

Your success counts

## Batch Controller

with two stage control / pulse output



**Application examples:** Extreme cold weather regions



For custom single or repeating similar batches



Hot and sandy deserts

**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).**

### 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 preset and running batch value simultaneously.
- Self-learning overrun correction.
- Easy to enter a batch value and to control the process.
- Count-up and count-down function available.
- No-flow monitoring.
- Selectable on-screen engineering units; volumetric or mass.
- Ability to process all types of signals: Sine wave (coil), NAMUR, NPN/PNP pulse, Reed-switch and Active pulse signals.
- Remote control input: Start / Pause / Stop.
- Two configurable control outputs: for two-stage control or one-stage control with scaled pulse output according to acc. total.
- Full Modbus communication RS232/485/TTL.
- Power requirements: Battery powered, 8 - 30V DC, 8 - 24V AC/DC or 115 - 230V AC.
- Sensor supply 3 / 8.2 / 12 / 24V DC.

## Introduction

The F130 is a straight forward two-stage Batch controller offering exactly what is required for many applications. The operator can enter a batch quantity easily or execute repeating batches. During the batch, the preset value is displayed as well as the batched (or remaining) quantity and the units of measurement. The automatic self-learning overrun correction ensures an accurate result after each batch. A wide selection of options further enhances the capabilities of this model, which includes Intrinsic Safety and full Modbus communication.

## No-flow

If there is a predefined time-out in the input signal, the no-flow alarm will be triggered. The F130 goes in pause-mode and the display will show: NO FLOW.

## 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 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.

## Display

The display has large 17mm (0.67") and 8mm (0.31") digits which show the batched quantity and the preset value simultaneously. On-screen engineering units are easily configured from a comprehensive menu. A seven digit resettable "day total" is available as well as an eleven digit non-resettable accumulated total. All values are backed-up in EEPROM memory every minute.



## Control outputs

Two outputs are available which can be configured to operate as two stage control for large batch quantities or as one stage control for smaller batches. In this case, the second output is available as a scaled pulse output according to accumulated total or batch total. The pulse output length is user defined from 0.001 second up to 9.999 seconds. The maximum output frequency is 500Hz. The output signals can be passive NPN, active PNP or isolated electro-mechanical relays.

## Communication

All process data and settings can be read and modified manually or through the Modbus communication link (RS232 / RS485). If desired, the batch process can even be started and stopped through communication.

## Hazardous areas

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



All info  
at a glance



Easy  
to install



Easy  
to program



Know one  
know them all!



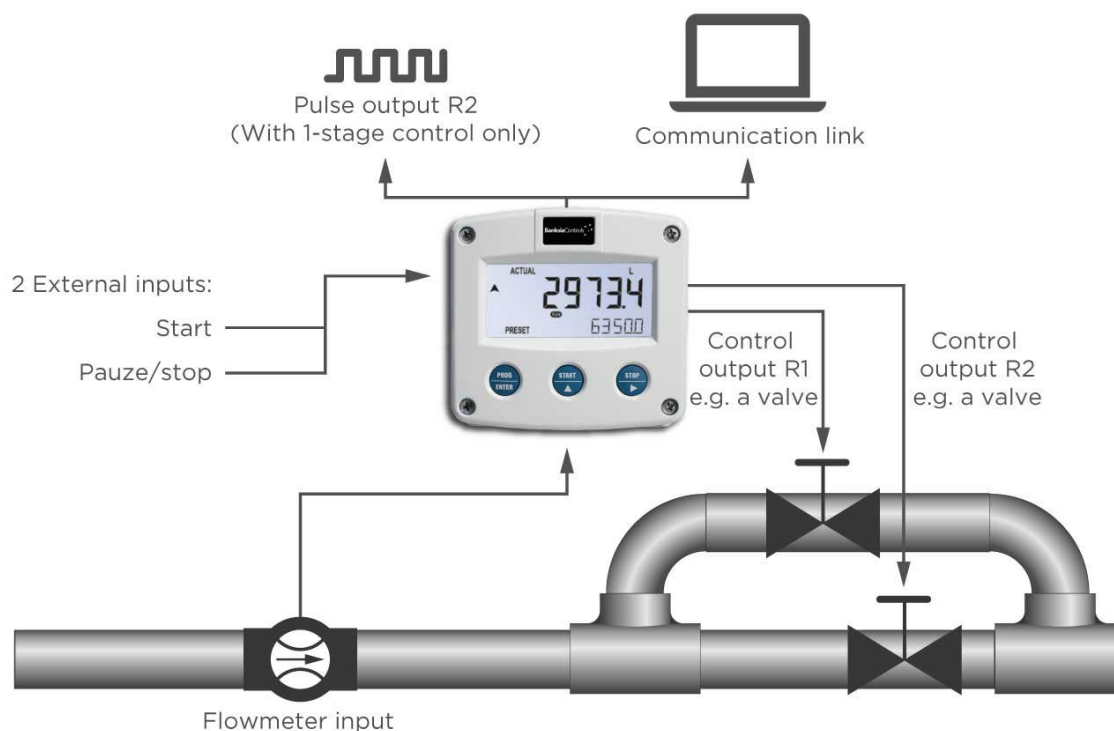
Reliable



User-friendly

## Overview application F130

The F-Series is your first and safest choice for field mount indicators in safe and hazardous area applications. Especially in harsh weather conditions like rain, snow, salty atmospheres and temperatures between -40°C up to +80°C (-40°F up to 176°F). For batching small up to very large quantities. Single or repeating batches. Alternative basic model: F030 or more sophisticated models: F131, F136 or the N-Series DIN panel mount batch controllers with numerical keypad.



## Signal input

The F130 will accept most pulse and analog input signals for volumetric flow or mass flow measurement. For remote control, two inputs are available to start, pause and stop the batch process.

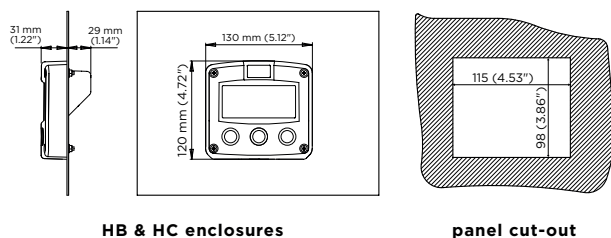
Type of signal	Resistance	Low Pass filter (LP)	Max. frequency	Max. frequency Low Pass filter (LP)	Min. amplitude P-P	Remark
NPN	100kΩ pull-up	100kΩ pull-up	6kHz Threshold 1.2V	1.2kHz		Open collector
REED	1MΩ pull-up	1MΩ pull-up	1.2kHz Threshold 1.2V	120Hz		
PNP	100KΩ pull-down	100KΩ pull-down	6kHz Threshold 1.2V	1.2kHz		
NAMUR	820Ω pull-down	-	4kHz	-		External power required
COIL LO	-	-		-	80mV <sub>pp</sub>	Default sensitivity
COIL-HI	-	-		-	20mV <sub>pp</sub>	Sensitive for interference!
COIL-HI (Type ZF)	-	-		-	10mV <sub>pp</sub>	
ACTIVE 8.2V DC	3K9Ω		10kHz Threshold 4V			External power required
ACTIVE 12V DC	4KΩ		10kHz Threshold 6V			External power required
ACTIVE 24V DC	3KΩ		10kHz Threshold 12V			External power required

## Enclosures

Various types of enclosures can be selected, all ATEX and IECEx approved. The F130 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*

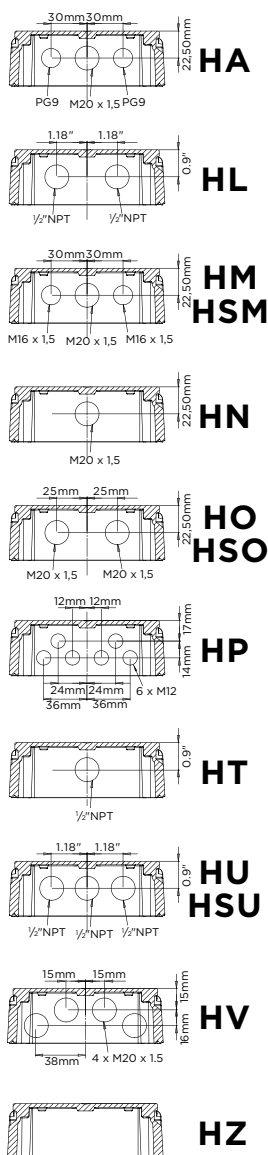


**HB & HC enclosures**

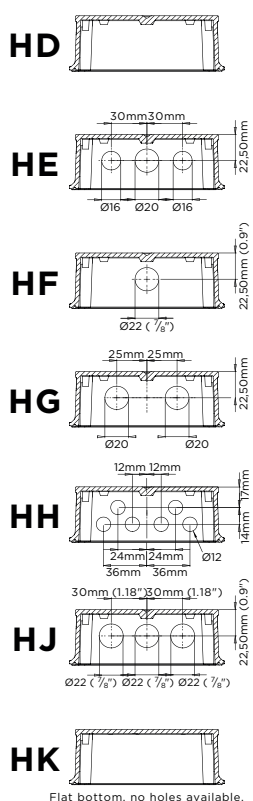
**panel cut-out**

*Cable entries*

### Aluminum / Stainless Steel

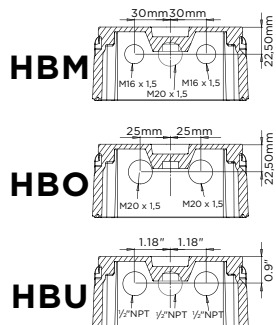


### GRP

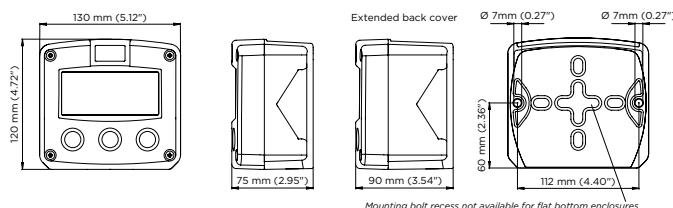


Flat bottom, no holes available.

### Extended Aluminum
















































*Aluminum, GRP & Stainless steel 316L field mount enclosures*

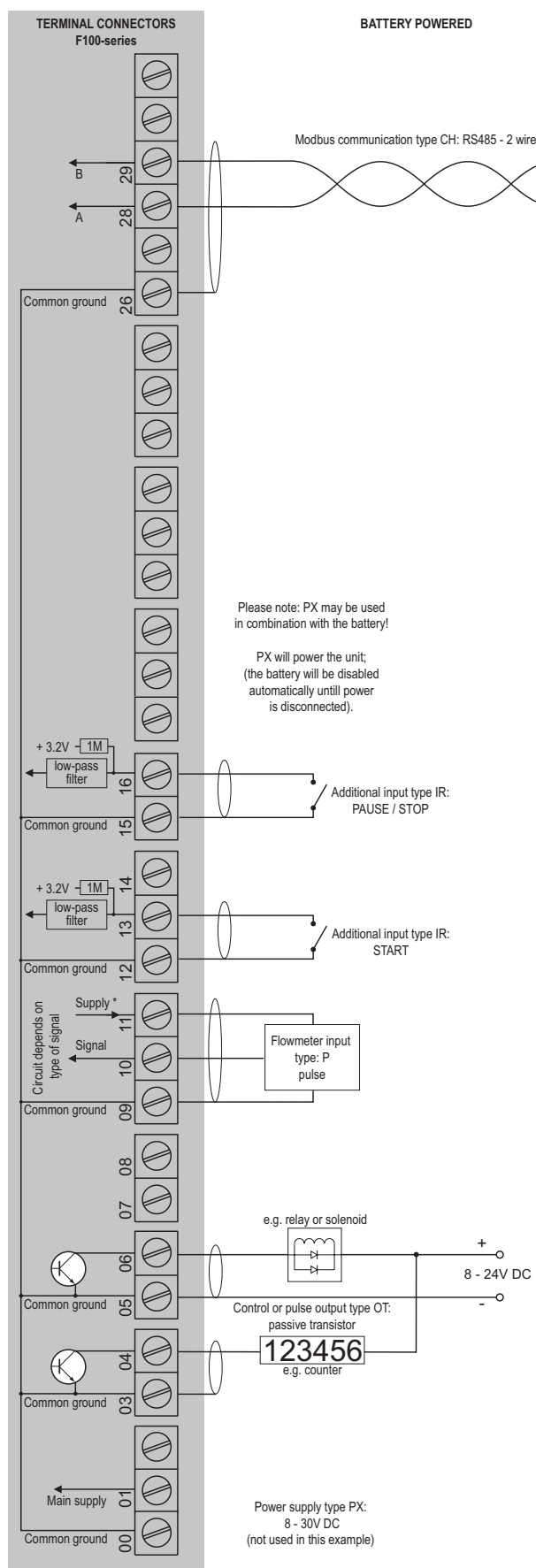


Mounting bolt recess not available for flat bottom enclosures.

## Terminal connections

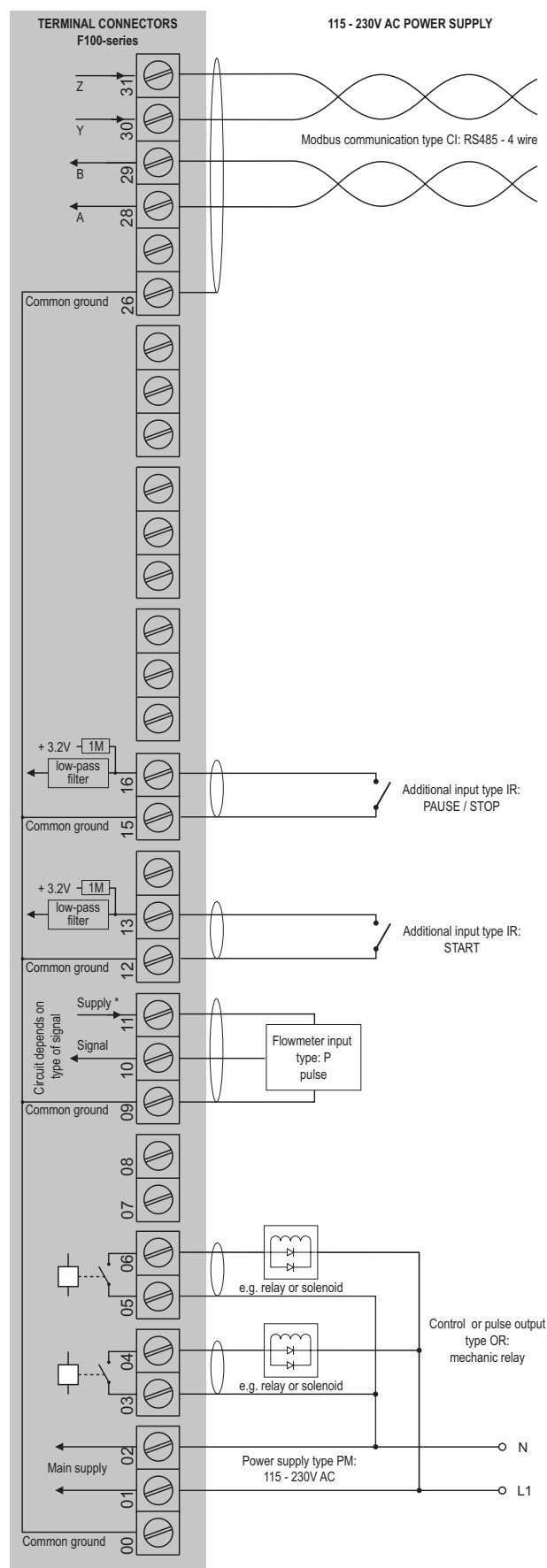
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Configuration example F130-P-CH-OT-PX-XX-ZX



\* For pulse type inputs:  $V_{ref}$ : 1.2V/3.0V available. - NO power output, available  $I_{supply}$ : <1mA. Note: using these ref. voltages at max. load, will reduce battery life significantly.

Configuration example F130-P-CI-OR-PM-XX-ZX



\*Supply voltage: 1.2 / 3.2 / 8.2 / 12 / 24V DC to sensor



## Hazardous area applications

The F130-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).

- 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 T100 °C Da.**

- The IECEx markings for gas and dust applications are:

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

**Dust: Ex ia IIIC T100 °C Da.**

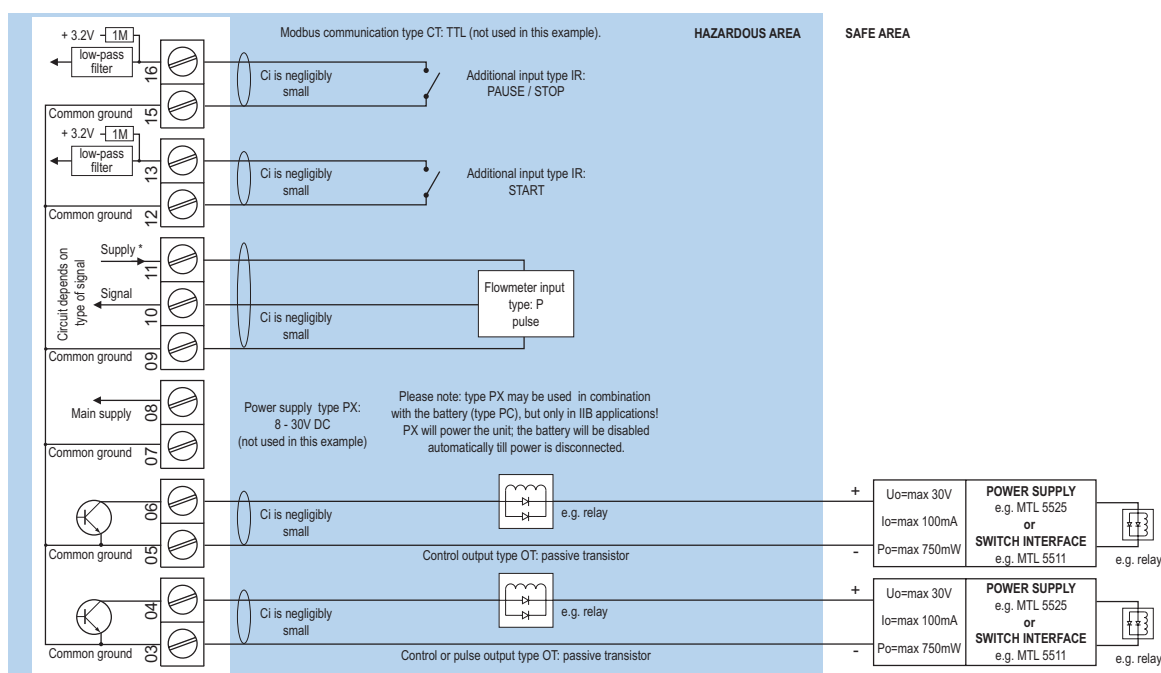
Besides the I.S. power supplies for the control outputs, it is allowed to connect up to two I.S. power supplies in IIB/IIIC applications or one in IIC applications. Consult the certificate for the maximum input and output values of the circuits. Full functionality of the F130 remains available, including two stage control, pulse output and Modbus communication (type CT). Power supply type PD-XI offers a 8.2V sensor supply e.g. for one Namur sensor. An ATEX approved flame proof Ex d enclosure is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 03ATEX1074 X

- IECEx DEK 11.0042X



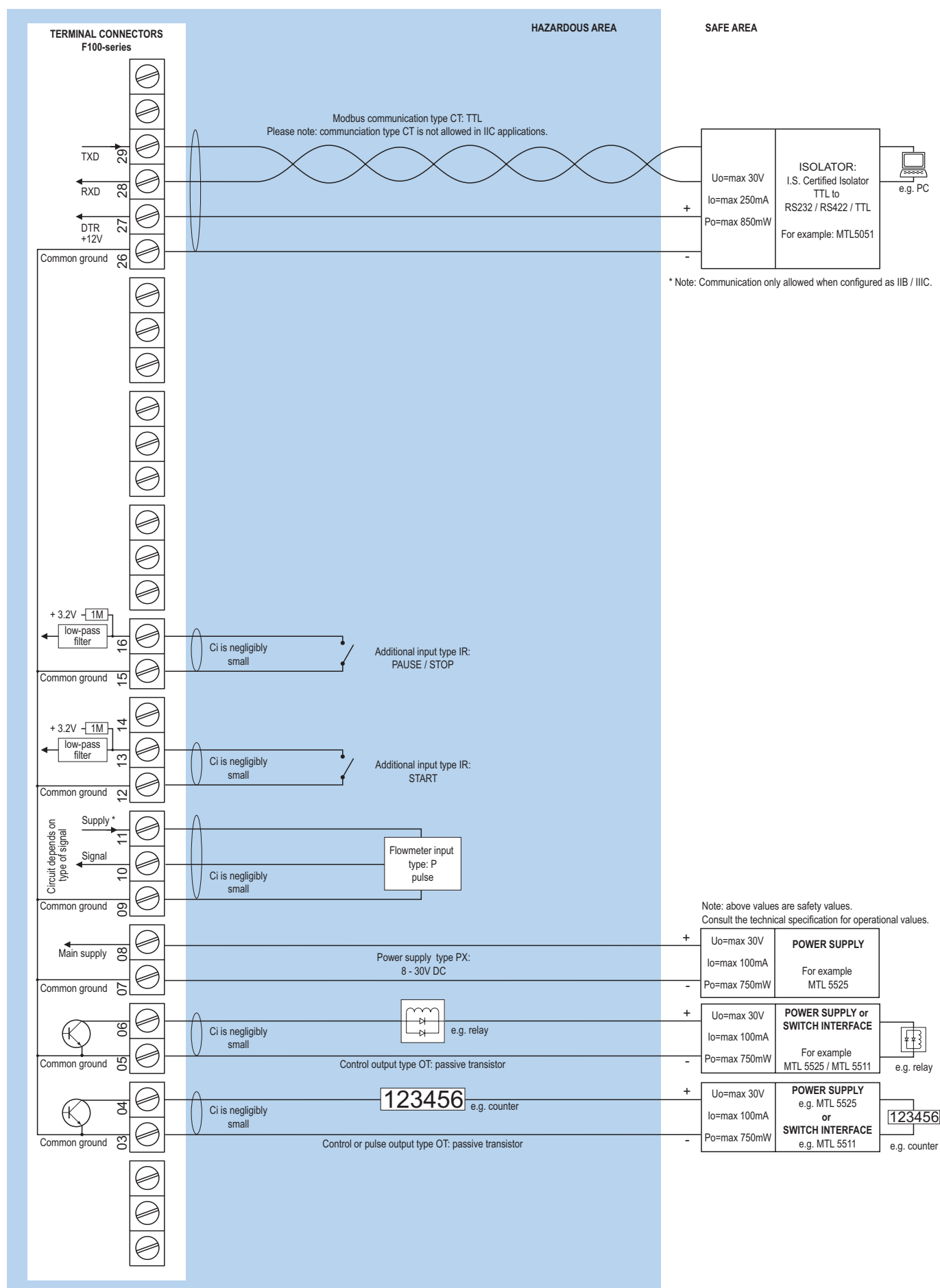
### Configuration example IIB / IIIC and IIC - F130-P-OT-PC-(PX)-XI - Battery powered unit



\* For pulse type inputs:  $V_{ref}$ : 1.2V/3.0V available - NO power output, available  $I_{supply}$ : <1mA.  
Note: using these ref. voltages at max. load, will reduce battery life significantly.

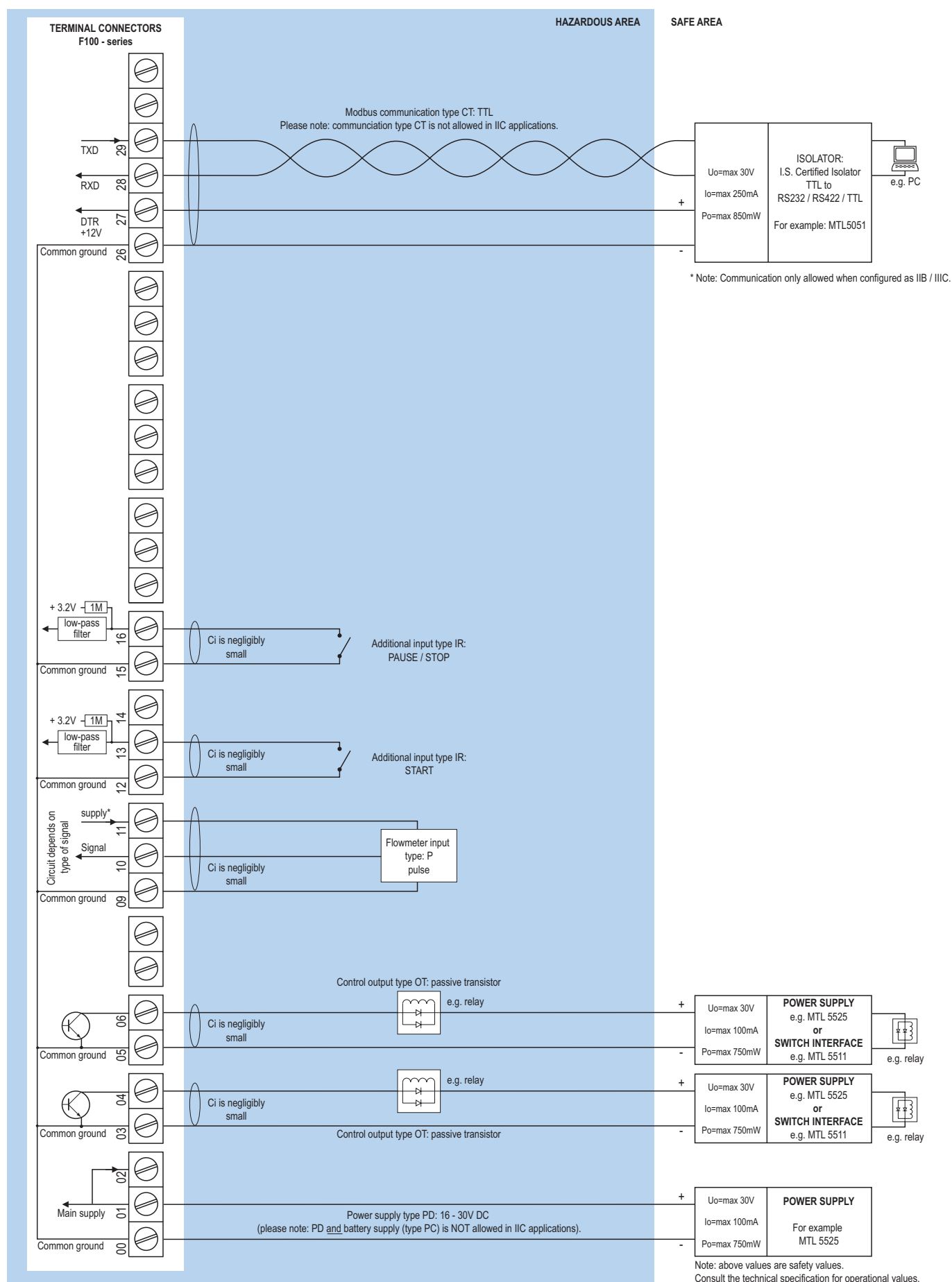
Note: above values are safety values.  
Consult the technical specification for operational values.

Configuration example IIB / IIIC and IIC - F130-P-(CT)-OT-PX-XI - Basic power requirement 8 - 30V DC



\* For pulse type inputs:  $V_{ref}$ : 1.2V/3.0V available.- NO power output, available  $I_{supply}$ : <1mA.  
Note: using these ref. voltages at max. load, will reduce battery life significantly.

Configuration example IIB / IIIC and IIC - F130-A-(CT)-OT-PD-XI - Power requirement 16 - 30V DC



\* Note power supply type PD: the supply voltage to pulse sensors is maximum 8.7V (Uo=max 8.7V Io=max 25mA Po=max 150mW).



## 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 white LED-backlight. Intensity can be adjusted in the configuration menu. Good readings in full sunlight and darkness.
<b>Note ZB</b>	Only available for safe area applications.

## 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).

## 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. IP & NEMA 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 T100 °C Da.
<b>IECEx</b>	Gas: Ex ia IIC/IIB T4 Ga. Dust: Ex ia IIIC T100 °C Da.
<b>Ambient Ta</b>	-40°C to +70°C (-40°F to +158°F).

## Explosion proof (Type XF)

<b>ATEX</b>	Gas: II 2 G / Ex d IIB T5 Gb. Dust: II 2 D / Ex t IIB T100 °C Db.
<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.
<b>Note XF</b>	IECEx available on request.

## 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.

## 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.

## 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 HB/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 - Flowmeter

<b>Type P</b>	Coil / sine wave (HI: 20mVpp or LO: 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed switch, Namur, active pulse signals 8 - 12 and 24V DC.
<b>Frequency</b>	Minimum 0Hz - maximum 6kHz for total and flow rate. Maximum frequency depends on signal type and internal low-pass filter. E.g. reed switch with low-pass filter: max. frequency 120Hz.
<b>K-Factor</b>	0.000010 - 9,999,999 with variable decimal position.
<b>Low-pass filter</b>	Available for all pulse signals.
<b>Option ZF</b>	coil sensitivity 10mVpp.

## Additional inputs

<b>Function</b>	Remote control: Two terminal inputs to start, pause and stop the batch process.
<b>Type IR</b>	Internally pulled-up switch contact - NPN.
<b>Duration</b>	Minimum pulse duration 100msec.

## Signal outputs - Digital output

<b>Function</b>	User defined: batch process one or two stage control - scaled pulse output according the running batch or according accumulated total.
<b>Frequency</b>	Max. 500Hz. Pulse width user definable between 0.001 second up to 9.999 seconds.
<b>Type OA</b>	Two active 24V DC transistor outputs (PNP); max. 50mA per output. 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 (requires PF or PM).
<b>Type OT</b>	Two passive transistor outputs (NPN) - not isolated. Max. 50V DC - 300mA per output.

## Signal outputs - Communication option

<b>Function</b>	Reading display information, reading / writing preset value and all configuration settings. Start, pause and stop batch process.
<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.

## 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 or 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 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).
<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 for pulse signals and 1.2V DC for coil pick-up.
<b>Note PB/PC/PX</b>	This is not a real sensor supply. Only suitable for sensors with a very low power consumption like coils (sine wave) and reed-switches.
<b>Type PD</b>	1.2 / 3 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC. $U_{max}$ sensor is 2V below $U_{supply}$
<b>Type PD-XI</b>	1.2 / 3 / 8.2V DC - max. 7mA @ 8.2V DC and mains power supply voltage (as connected to terminal 1).
<b>Note PD-XI</b>	In case PD-XI and signal A: the sensor supply voltage is according to the power supply voltage connected to terminal 1. Also terminal 2 offers the same voltage.
<b>Type PF / PM</b>	1.2 / 3 / 8.2 / 12 / 24V DC - max. 400mA @ 24V DC.

## Operator functions

<b>Displayed info</b>	<ul style="list-style-type: none"> <li>• Preset value - can be entered by the operator.</li> <li>• Batched quantity or remaining quantity.</li> <li>• Total and accumulated total</li> <li>• No-flow alarm.</li> <li>• Total can be reset to zero by pressing the CLEAR-key twice.</li> </ul>
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## Preset and total

<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>Note</b>	Total can be reset to zero.

## Accumulated total

<b>Digits</b>	11 digits.
<b>Units / decimals</b>	According to selection for total.
<b>Note</b>	Can not be reset to zero.

Description			
Model	<b>F130</b>	<b>Batch controller with two stage control / pulse output.</b>	
	<b>P</b>	<b>Pulse input, e.g., coil, npn, pnp, namur, reed-switch.</b>	<b>-P</b>
Communication	CB	Communication RS 232 - Modbus ASCII / RTU - requires XX.	-CB
	CH	Communication RS 485 - 2wire - Modbus ASCII / RTU - requires XX.	-CH
	CI	Communication RS 485 - 4wire - Modbus ASCII / RTU - requires XX.	-CI
	CT	Intrinsically Safe TTL - Modbus ASCII / RTU - requires XI.	-CT
	<b>CX</b>	<b>No communication.</b>	<b>-CX</b>
Enclosures	HB	Aluminum panel mount enclosure.	-HB
	<b>HC</b>	<b>GRP panel mount enclosure.</b>	<b>-HC</b>
	HD	GRP field mount - Cable entry: no holes.	-HD
	HE	GRP field mount - Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.	-HE
	HF	GRP field mount - Cable entry: 1 x Ø 22mm ( $\frac{7}{8}$ ").	-HF
	HG	GRP field mount - Cable entry: 2 x Ø 20mm.	-HG
	HH	GRP field mount - Cable entry: 6 x Ø 12mm.	-HH
	HJ	GRP field mount - Cable entry: 3 x Ø 22mm ( $\frac{7}{8}$ ").	-HJ
	HK	GRP field mount - Flat bottom, cable entry: no holes.	-HK
	HA	Aluminum field mount - Cable entry: 2 x PG9 + 1 x M20.	-HA
	HL	Aluminum field mount - Cable entry: 2 x $\frac{1}{2}$ "NPT.	-HL
	HM	Aluminum field mount - Cable entry: 2 x M16 + 1 x M20.	-HM
	HN	Aluminum field mount - Cable entry: 1 x M20.	-HN
	HO	Aluminum field mount - Cable entry: 2 x M20.	-HO
	HP	Aluminum field mount - Cable entry: 6 x M12.	-HP
	HT	Aluminum field mount - Cable entry: 1 x $\frac{1}{2}$ "NPT.	-HT
	HU	Aluminum field mount - Cable entry: 3 x $\frac{1}{2}$ "NPT.	-HU
	HV	Aluminum field mount - Cable entry: 4 x M20.	-HV
	HZ	Aluminum field mount - Cable entry: no holes.	-HZ
	HBM	Extended Alu. field/meter mount - Cable entry: 2 x M16 + 1 x M20.	-HBM
	HBO	Extended Alu. field/meter mount - Cable entry: 2 x M20.	-HBO
	HBU	Extended Alu. field/meter mount - Cable entry: 3 x $\frac{1}{2}$ "NPT.	-HBU
	HSM	Stainless steel 316L field mount - Cable entry: 2 x M16 + 1 x M20.	-HSM
	HSO	Stainless steel 316L field mount - Cable entry: 2 x M20.	-HSO
	HSU	Stainless steel 316L field mount - Cable entry: 3 x $\frac{1}{2}$ "NPT.	-HSU
Additional	<b>IR</b>	<b>Remote control input to start, pause or stop.</b>	<b>-IR</b>
Digital output	OA	Two active transistor outputs- requires XX.	-OA
	OR	Two mechanical relay outputs - requires XX and PF or PM.	-OR
	<b>OT</b>	<b>Two passive transistor outputs.</b>	<b>-OT</b>
Power	PD	8 - 24V AC/DC + sensor supply - with XI: 16 - 30V DC.	-PD
	PF	24V AC/DC + sensor supply - requires XX.	-PF
	PL	Input loop powered from sensor signal type "A" - Requires OT and XX.	-PL
	<b>PX</b>	<b>Basic power supply 8 - 30V DC.</b>	<b>-PX</b>
Battery	PB	Additional lithium battery powered (optional) - requires XX and PD or PX.	-PB -P_
	PC	Additional lithium battery powered (optional) - Intrinsically safe - requires XI, and PD or PX.	-PC -P_
Hazardous	XI	Intrinsically safe, according ATEX and IECEx.	-XI
	XF	Ex d enclosure - 3 keys according ATEX - 3 keys according ATEX.	-XF
	<b>XX</b>	<b>Safe area only.</b>	<b>-XX</b>
Options	ZB	Backlight - requires XX.	-ZB
	ZF	Coil input 10mVpp.	-ZF
	<b>ZX</b>	<b>No options.</b>	<b>-ZX</b>

The **bold** marked text contains the standard configuration: F130-P-CX-HC-IR-OT-PX-XX-ZX.