



Flow rate Indicator / Totalizer

with analog and pulse signal outputs





d weather at polar regions

The E-Series provides unequalled safety and ease of use, opening covers 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

- Displays flow rate, total, acc. total, daily total, previous day total, measuring units and a flow rate indicating speedometer.
- 7 digit flow rate / total and 11 digit accumulated total.
- Bright LED backlight.
- Easy K-factor configuration for volumetric or mass.
- Ability to process all types of signals: Sine wave (coil), NAMUR, NPN/PNP pulse, Reed-switch, Active pulse signals, (0)4 - 20mA.
- Scaled pulse output according to acc. total and input
- Loop powered 4-20mA output according to flow rate.
- Modbus RS232 / RS485 or USB communication.
- 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.
- Data logging of flow rate, total and accumulated total.



Introduction

The E110 is a popular model in our range of explosion proof flow rate indicators. 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 rate indicator / totalizer.

Configuration

The E-Series uses the highly appreciated configuration structure of our F-, D- and N-Series product lines. 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) F110 operates identical to an explosion proof E110 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. 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 are accessed via a simple operator menu that can be passcode 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. Current day total (daily total) and previous day total, both non resettable are available as well. The last 15 historical day totals are stored and can be displayed. 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. For good readings in full sunlight and darkness, the E110 is provided with a bright backlight. When battery powered the backlight is only operational after a keypad touch, to safe battery life.

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). The application range of the enclosure is very wide: • The ATEX markings for gas and dust applications are:

II 2 G Ex d IIC T6 Gb.

II 2 D Ex tb IIIC T85°C Db.

• The IECEx markings for gas and dust applications are: Ex d IIC T6 Gb.

Ex tb IIIC T85°C Db

• The FM and CSA c-us markings are:

XP (Explosion-proof): Class I, Division 1, Grps A, B, C, D.DIP (Dust-Ignition-proof): Class II/III, Division 1, Groups E, F and 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 Us



Analog output

The flow rate is transmitted with the galvanically isolated 4 - 20mA output signal. The E110 can even be loop powered via the isolated loop-current.

Pulse outputs

A scaled pulse output is available according the 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.

Power requirements

Several power inputs are possible to power the E110 and sensor. As standard, the E110 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 E110 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.

Communication

Processed data can be read, total can be cleared and settings can be read and modified through the Modbus link (RS232 / RS485) or the local USB communication which is located at the side entry plug. Under safe conditions, the plug can be removed for easy configuration or data log extraction.

Enclosures

Two fundamental 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. Depending on your product, just connect the E-Series to your PC with the special Configuration Cable (ACE02) or use the Modbus or USB communication cables (ACE01/06/07).

Current Unit: 1	234	567 / E110-P	ZL	/ 03:03:42	Status	: values were		ead correctly f	rom the unit.		About
OME Runtime Val	ues	Total Flow R	ate	Display Flow	meter	Analog Outpu	ıt	Pulse Output	Modbus Datak	gging	Others
Signal	~		~	0110	C H			Callenn	C any de		
C NPN Low Pass	c	Reed Low Pass	C	PNP Low Pass	CCC	amur (bil High (•	8.1V dc	C 24V dc		
Units (automatic)	unit	conversion) —									
C Hand		Auto volume	C	Auto mass							
Unit											
€ L	C	US GAL	C	CF	C ko	(2	lb -			
C m ³	C	I GAL	C	OI BBL	C to	n (0	US ton			
K-Factor											
1	_	Value =		1 pulses / L							
Decimals K-Factor											
· 0	C	1	C	2	C 3	(~	4	C 5	C 6	

Data logging

The data log function can hold up to 2824 logs. Each log contains the flow rate, total, acc. total, time stamp and log number. The log interval can be user defined from every minute up to once every 24 hours. Events like cleared total, changed menu settings or factory reset can also be logged. Once the log is full it will roll over, deleting the oldest data. The log data can be visualized on the LCD but is also easy accessible and downloadable as .CSV file via Modbus or USB communication with our free software tool.



Easy-to-operate through glass keypad







Overview application E110

Flow measurement where re-transmission of the flow rate and/or totalizer functions or serial communication is required. The E110 offers you a flow rate indicator / 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 E110 accepts most input signals for volume flow or mass flow meters. The pulse input signal type can be selected in the configuration menu without having to adjust any sensitive mechanical dip-switches or jumpers. The analog input is available with linear and square root calculation. The analog input is available with linear and square root calculation and even as 4 - 20mA input loop powered.

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 _{pp}	Default sensitivity
COIL-HI					20mV_{pp}	
COIL-HI (Type ZF)	-	-	-	-	10mV _{pp}	Sensitive for interference!
COIL-HI (Type ZG)					5mV _{pp}	
ACTIVE 8.2V DC	3K9Ω		10kHz Threshold 4V			External power required
ACTIVE 24V DC	3KΩ		10kHz Threshold 12V			External power required



Dimensions enclosures





Enclosure types

minum Ex d enclosure
0 gr.
nless steel 316L Ex d enclosure.
0 gr.

Enclosure drillings

Type H_A	T1: 2 x ¾"NPT / T2: 1 x 1"NPT
Type H_B	T1: 2 x ³ / ₄ "NPT / T2: 1 x ³ / ₄ "NPT
Type H_C	T1: 2 x ½"NPT / T2: 1 x 1"NPT
Type H_D	T1: 2 x ¹ / ₂ "NPT / T2: 1 x ³ / ₄ "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





E110-A-AH-CB-IB-OR-PD-XD-ZB



E110-P-AH-CH-IB-OT-PX-XD-ZB



* 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

*Supply voltage S3: 3V DC to sensor



Technical specifications E110

Display

Туре	High intensity transflective numeric and
	alphanumeric LCD, UV-resistant, with bright
	backlight. 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 -40°C to +70°C (-40°F to +158°F).

Power requirements

Туре РВ	Long life Lithium battery - life-time depends
	upon settings and configuration - up to approx.
	3 years.
Note PB	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).
Type PD	9 - 27V DC. Consumption max. 4.5 Watt.
Туре РХ	9 - 27V DC. Consumption max. 3 Watt.
Туре АН	Loop powered, analog output. 11 - 27V DC,
	Min. 3.5mA. Consumption max. 675mW
	(25mA @ 27VDC)
Note AH	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 D		
	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 _{out} max. 20mA.		
	12V DC, I _{out} max. 30mA.		
	24V DC, $\mathbf{I}_{_{out}}$ max. 75mA (this voltage varies		
	depending on the input supply voltage)		

Terminal connections

Туре	Removable plug-in terminal strip. Wire max.
	1.5mm ² and 2.5mm ² .

Data protection

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

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

Ambient Ta	-40°C to) +70°C (-40°F to +158°F).
ATEX	Gas:	II 2 G Ex d IIC T6 Gb.
certification	Dust:	II 2 D Ex tb IIIC T85°C Db.
IECEx certification	Gas: Dust:	Ex d IIC T6 Gb. Ex tb IIIC T85°C Db.
FM & CSA c-us certification	Class I, E certificat Class I, Z Zone 21,	Div. 1, Grps A, B, C, D. tion Class II/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.	

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 $\frac{3}{4}$ "NPT / 1 x 1"NPT
Туре Н_В	Entry threads: $3 \times \frac{3}{4}$ "NPT
Type H_C	Entry threads: 2 x ½"NPT / 1 x 1"NPT
Type H_D	Entry threads: 2 x $\frac{1}{2}$ "NPT / 1 x $\frac{3}{4}$ "NPT
Type H_G	Entry threads: 2 x M20 / 1 x M25
Туре Н_Н	Entry threads: 3 x M25

General E-Series accessories

ACE01	USB data logging and configuration cable for
	type CU.
ACE02	Remote configuration cable for type CX.
ACE03	Stainless steel wall mounting kit
	(inc. screws+plugs).
ACE04	Stainless steel pipe mounting kit.
ACE05	2 pins, 30cm (12") cable with Amphenol
	connector.
ACE06	Remote configuration cable (1.8m/5.9ft) for
	type CH.
ACE07	Remote configuration cable (1.8m/5.9ft) for
	type CB.



Technical specifications E110

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. Max. 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.
Туре А	(0)4 - 20mA. Analog input signal can be scaled
	to any desired range within 0 - 20mA.
Туре U	0 - 10V DC. Analog input signal can be scaled to
	any desired range within 0 - 10V DC.
Accuracy	16 bit. Low level cut-off programmable.
	Type A: Error 0.03% @ 20°C (Typical 30ppm/°C).
	Type U: Error 0.03% @ 20°C (Typical 45ppm/°C).
Span	0.001 - 9,999,999 with variable decimal position.
Update time	Two times per second.
Voltage drop	Type A: max. 1V DC @ 20mA.
Load impedance	Type U: 3kOhm.
Relationship	Linear and square root calculation.
Note A and U	External power to sensor is required; e.g. type
	PD. Contact us for latest specification.

Signal inputs - Additional input

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

Signal outputs - Digital output

Function	 Scaled pulse output - transmitting acc. total.
	• Input pulse retransmission (squared, OT only).
Frequency	Max. 500Hz. Pulse length user definable
	between 1msec up to 10 seconds.
	Retransmission: Minimum pulse duration: 50µs,
	square wave.
Type OR	One isolated electro-mechanical relay output
	(NO). Maximum resistive load: 2A @ 250V AC
	/ 30V DC. Max. inductive load: 0,5A (pilot duty
	applications). Type OT remains also available.
Restrictions OR	Requires 24 - 27V DC and supplied via P5 - P6.
	Frequency max. 0.5Hz.
Туре ОТ	One passive transistor output (NPN) - not
	isolated. 300mA - 50V @ 25°C.

Signal outputs - Communication option

Function	Reading display info, clear total, read/write
	configuration settings and data log extraction.
Protocol	Modbus ASCII / RTU.
Туре СВ	RS232
Туре СН	RS485 2-wire
Type CU	Local USB communication. for connection to a
	PC / laptop incl. Ex d USB plug at the right-hand
	side entry.
Restriction CU	Requires $\frac{3}{4}$ "NPT or M25 side entry thread.
Туре СХ	No communication, remote configuration
	possible with accessory cable ACE02.

Signal outputs - Analog output

	 · · · · · · · · · · · · · · · ·
Function	Transmitting flow rate.
Type AH	Galvanically isolated, loop powered 4 - 20mA
	output
Accuracy	12 bit. Error 0.03% @ 20°C (Typical 45ppm/°C).
	Output signal can be scaled to any desired
	range.

Operator functions

Displayed info	 Flow rate and / or total
	 Total and accumulated total. Current day (daily) total and previous day The last 15 historical day totals are stored and
	can be displayed.
	 Indicating speedometer for flow rate.
	 Total can be reset to zero by pressing the
	CLEAR-key twice.
-	
Remote cont	figuration
Function	Easy remote configuration via our free
	downloadable software and a special
	communication cable.
Type CB	Poquiros ACEO7 cable with PS272 to LISP plug

Туре СВ	Requires ACE07 cable with RS232 to USB plug.
Туре СН	Requires ACE06 cable with RS485 to USB plug.
Type CU	Requires ACE01 cable with mini USB to USB plug.
Туре СХ	Requires ACE02 cable for option CX to USB plug.

Data logging

Function	Records process data over time with real time clock.
Type ZL	Each log containing flowrate, total, acc. total,
	time/date stamp and log number, requires Type P.
Interval logs	Every: 1 min, 5 min, 10 min, 15 min, 30 min, 1 hr, 2
	hr, 3 hr, 4 hr, 6 hr, 8 hr or disable.
	Max. 1500 interval logs.
Daily logs	Configurable time once / twice per day or
	disable. Max. 600 daily logs.
Event logs	When settings change (manual/Modbus),
	restart / power failure, factory reset, cleared
	total or error event. Max. 724 event logs.
Extraction	Via USB (CU) or Modbus communication
	(CB/CH) as .csv

Total

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, nm ³ , nL or p.
Decimals	0 - 1 - 2 or 3.
Time units	/sec - /min - /hr - /day.



Ordering information E110

		Description										
Model	E110	Flow rate Indicator / Totalizer with analog and pulse signal outputs.										
Input	А	(0)4 - 20mA input.*	-A									
	Ρ	Pulse input: coil, npn, pnp, namur, reed-switch.	-Р									
	U	0 - 10V DC input.*	-U									
Analog output	AH	Galvanically isolated, loop powered 4-20mA output.		-AH								
Communication	СВ	RS232 communication - Modbus ASCII / RTU			-CB							
	СН	RS485 communication - 2wire - Modbus ASCII / RTUCl			-CH	СН						
	CU	USB communication - requires ³ / ₄ "NPT or M25 entry threadCU										
	сх	No communication, remote configuration is possibleCX			-cx							
Enclosures	HA_	Die-cast aluminum Ex d enclosure.				-на_						
	HS_	Stainless steel 316L Ex d enclosure.				-HS_						
	H_A	Entry threads: 2 x ³ / ₄ "NPT / 1 x 1"NPT.				-H_A						
	H_B	Entry threads: 3 x ¾"NPT.										
	H_C	Entry threads: 2 x ½"NPT / 1 x 1"NPT.					-H_C					
	H_D	Entry threads: 2 x ½"NPT / 1 x ¾"NPT.				-H_D						
	H_G	Entry threads: 2 x M20 / 1 x M25.				-H_G						
	H_H	Entry threads: 3 x M25H										
Add.	IB	Remote control input to reset total or to lock the "clear total" buttonIB										
Digital output	OR	Mechanical relay output (OT remains available) - requires 24 - 27V DCOR										
	от	Passive transistor output.					-от					
Power	PD	9 - 27V DC + sensor supply.						-PD				
	РХ	Basic power supply 9 - 27V DC (no real sensor supply).						-PX				
Battery	PB	Additional lithium battery powered (optional)PB -F				P_						
Hazardous	XD	Explosion proof according ATEX, IECEx, FM and CSA c-us.								-XD		
Options	ZB	Backlight is included as standard.									-ZB	
	ZF	Coil input 10mVpp.					-ZF					
	ZG	Coil input 5mVpp						-ZG				
	ZL	Data logging to survey information - requires type P.								-ZL		
		E110		-AH	-C_	-H	-IB	-0_	-P_	-XD	-Z_	

The **bold** marked text contains the standard configuration: E110-P-AH-CX-HAA-IB-OT-PX-XD-ZB. *Contact us for latest specifications.

