

LEVEL MONITOR

WITH LINEARISATION AND ONE HIGH / LOW ALARM OUTPUT



Features

- Displays level, height and percentage filled.
- Eight point linearisation of the tank shape - with interpolation.
- Two alarm values can be entered: low and high level alarm.
- Red flashing LED backlight in case of a level alarm.
- Large 17mm (0.67") digits.
- Selectable on-screen engineering units; volumetric or mass.
- 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
 Ⓢ II 1 GD EEx ia IIC T4 T100°C.
- Explosion/flame proof Ⓢ II 2 GD EEx d IIB T5.
- 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

- One free configurable alarm output.

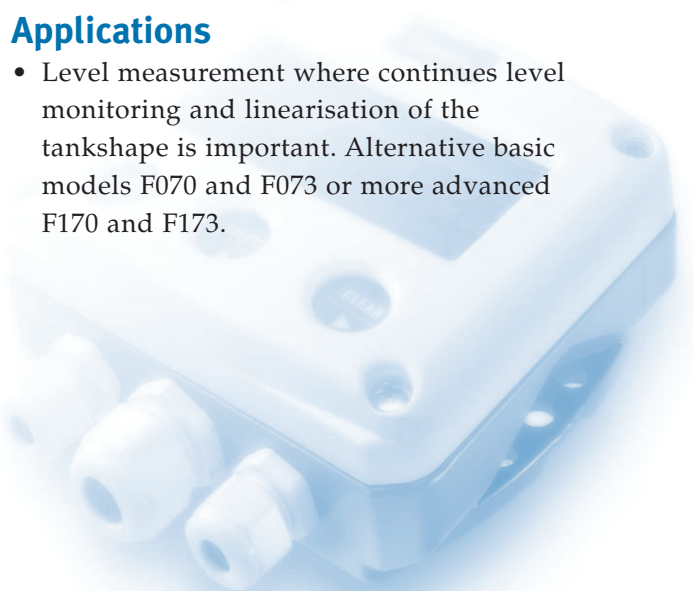
Signal input

Level

- (0)4 - 20mA.
- 0 - 10V DC.

Applications

- Level measurement where continuous level monitoring and linearisation of the tankshape is important. Alternative basic models F070 and F073 or more advanced F170 and F173.



General information

Introduction

The F077 is a versatile level monitor with linearisation and continuous level monitoring feature. In addition to the average Span, eight linearisation points can be entered to compensate for the tankshape. The unit will interpolate between these points to increase the accuracy. This linearisation effects all displayed information as well as the alarm output. With the level monitoring featue, one one low level and one high level alarm value can be set. A wide selection of options further enhance this models capabilities, including Intrinsic Safety.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits which can be set to show level, height or percentage and alarm values. As the F077 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

The tri-color backlight in combination with the F077 offers a unique feature: in case of a level alarm, the backlight can be set to be red or flashing red / green. 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 alphanumeric description, therefore avoiding confusing abbreviations. All settings are safely stored in EEPROM memory in the event of sudden power failure.

Alarm output

One alarm output is available to transmit the level alarm. It can be set to switched for a low,

high or both alarms! The output signal can be a passive NPN, active PNP or an isolated electro-mechanical relay.

Signal input

The F077 does accept (0)4 - 20mA and 0 - 10V input signals from any type of level measurement device. Also a 4 - 20mA input loop powered model is available.

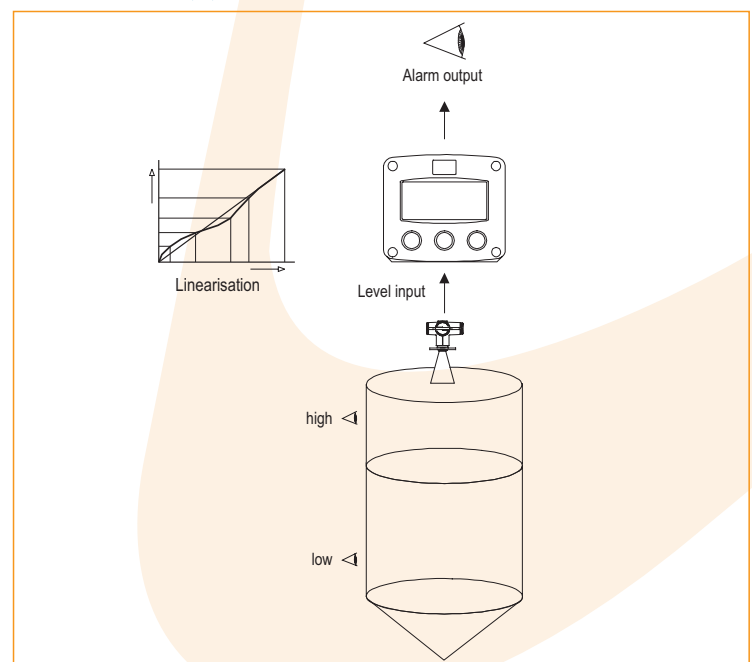
Hazardous areas

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 $+70^\circ\text{C}$ (-40°F to $+158^\circ\text{F}$). 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 F077 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 F077

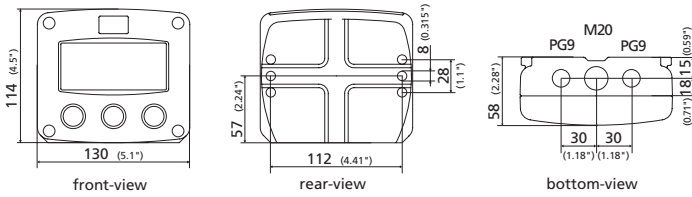


Dimensions enclosures

Enclosure HA

Aluminum field mount enclosure

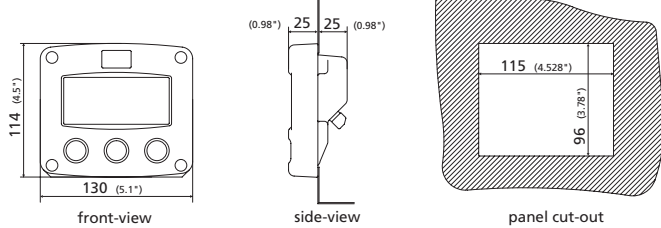
IP67 / NEMA 4X
Tapped holes: European thread



Enclosure HB

Aluminum panel mount enclosure

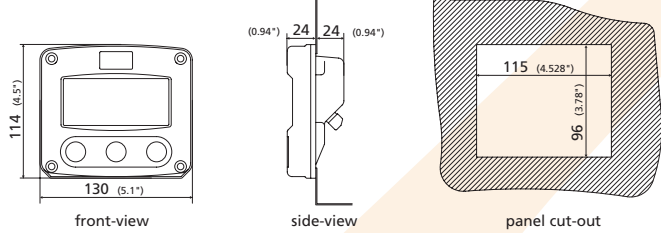
IP65 / NEMA 4



ENCLOSURE HC (STANDARD)

ABS PANEL MOUNT ENCLOSURE

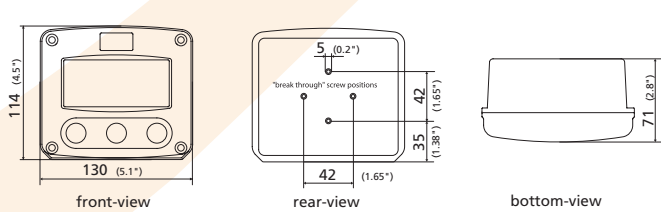
IP65 / NEMA 4



Enclosure HD

ABS wall mount enclosure

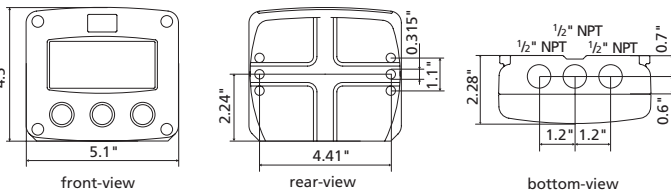
IP67 / NEMA 4X
Holes user defined



Enclosure HU

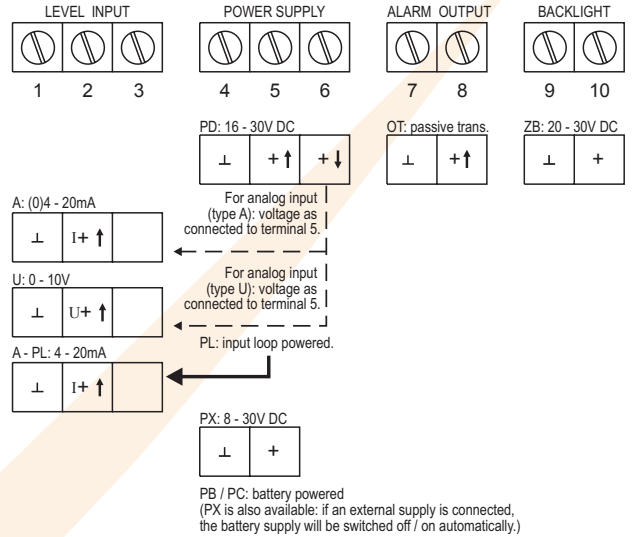
Aluminum field mount enclosure

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

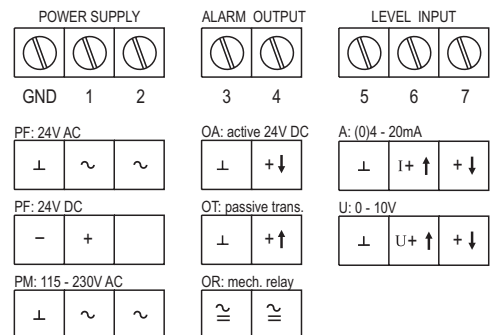


Terminal connections power supply

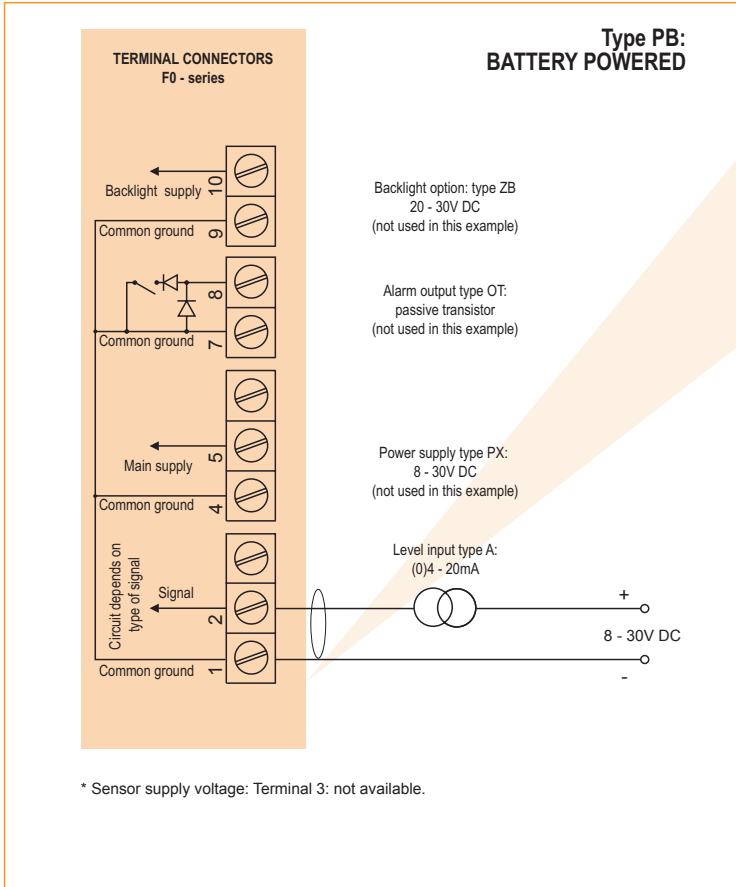
PB/PC - PD - PL - PX



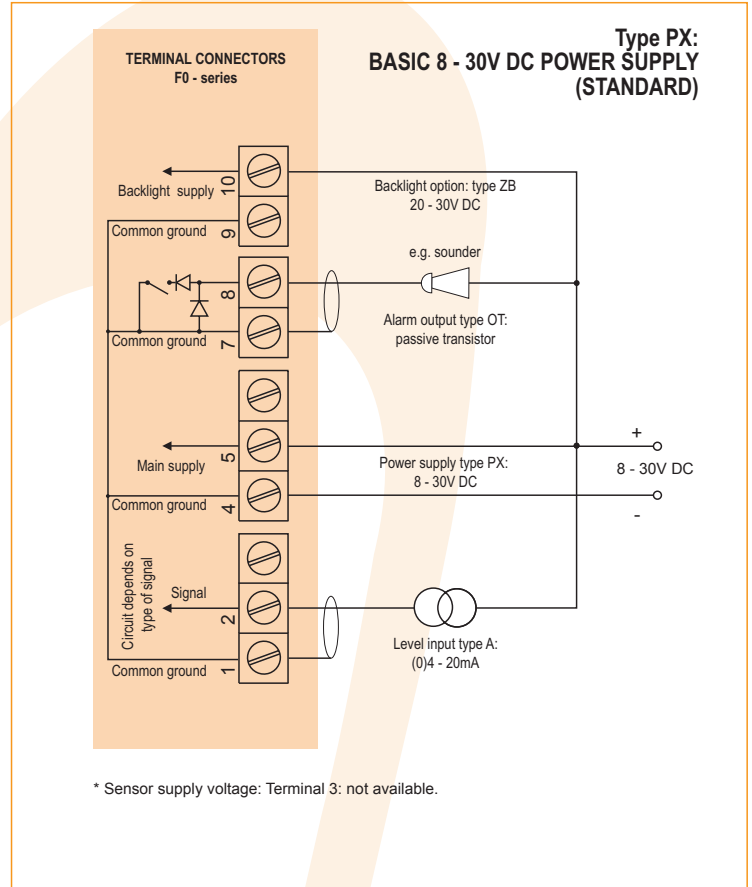
Terminal connections power supply PF - PM



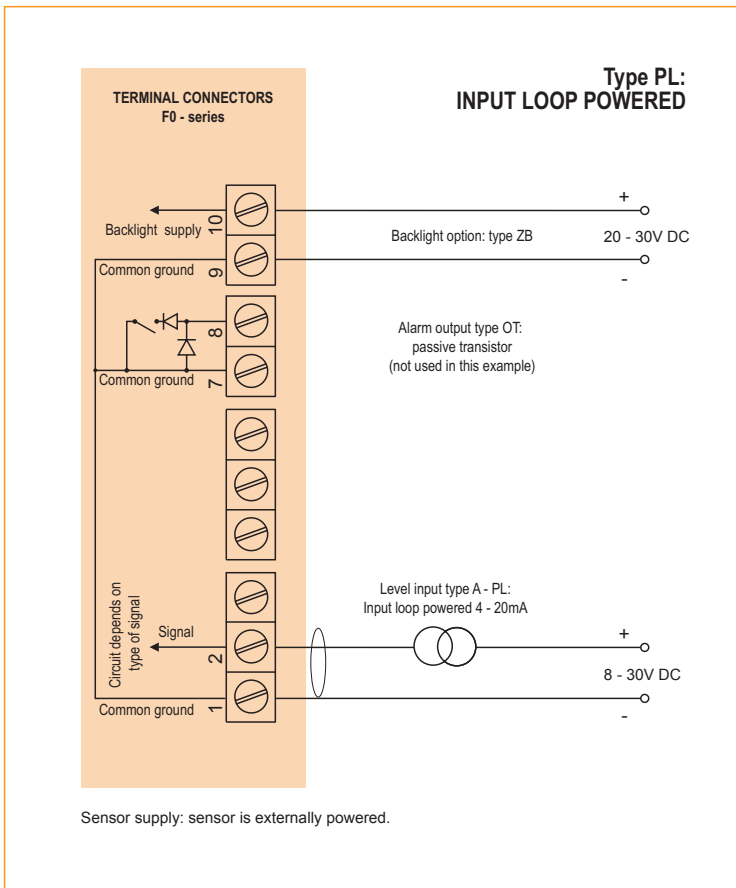
Typical wiring diagram Fo77-A-(OT)-PB-(PX)



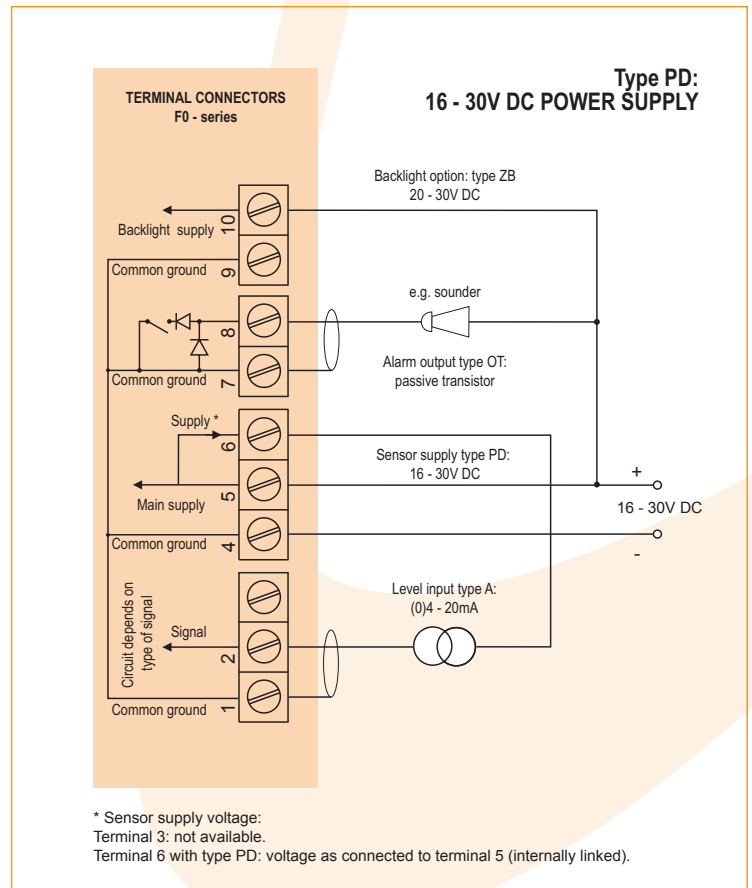
Typical wiring diagram Fo77-A-OT-PX-ZB



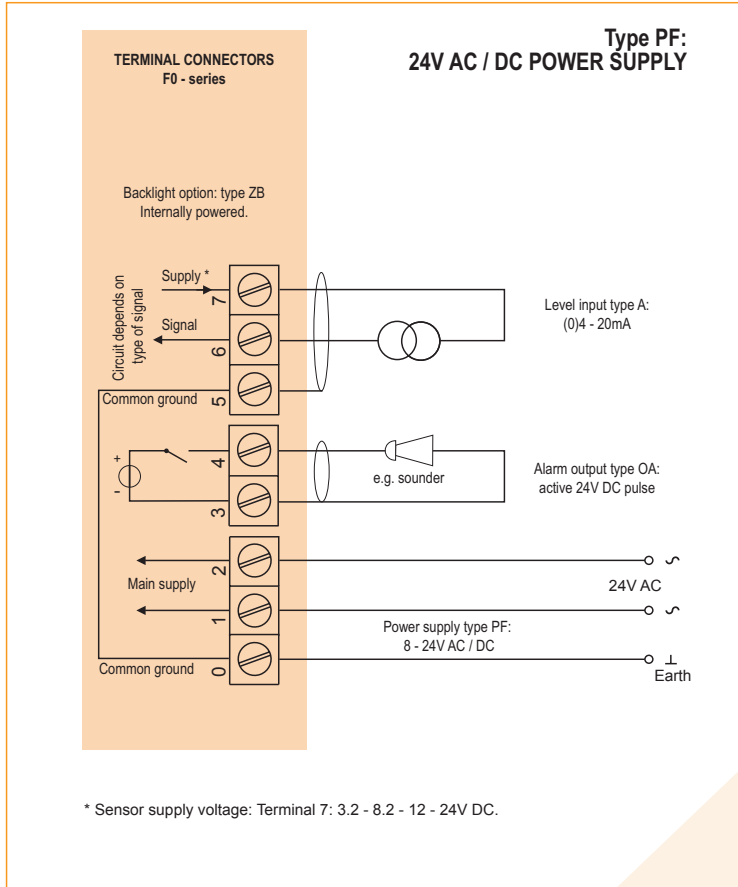
Typical wiring diagram Fo77-A-(OT)-PL-ZB



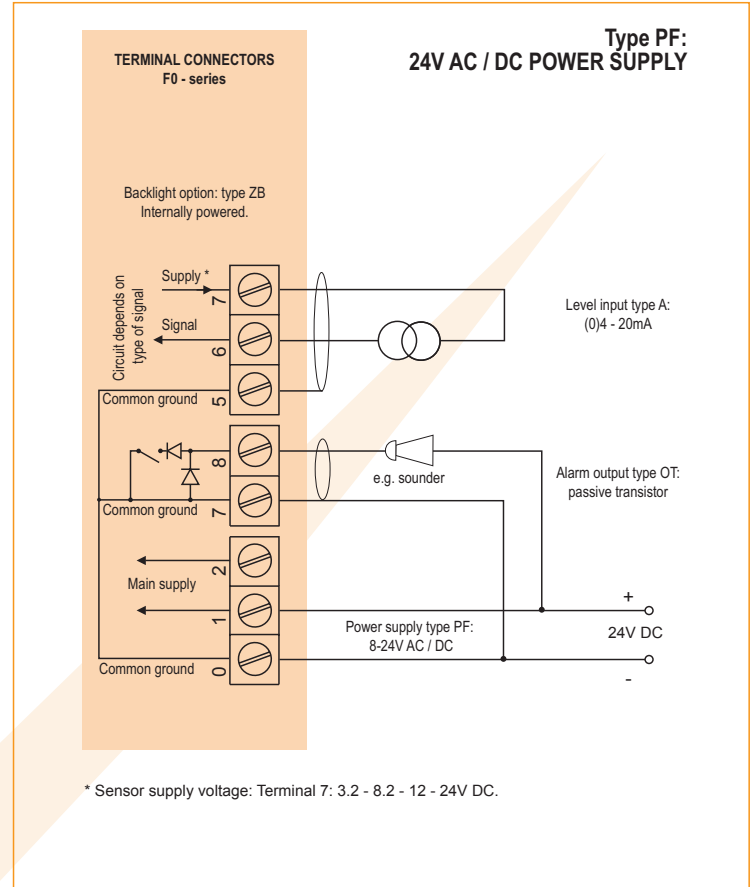
Typical wiring diagram Fo77-A-OT-PD-ZB



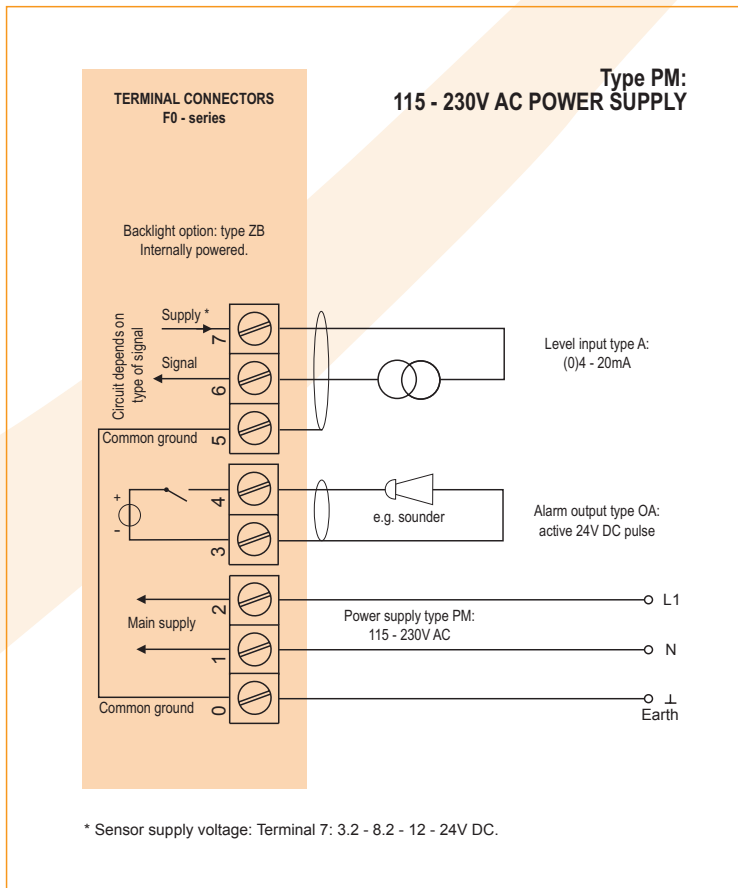
Typical wiring diagram Fo77-A-OA-PF-ZB



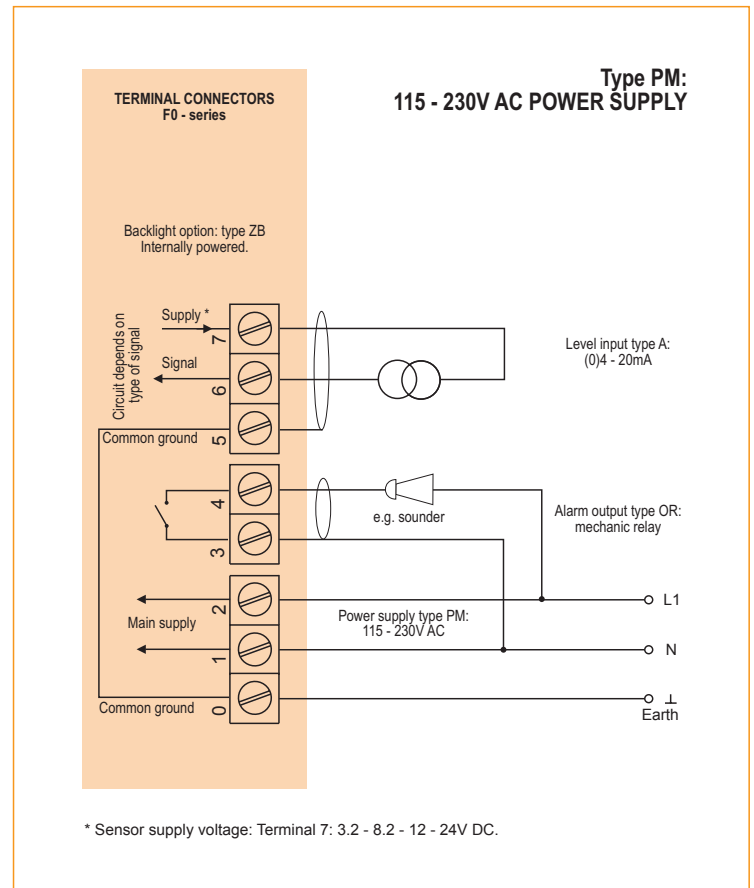
Typical wiring diagram Fo77-A-OT-PF-ZB



Typical wiring diagram Fo77-A-OA-PM-ZB



Typical wiring diagram Fo77-A-OR-PM-ZB

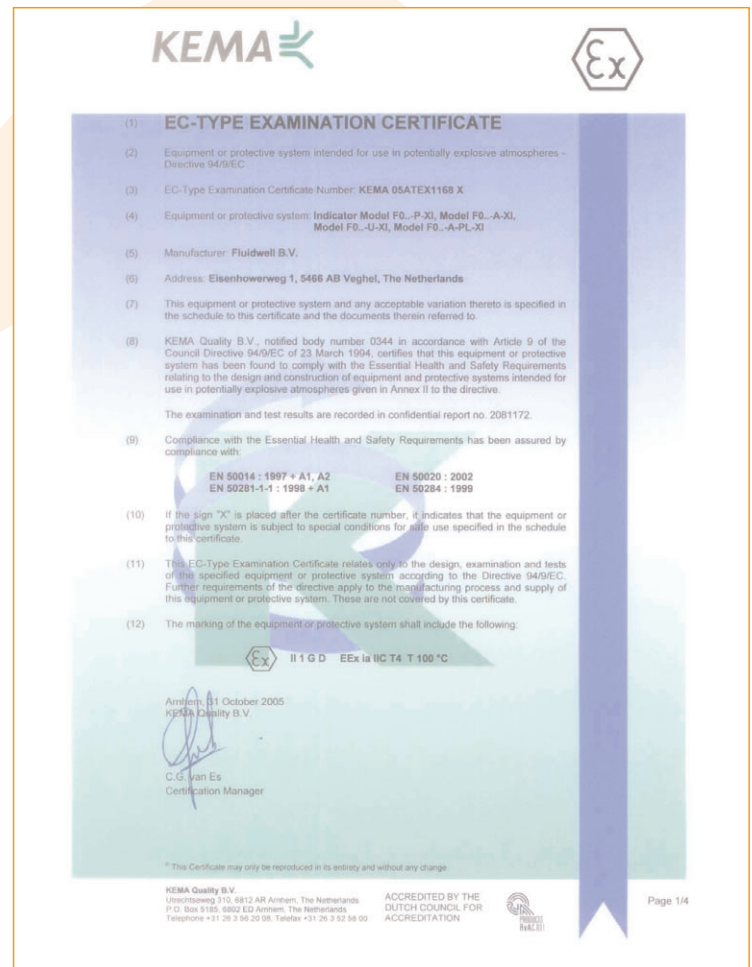


Hazardous area applications

The F077-XI has been ATEX approved by KEMA for use in Intrinsically Safe applications. It is approved according to Ex 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.

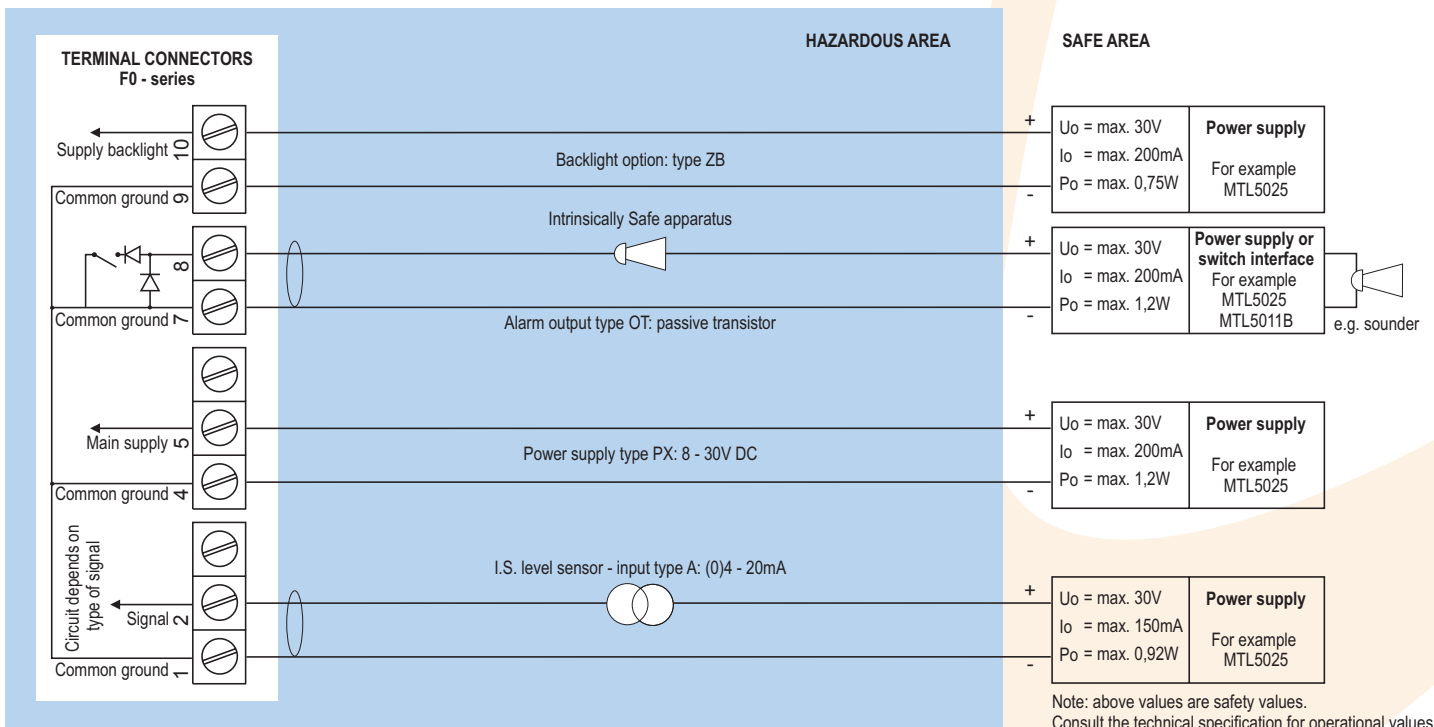
It is allowed to connect up to four I.S. power supplies to power the unit, sensor, alarm output and backlight. An ATEX approved flame proof enclosure with rating Ex II 2 GD EEx d IIB T5 is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 05ATEX1168 X



Configuration example IIA - IIB and IIC

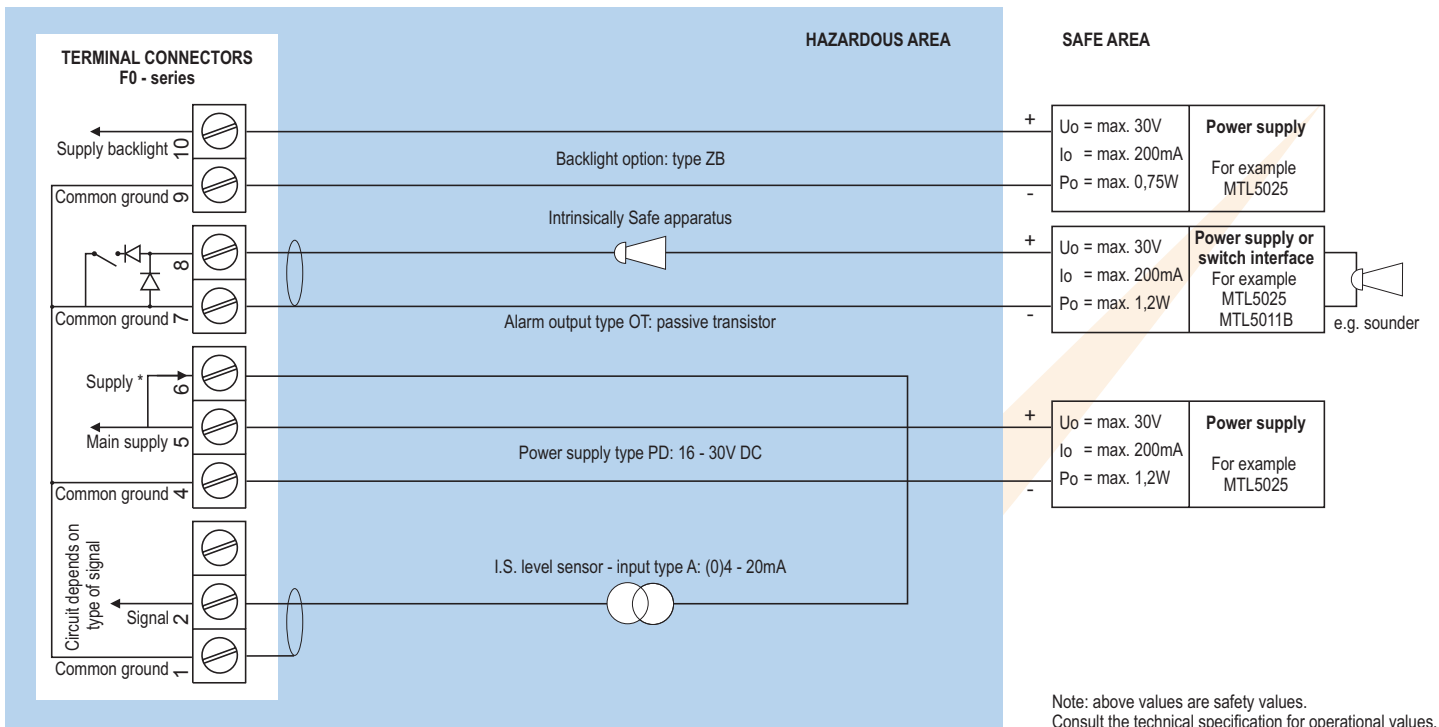
F077-A-OT-PX-XI-ZB - Basic power supply 8 - 30V DC



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

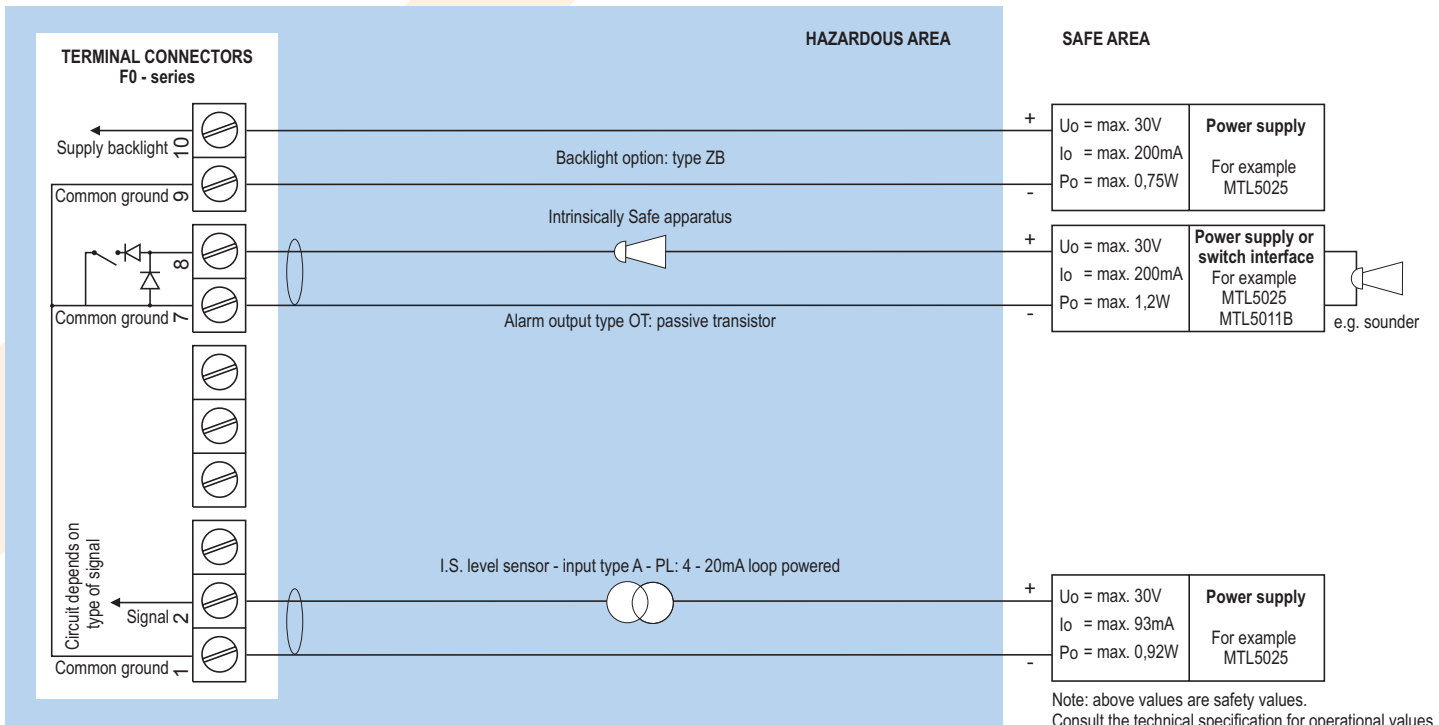
Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.

Configuration example IIA - IIB and IIC - F077-A-OT-PD-XI-ZB - Power supply 16 - 30V DC



* Sensor supply voltage for analog level sensor 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.

Configuration example IIA - IIB and IIC - F077-A-OT-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.

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 tri-color LED-backlight; green / amber. Red (flashing) backlight during alarm conditions. Intensity, color and alarm response selected through the keyboard. Good readings in full sunlight and darkness. Also available Intrinsically Safe.

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. 1 Watt.
Type PF	24V AC / DC ± 10%. Power consumption max. 15 Watt.
Type PL	Input loop powered from sensor signal 4 - 20mA (type A).
Type PM	115 - 230V AC ± 10%. Power consumption max. 15 Watt.
Type PX	8 - 30V DC. Power consumption max. 0.3 Watt.
Type ZB	20 - 30V DC. Power consumption max. 1 Watt. With type PF / PM: internally powered.
Note PB/PF/PM	Not available Intrinsically Safe.
Note PF/PM	The total consumption of the sensor, active output type OA and backlight type ZB may not exceed 400mA @ 24V DC.
Note	For Intrinsically Safe applications, consult the safety values in the certificate.

Sensor excitation

Type PB/PC/PX	Not available.
Type PD	The sensor supply voltage will be according to power supply voltage (as connected to terminal 5).
Type PF / PM	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 .
------	--

Data protection

Type	EEPROM backup of all settings. 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).
-------------------------------	--

Signal input

Level sensor

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	Resolution: 16 bit. Error < 0.01mA / ± 0.05% FS. Low level cut-off programmable.
Span	0.00010 / 999,999 with variable decimal position.
Offset	-999,999 / 999,999.
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.

Signal output

Alarm output

Function	User defined: low, high or both alarms output.
Type OA	One active 24V DC transistor output (PNP); load max. 400mA (requires PF or PM).
Type OR	One electro-mechanical relay output - isolated; max. switch power 230V AC (N.O.) - 0.5A (requires PF or PM).
Type OT	One passive transistor output (NPN) - not isolated.
Load	Max. 50V DC - 300mA per output.

Operational

Operator functions

Displayed functions	<ul style="list-style-type: none"> • Level. • Height or percentage (or no indication). • Low alarm value. • High alarm value. • Alarm values can be set (or only displayed).
---------------------	---

Level

Digits	7 digits.
Units	L, m ³ , GAL, USGAL, KG, lb, bbl, no unit.
Decimals	0 - 1 - 2 or 3.

Height

Digits	6 digits.
Units	mm, cm, m, mtr, inch, ft, mmwk, mmwc, cmwk, cmwc, mwk, mwc, inwc, ftwc, mbar, bar, psi, no unit.
Decimals	0 - 1 or 2.

Percentage

Digits	3 digits.
Decimals	1.

Alarm values

Digits	7 digits.
Units	According to the settings for level.
Decimals	According to the settings for level.
Time units	According to the settings for level.
Type of alarm	Low and high level alarm. Includes alarm delay time and configurable alarm output.

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



Ordering information

Example (standard configuration)

F077-A-HC-OT-PX-XX-ZX.

Explanation standard configuration:

A: level input signal: analog; **HC:** ABS panel mount enclosure; **OT:** passive transistor output;
PX: the unit is powered with 8 - 30V DC (basic power supply); **XX:** safe area; **ZX:** no options.

ordering information:	F077	-	-H	-O	-P	-X	-Z
Level sensor input signal							
A ⓘ	(0)4 - 20mA input.						
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.						
Output							
OA	One active transistor output - requires PF or PM.						
OR	One mechanic relay output - requires PF or PM.						
OT ⓘ	One passive transistor output - standard configuration.						
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 sensor supply).						
Hazardous area							
XI ⓘ	Intrinsically Safe.						
XF ⓘ	EExd enclosure - 3 keys.						
XX	Safe area only.						
Other options							
ZB ⓘ	Backlight.						
ZX ⓘ	No options.						

The bold marked text contains the standard configuration.

ⓘ Available Intrinsically Safe.

Specifications are subject to change without notice.

FLUIDWELL bv
P.O. Box 6
5460 AA - Veghel - The Netherlands
Tel.: +31 (0)413 343786
Fax.: +31 (0)413 363443
sales@fluidwell.com
Internet: www.fluidwell.com

