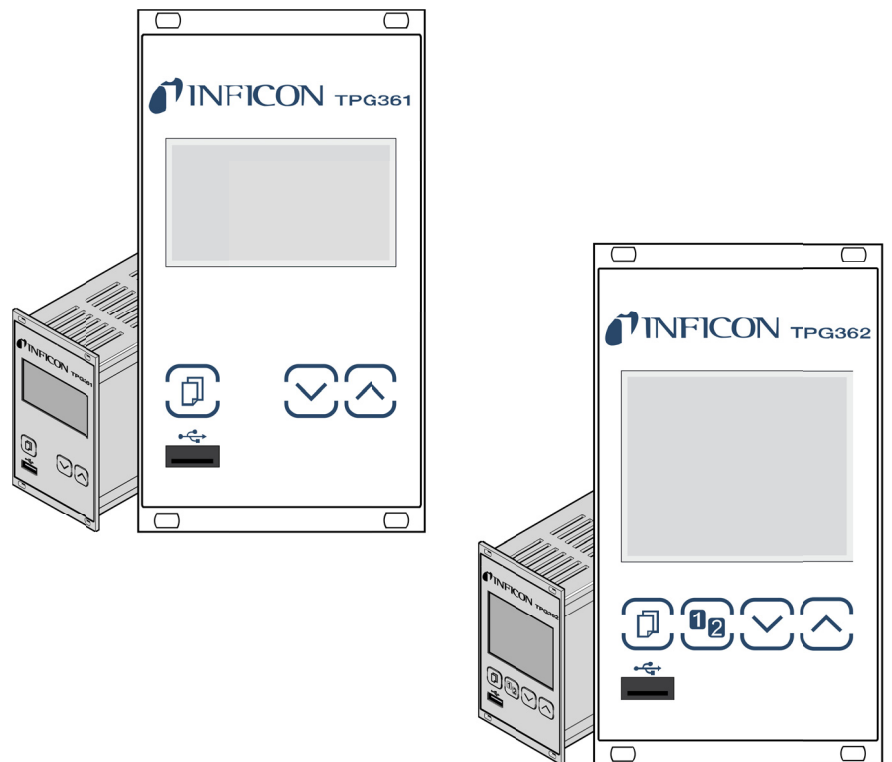


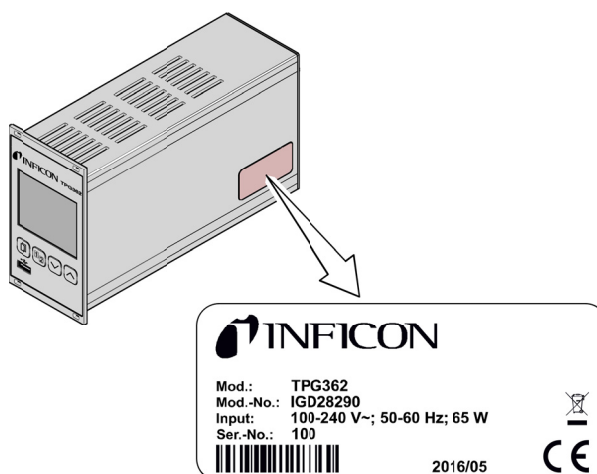
Single-Channel & Two-Channel Control Units for Compact Gauges

TPG361, TPG362



Product Identification

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



Specimen nameplate

Validity

This document applies to products with part numbers:

IGD28040 (TPG361)
IGD28290 (TPG362)

The part number (PN) can be found on the product nameplate.

This manual is based on firmware version V1.00.

If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 44).

If not indicated otherwise in the legends, the illustrations in this document correspond to the unit TPG362. They apply to the TPG361 by analogy.

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

All dimensions are indicated in mm.

Intended Use

The TPG361 and TPG362 are used together with INFICON compact gauges for total pressure measurement. All products must be operated in accordance with their respective Operating Manuals.

Scope of Delivery



The scope of delivery consists of the following parts:

- 1 Control Unit
- 1 Power cord
- 1 Connector for *control* connection
- 4 Collar screws and plastic sleeves
- 2 Rubber feet
- 1 Rubber bar
- 1 CD-ROM (manuals, tools, ...)
- 1 EU Declaration of Conformity
- 1 Installation Manual

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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



Information on preventing any kind of physical injury.



Information on preventing extensive equipment and environmental damage.



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

Further symbols



The lamp / display is lit.



The lamp / display flashes.



The lamp / display is 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 end-user of the product.

1.3 General Safety Instructions

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

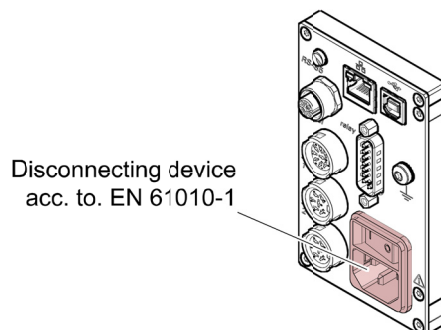
⊠
DANGER

DANGER: mains voltage
 Contact with live parts is extremely hazardous when any objects are introduced or any liquids penetrate into the unit.
 Make sure no objects enter through the louvers and no liquids penetrate into the equipment.

Disconnecting device

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

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




Communicate the safety instructions to all other users.







1.4 Liability and Warranty

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

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

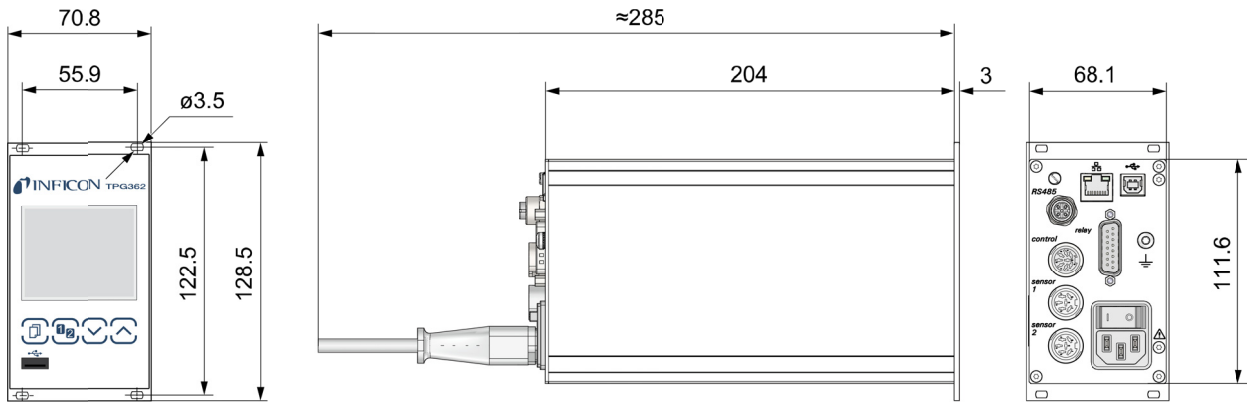
2 Technical Data

Mains specifications	Voltage	100 ... 240 VAC ±10%
	Frequency	50 ... 60 Hz
	Power consumption	
	TPG361	≤45 VA
	TPG362	≤65 VA
	Overvoltage category	II
	Protection class	1
	Connection	European appliance connector IEC 320 C14
Ambience	Temperature	
	storage	-20 ... +60 °C
	operation	+ 5 ... +50 °C
	Relative humidity	≤80% up to +31 °C, decreasing to 50% at +40 °C
	Use	indoors only max. altitude 2000 m NN
	Pollution degree	II
	Degree of protection	IP20
Gauge connections	Number	
	TPG361	1
	TPG362	2 (1 per channel)
	<i>sensor connector</i>	Amphenol C91B appliance connector, 6-pin, (pin assignment →  15)
	Compatible compact gauges	
	Pirani	TPR261, TPR265, TPR280, TPR281
	Pirani Capacitance	PCR260, PCR280
	Cold Cathode	IKR251, IKR261, IKR270, IKR360, IKR361
	FullRange® CC	PKR251, PKR261, PKR360, PKR361
	Process Ion	IMR265
	FullRange® BA	PBR260
	Capacitance	CMR261 ... CMR275, CMR361 ... CMR375
	Piezo	APR250 ... APR267
Gauge supply	Voltage	+24 VDC ±5%
	Ripple	<±1%
	Current	0 ... 1 A (per channel)
	Power	25 W (per channel)
	Fuse protection	1.5 A (per channel) with PTC element, self- resetting after turning the unit off or disconnect- ing the gauge. The supply conforms to the grounded protective extra low voltage require- ments.
	Operation	Front panel
TPG361		via 3 keys
TPG362		via 4 keys
Remote control		via RS485 interface via USB type B interface via ethernet interface

Measurement values	Measurement ranges	depending on gauges (→  [1] ... [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	750 ms ($f_g = 0.2$ Hz)
	normal	150 ms ($f_g = 1$ Hz)
	fast	20 ms ($f_g = 8$ Hz)
	Measurement units	mBar, hPa, Torr, Pa, Micron, V
	Offset correction	for linear gauges -5 ... 110% F.S.
	Calibration factor	0.10 ... 10.00
A/D converter	resolution 0.001% F.S.	
Switching functions	Number	
	TPG361	2
	TPG362	4 (user-assignable)
	Reaction delay	≤10 ms, if switching threshold close to measurement value (for larger differences consider filter time constant).
	Adjustment range	depending on gauge (→  [1] ... [18])
Hysteresis	≥1% F.S. for linear gauges, ≥10% of measurement value for logarithmic gauges	
Switching function relays	Contact type	floating changeover contact
	Load max.	60 V (dc), 30 W (ohmic) 30 V (ac), 1 A (ohmic)
	Service life	
	mechanical	1×10^8 cycles
	electrical	1×10^5 cycles (at max. load)
	Contact positions	→  16
Relay connector	D-Sub appliance connector, female, 15-pin (pin assignment →  16)	
Error signal	Number	1
	Reaction time	≤10 ms
Error signal relay	Contact type	floating normally open contact
	Load max.	60 V (dc), 0.5 A, 30 W (ohmic) 30 V (ac), 1 A (ohmic)
	Service life	
	mechanical	1×10^8 cycles
	electrical	1×10^5 cycles (at max. load)
	Contact positions	→  15
Control connector	Amphenol C91B appliance connector, female, 7-pin (pin assignment →  15)	

Gauge control	Automatic	
	ON setpoint	adjustable (→ 136)
	OFF setpoint	adjustable (→ 137)
	Manual	
	via keys	
	activation/deactivation	→ 122
	External	
	via <i>control</i> connector	
	ON condition	Signal $\leq +0.8$ V (dc)
	OFF condition	Signal $+2.0 \dots 5$ V (dc) or input open
Hotstart		
when mains power on	→ 136	
Self control		
deactivation when pressure is rising OFF threshold	adjustable (→ 137)	
<i>Control</i> connector	Amphenol C91B appliance connector, female, 7-pin (pin assignment → 15)	
Analog outputs	Number	
	TPG361	1
	TPG362	2 (1 per channel)
	Voltage range	0 ... +10 V (dc)
	Deviation from display value	± 10 mV
	Output resistance	$< 50 \Omega$
	Measuring signal vs. pressure	depending on gauge (→ 11 ... 118)
<i>Control</i> connector	Amphenol C91B appliance connector, female, 7-pin (pin assignment → 15)	
RS485 interface	Protocol	ACK/NAK, ASCII with 3-character mnemonics
	Data format	bi-directional data flow, 1 start bit, 8 data bits, 1 stop bit, no parity bit, no handshake
	Transmission rate	9600
	<i>RS485</i> connector	Binder M12 appliance connector, 5-pin (pin assignment → 17)
USB Type A interface	Protocol	FAT file system file handling in ASCII format
USB Type B interface	Protocol	ACK/NAK, ASCII with 3-character mnemonics
	Data format	bi-directional data flow, 1 start bit, 8 data bits, 1 stop bit, no parity bit, no handshake
	Transmission rate	9600, 19200, 38400, 57600, 115200
Ethernet interface	Protocol	ACK/NAK, ASCII with 3-character mnemonics
	Data format	bi-directional, 1 start bit, 8 data bits, 1 stop bit, no parity bit, no handshake
	Transmission rate	9600, 19200, 38400, 57600, 115200
	IP Address	DHCP or manual setting (→ 87)
	MAC Address	readable via "MAC" mnemonic

Dimensions [mm]



Use

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

Weight

1.1 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 end-user 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

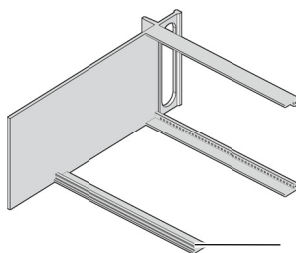
DANGER: protection class of the rack

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

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

Guide rail

In order to reduce the mechanical strain on the front panel of the TPG36x, preferably equip the rack chassis adapter with a guide rail.



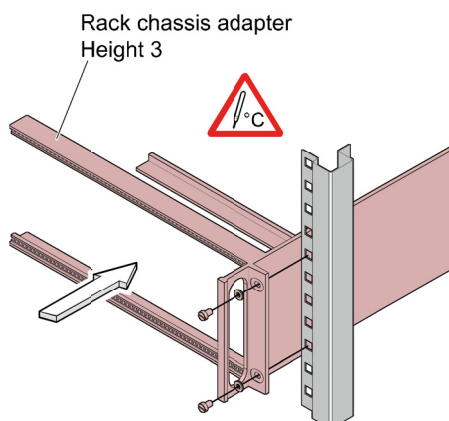
Guide rail

Height 3 rack chassis adapter

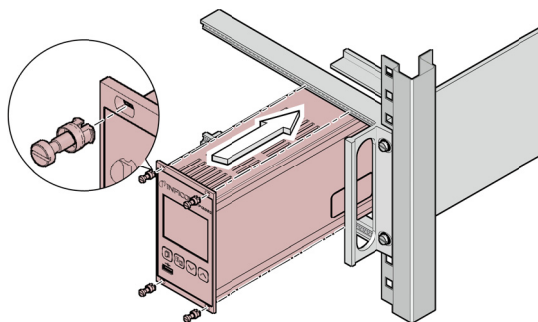
- 1 Secure the rack adapter in the rack frame.



The maximum admissible ambient temperature (→ 7) must not be exceeded and the air circulation must not be obstructed.



- 2 Slide the TPG36x into the rack chassis adapter ...



... and fasten the adapter panel to the rack chassis adapter using the screws supplied with the TPG36x.

3.2.2 Installation in a control panel

STOP DANGER

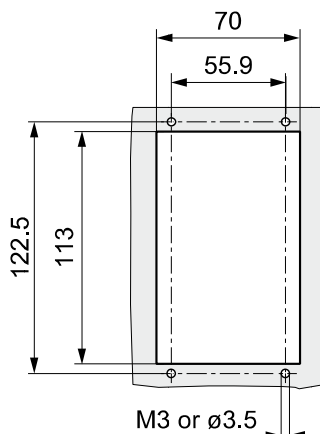


DANGER: protection class of the rack

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

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

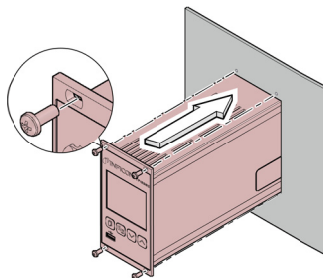
For mounting the TPG36x into a control panel, the following cut-out is required:



The maximum admissible ambient temperature (→ 7) must not be exceeded and the air circulation must not be obstructed.

For reducing the mechanical strain on the front panel of the TPG36x, preferably support the unit.

- 1 Slide the TPG36x into the cut-out of the control panel ...

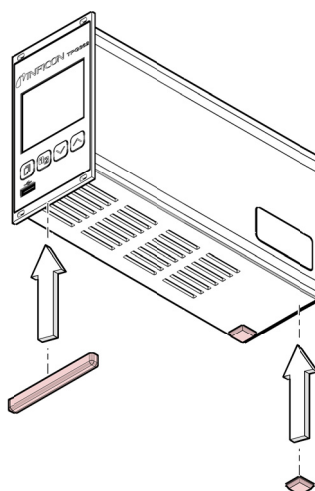


... and secure it with four M3 or equivalent screws.

3.2.3 Use as Desk-Top Unit

The TPG36x may also be used as a desk-top unit. For this purpose, two self-adhesive rubber feet and a slip-on rubber bar are supplied with it.

- 1 Stick the two supplied rubber feet to the rear part of the bottom plate ...



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



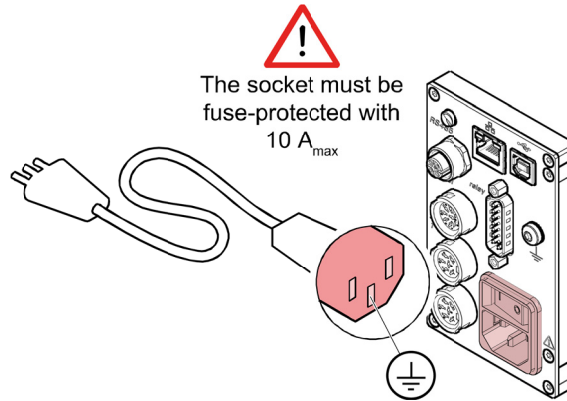
Select a location where the admissible maximum ambient temperature (→ 7) is not exceeded (e.g. due to sun irradiation).

3.3 Mains Power Connector

DANGER

DANGER: line voltage
 Incorrectly grounded products can be extremely hazardous in the event of a fault.
 Use only a 3-conductor power cable with protective ground. The mains power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

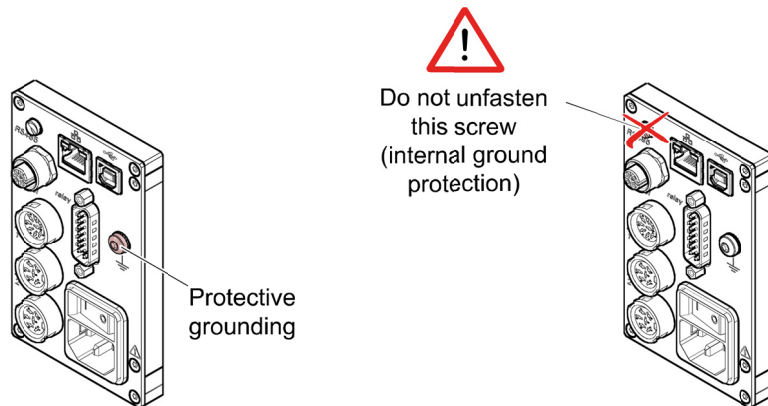
The unit is supplied with a power cord. If the mains connector is not compatible with your system, use your own, suitable cable with protective ground ($3 \times 1.5 \text{ mm}^3$).



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

Ground Connection

On the rear of the unit is a screw enabling the TPG36x where necessary to be connected via a ground conductor, e.g. with the protective ground of the pump stand.



3.4 Gauge Connectors *sensor 1, sensor 2*



Gauge connector *sensor 2* is not present in TPG361.

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



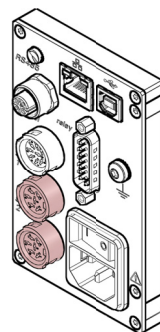
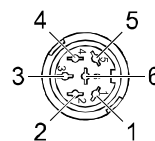
Connect the gauge to the *sensor* connector via a sensor cable set available from us (\rightarrow sales literature) or your own, screened (electromagnetic compatibility) sensor cable. Use compatible gauges only (\rightarrow 7).

Pin assignment
sensor 1, sensor 2



Gauge connector *sensor 2* is not present in TPG361.

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



Pin	Signal
1	Identification
6	Supply +24 V (dc)
2	Supply common GND
3	Signal input (measuring signal 0 ... +10 V (dc))
4	Signal common (measuring signal-)
5	Screening

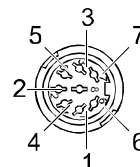
3.5 Control Connector

This connector allows the user to read the measuring signal, evaluate the state of the floating contacts of the error relay, and activate or deactivate the gauges (→ 34).

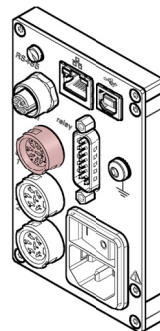


Connect the peripheral components to the *control* connector on the rear of the unit using your own, screened (electromagnetic compatibility) cable.

Pin assignment,
Contact positions
control



Pin assignment of the female 7-pin Amphenol C91B appliance connector:



In TPG361 Pin 1 and Pin 6 are not assigned.

Pin	Signal
2	Analog output gauge 1 0 ... +10 V (dc)
1	Analog output gauge 2 0 ... +10 V (dc)
5	Screening GND
4	Gauge 1 on: signal $\leq +0.8$ V (dc) off: signal +2.0 ... 5 V (dc) or input open
6	Gauge 2 on: signal $\leq +0.8$ V (dc) off: signal +2.0 ... 5 V (dc) or input open
3	No error Error or power supply turned off
7	

A suitable connector is supplied with the TPG36x.

3.6 Relay Connector

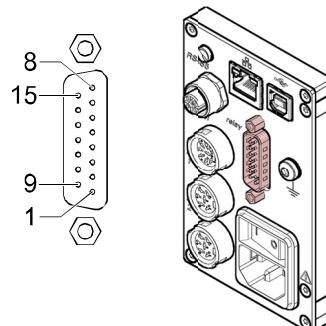
This connector allows to use of the floating switching contacts for an external control system.



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

Pin assignment,
Contact positions
relay

Pin assignment of the female 15-pin D-Sub appliance connector:



In TPG361 Pin 9 to Pin 14 are not assigned.

Pin	Signal
Switching function 1	
4	Pressure below threshold
3	Pressure above threshold or power supply turned off
2	
Switching function 2	
7	Pressure below threshold
6	Pressure above threshold or power supply turned off
5	
Switching function 3	
11	Pressure below threshold
10	Pressure above threshold or power supply turned off
9	
Switching function 4	
14	Pressure below threshold
13	Pressure above threshold or power supply turned off
12	
Supply for relays with higher switching power	
15	+24 V (dc), 200 mA
1	GND
8	GND

Fuse-protected at 300 mA with PTC element, self-resetting after turning off the TPG36x or pulling the *relay* connector. Meets the grounded protective extra low voltage requirements.

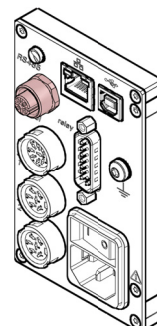
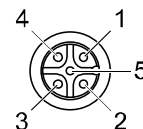
3.7 Interface Connector RS485

The RS485 interface allows for operating the TPG36x via a HOST or terminal (→ 51).



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

Pin assignment
RS485




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

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

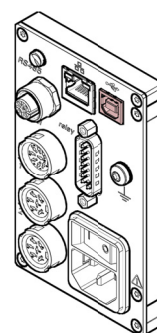
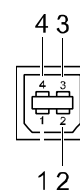
3.8 Interface Connector USB Type B

The USB Type B interface connector facilitates direct communication with the TPG36x via a computer (e.g. firmware update, parameter saving (read/write)).



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

Pin assignment
USB Type B




Pin assignment of the 4-pin USB Type B appliance connector:

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

3.9 Interface Connector USB Type A

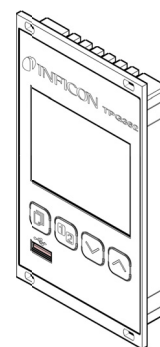
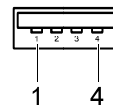
The USB Type A interface connector with master functionality is situated on the front of the unit and is used for the connection of a USB memory stick (e.g. firmware update, parameter saving (read/write), data logger).



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

Pin assignment USB Type A

Pin assignment of the 4-pin USB Type A appliance connector:




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

3.10 Interface Connector Ethernet

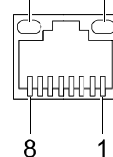
The ethernet interface allows direct communication with the TPG36x via a computer.



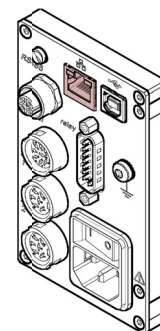
Connect the ethernet cable to the connector  on the rear of the unit.

Pin assignment Ethernet

yellow green



Pin assignment of the 8-pin RJ45 appliance connector:



Pin	Signal
1	TD+ (transmission data +)
2	TD- (transmission data -)
3	RD+ (received data +)
4	NC
5	NC
6	RD- (received data -)
7	NC
8	NC

Green LED

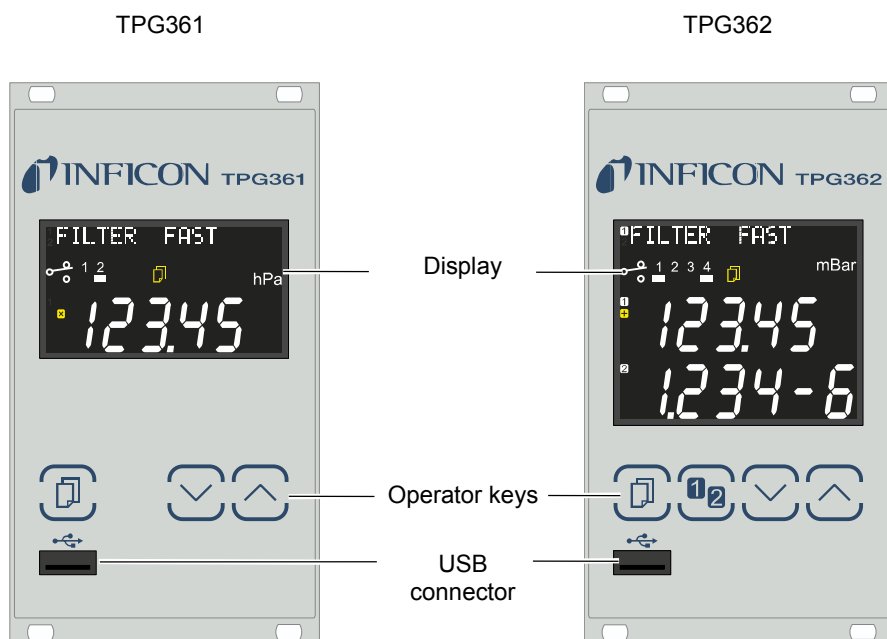
Link or transmit LED. Indicates that a hardware connection has been established.

Yellow LED

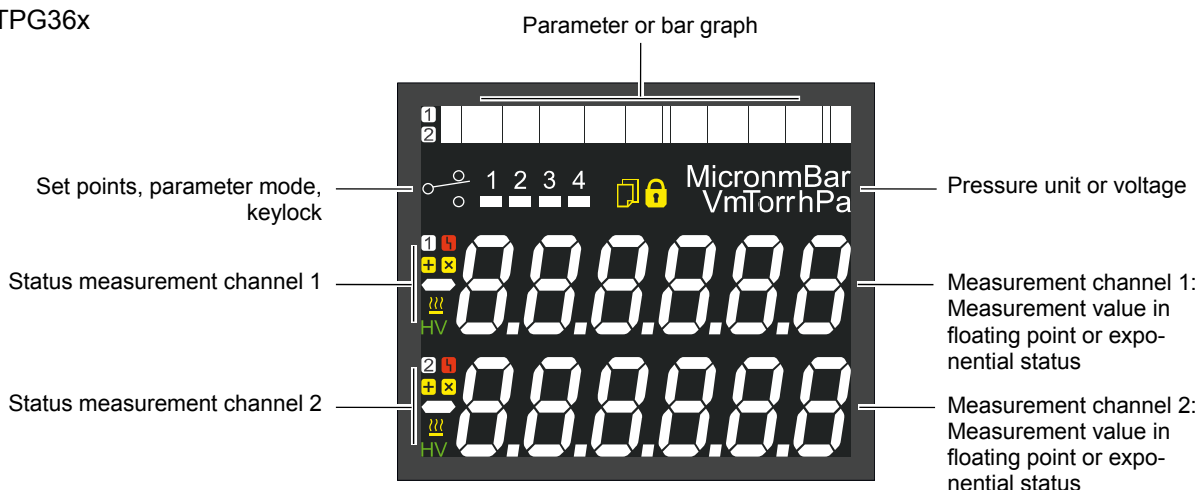
Status or packet detect LED. Indicates the status of the transmission. When this LED flashes or flickers, data are being transmitted.

4 Operation

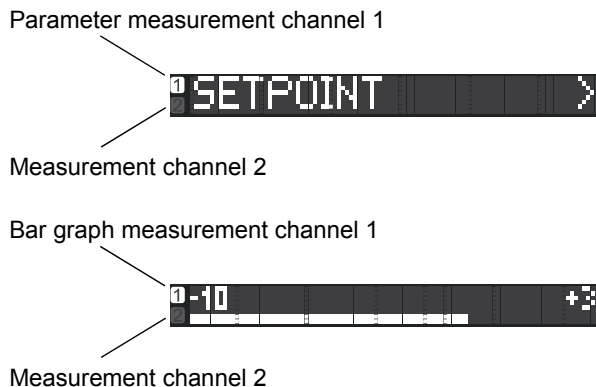
4.1 Front panel



Display TPG36x



Parameter, bar graph



Bar graph with set point measurement channel 1



Measurement channel 2

Pressure vs. time, trend measurement channel 1



Measurement channel 2

Set points, parameter mode, keylock

Set points 1 ... 4



Relay on

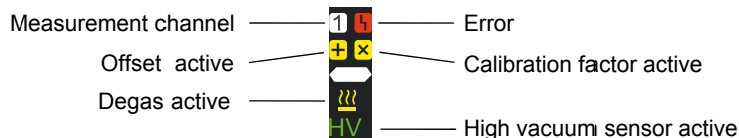
Relay off

Parameter mode activated



Keylock on

Measurement channel specifically



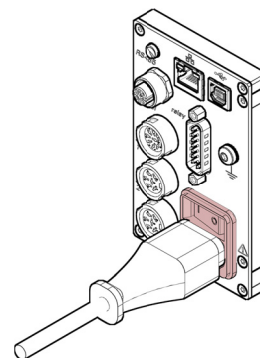
4.2 Turning the TPG36x On and Off

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

Turning the TPG36x on

The power switch is on the rear of the unit.

Turn the TPG36x on with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).



After power on, the TPG36x ...

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

Turning the TPG36x off

Turn the TPG36x off with the power switch (or centrally, via a switched power distributor, if the unit is incorporated in a rack).

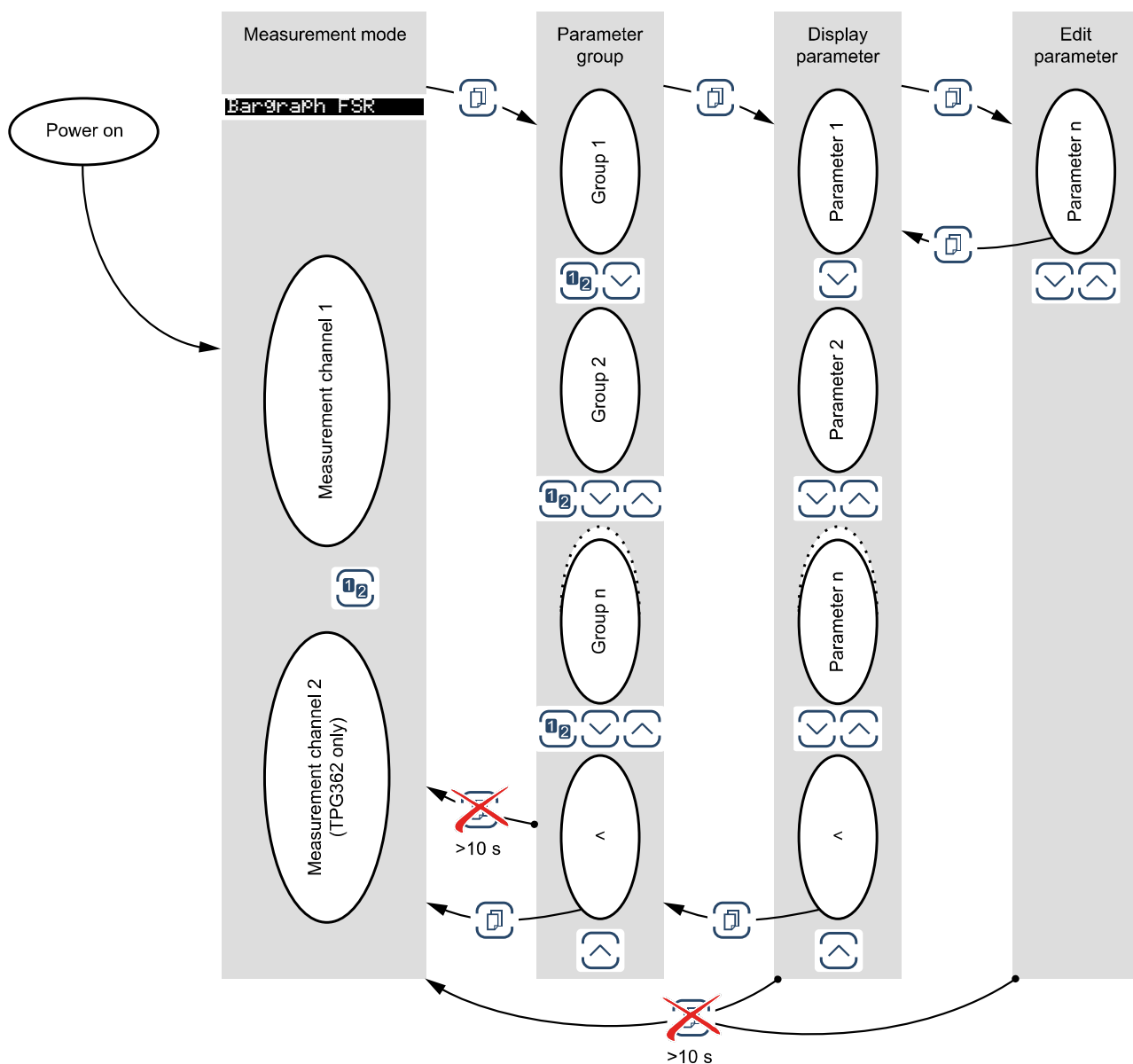


Wait at least 10 s before turning the TPG36x on again in order for it to correctly initialize itself.

4.3 Operating Modes

The TPG36x works in the following operating modes:

- Measurement mode
for displaying measurement values or statuses (→ 22)
- Parameter mode
for displaying and editing parameters (→ 24)
 - Switching function parameter group **SETPOINT** >
 - for entering and displaying thresholds (→ 25)
 - Gauge parameter group **SENSOR** >
 - for entering and displaying gauge parameters (→ 27)
 - Gauge control group **SENSOR-CONTROL** >
 - for entering and displaying gauge control parameters (→ 34)
 - General parameter group **GENERAL** >
 - for entering and displaying general parameters (→ 38)
 - Test program group **TEST** >
 - for running internal test programs (→ 44)
- Data logger mode **DATA LOGGER** >
- for logging measurement data (→ 47)
- Program transfer mode **SETUP** >
- for saving (read/write) parameters (→ 49)



4.4 Measurement Mode

Measurement mode is the standard operating mode of the TPG36x with display of

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

Adjusting bar graph

If required a bar graph may be displayed (→ 41).

Changing measurement channel (TPG362 only)



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

Turning the gauge on/off

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

Available for the following gauges:

- | | | |
|-------------------------------------|--------------------------|-------|
| <input type="checkbox"/> | Pirani Gauge | (TPR) |
| <input type="checkbox"/> | Pirani Capacitance Gauge | (PCR) |
| <input checked="" type="checkbox"/> | Cold Cathode Gauge | (IKR) |
| <input checked="" type="checkbox"/> | FullRange® CC Gauge | (PKR) |
| <input checked="" type="checkbox"/> | Process Ion Gauge | (IMR) |
| <input checked="" type="checkbox"/> | FullRange® BA Gauge | (PBR) |
| <input type="checkbox"/> | Capacitance Gauge | (CMR) |
| <input type="checkbox"/> | Piezo Gauge | (APR) |



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



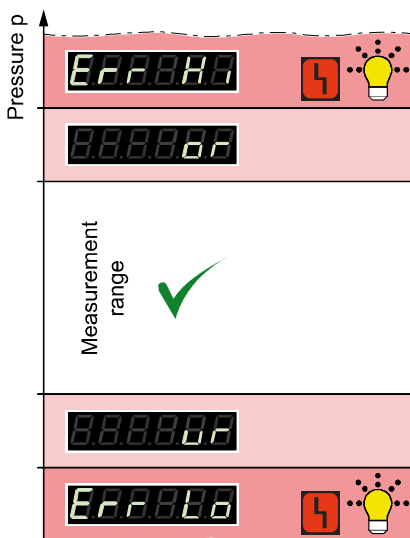
⇒ Press key for >1 s:
Gauges switches on. Instead of the measurement value a status message may be displayed:

Measurement range

If the unit is operated with linear gauges (CMR261 ... 375, APR250 ... 267), negative pressures may be indicated.

Possible causes:

- negative drift
- activated offset correction.



Displaying the gauge identification



⇒ Press keys for >0.5 ... 1 s:
For the measurement channel in question the type of the connected gauge is automatically identified and displayed for 4 s:

Pirani Gauge (TPR261, TPR265, TPR280, TPR281)	}	Sx TPR/PCR
Pirani Capacitance Gauge (PCR260, PCR280)		
Cold Cathode Gauge (IKR251, IKR261, IKR270, IKR360, IKR361)		Sx IKR
FullRange® CC Gauge (PKR251, PKR261, PKR360, PKR361)		Sx PKR
Process Ion Gauge (IMR265)		Sx IMR
FullRange® BA Gauge (PBR260)		Sx PBR
Capacitance Gauge (CMR261 ... CMR375)	}	Sx CMR/APR
Piezo Gauge (APR250 ... APR267)		
No gauge connected		Sx noSENSOR
Gauge connected, but not identifiable		Sx noIDENT

Changing to the Parameter mode



4.5 Parameter Mode

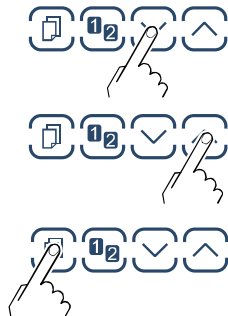
The Parameter mode is used for displaying, editing and entering parameter values as well as for testing the TPG36x and for saving measurement data. For ease of operation the individual parameters are divided into groups.



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



Selecting a parameter group

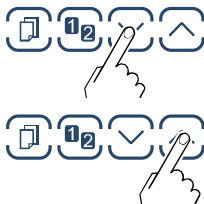


Select group

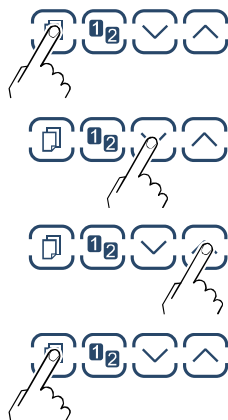
Confirm group

- ⇒ Switching function parameters → 25
- Gauge parameters → 27
- Gauge control → 34
- General parameters → 38
- Test parameters → 44
- Data logger → 47
- Program transfer → 49

Reading a parameter in a parameter group



Editing and saving a parameter in a parameter group



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

Edit the value.

Save the change and return to read mode

4.5.1 Switching Function Parameters

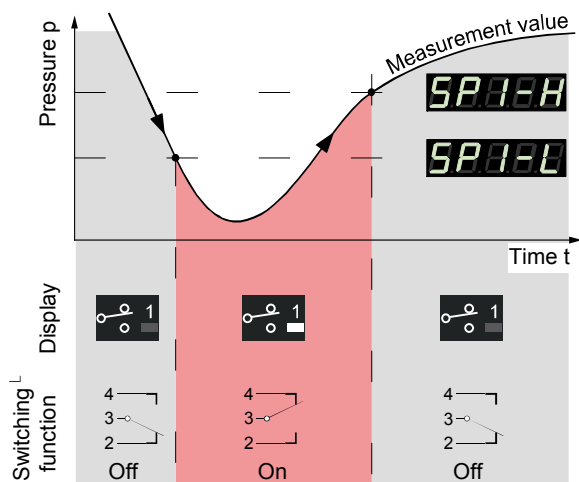
SETPOINT >

The switching function parameter group is used for displaying, editing and entering threshold values and assigning the two (TPG361) or four (TPG362) switching functions to a measurement channel.

Parameters in this group

SP1-CH	Assignment of switching function 1 to a channel
SP1-L	Switching function 1 lower threshold
SP1-H	Switching function 1 upper threshold
SP2-CH	Assignment of switching function 2 to a channel
SP2-L	Switching function 2 lower threshold
SP2-H	Switching function 2 upper threshold
SP3-CH	Assignment of switching function 3 to a channel (TPG362 only)
SP3-L	Switching function 3 lower threshold (TPG362 only)
SP3-H	Switching function 3 upper threshold (TPG362 only)
SP4-CH	Assignment of switching function 4 to a channel (TPG362 only)
SP4-L	Switching function 4 lower threshold (TPG362 only)
SP4-H	Switching function 4 upper threshold (TPG362 only)
<	One level back

The TPG361 has two, and the TPG362 four, switching functions with two adjustable thresholds each. The status of the switching functions is displayed on the front panel (→ 19, 15) and can be evaluated via the floating contacts at the *relay* connector.



Selecting a parameter

⇒ The name of the parameter and the currently valid parameter value are displayed.
e.g.: **SP1-CH DISABLED**
Switching function 1 turned off

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

Editing and saving the parameter

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

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

⇒ Save the change and return to read mode.



We recommend setting the threshold $\frac{1}{2}$ decade above the lower, or $\frac{1}{2}$ decade below the upper, threshold limit.

Assigning a switching function

	Value
SP1-CH	Assignment of a switching function to a measurement channel.
SP1-CH 1	⇒ Switching function 1 is assigned to channel 1
SP1-CH 2	⇒ Switching function 1 is assigned to channel 2
SP1-CH DISABLED	⇒ Switching function 1 is factory-deactivated
SP1-CH ENABLED	⇒ Switching function 1 is turned on



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

Limits of the lower switching thresholds

	Value
SP1-L	The lower threshold (Setpoint low) defines the pressure at which the switching function is activated when the pressure is dropping.
e.g.: SP1-L 5.00-4	⇒ gauge dependent (→ table). If another gauge type is connected, the TPG36x automatically adjusts the switching threshold if required.

	lower threshold limit	upper threshold limit
Sx TPR/PCR	5×10^{-4} *)	1500
Sx IKR	IKR2x1: 1×10^{-9} IKR36x: 1×10^{-9} IKR270: 1×10^{-11}	1×10^{-2}
Sx PKR	1×10^{-9}	1000
Sx IMR	1×10^{-6}	1000
Sx PBR	5×10^{-10}	1000
Sx CMR/APR	F.S. / 1000	F.S

all values in mbar, GAS=nitrogen

*) 5×10^{-5} mbar, 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 full scale value. The upper threshold is if necessary automatically adjusted to a minimum hysteresis. This prevents unstable states.

Limits of the upper switching thresholds

	Value
SP1-H	The upper switching threshold (Setpoint high) defines the pressure at which the switching function is deactivated when the pressure is rising.
e.g.: SP1-H 1500	⇒ Gauge dependent (→ table). If another gauge type is connected, the TPG36x automatically adjusts the threshold if required.

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

all values in mbar, GAS=nitrogen



The minimum hysteresis between the upper and lower switching threshold amounts to at least 10% of the lower threshold or 1% of the set full scale 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 in this group

DEGAS	Cleaning the electrode system.
FSR	Measurement range linear gauges.
FILTER	Measurement value filter.
OFFSET	Offset correction.
GAS	Calibration factor for other gases.
COR	Offset correction.
DIGITS	Display resolution.
<	One level back.

Selecting a parameter

⇒ The name of the parameter and the currently valid parameter value are displayed.
e.g.: **DEGAS OFF**

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

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

→ 28 29 30 31 32 32 33

	DEGAS	FSR	FILTER	OFFSET	GAS	COR	DIGITS
Sx TPR/PCR	-	-	✓	-	✓	✓	✓
Sx IKR	-	-	✓	-	✓	✓	✓
Sx PKR	-	-	✓	-	✓	✓	✓
Sx IMR	-	-	✓	-	✓ ^{*)}	✓	✓
Sx PBR	✓	-	✓	-	✓ ^{*)}	✓	✓
Sx CMR/APR	-	✓	✓	✓	-	✓	✓

^{*)} with restrictions.

Degas

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

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

Editing and saving a parameter

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

Abort Degas.

⇒ Save change and return to read mode.

Measuring range (F.S.) of linear gauges

For linear gauges, the full scale (F.S.) value 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
FSR	
e.g. FSR 1000 MBAR	⇒ 0.01 mbar 0.1 mbar 1 mbar 10 mbar 100 mbar 1000 mbar 2 bar 5 bar 10 bar 50 bar
	A conversion table can be found in the Appendix (→ 82).

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
(→ 15).

	Value
FILTER	
FILTER OFF	⇒ No measurement value filter
FILTER FAST	⇒ Fast: The TPG36x responds quickly to fluctuations in the measurement value. As a result, it will respond faster to interference in the measured values.
FILTER NORMAL	⇒ Normal (factory setting): Good relationship between response and sensitivity of the display and the switching function to changes in the measured values.
FILTER SLOW	⇒ Slow: The TPG36x 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 actual 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)

The offset correction affects:

- the displayed measurement value
- the displayed threshold value of the switching functions
- the analog outputs at the *control* connector (→ 15)

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

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



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

Calibration factor GAS

The calibration factor GAS allows

- the measured value to be calibrated for the preset gases N₂, Ar, H₂, He, Ne, Kr and Xe, or
- manual input of the correction factor for other gases (COR).

→ Characteristic curves in [1] ... [14].



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 mbar.

²⁾ Effective from pressure <1×10⁻⁵ mbar.

³⁾ Effective from pressure <1×10⁻² mbar.

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

Calibration factor COR

The calibration factor COR allows the measured value to be calibrated for other gases (→ characteristic curve in [1] ... [14]).

Precondition: Parameter "GAS COR" set.



This parameter is not available with the measurement unit: 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	
COR		
e.g. COR 1.00	⇒ No correction	
e.g. COR 1.53	⇒ Measurement value corrected by a factor of 0.10 ... 10.00	

Display resolution


Display resolution of measured values.

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
DIGITS	
DIGITS AUTO	⇒ automatic ^{*)} (factory setting)
DIGITS 1	⇒ e.g. 2E-1 or 500
DIGITS 2	⇒ e.g. 2.5E-1 or 520
DIGITS 3	⇒ e.g. 2.47E-1 or 523
DIGITS 4	⇒ e.g. 2.473E-1 or 523.7

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

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

4.5.3 Gauge Control

SENSOR-CONTROL

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



If the connected gauges cannot be controlled (→ 35), this group is not available.

Parameters in this group

- S-ON Gauge activation
- S-OFF Gauge deactivation
- T-ON ON threshold
- T-OFF OFF threshold
- < One level back

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

→ 35 36 36 37

	S-ON	T-ON	S-OFF	T-OFF
Sx TPR/PCR	-	-	-	-
Sx IKR	✓	✓	✓	✓
Sx PKR	✓	-	✓	-
Sx IMR	✓	✓	✓	✓
Sx PBR	✓	✓	✓	✓
Sx CMR/APR	-	-	-	-




Gauge activation

Certain 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
S-ON	
S-ON HAND	⇒ Manual activation: The gauge is activated by pressing the  key.
S-ON EXTERNAL	⇒ External activation: The gauge is activated by an input signal fed via the <control> connector →  15).
S-ON HOTSTART	⇒ Hot start: The gauge is automatically activated when the TPG36x is turned on. Measurement is thus automatically resumed after a power failure. Gauge deactivation →  36.
S-ON CH 1 (TPG362 only)	⇒ Automatic activation: The gauge is activated by one of the following gauges connected to measurement channel 1: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Pirani & Pirani Capacitance Gauge (TPR/PCR) <input type="checkbox"/> Cold Cathode Gauge (IKR) <input checked="" type="checkbox"/> FullRange® CC Gauge (PKR) <input checked="" type="checkbox"/> Process Ion Gauge (IMR) <input checked="" type="checkbox"/> FullRange® BA Gauge (PBR) <input checked="" type="checkbox"/> Capacitance Gauge *) (CMR/APR) *) only gauges with 1, 10 or 100 mbar F.S.
S-ON CH 2 (TPG362 only)	⇒ Automatic activation: The gauge is activated by one of the following gauges connected to measurement channel 2: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Pirani & Pirani Capacitance Gauge (TPR/PCR) <input checked="" type="checkbox"/> Pirani Capacitance Gauge (PCR) <input type="checkbox"/> Cold Cathode Gauge (IKR) <input checked="" type="checkbox"/> FullRange® CC Gauge (PKR) <input checked="" type="checkbox"/> Process Ion Gauge (IMR) <input checked="" type="checkbox"/> FullRange® BA Gauge (PBR) <input checked="" type="checkbox"/> Capacitance & Piezo Gauge *) (CMR/APR) *) only gauges with 1, 10 or 100 mbar F.S.

ON threshold (TPG362 only)

Definition of the ON threshold for the gauge to be activated by a gauge connected to the other measurement channel.

Available for the following 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
T-ON	
e.g.: T-ON 1.00	→ table below.

	TPR PCR	PKR IMR PBR	CMR, APR		
			F.S.=1	F.S.=10	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 mbar, CAL=1

^{*)} 10⁻⁴ mbar, if PrE is activated (→ 39)



Value **T-OFF** must be ≥ **T-ON** .

Gauge deactivation

Certain 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
S-OFF	
S-OFF HAND	⇒ Manual deactivation: The gauge is deactivated by pressing the key
S-OFF EXTERNAL	⇒ External deactivation: The gauge is deactivated by an input signal via the <control> connector → 15).
S-OFF SELF (also with Cold Cathode Gauge)	⇒ Self control: The gauge deactivates itself when the pressure rises (→ 37).
S-OFF CH 1 (only TPG362)	⇒ Automatic deactivation: The gauge is deactivated by one of the following gauges connected to measurement channel 1: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Pirani & Pirani Capacitance Gauge (TPR/PCR) <input type="checkbox"/> Cold Cathode Gauge (IKR) <input checked="" type="checkbox"/> FullRange® CC Gauge (PKR) <input checked="" type="checkbox"/> Process Ion Gauge (IMR) <input checked="" type="checkbox"/> FullRange® BA Gauge (PBR) <input checked="" type="checkbox"/> Capacitance & Piezo Gauge ^{*)} (CMR/APR)

S-OFF CH 2
(only TPG362)

*) only for gauges with 1, 10 or 100 mbar F.S.

⇒ Automatic deactivation:
The gauge is deactivated by one of the following gauges connected to measurement channel 2:

- 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 mbar F.S.

OFF threshold
(TPG361 only)

Definition of the OFF threshold for the gauge to be deactivated by itself.

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
T-OFF	
e.g.: T-OFF 0.001	$10^{-5} \dots 10^{-2}$ mbar, GAS = N ₂

OFF threshold
(TPG362 only)

Definition of the OFF threshold for the gauge to be deactivated by a gauge connected to the other measurement channel or by itself.

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
T-OFF	
e.g.: T-OFF 0.001	→ table below.

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

all values in mbar, CAL=1

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



Value **T-OFF** must be \geq **T-ON**.

4.5.4 General Parameters

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

Parameters in this group

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

Measurement unit

Unit of measured values, thresholds etc. See Appendix for conversion table (→ 82).

	Value
UNIT	
UNIT MBAR	⇒ mBar
UNIT HPASCAL	⇒ hPa (factory setting)
UNIT TORR	⇒ Torr (only available if Torr lock is not activated → 45)
UNIT PASCAL	⇒ Pa
UNIT MICRON	⇒ Micron (= 0.001 Torr) (only available if Torr lock is not activated → 45)
UNIT VOLT	⇒ V

TPG361 only: If the measurement unit micron is selected, automatic changeover to Torr occurs above 99000 micron. Below 90 Torr automatic changeover back to the measurement unit micron occurs.

Transmission rate

Transmission rate of the USB interface.

The transmission rate of the RS485 interface is 9600 baud and cannot be changed.

	Value
BAUD USB	
BAUD USB 9600	⇒ 9600 baud (factory setting)
BAUD USB 19200	⇒ 19200 baud
BAUD USB 38400	⇒ 38400 baud
BAUD USB 57600	⇒ 57600 baud
BAUD USB 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} mbar can be extended (the setting only affects the control unit).

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
RNG-EXT	
RNG-EXT DISABLED	⇒ Deactivated (factory setting)
RNG-EXT ENABLED	⇒ Display and setpoint adjustment range extended to 5×10^{-5} mbar

Error relay

Switching behaviour of the error relay.

	Value
ERR-RELAY	
ERR-RELAY ALL	⇒ Switches for all errors (factory setting)
ERR-RELAY no SE	⇒ Only unit errors
ERR-RELAY CH 1	⇒ Error sensor 1 and unit error
ERR-RELAY CH 2	⇒ Error sensor 2 and unit error (only TPG362)

Underrange control

Definition of behaviour 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: relay is switching

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
<div style="background-color: black; color: white; padding: 2px; margin-bottom: 5px;">PE-UR</div> <div style="background-color: black; color: white; padding: 2px; margin-bottom: 5px;">PE-UR DISABLED</div> <div style="background-color: black; color: white; padding: 2px;">PE-UR ENABLED</div>	<p>⇒ Factory setting. Underrange state is interpreted as an admissible measurement value. UR is displayed. The switching function remains ON.</p> <p>⇒ Underrange state is interpreted as an admissible measurement value. UR is displayed. The switching function remains OFF.</p>



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 **PE-UR DISABLED**.

If **PE-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 as a function of time ($p = f(t)$) may be shown.

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

	Value
BARGRAPH	
BARGRAPH OFF	⇒ Factory setting.
BARGRAPH FSR	⇒ Bar graph covering full scale range.
BARGRAPH FSR h	⇒ Bar graph covering full scale range, high-level presentation.
BARGRAPH FSR+SP	⇒ Bar graph covering full scale range and setpoint threshold.
BARGRAPH DEC	⇒ Bar graph covering a decade according to current measurement value.
BARGRAPH DEC h	⇒ Bar graph covering a decade according to current measurement value, high-level presentation.
BARGRAPH DEC+SP	⇒ Bar graph covering a decade according to current measurement value and setpoint threshold.
BARGRAPH f(0.2s)	⇒ $p = f(t)$, autoscaled, 0.2 seconds / pixel For each measurement every 200 ms a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 20 seconds.
BARGRAPH f(1s)	⇒ $p = f(t)$, autoscaled, 1 second / pixel For each measurement every second a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 seconds.
BARGRAPH f(6s)	⇒ $p = f(t)$, autoscaled, 6 seconds / pixel For each measurement every 6 seconds a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 10 minutes.
BARGRAPH f(1min)	⇒ $p = f(t)$, autoscaled, 1 minute / pixel For each measurement every minute a measurement value is saved in tabular form and the last 100 measurement values (=100 pixel) are shown autoscaled. The represented data string corresponds to a logging duration of 100 minutes.

Backlight		Value
	BACKLIGHT e.g. BACKLIGHT 60%	⇒ Factory setting Adjustable from 0 ... 100% 100% = full brightness

Screensave		Value
	SCREENSAVE	
	SCREENSAVE OFF	⇒ factory setting
	SCREENSAVE 10min	⇒ after 10 minutes
	SCREENSAVE 30min	⇒ after 30 minutes
	SCREENSAVE 1h	⇒ after 1 hour
	SCREENSAVE 2h	⇒ after 2 hours
	SCREENSAVE 8h	⇒ after 8 hours
	SCREENSAVE DR	⇒ the backlight is switched off completely after 1 minute

Contrast		Value
	CONTRAST e.g. CONTRAST 40%	⇒ factory setting adjustable from 0 ... 100 % 100% = full contrast

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



Loading of the default parameter settings is irreversible.

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

Language	Display language.	Value
	LANGUAGE LANGUAGE ENGLISH LANGUAGE GERMAN LANGUAGE FRENCH	⇒ English (factory setting) ⇒ German ⇒ French

Measurement value format

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

	Value
<code>FORMAT</code>	
<code>FORMAT X.X</code>	⇒ Floating point format, if possible (factory setting)
<code>FORMAT X.XESY</code>	⇒ Exponential format

Display of measurement range end value

Display of underrange or overrange.

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

4.5.5 Test Parameters

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



The group is only available if

- the key was pressed while the unit was turned on, or
- the key was pressed for 5 s while **<** is displayed.

Parameters in this group

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

The parameters in this group are available for all gauges.

Firmware version

The firmware version (program version) is displayed.

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

Hardware version

The hardware version is displayed.

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

MAC address

The MAC address is displayed.

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

Operating hours

The operating hours are displayed.

	Hours
e.g. RUNHOURS 24 h	⇒ Operating hours

Watchdog control

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

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

Torr lock

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

	Setting
TORR-LOCK	
TORR-LOCK OFF	⇒ Measurement unit Torr available (factory setting)
TORR-LOCK ON	⇒ Measurement unit Torr not available



Keylock

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

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



FLASH test

Test of the program memory.

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



EEPROM test

Test of the parameter memory.

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

Display test

Test of the display.

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

I/O test

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



Caution



Caution: The relays switch irrespective of the pressure. Starting a test program may cause unwanted effects in connected control systems.

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

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

The switching function contacts are connected to the *control* connector on the rear of the unit (→ 15). Check their function with an ohmmeter.

	Test sequence
I/O ▼+▲	Press keys at the same time to start test
I/O OFF	⇒ All relays deactivated
I/O REL1 ON	⇒ Switching function relay 1
I/O REL1 OFF	⇒ Switching function relay 1
I/O REL2 ON	⇒ Switching function relay 2
I/O REL2 OFF	⇒ Switching function relay 2
I/O REL3 ON	⇒ Switching function relay 3
I/O REL3 OFF	⇒ Switching function relay 3
I/O REL4 ON	⇒ Switching function relay 4
I/O REL4 OFF	⇒ Switching function relay 4
I/O REL5 ON	⇒ Gauge relay CH1
I/O REL5 OFF	⇒ Gauge relay CH1
I/O REL6 ON	⇒ Gauge relay CH2
I/O REL6 OFF	⇒ Gauge relay CH2
I/O REL7 ON	⇒ Error relay
I/O REL7 OFF	⇒ Error relay

4.6 Data Logger Mode

DATA LOGGER

The data logger group is used for

- recording measurement data on a USB memory stick (interface type A on the front of the TPG36x)
- deleting recorded measurement data from the USB memory stick



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



Not all USB memory sticks are automatically recognized by the TPG36x, as they (in particular cheaper brands) do not always conform to USB standard requirements. Try a different memory stick before contacting your nearest INFICON service center.

Parameters in this group

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

Date

	Value
DATE	Current date in the format YYYY-MM-DD
e.g. DATE 2016-04-26	⇒ e.g. 2016-04-26

Time

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

Interval

Data logging interval.

	Value
INTERVAL	
INTERVAL 1s	⇒ Recording interval 1/s
INTERVAL 10s	⇒ Recording interval 1/10 s
INTERVAL 30s	⇒ Recording interval 1/30 s
INTERVAL 1min	⇒ Recording interval 1/60 s
INTERVAL 1%	⇒ Recording interval: in the event of measurement value changes $\geq 1\%$
INTERVAL 5%	⇒ Recording interval: in the event of measurement value changes $\geq 5\%$

Decimal separator

Decimal separator for measurement values in the measurement data file.

	Wert
DEC-SEPARATOR	
DEC-SEPARATOR ,	⇒ Decimal comma
DEC-SEPARATOR .	⇒ Decimal point

File name

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

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



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

Start / Stop

Starting / stopping measurement value record.



The number of the respective measurement channel (1, 2) flashes during measurement data record.

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



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

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

Deletion

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

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

4.7 Setup Mode

SETUP

This group is used for

- saving all parameters on a USB memory stick (interface type A on the front of the TPG36x)
- loading all parameters from a USB memory stick onto the TPG36x
- formatting a USB memory stick
- deleting files with saved parameters from the USB memory stick



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

Parameters in this group

SAVE	Saving all parameters
RESTORE	Loading all parameters onto the TPG36x
FORMAT	Formatting USB memory stick (FAT32)
CLEAR	Deletion of files with saved parameters
<	One level back

Saving a parameter

Saving all parameters of the TPG36x to a USB memory stick (file ending: CSV).

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



Loading a parameter

Loading all parameters from a USB memory stick onto the TPG36x.

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



Formatting

Formatting USB memory stick.

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

Deleting

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

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

5 Communication Protocol (Serial Interface)

The serial interface is used for communication between the TPG36x and a computer. A terminal can be connected for test purposes.

When the TPG36x is put into operation, it starts transmitting measured values in intervals of 1 s. As soon as the first character is transferred to the TPG36x, the automatic transmission of measured values stops. After the necessary inquiries or parameter modifications have been made, the transmission of measured values can be started again with the **COM** command (→ 54).

Communication structure and procedures are identical for both controllers TPG361 and TPG362. Therefore the term TPG36x is used in this chapter.

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

Example: TPG361 Transmit: **OFC** [,a]
 TPG362 Transmit: **OFC** [,a,b]

5.1 Data Transmission

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

Data format

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

Definitions

The following abbreviations and symbols are used:

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

"Transmit": Data transfer from HOST to TPG36x

"Receive": Data transfer from TPG36x to HOST

Flow Control

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

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

5.2 Communication Protocol

Transmission format Messages are transmitted to the TPG36x as ASCII strings in the form of mnemonic operating codes and parameters. All mnemonics comprise three ASCII characters. Spaces are ignored. <ETX> (CTRL C) clears the input buffer in the TPG36x.

HOST	TPG36x	Explanation
Mnemonics [and parameters]	—————>	Receives message with "end of message"
<CR>[<LF>]	—————>	
	<————— <ACK><CR><LF>	Positive acknowledgment of a received message

Reception format When requested with a mnemonic instruction, the TPG36x transmits the measurement data or parameters as ASCII strings to the HOST.

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


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

HOST	TPG36x	Explanation
Mnemonics [and parameters]	—————>	Receives message with "end of message"
<CR>[<LF>]	—————>	
	<————— <ACK><CR><LF>	Positive acknowledgment of a received message
<ENQ>	—————>	Requests to transmit data
	<————— Measurement values or parameters <CR><LF>	Transmits data with "end of message"
	<————— :	
<ENQ>	—————>	Requests to transmit data
	<————— Measurement values or parameters <CR><LF>	Transmits data with "end of message"
	<————— :	

Error processing The strings received are verified in the TPG36x. If an error is detected, a negative acknowledgment <NAK> is output.

HOST	TPG36x	Explanation
Mnemonics [and parameters]	—————>	Receives message with "end of message"
<CR>[<LF>]	—————>	
***** Transmission or programming error *****		
	<—— <NAK><CR><LF>	Negative acknowledgment of a received message
Mnemonics [and parameters]	—————>	Receives message with "end of message"
<CR>[<LF>]	—————>	
	<————— <ACK><CR><LF>	Positive acknowledgment of a received message

5.3 Mnemonics

		→ 
ADC	A/D converter test	72
AYT	Are you there?	77
BAL	Backlight	64
BAU	Transmission rate (USB)	65
CAL	Calibration factor	60
CF1	Calibration factor gauge 1	60
CF2	Calibration factor gauge 2	60
COM	Continuous mode of measurement values	54
CPR	Combined pressure (linear gauges)	55
DAT	Date	71
DCB	Display control bar graph	66
DCC	Display control contrast	67
DCD	Display resolution	60
DCS	Display control screensave	67
DGS	Degas	61
DIS	Display test	72
EEP	EEPROM test	73
EPR	FLASH test	73
ERA	Error relay allocation	67
ERR	Error status	56
ETH	Ethernet configuration	77
EVA	Measurement range end value	68
FIL	Measurement value filter	61
FMT	Number format (measurement value)	68
FSR	Measurement range (linear gauges)	62
GAS	Gas type correction	62
HDW	Hardware version	73
IOT	I/O test	74
LCM	Start / stop data logger	71
LNG	Language (display)	68
LOC	Keylock	74
MAC	Ethernet MAC address	75
OFC	Offset correction (linear gauges)	63
OFD	Offset display (linear gauges)	63
PNR	Firmware version	75
PR1	Measurement data gauge 1	56
PR2	Measurement data gauge 2	56
PRE	Pirani range extension	69
PRX	Measurement data gauges 1 and 2	57
PUC	Penning underrange control	69
RES	Reset	57
RHR	Operating hours	75
SAV	Save parameters (EEPROM)	69
SC1	Gauge 1 control	64
SC2	Gauge 2 control	64
SCM	Save / load parameters (USB)	72
SEN	Gauge on/off	58

SP1	Switching function 1	59
SP2	Switching function 2	59
SP3	Switching function 3	59
SP4	Switching function 4	59
SPS	Switching function status	59
TAI	Test A/D converter, ID resistance	75
TID	Gauge identification	58
TIM	Time	71
TKB	Operator key test	76
TLC	Torr lock	76
TMP	Inner temperature of the unit	76
UNI	Pressure unit	70
WDT	Watchdog control	77

5.4 Measurement Mode

5.4.1 COM - Continuous Output of Measurement Values

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

	Description
a	Mode, a = 0 -> 100 ms 1 -> 1 s (default) 2 -> 1 minute

Receive: <ACK><CR><LF>

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

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

	Description
b	Status gauge 1, b = 0 -> Measurement data okay 1 -> Underrange 2 -> Overage 3 -> Sensor error 4 -> Sensor off (IKR, PKR, IMR, PBR) 5 -> No sensor (output: 5,2.0000E-2 [mbar]) 6 -> Identification error
sx.xxxxEsxx	Measurement value gauge 1 ¹⁾ [in current pressure unit] (s = sign)
c	Status gauge 2
sy.yyyyEsyy	Measurement value gauge 2 ¹⁾ [in current pressure unit] (s = sign)



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

5.4.2 CPR - Combined pressure range (linear gauges, TPG362 only)

This command combines different pressure ranges to one combined pressure range, if several linear gauges with different full scales (F.S.) are connected to the TPG362. Thus the pressure for this combined pressure range can be read out with best accuracy.

The pressure is higher than the full scale of the gauge with lower full scale: The TPG362 switches to the gauge with higher full scale.

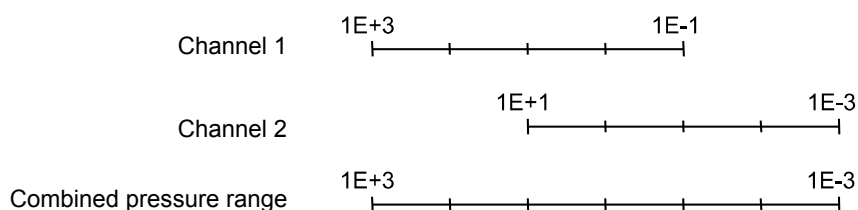
Only one linear gauge is connected: The measurement value of this gauge is output.

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

Example

Channel 1: linear gauge, 1000 mbar F.S.

Channel 2: linear gauge, 10 mbar F.S.



Transmit command: CPR,1,2
CPR,2,1

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

	Description
a	Measurement channel of the selected gauge, a = 0 → No linear gauge connected 1 → Measurement channel 1 2 → Measurement channel 2
b	Measurement channel of the selected gauge

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b,sx.xxxxEsxx

	Description
a	Measurement channel of the selected gauge
b	Measurement channel of the selected gauge
sx.xxxxEsxx	Combined measurement value ¹⁾ [in current pressure unit] (s = sign)



¹⁾ Values always in exponential format.

5.4.3 ERR - Error Status

Transmit: **ERR** <CR>[<LF>] Error status
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: aaaa <CR><LF>

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



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

5.4.4 PR1, PR2 - Measurement Data Gauge 1 or 2

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

	Description
n	Measurement value, n = 1 → Gauge 1 2 → Gauge 2

Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: a,sx.xxxxEsxx <CR><LF>

	Description
a	Status, a = 0 → Measurement data okay 1 → Underrange 2 → Overrange 3 → Sensor error 4 → Sensor off (IKR, PKR, IMR, PBR) 5 → No sensor (output: 5,2.0000E-2 [mbar]) 6 → Identification error
sx.xxxxEsxx	Measurement value ¹⁾ [in current pressure unit] (s = sign)



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

5.4.5 PRX - Measurement Data Gauges 1 and 2

Transmit: **PRX** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: a,sx.xxxxEsxx,b,sy.yyyyEsyy <CR><LF>

	Description
a	Status gauge 1, a = 0 → Measurement data okay 1 → Underrange 2 → Overrange 3 → Sensor error 4 → Sensor off (IKR, PKR, IMR, PBR) 5 → No sensor (output: 5,2.0000E-2 [mbar]) 6 → Identification error
sx.xxxxEsxx	Measurement value gauge 1 ¹⁾ [in current pressure unit] (s = sign)
b	Status gauge 2
sy.yyyyEsyy	Measurement value gauge 2 ¹⁾ [in current pressure unit] (s = sign)



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

5.4.6 RES - Reset

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

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

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

Receive: b[,b][,b][...] <CR><LF>

	Description (TPG361 only)
b	List of all present error messages, b = 0 → No error 1 → Watchdog has responded 2 → Task fail error 5 → FLASH error 6 → RAM error 7 → EEPROM error 9 → DISPLAY error 10 → A/D converter error 11 → Gauge error (e.g. filament rupture, no supply) 12 → Gauge identification error

	Description (TPG362 only)
b	List of all present error messages, b =
	0 → No error
	1 → Watchdog has responded
	2 → Task fail error
	3 → FLASH error
	4 → RAM error
	5 → EEPROM error
	6 → DISPLAY error
	7 → A/D converter error
	8 → UART error
	9 → Gauge 1 error (e.g. filament rupture, no supply)
	10 → Gauge 1 identification error
	11 → Gauge 2 error (e.g. filament rupture, no supply)
	12 → Gauge 2 identification error

5.4.7 SEN - Gauge on/off

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

	Description
a	Gauge 1, a =
	0 → No status change
	1 → Turn gauge off
	2 → Turn gauge on
b	Gauge 2

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Status gauge 1, a =
	0 → Gauge cannot be turned on/off
	1 → Gauge turned off
	2 → Gauge turned on
b	Status gauge 2

5.4.8 TID - Gauge Identification

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Identification gauge 1, a =
	TPR/PCR (Pirani Gauge or Pirani Capacitance Gauge)
	IKR (Cold Cathode Gauge 10^{-9} and 10^{-11})
	PKR (FullRange [®] CC Gauge)
	PBR (FullRange [®] BA Gauge)
	IMR (Pirani / High Pressure Gauge)
	CMR/APR (Linear gauge)
	noSEn (no sensor)
	noid (no identifier)
b	Identification gauge 2

5.5 Switching Function Parameters

5.5.1 SPS - Switching Function Status

Transmit: **SPS** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: a,b,c,d <CR><LF>

	Description
a	Status switching function 1, a = 0 → Off 1 → On
b	Status switching function 2
c	Status switching function 3
d	Status switching function 4

5.5.2 SP1 ... SP4 - Switching Function 1 ... 4

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

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



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

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

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

5.6 Gauge Parameters

5.6.1 CAL - Calibration Factor

Precondition: Parameter "GAS" is set to "7" (other gases) (→ 62). Except linear gauges.

This parameter is effective in the entire measurement range of the gauge.

Transmit: **CAL** [,a.aaa,b.bbb] <CR>[<LF>]

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

	Description
a.aaa	Calibration factor gauge 1
b.bbb	Calibration factor gauge 2

5.6.2 CF1, CF2 - Calibration Factor Gauge 1 and 2

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

	Description
x	Calibration factor gauge x = 1 → Gauge 1 2 → Gauge 2
a.aaa	Calibration factor gauge x, 0.100 ... 10.000 (default = 1.000)

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

	Description
a.aaa	Calibration factor gauge 1
b.bbb	Calibration factor gauge 2

5.6.3 DCD - Display Resolution

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,a <CR><LF>

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

When the PrE (→ 69) is ON and the pressure is in the range $p < 1.0E-4$ mbar the display resolution of the PCR Gauge is reduced by one decimal digit.

5.6.4 DGS - Degas

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Degas status gauge 1
b	Degas status gauge 2

5.6.5 FIL - Measurement Value Filter

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

	Description
a	Filter gauge 1, a = 0 → Filter off 1 → Fast 2 → Normal 3 → Slow
b	Filter gauge 2

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

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

5.6.6 FSR - Measurement Range (Linear Gauges)



The full scale value of the measurement range (Full Scale) of linear gauges has to be defined by the user; the full scale value of logarithmic gauges is automatically recognized.

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

	Description
a	Full scale value gauge 1, a = 0 → 0.01 mbar 1 → 0.1 mbar 2 → 1 mbar 3 → 10 mbar 4 → 100 mbar 5 → 1000 mbar (default) 6 → 2 bar 7 → 5 bar 8 → 10 bar 9 → 50 bar
b	Full scale value gauge 2

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

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

5.6.7 GAS - Gas Type Correction

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,a <CR><LF>

	Description
a	Gas type correction, a = 0 → nitrogen / air (default) 1 → Argon 2 → Hydrogen 3 → Helium 4 → Neon 5 → Krypton 6 → Xenon 7 → Other gases Calibration factor for other gases by entering command "COR" (→ 60)

5.6.8 OFC - Offset Correction (Linear Gauges)

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Offset correction gauge 1
b	Offset correction gauge 2

5.6.9 OFD - Offset Display (Linear Gauges)

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

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



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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

	Description
sa.aaaaEsaa	Gauge 1 Offset ¹⁾ (s = sign)
sb.bbbbEsbb	Gauge 2 Offset ¹⁾ (s = sign)

5.7 Gauge Control

5.7.1 SC1, SC2 - Gauge 1 and 2 Control

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

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

5.8 General Parameters

5.8.1 BAL - Backlight

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Backlight

5.8.2 BAU - Transmission Rate (USB)

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

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



The transmission rate of the RS485 interface is 9600 baud and cannot be changed.



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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: x <CR><LF>

	Description
a	Transmission rate

5.8.3 DCB - Display Control Bar Graph

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,b <CR><LF>

	Description
a	Measurement channel
b	Bar graph display

5.8.4 DCC - Display Control Contrast

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Contrast

5.8.5 DCS - Display Control Screensave

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Screensave

5.8.6 ERA - Error Relay Allocation

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

	Description
a	Switching behaviour error relay, a = 0 → Switches for all errors (default) 1 → Only unit errors 2 → Error sensor 1 and unit error 3 → Error sensor 2 and unit error (TPG362 only)

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Switching behaviour error relay

5.8.7 EVA - Measurement Range End Value

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Measurement range end value

5.8.8 FMT - Number Format (Measurement Value)

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Number format

5.8.9 LNG - Language (Display)

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Language

5.8.10 PRE - Pirani Range Extension

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Pirani range extension



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

5.8.11 PUC - Penning Underrange Control

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

	Description
a	Underrange control, a = 0 → Off (default) 1 → On

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Underrange control

5.8.12 SAV - Save Parameters (EEPROM)

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

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

Receive: <ACK><CR><LF>

5.8.13 UNI - Pressure Unit

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Pressure unit

5.9 Data Logger Parameters



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

5.9.1 DAT - Date

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

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

5.9.2 LCM - Start / Stop Data Logger

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

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

5.9.3 TIM - Time

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

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

5.10 Group Setup



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

5.10.1 SCM - Save / Load Parameters (USB)

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Setup parameters, a = 0 → Saving completed (read only) 1 → CSV file is being saved (read only) 2 → Loading all parameters from the USB memory stick onto the TPG36x 3 → Formatting USB memory stick (FAT32) 4 → Deleting parameter files (ending CSV) from the USB memory stick
bb	Number in the file name (0 ... 99)

5.11 Test Parameters

(For service personnel)

5.11.1 ADC - A/D Converter Test

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

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

5.11.2 DIS - Display Test

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: x <CR><LF>

	Description
a	Display test status

5.11.3 EEP - EEPROM Test

Test of the parameter memory.

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

Receive: <ACK><CR><LF>

Transmit: <ENQ> Starts the test (duration <1 s)



Do not keep repeating the test (EEPROM life).

Receive: aaaa <CR><LF>

	Description
aaaa	Error word

5.11.4 EPR - FLASH Test

Test of the program memory.

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

Receive: <ACK><CR><LF>

Transmit: <ENQ> Starts the test (very brief)

Receive: aaaa,bbbb <CR><LF>

	Description
aaaa	Error word
bbbb	Check sum (hex)

5.11.5 HDW - Hardware Version

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


Receive: <ACK><CR><LF>


Transmit: <ENQ>

Receive: a.a <CR><LF>

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

5.11.6 IOT - I/O Test


Caution



Caution: The relays switch irrespective of the pressure. Starting a test program may cause unwanted effects in connected control systems.
Disconnect all sensor cables and control system lines to ensure that no control commands or messages are triggered by mistake.

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

	Description
a	Test status, a = 0 -> Test stopped 1 -> Test runs
bb	Relay status (in hex format), bb = 00 -> All relays deactivated 01 -> Switching function relay 1 activated 02 -> Switching function relay 2 activated 04 -> Switching function relay 3 activated 08 -> Switching function relay 4 activated 40 -> Error relay activated 4F -> All relays activated

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a,bb <CR><LF>

	Description
a	I/O test status
bb	Relay status

5.11.7 LOC - Keylock

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

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Keylock status

5.11.8 MAC - Ethernet MAC Address

Transmit: **MAC** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: aa-aa-aa-aa-aa-aa <CR><LF>

	Description
aa-aa-aa-aa-aa-aa	Ethernet MAC address of the TPG36x: 00-A0-41-xx-xx-xx

5.11.9 PNR - Firmware Version

Transmit: **PNR** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: a.aa <CR><LF>

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

5.11.10 RHR - Operating Hours

Transmit: **RHR** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: a <CR><LF>

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

5.11.11 TAI - Test A/D Converter, ID Resistance

Transmit: **TAI** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ> Starts the test (very brief)
 Receive: a.aa,b.bb <CR><LF>

	Description
a.aa	Identification resistance gauge 1 [kOhm]
b.bb	Identification resistance gauge 2 [kOhm]

5.11.12 **TKB** - Operator Key Test

Transmit: **TKB** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: abcd <CR><LF>

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

5.11.13 **TLC** - Torr Lock

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

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

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

	Description
a	Torr lock status

5.11.14 **TMP** - Inner Temperature of the Unit

Inner temperature of the TPG36x.

Transmit: **TMP** <CR>[<LF>]
 Receive: <ACK><CR><LF>
 Transmit: <ENQ>
 Receive: aa <CR><LF>

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

5.11.15 WDT - Watchdog Control

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

	Description
a	Watchdog control, a = 0 → Manual error acknowledgement 1 → Automatic error acknowledgement ¹⁾ (default)



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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

Receive: a <CR><LF>

	Description
a	Watchdog control

5.12 Further

5.12.1 AYT - Are you There?

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

	Description
a	Type of the unit, e.g. TPG362
b	Model No. of the unit, e.g. IGD28290
c	Serial No. of the unit, e.g. 100
d	Firmware version of the unit, e.g. 1.00
e	Hardware version of the unit, e.g. 1.0

5.12.2 ETH - Ethernet Configuration

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

Receive: <ACK><CR><LF>

Transmit: <ENQ>

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

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

5.13 Example



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

T: TID <CR> [<LF>]	Request for gauge identification
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: TPR/PCR,CMR <CR> <LF>	Gauge identifications
T: SEN <CR> [<LF>]	Request for gauge statuses
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 0,0 <CR> <LF>	Gauge statuses
T: SP1 <CR> [<LF>]	Request for parameters of switching function 1 (setpoint 1)
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 2,1.0000E-09,9.0000E-07 <CR> <LF>	Thresholds
T: SP1 ,2,6.80E-3,9.80E-3 <CR> [<LF>]	Modification of parameters of switching function 1 (setpoint 1)
R: <ACK> <CR> <LF>	Positive acknowledgement
T: FOL ,1,2 <CR> [<LF>]	Modification of filter time constant (syntax error)
R: <NAK> <CR> <LF>	Negative acknowledgement
T: <ENQ>	Request for data transmission
R: 0001 <CR> <LF>	ERROR word
T: FIL ,1,2 <CR> [<LF>]	Modification of filter time constant
R: <ACK> <CR> <LF>	Positive acknowledgement
T: <ENQ>	Request for data transmission
R: 1,2 <CR> <LF>	Filter time constants

6 Maintenance

Cleaning the TPG36x

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 is extremely hazardous when liquids penetrate into the unit.


Make sure no liquids penetrate into the equipment.

Battery replacement











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

7 Troubleshooting

Signalization of errors

The error is shown in the dot matrix and the error relay opens (→  15).

Error messages

	Possible cause and remedy/acknowledgement
SENSOR ERROR	<p>Interruption or instability in sensor line or connector (Sensor error).</p> <p>⇒ Acknowledge with the  key. If the problem persists, Sx noSENSOR or Sx noIDENT is displayed.</p>
WATCHDOG ERROR	<p>Possible cause and remedy/acknowledgement</p> <p>The TPG36x has been turned on too fast after power off.</p> <p>⇒ Acknowledge with the  key. If the watchdog is set to Auto, the TPG36x acknowledges the message automatically after 2 s (→  45).</p> <p>The watchdog has tripped because of a severe electric disturbance or an operating system error.</p> <p>⇒ Acknowledge with the  key. If the watchdog is set to WATCHDOG AUTO, the TPG36x acknowledges the message automatically after 2 s (→  45).</p>
UART ERROR	<p>Possible cause and remedy/acknowledgement</p> <p>Error in UART.</p> <p>⇒ Acknowledge with the  key.</p>
PROGRAM CORRUPT	<p>Possible cause and remedy/acknowledgement</p> <p>Program memory error (FLASH).</p> <p>⇒ Acknowledge with the  key.</p>
DATA CORRUPTED	<p>Possible cause and remedy/acknowledgement</p> <p>Parameter memory error (EEPROM).</p> <p>⇒ Acknowledge with the  key.</p>
DISPLAY ERROR	<p>Possible cause and remedy/acknowledgement</p> <p>Display driver error.</p> <p>⇒ Acknowledge with the  key.</p>
A/D ERROR	<p>Possible cause and remedy/acknowledgement</p> <p>A/D converter error.</p> <p>⇒ Acknowledge with the  key.</p>

Technical support



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

8 Repair

Return defective products to your nearest INFICON service center for repair. INFICON assumes no liability and the warranty is rendered null and void if repair work is carried out by the end-user or by third parties.

9 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 (→ 7).

10 Disposal



WARNING



WARNING: substances detrimental to the environment.
Products or parts thereof (mechanical and electric components, operating fluids etc.) may be detrimental to the environment.
Please dispose of such materials in accordance with the relevant local regulations.

Separating the components

Non-electronic components

Electronic components

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

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

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 the vacuum technology

	mBar	Bar	Pa	hPa	kPa	Torr mm HG
mBar	1	1×10^{-3}	100	1	0.1	0.75
Bar	1×10^3	1	1×10^5	1×10^3	100	750
Pa	0.01	1×10^{-8}	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

$$1 \text{ Pa} = 1 \text{ N/m}^2$$

Linear measurements

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

Temperature

	Kelvin	Celsius	Fahrenheit
Kelvin	1	$^{\circ}\text{C} + 273.15$	$(^{\circ}\text{F} + 459.67) \times 5/9$
Celsius	$\text{K} - 273.15$	1	$5/9 \times ^{\circ}\text{F} - 17.778$
Fahrenheit	$9/5 \times \text{K} - 459.67$	$9/5 \times (^{\circ}\text{C} + 17.778)$	1

B: Firmware Update



If your TPG36x firmware needs updating, e.g. for implementing a new gauge type, please contact your nearest INFICON service center.

A firmware update is possible

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

User Parameters

Most of the settings you may have made in the Parameter mode will not be affected by a firmware update. However, we recommend that you save the parameters before an update (→ 49).

Firmware update with a USB memory stick (type A)



Not all USB memory sticks are automatically recognized by the TPG36x, as they (particularly cheaper brands) do not always conform to USB standard specifications. Try a different memory stick before contacting your nearest INFICON service center.

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

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

- 5 Remove the memory stick and the unit will restart automatically.
- 6 If necessary, customer-specific settings saved before the update may now be resaved to the unit (→ 49).

Firmware update with USB Update Tool (USB type B)

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



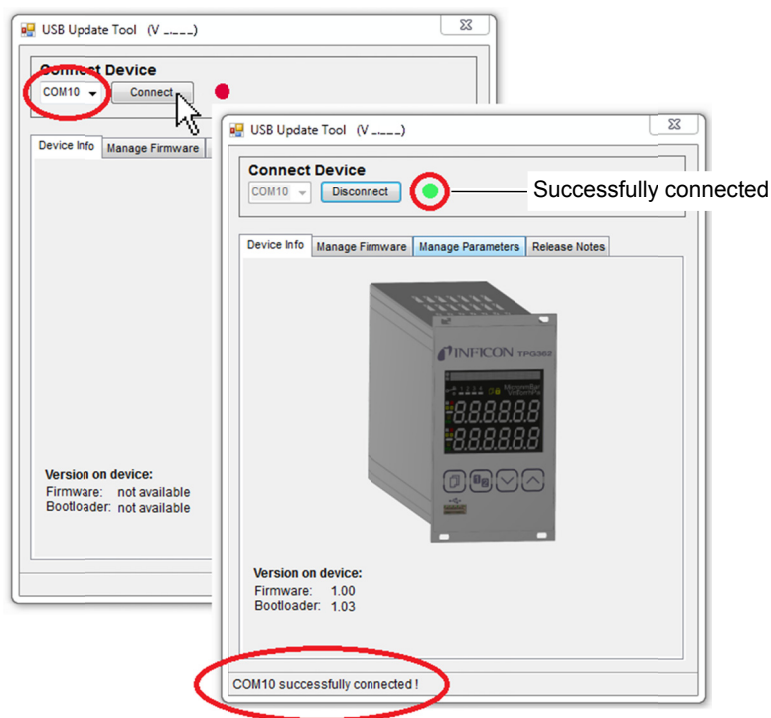
During firmware update, no USB memory stick should be connected on the front of the unit.



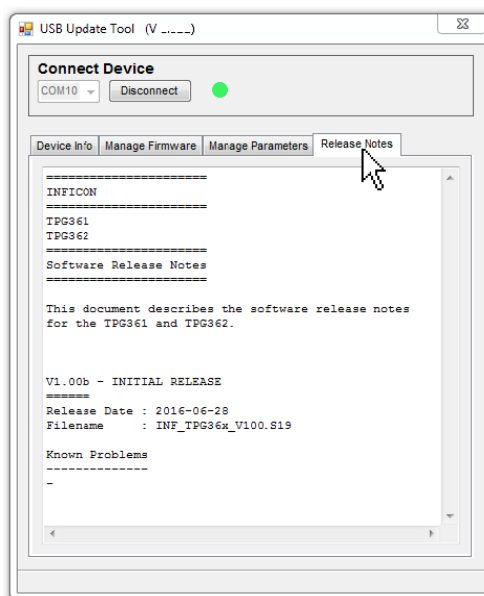
If a virtual serial interface (COM) is not automatically established, you may download and then install the driver from the website "www.ftdichip.com/drivers/vcp.htm".

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

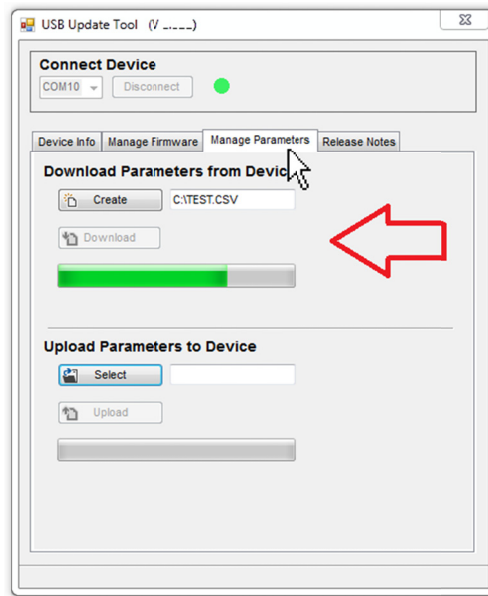
- Start USB UpdateTool, select the COM interface from the menu and click on <Connect>.



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

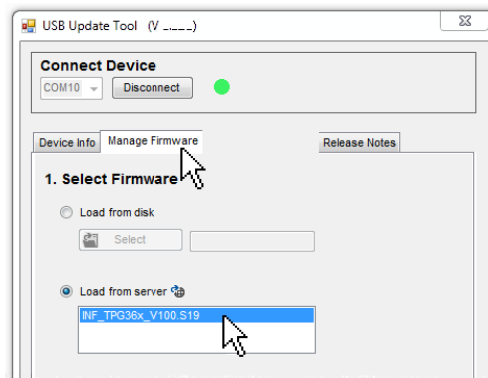


- 5 We recommend to download the parameters before an update (click on <Manage Parameters>).

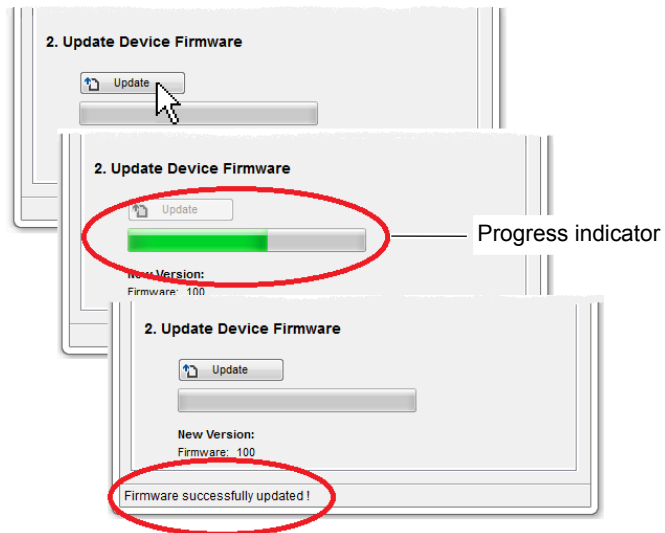


- 6 Click on <Manage Firmware>, select firmware ...

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



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

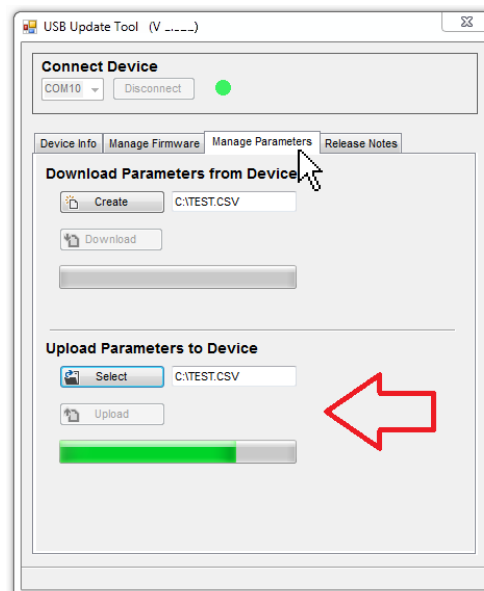


If the update was not successful, try again.



7

Upload parameters to device.



C: Ethernet Configuration

The user program (e.g. terminal program, LabView, etc.) must support serial interfaces. Under Microsoft Windows operating systems the TPG36x is listed as a virtual COM interface.



Please contact your network administrator, before starting Ethernet configuration.



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

C 1: Connect the TPG36x to a Network

With registration

- 1 Readout the MAC address of the TPG36x (→ [44](#)).
- 2 The TPG36x should be registered in the network by the network administrator. After registration ask him for the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP).
- 3 Configuring the TPG36x:
 - Save all TPG36x parameters on a USB memory stick ("SAVE SETUP", → [49](#)).
 - Set the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP) in the saved CSV file on the memory stick.
 - Load the modified parameters onto the TPG36x ("RESTORE SETUP", → [49](#)).
 - Connect the TPG36x with an Ethernet patch cable to the network.
- 4 Search for the TPG36x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ [87](#)).
- 5 Start the program for communication with the TPG36x and connect it to the assigned COM interface.

Without registration

- 1 If unknown, ask the network administrator for the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP).
- 2 Configuring the TPG36x:
 - Save all TPG36x parameters on a USB memory stick ("SAVE SETUP", → [49](#)).
 - Set the Ethernet parameters (IP ADDRESS, GATEWAY, NETMASK and DHCP) in the saved CSV file on the memory stick.
 - Load the modified parameters onto the TPG36x ("RESTORE SETUP", → [49](#)).
 - Connect the TPG36x with an Ethernet patch cable to the network.
- 3 Search for the TPG36x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ [87](#)).
- 4 Start the program for communication with the TPG36x and connect it to the assigned COM interface.

C 2: Connect the TPG36x to a Computer

Computer with DHCP server

- 1 Connect the TPG36x to a computer ...
 - with a crossover Ethernet cable,
 - via a switch, or
 - with an Ethernet patch cable (precondition: the interface is auto MDI-X capable).
- 2 The DHCP server assigns automatically an IP address.
Precondition: DHCP = ON
- 3 Search for the TPG36x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ 87).
- 4 Start the program for communication with the TPG36x and connect it to the assigned COM interface.

Computer without DHCP server

- 1 Save all TPG36x parameters on a USB memory stick ("SAVE SETUP", → 49).
- 2 Set the following Ethernet parameters in the saved CSV file on the memory stick:

IP ADDRESS:	192.168.0.1 (192.168.0.2 for a second unit, and so on)
NETMASK:	255.255.0.0
DHCP:	OFF
- 3 Load the modified parameters onto the TPG36x ("RESTORE SETUP", → 49).
- 4 Connect the TPG36x to a computer ...
 - with a crossover Ethernet cable,
 - via a switch, or
 - with an Ethernet patch cable (precondition: the interface is auto MDI-X capable).
- 5 Search for the TPG36x in the network using the Ethernet Configuration Tool and assign it to a virtual COM interface (→ 87).
- 6 Start the program for communication with the TPG36x and connect it to the assigned COM interface.

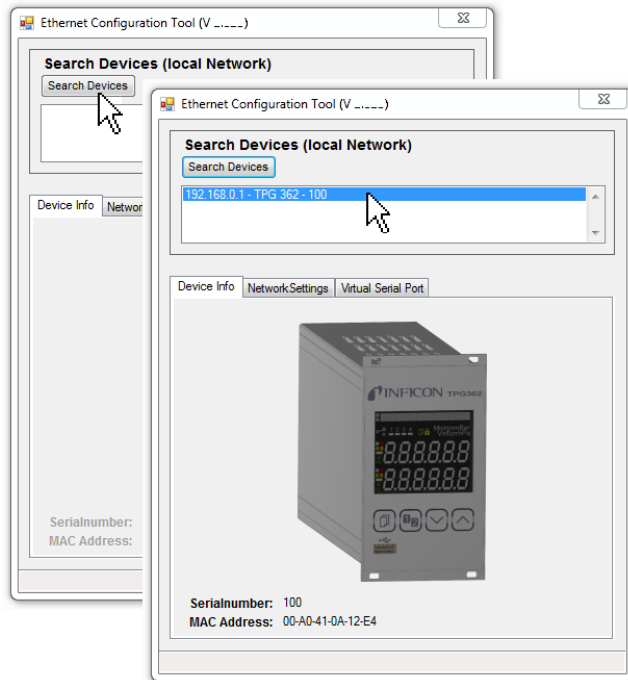
C 3: Ethernet Configuration Tool

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

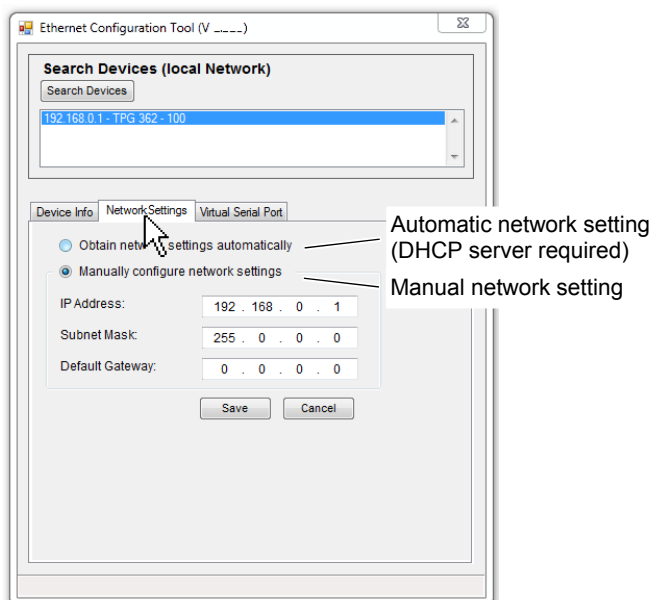
Precondition: Windows 7, 8 or 10 operating system (does not work under Windows XP)

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

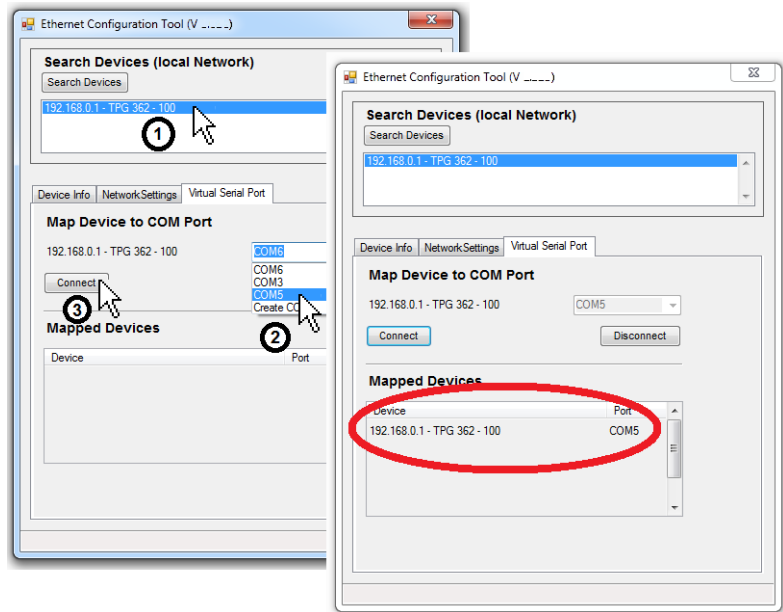
- Start the Ethernet Configuration Tool and click on <Search Devices>: the Tool searches the local network for connected devices and lists the devices thus found in the selection window. The <Device Info> register shows basic information about the selected device.



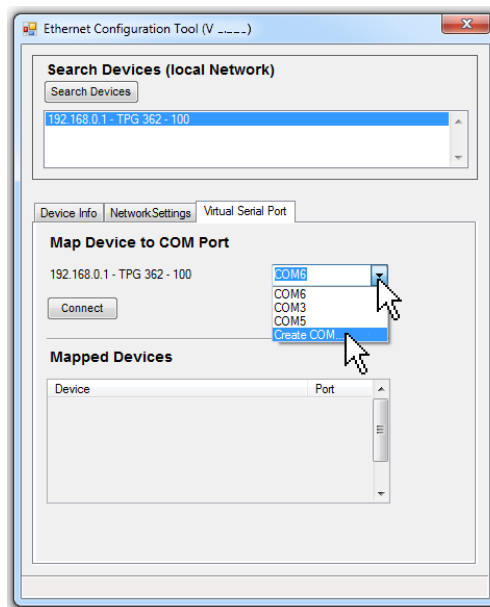
- Automatic or manual network setting occurs in the <Network Settings> register.



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









... a new COM Port can be created.



D: Literature

- [1] www.inficon.com
Instruction Sheet
Compact Pirani Gauge TPR261
IG 803 105 BE
INFICON AG, LI-9496 Balzers, Liechtenstein
- [2] www.inficon.com
Instruction Sheet
Compact Pirani Gauge TPR265
IG 803 177 BE
INFICON AG, LI-9496 Balzers, Liechtenstein
- [3] www.inficon.com
Operating Manual
Compact Pirani Gauge TPR280, TPR281
IG 803 178 BE
INFICON AG, LI-9496 Balzers, Liechtenstein
- [4] www.inficon.com
Operating Manual
Pirani Capacitance Gauge PCR260
IG 803 180 BE
INFICON AG, LI-9496 Balzers, Liechtenstein
- [5] www.inficon.com
Operating Manual
Pirani Capacitance Gauge PCR280
IG 3181 BEN
INFICON AG, LI-9496 Balzers, Liechtenstein
- [6] www.inficon.com
Operating Manual
Pirani Capacitance Gauge PCR280
IG 3182 BEN
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- [7] www.inficon.com
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- [8] www.inficon.com
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IG 803 113 BN
INFICON AG, LI-9496 Balzers, Liechtenstein
- [9] www.inficon.com
Instruction Sheet
Compact Cold Cathode Gauge IKR270
IG 803 115 BE
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- [10] www.inficon.com
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Compact FullRange[®] Gauge PKR360, PKR361
IG 3164 BEN
INFICON AG, LI-9496 Balzers, Liechtenstein
- [11] www.inficon.com
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Compact FullRange[®] Gauge PKR251
IG 803 119 BN
INFICON AG, LI-9496 Balzers, Liechtenstein
- [12] www.inficon.com
Instruction Sheet
Compact FullRange[®] Gauge PKR261
IG 803 122 BN
INFICON AG, LI-9496 Balzers, Liechtenstein

-  [13] www.inficon.com
 Instruction Sheet
 Compact Process Ion Gauge IMR265
 IG 803 132 BE
 INFICON AG, LI-9496 Balzers, Liechtenstein
-  [14] www.inficon.com
 Instruction Sheet
 Compact FullRange® BA Gauge PBR260
 IG 803 131 BE
 INFICON AG, LI-9496 Balzers, Liechtenstein
-  [15] www.inficon.com
 Instruction Sheet
 Compact Capacitance Gauge CMR261 ... CMR275
 IG 803 133 BE
 INFICON AG, LI-9496 Balzers, Liechtenstein
-  [16] www.inficon.com
 Operating Manual
 Compact Capacitance Gauge CMR361 ... CMR365
 IG 803 136 BE
 INFICON AG, LI-9496 Balzers, Liechtenstein
-  [17] www.inficon.com
 Operating Manual
 Compact Capacitance Gauge CMR371 ... CMR375
 IG 3138 BEN
 INFICON AG, LI-9496 Balzers, Liechtenstein
-  [18] www.inficon.com
 Instruction Sheet
 Compact Piezo Gauge APR250 ... APR267
 IG 803 127 BN
 INFICON AG, LI-9496 Balzers, Liechtenstein

EU Declaration of Conformity



We, INFICON, hereby declare that the equipment mentioned below complies with the provisions of the Directive relating to electrical equipment designed for use within certain voltage limits 2014/35/EU, the Directive relating to electromagnetic compatibility 2014/30/EU and the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU.

Product Single- and Dual-Channel Measurement and Control Unit for Compact Gauges
TPG361, TPG362

Part numbers IGD28040
IGD28290

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)
- EN 61000-6-1:2007
(EMC: generic immunity for residential, commercial and light-industrial environments)
- EN 61000-6-2:2005
(EMC: generic immunity standard for industrial environments)
- EN 61000-6-3:2007 + A1:2011
(EMC: generic emission standard for residential, commercial and light-industrial environments)
- EN 61000-6-4:2007 + A1:2011
(EMC: generic emission standard for industrial environments)
- EN 61010-1:2010
(Safety requirements for electrical equipment for measurement, control and laboratory use)
- EN 61326-1:2013
(EMC requirements for electrical equipment for measurement, control and laboratory use)

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