

FLOWRATE INDICATOR / TOTALIZER

WITH RUGGED ALUMINUM FIELD ENCLOSURE
OR PANEL MOUNT ENCLOSURE



Features

- Displays instantaneous flowrate, total and accumulated total.
- Large 17mm (0.67") digit selection for flowrate or total.
- Selectable on-screen engineering units.
- 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 178°F).
- Very compact design for panel mount, wall mount or field mount applications.
- Rugged aluminum field mount enclosure IP67/NEMA4X.
- Intrinsically Safe
Ex II 1 GD EEx ia IIC T4 T100°C.
- Explosion/flame proof Ex II 2 GD EEx d IIB T5.
- Easy configuration with clear alphanumerical display.
- LED backlight option.
- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC power supply.
- Sensor supply 3.2 - 8.2 - 12 - 24V DC.

Signal input

Flow

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

Applications

- Flow measurement where a local flowrate indication and totaliser function is required without re-transmission functionality. Alternative basic models F010 and F011 or more advanced F013 - F014 - F016 - F110 and higher.

General information

Introduction

The F012 is a local indicator to display the actual flowrate, total and accumulated total. The total can be reset to zero by pressing the CLEAR button twice. The eleven digit accumulated total however can not be reset to zero. A wide selection of options further enhance this models capabilities, including Intrinsic Safety for hazardous area applications.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits which can be set to show flowrate and / or totals. On-screen engineering units are easily configured from a comprehensive selection. The accumulated total can register up to 11 digits and is backed-up in EEPROM memory every minute, just as the running total. As the F012 has been designed for field mounted applications, a smart display update function has been incorporated. Related to the lower temperatures, the update frequency of the LCD is tuned automatically to achieve a readable display even at -40°C / -40°F.

Backlight

For those applications where readability during day and night is an issue, a bi-color backlight is available. The background color can be set to green or amber and the intensity can be adjusted from the keyboard. The display is a transfective type, which means that a high contrast reading is guaranteed in full sunlight as well as during the night. This backlight option is also available Intrinsically Safe.

Configuration

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, therefore avoiding 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.

Signal input

The F012 will accept most pulse and analog input signals for 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, jumpers or trimmers. The analog input version is even available as 4 - 20mA input loop powered display.

Power supply

Several power supply options are available to power the F012 and sensor. Most popular is our battery powered version with a long life lithium battery which will last up to five years. For analog sensors, a 4 - 20mA loop powered version is available as well. A real sensor supply is offered with the 24V AC/DC or 115 - 230V AC power supply option.

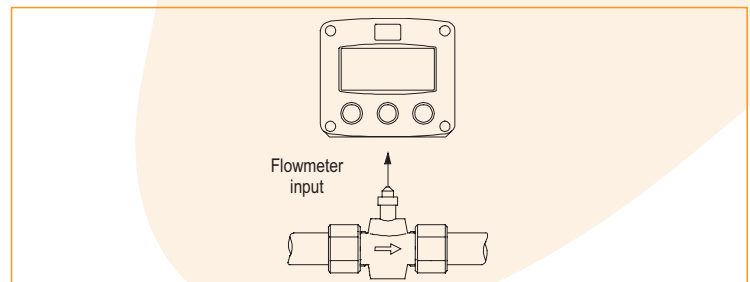
Hazardous areas

For hazardous area applications, this model has been ATEX certified Intrinsically Safe $\text{Ex II 1 GD EEx ia IIC T4 T100}^{\circ}\text{C}$ with an allowed operational temperature of -40°C to +70°C (-40°F to +158°F). IEC, CSA and FM certification is expected to be available in May 2006. A flame proof enclosure with ATEX certification offers the rating $\text{Ex II 2 GD EEx d IIB T5}$.

Enclosures

Various types of enclosures can be selected, all ATEX approved. As standard the F012 is supplied in an ABS panel mount enclosure, which can be converted to an IP67 / NEMA 4X ABS field mount enclosure by the addition of a back case. Most popular is our aluminum field mount enclosure with IP67 / NEMA 4X rating. Both European or U.S. cable gland entry threads are available.

Overview application F012

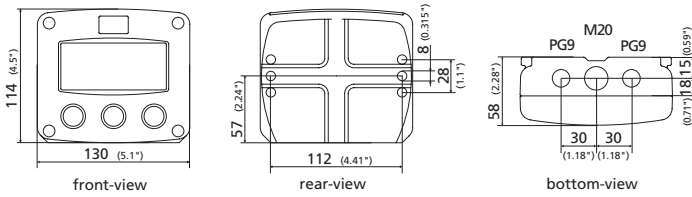


Dimensions enclosures

Enclosure HA

Aluminum field mount enclosure

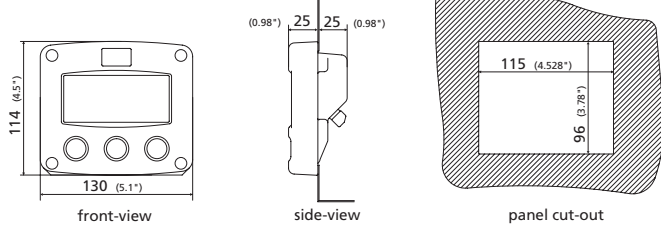
IP67 / NEMA 4X
Tapped holes: European thread



Enclosure HB

Aluminum panel mount enclosure

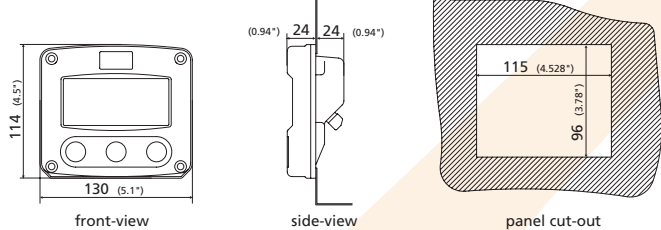
IP65 / NEMA 4



ENCLOSURE HC (STANDARD)

ABS PANEL MOUNT ENCLOSURE

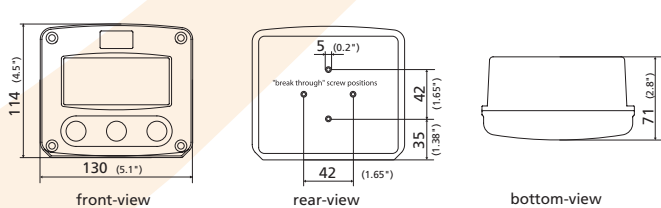
IP65 / NEMA 4



Enclosure HD

ABS wall mount enclosure

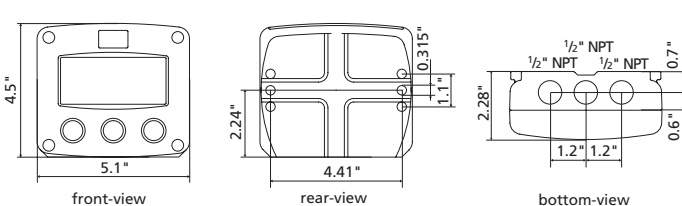
IP67 / NEMA 4X
Holes user defined



Enclosure HU

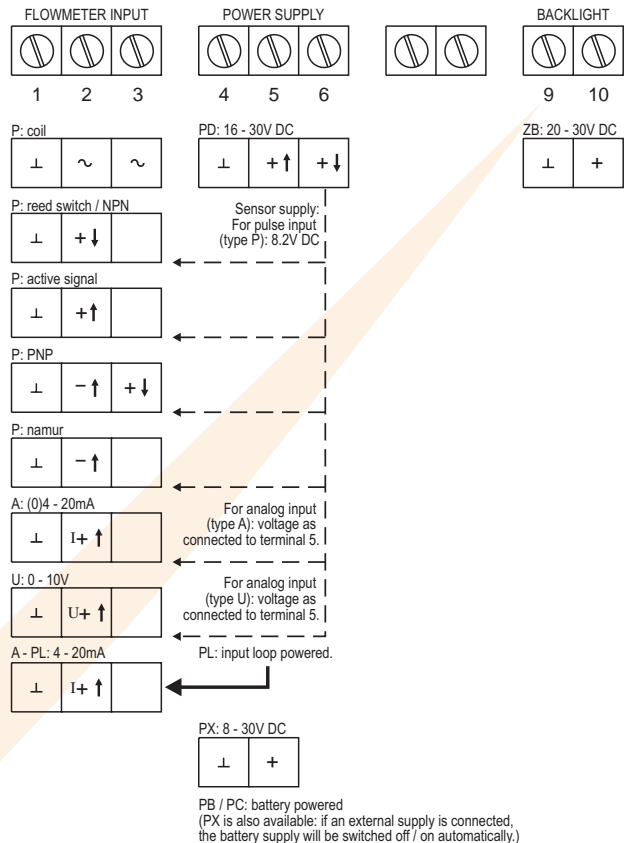
Aluminum field mount enclosure

IP67 / NEMA 4X
Tapped holes: U.S. thread

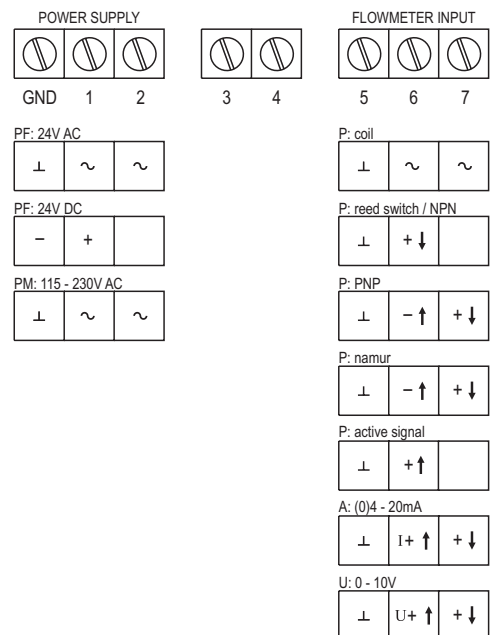


Terminal connections power supply

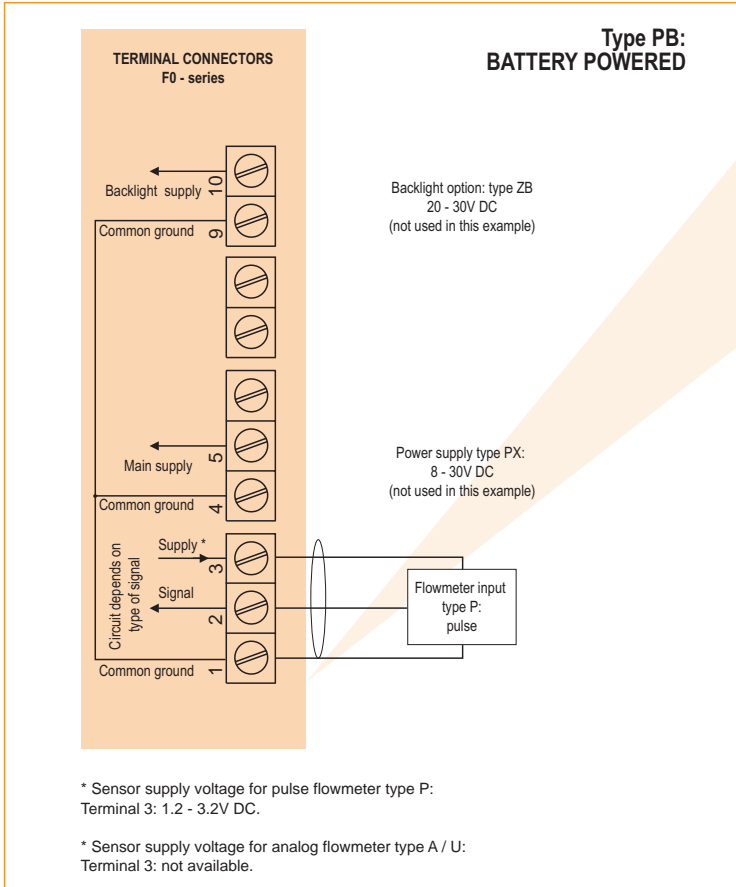
PB/PC - PD - PL - PX



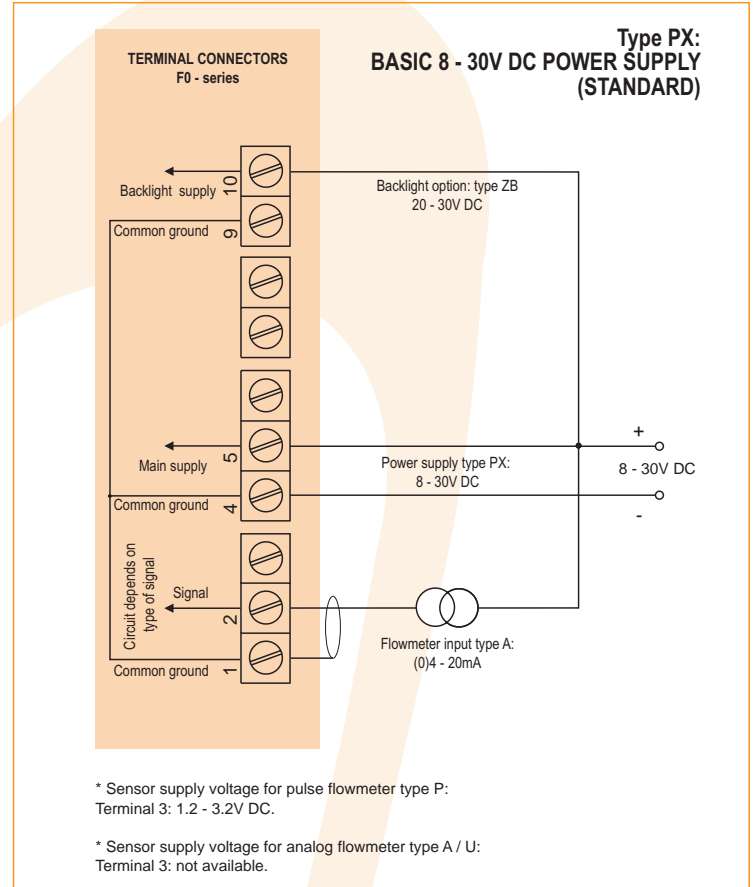
Terminal connections power supply PF - PM



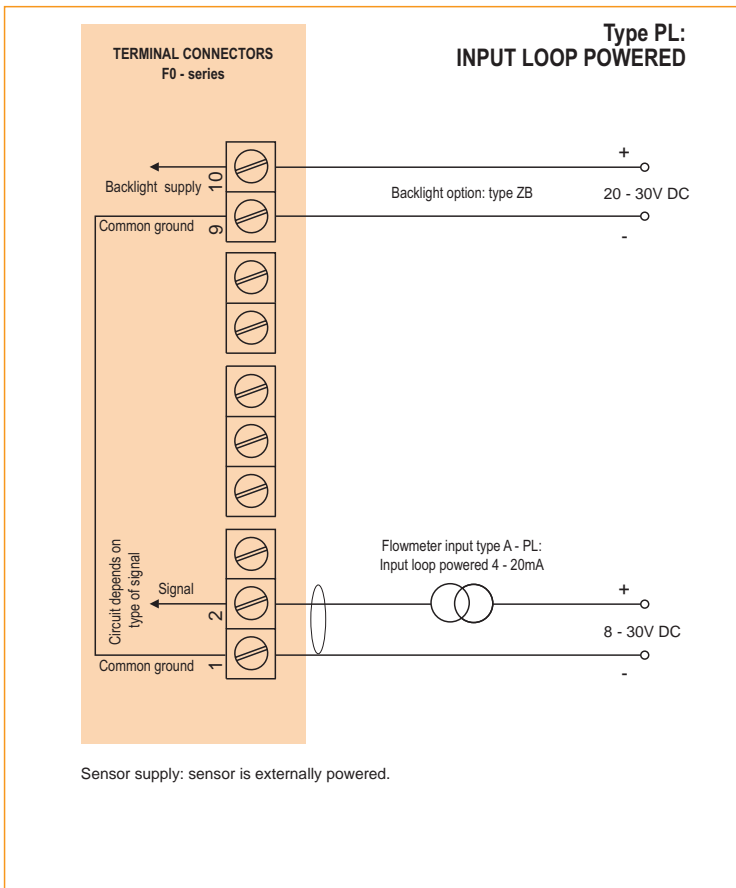
Typical wiring diagram Fo12-P-PB-(PX)-(ZB)



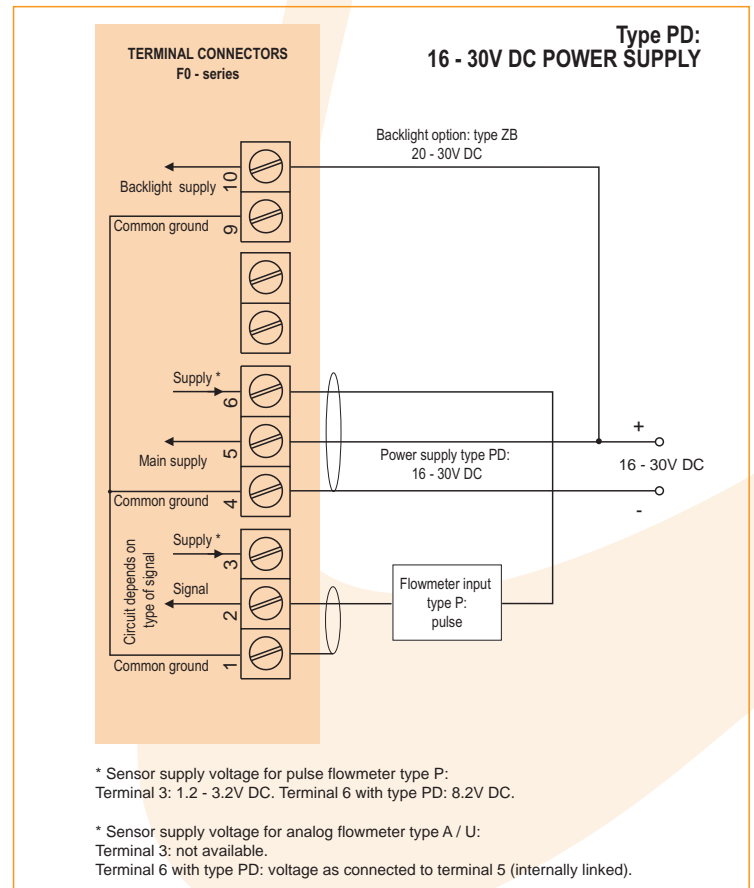
Typical wiring diagram Fo12-A-PX-ZB



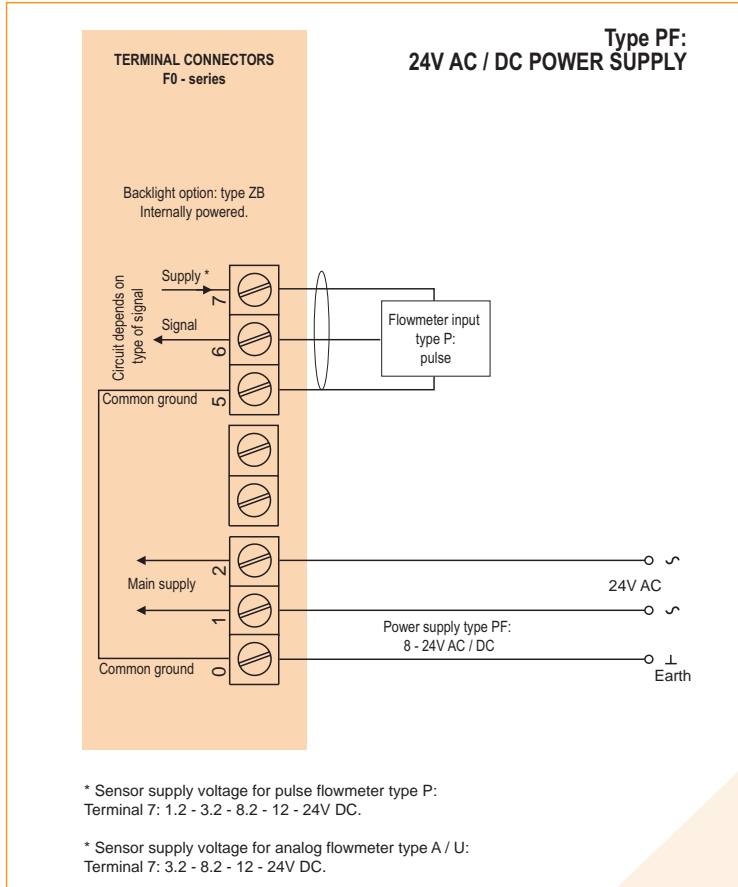
Typical wiring diagram Fo12-A-PL-ZB



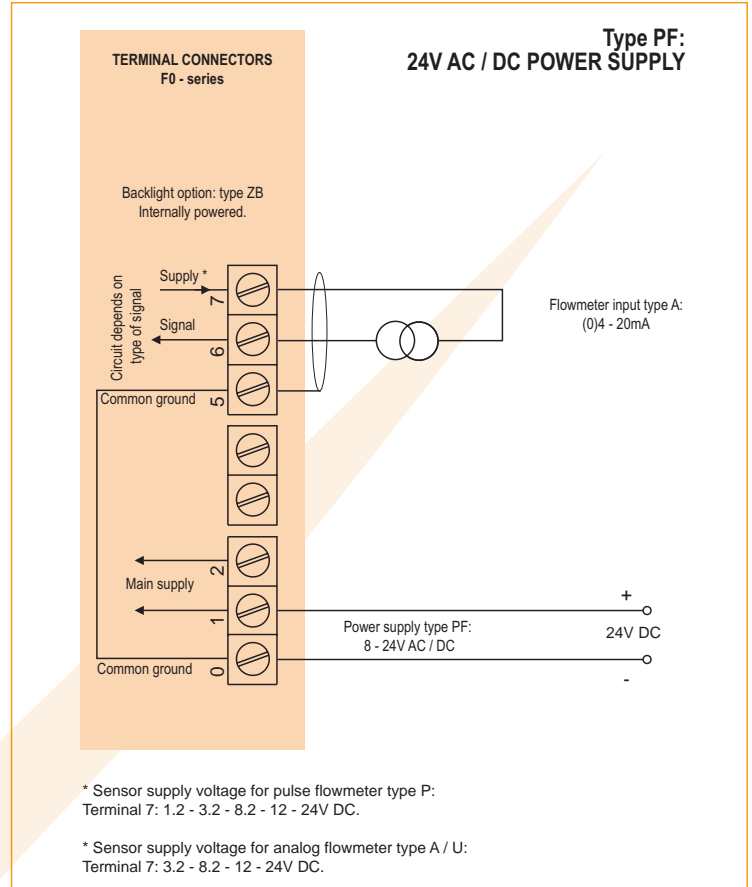
Typical wiring diagram Fo12-P-PD-ZB



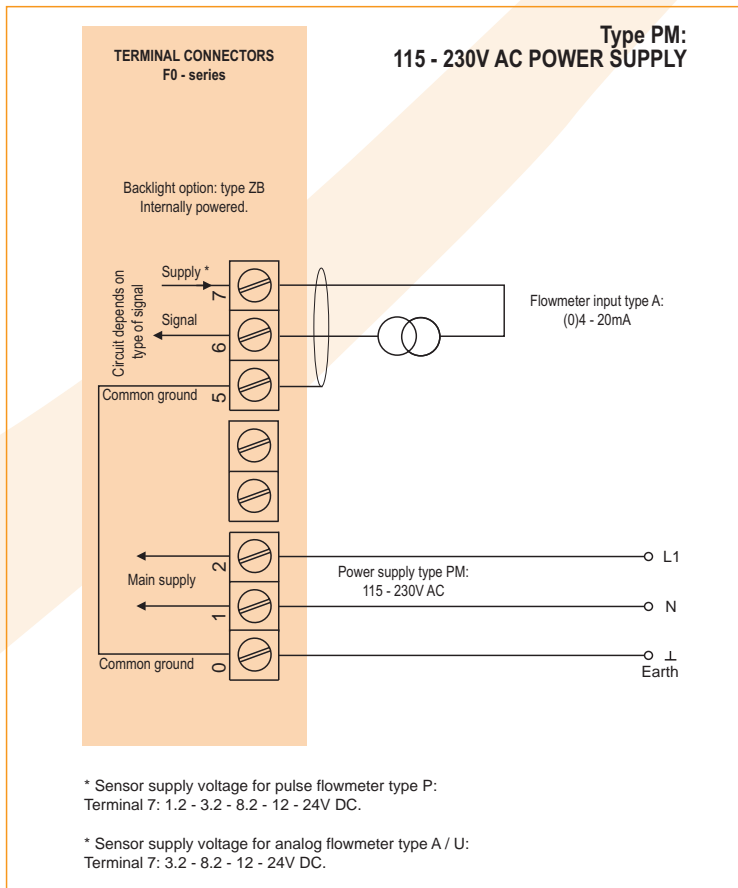
Typical wiring diagram Fo12-P-PF-ZB



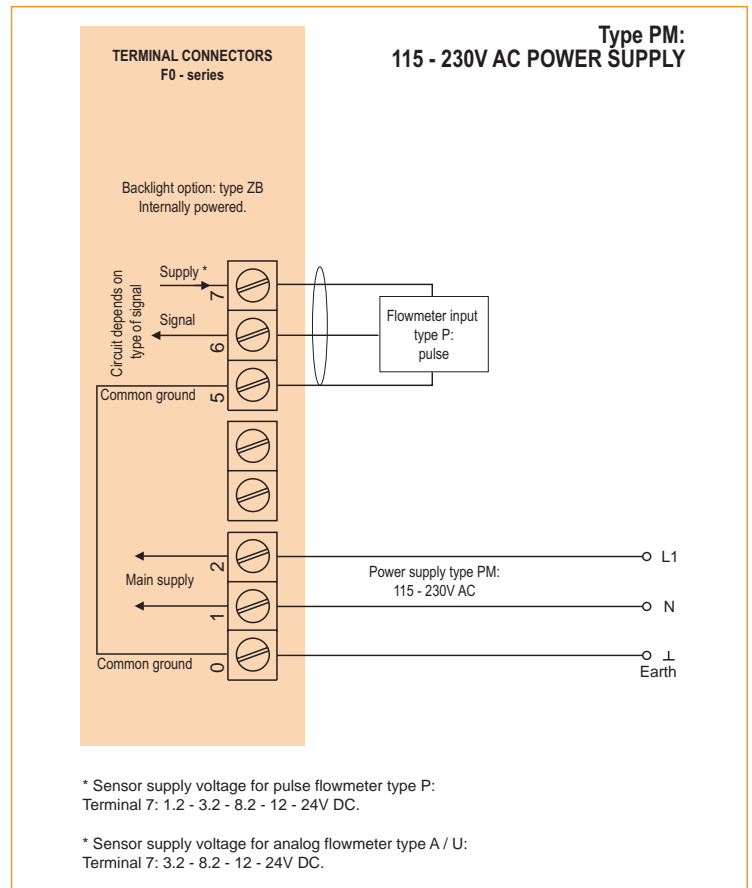
Typical wiring diagram Fo12-A-PF-ZB



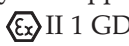

Typical wiring diagram Fo12-A-PM-ZB



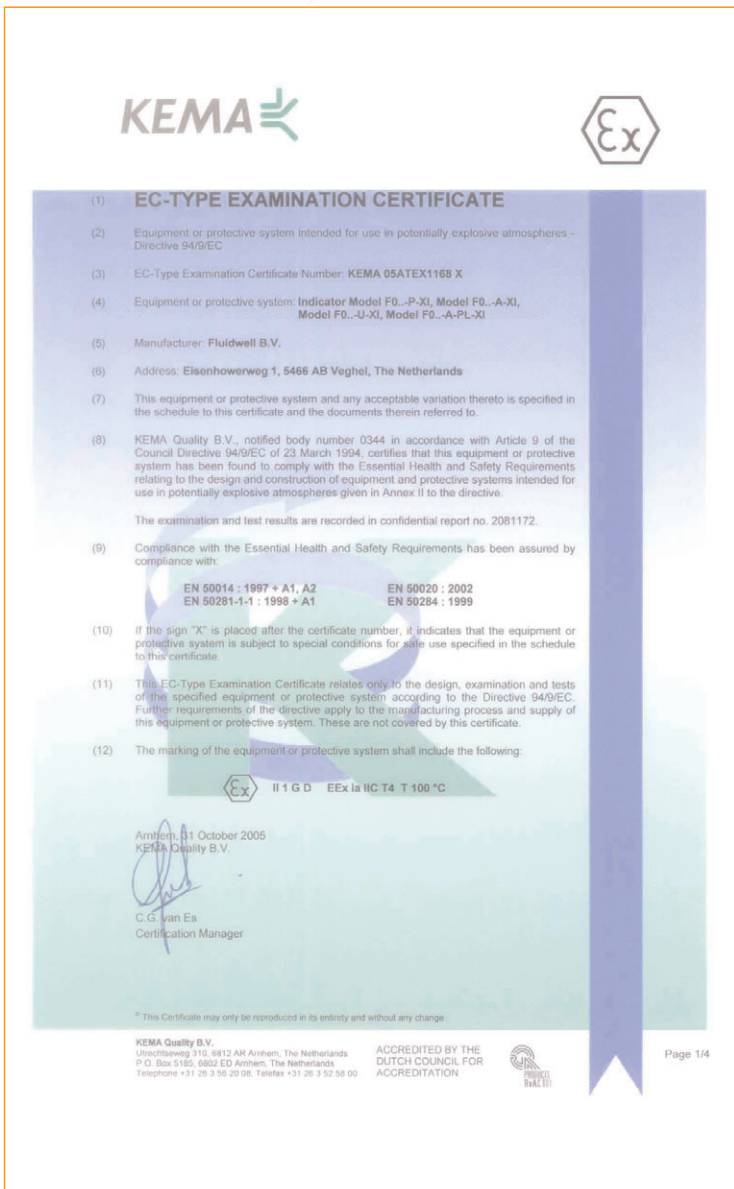
Typical wiring diagram Fo12-P-PM-ZB



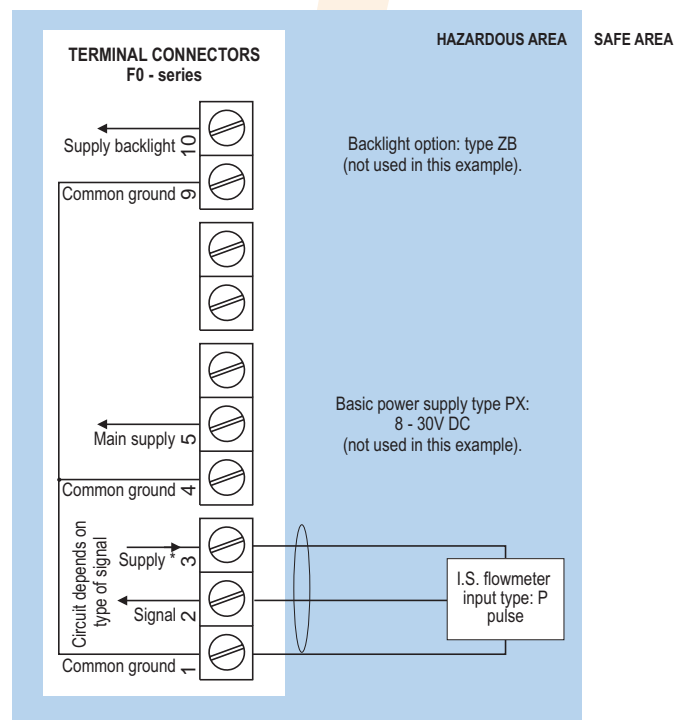
Hazardous area applications

The F012-XI has been ATEX approved by KEMA for use in Intrinsically Safe applications. It is approved according to  II 1 GD EEx ia IIC T4 T100°C for gas and dust applications with an operational temperature range of -40°C to +70°C (-40°F to +158°F). IEC, CSA and FM approvals are expected to become available in May 2006. It is allowed to connect up to three I.S. power supplies to power the unit, sensor and backlight. The F012-PD-XI offers a 8.2V DC sensor supply to power e.g. a Namur sensor or the input voltage to power an analog sensor. An ATEX approved flame proof enclosure with rating  II 2 GD EEx d IIB T5 is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 05ATEX1168 X

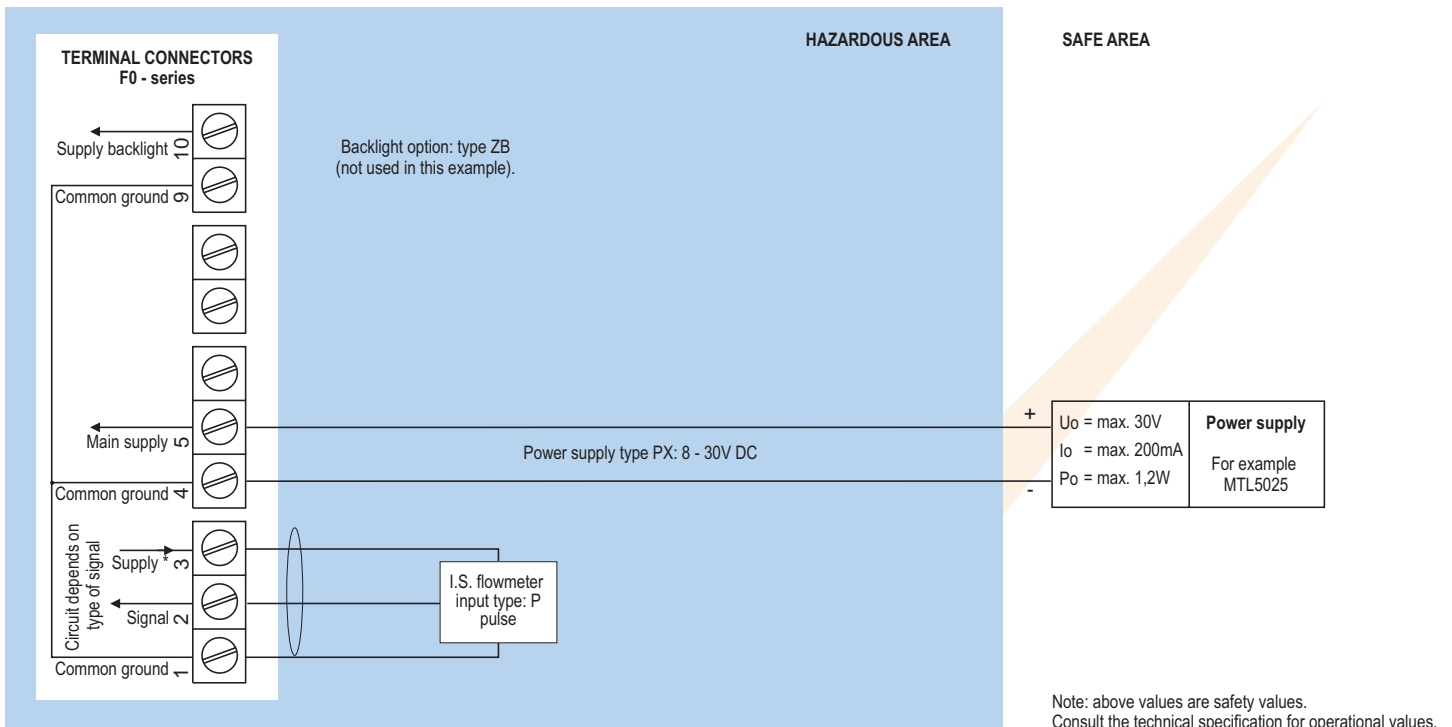


Configuration example IIA - IIB and IIC F012-P-PC-(PX)-XI-(ZB) - Battery powered unit



* Sensor supply voltage for pulse flowmeter type P : Terminal 3: 1.2 - 3.2V DC.
Please note: type PX may be used in combination with the battery (type PC).
PX will power the unit; the battery will be disabled automatically till power is disconnected.

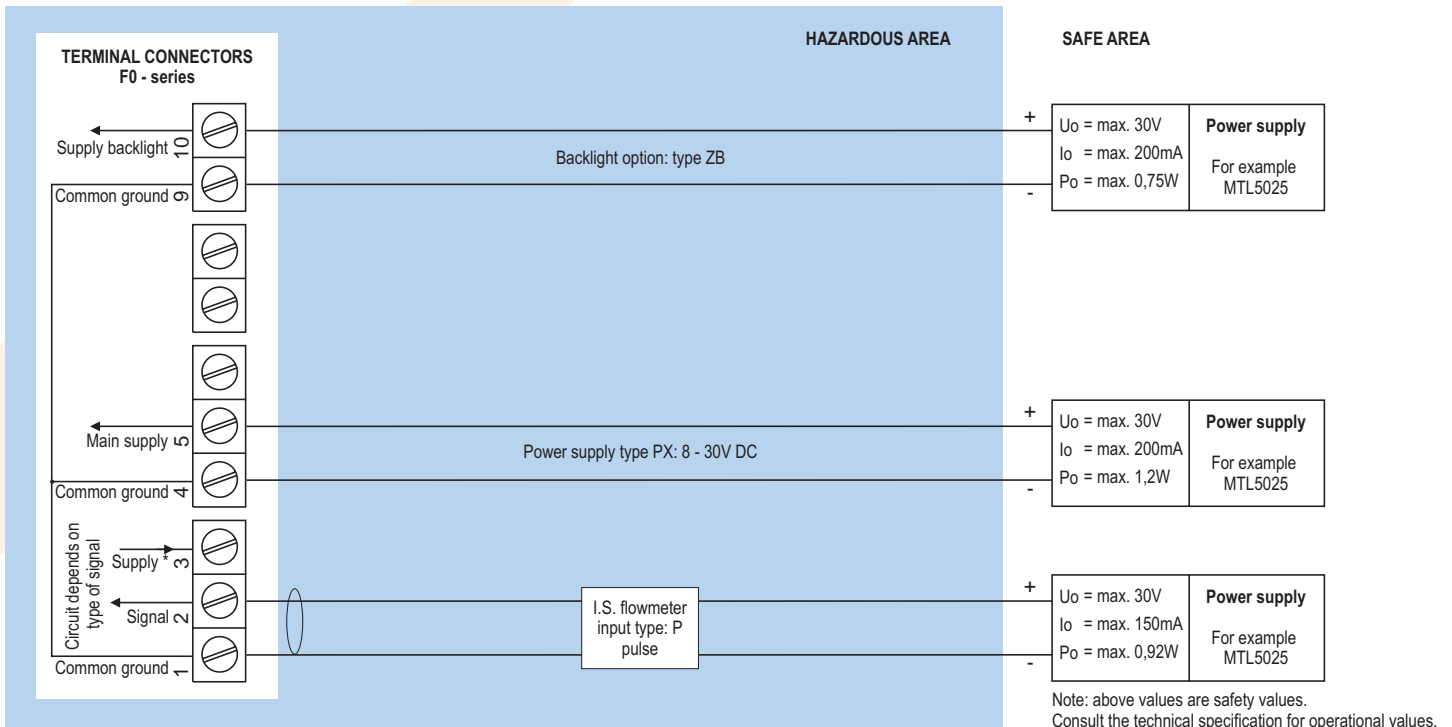
Configuration example IIA - IIB and IIC - F012-P-PX-XI-(ZB) - Basic power supply 8 - 30V DC



* Sensor supply voltage for pulse type P: Terminal 3: 1.2V - 3.2V DC.

Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.

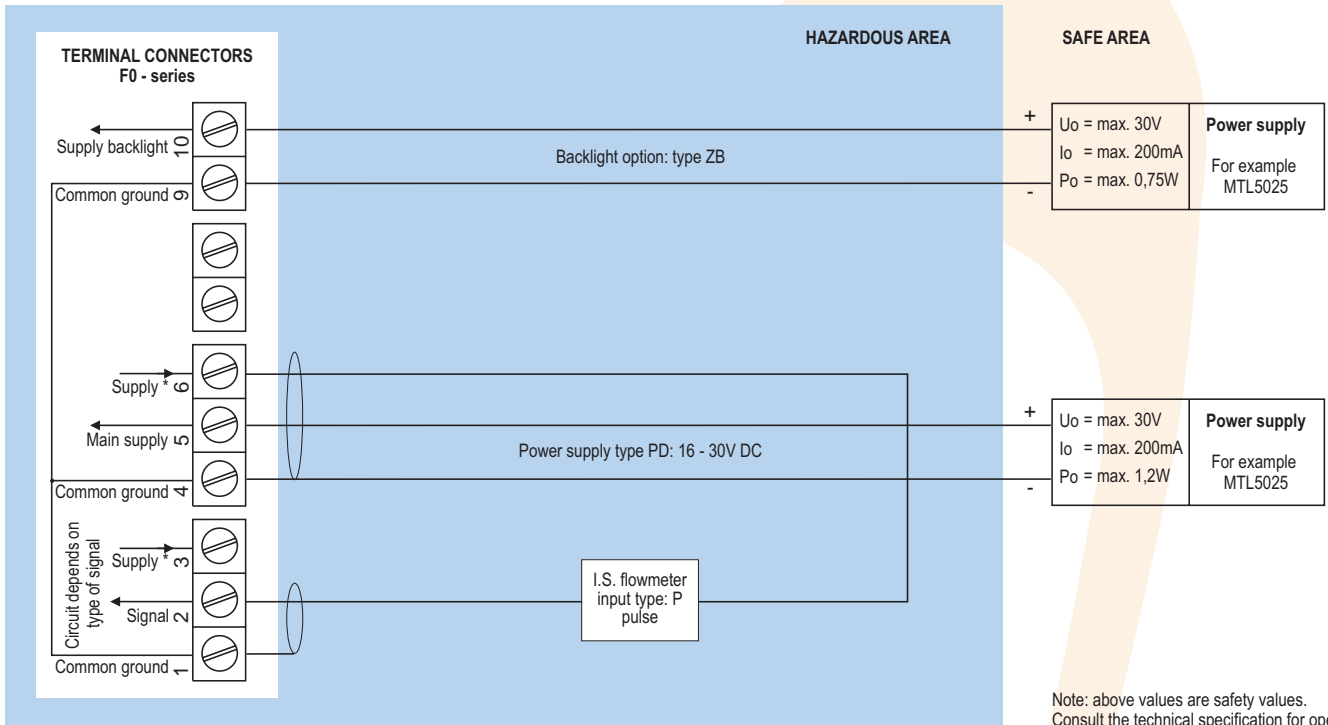
Configuration example IIA - IIB and IIC - F012-P-PX-XI-ZB - Basic power supply 8 - 30V DC



* Sensor supply voltage for pulse type P: Terminal 3: 1.2V - 3.2V DC.

Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.

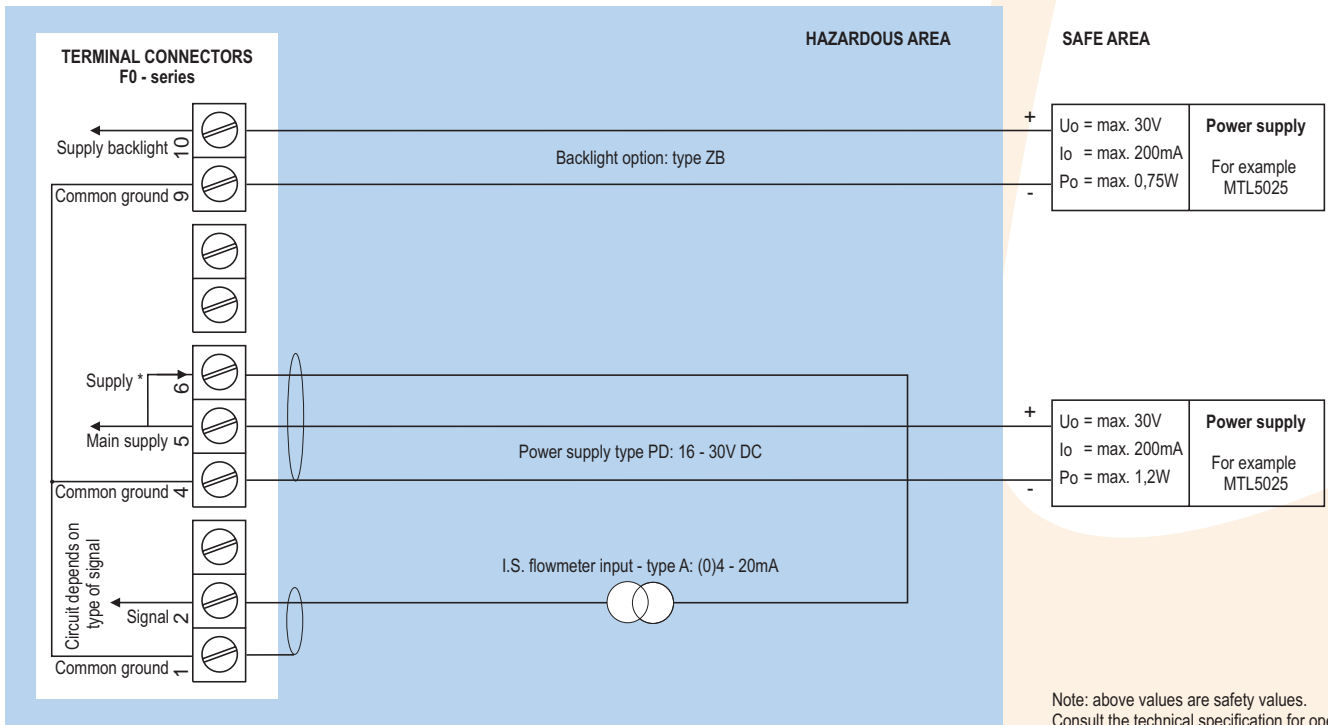
Configuration example IIA - IIB and IIC - F012-P-PD-XI-ZB - Power supply 16 - 30V DC



* Sensor supply voltage for pulse type P: Terminal 3: 1.2V - 3.2V DC. Terminal 6: 8.2V DC.
Please note: type PD may be used in combination with the battery (type PC). PD will power the unit; the battery will be disabled automatically till power is disconnected.

Note: above values are safety values.
Consult the technical specification for operational values.

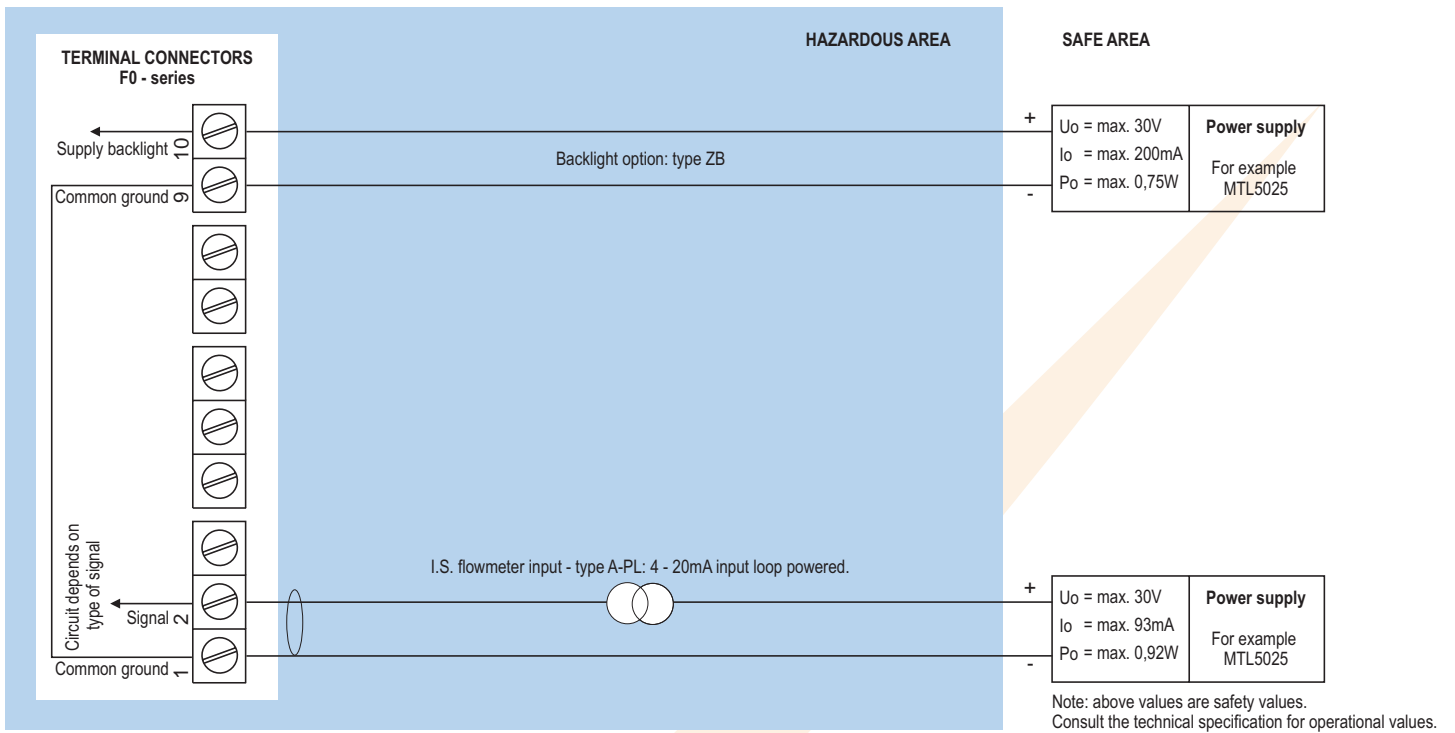
Configuration example IIA - IIB and IIC - F012-A-PD-XI-ZB - Power supply 16 - 30V DC



* Sensor supply voltage for analog flowmeter type A / U: Terminal 6: as input voltage terminal 5 (internally linked).
Please note: type PD may be used in combination with the battery (type PC). PD will power the unit; the battery will be disabled automatically till power is disconnected.

Note: above values are safety values.
Consult the technical specification for operational values.

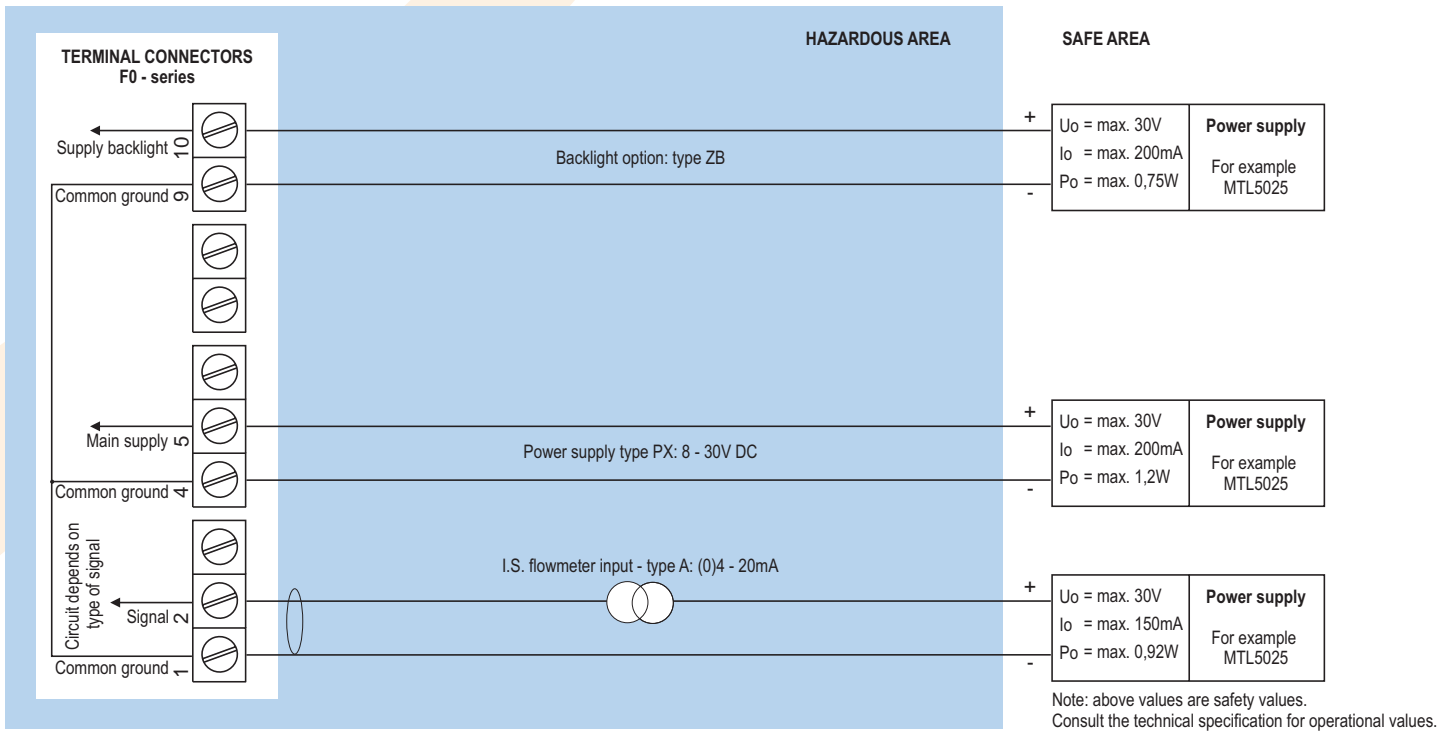
Configuration example IIA - IIB and IIC - F012-A-PL-XI-ZB - Input loop powered



Sensor supply is not available: unit is input loop powered (type PL).

Please note: type PL may be used in combination with the battery (type PC). PL will power the unit; the battery will be disabled automatically till power is disconnected.

Configuration example IIA - IIB and IIC - F012-A-PX-XI-ZB - Basic power supply 8 - 30V DC



* Sensor supply voltage for analog flowmeter type A / U: not available in this example.

Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.

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: 8 times/sec. - 30 secs - off.
Option ZB	Transflective LCD with bi-color LED-backlight; green / amber. Intensity and color selected through the keyboard. Good readings in full sunlight and darkness. Also available Intrinsically Safe.
Power requirements	20 - 30V DC. Power consumption max. 30mA.
Note	With type PF / PM: internally powered.

Operating temperature

Standard unit	-40°C to +80°C (-40°F to +178°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.
Type PC	Intrinsically Safe long life lithium battery - life-time depends upon settings and configuration - up to 5 years.
Type PD	16 - 30V DC. Power consumption max. 25mA @ 24V DC.
Type PF	24V AC / DC ± 10%. Power consumption max. 400mA @ 24V rms.
Type PL	Input loop powered from sensor signal 4 - 20mA (type A).
Type PM	115 - 230V AC ± 10%. Power consumption max. 70mA @ 230V AC.
Type PX	8 - 30V DC. Power consumption max. 20mA @ 24V DC.
Note	PB, PF and PM are not available Intrinsically Safe.
Note PF / PM	The total consumption of the sensor and backlight type ZB may not exceed 400mA @ 24V DC.

Sensor excitation

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	for pulse signals: 1.2 - 3.2 - 8.2V DC - max. 5mA@8.2V DC. For analog signals, the sensor supply voltage is according to the power supply voltage connected.
Type PF / PM	1.2 - 3.2 - 8.2 - 12 and 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.
Pass-code	Configuration settings can be pass-code protected.

Casing

General

Window	Polycarbonate window.
Sealing	EPDM and PE.
Control keys	Three industrial micro-switch keys. UV-resistant polyester keypad.

Aluminum field enclosures

General	Die-cast aluminum field mount enclosure IP67 / NEMA 4X with 2-component UV-resistant coating.
Dimensions	130 x 114 x 58mm (5.1" x 4.5" x 2.28") - W x H x D.
Weight	950 gr.
Type HA	Cable entry: 2 x PG9 and 1 x M20 tapped hole in the centre.
Type HT	Cable entry: 1 x 1/2" NPT tapped hole in the centre.
Type HU	Cable entry: 3 x 1/2" NPT tapped hole.
Type HZ	Cable entry: none, user defined.

ABS wall mount enclosures

General	ABS wall mount enclosure IP67 / NEMA 4X, UV-resistant and flame retardant.
Dimensions	130 x 114 x 71mm (5.1" x 4.5" x 2.8") - W x H x D.
Weight	400 gr.
Type HD	Cable entry: none, user defined.
Type HF	Cable entry: 1x 22mm (0.866") hole in the centre.

Panel mount enclosures

Type HB	Die-cast aluminum panel mount enclosure IP65 / NEMA 4.
Dimensions	130 x 114 x 50mm (5.1" x 4.5" x 1.97") - W x H x D.
Panel cut-out	115 x 96mm (4.53" x 3.78") L x H.
Weight	525 gr.
Type HC	ABS panel mount enclosure IP65 / NEMA 4, UV-resistant and flame retardant.
Dimensions	130 x 114 x 48mm (5.1" x 4.5" x 1.89") - W x H x D.
Panel cut-out	115 x 96mm (4.53" x 3.78") L x H.
Weight	300 gr.

Hazardous area

Intrinsically Safe

ATEX certification	Ⓔ II 1 GD EEx ia IIC T4 T100°C
CSA C-US/IECEX certification	IEC, CSA and FM approvals are expected to become available in May 2006.
Ambient	-40°C to +70°C / -40° to +158°F.

Explosion proof

ATEX certification	Ⓔ II 2 GD EEx d IIB T5.
Type XF	Dimensions of enclosure: 350 x 250 x 200mm (13.7" x 9.9" x 7.9") L x H x D.
Weight	Appr. 15kg.

Environment

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

Flowmeter sensor

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 0Hz - maximum 7kHz for total and flowrate. 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.
Option ZG	coil sensitivity 5mVpp.
Type A	(0)4 - 20mA. Analog input signal can be scaled to any desired range within 0 - 20mA.
Type U	0 - 10V DC. Analog input signal can be scaled to any desired range within 0 - 10V DC.
Accuracy	14 bit. Error < 0.05%. Low level cut-off programmable.
Span	0.000010 - 9,999,999 with variable decimal position.
Update time	Four times per second.
Voltage drop	Type A: max. 2V DC @ 20mA.
Voltage drop	Type A - PL (loop powered): max. 2.6V DC @ 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.

Operational

Operator functions

Displayed functions	<ul style="list-style-type: none"> Flowrate and / or total. Total and accumulated total. Total can 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.

Flowrate

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.

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



Ordering information

Example (standard configuration)

F012-P-HC-PX-XX-ZX.

Explanation standard configuration:

P: flowmeter signal: pulse; **HC**: ABS panel mount enclosure; **PX**: the unit is powered with 8 - 30V DC (basic power supply); **XX**: safe area; **ZX**: no options.

ordering information:	F012	-	-H	-P	-X	-Z
Flowmeter Sensor input signal						
A	⊗ (0)4 - 20mA input.					
P	⊗ Pulse input: coil, npn, pnp, namur, reed-switch.					
U	⊗ 0 - 10V DC input.					
Enclosure						
HA	⊗ Aluminum field mount enclosure IP67 / NEMA 4X - two holes PG9 + one hole M20.					
HB	⊗ Aluminum panel mount enclosure IP65 / NEMA 4.					
HC	⊗ ABS panel mount enclosure IP65 / NEMA 4.					
HD	⊗ ABS wall mount enclosure IP67 / NEMA 4X.					
HF	⊗ ABS wall mount enclosure IP67 / NEMA 4X - 1x hole 22mm.					
HT	⊗ Aluminum field mount enclosure IP67 / NEMA 4X - one hole 1/2"NPT.					
HU	⊗ Aluminum field mount enclosure IP67 / NEMA 4X - three holes 1/2"NPT.					
HZ	⊗ Aluminum field mount enclosure IP67 / NEMA 4X - no holes.					
Power supply						
PB	Lithium battery powered.					
PC	⊗ Lithium battery powered - Intrinsically Safe.					
PD	⊗ 16 - 30V DC + sensor supply.					
PF	24V AC / DC + sensor supply.					
PL	⊗ Input loop powered from sensor signal 4 - 20mA (type A).					
PM	115 - 230V AC + sensor supply.					
PX	⊗ Basic power supply 8 - 30V DC (no real sensor supply).					
Hazardous area						
XI	⊗ Intrinsically Safe.					
XF	⊗ EExd enclosure - 3 keys.					
XX	Safe area only.					
Other options						
ZB	⊗ Backlight.					
ZF	⊗ Coil input 10mVpp.					
ZG	⊗ Coil input 5mVpp.					
ZX	⊗ No options.					

The bold marked text contains the standard configuration.

⊗ Available Intrinsically Safe.

Specifications are subject to change without notice.