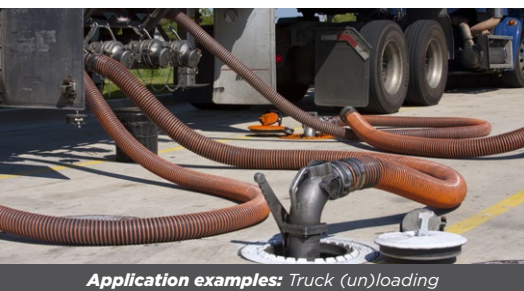


Totalizer with receipt printer driver

linearization, analog and pulse outputs



Application examples: Truck (un)loading



Extreme cold weather at polar regions



Proof of delivery with printed receipt

The F-Series is your first and safest choice for field mount indicators in safe and hazardous area applications. Especially in harsh weather conditions like rain, snow, salty atmospheres and temperatures between -40°C up to $+70^{\circ}\text{C}$ (-40°F up to 158°F).

Advantages

- Configurable Totalizer / Delivery receipt printing function.
- Robust aluminum or stainless steel 316L field enclosure (IP67 / NEMA Type4X). It is so rugged, a truck can even stand on it!
- Programming can be done by your own crew, with the sensible menu-driven structure, saving cost and irritation. Know one, know them all!
- Very diverse mounting possibilities: walls, pipes, panels or directly onto outdoor sensors!

Features

- Displays simultaneous linearized flow rate and total, as well as accumulated total, daily total and 15 previous day totals.
- 15 linearization points for high accuracy at the full flow range.
- Large 17mm (0.67") digit selection for flow rate or total.
- LED backlight option.
- Smart K-factor configuration for volumetric or mass flow.
- Selectable Modbus Communication / ticket printing.
- Ability to process all types of signals: Sine wave (coil), NAMUR, NPN/PNP pulse, Reed-switch, Active pulse signals.
- Scaled pulse output according to linearized acc. total and input retransmission.
- Isolated, loop powered 4-20mA output acc. linearized flow rate.
- Power requirements: long life lithium battery, 6 - 30V DC or loop powered analog 4 - 20mA output.
- Sensor supply: 3 / 8.2 / 12 / 24V DC.
- Auto backup of settings and running totals.

Introduction

The F119 is an advanced Totalizer with the unique function to send a “print receipt” command to a printer. The configurable ticket printing can be set for (daily) totals or delivery tickets. The F119 provides very precise linearization of the flowmeter signal. In addition to the average K-Factor, fifteen linearization points can be entered with their frequencies or values. The unit will interpolate between these points greatly enhancing accuracy in any flow range. Even for very low frequency applications is catered. This linearization effects all displayed information as well as the signal outputs.

Display

The display has large 17mm (0.67”) and 8mm (0.31”) digits which can be set to show flow rate and totals. A current day total (daily total) and 15 historical (previous) day totals can be enabled in the setup menu to be shown at the main display. On-screen engineering units can easily be configured from a comprehensive menu. The accumulated total can register up to 11 digits and is backed-up in EEPROM memory every minute. For those applications where readability during day and night is required, a white backlight is available.



Pulse output

A scaled pulse output is available 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.

Analog output signal

The linearized flow rate is transmitted with the galvanically isolated 4 - 20mA output signal. The F119 can even be loop powered via the isolated loop-current.



All info at a glance



Easy to install



Easy to program



Know one know them all!



Reliable



User-friendly

Configuration

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumerical description, which avoids confusing abbreviations. Once familiar with one F-series product, you will be able to program all models in the series without a manual. All settings are safely stored in EEPROM memory in the event of sudden power failure.

Remote configuration

Quick and easy configuration via a PC connection using the free downloadable Configuration Software. Just connect the F119 to your PC with the available configuration cables.

Power requirements

As standard, a basic 6 - 30V DC can power the F119 and bright backlight, the isolated, two-wire, analog output can only power the F119. A long life lithium battery is optional available. An 8.2 / 12 / 24V DC sensor supply is available with option type PD. Date and time continue in case of power failure.

Communication

The “print receipt” command is processed through the ASCII data communication link (RS232 / RS485). When ticket printing is disabled, all process data and settings can be read and modified through the Modbus communication link.

Printer accessories

An external printing device is necessary, below handheld and panel printers are optional available as accessory.



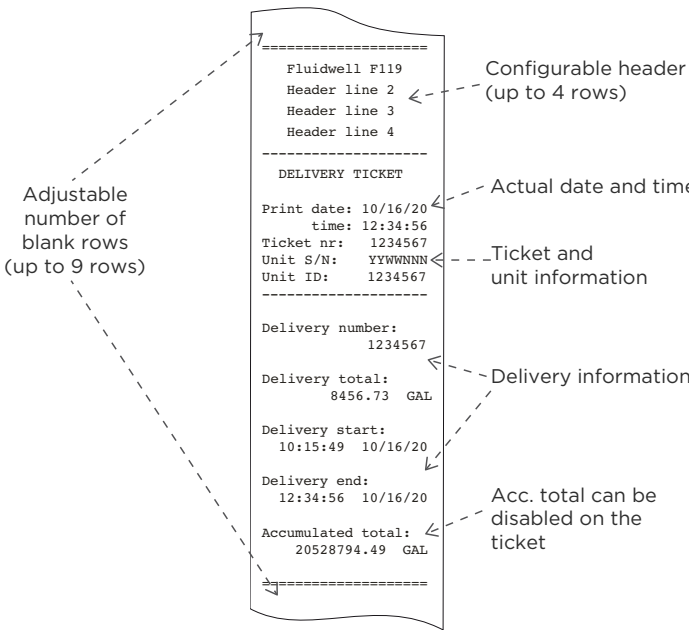
Handheld and panel printers

Ticket printing

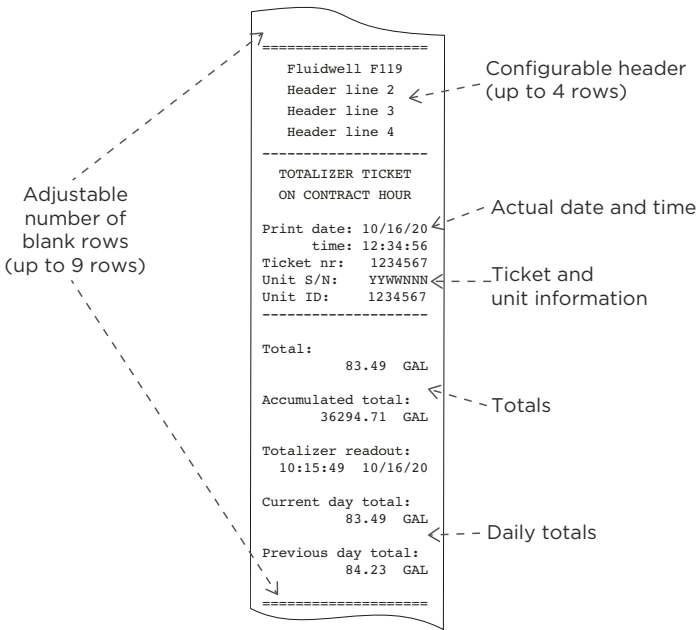
The configurable ticket printing can be set for (daily) totals or delivery tickets. When delivery mode is chosen, a ticket is printed when a delivery is ended by the “Clear”-button or the external clear input. When totalizer mode is chosen, a ticket is printed at contract hour or with a print command by the keypad.

Reprints are available in both print modes, they have an extra line at the ticket which shows [* REPRINT *].

Delivery Ticket example



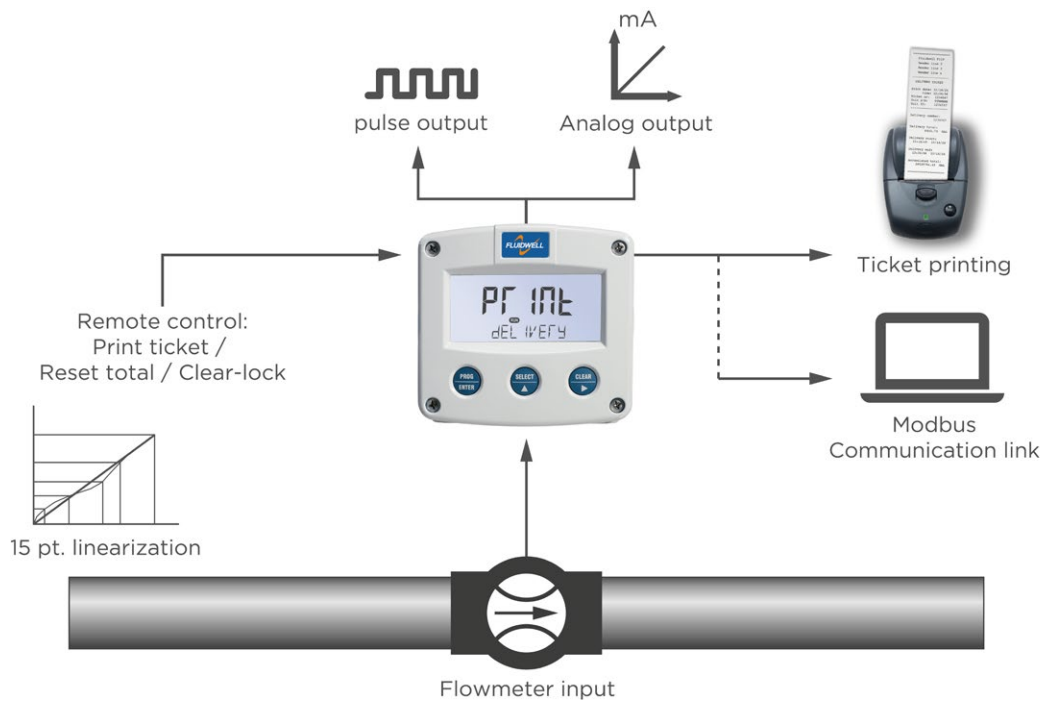
Totalizer Ticket example



Overview application F119

The F-Series is your first and safest choice for field mount indicators in safe and hazardous area applications. Especially in harsh weather conditions like rain, snow, salty atmospheres and temperatures between -40°C up to +70°C (-40°F up to 158°F). Liquid flow measurement with mechanical flowmeters where a precise calculation over the full measurement range and re-transmission of the flow rate and/or totalizer functions is required. As well as the requirement of tickets of deliveries and/or daily totals.

Alternative models without ticket printing: F016, F112, F118 or the E112 explosion proof flow rate indicator / totalizer.



Signal input

The F119 accepts most pulse input signals from volumetric or mass flowmeters. The input signal type can be selected by the user in the configuration menu without having to adjust any sensitive mechanical dip-switches or jumpers. The F119 has an easy K-factor and engineering unit configuration for volumetric or mass flow measurement. The smart K-factor conversion simplifies your setup, avoiding the manual calculation and entering of 2 different K-factors for the (accumulated) Total and Flow rate.

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	1.2kHz		Open collector LP = less sensitive
REED	1MΩ pull-up	1MΩ pull-up	1.2kHz Threshold 1.2V	120Hz		LP = less sensitive
PNP	51KΩ pull-down	51KΩ pull-down	6kHz Threshold 1.2V	700Hz		LP = less sensitive
NAMUR	820Ω pull-down	-	4kHz	-		External power required
COIL LO	-	-		-	80mV _{pp}	Default sensitivity
COIL-HI	-	-	-	-	20mV _{pp}	Sensitive for interference!
ISOLATED ACTIVE	4.7kΩ		3.5kHz Threshold 3V			Active pulses 3 - 30V

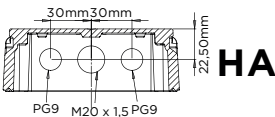
Enclosures

Various types of enclosures can be selected. The F119 is supplied in an GRP panel mount enclosure as standard, which can be converted to an IP67 / NEMA Type4X GRP field mount enclosure by the addition of a back case. Most popular is our robust aluminum field mount enclosure which is also available with an extended backcover with undrilled preparation for direct meter mounting at the back side. It is so rugged, even a truck can stand on it! For the most challenging environments we have a durable high grade Stainless steel 316L enclosure. All enclosures have an IP67 / NEMA Type4X rating and EU or U.S. cable gland entry threads available.

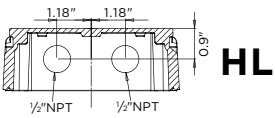
Dimensions enclosures

Cable entries

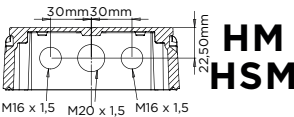
Aluminum / Stainless Steel



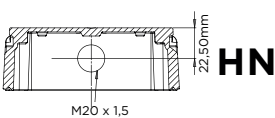
HA



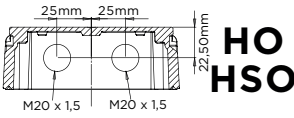
HL



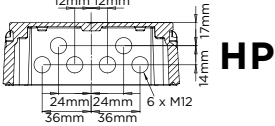
HM
HSM



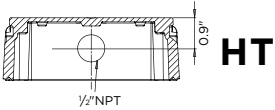
HN



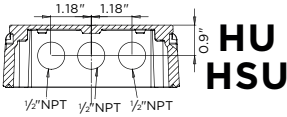
HO
HSO



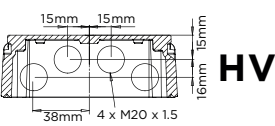
HP



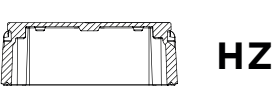
HT



HU
HSU



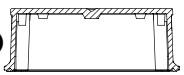
HV



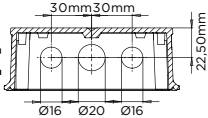
HZ

GRP

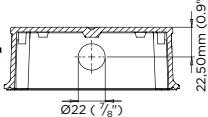
HGD



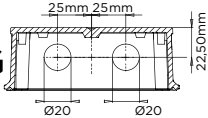
HGE



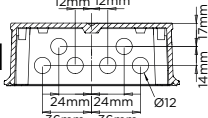
HGF



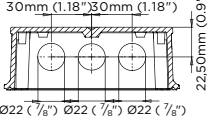
HGG



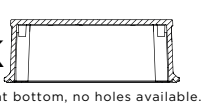
HGH



HGJ

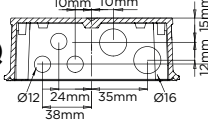


HGK



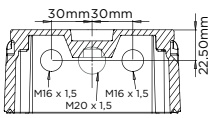
Flat bottom, no holes available.

HGQ

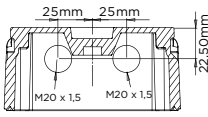


Extended Aluminum

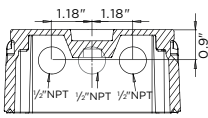
HBM



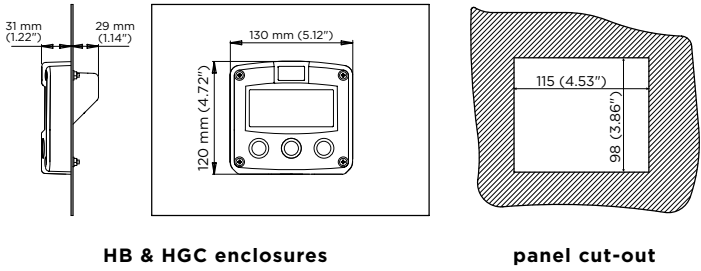
HBO



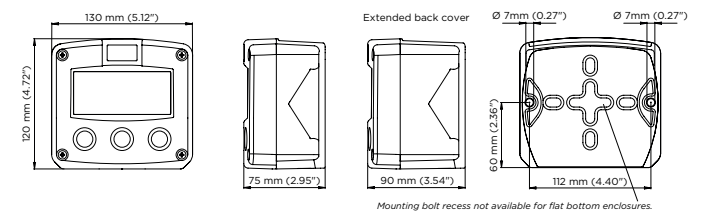
HBU



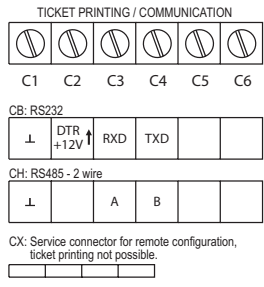
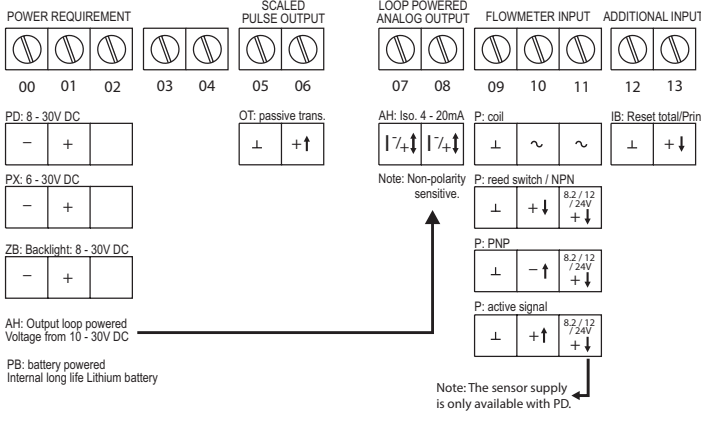
Aluminum & GRP panel mount enclosure



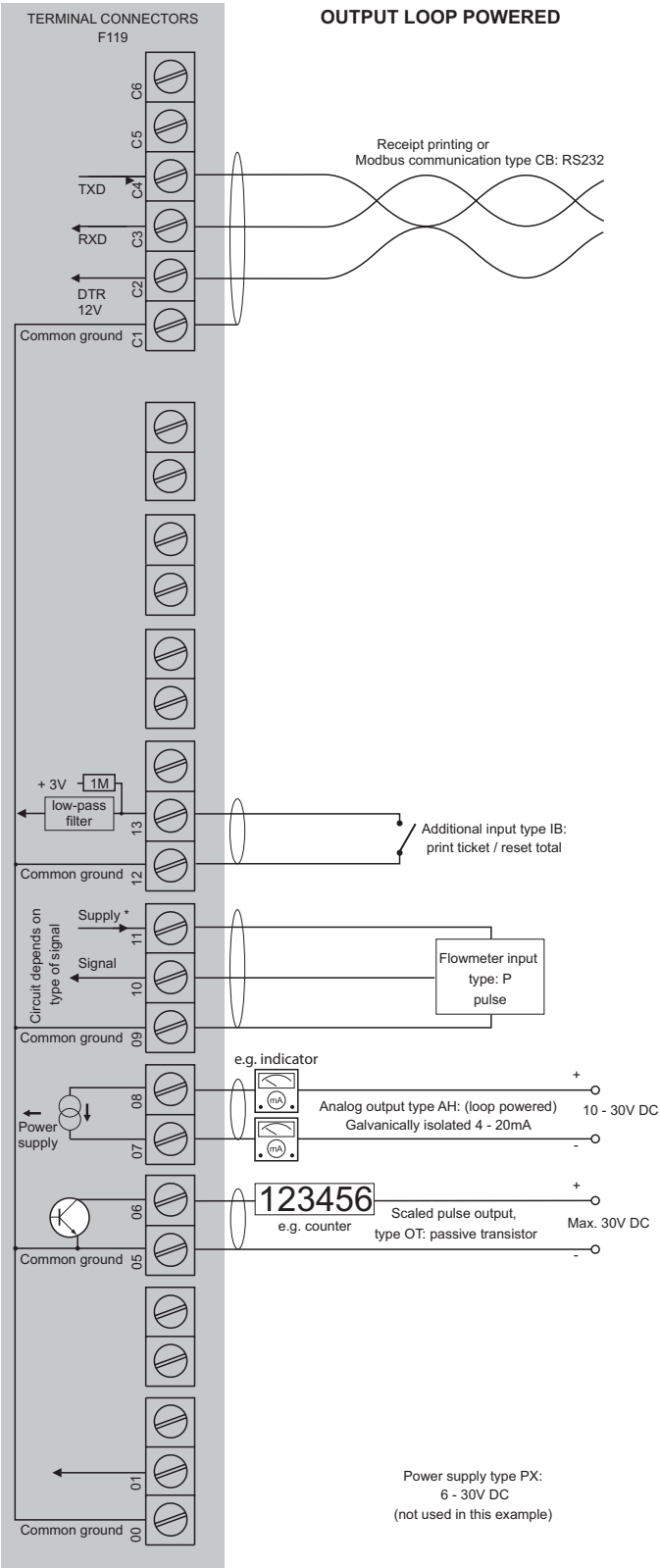
Aluminum, GRP & Stainless steel 316L field mount enclosures



Terminal connections

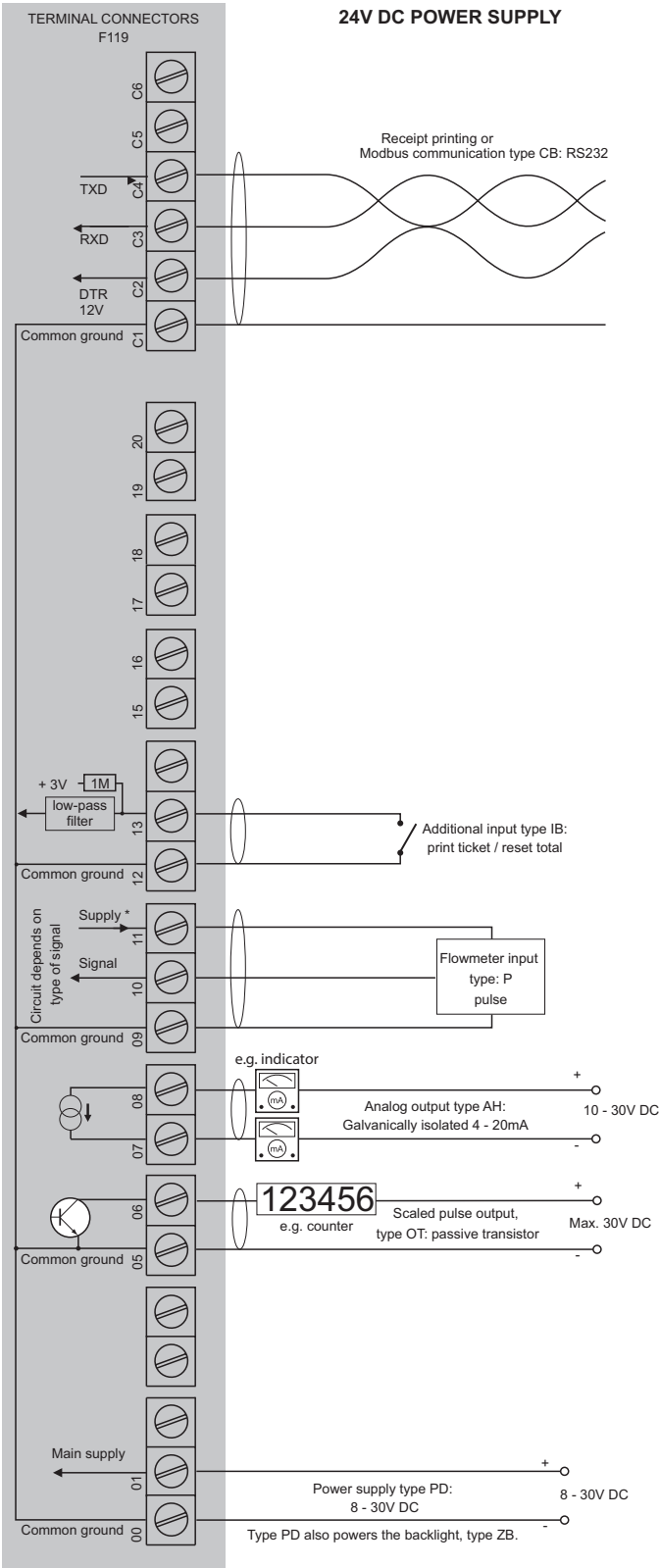


Configuration example F119-P-AH-CB-IB-OT-PX-XX-ZX



* For pulse type inputs: V_{ref} : 1.2V/3.0V available.- NO power output, available I_{supply} : <1mA.
Note: using these ref. voltages at max. load, will reduce battery life significantly.

Configuration example F119-P-AH-CB-IB-OT-PD-XX-ZB



* U_{max} sensor is 2V below U_{supply}
 U_{max} sensor: 8.2V requires 10VDC(8VAC) U_{supply}
12V requires 14VDC(10VAC) U_{supply}
24V requires 26VDC(18VAC) U_{supply}

Display

Type	High intensity reflective numeric and alphanumeric LCD, UV-resistant.
Dimensions	90 x 40mm (3.5" x 1.6").
Digits	Seven 17mm (0.67") and eleven 8mm (0.31") digits. Various symbols and measuring units.
Refresh rate	User definable: fast, 1sec, 3sec, 15sec, 30sec, off.
Option ZB	Transflective LCD with optional bright LED-backlight. Intensity can be adjusted in the configuration menu. Improved readability in full sunlight and darkness.

Ambient temperature

Safe areas	-40°C to +70°C (-40°F to +158°F).
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Terminal connections

Type	Removable plug-in terminal strip. Wire max. 1.5mm ² .
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Data protection

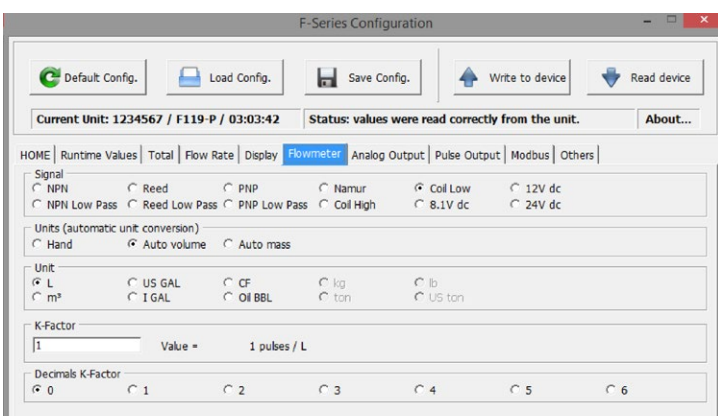
Type	EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years.
Password	Configuration settings can be password protected.
Date / time	Date and time continue in case of power failure.

Directives & Standards

EMC	EN 61326-1; FCC 47 CFR part 15
Low voltage	CSA/UL/IEC 61010-1
RoHS	EN 50581
IP & NEMA	CSA C22.2 No. 94.2-15; UL 50E

Remote configuration

Function	Easy remote configuration via our free software and a communication cable.
Type CB	Requires ACE07 cable with RS232 to USB plug.
Type CH	Requires ACE06 cable with RS485 to USB plug.
Type CX	Requires ACE02 cable for option CX to USB plug.



Screenshot Remote Configuration Software

Enclosure

Window	Polycarbonate window.
Sealing	Silicone.
Control keys	Three industrial micro-switch keys. UV-resistant silicone keypad.

Panel mount enclosures

Dimensions	130 x 120 x 60mm (5.12" x 4.72" x 2.36") - W x H x D.
Panel cut-out	115 x 98mm (4.53" x 3.86") L x H.
Type HB	Die-cast aluminum panel mount enclosure IP65 / NEMA Type4X.
Weight	600 gr.
Type HGC	GRP panel mount enclosure IP65 / NEMA Type4X, UV-resistant and flame retardant.
Weight	450 gr.
Type HSB	Die-cast stainless steel 316L IP67 / NEMA Type4X.
Weight	1150gr.

GRP wall / field mount enclosures

General	GRP wall/field mount enclosure IP67 / NEMA Type4X, UV-resistant and flame retardant.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	600 gr.
Type HGD	Cable entry: no holes.
Type HGE	Cable entry: 2 x Ø 16mm and 1 x Ø 20mm.
Type HGF	Cable entry: 1 x Ø 22mm (7/8").
Type HGG	Cable entry: 2 x Ø 20mm.
Type HGH	Cable entry: 6 x Ø 12mm.
Type HGJ	Cable entry: 3 x Ø 22mm (7/8").
Type HGK	Flat bottom, cable entry: no holes.
Type HGQ	Cable entry: 2 x Ø 16mm & 3 x Ø 12mm.

Aluminum wall / field mount enclosures

General	Die-cast aluminum wall/field mount enclosure IP67 / NEMA Type4X with 2-component UV-resistant coating. Extended back cover available with undrilled preparation for direct meter mounting.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D. 130 x 120 x 90mm (5.12" x 4.72" x 3.54") - W x H x D.
Weight	1100 gr. / extended enclosure: 1310 gr.
Type HA	Cable entry: 2 x PG9 and 1 x M20.
Type HL	Cable entry: 2 x 1/2" NPT.
Type HM/HBM	Cable entry: 2 x M16 and 1 x M20.
Type HN	Cable entry: 1 x M20.
Type HO/HBO	Cable entry: 2 x M20.
Type HP	Cable entry: 6 x M12.
Type HT	Cable entry: 1 x 1/2" NPT.
Type HU/HBU	Cable entry: 3 x 1/2" NPT.
Type HV	Cable entry: 4 x M20.
Type HZ	Cable entry: no holes.

Stainless steel 316L wall / field mount enclosures

General	Die-cast stainless steel 316L wall / field mount enclosure with flat bottom. IP67 / NEMA Type4X.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	2700 gr.
Type HSM	Cable entry: 2 x M16 + 1 x M20.
Type HSO	Cable entry: 2 x M20.
Type HSU	Cable entry: 3 x 1/2" NPT.

Signal inputs - Flowmeter

Type P	Coil / sine wave (HI: 20mVpp or LO: 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed switch or Namur.
Frequency	Minimum 0Hz - maximum 7kHz 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	nnp-lp; reed-lp; pnp-lp.
Linearization	15 positions with interpolation function; Meter-Factor 0.000001 - 9.999999 versus Frequency 0.001Hz - 9,999Hz.

Signal inputs - Additional input

Type IB	<ul style="list-style-type: none"> • Print ticket • Terminal input to reset total remotely; • If this terminal input is closed, the "clear total"-function is disabled; Non-isolated; Internally pulled-up switch contact - NPN. Minimum pulse duration 200 msec.
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Daily total display examples



Daily total



Previous daily total



Historical day total

Signal outputs - Digital output

Function	<ul style="list-style-type: none"> • Scaled pulse output according to linearized accumulated total (e.g. a pulse every 3.25 gal). • Input pulse retransmission (squared).
Frequency	Max. 500Hz. Pulse length user definable between 1msec up to 10 seconds. Retransmission: Minimum pulse duration: 50µs, square wave.
Type OT	One passive transistor output, load max. 30V DC - 300mA .

Signal outputs - Analog output

Function	Re-transmitting the linearized flow rate - the output can be scaled to any range (e.g. 200 L/min to 1200 L/min).
Accuracy	12 bit. Error 0.03% @ 20°C (Typical 45ppm/°C). Output signal can be scaled to any desired range.
Update time	Ten times per second.
Supply voltage	10V (lift-off voltage) - 30V DC
Max. load	700 Ohm @ 24V.
Type AH	Passive galvanic isolated output - output loop powered.

Signal outputs - Communication option

Function	<ul style="list-style-type: none"> • Ticket printing on demand (delivery). • Ticket printing of daily totals, at contract hour. • Reading display information, reading / writing all configuration settings.
Protocol	Modbus ASCII (printer) Modbus ASCII / RTU (communication).
Speed	1200 - 2400 - 4800 - 9600 - 19200 - 38400.
Addressing	1 - 247.
Type CB	RS232
Type CH	RS485 2-wire
Type CX	Service connector - for remote configuration. Requires communication cable (ACE02). Ticket printing is not possible.

Power requirements

Type AH	Loop powered, analog output. 10 - 30V DC, Min. 3.5mA. Max. load: 700 Ohm @ 24V.
Type PB	Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years.
Type PD	8 - 30V DC. Power consumption max. 3W.
Type PX	6 - 30V DC. Power consumption max. 0.4W.
Type PX-ZB	8 - 30V DC. Power consumption max. 1.0W.
Note AH	The loop powered analog output cannot power the backlight.
Note PB	The battery cannot power the backlight.

Sensor excitation

Type PB/PX	3V DC for pulse signals and 1.2V DC for coil pick-up.
Note 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	With T _a : -40°C to +60°C (-40°F to +140°F).
T_a max. +60°C	8.2V DC, I _{out} max. 10mA. 12V DC, I _{out} max. 10mA. 24V DC, I _{out} max. 75mA (this voltage varies depending on the input supply voltage).
Type PD	With T _a : -40°C to +50°C (-40°F to +122°F).
T_a max. +50°C	8.2V DC, I _{out} max. 20mA. 12V DC, I _{out} max. 20mA. 24V DC, I _{out} max. 75mA (this voltage varies depending on the input supply voltage).

Spare parts & Accessories

SPB02	PB - Lithium battery 3xAA-cell - long life time. For Class 1. Div. 2 hazardous area applications.
ACE02	Remote configuration cable (1.8m/5.9ft), for option CX to USB.
ACE06	Remote configuration cable (1.8m/5.9ft), for option CH - RS485 Communication to USB.
ACF02	Stainless steel wall mounting kit. (incl. screws and plugs).
ACF05	Stainless steel pipe mounting kit. (worm gear clamps NOT included)
ACF06	Two stainless steel worm gear clamps. D=44-56mm (1.73"-2.20")
ACF07	Two stainless steel worm gear clamps. D=58-75mm (2.29"-2.95")
ACF08	Two stainless steel worm gear clamps. D=77-95mm (3.04"-3.74")
ACF09	Two stainless steel worm gear clamps. D=106-138mm (4.18"-5.43")
ACF12	Stainless steel plate for conduit hub earthing in plastic HGL/HGT enclosure, without conduit hub.

Printer ordering information

ACP01	Ap 1300 - Thermal portable printer (incl. cables and battery charger).
ACP02	Ap 1400 - Thermal panel printer with standard 9V DC to 36V DC power supply (incl. cables).
ACP03	Ap 1400 - Thermal panel printer with external 100 - 240V AC power supply (incl. cables).

Operator functions

Displayed info	<ul style="list-style-type: none"> • Linearized flow rate and / or total. • Total and accumulated total. • Current day (daily) total and previous day total. • 15 historical day totals. • Total can be reset to zero by pressing the CLEAR-key twice. • Ticket printing on demand by pressing the keys.
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Total

Digits	7 digits.
Units	L, m ³ , US gal, igal, cf, Oil bbl, kg, ton, US ton, lb, nL, nm ³ or 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.

Flow rate

Digits	7 digits.
Units	mL, L, m ³ , 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.

Daily totals

Digits	7 digits.
Units / decimals	According to selection for total.
Contract hour	0:00 - 23:00, settable per whole hour.
Current day total	Running total, started at zero after the last contract hour.
Prev. day total	Fixed total, copied from current day total at the last contract hour.
Hist. day totals	The last 15 previous day totals are stored and can be reviewed on the display (without ZL).
Note	Current day total cannot be reset to zero.

	Description	
Model	F119	Totalizer with receipt printer driver, linearization, analog and pulse outputs.
Input	P	Pulse input, e.g., coil, npn, pnp, reed-switch.
Analog	AH	Galvanically isolated, loop powered 4-20mA output.
Communi- cation	CB	Printer driver or RS232 Modbus Communication - ASCII / RTU.
	CH	Printer driver or RS485 2wire Modbus Communication - ASCII / RTU.
	CX	No communication, ticket printing is not possible, remote configuration remains possible.
Enclosures	HB	Aluminum panel mount enclosure.
	HGC	GRP panel mount enclosure.
	HSB	Stainless steel 316L panel mount enclosure.
	HGD	GRP field mount - Cable entry: no holes.
	HGE	GRP field mount - Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.
	HGF	GRP field mount - Cable entry: 1 x Ø 22mm (7/8").
	HGG	GRP field mount - Cable entry: 2 x Ø 20mm.
	HGH	GRP field mount -Cable entry: 6 x Ø 12mm.
	HGJ	GRP field mount - Cable entry: 3 x Ø 22mm (7/8").
	HGK	GRP field mount - Flat bottom, cable entry: no holes.
	HGQ	GRP field mount - Cable entry: 2 x Ø 16mm & 3 x Ø 12mm.
	HA	Aluminum field mount - Cable entry: 2 x PG9 + 1 x M20.
	HL	Aluminum field mount - Cable entry: 2 x 1/2"NPT.
	HM	Aluminum field mount - Cable entry: 2 x M16 + 1 x M20.
	HN	Aluminum field mount - Cable entry: 1 x M20.
	HO	Aluminum field mount - Cable entry: 2 x M20.
	HP	Aluminum field mount - Cable entry: 6 x M12.
	HT	Aluminum field mount - Cable entry: 1 x 1/2"NPT.
	HU	Aluminum field mount - Cable entry: 3 x 1/2"NPT.
	HV	Aluminum field mount - Cable entry: 4 x M20.
	HZ	Aluminum field mount - Cable entry: no holes.
	HBM	Extended Alu. field/meter mount - Cable entry: 2 x M16 + 1 x M20.
	HBO	Extended Alu. field/meter mount - Cable entry: 2 x M20.
	HBU	Extended Alu. field/meter mount - Cable entry: 3 x 1/2"NPT.
	HSM	Stainless steel 316L field mount - Cable entry: 2 x M16 + 1 x M20.
	HSO	Stainless steel 316L field mount - Cable entry: 2 x M20.
	HSU	Stainless steel 316L field mount - Cable entry: 3 x 1/2"NPT.
Additional	IB	Remote control input to print a ticket, reset total or to lock the "clear total" button.
Digital	OT	One passive transistor output.
Power	PD	8 - 30V DC + sensor supply.
	PX	Basic power supply 6 - 30V DC (no real sensor supply).
Battery	PB	Additional lithium battery powered (optional).
Hazardous	XX	Safe area according, according CE.
Options	ZB	Backlight.
	ZX	No options.

The **bold** marked text contains the standard configuration: F119-P-AH-CB-HGC-IB-OT-PX-XX-ZX.