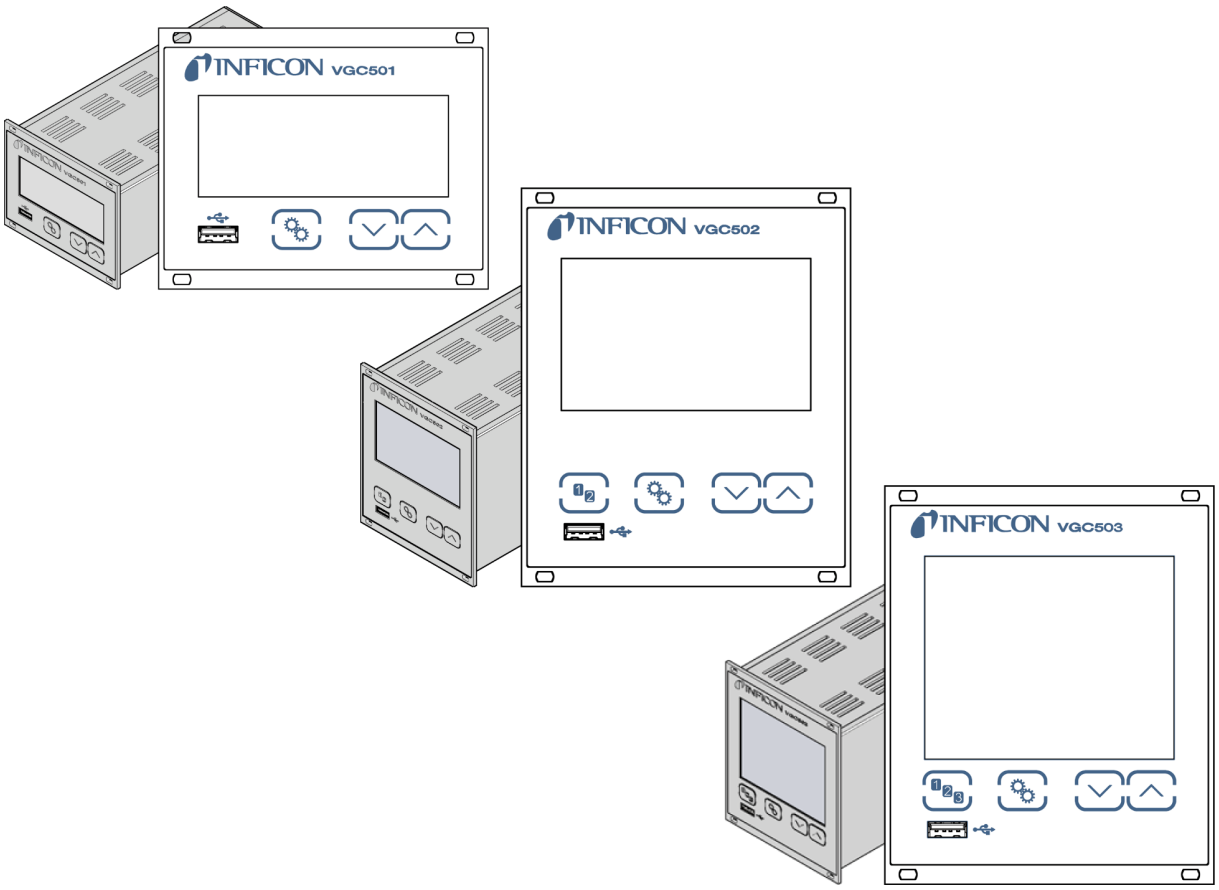


Operating Manual

Incl. EU Declaration of Conformity

VGC501, VGC502, VGC503

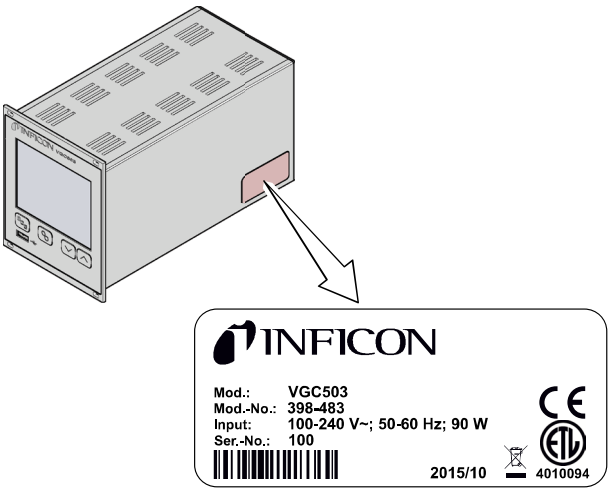
Single-Channel, Two-Channel & Three-Channel Control Units

Contents

For cross-references within this document, the symbol (→ 🗎 XY) is used; for cross-references to further documents listed under ‘Literature’, use is made of the symbol (→ 🕮 [Z]).

Product Identification

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



Specimen nameplate

Validity

This document applies to products with part numbers:

398-481	(VGC501, Single-Channel Control Unit)
398-482	(VGC502, Two-Channel Control Unit)
398-483	(VGC503, Three-Channel Control Unit)

The part number (Mod.-No.) can be found on the product nameplate.

This manual is based on firmware version V1.08.

If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 🗎 60).

If not indicated otherwise in the legends, the illustrations in this document correspond to the unit VGC503 (Three-Channel Control Unit). They apply to the VGC501 (Single-Channel Control Unit) and to the VGC502 (Two-Channel Control Unit) by analogy.

We reserve the right to make technical changes without prior notice.

All dimensions are indicated in mm.

Intended Use

The Control Units VGC501, VGC502 and VGC503 are used together with INFICON gauges for total pressure measurement. All products must be operated in accordance with their respective operating manuals.

Scope of Delivery

The scope of delivery consists of the following parts:

1× Control Unit
1× Power cord (country-specific)
1× Rubber bar
2× Rubber feet
4× Collar screws
4× Plastic sleeves

1 Safety

1.1 Symbols Used

Symbols for residual risks

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.

Further symbols


The lamp / display is lit.


The lamp / display flashes.


The lamp / display is off.


Press the key (example: parameter key).


Do not press any key.

<……> Labeling

1.2 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.

1.3 General Safety Instructions

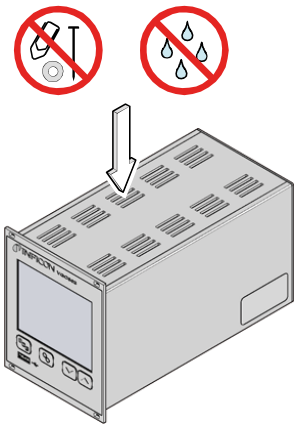
Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.

DANGER

Mains voltage

Contact with live parts is extremely hazardous when any objects are introduced or any liquids penetrate into the unit.

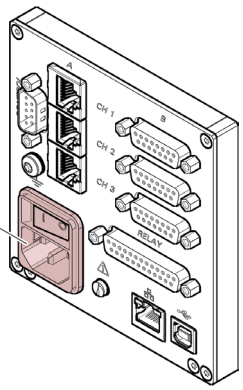
Make sure no objects enter through the louvers and no liquids penetrate into the equipment.



Disconnecting device

The disconnecting device must be readily identifiable by and easily reached by the user.

To disconnect the unit from the mains supply, you must unplug the mains cable.



Internet connection

The device must not be connected to the Internet.

Communicate the safety instructions to all other users.

1.4 Liability and Warranty

INFICON assumes no liability and the warranty is rendered 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.

2 Technical Data

Mains specifications

Voltage	100 … 240 V (ac) ±10%
Frequency	50 … 60 Hz
Power consumption	
VGC501	≤45 W
VGC502	≤65 W
VGC503	≤90 W
Overvoltage category	II
Protection class	1
Connection	European appliance connector IEC 320 C14

Ambience

Temperature	
Storage	–20 … +60 °C
Operation	+ 5 … +50 °C
Relative humidity	≤80% up to +31 °C, decreasing to 50% at +40 °C
Use	indoors only max. altitude 2000 m NN
Pollution degree	II
Degree of protection	IP30

Gauge connections

Number	
VGC501	1
VGC502	2
VGC503	3
Gauge connections per channel	RJ45 (FCC68), 8-pin (→ 🗎 21) D-sub, 15-pin, female (→ 🗎 21) (connected in parallel)
Compatible gauges	
Pirani	PSG400, PSG400-S, PSG100-S, PSG101-S, PSG500, PSG500-S, PSG502-S, PSG510-S, PSG512-S, PSG550, PSG552, PSG554, PPG550, PPG570
Pirani / Capacitance	PCG400, PCG400-S, PCG550, PCG552, PCG554
Cold cathode	PEG100, MAG500, MAG504
Cold cathode / Pirani	MPG400, MPG401, MPG500, MPG504
Capacitance	CDG020D, CDG025, CDG025D, CDG025D-X3, CDG045, CDG045-H, CDG045D, CDG045D2, CDG045Dhs, CDG100, CDG100D, CDG100D2, CDG100Dhs, CDG160D, CDG160Dhs, CDG200D, CDG200Dhs
Hot ionization	BAG500, BAG502, BAG552
Hot ionization / Pirani	BPG400, BPG402, BPG500, BPG502, BPG552, HPG400
Hot ionization / Capacitance / Pirani	BCG450, BCG552

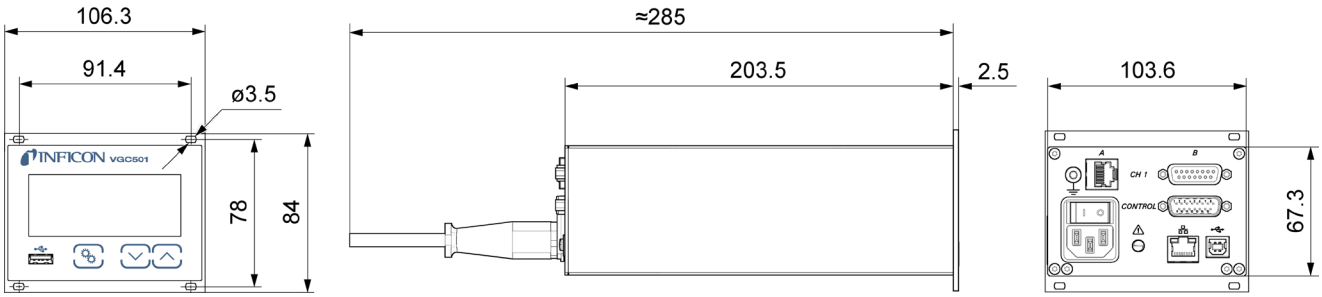
Gauge supply	Voltage	+24 V (dc) ±5%
	Ripple	<±1%
	Current	0 … 1 A (per channel)
	Power	25 W (per channel)
	Fuse protection	1.5 A (per channel) with PTC element, self-resetting after turning the unit off or disconnecting the gauge. The supply conforms to the grounded protective extra low voltage requirements.
Operation	Front panel	
	VGC501	via 3 keys
	VGC502, VGC503	via 4 keys
	Remote control	via USB type B interface via Ethernet interface
Measurement values	Measurement ranges	depending on gauges (→ 🕮 [1] … [27])
	Measurement error analog	
	Gain error	≤0.01% FS (typical) ≤0.10% FS (over temperature range, time)
	Offset error	≤0.01% FS (typical) ≤0.10% FS (over temperature range, time)
	Measurement rate analog	≥100 / s
	Display rate	≥10 / s
	Filter time constant	
	Slow	8 s (f_g = 0.02 Hz)
	Normal	800 ms (f_g = 0.2 Hz)
	Fast	160 ms (f_g = 1 Hz)
	Measurement units	mBar, hPa, Torr, Pa, Micron, V
	Offset correction	for linear gauges
	Calibration factor	0.10 … 10.00
	A/D converter	resolution 0.001% FS
		(the measurement values of BAG, BPG, HPG, BCG and CDGxxxD are transmitted digitally)
Switching functions	Number	
	VGC501	2
	VGC502	4 (user-assignable)
	VGC503	6 (user-assignable)
	Reaction delay	≤10 ms, if switching threshold close to measurement value (for larger differences consider filter time constant)
	Adjustment range	depending on gauge (→ 🗎 38, 39)
	Hysteresis	≥1% FS for linear gauges, ≥10% of measurement value for logarithmic gauges

Switching function relays	Contact type	floating changeover contact
	Load max.	60 V(dc), 30 W (ohmic) 30 V(ac), 1 A (ohmic)
	Service life	
	Mechanical	1×10^8 cycles
	Electrical	1×10^5 cycles (at max. load)
	Contact positions	→ 🗎 24
	Connector	
	VGC501 *(CONTROL)*	D-sub appliance connector, male, 15-pin (pin assignment → 🗎 22)
	VGC502, VGC503 (*RELAY)*	D-sub appliance connector, female, 25-pin (pin assignment → 🗎 23)
Error signal	Number	1
	Reaction time	≤10 ms
Error signal relay	Contact type	floating normally open contact
	Load max.	60 V(dc), 0.5 A, 30 W (ohmic) 30 V(ac), 1 A (ohmic)
	Service life	
	Mechanical	1×10^8 cycles
	Electrical	1×10^5 cycles (at max. load)
	Contact positions	→ 🗎 24
	Connector	
	VGC501 (CONTROL)	D-sub appliance connector, male, 15-pin (pin assignment → 🗎 22)
	VGC502, VGC503 (RELAY)	D-sub appliance connector, female, 25-pin (pin assignment → 🗎 23)
Analog outputs	Number	
	VGC501	1
	VGC502	2 (1 per channel)
	VGC503	3 (1 per channel)
	Voltage range	–5 … +14.5 V (dc) If no gauge is connected, +14.5 V (dc) is output
	Deviation from display value	±20 mV
	Output resistance	<50 Ω
	Measuring signal vs. pressure	depending on gauge (→ 🕮 [1] … [27])
	C*ONTROL* connector	
	VGC501	D-sub appliance connector, male, 15-pin (pin assignment → 🗎 22)
	VGC502, VGC503	D-sub appliance connector, male, 9-pin (pin assignment → 🗎 23)
Recorder output (VGC502, VGC503 only)	Number	1
	Voltage range	0 … +10 V (dc)
	Resolution	1 mV
	Accuracy	±20 mV
	Internal resistance	<50 Ω
	Measuring signal vs. pressure	programmable
	C*ONTROL* connector	D-sub appliance connector, male, 9-pin (pin assignment → 🗎 23)

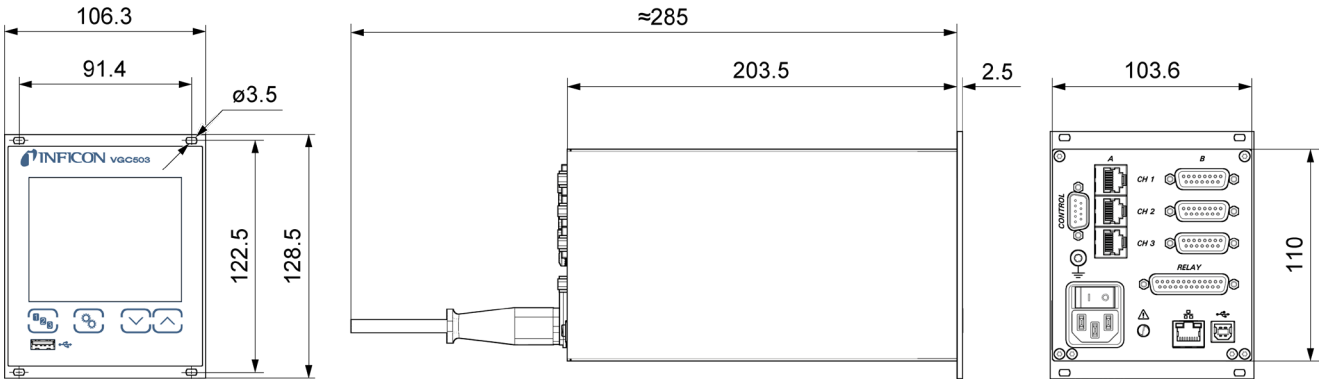
USB Type A interface	Protocol	FAT file system file handling in ASCII format
USB Type B interface	Protocol	ACK/NAK, ASCII with 3-character mnemonics
	Data format	bi-directional data flow, 1 start bit, 8 data bits, 1 stop bit, no parity bit, no handshake
	Transmission rate	9600, 19200, 38400, 57600, 115200
Ethernet interface	Protocol	ACK/NAK, ASCII with 3-character mnemonics,
	Data format	bi-directional, 1 start bit, 8 data bits, 1 stop bit, no parity bit, no handshake
	Transmission rate	9600, 19200, 38400, 57600, 115200
	IP Address	DHCP (default) or manual setting (→ 🗎 110)
	MAC Address	readable via "MAC" parameter

Dimensions [mm]

VGC501



VGC502, VGC503



Use

For incorporation into a rack or control panel or as a desk-top unit

Weight

VGC501	0.85 kg
VGC502	1.10 kg
VGC503	1.14 kg

3 Installation

Skilled personnel

The unit may only be installed by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

The unit is suited for incorporation into a 19" rack or a control panel or for use as a desk-top unit.

DANGER

Putting a product which is visibly damaged into operation can be extremely hazardous. If the product is visibly damaged do not put it into operation and make sure it is not inadvertently put into operation.

3.1 Installation, Setup

3.1.1 Rack Installation VGC501

The unit is designed for installation into a 19" rack chassis adapter according to DIN 41 494. For this purpose, four collar screws and plastic sleeves are supplied with it.

DANGER

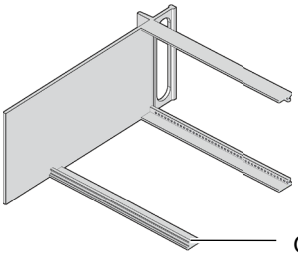
Protection class of the rack

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. according to the EN 60204-1 regulations for switching cabinets.

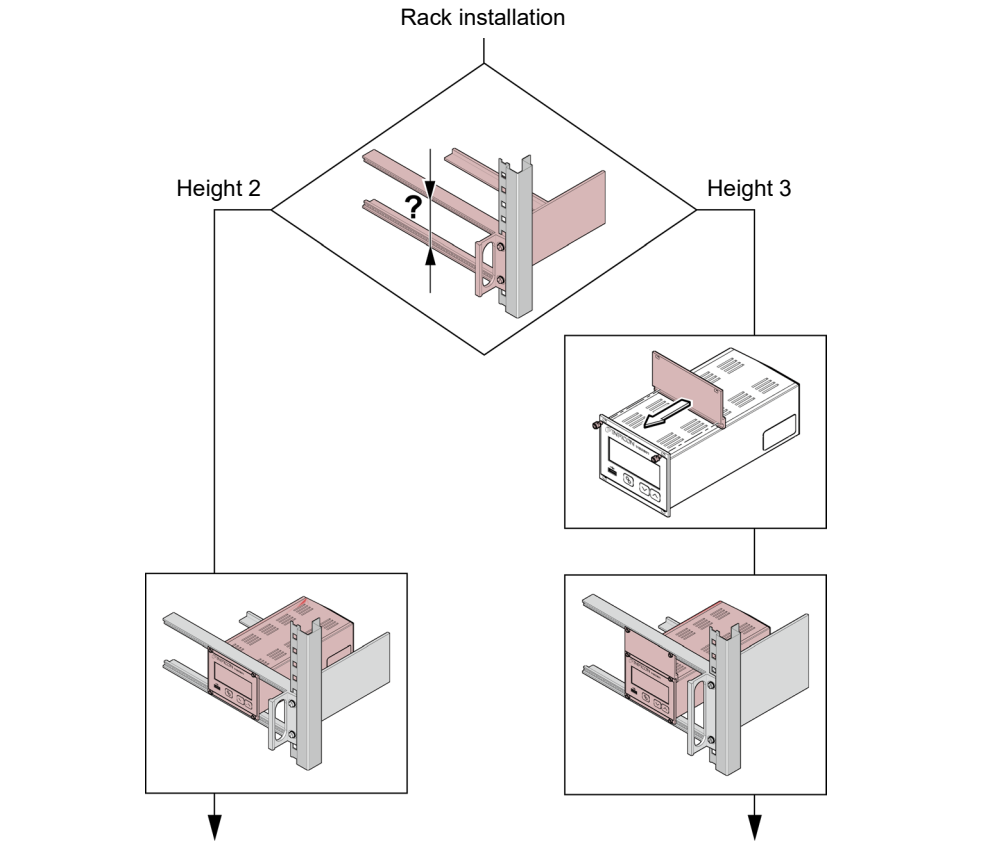
Take appropriate measures for the rack to meet the specifications of the protection class.

Guide rail

In order to reduce the mechanical strain on the front panel of the VGC50x, preferably equip the rack chassis adapter with a guide rail.



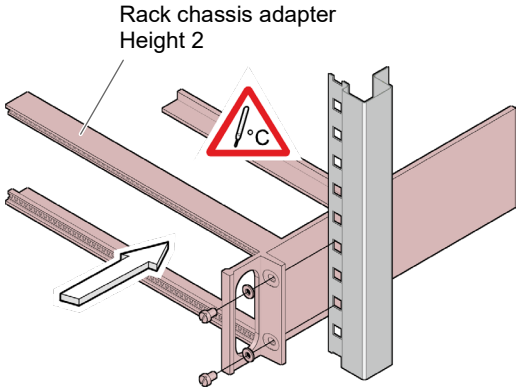
Mounting height



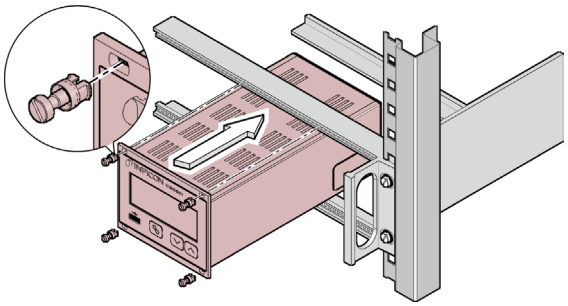
Height 2 rack chassis adapter

❶ Secure the rack chassis adapter in the rack frame.

The maximum admissible ambient temperature (→ 🗎 8) must not be exceeded and the air circulation must not be obstructed.



❷ Slide the VGC501 into the adapter …



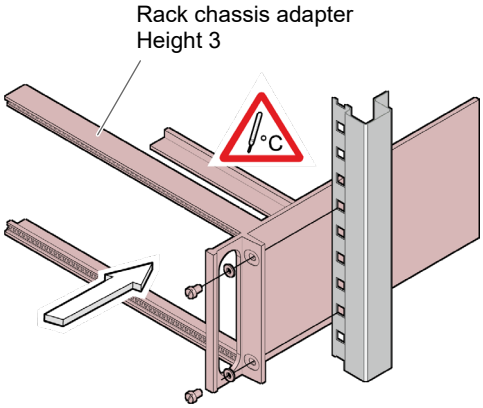
… and fasten the VGC501 to the rack chassis adapter using the screws supplied with it.

Height 3 rack chassis adapter

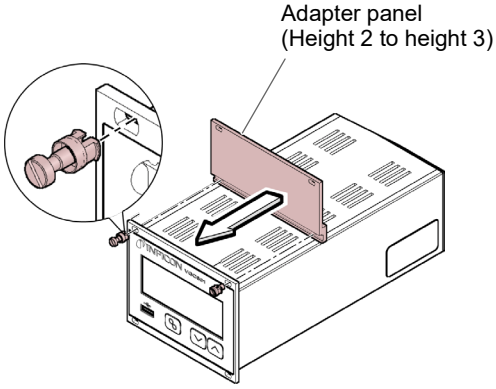
For incorporation into a 19" rack chassis adapter, height 3, an adapter panel (incl. two collar screws and plastic sleeves) is available (Accessories → 🗎 105).

❶ Secure the rack adapter in the rack frame.

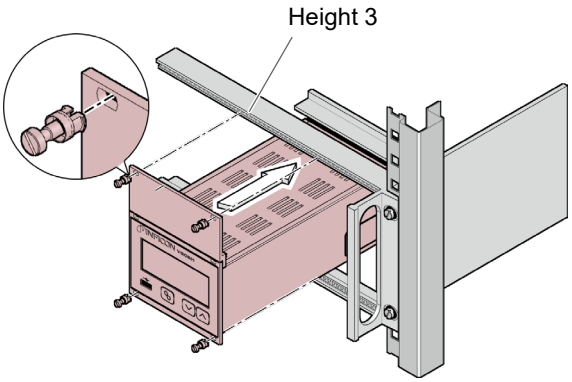
The maximum admissible ambient temperature (→ 🗎 8) must not be exceeded and the air circulation must not be obstructed.



❷ Mount the adapter panel as upper extension to the front panel of the VGC501 using the screws supplied with the adapter panel.



❸ Slide the VGC501 into the rack chassis adapter …



… and fasten the adapter panel to the rack chassis adapter using the screws supplied with the VGC501.

3.1.2 Rack Installation VGC502, VGC503

The unit is designed for installation into a 19" rack chassis adapter according to DIN 41 494. For this purpose, four collar screws and plastic sleeves are supplied with it.

DANGER

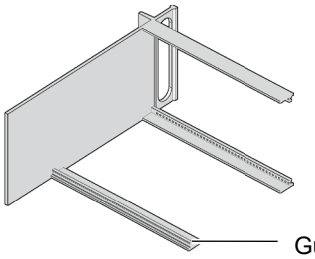
Protection class of the rack

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. according to the EN 60204-1 regulations for switching cabinets.

Take appropriate measures for the rack to meet the specifications of the protection class.

Guide rail

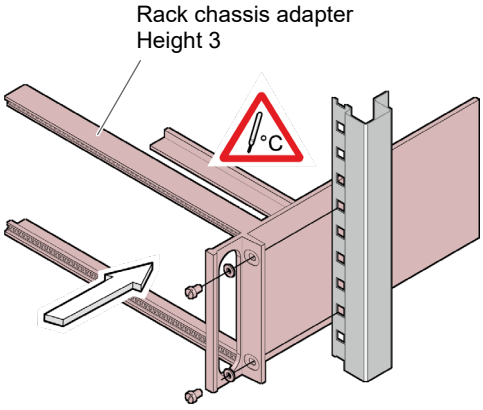
In order to reduce the mechanical strain on the front panel of the VGC502/503, preferably equip the rack chassis adapter with a guide rail.



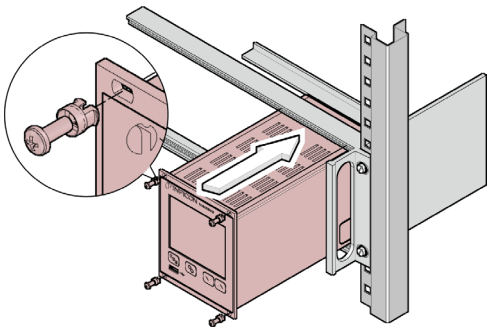
Height 3 rack chassis adapter

❶ Secure the rack adapter in the rack frame.

The maximum admissible ambient temperature (→ 🗎 8) must not be exceeded and the air circulation must not be obstructed.



❷ Slide the VGC502/503 into the rack chassis adapter …



… and fasten the adapter panel to the rack chassis adapter using the screws supplied with the VGC502/503.

3.1.3 Installation in a control panel

DANGER

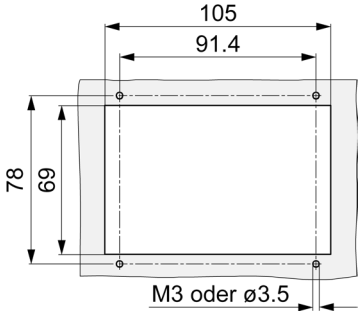
Pprotection class of the rack

If the product is installed in a rack, it is likely to lower the protection class of the rack (protection against foreign bodies and water) e.g. according to the EN 60204-1 regulations for switching cabinets.

Take appropriate measures for the rack to meet the specifications of the protection class.

VGC501

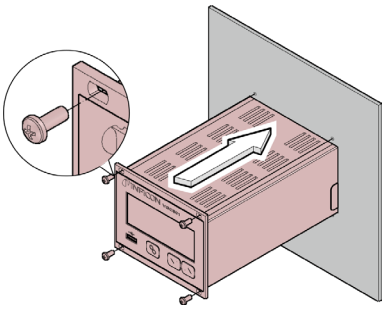
For mounting the VGC501 into a control panel, the following cut-out is required:



The maximum admissible ambient temperature (→ 🗎 8) must not be exceeded and the air circulation must not be obstructed.

For reducing the mechanical strain on the front panel of the VGC501, preferably support the unit.

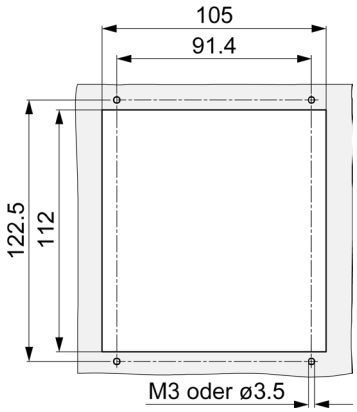
❶ Slide the VGC501 into the cut-out of the control panel …



… and secure it with four M3 or equivalent screws.

VGC502, VGC503

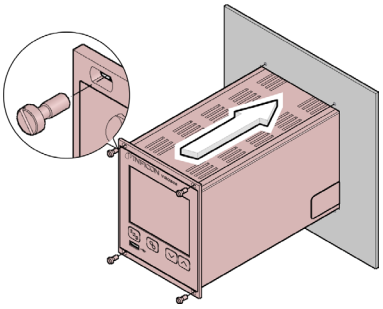
For mounting the VGC502/503 into a control panel, the following cut-out is required:



The maximum admissible ambient temperature (→ 🗎 8) must not be exceeded and the air circulation must not be obstructed.

For reducing the mechanical strain on the front panel of the VGC502/503, preferably support the unit.

❶ Slide the VGC502/503 into the cut-out of the control panel …

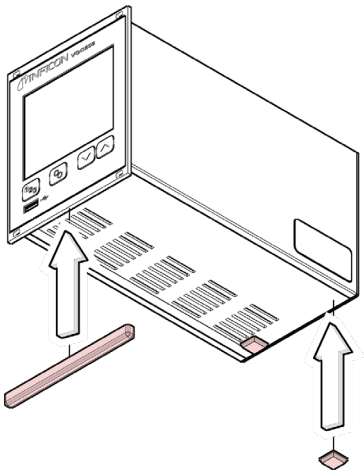


… and secure it with four M3 or equivalent screws.

3.1.4 Use as Desk-Top Unit

The VGC50x may also be used as a desk-top unit. For this purpose, two self-adhesive rubber feet and a slip-on rubber bar are supplied with it.

❶ Stick the two supplied rubber feet to the rear part of the bottom plate …



Select a location where the admissible maximum ambient temperature is not exceeded (e.g. due to sun irradiation) (→ 🗎 8).

… and slip the supplied rubber bar onto the bottom edge of the front panel.

3.2 Mains Power Connector

DANGER

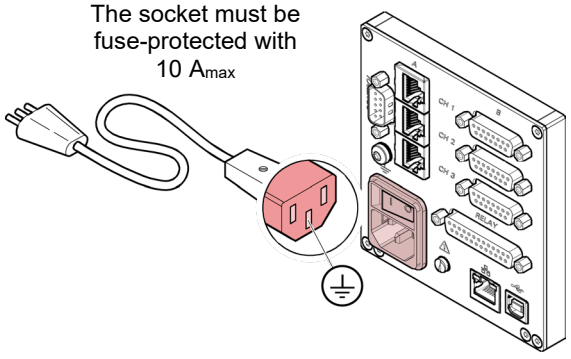
Line voltage

Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 3-conductor power cable with protective ground. The mains power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

The unit is supplied with a power cord. If the mains connector is not compatible with your system, use your own, suitable cable with protective ground (3×1.5 mm^3).

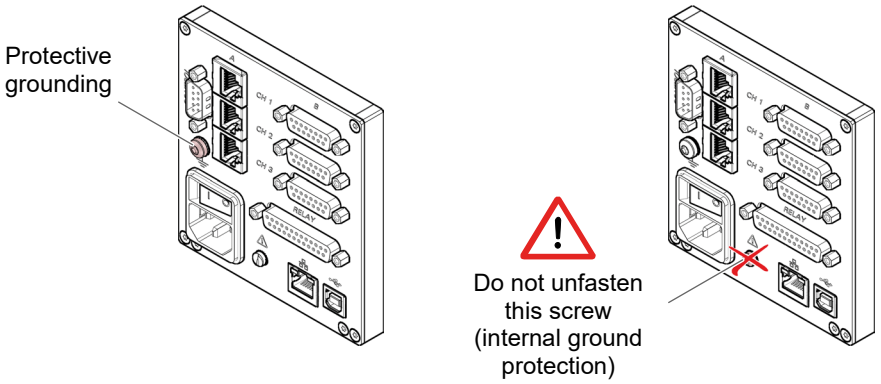
The socket must be fuse-protected with 10 A_{max}



If the unit is installed in a switching cabinet, the mains voltage should be supplied and turned on via a central distributor.

Ground Connection

On the rear of the unit is a screw enabling the VGC50x where necessary to be connected via a ground conductor, e.g. with the protective ground of the pump stand.



3.3 Gauge Connectors *CH 1*, *CH 2, CH 3*

For each channel there are two connections available which are connected in parallel:

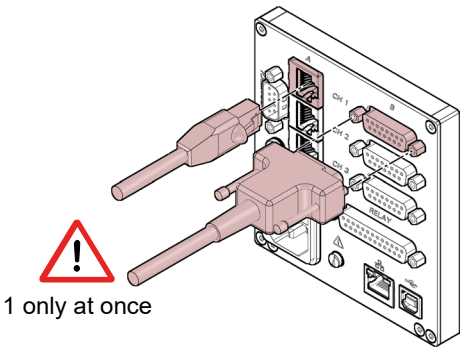
- one RJ45 appliance connector, female, 8-pin (CH *A*)
- one D-sub appliance connector, female, 15-pin (CH *B*)

Connect the gauge to the *CH 1, CH 2* or *CH 3* connector via a sensor cable set available from us (→ sales literature) or your own, screened (electromagnetic compatibility) sensor cable. Use compatible gauges (→ 🗎 8).

Caution

Multiple connection

Only one sensor may be connected to each of the channels (connection CH *A* or CH *B*). Otherwise the connected sensors may be damaged.



DANGER

Hazardous voltage

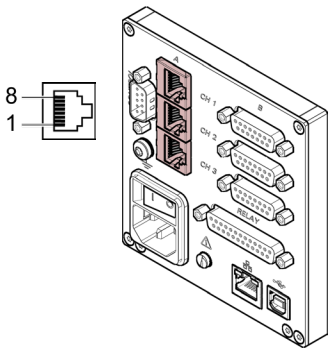
According to EN 61010, voltages exceeding 30 V (ac) or 60 V (dc) are hazardous.

Only connect a protective low voltage (PELV).

Pin assignment *CH 1, CH 2, CH 3*

Appliance socket RJ45

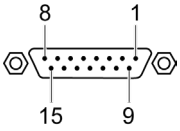
Pin assignment of the female 8-pin RJ45 appliance connectors:

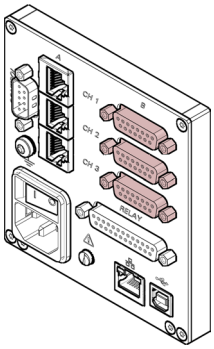


Pin	Signal	
1	Supply	+24 V (dc)
2	Supply common	GND
3	Signal input	(measuring signal 0 … +10 V (dc))
4	Identification	
5	Signal common	
6	Status	
7	HV_L	
8	HV_H / HV_EMI	

Appliance socket D-sub

Pin assignment of the female 15-pin D-sub appliance connectors:





Pin	Signal	
1	EMI status	
2	Signal input	(measuring signal 0 … +10 V (dc))
3	Status	
4	HV_H / HV_EMI	
5	Supply common	GND
6	n.c.	
7	Degas	
8	Supply	+24 V (dc)
9	n.c.	
10	Identification	
11	Supply	+24 V (dc)
12	Signal common	
13	RxD	
14	TxD	
15	Chassis	

3.4 *CONTROL* Connector VGC501

This connector allows the user to read the measuring signal, evaluate the state of the floating contacts of the error relay, and activate or deactivate the gauges (only for cold cathode gauges PEG/MAG).

Connect the peripheral components to the *CONTROL* connector on the rear of the unit using your own, screened (electromagnetic compatibility) cable.

DANGER

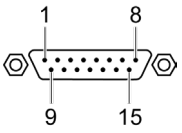
Hazardous voltage

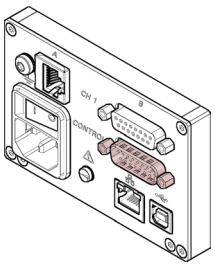
According to EN 61010, voltages exceeding 30 V (ac) or 60 V (dc) are hazardous.

Only connect a protective low voltage (PELV).

Pin assignment

Pin assignment of the male 15-pin D-sub appliance connector:





Pin	Signal
1	Analog output –5 … +13 V (dc)
2	Analog output GND
	Switching function 1
3 4 5	Pressure above threshold or power supply turned off / Pressure bellow threshold
6	HV_H on +24 V off 0 V
7 8	+24 V (dc), 200 mA Chassis = GND Fuse-protected at 300 mA with PTC element, self-resetting after power off or pulling the *CONTROL* connector. Meets the requirements of a grounded protective extra low voltage.
	Error signal
9 10 11	No error / Error or power supply turned off
	Switching function 2
12 13 14	Pressure above threshold or power supply turned off / Pressure bellow threshold
15	Chassis = GND

The analog output (pin 1) differs from the displayed value by no more than ±20 mV.

3.5 *CONTROL* Connector VGC502, VGC503

The *CONTROL* connection contains the following signal pins:

- Analog outputs for the signals of the individual channels.
- Recorder output. This is a programmable analog output which can be assigned to one of the three channels.
- HV-EMI. Used to switch the high-vacuum circuit of the PEG/MAG gauges on and off. The signal levels are:
  On = +24 V
  Off = 0 V

Connect the peripheral components to the *CONTROL* connector on the rear of the unit using your own, screened (electromagnetic compatibility) cable.

DANGER

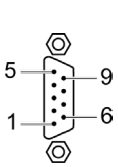
Hazardous voltage

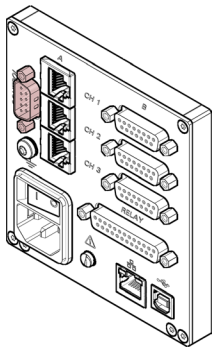
According to EN 61010, voltages exceeding 30 V (ac) or 60 V (dc) are hazardous.

Only connect a protective low voltage (PELV).

Pin assignment

Pin assignment of the male 9-pin D-sub appliance connector:





Pin	Signal	
1	Analog output 1	–5 … +13 V (dc)
2	Analog output 3	–5 … +13 V (dc)
3	Screening GND	
4	HV_EMI 3	
5	HV_EMI 1	
6	Analog output 2	–5 … +13 V (dc)
7	Recorder output	0 … +10 V (dc)
8	Screening GND	
9	HV_EMI 2	

The analog outputs (pins 1, 2, 6) differ from the displayed values by no more than ±20 mV.

3.6 *RELAY* Connector VGC502, VGC503

The switching functions and the error monitoring system influence the state of several relays inside of the Vacuum Gauge Controller. The *RELAY* connection allows utilizing the relay contacts for switching purposes. The relay contacts are potential-free (floating).

Connect the peripheral components to the *RELAY* connector on the rear of the unit using your own, screened (electromagnetic compatibility) cable.

DANGER

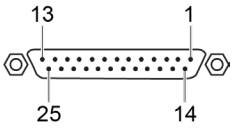
Hazardous voltage

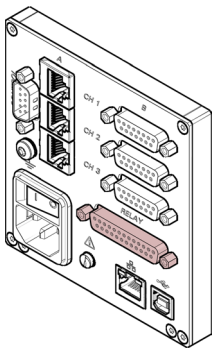
According to EN 61010, voltages exceeding 30 V (ac) or 60 V (dc) are hazardous.

Only connect a protective low voltage (PELV).

Pin assignment, Contact positions

Pin assignment of the female 25-pin D-sub appliance connector:



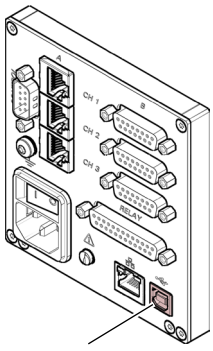


Pin	Signal	
	Switching function 1	
4 5 6	Pressure above threshold or power supply turned off	Pressure below threshold
	Switching function 2	
8 9 10	Pressure above threshold or power supply turned off	Pressure below threshold
	Switching function 3	
11 12 13	Pressure above threshold or power supply turned off	Pressure below threshold
	Switching function 4	
16 17 18	Pressure above threshold or power supply turned off	Pressure below threshold
	Switching function 5	
19 20 21	Pressure above threshold or power supply turned off	Pressure below threshold
	Switching function 6	
22 23 24	Pressure above threshold or power supply turned off	Pressure below threshold
	Error signal	
3 15 14	Error or power supply turned off	No error
	Supply for relays with higher switching power	
25	+24 V (dc), 200 mA	Fuse-protected at 200 mA with PTC element, self-resetting after turning off the VGC50x or pulling the *RELAY* connector. Meets the grounded protective extra low voltage requirements.
1, 7	GND	
2	n.c.	

3.7 Interface Connector USB Type B

The USB Type B interface connector facilitates direct communication with the VGC50x via a computer (e.g. firmware update, parameter saving (read/write)).

Connect the USB interface connector to the ⇻ connector on the rear of the unit using a screened (electromagnetic compatibility) cable.

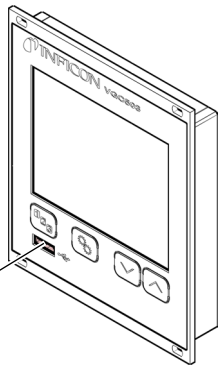


USB Type B

3.8 Interface Connector USB Type A

The USB Type A interface connector with master functionality is situated on the front of the unit and is used for the connection of a USB memory stick (e.g. firmware update, parameter saving (read/write), data logger).

Connect the USB memory stick to the connector ⇻ on the front of the unit.

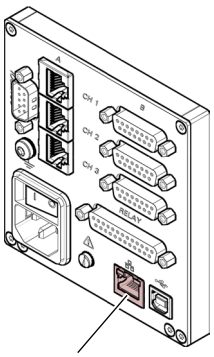


USB Type A

3.9 Interface Connector Ethernet

The Ethernet interface allows direct communication with the VGC50x via a computer.

Connect the Ethernet cable to the connector 品 on the rear of the unit.



Ethernet

Green LED

Link or transmit LED. Indicates that a hardware connection has been established.

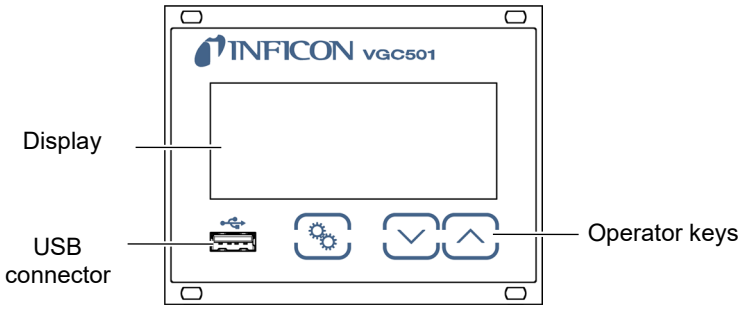
Yellow LED

Status or packet detect LED. Indicates the status of the transmission. When this LED flashes or flickers, data are being transmitted.

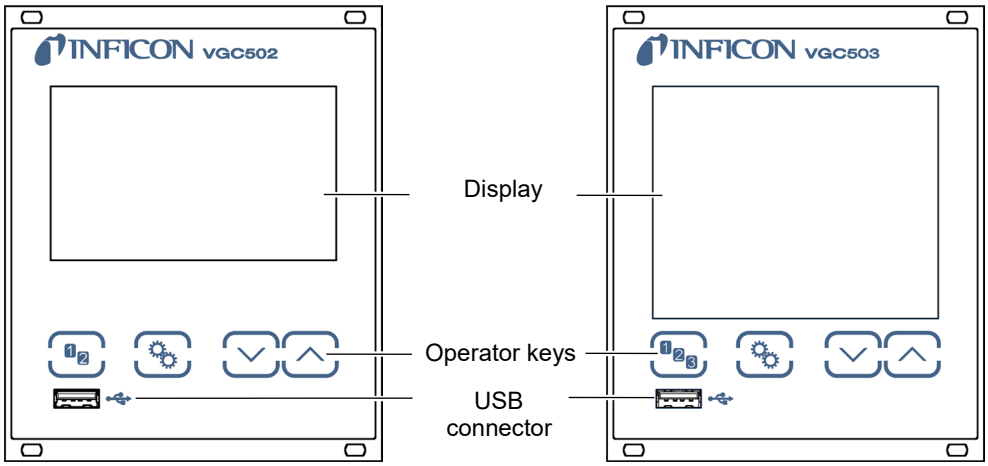
4 Operation

4.1 Front panel

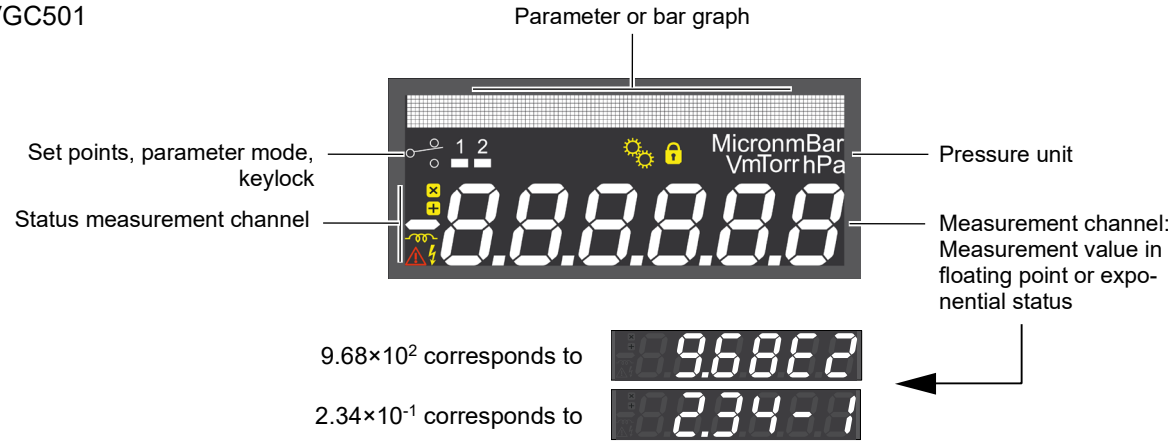
VGC501



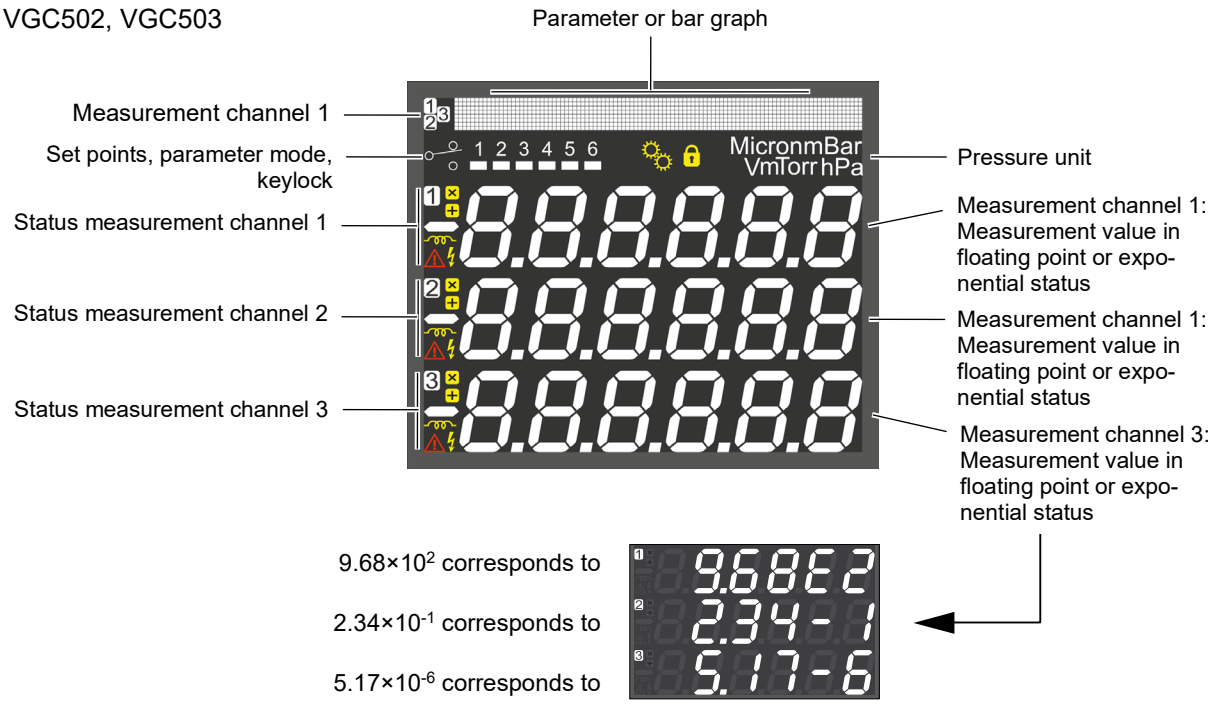
VGC502 **VGC503**



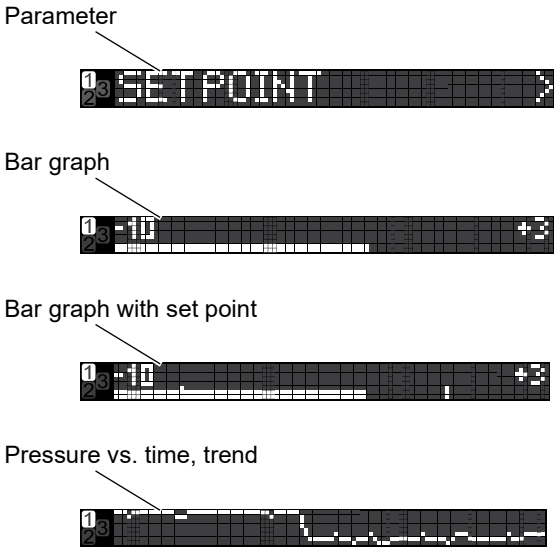
Display VGC501



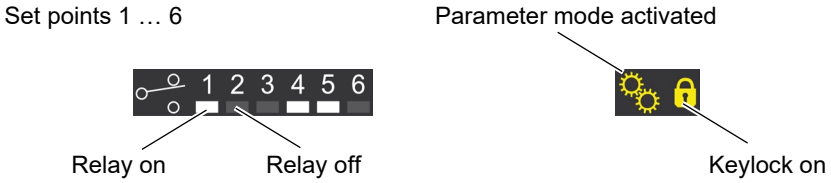
Display VGC502, VGC503



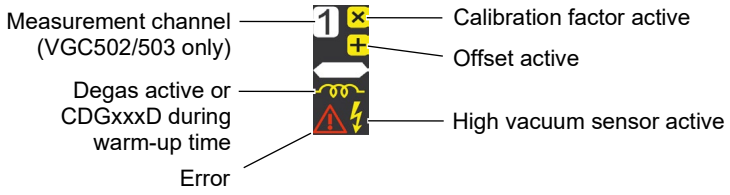
Parameter, bar graph



Set points, parameter mode, keylock



Measurement channel specifically

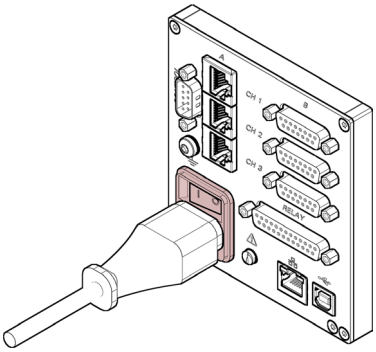


4.2 Turning the VGC50x On and Off

Turning the VGC50x on

The power switch is on the rear of the unit.

Turn the VGC50x on with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).



After power on, the VGC50x …

- automatically performs a self-test
- identifies the connected gauges
- activates the parameters that were in effect before the last power off
- switches to the Measurement mode
- adapts the parameters if required (if a different gauge was previously connected).

Turning the VGC50x off

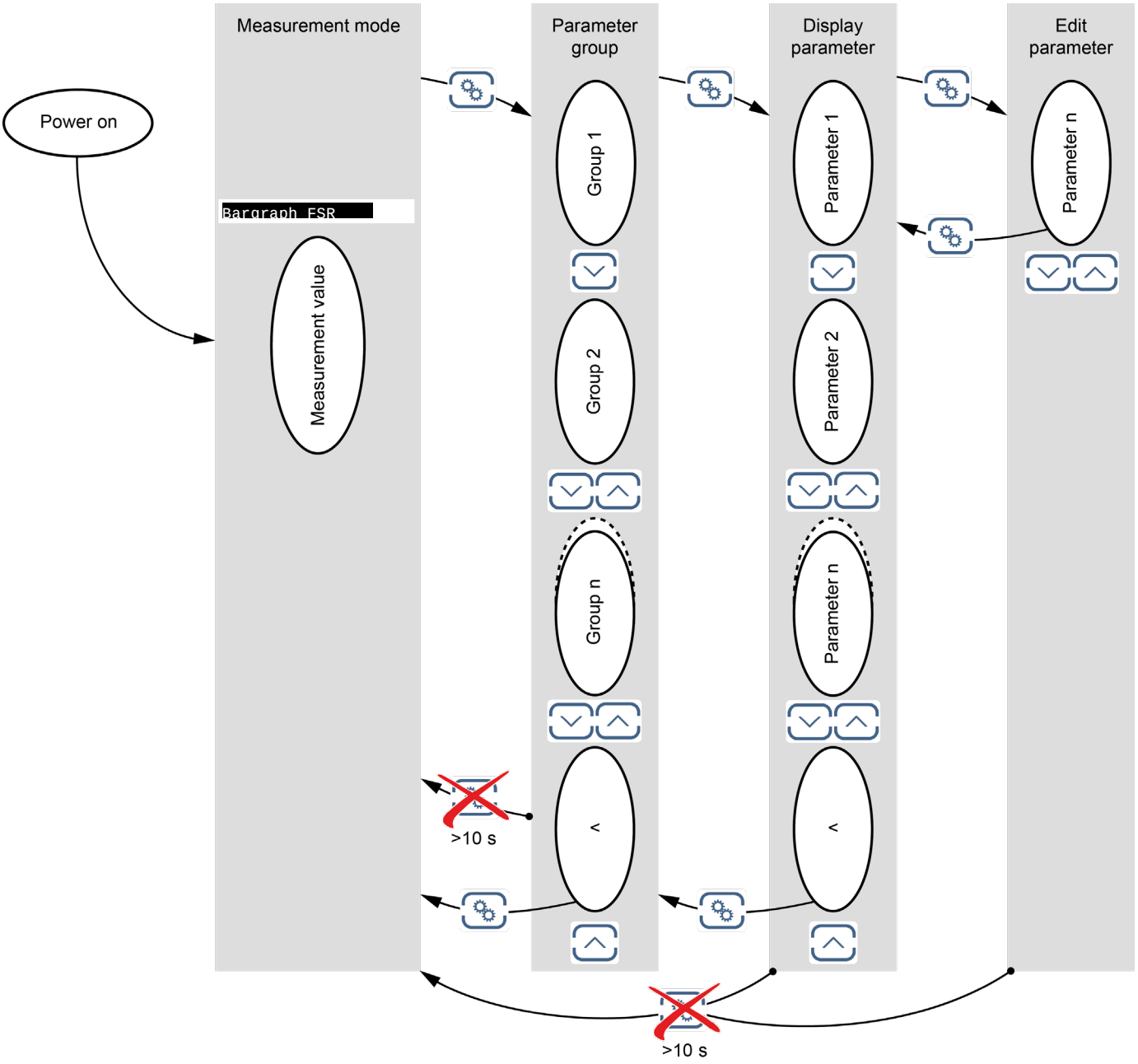
Turn the VGC50x off with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).

Wait at least 10 s before turning the VGC50x on again in order for it to correctly initialize itself.

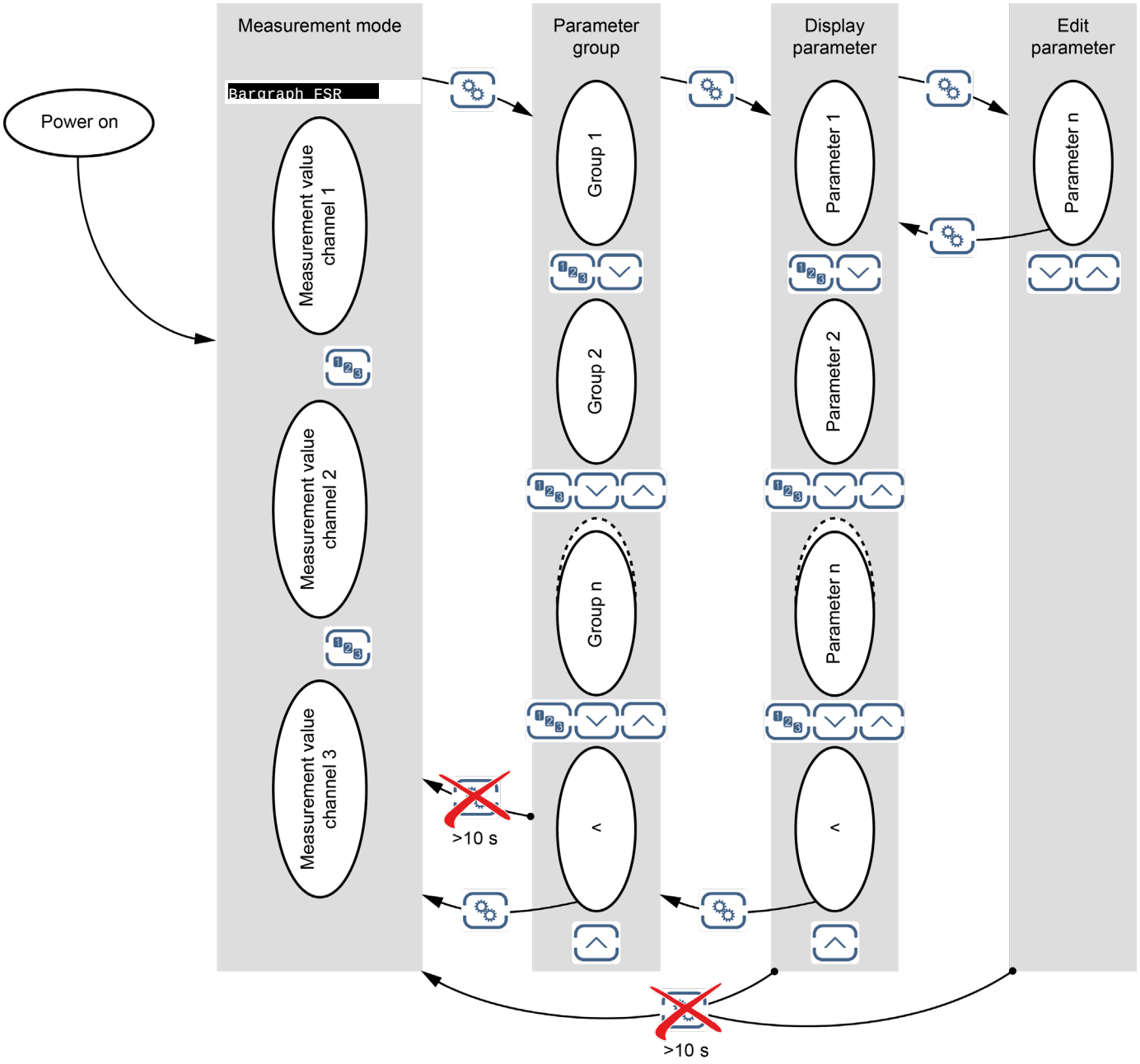
4.3 Operating Modes

The VGC50x works in the following operating modes:

- Measurement mode
  for displaying measurement values or statuses (→ 🗎 32)
- Parameter mode
  for displaying and editing parameters (→ 🗎 34)
  - Switching function parameter group `SETPOINT >`
    for entering and displaying thresholds (→ 🗎 36)
  - Gauge parameter group `SENSOR >`
    for entering and displaying gauge parameters (→ 🗎 40)
  - Gauge control group `SENSOR-CONTROL >`
    for entering and displaying gauge control parameters (→ 🗎 48)
  - General parameter group `GENERAL >`
    for entering and displaying general parameters (→ 🗎 52)
  - Test program group `TEST >`
    for running internal test programs (→ 🗎 60)
  - Data logger mode `DATA LOGGER >`
    for logging measurement data (→ 🗎 63)
  - Parameter transfer mode `SETUP >`
    for saving (read/write) parameters (→ 🗎 65)


Measurement mode
Parameter group
Display parameter
Edit parameter
Power on
Bargraph FSR
Measurement value
Group 1
Group 2
Group n
Parameter 1
Parameter 2
Parameter n
Parameter n
<
<
<
>10 s
>10 s

VGC502, VGC503



4.4 Measurement Mode

Measurement mode is the standard operating mode of the VGC50x with display of

- a bar graph (if required)
- a measurement value for each measurement channel
- status messages for each measurement channel

Adjusting bar graph

If required a bar graph may be displayed (→ 🗎 57).

Changing measurement channel (VGC502/503 only)

The unit alternates between measurement channels one, two and three. The number of the selected measurement channel lights up.

Turning the gauge on/off

Certain gauges can be turned on and off manually, provided the gauge control is set to `S-ON HAND` (→ 🗎 50).

Available for the following gauges:

☐ Pirani	(PSG)
☐ Pirani / Capacitance	(PCG)
☑ Cold cathode	(PEG, MAG)
☐ Cold cathode / Pirani	(MPG)
☐ Capacitance	(CDG)
☐ Hot ionization	(BAG)
☐ Hot ionization / Pirani	(BPG, HPG)
☐ Hot ionization / Pirani / Capacitance	(BCG)

⇨ Press key for >1 s:
Gauge switches off. Instead of a measurement value the word OFF is displayed.

⇨ Press key for >1 s:
Gauges switches on. Instead of the measurement value a status message may be displayed.

Switching the emission on / off

For certain gauges the emission can be switched on and off manually, provided the sensor parameter is set to `EMISSION HAND` (→ 🗎 47).

Switching on the emission is only possible if the pressure is below 2.4×10^{-2} mbar.

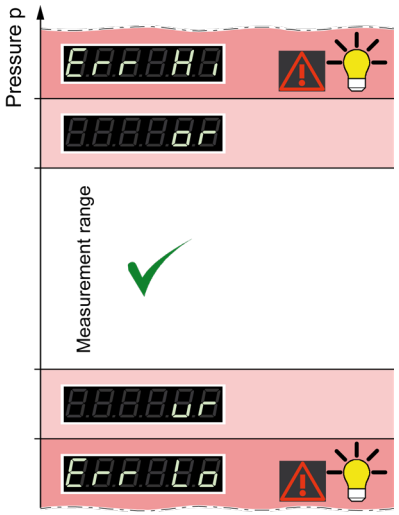
Available for the following gauges:

☐ Pirani	(PSG)
☐ Pirani / Capacitance	(PCG)
☐ Cold cathode	(PEG, MAG)
☐ Cold cathode / Pirani	(MPG)
☐ Capacitance	(CDG)
☑ Hot ionization	(BAG500, BAG502, BAG552 only)
☑ Hot ionization / Pirani	(BPG402, BPG502, BPG552 only)
☑ Hot ionization / Pirani / Capacitance	(BCG)

⇨ Press key for >1 s:
The emission is switched off. The measurement value of the Pirani or CDG sensor is displayed instead of the measurement value of the hot cathode ionization sensor.

⇨ Press key for >1 s:
The emission is switched on. The measurement value of the hot cathode ionization sensor is displayed and ϟ lid solid.

Measurement range



If the unit is operated with linear gauges (CDG), negative pressures may be indicated.

Possible causes:

- negative drift
- activated offset correction.

Displaying the gauge identification

First, select the required measurement channel with key.

⇨ Press keys for >0.5 … 1 s:
For the measurement channel in question the type of the connected gauge is automatically identified and displayed for 6 s. If the key is pressed again within this 6 s, the type of the gauge connected on the next channel is displayed for 6 s.

Pirani gauge
(PSG400, PSG400-S, PSG100-S, PSG101-S, PSG500, PSG500-S, PSG502-S, PSG510-S, PSG512-S, PSG550, PSG552, PSG554, PPG550, PPG570) — PSG

Pirani / Capacitance gauge
(PCG400, PCG400-S, PCG550, PCG552, PCG554) — PCG

Cold cathode gauge
(PEG100, MAG500, MAG504) — PEG/MAG

Cold cathode / Pirani gauge
(MPG400, MPG401, MPG500, MPG504) — MPG

Hot ionization gauge

(BAG500) — BAG500
(BAG502) — BAG502
(BAG552) — BAG552

Hot ionization / Pirani gauge

(BPG400) — BPG400
(BPG402) — BPG402
(BPG500) — BPG500
(BPG502) — BPG502
(BPG552) — BPG552
(HPG400) — HPG400

Hot ionization / Capacitance / Pirani gauge

(BCG450)	`BCG450`	
(BCG552)	`BCG552`	
Linear gauge (capacitance, analog) (CDG020D, CDG025, CDG045, CDG045-H, CDG045Dhs, CDG100, CDG100Dhs, CDG160Dhs, CDG200Dhs)	`CDG 1000MBAR`	
Linear gauge (capacitance, digital) (CDG025D, CDG025D-X3, CDG045D, CDG045D2, CDG100D, CDG100D2, CDG160D, CDG200D)	`CDGxxxD Vx.xx`	Version during 3 s, then
	`CDGxxxD 1000MBAR`	FS during 3 s
No gauge connected	`noSENSOR`	
Gauge connected, but not identifiable	`noIDENT.`	

Changing to the Parameter mode

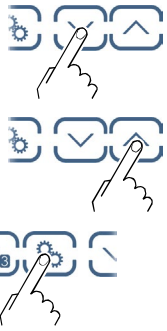
→ 🗎 34

4.5 Parameter Mode

The Parameter mode is used for displaying, editing and entering parameter values as well as for testing the VGC50x and for saving measurement data. For ease of operation the individual parameters are divided into groups.

Unit switches from measurement mode to parameter mode. The respective parameter group is displayed in place of the bar graph.

Selecting a parameter group

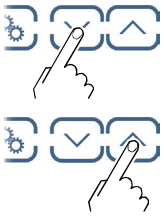


Select group

Confirm group

⇨ Switching function parameters → 🗎 36
Gauge parameters → 🗎 40
Gauge control → 🗎 48
General parameters → 🗎 52
Test parameters → 🗎 60
Data logger → 🗎 63
Parameter transfer → 🗎 65

Reading a parameter in a parameter group



Editing and saving a parameter in a parameter group

Confirm the parameter. The value flashes and can now be edited.

Edit the value.

Save the change and return to read mode.

4.5.1 Switching Function Parameters

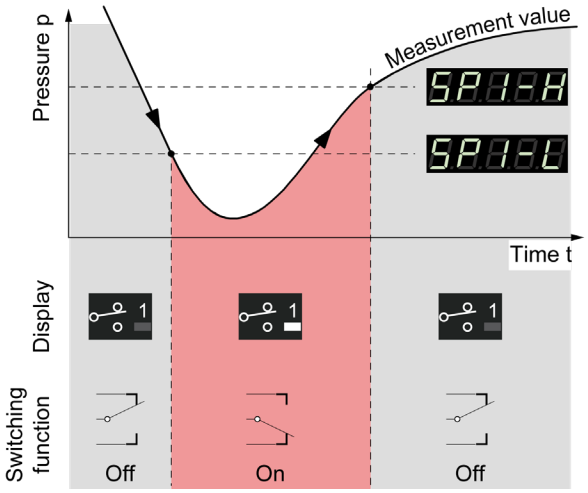
SETPOINT >	The switching function parameter group is used for displaying, editing and entering threshold values and assigning the two (VGC501), four (VGC502) or six (VGC503) switching functions to a measurement channel.

Parameters in this group

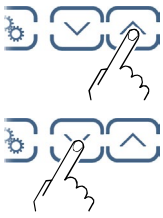
SP1-CH	Configuration of switching function 1
SP1-L	Switching function 1 lower threshold
SP1-H	Switching function 1 upper threshold
SP2-CH	Configuration of switching function 2
SP2-L	Switching function 2 lower threshold
SP2-H	Switching function 2 upper threshold
SP3-CH	Configuration of switching function 3 (VGC502/503 only)
SP3-L	Switching function 3 lower threshold (VGC502/503 only)
SP3-H	Switching function 3 upper threshold (VGC502/503 only)
SP4-CH	Configuration of switching function 4 (VGC502/503 only)
SP4-L	Switching function 4 lower threshold (VGC502/503 only)
SP4-H	Switching function 4 upper threshold (VGC502/503 only)
SP5-CH	Configuration of switching function 5 (VGC503 only)
SP5-L	Switching function 5 lower threshold (VGC503 only)
SP5-H	Switching function 5 upper threshold (VGC503 only)
SP6-CH	Configuration of switching function 6 (VGC503 only)
SP6-L	Switching function 6 lower threshold (VGC503 only)
SP6-H	Switching function 6 upper threshold (VGC503 only)
<	One level back

The VGC501 has two, the VGC502 has four and the VGC503 has six, switching functions with two adjustable thresholds each. The status of the switching functions is displayed on the front panel and can be evaluated via the floating contacts at the *CONTROL*, respectively *RELAY* connector.

- VGC501: *CONTROL* connector (→ 🗎 22)
- VGC502, VGC503: *RELAY* connector (→ 🗎 23)



Selecting a parameter

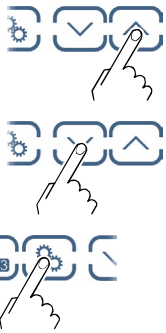


⇨ The name of the parameter and the currently valid parameter value are displayed.

e.g.: `SP1-CH DISABLED`
Switching function 1 turned off

⇨ Select parameter. The value flashes and can now be edited.

Editing and saving the parameter



⇨ Press key for <1 s:
The value is increased/decreased by 1 increment.

Press key for >1 s:
The value is increased/decreased continuously.

⇨ Save the change and return to read mode.

We recommend setting the upper threshold ½ decade above the lower, or the lower threshold ½ decade below the upper, threshold limit.

Configuring a switching function

	Value
SP1-CH	Configuring a switching function.
SP1-CH 1	⇨ Switching function 1 is assigned to channel 1
SP1-CH 2	⇨ Switching function 1 is assigned to channel 2 (VGC502/503 only)
SP1-CH 3	⇨ Switching function 1 is assigned to channel 3 (VGC503 only)
SP1-CH DISABLED	⇨ Switching function 1 is factory-deactivated
SP1-CH ENABLED	⇨ Switching function 1 is always turned on

The lower and the upper threshold of a switching function are always assigned to the same channel. The last assignment is valid for both thresholds.

Limits of the lower switching thresholds

	Value
SP1-L	The lower threshold (Setpoint low) defines the pressure at which the switching function is activated when the pressure is dropping.
e.g.: SP1-L 5.00-4	⇨ gauge dependent. If another gauge type is connected, the VGC50x automatically adjusts the switching threshold if required.

	SPx-L min.	SPx-L max.
PSG	2×10^{-3} *)	= SPx-H max.
PCG	2×10^{-3} *)	
PEG/MAG	1×10^{-9}	
MPG	1×10^{-9}	
BAGxxx	1×10^{-8}	
BPGxxx	1×10^{-8}	
HPG400	1×10^{-6}	
BCGxxx	1×10^{-8}	
CDG	FS / 1000	
CDGxxxD	FS / 1000	

all values in mbar, GAS=nitrogen

*) 2×10^{-4} mbar if RNG-EXT (Pirani range extension) is activated (→ 🗎 53)

The minimum hysteresis between the upper and lower switching threshold amounts to at least 10% of the lower threshold (logarithmic gauges) or 1% of the full scale value (linear gauges). The upper threshold is if necessary automatically adjusted to a minimum hysteresis. This prevents unstable states.

Limits of the upper switching thresholds

	Value
SP1-H	The upper switching threshold (Setpoint high) defines the pressure at which the switching function is deactivated when the pressure is rising.
e.g.: SP1-H 1500	⇨ gauge dependent. If another gauge type is connected, the VGC50x automatically adjusts the threshold if required.

	SPx-H min.	SPx-H max.
PSG	= SPx-L min.	1×10^{3}
PCG		1.5×10^{3}
PEG/MAG		1×10^{-2}
MPG		1×10^{3}
BAGxxx		1×10^{3}
BPGxxx		1×10^{3}
HPG400		1×10^{3}
BCGxxx		1.5×10^{3}
CDG		FS
CDGxxxD		FS

all values in mbar, GAS=nitrogen

The minimum hysteresis between the upper and lower switching threshold amounts to at least 10% of the lower threshold (logarithmic gauges) or 1% of the full scale value (linear gauges). This prevents unstable states.

4.5.2 Gauge Parameters

SENSOR > — The sensor parameter group is used for displaying, entering and editing parameters of the connected gauges.

Parameters in this group

DEGAS	Cleaning the electrode system.
FSR	Measurement range linear gauges.
FILTER	Measurement value filter.
OFFSET	Offset correction.
GAS	Correction factor for other gases.
COR	Calibration factor.
HV-CTRL	Activating / deactivating high vacuum measurement circuit.
EMISSION	Emission.
FILAMENT	Filament selection.
DIGITS	Display resolution.
<	One level back.

Some parameters are not available for all gauges and thus not always displayed.

Available for

	→ 🗎 41 DEGAS	42 FSR	43 FILTER	44 OFFSET	46 GAS	46 COR	47 HV-CTRL	47 EMISSION	47 FILAMENT	48 DIGITS
PSG	–	–	✓	–	✓	✓	–	–	–	✓
PCG	–	–	✓	–	✓	✓	–	–	–	✓
PEG/MAG	–	–	✓	–	✓	✓	✓	–	–	✓
MPG	–	–	✓	–	✓	✓	–	–	–	✓
BAG500	✓	–	✓	–	✓	✓	–	–	–	✓
BAG502	✓	–	✓	–	✓	✓	–	–	✓	✓
BAG552	✓	–	✓	–	✓	✓	–	–	✓	✓
BPG400	✓	–	✓	–	✓	✓	–	–	–	✓
BPG402	✓	–	✓	–	✓	✓	–	✓	✓	✓
BPG500	✓	–	✓	–	✓	✓	–	–	–	✓
BPG502	✓	–	✓	–	✓	✓	–	✓	✓	✓
BPG552	✓	–	✓	–	✓	✓	–	✓	✓	✓
HPG400	–	–	✓	–	✓	✓	–	–	–	✓
BCG450	✓	–	✓	–	✓	✓	–	✓	–	✓
BCG552	✓	–	✓	–	✓	✓	–	✓	–	✓
CDG	–	✓	✓	✓	–	✓	–	–	–	✓
CDGxxxD	–	✓	✓	✓	–	✓	–	–	–	✓

Degas

Contamination deposits on the electrode system of hot cathode gauges may cause instabilities of the measurement values. The degas function facilitates cleaning of the electrode system.

The degas process works only at pressures below 7.2×10^{-6} mbar.

Gauges with two filaments: The Degas function acts only upon the active filament.

Available for the following gauges:

- ☐ Pirani (PSG)
- ☐ Pirani / Capacitance (PCG)
- ☐ Cold cathode (PEG, MAG)
- ☐ Cold cathode / Pirani (MPG)
- ☐ Capacitance (CDG)
- ☑ Hot ionization (BAG)
- ☑ Hot ionization / Pirani (BPG)
- ☐ Hot ionization / Pirani (HPG)
- ☑ Hot ionization / Pirani / Capacitance (BCG)

	Value	
DEGAS		
DEGAS OFF	⇨ Normal operation (Degas blocked)	
DEGAS ON	⇨ Degas: The electron collection grid is heated to ≈700 °C by electron bombardment and the electrode system is thus cleaned. Duration = 180 s.	

Editing and saving a parameter

⇨ Start Degas. Duration of the Degas function 180 seconds (may also be aborted).

Abort Degas.

⇨ Save change and return to read mode.

Measurement range (FS) of linear gauges

For linear analog gauges, the full scale (FS) value has to be defined on the basis of the connected gauge type. For linear digital gauges and logarithmic gauges it is automatically recognized.

Available for the following gauges:

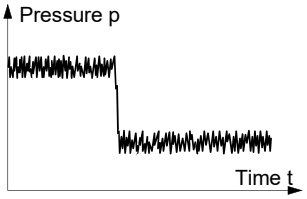
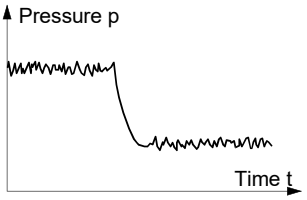
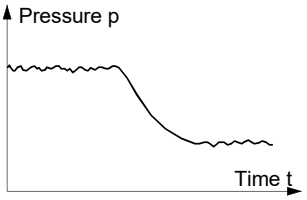
- ☐ Pirani (PSG)
- ☐ Pirani / Capacitance (PCG)
- ☐ Cold cathode (PEG, MAG)
- ☐ Cold cathode / Pirani (MPG)
- ☑ Capacitance (CDG)
- ☐ Hot ionization (BAG)
- ☐ Hot ionization / Pirani (BPG, HPG)
- ☐ Hot ionization / Pirani / Capacitance (BCG)

	Value
`FSR`	
e.g. `FSR 1000 MBAR`	⇨ 0.01 mbar, 0.02 mbar, 0.05 mbar 0.01 Torr, 0.02 Torr, 0.05 Torr 0.10 mbar, 0.25 mbar, 0.50 mbar 0.10 Torr, 0.25 Torr, 0.50 Torr 1 mbar, 2 mbar, 5 mbar 1 Torr, 2 Torr, 5 Torr 10 mbar, 20 mbar, 50 mbar 10 Torr, 20 Torr, 50 Torr 100 mbar, 200 mbar, 500 mbar 100 Torr, 200 Torr, 500 Torr 1000 mbar, 1100 mbar 1000 Torr 2 bar, 5 bar, 10 bar, 50 bar A conversion table can be found in the Appendix (→ 🗎 106).

Measurement value filter

The measurement value filter permits a better evaluation of unstable or disturbed measuring signals.

The measurement value filter does not affect the analog output (→ 🗎 23).

	Value
FILTER	
FILTER OFF	⇨ No measurement value filter
FILTER FAST	⇨ Fast: The VGC50x responds quickly to fluctuations in the measurement value. As a result, it will respond faster to interference in the measured values. 
FILTER NORMAL	⇨ Normal (factory setting): Good relationship between response and sensitivity of the display and the switching function to changes in the measured values. 
FILTER SLOW	⇨ Slow: The VGC50x does not respond to small changes in measured values. As a result, it will respond more slowly to changes in the measured values. 

Offset correction of the controller

The offset value is displayed and readjusted according to the actual measurement value.

Available for the following gauges:

- ☐ Pirani (PSG)
- ☐ Pirani / Capacitance (PCG)
- ☐ Cold cathode (PEG, MAG)
- ☐ Cold cathode / Pirani (MPG)
- ☑ Capacitance (CDG)
- ☐ Hot ionization (BAG)
- ☐ Hot ionization / Pirani (BPG, HPG)
- ☐ Hot ionization / Pirani / Capacitance (BCG)

The offset correction affects:

- ☑ the displayed measurement value
- ☐ the displayed threshold value of the switching functions
- ☐ the analog outputs at the *CONTROL* connector (→ 🗎 22, 23)

	Value	
OFFSET		
OFFSET OFF	⇨ Offset correction factory-deactivated	
e.g. OFFSET 9.53	⇨ Offset correction activated (display in the relevant units of measurement)	

⇨ Press key for >1.5 s:
The offset value is readjusted (the actual measurement value is accepted as new offset value).

Reset the offset value.

⇨ Save change and return to read mode.

When offset correction is activated, the saved offset value is subtracted from the actual measurement value. This allows measuring relative to a reference pressure.

Zero adjustment of a digital CDG

First adjust the gauge and then the controller.

Available for the following gauges:

☐ Pirani	(PSG)
☐ Pirani / Capacitance	(PCG)
☐ Cold cathode	(PEG, MAG)
☐ Cold cathode / Pirani	(MPG)
☑ Capacitance	(CDG)
☐ Hot ionization	(BAG)
☐ Hot ionization / Pirani	(BPG, HPG)
☐ Hot ionization / Pirani / Capacitance	(BCG)

When the zero of the gauge is readjusted, the offset correction must be deactivated.

	Value	
OFFSET		+
e.g. OFFSET OFF	⇨ Zero adjustment deactivated	

Lit solid after >1.5 s and as long as key remains pressed

⇨ Press >1.5 s:
Zero adjustment of the digital CDG.

After adjusting the zero point, a zero value is displayed. Due to the measuring resolution of the CDG (noise, drift), a zero with plus/minus several digits are displayed.

Correction factor GAS

The correction factor GAS allows

- the measured value to be calibrated for the preset gases N_2, Ar, H_2, He, Ne, Kr and Xe, or
- manual input of the correction factor for other gases (COR).

→ Characteristic curves in 🕮 [1] … [16].

This parameter is not available for the unit of measurement: Volt.

Available for the following gauges:		Only for pressures
☑ Pirani	(PSG)	<1 mbar
☑ Pirani / Capacitance	(PCG)	<1 mbar
☑ Cold cathode	(PEG, MAG)	
☑ Cold cathode / Pirani	(MPG)	$<1\times10^{-3}$ mbar
☐ Capacitance	(CDG)	
☑ Hot ionization	(BAG)	$<1\times10^{-3}$ mbar
☑ Hot ionization / Pirani	(BPG)	$<1\times10^{-3}$ mbar
☑ Hot ionization / Pirani	(HPG)	
☑ Hot ionization / Pirani / Capacitance	(BCG)	$<1\times10^{-3}$ mbar

	Value
GAS	
GAS N2	⇨ Gas: nitrogen / air (factory setting)
GAS AR	⇨ Gas: argon
GAS H2	⇨ Gas: hydrogen
GAS HE	⇨ Gas: helium
GAS NE	⇨ Gas: neon
GAS KR	⇨ Gas: krypton
GAS XE	⇨ Gas: xenon
GAS COR	⇨ Calibration factor for other gases by manually entering parameter COR

Calibration factor COR

The calibration factor COR allows the measured value to be calibrated for other gases (→ characteristic curve in 🕮 [1] … [16]). This parameter is effective in the entire measurement range of the gauge.

Precondition: Parameter "GAS COR" is set (except capacitance gauges).

This parameter is not available with the measurement unit: Volt.

Available for the following gauges:	
☑ Pirani	(PSG)
☑ Pirani / Capacitance	(PCG)
☑ Cold cathode	(PEG, MAG)
☑ Cold cathode / Pirani	(MPG)
☑ Capacitance	(CDG)
☑ Hot ionization	(BAG)
☑ Hot ionization / Pirani	(BPG, HPG)
☑ Hot ionization / Pirani / Capacitance	(BCG)

	Value	
COR		
e.g. COR 1.00	⇨ No correction	
e.g. COR 1.53	⇨ Measurement value corrected by a factor of 0.10 … 10.00	

Turning the gauge on / off

Activating / deactivating the high vacuum measurement circuit (→ also [32]).

Available for the following gauges:

☐ Pirani	(PSG)
☐ Pirani / Capacitance	(PCG)
☑ Cold cathode	(PEG, MAG)
☐ Cold cathode / Pirani	(MPG)
☐ Capacitance	(CDG)
☐ Hot ionization	(BAG)
☐ Hot ionization / Pirani	(BPG, HPG)
☐ Hot ionization / Pirani / Capacitance	(BCG)

	Value	
HV-CTRL		
HV-CTRL ON	⇨ High vacuum measurement circuit activated	
HV-CTRL OFF	⇨ High vacuum measurement circuit deactivated	

Emission

Switching the emission on and off.

Available for the following gauges:

☐ Pirani	(PSG)
☐ Pirani / Capacitance	(PCG)
☐ Cold cathode	(PEG, MAG)
☐ Cold cathode / Pirani	(MPG)
☐ Capacitance	(CDG)
☐ Hot ionization	(BAG)
☑ Hot ionization / Pirani	(BPG402, BPG502, BPG552 only)
☑ Hot ionization / Pirani / Capacitance	(BCG)

	Value
EMISSION	
EMISSION AUTO	⇨ The emission is switched on and off automatically by the gauge
EMISSION HAND	⇨ The emission is switched on and off by the user

 The symbol  lid solid, if the emission is switched on.

Filament

Means of selection.

Available for the following gauges:

☐ Pirani	(PSG)
☐ Pirani / Capacitance	(PCG)
☐ Cold cathode	(PEG, MAG)
☐ Cold cathode / Pirani	(MPG)
☐ Capacitance	(CDG)
☑ Hot ionization	(BAG502, BAG552 only)
☑ Hot ionization / Pirani	(BPG402, BPG502, BPG552 only)
☑ Hot ionization / Pirani / Capacitance	(nur BCG552)

	Value
FILAMENT	
FILAMENT AUTO	⇨ The gauge automatically alternates between the filaments
FILAMENT FIL 1	⇨ Filament 1 active
FILAMENT FIL 2	⇨ Filament 2 active

Display resolution

Display resolution of measured values.

Available for the following gauges:

☑ Pirani	(PSG)
☑ Pirani / Capacitance	(PCG)
☑ Cold cathode	(PEG, MAG)
☑ Cold cathode / Pirani	(MPG)
☑ Capacitance	(CDG)
☑ Hot ionization	(BAG)
☑ Hot ionization / Pirani	(BPG, HPG)
☑ Hot ionization / Pirani / Capacitance	(BCG)

	Value
DIGITS	
DIGITS AUTO	⇨ Automatic *) (factory setting)
DIGITS 1	⇨ e.g. 2E-1 or 500
DIGITS 2	⇨ e.g. 2.5E-1 or 520
DIGITS 3	⇨ e.g. 2.47E-1 or 523
DIGITS 4	⇨ e.g. 2.473E-1 or 523.7

*) The mantissa is dependent on the connected gauge and the currently valid pressure value.

With PSG and PCG gauges in the pressure range p<1.0E-4 mbar and activated RNG-EXT (→ 🖹 53) the display is reduced by one decimal digit.

4.5.3 Gauge Control

SENSOR-CONTROL > The sensor control group is used for displaying, entering and editing parameters which define how the connected gauges are activated/deactivated.

This group is available for the PEG/MAG gauges only.

Parameters in this group

S-ON	Gauge activation
S-OFF	Gauge deactivation
T-ON	ON threshold (VGC502/503 only)
T-OFF	OFF threshold
<	One level back

Gauge activation

Certain gauges can be activated by different means.

	Value
`S-ON`	
`S-ON HAND`	⇨ Manual activation: The gauge is activated by pressing the key.
`S-ON HOTSTART`	⇨ Hot start: The gauge is automatically activated when the VGC50x is turned on. Measurement is thus automatically resumed after a power failure. Gauge deactivation → 📄 50.
`S-ON CH 1` (VGC502/503 only)	⇨ By channel 1: The subsequent parameter T-ON is used to specify the switch-on threshold. The sensor is switched on when the pressure on channel 1 falls below the switch-on threshold.
`S-ON CH 2` (VGC502/503 only)	⇨ By channel 2: The subsequent parameter T-ON is used to specify the switch-on threshold. The sensor is switched on when the pressure on channel 2 falls below the switch-on threshold.
`S-ON CH 3` (VGC503 only)	⇨ By channel 3: The subsequent parameter T-ON is used to specify the switch-on threshold. The sensor is switched on when the pressure on channel 3 falls below the switch-on threshold.

ON threshold (VGC502, VGC503 only)

Definition of the ON threshold for the gauge to be activated by a gauge connected to the other measurement channel.
This parameter is only available if the sensor activation parameter is set to S-ON CH 1, CH 2 or CH 3 (VGC503 only).

	Value
`T-ON`	
e.g.: `T-ON 100`	⇨ The sensor is switched on when the pressure on the respective channel falls below the switch-on threshold.

☞ Value `T-OFF` must be ≥ `T-ON` .

Gauge deactivation

Certain gauges can be deactivated by different means.

	Value
S-OFF	
S-OFF HAND	⇨ Manual deactivation: The gauge is deactivated by pressing the key
S-OFF SELF	⇨ Self control: The subsequent parameter T-OFF is used to specify the switch-off threshold. The sensor is switched off when the pressure at the sensor exceeds the switch-off threshold.
S-OFF CH 1 (VGC502/503 only)	⇨ By channel 1: The subsequent parameter T-OFF is used to specify the switch-off threshold. The sensor is switched off when the pressure on channel 1 exceeds the switch-off threshold.
S-OFF CH 2 (VGC502/503 only)	⇨ By channel 2: The subsequent parameter T-OFF is used to specify the switch-off threshold. The sensor is switched off when the pressure on channel 2 exceeds the switch-off threshold
S-OFF CH 3 (VGC503 only)	⇨ By channel 3: The subsequent parameter T-OFF is used to specify the switch-off threshold. The sensor is switched off when the pressure on channel 3 exceeds the switch-off threshold.

OFF threshold VGC501

Definition of the OFF threshold for the gauge to be deactivated by itself.
This parameter is only available if the sensor deactivation parameter is set to S-OFF SELF.

	Value
T-OFF	
e.g.: T-OFF 1.00-2	⇨ The sensor is switched off when the pressure exceeds the switch-off threshold.

OFF threshold VGC502, VGC503

Definition of the OFF threshold for the gauge to be deactivated by a gauge connected to the other measurement channel or by itself.
This parameter is only available if the sensor deactivation parameter is set to S-OFF CH 1, CH 2, CH 3 (VGC503 only) or S-OFF SELF.

	Value
`T-OFF`	
e.g.: `T-OFF 100`	⇨ The sensor is switched off when the pressure on the respective channel exceeds the switch-off threshold.

Value `T-OFF` must be ≥ `T-ON` .

4.5.4 General Parameters

GENERAL >	The General parameters group is used for displaying, entering and editing generally applicable system parameters.

Parameters in this group

UNIT	Measurement unit
BAUD USB	Transmission rate USB interface
RNG-EXT	Pirani range extension
AO-MODE	Recorder output
ERR-RELAY	Error relay
BARGRAPH	Bar graph display
BACKLIGHT	Backlight
SCREENSAVE	Screensaver
CONTRAST	Contrast adjustment
DEFAULT	Factory settings
LANGUAGE	Language
FORMAT	Number format, measurement value
END VAL	Display of measurement range end value
<	One level back

Measurement unit

Unit of measured values, thresholds etc. (conversion table → 🗎 106).

	Value
UNIT	
UNIT MBAR	⇨ mBar
UNIT HPASCAL	⇨ hPa (factory setting)
UNIT TORR	⇨ Torr (only available if Torr lock is not activated → 🗎 61)
UNIT PASCAL	⇨ Pa
UNIT MICRON	⇨ Micron (= 0.001 Torr) (only available if Torr lock is not activated → 🗎 61)
UNIT VOLT	⇨ V

A change of the pressure unit influences also the pressure unit settings of the BAG, BPG, HPG and BCG gauges.

VGC501 only: If the measurement unit micron is selected, automatic changeover to Torr occurs above 99000 micron. Below 90 Torr automatic changeover back to the measurement unit micron occurs.

Transmission rate

Transmission rate of the USB interface.

	Value
BAUD USB	
BAUD USB 9600	⇨ 9600 baud
BAUD USB 19200	⇨ 19200 baud
BAUD USB 38400	⇨ 38400 baud
BAUD USB 57600	⇨ 57600 baud
BAUD USB 115200	⇨ 115200 baud (factory setting)

Pirani range extension

The display and setpoint adjustment range can be extended (the setting only affects the control unit).

Use the parameter Pirani range extension only with Pirani and Pirani / Capacitance gauges with display / measurement range up to 5×10^{-5} mbar.

Available for the following gauges:

- ☑ Pirani (PSG)
- ☑ Pirani / Capacitance (PCG)
- ☐ Cold cathode (PEG, MAG)
- ☐ Cold cathode / Pirani (MPG)
- ☐ Capacitance (CDG)
- ☐ Hot ionization (BAG)
- ☐ Hot ionization / Pirani (BPG, HPG)
- ☐ Hot ionization / Pirani / Capacitance (BCG)

	Value
RNG-EXT	
RNG-EXT DISABLED	⇨ Deactivated (factory setting)
RNG-EXT ENABLED	⇨ Display extended to 5×10^{-5} mbar

Recorder output (VGC502, VGC503)

The recorder output is a programmable analog output. The recorder output voltage is a function of the pressure on the sensor. The relation between the pressure and the voltage is called the characteristic curve of the output.

Fundamentally we have to distinguish between logarithmic and linear characteristic curves:

- A logarithmic characteristic curve is useful if the pressure range covers several orders of magnitude in the measurement. In this case it is appropriate to take the logarithm of the pressure and then scale the result in a suitable manner.
- A linear characteristic curve is useful if the pressure range covers only a few orders of magnitude in the measurement. In this case the recorder output voltage is proportional to the pressure value. You can specify which pressure value will result in the maximum output voltage.

The available characteristic curves will be described in the following. In each case it is shown how to calculate the pressure p (in mbar) from the recorder output voltage U (in volts).

Assign the recorder output to a certain channel with the key:

- Select parameter AO-MODE
- Select channel with key
- Select characteristic curve with key

The switching functions can be assigned to the channels any way

	Value
AO-MODE	
AO-MODE LOG	⇨ Logarithmic representation of the entire measuring range (factory setting). PSG: p = 10^[U/(10 / 7) - 4] PCG: p = 10^[U/(10 / 7) - 4] PEG/MAG: p = 10^[U/(10 / 7) - 9] MPG: p = 10^[U/(10 / 12) - 9] CDG: p = 10^[U/(10 / 4) - 4] × FS BAG: p = 10^[U/(10 / 7) - 9] BPG: p = 10^[U/(10 / 12) - 9] BCG: p = 10^[U/(10 / 12) - 9] HPG: p = 10^[U/(10 / 9) - 6]
AO-MODE LOG A	⇨ Logarithmic representation of the entire measuring range (compatible to VGC012, VGC023, VGC032). PSG: p = 10^[U/(10/6) - 3] PCG: p = 10^[U/(10/7) - 4] PEG/MAG: p = 10^[U/(9/7) - 9 + 7/9] MPG: p = 10^[U/(10/11) - 8] CDG: p = 10^[U/(10/4) - 4] × FS BAG5xx: p = 10^[U - 9.875] BPG400/500: p = 10^[(U - 7.75) / 0.75] BPG402/502/552: p = 10^[U - 8] BCG: p = 10^[(U - 7.75) / 0.75] HPG: p = 10^[U/(10/9) - 6]
AO-MODE LOG -6	⇨ Logarithmic representation of a part of the measuring range (2.5 V/decade). p = 10^[U/(10/4) - 10]
AO-MODE LOG -3	⇨ Logarithmic representation of a part of the measuring range (2.5 V/decade). p = 10^[U/(10/4) - 7]
AO-MODE LOG +0	⇨ Logarithmic representation of a part of the measuring range (2.5 V/decade). p = 10^[U/(10/4) - 4]
AO-MODE LOG +3	⇨ Logarithmic representation of a part of the measuring range (2.5 V/decade). p = 10^[U/(10/4) - 1]
AO-MODE LOG C1	⇨ Logarithmic representation matched to the following sensor combination: • PSG/PCG on channel 1 • PEG on channel 2 p = 10^[U/(10/12) - 9]
AO-MODE LOG C2	⇨ Logarithmic representation matched to the following sensor combination: • CDG on channel 1 • CDG on channel 2 This characteristic curve is only useful if the sensors have different measuring ranges. The total measuring range of the sensor combination is represented logarithmically in the range 0…10 V.

AO-MODE LOG C3	⇨ Logarithmic representation matched to the following sensor combination: • CDG on channel 1 • CDG on channel 2 • CDG on channel 3 This characteristic curve is only useful if the sensors have different measuring ranges. The total measuring range of the sensor combination is represented logarithmically in the range 0…10 V.  The three sensors must be sorted with regard to their measuring range (FS). The sort order may be increasing or decreasing.
AO-MODE LIN -10	⇨ Linear representation: U = 10 V is equivalent of p = 10^{-10} mbar p = U/10 × 10^{-10}
⋮	Adjustable in the range LIN -10 … LIN +3
AO-MODE LIN +3	⇨ Linear representation: U = 10 V is equivalent of p = 10^{+3} mbar p = U/10 × 10^{+3}
AO-MODE IM221	⇨ Logarithmic representation of the IM221 controller (1 V/decade): U = 8 V is equivalent of p = 10^{-2} mbar p = 10^[U - 10]
AO-MODE LOG C4	⇨ Logarithmic representation of 12 decades (0.83 V/decade) matched the following sensor combination: • PCG on channel 1 • BPG402/502/552 on channel 2 p = 10^[U/(10/12) - 9] U = 10 V is equivalent of p = 1000 mbar. The switching point between the sensors is 10^{-2} mbar.
AO-MODE PM411	⇨ Nonlinear characteristic curve of the output as with the PM411 board
AO-MODE CH x	⇨ Output voltage = input voltage
AO-MODE PRM10K	⇨ Nonlinear characteristic curve of the output as with the PRM10K gauge from Edwards.
AO-MODE IMR110	⇨ Logarithmic representation compatible with IMR110 gauge, p = 10^[U/2 - 6]
AO-MODE IMR120	⇨ Logarithmic representation compatible with IMR120 gauge, p = 10^[U/2 - 8]
AO-MODE IMR310	⇨ Logarithmic representation compatible with IMR310 gauge, p = 10^[U*6/10 - 6]
AO-MODE MR320	⇨ Logarithmic representation compatible with IMR320 gauge, p = 10^[U*7/10 - 9]
AO-MODE PRL10K	⇨ Nonlinear characteristic curve of the output as with the PRL10K gauge from Edwards
AO-MODE PRL1Q	⇨ Nonlinear characteristic curve of the output as with the PRL1Q gauge from Edwards

Error relay

Switching behaviour of the error relay.

	Value
ERR-RELAY	
ERR-RELAY ALL	⇨ Switches for all errors (factory setting)
ERR-RELAY no SE	⇨ Only unit errors
ERR-RELAY CH 1	⇨ Error sensor 1 and unit error
ERR-RELAY CH 2	⇨ Error sensor 2 and unit error (VGC502/503 only)
ERR-RELAY CH 3	⇨ Error sensor 3 and unit error (VGC503 only)

Bar graph

In the dot matrix a bar graph or the measured pressure as a function of time ($p = f_{(t)}$) may be shown.

During parameter setting the parameter and the parameter value may be displayed in place of this.

	Value
BARGRAPH	
BARGRAPH OFF	⇨ Factory setting.
BARGRAPH FSR	⇨ Bar graph covering full scale range.
BARGRAPH FSR h	⇨ Bar graph covering full scale range, high-level presentation.
BARGRAPH FSR+SP	⇨ Bar graph covering full scale range and setpoint threshold.
BARGRAPH DEC	⇨ Bar graph covering a decade according to current measurement value.
BARGRAPH DEC h	⇨ Bar graph covering a decade according to current measurement value, high-level presentation.
BARGRAPH DEC+SP	⇨ Bar graph covering a decade according to current measurement value and setpoint threshold.
BARGRAPH f(0.2s)	⇨ $p = f_{(t)}$, autoscaled, 0.2 seconds / pixel For each measurement every 200 ms a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 20 seconds.
BARGRAPH f(1s)	⇨ $p = f_{(t)}$, autoscaled, 1 second / pixel For each measurement every second a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 seconds.
BARGRAPH f(6s)	⇨ $p = f_{(t)}$, autoscaled, 6 seconds / pixel For each measurement every 6 seconds a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 10 minutes.
BARGRAPH f(1min)	⇨ $p = f_{(t)}$, autoscaled, 1 minute / pixel For each measurement every minute a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 minutes.
BARGRAPH f(0.5h)	⇨ $p = f_{(t)}$, autoscaled, 30 minutes / pixel For each measurement every 30 minutes a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 50 hours.
IDENT	⇨ The sensor type is displayed for the selected measuring channel. e.g.: PSG

Backlight

	Value
`BACKLIGHT`	
e.g. `BACKLIGHT 60%`	⇨ Factory setting Adjustable from 0 … 100% 100% = full brightness

Screensaver

The screensaver reduces the brightness of the backlight or switches it off completely (dark room).

	Value
`SCREENSAVE`	
`SCREENSAVE OFF`	⇨ factory setting
`SCREENSAVE 10min`	⇨ after 10 minutes
`SCREENSAVE 30min`	⇨ after 30 minutes
`SCREENSAVE 1h`	⇨ after 1 hour
`SCREENSAVE 2h`	⇨ after 2 hours
`SCREENSAVE 8h`	⇨ after 8 hours
`SCREENSAVE DR`	⇨ the backlight is switched off completely after 1 minute. It is activated again by pressing any key.

Contrast

	Value
`CONTRAST`	
e.g. `CONTRAST 40%`	⇨ factory setting adjustable from 0 … 100 % 100% = full contrast

Default parameter settings

All user parameter settings are replaced by the default values (factory settings).

Loading of the default parameter settings is irreversible.

	Value
`DEFAULT`	
`DEFAULT ▼+▲ 2s`	Press  keys at the same time for >2 s to start loading default values
`DEFAULT SET`	⇨ The default values are loaded

Language

Display language.

	Value
`LANGUAGE`	
`LANGUAGE ENGLISH`	⇨ English (factory setting)
`LANGUAGE GERMAN`	⇨ German
`LANGUAGE FRENCH`	⇨ French

Measurement value format

Measurement values in floating point or exponential format. If a measurement value cannot reasonably be expressed in the floating point format, it is automatically displayed in the exponential format.

	Value
FORMAT	
FORMAT X.X	⇨ Floating point format, if possible (factory setting)
FORMAT X.XESY	⇨ Exponential format

Display of measurement range end value

Display of underrange or overrange.

	Value
END VAL	
END VAL UR/OR	⇨ When an underrange or overrange occurs UR or OR is displayed (factory setting)
END VAL VALUE	⇨ When an underrange or overrange occurs the respective full scale value is displayed

4.5.5 Test Parameters

`TEST >` The Test parameter group is used for e.g. displaying the firmware version, entering and editing special parameter values, and for running test programs.

The group is only available if the key was pressed while the VGC50x was turned on.

Parameters in this group

`SOFTWARE`	Firmware version
`HARDWARE`	Hardware version
`MAC`	MAC address
`RUNHOURS`	Operating hours
`WATCHDOG`	Watchdog control
`TORR-LOCK`	Torr lock
`KEY-LOCK`	Keylock
`FLASH`	FLASH test (program memory)
`EEPROM`	EEPROM test (parameter memory)
`DISPLAY`	Display test
`I/O`	I/O test
`COMP.`	Compatibility
`CALIB`	Re-calibration
`<`	One level back

The parameters in this group are available for all gauges.

Firmware version

The firmware version (program version) is displayed.

	Version
e.g. `SOFTWARE 1.00`	This information is helpful when contacting INFICON

Hardware version

The hardware version is displayed.

	Hardware
e.g. `HARDWARE 1.0`	This information is helpful when contacting INFICON

MAC address

The MAC address is displayed.

	MAC address
e.g.: `MAC 00A0410A0008`	The address is displayed without any separators (e.g. 00-A0-41-0A-00-08)

Operating hours

The operating hours are displayed.

	Hours
e.g. `RUNHOURS 24 h`	⇨ Operating hours

Watchdog control

Behaviour of the system control (watchdog control) in the event of an error.

	Setting
WATCHDOG	
WATCHDOG AUTO	⇨ The system automatically acknowledges error messages of the watchdog after 2 s (factory setting)
WATCHDOG OFF	⇨ Error messages of the watchdog have to be acknowledged by the operator

Torr lock

The measurement units Torr and Micron can be suppressed in the corresponding parameter setting UNIT TORR (→ 52).

	Setting
TORR-LOCK	
TORR-LOCK OFF	⇨ Measurement units Torr and Micron available (factory setting)
TORR-LOCK ON	⇨ Measurement units Torr and Micron not available

Keylock

The keylock function prevents inadvertent entries in the parameter mode and thus malfunctions.

	Setting
KEY-LOCK	
KEY-LOCK OFF	⇨ Keylock function disabled (factory setting)
KEY-LOCK ON	⇨ Keylock function enabled

FLASH test

Test of the program memory.

	Test sequence
FLASH ▼+▲	Press  keys at the same time to start test
FLASH RUN	⇨ Test in progress (very briefly)
FLASH PASS	⇨ Test completed, no error found. After the test, an 8-digit checksum (e.g. FLASH 0x12345678) is displayed.
FLASH ERROR	⇨ Test completed, error found. After the test, an 8-digit checksum (e.g. FLASH 0x12345678) is displayed. If the error persists after repeating the test, please contact your nearest INFICON service center.

EEPROM test

Test of the parameter memory.

	Test sequence
`EEPROM ▼+▲`	Press ▼+▲ keys at the same time to start test
`EEPROM RUN`	⇨ Test in progress.
`EEPROM PASS`	⇨ Test completed, no error found.
`EEPROM ERROR`	⇨ Test completed, error found. If the error persists after repeating the test, please contact your nearest INFICON service center.

Display test

Test of the display.

	Test sequence
`DISPLAY ▼+▲`	Press ▼+▲ keys at the same time to start test
	⇨ After starting the test, all display elements are lit at the same time for 10 s.

I/O test

Test of the unit relays. The test program tests their switching function.

Caution

The relays switch irrespective of the pressure.

Starting a test program may cause unwanted effects in connected control systems.

Disconnect all sensor and control system lines to ensure that no control commands or messages are triggered by mistake.

The relays switch on and off cyclically. The switching operations are indicated optically and are also clearly audible.

The switching function contacts are connected to the *CONTROL* connector (VGC501) or to the *RELAY* connector (VGC502/503) on the rear of the unit (→ 🗎 23). Check their function with an ohmmeter.

	Test sequence
`I/O ▼+▲`	Press ▼+▲ keys at the same time to start test
`I/O OFF`	⇨ All relays deactivated
`I/O REL1 ON`	⇨ Switching function relay 1
`I/O REL1 OFF`	⇨ Switching function relay 1
`I/O REL2 ON`	⇨ Switching function relay 2
⋮	

Compatibility

Compatibility of the VGC50x with INFICON gauges or with OLV transmitters.

	Value
`COMP. INFICON`	INFICON gauges supported (default)
`COMP. OLV`	OLV transmitters supported

Re-calibration

Date of the next re-calibration.

	Value
CALIB e.g. CALIB 2018-10-06	Date of the next re-calibration. ⇨ e.g. 2018-10-06 A warning is displayed when the date is reached.

Once the configured date is reached, the following information message is displayed periodically:

RECALIB REQUIRED

4.5.6 Data Logger Mode

DATA LOGGER >

The data logger group is used for

- recording measurement data on a USB memory stick (interface type A on the front of the Center unit)
- deleting recorded measurement data from the USB memory stick

This group is only available when a USB memory stick formatted for the FAT file system (FAT32) is plugged in. Use a max. 32 GB memory stick.

Not all USB memory sticks are automatically recognized by the VGC50x, as they (in particular cheaper brands) do not always conform to USB standard requirements. Try a different memory stick before contacting your nearest INFICON service center.

Parameters in this group

DATE	Current date
TIME	Current time
INTERVAL	Display interval
DEC-SEPARATOR	Decimal separator
FILENAME	File name
START / STOP	Start / stop record
CLEAR	Deletion of files with displayed measurement data

Date

	Value
DATE e.g. DATE 2015-04-15	Current date in the format YYYY-MM-DD ⇨ e.g. 2015-04-15

Time

	Value
TIME e.g. TIME 15:45	Current time in the format hh:mm [24 h] ⇨ e.g. 15:45

Interval

Data logging interval.

	Value
INTERVAL	
INTERVAL 1s	⇨ Recording interval 1/s
INTERVAL 10s	⇨ Recording interval 1/10 s
INTERVAL 30s	⇨ Recording interval 1/30 s
INTERVAL 1min	⇨ Recording interval 1/60 s
INTERVAL 1%	⇨ Recording interval: in the event of measurement value changes ≥1%
INTERVAL 5%	⇨ Recording interval: in the event of measurement value changes ≥5%

Decimal separator

Decimal separator for measurement values in the measurement data file.

Further processing of recorded data (e.g. with Excel): Pay attention to the corresponding decimal separator (comma or dot).

	Value
DEC-SEPARATOR	
DEC-SEPARATOR ,	⇨ Decimal comma
DEC-SEPARATOR .	⇨ Decimal point

File name

	Value
FILENAME	Name of the measurement data file, max. 7 digits
e.g. FILENAME DATALOG	⇨ File ending: CSV

After entering the 7th digit the display stops flashing. The name of the data file is saved and the unit is in the read mode again.

Is the file name shorter than 7 digits, a blank space must be set to each remaining digit.

Start / Stop

Starting / stopping measurement value display.

flashes during measurement data display (in the measurement mode only).

	Value
START	
START ▲	⇨ Press key to start record: Data record is running, display has changed to STOP ▼ and the down arrow ▼ is blinking.
STOP ▼	⇨ Press key to stop saving: Data record is stopped, display has changed to START ▲ and the up arrow ▲ is blinking.

The unit does not return automatically to the measurement mode, as long as the arrows ▼ or ▲ in the display are blinking.

Press the key to leave the editing mode. Then, after approx. 10 s, the unit returns automatically to the measurement mode.

Deletion

Deletion of all measurement data files (ending CSV) from USB memory stick.

	Value
CLEAR ▼+▲	Press keys at the same time to delete files
CLEAR RUNNING	⇨ CSV files are being deleted
CLEAR DONE	⇨ CSV files have been deleted

4.5.7 Parameter Transfer Mode

SETUP >

This group is used for

- saving all parameters on a USB memory stick (interface type A on the front of the VGC50x)
- loading all parameters from a USB memory stick onto the VGC50x
- formatting a USB memory stick
- deleting files with saved parameters from the USB memory stick

This group is only available when a USB memory stick formatted for the FAT file system (FAT32) is plugged in. Use a max. 32 GB memory stick.

Parameters in this group

SAVE	Saving all parameters
RESTORE	Loading all parameters onto the VGC50x
FORMAT	Formatting USB memory stick (FAT32)
CLEAR	Deletion of files with saved parameters
<	One level back

Saving a parameter

Saving all parameters of the VGC50x to a USB memory stick (file ending: CSV).

The setpoint/threshold and offset values are stored in mBar or hPa, respectively.

	Value
SAVE	
SAVE SETUP	⇨ File name on the USB memory stick: SETUP01.CSV
⋮	
SAVE SETUP99	⇨ File name on the USB memory stick: SETUP99.CSV
SAVE RUNNING	⇨ CSV file is being saved
SAVE DONE	⇨ Saving completed

Loading parameters

Loading all parameters from a USB memory stick onto the VGC50x.

If no unit has been specified for the setpoint/threshold and offset values in the CSV-file, the value is read in mBar or hPa, respectively. Otherwise, one of the units "MBAR", "HPASCAL", "TORR", "PASCAL" or "MICRON" must be explicitly entered in capital letters and with a single space.

Examples: 5.00-4 TORR
0.0002 PASCAL

	Value
RESTORE	
RESTORE SETUP01	⇨ File name on the USB memory stick: SETUP.CSV
⋮	
RESTORE SETUP99	⇨ File name on the USB memory stick: SETUP99.CSV
RESTORE RUNNING	⇨ CSV file is being loaded
RESTORE DONE	⇨ Loading completed
RESTORE ERROR	⇨ Error occurred

Formatting

Formatting USB memory stick.

	Value
FORMAT ▼+▲	Press ▽△ keys at the same time to start formatting
FORMAT RUNNING	⇨ Formatting in progress
FORMAT DONE	⇨ Formatting completed

Deleting

Deleting all parameter files (ending CSV) from the USB memory stick.

	Value
CLEAR ▼+▲	Press ▽△ keys at the same time to delete files
CLEAR RUNNING	⇨ CSV files are being deleted
CLEAR DONE	⇨ CSV files have been deleted

5 Communication Protocol (Serial Interface)

The VGC50x communicates with a computer via virtual serial interfaces (COM ports). Thus the user software can access the VGC50x via USB Type B or via Ethernet interface.

Communication via USB Type B interface

The corresponding driver for the virtual COM port is installed automatically, when the VGC50x is connected to a computer via the USB Type B interface. If the driver is not installed automatically, it can be downloaded from the FTDI website (www.ftdichip.com/Drivers/VCP.htm).

The installed virtual COM port appears as additional serial interface in the device manager of the computer.

Communication via Ethernet interface

With the Ethernet Configuration Tool a virtual serial interface (COM) can be assigned to an IP address. In addition, it allows configuration of the Ethernet interface via a computer (→ 🗎 110).

The installed virtual COM port appears as additional serial interface in the device manager of the computer.

When the VGC50x is put into operation, it starts transmitting measured values in intervals of 1 s. As soon as the first character is transferred to the VGC50x, the automatic transmission of measured values stops. After the necessary inquiries or parameter modifications have been made, the transmission of measured values can be started again with the **COM** command (→ 🗎 72).

Communication structure and procedures are identical for the three controllers VGC501, VGC502 and VGC503. Therefore the term VGC50x is used in this chapter.

It should be noted that mnemonics with channel specific parameters must be issued with the number of values corresponding to the number of channels of the respective device.

Example:	VGC501	Transmit: **OFC** [,a]
	VGC502	Transmit: **OFC** [,a,b]
	VGC503	Transmit: **OFC** [,a,b,c]

5.1 Data Transmission

The data transmission is bi-directional, i.e. data and control commands can be transmitted in either direction.

Data format

1 start bit, 8 data bits, no parity bit, 1 stop bit, no hardware handshake.

Definitions

The following abbreviations and symbols are used:

Symbol	Meaning	Dez	Hex
HOST	Computer or terminal		
[...]	Optional elements		
ASCII	American Standard Code for Information Interchange		
		Dez	Hex
<ETX>	END OF TEXT (CTRL C) Reset the interface	3	03
<CR>	CARRIAGE RETURN Go to beginning of line	13	0D
<LF>	LINE FEED Advance by one line	10	0A
<ENQ>	ENQUIRY (CTRL E) Request for data transmission	5	05
<ACK>	ACKNOWLEDGE Positive report signal	6	06
<NAK>	NEGATIVE ACKNOWLEDGE Negative report signal	21	15

"Transmit": Data transfer from HOST to VGC50x
"Receive": Data transfer from VGC50x to HOST

Flow Control

After each ASCII string, the HOST must wait for a report signal (<ACK><CR><LF> or <NAK> <CR><LF>).

The input buffer of the HOST must have a capacity of at least 32 bytes.

5.2 Communication Protocol

Transmission format

Messages are transmitted to the VGC50x as ASCII strings in the form of mnemonic operating codes and parameters. All mnemonics comprise three ASCII characters.

Spaces are ignored. <ETX> (CTRL C) clears the input buffer in the VGC50x.

Transmission protocol

HOST	VGC50x	Explanation
Mnemonics [and parameters] ——————>		Receives message with "end of message"
<CR>[<LF>] ——————————>		
<——————————	<ACK><CR><LF>	Positive acknowledgment of a received message

Reception format

When requested with a mnemonic instruction, the VGC50x transmits the measurement data or parameters as ASCII strings to the HOST.

<ENQ> (CTRL E) must be transmitted to request the transmission of an ASCII string. Additional strings, according to the last selected mnemonic, are read out by repetitive transmission of <ENQ>.

If <ENQ> is received without a valid request, the ERROR word is transmitted.

Reception protocol

HOST	VGC50x	Explanation
Mnemonics [and parameters] ——————>		Receives message with "end of message"
<CR>[<LF>] ——————————>		
<——————————-	<ACK><CR><LF>	Positive acknowledgment of a received message
<ENQ> ——————————>		Requests to transmit data
<——————————	Measurement values or parameters	Transmits data with "end of message"
<————————————	<CR><LF>	
:		:
<ENQ> ——————————>		Requests to transmit data
<——————————	Measurement values or parameters	Transmits data with "end of message"
<————————————	<CR><LF>	

Error processing

The strings received are verified in the VGC50x. If an error is detected, a negative acknowledgment <NAK> is output.

Error recognition protocol

HOST	VGC50x	Explanation
Mnemonics [and parameters] ——————>		Receives message with "end of message"
<CR>[<LF>] ——————————>		
***** Transmission or programming error *****		
<——	<NAK><CR><LF>	Negative acknowledgment of a received message
Mnemonics [and parameters] ——————->		Receives message with "end of message"
<CR>[<LF>] ——————————>		
<——————————	<ACK><CR><LF>	Positive acknowledgment of a received message

5.3 Mnemonics

		→
ADC	A/D Converter test	96
AOM	Analog output mode	88
AYT	Are you there?	101
BAL	Backlight	89
BAU	Transmission rate (USB)	89
CAL	Calibration factor	80
CDA	Re-calibration	96
CF1	Calibration factor gauge 1	80
CF2	Calibration factor gauge 2	80
CF3	Calibration factor gauge 3	80
COM	Continuous mode of measurement values	72
COR	Calibration factor	80
CPR	Combined pressure range (linear gauges)	73
CPT	Compatibility with gauges	96
DAT	Date	94
DCB	Display control bar graph	90
DCC	Display control contrast	91
DCD	Display resolution	81
DCS	Display control screensaver	91
DGS	Degas	81
DIS	Display test	96
EEP	EEPROM test	96
EPR	FLASH test	97
ERA	Error relay allocation	92
ERR	Error status	74
ETH	Ethernet configuration	101
EUM	Emission user mode	81
EVA	Measurement range end value	92
FIL	Measurement value filter	82
FMT	Number format (measurement value)	92
FSR	Measurement range (linear gauges)	83
FUM	Filament user mode BAG502, BAG552, BPG402, BPG502, BPG552, BCG552	82
GAS	Gas type correction	84
GF1	Gauge formula gauge 1	74
GF2	Gauge formula gauge 2	74
GF3	Gauge formula gauge 3	74
GIM	Gauge identification mode	75
HDW	Hardware version	97
HVC	HV control, EMI on/off	97
IOT	I/O test	97
ITR	Data output BAG, BPG, HPG, BCG, CDGxxxD	84
LCM	Start / stop data logger	95
LNG	Language (display)	93
LOC	Keylock	97
MAC	Ethernet MAC address	97
OFC	Offset correction (linear gauges)	85
OFD	Offset display (linear gauges)	85
OFS	Offset correction (VGC501 only)	86
PNR	Firmware version	97

5.4 Measurement Mode

COM - Continuous output of measurement values

Transmit: **COM** [,a] <CR>[<LF>]

	Description
a	Time interval, a = 0 –> 100 ms 1 –> 1 s (default) 2 –> 1 minute

Receive: <ACK><CR><LF>

<ACK> is immediately followed by the continuous output of the measurement value in the desired interval.

Receive: b,sx.xxxxEsxx,c,sy.yyyyEsyy,d,sz.zzzzEszz <CR><LF>

	Description
b	Status gauge 1, b = 0 –> Measurement data okay 1 –> Underrange 2 –> Overrange 3 –> Measurement value error (sensor error) 4 –> Sensor off (PEG, MAG) 5 –> No sensor 6 –> Identification error 7 –> Error BAG, BPG, HPG, BCG
sx.xxxxEsxx	Measurement value gauge 1 [1)] [in current pressure unit] (s = sign)
c	Status gauge 2
sy.yyyyEsyy	Measurement value gauge 2 [1)] [in current pressure unit] (s = sign)
d	Status gauge 3
sz.zzzzEszz	Measurement value gauge 3 [1)] [in current pressure unit] (s = sign)

1) Values always in exponential format.
For logarithmic gauges, the 3rd and 4th decimal are always 0.

CPR - Combined pressure range (linear gauges)

This parameter combines different pressure ranges to one combined pressure range, if several linear gauges with different full scales (FS) are connected to the VGC502 and VGC503. Thus the pressure for this combined pressure range can be read out with best accuracy.

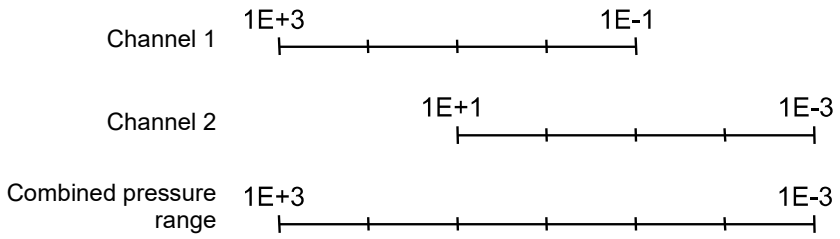
The pressure is higher than the full scale of the gauge with lower full scale: The VGC502/503 switches to the gauge with higher full scale.

Only one linear gauge is connected: The measurement value of this gauge is output.

No linear gauge is connected: 1000 mbar is output as measurement value and the parameters a, b and c are set to "0".

Example

Channel 1: linear gauge, 1000 mbar FS
Channel 2: linear gauge, 10 mbar FS



Transmit command: CPR,1,2,0 or
CPR,1,2 or
CPR,2,1

Transmit: **CPR** [,a,b,c] <CR>[<LF>]

	Description
a	Measurement channel of the selected gauge, a =
	0 –> No linear gauge connected
	1 –> Measurement channel 1
	2 –> Measurement channel 2
	3 –> Measurement channel 3
b	Measurement channel of the selected gauge
c	Measurement channel of the selected gauge

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c,sx.xxxxEsxx

	Description
a	Measurement channel of the selected gauge
b	Measurement channel of the selected gauge
c	Measurement channel of the selected gauge
sx.xxxxEsxx	Combined measurement value [1] [mbar]
	(s = sign)

[1] Values always in exponential format.

ERR - Error status

Transmit: **ERR** <CR>[<LF>] Error status

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: aaaa <CR><LF>

	Description
aaaa	Error status, aaaa = 0000 –> No error 1000 –> ERROR (controller error (see display on front panel) 0100 –> NO HWR (no hardware) 0010 –> PAR (inadmissible parameter) 0001 –> SYN (Syntax error)

The ERROR word is cancelled when read out. If the error persists, it is immediately set again.

GF1, GF2, GF3 – Gauge formula for gauges 1, 2 or 3

With this command, the factors a, b and c are assigned if a freely configurable formula "U-LOG" or "U-LIN" was selected with the "GIM" command (for formula p = f(U) see GIM command, 75).

Transmit: **GFx** [,a,b,c] <CR>[<LF>] Conversion voltage to pressure

	Description
a	Factor a (default = 6.143)
b	Factor b (default = 1.286)
c	Factor c (default = 0)

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Factor a
b	Factor b
c	Factor c

GIM – Gauge identification mode

In this mode, a fixed measuring tube can be assigned to each measuring channel. This means that measuring tubes without identification resistance can also be operated with the VGC50x. With the setting "AUTO" the corresponding measuring channel is identified automatically.

Transmit: **GIM** [,a,b,c] <CR>[<LF>] Gauge identification mode

	Description
a	Identification gauge 1, a = 0 –> AUTO (default) 1 –> DU20x 2 –> DU200x 3 –> DU200xR 4 –> PSG 5 –> PCG 6 –> PEG/MAG 7 –> MPG 8 –> CDGxxxD 9 –> BPG400 10 –> BPG402 11 –> HPG400 12 –> BCG450 13 –> BAG552 14 –> BPG500 15 –> BPG552 16 –> BCG552 17 –> CDG (analog only) 18 –> BAG500 19 –> BAG502 20 –> BPG502 21 –> U-LOG (formula $p = 10^{((U - a) / b + c)}$) [1] 22 –> U-LIN (formula $p = U \times a + b$) [1]
b	Identification gauge 2
c	Identification gauge 3

[1] The factors for the conversion p = f(U) can be set for each measuring channel using the commands GF1, GF2 and GF3 (→ 74).

Example "GIM,0,5,0": The gauges on measuring channels 1 and 3 are recognized automatically. The gauge connected to measuring channel 2 is evaluated as PCG.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Identification gauge 1
b	Identification gauge 2
c	Identification gauge 3

PR1, PR2, PR3 - Measurement data gauge 1, 2 or 3

Transmit: **PRn** <CR>[<LF>]

	Description
n	Measurement value, n = 1 –> Gauge 1 2 –> Gauge 2 3 –> Gauge 3

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,sx.xxxxEsxx <CR><LF>

	Description
a	Status, a = 0 –> Measurement data okay 1 –> Underrange 2 –> Overrange 3 –> Sensor error 4 –> Sensor off (PEG, MAG) 5 –> No sensor 6 –> Identification error 7 –> Error BAG, BPG, HPG, BCG
sx.xxxxEsxx	Measurement value [1] [in current pressure unit] (s = sign)

1) Values always in exponential format.
For logarithmic gauges, the 3rd and 4th decimal are always 0.

PRX - Measurement data gauge 1, 2 and 3

Transmit: **PRX** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,sx.xxxxEsxx,b,sy.yyyyEsyy,c,sz.zzzzEszz <CR><LF>

	Description
a	Status gauge 1, a = 0 –> Measurement data okay 1 –> Underrange 2 –> Overrange 3 –> Sensor error 4 –> Sensor off (PEG, MAG) 5 –> No Sensor 6 –> Identification error 7 –> Error BAG, BPG, HPG, BCG
sx.xxxxEsxx	Measurement value gauge 1 [1)] [in current pressure unit] (s = sign)
b	Status gauge 2
sy.yyyyEsyy	Measurement value gauge 2 [1)] [in current pressure unit] (s = sign)
c	Status gauge 3
sz.zzzzEszz	Measurement value gauge 3 [1)] [in current pressure unit] (s = sign)

1) Values always in exponential format.
For logarithmic gauges, the 3rd and 4th decimal are always 0.

RES - Reset

Transmit: **RES** [,a] <CR>[<LF>]

	Description
a	a = 1 –> Cancels currently active error and returns to measurement mode

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: b[,b][,b][…] <CR><LF>

	Description
b	List of all present error messages, b = 0 –> No error 1 –> Watchdog has responded 2 –> Task fail error 3 –> FLASH error 4 –> RAM error 5 –> EEPROM error 6 –> DISPLAY error 7 –> A/D converter error 8 –> UART error 9 –> Gauge 1 general error 10 –> Gauge 1 ID error 11 –> Gauge 2 general error 12 –> Gauge 2 ID error 13 –> Gauge 3 general error 14 –> Gauge 3 ID error

TID - Gauge identification

Transmit: **TID** <CR>[<LF>] Gauge identification

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Identification gauge 1, a = PSG (Pirani Gauge) PCG (Pirani / Capacitance Gauge) PEG/MAG (Cold Cathode Gauge) MPG (Cold Cathode / Pirani Gauge) CDG (Capacitance Gauge, analog) CDGxxxD (Capacitance Gauge, digital) BAGxxx (Hot Ionization Gauge) BPGxxx (Hot Ionization / Pirani Gauge) HPG400 (Hot Ionization / Pirani Gauge) BCGxxx (Hot Ionization / Capacitance / Pirani Gauge) U-LOG (Configurable logarithmic curve [1]) U-LIN (Configurable linear curve [1]) noSENSOR (No sensor) noIDENT (No identifier)
b	Identification gauge 2
c	Identification gauge 3

[1] Command "GIM" → 🗎 75

5.5 Switching Function Parameters

SPS - Switching function status

Transmit: **SPS** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c,d,e,f <CR><LF>

	Description
a	Status switching function 1, a = 0 –> Off 1 –> On
b	Status switching function 2
c	Status switching function 3
d	Status switching function 4
e	Status switching function 5
f	Status switching function 6

SP1 … SP6 - Switching function 1 … 6

Transmit: **SPx** [,a,x.xxxxEsxx,y.yyyyEsyy] <CR>[<LF>]

	Description
x	Switching function, x = 1 –> Switching function 1 2 –> Switching function 2 3 –> Switching function 3 4 –> Switching function 4 5 –> Switching function 5 6 –> Switching function 6
a	Switching function assignment, a = 0 –> Turned off 1 –> Turned on 2 –> Measurement channel 1 3 –> Measurement channel 2 4 –> Measurement channel 3
x.xxxxEsxx	Lower threshold [1] [in current pressure unit] (default = depending on gauge) (s = sign)
y.yyyyEsyy	Upper threshold [1] [in current pressure unit] (default = depending on gauge) (s = sign)

[1] Values can be entered in any format.
They are internally converted into the floating point format.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,x.xxxxEsxx,y.yyyyEsyy <CR><LF>

	Description
a	Switching function assignment
x.xxxxEsxx	Lower threshold [in current pressure unit] (s = sign)
y.yyyyEsyy	Upper threshold [in current pressure unit] (s = sign)

5.6 Gauge Parameters

CAL - Calibration factor

CAL corresponds to the COR command

CF1, CF2, CF3 - Calibration factor gauge 1, 2 or 3

Transmit: **CFx** [,a.aaa] <CR>[<LF>]

	Description
x	Calibration factor gauge x = 1 –> Gauge 1 2 –> Gauge 2 3 –> Gauge 3
a.aaa	Calibration factor gauge x, 0.100 … 10.000 (default = 1.000)

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a.aaa <CR><LF>

	Description
a.aaa	Calibration factor gauge x

COR - Calibration factor

Transmit: **COR** [,a.aaa,b.bbb,c.ccc] <CR>[<LF>]

	Description
a.aaa	Calibration factor gauge 1, 0.100 … 10.000 (default = 1.000)
b.bbb	Calibration factor gauge 2
c.ccc	Calibration factor gauge 3

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a.aaa,b.bbb,c.ccc <CR><LF>

	Description
a.aaa	Calibration factor gauge 1
b.bbb	Calibration factor gauge 2
c.ccc	Calibration factor gauge 3

DCD - Display resolution

Transmit: **DCD** [,a,a,a] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,a,a <CR><LF>

	Description
a	Resolution a = 0 –> AUTO (default) 1 –> One digit 2 –> Two digits 3 –> Three digits 4 –> Four digits

When the PrE (→ 🗎 93) is ON and the pressure is in the range p<1.0E-4 mbar the display resolution of the PSG- and PCG gauges is reduced by one decimal digit.

DGS - Degas

Transmit: **DGS** [,a,b,c] <CR>[<LF>]

	Description
a	Degas gauge 1, a = 0 –> Degas off (default) 1 –> Degas on (3 minutes)
b	Degas gauge 2
c	Degas gauge 3

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Degas status gauge 1
b	Degas status gauge 2
c	Degas status gauge 3

EUM - Emission user mode

Transmit: **EUM** [,a,b,c] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Emission for measurement channel 1, a = 0 –> Manually 1 –> Automatic (default)
b	Emission for measurement channel 2
c	Emission for measurement channel 3

FIL - Measurement value filter

Transmit: **FIL** [,a,b,c] <CR>[<LF>]

	Description
a	Filter gauge 1, a =
	0 –> Filter off
	1 –> Fast
	2 –> Normal
	3 –> Slow
b	Filter gauge 2
c	Filter gauge 3

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Filter time constant gauge 1
b	Filter time constant gauge 2
c	Filter time constant gauge 3

FUM - Filament user mode BAG502, BAG552, BPG402, BPG502, BPG552, BCG552

Transmit: **FUM** [,a,b,c] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Filament for measurement channel 1, a =
	0 –> Automatic (default)
	1 –> Filament 1
	2 –> Filament 2
b	Filament for measurement channel 2
c	Filament for measurement channel 3

FSR - Measurement range (linear gauges)

The full scale value of the measurement range (full scale) of linear analog gauges has to be defined by the user. The full scale value of linear digital gauges and logarithmic gauges is automatically recognized.

Transmit: **FSR** [,a,b,c] <CR>[<LF>]

	Description
a	Full scale value gauge 1, a = 0 –> 0.01 mbar 1 –> 0.01 Torr 2 –> 0.02 mbar 3 –> 0.02 Torr 4 –> 0.05 mbar 5 –> 0.05 Torr 6 –> 0.10 mbar 7 –> 0.10 Torr 8 –> 0.25 mbar 9 –> 0.25 Torr 10 –> 0.50 mbar 11 –> 0.50 Torr 12 –> 1 mbar 13 –> 1 Torr 14 –> 2 mbar 15 –> 2 Torr 16 –> 5 mbar 17 –> 5 Torr 18 –> 10 mbar 19 –> 10 Torr 20 –> 20 mbar 21 –> 20 Torr 22 –> 50 mbar 23 –> 50 Torr 24 –> 100 mbar 25 –> 100 Torr 26 –> 200 mbar 27 –> 200 Torr 28 –> 500 mbar 29 –> 500 Torr 30 –> 1000 mbar 31 –> 1100 mbar 32 –> 1000 Torr 33 –> 2 bar 34 –> 5 bar 35 –> 10 bar 36 –> 50 bar
b	Full scale value gauge 2
c	Full scale value gauge 3

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Full scale value gauge 1
b	Full scale value gauge 2
c	Full scale value gauge 3

GAS - Gas type correction

Transmit: **GAS** [,a,b,c] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Gas type correction measurement channel 1, a = 0 –> nitrogen / air (default) 1 –> Argon 2 –> Hydrogen 3 –> Helium 4 –> Neon 5 –> Krypton 6 –> Xenon 7 –> Other gases
b	Gas type correction measurement channel 2
c	Gas type correction measurement channel 3

HVC - HV control, EMI on / off

Transmit: **HVC** [,a,b,c] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Gauge 1, a = 0 –> Off 1 –> On
b	Gauge 2
c	Gauge 3

ITR - Data output BAG, BPG, HPG, BCG, CDGxxxD

Transmit: **ITR** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: aa,aa,aa,aa,aa,aa,aa,aa bb,bb,bb,bb,bb,bb,bb,bb cc,cc,cc,cc,cc,cc,cc,cc <CR><LF>

	Description
aa,aa,aa,aa,aa,aa,aa,aa	Data string gauge 1 (byte 0 … 7 in hex format)
bb,bb,bb,bb,bb,bb,bb,bb	Data string gauge 2 (byte 0 … 7 in hex format)
cc,cc,cc,cc,cc,cc,cc,cc	Data string gauge 3 (byte 0 … 7 in hex format)

OFC - Offset correction (linear gauges)

Transmit: **OFC** [,a,b,c] <CR>[<LF>]

	Description
a	Offset correction gauge 1, a =
	0 –> Off (default)
	1 –> On
	2 –> Determine offset value and activate offset correction
	3 –> Adjust the zero of linear gauge
b	Offset correction gauge 2
c	Offset correction gauge 3

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c <CR><LF>

	Description
a	Offset correction gauge 1
b	Offset correction gauge 2
c	Offset correction gauge 3

OFD - Offset display (linear gauges)

Transmit: **OFD** [,sa.aaaaEsaa,sb.bbbbEsbb,sc.ccccEscc] <CR>[<LF>]

	Description
sa.aaaaEsaa	Gauge 1 Offset [1)], [in current pressure unit] (default = 0.0000E+00) (s = sign)
sb.bbbbEsbb	Gauge 2 Offset [1)] (s = sign)
sc.ccccEscc	Gauge 3 Offset [1)] (s = sign)

[1)] Values can be entered in any format. They are internally converted into the floating point format.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: sa.aaaaEsaa,sb.bbbbEsbb,sc.ccccEscc <CR><LF>

	Description
sa.aaaaEsaa	Gauge 1 Offset [1)] (s = sign)
sb.bbbbEsbb	Gauge 2 Offset [1)] (s = sign)
sc.ccccEscc	Gauge 3 Offset [1)] (s = sign)

OFS - Offset correction (linear gauges, VGC501 only)

Transmit: **OFS** [,a,sx.xxxxEsxx] <CR>[<LF>]

	Description
a	Mode, a = 0 –> Off (default) No offset value needs to be entered 1 –> On If no offset value has been entered, the previously defined offset value is taken over 2 –> Auto (offset measurement) No offset value needs to be entered 3 –> Zero adjustment CDGxxxD No offset value needs to be entered
sx.xxxxEsxx	Offset [1], [in current pressure unit] (default = 0.0000E+00) s = sign

[1] Values can be entered in any format. They are internally converted into the floating point format.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,sx.xxxxEsxx <CR><LF>

	Description
a	Mode
sx.xxxxEsxx	Offset [1], [in current pressure unit] s = sign

5.7 Gauge Control

SC1, SC2, SC3 - Gauge 1, 2 or 3 control

Transmit: **SCx** [,a,b,c.ccEscc,d.ddEsdd] <CR>[<LF>]

	Description
x	Controlled gauge, x =
	1 –> Gauge 1
	2 –> Gauge 2
	3 –> Gauge 3
a	Gauge activation, a =
	0 –> Manual (default)
	1 –> Hot start
	3 –> Via measurement channel 1
	4 –> Via measurement channel 2
	5 –> Via measurement channel 3
b	Gauge deactivation, b =
	0 –> Manual (default)
	1 –> Self control
	3 –> Via measurement channel 1
	4 –> Via measurement channel 2
	5 –> Via measurement channel 3
c.ccEscc	ON threshold (s = sign)
d.ddEsdd	OFF threshold (s = sign)

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c.ccEscc,d.ddEsdd <CR><LF>

	Description
a	Gauge activation
b	Gauge deactivation
c.ccEscc	ON threshold (s = sign)
d.ddEsdd	OFF threshold (s = sign)

5.8 General Parameters

AOM - Analog output mode

Characteristic curve of the recorder output

Transmit: **AOM** [,a,b] <CR>[<LF>]

	Description
a	Measurement channel, a =
	0 –> Measurement channel 1
	1 –> Measurement channel 2
	2 –> Measurement channel 3
b	Output characteristic, b =
	0 –> Logarithmic `LOG`
	1 –> Logarithmic `LOG A`
	2 –> Logarithmic `LOG -6`
	3 –> Logarithmic `LOG -3`
	4 –> Logarithmic `LOG +0`
	5 –> Logarithmic `LOG +3`
	6 –> Logarithmic `LOG C1`
	7 –> Logarithmic `LOG C2`
	8 –> Logarithmic `LOG C3`
	9 –> Linear `LIN -10`
	10 –> Linear `LIN -9`
	11 –> Linear `LIN -8`
	12 –> Linear `LIN -7`
	13 –> Linear `LIN -6`
	14 –> Linear `LIN -5`
	15 –> Linear `LIN -4`
	16 –> Linear `LIN -3`
	17 –> Linear `LIN -2`
	18 –> Linear `LIN -1`
	19 –> Linear `LIN +0`
	20 –> Linear `LIN +1`
	21 –> Linear `LIN +2`
	22 –> Linear `LIN +3`
	23 –> `IM221`
	24 –> Logarithmic `LOG C4`
	25 –> `PM411`
	26 –> `CH x`
	27 –> `PRM10K`
	28 –> `IMR110`
	29 –> `IMR120`
	30 –> `IMR310`
	31 –> `IMR320`
	32 –> `PRL10K`
	33 –> `PRL1Q`

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Measurement channel
b	Voltage (measurement value)

BAL - Backlight

Transmit: **BAL** [,a] <CR>[<LF>]

	Description
a	Backlight in percent, a = 0 … 100 100% is full brightness

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Backlight

BAU - Transmission rate (USB)

Transmit: **BAU** [,a] <CR>[<LF>]

	Description
a	Transmission rate, a = 0 –> 9600 Baud 1 –> 19200 Baud 2 –> 38400 Baud 3 –> 57600 Baud 4 –> 115200 Baud (default)

As soon as the new baud rate has been entered, the report signal is transmitted at the new transmission rate.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

	Description
a	Transmission rate

DCB - Display control bar graph

Transmit: **DCB** [,a,b] <CR>[<LF>]

	Description
a	Measurement channel, a =
	0 –> Measurement channel 1
	1 –> Measurement channel 2
	2 –> Measurement channel 3
b	Bar graph display, b =
	0 –> Off (default)
	1 –> Bar graph covering full scale range
	2 –> Bar graph covering full scale range, high-level presentation
	3 –> Bar graph covering full scale range and setpoint threshold
	4 –> Bar graph covering a decade according to current measurement value
	5 –> Bar graph covering a decade according to current measurement value, high-level presentation
	6 –> Bar graph covering a decade according to current measurement value and setpoint threshold
	7 –> p = $f_{(t)}$, autoscaled, 0.2 seconds / pixel For each measurement every 200 ms a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 20 seconds.
	8 –> p = $f_{(t)}$, autoscaled, 1 second / pixel For each measurement every second a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 seconds.
	9 –> p = $f_{(t)}$, autoscaled, 6 seconds / pixel For each measurement every 6 seconds a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 10 minutes.
	10 –> p = $f_{(t)}$, autoscaled, 1 minute / pixel For each measurement every minute a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 minutes.
	11 –> p = $f_{(t)}$, autoscaled, 30 minutes / pixel For each measurement every 30 minutes a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 50 hours.
	12 –> The sensor type is displayed for the selected measuring channel.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Measurement channel
b	Bar graph display

DCC - Display control contrast

Transmit: **DCC** [,a] <CR>[<LF>]

	Description
a	Contrast in percent, a = 0 … 100 100% = full contrast

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Contrast

DCS - Display control screensaver

Transmit: **DCS** [,a] <CR>[<LF>]

	Description
a	Screensaver, a = 0 –> Off (default) 1 –> After 10 minutes 2 –> After 30 minutes 3 –> After 1 hour 4 –> After 2 hours 5 –> After 8 hours 6 –> The backlight is switched off completely after 1 minute

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Screensaver

ERA - Error relay allocation

Transmit: **ERA** [,a] <CR>[<LF>]

	Description
a	Switching behaviour error relay, a = 0 –> Switches for all errors (default) 1 –> Only unit errors 2 –> Error sensor 1 and unit error 3 –> Error sensor 2 and unit error 4 –> Error sensor 3 and unit error

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Switching behaviour error relay

EVA - Measurement range end value

Transmit: **EVA** [,a] <CR>[<LF>]

	Description
a	Measurement range end value, a = 0 –> UR or OR is displayed (default) when an underrange or overrange occurs 1 –> The measurement range end value is displayed when an underrange or overrange occurs

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Measurement range end value

FMT - Number format (measurement value)

Transmit: **FMT** [,a] <CR>[<LF>]

	Description
a	Number format (measurement value), a = 0 –> Floating point format, if possible (default) 1 –> Exponential format

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Number format

LNG - Language (display)

Transmit: **LNG** [,a] <CR>[<LF>]

	Description
a	Language, a = 0 –> English (default) 1 –> German 2 –> French

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Language

PRE - Pirani range extension

Transmit: **PRE** [,a] <CR>[<LF>]

	Description
a	Pirani range extension, a = 0 –> Disabled (default) 1 –> Enabled

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Pirani range extension status

PCG and PSG gauges only, measurement range up to 5×10^{-5} mbar.

SAV - Save parameters (EEPROM)

Transmit: **SAV** [,a] <CR>[<LF>]

	Description
a	Save parameters to EEPROM, a = 0 –> Save default parameters (default) 1 –> Save user parameters

Receive: <ACK><CR><LF>

UNI - Pressure unit

Transmit: **UNI** [,a] <CR>[<LF>]

	Description
a	Pressure unit, a = 0 –> mbar/bar 1 –> Torr 2 –> Pascal 3 –> Micron 4 –> hPascal (default) 5 –> Volt

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Pressure unit

5.9 Data Logger Parameters

The group is only available when a USB memory stick formatted for the the FAT file system (FAT32) is plugged in. Use a max. 32 GB memory stick.

DAT - Date

Transmit: **DAT** [,yyyy-mm-dd] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: yyyy-mm-dd <CR><LF>

	Description
yyyy-mm-dd	Current date in the format yyyy-mm-dd

LCM - Start / stop data logger

Further processing of recorded data (e.g. with Excel): Pay attention to the corresponding decimal separator (comma or dot).

Transmit: **LCM** [,a,b,c,ddddddd] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c,ddddddd <CR><LF>

	Description
a	Data logger command, a =
	0 –> Stop / data logging stopped
	1 –> Start / data logging started
	2 –> Clear / deletion of measurement data file (ending CSV) from USB memory stick
b	Data logging interval, b =
	0 –> Logging interval 1/s
	1 –> Logging interval 1/10 s
	2 –> Logging interval 1/30 s
	3 –> Logging interval 1/60 s
	4 –> Logging interval in the event of measurement value changes ≥1%
	5 –> Logging interval in the event of measurement value changes ≥5%
c	Decimal separator, c =
	0 –> , (decimal comma)
	1 –> . (decimal point)
ddddddd	File name (max. 7 digits)

TIM - Time

Transmit: **TIM** [,hh:mm] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: hh:mm <CR><LF>

	Description
hh:mm	Current time in the format hh:mm [24 h]

5.10 Parameter Transfer

The group is only available when a USB memory stick formatted for the the FAT file system (FAT32) is plugged in. Use a max. 32 GB memory stick.

SCM - Save / load parameters (USB)

Transmit: **SCM** [,a,bb] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Setup parameters, a = 0 –> Saving completed (read only) 1 –> CSV file is being saved (read only) 2 –> Loading all parameters from the USB memory stick onto the VGC50x 3 –> Formatting USB memory stick (FAT32) 4 –> Deleting parameter files (ending CSV) from the USB memory stick
bb	Number in the file name (0 … 99)

5.11 Test Parameters

(For service personnel)

ADC - A/D converter test

ADC corresponds to the TAD command

CDA - Re-calibration

Transmit: **CDA** [,yyyy-mm-dd] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: yyyy-mm-dd <CR><LF>

	Description
yyyy-mm-dd	Date of the next re-calibration. A warning is displayed when the date is reached.

CPT - Compatibility

Transmit: **CPT** [,a] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	a = 0 –> INFICON gauges (standard) 1 –> OLV transmitter

DIS - Display test

DIS corresponds to the TDI command

EEP - EEPROM test

EEP corresponds to the TEE command

EPR - FLASH test

EPR corresponds to the TEP command

HDW - Hardware version

Transmit: **HDW** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a.a <CR><LF>

	Description
a.a	Hardware version, e.g. 1.0

IOT - I/O test

IOT corresponds to the TIO command

LOC - Keylock

Transmit: **LOC** [,a] <CR>[<LF>]

	Description
a	Keylock, a = 0 –> Off (default) 1 –> On

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Keylock status

MAC - Ethernet MAC address

Transmit: **MAC** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: aa-aa-aa-aa-aa-aa <CR><LF>

	Description
aa-aa-aa-aa-aa-aa	Ethernet MAC address of the unit: 00-A0-41-0A-00-00 … 00-A0-41-0B-FF-FF

PNR - Firmware version

Transmit: **PNR** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a.aa <CR><LF>

	Description
a.aa	Firmware version, e.g. 1.00

RHR - Operating hours

Transmit: **RHR** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Run (operating) hours, e.g. 24 [hours]

RST - Operating hours

RST corresponds to the TRS command

TAD - A/D converter test

Transmit: **TAD** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: aa.aaaa,bb.bbbb,cc.cccc <CR><LF>

	Description
aa.aaaa	A/D converter channel 1 Measurement signal [0.0000 … 11.0000 V]
bb.bbbb	A/D converter channel 2 Measurement signal [0.0000 … 11.0000 V]
cc.cccc	A/D converter channel 3 Measurement signal [0.0000 … 11.0000 V]

TAI – ID resistance test

Transmit: **TAI** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> starts the test (very brief)

Receive: a.aa,b.bb,c.cc <CR><LF>

	Description
a.aa	Identification gauge 1 [kOhm]
b.bb	Identification gauge 2 [kOhm]
c.cc	Identification gauge 3 [kOhm]

TDI - Display test

Transmit: **TDI** [,a] <CR>[<LF>]

	Description
a	Display test, a = 0 –> Stops the test - display according to current operating mode (default) 1 –> Starts the test - all segments on

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: x <CR><LF>

	Description
x	Display test status

TEE - EEPROM test

Test of the parameter memory.

Transmit: **TEE** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (duration <1 s)

Do not keep repeating the test (EEPROM life).

Receive: aaaa <CR><LF>

	Description
aaaa	Error word

TEP - FLASH test

Test of the program memory.

Transmit: **TEP** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (very brief)

Receive: aaaa,bbbbbbbb <CR><LF>

	Description
aaaa	Error word
bbbbbbbbbb	Check sum (hex)

TIO - I/O test

Caution

The relays switch irrespective of the pressure.

Starting a test program may cause unwanted effects in connected control systems.

Disconnect all sensor cables and control system lines to ensure that no control commands or messages are triggered by mistake.

Transmit: **TIO** [,a,b] <CR>[<LF>]

	Description
a	Test status, a = 0 –> Off 1 –> On
b	Relay status (in hex format), bb = 00 –> All relays deactivated 01 –> Switching function relay 1 activated 02 –> Switching function relay 2 activated 04 –> Switching function relay 3 activated 08 –> Switching function relay 4 activated 10 –> Switching function relay 5 activated 20 –> Switching function relay 6 activated 40 –> Error relay activated 4F –> All relays activated

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	I/O test status
b	Relay status

TKB - Operator key test

Transmit: **TKB** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: abcd <CR><LF>

	Description
a	Key 1, a = 0 –> Not pushed 1 –> Pushed
b	Key 2, b = 0 –> Not pushed 1 –> Pushed
c	Key 3, c = 0 –> Not pushed 1 –> Pushed
d	Key 4, d = 0 –> Not pushed 1 –> Pushed

TLC - Torr lock

Transmit: **TLC** [,a] <CR>[<LF>]

	Description
a	Torr lock, a = 0 –> Off (default) 1 –> On

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Torr lock status

TMP - Inner Temperature of the Unit

Transmit: **TMP** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: aa <CR><LF>

	Description
aa	Temperature (±2 °C) [°C]

TRS - Serial Interface test

Transmit: **TRS** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (repeats each character, test is interrupted with <CTRL> C).

WDT - Watchdog control

Transmit: **WDT** [,a] <CR>[<LF>]

	Description
a	Watchdog control, a = 0 –> Manual error acknowledgement 1 –> Automatic error acknowledgement [1] (default)

[1] If the watchdog has responded, the error is automatically acknowledged and cancelled after 2 s.

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Watchdog control

5.12 Further

AYT - Are you there?

Transmit: **AYT** <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,b,c,d,e <CR><LF>

	Description
a	Type of the unit, e.g. VGC503
b	Model No. of the unit, e.g. 398-483
c	Serial No. of the unit, e.g. 100
d	Firmware version of the unit, e.g. 1.00
e	Hardware version of the unit, e.g. 1.0

ETH - Ethernet configuration

Transmit: **ETH** [,a,bbb.bbb.bbb.bbb,ccc.ccc.ccc.ccc,ddd.ddd.ddd.ddd] <CR>[<LF>]

Receive: <ACK><CR><LF>
Transmit: <ENQ>

Receive: a,bbb.bbb.bbb.bbb,ccc.ccc.ccc.ccc,ddd.ddd.ddd.ddd <CR><LF>

	Description
a	DHCP (dynamic host configuration protocol), a = 0 –> Statically 1 –> Dynamically
bbb.bbb.bbb.bbb	IP address
ccc.ccc.ccc.ccc	Subnet address
ddd.ddd.ddd.ddd	Gateway address

5.13 Example

"Transmit (T)" and "Receive (R)" are related to host.

T: **TID** <CR> [<LF>]	Request for gauge identification
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: PSG <CR> <LF>	Gauge identification
T: **SP1** <CR> [<LF>]	Request for parameters of switching function 1 (setpoint 1)
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 1,1.0000E-09,9.0000E-07 <CR> <LF>	Thresholds
T: **SP1**,1,6.80E-3,9.80E-3 <CR> [<LF>]	Modification of parameters of switching function 1 (setpoint 1)
R: <ACK> <CR> <LF>	Positive acknowledgement
T: **FOL**,2 <CR> [<LF>]	Modification of filter time constant (syntax error)
R: <NAK> <CR> <LF>	Negative acknowledgement
T: <ENQ>	Request for data transmission
R: 0001 <CR> <LF>	ERROR word
T: **FIL**,2 <CR> [<LF>]	Modification of filter time constant
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 2 <CR> <LF>	Filter time constants
T: **PR1** <CR> [<LF>]	Request for measurement data
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 0,+8.3400E-03 <CR> <LF>	Status and pressure
T: <ENQ>	Request for data transmission
R: 1,+8.0000E-04 <CR> <LF>	Status and pressure

6 Maintenance

Cleaning the VGC50x

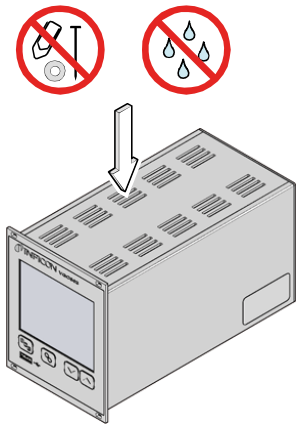
For cleaning the outside of the unit a slightly moist cloth will usually do. Do not use any aggressive or scouring cleaning agents.

DANGER

Mains voltage

Contact with live parts is extremely hazardous when liquids penetrate into the unit.

Make sure no liquids penetrate into the equipment.



Battery replacement

The product contains a battery (type CR2032, service life >10 years) in order to maintain the data integrity of the real-time clock. Battery replacement is necessary if the real-time clock repeatedly shows an incorrect date. Please contact your local INFICON service center.

7 Troubleshooting

Signalization of errors

The error is shown in the dot matrix and the error relay opens (→ 🗎 23).

Error messages

	Possible cause and remedy/acknowledgement
SENSOR ERROR	Interruption or instability in sensor line or connector (Sensor error). ⇨ Acknowledge with the key.
WATCHDOG ERROR	The VGC50x has been turned on too fast after power off. ⇨ Acknowledge with the key. If the watchdog is set to Auto, the VGC50x acknowledges the message automatically after 2 s (→ 🗎 61).
	The watchdog has tripped because of a severe electric disturbance or an operating system error. ⇨ Acknowledge with the key. If the watchdog is set to WATCHDOG AUTO, the VGC50x acknowledges the message automatically after 2 s (→ 🗎 61).
DATA CORRUPTED	Parameter memory error (EEPROM). ⇨ Acknowledge with the key.

Technical support

If the problem persists after the message has been acknowledged several times and/or the gauge has been exchanged, please contact your nearest INFICON service center.

8 Repair

Return defective products to your nearest INFICON service center for repair.

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

9 Accessories

VGC501 only

	Ordering number
Adapter panel for installation into a 19" rack chassis adapter, height 3 U	398-499

10 Storage

Caution

Electronic components.

Inappropriate storage (static electricity, humidity etc.) may damage electronic components.

Store the product in an antistatic bag or container. Observe the relevant specifications under Technical Data (→ 🗎 8).

11 Disposal

WARNING

Substances detrimental to the environment.

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

Please dispose of such materials in accordance with the relevant local regulations.

Separating the components

After disassembling the product, separate its components in accordance with the following criteria:

Electronic and non-electronic components

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

Appendix

A: ConversionTables

Weights

	kg	lb	slug	oz
kg	1	2.205	68.522×10^{-3}	35.274
lb	0.454	1	31.081×10^{-3}	16
slug	14.594	32.174	1	514.785
oz	28.349×10^{-3}	62.5×10^{-3}	1.943×10^{-3}	1

Pressures

	N/m^2, Pa	Bar	mBar, hPa	Torr	at
N/m^2, Pa	1	10×10^{-6}	10×10^{-3}	7.5×10^{-3}	9.869×10^{-6}
Bar	100×10^{3}	1	10^{3}	750.062	0.987
mBar, hPa	100	10^{-3}	1	750.062×10^{-3}	0.987×10^{-3}
Torr	133.322	1.333×10^{-3}	1.333	1	1.316×10^{-3}
at	101.325×10^{3}	1.013	1.013×10^{3}	760	1

Pressure units used in the vacuum technology

	mBar	Bar	Pa	hPa	kPa	Torr mm HG
mBar	1	1×10^{-3}	100	1	0.1	0.75
Bar	1×10^{3}	1	1×10^{5}	1×10^{3}	100	750
Pa	0.01	1×10^{-5}	1	0.01	1×10^{-3}	7.5×10^{-3}
hPa	1	1×10^{-3}	100	1	0.1	0.75
kPa	10	0.01	1×10^{3}	10	1	7.5
Torr mm HG	1.332	1.332×10^{-3}	133.32	1.3332	0.1332	1

1 Pa = 1 N/m^2

Linear measurements

	mm	m	inch	ft
mm	1	10^{-3}	39.37×10^{-3}	3.281×10^{-3}
m	10^{3}	1	39.37	3.281
inch	25.4	25.4×10^{-3}	1	8.333×10^{-2}
ft	304.8	0.305	12	1

Temperature

	Kelvin	Celsius	Fahrenheit
Kelvin	1	°C+273.15	(°F+459.67)×5/9
Celsius	K-273.15	1	5/9×°F-17.778
Fahrenheit	9/5×K-459.67	9/5×(°C+17.778)	1

B: Firmware Update

If your VGC50x firmware needs updating, e.g. for implementing a new gauge type, please contact your nearest INFICON service center.

A firmware update is possible

- via a USB memory stick (type A connector on the front of the unit), or
- with the USB Update Tool via the USB type B connector on the rear of the unit.

User Parameters

Most of the settings you may have made in the Parameter mode will not be affected by a firmware update. However, we recommend that you save the parameters before an update (→ 🗎 65).

Firmware update with a USB memory stick (type A)

Not all USB memory sticks are automatically recognized by the VGC50x, as they (particularly cheaper brands) do not always conform to USB standard specifications. Try a different memory stick before contacting your nearest INFICON service center.

1. Download two files with the ending ".S19" and ".CNF" from our website "www.inficon.com" to a USB memory stick.
2. Switch off the unit.
3. Plug in the memory stick and then turn on the unit.
4. The update occurs automatically in the following steps:

`BOOTING`	Very brief.
`BOOTLOADER V1.x`	Very brief.
`ERASING FW...`	Old firmware is being deleted from the unit.
`UPDATING FW...`	New firmware is being loaded onto the unit.
`UPDATE COMPLETE`	Update completed.

5. Remove the memory stick and the unit will restart automatically.
6. If necessary, customer-specific settings saved before the update may now be resaved to the unit (→ 🗎 65).

Firmware update with USB Update Tool (USB type B)

Precondition: Microsoft Windows XP, 7, 8 or 10 operating system

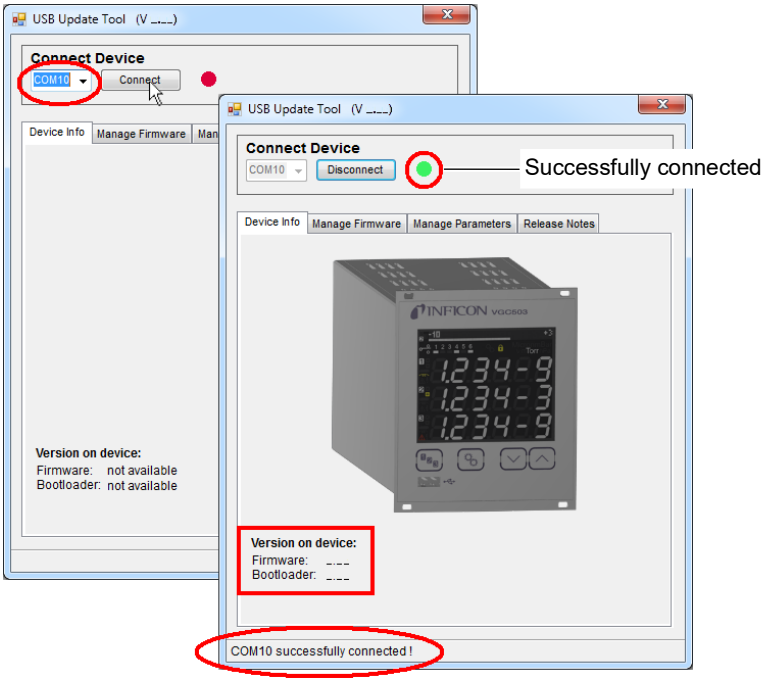
Your operating system should be updated first. Additionally administrator rights are required.

During firmware update, no USB memory stick should be connected on the front of the unit.

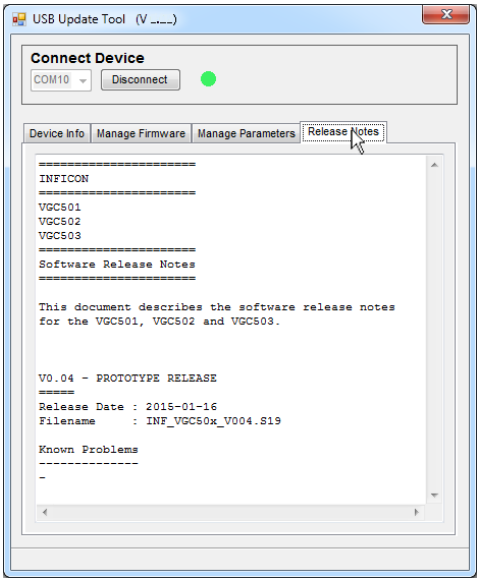
If a virtual serial interface (COM) is not automatically established, you may download and then install the driver from the website "www.ftdichip.com/drivers/vcp.htm".

1. Download the USB UpdateTool from the CD ROM or from our website "www.inficon.com".
2. Using a USB cable type A/B connect the unit to the computer.

❸ Start USB UpdateTool, select the COM interface from the menu and click on <Connect>.

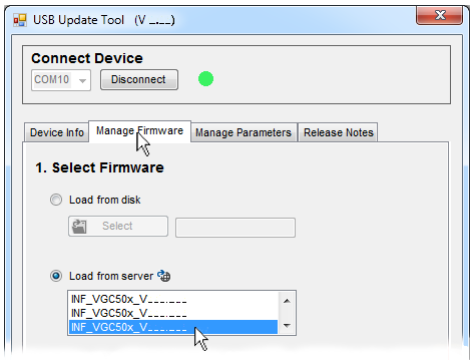


❹ Click on <Release Notes> to view the software release notes.

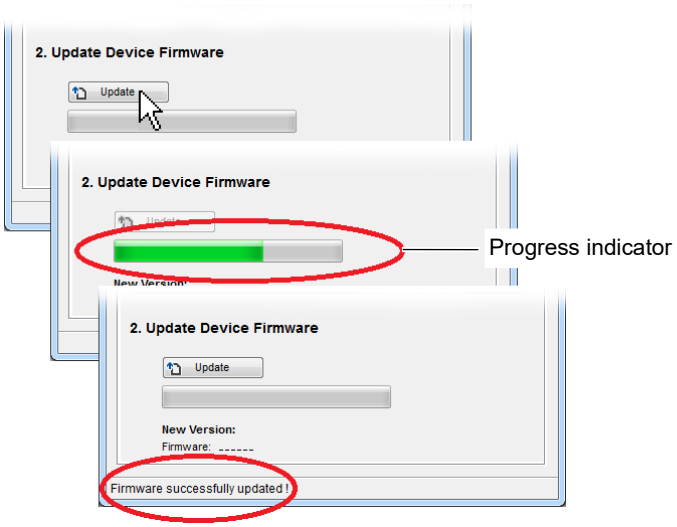


❺ Click on <Manage Firmware>, select firmware …

- Option <Load from disk>: Download a copy of the firmware from our website "www.inficon.com". Then, select the appropriate folder.
- Option <Load from server>: The update tool connects to the internet. Select the desired firmware version from the selection list.



… and click <Update>: The firmware is updated.



If the update was not successful, try again.

C: Ethernet Configuration

The user program (e.g. terminal program, LabView, etc.) must support serial interfaces. Under Microsoft Windows operating systems the VGC50x is listed as a virtual COM interface.

Please contact your network administrator, before starting Ethernet configuration.

Your operating system should be updated first. Additionally administrator rights are required.

C 1: Connect the VGC50x to a Network

With registration

1. Readout the MAC address of the VGC50x (→ 🗎 60).
2. The VGC50x should be registered in the network by the network administrator. After registration ask him for the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP).
3. Configuring the VGC50x:
   - Save all VGC50x parameters on a USB memory stick ("SAVE SETUP", → 🗎 65).
   - Set the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP) in the saved CSV file on the memory stick.
   - Load the modified parameters onto the VGC50x ("RESTORE SETUP", → 🗎 65).
   - Connect the VGC50x with an Ethernet patch cable to the network.
4. Search for the VGC50x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ 🗎 111).
5. Start the program for communication with the VGC50x and connect it to the assigned COM interface.

Without registration

1. If unknown, ask the network administrator for the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP).
2. Configuring the VGC50x:
   - Save all VGC50x parameters on a USB memory stick ("SAVE SETUP", → 🗎 65).
   - Set the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP) in the saved CSV file on the memory stick.
   - Load the modified parameters onto the VGC50x ("RESTORE SETUP", → 🗎 65).
   - Connect the VGC50x with an Ethernet patch cable to the network.
3. Search for the VGC50x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ 🗎 111).
4. Start the program for communication with the VGC50x and connect it to the assigned COM interface.

C 2: Connect the VGC50x to a Computer

Computer with DHCP server

1. Connect the VGC50x to a computer …
   - with a crossover Ethernet cable,
   - via a switch, or
   - with an Ethernet patch cable (precondition: the interface is auto MDI-X capable).
2. The DHCP server assigns automatically an IP address.
   Precondition: DHCP = ON (standard)
3. Search for the VGC50x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ 🗎 111).
4. Start the program for communication with the VGC50x and connect it to the assigned COM interface.

Computer without DHCP server

1. Save all VGC50x parameters on a USB memory stick ("SAVE SETUP", → 🗎 65).
2. Set the following Ethernet parameters in the saved CSV file on the memory stick:

IP ADDRESS:	192.168.0.1 (192.168.0.2 for a second unit, and so on)
NETMASK:	255.255.0.0
DHCP:	OFF

3. Load the modified parameters onto the VGC50x ("RESTORE SETUP", → 🗎 65).
4. Connect the VGC50x to a computer …
   - with a crossover Ethernet cable,
   - via a switch, or
   - with an Ethernet patch cable (precondition: the interface is auto MDI-X capable).
5. Search for the VGC50x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ 🗎 111).
6. Start the program for communication with the VGC50x and connect it to the assigned COM interface.

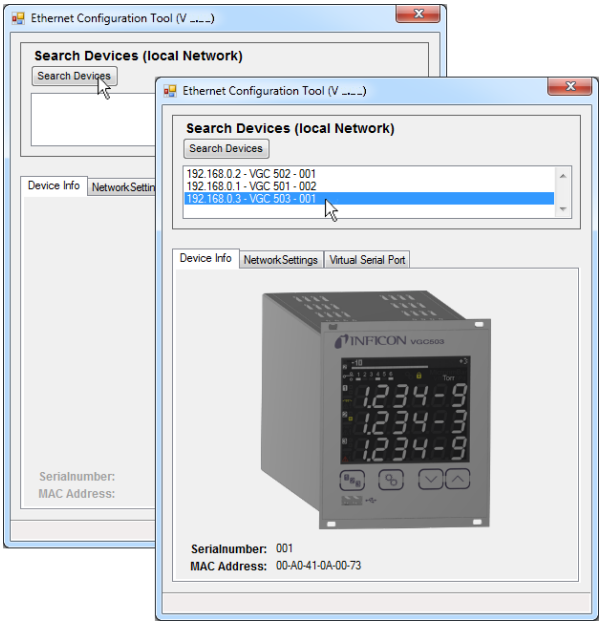
C 3: Ethernet Configuration Tool

With the Ethernet Configuration Tool a virtual serial interface (COM) can be assigned to an IP address. In addition, it allows configuration of the Ethernet interface via a computer.

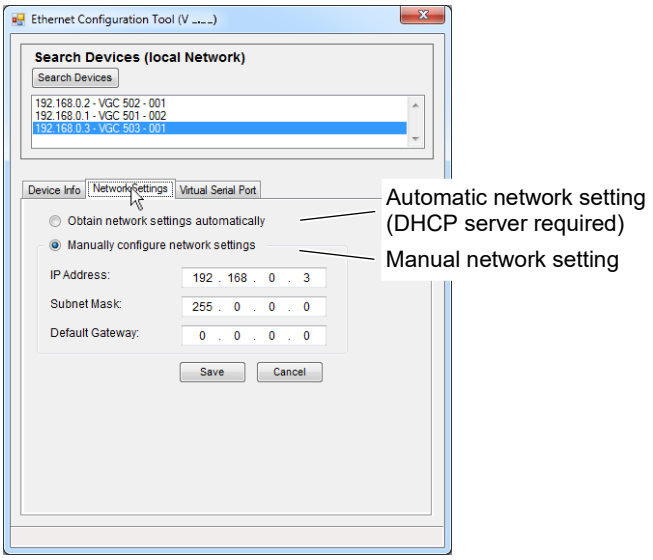
Precondition: Windows 7, 8 or 10 operating system (does not work under Windows XP)

❶ Download the Ethernet Configuration Tool from the CD ROM or from our website "www.inficon.com".

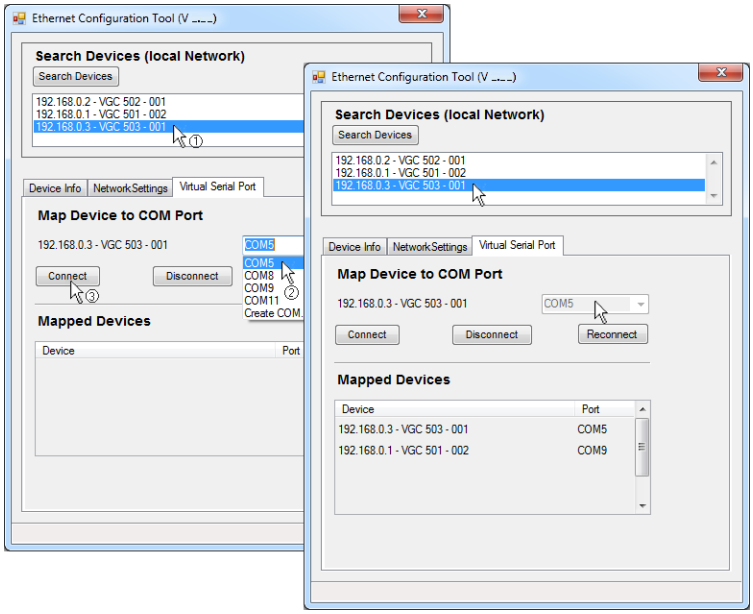
❷ Start the Ethernet Configuration Tool and click on <Search Devices>: The tool searches the local network for connected devices and lists the devices thus found in the selection window. The <Device Info> register shows basic information about the selected device.



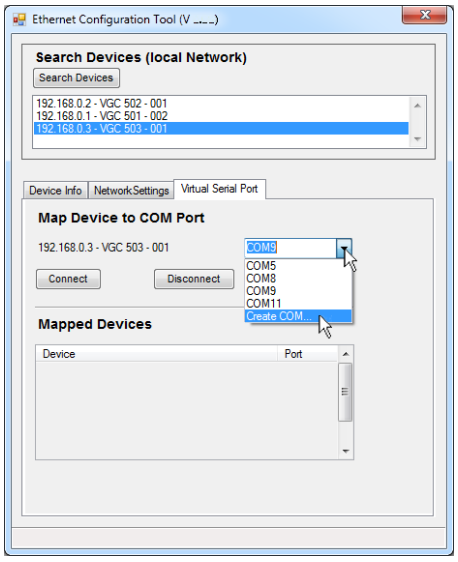
❸ Automatic or manual network setting occurs in the <Network Settings> register.



❹ In the <Virtual Serial Port> register a specific COM Port can be assigned to each device, and/or …



… a new COM Port can be created.



The new created virtual interface (COM) appears in the list box and in the Windows Device Manager.

D: Literature

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tina04e1
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tinb85e1
INFICON AG, LI–9496 Balzers, Liechtenstein

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Operating Manual
MEMS Pirani & Piezo Diaphragm Gauge PPG570
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Operating Manual
Capacitance Diaphragm Gauge CDG160Dhs, CDG200Dhs
tinb45e1
INFICON AG, LI–9496 Balzers, Liechtenstein

ETL Certification

C ETL US LISTED
Intertek
4010094

ETL LISTED

The products VGC501, VGC502 and VGC503

- conform to the UL Standards UL 61010-1 and UL 61010-2-030
- are certified to the CSA Standards CSA C22.2 # 61010-1 and CSA C22.2 # 61010-2-030

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.

Products: VGC501, VGC502, VGC503

The products of the declaration described above are in conformity with following Union harmonization legislation:

- 2014/35/EU, OJ L 96/357, 29.3.2014
  (LV Directive; directive relating to electrical equipment designed for use within certain voltage limit)
- 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 61000-3-2:2006 + A1:2009 + A2:2009
  (EMC: limits for harmonic current emissions)
- EN 61000-3-3:2013
  (EMC: limitation of voltage changes, voltage fluctuations and flicker)
- EN 61000-6-1:2007
  (EMC: generic immunity for residential, commercial and light-industrial environments)
- 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, commercial and light-industrial environments)
- EN 61000-6-4:2007 + A1:2011
  (EMC: generic emission standard for industrial 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
  (EMC requirements for electrical equipment for measurement, control and laboratory use)
- EN IEC 63000:2018
  (RoHS: technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances)

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

Balzers, 2024-11-07

William Opie
Managing Director

Balzers, 2024-11-07

Denis Hari
Product Manager

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.

Products: VGC501, VGC502, VGC503

The products of the declaration described above are in conformity with the relevant UK Statutory Instruments:

- S.I. 2016/1011, 11.2016
  (The electrical equipment (safety) regulations 2016)
- S.I. 2016/1091, 11.2016
  (The electromagnetic compatibility regulations 2016)
- S.I. 2012/3032, 12.2012
  (The restriction of the use of certain hazardous substances in electrical and electronic equipment regulations 2012)

Harmonized and international/national standards and specifications:

- EN 61000-3-2:2006 + A1:2009 + A2:2009
  (EMC: limits for harmonic current emissions)
- EN 61000-3-3:2013
  (EMC: limitation of voltage changes, voltage fluctuations and flicker)
- EN 61000-6-1:2007
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William Opie
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Notes

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TINA96E1-D

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