Operating Manual
Incl. EU Declaration of Conformity

Trigon™ BCG552

Bayard-Alpert Pirani Capacitance Diaphragm TripleGauge®

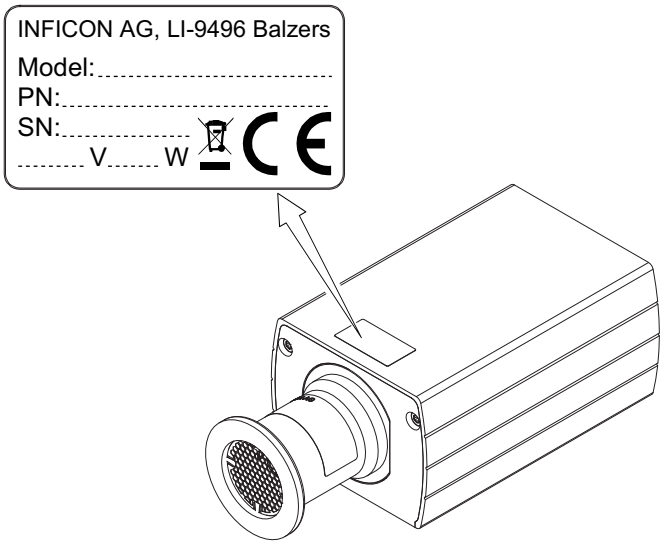
Table of Contents

Symbol for cross-references within this document: → 🗎 XY
Symbol for references to literature list: → 🕮 [Z]

1 General

1.1 Product Identification

In all communications with INFICON, please specify the information on the product nameplate.



1.2 Validity

This document applies to products with the following part numbers:

3 B C 3 - G x x - x 3 x 0

Digital interface	0 = None (analoge) G = EtherCAT
Display Switching function	3 = 2 switching functions, ATM sensor C = Display, 2 switching functions, ATM sensor
Flange	6 = DN 25 ISO-KF 8 = DN 40 CF-R
Unit	0 = mbar 1 = Torr 2 = Pa

The part number (PN) can be taken from the product nameplate.

If not indicated otherwise in the legends, the illustrations in this document correspond to gauges without display and with DN 25 ISO-KF vacuum connection. They apply to the other gauges by analogy.

1.3 Intended Use

The Trigon™ BCG552 gauges have been designed for vacuum measurement of gases in the pressure range 5×10^{-10} ... 1500 mbar.

They must not be used for measuring flammable or combustible gases in mixtures containing oxidants (e.g. atmospheric oxygen) within the explosion range.

The gauge is intended for operation in connection with an INFICON Vacuum Gauge Controller of the VCG50x and VGC40x series (limited to BCG450 functionality) or with another suitable controller.

1.4 Functional Principle

Due to the combination of three sensor technologies incorporated in the gauge (capacitance diaphragm sensor, Pirani sensor and hot cathode ionization sensor (BA)), a minimized gas type dependence is achieved.

Between 10 mbar and atmospheric pressure, the capacitance diaphragm sensor operates without any gas type dependence. Below 1 mbar, the Pirani sensor and the hot cathode ionization sensor take over with only a small gas type dependence.

Between 1 ... 10 mbar and 5×10^{-3} ... 2×10^{-2} mbar the gauge's built-in electronic circuits take care of continuous and smooth crossovers between the ranges. Over the whole measurement range, the measurement signal is output as a logarithm of the pressure.

The hot cathode is switched on by the Pirani measurement system only below the switching threshold of 2.4×10^{-2} mbar (to prevent damage). It is switched off when the pressure exceeds 3.2×10^{-2} mbar.

The gauge is equipped with two hot cathodes. The identical filaments are monitored by the gauge electronics. In case of a filament failure, the gauge will switch over to the second (undamaged) filament and continue to operate. The filament status is displayed on the gauge or can be read via the interfaces.

Gauge adjustment is carried out automatically. No manual adjustment is required.

A user programmable atmospheric pressure switching function is incorporated.

1.5 Trademarks

Trigon™	INFICON Holding AG
TripleGauge®	INFICON Holding AG
VacXplor™	INFICON Holding AG
EtherCAT®	EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

2 Safety

2.1 Symbols Used

⚠ DANGER

Information on preventing any kind of physical injury.

⚠ WARNING

Information on preventing extensive equipment and environmental damage.

⚠ Caution

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.

☞ Notice

<…> Labeling

2.2 Personnel Qualifications

Skilled personnel

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

2.3 Liability and Warranty

INFICON assumes no liability and the warranty becomes null and void if the end-user or third parties

- disregard the information in this document
- use the product in a non-conforming manner
- make any kind of interventions (modifications, alterations etc.) on the product
- use the product with accessories not listed in the corresponding product documentation.

The end-user assumes the responsibility in conjunction with the process media used.

Gauge failures due to contamination or wear and tear, as well as expendable parts (e.g. BA cathode) are not covered by the warranty.

2.4 General Safety Instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used.

  Consider possible reactions with the product materials.

  Consider possible reactions (e.g. explosion) of the process media due to the heat generated by the product (Pirani filament 120 °C, Bayard-Alpert filament 1600 °C).
- Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
- Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.
- The device must not be connected to the Internet.

Communicate the safety instructions to all other users.

3 Technical Data

Measurement principle

Pressure range	
10 ... 1500 mbar	capacitance diaphragm sensor
1 ... 10 mbar	crossover range
2×10^{-2} ... 1 mbar	Pirani sensor
5×10^{-3} ... 2×10^{-2} mbar	crossover range
5×10^{-10} ... 5×10^{-3} mbar	hot cathode ionisation (BA)

Measurement range

Measurement range (air, O_2, CO, N_2)	5×10^{-10} … 1500 mbar, continuous
Accuracy	
1×10^{-8} ... 50 mbar	±15% of reading
50 ... 950 mbar	±5% of reading
950 ... 1050 mbar	±2.5% of reading
Repeatability	
1×10^{-8} ... 100 mbar	5% of reading
Gas type dependence	→ 🗎 41

Emission (hot cathode)

Switching on threshold	2.4×10^{-2} mbar
Switching off threshold	3.2×10^{-2} mbar
Emission current	
Sliding mode (default)	
$p \le 8\times10^{-7}$ mbar	5 mA
$p > 1\times10^{-3}$ mbar	25 µA
Two point mode	
$p \le 7.2\times10^{-6}$ mbar	5 mA
3.0×10^{-5} mbar < p < 3.2×10^{-2} mbar	25 µA
Emission current switching	
Two point mode	
25 µA ➔ 5 mA	7.2×10^{-6} mbar
5 mA ➔ 25 µA	3.0×10^{-5} mbar

Degas (hot cathode)

Degas emission current ($p < 7.2 \times 10^{-6}$ mbar)	≈16 mA (P_{degas} ≈4 W)
Control input signal	0 V/+24 V (dc), active high (control via RS232 → 🗎 27)
Duration	≤3 min
In degas mode, the gauge keeps supplying measurement values, however their tolerances may be higher than during normal operation.	

Output signal

Output signal (measurement signal)	0 … +10.13 V
Measurement range	0.774 … +10.13 V (5×10^{-10} … 1500 mbar)
Voltage vs. pressure	0.75 V/decade, logarithmic
Error signal	+0.1 V (diaphragm sensor or EEPROM error) +0.3 V (BA sensor error) +0.5 V (Pirani sensor error)
Minimum loaded impedance	10 kΩ

Display

Display panel	OLED, 3.81 cm (1.5")
Pressure units	mbar (default), Torr, Micron, Pa, hPa

Supply

⚠ DANGER

The gauge may only be connected to power supplies, instruments or control devices that conform to the requirements of a grounded protective extra-low voltage (PELV) and limited power source (LPS), Class 2.

- The connection to the gauge has to be fused [1].

Supply voltage	Class 2 / LPS
at the gauge	+24 V (dc) (+20 … +28 V (dc)) [2]
Ripple	≤2 V_{pp}
Power consumption	
Standard operation	≤0.5 A
Degas	≤0.9 A
Emission start (<200 ms)	≤1.4 A
Power consumption	
without fieldbus	≤18 W
with fieldbus	≤21 W
Fuse to be connected [1]	1.25 AT

Sensor cable connection

For reasons of compatibility, the expression "sensor cable" is used for all BCG552 versions in this document, although the pressure reading of the gauges with fieldbus interface is normally transmitted via the corresponding bus.

[1] INFICON controllers fulfill these requirements.

[2] Measured at sensor cable connector (consider the voltage drop as function of the sensor cable length).

Receptacle	D-sub 15-pin, male
Sensor cable	shielded, number of conductors depending on the functions used (max. 15 conductors plus shielding)
Cable length (supply voltage 24 V [2])	
Analog and fieldbus operation	≤35 m (0.25 mm^2 / conductor)
RS232C operation	≤30 m
Gauge identification	42 kΩ

Setpoint relays

Relay type	solid state relays
Setpoints	SP1, SP2
Setting range	$5×10^{-10}$ … 1500 mbar
Hysteresis	10% of threshold
Switching characteristics	Low Trip Point
Contact rating	≤60 V (dc) / 0.5 A (dc), resistive
closed	LED on
open	LED off
Switching time	<30 ms

RS232C interface

Data rate	9600 Baud
Data format	binary, 8 data bits, one stop bit, no parity bit, no handshake
For further information on the RS232C interface → 🗎 27.	

EtherCAT interface

Fieldbus name	EtherCAT
Standard applied, data format, communication protocol	→ 🕮 [3], → 🕮 [4]
Data rate	100 Mbps
Node address	explicit device identification
Physical layer	100Base-Tx (IEEE 802.3)
EtherCAT connector	2×RJ45, 8-pin, socket, IN and OUT
Cable	shielded, 8-pin special Ethernet Patch cable (quality CAT5e or higher)
Cable length	≤100 m

Diagnostic port

Plug	Jack connector, 2.5 mm, 3-pin
Protocol	RS232C
Data rate	57600 Baud
Data format	binary, 8 data bits, one stop bit, no parity bit, no handshake
For further information on the diagnostic port → 🕮 [2].	

Materials exposed to vacuum, internal volume

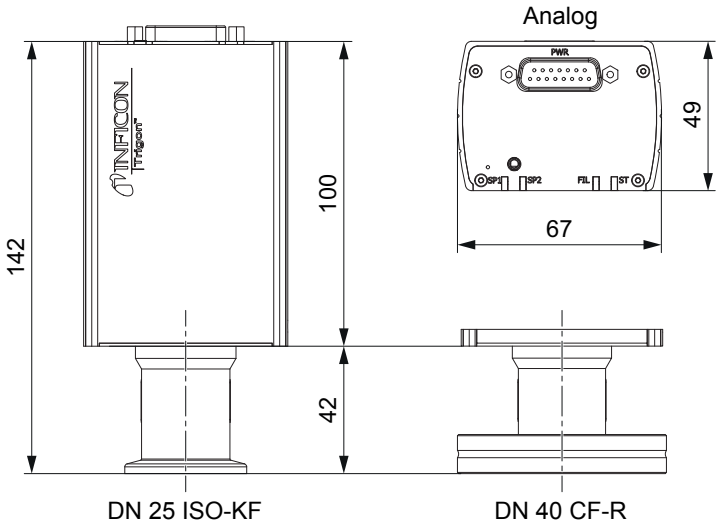
Housing, supports, screens	stainless steel
Feedthroughs	NiFe, nickel plated
Insulator	glass
Cathode	iridium, yttrium oxide (Y_2O_3)
Cathode holder	Nickel

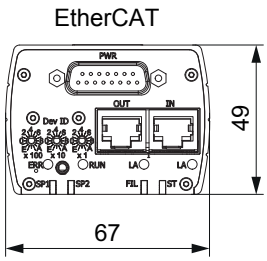
Pirani element	Tungsten
Sensor diaphragm	ceramic (Al_2O_3)
Sensor contacts	SnAg
Internal volume	
DN 25 ISO-KF	≈34 cm^3
DN 40 CF-R	≈34 cm^3
Admissible pressure (absolute)	5 bar
Bursting pressure (absolute)	10 bar

Ambiance

Admissible temperatures	
Storage	-20 … +70 °C
Operation	0 ... +50 °C
Bakeout	+80 °C (at vacuum connection, without electronics unit, horizontally mounted)
Relative humidity (year's mean / during 60 days)	≤65% / 85% (no condensation)
Use	indoors only, altitude up to 2000 m above sea level
Mounting orientation	any
Pollution degree	2
Degree of protection	IP40

Dimensions [mm]





Weight

DN 25 ISO-KF	≈550 g
DN 40 CF-R	≈760 g

4 Installation

4.1 Vacuum Connection

⚠ WARNING

Fragile components

The ceramic sensor may be damaged by impacts.

- Do not drop the product and prevent shocks and impacts.

⚠ DANGER

Leaking process media

High-intensity mechanical, chemical or thermal impacts can cause leaks in the measuring sensor. Process media can thus leak and possibly cause hazards, if overpressure is in the vacuum system.

- Avoid high-intensity mechanical, chemical or thermal impacts and overpressure in the vacuum system.
- Take appropriate measures (e.g. shut off gas supply, extraction, leak test) to avoid hazards or damage due to leaking process media.

⚠ DANGER

Overpressure in the vacuum system >1 bar

Injury caused by released parts and harm caused by escaping process gases can result if clamps are opened while the vacuum system is pressurized.

- Do not open any clamps while the vacuum system is pressurized. Use the type of clamps which are suited to overpressure.

⚠ DANGER

Overpressure in the vacuum system >2.5 bar

KF flange connections with elastomer seals (e.g. O-rings) cannot withstand such pressures. Process media can thus leak and possibly damage your health.

- Use O-rings provided with an outer centering ring.

⚠ DANGER

Protective ground

Products that are not correctly connected to ground can be extremely hazardous in the event of a fault. The gauge must be electrically connected to the grounded vacuum chamber. This connection must conform to the requirements of a protective connection according to EN 61010:

- CF connections fulfill this requirement.
- For manometers with a KF vacuum connection, use a conductive metallic clamping ring.

⚠ Caution

Vacuum component

Dirt and damages impair the function of the vacuum component.

- When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

⚠ Caution

Dirt sensitive area

Touching the product or parts thereof with bare hands increases the desorption rate.

- Always wear clean, lint-free gloves and use clean tools when working in this area.

Mount the gauge so that no vibrations occur. Vibrations at the gauge cause a deviation of the measured values.

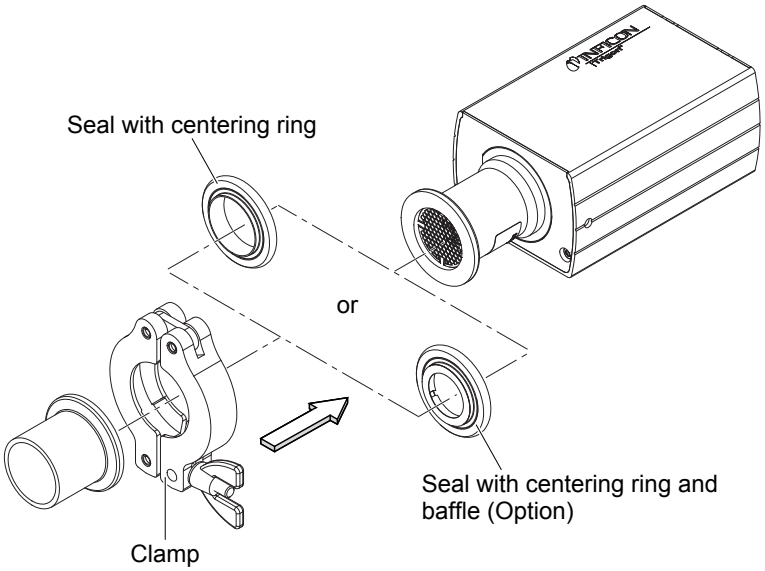
The gauge may be mounted in any orientation. To keep condensates and particles from getting into the measuring chamber preferably choose a horizontal to upright position.

The gauge is supplied with a built-in grid. For potentially contaminating applications and to protect the electrodes against light and fast charged particles, installation of the optional baffle is recommended.

The sensor can be baked at up to 80 °C (at vacuum connection, horizontally mounted). At temperatures exceeding 50 °C, the electronics unit has to be removed.

We recommend to install the gauge without applying vacuum grease.

Remove the protective lid and connect the product to the vacuum system.



Keep the protective lid.

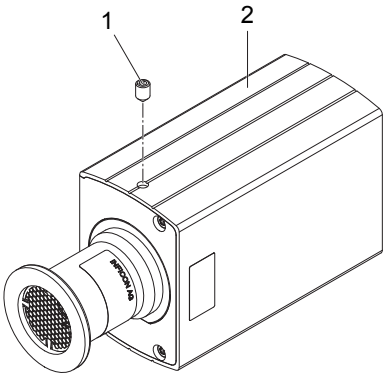
4.1.1 Removing and Installing the Electronics Unit

Required tools / materials

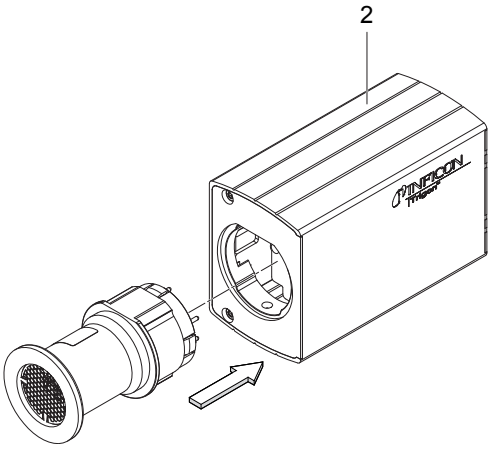
- Allen wrench AF 2.5

Removing the electronics unit

1 Unscrew the hexagon socket set screw (1) on the side of the electronics unit (2).

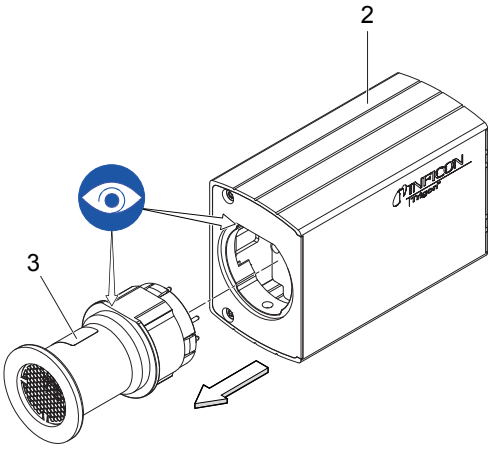


2 Remove the electronics unit (2) without twisting it.



Installing the electronics unit

3 Place the electronics unit (2) on the sensor (3) (be careful to correctly align the pins and notch).



4 Slide the electronics unit in to the mechanical stop and lock it with the hexagon socket set screw.

4.1.2 Using the Optional Baffle

In severely contaminating processes and to protect measurement electrodes optically against light and fast charged particles, replacement of the built-in grid by the optional baffle is recommended.

Precondition

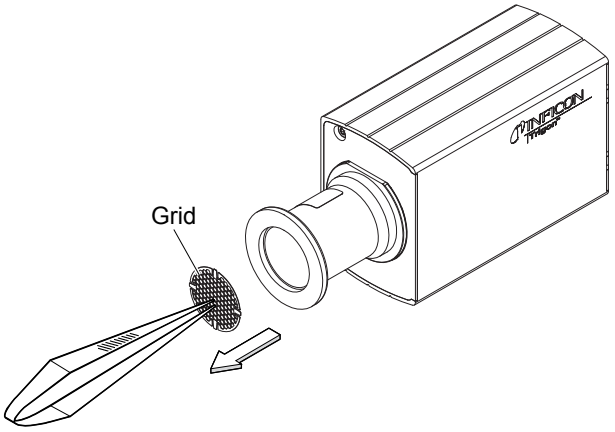
- The gauge is deinstalled.

Required tools / material

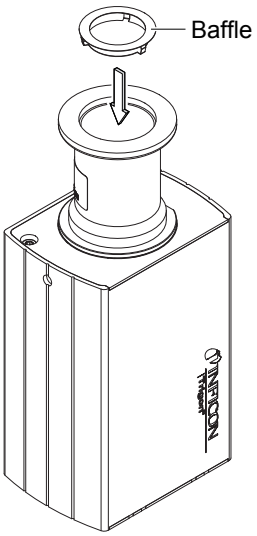
- Baffle
- Pointed tweezers
- Pin (e.g. pencil)
- Screwdriver No 1

Baffle installation

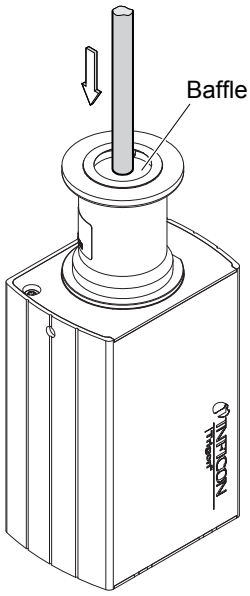
1 Carefully remove the grid with tweezers.



2 Carefully place the baffle onto the sensor opening.

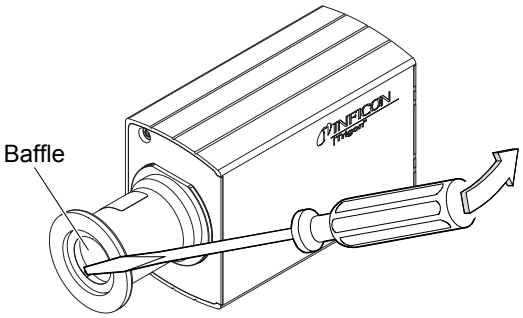


3 Using a pin, press the baffle down in the center until it catches.



Baffle deinstallation

4 Carefully remove the baffle with the screwdriver.

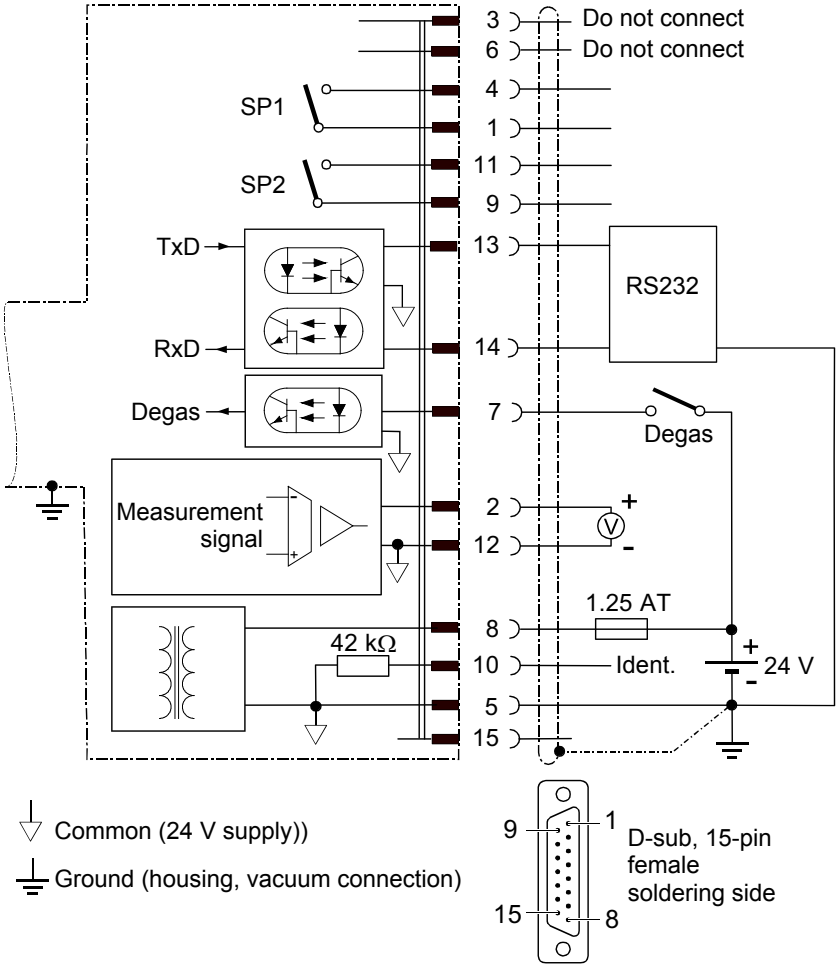


4.2 Power Connection

4.2.1 D-sub, 15-pin Connector

If no sensor cable is available, make one according to the following diagram. Connect the sensor cable.

Corresponding sensor cables for VGC50x / VGC40x Vacuum Gauge Controller → www.inficon.com.



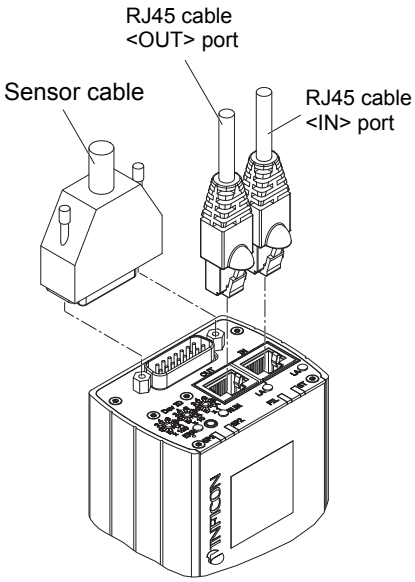
Pin 1	Relay SP 1, common	
Pin 2	Signal output (measurement signal)	0 ... +10.13 V
Pin 3	Do not connect	
Pin 4	Relay SP1 (NO)	
Pin 5	Supply common	0 V
Pin 6	Do not connect	
Pin 7	Degas on, active high	0 V / +24 V
Pin 8	Supply	+24 V (dc)
Pin 9	Relay SP2, common	
Pin 10	Gauge identification	
Pin 11	Relay SP2 (NO)	
Pin 12	Signal common	
Pin 13	RS232C, TxD	
Pin 14	RS232C, RxD	
Pin 15	Do not connect	

4.2.2 EtherCAT Connector

For operating the gauge via EtherCAT, an Ethernet Patch Cable (CAT5e quality) with RJ45 connector is required.

The device supports daisy-chained operation:

- From the previous device, the cable connected to the <OUT> port must be connected to the <IN> port of the gauge.
- And the cable from the <OUT> port of the gauge must be connected to the <IN> port of the next device.



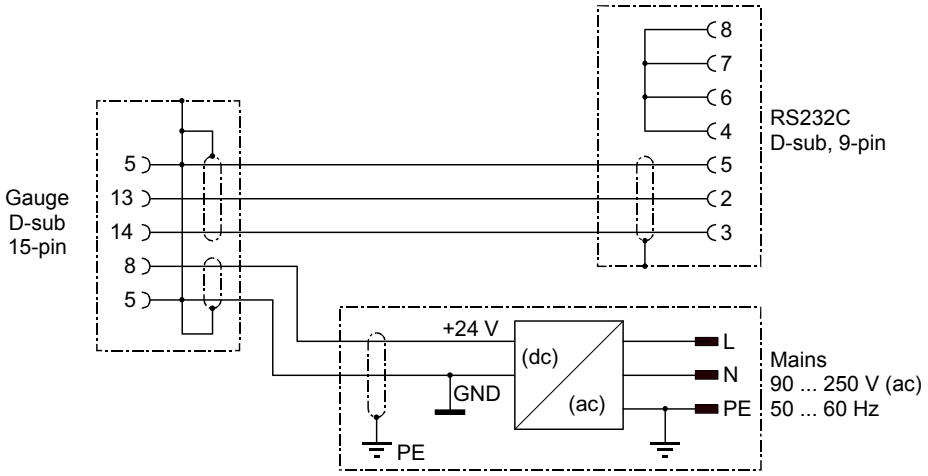
4.2.3 Using the Optional Power Supply (With RS232C Line)

The optional 24 V (dc) power supply allows the RS232C operation of the gauge with any suitable instrument or control device.

Technical Data

Mains connection	
Mains voltage	90 … 250 V (ac), 50 … 60 Hz
Mains cable	1.8 m (Schuko DIN and USA connectors)
Output (operating voltage of gauge)	
Voltage	21 … 27 V (dc), set to 24 V (dc)
Current	≤1.5 Amax. 1.5 A
Gauge connection	
Connector	D-sub 15-pin, female
24 V (dc) cable	5 m, black
Connection to the instrument or control unit	
RS232C connection	D-sub 9-pin, female
Cable	5 m, black, 3-pin shielded

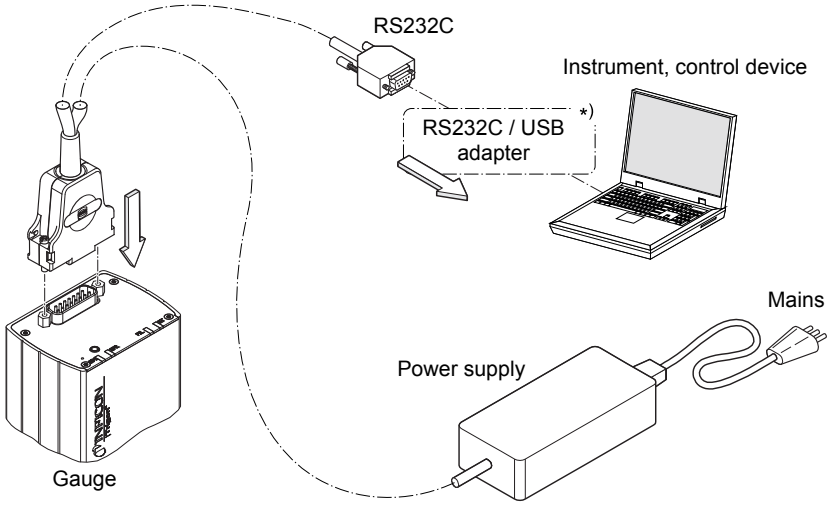
Wiring diagram



Connecting the power supply

1 Connect the power supply to the the gauge.

2 Connect the RS232C line to the instrument or control device.



*) To be provided by the end-user

3 Connect the power supply to the mains.

5 Operation

When the supply voltage is applied, the measurement signal is available at the connector.

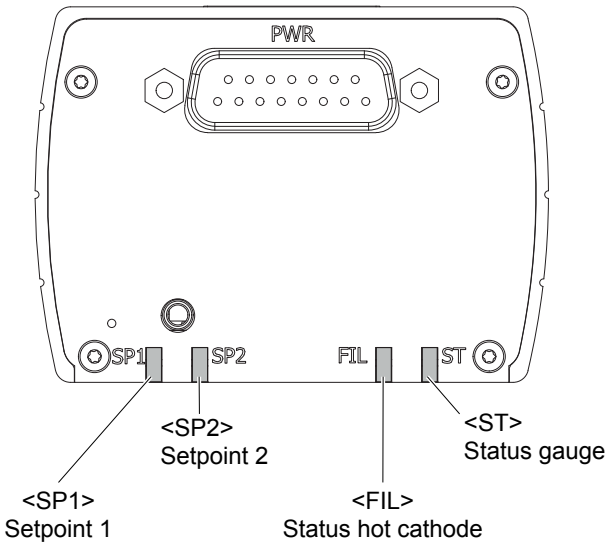
Allow a stabilization period of at least 10 minutes. Therefore it is advisable to operate the gauge continuously, irrespective of the pressure.

Adjusting the Gauge

The gauge is adjusted automatically during operation.

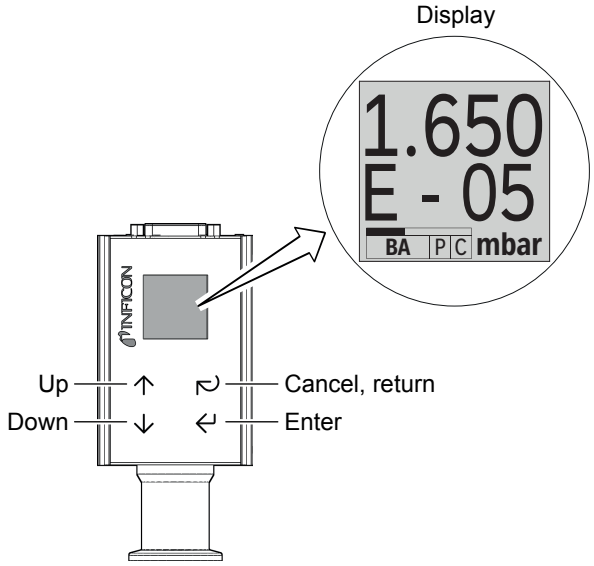
After the stabilization period has elapsed (during initial installation and each reinstallation), the gauge should be operated for further 10 minutes at a pressure $<10^{-6}$ mbar to allow automatic adjustment.

5.1 Status Indication (LEDs)



LED	State	Meaning
<SP1>	lit green	Relay SP1 closed
	off	Relay SP1 open
<SP2>	lit green	Relay SP2 closed
	off	Relay SP2 open
<FIL>	off	Emission off
	lit green	Emission on, both hot cathodes ok
	blinking green	Emission on, one hot cathode broken
	lit solid red	Emission on, both hot cathodes broken
<ST>	off	No supply voltage
	lit green	Measurement mode
	lit solid or is blinking red	Error

5.2 User Interface (OLED)

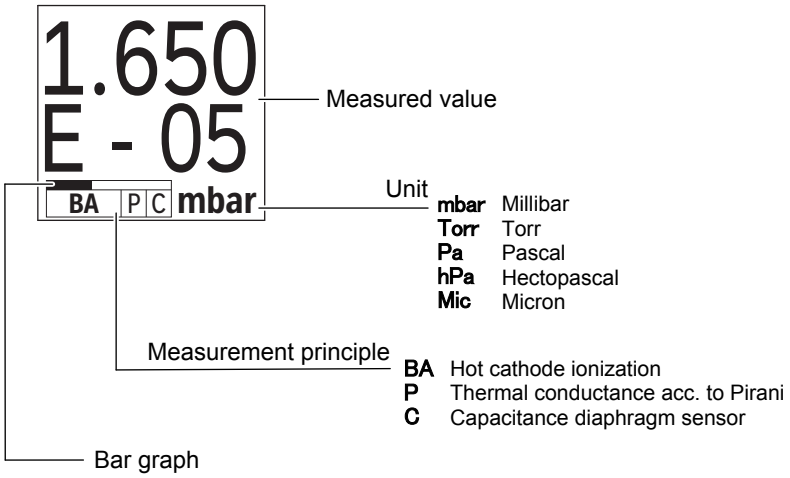


The orientation of the display, the backlight and the screen saver can be adjusted using the operator keys (→ 🗎 22, "Setting Display Parameters").

Put the gauge into operation

When the supply voltage is applied the software version is briefly displayed.

Measurement mode

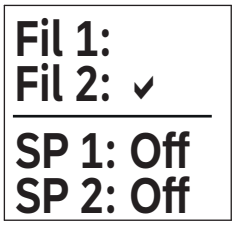


5.2.1 Menu Structure

5.2.1.1 Displaying Gauge Information

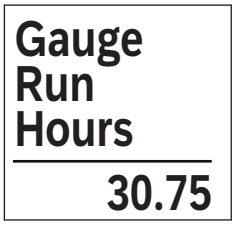
Use the down key to select the desired information.

Status cold cathode filaments and setpoint relays



Display of the status of the active cathode filament and the setpoint relays.

Operating hours gauge



Display of operating hours of the gauge.

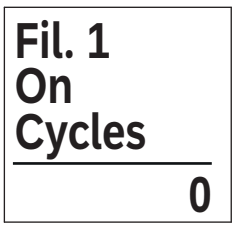
Operating hours cathode filament 1

Display of operating hours of the cathode filament 1.

Operating hours cathode filament 2

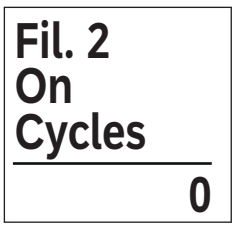
Display of operating hours of the cathode filament 2.

Cycles filament 1



Display of on cycles of the cathode filament 1.

Cycles filament 2



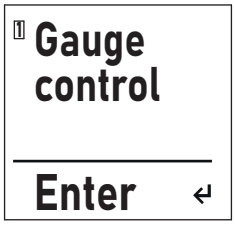
Display of on cycles of the cathode filament 2.

5.2.1.2 Setting Gauge Parameters

Only available for gauges without fieldbus.

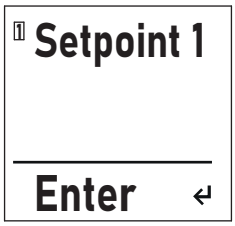
Use the down key to select the desired parameter and press the enter key to confirm.

Gauge control



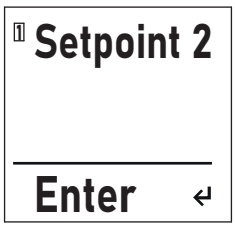
Adjustable parameters:
- Emission on / off
- Degas on / off
- Pirani adjustment

Setpoint relay 1



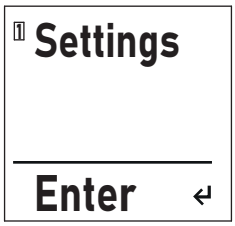
Adjustable parameters for setpoint relay 1:
(The current settings are displayed first. Then press the down key to go to the first adjustable parameter.)
- Setpoint mode LTP, HTP, LTP-ATM, HTP-ATM
- Threshold for LTP and HTP
- Factor for LTP-ATM and HTP-ATM

Setpoint relay 2



Adjustable parameters for setpoint relay 2:
(The current settings are displayed first. Then press the down key to go to the first adjustable parameter.)
- Setpoint mode LTP, HTP, LTP-ATM, HTP-ATM
- Threshold for LTP and HTP
- Factor for LTP-ATM and HTP-ATM

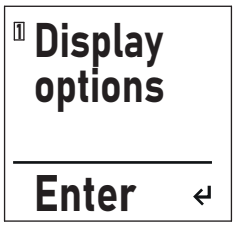
Settings for emission, filament, unit, regulator type



Adjustable parameters:
- Emission control
- Filament control
- Selection of filament
- Pressure units
- Regulator type

5.2.1.3 Setting Display Parameters

- Gauge without fieldbus: Press the down key five times and confirm with the enter key.
- Gauge with fieldbus: Press the down key once and confirm with the enter key.



Adjustable parameters:
- Screensaver
- Display orientation
- Background color
- Display pressure unit

5.3 Gas Type Dependence

Pressure range	Measurement principle	Gas type dependence
10 … 1500 mbar	capacitance diaphragm sensor	independent of gas type, no correction required
1 … 10 mbar	capacitance diaphragm sensor and Pirani sensor	crossover range
2×10^{-2} … 1 mbar	Pirani sensor	[3]
5×10^{-3} … 2×10^{-2} mbar	Pirani sensor and hot cathode ionization sensor (BA)	crossover range
5×10^{-10} … 5×10^{-3} mbar	hot cathode ionization (BA)	[3]

5.4 Bayard-Alpert Hot Cathodes

The gauge is equipped with two filaments.

When the emission is switched on, the gauge alternately selects one of the two filaments. This ensures even aging of the filaments.

We recommend the replacement of the sensor as soon as the first filament failure has been detected.

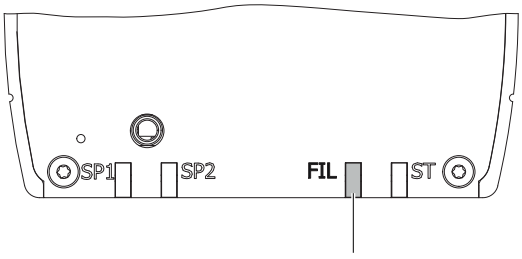
5.4.1 Filament Status

The filament status

- is indicated by the LED <FIL> on the gauge
- can be read via the display
- can be read via the diagnostic port
- can be read via the digital interface

Status display via LED <FIL>

The status of the dual filament hot cathode is indicated by the LED <FIL> on the gauge.



<FIL>
Filament status display

Filament status	Emission	LED <FIL>
–	off	off
Both filaments O.K.	on	lit green
One filament broken	on	blinking green
Both filaments broken	on	lit solid red

Status indication via display

The status of the dual filament hot cathode can be read via the display (→ 🗎 21, "Displaying Gauge Information").

Status indication via interface

The status of the dual filament hot cathode can be read via the digital interface.

[3] The pressure reading applies to dry air, O_2, CO and N_2. For other gases, it has to be converted.

Gauge	Digital interface	Detailed information
Without fieldbus	RS232C	→ 🗎 27
	Diagnostic port	RS232C/485C: → 🕮 [2]
		VacXplor user software: www.inficon.com
With fieldbus	EtherCAT	→ 🕮 [1]

5.4.2 Filament Control

The filament control mode

- can be read / written via the diagnostic port
- can be read/written via the digital interface
- can be read/written via the display (written only for gauges without fieldbus)

The filament control mode function defines the rules by which the filament is selected when the emission is switched on.

Filament control mode	Description
AUTO (automatic)	Default. This mode automatically alternates between filaments when emission is switched on. This ensures that the filaments age evenly.
MAN (manual)	In this mode filament selection can be commanded manually.

5.4.3 Emission Control

The emission control mode

- can be read / written via the diagnostic port
- can be read/written via the digital interface
- can be read/written via the display (written only for gauges without fieldbus)

The emission control mode function defines the rules by which the emission of the gauge is switched on and off. The manual mode feature has a positive effect on gauge live time, mainly in process situations where the process chamber has to be vented frequently.

Emission control mode	Description
AUTO (automatic)	Default. In this mode the emission is switched on and off automatically by the gauge. However, the emission will only be switched on if the pressure falls below "Switching on pressure". If the pressure rises above the "Switching off pressure", the emission is switched off. However, the user can switch off the emission any time. If the emission is switched off manually while it is in the on state, it is switched on again only after pressure has exceeded "Switching off pressure" and subsequently fallen below "Switching on pressure".
MAN (manual)	In this mode the emission can be switched on and off manually. However, switching on the emission is only possible if the pressure is below "Switching on pressure". If the pressure rises above the "Switching off pressure" while the emission is on, the emission will be switched off by the gauge (the transmitted measured value then corresponds to the Pirani measured value). After the emission has been switched off manually, there is no longer any automatic switching (to BA mode).

5.4.4 Degas

The degas process allows in-situ cleaning of the electrode system by heating the electron collector grid to approx. 700 °C by electron bombardment.

Procedure → 🗎 34, "Degas"

5.5 Switching functions SP1, SP2, ATM

The two setpoints can be set to any pressure within the measurement range of the gauge. A relay is provided for each switching function.

The setpoints SP1 and SP2 can be programmed to atmospheric pressure setpoint (ATM).

The following switching functions are assigned to the relays at the factory:

Gauge	Relay 1	Relay 2
Without fieldbus	ATM (atmospheric pressure setpoint)	SP2 (setpoint 2)
With fieldbus	SP1 (setpoint 1)	SP2 (setpoint 2)

5.5.1 Setting of Switching Characteristics, Hysteresis and Threshold Value

The switching characteristics, hysteresis and the threshold value can read/written via

- the diagnostic port
- the digital interface
- the dsplay (written only for gauges without fieldbus)

Diagnostic port, digital interface

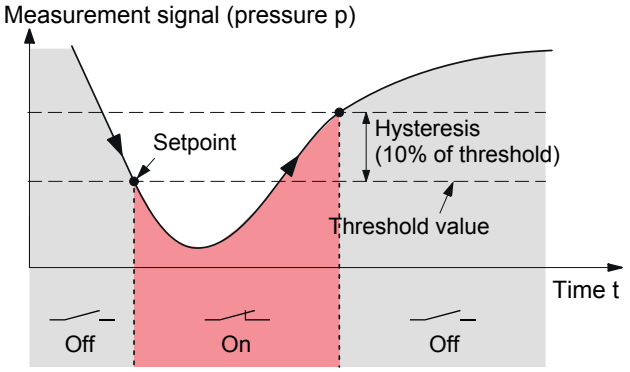
SP1, SP2 (adjustable parameters):	Low Trip Point Low Trip Enable Low Trip Point Hysteresis
	High Trip Point High Trip Enable High Trip Point Hysteresis
	Setpoint Mode
ATM setpoint (adjustable parameters):	Factor of ATM Low Trip Enable Low Trip Point Hysteresis
	High Trip Enable High Trip Point Hysteresis
	Setpoint Mode

Display

Use the parameters Setpoint 1 and Setpoint 2 to set the switching characteristics, hysteresis and threshold values (only for gauges without fieldbus).

Low Trip Point (default)

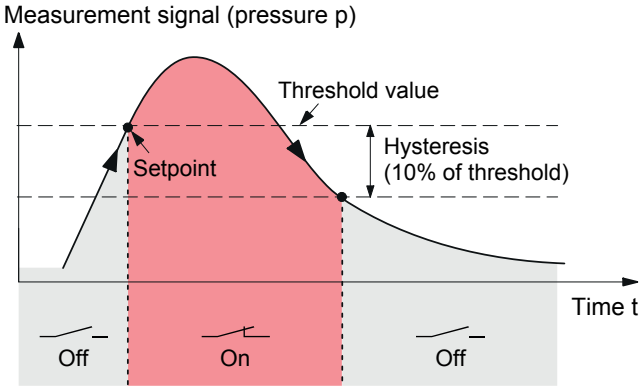
If the pressure in the vacuum system is lower than the setpoint, the corresponding LED (<SP1> or <SP2>) is lit solid and the corresponding relay is energized.



The setpoints SP1 and SP2 are factory set to the lower measurement range limit and therefore do not switch.

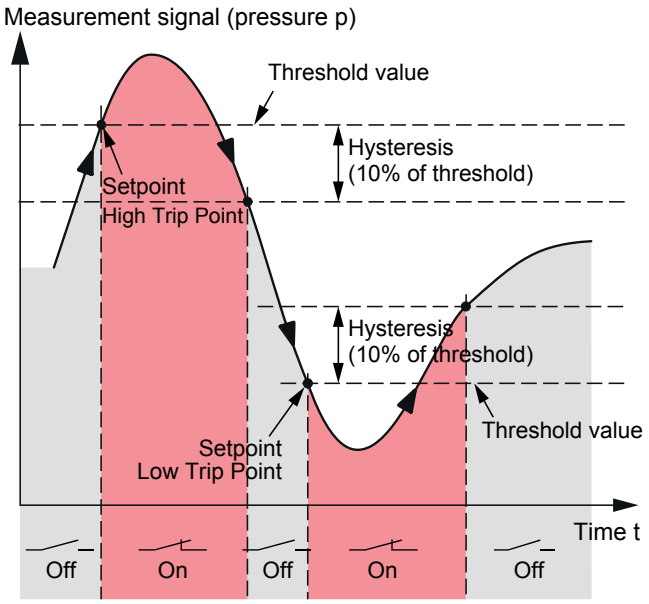
High Trip Point

If the pressure in the vacuum system is higher than the setpoint, the corresponding LED (<SP1> or <SP2>) is lit solid and the corresponding relay is closed.



Low & High Trip Point

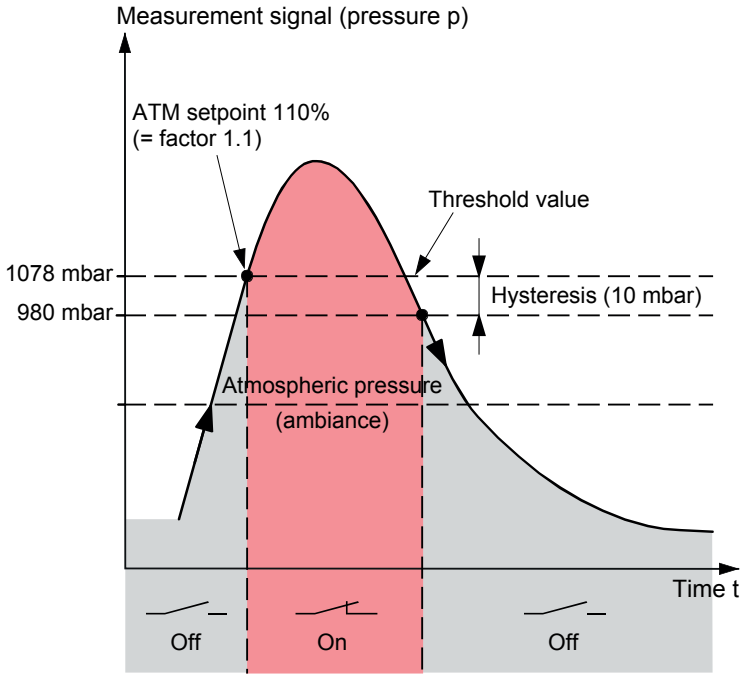
Both a High Trip Point and a Low Trip Point are assigned to each setpoint. If the pressure in the vacuum system is higher than the defined High Trip Point threshold, the corresponding LED (<SP1> or <SP2>) is lit and the corresponding relay is closed. If the pressure in the vacuum system is lower than the defined Low Trip Point threshold, the correspoinding LED (<SP1> or <SP2>) is lit and the corresponding relay is closed.



ATM (atmospheric pressure setpoint)

The ATM setpoint is defined as a factor of the current atmos-pheric pressure and can be set to any pressure within the measurement range of the gauge. The relay switches when the pressure in the vacuum system has reached the defined value.

BCG552 without fieldbus (default):	Factor ATM setpoint = 0.99 (99% of current atmospheric pressure)
	Switching characteristics = High Trip Point
Example:	ATM setpoint: 110% of the atmospheric pressure (= factor 1.1) Switching characteristics: High Trip Point Hysteresis: 10 mbar



5.6 RS232C Interface

The RS232C interface allows transmission of digital measurement data and instrument conditions as well as the setting of instrument parameters.

⚠ Caution

Data transmission errors

Any attempt to simultaneously operate the gauge via the RS232C and the fieldbus interface may result in incorrect data and data transmission errors.

- Therefore, it is inadmissible to simultaneously operate the gauge via the RS232C and the fieldbus interface.

5.6.1 Description of the Functions

The interface works in duplex mode. A nine byte string is sent continuously without a request approx. every 16 ms. Commands are transmitted to the gauge in a five byte input (receive) string.

Operational parameters

- Transmission rate: 9600 Baud (set value)
- Byte: 8 data bits
1 stop bit
- handshake: no
- parity bit: no

Electrical connections

Signal	Sensor cable connector
TxD	Pin 13
RxD	Pin 14
GND	Pin 5

5.6.1.1 Output String (Transmit)

The complete output string (frame) is nine bytes (byte 0 … 8). The data string is seven bytes (byte 1 … 7).

Format of the output string

Byte No.	Function	Value	Comment
0	Length of data string	7	
1	Page number	5	for hot cathode gauges
2	Status		Status byte
3	Error		Error byte
4	Measurement high byte	0 ... 255	Calculation of pressure value
5	Measurement low byte	0 ... 255	Calculation of pressure value
6	Software version	0 ... 255	Software version
7	Response value	13	for BCG552
8	Check sum	0 ... 255	Synchronization

Synchronization

Synchronization of the master is achieved by testing three bytes

Byte No.	Function	Value	Comment
0	Length of data string	7	
1	Page number	5	for hot cathode gauges
8	Check sum of bytes 1 ... 7	0 ... 255	Low byte of check sum [1)]

[1)] High order bytes are ignored in the check sum.

Status byte

Bit 1	Bit 0	Definition
0	0	emission off
0	1	emission 25 µA
1	0	emission 5 mA
1	1	degas

Bit 2	Definition
x	reserved for future use

Bit 3	Definition
0 ⇔ 1	toggle bit, changes with every string received correctly

Bit 5	Bit 4	Definition
0	0	current pressure unit mbar
0	1	current pressure unit Torr
1	0	current pressure unit Pa

Bit 6	Definition
0	filament 1 active
1	filament 2 active

Bit 7	Definition
x	reserved for future use

Error byte

Bit No.	Definition
0	diaphragm sensor error
1	reserved for future use
2	Pirani sensor error
3	reserved for future use
4	BA sensor error
5	reserved for future use
6	hardware failure, EEPROM failure
7	reserved for future use

Software version

The software version of the gauge can be calculated from the response value of byte 6 of the transmitted string according to the following rule:

Version No = $Value_{Byte\ 6}$ / 20

(Example: $Value_{Byte\ 6}$ of 32 means software version 1.6)

Calculation of the pressure value

The pressure can be calculated from bytes 4 and 5 of the transmitted string. Depending on the currently selected pressure unit (byte 2, bits 4 and 5), the appropriate rule must be applied.

As result, the pressure value results in the usual decimal format.

$p_{mbar} = 10^{((\text{high byte} \times 256 + \text{low byte}) / 4000 - 12.5)}$

$p_{Torr} = 10^{((\text{high byte} \times 256 + \text{low byte}) / 4000 - 12{,}625)}$

$p_{Pa} = 10^{((\text{high byte} \times 256 + \text{low byte}) / 4000 - 10.5)}$

Example

The example is based on the following output string:

Byte No.	0	1	2	3	4	5	6	7	8
Value	7	5	0	0	242	48	20	13	72

The instrument or controller (receiver) interprets this string as follows:

Byte No.	Function	Value	Comment
0	Length of data string	7	
1	Page number	5	hot cathode gauges
2	Status	0	emission = off pressure unit = mbar
3	Error	0	No error
4 5	Measured value High byte Low byte	242 48	Calculation of the pressure: $p = 10^{((242 \times 256 + 48) / 4000 - 12.5)}$ = 1000 mbar
6	Software version	20	Software version = 20 / 20 = 1.0
7	Sensor type	13	BCG552
8	Check sum	72	5 + 0 + 0 + 242 + 48 + 20 + 13 = $328_{dec} = 01\ 48_{hex}$ High order byte is ignored Check sum = $48_{hex} = 72_{dec}$

5.6.1.2 Input String (Receive)

For transmission of the commands to the gauge, a string (frame) of five bytes is sent (without <CR>). Byte 1 … 3 form the data string.

Format of the input string

Byte No.	Function	Value	Comment
0	Length of data string	3	
1	Data		→ admissible input strings
2	Data		→ admissible input strings
3	Data		→ admissible input strings
4	Check sum (of bytes No. 1 ... 3)	0 ... 255	(low byte of sum) [1]

[1] High order bytes are ignored in the check sum.

Admissible input strings

For commands to the gauge, following defined strings are used:

Befehl:	Byte No.				
	0	1	2	3	4 [2]
Set the unit mbar on the display [1]	3	0x10	0x8E	0	0x9E
Set the unit Torr on the display [1]	3	0x10	0x8E	1	0x9F
Set the unit Pa on the display [1]	3	0x10	0x8E	2	0xA0
Switch degas on (switches itself off after 3 min.)	3	0x10	0xC4	1	0xD5
Switch degas off	3	0x10	0xC4	0	0xD4
Read software version [3]	3	0x00	0xD1	0	0xD1
Reset	3	0x40	0	0	0x40
Switch emission on [4]	3	0x40	0x10	1	0x51
Switch emission off [4]	3	0x40	0x10	0	0x50
"Emission Control Mode" automatic (AUTO) [5]	3	0x10	0x8A	1	0x9B
"Emission Control Mode" manual (MAN) [5]	3	0x10	0x8A	0	0x9A
"Filament Control Mode" automatic (AUTO) [6]	3	0x10	0xD3	0	0xE3
"Filament Control Mode" manual (MAN) [6]	3	0x10	0xD3	1	0xE4
Select filament 1 [7]	3	0x10	0xD2	0	0xE2
Select filament 2 [7]	3	0x10	0xD2	1	0xE3
Read filament status	3	0x00	0xD4	0	0xD4

[1] Only required for gauges with display. Transmitted data is not affected by this setting.

[2] Only low order byte of sum (high order byte is ignored).

[3] Response value in byte no. 6 of transmitted string.

[4] Observe switch on/off requirements.

[5] Defines the "Emission Control Mode":
AUTO = emission on / off automatically controlled by the gauge.
MAN = emission on / off controlled via interfaces.

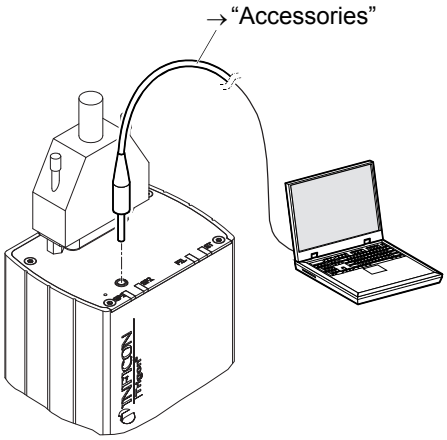
[6] Defines the "Filament Control Mode":
AUTO = selection of filament automatically controlled by the gauge.
MAN = selection of filament controlled via interfaces.

[7] The "Select filament x" command can be sent any time but is only executed if the gauge is in the "Emission OFF" state.

5.7 Diagnostic port

The diagnostic port permits to output the pressure reading and all status information and to enter all settings at the same time.

- RS232C communication: Communication Protocol → 🕮 [2].
- VacXplor user software: This can be downloaded from the website (www.inficon.com).



5.8 EtherCAT Interface

⚠ Caution

Data transmission errors

Any attempt to simultaneously operate the gauge via the RS232C serial interface and EtherCAT interface may result in incorrect data and data transmission errors.

- Therefore, it is inadmissible to simultaneously operate the gauge via the RS232C serial interface and EtherCAT interface.

Via this interface, the following and further data are exchanged in the standardized EtherCAT protocol:

- Pressure reading
- Pressure unit (mbar, Torr, Mic, Pa, hPa)
- Degas function
- Gauge adjustment
- Status and error messages
- Status of the switching functions

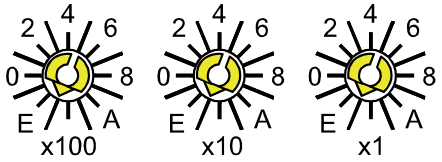
For operating the gauge via EtherCAT, prior installation of the device specific ESI file is required on the bus master side. This file can be downloaded from our website (www.inficon.com).

Explicit device address setting

During device initialization, the device address switches are read by the device firmware (default 00_{hex}). This device address is supported to the master as Explicit Device Identification.

The explicit device address is set in hexadecimal form (00 … FFF_{hex}) via the <x100>, <x10> und <x1> switches.

Example: Device address = 0xDDD (dec 3549):
0x100 * 0xD (dec 3328) + 0x10 * 0xD (dec 208) + 0x1 * 0xD (dec 13)



Status LEDs

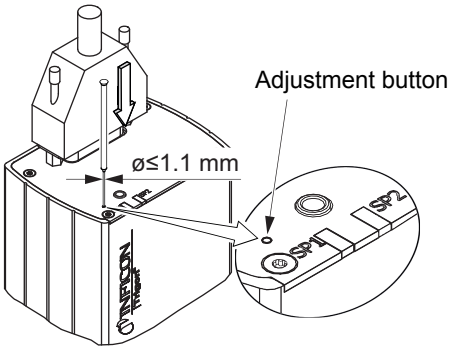
LEDs on the gauge inform on the gauge status and the current EtherCAT status.

5.9 Activating the Factory Setting (Factory Reset)

All user defined parameters (e.g. setpoints, filament control) are restored to their default values.

Loading of the default parameters is irreversible.

Loading the default parameters:
Keep the adjustment button depressed for 10 s while the gauge is in operation.



6 Deinstallation

Precondition

- Vacuum system vented

6.1 Power Connection

1. Put the gauge out of operation.
2. Unfasten the lock screws and disconnect the sensor cable.

6.2 Vacuum connection

⚠ WARNING

Fragile components
The ceramic sensor may be damaged by impacts.
- Do not drop the product and prevent shocks and impacts.

⚠ DANGER

Contaminated parts

Contaminated parts can be detrimental to health and environment.

- Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

⚠ Caution

Vacuum component

Dirt and damages impair the function of the vacuum component.

- When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

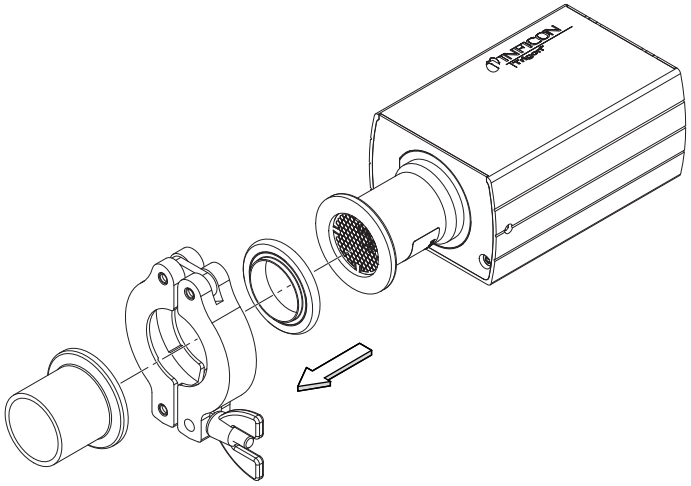
⚠ Caution

Dirt sensitive area

Touching the product or parts thereof with bare hands increases the desorption rate.

- Always wear clean, lint-free gloves and use clean tools when working in this area.

Remove the gauge from the vacuum system and install the protective lid.



7 Maintenance, Repair

Gauge failures due to contamination or wear and tear, as well as expendable parts (e.g. BA cathode) are not covered by the warranty.

INFICON assumes no liability and the warranty becomes null and void if any repair work is carried out by the end-user or third parties.

⚠ DANGER

Contaminated parts

Contaminated parts can be detrimental to health and environment.

- Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

7.1 Adjusting the Gauge

The gauge is factory-calibrated. Through the use in different climatic conditions, fitting positions, extreme temperatures, aging or contamination and after exchanging the sensor a shifting of the characteristic curve can occur. However, readjustments are automatically carried out during operation of the gauge.

After the stabilization period has elapsed (during initial installation and each reinstallation), the gauge should be operated for further 10 minutes at a pressure $<10^{-6}$ mbar to allow automatic adjustment.

7.2 Cleaning the Gauge

Small deposits on the electrode system can be removed by baking the anode. In the case of severe contamination, the baffle can be exchanged easily. The sensor itself cannot be cleaned and needs to be replaced in case of severe contamination.

A slightly damp cloth normally suffices for cleaning the outside of the unit. Do not use any aggressive or scouring cleaning agents.

Make sure that no liquid can penetrate the product. Allow the product to dry thoroughly before putting it into operation again.

7.2.1 Degas

Even small deposits on the electrode system of the BA sensor can lead to unstable measurement readings.

These deposits can be removed by baking the anode.

The degas process allows in-situ cleaning of the electrode system by heating the electron collector grid to approx. 700 °C by electron bombardment.

The degas process should be run at pressures below 7.2×10^{-6} mbar (emission current 5 mA).

The degas process can be started / stopped via

- pin 7 on the D-sub connector
- the diagnostic port
- the digital interface
- the display (only for gauges without fieldbus)

The gauge automatically terminates the degas process after 3 minutes, if it has not been stopped before.

The degas process must be stopped in the same manner it was started.

A new degas cycle can only be started after a waiting time of 30 minutes.

For a repeated degas process, the control signal first has to change from On to Off. Then degas can be started again with a new On command. To achieve an unambiguous operating status, it is recommended that the degas signal is set to Off again by the system control after 3 minutes of degassing.

7.3 Adjusting the Atmospheric Pressure Sensor

The ambient pressure of the gauge is measured by a separate atmospheric pressure sensor built into the electronics unit of the gauge.

The atmospheric pressure sensor can be calibrated against the diaphragm capacitive sensor in the gauge. The gauge electronics compares the output signals of the two sensors and carries out the necessary adjustments to the atmospheric pressure sensor signal.

The following adjustment procedure can only be carried out via the serial interfaces.

Adjustment via RS232 interface

1 Vent vacuum system (or operate gauge in the deinstalled state).

2 Two 5 byte long command strings have to be sent to the gauge in succession:

String No. 1 (unlock atmosphere sensor adjustment):

Byte No.	Function	Value		Comment
0	Length of data string	0x03	hex	
1	Data	0x10	hex	
2	Data	0x1C	hex	
3	Data	0x00	hex	
4	Check sum (of bytes No. 1 ... 3)	0x2C	hex	only low byte of sum, high byte is ignored

String No. 2 (execute sensor adjustment):

Byte No.	Function	Value		Comment
0	Length of data string	0x03	hex	
1	Data	0x40	hex	
2	Data	0x20	hex	
3	Data	0x01	hex	
4	Check sum (of bytes No. 1 ... 3)	0x61	hex	only low byte of sum, high byte is ignored

After the conclusion of this procedure, the separate atmospheric pressure sensor is calibrated to match the Capacitance Diaphragm sensor.

Adjustment of the atmosphere sensor via fieldbus interface

The adjustment of the atmospheric pressure sensor via the fieldbus interface is described in the respective communication protocol.

7.4 What to Do in Case of Problems

In the event of a fault or a complete failure of the output signal, the gauge can easily be checked.

Required tools / material

- Voltmeter / ohmmeter
- Allen wrench AF 2.5
- Spare sensor (if the sensor is faulty)

Trouble shooting gauge

The output signal is available at the sensor cable connector (pin 2 and pin 12).

In case of an error, it may be helpful to just turn off the mains supply and turn it on again after 5 s.

Problem	LED <ST>	Display	Possible cause	Correction
No voltage at signal output.	off	dark	No supply voltage	Turn on the power supply.
Output signal: 0.1 V [4]	blinking red	"FAILURE EEPROM Memory"	EEPROM error	Turn the gauge off and on again after 5 s.
				Replace the gauge
Output signal: 0.1 V [4]	lit solid red	"FAILURE Cap. Dia. Gauge"	Diaphragm sensor error	Replace the sensor
Output signal: 0.5 V [4]	lit solid red	"FAILURE Pirani Gauge"	Pirani sensor error	Replace the sensor
Output signal: 0.3 V [4]	lit solid red	"FAILURE Hot Ion. Gauge"	Hot cathode sensor error	Replace the sensor

Troubleshooting (sensor)

If the cause of a fault is suspected to be in the sensor, the following checks can be made with an ohmmeter.

Separate the sensor from the electronics unit.

Using an ohmmeter, make the following measurements on the contact pins.

Ohmmeter measurement between pins	👍	👎	Possible cause, error
PIR1	≈40 Ω	>>40 Ω	Pirani element 1 broken
PIR2	≈40 Ω	>>40 Ω	Pirani element 2 broken
F1 - FC and F2 - FC	≈0.15 Ω	>>0.15 Ω	Filament of hot cathode broken
PIR1 - GND and PIR2 - GND	∞	<< ∞	Electrode short circuit to ground
F1, FC, F2 - GND	∞	<< ∞	Electrode short circuit to ground
A - GND	∞	<< ∞	Electrode short circuit to ground
C - GND	∞	<< ∞	Short circuit between electrodes

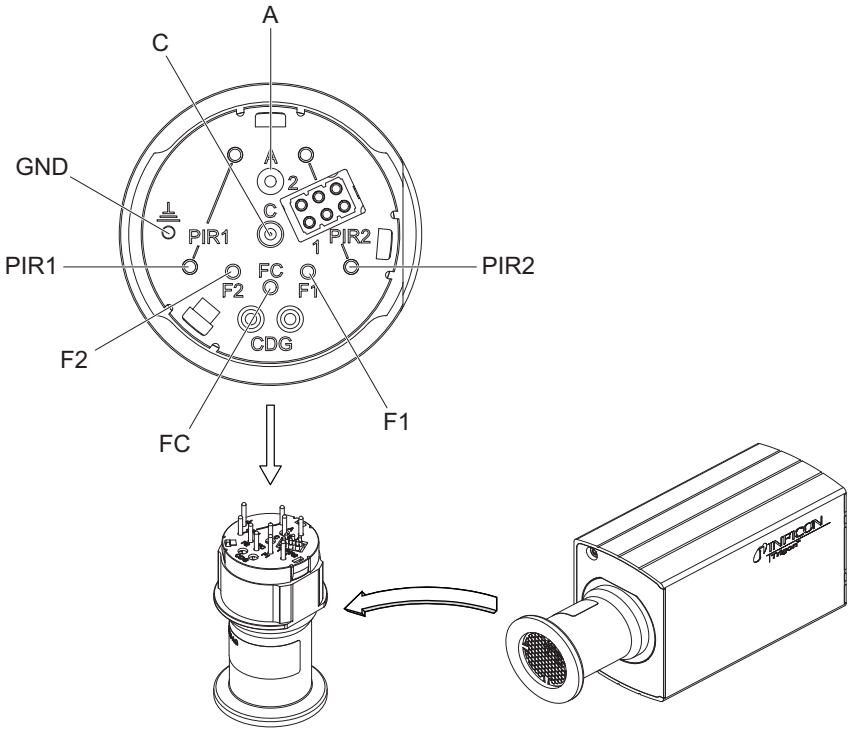
⚠ Caution

Electrostatic discharge (ESD)

The pins marked <CDG>, and all unmarked pins in the diagram are used by the diaphragm sensor electronics and cannot be utilized for diagnostic purposes due to electrostatic discharge (ESD).

- Do not connect an ohmmeter/continuity checker to these pins.

[4] Standard output voltage (depending on setting for safe value)



Correction

All of the above faults can only be remedied by replacing the sensor.

Troubleshooting on fieldbus gauges

Error diagnosis of fieldbus gauges can only be performed as described above for the basic sensor and sensor electronics. Diagnosis of the fieldbus interface can only be done via the superset bus controller.

7.5 Replacing the Sensor

Replacement is necessary, when

- the sensor is severely contaminated
- the sensor is mechanically deformed
- the sensor is faulty, e.g. hot cathode broken
- the sensor is faulty, e.g. Pirani filament broken

Required tools / material

- Allen wrench AF 2.5
- Spare sensor

Procedure

1 Deinstall the gauge.

2 Deinstall the electronics unit from the faulty sensor and mount it to the new sensor.

8 Accessories

	Ordering No.
Diagnostic cable RS232C; 9p-Dsub - phone jack 2.5 mm (2 m) [5)]	303-333
Diagnostic cable RS232C; USB-A - phone jack 2.5 mm (1.8 m) [5)]	303-366

9 Options

	Ordering No.
24 V (dc) power supply with RS232 line	353-511
Baffle DN 25 ISO-KF / DN 40 CF-R	353-512
Seal with centering ring and baffle DN 25 ISO-KF	211-113

10 Spare Parts

When ordering spare parts, always indicate:

- all information on the product nameplate
- description and ordering number according to the spare parts list

	Ordering No.
Replacement sensor, vacuum connection DN 25 ISO-KF (including allen key)	354-423
Replacement sensor, vacuum connection DN 40 CF-R (including allen key)	354-424

[5)] Diagnostic SW available upon request.

11 Returning the Product

⚠ WARNING

Forwarding contaminated products

Contaminated products (e.g. radioactive, toxic, caustic or biological hazard) can be detrimental to health and environment.

- Products returned should preferably be free of harmful substances. Adhere to the forwarding regulations of all involved countries and forwarding companies Enclose a duly completed declaration of contamination (form under www.inficon.com).

Products that are not clearly declared as "free of harmful substances" are decontaminated at the expense of the customer.

Products not accompanied by a duly completed declaration of contamination are returned to the sender at his own expense.

12 Disposal

⚠ DANGER

Contaminated parts

Contaminated parts can be detrimental to health and environment.

- Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

⚠ WARNING

Substances detrimental to the environment

Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment.

- Dispose of such substances in accordance with the relevant local regulations.

Separating the components

After disassembling the product, separate its components according to the following criteria:

- Contaminated components

  Contaminated components (radioactive, toxic, caustic or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.
- Other components

  Such components must be separated according to their materials and recycled.

13 Appendix

13.1 Measurement Signal vs. Pressure

Conversion formulae

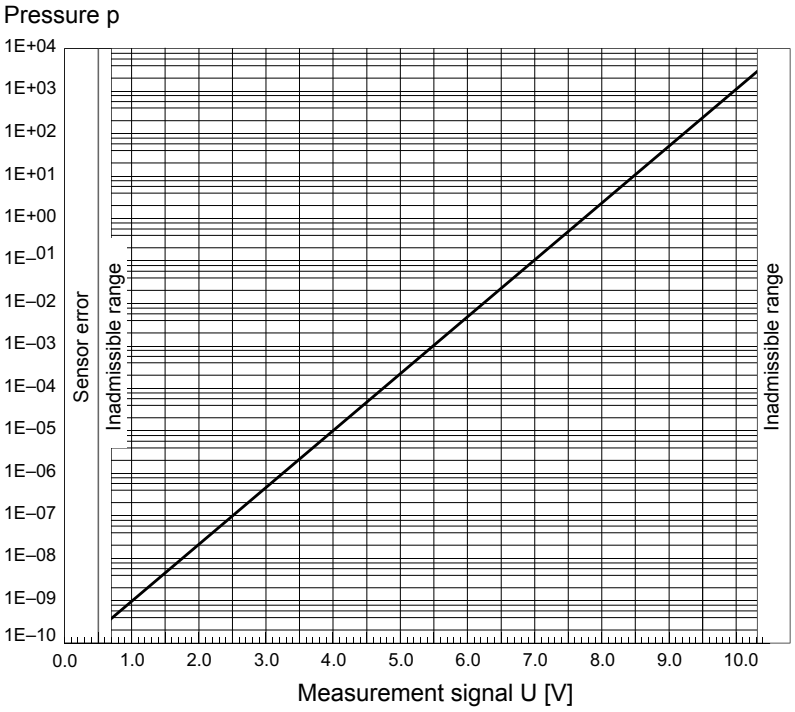
$$p = 10^{(U - 7.75) / 0.75 + c}$$

$$U = 0.75 \times (\log p - c) + 7.75$$

where	U	p	c
	[V]	[mbar]	0
	[V]	[Torr]	-0,125
	[V]	[Mic]	2875
	[V]	[Pa]	2
	[V]	[hPa]	0

where p pressure
U Measurement signal
c constant (pressure unit dependent)

Conversion curve



Conversion table

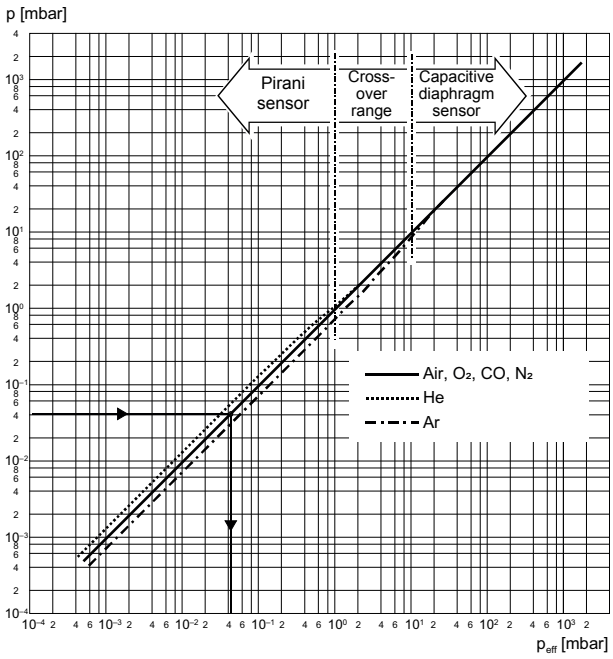
Measurement signal U [V]	[mbar]	Pressure p [Torr]	[Pa]
0.1 / 0.3 / 0.5	Sensor error		
0.51 ... 0.774	Inadmissible range		
0.774	5×10^{-10}	3.75×10^{-10}	5×10^{-8}
1.00	1×10^{-9}	7.5×10^{-10}	1×10^{-7}
1.75	1×10^{-8}	7.5×10^{-9}	1×10^{-6}
2.5	1×10^{-7}	7.5×10^{-8}	1×10^{-5}
3.25	1×10^{-6}	7.5×10^{-7}	1×10^{-4}
4.00	1×10^{-5}	7.5×10^{-6}	1×10^{-3}

Measurement signal U [V]	[mbar]	Pressure p [Torr]	[Pa]
4.75	1×10^{-4}	7.5×10^{-5}	1×10^{-2}
5.50	1×10^{-3}	7.5×10^{-4}	1×10^{-1}
6.25	1×10^{-2}	7.5×10^{-3}	1×10^{0}
7.00	1×10^{-1}	7.5×10^{-2}	1×10^{1}
7.75	1×10^{0}	7.5×10^{-1}	1×10^{2}
8.50	1×10^{1}	7.5×10^{0}	1×10^{3}
9.25	1×10^{2}	7.5×10^{1}	1×10^{4}
10.00	1×10^{3}	7.5×10^{2}	1×10^{5}
>10.13	Inadmissible range		

13.2 Gas Type Dependence

Indication range above 10^{-2} mbar

Indicated pressure (gauge calibrated for air)



Calibration in pressure range 2×10^{-2} ... 1 mbar

The gas type dependence in the pressure range 2×10^{-2} ... 1 mbar (Pirani pressure range) can be compensated by means of the following formula:

p_{eff} = C × indicated pressure

where	Gas type	Correction factor C
	He	0.8
	Ne	1.4
	Ar	1.7
	Kr	2.4
	Xe	3
	H_2	0.5
	Air, O_2, CO, N_2	1
	CO_2	0.9
	Water vapor	0.5
	Freon 12	0.7

These conversion factors are average values.

Calibration in pressure range <5×10^{-3} mbar

The gas type dependence in the pressure range <5×10^{-3} mbar can be compensated by means of the following formula (gauge adjusted for air):

p_{eff} = C × indicated pressure

where	Gas type	Correction factor C
	He	5.9
	Ne	4.1
	Ar	0.8
	Kr	0.5
	Xe	0.4
	H_2	2.4
	Air, O_2, CO, N_2	1

These conversion factors are average values.

A mixture of gases and vapors is often involved. In this case, accurate determination is only possible with a partial-pressure measuring instrument.

13.3 Literature

[1] Communication Protocol
EtherCAT® Trigon™ BCG552
tirb77e1
INFICON AG, LI-9496 Balzers, Liechtenstein

[2] Communication Protocol
RS232C / RS485C Trigon™ BCG552
tirb89e1
INFICON AG, LI-9496 Balzers, Liechtenstein

[3] ETG.5003.1 S (R) V1.1.0: Semiconductor Device profile – Part 1: Common Device Profile (CDP)

[4] ETG.5003.2080 S (R) V1.3.0: Semiconductor Device profile – Part 2080: Specific Device Profile (SDP): Vacuum Pressure Gauge

EU Declaration of Conformity

CE

Manufacturer: INFICON AG, Alte Landstraße 6, LI-9496 Balzers

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product: Trigon™ BCG552

The product of the declaration described above is in conformity with following Union harmonization legislation:

- 2014/30/EU, OJ L 96/79, 29.3.2014
  (EMC Directive; Directive relating to electromagnetic compatibility)
- 2011/65/EU, OJ L 174/88, 1.7.2011
  (RoHS Directive; Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment)

Harmonized and international/national standards and specifications:

- EN 61000-6-2:2005
  (EMC: generic immunity standard for industrial environments)
- EN 61000-6-3:2007 + A1:2011
  (EMC: generic emission standard for residential and commercial environments)
- EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
  (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1:2013; Group 1, Class B
  (EMC requirements for electrical equipment for measurement, control and laboratory use)

Signed for and on behalf of: INFICON AG, Alte Landstraße 6, LI-9496 Balzers

Balzers, 2024-12-02

William Opie
Managing Director

Balzers, 2024-12-02

Remo Klaiber
Director Global Marketing

UKCA Declaration of Conformity

Manufacturer: INFICON AG, Alte Landstraße 6, LI-9496 Balzers

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product: Trigon™ BCG552

The product of the declaration described above is in conformity with the relevant UK Statutory Instruments:

- S.I. 2016/1091, 11.2016
  (Regulation relating to electromagnetic compatibility 2016)
- S.I. 2012/3032, 12.2012
  (Regulation on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2012)

Harmonized and international/national standards and specifications:

- EN 61000-6-2:2005
  (EMC: generic immunity standard for industrial environments)
- EN 61000-6-3:2007 + A1:2011
  (EMC: generic emission standard for residential and commercial environments)
- EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
  (Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1:2013; Group 1, Class B
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Signed for and on behalf of: INFICON AG, Alte Landstraße 6, LI-9496 Balzers

Balzers, 2024-12-02

William Opie
Managing Director

Balzers, 2024-12-02

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