

# DUAL INPUT PRESSURE INDICATOR



## 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 both inputs the actual pressure.
- Large 17mm (0.67") digits.
- Selectable on-screen engineering units for each input individually.
- Auto backup of all settings.
- Explosion/flame proof available.
- Full Modbus communication RS232/485/TTL.
- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC power supply.
- Sensor supply 3 / 8.2 / 12 / 24V DC.
- LED backlight option.

## Signal input

### Pressure

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

## 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 model: two F050's or the D-Series DIN panel mount indicators.

## General information

### Introduction

The F151 incorporates two fully separated pressure indicators in one enclosure. There is no relationship between the inputs, even different measuring units can be used. A wide selection of options further enhances the capabilities of this model, including Intrinsic Safety and full Modbus communication.

### Display

The display has large 17mm (0.67") and 8mm (0.31") digits. For each pressure input, on-screen engineering units are easily configured from a comprehensive menu. The measuring unit is displayed together with the input channel information A or B. The F151 can be set to select the channel to display 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.

### Signal input

The F151 will accept (0)4 - 20mA or 0 - 10V input signals from a pressure transducer. Both signal inputs require the same signal type, but different measuring ranges are allowed. Also available is an input loop powered version where the measuring range is 4 - 20mA.

### 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).

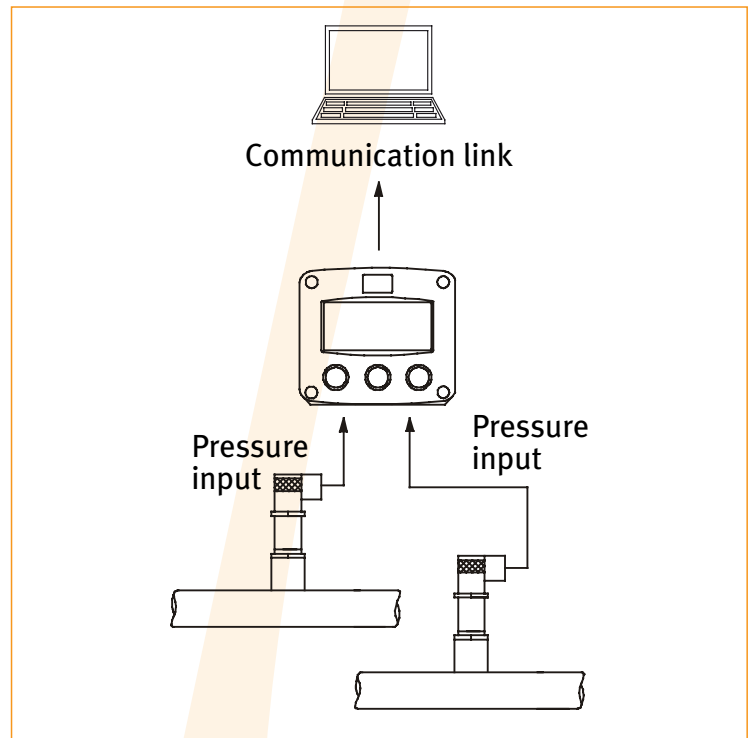
### Hazardous areas

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 F151 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.

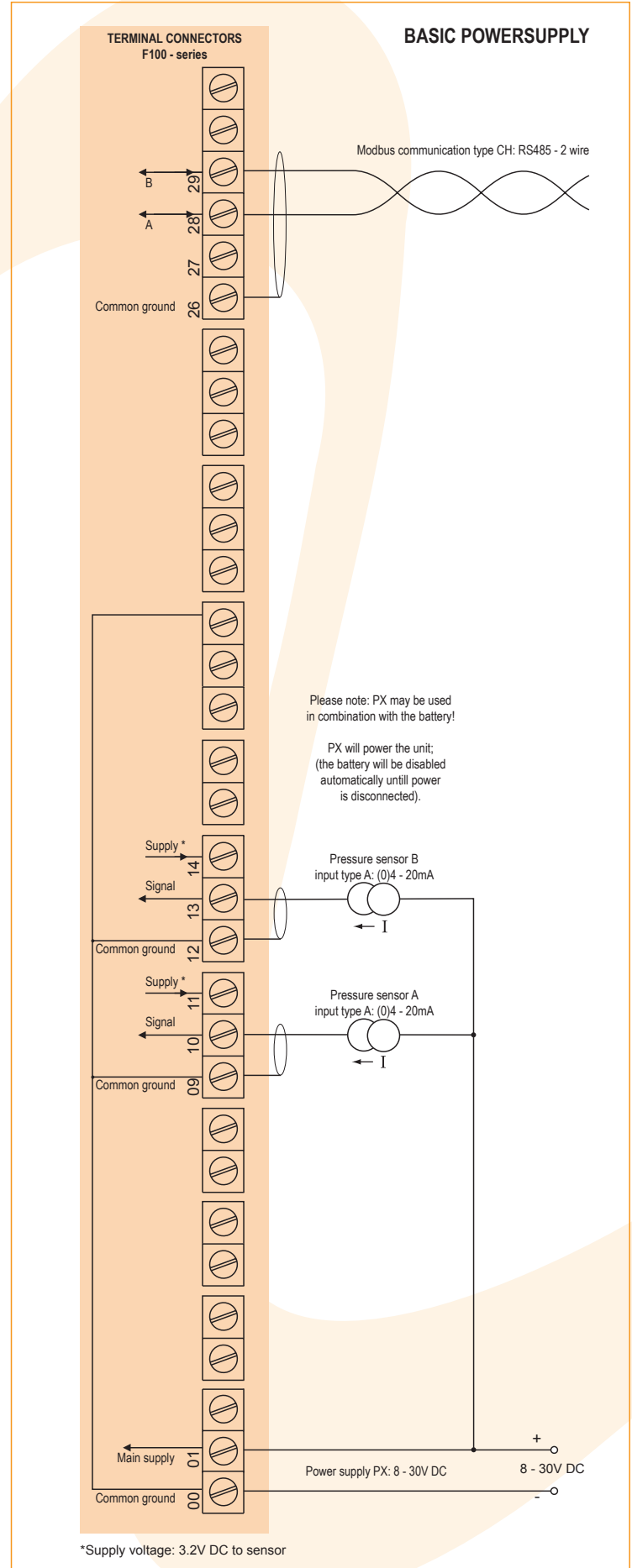
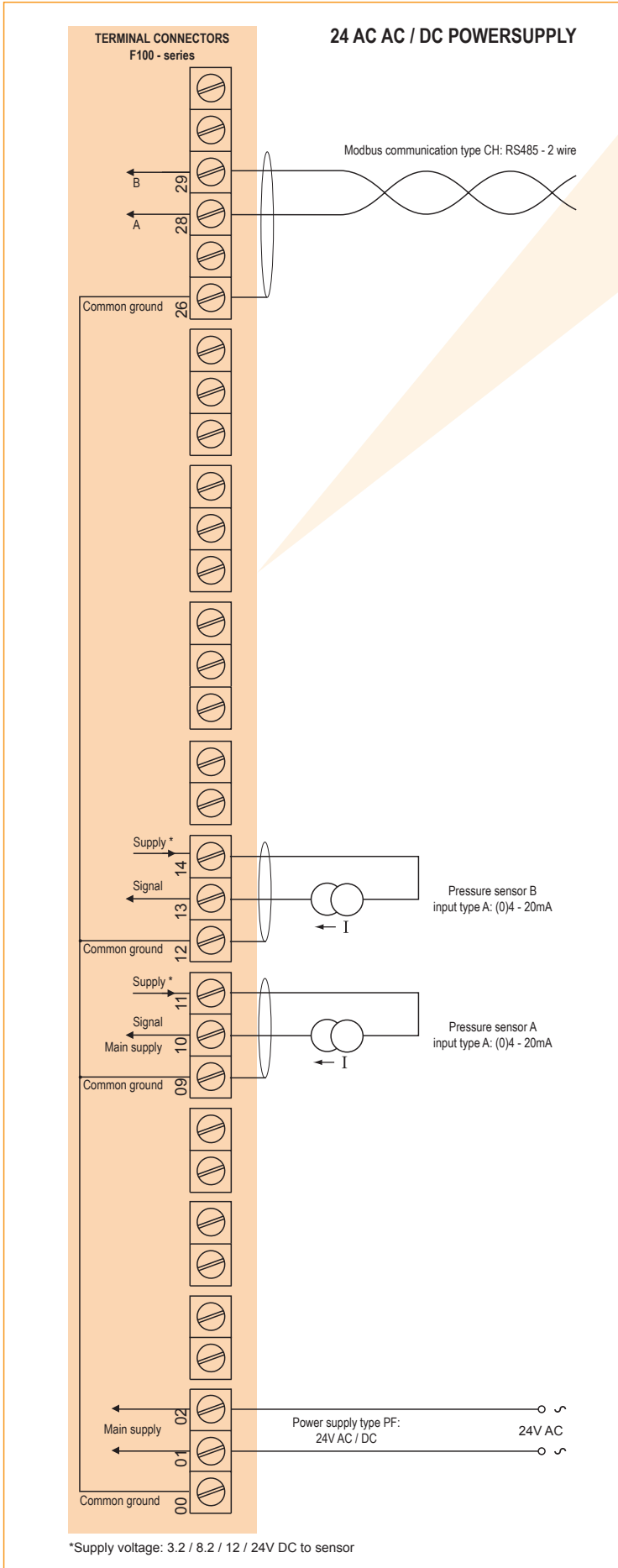
## Overview application F151



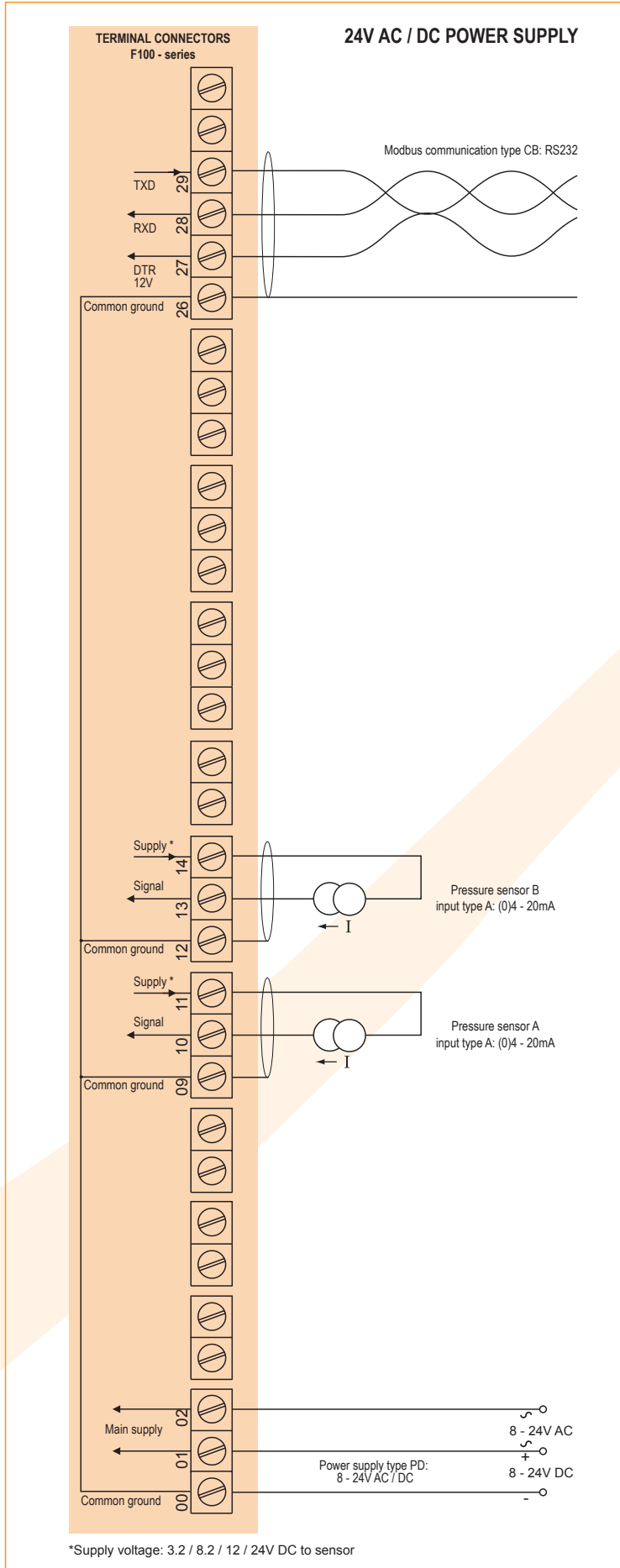


Typical wiring diagram F151-A-CH-PF

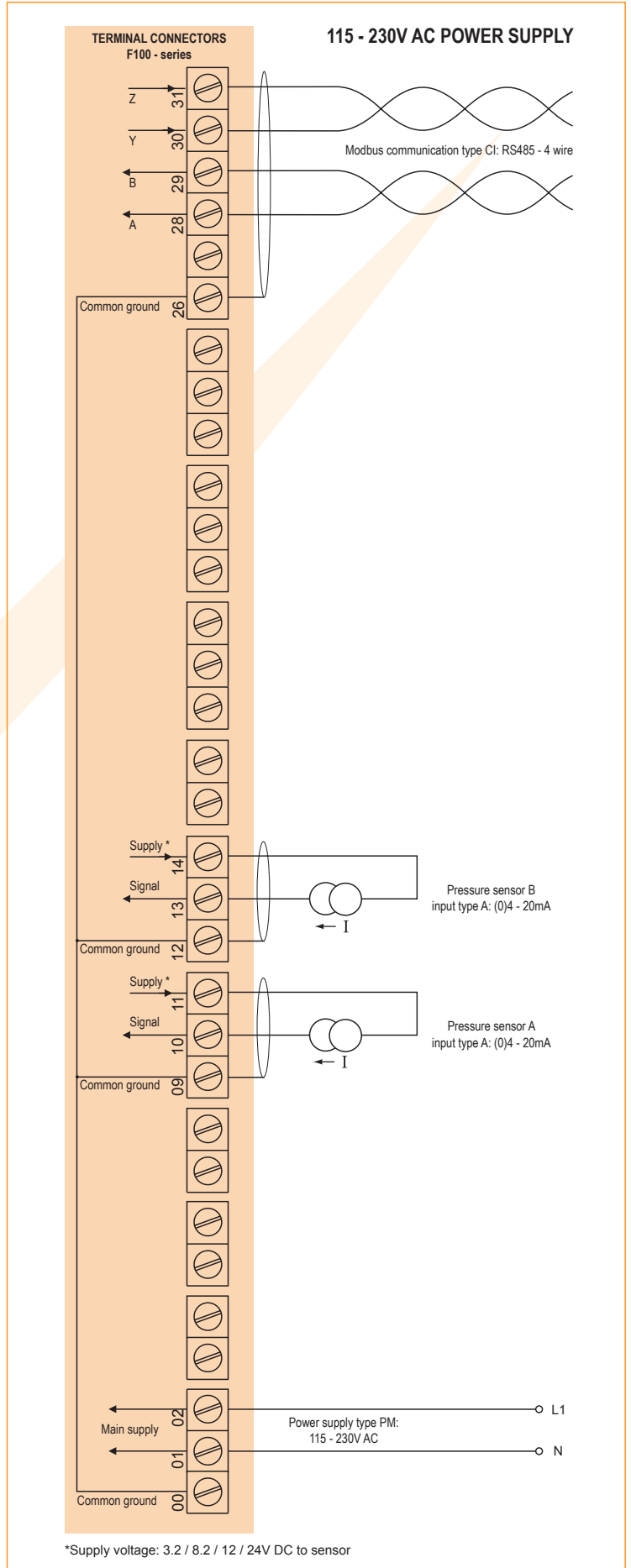
Typical wiring diagram F151-A-CH-PX



Typical wiring diagram F151-A-CB-PD



Typical wiring diagram F151-A-CI-PM



## Hazardous area applications

The F151-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.**

It is allowed to connect up to three I.S. power supplies in IIB/IIC applications or one in IIC applications.

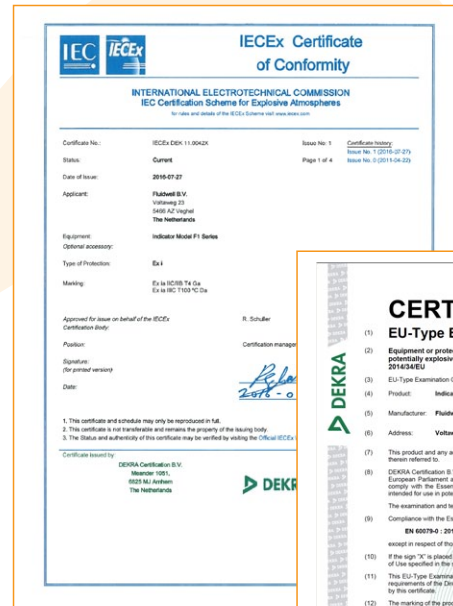
Consult the certificate for the maximum input and output values of the circuits.

Full functionality of the F151 remains available, including the Modbus communication (CT).

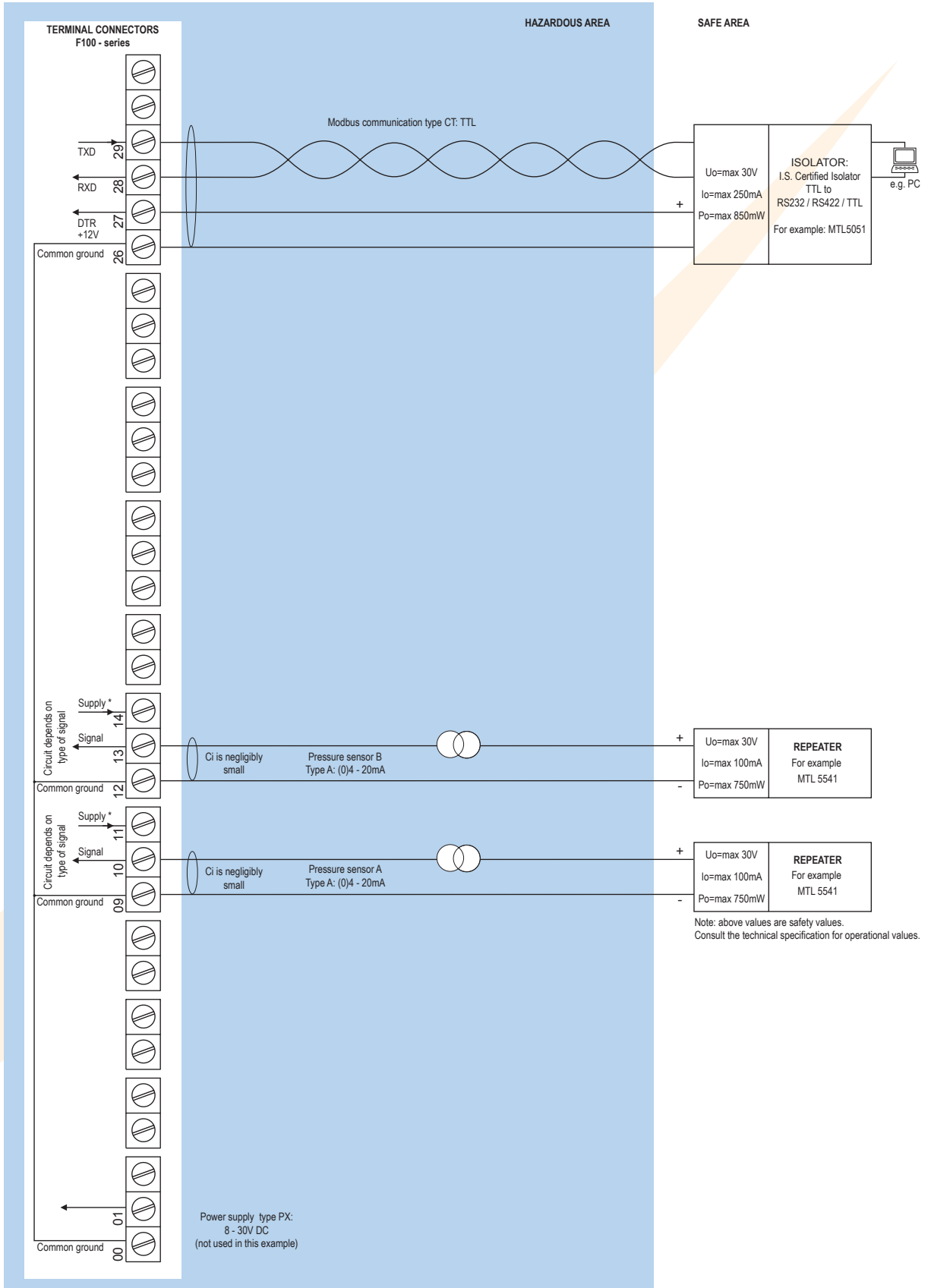
Power supply type PD-XI offers a sensor supply according to the connected power supply voltage at terminal 1.

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

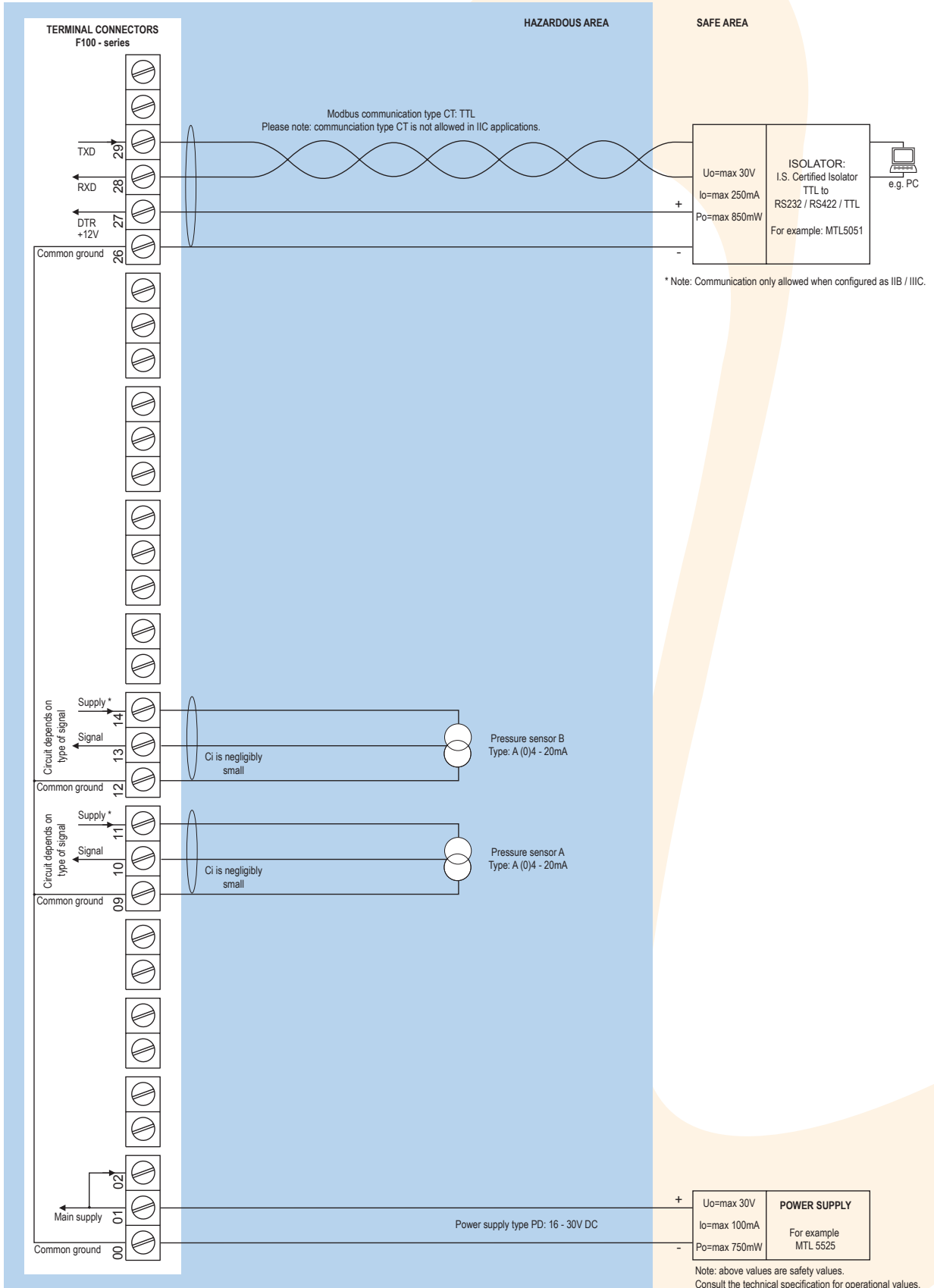


Configuration example IIB / IIIC - F151-A-CT-PC-XI - Battery powered



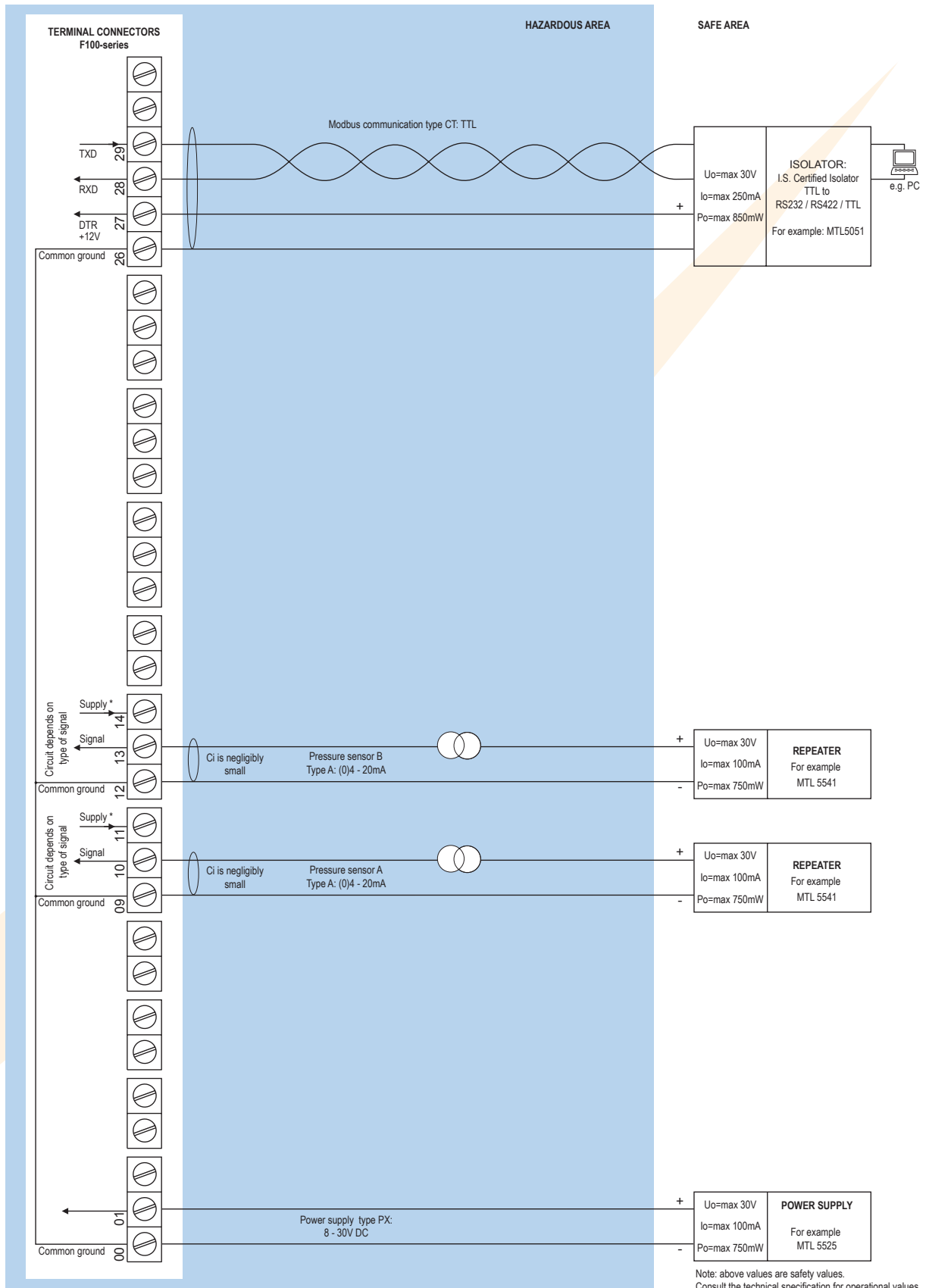
\* Note sensor supply voltage: 3.2V DC - not suitable to power analog sensors.

**Configuration example IIB / IIIC and IIC - F151-A-(CT)-PD-XI - Power requirement 16 - 30V DC**





## Configuration example IIB / IIC - F151-A-CT-PX-XI - Basic power requirement 8 - 30V DC



## 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. 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 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%. Power consumption max. 1 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.
Note	This is not a real sensor supply. Only suitable for sensors with a very low power consumption.
Type PD	3 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC.
Type PD-XI	The sensor supply voltage will be according to power supply as connected to terminal 1.
Type PF / PM	3 / 8.2 - 12 / 24V DC - max. 400mA @ 24V DC.

### Terminal connections

Type	Removable plug-in terminal strip. Wire max. 1.5mm <sup>2</sup> and 2.5mm <sup>2</sup> .
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### Data protection

Type	EEPROM backup of all settings. 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: 3 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

### Pressure sensors

Accuracy	Resolution: 14 bit. Error < 0.025mA / ± 0.125% FS. Low level cut-off programmable.
Update time	Four times per second.
Type A	(0)4 - 20mA. Analog input signal can be scaled to any desired range within 0 - 20mA.
Span	0.000010 - 9,999,999 with variable decimal position.
Offset	0.000 - 9,999.999.
Voltage drop	2.5V @ 20mA.
Type U	0 - 10V DC. Analog input signal can be scaled to any desired range within 0 - 10V DC.
Span	0.000010 - 9,999,999 with variable decimal position.
Load impedance	3kOhm.
Note	For signal type A and U: external power to sensor required; e.g. PD.

## Signal outputs

### 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"><li>• Pressure A.</li><li>• Pressure B.</li></ul>
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### Pressure

Digits	6 digits.
Units	mbar, bar, PSI, no unit.
Decimals	0 - 1 - 2 - 3.

## 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

### Cable glands

ACF20	For HA enclosure, includes O-rings.
ACF25	For HE enclosure, includes locknuts and O-rings.
ACF26	For HF enclosure, includes locknuts and O-rings.
ACF27	For HG enclosure, includes locknuts and O-rings.
ACF28	For HH enclosure, includes locknuts and O-rings.
ACF29	For HJ enclosure, includes locknuts and O-rings.
ACF32	For HM enclosure, includes O-rings.
ACF33	For HN enclosure, includes O-rings.
ACF34	For HO enclosure, includes O-rings.
ACF35	For HP enclosure, includes O-rings.
ACF39	For HT enclosure, includes O-rings.
ACF40	For HU enclosure, includes O-rings.

### Blind plugs

ACF50	For HA enclosure, includes O-rings.
ACF55	For HE enclosure, includes locknuts and O-rings.
ACF56	For HF enclosure, includes locknuts and O-rings.
ACF57	For HG enclosure, includes locknuts and O-rings.
ACF58	For HH enclosure, includes locknuts and O-rings.
ACF59	For HJ enclosure, includes locknuts and O-rings.
ACF62	For HM enclosure, includes O-rings.
ACF63	For HN enclosure, includes O-rings.
ACF64	For HO enclosure, includes O-rings.
ACF65	For HP enclosure, includes O-rings.
ACF69	For HT enclosure, includes O-rings.
ACF70	For HU enclosure, includes O-rings.

### Intrinsically Safe isolators

ACGo1	MTL5511 - One channel pulse or switch output transfer from hazardous area to safe area.
ACGo2	MTL5525 - One channel power supply from safe area to hazardous area (e.g. to power the unit with PD or to power a switching or analog device in hazardous area).
ACGo3	MTL5541 - One channel 4 - 20mA repeater from hazardous area to safe area.
ACGo4	MTL 5051 - Bi-direction serial-data-isolator (for Modbus communication).
ACGo5	MTL5516C - Two channel pulse or switch output transfer from hazardous area to safe area.
ACGo6	MTL5513 - One channel pulse or switch output transfer from hazardous area to safe area.
ACGo7	MTL5546Y - One channel isolated driver bringing 4 - 20mA from safe area to hazardous area, HART transparent, OCD.



## Ordering information

Standard configuration: F151-A-CX-HC-PX-XX-ZX.



### Ordering information:

F151 - -C -H -P -X -Z



#### Pressure input signal

- A  **(0)4 - 20mA input.**
- U  0 - 10V DC input.








#### 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: 1 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.


#### 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 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.
- ZX  **No options.**

The bold marked text contains the standard configuration.

 Available Intrinsically Safe.

Specifications are subject to change without notice.



Quality  
ISO 9001

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