DUAL INPUT PRESSURE INDICATOR

Features

- Displays for both inputs the actual pressure.
- Large 17mm (0.67") digits.
- Selectable on-screen engineering units for each input individually.
- Ability to process (0)4 - 20mA or 0 - 10V signals.
- Auto backup of all settings.
- Operational temperature -30°C up to +80°C (-22°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 Ⓔx II 1 GD EEx ia IIB/IIC T4 T100°C.
- Explosion/flame proof Ⓔx II 2 GD EEx d IIB T5.
- 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.

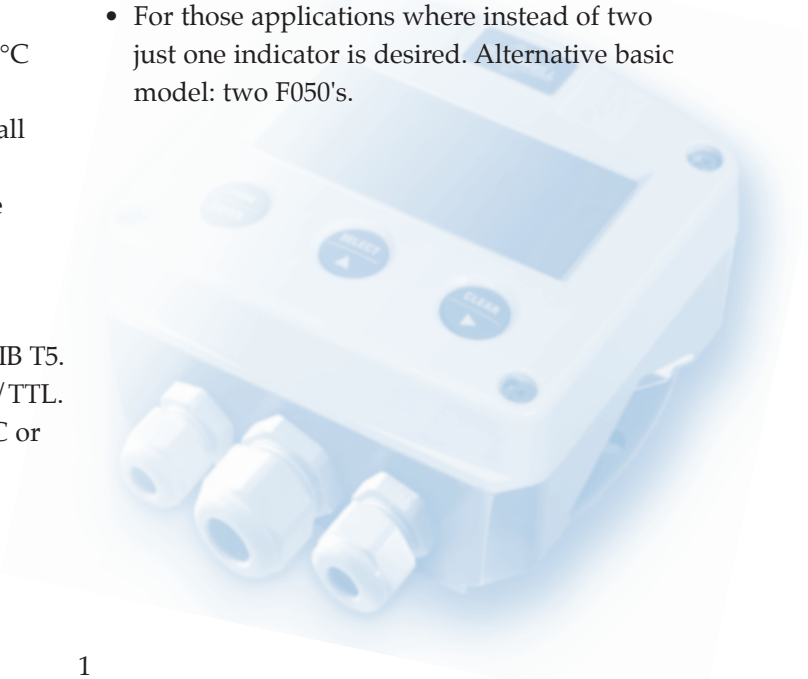
Signal input

Pressure

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

Applications

- For those applications where instead of two just one indicator is desired. Alternative basic model: two F050's.



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 pass-code protected. Each setting is clearly indicated with an alphanumerical 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).

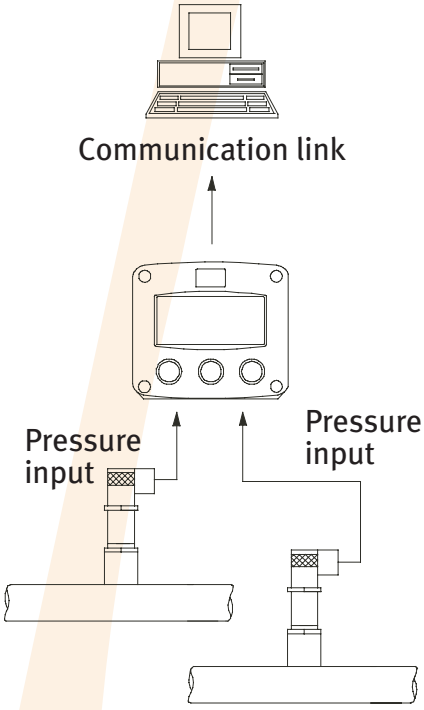
Hazardous areas

For hazardous area applications, this model has been ATEX certified Intrinsically Safe Ex II 1 GD EEx ia IIB / IIC T4 T100°C with an allowed operational temperature of -30°C to +70°C (-22°F to +158°F). A flame proof enclosure is also available with the rating Ex II 2 GD EEx d IIB T5.

Enclosures

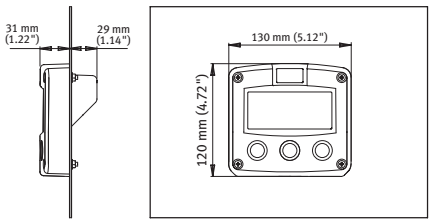
Various types of enclosures can be selected, all ATEX approved. As standard the F151 is supplied in an GRP panel mount enclosure, which can be converted to an IP67 / NEMA 4X GRP field mount enclosure by the addition of a back case. Most popular is our rugged aluminum field mount enclosure with IP67 / NEMA 4X rating. Both European or U.S. cable gland entry threads are available.

Overview application F151

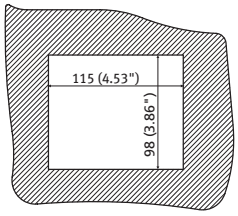


Dimensions enclosures

Aluminum & GRP panel mount enclosure

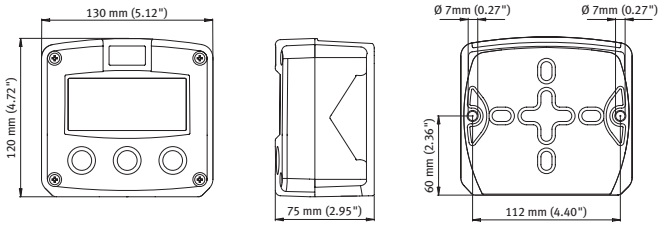


HB & HC enclosures

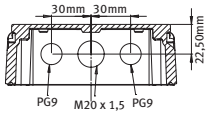


panel cut-out

Aluminum & GRP field / wall mount enclosures



Aluminum



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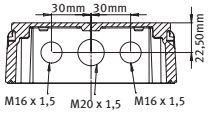

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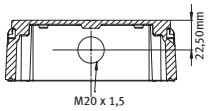

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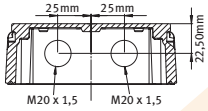

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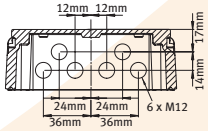

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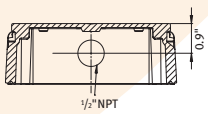

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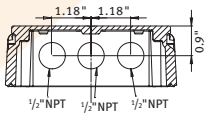
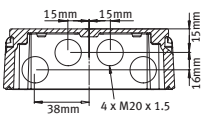
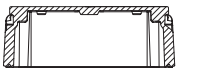


HU

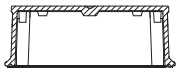


HV

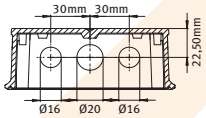


HZ

GRP



HD



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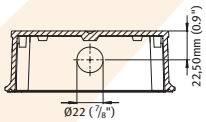

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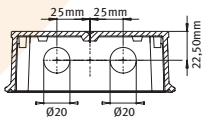

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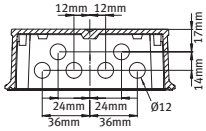

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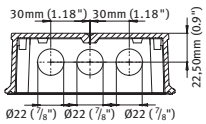

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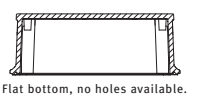
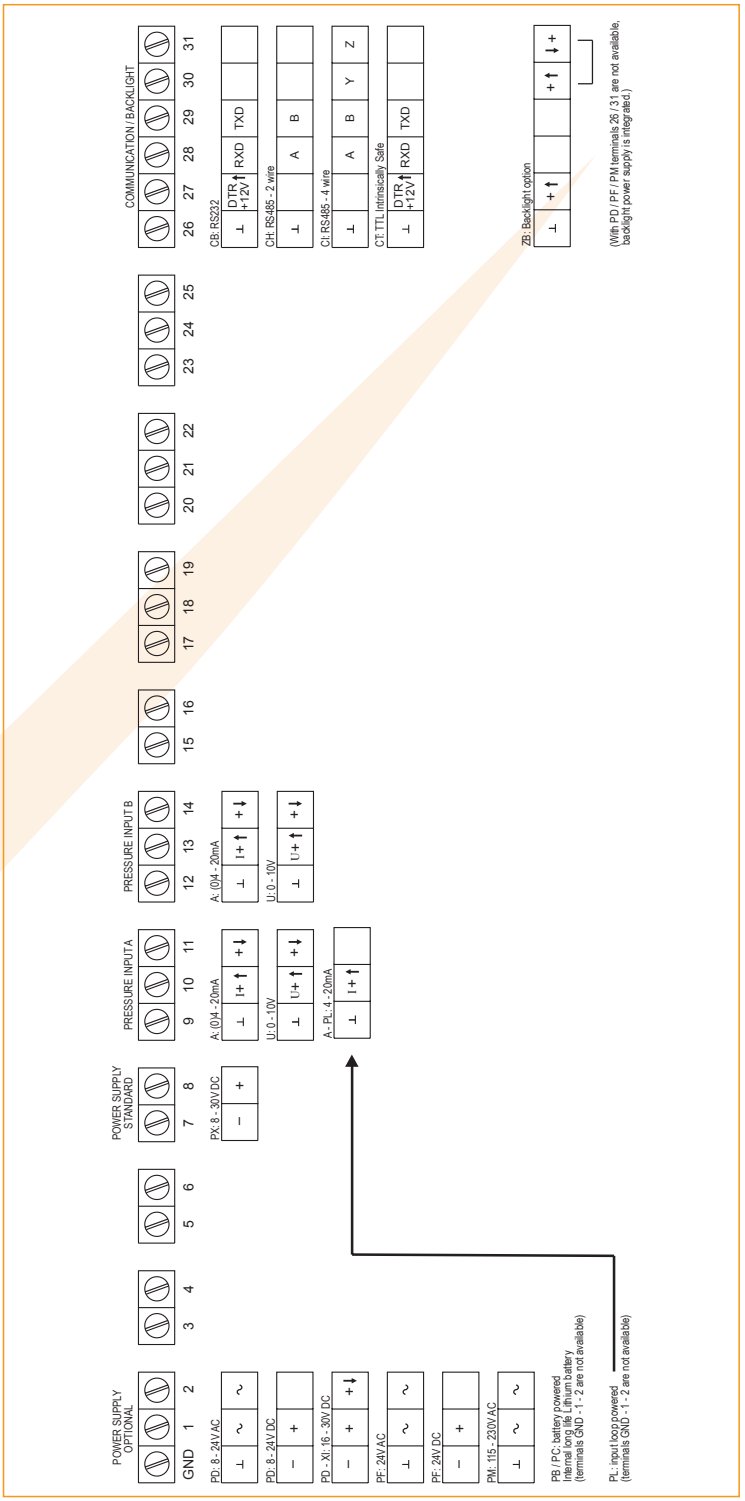


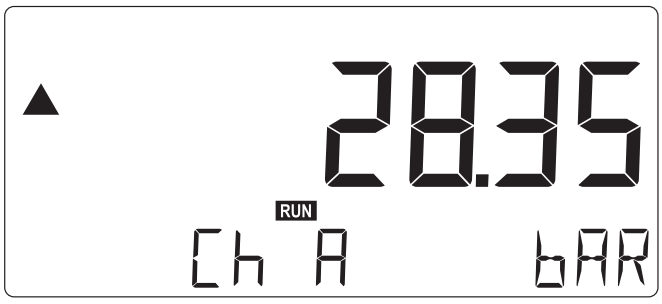
HK

Flat bottom, no holes available.

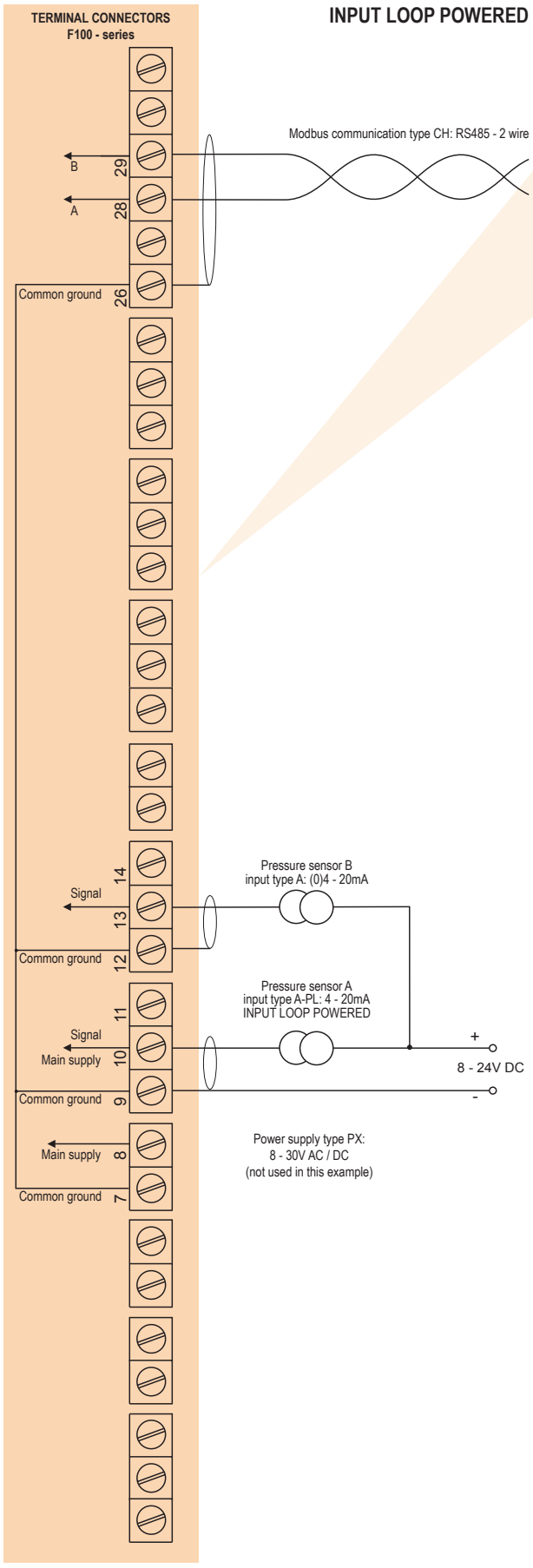
Terminal connections



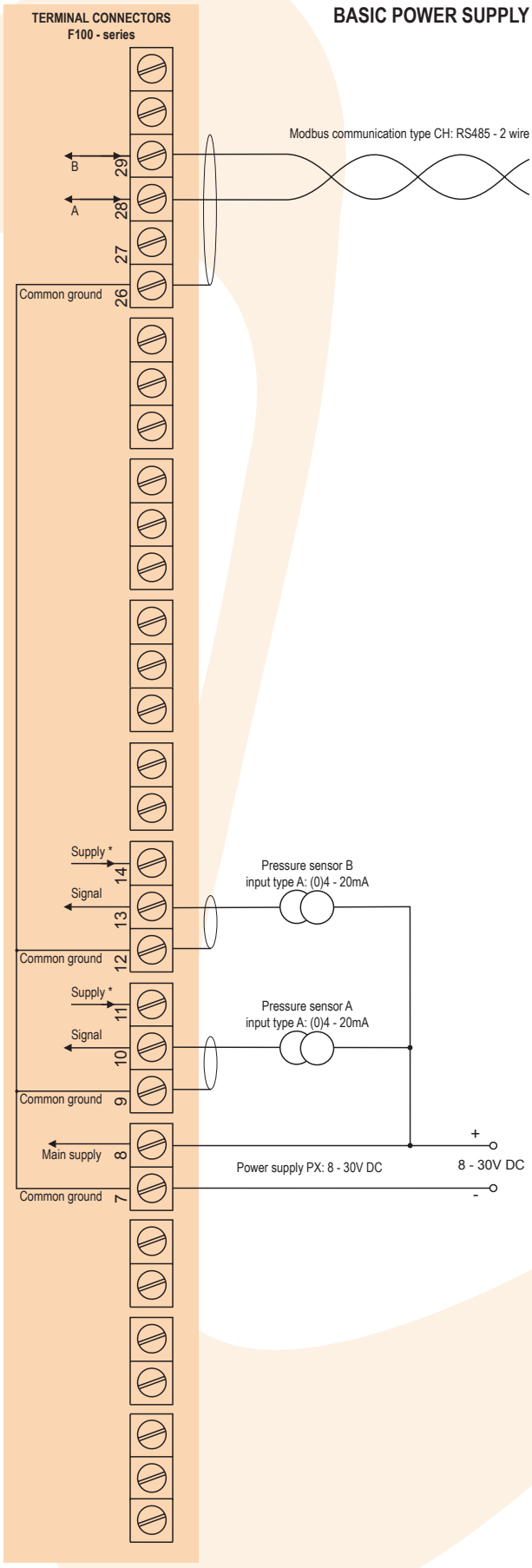
Display example - 90 x 40mm (3.5" x 1.6")



Typical wiring diagram F151-A-CH-PL

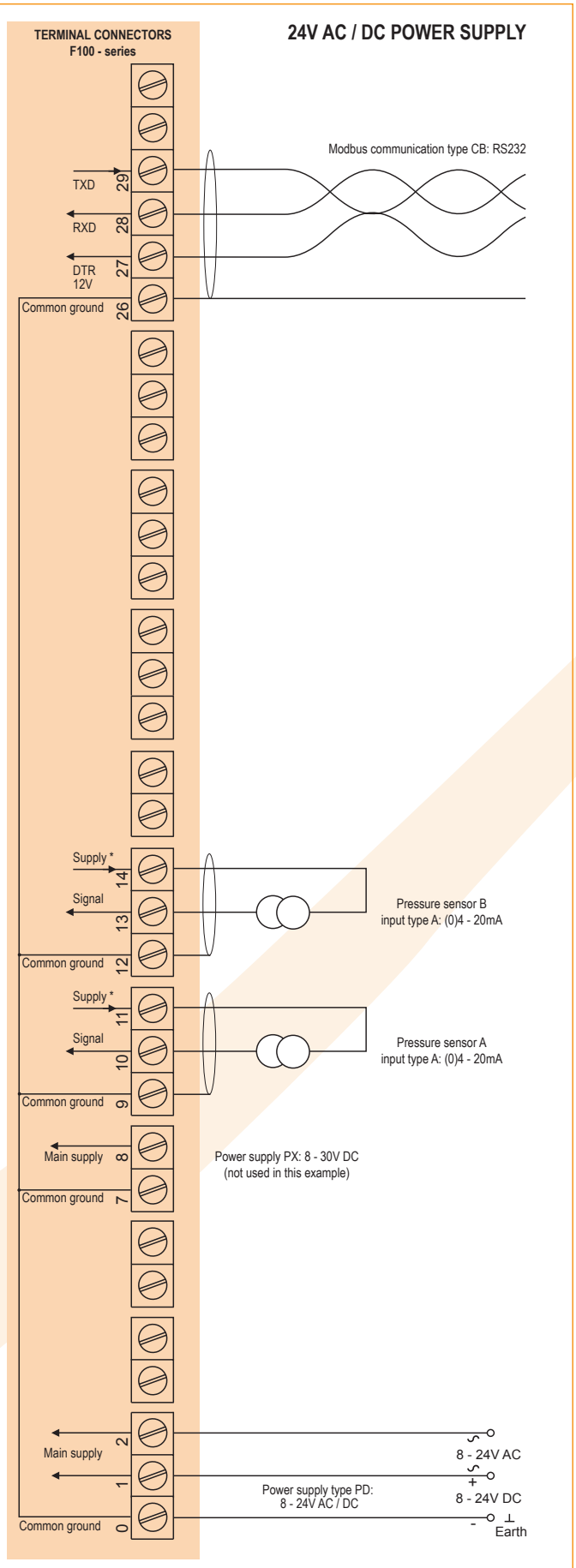


Typical wiring diagram F151-A-CH-PX



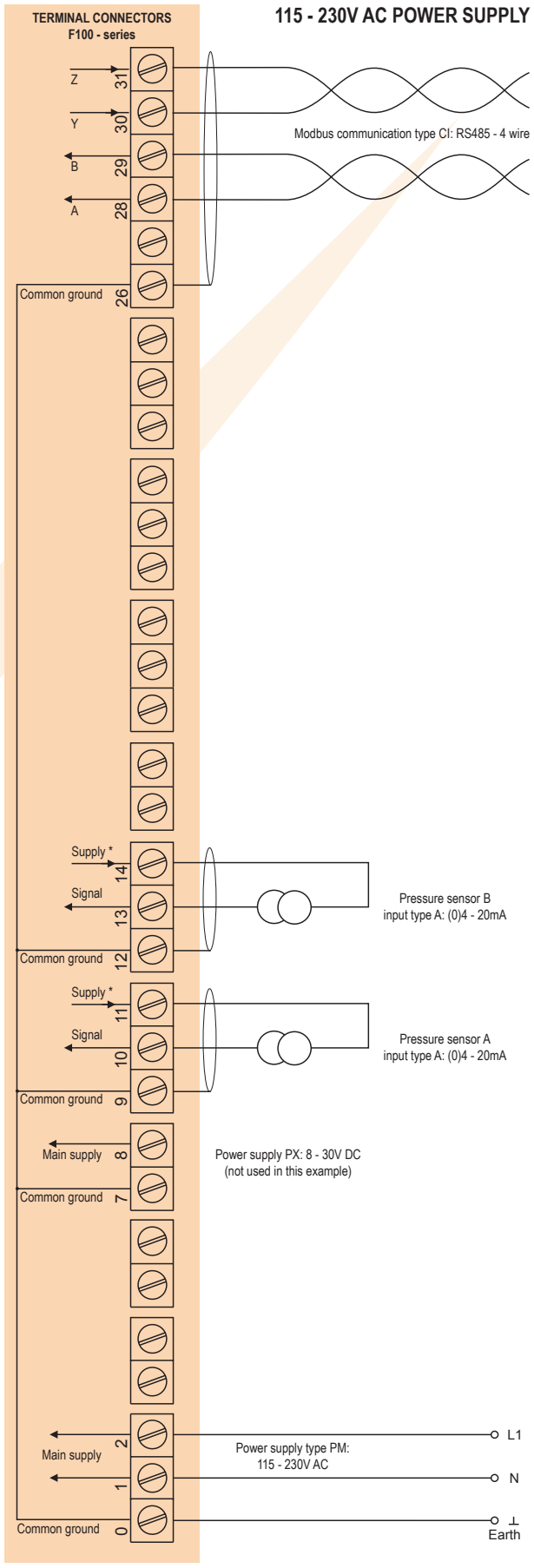
*Supply voltage: 3.2V DC to sensor

Typical wiring diagram F151-A-CB-PD



*Supply voltage: 3.2 / 8.2 / 12 / 24V DC to sensor

Typical wiring diagram F151-A-CI-PM



*Supply voltage: 3.2 / 8.2 / 12 / 24V DC to sensor

Hazardous area applications

The F151-XI has been ATEX approved by KEMA for use in Intrinsically Safe applications. It is approved according to Ex II 1 GD EEx ia IIB/IIC T4 T100°C for gas and dust applications with an operational temperature range of -30°C to +70°C (-22°F to +158°F). It is allowed to connect up to three I.S. power supplies in IIB applications or one in IIC applications.
Full functionality of the F151 remains available, including the Modbus communication (type CT). Power supply type PD-XI offers a sensor supply according to the connected power supply voltage at terminal 1. A flame proof enclosure with rating ATEX Ex II 2 GD EEx d IIB T5 is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 03ATEX1074 X

KEMA

(1) **EC-TYPE EXAMINATION CERTIFICATE**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC

(3) EC-Type Examination Certificate Number: **KEMA 03ATEX1074 X** Issue Number: **2**

(4) Equipment: **Indicator Model F1 Series**

(5) Manufacturer: **Fluidwell B.V.**

(6) Address: **Eisenhowerweg 1, 5466 AB Veghel, The Netherlands**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 2092823.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014 : 1997 + A1, A2 EN 50020 : 2002
EN 50281-1-1 : 1998 + A1 EN 50284 : 1999

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

Ex II 1 GD EEx ia IIB/IIC T4 T 100 °C

This certificate is issued on 11 September 2006 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

C.G. van Es
Certification Manager

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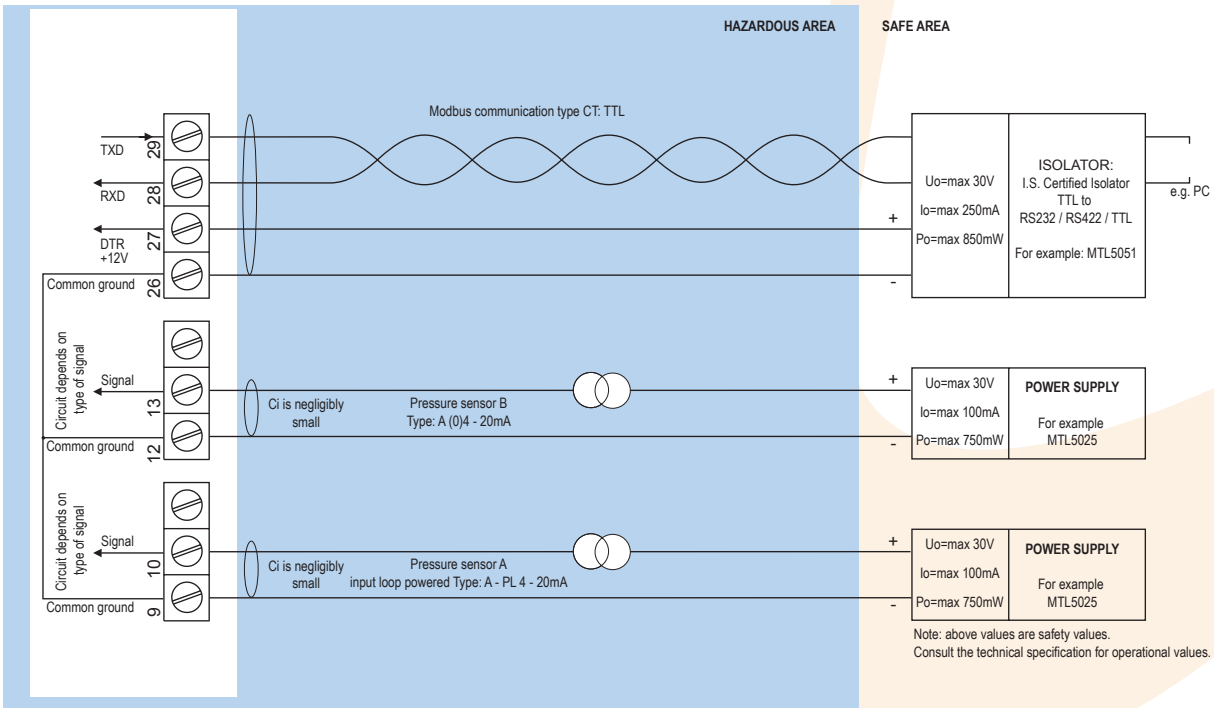
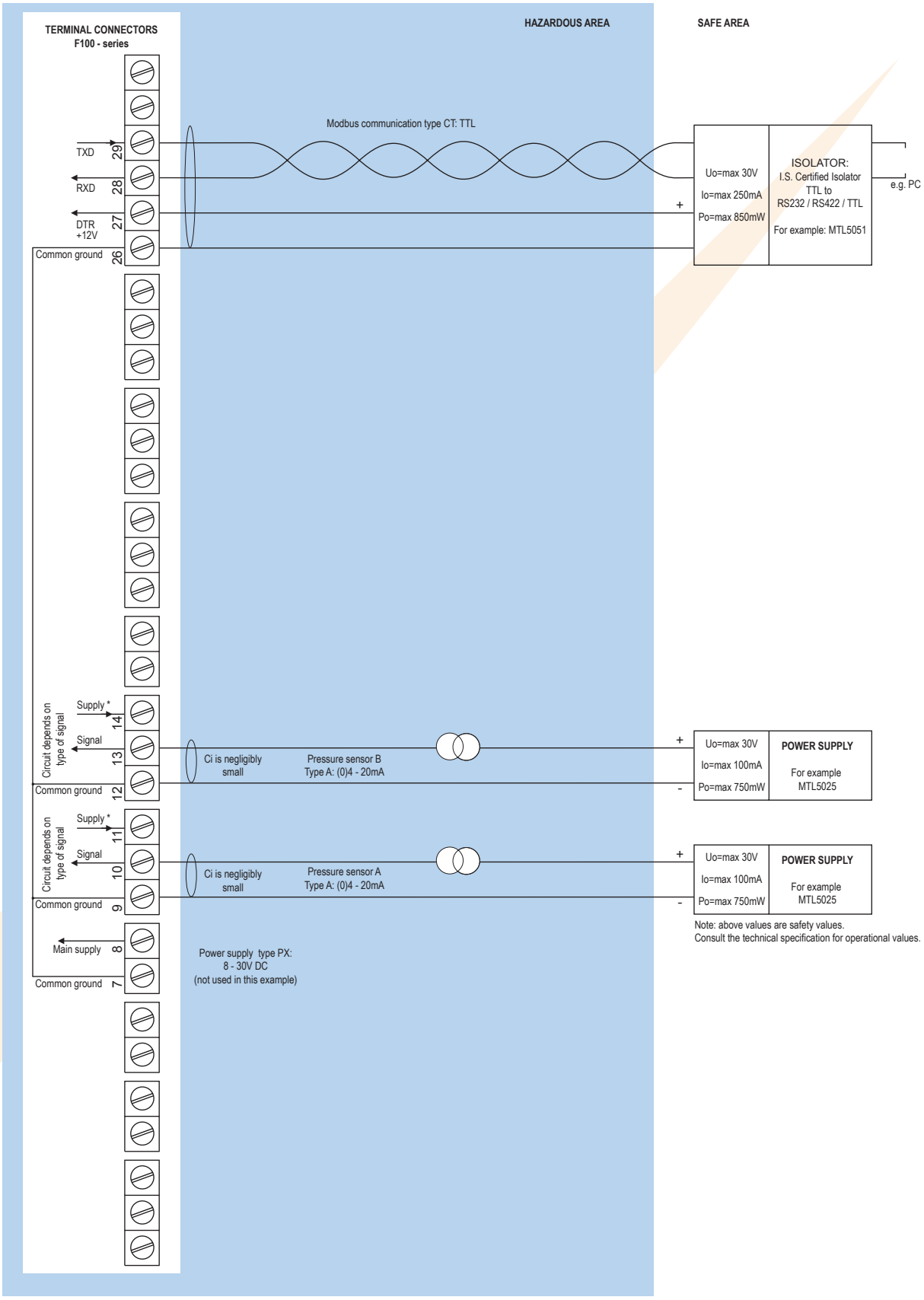
T +31 26 3 56 20 00 F +31 26 3 52 58 00 customer@kema.com www.kema.com Registered Arnhem 09085396

Experience you can trust.

Configuration example IIB
F151-A-CT-PL-XI - Input loop powered unit

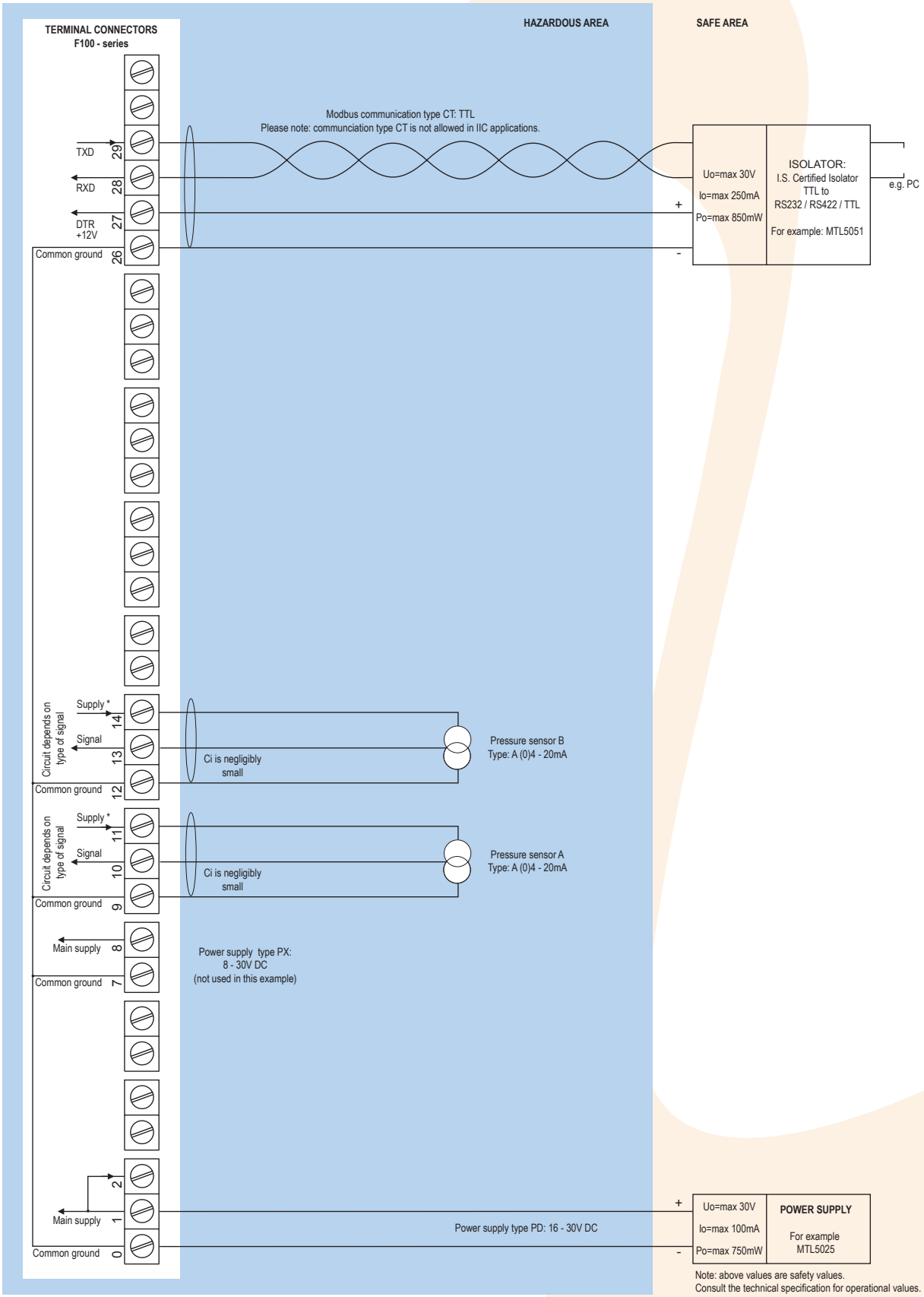


Configuration example IIB - F151-A-CT-PC-XI - Battery powered



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

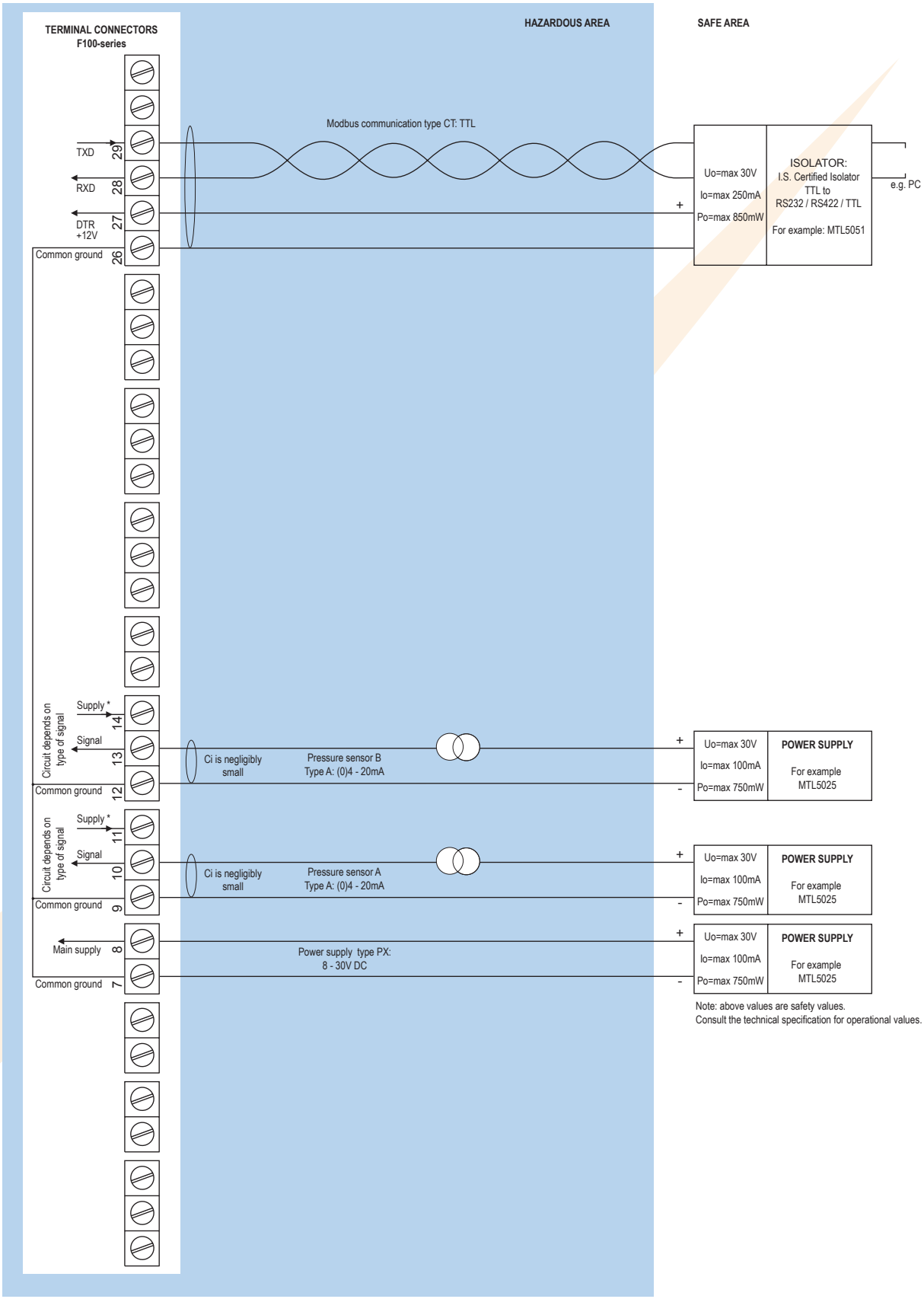
Configuration example IIB / IIC - F151-A-(CT)-PD-XI - Power supply 16 - 30V DC



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

* Note power supply type PD: the supply voltage to the sensor is as connected to terminal 1 (internally linked).

Configuration example IIB - F151-A-CT-PX-XI - Basic power supply 8 - 30V DC



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

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

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. - 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 temperature	
Operational	-30°C to +80°C (-22°F to +178°F).
Intrinsically Safe	-30°C to +70°C (-22°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	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 types AI or AF and OT.
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 values in the certificate.

Sensor excitation	
Type PB/PC/PX	3.2V DC.
Note	This is not a real sensor supply. Only suitable for sensors with a very low power consumption.
Type PD	3.2 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC.
Type PD-XI	The sensor supply volage will be according to power supply as connected to terminal 1.
Type PF / PM	3.2 / 8.2 - 12 / 24V DC - max. 400mA @ 24V DC.

Terminal connections	
Type	Removable plug-in terminal strip. Wire max. 1.5mm² and 2.5mm².

Data protection	
Type	EEPROM backup of all settings. Data retention at least 10 years.
Pass-code	Configuration settings can be pass-code protected.

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

Hazardous area	
Intrinsically Safe Type XI	ATEX approval ref.: ⟨Ex⟩ II 1 GD EEx ia IIB/IIC T4 T100°C. Maximum ambient +70°C (158°F).
Explosion proof Type XF	ATEX approval ref.: ⟨Ex⟩ II 2 GD EEx d IIB T5. Dimensions of enclosure: 300 x 250 x 200mm (11.8" x 9.9" x 7.9") L x H x D.
Weight Type XF	appr. 15 kg.

Casing

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 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 / field 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 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 4.
Weight	600 gr.
Type HC	GRP panel mount enclosure IP65 / NEMA 4, UV-resistant and flame retardant.
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.

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	(o)4 - 20mA. Analog input signal can be scaled to any desired range within o - 20mA.
Span	0.000010 - 9,999,999 with variable decimal position.
Offset	0.000 - 9,999.999.
Voltage drop	2.5V @ 20mA.
Type U	o - 10V DC. Analog input signal can be scaled to any desired range within o - 10V DC.
Span	0.000010 - 9,999,999 with variable decimal position.
Load impedance	3kΩ.
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	• Pressure A. • Pressure B.

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

Accessories

Mounting accessories	
ACF02	Stainless steel wall mounting kit.
ACF05	Stainless steel pipe mounting kit (worm gear clamps not included).
ACF06	Two stainless steel worm gear clamps Ø 44 - 56mm.
ACF07	Two stainless steel worm gear clamps Ø 58 - 75mm.
ACF08	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”).

Cable gland accessories	
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 plug accessories	
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 accessories	
ACG01	MTL5011B - One channel pulse or switch output transfer from hazardous area to safe area, including power supply.
ACG02	MTL5025 - 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).
ACG03	MTL5042 - One channel 4 - 20mA repeater from hazardous area to safe area, including power supply.
ACG04	MTL 5051 - Bi-direction serial-data-isolator (for Modbus communivation).
ACG05	MTL5018 - Two channel pulse or switch output transfer from hazardous area to safe area , including power supply.
ACG06	MTL5012 - One channel pulse or switch output transfer from hazardous area to safe area, including power supply.
ACG07	MTL5045 - One channel isolated driver bringing 4 - 20mA from safe area to hazardous area, including power supply.

Ordering information

Standard configuration: F151-A-AX-CX-EX-HC-IX-OX-PX-TX-XX-ZX.

Ordering information:		F151	-_	-AX	-C _	-EX	-H _	-IX	-OX	-P _	-TX	-X _	-Z _
Pressure input signal													
A	Ex	**(o)4 - 20mA input.**											
U	Ex	0 - 10V DC input.											
Analog output signal													
AX	Ex	**No analog output.**											
Communication													
CB		Communication RS232 - Modbus ASCII / RTU.											
CH		Communication RS485 - 2-wire - Modbus ASCII / RTU.											
CI		Communication RS485 - 4-wire - Modbus ASCII / RTU.											
CT	Ex	Intrinsically Safe TTL - Modbus ASCII / RTU.											
CX	Ex	**No communication.**											
Flow equations													
EX	Ex	**No flow equations.**											
Panel mount enclosures - IP65 / NEMA4													
HB	Ex	Aluminum enclosure.											
HC	Ex	**GRP enclosure.**											
GRP field / wall mount enclosures - IP67 / NEMA4X													
HD	Ex	Cable entry: no holes.											
HE	Ex	Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.											
HF	Ex	Cable entry: 1 x Ø 22mm (7/8").											
HG	Ex	Cable entry: 2 x Ø 20mm.											
HH	Ex	Cable entry: 6 x Ø 12mm.											
HJ	Ex	Cable entry: 3 x Ø 22mm (7/8").											
HK	Ex	Flat bottom, cable entry: no holes.											
Aluminum field / wall mount enclosures - IP67 / NEMA4X													
HA	Ex	Cable entry: 2 x PG9 + 1 x M20.											
HM	Ex	Cable entry: 2 x M16 + 1 x M20.											
HN	Ex	Cable entry: 1 x M20.											
HO	Ex	Cable entry: 2 x M20.											
HP	Ex	Cable entry: 6 x M12.											
HT	Ex	Cable entry: 1 x ½"NPT.											
HU	Ex	Cable entry: 3 x ½"NPT.											
HV	Ex	Cable entry: 4 x M20.											
HZ	Ex	Cable entry: no holes.											
ABS field / wall mount enclosures													
HS	Ex	Silicone free ABS field enclosure IP65 – Cable entry: no holes (old HD enclosure).											
Additional inputs													
IX	Ex	**No additional input.**											
Outputs													
OX	Ex	**No output.**											
Power supply													
PB		Lithium battery powered.											
PC	Ex	Lithium battery powered - Intrinsically Safe.											
PD	Ex	8 - 24V AC / DC + sensor supply - with XI: 16 - 30V DC.											
PF		24V AC / DC + sensor supply.											
PL	Ex	Input loop powered from sensor signal type "A".											
PM		115 - 230V AC + sensor supply.											
PX	Ex	**Basic power supply 8 - 30V DC (no real sensor supply).**											
Temperature input signal													
TX	Ex	**No temperature input signal.**											
Hazardous area													
XI	Ex	Intrinsically Safe, according ATEX.											
XF		EExd enclosure - 3 keys.											
XX		**Safe area only.**											
Other options													
ZB		Backlight.											
ZX	Ex	**No options.**											

The bold marked text contains the standard configuration.

Ex Available Intrinsically Safe.

Specifications are subject to change without notice.

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