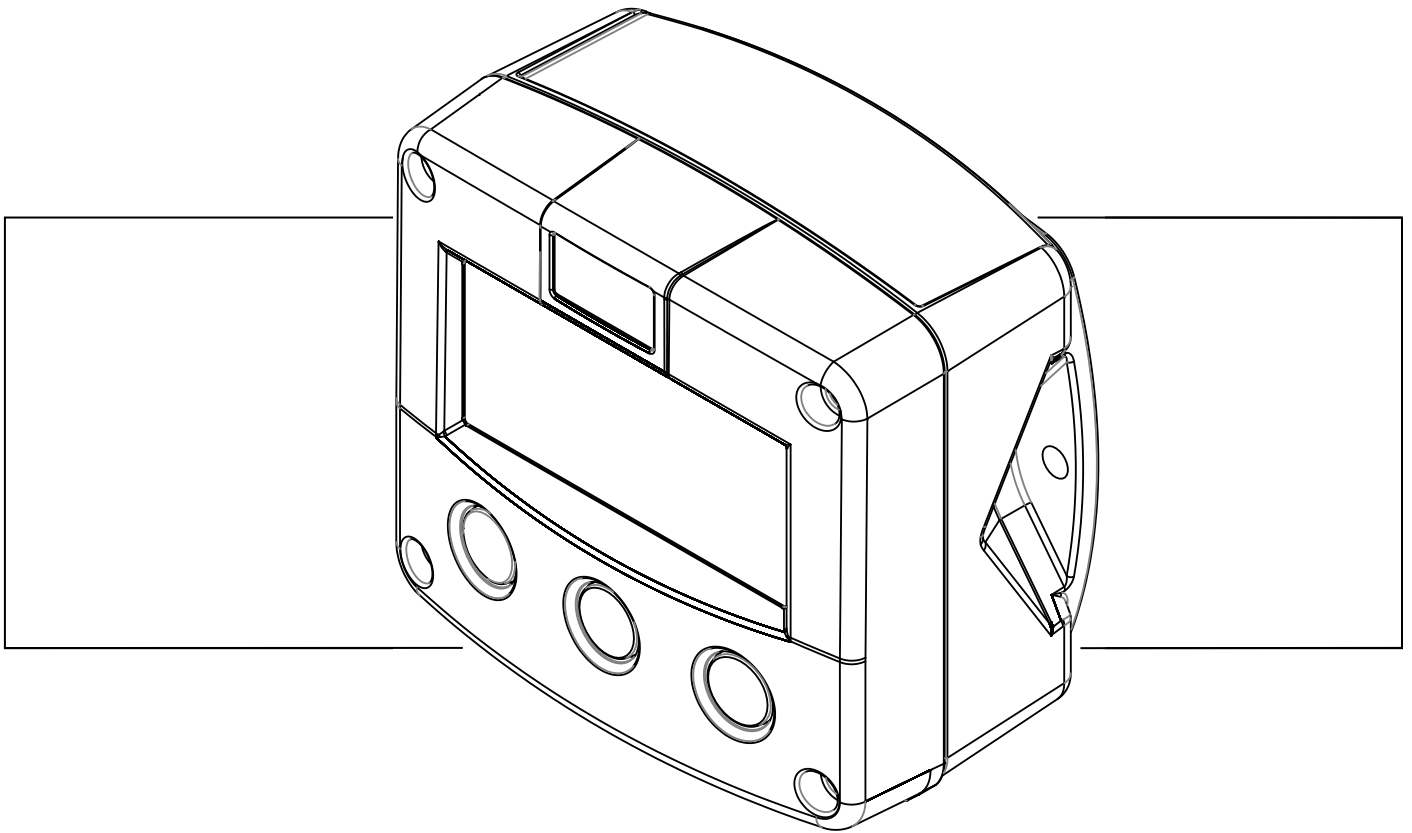# F133-P

Delivery controller / Dispenser
with pump start and valve control

Signal input flowmeter: pulse, Namur and coil.

Status inputs: start and stop.

Control outputs: two pump / valve control outputs.

Options: Intrinsically Safe, Modbus communication and backlight.

SAFETY INSTRUCTIONS

- *Any responsibility is lapsed if the instructions and procedures as described in this manual are not followed.*
- *LIFE SUPPORT APPLICATIONS: The F133-P is not designed for use in life support appliances, devices, or systems where malfunction of the product can reasonably be expected to result in a personal injury. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify the manufacturer and supplier for any damages resulting from such improper use or sale.*
- *Electro static discharge does inflict irreparable damage to electronics! Before installing or opening the unit, the installer has to discharge himself by touching a well-grounded object.*
- *This unit must be installed in accordance with the EMC guidelines (Electro Magnetic Compatibility).*
- **Do connect a proper grounding to the metal enclosure as indicated if the F133-P has an incoming power line which carries a 115-230V AC. The Protective Earth (PE) wire may never be disconnected or removed.**
- *Intrinsically safe applications: follow the instructions as mentioned in Chapter 5 and consult "Fluidwell F1..-..-XI - Documentation for Intrinsic safety".*

DISPOSAL OF ELECTRONIC WASTE

- The WEEE Directive requires the recycling of disposed electrical and electronic equipment in the European Union. When the WEEE Directive does not apply to your region, we support its policy and ask you to be aware on how to dispose of this product.
- The crossed out wheelie bin symbol as illustrated and found on our products tells that this product shall not be disposed of into the general waste system or into a landfill.
- At the end of its life, equipment shall be disposed of according to the local regulations regarding waste of the electrical and the electronic equipment.
- Please contact your local dealer, national distributor or the manufacturer's Technical helpdesk for information on the product disposal.

SAFETY RULES AND PRECAUTIONARY MEASURES

- The manufacturer accepts no responsibility whatsoever if the following safety rules and precautions instructions and the procedures as described in this manual are not followed.
- Modifications of the F133-P implemented without preceding written consent from the manufacturer, will result in the immediate termination of product liability and warranty period.
- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained persons authorized by the operator of the facility. Persons must read and understand this manual before carrying out its instructions.
- This device may only be operated by persons who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.
- Check the mains voltage and information on the manufacturer's plate before installing the unit.
- Check all connections, settings and technical specifications of the various peripheral devices with the F133-P supplied.
- Open the enclosure only if all leads are free of potential.
- Never touch the electronic components (ESD sensitivity).
- Never expose the system to heavier conditions than allowed according the classification of the enclosure (see manufacture's plate and chapter 4).
- If the operator detects errors or dangers, or disagrees with the safety precautions taken, then inform the owner or principal responsible.
- The local labor and safety laws and regulations must be adhered to.

ABOUT THE MANUAL

This manual is divided into two main sections:
- The daily use of the unit is described in chapter 2 "Operation". These instructions are meant for users.
- The following chapters and appendices are exclusively meant for electricians/technicians. These provide a detailed description of all software settings and hardware installation guidance.

This manual describes the standard unit as well as most of the options available. For additional information, please contact your supplier.

A hazardous situation may occur if the F133-P is not used for the purpose it was designed for or is used incorrectly. Please carefully note the information in this operating manual indicated by the pictograms:

A "**warning !**" indicates actions or procedures which, if not performed correctly, may lead to personal injury, a safety hazard or damage of the F133-P or connected instruments.

A "**caution !**" indicates actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the F133-P or connected instruments.

*A "**note !**" indicates actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned.*

WARRANTY AND TECHNICAL SUPPORT

For warranty and technical support for your Fluidwell products,
visit our internet site www.fluidwell.com or contact us at support@fluidwell.com.

CONTENTS MANUAL

1. INTRODUCTION
1.1. SYSTEM DESCRIPTION

Functions and features

The delivery controller / dispenser model F133-P is a microprocessor driven instrument designed for the delivery of unknown quantities as well as displaying the flow rate, the delivered total and the delivered accumulated total.

This product has been designed with a focus on:
- ultra-low power consumption to allow long-life battery powered applications (type PB/PC);
- intrinsic safety for use in hazardous applications (type XI),
- ability to process all types of flowmeter signals;
- transmitting possibilities with analog, pulse and communication outputs;
- several mounting possibilities with GRP or aluminum enclosures for industrial surroundings.

Flowmeter input

This manual describes the unit with a pulse input from the flowmeter. Other versions are available to process (0)4-20mA signals.

One flowmeter with a passive or active pulse, Namur or sine wave (coil) signal output can be connected to the F133-P. To power the sensor, several options are available.

Standard outputs
- Two transistor or relay (option) outputs: to control a pump and a valve. All kind of switch conditions can be set to optimize the process control.
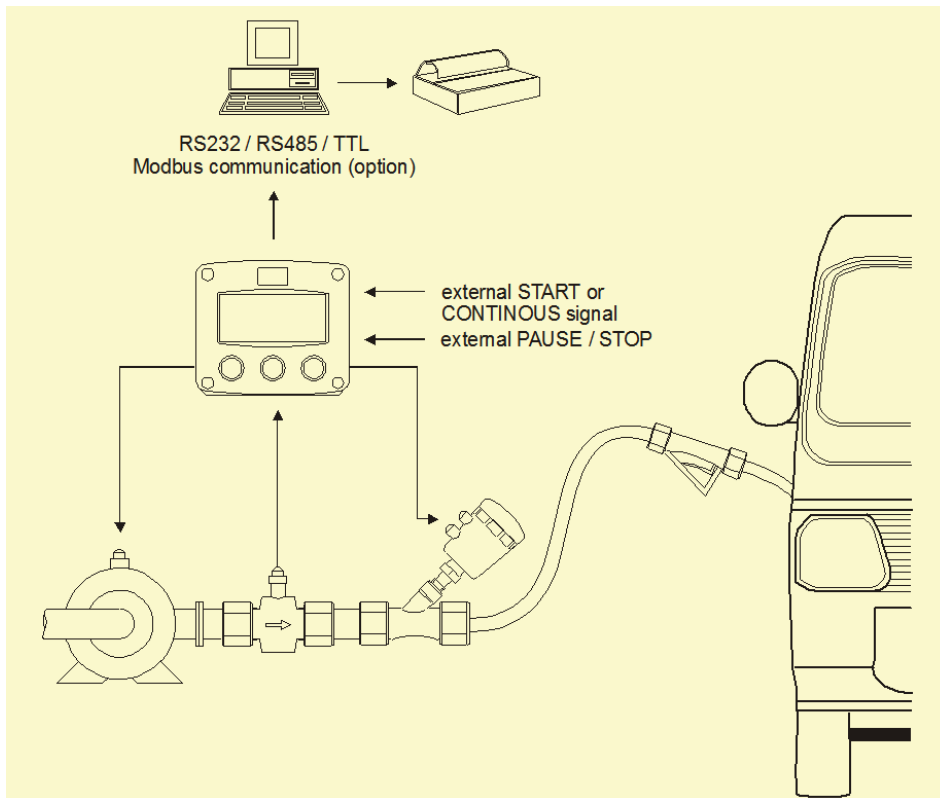
Fig. 1: Typical application

Configuration of the unit

The F133-P is designed for use in many types of applications. For that reason, a setup menu is available to program the F133-P according to your specific requirements.

The setup includes several important features, such as K-Factors, engineering units, signal selection, power management (to extend battery life-time), etc. All settings are stored in a non-volatile memory and therefore kept in the event of a power failure or an exhausted battery.

Display information

The unit has a LCD with (optional) backlight to show the process information, status and alarm messages. The display refresh rate is programmed in the setup menu.

At a key press, the display refresh rate will switch to FAST for 30 seconds. When 'OFF' is selected, the display goes off after 30 seconds after the last key press. The display temporarily comes on after a key press.

A backup of the total and accumulated total in EEPROM memory is made every minute.

Options
The following options are available: full Modbus communication RS232/485/TTL (also battery powered), intrinsic safety, mechanical relay or active output, power- and sensor-supply options, panel -mount, wall-mount and weather-proof enclosures, flame proof enclosure and LED backlight.

2.   OPERATIONAL
2.1.   GENERAL

Caution !

- This device may only be operated by persons who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.
- Take careful notice of the "Safety rules, instructions and precautionary measures" in the front of this manual.

This chapter describes the daily use of the F133-P . This instruction is meant for users / operators.

2.2.   CONTROL PANEL
The control panel has three keys. The available keys are:

Fig. 2: Control Panel

Functions of the keys

This key is used to program and save new values or settings.
The PROG/ENTER key is also used to gain access to the setup menu (read chapter 3).

This key is used to START the dispense process.
The START/▲ key is also used to increase a value after the PROG/ENTER key has been pressed (read chapter 3).

This key is used to pause or stop the dispense process.
The STOP/▶ key is also used to select the batch total, the batch counter, the total and the accumulated total.
The STOP/▶ key is also used to select a digit or an option after the PROG/ENTER key has been pressed (read chapter 3).

2.3.   OPERATOR INFORMATION AND FUNCTIONS
In general, the F133-P operates in the operator mode. The shown information depends on the settings which are made in the setup menu.
The signal from the connected sensor is processed by the F133-P in the background, independent from the selected display refresh rate.

Start-up the delivery
You only can start-up when the "READY" indicator is shown on the display. When "READY" is shown, the data of the last delivery is shown. When you press the "START" key, the F133-P initiates a new delivery, the "RUN" indicator comes on and temporarily the total shows "8888888" and the flow rate "88888". Depending on the setup of the F133-P, relays are switched to start the pump(s) and to open the valve(s). In the software, a timer is started to monitor the flow rate.
When a flow is detected, the delivery will start and the total and the flow rate show the actual status. When the flow rate is not sufficient, the delivery will not start and the Alarm indicator comes on, the total shows "0000000" and the flow rate shows "not started". The startup sequence is stopped.
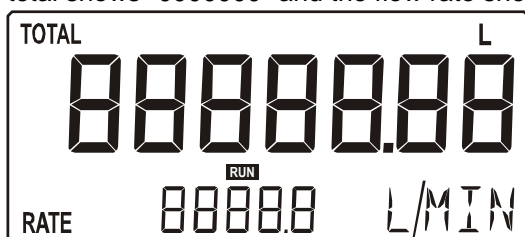
Fig. 3: Process information (typical)   **Fig. 4: Delivery information (typical)**

Interrupt the delivery

After the startup sequence is completed, the dispense sequence becomes active. During the dispense sequence you can interrupt the delivery temporarily with the STOP command. The "PAUSE" indicator comes on and an internal restart timer is started. Note that the pump stays on and the valve is closed. The delivery is continued when the restart timer still active and the START command is given. When the restart timer is lapsed, the delivery is stopped automatically.
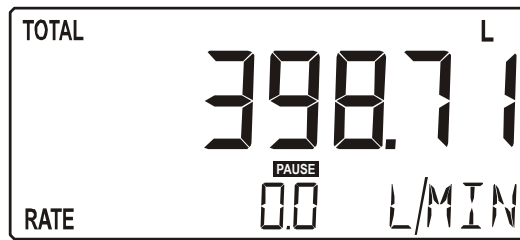
TOTAL	L
398.71	
RATE PAUSE	0.0 L/MIN

Fig. 5: Pause information (typical)

When "READY" is shown, following functions are available:

- **Batch-total**

  To display the batch-total, use the STOP button. This quantity equals the accumulated delivered quantity (from the START moment till the READY moment) and cannot be initialized by the operator. It will count up to 9999999.
  Press STOP a few times to return to the main display information.

- **Batch-counter**

  To display the batch-counter, press STOP again. This counter displays the number of deliveries that have been made successfully and cannot be initialized by the operator. It will count up to 9999999.
  Press STOP a few times to return to the main display information.

- **Display Total and accumulated Total**

  Press STOP to display the Total and Accumulated Total. These totalizers do count the flowmeters signal continuously, even when no process is running.
  The value for Total can be initialized. To do so, be sure Total is shown.
  First press PROG followed by STOP. After pressing PROG, the text "PUSH STOP" is shown. To avoid initialization in that stage, press a different key or wait for 20 seconds. Initialization of Total DOES NOT influence accumulated Total.
  Accumulated Total can never be initialized. This value will count up to 99999999999.
  Press STOP a few times to return to the main display information.

Alarms

The following alarms can occur:

- **Flow rate alarm:**

  When the actual flow rate is outside the allowed range (as set in the setup menu), the delivery will be paused automatically and an alarm message will be shown indicating the type of flow rate alarm: "LO RATE" or "HI RATE". If pause is enabled, the delivery can be restarted.

- **Maximum batch:**

  When the total quantity delivered exceeds a certain quantity, the F133-P will switch-off all relays and generate an "MAX BATCH" alarm.
  If pause is enabled, the delivery can be restarted.

- **Low-battery alarm**

Only use original batteries. Original batteries can be ordered at the manufacturer. The use of unapproved batteries will void the warranty.

Note !

At the end of the battery's life-time, the voltage starts to drop. When the voltage becomes too low, the battery indicator comes on. When the battery indicator is on, install a new and fresh battery as soon as possible.
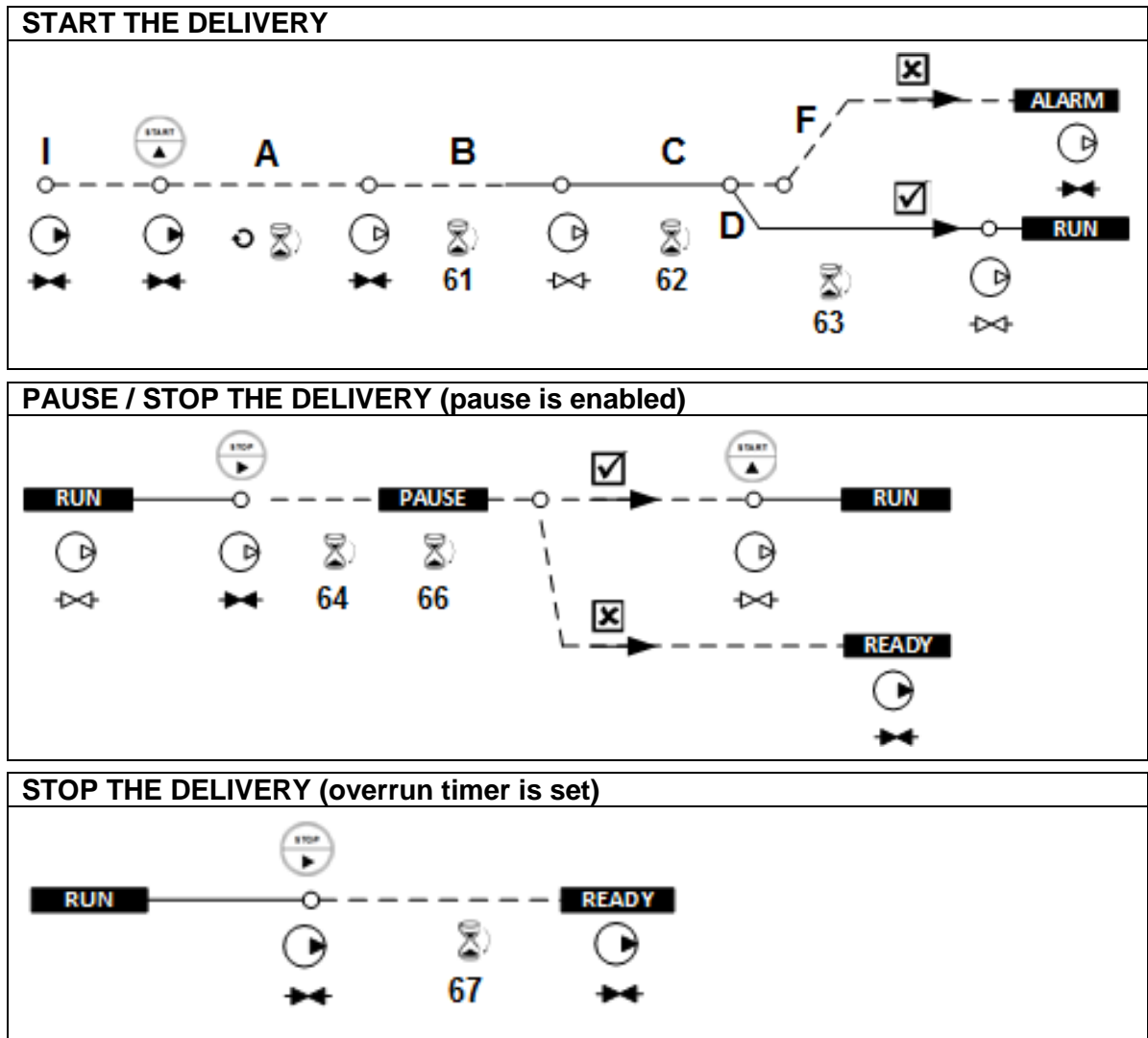
TOTAL	m³
▲ **1742638**	
LOW BATTERY RUN	
RATE	1853.9 L/MIN

Fig. 6: Low-battery alarm (typical)

- **Alarm**

  When the alarm indicator is shown, refer to Appendix B: Problem Solving.

2.4.   DISPENSER FUNCTIONAL DIAGRAM

Note !

The function of the F133-P depends on the different settings in the setup menu. The example is given for a typical configuration.

START THE DELIVERY

PAUSE / STOP THE DELIVERY (pause is enabled)

STOP THE DELIVERY (overrun timer is set)

LEGEND:

I: Idle, waits for new delivery.
A: Start, the START key is pushed to start a new delivery, the F133-P will reset itself.
B: Delay, time for the pump to start up.
C: Begin, pump is at delivery speed.
D: Startup, valve opens to build up the flow, flow detection is active.
E: Started, flow is present at required rate.
F: Not started, there is no flow or the flow is not sufficient, the valve closes and the display shows NOT STARTED.

▶	Pump, stopped	⧗	Timer, predefined by software
▷	Pump, running	**61**	Timer, set by setup menu **CONTROL**
►◄	Valve, closed	☑	Flow OK, restart timer active
◁▷	Valve, open	☒	Flow NOK, restart timer elapsed
↻	Reset, predefined by software		

3.   CONFIGURATION

This and the following chapters are exclusively meant for electricians and non-operators. In these, an extensive description of all software settings and hardware connections are provided.

Caution !

- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained persons authorized by the operator of the facility. Persons must read and understand this manual before carrying out its instructions.

- This device may only be operated by persons who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.

- Make sure, the measuring system is correctly wired up according to the wiring diagrams. Protection against accidental contact is no longer assured when the housing cover is removed or the panel cabinet has been opened (danger from electrical shock). The housing may only be opened by trained persons authorized by the operator of the facility.

- Take careful notice of the "Safety rules, instructions and precautionary measures" in the front of this manual.

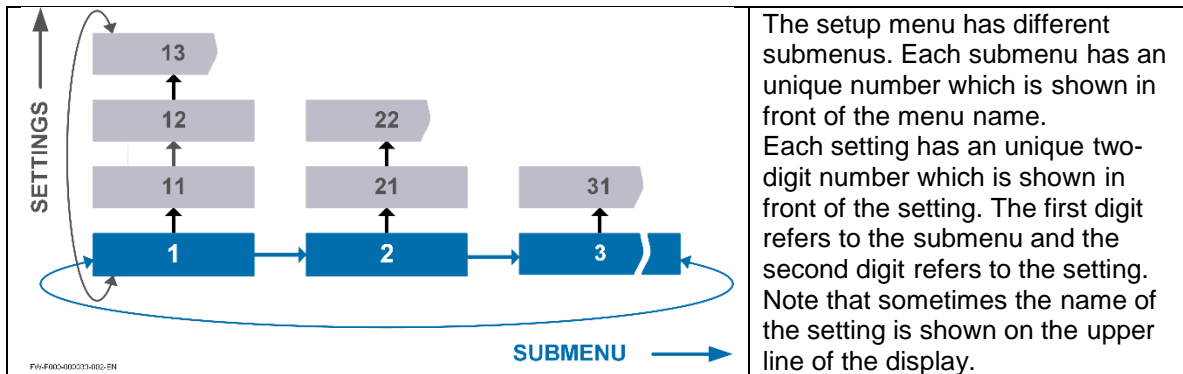The setup menu is used to program the F133-P.
The setup menu is accessible at all times while the F133-P remains fully operational. Be aware that in this case any change to the settings may have an influence on the operation.

Note !

It is possible to prevent access to the setup menu with a password. A password may be required to enter the setup menu. Without this password, access is denied.

3.1.   HOW TO PROGRAM THE F133-P

The setup menu has different submenus. Each submenu has an unique number which is shown in front of the menu name.
Each setting has an unique two-digit number which is shown in front of the setting. The first digit refers to the submenu and the second digit refers to the setting. Note that sometimes the name of the setting is shown on the upper line of the display.

How to enter the setup menu

When the setup menu is protected by a password, the F133-P asks for a password to access the setup menu. When in the operator mode, press and hold the PROG/ENTER key for 7 seconds to access the setup menu.

How to navigate in the setup menu

The setup menu has different submenus to program the F133-P. For navigation, the submenus and the settings are identified with numbers (for the submenu: e.g. 1; for the setting: e.g. 12.).

The STOP/► key and the PROG/ENTER key are used for navigation. The explanation assumes that you are in the submenu PRESET.

	Action	Result	Remark
1	Press the STOP/► key to select the next submenu.	• The submenu FLOW RATE shows	-
2	Press again to go to the next submenu.	• The submenu OVERRUN shows.	-
3	Momentarily, press the PROG/ENTER key to select the previous submenu.	• The submenu FLOW RATE shows	-
4	Press again to go to the previous submenu.	• The submenu PRESET shows	-

The START/▲ key and the STOP/► key are used for navigation.

The explanation assumes that you are in the submenu PRESET. When you are:

- in the first setting and you navigate to the previous setting, the F133-P goes back to the related main menu.
- in the last setting and you navigate to the next setting, the F133-P goes to the related main menu.

Action		Result	Remark
1	Press the START/▲ key to select the first setting.	• The setting UNIT shows.	-
2	Press the START/▲ key again to go to the next setting.	• The setting DECIMALS shows.	-
3	Press the STOP/► key to select the previous setting.	• The setting UNIT shows.	-
4	Press the STOP/►key again to go to the previous setting.	• The submenu PRESET shows	This is normal behavior because the setting UNIT is the first setting of the submenu PRESET.

How to make a setting

Caution !

Changes are only saved when you press the PROG/ENTER key.

The explanation assumes that you are in the submenu PRESET and the setting UNIT. When you do not want to save the change, wait for approximately 20 seconds or press and hold the PROG/ENTER key for approximately 3 seconds.

Action		Result	Remark
1	Momentarily, press the PROG/ENTER key.	• The PROG indicator blinks. • The engineering unit L shows.	To access the setting.
2	Press the START /▲ key to select the next engineering unit.	• The PROG indicator blinks. • The engineering unit m^3 shows.	If you wait too long, the program mode goes off and changes are not saved, this is normal behavior.
3	Press the START /▲ key to select the next engineering unit.	• The PROG indicator blinks. • The engineering unit US GAL shows.	-
4	Press the STOP /► key to select the previous engineering unit	• The PROG indicator blinks. • The engineering unit m^3 shows.	-
5	To confirm the changes: Momentarily, press the PROG/ENTER key.	• The PROG indicator goes off. • The change is saved. • The engineering unit m^3 shows.	If you do not press the PROG/ENTER key to confirm, your selection is not saved.
	To discard the changes: Press and hold the PROG/ENTER key for approximately 3 seconds.	• The PROG indicator goes off. • The change is discarded. • The engineering unit L shows.	-

3.1.1. SETUP MENU - SETTINGS

1	**TOTAL**		
	11	unit	L; m3; kg; lb; GAL; USGAL; bbl; no unit
	12	decimals	0000000; 111111.1; 22222.22; 3333.333
	13	K-factor:	0.000010 - 9999999
	14	decimals K-factor	0 - 6
	15	batch-max	0 - 9999999
	16	batch total	0.001 - 9999999
	17	batch count	0 - 9999999
2	**FLOW RATE**		
	21	unit	mL; L; m3; mg; g; kg; ton; gal; bbl; lb; cf; rev; - - - - (no unit); scf; nm3; nL; p
	22	time	/sec; /min; /hour; /day
	23	decimals	0000000; 111111.1; 22222.22; 3333.333
	24	K-factor	0.000010 - 9,999,999
	25	decimals K-factor	0 - 6
	26	calculation	per 1 - 255 pulses
	27	cut-off	0.1 - 999.9 seconds
	28	low flow rate alarm	0.001 - 9999999
	29	high flow rate alarm	0.001 - 9999999
	2A	delay time alarm	0.0 - 999.9 seconds
3			
3	**DISPLAY**		
	31	light	0% (off); 20%; 40%; 60%;- 80%; 100% (full brightness)
	32	BL alarm	off; on. flash
4	**POWER MANAGEMENT**		
	41	LCD new	fast; 1 sec; 3 sec; 15 sec; 30 sec; off
	42	battery mode	operational; shelf
5	**FLOWMETER**		
	51	signal	npn; npn-lp; reed; reed-lp; pnp; pnp-lp; namur; coil-hi; coil-lo; 8-1 DC; 12 DC; 24 DC
6	**CONTROL**		
	61	delay	0.1 - 999.9 seconds
	62	begin	0.1 - 999.9 seconds
	63	start-up	0.1 - 999.9 seconds
	64	no pulse	0.1 - 999.9 seconds
	65	pause	disable - enable
	66	restart	0.1 - 999.9 seconds
	67	overrun	0.1 - 999.9 seconds
7	**STATUS**		
	71	status 1	start; stop; continue; off
	72	status 2	stop; pause; both; off
8	**COM MODB**		
	81	speed	1200; 2400; 4800; 9600
	82	address	1 - 247
	83	mode	bus-rtu; bus-asc; off
	84	databits	7 bits; 8 bits
	85	parity	odd; even; none
	86	comm. lock	disable; time-out; full
9	**OTHERS**		
	91	model	F133-P
	92	software version	nn:nn:nn
	93	serial no.	nnnnnnn
	94	password	0000 - 9999
	95	tag-nr	0000000 - 9999999

3.1.2. EXPLANATION OF SETUP MENU 1 - TOTAL

UNIT 11	This setting is used to select the engineering unit for the indication of the batch total and the accumulated total.
Note !	***When you change the engineering unit, you must recalculate and reprogram the K-factor for the (accumulated) total. When you recalculate and reprogram the K-Factor, the history for (accumulated) batch total is not correct anymore, because the (accumulated) batch total is not recalculated. For future reference, best practice is to make a note of the accumulated total before you program the recalculated K-Factor.***
DECIMALS 12	This setting is used to set the amount of digits behind the decimal point for the (accumulated) total indication.
K-FACTOR 13	This setting is used to set the K-Factor for the total. With the K-Factor, the flowmeter pulse signals are converted to a quantity. The K-Factor is based on the number of pulses generated by the flowmeter per selected engineering unit, for example per m^3. A more accurate K-Factor (more decimals, as set in decimals K-Factor) allows for a more accurate operation of the system. **Example 1: Calculating the K-Factor.** The flowmeter generates 2.4813 pulses per liter and the selected unit is m^3. A cubic meter consists of 1000 liter which gives 2.4813 pulses*1000 liter=2481.3 pulses per m^3. So, the K-Factor is 2481.3. Enter for the Flowmeter K-Factor: 24813 and for the flowmeter K-Factor decimals: 1. **Example 2: Calculating the K-Factor.** The flowmeter generates 6.5231 pulses per gallon and the selected engineering unit is gallons. So, the K-Factor is 6.5231. Enter for the Flowmeter K-Factor: 65231 and for the Flowmeter K-Factor decimals: 4. ***When you recalculate and reprogram a new K-Factor, the history for (accumulated) batch total is not correct anymore, because the (accumulated) batch total is not recalculated. For future reference, best practice is to make a note of the accumulated total before you program the recalculated K-Factor.***
DECIMALS K-FACTOR 14	This setting is used to set the amount of digits behind the decimal point for the K-Factor.
BATCH MAX 15	This setting is used to set the upper limit for a batch volume. An operator cannot set a batch volume which is beyond the upper limit.
BATCH TOTAL 16	Batch total - also shown at operator level - displays the accumulated quantity of product being delivered. From here, this total can be programmed to zero or to any desired quantity.
BATCH COUNTER 17	Batch count - also shown at operator level - displays the number of deliveries executed. From here, this total can be reset to zero or being programmed to any desired quantity

3.1.3. EXPLANATION OF SETUP MENU 2 - FLOW RATE

The settings for total and flow rate are entirely separate. In this way, different engineering units can be used for each e.g. cubic meters for total and liters for flow rate.

UNIT 21	This setting is used to select the engineering unit for the indication of the flow rate.
Note !	***Alteration of the engineering unit will have consequences for operator and SETUP-level values, they will not be automatically recalculated to the value of the new selected unit. The K-factor has to be adapted as well; the calculation is not done automatically.***
TIME 22	This setting is used to set the time unit for the flow rate calculation. Note that the flow rate is given in engineering unit/time unit, e.g. liters/minute (l/min). *When you change this setting, also recalculate and change the settings for the analog rate-min and analog rate-max.*
DECIMALS 23	This setting is used to set the amount of digits behind the decimal point for the flow rate indication.
K-FACTOR 24	This setting is used to set the K-Factor for the flow rate. With the K-Factor, the flowmeter pulse signals are converted to a quantity. The K-Factor is based on the number of pulses generated by the flowmeter per selected engineering unit, for

	example per m^3. A more accurate K-Factor (more decimals, as set in decimals K-Factor) allows for a more accurate operation of the system.
DECIMALS K-FACTOR 25	This setting is used to set the amount of digits behind the decimal point for the K-Factor.
CALCULATION 26	The flow rate is calculated by measuring the time between a number of pulses, for example 10 pulses. The more pulses the more accurate the flow rate will be. The maximum value is 255 pulses. This setting does influence the update interval for the flow rate and thus, indirectly the update interval of the analog output.. (maximum update 10 times a second). If the output response is too slow, decrease the number of pulses. For low frequency applications (< 10Hz): do not program more than 10 pulses, else the update time will be very slow. For high frequency applications (> 1kHz): do program 50 or more pulses.
CUT-OFF 27	This setting is used to set the threshold for a minimum flow. If during this time less than XXX-pulses are generated (refer to Calculation), the flow rate will be shown as zero. The cut-off has to be entered in seconds.
LOW FLOW RATE ALARM 28	This setting is used to activate the related alarm condition and to set the threshold value for a this flow alarm. The setting 0.0 disables this alarm.
HIGH FLOW RATE ALARM 29	This setting is used to activate the related alarm condition and to set the threshold value for a this flow alarm. The setting 0.0 disables this alarm.
DELAY TIME ALARM 2A	This setting is used to set a delay time for the related alarm. When the alarm condition is still valid after the delay time, an alarm is given.

3.1.3. EXPLANATION OF SETUP MENU 3 - DISPLAY

LIGHT 33	The backlight brightness can be adjusted from 0% (off) to 100% (full brightness) in steps of 20%. When the F133-P is only loop powered, the backlight is disabled. An external power supply is required to supply the backlight.
BL ALARM 34	This setting is used to set the behavior of the backlight (bl) during an alarm condition.

3.1.4. EXPLANATION OF SETUP MENU 4 - POWER MANAGEMENT

When used with the internal battery option (type PB/PC), the user can expect reliable measurement over a long period of time. The F113-P has several smart power management functions to extend the battery life time significantly. Two of these functions can be set.

LCD NEW 41	The calculation of the display-information influences the power consumption significantly. When the application does not require a fast display refresh rate, it is strongly advised to select a slow refresh rate. Please understand that NO information will be lost; every pulse will be counted and the output signals will be generated in the normal way. At a key press, the display refresh rate will switch to FAST for 30 seconds. When 'OFF' is selected, the display goes off after 30 seconds after the last key press. The display temporarily comes on after a key press. **Example battery life-time with a coil pick-up:** • 1kHz pulse and FAST update: about 2 years; • 1kHz pulse and 1 sec update: about 5 years.
BATTERY MODE 42	The F113-P has two modes: operational or shelf. After "shelf" has been selected, the F113-P can be stored for several years; it will not process the sensor signal; the display is switched off but all settings and totals are stored. In this mode, power consumption is extremely low. To wake up the F113-p again, press the select/▲ key two times.

3.1.5. EXPLANATION OF SETUP MENU 5 - FLOWMETER

SIGNAL 51	With this setting the type of flowmeter output is selected. The settings with LP (low-pass) filter are used to apply a build-in noise reduction. *Selections "active pulse" offer a detection level of 50% of the supply voltage.*			
TYPE OF SIGNAL	**EXPLANATION**	**RESISTANCE**	**FREQ. / MV**	**REMARK**
NPN	NPN input	100 kΩ pull-up	max.6 kHz.	(open collector)
NPN - LP	NPN with low pass filter	100 kΩ pull-up	max.1.2 kHz.	(open collector) less sensitive
REED	Reed-switch input	1 MΩ pull-up	max.1.2 kHz.	
REED - LP	Reed-with low pass filter	1 MΩ pull-up	max.120 Hz.	Less sensitive
PNP	PNP input	100K pull-down	max.6 kHz.	
PNP - LP	PNP with low pass filter	100K pull-down	max.1.2 kHz.	Less sensitive
NAMUR	NAMUR input	820 Ω pull-down	max.4 kHz.	External power required
COIL-HI	High sensitive coil input	-	min. 20 mV_{pp}	Sensitive for interference!
COIL-HI (option ZF)			min. 10 mV_{pp}	
COIL-HI (option ZG)			min. 5 mV_{pp}	
COIL LO	Low sensitive coil input	-	min. 80 mV_{pp}	Normal sensitivity
8-1 DC	Active pulse input detection level 8.2V DC	3K9	max.10KHz.	External power required
12 DC	Active pulse input detection level 12V DC	4K	max.10KHz.	External power required
24 DC	Active pulse input detection level 24V DC	3K	max.10KHz.	External power required

3.1.6. EXPLANATION OF SETUP MENU 6 - CONTROL

Two open-collector outputs (Optional: mechanic relays or active outputs) are available to control relays or small valves (max. 50VDC – 300mA). It is advised to use relay one for pump-start and relay two for the valve control.

DELAY TIME 61	This is the time between the moment of a start-signal and the moment before relay 2 will be switched on. In the mean time, relay 1 will be switched to control e.g. a pump. With time 0.0 seconds, this function is disabled.
BEGIN TIME 62	After the delay-time (61), relay 2 will be switched-on as well. and the "begin-time" becomes valid. The unit has to receive about twice the number of pulses as programmed with setting 26, before "start-up time" (setup 63) becomes valid. If not enough pulses have been received within this time, the delivery will be cancelled. With time 0.0 seconds, this function is disabled.
START-UP TIME 63	Now, the start-up time allows the system to become operational without having a low-flow rate alarm. After this time, the system will become full operational. With time 0.0 seconds, this function is disabled.
NO PULSE TIME 64	As soon as the unit is full operational, the flow can be monitored. The F133-P will switch-off relay 1 and 2 (or relay 2 only: see setting 65/66) as soon as during X-seconds no pulses have been received from the flowmeter. In most cases, this is "end of process" (see 65). With time 0.0 seconds, this function is disabled.
PAUSE 65	With this function, a "pause-function" can be enabled: if during the process "stop" will be pressed, or the process is interrupted for another reason like "no pulse time", "flow rate alarm" or with the "status input", the batch will be stopped but can be resumed. If the unit comes in "PAUSE", relay 2 will be switched-off but relay 1 (pump control) remains energized. Applications where this function is useful is delivery of sub-batches for example where you want to have one "overall" total.
RESTART TIME 66	Following setup 65, the F133-P allows the Operator to restart a delivery within X-seconds. If this does not happen within this time, the delivery will be finished completely. With time 0.0 seconds, this function is disabled.

OVERRUN TIME 67	As soon as a delivery has been finished, the relays will be switched-off but there may still be some flow till the valve is closed. During this "overrun-time" all pulses will be counted as being part of the delivery. We advise to program a time of one second or a couple of seconds, depending on the response time of your system to close the valve. With time 0.0 seconds, this function is disabled.

3.1.7.   EXPLANATION OF SETUP MENU 7 - STATUS

For external control of the F133-P, the unit can be started and/or stopped with two external switches.

STATUS INPUT 1 71	Following functions can be selected: OFF: status input is disabled. START-function: do generate a short pulse to start a delivery. STOP-function: do generate a short pulse to stop the delivery. CONTINUOUSLY: do switch the input continuously to execute a delivery; first "disconnect" when the delivery is READY. When it is interrupted during the batch, the unit goes always to "READY". To start-up a new batch, the input must be interrupted for at least 100msec. in-between deliveries
STATUS INPUT 2 72	Following functions can be selected: OFF: status input is disabled. PAUSE-function: do generate a short pulse to pause the delivery. STOP-function: do generate a short pulse to stop the delivery. BOTH-function: do generate a short pulse to pause the delivery. One more pulse will stop the delivery.

3.1.8.   EXPLANATION OF SETUP MENU 8 - COMMUNICATION (OPTION)

This product is designed for the connection to a communication network. Products with a communication option do not include cyber security functions. Fluidwell cannot take any responsibility for the cyber security, omissions or errors in the communication safety. To maintain a secure operation, automation and control, it is the sole responsibility of the owner to install and manage the appropriate safety measures to protect the network, the product and the communication against any kind of security breaches.

The functions described below deal with hardware that is not part of the standard delivery. Programming of these functions does not have any effect if this hardware has not been installed. Consult Appendix C and the Modbus communication protocol description for a detailed explanation.

SPEED 81	This setting is used to set the Baudrate.
ADDRESS 82	This setting is used to set the communication address for the F133-P.
MODE 83	This setting is used to set the Modbus transmission mode. Select OFF to disable the communication.
DATABITS 84	This setting determines for communication the number of databits. Select 8 bit for BUS-RTU and 7 bits for BUS-ASC.
PARITY 85	As demanded by the connected equipment, select a parity bit (odd, even or none).
COMM. LOCK 86	With this setting, you determine if the unit will be locked after a delivery till the unit will be released through communication (read appendix C Communication variables) Following can be selected: disable: function is disabled time-out: the unit will be locked for 10 minutes or till communication release. If nothing happens within 10 minutes, the unit will release itself automatically. full: the unit can only be released through communication. When the delivery is waiting to be released, the display will show 'FINISHING'. Note that all keys and external controls are disabled during this time. **When you select this option you can ONLY release the unit to normal operation after each delivery through communications. If you accidentally lock yourself out, please remove all power (including the battery) so the unit will restart. You can then enter the setup-level to change this setting.**

3.1.9.   EXPLANATION OF SETUP MENU 9 - OTHERS

For support and maintenance it is important to have information about the characteristics of the F133-P. Your supplier will ask for this information when support is required.

MODEL 91	This setting shows the model name.
SOFTWARE VERSION 92	This setting shows the version number of the firmware (software).
SERIAL NO 93	This setting shows the serial number.
PASSWORD 94	This setting is used to set a password (pin code) to limit the access for the setup menu. Only persons who know the pin code can access the setup menu. The pin code 0000 disables the pin code to allow for access by any person.
TAG-NR 95	This setting is used to set a tag number for the F133-P.

4.   INSTALLATION

4.1.   GENERAL DIRECTIONS

Caution !

- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained persons authorized by the operator of the facility. Persons must read and understand this manual before carrying out its instructions.

- This device may only be operated by persons who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.

- Make sure, the measuring system is correctly wired up according to the wiring diagrams. Protection against accidental contact is no longer assured when the housing cover is removed or the panel cabinet has been opened (danger from electrical shock). The housing may only be opened by trained persons authorized by the operator of the facility.

- Take careful notice of the "Safety rules, instructions and precautionary measures" at the front of this manual.
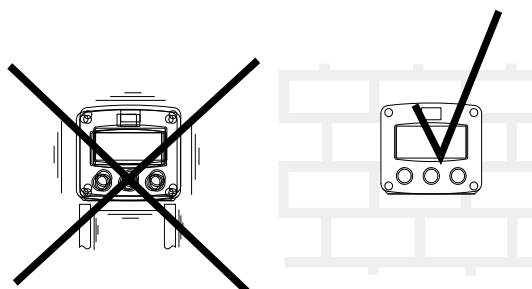
4.2.   INSTALLATION / SURROUNDING CONDITIONS
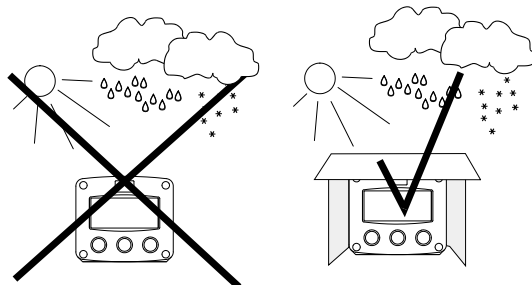
Take the relevant IP classification of the enclosure into account (see identification plate). Even an enclosure rated for IP67 / TYPE 4(X) should NEVER be exposed to strongly varying (weather) conditions.

When panel-mounted, the front panel of the F133-P is rated for IP65 / TYPE 4(X)!

When used in very cold surroundings or varying climatic conditions, inside the instrument case, take the necessary precautions against moisture.

Mount the F133-P onto a solid structure to avoid vibrations.
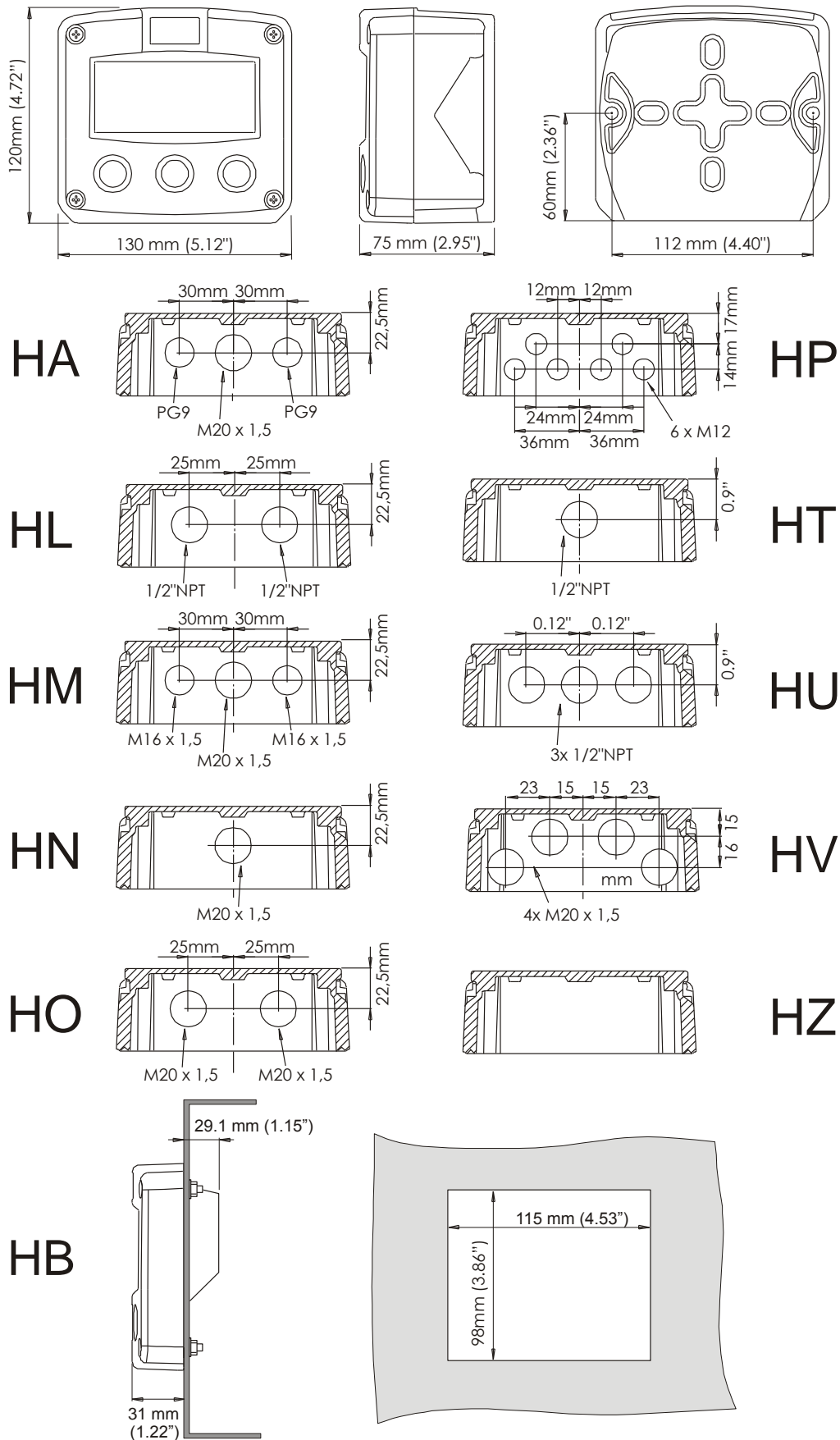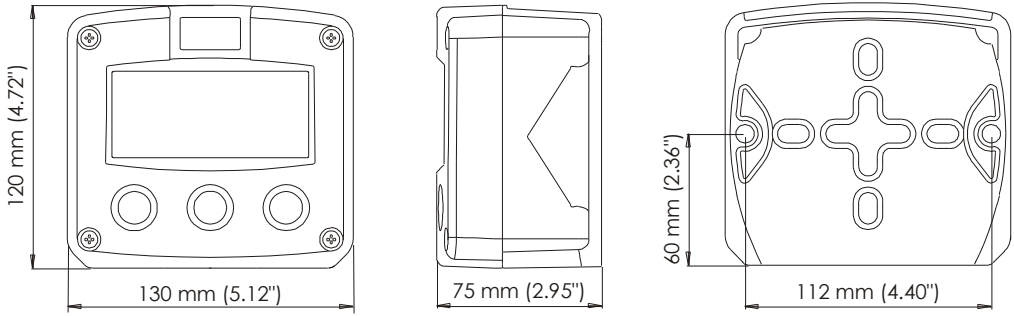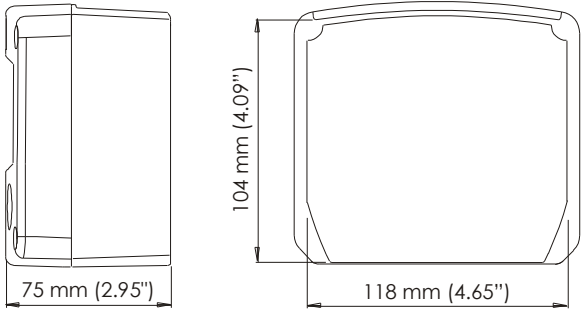
4.3.   DIMENSIONS- ENCLOSURE

HA

30mm 30mm

22,5mm

PG9   M20 x 1,5   PG9

HP

12mm 12mm

17mm
14mm

24mm 24mm
36mm 36mm
6 x M12

HL

25mm 25mm

22,5mm

1/2"NPT   1/2"NPT

HT

0.9"

1/2"NPT

HM

30mm 30mm

22,5mm

M16 x 1,5   M16 x 1,5
M20 x 1,5

HU

0.12" 0.12"

0.9"

3x 1/2"NPT

HN

22,5mm

M20 x 1,5

HV

23 15 15 23

16 15

mm
4x M20 x 1,5

HO

25mm 25mm

22,5mm

M20 x 1,5   M20 x 1,5

HZ

HB

29.1 mm (1.15")

31 mm
(1.22")

115 mm (4.53")

98mm (3.86")

Fig. 7: Aluminum enclosures - Dimensions

120mm (4.72")

130 mm (5.12")

75 mm (2.95")

60mm (2.36")

112 mm (4.40")

GRP enclosures:

120 mm (4.72")
130 mm (5.12")

75 mm (2.95")

60 mm (2.36")
112 mm (4.40")

HK back box: (flat bottom)

104 mm (4.09")
75 mm (2.95")
118 mm (4.65")

HD
HK

25mm 25mm
22,5mm
D=20mm D=20mm
HG

HE
30mm 30mm
22,5mm
D=16mm D=16mm
D=20mm

12mm 12mm
17mm
14mm
24mm 24mm D=12mm
36mm 36mm
HH

HF
0.9"
D=22mm (0.866")

0.12" 0.12"
0.9"
3x D=22mm (0.866")
HJ

HC
29.1 mm (1.15")
31 mm (1.22")

115 mm (4.53")
98 mm (3.86")
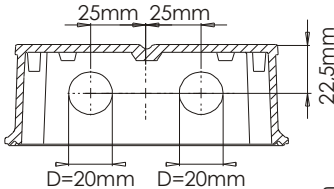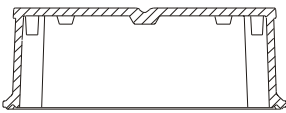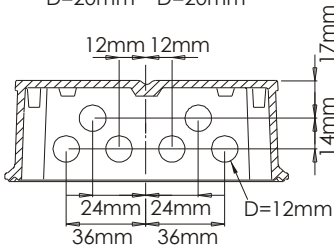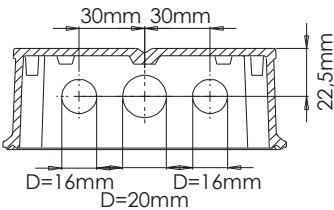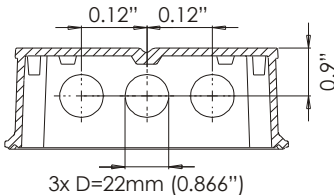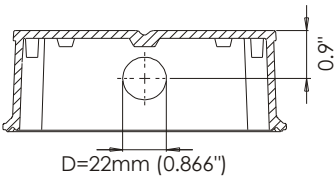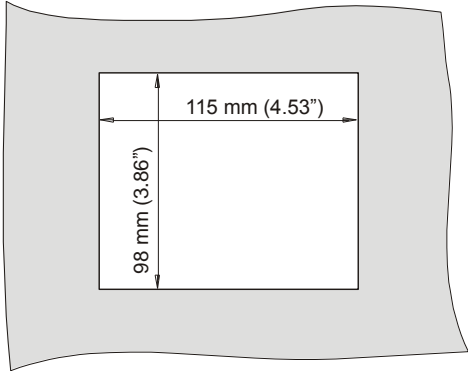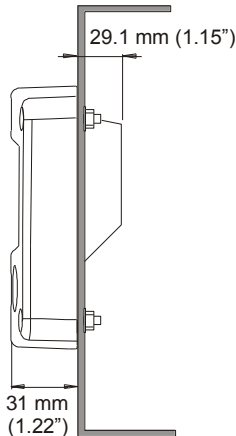
Fig. 8: GRP enclosures - Dimensions

4.4. INSTALLING THE HARDWARE

⚠️ **WARNING**

- Electro static discharge does inflict irreparable damage to electronics! Before installing or opening the F133-P , the installer has to discharge himself by touching a well-grounded object.
- Do ground the aluminum enclosure properly as indicated. It is the responsibility of the installer to install, connect and test the Protective Earth connections in accordance with the (inter)national Rules and Regulations.
- This chapter shows general information regarding the electrical installation of the F133-P . Chapter 5 gives additional specific information regarding Intrinsically safe installation and overrules the information given in this chapter.

4.4.1. GENERAL INSTALLATION GUIDELINES

- In the F133-P , different types of bonding and earthing are used. The common (ground) is mostly used for termination of the wire shields and the Protective Earth (PE) is used for electrical safety.
- The F133-P that came with a power module type PM; 110V-230V AC or type PD/PF with an option OR (the relays can handle 110V-230V AC) shall be connected to the Protective Earth (PE) stud which is installed in the metal back panel. The metal front panel is connected to the Protective Earth by the mounting screws and serrated washers.
- For V AC applications, the terminal 00 shall not be connected to avoid earth loops.
  For V DC applications, the terminal 00 shall be connected to the common (do NOT use for PE).
- The wire screens (shield) are meant to prevent electromagnetic interference and shall be, galvanic isolated, connected to the common ground terminals that belong to the specific sensor connection. The wire screens shall be terminated at one side to prevent wire loops. Inside of the Fluidwell unit, the different common ground terminals are connected to each other. It is advised, as illustrated, to terminate the wire screens in the vicinity of the sensor and to insulated the wire screen with a shrink tube at the Fluidwell unit side.
- Separate cable glands with effective IP67 / TYPE 4(X) seals for all wires.
- Unused cable entries: make sure that you fit IP67 / TYPE 4(X) plugs to maintain rating.
- A reliable ground connection for both the sensor, and if applicable, for the metal enclosure (above).
- An effective screened cable for the input signal, and grounding of its screen to the "⊥ " terminal or at the sensor itself, whichever is appropriate to the application.
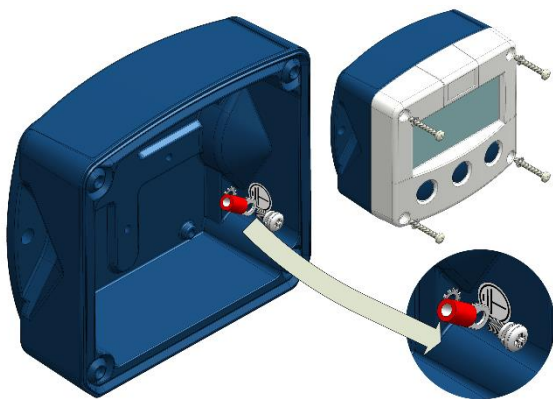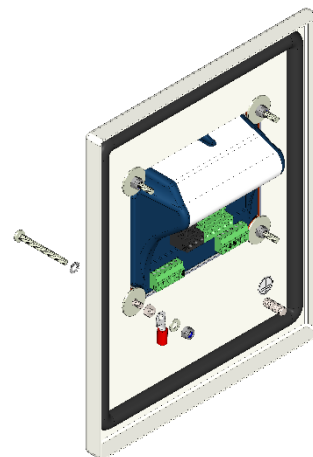
Field mounted   **Panel mounted**

### 4.4.2. ALUMINUM ENCLOSURE - FIELD MOUNTED

⚠️ **WARNING**

Risk of damage to equipment!
Do not use the terminal 00 to connect the protective earth wire, the 00 and the common ground terminals are internally connected. Be careful, to prevent damage to equipment when you connect different power supplies (sensor, PLC, etc.). Inside the Fluidwell display, the common grounds are internally connected to each other.
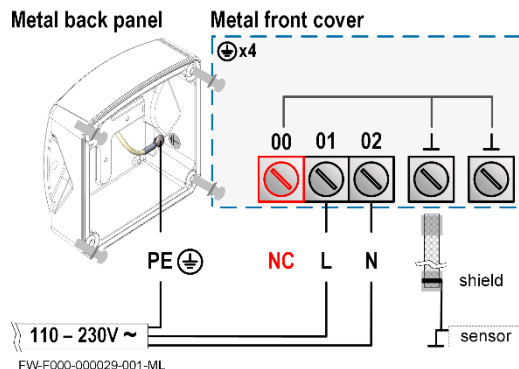
The PE connection
The PE connection is made with the PE stud inside the back panel and the 4 mounting screws that attach the cover to the back panel.
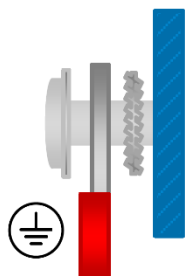
The PE connection in the metal back panel is made with a serrated washer, a terminal, a washer and a screw.
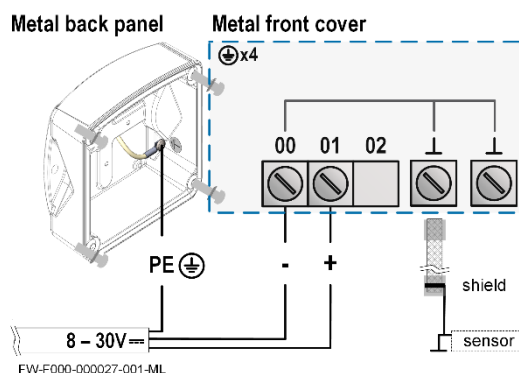
The PE connection to the metal cover is made with the serrated washers and the mounting screws.

FW-F000-000029-001-ML

Type PM (110-230V AC)

FW-F000-000028-001-ML

Type PD-OR / PF-OR (8-24V AC)
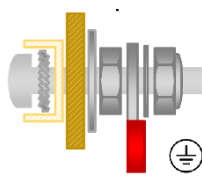

FW-F000-000027-001-ML

Type PD-OR / PF-OR (8-30V DC)
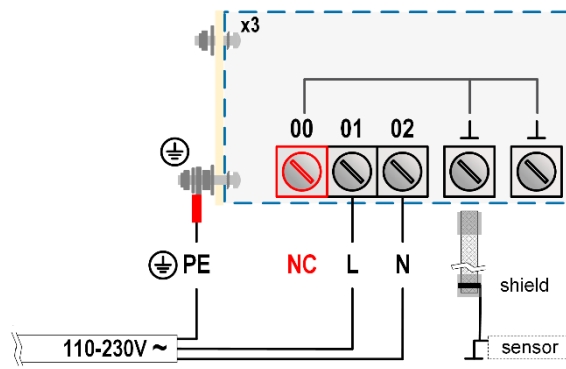
4.4.3. ALUMINUM ENCLOSURE - PANEL MOUNTED

The PE connection
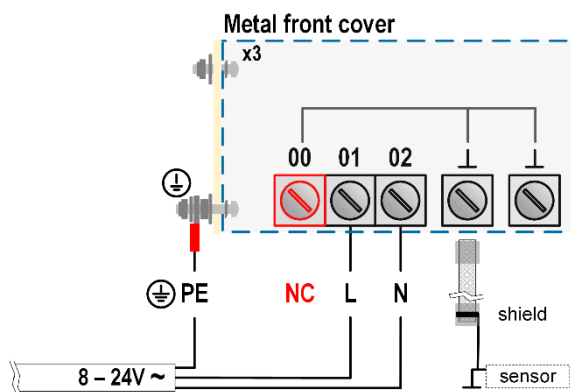The PE connection is made with one of the mounting screws that attaches the front panel to the panel.

The PE connection to the metal cover is made with the serrated washers and the mounting screws.
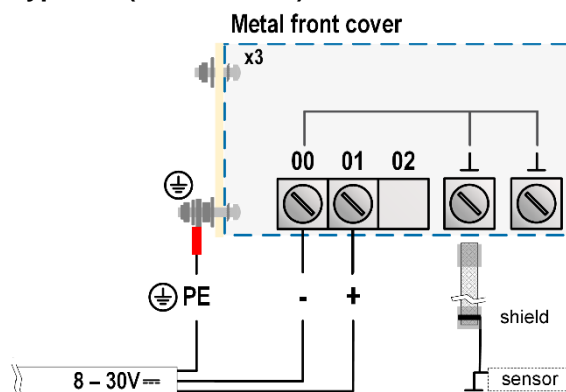The PE connection to the panel is made with the washer, the nut, the terminal, the washer and a lock nut.

FW-F000-000021-001-ML

Type PM (110-230V AC)

FW-F000-000020-001-ML

Type PD-OR / PF-OR (8-24V AC)
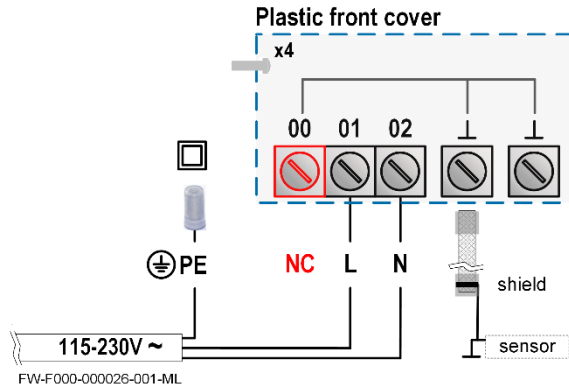

FW-F000-000019-001-ML
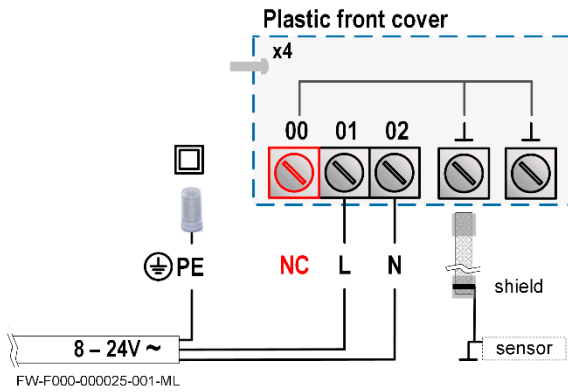
Type PD-OR / PF-OR (8-30V DC)

4.4.4. PLASTIC (GRP) ENCLOSURE
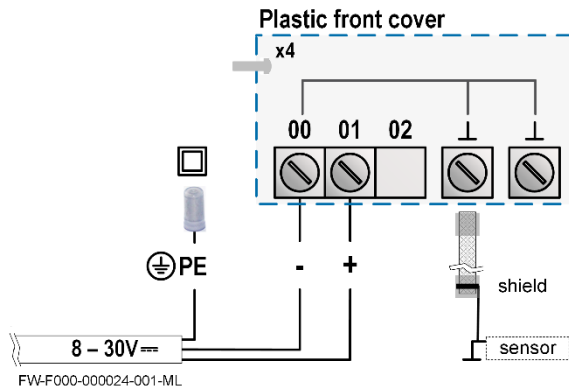
The PE connection

The F133-P in a GRP enclosure meets the requirements of class 2 (double insulated). Therefore the incoming PE wire is terminated with an insulating end cap.
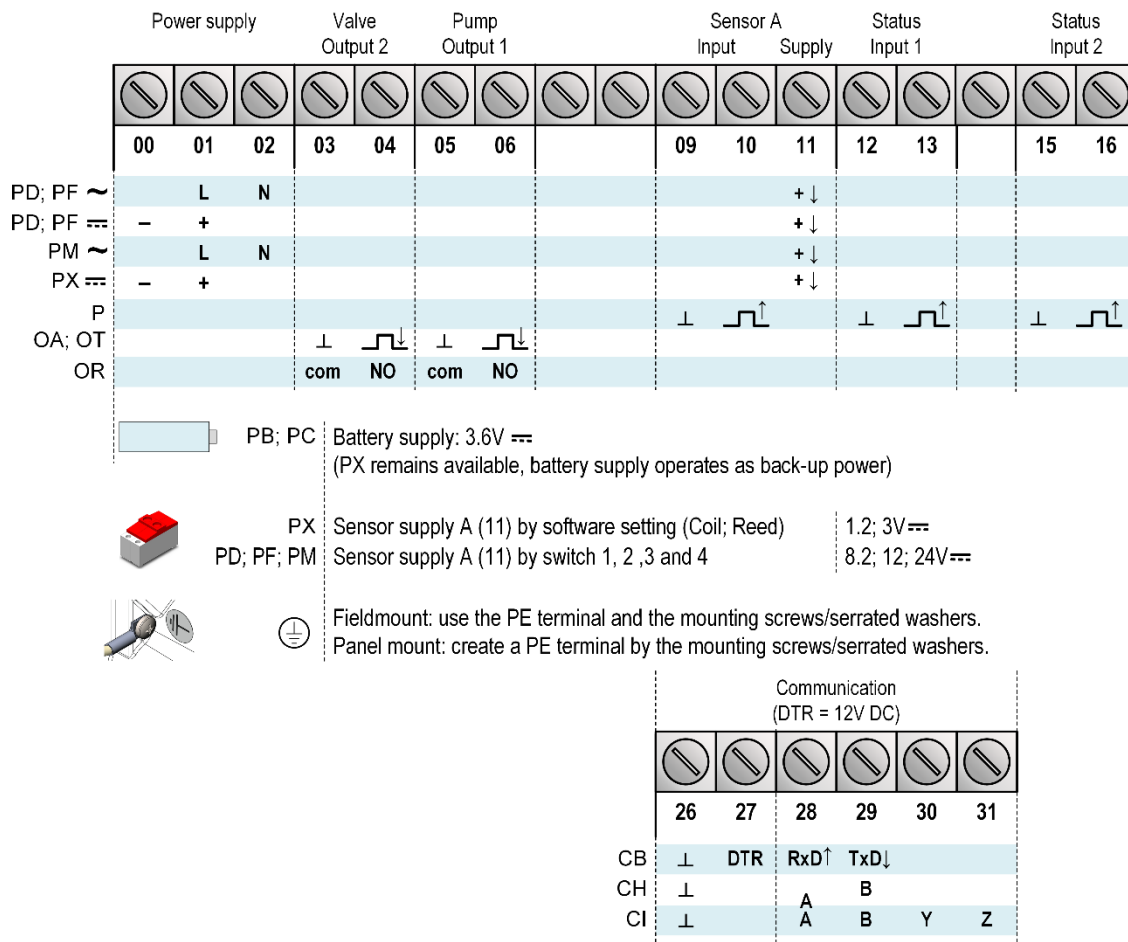

Type PM (110-230V AC)

Type PD-OR / PF-OR (8-24V AC)

Type PD-OR / PF-OR (8-30V DC)

4.4.3. TERMINAL CONNECTORS
Refer to Appendix A: Technical Specification

	Power supply			Valve Output 2		Pump Output 1			Sensor A Input		Supply	Status Input 1			Status Input 2	
	00	01	02	03	04	05	06		09	10	11	12	13		15	16
PD; PF ~		L	N								+↓					
PD; PF ⎓	–	+									+↓					
PM ~		L	N								+↓					
PX ⎓	–	+									+↓					
P									⊥	⊓↑		⊥	⊓↑		⊥	⊓↑
OA; OT				⊥	⊓↓	⊥	⊓↓									
OR				com	NO	com	NO									

PB; PC — Battery supply: 3.6V ⎓
(PX remains available, battery supply operates as back-up power)

PX — Sensor supply A (11) by software setting (Coil; Reed) — 1.2; 3V ⎓
PD; PF; PM — Sensor supply A (11) by switch 1, 2 ,3 and 4 — 8.2; 12; 24V ⎓

Fieldmount: use the PE terminal and the mounting screws/serrated washers.
Panel mount: create a PE terminal by the mounting screws/serrated washers.

		Communication (DTR = 12V DC)				
	26	27	28	29	30	31
CB	⊥	DTR	RxD↑	TxD↓		
CH	⊥		A	B		
CI	⊥		A	B	Y	Z

FW-F133-000001-001-EN

Fig. 9: Overview of terminal connectors - Standard configuration and options

SENSOR SUPPLY

For type PB/PC; PX; AP: There is no real sensor supply out available. Only a limited power supply is available. This power supply MAY NOT be used to supply the flowmeters electronics, converters etc. as it will not provide adequate sustained power ! All energy used by the flowmeters pick-up will directly influence the battery life-time. It is strongly advised to use a "zero power" pickup such as a coil or reed-switch when operating without external power. It is possible to use some low power NPN or PNP output signals, but the battery life time will be significantly reduced (consult your distributor). The sensor supply is fixed: 1.2V DC or 3V DC (set by the firmware).

For type PD; PF; PM: It is possible to supply the sensor with different voltages. You can set the voltage with the switches. Internal power is only applicable for low power sensors (Coil, Reed). External power is only available when the main external power supply is connected.
The sensor supply voltage is selectable: 1.2; 3; 8.2; 12 or 24V DC.

Set the sensor supply
1. Make the F133-P safe. If applicable, mind the battery power.
2. Open the F133-P and carefully remove the cable-connectors and the protective cover.
3. Find and set the switches and select the V_{out} as required.
4. Close the protective cover and install the cable connectors.
5. Close the F133-P .

⚠ **WARNING** **Risk of electrocution - High voltage!**
Make sure, all the leads to the terminals are disconnected from the F133-P and NEVER connect the mains power supply to the unit when the protection cover has been removed!

Type PD	Power supply in: 8-24V AC / 10-30V DC				
FW-PD-000001-001-EN Switch location (typical)	Sensor A		V_{out} selection		Sensor supply out
	1	2	3	4	
	int	-	off	off	NOTE: Use an AC autotransformer (spartrafo) with galvanic isolation.
	int	-	off	off	Coil 1.2V DC; <1mA Reed 3V DC; <1mA
	ext	-	on	on	8.2V DC @8V_{in} AC / 10V_{in} DC
			on	off	12V DC @10V_{in} AC / 14V_{in} DC
			off	off	24V DC @18V_{in} AC / 26V_{in} DC
Type PF	**Power supply in**: 15-24V AC / 20-30V DC				
FW-PFPM-000001-001-EN Switch location (typical)	Sensor A		V_{out} selection		Sensor supply out
	1	2	3	4	
	int	-	off	off	Coil 1.2V DC; <1mA Reed 3V DC; <1mA
	ext	-	on	on	8.2V DC @8V_{in} AC / 10V_{in} DC
			on	off	12V DC @10V_{in} AC / 14V_{in} DC
			off	off	24V DC @18V_{in} AC / 26V_{in} DC
Type PM	**Power supply in**: 115V - 230V AC				
FW-PFPM-000001-001-EN Switch location (typical)	Sensor A		V_{out} selection		Sensor supply out
	1	2	3	4	
	int	-	off	off	Coil 1.2V DC; <1mA Reed 3V DC; <1mA
	ext	-	on	on	8.2V DC
			on	off	12V DC
			off	off	24V DC

Fig. 10: Sensor supply voltage - Switch setting

Terminal 03-04; valve control output R2:
This output is available to control the dispensing valve. Relay 2 is switched-on according to the settings 51-56.

Terminal 05-06; pump control output R1:
This output is available to control the dispensing pump. Relay 1 is switched-on during the whole batch process.

Option OT:
A <u>passive</u> transistor output is available with this option. Max. driving capacity 300mA@50V DC.
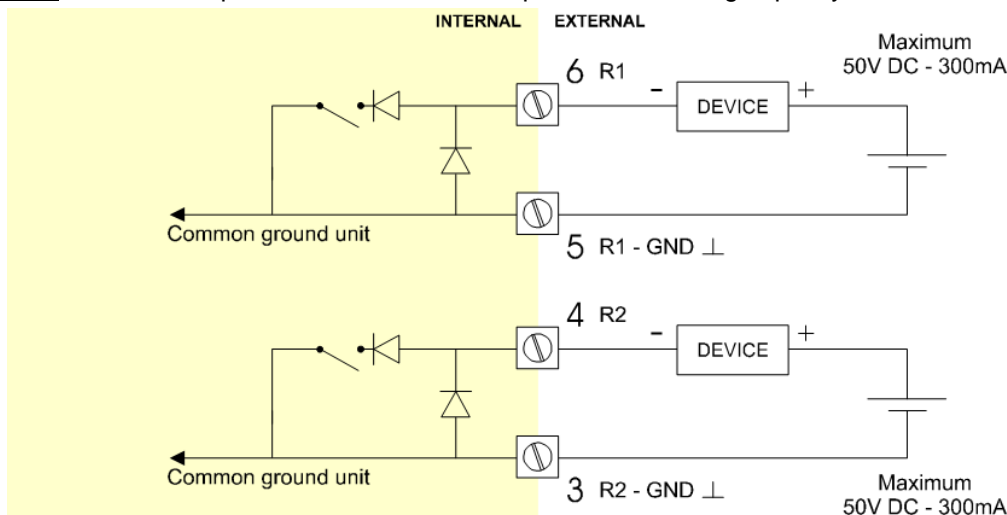

Fig. 11: Terminal connections - Passive transistor output (typical)

Option OA:
An <u>active 24V DC signal</u> according to the functions R1 and R2 is available with this option. Max. driving capacity 50mA@24V per output. (Requires power supply type PD/PF/PM).
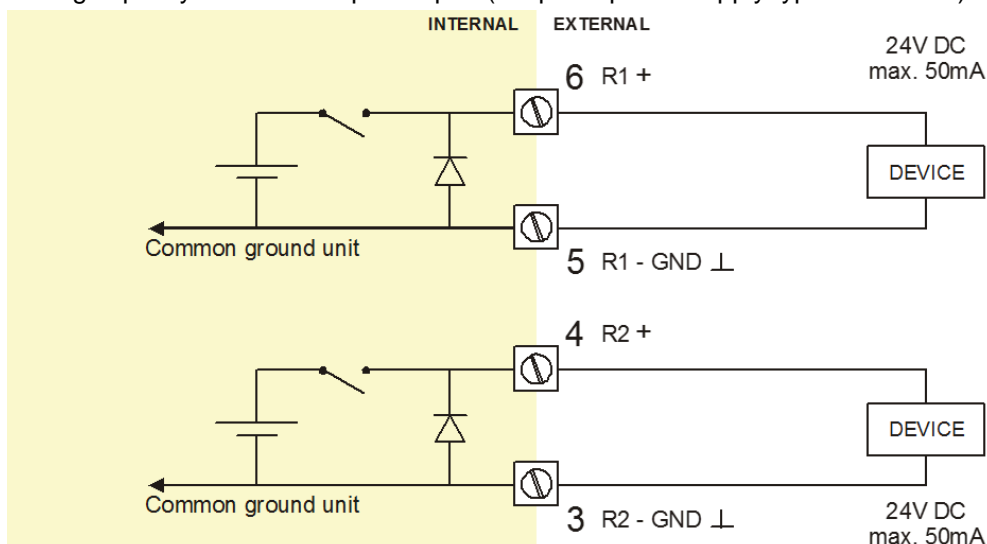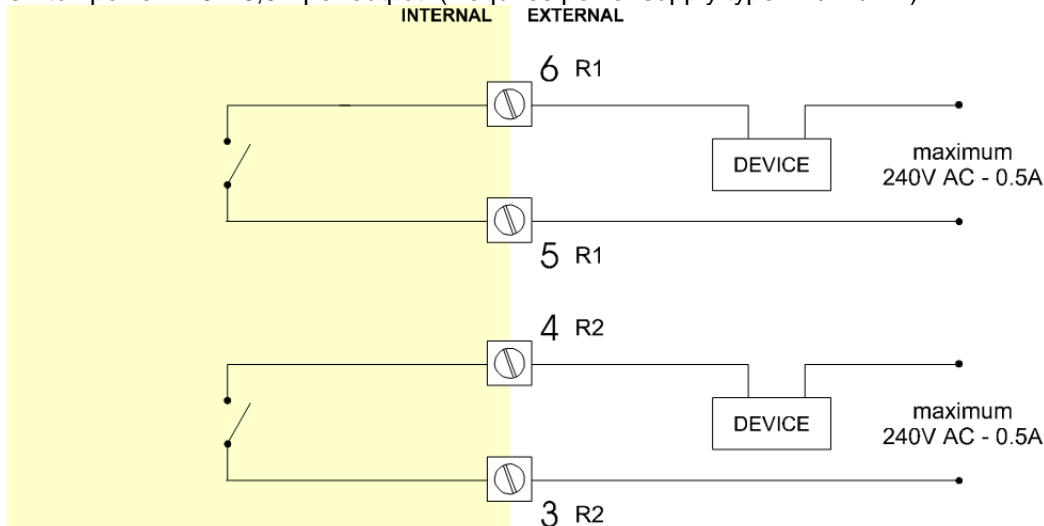

Fig. 12: Terminal connections - Active output (typical)

Option OR:
A mechanical <u>relay output</u> according the functions R1 and R2 is available with this option. Max. switch power 240V-0,5A per output. (Requires power supply type PD/PF/PM).

Fig. 13: Terminal connections - Mechanical relay output (typical)

Terminal 09-11; Flowmeter input:
Three basic types of flowmeter signals can be connected to the unit: pulse, active pulse or sine-wave (coil). The screen of the signal wire must be connected to the common ground terminal 09 (unless earthed at the sensor itself).
The maximum input frequency is approximately 10 kHz (depending on the type of signal). The input signal type has to be selected in the flowmeter setup (read chapter 3).

Sine-wave signal (Coil):
The F133-P is suitable for use with flowmeters which have a coil output signal.
Two sensitivity levels can be selected:
- COIL-LO: sensitivity from about $80mV_{pp}$;
- COIL-HI: sensitivity from about $20mV_{pp}$;
- type ZF, COIL-HI: sensitivity from about $10mV_{pp}$;
- type ZG, COIL-HI: sensitivity from about $5mV_{pp}$.
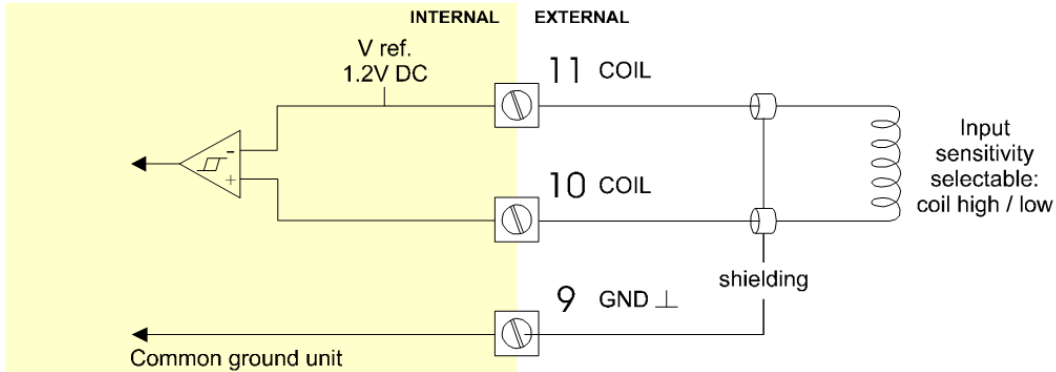
Fig. 14: Terminal connections - Coil signal input (typical)

Pulse-signal NPN / NPN-LP:
The F133-P is suitable for use with flowmeters which have a NPN output signal. For reliable pulse detection, the pulse amplitude has to go below 1.2V. Signal setting NPN-LP employs a low-pass signal noise filter, which limits the maximum input frequency (read chapter 3).
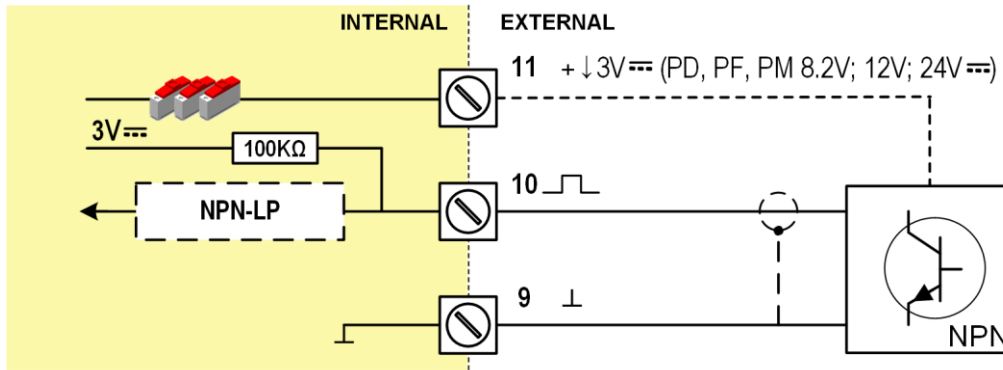

Fig. 15: Terminal connections - NPN signal input (typical)

Pulse-signal PNP / PNP-LP:
The F133-P is suitable for use with flowmeters which have a PNP output signal. 3V is offered on terminal 11 which has to be switched by the sensor to terminal 10 (SIGNAL). For a reliable pulse detection, the pulse amplitude has to go above 1.2V. Signal setting PNP-LP employs a low-pass signal noise filter, which limits the maximum input frequency (read chapter 3).
A sensor supply voltage of 8.2, 12 or 24V DC can be provided with power supply type PD, PF, PM. For a signal detection level of 50% of the supply voltage: please refer to "active signals".
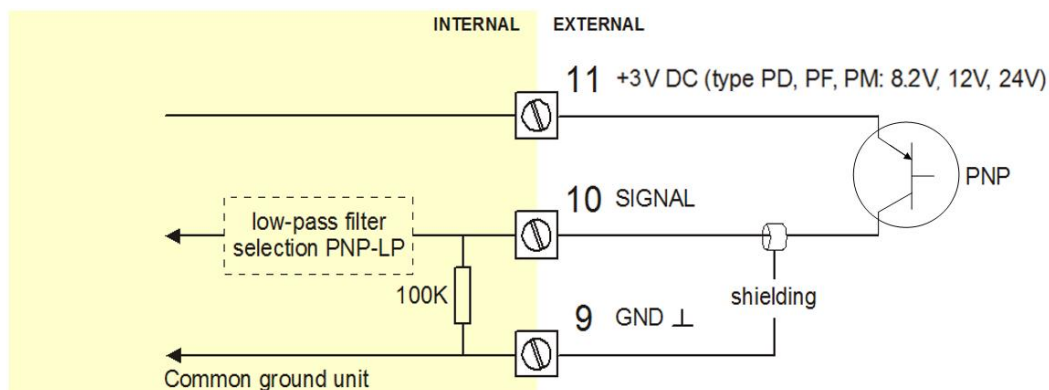
Fig. 16: Terminal connections - PNP signal input (typical)

Active signal 8.2V, 12V and 24V:
If a sensor gives an active signal (read chapter 3). The detection levels are 50% of the selected supply voltage; approx. 4V (8-1 DC) or 6V (12 DC) or 12V (24 DC). Active signal selection may well be desired in case of power supply type PD, PF, PM is available for sensor supply.
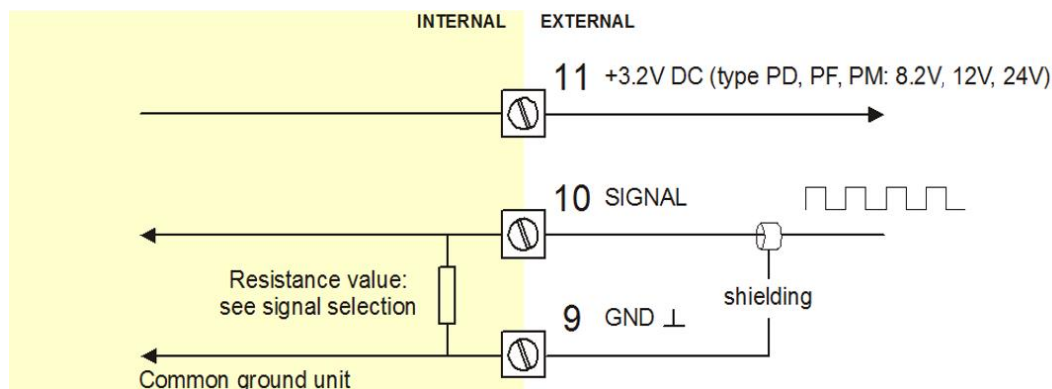

Fig. 17: Terminal connections - Active signal input (typical)

Reed-switch:
The F133-P is suitable for use with flowmeters which have a reed-switch. To avoid pulse bounce from the reed-switch, it is advised to select REED LP - low-pass filter (read chapter 3).
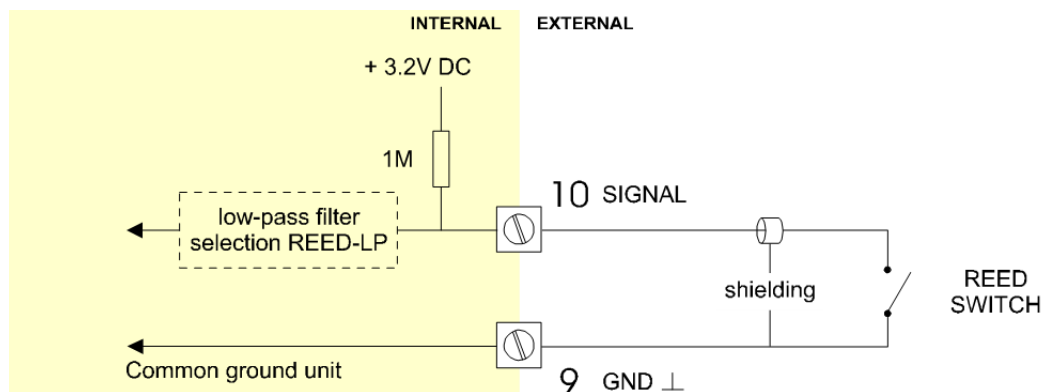

Fig. 18: Terminal connections - Reed-switch signal input (typical)

NAMUR-signal:
The F133-P is suitable for flowmeters with an Namur signal. The standard F133-P is not able to power the Namur sensor, as an external power supply for the sensor is required. However, a 8.2V sensor supply voltage (terminal 11) can be provided with power supply type PD, PF, PM.
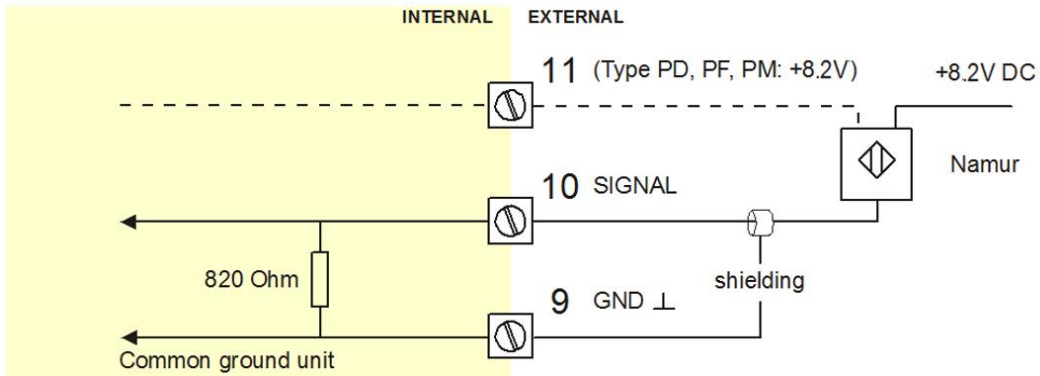
Fig. 19: Terminal connections - NAMUR signal input (typical)

Terminal 12-13; status input 1:
With this function, the batch controller can be started and/or stopped. The function of the input is described in paragraph 3.2.3.7. "STATUS". The input must be switched with a potential free contact to the GND-terminal number 9 for at least 0.3 seconds.
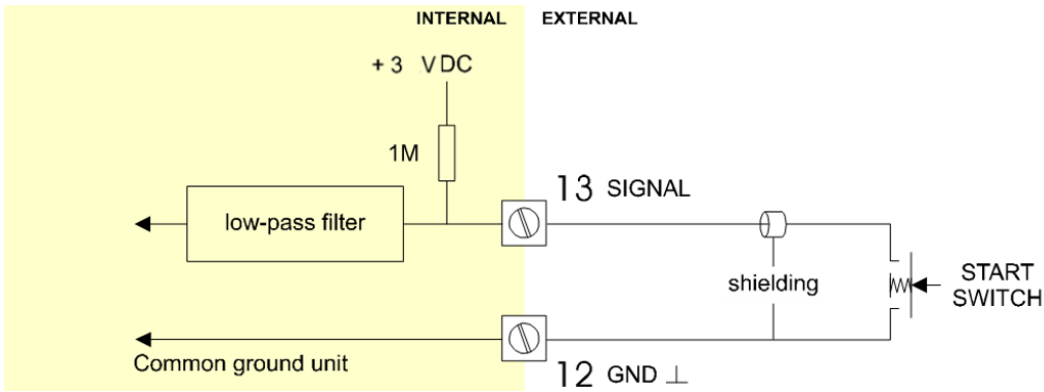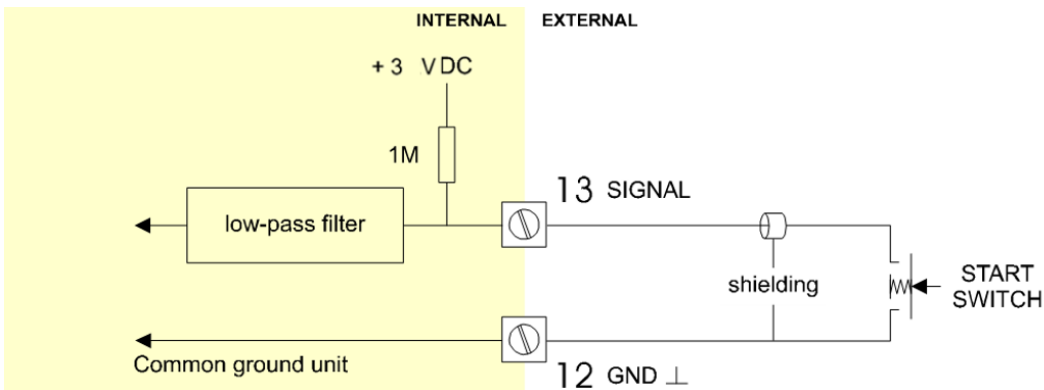
Fig. 20: Terminal connections - Status input 1 (typical)

Terminal 15-16; status 2:
With this function, the batch controller can be started and/or stopped. The function of the input is described in paragraph 3.2.3.7. "STATUS". The input must be switched with a potential free contact to the GND-terminal number 9 for at least 0.3 seconds.

Fig. 21: Terminal connections - Status input 2 (typical)

Terminal 26-31: type CB / CH / CI / CT - communication RS232 / RS485 / TTL (option)
For connections, refer to figure: Overview of terminal connectors - Standard configuration and options

Full serial communications and computer control in accordance with RS232 (length of cable max. 15 meters) or RS485 (length of cable max. 1200 meters) is possible.
When using the RS232 communication option, terminal 27 is used for supplying the interface.
Please connect the DTR (or the RTS) signal of the interface to this terminal and set it active (+12V).
If no active signal is available it is possible to connect a separate supply between terminals
26 and 27 with a voltage between 8V and 24V.

Terminal 00 – 01: type ZB backlight (option):
If the unit is supplied with a power supply:
- type PD, PF or PM, the backlight supply is integrated.
- type PX, use the terminals 00 and 01 to supply the backlight.

The backlight intensity is set in the setup menu: Display.

5. INTRINSICALLY SAFE APPLICATIONS

WARNING

- For the combined connection of the different supply, input and output circuits, the instructions in this manual must be observed. From the safety point of view the circuits shall be considered to be connected to earth.
- Certificates, safety values, control drawing and declaration of compliance can be found in the document named: "Fluidwell F1..-..-XI - Documentation for Intrinsic safety".
- For installation under ATEX directive: this Intrinsically safe device must be installed in accordance with the latest ATEX directive and product certificate KEMA 03ATEX1074 X.
- For installation under IECEx scheme: this Intrinsically safe device must be installed in accordance the product certificate IECEx DEK 11.0042X.
- Exchange of Intrinsically safe battery FWLiBAT-00x with certificate number KEMA 03ATEX1071 U or IECEx KEM 08.0005U is allowed in Hazardous Area. Read chapter 6 for battery replacement instructions.
- When the enclosure of the F133-P is made of aluminum alloy, when used in a potentially explosive atmosphere requiring apparatus of EPL Ga, the indicator shall be installed so, that even in the event of rare incidents, an ignition source due to impact or friction sparks between the enclosure and iron/steel is excluded.
- When two or more active Intrinsically safe circuits are connected to the indicator, in order to prevent voltage and/or current addition, applicable to the external circuits, precautions must be taken to separate the Intrinsically safe circuits in accordance with EN 60079-11.
- To maintain the degree of protection of at least IP65 in accordance with IEC 60529, suitable cable entries and blanking elements must be used and correctly installed.
- For enclosures and windows with a high surface resistance, potential charging hazard exists. Do not rub these surfaces of the indicator. Clean window and enclosure only with a lint-free cleaning cloth made damp with a mild soap solution.
- Chapter 4 shows general information regarding the electrical installation of your indicator. This chapter gives additional specific information regarding Intrinsically safe installation and overrules the information given in chapter 4.

Caution !

- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained persons authorized by the operator of the facility. Persons must read and understand this manual before carrying out its instructions.
- This device may only be operated by persons who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.
- Make sure, the measuring system is correctly wired up according to the wiring diagrams. Protection against accidental contact is no longer assured when the housing cover is removed or the panel cabinet has been opened (danger from electrical shock). The housing may only be opened by trained persons authorized by the operator of the facility.
- Take careful notice of the "Safety rules, instructions and precautionary measures" in the front of this manual.

Note !

- Special conditions for safe use mentioned in both the certificate and the installation instructions must be observed for the connection of power to both input and / or output circuits.
- When installing this device in hazardous areas, the wiring and installation must comply with the appropriate installation standards for your industry.
- Study the following pages with wiring diagrams per classification.

Serial number and year of production
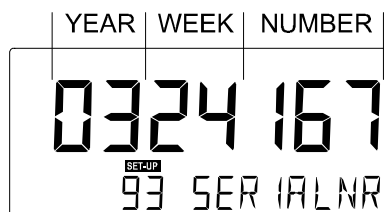This information can be looked-up in the setup menu: Others.

YEAR	WEEK	NUMBER

```
0324 167
93 SERIALNR
```

Fig. 22: Example serial number (typical)

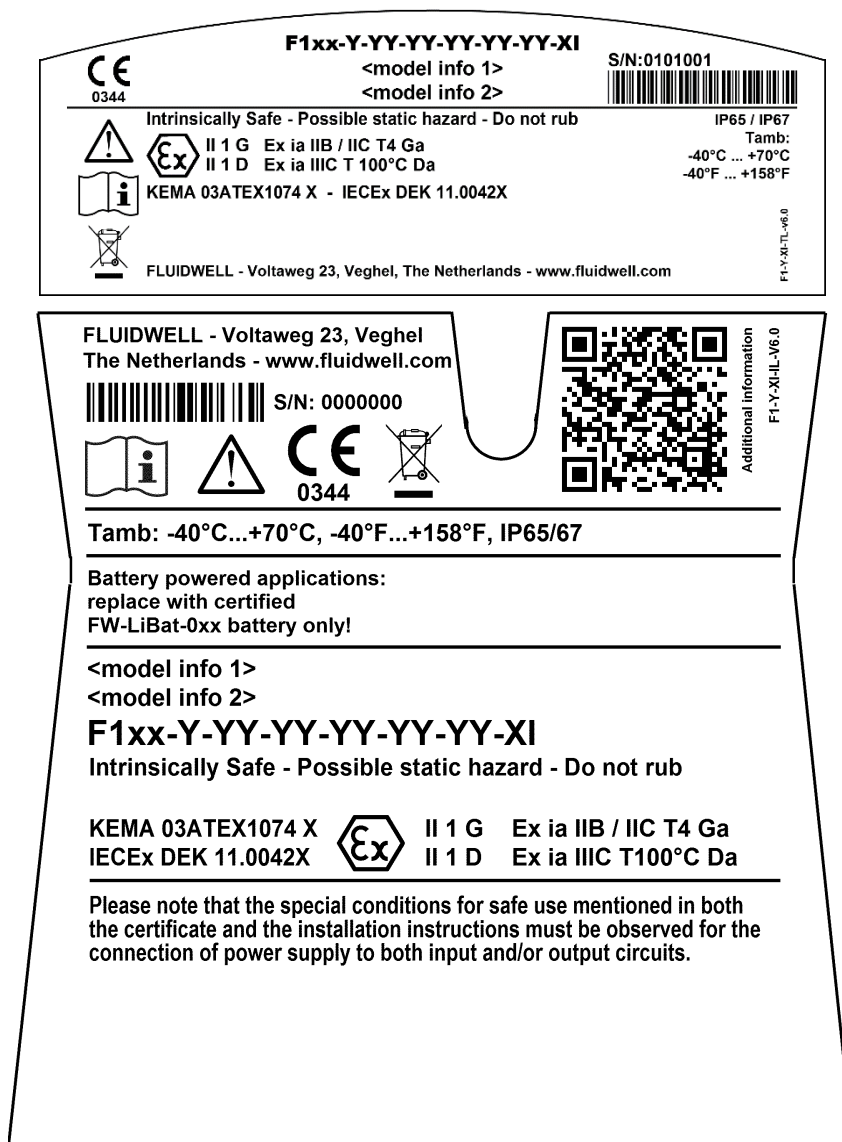**Label information pulse input type – F1xx-..-..-XI (inside and outside the enclosure)**

Fig. 23: Label information - Intrinsically safe application (typical)

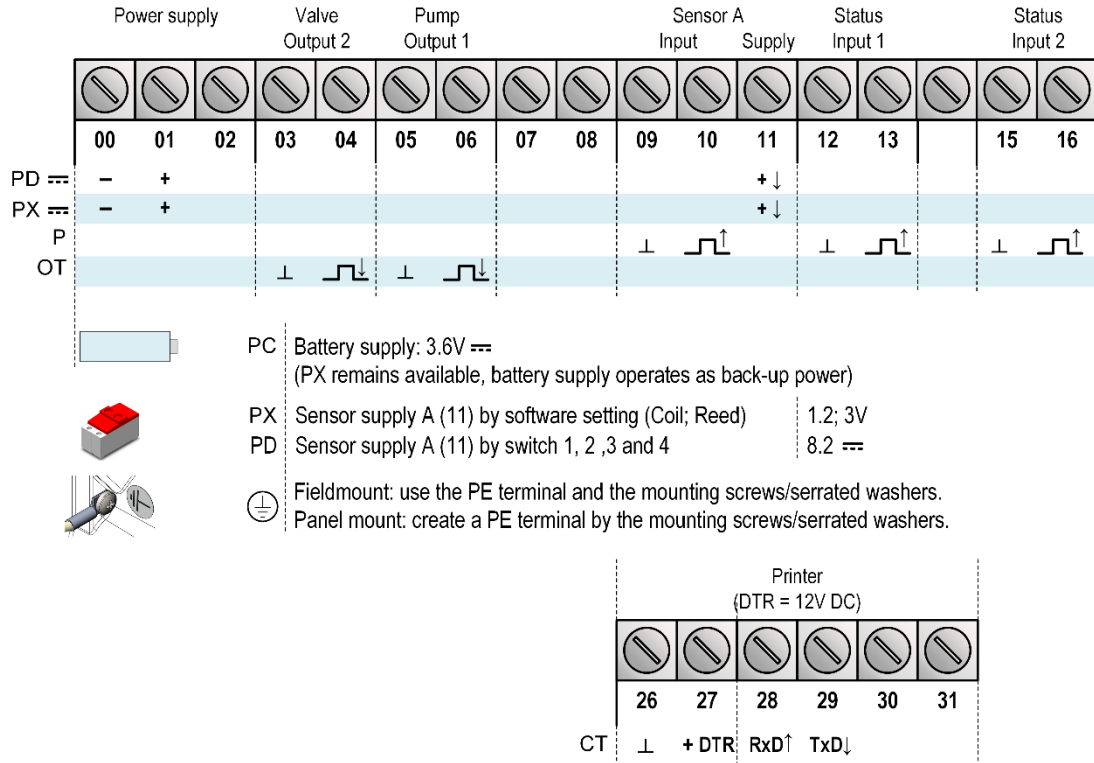## 5.2.   TERMINAL CONNECTORS INTRINSICALLY SAFE APPLICATIONS

The unit is classified as group IIB/IIIC by default.

Note !

Classification of the unit as group IIC is only possible under the following conditions:
The indicator is either supplied by
- the internal supply (option -PC);
- the external supply connected to terminals 0 and 1 (option -PD);
- the circuit supply connected to terminals 7 and 8 (option -AP);
- The maximum values for any of those circuits are those as defined for group IIB/IIIC;
- No other active external Intrinsically safe circuits may be connected to the indicator, with exception of circuits connected to terminals 3 and 4 and/or terminals 5 and 6; the maximum values for any of those circuits are those as defined for group IIB/IIIC.

Terminal connectors F133-P-…-XI:
For intrinsically safe applications, consult the safety values in the certificate.

Fig. 24: Overview terminal connectors XI – Intrinsically safe applications

Explanation Intrinsically safe options:

For option PD-XI: It is possible to supply the sensor with different voltages. You can set the voltage with the switches. Internal power is only applicable for low power sensors (Coil, Reed). The sensor supply is set by the firmware: 1.2V DC or 3V DC. External power is only available when the main external power supply is connected. The sensor supply voltage is fixed: 8.2V DC.

Set the sensor supply
1. Make the F133-P safe. If applicable, mind the battery power.
2. Open the F133-P and carefully remove the cable-connectors and the protective cover.
3. Find and set the switches and select the V_{out} as required.
4. Close the protective cover and install the cable connectors.
5. Close the F133-P.

⚠️ **WARNING** **Risk of electrocution - High voltage!**
Make sure, all the leads to the terminals are disconnected from the F133-P and NEVER connect the mains power supply to the unit when the protection cover has been removed!

Type PD-XI	Power supply in: 16-30V DC / max. 1W			
	Sensor A			Sensor supply out
	1	2		
	off	-		Coil 1.2V DC; <1mA Reed 3V DC; <1mA
	on	-		8.2V DC; 7mA (max)
Switch location (typical)				

Fig. 25: Switch position voltage selection option PD-XI

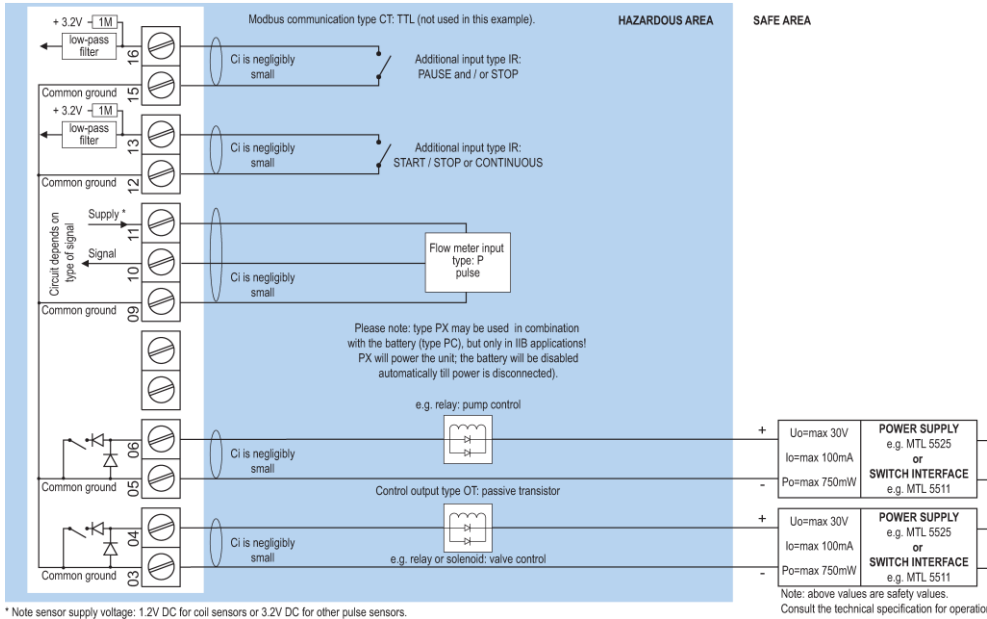## 5.3.   CONFIGURATION EXAMPLES INTRINSICALLY SAFE APPLICATIONS

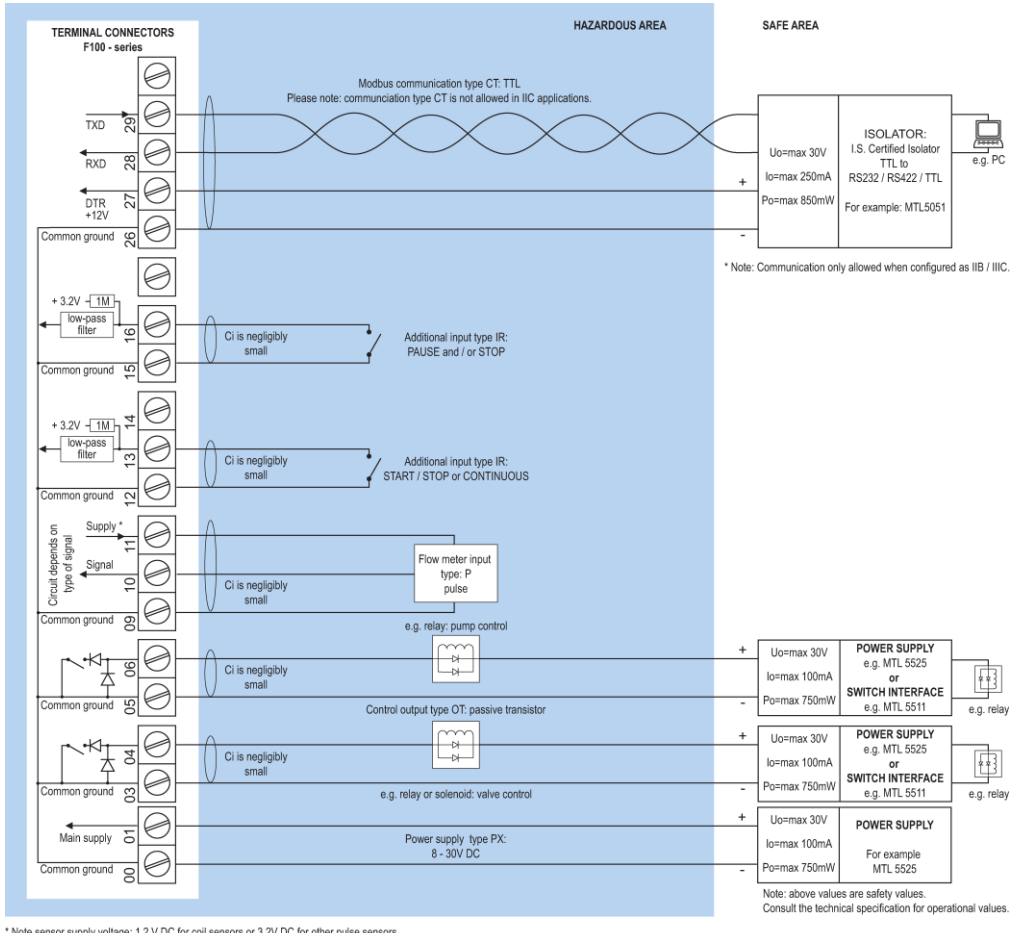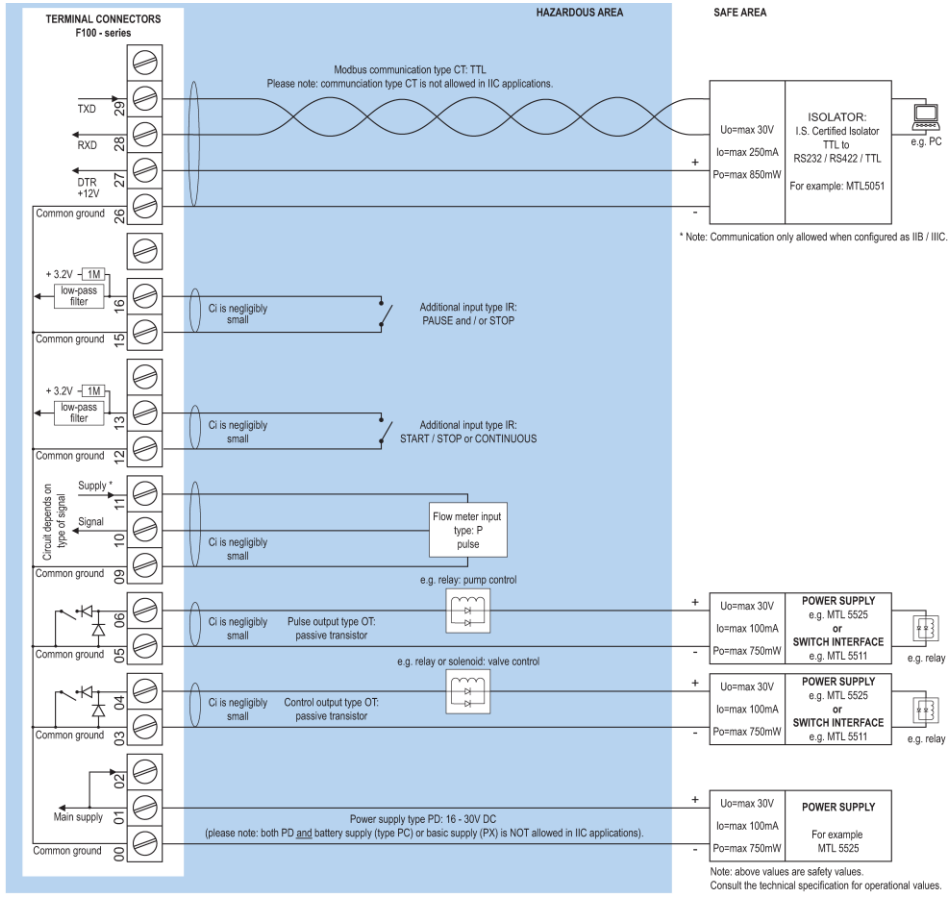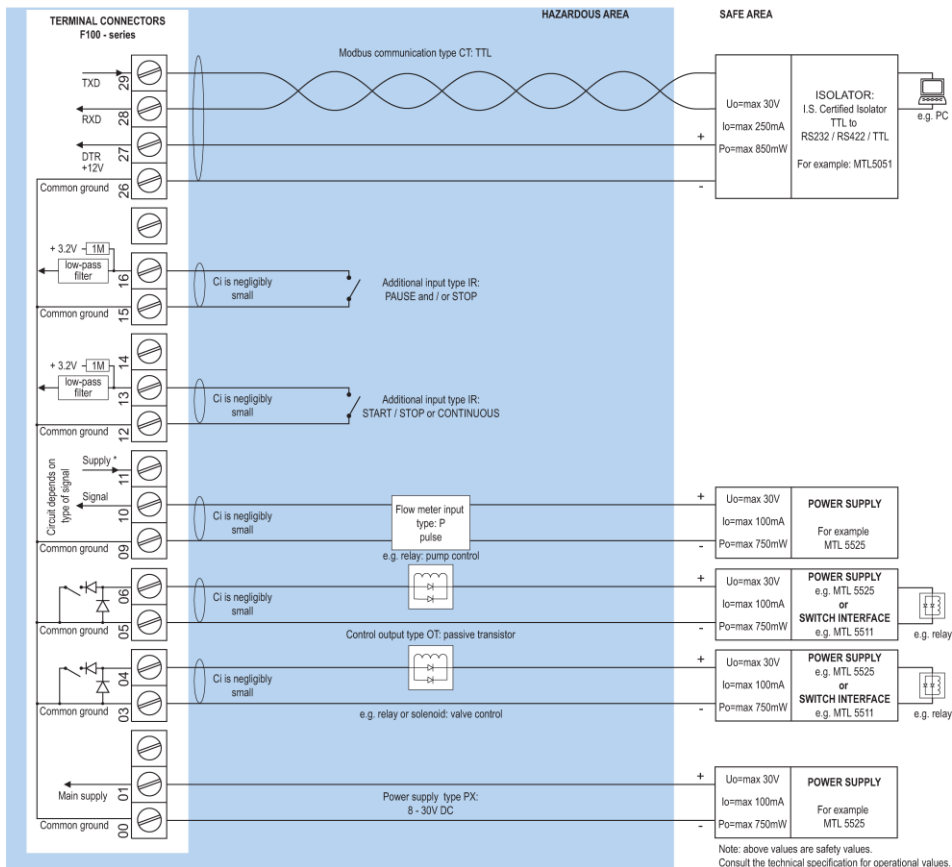**Fig. 26: F133-P-(CT)-OT-PC-(PX)-XI - Battery powered - IIB/IIC – IIIC**

Fig. 27: F133-P-(CT)-OT-(PX)-XI - Basic power supply - IIB/IIC – IIIC

Fig. 28: F133-P-(CT)-OT-PD-XI - External power supply - IIB/IIC – IIIC

Fig. 29: F133-P-CT-OT-PX-XI - Basic power supply - IIB/IIC – IIIC

5.4 BATTERY REPLACEMENT INSTRUCTIONS

5.4.1. SAFETY INSTRUCTIONS

WARNING

- Handle the battery with care. A mistreated battery can become unsafe. Unsafe batteries can cause (serious) injury to persons.
- Only use batteries which are certified for use in hazardous areas. The use of standard batteries in hazardous area's is not safe and prohibited. Batteries that are regarded as unsafe can cause (serious) injury to persons and damage to the property.
- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained persons authorized by the operator of the facility. Persons must read and understand this manual before carrying out its instructions.

Caution !

- Only use batteries which are certified for use in hazardous areas. The use of standard batteries in hazardous area's is not safe and prohibited. Batteries that are regarded as unsafe can cause (serious) injury to persons and damage to the property.
- For use in hazardous areas we advise to apply FW-LiBAT batteries only.

5.4.2. REPLACE THE BATTERY

The batteries are used to store electrical energy. The battery is a high power battery which must be treated carefully. When the battery is mistreated or damaged, there is a risk of a fire, an explosion and serious burns.

1. Mind that you cannot switch off a battery.
2. Make sure, it is safe to work on the battery system.
3. Handle the battery with the utmost care to prevent a short circuit and damage.
4. Do not recharge, crush, disassemble, incinerate, heat above its rated temperature or expose the contents to water.
5. Dispose of the battery in accordance with the (inter)national, the manufacturer's and the plant owner's standards and regulations.
6. Read and understand the instructions.
7. Get approval from the safety officer to do the work.
8. Lock-out/Tag-out the unit and related system.
9. Make sure, it is safe to do the work.
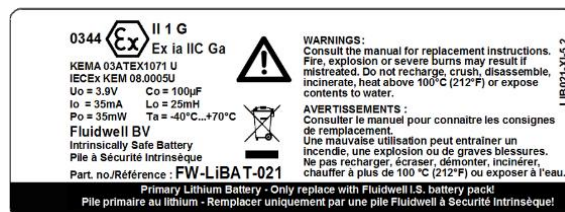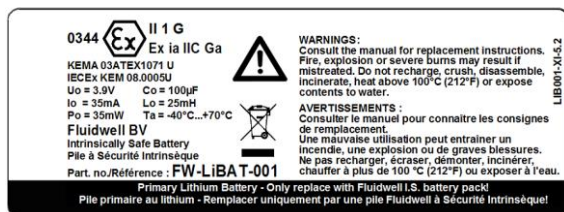
REMOVE THE BATTERY

1. If necessary, clean the housing with an anti-static cloth made damp with a mild soap solution.
2. Let the enclosure dry onto the air.
3. Carefully, open the enclosure.
4. Keep the removed parts in a clean location.
5. Get access to the battery.
6. Find the battery connector and disconnect the battery from the unit.
7. Remove and keep the battery from the unit.
8. Install an insulation tape over the battery connector to prevent a short circuit.

INSTALL THE BATTERY

1. Make sure, the new battery is certified for use in the unit.
2. Work as clean as possible, to prevent contamination to enter the unit.
3. Carefully, install the battery.
4. Make sure, the battery is correctly locked into the battery holder.
5. Install the battery connector.
6. Carefully assemble the unit and close the enclosure.
7. With the enclosure carefully closed, do a test of the unit.
8. If necessary, get access to the setup menu and make any adjustments to obtain the correct settings.

5.4.3. DISPOSAL OF BATTERIES

- Batteries pose an environmental hazard.
- Do not dispose of as general waste or incinerate.
- Return used batteries to a recycling point.

6. MAINTENANCE

6.1. GENERAL DIRECTIONS

Caution !

- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained persons authorized by the operator of the facility. Persons must read and understand this Manual before carrying out its instructions.

- This device may only be operated by persons who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.

- Make sure, the measuring system is correctly wired up according to the wiring diagrams. Protection against accidental contact is no longer assured when the housing cover is removed or the panel cabinet has been opened (danger from electrical shock). The housing may only be opened by trained persons authorized by the operator of the facility.

- Take careful notice of the "Safety rules, instructions and precautionary measures" in the front of this manual.

The F133-P does not require special maintenance unless it is used in low-temperature applications or surroundings with high humidity (above 90% annual mean). It is the users responsibility to take all precautions to dehumidify the internal atmosphere of the F133-P in such a way that no condensation will occur, e.g. to put a dose of desiccant (drying agent) inside the enclosure just before closing it. Furthermore, it is required to replace the desiccant periodically as advised by its supplier.

Battery life-time:
It is influenced by several issues :

- Type of sensor (read chapter 3): NPN and PNP inputs consume more energy than coil inputs;
- Input frequency: the higher the frequency, the shorter the battery life-time;
- Display update: fast display update uses significantly more power;
- Pulse output and communications;
- Low temperatures; the available power will be less due to battery chemistry.

Note !

It is strongly advised to disable the unused functions.

Check periodically:

- The condition of the casing, cable glands and front panel.
- The input/output wiring for reliability and aging symptoms.
- The process accuracy. As a result of wear and tear, re-calibration of the flowmeter might be necessary. Do not forget to re-enter any subsequent K-factor alterations.
- The indication for low-battery.
- Clean the casing with soapy-water. Do not use any aggressive solvents as these might damage the polyester coating.

6.2. REPAIR

This product cannot be repaired by the user and must be replaced with an equivalent certified product. Repairs should only be carried out by the manufacturer or his authorized agent.

6.3. REPAIR POLICY

I you have any problem with your Fluidwell product and you wish to repair it, please follow the procedure below:
a. Obtain a Return Material Authorization (RMA) from your supplier or distributor Together with the RMA, you need to complete a repair form to submit detailed information about the problem.
b. Send the product, within 30 days, to the address provided with the RMA. The physical return of your repair can only take place after the authorization of your repair application, as confirmed by the RMA number.

If the product is within the warranty period, it will be repaired or exchanged and returned within three weeks. If the product is no longer under warranty, you will receive a repair estimate.

APPENDIX A: TECHNICAL SPECIFICATION

GENERAL	
Display	
Type	High intensity reflective numeric and alphanumeric LCD, UV-resistant.
Digits	Seven 17mm (0.67") and eleven 8mm (0.31"). Various symbols and measuring units.
Refresh rate	User definable: 8 times/sec - 30 secs.
Type ZB	LCD with LED backlight. Improved readability in full sunlight and darkness. Power requirements: 12-24V DC + 10% or type PD, PF, PM. Power consumption max. 1 Watt.
Enclosures	
General	Die-cast aluminum or GRP (Glassfibre Reinforced Polyamide) enclosure with Polycarbonate window, silicone and EPDM gaskets. UV stabilized and flame retardant material.
Control Keys	Three industrial micro-switch keys. UV-resistant silicone keypad.
Painting	Aluminum enclosure only: UV-resistant 2-component industrial painting.
Panel-mount enclosures	Dimensions: 130 x 120 x 60mm (5.10" x 4.72" x 2.38") – LxHxD.
Classification	IP65 / TYPE 4(X)
Panel cut-out	115 x 98mm (4.53" x 3.86") LxH.
Type HC	GRP panel-mount enclosure
Type HB	Aluminum panel-mount enclosure
Field/wall-mount enclosures	Dimensions: 130 x 120 x 75mm (5.10" x 4.72" x 2.95") – LxHxD.
Classification	IP67 / TYPE 4(X)
Aluminum enclosures	
Type HA	Drilling: 2x PG9 – 1x M20.
Type HL	Drilling: 2x ½"NPT.
Type HM	Drilling: 2x M16 – 1x M20.
Type HN	Drilling: 1x M20.
Type HO	Drilling: 2x M20.
Type HP	Drilling: 6x M12.
Type HT	Drilling: 1x ½"NPT.
Type HU	Drilling: 3x ½"NPT.
Type HV	Drilling: 4x M20
Type HZ	No drilling.
GRP enclosures	
Type HD	No drilling.
Type HE	Drilling: 2x 16mm (0.63") – 1x 20mm (0.78").
Type HF	Drilling: 1x 22mm (0.87").
Type HG	Drilling: 2x 20mm (0.78").
Type HJ	Drilling: 3x 22mm (0.87").
Type HH	Drilling: 6x 12mm (0.47").
Type HK	Flat bottom - no drilling.
Explosion proof enclosure	Dimensions: 300 x 250 x 200mm (11.8" x 9.9" x 7.9")– LxHxD. Weight: approx. 13.5kg.
Classification	IP65 / TYPE 4(X)
Aluminum enclosures	
Type HC-XF	Drilling: 4x M20 (cable glands included)
Operating temperature	
Safe area	-40°C to +80°C (-40°F to +176°F)
Intrinsically Safe (XI)	-40°C to +70°C (-40°F to +158°F)
Explosion Proof (XF)	-20°C to +40°C (-4°F to +104°F)
Relative humidity	90%, no condensation allowed.
Power supply	
Type AP	8-30V DC; Power consumption max. 0.5 Watt.
Type PB	Lithium battery - life-time depends upon settings - up to 5 years.
Type PC	Intrinsically safe lithium battery - life-time depends upon settings - up to 5 years.
Type PD	8-24V AC / 8-30V DC; Power consumption max. 5 Watt.
Type PD-ZB	10-24V AC / 12-30V DC; Power consumption max. 5 Watt.
Type PD-XI	16-30V DC; Power consumption max. 1 Watt.
Type PF	15-24V AC / 20-30V DC; Power consumption max. 15 Watt.
Type PM	115-230V AC; Power consumption max. 15 Watt.
Type PX	8-30V DC; Power consumption max. 0.75 Watt.
Type PX-ZB	12-30V DC; Power consumption max. 1.5 Watt.
Type PX-XI	8-30V DC; Power consumption max. 0.75 Watt.
Note I.S. applications	**For Intrinsically safe applications, consult the safety values in the certificate.**

Sensor excitation	
Type PB / PC / PX	3V DC for low power pulse signals and 1.2V DC for coil pick-up.
Type PD	1.2; 3; 8.2; 12; 24V DC - max. 50mA@24V DC
Type PD-XI	Intrinsically safe: Pulse signals: 1.2; 3; 8.2 - max. 7mA@8.2V DC.
Type PF / PM	1.2; 3; 8.2; 12; 24V DC - max. 400mA@24V DC.

Terminal connections		
Type:	Removable plug-in terminal strip. Wire max. 1.5m m^2 and 2.5m m^2	
Data protection		
Type	EEPROM backup of all setting. Backup of running totals every minute. Data retention at least 10 years.	
Password	Configuration settings can be Password protected.	
Hazardous area (option)		
Intrinsically safe Type XI	**ATEX approval:** ⟨Ex⟩ II 1 G Ex ia IIB/IIC T4 Ga II 1 D Ex ia IIIC T100°C Da	**IECEx approval:** Ex ia IIB/IIC T4 Ga Ex ia IIIC T100°C Da
Explosion proof Type XD/XF	ATEX approval ref: ⟨Ex⟩ II 2 EEx d IIB T5. Weight appr. 15kg. Dimensions of enclosure: 218 x 418 x 213mm (8.58" x 16.45" x 8.38") LxHxD.	
Directives and Standards		
EMC	EN 61326-1; FCC 47 CFR part 15	
LVD	EN/IEC 61010-1	
ATEX / IECEx	EN/IEC 60079-0; EN/IEC 60079-11	
RoHS	EN 50581	
IP & NEMA	EN 60529; NEMA 250	

INPUTS

Flowmeter	
Type P	npn; npn-lp; reed; reed-lp; pnp; pnp-lp; namur; coil-hi; coil-lo; 8-1 DC; 12 DC; 24 DC
Frequency	Minimum 0 Hz - maximum 7 kHz 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 120 Hz.
K-Factor	0.000010 - 9999999 with variable decimal position.
Low-pass filter	npn-lp; reed-lp; pnp-lp

OUTPUTS

Transistor outputs	
Function	Controlling a pump and dispense valve.
Type OA	Active 24V DC transistor output; max. 50mA per output (requires type PD, PF or PM).
Type OR	Isolated mechanic relay output; max. switch power 230V AC - 0,5A (requires type PF or PM).
Type OT	Passive transistor output - not isolated. Load max. 50V DC - 300mA.
Communication option	
Protocol	bus-rtu; bus-asc
Speed	1200; 2400; 4800; 9600
Address	1 - 247
Type CB	RS232
Type CH	RS485 2-wire
Type CI	RS485 4-wire
Type CT	TTL Intrinsically Safe communication.
Type CX	no communication.

OPERATIONAL	
Operator functions	
Functions	• start / interrupt and stop the delivery, • total can be reset to zero.
Shown information	• delivered total • flow rate • accumulated delivered total (7 digits) • number of delivies executed • total and accumulated total.
Total	
Digits	7 digits.
Units	L; m³; GAL; USGAL; kg; lb; bbl; no unit.
Decimals	0000000; 111111.1; 22222.22; 3333.333
Note	total can be reset to zero.
Accumulated total	
Digits	11 digits.
Units / decimals	according to selection for total.
Flow rate	
Digits	7 digits.
Units	L; m³; mg; g; kg; ton; GAL; bbl; lb; cf; rev; - - - - (no unit); scf; N m³; Nl; P; mL
Decimals	0000000; 111111.1; 22222.22; 3333.333
Time units	/sec; /min; /hour; /day

APPENDIX B: PROBLEM SOLVING

In this appendix, several problems are included that can occur when the F133-P is going to be installed or while it is in operation.

Flowmeter does not generate pulses:
Check:
- Signal selection;
- Pulse amplitude;
- Flowmeter, wiring and connection of terminal connectors;
- Power supply of flowmeter.

Flowmeter generates "too many pulses":
Check:
- Settings for total and Flow rate;
- Type of signal selected with actual signal generated;
- Sensitivity of coil input;
- Proper grounding of the F133-P;
- Use screened wire for flowmeter signals and connect screen to terminal 9. (unless connected at sensor).

Flow rate displays "0 / zero" while there is flow (total is counting):
Check:
- are the K-Factor and time unit correct?
- The unit has to count the number of pulses according to setup 26 within the time according to setup 27. Make sure, setup 27is set to 10.0 seconds for example : the result is that the unit has at least 10 seconds time to measure the number of pulses according to setup 26.

The password is unknown:
- If the password is not 1234, there is only one possibility left: call your supplier.

ALARM
When the alarm flag starts to blink an internal alarm condition has occurred. Press the "select button" several times to display the error code. When multiple errors arise at the same time, their error codes are added and their sum is shown. The digital [d] codes are:

Not recoverable by the end user:
[d] 0 = no error;
[d] 1 = display error;
[d] 2 = data-storage error;
[d] 3 = error 1 + error 2 simultaneously;
[d] 4 =: initialization error.

For a not recoverable error, keep the error code at hand and contact your supplier.

APPENDIX C: COMMUNICATION VARIABLES

General

The product is fitted with the Modbus communication protocol and can be equipped with various physical interfaces like RS485 and RS232 (please see device datasheet for available options). The tables below show the various variables that can be accessed through the communication. Currently, the function codes supported are:

- function code 3 "Read Holding Registers" (4x references);
- function code 16 "Preset Multiple Registers" (4x references).

The table below shows the Modbus PDU addresses in a decimal format, followed by its hexadecimal representation (0x0000). When the PLC address range is required (4x references are typically used by PLCs), please add a value of 40001 to the Modbus PDU address. E.g. reading the serial number of the product with PLC-based addressing means: 165 + 40001 = register 40166.

The variables that consist of a multiple register must always read/write in 1 single action!

Refer to the illustration:

For this example it is assumed that the variable accumulated total has 3 registers (words) with address 566, 567 and 568. When a transmission is done, register 566, which acts as the MSW, arrives first with bit 15 which is the MSB of the lowest addressed word, but is also the MSB (bit 47) of the complete variable that represents the Accumulated total.

Although most Modbus Masters will support variables that span 2 registers, variables spanning more registers sometimes require you to manually calculate the resulting value.

MSW	ACCUMULATED TOTAL		LSW
REGISTER 566 [d] 00001 [h] 0001	REGISTER 567 [d] 45236 [h] b0b4	REGISTER 568 [d] 34756 [h] 87c4	
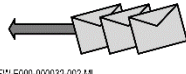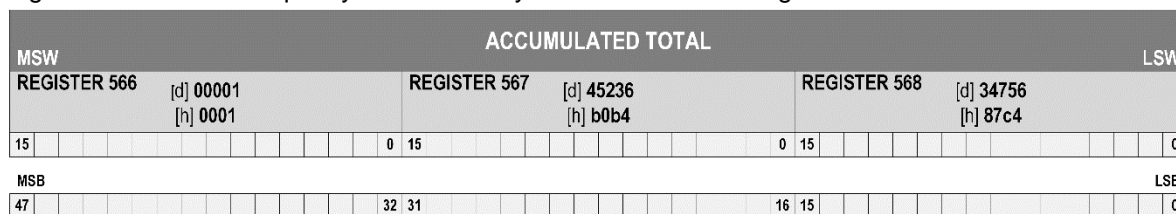
ACCUMULATED TOTAL: [register 566 * 4294967296] + [register 567* 65536] + [register 568*1] =
[d] ACCUMULATED TOTAL: [00001 * 4294967296] + [45236 × 65536] + [34756*1] = 7259588540
[h] ACCUMULATED TOTAL: 0x[0001] [b0b4] [87c4] = 1B0B487BC

For additional information regarding using your Fluidwell Modbus device, please read the 'Fluidwell General Modbus Communication Protocol' and 'Modbus troubleshooting guide' that are available through our website or your distributor.

Runtime variables

PDU ADDRESS	REGISTER	VARIABLE	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 572 [h] 0x23C	40573	flow rate	2	R	uint32	0…9999999, Representation: unit, time, decimals depending on variable: flow rate unit, decimals and time unit
[d] 208 [h] 0x0D0	40209	batch display total	3	R*	uint48	0…9999999999, Representation: unit, decimals depending on variables total unit and decimals
[d] 1072 [h] 0x430	41073	accumulated batch total	4	R	uint64	0…999999999999999999, Representation: unit, decimals depending on variables: total unit and decimals
[d] 203 [h] 0x0CB	40204	batch counter	1	R/W	uint16	0…9999999, Representation: counts
[d] 51 [h] 0x204	40517	error status (bitfield)	1	R	uint16	[d] 0 = no error [d] 1 = display error [d] 2 = data-storage error [d] 3 = error 1 + error 2 simultaneously [d] 4 =: initialization error

Reading flow rate, total or accumulated total: The returned values are given including the decimals and represent the actual value. The given value may differ from the value that is shown on the display – this is due to the fact that the display is limited in the number of digits and may have a slower update rate set.

For example when two decimals are selected for total and total has a value of 123456,78 the display will show 23456,78 while communication will read a "total" of 12345678 (note that the decimals should be adapted according the setting in "total decimals" which is in this case 2).

* Clearing total: It is possible to clear the total counter by means of writing a value of 0 to all the 3 registers of total/flow rate in a single write action. Writing any other value will result in the reply of an error message because the registers of total/flow rate are during operation read-only.

SETUP VARIABLES OF THE F133-P

PDU ADDRESS	REGISTER	VARIABLE TOTAL	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 32 [h] 0x020	40033	unit	1	r/w	uint16	0=none　　3=kg　　6= USGAL 1=L　　4= lb　　7=bbl 2= m³　　5=GAL
[d] 33 [h] 0x021	40034	decimals	1	r/w	uint16	0…3
[d] 34 [h] 0x022	40035	K-factor	2	r/w	uint32	1...9999999 Representation: 0.000010…9999999 depending on variable: decimals K-factor.
[d] 37 [h] 0x025	40038	decimals K-factor	1	r/w	uint16	0…6
[d] 218 [h] 0x0DA	40219	batch maximum	2	r/w	uint32	0…9999999
[d] 1078 [h] 0x436	41079	batch total	3	r/w	uint48	0…99999999999999 Representation: 0.001…9999999
[d] 203 [h] 0x0CB	40204	batch counter	2	r/w	uint16	0…9999999, Representation: counts

PDU ADDRESS	REGISTER	VARIABLE FLOW RATE	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS			
[d] 48 [h] 0x030	40049	unit	1	r/w	uint16	0=mL 1=L 2= M³ 3=mg	4=g 5=kg 6=ton 7=GAL	8=bbl 9=lb 10=cf 11=rev	12=none 13=scf 14=NM³ 15=NL 16=P
[d] 49 [h] 0x031	40050	time unit	1	r/w	uint16	0=/sec	1=/min	2=/hour	3=/day
[d] 50 [h] 0x032	40051	decimals	1	r/w	uint16	0…3			
[d] 51 [h] 0x033	40052	K-factor	2	r/w	uint32	1...9999999 Representation: 0.000010…9999999 depending on variable: decimals K-factor.			
[d] 54 [h] 0x036	40055	decimals K-factor	1	r/w	uint16	0…6			
[d] 55 [h] 0x037	40056	calculation	1	r/w	uint16	per 1 – 255 pulses			
[d] 56 [h] 0x0038	40057	cut-off time	1	r/w	uint16	0.1 – 999.9 seconds			
[d] 234 [h] 0x0EA	40235	alarm low	2	r/w	uint32	0.001 – 9999999 unit / time unit			
[d] 237 [h] 0x0ED	40238	alarm high	2	r/w	uint32	0.001 – 9999999 unit / time unit			
[d] 205 [h] 0x0CD	40206	alarm delay	1	r/w	uint16	0.1 – 999.9 seconds			

PDU ADDRESS	REGISTER	VARIABLE DISPLAY	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 67 [h] 0x043	40068	backlight brightness	1	r/w	uint16	0=off　　2=40%　　4=80% 1=20%　　3=60%　　5=100%
[d] 110 [h] 0x06E	40111	backlight alarm	1	r/w	uint16	0=off　　1=on　　2=flash

PDU ADDRESS	REGISTER	VARIABLE POWER MANAGEMENT	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 80 [h] 0x050	40081	LCD update time	1	r/w	uint16	0=fast　　2=3sec　　4=30sec 1=1sec　　3=15sec　　5=off
[d] 81 [h] 0x051	40082	battery mode	1	r/w	uint16	0=operational　1=shelf

PDU ADDRESS	REGISTER	VARIABLE FLOWMETER	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 96 [h] 0x060	40097	flowmeter signal	1	r/w	uint16	0=NPN　　4=PNP　　8= coil lo 1=NPN LP　5=PNP LP　9=act 8.1V 2=Reed　　6=NAMUR　10= act 12 V 3=Reed LP　7=coil hi　11=act 24V

PDU ADDRESS	REGISTER	VARIABLE CONTROL	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 158 [h] 0x09E	40159	delay time	1	r/w	uint16	0.1 … 999.9 steps of 0.1 second
[d] 195 [h] 0x0C3	40196	begin time	1	r/w	uint16	0.1 … 999.9 steps of 0.1 second
[d] 197 [h] 0x0c5	40198	start-up time	1	r/w	Uint16	0.1 … 999.9 steps of 0.1 second
[d] 222 [h] 0x0DE	40223	no pulse time	1	r/w	uint16	0.1 … 999.9 steps of 0.1 second
[d] 194 [h] 0x0C2	40195	pause	1	r/w	uint16	0=disable 1=enable
[d] 174 [h] 0x0AE	40175	restart time	1	r/w	uint16	0.1 … 999.9 steps of 0.1 second
[d] 192 [h] 0x0C0	40193	overrun time	1	r/w	uint16	0.1 … 999.9 steps of 0.1 second

PDU ADDRESS	REGISTER	VARIABLE STATUS	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 217 [h] 0x0D9	40218	function status input no. 1	1	r/w	uint16	0=off 2=stop 3=continuous 1=start
[d] 111 [h] 0x06F	40112	function status input no. 2	1	r/w	uint16	0=off 2=stop 3=both 1=pauze

PDU ADDRESS	REGISTER	VARIABLE COMMUNICATION	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 144 [h] 0x090	40145	speed (baudrate)	1	r/w	uint16	0=1200 3=9600 5=19200HP 1=2400 4=9600HP 6=38400HP 2=4800
[d] 145 [h] 0x091	40146	Modbus address	1	r/w	uint16	1…247
[d] 146 [h] 0x092	40147	Modbus mode	1	r/w	uint16	0=OFF 1=RTU 2=ASCII
[d] 1271 [h] 0x4F7	41272	databits	1	r/w	uint16	0=8 bits 1=7 bits
[d] 1272 [h] 0x4F8	41273	parity	1	r/w	uint16	0=none 1=even 2=odd
[d] 199 [h] 0x0C7	40200	com lock	1	r/w	uint16	0=disable 1=period 2=full

PDU ADDRESS	REGISTER	VARIABLE OTHERS	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 173 [h] 0x0AD	40174	model number	1	r	uint16	0…9999
[d] 160 [h] 0x0A0	40161	model suffix	1	r	uint16	Representation: ASCII character
[d] 162 [h] 0x0A2	40163	firmware version	2	r	uint32	0…999999 Representation: nn:nn:nn
[d] 165 [h] 0x0A5	40166	serial number	2	r	uint32	0…9999999 Representation: nnnnnnn
[d] 168 [h] 0x0A8	40169	password	1	r/w	uint16	0…9999
[d] 170 [h] 0x0AA	40171	tag-nr	2	r/w	uint32	0...9999999 Representation: nnnnnnn

PDU ADDRESS	REGISTER	VARIABLE COMMUNICATION - BATCH	NO. REGISTERS	R/W	TYPE	VALUE / REMARKS
[d] 221 [h] 0x0DD	40224	batch mode	1	r	uint16	0=invalid 5=startup 128= time out 1=idle 6=dispense 129=alarm lo 2=test 7=pause 130=alarm hi 3=delay 8=stop 131=dispense 4=begin 9=finish 1=3=max error 132=error
[d] 57 [h] 0x09D	40058	batch action	1	r/w	Uint16	0=none 2= n/a 4=finish 1=n/a 3= n/a Do write finish to the unit to release the F133-P according setup

APPENDIX D: DECLARATION OF CONFORMITY

Indicators, controllers and monitoring systems for flow, level, pressure and temperature measurement in industrial environments.

FLUIDWELL
Accurate Liquid Management

Count on us.

Declaration of Conformity

Fluidwell F1-series indicators

Veghel, July 2016

We, Fluidwell BV, declare under our sole responsibility that the F1-series indicators are designed and will operate conform the following applicable European Directives and Harmonised Standards, when installed and operated according to the related manual:

EMC Directive		EN61000-6-2:2005; EN61000-6-3:2007; EN61326-1:2013
RoHS Directive		EN 50581:2012
Low Voltage Directive	For options –PM or –OR:	EN61010-1:2010
ATEX Directive	For option --XI, intrinsically safe:	EN60079-0:2012+A11; EN60079-11:2012
	Protective system:	Ⓔ II 1 G Ex ia IIB/IIC T4 Ga
		Ⓔ II 1 D Ex ia IIIC T100 °C Da
Certification	Certificates:	KEMA 03ATEX1074 X, Issue 5
	Notified body 0344:	DEKRA Certification BV, Meander 1051, 6825 MJ, Arnhem, the Netherlands.

Last two digits of the year in which the CE marking was affixed: 03.

Fluidwell BV

I. Meij, Manager Technology

Fluidwell BV are ISO9001 certified by DEKRA Certification BV, Meander 1051, 6825 MJ, Arnhem, The Netherlands.

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LIST OF CONFIGURATION SETTINGS			
SETTING	**DEFAULT**	**DATE :**	**DATE :**
1 - TOTAL	Enter your settings here		
11 unit	L		
12 decimals	0000000		
13 K-factor	0000001		
14 decimals K-factor	0		
15 batch max	0		
16 batch total			
17 batch count			
2 - FLOW RATE			
21 unit	L		
22 time	/min		
23 decimals	0000000		
24 K-factor	0000001		
25 decimals K-factor	0		
26 calculation / pulses	010		
27 cut-off	30.0 sec.		
28 low flow rate alarm	0.0 L/min		
29 high flow rate alarm	0.0 L/min		
2A alarm delay time	0.0 sec		
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31 light	100%		
32 bl alarm	off		
4 - POWER MANAGEMENT			
41 LCD-new	1 sec.		
42 mode	operational		
5 - FLOWMETER			
51 signal	coil-lo		
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61 delay time	0.0 sec		
62 begin time	0.0 sec		
63 start-up time	0.0 sec		
64 no pulse time	0.0 sec		
65 pause	enabled		
66 restart time	0.0 sec		
67 overrun time	0.0 sec		
7 - STATUS			
71 status input 1	off		
72 status input 2	off		
8 – COMM modB			
81 speed	9600		
82 address	1		
83 mode	BUS-RTU		
84 databits	8		
85 parity	none		
86 comm.lock	disabled		
8 - OTHERS			
81 model	F133-P	F133-P	F133-P
82 software version	03.03.xx		
83 serial number	xxxxxxxx		
84 Password	0000		
85 Tag-nr.	0000000		