

FEATURES:

- ◆ For measurement of waste water, bore water, irrigation and liquids on application.
- ◆ Internal battery powered - ideal for remote locations, or where an external power supply is not available.
- ◆ Rugged construction with no moving parts – ensures long, maintenance-free flowmeter life.
- ◆ Bi-directional Flowrate and Totaliser electronic display housed industrial grade rugged enclosure.
- ◆ Display can be either integral or remote via pre-wired cable, standard 10 metres or to required length [25metres max].
- ◆ Pulse output -for connection to external reset counter or PLC. 50Hz max., 50% nominal duty cycle.
- ◆ Internal Version x 2 internal D-batteries.
- ◆ Typically up to 15 years battery life, site-replaceable batteries.
- ◆ Remote Version internal or remote battery pack.
- ◆ IP68 Potting pack for remote sensor included.
- ◆ Built-in reference electrode, No grounding rings needed
- ◆ Measured liquid must have conductivity >50µS/cm
- ◆ Accuracy: ±0.2% ± 0.5 mm/s
- ◆ Temperature range: 0 to 70° C;
- ◆ Pressure: to 1600 kPa (Flanged CL16).
- ◆ Rectangular bore flow profiling means zero pipe runs.
- ◆ With NMI-M10 - AS4747 Australian Pattern Approval including NSW DPIE
- ◆ K-MAGS custom programmed eng. units at time of order



Remote Mount Display
(IP67 version)



Integral Mount Display
(IP68 version)

Rectangular Bore install



The **KMS703** is a battery powered electromagnetic flowmeter which is ideal for remote location where no power connection is available and provides certainty in case of power failure. The strengths of the KMS703 lies in its unique flow sensor construction with a rectangular and reduced cross section and its efficient coil construction.

All KMS703 are supplied fully wired, programmed to your specific application requirements, and tested, with Total and Flowrate display and outputs all configured. Application examples include use for measuring raw water, irrigation water, potable water and other liquid with conductivity of >50µS/cm.

| Size (mm) | Order Code | Min. (Litres/minute) @ ±2% accuracy * | FLOW RANGES (Litres/minute) Q3 @ ±2% accuracy | Max. (Litres/minute) Q4 | PEAK Flowrate +15% Q4 |
|-----------|-------------|---------------------------------------|---|-------------------------|-----------------------|
| 25 | KMS703-025F | 0.7 | | 267 | |
| 40 | KMS703-040F | 1.6 | | 667 | |
| 50 | KMS703-050F | 2.6 | | 1000 | |
| 80 | KMS703-080F | 7.0 | | 2666 | |
| 100 | KMS703-100F | 11 | | 4167 | |
| 150 | KMS703-150F | 27 | | 10500 | |
| 200 | KMS703-200F | 42 | | 10800 | |
| 250 | KMS703-250F | 66 | | 16667 | |
| 300 | KMS703-300F | 106 | | 26666 | |

OPTIONS

| | |
|----------------|--|
| -R | Remote wired display/transmitter w/ 2m cable |
| -20M | 20 metres cable (instead of 10 metres) between sensor and display, for remote version. |
| -RP | 5-metres cable connection for pulse output to remote resettable display via MIL-spec plug e.g. wire to ME5-T-B or Datalogger |
| -KMBAT | Replacement Batteries (Dual 3.6v lithium D cell batteries) price for dual pack |
| ME5-T-B | External reset Totaliser, Lithium battery operated. |

ANSI-150 PVC or Galvanized Iron connection kits available



NMI-M10
AS4747 Australian
Pattern Approved.
AS/NZS4020:2005
Approved for drinking
water

| Measured value | |
|--------------------------|---------------|
| Primary measured value | Flow velocity |
| Secondary measured value | Volume flow |

| Design | |
|------------------|---|
| Features | Rectangular flow tube design coated with Rilsan® polymer approved for drinking water. |
| | Built-in reference electrode |
| Display version | Remote [Wired] |
| | Integral [Compact] |
| Nominal diameter | DN25 to DN300 |

| Display and user | |
|---------------------|--|
| Display | LCD display, 8 digits |
| Operation | 2 optical keys <i>[accessible without opening the display housing.]</i> |
| Display information | Sum counter / Forward counter / Reverse counter / Flow rate |

| Input and output | |
|--------------------------|--|
| Pulse output | Passive |
| | $f \leq 100 \text{ Hz}$; $I \leq 10 \text{ mA}$; U : 2.7 up to 24 VDC |
| Pulse width [selectable] | Default: 5 ms 10, 20, 50, 100 or 200 ms |

| Measurements | | |
|----------------------|-----------|--|
| Measuring units | Volume | Default setting: m^3 Selectable: litre |
| | Flow rate | Default setting: m^3 / hr Selectable: litre/sec |
| Empty pipe detection | | Display shows -EP- in case of empty pipe detection |

| Measuring accuracy | |
|-------------------------|--|
| Maximum measuring error | Up to 0.2% @ $\pm 0.5 \text{ mm/s}$ |
| Repeatability | $\pm 0.1\%$ ($v > 0.5 \text{ m/s}$ / 1.5 ft/s) |

| Operating conditions | |
|-------------------------|--|
| Process temperature | -5 to 70 °C |
| Operating pressure | Up to 1600 kpa (232 psi) |
| Chemical properties | Raw water, drinking water, irrigation water. |
| Electrical conductivity | $\geq 20 \mu\text{S/cm}$ |

| Electrical connections | |
|---|--|
| Cable entries <i>[Integral display only]</i> | 2 x M20 x 1.45 |
| Output cable <i>[Remote display only]</i> | Output cable with plug and play - IP68 rated connector |

| Power supply | |
|---------------------|--|
| Battery | <i>Internal battery pack:</i> Dual D-cell [Lithium, 3.6V, 38Ah] |
| | <i>External battery pack:</i> Dual DD-cell [Lithium, 3.6V, 76Ah] IP68 rated with 1.5m cable |
| Typical lifetime | With dual internal battery: up to 15 years |
| | With external battery pack: up to 20 years |
| Battery replacement | No loss of totalizer data |

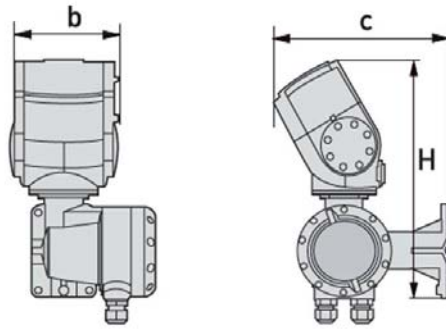
| Signal cable [remote versions only] | |
|---------------------------------------|---------------------|
| Length | Standard: 10 metres |
| | Optional: 20 metres |

| Materials | |
|--------------------------|--|
| Sensor housing | Sheet steel |
| Measuring tube | Metallic alloy |
| Flanges | Steel 1.0460 / 1.0038 |
| Liner | Rilsan® |
| Measuring electrodes | Stainless steel [AISI 304] |
| Reference electrode | Stainless steel [AISI 304] |
| Remote display housing | Aluminium-polyester topcoat |
| Integral display housing | Polycarbonate |
| Connection box | Die cast Aluminium or optional Stainless steel |

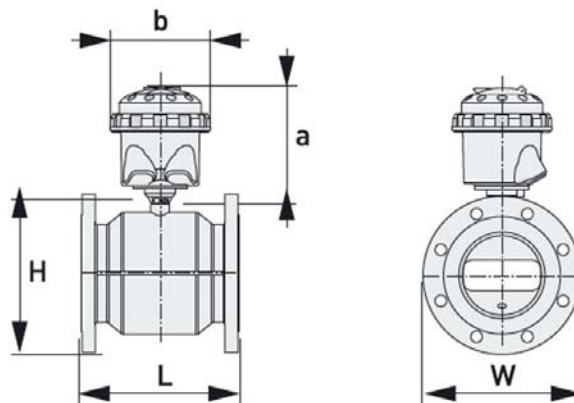
| Approvals and standards | |
|----------------------------|---|
| Remote / Field version | IP68 (NEMA 4X/6P) |
| Integral / Compact version | IP66/67 (NEMA 4/4X/6) |
| Integral / Compact version | IP66/67 (NEMA 4/4X/6) |
| Drinking water approvals | ACS, DVGWW270, ANSI Standard 61, TZW, WRAS |
| Pattern Approval | NMI-M10 - AS4747 Pattern Approval inc. NSW DPIE |

| Installation conditions | |
|-------------------------|--|
| Installation | Flow sensor always full. |
| Flow direction | Forward and reverse |
| Inlet & outlet run | $\geq 0 \text{ DN}$ |
| Dimensions and weights | Please refer to <i>Dimensions and Weights</i> on page 3. |

Display housing

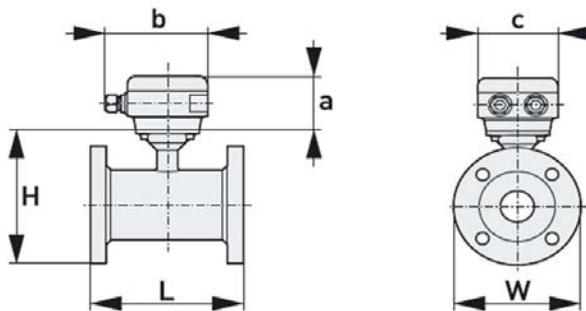


| Version | Dimensions [mm] | | | Weight [kg] |
|------------------|-------------------|-----|-----|---------------|
| | b | c | H | |
| Remote [IP 67] | 159 | 235 | 310 | 3.3 |



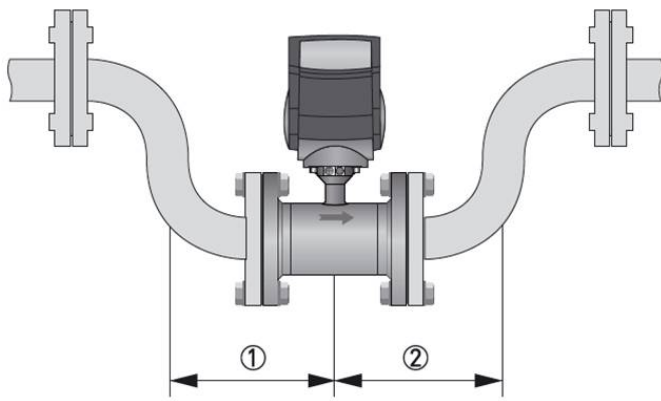
| Version | Dimensions [mm] | | | Weight [kg] |
|--------------------|-------------------|-----|-----|---------------|
| | a | b | c | |
| Integral [IP 68] | 159 | 235 | 310 | 1.8 |

Flow sensor



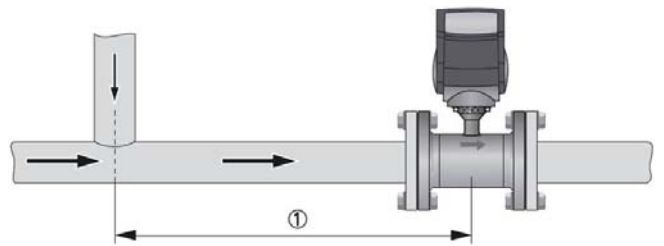
| Nominal size DN [mm] | Dimensions [mm] | | | | | | Approx. weight [kg] |
|---------------------------|-------------------|-----|-----|----|-----|-----|--------------------------|
| | L | H | W | a | b | c | |
| 25 | 150 | 115 | 115 | 88 | 139 | 106 | 5 |
| 40 | 150 | 166 | 166 | 88 | 139 | 106 | 6 |
| 50 | 200 | 186 | 186 | 88 | 139 | 106 | 13 |
| 80 | 200 | 209 | 209 | 88 | 139 | 106 | 17 |
| 100 | 250 | 237 | 237 | 88 | 139 | 106 | 17 |
| 150 | 300 | 300 | 300 | 88 | 139 | 106 | 29 |
| 200 | 350 | 361 | 340 | 88 | 139 | 106 | 36 |
| 250 | 400 | 408 | 495 | 88 | 139 | 106 | 50 |

Inlet and outlet



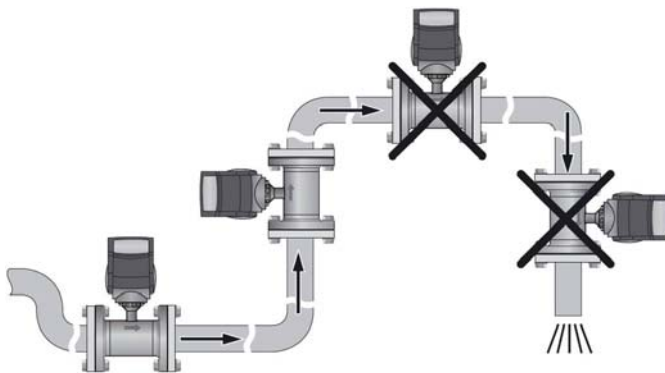
① Inlet: ≥ 0 DN ② Outlet: ≥ 0 DN

T-section

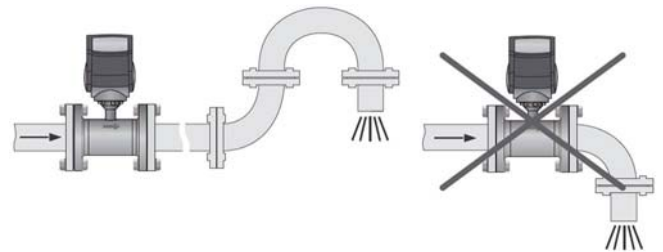


① Inlet: ≥ 0 DN

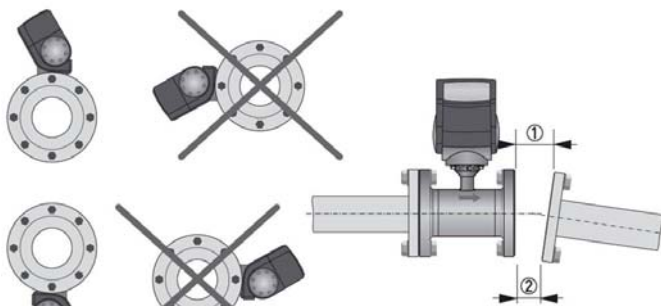
Bends



Open discharge



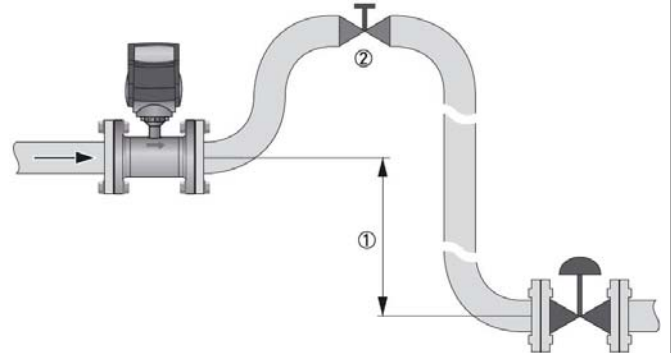
Mounting position and flange deviation



$L_{max} - L_{min} \leq 0.5 \text{ mm} / 0.02$

① L_{max} ② L_{min}

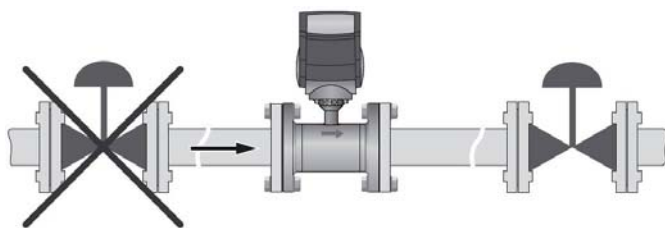
Air venting and vacuum forces



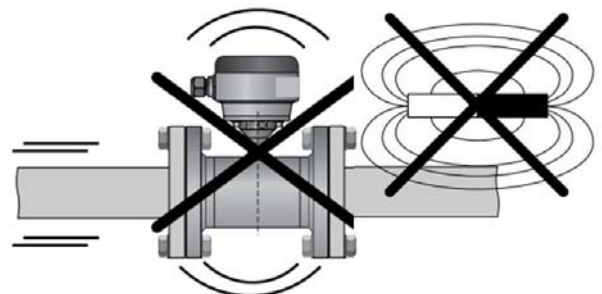
① $\geq 5 \text{ m}$

② Air ventilation point

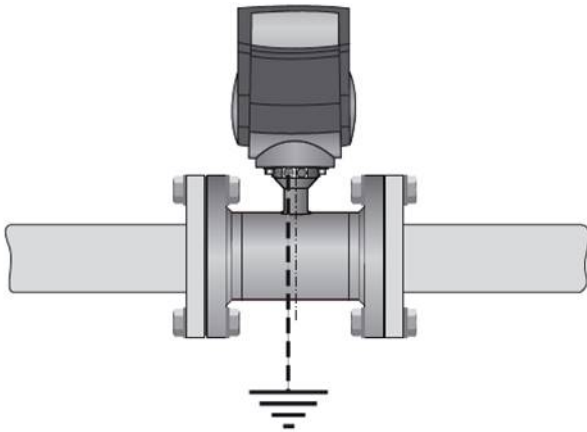
Control valve



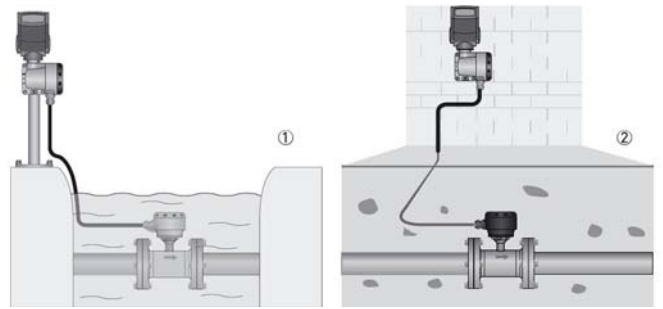
Avoid vibrations and magnetic field



Grounding



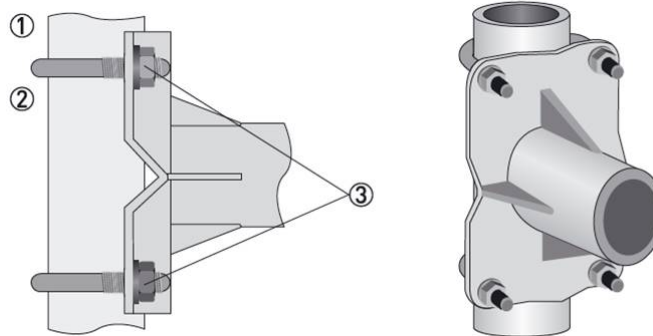
IP68 Versions



① Submersible up to 5 meters

② Buried

Remote display / signal converter pipe mounting

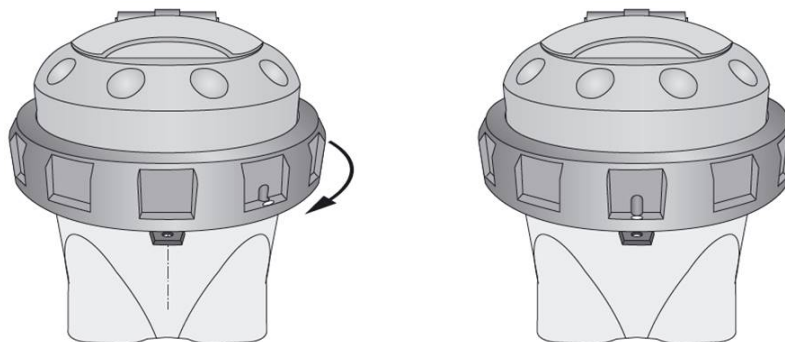


- ① Fix the signal converter to the pipe.
- ② Fasten the signal converter using standard U-bolts and washers.
- ③ Tighten the nuts.

Wall mounting

No special requirements.

Integral version [compact]

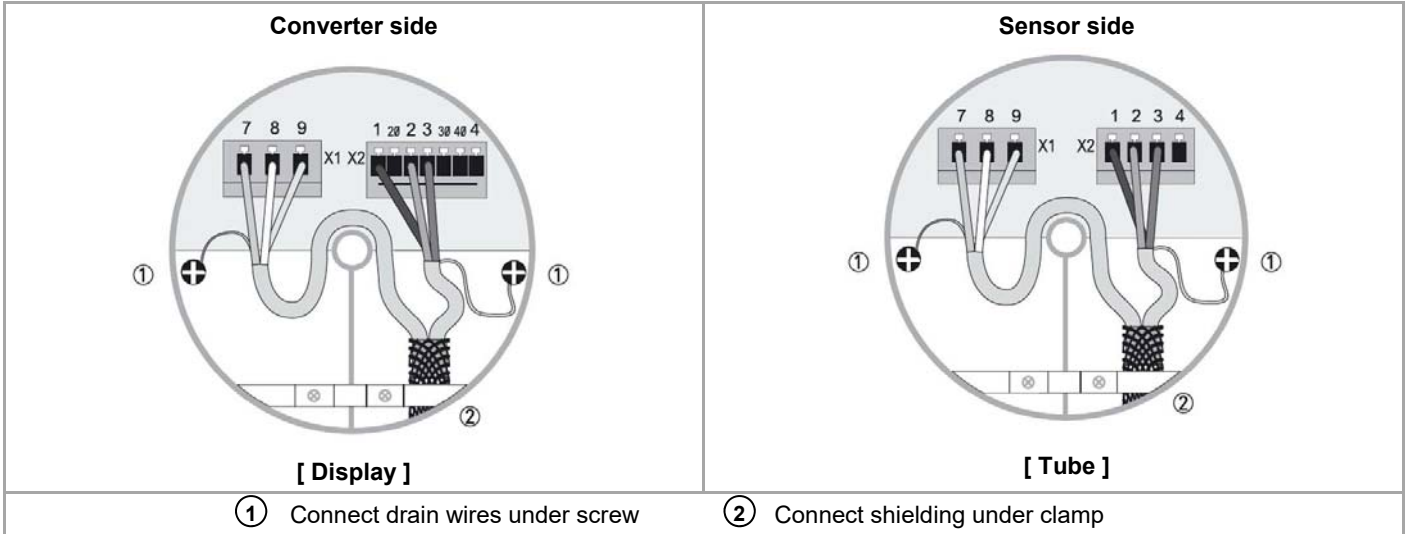


- ✓ Before closing the case of the converter, ensure that all surfaces in contact with the seals are clean.
- ✓ Position the upper part of the case and tighten the lock ring.
- ✓ Use the wrench to tighten the ring as shown.

DANGER! The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

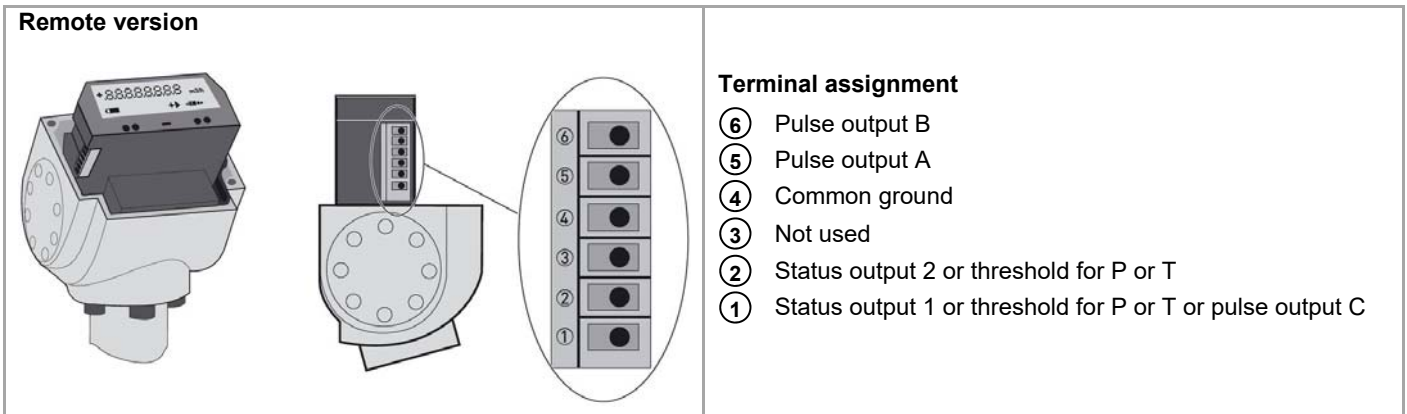
CAUTION! Observe connection polarity

Signal cable connection [Remote version]



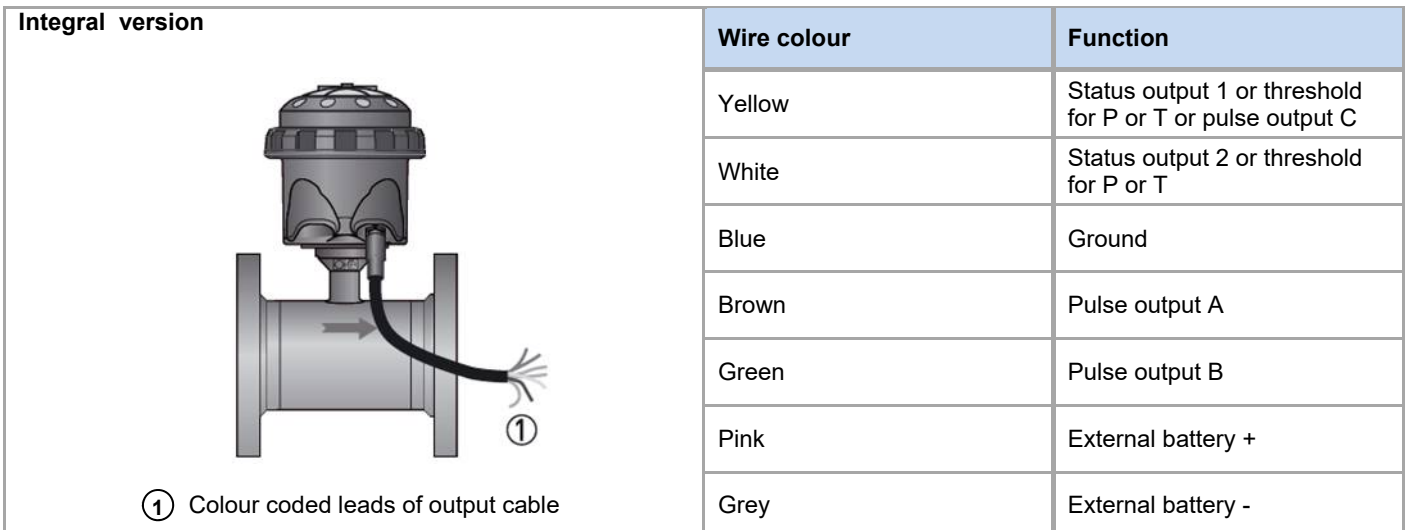
| Wire Color | Terminal | Function |
|-------------|----------|---------------------------|
| Brown | 1 | Reference electrode |
| White | 2 | Standard electrode signal |
| Violet | 3 | Standard electrode signal |
| Blue | 7 | Field current |
| Green | 8 | Field current |
| Yellow | 9 | No function |
| Drain wires | Screws | Shielding |

Output cable connection

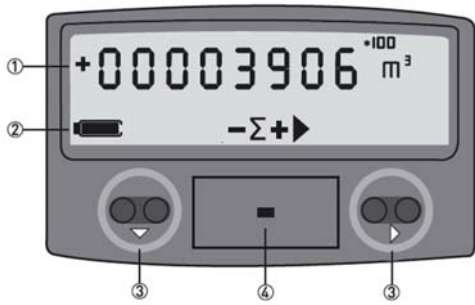


Terminal assignment

- ⑥ Pulse output B
- ⑤ Pulse output A
- ④ Common ground
- ③ Not used
- ② Status output 2 or threshold for P or T
- ① Status output 1 or threshold for P or T or pulse output C



| Wire colour | Function |
|-------------|---|
| Yellow | Status output 1 or threshold for P or T or pulse output C |
| White | Status output 2 or threshold for P or T |
| Blue | Ground |
| Brown | Pulse output A |
| Green | Pulse output B |
| Pink | External battery + |
| Grey | External battery - |



Display example:

Forward counter in cubic metres (m³)

- ① Counter value or flow rate
- ② Status information including battery status, flow direction and counter
- ③ Optical keys ▼ and ▶ to navigate the menu and for display options
- ④ Reset button only accessible after removing the housing

Set display to a different counter or to flow rate:

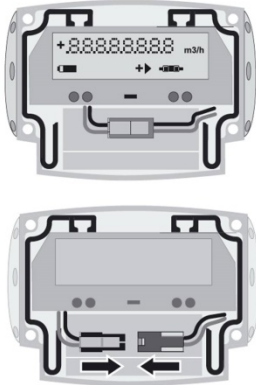
- ◆ Press the left optical key ▼ for 1 second to cycle to the next display.
- ◆ Leave the optical key untouched, to keep the current display.
- ◆ If the meter is set to AMR mode, the display will always switch back to the sum counter display.

| Show counters and flow rate on the display | Status information on the display |
|--|-----------------------------------|
| <p>Sum Counter</p> | <p>Battery status</p> |
| <p>Forward counter</p> | <p>AMR</p> <p>AMR mode on</p> |
| <p>Reverse counter</p> | <p>Automatic self-test</p> |
| <p>Positive flow rate</p> | <p>TEST</p> <p>Test mode on</p> |

| Warning and error messages | Description | Actions |
|---------------------------------|---|---|
| | At the current consumption rate, the battery will be empty within 1 year. | Plan battery replacement. <i>Note: this sign can also appear for a short period if the battery consumption is temporarily very high.</i> |
| | Battery nearly empty | Replace the battery |
| <p>E-00</p> | Battery empty: voltage too low | |
| <p>-EP-</p> | Empty pipe / pipe not full | Check pipe |
| <p>!</p> <p>(Flashing)</p> | Warning | Check all connections. If the exclamation mark does not disappear, contact service. |
| <p>16.1 ...</p> | Pressure : too high / low | Check operating conditions |
| <p>0.2 °C</p> | Temperature : too high / low | |
| <p>E-X</p> <p>(X = 1...511)</p> | Impaired software integrity | The meter has stored the last counter values and went to sleep mode. Contact the service department. |

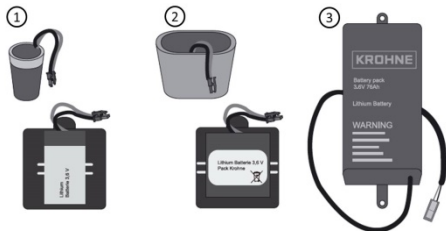
CAUTION! Observe connection polarity

Connecting the internal battery



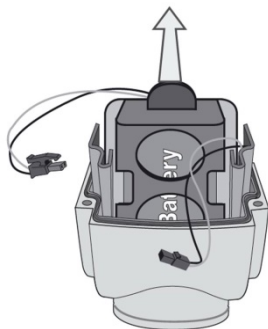
1. Remove the protection cap and loosen the 4 Allen bolts [4mm]
2. Remove the cover
3. Remove one of the blind cable glands in the bottom of the converter housing
4. Remove the metal strip at the bottom of the converter.
5. Pull the cable to the top of the electronics
6. Fasten the battery connector to the internal connector in the converter.
7. Check if the display lights up
8. Refit the metal strip at the bottom of the housing
9. Tighten the cable gland
10. Put back the cover.

Batteries and battery holders



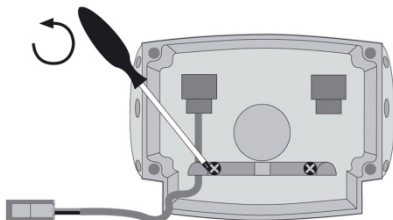
- ① Internal single D-cell battery [without / in holder]
- ② Internal dual D-cell battery [without / in holder]
- ③ External dual DD-cell battery pack

Replacement of the battery



1. Remove the protection cap and loosen the 4 Allen bolts [4mm]
2. Remove the cover
3. Disconnect the connector of the battery
4. Remove the battery from the holder
5. Insert the new battery in the holder.
6. Replace the battery
7. Check if the display lights up
8. Fasten the battery connector to the internal connector
9. Check if the displays lights up.
10. Put back the cover.
11. Tighten the 4 bolts and put back the protection cap.

Replacement of the external battery



WARNING!
Make sure that the battery cable is not jammed by the cover.

1. Remove the protection cap and loosen the 4 Allen bolts [4mm]
2. Remove the cover
3. Loosen the cable glands in the bottom of the converter housing
4. Remove the metal strip at the bottom of the housing [2 screws]
5. Disconnect the connector of the battery.
6. Remove the cable of the old battery
7. Lead the cable of the new external battery through the gland opening and mount the attached cable gland loosely
8. Pull the cable to the top of the electronics.
9. Fasten the battery connector to the internal connector in the converter.
10. Check if the display lights up.
11. Refit the metal strip at the bottom of the housing
12. Tighten the cable gland
13. Put back the cover.
14. Tighten the 4 bolts and put back the protection cap.

KMS703 Electromagnetic Flowmeter Installation Guide and Checklist

| <u>LOCATION</u> | |
|---|--------------------------|
| To avoid vibration that may hinder correct flow readings, support the weight of the flowmeter sensor. | <input type="checkbox"/> |
| Mount the flowmeter’s display box in an area that allows easy access for reading. | <input type="checkbox"/> |
| If mounted outdoors: <ul style="list-style-type: none"> • Install a sunshade, to protect the display box from direct sunlight; and • Consider if you need to install a lockable vandal-proof enclosure, preferably with a window for reading the display. | <input type="checkbox"/> |
| To ensure correct flow readings, avoid installing the flowmeter sensor in the vicinity of strong electromagnetic fields , and avoid areas where there is excessive vibration . | <input type="checkbox"/> |
| Ensure that the chosen location will allow the flowmeter to operate within its environmental rating . | <input type="checkbox"/> |

| <u>ELECTRICAL</u> | |
|---|--------------------------|
| Units in most cases come prewired between sensor and transmitter/display box, otherwise ensure proper colour coding is used when wiring signal cable. | <input type="checkbox"/> |
| If unsure regarding wiring of outputs – call ManuFlo. Use cable glands provided and make sure they are properly tightened and sealed. Allow for a drip loop before the gland to prevent ingress into the transmitter. | <input type="checkbox"/> |

| <u>PLUMBING</u> | |
|---|--------------------------|
| Install the flowmeter sensor in a section of pipe that is full at all times , to ensure correct flow readings. | <input type="checkbox"/> |
| Follow installation guidelines for proper placement or location of the flow meter. | <input type="checkbox"/> |
| Install any gaskets and bonding cables according to the type of pipe. | <input type="checkbox"/> |

Note: detailed installation instructions are in the Manual provided with the flowmeter.

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



NMI-M10
 AS4747 Australian Pattern Approved.
 AS/NZS4020:2005
 Approved for drinking water

