

## Level Monitor

with analog and high / low alarm outputs



**Application examples:** Extreme cold weather regions



Level monitoring at a tank / silo



Red flashing LED backlight in case of a level alarm.

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  $-40^{\circ}\text{C}$  up to  $+80^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  up to  $176^{\circ}\text{F}$ ).

### Advantages

- Robust aluminum or stainless steel 316L field enclosure (IP67 / NEMA Type4X). It is so rugged, a truck 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 level, percentage filled and height.
- 4 alarm values can be entered: low-low, low, high and high-high level alarm.
- Large 17mm (0.67") digits.
- Red flashing LED backlight in case of a level alarm.
- Selectable on-screen engineering units; volumetric or mass.
- Level input: (0)4 - 20mA.
- Analog output according to the actual level.
- Up to 4 free configurable alarm outputs.
- Full Modbus communication RS232/485/TTL.
- Power requirements: Loop or battery powered, 8 - 30V DC, 8 - 24V AC/DC or 115 - 230V AC.
- Sensor supply 3 / 8.2 / 12 / 24V DC.
- Auto backup of all setting.
- Explosion/flame proof available, according ATEX/IECEx.

## Introduction

The F170 is a versatile level indicator with continuous level monitoring feature. It offers the facility to set two low level and two high level alarm values. If desired, an ignore function can be set up to allow for an incorrect level for a certain period of time. Up to four outputs are available to transmit the alarm condition. 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 which can be set to show level, percentage or height and alarm values. The alarm values can be password protected. On-screen engineering units are easily configured from a comprehensive menu. The bright backlight can be set to be red or flashing red in case of an alarm.

## Configuration

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumerical description, which avoids confusing abbreviations. All settings are safely stored in EEPROM memory in the event of sudden power failure.

## Alarm outputs

Up to four configurable outputs with clear alarm function are available to transmit the alarm condition. You can have e.g. two the same low alarm outputs, one high alarm output and one "all alarms" output. Type OS offers four mechanical relay outputs. However, only two outputs are available in Intrinsically Safe applications. Three outputs are available in all other configurations. The output signals can be a passive NPN, active PNP or an isolated electro-mechanical relay.



## 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 is ATEX and IECEx certified as Intrinsically Safe for gas applications with an allowed ambient temperature of -40°C to +70°C (-40°F to +158°F) and dust applications with an allowed ambient temperature of -40°C to +50°C (-40°F to +122°F). A flame proof Ex d enclosure with ATEX/IECEx certification is also available.

## Analog output signal

The actual level is re-transmitted with the (0)4 - 20mA output signal. The output signal is updated eight times per second with a filter function being available to smoothen out the signal if desired. The output value is user defined in relation to the level, e.g. 4mA equals to 5m3 and 20mA equals to 20.000 m3. The output signal can be passive, active or isolated where the passive output type will loop power the F170 as well.



All info  
at a glance



Easy  
to install



Easy  
to program



Know one  
know them all!



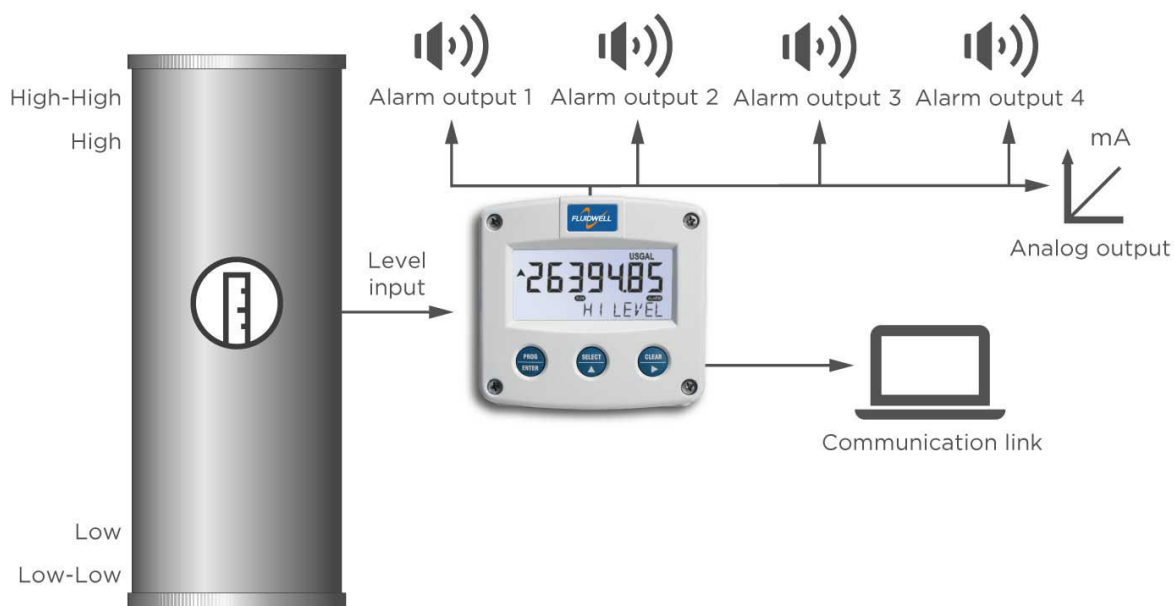
Reliable



User-friendly

## Overview application F170

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). Level measurement where continuous level monitoring is important. Also re-transmission of the level or serial communication is required. Alternative basic model: F070 - F073 - F077 or more sophisticated model F173.



## Signal input

The F170 accepts (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.

## Power requirements

Several power supply options are available to power the F170 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 but cannot power the backlight. A real sensor supply is offered with the 24V AC/DC or 115-230V AC power requirement options.

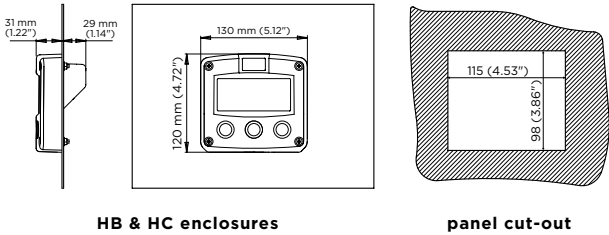


Enclosures

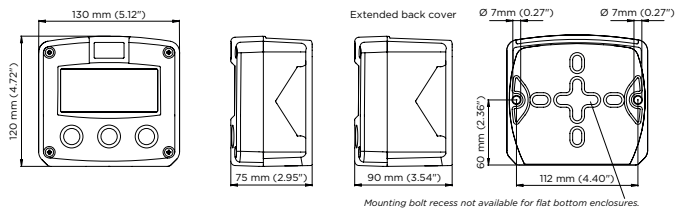
Various types of enclosures can be selected, all ATEX and IECEx approved. The F170 is supplied in an GRP panel mount enclosure as standard, which can be converted to an IP67 / NEMA Type4X GRP field mount enclosure by the addition of a back case. Most popular is our robust aluminum field mount enclosure which is also available with an extended backcover with undrilled preparation for direct meter mounting at the back side. It is so rugged, even a truck can stand on it! For the most challenging environments we have a durable high grade Stainless steel 316L enclosure. All enclosures have a IP67 / NEMA Type4X rating and EU or U.S. cable gland entry threads available.

Dimensions enclosures

Aluminum & GRP panel mount enclosure

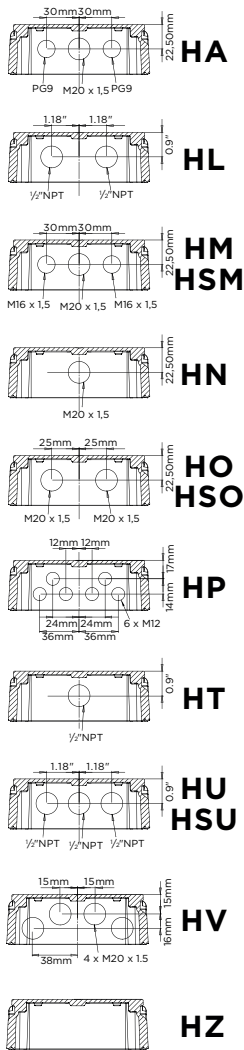


Aluminum, GRP & Stainless steel 316L field mount enclosures

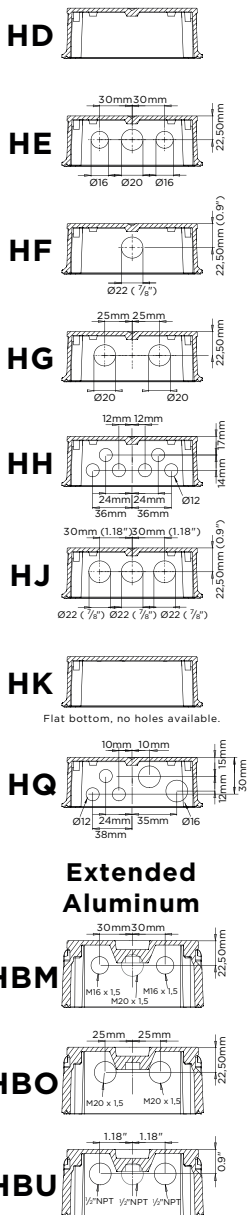


Cable entries

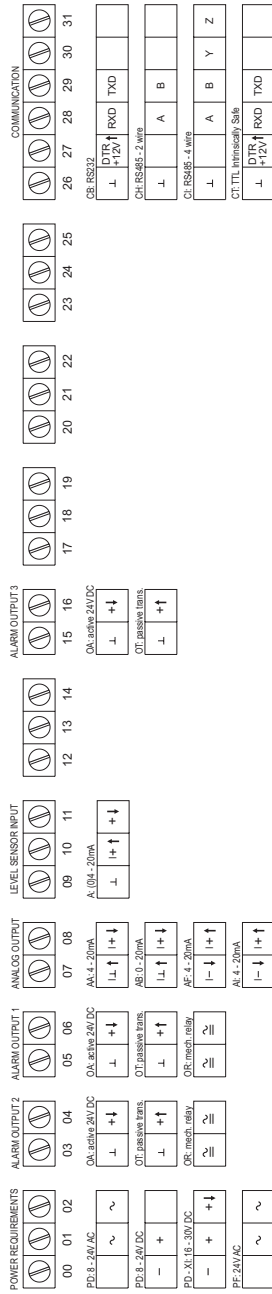
Aluminum / Stainless Steel



GRP

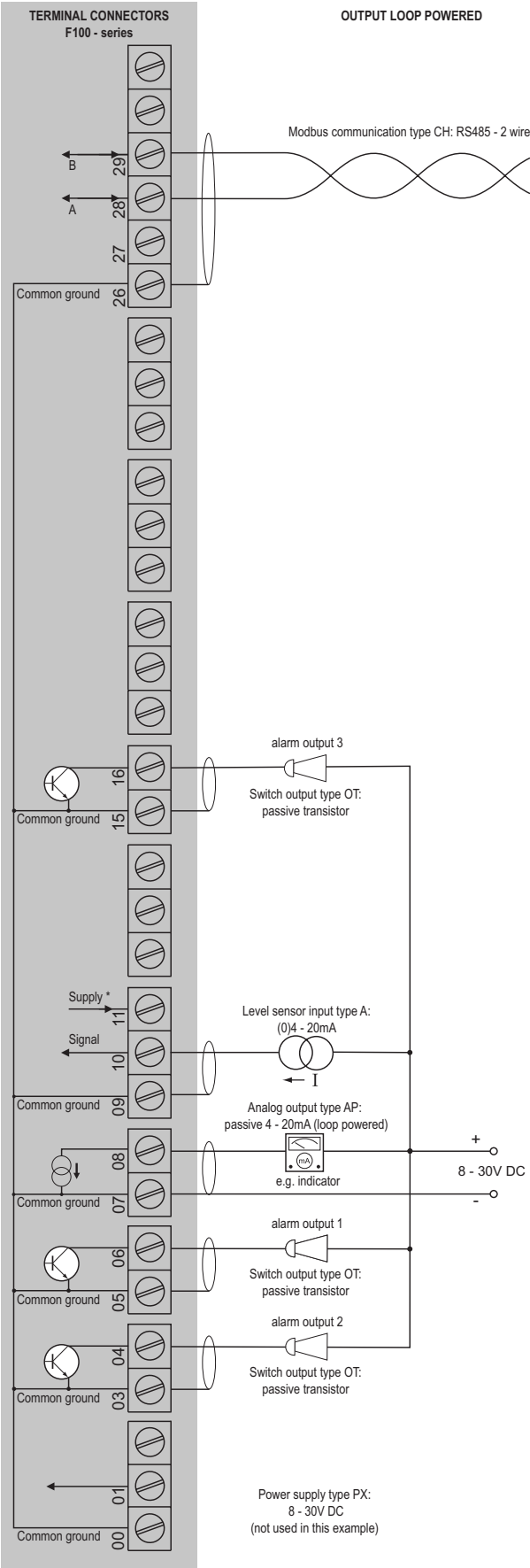


Terminal connections



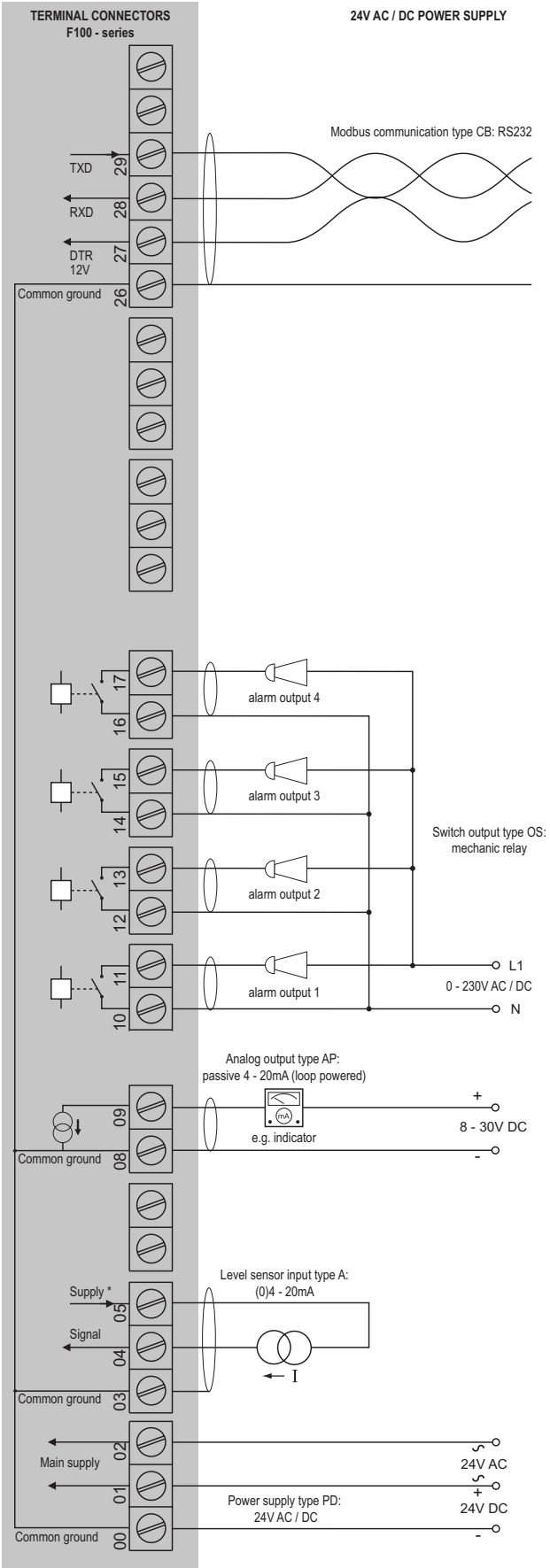
Please note:  
Terminal connections for the F170 with four alarm outputs (type OS) is shown on one of the next pages.

Configuration example F170-A-AP-CH-OT-PX-XX-ZX



\*Supply voltage: 3.2V DC to sensor

Configuration example F170-A-AP-CB-OS-PD-XX-ZX



\*  $U_{max}$  sensor is 2V below  $U_{supply}$   
 $U_{max}$  sensor: 8.2V requires 10VDC(8VAC)  $U_{supply}$   
12V requires 14VDC(10VAC)  $U_{supply}$   
24V requires 26VDC(18VAC)  $U_{supply}$



Hazardous area applications

The F170-XI has been certified according to 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). For equipment category Dust, zone 20 (1 D / EPL Da), the maximum ambient temperature is limited to 50°C (+122°F) and a maximum dust layer thickness of 200mm.

- The ATEX markings for gas and dust applications are:

Gas: **II 1 G Ex ia IIB/IIC T4 Ga.**

Dust: **II 1 D Ex ia IIIC T<sub>200</sub> 100 °C Da.**

- The IECEx markings for gas and dust applications are:

Gas: **Ex ia IIC/IIB T4 Ga.**

Dust: **Ex ia IIIC T<sub>200</sub> 100 °C Da.**

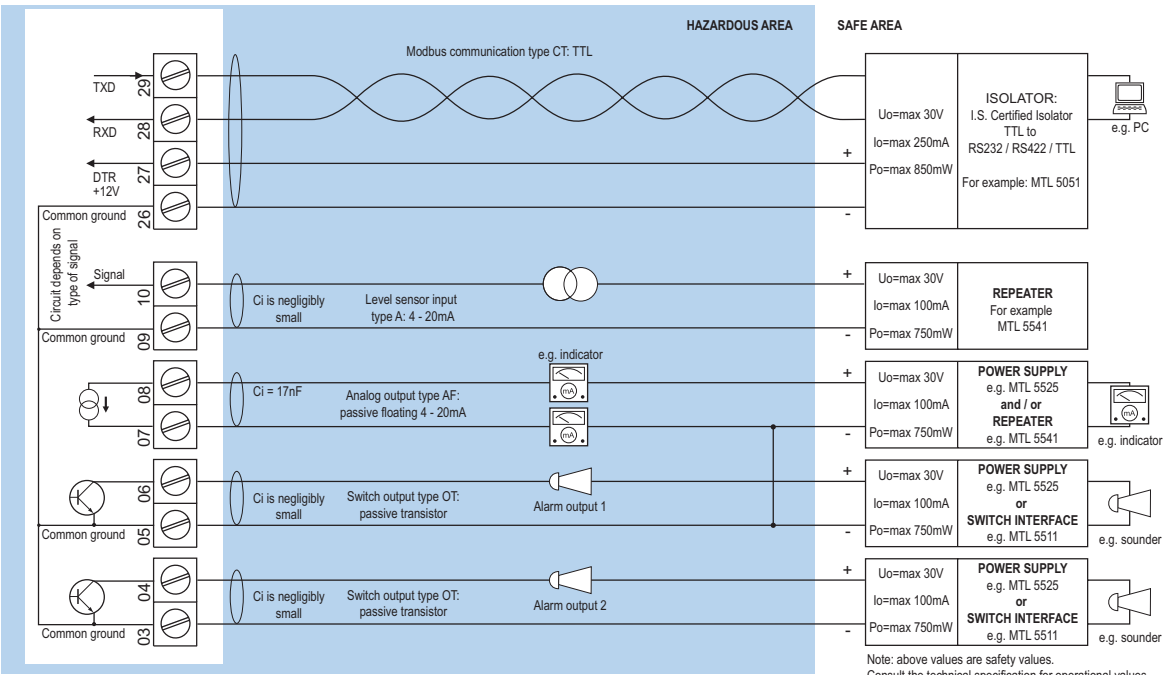
Besides the I.S. power supplies for the two alarm outputs, it is allowed to connect up to three I.S. power supplies in IIB/IIIC applications or one in IIC applications. Consult the certificate for the maximum input and output values of the circuits. Full functionality of the F170 remains available, including two alarm outputs and 4 - 20mA output and Modbus communication (type CT). Power supply type PD-XI offers a sensor supply according to the connected power supply voltage at terminal 1. An ATEX/ IECEx 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

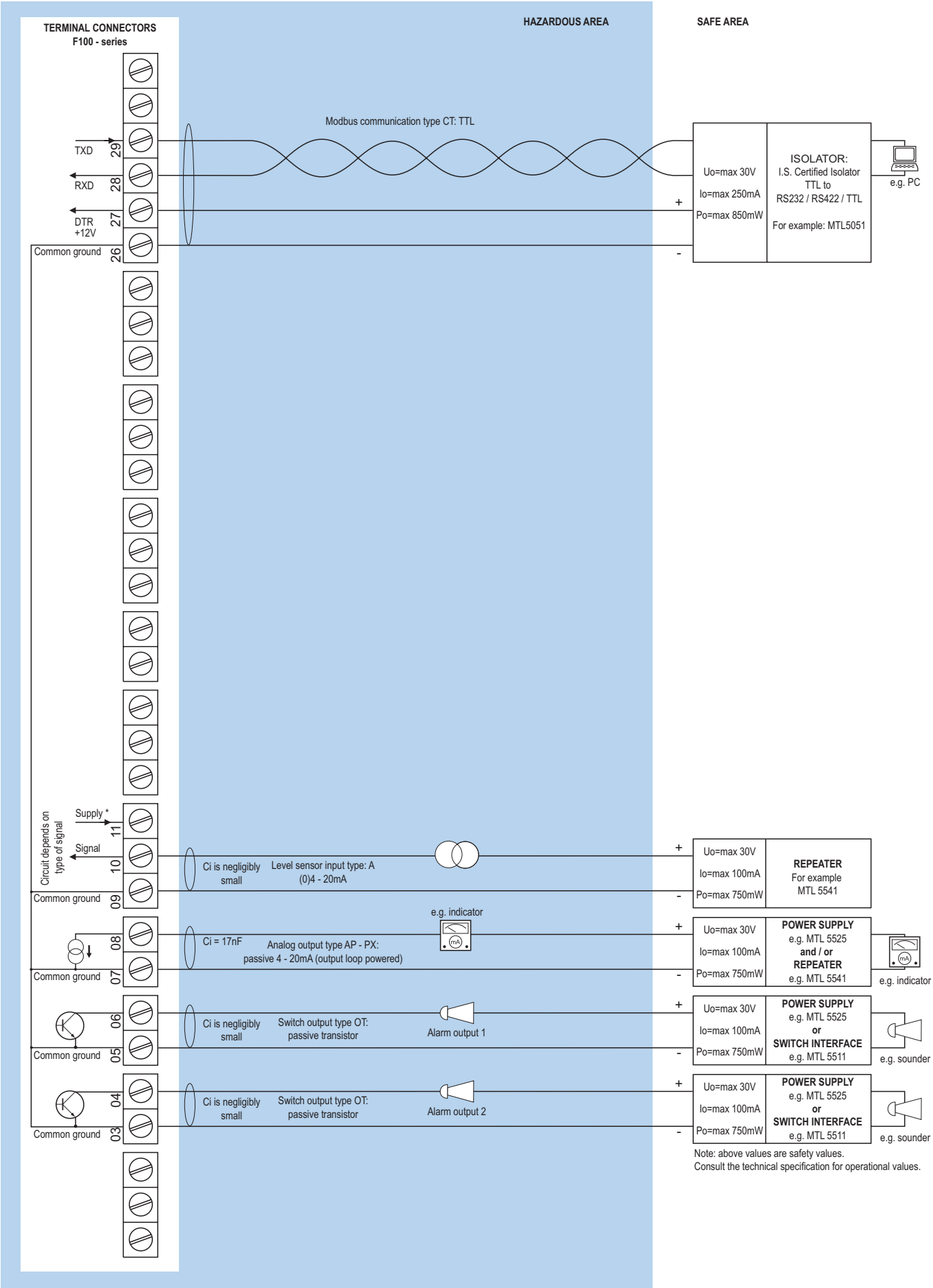


Configuration example IIB / IIIC - F170-A-CT-OT-PC-XI - Battery powered

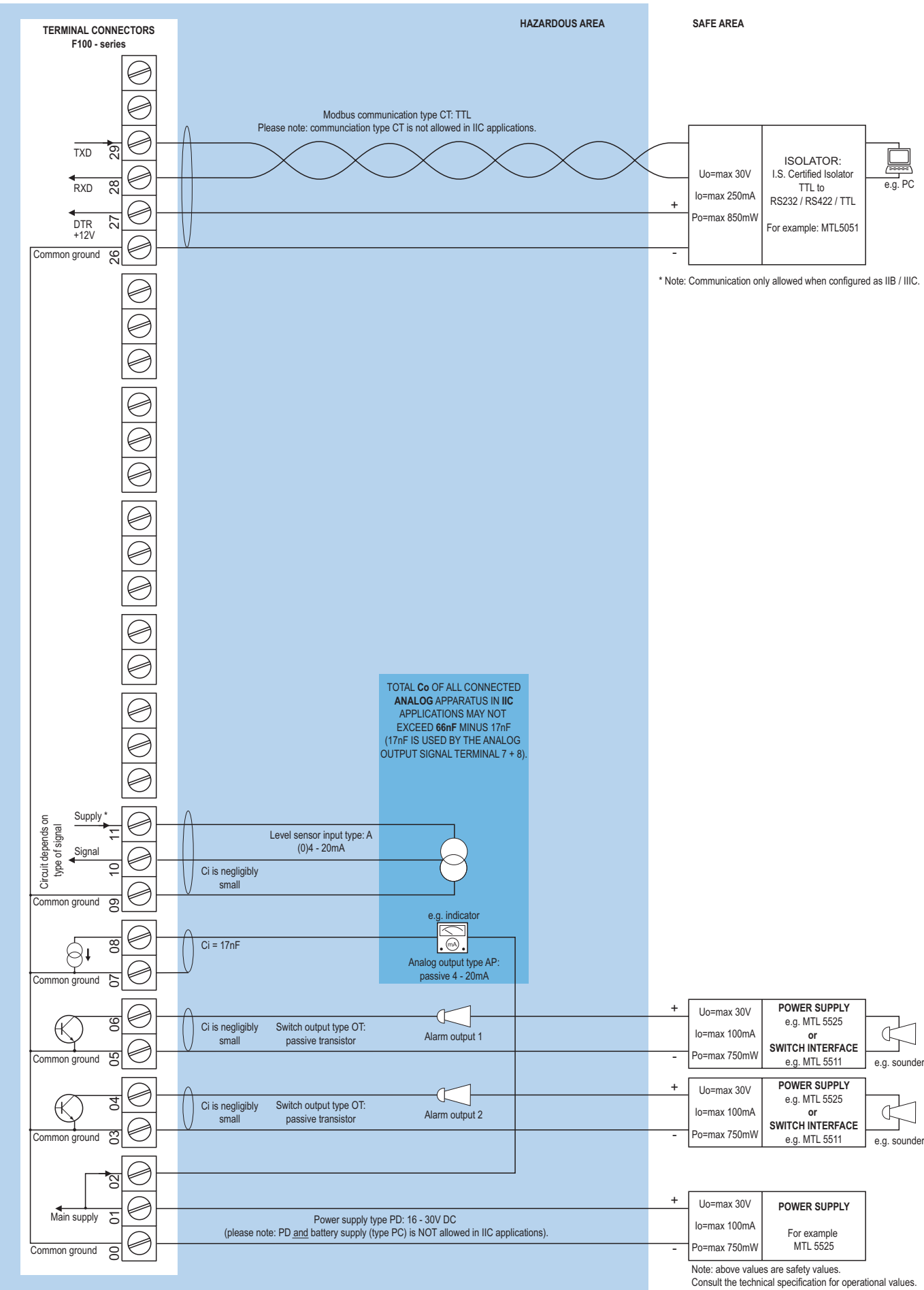


Note: above values are safety values. Consult the technical specification for operational values.

Configuration example IIB / IIIC - F170-A-AP-CT-OT-(PX)-XI - Output loop powered



Configuration example IIB / IIIC and IIC - F170-A-AP-(CT)-OT-PD-XI - Power requirement 16 - 30V DC



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



The diagram illustrates the terminal block wiring for the MTL5000 series, divided into a **HAZARDOUS AREA** and a **SAFE AREA**.

**Terminal Block (F100 - series):**

- 29:** TXD
- 28:** RXD
- 27:** DTR +12V
- 26:** Common ground
- 11:** Supply\*
- 10:** Signal
- 09:** Common ground
- 08:** (Analog output type AF)
- 07:** (Analog output type AF)
- 06:** (Switch output type OT)
- 05:** Common ground
- 04:** (Switch output type OT)
- 03:** Common ground
- 02:** Main supply
- 01:** Main supply
- 00:** Common ground

**Modbus communication type CT: TTL**

**SAFE AREA Connections:**

- Modbus:** Uo=max 30V, Io=max 250mA, Po=max 850mW. ISOLATOR: I.S. Certified Isolator TTL to RS232 / RS422 / TTL. For example: MTL5051. e.g. PC.
- Level sensor input type: A (0)4 - 20mA:** Uo=max 30V, Io=max 100mA, Po=max 750mW. REPEATER. For example: MTL 5541.
- Analog output type AF: passive floating 4 - 20mA:** Uo=max 30V, Io=max 100mA, Po=max 750mW. POWER SUPPLY e.g. MTL 5525 and / or REPEATER e.g. MTL 5541. e.g. indicator.
- Switch output type OT: passive transistor:** Uo=max 30V, Io=max 100mA, Po=max 750mW. POWER SUPPLY e.g. MTL 5525 or SWITCH INTERFACE e.g. MTL 5511. e.g. sounder.
- Switch output type OT: passive transistor:** Uo=max 30V, Io=max 100mA, Po=max 750mW. POWER SUPPLY e.g. MTL 5525 or SWITCH INTERFACE e.g. MTL 5511. e.g. sounder.
- Power supply type PD: 16 - 30V DC:** Uo=max 30V, Io=max 100mA, Po=max 750mW. POWER SUPPLY. For example: MTL 5525.

**Notes:**

- Due to analog output type AF, the unit has to be powered with battery type PC or with external power supply type PD.
- Note: above values are safety values. Consult the technical specification for operational values.

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

## Display

<b>Type</b>	High intensity reflective numeric and alphanumeric LCD, UV-resistant.
<b>Dimensions</b>	90 x 40mm (3.5" x 1.6").
<b>Digits</b>	Seven 17mm (0.67") and eleven 8mm (0.31") digits. Various symbols and measuring units.
<b>Refresh rate</b>	User definable: fast, 1sec, 3sec, 15sec, 30sec, off.
<b>Option ZB</b>	Transflective LCD with adjustable white LED-backlight. Red (flashing) backlight during alarm conditions. Good readings in full sunlight and darkness.
<b>Note ZB</b>	Only available for safe area applications with option PD, PF, PM or PX.

## Ambient temperature

<b>Safe areas</b>	-40°C to +80°C (-40°F to +176°F).
<b>Intrinsically Safe</b>	-40°C to +70°C (-40°F to +158°F).
<b>Dust, zone 20</b>	-40°C to +50°C (-40°F to +122°F).

## Terminal connections

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

<b>Type</b>	EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years.
<b>Password</b>	Configuration settings can be password protected.

## Directives & Standards

<b>EMC</b>	Directive 2014/30/EU, FCC 47 CFR part 15.
<b>Low voltage</b>	Directive 2014/35/EU
<b>RoHS</b>	Directive 2011/65/EU
<b>ATEX / IECEx</b>	Directive 2014/34/EU, IEC 600079-0, IEC 60079-11.
<b>IP &amp; NEMA</b>	EN 60529 & NEMA 250

## Intrinsically Safe (Type XI)

<b>ATEX</b>	Gas: II 1 G Ex ia IIB/IIC T4 Ga. Dust: II 1 D Ex ia IIIC T <sub>200</sub> 100 °C Da.
<b>IECEx</b>	Gas: Ex ia IIC/IIB T4 Ga. Dust: Ex ia IIIC T <sub>200</sub> 100 °C Da.
<b>Ambient Ta</b>	-40°C to +70°C (-40°F to +158°F).
<b>Dust, zone 20</b>	-40°C to +50°C (-40°F to +122°F).

## Explosion proof (Type XF)

<b>ATEX/IECEx</b>	Gas: II 2 G Ex db IIB+H2 T5 Gb. Dust: II 2 D Ex tb IIIC T80°C.
<b>Protection</b>	IP66
<b>Type XF</b>	Dimensions of enclosure: 300 x 250 x 200mm (11.8" x 9.9" x 7.9") L x H x D.
<b>Weight</b>	Appr. 15kg.

## Enclosure

<b>Window</b>	Polycarbonate window.
<b>Sealing</b>	Silicone.
<b>Control keys</b>	Three industrial micro-switch keys. UV-resistant silicone keypad.

## Panel mount enclosures

<b>Dimensions</b>	130 x 120 x 60mm (5.12" x 4.72" x 2.36") - W x H x D.
<b>Panel cut-out</b>	115 x 98mm (4.53" x 3.86") L x H.
<b>Type HB</b>	Die-cast aluminum panel mount enclosure IP65 / NEMA Type4X.
<b>Weight</b>	600 gr.
<b>Type HC</b>	GRP panel mount enclosure IP65 / NEMA Type4X, UV-resistant and flame retardant.
<b>Weight</b>	450 gr.
<b>Type HSB</b>	Die-cast stainless steel 316L IP67 / NEMA Type4X.
<b>Weight</b>	1150gr.

## GRP wall / field mount enclosures

<b>General</b>	GRP wall/field mount enclosure IP67 / NEMA Type4X, UV-resistant and flame retardant.
<b>Dimensions</b>	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
<b>Weight</b>	600 gr.
<b>Type HD</b>	Cable entry: no holes.
<b>Type HE</b>	Cable entry: 2 x Ø 16mm and 1 x Ø 20mm.
<b>Type HF</b>	Cable entry: 1 x Ø 22mm (7/8").
<b>Type HG</b>	Cable entry: 2 x Ø 20mm.
<b>Type HH</b>	Cable entry: 6 x Ø 12mm.
<b>Type HJ</b>	Cable entry: 3 x Ø 22mm (7/8").
<b>Type HK</b>	Flat bottom, cable entry: no holes.
<b>Type HQ</b>	Cable entry: 2 x Ø 16mm & 3 x Ø 12mm.

## Aluminum wall / field mount enclosures

<b>General</b>	Die-cast aluminum wall/field mount enclosure IP67 / NEMA Type4X with 2-component UV-resistant coating. Extended back cover available with undrilled preparation for direct meter mounting.
<b>Dimensions</b>	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D. 130 x 120 x 90mm (5.12" x 4.72" x 3.54") - W x H x D.
<b>Weight</b>	1100 gr. / extended enclosure: 1310 gr.
<b>Type HA</b>	Cable entry: 2 x PG9 and 1 x M20.
<b>Type HL</b>	Cable entry: 2 x 1/2" NPT.
<b>Type HM/HBM</b>	Cable entry: 2 x M16 and 1 x M20.
<b>Type HN</b>	Cable entry: 1 x M20.
<b>Type HO/HBO</b>	Cable entry: 2 x M20.
<b>Type HP</b>	Cable entry: 6 x M12.
<b>Type HT</b>	Cable entry: 1 x 1/2" NPT.
<b>Type HU/HBU</b>	Cable entry: 3 x 1/2" NPT.
<b>Type HV</b>	Cable entry: 4 x M20.
<b>Type HZ</b>	Cable entry: no holes.

## Stainless steel 316L wall / field mount enclosures

<b>General</b>	Die-cast stainless steel 316L wall / field mount enclosure with flat bottom. IP67 / NEMA Type4X.
<b>Dimensions</b>	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
<b>Weight</b>	2700 gr.
<b>Type HSM</b>	Cable entry: 2 x M16 + 1 x M20.
<b>Type HSO</b>	Cable entry: 2 x M20.
<b>Type HSU</b>	Cable entry: 3 x 1/2"NPT.

## Signal inputs - Level sensor

<b>Type A</b>	(0)4 - 20mA. Analog input signal can be scaled to any desired range within 0 - 20mA.
<b>Type U</b>	0 - 10V DC. Contact factory.
<b>Accuracy</b>	Resolution: 14 bit. Error < 0.025mA / $\pm$ 0.125% FS. Low level cut-off programmable.
<b>Span</b>	0.000010 - 9,999,999 with variable decimal position.
<b>Update time</b>	Four times per second.
<b>Voltage drop</b>	Type A: 2.5V @ 20mA.
<b>Relationship</b>	Linear calculation.
<b>Note A</b>	For signal type A: external power to sensor is required; e.g. type PD.

## Signal outputs - Digital output

<b>Function</b>	User defined: low, low-low, high, high-high or all alarms output with optional clear alarm output function, e.g. to turn off an acoustic alarm. Each output can be activated in setup mode to test the wiring and performance of the outputs.
<b>Type OA</b>	Three active 24V DC transistor outputs (PNP); max. 50mA per output (requires -PD, PF, PM or PX). Requires min. 24V power supply
<b>Type OR</b>	Two electro-mechanical relay outputs isolated max. switch power 230V AC (N.O.) - 0.5A per relay and one OT passive transistor output (requires PF or PM).
<b>Type OS</b>	Four electro-mechanical relay outputs - isolated; max. switch power 230V AC - 0.5A per relay (requires XX, AP and PD with 24V AC / DC).
<b>Type OT</b>	Three passive transistor outputs (NPN) - not isolated. Max. 50V DC - 300mA per output.
<b>Note XI</b>	Intrinsically Safe applications: only two transistor outputs type OT available.

## Signal outputs - Analog output

<b>Function</b>	Transmitting level.
<b>Accuracy</b>	10 bit. Error < 0.05%. Analog output signal can be scaled to any desired range.
<b>Update time</b>	Eight times per second.
<b>Type AA</b>	Active 4 - 20mA output (requires PD, PF, PM or PX).
<b>Type AB</b>	Active 0 - 20mA output (requires PD, PF, PM or PX).
<b>Type AF</b>	Passive floating 4 - 20mA output for Intrinsically Safe applications (requires XI + PD).
<b>Type AI</b>	Passive galvanically isolated 4 - 20mA output - also available for battery powered models.
<b>Type AP</b>	Passive 4 - 20mA output - not isolated. Unit will be loop powered.
<b>Type AU</b>	Active 0 - 10V DC output (requires PD, PF, PM or PX). Requires min. 12V power supply.

## Signal outputs - Communication option

<b>Function</b>	Reading display information, reading / writing all configuration settings.
<b>Protocol</b>	Modbus ASCII / RTU.
<b>Speed</b>	1200 - 2400 - 4800 - 9600 baud.
<b>Addressing</b>	Maximum 255 addresses.
<b>Type CB</b>	RS232
<b>Type CH</b>	RS485 2-wire
<b>Type CI</b>	RS485 4-wire
<b>Type CT</b>	TTL Intrinsically Safe.

## Mounting accessories

<b>ACF02</b>	Stainless steel wall mounting kit.
<b>ACF05</b>	Stainless steel pipe mounting kit (worm gear clamps not included).
<b>ACF06</b>	Two stainless steel worm gear clamps Ø 44 - 56mm.
<b>ACF07</b>	Two stainless steel worm gear clamps Ø 58 - 75mm.
<b>ACF08</b>	Two stainless steel worm gear clamps Ø 77 - 95mm.
<b>ACF09</b>	Two stainless steel worm gear clamps Ø 106 - 138mm.
<b>ACF11</b>	Swivel with 25° movement from center axis for direct flowmeter mounting: 1" NPT to 1/2" NPT.

## Intrinsically Safe isolators

<b>ACG01</b>	MTL5511 - One channel pulse or switch output transfer from hazardous area to safe area.
<b>ACG02</b>	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).
<b>ACG03</b>	MTL5541 - One channel 4 - 20mA repeater from hazardous area to safe area.
<b>ACG04</b>	MTL 5051 - Bi-direction serial-data-isolator (for Modbus communication).
<b>ACG05</b>	MTL5516C - Two channel pulse or switch output transfer from hazardous area to safe area.
<b>ACG06</b>	MTL5513 - One channel pulse or switch output transfer from hazardous area to safe area.
<b>ACG07</b>	MTL5546Y - One channel isolated driver bringing 4 - 20mA from safe area to hazardous area, HART transparent, OCD.

## Power requirements

<b>Type AP</b>	Analog output loop powered, 8 - 30V DC. Power consumption max 0.5 Watt.
<b>Type PB</b>	Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years. (requires PD, PLor PX)
<b>Type PC</b>	Intrinsically Safe long life lithium battery life-time depends upon settings and configuration - up to 5 years. (requires XI and PD or PX)
<b>Type PD</b>	8 - 24V AC / DC $\pm$ 10%. Power consumption max. 5W.
<b>Type PD-XI</b>	16 - 30V DC power consumption max. 1W.
<b>Type PD-OS</b>	20 - 30V DC / 15 - 24V AC power consumption max. 1 W. (requires XX and AP)
<b>Type PF</b>	24V AC / DC $\pm$ 10%. Power consumption max. 15W.
<b>Type PL</b>	Input loop powered from sensor signal 4 - 20mA (type "A") - requires types AI and OT (not Xi). Not available with option ZB.
<b>Type PM</b>	115 - 230V AC $\pm$ 10%. Power consumption max. 15W.
<b>Type PX</b>	8 - 30V DC. Power consumption max. 0.75W.
<b>Type ZB</b>	12 - 30V DC $\pm$ 10%. Power consumption max. 1.5W.
<b>Note PB/PF/PM</b>	Not available Intrinsically Safe.
<b>Note PF/PM</b>	The total consumption of the sensors and outputs may not exceed 400mA @ 24V.
<b>Note XI</b>	For Intrinsically Safe applications, consult the safety values in the certificate.

## Sensor excitation

<b>Type PB/PC/PX</b>	3V DC.
<b>Note PB/PC/PX</b>	This is not a real sensor supply. Only suitable for sensors with a very low power consumption.
<b>Type PD</b>	3 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC. $U_{max}$ sensor is 2V below $U_{supply}$
<b>Type PD-XI</b>	The sensor supply voltage is according to power supply as connected to terminal 1 (internally linked).
<b>Type PF / PM</b>	3 / 8.2 / 12 / 24V DC - max. 400mA @ 24V DC.

## Operator functions

<b>Displayed info</b>	<ul style="list-style-type: none"> <li>• Level, height and percentage.</li> <li>• Low-low alarm value.</li> <li>• Low alarm value.</li> <li>• High alarm value.</li> <li>• High-high alarm value.</li> <li>• Alarm values can be set (or only displayed).</li> </ul>
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## Level

<b>Digits</b>	7 digits.
<b>Units</b>	L, m <sup>3</sup> , GAL, USGAL, kg, lb, bbl, no unit.
<b>Decimals</b>	0 - 1 - 2 or 3.
<b>Offset</b>	User defined quantity.

## Height

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

## Percentage

<b>Digits</b>	4 digits.
<b>Decimals</b>	1.

## Alarm values

<b>Function</b>	Four user defined alarm values to monitor the level, height or percentage.
<b>Digits</b>	7 digits.
<b>Units</b>	According to the settings for level.
<b>Decimals</b>	According to the settings for level.
<b>Type of alarm</b>	Low, high, low-low, high-high or all level alarms. Includes alarm ignore time and configurable alarm outputs.
<b>Protection</b>	The alarm values can be password protected.

	Description	
Model	<b>F170</b>	<b>Level monitor with analog and high / low alarm outputs.</b>
Input	<b>A</b>	<b>(0)4 - 20mA input.</b>
Analog output	AA	Active 4 - 20mA output - requires XX and PD, PF, PM or PX.
	AB	Active 0 - 20mA output - requires XX and PD, PF, PM or PX.
	AF	I.S. floating 4 - 20mA output - requires XI + PD.
	AI	Isolated 4 - 20mA output - requires XX.
	<b>AP</b>	<b>Passive 4 - 20mA output, loop powered unit.</b>
	AU	Active 0 - 10V DC output - requires XX and PD, PF, PM or PX.
Communication	CB	Communication RS 232 - Modbus ASCII / RTU - requires XX.
	CH	Communication RS 485 - 2wire - Modbus ASCII / RTU - requires XX.
	CI	Communication RS 485 - 4wire - Modbus ASCII / RTU - requires XX.
	CT	Intrinsically Safe TTL - Modbus ASCII / RTU - requires XI.
	<b>CX</b>	<b>No communication.</b>
Enclosures	HB	Aluminum panel mount enclosure.
	<b>HC</b>	<b>GRP panel mount enclosure.</b>
	HSB	Stainless steel 316L panel mount enclosure.
	HD	GRP field mount - Cable entry: no holes.
	HE	GRP field mount - Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.
	HF	GRP field mount - Cable entry: 1 x Ø 22mm ( $\frac{7}{8}$ ").
	HG	GRP field mount - Cable entry: 2 x Ø 20mm.
	HH	GRP field mount - Cable entry: 6 x Ø 12mm.
	HJ	GRP field mount - Cable entry: 3 x Ø 22mm ( $\frac{7}{8}$ ").
	HK	GRP field mount - Flat bottom, cable entry: no holes.
	HQ	GRP field mount - Cable entry: 2 x Ø 16mm & 3 x Ø 12mm.
	HA	Aluminum field mount - Cable entry: 2 x PG9 + 1 x M20.
	HL	Aluminum field mount - Cable entry: 2 x $\frac{1}{2}$ "NPT.
	HM	Aluminum field mount - Cable entry: 2 x M16 + 1 x M20.
	HN	Aluminum field mount - Cable entry: 1 x M20.
	HO	Aluminum field mount - Cable entry: 2 x M20.
	HP	Aluminum field mount - Cable entry: 6 x M12.
	HT	Aluminum field mount - Cable entry: 1 x $\frac{1}{2}$ "NPT.
	HU	Aluminum field mount - Cable entry: 3 x $\frac{1}{2}$ "NPT.
	HV	Aluminum field mount - Cable entry: 4 x M20.
	HZ	Aluminum field mount - Cable entry: no holes.
	HBM	Extended Alu. field/meter mount - Cable entry: 2 x M16 + 1 x M20.
	HBO	Extended Alu. field/meter mount - Cable entry: 2 x M20.
	HBU	Extended Alu. field/meter mount - Cable entry: 3 x $\frac{1}{2}$ "NPT.
	HSM	Stainless steel 316L field mount - Cable entry: 2 x M16 + 1 x M20.
	HSO	Stainless steel 316L field mount - Cable entry: 2 x M20.
	HSU	Stainless steel 316L field mount - Cable entry: 3 x $\frac{1}{2}$ "NPT.
Digital output	OA	Three active transistor outputs - requires XX and PD, PF, PM or PX.
	OR	Two mechanical relay outputs + one OT - requires XX and PF or PM.
	OS	Four mechanical relay outputs - requires XX, AP and PD.
	<b>OT</b>	<b>Three passive transistor outputs.</b>
Power	PD	8 - 24V AC/DC + sensor supply - with XI: 16 - 30V DC.
	PF	24V AC/DC + sensor supply - requires XX.
	PL	Input loop powered from sensor signal type "A" - requires XX, AI and OT.
	PM	115 - 230V AC + sensor supply - requires XX.
	<b>PX</b>	<b>Basic power supply 8 - 30V DC.</b>
Battery	PB	Additional lithium battery powered (optional) - requires XX and PD or PX.
	PC	Additional lithium battery powered (optional) - Intrinsically safe - requires XI, and PD or PX.
Hazardous	XI	Intrinsically safe, according ATEX and IECEx.
	XF	Ex d enclosure - 3 keys according ATEX and IECEx.
	<b>XX</b>	<b>Safe area only, according CE / UKCA.</b>
Options	ZB	Backlight - requires XX And PD, PF, PM or PX.
	<b>ZX</b>	<b>No options.</b>

The **bold** marked text contains the standard configuration: F170-A-AP-CX-HC-OT-PX-XX-ZX.