keypad Version No.' with eventual return to normal operation.

SECURITY PASSWORD

Caution. Access is **NOT** possible without the correct password. 'Lost' passwords can ONLY be reset by the Service Engineer.

Login Key 1	Set Level 1 security password.
Login Key 2	Set Level 2 security password.

The maximum which can be entered must not exceed 21000. The value entered may be displayed with a small error in the decimal digits e.g. 1.900 may be displayed as 1.899. This is a display characteristic and the value 1.900 will be used by the MagMaster.

§ Select both parameters for bidirectional operation (e.g. when dual current output is fitted). If both are zero, then I_{OUT} is always 0%.

‡ On performing a Rapid Reset/Escape to return to 'Operation' level, 'Test Mode' is automatically cancelled.

Ø If the sensor is empty or disconnected, the alarms 'MtSnsr' and 'Coil' will be displayed as appropriate.

CUSTOMER:

TYPE: PROCESS / SLURRY / PROBE B3> SENSOR SIZE: 200

SUPPLY: 95V TO 240V A.C. or 11V TO 40V D.C.

MAGMASTER™ TRANSMITTER CONFIGURATION DATA

B1> SENSOR No: P54156141 JOB No:

TX S/No:

							DEFAULT VALUES
41>	FULL SCALE FLOWRATE	SPECIFY 300					
42>	FLOWRATE VOLUME UNITS	Litre	m^3	ImpGal	UsGal	ft^3	Litre
43>	MULTIPLIER	0.001 (m)	1	100 (h)	1000 (k)	10^6 (M)	1
44>	TIME UNIT	Sec	Min	Hour	Day	Week	Sec
71>	TOTALISER	Litre	m^3	ImpGal	UsGal	ft^3	Litre
72>	MULTIPLYING FACTOR	0.001 (m)	1	100 (h)	1000 (k)	10^6 (M)	1
73>	TOTALISER RESET	Yes	No				No
22>	DISPLAY RESOLUTION (Number of Decimal Places)	1	2	3	4	5	2
45>	RESPONSE TIME (Seconds)	1	2	3	4	8	15	30	3
52>	ANALOGUE OUTPUT ZERO (mA)	0	4	OR SPECIFY			4
51>	FULL SCALE FLOWRATE (mA)	10	20	OR SPECIFY			20
53>	ANALOGUE DIRECTION	Forward	Reverse	Both			Forward
61>	OUTPUT PULSE	1 Pulse/Litre	OR SPECIFY 0.00 Pulses/Volume Unit				1 Pulse/Litre
6	PULSE SHAPE	Square Wave	OR SPECIFY Pulse Width .....ms				Square Wave
81>	ALARM No. 1	Fault	Forward	Reverse	Empty Sensor		Fault, Empty Sensor
82>	ALARM No. 2	Fault	Forward	Reverse	Empty Sensor		Reverse
81>	ALARM No. 1	mA Overrange	Pulse Overrange	Pulse Cutoff			
82>	ALARM No. 2	mA Overrange	Pulse Overrange	Pulse Cutoff			
81>	ALARM No. 1	High	Low				
82>	ALARM No. 2	High	Low				
83>	ALARM TRIP LEVELS (% OF F.S. FLOW)	SPECIFY	High.....%	Low.....%			+110% -110%
82>	TAG No:	SPECIFY					

SENSOR FACTORS

B51> 1.5131

B52> 0

B53> 5

B54> 1.0000

FLOW PROBE FACTORS

461> 1.00

462> 1.00

CONFIGURED BY: SIGNATURE DATE 11/04/06