



# PGC201 PASSIVE GAUGE CONTROLLER INSTRUCTION MANUAL

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Issue: A

Original Instructions



# Declaration of Conformity

We, Edwards,  
Innovation Drive,  
Burgess Hill,  
West Sussex,  
RH15 9TW, UK

declare under our sole responsibility, as manufacturer and person within the EU authorised to assemble the technical file, that the product(s)

- Passive Penning (CPG), Pirani (PRG) gauges connected to controllers (PGC).

D03000100	CPG35K - NW40	D03000200	PRG20K - NW16 AI
D03000110	CPG35K - DN40CF	D03000210	PRG20K - DN16CF SS
D03000130	CPG35K - NW25	D03000220	PRG20KCR - NW16 SS
D03000140	CPG35KB - DN40CF	D03000400	PGC201 Pirani/Penning Contr +*
D03000201	PRG cable 5 m	D03000101	CPG cable 5 m
D03000202	PRG cable 10 m	D03000102	CPG cable 10 m
D03000203	PRG cable 20 m	D03000103	CPG cable 20 m
D03000204	PRG cable 30 m	D03000104	CPG cable 30 m
D03000205	PRG cable 50 m	D03000105	CPG cable 50 m

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

EN61010-1:2010	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use. General Requirements
EN61326-1:2013 Class B, Industrial	Electrical equipment for measurement, control and laboratory Use. EMC requirements. General requirements

and fulfils all the relevant provisions of

(+) 2014/35/EU	Low Voltage Directive
(*) 2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Certain Hazardous Substances (RoHS) Directive
2012/19/EU	Waste from Electrical and Electronic Equipment (WEEE) Directive

*Note: This declaration covers all product serial numbers from the date this Declaration was signed onwards.*

Larry Marini, Senior Technical


07.06.2017, Eastbourne

Date and Place

This product has been manufactured under a quality management system certified to ISO 9001:2008

### Material Declaration

In accordance with the requirements of the Chinese regulatory requirement on the Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products Order No. 32 (also known as 'China RoHS2') and SJ/T 11364 Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products:

Product	Product Label	Meaning
PGC201 vacuum gauge controller		This product contains hazardous substances in at least one of the homogeneous materials used which are above the limit requirement in GB/T 26572 as detailed in the declaration table below. These parts can safely be used for the environmental protection use period as indicated.

### 材料成分声明 Materials Content Declaration

部件名称 Part name	有害物质 Hazardous Substances					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr VI)	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
印刷电路组件 (PCA) Printed Circuit Assembly (PCA)	X	O	X	O	O	O
电缆/电线/连接器 Cable/Wire/Connector	X	O	O	O	O	O
机械部件 Mechanical Components	X	O	O	O	O	O

O: 表示该有害物质在该部件的所有均质材料中的含量低于 GB/T 26572 标准规定的限量要求  
O: Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.  
X: 表示该有害物质在该部件的至少一种均质材料中的含量超出 GB/T26572 标准规定的限量要求  
X: Indicates that the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T26572.

These products are EU RoHS complaint, the following Exemptions apply:

6(b) Lead as an alloying element in aluminium containing up to 0.4% by weight

6(c) Copper alloy containing up to 4% lead by weight

7(a) Lead in in high melting temperature type solder (i.e lead based alloys containing 85% by weight or more lead)

(c) I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound

7(c) II Lead in dielectric ceramic in capacitors for a rated voltage of 125 V AC or 250 V DC or higher

8(b) Cadmium and its compounds in electrical contacts

15 Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages

34 Lead in cermet-based trimmer potentiometer elements

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# Contents

<b>Description</b>	<b>1</b>
Validity .....	1
Part number .....	1
Nameplate .....	1
Intended use .....	1
Responsibility and warranty .....	1
Shipping damage .....	2
<b>Safety</b>	<b>3</b>
General information .....	3
Key to the symbols .....	3
Basic safety information .....	3
<b>General equipment description</b>	<b>5</b>
PGC201 .....	5
PRG (Pirani) method of measurement .....	5
CPG (cold cathode) method of measurement .....	5
Connectable gauge heads .....	5
<b>Technical data</b>	<b>7</b>
General data .....	7
Mechanical data .....	7
Standard parameters (factory defaults) .....	8
Sensor-dependent parameters .....	8
General parameters .....	8
Environment .....	8
Standards .....	9
Mains connection .....	9
Measurement channels .....	9
PRG measurement channels .....	9
CPG measurement channel .....	10
Measurement .....	10
Switching functions / relay outputs .....	10
Switching function relay .....	10
Ready signal relay .....	10
Outputs and inputs .....	11
Analog output .....	11
External control .....	11
Serial interfaces .....	11
RS232 .....	11
RS485 .....	12
<b>Installation</b>	<b>13</b>
Supplied equipment .....	13
Mechanical installation .....	13

Rack installation .....	13
Front panel installation .....	14
Benchtop instrument .....	15
Connections .....	15
Rear side of the instrument .....	15
Mains connection .....	16
Earthing .....	17
PRG measurement channels (PRG 1 and PRG 2) .....	17
CPG measurement channel (CPG) .....	17
Analog output and external control (analog output / extern control) .....	18
RS232 / RS485 Interface (Interface RS232 / RS485) .....	19
Relay output (relay output) .....	19
<b>Operation</b> .....	<b>21</b>
Front panel .....	21
Display .....	21
Control pushbuttons .....	22
(CH) .....	22
(PARA) .....	22
Arrow pushbuttons (◀ 'DOWN' / ▶ 'UP') .....	22
Switching on and off .....	22
Switching on .....	22
Switching off .....	22
Operating modes .....	22
Measurement mode .....	23
Parameter mode .....	23
Measurement mode .....	23
Selection .....	23
Description .....	23
Pushbutton functions .....	23
Measurement channel selection .....	23
Parameter mode selection .....	24
Switching the CPG on .....	24
Switching the CPG off .....	24
PRG adjustment .....	24
Parameter mode .....	25
Selection .....	25
Parameter groups .....	25
Switching function parameters (PArA SP) .....	26
Sensor parameters (PArA SEn) .....	26
General parameters (PArA GEn) .....	26
Operating concept .....	26
<b>Parameters</b> .....	<b>29</b>
Switching function parameters (PArA SP) .....	29
Basic terms .....	29
Switching functions .....	29
Threshold values .....	29
Lower threshold value (SP1 Lo, SP2 Lo) .....	29
Upper threshold value (SP1 Hi, SP2 Hi) .....	29

Hysteresis .....	29
Configuring the switching functions .....	30
Adjustment range .....	30
Sensor parameters (PArA SEn) .....	31
Filament material PRG (FIL) .....	31
Type of gas correction PRG (GASTM) .....	31
Type of gas correction CPG (GASPM) .....	32
Sensor switch-on type (S-on) .....	32
Sensor switch-on value (t-on) .....	32
Sensor switch-off type (S-off) .....	32
Sensor switch-off value (t-off) .....	33
General parameters (PArA GEn) .....	33
Unit of measurement (unit) .....	33
Analog output (AnALoG) .....	34
Display format (diGit) .....	34
Display brightness (bri) .....	34
Baud rate (bAud) .....	34
Interface (rS) .....	35
<b>Computer interface</b> .....	<b>37</b>
Basics .....	37
Connection .....	37
Nomenclature .....	37
Communication .....	38
Protocol .....	38
General string structure .....	38
Command set (mnemonics) .....	39
Command overview .....	39
RPV (read pressure value) .....	40
RVN (read version number) .....	41
RSS (read set point status) .....	41
SHV (set HV on/off) .....	41
SKL (set key lock on/off) .....	42
SAC (save actual configuration) .....	42
RSA (read serial address) .....	42
SSA (set serial address) .....	42
RGP (read general parameter) .....	43
SGP (set general parameter) .....	44
RGC (read gas correction) .....	45
SGC (set gas correction) .....	45
RSC (read sensor control) .....	45
SSC (set sensor control) .....	46
RSP (read set point) .....	47
SSP (set set point) .....	47
<b>Maintenance and service</b> .....	<b>49</b>
Maintenance .....	49
General maintenance information .....	49
Troubleshooting .....	49
Fault finding .....	49

Error messages .....	49
Help the case of faults .....	49
Fuse replacement .....	50
Repair .....	50

## **Storing and waste disposal** **51**

Storing .....	51
Waste disposal .....	51

## List of Figures

Dimensions (mm) .....	7
Rack installation .....	14
Front panel cut-out dimensions (mm) .....	14
Preparing the instrument for utilisation as a benchtop unit .....	15
Rear panel of the instrument .....	16
Connection plug for analog output and external control (SUB-D, 15-way) .....	18
Interface connection socket (SUB-D, 9-way) .....	19
Connection plug for relay output (SUB-D, 25-way) .....	19
Front panel .....	21
Operating the pushbuttons .....	23
Full-scale adjustment for the PRG gauge head .....	24
Zero adjustment for the PRG gauge head .....	25
Behaviour of a switching function in response to pressure changes .....	30

## List of Tables

Part numbers .....	1
Connectable gauge heads .....	5
Gauge head cables .....	6
Accessories .....	6
Switching parameters, factory defaults .....	8
Sensor parameters, factory defaults .....	8
General parameters, factory defaults .....	8
Supplied equipment .....	13
Display components .....	21
Display in the measurement mode .....	23
Parameter groups and corresponding parameters .....	26
Available sensor parameters .....	31
Values for the parameter FIL .....	31
Values for the parameter unit .....	34
Values for the parameter AnALoG .....	34
Values for the parameter diGit .....	34
Values for the parameter bri .....	34
Values for the parameter bAud .....	34
Values for the parameter rS .....	35

Terms computer interface ..... 37  
Control characters computer interface ..... 37  
Mnemonics for read commands ..... 39  
Mnemonics for write commands ..... 39  
Mnemonics for read and write commands ..... 39  
Error messages ..... 49

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# Description

## Validity

### Part number

This document applies to the following products:

**Table 1** Part numbers

Item number	Product description
D03000400	PGC201 Three-channel measuring instrument for passive vacuum sensors

## Nameplate

A nameplate is located on the side of the instrument. When communicating with Edwards, stating the information on the nameplate is necessary.

## Intended use

The PGC201 is a universal vacuum gauge controller instrument which, by combining two principles of measurement, Pirani (PRG) and Penning (CPG), provides full coverage and control over vacuum pressures ranging between  $1 \times 10^{-9}$  mbar and atmospheric pressure.

One CPG sensor and a maximum of two PRG sensors can be connected.

The built-in RS232/RS485 interface permits computer-controlled operation as well as the exchange of the measurement data between the PGC201 and a computer.

Operate all connected sensors in agreement with the information given in the corresponding Operating Instructions.



### Note:

*Based on the technical data please check first whether your measuring instrument is suited to your kind of application.*

## Responsibility and warranty

Edwards will not assume any responsibility or warranty in cases where the operator or third persons:

- Do not observe the information given in this document.
- Do not use the product as intended.
- Modify the product in any way (conversions, repair work, and so forth).
- Operate the product with accessories not listed in the corresponding product documentation.

Subject to technical alterations without prior notice. The figures are not binding.

## Shipping damage

- Examine the shipping package for any external damage.
- Remove all of the packaging material and check the instrument. If the instrument is damaged, follow the Edwards return of equipment procedures that are laid out in the back of this manual. Do not use the instrument if it is damaged.

# Safety

## General information

The Edwards PGC201 controller is delivered ready for operation. This manual provides installation, operation and maintenance instructions for the PGC201. The instrument must be used as specified in this manual.

## Key to the symbols

Important instructions relating to technical safety and safe operation are emphasised by symbols.



### **WARNING:**

Warnings are given where failure to observe the instruction could result in injury or death to people.



### **CAUTION:**

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.



### **WARNING:**

Risk of electric shock.



### **Note:**

*General information pointing to further information, respectively reference sections.*

## Basic safety information

During all installation, maintenance and repair activities, comply with the pertinent safety regulations.



### **WARNING:**

Do not allow objects or liquids to enter the instrument. Coming into contact with components at mains voltage level can be dangerous to life.



### **CAUTION:**

Improper usage can damage the instrument. Use the instrument only in agreement with the specifications issued by the manufacturer.



### **CAUTION:**

Wrong connection and operating data can damage the instrument. Comply with all specified connection and operating data.

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# General equipment description

## PGC201

This combination instrument offers three measurement channels, two PRG and one CPG. Thus measurement of vacuum pressures over 12 full decades from  $1 \times 10^{-9}$  mbar to atmospheric pressure is possible. Six switching thresholds permit the integration of the PGC201 within complex vacuum control facilities. The two PRG channels are immediately active upon powering up. The CPG channel may be switched on and off by one of the two PRG channels or externally or manually. The operating status of the switching thresholds and the measurement systems is displayed and signalled correspondingly through the outputs.

### PRG (Pirani) method of measurement

This method of measurement covering the range of  $5 \times 10^{-4}$  to  $1 \times 10^3$  mbar utilises the heat conductance of the gas for the purpose of measuring pressure. In order to attain a response time which is as short as possible, all PRG instruments rely exclusively on the principle of the controlled Pirani where the measurement filament is part of a Wheatstone Bridge. When the temperature of the filament changes due to pressure changes, the bridge becomes unbalanced. The quickly responding control circuitry adapts the heating power for the filament so that the filament temperature reaches its nominal level thereby balancing the measurement bridge again. The displayed pressure is dependent on the type of gas. By default the display of the instrument has been calibrated for nitrogen or dry air.

### CPG (cold cathode) method of measurement

This principle of measurement relies on the ion current produced when a gas discharge is generated within the sensor. The resultant ion current from the discharge is proportional to the pressure. This sensor arrangement allows reliable measurement in the range from  $1 \times 10^{-9}$  to  $1 \times 10^{-2}$  mbar. Two versions with either a NW or CF flange are available.

### Connectable gauge heads

The following gauge heads can be operated by the PGC201:

**Table 2** Connectable gauge heads

Gauge head	Product description	Item number
CPG	CPG35K - NW40	D03000100
	CPG35K - DN40CF	D03000110
	CPG35K - NW25	D03000130
	CPG35KB - DN40CF	D03000140
PRG	PRG20K - NW16 Al	D03000200
	PRG20K - DN16CF SS	D03000210
	PRG20KCR - NW16 SS	D03000220

**Table 3 Gauge head cables**

Gauge head type	Product description	Item number
PRG cables	PRG Cable 5 m	D03000201
	PRG Cable 10 m	D03000202
	PRG Cable 20 m	D03000203
	PRG Cable 30 m	D03000204
	PRG Cable 50 m	D03000205
CPG cables	CPG Cable 5 m	D03000101
	CPG Cable 10 m	D03000102
	CPG Cable 20 m	D03000103
	CPG Cable 30 m	D03000104
	CPG Cable 50 m	D03000105

**Table 4 Accessories**

Gauge head type	Product description	Item number
PRG spares	Replacement sensing cell K	D03000209
	Replacement sensing cell KCR	D03000229
CPG spares	Spare cathode plates and discs	D03000109
	Spare anode ring	D03000119

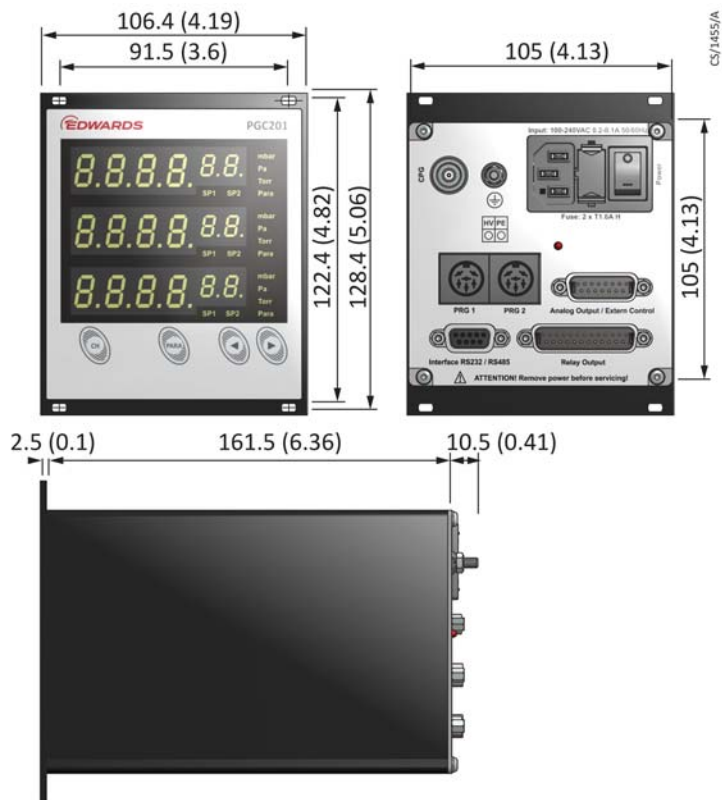
# Technical data

## General data

## Mechanical data

Dimensions:	Width: 106.4 mm Height: 128.4 mm Depth: 174.5 mm
Weight:	≤ 1.4 kg
Installation depth:	≤ 230 mm approximately (including connected plugs)
Usage:	Rack installation Front panel installation Benchtop instrument

Figure 1 Dimensions (mm)



## Standard parameters (factory defaults)

### Sensor-dependent parameters

**Table 5 Switching parameters, factory defaults**

Parameter	Parameter description	PRG setting (mbar)	CPG setting (mbar)
SP1 Lo	Switching threshold 1 - lower threshold	5.0 <sup>-3</sup>	1.0 <sup>-8</sup>
SP1 Hi	Switching threshold 1 - upper threshold	5.5 <sup>-3</sup>	1.1 <sup>-8</sup>
SP2 Lo	Switching threshold 2 - lower threshold	5.0 <sup>-3</sup>	1.0 <sup>-8</sup>
SP2 Hi	Switching threshold 2 - upper threshold	5.5 <sup>-3</sup>	1.1 <sup>-8</sup>

**Table 6 Sensor parameters, factory defaults**

Parameter	Parameter description	PRG setting	CPG setting
FIL	PRG filament material	tu (tungsten)	-
BR5 <sup>ti</sup>	PRG gas type correction characteristic	n2 (nitrogen)	-
BR5 <sup>pi</sup>	CPG gas type correction factor	-	1.00
S-on	Switch-on type for sensor	-	CH2
S-off	Switch-off type for sensor	-	CH2

### General parameters

**Table 7 General parameters, factory defaults**

Parameter	Parameter description	Setting
unit	Displayed unit of measurement	bar
ANALoB	Analog output	2
digit	Number of displayed digits	2
bri	Display brightness	Hi
baud	Baud rate	19.2
rs	Serial interface	232

## Environment

Temperature:	Storage: -20 to +60 °C Operating: +5 to +50 °C (sea level) +5 to +30 °C (2000 metres above sea level)
Relative atmospheric humidity:	80% maximum (up to 30 °C) decreasing to 50% maximum (from 40 °C)
Use:	Indoors (altitude 2000 m maximum above sea level)
Ingress protection type:	IP40

## Standards

- Conformity with respect to Low Voltage Directive 2014/35/EU
- Conformity with respect to EMC Directive 2014/30/EU
- Conformity with respect to RoHS Directive 2011/65/EU

International/national standards as well as specifications:

- DIN EN 61010-1 (2011) (Safety requirements for electrical equipment for measurement, control and laboratory use).
- DIN EN 61326-1 (2013) (Electrical equipment for measurement, control and laboratory use - EMC requirements. Industrial immunity; domestic emissions, Class B).

## Mains connection

Voltage:	100 to 240 V a.c.
Frequency:	50/60 Hz
Fuses:	2 x T1.6 A H
Power consumption:	< 10 W
Current consumption:	0.2 to 0.1 Amp approximately
Over-voltage category:	II
Protection category:	1
Connection:	Cold-device plug IEC 60320 C14

## Measurement channels

Number:	2 PRG measurement channels 1 CPG measurement channels
Connection:	6-way DIN socket for PRG 1-way HV socket (shielded) for CPG

## PRG measurement channels

Measurement range:	$5 \times 10^{-4}$ to 1000 mbar
Measurement accuracy:	$\pm 20\%$ of measured value ( $10^{-3}$ to $10^{-2}$ mbar) $\pm 15\%$ of measured value ( $10^{-2}$ to $10^2$ mbar)
Cable length:	Up to 100 m
Cable length compensation:	Automatic

## CPG measurement channel

Measurement range:	$1 \times 10^{-9}$ to $1 \times 10^{-2}$ mbar
Measurement accuracy:	$\pm 30\%$ of measured value ( $10^{-8}$ to $10^{-4}$ mbar)
Cable length:	Up to 100 m for the pressure range $1 \times 10^{-8}$ to $1 \times 10^{-2}$ mbar

## Measurement

Display rate:	$4 \text{ s}^{-1}$
Unit of measurement:	mbar, Pa, Torr

## Switching functions / relay outputs

### Switching function relay

Number:	6
Assignment:	2 per channel
Response time:	< 50 ms
Adjustment range:	CPG $1 \times 10^{-8}$ to $1 \times 10^{-2}$ mbar PRG $5 \times 10^{-3}$ to $5 \times 10^2$ mbar
Hysteresis:	Adjustable > 10% of measured value
Contact type:	Changeover contact, floating
Load (resistive):	Switched current: 1 Amp maximum Switched voltage: maximum 30 V a.c./30 V d.c.
Service life:	Mechanical: $5 \times 10^6$ switching cycles Electrical: $10^5$ switching cycles at maximum load
Connection:	SUB-D, 25-way, plug

### Ready signal relay

Number:	3
Assignment:	1 per channel
Response time:	< 50 ms
Contact type:	Normally open contact, floating
Load (resistive):	Switched current: 1 Amp maximum switched voltage: Maximum 30 V a.c./30 V d.c.
Service life:	Mechanical: $5 \times 10^6$ switching cycles
Electrical:	$10^5$ switching cycles at maximum load
Connection:	SUB-D, 25-way, plug

## Outputs and inputs

### Analog output

Number:	1 per measurement channel
Voltage range:	0 to 10 V d.c. (limit values 0 to 10.5 V d.c.)
Output voltage for fault:	10.2 to 10.5 V d.c.
Deviation of display value:	± 0.2%
Internal resistance:	100 Ohm
Characteristic:	Logarithmic

Measurement channel	$P_{nRL05\ 1}$	$P_{nRL05\ 2}$
CPG	1.43 V d.c./decade ( $0\text{ V} \triangleq 1 \times 10^{-9}$ mbar) $p = 10^{-9}\text{ mbar} \cdot 10^{(U[V]/1.43V)}$ $p = 10^{-7}\text{ Pa} \cdot 10^{(U[V]/1.43V)}$ $p = 0.75 \times 10^{-9}\text{ Torr} \cdot 10^{(U[V]/1.43V)}$	1.333 V d.c./decade ( $0.667\text{ V} \triangleq 1 \times 10^{-9}$ mbar) $p = 10^{-9}\text{ mbar} \cdot 10^{((U[V]-0.677V)/1.333V)}$ $p = 10^{-7}\text{ Pa} \cdot 10^{((U[V]-0.677V)/1.333V)}$ $p = 0.75 \times 10^{-9}\text{ Torr} \cdot 10^{((U[V]-0.677V)/1.333V)}$
PRG	1.67 V d.c./decade ( $0\text{ V} \triangleq 1 \times 10^{-3}$ mbar) $p = 10^{-3}\text{ mbar} \cdot 10^{(U[V]/1.67V)}$ $p = 10^{-1}\text{ Pa} \cdot 10^{(U[V]/1.67V)}$ $p = 0.75 \times 10^{-3}\text{ Torr} \cdot 10^{(U[V]/1.67V)}$	1.286 V d.c./decade ( $1.9\text{ V} \triangleq 5 \times 10^{-4}$ mbar) $p = 5 \times 10^{-4}\text{ mbar} \cdot 10^{((U[V]-1.9V)/1.286V)}$ $p = 5 \times 10^{-2}\text{ Pa} \cdot 10^{((U[V]-1.9V)/1.286V)}$ $p = 3.75 \times 10^{-4}\text{ Torr} \cdot 10^{((U[V]-1.9V)/1.286V)}$

Response time:	100 ms approximately
Resolution:	10-bit
Connection:	SUB-D, 15-way, plug (jointly used with connection for external control)

### External control

PLC compatible logic level:	(Low) < 7 V d.c.; 0 Amp (High) > 13 V d.c.; 7 mA (at 24 V d.c.)
Contact via relay:	24 V d.c. approximately, is provided by the instrument via a self-resetting fuse (100 mA)
Connection:	SUB-D, 15-way, plug (jointly used with analog output connection)

### Serial interfaces

#### RS232

Standard:	RS232
Parameters:	8 data bits, 1 stop bit, no parity, no protocol
Signals:	RXD and TXD
Baud rate:	9600, 19200, 38400 baud
Connection:	SUB-D, 9-way, socket (jointly used with RS485)

## RS485

Standard:	RS485 (half-duplex)
Parameters:	8 data bits, 1 stop bit, no parity, no protocol
Signals:	A and B
Baud rate:	9600, 19200, 38400 baud
Connection:	SUB-D, 9-way, socket (jointly used with RS232)

# Installation

## Supplied equipment

Table 8 Supplied equipment

Description	Quantity
PGC201	1
Mains cord with shockproof plug (EU)	1
Mains cord with shockproof plug (US)	1
Operating Instructions	1
Spare fuses	2
Neck collar screws	4
Plastic sleeves	4
Edge protection	2
Adhesive feet	2

## Mechanical installation

The PGC201 can be used as follows:

- Rack installation
- Front panel installation
- Benchtop instrument



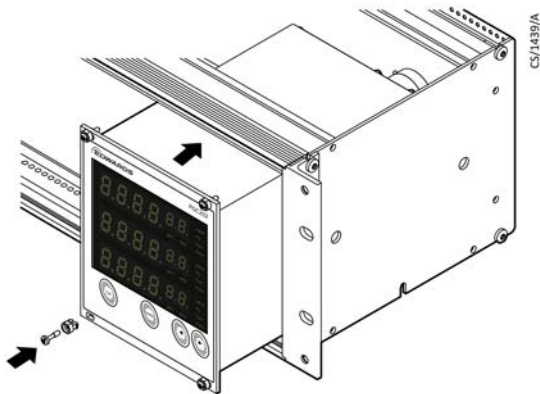
### **WARNING:**

**Install the instrument or place it so that you are in a position to operate the mains power switch at any time or ensure that the instrument can be de-energised at any time.**

## Rack installation

The PGC201 has been designed for installation within a sub-rack (19 inches) in accordance with DIN EN 60297 (IEC 60297) (see [Figure 2](#)). The equipment supplied includes four neck collar screws and plastic sleeves for this purpose.

Figure 2 Rack installation

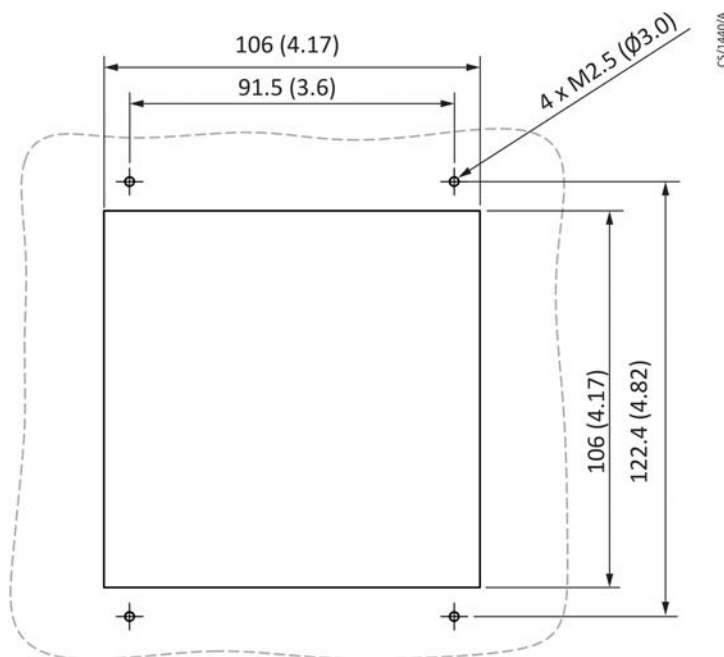


- Attach the sub-rack within the rack.
- Push the PGC201 into the sub-rack.
- Affix the instrument to the sub-rack with the neck collar screws and the plastic sleeves supplied with the product.

## Front panel installation

For panel mounting of the instrument, the following cut-out (see Figures 3) is required:

Figure 3 Front panel cut-out dimensions (mm)



- Guide the PGC201 into the cut-out.
- Affix the instrument with the neck collar screws and the plastic sleeves supplied with the product.

## Benchtop instrument



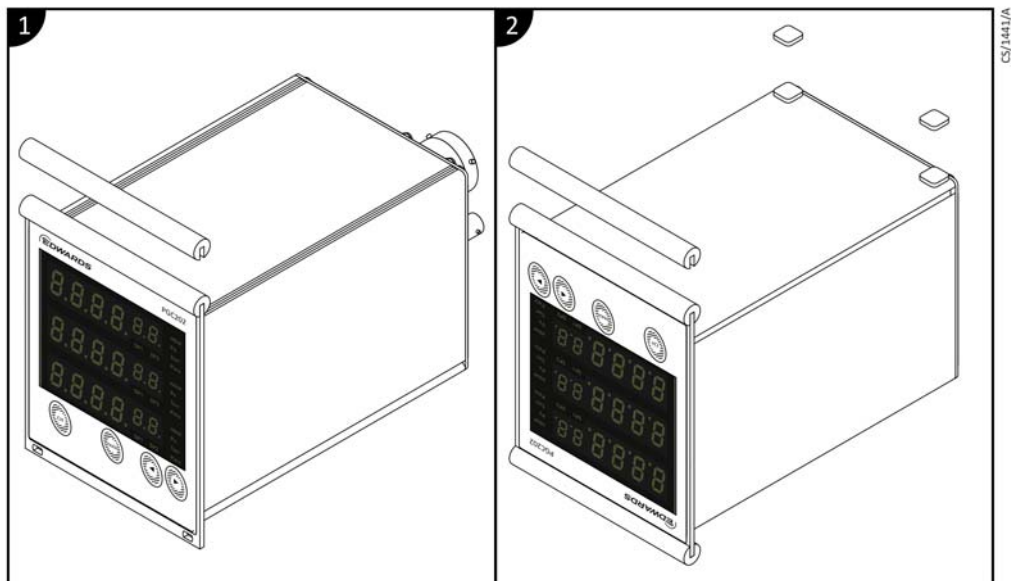
### WARNING:

When using the PGC201 as a benchtop instrument fit the two edge protection rubber pieces onto the top and bottom edge of the front panel to avoid injury by sharp edges.

When intending to use the PGC201 as a benchtop instrument, then proceed as follows:

- Push one of the two edge protection rubber pieces supplied with the product over the top edge of the front panel (see Figure 4 item 1).
- Place the PGC201 on its back (see Figure 4 item 2).
- Push the second edge protection rubber piece supplied with the product onto the bottom edge of the front panel.
- Stick the two rubber feet supplied with the product onto the bottom of the housing.
- Turn the PGC201 over again and move it to the desired place.

Figure 4 Preparing the instrument for utilisation as a benchtop unit



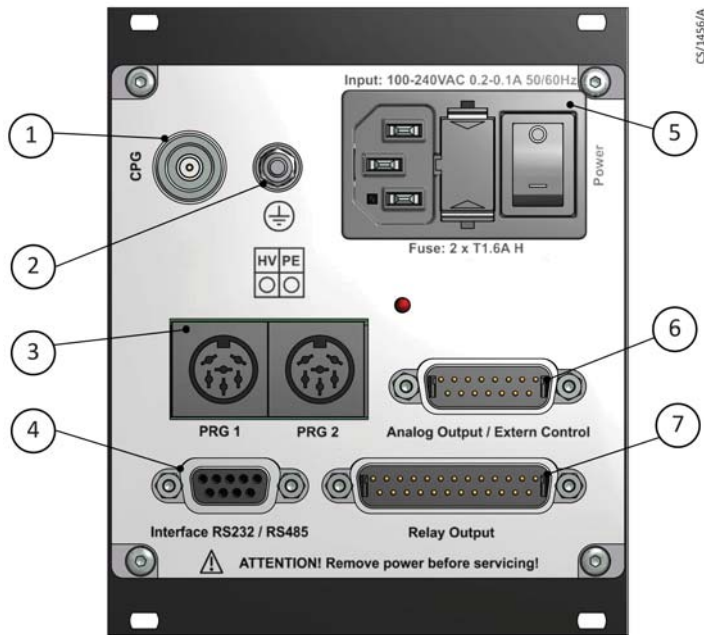
1. Top side
2. Bottom side

## Connections

### Rear side of the instrument

Figure 5 shows the rear panel of the PGC201. The way in which the individual connections have been wired is described in the following sections.

Figure 5 Rear panel of the instrument



- 1 Connection for the CPG gauge head (CPG)
- 2 Ground connection (protective earth) and shield of the PRG measurement cables
- 3 Connections for the PRG gauge heads (PRG 1, PRG 2)
- 4 Connection for the RS232 or RS485 interface
- 5 Mains connection with mains switch and fuses
- 6 Connection for analog output and external control
- 7 Connection for relay output

## Mains connection



### WARNING:

Appliances, which have not been professionally connected to Earth, can be life-threatening in the event of a malfunction. For this reason use 3-wire mains cords and extension cords with protective earthing only. Insert the mains plug into a mains power socket which provides an Earth contact.



### Note:

A mains power cord is supplied with the product. If the plug on the mains power side is not compatible with your mains power outlets, you will need a mains cord which meets the following specifications:

- 3-wire cable with protective earthing.
- Conductor cross-section: 3 x 0.75 mm<sup>2</sup> or greater.
- Cable length 2.5 m maximum.

The mains connection on the rear panel (see [Figure 5](#)) is not intended for use with a mains cord designed for use with heating apparatus.

- Insert the plug of the mains cord into the mains socket provided on the instrument.
- Insert the mains plug of the mains cord into the mains outlet.

## Earthing



### WARNING:

The vacuum chamber earth should be connected to the PGC201 protective earth terminal on the rear of the instrument.

With the aid of the earthing screw (see [Figure 5](#) item 2) the PGC201 can be connected to the protective ground of the vacuum chamber.

## PRG measurement channels (PRG 1 and PRG 2)



### WARNING:

A special cable from Edwards is required for connection to PRG1 and PRG2. The ground connection (see [Figure 5](#)) of the special cable must be connected to the ground connection on the rear of the instrument.



### CAUTION:

Gauge heads which have not been designed to be operated in connection with the PGC201 or which do not comply with current EMC guidelines can impair operation of the instrument or even damage it. Always operate the PGC201 with approved gauge heads, see [Connectable gauge heads](#).

The connections PRG 1 and PRG 2 (see [Figure 5](#)) allow the connection of up to two PRG gauge heads (see [Connectable gauge heads](#)).

Connecting:

- PRG 1: connect the gauge head using the corresponding connecting cable to connection PRG 1 on the rear of the PGC201.
- PRG 2: connect the gauge head using the corresponding connecting cable to connection PRG 2 on the rear of the PGC201.

## CPG measurement channel (CPG)



### WARNING:

The CPG gauge head is powered by an HT voltage source (ignition voltage 3.3 kV; operating voltage 1.7 kV /  $R_i = 6.6 \text{ M}\Omega$ ).



**CAUTION:**

Gauge heads which have not been designed to be operated in connection with the PGC201 or which do not comply with current EMC guidelines can impair operation of the instrument or even damage it. Always operate the PGC201 with approved and approved relevant connecting cables see [Connectable gauge heads](#).



**CAUTION:**

For utilising the connection CPG, a special cable from Edwards must be used.

The connection PM (Figure 5) serves the purpose of connecting a CPG gauge head (see [Connectable gauge heads](#)).

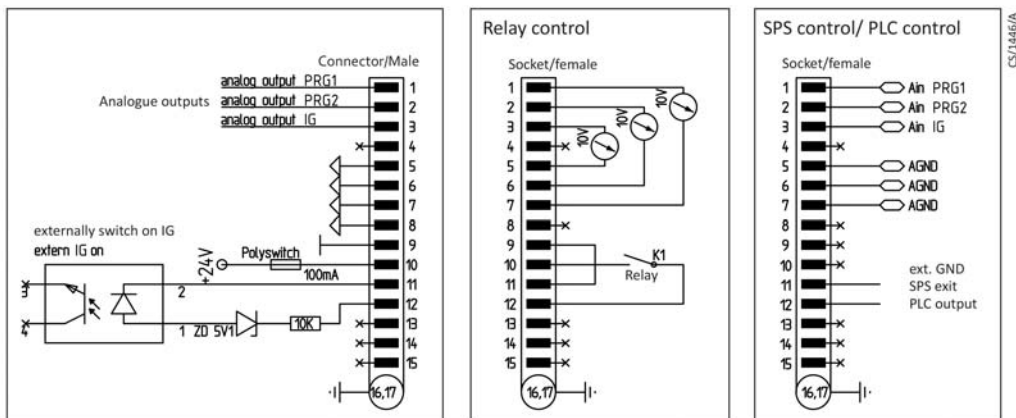
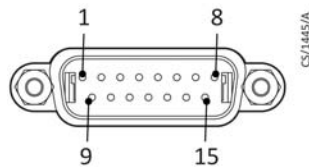
Connecting:

- Connect the CPG gauge head through the corresponding connecting cable to the connection CPG on the rear of the PGC201.
- Lock the plug using the knurled nut provided at the plug.

**Analog output and external control (analog output / extern control)**

The connection Analog Output / Extern Control (Figures 5 and 6) provides the connections of the analog outputs for the signals of the individual measurement channels as well as the inputs for externally controlling the CPG gauge.

**Figure 6 Connection plug for analog output and external control (SUB-D, 15-way)**



Connecting:

- Connect the peripheral components using a shielded connecting cable to the connection Analog Output/Extern Control on the rear of the PGC201.

## RS232 / RS485 Interface (Interface RS232 / RS485)

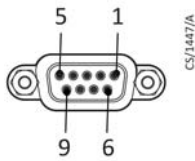


### CAUTION:

When using the RS232 serial interface use a serial extension cable with a 9-way plug and a 9-way socket. The wires in the cable must not be crossed. Utilisation of the RS485 requires a special cable.

The connection Interface RS232 / RS485 (Figures 5 and 7) permits operation of the instrument via a computer or a terminal.

Figure 7 Interface connection socket (SUB-D, 9-way)



1	B (RS485)	6	Link with 4
2	TxD (RS232)	7	Link with 8
3	RxD (RS232)	8	Link with 7
4	Link with 6	9	A (RS485)
5	Ground		

Connecting:

- Connect the serial interface of the computer using a shielded cable to the connection RS232/RS485 on the rear of the PGC201.

## Relay output (relay output)

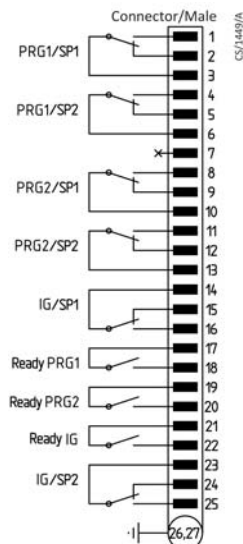
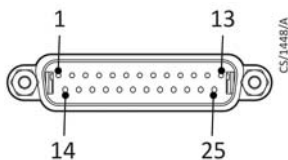


### WARNING:

Voltages exceeding 60 V d.c. or 30 V a.c. are dangerous when touched. You may only switch output voltages of up to 60 V d.c. or 30 V a.c. with a maximum current of 1 Amp at the connector marked Relay Output. The voltage must comply with the requirements of a safety extra-low voltage (SELV-E in accordance with EN 61010).

Through the connection Relay Output (Figures 5 and 8) you can utilise the floating relay contacts for switching purposes and ready signals.

Figure 8 Connection plug for relay output (SUB-D, 25-way)



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# Operation

**WARNING:**

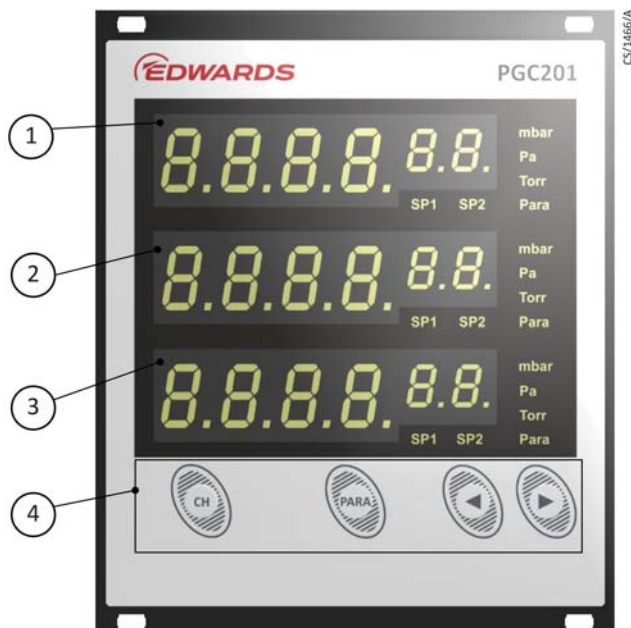


**Do not use the PGC for safety critical applications. The PGC is not intended to be fail safe.**

## Front panel

Figure 9 shows the front panel of the PGC201.

Figure 9 Front panel



- 1 Display of channel 1 with two corresponding switching thresholds
- 2 Display of channel 2 with two corresponding switching thresholds
- 3 Display of channel 3 with two corresponding switching thresholds
- 4 Status indication operating pushbuttons

## Display

Table 9 Display components

Display	Description
8.8.8.8.8.8	Measured value or status message
SP1, SP2	Switching function status. When the symbol is lit, the pressure is then below the lower threshold. When the symbol is not lit, then the pressure is above the upper threshold.
mbar, Pa, Torr	Pressure unit (applies to all channels)
Para	Channel selection, configuration mode for channel

## Control pushbuttons

(CH)

With the pushbutton (CH) you can select a measurement channel. This is necessary, for example, when wanting to switch the CPG gauge head on or off, or when wanting to change the sensor parameters. The number of the selected measurement channel is displayed flashing for 10 seconds.

(PARA)

Through the pushbutton (PARA) you can invoke the parameter mode for switching threshold, sensor and general parameters. The indicator Para for the selected measurement channel comes on. You can set up different parameters.

Arrow pushbuttons (◀ 'DOWN' / ▶ 'UP')

The arrow pushbuttons are needed to be able to enter data in the parameter mode or switch the CPG gauge head on or off (see [Switching on](#) and [Switching off](#)). By operating the pushbuttons, a default value can be reduced or increased. The corresponding pushbuttons are designated in the following as 'DOWN' (◀) and 'UP' (▶).

## Switching on and off

### Switching on

- Switch the instrument on at the mains switch.

After switching on, the PGC201 runs the following:

- Self test
- Display test
- Display of the software version used
- Re-establishing the parameters set up last
- Identification of the connected measuring equipment
- Activation of the measurement mode

### Switching off



#### CAUTION:

Wait for at least 5 seconds before switching the instrument on again.

Switch the instrument off at the mains switch.

## Operating modes

The PGC201 may be operated in one of the following operating modes:

## Measurement mode

The measurement mode is the standard operating mode. Here the measured values or status messages are displayed (see [Measurement mode](#)).

## Parameter mode

In the parameter mode you have access to different parameters. You can simply view the parameters or change them with the aid of the arrow keys. In this way you can configure the PGC201 (see [Parameter mode](#)).

## Measurement mode

### Selection

After switching on the PGC201 it will automatically run the measurement mode.

If running the parameter mode and when not operating a key for 10 seconds the instrument will then automatically revert back to the measurement mode.

### Description

In the measurement mode the measured values of the gauge heads are displayed. When the pressure is outside the permissible range, then a status message is displayed.

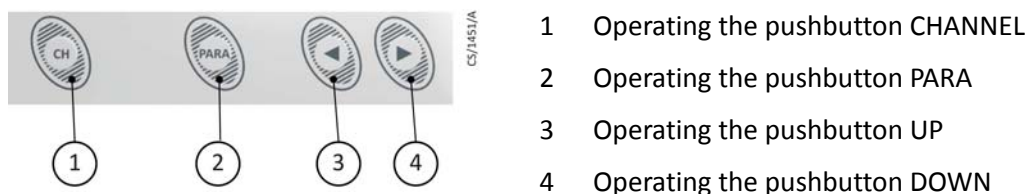
Measurement channels to which no gauge head has been connected will indicate *noSEn*. This status message is erased after 30 seconds and 4 dots are displayed.

**Table 10** Display in the measurement mode

Display	Description
<i>1000 n</i>	Above the permissible range (overrange)
<i>8.888<sup>-8</sup></i>	Within the permissible range
<i>ε8.88<sup>-8</sup></i>	Below the permissible range (underrange)
<i>S oFF</i>	Gauge head has been switched off
<i>HU on</i>	CPG is on

## Pushbutton functions

**Figure 10** Operating the pushbuttons



- 1 Operating the pushbutton CHANNEL
- 2 Operating the pushbutton PARA
- 3 Operating the pushbutton UP
- 4 Operating the pushbutton DOWN

### Measurement channel selection

- Press the pushbutton (CH).
- The instrument selects the next measurement channel. The Para indicator for the selected measurement channel will flash for 10 seconds.

## Parameter mode selection

- Press the pushbutton (PARA) and keep it depressed for approximately 2 seconds.
- The instrument will change to the parameter mode (see [Parameter mode](#)).
- If no pushbuttons are pressed within 10 seconds, the instrument will then automatically return to the measurement mode.

## Switching the CPG on

The CPG gauge head can be switched on manually. For this, sensor control must be set to *HRnd* (see [Sensor switch-on type \(S-on\)](#)).

- Press the pushbutton (CH) to select measurement channel 3.
- Keep the key marked (UP) pressed for approximately two seconds.
- The CPG gauge head at measurement channel 3 is switched on. Either the measured value or a status message will be displayed ([Table 10](#)).

## Switching the CPG off

The CPG gauge head can be switched off manually. For this, sensor control must be set to *HRnd* (see [Sensor switch-off type \(S-off\)](#)).

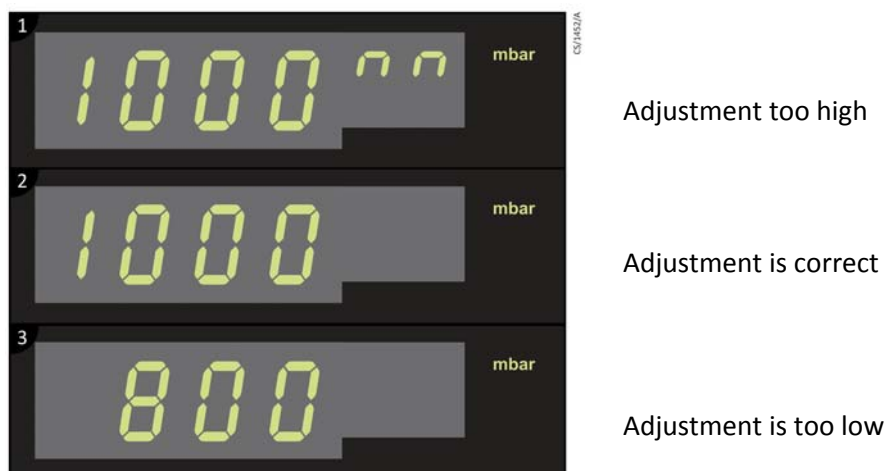
- Press the pushbutton (CH) so as to select measurement channel 3.
- Keep the key marked (DOWN) pressed for approximately two seconds.
- The CPG gauge head at measurement channel 3 is switched off. The display will indicate the status *oFF*.

## PRG adjustment

Ageing and contamination of the sensor filament will impair the accuracy of the pressure readout. For this it is recommended that the PRG gauge head is adjusted as required. For this, the gauge head must be orientated in the same way in which it is subsequently operated. The adjustment process is performed as follows:

- Vent the vacuum system and adjust the 100% potentiometer on the PRG gauge head so that the following readout is obtained:

**Figure 11 Full-scale adjustment for the PRG gauge head**



- In order to ensure a stable but also correct adjustment of the 100% point, the adjustment potentiometer (100%) should be turned further by 90° in the clockwise direction after the indication of 1000 mbar has been displayed. Here the over-range indicator should just come on.
- Evacuate the vacuum system to a pressure  $< 5 \times 10^{-4}$  mbar and adjust the "0" potentiometer on the PRG gauge head so that the following reading is obtained:

Figure 12 Zero adjustment for the PRG gauge head



- Vent the vacuum system and check the 100% setting once more. Correct any deviation with the 100% potentiometer.
- If a correction of the 100% setting was necessary, then repeat the Zero adjustment.

## Parameter mode

### Selection

By pressing the (PARA) pushbutton for approximately 2 seconds the instrument changes from the measurement mode to the parameter mode. The Para indicator comes on for the channel selected in each case. When the instrument is running in the parameter mode and if no pushbutton is operated for 10 seconds, then the instrument will automatically return back to the measurement mode. The Para indicator for the channel which was selected in each case is turned off.

### Parameter groups

In the parameter mode you have access to different parameters. You may view these parameters or change these with the aid of the arrow pushbuttons. In this way you can configure the instrument. Table 11 shows all available parameters.

**Table 11 Parameter groups and corresponding parameters**

Parameter groups	Parameter
<i>PARA</i> <i>SP</i>	<i>SP1Lo</i> <i>SP1Hi</i> <i>SP2Lo</i> <i>SP2Hi</i>
<i>PARA</i> <i>SEn</i>	<i>FIL</i> <i>BAS<sup>Lo</sup></i> <i>BAS<sup>Hi</sup></i> <i>S-on</i> <i>S-off</i> <i>SEnS</i>
<i>PARA</i> <i>GEN</i>	<i>unit</i> <i>AnALoB</i> <i>digit</i> <i>br1</i> <i>Adr Pb</i> <i>bAud</i> <i>rS</i>

The available parameters have been divided into the following parameter sets:

#### Switching function parameters (*PARA SP*)

These parameters affect only the sensor of the selected measurement channel. Two switching functions are available per measuring channel.

See [Switching function parameters \(PARA SP\)](#).

#### Sensor parameters (*PARA SEn*)

These parameters affect only the selected measurement channel. Two switching functions are available per measuring channel.

See [Sensor parameters \(PARA SEn\)](#).

#### General parameters (*PARA GEN*)

With the aid of these parameters you can generally configure the instrument. The parameters apply to all measurement channels.

See [General parameters \(PARA GEN\)](#).

## Operating concept

From the measurement mode, you can select and change a certain parameter as follows:

- Press the pushbutton (CH) to select the desired measurement channel (only necessary when wanting to change a sensor parameter)

- The Para indicator flashes for the selected channel.
- Press the (PARA) pushbutton for about 2 seconds.
  - The parameter menu has now been invoked.
- Use the arrow pushbuttons to select the desired parameter group.
  - The name of the parameter group is displayed.
- Press the (PARA) pushbutton to select the desired parameter.
  - The name and the value of the parameter are displayed.
- Use the arrow pushbuttons to change the value of the parameter.
  - The value of the parameter is changed.
- Repeat the last 2 steps to change further parameters from the same parameter group.

After having accessed the last parameter of a parameter group, the instrument will switch back to the measurement mode. Changes to the parameters become effective immediately and are automatically saved to the EEPROM.

When the instrument is running in the parameter mode and if for a period of 10 seconds no changes are made to the parameters, then the instrument will automatically return to the measurement mode. Any parameter changes made up to this point are automatically saved to the EEPROM.



**Note:**

*When the instrument is running in the parameter mode, and when not entering a change for more than 10 seconds, then the instrument will automatically return back to the measurement mode.*

*Any changes, which have been entered and confirmed up to this point of time, are automatically saved in the EEPROM.*

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# Parameters

## Switching function parameters (PARA SP)

In this parameter group you can configure the switching functions. The PGC201 provides the following switching function parameters:

SP1 <sup>Lo</sup>	Switching function 1	low switching threshold
SP1 <sup>Hi</sup>	Switching function 1	high switching threshold
SP2 <sup>Lo</sup>	Switching function 2	low switching threshold
SP2 <sup>Hi</sup>	Switching function 2	high switching threshold

### Basic terms

#### Switching functions

The PGC201 contains 6 switching function relays, that is, the switching functions 1 and 2 are available for each measurement channel. These switch depending on the measured pressure. The contacts of the relays are floating and may be used for switching purposes through the connection marked Relay Output (see [Relay output \(relay output\)](#)).

#### Threshold values

The switching behaviour of individual relays is defined in each case through two parameters: the lower threshold and the upper threshold value of the switching function.

#### Lower threshold value (SP1<sup>Lo</sup>, SP2<sup>Lo</sup>)

The lower threshold value governs switching on of the assigned switching function. When the pressure drops below the lower threshold value, then the relay is energised. The common contact of the relay is then connected to the normally open contact.

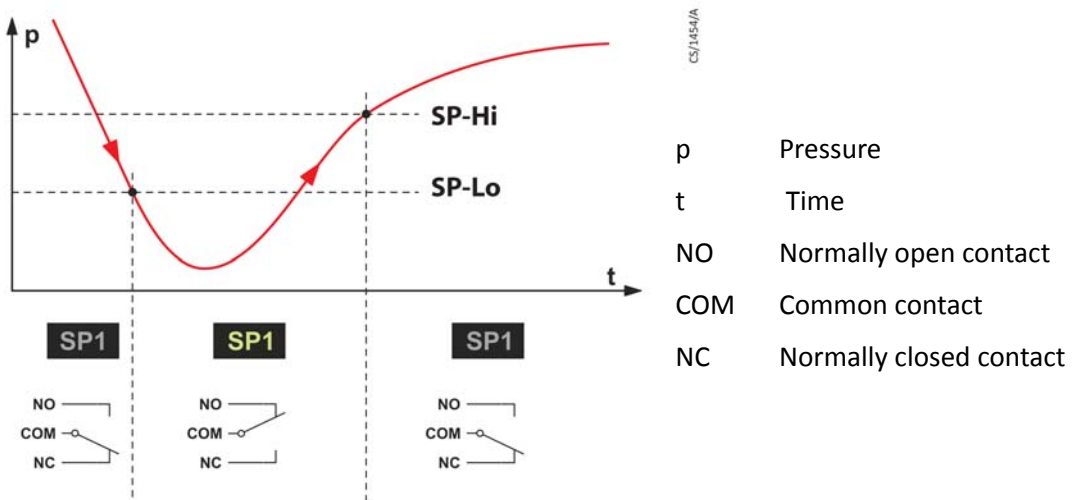
#### Upper threshold value (SP1<sup>Hi</sup>, SP2<sup>Hi</sup>)

The upper threshold value governs switching off of the assigned switching function. When the pressure exceeds the upper switching threshold, then the relay is de-energised. The common contact of the relay is then connected to the normally closed contact.

#### Hysteresis

In the pressure range between the two thresholds, the current relay status is maintained. Within this range the relay will not switch over and the relay status depends on the history (see [Figure 13](#)).

Figure 13 Behaviour of a switching function in response to pressure changes



The range between the lower and the upper threshold value produces a certain amount of hysteresis between switching on and switching off of the relay. The hysteresis prevents rapid switching on and off of the switching function when the pressure is close to a switching threshold.

### Configuring the switching functions

- Select the desired measurement channel by operating the pushbutton (CH) several times.
- Keep the pushbutton (PARA) depressed for approximately 2 seconds.
  - The instrument is now running the parameter mode in the parameter group *SP*.
- Press the pushbutton (PARA) to select the desired parameter.
  - The name and the value of the parameter are displayed.
- Use the arrow pushbuttons to change the threshold value.
  - The value of the parameter is changed.
- Repeat the steps to change further parameters of the parameter group.

### Adjustment range



**CAUTION:**

Select the threshold values for the CPG in the range from  $1 \times 10^{-8}$  to  $1 \times 10^{-2}$  mbar and for the PRG in the range from  $5 \times 10^{-3}$  to  $5 \times 10^2$  mbar.

The upper and the lower threshold value can be changed depending on the type of sensor in the range between  $5 \times 10^2$  and  $1 \times 10^{-8}$  mbar.

Hysteresis amounts to at least 10% of the lower threshold value.

## Sensor parameters (PARA SEN)

A separate set of sensor parameters exists for each measurement channel. Depending on which transmitter is connected to the respective measurement channel, different parameters are available (see Table 12).

Table 12 Available sensor parameters

Gauge heads	FIL	GASti	GASti	S-on	S-off
CPG			✓	✓	✓
PRG	✓	✓			

- Select the desired measurement channel by operating the pushbutton (CH) several times.
- Keep the pushbutton (PARA) depressed for approximately 2 seconds
  - The instrument is now running the parameter mode.
- Use the arrow keys to access the parameter group SEN.
- Press the pushbutton (PARA) to select the desired parameter.
  - The name and the value of the parameter are displayed.
- Use the arrow keys to change the parameter setting.
- Repeat the steps to change further parameters of the parameter group.

## Filament material PRG (FIL)

Filament material of the connected PRG gauge head.

Table 13 Values for the parameter FIL

Display	Description
W	Tungsten PRG20K
Pt	Platinum PRG20KCR

## Type of gas correction PRG (GASti)

The PRG gauge heads are normally calibrated for measurements in nitrogen or air. With the aid of the parameter GASti you can set up the measurement channel to the other type of gas in each case. You may select the characteristic for a gauge head between nitrogen ( $n_2$ ) and argon (Ar).

For this proceed as follows:

- Select the parameter GASti.
- Press the pushbutton (PARA).
  - The setup characteristic is displayed.
- Use the arrow pushbuttons to change the characteristic.
  - The value of the parameter is changed.

## Type of gas correction CPG ( $gAS^{P_{i1}}$ )

The CPG gauge heads are normally calibrated for measurements in nitrogen or air. With the aid of the parameter  $gAS^{P_{i1}}$  you can set up the measurement channel to other types of gas.

- For this proceed as follows:
- Select the parameter  $gAS^{P_{i1}}$ .
  - Press the pushbutton (PARA).
- The setup characteristic is displayed.
  - Use the arrow pushbuttons to change the characteristic.
- The value of the parameter is changed.

You can set up the correction factor for a gauge head in the range of 0.2 - 1.0 - 8.0. A setting of 1.0 returns the uncorrected value.

## Sensor switch-on type ( $S-on$ )

This parameter defines how the CPG gauge head is switched on.

You can set the switch-on time to the following values:

$MANd$	Manual. The gauge head can be switched on by pressing the pushbutton (UP) (see <a href="#">Switching on</a> ).
$ECt$	Externally through optocoupler (PLC compatible high-level > 13 V d.c.; 7 mA at 24 V d.c.).
$Hot$	Warm start. The sensor is switched on automatically upon switching on the instrument. After a power failure the measurement is started automatically.
$CH 1$	Through measurement channel PRG 1. With the aid of the next parameter t-on the operator can define a switch-on value. When the pressure in the measurement channel PRG 1 drops below the switch-on value, the sensor is switched on.
$CH 2$	Through measurement channel PRG 2. With the aid of the next parameter t-on the operator can define a switch-on value. When the pressure in the measurement channel PRG 2 drops below the switch-on value, the sensor is switched on.

## Sensor switch-on value ( $t-on$ )

This parameter will only appear when the sensor switch-on time has been set to  $CH 1$  or  $CH 2$  (see [Sensor switch-on type \(S-on\)](#)).

Through the parameter t-on you can define a switch-on value. When the pressure in the respective measurement channel drops below the switch-on value, the gauge head is switched on.

## Sensor switch-off type ( $S-off$ )

This parameter defines how the CPG gauge head is switched off.

You can set up the switch-off type to the following values:

<i>HRnd</i>	Manual. The gauge head can be switched off by pressing the pushbutton (DOWN) (see <a href="#">Switching off</a> ).
<i>Ect</i>	Externally through an optocoupler (PLC compatible low level < 7 V d.c.; 0 A at 24 V d.c.).
<i>SELF</i>	Self-monitoring. With the aid of the next parameter <i>t-off</i> , a switch-off value can be defined. When the pressure at the gauge head exceeds the switch-off value then the gauge head is switched off.
<i>CH 1</i>	Through measurement channel PRG 1. With the aid of the next parameter <i>t-off</i> , a switch-off value can be defined. When the pressure in the measurement channel PRG 1 exceeds the switch-off value then the sensor is switched off.
<i>CH 2</i>	Through measurement channel PRG 2. With the aid of the next parameter <i>t-off</i> , a switch-off value can be defined. When the pressure in the measurement channel PRG 2 exceeds the switch-off value then the sensor is switched off.

### Sensor switch-off value (*t-off*)

This parameter will only appear when the sensor switch-off type has been set to *CH 1* or *CH 2* (see [Sensor switch-off type \(S-off\)](#)).

Through the parameter *t-off* you can define a switch-off value. When the pressure in the respective measurement channel exceeds the switch-off value, the gauge head is switched off.

### General parameters (*PARA GEN*)

With the aid of these parameters you can generally configure the instrument. The parameters apply to all measurement channels.

- Keep the pushbutton (PARA) depressed for approximately 2 seconds.
  - The instrument is now in the parameter mode.
- Use the arrow pushbuttons so as to access the parameter group *GEN*.
- Press the pushbutton (PARA) to select the desired parameter.
  - The name and the value of the parameter are displayed.
- Use the arrow pushbuttons to change the parameter setting.
- Repeat the steps to change further parameters of the parameter group.

### Unit of measurement (*Unit*)

Unit of measurement for pressure values. This unit of measurement affects the displayed pressure values, threshold values etc.

Table 14 Values for the parameter *Unit*

Display	Description
<i>mBar</i>	Unit of measurement mbar
<i>Torr</i>	Unit of measurement Torr
<i>PA</i>	Unit of measurement Pascal

The unit of measurement is indicated on the display (Figure 9, Position E).

### Analog output (*ANALOG*)

Analog output for the gauge heads.

Table 15 Values for the parameter *ANALOG*

Display	Description
1	alternate mode (see Analog output)
2	PGC 201 mode (see Analog output)

### Display format (*digit*)

Number of digits on the display.

Table 16 Values for the parameter *digit*

Display	Description
2	digits, for example $2.5^{-1}$
3	digits, for example $2.47^{-1}$

### Display brightness (*br i*)

Display brightness.

Table 17 Values for the parameter *br i*

Display	Description
<i>Hi</i>	High brightness
<i>Lo</i>	Low brightness

### Baud rate (*BAUD*)

Baud rate of the interface

Table 18 Values for the parameter *BAUD*

Display	Description
9.6	Baud rate 9600 baud
19.2	Baud rate 19200 baud
38.4	Baud rate 38400 baud

**Note:**

*Changing the baud rate will only become effective after having restarted the instrument.*

**Interface (r5)**

Selection of the interface.

**Table 19** Values for the parameter r5

Display	Description
232	RS232 Interface
485	RS485 Interface

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# Computer interface

## Basics

### Connection

The PGC201 can communicate with the computer through a serial interface. RS232 and RS485 interfaces are available. The selection is made through the parameter group  $PARA\ GEN$  in the parameter mode (see [General parameters \(PARA GEN\)](#))).

The respective connecting socket and the necessary connecting cable are described in [RS232 / RS485 Interface \(Interface RS232 / RS485\)](#).

### Nomenclature

The following terms and symbolical spellings are used in order to describe the computer interface:

**Table 20 Terms computer interface**

Terms	Description
Send	Data transfer from the host to the instrument
receive	Data transfer from the instrument to the host
Host	Terminal (Computer)
ASCII	American Standard Code for Information Interchange

#### Square brackets [...]

Square brackets mark parameters.

#### Sharp brackets <...>

Abbreviations in sharp brackets mark control characters. The complete term including the sharp brackets is replaced by a numerical value.

**Table 21 Control characters computer interface**

Terms	Value	Description
<,>	0x2C	Separator
<CR>	0x0D	Terminator

## Communication

### Protocol

The following log is used for communication:

- 8 data bits
- no parity bit
- 1 stop bit

The baud rate is selectable.

- 9600
- 19200
- 38400

No hardware handshake is used. The messages are transferred by way of ASCII strings. A comma (0x2C) in the string is taken as a separating character. Space characters (0x20) or tabs (0x09) may be contained in the string. As to the communication, the computer is always the master. The input buffer of the computer must have a capacity of at least 50 bytes.

### General string structure

The Address is necessary for RS485 only

The response includes the Address for RS485 only

Write command

Example: **Address Command <,> [Parameter] <CR>**

Response: **OK**

Reading command

Example: **Address Command <CR>**

Response: **Address <,> <TAB> [Parameter] <CR>**

Error code

Response: <b>? &lt;TAB&gt; X</b>	Incorrect command
Response: <b>? &lt;TAB&gt; P &lt;,&gt; &lt;TAB&gt; z</b>	Incorrect parameter, Parameter number of the transmitted command
Response: <b>? &lt;TAB&gt; C &lt;,&gt; &lt;TAB&gt; x</b>	Channel x on device not available
Response: <b>? &lt;TAB&gt; S &lt;,&gt; &lt;TAB&gt; x</b>	No sensor on Channel x connected
Response: <b>? &lt;TAB&gt; K</b>	No divider in the command available

## Command set (mnemonics)

### Command overview

Table 22 Mnemonics for read commands

Read commands	Description
RPV	Read Pressure Value.
	Read the pressure value for a measurement channel.
RVN	Read Version Number
	Read the instrument software version number.
RSS	Read Setpoint Status
	Read the status of the switching thresholds for a channel.

Table 23 Mnemonics for write commands

Write commands	Description
SHV	Set HV on/off
	Switch the high voltage on or off for a channel.
SKL	Set Key Lock on/off
	Switch the keylock on or off.
SAC	Save Actual Configuration
	Save the current configuration for switching threshold, sensor and general parameters.

Table 24 Mnemonics for read and write commands

Read and write commands	Description
RSA	Read Serial Address
	Read address for RS485.
SSA	Set Serial Address
	Set address for RS485.
RGP	Read General Parameter
	Read instrument settings.
SGP	Set General Parameter
	Set instrument settings.
RGC	Read Gas Correction
	Read type of gas correction factor for a measurement channel.
SGC	Set Gas Correction
	Set type of gas correction factor for a measurement channel.
RSC	Read Sensor Control
	Read type of sensor control for a measurement channel.

**Table 24 Mnemonics for read and write commands (continued)**

Read and write commands	Description
SSC	Set Sensor Control
	Set type of sensor control for a measurement channel.
RSP	Read Setpoint
	Read switching thresholds for a channel.
SSP	Set Setpoint
	Set switching thresholds for a channel.



**Note:**

*All changes to values are only permanently saved to the EEPROM after having issued the write command SAC. For this reason after having set all values, save the current configuration through the SAC write command before restarting the instrument.*

**RPV (read pressure value)**

Reading a pressure value for a measurement channel.

Example: **RPV[a]<CR>**

Response: **b,[,][TAB]x.xxxxE±xx**

Parameter	Description
a	Channel number
	1 = Channel 1 (PRG 1)
	2 = Channel 2 (PRG 2)
	3 = Channel 3 (CPG)
b	Status
	0 = Measured value OK
	1 = Measured value < measurement range
	2 = Measured value > measurement range
	3 = Measured values << measurement range (Err Lo)
	4 = Measured values >> measurement range (Err Hi)
	5 = Sensor off (S oFF)
	6 = HV on (HU on)
	7 = Sensor error (Err S)
	9 = No sensor(no Sen)
	10 = No switch-on or switch-off threshold (notriG)
12 = Pirani error (Err Pi)	
x.xxxxE±xx	Pressure value of the selected channel in the current unit of measurement

**RVN (read version number)**

Reading the version number of the instrument software.

Example: **RVN<CR>**

Response: **x.xx<CR>**

Parameter	Description
x.xx	Version number

**RSS (read set point status)**

Reading the status of the switching thresholds for a channel.

Example: **RSS[a]<CR>**

Response: **b[,][TAB]c<CR>**

Parameter	Description
a	Channel number
	1 = Channel 1 (PRG 1)
	2 = Channel 2 (PRG 2)
	3 = Channel 3 (CPG)
b	Status SP1
	0 = low
	1 = high
c	Status SP2
	0 = low
	1 = high

**SHV (set HV on/off)**

Setting HV on/off for CPG, if switch-on and switch-off type have been set to manual.

Example: **SHV[a, b]<CR>**

Response: **OK<CR>**

Parameter	Description
a	Channel number
	3 = Channel 3 (CPG)
b	HV on/off
	0 = off
	1 = on

**SKL (set key lock on/off)**

Switching the keylock on or off.

Example: **SKL[a]<CR>**

Response: **OK<CR>**

Parameter	Description
a	Key lock
	0 = off
	1 = on

**SAC (save actual configuration)**

Saving current configuration for switching threshold, sensor and general parameters.

Example: **SAC<CR>**

Response: **OK<CR>**

**RSA (read serial address)**

Read address for RS485.

Example: **RSA<CR>**

Response: **a<CR>**

Parameter	Description
a	Address 1 - 126 (01 - 7E) (output in the HEX format)

**SSA (set serial address)**

Setting address for RS485.

Example: **SSA[a]<CR>**

Response: **OK<CR>**

Parameter	Description
a	Address 1 - 126 (01 - 7E) (entry must be in the HEX format)

**RGP (read general parameter)**

Reading instrument settings.

Example: **RGP<CR>**

Response: **a[,][TAB]b[,][TAB]c[,][TAB]d[,][TAB]e[,][TAB]f[,][TAB]g <CR>**

Parameter	Description
a	Unit 0 = mbar 1 = Pa 2 = Torr
b	Analog output 0 = Legacy controller mode 1 = PGC 201 default
c	Number of displayed digits 0 = 2 1 = 3
d	Brightness 0 = hoch 1 = gering
e	Profibus 1 - 126
f	Baud rate 0 = 9600 1 = 19200 2 = 38400
g	Serial interface 0 = RS232 1 = RS485

## SGP (set general parameter)

Setting instrument settings.

Example: **SGP[a, b, c, d, e, f, g]<CR>**

Response: **OK <CR>**

Parameter	Description
a	Unit
	0 = mbar
	1 = Pa
	2 = Torr
	X = Parameter remains unchanged
b	Analog output
	0 = Legacy controller mode
	1 = PGC 201 default
	X = Parameter remains unchanged
c	Number of displayed digits
	0 = 2
	1 = 3
	X = Parameter remains unchanged
d	Brightness
	0 = hoch
	1 = gering
	X = Parameter remains unchanged
f	Baud rate
	0 = 9600
	1 = 19200
	2 = 38400
	X = Parameter remains unchanged
g	Serial interface
	0 = RS232
	1 = RS485
	X = Parameter remains unchanged



### CAUTION:

Changes to the baud rate address only become effective after having restarted the instrument. Before restarting, save the current configuration using the SAC write command.

### RGC (read gas correction)

Reading the type of gas correction factor for a measurement channel.

Example: **RGC[a]<CR>**

Response: **b<CR>**

Parameter	Description
a	Channel number
	3 = Channel 3 (CPG)
b	Gas type correction factor channel
	Format X.XX with a range from 0.20 to 8.00

### SGC (set gas correction)

Setting the type of gas correction factor for a measurement channel.

Example: **SGC[a, b]<CR>**

Response: **OK<CR>**

Parameter	Description
a	Channel number
	3 = Channel 3 (CPG)
b	Gas type correction factor channel
	Format X.XX with a range from 0.20 to 8.00

### RSC (read sensor control)

Reading the type of sensor control for CPG.

Example: **RSC[a]<CR>**

Response: **b[,][TAB]c[,][TAB]x.xxxxE±xx[,][TAB]x.xxxxE±xx<CR>**

Parameter	Description
a	Channel number
	3 = Channel 3 (CPG)
b	Sensor switch-on type channel
	0 = Manual
	1 = External
	2 = n.a.
	3 = Through channel 1
	4 = Through channel 2

Parameter	Description
c	Sensor switch-off type channel
	0 = Manual
	1 = External
	2 = Self-monitoring
	3 = Through channel 1
	4 = Through channel 2
x.xxxxE±xx	Switch-on value in the current unit of measurement
x.xxxxE±xx	Switch-off value in the current unit of measurement

### SSC (set sensor control)

Setting the type of sensor control for CPG.

Example: **SSC[a, b, c, x.xxxxE±xx, x.xxxxE±xx]<CR>**

Response: **OK<CR>**

Parameter	Description
a	Channel number
	3 = Channel 3 (CPG)
b	Sensor switch-on type channel
	0 = Manual
	1 = External
	2 = n.a.
	3 = Through channel 1 (PRG 1)
	4 = Through channel 2 (PRG 2)
c	Sensor switch-off type channel
	0 = Manual
	1 = External
	2 = Self-monitoring
	3 = Through channel 1 (PRG 1)
	4 = Through channel 2 (PRG 2)
x.xxxxE±xx	Switch-on value in the current unit of measurement
x.xxxxE±xx	Switch-off value in the current unit of measurement

## RSP (read set point)

Reading the switching thresholds for a channel.

Example: **RSP[a]<CR>**

Response: **b[,][TAB]c[,][TAB]d[,][TAB]e<CR>**

Parameter	Description
a	Channel number
	1 = Channel 1 (PRG 1)
	2 = Channel 2 (PRG 2)
	3 = Channel 3 (CPG)
b	$SP_1^{L0}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)
c	$SP_1^{H1}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)
d	$SP_2^{L0}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)
e	$SP_2^{H1}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)

## SSP (set set point)

Setting the switching thresholds for a channel.

Example: **SSP[a, b, c, d, e]<CR>**

Response: **OK<CR>**

Parameter	Description
a	Channel number
	1 = Channel 1 (PRG 1)
	2 = Channel 2 (PRG 2)
	3 = Channel 3 (CPG)
b	$SP_1^{L0}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)
c	$SP_1^{H1}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)
d	$SP_2^{L0}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)
e	$SP_2^{H1}$ (pressure value of the switching threshold in the current unit of measurement in the form of x.xxxxE±xx)

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# Maintenance and service

## Maintenance

### General maintenance information



#### **WARNING:**

**Do not insert objects or allow liquids to enter the instrument. Coming into contact with components at mains voltage level can be dangerous to life.**

For external cleaning please use a piece of dry cotton cloth. Do not use any aggressive or abrasive detergents.

## Troubleshooting

### Fault finding

A malfunction of the PGC201 is indicated by an error message on the display (Error messages).

### Error messages

Table 25 Error messages

Error (display)	Fault cause and remedy
<i>Err Lo</i>	Measurement signal from the gauge head significantly below the permissible range.
<i>Err Hi</i>	Measurement signal from the gauge head significantly above the permissible range.
<i>Err S</i>	Sensor error. Malfunction affecting the connection to the gauge head. The message will only be displayed in the display field for the affected measurement channel. Acknowledge by pressing any key.
<i>no Sen</i>	No gauge head connected to the measurement channel. The status message disappears after 30 seconds.
<i>notr iB</i>	Error affecting the switch-on or switch-off channel. No switch-on or switch-off threshold has been defined for the CPG gauge head (malfunction of the PRG gauge head, for example).
<i>Fil br</i>	Filament broken. Filament of the PRG vacuum gauge head is defective. The error message persists until the sensor is replaced.

### Help the case of faults

If the malfunction persists even after having replaced the gauge heads, please contact your nearest Edwards service office.

## **Fuse replacement**

Fuses should only be replaced with fuses of the correct type, as specified on the rear of the instrument. The two fuses are located in the fuse insert at the mains connector (Figure 5) and may be levered out using a small screwdriver.

## **Repair**

Send defective products for repair to your nearest Edwards service office. Edwards will not assume any responsibility or honour a warranty if the operator or third persons have attempted repair work on the PGC201.

# Storing and waste disposal

## Storing

Return the PGC201 to its protective packaging and store in clean dry conditions until required for use. Do not exceed the storage temperature conditions specified in Environment.

## Waste disposal

Dispose of the PGC201 and any components safely and in accordance with all local and national safety and environmental requirements.

Alternatively, the PGC201 and /or cables may be able to be recycled; contact Edwards or supplier for advice (also see below).

The PGC201 and associated cables are within the scope of the European Directive on Waste and Electronic Equipment, 2012/19/EU. Edwards offers customers a recycling service for the product / cables / associated gauge heads at the end of the product's life. Contact Edwards for advice on how to return the PGC201 and/or cables for recycling.

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## Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must send us a completed Declaration of Contamination of Vacuum Equipment and Components - Form HS2. The HS2 form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

We provide instructions for completing the form in the Declaration of Contamination of Vacuum equipment and Components - Procedure HS1.

If you are returning a vacuum pump, note the following:

- If a pump is configured to suit the application, make a record of the configuration before returning the pump. All replacement pumps will be supplied with default factory settings.
- Do not return a pump with accessories fitted. Remove all accessories and retain them for future use.
- The instruction in the returns procedure to drain all fluids does not apply to the lubricant in pump oil reservoirs.

Download the latest documents from [www.edwardsvacuum.com/HSForms/](http://www.edwardsvacuum.com/HSForms/), follow the procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to Edwards.

**Note:** *If we do not receive a completed HS2 form, we will not accept the return of the equipment.*

