FLUIDWELL Accurate Liquid Management

DUAL INPUT FLOW RATE / TOTALIZER

WITH TWO PULSE SIGNAL OUTPUTS



Features

- Displays for each flow the flow rate, total and accumulated total.
- Large 17mm (0.67") digit selection for flow rate or total.
- Selectable on-screen engineering units; volumetric or mass.
- Ability to process all types of flowmeter signals.
- Auto backup of settings and running totals.
- Operational temperature -40°C up to +80°C (-40°F up to 176°F).
- Very compact design for panel mount, wall mount or field mount applications.
- Rugged aluminum field mount enclosure IP67/NEMA4X.
- Intrinsically Safe ATEX and IECEx approval for gas and dust applications.
- Explosion/flame proof 🐼 II 2 GD EEx d IIB T5.
- For each flow one pulse signal output.
- Full Modbus communication RS232/485/TTL.
- Loop or battery powered, 8 24V AC/DC or 115 - 230V AC power supply.
- Sensor supply 3.2 / 8.2 / 12 / 24V DC.

Signal output

• Two scaled pulse outputs according to accumulated total of flow A and flow B.

Signal input

Flow

- Reed-switch.
- NAMUR.
- NPN/PNP pulse.
- Sine wave (coil).
- Active pulse signals.
- (0)4 20mA.
- 0 10V DC.

Applications

• For those applications where instead of two just one indicator is desired. Alternative basic models: two F014's.



General information

Introduction

The F111 incorporates two fully separated flow rate / totalizers in one enclosure, including a pulse signal output for each flow. There is no relationship between the flows, even different pulse signal input types can be used. A wide selection of options further enhances the capabilities of this model, which includes Intrinsic Safety and full Modbus communication.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits which can be set to show flow rate and/or totals. For each flow, on-screen engineering units are easily configured from a comprehensive menu. Both accumulated totals can register up to 11 digits and are backed-up in EEPROM memory every minute. The F111 can be set to show the selected

information manually or with an automatic

Configuration

toggle function.

All configuration settings are accessed via a simple operator menu which can be pass-code protected. Each setting is clearly indicated with an alphanumerical description, which avoides confusing abbreviations and baffling codes. 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 in the event of sudden power failure.

Pulse output

The unit has two scaleable pulse outputs, one for flow A and the other for flow B. The outputs reflect the count on the accumulated display. The pulse length is user defined from 0.008 second up to 2 seconds. The maximum output frequency is 64Hz. The output signal can be a passive NPN, active PNP or an isolated electro-mechanical relay.

Signal input

The F111 accepts most pulse and analog input signals for volumetric flow or mass flow measurement. The input signal type can be selected by the user in the configuration menu without having to adjust any sensitive

mechanical dip-switches or jumpers. The analog input versions are even available as 4 - 20mA input loop powered displays. For the pulse type input, different signal types can be used.

Communication

All process data and settings can be read and modified manually or through the Modbus communication link (RS232 / RS485).
Full Modbus functionality remains available for the Intrinsically Safe version (TTL).

Hazardous areas

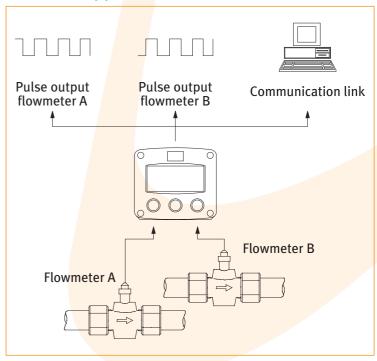
This model has been ATEX and IECEx certified Intrinsically Safe for gas and dust applications, with an allowed operational temperature of -40°C to +70°C (-40°F to +158°F).

A flame proof enclosure with ATEX certification offers the rating II 2 GD EEx d IIB T5.

Enclosures

Various types of enclosures can be selected, all ATEX and IECEx approved. As standard the F111 is supplied in an GRP panel mount enclosure, which can be converted to an IP67 / NEMA 4X GRP field mount enclosure by the addition of a back case. Most popular is our rugged aluminum field mount enclosure with IP67 / NEMA 4X rating. Both European or U.S. cable gland entry threads are available.

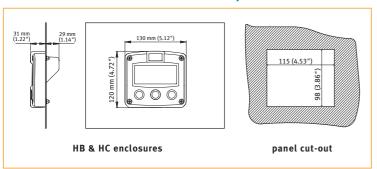
Overview application F111



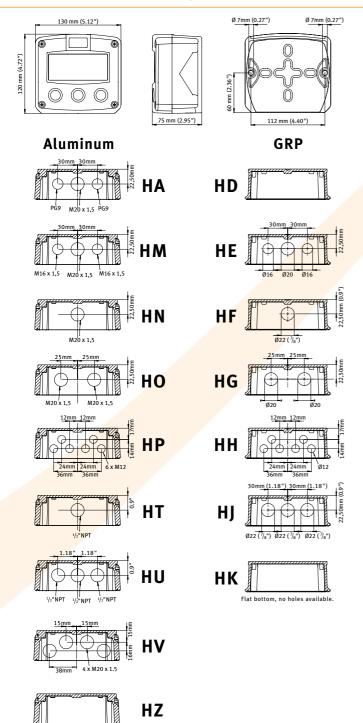


Dimensions enclosures

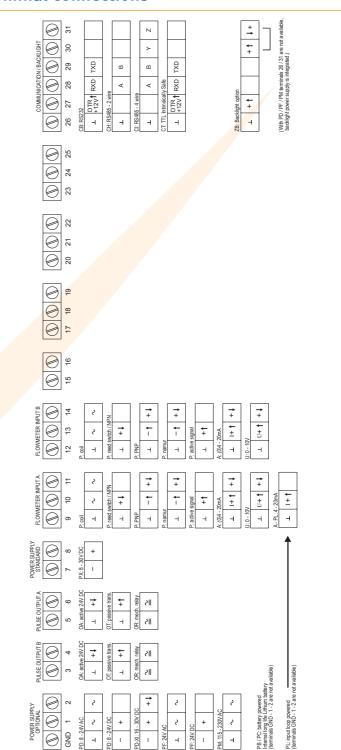
Aluminum & GRP panel mount enclosure



Aluminum & GRP field / wall mount enclosures



Terminal connections



Display example - 90 x 40mm (3.5" x 1.6")



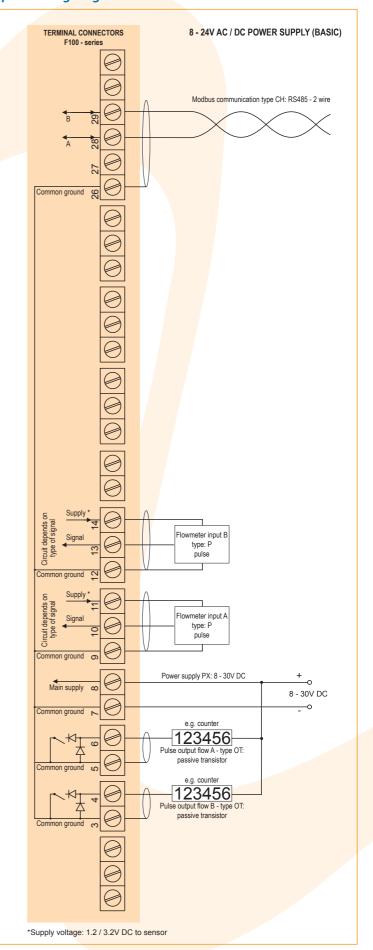


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Typical wiring diagram F111-P-CH-PB-OT-(PX)

BATTERY POWERED TERMINAL CONNECTORS F100 - series Modbus communication type CH: RS485 - 2 wire Common ground & Circuit depends on type of signal Flowmeter input B type: P pulse Circuit depends on type of signal Flowmeter input A type: P pulse Common ground Power supply type PX: (not used in this example) Pulse output flow A - type OT: passive transistor (not used in this example) Pulse output flow B - type OT: (not used in this example) Please note: PX may be used in combination with the battery! PX will power the unit; the battery will be disabled automatically untill power is disconnected *Supply voltage: 1.2 / 3.2V DC to sensor

Typical wiring diagram F111-P-CH-OT-PX





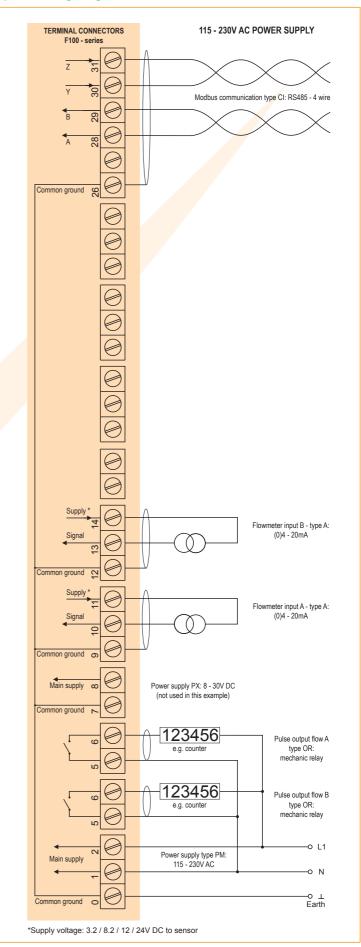
F111

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Typical wiring diagram F111-A-CB-OA-PD

24V AC / DC POWER SUPPLY TERMINAL CONNECTORS F100 - series Modbus communication type CB: RS232 TXD RXD DTR 12V Common ground Supply * Flowmeter input B - type A: (0)4 - 20mA Flowmeter input A - type A: (0)4 - 20mA Common ground Main supply Power supply PX: 8 - 30V DC (not used in this example) 123456 Pulse output flow A - type OA: active 24V DC pulse 123456 Pulse output flow B - type OA: e.g. counte active 24V DC pulse 8 - 24V AC Main supply \0 Power supply type PD: 8 - 24V DC 8 - 24V AC / DC -0 ⊥ Earth Common ground *Supply voltage: 3.2 / 8.2 / 12 / 24V DC to sensor

Typical wiring diagram F111-A-CI-OR-PM





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Hazardous area applications

The F111-XI has been certified according ATEX and IECEx by DEKRA for use in Intrinsically Safe applications with an ambient temperature of -40° C to $+70^{\circ}$ C $(-40^{\circ}$ F to $+158^{\circ}$ F).

 The ATEX markings for gas and dust applications are:

II 1 G Ex ia IIB/IIC T4 Ga II 1 D Ex ia IIIC T100 C Da IP6X.

• The IECEx markings for gas and dust applications are: Ex ia IIC/IIB T4 Ga and Ex ia IIIC T100 C Da IP6X.

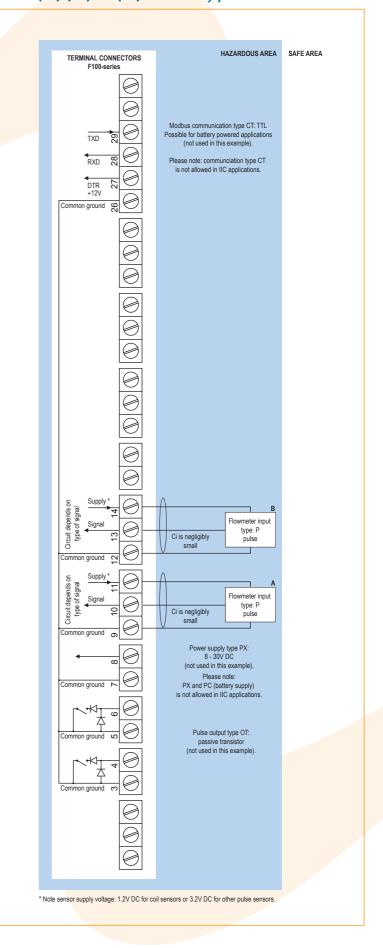
Besides the two I.S. power supplies for the pulse outputs, it is allowed to connect up to three I.S. power supplies in IIB/IIIC applications or one in IIC applications.

Consult the certificate for the maximum input and output values of the circuits. Full functionality of the F111 remains available, including pulse output and Modbus communication (type CT). Power supply type PD-XI offers a 8.2V sensor supply e.g. for one Namur sensor. A flame proof enclosure with rating ATEX II 2 GD EEx d IIB T5 is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 03ATEX1074 X • IECEX DEK 11.0042X



Configuration example IIB / IIIC and IIC F111-P-(CT)-(OT)-PC-(PX)-XI - Battery powered unit

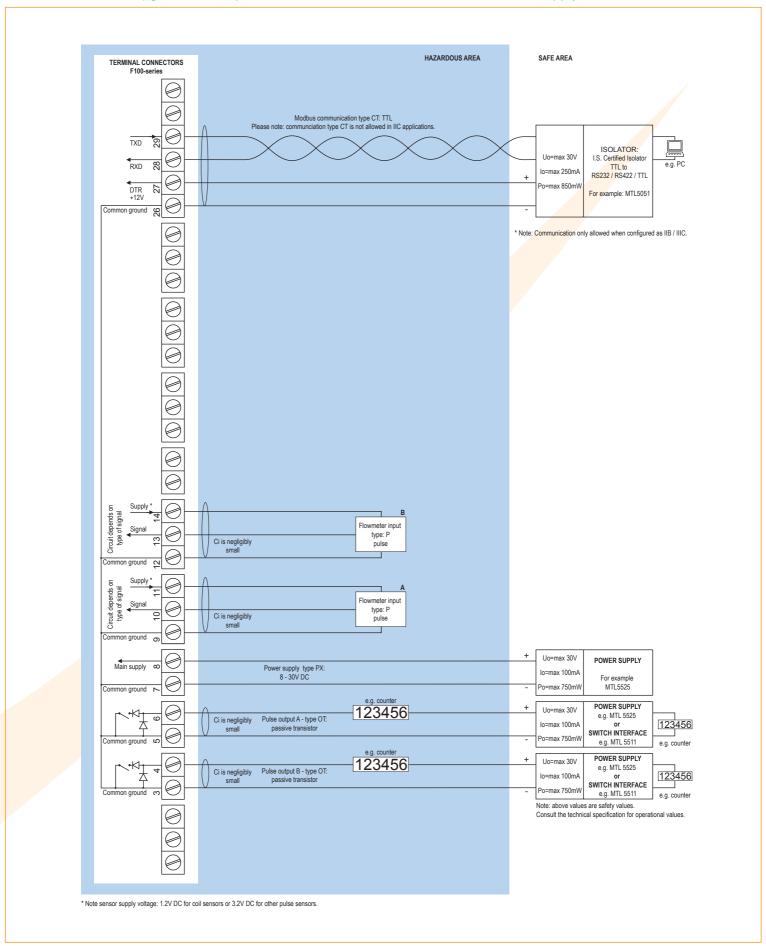




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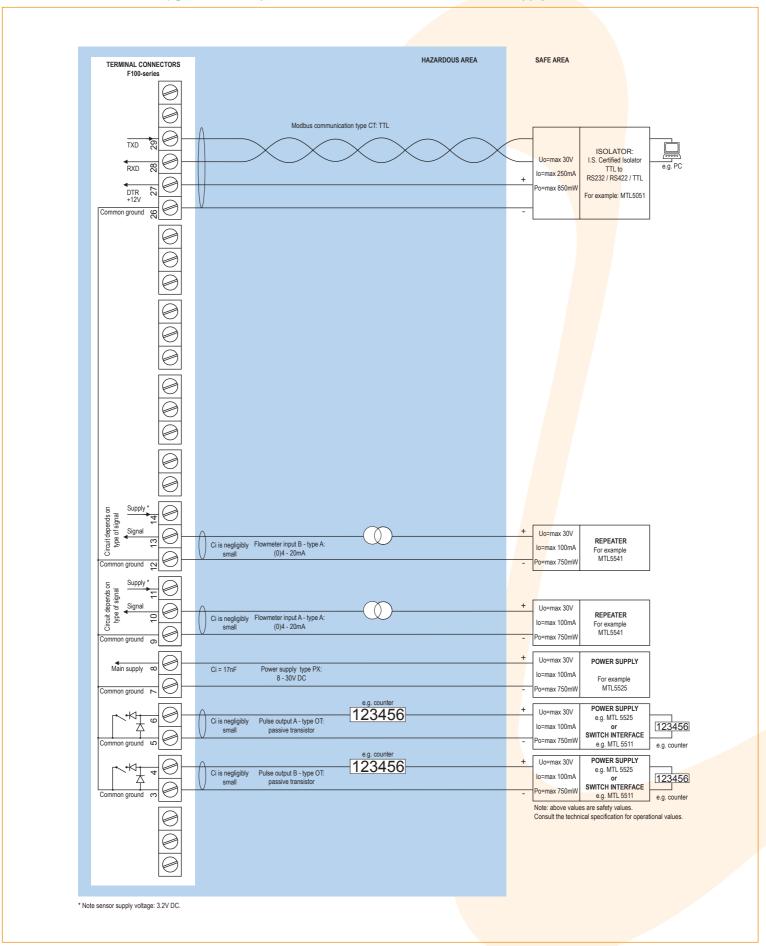
Configuration example IIB / IIIC and IIC - F111-P-(CT)-PX-OT-XI - Power supply 8 - 30V DC





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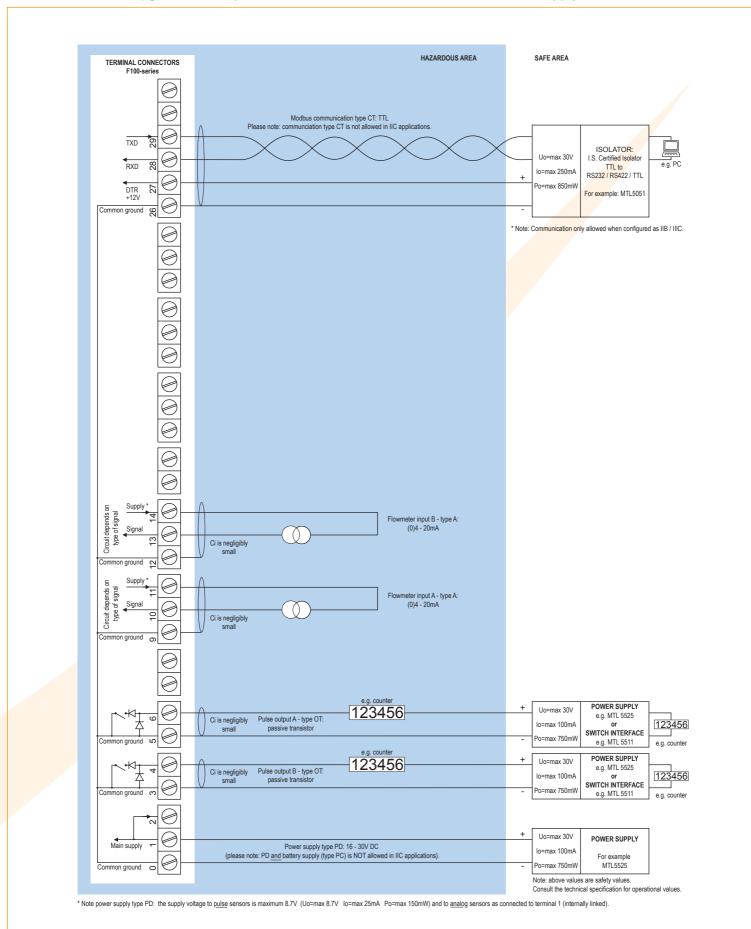
Configuration example IIB / IIIC - F111-A-CT-OT-PX-XI - Power supply 8 - 30V DC



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Configuration example IIB / IIIC and IIC - F111-A-(CT)-OT-PD-XI - Power supply 16 - 30V DC



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Technical specification

General

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Display	
Туре	High intensity reflective numeric and
	alphanumeric LCD, UV-resistant.
Dimensions	90 x 40mm (3.5" x 1.6").
Digits	Seven 17mm (0.67") and eleven 8mm (0.31") digits.
	Various symbols and measuring units.
Refresh rate	User definable: 8 times/sec 1 time/30 secs.
Option ZB	Transflective LCD with green LED backlight.
	Good readings in full sunlight and darkness.
Note ZB	Only available for safe area applications.

Operating t	temperature
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Standard unit -40° C to $+80^{\circ}$ C (-40° F to $+176^{\circ}$ F). Intrinsically Safe -40° C to $+70^{\circ}$ C (-40° F to $+158^{\circ}$ F).

Power require	ments
Type PB	Long life Lithium battery - life-time depends upon
	settings and configuration - up to 5 years.
Type PC	Intrinsically Safe long life lithium battery - life-time
	depends upon settings and configuration - up to 5
	years.
Type PD	8 - 24V AC / DC ± 10%. Power consumption max. 10
	Watt. Intrinsically Safe: 16 - 30V DC; power
	consumption max. 0.75 Watt.
Type PF	24V AC / DC ± 10%. Power consumption max. 15 Watt.
Type PL	Input loop powered from sensor signal 4 - 20mA
	(type "A") - requires type OT (not Xi).
Type PM	115 - 230V AC ± 10%. Power consumption max. 15 Watt.
Type PX	8 - 30V DC. Power consumption max. 0.5 Watt.
Type ZB	12 - 24V DC ± 10% or internally powered with type PD
	/ PF / PM. Power consumption max. 1 Watt.
Note PB/PF/PM	Not availble Intrinsically Safe.
Note PF/PM	The total consumption of the sensors and outputs
	may not exceed 400mA @ 24V.
Note	For Intrinsically Safe applications, consult the safety

Tvn	o DR	/DC /D)Υ ၁	2
Sei	1501	' exci	tatio	n

Type PB/PC/PX	3.2V DC for pulse signals and 1.2V DC for coil pick-up.	
Note	This is not a real sensor supply. Only suitable for	
	sensors with a very low power consumption like coils	
	(sine wave) and reed-switches.	
Type PD	1.2 / 3.2 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC.	
Type PD-XI	1.2 / 3.2 / 8.2V DC - max. 7mA @ 8.2V DC and mains	
	power supply voltage (as connected to terminal 1).	
Note	In case PD-XI and signal A or U: the sensor supply	
	voltage is according to the power supply voltage	
	connected to terminal 1. Also terminal 2 offers the	
	same voltage.	
Type PF / PM	1.2 / 3.2 / 8.2 / 12 / 24V DC - max. 400mA @ 24V DC.	

values in the certificate.

Terminal connections

Type	Removable plug-in terminal strip.
	Wire max. 1.5mm ² and 2.5mm ² .

Data protection

Type	EEPROM backup of all settings. Backup of running
	totals every minute. Data retention at least 10 years.
Pass-code	Configuration settings can be pass-code protected.

Casing

General	
Window	Polycarbonate window.
Sealing	Silicone.
Control keys	Three industrial micro-switch keys. UV-resistant
	silicone keypad.

Aluminum wal	l / field mount enclosures
General	Die-cast aluminum wall/field mount enclosure IP67 /
	NEMA 4X with 2-component UV-resistant coating.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	1100 gr.
Type HA	Cable entry: 2 x PG9 and 1 x M20.
Type HM	Cable entry: 2 x M16 and 1 x M20.
Type HN	Cable entry: 1 x M20.
Type HO	Cable entry: 2 x M20.
Type HP	Cable entry: 6 x M12.
Type HT	Cable entry: 1 x ¹ / ₂ " NPT.
Type HU	Cable entry: 3 x 1/2" NPT.
Type HV	Cable entry: 4 x M20.
Type HZ	Cable entry: no holes.

GRP wall / fie	eld mount enclosures
General	GRP wall/field mount enclosure IP67 / NEMA 4X,
	UV-resistant and flame retardant.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	600 gr.
Type HD	Cable entry: no holes.
Type HE	Cable entry: 2 x Ø 16mm and 1 x Ø 20mm.
Type HF	Cable entry: 1 x Ø 22mm ($^{7}/_{8}$ ").
Type HG	Cable entry: 2 x Ø 20mm.
Type HH	Cable entry: 6 x Ø 12mm.
Type HJ	Cable entry: $3 \times \emptyset$ 22mm ($\frac{7}{8}$ ").
Type HK	Flat bottom, cable entry: no holes.

Panel mount enclosures		
Dimensions	130 x 120 x 60mm (5.12" x 4.72" x 2.36") - W x H x D.	
Panel cut-out	115 x 98mm (4.53" x 3.86") L x H.	
Type HB	Die-cast aluminum panel mount enclosure IP65 /	
	NEMA 4X.	
Weight	600 gr.	
Type HC	GRP panel mount enclosure IP65 / NEMA 4X,	
	UV-resistant and flame retardant.	
Weight	450 gr.	
Weight	450 gr.	

ABS wall / field mount enclosures General Silicone free ABS wall/field mount enclosure IP65 with EPDM and PE sealings. UV-resisitant polyester keypad (old HD enclosure). Dimensions 130 x 114 x 71mm (5.1" x 4.5" x 2.8") - W x H x D. Weight 450 gr. Type HS Cable entry: no holes.



Hazardous area

Intrinsically Safe (Type XI)

ATEX certification II 1 G Ex ia IIB/IIC T4 Ga.

II 1 D Ex ia IIIC T100 °C Da IP6X.

IECEX Ex ia IIC/IIB T4 Ga.

certification Ex ia IIIC T100 °C Da IP6X.

Ambient Ta -40°C to +70°C (-40°F to +158°F).

Explosion proof (Type XF)

ATEX certification (II 2 GD EEx d IIB T5.

Dimensions 300 x 250 x 200mm (11.8" x 9.9" x 7.9") L x H x D.

Weight Appr. 15kg.

Environment

Electromagnetic Compliant ref: EN 61326 (1997), EN 61010-1 (1993). compatibility

Signal inputs

	3 ,
Flowmeter	
Type P	Coil / sine wave (minimum 20mVpp or 80mVpp -
	sensitivity selectable), NPN/PNP, open collector, reed-
	switch, Namur, active pulse signals 8 - 12 and 24V DC.
Frequency	Minimum oHz - maximum 7kHz for total and flow rate.
	Maximum frequency depends on signal type and
	internal low-pass filter. E.g. reed switch with
	low-pass filter: max. frequency 120Hz.
K-Factor	o.oooo10 - 9,999,999 with variable decimal position.
Low-pass filter	Available for all pulse signals.
Option ZF	coil sensitivity 10mVpp.
Type A	(o)4 - 20mA. Analog input signal can be scaled to any
	desired range within o - 20mA.
Type U	o - 10V DC. Analog input signal can be scaled to any
	desired range within o - 10V DC.
Accuracy	Resolution: 14 bit. Error $<$ 0.025mA $/$ \pm 0.125% FS.
	Low level cut-off programmable.
Span	o.oooo10 - 9,999,999 with variable decimal position.
Update time	Four times per second.
Voltage drop	Type A: 2.5V @ 20mA.
Load impedance	Type U: 3kΩ.
Relationship	Linear and square root calculation.
Note	For signal type A and U: external power to sensor is
	required; e.g. type PD.

Signal outputs

Pulse output	
Function	Pulse output - transmitting accumulated total.
Frequency	Max. 64Hz. Pulse length user definable between
	7.8msec up to 2 seconds.
Type OA	two active 24V DC transistor outputs (PNP);
	max. 50mA per output (requires PD, PF or PM).
Type OR	two electro-mechanical relay outputs - isolated;
	max. switch power 230V AC (N.O.) - 0.5A per relay
	(requires PF or PM).
Type OT	two passive transistor outputs (NPN) - not isolated.
	Max. 50V DC - 300mA per output.

Communication option	
Function	Reading display information, reading / writing all
	configuration settings.
Protocol	Modbus ASCII / RTU.
Speed	1200 - 2400 - 4800 - 9600 baud.
Addressing	Maximum 255 addresses.
Type CB	RS232
Type CH	RS485 2-wire
Type CI	RS485 4-wire
Type CT	TTL Intrinsically Safe.

Operational

Operator functions

Displayed	 Flow rate and / or total flow A.
functions	 Total and accumulated total flow A.
	 Flow rate and / or total flow B.
	 Total and accumulated total flow B.

• Total A and total B can individually be reset to zero by pressing the CLEAR-key twice.

Total		
Digits	7 digits.	
Units	L, m³, GAL, USGAL, kg, lb, bbl, no unit.	
Decimals	0 - 1 - 2 or 3.	
Note	Total can be reset to zero.	

Accumulated total

Digits	11 digits.
Units / decimals	According to selection for total.
Note	Can not be reset to zero.

Flow rate	
Digits	7 digits.
Units	mL, L, m ³ , Gallons, kg, Ton, lb, bl, cf, RND, ft ³ , scf,
	Nm³, Nl, igal - no units.
Decimals	0 - 1 - 2 0r 3.
Time units	/sec - /min - /hr - /day.

Accessories

Mounting accessories	
ACF02	Stainless steel wall mounting kit.
ACF05	Stainless steel pipe mounting kit (worm gear clamps not included).
ACFo6	Two stainless steel worm gear clamps Ø 44 - 56mm.
ACF07	Two stainless steel worm gear clamps Ø 58 - 75mm.
ACFo8	Two stainless steel worm gear clamps Ø 77 - 95mm.
ACF09	Two stainless steel worm gear clamps Ø 106 - 138mm.
ACF10	Customized Grevopal tagplates for ACF02 and ACF05,
	including stainless steel screws.
	Dimension: 95mm x 12.5mm (3.75" x 0.50").





Ordering information

Standard configuration: F111-P-AX-CX-EX-HC-IX-OT-PX-TX-XX-ZX. **Ordering information:** -EX Flowmeter input signal Ρ **€** Pulse input: coil, npn, pnp, namur, reed-switch. U Communication CB Communication RS232 - Modbus ASCII / RTU. Communication RS485 - 2-wire - Modbus ASCII / RTU. CH Communication RS485 - 4-wire - Modbus ASCII / RTU. CI (a) Intrinsically Safe TTL - Modbus ASCII / RTU. CT CX No communication. EX 🐵 No flow equations. Panel mount enclosures - IP65 / NEMA4X HB Aluminum enclosure. HC GRP enclosure. GRP field / wall mount enclosures - IP67 / NEMA4X HD © Cable entry: no holes. HE © Cable entry: 2 x Ø 16mm & 1 x Ø 20mm. HF © Cable entry: $1 \times \emptyset 22mm (7/8")$. HG © Cable entry: 2 x Ø 20mm. HH 🖾 Cable entry: 6 x Ø 12mm. HJ © Cable entry: 3 x Ø 22mm (7/8"). HK Flat bottom, cable entry: no holes. Aluminum field / wall mount enclosures - IP67 / NEMA4X HN © Cable entry: 1 x M20. HO Gable entry: 2 x M20. HP © Cable entry: 6 x M₁₂. HU © Cable entry: 3 x 1/2"NPT. HV Cable entry: 4 x M20. ABS field / wall mount enclosures - IP65 HS Silicone free ABS field enclosure – Cable entry: no holes (old HD enclosure). Additional in **Outputs** OA two active transistor outputs - requires PD, PF or PM. OR Two mechanical relay outputs - requires PF or PM. OT Two passive transistor outputs - standard configuration. Pov PB Lithium battery powered. PC Lithium battery powered - Intrinsically Safe. 8 - 24V AC/DC + sensor supply - with XI: 16 - 30V DC. PD PF 24V AC/DC + sensor supply. PLInput loop powered from sensor signal type "A" - requires OT (not Xi). PM 115 - 230V AC + sensor supply. PX Basic power supply 8 - 30V DC (no real sensor supply). Temperature input sign XΙ (a) Intrinsically Safe, according ATEX and IECEx. XF EExd enclosure - 3 keys. $\mathbf{X}\mathbf{X}$ Safe area only.

The bold marked text contains the standard configuration.

Available Intrinsically Safe.

ZX

No options.

Backlight. Coil input 10mVpp.

Other options

7B

