

## BPG402-S

### Bayard-Alpert Pirani Gauge

The INFICON Bayard-Alpert Pirani Combination Gauge, BPG402-S, functions as two gauges in a single compact unit measuring from  $5 \times 10^{-10}$  mbar to atmosphere ( $3.8 \times 10^{-10}$  Torr to atmosphere). Combining technologies reduces the complexity of installation, setup, and integration. Choose the BPG402-S with two yttrium oxide coated iridium filaments for affordable and repeatable process to base pressure measurements in one economical package. Sensing elements with on-board calibration data guarantees high reproducibility when exchanging sensors.



#### ADVANTAGES

- Extremely wide measurement range from  $5 \times 10^{-10}$  mbar to atmosphere ( $3.8 \times 10^{-10}$  Torr to atmosphere)
- Excellent repeatability in the process pressure range from  $10^{-8}$  ...  $10^{-2}$  mbar of 5%
- Pirani interlock protects the filament from premature burnout
- Two long-life yttrium oxide coated iridium filaments
- Optional graphic display and Fieldbus interfaces available, e.g. EtherCAT, DeviceNet, etc.
- Latest EtherCAT protocol generation 2.0
- Automatic high vacuum Pirani adjustment reduces operator interventions
- Easy to exchange sensing element with on-board calibration data guarantees high reproducibility
- RoHS compliance

#### APPLICATIONS

- Pressure measurement in semiconductor process and transfer chambers
- Industrial coating
- General vacuum measurement and control in the low to ultra high vacuum range

# BPG402-S

## ORDERING INFORMATION

| Type         | BPG402-S<br>w/o display | BPG402-S<br>with display | BPG402-SL<br>with long<br>tube<br>w/o display | BPG402-SP<br>with<br>Profibus DP <sup>1)</sup> | BPG402-SD<br>with<br>DeviceNet™ <sup>1)</sup> | BPG402-SE<br>with<br>EtherCAT <sup>®2)</sup> |
|--------------|-------------------------|--------------------------|-----------------------------------------------|------------------------------------------------|-----------------------------------------------|----------------------------------------------|
| DN 25 ISO-KF | 353-570                 | 353-572                  | -                                             | 353-574                                        | 353-576                                       | 353-596                                      |
| DN 40 CF-R   | 353-571                 | 353-573                  | 353-578                                       | 353-575                                        | 353-577                                       | 353-597                                      |

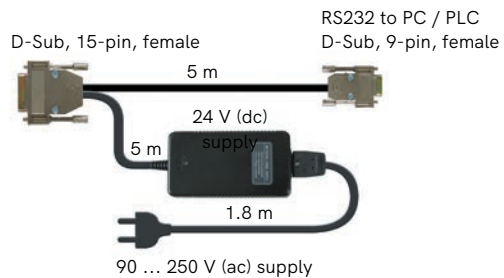
<sup>1)</sup> Communication standard ETG.5 == 3.2080 S (R) V1.3.0; old version V1.0.0 still available on request

<sup>2)</sup> not available with LCD

| Spare Parts                     | BPG402-S | BPG402-S | BPG402-SL | BPG402-SP | BPG402-SD | BPG402-SE |
|---------------------------------|----------|----------|-----------|-----------|-----------|-----------|
| Replacement sensor DN 25 ISO-KF | 354-494  | 354-494  | -         | 354-494   | 354-494   | 354-494   |
| Replacement sensor DN 40 CF-R   | 354-495  | 354-495  | 354-496   | 354-495   | 354-495   | 354-495   |

| Accessories                             | Part no. |
|-----------------------------------------|----------|
| Power supply 24 V (dc) / RS232C line    | 353-511  |
| Baffle                                  | 353-512  |
| Centering ring with baffle DN 25 ISO-KF | 211-113  |

### Power supply 24 V (dc) / RS232C line



### Baffle:

Prevents contamination of the sensor.  
Easy installation into the vacuum connection - no tools required.



## BPG402-S

### SPECIFICATIONS

|                                                               | BPG402-S / -SL Standard                                                                  | BPG402-S Display |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------|
| Measurement range (air, O <sub>2</sub> , CO, N <sub>2</sub> ) | 5 × 10 <sup>-10</sup> ... 1000 mbar (3.8 × 10 <sup>-10</sup> ... 750 Torr)               |                  |
| Accuracy 10 <sup>-8</sup> ... 10 <sup>-2</sup> mbar           |                                                                                          | ±15% of reading  |
| Repeatability 10 <sup>-8</sup> ... 10 <sup>-2</sup> mbar      |                                                                                          | 5% of reading    |
| Degas <sup>1)</sup> p < 7.2 × 10 <sup>-6</sup> mbar           | Electron bombardment, max. 3 min                                                         |                  |
| Pressure, max. (absolute)                                     | 2 bar                                                                                    |                  |
| Temperature                                                   |                                                                                          |                  |
| Operation (ambient)                                           | 0 - +50°C                                                                                |                  |
| Storage                                                       | -20 - +70°C                                                                              |                  |
| Bakeout at flange without electronics                         |                                                                                          |                  |
| BPG402-S                                                      | 80°C                                                                                     |                  |
| BPG402-SL                                                     | 150°C                                                                                    |                  |
| Supply voltage                                                | +20 - +28 V / ≤0.8 A (dc)                                                                |                  |
| Output signal analog                                          | 0 - +10 V                                                                                |                  |
| Measurement range                                             | +0.774 - +10 V                                                                           |                  |
| Voltage vs. pressure                                          | 0.75 V / Decade                                                                          |                  |
| Error signal                                                  | 0.1 / 0.3 / 0.5 V                                                                        |                  |
| Load impedance, min.                                          | 10 kΩ                                                                                    |                  |
| Set point relay                                               | 1                                                                                        |                  |
| Range                                                         | 1 × 10 <sup>-9</sup> ... 100 mbar                                                        |                  |
| Relay contact                                                 | NO, potential free                                                                       |                  |
| Hysteresis                                                    | 10% of reading                                                                           |                  |
| Contact rating                                                | ≤30 V / ≤0.5 A (dc)                                                                      |                  |
| Digital functions                                             | Degas                                                                                    |                  |
| Interface (digital) <sup>2)</sup>                             | RS232C                                                                                   |                  |
| Emission control                                              | Automatic / manual via interface                                                         |                  |
| Filament                                                      | Two Yt <sub>2</sub> O <sub>3</sub> coated Ir                                             |                  |
| Filament status                                               | LED / digital output                                                                     |                  |
| Electrical connection                                         | D-Sub, 15 pin, male                                                                      |                  |
| Cable length, max. <sup>3)</sup>                              | 100 m (330 ft)                                                                           |                  |
| Materials exposed to vacuum                                   | Yt <sub>2</sub> O <sub>3</sub> , Ir, Pt, Mo, Cu, W, NiFe, NiCr, stainless steel, glass   |                  |
| Internal volume KF / CF                                       | 24 cm <sup>3</sup> (1.46 in. <sup>3</sup> ) / 34 cm <sup>3</sup> (2.1 in. <sup>3</sup> ) |                  |
| Weight KF / CF                                                | 450 g / 710 g                                                                            |                  |
| Degree of protection                                          | IP30                                                                                     |                  |

<sup>1)</sup> Reduced accuracy during degas

<sup>2)</sup> Simultaneous use of RS232C or VGC40x and VGC50x series controllers and Fieldbus is not allowed

<sup>3)</sup> For RS232C operation <30 m

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### SPECIFICATIONS INTERFACES

#### DeviceNet™

|                                                                 |                                                                                                                                                                                                                        |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Protocol                                                        | DeviceNet™, group 2 slave only                                                                                                                                                                                         |
| Data rate switch                                                | 125, 250, 500 kBaud or network programmable                                                                                                                                                                            |
| Cable length                                                    |                                                                                                                                                                                                                        |
| 125 kbps                                                        | 500 m (1650 ft.)                                                                                                                                                                                                       |
| 250 kbps                                                        | 250 m (825 ft.)                                                                                                                                                                                                        |
| 500 kbps                                                        | 100 m (330 ft.)                                                                                                                                                                                                        |
| MAC ID                                                          | Two switches (address 00 - 63) or network programmable                                                                                                                                                                 |
| Digital functions                                               | Read pressure, select units: Torr, mbar, Pa<br>Degas function, Pirani full scale adjust<br>Monitor gauge status<br>Safe state allows definition of behavior in case of error<br>Detailed alarm and warning information |
| Analog functions                                                | 0 ... 10 V analog output pressure indication<br>two setpoint relays A + B                                                                                                                                              |
| Visual communication indicators                                 | LED network status (green / red)<br>LED module status (green / red)                                                                                                                                                    |
| Specification                                                   | DeviceNet™ "Vacuum Gauge Device Profile"                                                                                                                                                                               |
| Device type                                                     | "CG" for combination gauge                                                                                                                                                                                             |
| I / O slave messaging                                           | Polling only                                                                                                                                                                                                           |
| Setpoint relays                                                 | 2                                                                                                                                                                                                                      |
| Range                                                           | $1 \times 10^{-9}$ ... 100 mbar                                                                                                                                                                                        |
| Relay contact                                                   | NO, potential free                                                                                                                                                                                                     |
| Hysteresis                                                      | 10 % of reading                                                                                                                                                                                                        |
| Contact rating                                                  | 60 V / 0.5 A (dc)                                                                                                                                                                                                      |
| Supply voltage for DeviceNet™                                   | +11 - +25 V / 0.5 A (dc)                                                                                                                                                                                               |
| Supply voltage for gauge                                        | +20 - +28 V / 0.8 A (dc)                                                                                                                                                                                               |
| Connector for DeviceNet™                                        | Microstyle, 5-pin                                                                                                                                                                                                      |
| Connector for Gauges (analog output, supply voltage, setpoints) | D-Sub, 15-pin, male                                                                                                                                                                                                    |

#### EtherCAT®

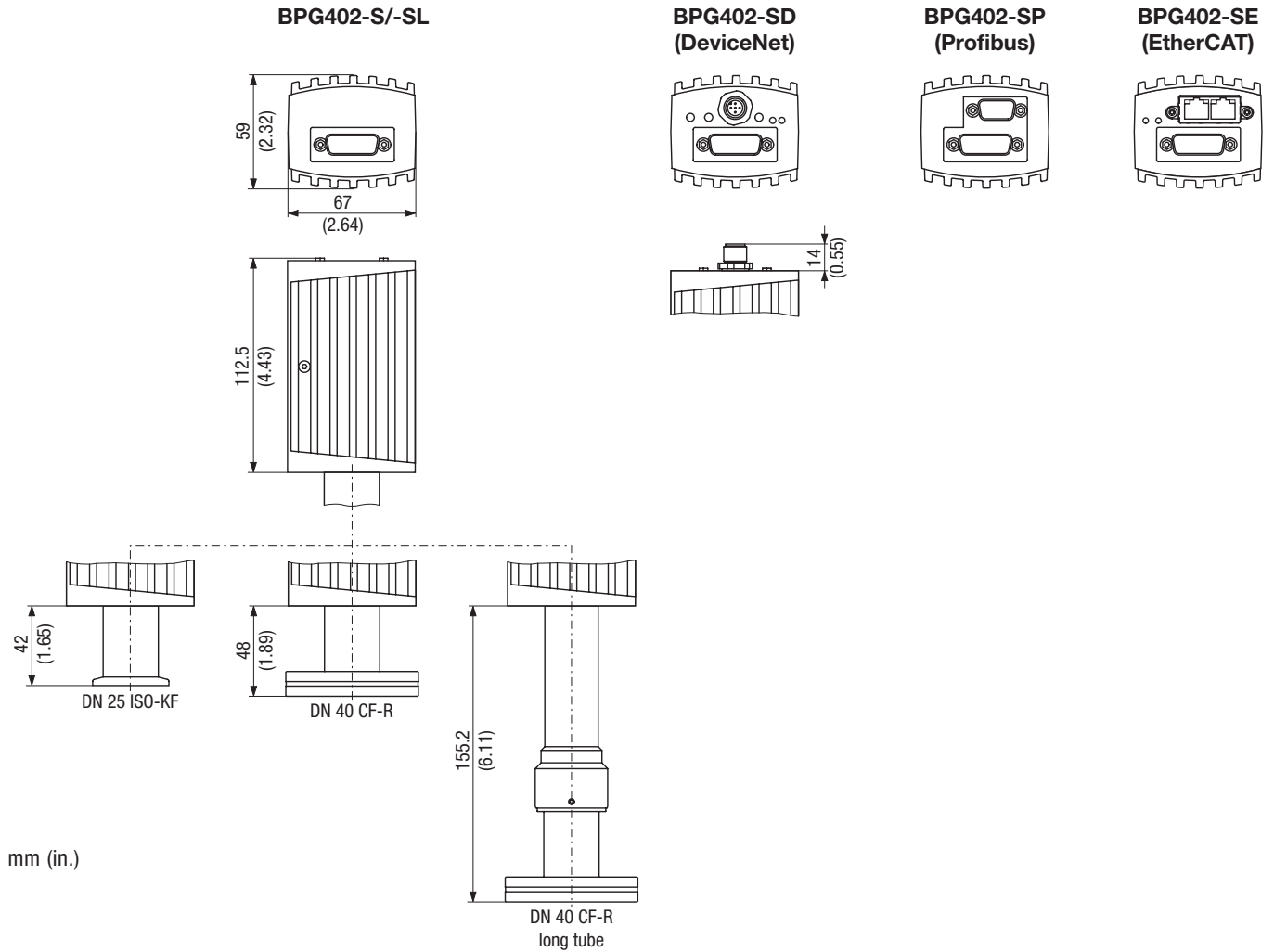
|                         |                                                                                                                                               |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Protocol                | EtherCAT®                                                                                                                                     |
| Communication standards | Semiconductor Device Profile<br>ETG.5003 Part 1 Common Device Profile<br>ETG.5003 Part 2080 "Specific Device Profile - Vacuum Pressure Gauge" |
| Process Data            | Fixed PDO mapping and configurable PDO mapping                                                                                                |
| EtherCAT connector      | RJ45, 8-pin (socket), IN and OUT                                                                                                              |
| Cable                   | Shielded Ethernet CAT5e or higher                                                                                                             |
| Cable length            | ≤100 m (330 ft.)                                                                                                                              |
| Data rate               | 100000 Kbps                                                                                                                                   |

## BPG402-S

| PROFIBUS DP                                                  |                                                                                                                                                                                                                                         |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baud rates                                                   | 9.6 / 19.2 / 93.75 / 187.5 / 500 kBaude<br>1.5 / 12 MBaud                                                                                                                                                                               |
| Address                                                      | Two switches (address 00 - 127) or network programmable                                                                                                                                                                                 |
| Digital functions                                            | Read pressure, select units: Torr, mbar, Pa<br>Degas function, Pirani full scale adjust<br>Monitor gauge status, filament status<br>Safe state allows definition of behavior in case of error<br>Detailed alarm and warning information |
| Analog functions                                             | 0 ... 10 V analog output pressure indication<br>two setpoint relays A + B                                                                                                                                                               |
| Setpoint relays                                              | 2                                                                                                                                                                                                                                       |
| Range                                                        | $1 \times 10^{-9}$ ... 100 mbar                                                                                                                                                                                                         |
| Relay contact                                                | NO, potential free                                                                                                                                                                                                                      |
| Hysteresis                                                   | 10 % of reading                                                                                                                                                                                                                         |
| Contact rating                                               | $\leq 30$ V / $\leq 0.5$ A (dc)                                                                                                                                                                                                         |
| Connector for Profibus DP                                    | D-Sub, 9-pin, female                                                                                                                                                                                                                    |
| Connector for BPG (analog output, supply voltage, setpoints) | D-Sub, 15-pin, male                                                                                                                                                                                                                     |

# BPG402-S

## DIMENSIONS



mm (in.)