

AS-4020 Approved for drinking water

FEATURES:

- ◆ For water applications where installation space is restricted..
- ◆ Flanged connection suites AS4087 CL 16 flanges.
- ◆ **Accuracy to $\pm 0.5\%$ even with zero straight pipe lengths.**
- ◆ Integrated verification, diagnostic function and empty pipe detection.
- ◆ Fully wired and programmed for simple installation and start-up.
- ◆ Power supply option: 85 - 253 VAC or 17 - 31 VDC powered.
- ◆ Modern robust housing design with bright graphic display.
- ◆ Programmable via 4 internal push buttons or via magnetic wand.
- ◆ Totaliser up to 10 digits with Flowrate display and status page.
- ◆ Integral display version directly mounted to the sensor tube or Remote display wired via 2 metres cable (can be longer on request).
- ◆ Rilsen liner with Hastelloy C electrodes wafer flow sensor.
- ◆ Protection category: IP66 / 67 (NEMA 4/4X/6) standard.
- ◆ Measured liquid conductivity: $\geq 5 \mu\text{S/cm}$ ($\geq 20 \mu\text{S/cm}$ for water).
- ◆ Process temperature: -5 to 70 °C.
- ◆ Virtually maintenance free with no moving parts.

NEW



Remote display

Integral display

Special Flow Profile For Compact Installation

The **KMS503F** electromagnetic flowmeter is capable of operating over a very wide flowrange. It offers reference meter quality performance with accuracy of $\pm 0.5\%$ of reading, being ideal for measurement of water and wastewater applications. With no moving parts and a special 'built-in' rectangular flow profile section. This type of flowmeter guarantees the highest level of performance, whilst maintaining a high degree of accuracy.

A self-verifying feature has been implemented in all KMS flowmeters, providing ultra-stable performance over time. All KMS flowmeters are supplied fully wired and wet tested with certificate and programmed to your specific application requirements:

- ◆ Totals: **L** [litres]; **mL** [millilitres]; **m³** [cubic metre] . Total is factory programmed to be resettable or non-resettable;
- ◆ Flowrate: **L/s**; **L/min**; **L/h** [Litres per second/minute/hour]; **m³/s**; **m³/min**; **m³/h** [cubic metre per second/minute/hour];
- ◆ Outputs: Pulse and 4-20mA output with 1m cable pre-wired and labeled.

Application examples include use in water applications (irrigation, bore water etc) and proportional speed control via the current output signal. The uses are wide and far reaching.

Size (mm)	Order Code Integral	MINIMUM Flowrate		MAXIMUM Flowrate
		(Litres/minute) @ $\pm 5\%$ accuracy *	(Litres/minute) @ $\pm 0.5\%$ accuracy	(Litres/minute) @ $\pm 0.5\%$ accuracy
25	KMS503-025F	2.45	14.7	300
40	KMS503-040F	6.4	38	800
50	KMS503-050F	9.7	59	1200
80	KMS503-080F	25	150	3300
100	KMS503-100F	39	235	4990
150	KMS503-150F	88	530	10,000
200	KMS503-200F	157	940	20,000
250	KMS503-250F	250	1500	30,000
300	KMS503-300F	350	2000	45,000

*measures at lower flowrates, but at reduced accuracy

OPTIONS

- R	Remote wired display/transmitter with 2m cable (can be longer on request).
- DC	17 – 31 Vdc powered
- XCn	Extra cable (where n in Product Code = extra cable length in metres)
-APA	Australian Pattern Approval certificate for billing and custody transfers



ACCESSORIES

Table D/ANSI-150 PVC Pressure pipe slip flanges / Table D&E Galvanised iron connection kits available. [Pre-fitted to sensor]

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

Design	
Features	Integrated verification
	Diagnostic function
	Empty pipe detection
Display version	Remote [Wired]
	Integral [Compact]
Sensor nominal diameter	DN25 to DN300

Display and user	
Display	LC display, 10 digits counter
Operation	4 internal push buttons or via magnetic wand
Display information	Flow rate Forward counter Reverse counter

Input and output	
Pulse output	Passive
	$U_{ext} \leq 32 \text{ VDC}, i \leq 100 \text{ mA}$
Pulse width	Default: fixed 500 ms
4 – 20 mA output	Active
	$U_{int, nom} = 20 \text{ VDC}$ $i \leq 22 \text{ mA}, R_L \leq 750 \Omega$
Communication interface	HART [®] and optional MODBUS TCP

Measurements		
Measuring units	Volume	Default setting: L
		Selectable: mL, m ³
	Flow rate	Default setting: l/min
		Selectable: l/s, l/h, m ³ /s/min/h

Operating conditions	
Chemical properties	Waste water Bore water Irrigation water
Electrical conductivity	Standard: $\geq 5 \mu\text{S/cm}$
	Demineralized water: $\geq 20 \mu\text{S/cm}$
Process temperature	-5 to 70 °C
Solid content [volume]	$\leq 10\%$
Operating pressure	Up to 1600 kpa (232 psi)
Pressure loss	Negligible

Measuring accuracy	
Maximum measuring error	Up to $\pm 0.5\%$ @ $\geq 0.5 \text{ mm/s}$
Repeatability	$\pm 0.1\%$ ($v \geq 0.5 \text{ m/s}$)

Electrical connections	
Power supply	85 – 253 VAC [50/60 Hz]
	17 – 31 VDC
Power consumption	AC: 15 VA
	DC: 5.6 W
Signal cable	Standard: 2 metres
	Optional: up to 100 metres
Cable entries	M20 x 1.5 [8...12mm]

Materials	
Display housing	Aluminium with polyester topcoat
Sensor housing	Sheet metal
Measuring tube	Austenitic stainless steel
Liner	Rilsen
Protective coating	Polyurethane coating
Connection box	Only for remote versions
	die-cast alum. or 316SST
Measuring electrodes	316 SST
Grounding electrodes	316 SST

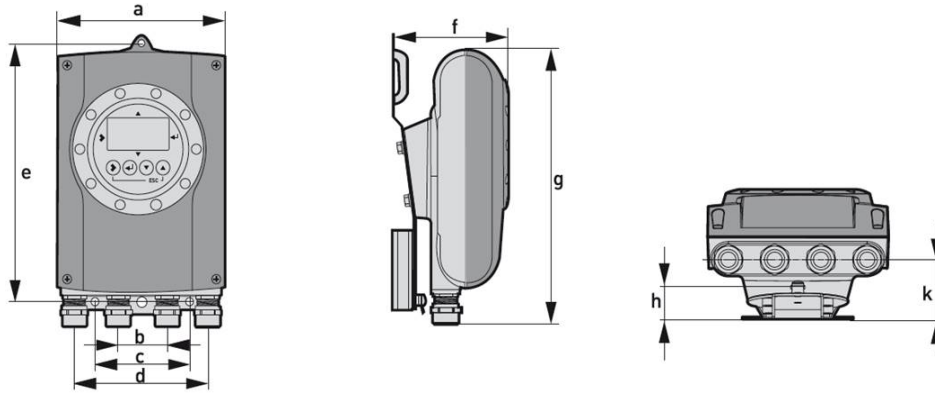
Installation conditions	
Installation	Assure that the flow sensor is always fully filled.
Flow direction	Forward and reverse
	Arrow on flow sensor indicates flow direction
Inlet run	$\geq 0 \text{ DN}$
Outlet run	$\geq 0 \text{ DN}$
Dimensions and weights	Please refer to <i>Dimensions and Weights</i> on page 3 .

Approvals and standards	
CE	The manufacturer certifies that these requirements have been met by applying the CE marking.
Protection category	Standard: IP66 / 67 (NEMA 4/4X/6)

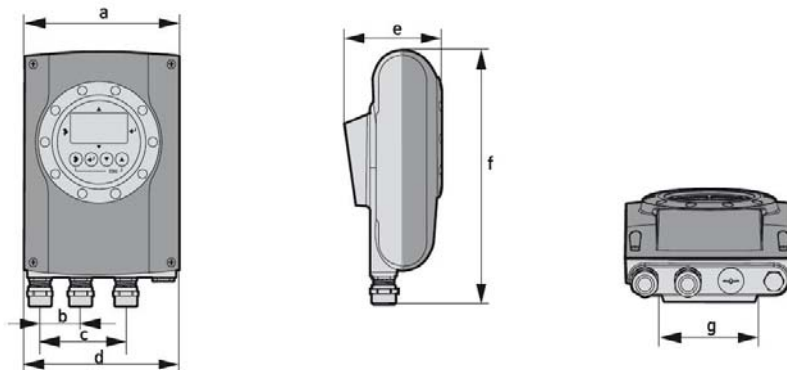


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Display housing

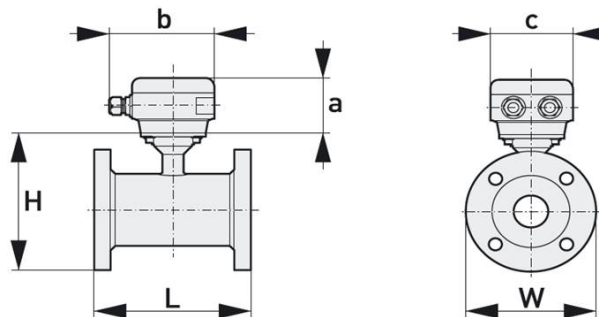


Version	Dimensions [mm]									Weight [kg]
	a	b	c	d	e	f	g	h	k	
Remote	157	40	80	120	248	111.7	260	28.4	51.3	3.3 kg



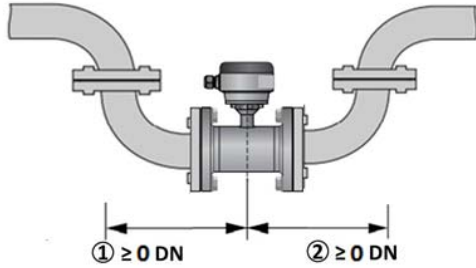
Version	Dimensions [mm]							Weight [kg]
	a	b	c	d	e	f	g	
Integral	157	40	80	148.2	101	260	95.5	1.8

Flow sensor



Nominal size DN [mm]	Dimensions [mm]						Approx. weight [kg]
	L	H	W	a	b	c	
25	150	140	115	88	139	106	5
40	150	166	166	88	139	106	7
50	200	186	186	88	139	106	11
80	200	209	209	88	139	106	14
100	250	237	237	88	139	106	15
150	300	300	300	88	139	106	27
200	350	361	361	88	139	106	34
250	400	408	395	88	139	106	48
300	500	458	445	88	139	106	60

Straight Pipe Requirements

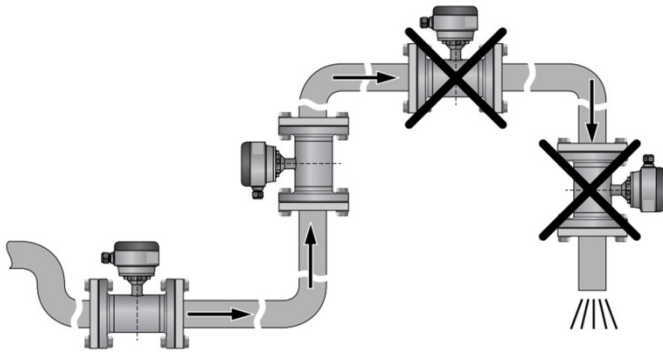


To ensure accurate measurement:

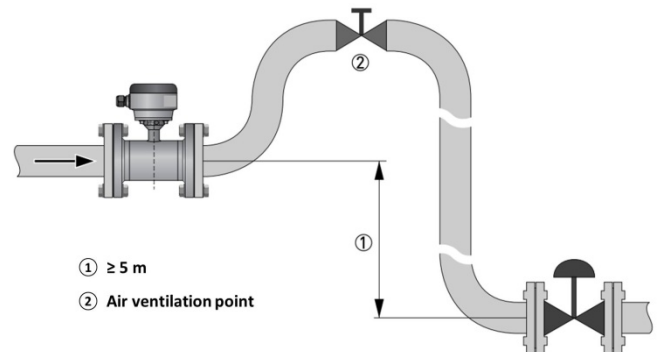
- Pipe must be full at all times
- Due to patented rectangular built-in flow profile section can operate without straight pipe diameters upstream or downstream of sensor.



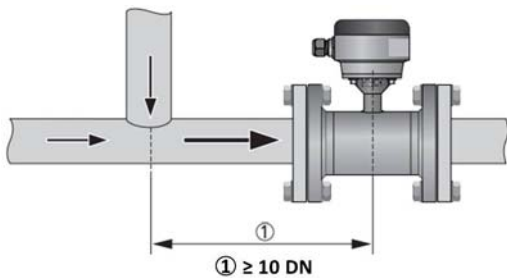
Installation on bending pipes



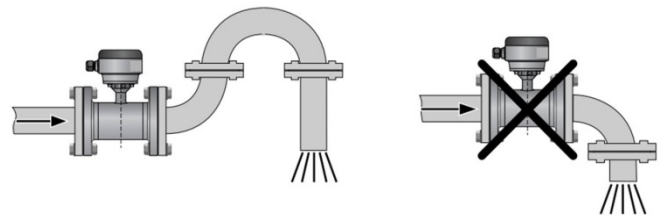
Air venting



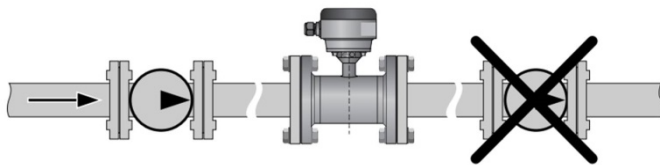
T - section



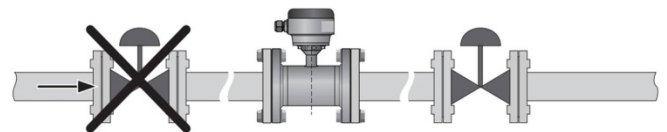
Installation in front of an open discharge



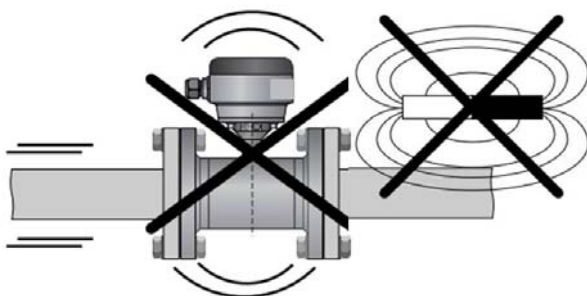
Installation behind a pump



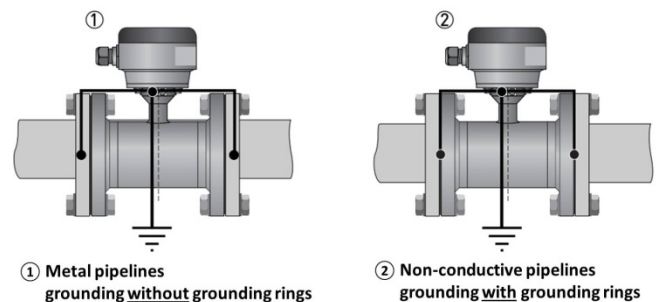
Installation in front of a control valve



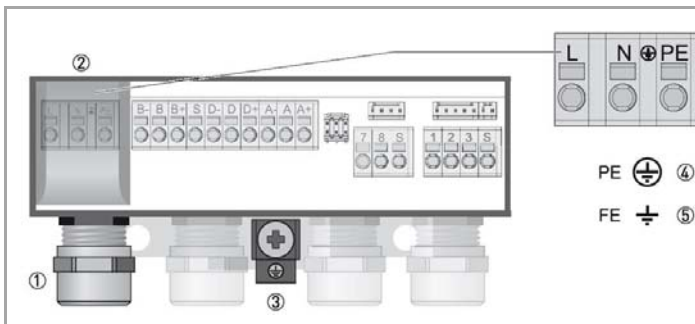
Avoid vibrations and magnetic field



Grounding

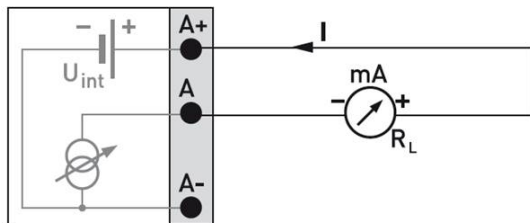


DANGER! The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.
CAUTION! Observe connection polarity



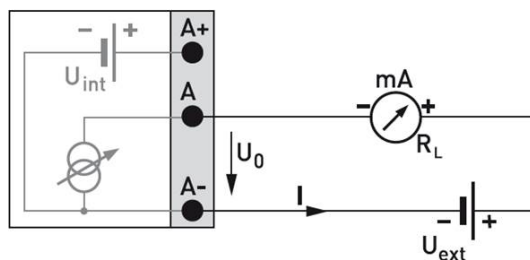
Terminal compartment for power

- ① Cable entry for power supply
- ② Mains cover
- ③ Ground terminal
- ④ 100...230 VAC [-15% / +10%]
- ⑤ 24 VDC [-30% / +30%]



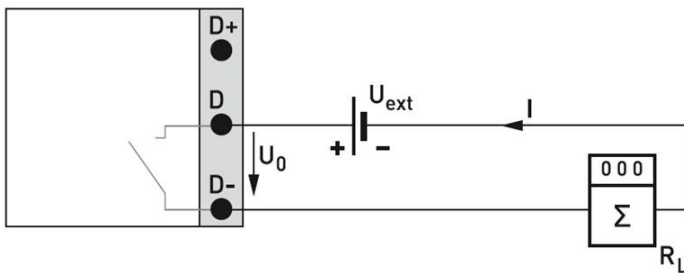
Current output active (HART®)

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



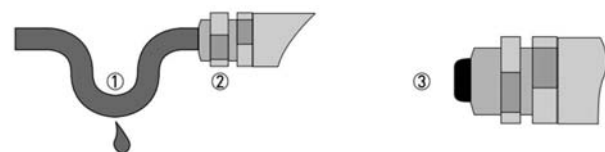
Current output passive (HART®)

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



Pulse output passive (standard)

- $U_{ext} \leq 32 \text{ VDC}$
- f_{max} in operating menu set to $100 \text{ Hz} < f_{max} \leq 10 \text{ kHz}$:
(over range up to $f_{max} \leq 12 \text{ kHz}$)
- $I \leq 20 \text{ mA}$
- $R_L \leq 10 \text{ k}\Omega$ for $f \leq 1 \text{ kHz}$
- $R_L \leq 1 \text{ k}\Omega$ for $f \leq 10 \text{ kHz}$
- closed:
 $U_0 \leq 5 \text{ V}$ at $I = 20 \text{ mA}$
- open:
 $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ V}$
- 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.



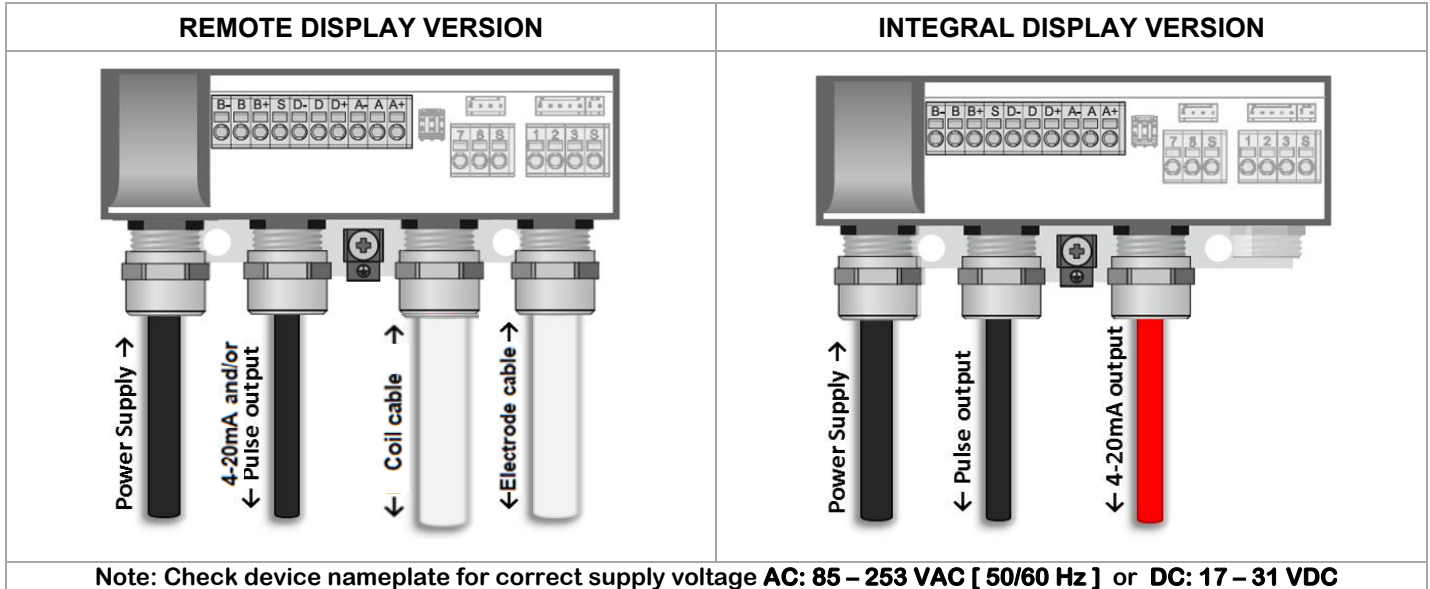
Laying electrical cables correctly

- (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.



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) Push buttons for operation with open housing
- (7) Magnet keys for operation with closed housing

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 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

LOCATION

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"/>

ELECTRICAL

Have the appropriate power supply (e.g 85-253vac or 17 -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"/>

PLUMBING

Install the flowmeter sensor in a section of pipe that is full at all times , to ensure correct flow readings.	<input type="checkbox"/>
Please Note: if there is excessive turbulence in the flow this will hinder accuracy of flow readings, in these cases you may want to observe straight pipe sections before and after the sensor , of length at least: <ul style="list-style-type: none"> • 3 x pipe diameter before (upstream of) sensor; and • 2 x pipe diameter after (downstream of) sensor. e.g. for 50mm diameter pipe, the lengths of straight pipe required are at least 3 x 50mm = 150mm before sensor, and 2 x 50mm=100mm after sensor.	<input type="checkbox"/>
Install any gaskets and bonding cables according to the type of pipe.	<input type="checkbox"/>

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



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AC Direct Powered



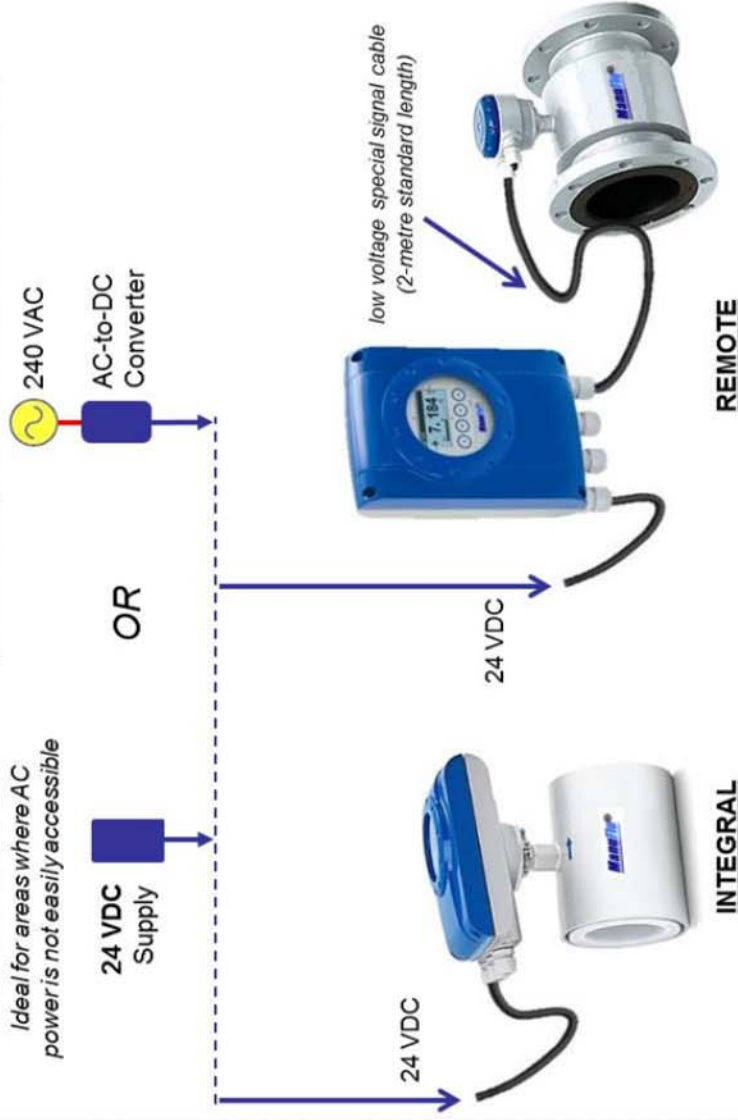
DC Powered, Direct

Ideal for areas where AC power is not easily accessible



OR

DC Powered, via 240VAC-to-24VDC Converter



Integral display flowmeter:

- The display is mounted on top of the flowmeter sensor fitted in the pipeline.
- The display must be in a position to be easily read and accessible to be able to configure and interrogate via the display buttons.
- AC mains power can be used to power the unit. If AC power is not available or is difficult to access at the flowmeter location, then the DC-powered flowmeter option can be taken up. ManuFlo have available an AC-to-DC power pack adaptor to run a safer low-voltage DC to the flowmeter.

Remote display flowmeter:

- Where an integral display cannot be easily accessed, then the remote display option is chosen.
- The display unit is separate to the sensor, and is connected to the via a low voltage signal cable (standard 2-metre length provided by ManuFlo).
- The display unit is mounted in an easily viewable and accessible position, and can be powered by AC or DC supply.