

Your success counts

## Flow rate Monitor / Totalizer

with linearization, high / low alarms, analog and pulse signal outputs and HART Communication



**HART**  
COMMUNICATION PROTOCOL



The E-Series provides unequalled safety and ease of use, opening the cover is history. The through-glass keypad enables operability without interruptions. The E-Series saves time, money and hassle and delivers user-friendliness in the toughest conditions.

### Advantages

- Save time and gain flexibility with the easy-to-operate through glass keypad: no need to remove the front cover or to arrange a work permit.
- Intuitive "Know one, know them all!" configuration menu, saving time, cost and aggravation.
- Cost saving with an easy to install, spacious chamber, plug and play connectors and 1" NPT thread for flow meter mounting.
- Durable high grade stainless steel 316L Ex d enclosure for extremely salty atmospheres (offshore).

### Features

- Explosion proof according ATEX, IECEx, FM and CSA c-us.
- High and low flow rate alarm monitoring.
- Displays flow rate, total, alarm values, measuring units and a flow rate indicating speedometer.
- Bright LED backlight, red flashing in case of an alarm.
- 15 point linearization of the flow curve - with interpolation.
- Ability to process all types of signals: Sine wave (coil), NAMUR, NPN/PNP pulse, Reed-switch, Active pulse signals.
- 4 configurable digital outputs for alarms, scaled pulse output of the linearized accumulated total and input retransmission.
- Loop powered 4-20mA output acc. linearized flow rate.
- Integrated HART 7 communication protocol.
- Power requirements: Loop powered, battery or 9 - 27V DC.
- Sensor supply: 8.2 / 12 / 24V DC.
- Auto backup of settings and running totals.
- Easy configurable via PC with free downloadable software.

## Introduction

The E018 is one of the top models in our range of explosion proof flow computers. The E-series distinguishes itself by its quality and functionality driven European design and manufacturing. It is more than fulfilling the rules for explosion proof design, it is about safety during the daily operation. Often, the environment is much tougher than the explosion proof requirements demand. Thus dangerous conditions may be experienced due to a broken enclosure or a poorly made flame path. Ruggedness and reliability is where Fluidwell stands for and it is now available in a comprehensive well designed and purpose driven explosion proof flow monitor / totalizer.

## Configuration

The E-Series uses the highly appreciated configuration structure of our F-, D- and N-Series product line. Each setting is clearly indicated with an alphanumeric description, which avoids confusing abbreviations. Once familiar with one E-series product, you will be able to program all models in all series without a manual. For example: an (intrinsically safe) F018 operates identical to an explosion proof E018 and has the same three buttons! In other words: know one, know them all.

## Operation

Operation is done via the optical, easy-to-operate, through glass keypad without having to remove the front cover. If required, these optical keys can be disabled. For easy handheld configuration there are three mechanical push buttons on the bottom side of the display collar. All settings can be password protected.



Solid die cast aluminum or high grade stainless steel 316L enclosure

Flow rate indicating speedometer in percentage

Display with bright backlight (65 x 45mm/2.56" x 1.77")

Displayed function

11 digits (7mm, 0.28")

Same configuration menu and keys as the F-Series: **"Know one, know them all!"**

Side entry thread: 1/2"NPT / 3/4"NPT / M20 / M25

USB connector via side entry

Displayed function

Engineering units

7 digits (12mm, 0.47")

**Easy-to-operate through glass keypad**

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

Bottom entry thread: 3/4"NPT / 1"NPT / M25

## Display

The unique LCD display provides multiple flow data at a glance. The main information is displayed with 7 digits (12mm, 0.47") to show total or flow rate and 11 digits (7mm, 0.28"), which can be set to show flow rate and accumulated total. On-screen engineering units are easily configured from a comprehensive selection, while different units for flow rate and total can be displayed simultaneously. The speedometer offers a quick impression of the actual flow rate. The E018 is provided with a bi-color backlight, which can be turned on to flashing red to indicate a flow rate alarm condition. When battery powered the backlight is only operational after a keypad touch, to extend battery lifetime.

## Hazardous areas

The E-Series has been certified according ATEX, IECEx, FM and CSA c-us with an ambient temperature of -40°C to +70°C (-40°F to +158°F). For stainless steel 40°C to +67°C (-40°F to +153°F).

- The ATEX markings for gas and dust applications are:
  - Ex II 2 G Ex db IIC T6 Gb.**
  - Ex II 2 D Ex tb IIIC T85°C Db.**
- The IECEx markings for gas and dust applications are:
  - Ex db IIC T6 Gb.**
  - Ex tb IIIC T85°C Db.**
- The FM and CSA c-us markings are:
  - XP (Explosion-proof): Class I, Division 1, Groups A, B, C, D.**
  - DIP (Dust-Ignition-proof): Class II/III, Div. 1, Groups E, F & G.**
  - Class I, Zone 1, AEx d IIC T6 Gb, Zone 21, AEx tb IIIC T85°C Db.**



All info at a glance



Easy to install



Easy to program



Know one know them all!



Reliable



User-friendly

### Analog output

The linearized flow rate is transmitted with the galvanically isolated 4 - 20mA output signal. The E018 can even be loop powered via the isolated loop-current.

### Pulse / Alarm outputs

Four digital outputs are available, which can be set as an alarm output to transmit the flow rate alarm, as a scaled or unscaled pulse output. The alarm output can be set to switch for a low, high or all alarms! Scaled pulse output is according the linearized accumulated total. The unscaled pulse output retransmits the incoming pulse signal. The pulse length is user defined from 1msec. up to 10 seconds. The output can be a passive NPN signal or a mechanical relay output.

### HART Communication

Process data can be read, total can be cleared and every single menu setting can easily be read and modified via the HART communication link with a free downloadable device-specific DD. This guarantees that they will operate hassle free with other registered DD enabled host systems. Fluidwell lifts the user-friendly configuration to the next level!



HART REGISTERED certificate

### Power requirements

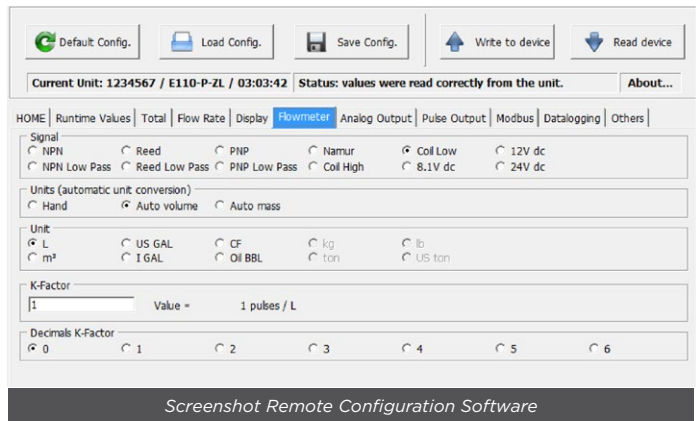
Several power inputs are possible to power the E018 and sensor. As standard the E018 can be loop powered via the isolated, two-wire, analog output. The battery powered version with a long life lithium battery and the basic 9 - 27V DC can power the E018 including the backlight, but don't offer a real sensor supply. A real sensor supply of 8.2, 12 or 24V is optional available with type PD.

### Enclosures

Two versions of our IP66/IP67, NEMA Type4X/7/9 explosion proof enclosures are available: a solid die cast aluminum or a high grade stainless steel 316L enclosure resistant to extremely salty atmospheres (offshore). The aluminum enclosure has an industrial two component coating and is better suitable for outdoor and chemical plant applications than powder coated alternatives. A major advantage for the installation engineer is the spacious mid-chamber for the cable entry in combination with the plug-and-play connectors. Especially for straight flow meter mounting a 1" NPT connection is available (see page 5 for available NPT and Metric threads sizes).

### Remote configuration

Even more user-friendly is the remote configuration via a PC using the free downloadable E-Series Configuration Software. Just connect the E-Series to your PC with the special Configuration Cable (ACE02).



Screenshot Remote Configuration Software



Easy-to-operate through glass keypad



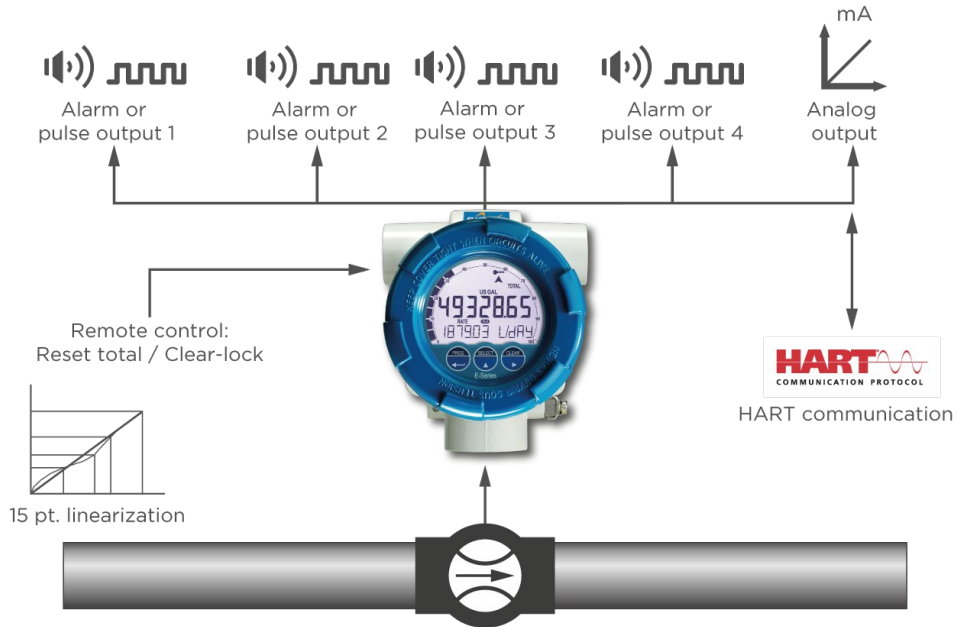
High grade Stainless Steel 316L enclosure



USB communication

### Overview application E018

Flow measurement in an explosion proof application with mechanical flow meters, where re-transmission of the totalizer, monitoring of the flow rate and HART communication is required. The E018 offers you a flow rate monitor / totalizer designed to be used in rough and tough applications, beyond being just explosion proof. Its sturdy design and ease of use are unequaled by any other explosion proof indicator in the market! The E-Series is always your first and safest choice in explosion proof applications. For intrinsically safe applications we offer our field mount F-Series indicators.



### Signal input

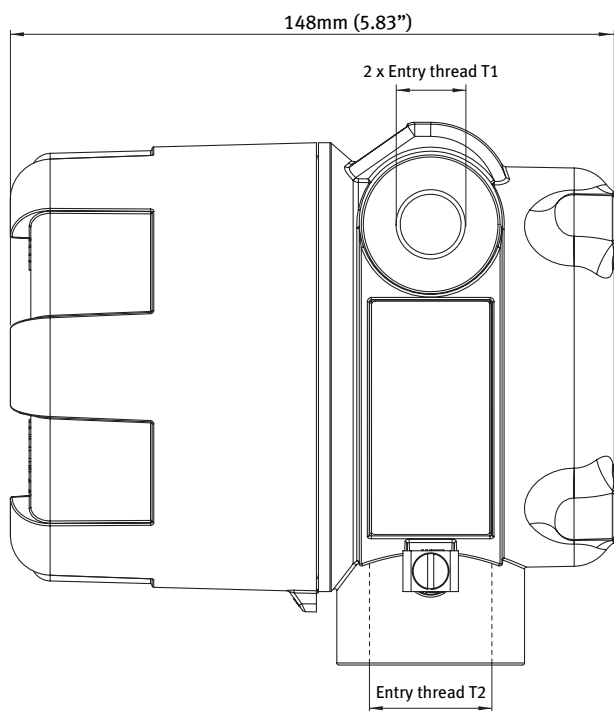
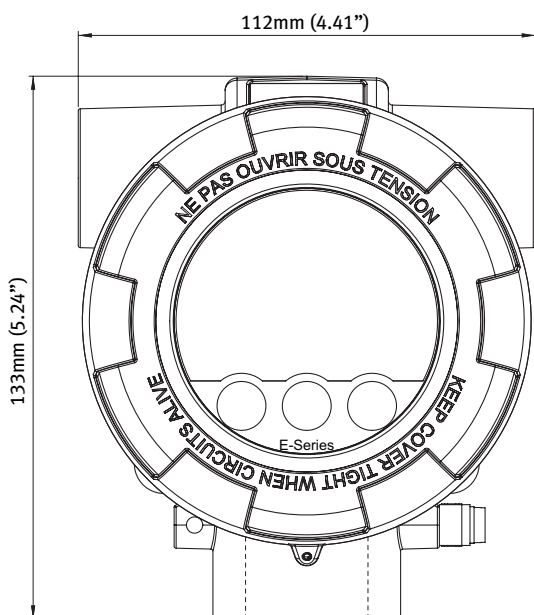
The E018 accepts most input signals for volume flow or mass flow meters. The input signal type can be selected in the configuration menu without having to adjust any sensitive mechanical dip-switches or jumpers. In addition to the average K-Factor, 15 linearization points can be entered with their frequencies or values. The unit will interpolate between these points greatly enhancing accuracy in any flow range.

Type of signal	Resistance	Low Pass filter (LP)	Max. frequency	Max. frequency Low Pass filter (LP)	Min. amplitude p-P	Remark
NPN	100kΩ pull-up	100kΩ pull-up	6kHz Threshold 1.2V	2.2kHz		Open collector
REED	1MΩ pull-up	1MΩ pull-up	1.2kHz Threshold 1.2V	120Hz		
PNP	51KΩ pull-down	51KΩ pull-down	6kHz Threshold 1.2V	700Hz		
NAMUR	820Ω pull-down	-	4kHz	-		External power required
COIL LO	-	-			90mV <sub>pp</sub>	Default sensitivity
COIL-HI					20mV <sub>pp</sub>	Sensitive for interference!
COIL-HI (Type ZF)	-	-	-	-	10mV <sub>pp</sub>	
COIL-HI (Type ZG)					5mV <sub>pp</sub>	
ACTIVE 8.2V DC	3K9Ω		10kHz Threshold 4V			External power required
ACTIVE 24V DC	3KΩ		10kHz Threshold 12V			External power required



## Dimensions enclosures

Aluminum & Stainless Steel 316L enclosure



### Enclosure types

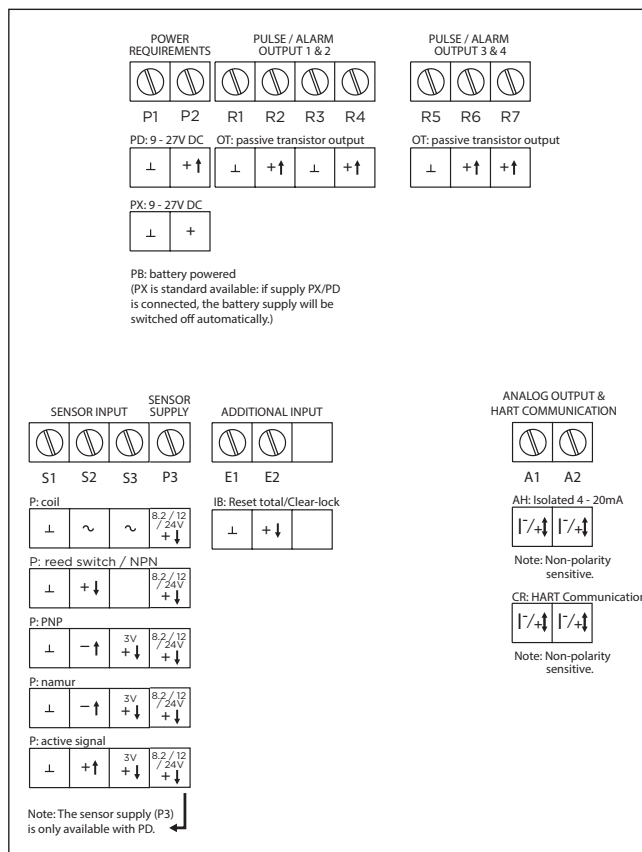
<b>Type HA_</b>	Aluminum Ex d enclosure.
<b>Weight</b>	1550 gr. (3.41 lbs).
<b>Type HS_</b>	Stainless steel 316L Ex d enclosure.
<b>Weight</b>	3600 gr. (9.65 lbs)

### Enclosure drillings

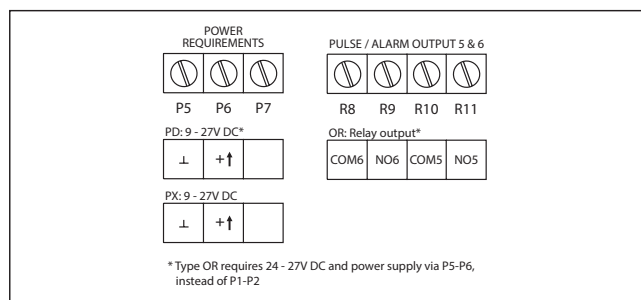
<b>Type H_A</b>	T1: 2 x 3/4" NPT / T2: 1 x 1" NPT
<b>Type H_B</b>	T1: 2 x 3/4" NPT / T2: 1 x 3/4" NPT
<b>Type H_C</b>	T1: 2 x 1/2" NPT / T2: 1 x 1" NPT
<b>Type H_D</b>	T1: 2 x 1/2" NPT / T2: 1 x 3/4" NPT
<b>Type H_G</b>	T1: 2 x M20 / T2: 1 x M25
<b>Type H_H</b>	T1: 2 x M25 / T2: 1x M25

## Terminal connections

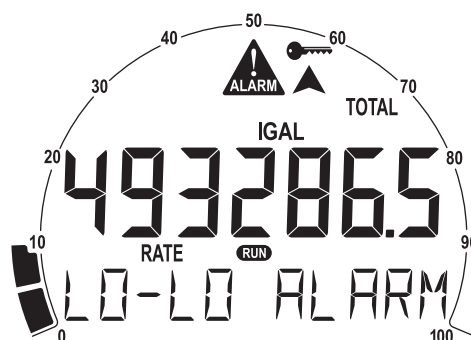
### Main Electronics Module



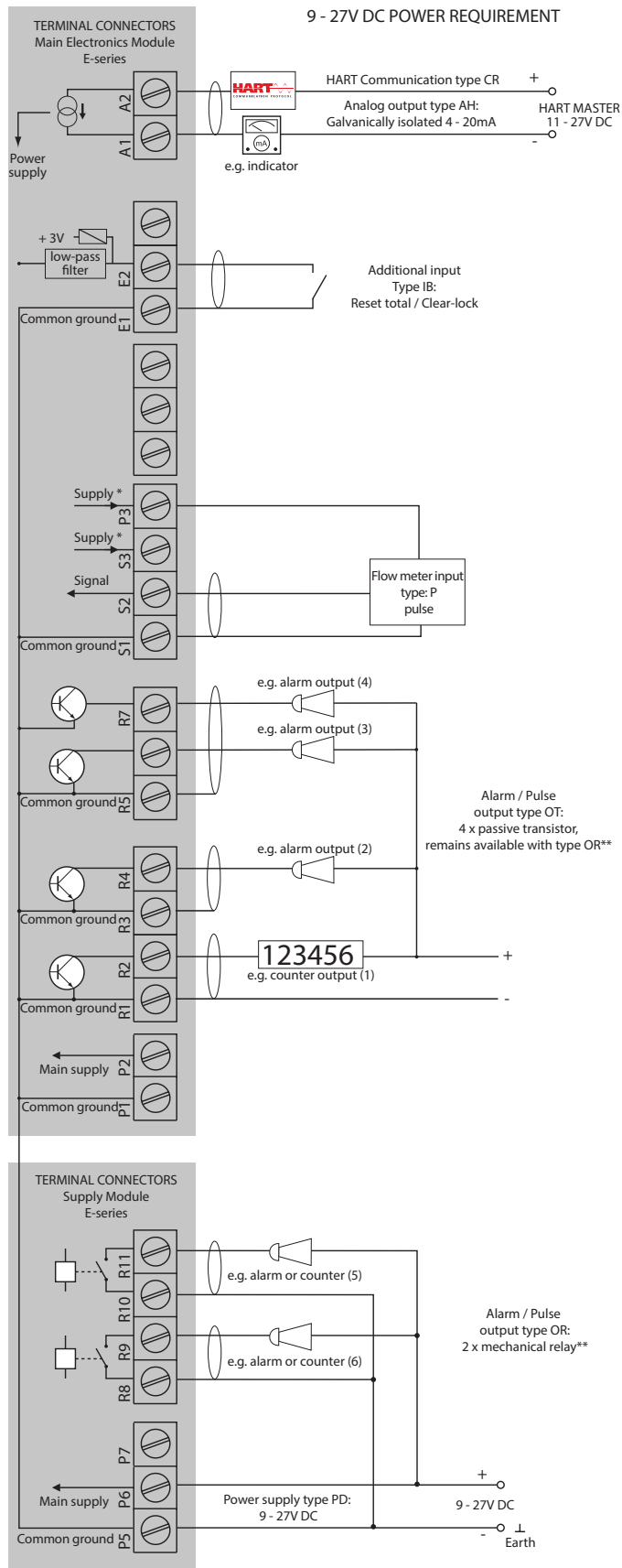
### Supply Module



## Display example

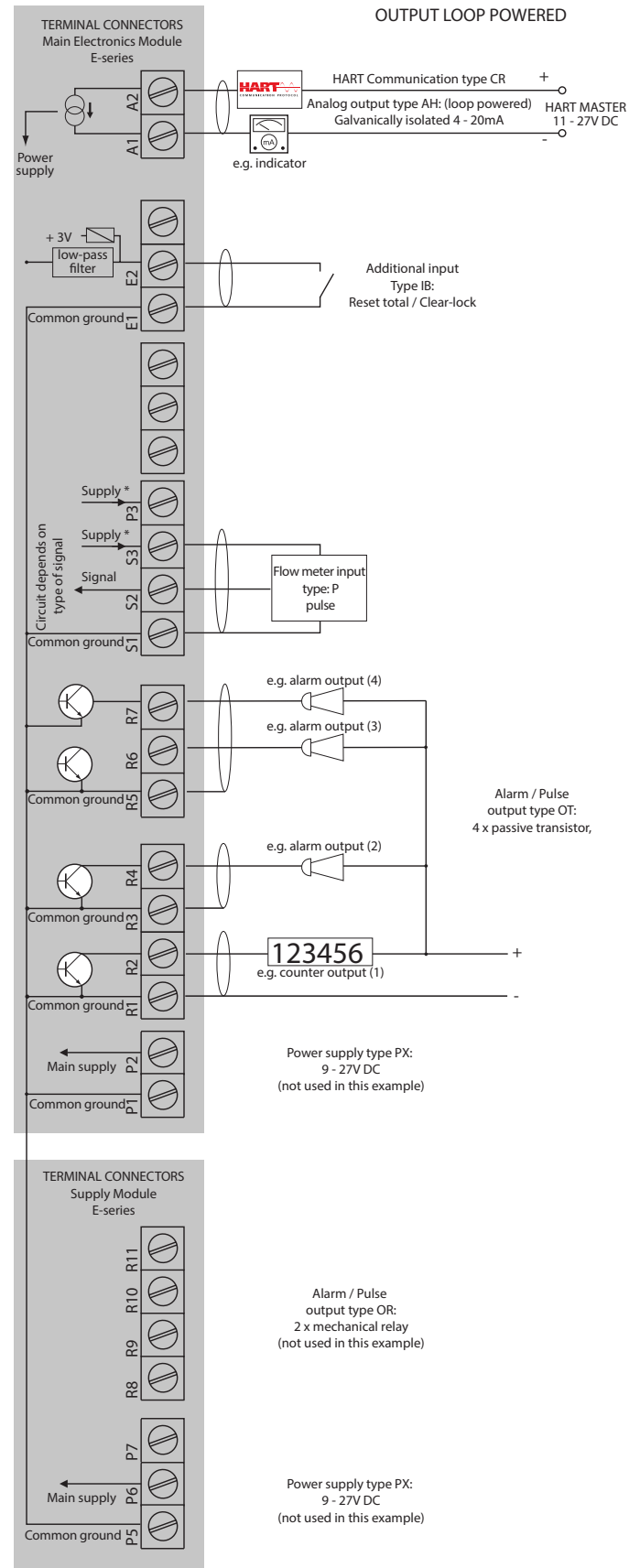


E018-P-AH-CR-IB-OR-PD-XD-ZB



\* Supply voltage S3: 3V DC and supply voltage P3: 8.2 / 12 / 24V DC to sensor  
 \*\* Type OR requires 24 - 27V DC and power supplied via P5-P6, instead of P1-P2

E018-P-AH-CR-IB-OT-PX-XD-ZB



\*Supply voltage S3: 3V DC to sensor

## Display

<b>Type</b>	High intensity transfective numeric and alphanumeric LCD, UV-resistant, with bi-color backlight. Red (flashing) backlight during alarm conditions. Intensity can be adjusted via the keypad.
<b>Note</b>	When battery powered, the backlight is only operational after a keypad touch, to extend battery lifetime.
<b>Dimensions</b>	Ø 65 x 45mm (2.56" x 1.77").
<b>Digits</b>	Seven 12mm (0.47") and eleven 7mm (0.28") digits. Various symbols and measuring units.
<b>Refresh rate</b>	User definable: 8 times/sec. - 30 secs.
<b>Speedometer</b>	To indicate the actual flow rate the bargraph runs from 0 to 100% in 20 blocks, each block is 5%.

## Operating temperature

<b>Ambient HA_</b>	-40°C to +70°C (-40°F to +158°F).
<b>Ambient HS_</b>	-40°C to +67°C (-40°F to +153°F).

## Power requirements

<b>Type PB</b>	Long life Lithium battery - life-time depends upon settings and configuration - up to approx. 2 years.
<b>Note PB</b>	The battery can power the backlight for a short time after a keypad touch but cannot power the relay output (OR) or the real sensor supply (Terminal P3).
<b>Type PD</b>	9 - 27V DC. Consumption max. 4.5 Watt.
<b>Type PX</b>	9 - 27V DC. Consumption max. 3 Watt.
<b>Type AH</b>	Loop powered, analog output. 11 - 27V DC, Min. 3.5mA. Consumption max. 675mW (25mA @ 27VDC)
<b>Note AH</b>	The loop powered analog output cannot power the backlight, mechanical relay output (OR) or the real sensor supply (Terminal P3).

## Sensor excitation

<b>Type AH/PB/PX</b>	Terminal S3: 3V DC for pulse signals and 1.2V DC for coil pick-up, I <sub>out</sub> max. 100µA.
<b>Note AH/PB/PX</b>	This is not a real sensor supply. Only suitable for sensors with a very low power consumption like coils (sine wave) and reed-switches.
<b>Type PD</b>	Terminal P3: 8.2 / 12 / 24V DC 8.2V DC, I <sub>out</sub> max. 20mA. 12V DC, I <sub>out</sub> max. 30mA. 24V DC, I <sub>out</sub> max. 75mA (this voltage varies depending on the input supply voltage)

## Terminal connections

<b>Type</b>	Removable plug-in terminal strip. Wire max. 1.5mm <sup>2</sup> and 2.5mm <sup>2</sup> .
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## Data protection

<b>Type</b>	EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years.
<b>Password</b>	Configuration settings and clear total can be password protected.

## Directives & Standards

<b>EMC</b>	Directive 2014/30/EU, FCC 47 CFR part 15.
<b>Low voltage</b>	Directive 2014/35/EU
<b>RoHS</b>	Directive 2011/65/EU
<b>ATEX / IECEx</b>	Directive 2014/34/EU, IEC 60079-0, IEC 60079-1, IEC 60079-31.
<b>FM</b>	Class 3600, 3615, 3616, 3810.
<b>CSA</b>	CSA 22.2 No. 25, No. 30, No. 61010-1-12.
<b>UL</b>	UL 61010-1.
<b>IP &amp; NEMA</b>	EN 60529 & NEMA 250.

## Hazardous area - Explosion proof

<b>ATEX certification</b>	Gas:  II 2 G Ex db IIC T6 Gb. Dust:  II 2 D Ex tb IIIC T85°C Db.
<b>IECEX certification</b>	Gas: Ex db IIC T6 Gb. Dust: Ex tb IIIC T85°C Db.
<b>FM &amp; CSA c-us certification</b>	Class I, Div. 1, Grps A, B, C, D. Class II/III, Div. 1, Grps E, F, & G. Class I, Zone 1, AEx d IIC T6 Gb, Zone 21, AEx tb IIIC T85°C Db.

## Enclosure - General

<b>Window</b>	Glass window.
<b>Sealing</b>	Silicone.
<b>Control keys</b>	Three infra-red keys with operation through the glass front window.
<b>Rating</b>	IP66, IP67 / NEMA Type4X / Type7 / Type9.
<b>Dimensions</b>	112 x 133 x 148mm (4.41" x 5.24" x 5.83") - W x H x D.
<b>Mounting threads</b>	4 x M6 at the backside of the enclosure.

## Enclosure - Types

<b>Type HA_</b>	Aluminum Ex d enclosure.
<b>Weight</b>	1550 gr. (3.41 lbs).
<b>Type HS_</b>	Stainless steel 316L Ex d enclosure.
<b>Weight</b>	3600 gr. (9.65 lbs).

## Enclosure - Drillings

<b>Type H_A</b>	Entry threads: 2 x 3/4"NPT / 1 x 1"NPT
<b>Type H_B</b>	Entry threads: 3 x 3/4"NPT
<b>Type H_C</b>	Entry threads: 2 x 1/2"NPT / 1 x 1"NPT
<b>Type H_D</b>	Entry threads: 2 x 1/2"NPT / 1 x 3/4"NPT
<b>Type H_G</b>	Entry threads: 2 x M20 / 1 x M25
<b>Type H_H</b>	Entry threads: 3 x M25

## General E-Series accessories

<b>ABB01-07</b>	Brass nickel plated blind plugs.
<b>ABS01-07</b>	Stainless steel blind plugs.
<b>ARB01-04</b>	Brass nickel plated reducers.
<b>ARS01-04</b>	Stainless steel reducers.
<b>ACE03</b>	Stainless steel wall mounting kit (inc. screws+plugs).
<b>ACE04</b>	Stainless steel pipe mounting kit.
<b>ACE05</b>	2 pins, 30cm (12") cable with Amphenol connector.
<b>ACG08</b>	MTL5541AS barrier - For hazardous area 4-20mA with HART Communication to safe area, with current sink for safe area connection.

## Signal inputs - Flowmeter

<b>Type P</b>	Coil / sine wave (HI: 20mVpp or LO: 90mVpp - sensitivity selectable), NPN/PNP, reed switch, Namur, active pulse signals 8 or 24V DC.
<b>Frequency</b>	Minimum 0Hz - maximum 10kHz for total and flow rate. Maximum frequency depends on signal type and internal low-pass filter. E.g. reed switch with low-pass filter: max. frequency 120Hz.
<b>K-Factor</b>	0.000010 - 9,999,999 with variable decimal position.
<b>Low-pass filter</b>	Available for all pulse signals.
<b>Option ZF</b>	coil sensitivity 10mVpp.
<b>Option ZG</b>	coil sensitivity 5mVpp.

## Signal inputs - Additional input

<b>Function</b>	Terminal input to reset total remotely or to lock the "clear total" button.
<b>Type IB</b>	Internally pulled-up switch contact - NPN.
<b>Duration</b>	Minimum pulse duration 100msec.

## Signal outputs - Digital output

<b>Function</b>	<ul style="list-style-type: none"> <li>Scaled pulse output - transmitting acc. total.</li> <li>Input pulse retransmission (squared, OT only).</li> <li>Alarm output: Low, high or both alarms.</li> </ul>
<b>Note</b>	All four outputs are user defined: pulse output, low-low, low, high, high-high or all alarm outputs.
<b>Frequency</b>	Max. 500Hz. Pulse length user definable between 1msec up to 10 seconds. Retransmission: Minimum pulse duration: 50µs, square wave output based on frequency of (sine wave or coil) input signal.
<b>Type OR</b>	Two isolated electro-mechanical relay outputs (NO). Maximum resistive load: 1A @ 250V AC / 30V DC. Maximum inductive load: 0,5A (pilot duty applications). Type OT remains also available.
<b>Restrictions OR</b>	Requires 24 - 27V DC and supplied via P5 - P6. Frequency max. 0.5Hz.
<b>Type OT</b>	Four passive transistor outputs (NPN) - not isolated. 300mA - 50V @ 25°C.

## Signal outputs - Analog output

<b>Function</b>	Transmitting linearized flow rate.
<b>Type AH</b>	Galvanically isolated, loop powered 4 - 20mA output
<b>Accuracy</b>	12 bit. Error 0.05% of full scale at 25°C (77°F), 40ppm/°C temperature drift. Analog output signal can be scaled to any desired range.

## Signal outputs - Communication option

<b>Function</b>	Reading display info, clear total and read/write configuration settings.
<b>Type CR</b>	HART Communication protocol, Revision 7.0.
<b>Liftoff voltage</b>	11V.
<b>Loop resistance</b>	250 Ohm.
<b>Addressing</b>	Selectable 0 - 63.
<b>Type CX</b>	No communication, remote configuration possible with accessory cable ACE02.

## Operator functions

<b>Displayed info</b>	<ul style="list-style-type: none"> <li>Linearized flow rate and / or total.</li> <li>Linearized total and accumulated total.</li> <li>Low flow rate alarm value.</li> <li>High flow rate alarm value.</li> <li>Indicating speedometer for linearized flow rate.</li> <li>Alarm values can be set (or only displayed).</li> <li>Total can be reset to zero by pressing the CLEAR-key twice (password protected).</li> </ul>
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## Remote configuration

<b>Function</b>	Easy remote configuration via our free downloadable software and a special communication cable.
<b>Type CR/CX</b>	Requires ACE02 cable for option CX to USB plug.

## Total

<b>Digits</b>	7 digits.
<b>Units</b>	L, m <sup>3</sup> , US gal, igan, cf, Oil bbl, kg, ton, US ton, lb or none.
<b>Decimals</b>	0 - 1 - 2 or 3.
<b>Note</b>	Total can be reset to zero.

## Accumulated total

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

## Flow rate

<b>Digits</b>	7 digits.
<b>Units</b>	mL, L, m <sup>3</sup> , mg, g, kg, ton, US ton, US gal, igan, Oil bbl, lb, cf, rev, none, scf, nm <sup>3</sup> , or nL.
<b>Decimals</b>	0 - 1 - 2 or 3.
<b>Time units</b>	/sec - /min - /hr - /day.

## Alarm values

<b>Digits</b>	7 digits.
<b>Units</b>	According to selection for flow rate.
<b>Decimals</b>	According to selection for flow rate.
<b>Time units</b>	According to selection for flow rate.
<b>Type of alarm</b>	Configurable low-low, low, high, high-high or all flow rate alarms. Includes alarm delay time.

## Accessories

<b>ABB01-07</b>	Brass nickel plated blind plugs.
<b>ABS01-07</b>	Stainless steel blind plugs.
<b>ARB01-04</b>	Brass nickel plated reducers.
<b>ARS01-04</b>	Stainless steel reducers.
<b>ACE03</b>	Stainless steel wall mounting kit (inc.screws+plugs).
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<b>ACE05</b>	2 pins, 30cm (12") cable with Amphenol connector.
<b>ACG08</b>	MTL5541AS barrier - For hazardous area 4-20mA with HART Communication to safe area, with current sink for safe area connection.



		Description
Model	<b>E018</b>	<b>Flow Monitor / Totalizer with linearization, pulse/alarms and analog outputs and HART Communication.</b>
Input	<b>P</b>	<b>Pulse input: coil, npn, pnp, namur.</b>
Analog output	<b>AH</b>	<b>Galvanically isolated, loop powered 4-20mA output.</b>
Communication	CR	HART communication, remote configuration is possible.
	<b>CX</b>	<b>No communication, remote configuration is possible.</b>
Enclosures	<b>HA_</b>	<b>Die-cast aluminum Ex d enclosure.</b>
	HS_	Stainless steel 316L Ex d enclosure.
	<b>H_A</b>	<b>Entry threads: 2 x 3/4"NPT / 1 x 1"NPT.</b>
	H_B	Entry threads: 3 x 3/4"NPT.
	H_C	Entry threads: 2 x 1/2"NPT / 1 x 1"NPT.
	H_D	Entry threads: 2 x 1/2"NPT / 1 x 3/4"NPT.
	H_G	Entry threads: 2 x M20 / 1 x M25.
	H_H	Entry threads: 3 x M25.
Add.	<b>IB</b>	<b>Remote control input to reset total or to lock the "clear total" button.</b>
Digital output	OR	2 mechanical relay outputs (OT remains available) - requires 24 - 27V DC.
	<b>OT</b>	<b>4 passive transistor outputs.</b>
Power	PD	9 - 27V DC + sensor supply.
	<b>PX</b>	<b>Basic power supply 9 - 27V DC (no real sensor supply).</b>
Battery	PB	Additional lithium battery powered (optional).
Hazardous	<b>XD</b>	<b>Explosion proof according ATEX, IECEx, FM and CSA c-us.</b>
Options	<b>ZB</b>	<b>Backlight is included as standard.</b>
	ZF	Coil input 10mVpp.
	ZG	Coil input 5mVpp.

The **bold** marked text contains the standard configuration: E018-P-AH-CX-HAA-IB-OT-PX-XD-ZB.

