

Your success counts

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 alphanumeric 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.

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.



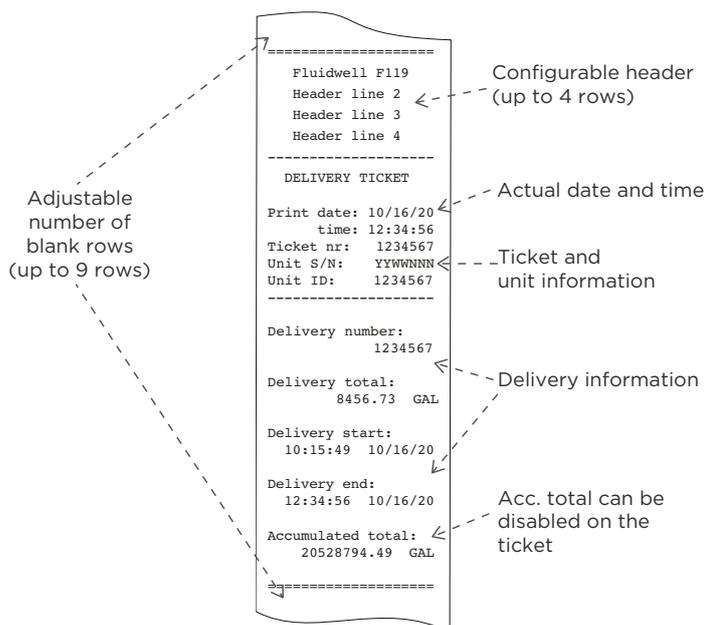
Handheld and panel printers

Ticket printing

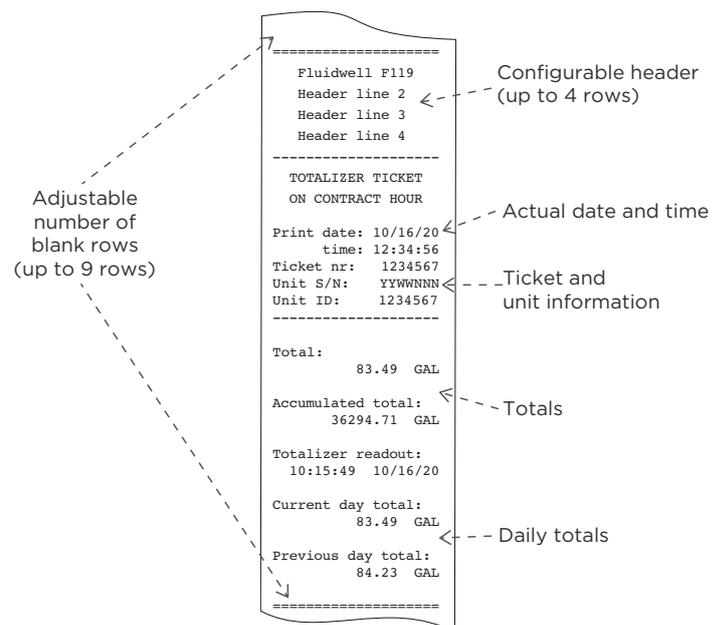
The configurable ticket printing can be set for (daily) totals or delivery tickets. When delivery mode is chosen, a ticket is printed when a delivery is ended by the "Clear"-button or the external clear input. When totalizer mode is chosen, a ticket is printed at contract hour or with a print command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

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

Delivery Ticket example

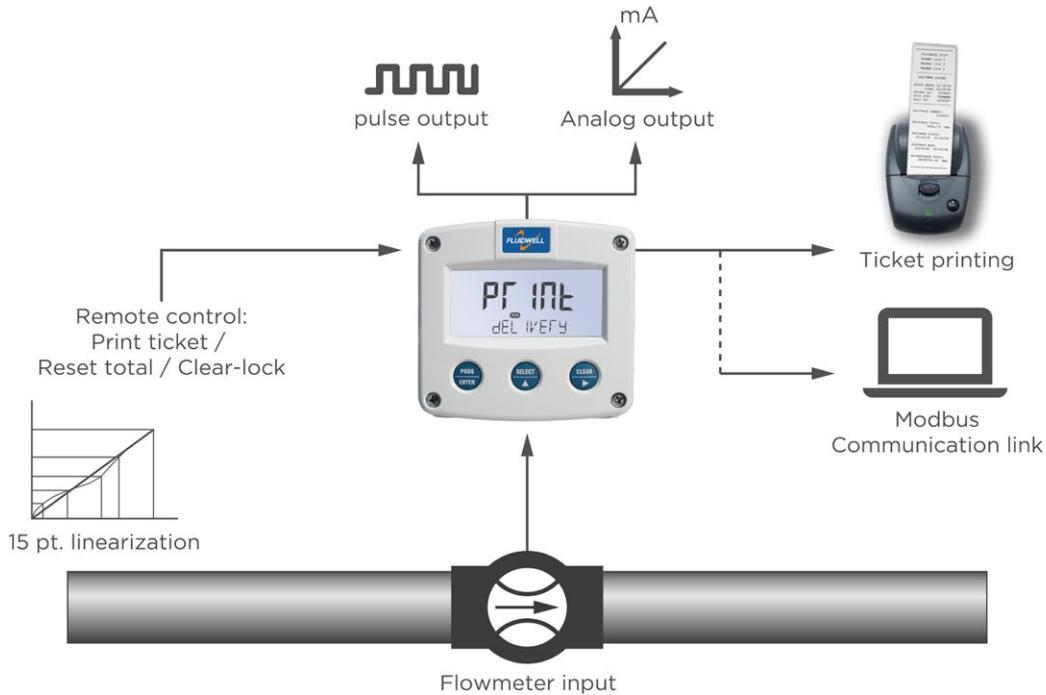


Totalizer Ticket example



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 |

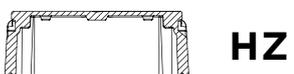
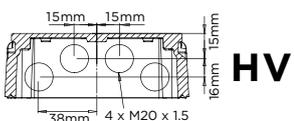
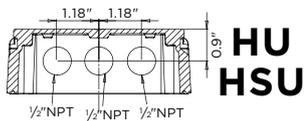
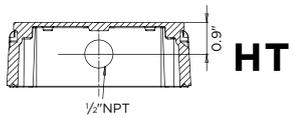
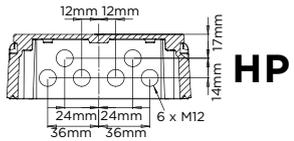
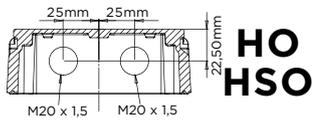
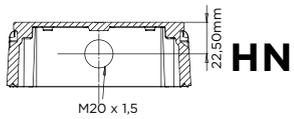
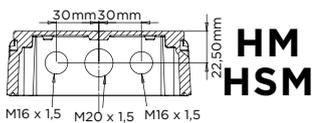
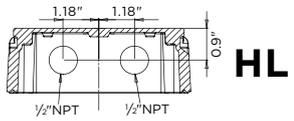
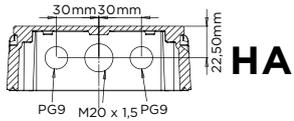
Enclosures

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.

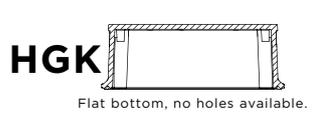
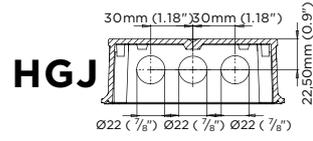
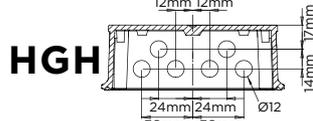
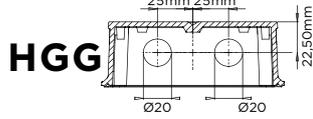
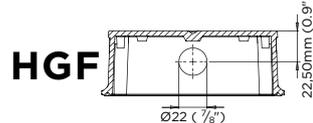
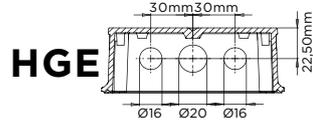
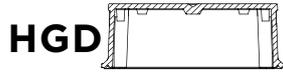
Dimensions enclosures

Cable entries

Aluminum / Stainless Steel

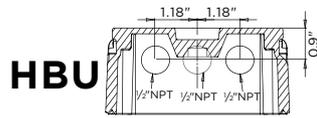
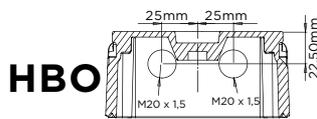
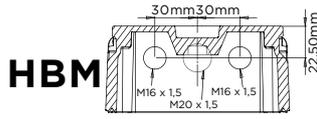


GRP

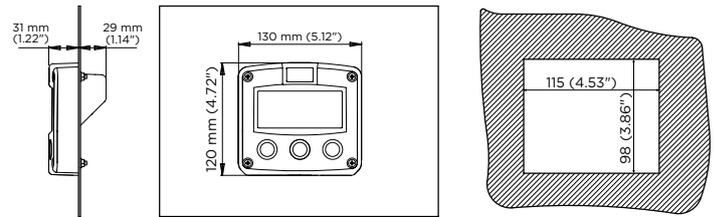


Flat bottom, no holes available.

Extended Aluminum



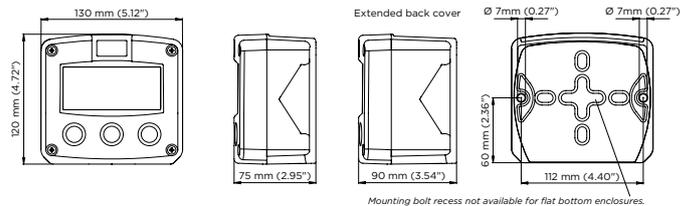
Aluminum & GRP panel mount enclosure



HB & HGC enclosures

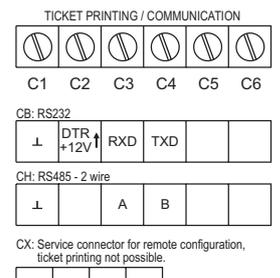
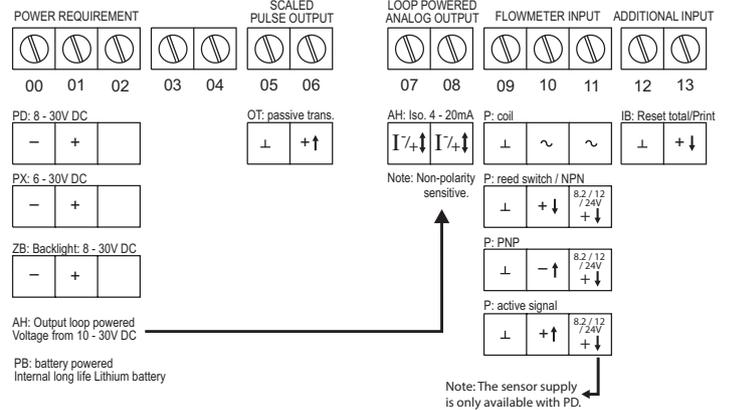
panel cut-out

Aluminum, GRP & Stainless steel 316L field mount enclosures



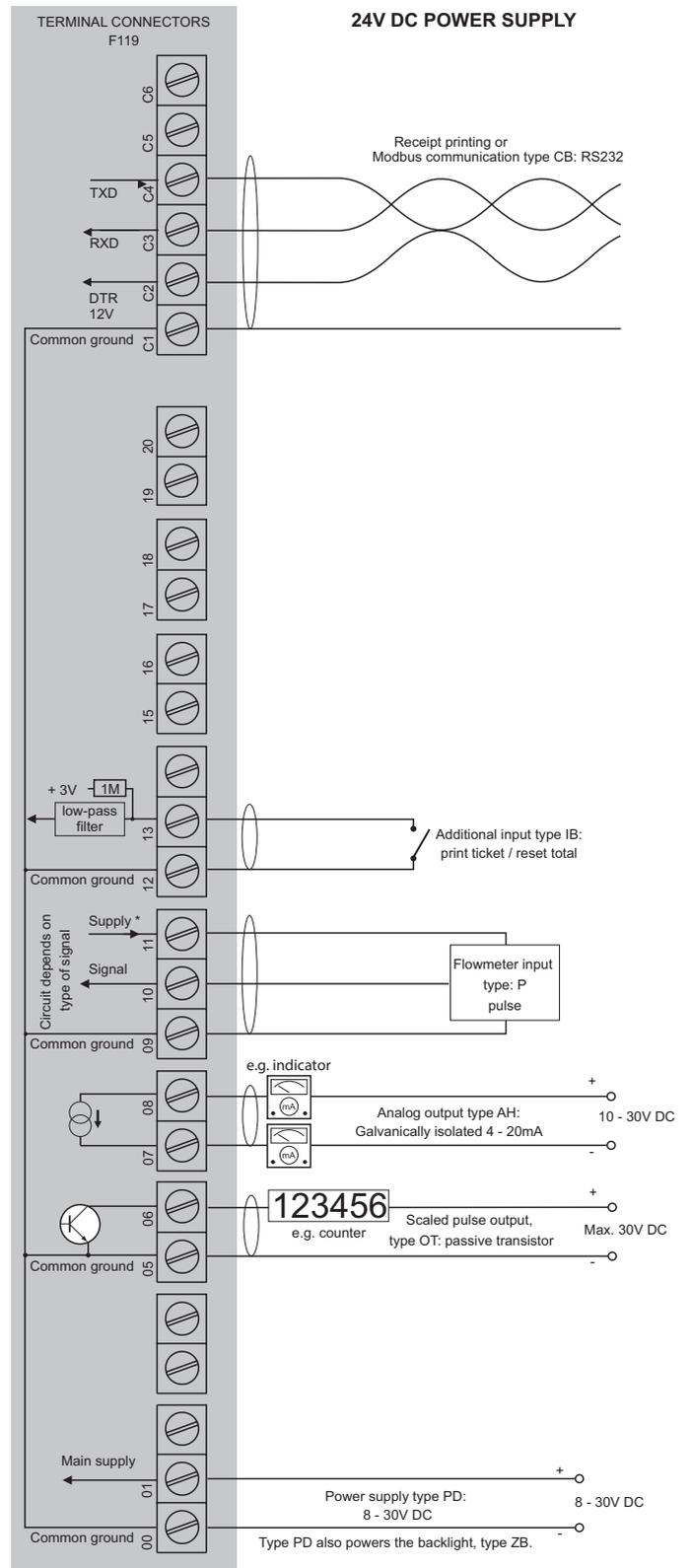
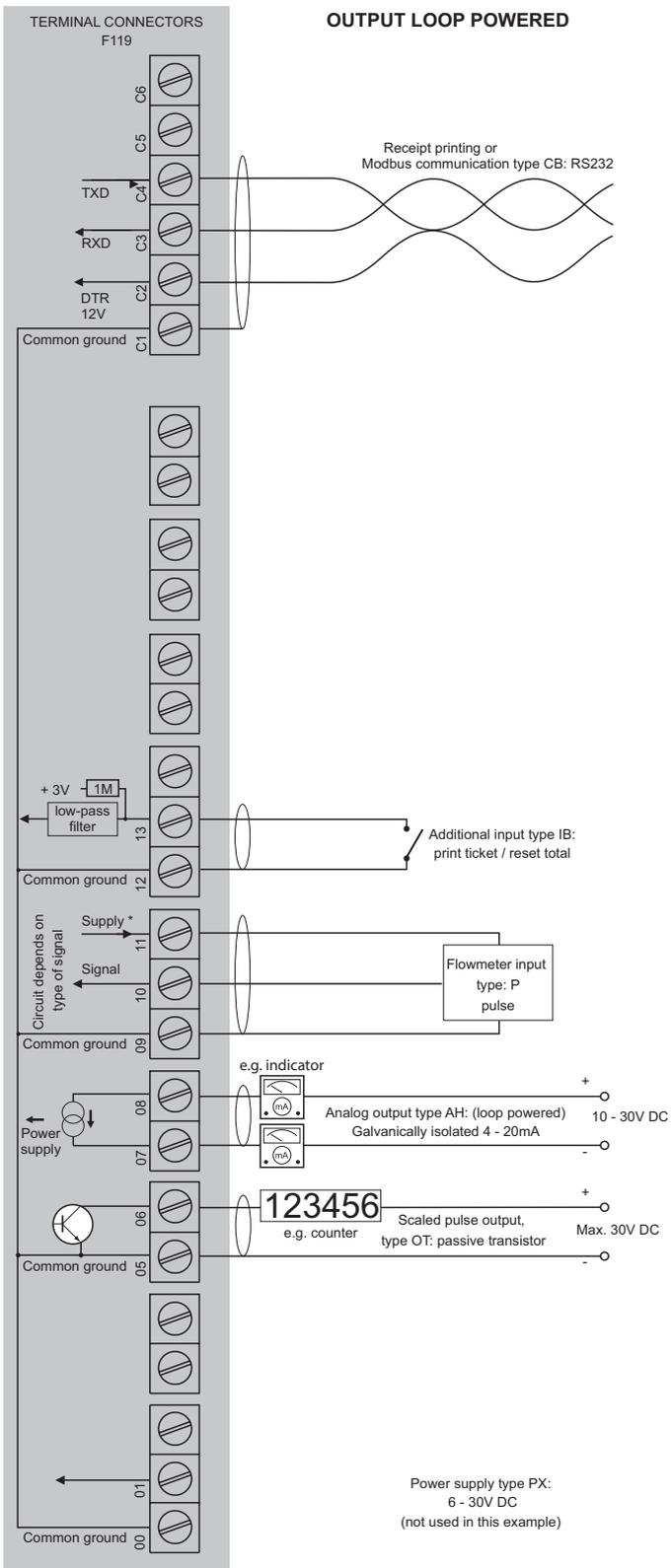
Mounting bolt recess not available for flat bottom enclosures.

Terminal connections



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

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



* 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.

* 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). |
|-------------------|-----------------------------------|

Terminal connections

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

Data protection

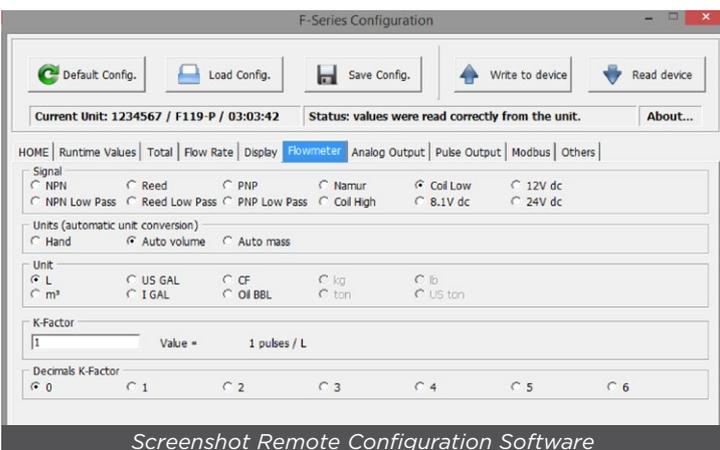
| | |
|-----------------|---|
| Type | EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years. |
| Password | Configuration settings can be password protected. |

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. |

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. |

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 HB/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; <p>Non-isolated; Internally pulled-up switch contact - NPN. Minimum pulse duration 200 msec.</p> |
|----------------|---|

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 | 10 bit. Error < 0.05%. Software function to calibrate the 4.00mA and 20.00mA levels precisely within set-up.. |
| 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. |
|-----------------------|--|

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. |
| | 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. |
| | 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 |
| 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 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.