Instruction Manual –
BOOK 7 Keypad Version

Electromagnetic Flowmeters
MagMaster™
ABB

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.

Use of Instructions

⚠️ Warning.
An instruction that draws attention to the risk of injury or death.

🌟 Note.
Clarification of an instruction or additional information.

⚠️ Caution.
An instruction that draws attention to the risk of damage to the product, process or surroundings.

ℹ️ Information.
Further reference for more detailed information or technical details.

Although Warning hazards are related to personal injury, and Caution hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all Warning and Caution notices.

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 Marketing 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.
# INTRODUCTION

This manual provides details to enable the Keypad MagMaster™ transmitter to be reconfigured from default parameters or from parameters initially set up by the factory to special order.

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### BOOK 7 KEYPAD VERSION

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2.1 Displays – Fig. 2.1
The display comprises a 5-digit, 7-segment digital upper display line and two 16-character dot-matrix lower display lines. The upper display shows the flow value. The middle display line shows alarm codes on the left, when an alarm is present – see Book 5 Fault Finding, and flow units in the centre. The lower display line shows user information – see Section 3.1.

Fig. 2.1 Display Window

2.2 Switch Familiarization – Fig. 2.2

Fig. 2.2 Location of 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

Fig. 2.3 Membrane Switch Functions

2.3 Rapid Reset/Escape

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

Fig. 2.4 Rapid Reset/Escape Switch
3.1 Startup
Ensure all necessary electrical connections have been made and switch on the power supply to the flowmeter.

After a short delay, the bottom line of the display will alternate between ‘ABB Kent-Taylor’ and ‘MagMaster V x.x’ (MagMaster software version).

In a few seconds the flow rate will appear on the display together with the flow rate units.

3.2 Operation
Viewing User Information (Read Only)
3.3 Access to Secure Parameters
A 5-digit security code is used to prevent tampering with the secure parameters.

3.3.1 Security Codes
A code number, between 00000 and 99999, must be entered, to gain access to the secure parameters. A default user code of ‘10760’ has been installed, but this may be changed if required with the ‘Login Key 1’ parameter – see Section 3.4 Menu Layout.

An 'engineer’ code (default - 56360) is used to gain access to test procedures, security code settings and parameters not essential at the user level. This code can be changed if required with the ‘Login Key 2’ parameter – see Section 3.4 Menu Layout.

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 enter switch. Continue until all digits have been set, and depress the enter 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.

3.3.2 Changing Parameter Values and Variables
When a parameter is selected, which holds one or more variable units e.g. ‘Flow Unit’ parameter which can be Litres, Cubic metres, 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 enter 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 enter switch and enter the final selection with the enter switch.
3.4 Menu Layout

Below is a summary of all the parameters contained in the menu.
3.5 Parameter Access and Change

The correct security level MUST be selected as in Section 3.3.

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.

Enter full main scale (100%) flow range (Upper Range Value) in selected flow units (see below)‡

‡ 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.

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Information.

Select both parameters for bidirectional operation (e.g. when dual current output is fitted). If both are zero, then \( I_{\text{out}} \) is always 0%.
3.5 Parameter Access and Change

- **Pulse Fact**: Enter required output pulses per flow volume unit.

- **Pulse Cutoff**: Flow rate (%) below which pulse output and totaliser cease to operate.

- **Pulse Max**: Maximum output frequency in Hz.

- **Pulse Hz**: Display of present output frequency in Hz (live value).

- **Pulse 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)

- **Pulse Size**: Enter output pulse width in msecs. (Value will be rounded up to nearest 10ms). Set to '0' for square wave output.

- **Total Unit**: Select totaliser measurement units
  - **Total Mult**: Select multiplier units required.
  - **Total ClrEn**: Enter '1' to enable totaliser reset function to be used from front panel.
  - **Returns to Total Unit**: Returns to **Total Unit**

‡ 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.
...3.5 Parameter Access and Change

Select Alarm 1 output functions.

- '1' = selected, '0' = deselected

Idle state for alarm output. With no alarm active:
- 0 = Low (O/P transistor ON)
- 1 = High (O/P transistor OFF)

Identical to, but independant of, Alarm 1

Selecting Alarm 2 output functions.

High flow alarm trip point as % of range (default = +110%).

Low flow alarm trip point as % of range (default = –110%).

Enter hysteresis for alarms as % of range.

Set to '1' if Hi/Lo Alarms are to be displayed (default = 0)

Identical to, but independant of, Alarm 1

Select high and low flow alarm trip points.

- Alm No1 En
- Alm No1 Fault
- Alm No1 Fwd
- Alm No1 Rev
- Alm No1 Cutoff
- Alm No1 Msnr
- Alm No1 Hi
- Alm No1 Lo
- Alm No1 Anlg
- Alm No1 PIs
- Alm No1 Idle
- Alm No2 Idle
- Alm Trip Hi
- Alm Trip Lo
- Alm Trip Hyst
- Alm Trip Disp

Alarm occurs for:
- System fault.
- Forward flow.
- Reverse flow.
- Pulse Output Cutoff.
- Empty sensor.
- Flow ≥ 'Alm Trip Hi'.
- Flow ≤ 'Alm Trip Lo'.
- Analogue Output over range.
- Pulse Output over range.

Returns to:
- Alm No1 Idle
- Alm No2 Idle
- Alm Trip Hi
...3.5 Parameter Access and Change

Set up function of external logic input
Select 'Zero' to set flowrate output to zero
'Hi' to hold flowmeter output value
'Clr' to reset all totalisers
'Anlg' to select Anlg No2 Range

Set empty pipe detection.
Set empty pipe detector trip threshold.
(default = 50)

Sensor calibration details etc.

Serial No.
(up to 13 characters).

Snsr Tag
Tag No. (if required)

Snsr Size
Sensor calibrated bore, in millimetres.

Snsr Vel
Displays the current velocity in the sensor (live value).

Sensor calibration data – should agree with sensor data label

Returns to Snsr No

Inpt

Inpt Idle
Enter inactive state of input contact
(‘1’ for Hi normal ‘0’ for Lo normal).

Returns to Inpt

Mtsnsr Trip

Mtsnsr mV
Returns to Mtsnsr Trip

Actual measured value related to fluid conductivity.

Snsr No

Snsr Fact 1

Snsr Fact 2

Snsr Fact 3

Snsr Fact 4

Tag No. (if required)

Snsr Size
Sensor calibrated bore, in millimetres.

Snsr Vel
Displays the current velocity in the sensor (live value).

Sensor calibration data – should agree with sensor data label

Returns to Snsr No

Inpt

Inpt Idle
Enter inactive state of input contact
(‘1’ for Hi normal ‘0’ for Lo normal).

Returns to Inpt

Mtsnsr Trip

Mtsnsr mV
Returns to Mtsnsr Trip

Actual measured value related to fluid conductivity.

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Sensor calibrated bore, in millimetres.

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Sensor calibration data – should agree with sensor data label

Returns to Snsr No

Inpt

Inpt Idle
Enter inactive state of input contact
(‘1’ for Hi normal ‘0’ for Lo normal).

Returns to Inpt

Mtsnsr Trip

Mtsnsr mV
Returns to Mtsnsr Trip

Actual measured value related to fluid conductivity.

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Sensor calibration data – should agree with sensor data label

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Inpt Idle
Enter inactive state of input contact
(‘1’ for Hi normal ‘0’ for Lo normal).

Returns to Inpt

Mtsnsr Trip

Mtsnsr mV
Returns to Mtsnsr Trip

Actual measured value related to fluid conductivity.

Snsr No

Snsr Fact 1

Snsr Fact 2

Snsr Fact 3

Snsr Fact 4

Tag No. (if required)

Snsr Size
Sensor calibrated bore, in millimetres.

Snsr Vel
Displays the current velocity in the sensor (live value).

Sensor calibration data – should agree with sensor data label

Returns to Snsr No
...3 OPERATION

...3.5 Parameter Access and Change

'Test Mode'
Set to '1', to enable.

Display current flowrate. If in 'Test Mode', any value may be entered manually.

Flowrate as a percentage.

Output Frequency.

Output Current.

Flow velocity in sensor.

Shows currently active alarms, ('Clr' indicates no alarms active).

Live flow velocity (uncorrected for sensor calibration).

Set display resolution
Enter number of decimal places required on flow display (0 - 5)

Set Level 1 security password

Serial Communication display mode (Read Only) – attempts to edit this parameter result in display of 'Keypad Version No.' with eventual return to normal operation

Return to Login Key 1

Set Level 2 security password

Return to Login Key 1

Test Flow

Test %

Test Hz

Test mA

Test Vel

Test Alm

Test Txv

Disp Mode

Disp Res

Login Key 1

Login Key 2

Disp Mode

Disp Res

Set to '1', to enable.

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

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

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

‡ 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.
**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, Strip Chart and Paperless 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 (0) 755 883 4366
Fax: +1 (0) 755 883 4373

**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.