

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

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.

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1 INTRODUCTION

The MagMaster velocity simulators are instruments designed to check the operation of MagMaster, AquaMag, AquaProbe, D-Mag and VTC/VUC Electromagnetic flowmeter transmitters.

The simulators feature automatic 'power down' to prolong battery life. Low battery voltage indication is provided on the units.

Zero flow and velocities from 0.05 to 20 m/s (metric version) or 0.15 to 60ft/s (Imperial version) in forward and reverse directions are simulated. Two LEDs verify the presence of coil drive.

1.1 Application

The MagMaster simulators provide signals for general flowmeter equipment test and cannot be used for accurate calibration.

1.2 Safety Measures

In order to ensure safety in respect of both personnel and equipment all relevant sections of this manual must be read and the safety requirements of associated equipment and the local environment taken into consideration.

Always disconnect the power supplies from equipment under test before disconnecting wiring or replacing PCBs in association with test procedures.

1.3 Unpacking

Remove the MagMaster Simulator from the packing and visually check that the unit is not damaged in any way.

Check that the accessories are supplied in good condition.

2 BATTERY INSTALLATION

Remove the battery compartment lid from the rear of the unit and fit the battery to the connector. Ensure that when the 'Flow Direction' switch is positioned at either 'REV' or 'FWD' the LED marked 'BATT' flashes at a rate of approximately 1.5Hz.

Return the 'FLOW DIRECTION' switch to the 'ZERO/OFF' position.

Note. If the simulator is not to be used for some considerable time, remove the battery to prevent damage due to leakage etc.

3 CONTROLS

3.1 'Velocity' Switch – Fig. 3.1

This twelve position switch selects various simulated velocities – see Table 3.1.

Switch Position	Velocity (m/s) Metric Version	Velocity (ft/s) Imperial Version
1	0.05	0.15
2	0.05	0.15
3	0.1	0.3
4	0.2	0.6
5	0.5	1.5
6	1	3
7	2	6
8	5	15
9	10	30
10	20	60
11	20	70
12	20	60

Table 3.1 'Velocity' Switch Positions

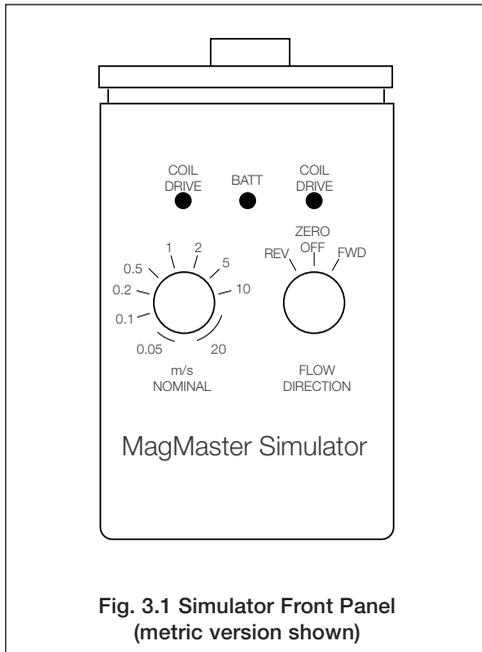


Fig. 3.1 Simulator Front Panel (metric version shown)

3.2 Flow Direction Switch – Fig. 3.1

This three position switch selects the flow direction – see Table 3.2.

Switch Position	Indication	Function
1	REV	Reverse Flow
2	ZERO/OFF	Zero Flow and Off
3	FWD	Forward Flow

Table 3.2 Flow Direction Switch Positions

Position 1 (REV) – reverse flow direction is simulated at a rate as indicated by the position of the 'VELOCITY' switch.

Position 2 (ZERO/OFF) – simulator power is switched off and the signal leads are short circuited to simulate zero flow.

Position 3 (FWD) – simulates forward flow direction at a rate as indicated by the position of the 'VELOCITY' switch.

To conserve battery life the simulator switches itself off after approximately 15 minutes use. The 'BATT' LED is extinguished to indicate this condition.

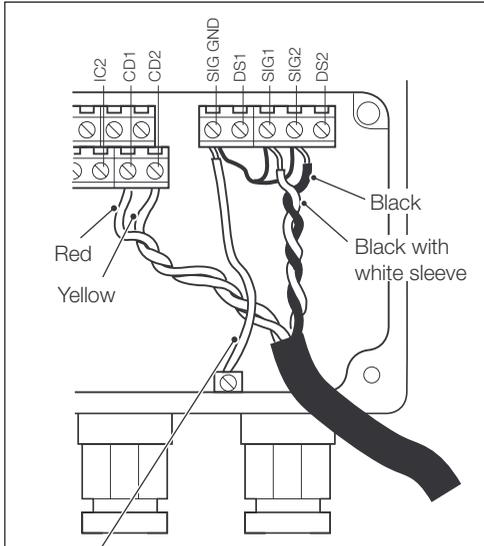
To reset the simulator turn the Flow Direction switch to the 'ZERO OFF' position and back to 'FWD' OR 'REV' as required.

3.3 'COIL DRIVE' LEDs – Fig. 3.1

These LEDs flash in anti-phase when the simulator is connected to a correctly functioning transmitter. This indicates the presence of the coil drive.

3.4 'BATT' LED – Fig. 3.1

This LED flashes at a rate of approximately 1.5Hz when the flow direction switch is in either the FWD or REV position and the battery is in good condition. The flash rate slows to approximately 0.75Hz when the battery voltage is low.



Note. Strap SIG GND to transmitter casing as shown

Fig. 4.1a Wiring into the MagMaster Transmitter

4.1 MagMaster – Fig. 4.1

Disconnect the power supply from the transmitter. Remove the half cover and protection cover from the transmitter. Remove the half cover and protection cover from the transmitter (see MagMaster Installation Manual). After recording the position of the signal and coil-drive wiring and ensuring that any disconnected wiring does not short to any other part, replace the wiring with the tag ends of the provided cable as indicated in Fig. 4.1a. Plug the other end of the cable into the simulator.

If necessary connect a data terminal, organiser etc: to the MagMaster transmitter (Fig. 4.1b) and reconnect the power to the MagMaster transmitter.

Switch on the simulator; the MagMaster indicates the flowrate on the local display, if fitted. If a data terminal is connected call up the Read Flow parameter (see MagMaster Configuration Manual) and the terminal will indicate a flowrate (forward or reverse) depending on the settings of the Simulator.

To simplify checking of the transmitter, login at engineer level and select parameter 'Test Txv' (C8). This displays the true simulator velocity in either m/s or ft/s dependent upon the selected 'Flow Unit' (42).

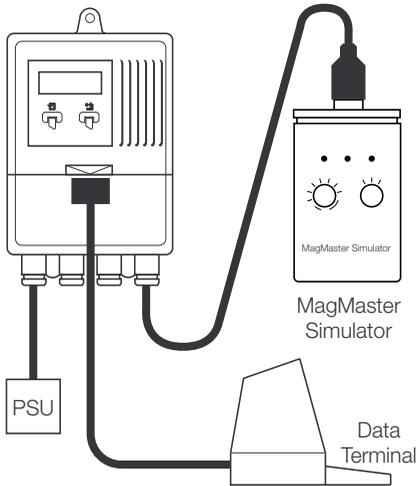


Fig. 4.1b Connecting the Simulator to the MagMaster Transmitter

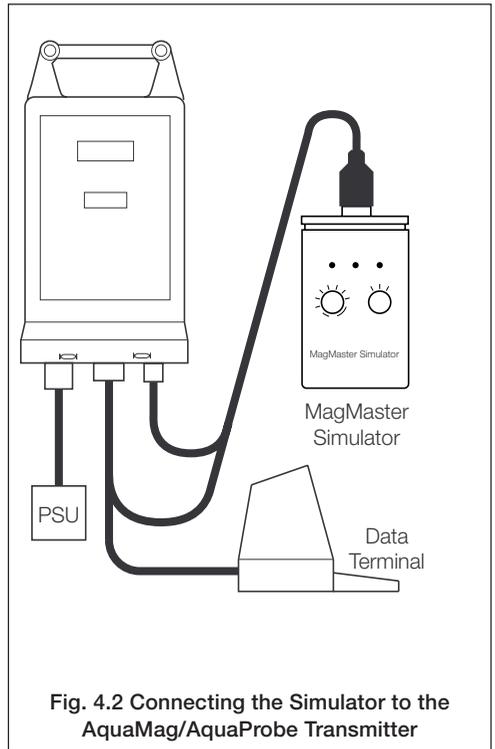


Fig. 4.2 Connecting the Simulator to the AquaMag/AquaProbe Transmitter

4.2 AquaMag/AquaProbe – Fig. 4.2

Note. Due to the low power design of AquaMag/AquaProbe, the Simulator takes a short time to settle to the correct output. Therefore, the Simulator cannot be used with an AquaMag/AquaProbe set in 'Intermittent Mode'.

Connect the simulator in place of the sensor, using the appropriate lead supplied.

Ensure that power is connected to the transmitter and connect a suitable data terminal (refer to the relevant Instruction Manual for further details). Switch on the simulator and select the 'TEST' mode on the transmitter (refer to the Programming Section of the relevant Instruction Manual).

The display indicates velocity as set on the simulator. Frequency output is 10Hz per metre per second (x1 outputs).

4.3 D-Mag (Digital) – Fig 4.3

Disconnect the mains supply from the flowmeter. Remove the front cover and display panel of the integral transmitter (refer to the D-Mag Instrumentation Manual).

After recording the position of the signal and coil drive wiring and ensuring that any disconnected wiring does not short to any other part, replace the wiring with the tag ends of the provided cable as indicated in Fig. 4.3. Plug the other end of the cable into the simulator.

Warning. Ensure that the 'COM' connection on the main terminal block of the Integral transmitter is at the same potential as the sensor body. Failure to do this may result in incorrect operation and possible damage.

It is necessary to calculate the expected display from the velocity value, detector head size and flow units (refer to the D-Mag Instruction Manual for further details).

Example

Display (gals/min) = Velocity x Cal factor x nr² x conversion factor x time units.

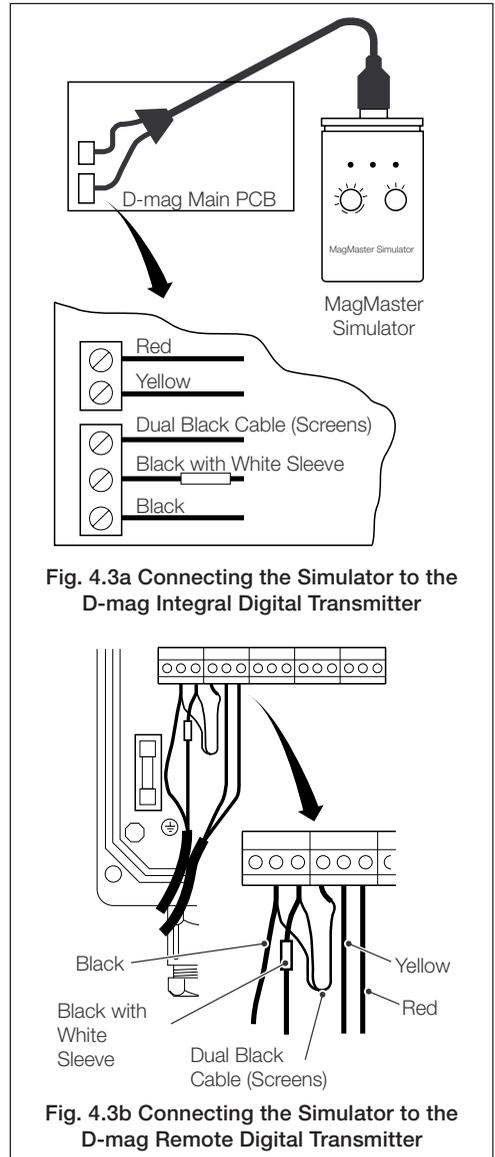
= 1 x 1.000 x n x (150/2000)² x 219.95 (gals in a cubic metre) x 60

= 233.2

The analog and pulse outputs depend on the setting of their separate parameters.

Example.

If parameter P2 = 0, P3 = 0, P16 = 35.683 and P17 = 1.0 then the display indicates in metres per second. Connect the mains to the transmitter and switch on the simulator.



...4 OPERATION

4.4 D-Mag (Analog) VTC, VUC – Fig. 4.4

Disconnect the mains supply from the transmitter.

Remove the Range Board from the transmitter unit (see relevant Instruction Manual if necessary) and replace with the Test Range Card provided.

After recording the position of the wires and ensuring that no disconnected wiring comes into contact with any item in the transmitter, disconnect the wiring from termination blocks TB1 and TB2 (refer to the Instruction Manual if necessary). Connect the tag ends of the cable provided to the transmitter as shown in Fig. 4.4 and plug the other end of the cable into the simulator.

Connect power to the flowmeter and switch on the simulator.

The green LED on the inserted Test Range Card is illuminated when the power is connected to the flowmeter.

The Test Range Card sets a full scale range of 10 metres/second on the transmitter under test, therefore the output signal from the transmitter should be 100% at 10 metres/second, 50% at 5 metres/second etc.

Note. Early versions of remote D-Mag transmitters, Integral transmitters (larger sizes) and also VUC transmitters read in reverse with the connections as shown.

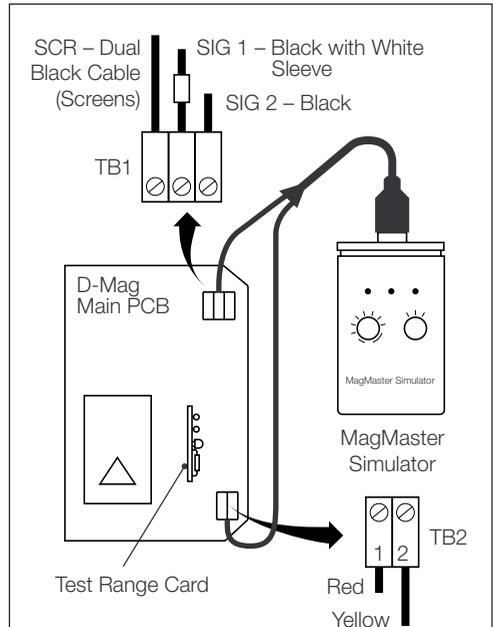


Fig. 4.4a Connecting the Simulator to the D-mag Analog Transmitter (Small Sizes, Integral)

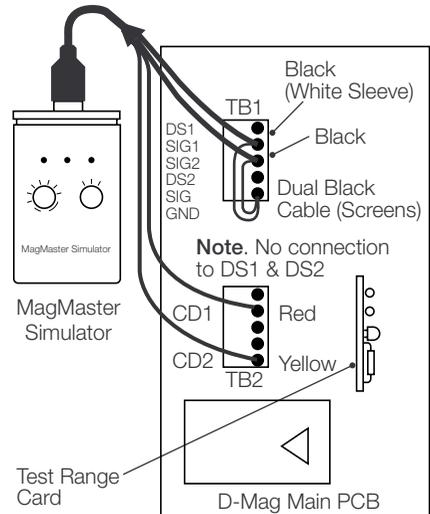


Fig. 4.4b Connecting the Simulator to the D-mag Analog Transmitter (Remote and Integral Large Sizes)

5 SPECIFICATION

Power Supply

9 volt alkaline battery or any
PP3 type battery

Battery Life (Alkaline)

>500 hours continuous

Features

Power On / Battery Low (LED indication)

Automatic power off after approximately
15 minutes to give typical battery life of
1 year.

Coil Drive indication

Rugged

Simulation

Metric version

0, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10
and 20 m/s, forward and reverse flow

Imperial version

0, 0.15, 0.3, 0.6, 1.5, 3, 6, 15, 30
and 60 ft/s, forward and reverse flow

Accuracy

Typically +0.25% of setting (excluding test
range card) or +2mm/s whichever is the greater

Construction

Plastic case with battery compartment and
connector socket

6 ACCESSORIES AND SPARES

These can be ordered separately as required by using the ORDERING INFORMATION, for example:

VSE 001 = Test Range Card

7 ORDERING INFORMATION

MagMaster Simulator (VS/E)	X	X	X
Simulator Type			
Not required	0		
Metric simulator	1		
Imperial (USA) simulator	2		
Leads			
Not required		0	
MagMaster lead ONLY		1	
AquaMaster/AquaProbe lead ONLY		2	
MagMaster + AquaProbe leads		3	
Note. The MagMaster lead is suitable for use with D-mag/VTC, VUC transmitters			
Test Cards			
Not required			0
D-mag analog/VTC, VUC test range card			1

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 Refurbishment*

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
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www.abb.com

The Company's policy is one of continuous product
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