



### Your success counts

# Flow rate Monitor / Totalizer

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





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 alphanumerical 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) FO18 operates identical to an explosion proof EO18 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.



#### 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:
- ⟨L⟩ 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!



User-friendly

Reliable

ole



#### **Analog output**

The linearized flow rate is transmitted with the galvanically isolated 4 - 20mA output signal. The EO18 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**

Pprocess 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 userfriendly configuration to the next level!

<b>HA</b>	<b>RT</b> <sup>®</sup>		
REGIST	TERED		
Certificate of F	-		
FieldComm Gro	Sup vermed		
Fluidwell	E018p		
Manufacturer	Product Name		
6039	E2CD		
Manufacturer ID (Hex)	Expanded Device Type (Hex)		
7	03		
HART Protocol Revision	Device Revision (Hex)		
00	01		
Hardware Revision (Hex)	Software Revision (Hex)		
4/13/2016	FieldComm Group		
Test Date	Verification Method		
The above product has successfully complete requirements to be "HAR "HART REGISTERED" products conform to GB/T	TREGISTERED".		
Registration Number: L2-06-1000-490.2 Registration 7/15	2016 Approval: 7. J. Masture		
FieldCe	MM GROUP"		
Connecting I	he World of		
Process Auto	mation		
HART <sup>e</sup> is a registered trademar	k of FieldComm Group		

#### **Power requirements**

Several power inputs are possible to power the E018 and sensor. As standard the E018 can be loop powered via the isolated, twowire, 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 plugand-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).

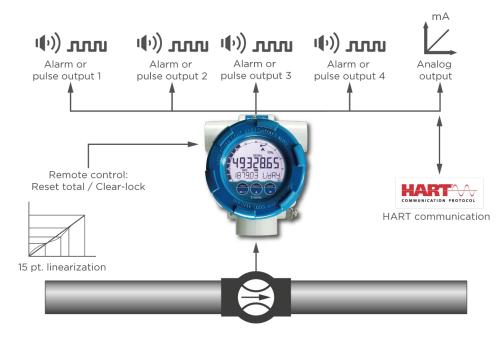
Current Unit: 1	234	567 / E110-P-	ZL	/ 03:03:42	Status	: values were		ead correctly f	rom the unit.		About.
OME Runtime Val	Jes	Total Flow R	ate	Display Flow	meter	Analog Outpu	t	Pulse Output	Modbus Data	logging	Others
Signal C NPN	0	Reed	0	PNP	C N	amur G		Coil Low	C 12V dc		
C NPN Low Pass									C 24V dc		
Units (automatic i	unit	conversion)									
		Auto volume	C	Auto mass							
Unit											
€L	C	US GAL	C	CF	C ko	0	2	b			
C m <sup>a</sup>	C	I GAL	C	OI BBL	C to	n C	-	US ton			
K-Factor											
1	_	Value =		1 pulses / L							
Decimals K-Factor											
· 0	C	1	C	2	C 3	0	2	4	C 5	C	5





#### **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.



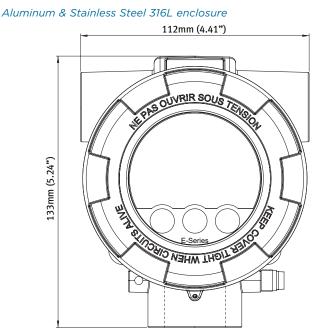
#### Signal input

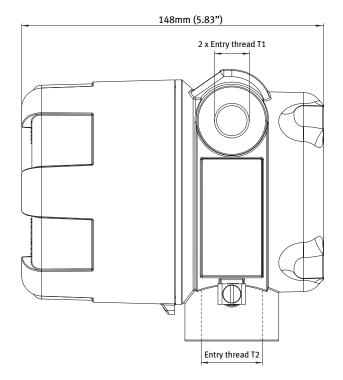
The E018 accepts most input signals for volume flow or mass flow meters. The input signal type can be selected in the configuration menu without having to adjust any sensitive mechanical dip-switches or jumpers. In addition to the average K-Factor, 15 linearization points can be entered with their frequencies 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					$20 \text{mV}_{pp}$	
COIL-HI (Type ZF)	-	-	-	-	10mV <sub>pp</sub>	Sensitive for interference!
COIL-HI (Type ZG)					5mV <sub>pp</sub>	
ACTIVE 8.2V DC	3K9Ω		10kHz Threshold 4V			External power required
ACTIVE 24V DC	3ΚΩ		10kHz Threshold 12V			External power required



#### **Dimensions enclosures**





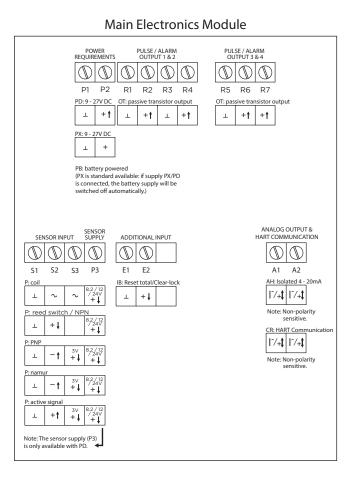
#### **Enclosure types**

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

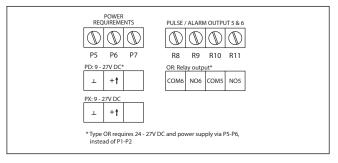
#### **Enclosure drillings**

Type H_A	T1: 2 x ¾"NPT / T2: 1 x 1"NPT
Type H_B	T1: 2 x <sup>3</sup> / <sub>4</sub> "NPT / T2: 1 x <sup>3</sup> / <sub>4</sub> "NPT
Type H_C	T1: 2 x 1/2"NPT / T2: 1 x 1"NPT
Type H_D	T1: 2 x ½"NPT / T2: 1 x ¾"NPT
Type H_G	T1: 2 x M20 / T2: 1 x M25
Type H_H	T1: 2 x M25 / T2: 1x M25

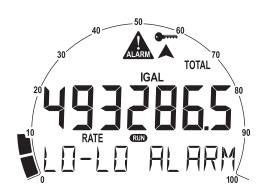
### **Terminal connections**



#### Supply Module



#### **Display example**



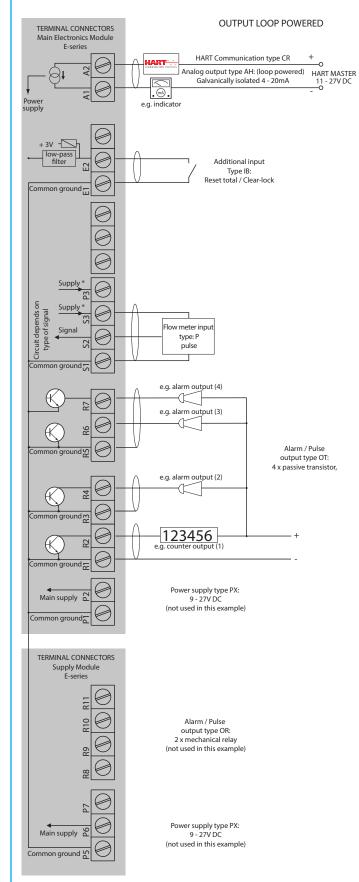


#### E018-P-AH-CR-IB-OR-PD-XD-ZB

#### 9 - 27V DC POWER REQUIREMENT TERMINAL CONNECTORS Main Electronics Module E-series HART Communication type CR 0 HART 0 A2 Analog output type AH: HART MASTER gt Galvanically isolated 4 - 20mA 11 - 27V DC O ...... 7 Power supply e.g. indicato + 3V low-pass filter Additional input ... Type IB: total / Clear-lock Common ground Supply Supply Flow meter input Signal type: P 5 pulse 0 Common ground e.g. alarm output (4) -1 0 ß e.g. alarm output (3) e ſ 0 Alarm / Pulse nd ¦2 output type OT: 4 x passive transistor, remains available with type OR\*\* e.g. alarm output (2) Æ R4 P ndg grou 123456 2 e.g. counter output (1) nmon ground 🕁 Main supply Common ground TERMINAL CONNECTORS Supply Module . series Ĵ. e.g. alarm or counter (5) Alarm / Pulse output type OR: 2 x mechanical relay\*\* e.g. alarm or counter (6) 5 -0 Power supply type PD: 9 - 27V DC Main supply 9 - 27V DC –O⊥ Earth I Common ground 2

\* 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



## Technical specifications E018

#### Display

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

#### **Operating temperature**

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

#### Power requirements

Long life Lithium battery - life-time depends
upon settings and configuration - up to approx.
2 years.
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).
9 - 27V DC. Consumption max. 4.5 Watt.
9 - 27V DC. Consumption max. 3 Watt.
Loop powered, analog output. 11 - 27V DC,
Min. 3.5mA. Consumption max. 675mW
(25mA @ 27VDC)
The loop powered analog output cannot power
the backlight, mechanical relay output (OR) or
the real sensor supply (Terminal P3).

#### **Sensor excitation**

Type AH/PB/PX	Terminal S3: 3V DC for pulse signals and 1.2V DC
	for coil pick-up, lout max. 100µA.
Note AH/PB/PX	This is not a real sensor supply. Only suitable for
	sensors with a very low power consumption like
	coils (sine wave) and reed-switches.
Type PD	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

Туре	Removable plug-in terminal strip. Wire max.
	1.5mm <sup>2</sup> and 2.5mm <sup>2</sup> .

#### **Data protection**

Data prote	
Туре	EEPROM backup of all settings. Backup of
	running totals every minute. Data retention at
	least 10 years.
Password	Configuration settings and clear total can be
	password protected.

#### **Directives & Standards**

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

#### Hazardous area - Explosion proof

ATEX	Gas:	🚱 II 2 G Ex db IIC T6 Gb.
certification	Dust:	🚯 II 2 D Ex tb IIIC T85°C Db.
IECEx certification	Gas: Dust:	Ex db IIC T6 Gb. Ex tb IIIC T85°C Db.
FM & CSA c-us certification	Class II/ Class I,	Div. 1, Grps A, B, C, D. 'III, Div. 1, Grps E, F, & G. Zone 1, AEx d IIc T6 Gb, , AEx tb IIIC T85°C Db.

#### **Enclosure - General**

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

#### **Enclosure - Types**

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

#### **Enclosure - Drillings**

Type H_A	Entry threads: 2 x <sup>3</sup> / <sub>4</sub> "NPT / 1 x 1"NPT
Type H_B	Entry threads: 3 x $\frac{3}{4}$ "NPT
Type H_C	Entry threads: 2 x $\frac{1}{2}$ "NPT / 1 x 1"NPT
Type H_D	Entry threads: 2 x $\frac{1}{2}$ "NPT / 1 x 3/4"NPT
Type H_G	Entry threads: 2 x M20 / 1 x M25
Type H_H	Entry threads: 3 x M25

#### **General E-Series accessories**

Brass nickel plated blind plugs.
Stainless steel blind plugs.
Brass nickel plated reducers.
Stainless steel reducers.
Stainless steel wall mounting kit
(inc. screws+plugs).
Stainless steel pipe mounting kit.
2 pins, 30cm (12") cable with Amphenol
connector.
MTL5541AS barrier - For hazardous area 4-20mA
with HART Communication to safe area, with
current sink for safe area connection.



## Technical specifications E018

#### **Signal inputs - Flowmeter**

Туре Р	Coil / sine wave (HI: 20mVpp or LO: 90mVpp
	- sensitivity selectable), NPN/PNP, reed switch,
	Namur, active pulse signals 8 or 24V DC.
Frequency	Minimum OHz - 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.
K-Factor	0.000010 - 9,999,999 with variable decimal
	position.
Low-pass filter	Available for all pulse signals.
Option ZF	coil sensitivity 10mVpp.
Option ZG	coil sensitivity 5mVpp.

#### Signal inputs - Additional input

Function	Terminal input to reset total remotely or to lock
	the "clear total" button.
Туре ІВ	Internally pulled-up switch contact - NPN.
Duration	Minimum pulse duration 100msec.

#### Signal outputs - Digital output

Function	<ul> <li>Scaled pulse output - transmitting acc. total.</li> </ul>
	• Input pulse retransmission (squared, OT only).
	<ul> <li>Alarm output: Low, high or both alarms.</li> </ul>
Note	All four outputs are user defined: pulse output,
	low-low, low, high, high-high or all alarm outputs.
Frequency	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.
Type OR	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.
Туре ОТ	Four passive transistor outputs (NPN) - not
	isolated. 300mA - 50V @ 25°C.

#### Signal outputs - Analog output

Function	Transmitting linearized flow rate.
Туре АН	Galvanically isolated, loop powered 4 - 20mA
	output
Accuracy	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

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

#### **Operator functions**

Displayed info	<ul> <li>Linearized flow rate and / or total.</li> </ul>
	<ul> <li>Linearized total and accumulated total.</li> </ul>
	<ul> <li>Low flow rate alarm value.</li> </ul>
	<ul> <li>High flow rate alarm value.</li> </ul>
	<ul> <li>Indicating speedometer for linearized flow rate.</li> </ul>
	<ul> <li>Alarm values can be set (or only displayed).</li> </ul>
	<ul> <li>Total can be reset to zero by pressing the</li> </ul>
	CLEAR-key twice (password protected).

#### **Remote configuration**

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

#### Total

Iotai	
Digits	7 digits.
Units	L, m³, US gal, igal, cf, Oil bbl, kg, ton, US ton, lb
	or none.
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	Can not be reset to zero.

#### Flow rate

Digits	7 digits.
Units	mL, L, m³, mg, g, kg, ton, US ton, US gal, igal, Oil
	bbl, lb, cf, rev, none, scf, nm³, or nL.
Decimals	0 - 1 - 2 or 3.
Time units	/sec - /min - /hr - /day.

#### **Alarm values**

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

#### Accessories

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

## FLUIDWELL

## Ordering information E018

	Description		
Model	E018	Flow Monitor / Totalizer with linearization, pulse/alarms and analog outputs and HART Communication.	
Input	Р	Pulse input: coil, npn, pnp, namur.	
Analog output	AH	Galvanically isolated, loop powered 4-20mA output.	
Commu- nication	CR	HART communication, remote configuration is possible.	
Con nica	сх	No communication, remote configuration is possible.	
	HA_	Die-cast aluminum Ex d enclosure.	
	HS_	Stainless steel 316L Ex d enclosure.	
S	H_A	Entry threads: 2 x ¾"NPT / 1 x 1"NPT.	
Enclosures	H_B	Entry threads: 3 x <sup>3</sup> / <sub>4</sub> "NPT.	
Enclo	H_C	Entry threads: 2 x ½"NPT / 1 x 1"NPT.	
	H_D	Entry threads: 2 x <sup>1</sup> / <sub>2</sub> "NPT / 1 x <sup>3</sup> / <sub>4</sub> "NPT.	
	H_G	Entry threads: 2 x M20 / 1 x M25.	
	H_H	Entry threads: 3 x M25.	
Add.	IB	Remote control input to reset total or to lock the "clear total" button.	
Digital output	OR	2 mechanical relay outputs (OT remains available) - requires 24 - 27V DC.	
Digout	от	4 passive transistor outputs.	
Power	PD	9 - 27V DC + sensor supply.	
Pov	PX	Basic power supply 9 - 27V DC (no real sensor supply).	
Battery	PB	Additional lithium battery powered (optional).	
Hazardous	XD	Explosion proof according ATEX, IECEx, FM and CSA c-us.	
Options	ZB	Backlight is included as standard.	
	ZF	Coil input 10mVpp.	
0	ZG	Coil input 5mVpp.	
The <b>bold</b>	The <b>bold</b> marked text contains the standard configuration: E018-P-AH-CX-HAA-IB-OT-PX-XD-ZB.		



Distributor: UK Flowtechnik Free: 0800 433 4770 +44(0)115 901 7111

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