

PN2294



Pressure sensor with display

PN-010-REN14-MFRKG/US/ /V



- 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 analog outputs: 1 |                 |                 |              |
| Measuring range              | -1...10 bar                                               | -14.6...145 psi | -100...1000 kPa | -0.1...1 MPa |
| Process connection           | threaded connection 1/4" NPT Internal thread              |                 |                 |              |

Application

|                                          |                                            |          |          |
|------------------------------------------|--------------------------------------------|----------|----------|
| System                                   | 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                   | 150 bar                                    | 2175 psi | 15 MPa   |
| Pressure rating                          | 75 bar                                     | 1087 psi | 7.5 MPa  |
| Vacuum resistance                        | -1000 mbar                                 |          | -0.1 MPa |
| Type of pressure                         | relative pressure; vacuum                  |          |          |
| MAWP (for applications according to CRN) | 50 bar                                     | 725 psi  | 5 MPa    |

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 analog outputs: 1 |
|------------------------------|-----------------------------------------------------------|

### Outputs

|                                                      |                                                          |
|------------------------------------------------------|----------------------------------------------------------|
| Total number of outputs                              | 2                                                        |
| Output signal                                        | switching signal; analog signal; IO-Link; (configurable) |
| Electrical design                                    | PNP/NPN                                                  |
| Number of digital outputs                            | 2                                                        |
| Output function                                      | normally open / closed; (configurable)                   |
| Max. voltage drop switching output DC [V]            | 2                                                        |
| Permanent current rating of switching output DC [mA] | 250                                                      |
| Switching frequency DC [Hz]                          | < 500                                                    |
| Number of analog outputs                             | 1                                                        |
| Analog current output [mA]                           | 4...20; (scalable 1:5)                                   |
| Max. load [Ω]                                        | 500                                                      |
| Analog voltage output [V]                            | 0...10; (scalable 1:5)                                   |
| Min. load resistance [Ω]                             | 2000                                                     |
| Short-circuit protection                             | yes                                                      |
| Type of short-circuit protection                     | yes (non-latching)                                       |
| Overload protection                                  | yes                                                      |

### Measuring/setting range

|                    |             |                 |                 |                |
|--------------------|-------------|-----------------|-----------------|----------------|
| Measuring range    | -1...10 bar | -14.6...145 psi | -100...1000 kPa | -0.1...1 MPa   |
| Analog start point | -1...8 bar  | -14.6...116 psi |                 | -0.1...0.8 MPa |
| Analog end point   | 1...10 bar  | 14.6...145 psi  |                 | 0.1...1 MPa    |

### Factory setting / CMPT = 2

|                                   |                  |                   |                    |
|-----------------------------------|------------------|-------------------|--------------------|
| Set point SP                      | -0.94...10 bar   | -13.6...145 psi   | -0.094...1 MPa     |
| Reset point rP                    | -0.98...9.96 bar | -14.2...144.4 psi | -0.098...0.996 MPa |
| Min. difference between SP and rP | 0.06 bar         | 0.6 psi           | 0.006 MPa          |
| In steps of                       | 0.02 bar         | 0.2 psi           | 0.002 MPa          |

### Status\_B High Resolution / CMPT = 3

|                                   |                  |                   |                    |
|-----------------------------------|------------------|-------------------|--------------------|
| Set point SP                      | -0.94...10 bar   | -13.6...145 psi   | -0.094...1 MPa     |
| Reset point rP                    | -0.98...9.96 bar | -14.2...144.4 psi | -0.098...0.996 MPa |
| Min. difference between SP and rP | 0.06 bar         | 0.6 psi           | 0.005 MPa          |
| In steps of                       | 0.01 bar         | 0.1 psi           | 0.001 MPa          |

### 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: $< \pm 1\%$ : $< \pm 1\%$ |

## Reaction times

|                                   |      |         |
|-----------------------------------|------|---------|
| Response time                     | [ms] | $< 1.5$ |
| Delay time programmable dS, dr    | [s]  | 0...50  |
| Damping process value dAP         | [s]  | 0...4   |
| Damping for the analog output dAA | [s]  | 0...4   |
| Max. response time analog output  | [ms] | 3       |

## Software / programming

|                           |                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Parameter setting options | hysteresis / window; normally open / 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 class          | 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>473</td></tr> <tr> <td>Status_B High Resolution / CMPT = 3</td><td>989</td></tr> </table> | Type of operation | DeviceID | Factory setting / CMPT = 2 | 473 | Status_B High Resolution / CMPT = 3 | 989 |
| Type of operation                   | DeviceID                                                                                                                                                                                            |                   |          |                            |     |                                     |     |
| Factory setting / CMPT = 2          | 473                                                                                                                                                                                                 |                   |          |                            |     |                                     |     |
| Status_B High Resolution / CMPT = 3 | 989                                                                                                                                                                                                 |                   |          |                            |     |                                     |     |
| Note                                | For further information please see the IODD PDF file at "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) | <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     | [bar]                        | 0.005             |
| IO-Link process data (cyclical) | <b>Function</b>              | <b>bit length</b> |
|                                 | 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 number                                                                    | J012                |
| Pressure equipment directive | sound engineering practice; can be used for group 2 fluids; group 1 fluids on request |                     |

### Mechanical data

|                               |                                                            |                                                          |
|-------------------------------|------------------------------------------------------------|----------------------------------------------------------|
| Weight                        | [g]                                                        | 223.5                                                    |
| Housing                       | tubular                                                    |                                                          |
| Dimensions                    | [mm]                                                       | Ø 34 / L = 90.7                                          |
| Material                      | stainless steel (1.4404 / 316L); PBT+PC-GF30; PBT-GF20; PC |                                                          |
| Materials (wetted parts)      | stainless steel (1.4404 / 316L); Al2O3 (ceramics); FKM     |                                                          |
| Min. pressure cycles          | 100 million                                                |                                                          |
| Tightening torque             | [Nm]                                                       | > 50; (Depends on lubrication, seal and pressure rating) |
| Process connection            | threaded connection 1/4" NPT Internal thread               |                                                          |
| 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



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### Connection



|      |                  |
|------|------------------|
| OUT1 | Switching output |
|      | IO-Link          |
| OUT2 | Switching output |
|      | analog output    |
|      | Core colors :    |
| BK = | black            |
| BN = | brown            |
| BU = | blue             |
| WH = | white            |