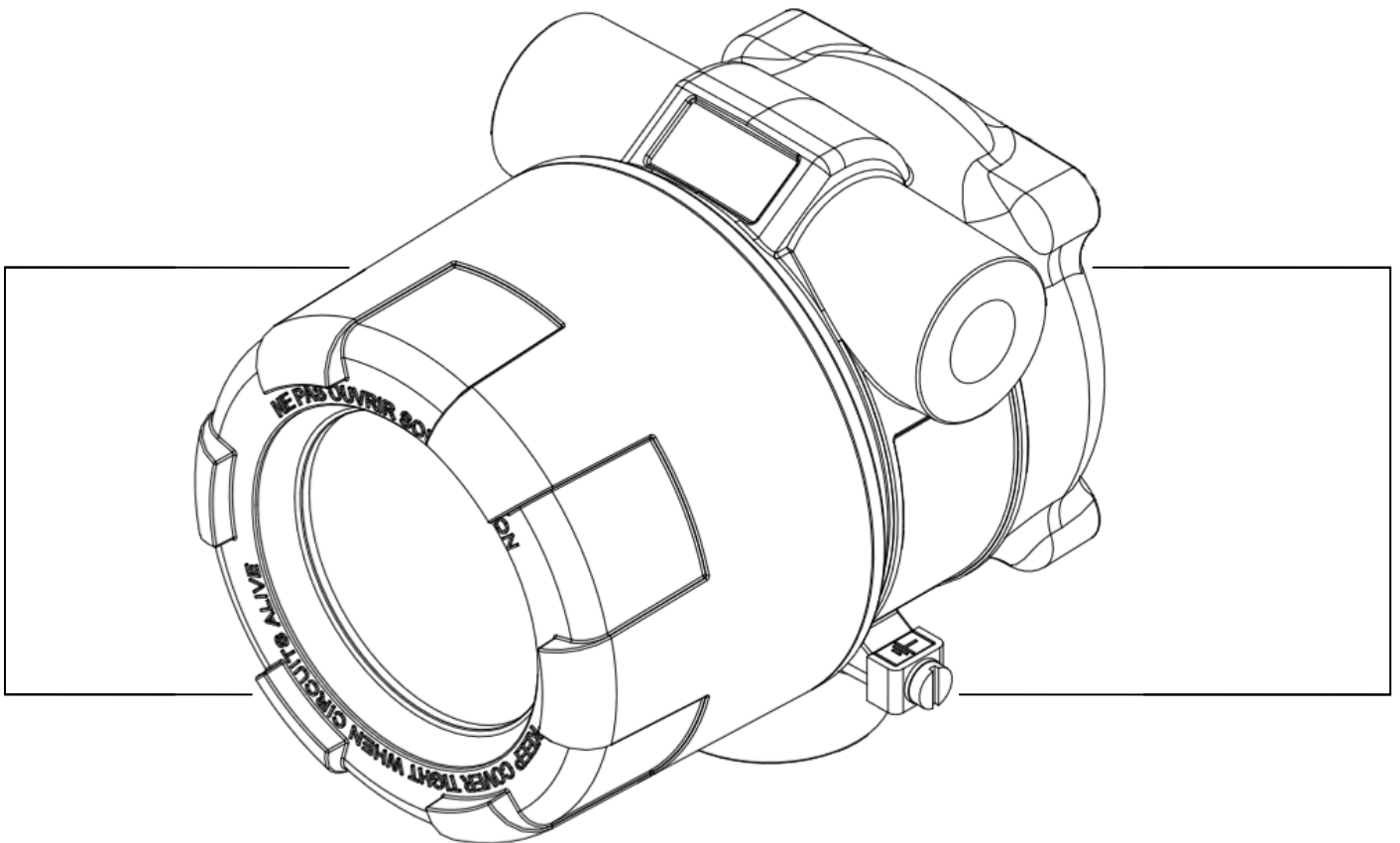


E112-P

***EXPLOSION PROOF FLOWRATE INDICATOR / TOTALIZER
with LINEARIZATION***



Signal input flowmeter: pulse, Namur and coil

Signal outputs: Analog referenced flowrate and pulse referenced total

Remote control: External reset

Options: Modbus communication



SAFETY INSTRUCTIONS



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



- *LIFE SUPPORT APPLICATIONS: The E112-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 be discharged 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 / stainless steel casing as indicated if the E112-P is used on a ship, truck or other application with no ground. The green / yellow wire between the casing and terminal-block may never be removed.*

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 E112-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 all connections, settings and technical specifications of the various peripheral devices with the E112-P supplied.
- Never open the housing in hazardous areas while connected to power supplying or consuming devices other than the internal battery supply. Open the housing only if all leads are free of current.
- 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 E112-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 E112-P 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 E112-P 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:	03.01.xx
Software version:	03.01.xx
Manual :	FW-E112-P-MAN-EN_v0101_08
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1. INTRODUCTION

1.1. SYSTEM DESCRIPTION OF THE E112-P

Functions and features

The flowrate / totalizer model E112-P is an explosion proof microprocessor driven instrument designed to linearize the flowmeters flow curve and display the flowrate, total and accumulated total.

The E-series product line has been designed with a focus on:

- User-friendliness: operation through the glass without removing the cover.
- Mounting flexibility: multiple solutions for sensor mounting, including 1" NPT or M25 bottom entry as well as suitable for wall or pipe mount applications.
- Ruggedness for harsh surrounding: not just designed to be explosion proof.
- Usability: wide operational temperature, high ingress protection rating and international certification.
- Installation friendly design: spacious cabling area, plug and play cable connection and easy removable electronic module.
- Cost effectiveness: aluminum enclosure with high quality industrial two component coating.
- Suitability for offshore applications: stainless steel 316L enclosure version.
- Ease for the Operator: functional information and identical operation as all F / D / N –series of Fluidwell.
- Ability to process any type of sensor signals,
- Multiple power supply options to suit any application, including long-life battery supply.
- Transmitting possibilities with analog / pulse and communication (option) outputs.

Flowmeter input

This manual describes the unit with a pulse type input from the flowmeter "-P version". Other versions, (0)4-20mA or 0-10V flowmeter signals, are pending.

One flowmeter with a passive or active pulse, Namur or sine wave (coil) signal output can be connected to the E112-P. To power the sensor, several options are available.

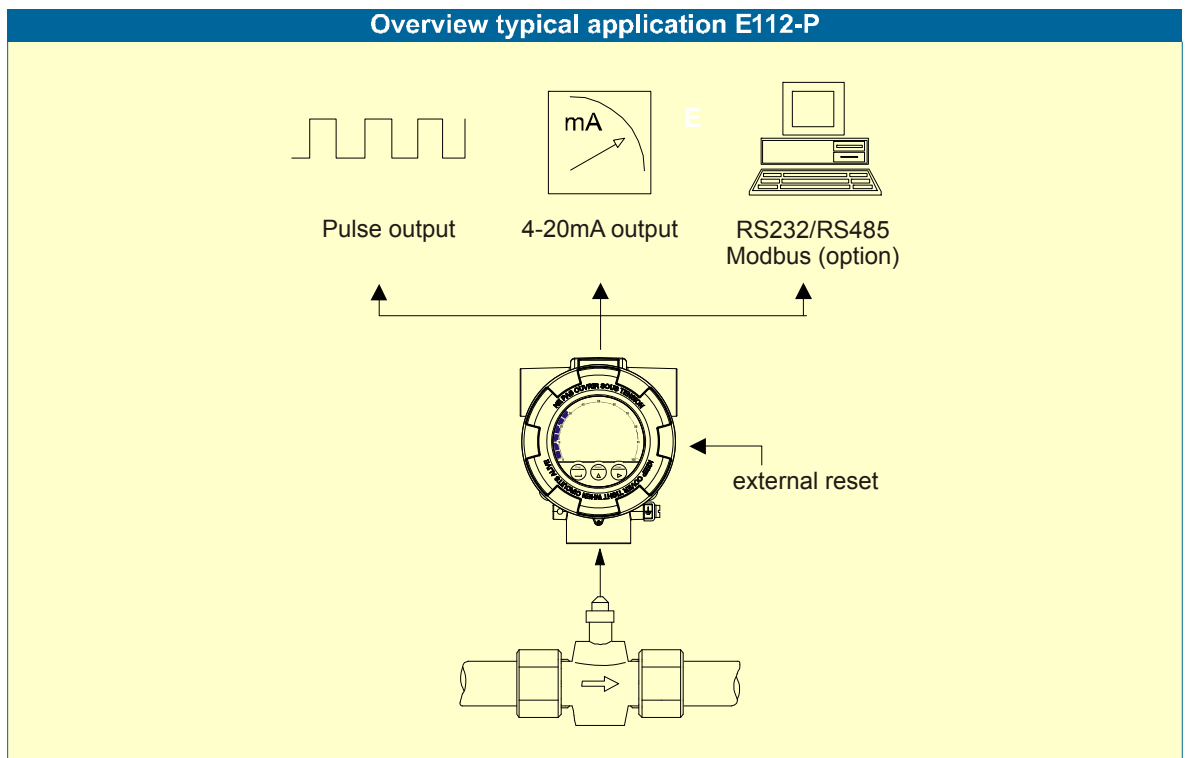


Fig. 1: Typical application for the E112-P

Standard outputs

- Configurable pulse output: a scaled pulse representing a certain linearized total quantity. Maximum frequency 500Hz. The pulse length can be set as desired.
- Configurable linear 4-20mA isolated analog output with 12-bits resolution representing the actual linearized flowrate. Flowrate levels as well as the minimum and maximum signal output can be tuned.

Configuration of the unit

The highly praised configuration structure is identical to any other Fluidwell product while the clear texts reduce potential mistakes. Once familiar with one product, you are able to control them all, often without a manual: if you know one – you know them all.

The E112-P has been designed to be implemented in many types of applications. For that reason, a SETUP-level is available to configure the E112-P according to your specific requirements.

SETUP includes several important features, such as K-factors, measurement units, signal selection etc. All settings are stored in an EEPROM memory and will not be lost in the event of a power failure or a drained battery.

To extend the battery life time (option), please make use of the power-management functions as described in chapter 3.2.3.

Display information

The unit has a large transfective 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 7mm (0.28") (11) digits or with the large 12mm (0.47") (7) digits. The E112 shows the operator a speedometer reflecting the actual flowrate.

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

Backlight

A backlight is standard available while the brightness can be tuned as desired (externally powered only).

The backlight can even be used in battery powered applications: it will be switched on during a limited period of time and will switch off automatically within 30 seconds after the key touch.

For loop powered applications only, the backlight will not function.

Options

The following options are available:

- Full Modbus communication RS232/485 (also battery powered),
- Mechanical relay,
- Power- and Sensor-supply.

2. OPERATIONAL

2.1. GENERAL



- *The E112-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 front of this manual.*

This chapter describes the daily use of the E112-P. This instruction is meant for users / operators.

2.2. CONTROL PANEL

The following three infra-red keys, operated through glass, are available:

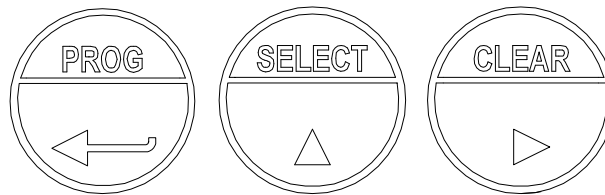


Fig. 2: Infra-red keys Control Panel

To operate the key touch the glass only briefly. Familiarize yourself what will trigger the switch, too short or too long will not function.

Unlock infra-red keys

The infra-red keys are locked after 30 seconds when enabled at SETUP 8.5. A key-symbol will appear at the top of the display to indicate this.

To unlock the infra red keys, touch briefly after each other all three keys in the following order:

PROG – SELECT – CLEAR.

The display will hint this sequence. The key-symbol will disappear after the order is correctly executed.

Unlock infra-red keys manually

To unlock the infra-red keys touch simultaneously the PROG and CLEAR keys for 3 seconds (or wait for 30 seconds). The key-symbol will appear as shown.

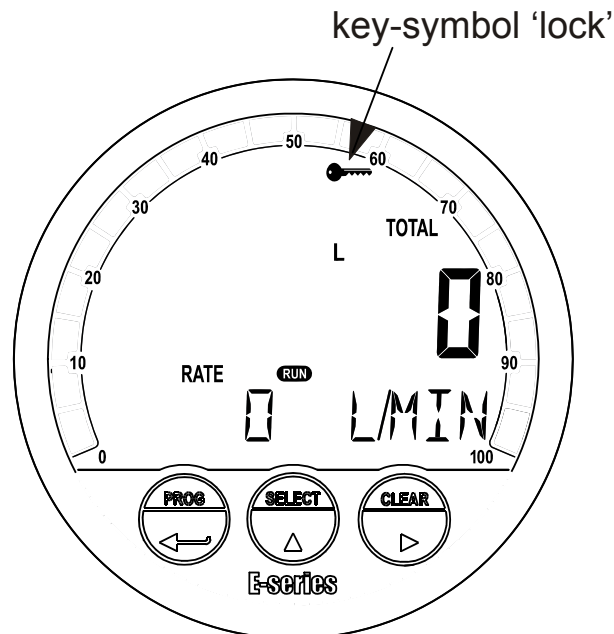


Fig. 3: Locked keyboard - infra-red keys

Enable or disable infra red keys with on-off switch

Under the infra-red keys an on-off switch is located to enable or disable the infra-red keys. Move this switch to the right to enable or to the left to disable the infra-red keys. The key-symbol will appear in the display.

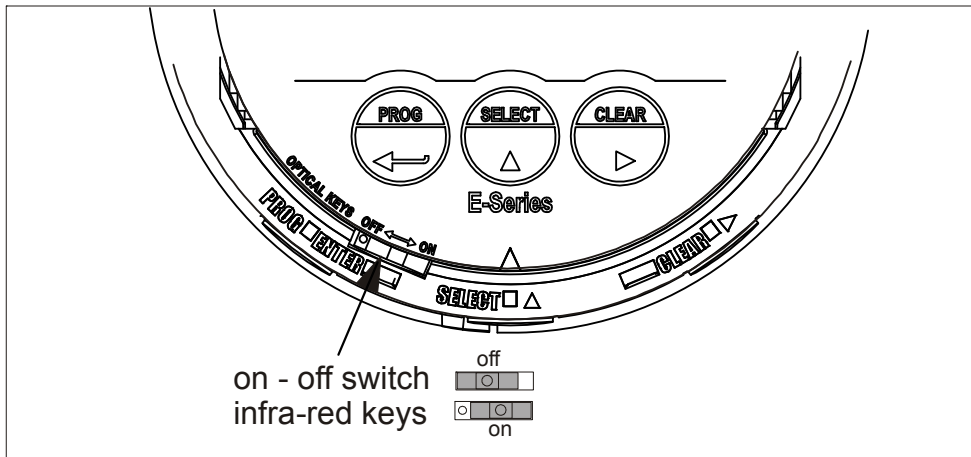


Fig. 4: On-Off switch infra-red keys

Note: For battery powered applications it is recommended to switch of the infra-red keys permanently when possible to save on power consumption significantly.

Manual push button operation

Next to the three infra-red keys also three manual push buttons are available when the cover is removed. Make sure the infra-red keys are locked before removing the cover to prevent unwanted actions.

On the side of the collar of the display three black mechanical push buttons are present in the same order as the infra-red keys, PROG/ENTER – SELECT – CLEAR. They operate in the same manner as the infra-red keys.

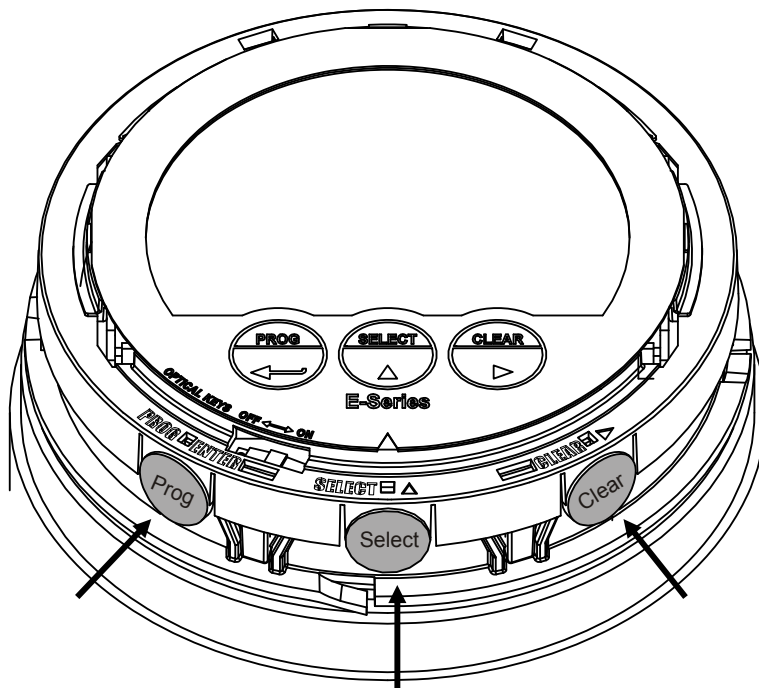


Fig. 5: Push buttons Control Panel

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.
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



Note !

Note: Be aware that the infra-red keys are locked and will not function. Unlock the infra-red keys as described on page 7.

In general, the E112-P will always act at Operator level. The information displayed is dependent upon the SETUP-settings. All pulses generated by the connected flowmeter are measured by the E112-P in the background, whichever screen refresh rate setting is chosen. After pressing a key, the display will be refreshed 8 times per second, after 30 seconds it will slow-down to the desired setting.

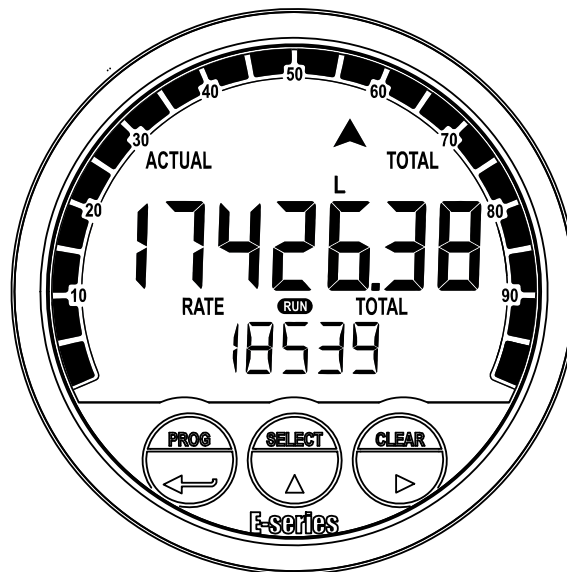


Fig. 6: Example of display information during process

For the Operator, the following functions are available:

- **Display flowrate / total or flowrate**

This is the main display information of the E112-P. 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 12mm 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 a reset of the total at this stage, press another key than CLEAR or wait for 20 seconds.

Reset 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 reset. 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.

- **Display speedometer flowrate**

The display shows around the edge an impression of the actual flowrate. The black indicators run from 0 to 100 with 2 blocks per 10. This function can be enabled or disabled with SETUP 3.4 – Bargraph. The range of the speedometer can be set with SETUP 3.5 – Ratespan.

- **Low-battery alarm (Type PB only)**

Only In case of a battery powered application: when the battery voltage drops, it must be replaced. At first  will be displayed, but as soon as it is flashing 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.

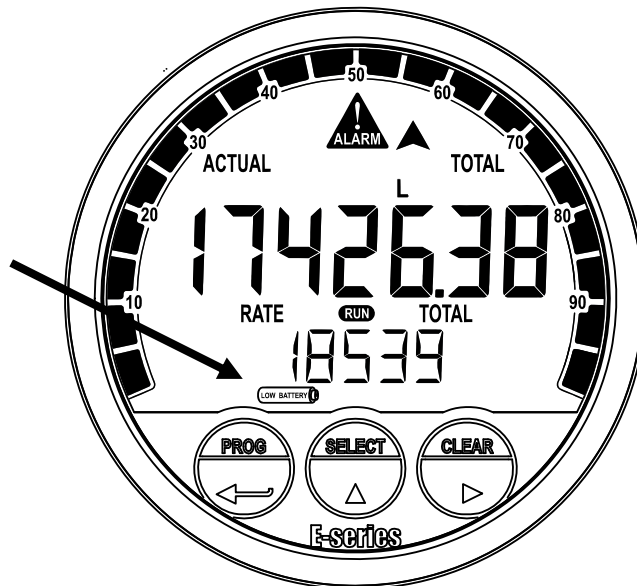



Fig. 7: Example of low-battery alarm.

- **Alarm 01-03**



The sign  flashes when an alarm situation is active; this can be a low flowrate but also a problem with the product. Please do also 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 E112-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



Note !

Note: *Be aware that the infra-red keys may be locked and will not function. Unlock the infra-red keys as described on page 7.*

Configuration of the E112-P is done at SETUP level. SETUP level is reached by pressing the PROG/ENTER key for 7 seconds; at which time  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.

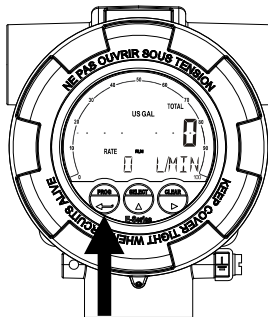
SETUP can be reached at all times while the E112-P remains fully operational. Be aware that in this case any change to the settings may have an influence on the operation.



Note !

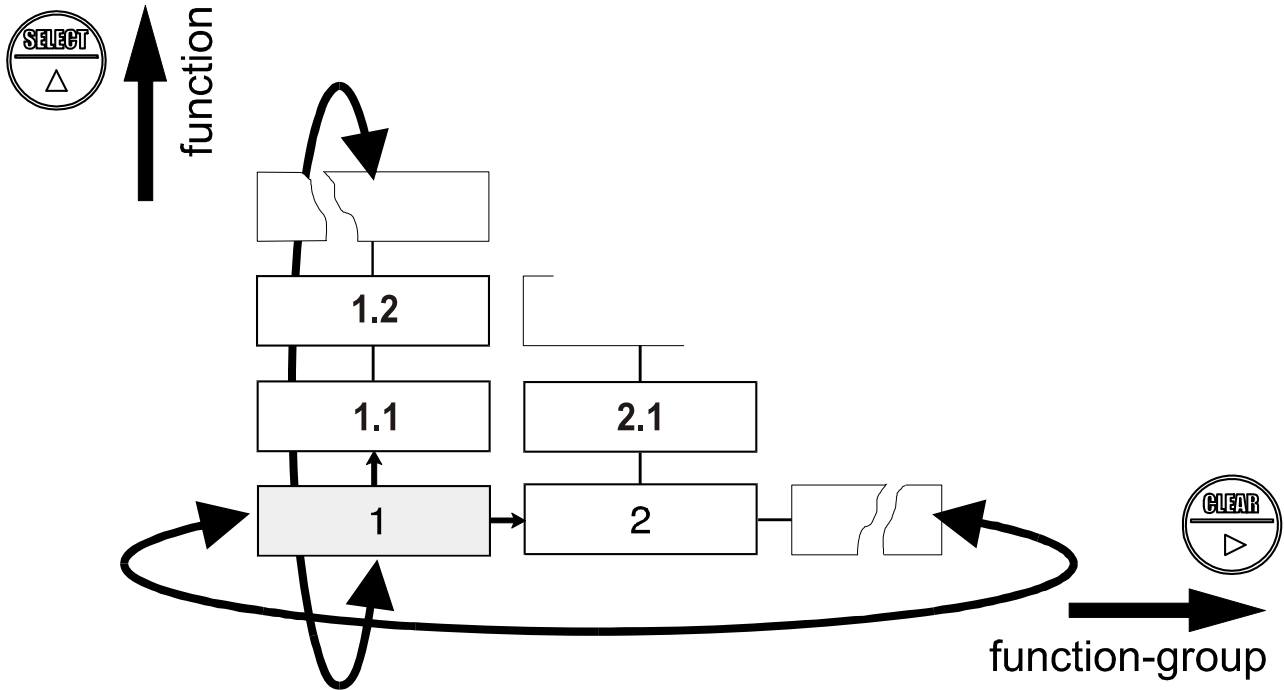
Note: *A pass code may be required to enter SETUP. Without this pass code access to SETUP is denied.*

To enter SETUP-level:



Press  for 7 seconds

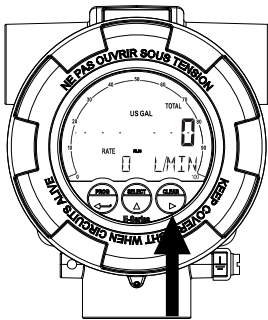
Matrix structure SETUP-level:



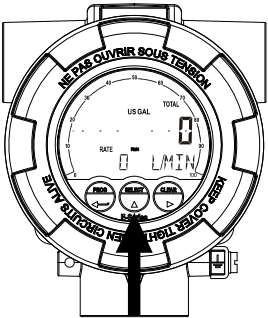
SCROLLING THROUGH SETUP-LEVEL

Selection of function-group and function:

SETUP is divided into several function groups and functions.



Select function-group with



Select function with



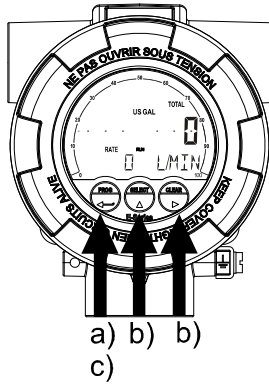
Each function has a unique number, which is displayed below the word "SETUP" at the bottom of the display. The number is a combination of two figures. The first figure indicates the function-group and the second figure the sub-function. Additionally, each function is expressed with a keyword.





After selecting a sub-function, the next main function is selected by scrolling through all "active" sub-functions (e.g. 1[▲], 1.1[▲], 1.2[▲], 1.3[▲], 1.4[▲], 1[▶], 2[▶], 3[▲], 3.1 etc.).



Scrolling back function group is done by pressing PROG (e.g. 4[◀], 3[◀], 2[◀], 1[◀])



Scrolling back a sub-function is done by pressing CLEAR (e.g. 1.4[▶], 1.3[▶], 1.2[▶], 1.1[▶]),



To change or select a value:



- a) press  briefly; **PROGRAM** will start flash
- b) select or enter value with  and / or 
- c) press  to confirm the value / selection.

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.

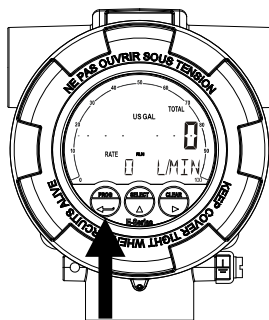
When data is altered but ENTER is not pressed, then the alteration can still be cancelled by waiting for 20 seconds or by pressing ENTER for three seconds: the PROG-procedure will be left automatically and the former value reinstated.



Note !

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

To return to OPERATOR-level:



Press  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.

3.3. OVERVIEW FUNCTIONS SETUP LEVEL

SETUP FUNCTIONS AND VARIABLES			
1	TOTAL		
	1.1	UNIT	L - m3 - kg - lb - ton - ft3 - GAL - USGAL - IGAL - bbl - no unit
	1.2	DECIMALS	0 - 1 - 2 - 3 (Ref: displayed value)
	1.3	K-FACTOR:	0.000010 - 9,999,999
	1.4	DECIMALS K-FACTOR	0 - 6
	1.5	MULTIPLY FACTOR	x1 - x10 - x100 - x1000
2	FLOWRATE		
	2.1	UNIT	mL - L - m ³ - mg - g - kg - ton - GAL - bbl - lb - cf - rev - none - scf - nm ³ - nL - P
	2.2	TIME UNIT	/sec - /min - /hour - /day
	2.3	DECIMALS	0 - 1 - 2 - 3 (Ref: displayed value)
	2.4	K-FACTOR	0.000010 - 9,999,999
	2.5	DECIMALS K-FACTOR	0 - 6
	2.6	CALCULATION	per 1 - 255 pulses
	2.7	CUT-OFF	0.1 - 999.9 seconds
3	DISPLAY		
	3.1	FUNCTION	total - flowrate
	3.2	LCD NEW	fast - 1 sec - 3 sec - 15 sec - 30 sec - off
	3.3	BACKLIGHT	0% - 20% - 40% - 60% - 80% - 100%
	3.4	BARGRAPH	disable - enable
	3.5	RATESPAN	0000000 - 9999999
4	FLOWMETER		
	4.1	SIGNAL	nnp - nnp_lp - reed - reed_lp - pnp - pnp_lp - namur - coil_hi - coil_lo - 8.2 DC - 24 DC
5	LINEARIZE		
	5.1	FREQ. / M-FACTOR 1	0000.1 - 9999.9 Hz / 0.000001 - 9.999999
	5.2	FREQ. / M-FACTOR 2	0000.1 - 9999.9 Hz / 0.000001 - 9.999999
	5.3	FREQ. / M-FACTOR 3	0000.1 - 9999.9 Hz / 0.000001 - 9.999999

	5.F	FREQ. / M-FACTOR 15	0000.1 - 9999.9 Hz / 0.000001 - 9.999999
	5.G	LINEARIZATION	enable / disable
	5.H	DECIMALS FREQUENCY	00000 - 1111.1 - 222.22 - 33.333
6	ANALOG		
	6.1	OUTPUT	disable - enable
	6.2	RATE-MIN 4mA	0000000 - 9999999
	6.3	RATE-MAX 20mA	0000000 - 9999999
	6.4	CUT-OFF	0.0 - 9.9%
	6.5	TUNE-MIN	0000 - 9999
	6.6	TUNE-MAX	0000 - 9999
	6.7	FILTER	00 - 99
7	PULSE		
	7.1	WIDTH	0.000 - 9.999
	7.2	DECIMALS	00000 - 1111.1 - 222.22 - 33.333
	7.3	AMOUNT	0000000 - 9999999
8	COMMUNICATION		
	8.1	SPEED / BAUDRATE	1200 - 2400 - 4800 - 9600
	8.2	ADDRESS	001 - 255
	8.3	MODE	Bus rtu - bus asc - off
9	OTHERS		
	9.1	TYPE / MODEL	E112-P
	9.2	SOFTWARE VERSION	03:01:xx
	9.3	SERIAL NO.	-
	9.4	PASS CODE	0000 - 9999
	9.5	KEYBOARD LOCK	enable - disable
	9.6	TAGNUMBER	0000000 - 9999999

3.4. EXPLANATION OF SETUP-FUNCTIONS

1 - TOTAL	
UNIT 1.1	<p>SETUP – 1.1 determines the measurement unit for total, accumulated total and pulse output. The following units can be selected:</p> <p style="text-align: center;">L - m³ - kg - lb. - GAL - USGAL – IGAL - bbl - _ (no unit).</p> <p>Alteration of the measurement unit will result in also making changes to related settings to keep a match. Please note that the K-factor has to be adapted as well; the calculation is not done automatically.</p>
DECIMALS 1.2	<p>The decimal point determines for total and accumulated total the number of decimals. The following can be selected:</p> <p style="text-align: center;">0000000 - 111111.1 - 22222.22 - 3333.333</p>
K-FACTOR 1.3	<p>With the K-factor, the flowmeter pulse signals are converted to a total unit. The K-factor is based on the number of pulses generated by the flowmeter per selected measurement unit (SETUP 1.1), for example per cubic meter. The more accurate the K-factor, the more accurate the functioning of the system will be.</p> <p>Example 1: Calculating the K-factor. <i>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 – 1.3: "2481300" and for SETUP – 1.4 - decimals K-factor "3".</i></p> <p>Example 2: Calculating the K-factor. <i>Assume that the flowmeter generates 6.5231 pulses per gallon and the selected measurement unit is gallons. So, the K-Factor is 6.5231. Enter for SETUP – 1.3: "6523100" and for SETUP – 1.4 decimals K-factor "6".</i></p>
DECIMALS K-FACTOR 1.4	<p>This setting determines the number of decimals for the K-factor entered. (SETUP 1.3). The following can be selected:</p> <p style="text-align: center;">0 - 1 - 2 - 3 - 4 - 5 - 6</p> <p>Please note that this setting influences the total K-factor. (i.e. the position of the decimal point and thus the value given) This setting has NO influence on the displayed number of decimals for total (SETUP 1.2)!</p>
MULTIPLY FACTOR 1.5	<p>This setting determines the scale factor of the Total. This makes it possible to show up to 3 digits more of the Total/accumulated Total. The amount shown is a rounded number. The following can be selected:</p> <p style="text-align: center;">x1 – x10 – x100 – x1000</p>

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.

Note: *these settings also influence the analog output.*

UNIT 2.1	<p>SETUP – 2.1 determines the measurement unit for flowrate. The following units can be selected:</p> <p style="text-align: center;">mL - L - m³ - mg - g - kg - ton - GAL - bbl - lb - cf - rev - none - scf - nm³ - nL - P</p> <p>Alteration of the measurement unit will NOT affect operator and SETUP-level values. Please note that the K-factor has to be adapted as well; the calculation is not done automatically.</p>
TIME UNIT 2.2	<p>The flowrate can be calculated per second (/SEC), minute (/MIN), hour (/HR) or day (/DAY). Note: Changes to SETUP 2.2 Time unit has an effect on the settings of SETUP 6.2 Rate Min and SETUP 6.3 Rate Max and SETUP 3.5 Ratespan. Don't forget to update these settings after a change.</p>
DECIMALS 2.3	<p>This setting determines for flowrate the number of decimals. The following can be selected:</p> <p style="text-align: center;">00000 - 1111.1 - 2222.22 - 3333.333</p> <p>Note: Changes to SETUP 2.3 Decimals will also change the decimal setting of SETUP 6.2 Rate Min and SETUP 6.3 Rate Max and SETUP 3.5 Ratespan. Therefore it is wise to first determine the required decimals for the flowrate.</p>
K-FACTOR 2.4	<p>With the K-factor, the flowmeter pulse signals are converted to a flowrate unit. The K-factor is based on the number of pulses generated by the flowmeter per selected measurement unit (SETUP 2.1), for example per liter. The more accurate the K-factor, the more accurate the functioning of the system will be. For examples read SETUP 1.3.</p> <p>Alteration of the K-Factor will have consequences for Operator and SETUP-level values!</p>
DECIMALS K-FACTOR 2.5	<p>This setting determines the number of decimals for the K-factor (SETUP 2.4). The following can be selected:</p> <p style="text-align: center;">0 - 1 - 2 - 3 - 4 - 5 - 6</p> <p>Note: SETUP 2.5 influences the flowrate K-factor setting only. This setting has NO influence on the displayed number of decimals for "Flowrate" (SETUP 2.3)!</p>
CALCULATION 2.6	<p>The flowrate is calculated by measuring the time between a number of pulses, for example 10 pulses. The more pulses the more accurate the flowrate will be. The maximum value is 255 pulses. Note: <i>this setting does influence the update time for the analog output directly (maximum update 10 times a second). If the output response is too slow, decrease the number of pulses.</i> Note: <i>the lower the number of pulses, the higher the power consumption of the unit will be (important for battery powered applications).</i> Note: <i>for low frequency applications (below 10Hz): do not program more than 10 pulses else the update time will be very slow.</i> Note: <i>for high frequency application (above 1kHz) do program a value of 50 or more pulses.</i></p>



Note !



Note !



Note !



Note !



Note !

CUT-OFF TIME 2.7	With this setting, a minimum flow requirement threshold is determined, if during this time less than XXX-pulses (SETUP 2.6) are generated, the flowrate will be displayed as zero. The cut-off time has to be entered in seconds - maximum time is 999.9 seconds (about 15 minutes).
----------------------------	---

3 - DISPLAY

FUNCTION 3.1	The large 12mm (0.47") digits can be set to display total, flowrate or accumulated total. When "total" is selected, total is displayed with the large 12mm (0.47") digits and flowrate is displayed with the 7 mm (0.28") digits simultaneously. When "flowrate" is selected, only flowrate will be displayed with the large 12mm (0.47") digits together with its measuring unit while total will be displayed after pressing SELECT. When "accumulated total" is selected, total is displayed with the large 12mm (0.47") digits and accumulated total is displayed with the 7 mm (0.28") digits simultaneously.
When battery powered, the user can expect reliable measurement over a long period of time. The E112-P has several smart power management functions to extend the (optional) battery life time significantly next to permanently disabling the infra-red keys. The following functions can be set:	
LCD NEW 3.2	The calculation of the display-information influences the power consumption significantly. When the application does not require a fast display refresh rate, it is strongly advised to select a slow refresh rate. Please understand that NO information will be lost; every pulse will be counted and the output signals will be generated in the normal way. The following refresh rates can be selected: fast - 1 sec - 3 sec - 15 sec - 30 sec - off. <i>(read 3 sec as a refreshment every 3 seconds, 30 sec as a refreshment every 30 seconds)</i> When "off" is selected the display will be automatically switched off after 30 seconds since the last action. The display will return again after touching one of the keys.
BACKLIGHT 3.3	The unit is provided with a backlight. The backlight brightness can be adjusted from off (0) to a 100% in steps of 20%. The following can be selected: 0% – 20% – 40% – 60% – 80% – 100% For battery powered untis the brightness will not change. Note: When the unit is only loop powered it cannot make use of the backlight. In that case an external supply is required.
BARGRAPH 3.4	The unit has a speedometer display which offers a quick impression of the actual flow rate. This graph on the display can be switched on or off. The following can be selected: enable – disable
RATESPAN 3.5	With Ratespan the range of the speedometer can be set. The display shows 0 – 100 with 20 blocks so each block is 5% of the 100% range set here. The following can be selected: 0000.000 - 9999999 The number of decimals displayed depends upon SETUP 2.3.



Note !

4 - FLOWMETER

TYPE OF SIGNAL	EXPLANATION	RESISTANCE	FREQ. / MV	REMARK
SIGNAL 4.1	The E112-P is able to handle several types of input signal. The type of flowmeter signal is selected with SETUP 4.1. Note: The selections "Active pulse input" offer a pulse detection level of 50% of the supply voltage. Read also par. 4.5. Terminal S1-S6 Flowmeter Input.			
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 sine-wave (coil) input	-	20mVp-p.	Sensitive for disturbance!
COIL LO	Low sensitive sine-wave (coil) input	-	120mVp-p.	Normal sensitivity
ACT_8.1	Active pulse input 8.2 VDC	3K9 pull-down	10KHz.	External power required
ACT_24	Active pulse input 24 VDC	3K pull-down	10KHz.	External power required



Note !

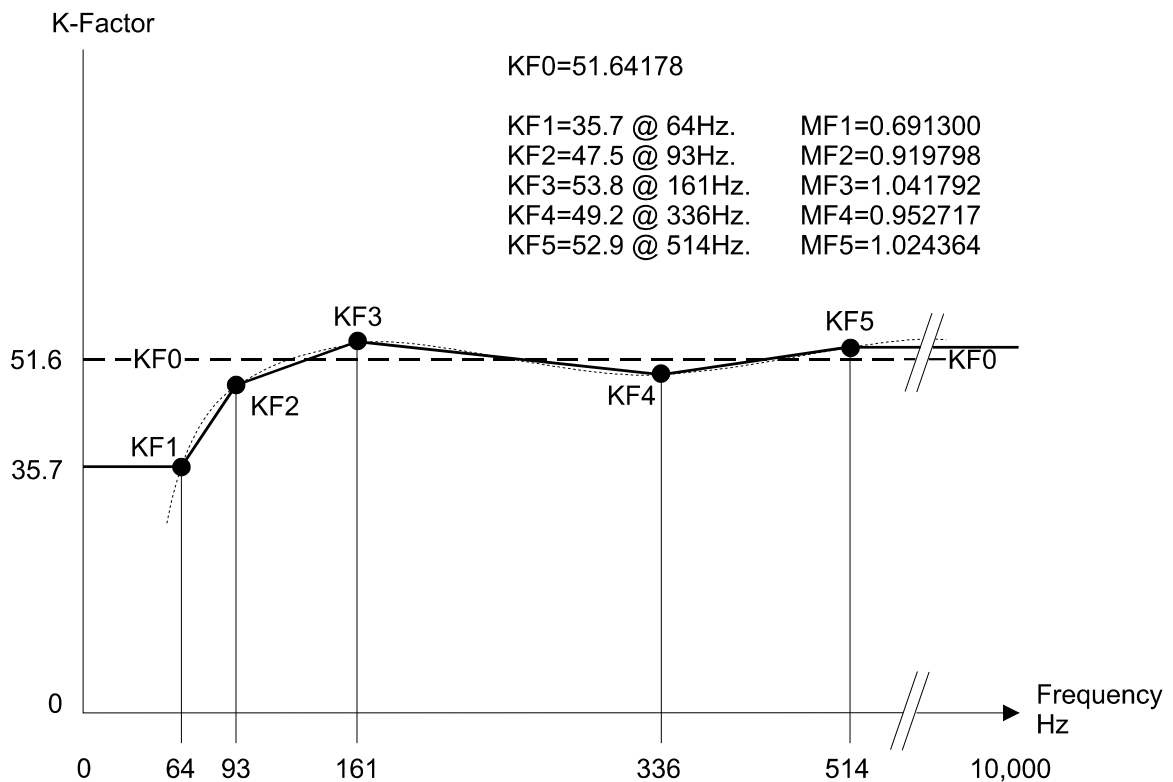
5 - LINEARIZE

The linearization function is available to approach the real flow curve better as with the general K-factor (KF0) entered with setup 1.4 and 2.4. This to obtain a more accurate flowrate, total and accumulated total as well as the analog and pulse output at any flowmeter frequency. A maximum of 15 linearization-positions can be entered while the interpolation will calculate any other position in-between.

For each linearization position, the frequency and a Meter Factor (MF) must be entered. The Meter Factor for each frequency is calculated with following formula:

$$\text{Meter-Factor} = \frac{\text{K-Factor at flowrate X}}{\text{KF0}}$$

The lowest frequency and MF you enter will be valid from 0Hz. The highest frequency and MF will be valid till 10KHz. It is advised to enter the frequencies in increasing order, however it is not necessary. Please have a look at following example to understand the method of linearization:



Note !

FREQUENCY / M-FACTOR 5.1 TO 5.F	<p>The frequency is displayed at the bottom line of the display. The maximum frequency is 9,999.9 Hz. With value 0.0Hz, the M-Factor is disabled. (Please read Setup function 5.H - decimals frequency)</p> <p>The M-Factor is displayed at the top-line of the display. The minimum value to be entered is 0.000001 and the maximum value is 9.999999. <i>Please note that this value has always six decimals while the "dot" is not displayed.</i></p> <p>Most M-factors will be around 1.000000 like 0.945354 or 1.132573.</p>
DISABLE / ENABLE 5.G	With this setup function, you can easily enable / disable the linearization function.
DECIMALS FREQUENCY 5.H	For the frequency, following decimal positions can be selected: 00000 - 1111.1 - 222.22 - 33.333

6 - ANALOG OUTPUT



Note !

An analog 4-20mA signal is generated according to the flowrate with a 12 bits resolution. The settings for flowrate (SETUP 2) influence the analog output directly.

The relationship between rate and analog output is set with the following functions:

OUTPUT 6.1	The analog output can be disabled. In case of a passive analog output 3.5mA will be generated if a power supply is available but the output is disabled. The following can be selected: enable – disable			
RATE MIN 6.2	Enter here the flowrate at which the output should generate the minimum signal (4mA) - in most applications at flowrate "zero". The number of decimals displayed depends upon SETUP 2.3. The time and measuring units (L/min for example) depend upon SETUP 2.1 and 2.2 and are displayed during editing.			
RATE MAX 6.3	Enter here the flowrate at which the output should generate the maximum signal (20mA) - in most applications at maximum flow. The number of decimals displayed depends upon SETUP 2.3. The time and measuring units (L/min for example) depend upon SETUP 2.1 and 2.2 but cannot be displayed.			
CUT-OFF 6.4	To ignore leakage of the flow for example, a low flow cut-off can be set as a percentage of the full range of 16mA, (or 20mA). When the flow is less than the required rate, the current will be the minimum signal (4mA). Examples:			
4mA (SETUP 6.2)	20mA (SETUP 6.3)	CUT-OFF (SETUP 6.4)	REQUIRED RATE	OUTPUT
0 L/min	100 L/min	2%	$(100-0)*2\% = 2.0 \text{ L/min}$	$4+(16*2\%) = 4.32\text{mA}$
20 L/min	800 L/min	3.5%	$(800-20)*3.5\% = 27.3 \text{ L/min}$	$4+(16*3.5\%) = 4.56\text{mA}$
TUNE MIN / 4MA 6.5	The initial minimum analog output value is 4mA. However, this value might differ slightly due to external influences such as temperature for example. The 4mA value can be tuned precisely with this setting. <ul style="list-style-type: none"> ▪ <i>Before tuning the signal, be sure that the analog signal is not being used for any application!</i> After pressing PROG, the current will be about 4mA. The current can be increased / decreased with the arrow-keys and is <u>directly active</u> . Press ENTER to store the new value. Remark: the analog output value can be programmed "up-side-down" if desired, so 20mA at minimum flowrate and 4mA at maximum flowrate for example!			
TUNE MAX / 20MA 6.6	The initial maximum analog output value is 20mA. However, this value might differ slightly due to external influences such as temperature for example. The 20mA value can be tuned precisely with this setting. <ul style="list-style-type: none"> ▪ <i>Before tuning the signal, be sure that the analog signal is not being used for any application!</i> After pressing PROG, the current will be about 20mA. The current can be increased / decreased with the arrow-keys and is <u>directly active</u> . Press ENTER to store the new value. Remark: the analog output value can be programmed "up-side-down" if desired, so 4mA at maximum flowrate and 20mA at minimum flowrate for example!			

Continued next page >>>





6 - ANALOG OUTPUT (CONTINUED)

FILTER 6.7	<p>This function is used to stabilize the analog output signal. The output value is updated every 0.1 second. With the help of this digital filter a more stable but less precise reading can be obtained. The filter principal is based on three input values: the filter level (01-99), the last analog output 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 their response times are indicated:</p>			
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	0.1 second	0.2 second	0.4 second	0.7 second
03	0.2 second	0.4 second	0.6 second	1.2 seconds
05	0.4 second	0.7 second	1.1 seconds	2.1 seconds
10	0.7 second	1.4 seconds	2.2 seconds	4.4 seconds
20	1.4 seconds	2.8 seconds	4.5 seconds	9.0 seconds
30	2.1 seconds	4 seconds	7 seconds	14 seconds
50	3.5 seconds	7 seconds	11 seconds	23 seconds
75	5.2 seconds	10 seconds	17 seconds	34 seconds
99	6.9 seconds	14 seconds	23 seconds	45 seconds

7 - PULSE

One transistor or relay output is available as scaled pulse output according to the accumulated total.

WIDTH 7.1	<p>The pulse width determines the time that the output will be active; in other words the pulse duration. The pulse width is set in milliseconds in the range 0.001 - 9.999 sec. Value "zero" will disable the pulse output.</p> <p>Note: <i>The pulse signal always has a 50% duty cycle, hence the minimum time between the pulses is equal to the pulse width setting. 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". It might be that pulses will be missed due to a buffer-overflow, so it is advised to program this setting within its range!</i></p>	 Note !
DECIMALS 7.2	<p>This setting determines the decimal position for SETUP 7.3. The following can be selected:</p> <p style="text-align: center;">0000000 - 111111.1 - 22222.22 - 3333.333</p>	
AMOUNT 7.3	<p>A pulse will be generated every time a certain quantity is added to the total. Enter this quantity here while taking the decimal position of SETUP 7.2 into account. The following can be selected:</p> <p style="text-align: center;">0000.000 - 9999999</p>	 Note !

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 8.1	For external control, the following communication speeds can be selected: 1200 - 2400 - 4800 - 9600 baud
BUS ADDRESS 8.2	For communication purposes, a unique identity can be attributed to every E112-P. This address can vary from 1-255.
MODE 8.3	The communication protocol is Modbus ASCII or RTU mode. Select OFF, to disable this communication function. BUS ASC – BUS RTU – OFF

9 - OTHERS

TYPE OF MODEL 9.1	For support and maintenance it is important to have information about the characteristics of the E112-P. 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 9.2	For support and maintenance it is important to have information about the characteristics of the E112-P. 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 9.3	For support and maintenance it is important to have information about the characteristics of the E112-P. 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.
PASSWORD 9.4	All SETUP values can be password protected. This protection is disabled with value 0000 (zero). Up to and including 4 digits can be programmed, for example 1234.
KEYBOARD LOCK 9.5	To avoid undesired use of the infra-red keyboard it can be locked automatically after 30 seconds by enabling this function.
TAGNUMBER 9.6	For identification of the unit and communication purposes, a unique tag number of maximum 7 digits can be entered.

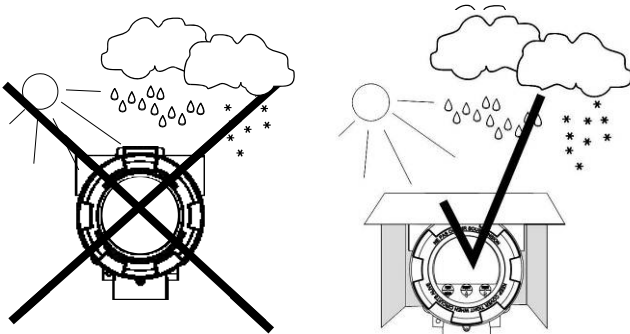
4. INSTALLATION



4.1. GENERAL DIRECTIONS

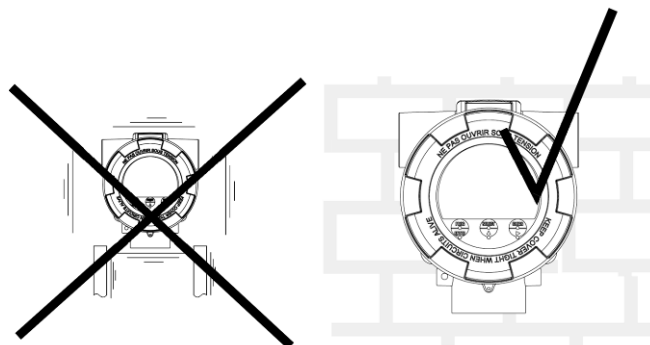
- *Mounting, electrical installation, start-up and maintenance of this instrument may only be carried out by trained personnel authorized by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.*
- *The E112-P may only be operated 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 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 E112-P on a solid structure to avoid vibrations.

4.3. DIMENSIONS- ENCLOSURE

Aluminum / Stainless steel enclosures:

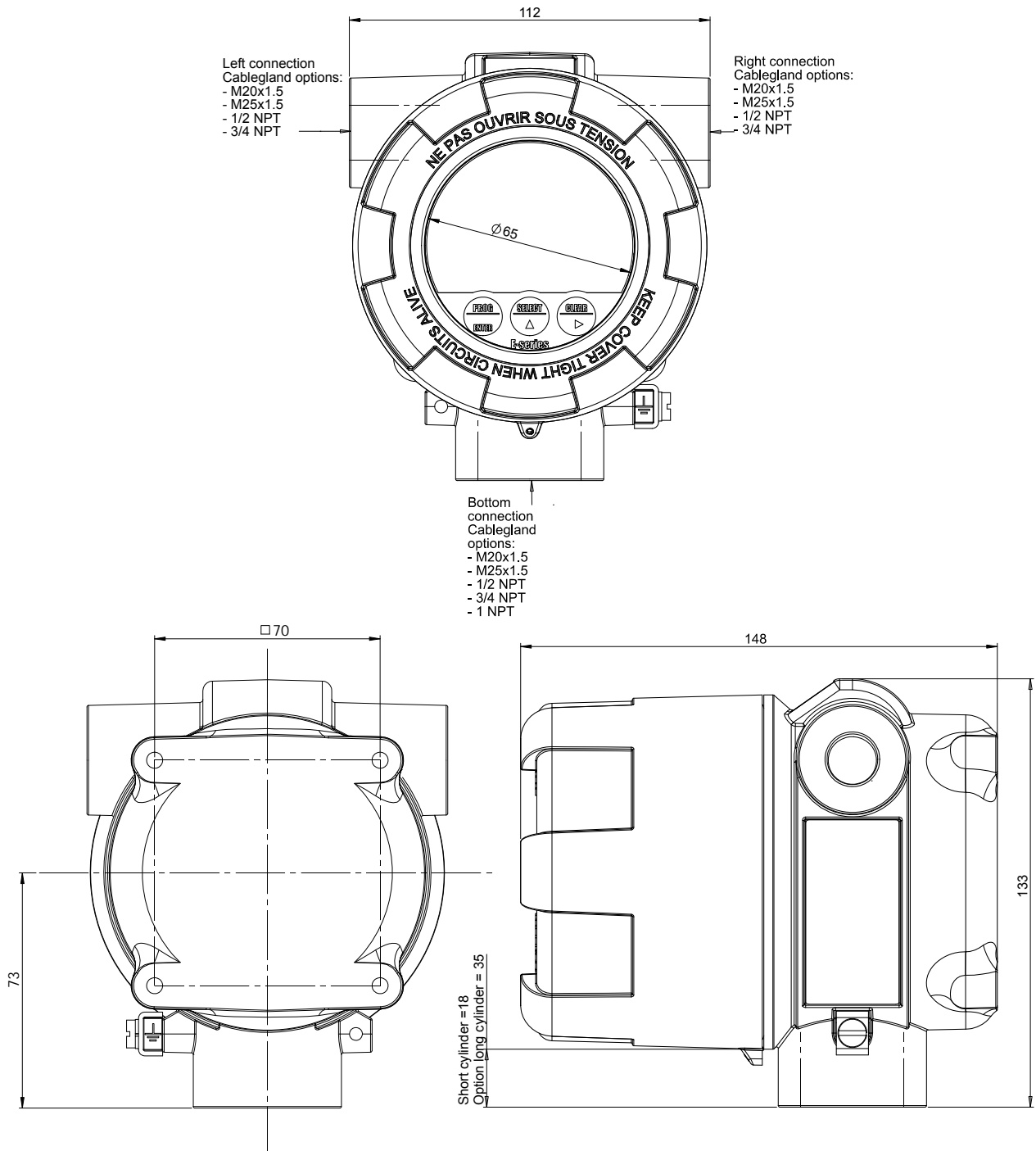


Fig. 8: Dimensions aluminum / Stainless Steel enclosures.

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).*
- *The display inside the enclosure can be turned 90° so the enclosure can be mounted in any position desired.*



Aluminum / Stainless Steel enclosures

- *When installed in an aluminum / stainless steel enclosure and a potentially explosive atmosphere requiring apparatus of equipment protection level Gb and Db, 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 aluminum/steel is excluded.*
- *Do ground the aluminum / stainless steel enclosure properly as indicated, if the environment in which the E112-P has been installed requires this (i.e. ship, truck). The green / yellow wire between the casing and terminal-block may never be removed.*

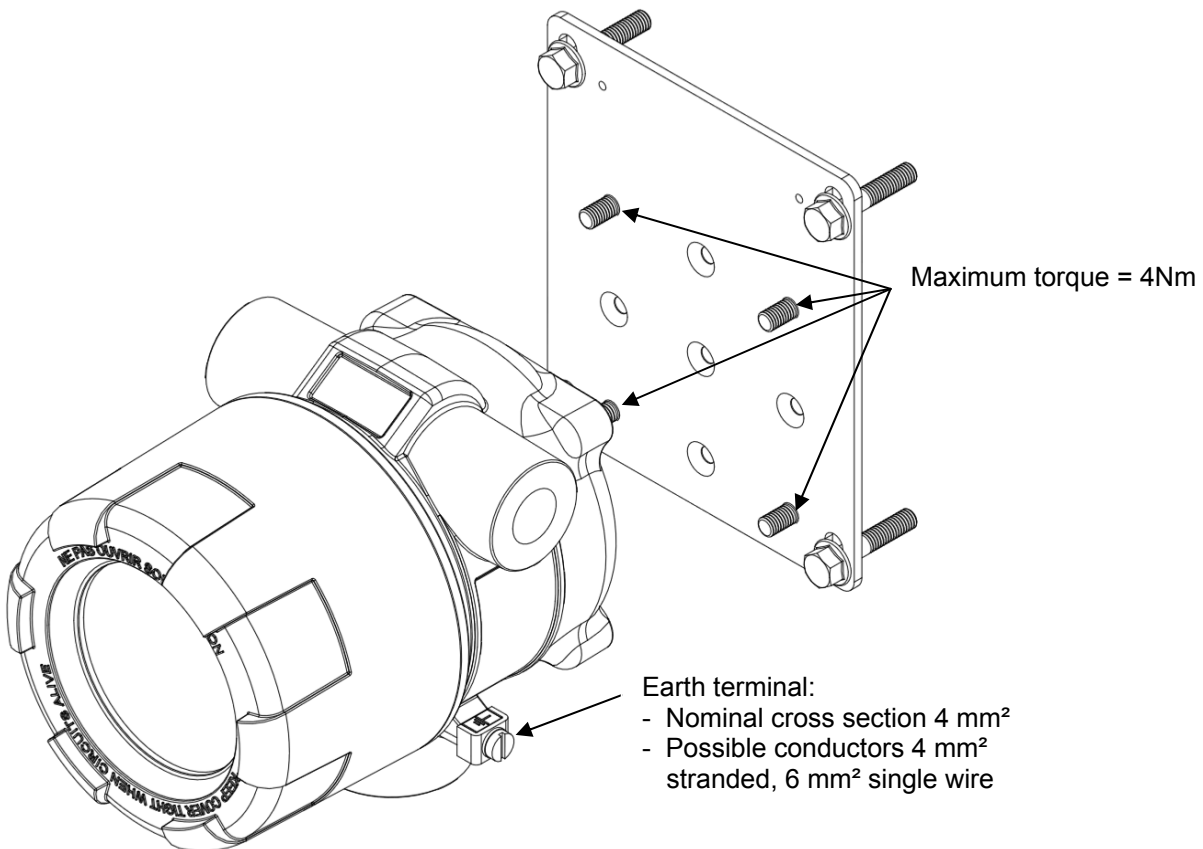


Fig. 9: Grounding enclosure

FOR INSTALLATION, PAY EMPHATIC ATTENTION TO:

- Ex d cable glands with effective IP66/67 (NEMA4X) seals for all wires.
- Unused cable entries: ensure that you fit IP66/67 (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 S1 (GND) or at the sensor itself, whichever is appropriate to the application.
- For battery supplied equipment: DO NOT OPEN WHEN AN EXPLOSIVE GAS ATMOSPHERE IS PRESENT.
- Without thermal separator, the process temperature shall not exceed the specified maximum ambient temperature.
- When the enclosure temperature exceeds 70 °C / 158 °F, apply suitable cable and gland for this temperature.
- When included in the shipment, the certified blank plugs supplied by Fluidwell shall be used.

The E-series can be connected to another Ex d enclosure following the compulsory conditions below:

- The part which is used for the connection between the two volumes must be Ex-d certified,
- The connected enclosure must be Ex d certified with its own electrical equipment inside (i.e. pickup coil or other sensors),
- For the short cylinder version, the volume of empty space inside this added enclosure and connection volume must not represent more than 13,5 cm³,
- There must be no generation of heat in the added enclosure,
- There must be no significant added electrical energy in the added enclosure, any energy which would come from the E-series is already taken into account in the E-series certificate.

4.4.2. SEAL CONDUITS/ENCLOSURE

For FM Group A,B,C,D and CSA group B,C,D:
"SEAL ALL CONDUITS WITHIN 18 INCHES"



For CSA Group A:
"SEAL IMMEDIATELY AT ENCLOSURE WALL"

4.4.3. SPECIAL CONDITIONS FOR SAFE USE

The painted aluminum enclosure shall be installed in such a way that danger of ignition due to electrostatic discharge is avoided.

4.4.4. FLAMEPROOF JOINTS

(Clause 5: EN/IEC 60079-1:2007)



There are 5 types of flameproof joints in the E-Type enclosure:

1. The cement between glass and cover (length ≥ 10 mm)
2. Thread between body/cover M100x1.5 (Tolerance 6g/6H min. 8 full threads engaged)
3. Thread for conduit opening left:
 - i. M20 x 1.5, M25 x 1.5, (for metric: Tolerance 6g/6H min. 8 full threads engaged)
 - ii. 1/2 NPT, 3/4 NPT. (for NPT: Tolerance ANSI/ASME B1.20.1)
4. Thread for conduit opening right:
 - i. M20 x 1.5, M25 x 1.5, (for metric: Tolerance 6g/6H min. 8 full threads engaged)
 - ii. 1/2 NPT, 3/4 NPT. (for NPT: Tolerance ANSI/ASME B1.20.1)
5. On the process opening:
 - i. M20 x 1.5, M25 x 1.5 (for metric: Tolerance 6g/6H min. 8 full threads engaged)
 - ii. 1/2 NPT, 3/4 NPT, 1 NPT (for NPT: Tolerance ANSI/ASME B1.20.1)



All flameproof joints are designed for :
- volume $500 < V \leq 2000$ cm³.
- group IIC enclosures



Use certified / Ex d cable glands


- All NPT threads (cable entry openings) are in accordance with ANSI/ASME B1.20.1.
- All Metric threads (cable entry openings, thread between body and cover and threaded holes for feed thru capacitors) are in accordance with fit class 6g/6H (ISO 965-1 and 965-3).

When installed according to this manual, this product will meet the directives and standards as listed in Appendix A of this manual.

4.4.5. VOLTAGE SELECTION SENSOR SUPPLY

Type PB / PX - Pickup element supply powered applications:


Terminal S3 provides a limited supply voltage of 3.0 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: Sensor supply: 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 via terminal P4.

Total power consumption PD: see **Appendix A Technical Specifications**.

 **Note:** 8.2 and 12V DC require a supply voltage of 16V minimum.

 **Note:** The output is protected against overload. In case of an overload also the functionality of the E112-P is affected!

The voltage is selected with the two switches inside the casing.

The switches are located at the bottom center (type PD):

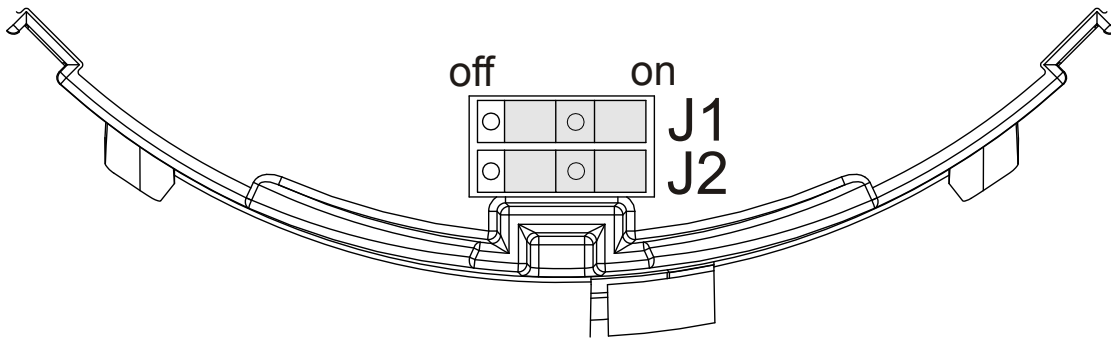


Fig. 10: Switch setting sensor supply voltage

Switch positions: the combination of these switches determine the voltage as indicated.

VOLTAGE SELECTION		
SWITCH J1	SWITCH J2	VOLTAGE
off ←	off ←	8.2 V DC
off ←	on →	12 V DC
on →	on X	Input V DC

4.5. OVERVIEW OF TERMINAL CONNECTORS

The following terminal connectors are available:

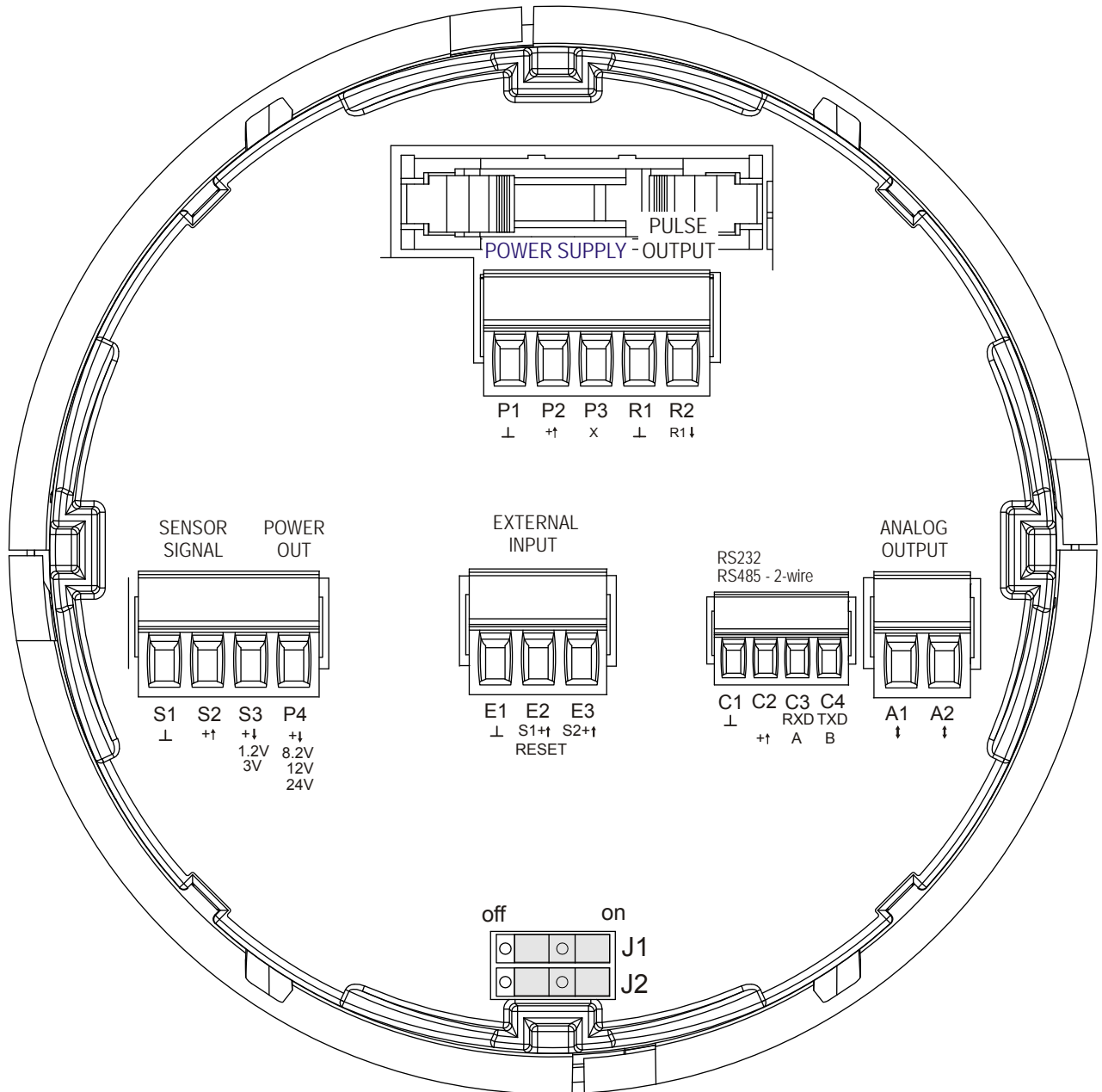


Fig. 11: Overview of terminal connectors

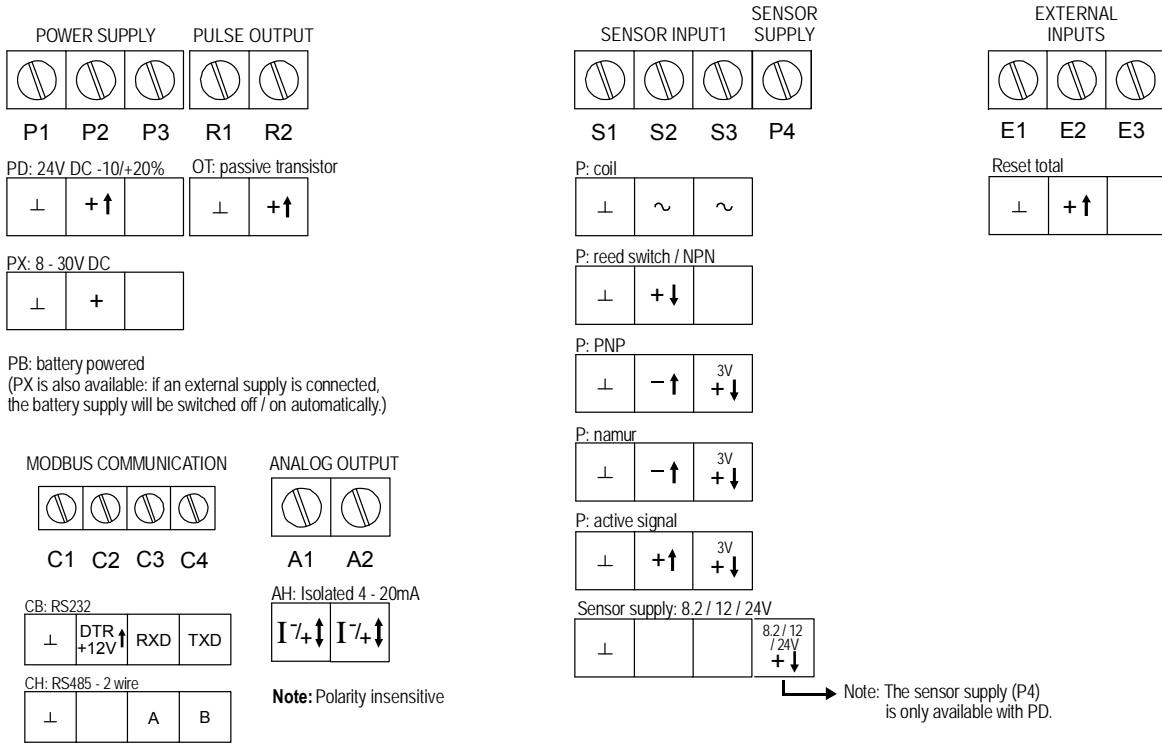


Fig. 12: Overview of terminal connectors (2)

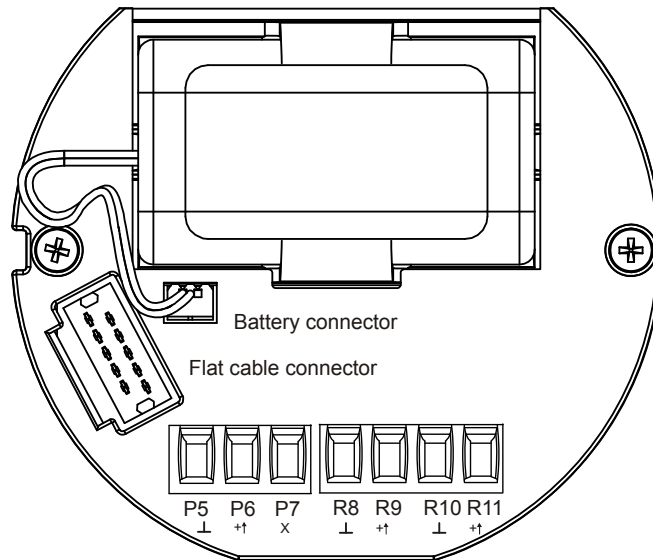


Fig. 13: Overview of terminal connectors Supply board

4.5.1. TERMINAL CONNECTORS:

Terminal P1-P2: Power Supply - type PD/PX:

Connect an external power supply of 8-30VDC (PX) or 24VDC -10/+20% (PD) to these terminals. When power is applied to these terminals, the (optional) internal battery will be disabled / enabled automatically to extend the battery life time.

Terminal R1-R2; (scaled) pulse output R1:

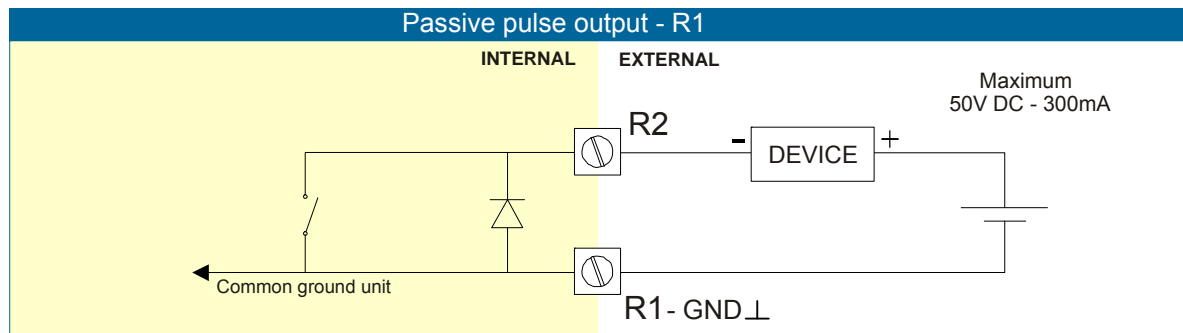
Setup 7 (par. 3.4.) determines the pulse output function. The maximum pulse frequency of this output is 60Hz.

Type OT:

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



Note: R1 is a common ground (GND) terminal.



TERMINAL S1-S6; 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 S1 (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 SETUP 4.1 Signal (read par. 3.4.)

Sine-wave signal (Coil):

The E112-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.

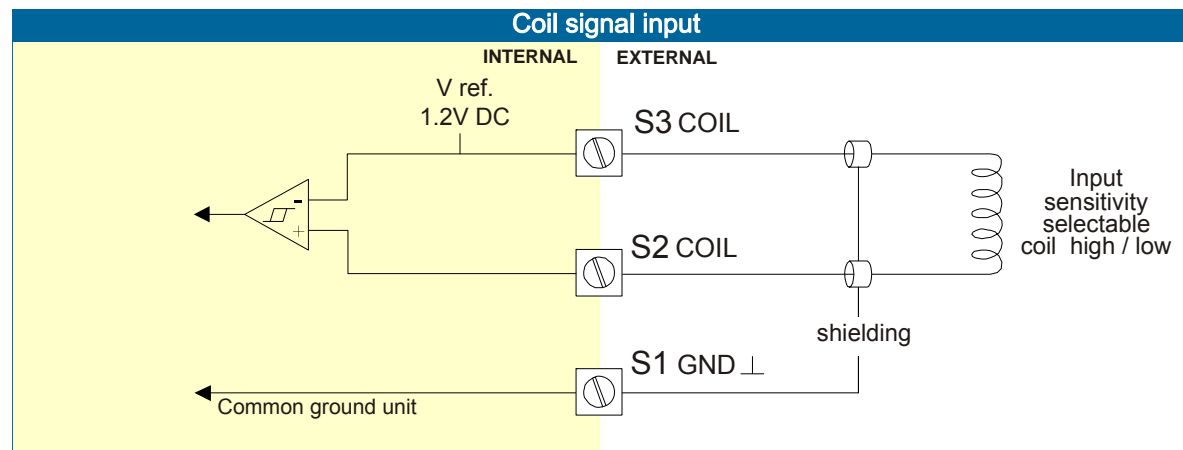
COIL HI: sensitivity from about 20mVp-p.

Type ZF offers for setting COIL HI: sensitivity from about 10mVp-p.

Type ZG offers for setting COIL HI: sensitivity from about 5mVp-p.

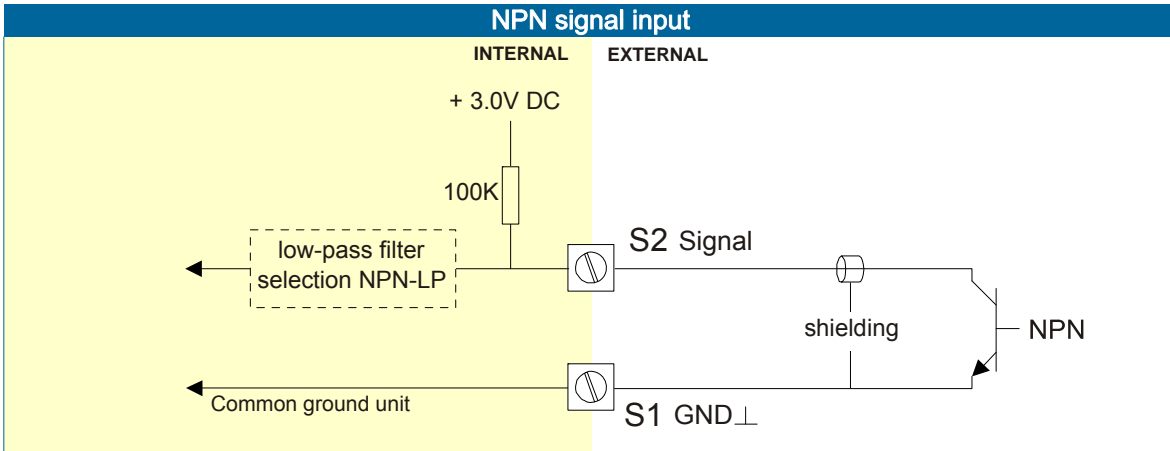


Note: if inputs 1 AND 2 are both configured as coil the selected sensitivity is equal for both!



Pulse-signal NPN / NPN-LP:

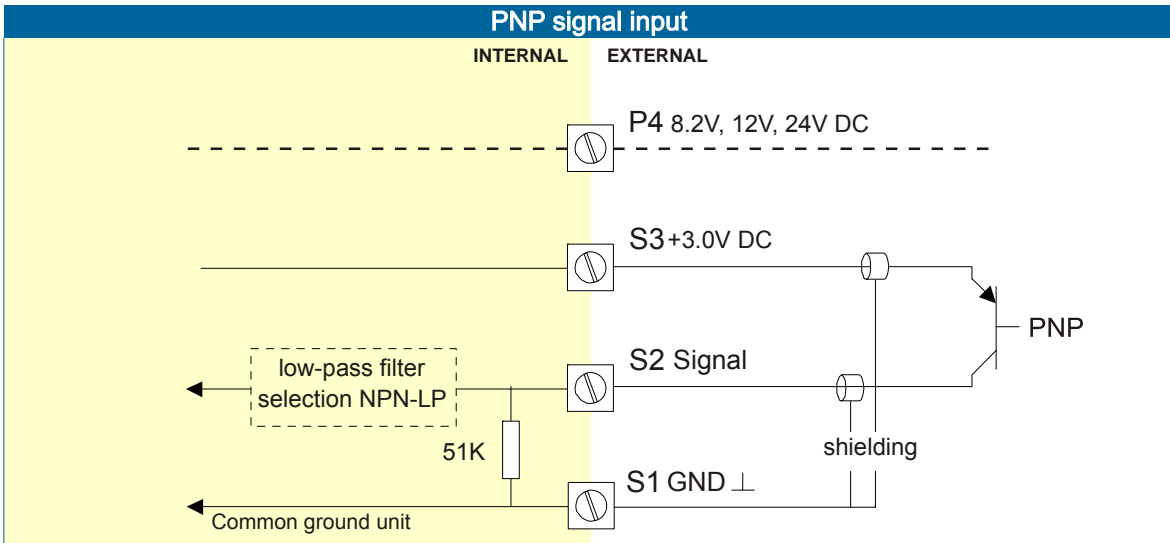
The E112-P is suitable for use with flowmeters which have a NPN output signal. For reliable pulse detection, the pulse amplitude has to go below 1.2V. It is advised to select Signal setting NPN-LP - low-pass signal noise filter which limits the maximum input frequency, to avoid pulse bounce (read par. 3.4.).



Pulse-signal PNP / PNP-LP:

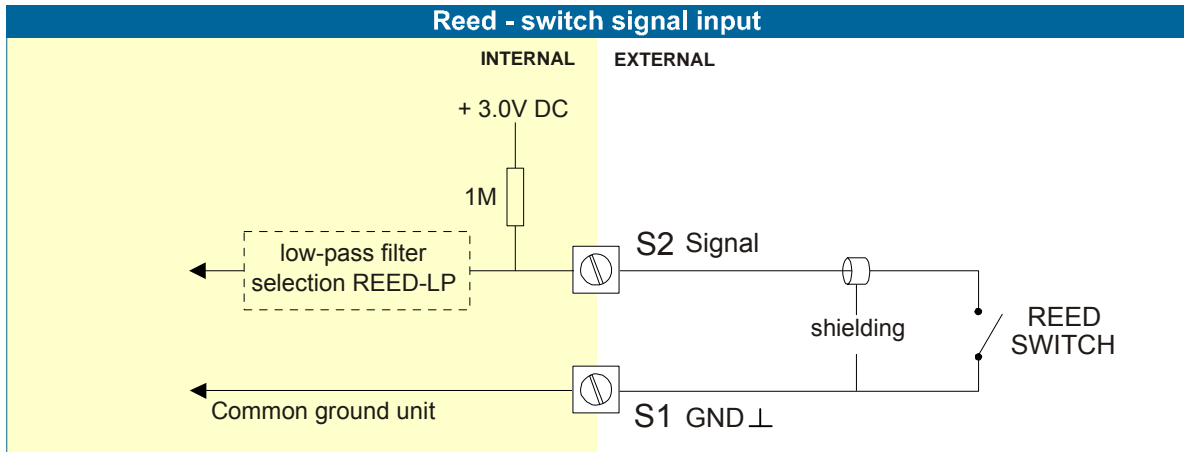
The E112-P is suitable for use with flowmeters which have a PNP output signal. 3.0V is offered on terminal S3 which has to be switched by the sensor to terminal S2 (SIGNAL). For reliable pulse detection, the pulse amplitude has to go above 1.2V. It is advised to select Signal setting PNP-LP - low-pass signal noise filter which limits the maximum input frequency, to avoid pulse bounce (read par. 3.4.).

A sensor supply voltage of 8.2, 12 or 24V DC can be supplied through terminal P4. See paragraph 3.4. for more information.



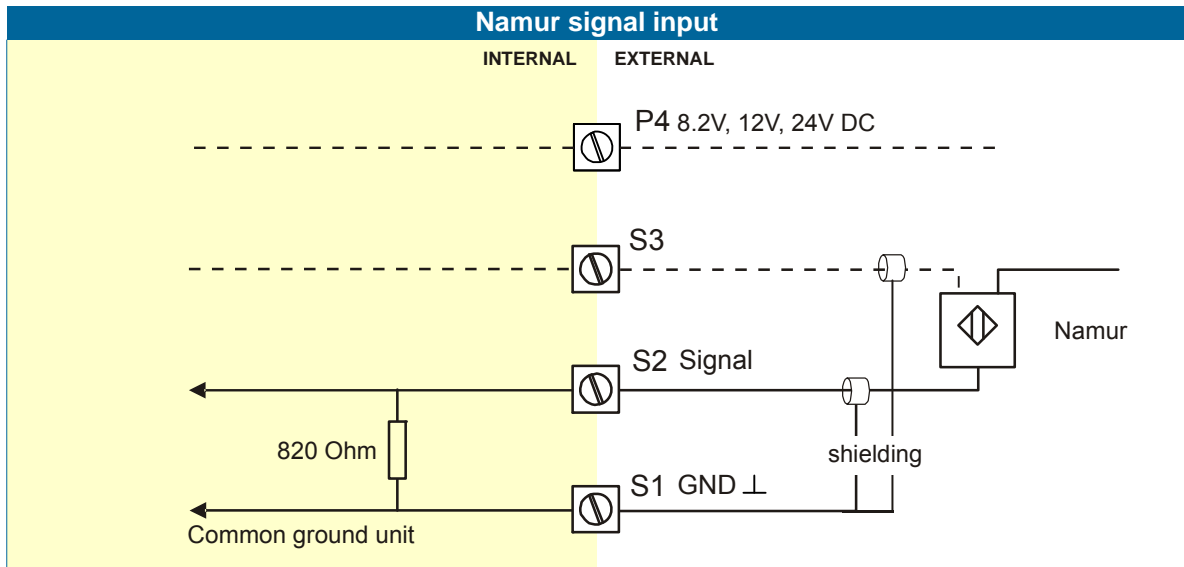
Reed-switch:

The E112-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 noise filter, which limits the maximum input frequency (read par. 3.4.).



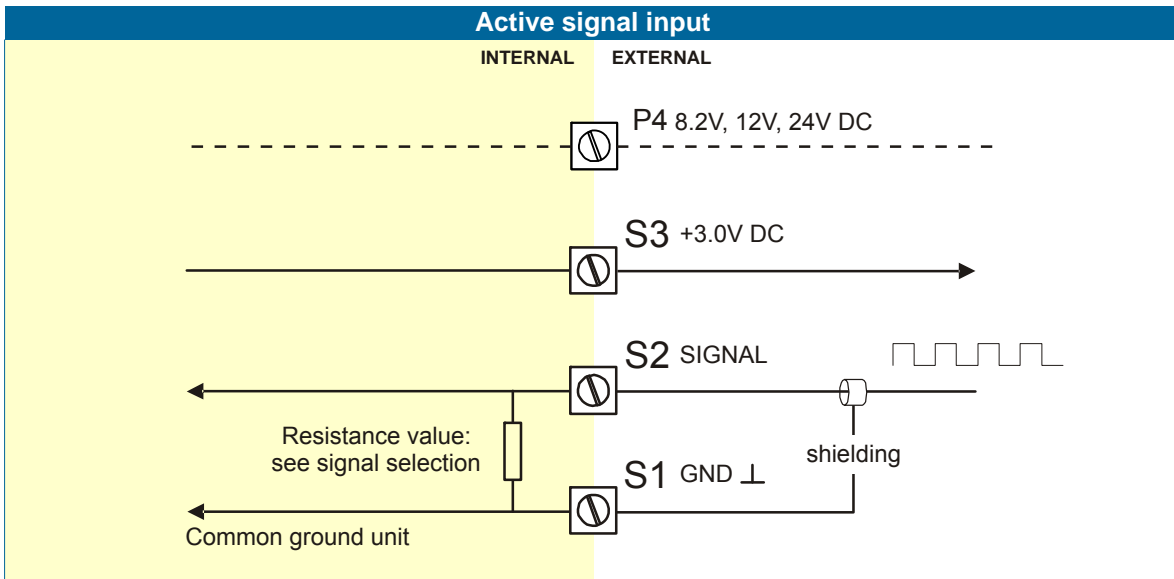
NAMUR-signal:

The E112-P is suitable for flowmeters with a Namur signal. The standard E112-P is not able to power the Namur sensor, as an external power supply for the sensor is required. However, an 8.2V sensor supply voltage can be provided through terminal P4. See paragraph 3.4. for more information.



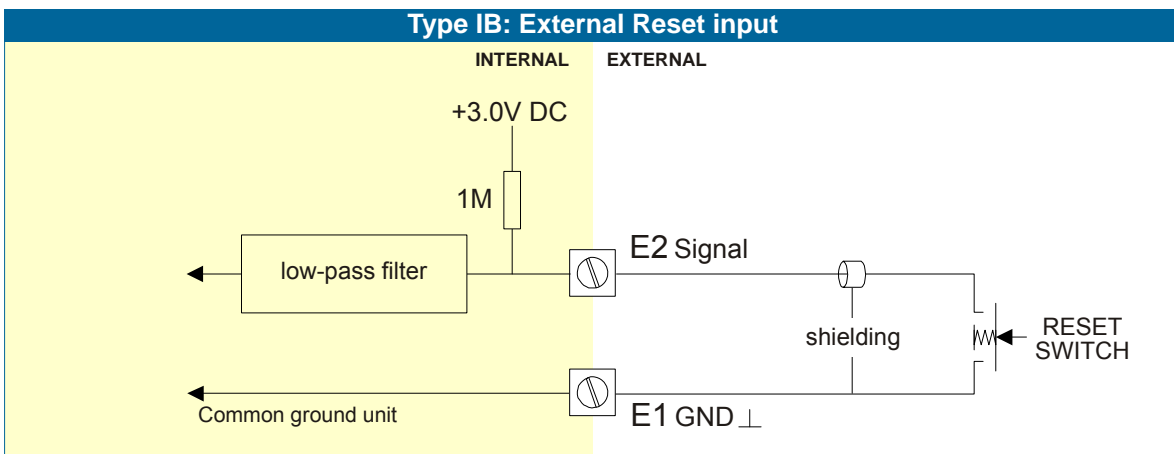
Active signals 8.2V and 24V:

The E112-P is suitable for flowmeters with an Active signal. The detection levels are 50% of the selected supply voltage; approximately 4V (ACT_8.1) or 12V (ACT_24). Active signal selection may well be desired in case of sensor power supply through terminal P4. See par. 3.4. for more information.



Terminal E1-E2: type IB – External Reset:

With this function the total can be reset to zero with an external switch. The Total resets only when the switch *closes*. When closed Total still counts but the "Clear Total" function is disabled (see chapter 2). The input must be switched with a potential free contact to the GND-terminal number E1.



Terminal C1-C4: type CB / CH - communication RS232 / RS485 (option)

- Full serial communications and computer control in accordance with RS232 (length of cable max. 5 meters) or RS485 (length of cable max. 1200 meters) is possible.
- Read the Modbus communication protocol and Appendix C.

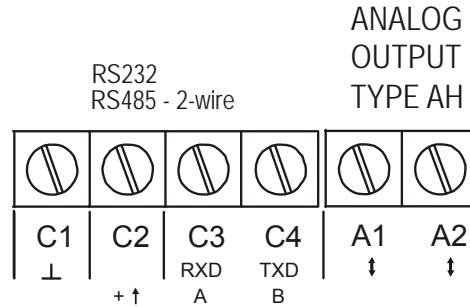


Fig. 14: Overview terminal connectors communication option.

When using the RS232 communication option, terminal C2 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 C1 and C2 with a voltage between 8V and 12V.

Terminal A1-A2 analog output (SETUP 6):

An analog output signal proportional to the flowrate is available as standard.

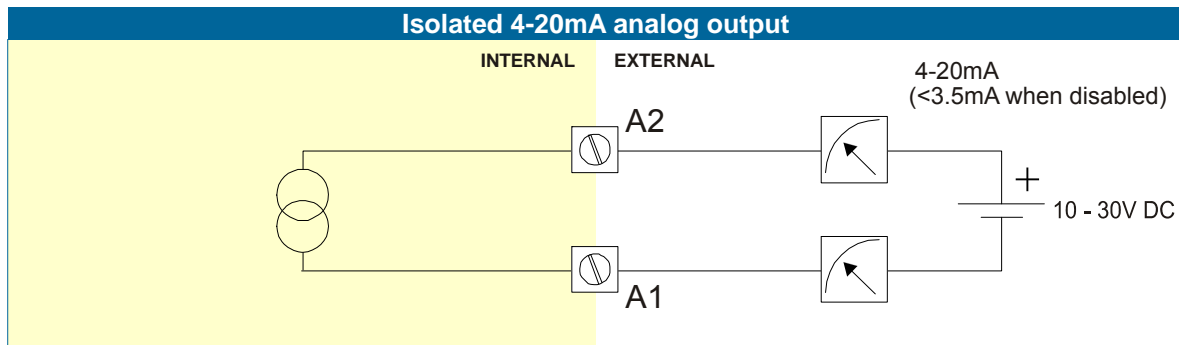
Type AH

An isolated 4-20mA signal proportional to the flowrate is available with this option.

When the output is disabled, the current is by default limited to 3.5mA on these terminals.

Max. driving capacity 1000 Ohm @ 30VDC.

This loop can also be used to power the E112. If only powered by the loop the backlight will not be activated.



5. MAINTENANCE

5.1. 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 E112-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.*

The E112-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 E112-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: NPN and PNP inputs consume more energy than coil inputs.
- Input frequency: the higher the frequency, the shorter the battery life-time.
- Flowrate calculation: the lower number of pulses (SETUP 2.6) the shorter the battery life-time.
- Analog output signal; be sure that an external power supply is connected or that the function is disabled if not in use; or else it will have an influence on the battery life-time (SETUP 6.1).
- Display update: fast display update uses significantly more power; SETUP 3.2.
- Infra-red keys activity: if possible turn off the infra-red keys with the on-off switch.
- Pulse output and communications.
- Low temperatures; the available power will be less due to battery chemistry.



Note !

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

Check periodically:

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

5.2. REPAIR

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

6 LABEL

6.1. GENERAL REMARKS REGARDING THE SHOWN LABELS

Two labels will be fitted on the E-series enclosure: one showing the certification data, the other showing the thread sizes, type number, serial number and address applied.

6.2. LABEL WITH CERTIFICATION DATA

The E-series comes in two temperature classes, T5 as well as T6. All versions consuming 4.2 watts or less (e.g. when supplied from a barrier, battery and/or distribution network) are classified T6. All versions consuming 9.2 watts or less (e.g. with additional power module) are classified T5.

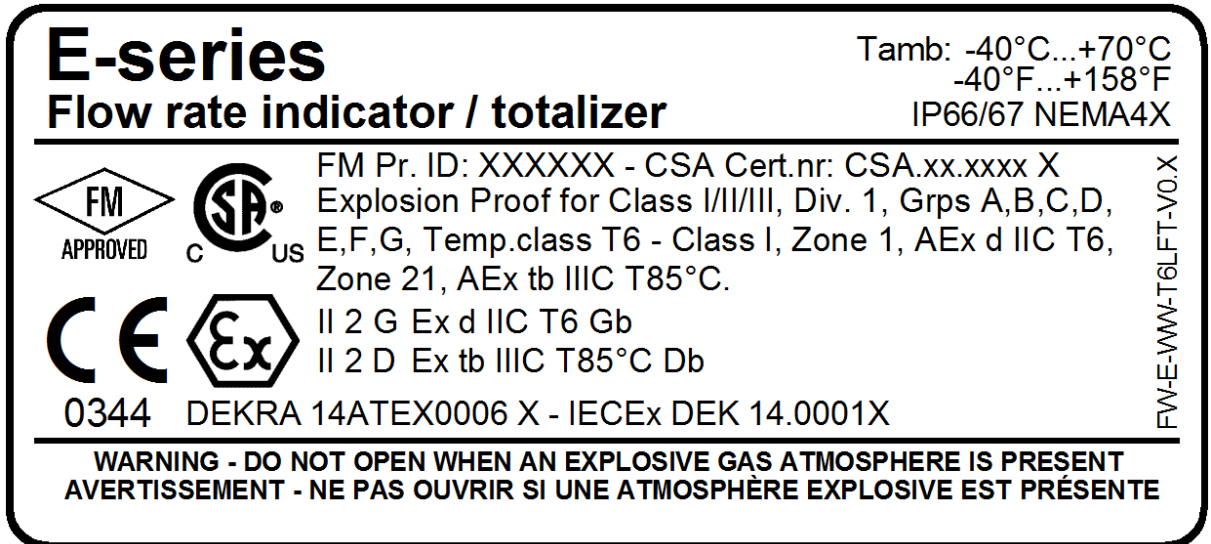


Fig. 15: E-series label for T6 temperature class

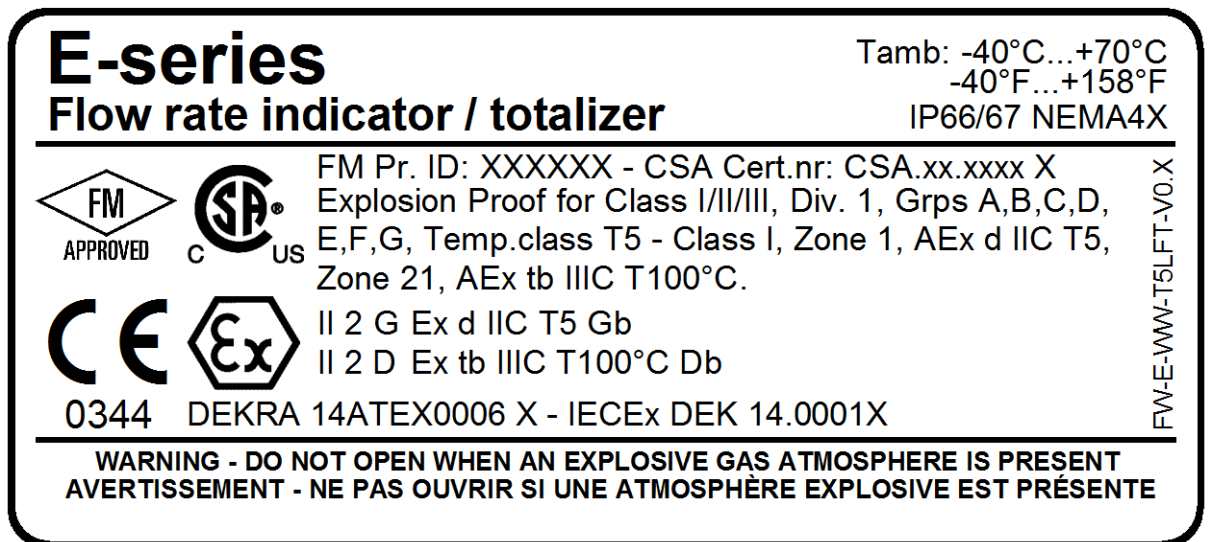


Fig. 16: E-series label for T5 temperature class

Note 1: Where the product type now reads "Flow rate indicator / totalizer" the actual product type may differ depending on Batch, Level, Temperature or Pressure indicator applications.

Note 2: The shown label also includes preliminary certification data for FM and CSA certifications. These certifications are currently not present on the E-series Indicator / Totalizer but are expected to become available in 2014. Until that time, the FM and CSA logo's and certification data is not printed on the labels. The specific certification data may change when the certificates become available.

The label will match the certification data and markings as stated in **Appendix A: Specifications..**

6.3. LABEL WITH THREAD SIZES.

The thread sizes will be indicated on the label as per the drawing below.

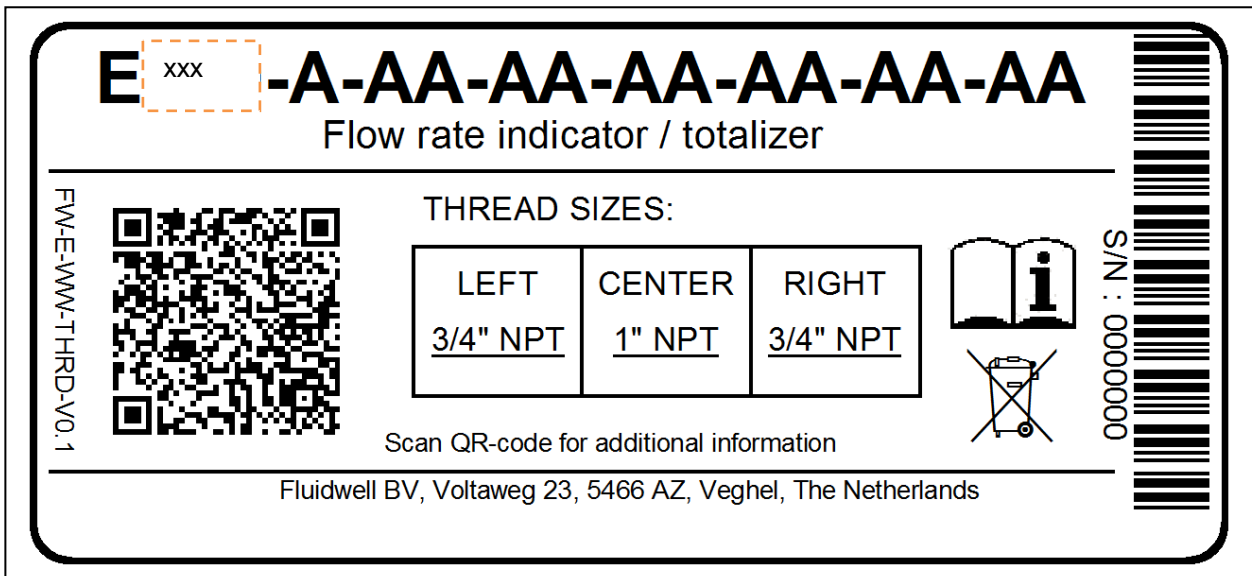


Fig. 17: E-series label for thread size indication

If not already present on the certification label, an optional date code will be included as well. The areas greyed out can be freely changed and used to apply additional information.

6.4 TYPE OR MODEL CODING ON THE THREAD SIZE LABEL

In addition to the thread sizes the thread size label will also show information regarding the exact model or type code. The code uses letter and digit combinations:

APPENDIX A: TECHNICAL SPECIFICATIONS

GENERAL

Display	
Type	High intensity transfective numeric and alphanumeric LCD, UV-resistant. With bi-color backlight. Intensity can be adjusted via the keyboard.
Note:	When battery powered, the backlight is only operational during setup to extend battery lifetime.
Dimensions	65 x 45 mm (2.56" x 1.77")
Digits	Seven 12mm (0.47") and eleven 7mm (0.28"). Various symbols and measuring units.
Refresh rate	User definable: 8 times/sec - 30 secs.
Speedometer	The black indicators around the edge run from 0 to 100% in 20 blocks, each block is 5%.

Casing	
Window	Glass.
Sealing	Silicone.
Control Keys	Three infra-red keys with operation through the glass front window.

Aluminum Enclosure	
General	Die-cast aluminum Ex d enclosure
Rating	IP66/67 / NEMA 4X / NEMA 7 / NEMA 8 / NEMA 9.
Dimensions	112 x 133 x 148mm (4.41" x 5.24" x 5.83") - W x H x D.
Weight	1300 gr.
Type HA	Entry threads: 2 x 3/4"NPT / 1 x 1"NPT
Type HB	Entry threads: 3 x 3/4"NPT
Type HC	Entry threads: 2 x 1/2"NPT / 1 x 1"NPT
Type HD	Entry threads: 2 x 1/2"NPT / 1 x 3/4"NPT
Type HG	Entry threads: 2 x M20 / 1 x M25
Type HH	Entry threads: 3 x M25

Stainless Steel Enclosure	
General	Stainless steel Ex d enclosure
Rating	IP66/67 / NEMA 4X / NEMA 7 / NEMA 8 / NEMA 9.
Dimensions	112 x 133 x 148mm (4.41" x 5.24" x 5.83") - W x H x D.
Weight	3600 gr.
Type HN	Entry threads: 2 x 3/4"NPT / 1 x 1"NPT
Type HO	Entry threads: 3 x 3/4"NPT
Type HP	Entry threads: 2 x 1/2"NPT / 1 x 1"NPT
Type HR	Entry threads: 2 x 1/2"NPT / 1 x 3/4"NPT
Type HU	Entry threads: 2 x M20 / 1 x M25
Type HV	Entry threads: 3 x M25





Operating temperature	
Operational	-40°C to +70°C (-40°F to +158°F)

Power supply	
Type PB	Lithium battery - life-time depends upon settings - up to several years.
Note:	When battery powered, the backlight is only operational during setup to extend battery lifetime. Option PB cannot power the real sensor supply (Terminal P4).
Type PD	24V DC -10/+20%. Power consumption max. 4.2 Watt.
Type PX	8 - 30V DC. Power consumption max. 4.2 Watt.
Note:	When power supply <21V it cannot power the real sensor supply (Terminal P4).
Type AH	Loop powered, analog output. 10 - 30V DC, Output disabled <3.5mA. Power consumption max. 750mW@25mA at 30V DC.
Note:	The loop powered analog output cannot power the backlight or the real sensor supply (Terminal P4).

Sensor excitation	
Type AH/PB/PX	Terminal S3: 3V DC for pulse signals and 1.2V DC for coil pick-up. 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	Terminal P4: 8.2 – 12 and 24V DC 8.2V DC -I _{out} max. 25mA (Supply voltage should be at least 12V) 12V DC -I _{out} max. 30mA (Supply voltage should be at least 15V) 24V DC -I _{out} max. 75mA (this voltage varies depending on the input supply voltage and is approximately 1V lower)

Terminal connections	
Type:	Removable plug-in terminal strip Wire max. 1.5mm ² and 2.5mm ²

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

Hazardous area	
Explosion proof	<p>ATEX approvals:</p> <p>power consumption ≤ 4.2 W  II 2 G Ex d IIC T6 Gb  II 2 D Ex tb IIIC T85°C Db</p> <p>power consumption ≤ 9.2 W  II 2 G Ex d IIC T5 Gb  II 2 D Ex tb IIIC T100°C Db</p> <p>IECEx approval:</p> <p>power consumption ≤ 4.2 W Ex d IIC T6 Gb Ex tb IIIC T85 °C Db</p> <p>power consumption ≤ 9.2 W Ex d IIC T5 Gb Ex tb IIIC T100 °C Db</p> <p>CSA (c us) approval: Pending according XP CI I II III Div 1 GP A, B, C, D, E, F, G.</p> <p>FM (c us) approval: Pending according XP CI I II III Div 1 GP A, B, C, D, E, F, G.</p> <p>Ambient Ta: -40°C to +70°C (-40°F to +158°F) Enclosure: IP66/67, NEMA 4X</p>

Directives & Standards	
EMC	EN 61326-1 and FCC 47 CFR part 15
Low voltage	EN/IEC 61010-1
ATEX / IECEx	EN/IEC 60079-0, EN/IEC 60079-1, EN/IEC 60079-7, EN/IEC 60079 -31
FM	FM Class No. 3600, FM Class No. 3615
CSA	CSA 22.2 No. 30, CSA 22.2 No.94-M91
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 8.2/24V DC.
Frequency	Minimum 0 Hz - maximum 7 kHz for total and 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.
Linearization	15 positions with interpolation function; Meter-Factor 0.000001 - 9.999999 versus Frequency 0.001 Hz - 9,999 Hz.
Option ZF	coil sensitivity 10mVpp
Option ZG	coil sensitivity 5mVpp.

External	
Type	Internally pulled-up switch contact - NPN
Function	<ul style="list-style-type: none"> Terminal input to reset total remotely If this terminal input is closed, the "clear total" function is disabled
Duration	Minimum pulse duration 100msec

OUTPUTS

Analog output	
Type AH	Galvanically isolated, loop powered 4 - 20mA output
Function	transmitting flowrate
Accuracy	12 bit. Error < 0.1%. Analog output signal can be scaled to any desired range
Fault detection	Pending: According to Namur NE43

Digital output(s)	
Function	One pulse output - transmitting accumulated total
Frequency	Max. 500Hz. Pulse length user definable between 1msec up to 10 seconds
Type OT	Passive transistor output (NPN) - not isolated. Load max. 50V DC - 300mA @ 25°C

Communication option	
Functions	Reading display information, reading / writing all settings
Protocol	Modbus RTU
Speed	1200 - 2400 - 4800 - 9600 baud
Addressing	maximum 255 addresses
Type CB	RS232
Type CH	RS485 2-wire

OPERATIONAL

Operator functions	
Displayed functions	<ul style="list-style-type: none"> Linearized total and/or flowrate. Linearized total and linearized accumulated total. Total can be reset to zero by pressing the CLEAR-key twice. Speedometer

Total	
Digits	7 digits
Units	L, m3, GAL, USGAL, kg, lb, bbl, ft3, Ton, ical, no unit
Decimals	0 - 1 - 2 or 3
Note	total can be reset to zero

Accumulated total	
Digits	11 digits
Units / decimals	according to selection for total
Note	cannot be reset to zero

Flowrate	
Digits	7 digits
Units	mL, L, m3, Gallons, kg, Ton, lb, bl, cf, RND, ft3, scf, Nm3, NI, ical - no units
Bargraph speedometer	20 blocks, each block is 5% of total span
Decimals	0 - 1 - 2 or 3
Time units	/sec - /min - /hr - /day

APPENDIX B: PROBLEM SOLVING

In this appendix, several problems are included that can occur when the E112-P is going to be installed or while it is in operation.

Flowmeter does not generate pulses:

Check:

- Signal selection SETUP – 4.1,
- 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 and Flowrate: SETUP 1.1-1.4 and 2.1-2.7,
- Type of signal selected with actual signal generated - SETUP – 4.1,
- Sensitivity of coil input - SETUP – 4.1 and par. 4.4.3.
- Proper grounding of the E112-P - par. 4.4.1.
- Use screened wire for flowmeter signals and connect screen to terminal S1. (unless connected at sensor)

Analog output does not function properly:

Check:

- SETUP 5.1 - is the function enabled?
- SETUP 5.2 / 5.3: are the flow-levels programmed correctly?
- Connection of the external power-supply according to the specification.

Pulse output does not function:

Check:

- SETUP 6.1 - pulse per "x" quantity; is the value programmed reasonable and will the maximum output be under 20Hz?
- SETUP 6.2 - impulse width; is the external device able to recognize the selected pulse width and frequency?

Flowrate displays "0 / zero" while there is flow (total is counting):

Check:

- SETUP 2.2 / 2.5: are the K-factor and time unit correct?
- SETUP 2.6 / 2.7: The unit has to count the number of pulses according to SETUP 2.6 within the time according to SETUP 2.7. Make sure that 2.7 is set to 10.0 seconds for example: the result is that the unit has at least 10 seconds time to measure the number of pulses according to SETUP 2.6.

Linearization does not work:

Check:

- SETUP 5.G: is the function enabled?
- SETUP 5.1-5.F: are all M-Factors and the frequency entered correctly?

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

GENERAL

The tables below show the various variables that can be used for communication.

The E112-P is fitted with the Modbus communication protocol and can be equipped with various physical interfaces like RS485 and RS232 (please see device datasheet for available options).

Currently, the functions supported are function 3 Read Holding Registers (4X references) and function 16 Preset Multiple Registers (4X references). The shown communication variables, indicated by the column VAR, show protocol addressed in decimal representation, followed by its hexadecimal representation (0x0000). When the PLC address range is required (4X references typically used by PLCs), please add a value of 40001 to the protocol address. E.g. reading the serial number with PLC-based addressing means reading $165 + 40001 = \text{register } 40166$.

Variables spanning multiple registers use 'little-endian' data representation. This means that the lowest register holds the least significant word of the variable. Although most Modbus masters will support variables that span 2 registers, variables spanning more registers sometimes require you to manually calculate the resulting value.

Following example shows how data is represented and how this calculation can be accomplished:

For a total-value of 158928, the following register data has been received by the Modbus master:

register 566 = 0x6CD0 = 27856

register 567 = 0x0002 = 2

register 568 = 0x0000 = 0

If we interpret this as a long integer value, it's value would be: 0x0000.0002.6CD0 = 158928.

*If this value needs to be calculated: $0*65536*65536 + 2*65536 + 27856 = 158928$.*

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

RUNTIME VARIABLES OF THE E112-P

VAR	RUN-TIME VALUES	REGs	R/W	TYPE	VALUE / REMARKS
572 0x23C	flow rate	2	r	uint32	0...9999999 Representation: unit, time, decimals depending on variables 48, 49, 50
566 0x236	total	3	r	uint48	0...9999999999 Representation: unit, decimals depending on variables 32, 33
560 0x230	accumulated total	3	r	uint48	0...99999999999999 Representation: unit, decimals depending on variables 32, 33
37 0x025	error status	1	r	uint16	Bitfield: 0x0001=Display error 0x0002=EEPROM error 0x0004=EEPROM initialization error 0x0010= IO configuration error 0x0020= IO configuration error 0x0040=Linearization error (calculated M-factor out of range)

Reading flowrate, total or accumulated total: The returned values are given including the decimals and represent the actual value. The given value may differ from the value that is displayed on the display – this is due to the fact that the display is limited in the number of digits and may have a slower update rate set. For example when two decimals are selected for total and total has a value of 123456,78 the display will show 23456,78 while communication will read a "total" of 12345678 and a "total decimals" of 2.

Clearing total: It is possible to clear the total counter by means of writing a value of 0 to all the 3 registers of total in a single write action. Writing any other value will result in the reply of an error message.

SETUP VARIABLES OF THE E112-P

VAR	TOTAL	REGs	R/W	TYPE	VALUE / REMARKS
32 0x020	unit	1	r/w	uint8	0=none 1=L 2=m3 3=kg 4=lb 5=gal 6=usgal 7=bbl
33 0x021	decimals	1	r/w	uint8	0...3
34 0x022	K-factor	2	r/w	uint32	1...9999999 Representation: 0.000010...9999999 depending on variable 54: decimals K-factor.
37 0x025	decimals K-factor	1	r/w	uint8	0...6
VAR	FLOWRATE	REGs	R/W	TYPE	VALUE / REMARKS
48 0x030	unit	1	r/w	uint8	0=mL 1=L 2=m3 3=mg 4=g 5=kg 6=ton 7=gal 8=bbl 9=lb 10=cf 11=rev 12=none 13=scf 14=NM3 15=NL 16=p
49 0x031	time unit	1	r/w	uint8	0=sec 1=min 2=hour 3=day
50 0x032	decimals	1	r/w	uint8	0...3
51 0x033	K-factor	2	r/w	uint32	1...9999999 Representation: 0.000010...9999999 depending on variable 54: decimals K-factor.
54 0x036	decimals K-factor	1	r/w	uint8	0...6
55 0x037	number of pulses	1	r/w	uint8	1...255
56 0x038	cut-off time	1	r/w	uint16	1...9999 Representation: 0.0001 – 9.999 sec
VAR	DISPLAY	REGs	R/W	TYPE	VALUE / REMARKS
64 0x040	display function	1	r/w	uint8	0=total 1=flowrate
80 0x050	LCD update time	1	r/w	uint8	0=fast 1=1sec 2=3sec 3=15sec 4=30sec 5=off
67 0x043	backlight brightness	1	r/w	uint8	0=off 1=20% 2=40% 3=60% 4=80% 5=100%
58 0x03A	bargraph enable	1	r/w	uint8	0=disable 1=enable
59 0x03B	ratespan	3	r/w	uint32	0...9999999
VAR	FLOWMETER	REGs	R/W	TYPE	VALUE / REMARKS
96 0x060	flowmeter signal	1	r/w	uint8	0=npn 1=npn-lp 2=reed 3=reed LP 4=pnp 5=pnp-lp 6=namur 7=coil hi 8=coil lo 9=act.8.1V 10=act. 12V 11=act.24V

VAR	LINEARISATION	REGs	R/W	TYPE	VALUE / REMARKS
1024 (400h)	linearization table entry	3	r/w	struct 2x uint24	<p>The linearization table is an INDEXED variable. Reading and writing the entries of the linearization tables is done by first selecting the entry through the index. Valid values for the index are 0...14, which correspond with the linearization table entries 1 through 15. Indexes outside this range will result in an error being sent back. (See the communication-section of this appendix for setting the index and its extended functionality through variable 150 and 149.)</p> <p>The 3 registers represent a structure containing 2 variables of each 3 bytes. The three least significant bytes (register 400 and LSB of register 401) contain the frequency part, the three most significant bytes (MSB of register 401 and register 402) contain the M-factor part.</p> <p>Valid range for the frequency is 0.000 to 9999Hz. Decimal point dependant on variable 1039. A value of 0 for frequency means that entry is disabled.</p> <p>Valid range for the M-factor 0.000000 to 9.999999.</p>
1038 (40Eh)	linearization on/off	1			0=disable 1=enable
1039 (40Fh)	Decimals	1			0...3 This variable selects the number of decimals used for the frequencies entered in the linearization table.
VAR	ANALOG OUTPUT	REGs	R/W	TYPE	VALUE / REMARKS
112 0x070	analog output	1	r/w	uint8	0=disable 1=enable
113 0x071	minimum rate	2	r/w	uint32	0...9999999 Representation: unit, time, decimals depending on variables 48, 49, 50
116 0x074	maximum rate	2	r/w	uint32	0...9999999 Representation: unit, time, decimals depending on variables 48, 49, 50
119 0x077	cut off percentage	1	r/w	uint8	0...99 Representation: 0.0 – 9.9%
120 0x078	tune minimum rate	1	r/w	uint16	0...9999
122 0x07A	tune maximum rate	1	r/w	uint16	0...9999
99 0x063	filter	1	r/w	uint8	0...99
VAR	PULSE OUTPUT	REGs	R/W	TYPE	VALUE / REMARKS
128 0x080	impulse width	1	r/w	uint8	0...9999 Representation: 0.001 – 9.999 sec
130 0x082	Impulse quantity decimals	1	r/w	uint8	0...3
129 0x081	pulse per X quantity	2	r/w	uint32	1...9999999 Representation: 0.000001...9999999 depending on variables 130, 32

VAR	COMMUNICATION	REGs	R/W	TYPE	VALUE / REMARKS
144 0x090	speed (baudrate)	1	r/w	uint8	0=1200 1=2400 2=4800 3=9600
145 0x091	Modbus address	1	r/w	uint8	1...255
146 0x092	Modbus mode	1	r/w	uint8	0=off 1=RTU 2=ASCII
VAR	OTHERS	REGs	R/W	TYPE	VALUE / REMARKS
160 0x0A0	model number	1	r	uint16	0...9999
173 0x0AD	model suffix	1	r	char	Representation:ASCII character
162 0x0A2	firmware version	2	r	uint32	0...999999 Representation: xx.xx.xx
165 0x0A5	serial number	2	r	uint32	0...9999999
168 0x0A8	pass code	1	r	uint16	0...9999
139 0x08B	keyboard lock	1	r/w	uint8	0=disable 1=enable
170 0x0AA	tag number	2	r/w	uint32	0...9999999

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NOTES

DECLARATION OF CONFORMITY



Count on us.

Declaration of Conformity

Fluidwell E- series indicators

Veghel, February 2014

Fluidwell bv declares that the E- series indicators are designed and will operate conform the following applicable European Directives and Harmonized 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
ATEX Directive 94/9/EC	EN60079-0:2012
	EN60079-1:2007
	EN60079-7: 2007
	EN60079-31: 2009

Protective system		II 2 G Ex d IIC T6 Gb
for power consumption $\leq 4.2W$:		II 2 D Ex tb IIIC T85 °C Db
Protective system		II 2 G Ex d IIC T5 Gb
for power consumption $\leq 9.2W$:		II 2 D Ex tb IIIC T100 °C Db

Certificate: DEKRA 14ATEX0006 X

Notified body 0344: DEKRA Certification BV, Utrechtseweg 310, Arnhem, The Netherlands.

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LIST OF CONFIGURATION SETTINGS			
SETTING	DEFAULT	DATE :	DATE :
1 - TOTAL		Enter your settings here	
1.1 unit	L		
1.2 decimals	0000000		
1.3 K-factor	0000001		
1.4 decimals K-factor	0		
1.5 multiply factor	x1		
2 - FLOWRATE			
2.1 unit	L		
2.2 time unit	/min		
2.3 decimals	0000000		
2.4 K-factor	0000001		
2.5 decimals K-factor	0		
2.6 calculation / pulses	010		
2.7 cut-off time	30.0 sec.		
3 - DISPLAY			
3.1 function	total		
3.2 LCD-new	1 sec		
3.3 backlight	0		
3.4 bargraph	enable		
3.5 ratespan	1000		
4 - FLOWMETER			
4.1 signal	coil-lo		
5 - LINEARIZE			
5.1 frequency	0.0Hz		
M-Factor	1.000000		
5.2 frequency	0.0Hz		
M-Factor	1.000000		
5.3 frequency	0.0Hz		
M-Factor	1.000000		
5.4 frequency	0.0Hz		
M-Factor	1.000000		
5.5 frequency	0.0Hz		
M-Factor	1.000000		
5.6 frequency	0.0Hz		
M-Factor	1.000000		
5.7 frequency	0.0Hz		
M-Factor	1.000000		
5.8 frequency	0.0Hz		
M-Factor	1.000000		
5.9 frequency	0.0Hz		
M-Factor	1.000000		

SETTING	DEFAULT	DATE :	DATE :
5 – LINEARIZE (cont)		Enter your settings here	
5.A frequency	0.0Hz		
M-Factor	1.000000		
5.B frequency	0.0Hz		
M-Factor	1.000000		
5.C frequency	0.0Hz		
M-Factor	1.000000		
5.D frequency	0.0Hz		
M-Factor	1.000000		
5.E frequency	0.0Hz		
M-Factor	1.000000		
5.F frequency	0.0Hz		
M-Factor	1.000000		
6G linearization	disabled		
6H decimals frequency	1111.1		
6 - ANALOG OUTPUT			
6.1 output	disabled		
6.2 min. flowrate 4-mA	0000000		
6.3 max. flowrate 20mA	9999999		
6.4 cut off percentage	0.0%		
6.5 tune min - 4mA	0208		
6.6 tune max - 20mA	6656		
6.7 filter	0 (off)		
7 - PULSE			
7.1 width	000 periods		
7.2 decimals	0		
7.3 amount	0001000		
8 - COMMUNICATION			
8.1 baud-rate	9600		
8.2 address	1		
8.3 mode	BUS-RTU		
9 - OTHERS			
9.1 model	E112-P	E112-P	E112-P
9.2 software version	03-01_ _	03-01_ _	03-01_ _
9.3 serial number			
9.4 pass code	0000		
9.5 keyboard lock	enabled		
9.6 tagnumber	0000000		

