**FLOMEC**™

# Batch Controller

## Owner's Manual – Model F130-P
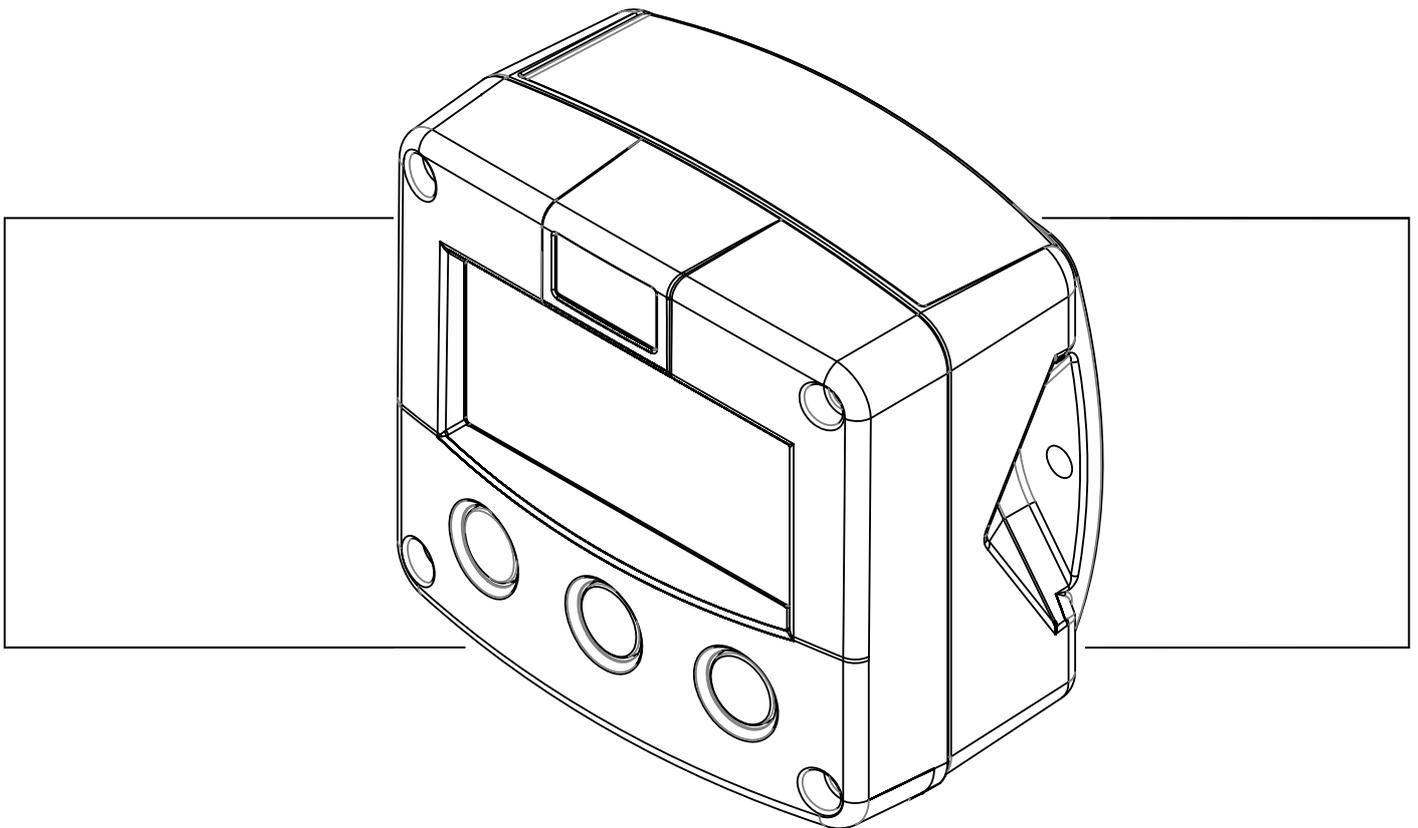


*Signal input flowmeter type P: pulse, Namur and coil*

*Status inputs: start and stop*

*Control output: two control outputs for two stage control, or one control output and pulse output ref. total*

*Options: Intrinsically Safe, Modbus communication*

CE 〈Ex〉

## SAFETY INSTRUCTIONS

**WARNING**

- *Any responsibility is lapsed if the instructions and procedures as described in this manual are not followed.*

- *LIFE SUPPORT APPLICATIONS: The F130-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 aluminum casing as indicated if the F130-P has been supplied with the 115-230V AC power-supply type PM. The green / yellow wire between the back-casing and removable terminal-block may never be removed.*

- *Intrinsically Safe applications: follow the instructions as mentioned in Chapter 5 and consult "Fluidwell F1..-...-XI - Documentation for Intrinsic Safety".*

## DISPOSAL

At the end of its life this product should be disposed of according to local regulations regarding waste electronic equipment. If a battery is present in this product it should be disposed of separately. The separate collection and recycling of your waste equipment will help to conserve natural resources and ensure that it is recycled in a manner that protects the environment.

## 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 F130-P implemented without preceding written consent from the manufacturer, will result in the immediate termination of product liability and warranty period.
- Installation, use, maintenance and servicing of this equipment must be carried out by authorized technicians.
- 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 F130-P supplied.
- Open the casing 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 to the casing classification (see manufacture's plate and chapter 4.2.).
- 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 OPERATION MANUAL

This operation 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 operation 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 F130-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 F130-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 F130-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.

| | | |
|---|---|---|
| Hardware version | : | 03.01.xx |
| Software version | : | 03.01.xx |
| Manual | : | GPI_F130PEN_v0601_01 |
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# CONTENTS MANUAL

# 1. INTRODUCTION

## 1.1. SYSTEM DESCRIPTION OF THE F130-P

**Functions and features**
The batch controller model F130-P is a microprocessor driven instrument designed for batching and filling of small batch sizes up to large quantities as well as displaying total and 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),
▪ several mounting possibilities with GRP or aluminum enclosures for industrial surroundings,
▪ ability to process all types of flowmeter signals,
▪ transmitting possibilities with analog / pulse and communication (option) outputs.

**Flowmeter input**
This manual describes the unit with a <u>pulse type</u> input from the flowmeter "-P version". Other versions are available to process (0)4-20mA or 0-10V flowmeter signals.
One flowmeter with a passive or active pulse, Namur or sine wave (coil) signal output can be connected to the F130-P. To power the sensor, several options are available.

**Standard outputs**
▪ Two transistor or relay outputs: for two-stage control or one stage control with pulse output.
▪ Configurable pulse output: a scaled pulse mirroring a certain linearized total quantity. Maximum frequency 500Hz. The pulse length can be set from 1msec up to 10 seconds.
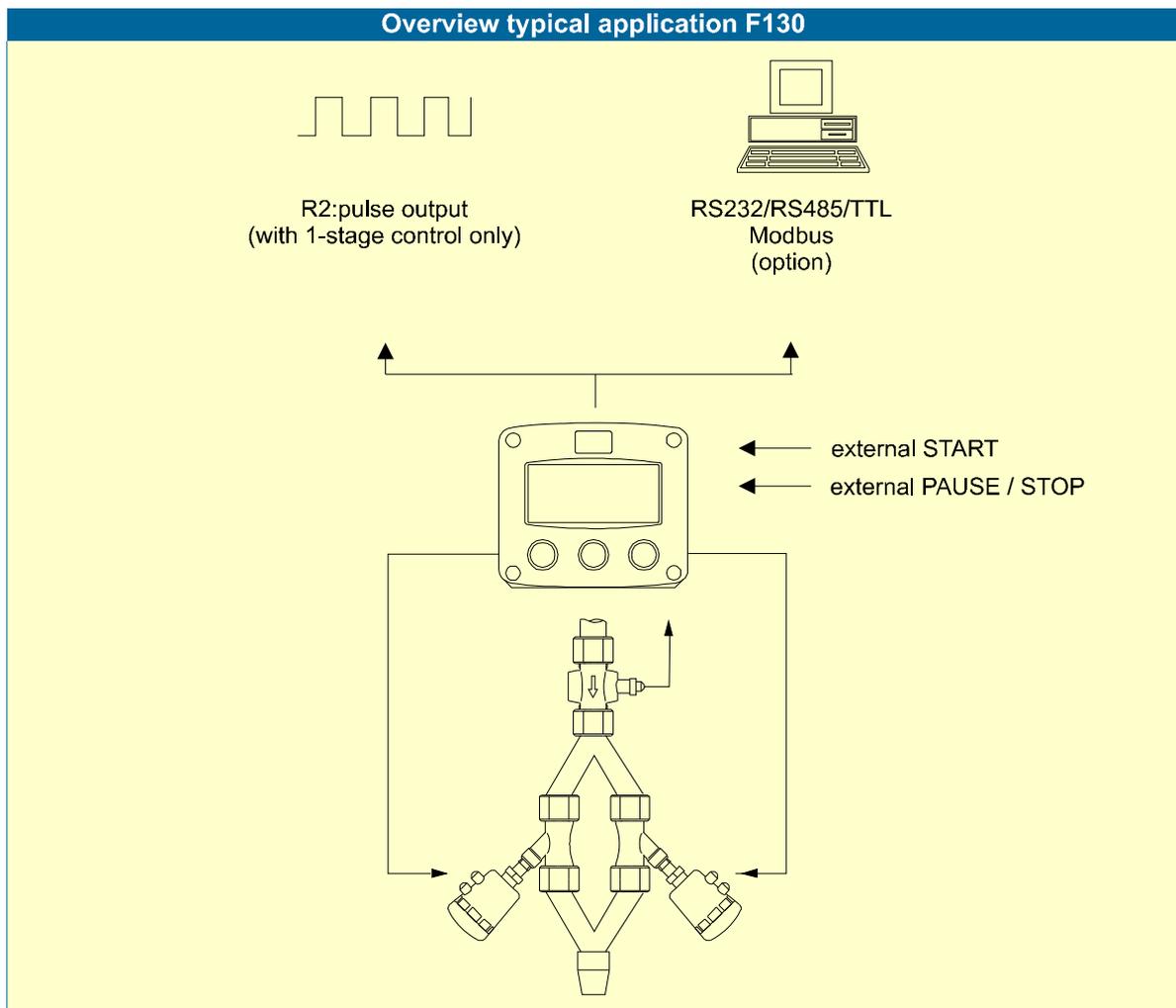


Fig. 1: Typical application for the F130-P

**Configuration of the unit**
The F130-P was designed to be implemented in many types of applications. For that reason, a SETUP-level is available to configure your F130-P according to your specific requirements.
SETUP includes several important features, such as K-factors, measurement units, signal selection etc. All setting are stored in EEPROM memory and will not be lost in the event of power failure or a drained battery.
To extend the battery-life time, please make use of the power-management functions as described in chapter 3.2.3.

**Display information**
The unit has a large transflective LCD with all kinds of symbols and digits to display measuring units, status information and key-word messages.
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 (also battery powered), intrinsic safety, mechanical relay or active outputs, power- and sensor-supply options, LED backlight, panel-mount, wall-mount and weather-proof enclosures, flame proof enclosure.

## 2. OPERATIONAL

### 2.1. GENERAL

- *The F130-P may only be operated by personnel 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.*

Caution !

This chapter describes the daily use of the F130-P. This instruction is meant for users / operators.

### 2.2. CONTROL PANEL

The following keys are available:



*Fig. 2: Control Panel*

**Functions of the keys**

This key is used to program and save new values or settings.
It is also used to gain access to SETUP-level; please read chapter 3.

This key is used to START the batch process.
**The** arrow-key ▲ is used to increase a value after PROG has been pressed or to configure the unit; please read chapter 3.

Press STOP to "PAUSE" the batch process. When this key is pressed twice, the process is completely finished and can't be continued.
STOP is also used to select Total and accumulated total.
After PROG has been pressed, the arrow-key ▶ is used to select a value

### 2.3. OPERATOR INFORMATION AND FUNCTIONS

In general, the F130-P will always function at Operator level. The information displayed is dependant upon the SETUP-settings. All pulses generated by the connected flowmeter are measured by the F130-P in the background, whichever screen refresh rate setting is chosen. After pressing a key, the display will be updated very quickly during a 30 second period, after which it will slow-down again.

- **To enter a batch quantity**
    To change the PRESET-value, following procedure must be followed:

    1)   press PROG: the word "PROGRAM" will be flashing,
    2)   use ▶ to select the digits and ▲ to increase that value,
    3)   set the new PRESET-value by pressing ENTER.
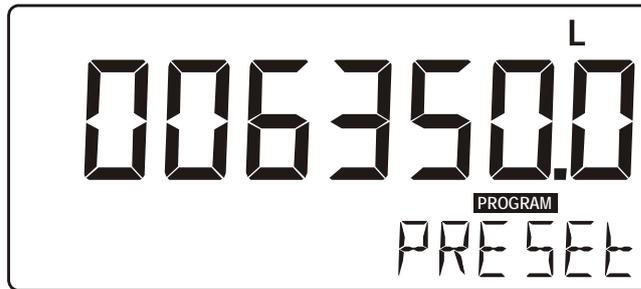
*Fig. 3: Example display information during programming preset value.*

When data is altered but ENTER has not been pressed yet, then the alteration can still be cancelled by waiting for 20 seconds or by pressing ENTER during three seconds: the former value will be reinstated. The PRESET-value can be used time after time till a new value is programmed.

*Please note that alterations will only be set after ENTER has been pressed!*

- **Batch maximum**
  When you program a new value which is not valid - the batch size is too large - the decrease-sign ▾ will be displayed while you are programming; the new value will not be accepted!

- **Starting up the batch process**
  The batch process can only be started up when "READY" is displayed. The batch process is started-up by pressing the START-key. Depending on the SETUP-settings, one or two relays will be switched.  The arrows at the display indicate if the ACTUAL-value is / was counting up or down.
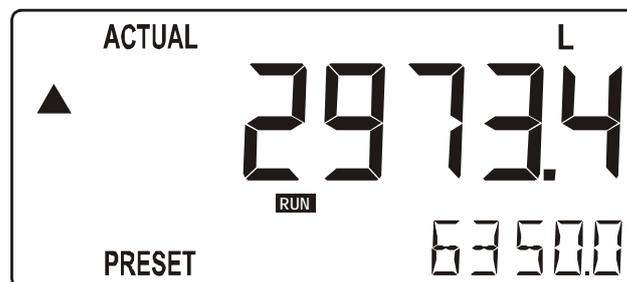


*Fig. 4: Example display information during the process*

- **Interrupting and ending the batch process**
  When STOP is pressed once, the batch process will be temporarily interrupted; the actual values are not lost. At the display, the word "PAUSE" will be flashing. From this stage, the batch process can be resumed with the START-key.
  The process can be ended entirely at all times by pressing STOP twice in which case the actual values are "lost" and the system returns to steady state: the batch can not be resumed.
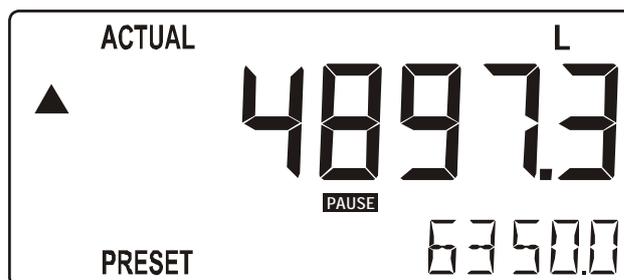


*Fig. 5: Example display information when interrupted*

When a batch has completed the following functions are available:

▪ **Display accumulated total**
When the STOP-key is pressed, total and accumulated total are displayed. The accumulated total cannot be re-initialized. The value will count up to 99,999,999,999. The unit and number of decimals are displayed according to the configuration settings for preset.

*Note !*

*When the value is too large to display, the readout changes to  - - - - - - -. The maximum number to display can be changed with the decimals function, as described in chapter 3.*

▪ **Clear total**
The value for total can be re-initialized. To do so, select Total and press PROG followed by STOP - STOP. After pressing STOP once, the flashing text "PUSH STOP" is displayed.
To avoid re-initialization at this stage, press another key than STOP or wait for 20 seconds.
Re-initialization of total DOES NOT influence the accumulated total.

## 2.4 OPERATOR ALARMS

▪ **Low-battery alarm**
When the battery voltage drops, it must be replaced. At first "low-battery" will flash, but as soon as it is displayed continuously, the battery MUST be replaced shortly after!
Only official batteries may be used, or else the guarantee will be terminated. The remaining lifetime after the first moment of indication is generally several days up to some weeks.



*Fig. 6: Example of low-battery alarm.*

▪ **No flow alarm**
The F130-P offers a no-flow monitoring feature: if the flowmeter fails to generate a signal during a certain period of time, the unit will shut-off the control output(s) and bring the batch controller in alarm status.
To clear the alarm press STOP, this will also bring the batch in PAUSE mode. When in PAUSE mode, the batch can be continued or denied. (See "Interrupting and ending the batch process" above.)

▪ **Alarm 01-03**
When "ALARM" is displayed, press the SELECT key to display the reason of the alarm: 1-3. Please consult Appendix B: problem solving.

# 3.    CONFIGURATION

## 3.1.    INTRODUCTION

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 the instrument may only be carried out by trained personnel authorized by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.*
- *The F130-P may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.*
- *Ensure that the measuring system is correctly wired up according to the wiring diagrams. The housing may only be opened by trained personnel.*
- *Take careful notice of the " Safety rules, instructions and precautionary measures " in the front of this manual.*

## 3.2.    PROGRAMMING SETUP-LEVEL

### 3.2.1.    GENERAL

Configuration of the F130-P is done at SETUP-level. SETUP-level is reached by pressing the PROG/ENTER key for 7 seconds; at which time, both arrows ⬍ will be displayed. In order to return to the operator level, PROG will have to be pressed for three seconds. Alternatively, if no keys are pressed for 2 minutes, the unit will exit SETUP automatically.
SETUP can be reached at all times while the F130-P remains fully operational.

Note !

**Note:** *A pass code may be required to enter SETUP. Without this pass code access to SETUP is denied.*

**To enter SETUP-level:**
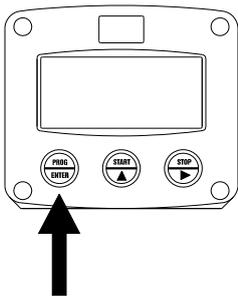
Press $\overset{\text{PROG}}{\underset{\text{ENTER}}{\bigcirc}}$ for 7 seconds

**Matrix structure SETUP-level:**
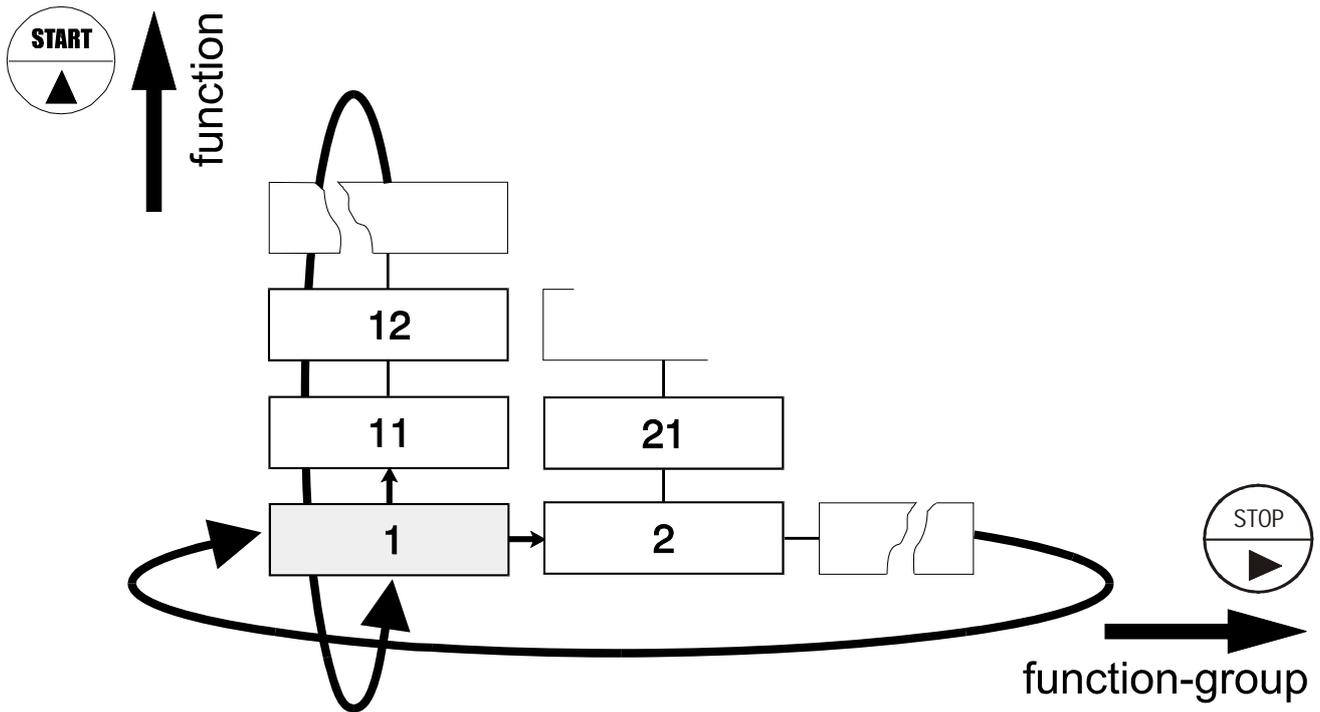


**SCROLLING THROUGH SETUP-LEVEL**

**Selection of function-group and function:**
SETUP is divided into several function groups and functions.
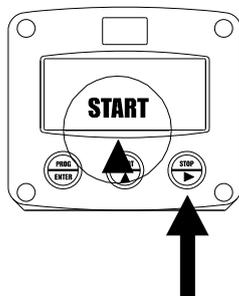


Select function-group with STOP ▶
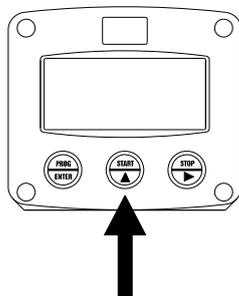
Select function with START ▲

Each function has a unique number, which is displayed below the word "SETUP" at the bottom of the display. The number is a combination of two figures. The first figure indicates the function-group and the second figure the sub-function. Additionally, each function is expressed with a keyword.

After selecting a sub-function, the next main function is selected by scrolling through all "active" sub-functions (e.g. 1▲, 11▲, 12▲, 13▲, 14▲, 1▶, 2▶, 3▲, 31 etc.).

**To change or select a value:**
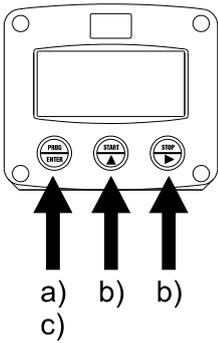
a) press (PROG ENTER) briefly; **PROGRAM** will start flash

b) select or enter value with (START ▲) and / or (STOP ▶)

c) press (PROG ENTER) to confirm the value / selection.

a) b) b)
c)

To change a value, use ▸ to select the digits and ▲ to increase that value.
To select a setting, both ▲ and ▸ can be used.
If the new value is invalid, the increase sign▲ or decrease-sign▾ will be displayed while you are programming.

When data is altered but ENTER is not pressed, then the alteration can still be cancelled by waiting for 20 seconds or by pressing ENTER for three seconds: the PROG-procedure will be left automatically and the former value reinstated.

Note !

*Note: alterations will only be set after ENTER has been pressed!*

**To return to OPERATOR-level:**
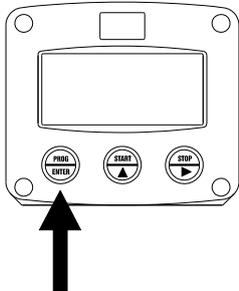
Press (PROG ENTER) for 3 seconds

In order to return to the operator level, PROG will have to be pressed for three seconds. Also, when no keys are pressed for 2 minutes, SETUP will be left automatically.

### 3.2.2. OVERVIEW FUNCTIONS SETUP LEVEL

| SETUP FUNCTIONS AND VARIABLES | | | |
|---|---|---|---|
| **1** | **PRESET** | | |
| | 11 | UNIT | L - m3 - kg - lb - GAL - USGAL - bbl - no unit |
| | 12 | DECIMALS | 0 - 1 - 2 - 3 (Ref: displayed value) |
| | 13 | K-FACTOR: | 0.000010 - 9,999,999 |
| | 14 | DECIMALS K-FACTOR | 0 - 6 |
| | 15 | BATCH MINIMUM | X,XXX,XXX quantity |
| | 16 | BATCH MAXIMUM | X,XXX,XXX quantity |
| **2** | **OVERRUN** | | |
| | 21 | OVERRUN | disable - enable |
| | 22 | TIME | 0.1 - 999.9 seconds |
| **3** | **ALARM** | | |
| | 31 | NO-FLOW ALARM | disable - enable |
| | 32 | NO-FLOW TIME | 0.1 - 999.9 seconds |
| **4** | **DISPLAY** | | |
| | 41 | DISPLAY | increase - decrease |
| | 42 | LIGHT (BACKLIGHT BRIGHTNESS) | 0% (OFF) - 20% - 40% - 60% - 80% - 100% (FULL BRIGHTNESS) |
| **5** | **POWER MANAGEMENT** | | |
| | 51 | LCD NEW | fast - 1 sec - 3 sec - 15 sec - 30 sec - off |
| | 52 | BATTERY MODE | operational - shelf |
| **6** | **FLOWMETER** | | |
| | 61 | SIGNAL | npn - npn_lp - reed - reed_lp - pnp - pnp_lp - namur - coil_hi - coil_lo - act_8.1 - act_12 - act_24 |
| **7** | **RELAYS** | | |
| | 71 | RELAYS | 1-step / 2-step |
| | 72 | PRECLOSE | X,XXX,XXX quantity |
| | 73 | IMPULSE WIDTH | 0.000 - 9.999 sec (0 = off) |
| | 74 | IMPULSE DECIMAL | 0 – 1 – 2 – 3 |
| | 75 | IMPULSE PER | X,XXX,XXX quantity |
| | 76 | IMPULSE ACCORDING | total - batch |
| **8** | **COMMUNICATION** | | |
| | 81 | SPEED / BAUDRATE | 1200 - 2400 - 4800 - 9600 |
| | 82 | ADDRESS | 1 - 255 |
| | 83 | MODE | ASCII - rtu - off |
| **9** | **OTHERS** | | |
| | 91 | TYPE / MODEL | |
| | 92 | SOFTWARE VERSION | |
| | 93 | SERIAL NO. | |
| | 94 | PASSWORD | 0000 - 9999 |
| | 95 | TAGNUMBER | 0000000 - 9999999 |

### 3.2.3. EXPLANATION OF SETUP-FUNCTIONS

| 1 - PRESET | |
|---|---|
| **MEASUREMENT UNIT**<br>**11** | SETUP - 11 determines the measurement unit for preset, total, accumulated total and pulse output. The following units can be selected:<br><br>L - m3 - kg - lb. - GAL - USGAL - bbl - _ (no unit).<br><br>Alteration of the measurement unit will have consequences for operator and SETUP-level values.<br>Please note that the K-factor has to be adapted as well; the calculation is not done automatically. |
| **DECIMALS**<br>**12** | The decimal point determines for preset, total, accumulated total and pulse output the number of digits following the decimal point.<br>The following can be selected:<br><br>0000000 - 111111.1 - 22222.22 - 3333.333 |
| **K-FACTOR**<br>**13** | 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 measurement unit (SETUP 11), for example per cubic meter. The more accurate the K-factor, the more accurate the functioning of the system will be.<br><br>**Example 1:** **Calculating the K-factor.**<br>*Let us assume that the flowmeter generates 2.4813 pulses per liter and the selected unit is "cubic meters / m3". A cubic meter consists of 1000 parts of one liter which implies 2,481.3 pulses per m3. So, the K-factor is 2,481.3. Enter for SETUP - 13: "2481300" and for SETUP - 14 - decimals K-factor "3".*<br><br>**Example 2:** **Calculating the K-factor.**<br>*Let us assume that the flowmeter generates 6.5231 pulses per gallon and the selected measurement unit is gallons.*<br>*So, the K-Factor is 6.5231. Enter for SETUP - 13: "6523100" and for SETUP - 14 decimals K-factor "6".* |
| **DECIMALS K-FACTOR**<br>**14** | This setting determines the number of decimals for the K-factor entered. (SETUP 13). The following can be selected:<br><br>0 - 1 - 2 - 3 - 4 - 5 - 6<br><br>Please note that this setting influences the accuracy of the K-factor indirectly. (i.e. the position of the decimal point and thus the value given) This setting has NO influence on the displayed number of digits for total (SETUP 12)! |
| **BATCH MINIMUM**<br>**15** | This function limits the operator to enter a new preset-value which is less as the entered batch minimum. |
| **BATCH MAXIMUM**<br>**16** | This function limits the operator to enter a new preset-value which is more as the entered batch maximum. |

| 2 - OVERRUN | |
|---|---|
| Overrun can occur at the end of the batch process, as a result of slowness of a valve / pump. Consequently, the accuracy is less. With this function, the F130-P analyses the actual overrun characteristic after every batch. This information is used to correct the overrun automatically. | |
| **OVERRUN**<br>**21** | For an accurate overrun correction, it is necessary that the flow meter meets certain technical demands, such as "high resolution" and shows no "false" overrun due to a slow update time.<br>Do not enable this function if the flow meter does not meet these technical demands. |
| **OVERRUN TIME**<br>**22** | The overrun characteristic of the system will be analyzed during a certain time after the batch. In this way, false signal generated through leakage are eliminated.<br>Enter here the expected time needed by the system to stop a batch. It is advisable to provide extra time in order to avoid an incorrect overrun correction or false leakage alarms.<br>*Note that the next batch can only be started after elapsing of this overrun time!*<br>The minimum overrun time is 0.1 second, maximum 999.9 seconds. |

| 3 - ALARM | |
|---|---|
| The F130-P offers a no-flow monitoring feature: if the flowmeter fails to generate a signal during a certain period of time, the unit will shut-off the control output(s) and bring the batch controller in alarm status. After clearing the alarm, the batch can be continued or denied. | |
| **NO-FLOW ALARM**<br>**31** | With this function, the no-flow monitoring can be enabled / disabled. |
| **NO-FLOW TIME**<br>**32** | In case of a failing signal, this function determines the period of time after which an alarm has to be triggered.<br>The minimum monitoring time is 0.1 second, maximum 999.9 seconds. |

| 4 - DISPLAY | |
|---|---|
| **DISPLAY**<br>**41** | The large 17mm digits can be set to display the actual batched quantity (increase) OR to display the remaining quantity to be batched (decrease). |
| **LIGHT (BACKLIGHT BRIGHTNESS)**<br>**42** | The density of the backlight can be set in following range:<br><br>0% (OFF) – 20% - 40% - 60%  - 80% - 100% (FULL BRIGHTNESS) |

## 5 - POWER MANAGEMENT

When used with the internal battery option, the user can expect reliable measurement over a long period of time. The F130-P has several smart power management functions to extend the battery life time significantly. Two of these functions can be set:

| | |
|---|---|
| **LCD NEW**<br>**51** | The refresh rate of the display influences the power consumption significantly. When the application does not require a fast display update, 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.<br>The following can be selected:  Fast - 1 sec - 3 sec - 15 sec - 30 sec - off.<br><br>**Example:** **Battery life-time**<br>*with a coil pick-up, 1KHz. pulses, FAST update: about 2 years.*<br>*with a coil pick-up, 1KHz. pulses, 1 sec update: about 5 years.*<br><br>*Note: after a button has been pressed by the operator - the display refresh rate will always switch to FAST for 30 seconds.* |
| **BATTERY-MODE**<br>**52** | The unit has two modes: operational or shelf.<br>After "shelf" has been selected, the unit powers down and can be stored for several years; it will not count pulses, the display is switched off but all settings and totals are stored. In this mode, power consumption is extremely low.<br>To wake up the unit again, press the SELECT-key twice. |

*Note !*

## 6 - FLOWMETER

| | |
|---|---|
| **SIGNAL**<br>**61** | The F130-P is able to handle several types of input signal. The type of flowmeter pickup / signal is selected with SETUP 61.<br>*Note: The selections "active pulse" offer a detection level of 50% of the supply voltage.* Read also par. 4.4.3. Flowmeter input terminal 09-11. |

*Note !*

| TYPE OF SIGNAL | EXPLANATION | RESISTANCE | FREQ. / mV | REMARK |
|---|---|---|---|---|
| NPN | NPN input | 100K pull-up | 6 kHz. | (open collector) |
| NPN - LP | NPN input with low pass filter | 100K pull-up | 2.2 kHz. | (open collector) less sensitive |
| REED | Reed-switch input | 1M pull-up | 1.2 kHz. | |
| REED - LP | Reed-switch input with low pass filter | 1M pull-up | 120 Hz. | Less sensitive |
| PNP | PNP input | 100K pull-down | 6 kHz. | |
| PNP - LP | PNP input with low pass filter | 100K pull-down | 700 Hz. | Less sensitive |
| NAMUR | Namur input | 820 Ohm pull-down | 4 kHz. | External power required |
| COIL HI | High sensitive coil input | - | 20mV p.t.p. | Sensitive for disturbance! |
| COIL LO | Low sensitive coil input | - | 90mV p.t.p. | Normal sensitivity |
| ACT_8.1 | Active pulse input 8.1 VDC | 3K9 | 10KHz. | External power required |
| ACT_12 | Active pulse input 12 VDC | 4K | 10KHz. | External power required |
| ACT_24 | Active pulse input 24 VDC | 3K | 10KHz. | External power required |

## 7 - RELAY OUTPUT

Two control outputs are available to control relays or valves. Relay 2 can also be used as pulse output according the batch total (actual) or accumulated total.

| | |
|---|---|
| **1-STEP / 2-STEP**<br>**71** | With this setting, the function of relay is<br>*Select "2-step" to executed batches with a two-stage valve.*<br>*Select "1-step" to be able to use relay 2 as pulse output relay.* |
| **PRECLOSE QUANTITY**<br>**72** | According to the setting 71 - 2-step, relay two will be used to control a second valve for the batch process.<br>If the product is batched in two steps, the switch-off-moment for relay 2 has to be set. The switch moment is based on the remaining quantity before the end of batch.<br>If preclose is set to zero, relay 2 will switch simultaneously with relay 1. |
| **PULSE WIDTH**<br>**73** | The pulse width determines the time that the output will be switched on; in other words the pulse length. The time between two pulses (when the output is switched off) is at least as long as the pulse width time (50/50 duty cycle).<br>The pulse width is set in milliseconds in the range 0.001 - 9.999 sec. Value "zero" disables the pulse output.<br><br>*Note: If the frequency should go out of range - when the flowrate increases for example - an internal buffer will be used to "store the missed pulses": As soon as the flowrate slows down, the buffer will be "emptied".*<br>*It might be that pulses will be missed due to a buffer-overflow, so it is advised to program this setting within its range!* |
| **IMPULSE DECIMAL**<br>**74** | This setting determines the decimal position for setting 75.<br><br>*Note: the measuring unit is according to setting 11 (for total)* |
| **IMPULSE PER**<br>**75** | According to the measurement unit settings for preset, a scaled pulse will be generated every X-quantity. Enter this quantity here while taking the displayed decimal position and measuring unit into account. |
| **IMPULSE ACCORDING ACC. TOTAL / BATCH**<br>**76** | With this function, it is determined if a pulse will be generated according the quantity batched or according accumulated total.<br>With setting "batch" the pulse generator will be set to zero when a new batch is started up. |

## 8 - COMMUNICATION (OPTIONAL)

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.

| | |
|---|---|
| **BAUDRATE**<br>**81** | For external control, the following communication speeds can be selected:<br>1200 - 2400 - 4800 - 9600 baud |
| **BUS ADDRESS**<br>**82** | For communication purposes, a unique identity can be attributed to every F130-P. This address can vary from 1-255. |
| **MODE**<br>**83** | The communication protocol is Modbus ASCII or RTU mode. Select OFF, to disable this communication function. |

| 9 - OTHERS | |
|---|---|
| **TYPE OF MODEL**<br>**91** | For support and maintenance it is important to have information about the characteristics of the F130-P.<br><small>Your supplier will ask for this information in the case of a serious breakdown or to assess the suitability of your model for upgrade considerations.</small> |
| **VERSION SOFTWARE**<br>**92** | For support and maintenance it is important to have information about the characteristics of the F130-P.<br>Your supplier will ask for this information in the case of a serious breakdown or to assess the suitability of your model for upgrade considerations. |
| **SERIAL NUMBER**<br>**93** | For support and maintenance it is important to have information about the characteristics of the F130-P.<br>Your supplier will ask for this information in the case of a serious breakdown or to assess the suitability of your model for upgrade considerations. |
| **PASS CODE**<br>**94** | All SETUP-values can be pass code protected.<br>This protection is disabled with value 0000 (zero).<br>Up to and including 4 digits can be programmed, for example 1234. |
| **TAGNUMBER**<br>**95** | For identification of the unit and communication purposes, a unique tag number of maximum 7 digits can be entered. |

# 4.    INSTALLATION

## 4.1.    GENERAL DIRECTIONS

- Mounting, electrical installation, start-up and maintenance of this instrument may only be carried out by trained personnel authorized by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.
- The F130-P may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.
- Ensure that 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 personnel.
- Take careful notice of the " Safety rules, instructions and precautionary measures " at the front of this manual.

## 4.2.    INSTALLATION / SURROUNDING CONDITIONS
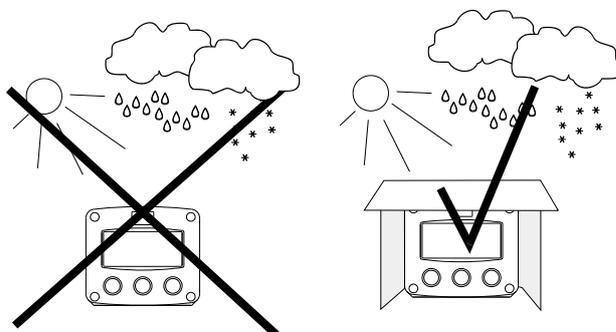


Take the relevant IP classification of the casing into account (see manufactures plate). Even an IP67 (NEMA 4X) casing should NEVER be exposed to strongly varying (weather) conditions.
When panel-mounted, the unit is IP65 (NEMA 4X)!
When used in very cold surroundings or varying climatic conditions, take the necessary precautions against moisture by placing a dry sachet of silica gel, for example, inside the instrument case.
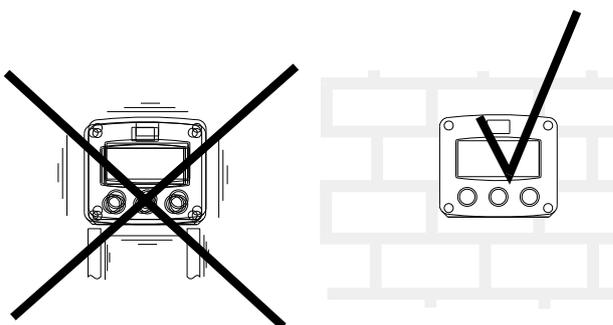


Mount the F130-P on a solid structure to avoid vibrations.

### 4.3. DIMENSIONS- ENCLOSURE
**Aluminum enclosures:**
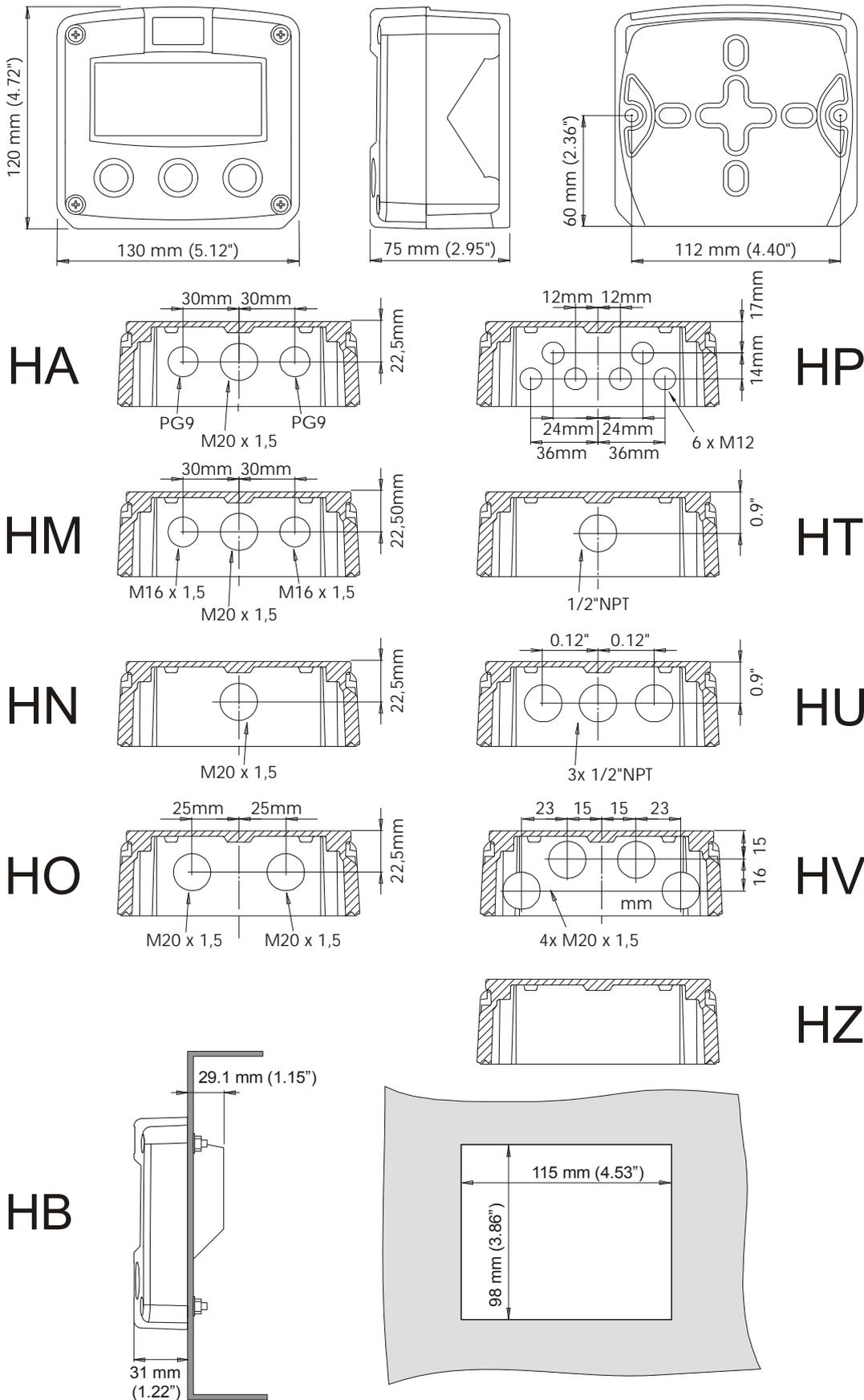


*Fig. 7: Dimensions aluminum enclosures*

**GRP enclosures:**
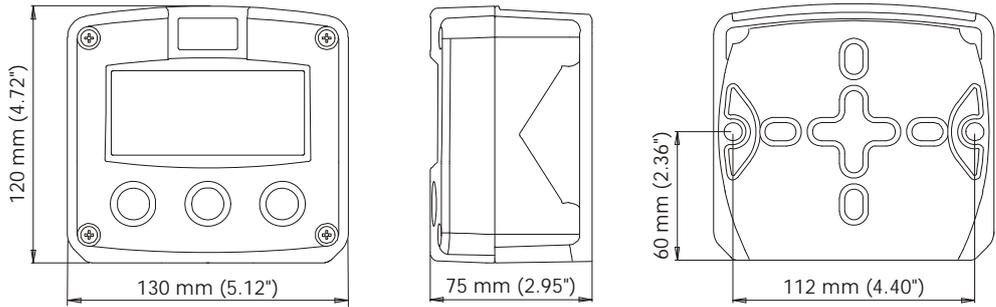
HK back box:
(flat bottom)

HD
HK

HG

HE

HH

HF

HJ

HC
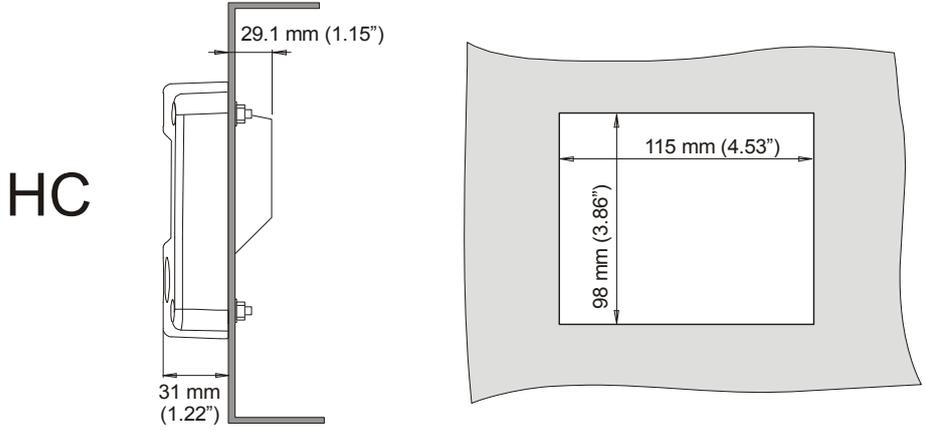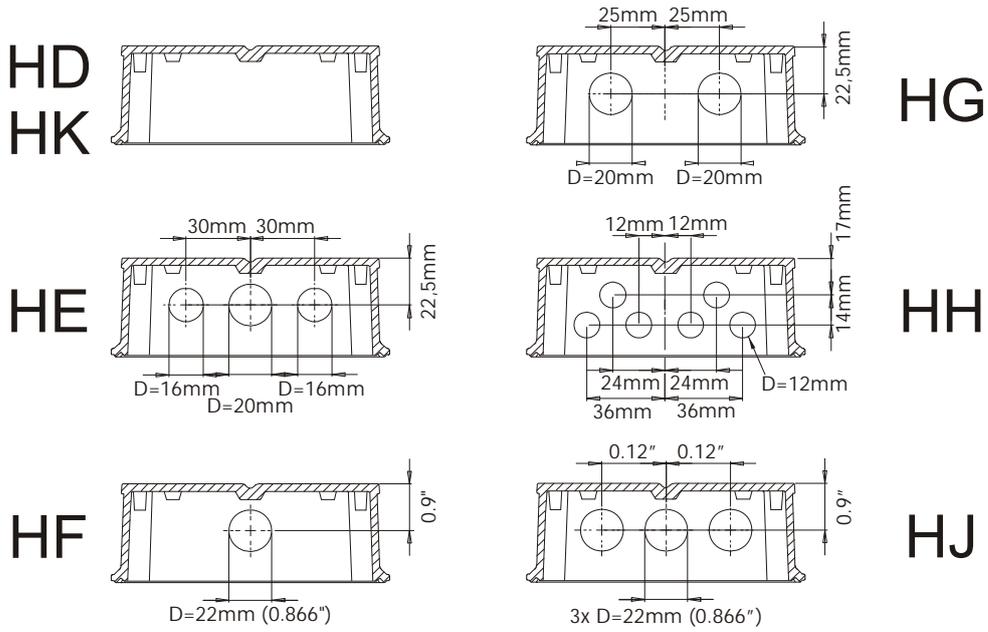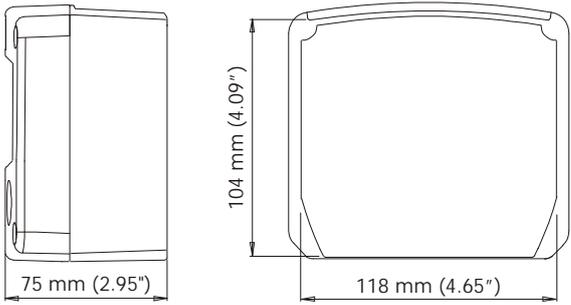
*Fig. 8: Dimensions GRP enclosures*

GPI_F130PEN_v0601_01

### 4.4. INSTALLING THE HARDWARE

### 4.4.1. INTRODUCTION

⚠ WARNING
- 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).

⚠ WARNING
**Aluminum enclosures**
- When installed in an aluminum enclosure and a potentially explosive atmosphere requiring apparatus of equipment protection level Ga and Da, the unit must be installed such 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.

- Do ground the aluminum enclosure properly as indicated, if the F130-P has been supplied with the 115-230V AC power-supply type PM. The green / yellow wire between the back-casing and removable terminal-block may never be removed.
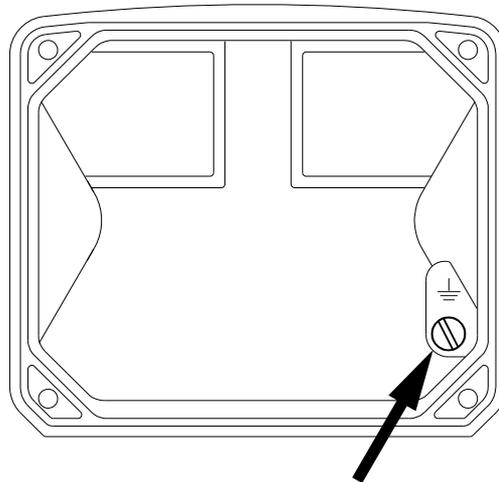


*Fig. 9: Grounding aluminum enclosure with type PM 115-230V AC.*

**FOR INSTALLATION, PAY EMPHATIC ATTENTION TO:**

- Separate cable glands with effective IP67 (NEMA4X) seals for all wires.
- Unused cable entries: ensure that you fit IP67 (NEMA4X) plugs to maintain rating.
- A reliable ground connection for both the sensor, and if applicable, for the metal casing.
- An effective screened cable for the input signal, and grounding of its screen to terminal 9 (GND) or at the sensor itself, whichever is appropriate to the application.

### 4.4.2. VOLTAGE SELECTION SENSOR SUPPLY

*For <u>Intrinsically Safe</u> applications: read chapter 5.*

**Type PB / PC / PX (AP) - battery powered and output loop-powered applications:**
Terminal 11 provides a limited supply voltage of 3.2 V DC (coil signals 1.2V) for the signal output of the flowmeter.
*Note: This voltage MAY NOT be used to power 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).*

**Type PD / PF / PM: Sensor supply: 1.2 - 3.2V - 8.2V - 12V or 24 V DC:**
With this option, a real power supply for the sensor is available. The flowmeter can be powered with 8.2 - 12 or 24 V DC.
Total power consumption PD: max. 50mA@24V and PF / PM: max. 400mA@24V.
The voltage is selected with the three switches inside the enclosure.

- *Warning: be sure that all the leads to the terminals are disconnected from the unit when the internal plastic protection cover has been removed !*
- *HIGH VOLTAGE 400V !! NEVER connect the mains power supply to the unit when the plastic protection cover has been removed !!!*

To access the voltage selection switches you must:
1. Remove the terminals to the field wiring
2. Remove the internal plastic cover.
   A circuit board with four mini switches is now visible.

Depending on the type of F132-P you will find the switches either on the left side (type PD) or on the right side (type PF / PM) of the circuit board. See figure 10 below for details.
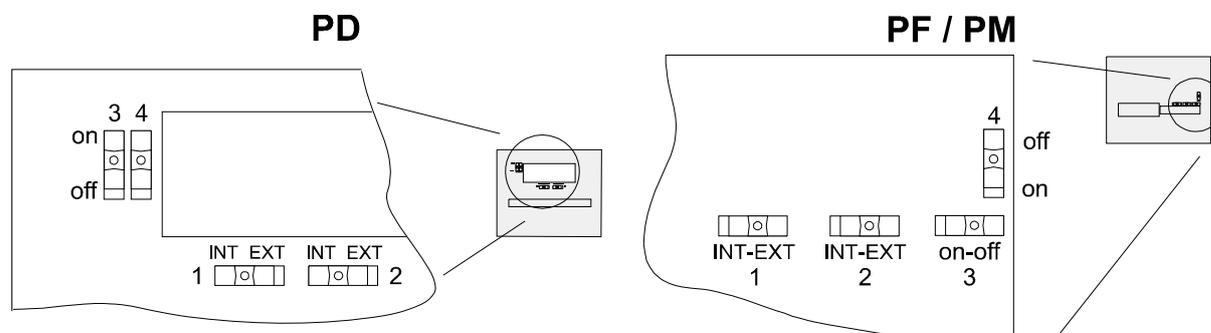


*Fig. 10: Switch setting sensor supply voltage.*

**Switch positions**

| SENSOR A | |
| --- | --- |
| SWITCH 1 | VOLTAGE |
| internal | 3.2 V DC |
| external | switch 3+4 |

| SENSOR B | |
| --- | --- |
| SWITCH 2 | VOLTAGE |
| | |
| | |

| VOLTAGE SELECTION | | |
| --- | --- | --- |
| SWITCH 3 | SWITCH 4 | VOLTAGE |
| on | on | 8.2 V DC |
| on | off | 12 V DC |
| off | off | 23 V DC |

**Function switch 1:**   voltage selection sensor A - terminal 11.
**Function switch 2:**   not available for this Model.
**Function switch 3+4:** the combination of these switches determine the voltage as indicated.
Do move switch 1 and / or switch 2 to the OFF position to enable the selected voltage with switch 3+4.

### 4.4.3. TERMINAL CONNECTORS

*For Intrinsically Safe applications: read chapter 5.*

The following terminal connectors are available:



| | TWO-STAGE or PULSE | BATCH | | | | | |
| POWER SUPPLY TYPE PD / PF / PM | OUTPUT R 2 TYPE OA / OT / OR | OUTPUT R 1 TYPE OA / OT / OR | POWER SUPPLY TYPE PX 8-30V DC | SENSOR SIGNAL PULSE INPUT TYPE P | START INPUT | | STOP INPUT |

| GND | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ⊥ | N | L1 | R2 ⊥ | R2 | R1 ⊥ | R1 | ⊥ | + ↑ | ⊥ | SIGNAL | + ↓ | ⊥ | START | | ⊥ | STOP |

*Fig. 11: Overview of terminal connectors standard configuration F130-P and options.*

**REMARKS: TERMINAL CONNECTORS:**

**Terminal GND- 01- 02: Power Supply - <u>only available with type PD / PF or PM</u>:**

| TYPE | | SENSOR SUPPLY | Terminal | | | backlight | TYPE AA | TYPE AU | Type OA | Type OR |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | GND | 01 | 02 | | | | | |
| PD | 8-24V AC | 8,2 / 12 / 24V max. 50mA | | AC | AC | ◊ | ◊ | ◊ | ◊ | |
| PD | 8-30V DC | 8,2 / 12 / 24V max. 50mA | L- | L+ | | ◊ | ◊ | ◊ | ◊ | |
| PF | 24V AC ± 15% | 8,2 / 12 / 24V max. 400mA | | AC | AC | ◊ | ◊ | ◊ | | ◊ |
| PF | 24V DC ± 15% | 8,2 / 12 / 24V max. 400mA | L- | L+ | | ◊ | ◊ | ◊ | | ◊ |
| PM | 115-230V AC ± 15% | 8,2 / 12 / 24V max. 400mA | EARTH | AC | AC | ◊ | ◊ | ◊ | ◊ | ◊ |
| Note PD | | do not use a AC autotransformer (Spartrafo) without a galvanic isolation. | | | | | | | | |
| Note PF / PM | | The total consumption of the sensors and outputs may not exceed 400mA@24V | | | | | | | | |

◊=option

**Note: for power supply type PX: please read Terminal 07-08 !**

Note !

**Terminal 03-04; control or pulse output R2:**
This output is available to control the batch process for two-step control or as pulse output.
In case of a pulse output function: the maximum pulse frequency of this output is 60Hz.

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

**Type OA:** :
An active 24V DC signal 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).
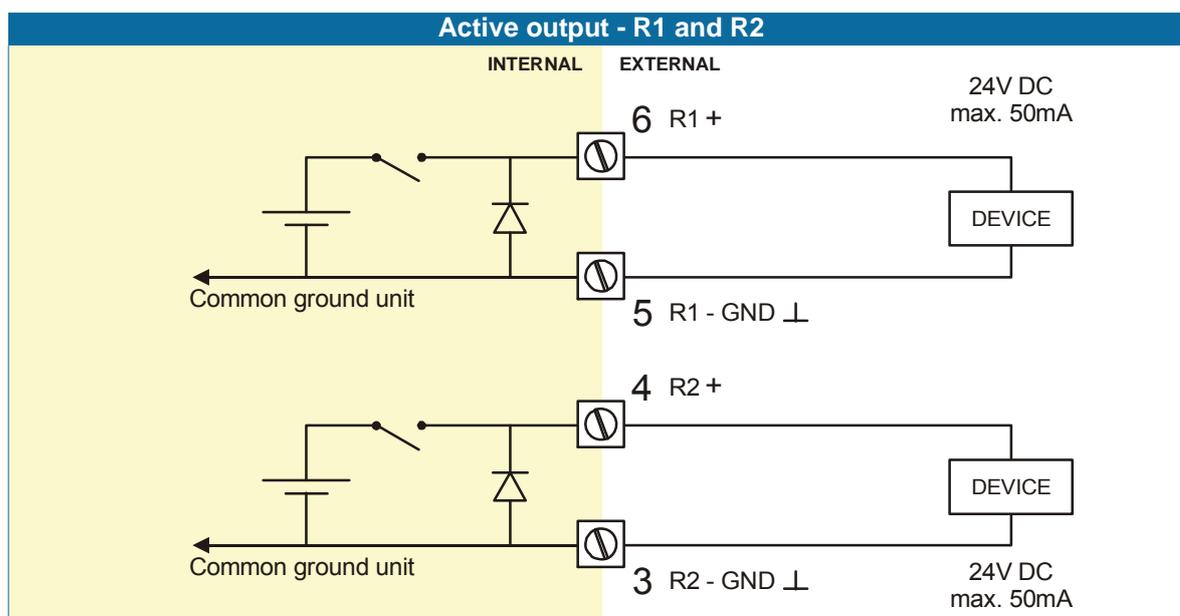


**Type OR:** :
A mechanical relay output according the functions R1 and R2 is available with this option.
Max. switch power 240V-0,5A per output. (Requires power supply type PF / PM).
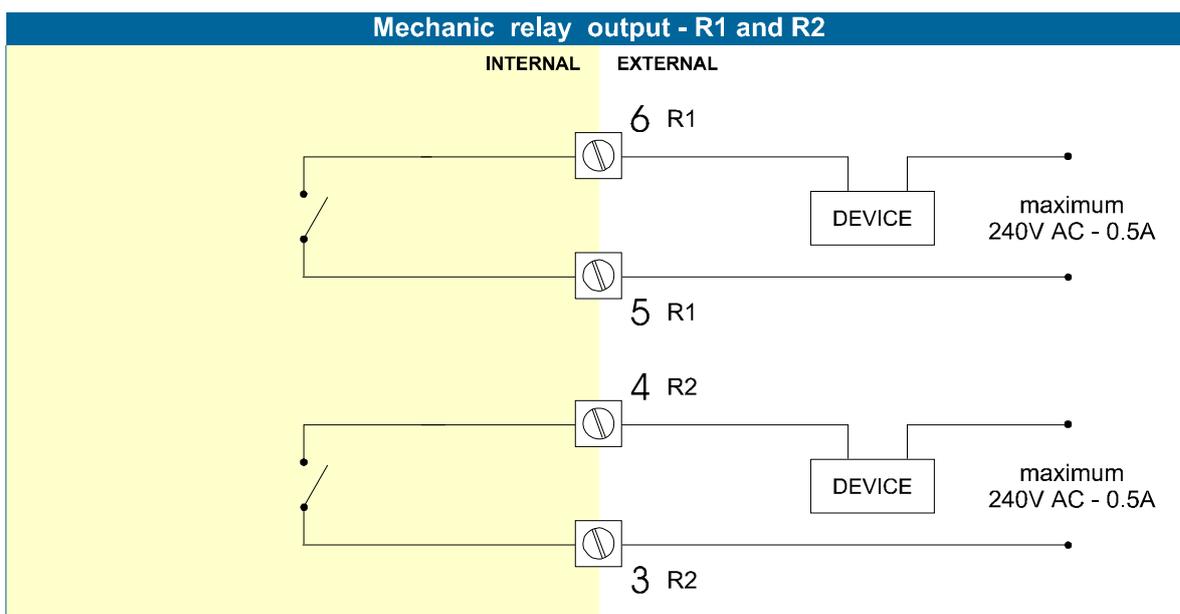
**Type OT:**
A passive transistor output is available with this option. Max. driving capacity 300mA@50V DC.



**Passive transistor output - R1 and R2**
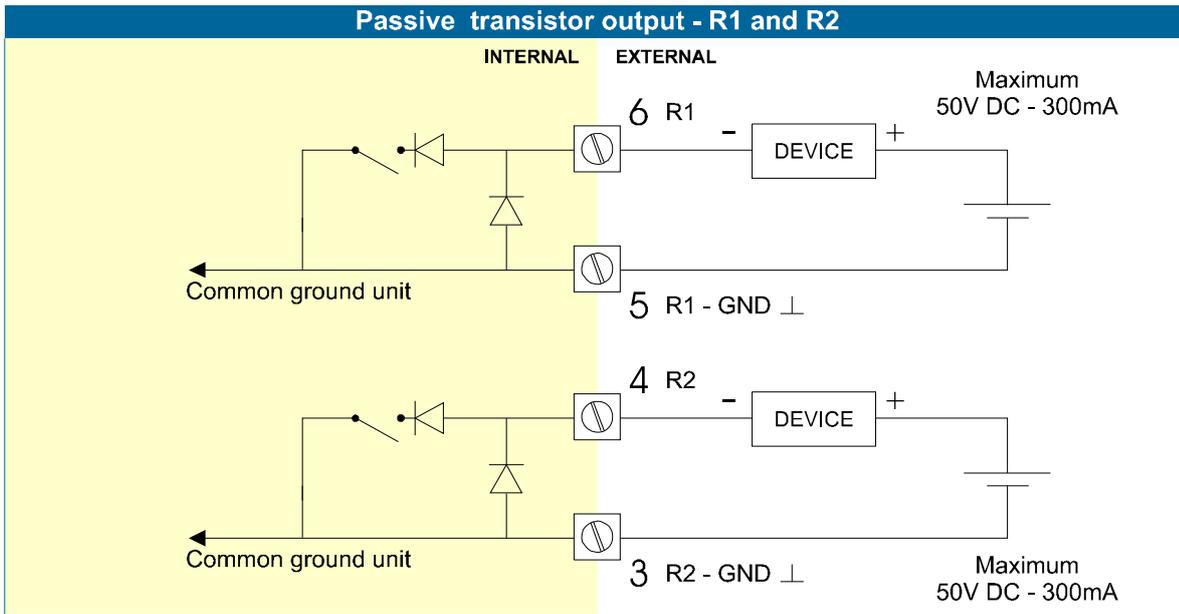
**Terminal 07-08; basic POWER SUPPLY - type PX.**
Connect an external power supply of 8-30VDC to these terminals; the "**-**" to terminal 7 and the "**+**" to terminal 8. When power is applied to these terminals, the (optional) internal battery will be disabled / enabled automatically to extend the battery life time.

**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 with the correct SETUP-function (read par. 3.2.3.)

**Sine-wave signal (Coil)**:
The F130-P is suitable for use with flowmeters which have a coil output signal. Two sensitivity levels can be selected with the SETUP-function:
COIL LO: sensitivity from about 120mVp-p.
COIL HI: sensitivity from about 20mVp-p.
Type ZF offers for setting COIL HI : sensitivity from about 10mVp-p.
Type ZG offers for setting COIL HI : sensitivity from about 5mVp-p.



**Coil signal input**
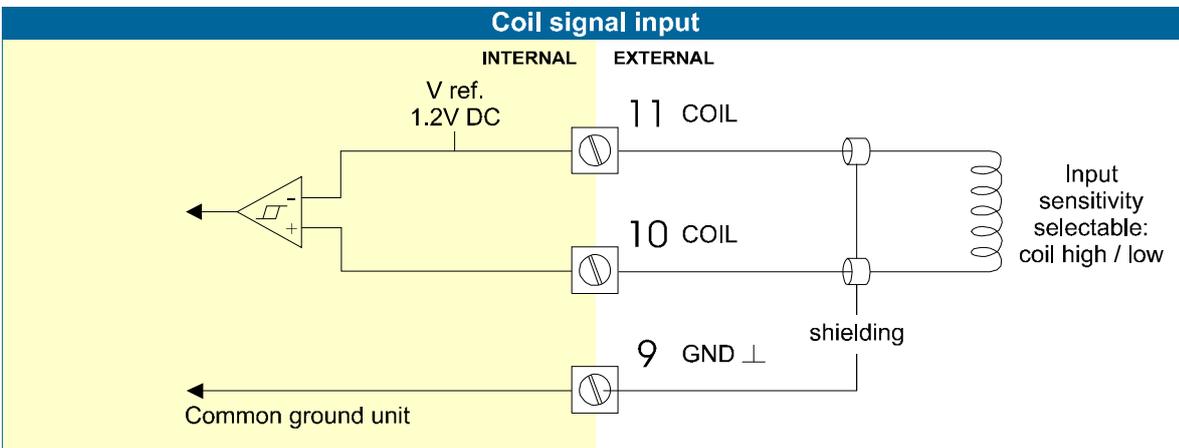
**Pulse-signal NPN / NPN-LP:**
The F130-P is suitable for use with flowmeters which have a NPN output signal. For reliable pulse detection, the pulse amplitude has to go below 1.2V. Signal setting NPN-LP employs a low-pass signal noise filter, which limits the maximum input frequency - read par. 3.2.3.

**NPN signal input**

INTERNAL    EXTERNAL

+ 3.2V DC

100K

low-pass filter
selection NPN-LP

10  SIGNAL

shielding            NPN

Common ground unit

9   GND ⊥
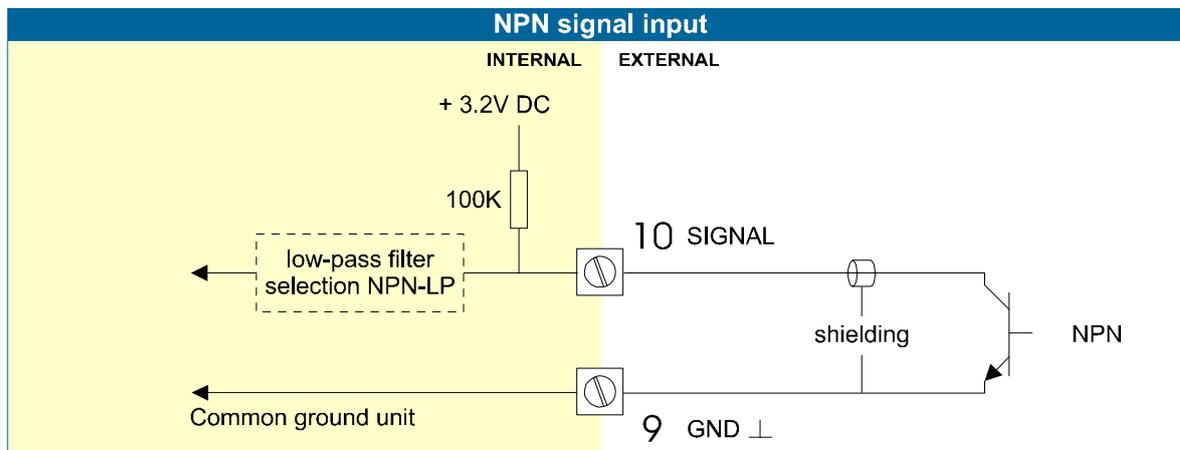
**Pulse-signal PNP / PNP-LP:**
The F130-P is suitable for use with flowmeters which have a PNP output signal. 3.2V is offered on terminal 11 which has to be switched by the sensor to terminal 10 (SIGNAL). For a reliable pulse detection, the pulse amplitude has to go above 1.2V. Signal setting PNP-LP employs a low-pass signal noise filter, which limits the maximum input frequency - read par. 3.2.3.
A sensor supply voltage of 8.1, 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".

**PNP signal input**

INTERNAL    EXTERNAL

11  +3.2V DC (type PD, PF, PM: 8.1V, 12V, 24V)

PNP

low-pass filter
selection PNP-LP

10  SIGNAL

100K

shielding

9   GND ⊥

Common ground unit
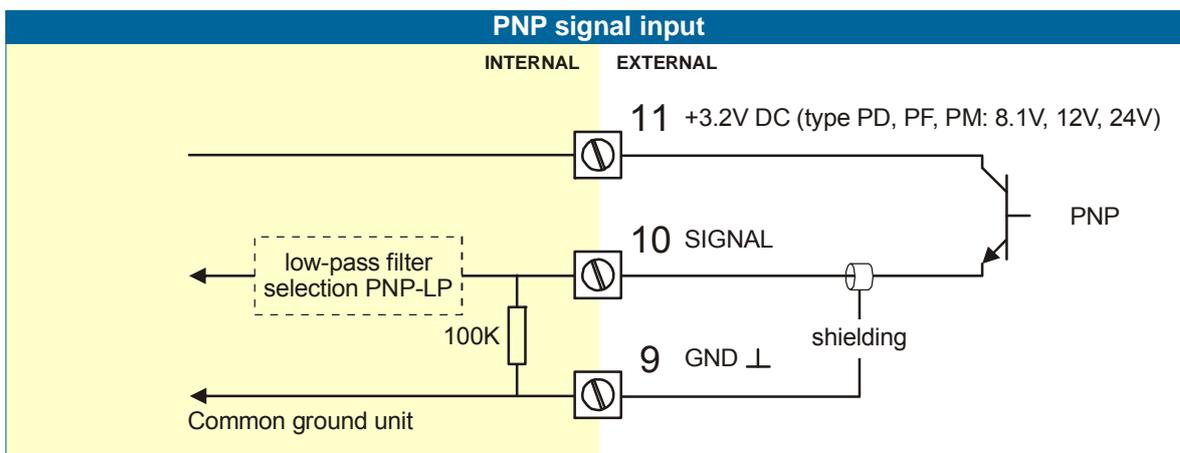
**Active signals 8.1V - 12V and 24V:**

If a sensor gives an active signal, please read par. 3.2.3. The detection levels are 50% of the selected supply voltage; approximately 4V (ACT_8.1) or 6V (ACT_12) or 12V (ACT_24).

| Active signal input |
|---|
| INTERNAL    EXTERNAL |
| **11**   +3.2V DC (type PD, PF, PM: 8.1V, 12V, 24V) |
| **10**   SIGNAL |
| Resistance value: see signal selection     shielding |
| **9**   GND ⊥ |
| Common ground unit |
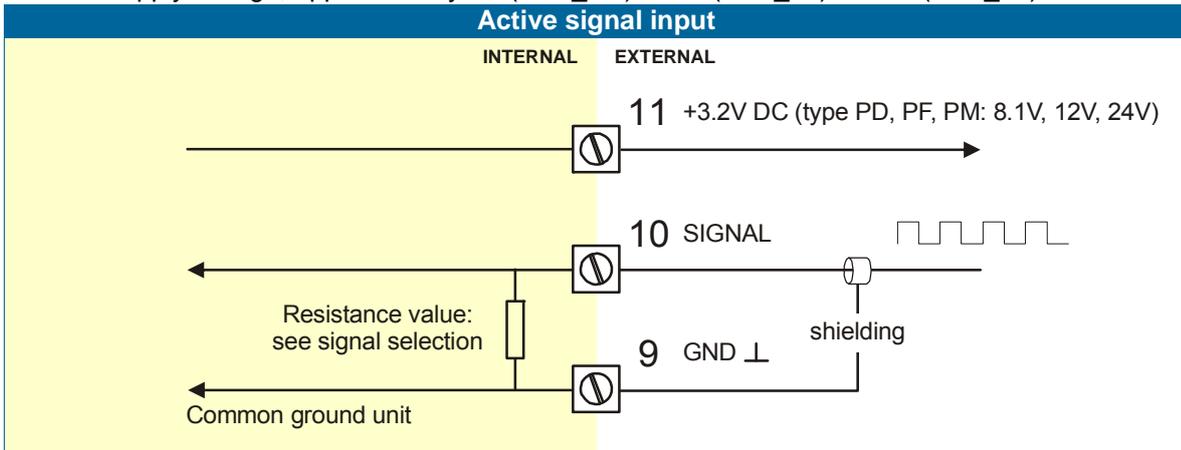
Active signal selection may well be desired in the case of power supply type PD, PF, PM being supplied for sensor supply.

**Reed-switch:**

The F130-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 par. 3.2.3.)

| Reed - switch signal input |
|---|
| INTERNAL    EXTERNAL |
| + 3.2V DC |
| 1M |
| low-pass filter selection REED-LP    **10**   SIGNAL |
| shielding     REED SWITCH |
| Common ground unit    **9**   GND ⊥ |
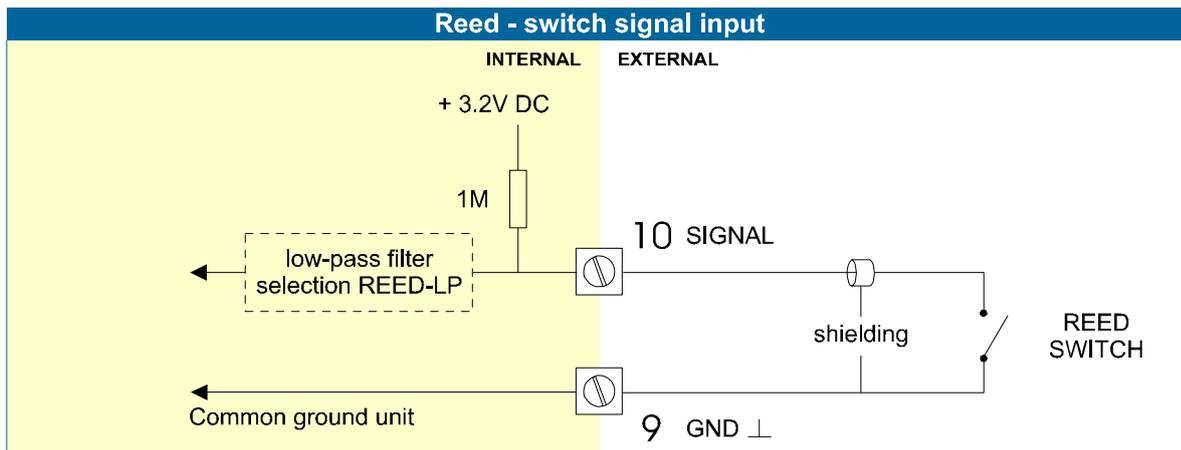
**NAMUR-signal:**

The F130-P is suitable for flowmeters with an Namur signal. The standard F130-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.

| Namur signal input |
|---|
| INTERNAL    EXTERNAL |
| **11** (Type PD, PF, PM: +8.1V)    +8.1V DC |
|    Namur |
| **10**   SIGNAL |
| 820 Ohm    shielding |
| **9**   GND ⊥ |
| Common ground unit |
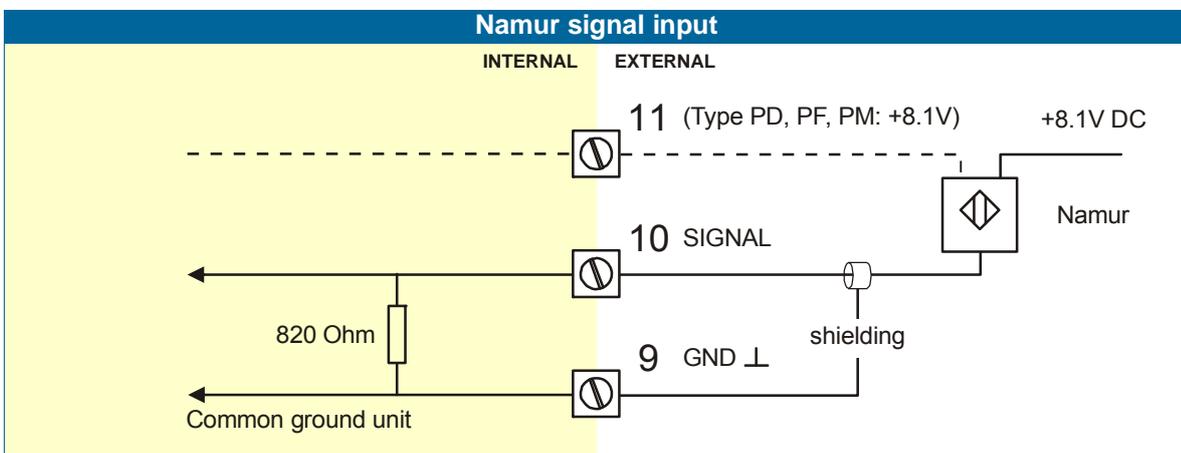
**Terminal 12-13; external START:**
With this function, the batch controller can be started with an external switch. The input must be switched with a potential free contact to the GND-terminal number 12 for at least 0.3 seconds.
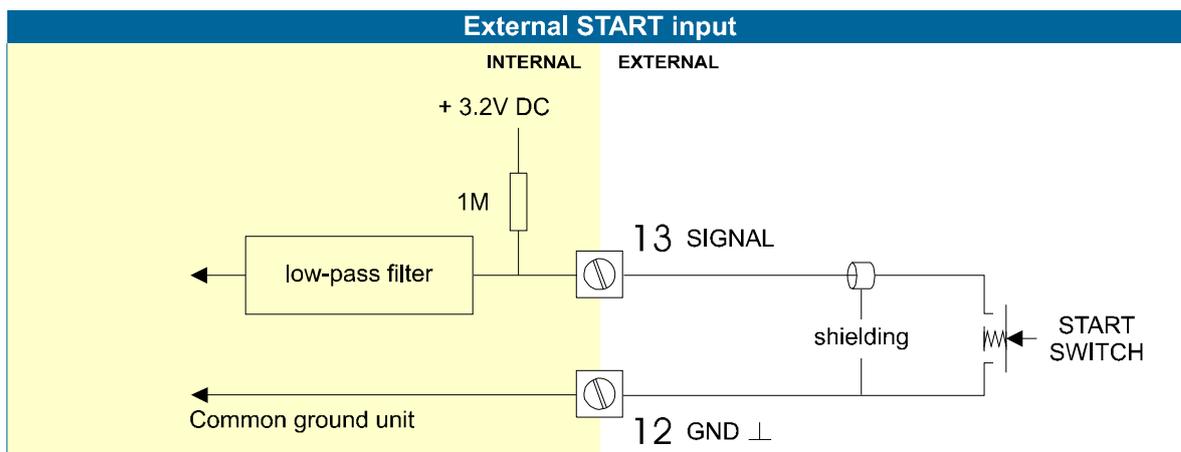


**Terminal 15-16; external STOP:**
With this function, the batch controller can be interrupted or cancelled with an external switch.
The input must be switched once for interruption or switch twice for cancellation with a potential free contact to the GND-terminal number 15 for at least 0.3 seconds.
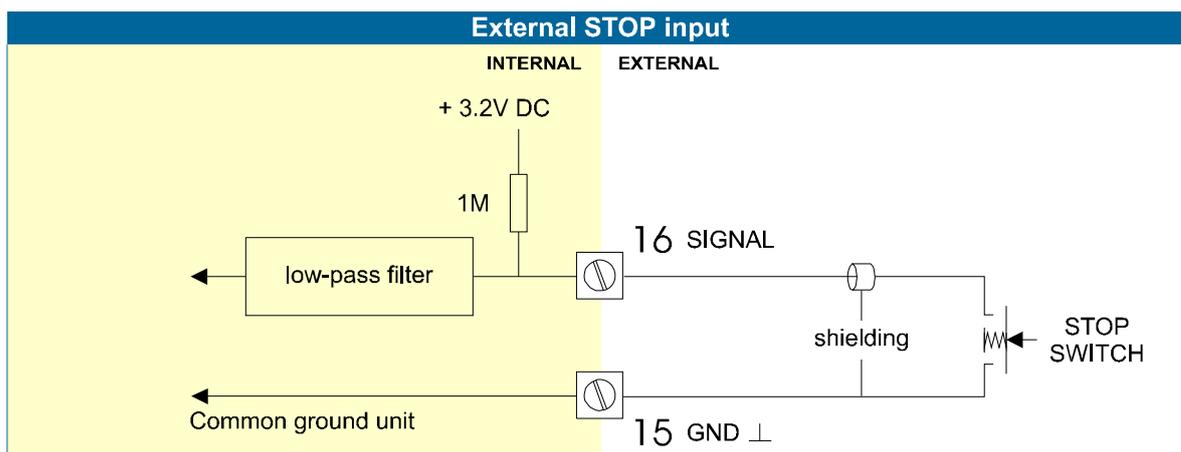


**Terminal 26-31: type CB / CH / CI / CT - communication RS232 / RS485 / TTL (option)**
- Full serial communications and computer control in accordance with RS232 (length of cable max. 15 meters) or RS485 (length of cable max. 1200 meters) is possible.
- Read the Modbus communication protocol and Appendix C.
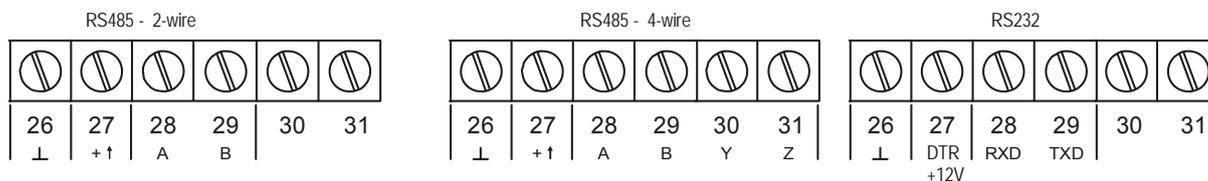


*Fig. 12: Overview terminal connectors communication option.*

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 26-31: backlight - type ZB (option):**

Note !

***Note: if the unit is supplied with a power supply type PD, PF or PM, the backlight supply is integrated, so the text following is not applicable.***

To power the backlight, provide a 12-24V DC to terminal 26 (-) and 27 (+). An external trimmer 1kOhm trimmer can be used to tune the brightness of the backlight, or if not desired, a short-cut between these terminals have to be made which will result in the maximum brightness.

Note !

***Note: Intrinsically Safe as well as 4-wire RS485 communication is not possible in combination with type ZB, except if a PD, PF or PM power supply is being used.***

Option type ZB: adjustable backlight

Power suppply
12-24V DC ± 10%

1kOhm trimmer connection
or short-cut

| 26 | 27 | | | 30 | 31 |
| GND | + ↑ | | | + ↑ | ↓ + |
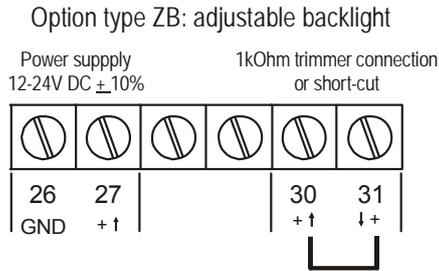
*Fig. 13: Overview terminal connectors backlight option.*

# 5. INTRINSICALLY SAFE APPLICATIONS

## 5.1. GENERAL INFORMATION AND INSTRUCTIONS

**Caution !**

**CAUTIONS**
- Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained personnel authorized by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.
- This device may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.
- Ensure that 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 cabinet has been opened (danger of electric shock). The housing may only be opened by trained personnel.
- To maintain the degree of protection of at least IP65 in accordance with IEC 60529, certified cable entries in accordance with IEC 61241-0 must be used and correctly installed. Unused openings must be closed with suitable blanking elements.
- When the enclosure of the Indicator is made of aluminum alloy, when used in a potentially explosive atmosphere requiring apparatus of equipment protection level Ga and Da, the unit must be installed such 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.
- Take careful notice of the " Safety rules, instructions and precautionary measures " in the front of this manual.

**WARNING**

**SAFETY INSTRUCTIONS**
- 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 IEC 60079-11.
- 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.
- For installation under ATEX directive: this intrinsically safe device must be installed in accordance with the Atex directive 94/9/EC and the 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-0xx with certificate number KEMA 03ATEX1071 U or IECEx KEM 08.0005U is allowed in Hazardous Area. See paragraph 5.4. for detailed battery replacement instructions.

**Note !**

**PLEASE NOTE**
- Certificates, safety values and declaration of compliance can be found in the document named: "Fluidwell F1..-..-XI - Documentation for Intrinsic Safety".
- 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.

### Label information (inside and outside the enclosure)

Indicated labels on the back cover (below) and on the inside cover (right) show the type labels for intrinsically safe certified units.
For details on usage see the separate "Fluidwell F1..-..-IX Documentation for Intrinsic Safety".

S/N: 1101001
Remark: consult the manual.
⚠ Battery powered applications:
Replace with certified FW-LiBat-0xx battery only!
Made by Fluidwell bv - Voltaweg 23, Veghel, The Netherlands
Tamb: -40°C ... +70°C / -40°F ... +158°F          IP6x
Intrinsically Safe - Possible static hazard - Do not rub

⟨Ex⟩  II 1 G       Ex ia IIB / IIC T4 Ga
      II 1 D       Ex ia IIIC T100°C Da IP6x
KEMA 03ATEX1074 X - IECEx DEK 11.0042X

Please note that the special conditions for safe use mentioned in both the certificate and the installation instructions must be observed for the connection of power supply to both input and/or output circuits.

**MODEL: F1xx-P-XI**
Primary signal input: pulse, coil, namur

**MODEL: F1xx-P-XI**
Primary signal input: pulse, coil, namur
S/N: 1101001
IP67      Intrinsically Safe - Possible static hazard - Do not rub
Tamb: -40°C ... +70°C / -40°F ... +158°F

⟨Ex⟩  II 1 G       Ex ia IIB / IIC T4 Ga
      II 1 D       Ex ia IIIC T100°C Da IP6x
KEMA 03ATEX1074 X - IECEx DEK 11.0042X

Made by Fluidwell bv - Voltaweg 23, Veghel, The Netherlands - www.fluidwell.com

### Serial number and year of production

This information can be looked-up on the display:
See setup function (par. 3.2.2.) for details.

YEAR | WEEK | NUMBER
0324 167
93 SERIALNR

### 5.2.    TERMINAL CONNECTORS INTRINSICALLY SAFE APPLICATIONS

Note !

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

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); or
  ▪ the external supply connected to terminals 0 and 1 (option -PD); or
  ▪ 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 F130-P-XI:

| POWER SUPPLY TYPE PD | | | TWO-STAGE or PULSE OUTPUT R 2 TYPE OT | | BATCH OUTPUT R 1 TYPE OT | | POWER SUPPLY TYPE PX 8-30V DC | | SENSOR SIGNAL PULSE INPUT TYPE P | | | START INPUT | | | STOP INPUT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GND | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| ⊥ | +↑ | +↓ | R2 ⊥ | R2 | R1 ⊥ | R1 | ⊥ | +↑ | ⊥ | SIGNAL | +↓ | ⊥ | START | | ⊥ | STOP |
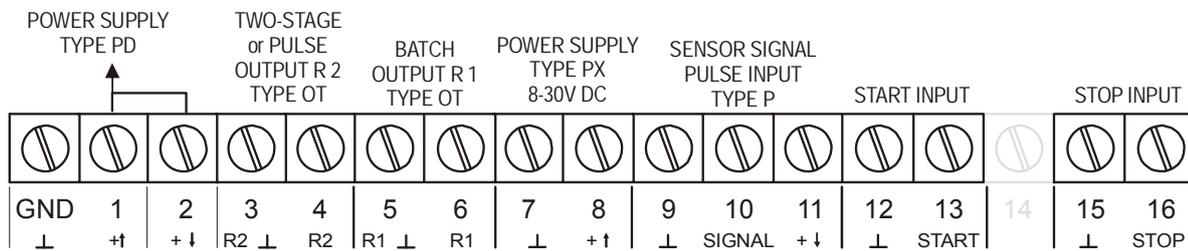
*Fig. 14: Overview terminal connectors XI - Intrinsically Safe applications*

**Explanation Intrinsically Safe options:**

**Type PD - Intrinsically Safe power supply and sensor supply - Terminal GND- 01 and 11.**

| TYPE | | SENSOR SUPPLY | Terminal | | |
|---|---|---|---|---|---|
| | | | GND | 01 | 02 |
| PD | Input voltage: 16-30V DC | 3,2 - 8,1V | L- | L+ | output voltage is according the input voltage; internally linked with terminal 01. |

Terminal 02: this terminal offers the same voltage as connected to terminal 01.
Terminal 11: this terminal offers a 3.2V or 8.1V to power the sensor. This voltage is selected with the switch(es) inside the enclosure.

To access the voltage selection switches you must:
1. Remove the terminals to the field wiring
2. Remove the internal plastic cover.
   A circuit board with four mini switches is now visible.

| Switch position | | Switch position | |
|---|---|---|---|
| **terminal 11** | | **no function** | |
| SWITCH 1 | VOLTAGE | SWITCH 2 | |
| on | 8.1 V DC | not available | |
| off | 3.2 V DC | | |
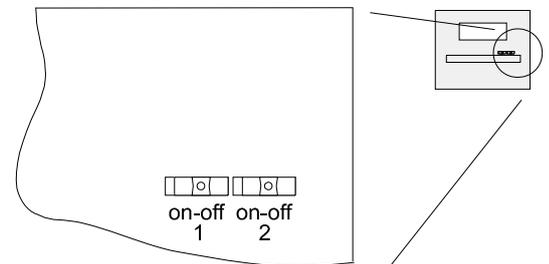


*Fig. 15: Switch position voltage selection type PD-XI.*

### 5.3 CONFIGURATION EXAMPLES
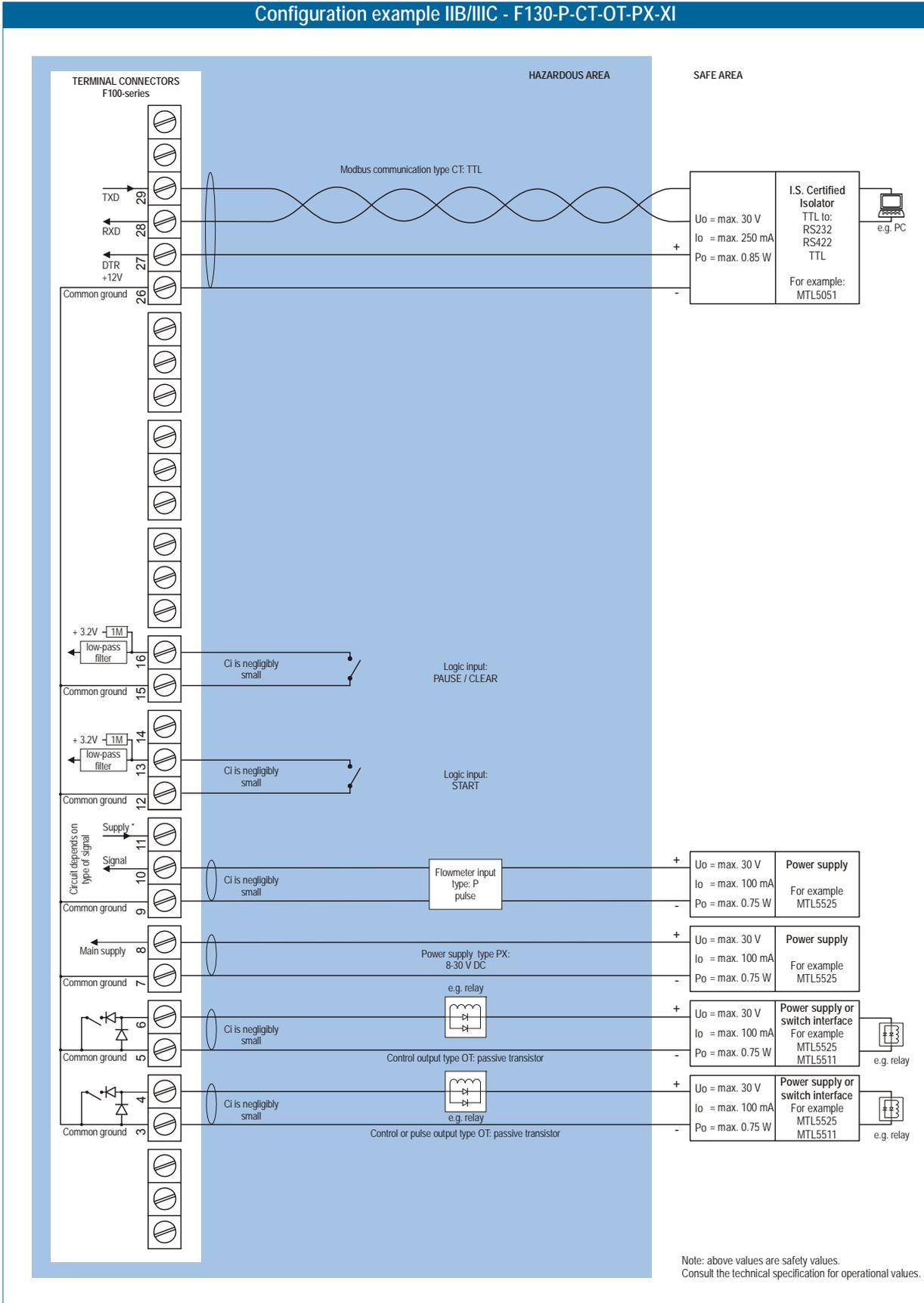


*Fig. 16: Configuration example 1 Intrinsically Safe.*

GPI_F130PEN_v0601_01

**Configuration example IIB/IIIC and IIC - F130-P-(CT)-OT-PD-XI**

TERMINAL CONNECTORS
F100-series

HAZARDOUS AREA

SAFE AREA

Modbus communication type CT: TTL
Please note: communciation type CT is not allowed in IIC applications.

TXD 29

RXD 28

DTR
+12V 27

Common ground 26

$U_o$ = max. 30 V
$I_o$ = max. 250 mA
$P_o$ = max. 0.85 W

I.S. Certified
Isolator
TTL to:
RS232
RS422
TTL

For example:
MTL5051

e.g. PC

* Note: Communication only allowed when configured as IIB/IIIC.

+ 3.2V — 1M
low-pass filter

16

Ci is negligibly small

Logic input:
PAUSE / CLEAR

Common ground 15

+ 3.2V — 1M
low-pass filter

14

13

Ci is negligibly small

Logic input:
START

Common ground 12

Circuit depends on type of signal

Supply * 11

Signal 10

Flowmeter input
type: P
pulse

Ci is negligibly small

Common ground 9

Main supply 8

Power supply type PX:
8-30 V DC
(not used in this example)

7

e.g. relay

6

Ci is negligibly small

Control output type OT: passive transistor

Common ground 5

+ $U_o$ = max. 30 V
$I_o$ = max. 100 mA
- $P_o$ = max. 0.75 W

Power supply or
switch interface
For example
MTL5525
MTL5511

e.g. relay

4

Ci is negligibly small
e.g. relay

Control or pulse output type OT: passive transistor

Common ground 3

+ $U_o$ = max. 30 V
$I_o$ = max. 100 mA
- $P_o$ = max. 0.75 W

Power supply or
switch interface
For example
MTL5525
MTL5511

123456

e.g. counter

2

Main supply 1

Power supply type PD: 16-30V DC
(please note: PD and battery supply (type PC) is NOT allowed in IIC applications).

Common ground 0

+ $U_o$ = max. 30 V
$I_o$ = max. 100 mA
- $P_o$ = max. 0.75 W

Power supply

For example
MTL5525

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

* Note power supply type PD: the supply voltage to the sensor is maximum 8.7V ($U_o$=8.7V $I_o$=25mA $P_o$=150mW)

*Fig. 17: Configuration example 2 Intrinsically Safe.*

### 5.4 BATTERY REPLACEMENT INSTRUCTIONS

**Safety Instructions**

▪ **Fire, explosion or severe burns may result if mistreated.** Do not recharge, crush, disassemble, incinerate, heat above 100°C (212°F) or expose contents to water.
▪ Mounting, electrical installation, start-up and maintenance of this device may only be carried out by trained personnel authorized by the plant operator. Personnel must read and understand this instruction before carrying out the replacement procedure.
▪ Always follow the instructions listed in the supplied Battery Replacement Instruction Sheet.
▪ Batteries pose an environmental hazard. Return used batteries to a recycling point.

**Safety instructions for hazardous areas**

▪ Verify the correct battery is supplied: **Only batteries with indicated Ex label are certified for replacement and use in hazardous areas**. Batteries for use in safe areas have no Ex label. **DO NOT EXCHANGE**: Using the wrong type of battery can pose a SERIOUS RISK.
▪ **For use in hazardous areas Fluidwell recommends FW-LiBAT batteries (manufactured by Fluidwell bv) only**.

**Battery replacement procedure**

*Depending on the production batch, one of two visualized Intrinsically Safe certified battery types may have been installed in the unit. They are interchangeable.*



| FW-LiBAT-001 battery | FW-LiBAT-021 battery |
| --- | --- |
| CE 0344 〈Ex〉 II 1 G Ex ia IIC / Ga Ex ia IIC   KEMA 03ATEX1071 U / IECEx KEM 08.0005U  Fluidwell bv  Intrinsically Safe Battery  Part. no.: FW-LiBAT-001  $U_o$ = 3.9V  $C_o$ = 100µF  $I_o$ = 35mA  $L_o$ = 25mH  $P_o$ = 35mW  $T_a$ = -40°C...+70°C   Consult the manual for replacement instructions.  WARNING: Fire, explosion or severe burns may result if mistreated. Do not recharge, crush, disassemble, incinerate, heat above 100°C (212°F) or expose contents to water.  **Primary Lithium Battery**  **Only replace with Fluidwell I.S. battery pack!** | CE 0344 〈Ex〉 II 1 G  Ex ia IIC Ga   KEMA 03ATEX1071 U / IECEx KEM 08.0005U  Fluidwell bv  Intrinsically Safe Battery  Part. no.: FW-LiBAT-021  $U_o$ = 3.9V  $C_o$ = 100µF  $I_o$ = 35mA  $L_o$ = 25mH  $P_o$ = 35mW  $T_a$ = -40°C...+70°C   Consult the manual for replacement instructions.  WARNING: Fire, explosion or severe burns may result if mistreated. Do not recharge, crush, disassemble, incinerate, heat above 100°C (212°F) or expose contents to water.  **Primary Lithium Battery**  **Only replace with Fluidwell I.S. battery pack!** |

1. To replace the battery, open the unit to gain access to the back inside cover of the unit.
2. Unplug the field connectors from the back inside of the unit.
3. Remove the screw that holds the plastic inside cover.
4. Open the cover and unplug the battery connector.
5. Remove the battery from the inside of the plastic cover. *Do not remove the battery clip!*
6. Install the new battery and re-assemble the unit in reverse order.
7. Start-up the unit

# 6.    MAINTENANCE

## 6.1.    GENERAL DIRECTIONS

- *Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorized by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.*
- *The F130-P may only be operated by personnel who are authorized and trained by the operator of the facility. All instructions in this manual are to be observed.*
- *Ensure that 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 personnel.*
- *Take careful notice of the " Safety rules, instructions and precautionary measures " in the front of this manual.*

Caution !

The F130-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 F130-P in such a way that no condensation will occur, for example by placing dry silica-gel sachet in the casing just before closing it. Furthermore, it is required to replace or dry the silica gel periodically as advised by the silica gel supplier.

**Battery life-time:**
It is influenced by several issues :
- Type of sensor: read chapter 3.2.3. 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; SETUP 51.
- Pulse output and communications .
- Low temperatures; the available power will be less due to battery chemistry.

**Note:** *It is strongly advised to disable unused functions.*

Note !

**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 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.

## 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 | Transflective LCD with green LED backlight. Good readings in full sunlight and darkness. Note: only available for safe area applications. 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 / NEMA4X |
| 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 / NEMA4X |
| Aluminium enclosures | |
| Type HA | Drilling: 2x PG9 – 1x M20. |
| 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. |
| ABS enclosure | |
| Type HS | Silicone free ABS enclosure with EPDM and PE gaskets. UV-resistant polyester keypad. (no drilling) |

| Operating temperature | |
|---|---|
| Operational | -40°C to +80°C (-40°F to +176°F) |
| Intrinsically Safe | -40°C to +70°C (-40°F to +158°F) |

| Power supply | |
|---|---|
| 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 / DC + 10%. Power consumption max. 10 Watt. Intrinsically safe: 16-30V DC; power consumption max. 0.75 Watt. |
| Type PF | 24V AC / DC + 10%. Power consumption max. 15 Watt. |
| Type PL | Input loop powered from sensor signal 4-20mA (type A, non IS). |
| Type PM | 115-230V AC + 10%. Power consumption max. 15 Watt. |
| Type PX | Output loop powered: 8-30V DC. Power consumption max. 0.5 Watt. |
| Note PF / PM | The total consumption of the sensors`, backlight and outputs may not exceed 400mA@24V. |
| Note I.S. applications | For intrinsically safe applications, consult the safety values in the certificate. |

| Sensor excitation | |
|---|---|
| Type PB / PC / PX | 3.2V DC for pulse signals and 1.2V DC for coil pick-up.<br>Note: This is not a real sensor supply. Only suitable for pulse sensors with a very low power consumption like coils (sine wave) and reed-switches. |
| Type PD | 1.2 / 3.2 / 8.2 / 12 and 24V DC - max. 50mA@24V DC |
| Type PD-XI | Intrinsically safe: Pulse signals: 1.2 / 3.2 / 8.2 - max. 7mA@8.2V DC.<br>Analog signals: the sensor supply voltage is according to the power supply voltage connected to terminal 1. Also terminal 2 offers the same voltage. |
| Type PF / PM | 1.2 / 3.2 / 8.2 / 12 and 24V DC - max. 400mA@24V DC. |

| Terminal connections | |
|---|---|
| Type: | Removable plug-in terminal strip. Wire max. 1.5mm2 and 2.5mm2 (Type PM / PF) |

| Data protection | |
|---|---|
| Type | EEPROM backup of all setting. Backup of running totals every minute.<br>Data retention at least 10 years. |
| Pass code | Configuration settings can be pass code protected. |

| Hazardous area (option) | |
|---|---|
| Intrinsically safe<br>Type XI | **ATEX approval:**<br>⟨Ex⟩ II 1 G Ex ia IIB/IIC T4 Ga<br>II 1 D Ex ia IIIC T100°C Da IP6x<br><br>**IECEx approval:**<br>Ex ia IIB/IIC T4 Ga<br>Ex ia IIIC T100°C Da IP6x |
| Explosion proof<br>Type XD/XF | ATEX approval ref.: <EX> II 2 GD EEx d IIB T5.  Weight appr. 15kg.<br>Dimensions of enclosure: 350 x 250 x 200mm (13.7″ x 9.9″ x 7.9″) LxHxD. |

| Directives & Standards | |
|---|---|
| EMC | Directive 2004/108/EC, FCC 47 CFR part 15 |
| Low voltage | Directive 2006/95/EC |
| ATEX / IECEx | Directive 94/9/EC, IEC 60079-0, IEC 60079-11, IEC 60079-26 |
| IP & NEMA | EN 60529 & NEMA 250 |

## INPUTS

| Flowmeter | |
|---|---|
| Type P | Coil/sine wave (minimum 20mVp-p or 80mVp-p - sensitivity selectable), NPN/PNP, open collector, reed-switch, Namur, active pulse signals 8, 12 and 24V. |
| Frequency | Minimum 0 Hz - maximum 7 kHz for total and flowrate.<br>Maximum frequency depends on signal type and internal low-pass filter.<br>E.g. Reed switch with low-pass filter: max. frequency 120 Hz. |
| K-Factor | 0.000010 - 9,999,999 with variable decimal position. |
| Low-pass filter | Available for all pulse signals. |
| Type A | (0)4-20mA - with signal calibration feature at any current within the range. |
| Type U | 0-10 V - with signal calibration feature at any voltage within the range. |
| Accuracy | Resolution: 14 bit.. Error < 0.025mA / ±0.125% FS. Low level cut-off programmable. |
| Span | 0.000010 - 9,999,999 with variable decimal position. |
| Update time | Four times a second. |
| Voltage drop | 2.5 Volt. |
| Load impedance | 3kOhm |
| Relationship | Linear and square root calculation. |
| Note | For signal type A and U: external power to sensor is required; e.g. Type PD. |

| Control inputs | |
|---|---|
| Function | External START and PAUSE / STOP inputs |

| OUTPUTS | |
|---|---|
| Type P | Two Reed switch inputs / make-contacts. Minimum contact duration 100msec. |

| Control outputs | |
|---|---|
| Function | User defined: batch process two stage control or scaled pulse output acc. batch or acc. total. |
| Pulse output | Max. frequency 60Hz. Pulse length user definable between 7,8msec up to 2 seconds. |
| Type OA | Two active 24V DC transistor outputs; max. 50mA per output (requires type PD, PF or PM). |
| Type OR | Two mechanic relay outputs; max. switch power 230V AC - 0,5A (requires type PF or PM). |
| Type OT | Two passive transistor outputs - not isolated. Load max. 50V DC - 300mA. |

| Communication option | |
|---|---|
| Functions | Reading display information, reading / writing all settings. Start / stop the batch process. |
| Protocol | Modbus ASCII or RTU |
| Speed | 1200 - 2400 - 4800 - 9600 baud |
| Addressing | maximum 255 addresses. |
| Type CB | RS232 |
| Type CH | RS485 2-wire |
| Type CI | RS485 4-wire |
| Type CT | TTL Intrinsically Safe communication. |
| Type CX | no communication. |

## OPERATIONAL

| Operator functions | |
|---|---|
| Functions | • enter a preset value, <br> • start / interrupt and stop the batch process, <br> • total can be reset to zero. |
| Displayed information | • preset value <br> • running batch total or remaining quantity, <br> • total and accumulated total. |

| Preset / Total | |
|---|---|
| Digits | 7 digits. |
| Units | L, m3, GAL, USGAL, KG, lb, bbl, no unit. |
| Decimals | 0 - 1 - 2 or 3. |
| Note | total can be reset to zero. |

| Accumulated total | |
|---|---|
| Digits | 11 digits. |
| Units / decimals | according to selection for total. |

## APPENDIX B:   PROBLEM SOLVING

In this appendix, several problems are included that can occur when the F130-P is going to be installed or while it is in operation.

**Flowmeter does not generate pulses:**
Check:
- Signal selection SETUP - 61,
- Pulse amplitude (par. 4.4.3.),
- Flowmeter, wiring and connection of terminal connectors (par. 4.4.3.),
- Power supply of flowmeter (par. 4.4.2.).

**Flowmeter generates "too many pulses":**
Check:
- Settings for total: SETUP 11-14,
- Type of signal selected with actual signal generated - SETUP - 61,
- Sensitivity of coil input - SETUP - 61 and par. 4.4.3.
- Proper grounding of the F130-P and flowmeter - par. 4.4.1.

**Pulse output does not function:**
Check:
- SETUP 71 - pulse per "x" quantity; is the value programmed reasonable and will the maximum output be under 20Hz?
- SETUP 72 - impulse width; is the external device able to recognize the selected pulse width and frequency?

**The pass code is unknown:**
If the pass code 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 5-digit error code. The codes are:
0001:   irrecoverable display-data error: data on the display might be corrupted.
0002: irrecoverable data-storage error: the programming cycle might have gone wrong: check programmed values.
0003:   error 1 and error 2 occurred simultaneously

If the alarm occurs more often or stays active for a longer time, please contact your supplier.

## APPENDIX C:   COMMUNICATION VARIABLES

**Remarks:**
- Below, an overview of the F130-P specific variables; other common variables are described in the standard table.
- All numbers are <u>decimal numbers</u>, unless otherwise noted.
- The following variables of the standard table (var00-var30) are not valid for this product and will be responded with value 1: var00, 03-05, 07,08, 16-22, 24, 26-29.

<table>
<tr><td colspan="5" align="center"><b>CONFIGURATION VARIABLES F130-P - SETUP-LEVEL:</b></td></tr>
<tr><td><b>VAR</b></td><td><b>DESCRIPTION</b></td><td><b>BYTES</b></td><td><b>VALUE</b></td><td><b>REMARKS</b></td></tr>
<tr><td colspan="5"><b>PRESET / TOTAL</b></td></tr>
<tr><td>32<br>(20h)</td><td>unit</td><td>1</td><td>0=L<br>1=m3<br>2=kg<br>3=lb<br>4=gal<br>5=usgal<br>6=bbl<br>7=none</td><td></td></tr>
<tr><td>33<br>(21h)</td><td>decimals</td><td>1</td><td>0…3</td><td></td></tr>
<tr><td>34<br>(22h)</td><td>K-factor</td><td>3</td><td>1....9.999.999</td><td>K-f 0000001 - K-f 0000009 is allowed when decs < 6! (VAR37)</td></tr>
<tr><td>37<br>(25h)</td><td>decimals K-factor</td><td>1</td><td>0…6</td><td></td></tr>
<tr><td>218<br>DAh</td><td>batch maximum</td><td>3</td><td>0-9,999,999</td><td>decimals: see 33 (21h)</td></tr>
<tr><td colspan="5"><b>OVERRUN</b></td></tr>
<tr><td>192<br>(C0h)</td><td>overrun time</td><td>2</td><td>1…9,999</td><td>steps of 0.1 second</td></tr>
<tr><td>194<br>(C2h)</td><td>disable/enable overrun</td><td>1</td><td>0=disable<br>1=enable</td><td></td></tr>
<tr><td colspan="5"><b>DISPLAY</b></td></tr>
<tr><td>195<br>(C3h)</td><td>increase / decrease</td><td>1</td><td>0=decrease<br>1=increase</td><td></td></tr>
<tr><td colspan="5"><b>POWERMANAGEMENT</b></td></tr>
<tr><td>80<br>(50h)</td><td>LCD update time</td><td>1</td><td>0=fast<br>1=1sec<br>2=3sec<br>3=15sec<br>4=30sec<br>5=off</td><td></td></tr>
<tr><td>81<br>(51h)</td><td>power-mode battery</td><td>1</td><td>0=operational<br>1=shelf</td><td></td></tr>
<tr><td colspan="5"><b>FLOWMETER</b></td></tr>
<tr><td>96<br>(60h)</td><td>flowmeter signal</td><td>1</td><td>0=npn<br>1=npn-lp<br>2=reed<br>3=reed LP<br>4=pnp<br>5=pnp-lp<br>6=namur<br>7=coil hi<br>8=coil lo</td><td></td></tr>
</table>

| VAR | DESCRIPTION | BYTES | VALUE | REMARKS |
|---|---|---|---|---|
| **RELAYS** | | | | |
| 196 (C4h) | 1-step / 2-step | 1 | 0=1-step<br>1=2-step | |
| 197 (C5h) | preclose quantity | 3 | 0-9,999,999 | decimals: see 33 (21h) |
| 128 (80h) | impulse width | 1 | 0=off<br>1=short<br>2=long | |
| 129 (81h) | pulse per X quantity | 3 | 1..9999999 | unit, decimals acc. var32 -33 |
| **OTHERS** | | | | |
| 168 (A8h) | pass code | 2 | xxxx | read only! |
| 170 AAh | tagnumber | 3 | 0..9999999 | Other vars: see standard table |
| **BATCH MODE** | | | | |
| 223 DFh | batch mode | 1 | 1 = Batch running<br>2 = Batch pausing<br>4 = Batch finished<br>8 = Batch in overruntime | read only |
| **BATCH KEYLOCK** | | | | |
| 154 9Ah | Batch keylock | 2 | Range: 0000h..FFFFh | steps of 0.1 second |
| **BATCH KEYLOCK MASK** | | | | |
| 156 9Ch | Batch Keylock mask keys set are not detected | 1 | Key 1: 0x01<br>Key 2: 0x02<br>Key 3: 0x04 | bitfield |
| **BATCH COMMAND** | | | | |
| 157 9Dh | Batch Command Read out returns last executed command entered through communication | 1 | Commands:<br>1 = Start<br>2 = Pause<br>3 = Stop<br>4 = Release | Before a new batch can be initiated through communication, the release command must be send. This way, when combined with the Keylock, overwriting of batch information (total/preset) data can be prevented. |
| **PRESET** | | | | |
| 200 (C8h) | preset quantity | 3 | 0-9,999,999 | decimals: see 33 (21h) |

### OTHER F130-P VARIABLES FOR COMMUNICATION

**ACTUAL - variable number 208 (DOh) – 6 bytes**

READ ACTUAL:      The value of actual read using communication might differ from the value that appears on the display. This is due to the fact that the display can only display up to seven digits (e.g. when two decimals are selected for "preset" and actual has a value of 123456,78 the display will show 23456,78 while communication will read an "actual" of 12345678 and a "actual decimals" of 2).

**TOTAL** - variable number 566 (236h) – 6 bytes

Read total:      The value of total read using RS communications might differ from the value that appears on the display. This is due to the fact that the display can only display up to seven digits ( 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 and a "total decimals" of 2).

Write total:      total can only be cleared. This means writing a value different from 0 will result in the reply of an error message. Only writing 6 bytes of zero's to total will be accepted.

**ACCUMULATED TOTAL** - variable number 560 (230h) – 6 bytes

Read acc. total:      A difference between the read value and the display value, as explained for "Read total", might appear here too.

Write acc. total:      Not possible.

When reading or writing total or accumulated total it should be noted that the used values are given including the decimals. This means that a read/write to one of these variables should be accompanied with a read/write to the variable that holds the number of decimals for this variable:

**Example: read var. 566 for total:**
*Read var. 33 for total decimals and calculate the real value of total by multiplying total with $10^{-(total\ decimals)}$*

## INDEX OF THIS MANUAL

## LIST OF FIGURES IN THIS MANUAL

# DECLARATION OF CONFORMITY

## Declaration of Conformity

### Fluidwell F1- series

Veghel, February 2015

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

EMC Directive 2004/108/EC

EN61000-6-2:2005, EN61000-6-3:2007
EN61326-1:2006

RoHS Directive 2011/65/EU

EN 50581:2012

ATEX Directive 94/9/EC
Models –XI,  Intrinsically Safe:

EN60079-0:2009
EN60079-11:2007
EN60079-26:2007
EN61241-11:2006

Protective system:

II 1 G   Ex ia IIC T4 Ga

II 1 D   Ex ia IIIC T100 °C Da IP6X

Certificate:

KEMA 03ATEX1074 X, issue 4

Notified body 0344: DEKRA Certification BV, Meander 1051, 6825 MJ, Arnhem, The Netherlands.

Additionally, for options applicable or safe area versions:
Low Voltage Directive 2006/95/EC          EN61010-1:2010
The last two digits of the year in which the CE marking was affixed: 03.

Remark: compliance is not affected by standards EN60079-0:2012 and EN60079-11:2012.

Fluidwell BV

I. Meij, Product Manager

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

| LIST OF CONFIGURATION  SETTINGS | | | |
|---|---|---|---|
| SETTING | DEFAULT | DATE : | DATE : |
| **1 - PRESET** | Enter your settings here | | |
| 11 unit | L | | |
| 12 decimals | 0000000 | | |
| 13 K-factor | 0000001 | | |
| 14 decimals K-factor | 0 | | |
| 15 min. batch size | 0 | | |
| 16 max. batch size | 0 | | |
| **2 - OVERRUN** | | | |
| 21 overrun | disabled | | |
| 22 overrun time | 0.0 sec | | |
| **3 - ALARM** | | | |
| 31 no-flow alarm | disabled | | |
| 32 no-flow time | 10.0 sec | | |
| **4 - DISPLAY** | | | |
| 41 display | increase | | |
| 42 light | 100% | | |
| **5 - POWER MANAGEMENT** | | | |
| 51 LCD-new | 1 sec. | | |
| 52 mode | operational | | |
| **6 - FLOWMETER** | | | |
| 61 signal | coil-lo | | |
| **7 - RELAY OUTPUT** | | | |
| 71 relays | 1-step | | |
| 72 preclose quantity | 0 | | |
| 73 impulse width | 0.000 | | |
| 74 impulse decimal | 0 | | |
| 75 impulse per | 0001000 | | |
| 76 impulse according | total | | |
| **8 - COMMUNICATION** | | | |
| 81 baud-rate | 9600 | | |
| 82 address | 1 | | |
| 83 mode | BUS-RTU | | |
| **9 - OTHERS** | | | |
| 91 model | F130-P | F130-P | F130-P |
| 92 software version | 03.01. ___ | 03.01. ___ | 03.01. ___ |
| 93 serial number | _ _ _ _ _ _ _ | _ _ _ _ _ _ _ | _ _ _ _ _ _ _ |
| 94 password | 0000 | | |
| 95 tagnumber | 0000000 | | |

## Limited Warranty Policy

Great Plains Industries, Inc. 5252 E. 36<sup>th</sup> Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 2 year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

A.  the product has been altered or modified outside the warrantor's duly appointed representative;

B.  the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, contact the GPI Customer Service Department at 316-686-7361 or 888-996-3837. Or by mail at:

Great Plains Industries, Inc.
5252 E. 36<sup>th</sup> St. North,
Wichita, KS, USA 67220-3205

If you are outside North or South America contact:

Great Plains Industries – Australia
1/16 Atkinson Road,
Taren Point NSW 2229, Sydney, Australia

The company shall, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to a duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.

GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

Note: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).

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Wichita · Sydney · Mexico City | GREAT PLAINS INDUSTRIES **GPI**

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