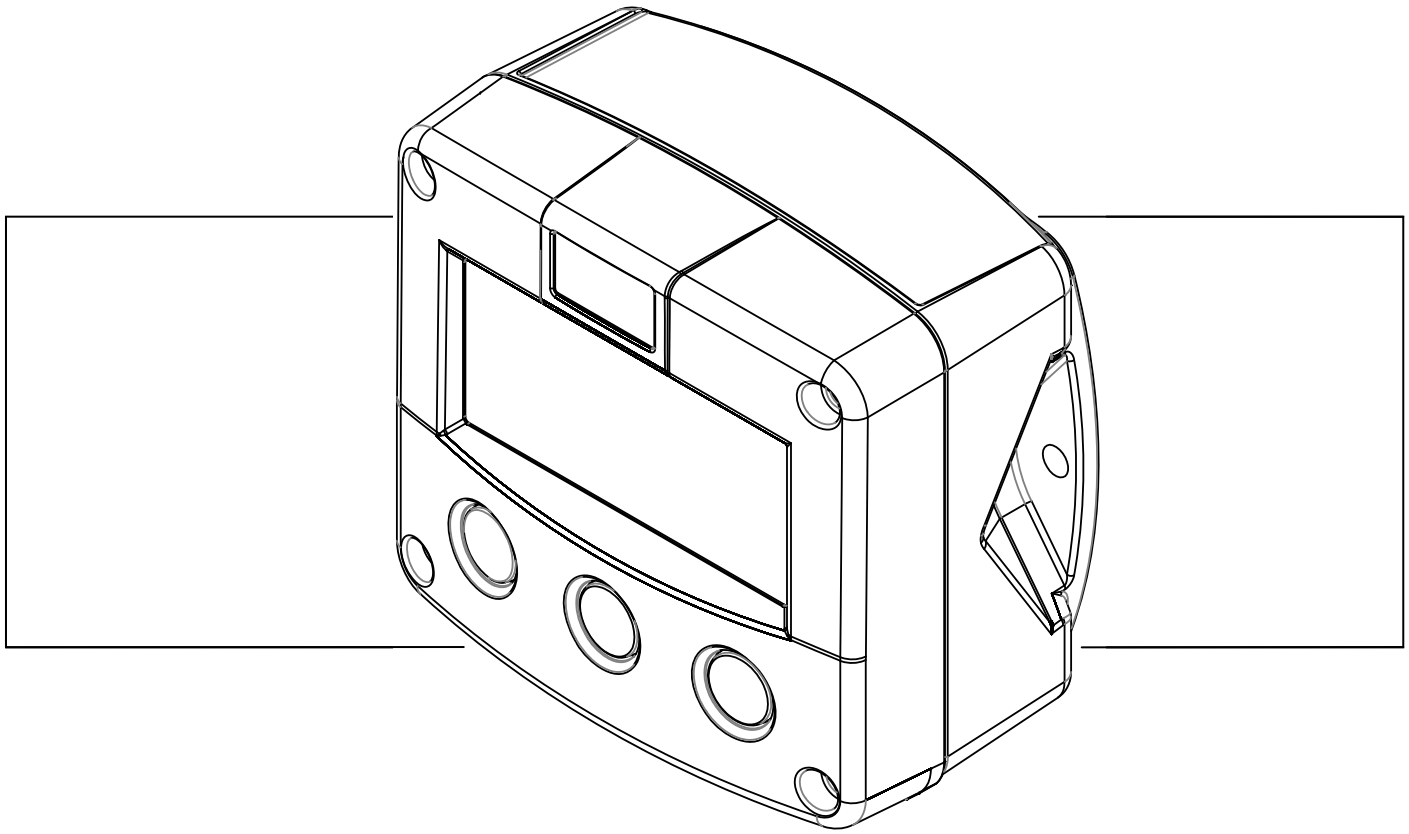
F013-A

FLOWRATE MONITOR / TOTALIZER

WITH HIGH / LOW FLOWRATE ALARMS



Signal input flowmeter: (0)4-20mA.

Alarm output: one flowrate alarm.

Options: Intrinsically Safe.

F-Series - Field mounted indicators for safe and hazardous areas. More info: www.fluidwell.com/fseries

SAFETY INSTRUCTIONS

- **Any responsibility is lapsed if the instructions and procedures as described in this manual are not followed.**
- **LIFE SUPPORT APPLICATIONS: The F013-A 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 F013-A 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 F0..-..-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 F013-A 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 F013-A 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 F013-A 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 F013-A or connected instruments.


Caution !

A "**caution**" indicates actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the F013-A or connected instruments.


Note !

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	:	FB03.03.xx
Software version	:	03.02.xx
Manual	:	HF013AEN_v0403_03 Atex_IECEx_CSA_FM
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Information in this manual is subject to change without prior notice. The manufacturer is not responsible for mistakes in this material or for incidental damage caused as a direct or indirect result of the delivery, performance or use of this material.

CONTENTS MANUAL

1. INTRODUCTION

1.1. SYSTEM DESCRIPTION OF THE F013-A

Functions and features
The flowrate / totalizer model F013-A is a microprocessor driven instrument designed to display flowrate, total and accumulated total as well as the monitoring of the flowrate for high / low values.
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 one configurable alarm output.

Flowmeter input
This manual describes the unit with an analog (0)4-20mA input type from the flowmeter "-A version". Other versions are available to process pulse or 0-10V flowmeter signals.
One flowmeter with a passive or active (0)4-20mA signal output can be connected to the F013-A. To power the sensor, several options are available.

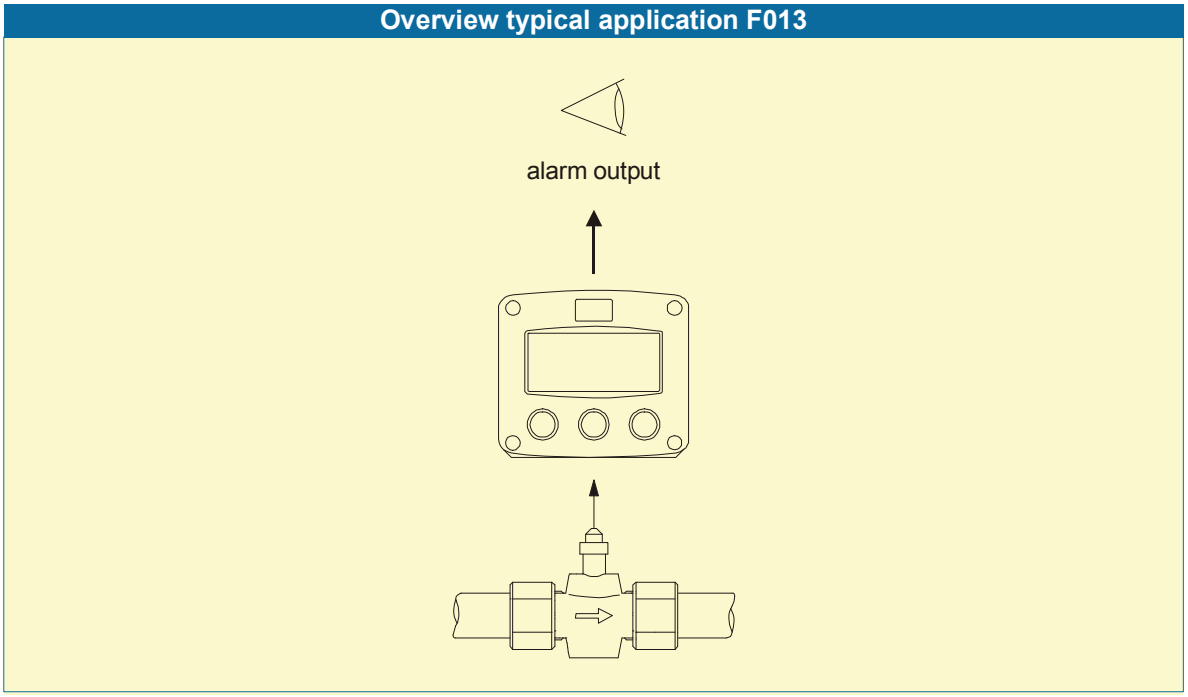


Fig. 1: Typical application for the F013-A.

Configuration of the unit
The F013-A has been designed to be implemented in many types of applications. For that reason, a SETUP-level is available to configure your F013-A according to your specific requirements.
It includes several important features, such as Span, measurement units, signal selection etc. All setting are stored in EEPROM memory and will not be lost in the event of power failure. To extend the battery-life time, please 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, trend-indication and key-word messages.
Flowrate and totals can be displayed either with the small 8mm digits or with the 17mm digits.
A backup of the total and accumulated total in EEPROM memory is made every minute.

Options
The following options are available: intrinsic safety, mechanical relay or active outputs, 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 !

- The F013-A 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.

This chapter describes the daily use of the F013-A. 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 SELECT accumulated total and flowrate alarm values.
The arrow-key ▲ is used to increase a value after PROG has been pressed or to configure the unit; please read chapter 3.

Press this key twice to CLEAR the value for total.
The arrow-key ▶ is used to select a digit after PROG has been pressed or to configure the unit; please read chapter 3.

2.3. OPERATOR INFORMATION AND FUNCTIONS

In general, the F013-A will always act at Operator level. The information displayed is dependant upon the SETUP-settings. The signal generated by the connected flowmeter is measured by the F013-A 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.

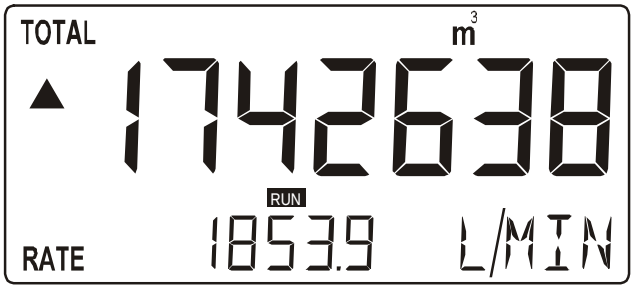


Fig. 3: Example of display information during process.

For the Operator, the following functions are available:

- **Display flowrate / total or flowrate**
  This is the main display information of the F013-A. After selecting any other information, it will always return to this main display automatically.
  Total is displayed on the upper-line of the display and flowrate on the bottom line.
  It is possible to display flowrate only with the large 17mm digits; in this instance press the SELECT-key to read the total.
  When "-------" is shown, then the flowrate value is too high to be displayed. The arrows ⬍ indicate the increase/decrease of the flowrate trend.

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

- **Display accumulated total**
  When the SELECT-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 total.

- **Programming the flowrate alarm values**

Note !

Note: *This function might not be accessible due to a configuration setting.*

When the SELECT-key is pressed a few times, following flowrate alarm values are displayed:
- low flowrate alarm: enter here 40 L/min for example,
- high flowrate alarm: enter here 200 L/min for example,

To change the alarm value, the following procedure must be executed:

1) press PROG: the word "PROGRAM" will flash or a pass code will be requested,
2) use ▸ to select the digits and ▲ to increase that value,
3) confirm the new alarm value by pressing ENTER.

Fig. 4: Example of display information during programming minimum flowrate.

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.

- **Flowrate alarm**

When the actual flowrate is outside the allowed range, an alarm message will be displayed indicating the type of alarm: "LO RATE", "HI RATE".
The alarm is terminated automatically as soon as the flowrate is within its range again.

- **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 original batteries supplied by the manufacturer may be used, else the guarantee and liability will be terminated. The remaining lifetime after the first moment of indication is generally several days up to some weeks.

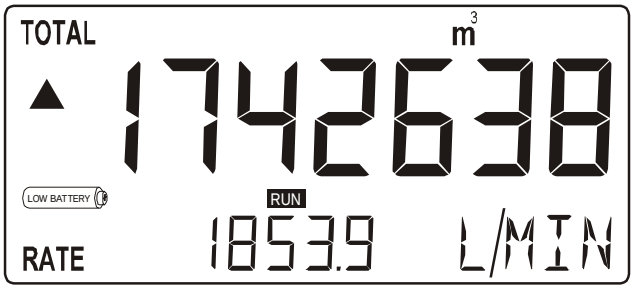


Fig. 5: Example of low-battery alarm.

- **Range error**

As soon as the input value is 5% outside the calibrated measuring range, “ALARM” will be displayed. Meanwhile, the calibrated value will be displayed.
After pressing the SELECT key, the reason of the alarm will be displayed: “LO RANGE” or “HI RANGE”.

- **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 F013-A 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

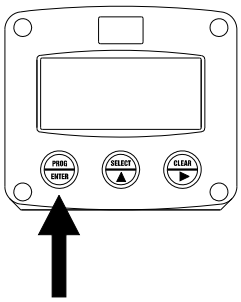
3.2.1. GENERAL

Configuration of the F013-A 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 F013-A remains fully operational.


Note !

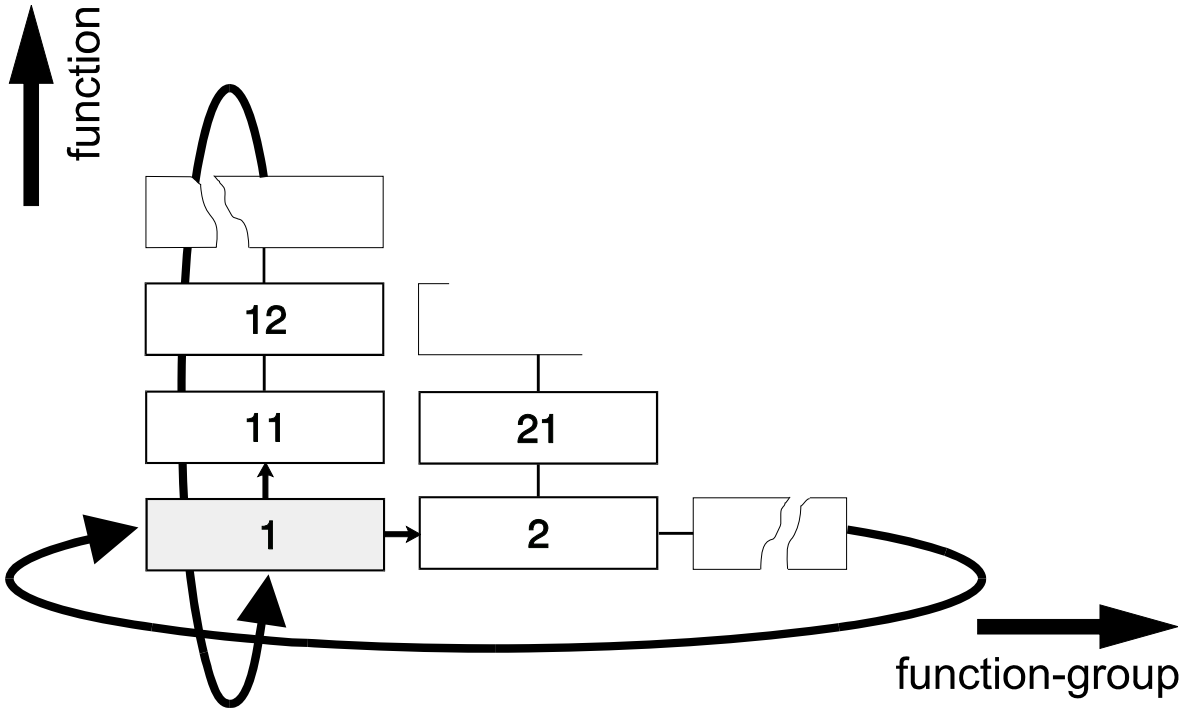
Note: *A pass code may be required to enter SETUP. Without this pass code access to SETUP is denied.*

To enter SETUP-level:



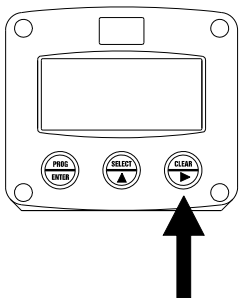
Press PROG/ENTER for 7 seconds

Matrix structure SETUP-level:

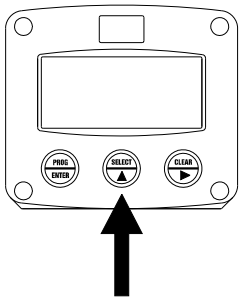


SCROLLING THROUGH SETUP-LEVEL

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



Select function-group with CLEAR ▶

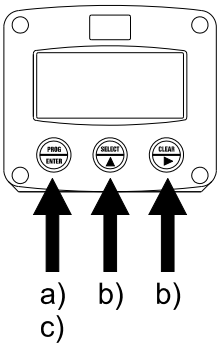


Select function with SELECT ▲

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.). The “CLEAR” button can be used to jump a step back if you missed the desired function.

To change or select a value:



a) press PROG ENTER briefly; **PROGRAM** will start flash

b) select or enter value with SELECT ▲ and / or CLEAR ▶

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

To change a value, use ▶ to select the digits and ▲ to increase that value.
If the new value is invalid, the increase sign ▲ or decrease-sign ▼ will be displayed while you are programming.

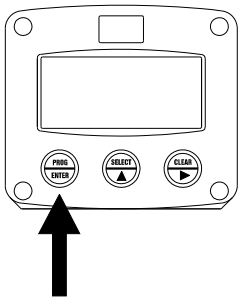
To select a setting, ▲ is used to select in one direction and ▶ can be used to select in the other direction.

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	**TOTAL**		
	11	UNIT	L - m3 - kg - lb - GAL - USGAL - bbl - no unit
	12	DECIMALS	0 - 1 - 2 - 3 (Ref: displayed value)
	13	SPAN	0.000001 - 9,999,999 unit / second
	14	DECIMALS SPAN	0 - 6
2	**FLOWRATE**		
	21	UNIT	mL - L - m3 - mg - g - kg - ton - GAL - bbl - lb - cf - REV - no unit - scf - Nm3 - NL - P
	22	TIME UNIT	sec - min - hour - day
	23	DECIMALS	0 - 1 - 2 - 3 (Ref: displayed value)
	24	SPAN	0.000001 - 9,999,999 unit / time-unit
	25	DECIMALS SPAN	0 - 6
3	**ALARM**		
	31	FLOWZERO	default - no relays - ignore
	32	ALARM LOW	0000.000 - 9,999,999
	33	ALARM HIGH	0000.000 - 9,999,999
	34	DELAY ALARM LOW	0.1 - 999.9 seconds
	35	DELAY ALARM HIGH	0.1 - 999.9 seconds
	36	ALARM OUTPUT	high - low - both - off
4	**DISPLAY**		
	41	FUNCTION	total - flowrate
	42	SET ALARM	operator - setup
	43	BACKLIGHT (optional)	off - green - amber
	44	BACKLIGHT ALARM	off - on - flash
	45	BL. BRIGHTNESS	1 - 5
5	**POWER MANAGEMENT**		
	51	LCD UPDATE	fast - 1 sec - 3 sec - 15 sec - 30 sec - off
	52	BATTERY MODE	operational - shelf
6	**FLOWMETER**		
	61	FORMULA	interpolation, square root
	62	FILTER	00 - 99
	63	CUT-OFF	0.0 - 99.9%
	64	CALIBRATE LOW	default - calibrate - calibrate set
	65	CALIBRATE HIGH	default - calibrate - calibrate set
7	**OTHERS**		
	71	TYPE / MODEL	F013-A
	72	SOFTWARE VERSION	03.xx.xx
	73	SERIAL NO.	xxxxxxx
	74	PASS CODE	0000 - 9999
	75	TAGNUMBER	0000000 - 9999999

3.2.3. EXPLANATION OF SETUP-FUNCTIONS

1 - TOTAL	
MEASUREMENT UNIT **11**	SETUP - 11 determines the measurement unit for total and accumulated total. The following units can be selected: L - m3 - kg - lb. - GAL - USGAL - bbl - _ (no unit). Alteration of the measurement unit will have consequences for operator and SETUP-level values. Please note that the Span has to be adapted as well; the calculation is not done automatically.
DECIMALS **12**	The decimal point determines for total and accumulated total the number of digits following the decimal point. The following can be selected: 0000000 - 111111.1 - 22222.22 - 3333.333
SPAN **13**	With the span, the flowmeter signal is converted to a quantity. The **span for Total** is determined on the basis of the measurement unit (setting 11) and the **flowrate per second** at 20mA. Enter the span in whole numbers (decimals are set with SETUP 14). The more accurate the span, the more accurate the functioning of the system will be: **Example 1** **Calculating the Span.** *Let us assume that the flowmeter generates 20mA at a rate of 652.31 USGAL per hour, the selected unit is barrels.* *There are 42 gallons in one barrel; so the rate is 652.31/42 is 15.53119 barrels/hour.* *This is 0.0043142 barrels/second, which is the span.* *Enter for SETUP - 13: "004314" and for SETUP - 14 "6".* **Example 2** **Calculating the Span.** *Let us assume that the flowmeter generates 20mA at a flowrate of 2,481.3 Liters/minute and the selected unit is "cubic meters / m3".* *The rate per second is 2,481.3÷60 is 41.355 L/sec.* *This is 0.041355 m3/sec., which is the span.* *Enter for SETUP - 13: "041355" and for SETUP - 14 - decimals span "6".*
DECIMALS SPAN **14**	This setting determines the number of decimals for the Span (SETUP 13). The following can be selected: 0 - 1 - 2 - 3 - 4 - 5 - 6 Please note that this function influences the accuracy of the Span indirectly. This setting has NO influence on the displayed number of digits for total (SETUP 12)!

2 - FLOWRATE	
The settings for total and flowrate are entirely separate. In this way, different units of measurement can be used for each e.g. cubic meters for total and liters for flowrate. The display update time for flowrate is one second or more.	
MEASUREMENT UNIT **21**	SETUP - 21 determines the measurement unit for flowrate and alarm values. The following units can be selected: mL - L - m3 - mg - g - kg - ton - GAL - bbl - lb - cf - REV - no unit - scf - Nm3 - NL - P. Alteration of the measurement unit will have consequences for operator and SETUP-level values. Please note that the Span has to be adapted as well; the calculation is not done automatically.
TIME UNIT **22**	The flowrate can be calculated per second (SEC), minute (MIN), hour (HR) or day (DAY).
DECIMALS **23**	This setting determines for flowrate the number of digits following the decimal point. The following can be selected: 00000 - 1111.1 - 2222.22 - 3333.333
SPAN **24**	With the span, the flowmeter signal is converted to a quantity. The **span for flowrate** is determined on the basis of the **selected measurement unit and time unit** at 20mA. Enter the span in whole numbers (decimals are set with SETUP 25). The more accurate the span, the more accurate the functioning of the system will be: **Example 1** **Calculating the span for flowrate** *Let us assume that the flowmeter generates 20mA at a flowrate of 2,481.3 Liters/minute, the selected unit is "Liters" and time unit "minute".* *The span is 2481.3* *Enter for* SETUP *- 24: "248130" and for* SETUP *- 25 - decimals span "2".* **Example 2** **Calculating the span for flowrate** *Let us assume that the flowmeter generates 20mA at a rate of 652.31 USGAL per hour, the selected unit is USG and the time unit is minute.* *The span is 652.31 / 60 minutes is 10.87183 (GPM).* *Enter for SETUP - 24: "108718" and for SETUP - 25 "4".*
DECIMALS SPAN **25**	This setting determines the number of decimals for the Span (SETUP 24). The following can be selected: 0 - 1 - 2 - 3 - 4 - 5 - 6 Please note that this SETUP - influences the accuracy of the Span indirectly. This setting has NO influence on the displayed number of digits for "flowrate" (SETUP 23)!

Note !

3 - ALARM	
With these settings, it is determined how the flowrate will be monitored and the functionality of the transistor / relay output (terminals 7-8) be determined.	
FLOW ZERO **31**	When the flowrate is zero, then it is possible to ignore or disable the flowrate monitoring. The following settings can be selected: DEFAULT: in case of a low-flowrate alarm and zero flow, it will switch the alarm output and indicate the alarm on the display. NO RELAY: in case of a low-flowrate alarm and zero flow, it won't switch the alarm output but will indicate the alarm on the display only. IGNORE: in case of a low-flowrate alarm and zero flow, it won't switch the alarm output and nothing will be indicated on the display.
ALARM VALUE LOW FLOWRATE **32**	The low alarm is set with this setting. An alarm will be generated as long as the flowrate lower as this value. With value 0.0 this function is disabled.
ALARM VALUE HIGH FLOWRATE **33**	The high alarm is set with this setting. An alarm will be generated as long as the flowrate higher as this value. With value 0.0 this function is disabled.
DELAY TIME ALARM LOW FLOWRATE **34**	An alarm generated by SETUP 32 “low” can be ignored during X-time period. If the actual flowrate is still incorrect after this delay time, then an alarm will be generated.
DELAY TIME ALARM HIGH FLOWRATE **35**	An alarm generated by SETUP 33 “high” can be ignored during X-time period. If the actual flowrate is still incorrect after this delay time, then an alarm will be generated.
ALARM OUTPUT TRANSISTOR / RELAY **36**	One transistor or relay output is available to transmit the alarm condition. Assign with this function the type of alarm to be transmitted: low flowrate alarm, high flowrate alarm or both alarms. The function is disabled with the selection “off”.

4 - DISPLAY	
FUNCTION **41**	The large 17mm digits can be set to display total or flowrate. When "total" is selected, both total and flowrate are displayed simultaneously. When "flowrate" is selected, only flowrate will be displayed with it’s measuring unit while total will be displayed after pressing SELECT.
SET ALARM **42**	This function determines if the flowrate alarm values can be set at both Operator level and SETUP-level or SETUP-level only. If SETUP has been selected, the alarm values are still visible for the Operator but can not be changed.
The functions below will only effect the optional LED-backlight.	
BACKLIGHT (OPTION) **43**	If a LED backlight has been supplied, the color can be selected. Following selections are available: OFF - GREEN - AMBER
BACKLIGHT ALARM (OPTION) **44**	In case the F013-A generates a flowrate alarm, the backlight can be set to change to red. Following selections are available: OFF: during flowrate alarm the color is according to setting 43 ON: during flowrate alarm the color is red. FLASH: during flowrate alarm the color flashes red and the color as per setting 43.
BRIGHTNESS (OPTION) **45**	The density of the backlight can be set in following range: 1 - 5 One is minimum and five is maximum brightness.

5 - POWER MANAGEMENT

When used with the internal battery option, the user can expect reliable measurement over a long period of time. The F013-A has several smart power management functions to extend the battery life time significantly. Two of these functions can be set:

LCD NEW **51**	The calculation of the display-information 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; the signal will be processed in the normal way. The following can be selected: Fast - 1 sec - 3 sec - 15 sec - 30 sec - off. **Example battery life-time:** *battery life-time with a FAST update: about 3 years.* *battery life-time with a 1 sec update: about 5 years.* ***Note:** after a button has been pressed by the operator - the display refresh rate will always switch to FAST for 30 seconds. When "OFF" is selected, the display will be switched off after 30 seconds and will be switched on as soon as a button has been pressed.*
BATTERY-MODE **52**	The unit has two modes: operational or shelf. After "shelf" has been selected, the unit 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 unit again, press the SELECT-key twice.

Note !

6 - FLOWMETER

SIGNAL
61

The F013-A can process the (0)4-20mA signal in two ways:

- Interpolation: the signal is processed linear

  $$R = S \times I$$

- Square root: for differential pressure

  $$R = S \sqrt{I}$$

where:
R = Rate: the calculated flowrate
S = Span: the maximum flowrate at 20mA. The span is programmed with setting 24 for flowrate and with setting 13 for total.
I = Input: the scaled analog value; in these formulas value 0 (zero) for (0)4mA and value 1 (one) for 20mA.

FILTER
62

Note !

The analog output signal of a flowmeter does mirror the actual flow. This signal is measured several times a second by the F013-A. The value measured is a "snap-shot" of the real flow as it will be fluctuating. With the help of this digital filter a stable and accurate reading can be obtained while the filter level can be set to a desired value.
The filter principal is based on three input values: the filter level (01-99), the last measured analog value and the last average value. The higher the filter level, the longer the response time on a value change will be.
Below, several filter levels with there response times are indicated:

FILTER VALUE	RESPONSE TIME ON STEP CHANGE OF ANALOG VALUE. TIME IN SECONDS			
	50% INFLUENCE	75% INFLUENCE	90% INFLUENCE	99% INFLUENCE
01	filter disabled	filter disabled	filter disabled	filter disabled
02	0.3 seconds	0.5 seconds	1.0 seconds	1.8 seconds
03	0.5 seconds	1.0 seconds	1.5 seconds	3 seconds
05	1.0 seconds	1.8 seconds	2.8 seconds	5.3 seconds
10	1.8 seconds	3.5 seconds	5.6 seconds	11 seconds
20	3.5 seconds	7.0 seconds	11 seconds	23 seconds
30	5.3 seconds	10 seconds	17 seconds	34 seconds
50	8.8 seconds	17 seconds	29 seconds	57 seconds
75	13 seconds	26 seconds	43 seconds	86 seconds
99	17 seconds	34 seconds	57 seconds	114 seconds

Continued next page >>>

6 - FLOWMETER (CONTINUED)

CUT-OFF
63

To ignore e.g. leakage of the flow or vibration, a low-flow cut-off can be set as percentage over the full range of 16mA (or 20mA). When the analog value is less then required with this setting, the signal will be ignored.
The cut-off value can be programmed is the range 0.0 - 99.9%.

Examples:

FUNCTION (setup 61)	SPAN (setup 13/24)	REQUIRED CUT-OFF	CUT-OFF (setup 63)	REQUIRED OUTPUT
interpolation	450 L/min	25 L/min	25/450 x 100%=5.5%	16mA x 5.5% + 4mA = 4.88mA
square root	450 L/min	25 L/min	$(25/450)^2$ x 100%=0.3%	16mA x 0.3% + 4mA = 4.05mA

TUNE MIN / 4MA
64

With this setting it is possible to calibrate the input value for (0)4mA as the signal from the flowmeter might not be exact 4.0 mA (or 0.0 mA) at flowrate zero.
This function will measure the real output value at flow zero.

Note !

Please note: the input loop powered version - type A-PL - requires a signal from 4mA and not lower!

WARNING

- *Warning: be very sure that the offered signal is correct before the calibration is executed as this function has major influences on the accuracy of the system!*

After pressing PROG, three settings can be selected:
- CALIBRATE: with this setting, the input will be calibrated with the actual "(0)4mA" value. After pressing enter, CAL SET will be displayed as soon as the calibration is completed. From that moment, the analog value must be more than the calibrated value before the signal will be processed.
- DEFAULT: with this setting, the manufactures value is re-installed.
- CAL SET: to select the last calibrated value.

TUNE MAX / 20MA
65

With this setting it is possible to calibrate the input value for 20mA as the signal from the flowmeter might not be exact 20.0 mA at maximum flowrate.
This function will measure the real output value at maximum flowrate.

WARNING

- *Warning: be very sure that the offered signal is correct before the calibration is executed as this function has major influences on the accuracy of the system!*

After pressing PROG, three settings can be selected:
- CALIBRATE: with this setting, the input will be calibrated with the actual "20mA" value. After pressing enter, CAL SET will be displayed as soon as the calibration is completed. From that moment, the analog value must be less than the calibrated value for a reliable measurement.
- DEFAULT: with this setting, the manufactures value is re-installed.
- CAL SET: to select the last calibrated value.

7 - OTHERS	
TYPE OF MODEL **71**	For support and maintenance it is important to have information about the characteristics of the F013-A. 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.
VERSION SOFTWARE **72**	For support and maintenance it is important to have information about the characteristics of the F013-A. 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 **73**	For support and maintenance it is important to have information about the characteristics of the F013-A. 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 **74**	All SETUP-values can be pass code protected. This protection is disabled with value 0000 (zero). Up to and including 4 digits can be programmed, for example 1234.
TAGNUMBER **75**	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

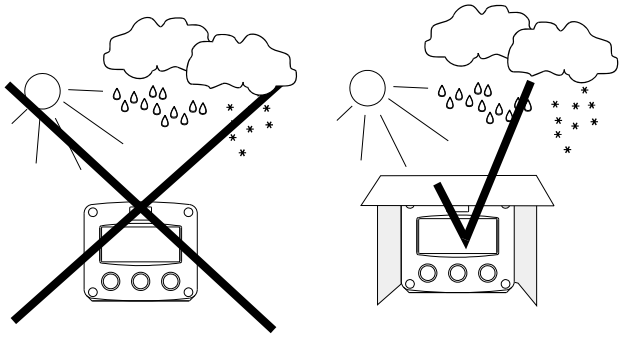
- Mounting, electrical installation, start-up and maintenance of this instrument may only be carried out by trained personnel authorized by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.
- The F013-A may only be operated by 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.

Caution !

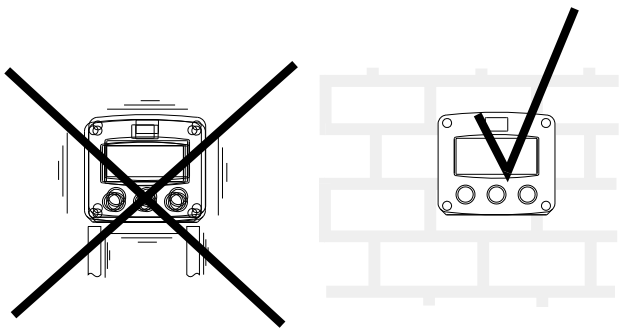
Protection against accidental contact is no longer assured when the housing cover is removed or the panel cabinet has been opened (danger from electrical shock). The housing may only be opened by trained personnel.

- 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 4)!
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 F013-A on a solid structure to avoid vibrations.

4.3. DIMENSIONS- ENCLOSURE

Aluminum enclosures:

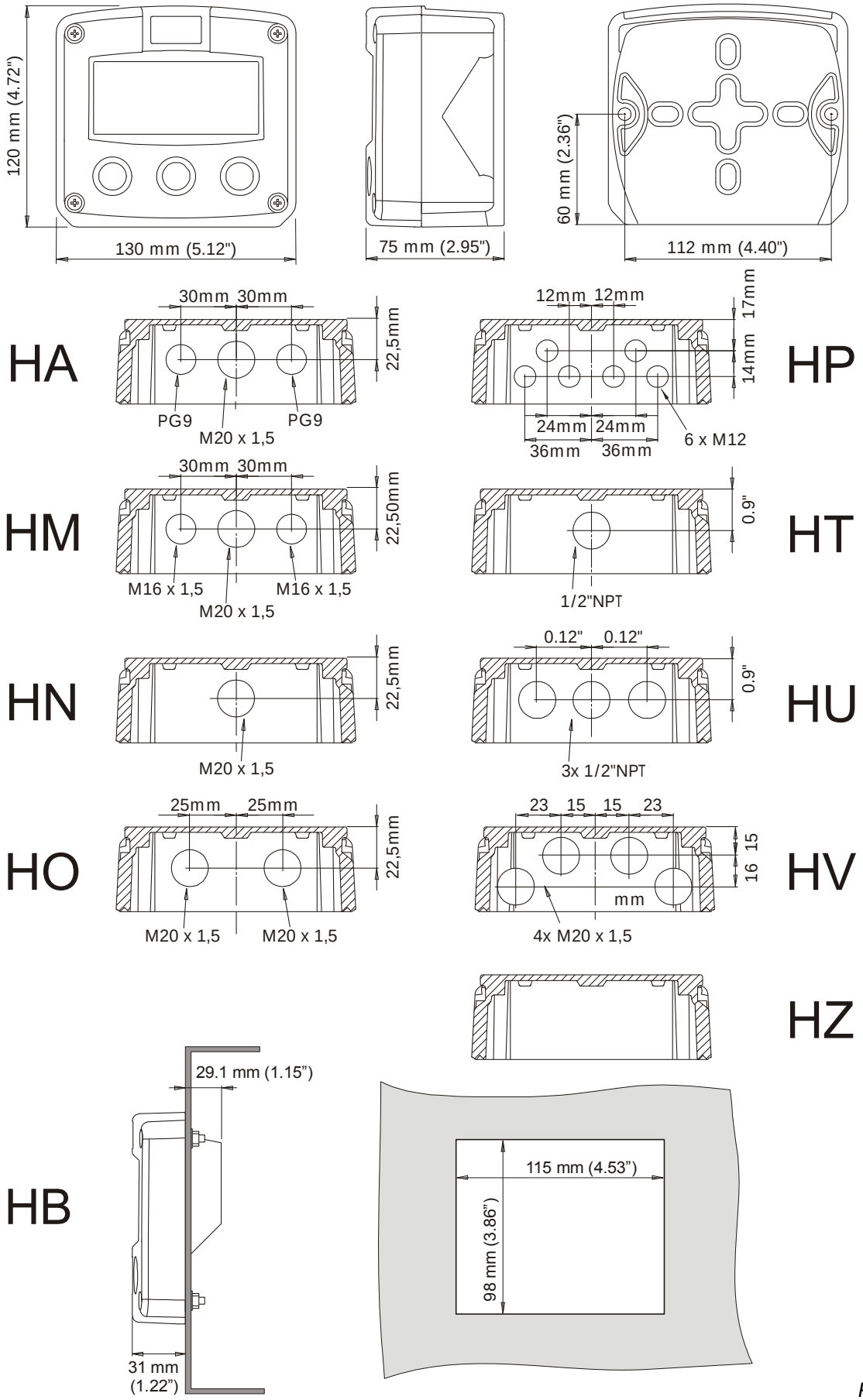
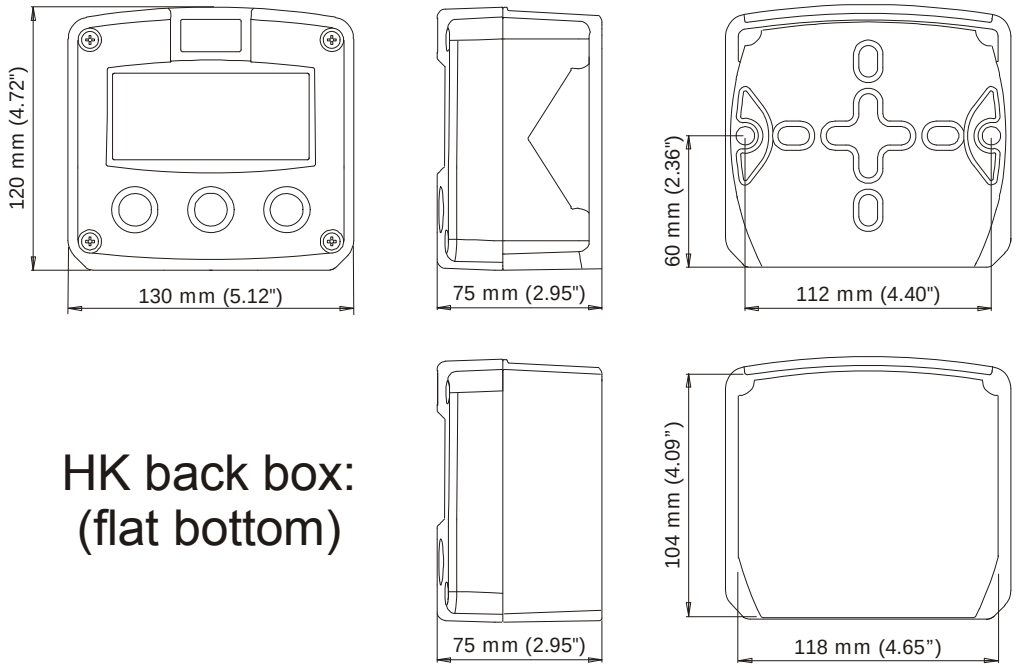
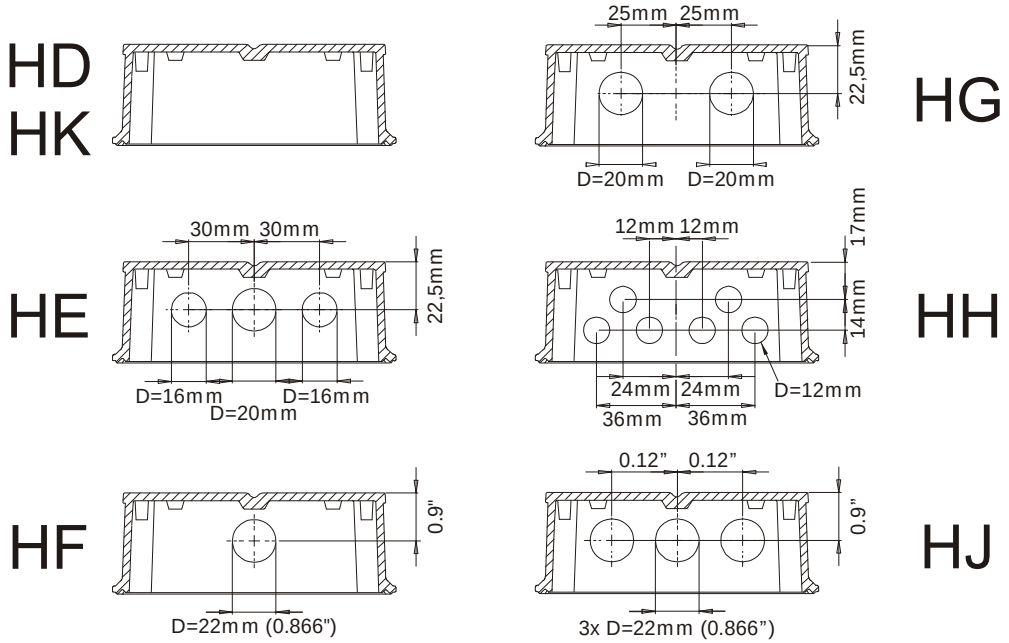


Fig. 6:

Dimensions Aluminum enclosures.

GRP enclosures:





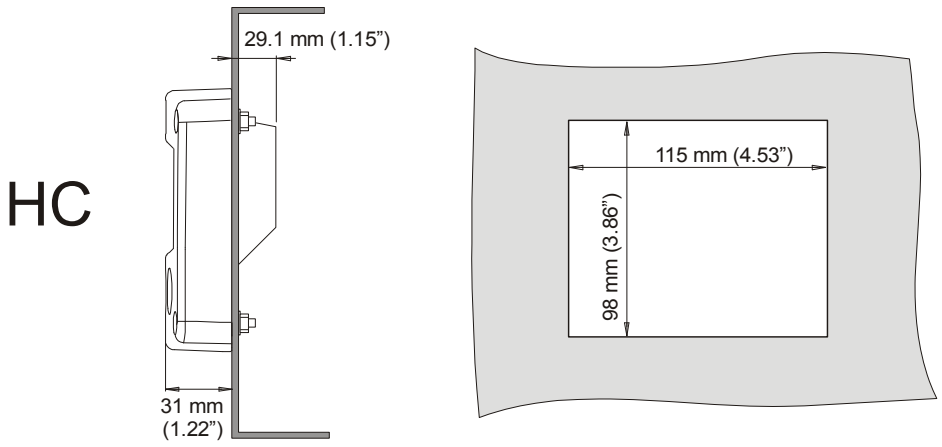


Fig. 7: Dimensions GRP enclosures.

4.4. INSTALLING THE HARDWARE

4.4.1. INTRODUCTION

- 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 ground the aluminum casing properly as indicated, if the F013-A 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.

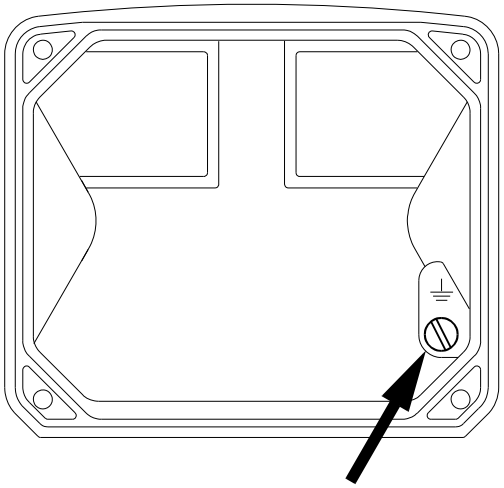


Fig. 8: Grounding aluminum enclosure with option PM 115-230V AC.

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. (above)
- An effective screened cable for the input signal, and grounding of it's screen to the "⊥ " terminal or at the sensor itself, whichever is appropriate to the application.

4.4.2. TERMINAL CONNECTORS WITH POWER SUPPLY - TYPE : PB / PD / PL / PX

For Intrinsically Safe applications: read chapter 5.

The following terminal connectors are available:

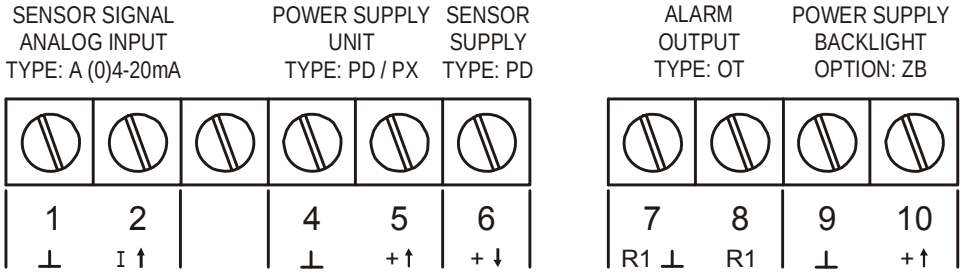
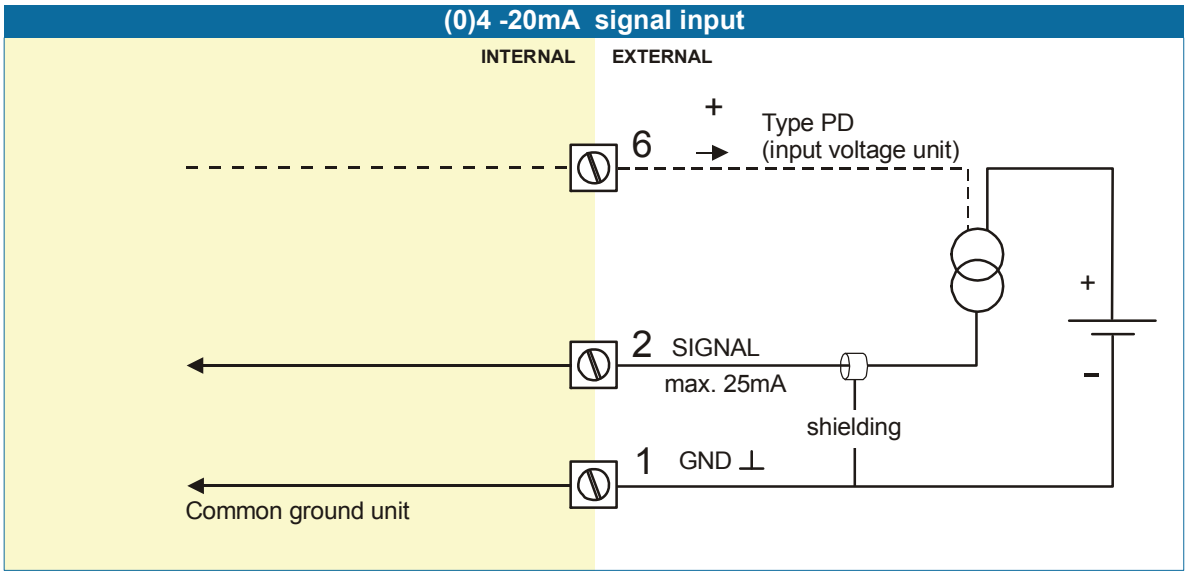


Fig. 9: Overview of terminal connectors F013-A-(PB / PD / PL / PX) and options.

REMARKS: TERMINAL CONNECTORS:

Terminals 1-2; Flowmeter input:
The F013-A requires a (0)4-20mA flowmeter signal which will be processed 4 times a second with a 16 bits accuracy. The input is not isolated.
The screen of the signal wire must be connected to the common ground terminal

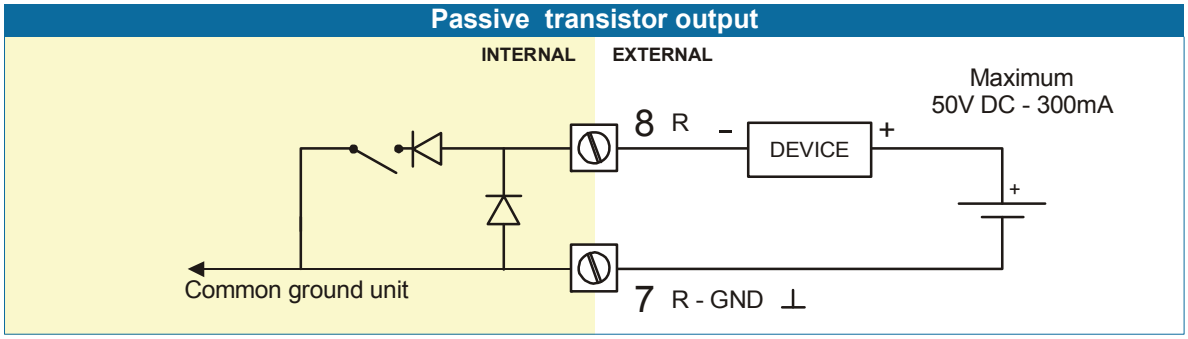


Terminals 1-2; sensor INPUT LOOP POWERED - type A-PL:
Model F013-A-PL is powered from the 4-20mA sensor signal. In the mean time, the unit will process the signal four times a second with a 16 bit accuracy. The input is not isolated.
The screen of the signal wire must be connected to the common ground terminal 1.

Terminal 4-5: POWER SUPPLY UNIT - TYPE PD / PX:
To power the unit an internal battery can be used (type PB) and / or an external DC power supply of 8-30V DC (type PX) or 16-30V DC (type PD).
Connect the "**-**" to terminal 4 and the "**+**" to terminal 5. When power is applied to these terminals, the optional internal battery will be disabled / enabled automatically to extend the battery life time.
The input loop powered model - type A-PL - does not have this power supply option.

Terminal 6: sensor supply voltage - type PD.
With this option, a sensor supply terminal comes available which offers the same voltage as connected to terminal 5 (internally linked).
Remark: this terminal is only available if option PD has been ordered.

Terminal 7-8; Alarm output – type OT:
With SETUP 36, the function of this output is set to a low and / or high flowrate alarm output.
A passive transistor output is available with this option. Max. driving capacity 300mA@50V DC.



Terminal 9-10: power supply backlight - type ZB (option):
To power the backlight, a voltage in the range 20-30V DC has to be connected.
Maximum current 30mA. Connect the "**-**" to terminal 9 and the "**+**" to terminal 10.

4.4.3. TERMINAL CONNECTORS WITH POWER SUPPLY - TYPE : PF / PM

For Intrinsically Safe applications: read chapter 5.

The following terminal connectors are available:

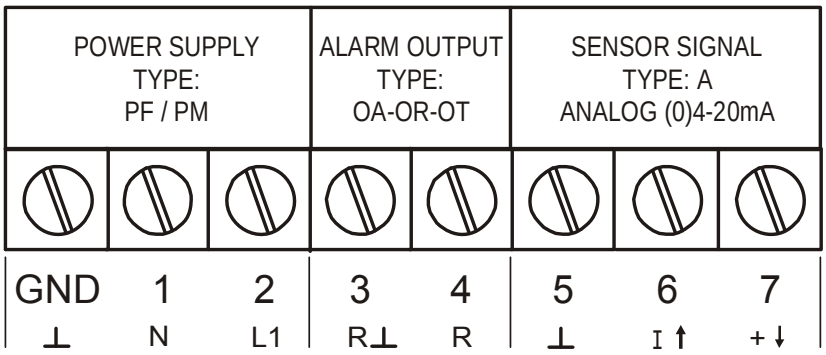


Fig. 10: Overview of terminal connectors F013-A-(PF / PM) and options.

SENSOR SUPPLY

Type PF-PM: Sensor supply: 8.2V, 12V or 24 V:
With this option, a real power supply for the sensor is available. The sensor can be powered with 8.2, 12 or 24 V DC (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 !!!

First, remove the terminal strip(s) after which the internal plastic cover can be removed. The switches are located on the right hand side as indicated:

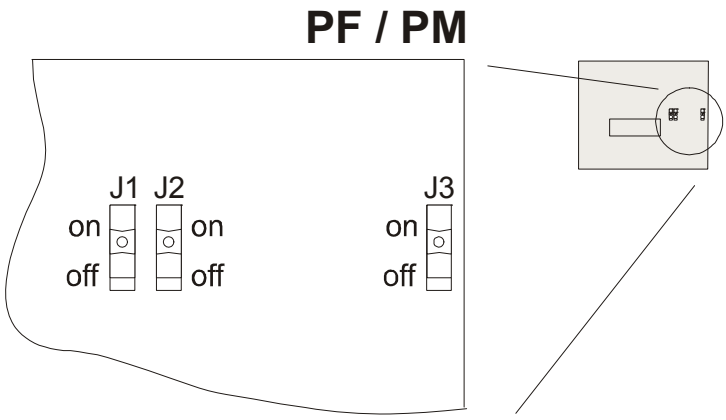


Fig. 11: switch position voltage selection (type PF and PM).

Switch positions / sensor supply voltage:

VOLTAGE SELECTION			
SWITCH	8.2V DC	12V DC	24V DC
J1	off	off	off
J2	on	on	off
J3	on	off	on or off

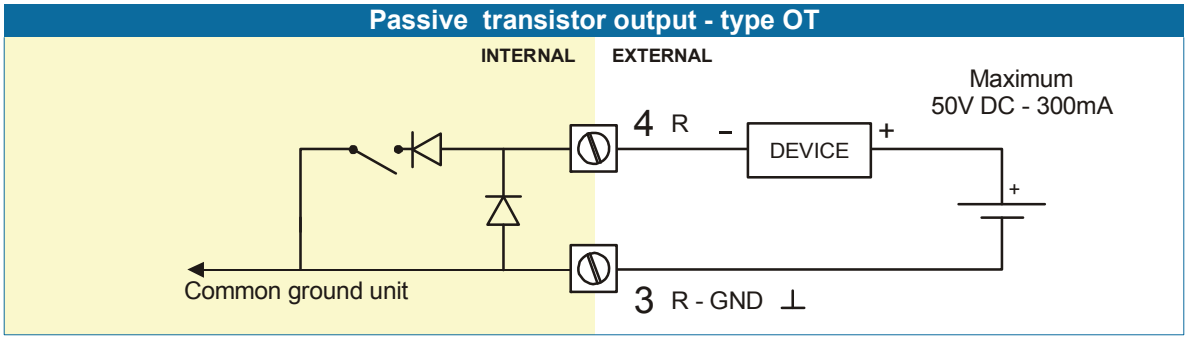
REMARKS: TERMINAL CONNECTORS:

Terminal GND- 01- 02; POWER SUPPLY only available with type PF / PM:

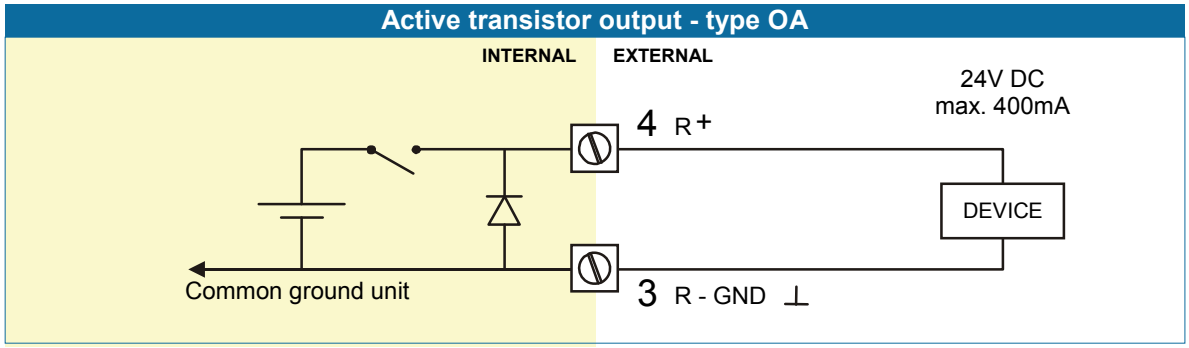
OPTION	SENSOR SUPPLY	Terminal		
		GND	01	02
PF 24V AC ± 10%	8.2, 12, 24V max. 400mA@24V DC		AC	AC
PF 24V DC ± 10%	8.2, 12, 24V max. 400mA@24V DC	L-	L+	
PM 115-230V AC ± 10%	8.2, 12, 24V max. 400mA@24V DC	EARTH	AC	AC
Note PF / PM	The total consumption of the sensor, transistor output type OA and backlight type ZB may not exceed 400mA@24V DC.			

Terminal 3-4; Alarm output:
With SETUP 36, the function of this output is set to a low and / or high flowrate alarm output.

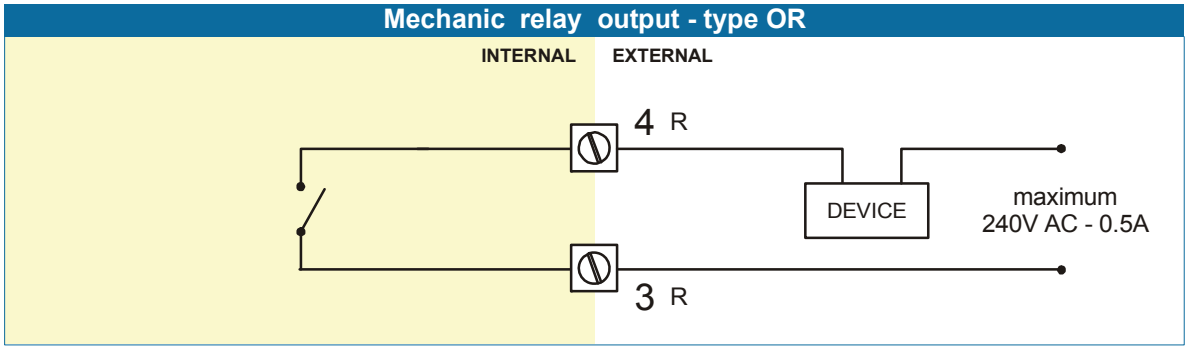
Type OT:
A passive transistor output is available with this option. Max. driving capacity 300mA@50V DC.



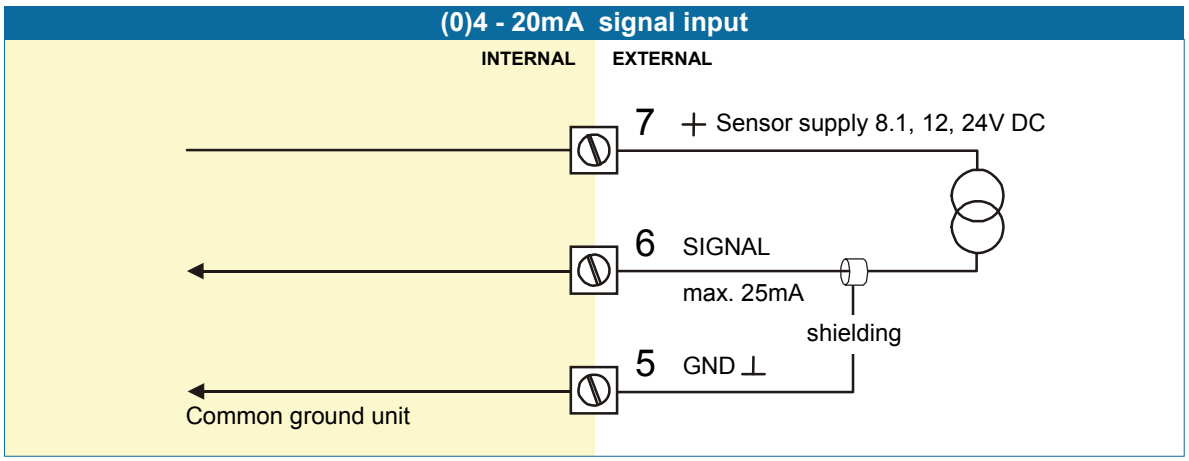
Type OA:
An active 24V DC transistor output is available with this option.
Max. driving capacity 400mA@24V DC. (Requires power supply type PF / PM).



Type OR:
An isolated mechanical relay output is available with this option.
Max. switch power 240V 0,5A. (Requires power supply type PF / PM).



Terminals 5-7; Flowmeter input:
The F013-A requires a (0)4-20mA flowmeter signal which will be processed 4 times a second with a 16 bit accuracy. The input is not isolated.
The screen of the signal wire must be connected to the common ground terminal 5.



5. INTRINSICALLY SAFE APPLICATIONS

5.1. GENERAL INFORMATION AND INSTRUCTIONS:

- 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.

Caution !

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

- Safety Instructions
- Certificates, safety values, control drawing and declaration of compliance can be found in the document named: “Fluidwell F0..-A-XI - Documentation for Intrinsic Safety”.

WARNING

- 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 05ATEX1168 X.
- For installation under IECEx scheme: this intrinsically safe device must be installed in accordance the product certificate IECEx KEM 08.0006X.
- For installation under CSA: this intrinsically safe device must be installed in accordance with the product certificate CSA.08.2059461 X.
- For installation under FM: this intrinsically safe device must be installed in accordance with the Certificate / Project ID: 3033306.
- The control drawing number FWCD-0001 can be found in the document named: “Fluidwell F0..-A-XI - Documentation for Intrinsic Safety”.
- The control drawing number FWCD-0002 can be found in the document named: “Fluidwell F0..-A-PL-XI - Documentation for Intrinsic Safety”.
- Exchange of Intrinsically Safe battery FWLiBAT-00x with certificate number KEMA 03ATEX1071 U or IECEx KEM 08.0005U is allowed in Hazardous Area. See paragraph 5.4. for battery replacement instructions.

- Please 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.

Note !

- 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 on the display: setup function (par. 3.2.2.).

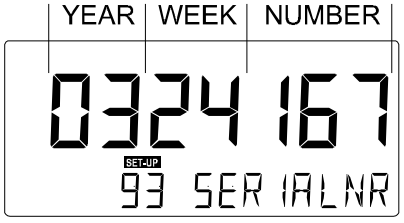


Fig. 12: Example serial number.

Label information analog input type - F0..A-XI (inside and outside the enclosure)

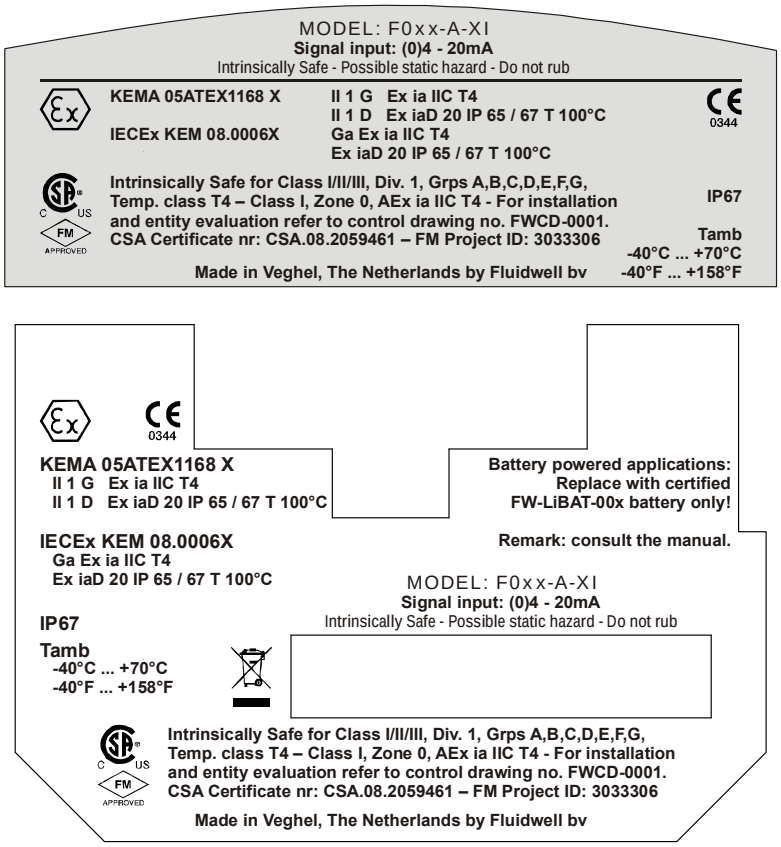


Fig. 13: Label information Intrinsically Safe application.

Label information analog input - loop powered - type A-PL (inside and outside the enclosure)

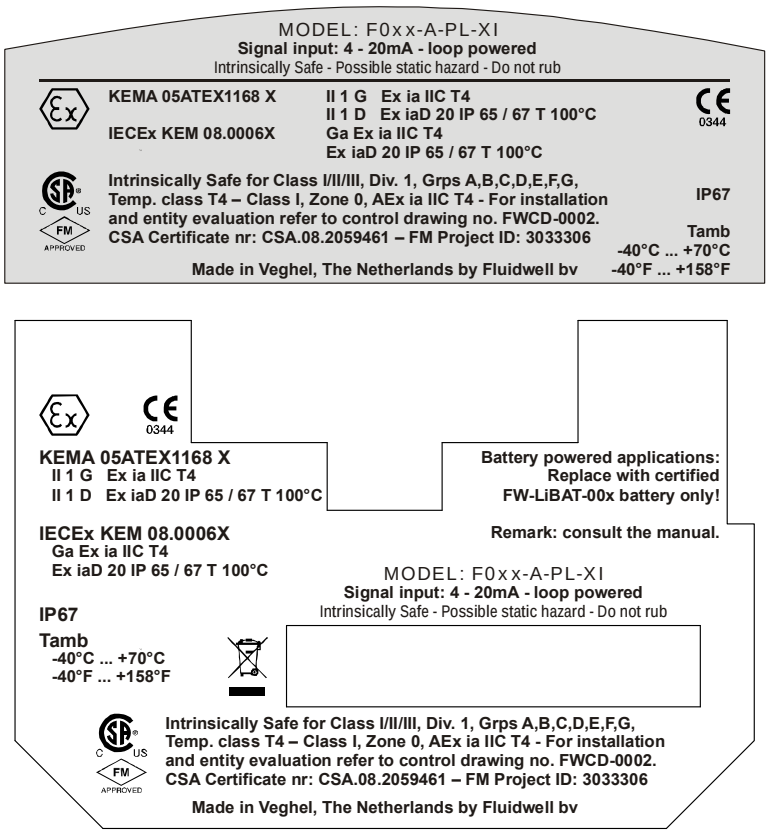


Fig. 14: Label information Intrinsically Safe application.

5.2. TERMINAL CONNECTORS INTRINSICALLY SAFE APPLICATIONS:

Terminal connectors F013-A-(PC / PD / PL / PX)-XI-(ZB):

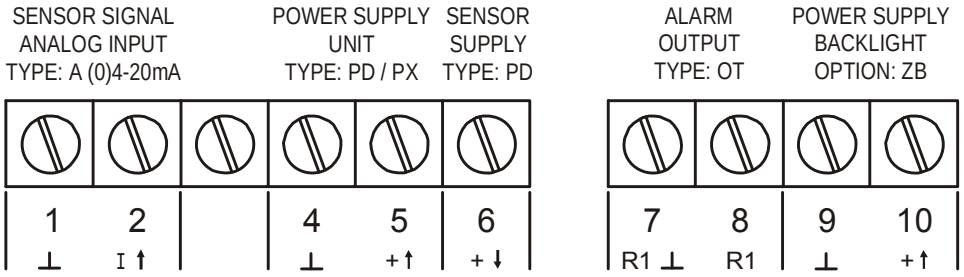


Fig. 15: Overview terminal connectors XI - Intrinsically Safe applications.

Remarks power supply options:
Type PC: offers - additional to type PX - an internal Intrinsically Safe lithium battery. This ATEX certified battery (FW-LiBATT-xxx) may be changed in hazardous area.
Type PD: offers - additional to type PX - a sensor supply terminal (terminal 6) which offers the same voltage as connected to terminal 5 (internally linked).
Type PX: as standard, all intrinsically products are supplied with terminal 4 and 5 to power the product externally.
Type PL: the unit will be powered from the 4-20mA input signal. Terminal 4-6 are not available.

5.3. CONFIGURATION EXAMPLES INTRINSICALLY SAFE APPLICATIONS:

Configuration example no. 1

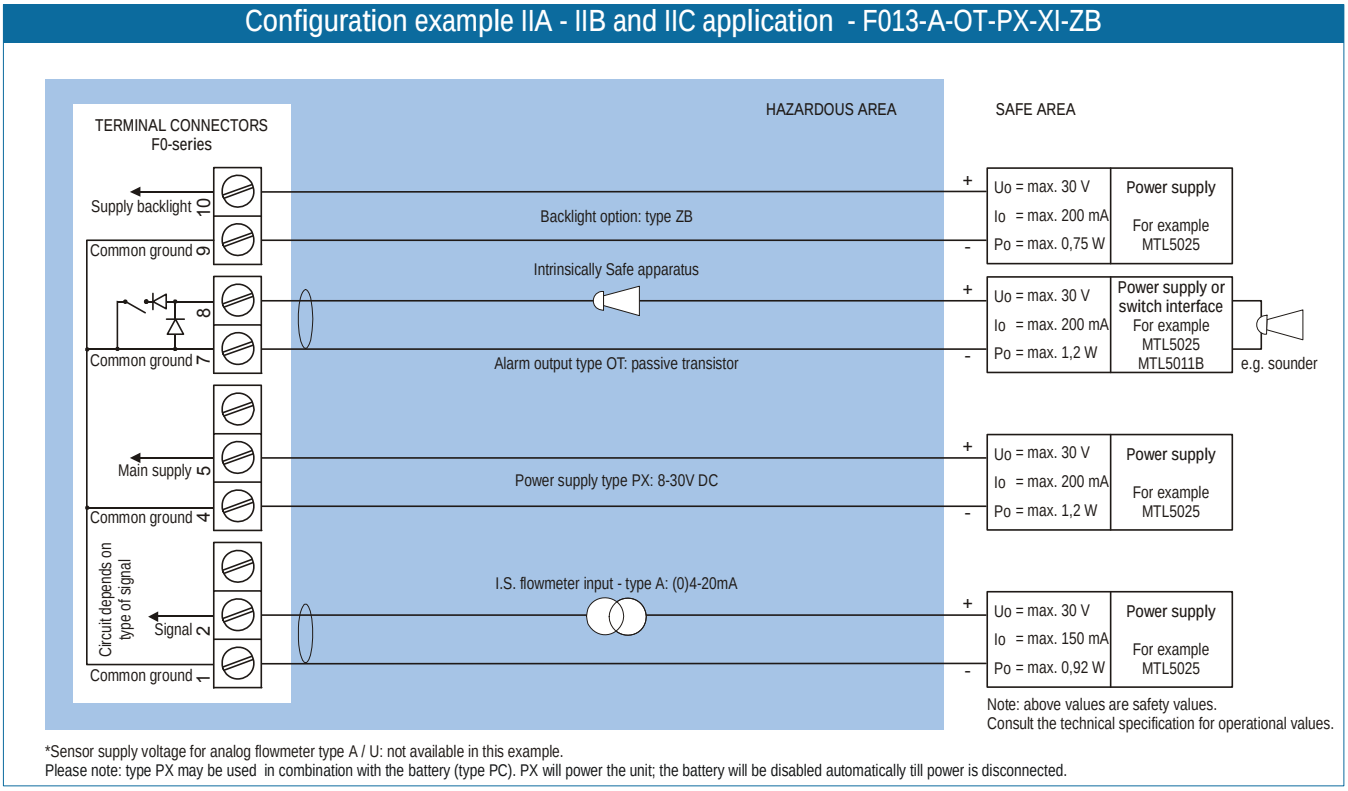


Fig. 16: Configuration example Intrinsically Safe.

Configuration example no. 2

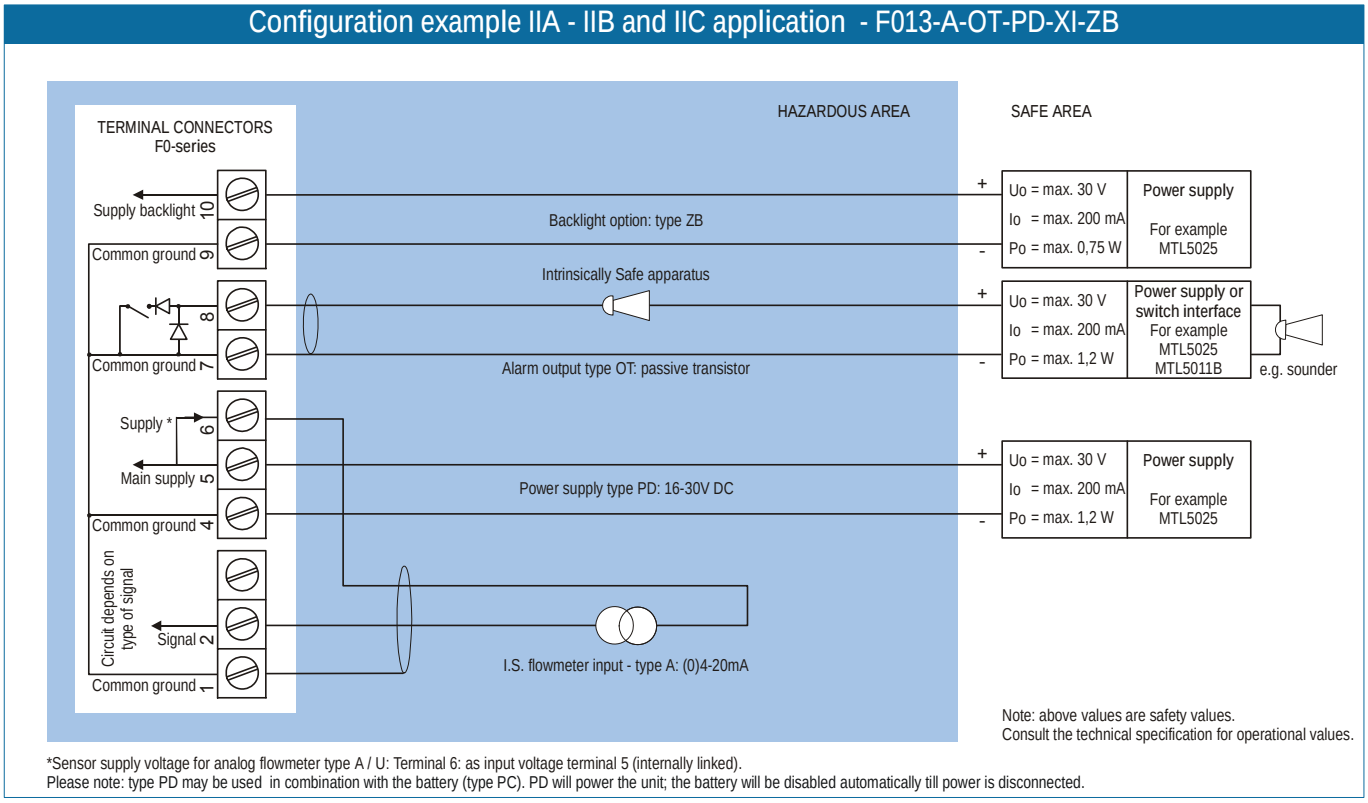


Fig. 17: Configuration example Intrinsically Safe.

Configuration example no. 3

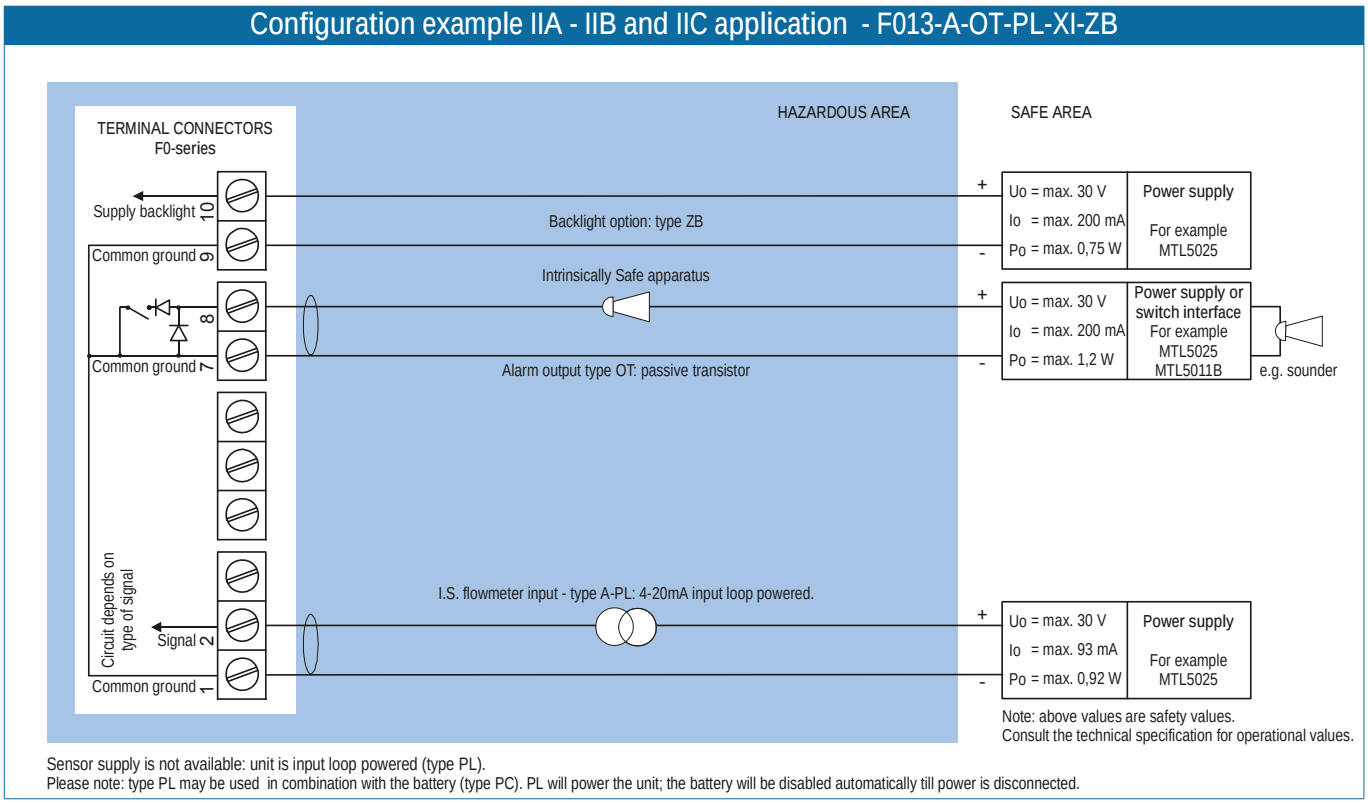


Fig. 18: Configuration example Intrinsically Safe.

5.4. BATTERY REPLACEMENT INSTRUCTIONS

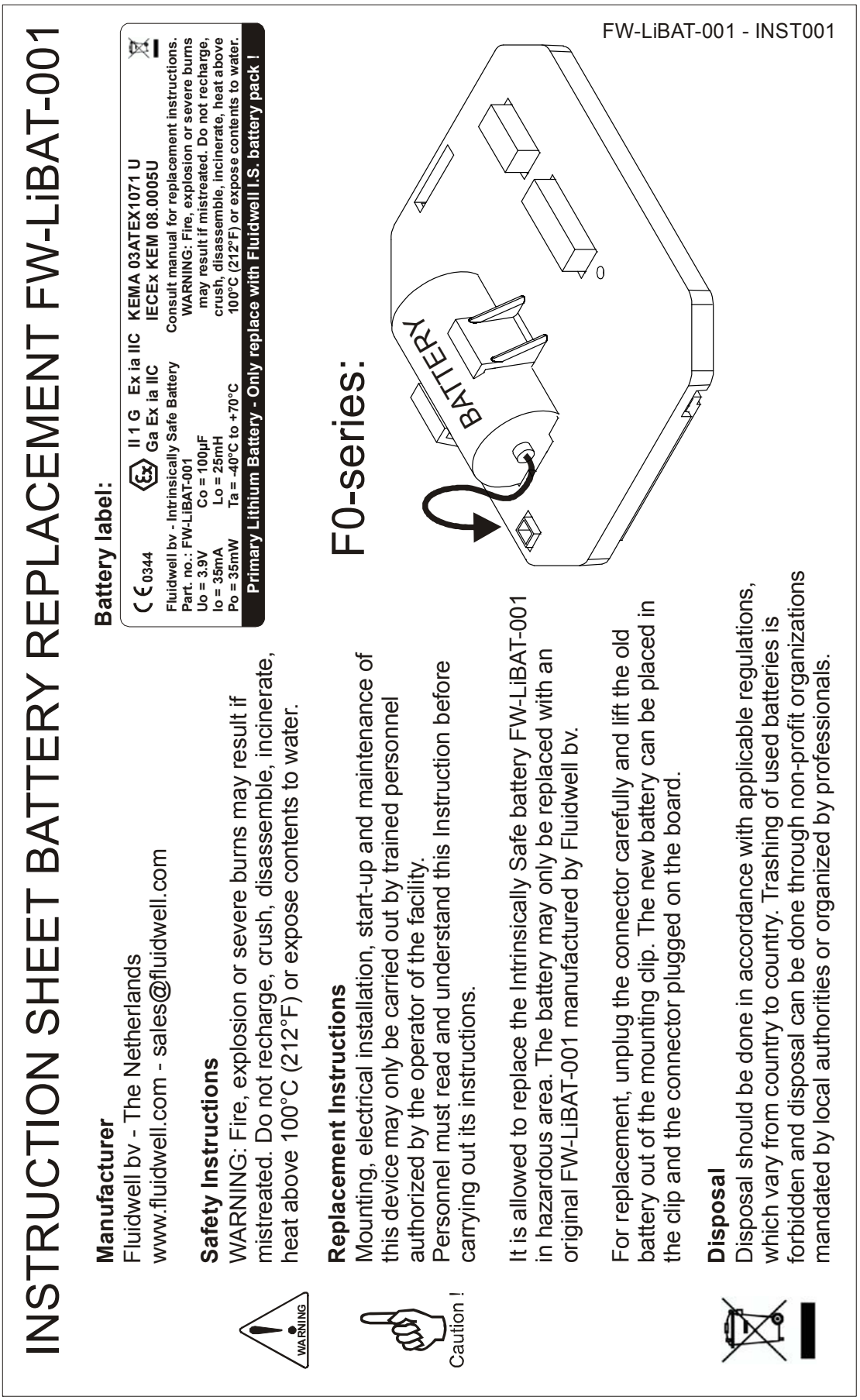


Fig. 19: Battery replacement instructions Intrinsically Safe Battery.

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 F013-A 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.


Caution !

- 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.

The F013-A 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 F013-A 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 :

- Display update: fast display update uses significantly more power.
- Low temperatures; the available power will be less due to battery chemistry.


Note !

Note: *It is strongly advised to use only necessary 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 span 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 (option)	Tri-color configurable LED-backlight - green, amber with red flashing during alarm. Intensity adjustable from the keyboard.

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 / NEMA4
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
Aluminum 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 +178°F).
Intrinsically Safe	-40°C to +70°C (-40°F to +158°F).

Power requirements	
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	16-30 V DC. Power consumption max. 1 Watt.
Type PF	24V AC/DC ±10%. Power consumption max. 15 Watt.
Type PL	Input loop powered from 4-20mA signal input. Voltage drop max. 2.6V DC
Type PM	115-230V AC ±10%. Power consumption max. 15 Watt.
Type PX	8-30 V DC (also available with PB / PC). Power consumption max. 0.3 Watt.
Type ZB	20-30V DC. Power consumption max. 1 Watt. Note: with type PF / PM: internally powered.
Note PF / PM	The total consumption of the sensor, active output type OA and backlight type ZB may not exceed 400mA@24V DC.
Note I.S. application	for intrinsically safe applications, consult the safety values in the certificate.

Sensor excitation	
Type PB / PC / PX	Sensor supply voltage: 3.2V DC for pulse signals and 1.2V DC for coil pick-up. Please note: this is not a real sensor supply. Only suitable for sensors with a very low power consumption like coils (sine wave) and reed-switches. Analog sensors type A / U: sensor supply not available.
Type PD	With pulse input type P: sensor supply 1.2, 3.2, 8.2V DC - max. 5mA@8.2V DC. With analog input type A / U: as connected power supply voltage (internally linked)
Type PF / PM	Analog sensors type A / U: sensor supply 8.2, 12 and 24V DC - max. 400mA@24V DC With pulse input type P: sensor supply 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

Data protection	
Type	EEPROM backup of all settings. Data retention at least 10 years.
Pass code	Configuration settings can be pass code protected.

Hazardous area (option)	
Intrinsically safe Type XI	ATEX approval: II 1 G Ex ia IIC T4 II 1 D Ex iaD 20 IP 65 / 67 T 100°C IECEx approval: Ga Ex ia IIC T4 Ex iaD 20 IP 65 / 67 T 100°C CSA / FM approval : IS Class I/II/III, Division 1 Groups A to G T4 Class I zone 0 AEx ia IIC T4
Explosion proof Type XF	ATEX approval ref.: <EX> II 2 GD EEx d IIB T5. Weight appr. 15kg. Dimensions of enclosure: 350 x 250 x 200mm (13.7" x 9.9" x 7.9") LxHxD.

Environment	
Electromagnetic compatibility	Compliant ref: EN 61326 (1997), EN 61010-1 (1993)
Low voltage directive	Compliant ref: EN60950.

INPUT

Flowmeter	
Type P	Coil/sine wave (minimum 20mVpp or 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed-switch, Namur, active pulse signals.
Frequency	Minimum 0 Hz - maximum 7 kHz for flowrate. 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 - 9,999,999 with variable decimal position.
Low-pass filter	Available for all pulse signals.
Note	For coil signal input: higher sensitivity is available - type ZF (10mVpp) / type ZG (5mVpp).
Type A	(0)4-20mA - with signal calibration feature.
Type U	0-10 V - with signal calibration feature.
Accuracy	Resolution: 16 bit.. Error < 0.01mA / ±0.05% FS. Low level cut-off programmable.
Span	0.001 - 99,999 with variable decimal position.
Update time	Four times a second.
Voltage drop	2.6 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 / PF / PM.

OUTPUT

Alarm output	
Function	high, low or high and low flowrate alarm.
Type OT	One passive transistor output - not isolated. Load max. 50V DC - 300mA.
Type OA	One active 24V DC transistor output; max. 400mA per output (requires type PF or PM).
Type OR	One mechanic relay output; max. switch power 230V AC - 0,5A (requires type PF or PM).

OPERATIONAL

Operator functions	
Displayed functions	• total and/or flowrate. • total and accumulated total. • total can be reset to zero by pressing the CLEAR-key twice. • alarm value's low - high flowrate • alarm value's can be entered (this function can be disabled)

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.

Flowrate	
Digits	7 digits.
Units	mL, L, m3, Gallons, KG, Ton, lb, bl, cf, RND, ft3, scf, Nm3, Nl, igal - no units.
Decimals	0 - 1 - 2 or 3.
Time units	/sec - /min - /hr - /day.

Alarm values	
Digits	7 digits.
Units	According to selection for flowrate.
Decimals	According to selection for flowrate.
Time units	According to selection for flowrate.
Type of alarm	low and high flowrate alarm. Includes delay time alarm and configurable alarm output.

APPENDIX B: PROBLEM SOLVING

In this appendix, several problems are included that can occur when the F013-A is going to be installed or while it is in operation.

Flowrate displays "0 / zero" while there is flow (total is counting):
Check:
1) SETUP 22 / 25: are the span and time unit correct?

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

Range error
- Range error (LO RANGE or HI RANGE): the input value is at least 5% above or below the calibrated measurement range SETUP 54, 55. Do recalibrate the input if desired.

ALARM
When the alarm flag starts to blink an internal alarm condition has occurred. Press the "select button" several times to display the 4-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

The alarm condition will almost certainly be handled internally and if all mentioned values still appear correct, no intervention by the operator is needed. If the alarm occurs more often or stays active for a longer time, please contact your supplier.

LIST OF FIGURES IN THIS MANUAL

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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 span	0000001 /sec	/sec	/sec
14 decimals span	0		

SETTING	DEFAULT	DATE :	DATE :
2 - FLOWRATE		Enter your settings here	
21 unit	L		
22 time unit	/min		
23 decimals	0000000		
24 span	0000001 /min	/ unit	/ unit
25 decimals span	0		
3 - ALARM			
31 flow zero	default		
32 alarm value low	0		
33 alarm value high	0		
34 delay time alarm low	0.0 sec		
35 delay time alarm high	0.0 sec		
36 alarm output	hi - lo		
4 - DISPLAY			
41 function	total		
42 set rate min/max	operator level		
43 backlight	off		
44 backlight alarm	off		
45 brightness	5		
5 - POWER MANAGEMENT			
51 LCD-new	1 sec.		
52 mode	operational		
6 - FLOWMETER			
61 formula	interpolation		
62 filter	01 (off)		
63 cut-off %	00.0%		
64 calibrat. low-(0)4mA	default		
65 calibrat. high-20mA	default		
7 - OTHERS			
71 model	F013-A	F013-A	F013-A
72 software version	03.____.____	03.____.____	03.____.____
73 serial number	_ _ _ _ _ _ _	_ _ _ _ _ _ _ _	_ _ _ _ _ _ _ _
74 pass code	0000		
75 tagnumber	0000000		

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