**KMS302F**

**Electromagnetic Flanged Flowmeters with ‘S300’ display**

for grout, oxides and slurries (sizes: 25mm to 150mm)

### FEATURES:

- For grout, oxides, silicafume, recycle-water & selected slurry applications (up to 50% solids).
- Polypropylene liner, Hastelloy C electrodes, ANSI 150 lb Flanges
- K-MAGS Fully wired and custom programmed.
- Flow sensor sizes 25 to 150mm
- Flanged connection suites ANSI 150lb flanges
- Self-verifying. Accuracy: ±0.25%.
- Totaliser up to 10 digits. With Flowrate display.
- Integral display or Remote via 2-metres cable to flowsensor.
- Durable cast alloy display box (integral) or plastic (remote).
- Pulse and 4-20mA outputs. HART protocol.
- Programmable via reflective buttons or via HART to
- IP68 remote flow sensor (when potted).
- Empty pipe detection.
- Pressure rating to 1600 kpa:
- Process temperature: -5 ºC to 90 ºC
- Measured liquid must have conductivity of at least 1 µS/cm
  (20µS/cm for water)
- 85 - 253 vac or 11 – 31 vdc powered

The **K-MAGS** electromagnetic flowmeters are custom configured, wired, programmed, tested and supplied by **ManuFlo**. They offer quality performance with accuracy of ± 0.25% of rate and are capable of operating over very wide flow ranges. With no moving parts and an obstruction-less bore, this type of flowmeter guarantees the highest level of performance, unaffected by specific gravity or viscosity variations, or the most contaminated of fluids, whilst maintaining a high degree of accuracy for liquids with conductivity ≥ 5µS/cm. A unique self-verifying feature is implemented in K-mags, providing ultra-stable performance over time.

All K-MAGS 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 mining slurries, grouts, oxides, construction chemicals, food industry etc. The uses are wide and far reaching.

### OPTIONS

- **-R** Remote ‘Wall’ wired display/transmitter & 2m cable
- **-F** Remote ‘Field’ wired display/transmitter & 2m cable
- **-MOD** Additional RS485 MODBUS communication
- **-DC** 11-31 VDC Powered
- **-TRB** Totaliser Reset Button
- **-VR** Virtual Reference grounding option for IFC 300 (instead of grounding rings on corrosive media)

**ANSI-150 PVC or Galvanized Iron connection kits available**

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**AS4747 / NM-M10 Pattern Approved. For Custody Transfers**

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**Flow Measurement Products**

**Page 1**

**MANU ELECTRONICS PTY LTD**

**KMS302F_ATM0520**
**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Signal converter / Display</th>
<th>Measuring sensor / Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td>Remote version</td>
</tr>
<tr>
<td></td>
<td>Integral version</td>
</tr>
<tr>
<td><strong>Outputs</strong></td>
<td>4-20mA &amp; Pulse output</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td>External totaliser reset input</td>
</tr>
<tr>
<td><strong>Counter</strong></td>
<td>2 internal counter, 10 digits max</td>
</tr>
<tr>
<td><strong>Verification</strong></td>
<td>Integrated verification</td>
</tr>
<tr>
<td></td>
<td>Diagnostic functions</td>
</tr>
<tr>
<td></td>
<td>Empty Pipe detection</td>
</tr>
<tr>
<td><strong>Comms interface</strong></td>
<td>HART®</td>
</tr>
<tr>
<td><strong>Graphic display</strong></td>
<td>59 x 31 mm white backlit LCD</td>
</tr>
<tr>
<td><strong>Operating elements</strong></td>
<td>4 Optical keys</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td>Totaliser: L; mL; m³; gal</td>
</tr>
<tr>
<td></td>
<td>Flowrate: L/sec; L/min; L/h; m³/h; gal/min</td>
</tr>
<tr>
<td><strong>Protection category</strong></td>
<td>Remote: Polyamide - polycarbonate</td>
</tr>
<tr>
<td></td>
<td>Integral: Aluminium (polyurethane coated)</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>85 – 253 VAC @ 22 VA</td>
</tr>
<tr>
<td></td>
<td>11 – 31 VDC @ 12 W</td>
</tr>
<tr>
<td><strong>Signal cable</strong></td>
<td>2 metres standard (Remote version only)</td>
</tr>
<tr>
<td><strong>Cable entries</strong></td>
<td>M20 x 1.5 (8…12mm)</td>
</tr>
</tbody>
</table>

| **Accuracy** | ±0.2% @ 1 mm/s |
| **Repeatability** | ±0.1% |
| **Temperature** | -5 to 90 °C |
| **Pressure rating** | ≤ 1600 kpa |
| **Conductivity** | Water: ≥ 20 µS/cm |
|             | Other media: ≥ 1 µS/cm |
| **Solid content (volume)** | ≤ 50% |
| **Protection category** | IP65 or IP68 when potted |

| **Materials** | Liner: Polypropylene liner |
|              | Electrodes: Hastelloy C |
|              | Housing: Sheet steel |
| **Basic Input and Outputs (I/Os)** | |
| **Analog 4-20mA Output** | Active: \( R_L \leq 1k\Omega \) \& \( I \leq 22mA \) |
|              | Passive: \( U_{out} \leq 32VDC; I \leq 22mA \) |
| **Digital Pulse Output** | Passive: \( U_{out} \leq 32VDC; I \leq 100mA \) |
| **Pulse rate** | 0.25 to 10KHz |
| **Pulse width** | Symmetric (50% duty cycle) |
|              | Fixed (0.05 up to 2000mS) |
| **Totaliser Reset Input** | Passive: 12 – 32 VDC |

**DISPLAY AND OPERATING ELEMENTS**

**Display example:**
Flow indication in Litres per minute (L/min) and totaliser in Litres (L)

1. Indicates a possible status message in the status list
2. Tag number (is only indicated if this number was entered previously by the operator)
3. Indicates when a key has been pressed
4. Flowrate in large representation
5. Forward totalizer
6. Optical keys for accessing menu and settings

**Remote display version:**
Electrical connection to the measuring sensor via field current and signal cable (standard 2 metres cable)

1. Cover for terminal components
2. Terminal compartment for measuring sensor
3. Terminal compartment for inputs and outputs
4. Terminal compartment for power supply w/ safety cover
5. Cable entry for field current and signal cable
6. Cable entry for inputs and outputs
7. Cable entry for inputs and outputs/totalizer reset button
8. Cable entry for power supply input (AC or DC) version

**Integral display version:**

1. Cable entry for power supply input (AC or DC) version
2. Cable entry for inputs and outputs/totalizer reset button
3. Cable entry for inputs and outputs….
**ELECTRICAL CONNECTIONS**

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

**CAUTION!** Observe connection polarity

### Power supply connection

1. 85 – 253 VAC @ 22 VA
2. 11 – 31 VDC @ 12 W

- Terminal compartment for power supply w/ safety cover

### Current output active (HART®)

- $U_{int, \text{nom}} = 24$ VDC
- $I \leq 22$ mA
- $RL \leq 1K\Omega$
- HART® at connection terminals A

### Current output passive (HART®)

- $U_{int, \text{nom}} = 24$ VDC
- $U_{ext} \leq 32$ VDC
- $I \leq 22$ mA
- $U_0 \geq 1.8$ V at $I = 22$ mA
- $RL \leq (U_{ext} - U_0)/I_{max}$
- HART® at connection terminals A

### Pulse output passive (standard)

- $U_{ext} \leq 32$ VDC
- $f_{max}$ in operating menu set to $100$ Hz $< f_{max} \leq 10$ kHz: (over range up to $f_{max} \leq 12$ kHz)
  - $I \leq 20$ mA
  - $RL \leq 1k\Omega$ for $f \leq 1$ kHz
  - $RL \leq 1k\Omega$ for $f \leq 10$ kHz
- closed:
  - $U_0 \leq 5$ V at $I = 20$ mA
- open:
  - $I \leq 0.05$ mA at $U_{ext} = 32$ V
- The minimum load impedance $RL, \text{min}$ is calculated as follows: $RL, \text{min} = (U_{ext} - U_0)/I_{max}$
- The output is open if the device is de-energised.

### Laying electrical cables correctly

1. For compact versions with nearly horizontally-oriented cable entries, lay the necessary electric cables with a drip loop as shown in the illustration.
2. Tighten the screw connection of the cable entry securely.
3. Seal cable entries that are not needed with a plug.
## TRANSMITTER DIMENSIONS AND WEIGHTS

### INTEGRAL Version

<table>
<thead>
<tr>
<th>Version</th>
<th>Dimensions [ mm ]</th>
<th>Weight [ kg ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integral</td>
<td>202 120 155 260 137</td>
<td>4.2</td>
</tr>
<tr>
<td>Field</td>
<td>202 120 155 260 137 140.5 295.8 277</td>
<td>5.7</td>
</tr>
</tbody>
</table>

### REMOTE WALL MOUNT Version

<table>
<thead>
<tr>
<th>Version</th>
<th>Dimensions [ mm ]</th>
<th>Weight [ kg ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote</td>
<td>198 138 299</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Mounting Plate, wall-mounted housing

<table>
<thead>
<tr>
<th>[ mm ]</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
<td>64</td>
<td>16</td>
<td>6</td>
<td>63</td>
<td>4</td>
<td>64</td>
<td>98</td>
</tr>
</tbody>
</table>
REMOTE Version DN25 to 150mm

![REMOTE Version Diagram]

- \( a = 88 \text{ mm} \)
- \( b = 139 \text{ mm} \)
- \( c = 106 \text{ mm} \)
- Total height = \( H + a \)

INTEGRAL Version DN25 to 150mm

![INTEGRAL Version Diagram]

- \( a = 155 \text{ mm} \)
- \( b = 230 \text{ mm} \)
- \( c = 260 \text{ mm} \)
- Total height = \( H + a \)

<table>
<thead>
<tr>
<th>Nominal size DN [ mm ]</th>
<th>Standard length</th>
<th>ISO Insertion length</th>
<th>Dimensions [ mm ]</th>
<th>Approx. weight [ kg ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>150</td>
<td>200</td>
<td>140</td>
<td>115</td>
</tr>
<tr>
<td>40</td>
<td>150</td>
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<td>150</td>
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<tr>
<td>50</td>
<td>200</td>
<td>200</td>
<td>186</td>
<td>165</td>
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<tr>
<td>80</td>
<td>200</td>
<td>200</td>
<td>209</td>
<td>200</td>
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<tr>
<td>100</td>
<td>250</td>
<td>250</td>
<td>237</td>
<td>220</td>
</tr>
<tr>
<td>150</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>285</td>
</tr>
</tbody>
</table>
Straight Pipe Requirements

To ensure accurate measurement:
- Pipe must be full at all times
- Must have straight pipe of length > 5x pipe diameter upstream of sensor and also straight pipe of length > 2x pipe diameter downstream of sensor.

**e.g. 50mm flowmeter requires**
at least 250mm of straight 50mm Ø pipe upstream, and
at least 100mm of straight 50mm Ø pipe downstream

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**Installation on bending pipes**

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**Air venting**

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**T - section**

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**Installation in front of an open discharge**

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**Installation behind a pump**

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**Installation in front of a control valve**

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**Avoid vibrations and magnetic field**

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**Grounding**

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**MANU ELECTRONICS PTY LTD**

**Flow Measurement Products**
# KMS Electromagnetic Flowmeter Installation Guide and Checklist

## LOCATION

To avoid vibration that may hinder correct flow readings, **support the weight** of the flowmeter sensor.

Mount the flowmeter’s display box in an area that allows **easy access** for reading.

If mounted outdoors:
- 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.

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**.

Ensure that the chosen location will allow the flowmeter to operate within its **environmental rating**.

## ELECTRICAL

Have the appropriate **power supply** (e.g. 85-253vac or 11-31 VDC) available.

Units in most cases come prewired between sensor and transmitter/display box, otherwise ensure proper colour coding is used when wiring signal cable.

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.

## PLUMBING

Install the flowmeter sensor in a section of pipe that is **full at all times**, to ensure correct flow readings.

To prevent turbulence in the flow that may hinder correct flow readings, ensure that there is **straight pipe before and after the sensor**, of length at least:
- 5x pipe diameter before (upstream of) sensor; and
- 2x pipe diameter after (downstream of) sensor.

E.g. for 50mm diameter pipe, the lengths of straight pipe required are at least 5x50mm=250mm before sensor, and 2x50mm=100mm after sensor.

Install any **gaskets and bonding cables** according to the type of pipe.

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

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

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**AS4747 / NMI-M10 Pattern Approved.**

For Custody Transfers