

PN2299



Pressure sensor with display

PN-1-1BREN14-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 analogue outputs: 1 |                   |                  |                   |                  |                |
| Measuring range                          | -1...1 bar                                                  | -1000...1000 mbar | -14.5...14.5 psi | -29.5...29.5 inHg | -402...402 inH2O | -100...100 kPa |
| Process connection                       | threaded connection 1/4" NPT 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                                                       |                   |                  |                   |                  |                |
| Vacuum resistance [MPa]                  | -0.1                                                        |                   |                  |                   |                  |                |
| Type of pressure                         | relative pressure; vacuum                                   |                   |                  |                   |                  |                |
| MAWP (for applications according to CRN) | 20 bar                                                      | 20000 mbar        | 290 psi          |                   | 2000 kPa         |                |
| Electrical data                          |                                                             |                   |                  |                   |                  |                |
| Operating voltage [V]                    | 18...30 DC; (to SELV/PELV)                                  |                   |                  |                   |                  |                |
| Current consumption [mA]                 | < 35                                                        |                   |                  |                   |                  |                |



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|                             |      |                 |
|-----------------------------|------|-----------------|
| Min. insulation resistance  | [MΩ] | 100; (500 V DC) |
| 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 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]<br>2                                                   |
| Permanent current rating of switching output DC | [mA]<br>250                                                |
| Switching frequency DC                          | [Hz]<br>< 500                                              |
| Number of analogue outputs                      | 1                                                          |
| Analogue current output                         | [mA]<br>4...20; (scalable 1:5)                             |
| Max. load                                       | [Ω]<br>500                                                 |
| Analogue voltage output                         | [V]<br>0...10; (scalable 1:5)                              |
| Min. load resistance                            | [Ω]<br>2000                                                |
| Short-circuit protection                        | yes                                                        |
| Type of short-circuit protection                | pulsed                                                     |
| Overload protection                             | yes                                                        |

## Measuring/setting range

|                      |                  |                   |                   |                   |                  |                |
|----------------------|------------------|-------------------|-------------------|-------------------|------------------|----------------|
| Measuring range      | -1...1 bar       | -1000...1000 mbar | -14.5...14.5 psi  | -29.5...29.5 inHg | -402...402 inH2O | -100...100 kPa |
| Analogue start point | -1000...600 mbar | -14.5...8.7 psi   | -29.5...17.7 inHg | -402...240 inH2O  | -100...60 kPa    |                |
| Analogue end point   | -600...1000 mbar | -8.7...14.5 psi   | -17.7...29.5 inHg | -240...402 inH2O  | -60...100 kPa    |                |

## Factory setting / CMPT = 2

|                                   |                  |                   |                   |                  |                 |
|-----------------------------------|------------------|-------------------|-------------------|------------------|-----------------|
| Set point SP                      | -985...1000 mbar | -14.3...14.5 psi  | -29.2...29.5 inHg | -396...402 inH2O | -98.5...100 kPa |
| Reset point rP                    | -995...990 mbar  | -14.45...14.4 psi | -29.4...29.3 inHg | -400...398 inH2O | -99.5...99 kPa  |
| Min. difference between SP and rP | 10 mbar          | 0.15 psi          | 0.3 inHg          | 4 inH2O          | 1 kPa           |
| In steps of                       | 5 mbar           | 0.05 psi          | 0.1 inHg          | 2 inH2O          | 0.5 kPa         |

## Status\_B High Resolution / CMPT = 3

|                                   |                  |                    |                   |                  |                  |
|-----------------------------------|------------------|--------------------|-------------------|------------------|------------------|
| Set point SP                      | -987...1000 mbar | -14.32...14.5 psi  | -29.2...29.5 inHg | -396...401 inH2O | -98.7...100 kPa  |
| Reset point rP                    | -996...992 mbar  | -14.44...14.38 psi | -29.4...29.3 inHg | -400...398 inH2O | -99.6...99.2 kPa |
| Min. difference between SP and rP | 9 mbar           | 0.12 psi           | 0.3 inHg          | 4 inH2O          | 0.9 kPa          |
| In steps of                       | 1 mbar           | 0.01 psi           | 0.1 inHg          | 1 inH2O          | 0.1 kPa          |

## Accuracy / deviations

|                       |                          |
|-----------------------|--------------------------|
| Switch point accuracy | < ± 0,4; (Turn down 1:1) |
|-----------------------|--------------------------|



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|                                     |                                                                        |                                                                                                                                 |
|-------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|                                     | [% of the span]                                                        |                                                                                                                                 |
| Repeatability                       | [% of the span]                                                        | < ± 0,1; (with temperature fluctuations < 10 K; Turn down 1:1)                                                                  |
| Characteristics deviation           | [% of the span]                                                        | < ± 0,25 (BFSL) / < ± 0,5 (LS); (Turn down 1:1; BFSL = Best Fit Straight Line; LS = limit value setting)                        |
| Hysteresis deviation                | [% of the span]                                                        | < ± 0,1; (Turn down 1:1)                                                                                                        |
| Long-term stability                 | [% of the span]                                                        | < ± 0,05; (Turn down 1:1; per 6 months)                                                                                         |
| Temperature coefficient zero point  | [% of the span / 10 K]                                                 | < ± 0,2; (-0...80 °C)                                                                                                           |
| Temperature coefficient span        | [% 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                                             | 477                                                                                                                             |
|                                     | Status_B High Resolution / CMPT = 3                                    | 993                                                                                                                             |
| 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)     | 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]  | 1                                                                                          |                                              |
| 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]                          | 223.5                                                                                      |                                              |
| Housing                             | cylindrical                                                                                |                                              |
| Dimensions [mm]                     | Ø 34 / L = 90.7                                                                            |                                              |
| 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]              | > 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                                                                               | 5 x LED, green (mbar, psi, kPa, inH2O, inHg) |
|                                     | switching status                                                                           | 2 x LED, yellow                              |
|                                     | measured values                                                                            | alphanumeric display, red/green 4-digit      |
| Remarks                             |                                                                                            |                                              |
| Pack quantity                       | 1 pcs.                                                                                     |                                              |

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### Electrical connection

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



### Connection



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