FLOW RATE MONITOR / TOTALIZER
WITH HIGH / LOW ALARM OUTPUT

Features
• Displays instantaneous flow rate, total and accumulated total.
• Two alarm values can be entered: low and high flow rate alarm.
• Large 17mm (0.67”) digit selection for flow rate or total.
• Ability to process all types of flowmeter signals.
• Auto backup of settings and running totals.
• Operational temperature: -40°C up to +80°C (-40°F up to 178°F).
• Red flashing LED backlight in case of a flow rate alarm.
• Very compact design for panel mount, wall mount or field mount applications.
• Rugged aluminum field mount enclosure IP67/NEMA4X.
• Intrinsically Safe - ATEX, IECEx and CSA approval for gas and dust applications.
• Explosion/flame proof II 2 GD Ex d IIB T5.
• Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC power supply.
• Sensor supply 3.2 / 8.2 / 12 / 24V DC.

Signal output
• One free configurable alarm output.

Signal input
Flow
• Reed-switch.
• NAMUR.
• NPN/PNP pulse.
• Sine wave (coil).
• Active pulse signals.
• (0)4 - 20mA.
• 0 - 10V DC.

Applications
• Flow measurement where continuous flow rate monitoring is important. Alternative advanced model: F113 and F118.
General information

Introduction

The F013 is a versatile flow rate indicator and totalizer with continuous flow rate monitoring feature. It offers the facility to set one low flow rate and one high flow rate alarm value. If desired, a delay function can be set up to allow for an incorrect flow rate for a certain period of time. A wide selection of options further enhance this model's capabilities.

Display

The display has large 17mm (0.67”) and 8mm (0.31”) digits which can be set to show flow rate, totals and alarm values. On-screen engineering units are easily configured from a comprehensive selection. The accumulated total can register up to 11 digits and is backed-up in EEPROM memory every minute, just as the running total. Related to the lower temperatures, the update frequency of the LCD is tuned automatically to achieve a readable display even at -40°C / -40°F.

Backlight

The tri-color backlight in combination with the F013 offers a unique feature: in case of a flow rate alarm, the backlight can be set to red or flashing red / green. The background color can be set to green or amber and the intensity can be adjusted from the keyboard. The display is a transflective type, which means that a high contrast reading is guaranteed in full sunlight as well as during the night. This backlight option is also available Intrinsically Safe.

Configuration

All configuration settings are accessed via a simple operator menu which can be pass-code protected. Each setting is clearly indicated with an alphanumerical description. 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.

Alarm output

One alarm output is available to transmit the flow rate alarm. It can be set to switched for a low, high or both alarms! The output signal can be a passive NPN, active PNP or an isolated electro-mechanical relay.

Signal input

The F013 will accept most pulse and analog input signals for flow or mass flow measurement. The input signal type can be selected by the user in the configuration menu without having to adjust any sensitive mechanical dip-switches, jumpers or trimmers. The analog input version is even available as 4 - 20mA input loop powered display.

Power supply

Several power supply options are available to power the F013 and sensor. Most popular is our battery powered version with a long life lithium battery which will last up to five years. For analog sensors, a 4 - 20mA loop powered version is available as well. A real sensor supply is offered with the 24V AC / DC or 115 - 230V AC power supply option.

Hazardous area

For hazardous area applications, this model has been ATEX, IECEx and CSA certified Intrinsically Safe for gas and dust applications, with an allowed operational temperature of -40°C to +70°C (-40°F to +158°F). FM certification is expected to be available in 2009. A flame proof enclosure with ATEX certification offers the rating II 2 GD EEx d IIB T5.

Enclosures

Various types of enclosures can be selected, all ATEX, IECEx and CSA approved. As standard, the F013 is supplied in an GRP panel mount enclosure. Most popular is our aluminum field mount enclosure with IP67 / NEMA 4X rating. Both European or U.S. cable gland entry threads are available.

Overview application F013

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[Diagram of an alarm output and flowmeter input setup]
**Dimensions enclosures**

*Aluminum & GRP panel mount enclosure*

- **HB & HC enclosures**
- **Panel cut-out**

*Aluminum & GRP field / wall mount enclosures*

**Terminal connections power supply**

**PB/PC - PD - PL - PX**

<table>
<thead>
<tr>
<th>FLOWMETER INPUT</th>
<th>POWER SUPPLY</th>
<th>ALARM OUTPUT</th>
<th>BACKLIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>P: call</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>P: Reed switch / NPN</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>P: Active signal</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>P: NPN</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>P: Namur</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>A: (0)4 - 20mA</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>A: PL 4 - 20mA</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>A: Active Signal</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>U: 0 - 10V</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>PD: 16 - 30V DC</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>OR: Passive Trans.</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>ZB: 20 - 30V DC</td>
<td>~</td>
<td>~</td>
<td></td>
</tr>
</tbody>
</table>

**POWER SUPPLY**

- PF: 230V AC
- PD: 16 - 30V DC
- PX: 8 - 30V DC
- PM: 115 - 230V AC

**ALARM OUTPUT**

- (0)4 - 20mA
- 0 - 10V
- passive trans.
- mech. relay

**FLOWMETER INPUT**

- PB: battery powered
- PD: 16 - 30V DC
- PX: 8 - 30V DC

**Terminal connections power supply**

**PF - PM**

<table>
<thead>
<tr>
<th>POWER SUPPLY</th>
<th>ALARM OUTPUT</th>
<th>FLOWMETER INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND: 1 - 2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>PD: 24V AC</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>OR: passive trans.</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>PF: 24V DC</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>PM: 115 - 230V AC</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>P: call</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>P: Reed switch / NPN</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>P: Active Signal</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>P: NPN</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>P: Namur</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>A: (0)4 - 20mA</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>U: 0 - 10V</td>
<td>~</td>
<td>~</td>
</tr>
</tbody>
</table>

**PB/PC** (battery powered)

- PX is also available; if an external supply is connected, the battery supply will be switched off / on automatically.

**Aluminum & GRP**

**Aluminum**

- HA
- HD
- HM
- HE
- HN
- HF
- HO
- HG
- HP
- HH
- HT
- HJ
- HU
- HK
- HZ

**GRP**

- Flat bottom, no holes available.
**Typical wiring diagram F013-P-(OT)-PB-(PX)-(ZB)**

**Type PB: BATTERY POWERED**

- Backlight option: type ZB
  - 20 - 30V DC (not used in this example)
- Alarm output type OT:
  - passive transistor (not used in this example)
- Power supply type PX:
  - 8 - 30V DC (not used in this example)

**Flowmeter input type P:**
- pulse

- Common ground
- Main supply
- Supply

* Sensor supply voltage for pulse flowmeter type P:
  - Terminal 3: 1.2 / 3.2V DC.

* Sensor supply voltage for analog flowmeter type A / U:
  - Terminal 3: not available.

**Typical wiring diagram F013-A-(OT)-PL-ZB**

**Type PL: INPUT LOOP POWERED**

- Backlight option: type ZB
  - 20 - 30V DC
- Alarm output type OT:
  - passive transistor (not used in this example)
- Flowmeter input type A - PL:
  - Input loop powered 4 - 20mA

- Common ground
- Main supply
- Supply

Sensor supply: sensor is externally powered.

**Typical wiring diagram F013-A-OT-PX-ZB**

**Type PX:**

- Basic 8 - 30V DC power supply (standard)

- Backlight option: type ZB
  - 20 - 30V DC
- Alarm output type OT:
  - passive transistor

- Power supply type PX:
  - 8 - 30V DC

* Sensor supply voltage for pulse flowmeter type P:
  - Terminal 3: 1.2 / 3.2V DC.

* Sensor supply voltage for analog flowmeter type A / U:
  - Terminal 3: not available.

**Typical wiring diagram F013-P-OT-PD-ZB**

**Type PD:**

- 16 - 30V DC power supply

- Backlight option: type ZB
  - 20 - 30V DC
- Alarm output type OT:
  - passive transistor

- Power supply type PD:
  - 16 - 30V DC

* Sensor supply voltage for pulse flowmeter type P:
  - Terminal 3: 1.2 / 3.2V DC. Terminal 6 with type PD: 8.2V DC.

* Sensor supply voltage for analog flowmeter type A / U:
  - Terminal 3: not available. Terminal 6 with type PD: voltage as connected to terminal 5 (internally linked).
**Typical wiring diagram** F013-P-OA-PF-ZB

**Typical wiring diagram** F013-A-OA-PM-ZB

**Typical wiring diagram** F013-A-OT-PF-ZB

**Typical wiring diagram** F013-P-OR-PM-ZB

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**TERMINAL CONNECTORS**

F0 - series

**Type PF:**

24V AC / DC POWER SUPPLY

- Circuit layout on type of signal
- Flowmeter input type P: pulse
- Alarm output type OA: active 24V DC pulse
- Main supply
- Common ground

* Sensor supply voltage for pulse flowmeter type P:
  Terminal 7: 1.2 / 3.2 / 8.2 / 12 / 24V DC.

* Sensor supply voltage for analog flowmeter type A / U:
  Terminal 7: 8.2 / 12 / 24V DC.

**Power supply type PF:**

- 8 - 24V AC / DC

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**TERMINAL CONNECTORS**

F0 - series

**Type PM:**

115 - 230V AC POWER SUPPLY

- Circuit layout on type of signal
- Flowmeter input type A: (0)4 - 20mA
- Alarm output type OA: active 24V DC pulse
- Main supply
- Common ground

* Sensor supply voltage for pulse flowmeter type P:
  Terminal 7: 1.2 / 3.2 / 8.2 / 12 / 24V DC.

* Sensor supply voltage for analog flowmeter type A / U:
  Terminal 7: 8.2 / 12 / 24V DC.

**Power supply type PM:**

- 115 - 230V AC
Hazardous area applications
The F013-XI has been certified according ATEX and IECEx by KEMA and according CSA c-us for use in Intrinsically Safe applications with an ambient temperature of -40°C to +70°C (-40°F to +158°F).

- The ATEX markings for gas and dust applications are:
  - II 1 G Ex ia IIC T4
  - II 1 D Ex iaD 20 IP 65/67 T 100 °C.

- The IECEx markings for gas and dust applications are:
  - Ga Ex ia IIC T4
  - Ex iaD 20 IP 65/67 T100 °C.

- The CSA c-us markings are:
  - Class I/II/III, Division 1, Groups A, B, C, D, E, F, G, Temperature class T4 and Class I, Zone 0, AEx ia IIC T4.

- FM approval is expected to become available in 2009.

It is allowed to connect up to three I.S. power supplies to power the unit, sensor and backlight. The F013-PD-XI offers a 8.2V DC sensor supply to power e.g. a Namur sensor or the input voltage to power an analog sensor. An ATEX approved flame proof enclosure with rating II 2 GD EEx d IIB T5 is available as well. Please contact your supplier for further details.

Certificate of conformity KEMA 05ATEX1168 X
- IECEx KEM 08.0006X • CSA 08.2059461 X

Configuration example IIA - IIB and IIC
F013-P-(OT)-(PC)-(PX)-XI-(ZB) - Battery powered unit

<table>
<thead>
<tr>
<th>TERMINAL CONNECTORS</th>
<th>HAZARDOUS AREA</th>
<th>SAFE AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>F0 - series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 2 3</td>
<td>Common ground</td>
<td>Signal</td>
</tr>
<tr>
<td>4 5</td>
<td>Common ground</td>
<td>Main supply</td>
</tr>
<tr>
<td>6 7 8</td>
<td>Common ground</td>
<td>Circuit depends on type of signal</td>
</tr>
<tr>
<td>9 10</td>
<td>Common ground</td>
<td>Supply backlight</td>
</tr>
<tr>
<td>11</td>
<td>Alarm output type OT: passive transistor (not used in this example)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Backlight option: type AEx ia IIC T4 (not used in this example)</td>
<td></td>
</tr>
</tbody>
</table>

* Sensor supply voltage for pulse flowmeter type P: Terminal 3: 1.2 / 3.2V DC. Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.
**Configuration example IIA - IIB and IIC - F013-P-OT-PX-XI-(ZB) - Basic power supply 8 - 30V DC**

TERMINAL CONNECTORS

**F0 - series**

- Supply backlight
- Common ground
- Main supply
- Common ground
- Circuit depends on type of signal

HAZARDOUS AREA

- Intrinsically Safe apparatus
- Main supply
- Power supply type PX: 8 - 30V DC
- I.S. flowmeter
  - Input type: P
  - Pulse

SAFE AREA

- Alarm output type OT: passive transistor
- Power supply or switch interface
  - For example: MTL5025
  - MTL5011B
- e.g. sounder
- Note: above values are safety values. Consult the technical specification for operational values.

* Sensor supply voltage for pulse type P: Terminal 3: 1.2V / 3.2V DC.
  Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.

**Configuration example IIA - IIB and IIC - F013-P-OT-PX-XI-ZB - Basic power supply 8 - 30V DC**

TERMINAL CONNECTORS

**F0 - series**

- Supply backlight
- Common ground
- Main supply
- Common ground
- Circuit depends on type of signal

HAZARDOUS AREA

- Intrinsically Safe apparatus
- Main supply
- Power supply type PX: 8 - 30V DC
- I.S. flowmeter
  - Input type: P
  - Pulse

SAFE AREA

- Alarm output type OT: passive transistor
- Power supply or switch interface
  - For example: MTL5025
  - MTL5011B
- e.g. sounder
- Note: above values are safety values. Consult the technical specification for operational values.

* Sensor supply voltage for pulse type P: Terminal 3: 1.2V / 3.2V DC.
  Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.
**Configuration example IIA - IIB and IIC - F013-P-OT-PD-XI-ZB - Power supply 16 - 30V DC**

**TERMINAL CONNECTORS**
- **F0 - series**

**HAZARDOUS AREA**
- Backlight option: type ZB
- Intrinsically Safe apparatus
- Alarm output type OT: passive transistor
- Power supply type PD: 16 - 30V DC
- I.S. flowmeter input type: P pulse

**SAFE AREA**
- Power supply
  - $U_o = \text{max. } 30V$
  - $I_o = \text{max. } 200mA$
  - $P_o = \text{max. } 0.75W$
- Power supply or switch interface
  - For example MTL5025
  - For example MTL5011B

Note: above values are safety values. Consult the technical specification for operational values.

* Sensor supply voltage for pulse type P: Terminal 3: 1.2V / 3.2V DC. Terminal 6: 8.2V DC.
  Please note: type PD may be used in combination with the battery (type PC). PD will power the unit; the battery will be disabled automatically till power is disconnected.

**Configuration example IIA - IIB and IIC - F013-A-OT-PD-XI-ZB - Power supply 16 - 30V DC**

**TERMINAL CONNECTORS**
- **F0 - series**

**HAZARDOUS AREA**
- Backlight option: type ZB
- Intrinsically Safe apparatus
- Alarm output type OT: passive transistor
- Power supply type PD: 16 - 30V DC
- I.S. flowmeter input - type A: (0)4 - 20mA

**SAFE AREA**
- Power supply
  - $U_o = \text{max. } 30V$
  - $I_o = \text{max. } 200mA$
  - $P_o = \text{max. } 0.75W$
- Power supply or switch interface
  - For example MTL5025
  - For example MTL5011B

Note: above values are safety values. Consult the technical specification for operational values.

* Sensor supply voltage for analog flowmeter type A / U: Terminal 6: as input voltage terminal 5 (internally linked).
  Please note: type PD may be used in combination with the battery (type PC). PD will power the unit; the battery will be disabled automatically till power is disconnected.
**Configuration example IIA - IIB and IIC - F013-A-OT-PL-XI-ZB - Input loop powered**

Sensor supply is not available: unit is input loop powered (type PL).
Please note: type PL may be used in combination with the battery (type PC). PL will power the unit; the battery will be disabled automatically till power is disconnected.

**Configuration example IIA - IIB and IIC - F013-A-OT-PX-XI-ZB - Basic power supply 8 - 30V DC**

*Sensor supply voltage for analog flowmeter type A / U: not available in this example.*
Please note: type PX may be used in combination with the battery (type PC). PX will power the unit; the battery will be disabled automatically till power is disconnected.
# Technical specification

## General

### 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.
- **Option ZB**: Transflective LCD with tri-color LED-backlight; green / amber. Red (flashing) backlight during alarm conditions. Intensity, color and alarm response selected through the keyboard. Good readings in full sunlight and darkness. Also available Intrinsically Safe.

### Operating temperature
- **Standard unit**: -40°C to +80°C (-40°F to +178°F).
- **Intrinsically Safe**: -40°C to +70°C (-40°F to +158°F).

### Power requirements
- **Type PB**: Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years.
- **Type PC**: Intrinsically Safe long life lithium battery - life-time depends upon settings and configuration - up to 5 years.
- **Type PD**: 16 - 30V DC. Power consumption max. 1 Watt.
- **Type PF**: 24V AC / DC ± 10%. Power consumption max. 15 Watt.
- **Type PL**: Input loop powered from sensor signal 4 - 20mA (type A).
- **Type PM**: 115 - 230V AC ± 10%. Power consumption max. 15 Watt.
- **Type ZB**: 20 - 30V DC. Power consumption max. 0.3 Watt. With type PF / PM: internally powered.

### Sensor excitation
- **Type PB/PC/PX**: 3.2V DC for pulse signals and 1.2V DC for coil pick-up.
- **Type PD**: 16 - 30V DC. Power consumption max. 1 Watt.
- **Type PF**: 24V AC / DC ± 10%. Power consumption max. 15 Watt.
- **Type PL**: Input loop powered from sensor signal 4 - 20mA (type A).
- **Type PM**: 115 - 230V AC ± 10%. Power consumption max. 15 Watt.
- **Note PB/PC/PM**: Not available Intrinsically Safe.
- **Note PF/PM**: The total consumption of the sensor, active output type OA and backlink type ZB may not exceed 400mA @ 24V DC.

### Terminal connections
- **Type**: Removable plug-in terminal strip. Wire max. 1.5mm² and 2.5mm².

## Data protection
- **Type**: EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years.
- **Pass-code**: Configuration settings can be pass-code protected.

## Casing
### General
- **Window**: Polycarbonate window.
- **Sealing**: Silicone.
- **Control keys**: Three industrial micro-switch keys. UV-resistant silicone keypad.

### Aluminum wall / field mount enclosures
- **General**: Die-cast aluminum wall/field mount enclosure IP67 / NEMA 4X with 2-component UV-resistant coating.
- **Dimensions**: 130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
- **Weight**: 1100 gr.
- **Type HA**: Cable entry: 2 x PG9 and 1 x M20.
- **Type HM**: Cable entry: 2 x M16 and 1 x M20.
- **Type HN**: Cable entry: 1 x M20.
- **Type HO**: Cable entry: 2 x M20.
- **Type HP**: Cable entry: 6 x M12.
- **Type HT**: Cable entry: 1 x 1/2" NPT.
- **Type HU**: Cable entry: 3 x 1/2" NPT.
- **Type HZ**: Cable entry: no holes.

### GRP wall / field mount enclosures
- **General**: GRP wall/field mount enclosure IP67 / NEMA 4X, 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 HD**: Cable entry: no holes.
- **Type HE**: Cable entry: 2 x Ø 16mm and 1 x Ø 20mm.
- **Type HF**: Cable entry: 1 x Ø 22mm (7/8").
- **Type HG**: Cable entry: 2 x Ø 20mm.
- **Type HH**: Cable entry: 6 x Ø 12mm.
- **Type HJ**: Cable entry: 3 x Ø 22mm (7/8").
- **Type HK**: Flat bottom, cable entry: no holes.

### 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 4.
- **Weight**: 600 gr.
- **Type HC**: GRP panel mount enclosure IP65 / NEMA 4, UV-resistant and flame retardant.
- **Weight**: 450 gr.

### ABS wall / field mount enclosures
- **General**: Silicone free ABS wall/field mount enclosure IP65 with EPDM and PE sealings. UV-resistant polyester keypad (old HD enclosure).
- **Dimensions**: 130 x 114 x 71mm (5.1" x 4.5" x 2.8") - W x H x D.
- **Weight**: 450 gr.
- **Type HS**: Cable entry: no holes.
**Hazardous area**

**Intrinsically Safe**
- ATEX certification: II 1 G Ex ia IIC T4
- IECEx certification: Ex iaD 20 IP 65 / 67 T 100 °C
- CSA c-us certification: Intrinsically Safe for Class I/II/III, Div. 1, Groups A, B, C, D, E, F, G, Temp. class T4 us and Class I, Zone 0, AEx ia IIC T4.
- Ambient: -40°C to +70°C / -40° to +158°F.

**Explosion proof**
- ATEX certification: II 1 GD Ex d IIB T5.
- Type XF: Dimensions of enclosure: 300 x 250 x 200mm (11.8” x 9.9” x 7.9”) L x H x D.
- Weight: Appr. 15kg.

**Environment**

**Signal input**

**Flowmeter sensor**
- Type P: Coil / sine wave (minimum 20mVpp or 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed-switch, Namur, active pulse signals 8 - 12 and 24V DC.
- 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: Available for all pulse signals.
- Option ZF: coil sensitivity 10mVpp.
- Option ZG: coil sensitivity 5mVpp.
- Type A: (0)4 - 20mA. Analog input signal can be scaled to any desired range within 0 - 20mA.
- Type U: 0 - 10V DC. Analog input signal can be scaled to any desired range within 0 - 10V DC.
- Accuracy: Resolution: 16 bit. Error < 0.01mA / ± 0.05% FS. Low level cut-off programmable.
- Span: 0.001 / 999,999 with variable decimal position.
- Update time: Four times per second.
- Voltage drop: Type A: max. 2V DC @ 20mA.
- Voltage drop: Type A - PL (loop powered): max. 2.6V DC @ 20mA.
- Load impedance: Type U: 3kΩ.
- Relationship: Linear and square root calculation.
- Note: For signal type A and U: external power to sensor is required; e.g. type PD.

**Alarm output**
- Function: User defined: low, high or both alarms output.
- Type OA: One active 24V DC transistor output (PNP); load max. 400mA (requires PF or PM).
- Type OR: One electro-mechanical relay output - isolated; max. switch power 230V AC (N.O.) - 0.5A (requires PF or PM).
- Type OT: One passive transistor output (NPN) - not isolated. Max. 50V DC - 300mA per output.

**Total**
- Digits: 7 digits.
- Units: L, m³, GAL, USGAL, KG, lb, bbl, 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: Can not be reset to zero.

**Flow rate**
- Digits: 7 digits.
- Units: mL, L, m³, Gallons, KG, Ton, lb, bl, cf, RND, ft³, scf, Nm³, NI, iga - no units.
- 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: Low and high flow rate alarm. Includes alarm delay time and configurable alarm output.

**Accessories**

**Mounting accessories**
- ACF02: Stainless steel wall mounting kit.
- ACF05: Stainless steel pipe mounting kit (worm gear clamps not included).
- ACF06: Two stainless steel worm gear clamps Ø 44 - 56mm.
- ACF07: Two stainless steel worm gear clamps Ø 58 - 75mm.
- ACF08: Two stainless steel worm gear clamps Ø 77 - 95mm.
- ACF09: Two stainless steel worm gear clamps Ø 106 - 138mm.
- ACF10: Customized Grevopal tagplates for ACF02 and ACF05, including stainless steel screws. Dimension: 95mm x 12.5mm (3.75” x 0.50”).

**Display example - 90 x 40mm (3.5” x 1.6”)**

```
TOTAL
1397853
m³

↓  
ALARM

LOW RATE

RATE
```
Ordering information

Standard configuration: F013-P-0C-0X-XX-ZX.

<table>
<thead>
<tr>
<th>Ordering information:</th>
<th>F013</th>
<th>_</th>
<th>-</th>
<th>H</th>
<th>-</th>
<th>O</th>
<th>-</th>
<th>P</th>
<th>-</th>
<th>X</th>
<th>-</th>
<th>Z</th>
</tr>
</thead>
</table>

Flowmeter Sensor input signal
- **A**: (0)4 - 20mA input.
- **P**: Pulse input: coil, npn, pnp, namur, reed-switch.
- **U**: 0 - 10V DC input.

Panel mount enclosures - IP65 / NEMA4
- **HB**: Aluminum enclosure.
- **HC**: GRP enclosure.

GRP field / wall mount enclosures - IP67 / NEMA4X
- **HD**: Cable entry: no holes.
- **HE**: Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.
- **HF**: Cable entry: 1 x Ø 22mm (3/4”).
- **HG**: Cable entry: 2 x Ø 20mm.
- **HH**: Cable entry: 6 x Ø 12mm.
- **HJ**: Cable entry: 3 x Ø 22mm (3/4”).
- **HK**: Flat bottom, cable entry: no holes.

Aluminum field / wall mount enclosures - IP67 / NEMA4X
- **HA**: Cable entry: 2 x PG9 + 1 x M20.
- **HM**: Cable entry: 2 x M16 + 1 x M20.
- **HN**: Cable entry: 1 x M20.
- **HO**: Cable entry: 2 x M20.
- **HP**: Cable entry: 6 x M12.
- **HT**: Cable entry: 1 x ½"NPT.
- **HU**: Cable entry: 3 x ½"NPT.
- **HZ**: Cable entry: no holes.

ABS field / wall mount enclosures
- **HS**: Silicone free ABS field enclosure IP65 – Cable entry: no holes (old HD enclosure).

Output
- **OA**: One active transistor output - requires PF or PM.
- **OR**: One mechanical relay output - requires PF or PM.
- **OT**: One passive transistor output - standard configuration.

Power supply
- **PB**: Lithium battery powered.
- **PC**: Lithium battery powered - Intrinsically Safe.
- **PD**: 16 - 30V DC + sensor supply.
- **PF**: 24V AC / DC + sensor supply.
- **PL**: Input loop powered from sensor signal 4 - 20mA (type A).
- **PM**: 115 - 230V AC + sensor supply.
- **PX**: Basic power supply 8 - 30V DC (no real sensor supply).

Hazardous area
- **XI**: Intrinsically Safe.
- **XF**: Exd enclosure - 3 keys.
- **XX**: Safe area only.

Other options
- **ZB**: Backlight.
- **ZF**: Coil input 10mVpp.
- **ZG**: Coil input 5mVpp.
- **ZX**: No options.

The bold marked text contains the standard configuration.

Available Intrinsically Safe.