

FEATURES

- ◆ For ADMIXTURE Batching, Shotcrete, Mild-Recycled Water & Selected Chemical Applications (upto 10% solids)
- ◆ Liner: PTFE (6 - 15mm); Process Temperature (-40 to 80°C)
Polypropylene (25 - 150mm); Process Temperature (-5 to 90°C)
- ◆ Hastelloy C electrodes.
- ◆ Flanged connection suites ANSI 150lb flanges.
- ◆ Flow sensor sizes 6 to 150mm.
- ◆ Self-verifying. Accuracy: $\pm 0.3\% + 1 \text{ mm/s}$.
- ◆ Built in flow profiler for higher accuracy.
- ◆ Empty pipe detection.
- ◆ Totaliser up to 10 digits. With Flowrate display.
- ◆ Totaliser resettable via optional pushbutton.
- ◆ Programmable via 4 push buttons or via HART to PC.
- ◆ Remote display via 2-metres cable to flowsensor or Integral (45° or 0° mounted)
- ◆ 85 - 253 vac or 11 – 31 vdc powered.
- ◆ Durable cast alloy display enclosure.
- ◆ K-MAGS Fully wired and custom programmed to requirement.
- ◆ Pulse and 4-20mA outputs. HART protocol
- ◆ IP68 remote flow sensor (when potted).
- ◆ Measured liquid must have conductivity of at least 5 $\mu\text{S/cm}$
(20 $\mu\text{S/cm}$ for water)



Remote Mount Display



Integral Mount '0' Degrees Display



Integral Mount 45° Degrees Display

The **K-MAGS** electromagnetic flowmeters are custom configured, wired, programmed, tested and supplied by *ManuFlo*. They offer quality performance with accuracy of $\pm 0.3\%$ 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, virtually unaffected by specific gravity or viscosity variations, or the most contaminated of fluids, whilst maintaining a high degree of accuracy for liquids with conductivity of $\geq 20\mu\text{S/cm}$ for water and $\geq 5\mu\text{S/cm}$ for other liquids. A unique self-verifying feature is implemented in K-mags, providing ultra-stable performance over time.

Application examples include use for measuring mining slurries, grouts, oxides, construction chemicals, food industry etc. The uses are wide and far reaching.

Size (mm)	Order Code		MINIMUM Flowrate		MAXIMUM Flowrate
	Integral	Remote	(Litres/minute) @ $\pm 3\%$ accuracy *	(Litres/minute) @ $\pm 0.3\%$ accuracy	(Litres/minute) @ $\pm 0.3\%$ accuracy
6	KMS104P-006F	KMS104P-006F-R	0.1	2	20
10	KMS104P-010F	KMS104P-010F-R	0.3	5	56
15	KMS104P-015F	KMS104P-015F-R	0.5	11	106
25	KMS102P-025F	KMS102P-025F-R	1.0	30	295
40	KMS102P-040F	KMS102P-040F-R	3.0	80	753
50	KMS102P-050F	KMS102P-050F-R	4.4	127	1178
80	KMS102P-080F	KMS102P-080F-R	11.0	305	3014
100	KMS102P-100F	KMS102P-100F-R	17.0	500	4711
150	KMS102P-150F	KMS102P-150F-R	38.0	1100	10601

* will measure at lower flowrates, but at reduced accuracy.

OPTIONS

-TRB	Totaliser Reset Button	-XCn	Extra cable (where n = extra cable length in metres)
-DC	11-31 VDC Powered	-W	WAFER SENSOR in Lieu of Flanged

ANSI-150 PVC or Galvanized Iron connection kits available

Measured value		Measuring accuracy	
Primary measured value	Flow velocity	Maximum measuring error	Up to $\pm 0.3\%$ @ 1 mm/s
Secondary measured value	Volume flow	Repeatability	$\pm 0.1\%$

Design		Electrical connections	
Features / verification	Integrated verification	Power supply	85 – 253 V AC [50/60 Hz]
	Diagnostic function		11 – 31 V DC
	Stabilisation	Power consumption	AC: 7 VA
	Empty pipe detection		DC: 4 W
Display version	Remote [Wired]	Signal cable [remote version only]	Standard: 2 metres
	Integral [Compact]		Optional: up to 100 metres
Sensor nominal diameter	DN6 to DN150	Cable entries	M20 x 1.5 [8....12mm]

Display and user		Materials	
Graphic display	LC display - White backlit 2 internal counters - 10 digits	Display housing	Aluminium polyester coated
Operation	4 push buttons - accessible without opening the housing	Sensor housing	Sheet metal
Display information	Flow rate Forward & reverse counter	Measuring tube	Austenitic stainless steel
		Liner	PTFE (6 to 15mm) Polypropylene (25 to 150mm)
		Protective coating	Polyurethane coating
		Connection box	Only for remote versions
			die-cast aluminium
		Measuring electrodes	Hastelloy [®] C
		Grounding rings	Stainless steel

Input and output	
Pulse output	Passive
	$U_{ext} \leq 32$ VDC, $i \leq 100$ mA
Pulse width	Default: symmetric
	Fixed: 0.05 2000 ms
4 – 20 mA output	Active
	$U_{int, nom} = 20$ VDC $i \leq 22$ mA, $R_L \leq 750$ Ω
Communication interface	HART [®]
Control input [optional]	External counter reset input

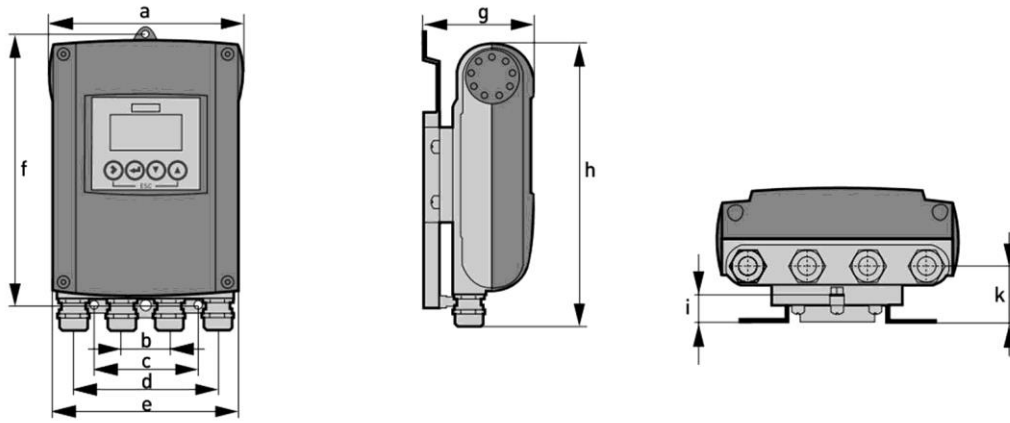
Measurements		
Measuring units	Volume	Default setting: Litres
		Selectable: m ³
	Flow rate	Default setting: litres per min
		Selectable: l/s, l/h, m ³ /h

Operating conditions	
Chemical properties	Conductive, liquid media
Electrical conductivity	Water: ≥ 20 μ S/cm
	Other liquid: ≥ 5 μ S/cm
Process temperature	-40 to 180 °C (PTFE liner) -5 to 90 °C (Polypropylene)
Solid content [volume]	$\leq 10\%$
Operating pressure	Up to 1600 kpa (232 psi)
Pressure loss	Negligible

Installation conditions	
Installation	Assure that the flow sensor is always fully filled.
Flow direction	Forward and reverse
	Arrow on flow sensor indicates flow direction
Inlet run	≥ 5 DN
Outlet run	≥ 2 DN
Dimensions and weights	Please refer to <i>Dimensions and Weights</i> on page 4.

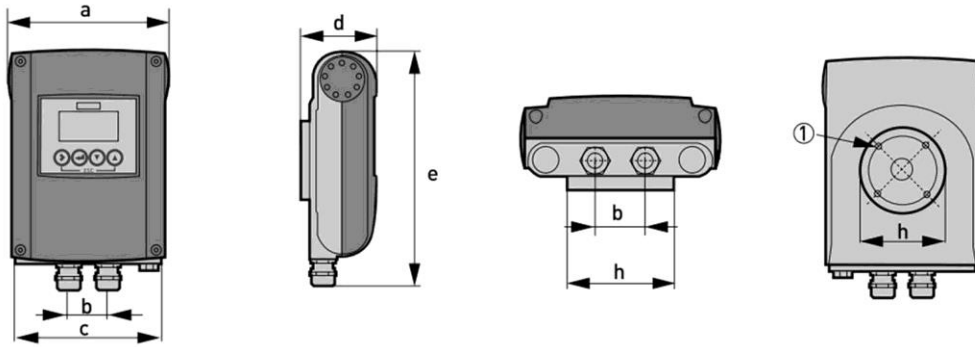
Approvals and standards	
CE	The manufacturer certifies that these requirements have been met by applying the CE marking.
Non-Ex	Standard
Protection category	IP65 / 66 (NEMA 4/4X)

REMOTE Version



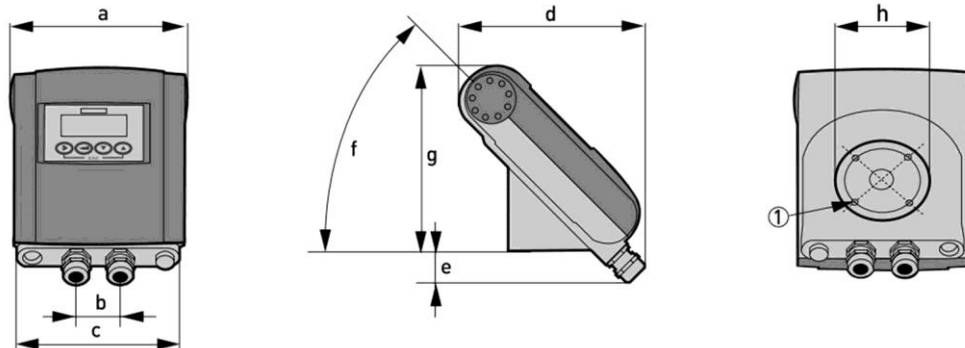
	Dimensions [mm]										Weight [kg]
	a	b	c	d	e	f	g	h	i	k	
Wall-mounted version	161	40	87.2	120	155	241	95.2	257	19.3	39.7	Std: 1.9 Ex: 2.4

INTEGRAL 0° Version



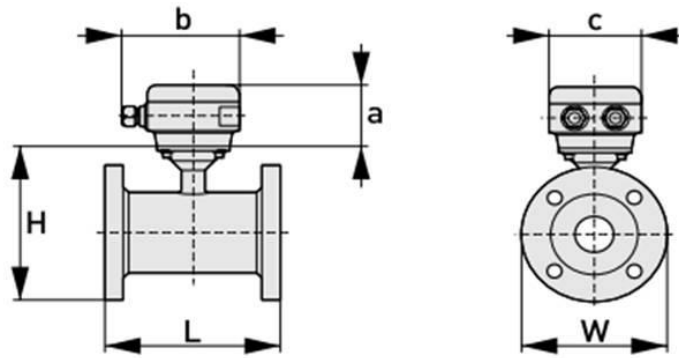
	Dimensions [mm]									Weight [kg]
	a	b	c	d	e	f	g	h		
0° version	161	40	155	81.5	257	-	-	Ø72	Std: 1.9 Ex: 2.4	

INTEGRAL 45° Version



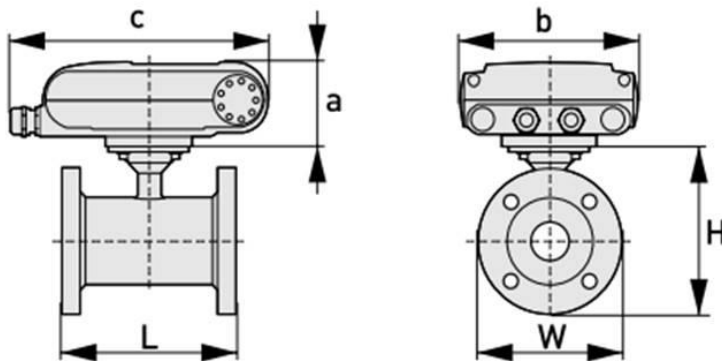
	Dimensions [mm]									Weight [kg]
	a	b	c	d	e	f	g	h		
45° version	161	40	155	184	27.4	45°	186	Ø72	Std: 2.1 Ex: 2.6	

REMOTE
Version



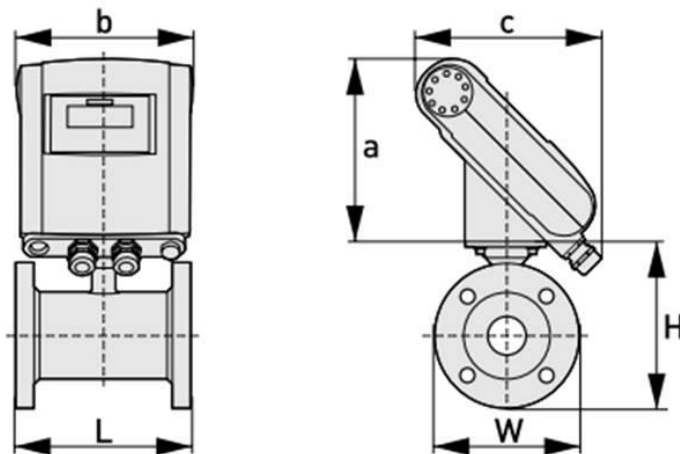
a = 88 mm / 3.5"
b = 139 mm / 5.5"
c = 106 mm / 4.2"

INTEGRAL 0°
Version



a = 82 mm / 3.2"
b = 161 mm / 6.3"
c = 257 mm / 10.1"

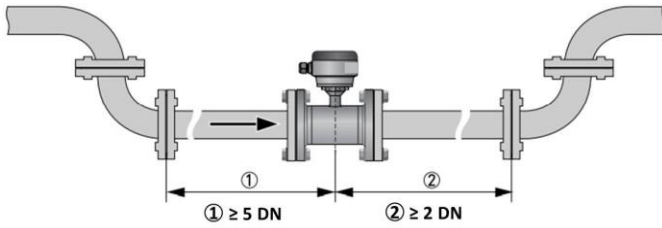
INTEGRAL 45°
Version



a = 186 mm / 7.3"
b = 161 mm / 6.3"
c = 184 mm / 7.3"

Nominal size DN [mm]	Pressure rating PN [bar]	Dimensions [mm]				Approx. weight [kg]
		Standard length	ISO insertion length	H	W	
6	40	130	-	142	90	3
10	40	130	-	106	90	6
15	40	130	200	106	90	6
25	40	150	200	140	115	5
40	40	150	200	166	150	7
50	40	200	200	186	165	11
80	40	200	200	209	200	14
100	16	250	250	237	220	15
150	16	300	300	300	285	27

Straight Pipe Requirements



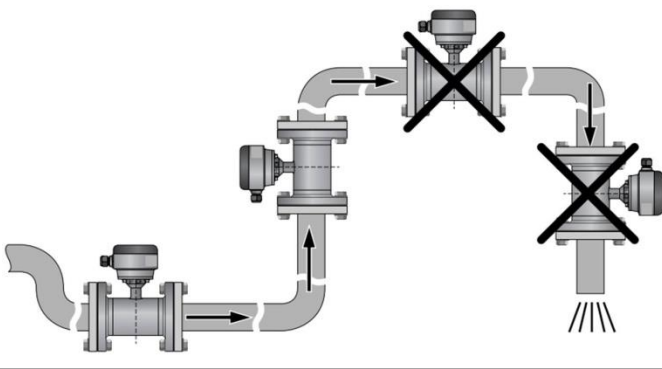
To ensure accurate measurement:

- 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.

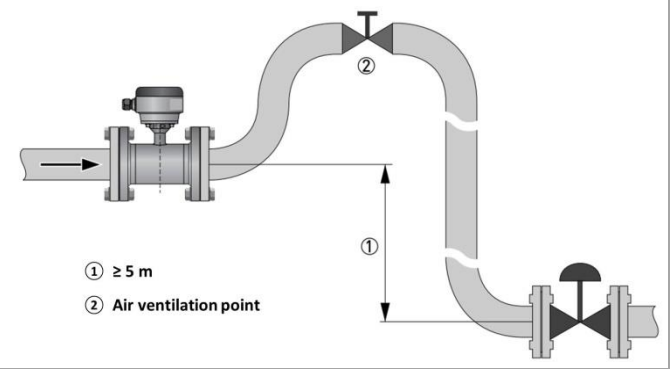
e.g. 50mm flowmeter requires

at least 250mm of straight 50mm Ø pipe upstream, and at least 100mm of straight 50mm Ø pipe downstream

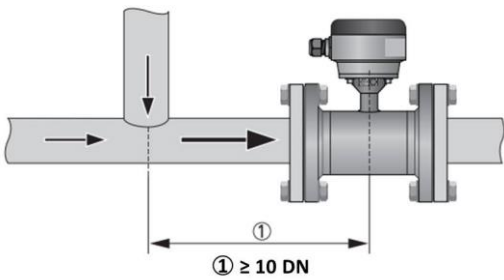
Installation on bending pipes



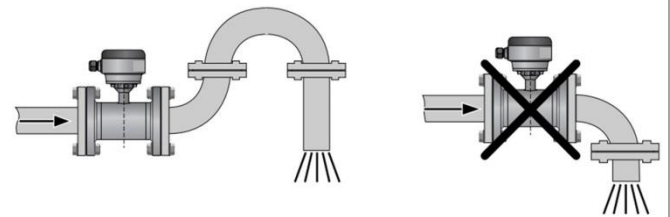
Air venting



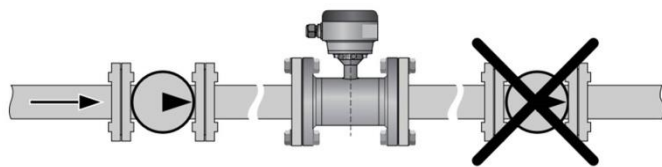
T - section



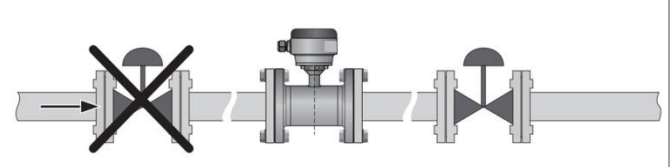
Installation in front of an open discharge



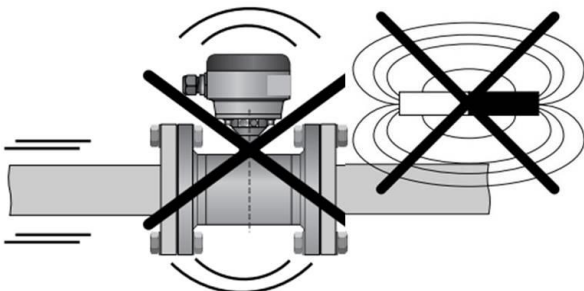
Installation behind a pump



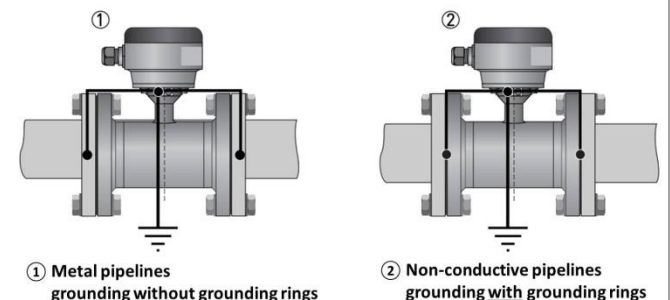
Installation in front of a control valve



Avoid vibrations and magnetic field



Grounding

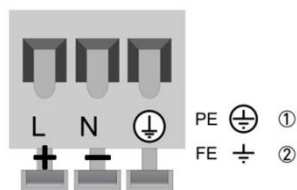
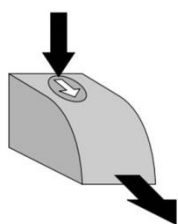


① Metal pipelines grounding without grounding rings

② Non-conductive pipelines grounding with grounding rings

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

CAUTION! Observe connection polarity

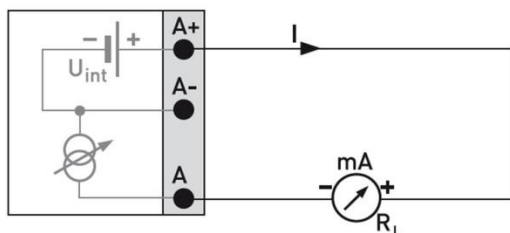


Power supply connection

(1) 85 – 253 VAC @ 7 VA

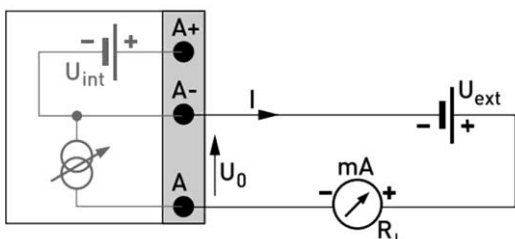
(2) 11 – 31 VDC @ 4 W

- Open the cover of the electrical terminal compartment by pressing down and pulling forwards at the same time.



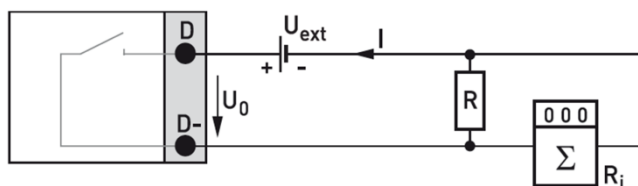
Current output active (HART®)

- $U_{int, nom} = 20$ VDC
- $I \leq 22$ mA
- $R_L \leq 750 \Omega$
- HART® at connection terminals A



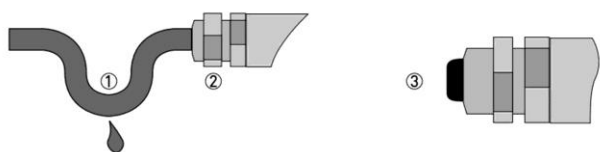
Current output passive (HART®)

- $U_{int, nom} = 20$ VDC
- $U_{ext} \leq 32$ VDC
- $I \leq 22$ mA
- $U_0 \geq 2$ V at $I = 22$ mA
- $R_L \leq (U_{ext} - U_0)/I_{max}$
- HART® at connection terminals A



Pulse output passive (standard)

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



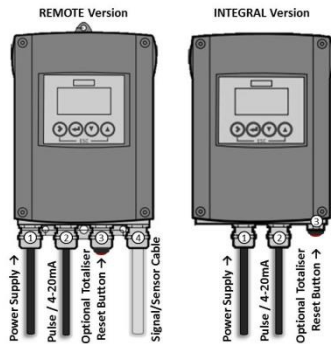
Laying electrical cables correctly

- (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.

Switching on the power

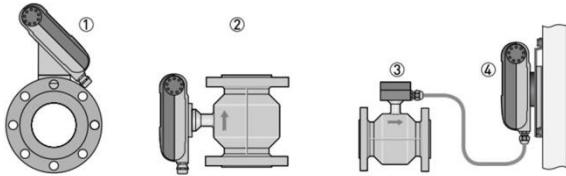
Before connecting to power, please check that the system has been correctly installed. This includes:

- ✓ The device must be mechanically safe and mounted in compliance with the regulations.
- ✓ The power connections must have been made in compliance with the regulations.
- ✓ The electrical terminal compartments must be secured and the covers have been screwed on.
- ✓ Check that the electrical operating data of the power supply are correct.



Cable connections:

- (1) Power supply input (AC or DC) version
- (2) Pulse or 4-20ma output
- (3) Optional totalizer reset button (can also be used as Pulse or 4-20mA output if reset button not needed)
- (4) Signal/Sensor cable for remote version only



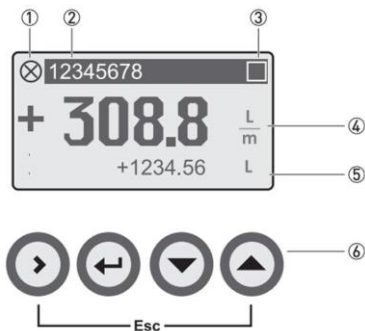
Display versions:

Integral version - the signal converter is mounted directly on the measuring sensor

Remote version- electrical connection to the measuring sensor via field current and signal cable

- (1) Integral version as 45° version
- (2) Integral version as 0° version
- (3) Measuring sensor with connection box
- (4) Wall version

Display and operating elements



Display example:

Flow indication in Litres per minute (L/m) 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) keys for accessing menu and settings

Key	Measuring mode	Menu mode	Sub-menu or function mode	Parameter and data mode
>	Switch from measuring mode to menu mode; press key for 2.5 s, "Quick Start" menu is then displayed	Access to displayed menu, then 1st submenu is displayed	Access to displayed submenu or function	For numerical values, move cursor (highlighted in blue) one position to the right
←	Reset of display	Return to measuring mode but prompt whether the data should be saved	Press 1 to 3 times, return to menu mode, data saved	Return to sub-menu or function, data saved
▲ Or ▼	Switch between display pages: measured value 1 + 2, trend page and status page(s)	Select menu	Select sub-menu or function	Use cursor highlighted in blue to change number, unit, setting and to move the decimal point
Esc [> + ▲]	-	-	Return to menu mode without acceptance of data	Return to sub-menu or function without acceptance of data

KMS 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>	
Have the appropriate power supply (e.g 85-253vac or 11 -31 VDC) available.	<input type="checkbox"/>
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"/>
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: <ul style="list-style-type: none"> • 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.	<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.