

PN2297



Pressure sensor with display

PN-001BREN14-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°



| Product characteristics                  |                                                           |                 |                  |                     |              |
|------------------------------------------|-----------------------------------------------------------|-----------------|------------------|---------------------|--------------|
| Number of inputs and outputs             | Number of digital outputs: 2; Number of analog outputs: 1 |                 |                  |                     |              |
| Measuring range                          | -0.05...1 bar                                             | -50...1000 mbar | -0.72...14.5 psi | -20.1...401.5 inH2O | -5...100 kPa |
| 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                   | 30000 mbar                                                | 450 psi         |                  | 3000 kPa            |              |
| Pressure rating                          | 10000 mbar                                                | 145 psi         |                  | 1000 kPa            |              |
| Vacuum resistance [mbar]                 | -1000                                                     |                 |                  |                     |              |
| Type of pressure                         | relative pressure                                         |                 |                  |                     |              |
| MAWP (for applications according to CRN) | 10 bar                                                    | 10000 mbar      | 145 psi          | 1000 kPa            |              |
| Electrical data                          |                                                           |                 |                  |                     |              |
| Operating voltage [V]                    | 18...30 DC; (to SELV/PELV)                                |                 |                  |                     |              |
| Current consumption [mA]                 | < 35                                                      |                 |                  |                     |              |
| Min. insulation resistance [MΩ]          | 100; (500 V DC)                                           |                 |                  |                     |              |

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|                             |     |
|-----------------------------|-----|
| Protection class            | III |
| 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    | -0.05...1 bar   | -50...1000 mbar  | -0.72...14.5 psi   | -20.1...401.5 inH2O | -5...100 kPa |
| Analog start point | -50...800 mbar  | -0.72...11.6 psi | -20...321 inH2O    | -5...80 kPa         |              |
| Analog end point   | 150...1000 mbar | 2.18...14.5 psi  | 60.5...401.5 inH2O | 15...100 kPa        |              |

### Factory setting / CMPT = 2

|                                   |                 |                  |                     |                 |
|-----------------------------------|-----------------|------------------|---------------------|-----------------|
| Set point SP                      | -44...1000 mbar | -0.64...14.5 psi | -17.5...401.5 inH2O | -4.4...100 kPa  |
| Reset point rP                    | -48...996 mbar  | -0.7...14.44 psi | -19...400 inH2O     | -4.4...99.6 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         | 0.5 inH2O           | 0.2 kPa         |

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

|                                   |                 |                   |                     |                 |
|-----------------------------------|-----------------|-------------------|---------------------|-----------------|
| Set point SP                      | -44...1000 mbar | -0.63...14.5 psi  | -17.5...401.5 inH2O | -4.4...100 kPa  |
| Reset point rP                    | -48...996 mbar  | -0.69...14.44 psi | -19.2...399.8 inH2O | -4.8...99.6 kPa |
| Min. difference between SP and rP | 5 mbar          | 0.06 psi          | 1.7 inH2O           | 0.5 kPa         |
| In steps of                       | 1 mbar          | 0.01 psi          | 0.1 inH2O           | 0.1 kPa         |

### Accuracy / deviations

|                                       |                          |
|---------------------------------------|--------------------------|
| Switch point accuracy [% of the span] | < ± 0,4; (Turn down 1:1) |
|---------------------------------------|--------------------------|



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|                                    |                        |                                                                                                                  |
|------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------|
| Repeatability                      | [% of the span]        | $< \pm 0,1$ ; (with temperature fluctuations $< 10$ K; Turn down 1:1)                                            |
| Characteristics deviation          | [% of the span]        | $< \pm 0,25$ (BFSL) / $< \pm 0,5$ (LS); (Turn down 1:1; BFSL = Best Fit Straight Line; LS = limit value setting) |
| Hysteresis deviation               | [% of the span]        | $< \pm 0,1$ ; (Turn down 1:1)                                                                                    |
| Long-term stability                | [% of the span]        | $< \pm 0,05$ ; (Turn down 1:1; per 6 months)                                                                     |
| Temperature coefficient zero point | [% of the span / 10 K] | $< \pm 0,2$ ; (-0...80 °C)                                                                                       |
| Temperature coefficient span       | [% of the span / 10 K] | $< \pm 0,2$ ; (-0...80 °C)                                                                                       |
| 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>475</td></tr> <tr> <td>Status_B High Resolution / CMPT = 3</td><td>991</td></tr> </table> | Type of operation | DeviceID | Factory setting / CMPT = 2 | 475 | Status_B High Resolution / CMPT = 3 | 991 |
| Type of operation                   | DeviceID                                                                                                                                                                                            |                   |          |                            |     |                                     |     |
| Factory setting / CMPT = 2          | 475                                                                                                                                                                                                 |                   |          |                            |     |                                     |     |
| Status_B High Resolution / CMPT = 3 | 991                                                                                                                                                                                                 |                   |          |                            |     |                                     |     |
| 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     | [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                                                                                                                                         |          |            |          |    |                              |   |



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|                                                                                                                                          |                                                                                            |                                         |
|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------|
| 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 [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 number                                                                         | J012                                    |
| Pressure equipment directive                                                                                                             | sound engineering practice; can be used for group 2 fluids; group 1 fluids on request      |                                         |
| Mechanical data                                                                                                                          |                                                                                            |                                         |
| Weight [g]                                                                                                                               | 222                                                                                        |                                         |
| 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                                                                               | 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                                                                                     |                                                                                            |                                         |
| <div><div><div><div><div></div><div></div><div></div><div></div></div><div>2</div><div>1</div><div>3</div><div>4</div></div></div></div> |                                                                                            |                                         |

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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            |