

# **SCS-AMM15 : ADMIX SHOTCRETE MEASUREMENT SYSTEM**

Congratulations on choosing a **ManuFlo**®™ (Manu Electronics) liquid admixture magflow shotcrete measurement system. You will now join many thousands of satisfied customers worldwide.



## **Your system comprises:**

- FRT303-D-E-BL-VR: Flowrate/Totaliser Indicator with backlit LED display and regulated 12VDC output
- AMM15: electromagnetic flowmeter with couplings. 1000 kPa maximum pressure.
- -SSB: Stainless Steel outer enclosure, with 3 outlets (1 outlet gland is for optional outputs), all wired with 1.5 metre cable to flowmeter and 1 metre power cord

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## **Information sheets included:**

1. FRT303
2. AMM15
3. Schematic wiring diagram +guide

## **Prior to installation:**

- A. Consider a good viewing AND operating position for the system.
- B. Wire the system to a 12-24 VDC power source.
- C.
  - Install the flowmeter as per the installation guide found on the flowmeter brochure.
  - Make sure the cable to the flowmeter is looped downward to prevent any possible water ingress in gland and that pipe is full of liquid at all times at flowmeter measurement point.
  - Ensure that operating pressure does not exceed 1000 kPa (10 bar), else damage to flowmeter may result.
- D. 1.5 metres of low voltage signal cable is supplied from the FRT303 to the AMM15 flowmeter.

## **Operation/Specifications:**

Power supply to the system is 12-24VDC. The FRT303 has a special LED backlight to illuminate the LCD display. A special internal regulator provides +12VDC to the AMM15 magflow via a 1.5m lead. The AMM15 magflow outputs 1000 pulses/Litre back to the FRT display unit.

The display indicates in LITRES/MINUTE to 1 decimal place, has a resettable Totaliser in LITRES, and a Grand Total in LITRES. The flowrange measurement is from 0.9 to 50 Litres/minute.

A 4-20mA and Pulse re-transmission output is available for PLC controlled systems.

The FRT303 display indicator is housed in a rugged IP64 Stainless Steel Enclosure.

If unsure on any aspect of installation or operation, call ManuFlo or your local installer.

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**ManuFlo**®™

**Flow Measurement & Control Products**

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# FRT303 - Flowrate Totaliser LCD Indicator

## FEATURES

- Displays Flowrate, Resetable Total, and Grand Total. Easy reset of Total.
- Power options: Internal Lithium Battery, external 5 - 25 VDC, external 240 vac.
- High and low setpoints, Pulse and 4-20mA output options.
- IP65 enclosure with cover to protect LCD. Mounting lugs for wall mounting.
- Fully programmable functions.
- Australian-made, by Manu Electronics.



The FRT303 Flowrate Totaliser is designed to operate with a wide range of pulse/signal output or coil output flowmeters, providing an instantaneous flowrate reading with a resetable Total display and Grand Total display. To toggle the display between the Total and the Grand Total, simply touch the front panel button once. To reset the Total, touch the front panel button twice.

Power is via either: an internal Lithium battery which has a life of up to 10 years; optional external 5-25 VDC; or optional external 240 vac. The FRT303 will accept flowmeter input pulses from 0.2 to 2000 Hz (Note: for steady flowrate calculations, need at least 5 Hz input). A filter factor is programmable, to smooth the flowrate reading for pulsating flows.

The unit has other fully programmable optional features including pulse output, 4-20mA output, and Hi-Low flow setpoint outputs. All functions are entered via internal keypads and a menu display.

The LCD can be programmed to show flowrate and totals in a number of different units. All application parameters will be pre-programmed according to your requirements, including display unit preferences and the flowmeter K-factor.

The FRT303 is provided in a compact IP65 Polycarbonate enclosure with molded mounts, allowing it to be used in a wide range of field applications.

| Order Code  | Power Option      | Input to FRT from Flowmeter |                               |             | Outputs                 |                             |                              |                                  |                             |                                |
|-------------|-------------------|-----------------------------|-------------------------------|-------------|-------------------------|-----------------------------|------------------------------|----------------------------------|-----------------------------|--------------------------------|
|             |                   | Coil                        | Reed Switch or Open Collector | Pulse/NAMUR | Pulse Output (isolated) | Pulse Output (non-isolated) | High/Low Flowrate indication | 4-20mA current output (isolated) | 4-20mA current output drive | Tradewaste 6-pin MIL spec plug |
| FRT303-B    | Battery           | Y                           | Y                             |             |                         |                             |                              |                                  |                             |                                |
| FRT303-B-P  | Battery           | Y                           | Y                             |             |                         | Y                           |                              |                                  |                             |                                |
| FRT303-D    | DC External power | Y                           | Y                             | Y           |                         |                             |                              |                                  |                             |                                |
| FRT303-D-P  | DC External power | Y                           | Y                             | Y           | Y                       |                             |                              |                                  |                             |                                |
| FRT303-D-E  | DC External power | Y                           | Y                             | Y           | Y                       |                             | Y                            |                                  | Y                           |                                |
| FRT303-A-P  | AC External power | Y                           | Y                             | Y           | Y                       |                             |                              |                                  |                             |                                |
| FRT303-A-E  | AC External power | Y                           | Y                             | Y           | Y                       |                             | Y                            |                                  | Y                           |                                |
| FRT303-A-TW | AC External power | Y                           | Y                             | Y           | Y                       |                             | Y                            |                                  | Y                           | Y                              |

| Order Code | OPTIONS  |
|------------|--|
| -BL        | Backlit LED display (for DC and ac models only)  |
| -VR        | Voltage regulated 12VDC output (for use with 12 VDC flowmeters only)   |
| -SSB       | Stainless Steel outer enclosure. Hinged lid. Lockable.   |
| SCS-AMM15  | Shotcrete System complete. Includes FRT303-D-E-BL-VR Flowrate/Totaliser Indicator with backlit LED display and regulated 12VDC output, -SSB Stainless Steel outer enclosure, all wired with 1.5 metre cable to flowmeter and 1 metre power cord. |

**Technical/Electrical Specifications**

**Display**

- Flowrate
- Total (resetable)
- Grand Total
- LCD
- 6 digits, up to 3 decimal places, in Litres, Kilolitres per sec, min, hr.
- up to 7 digits, up to 3 decimal places, in Litres, Kilolitres, Megalitres.
- 7 digits up to 3 decimal places, in Litres, Kilolitres, Megalitres.

**Power Options**

- Battery
- External power
- 3.6v Lithium battery (5-10yrs life), 10µA dormant state, with automatic sleep mode to preserve battery power.
- +5 to 25 VDC option; 240 vac option.

**Pulse Input**

- 0.2 to 2000 Hz

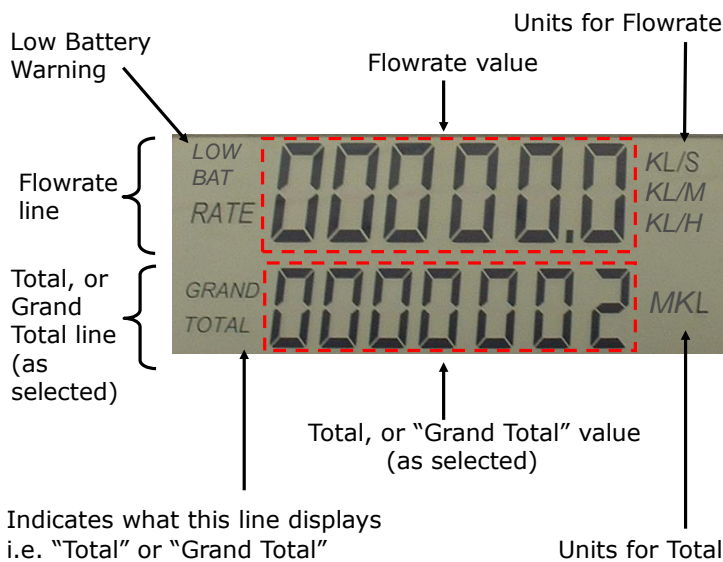
**Output Options**

**(all scalable via program)**

- Pulse output
- Current output
- High/Low Flowrate Setpoint
- open collector 5-25 VDC, 100Hz max. 50% duty cycle.
- 4 to 20mA
- open collector 5-25 VDC contact output.

**Enclosure**

- Dimensions (mm)
- Rating IP66 waterproof
- Access
- Electrical connection
- 120 W, 95 H, 60 D
- Sealed Polycarbonate enclosure with hinged lid and screw lugs for mounting.
- 4 stainless steel screws to access internal programming and wire-up.
- 1 or 2 IP67 cable gland entries, plug-in screw terminals.



**Elements of the LCD Display**

**SCS-AMM15 Shotcrete System**

*Due to continuous product improvement, specifications are subject to change without notice.*

# AMM - ADMIX MINI MAG Magnetic Flowmeter

Sizes: 15mm (1/2"), 20mm (3/4"), 25mm (1")

## FEATURES

- Very compact and light weight design in sizes 15mm (1/2"), 20mm (3/4") & 25mm (1").
- 1000 pulses/Litre (15, 20mm sizes), 500 pulses/Litre (25mm size).
- 15 and 20mm models are directly interchangeable with MES20 20mm flowmeters.
- Measurement range 0.2 to 10 m/s @ +/- 2%.
- PVDF lined sensor, Stainless Steel 316 electrodes with integrated grounding rings.
- BSP(male) threaded end connections. Supplied with BSP (female) couplings.
- Virtually maintenance free, with no moving parts.
- Measures liquids with conductivity > 20µS/cm, to 40°C.
- Accuracy is unaffected by varying viscosity or specific gravity of liquids.
- 12 VDC powered (can be directly powered from ManuFlo devices, has LEDs for pulse and power indication (optional 24 VDC for use directly with 24V PLCs).
- Easy plug-in wiring connections via DIN43650-A plug set to IP65 rating.



## INTRODUCTION

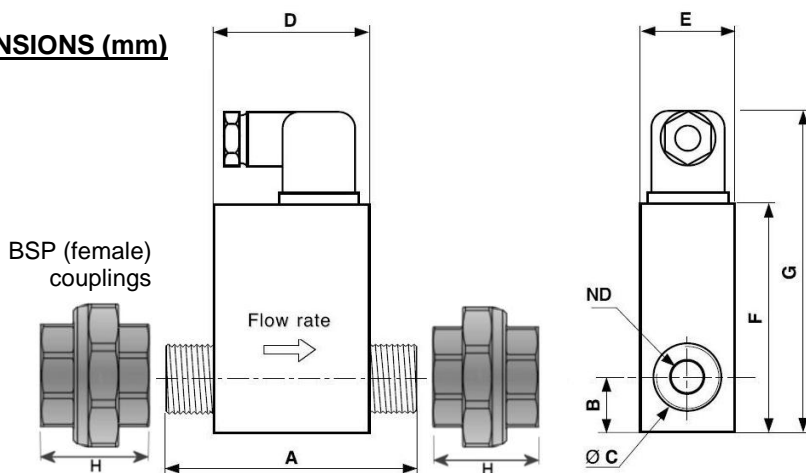
The Admix Mini Mag is a low-cost Electromagnetic Flowmeter designed for the economical measurement of chemical liquid admixtures and any other conductive liquid. The 15 and 20mm sizes output 1000 pulses per Litre (1 pulse / 1 ml), making them a direct replacement of MES20 admixture flowmeters in applications where there is a high content of solids in the measured liquid. Liquids with an electrical conductivity of at least 20µS/cm can be measured. The processor/electronics is integrated with the flowmeter sensor, so these two elements form a very compact package.

The Admix Mini Mag is available in three sizes: 15, 20 and 25mm connections i.e. 1/2", 3/4", 1" with 8mm, 12mm and 20mm bores respectively. With no moving parts, and an obstruction-free bore, this type of flowmeter is ideal for measuring a wide range of liquids up to a temperature of 40°C, with no head losses and virtually no ongoing maintenance. The Admix Mini Mag is ideal for measurement of admixtures in concrete batch plants, flowrate and total display for shotcreting and general process batching applications.

Admix Mini Mag is powered by +12VDC supply, and can be used directly with the complete range of ManuFlo or any other Instrumentation e.g. ManuFlo ME995 and ME3000 Batch Controllers, ME2008 and UIC interface boards, FRT303 and ME5 indicators.

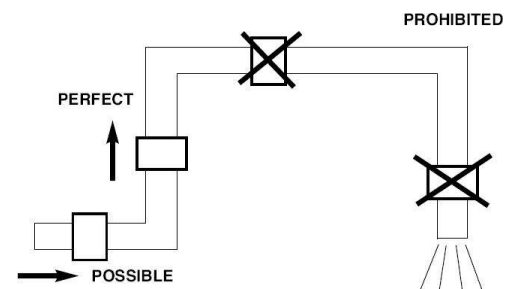
The operation of electromagnetic flow meters is based on Faraday's Law of Induction. A voltage is induced in a conductor as it moves through a magnetic field. This principle is applied in the Admix Mini Mag design. The voltage induced in the flowing liquid, is measured at two electrodes and is proportional to the average flow velocity. The microprocessor then scales this signal voltage to be read in digital units.

## DIMENSIONS (mm)



| Model | A    | B    | Ø C     | D  | E  | F  | G   | H  | ND |
|-------|------|------|---------|----|----|----|-----|----|----|
| 1/2"  | 84,5 | 18,5 | 1/2" MG | 80 | 36 | 88 | 100 | 40 | 8  |
| 3/4"  | 90   | 20   | 3/4" MG | 80 | 36 | 88 | 100 | 43 | 14 |
| 1"    | 90   | 22   | 1" MG   | 80 | 36 | 88 | 100 | 50 | 18 |

## PLUMBING

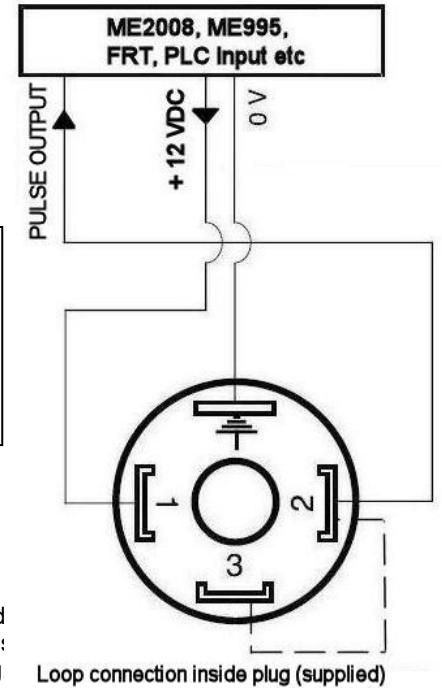


| Flow meter sizes | Measuring Range      | Fixed Pulse Value | Order Codes |
|------------------|----------------------|-------------------|-------------|
| 15mm (08mm bore) | 1.0 - 50 Litres/min  | 1000 pulses/Litre | AMM15       |
| 20mm (12mm bore) | 2.0 - 110 Litres/min | 1000 pulses/Litre | AMM20       |
| 25mm (20mm bore) | 3.0 - 210 Litres/min | 500 pulses/Litre  | AMM25       |

For 24 VDC powered option, add suffix **-24** to Order Code

|                            |   |
|----------------------------|---|
| <b>Accuracy</b>            | ±2% of range, <1.0% of rate   |
| <b>Process connections</b> | BSP(male) threaded ISO228, ½", ¾", 1"                                     |
| <b>Liner Material</b>      | PVDF  |
| <b>Electrodes</b>          | S/S316  |
| <b>Grounding Rings</b>     | S/S316  |
| <b>Protection class</b>    | IP65  |
| <b>Max. Fluid Temp.</b>    | -10 °C to +40 °C  |
| <b>Max. Pressure</b>       | 6 bar @ 40°C, 10 bar @ 20°C   |
| <b>Conductivity</b>        | Minimum 20µS/cm   |
| <b>Supply power</b>        | +12 VDC @ 40mA<br>(optional +24V @ 20mA)                                  |
| <b>Pulse output</b>        | NPN pulse, VDC max: 28V, I max: 50mA,<br>Diode and poly-switch protected. |

The pin designations are:  
 NPN Pulse output,  
 passive, optocoupler  
**Pin 1** = + 12VDC (+) supply  
**Pin 2** = Pulse (Collector)  
**Pin 3** = Minus (Emitter)  
**Pin 4** = - Ground (0v)

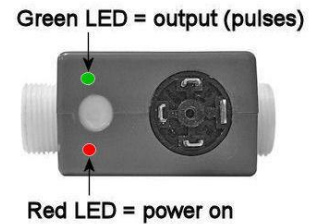
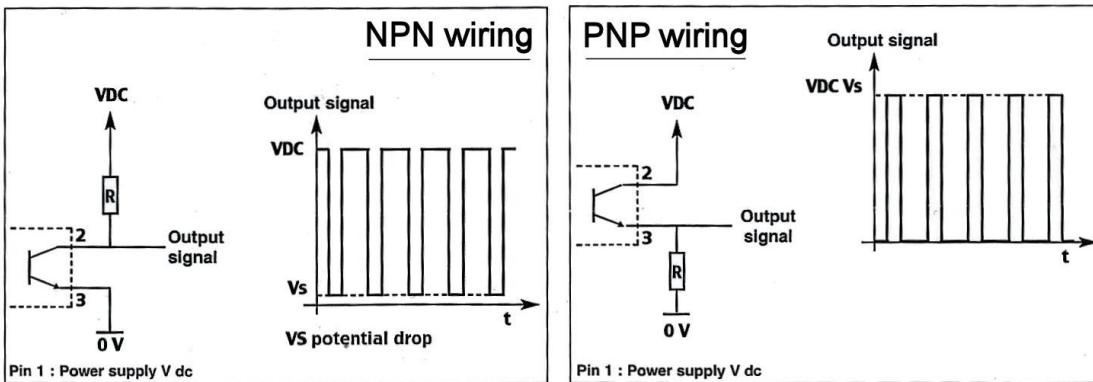


**ELECTRICAL CONNECTIONS**

**Electrical Connection** DIN 43650 plug set  
 To wire: Use minimum 2 core shielded cable. Unscrew the DIN female plug, remove the gland pass the signal/power cable through the gland and connect as per diagram to designated pin: Tighten the gland and then refit DIN plug, tighten screw to assure a secure seal to IP65 rating

**CONNECTION**

**Caution: Never use the instrument without a load resistance. Check the load resistance "R" before connecting the power.**



**Standard model 12 VDC power supply:** Resistance value R for VDC = 12 V **R = 1000 Ω**  
**With the option 24 VDC power supply:** Resistance value R for VDC= 24 V **R = 2000 Ω**

**INSTALLATION & CONDITIONS OF USE**

- **It is essential that the meter tube be always completely filled with liquid.** Partial filling, or an empty pipe, will result in pulse fluctuations from 1 – 900Hz. Keep the pipe full at all times.
- The flowmeter will transmit pulses in the forward flow direction only. Reverse flow (backflow) will not be measured.
- The installation orientation is arbitrary. The flowmeter should not be installed in the vicinity of strong electromagnetic fields.
- Valves or other shutoff devices should not be installed immediate to the flowmeter. Allow some **straight pipe before and after the flowmeter (length upstream: 5x diameter, length downstream: 3x diameter)** before fitting elbows, valves etc.
- For accurate measurement, the diameter difference of the transition from the pipeline to the flowmeter should be kept to a minimum.
- Flowmeter has inbuilt Stainless Steel grounding rings.
- Fluid temperature range of -10 to +40 °C. Pressure up to 10bar @20°C. Conductivity of fluid must be > 20 µS/cm.
- After prolonged period of use, if the calibration is found to be significantly inaccurate then the flowmeter probes may be excessively coated, so remove and wipe the inside of the flowmeter tube. The flowmeter is rated to IP65, but as a safeguard after installation, place a cover over the flowmeter and make sure signal cable is looped downward to avoid trailing water ingress through cable gland.
- **WARNING:** Do not exceed the maximum recommended flowrate as overdose will occur. (Generally the correct size flowmeter for the flowrate should be selected to avoid this). Flowmeter will measure below minimum flowrate but at a reduced accuracy (e.g. ±10%).