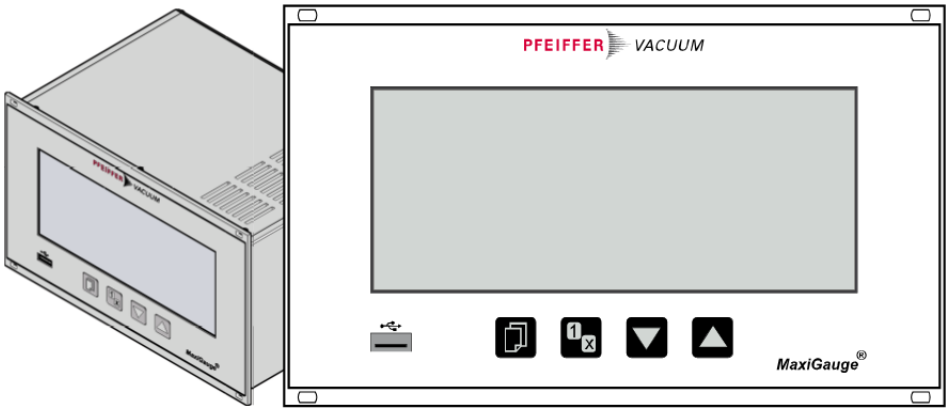


OPERATING INSTRUCTIONS

EN

Translation of the Original

TPG 366

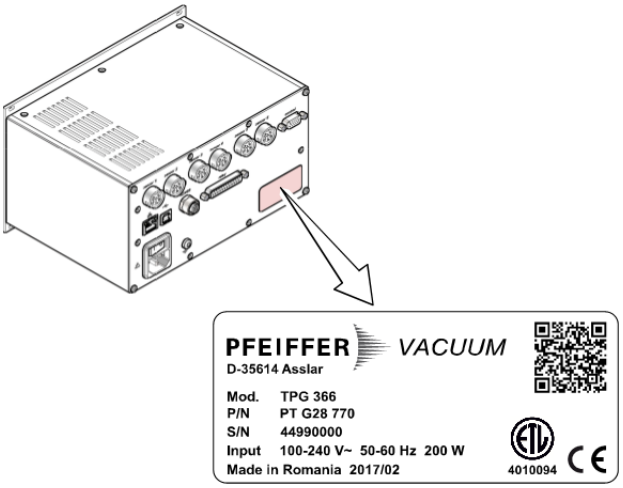
MaxiGauge®, Total pressure measurement and control unit for ActiveLine gauges

BG 5501 BEN / A (2017-09)

PFEIFFER VACUUM

Product Identification

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



Nameplate example

Validity

This document applies to products with part number:

PT G28 770 (TPG 366, MaxiGauge)

The part number (P/N) can be found on the product nameplate.

This manual is based on firmware version V010100.

If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 🗎 45).

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

All dimensions are indicated in mm.

Intended Use

Unit TPG 366 is used together with Pfeiffer Vacuum ActiveLine gauges for total pressure measurement. All products must be operated in accordance with their respective Operating Instructions.

Scope of Delivery

The scope of delivery consists of the following parts:

1 Gauge
1 Power cord
4 Collar screws and plastic sleeves
2 Rubber feet
1 Rubber bar
1 Installation instructions
3 Operating instructions (1×de, 1×en, 1×fr)

Trademarks

MaxiGauge® Pfeiffer Vacuum GmbH
FullRange® Pfeiffer Vacuum GmbH

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]).

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

 Note

 Label on rear: prompt to consult the operating instructions

 The lamp / display is lit.

 The lamp / display flashes.

 The lamp / display is dark

 Press the key (example: PARA 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 operator of the product.

1.3 General Safety Instructions

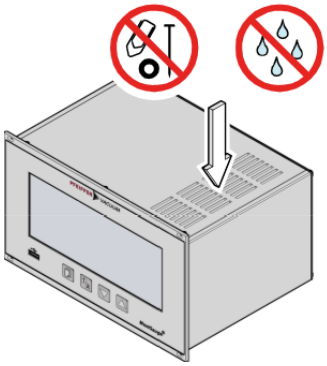
Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.

DANGER

DANGER: Mains voltage

Contact with live parts can be extremely hazardous if any objects are introduced or any liquids penetrate into the unit.

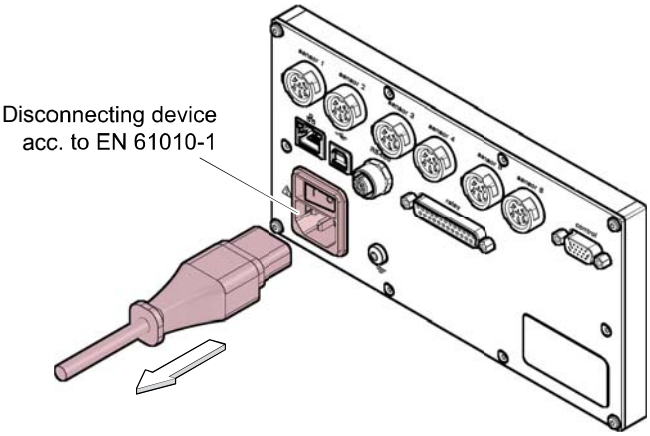
Make sure no objects enter through the louvers and no liquids penetrate into the equipment.



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.



Communicate the safety instructions to all other users.

1.4 Liability and Warranty

Pfeiffer Vacuum assumes no liability and the warranty is rendered null and void if the operator 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.

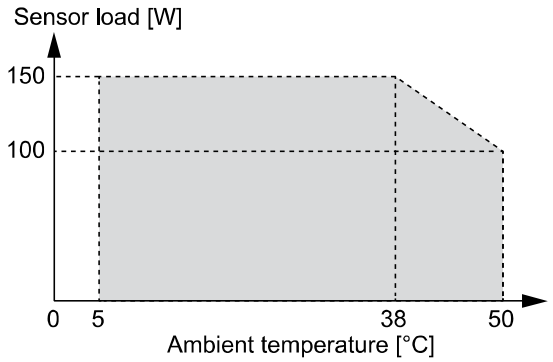
2 Technical Data

Mains specifications

Voltage	100 to 240 V (ac) ±10%
Frequency	50 to 60 Hz
Power consumption	≤200 W
Overvoltage category	II
Protection class	1
Connection	European appliance connector IEC 320 C14

Environment

Ambient temperature	
Storage	-20 to +60 °C
Operation	
Sensor load 150 W	+5 to +38 °C
Sensor load 100 W	+5 to +50 °C



Relative humidity	≤80% to +31 °C, decreasing to 50% at +40 °C
Use	Indoors only Max. altitude 2000 m NN
Pollution degree	II
Protection rating	IP30

Gauge connections

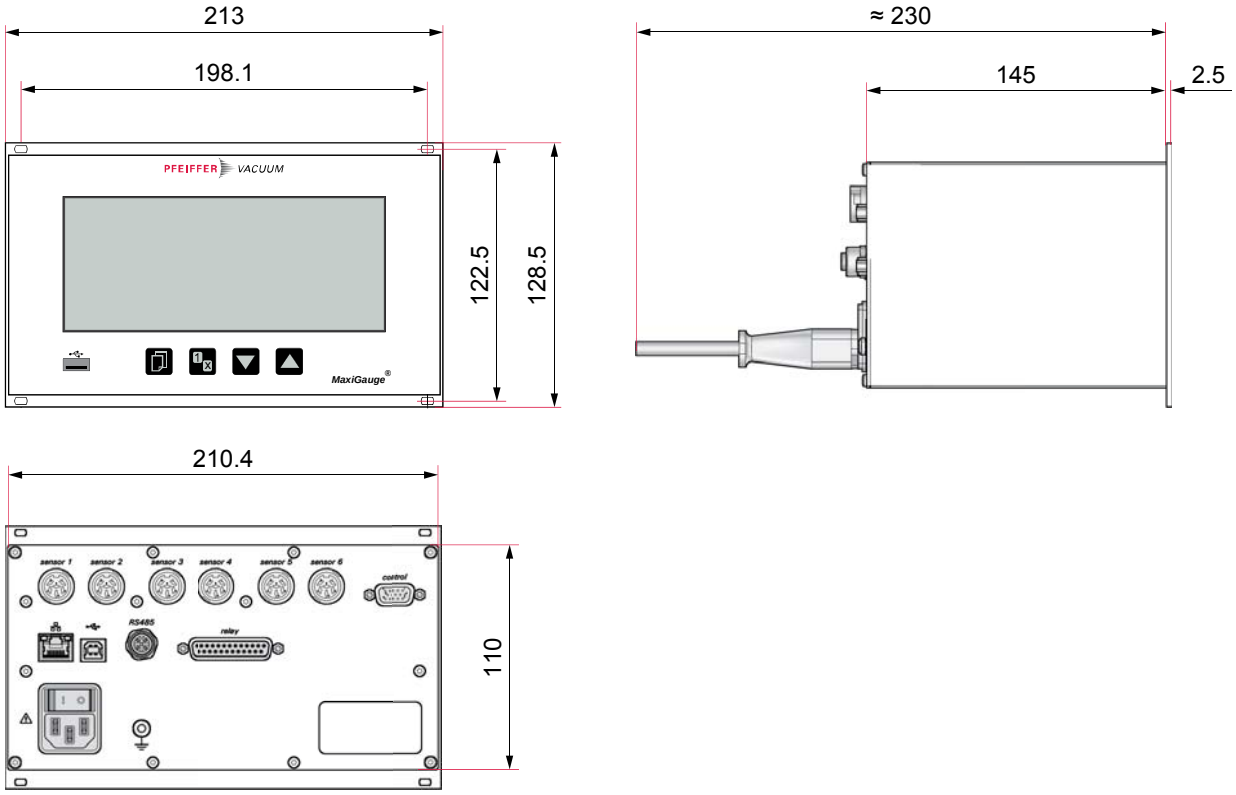
Number	6
Connection *sensor 1 to 6*	Connector socket Amphenol C91B, 6-pin (pin assignment → 14)
Compatible gauges	
Pirani	TPR 250, TPR 260, TPR 261, TPR 265, TPR 280, TPR 281
Pirani Capacitance	PCR 260, PCR 280
Cold Cathode	IKR 250, IKR 251, IKR 260, IKR 261, IKR 270, IKR 360, IKR 361
FullRange® CC	PKR 250, PKR 251, PKR 260, PKR 261, PKR 360, PKR 361
Process Ion	IMR 260, IMR 265
FullRange® BA	PBR 260
Capacitance	CMR 261 … CMR 275, CMR 361 … CMR 375
Piezo	APR 250 … APR 267

Gauge supply	Voltage	+24 V (dc) ±5%
	Ripple	<±1%
	Current	0 … 1 A (per channel)
	Power	25 W (per channel)
	Fuse	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 extralow voltage requirements.
Operation	Front panel	via 4 keys
	Remote control	via RS485 interface via USB type B interface via Ethernet interface
Measurement values	Measurement ranges	Depending on gauges (→ 🕮 [**1**] to [18])
	Measurement error Gain error	≤0.01% F.S. (typical) ≤0.10% F.S. (over temperature range, time)
	Offset error	≤0.01% F.S. (typical) ≤0.10% F.S. (over temperature range, time)
	Measurement rate analog	≥100 / s
	Display rate	≥10 / s
	Filter time constant Slow Normal Fast	 750 ms (f_g = 0.2 Hz) 150 ms (f_g = 1 Hz) 20 ms (f_g = 8 Hz)
	Measurement units	mBar, hPa, Torr, Pa, Micron, V
	Offset correction	for linear gauges –5 to 110% F.S.
	Calibration factor	0.10 to 10.00
	A/D converter	Resolution 0.001% F.S.
Switching functions	Number	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 gauges (→ 🕮 [**1**] to [18])
	Hysteresis	≥1% F.S. for linear gauges, ≥10% of measurement value for logarithmic gauges
Switching function relay	Contact type	Floating changeover contact
	Max. load	60 V (dc), 0.5 A, 30 W (ohmic) 30 V (ac), 1 A (ohmic)
	Service life Mechanical Electrical	 1×10^8 switching cycles 1×10^5 switching cycles (at max. load)
	Contact positions	→ 🗎 15
	Relay port	Connector socket D-Sub, 25-pin (pin assignment → 🗎 15)

Error signal	Number	1
	Reaction time	≤10 ms
Error signal relay	Contact type	Floating normally open contact
	Max. load	60 V (dc), 0.5 A, 30 W (ohmic) 30 V (ac), 1 A (ohmic)
	Service life Mechanical Electrical	 1×10^8 switching cycles 1×10^5 switching cycles (at max. load)
	Contact positions	→ 🗎 15
	Relay *port*	Connector socket D-Sub, 25-pin (pin assignment → 🗎 15)
Gauge control	Automatic ON threshold OFF threshold	 Adjustable (→ 🗎 35) Adjustable (→ 🗎 37)
	Switch on/off via keys	→ 🗎 21
	Via *control connector* ON condition OFF condition	 Signal ≤+0.8 V (dc) Signal +2.0 to 5 V (dc) or Open input
	When mains power on	→ 🗎 35
	For pressure rise OFF threshold	 Adjustable (→ 🗎 37)
	Control port	Connector socket D-Sub HD, 15-pin (pin assignment → 🗎 14)
Analog outputs	Number	6 (1 per channel)
	Voltage range	0 to +10 V (dc)
	Deviation from display value	±10 mV
	Output resistance	<50 Ω
	Measuring signal vs. pressure	Depending on gauges (→ 🕮 [1] to [18])
	Control port	Connector socket D-Sub HD, 15-pin (pin assignment → 🗎 14))
RS485-interface	Protocol	• ACK/NAK, ASCII with 3-character mnemonics, or • PV protocol
	Data format	Bi-directional data flow, 1 start bit, 8 databits, 1 stop bit, no parity bit, no handshake
	Baud rate	9600
	RS485 port	Binder M12-appliance connector, 5-pin (pin assignment → 🗎 16)
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, or • PV protocol
	Data format	Bi-directional data flow, 1 start bit, 8 databits, 1 stop bit, no parity bit, no handshake
	Baudrate	9600, 19200, 38400, 57600, 115200
Ethernet-interface	Protocol	• ACK/NAK, ASCII with 3-character mnemonics, or • PV protocol
	Data format	Bi-directional data flow, 1 start bit, 8 databits, 1 stop bit, no parity bit, no handshake
	Baudrate	9600, 19200, 38400, 57600, 115200
	IP address	DHCP or manual setting (→ 🖹 61)
	Port	8000 (fix)
	MAC address	Readable via "MAC" parameter

Dimensions [mm]



Use	For incorporation into a rack or control panel or as a desktop unit
Weight	<2.2 kg

3 Installation

3.1 Personnel

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 operator of the product.

3.2 Installation, Setup

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.

3.2.1 Rack Installation

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

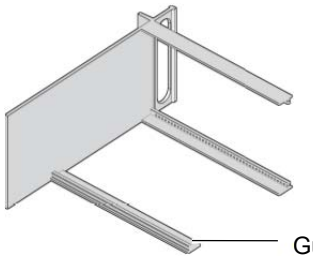
DANGER: Protection rating of installed unit

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

Take appropriate measures to restore the necessary protection rating.

Guide rail

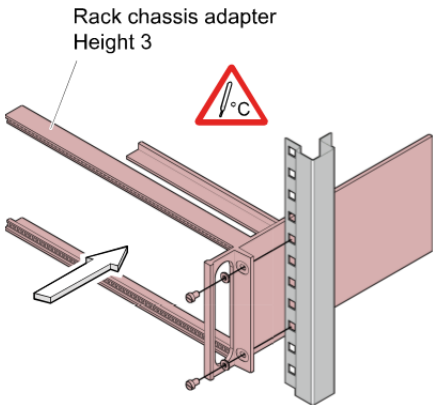
To reduce the mechanical strain on the front panel of the TPG 366, preferably equip the rack chassis adapter with a guide rail.



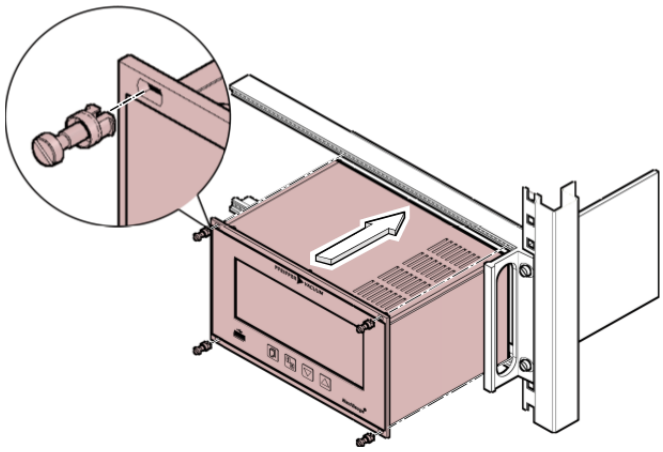
Rack chassis adapter height 3

❶ Secure the rack chassis adapter in the rack frame.

The maximum admissible ambient temperature (→ 🗎 6) must not be exceeded and the air circulation must not be obstructed.



❷ Slide the TPG 366 into the rack chassis adapter …



… and secure in place using the screws supplied with the TPG 366.

3.2.2 Installation in a Control Panel

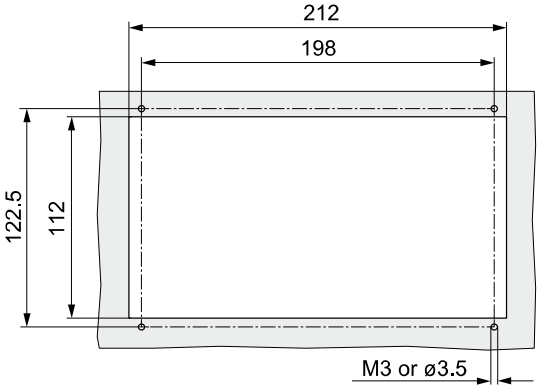
DANGER

DANGER: Protection rating of installed unit

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

Take appropriate measures to restore the necessary protection rating.

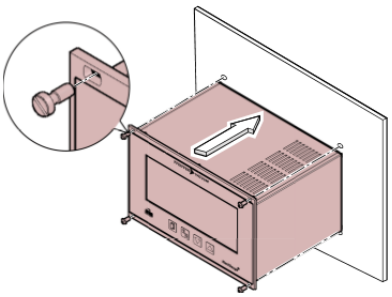
The following operator panel cutout is required for mounting in an operator panel:



The maximum admissible ambient temperature (→ 🗎 6) must not be exceeded and the air circulation must not be obstructed.

To reduce mechanical strain on the front panel of the TPG 366, preferably support the unit.

1. Slide the TPG 366 into the cut-out of the control panel …

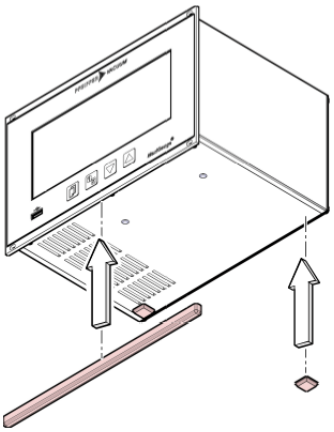


… and secure it with four M3 or equivalent screws.

3.2.3 Use as a Desktop Unit

The TPG 366 may also be used as a desktop unit. For this purpose, it is supplied with two self-adhesive rubber feet and a slip-on rubber bar.

1. Stick the rubber feet supplied with the product to the rear part of the bottom plate …



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

Select a location where the admissible maximum ambient temperature is not exceeded (e.g. due to sun irradiation) (→ 🗎 6).

3.3 Mains Power Connector

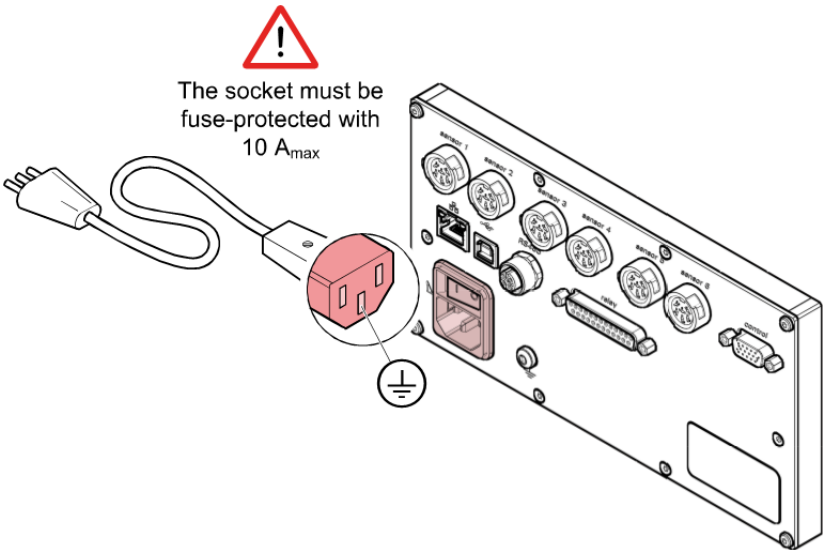
DANGER

DANGER: Mains 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.

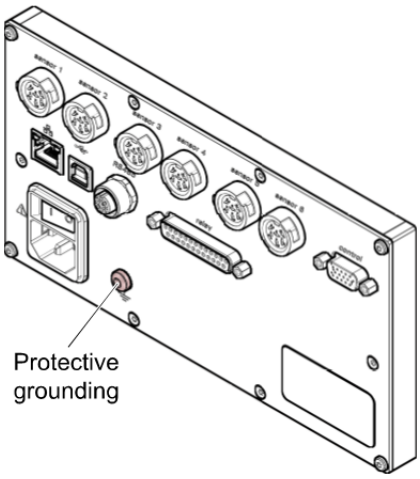
The unit is supplied with a power cord. If the mains connector is not compatible with your system, use your own, suitable cable with protective ground (3×1.5 mm^2).



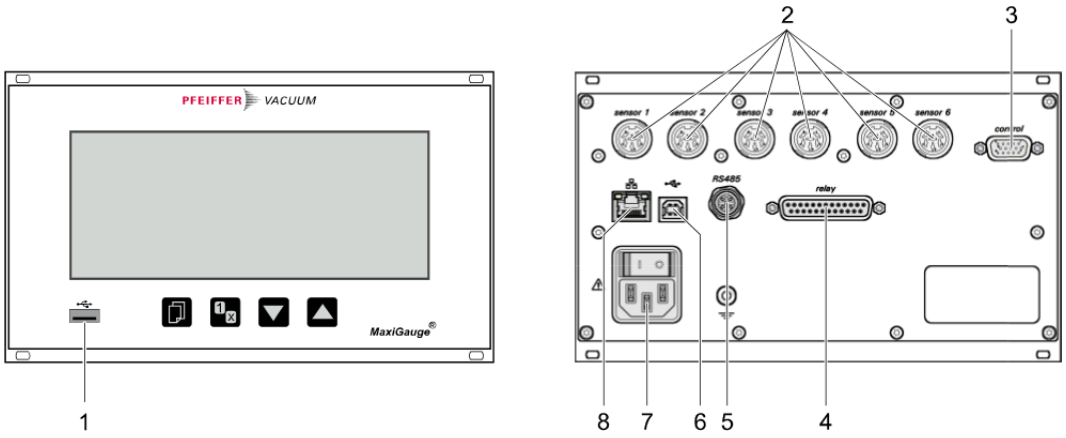
If the unit is installed in a switching cabinet, the mains voltage should be supplied and turned on via a switched power distributor.

Ground connection

On the rear of the unit there is a screw that can be used to connect the TPG 366 to the pumping unit grounding conductor, if necessary.



3.4 Gauge and Interface Ports



1	⇳	USB Type A interface	→ 🗎 17
2	*Sensor 1 to 6*	Gauge ports	→ 🗎 14
3	*Control*	Control connector functions	→ 🗎 14
4	*Relay*	Relay port	→ 🗎 15
5	*RS485*	RS485 serial interface port	→ 🗎 16
6	⇳	USB Type B interface	→ 🗎 16
7	⚠	3-pin mains power connector	→ 🗎 12
8	品	Ethernet interface	→ 🗎 17

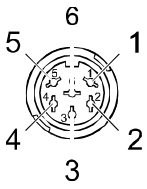
3.4.1 Gauge Ports *sensor 1 to sensor 6*

For each measurement channel, there is a female gauge connector on the rear of the unit.

Connect the gauge using a preassembled measuring cable (→sales literature) or your own, screened (electromagnetic compatibility) cable to one of the six ports *sensor 1 to sensor 6* on the rear of the unit. Use compatible gauges only (→ 🗎 6).

Pin assignment *sensor 1 to sensor 6*

Pin assignment of the female 6-pin C91B appliance connectors:



Female connector view

Pin	Signal	
1	Identification	
6	Supply	Gauge power supply +24 V(dc)
2	Ground supply	GND
3	Signal input	Measuring signal 0 to +10 V(dc)
4	Ground signal	Measuring signal–
5	Screening	

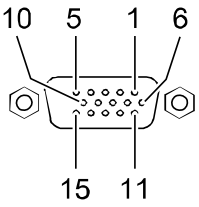
3.4.2 *control* Port

This connector allows the user to read the measuring signal, perform a floating evaluation of the state of error monitoring, and activate or deactivate the gauges (→ 🗎 33).

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

Pin assignment *control*

The 15-pin high-density D-Sub socket is assigned as follows:



Female connector view

Pin	Signal
1	Analog output sensor 1 (0 to 10 V (dc)
2	Analog output sensor 2 (0 to 10 V (dc)
3	Analog output sensor 3 (0 to 10 V (dc)
4	Analog output sensor 4 (0 to 10 V (dc)
5	Analog output sensor 5 (0 to 10 V (dc)
6	Analog output sensor 6 (0 to 10 V (dc)
7	GND
8	GND
9	GND
10	External control sensor 1
11	External control sensor 2
12	External control sensor 3
13	External control sensor 4
14	External control sensor 5
15	External control sensor 6

3.4.3 *relay* Port

The switch functions and error monitoring influence the position of various relays. The *relay* port allows you to use the relay contacts for switching. The relay contacts are floating contacts.

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

DANGER

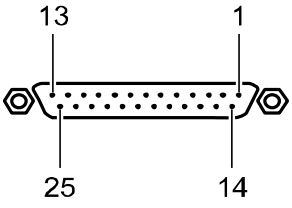
DANGER: Dangerous contact voltage

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

Only apply a grounded protective extra-low voltage (PELV).

Pin assignment, contact positions *relay*

Pin assignment of the 25-pin sub-D socket:



Female connector view

Pin	Signal		
	Switching function 1		
4 5 6		Pressure above threshold or unit switched off	 Pressure below threshold
	Switching function 2		
8 9 10		Pressure above threshold or unit switched off	 Pressure below threshold
	Switching function 3		
11 12 13		Pressure above threshold or unit switched off	 Pressure below threshold
	Switching function 4		
16 17 18		Pressure above threshold or unit switched off	 Pressure below threshold
	Switching function 5		
19 20 21		Pressure above threshold or unit switched off	 Pressure below threshold
	Switching function 6		
22 23 24		Pressure above threshold or unit switched off	 Pressure below threshold
	Error signal		
3 15 14		Error or unit switched off	 No error
	Supply for relays with a higher switching capacity		
25	+24 V (dc), 200 mA	Fuse-protected at 300 mA with PTC element, self-resetting after switching off the TPG 366 or pulling the *relay* connector. Meets the grounded protective extra low voltage requirements.	
1, 7	GND		
2	n.c.		

3.4.4 Interface Port *RS485*

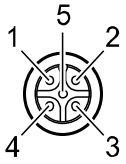
The RS485 interface enables operation of the TPG 366 via a computer or a terminal (→ 🕮 [19]). Integration into a bus system is possible with the use of a Y distributor.

Connect the serial interface to the *RS485* port on the rear of the unit using a screened (electromagnetic compatibility) cable.

Pin assignment *RS485*

Pin assignment of the female binder 5-pin M12 appliance connector socket:

Pin	Signal
1	RS485+ (differential)
2	+24 V(dc), ≤200 mA
3	GND
4	RS485- (differential)
5	Not assigned



Female connector view

3.4.5 Interface Port USB Type B

Connect the TPG 366 to a computer (for firmware update, parameter saving (read/write) for example).

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

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

USB type B pin assignment

Pin assignment of the female 4-pin USB type B connector socket:

Pin	Signal
1	VBUS (5 V)
2	D-
3	D+
4	GND

Female connector view

3.4.6 Interface Port USB Type A

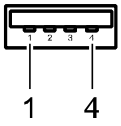
The USB Type A interface port with master functionality is situated on the front of the unit and is used for the connection of a USB memory stick (for instance, for firmware updates, parameter storage (read/write), data logger).

Connect the USB memory stick to the port on the front of the unit.

USB type A pin assignment

Pin assignment of the 4-pin USB type A connector socket:

Pin	Signal
1	VBUS (5 V)
2	D-
3	D+
4	GND



Female connector view

3.4.7 Ethernet Interface Port

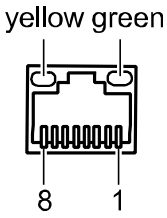
The Ethernet interface supports direct communication with the TPG 366 via a network.

Connect the ethernet cable to the port on the rear of the unit.

Ethernet pin assignment

Pin assignment of the 8-pin RJ45 appliance connector socket:

Pin	Signal
1	TD+ (transmission data +)
2	TD− (transmission data −)
3	RD+ (received data +)
4	n.c.
5	n.c.
6	RD− (received data −)
7	n.c.
8	n.c.



Female connector view

Green LED

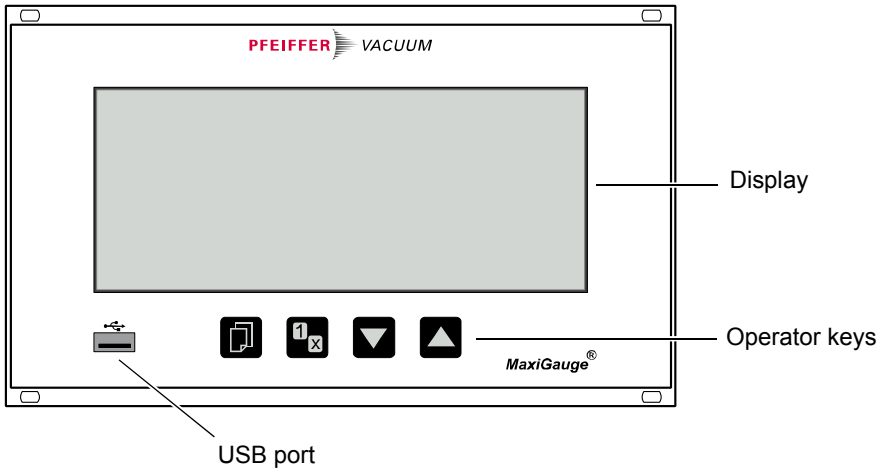
Link or transmit LED. Indicates that a hardware-based connection exists.

Yellow LED

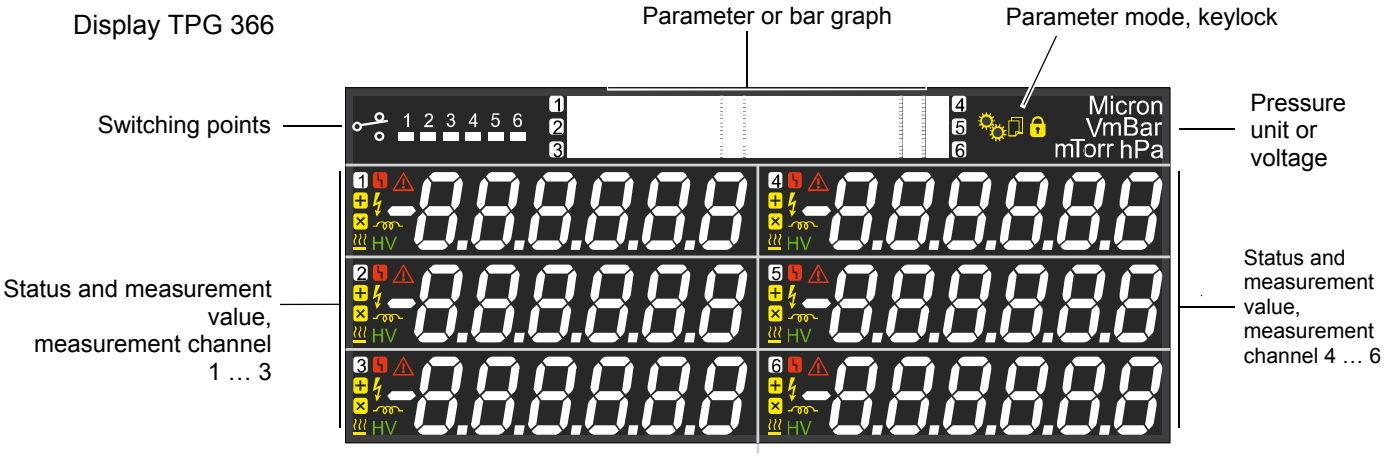
Status or packet-detect LED. Indicates the status of the transmission. Whenever this LED flashes or flickers, this indicates that data is being transmitted.

4 Operation

4.1 Front Panel



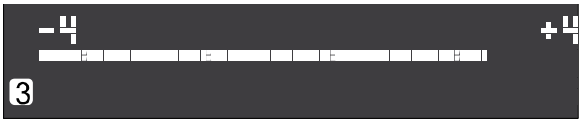
Display TPG 366



Parameter, bar graph

Parameter rows 1 & 2

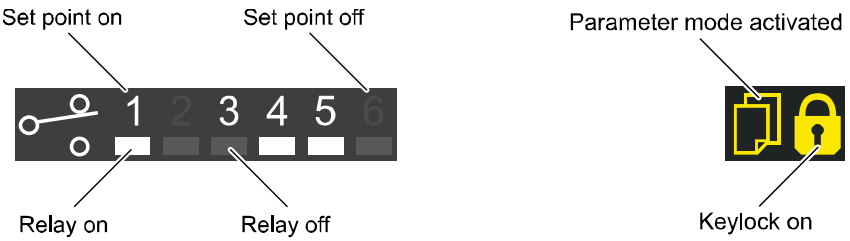
Bar graph measurement channel 3



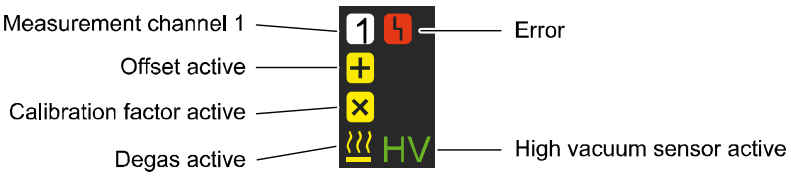
Bar graph with setpoint, measurement channel 3

Pressure vs. time, trend measurement channel 3

Switching points, parameter mode, keylock



Specific measurement channel



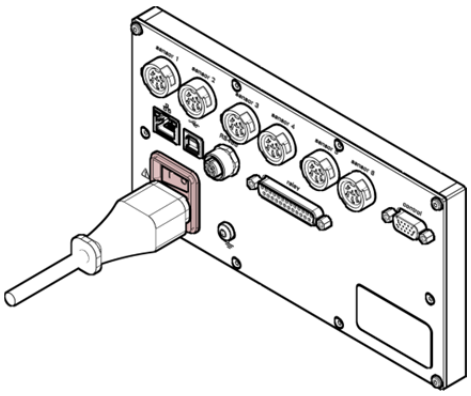
4.2 Switching the TPG 366 on and off

Make sure the unit is correctly installed and the specifications in the Technical Data are met.

Switching on the TPG 366

The power switch is on the rear of the unit.

Switch on the TPG 366 at the power switch (or, if the unit is incorporated in a rack, switch it on centrally via a switched power distributor).



After power on, the TPG 366 …

- Automatically performs a self-test
- Identifies the connected gauges
- Activates the parameters that were in effect before the last power off
- Switches to measurement mode
- Adapts the parameters if required (if a different gauge was previously connected).

Switching off the TPG 366

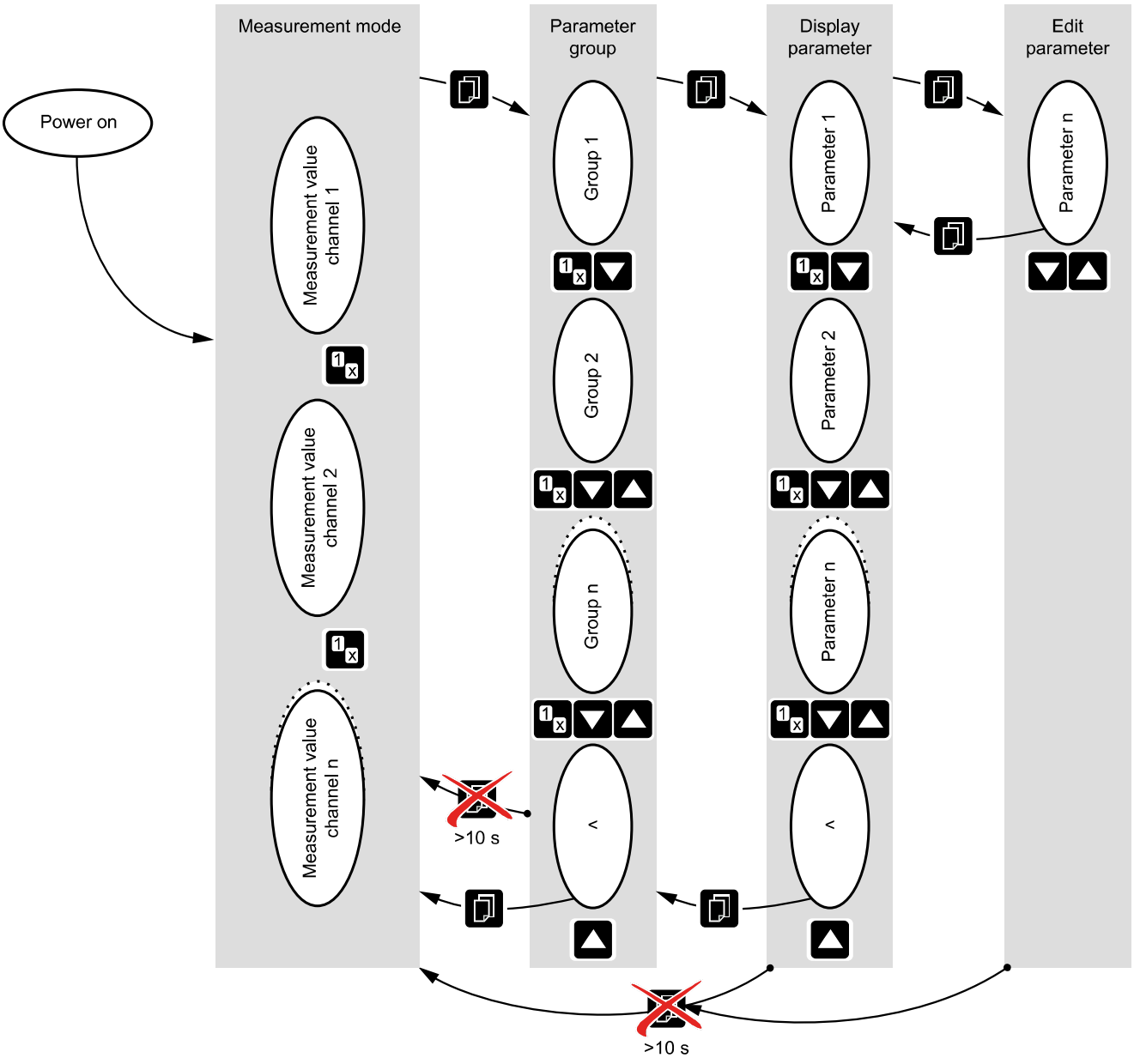
Switch off the TPG 366 at the power switch (or, if the unit is incorporated in a rack, switch it off centrally via a switched power distributor).

Wait at least 10 seconds before switching the TPG 366 on again in order for it to re-initialize properly.

4.3 Operating Modes

TPG 366 has the following operating modes:

- Measurement mode
  For displaying measurement values or statuses (→ 🗎 21)
- Parameter mode
  For displaying and entering parameters (→ 🗎 23)
  - Switching function parameter group SETPOINT >
    For entering and displaying thresholds (→ 🗎 24)
  - Gauge parameter group SENSOR >
    For entering and displaying gauge parameters (→ 🗎 27)
  - Gauge control group SENSOR-CONTROL >
    For entering and displaying gauge control parameters (→ 🗎 33)
  - General parameter group GENERAL >
    For entering and displaying general parameters (→ 🗎 38)
  - Test program group TEST >
    For running internal test programs (→ 🗎 45)
- Data logger mode DATA LOGGER >
  For logging measurement data (→ 🗎 49)
- Program transfer mode SETUP >
  For saving (read/write) parameters (→ 🗎 51)



4.4 Measurement Mode

Measurement mode is the standard operating mode of the TPG 366 with display of

- A bar graph (if required)
- A measurement value for each measurement channel
- Status messages for each measurement channel

Adjusting bar graph

A bar graph can be displayed if required (→ 🗎 40).

Changing the measurement channel

The unit alternates between the measurement channels. The number of the selected measurement channel lights up.

Switching the gauge on-/off

Certain gauges can be turned on- and off manually, provided the gauge control is set to SENSOR ON / HAND (→ 🗎 34).

Available for the following gauges:

- ☐ Pirani Gauge (TPR)
- ☐ Pirani Capacitance Gauge (PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☑ FullRange® CC Gauge (PKR)
- ☑ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☐ Capacitance Gauge (CMR)
- ☐ Piezo Gauge (APR)

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

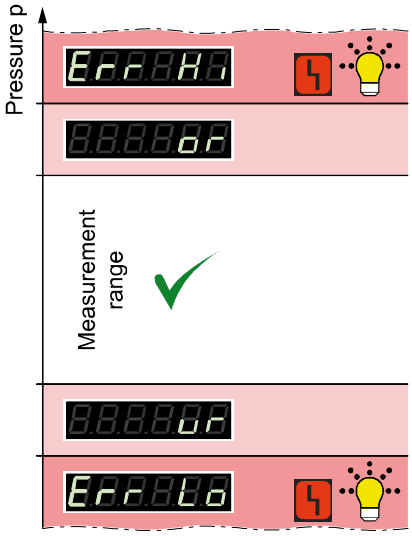
⇨ Hold down key for >1 s:
Gauge switches on. Instead of the measurement value, a status message may be displayed:

Measurement range

If the unit is operated with linear gauges (CMR 261 … 375, APR 250 … 267), negative pressures may be indicated.

Possible causes:

- Negative drift
- Activated offset correction.



Displaying the gauge identification

⇨ Press keys for >0.5 to 1 s:
For the measurement channel in question, the gauge identification (row 1) and measuring point name (row 2) are read and displayed for 5 seconds:

Example:		
Row 1	TPR/PCR	Sensor type
Row 2	FORELINE	Measuring point name (default = blank)

Sensor type (row 1)

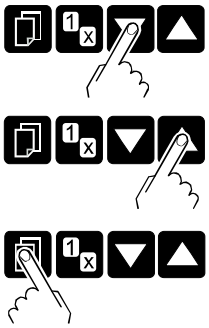
Pirani Gauge (TPR 261, TPR 265, TPR 280, TPR 281) Pirani Capacitance Gauge (PCR 260, PCR 280)	TPR/PCR
Cold Cathode Gauge (IKR 251, IKR 261, IKR 270, IKR 360, IKR 361)	IKR
FullRange® CC Gauge (PKR 251, PKR 261, PKR 360, PKR 361)	PKR
Process Ion Gauge (IMR 265)	IMR
FullRange® BA Gauge (PBR 260)	PBR
Capacitance Gauge (CMR 261 to CMR 375) Piezo Gauge (APR 250 to APR 267)	CMR/APR 1000 hPa
No gauge connected	NO SENSOR
Gauge connected, but not identifiable	NO IDENT.

4.5 Parameter Mode

Parameter mode is used for displaying, editing and entering parameter values as well as for testing the TPG 366 and for saving measurement data. For ease of operation, the individual parameters are divided into groups.

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

Selecting a parameter group

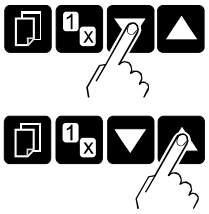


Select group

⇨ Switching function parameters → 🗎 24
Gauge parameters → 🗎 27
Gauge control → 🗎 33
General parameters → 🗎 38
Test parameters → 🗎 45
Data logger → 🗎 49
Program transfer → 🗎 51

Confirm group

Reading a parameter in parameter group



Editing and saving a parameter in a parameter group

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

Edit the value.

Save the change and return to read mode

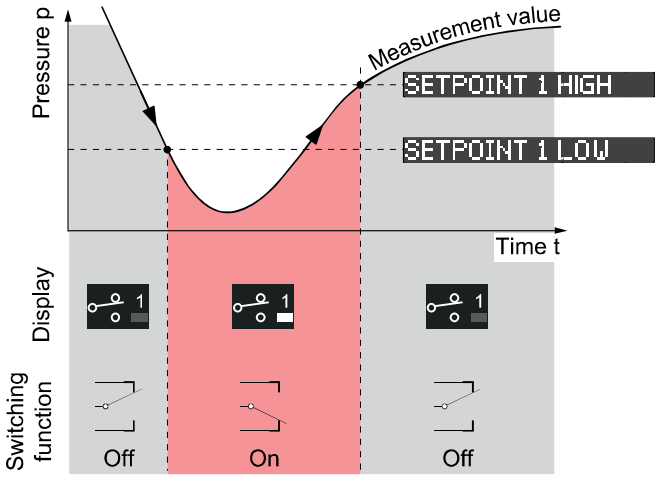
4.5.1 Switching Function Parameters

SETPOINT	The switching function parameter group is used to display, edit and enter threshold values and assign the six switching functions to a measurement channel.

Parameters of this group

SETPOINT 1 CH	Assignment of setpoint 1 to a channel
SETPOINT 1 LOW	Lower threshold of setpoint 1
SETPOINT 1 HIGH	Upper threshold of setpoint 1
SETPOINT 2 CH	Assignment of setpoint 2 to a channel
SETPOINT 2 LOW	Lower threshold of setpoint 2
SETPOINT 2 HIGH	Upper threshold of setpoint 2
SETPOINT 3 CH	Assignment of setpoint 3 to a channel
SETPOINT 3 LOW	Lower threshold of setpoint 3
SETPOINT 3 HIGH	Upper threshold of setpoint 3
SETPOINT 4 CH	Assignment of setpoint 4 to a channel
SETPOINT 4 LOW	Lower threshold of setpoint 4
SETPOINT 4 HIGH	Upper threshold of setpoint 4
SETPOINT 5 CH	Assignment of setpoint 5 to a channel
SETPOINT 5 LOW	Lower threshold of setpoint 5
SETPOINT 5 HIGH	Upper threshold of setpoint 5
SETPOINT 6 CH	Assignment of setpoint 6 to a channel
SETPOINT 6 LOW	Lower threshold of setpoint 6
SETPOINT 6 HIGH	Upper threshold of setpoint 6
<	One level back

The TPG 366 has six switching functions with two adjustable thresholds each. The switching function statuses are displayed on the front panel and are available as floating contacts at the *relay* port (→ 🗎 15)



Selecting a parameter

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

E.g.: SETPOINT 1 CH
DISABLED
Switching function 1 switched off

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

Editing and saving a parameter

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

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

⇨ Save the change and return to read mode.

We recommend setting the threshold 1/2-decade above the lower, or 1/2-decade below the upper, threshold limit.

Assigning a switching function

		Value
Row 1	SETPOINT 1 CH	Assignment of a switching function to a measurement channel.
Row 2	DISABLED	⇨ Switching function 1 is switched off (factory setting)
	ENABLED	⇨ Switching function 1 is always switched on
	SENSOR 1	⇨ Switching function 1 is assigned to channel 1
	⋮	
	SENSOR 6	⇨ Switching function 1 is assigned to channel 6

The lower and 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 thresholds

		Value
Row 1	SETPOINT 1 LOW	The lower threshold (Setpoint low) defines the pressure at which the switching function is activated when the pressure drops.
Row 2	5.00-4	⇨ Gauge dependent (→ table). If the gauge type is changed, the TPG 366 automatically adjusts the threshold if required.

	Lower threshold limit	Upper threshold limit
TPR/PCR	5×10^{-4} *)	1500
IKR	IKR 2x1: 1×10^{-9} IKR 36x: 1×10^{-9} IKR 270: 1×10^{-11}	1×10^{-2}
PKR	1×10^{-9}	1000
IMR	1×10^{-6}	1000
PBR	5×10^{-10}	1000
CMR/APR	F.S. / 1000	F.S

All values in hPa, GAS=nitrogen

*) 5×10^{-5} hPa if RNE-EXT is activated (→ 🗎 39)

The minimum hysteresis between the upper and lower switching threshold amounts to at least 10% of the lower threshold or 1% of the set measurement range end value. If necessary, the upper threshold is automatically adjusted to a minimum hysteresis. This prevents unstable states.

Limits of the upper thresholds

		Value
Row 1	SETPOINT 1 HIGH	The upper threshold (Setpoint high) defines the pressure at which the switching function is activated when the pressure rises.
Row 2	1500	⇨ Gauge dependent (→ table). If the gauge type is changed, the TPG 366 automatically adjusts the threshold if required.

		Lower threshold limit	Upper threshold limit
TPR/PCR	Lower threshold	+10% lower threshold	1500
IKR		+10% lower threshold	1×10^{-2}
PKR		+10% lower threshold	1000
IMR		+10% lower threshold	1000
PBR		+10% lower threshold	1000
CMR/APR		+1% measurement range (F.S.)	F.S

All values in hPa, GAS=nitrogen

The minimum hysteresis between the upper and lower switching threshold amounts to at least 10% of the lower threshold or 1% of the set measurement range end value. 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 of this group

DEGAS FILAMENT	Electrode system cleaning
FULLSCALE	Measurement range for linear gauges
FILTER	Measurement value filter
OFFSET	Offset correction
GAS	Calibration factor for other gases
COR	Calibration factor
DIGITS	Display resolution
DESIGNATION	Measuring point name
<	One level back

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

Available for	→ 27 DEGAS FILAMENT	28 FULLSCALE	29 FILTER	30 OFFSET	31 GAS	31 COR	32 DIGITS	32 DESIGNATION
TPR/PCR	–	–	✓	–	✓	✓	✓	✓
IKR	–	–	✓	–	✓	✓	✓	✓
PKR	–	–	✓	–	✓	✓	✓	✓
IMR	–	–	✓	–	✓*)	✓	✓	✓
PBR	✓	–	✓	–	✓*)	✓	✓	✓
CMR/APR	–	✓	✓	✓	–	✓	✓	✓

*) With restrictions.

Degas

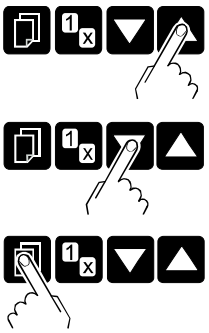
Contamination deposits on the electrode system of hot cathode gauges may cause measurement value instabilities. The degas function allows this system to be cleaned.

Available for the following gauges:

- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☐ Cold Cathode Gauge (IKR)
- ☐ FullRange® CC Gauge (PKR)
- ☐ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

		Value	
Row 1	DEGAS FILAMENT	Parameter name	
Row 2	OFF	⇨ Normal operation (degas blocked)	
	ON	⇨ Degas: The electron collection grid is heated to ≈700 °C by electron bombardment, cleaning the electrode system. Duration = 180 seconds.	

Editing and saving a parameter



⇨ Activate degas. Degas duration 180 seconds (can also be aborted).

Abort degas.

⇨ Save the change and return to read mode.

F.S. measurement range of the linear gauges

For linear gauges, the measurement range end value (Full Scale) has to be defined on the basis of the connected gauge type. For logarithmic gauges it is automatically recognized.

Available for the following gauges:

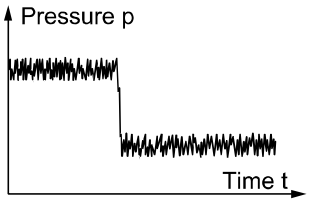
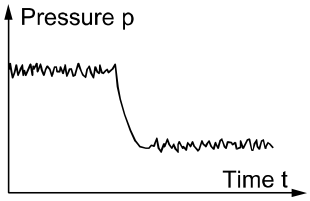
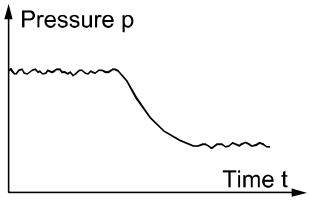
- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☐ Cold Cathode Gauge (IKR)
- ☐ FullRange® CC Gauge (PKR)
- ☐ Process Ion Gauge (IMR)
- ☐ FullRange® BA Gauge (PBR)
- ☑ Capacitance & Piezo Gauge (CMR/APR)

		Value
Row 1	FULLSCALE	Parameter name
Row 2	1000 hPa	⇨ 0.01 hPa 0.1 hPa 1 hPa 10 hPa 100 hPa 1000 hPa 2000 hPa 5000 hPa 10000 hPa 50000 hPa A conversion table can be found in the Appendix (→ 🗎 56).

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 (→ 14).

		Value
Row 1	FILTER	Parameter name
Row 2	DISABLED	⇨ No measurement value filter
	FAST	⇨ Fast: The TPG 366 responds quickly to fluctuations in the measurement value. As a result, it will have a more sensitive response to interference in the measured values. 
	NORMAL	⇨ Normal (factory setting): Good relationship between response and sensitivity of the display and the switching function to changes in the measured values. 
	SLOW	⇨ Slow: The TPG 366 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

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

Available for the following gauges:

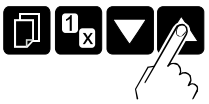
- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☐ Cold Cathode Gauge (IKR)
- ☐ FullRange® CC Gauge (PKR)
- ☐ Process Ion Gauge (IMR)
- ☐ FullRange® BA Gauge (PBR)
- ☑ Capacitance & Piezo Gauge (CMR/APR)

Offset correction affects:

- ☑ The displayed measurement value
- ☐ The displayed threshold value of the switching functions
- ☐ The analog outputs at the *control* port (→ 🗎 14)

		Value	
Row 1	OFFSET	Parameter name	
Row 2	OFF	⇨ Offset correction switched off (factory setting)	
	9.53	⇨ Offset correction switched on (displayed in current unit of measurement)	

Editing and saving a parameter



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

Reset the offset value.

⇨ Save the change and return to read mode.

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

Switch off offset correction before readjusting the zero point on the gauge.

GAS calibration factor

The GAS calibration factor is used to

- Standardize the measurement value to the preset gases N_2, Ar, H_2, He, Ne, Kr, and Xe, or
- Manually enter the correction factor for other gases (COR).

→ Characteristic curves in 🕮 [1] to [13].

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

Available for the following gauges:

☑	Pirani & Pirani Capacitance Gauge [1)]	(TPR/PCR))
☑	Cold Cathode Gauge	(IKR)
☑	FullRange® CC Gauge [2)]	(PKR)
☑	Process Ion Gauge	(IMR)
☑	FullRange® BA Gauge [3)]	(PBR)
☐	Capacitance & Piezo Gauge	(CMR/APR)

1) Effective from pressure <1 hPa.
2) Effective from pressure <1×10^{-5} hPa.
3) Effective from pressure <1×10^{-2} hPa.

		Value
Row 1	GAS	Parameter name
Row 2	N2 NITROGEN	⇨ Gas: nitrogen / air (factory setting)
	AR ARGON	⇨ Gas: argon
	H2 HYDROGEN	⇨ Gas: hydrogen
	HE HELIUM	⇨ Gas: helium
	NE NEON	⇨ Gas: neon
	KR KRYPTON	⇨ Gas: krypton
	XE XENON	⇨ Gas: xenon
	COR	⇨ Manually enter the calibration factor for other gases via parameter COR (effective over the entire measurement range)

COR calibration factor

The calibration factor COR is effective over the entire measurement range and allows the measurement value to be standardized to other gases (→ characteristic curves in 🕮 [1] to [13]).

Requirement: Parameter "GAS COR" must be set.

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

Available for the following gauges:

☑	Pirani & Pirani Capacitance Gauge	(TPR/PCR)
☑	Cold Cathode Gauge	(IKR)
☑	FullRange® CC Gauge	(PKR)
☑	Process Ion Gauge	(IMR)
☑	FullRange® BA Gauge	(PBR)
☑	Capacitance & Piezo Gauge	(CMR/APR)

		Value	
Row 1	COR	Parameter name	
Row 2	1.00	⇨ No correction	
	1.53	⇨ Measurement value corrected by a factor of 0.10 to 10.00	

Display resolution

Resolution of the displayed measurement value.

Available for the following gauges:

- ☑ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☑ FullRange® CC Gauge (PKR)
- ☑ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☑ Capacitance & Piezo Gauge (CMR/APR)

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

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

With PCR gauges in the pressure range p<1.0E-4 hPa and activated RNG-EXT (→ 🗎 39), the display is reduced by one decimal digit.

Designation

Name of measuring point (8 characters max.).

Available for the following gauges:

- ☑ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☑ FullRange® CC Gauge (PKR)
- ☑ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☑ Capacitance & Piezo Gauge (CMR/APR)

		Value
Row 1	DESIGNATION	Parameter name
Row 2	FORELINE	⇨ Measuring point name (only capital letters, numbers and underlines permitted)

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 switched on/off.

If the connected gauges cannot be controlled (→ 🗎 34), this group is not available.

Parameters of this group

SENSOR ON	Type of gauge activation
SENSOR OFF	Type of gauge deactivation
THRESHOLD ON	Activation threshold
THRESHOLD OFF	Deactivation threshold
<	One level back

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

Available for	→ 🗎 34 SENSOR ON	35 THRESHOLD ON	36 SENSOR OFF	37 THRESHOLD OFF
TPR/PCR	–	–	–	–
IKR	✓	✓	✓	✓
PKR	✓	–	✓	–
IMR	✓	✓	✓	✓
PBR	✓	✓	✓	✓
CMR/APR	–	–	–	–

Type of gauge activation

Some gauges can be activated by different means.

The following gauges can be controlled:

- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☑ FullRange® CC Gauge *) (PKR)
- ☑ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

*) Except by a gauge connected to the other measurement channel.

		Value
Row 1	SENSOR ON	Parameter name
Row 2	HAND	⇨ Manual activation: The gauge is activated by pressing the ▲ key.
	HOTSTART	⇨ Hot start: The gauge is automatically activated when the TPG 366 is switched on. Measurement is thus automatically resumed after a power failure. Deactivation conditions → 🗎 36.
	EXTERNAL	⇨ External activation: The gauge is activated by a control input at the <control> port → 🗎 14).
	CH 1	⇨ Through measurement channel 1: ☑ Pirani & Pirani Capacitance Gauge (TPR/PCR) ☐ Cold Cathode Gauge (IKR) ☑ FullRange® CC Gauge (PKR) ☑ Process Ion Gauge (IMR) ☑ FullRange® BA Gauge (PBR) ☑ Capacitance & Piezo Gauge *) (CMR/APR) *) Only gauges with 1, 10, or 100 hPa F.S.
	⋮	
	CH 6	⇨ Through measurement channel 6: ☑ Pirani & Pirani Capacitance Gauge (TPR/PCR) ☐ Cold Cathode Gauge (IKR) ☑ FullRange® CC Gauge (PKR) ☑ Process Ion Gauge (IMR) ☑ FullRange® BA Gauge (PBR) ☑ Capacitance & Piezo Gauge *) (CMR/APR) *) Only gauges with 1, 10, or 100 hPa F.S.

Activation threshold

Definition of the activation threshold when activating by a gauge connected to the other measurement channel.

Available for the following gauges:

- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☐ FullRange® CC Gauge (PKR)
- ☑ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

		Value
Row 1	THRESHOLD ON	Parameter name
Row 2	1.00	→ Table below.

	TPR PCR	PKR IMR PBR	CMR, APR F.S.=1	CMR, APR F.S.=10	CMR, APR F.S.=100
IKR	$10^{-3*)}$ …10^{-2}	10^{-5} …10^{-2}	10^{-3}…10^{-2}	–	–
IMR	$10^{-3*)}$…1	10^{-5}…1	10^{-3}…1	10^{-2}…1	10^{-1}…1
PBR	$10^{-3*)}$ … 1	10^{-5} … 1	10^{-3} … 1	10^{-2} … 1	10^{-1} … 1

All values in hPa, CAL=1

*) 10^{-4} hPa if RNG-EXT is activated (→ 🗎 39)

The THRESHOLD OFF value must be ≥ THRESHOLD ON.

Type of gauge deactivation

Some gauges can be deactivated by different means.

The following gauges can be controlled:

- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☑ FullRange® CC Gauge *, **) (PKR)
- ☑ Process Ion Gauge *) (IMR)
- ☑ FullRange® BA Gauge *) (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

*) Except for self-control

**) Except by a gauge connected to the other measurement channel.

		Value
Row 1	SENSOR OFF	Parameter name
Row 2	HAND	⇨ Manual deactivation: The gauge is deactivated by pressing the ▼ key
	SELF (Also with Cold Cathode Gauge)	⇨ Self control: The gauge is deactivated automatically when the pressure rises (→ 🗎 37).
	EXTERNAL	⇨ External deactivation: The gauge is deactivated by a control input at the <control> port → 🗎 14).
	CH 1	⇨ Through measurement channel 1: ☑ Pirani & Pirani Capacitance Gauge (TPR/PCR) ☐ Cold Cathode Gauge (IKR) ☑ FullRange® CC Gauge (PKR) ☑ Process Ion Gauge (IMR) ☑ FullRange® BA Gauge (PBR) ☑ Capacitance & Piezo Gauge *) (CMR/APR) *) Only gauges with 1, 10, or 100 hPa F.S.
	⋮	
	CH 6	⇨ Through measurement channel 6: ☑ Pirani & Pirani Capacitance Gauge (TPR/PCR) ☐ Cold Cathode Gauge (IKR) ☑ FullRange® CC Gauge (PKR) ☑ Process Ion Gauge (IMR) ☑ FullRange® BA Gauge (PBR) ☑ Capacitance & Piezo Gauge *) (CMR/APR) *) Only gauges with 1, 10, or 100 hPa F.S.

Deactivation threshold

Definition of the deactivation threshold for deactivating the gauge on another channel or by self control.

Available for the following gauges:

- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKRx)
- ☐ FullRange® CC Gauge (PKR)
- ☑ Process Ion Gauge (IMR)
- ☑ FullRange® BA Gauge (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

		Value
Row 1	THRESHOLD OFF	Parameter name
Row 2	0.001	→ Table below.

	TPR PCR	PKR IMR PBR	CMR, APR F.S.=1	CMR, APR F.S.=10	CMR, APR F.S.=100
IKR	$10^{-3*)}$to10^{-2}	10^{-5}to10^{-2}	10^{-3}to10^{-2}	–	–
IMR	$10^{-3*)}$to1	10^{-5}to1	10^{-3}to1	10^{-2}to1	10^{-1}to1
PBR	$10^{-3*)}$to1	10^{-5}to1	10^{-3}to1	10^{-2}to1	10^{-1}to1

All values in hPa, CAL=1

*) 10^{-4} hPa if RNG-EXT is activated (→ 🗎 39)

The THRESHOLD OFF value must be ≥ THRESHOLD ON

4.5.4 General Parameters

GENERAL >

The general parameters group is used for displaying, entering, and editing generally applicable system parameters (system parameters).

Parameters of this group

UNIT	Measurement units
BAUDRATE USB	USB interface baud rate
RANGE-EXTENSION	Pirani range extension
ERROR-RELAY	Error relay
PENNING-UR	Penning underrange
BARGRAPH / GRAPH	Bar graph display
RS485 ADDRESS	RS485 device address
PROTOCOL	Protocol serial interface
BACKLIGHT	Backlight
SCREENSAVER	Screensaver
CONTRAST LCD	Contrast setting
SET DEFAULT	Factory settings
LANGUAGE	Language
FORMAT	Measurement value number format
END VALUE	Display of measurement range end value
DHCP (ETH)	Dynamic Host Configuration Protocol (Ethernet)
IP (ETH)	IP address (Ethernet)
SUBNET (ETH)	Subnet mask (Ethernet)
GATEWAY (ETH)	Gateway address (Ethernet)
<	One level back

Measurement units

Unit of measurement for the measurement values, thresholds etc.. A conversion table can be found in the Appendix (→ 🖹 56).

		Value
Row 1	UNIT	Parameter name
Row 2	MBAR	⇨ mbar
	HPASCAL	⇨ hPa (factory setting)
	TORR	⇨ Torr (only available if Torr lock is not active → 🖹 46)
	PASCAL	⇨ Pa
	MICRON	⇨ Micron (= 0.001 Torr) (only available if Torr lock is not active → 🖹 46)
	VOLT	⇨ Volt

Baud rate

Transfer rate of the USB interface.

The transfer rate of the RS485 interface is fixed at 9600 baud.

		Value
Row 1	BAUDRATE USB	Parameter name
Row 2	9600	⇨ 9600 baud (factory setting)
	19200	⇨ 19200 baud
	38400	⇨ 38400 baud
	57600	⇨ 57600 baud
	115200	⇨ 115200 baud

Pirani range extension

The display- and setpoint adjustment range of the Pirani Capacitance Gauge with display- / measurement range up to 5×10^{-5} hPa can be extended (only affects the gauge).

Available for the following gauge(s):

- ☑ Pirani Gauge (TPR)
- ☑ Pirani Capacitance Gauge (PCR)
- ☐ Cold Cathode Gauge (IKR)
- ☐ FullRange® CC Gauge (PKR)
- ☐ Process Ion Gauge (IMR)
- ☐ FullRange® BA Gauge (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

		Value
Row 1	RANGE-EXTENSION	Parameter name
Row 2	DISABLED	⇨ Deactivated (factory setting)
	ENABLED	⇨ Display and setpoint adjustment range up to 5×10^{-5} hPa

Error relay

Switching behavior of the error relay.

		Value
Row 1	ERROR RELAY	Parameter name
Row 2	ALL ERRORS	⇨ Activates for all errors (factory setting)
	no SENSOR ERRORS	⇨ Device errors only
	SENSOR 1 ERRORS	⇨ Sensor 1 error and device error
	⋮	
	SENSOR 6 ERRORS	⇨ Sensor 6 error and device error

Under range control

Definition of behavior in the event of an underrange with Cold Cathode Gauges (Penning underrange control).

Available for the following gauges:

- ☐ Pirani & Pirani Capacitance Gauge (TPR/PCR)
- ☑ Cold Cathode Gauge (IKR)
- ☐ FullRange® CC Gauge (PKR)
- ☐ Process Ion Gauge (IMR)
- ☐ FullRange® BA Gauge (PBR)
- ☐ Capacitance & Piezo Gauge (CMR/APR)

There are a number of possible causes of an underrange:

- The pressure in the vacuum system is lower than the measurement range
- The measurement element has not (yet) ignited
- Discharge has failed
- A fault has occurred

Caution

Caution: Switching relay

An underrange can lead to unintended reactions of the connected control system.

Prevent false control signals and messages by disconnecting the sensor and control cables.

		Value
Row 1	PENNING-UR	Parameter name
Row 2	DISABLED	⇨ Factory setting. Underrange state is interpreted as an admissible measurement value. UR is displayed. The switching function remains ON.
	ENABLED	⇨ Underrange state is interpreted as an inadmissible measurement value. UR is displayed. The switching function switches to OFF.

If there is a possibility of the pressure in the vacuum system dropping below the measurement range of the gauge, it is advisable to select PENNING-UR DISABLED.

If PENNING-UR ENABLED is selected, evaluation of the switching function is suppressed for 10 seconds when the gauge is turned on and each time after an underrange has recurred. During this time, the switching function remains OFF.

Bar graph

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

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

		Value
Row 1	BARGRAPH / GRAPH	Parameter name
Row 2	OFF	⇨ Factory setting.
	FULLSCALE	⇨ Bar graph covering the full scale range of the gauge.
	FULLSCALE h	⇨ Bar graph covering the full scale range of the gauge, high-level presentation.
	FULLSCALE+SP	⇨ Bar graph covering the full scale range of the gauge and setpoint threshold.
	DECADE	⇨ Bar graph covering a decade according to current measurement value.
	DECADE h	⇨ Bar graph covering a decade according to current measurement value, high-level presentation.
	DECADE+SP	⇨ Bar graph covering a decade according to current measurement value and setpoint threshold.
	f(0.2s)	⇨ p = $f_{(t)}$, autoscaled, 0.2 seconds / pixel For each measurement, a measurement value is saved in tabular form every 200 ms and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 20 seconds.
	f(1s)	⇨ p = $f_{(t)}$, autoscaled, 1 seconds / pixel For each measurement, a measurement value is saved in tabular form every second and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 seconds.
	f(6s)	⇨ p = $f_{(t)}$, autoscaled, 6 seconds / pixel For each measurement, a measurement value is saved in tabular form every 6 seconds and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 10 minutes.
	f(1min)	⇨ p = $f_{(t)}$, autoscaled, 1 minute / pixel For each measurement, a measurement value is saved in tabular form every minute and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 minutes.
	f(0.5h)	⇨ p = $f_{(t)}$, autoscaled, 30 minutes / pixel For each measurement, a measurement value is saved in tabular form every 30 minutes and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 50 hours.
	IDENTIFICATION	⇨ For the selected measurement channel the sensor type (line 1) and the measuring point name (line 2) are displayed. e.g.: TPR/PCR FORELINE

SETPOINTS	⇨ For the selected measurement channel the sensor type (line 1) and the assigned setpoints (line 2) are displayed. e.g.: TPR/PCR SP 2,4,5

Address

RS485-device address.

		Value
Row 1	RS485 ADDRESS	Parameter name
Row 2	1	⇨ Factory setting.
	⋮	Adjustable from 1 … 24
	24	

Protocol

Serial interface protocol (RS485, USB-B, Ethernet).

		Value
Row 1	PROTOCOL	Parameter name
Row 2	AUTOMATIC	⇨ Automatic recognition (factory setting)
	PFEIFFER VACUUM	⇨ Pfeiffer Vacuum protocol
	MNEMONIC 3 CHAR	⇨ Mnemonics log

Backlight

		Value
Row 1	BACKLIGHT	Parameter name
Row 2	60%	⇨ Factory setting Adjustable from 0 … 100% 100% = full brightness

Screensaver

Reduces the backlight brightness.

		Value
Row 1	SCREENSAVER	Parameter name
Row 2	OFF	⇨ Factory setting
	10 MINUTES	⇨ After 10 minutes
	30 MINUTES	⇨ After 30 minutes
	1 HOUR	⇨ After 1 hour
	2 HOURS	⇨ After 2 hours
	8 HOURS	⇨ After 8 hours
	DARKROOM	⇨ Extinguishes the backlight after 1 minute. It is activated again by pressing any key.

Contrast

		Value
Row 1	CONTRAST LCD	Parameter name
Row 2	40%	⇨ Factory setting Adjustable from 0 … 100% 100% = full contrast

Default parameters

Resets all user-set / modified parameters to the default values (factory settings).

Resetting to the default parameters cannot be undone.

		Value
Row 1	SET DEFAULT	Parameter name
Row 2	▲+▼ 2s	Hold down the ▼▲ keys at the same time for >2 seconds to start loadig the default parameters
	DEFAULTS LOADED	⇨ Confirms that the default parameters have been loaded (displayed in default language)

Language

Display language.

		Value
Row 1	LANGUAGE	Parameter name
Row 2	ENGLISH	⇨ English (factory setting)
	GERMAN	⇨ German
	FRENCH	⇨ French

Number format

Measurement value number output 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
Row 1	FORMAT	Parameter name
Row 2	X.X	⇨ Floating point, if possible (factory setting)
	X.XESY	⇨ Exponential format
	X.XSY	⇨ Exponential format

Display of measurement range end value

Display of underrange or overrange.

		Value
Row 1	END VAL	Parameter name
Row 2	UR/OR	⇨ When an underrange or overrange occurs UR or OR is displayed (factory setting)
	VALUE	⇨ When an underrange or overrange occurs, the respective measurement range end value is displayed

DHCP

Dynamic Host Configuration Protocol. Allows the automatic allocation of the network configuration (IP address, subnet mask, gateway) to clients through the server.

		Value
Row 1	DHCP (ETH)	Parameter name
Row 2	OFF	⇨ The IP address, subnet mask, and gateway must be configured manually (factory setting)
	ON	⇨ The IP address, subnet mask, and gateway are set automatically, but cannot be changed.

IP address

IP address.

		Value
Row 1	IP (ETH)	Parameter name
Row 2	xxx.xxx.xxx.xxx	⇨ Can only be changed if DHCP is set to "OFF".

Subnet mask

Subnet mask.

		Value
Row 1	SUBNET (ETH)	Parameter name
Row 2	xxx.xxx.xxx.xxx	⇨ Can only be changed if DHCP is set to "OFF".

Gateway address

Gateway address.

		Value
Row 1	GATEWAY (ETH)	Parameter name
Row 2	xxx.xxx.xxx.xxx	⇨ Can only be changed if DHCP is set to "OFF".

4.5.5 Test Parameters

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

The group is only available if the

- key is pressed when switching on the center unit, or
- the key 5 s is held down for 5 seconds when < is displayed.

Parameters of this group

SOFTWARE VERSION	Firmware version
HARDWARE VERSION	Hardware version
MAC ADDRESS	MAC address
RUNHOURS	Operating hours
WATCHDOG	Watchdog error behavior
TORR-LOCK	Torr lock
KEY-LOCK	Keys locked
FLASH TEST	FLASH test (program memory)
EEPROM TEST	EEPROM test (parameter memory)
DISPLAY TEST	Display test
RELAY TEST	Relay test
RECALIBRATION	Recalibration
<	One level back

The parameters of this group are available for all gauges.

Firmware version

The firmware version (software version) is displayed.

		Version
Row 1	SOFTWARE VERSION	This information is helpful when contacting Pfeiffer Vacuum
Row 2	010100	

Hardware version

The hardware version is displayed.

		Version
Row 1	HARDWARE VERSION	This information is helpful when contacting Pfeiffer Vacuum
Row 2	010100	

MAC address

The MAC address is displayed.

		Value
Row 1	MAC ADDRESS	The address is displayed without separators (e.g. 00-A0-41-0A-00-08)
Row 2	00A0410A0008	

Operating hours

The operating hours are displayed.

		Value
Row 1	RUNHOURS	⇨ Operating hours
Row 2	24	

Watchdog error behavior

Behavior of the watchdog control in the event of an error.

		Setting
Row 1	WATCHDOG	
Row 2	AUTO	⇨ The system automatically acknowledges error messages of the watchdog after 2 seconds (factory setting)
	OFF	⇨ Error messages of the watchdog have to be acknowledged by the user

Torr lock

The measurement unit Torr can be suppressed in the corresponding parameter setting (→ 🗎 38).

		Setting
Row 1	TORR-LOCK	
Row 2	OFF	⇨ Measurement unit Torr available (factory setting)
	ON	⇨ Measurement unit Torr not available

Keys locked

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

		Setting
Row 1	KEY-LOCK	
Row 2	OFF	⇨ The keylock function disabled (factory setting)
	ON	⇨ The keylock function enabled

FLASH test

Test of the program memory.

		Test sequence
Row 1	FLASH TEST	
Row 2	▲+▼	⇨ To start the test, hold down the ▼▲ keys at the same time
	RUN	⇨ Test in progress (very brief)
	PASS	⇨ Test completed and no errors detected. After the test, an 8-digit checksum (e.g. 0x12345678) is displayed
	ERROR	⇨ Test completed with errors. After the test, an 8-digit checksum (e.g. 0x12345678) is displayed If the error persists after repeating the test, please contact your nearest Pfeiffer Vacuum service center.

EEPROM test

Test of the parameter memory.

		Test sequence
Row 1	EEPROM TEST	
Row 2	▲+▼	⇨ To start the test, hold down the ▼▲ keys at the same time
	RUN	⇨ Test in progress
	PASS	⇨ Test completed and no errors detected
	ERROR	⇨ Test completed with errors If the error persists after repeating the test, please contact your nearest Pfeiffer Vacuum service center.

Display test

Test of the display.

		Test sequence
Row 1	DISPLAY TEST	
Row 2	▲+▼	To start the test, hold down the ▼▲ keys at the same time ⇨ After starting the test, all display elements are lit at the same time for 10 seconds

Relay test

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

Caution

Caution: The relays switch irrespective of the pressure

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

Prevent false control signals and messages by disconnecting the sensor and control cables.

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 on the rear of the unit (→ 🗎 14). Check their function with an ohmmeter.

		Test sequence
Row 1	RELAY TEST	
Row 2	▲+▼	⇨ To start the test, hold down the ▼▲ keys at the same time
	OFF	⇨ All relays deactivated
	REL 1 ON	⇨ Switching function relay 1
	REL 1 OFF	⇨ Switching function relay 1
	REL 2 ON	⇨ Switching function relay 2
	REL 2 OFF	⇨ Switching function relay 2
	⋮	

Recalibration

Date of next recalibration.

		Test sequence
Row 1	RECALIBRATION	
Row 2	2017-02-17	Date of next recalibration

Once the configured date is reached, the following information message will be displayed periodically.

Row 1	RECALIBRATION
Row 2	REQUIRED !

4.6 Data Logger Mode

DATA LOGGER >

The data logger group is used for

- Logging measurement data on a USB memory stick (interface type A on the front of the TPG 366)
- Deleting logged 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 memory stick that is ≤32 GB.

Not all USB memory sticks are automatically recognized by the TPG 366, as they (in particular cheaper brands) do not always conform to USB standard requirements. Try a different memory stick before contacting your nearest Pfeiffer Vacuum service center.

Parameters of this group

DATE	Current date
TIME	Current time
INTERVAL	Logging interval
DEC-SEPARATOR	Decimal separator
FILENAME	File name
START / STOP	Start / stop logging
CLEAR	For deleting files containing logged measurement data

Date

		Value
Row 1	DATE	Current date in format YYYY-MM-DD
Row 2	2017-02-24	⇨ E.g. 2017-02-24

Time

		Value
Row 1	TIME	Current time in format hh:mm [24 h]
Row 2	15:45	⇨ E.g. 15:45

Interval

Measurement data logging interval.

		Value
Row 1	INTERVAL	
Row 2	1s	⇨ Logging interval 1/s
	10s	⇨ Logging interval 1/10 s
	30s	⇨ Logging interval 1/30 s
	1min	⇨ Logging interval 1/60 s
	1% DEVIATION	⇨ Logging interval: For changes in measured values ≥1%
	5% DEVIATION	⇨ Logging interval: For changes in measured values ≥5%

Decimal separator

Decimal separator for the measurement values during measurement data logging.

Further processing of recorded data (e.g. with Excel):

Pay attention to the corresponding decimal separator (comma or dot).

		Value
Row 1	DEC-SEPARATOR	
Row 2	, (COMMA)	⇨ Decimal comma
	. (DOT)	⇨ Decimal point

File name

		Value
Row 1	FILENAME	Name of the measurement data file, 7 characters max.
Row 2	DATALOG	⇨ File extension: CSV

Display stops flashing once the 7th character has been entered. Name saved and unit is again in read mode.

If the name is smaller than 7 characters, spaces must be entered for the remaining places.

Start / Stop

Start / stop measurement data logging.

The number of the respective measurement channel (e.g. 1) flashes during measurement data logging.

		Value
Row 1	START / STOP	
Row 2	▲ TO START	⇨ To start saving, press the ▲ key: When logging is in process, the display changes to STOP ▼ and the ▼ arrow flashes.
	▼ TO STOP	⇨ To stop saving, press the ▼ key: When logging is stopped, the display changes to START ▲ and the ▲ arrow flashes.

The unit will not return to measurement mode automatically while the ▼ or ▲ arrows are flashing.
Press the key to quit write mode. The unit returns to measurement mode automatically after approx. 10 seconds.

Delete

For deleting all measurement data files (extension CSV) from the USB memory stick.

		Value
Row 1	CLEAR	
Row 2	▲+▼	⇨ To delete files, hold down the ▼▲ keys at the same time
Row 2	RUNNING	⇨ CSV file deletion in progress
	DONE	⇨ CSV files have been deleted

4.7 Setup Mode

SETUP >

This group is used for

- Saving all parameters on a USB memory stick (interface type A on the front of the TPG 366)
- Loading all parameters from a USB memory stick onto the TPG 366
- 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 memory stick that is ≤32 GB.

Parameters of this group

SAVE TO	For saving all parameters
RESTORE FROM	For loading all parameters to the TPG 366
FORMAT	Format USB memory stick (FAT32)
CLEAR	For deleting files containing saved parameters
<	One level back

Saving parameters

Save all parameters of the TPG 366 to a USB memory stick (file extension: CSV).

		Value
Row 1	SAVE TO	
Row 2	SETUP 00	⇨ File name on the USB memory stick: SETUP01.CSV
	☰	☰
	SETUP 99	⇨ File name on the USB memory stick: SETUP99.CSV
	RUNNING	⇨ Saving of CSV file in progress
	DONE	⇨ Save complete

Loading parameters

Load all parameters from a USB memory stick onto the TPG 366.

		Value
Row 1	RESTORE FROM	
Row 2	SETUP 00	⇨ File name on the USB memory stick: SETUP.CSV
	☰	
	SETUP 99	⇨ File name on the USB memory stick: SETUP99.CSV
	RUNNING	⇨ Loading of CSV file in progress
	DONE	⇨ Loading complete
	ERROR	⇨ Loading error

Formatting

Format USB memory stick.

	Value
Row 1 FORMAT	
Row 2 ▲+▼	⇨ To start formatting, hold down the ▼▲ keys at the same time
Row 2 RUNNING	⇨ Formatting in progress
DONE	⇨ Formatting complete

Delete

Delete all measurement data files (extension CSV) from the USB memory stick.

	Value
Row 1 DELETE	
Row 2 ▲+▼	⇨ To delete files, hold down the ▼▲ keys at the same time
Row 2 RUNNING	⇨ CSV file deletion in progress
DONE	⇨ CSV files have been deleted

5 Maintenance

Cleaning the TPG 366

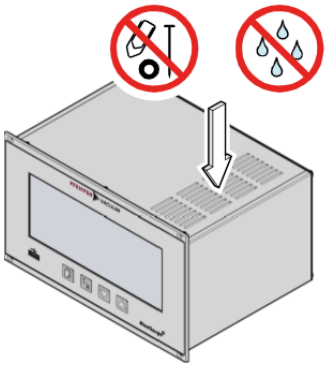
For cleaning the outside of the unit, a slightly moist cloth will usually do. Do not use any aggressive or scouring cleaning agents.

DANGER

DANGER: Mains voltage

Contact with live parts can be extremely hazardous if any 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 Pfeiffer Vacuum service center.

6 Troubleshooting

Signalization of malfunctions

The malfunction is displayed in the DotMatrix and the error relay opens (→ 14).

Type of malfunction

	Possible cause and remedy/acknowledgment
SENSOR ERROR	Interruption or malfunction in sensor line or connector (sensor error). ⇨ Acknowledge with the key.

	Possible cause and remedy/acknowledgment
WATCHDOG ERROR	The TPG 366 has been turned on too fast after power off. ⇨ Acknowledge with the key. If the watchdog is set to Auto, the TPG 366 acknowledges the message automatically after 2 seconds (→ 46).
	The watchdog has tripped because of a severe electric malfunction or an operating system error. ⇨ Acknowledge with the key. If the watchdog is set to AUTO, the TPG 366 acknowledges the message automatically after 2 seconds (→ 46).

	Possible cause and remedy/acknowledgment
UART ERROR	Error in UART. ⇨ Acknowledge with the key.

	Possible cause and remedy/acknowledgment
PROGRAM CORRUPT	Program memory (FLASH) error. ⇨ Acknowledge with the key.

	Possible cause and remedy/acknowledgment
DATA CORRUPTED	Parameter memory (EEPROM) error. ⇨ Acknowledge with the key.

	Possible cause and remedy/acknowledgment
DISPLAY ERROR	Display driver error. ⇨ Acknowledge with the key.

	Possible cause and remedy/acknowledgment
A/D ERROR	A/D converter error. ⇨ Acknowledge with the key.

Technical support

If the problem persists after the message has been acknowledged several times and/or after replacing the gauge, please contact your local Pfeiffer Vacuum service center.

7 Repair

Return defective products to your nearest Pfeiffer Vacuum service center for repair.

Pfeiffer Vacuum assumes no liability and the warranty is rendered null and void if repair work is carried out by the operator or by third parties.

8 Storage

Caution

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 (→ 🗎 6).

9 Disposal

WARNING

WARNING: Environmentally hazardous substances

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

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

Separating the components

After disassembling the product, separate its components as follows:

Non-electronic components

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

Electronic components

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

Appendix

A: Conversion Tables

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 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

Length

	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	Centigrade	Fahrenheit
Kelvin	1	°C+273.15	(°F+459.67)×5/9
Centigrade	K-273.15	1	5/9×(°F-32)
Fahrenheit	9/5×K-459.67	9/5×°C+32	1

B: Firmware Update

If your TPG 366 firmware needs updating, e.g. to support a new gauge type, please contact your local Pfeiffer Vacuum 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 terminal on the rear of the unit.

User parameters

Most of the settings you may have made in parameter mode will not be affected by a firmware update. However, we recommend that you save the parameters before an update (→ 🗎 51).

Firmware update with USB memory stick (type A)

Not all USB memory sticks are automatically recognized by the TPG 366, as they (in particular cheaper brands) do not always conform to USB standard requirements. Try a different memory stick before contacting your nearest Pfeiffer Vacuum service center.

❶ Download two files with the extension ".S19" and ".CNF" from our website "www.pfeiffer-vacuum.com" to a USB memory stick

❷ Switch off the device.

❸ Plug in the memory stick and switch on on the unit.

❹ The update runs automatically in the following steps:

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

❺ Remove the memory stick and the unit will restart automatically.

❻ If necessary, customer-specific settings saved before the update may now be resaved to the unit (→ 🗎 51).

Firmware update with USB Update Tool (USB type B)

Requirement: Windows XP, 7, 8, or 10 operating system

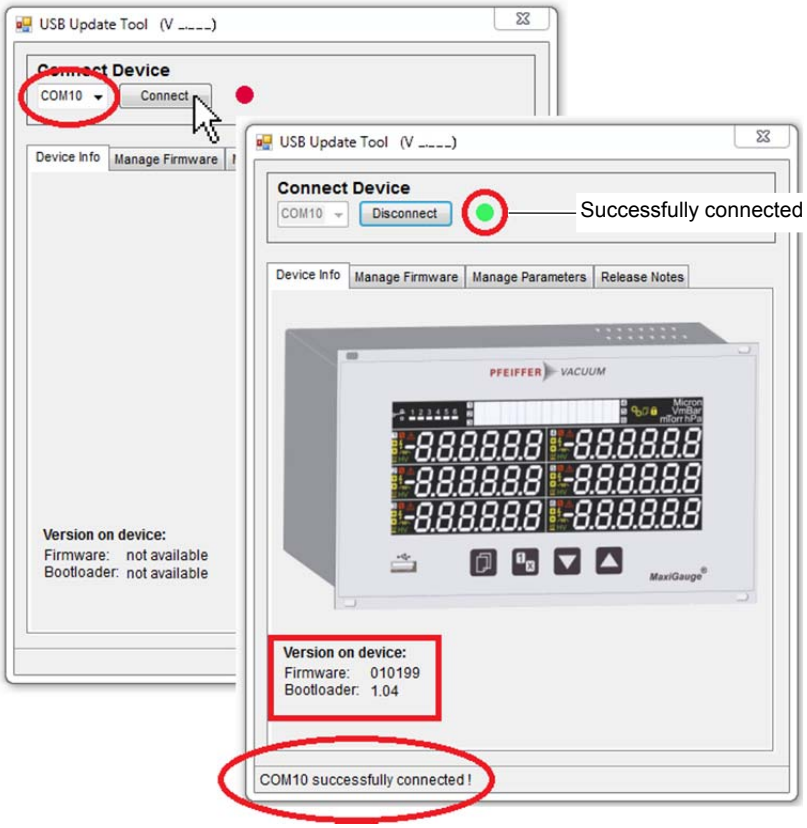
During firmware update, no USB memory stick should be connected on the front of the unit.

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

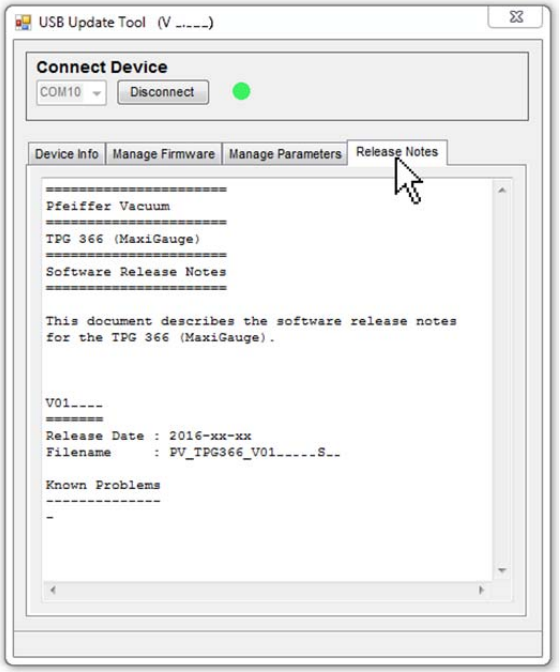
❶ Download the USB update tool from our website "www.pfeiffer-vacuum.com".

❷ Connect the unit to the PC with a type A/B USB cable.

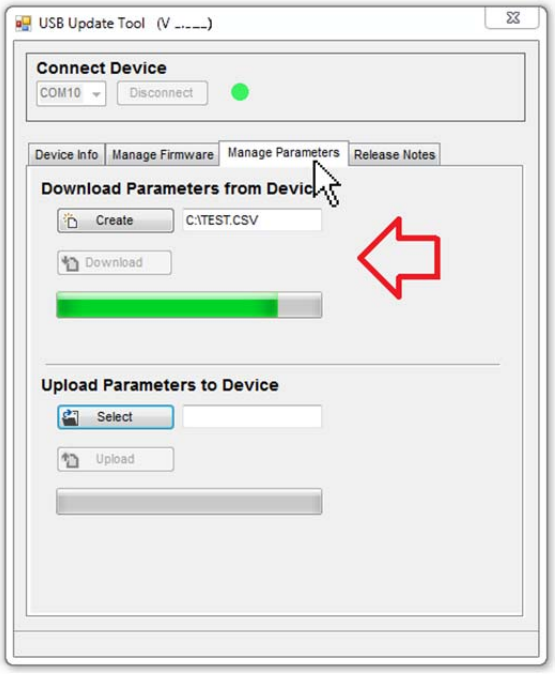
❸ Start the USB UpdateTool, select the COM interface from the selection list and click <Connect>.



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

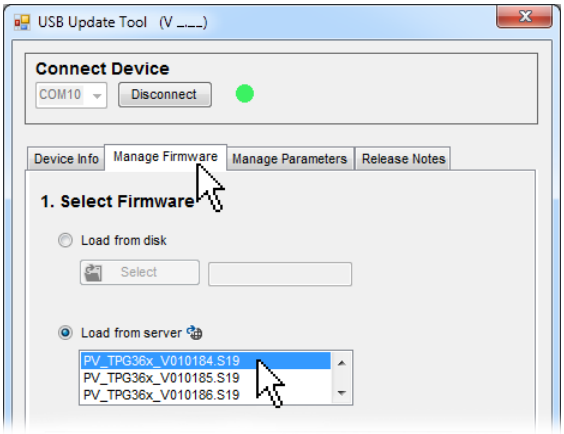


❺ We recommend that you save the parameters on the <Manage Parameters> tab page before an update.

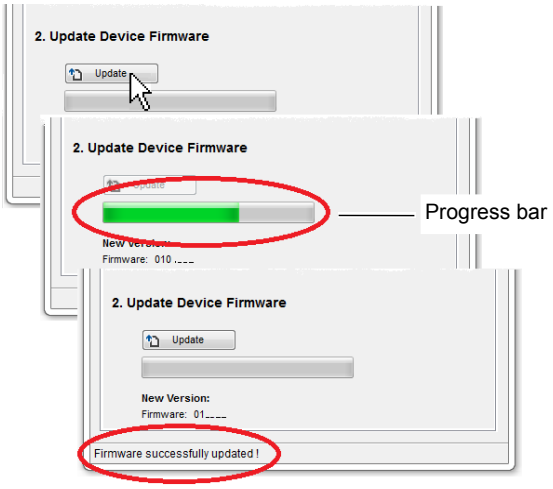


❻ Open the <Manage Firmware> tab page, select firmware …

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

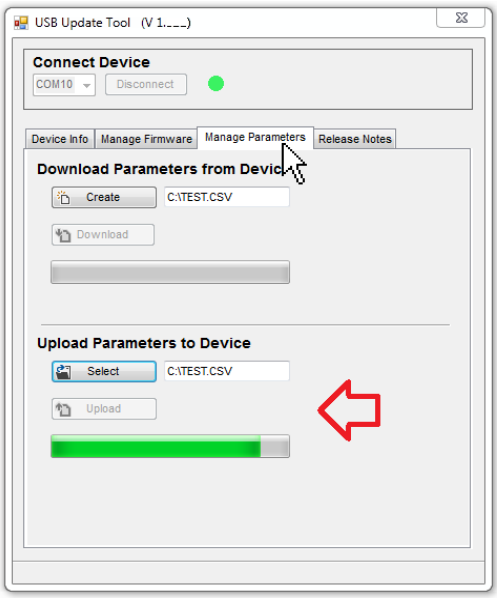


… and click <Update>: The firmware is updated.



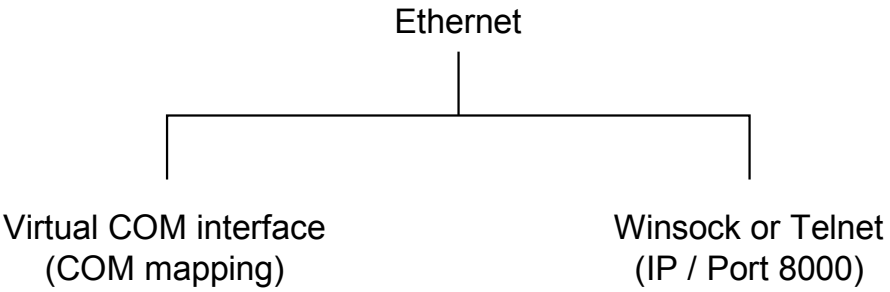
If the update was not successful, try again.

❼ Save the parameters back to the unit.



C: Ethernet Configuration

The TPG 366 can be connected via the virtual COM interface or via Winsock / Telnet.



Virtual COM interface (COM mapping)

The Ethernet configuration tool facilitates configuration of the Ethernet interface via a PC. In addition, a virtual serial interface (COM) can be assigned to an IP address.

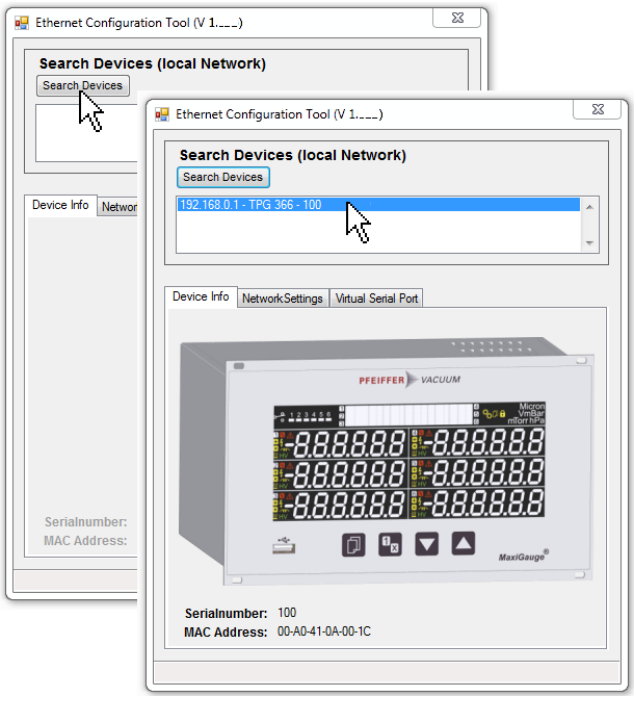
The virtual COM interfaces allow you to access each program that supports serial interfaces (e.g. terminal program, LabView, etc.). Depending on the protocol setting (→ 🖹 42), communication with the unit occurs with the mnemonic or Pfeiffer Vacuum protocol.

Requirement: Windows 7, 8, or 10 operating system (does not run on Windows XP)

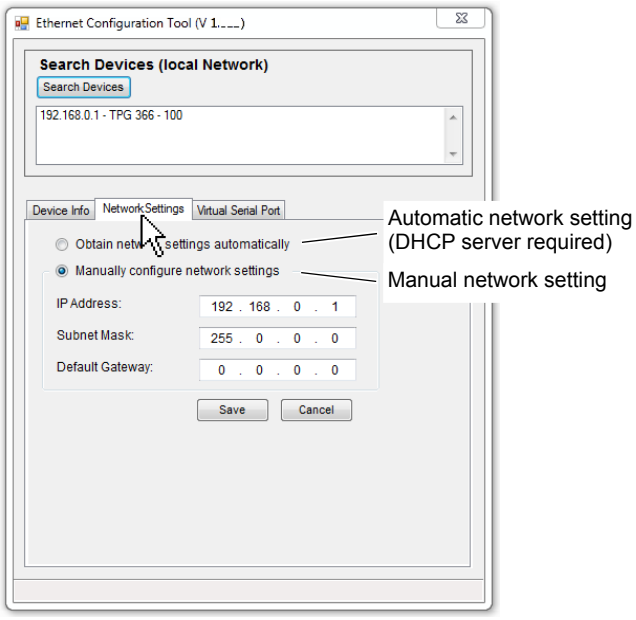
❶ Download the Ethernet configuration tool from our website "www.pfeiffer-vacuum.com".

❷ Connect the unit to the network with an Ethernet cable.

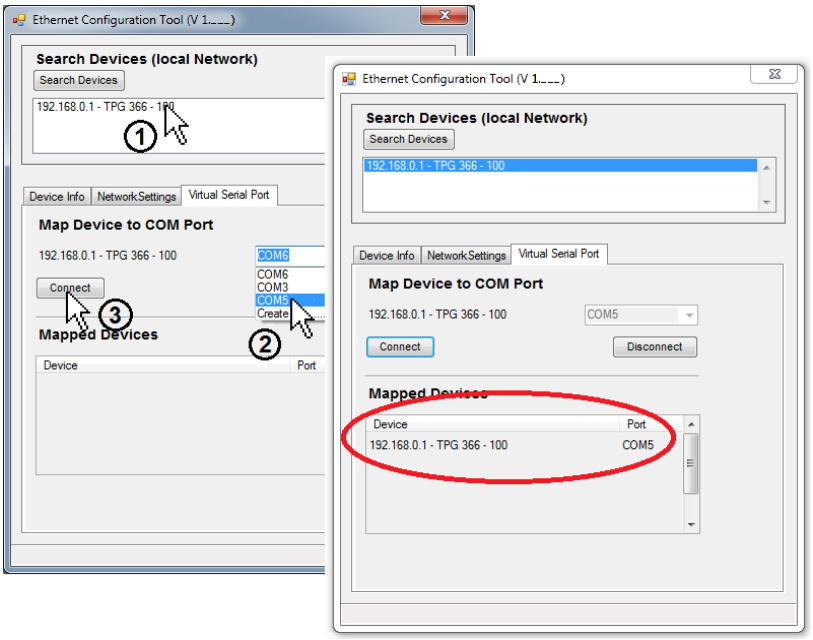
❸ Launch the Ethernet configuration tool and click <Search Devices>: The tool searches the local network for connected devices and lists the devices found in the selection window. The <Device Info> tab page shows basic information about the selected device.



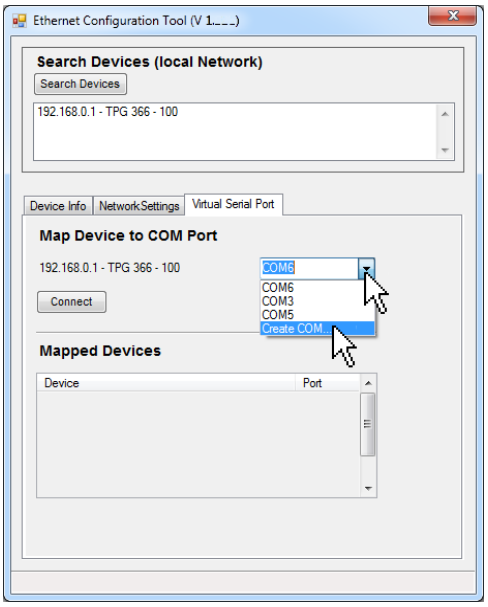
❹ The <Network Settings> tab page is where the automatic or manual network settings are configured.



❺ On the <Virtual Serial Port> tab page, you can assign a separate COM port to each device, and/or …



… generate a new COM port.



D: Literature

[1] www.pfeiffer-vacuum.com
Instruction Sheet
Pirani Gauge TPR 261
BG 5105 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[2] www.pfeiffer-vacuum.com
Instruction Sheet
Pirani Gauge TPR 265
BG 5177 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[3] www.pfeiffer-vacuum.com
Operating Instructions
Pirani Gauge TPR 280, TPR 281
BG 5178 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[4] www.pfeiffer-vacuum.com
Operating Instructions
Compact Pirani Capacitance Gauge PCR 260
BG 5180 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[5] www.pfeiffer-vacuum.com
Operating Instructions
Compact Pirani Capacitance Gauge PCR 280
BG 5181 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[6] www.pfeiffer-vacuum.com
Instruction Sheet
Compact Cold Cathode Gauge IKR 251
BG 5110 BN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[7] www.pfeiffer-vacuum.com
Instruction Sheet
Compact Cold Cathode Gauge IKR 261
BG 5113 BN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

[8] www.pfeiffer-vacuum.com
Instruction Sheet
Compact Cold Cathode Gauge IKR 270
BG 5115 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [9] www.pfeiffer-vacuum.com
Operating Instructions
Compact Cold Cathode Gauge IKR 360, IKR 361
Compact FullRange® Gauge PKR 360, PKR 361
BG 5164 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [10] www.pfeiffer-vacuum.com
Instruction Sheet
Compact FullRange® Gauge PKR 251
BG 5119 BN
Pfeiffer Vacuum GmbH D–35614 Aßlar, Germany

🕮 [11] www.pfeiffer-vacuum.com
Instruction Sheet
Compact FullRange® Gauge PKR 261
BG 5122 BN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [12] www.pfeiffer-vacuum.com
Instruction Sheet
Compact Process Ion Gauge IMR 265
BG 5132 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [13] www.pfeiffer-vacuum.com
Instruction Sheet
Compact FullRange® BA Gauge PBR 260
BG 5131 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [14] www.pfeiffer-vacuum.com
Instruction Sheet
Compact Capacitance Gauge CMR 261 … CMR 275
BG 5133 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [15] www.pfeiffer-vacuum.com
Operating Instructions
Compact Capacitance Gauge CMR 361 … CMR 365
BG 5136 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [16] www.pfeiffer-vacuum.com
Operating Instructions
Compact Capacitance Gauge CMR 371 … CMR 375
BG 5138 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [17] www.pfeiffer-vacuum.com
Instruction Sheet
Compact Piezo Gauge APR 250 … APR 267
BG 5127 BN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [18] www.pfeiffer-vacuum.com
Installation Instructions
TPG 366
BG 5512 BXX
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [19] www.pfeiffer-vacuum.com
Communication Instructions
RS485- und Pfeiffer Vacuum Protokoll
BG 5511 BEN
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

ETL Certification

4010094

ETL LISTED

The product TPG 366

- conforms to the UL Standards UL 61010-1 and UL 61010-2-030
- is certified to the CAN/CSA Standards C22.2 No. 61010-1-12 and C22.2 No. 61010-2-030

EU Declaration of Conformity

CE

We, Pfeiffer Vacuum, hereby declare that the equipment mentioned below complies with the provisions of the Low Voltage Directive 2014/35/EU, the EMC Directive 2014/30/EU, and the RoHS Directive 2011/65/EU

Product

Total Pressure Measurement and Control Unit

TPG 366

Article number

PT G28 770

Standards

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 in low voltage supply systems)
- EN 61000-6-1:2007
  (EMC: Immunity for residential, commercial and light-industrial environments)
- EN 61000-6-2:2005
  (EMC: Immunity for industrial environments)
- EN 61000-6-3:2007 + A1:2011
  (EMC: Emission standard for residential, commercial and light-industrial environments)
- EN 61000-6-4:2007 + A1:2011
  (EMC: Emission standard for industrial environments)
- EN 61010-1:2010
  (Safety requirements for electrical equipment for measurement, control, and laboratory use)
- EN 61326-1:2013; Group 1, Class B
  (EMC requirements for electrical equipment for measurement, control, and laboratory use)

Manufacturer / Signatures

Pfeiffer Vacuum GmbH, Berliner Str. 43, D-35614 Aßlar

Aßlar, 24. March 2017

Dr. Ulrich von Hülsen
Managing Director

Notes

VACUUM SOLUTIONS FROM A SINGLE SOURCE

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:
We are the only supplier of vacuum technology that provides a complete product portfolio.

COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!
We can support you with your plant layout and provide first-class on-site-service worldwide.

Looking for a perfect vacuum solution?
Please contact us:

Pfeiffer Vacuum GmbH
Headquarters
T +49 6441 802-0
info@pfeiffer-vacuum.de

www.pfeiffer-vacuum.com

PFEIFFER VACUUM

bg5501ben/ a