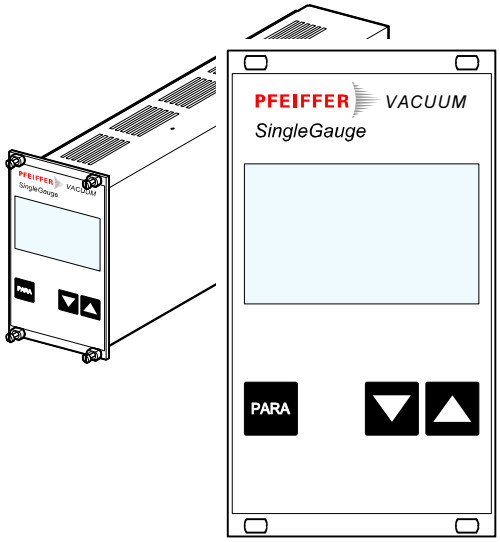
SingleGauge™

Single-Channel Measurement and Control Unit
for Compact Gauges

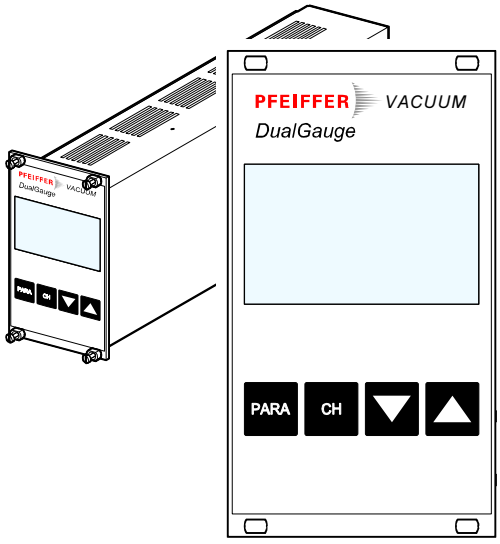
TPG 261



DualGauge™

Dual-Channel Measurement and Control Unit
for Compact Gauges

TPG 262



Product Identification

SingleGauge™ TPG 261 → 🕮 BG 805 195 BE
DualGauge™ TPG 262 → 🕮 BG 805 196 BE

Validity

This document applies to products with part number

PTG28030 (SingleGauge™)
PTG28280 (DualGauge™).

The part number (No.) can be taken from the product nameplate.

This document is based on firmware number 302-510--.

If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 🗎 13).

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

Intended Use

The RS232C interface is used for operating the TPG 261 / TPG 262 via a computer or a terminal.

Trademarks

DualGauge™ Inficon AG
FullRange™ Inficon AG

Contents

For cross-references within this document, the symbol (→ 🗎 XY) is used, for cross-references to other documents, the symbol (→ 🕮 [Z]).

1 RS232C Interface

The serial interface is used for communication between the TPG 261 / TPG 262 and a computer. A terminal can be connected for test purposes.

When the TPG 261 / TPG 262 is put into operation, it starts transmitting measured values in intervals of 1 s. As soon as the first character is transferred to the TPG 261 / TPG 262, 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 (→ 🗎 7).

1.1 Installation

SingleGauge™ TPG 261 → 🕮 BG 805 195 BE
DualGauge™ TPG 262 → 🕮 BG 805 196 BE

1.2 Data Transmission

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

Configuration of the interface

SingleGauge™ TPG 261 → 🕮 BG 805 195 BE
DualGauge™ TPG 262 → 🕮 BG 805 196 BE

Data format

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

1.2.1 Definitions

The following abbreviations and symbols are used:

Symbol	Meaning	Dec	Hex
HOST	Computer or terminal		
[...]	Optional elements		
ASCII	American Standard Code for Information Interchange		
<ETX>	END OF TEXT (CTRL C) Reset the interface	3	03
<CR>	CARRIAGE RETURN Go to beginning of the 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 TPG 261 / TPG 262
"Receive": Data transfer from TPG 261 / TPG 262 to HOST

1.2.2 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.

1.2.3 Communication Protocol

Transmission format

Messages are transmitted to the TPG 261 / TPG 262 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 TPG 261 / TPG 262.

Transmission protocol

HOST	TPG 261 / TPG 262	Explanation
Mnemonics [and parameters]	——————>	Receives message with
<CR>[<LF>]	——————>	"end of message"
<——————	<ACK><CR><LF>	Positive acknowledgment of a received message

Reception format

When requested with a mnemonic instruction, the TPG 261 / TPG 262 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.

Reception protocol

HOST	TPG 261 / TPG 262	Explanation
Mnemonics [and parameters]	——————>	Receives message with
<CR>[<LF>]	——————>	"end of message"
<——————	<ACK><CR><LF>	Positive acknowledgment of a received message
<ENQ>	——————>	Requests to transmit data
<— Measurement values or parameters		Transmits data with
<——————	<CR><LF>	"end of message"
:		:
<ENQ>	——————>	Requests to transmit data
<——— Measured values or parameters		Transmits data with
<——————	<CR><LF>	"end of message"

Error processing

The strings received are verified in the TPG 261 / TPG 262. If an error is detected, a negative acknowledgment <NAK> is output.

Error recognition protocol

HOST	TPG 261 / TPG 262	Explanation
Mnemonics [and parameters]	——————>	Receives message with
<CR>[<LF>]	——————>	"end of message"
***** Transmission or programming error *****		
<——————	<NAK><CR><LF>	Negative acknowledgment of a received message
Mnemonics [and parameters]	——————>	Receives message with
<CR>[<LF>]	——————>	"end of message"
<——————	<ACK><CR><LF>	Positive acknowledgment of a received message

2 Mnemonics

		→ 🗎
ADC	A/D converter test	15
BAU	Baud rate (transmission rate)	13
COM	Continuous mode	7
CAL	Calibration factor	10
DCD	Display control digits (display resolution)	13
DGS	Degas	12
DIC	Display control (display changeover)	13
DIS	Display test	15
EEP	EEPROM test	15
EPR	EPROM test	14
ERR	Error status	8
FIL	Filter time constant (measurement value filter)	10
FSR	Full scale range (measurement range of linear gauges)	10
IOT	I/O test	16
LOC	Keylock	14
OFC	Offset correction (linear gauges)	11
OFD	Offset display (linear gauges)	11
PNR	Program number (firmware version)	13
PR1	Pressure measurement (measurement data) gauge 1	6
PR2	Pressure measurement (measurement data) gauge 2	6
PRX	Pressure measurement (measurement data) gauge 1 and 2	6
PUC	Penning underrange control (underrange control)	11
RAM	RAM test	14
RES	Reset	8
RST	RS232 test	16
SAV	Save parameters to EEPROM	13
SC1	Sensor control 1 (gauge control 1)	12
SC2	Sensor control 2 (gauge control2)	12
SCT	Sensor channel change (measurement channel change)	8
SEN	Sensors on/off	7
SP1	Setpoint 1 (switching function 1)	9
SP2	Setpoint 2 (switching function 2)	9
SP3	Setpoint 3 (switching function 3)	9
SP4	Setpoint 4 (switching function 4)	9
SPS	Setpoint status (switching function status)	9
TID	Transmitter identification (gauge identification)	7
TKB	Keyboard test (operator key test)	16
TLC	Torr lock	14
UNI	Pressure unit	12
WDT	Watchdog control	14

2.1 Measurement Mode

Measurement data gauge 1 or 2

Transmit: **PRx** <CR>[<LF>] Pressure measurement

```
  |
  └─ Measurement value   x =  1 –> Gauge 1
                              2 –> Gauge 2
```

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

Receive: x,sx.xxxxEsxx <CR><LF> (always exponential format)

```
|       |
|       └─ Measurement value *)  [in current pressure unit]
|
└─ Status   x = 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
```

*) For logarithmic gauges, the 3rd and 4th decimal are always 0.

Measurement data gauges 1 and 2

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

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

Receive: x,sx.xxxxEsxx,y,sy.yyyyEsyy <CR><LF> (always exponential format)

```
|       |     |       |
|       |     |       └─ Measurement value gauge 1 *)
|       |     |          [in current pressure unit]
|       |     |
|       |     └─ Status gauge 2
|       |
|       └─ Measurement value gauge 1 *)  [in current pressure unit]
|
└─ Status gauge 1   x = 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
```

*) For logarithmic gauges, the 3rd and 4th decimal are always 0.

Continuous output of measurement values (RS232)

Transmit: **COM** [,x] <CR>[<LF>] Continuous mode

- x = Mode
  - 0 –> 100 ms
  - 1 –> 1 s (default)
  - 2 –> 1 min.

Receive: <ACK><CR><LF>

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

Receive: x,sx.xxxxEsxx,y,sy.yyyyEsyy <CR><LF> (always exponential format)

- Measurement value gauge 1 *) [in current pressure unit]
- Status gauge 2
- Measurement value gauge 1 *) [in current pressure unit]
- Status gauge 1
  - 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

*) For logarithmic gauges, the 3rd and 4th decimal are always 0.

Turning a gauge on/off

Transmit: **SEN** [,x,x] <CR>[<LF>] Sensors on/off

- Gauge 2
  - 0 –> No status change
  - 1 –> Turn gauge off
  - 2 –> Turn gauge on
- Gauge 1

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

Receive: x,x <CR><LF>

- Status gauge 2
  - 0 –> Gauge cannot be turned on/off
  - 1 –> Gauge turned off
  - 2 –> Gauge turned on
- Status gauge 1

Gauge identification

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

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

Receive: x,x <CR><LF>

- Identification gauge 2
  - TPR (Pirani Gauge)
  - IKR9 (Cold Cathode Gauge 10^{-9})
  - IKR11 (Cold Cathode Gauge 10^{-11})
  - PKR (FullRange CC Gauge)
  - PBR (FullRange BA Gauge)
  - IMR (Pirani / High Pressure Gauge)
  - CMR (Linear gauge)
  - noSEn (no SEnsor)
  - noid (no identifier)
- Identification gauge 1

Measurement channel change

Transmit: **SCT** [,x] <CR>[<LF>] Sensor channel change

- Display channel x = 0 –> Gauge 1
  1 –> Gauge 2

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

Receive: x <CR><LF>

- Display channel

Error status

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

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

Receive: xxxx <CR><LF>

- xxxx = 0000 –> No error
  1000 –> 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 set again.

Reset

Transmit: **RES** [,x] <CR>[<LF>] Reset

- x = 1 –> Cancels currently active error and returns to measurement mode

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

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

- List of all present error messages
  xx = 0 –> No error
  1 –> Watchdog has responded
  2 –> Task fail error
  3 –> EPROM error
  4 –> RAM error
  5 –> EEPROM error
  6 –> DISPLAY error
  7 –> A/D converter 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

2.2 Parameter Mode

2.2.1 Switching Function Parameters

Threshold value setting, allocation

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

- x = Upper threshold *) [in current pressure unit] (default = depending on gauge)
- x = Lower threshold *) [in current pressure unit] (default = depending on gauge)
- y = Switching function assignment y = 0 –> Meas. channel 1 ▶1
  1 –> Meas. channel 2 ▶2
- x = 1 –> Switching function 1 SP1
  2 –> Switching function 2 SP2
  3 –> Switching function 3 SP3
  4 –> Switching function 4 SP4

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

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

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

- x = Upper threshold [in current pressure unit]
- x = Lower threshold [in current pressure unit]
- y = Switching function assignment

Switching function status

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

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

Receive: x,x,x,x <CR><LF>

- x = Status switching function 4 SP4 x = 0 –> off, 1 –> on
- x = Status switching function 3 SP3
- x = Status switching function 2 SP2
- x = Status switching function 1 SP1

2.2.2 Gauge Parameters

Measurement value filter

Transmit: **FIL** [,x,x] <CR>[<LF>] Filter time constant

- Gauge 2 x = 0 –> fast
  - 1 –> medium (default)
  - 2 –> slow
- Gauge 1

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

Receive: x,x <CR><LF>

- Filter time constant gauge 2
- Filter time constant gauge 1

Calibration factor

Transmit: **CAL** [,x.xxx,x.xxx] <CR>[<LF>] Calibration factor **CAL**

- Gauge 2
  - log. 0.100 ... 9.990 (default = 1.000)
  - lin. 0.500 ... 2.000 (default = 1.000)
- Gauge 1

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

Receive: x.xxx,x.xxx <CR><LF>

- Calibration factor gauge 2
- Calibration factor gauge 1

Measurement range (F.S.) of 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** [,x,x] <CR>[<LF>] Full scale range

- Gauge 2 x = 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
- Gauge 1

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

Receive: x,x <CR><LF>

- Measurement range gauge 2
- Measurement range gauge 1

Offset correction (linear gauges)

Transmit: **OFC** [,x,x] <CR>[<LF>] Offset correction **OFS**

- Gauge 2: x = 0 –> off (default); 1 –> on; 2 –> auto (offset measurement)
- Gauge 1

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

Receive: x,x <CR><LF>

- Gauge 2
- Gauge 1

Offset display (linear gauges)

Transmit: **OFD** [,sx.xxxxEsxx,sx.xxxxEsxx] <CR>[<LF>] Offset display

- Gauge 2: Offset *) [in current pressure unit] (default = 0.0000)
- Gauge 1

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

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

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

- Gauge 2
- Gauge 1

Underrange control

Transmit: **PUC** [,x,x] <CR>[<LF>] Penning underrange control

- Gauge 2: x = 0 –> off (default); 1 –> on
- Gauge 1

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

Receive: x,x <CR><LF>

- Gauge 2
- Gauge 1

Degas

Transmit: **DGS** [,x,x] <CR>[<LF>] Degas **DEG**

- x = Gauge 2: 0 –> Degas off (default); 1 –> Degas on (3 min.)
- Gauge 1

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

Receive: x,x <CR><LF>

- Degas status gauge 2
- Degas status gauge 1

2.2.3 Gauge Control

Gauge control

Transmit: **SCx** [,x,y,x.xxEsxx,y.yyEsyy] <CR>[<LF>] Sensor control

- OFF threshold
- ON threshold
- Controlling source for gauge deactivation: x = 0 –> no control; 1 –> automatic deactivation; 2 –> manual deactivation (default); 3 –> external deactivation; 4 –> self control
- Controlling source for gauge activation: x = 0 –> no control; 1 –> automatic activation; 2 –> manual activation (default); 3 –> external activation; 4 –> hot start
- Controlled gauge: x = 1 –> Gauge 1; 2 –> Gauge 2

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

Receive: x,y,x.xxEsxx,y.yyEsyy <CR><LF>

- OFF threshold
- ON threshold
- Controlling source for deactivating the gauge
- Controlling source for activating the gauge

2.2.4 General Parameters

Pressure unit

Transmit: **UNI** [,x] <CR>[<LF>] Pressure unit

- Pressure unit: x = 0 –> mbar/bar (default); 1 –> Torr; 2 –> Pascal

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

Receive: x <CR><LF>

- Pressure unit

Transmission rate

Transmit: **BAU** [,x] <CR>[<LF>] Baud rate

```
        |
        └─ Transmission rate   x = 0 –>  9600 baud  (default)
                                   1 –> 19200 baud
                                   2 –> 38400 baud
```

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>

```
|
└─ Transmission rate
```

Display resolution

Transmit: **DCD** [,x] <CR>[<LF>] Display control digits

```
        |
        └─ Resolution   x =   2 –> Display x.x   (2 digits) (default)
                              3 –> Display x.xx (3 digits)
```

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

Receive: x <CR><LF>

```
|
└─ Resolution
```

Save parameters to EEPROM

Transmit: **SAV** [,x] <CR>[<LF>] Save parameters to EEPROM

```
        |
        └─ x =  0 –> Save default parameters
                1 –> Save user parameters
```

Receive: <ACK><CR><LF>

Display changeover

Transmit: **DIC** [,x] <CR>[<LF>] Display control

```
      |
      └─ Measurement display behavior when a Pirani gauge is combined
         with a linear gauge with 1000 mbar F.S.
         x =  0 –>manual  (default)
              1 –>automatic
```

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

Receive: x <CR><LF>

```
|
└─ Measurement display behavior
```

2.2.5 Test Parameters

(For service specialists)

Firmware version

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

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

Receive: 302-510-x <CR><LF>

```
|   |
|   └─ -x = Modification index  (-- = original version)
|
└─ Firmware number
```

Watchdog control

Transmit: **WDT** [,x] <CR>[<LF>] Watchdog control

```
└─ x =  0 –> Manual error acknowledgement
        1 –> Automatic error acknowledgement *)  (default)
```

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

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

Receive: x <CR><LF>

```
└─ Watchdog control
```

Torr lock

Transmit: **TLC** [,x] <CR>[<LF>] Torr lock

```
└─ x =  0 –> off  (default)
        1 –> on
```

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

Receive: x <CR><LF>

```
└─ Torr lock status
```

Keylock

Transmit: **LOC** [,x] <CR>[<LF>] Keylock

```
└─ x =  0 –> off  (default)
        1 –> on
```

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

Receive: x <CR><LF>

```
└─ Keylock status
```

RAM test

Transmit: **RAM** <CR>[<LF>] RAM test

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

Receive: xxxx <CR><LF>

```
└─ ERROR word
```

EPROM test

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

Receive: <ACK><CR><LF>
Transmit: <ENQ> Starts the test (duration ≈5 s)

Receive: xxxx,yyyy <CR><LF>

```
│    └─ Check sum (hex)
└─ ERROR word
```

EEPROM test

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

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

*) Do not keep repeating the test (EEPROM life).

Receive: xxxx <CR><LF>

- ERROR word

Display test

Transmit: **DIS** [,x] <CR>[<LF>] Display test

- x = 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>

- Display test status

ADC test

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

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

Receive: [x]x.xxxx,[x]x.xxxx,x.xxxx,x.xxxx <CR><LF>

- ADC channel 4
  Gauge 2 identification
  [0.0000 ... 5.0000 V]
- ADC channel 3
  Gauge 1 identification [0.0000 ... 5.0000 V]
- ADC channel 2
  Measurement signal gauge 2 [0.0000 ... 11.0000 V]
- ADC channel 1
  Measurement signal gauge 1 [0.0000 ... 11.0000 V]

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** [,x,yy] <CR>[<LF>] I/O test

- yy = Relay status (in hex format)
  - 00 –> All relays deactivated
  - 01 –> Switching function relay 1 activated
  - 02 –> Switching function relay 2 activated
  - 04 –> Switching function relay 3 activated
  - 08 –> Switching function relay 4 activated
  - 10 –> Gauge relay CH1 activated
  - 20 –> Gauge relay CH2 activated
  - 40 –> Error relay activated
  - 7F –> All relays activated
- x = 0 –> Test stopped
  - 1 –> Test runs

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

Receive: x,yy <CR><LF>

- Relay status
- I/O test status

Operator key test

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

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

Receive: xxxx <CR><LF>

- Key 4 ▲ x = 0 –> Not pushed, 1 –> Pushed
- Key 3 ▼
- Key 2 CH
- Key 1 PARA

RS232 test

Transmit: **RST** <CR>[<LF>] RS232 test

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

2.3 Example

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

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

Notes

Notes

Original: German BG 805 198 BD (0109)
bg805198be

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