



Pressure sensor with display

PN-+,5BRER14-MFRKG/US/ IV

When selecting an alternative article and accessories please note that technical data may differ!

Technical drawing of the PN2169 pressure sensor. The front view shows a cylindrical body with a top section of diameter Ø34 and a bottom section of diameter Ø27. The total height is 90.7 mm. The bottom section has a height of 14.5 mm and a G 1/4 internal thread. The side view shows a height of 49.4 mm for the main body and 14.2 mm for the bottom section. A side connection is M12 x 1 with a height of 51 mm. Callouts 1, 2, 3, and 4 point to specific features on the front view.

- 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°



| Product characteristics         |                                                             |                 |                  |                               |
|---------------------------------|-------------------------------------------------------------|-----------------|------------------|-------------------------------|
| Number of inputs and outputs    | Number of digital outputs: 2; Number of analogue outputs: 1 |                 |                  |                               |
| Measuring range                 | -0.5...0.5 bar                                              | -500...500 mbar | -7.26...7.26 psi | -201...201 inH2O -50...50 kPa |
| Process connection              | threaded connection G 1/4 internal thread                   |                 |                  |                               |
| 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          | 30000 mbar                                                  | 450 psi         | 3000 kPa         |                               |
| Pressure rating                 | 10000 mbar                                                  | 145 psi         | 1000 kPa         |                               |
| 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                                                         |                 |                  |                               |



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|                             |     |
|-----------------------------|-----|
| Reverse polarity protection | yes |
| 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      | -0.5...0.5 bar  | -500...500 mbar  | -7.26...7.26 psi | -201...201 inH2O | -50...50 kPa |
| Analogue start point | -500...300 mbar | -7.26...4.36 psi | -201...120 inH2O | -50...30 kPa     |              |
| Analogue end point   | -300...500 mbar | -4.36...7.26 psi | -120...201 inH2O | -30...50 kPa     |              |

## Factory setting / CMPT = 2

|                                   |                 |                  |                  |                  |
|-----------------------------------|-----------------|------------------|------------------|------------------|
| Set point SP                      | -494...500 mbar | -7.16...7.26 psi | -198...201 inH2O | -49.4...50 kPa   |
| Reset point rP                    | -498...496 mbar | -7.22...7.2 psi  | -200...199 inH2O | -49.8...49.6 kPa |
| Min. difference between SP and rP | 6 mbar          | 0.06 psi         | 2 inH2O          | 0.6 kPa          |
| In steps of                       | 2 mbar          | 0.02 psi         | 1 inH2O          | 0.2 kPa          |

## Status\_B High Resolution / CMPT = 3

|                                   |                 |                  |                  |                  |
|-----------------------------------|-----------------|------------------|------------------|------------------|
| Set point SP                      | -494...500 mbar | -7.16...7.25 psi | -198...201 inH2O | -49.4...50 kPa   |
| Reset point rP                    | -498...496 mbar | -7.22...7.19 psi | -200...199 inH2O | -49.8...49.6 kPa |
| Min. difference between SP and rP | 5 mbar          | 0.06 psi         | 2 inH2O          | 0.5 kPa          |
| In steps of                       | 1 mbar          | 0.01 psi         | 1 inH2O          | 0.1 kPa          |

## Accuracy / deviations

|                                       |                                                                                                          |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|
| Switch point accuracy [% of the span] | < ± 0,4; (Turn down 1:1)                                                                                 |
| Repeatability [% of the span]         | < ± 0,1; (with temperature fluctuations < 10 K; Turn down 1:1)                                           |
| Characteristics deviation             | < ± 0,25 (BFSL) / < ± 0,5 (LS); (Turn down 1:1; BFSL = Best Fit Straight Line; LS = limit value setting) |



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|                                    |                        |                                                                                |
|------------------------------------|------------------------|--------------------------------------------------------------------------------|
|                                    | [% of the span]        |                                                                                |
| Hysteresis deviation               |                        | $< \pm 0,1$ ; (Turn down 1:1)                                                  |
|                                    | [% of the span]        |                                                                                |
| Long-term stability                |                        | $< \pm 0,05$ ; (Turn down 1:1; per 6 months)                                   |
|                                    | [% of the span]        |                                                                                |
| Temperature coefficient zero point |                        | $< \pm 0,2$ ; (-0...80 °C)                                                     |
|                                    | [% of the span / 10 K] |                                                                                |
| Temperature coefficient span       |                        | $< \pm 0,2$ ; (-0...80 °C)                                                     |
|                                    | [% of the span / 10 K] |                                                                                |
| Notes on the accuracy / deviation  |                        | switch point accuracy, linearity error under DNV GL: $< \pm 1\%$ : $< \pm 1\%$ |

## 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                 | <table> <tr> <th>Type of operation</th><th>DeviceID</th></tr> <tr> <td>Factory setting / CMPT = 2</td><td>468</td></tr> <tr> <td>Status_B High Resolution / CMPT = 3</td><td>984</td></tr> </table> | Type of operation | DeviceID | Factory setting / CMPT = 2 | 468 | Status_B High Resolution / CMPT = 3 | 984 |
| Type of operation                   | DeviceID                                                                                                                                                                                            |                   |          |                            |     |                                     |     |
| Factory setting / CMPT = 2          | 468                                                                                                                                                                                                 |                   |          |                            |     |                                     |     |
| Status_B High Resolution / CMPT = 3 | 984                                                                                                                                                                                                 |                   |          |                            |     |                                     |     |
| 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     | [mbar] 1                                                                                                                                                         |          |            |          |    |                              |   |
| IO-Link process data (cyclical) | <table> <tr> <th>function</th><th>bit length</th></tr> <tr> <td>pressure</td><td>14</td></tr> <tr> <td>binary switching information</td><td>2</td></tr> </table> | function | bit length | pressure | 14 | binary switching information | 2 |
| 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                                                                                     |

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|                                    |                              |            |
|------------------------------------|------------------------------|------------|
| IO-Link resolution pressure [mbar] | 0.5                          |            |
| IO-Link process data (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]                    | 238.5                                                                                      |  |
| Materials                     | stainless steel (316L/1.4404); PBT+PC-GF30; PBT-GF20; PC                                   |  |
| Materials (wetted parts)      | stainless steel (316L/1.4404); Al2O3 (96%; 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 internal thread                                                  |  |
| Restrictor element integrated | no (can be retrofitted)                                                                    |  |

|                               |                  |                                         |
|-------------------------------|------------------|-----------------------------------------|
| Displays / operating elements |                  |                                         |
| Display                       | Display unit     | 4 x LED, green (mbar, kPa, psi, inH2O)  |
|                               | 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



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### Connection



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