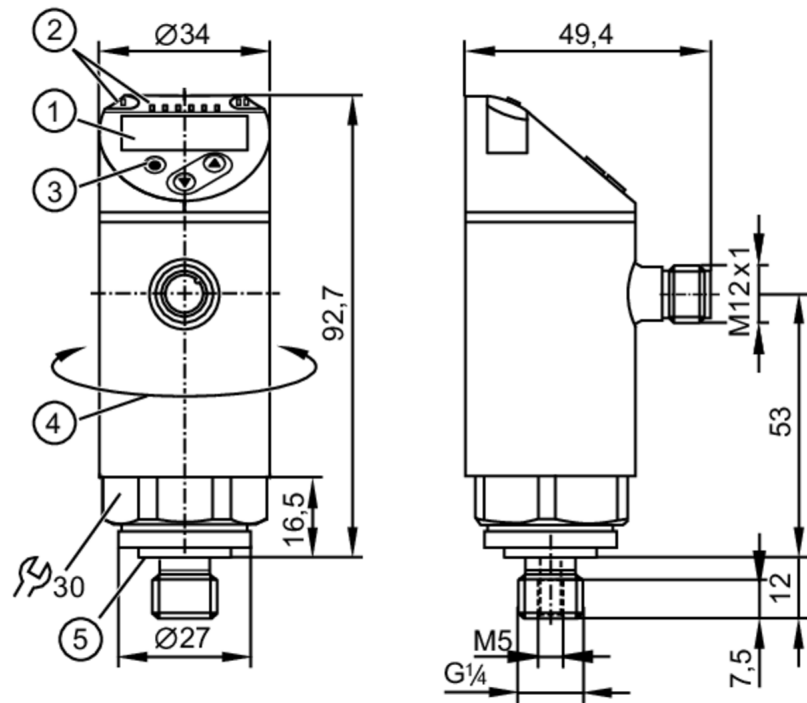


# PN2593



## Pressure sensor with display

PN-025-REG14-MFRKG/US/ IV



- 1 alphanumeric display 4-digit red/green
- 2 LEDs Display unit / switching status
- 3 programming button
- 4 upper part of the housing can be rotated 345°
- 5 Sealing



### Product characteristics

|                              |                                                                                   |                   |                |
|------------------------------|-----------------------------------------------------------------------------------|-------------------|----------------|
| Number of inputs and outputs | Number of digital outputs: 2; Number of analogue outputs: 1                       |                   |                |
| Measuring range              | -1...25 bar                                                                       | -14.5...362.5 psi | -0.1...2.5 MPa |
| Process connection           | threaded connection G 1/4 external thread (DIN EN ISO 1179-2); internal thread:M5 |                   |                |

### Application

|                          |                                            |          |        |
|--------------------------|--------------------------------------------|----------|--------|
| Special feature          | Gold-plated contacts                       |          |        |
| Measuring element        | ceramic-capacitive pressure measuring cell |          |        |
| Application              | for industrial applications                |          |        |
| Media                    | liquids and gases                          |          |        |
| Medium temperature [°C]  | -25...80                                   |          |        |
| Min. bursting pressure   | 350 bar                                    | 5075 psi | 35 MPa |
| Pressure rating          | 150 bar                                    | 2175 psi | 15 MPa |
| Vacuum resistance [mbar] | -1000                                      |          |        |
| Type of pressure         | relative pressure; vacuum                  |          |        |

### Electrical data

|                                 |                            |  |  |
|---------------------------------|----------------------------|--|--|
| Operating voltage [V]           | 18...30 DC; (to SELV/PELV) |  |  |
| Current consumption [mA]        | < 35                       |  |  |
| Min. insulation resistance [MΩ] | 100; (500 V DC)            |  |  |
| Protection class                | III                        |  |  |
| Reverse polarity protection     | yes                        |  |  |



## Pressure sensor with display

PN-025-REG14-MFRKG/US/ /V

|                                                 |                 |                                                                                                          |                   |                   |
|-------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------|-------------------|-------------------|
| Power-on delay time                             | [s]             | 0.3                                                                                                      |                   |                   |
| Integrated watchdog                             |                 | yes                                                                                                      |                   |                   |
| Inputs / outputs                                |                 |                                                                                                          |                   |                   |
| Number of inputs and outputs                    |                 | Number of digital outputs: 2; Number of analogue outputs: 1                                              |                   |                   |
| Outputs                                         |                 |                                                                                                          |                   |                   |
| Total number of outputs                         |                 | 2                                                                                                        |                   |                   |
| Output signal                                   |                 | switching signal; analogue signal; IO-Link; (configurable)                                               |                   |                   |
| Electrical design                               |                 | PNP/NPN                                                                                                  |                   |                   |
| Number of digital outputs                       |                 | 2                                                                                                        |                   |                   |
| Output function                                 |                 | normally open / normally closed; (parameterisable)                                                       |                   |                   |
| Max. voltage drop switching output DC           | [V]             | 2                                                                                                        |                   |                   |
| Permanent current rating of switching output DC | [mA]            | 250                                                                                                      |                   |                   |
| Switching frequency DC                          | [Hz]            | < 500                                                                                                    |                   |                   |
| Number of analogue outputs                      |                 | 1                                                                                                        |                   |                   |
| Analogue current output                         | [mA]            | 4...20; (scalable 1:5)                                                                                   |                   |                   |
| Max. load                                       | [Ω]             | 500                                                                                                      |                   |                   |
| Analogue voltage output                         | [V]             | 0...10; (scalable 1:5)                                                                                   |                   |                   |
| Min. load resistance                            | [Ω]             | 2000                                                                                                     |                   |                   |
| Short-circuit protection                        |                 | yes                                                                                                      |                   |                   |
| Type of short-circuit protection                |                 | pulsed                                                                                                   |                   |                   |
| Overload protection                             |                 | yes                                                                                                      |                   |                   |
| Measuring/setting range                         |                 |                                                                                                          |                   |                   |
| Measuring range                                 |                 | -1...25 bar                                                                                              | -14.5...362.5 psi | -0.1...2.5 MPa    |
| Analogue start point                            |                 | -1...20 bar                                                                                              | -14.5...290 psi   | -0.1...2 MPa      |
| Analogue end point                              |                 | 4...25 bar                                                                                               | 58...362.5 psi    | 0.4...2.5 MPa     |
| Factory setting / CMPT = 2                      |                 |                                                                                                          |                   |                   |
| Set point SP                                    |                 | -0.85...25 bar                                                                                           | -12...362.5 psi   | -0.085...2.5 MPa  |
| Reset point rP                                  |                 | -0.95...24.9 bar                                                                                         | -13.5...361 psi   | -0.095...2.49 MPa |
| Min. difference between SP and rP               |                 | 0.15 bar                                                                                                 | 1.5 psi           | 0.015 MPa         |
| In steps of                                     |                 | 0.05 bar                                                                                                 | 0.5 psi           | 0.005 MPa         |
| Status_B High Resolution / CMPT = 3             |                 |                                                                                                          |                   |                   |
| Set point SP                                    |                 | -0.84...25 bar                                                                                           | -12.2...362.6 psi | -0.084...2.5 MPa  |
| Reset point rP                                  |                 | -0.95...24.9 bar                                                                                         | -13.7...361.1 psi | -0.095...2.49 MPa |
| Min. difference between SP and rP               |                 | 0.11 bar                                                                                                 | 1.5 psi           | 0.011 MPa         |
| In steps of                                     |                 | 0.01 bar                                                                                                 | 0.1 psi           | 0.001 MPa         |
| Accuracy / deviations                           |                 |                                                                                                          |                   |                   |
| Switch point accuracy                           |                 | < ± 0,4; (Turn down 1:1)                                                                                 |                   |                   |
|                                                 | [% of the span] |                                                                                                          |                   |                   |
| Repeatability                                   |                 | < ± 0,1; (with temperature fluctuations < 10 K; Turn down 1:1)                                           |                   |                   |
|                                                 | [% of the span] |                                                                                                          |                   |                   |
| Characteristics deviation                       |                 | < ± 0,25 (BFSL) / < ± 0,5 (LS); (Turn down 1:1; BFSL = Best Fit Straight Line; LS = limit value setting) |                   |                   |
|                                                 | [% of the span] |                                                                                                          |                   |                   |



## Pressure sensor with display

PN-025-REG14-MFRKG/US/ /V

|                                                              |                                                                                                                                  |            |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------|
| Hysteresis deviation<br>[% of the span]                      | < ± 0,1; (Turn down 1:1)                                                                                                         |            |
| Long-term stability<br>[% of the span]                       | < ± 0,05; (Turn down 1:1; per 6 months)                                                                                          |            |
| Temperature coefficient zero point<br>[% of the span / 10 K] | < ± 0,2; (-0...80 °C)                                                                                                            |            |
| Temperature coefficient span<br>[% of the span / 10 K]       | < ± 0,2; (-0...80 °C)                                                                                                            |            |
| Notes on the accuracy / deviation                            | switch point accuracy, linearity error under DNV GL: < ± 1%: < ± 1%                                                              |            |
| Response times                                               |                                                                                                                                  |            |
| Response time [ms]                                           | < 1.5                                                                                                                            |            |
| Delay time programmable dS, dr [s]                           | 0...50                                                                                                                           |            |
| Damping process value dAP [s]                                | 0...4                                                                                                                            |            |
| Damping for the analogue output dAA [s]                      | 0...4                                                                                                                            |            |
| Max. response time analogue output [ms]                      | 3                                                                                                                                |            |
| Software / programming                                       |                                                                                                                                  |            |
| Parameter setting options                                    | hysteresis / window; normally open / normally closed; switch-on/ switch-off delay; Damping; Display unit; current/voltage output |            |
| Interfaces                                                   |                                                                                                                                  |            |
| Communication interface                                      | IO-Link                                                                                                                          |            |
| Transmission type                                            | COM2 (38,4 kBaud)                                                                                                                |            |
| IO-Link revision                                             | 1.1                                                                                                                              |            |
| SDCI standard                                                | IEC 61131-9                                                                                                                      |            |
| SIO mode                                                     | yes                                                                                                                              |            |
| Required master port type                                    | A; (when pin 2 not connected: B)                                                                                                 |            |
| Supported DeviceIDs                                          | Type of operation                                                                                                                | DeviceID   |
|                                                              | Factory setting / CMPT = 2                                                                                                       | 462        |
|                                                              | Status_B High Resolution / CMPT = 3                                                                                              | 973        |
| Note                                                         | For further information please see the IODD PDF file under "Downloads"                                                           |            |
| Factory setting / CMPT = 2                                   |                                                                                                                                  |            |
| Profiles                                                     | Smart Sensor: Process Data Variable; Device Identification, Device Diagnosis                                                     |            |
| Min. process cycle time [ms]                                 | 2.3                                                                                                                              |            |
| IO-Link resolution pressure [bar]                            | 0.01                                                                                                                             |            |
| IO-Link process data (cyclical)                              | function                                                                                                                         | bit length |
|                                                              | pressure                                                                                                                         | 14         |
|                                                              | binary switching information                                                                                                     | 2          |
| IO-Link functions (acyclical)                                | application specific tag                                                                                                         |            |
| Status_B High Resolution / CMPT = 3                          |                                                                                                                                  |            |
| Profiles                                                     | Smart Sensor ED2: Digital Measuring Sensor (0x000A), Identification and Diagnosis (0x4000)                                       |            |
| Min. process cycle time [ms]                                 | 3                                                                                                                                |            |
| IO-Link resolution pressure [bar]                            | 0.01                                                                                                                             |            |



## Pressure sensor with display

PN-025-REG14-MFRKG/US/ /V

| IO-Link process data<br>(cyclical) | function                     | bit length |
|------------------------------------|------------------------------|------------|
|                                    | pressure                     | 16         |
|                                    | device status                | 4          |
|                                    | binary switching information | 2          |
| IO-Link functions (acyclical)      | application specific tag     |            |

## Operating conditions

|                     |      |              |
|---------------------|------|--------------|
| Ambient temperature | [°C] | -25...80     |
| Storage temperature | [°C] | -40...100    |
| Protection          |      | IP 65; IP 67 |

## Tests / approvals

|                              |                                                                                       |                     |
|------------------------------|---------------------------------------------------------------------------------------|---------------------|
| EMC                          | DIN EN 61000-6-2                                                                      |                     |
|                              | DIN EN 61000-6-3                                                                      |                     |
| Shock resistance             | DIN EN 60068-2-27                                                                     | 50 g (11 ms)        |
| Vibration resistance         | DIN EN 60068-2-6                                                                      | 20 g (10...2000 Hz) |
| MTTF                         | [years]                                                                               | 138                 |
| UL approval                  | UL Approval no.                                                                       | J012                |
| Pressure Equipment Directive | Sound engineering practice; can be used for group 2 fluids; group 1 fluids on request |                     |

## Mechanical data

|                               |                                                                                   |                                                                                            |
|-------------------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Weight                        | [g]                                                                               | 263.5                                                                                      |
| Materials                     | stainless steel (316L/1.4404); PBT+PC-GF30; PBT-GF20; PC                          |                                                                                            |
| Materials (wetted parts)      | stainless steel (316L/1.4404); Al2O3 (ceramics); FKM                              |                                                                                            |
| Min. pressure cycles          | 100 million                                                                       |                                                                                            |
| Tightening torque             | [Nm]                                                                              | 25...35; (recommended tightening torque; depends on lubrication, seal and pressure rating) |
| Process connection            | threaded connection G 1/4 external thread (DIN EN ISO 1179-2); internal thread:M5 |                                                                                            |
| Process connection sealing    | FKM (DIN EN ISO 1179-2)                                                           |                                                                                            |
| Restrictor element integrated | no (can be retrofitted)                                                           |                                                                                            |

## Displays / operating elements

|         |                  |                                         |
|---------|------------------|-----------------------------------------|
| Display | Display unit     | 3 x LED, green (bar, psi, MPa)          |
|         | switching status | 2 x LED, yellow                         |
|         | measured values  | alphanumeric display, red/green 4-digit |

## Remarks

|               |        |
|---------------|--------|
| Pack quantity | 1 pcs. |
|---------------|--------|

## Electrical connection

Connector: 1 x M12; coding: A; Contacts: gold-plated



# PN2593



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PN-025-REG14-MFRKG/US/ /V

### Connection



|      |                  |
|------|------------------|
| OUT1 | switching output |
|      | IO-Link          |
| OUT2 | switching output |
|      | analogue output  |
|      | Core colours :   |
| BK = | black            |
| BN = | brown            |
| BU = | blue             |
| WH = | white            |