

# CLA-VAL e-FlowMeter

## Vortex Shedding Flow Meter



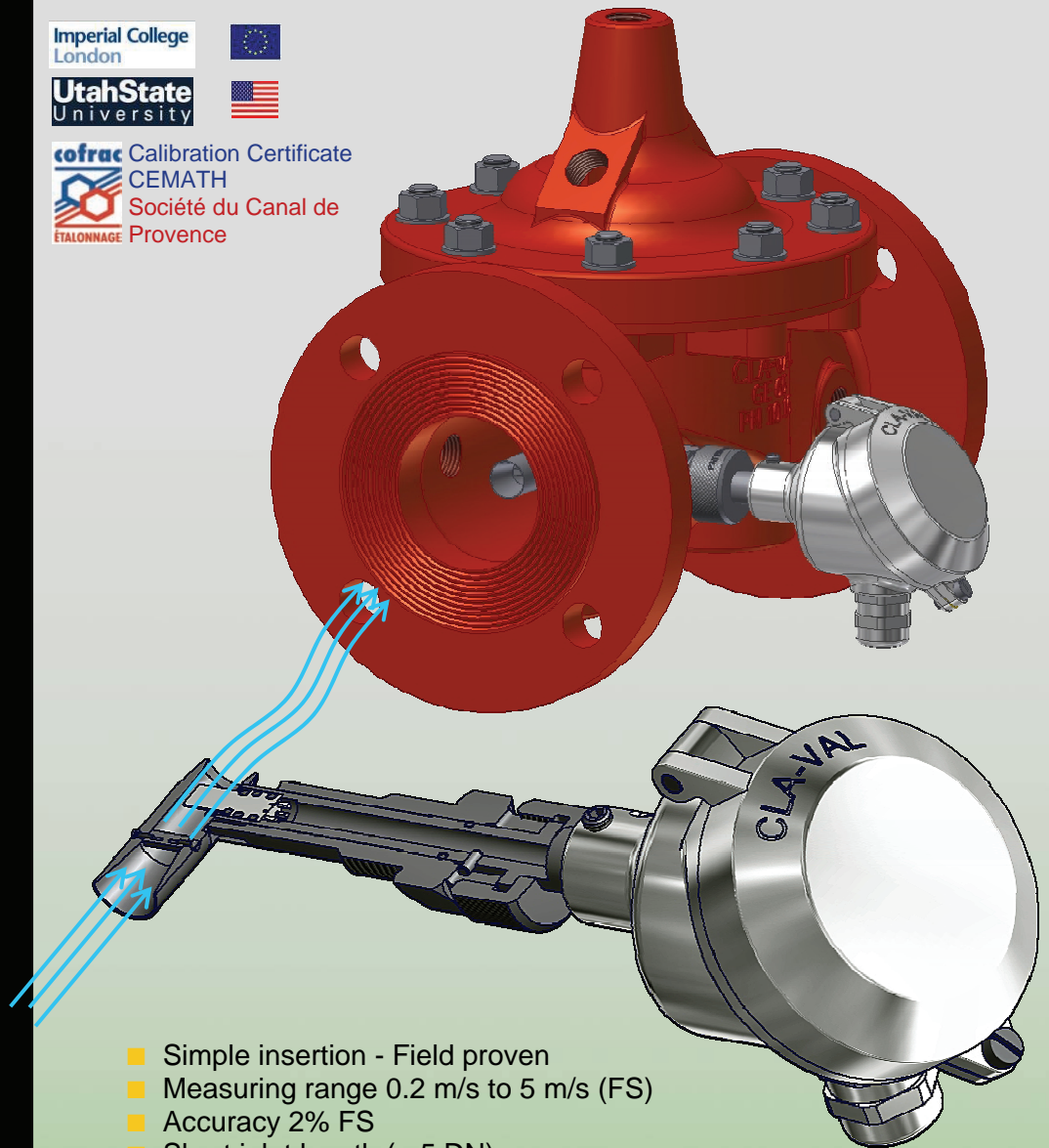
Imperial College  
London



Utah State  
University



cofrac Calibration Certificate  
CEMATH  
Société du Canal de  
Étalonnage Provence



### Pressure Management

Plug-and-Play Metering

Proven Technology from the Industry Leader

Factory precalibrated metering

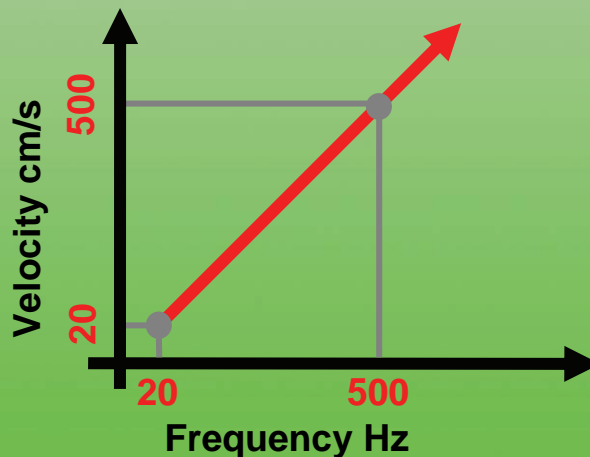
Sensor output signal 4-20 mA or pulse

Low power consumption (max. 4 mA)

IP 68 protection

- Simple insertion - Field proven
- Measuring range 0.2 m/s to 5 m/s (FS)
- Accuracy 2% FS
- Short inlet length (< 5 DN)
- Short outlet length (< 1 DN)
- Measurement by piezoelectric sensor
- Low frequency algorithm patented
- Rotating head of the sensor and lock patented

*Innovation  
Since 1936*



**PATENT  
PENDING**

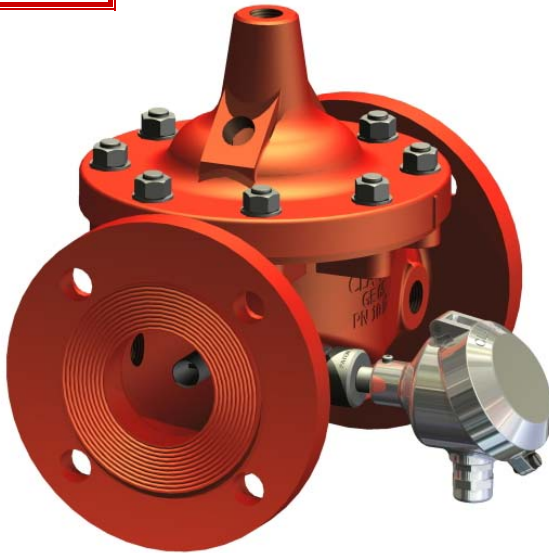


# CLA-VAL e-FlowMeter

Vortex Flow Meter  
for Accurate Measurement from 0.2 m/s to 5 m/s

## ► Plug and Play Metering

**PATENT  
PENDING**



## ► Description

- Retrofits on inlet body tapping of a CLA-VAL control valve
- Alleviates the need for an external meter and the associated installation costs
- Simple insertion into a CLA-VAL valve
- IP68 Submersible
- Stainless Steel as standard
- No moving parts
- Outputs: 4-20 mA, digital pulse or pulse
- Independent laboratory tested

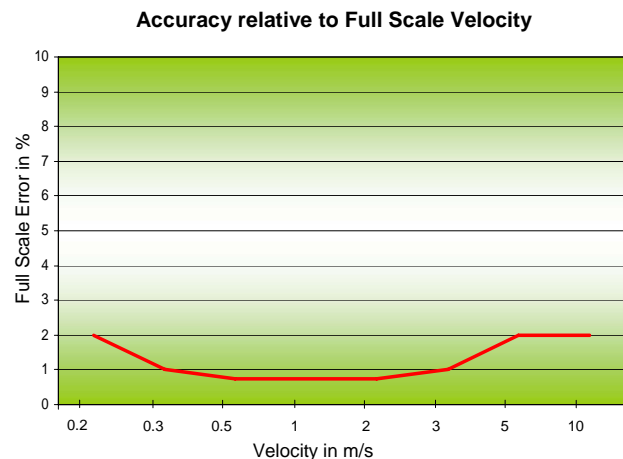
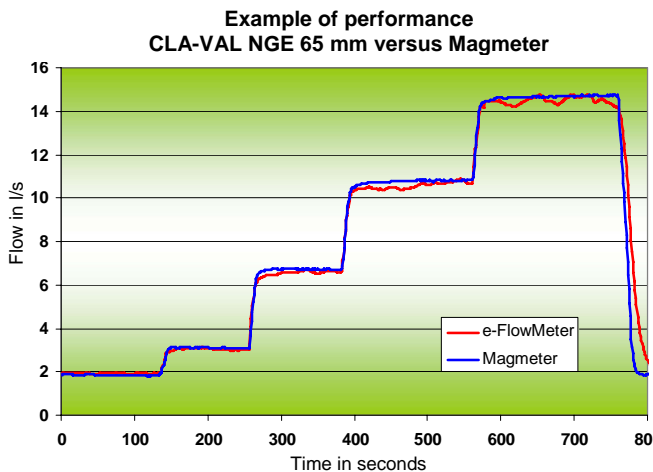


The CLA-VAL e-FlowMeter is a vortex shedding insertion flow meter designed to be factory assembled or retrofitted into a CLA-VAL Automatic Control Valve to provide accurate flow measurement data without the need to install a separate meter. Configured to be installed in the inlet tapping of a CLA-VAL Automatic Control Valve, the e-FlowMeter can be used in valves directly downstream of a turbulent flow such as elbows, valves or reducers. The e-FlowMeter employs an innovative and patented swivel mechanism allowing the meter to be inserted into tappings as small as 1/2".

The e-FlowMeter measures and transmits flow information as a 4-20 mA signal, digital pulse or pulse. It can be directly connected to a SCADA system, various market loggers or products in the CLA-VAL e-Line range.

## ► Typical Performance

Velocity from 0.2 m/s to 5 m/s (CLA-VAL standard flow range) accuracy is lower than 2% of Full Scale.



**Note:** CLA-VAL NGE type is a reduced port valve and CLA-VAL GE type is a full port valve. Typical water pipe velocities are less than 5 m/s. If deemed necessary the e-FlowMeter can perform high velocity measurements up to 10 m/s. For accurate scaling purpose CLA-VAL limits maximum velocity to 5 m/s. For high velocity applications please contact CLA-VAL.



# CLA-VAL e-FlowMeter

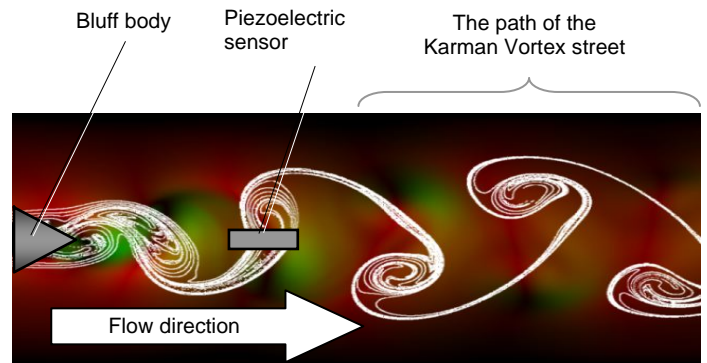
Vortex Flow Meter  
for Accurate Measurement from 0.2 m/s to 5 m/s

## ► Operation of the e-FlowMeter

### Karman Vortex Street

The e-FlowMeter is a vortex shedding insertion flow meter, based on the phenomenon of generating an alternating series of vortices called «Karman vortex street».

When the fluid encounters an obstacle placed in the axis of fluid flow, it divides and creates small vortices alternating on either side downstream of the obstacle. The frequency of vortex shedding, or generation of vortices is directly proportional to fluid velocity. These detached vortices generate variable pressure zones that are detected in the form of short bursts of pressure, using a measuring sensor placed downstream of the obstacle.



### Frequency measurement

The frequency of pressure surges, or generation of vortices is counted using a piezoelectric crystal encapsulated in the sensor head. The latter is connected by 2 wires to the circuit board for signal processing.

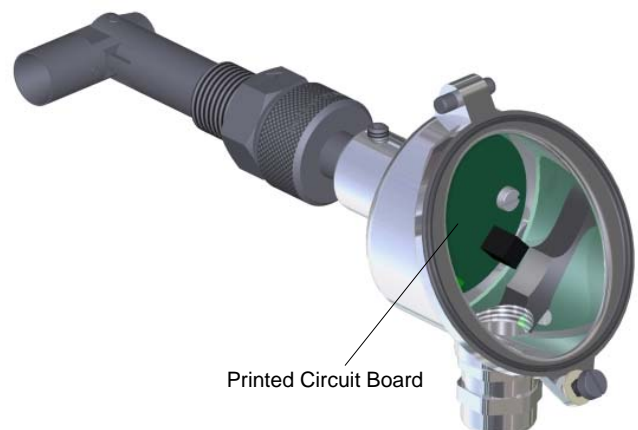
### Measurement cylinder orientation

Upon insertion of e-FlowMeter in the valve, the measurement cylinder is oriented parallel to the direction of flow. After inserting the CLA-VAL tool which allows 90 degree rotation of the measurement cylinder, it is locked in position by the piezoelectric sensor insert. This unique 90 degree swivel mechanism makes it possible to increase the length of the measurement cylinder up to 40 mm allowing stabilization of the fluid. This unique design allows it to be inserted into a valve body tapping of 1/2".

### Signal processing and output information

Existing Vortex flow meters operate in turbulent steady flow defined by a Reynolds number exceeding 5'000. This flow regime establishes stable and easily detectable «Karman vortex street» using unsophisticated electronics. Velocities are detected, in general, above 0.5 m/s.

Through the innovative electronic card developed by CLA-VAL e-FlowMeter can measure flow from a velocity of 0.2 m/s to obtain an accurate signal. This is then converted to 4-20 mA, pulse or digital pulse to suit the desired application.







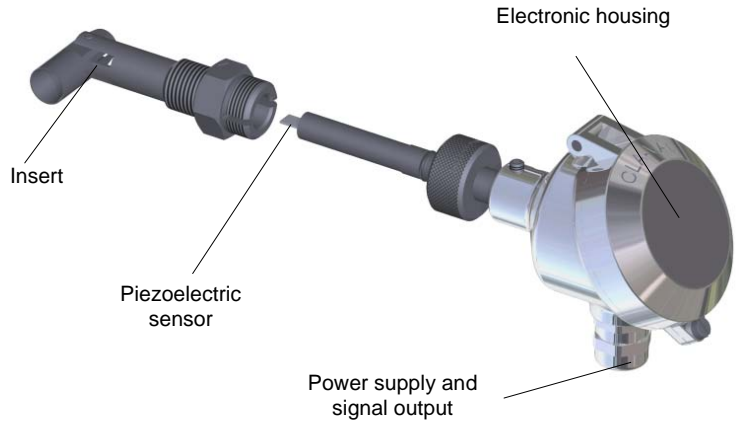
# CLA-VAL e-FlowMeter

Vortex Flow Meter  
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## ► Function of the e-FlowMeter

**Design:** e-FlowMeter is designed to measure flow with velocities from 0.2 m/s to 5 m/s.

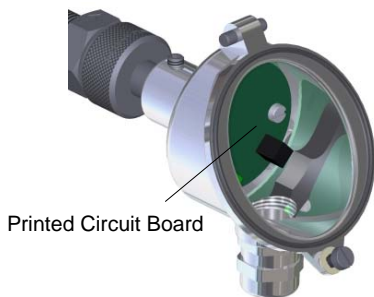
e-FlowMeter can be mounted on valves type NGE: 65 mm to 600 mm and GE: 65 mm to 400 mm.



**Programming:** CLA-VAL software can easily configure the type and size of the valve in which e-FlowMeter is inserted.

**Software updates:** All updates and programming software are downloaded free from the CLA-VAL website.

**USB connection:** e-FlowMeter connects directly to the USB port of a PC allowing access to settings and adjustments.



**Printed Circuit Board (PCB):** Designed with the latest technology and manufactured from high quality electronic components the PCB is fully tropical coated to ensure maximum humidity protection.

## ► Technical Data:



**Power supply:**  
(recommended CLA-VAL turbine power source)

### Electrical Specifications

4-20 mA Mode:

- Voltage: 8-32 VDC (e-Power IP)
  - Consumption: 4-20 mA
- Mode voltage pulse or digital pulse:
- 5 VDC (e-Power MP with super capacitor)
  - 6 - 24 VDC (e-Power MP with lead acid battery)
  - 6 - 24 VDC (e-Power IP)

**Power protection:**

4-20 mA Mode:

- Over Voltage: max. 40 VDC
- Inversion: max. 40 VDC

Pulse or Digital Pulse Mode:

- a) Voltage 5 VDC:
- Over Voltage: max. 5.5 VDC
  - Inversion: unprotected
- b) Voltage: 6 - 24 VDC:
- Over Voltage: max. 40 VDC
  - Inversion: max. 40 VDC



**Valve model and size:**

NGE 65 mm - 600 mm / GE 65 mm - 400 mm (Note: NGE 65 mm and NGE 80 mm factory tapped 1/2")

**Pressure range:**

- PN 25 bar standard

**Temperature range:**

- - 10°C to + 80°C (electronics only)

**Protection:**

- IP68 (toggle fitting and electronic housing)

**Software interface:**

- Plug & Play / NT / 2000 / XP / Vista / Win 7 (32 & 64 bit)



**Loss of signal:**

### Default Modes

- After 10 seconds (default), the 4-20 mA signal is 4 mA (default) or pulse mode frequency = 0



# CLA-VAL e-FlowMeter

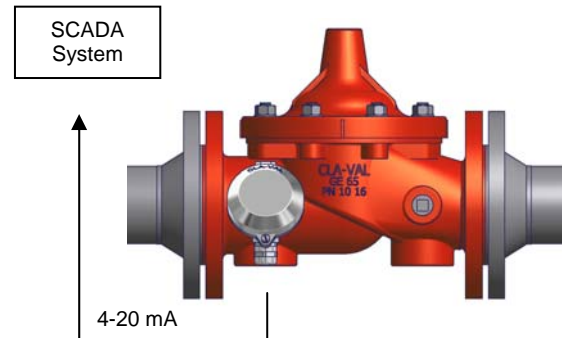
Vortex Flow Meter  
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## ► Typical Applications

### e-FlowMeter linked to SCADA systems

The e-FlowMeter measures a flow and transmits the corresponding 4-20 mA flow signal information to a SCADA system.

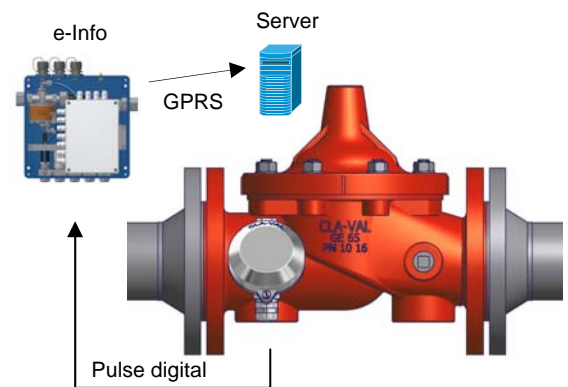
The e-FlowMeters very low consumption is directly powered through the 4-20 mA loop.



### e-FlowMeter linked to CLA-VAL e-Info

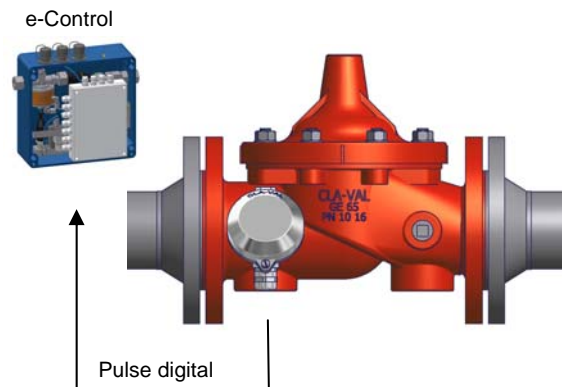
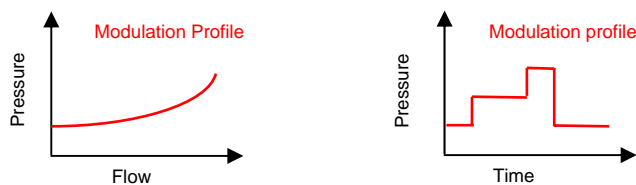
When connecting the e-FlowMeter to CLA-VAL's e-Info, flow information is transmitted by means of a digital pulse. In addition, upstream and downstream pressure logging can also be added. This information is transmitted by GSM-GPRS to a central server for daily monitoring of flow data and pressure data.

The CLA-VAL e-Info is a simplified version of the CLA-VAL e-Control (refer to the specific data for the product) but without the modulation function. The CLA-VAL e-Control and the CLA-VAL e-Info are powered by the CLA-VAL e-Power MP turbine.



### e-FlowMeter for Advanced Pressure Modulation

The e-FlowMeter linked to a CLA-VAL e-Control allows the user to plot any kind of pressure modulation profiles as a function of Flow, Time, or a combination of both. The e-FlowMeter is directly powered by the CLA-VAL e-Power MP turbine with no requirements for external power.

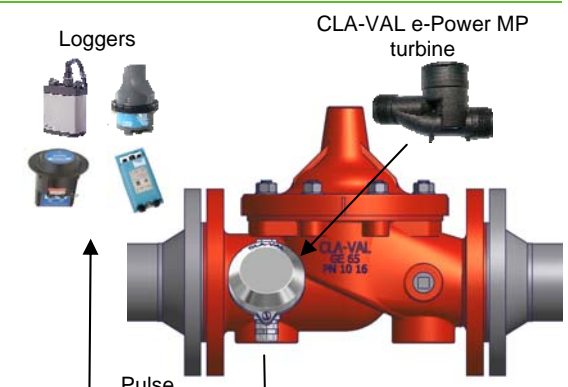


### e-FlowMeter linked to existing loggers

The e-FlowMeter can be connected to a variety of dataloggers reading a 4-20 mA or pulse output.

In pulse output mode, e-FlowMeter can be powered by the CLA-VAL e-Power MP turbine or any other energy supply 5 VDC or 6 VDC - 24 VDC (2 mA consumption).

In 4-20 mA output mode, e-FlowMeter can be powered by means of a CLA-VAL e-Power MP turbine or any other energy supply 8 VDC - 32 VDC (4-20 mA consumption).



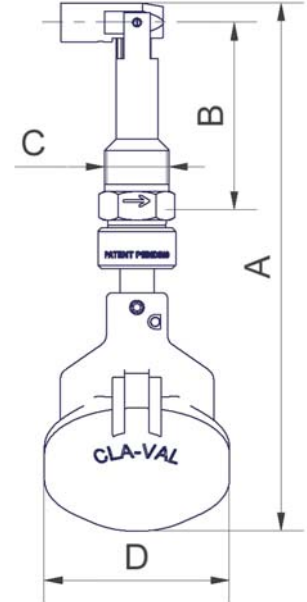


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## ► Dimensions

e-FlowMeter sizes		1	2a	2b	3	4
NGE Valves sizes (mm)		65*	-	125	250	400
		80*	-	150	300	500
		100	-	200	350	600
GE Valves sizes (mm)		65	100	-	200	300
		80	150	-	250	400
Overall length (mm)	A	225	240	275	335	455
Insertion length (mm)	B	58	70	108	165	287
Pipe thread R (ISO 7-1)	C	1/2"	3/4"	3/4"	1"	1"
Overall width (mm)	D	85	85	85	85	85

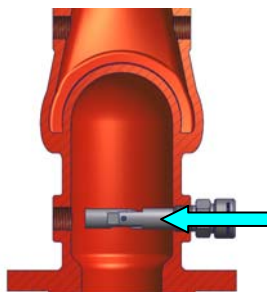


\*NGE 65 mm and NGE 80 mm to be factory tapped 1/2" instead of standard 3/8" tapping

## ► Flow Ranges

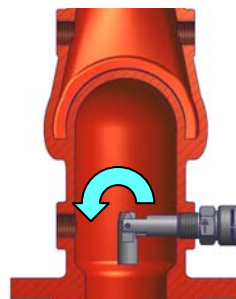
Valves sizes (mm)	65	80	100	125	150	200	250	300	350	400	500	600
Minimum flow @ 0.2 m/s (l/s)	0.7	1.0	1.6	2.5	3.5	6.3	10	14	19	25	39	57
Maximum flow @ 5 m/s (l/s)	17	25	39	61	88	157	245	353	481	628	982	1414

## ► Simple 3 Steps Retrofit Field Assembly



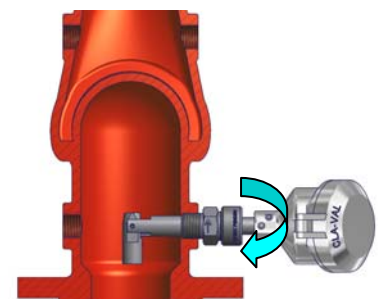
### Insert

The e-FlowMeter is inserted into the inlet tapping of a CLA-VAL valve. The insertion tool holds the measurement cylinder in a straight position when screwing thus avoiding any damage.



### Orient

When properly inserted the CLA-VAL insertion tool allows a 90 degree rotation of the measurement cylinder which must be oriented parallel to the direction of flow.



### Lock

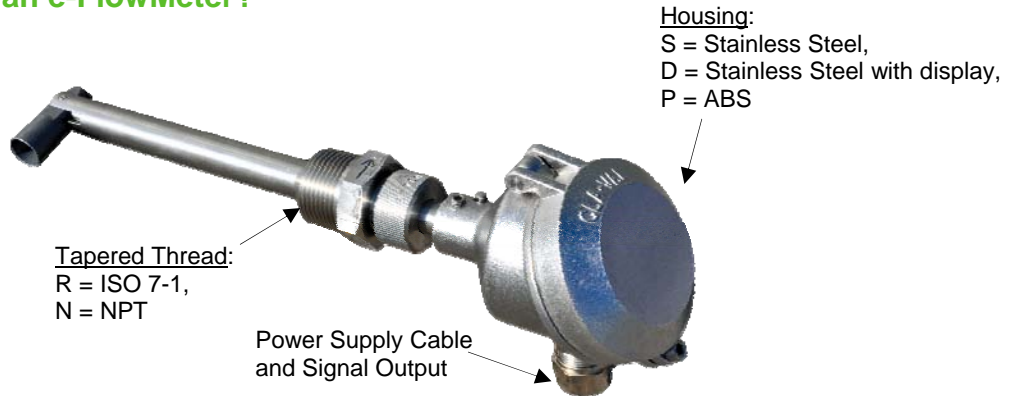
After insertion and orientation final operation consists of locking the e-FlowMeter by means of screwing the electronic housing. The e-FlowMeter is now operational and ready to measure.



# CLA-VAL e-FlowMeter

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## ► How to Order an e-FlowMeter?



58	Main family product number		Number	
	<b>786-1-G065</b> <b>786-1-G080</b> <b>786-1-N065</b> <b>786-1-N080</b> <b>786-1-N100</b> <b>970-2A-G100</b> <b>970-2A-G150</b> <b>875-2B-N125</b> <b>875-2B-N150</b> <b>875-2B-N200</b> <b>884-3-G200</b> <b>884-3-G250</b> <b>884-3-N250</b> <b>884-3-N300</b> <b>930-4-G300</b> <b>930-4-G400</b> <b>930-4-N400</b> <b>930-4-N500</b> <b>930-4-N600</b>	GE 65 mm GE 80 mm NGE 65 mm (main valve with Rp 1/2" tapping) NGE 80 mm (main valve with Rp 1/2" tapping) NGE 100 mm GE 100 mm GE 150 mm NGE 125 mm NGE 150 mm NGE 200 mm GE 200 mm GE 250 mm NGE 250 mm NGE 300 mm GE 300 mm GE 400 mm NGE 400 mm NGE 500 mm NGE 600 mm	Valves Model and DN	
	<b>S</b> <b>D</b> <b>P</b>	Stainless Steel Stainless Steel, with display ABS	Housing	
	<b>R</b> <b>N</b>	R (ISO 7-1) NPT	Tapered Thread	
	<b>03</b> <b>05</b> <b>10</b>	3 m (12 x 0,25 mm <sup>2</sup> ) 3 m (12 x 0,25 mm <sup>2</sup> ) with a junction box (splitter not included) 10 m (12 x 0,25 mm <sup>2</sup> )	Power Supply and Signal Cable	
<b>58</b>	<b>786-1-N100</b>	<b>S R 10</b>	<b>CLA-VAL 58786-1-N100SR10</b>	Example No.
<b>Example customer choice:</b> e-FlowMeter for NGE 100 mm with Stainless Steel Housing, R Tapered Thread, 10 meters Power Supply and Signal Cable <b>58786-1-N100SR10</b>				









# CLA-VAL e-FlowMeter

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## ► How to Order an e-FlowMeter?

No. CLA-VAL	CLA-VAL Model		
MEXUSB20401A MEXUSB40401A	2 meters cable 4 meters cable	e-Cable (connecting PC to e-FlowMeter)	
*CKEFM-STD-01	For valve sizes: NGE 65 mm - NGE 200 mm and GE 65 mm - GE 150 mm		Insertion Tool
*CKEFM-STD-02	For valve sizes: NGE 250 mm - NGE 600 mm and GE 200 mm - GE 400 mm		
*CKEFM-STD-03	For valve sizes: NGE 65 mm - NGE 600 mm and GE 65 mm - GE 400 mm		
58929	For all insertion tools		Locking Ring with Thumb Screw
*CKEFM-STD-04	For all e-FlowMeters		Measurement Cylinder (with Bluff Body and 2x M2 Screws)
MEX113740.1 MEX113740.2A MEX113740.2B MEX113740.3 MEX113740.4	e-FlowMeter size 1, NGE 65 mm / 80 mm /100 mm & GE 65 mm / 80 mm e-FlowMeter size 2A, GE 100 mm / 150 mm e-FlowMeter size 2B, NGE 125 mm / 150 mm / 200 mm e-FlowMeter size 3, NGE 250 mm / 300 mm & GE 200 mm / 250 mm e-FlowMeter size 4, NGE 400 mm / 500 mm / 600 mm & GE 300 mm / 400 mm		Sensor (supplied with wire and connector)
MEX113740.1 *CKEFM-STD-01	CLA-VAL MEX113740.1 & *CKEFM-STD-01	Example No.	
<b>Example customer choice:</b> Customer ordered 1x e-FlowMeter for NGE 100 mm (refer to previous page) and on this page customer selected an Insertion Tool Assembly *CKEFM-STD-01 as well as a Sensor MEX113740.1			