F 136 Datasheet

Your success counts

FLUIDWELL

Temporarily not available

Batch Controller

with two stage control and analog output in relation to the batch process

Ex i

Modbus

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.
- Easy to enter a batch value and to control the process.
- Self-learning overrun correction and no-flow monitoring.
- Count-up and count-down function available.
- Ability to process all types of signals: Sine wave (coil), NAMUR, NPN/PNP pulse, Reed-switch, Active pulse signals.
- Remote control input: Start / Pause / Stop.
- The analog output value reflects the course of the batch process; fourteen different profiles can be selected.
- 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: Loop or battery powered, 8 - 30V DC, 8 - 24V AC/DC or 115 - 230V AC.
- Sensor supply 3 / 8.2 / 12 / 24V DC.

Introduction

The F136 offers in addition to the standard functions an analog output signal in relation to the batch proces. This to transmit the course of the process. 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. The automatic self-learning overrun correction ensures an accurate result after each batch.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits. Besides the proces information, 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.

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, therefore avoiding confusing abbreviations and baffling codes. All settings are safely stored in EEPROM memory in the event of sudden power failure.

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. Full Modbus functionality remains available for the Intrinsically Safe version (TTL).

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, where the second output is available as a scaled pulse output. The output signals can be passive NPN, active PNP or an isolated electromechanical relay.

Hazardous areas

This model has been ATEX and IECEx certified 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.

Analog output signal

The (0)4 - 20mA or 0 - 10V DC output signal is related to the batch process. For example, a 4mA will be generated when START has been pressed and this value will increase smootly to 18.7mA when the overrun correction closes the valve. The end value will be 20mA when the batch is finished. Fourteen different profiles are available to re-transmit the course of the process (see section profiles). The output signal can be passive, active or isolated where the passive output type will loop power the F136 as well.

All info at a glance

Easy to install

Easy to program

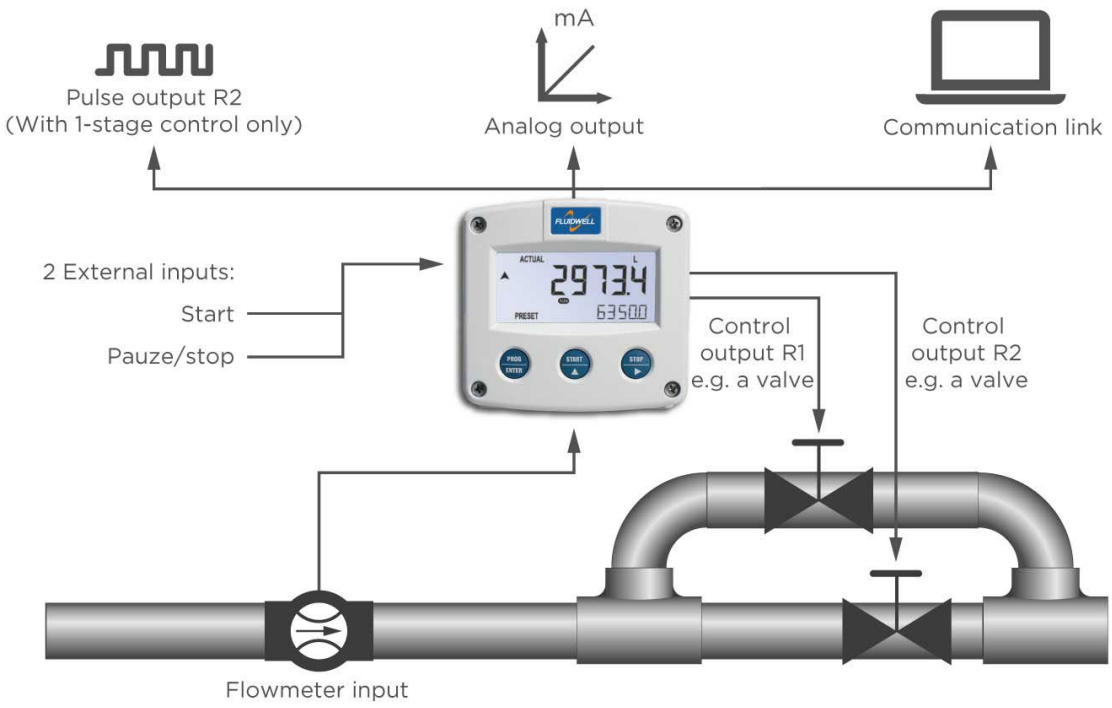
Know one know them all!

Reliable

User-friendly

Overview application F136

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 batch applications where retransmission of the course of the proces is required. Alternative basic model: F030, F130 and F131 and the N-Series DIN panel mount batch controllers with numerical keypad.



Signal input

The F136 will accept most pulse signals for volumetric flow or mass flow measurement. The input signal type can be selected by the user in the configuration menu without having to adjust any sensitive mechanical dip-switches or jumpers.

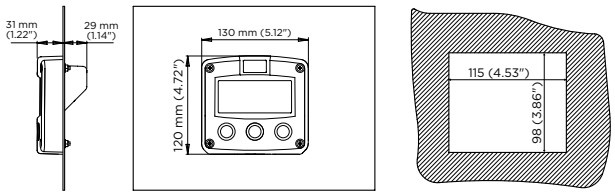
Type of signal	Resistance	Low Pass filter (LP)	Max. frequency	Max. frequency Low Pass filter (LP)	Min. amplitude P-P	Remark
NPN	100kΩ pull-up	100kΩ pull-up	6kHz Threshold 1.2V	1.2kHz		Open collector
REED	1MΩ pull-up	1MΩ pull-up	1.2kHz Threshold 1.2V	120Hz		
PNP	100KΩ pull-down	100KΩ pull-down	6kHz Threshold 1.2V	1.2kHz		
NAMUR	820Ω pull-down	-	4kHz	-		External power required
COIL LO	-	-		-	$80mV_{pp}$	Default sensitivity
COIL-HI	-	-	-	-	$20mV_{pp}$	Sensitive for interference!
COIL-HI (Type ZF)					$10mV_{pp}$	
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 F136 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 rugged aluminum field mount enclosure with IP67 / NEMA Type4X rating. Both EU or U.S. cable gland entry threads are available.

Dimensions enclosures

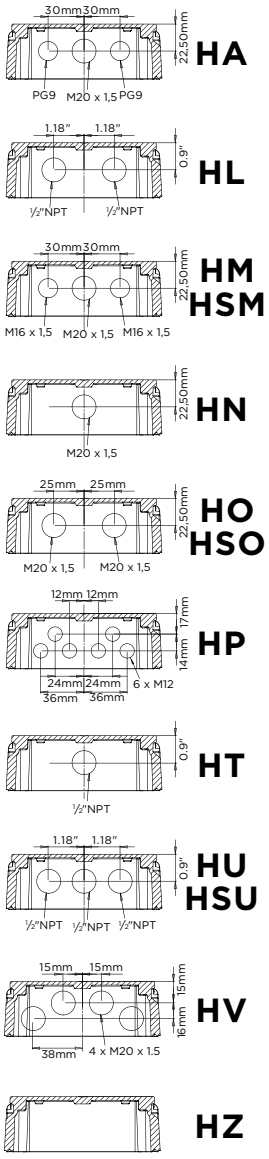
Aluminum & GRP panel mount enclosure



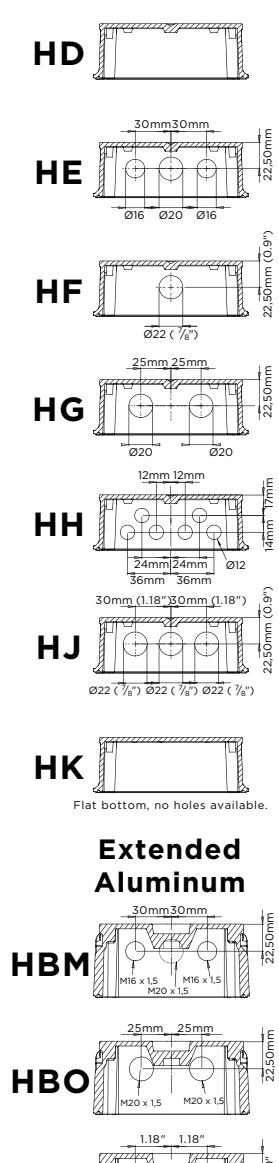
HB & HC enclosures **panel cut-out**

Cable entries

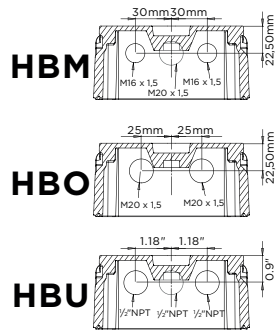
Aluminum / Stainless Steel



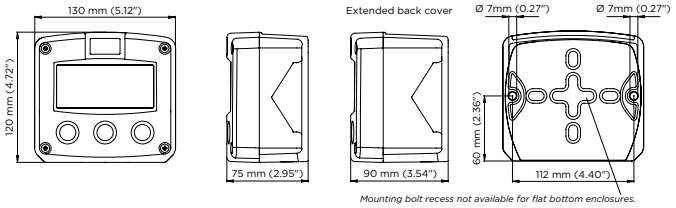
GRP



Extended Aluminum

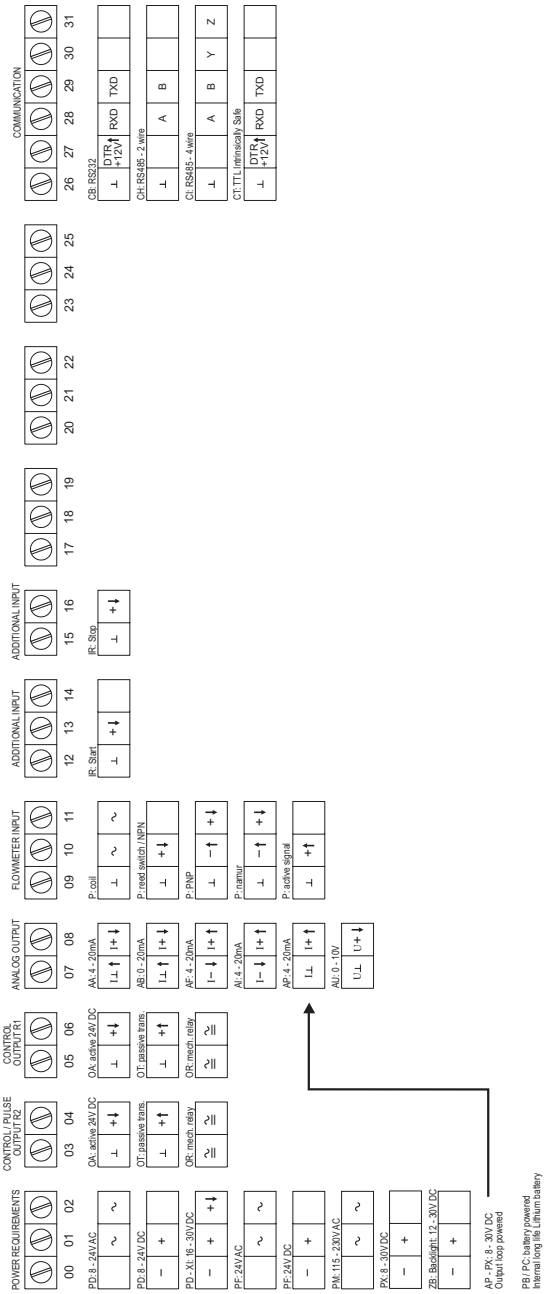


Aluminum, GRP & Stainless steel 316L field mount enclosures

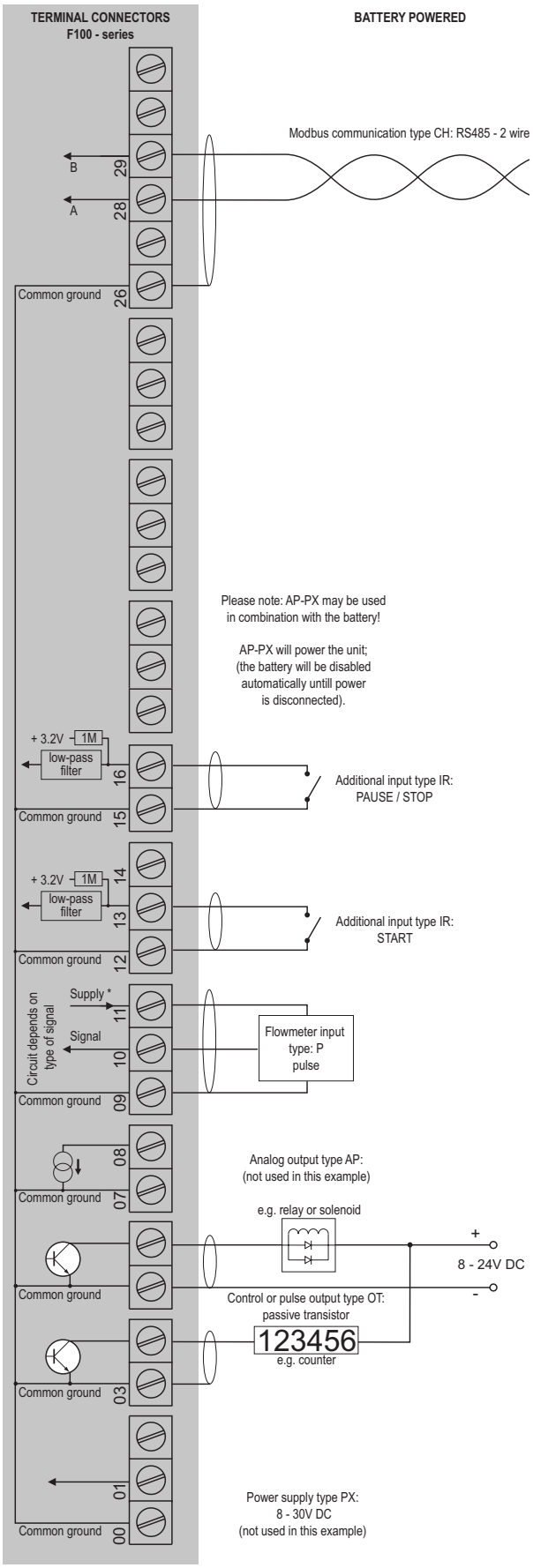


Mounting bolt recess not available for flat bottom enclosures.

Terminal connections

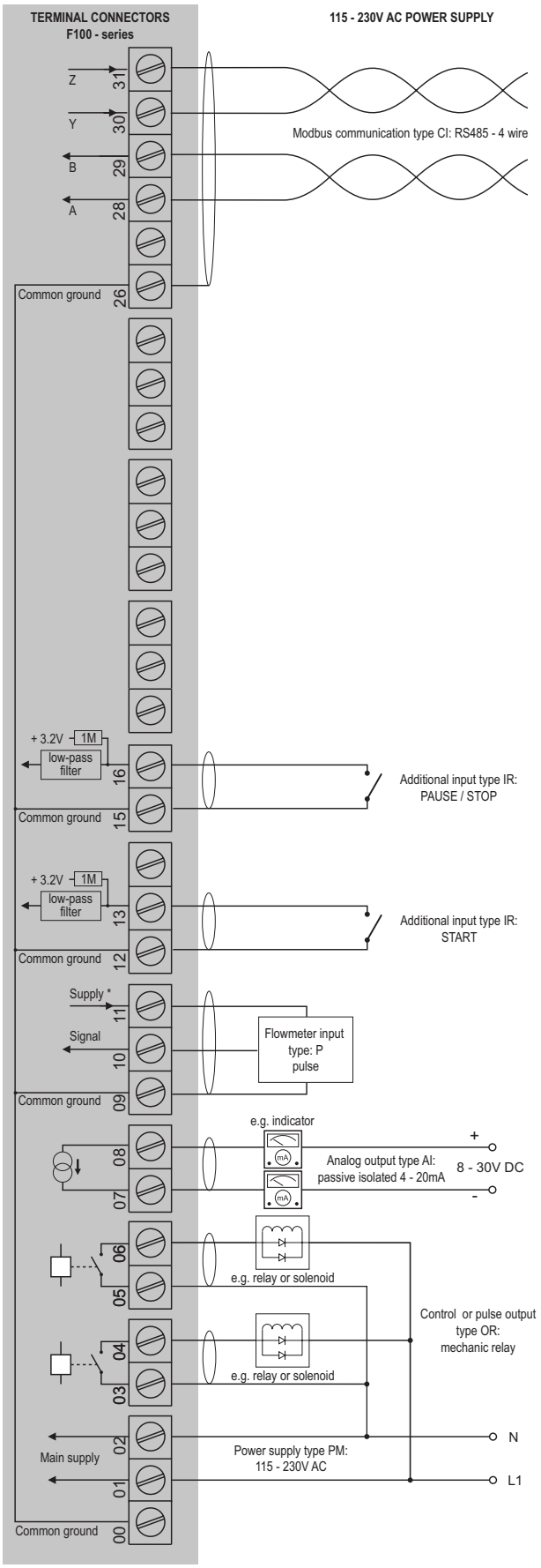


Configuration example F136-P-AP-CH-OT-(PX)-XX-ZX



* 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 F133-P-AI-CI-OR-PM-XX-ZX



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

Hazardous area applications

The F136-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).

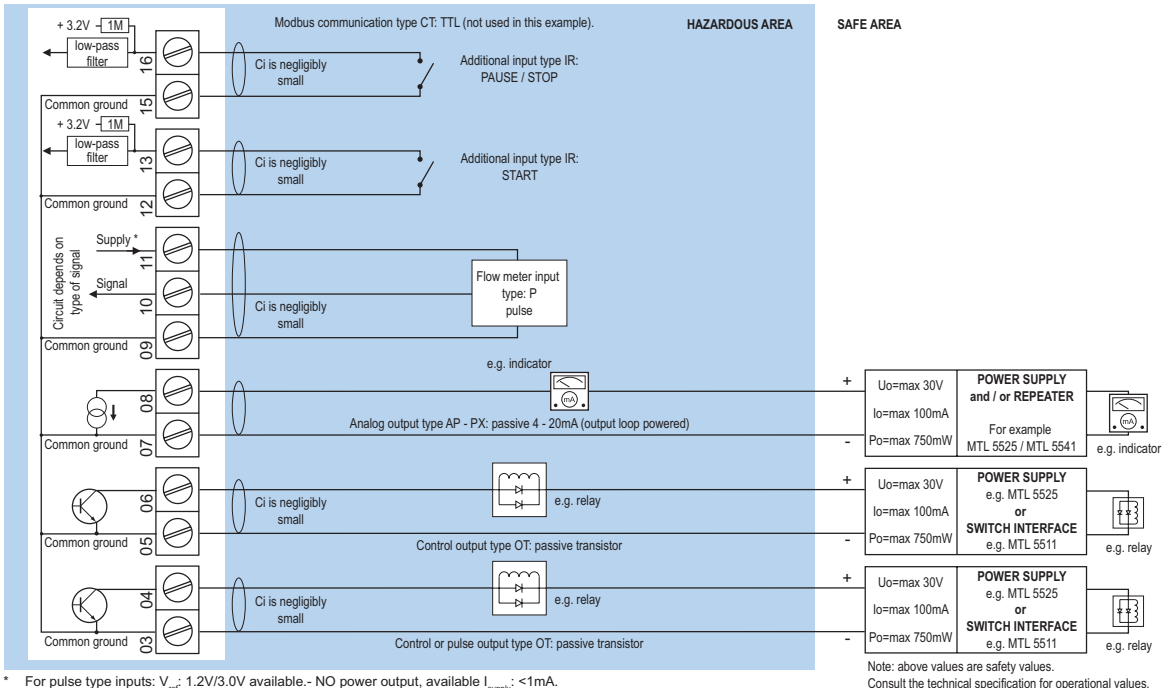
- The ATEX markings for gas and dust applications are:
  - **II 1 G Ex ia IIB/IIC T4 Ga**
  - **II 1 D Ex ia IIIC T100 °C Da.**
- The IECEx markings for gas and dust applications are:
  - **Ex ia IIC/IIB T4 Ga and Ex ia IIIC T100 °C Da.**

Besides the I.S. power supplies for the control 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 F136 remains available, including two stage control, 4 - 20mA output, 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

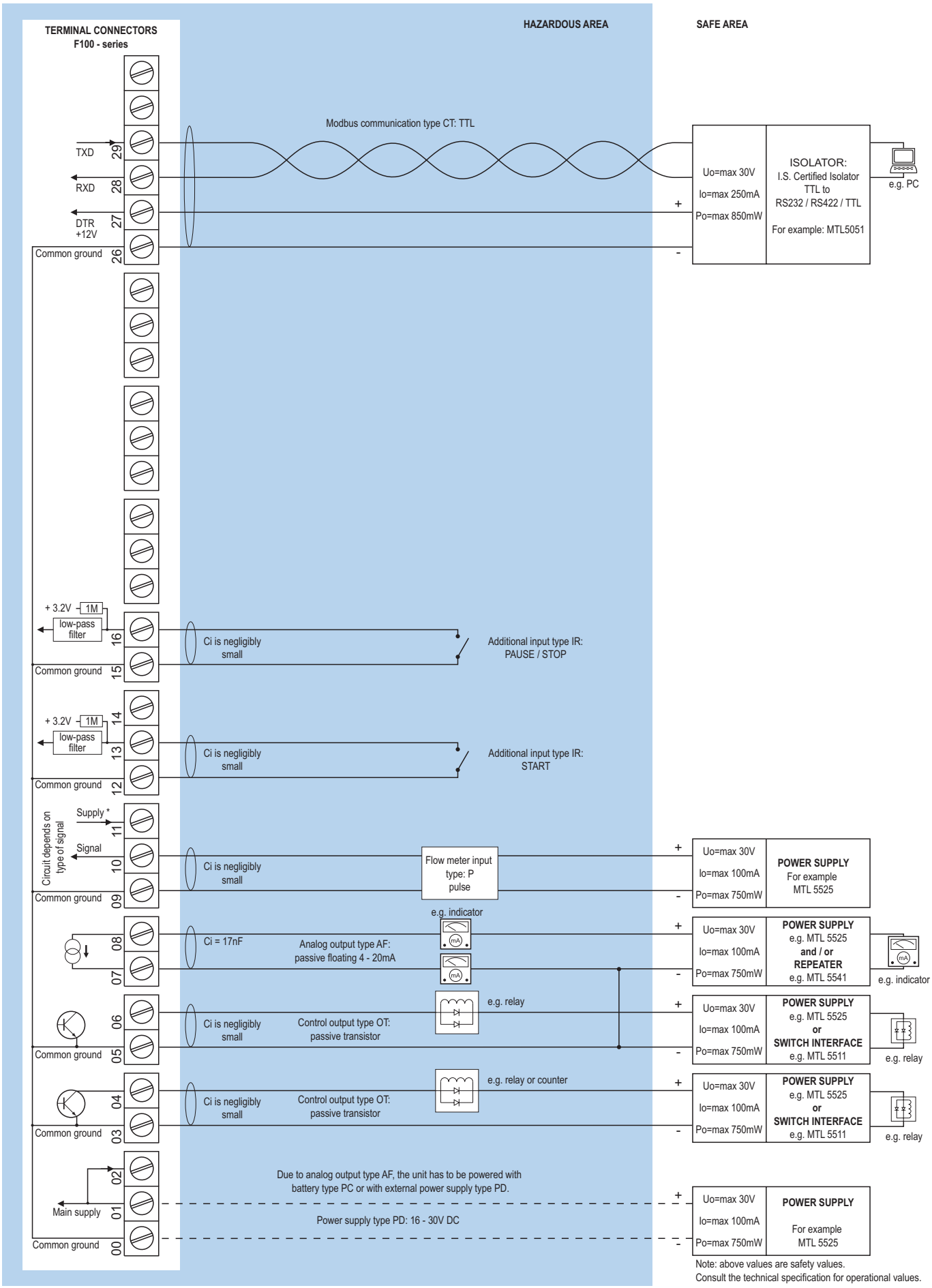
ration example IIB / IIIC and IIC - F136-P-AP-(CT)-OT-PX-XI - Output loop powered unit



* 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.

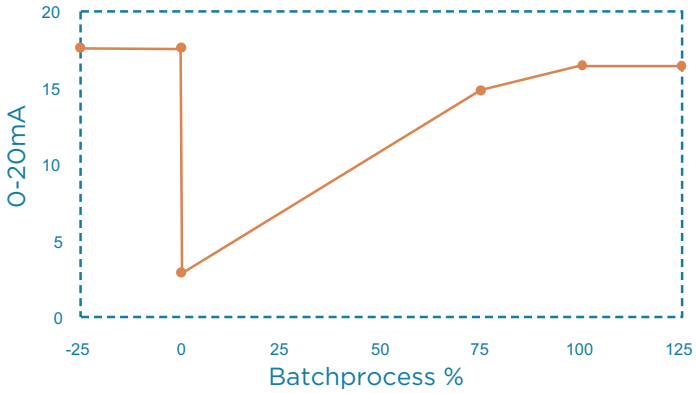
Configuration example IIB / IIIC - F136-P-AF-CT-OT-(PC)-(PD)-XI - Power requirement 16 - 30V DC or battery powered



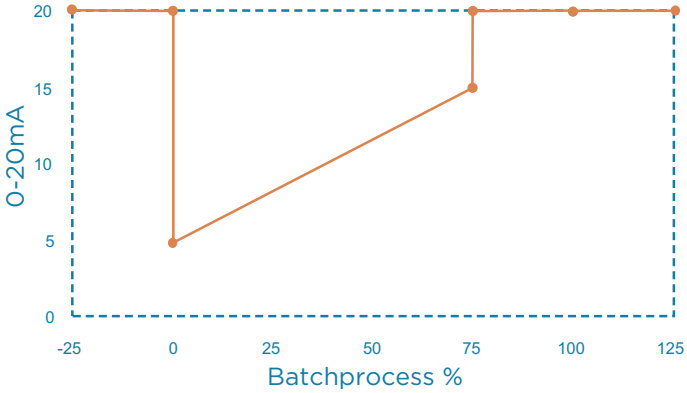
* Note power supply type PD: the supply voltage to pulse sensors is maximum 8.7V (Uo=max 8.7V Io=max 25mA Po=max 150mW) and to analog sensors as connected to terminal 1 (internally linked).

Selectable profiles analog output signal:

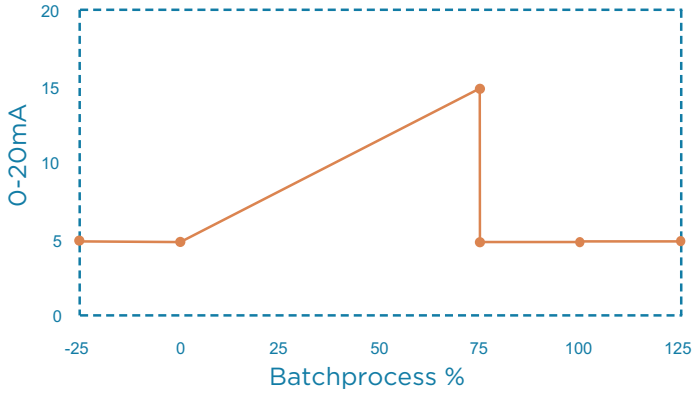
Stay



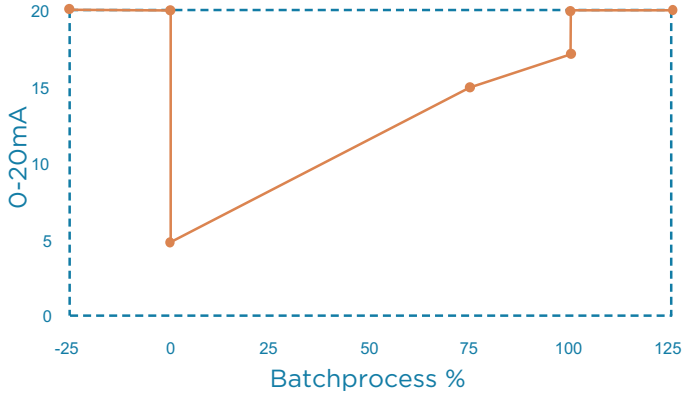
Overrun Up



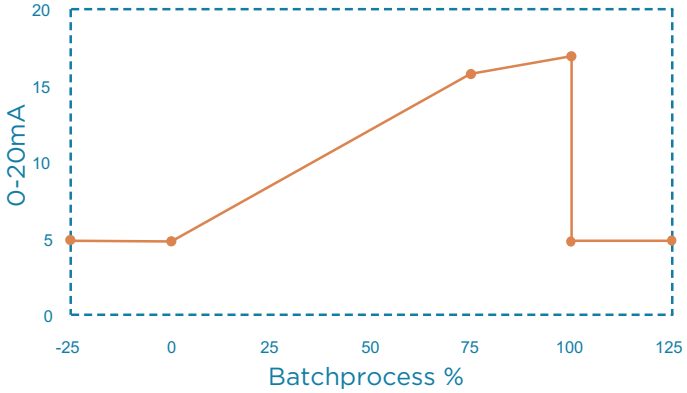
Overrun Down



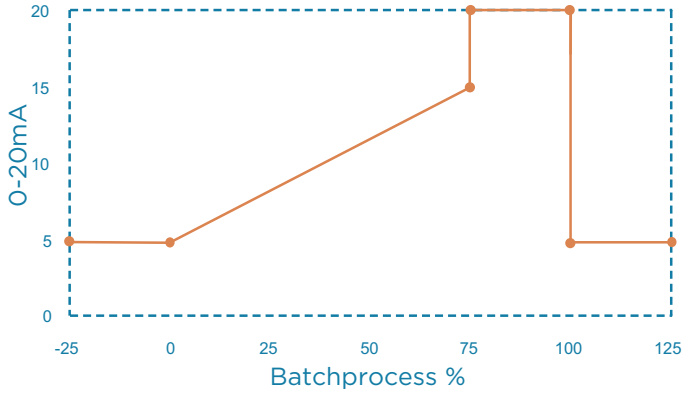
End Up



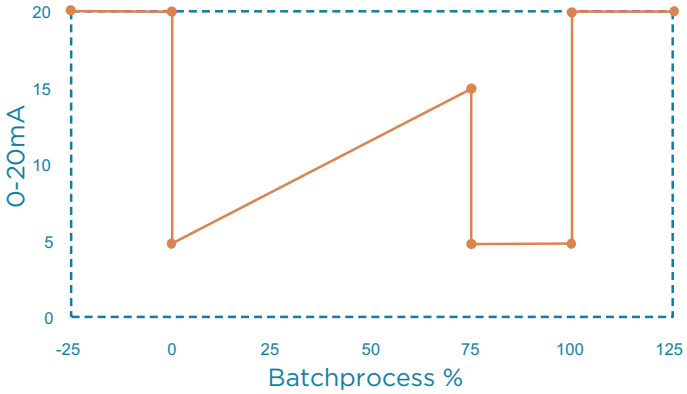
End Down



Bounce Up



Bounce Down



-25%: Situation before a next batch start.

0%: The moment after START has been pressed.

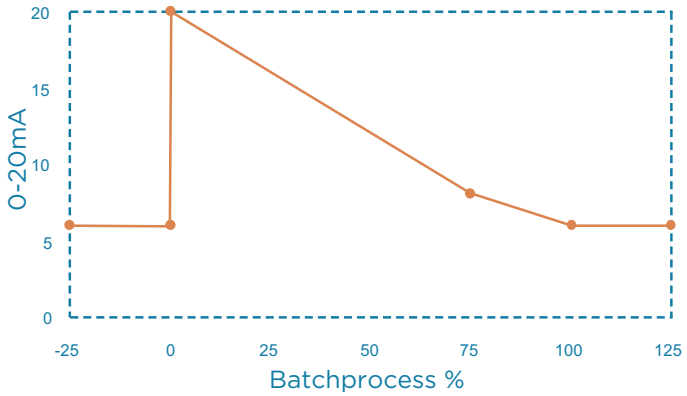
75%: Valve will be closed due to the overrun correction.

100%: End of overrun-time which is end-of-batch.

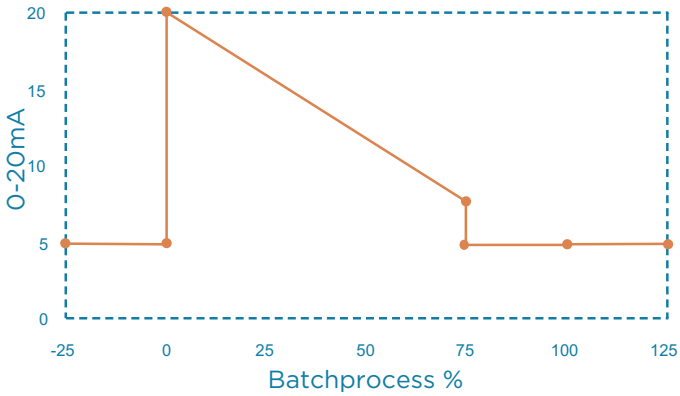
125% Situation after end-of-batch.

Selectable profiles analog output signal:

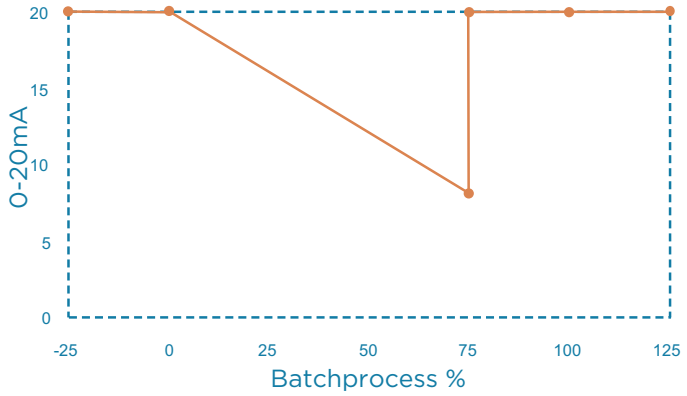
Stay



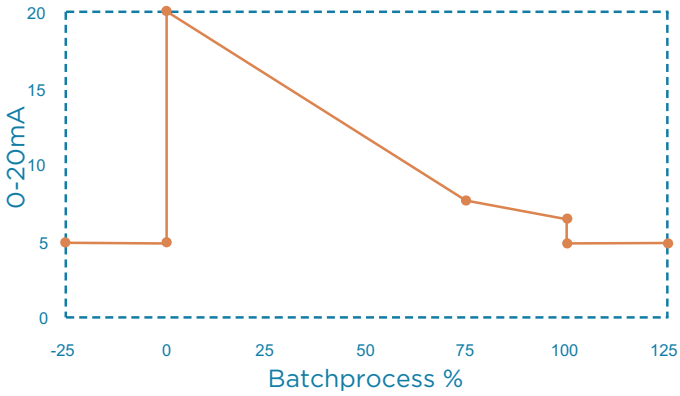
Overrun Up



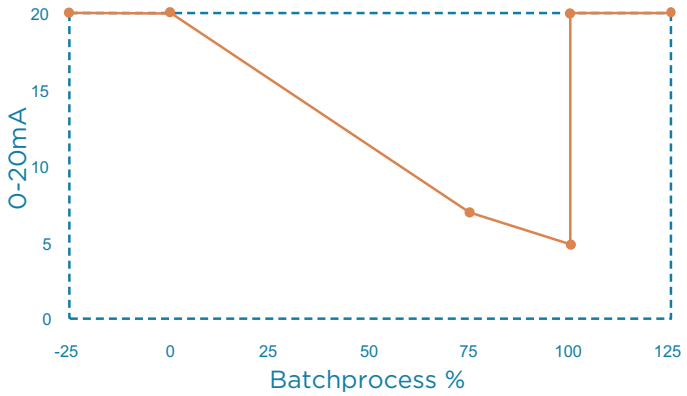
Overrun Down



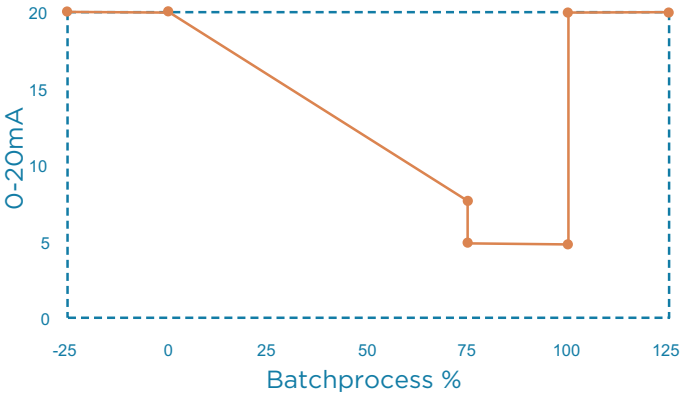
End Up



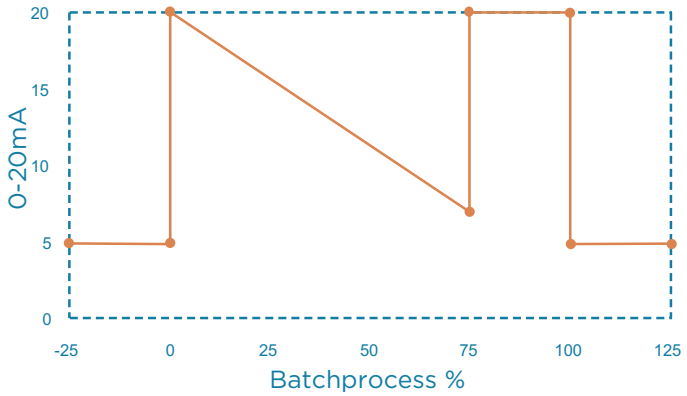
End Down



Bounce Up



Bounce Down



-25%: Situation before a next batch start.

0%: The moment after START has been pressed.

75%: Valve will be closed due to the overrun correction.

100%: End of overrun-time which is end-of-batch.

125% Situation after end-of-batch.

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: fast, 1sec , 3sec, 15sec, 30sec, off.
Option ZB	Transflective LCD with white LED-backlight. Intensitiy can be adjusted in the configuration menu. Good readings in full sunlight and darkness.
Note ZB	Only available for safe area applications.

Ambient temperature

Safe areas	-40°C to +80°C (-40°F to +176°F).
Intrinsically Safe	-40°C to +70°C (-40°F to +158°F).

Terminal connections

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

Data protection

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

Directives & Standards

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

Intrinsically Safe (Type XI)

ATEX	II 1 G Ex ia IIB/IIC T4 Ga. II 1 D Ex ia IIIC T100 °C Da.
IECEx	Ex ia IIC/IIB T4 Ga. Ex ia IIIC T100 °C Da.
Ambient Ta	-40°C to +70°C (-40°F to +158°F).

Explosion proof (Type XF)

ATEX	II 2 G / Ex d IIB T5 Gb. II 2 D / Ex t IIIB T100 °C Db.
Type XF	Dimensions of enclosure: 300 x 250 x 200mm (11.8" x 9.9" x 7.9") L x H x D.
Weight	Appr. 15kg.
Note XF	IECEx available on request.

Enclosure

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

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 Type4X.
Weight	600 gr.
Type HC	GRP panel mount enclosure IP65 / NEMA Type4X, UV-resistant and flame retardant.
Weight	450 gr.

GRP wall / field mount enclosures

General	GRP wall/field mount enclosure IP67 / NEMA Type4X, 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 (⅞").
Type HG	Cable entry: 2 x Ø 20mm.
Type HH	Cable entry: 6 x Ø 12mm.
Type HJ	Cable entry: 3 x Ø 22mm (⅞").
Type HK	Flat bottom, cable entry: no holes.

Aluminum wall / field mount enclosures

General	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.
Dimensions	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.
Weight	1100 gr. / extended enclosure: 1310 gr.
Type HA	Cable entry: 2 x PG9 and 1 x M20.
Type HL	Cable entry: 2 x ½" NPT.
Type HM/HBM	Cable entry: 2 x M16 and 1 x M20.
Type HN	Cable entry: 1 x M20.
Type HO/HBO	Cable entry: 2 x M20.
Type HP	Cable entry: 6 x M12.
Type HT	Cable entry: 1 x ½" NPT.
Type HB/HBU	Cable entry: 3 x ½" NPT.
Type HV	Cable entry: 4 x M20.
Type HZ	Cable entry: no holes.

Stainless steel 316L wall / field mount enclosures

General	Die-cast stainless steel 316L wall / field mount enclosure with flat bottom. IP67 / NEMA Type4X.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	2700 gr.
Type HSM	Cable entry: 2 x M16 + 1 x M20.
Type HSO	Cable entry: 2 x M20.
Type HSU	Cable entry: 3 x ½"NPT.

Signal inputs - Flowmeter

Type P	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.
Frequency	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.
K-Factor	0.000010 - 9,999,999 with variable decimal position.
Low-pass filter	Available for all pulse signals.
Option ZF	coil sensitivity 10mVpp.

Additional inputs

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

Signal outputs - Digital output

Function	User defined: batch process one or two stage control - scaled pulse output according the running batch or according accumulated total.
Frequency	Max. 500Hz. Pulse length user definable between 0.001 second up to 9.999 seconds.
Type OA	Two active 24V DC transistor outputs (PNP); max. 50mA per output (requires -PD, PF, PM or PX).Requires min. 24V power supply
Type OR	Two electro-mechanical relay outputs isolated max. switch power 230V AC (N.O.) - 0.5A per relay (requires PF or PM).
Type OT	Two passive transistor outputs (NPN) - not isolated. Max. 50V DC - 300mA per output.

Signal outputs - Communication option

Function	Reading display information, reading / writing all configuration settings.
Protocol	Modbus 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.

Signal outputs - Analog output

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

Power requirements

Type AP	Analog output loop powerd, 8 - 30V DC. Power consumption max 0.5 Watt.
Type PB	Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years. (requires PD or PX)
Type PC	Intrinsically Safe long life lithium battery life-time depends upon settings and configuration - up to 5 years. (requires XI and PD or PX)
Type PD	8 - 24V AC / DC ± 10%. Power consumption max. 5W.
Type PD-XI	16 - 30V DC power consumption max. 1W.
Type PF	24V AC / DC ± 10%. Power consumption max. 15W.
Type PM	115 - 230V AC ± 10%. Power consumption max. 15W.
Type PX	8 - 30V DC. Power consumption max. 0.75W.
Type ZB	12 - 30V DC ± 10%. Power consumption max. 1.5W.
Note PB/PF/PM	Not available Intrinsically Safe.
Note PF/PM	The total consumption of the sensors and outputs may not exceed 400mA @ 24V.
Note XI	For Intrinsically Safe applications, consult the safety values in the certificate.

Sensor excitation

Type PB/PC/PX	3V DC for pulse signals and 1.2V DC for coil pick-up.
Note PB/PC/PX	This is not a real sensor supply. Only suitable for sensors with a very low power consumption like coils (sine wave) and reed-switches.
Type PD	1.2 / 3 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC. Umax sensor is 2V below Usupply
Type PD-XI	1.2 / 3 / 8.2V DC - max. 7mA @ 8.2V DC and mains power supply voltage (as connected to terminal 1).
Type PF / PM	1.2 / 3 / 8.2 / 12 / 24V DC - max. 400mA @ 24V DC.

Operator functions

Displayed info	• Preset value - can be entered by the operator. • Batched quantity or remaining quantity. • Total and accumulated total. • Total can be reset to zero by pressing the STOP key twice.

Preset / total

Digits	7 digits.
Units	L, m^3, GAL, USGAL, kg, lb, bbl, no unit.
Decimals	0 - 1 - 2 or 3.
Note	Total can be reset to zero.

Accumulated total

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

		Description					
Model	**F136**	**Batch controller with two stage control and analog output in relation to the batch process.**					
Input	**P**	**Pulse input, e.g., coil, npn, pnp, namur, reed-switch.**	**-P**				
Analog output	AA	Active 4 - 20mA output - requires XX.	-AA				
	AB	Active 0 - 20mA output - requires XX.	-AB				
	AF	I.S. floating 4 - 20mA output - requires XI + PD.	-AF				
	AI	Isolated 4 - 20mA output - requires XX.	-AI				
	AP	**Passive 4 - 20mA output, loop powered unit.**	**-AP**				
	AU	Active 0 - 10V DC output - requires XX.	-AU				
Communication	CB	Communication RS 232 - Modbus RTU - requires XX.	-CB				
	CH	Communication RS 485 - 2wire - Modbus RTU - requires XX.	-CH				
	CI	Communication RS 485 - 4wire - Modbus RTU - requires XX.	-CI				
	CT	Intrinsically Safe TTL - Modbus RTU - requires XI.	-CT				
	CX	**No communication.**	**-CX**				
Enclosures	HB	Aluminum panel mount enclosure.	-HB				
	HC	**GRP panel mount enclosure.**	**-HC**				
	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 (⅞").	-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 (⅞").	-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 ½"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 ½"NPT.	-HT				
	HU	Aluminum field mount - Cable entry: 3 x ½"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 ½"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 ½"NPT.	-HSU				
Additional	**IR**	**Remote control input to start, pause or stop.**	**-IR**				
Digital output	OA	Two active transistor outputs- requires XX.	-OA				
	OR	Two mechanical relay outputs - requires XX and PF or PM.	-OR				
	OT	**Two passive transistor outputs.**	**-OT**				
Power	PD	8 - 24V AC/DC + sensor supply - with XI: 16 - 30V DC.	-PD				
	PF	24V AC/DC + sensor supply - requires XX.	-PF				
	PM	115 - 230V AC + sensor supply - requires XX.	-PM				
	PX	**Basic power supply 8 - 30V DC.**	**-PX**				
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.	-XF				
	XX	**Safe area only.**	**-XX**				
Options	ZB	Backlight - requires XX.	-ZB				
	ZF	Coil input 10mVpp.	-ZF				
	ZX	**No options.**	**-ZX**				

Temporarily not available

Please consult your local supplier for prices and lead times.

The **bold** marked text contains the standard configuration: F136-P-AP-CX-HC-IR-OT-PX-XX-ZX

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Important: specifications are subject to change without notice.
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