**Features**
- Displays actual pressure and alarm values.
- Two alarm values can be entered: low and high pressure alarm.
- Large 17mm (0.67”) digits.
- Selectable on-screen engineering units: mBar - Bar - PSI.
- Operational temperature -40°C up to +80°C (-40°F up to 178°F).
- Red flashing LED backlight in case of a pressure 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 EEx d IIB T5.
- Alarm signal output.
- Loop or battery powered, 8 - 24V AC/DC or 115 - 230V AC power supply.
- Sensor supply 8.2 / 12 / 24V DC.

**Signal output**
- One free configurable alarm output.

**Signal input**
**Pressure**
- (0)4 - 20mA.
- 0 - 10V DC.

**Applications**
- For applications where continuous pressure measurement and monitoring is important. Alternative basic model: F050 or more advanced F153.
General information

Introduction
The F053 is a versatile pressure indicator with continuous pressure monitoring feature. It offers the facility to set one low pressure and one high pressure alarm value. If desired, an ignore function can be set up to allow for an incorrect pressure for a certain period of time. A wide selection of options further enhance this model's capabilities, including Intrinsic Safety.

Display
The display has large 17mm (0.67") and 8mm (0.31") digits which displays the pressure, measuring unit and alarm values. As the F053 has been designed for field mounted applications, a smart display update function has been incorporated. Related to the lower temperature, 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 F053 offers a unique feature: in case of a pressure alarm, the backlight can be set to be 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, therefore avoiding confusing abbreviations. All settings are safely stored in EEPROM memory in the event of sudden power failure.

Alarm output
One alarm output is available to transmit the pressure 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 F053 does accept (0)4 - 20mA and 0 - 10V input signals from any type of pressure measurement device. Also a 4 - 20mA input loop powered model is available.

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 2 II GD Ex d IIB T5.

Enclosures
Various types of enclosures can be selected, all ATEX, IECEx and CSA approved. As standard the F053 is supplied in an GRP panel mount enclosure, which can be converted to an IP67 / NEMA 4X GRP field mount enclosure by the addition of a back case. 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 F053
Dimensions enclosures

Aluminum & GRP panel mount enclosure

Aluminum & GRP field / wall mount enclosures

Terminal connections power supply

PB/PC - PD - PL - PX

Terminal connections power supply

PF - PM

Aluminum & GRP panel mount enclosure

PB/PC - PL - PX

Terminal connections power supply

F053
Typical wiring diagram F053-A-(OT)-PB-(PX)

**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)
- Pressure input type A: (0)4 - 20mA

* Sensor supply voltage: Terminal 3: not available.

Typical wiring diagram F053-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: Terminal 3: not available.

Typical wiring diagram F053-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)
- Pressure input type A - PL:
  Input loop powered 4 - 20mA

Sensor supply: sensor is externally powered.

Typical wiring diagram F053-A-OT-PD-ZB

**Type PD:** 16 - 30V DC POWER SUPPLY

- Backlight option: type ZB
  20 - 30V DC
- Alarm output type OT:
  passive transistor
- Sensor supply type PD: 16 - 30V DC
- Pressure input type A: (0)4 - 20mA

* Sensor supply voltage:
  Terminal 3: not available.
  Terminal 6 with type PD: voltage as connected to terminal 5 (internally linked).
Typical wiring diagram F053-A-OA-PF-ZB

**TERMINAL CONNECTORS**

* F0 - series

**Type PF:**

- 24V AC / DC POWER SUPPLY

- Backlight option: type ZB
- Internally powered.

- Pressure input type A: (0)4 - 20mA

- Alarm output type OA: active 24V DC pulse

- Power supply type PF: 8 - 24V AC / DC

- Main supply

- Common ground

- Supply

- Signal

- e.g. sounder

* Sensor supply voltage: Terminal 7: 8.2 / 12 / 24V DC.

**Typical wiring diagram F053-A-OT-PF-ZB**

**TERMINAL CONNECTORS**

* F0 - series

**Type PF:**

- 24V AC / DC POWER SUPPLY

- Backlight option: type ZB
- Internally powered.

- Pressure input type A: (0)4 - 20mA

- Alarm output type OT: passive transistor

- Power supply type PF: 8 - 24V AC / DC

- Main supply

- Common ground

- Supply

- Signal

- e.g. sounder

* Sensor supply voltage: Terminal 7: 8.2 / 12 / 24V DC.

**Typical wiring diagram F053-A-OA-PM-ZB**

**TERMINAL CONNECTORS**

* F0 - series

**Type PM:**

- 115 - 230V AC POWER SUPPLY

- Backlight option: type ZB
- Internally powered.

- Pressure input type A: (0)4 - 20mA

- Alarm output type OA: active 24V DC pulse

- Power supply type PM: 115 - 230V AC

- Main supply

- Common ground

- Supply

- Signal

- e.g. sounder

* Sensor supply voltage: Terminal 7: 8.2 / 12 / 24V DC.

**Typical wiring diagram F053-A-OR-PM-ZB**

**TERMINAL CONNECTORS**

* F0 - series

**Type PM:**

- 115 - 230V AC POWER SUPPLY

- Backlight option: type ZB
- Internally powered.

- Pressure input type A: (0)4 - 20mA

- Alarm output type OR: mechanic relay

- Power supply type PM: 115 - 230V AC

- Main supply

- Common ground

- Supply

- Signal

- e.g. sounder

* Sensor supply voltage: Terminal 7: 8.2 / 12 / 24V DC.
Hazardous area applications

The F053-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 T100 °C.
- The IECEx markings for gas and dust applications are: Ga Ex ia IIC T4 and 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 F053-PD-XI offers 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 - F053-A-OT-PX-XI-ZB - Basic power supply 8 - 30V DC

TERMINAL CONNECTORS

<table>
<thead>
<tr>
<th>Common ground</th>
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<th>Common ground</th>
<th>Common ground</th>
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<tbody>
<tr>
<td>Supply backlit</td>
<td>Main supply</td>
<td>I.S. pressure sensor - input type A: (0)4 - 20mA</td>
<td></td>
</tr>
<tr>
<td>Common ground</td>
<td>Signal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HAZARDOUS AREA

- Backlight option: type ZB
- Intrinsically Safe apparatus
- Alarm output type OT: passive transistor
- Power supply PX: 8 - 30V DC
- I.S. pressure sensor - input type A: (0)4 - 20mA

SAFE AREA

- Power supply
- Power supply or switch interface
- Power supply
- Power supply

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

* Sensor supply voltage for analog pressure sensor 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.
Configuration example IIA - IIB and IIC - F053-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. pressure sensor - input type A: (0)4 - 20mA

**SAFE AREA**

- **Power supply**
  - For example MTL5025
  - Uo = max. 30V
  - Io = max. 200mA
  - Po = max. 0.75W

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

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 - F053-A-OT-PL-XI-ZB - Input loop powered

**TERMINAL CONNECTORS**

**F0 - series**

- **HAZARDOUS AREA**
  - Backlight option: type ZB
  - Intrinsically Safe apparatus
  - Alarm output type OT: passive transistor
  - I.S. pressure sensor - input type A-PL: 4 - 20mA input loop powered

**SAFE AREA**

- **Power supply**
  - For example MTL5025
  - Uo = max. 30V
  - Io = max. 93mA
  - Po = max. 0.92W

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

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.
Technical specification

Display

**General**

- **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: 8 times/sec. - 30 secs - off.
- **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:** 10V ± 10%. Power consumption max. 15 Watt.
- **Type PX:** 8 - 30V DC. Power consumption max. 0.3 Watt.
- **Type ZB:** 8 - 30V DC. Power consumption max. 1 Watt. With type PF / PM: internally powered.
- **Note PB/PF/PM:** Not available Intrinsically Safe.
- **Note PF/PM:** The total consumption of the sensor, active output type OA and backlight type ZB may not exceed 400mA @ 24V DC.
- **Note:** For Intrinsically Safe applications, consult the safety values in the certificate.

Sensor excitation

- **Type PB/PC/PX:** Not available.
- **Type PD:** The sensor supply voltage will be according to power supply voltage (as connected to terminal 5).
- **Type PF / PM:** 8.2 / 12 / 24V DC - max. 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. Data retention at least 10 years.
- **Pass-code:** Configuration settings can be pass-code protected.

Casing

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

**Pressure sensor**
- Type A: (0) - 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.
- Offset: -999,999 / +999,999 units.

**Update time**
- Four times per second.

**Voltage drop**
- Type A: max. 2V DC @ 20mA.
- 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.

### Signal output

**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.

### Operational

**Operator functions**
- Displayed functions:
  - Actual pressure.
  - Low alarm value.
  - High alarm value.
  - Alarm values can be set as % (or only displayed).

**Pressure**
- Digits: 7 digits.
- Units: mbar, bar, PSI, no-unit.
- Decimals: 0 - 1 - 2 or 3.

**Alarm values**
- Digits: 7 digits.
- Units: According to the settings for pressure.
- Decimals: According to the settings for pressure.
- Time units: According to the settings for pressure.
- Type of alarm: Low and high pressure alarm. Includes alarm delay time and configurable alarm output.

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

### 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.

#### Cable gland accessories
- ACF20: For HA enclosure, includes O-rings.
- ACF25: For HE enclosure, includes locknuts and O-rings.
- ACF26: For HF enclosure, includes locknuts and O-rings.
- ACF27: For HG enclosure, includes locknuts and O-rings.
- ACF28: For HH enclosure, includes locknuts and O-rings.
- ACF29: For HJ enclosure, includes locknuts and O-rings.
- ACF32: For HM enclosure, includes O-rings.
- ACF33: For HN enclosure, includes O-rings.
- ACF34: For HO enclosure, includes O-rings.
- ACF35: For HP enclosure, includes O-rings.
- ACF39: For HT enclosure, includes O-rings.
- ACF40: For HU enclosure, includes O-rings.

#### Blind plug accessories
- ACF50: For HA enclosure, includes O-rings.
- ACF55: For HE enclosure, includes locknuts and O-rings.
- ACF56: For HF enclosure, includes locknuts and O-rings.
- ACF57: For HG enclosure, includes locknuts and O-rings.
- ACF58: For HH enclosure, includes locknuts and O-rings.
- ACF59: For HJ enclosure, includes locknuts and O-rings.
- ACF62: For HM enclosure, includes O-rings.
- ACF63: For HN enclosure, includes O-rings.
- ACF64: For HO enclosure, includes O-rings.
- ACF65: For HP enclosure, includes O-rings.
- ACF69: For HT enclosure, includes O-rings.
- ACF70: For HU enclosure, includes O-rings.

#### Intrinsically Safe isolators accessories
- ACG01: MTL5011B - One channel pulse or switch output transfer from hazardous area to safe area, including power supply.
- ACG02: MTL5025 - One channel power supply from safe area to hazardous area (e.g. to power the unit with PD or to power a switching or analog device in hazardous area).
- ACG03: MTL5042 - One channel 4 - 20mA repeater from hazardous area to safe area, including power supply.
- ACG04: MTL 5051 - Bi-direction serial-data-isolator (for Modbus communication).
- ACG05: MTL5018 - Two channel pulse or switch output transfer from hazardous area to hazardous area, including power supply.
- ACG06: MTL5012 - One channel pulse or switch output transfer from hazardous area to safe area, including power supply.
- ACG07: MTL5045 - One channel isolated driver bringing 4 - 20mA from safe area to hazardous area, including power supply.
# Ordering Information

**Standard configuration:** F053-A-HC-OT-PX-XX-ZX.

### Ordering Information:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F053</td>
<td>-H-O-P-X-Z</td>
</tr>
</tbody>
</table>

### Pressure sensor input signal

- **A**: (0)4 - 20mA input.
- **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 1/2”NPT.
- **HU**: Cable entry: 3 x 1/2”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 sensor supply).

### Hazardous area

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

### Other options

- **ZB**: Backlight.
- **ZX**: No options.

The bold marked text contains the standard configuration.

© Available Intrinsically Safe.

Specifications are subject to change without notice.

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