



# TEMPERATURE INDICATOR

WITH RUGGED ALUMINUM FIELD ENCLOSURE  
OR PANEL MOUNT ENCLOSURE



## Features

- Displays actual temperature and measuring unit.
- Large 17mm (0.67") digits.
- Selectable on-screen engineering units: °C-°F-K.
- 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.
- Auto backup of all settings.
- 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.
- 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.

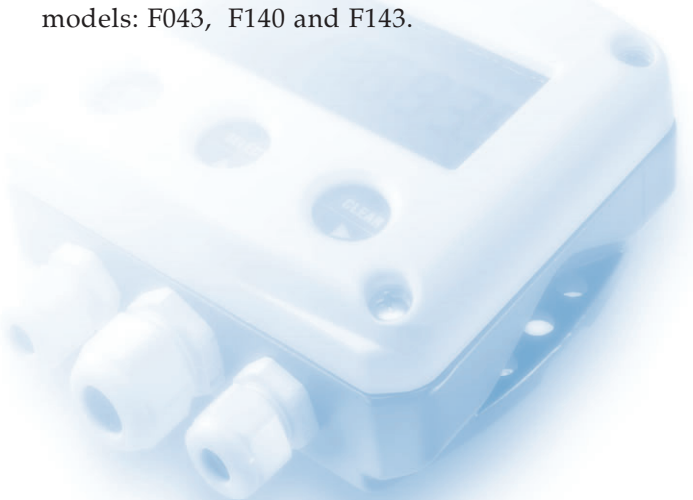
## Signal input

### Temperature

- PT100 - 2 or 3 wire.
- (0)4 - 20mA.
- 0 - 10V DC.

## Applications

- Applications where a basic temperature measurement display is required without temperature monitoring. More sophisticated models: F043, F140 and F143.



## General information

### Introduction

The F040 is a straight forward temperature indicator. The measuring unit to be displayed is simply selected through an alpha-numerical configuration menu. No adhesive labels have to be put on the outside of the enclosure: a weather proof and user friendly solution!

The configuration of the Span, off-set and number of decimals is done through software functions, without any sensitive dip-switches or trimmers. 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 displays the temperature and measuring unit. As the F040 has been designed for field mounted applications, a smart display update function has been incorporated. Related to the lower temperature, 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 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 Intrinsicly 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.

### Signal input

The F040 does accept (0)4 - 20mA and 0 - 10V input signals from any type of temperature measurement device. Also a two or three wire PT100 sensor can be used.

### Power supply

Several power supply options are available to power the F040 and sensor. A battery powered version with a long life lithium battery which will last up to five years. A 4-20mA input 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.

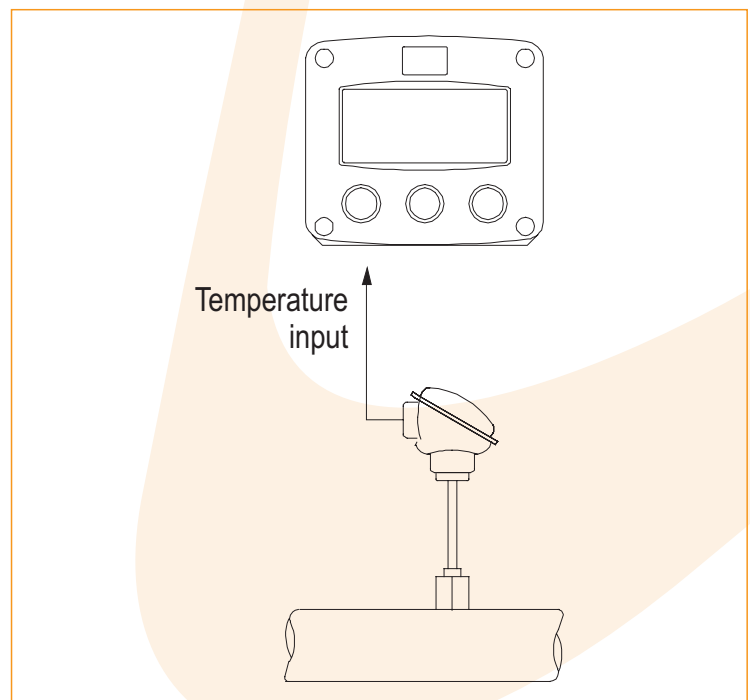
### Hazardous areas

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  $-40^\circ\text{C}$  to  $+70^\circ\text{C}$  ( $-40^\circ\text{F}$  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 F040 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 F040

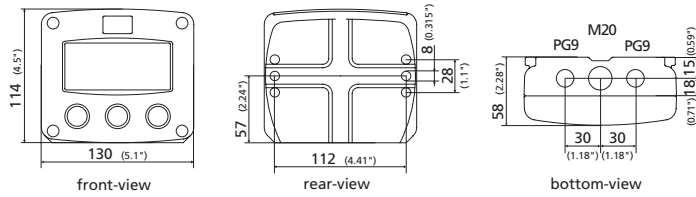


## Dimensions enclosures

### Enclosure HA

#### Aluminum field mount enclosure

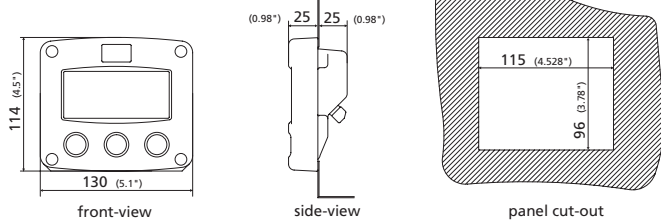
IP67 / NEMA 4X  
Tapped holes: European thread



### Enclosure HB

#### Aluminum panel mount enclosure

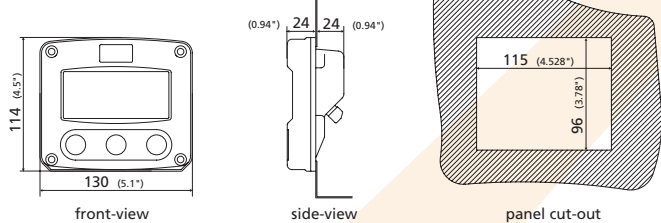
IP65 / NEMA 4



### ENCLOSURE HC (STANDARD)

#### ABS PANEL MOUNT ENCLOSURE

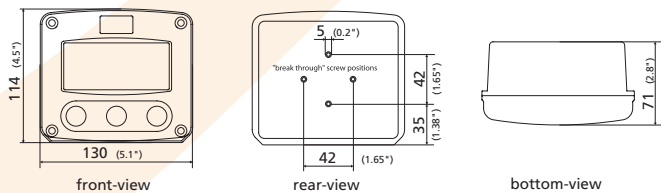
IP65 / NEMA 4



### Enclosure HD

#### ABS wall mount enclosure

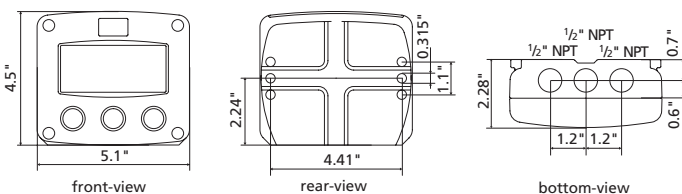
IP67 / NEMA 4X  
Holes user defined



### Enclosure HU

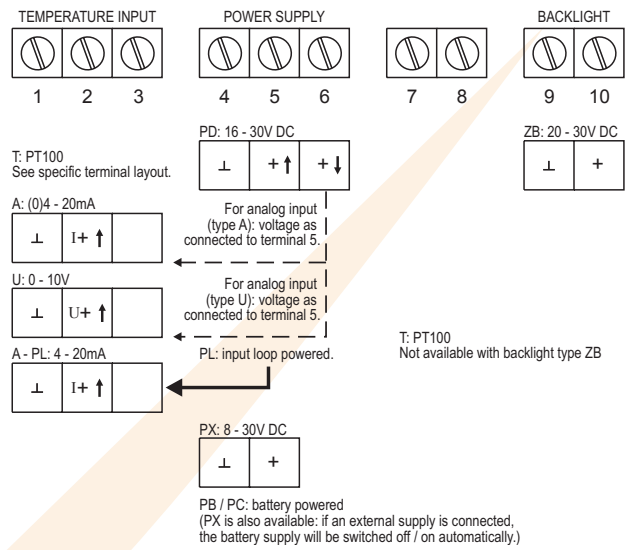
#### Aluminum field mount enclosure

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

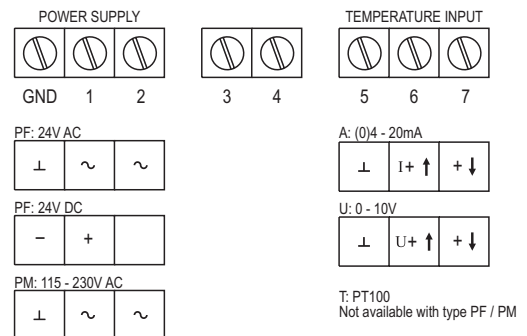


## Terminal connections power supply

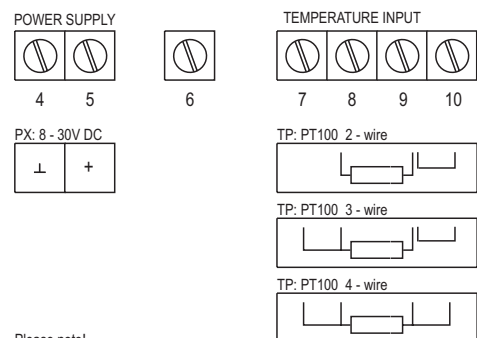
### PB/PC - PD - PL - PX



## Terminal connections power supply PF - PM

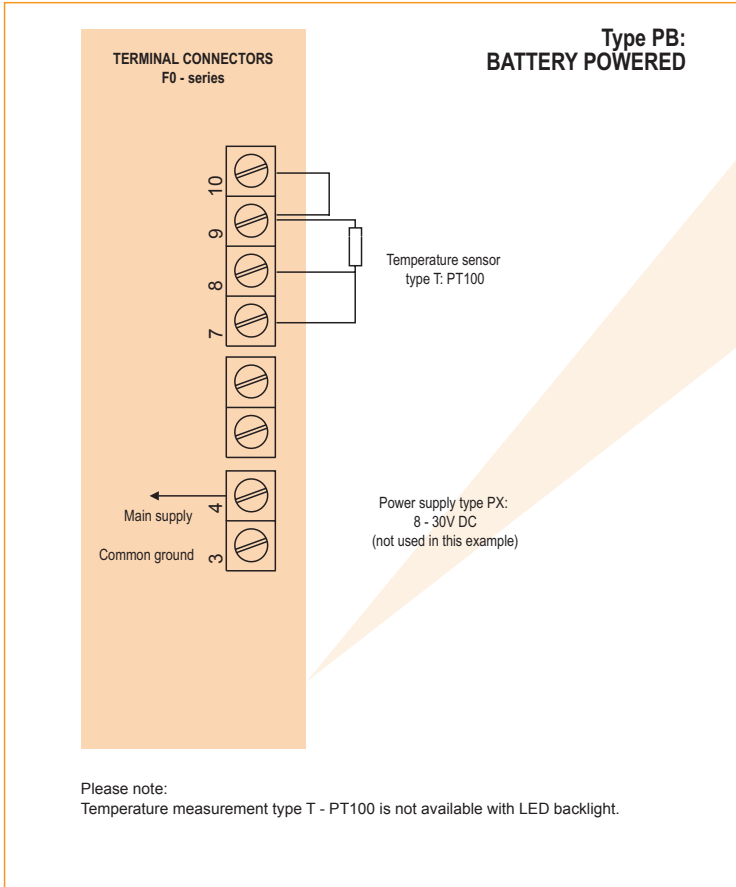


## Terminal connections PT100

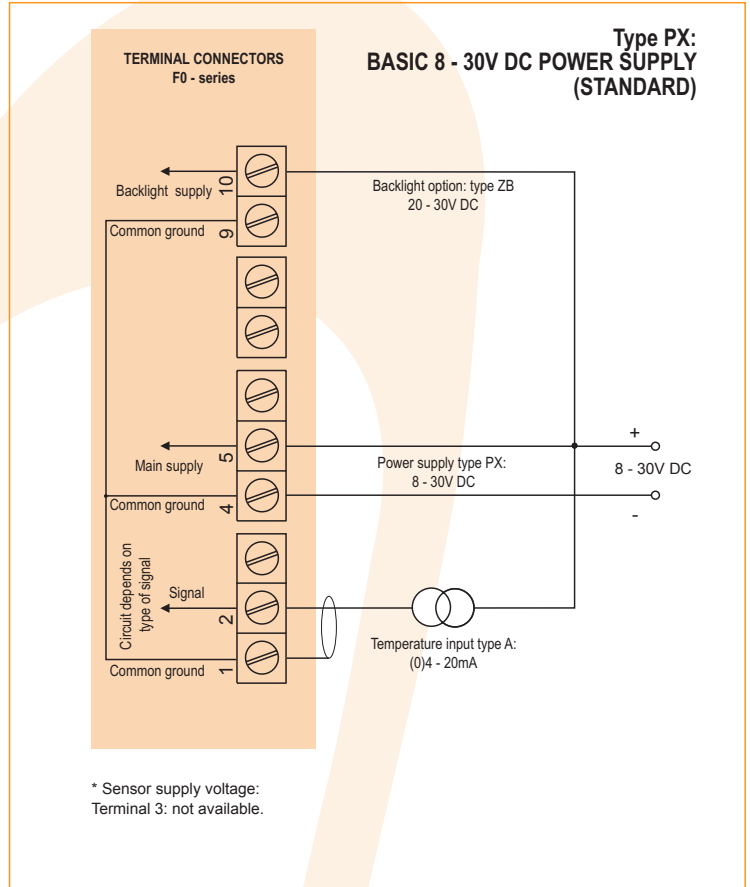


Please note!  
For the PT100 input signal, following options are NOT available:  
PF - PM - ZB.

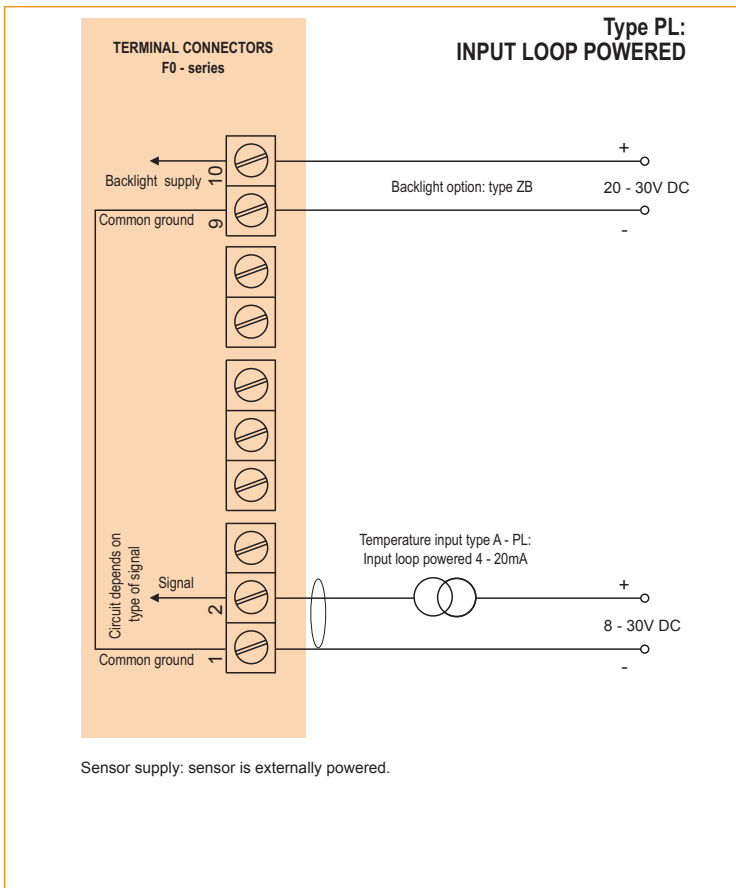
Typical wiring diagram Fo40-T-PB-(PX)



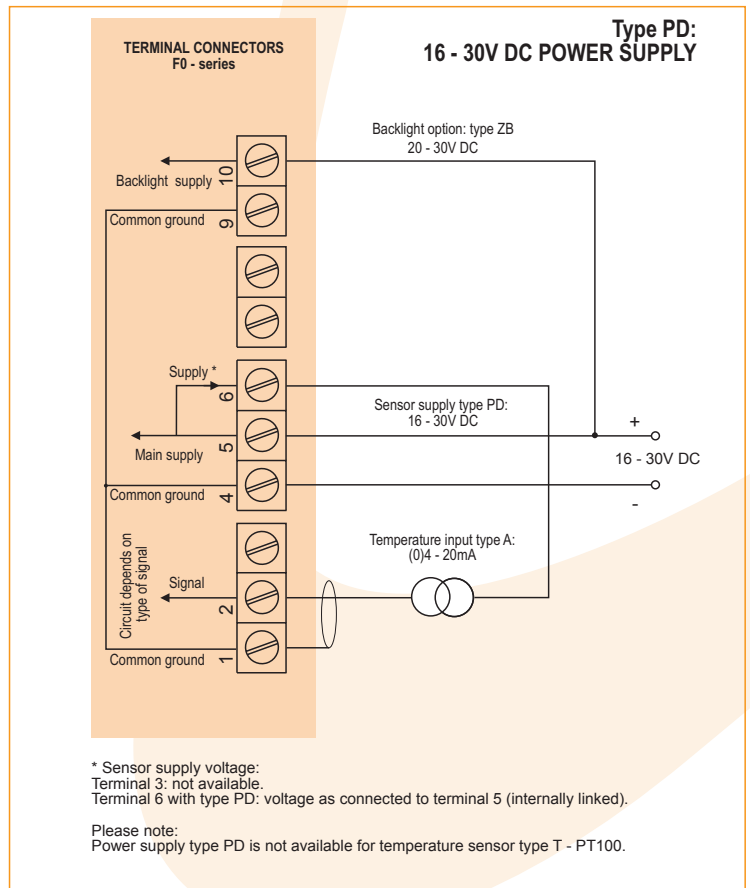
Typical wiring diagram Fo40-A-PX-ZB



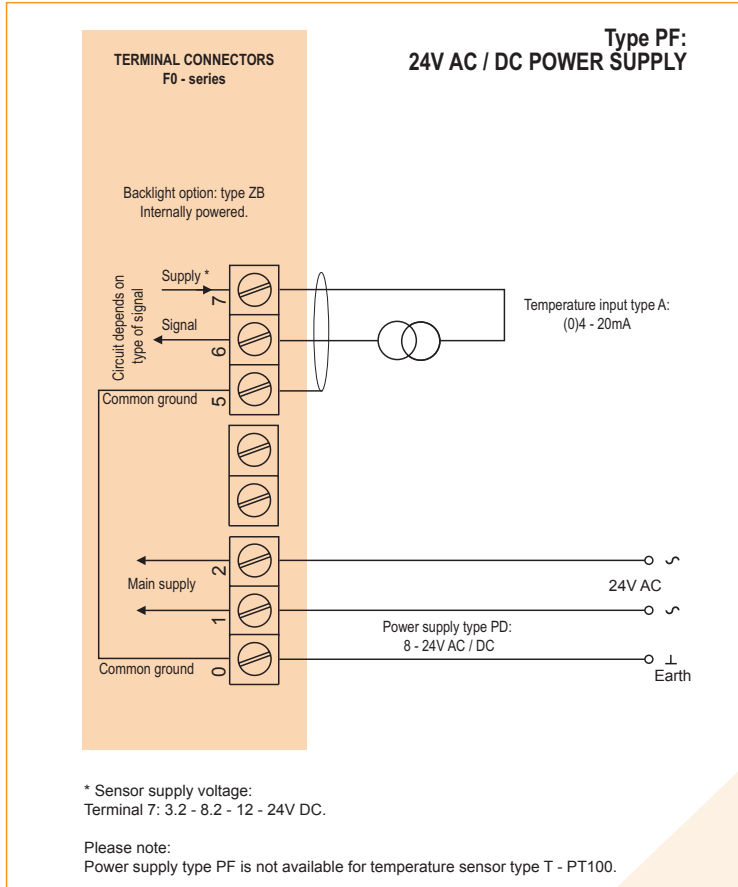
Typical wiring diagram Fo40-A-PL-(ZB)



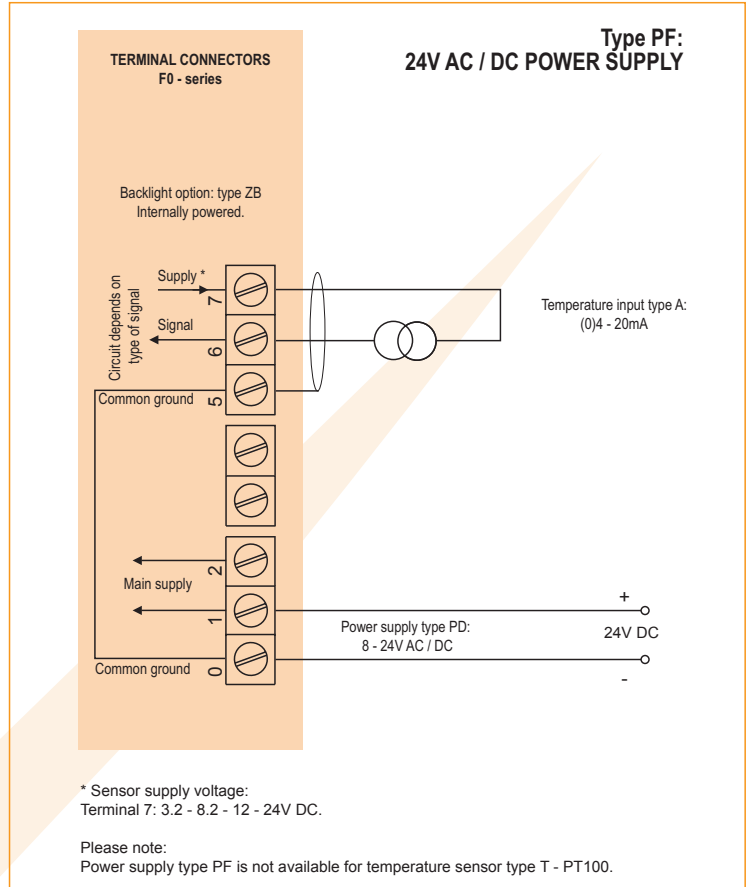
Typical wiring diagram Fo40-A-PD-ZB



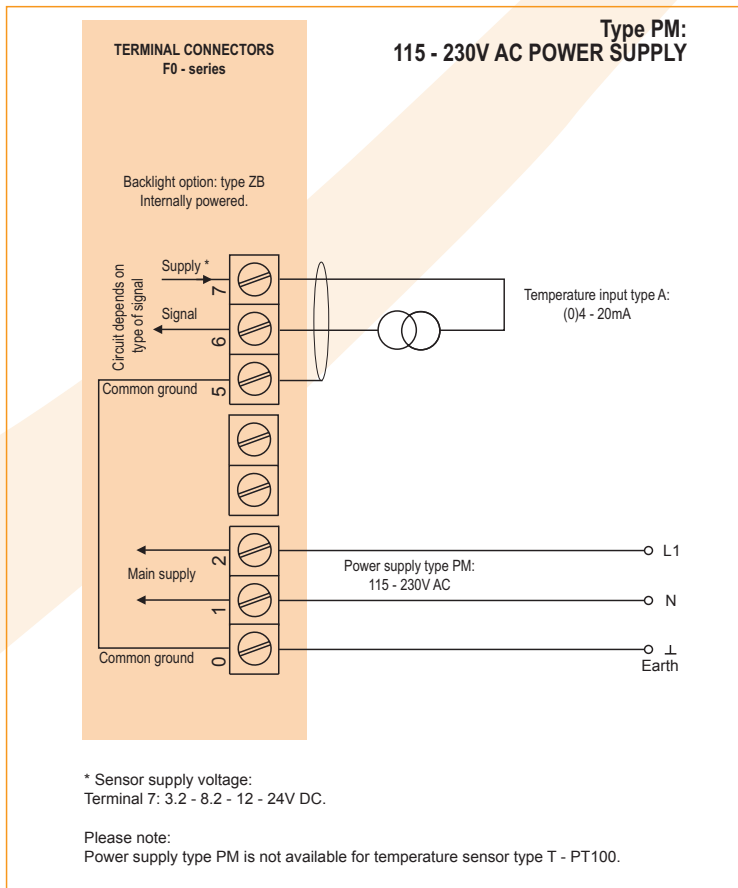
Typical wiring diagram Fo40-A-PF-ZB



Typical wiring diagram Fo40-A-PF-ZB



Typical wiring diagram Fo40-A-PM-ZB

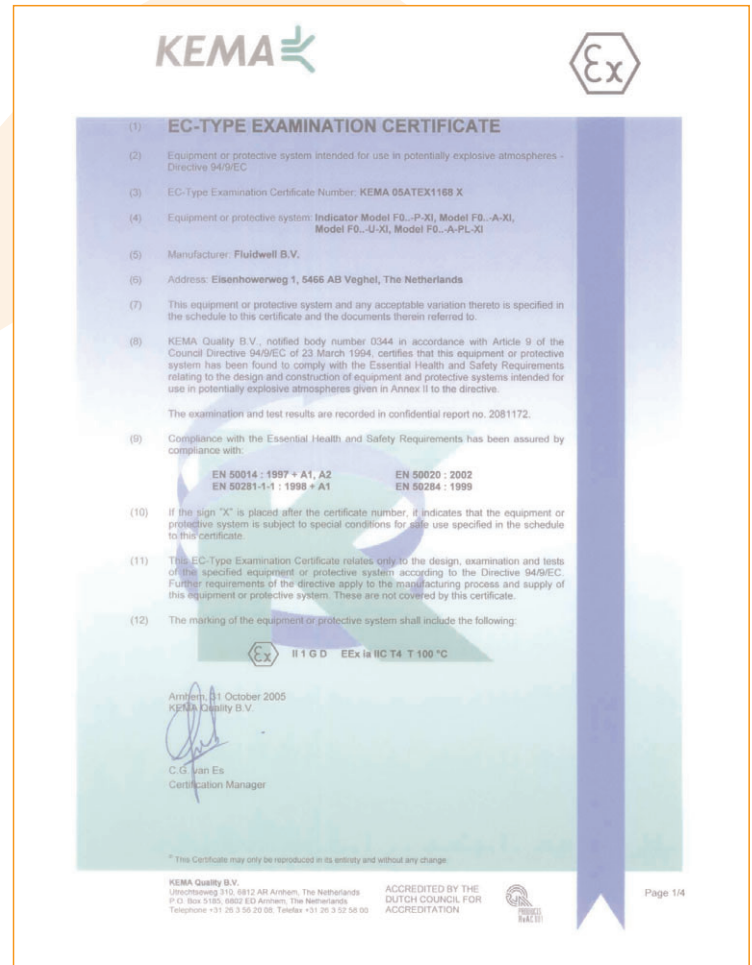


## Hazardous area applications

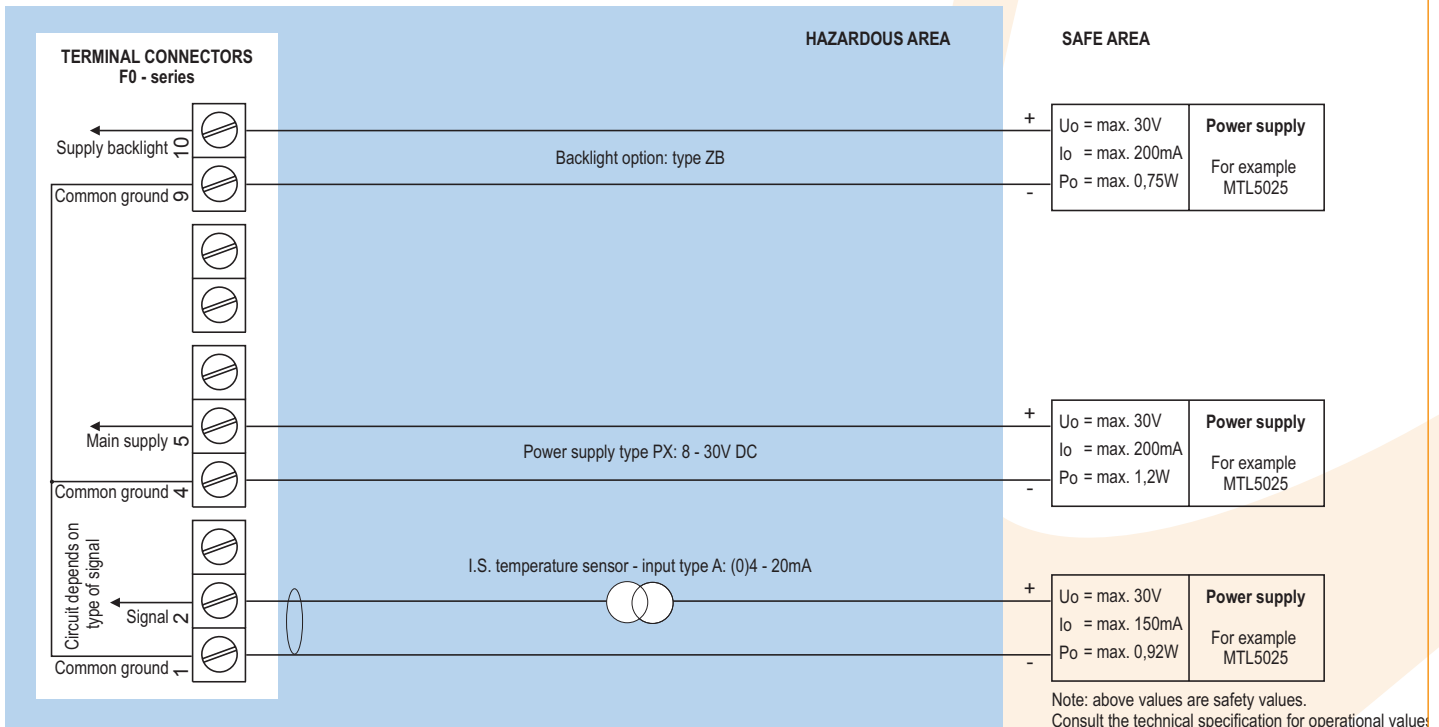
The F040-XI has been ATEX approved by KEMA for use in Intrinsically Safe applications. It is approved according to  $\text{Ex}$  II 1 GD EEx ia IIC T4 T100°C for gas and dust applications with an operational temperature range of -40°C to +70°C (-40°F to +158°F). IEC, CSA and FM approvals are expected to become available in May 2006.

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

## Certificate of conformity KEMA 05ATEX1168 X



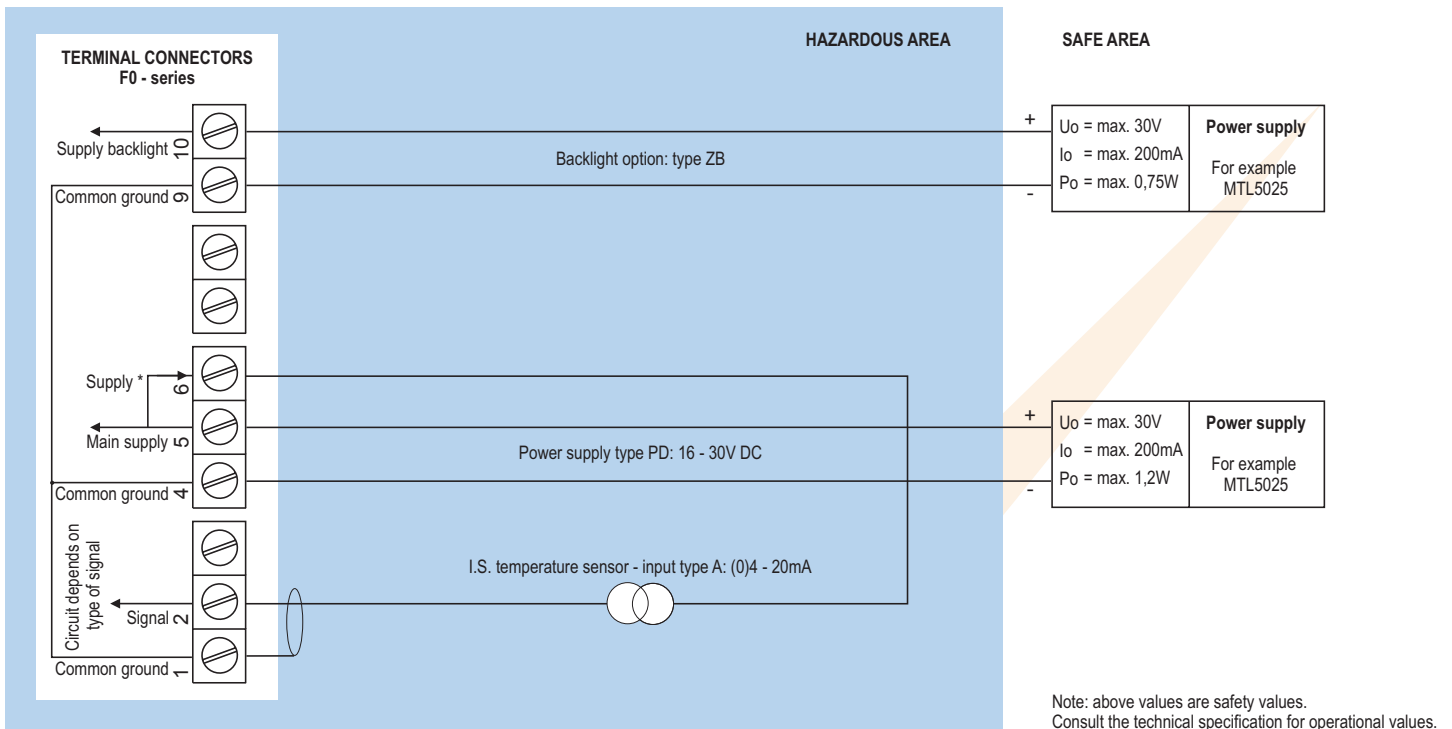
### Configuration example IIA - IIB and IIC Fo40-A-PX-XI-ZB - Battery powered unit



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

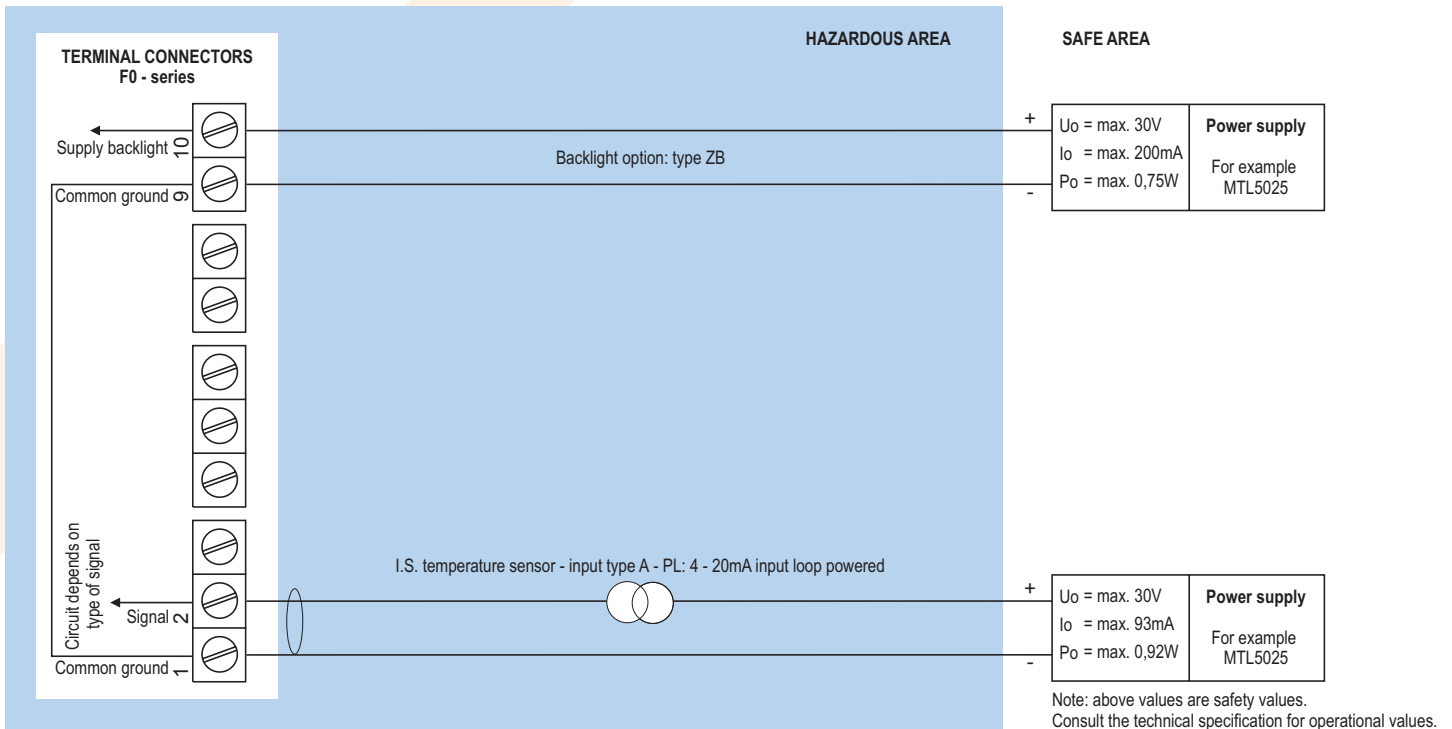
Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.

### Configuration example IIA - IIB and IIC - Fo40-A-PD-XI-ZB - Power supply 16 - 30V DC



\* Sensor supply voltage for analog temperature 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 - Fo40-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.

## 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.
Note	Not available with PT100

### 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 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 <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.
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 inputs

### Temperature

Accuracy	Resolution: 16 bit. Error < 0.01mA / ± 0.05% 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	-999,999 / 999,999.
Voltage drop	Type A: max. 2V DC @ 20mA.
Voltage drop	Type A - PL (loop powered): max. 2.6V DC @ 20mA.
Type T	2 or 3 wire PT100.
Range	-100°C to +200°C (-148°F to 392°F). Accuracy 0.1°C (0.18°F).
Option ZV	Range: -200°C to +800°C (-328°F to 1472°F). Accuracy 0.5°C (0.9°F).
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.
Offset	-999,999 / 999,999.
Load impedance	3kΩ.
Note	For signal A and U: power supply to temperature sensor is required; e.g. PD.

## Operational

### Operator functions

Displayed functions	<ul style="list-style-type: none"> <li>• Actual temperature.</li> <li>• Measuring unit.</li> </ul>
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### Temperature

Digits	6 digits.
Units	°C, °F or K.
Decimals	Type T: 1. Type A / U: 3.



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





















## Ordering information

Example (standard configuration)

F040-A-HC-PX-XX-ZX.

Explanation standard configuration:

**A:** temperature input signal: analog; **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:	F040	-	-H	-P	-X	-Z
<b>Temperature sensor input signal</b>						
<b>A</b> 	<b>(0)4 - 20mA input.</b>					
T 	PT100 input - not available with PF / PM or ZB.					
U 	0 - 10V DC input.					
<b>Enclosure</b>						
HA 	Aluminum field mount enclosure IP67 / NEMA 4X - two holes PG9 + one hole M20.					
HB 	Aluminum panel mount enclosure IP65 / NEMA 4.					
<b>HC</b> 	<b>ABS panel mount enclosure IP65 / NEMA 4.</b>					
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.					
<b>Power supply</b>						
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.					
<b>PX</b> 	<b>Basic power supply 8 - 30V DC (no sensor supply).</b>					
<b>Hazardous area</b>						
XI 	Intrinsically Safe.					
XF 	EExd enclosure - 3 keys.					
<b>XX</b>	<b>Safe area only.</b>					
<b>Other options</b>						
ZB 	Backlight.					
ZV 	PRTD-range -200°C / +800°C.					
<b>ZX</b> 	<b>No options.</b>					

The bold marked text contains the standard configuration.

 Available Intrinsically Safe.

Specifications are subject to change without notice.

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