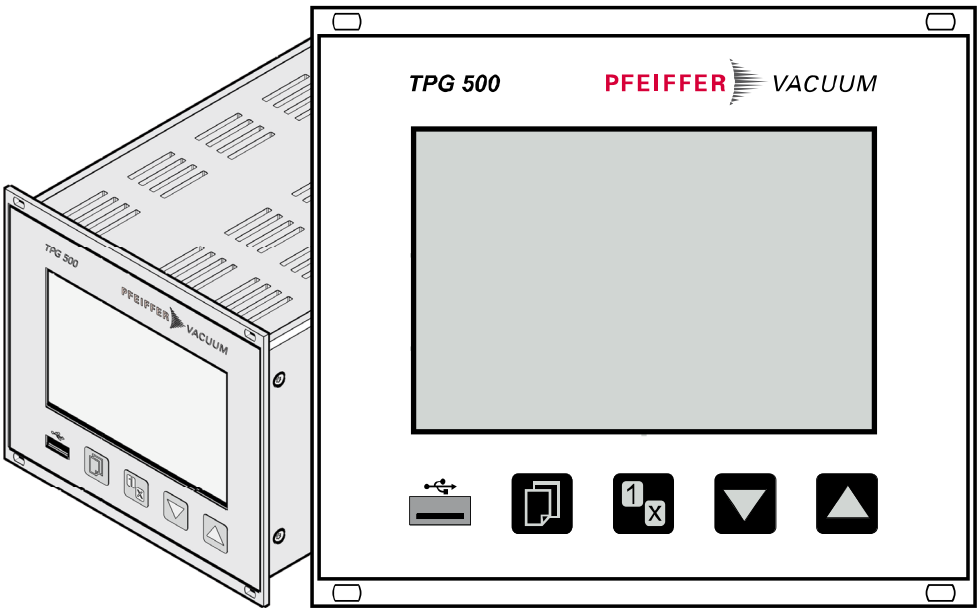


COMMUNICATION PROTOCOL

EN

Translation

TPG 500

Mnemonics and Pfeiffer Vacuum Protocol

BG 6009 BEN / A (2022-06)

PFEIFFER VACUUM

Product identification

→ TPG 500 Operating instructions, 🕮 [1].

Validity

This document is applicable for products with the part numbers

PT G28 500

You will find the part number (P/N) on the rating plate.

This document is based on firmware version V010300.

If the device is not functioning as described, check whether the correct firmware version is installed (command **PNR** → 🗎 33).

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

Intended use

The serial interfaces (RS485, USB, Ethernet, IF 300 A / B / C) enable the TPG 500 to be operated using a computer or a terminal.

RS232C interface

For RS232C communication, one of the interfaces provided for the TPG 500 is required along with relay boards (IF 300 A, IF 300 B, → 🕮 [2]).

Profibus interface

The TPG 500 can be equipped with a Profibus interface. The corresponding IF 300P interface relay board in plug-in position C of the TPG 500 is required. This board features the standardized Profibus interface and five relay outputs (switching function and error status).

Functional description and programming instructions → 🕮 [2], [7].

Profinet interface

The TPG 500 can be equipped with a Profinet interface. The corresponding IF 500PN interface relay board in plug-in position C of the TPG 500 is required. This board features the standardized Profinet interface.

Functional description and programming instructions → 🕮 [2], [8].

Contents

The symbol (→ 🗎 XY) is used for page references in the text and the symbol (→ 🕮 [Z]) for references to other documents listed in the bibliography.

1 Mnemonics protocol

The serial interfaces (RS485, USB, Ethernet, IF 300 A / B / C) enable the TPG 500 to be operated using a computer. For test purposes, you can also connect a terminal.

Note that for commands containing the channel-specific parameters, the number of values must correspond with the number of channels.

Example: Send: **FIL** [,a,b,c,d]

1.1 Installation

→ TPG 500 Operating instructions, 🕮 [1].

1.2 Data transmission

There is two-way information exchange, i.e. data and control commands can be exchanged in both directions.

Configuration of the interface

→ TPG 500 Operating instructions, 🕮 [1].

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	Dec	Hex
HOST	Computer or terminal		
[...]	Non-compulsory prescribed elements		
ASCII	American Standard Code for Information Interchange		
<ETX>	END OF TEXT (CTRL C) Interface reset	3	03
<CR>	CARRIAGE RETURN Carriage return	13	0D
<LF>	LINE FEED Line feed	10	0A
<ENQ>	ENQURY Data transfer request	5	05
<ACK>	ACKNOWLEDGE Positive feedback signal	6	06
<NAK>	NEGATIVE ACKNOWLEDGE Negative feedback signal	21	15
<ESC>	ESCAPE Switchover	27	1B

“Send”: Transfer from HOST to TPG 500.
“Receive”: Transfer from TPG 500 to HOST.

Flow control

The HOST must wait to receive the feedback signal (<ACK><CR><LF> or <NAK><CR><LF>) after each ASCII string.

The input buffer of the HOST must have a capacity of at least 64 Bytes.

1.3 Communication protocol

Transfer format

The messages are transferred in the form of mnemonics (command codes) and parameters as ASCII strings to the TPG 500. All mnemonics are composed of three ASCII characters.

Spaces are ignored. <ETX> (CTRL C) deletes the input buffer in the TPG 500.

With RS485, no LINE FEED (<LF>) may be sent, as this can lead to data collisions on the bus due to the half-duplex connection.

The use of LINE FEED is generally permitted for the other interfaces (USB, Ethernet, IF 300 A / B / C), but should be avoided for reasons of time.

Transfer protocol

HOST	TPG 500	Explanation
Mnemonics [and parameters] ——————>		Receives message with “end message”
<CR>[<LF>] ——————————————>		
	<——————— <ACK><CR><LF>	Positive confirmation of a received message

Receipt format

On demand, by means of mnemonics, the TPG 500 transfers the measured data or parameters to the HOST in the form of ASCII strings.

<ENQ> must be sent as a request to transfer an ASCII string. By repeatedly sending <ENQ>, additional strings are read out according to the last selected mnemonic.

<ENQ> without a valid request transfers the word ERROR.

Receipt protocol

HOST	TPG 500	Explanation
Mnemonics [and parameters] ——————>		Receives message with “end message”
<CR>[<LF>] ——————————————>		
	<——————— <ACK><CR><LF>	Positive confirmation of a received message
<ENQ> ——————————————>		Data transfer request
	<——————— Measured values or parameters	Sends data with “end message”
	<——————————— <CR><LF>	
:		:
<ENQ> ——————————————>		Data transfer request
	<——————— Measured values or parameters	Sends data with “end message”
	<——————————— <CR><LF>	

Malfuntion handling

Entered strings are checked in the TPG 500. In the event of an error, a negative confirmation <NAK> is output.

Error detection protocol

HOST	TPG 500	Explanation
Mnemonics [and parameters] ——————>		Receives message with “end message”
<CR>[<LF>] ——————————————>		
***** Transfer or programming error *****		
	<—— <NAK><CR><LF>	Negative confirmation of a received message
Mnemonics [and parameters] ——————->		Receives message with “end message”
<CR>[<LF>] ——————————————>		
	<——————— <ACK><CR><LF>	Positive confirmation of a received message

1.4 Mnemonics Table

1.5 Measuring mode

1.5.1 COM - Continuous measured value output

Send: COM [,a] <CR>[<LF>]

	Description
a	Mode, a = 0 –> 100 ms 1 –> 1 s 2 –> 1 minute

Receive: <ACK><CR><LF>

Immediately followed by continuous measurement value output in desired time interval.

Receive: b,x.xEsxx,b,x.xEsxx,b,x.xEsxx,b,x.xEsxx <CR><LF>

	Description
b	Status of the 4 measuring channels (A1, A2, B1, B2), b = 0 –> Measured data okay 1 –> Underrange 2 –> Overrange 3 –> Measuring point error (sensor error) 4 –> Measuring point switched off 5 –> No hardware
x.xEsxx	Measured value measurement channel [1] [current unit of measurement] (s = sign)

[1] Values always in exponential form.

1.5.2 ERR - Error status

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

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

Receive: aaaa <CR><LF>

	Description
aaaa	Error status, aaaa = 0000 –> No error 1000 –> Device error (see display on front panel) 0100 –> Hardware not installed 0010 –> Impermissible parameter 0001 –> Syntax error

The error status is deleted with the read-out, but is immediately reissued if the error persists or if there is another error.

1.5.3 PA1 / PA2 - Pressure measurement channel A1 / A2

Send: **PAn** <CR>[<LF>]

	Description
n	Measured value, n = 1 –> Measurement channel A1 2 –> Measurement channel A2

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

Receive: a,x.xEsxx <CR><LF>

	Description
a	Status, a = 0 –> Measured data okay 1 –> Underrange 2 –> Overrange 3 –> Measuring point error (sensor error) 4 –> Measuring point switched off 5 –> No hardware
x.xEsxx	Measured value [current unit of measurement] (s = sign)

1.5.4 PB1 / PB2 - Pressure measurement channel B1 / B2

Send: **PBn** <CR>[<LF>]

	Description
n	Measured value, n = 1 –> Measurement channel B1 2 –> Measurement channel B2

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

Receive: a,x.xEsxx <CR><LF>

	Description
a	Status, a = 0 –> Measured data okay 1 –> Underrange 2 –> Overrange 3 –> Measuring point error (sensor error) 4 –> Measuring point switched off 5 –> No hardware
x.xEsxx	Measured value [current unit of measurement] (s = sign)

1.5.5 PRX - Pressure measurement channels A1, A2, B1, B2

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

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

Receive: a,x.xEsxx,a,x.xEsxx,a,x.xEsxx,a,x.xEsxx <CR><LF>

	Description
a	Status of gauge, a = 0 –> Measured data okay 1 –> Underrange 2 –> Overrange 3 –> Measuring point error (sensor error) 4 –> Measuring point switched off 5 –> No hardware
x.xEsxx	Measured value of gauge [current unit of measurement] (s = sign)

1.5.6 RES - Device restart

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

	Description
a	a = 1 –> Restart of device and read-out of pending malfunction messages

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

Receive: b[,b][,b][…] <CR><LF>

	Description
b	List of pending malfunction messages, b = 0 –> No error 1 –> Watchdog has responded 3 –> FLASH error 5 –> EEPROM error

1.5.7 SEN - Switch measuring circuit on/off

Send: **SEN** [,a,b,c,d] <CR>[<LF>]

	Description
a	Measuring circuit A1, a =
	0 –> No change
	1 –> Switch off measuring circuit
	2 –> Automatic
	3 –> Switch on measuring circuit
b	Measuring circuit A2
c	Measuring circuit B1
d	Measuring circuit B2

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

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

	Description
a	Status of measuring circuit A1, a =
	0 –> No measuring circuit
	1 –> Gauge is switched off
	2 –> Automatic
	3 –> Gauge is switched on
b	Status of measuring circuit A2
c	Status of measuring circuit B1
d	Status of measuring circuit B2

1.5.8 TID - Measuring circuit identification

Plug-in board identification.

Send: **TID** <CR>[<LF>]

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

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

	Description
a, b	PI300D
	PI300DN
	PE300Dx9
	CP300x9
	CP300x10
	CP300T11
	CP300T11L
	NO BOARD
c	IF300x [1)]
	IF500PN
	NO BOARD

1) The IF300x plug-in boards (IF 300A / B / C / P) have the same identification and cannot be distinguished between.

1.6 Switching function parameters group

1.6.1 SPS - Switching function status

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

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

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

	Description
a	Switching function status 1, a = 0 –> off (default) 1 –> on
b	Switching function status 2
c	Switching function status 3
d	Switching function status 4
e	Switching function A
f	Switching function B

The parameters e and f are 1 if an automatic function is active for sensor A1 (e) or B1 (f) and the sensor is ON, otherwise the value is 0.
With the PE300 plug-in card, only the status of A1/B1 can be queried.

1.6.2 SP1 … SP4 - Switching function 1 … 4

Send: **SPx** [x.xEsxx,y.yEsyy,a,b] <CR>[<LF>]

	Description
x	Switching function, x = 1 –> Switching function 1 2 –> Switching function 2 3 –> Switching function 3 4 –> Switching function 4
x.xEsxx	lower threshold value [current unit of measurement] (s = sign)
y.yEsyy	upper threshold value [current unit of measurement] (s = sign)
a	Switching function assignment, a = 0 –> switched off (default) 1 –> Measurement channel A1 2 –> Measurement channel A2 3 –> Measurement channel B1 4 –> Measurement channel B2 5 –> switched on
b	ON-Timer (0 … 100 seconds, default 0 s)

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

Receive: x.xEsxx,y.yEsyy,a,b <CR><LF>

	Description
x.xEsxx	lower threshold value [current unit of measurement] (s = sign)
y.yEsyy	upper threshold value [current unit of measurement] (s = sign)
a	Switching function assignment
b	ON-Timer

1.7 Gauge parameters group

1.7.1 CA1, CA2 - Leakage current compensation

Leakage current compensation for measurement channels A1 and A2.

Send: **CAx** [,a,b] <CR>[<LF>]

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

Receive: a,b <CR><LF>

	Description
a	Leakage current compensation 0 –> Off (default) 1 –> On 2 –> Determine value automatically and switch on compensation
b	Compensation value (only used when writing if a = 1)

1.7.2 CB1, CB2 - Leakage current compensation

Leakage current compensation for measurement channels B1 and B2.

Send: **CBx** [,a,b] <CR>[<LF>]

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

Receive: a,b <CR><LF>

	Description
a	Leakage current compensation 0 –> Off (default) 1 –> On 2 –> Determine value automatically and switch on compensation
b	Compensation value (only used when writing if a = 1)

1.7.3 CID - Measuring point name

Name of the measuring point (max. 8 characters). Only capital letters, numbers and underscores are permitted.

Send: **CID** [,aaaaaaaa,bbbbbbbb,cccccccc,dddddddd] <CR>[<LF>]

	Description
aaaaaaaa	Name for measurement channel A1
bbbbbbbb	Name for measurement channel A2
cccccccc	Name for measurement channel B1
dddddddd	Name for measurement channel B2

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

Receive: aaaaaaaa,bbbbbbbb,cccccccc,dddddddd <CR><LF>

	Description
aaaaaaaa	Name for measurement channel A1 (default A1)
bbbbbbbb	Name for measurement channel A2 (default A2)
cccccccc	Name for measurement channel B1 (default B1)
dddddddd	Name for measurement channel B2 (default B2)

1.7.4 COR - Correction factor

Correction factor other gas types for measurement channels A1, A2, B1 and B2.

Send: **COR** [,a.aa,b.bb,c.cc,d.dd] <CR>[<LF>]

	Description
a.aa	Correction factor for measurement channel A1, adjustable between 0.20 … 8.00 (1.00 default)
b.bb	Correction factor for measurement channel A2
c.cc	Correction factor for measurement channel B1
d.dd	Correction factor for measurement channel B2

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

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

	Description
a.aa	Correction factor for measurement channel A1
b.bb	Correction factor for measurement channel A2
c.cc	Correction factor for measurement channel B1
d.dd	Correction factor for measurement channel B2

1.7.5 FIL - Measured value filter

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

	Description
a	Filter of measurement channel A1, a = 0 –> Filter OFF 1 –> f = 100 Hz [1)] 2 –> f = 10 Hz [1)] (default) 3 –> f = 1 Hz [1)] 4 –> f = 0.1 Hz [1)]
b	Filter of measurement channel A2
c	Filter of measurement channel B1
d	Filter of measurement channel B2

[1)] The stated frequency is the filter's limit frequency.

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

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

	Description
a	Filter of measurement channel A1
b	Filter of measurement channel A2
c	Filter of measurement channel B1
d	Filter of measurement channel B2

1.7.6 GAS - Gas type correction

Gas type correction for measurement channels A1, A2, B1 and B2.

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

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

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

	Description
a	Gas type correction for measurement channel A1 0 –> Nitrogen / air (default) 1 –> Helium 2 –> Neon 3 –> Argon 4 –> Krypton 5 –> Xenon 6 –> Hydrogen 7 –> other gases
b	Gas type correction for measurement channel A2
c	Gas type correction for measurement channel B1
d	Gas type correction for measurement channel B2

1.8 Gauge control group

1.8.1 SA1, SA2 - Gauge control slot A

Gauge control for measurement channels A1 and A2.

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

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

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

	Description
a	Gauge switch-on type, a = 0 –> Manual (default) 1 –> Hotstart 2 –> By measuring channel A1 3 –> By measuring channel A2 4 –> By measuring channel B1 5 –> By measuring channel B2 6 –> Hotstart + A1 7 –> Hotstart + A2 8 –> Hotstart + B1 9 –> Hotstart + B2 10 –> Previous 11 –> Previous + A1 12 –> Previous + A2 13 –> Previous + B1 14 –> Previous + B2
b	Gauge switch-off type, b = 0 –> Manual (default) 1 –> Self-monitoring 2 –> By measuring channel A1 3 –> By measuring channel A2 4 –> By measuring channel B1 5 –> By measuring channel B2
c.ccEscc	Switch-on value in the current unit of measurement (s = sign)
d.ddEsdd	Switch-off value in the current unit of measurement (s = sign)

1.8.2 SB1, SB2 - Gauge control slot B

Gauge control for measurement channels B1 and B2.

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

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

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

	Description
a	Gauge switch-on type, a = 0 –> Manual (default) 1 –> Hotstart 2 –> By measuring channel A1 3 –> By measuring channel A2 4 –> By measuring channel B1 5 –> By measuring channel B2 6 –> Hotstart + A1 7 –> Hotstart + A2 8 –> Hotstart + B1 9 –> Hotstart + B2 10 –> Previous 11 –> Previous + A1 12 –> Previous + A2 13 –> Previous + B1 14 –> Previous + B2
b	Gauge switch-off type, b = 0 –> Manual (default) 1 –> Self-monitoring 2 –> By measuring channel A1 3 –> By measuring channel A2 4 –> By measuring channel B1 5 –> By measuring channel B2
c.ccEscc	Switch-on value in the current unit of measurement (s = sign)
d.ddEsdd	Switch-off value in the current unit of measurement (s = sign)

1.8.3 SPA - Gauge control slot A

Gauge control for measurement channels A1 and A2. Both channels are controlled simultaneously.

To use all the control options of the TPG 500, we recommend using commands **SA1** and **SA2** (→ 17).

Send: **SPA** [,a.aEsaa,b.bEsbb,c] <CR>[<LF>]

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

Receive: a.aEsaa,b.bEsbb,c <CR><LF>

	Description
a.aEsaa	Switch-on value in the current unit of measurement 1.0E-11 … 9.9E+3 hPa (s = sign, default 1.0E-11)
b.bEsbb	Switch-off value in the current unit of measurement 1.0E-11 … 9.9E+3 hPa (s = sign, default 9.9E+3)
c	Measurement channel assignment, c = 0 –> No assignment 1 –> Measurement channel A1 2 –> Measurement channel A2 3 –> Measurement channel B1 4 –> Measurement channel B2 5 –> Measurement channel A1 [1)] 6 –> Measurement channel A2 [1)] 7 –> Measurement channel B1 [1)] 8 –> Measurement channel B2 [1)] 9 –> Complex [2)] (read only)

1) Self-monitoring with switch-on delay. The gauge is switched on via the selected measuring channel, however switches itself off. Self-monitoring is only enabled after a delay time of approx. 10 s.

2) If the control set using commands SA1 and SA2 cannot be mapped in the SPA command, this is indicated with parameter value c=9 when reading.

1.8.4 SPB - Gauge control slot B

Gauge control for measurement channels B1 and B2. Both channels are controlled simultaneously.

To use all the control options of the TPG 500, we recommend using commands **SB1** and **SB2** (→ 🗎 18).

Send: **SPB** [,a.aEsaa,b.bEsbb,c] <CR>[<LF>]

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

Receive: a.aEsaa,b.bEsbb,c <CR><LF>

	Description
a.aEsaa	Switch-on value in the current unit of measurement 1.0E-11 … 9.9E+3 hPa (s = sign, default 1.0E-11)
b.bEsbb	Switch-off value in the current unit of measurement 1.0E-11 … 9.9E+3 hPa (s = sign, default 9.9E+3)
c	Measurement channel assignment, c = 0 –> No assignment 1 –> Measurement channel A1 2 –> Measurement channel A2 3 –> Measurement channel B1 4 –> Measurement channel B2 5 –> Measurement channel A1 [1)] 6 –> Measurement channel A2 [1)] 7 –> Measurement channel B1 [1)] 8 –> Measurement channel B2 [1)] 9 –> Complex [2)] (read only)

1) Self-monitoring with switch-on delay. The gauge is switched on via the selected measuring channel, however switches itself off. Self-monitoring is only enabled after a delay time of approx. 10 s.

2) If the control set using commands SB1 and SB2 cannot be mapped in the SPB command, this is indicated with parameter value c=9 when reading.

1.9 General parameters group

1.9.1 AOM - Analog output mode

Send: **AOM** [,a] <CR>[<LF>]

	Description
a	Analog output mode, a = 0 –> Off (default) 1 –> 0 … 5 V 2 –> 0 … 10 V 3 –> 4 … 20 mA

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

Receive: x <CR><LF>

	Description
a	Analog output mode

1.9.2 BAL - Background light

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

	Description
a	Background light in percent, a = 0 … 100 (40% default) 100% is full brightness

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

Receive: a <CR><LF>

	Description
a	Background lighting

1.9.3 DCB - Display control bar graph

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

	Description
a	Measuring channel, a =
	0 –> Measuring channel A1
	1 –> Measuring channel A2
	2 –> Measuring channel B1
	3 –> Measuring channel B2
b	Display control bar graph, b =
	0 –> Switched off (default)
	1 –> Bar graph over entire measuring range of gauge
	2 –> Bar graph over entire measuring range of gauge and switch-point threshold value
	3 –> Bar graph over one decade according to current measured value
	4 –> Bar graph over one decade according to current measured value and switch-point threshold value
	5 –> p = $f_{(t)}$, auto-scaled, 0.2 second/pixel For each measuring channel, one measured value is stored in a table every 200 ms and the last 100 measured values (=100 pixels) are auto-scaled in the display. The illustrated data series corresponds to a recording duration of 20 seconds.
	6 –> p = $f_{(t)}$, auto-scaled, 1 second/pixel For each measuring channel, one measured value is stored in a table every second and the last 100 measured values (=100 pixels) are auto-scaled in the display. The illustrated data series corresponds to a recording duration of 100 seconds.
	7 –> p = $f_{(t)}$, auto-scaled, 6 second/pixel For each measuring channel, one measured value is stored in a table every 6 seconds and the last 100 measured values (=100 pixels) are auto-scaled in the display. The illustrated data series is equivalent to a recording duration of 10 minutes.
	8 –> p = $f_{(t)}$, auto-scaled, 1 minute/pixel For each measuring channel, one measured value is stored in a table every minute and the last 100 measured values (=100 pixels) are auto-scaled in the display. The illustrated data series is equivalent to a recording duration of 100 minutes.
	9 –> p = $f_{(t)}$, auto-scaled, 30 minutes/pixel For each measuring channel, one measured value is stored in a table every 30 minutes and the last 100 measured values (=100 pixels) are auto-scaled in the display. The illustrated data series is equivalent to a recording duration of 50 hours.
	10 –> The plug-in board type and the name of the measuring point are displayed for the selected measuring channel.
	11 –> The name of the measuring point and the assigned switch-points are displayed for the selected measuring channel.

Receive: <ACK><CR><LF>
Send: <ENQ>
Receive: a,b <CR><LF>

	Description
a	Measurement channel
b	Display control bar graph

1.9.4 DCC - Display contrast

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

	Description
a	Contrast in percent, a = 0 … 100 (40% default) 100% is full contrast

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

Receive: a <CR><LF>

	Description
a	Contrast

1.9.5 DCS - Screensaver

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

	Description
a	Screensaver, a = 0 –> Off (default) 1 –> After 10 minutes 2 –> After 30 minutes 3 –> After 1 hour 4 –> After 2 hours 5 –> After 8 hours 6 –> Switches off the background light completely after 1 minute

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

Receive: a <CR><LF>

	Description
a	Screensaver

1.9.6 ERA - Error relay assignment

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

	Description
a	Error relay switching behavior, a = 0 –> Switches with all errors (default) 1 –> Only device errors 2 –> Error sensor A1 and device error 3 –> Error sensor A2 and device error 4 –> Error sensor B1 and device error 5 –> Error sensor B2 and device error

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

Receive: a <CR><LF>

	Description
a	Error relay switching behavior

1.9.7 EVA - Upper range value

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

	Description
a	Upper range value display, a = 0 –> UR or OR is displayed for values above or below the measuring range (default) 1 –> The upper range value is displayed for values above or below the measuring range

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

Receive: a <CR><LF>

	Description
a	Upper range value

1.9.8 LNG - Language (user interface)

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

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

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

Receive: a <CR><LF>

	Description
a	Language

1.9.9 PUC - Underrange control

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

	Description
a	Underrange control a = 0 –> Off (default) 1 –> On

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

Receive: a <CR><LF>

	Description
a	Measuring underrange control

1.9.10 SAV -Store standard values (EEPROM)

Vorsicht

Termination of the current connection

Resetting the parameters to the factory setting also resets communication parameters (e.g. transfer rate, Ethernet settings) and can lead to a termination of the current connection.

Only reset parameters to factory setting if it is guaranteed that no malfunctions will be triggered by terminating the current connection.

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

	Description
a	Store parameters in the EEPROM, a = 0 –> Store standard parameters (default) 1 –> Store user parameters (user) 2 –> Store user parameters with hotstart (user hotstart)

Receive: <ACK><CR><LF>

The command "SAV,0" — Resets all parameters to factory setting.

The command "SAV,1" — Stores parameter values that were changed via the serial interface. Parameters that are automatically stored via operator keys on the device.

The command "SAV,2" — Saves as "SAV,1" and additionally activates the hotstart. Thus, a measuring circuit will be switched on automatically after a power failure. The measuring circuit must be switched on at the time of saving.

1.9.11 UNI - Unit of measurement

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

	Description
a	Unit of measurement, a = 0 –> hPascal (default) 1 –> mbar 2 –> Torr 3 –> Pascal 4 –> Micron 5 –> Volt 6 –> Ampere

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

Receive: a <CR><LF>

	Description
a	Unit of measurement

1.10 Communication parameters group

1.10.1 BAI - Transfer rate USB

When switching over, the response is already transferred with the changed transfer rate.

Send: **BAI** [,a] <CR>[<LF>]

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

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

Receive: a <CR><LF>

	Description
a	Transfer rate

1.10.2 BAR - Transfer rate RS485

When switching over, the response is already transferred with the changed transfer rate.

Send: **BAR** [,a] <CR>[<LF>]

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

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

Receive: a <CR><LF>

	Description
a	Transfer rate

1.10.3 BAU - Transfer rate IFxxx

If the TPG 500 is operated with the IF 300 P Profibus interface card, the transfer rate must be set to 19200 baud.

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

	Description
a	Transfer rate IFxx, a = 1 –> 1200 baud 2 –> 2400 baud 4 –> 4800 baud 9 –> 9600 baud (default) 3 –> 19200 baud

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

Receive: a <CR><LF>

	Description
a	Transfer rate

The IF 500P Profinet interface card works with a fixed transmission rate, so the baud rate does not have to be set (the return value of the BAU command is invalid).

1.10.4 ETH - Ethernet configuration

With the dynamic DHCP configuration, parameters b, c and d are determined automatically and do not have to be specified.

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

	Description
a	DHCP (Dynamic Host Configuration Protocol), a = 0 –> static (default) 1 –> dynamic
bbb.bbb.bbb.bbb	IP address (default 192.168.000.001)
ccc.ccc.ccc.ccc	Subnet address (default 255.000.000.000)
ddd.ddd.ddd.ddd	Gateway address (default 000.000.000.000)

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

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

	Description
a	DHCP
bbb.bbb.bbb.bbb	IP address (default 192.168.000.001)
ccc.ccc.ccc.ccc	Subnet address (default 255.000.000.000)
ddd.ddd.ddd.ddd	Gateway address (default 000.000.000.000)

1.10.5 NAD - Node address (device address) for RS485

Send: **NAD** [,a] <CR>[<LF>]

	Description
a	Device address, a = 1 … 24 (1 = default)

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

Receive: a <CR><LF>

	Description
a	Device address

The node address is used for addressing the device if several devices are connected via one bus. Depending on the protocol setting, the following differences must be observed:

"PFEIFFER VACUUM" protocol or "AUTOMATIC"

Addressing:
The "PFEIFFER VACUUM" protocol supports direct device addressing.
Under the "AUTOMATIC" setting, no MNE commands may be used in the bus operation of several devices.

"MNEMONIC 3 CHAR" protocol

Addressing:
Only the device that was addressed once with <ESC>a responds. If another device is to respond, it must be addressed. The remaining devices release the bus.

1.10.6 PRO - Serial interface protocol

Send: **PRO** [,a] <CR>[<LF>]

	Description
a	Serial interface protocol, a = 0 –> Automatic detection (default) 1 –> Pfeiffer Vacuum protocol 2 –> Mnemonics protocol

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

Receive: a <CR><LF>

	Description
a	Serial interface protocol

1.11 Data logger parameters group

This group is only available if a USB memory stick formatted with the FAT file system (FAT32) is plugged in. Use memory sticks with ≤32 GB.

1.11.1 DAT - Date

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

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

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

	Description
yyyy-mm-dd	Date in format yyyy-mm-dd

1.11.2 LCM - Start/stop data logger

For further processing of the recorded measured data (e.g. with Excel), pay attention to the corresponding country-specific decimal separator (comma or period).

Send: **LCM** [,a,b,c,ddddddddd,e] <CR>[<LF>]

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

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

	Description
a	Data logger command, a =
	0 –> Stop/recording stopped
	1 –> Start/recording running
	2 –> Delete/delete measured data files from USB memory stick
b	Storage interval, b =
	0 –> Recording interval 1s
	1 –> Recording interval 10 s
	2 –> Recording interval 30 s
	3 –> Recording interval 60 s
	4 –> With measured value change ≥1%
	5 –> With measured value change ≥5%
c	Decimal separator, c =
	0 –> , (comma) (default)
	1 –> . (period)
ddddddddd	File name (max. 8 characters)
e	Recording mode, e=
	0 –> Manual (default)
	1 –> Automatic

1.11.3 TIM - Time

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

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

Receive: hh:mm <CR><LF>

	Description
hh:mm	Time in format hh:mm [24 hours]

1.12 Setup parameters group

This group is only available if a USB memory stick formatted with the FAT file system (FAT32) is plugged in. Use memory sticks with ≤32 GB.

1.12.1 SCM - Store/reset parameters (USB)

Send: **SCM** [,a,b] <CR>[<LF>]

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

Receive: a <CR><LF>

	Description
a	Setup parameters, a = 0 –> Storage completed (read only) 1 –> Store parameters from device on the USB memory stick 2 –> Store parameters from the USB memory stick on the device 3 –> Format USB memory stick 4 –> Delete parameter files (ending with .CSV) from the USB memory stick
b	Number in file names (0 … 99)

1.13 Test parameters group

(for service technicians)

1.13.1 ADC - A/D converter test

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

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

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

	Description
aa.aa	A/D converter channel A1 Measuring signal [0.00 … 11.00 V]
bb.bb	A/D converter channel A2 Measuring signal [0.00 … 11.00 V]
cc.cc	A/D converter channel B1 Measuring signal [0.00 … 11.00 V]
dd.dd	A/D converter channel B2 Measuring signal [0.00 … 11.00 V]

1.13.2 CDA - Recalibration

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

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

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

	Description
yyyy-mm-dd	Date of next recalibration. If the date was reached, a warning is issued.

1.13.3 DIS - Display test

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

	Description
a	Display test, a = 0 –> Stop test - display corresponds with operating mode (default) 1 –> Start test - all LEDs on

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

Receive: x <CR><LF>

	Description
a	Display test status

1.13.4 EEP - EEPROM test

Parameter memory test.

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

Receive: <ACK><CR><LF>
Send: <ENQ> starts the test (duration <10 s)

Do not continually repeat the test (EEPROM service life).

Receive: aaaa <CR><LF>

	Description
aaaa	Error word

1.13.5 EPR - FLASH test

Program memory test.

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

Receive: <ACK><CR><LF>
Send: <ENQ> starts the test (very short)

Receive: aaaa <CR><LF>

	Description
aaaa	Error word

1.13.6 HDW - Hardware version

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

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

Receive: aaaaaa <CR><LF>

	Description
aaaaaa	Hardware version, e.g. 010100

1.13.7 IOT - I/O test

Vorsicht

Relay switching not pressure-driven

Starting the test program can lead to unintentional results at connected controllers.

Prevent triggering of incorrect control commands or messages. Unplug the connected measuring and control cable.

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

	Description
a	Status test, a =
	0 –> Test stopped
	1 –> Test running
bb	Status relay (in hex format), bb =
	00 –> All relays off
	01 –> Relay switching function 1 on
	02 –> Relay switching function 2 on
	04 –> Relay switching function 3 on
	08 –> Relay switching function 4 on
	10 –> Error relay on
	1F –> All relays on

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

Receive: a,bb <CR><LF>

	Description
a	I/O test status
bb	Relay status

Example: 14 = relay switching function 3 and error relay on

1.13.8 LOC - Input lock

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

	Description
a	Input lock, a =
	0 –> Off (default)
	1 –> On
	2 –> On [1] (only via interface)

[1] If the input lock was activated via the interface with a=2, it can only be deactivated again via the interface.

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

Receive: a <CR><LF>

	Description
a	Input lock status

1.13.9 MAC - Ethernet MAC address

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

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

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

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

1.13.10 PNR - Firmware version

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

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

Receive: aaaaaa <CR><LF>

	Description
aaaaaa	Firmware version, e.g. 010100

1.13.11 RHR - Operating hours

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

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

Receive: a <CR><LF>

	Description
a	Operating hours, e.g. 24 [hours]

1.13.12 TKB - Operator keys test

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

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

Receive: abcd <CR><LF>

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

1.13.13 TLC - Torr lock

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

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

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

Receive: a <CR><LF>

	Description
a	Torr lock status

1.13.14 WDT - Watchdog error behavior

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

	Description
a	Watchdog error behavior a = 0 –> Manual error confirmation 1 –> Automatic error confirmation [1] (default)

[1] If the Watchdog has responded, the error is confirmed and deleted automatically after 2 s.

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

Receive: a <CR><LF>

	Description
a	Watchdog error behavior

1.14 Other parameters

1.14.1 AYT - Device identification

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

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

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

	Description
a	Designation of the measurement instrument, e.g. TPG500
b	Article number of the measurement instrument, e.g. PTG28500
c	Serial number of the measurement instrument, e.g. 44990000
d	Firmware version of the measurement instrument, e.g. 010100
e	Hardware version of the measurement instrument, e.g. 010100

1.14.2 SME – Show me

Send: SME <CR>[<LF>]

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

Receive: a <CR><LF>

	Description
a	0 –> Visualization off (default) 1 –> Visualization on: The background lighting of the addressed controller flashes for 5 seconds.

1.14.3 TMP - Inner temperature of device

Inner temperature of the TPG 500.

Send: TMP <CR>[<LF>]

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

Receive: aa <CR><LF>

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

1.14.4 VBT - Battery voltage

Send: VBT <CR>[<LF>]

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

Receive: aaaa <CR><LF>

	Description
aaaa	Battery voltage [mV] Nominal value: 3 V

1.15 Mnemonics example

"Send (S)" and "Receive (E)" are related to the host.

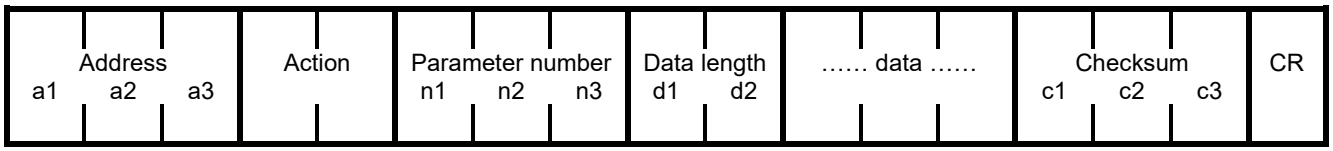
S: **TID** <CR> [<LF>]	Calling up the plug-in board identification
R: <ACK> <CR> <LF>	positive feedback signal
S: <ENQ>	Query
R: PI300D,CP300x9,IF300x <CR> <LF>	Output of plug-in board types
S: **SEN** <CR> [<LF>]	Calling up the measurement circuit states
R: <ACK> <CR> <LF>	positive feedback signal
S: <ENQ>	Query
R: 0,0,0,0 <CR> <LF>	Output of measurement circuit states
S: **SP1** <CR> [<LF>]	Calling up the parameters for switching function 1
R: <ACK> <CR> <LF>	positive feedback signal
S: <ENQ>	Query
R: 1.0E-09,9.0E-07,2 <CR> <LF>	Output of threshold values
S: **SP1**,6.8E-3,9.8E-3,2 <CR> [<LF>]	Change of threshold value for switching function 1
R: <ACK> <CR> <LF>	positive feedback signal
S: **FOL**,1,2,2,2 <CR> [<LF>]	Changing the filtering (syntax error)
R: <NAK> <CR> <LF>	negative feedback signal
S: <ENQ>	Query
R: 0001 <CR> <LF>	Output of ERROR word
S: **FIL**,1,2,2,2 <CR> [<LF>]	Changing the filtering
R: <ACK> <CR> <LF>	positive feedback signal
S: <ENQ>	Query
R: 1,2,2,2 <CR> <LF>	Output of filter stages

2 Pfeiffer Vacuum Protocol

2.1 Telegram frame

The Pfeiffer Vacuum protocol uses the ASCII format. This means that all data bytes are displayable characters with an ASCII code between 32 (decimal) and 127 (decimal) with the exception of the carriage return 'telegram end character' (CR, ASCII 13).

The transferred telegrams are found, without exception, in a frame structured as follows:



Address

Address of the addressed or responding device (slave), e.g. "042".

A separate address is issued to the controller and to each measuring channel ("aab"):

- aa: Controller address [1 … 24] (factory setting: 01)
- b: Channel number {1, 2, 3, 4}

Areas for measuring channel addresses: 011 … 244 (factory setting: 011 for channel 1, 012 for channel 2, 013 for channel 3, etc.).

Measuring channel-independent parameters (e.g. device address, operating hours) are addressed via the channel number b = 0 (e.g. "200" for controller 20).

Action

"00" = Read parameters (from master to slave).

"10" = Write parameters (from master to slave), or
transfer queried parameter value (from slave to master), or
confirm written parameter value (from slave to master).

Parameter number

Number of parameter concerned, e.g. "303".

Data length

e.g. "06" for 6 characters, corresponds with length of the "Data" field.

Data

Data in the respective data type (→ 🗎 39).

Checksum

The sum of the decimal values of all ASCII characters up to the checksum modulo 256 (decimal). e.g. sum = 786, 786 modulo 256 = 18. i.e. checksum = "018" (converted in ASCII string).

CR

carriage return (ASCII character 13) = telegram end.

Through the master-slave behavior, data is always being exchanged according to the schema: master sends (either control command or query), slave responds (confirmation or sending of data/error messages).

2.2 Telegram

2.2.1 master telegram

The device hosting the communication (master, e.g. PC) can send three different telegrams.

Read parameters:

a1	a2	a3	0	0	n1	n2	n3	0	2	=	?	c1	c2	c3	CR

Write parameters:

a1	a2	a3	1	0	n1	n2	n3	d1	d2	……data……	c1	c2	c3	CR

2.2.2 slave telegram

The slave device cannot start any communication itself, instead it only responds if addressed with a valid individual address. The following telegrams are possible:

Data response/control command understood:

a1	a2	a3	1	0	n1	n2	n3	d1	d2	……data……	c1	c2	c3	CR

The control command is valid and will be processed by the slave. The sent data are used, the telegram looks exactly like the control command.

Malfunction message:

a1	a2	a3	1	0	n1	n2	n3	0	6	N _ _	O R L	_ A O	D N G	E G I	F E C	c1	c2	c3	CR

"NO_DEF" Parameter number does not exist
"_RANGE" Data outside the permissible range
"_LOGIC" Logical access error, e.g. writing of a read-only parameter

2.2.3 Examples

Reading the actual pressure value from measuring channel A2 on the unit with address 01:

0	1	2	0	0	7	4	0	0	2	=	?	1	0	8	CR

Response from unit:

0	1	2	1	0	7	4	0	0	6	1	0	0	0	2	3	0	2	7	CR

Reading invalid parameters from unit with address 05:

0	5	0	0	0	0	4	9	0	2	=	?	1	1	2	CR

Response from unit:

0	5	0	1	0	0	4	9	0	6	N	O	_	D	E	F	1	9	6	CR

2.3 Data types

Depending on the content of the parameter, the data field can have different formats. The following data types are possible:

Data type	Description	Length	Example
0 – boolean_old	False/true in the form of six zeros (ASCII 48) or ones (ASCII 49)	6	000000 = false 111111 = true
1 – u_integer	Unsigned integer with six places (leading zeros)	6	000042 123456 001200
2 – u_real	Fixed-point number with four and two decimal places, standardized to 0.01 (leading zeros)	6	001570 = 15.70 000020 = 0.2
4 – string	Any character chain with ASCII characters ≥32 (decimal)	6	Hello! TC_600
7 – u_short_int	Unsigned integer with three places (leading zeros)	3	123 042 007
10 – u_expo_new	Positive exponential number. The first four places contain the mantissa multiplied by 1000, the last two contain both exponents with offset 20	6	100023 = 1.000E3 456711 = 4.567E-9
11 – string16	String	16	44991234 PT G28 500

2.4 Parameter

Sub-address xx0 = Measuring channel-independent parameters
xx1 = Parameters of measuring channel 1
xx2 = Parameters of measuring channel 2
xx3 = Parameters of measuring channel 3
xx4 = Parameters of measuring channel 4

Access type R = read, W = write

Parameter no.	Sub-address	Designation	Description	Data type	Access type	Unit	Min. value	Max. value
008	xx0	Key lock	0: Keys enabled 1: Keys locked	0	RW	####	000000	111111
041	xx1	Gauge A1 on/off	0: off 1: on 2: switch-on/off threshold not reached/exceeded for channel A1 (1) 3: switch-on/off threshold not reached/exceeded for channel A2 (2) 4: switch-on/off threshold not reached/exceeded for channel B1 (3) 5: switch-on/off threshold not reached/exceeded for channel B2 (4) 6: complex (read only). The current configuration can only be read out with the MNE commands SA1, SA2, SB1 and SB2.	7	RW	####	000	006
	xx2	Gauge A2 on/off						
	xx3	Gauge B1 on/off						
	xx4	Gauge B2 on/off						
045	xx0	Configuration, relay 1	9: always passive 10: always active 19: Threshold value of sensor A1 (1) not reached 20: Threshold value of sensor A2 (2) not reached 21: Threshold value of sensor B1 (3) not reached 22: Threshold value of sensor B2 (3) not reached The threshold value sensor A1/A2/B1/B2 (1/2/3/4) is only accessible via the display or the MNE protocol (SPx)	7	RW	####	009	022
046	xx0	Configuration, relay 2						
047	xx0	Configuration, relay 3						
048	xx0	Configuration, relay 4						
303	xx0	Error TPG	"000000", "WrnXXX", "ErrXXX" XXX stands for the error number or warning number (e.g. "Err042)	4	R	####	######	~~~~~~
	xx1	Error at sensor A1 (1)						
	xx2	Error at sensor A2 (2)						
	xx3	Error at sensor B1 (3)						
	xx4	Error at sensor B2 (4)						
312	xx0	Firmware version TPG500	e.g. "010100": first firmware version	4	R	####	######	~~~~~~
314	xx0	Operating hours TPG500	Stops when max. value is reached (if applicable <999999)	1	R	h###	000000	999999
349	xx0	Device name TPG500	"TPG500"	4	R	####	######	~~~~~~
	xx1	Device name sensor A1 (1)	"PI300#" or "PE300#" or "CP300#" or "noCARD" or "noID##"					
	xx2	Device name sensor A2 (2)						
	xx3	Device name sensor B1 (3)						
	xx4	Device name sensor B2 (4)						
354	xx0	Hardware version TPG	e.g. "010100": first hardware version	4	R	####	######	~~~~~~
355	xx0	Serial number	e.g. "44991234"	11	R	####	######	~~~~~~
358	xx0	Ordering number	e.g. "PT G28 500"	11	R	####	######	~~~~~~
730	xx1	Switch-on threshold sensor A1 (1)	Range 1.0E-11 … 9.9E+3 hPa Pressure always in hPa, regardless of the unit used in the display	10	RW	hPa#	100009	990023
	xx2	Switch-on threshold sensor A2 (2)						
	xx3	Switch-on threshold sensor B1 (3)						
	xx4	Switch-on threshold sensor B2 (4)						
732	xx1	Switch-off threshold sensor A1 (1)						
	xx2	Switch-off threshold sensor A2 (2)						
	xx3	Switch-off threshold sensor B1 (3)						
	xx4	Switch-off threshold sensor B2 (4)						
740	xx1	Pressure actual value sensor A1 (1)	R supplies the current pressure value (000000: underrange, 999999: overrange) Pressure always in hPa, regardless of the unit used in the display	10	R	hPa#	000000	999999
	xx2	Pressure actual value sensor A2 (2)						
	xx3	Pressure actual value sensor B1 (3)						
	xx4	Pressure actual value sensor B2 (4)						
797	xx0	Device address TPG	{010, 020, 030, … 240}	1	RW	###	000010	000240

The table uses # for a space character (ASCII 32) and ~ for DEL (ASCII 127)

2.5 ASCII table decimal / hexadecimal codes

Hex	Dec	ASCII	Hex	Dec	ASCII	Hex	Dec	ASCII	Hex	Dec	ASCII
0	0	NUL	10	16	DLE	20	32	SB	30	48	0
1	1	SOH	11	17	DC1	21	33	!	31	49	1
2	2	STX	12	18	DC2	22	34	"	32	50	2
3	3	ETX	13	19	DC3	23	35	#	33	51	3
4	4	EOT	14	20	DC4	24	36	$	34	52	4
5	5	ENQ	15	21	NAK	25	37	%	35	53	5
6	6	ACK	16	22	SYN	26	38	&	36	54	6
7	7	BEL	17	23	ETB	27	39	'	37	55	7
8	8	BH	18	24	CAN	28	40	(	38	56	8
9	9	HAT	19	25	EM	29	41	)	39	57	9
A	10	LF	1A	26	SUB	2A	42	*	3A	58	:
B	11	VT	1B	27	ESC	2B	43	+	3B	59	;
C	12	FF	1C	28	FS	2C	44	,	3C	60	<
D	13	CR	1D	29	GS	2D	45	-	3D	61	=
E	14	SO	1E	30	RS	2E	46	.	3E	62	>
F	15	SI	1F	31	US	2F	47	/	3F	63	?

Hex	Dec	ASCII	Hex	Dec	ASCII	Hex	Dec	ASCII	Hex	Dec	ASCII
40	64	@	50	80	P	60	96	`	70	112	p
41	65	A	51	81	Q	61	97	a	71	113	q
42	66	B	52	82	R	62	98	b	72	114	r
43	67	C	53	83	S	63	99	c	73	115	s
44	68	D	54	84	T	64	100	d	74	116	t
45	69	E	55	85	U	65	101	e	75	117	u
46	70	F	56	86	V	66	102	f	76	118	v
47	71	G	57	87	W	67	103	g	77	119	w
48	72	H	58	88	X	68	104	h	78	120	x
49	73	I	59	89	Y	69	105	i	79	121	y
4A	74	J	5A	90	Z	6A	106	j	7A	122	z
4B	75	K	5B	91	[	6B	107	k	7B	123	{
4C	76	L	5C	92	\	6C	108	l	7C	124	|
4D	77	M	5D	93	]	6D	109	m	7D	125	}
4E	78	N	5E	94	^	6E	110	n	7E	126	~
4F	79	O	5F	95	_	6F	111	o	7F	127	DEL

Appendix

A: Literature

🕮 [1] www.pfeiffer-vacuum.de
Operating instructions
Total pressure measuring and control unit TPG 500
BG 6008 BDE / BEN / BFR
Pfeiffer Vacuum GmbH, D-35614 Aßlar, Germany

🕮 [2] www.pfeiffer-vacuum.de
Operating instructions
Total pressure measuring and control unit TPG 300, TPG 500
BG 5972 BDE / BEN / BFR
Pfeiffer Vacuum GmbH, D-35614 Aßlar, Germany

🕮 [3] www.pfeiffer-vacuum.de
Operating instructions
Pirani sensors TPR 010, TPR 017, TPR 018
BG 5976 BDE / BEN / BFR
Pfeiffer Vacuum GmbH, D-35614 Aßlar, Germany

🕮 [4] www.pfeiffer-vacuum.de
Operating instructions
Cold cathode sensors IKR 050
BG 5031 BDE / BEN / BFR
Pfeiffer Vacuum GmbH, D-35614 Aßlar, Germany

🕮 [5] www.pfeiffer-vacuum.de
Operating instructions
Cold cathode sensors IKR 060
BG 5032 BDE / BEN / BFR
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

🕮 [6] www.pfeiffer-vacuum.de
Operating instructions
Cold cathode sensors IKR 070
BG 5033 BDE / BEN / BFR
Pfeiffer Vacuum GmbH, D-35614 Aßlar, Germany

🕮 [7] www.pfeiffer-vacuum.de
Communication protocol
Profibus-DP Interface Board IF 300 P
BG 5973 BEN (English only)
Pfeiffer Vacuum GmbH, D-35614 Aßlar, Germany

🕮 [8] www.pfeiffer-vacuum.de
Communication Protocol
Profinet Interface Board IF 500 PN
BG 6014 BEN (English only)
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Deutschland

🕮 [9] www.pfeiffer-vacuum.de
Installation guide
TPG 500
BG 6007 BXX
Pfeiffer Vacuum GmbH, D–35614 Aßlar, Germany

Notes

VACUUM SOLUTIONS FROM A SINGLE SOURCE

Worldwide, Pfeiffer Vacuum stands for innovative and customized vacuum solutions, technological perfection, competent consultation and reliable service.

COMPLETE RANGE OF PRODUCTS

From an individual component through to complex systems:
We are the only vacuum technology provider to offer a complete range of products.

EXPERTISE IN THEORY AND PRACTICE

Take advantage of our know-how and our training offer!
We will support you in system planning, and we offer first-class on-site service worldwide.

Are you looking for a perfect vacuum solution?
Then contact us at:

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

www.pfeiffer-vacuum.com

PFEIFFER VACUUM

bq6009berVa