

Flow meters



Flow meters - Continuous and precise measurement of flow rates

In order to guarantee smooth operation and consistent quality, many processes require constant in and outflow of liquid or gaseous media. Flow sensors measure the speed and flow meters continuously measure the volume per time unit relative to the defined pipe cross-section.

Flow measurement requires high repeatability and accuracy. TURCK sensors apply different methods for electronic measurement of flow rates, such as the calorimetric, the magnetic-inductive as well as the vortex principle.

TURCK flow meters indicate the flow rate via display and via an analog current output. The output signal can either be analog or binary, depending on whether continuous flow or a limit value is to be monitored. The programmable devices are characterized by a long service life and are thus almost maintenance-free.

The FTCL flow meters operate according to the thermodynamic principle. They are favourably priced and work reliably. Due to the different thermal conductivity of media, the devices are preferably ap-

plied in water or water-glycol mixtures. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in cooling circuits.

FCMI flow meters operate according to the magnetic-inductive principle. They measure the flow rate of many low-conductive liquids. Blistering and non-abrasive solids have only little influence on the measurement. The operating range between 0.2 and 80 l/min is ideal for all applications with small to medium flow rates.

FCVI vortex flow meters are insensitive to pressure and temperature changes and are thus suited for applications with high demands on measuring accuracy. Flow rates between 2 and 20 l/min are detected with an accuracy of 2 % f.s. The extremely responsive and temperature-stable flow meter is preferably applied in water return and coolant circuits.

Our strenghts – Your advantages



Measuring and monitoring of flow rates

Flow monitoring of media plays an important role in many applications of factory and process automation. The monitoring of coolant circuits, run-dry protection of pumps or the flow control of exhaust air ducts and air conditioning

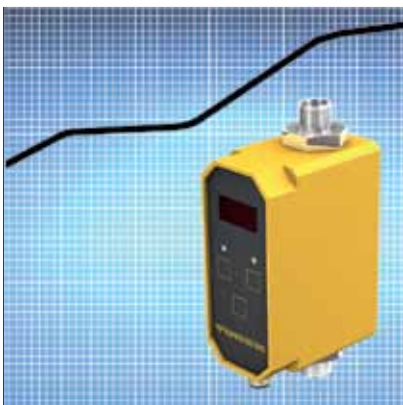
systems are some examples. In order to detect critical changes in flow and to indicate them to a control unit, electronic flow sensors are increasingly applied.



High repeatability

Unvarying processes and smooth operation require a constant inflow of media. Flow rate monitoring in such processes requires high repeatability. TURCK flow meters indicate the flow rate via display

and analog current output. The output signal can either be analog or binary, depending on whether continuous flow or a limit value is to be monitored.

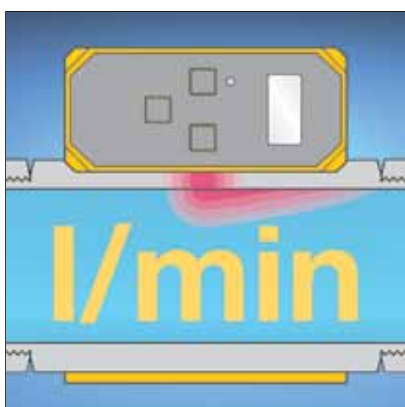


High-precision measurement – Compact design

Inline flow meters made by TURCK are highly precise operating systems incorporated in a compact housing. They are easily integrated in existing line configurations and are space saving alternatives for new constructions. Not only coolant circuits and temperature cycles are pre-

cisely monitored but also dosage intervals, like in water purification systems. Limit value monitoring as well as an analog linearized swichting output are available for these tasks.

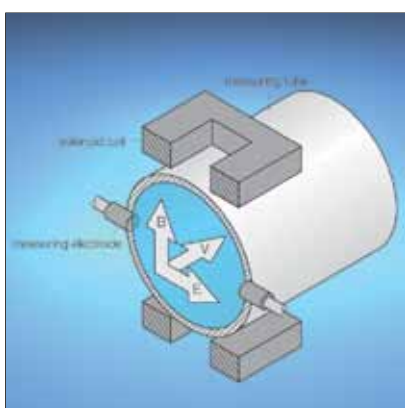
Our advantages



Calorimetric flow meter

The FTCL flow meter working on the calorimetric principle measures and monitors either the media temperature or the flow rate. The FTCL is therefore suited for many different applications. Flow rates between 1 and 40 l/min are detected with a repeatability of 10 % f.s. Short re-

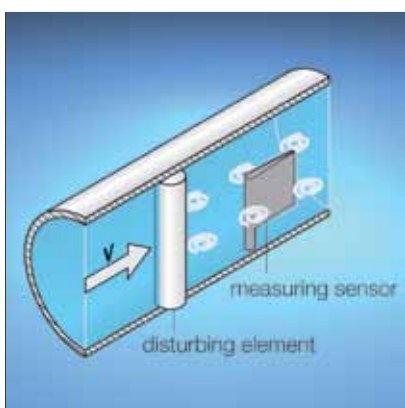
sponse times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in coolant circuits.



Magnetic-inductive flow meter

The magnetic-inductive flow meter FCMI measures flow rates of low-conductive liquids. The FCMI is therefore suited for many different applications. Outstanding features of the magnetic-inductive flow

meter are a high measuring range dynamics and a measuring accuracy of 2% f.s. The operating range between 0.2 and 80 l/min is ideal for all applications with small to medium flow rates.

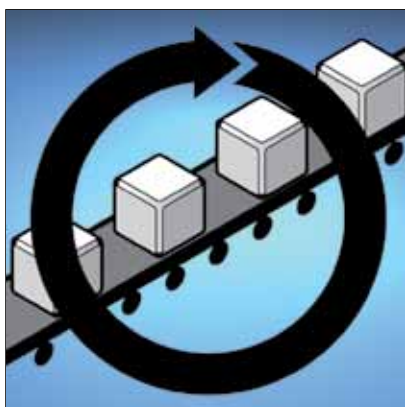


Vortex flow meters

The FCVI vortex flow meter works on the principle of the Karman vortex street. It is thus especially suited for high-precision measurement of water flow rates. Flow rates between 2 and 20 l/min are detected with a measuring accuracy of 2% f.s.

Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for flow rate monitoring in return and cooling circuits.

Our strenghts – Your advantages



High system availability

The inline flow meters proof their outstanding reliability especially in rough environments of factory and process automation, This is guaranteed through excellent EMC properties and a protection rating of IP67. An application-optimized housing, durable mounting aids

and a well legible display are the main features considered in the design. Flow meters thus withstand the special ambient conditions of many applications without any problems. Use these benefits to optimize your production processes.



Maximum planning freedom

Many solutions are implementable with only a few device types, numerous connection possibilities, simple mounting and flexible mounting aids. From polling of single switchpoints, over analog output signals, to a well legible display, even

from a greater distance. Profit from the extensive standard product range of TURCK flow meters providing more flexibility to your application.



User-friendly operation

The inline flow meters have two front panel buttons to make adjustments. For comfortable menu navigation and flow rate reading [l/min], the devices also feature a 3-digit 7-segment display. The programming functions are code protected. Without the access code, only the

stored values of the switchpoints and parameters are displayed. All these features in combination with a simply structured menu help to reduce commissioning times and to improve process safety.

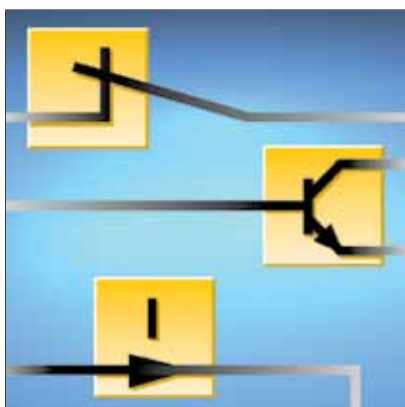
Our advantages



Easy mounting

The inline flow meters are built in pipelines. The pipe may be connected directly via cutting ring fitting or adapter. The flow meters can be mounted on a base-plate via a threaded bushing located at

the bottom of the housing. For frontal mounting of the sensor, screw the base-plate first on the housing.



Many different output signals

If output signals need to be further processed via control or PLC, the flow sensors provide a standard switching and also an analog 4...20 mA output. Initial and end value are adjusted in the programming mode. Upon error in the measurement system, 2 mA are provided

at the output. If the flow direction is opposed to the mounting direction, the flow rate is displayed as a negative value and the output current remains stable at 4 mA. The measuring range shown in the display is limited to -9.9 l/min in this mounting position.



High servicability

Thanks to the many application possibilities, user-friendly operation and adjustment, the well legible 3-digit 7-segment

display and last but not least the excellent repeatability, inline flow meters offer calculable advantages.

Type code

FCMI - **10D08** **DYA4P** - **LIU** **P** **8** **X** - **H1** **1** **4** **1**

FCMI Functional principle - **10D08** **DYA4P** Design - **LIU** **P** **8** **X** Electrical version -

Flow meters

- FTCI** calorimetric, inline with temperature monitoring
- FCMI** magnetic-inductive, inline
- FCVI** Vortex, inline

Materials

- A4** stainless steel A4 (1.4404 or 1.4571)
- DY** PVDF (Dyflor)
- P** plastic housing

Mechanical connection

- 10D08** compression fittings for smooth barrel, outer Ø 10 mm
- 10D10** compression fittings for smooth barrel, outer Ø 10 mm
- 10R09** compression fittings for smooth barrel, outer Ø 10 mm
- 15D15** compression fittings for smooth barrel, outer Ø 15 mm
- 18D15** compression fittings for smooth barrel, outer Ø 18 mm

Indications

- ...X** number of LEDs or multicolor LED

Voltage range

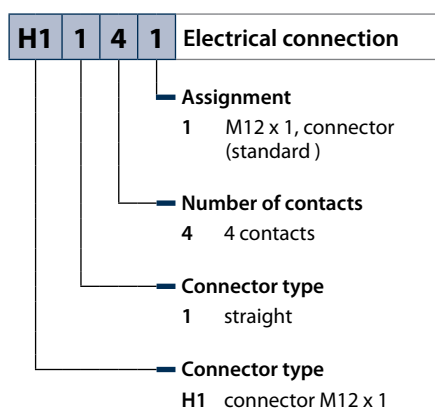
- 8** 19.2...28.8 VDC

Output range

- P** PNP

Output function

- LI** analog output (I)
- LIU** NO/NC programmable, analog + current + PNP
- 2U** NO/NC programmable, 2 x PNP



Designs and variants

	Medium	Operating ranges	Mechanical connection	Medium temperature	Material in contact with medium	Pressure resistance	Housing material	Page
10 mm cutting ring fitting 	Liquids	Flow Rate: 1...10 l/min	compression ferrule fittings for pipes Ø 10 x 1 (EN 10305-1)	-10...90 °C	V4A (1.4571)	20 bar	PBT	379
15 mm cutting ring fitting 	Liquids	Flow Rate: 2...20 l/min Flow Rate: 2...25 l/min Flow Rate: 1...10 l/min	compression ferrule fittings for pipes Ø 15 x 1.5 (EN 10305-1) NPT 1/2" compression ferrule fittings for pipes Ø 10 x 1 (EN 10305-1)	-10...90 °C	V4A (1.4571)	20 bar	PBT	379
18 mm cutting ring fitting 	Liquids	Flow Rate: 4...40 l/min Flow Rate: 10...100 l/min	compression ferrule fittings for pipes Ø 18 x 1.5 (EN 10305-1) NPT 3/4"	-10...90 °C	V4A (1.4571)	20 bar	PBT	380
10 mm cutting ring fitting 	Liquids	Flow Rate: 0...40 l/min	compression ferrule fittings for pipes Ø 10 x 1 (EN 10305-1)	5...60 °C	V4A (1.4571)/PVDF	10 bar	PBT	383
15 mm cutting ring fitting 	Liquids	Flow Rate: 0...80 l/min	compression ferrule fittings for pipes Ø 15 x 1.5 (EN 10305-1)	5...60 °C	V4A (1.4571)/PVDF	10 bar	PBT	383
G 3/4" – Male 	Liquids	Flow Rate: 0...75 l/min	3/4" swagelok	5...60 °C	V4A (1.4571)/PVDF	10 bar	PBT	384
10 mm cutting ring fitting 	Liquids	Flow Rate: 2...20 l/min	compression ferrule fittings for pipes Ø 10 x 1 (EN 10305-1)	5...60 °C	V4A (1.4571)/PVDF	10 bar	PBT	391

ts and variants

Flow meters for water and water-glycol mixtures



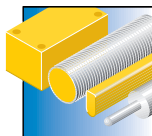
The FTCIs are particularly suited for flow rate monitoring in coolant circuits. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make these sensors particularly suited for automotive welding lines. A 3-digit 7-segment display indicates the flow rate and the cooling capacity continuously.

To prevent icing, industrial air conditioning systems use water-glycol mixtures in secondary circuits. In order to provide a reliable indication of flow rate values, the glycol amount is adjusted at the flow meter. The devices are programmable via three pushbuttons at the front. Either the measured value or the sensor parameters are displayed, depending on the adjustments made.

Features

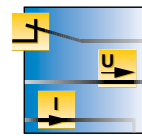
- Measurement of small to medium water flow rates and water-glycol mixtures
- Ideal for small pipe diameters of up to DN20
- Temperature monitoring
- Switchpoint freely adjustable within the operating range
- No disturbing built-ins, free pipe profile, no pressure loss
- Fast response times within seconds
- Adjustable to flow rates between 1 ... 40 l/min
- Repeatability < 10 % f.s.
- Two transistor outputs or one transistor and one analog current output

Properties



Designs

Rugged plastic housing with display, ideal for small pipe diameters of up to DN20



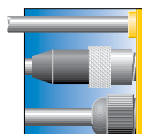
Electrical versions

Two PNP transistor outputs or one PNP transistor and one linear analog current output 4...20 mA



Measuring ranges

Adjustable to flow rates between 1 ... 40 l/min, repeatability < 10 % f.s.



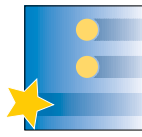
Electrical connections

Connected via male M12 x 1, A-coded



Materials

PBT housing, sensor made of stainless steel 1.4571 and FKM O-ring



Special features

Programmable switchpoint, output, hysteresis, switch ON/OFF delay, glycol amount, flow rate correction, averaging and access code



Internet link

Scan the QR code to access our products on the internet

10 mm cutting ring fitting



General data			
Medium	liquids	Protection class	IP65
Connection	male, M12 x 1	Sensor quality	AISI 316Ti
Operating ranges	Flow Rate: 1...10 l/min	Mechanical connection	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)
Pressure resistance	20 bar	Medium temperature	-10...90 °C
Operating voltage	21...26 VDC	Housing material	PBT
Function	Inline sensor with integrated processor		

Types and data – selection table

Type	Output	w	d
FTCI-10D10A4P-LIUP8X-H1141	programmable, PNP/analog output, 4...20 mA	w155	d619
FTCI-10D10A4P-2UP8X-H1141	programmable, 2 x PNP	w156	d620

15 mm cutting ring fitting



General data			
Medium	liquids	Connection	male, M12 x 1
Sensor quality	AISI 316Ti	Pressure resistance	20 bar
Medium temperature	-10...90 °C	Operating voltage	21...26 VDC
Housing material	PBT	Function	Inline sensor with integrated processor

Types and data – selection table

Type	Protection class	Operating ranges	Mechanical connection	Output	w	d
FTCI-15D15A4P-LIUP8X-H1141	IP65	Flow Rate: 2...20 l/min	compression ferrule fittings for pipes Ø 15 x 1.5 (EN10305-1)	programmable, PNP/analog output, 4...20 mA	w155	d621
FTCI-15D15A4P-2UP8X-H1141	IP65	Flow Rate: 2...20 l/min	compression ferrule fittings for pipes Ø 15 x 1.5 (EN10305-1)	programmable, 2 x PNP	w156	d622
FTCI-N1/2D15A4P-2LIX-H1140/D224	IP67	Flow Rate: 2...25 l/min	NPT ½"	4...20 mA, Analog output, 4...20 mA	w157	d623
FTCI-10D10A4P-2LIX-H1141	IP65	Flow Rate: 1...10 l/min	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)	Analog output, 4...20 mA	w158	d619

18 mm cutting ring fitting



General data

Medium	liquids	Connection	male, M12 x 1
Sensor quality	AISI 316Ti	Pressure resistance	20 bar
Medium temperature	-10...90 °C	Operating voltage	21...26 VDC
Housing material	PBT	Function	Inline sensor with integrated processor

Types and data – selection table

Type	Protection class	Operating ranges	Mechanical connection	Output	w	d
FTCI-18D15A4P-LIUP8X-H1141	IP65	Flow Rate: 4...40 l/min	compression ferrule fittings for pipes Ø 18 x 1.5 (EN10305-1)	programmable, PNP/analog output, 4...20 mA	w155	d624
FTCI-18D15A4P-2UP8X-H1141	IP65	Flow Rate: 4...40 l/min	compression ferrule fittings for pipes Ø 18 x 1.5 (EN10305-1)	programmable, 2 x PNP	w156	d625
FTCI-N3/4D19A4P-2LIX-H1140/D224	IP67	Flow Rate: 10...100 l/min	NPT 3/4"	4...20 mA, Analog output, 4...20 mA	w157	d623

Compact devices for electrically conductive media

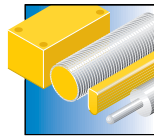


The magnetic-inductive flow meter FCMI is designed for continuous measurement of many conductive liquids. The operating range covers small to medium flow rates. Operating on the magnetic-inductive principle, they are applied in many different areas to measure quantities and dosages of many different media. The strengths of the magnetic-inductive flow meters include a high measuring range dynamics and excellent repeatability. A 3-digit 7-segment display indicates the flow rate continuously. The devices are programmable via three pushbuttons at the front. Either the measured value or the sensor parameters are displayed, depending on the adjustments made.

Features

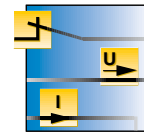
- Measurement of small to medium flow rates of conductive liquids > 20 µS/cm
- Ideal for small pipe diameters of up to DN15
- Switchpoint freely adjustable within the operating range
- No disturbing built-ins, free pipe profile, no pressure loss
- Fast response times within seconds
- Adjustable to flow rates between 1 ... 80 l/min
- Repeatability < 20 % f.s.
- Transistor and analog current output

Properties



Designs

Rugged plastic housing with display, ideal for small pipe diameters of up to DN15



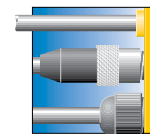
Electrical versions

Configurable PNP transistor output, linear analog current output 4...20 mA



Measuring ranges

Adjustable to flow rates between 1 ... 80 l/min, repeatability < 2 % f.s.



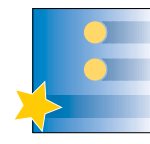
Electrical connections

Connected via male M12 x 1, A-coded



Materials

PBT housing, sensor material PVDF and stainless steel 1.4571



Special features

Programmable switchpoint, output, hysteresis, switch ON/OFF delay, averaging and access code




Internet link

Scan the QR code to access our products on the internet

10 mm cutting ring fitting




General data			
Medium	liquids	Protection class	IP65
Connection	male, M12 x 1	Sensor quality	V4A (1.4571)/PVDF
Operating ranges	Flow Rate: 0...40 l/min	Mechanical connection	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)
Pressure resistance	10 bar	Medium temperature	5...60 °C
Operating voltage	21...26 VDC	Output	 programmable, PNP/ analog output, 4...20 mA
Housing material	PBT	Function	Inline sensor with integrated processor

Types and data – selection table

Type	 
FCMI-10D08DYA4P-LIUP8X-H1141	w155 d619

15 mm cutting ring fitting



General data			
Medium	liquids	Protection class	IP65
Connection	male, M12 x 1	Sensor quality	V4A (1.4571)/PVDF
Operating ranges	Flow Rate: 0...80 l/min	Mechanical connection	compression ferrule fittings for pipes Ø 15 x 1.5 (EN10305-1)
Pressure resistance	10 bar	Medium temperature	5...60 °C
Operating voltage	21...26 VDC	Output	 programmable, PNP/ analog output, 4...20 mA
Housing material	PBT	Function	Inline sensor with integrated processor

Types and data – selection table

Type	 
FCMI-15D12DYA4P-LIUP8X-H1141	w155 d621

G 3/4" – Male



General data		Protection class	IP65
Medium	liquids	Sensor quality	V4A (1.4571)/PVDF
Connection	male, M12 x 1	Mechanical connection	3/4" swagelok
Operating ranges	Flow Rate: 0...75 l/min	Medium temperature	5...60 °C
Pressure resistance	10 bar	Output	— / — programmable, PNP/ analog output, 4...20 mA
Operating voltage	21...26 VDC	Function	Inline sensor with in- tegrated processor
Housing material	PBT		

Types and data – selection table

Type	w	d
FCMI-3/4D12DYA4P-LIUP8X-H1141	w155	d626

Flow meters for water applications

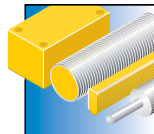


The Vortex flow meter FCVI is especially suited for applications with high demands on linearity and repeatability. The devices detect flow rates between 2 and 20 l/min with a repeatability of 2 % f.s. Short response times within seconds and stable values displayed even under the influence of strong temperature fluctuations, make the FCVI particularly suited for flow rate monitoring of process water and cooling water circuits. A 3-digit 7-segment display indicates the flow rate continuously. The devices are programmable via three pushbuttons at the front. Either the measured value or the sensor parameters are displayed, depending on the adjustments made.

Features

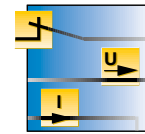
- Measurement of small to medium water flow rates
- Ideal for small pipe diameters of up to DN10
- Switchpoint freely adjustable within the operating range
- Fast response times within seconds
- Adjustable to flow rates between 2 ... 20 l/min
- Repeatability < 4 % f.s.
- Transistor and analog current output

Properties



Designs

Robust plastic housing with display, ideal for small pipe diameters of up to DN10



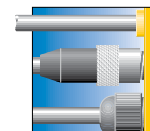
Electrical versions

Configurable PNP transistor output, linear analog current output 4...20 mA



Measuring ranges

Adjustable to flow rates between 2 ... 20 l/min, repeatability < 2 % f.s.



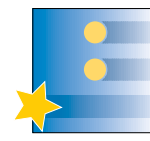
Electrical connections

Connected via male M12 x 1, A-coded



Materials

PBT housing, sensor made of PVDF and stainless steel 1.4571



Special features

Programmable switchpoint, output, hysteresis, switch ON/OFF delay, averaging and access code



Internet link

Scan the QR code to access our products on the internet

10 mm cutting ring fitting



General data		Protection class	IP65
Medium	liquids	Sensor quality	V4A (1.4571)/PVDF
Connection	male, M12 x 1	Mechanical connection	compression ferrule fittings for pipes Ø 10 x 1 (EN10305-1)
Operating ranges	Flow Rate: 2...20 l/min	Medium temperature	5...60 °C
Pressure resistance	10 bar	Output	—/— programmable, PNP/ analog output, 4...20 mA
Operating voltage	21...26 VDC	Function	Inline sensor with in- tegrated processor
Housing material	PBT		

Types and data – selection table

Type	w	d
FCVI-10R09DYA4P-LIUP8X-H1141	w155	d619