

PRODUCT CATALOG

F-SERIES

Indicators
Totalizers
Transmitters
Flow Computers
Batch Controllers
Monitors
Displays

Flow
Level
Pressure
Temperature

FOR



INTRODUCTION TO THE F-SERIES

The F-Series range offers you an extensive selection of indicators, controllers and monitoring systems for liquid and gas flow applications as well as for level, pressure and temperature measurement.



Industrial applications

The F-Series range has been developed for typical industrial environments. It is sturdy and weather-proof through its aluminum or GRP IP67 / NEMA 4X field enclosure. The enclosure can be mounted directly onto sensors, walls or pipes, but is also suitable for panel mount applications, with one major advantage: it requires minimal depth clearance. The operational temperature specification of the product range is from -40°C to $+80^{\circ}\text{C}$ (-40°F to $+178^{\circ}\text{F}$).

Operational

Fluidwell is acutely aware of the excessive amount of equipment which today's technicians need to control. For this reason, a clear user-friendly menu structure was developed for programming all Fluidwell products a number of years ago: all models are programmed in the same logical manner. The configuration of the unit is completely menu-driven with understandable texts avoiding confusing abbreviations. There are no sensitive DIP-switches or trimmers, you simply select "Flowmeter" as main function, after which you can select "Coil-input" or "Span". The Operator's main information is displayed in clear 17mm (0.7") or 26mm (1") and 8mm (0.3") alphanumeric characters. An adjustable bi-color backlight is available that will switch from green to red in case an alarm is triggered.



Input features

- For flow measurement, the instrument accepts signals from most flowmeters, ranging from PD-meters with reed-switches or hall-effect sensors to turbine sine wave (coil) pick-ups and other NPN/PNP pulse outputs. NAMUR standard sensors and (0)4 - 20mA or 0 - 10V DC analog devices are also catered for.
- For level and pressure measurement, inputs are available for (0)4 - 20mA or 0 - 10V DC signals.
- For temperature measurement, the instrument accepts (0)4 - 20mA or 0 - 10V DC signals, also 2, 3 or 4 wire PT100 elements and thermocouple.

Linearization of the input signal, square root calculation and data filter functions are all available.



Output features

Related to the functionality of the selected product, the following output features are available:

- Analog output proportional to the flow rate, level, differential, ratio, temperature, pressure position or control value. This turns the unit into a powerful transmitter with a local display. The output can also be used to control actuators, valves or pumps.
- Transistor or relay outputs for high and low alarms, pulse output as well as the control of valves / relays in batch control applications.
- The RS232, RS485 or TTL interface makes it possible to communicate remotely, even with the battery-powered unit. All software parameters can be monitored / modified in addition to the usual transfer of data using the Modbus protocol.


Power Management

During the development of the F-Series products, ultra-low power consumption was a key-requirement. Thanks to recent advancements in CMOS technology, Fluidwell has extended the battery life significantly and introduced several smart power-management functions.


Result: a battery lifetime of seven years can be achieved. Additionally, several alternative means of powering the F-Series are available: loop-powered, 24V AC/DC and 115 - 230V AC.

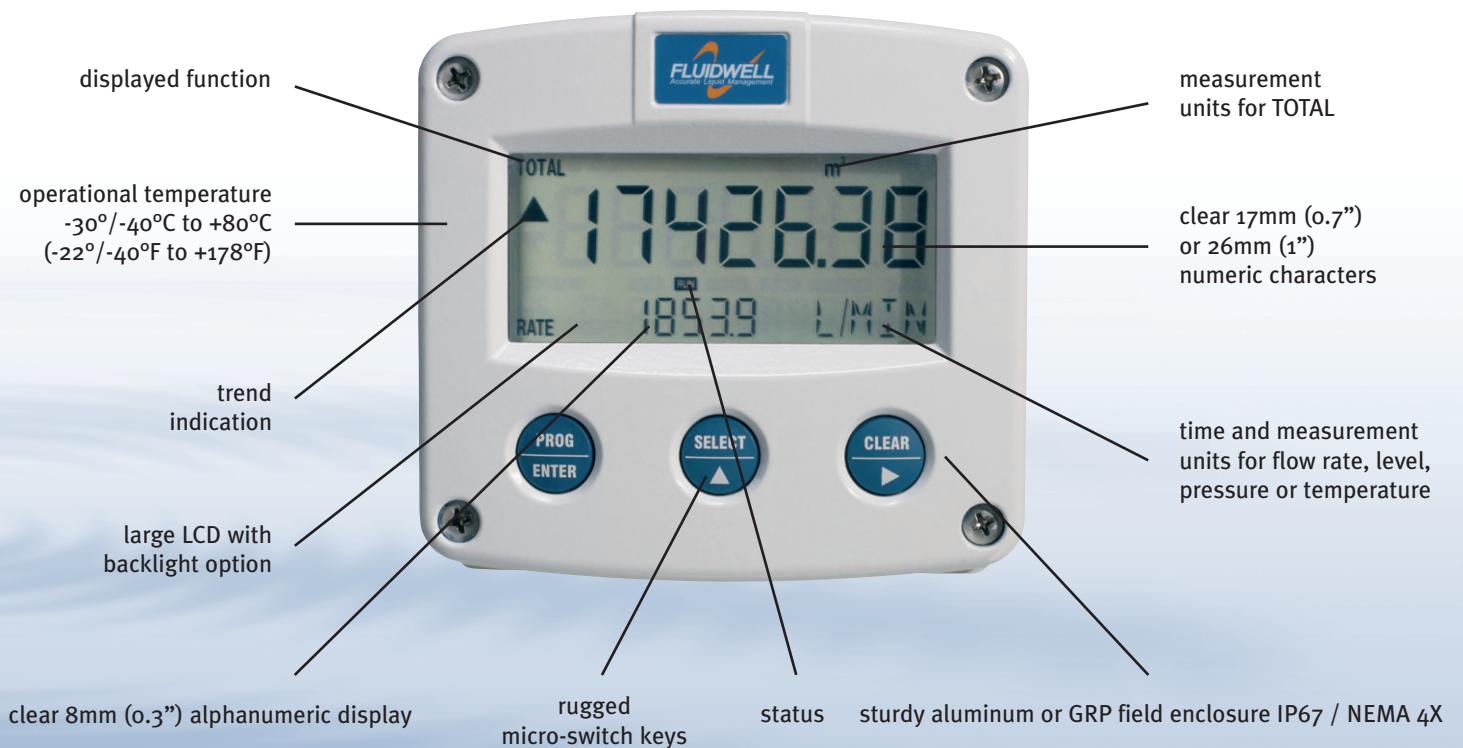
Since all settings are stored in EEPROM memory, you won't lose information when replacing the battery or in the event of sudden power loss. A backup of the running totals is made every minute.

Hazardous area installation

Both Fo- and F1-Series products can be supplied certified Intrinsically Safe to ATEX  II 1 GD EEx ia IIB/IIC T4. For the basic Fo-Series products, certification to IECEx, FM, CSA and non-incendive is expected in the fourth quarter of 2006 with following specifications:

- Intrinsically Safe Class I, II, or III, Division 1, Groups A through G, Ex ia Class I, Zone 0 and 1, Group IIC.
- Non-Incendive Class I, II, or III, Division 2, Groups A through G, Ex nA Class I, Zone 2, Group II.

An explosion-proof enclosure is also available which has been certified in accordance to ATEX  II 2 GD EEx d IIB T5.



FLOW COMPUTERS



Introduction

This product group offers a unique range of comprehensive solutions to calculate the consumption and net flow at standard conditions or the ratio between two flows. Typical applications are found on board of ships to calculate the fuel consumption, gas flow calculation in power plants and the monitoring of two component blending or the energy consumption calculation in cooling or heating applications.

All models are available for both safe area and hazardous area applications.

The functionality of these products is based on the F1 hardware platform as multiple inputs are required for flow, temperature and pressure measurement.

Following functions are offered:

- Ratio (A/B) - model F114.
- Sum (A+B) - model F116.
- Differential / consumption (A-B) - model F116.
- Differential / consumption (A-B) with temperature compensation - model F127.
- Liquid volume calculation with temperature compensation - model F126-EL.
- Gas volume calculation with temperature and pressure compensation - model F126-EG.
- Energy computer with energy consumption calculation - model F128.

A more detailed description of each flow computer and its typical features can be found on the following pages.



Configuration menu

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumeric description, therefore avoiding confusing abbreviations and baffling codes. There are no sensitive DIP-switches or trimmers, you simply select “flowmeter” as main function, after which you can select “NPN pulse” or “span” etc. Once familiar with one F-Series product, you will be able to program all models in the series without a manual. All settings are safely stored in EEPROM memory.

The clear and easy structured configuration menu is one of the most appreciated features of the F-Series.



Signal input type

For the flow computers, four basic signal input types are available:

- Pulse signals for flow measurement: sine wave (coil) low sensitivity (80mV p-p), sine wave high sensitivity (20mV p-p), Namur, NPN, PNP, reed-switch or active pulses. For most signals a low pass filter can be enabled to ignore pulse bounce. The sine wave input can even be supplied with 10mV or 5mV p-p sensitivity (option ZF and ZG).
- Analog signal: (0)4 - 20mA for flow, temperature and pressure measurement. The input signal can be tuned within this range (e.g. from 4.0mA to 18.0mA). To avoid incorrect signal processing at minimum signal, a low cut-off filter is available.
- Analog signal: 0 - 10V DC for flow, temperature and pressure measurement. The input signal can be tuned within this range (e.g. from 2.0 to 5.0V DC). A low cut-off filter is available here too, to avoid counting at minimum signal.
- PT100: 2 or 3 wire PRTD sensor for temperature measurement.

Product listing

- F114 Ratio Monitor / Totalizer with high / low alarms, analog output and communication option.
- F116 Differential / Sum Flow Computer with analog and pulse outputs and communication option.
- F126-EL Flow Computer with temperature compensation for corrected liquid volume calculation, analog output and communication option.
- F126-EG Flow Computer with temperature and pressure compensation for corrected gas volume calculation, analog output and communication option.
- F127-EL Differential Flow Computer with temperature compensation for corrected liquid volume calculation, analog output and communication option.
- F128 Energy Computer for closed hot water heating and chilled water cooling systems with analog and pulse outputs, high / low alarms and communication option.

Data protection

All settings and totals are stored in EEPROM memory ensuring that no information is lost in the event of power failure or battery exchange.

To reset total, the CLEAR key must be pressed twice to avoid undesired initialization. Accumulated total cannot be reset to zero. The configuration menu and alarm values can be password protected to prevent unauthorized access.

For an explanation of all the F-Series options such as analog and alarm outputs, communication, power supply and enclosures, please read the section "Ordering codes" in the back of this catalog.

F114 Ratio Monitor / Totalizer with high / low alarms and analog output

The F114 flow computer calculates the actual ratio between two separate flows. It offers the ability to set one low ratio and one high ratio alarm value. Special precautions are taken to allow start-up problems and incorrect ratio readings for a certain period of time. Based on the location of the flowmeters, a selection can be made out of six different formulas. The display shows the ratio, alarm values, flow rate A, total A and flow rate B, total B. On-screen engineering units are easily configured from a comprehensive selection. The ratio can be displayed as a percentage or as a ratio. A wide range of options further enhance this model capabilities, including Intrinsic Safety and full Modbus communication.

Features

- Calculates ratio between flow A and B.
- Displays ratio, flow rate A and B, total A and B and high / low alarm values.
- Six ratio calculation formulas.
- Ratio monitoring: two alarm values can be set: low and high ratio alarm.
- Alarm values can be changed by the operator or they can be password protected.
- Ratio: seven 17mm (0.67") digits, displayed as a percentage or as a ratio.
- Flow rate A and B: seven 17mm (0.67") digits.
- Total A and B - resettable: seven 17mm (0.67") digits.
- LED backlight available.

Application

- Mixing or blending of two components where continuous ratio displaying, monitoring and totalizing is important. For example in construction works, roof or wall insulation, gluing and coating.

Flowmeter input

- Pulse: sine wave (coil), reed-switch, NPN, PNP, Namur, active pulse signal.
- Analog: (o)4 - 20mA, o - 10V DC.

Display example



Pulse output

- No.

Analog output

- One (o)4 - 20mA / o - 10V DC output to transmit the ratio, flow rate A or flow rate B. The signal can be scaled to any range (e.g. from 1:5 to 1:100 or from 200 L/min to 1200 L/min).

Alarm outputs

- Two alarm outputs: low and high ratio alarm.

Communication

- RS232 / RS485 / TTL. Modbus RTU protocol. All process data and settings are accessible.

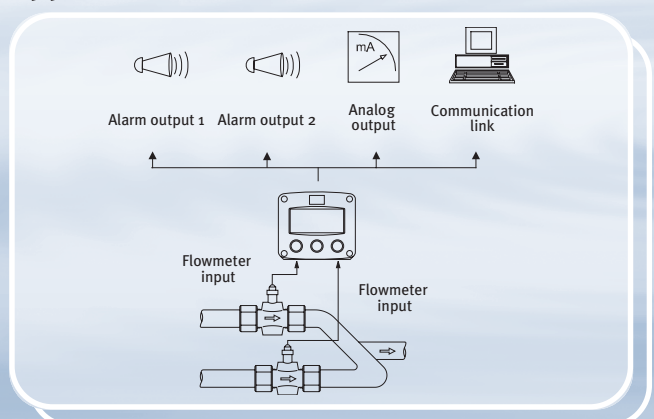
Power supply

- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC. Sensor supply 3.2, 8.2, 12 or 24V DC.

Hazardous area

- ATEX approval available for Intrinsically Safe and explosion proof applications.

Application overview



F116 Differential / Sum Flow Computer with analog and pulse outputs

The F116 flow computer has been developed to calculate differential / consumption or total volume. The usual difficulties encountered in such applications include: pulsating flows, very low consumption readings, vibration and high ambient temperatures. These are all well catered for in the design and operation of the F116. The pulse and analog outputs reflect the calculated differential or sum value. On-screen engineering units are easily configured from a comprehensive selection. A wide range of options further enhance this model capabilities, including Intrinsic Safety and full Modbus communication.

Features

- Calculates differential flow rate (consumption), total and accumulated total of flow A and B.
- Calculates the sum flow rate, total and accumulated total of flow A and B.
- Precautions for pulsating flows and very low consumption readings.
- Displays total and flow rate simultaneously.
- Large digit selection for flow rate or total.
- Flow rate: seven 17mm (0.67") or 8mm (0.31") digits.
- Total - resettable: seven 17mm (0.67") digits.
- Accumulated total - not resettable: eleven 8mm (0.31") digits.

Application

- Fuel consumption calculation for diesel engines on board of ships or locomotives. Sum function: where flows are split-up in two pipe-lines and total flow has to be calculated. More advanced model: F127.

Flowmeter input

- Pulse: sine wave (coil), reed-switch, NPN, PNP, Namur, active pulse signal.
- Analog: (0)4 - 20mA, 0 - 10V DC.

Display example



Pulse outputs

- One scaled pulse output according to accumulated total (e.g. one pulse every 3.25 gallons). Max. frequency 64Hz. Second output reflects a "negative" differential.

Analog output

- One (0)4 - 20mA / 0 - 10V DC output to transmit the differential or totalized flow rate. The signal can be scaled to any range (e.g. from 200 to 1200 L/min).

Alarm output

- No.

Communication

- RS232 / RS485 / TTL. Modbus RTU protocol. All process data and settings are accessible.

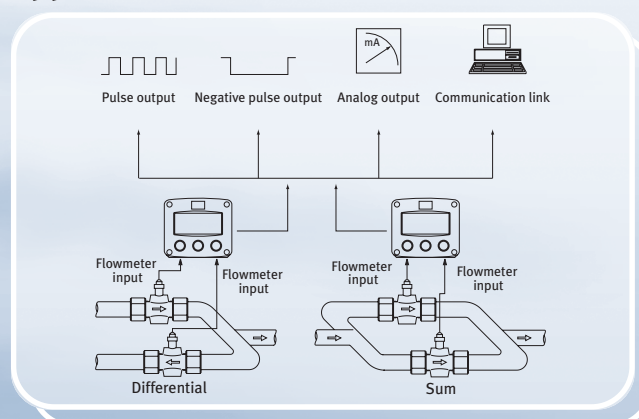
Power supply

- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC. Sensor supply 3.2, 8.2, 12 or 24V DC.

Hazardous area

- ATEX approval available for Intrinsically Safe and explosion proof applications.

Application overview



F126-EL Flow Computer with temperature compensation for corrected liquid volume

The F126-EL flow computer has been developed to calculate corrected liquid volume at normal conditions. The corrected volumetric flow is calculated by measuring the uncorrected volumetric flow and actual line temperature which is processed with the thermal expansion coefficient algorithm stored in the flow computer. The reference temperature can be defined as desired (e.g. 15°C, 20°C or 60°F). The display shows the compensated flow rate, total, accumulated total and the actual line temperature. A wide range of options further enhance this model capabilities, including Intrinsic Safety and full Modbus communication.

Features

- Calculates compensated flow rate, total and accumulated total based on a temperature / expansion relationship.
- Displays actual line temperature.
- Analog output reflecting compensated flow rate.
- Flow rate: seven 8mm (0.31") digits.
- Displays total and flow rate simultaneously.
- Temperature: six 17mm (0.67") digits.
- Total - resettable: seven 17mm (0.67") digits.
- Accumulated total - not resettable: eleven digits.
- LED backlight available.

Application

- Applications where net flow calculation at base conditions is desired for liquids using the thermal expansion coefficient.

Flowmeter input

- Pulse: sine wave (coil), reed-switch, NPN, PNP, Namur, active pulse signal.
- Analog: (0)4 - 20mA, 0 - 10V DC.

Temperature input

- PT100 - 2 or 3 wire, (0)4 - 20mA, 0 - 10V DC.

Display example



Pulse output

- No.

Analog output

- One (0)4 - 20mA / 0 - 10V DC output to transmit the compensated flow rate. The signal can be scaled to any range (e.g. from 200 L/min to 1200 L/min).

Alarm output

- No

Communication

- RS232 / RS485 / TTL. Modbus RTU protocol. All process data and settings are accessible.

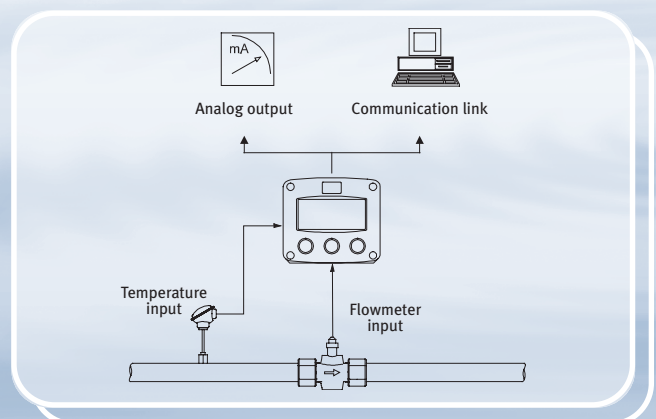
Power supply

- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC. Sensor supply 3.2, 8.2, 12 or 24V DC.

Hazardous area

- ATEX approval available for Intrinsically Safe and explosion proof applications.

Application overview



F126-EG Flow Computer with temperature and pressure compensation for corrected gas volume

The F126-EG flow computer has been developed to calculate corrected gas volume at normal conditions. The corrected volumetric flow is calculated by measuring the uncorrected volumetric flow, actual line temperature and pressure which are processed with the equations stored in the flow computer. A compressibility factor can be set to approach a real gas behavior. The reference conditions can be defined as desired (e.g. 15°C, 60°F or 1.013 bar). The display shows the compensated flow rate, total, accumulated total and the actual line temperature and pressure. A wide range of options further enhance this model capabilities, including Intrinsic Safety and full Modbus communication.

Features

- Calculates compensated flow rate, total and accumulated total.
- Displays actual line pressure and temperature.
- Analog output reflecting compensated flow rate.
- Flow rate: seven 8mm (0.31") digits.
- Displays total and flow rate simultaneously.
- Temperature: six 17mm (0.67") digits.
- Pressure: six 17mm (0.67") digits.
- Total - resettable: seven 17mm (0.67") digits.
- Accumulated total: eleven 8mm (0.31") digits.
- LED backlight available.

Application

- Applications where net gas flow calculation at base conditions is desired for generic gas products.

Flowmeter input

- Pulse: sine wave (coil), reed-switch, NPN, PNP, Namur, active pulse signal.
- Analog: (0)4 - 20mA, 0 - 10V DC.

Temperature input

- PT100 - 2 or 3 wire, (0)4 - 20mA, 0 - 10V DC.

Pressure input

- Analog: (0)4 - 20mA, 0 - 10V DC.

Display example



Pulse output

- No.

Analog output

- One (0)4 - 20mA / 0 - 10V DC output to transmit the compensated flow rate. The signal can be scaled to any range (e.g. from 200 L/min to 1200 L/min).

Alarm output

- No.

Communication

- RS232 / RS485 / TTL. Modbus RTU protocol. All process data and settings are accessible.

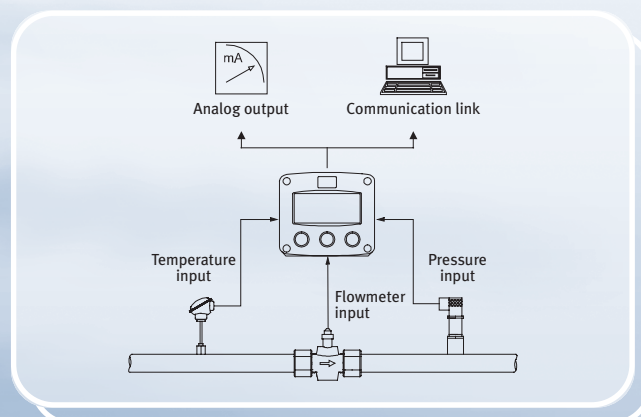
Power supply

- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC. Sensor supply 3.2, 8.2, 12 or 24V DC.

Hazardous area

- ATEX approval available for Intrinsically Safe and explosion proof applications.

Application overview



F127 Differential Flow Computer with temperature compensation for corrected liquid volume

The F127-EL flow computer has been developed to calculate corrected differential liquid volume at normal conditions. This is calculated by measuring the uncorrected volumetric flow and actual line temperature in both the supply and return line. These signals are processed with the thermal expansion coefficient algorithm stored in the flow computer. The reference temperature can be defined as desired (e.g. 15°C, 20°C or 60°F). The usual difficulties encountered in such applications include: pulsating flows, very low consumption readings, vibration and high ambient temperatures. These are all well catered for in the design and operation of the F127.

Features

- Displays compensated consumption (flow rate), total and accumulated total.
- Supply line: displays actual temperature and compensated flow rate.
- Return line: displays actual temperature and compensated flow rate.
- Flow rate: seven 17mm (0.67") or 8mm (0.31") digits.
- Large digit selection for flow rate or total.
- Displays total and flow rate simultaneously.
- Total - resettable: seven 17mm (0.67") digits.
- Accumulated total: eleven 8mm (0.31") digits.
- Temperature: six 17mm (0.67") digits.
- LED backlight available.

Application

- Fuel consumption calculation for diesel engines on board of ships or locomotives, generators or burners. Alternative basic model: F116.

Flowmeter input

- Pulse: sine wave (coil), reed-switch, NPN, PNP, Namur, active pulse signal.

Temperature input

- PT100 - 2 or 3 wire, (0)4 - 20mA, 0 - 10V DC.

Display example



Pulse output

- No.

Analog output

- One (0)4 - 20mA / 0 - 10V DC output to transmit the compensated differential flow rate (consumption). The signal can be scaled to any range (e.g. from 200 L/min to 1200 L/min).

Alarm output

- No.

Communication

- RS232 / RS485 / TTL. Modbus RTU protocol. All process data and settings are accessible.

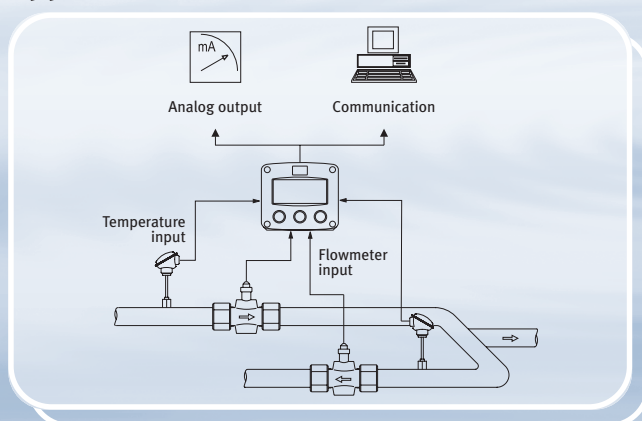
Power supply

- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC. Sensor supply 3.2, 8.2, 12 or 24V DC.

Hazardous area

- ATEX approval available for Intrinsically Safe and explosion proof applications.

Application overview



F128 Energy Computer for heating and cooling systems

The F128 energy computer calculates the energy consumption in closed hot water heating and chilled water cooling systems. By measuring the temperature in both the supply and return line as well as the actual flow, the transferred energy can be calculated using the energy equations stored in the energy computer. The data-logger is able to store actual energy readings at pre-defined times. Separate energy counters are available to register peak and non-peak transfers. The display shows the transferred energy, flow rate, temperatures and high / low alarm values. A wide range of options further enhance this model capabilities, including Intrinsic Safety and full Modbus communication.

Features

- Displays energy, flow rate, temperatures and alarm values.
- Several formulas for heating and/or cooling applications.
- Data-logger for registration per hour, 12 hours, day or week.
- Peak and non-peak registers.
- Analog, pulse and alarm outputs available as standard.
- Engineering units for energy, flow rate, total and temperature on the display.
- Operational temperature -30°C to +80°C (-22°F to 178°F).
- LED backlight available.

Application

- Energy consumption calculation in heat transfer or cooling applications.

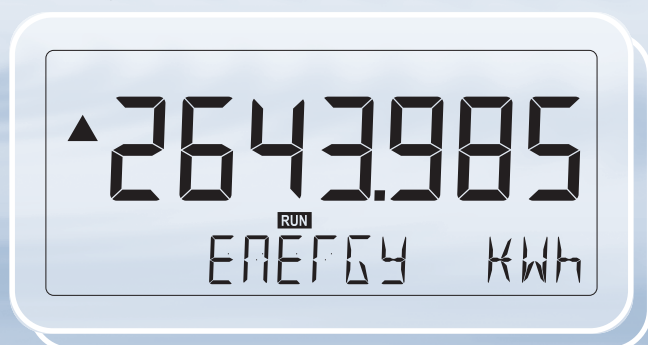
Flowmeter input

- Pulse: sine wave (coil), reed-switch, NPN, PNP, Namur, active pulse signal.
- Analog: (o)4 - 20mA, o - 10V DC.

Temperature input

- PT100 - 2 or 3 wire, (o)4 - 20mA, o - 10V DC.

Display example



Pulse output

- One scaled pulse output according to the energy consumption (e.g. one pulse every 1 W).
Max. frequency. 64Hz.

Analog output

- One (o)4 - 20mA / o - 10V output to transmit the energy consumption, flow rate or temperature. The signal can be scaled (e.g. 1 W/min to 100 W/min).

Alarm output

- 2 configurable alarm outputs for low or high alarms: energy consumption, flow rate or temperatures.

Communication

- RS232 / RS485 / TTL. Modbus RTU protocol.
All process data and settings are accessible.

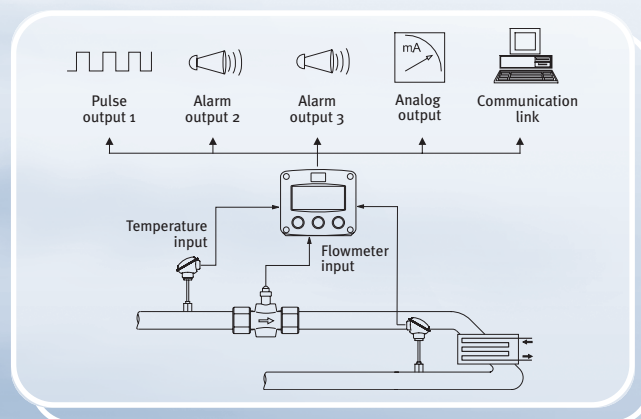
Power supply

- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC. Sensor supply 3.2, 8.2, 12 or 24V DC.

Hazardous area

- ATEX approval available for Intrinsically Safe and explosion proof applications.


Application overview



ORDERING CODES







This section describes the options and ordering codes of all F-Series products.



The  symbol indicates if the function is available Intrinsically Safe. The table on the following pages shows which options are available for each product. As it is our policy to improve our products continuously, it is advised to check the datasheets on our website www.fluidwell.com for up-to-date information about the latest options available.

Sensor input signal




This is the primary signal input type of the device. The configuration menu of each product allows you to select and adjust the signal parameters, without any sensitive mechanical DIP-switches, jumpers or trimmers. The analog input version “type A” is also available as 4 - 20mA input loop powered display (power supply type PL).

A		(0)4 - 20mA sensor input for flow, level, pressure and temperature measurement.
H		Thermocouple input for temperature measurement. Available types: check the latest datasheets.
P		Pulse input for flow applications. Signal types: sine wave (coil), NPN, PNP, reed switch, Namur and active signals. For most signals a low pass filter can be enabled.
T		PT100 (PRTD) input for temperature measurement, suitable for 2 or 3 wire (Fo: 4 wire as well).
U		0 - 10V DC sensor input for flow, level, pressure and temperature measurement.
X		No primary signal input (model F193 only).



Analog output signal

Available for the F1-Series only: related to the actual flow, level, height, pressure, temperature, percentage, ratio, consumption, differential or sum, position, energy or as control output. *Note: an active analog output comes with an active transistor output type OA and requires a power supply option type PD, PF or PM.*

AA		Active 4 - 20mA analog output - requires OA + PD, PF or PM.
AB		Active 0 - 20mA analog output - requires OA + PD, PF or PM.
AF		Passive floating 4 - 20mA analog output for Intrinsically Safe applications - requires PC, PD or PL.
AI		Passive isolated 4 - 20mA analog output - requires PB, PD, PF, PL or PM.
AP		Passive 4 - 20mA analog output signal. Output loop powered which means that the unit will be powered through this loop (comes with type PX as standard).
AU		Active analog output 0 - 10V DC - requires OA + PD, PF or PM.
AX		No analog output.



Communication

Available for the F1-Series only: all process data, settings and functions can be read, modified and controlled through the Modbus RTU / ASCII communication link. The selectable communication speed is 1200, 2400, 4800 or 9600 baud and 255 addresses can be assigned. Full Modbus functionality remains available for the Intrinsically Safe version (TTL). *Note: some models do not support Modbus ASCII.*

CB	RS232 - Modbus communication. Maximum cable length 15 meters (50 feet), no multi drop (1:1).
CH	RS485 - 2 wire - Modbus communication. Maximum cable length 1200 meters (3,937 feet), multi drop (1:n).
CI	RS485 - 4 wire (RS422) - Modbus communication. Maximum cable length 1200 meters (3,937 feet), multi drop (1:n).
CT	TTL (RS232 compatible) - Modbus communication, Intrinsically Safe only. No multi drop (1:1). Cable length: the normal RS232 limitations of bandwidth versus cable length are applicable. As a rule of thumb, speed (baud) x length (meters) < 15,000.
CX	No communication option.

Flow equations

The flow computers F126 and F127 use generic formulas for corrected gas and liquid volume.

EG	Formula for gas applications with temperature and pressure compensation.
EL	Formula for liquid applications with temperature compensation.
EX	No flow equations option.





Enclosures

Various types of enclosures are available for hazardous and safe area applications. The enclosures have recently been redesigned with a new keyboard and sealing to make them suitable for even the most harsh environments and to improve the operation. All enclosures have stainless steel screws. The aluminum enclosures are painted with a high quality UV stabilized two component industrial paint. The GRP enclosures (Glass-fiber Reinforced Polyamide) are UV stabilized and offer Vo acc. to UL94. New stainless steel accessories are available for wall and pipe mounting of the field enclosures (see section Accessories).

HA	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 2 x PG9 and 1 x M20.
HB	Panel mount enclosure	IP65 / NEMA 4	Aluminum	
HC	Panel mount enclosure	IP65 / NEMA 4	GRP	
HD	Field / wall mount enclosure	IP67 / NEMA 4X	GRP	Cable entry: no holes.
HE	Field / wall mount enclosure	IP67 / NEMA 4X	GRP	Cable entry: 2 x 16mm and 1 x 20mm.
HF	Field / wall mount enclosure	IP67 / NEMA 4X	GRP	Cable entry: 1 x 22mm (0.866").
HG	Field / wall mount enclosure	IP67 / NEMA 4X	GRP	Cable entry: 2 x 20mm.
HH	Field / wall mount enclosure	IP67 / NEMA 4X	GRP	Cable entry: 6 x 12mm.
HM	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 2 x M16 and 1 x M20.
HN	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 1 x M20.
HO	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 2 x M20.
HP	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 6 x M12.
HT	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 1 x 1/2" NPT.
HU	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: 3 x 1/2" NPT.
HZ	Field / wall mount enclosure	IP67 / NEMA 4X	Aluminum	Cable entry: no holes.



Inputs - additional pressure or switch input

Available for the F1-Series only: several products offer or require additional inputs with following functionality:

IA		(0)4 - 20mA input for pressure measurement.
IB		Additional reset input to zero the totalizer.
IU		0 - 10V DC input for pressure measurement.
IX		No additional input.





Outputs - alarm / pulse / control

Following switch output(s) are related to the totalizer (scaled pulse or alarm output), high / low alarms for flow, level, pressure or temperature or control outputs for the batch controllers. The Fo-Series offers maximum one output. The F1-Series maximum of four outputs, however in case of an Intrinsically Safe application a maximum of two outputs are available. Except the passive transistor (type OT), all output types require a power supply option type PD, PF or PM. For detailed information please consult the product datasheet.

OA		Active 24V transistor output(s), requires type PD, PF or PM. (F1-Series also: AA, AB or AU), max load: 50mA @ 24V DC.
OR		Mechanical SPST relays - isolated, requires type PF or PM, max. load 1A - 230V AC.
OS		Four mechanical SPST relays - isolated, requires type PD, max. load 1A - 230V AC.
OT		Passive transistor output(s), max. load 300mA @ 50V DC, (Intrinsically Safe max. 30V DC 100mA) per output.
OX		No output.





Power supply

To power the F-Series, several power supply options are available. For detailed information please consult the datasheet of the product.

PB		Long life lithium battery - only one battery required.
PC		Intrinsically Safe lithium battery - only one battery required.
PD		16 - 24V DC power supply with limited sensor supply capabilities.
PF		24V AC / DC power supply with full sensor supply.
PL		Input loop powered, the unit is powered through the 4 - 20mA signal input.
PM		115 - 230V AC power supply with full sensor supply.
PX		Sensor supply not available. Fo-Series can be powered with 8 - 30V DC. F1-Series can be powered by output loop (type AP), voltage: 8 - 30V DC.

Temperature - additional inputs






Available for the F1-Series only: several products require additional inputs with following functionality.

TA		(0)4 - 20mA input for temperature measurement.
TP		PT100 input for temperature measurement - 2 or 3 wire.
TU		0 - 10V DC input for temperature measurement.
TX		No additional input.








Hazardous area

All models can be supplied Intrinsically Safe with ATEX Certification. For the Fo-Series IECEx, CSA and FM approval as well as non-incendive approval are expected to become available during 2006. For detailed information and latest information, please consult the datasheet and certificate of the product.

XF		ATEX - EExd flameproof enclosure  II 2 GD EEx d IIB T ₅ .
XI		ATEX - Intrinsically Safe:  II 1 GD EEx ia IIB/IIC T ₄ T ₁₀₀ °C.
XN		Non incendive: Expected fourth quarter 2006.
XX		Safe area application.

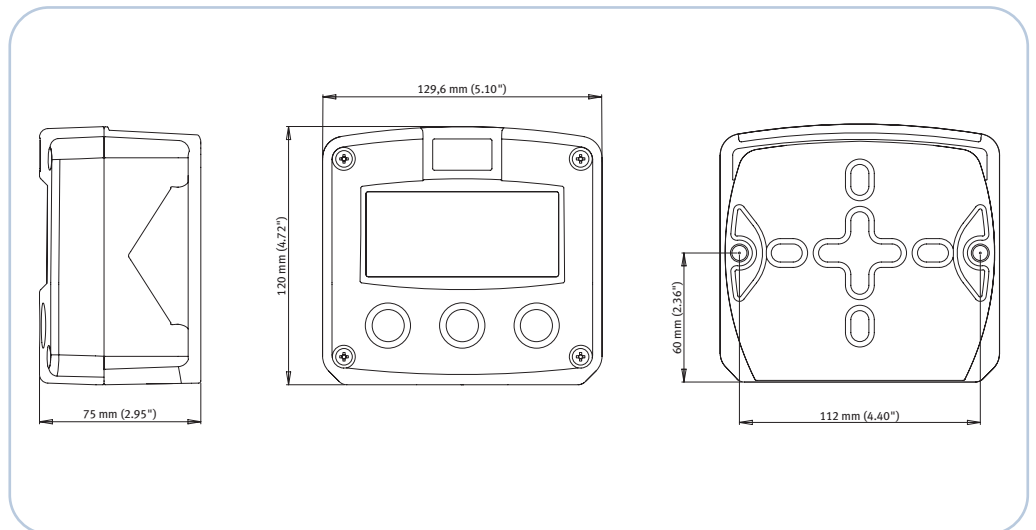
Other options

Several other options are listed below. Please be aware that more than one of these options can be selected.

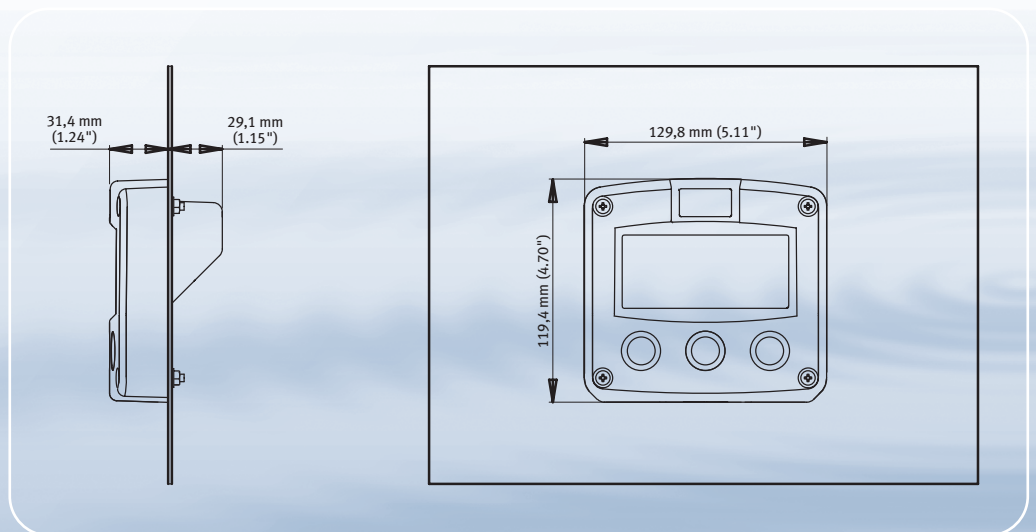
ZB		Bi-color backlight green/amber. In case of a monitoring application, the backlight can be set to switch to red in case of an alarm condition. <i>Note: for the F1-Series, only a green backlight for safe area applications is available at this moment.</i>
ZF		Extra high sensitivity for the sine wave (coil) input 10mV p-p.
ZG		Very high sensitivity for the sine wave (coil) input 5mV p-p.
ZV		PT100 (PRTD) range -200°C to +800°C (-328°F to +1472°F).
ZX		No additional option.

ENCLOSURES

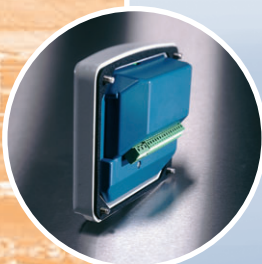
The following pages contain dimensional drawings of the F-Series enclosures and mounting accessories.



Field / wall mount enclosures, IP67 / NEMA4X

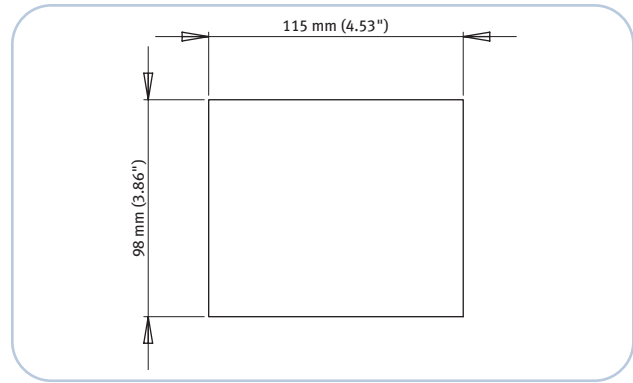


Panel mount enclosures, IP65 / NEMA4



Panel mounting

A major advantage of using the F-Series as a panel mount unit is the minimum depth clearance required. This allows a small box being used compared to many other panel mount devices.



Panel mount cut-out dimensions

Panel cut-out

The panel cut-out can be rectangle where the four bolts will be located in the corners.



Mounting the enclosure in a panel

The enclosure is supplied with four stainless steel bolts, O-rings, washers and nuts.



F-Series mounted in the cabinet

After installing the unit, the thick silicon gasket does assure a proper sealing.

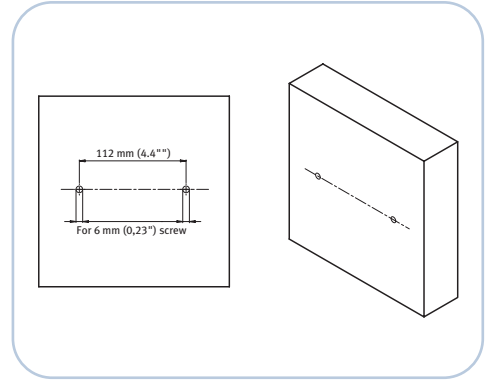


Wall mounting

The F-Series enclosures can be mounted onto the wall in two ways: with and without a mounting plate. Proper screws or bolts have to be used as the weight of the aluminum enclosure is about 1kg and the GRP enclosure about 0.5 kg.

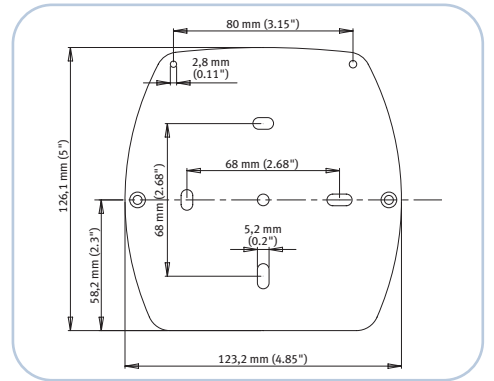
Mounting **without** a mounting plate;

Two holes have to be drilled horizontally to place 6mm (0.23") screws or bolts.



Mounting **with** a mounting plate

The stainless steel mounting plate does make the installation easier. It includes two proper fixed M6 stainless steel bolts with nuts and a large position to fix a tagplate with 3mm (0.11") screws.



Placing the mounting plate

Two or four holes have to be drilled horizontally and/or vertically, suitable for 5mm (0.2") screws or bolts.



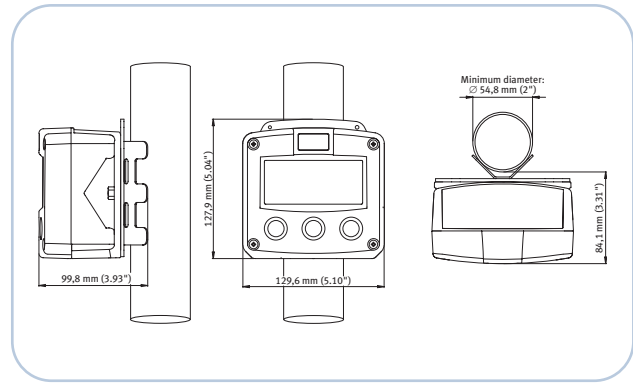
Placing the wall mount enclosure

Simply place the unit and fix it with the two stainless steel washers and M6 nuts provided.



Pipe mounting

The F-Series enclosures can be mounted on any horizontal or vertical pipe from 54,8mm (2") diameter with the stainless steel pipe mounting kit. Proper clamps have to be used as the total weight including the aluminum enclosure is about 1,4 kg and including the GRP enclosure about 0,9 kg. On the top of the mounting plate, a space is provided to place a proper tagplate with 3mm (0.11") screws.



Assembling the pipe mounting kit

The mounting kit includes three stainless steel M5 bolts to fix the pipe mounting bracket horizontally or vertically on the mounting plate. When assembled, the part can easily be fixed on the pipe with the stainless steel worm gear clamps.



Placing the field mount enclosure

Simply place the unit and fix it with the two stainless steel washers and M6 nuts provided.



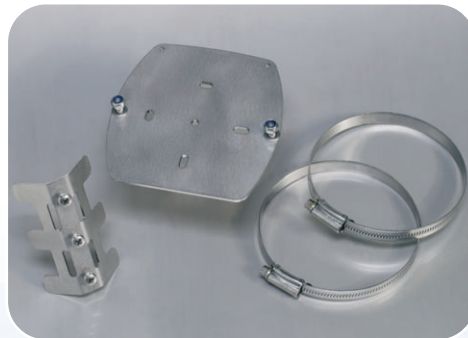
ACCESSORIES

The following pages contain several accessories, which are available for the F-Series.

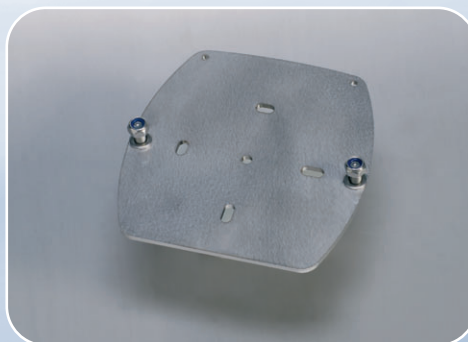


Mounting accessories

ACF02	Stainless steel wall mounting kit includes screws and plugs.
ACF05	Stainless steel pipe mounting kit (worm gear clamps not included).
ACF06	Two stainless steel worm gear clamps Ø 44 - 56mm (1.73" - 2.20").
ACF07	Two stainless steel worm gear clamps Ø 58 - 75mm (2.29" - 2.95").
ACF08	Two stainless steel worm gear clamps Ø 77 - 95mm (3.04" - 3.74").
ACF09	Two stainless steel worm gear clamps Ø 106 - 138mm (4.18" - 5.43").
ACF10	Customized Grevopal tagplates for ACF02 and ACF05, including stainless steel screws. Dimension: 95mm x 12.5mm (3.75" x 0.5").



Stainless steel pipe mounting kit



Stainless steel wall mounting kit

Cable gland accessories

ACF20	for HA enclosure: 2 x PG9, 1 x M20 includes O-rings - IP67 / NEMA 4X.
ACF25	for HE enclosure: 2 x M16, 1 x M20 includes locknuts and O-rings - IP67 / NEMA 4X.
ACF26	for HF enclosure: 1 x M20 includes locknut and O-ring - IP67 / NEMA 4X.
ACF27	for HG enclosure: 2 x M20 includes locknuts and O-rings - IP67 / NEMA 4X.
ACF28	for HH enclosure: 6 x M12 includes locknuts and O-rings - IP67 / NEMA 4X.
ACF32	for HM enclosure: 2 x M16, 1 x M20 - includes O-rings - IP67 / NEMA 4X.
ACF33	for HN enclosure: 1 x M20 - includes O-ring - IP67 / NEMA 4X.
ACF34	for HO enclosure: 2 x M20 - includes O-rings - IP67 / NEMA 4X.
ACF35	for HP enclosure: 6 x M12 - includes O-rings - IP67 / NEMA 4X.
ACF39	for HT enclosure: 1 x 1/2" NPT - includes O-ring - IP67 / NEMA 4X.
ACF40	for HU enclosure: 3 x 1/2" NPT - includes O-rings - IP67 / NEMA 4X.



Cable glands

Blind plug accessories

ACF50	for HA enclosure: 2 x PG9, 1 x M20 includes O-rings - IP67 / NEMA 4X.
ACF55	for HE enclosure: 2 x M16, 1 x M20 includes locknuts and O-rings - IP67 / NEMA 4X.
ACF56	for HF enclosure: 1 x M20 includes locknut and O-ring - IP67 / NEMA 4X.
ACF57	for HG enclosure: 2 x M20 includes locknuts and O-rings - IP67 / NEMA 4X.
ACF58	for HH enclosure: 6 x M12 includes locknuts and O-rings - IP67 / NEMA 4X.
ACF62	for HM enclosure: 2 x M16, 1 x M20 - includes O-rings - IP67 / NEMA 4X.
ACF63	for HN enclosure: 1 x M20 - includes O-ring - IP67 / NEMA 4X.
ACF64	for HO enclosure: 2 x M20 - includes O-rings - IP67 / NEMA 4X.
ACF65	for HP enclosure: 6 x M12 - includes O-rings - IP67 / NEMA 4X.
ACF69	for HT enclosure: 1 x 1/2" NPT - includes O-rings - IP67 / NEMA 4X.
ACF70	for HU enclosure: 3 x 1/2" NPT - includes O-rings - IP67 / NEMA 4X.



Blind plugs

Intrinsically Safe isolators accessories

Ordering code		Description	Hazardous area	Safe area
ACG01	MTL5011B	One channel pulse or switch output transfer from hazardous area to safe area, including power supply.	type OT: passive transistor	1 mechanic make-and-break relay
ACG02	MTL5025	One channel power supply from safe area to hazardous area (e.g. to power the unit with type PD or to power a switching or analog device in hazardous area).	device to be powered	20 - 35V DC
ACG03	MTL5042	One channel 4 - 20mA repeater from hazardous area to safe area, including power supply.	type AP / AF: passive analog output	floating 4 - 20mA
ACG04	MTL5051	Bi-direction serial-data isolator (for Modbus communication).	type CT: TTL	RS232, RS422 or TTL
ACG05	MTL5018	Two channel pulse or switch output transfer from hazardous area to safe area, including power supply.	type OT: transistor	2 mechanic make-and-break relays
ACG06	MTL5012	One channel pulse or switch output transfer from hazardous area to safe area, including power supply.	type OT: passive transistor	floating solid state
ACG07	MTL5045	One channel isolated driver bringing 4 - 20mA from safe area to hazardous area, including power supply.	active 4 - 20mA	4 - 20mA



MTL isolators



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