DATASHEET F141 - DUAL INPUT TEMPERATURE INDICATOR

DUAL INPUT TEMPERATURE INDICATOR

Features

- Displays two actual temperatures.
- Large 17mm (0.67") digits.
- Selectable on-screen engineering units for each input individually.
- Auto backup of all settings.
- Operational temperature -40°C up to +80°C (-40°F up to 176°F).
- Very compact design for panel mount, wall mount or field mount applications.
- Rugged aluminum field mount enclosure IP67/NEMA4X.
- Intrinsically Safe - ATEX and IECEx approval for gas and dust applications.
- Explosion/flame proof Ex 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.

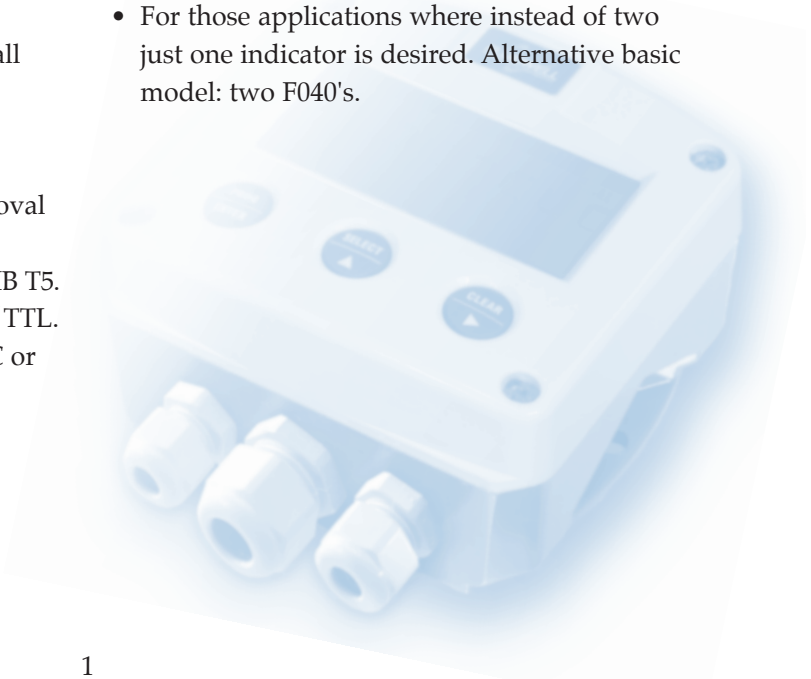
Signal input

Temperature

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

Applications

- For those applications where instead of two just one indicator is desired. Alternative basic model: two F040's.



General information

Introduction

The F141 incorporates two fully separated temperature indicators in one enclosure. There is no relationship between the inputs, even different measuring units can be used. A wide selection of options is availabe to further enhance this models capabilities, including Intrinsic Safety and full Modbus communication.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits. For each temperature 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 F141 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 F141 does accept (0)4 - 20mA and 0 - 10V input signals from any type of temperature measurement device. 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).

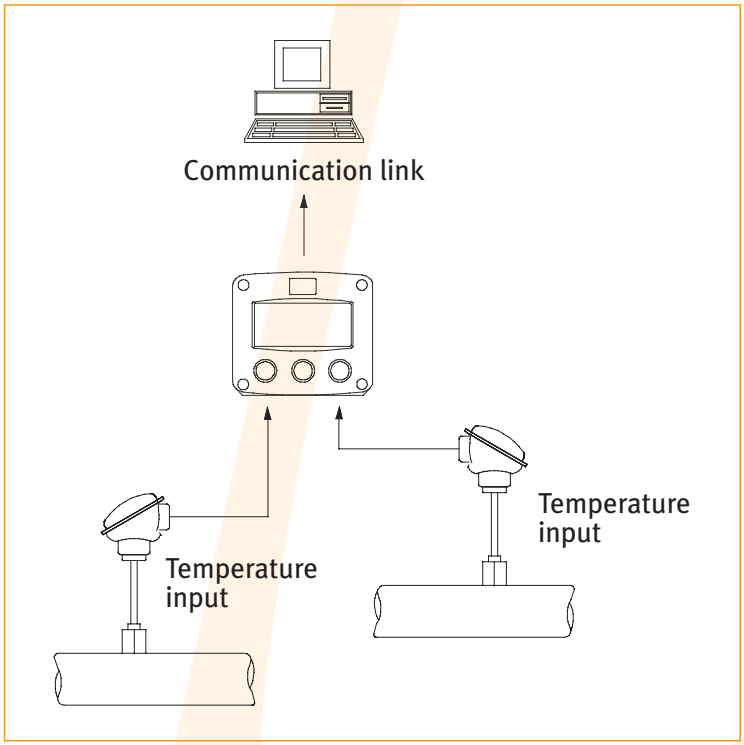
Hazardous areas

This model has been ATEX and IECEx certified Intrinsically Safe for gas and dust applications, with an allowed operational temperature of -40°C to +70°C (-40°F to +158°F).
A flame proof enclosure with ATEX certification offers the rating Ex II 2 GD EEx d IIB T5.

Enclosures

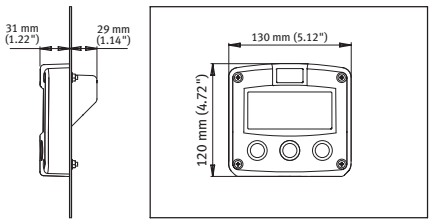
Various types of enclosures can be selected, all ATEX and IECEx approved. As standard the F141 is supplied in an GRP panel mount enclosure, which can be converted to an IP67 / NEMA 4X GRP field mount enclosure by the addition of a back case. Most popular is our rugged aluminum field mount enclosure with IP67 / NEMA 4X rating. Both European or U.S. cable gland entry threads are available.

Overview application F141

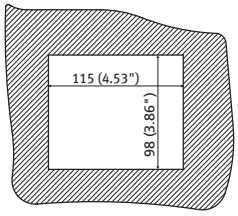


Dimensions enclosures

Aluminum & GRP panel mount enclosure

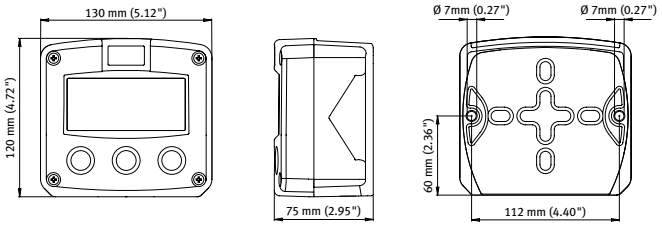


HB & HC enclosures

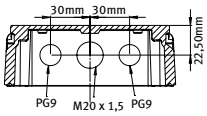


panel cut-out

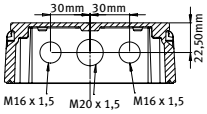
Aluminum & GRP field / wall mount enclosures



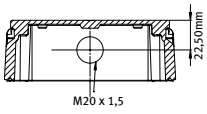
Aluminum



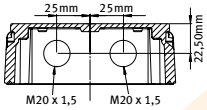
HA



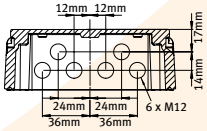
HM



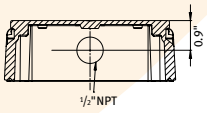
HN



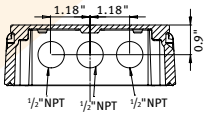
HO



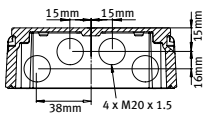
HP



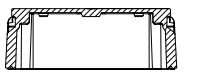
HT



HU

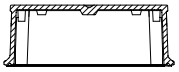


HV

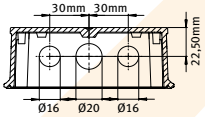


HZ

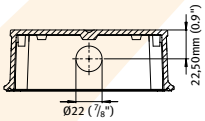
GRP



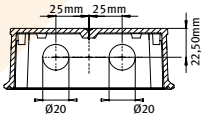
HD



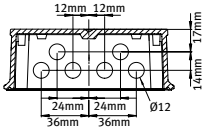
HE



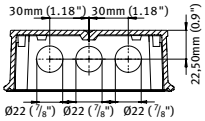
HF



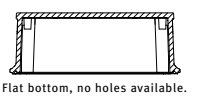
HG



HH



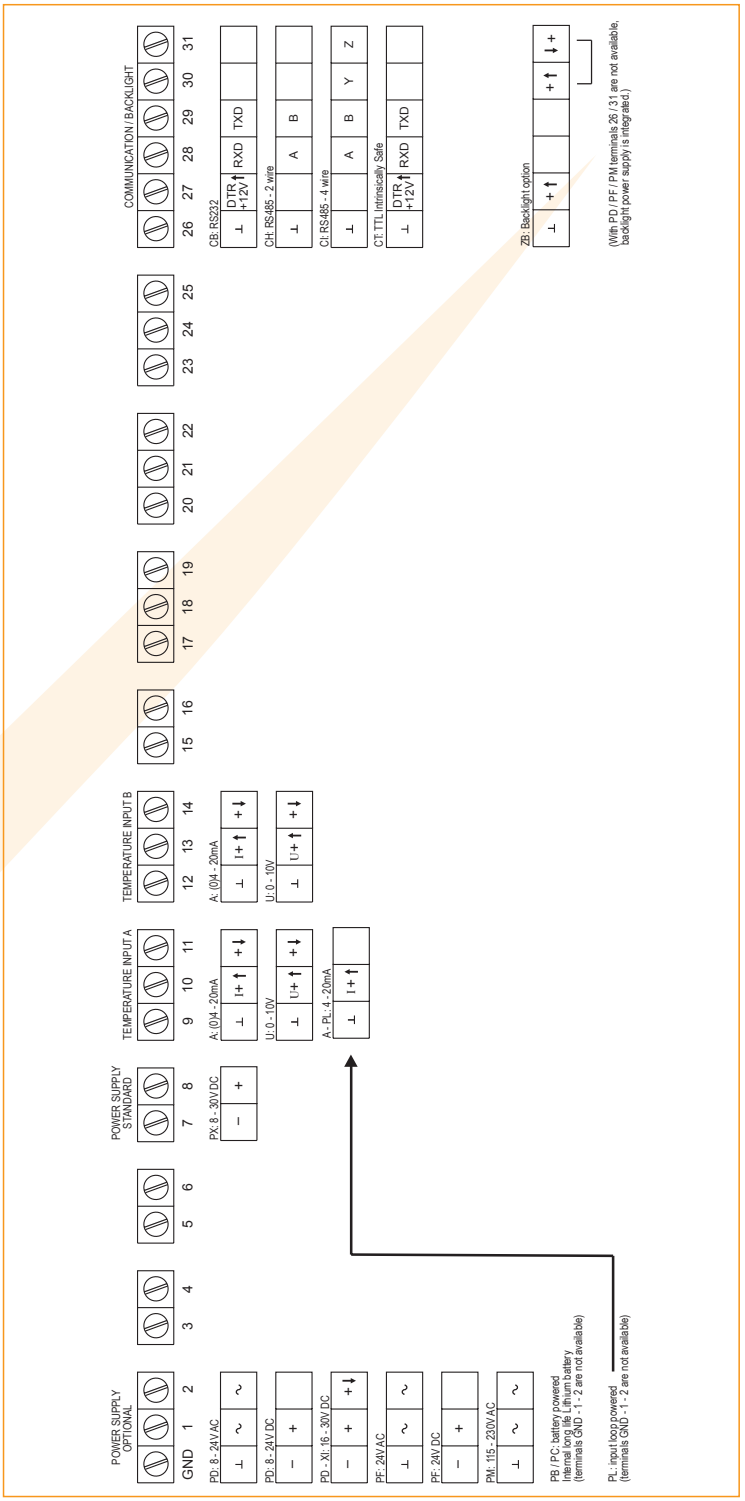
HJ



HK

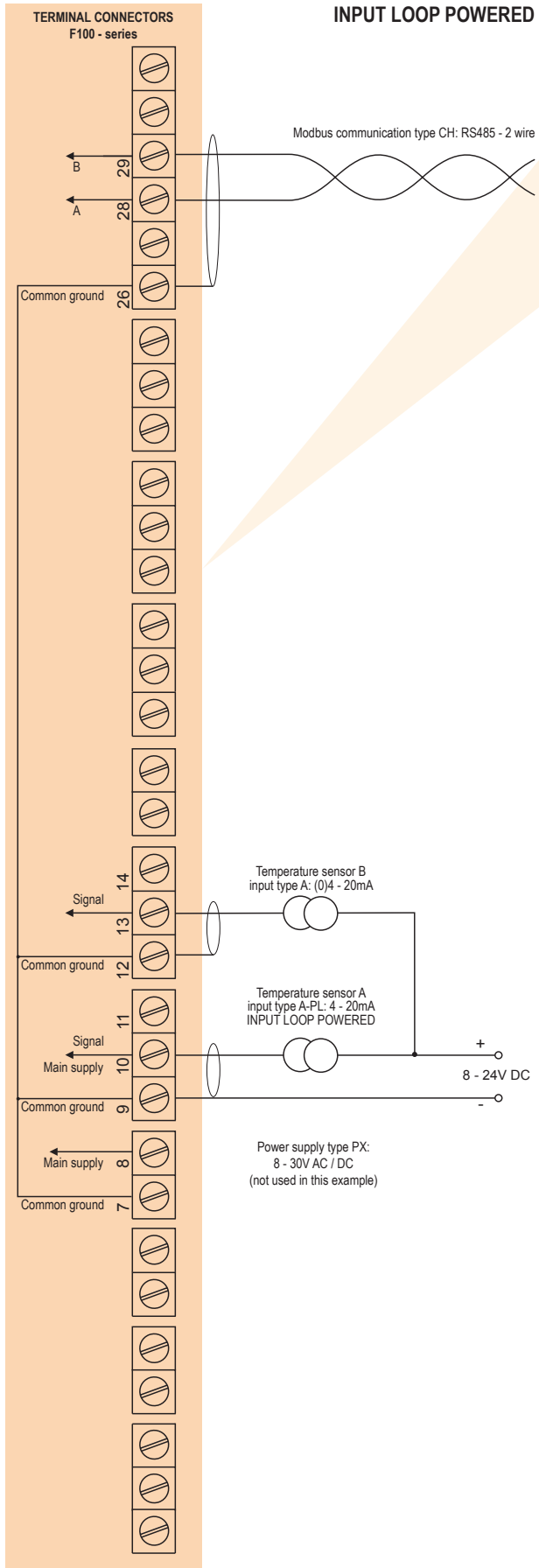
Flat bottom, no holes available.

Terminal connections

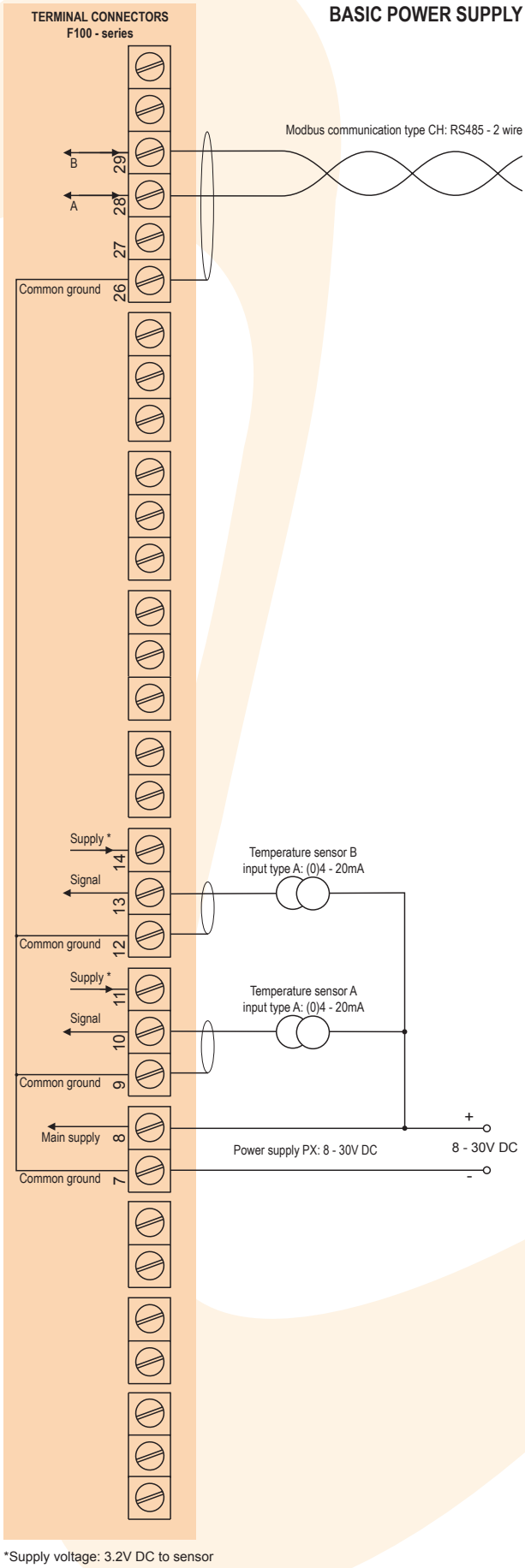


Display example - 90 x 40mm (3.5" x 1.6")

Typical wiring diagram F141-A-CH-PL

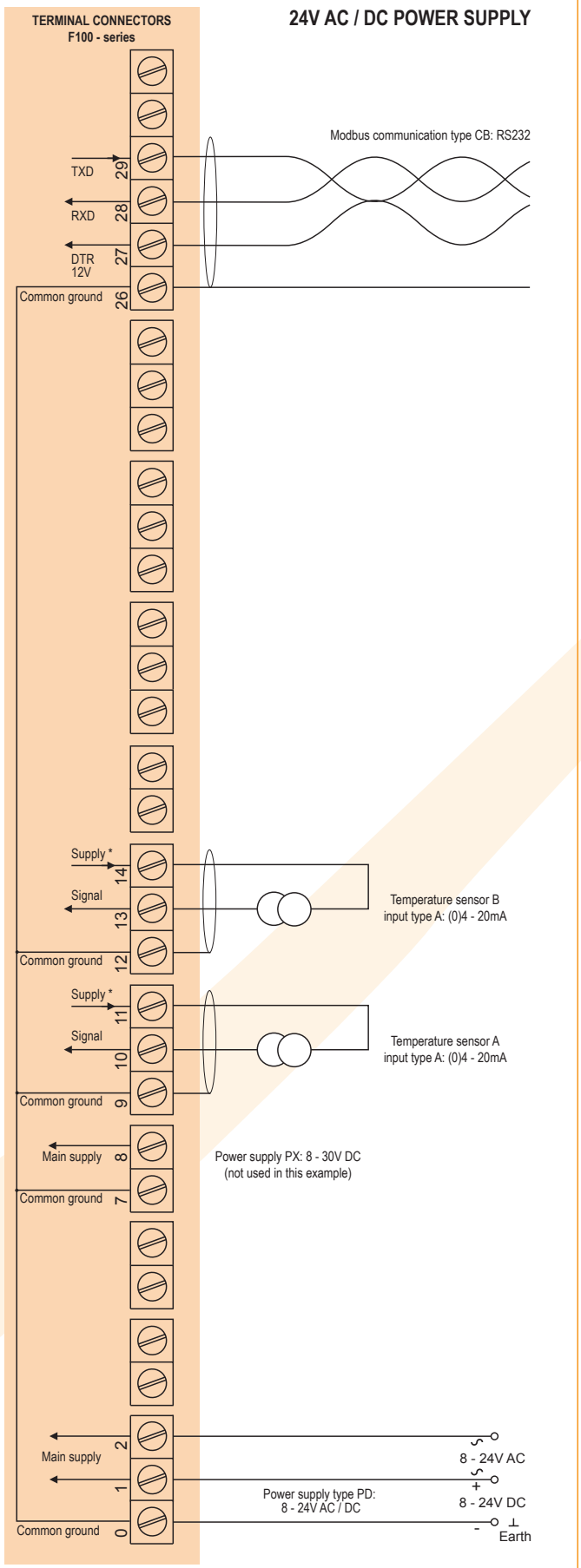


Typical wiring diagram F141-A-CH-PX



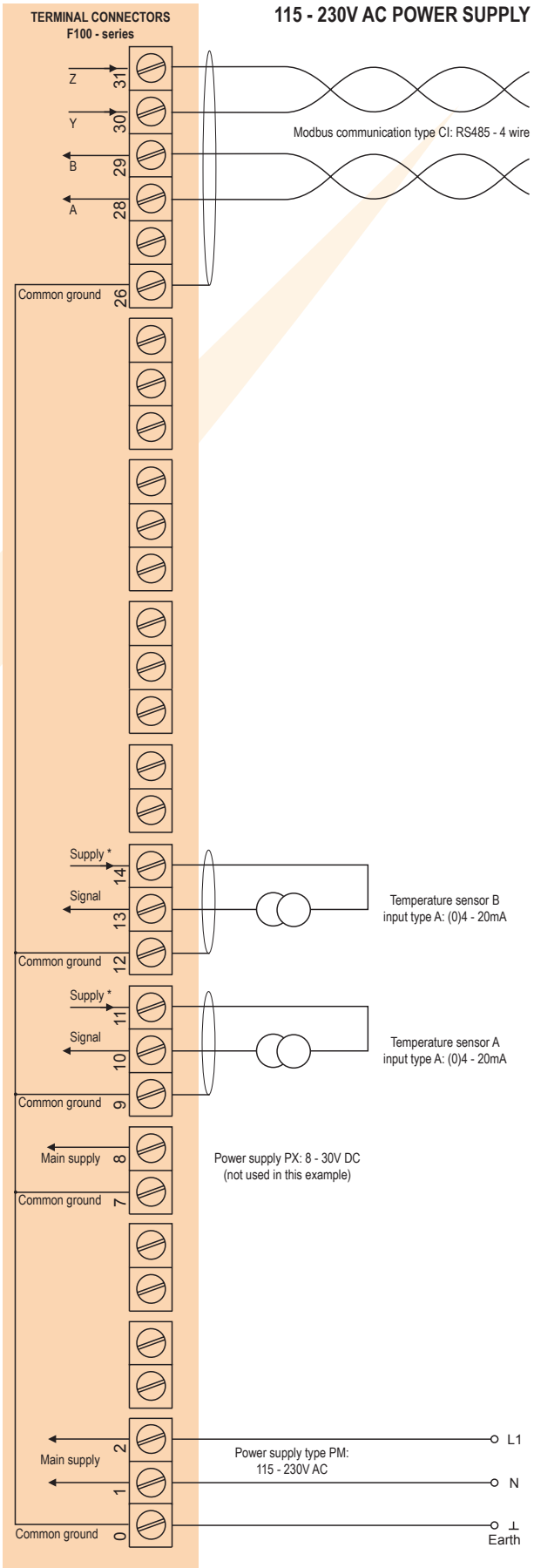
*Supply voltage: 3.2V DC to sensor

Typical wiring diagram F141-A-CB-PD



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

Typical wiring diagram F141-A-CI-PM



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

Hazardous area applications

The F141-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 IP6X.
- The IECEx markings for gas and dust applications are: **Ex ia IIC/IIB T4 Ga** and **Ex ia IIIC T100 °C Da IP6X.**

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 F141 remains available, including the Modbus communication (CT).

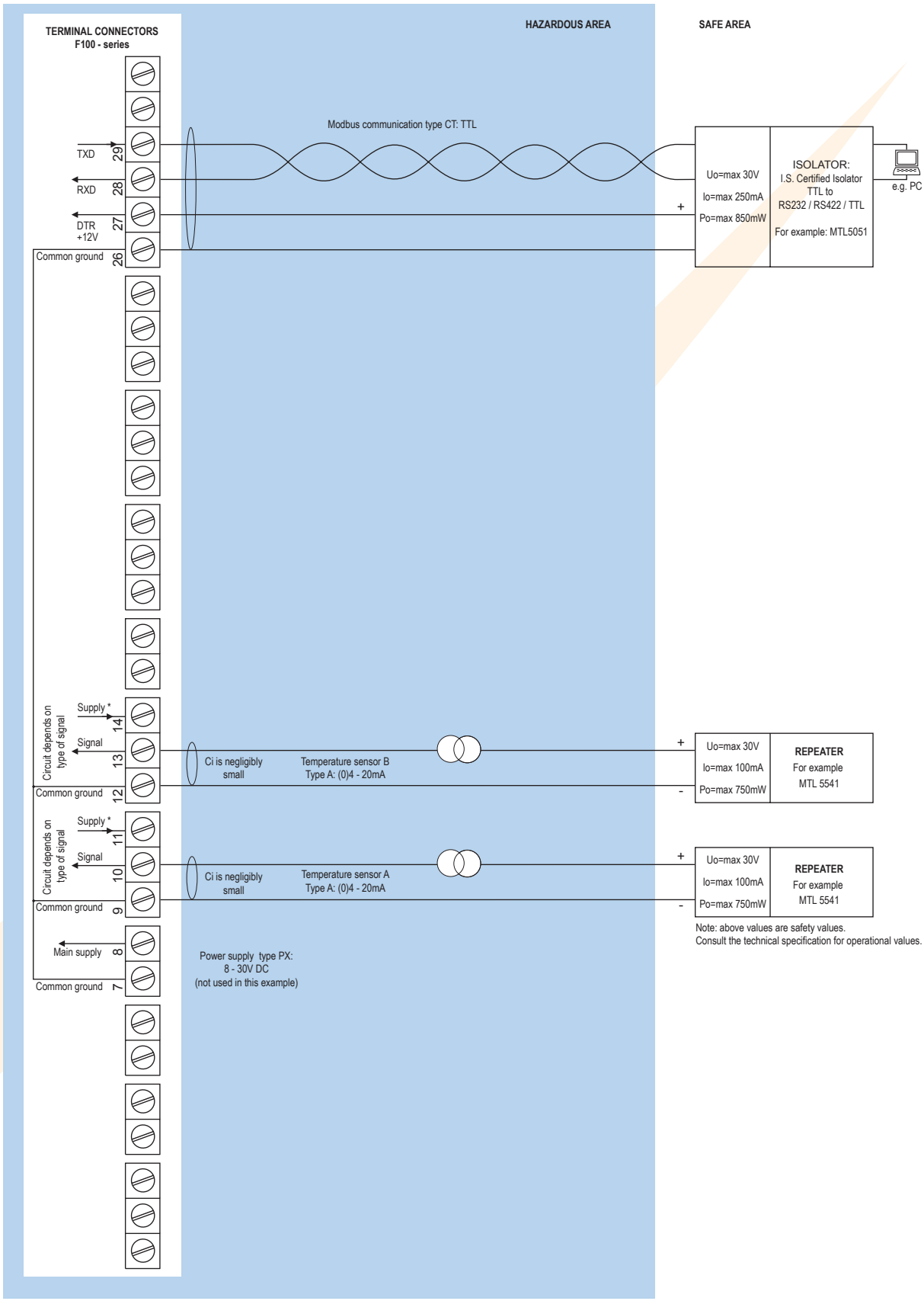
Power supply type PD-XI offers a sensor supply according to the connected power supply voltage at terminal 1.

A flame proof enclosure with rating ATEX **II 2 GD EEx d IIB T5** is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 03ATEX1074 X

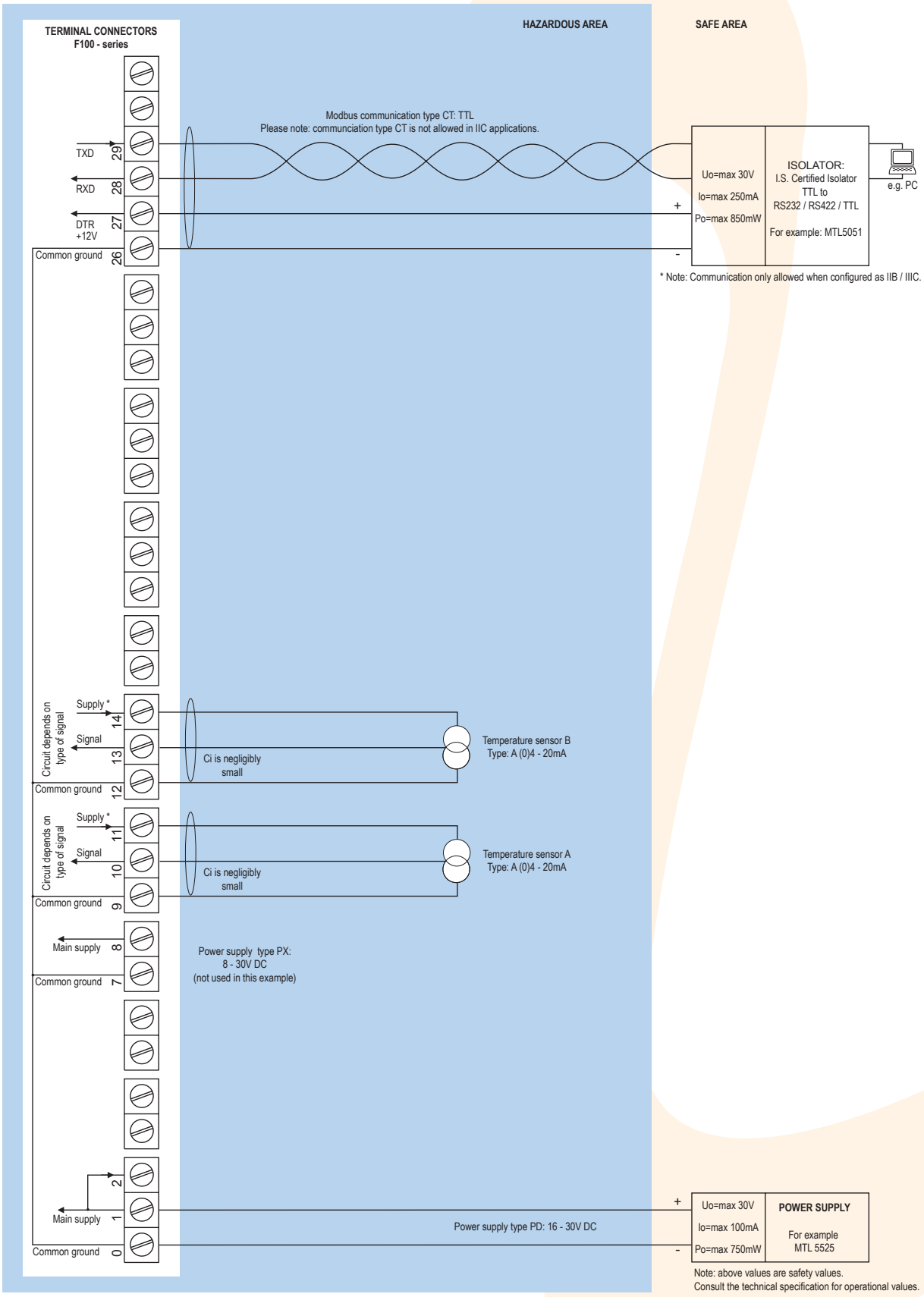
• IECEx DEK 11.0042X

Configuration example IIB / IIIC - F141-A-CT-PC-XI - Battery powered



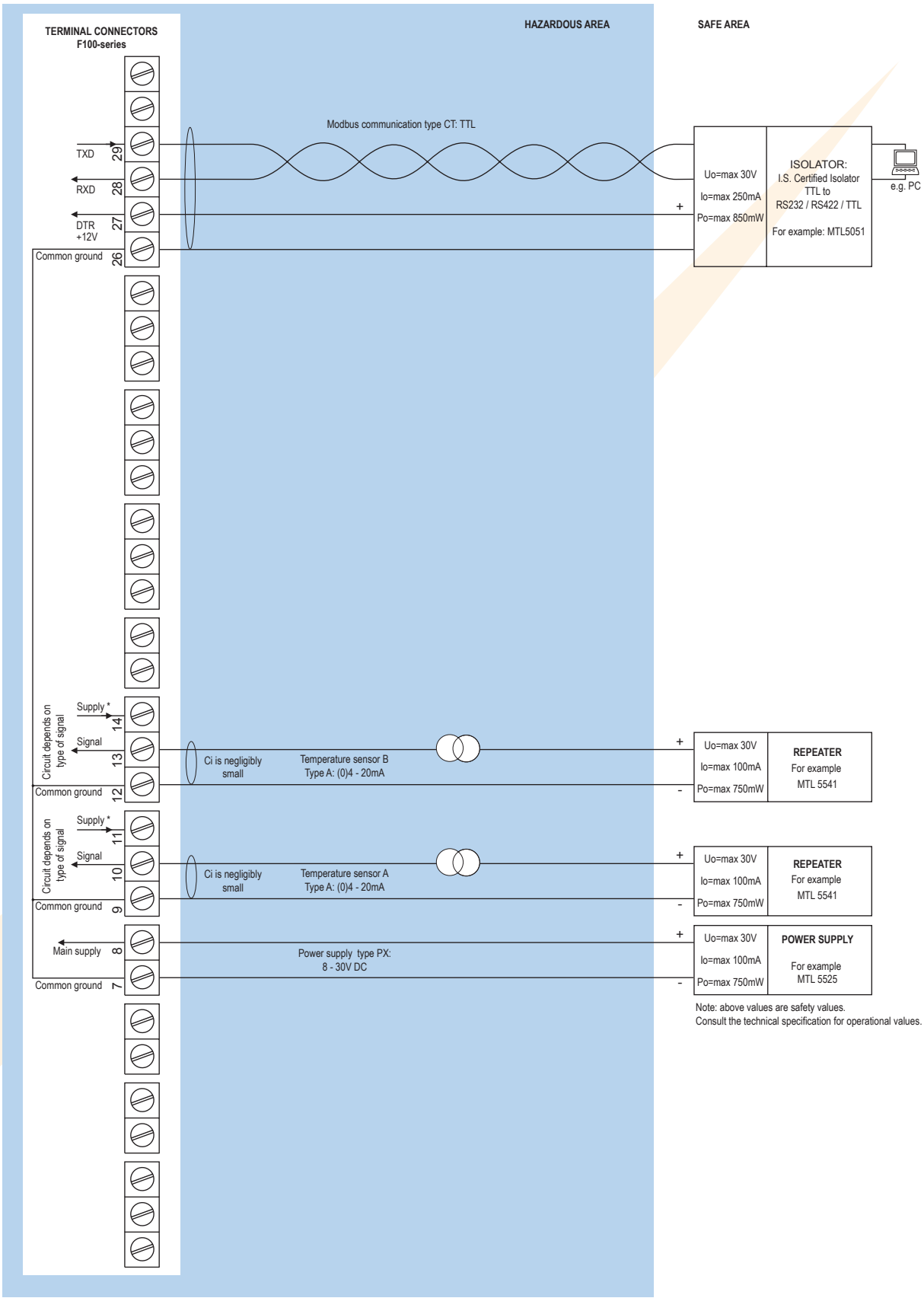
* Note sensor supply voltage: 3.2V DC - not suitable to power analog sensors.

Configuration example IIB / IIIC and IIC - F141-A-CT-PD-XI - Power supply 16 - 30V DC



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

Configuration example IIB / IIIC - F141-A-CT-PX-XI - Basic power supply 8 - 30V DC



* 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	
Standard unit	-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.
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 (not Xi).
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 PT100 sensors.
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.

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 4X.
Weight	600 gr.
Type HC	GRP panel mount enclosure IP65 / NEMA 4X, 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.

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 IP6X.
IECEx certification	Ex ia IIC/IIB T4 Ga. Ex ia IIIC T100 °C Da IP6X.
Ambient Ta	-40°C to +70°C (-40°F to +158°F).

Explosion proof (Type XF)	
ATEX certification	II 2 GD EEx d IIB T5.
Dimensions	300 x 250 x 200mm (11.8" 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 inputs

Temperature 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 0 - 20mA.
Span	0.000010 - 9,999,999 K with variable decimal position.
range	-275°C - 999,999°C.
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 - 999,999 K with variable decimal position.
Offset	-275°C - 999,999°C.
Load impedance	3kΩ.
Note	For signal A and U: power supply to temperature sensor is 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	• Temperature A. • Temperature B.

Temperature	
Digits	6 digits.
Units	°C, °F or K.
Decimals	Type A / U: 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.

Ordering information

Standard configuration: F141-A-AX-CX-EX-HC-IX-OX-PX-TX-XX-ZX.

Ordering information:	F141	-_	-AX	-C _	-EX	-H _	-IX	-OX	-P _	-TX	-X _	-Z _
Temperature sensor input signal												
A Ex	**(o)4 - 20mA input.**											
U Ex	0 - 10V DC input.											
Analog output signal												
AX	**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 / NEMA4X												
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 - IP65												
HS Ex	Silicone free ABS field enclosure – Cable entry: no holes (old HD enclosure).											
Additional inputs												
IX Ex	**No additional input.**											
Outputs												
OX Ex	**No outputs.**											
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	Input loop powered from sensor signal type "A" (not Xi).											
PM	115 - 230V AC + sensor supply.											
PX Ex	**No power supply option. Unit requires external loop AP.**											
Temperature input signal												
TX Ex	**No additional temperature input signal.**											
Hazardous area												
XI Ex	Intrinsically Safe, according ATEX and IECEx.											
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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