

DUAL INPUT FLOW RATE / TOTALIZER

WITH TWO PULSE SIGNAL OUTPUTS



Advantages

- Robust IP67 (NEMA Type4X) field enclosure. It is so rugged, **you can even stand on it!**
- Intrinsically Safe available - ATEX and IECEx approval for gas and dust applications.
- Programming can be done by your own crew, with the sensible menu-driven structure, saving cost and irritation. **Know one, know them all!**
- Very diverse mounting possibilities: walls, pipes, panels or directly onto outdoor sensors!

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.
- Auto backup of settings and running totals.
- Explosion/flame proof available.
- For each flow one pulse signal output.
- Full Modbus communication RS232/485/TTL.
- Battery powered, 8 - 24V AC/DC or 115 - 230V AC power supply.
- Sensor supply 3 / 8.2 / 12 / 24V DC.

Signal output

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

Signal input

Flow

- Ability to process all types of flowmeter signals: Reed-switch, NAMUR, NPN/PNP pulse, Sine wave (coil), Active pulse signals.

Applications

- The F-Series is your first and safest choice for field mount indicators in safe and hazardous area applications. Especially in harsh weather conditions like rain, snow, salty atmospheres and temperatures between -40°C up to +80°C (-40°F up to 176°F).
- For those applications where instead of two just one indicator is desired. Alternative basic models: two F014's or the D-Series DIN panel mount flow rate indicators.

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 toggle function.

Configuration

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumeric description, which avoids 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 0.001 second up to 9.999 seconds. The maximum output frequency is 500Hz. 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.

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).

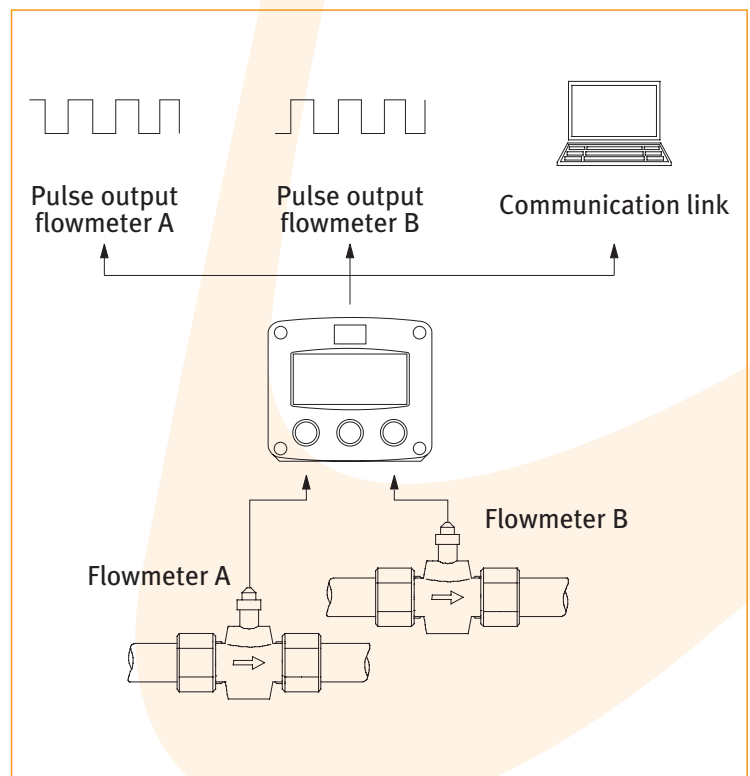
Hazardous areas

This model has been ATEX and IECEx certified Intrinsically Safe for gas and dust applications, with an allowed ambient temperature of -40°C to +70°C (-40°F to +158°F). A flame proof Ex d enclosure with ATEX certification is also available.

Enclosures

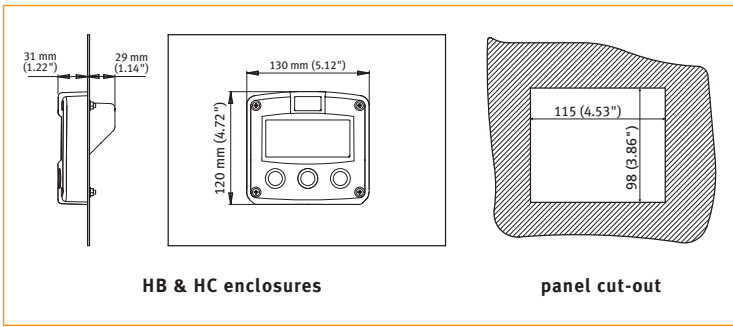
Various types of enclosures can be selected, all ATEX and IECEx approved. As standard the F111 is supplied in an GRP panel mount enclosure, which can be converted to an IP67 / NEMA Type4X GRP field mount enclosure by the addition of a back case. Most popular is our rugged aluminum field mount enclosure with IP67 / NEMA Type4X rating. Both European or U.S. cable gland entry threads are available.

Overview application F111



Dimensions enclosures

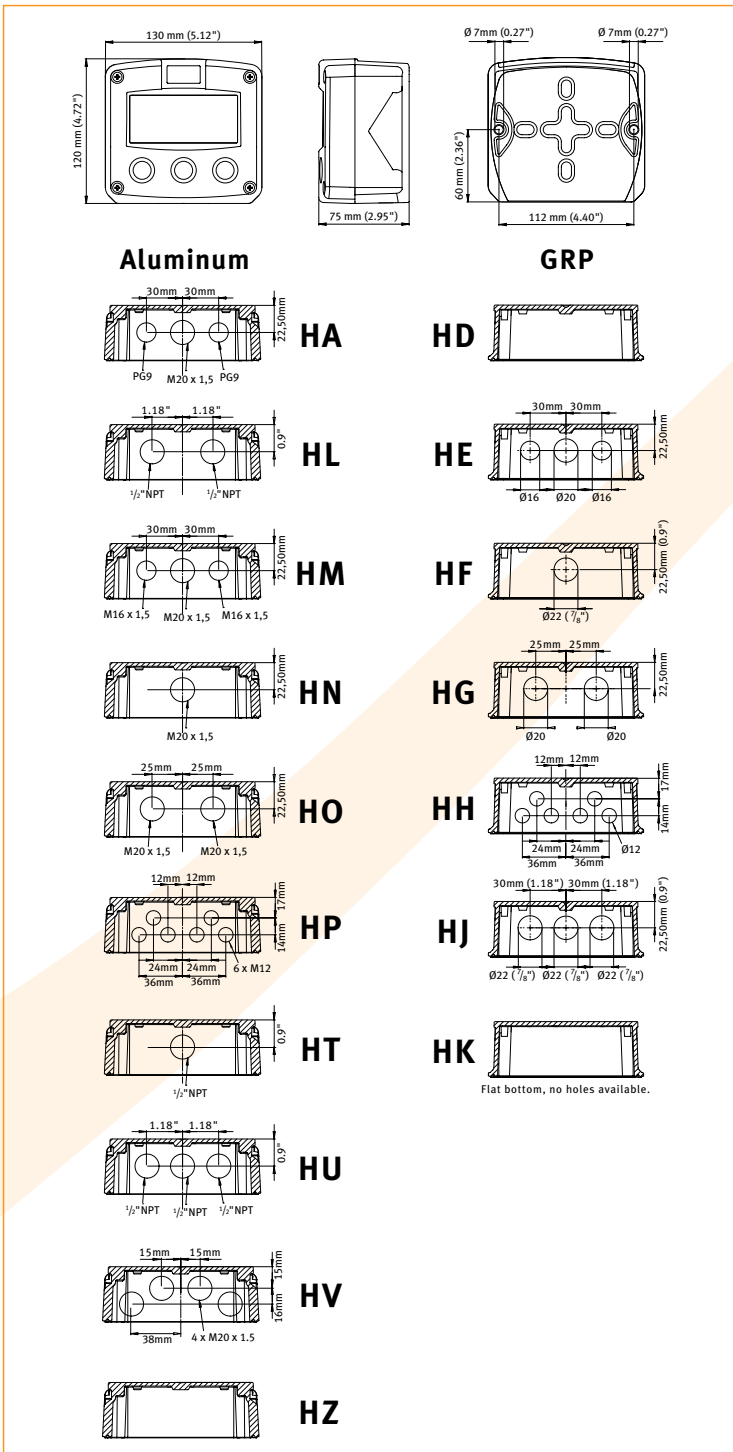
Aluminum & GRP panel mount enclosure



HB & HC enclosures

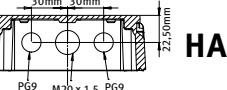
panel cut-out

Aluminum & GRP field / wall mount enclosures

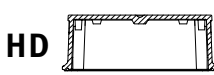


Aluminum

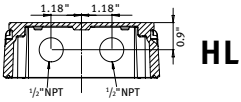
GRP



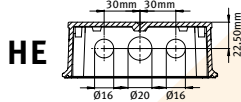
HA



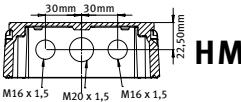
HD



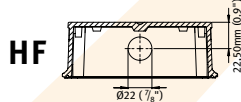
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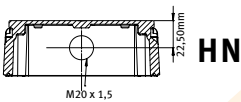
HE



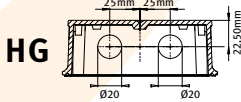
HM



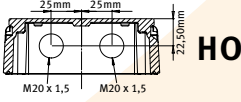
HF



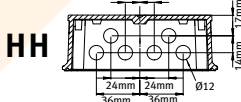
HN



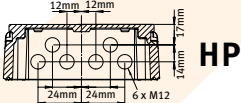
HG



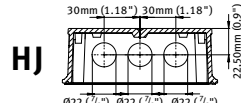
HO



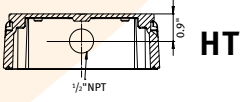
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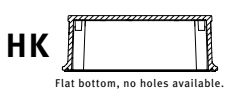
HP



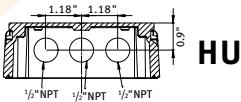
HJ



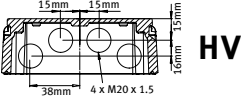
HT



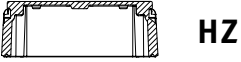
HK



HU



HV



HZ

Terminal connections

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
COMMUNICATION																															
CB: RS232																															
DTR +12V TXD																															
CH: RS485 - 2 wire																															
A B																															
CI: RS485 - 4 wire																															
A B Y Z																															
CT: TTL Intrinsically Safe																															
DTR +12V TXD																															
FLOWMETER INPUT B																															
P: coil ~ P: reset switch / NPN P: PNP P: rearm P: active signal																															
FLOWMETER INPUT A																															
P: coil ~ P: reset switch / NPN P: PNP P: rearm P: active signal																															
POWER REQUIREMENT																															
PX - XI: 8 - 30VDC - +																															
PULSE OUTPUT A																															
OX: active 24VDC OT: passive trans. OR: mech. relay																															
PULSE OUTPUT B																															
OX: active 24VDC OT: passive trans. OR: mech. relay																															
POWER REQUIREMENT																															
PD: 8 - 24V AC PF: 8 - 24V DC PD: XI: 6 - 30V DC PF: 24V AC PF: 24V DC																															
FM: TI5 - 230V AC PX: XX: 8 - 30V DC ZB: Backlight: 12 - 30V DC																															

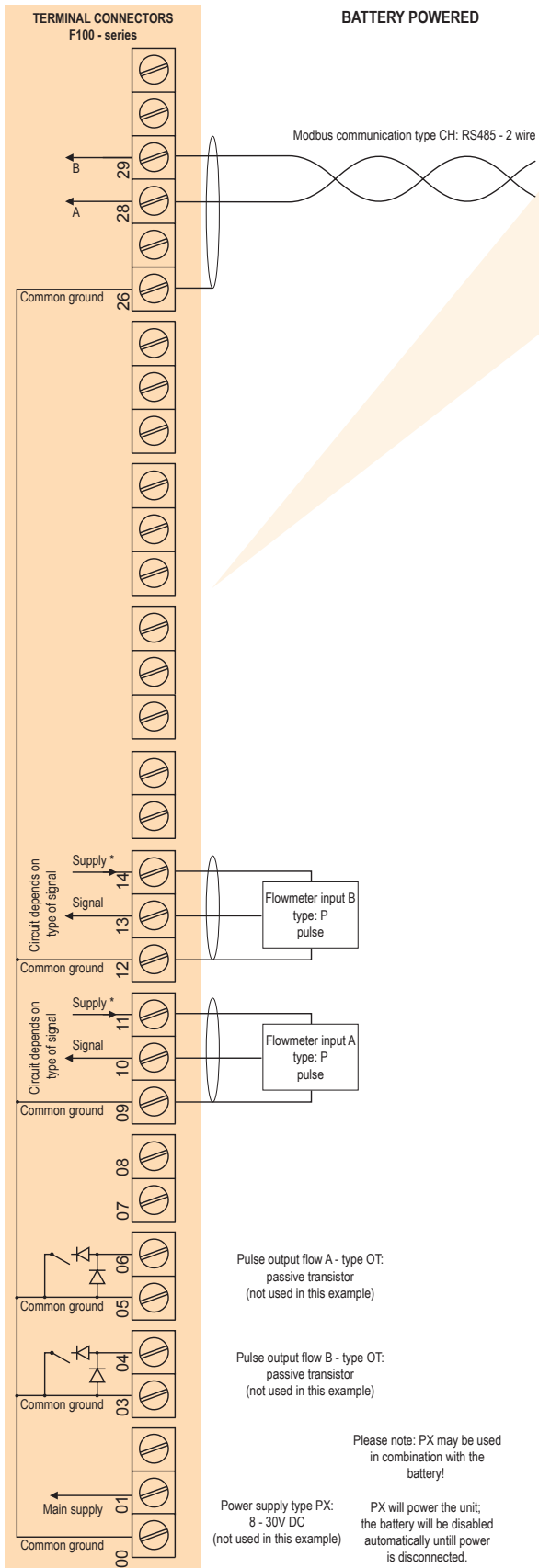
PB / PC: battery powered Internal long-life Lithium battery

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

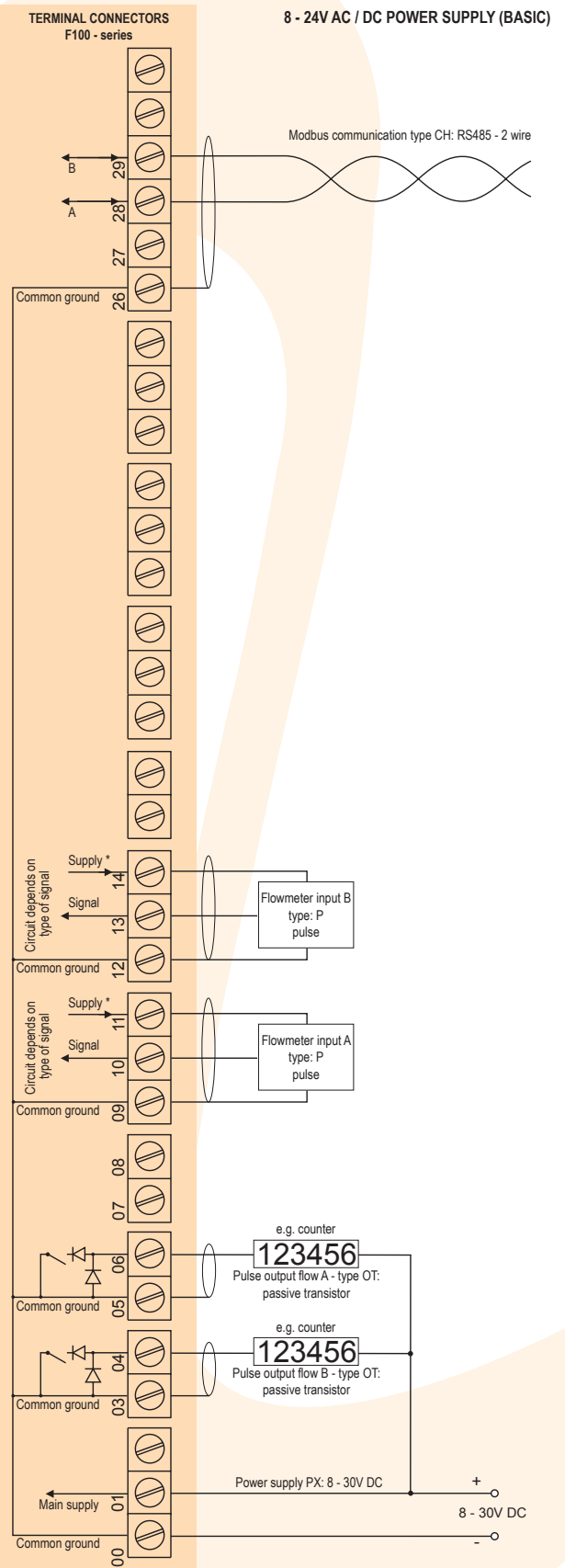


Typical wiring diagram F111-P-CH-PB-OT-PX

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

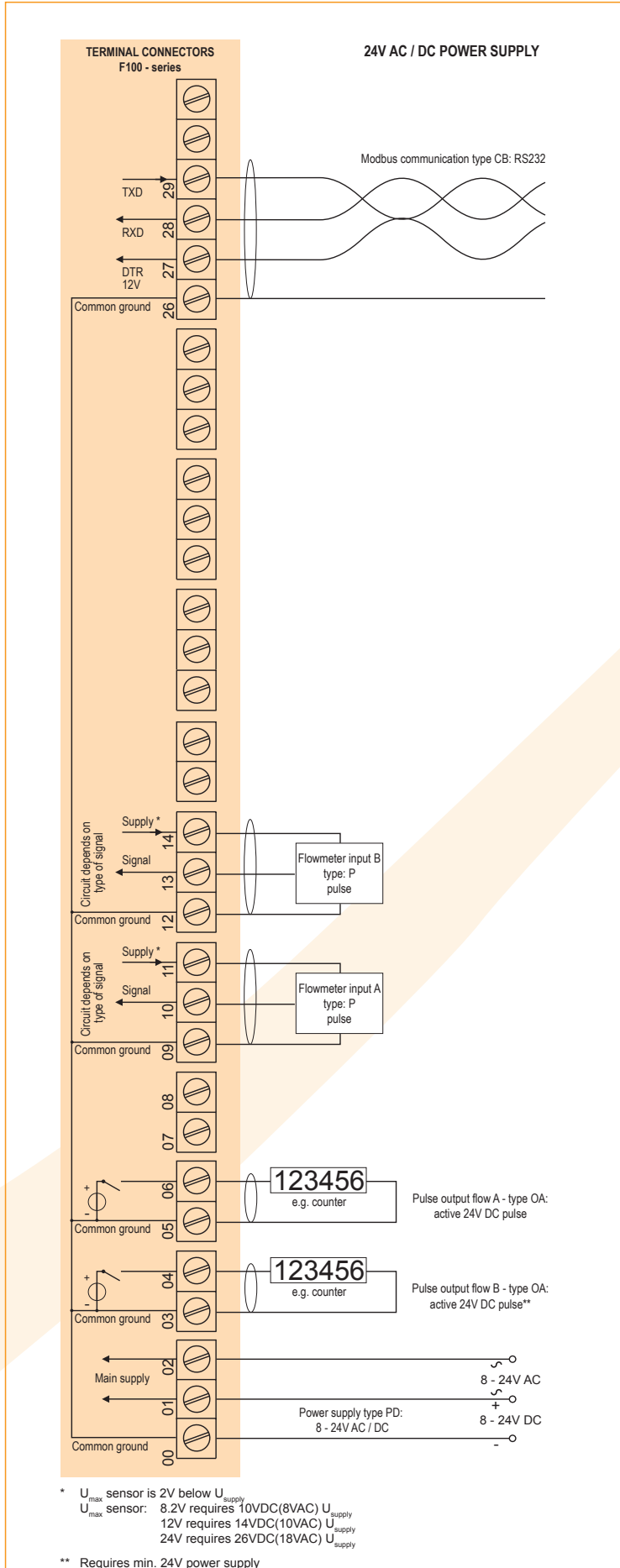


* For pulse type inputs: V_{ref} : 1.2V/3.0V available. - NO power output, available I_{supply} : <1mA. Note: using these ref. voltages at max. load, will reduce battery life significantly.

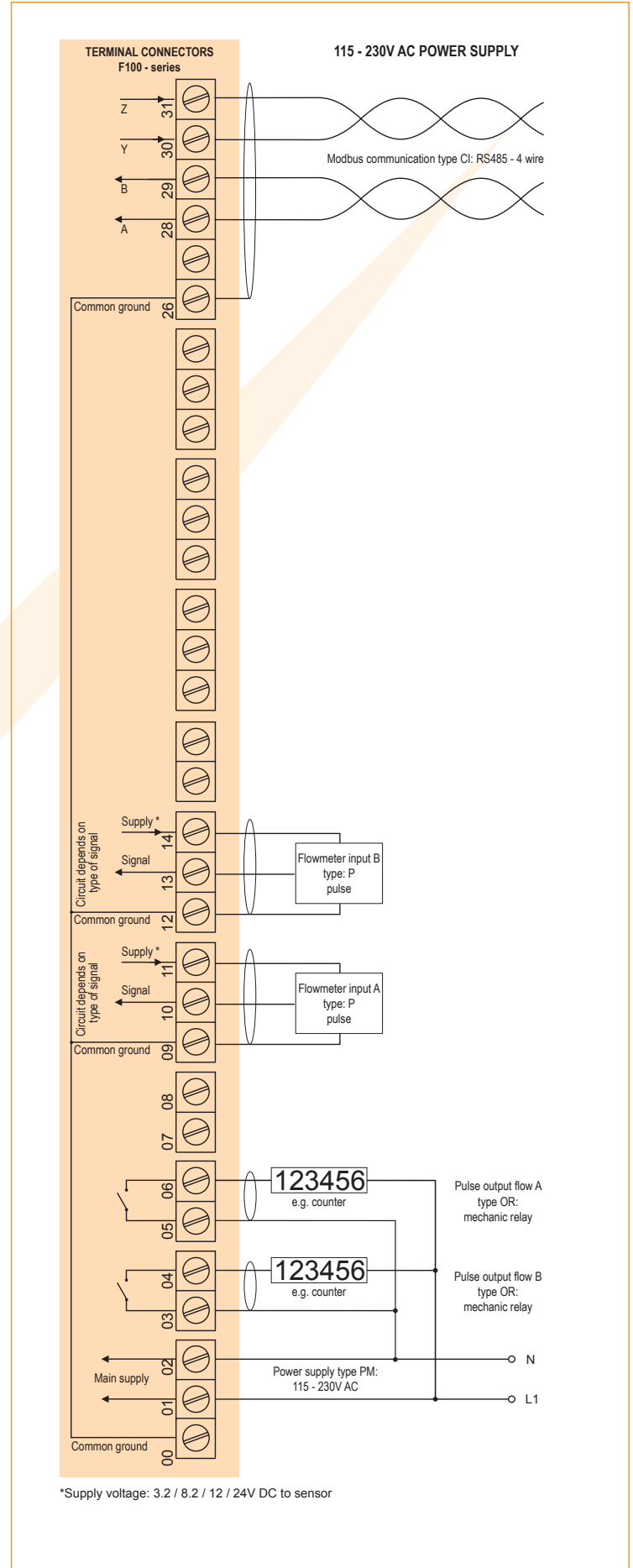


* For pulse type inputs: V_{ref} : 1.2V/3.0V available. - NO power output, available I_{supply} : <1mA. Note: using these ref. voltages at max. load, will reduce battery life significantly.

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



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



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°C (-40°F to +158°F).

- The ATEX markings for gas and dust applications are:

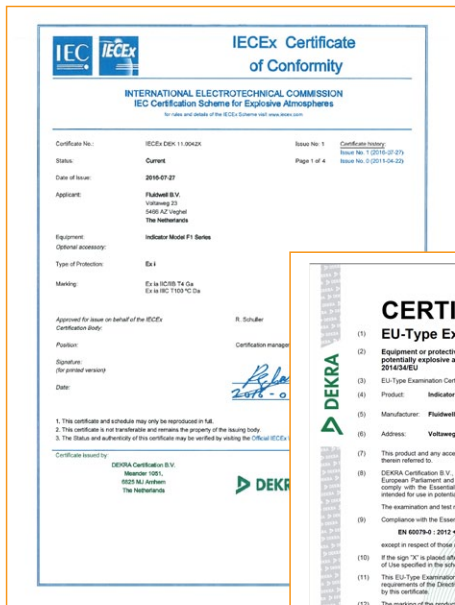
II 1 G Ex ia IIB/IIC T4 Ga
II 1 D Ex ia IIIC T100 °C Da.

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

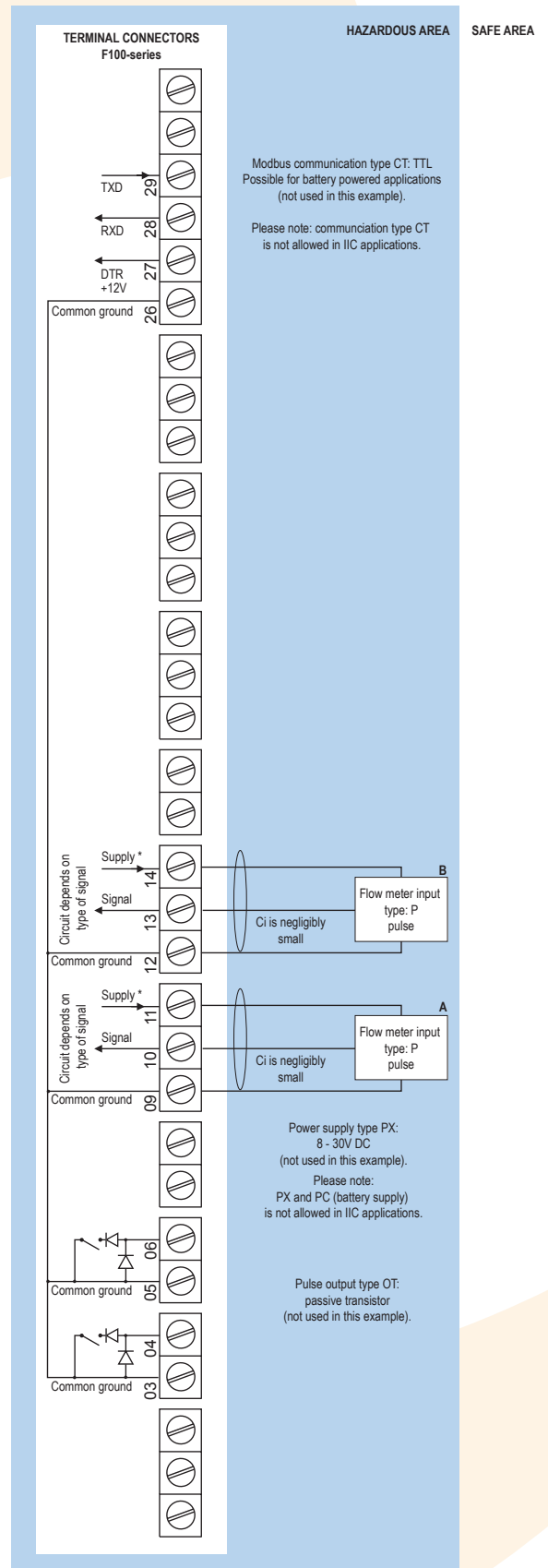
Besides the two I.S. power supplies for the pulse outputs, it is allowed to connect up to three I.S. power supplies in IIB/IIIC applications or one in IIC applications. Consult the certificate for the maximum input and output values of the circuits. Full functionality of the F111 remains available, including pulse output and Modbus communication (type CT). Power supply type PD-XI offers a 8.2V sensor supply e.g. for one Namur sensor.

An ATEX approved flame proof Ex d enclosure is available as well. Please contact your supplier for further details.

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

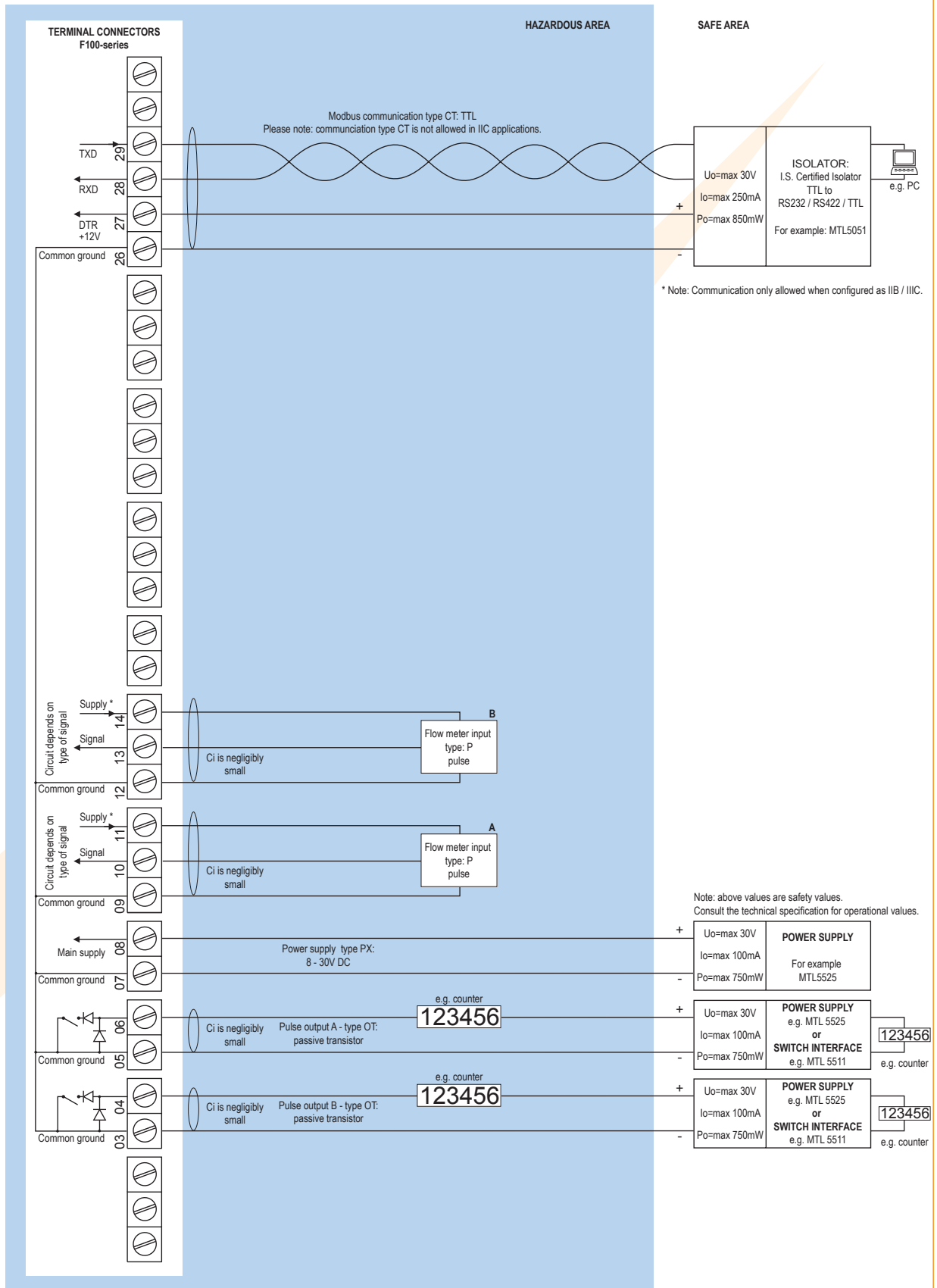


Configuration example IIB / IIIC and IIC F111-P-(CT)-(OT)-PC-(PX)-XI - Battery powered unit



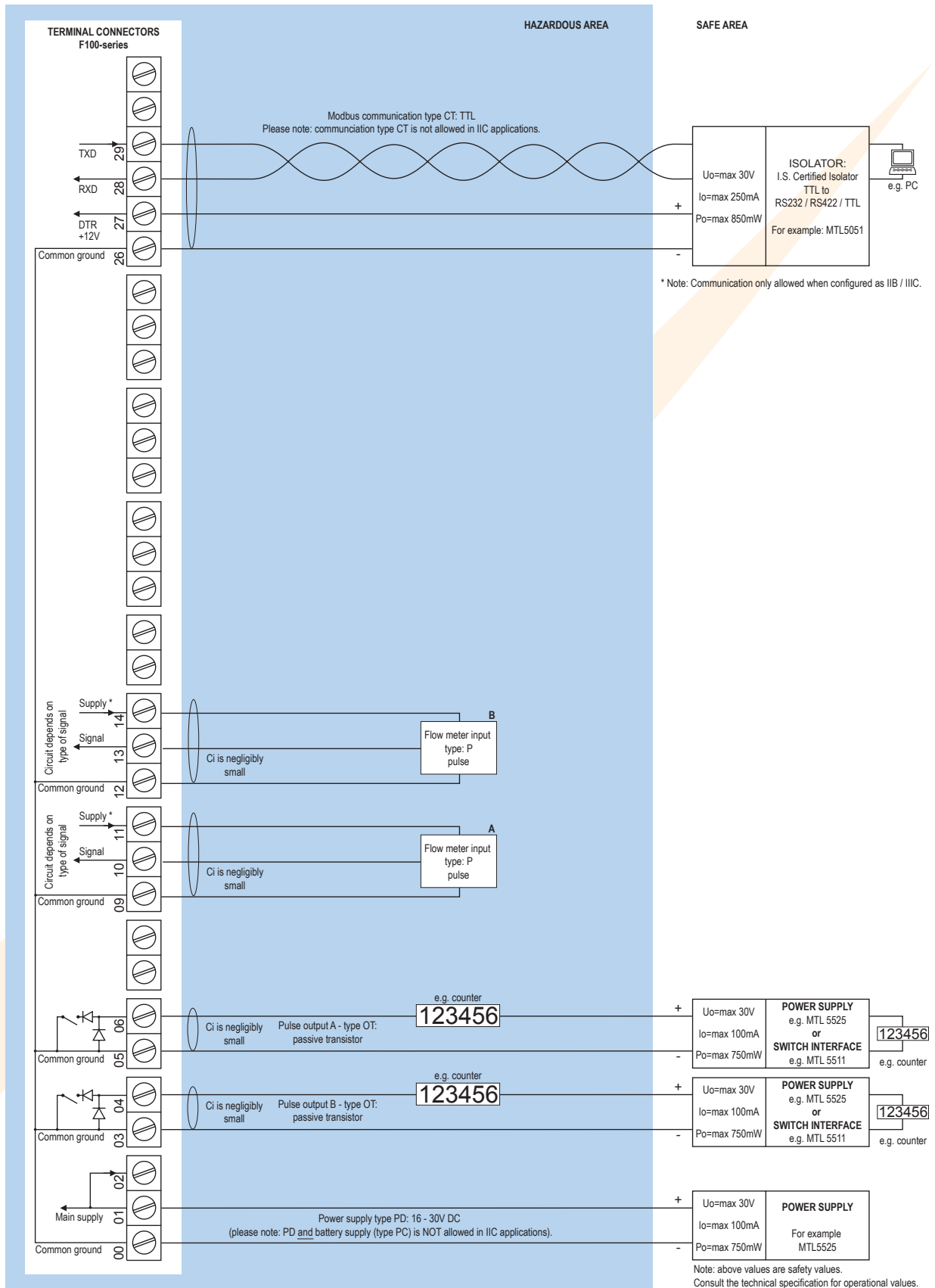
* For pulse type inputs: $V_{ref} = 1.2V/3.0V$ available. - NO power output, available I_{supply} < 1mA.
Note: using these ref. voltages at max. load, will reduce battery life significantly.

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



* For pulse type inputs: V_{ref} : 1.2V/3.0V available.- NO power output, available I_{supply} : <1mA.
Note: using these ref. voltages at max. load, will reduce battery life significantly

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



* Note power supply type PD: the supply voltage to pulse sensors is maximum 8.7V (Uo=max 8.7V Io=max 25mA Po=max 150mW) and to analog sensors as connected to terminal 1 (internally linked).

Technical specification

General

Display	
Type	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: fast, 1sec, 3sec, 15sec, 30sec, off.
Option ZB	Transflective LCD with white LED-backlight. Good readings in full sunlight and darkness.
Note ZB	Only available for safe area applications.

Ambient temperature

Safe areas	-40°C to +80°C (-40°F to +176°F).
Intrinsically Safe	-40°C to +70°C (-40°F to +158°F).

Power requirements

Type PB	Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years. (requires PD or PX)
Type PC	Intrinsically Safe long life lithium battery - life-time depends upon settings and configuration - up to 5 years. (requires XI and PD or PX)
Type PD	8 - 24V AC / DC ± 10%. Power consumption max. 5 Watt. Intrinsically Safe: 16 - 30V DC; power consumption max. 1 Watt.
Type PF	24V AC / DC ± 10%. Power consumption max. 15 Watt.
Type PM	115 - 230V AC ± 10%. Power consumption max. 15 Watt.
Type PX	8 - 30V DC. Power consumption max. 0.75 Watt.
Type ZB	12 - 30V DC ± 10%. Power consumption max. 1.5 Watt.
Note PB/PF/PM	Not available 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 values in the certificate.

Sensor excitation

Type PB/PC/PX	3V 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 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC. U _{max} sensor is 2V below U _{supply}
Type PD-XI	1.2 / 3 / 8.2V DC - max. 7mA @ 8.2V DC and mains power supply voltage (as connected to terminal 1).
Type PF / PM	1.2 / 3 / 8.2 / 12 / 24V DC - max. 400mA @ 24V DC.

Terminal connections

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

Type	EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years.
Password	Configuration settings can be password protected.

Directives & Standards

EMC	Directive 2014/30/EU, FCC 47 CFR part 15.
Low voltage	Directive 2014/35/EU
RoHS	Directive 2011/65/EU
ATEX / IECEx	Directive 2014/34/EU, IEC 600079-0, IEC 60079-11.
IP & NEMA	EN 60529 & NEMA 250

Enclosure

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

Aluminum wall / field mount enclosures

General	Die-cast aluminum wall/field mount enclosure IP67 / NEMA Type4X 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 HL	Cable entry: 2 x 1/2" NPT.
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 / field mount enclosures

General	GRP wall/field mount enclosure IP67 / NEMA Type4X, 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 x Ø 22mm (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 Type4X.
Weight	600 gr.
Type HC	GRP panel mount enclosure IP65 / NEMA Type4X, UV-resistant and flame retardant.
Weight	450 gr.

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.
IECEX certification	  Ex ia IIC/IIB T4 Ga. Ex ia IIIC T100 °C Da.
Ambient Ta	-40°C to +70°C (-40°F to +158°F).

Explosion proof (Type XF)

ATEX certification	 II 2 G / Ex d IIB T5 Gb. II 2 D / Ex t IIIB T100 °C Db.
Type XF	Dimensions of enclosure: 300 x 250 x 200mm (11.8" x 9.9" x 7.9") L x H x D.
Weight	Appr. 15kg.
Note	IECEX available on request.

Signal inputs

Flowmeter

Type P	Coil / sine wave (HI: 20mVpp or LO: 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed-switch, Namur, active pulse signals 8 - 12 and 24V DC.
Frequency	Minimum 0Hz - 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	0.000010 - 9,999,999 with variable decimal position.
Low-pass filter	Available for all pulse signals.
Option ZF	coil sensitivity 10mVpp.

Signal outputs

Digital output

Function	Pulse output - transmitting accumulated total.
Frequency	Max. 500Hz. Pulse length user definable between 0.001 second up to 9.999 seconds.
Type OA	two active 24V DC transistor outputs (PNP); max. 50mA per output (requires PD, PF, PM or PX). Requires min. 24V power supply.
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 functions	<ul style="list-style-type: none">• Flow rate and / or total flow A.• 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.
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Total

Digits	7 digits.
Units	L, m ³ , 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, Nm ³ , NL, igal - no units.
Decimals	0 - 1 - 2 or 3.
Time units	/sec - /min - /hr - /day.

Accessories

Mounting accessories

ACFo2	Stainless steel wall mounting kit.
ACFo5	Stainless steel pipe mounting kit (worm gear clamps not included).
ACFo6	Two stainless steel worm gear clamps Ø 44 - 56mm.
ACFo7	Two stainless steel worm gear clamps Ø 58 - 75mm.
ACFo8	Two stainless steel worm gear clamps Ø 77 - 95mm.
ACFo9	Two stainless steel worm gear clamps Ø 106 - 138mm.
ACF11	Swivel with 25° movement from center axis for direct flowmeter mounting: 1" NPT to 1/2" NPT.


Ordering information

Standard configuration: F111-P-AX-CX-EX-HC-IX-OT-PX-TX-XX-ZX.



Ordering information:

F111 - _ -C _ -H _ -O _ -P _ -X _ -Z _



Flowmeter input signal

P  **Pulse input: coil, npn, pnp, namur, reed-switch.**








Communication

- CB Communication RS232 - Modbus ASCII / RTU.
- CH Communication RS485 - 2-wire - Modbus ASCII / RTU.
- CI Communication RS485 - 4-wire - Modbus ASCII / RTU.
- CT  Intrinsically Safe TTL - Modbus ASCII / RTU.
- CX**  **No communication.**











Panel mount enclosures - IP65 / NEMA Type4X

- HB  Aluminum enclosure.
- HC**  **GRP enclosure.**


GRP field / wall mount enclosures - IP67 / NEMA Type4X

- HD  Cable entry: no holes.
- HE  Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.
- HF  Cable entry: 1 x Ø 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 / NEMA Type4X

- HA  Cable entry: 2 x PG9 + 1 x M20.
- HL  Cable entry: 2 x 1/2"NPT.
- HM  Cable entry: 2 x M16 + 1 x M20.
- HN  Cable entry: 1 x M20.
- HO  Cable entry: 2 x M20.
- HP  Cable entry: 6 x M12.
- HT  Cable entry: 1 x 1/2"NPT.
- HU  Cable entry: 3 x 1/2"NPT.
- HV  Cable entry: 4 x M20.
- HZ  Cable entry: no holes.


Digital output signal

- OA two active transistor outputs - requires PD, PF, PM or PX.
- OR Two mechanical relay outputs - requires PF or PM.
- OT**  **Two passive transistor outputs - standard configuration.**


Power requirements

- PD  8 - 24V AC/DC + sensor supply - with XI: 16 - 30V DC.
- PF 24V AC/DC + sensor supply.
- PM 115 - 230V AC + sensor supply.
- PX**  **Basic power supply 8 - 30V DC (no real sensor supply).**



Additional battery supply (optional)

- PB Lithium battery powered - requires PD, PL or PX.
- PC  Lithium battery powered - Intrinsically Safe - requires XI, and PD or PX.

Hazardous area

- XI  Intrinsically Safe, according ATEX and IECEx.
- XF Ex d enclosure - 3 keys according ATEX.
- XX** **Safe area only.**

Other options

- ZB Backlight.
- ZF  Coil input 10mVpp.
- ZX**  **No options.**

The bold marked text contains the standard configuration.

 Available Intrinsically Safe.

Specifications are subject to change without notice.

Klay Instruments bv
Nijverheidsweg 5, 7991 CZ, Dwingeloo
P.O. box 13, 7990 AA, Dwingeloo
The Netherlands
Tel.: +31 (0)521 591550
Fax.: +31 (0)521 592046
info@klay.nl
www.klay.nl