General Information

Product Identification
In all communications with Oerlikon Leybold Vacuum, please specify the information on the product name-plate. For convenient reference copy that information into the space provided below.

Oerlikon Leybold Vacuum, D-50968 Köln
Type: ________________  No: ________________
F-No: ________________  V ________________  Hz ________________  VA

Validity
This document applies to products with part numbers
230 002  (Version for Europe)
235 002  (Version for USA and Japan)
The part number can be taken from the product name-plate.

This document is based on firmware number
BG 509 763 -G
If your unit does not work as described in this document, please check that it is equipped with the above firmware version (→ 53).

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

Intended Use
CENTER ONE is used together with Leybold Vakuum Transmitters (in this document referred to as gauges) for total pressure measurement. All products must be operated in accordance with the relevant operating instructions.

Trademarks
THERMOVAC®, PENNINGVAC®  Oerlikon
CERAVAC®, IONIVAC®  Leybold Vacuum
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**EC Declaration of Conformity** 96

For cross-references within this document, the symbol \(\rightarrow \text{XY}\) is used, for cross-references to other documents, the symbol \(\rightarrow \text{[Z]}\).
1 Safety

1.1 Symbols Used

- **DANGER**
  Information on preventing any kind of physical injury.

- **WARNING**
  Information on preventing extensive equipment and environmental damage.

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

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.

  Communicate the safety instructions to all other users.
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 and easily reached by the user.
To disconnect the controller from mains, you must unplug the mains cable.

Communicate the safety instructions to all other users.
1.4 Liability and Warranty

Oerlikon Leybold Vacuum assumes no liability and the warranty becomes 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 documentation.
2 Technical Data

Mains specifications
Voltage 85 ... 264 V–
Frequency 50 ... 60 Hz
Power consumption ≤30 W
Overvoltage category II
Protection class 1
Connection European appliance connector IEC 320 C14

Ambiance
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
Protection type IP30

Compatible gauges
Number 1
Compatible types
Pirani TTR 90, TTR 211S, TTR 91,
TTR 91 S, TTR 96 S
Pirani/Capacitive TTR 100, TTR 100 S2,
Cold cathode TTR 101, TTR 101 S2
 PTR 225
Cold cathode/Pirani PTR 90
Capacitive CTR 90, CTR 91, CTR 100,
CTR 101, DI 200, DI 201,
DI 2000, DI 2001, DI 2001 rel
Ionization ITR 90
Ionization/Pirani ITR 100, ITR 200
Technical Data

Gauge connection
Number 2 (parallel)

Caution
Do not connect more than one gauge at the same time.

Connector 15-pin D-Sub, female, RJ45 (FCC68)
(pin assignment → 24)

Operation
Manual via 3 keys
HOST via RS232C interface

Measurement values
Measurement ranges depending on gauge
(→ [1] … [16])

Measurement error
gain error ≤0.02% FSr
offset error ≤0.05% FSr

Measurement rate
analog 100 / s
digital 50 / s (CTR 100, CTR 101, ITR 90, ITR 200)
10 / s (ITR 100)

Display rate 10 / s

Filter time constant
slow 750 ms (f_g = 0.2 Hz)
normal (nor) 150 ms (f_g = 1 Hz)
fast 20 ms (f_g = 8 Hz)

Measurement units mbar, Pa, Torr, Micron
Zero adjust for linear gauges
Correction factor for logarithmic gauges
0.10…10.00

A/D converter resolution >0.001% FSr
(The measurement values of ITR, CTR 100 and CTR 101 are transmitted digitally.)
Gauge supply
Voltage +24 V= ±5%
Current 750 mA
Fuse protection 900 mA with PTC element, self-resetting after turning CENTER ONE off or disconnecting the gauge

Switching function
Number 1
Reaction delay ≤10 ms if switching threshold close to measurement value (for larger differences consider filter time constant)
Adjustment range depending on gauge (→ [1] … [16])
Hysteresis ≥1% FSr for linear gauges
≥10% of measurement value for logarithmic gauges

Switching function relay
Contact type floating changeover contact
Load max. 125 V∼, 60 W (ohmic)
110 V=, 2 A, 60 W (ohmic)

For benchtop use, max. 30 V∼ or 60 V= may be connected.

Service life
mechanic 10^8
electric 10^5 (at maximum load)
Connector 9-pin D-Sub, male
(pin assignment → 26)
Contact positions
4 Vacuum pressure lower than switching threshold
3 Vacuum pressure higher than switching threshold or no mains power
Error signal (Error)
Number 1
Reaction time \( \leq 20 \text{ ms} \)

Error signal relay
Contact type floating normally open contact
Load max.
125 V~, 60 W (ohmic)
110 V=, 2 A, 60 W (ohmic)

DANGER
For benchtop use, max. 30 V~ or 60 V= may be connected.

Service life
mechanic \( 10^8 \)
electric \( 10^5 \) (at maximum load)

Connector 9-pin D-Sub, male
(pin assignment → 26)

Contact positions
9 \( \rightarrow \) no error
8 \( \rightarrow \) error or no mains power

Analog output
Number 1, recorder output
Voltage range 0 \( \ldots \) +10 V
Deviation from displayed value \( \pm 50 \text{ mV} \)
Internal resistance 660 Ω
Relationship measurement signal-pressure depending on gauge
(\( \rightarrow \) [1] \ldots [16])
Connector 9-pin D-Sub, male
(pin assignment → 26)
HOST interface
Standard Protocol
RS232C
ACK/NAK, ASCII with 3-character mnemonics, bi-directional data flow
RS232C only TXD and RXD used
Transmission rate 9600, 19200, 38400 baud
Connector 9-pin D-Sub, female (pin assignment → 25)

Dimensions [mm]

Use
For incorporation into a rack or control panel or for use as desk-top unit.

Weight
0.85 kg
3 Installation

3.1 Personal

Skilled personnel

The unit may only be installed by persons who have suitable technical training and the necessary experience.

3.2 Installation, Setup

CENTER ONE is suited for incorporation into a 19" rack or a control panel or for use as desk-top unit.

DANGER

DANGER: damaged product
Putting a damaged product into operation can be extremely hazardous.
In case of visible damage make sure the product is not put into operation.

3.2.1 Rack Installation

CENTER ONE is designed for installation into a 19" rack chassis adapter using according to DIN 41 494. For this purpose, four collar screws and plastic sleeves are supplied with it.
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. the EN 60204-1 regulations for switch 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 CENTER ONE, preferably equip the rack chassis adapter with a guide rail.
Installation

Slide rails

For safe and easy installation of heavy rack chassis adapters, preferably equip the rack frame with slide rails.
Mounting height

Rack installation

Height 2 U

Height 3 U
**Installation**

**Height 2 U rack chassis adapter**

1. Secure the rack chassis adapter in the rack frame.
2. Slide CENTER ONE into the adapter.
3. Fasten CENTER ONE to the rack chassis adapter using the screws supplied with it.

⚠️ The temperature inside the switching cabinet must not exceed the admissible maximum ambient temperature (→ § 9).

**Height 3 U rack chassis adapter**

For incorporation into a 19" rack chassis adapter, height 3, an adapter panel (incl. two collar screws and plastic sleeves) is available (→ § 86).

1. Secure the rack adapter in the rack frame.
2 Mount the adapter panel as upper extension to the front panel of CENTER ONE using the screws supplied with the adapter panel.

3 Slide CENTER ONE into the rack chassis adapter.

4 Fasten the adapter panel to the rack chassis adapter using the screws supplied with CENTER ONE.

⚠️ The temperature inside the switching cabinet must not exceed the admissible maximum ambient temperature (→ 9).
3.2.2 Installation in a Control Panel

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

![Diagram of cut-out dimensions]

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

1. Slide CENTER ONE into the cut-out of the control panel.

2. Secure it with four M3 screws.

⚠️ Make sure the admissible maximum ambient temperature (→ 9) is not exceeded.
3.2.3 Use as Desk-Top Unit

CENTER ONE is also suited for use as desk-top unit. For this purpose, two self-adhesive rubber feet as well as a slip-on rubber bar are supplied with it.

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

2. Slip the supplied rubber bar onto the bottom edge of the front panel.

⚠️ Select a location where the admissible maximum ambient temperature (→ 9) 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 (3×1.5 mm²) with protective ground. The 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 2.5 m power cord. If the mains cable is not compatible with your system, use your own, suitable cable with protective ground.

The socket must be fuse-protected with 10 A_max

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

**Grounding**

On the rear of the unit, there is a screw which can be used to connect the unit to ground, e.g. using the grounding of the pumping station.

Do not unfasten this screw (internal ground protection)
3.4 SENSOR Connector

CENTER ONE is equipped with two different gauge connectors.

**Caution**

Caution: one channel measurement unit
Connecting more than one gauge at the same time may lead to gauge destruction.

1 only at once
Make sure that there is never more than one gauge connected to CENTER ONE at the same time.

Connect the gauge to one of the two SENSOR connectors on the rear of the unit. Use a screened 1:1 cable (electromagnetic compatibility). Make sure the gauge is compatible (→ § 9).

**DANGER**

DANGER: protective low voltage
According to EN 61010, voltages exceeding 30 VAC or 60 VDC are hazardous.
If you are using the CENTER ONE as desktop unit, you may only connect a protective low voltage (SELV).
The transmission rate of the ITR 100 ionization vacuum gauge must be set to 9600 baud (→ [11]).

**Pin assignment**

Pin assignment of the 8-pin RJ45 appliance connector:

<table>
<thead>
<tr>
<th>Socket</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+24 V=</td>
</tr>
<tr>
<td>2</td>
<td>PGND</td>
</tr>
<tr>
<td>3</td>
<td>Signal</td>
</tr>
<tr>
<td>4</td>
<td>Ident</td>
</tr>
<tr>
<td>5</td>
<td>Signal GND</td>
</tr>
<tr>
<td>6</td>
<td>Status</td>
</tr>
<tr>
<td>7</td>
<td>HV_L</td>
</tr>
<tr>
<td>8</td>
<td>HV_H</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Socket</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emi status</td>
</tr>
<tr>
<td>2</td>
<td>Signal</td>
</tr>
<tr>
<td>3</td>
<td>Status</td>
</tr>
<tr>
<td>4</td>
<td>HV_H</td>
</tr>
<tr>
<td>5</td>
<td>PGND</td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
</tr>
<tr>
<td>7</td>
<td>Degas</td>
</tr>
<tr>
<td>8</td>
<td>Supply_ITR</td>
</tr>
<tr>
<td>9</td>
<td>Not used</td>
</tr>
<tr>
<td>10</td>
<td>Ident</td>
</tr>
<tr>
<td>11</td>
<td>Supply_CTR</td>
</tr>
<tr>
<td>12</td>
<td>Signal-GND</td>
</tr>
<tr>
<td>13</td>
<td>RXD</td>
</tr>
<tr>
<td>14</td>
<td>TXD</td>
</tr>
<tr>
<td>15</td>
<td>Chassis</td>
</tr>
</tbody>
</table>
3.5 Interface Connector RS232

The RS232C interface allows for operating CENTER ONE via a HOST or terminal (→ 61). It can also be used for updating the firmware (→ 90).

Connect the serial interface to the RS232 connector on the rear of the unit using a screened cable (electromagnetic compatibility).

DANGER

According to EN 61010, voltages exceeding 30 VAC or 60 VDC are hazardous.

If you are using CENTER ONE as desk-top unit you may only connect a protective low voltage (SELV).

Pin assignment

Pin assignment of the 9-pin D-Sub appliance connector:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
</tr>
<tr>
<td>2</td>
<td>TXD</td>
</tr>
<tr>
<td>3</td>
<td>RXD</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
</tr>
</tbody>
</table>
3.6 CONTROL Connector

This connector allows to read the measurement signal, to evaluate state of the floating switching function and error contacts, and to activate/deactivate the high vacuum measurement circuit (only for PTR 225 cold cathode gauge and ITR 100 ionization vacuum gauge).

Operation via the CONTROL connector (input HV_H, → 26) has priority over key operation.

DANGER

DANGER: protective low voltage
According to EN 61010, voltages exceeding 30 VAC or 60 VDC are hazardous.
If you are using CENTER ONE as desk-top unit you may only connect a protective low voltage (SELV).

Connect the peripheral components to the CONTROL connector on the rear of the unit. Use a screened cable (electromagnetic compatibility).

Pin assignment

Pin assignment of the 9-pin D-Sub appliance connector:

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analog output</td>
</tr>
<tr>
<td>2</td>
<td>Switching function off (n.c. contact)</td>
</tr>
<tr>
<td>3</td>
<td>Switching function (common)</td>
</tr>
<tr>
<td>4</td>
<td>Switching function off (n.o. contact)</td>
</tr>
<tr>
<td>5</td>
<td>Control input HV_H</td>
</tr>
<tr>
<td></td>
<td>On = +24 V</td>
</tr>
<tr>
<td></td>
<td>Off = 0 V</td>
</tr>
<tr>
<td>6</td>
<td>+24 V</td>
</tr>
<tr>
<td>7</td>
<td>Chassis</td>
</tr>
<tr>
<td>8</td>
<td>Error (n.o. contact)</td>
</tr>
<tr>
<td>9</td>
<td>Error (common)</td>
</tr>
</tbody>
</table>

The analog output (pin 1) differ from the displayed value by no more than ±50 mV.
4 Operation

4.1 Front Panel

Measurement value in floating point or exponential format or status messages (→ 25)

Warning/error (flashing)

Switching function status

Operator keys

Measurement unit

Upper threshold

Lower threshold

Offset value <> 0

Correction factor <> 1

High vacuum measurement circuit activated (PTR, ITR 100 and ITR 200 only)

Degas (ITR only)

Parameter mode activated
**Operation**

**Status messages**

If there are any status messages pending, they are displayed instead of the measurement value.

- **Gauge cannot be identified or e.g. line break (sensor error).** The **FAIL** lamp flashes.

- **The measurement value is above the upper measurement range limit of the connected gauge.** The **FAIL** lamp flashes.

- **The measurement value is below the lower measurement range limit of the connected gauge.** The **FAIL** lamp flashes.

- **Parameter setup lock activated** (→ 54).

**Error messages ITR 90 and ITR 100**

- **Meaning → [10], [11]**

  - **ITR 90:** 0…9
    - 0 = no communication to the transmitter
    - 1…9 = High-Byte of Error-Byte
  
  - **ITR 100:** 1…6

**Error messages ITR 200**

- **Meaning → [13]**

  - **xx = Error-Byte (HEX)**
4.2 Turning CENTER ONE On and Off

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

Turning CENTER ONE on

The power switch is on the rear of the unit.

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

After power ON, CENTER ONE …

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

Turning CENTER ONE off

Turn CENTER ONE 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 CENTER ONE on again in order for it to correctly initialize itself.
4.3 Operating Modes

CENTER ONE works in the following operating modes:

- **Measurement mode**
  for displaying measurement values or statuses
  (→ 30)
- **Parameter mode**
  for entering or displaying parameters (→ 34)
- **Test mode**
  for running internal test programs (→ 51)
- **Program transfer mode**
  for updating the firmware (→ 90)

4.4 Measurement Mode

The Measurement mode is the standard operating mode of CENTER ONE. Measurement values and statuses as well as the gauge identification are displayed in this mode.

To get to the Measurement mode, …

- turn CENTER ONE on
- do not press any key for at least 10 s while you are in the Parameter mode
- press the "PARA" key after Parameter X ("bAud"), while you are in the Parameter mode
- press all three keys simultaneously for at least 5 s while you are in the Test mode.

To quit the Measurement mode, …

- turn CENTER ONE off
- press the "PARA" key (to get to the Parameter mode)
- press all three keys simultaneously for at least 5 s (to get to the Test mode).
4.4.1 Operation
In the Measurement mode, the following commands are possible:

**Getting to the Parameter mode**

- Press >1 s

**Turning the gauge off**

- Only for PTR 225 cold cathode gauge and ITR 100 ionization vacuum gauge.
- No function for other connected gauges.

Press >1 s
4.4.2 Turning the Gauge On/Off

Turning the gauge on

Only for PTR 225 cold cathode gauge and ITR 100 ionization vacuum gauge.
No function for other connected gauges.

Displaying the gauge identification

Getting to the Test mode

Press >1 s (→ 32)

Press >0.5 s (→ 33)

Press >5 s (→ 51)

The high vacuum measurement circuit of these gauges can be activated in both, the Measurement and the Parameter mode (→ 48).

The current setting is displayed:

- **HV** StatusLabel ➔ High vacuum measurement circuit activated
- **HV** StatusLabel ➔ High vacuum measurement circuit deactivated
4.4.3 Gauge Identification

The type of the connected gauge is automatically identified and displayed for 5 s:

- **Pirani gauge**
  - (TTR 90, TTR 211S, TTR 91, TTR 91 S, TTR 96 S)

- **Pirani/Capacitive gauge**
  - (TTR 100, TTR 100 S2, TTR 101, TTR 101 S2)

- **Cold cathode gauge**
  - (PTR 225)

- **Cold cathode/Pirani gauge**
  - (PTR 90)

- **Linear gauge (capacitive, analog)**

- **Linear gauge (capacitive, digital)**
  - (CTR 100, CTR 101)

- **Ionization/Pirani vacuum gauge**
  - (ITR 90)

- **Ionization vacuum gauge**
  - (ITR 100)

- **Ionization/Pirani vacuum gauge**
  - (ITR 200)

- **No gauge connected**
  - (no Sensor)

- **Connected gauge cannot be identified**
  - (no Identifier)
4.5 Parameter Mode

The Parameter mode is used for displaying, modifying and entering parameter values.

To get to the Parameter mode, …
- press the "PARA" key while you are in the Measurement mode.

To quit the Parameter mode, …
- turn CENTER ONE off
- do not press any key for at least 10 s
- press the "PARA" key after Parameter X ("bAud"), (to get to the Measurement mode)
- press all three keys simultaneously for at least 5 s (to get to the Test mode).
4.5.1 Operation

In the Parameter mode, the following commands are possible:

Selecting a parameter

The name of the parameter is displayed as long as the key is pressed or at least for 2 s.

- Degas function (→ 38)
- Lower switching threshold (→ 38)
- Upper switching threshold (→ 38)
- Measurement range of linear gauges (→ 42)
- Offset correction / zero adjust of linear gauges (→ 43)
- Measurement unit (→ 45)
- Correction factor (→ 45)
- Filter time constant (→ 46)
- High vacuum measurement circuit (→ 48)
- Transmission rate of the interface (→ 49)
- Emission (→ 49)
- Filament (→ 49)

Modifying a parameter

Press <1 s >1 s
The value is decreased in small increments
The value is decreased in large increments
The parameter value is modified by 1 increment.
Operation

<table>
<thead>
<tr>
<th>Press &lt;1 s</th>
<th>&gt;1 s</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value is increased in small increments</td>
<td>The value is increased in large increments</td>
</tr>
<tr>
<td>The parameter value is modified by 1 increment.</td>
<td></td>
</tr>
</tbody>
</table>

Loading the default parameters

Press >5 s.

Setting all parameters back to their default values (→ 89).

Getting to the Test mode

Press >5 s (→ 51)
4.5.2 Parameters

Some parameters are not available for all gauge types. They are only displayed if available. The following table shows which parameters are available for which gauges.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>DEGAS</th>
<th>SPEAK</th>
<th>FSAA</th>
<th>FSAT</th>
<th>FORG</th>
<th>CREF</th>
<th>HGLT</th>
<th>DGLT</th>
<th>BRUG</th>
<th>FRUG</th>
<th>PREG</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP0614</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✗</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>ETP0616</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>PTP0602</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>PTP0603</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>PTP0604</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>ETP0615</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>ETP0617</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>PTP0600</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>PTP0601</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>PTP0603</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
</tbody>
</table>
Operation

Degas

Only for ITR 90, ITR 100 and ITR 200 ionization and ionization/Pirani vacuum gauges. ITR 100 and ITR 200 gauges: Degas acts only upon the active filament.

Contamination deposits on the electrode system of ionization vacuum gauges may cause instabilities of the measurement values. The Degas function allows to clean the electrode system.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="DEGAS" /></td>
</tr>
<tr>
<td><img src="image" alt="OFF" /></td>
</tr>
</tbody>
</table>

Lower/upper switching threshold

CENTER ONE has a switching function with two adjustable thresholds. The status of the switching function is displayed on the front panel and can be evaluated via the floating contact at the CONTROL connector (→ 27, 26).
the lower switching threshold (Setpoint low) defines the pressure at which the switching function is activated when the pressure is dropping.

⇒ gauge dependent
   (→ Table).

If another gauge type is connected, CENTER ONE automatically adjusts the switching threshold if required.
The minimum hysteresis between the upper and lower switching threshold is at least 10% of the lower threshold or 1% of the set full scale value. If the value of the minimum hysteresis drops below these values, the upper threshold is automatically adjusted. This prevents unstable states.
**Operation**

The upper switching threshold (Setpoint high) defines the pressure at which the switching function is deactivated when the pressure is rising.

- gauge dependent (→ Table).
- If another gauge type is connected, CENTER ONE automatically adjusts the threshold if required.

The minimum hysteresis between the upper and lower switching threshold is at least 10% of the lower threshold or 1% of the set full scale value. This prevents unstable states.
**Operation**

**Measurement range (F.S.) of capacitive gauges**


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

<table>
<thead>
<tr>
<th>Value</th>
<th>e.g.:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.01 mbar, 0.02 Torr, 0.05 Torr</td>
</tr>
<tr>
<td></td>
<td>0.10 mbar, 0.25 mbar, 0.50 mbar</td>
</tr>
<tr>
<td></td>
<td>0.10 Torr, 0.25 Torr, 0.50 Torr</td>
</tr>
<tr>
<td></td>
<td>1 mbar, 2 mbar, 5 mbar</td>
</tr>
<tr>
<td></td>
<td>1 Torr, 2 Torr, 5 Torr</td>
</tr>
<tr>
<td></td>
<td>10 mbar, 20 mbar, 50 mbar</td>
</tr>
<tr>
<td></td>
<td>10 Torr, 20 Torr, 50 Torr</td>
</tr>
<tr>
<td></td>
<td>100 mbar, 200 mbar, 500 mbar</td>
</tr>
<tr>
<td></td>
<td>100 Torr, 200 Torr, 500 Torr</td>
</tr>
<tr>
<td></td>
<td>1000 mbar, 1100 mbar</td>
</tr>
<tr>
<td></td>
<td>1000 Torr</td>
</tr>
<tr>
<td></td>
<td>2 bar, 5 bar, 10 bar, 50 bar</td>
</tr>
</tbody>
</table>

DI-Messköpfe:

- **di200** 200 mbar
- **di2** 2 bar
- **dir2** 2 bar relativ

Conversion table

→ Appendix 88.
Offset correction of the controller


For displaying the offset correction and zero adjustment of the gauge and adjustment to the currently measured value (in the range -5 ... +110% of the full scale setting).

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

The offset correction affects the readings on the display. The switching functions and the analog output on the CONTROL connector are not affected.

- Press briefly to activate offset correction.
- Press >2 s to adjust the offset value (current measurement value is taken over as offset value).
- Press briefly to deactivate offset correction.
Operation

<table>
<thead>
<tr>
<th>Value</th>
<th>Offset correction deactivated</th>
<th>Offset correction activated</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g.:</td>
<td>9.933</td>
<td></td>
</tr>
</tbody>
</table>

**Zero adjustment of the gauge**

- **Only for CTR 100 and CTR 101 linear gauges with Type C connection cable.**
- **First adjust the gauge and then the controller.**
- **Deactivate the offset correction before adjusting the zero of the gauge you are using (→ 43).**

<table>
<thead>
<tr>
<th>Value</th>
<th>Zero adjustment activated</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g.:</td>
<td>9.933</td>
</tr>
</tbody>
</table>

After adjusting the zero point, a zero value is displayed. Due to the measuring resolution of the CTR 100 and CTR 101 (noise, drift), a zero with plus/minus several digits are displayed.
**Measurement unit**

Measurement unit of the measurement value, switching threshold value, etc. → Appendix 88 for Conversion table.

This parameter setting is also effective for ITR 90 and ITR 200 gauges.

<table>
<thead>
<tr>
<th>Value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mbar/bar</td>
<td>💡</td>
</tr>
<tr>
<td>Torr (only available if Torr lock disabled → 54)</td>
<td></td>
</tr>
<tr>
<td>Pascal</td>
<td></td>
</tr>
<tr>
<td>Micron (=mTorr)</td>
<td></td>
</tr>
</tbody>
</table>

When selecting Micron, above 99000 Micron the readout automatically changes over to Torr. When the pressure drops below 90 Torr the instrument automatically switches back to Micron.

**Correction factor**


For ITR 90 and ITR 200 Ionization/Pirani vacuum gauges only for pressures $<1 \times 10^{-2}$ mbar.

For Pirani/Capacitive gauges TTR 100, TTR 100 S2, TTR 101 and TTR 101 S2 only for pressures $<10$ mbar.

The correction factor allows to convert the measurement value for other gases than $N_2$ (→ Characteristic curves in [1], [2], [3], [5], [10], [13]).
Value

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>1.00</td>
</tr>
<tr>
<td>1.53</td>
</tr>
</tbody>
</table>

\[ \Rightarrow \text{no correction} \]

\[ \Rightarrow \text{Measurement value corrected by a factor of } 0.10 \ldots 10.00 \]

**Measurement value filter**

The measurement value filter permits a better evaluation of unstable or disturbed measurement signals.

The measurement value filter affects neither the analog output (→ 26) nor the digitally transmitted measurement value of the ITR 90, ITR 100 and ITR 200 Ionization and Ionization/Pirani vacuum gauges.

Value

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>fast:</td>
</tr>
</tbody>
</table>

\[ \Rightarrow \text{fast: CENTER ONE responds quickly to fluctuations of the measurement value. As a consequence, it will also respond faster to interferences in measured values.} \]

\[ p \]

\[ t \]
⇒ normal:
Good relationship between response and sensitivity of the display and the switching functions to changes in the measured values.

⇒ slow:
CENTER ONE does not respond to small changes in measured values. As a consequence, it will also respond more slowly to changes in the measured values.

⇒ For CTR gauges only. The response of the CENTER ONE to signal changes depends on the measuring range. The display is especially stable in the low measuring range.

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS ... 0.1 FS</td>
<td>nor (normal)</td>
</tr>
<tr>
<td>0.1 FS ... 0.04 FS</td>
<td>SLo (slow)</td>
</tr>
<tr>
<td>0.04 FS ... 0.01 FS</td>
<td>≈ 2.5 × SLo</td>
</tr>
<tr>
<td>0.01 FS ... 0</td>
<td>≈ 5 × SLo</td>
</tr>
</tbody>
</table>
Turning the gauge on/off

Only for PTR 225 cold cathode gauge and ITR 100 ionization vacuum gauge.

Activating/deactivating the high vacuum measurement circuit (→ also 32).

<table>
<thead>
<tr>
<th>Value</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ High vacuum measurement circuit activated</td>
<td><img src="image" alt="HV" /></td>
</tr>
<tr>
<td>➔ High vacuum measurement circuit deactivated</td>
<td><img src="image" alt="灯" /></td>
</tr>
</tbody>
</table>

Display resolution (digits)

Display resolution of measured values.

<table>
<thead>
<tr>
<th>Value</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>➔ Display</td>
<td></td>
</tr>
<tr>
<td>➔ Display</td>
<td></td>
</tr>
<tr>
<td>➔ Display</td>
<td></td>
</tr>
</tbody>
</table>

When the PrE (→ 50) is ON and the pressure is in the range p<1.0E-4 mbar the display resolution of the TTR transmitters is reduced by one decimal digit.
**Transmission rate**

Transmission rate of the RS232C interface.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600 Baud</td>
</tr>
<tr>
<td>19200 Baud</td>
</tr>
<tr>
<td>38400 Baud</td>
</tr>
</tbody>
</table>

e.g.: 9600

**Emission**

[Pointing finger icon] Only for ITR 200 ionization/Pirani vacuum gauge.

Switching the emission on and off.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>the emission is switched on and off automatically by the gauge</td>
</tr>
<tr>
<td>the emission is switched on and off by the user</td>
</tr>
</tbody>
</table>

**Filament control mode**

[Pointing finger icon] Only for ITR 200 ionization/Pirani vacuum gauge.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>the gauge automatically alternates between the filaments</td>
</tr>
<tr>
<td>Filament 1 aktive</td>
</tr>
<tr>
<td>Filament 2 aktive</td>
</tr>
</tbody>
</table>
Operation

**Pirani range extension**

The display and setpoint adjustment range can be extended. TTR transmitters with display range down to 5×10⁻⁵ mbar only.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>➞ Default.</td>
</tr>
<tr>
<td>➞ Display extended to 5×10⁻⁵ mbar, setpoint adjustment range extended to 2×10⁻⁴ mbar.</td>
</tr>
</tbody>
</table>
4.6 Test Mode

The Test mode is the operating mode in which special parameter values for testing CENTER ONE can be displayed, entered, or modified.

To get to the Test mode, …
- press any key when turning CENTER ONE on
- press all keys simultaneously for at least 5 s while you are in the Measurement mode
- press all keys simultaneously for at least 5 s while you are in the Parameter mode.

To quit the Test mode, …
- turn CENTER ONE off
- press all keys simultaneously for at least 5 s (to get to the Measurement mode).
4.6.1 Operation

In the Test mode, the following commands are possible:

Selecting a test program

The name of the parameter is displayed as long as the key is pressed or at least for 2 s.

- Program version (→ 53)
- Watchdog error (→ 54)
- Torr lock (→ 54)
- Parameter setup lock (→ 54)

The name of the test program is displayed until it is started.

- RAM test program (→ 55)
- EPROM test program (→ 55)
- EEPROM test program (→ 56)
- Display test program (→ 56)
- A/D converter test program channel 0 (→ 57)
- A/D converter test program channel 1 (→ 57)
- A/D converter test program channel 2 (→ 58)
- I/O test program (→ 59)
- RS232C test program (→ 60)

Stopping the test program

Starting the test program
Changing to the measurement mode

Press >5 s (→ 30)

4.6.2 Parameters

Firmware version
The firmware version (program version) is displayed.

<table>
<thead>
<tr>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>P4.000</td>
</tr>
<tr>
<td>60509</td>
</tr>
<tr>
<td>763F</td>
</tr>
</tbody>
</table>

⇒ The two parts of the firmware number are displayed alternately.

The last character indicates the modification index (-, A ... Z). Please mention this index when contacting Oerlikon Leybold Vacuum in the event of a fault.
**Watchdog error**

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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="auto.png" alt="Auto" /></td>
<td>The system automatically acknowledges error messages of the watchdog after 2 s.</td>
</tr>
<tr>
<td><img src="off.png" alt="Off" /></td>
<td>Error messages of the watchdog have to be acknowledged by the operator.</td>
</tr>
</tbody>
</table>

**Torr lock**

The measurement unit "Torr" can be suppressed in the corresponding parameter setting ("unit", → § 45).

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="bare.png" alt="Bare" /></td>
<td>Lock disabled; measurement unit &quot;Torr&quot; available.</td>
</tr>
<tr>
<td><img src="off.png" alt="Off" /></td>
<td>Lock enabled, measurement unit &quot;Torr&quot; not available.</td>
</tr>
</tbody>
</table>

**Parameter setup lock**

This parameter affects the parameter mode. When the lock is activated, the user can inspect but not modify parameter values.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="on.png" alt="On" /></td>
<td>Parameters can be inspected and modified.</td>
</tr>
<tr>
<td><img src="off.png" alt="Off" /></td>
<td>Parameters can be inspected only.</td>
</tr>
</tbody>
</table>
4.6.3 Test Programs

**RAM test**
Test of the main memory.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The test runs automatically one time:</td>
</tr>
<tr>
<td>⇒ Test in process (very briefly).</td>
</tr>
<tr>
<td>⇒ Test finished, no error found.</td>
</tr>
<tr>
<td>⇒ Test finished, error(s) found.</td>
</tr>
<tr>
<td>The <strong>FAIL</strong> lamp flashes.</td>
</tr>
</tbody>
</table>

**EPROM test**
Test of the program memory.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The test runs automatically one time:</td>
</tr>
<tr>
<td>⇒ Test in process</td>
</tr>
<tr>
<td>⇒ Test finished, no error found. After the test, a four-digit checksum (hexadecimal format) is displayed.</td>
</tr>
<tr>
<td>⇒ Test finished, error(s) found. After the test, a four-digit checksum (hexadecimal format) is displayed. The <strong>FAIL</strong> lamp flashes.</td>
</tr>
</tbody>
</table>
**Operation**

**EEPROM test**

Test of the parameter memory.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The test runs automatically one time:</td>
</tr>
<tr>
<td>☐ Test in process (very briefly).</td>
</tr>
<tr>
<td>☐ Test finished, no error found.</td>
</tr>
<tr>
<td>☐ Test finished, error(s) found.</td>
</tr>
<tr>
<td>The [FAIL] lamp flashes.</td>
</tr>
</tbody>
</table>

**Display test**

Test of the display.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The test runs automatically one time 1):</td>
</tr>
<tr>
<td>☐ First, all display elements are lit at the same time, ...</td>
</tr>
<tr>
<td>☐ ... and then, each element is lit individually.</td>
</tr>
</tbody>
</table>

1) Stop the test sequence and activate one element after another by pressing the key once per element.

---

© Oerlikon Leybold Vacuum
**A/D converter test 0**

Test of channel 0 of the analog/digital converter (with a reference voltage at the signal input of the SENSOR connector (→ 24)).

The measurement value filter affects the applied voltage. If the signal input is open, CENTER ONE displays a default value that may easily fluctuate because of the high sensitivity of the open measurement circuit.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="A/D-0-1" /></td>
</tr>
<tr>
<td>z.B.: 7.3055</td>
</tr>
<tr>
<td>⇒ Positive portion of the measurement signal in Volt.</td>
</tr>
</tbody>
</table>

**A/D converter test 1**

Test of channel 1 of the analog/digital converter (with a reference voltage at the signal input of the SENSOR connector (→ 24)).

The measurement value filter affects the applied voltage. If the signal input is open, CENTER ONE displays a default value that may easily fluctuate because of the high sensitivity of the open measurement circuit.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="A/D-0-1" /></td>
</tr>
<tr>
<td>z.B.: 0.0003</td>
</tr>
<tr>
<td>⇒ Negative portion of the measurement signal in Volt.</td>
</tr>
</tbody>
</table>
A/D converter test 2

Test of channel 2 of the analog/digital converter (with a reference voltage at the signal input of the SENSOR connector (→ § 24)).

The measurement value filter affects the applied voltage. If the signal input is open, CENTER ONE displays a default value that may easily fluctuate because of the high sensitivity of the open measurement circuit.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad-29</td>
</tr>
<tr>
<td>z.B.:</td>
</tr>
<tr>
<td>18070</td>
</tr>
<tr>
<td>50000</td>
</tr>
</tbody>
</table>

⇒ Gauge identification voltage.
⇒ No gauge connected.
I/O test

Test of the two relays of CENTER ONE. The 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 gauge 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 can be heard.

The contacts are connected to the CONTROL connector on the rear of the housing (→ 26). Check the switching function with an ohmmeter.

<table>
<thead>
<tr>
<th>Test sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The test runs automatically one time:</td>
</tr>
<tr>
<td>⇒ both relays deactivated</td>
</tr>
<tr>
<td>⇒ switching function relay</td>
</tr>
<tr>
<td>⇒ switching function relay</td>
</tr>
<tr>
<td>⇒ error relay</td>
</tr>
<tr>
<td>⇒ error relay</td>
</tr>
</tbody>
</table>
RS232C test

Test of the RS232C interface. CENTER ONE repeats each sign transmitted by the communicating HOST.

\[\text{The data transferred from/to CENTER ONE can be displayed by the computer only (→ section 5).}\]

<table>
<thead>
<tr>
<th>Test sequence</th>
<th>The test runs automatically.</th>
</tr>
</thead>
</table>

The test runs automatically.
5 Communication (Serial Interface)

5.1 RS232C Interface

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

When the CENTER ONE is put into operation, it starts transmitting measured values in intervals of 1 s. As soon as the first character is transferred to the CENTER ONE, 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 (→ 67).

**Connection diagram, connection cable**

Pin assignment of the 9-pin D-Sub connector and RS232 cable → 25.

5.1.1 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:

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

"Transmit": Data transfer from HOST to CENTER ONE.
"Receive": Data transfer from CENTER ONE to HOST.

Format of pressure values

For pressure values, the following format is used:

\[sx.xxxxEsxx\]

Exponent
Sign exponent
Mantissa
Sign mantissa

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 25 bytes.
5.1.2 Communication Protocol

Transmission format

Messages are transmitted to the CENTER ONE as ASCII strings in the form of mnemonics and parameters. All mnemonics comprise three ASCII characters. Spaces are ignored. <ETX> (CTRL C) clears the input buffer in the CENTER ONE.

The input is terminated by <CR> or <LF> or <CR><LF> ("end of message"), and evaluation in the CENTER ONE is subsequently started.

The tables starting on 65 are applicable to the mnemonics and parameters. The maximum number of digits, the data formats and admissible value ranges are also specified there.

<table>
<thead>
<tr>
<th>Transmission protocol</th>
<th>HOST</th>
<th>CENTER ONE</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mnemonics [and parameters]</td>
<td>&lt;CR&gt;[&lt;LF&gt;]</td>
<td>Receives message with &quot;end of message&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;---&lt;ACK&gt;&lt;CR&gt;&lt;LF&gt;</td>
<td>Positive acknowledgment of a received message</td>
<td></td>
</tr>
</tbody>
</table>

Reception format

When requested with a mnemonic instruction, the CENTER ONE 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.
**Operation**

### Reception protocol

<table>
<thead>
<tr>
<th>HOST</th>
<th>CENTER ONE</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mnemonics [and parameters] →</td>
<td>&lt;CR&gt;&lt;LF&gt; →</td>
<td>Receives message with &quot;end of message&quot;</td>
</tr>
<tr>
<td>←&lt;ACK&gt;&lt;CR&gt;&lt;LF&gt;</td>
<td></td>
<td>Positive acknowledgment of a received message</td>
</tr>
<tr>
<td>&lt;ENQ&gt;</td>
<td></td>
<td>Requests to transmit</td>
</tr>
<tr>
<td>Measurements values or parameters ←&lt;CR&gt;&lt;LF&gt;</td>
<td>Transmits data with &quot;end of message&quot;</td>
<td></td>
</tr>
</tbody>
</table>

### Error processing

All strings received are verified in the CENTER ONE. If an error is detected, a negative acknowledgment <NAK> is output. The appropriate flag is set in the ERROR word. Errors can be decoded when the ERROR word is read.

### Error recognition protocol

<table>
<thead>
<tr>
<th>HOST</th>
<th>CENTER ONE</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mnemonics [and parameters] →</td>
<td>&lt;CR&gt;&lt;LF&gt; →</td>
<td>Receives message with &quot;end of message&quot;</td>
</tr>
</tbody>
</table>

***** Transmission or programming error *****

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>←&lt;NAK&gt;&lt;CR&gt;&lt;LF&gt;</td>
<td></td>
<td>Negative acknowledgment of a received message</td>
</tr>
</tbody>
</table>

Mnemonics [and parameters] →<CR><LF> → Receives message with "end of message"

vertime or programming error *****
5.2 Mnemonics

<table>
<thead>
<tr>
<th>Mnemonic</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAU</td>
<td>Baud rate</td>
<td>75</td>
</tr>
<tr>
<td>COM</td>
<td>Continuous mode</td>
<td>67</td>
</tr>
<tr>
<td>COR</td>
<td>Correction factor</td>
<td>74</td>
</tr>
<tr>
<td>DCD</td>
<td>Display control digits</td>
<td>75</td>
</tr>
<tr>
<td>DGS</td>
<td>Degas ITR on/off</td>
<td>70</td>
</tr>
<tr>
<td>ERR</td>
<td>Error status</td>
<td>69</td>
</tr>
<tr>
<td>EUM</td>
<td>Emission user mode</td>
<td>75</td>
</tr>
<tr>
<td>FIL</td>
<td>Filter time constant</td>
<td>74</td>
</tr>
<tr>
<td>FSR</td>
<td>CTR, DI full scale range</td>
<td>72</td>
</tr>
<tr>
<td>FUM</td>
<td>Filament user mode</td>
<td>76</td>
</tr>
<tr>
<td>HVC</td>
<td>HV, EMI on/off</td>
<td>67</td>
</tr>
<tr>
<td>ITR</td>
<td>ITR / CTR 100, CTR 101 data output</td>
<td>68</td>
</tr>
<tr>
<td>LOC</td>
<td>Parameter setup lock</td>
<td>78</td>
</tr>
<tr>
<td>OFS</td>
<td>Offset correction</td>
<td>73</td>
</tr>
<tr>
<td>PNR</td>
<td>Program number</td>
<td>77</td>
</tr>
<tr>
<td>PRE</td>
<td>Pirani range extension</td>
<td>76</td>
</tr>
<tr>
<td>PRI</td>
<td>Pressure measurement</td>
<td>66</td>
</tr>
<tr>
<td>RES</td>
<td>Reset</td>
<td>69</td>
</tr>
<tr>
<td>SAV</td>
<td>Save parameters to EEPROM</td>
<td>76</td>
</tr>
<tr>
<td>SP1</td>
<td>Setpoint</td>
<td>70</td>
</tr>
<tr>
<td>SPS</td>
<td>Setpoint status</td>
<td>71</td>
</tr>
<tr>
<td>TAD</td>
<td>A/D converter test</td>
<td>80</td>
</tr>
<tr>
<td>TDI</td>
<td>Display test</td>
<td>80</td>
</tr>
<tr>
<td>TEE</td>
<td>EEPROM test</td>
<td>79</td>
</tr>
<tr>
<td>TEP</td>
<td>EPROM test</td>
<td>79</td>
</tr>
<tr>
<td>TID</td>
<td>Sensor identification</td>
<td>68</td>
</tr>
<tr>
<td>TIO</td>
<td>I/O test</td>
<td>81</td>
</tr>
<tr>
<td>TKB</td>
<td>Keyboard test</td>
<td>81</td>
</tr>
<tr>
<td>TLC</td>
<td>Torr lock</td>
<td>78</td>
</tr>
<tr>
<td>TRA</td>
<td>RAM test</td>
<td>79</td>
</tr>
<tr>
<td>TRO</td>
<td>RS232 test</td>
<td>81</td>
</tr>
<tr>
<td>UNI</td>
<td>Pressure unit</td>
<td>74</td>
</tr>
<tr>
<td>WDT</td>
<td>Watchdog control</td>
<td>78</td>
</tr>
</tbody>
</table>
5.2.1 Measurement Mode

Measurement data

Transmit: PR1 <CR><LF>
Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x,sx.xxxxEsxx <CR><LF>

Measurement value ¹)
   [in current pressure unit]

Status, x =
0 → Measurement data okay
1 → Underrange
2 → Overrange
3 → Sensor error
4 → Sensor off (ITR 100, PTR 225)
5 → No sensor
6 → Identification error
7 → Error ITR

¹) The 3rd and 4th decimal are always 0, except for the CTR gauge.
Continuous output of measured values
(RS232)

Transmit:  \textbf{COM \,[,x] \,<CR><LF>}

\hspace{1cm} \text{Mode} \quad x = 0 \quad \rightarrow \quad 100 \text{ ms}
\hspace{1.5cm} 1 \quad \rightarrow \quad 1 \text{ s} \quad (\text{default})
\hspace{3cm} 2 \quad \rightarrow \quad 1 \text{ min.}

Receive:  \textbf{<ACK><CR><LF>}

\texttt{<ACK>} is immediately followed by the continuous output of the measured value in the desired interval.

Receive:  \texttt{x,sx.xxxxEsxx \,y \,<CR><LF>}

\begin{itemize}
  \item \text{Measured value} \textsuperscript{1)}
  \item \text{with pressure unit}
  \item \text{Status, } x =
  \begin{align*}
    0 & \rightarrow \text{Measurement data okay} \\
    1 & \rightarrow \text{Underrange} \\
    2 & \rightarrow \text{Overrange} \\
    3 & \rightarrow \text{Sensor error} \\
    4 & \rightarrow \text{Sensor off (ITR 100, PTR 225)} \\
    5 & \rightarrow \text{No sensor} \\
    6 & \rightarrow \text{Identification error} \\
    7 & \rightarrow \text{Error ITR}
  \end{align*}
\end{itemize}

\textsuperscript{1)} The 3\textsuperscript{rd} and 4\textsuperscript{th} decimal are always 0, except for the CTR gauge.

Activating/deactivating the HV circuit and EMI

Transmit:  \textbf{HVC \,[,x] \,<CR><LF>}

\hspace{1cm} \text{Mode} \quad x = \begin{align*}
  0 & \rightarrow \text{off (default)} \\
  1 & \rightarrow \text{on}
\end{align*}

Receive:  \textbf{<ACK><CR><LF>}

Transmit:  \textbf{<ENQ>}

Receive:  \texttt{x \,<CR><LF>}

\hspace{1cm} \text{Mode}
Operation

Data output ITR, CTR 100, CTR 101

Transmit: \texttt{ITR}<CR>[<LF>]
Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive, ITR 100: \texttt{xxx...xxx.y}<CR><LF>
\hspace{1cm} Gauge status ERS y
\hspace{1.5cm} (→ ITR 100)
\hspace{1.5cm} Transmission string (17 character)
\hspace{1.5cm} (→ ITR 100)

Receive, ITR 90 / 200: \texttt{xx,xx,xx,xx,xx,xx,xx,xx}<CR><LF>
CTR 100 / 101
\hspace{1cm} Transmission string byte
\hspace{2cm} 0 … 7 in hex format
\hspace{2cm} (→ ITR 90, ITR 200, CTR 100, CTR 101)

Gauge identification

Transmit: \texttt{TID}<CR>[<LF>]
Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive: \texttt{x}<CR><LF>
\hspace{1cm} Identification, x =
\hspace{2cm} TTR (Pirani, all versions)
\hspace{2cm} TTR100 (Pirani/Capacitive)
\hspace{2cm} PTR (Cold cathode)
\hspace{2cm} PTR90 (Cold cathode/Pirani)
\hspace{2cm} CTR (Capacitive)
\hspace{2cm} ITR (Hot cathode)
\hspace{2cm} ITR100 (Hot cathode)
\hspace{2cm} ITR200 (Hot cathode/Pirani)
\hspace{2cm} noSEn (no Sensor)
\hspace{2cm} noid (no identification)
Error status

Transmit:  \texttt{ERR}<CR>[<LF>]
Receive:  \texttt{<ACK}><CR><LF>
Transmit:  \texttt{<ENQ>}
Receive:  \texttt{xxxx}<CR><LF>

\begin{itemize}
\item \texttt{x = 0000} \rightarrow \text{No error}
\item \texttt{x = 1000} \rightarrow \text{Controller error}
\item \texttt{x = 0100} \rightarrow \text{NO, HWR No hardware}
\item \texttt{x = 0010} \rightarrow \text{PAR, Inadmissible parameter}
\item \texttt{x = 0001} \rightarrow \text{SYN, Syntax error}
\end{itemize}

\begin{itemize}
\item The ERROR word is cancelled when read out. If the error persists, it is immediately set again.
\end{itemize}

Reset

Transmit:  \texttt{RES},x<CR>[<LF>]

\begin{itemize}
\item \texttt{x = 1} \rightarrow \text{Reset}
\end{itemize}

Receive:  \texttt{<ACK><CR><LF>}
Transmit:  \texttt{<ENQ>}
Receive:  \texttt{[x],x,[x],x,...}<CR>[<LF>]

\begin{itemize}
\item List of all present error messages
\item \texttt{xx =}
\item \texttt{0} \rightarrow \text{No error}
\item \texttt{1} \rightarrow \text{Watchdog has responded}
\item \texttt{2} \rightarrow \text{Task fail error}
\item \texttt{5} \rightarrow \text{EPROM error}
\item \texttt{6} \rightarrow \text{RAM error}
\item \texttt{7} \rightarrow \text{EEPROM error}
\item \texttt{9} \rightarrow \text{DISPLAY error}
\item \texttt{10} \rightarrow \text{A/D converter error}
\item \texttt{11} \rightarrow \text{Sensor error (e.g. filament rupture, no supply)}
\item \texttt{12} \rightarrow \text{Sensor identification error}
\end{itemize}
5.2.2 Parameter Mode

Degas

Transmit: \texttt{DGS[,x]<CR><LF>}

\begin{itemize}
\item \texttt{x = 0} \rightarrow \textit{off} (default)
\item \texttt{x = 1} \rightarrow \textit{on} (3 min.)
\end{itemize}

Receive: \texttt{<ACK><CR><LF>}

Transmit: \texttt{<ENQ>}

Receive: \texttt{x <CR><LF>}

\hfill \text{Degas status}

Threshold value setting, allocation

Transmit: \texttt{SP1[,x.xxxEsx,x.xxxEsx]<CR><LF>}

\begin{itemize}
\item Upper threshold \textsuperscript{1)}
\begin{itemize}
\item [in current pressure unit]
\item (default = depending on gauge)
\end{itemize}
\end{itemize}

\begin{itemize}
\item Lower threshold \textsuperscript{1)}
\begin{itemize}
\item [in current pressure unit]
\item (default = depending on gauge)
\end{itemize}
\end{itemize}

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

Receive: \texttt{<ACK><CR><LF>}

Transmit: \texttt{<ENQ>}

Receive: \texttt{x.xxxxEsxx,x.xxxxEsxx<CR><LF>}

\hfill \text{Upper threshold}
\hfill \text{[in current pressure unit]}

\hfill \text{Lower threshold}
\hfill \text{[in current pressure unit]}
Switching function status

Transmit:  \texttt{SPS <CR>[<LF>]}
Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x <CR><LF>

\begin{itemize}
\item Switching function \( x = 0 \rightarrow \text{off} \)
\item \( 1 \rightarrow \text{on} \)
\end{itemize}
### Measurement range (F.S.) of capacitive 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: \texttt{FSR,[x]<CR>[<LF>]}  

| Measurement range, \( x = \) | 0 \( \rightarrow \) 0.01 mbar | 1 \( \rightarrow \) 0.01 Torr | 2 \( \rightarrow \) 0.02 Torr | 3 \( \rightarrow \) 0.05 Torr | 4 \( \rightarrow \) 0.10 mbar | 5 \( \rightarrow \) 0.10 Torr | 6 \( \rightarrow \) 0.25 mbar | 7 \( \rightarrow \) 0.25 Torr | 8 \( \rightarrow \) 0.50 mbar | 9 \( \rightarrow \) 0.50 Torr | 10 \( \rightarrow \) 1 mbar | 11 \( \rightarrow \) 1 Torr | 12 \( \rightarrow \) 2 mbar | 13 \( \rightarrow \) 2 Torr | 14 \( \rightarrow \) 5 mbar | 15 \( \rightarrow \) 5 Torr | 16 \( \rightarrow \) 10 mbar | 17 \( \rightarrow \) 10 Torr | 18 \( \rightarrow \) 20 mbar | 19 \( \rightarrow \) 20 Torr | 20 \( \rightarrow \) 50 mbar | 21 \( \rightarrow \) 50 Torr | 22 \( \rightarrow \) 100 mbar | 23 \( \rightarrow \) 100 Torr | 24 \( \rightarrow \) 200 mbar | 25 \( \rightarrow \) 200 Torr | 26 \( \rightarrow \) 500 mbar | 27 \( \rightarrow \) 500 Torr | 28 \( \rightarrow \) 1000 mbar | 29 \( \rightarrow \) 1100 mbar | 30 \( \rightarrow \) 1000 Torr | 31 \( \rightarrow \) 2 bar | 32 \( \rightarrow \) 5 bar | 33 \( \rightarrow \) 10 bar | 34 \( \rightarrow \) 50 bar | 35 \( \rightarrow \) DI200 mbar | 36 \( \rightarrow \) DI2 bar | 37 \( \rightarrow \) DI2 barRel
Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: x <CR><LF>
   Measurement range (F.S.)

Offset correction
Transmit: \texttt{OFS},[x,x.xxxEsx] <CR>[<LF>]

Offset \textsuperscript{1)}
[in current pressure unit]
(default = 0.000E0)

Mode, x =
0 \rightarrow \text{Off (default)}
   No offset value needs to be entered.
1 \rightarrow \text{On}
   If no offset value has been entered, the previously defined offset value is taken over.
2 \rightarrow \text{Auto}
   (offset measurement)
   No offset value needs to be entered.
3 \rightarrow \text{Zero adjust CTR 100, CTR 101. No offset value needs to be entered.}

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

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

Offset
[in current pressure unit]
Mode
Operation

Measurement unit

Transmit:  \textbf{UNI} [,x] <CR>[<LF>]
\begin{itemize}
\item x = 0 \rightarrow \text{mbar/bar} \ (\text{default})
\item 1 \rightarrow \text{Torr}
\item 2 \rightarrow \text{Pascal}
\item 3 \rightarrow \text{Micron}
\end{itemize}

Receive:  \text{<ACK><CR><LF>}
Transmit:  \text{<ENQ>}
Receive:  x <CR><LF>
\begin{itemize}
\item Measurement unit
\end{itemize}

Correction factor

Transmit:  \textbf{COR}[,x].xxx <CR>[<LF>]
\begin{itemize}
\item 0.100 \ldots 10.000
\end{itemize}
(default = 1.000)

Receive:  \text{<ACK><CR><LF>}
Transmit:  \text{<ENQ>}
Receive:  [x].xxx <CR><LF>
\begin{itemize}
\item Correction factor
\end{itemize}

Measurement value filter

Transmit:  \textbf{FIL} [,x] <CR>[<LF>]
\begin{itemize}
\item x =  \begin{itemize}
\item 0 \rightarrow \text{fast}
\item 1 \rightarrow \text{medium} \ (\text{default})
\item 2 \rightarrow \text{slow}
\end{itemize}
\end{itemize}

Receive:  \text{<ACK><CR><LF>}
Transmit:  \text{<ENQ>}
Receive:  x <CR><LF>
\begin{itemize}
\item Filter time constant
\end{itemize}
Number of digits in the display

Transmit:  \texttt{DCD}[,x][<CR>][<LF>]

\begin{align*}
  x = 2 & \rightarrow 2 \text{ digits (default)} \\
  3 & \rightarrow 3 \text{ digits}
\end{align*}

Receive:  \texttt{<ACK><CR><LF>}
Transmit:  \texttt{<ENQ>}
Receive:  \texttt{x<CR><LF>}

When the PrE (→ 50) is ON and the pressure is in the range \( p<1.0\text{E-4 mbar} \) the display resolution of the TTR transmitters is reduced by one decimal digit.

Transmission rate

Transmit:  \texttt{BAU}[,x][<CR>][<LF>]

\begin{align*}
  x = 0 & \rightarrow 9600 \text{ baud (default)} \\
  1 & \rightarrow 19200 \text{ baud} \\
  2 & \rightarrow 38400 \text{ baud}
\end{align*}

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

Receive:  \texttt{<ACK><CR><LF>}
Transmit:  \texttt{<ENQ>}
Receive:  \texttt{x<CR><LF>}

Emission (ITR 200)

Transmit:  \texttt{EUM}[,x][<CR>][<LF>]

\begin{align*}
  x = 0 & \rightarrow \text{Manually} \\
  1 & \rightarrow \text{Automatic (default)}
\end{align*}

Receive:  \texttt{<ACK><CR><LF>}
Transmit:  \texttt{<ENQ>}
Receive:  \texttt{x<CR><LF>}
Operation

Filament (ITR 200)
Transmit: \texttt{FUM \,[x] <CR><LF>}
\hspace{1cm} \begin{tabular}{l}
\hspace{1cm} x = 0 \rightarrow \text{Automatic (default)} \\
\hspace{1cm} 1 \rightarrow \text{Filament 1} \\
\hspace{1cm} 2 \rightarrow \text{Filament 2}
\end{tabular}
Receive: \quad <ACK><CR><LF>
Transmit: \quad <ENQ>
Receive: \quad x <CR><LF>

Save parameters to EEPROM
Transmit: \texttt{SAV \,[x] <CR><LF>}
\hspace{1cm} \begin{tabular}{l}
\hspace{1cm} x = 0 \rightarrow \text{Save default parameters} \\
\hspace{1cm} 1 \rightarrow \text{Save user parameters}
\end{tabular}
Receive: \quad <ACK><CR><LF>

Pirani range extension
Transmit: \texttt{PRE \,[x] <CR><LF>}
\hspace{1cm} \begin{tabular}{l}
\hspace{1cm} x = 0 \rightarrow \text{off (default)} \\
\hspace{1cm} 1 \rightarrow \text{on}
\end{tabular}
Receive: \quad <ACK><CR><LF>
Transmit: \quad <ENQ>
Receive: \quad x <CR><LF>

\begin{itemize}
\item TTR transmitters only, measurement range down to $5 \times 10^{-5}$ mbar.
\end{itemize}
5.2.3 Test Mode
(For service specialists)

Firmware version
Transmit: PNR <CR>[<LF>]
Receive: <ACK><CR><LF>
Transmit: <ENQ>
Receive: xxx-xxx-x <CR><LF>
- x = Modification index
  (-- = original version)
  Firmware number
Operation

Watchdog control
Transmit: \texttt{WDT[,x] <CR><LF>}
\[ x = 0 \rightarrow \text{Manual error acknowledgement} \]
\[ 1 \rightarrow \text{Automatic error acknowledgement} \]  
\[ 1) \]  
\[ 1) \text{If the watchdog has responded, the error is} \]
\[ \text{automatically acknowledged and cancelled after} \]
\[ 2 \text{~s.} \]

Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive: \texttt{x <CR><LF>}
\[ \rightarrow \text{Watchdog control} \]

Torr lock
Transmit: \texttt{TLC[,x] <CR><LF>}
\[ x = 0 \rightarrow \text{off (default)} \]
\[ 1 \rightarrow \text{on} \]

Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive: \texttt{x <CR><LF>}
\[ \rightarrow \text{Torr lock status} \]

Parameter setup lock
Transmit: \texttt{LOC[,x] <CR><LF>}
\[ x = 0 \rightarrow \text{off (default)} \]
\[ 1 \rightarrow \text{on} \]

Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive: \texttt{x <CR><LF>}
\[ \rightarrow \text{Parameter setup lock status} \]
RAM test
Transmit:  TRA <CR><LF>
Receive:  <ACK><CR><LF>
Transmit:  <ENQ>  Starts the test (duration <1 s)
Receive:  xxxx <CR><LF>
          ERROR word

EPROM test
Transmit:  TEP <CR><LF>
Receive:  <ACK><CR><LF>
Transmit:  <ENQ>  Starts the test (duration ≈10 s)
Receive:  xxxx,xxxx <CR><LF>
          Check sum (hex)
          ERROR word

EEPROM test
Transmit:  TEE <CR><LF>
Receive:  <ACK><CR><LF>
Transmit:  <ENQ>  Starts the test (duration <1 s)
            Do not keep repeating this test (EEPROM life).
Receive:  xxxx <CR><LF>
          ERROR word
Operation

Display test
Transmit: \texttt{TDI}, x \texttt{<CR><LF>}
\hspace{0.5cm} x = 0 \rightarrow \text{Stops the test – display according to current operating mode (default)}
\hspace{0.5cm} 1 \rightarrow \text{Starts the test – all LEDs on}
Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive: x \texttt{<CR><LF>}
\hspace{0.5cm} Display test status

ADC test
Transmit: \texttt{TAD} \texttt{<CR><LF>}
Receive: \texttt{<ACK><CR><LF>}
Transmit: \texttt{<ENQ>}
Receive: x.xxxx, x.xxxx, x.xxxx \texttt{<CR><LF>}
\hspace{0.5cm} ADC channel 2
\hspace{1.5cm} Gauge identification
\hspace{2cm} [0.0000 \ldots 5.0000 V]
\hspace{0.5cm} ADC channel 1
\hspace{1.5cm} Measurement signal (negative portion)
\hspace{2cm} [0.0000 \ldots 5.0000 V]
\hspace{0.5cm} ADC channel 0
\hspace{1.5cm} Measurement signal (positive portion) [0.0000 \ldots 11.0000 V]
I/O test

Transmit:  **TIO** [,x] <CR>[<LF>]

x =
0 → Stops the test (default)
1 → Setpoint relay off, error relay off
2 → Setpoint relay on, error relay off
3 → Setpoint relay off, error relay on
4 → Setpoint relay on, error relay on

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

  I/O test status

Operator key test

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

  Key 3 ➤ x = 0 → Not pushed
    1 → Pushed

  Key 2 ◀

  Key 1-preview

RS232 test

Transmit:  **TRS** <CR>[<LF>]
Receive:  <ACK><CR><LF>
Transmit:  <ENQ> Starts the test (repeats each character, test is interrupted with <CTRL> C).
5.2.4 Example

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

T: **TID** <CR> [<LF>]  
R:  <ACK> <CR> <LF>  
T:  <ENQ>  
R:  TTR<CR> <LF>  

Request for gauge identification  
Positive acknowledgement  
Request for data transmission  
Gauge identification

T: **SP1** <CR> [<LF>]  
R:  <ACK> <CR> <LF>  
T:  <ENQ>  
R:  1.0000E-09,9.0000E-07 <CR> <LF>  
T:  **SP1**,6.80E-3,9.80E-3 <CR> [<LF>]  
R:  <ACK> <CR> <LF>  

Thresholds  
Modification of threshold values of switching function (setpoint) 
Positive acknowledgement

T: **FOL2** <CR> [<LF>]  
R:  <NAK> <CR> <LF>  
T:  <ENQ>  
R:  0001 <CR> <LF>  
T:  **FIL2** <CR> [<LF>]  
R:  <ACK> <CR> <LF>  
T:  <ENQ>  
R:  2 <CR> <LF>  
T:  **PR1** <CR> [<LF>]  
R:  <ACK> <CR> <LF>  
T:  <ENQ>  
R:  0.8.3400E-03 <CR> <LF>  
T:  <ENQ>  
R:  1.8.0000E-04 <CR> <LF>  

Modification of filter time constant (syntax error)  
Negative acknowledgement  
Request for data transmission  
ERROR word  
Modification of filter time constant  
Positive acknowledgement  
Request for data transmission  
Filter time constant  
Request for measurement data  
Positive acknowledgement  
Request for data transmission  
Status and pressure  
Request for data transmission  
Status and pressure
6 Maintenance

The product requires no maintenance.

Cleaning CENTER ONE

For cleaning the outside of CENTER ONE, 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.
## 7 Troubleshooting

### Signalization of errors

![FAIL](image)

and the error relay opens (→ § 26).

### Error messages

<table>
<thead>
<tr>
<th>Possible cause and remedy/acknowledgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interruption or instability in sensor line or connector (Sensor error).</td>
</tr>
<tr>
<td>Acknowledge with the &quot;PARA&quot; key.</td>
</tr>
<tr>
<td>If the problem persists, or is displayed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Possible cause and remedy/acknowledgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTER ONE has been turned on too fast after power OFF.</td>
</tr>
<tr>
<td>Acknowledge with the &quot;PARA&quot; key.</td>
</tr>
<tr>
<td>If the watchdog is set to &quot;Auto&quot;, CENTER ONE acknowledges the message automatically after 2 s (→ § 54).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Possible cause and remedy/acknowledgement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The watchdog has tripped because of severe electric disturbance or an operating system error.</td>
</tr>
<tr>
<td>Acknowledge with the &quot;PARA&quot; key.</td>
</tr>
<tr>
<td>If the watchdog is set to &quot;Auto&quot;, CENTER ONE acknowledges the message automatically after 2 s (→ § 54).</td>
</tr>
</tbody>
</table>
Possible cause and remedy/acknowledgement

Main memory (RAM) error.
⇒ Acknowledge with the "PARA" key.

Possible cause and remedy/acknowledgement

Program memory (EPROM) error.
⇒ Acknowledge with the "PARA" key.

Possible cause and remedy/acknowledgement

Parameter memory (EEPROM) error.
⇒ Acknowledge with the "PARA" key.

Possible cause and remedy/acknowledgement

Display driver error.
⇒ Acknowledge with the "PARA" key.

Possible cause and remedy/acknowledgement

A/D converter error.
⇒ Acknowledge with the "PARA" key.

Possible cause and remedy/acknowledgement

Operating system (Task Fail) error.
⇒ Acknowledge with the "PARA" key.

Technical support

If the problem persists after the message has been acknowledged for several times and/or the gauge has been exchanged, please contact your local Leybold Vakuum service center.
8 Accessories

<table>
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<tr>
<th>Accessory Description</th>
<th>Ordering number</th>
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</thead>
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<td>Adapter panel for installation into a 19&quot; rack chassis adapter, height 3</td>
<td>230 005</td>
</tr>
<tr>
<td>Female D-Sub connector fitting the CONTROL connector, screw type</td>
<td>230 006</td>
</tr>
<tr>
<td>DI-SC adapter (connection cable for DI Gauge Heads)</td>
<td>245 009 V01</td>
</tr>
</tbody>
</table>

9 Storage

Caution: electronic component
Inappropriate storage (static electricity, humidity etc.) can damage electronic components.
Store the product in an antistatic bag or container. Observe the corresponding specifications in the technical data (→ 9).
Disposal

10 Disposal

WARNING

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

Separating the components

After disassembling the product, separate its components according to the following criteria:

Non-electronic components

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

Electronic components

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

Appendix

A: Conversion Tables

Weights

<table>
<thead>
<tr>
<th></th>
<th>kg</th>
<th>lb</th>
<th>slug</th>
<th>oz</th>
<th>cwt</th>
<th>sh cwt</th>
</tr>
</thead>
<tbody>
<tr>
<td>kg</td>
<td>1</td>
<td>2.205</td>
<td>68.522×10⁻³</td>
<td>35.274</td>
<td>19.684×10⁻³</td>
<td>22.046×10⁻³</td>
</tr>
<tr>
<td>lb</td>
<td>0.454</td>
<td>1</td>
<td>31.081×10⁻³</td>
<td>16</td>
<td>8.929×10⁻³</td>
<td>10×10⁻³</td>
</tr>
<tr>
<td>slug</td>
<td>14.594</td>
<td>32.174</td>
<td>1</td>
<td>514.785</td>
<td>0.287</td>
<td>0.322</td>
</tr>
<tr>
<td>oz</td>
<td>28.349×10⁻³</td>
<td>62.5×10⁻³</td>
<td>1.943×10⁻³</td>
<td>1</td>
<td>0.588×10⁻³</td>
<td>0.625×10⁻³</td>
</tr>
<tr>
<td>cwt</td>
<td>50.802</td>
<td>112</td>
<td>3.481</td>
<td>1.792×10³</td>
<td>1</td>
<td>1.12</td>
</tr>
<tr>
<td>sh cwt</td>
<td>45.359</td>
<td>100</td>
<td>3.108</td>
<td>1.6×10³</td>
<td>0.893</td>
<td>1</td>
</tr>
</tbody>
</table>

Pressures

<table>
<thead>
<tr>
<th>N/m², Pa</th>
<th>bar</th>
<th>mbar</th>
<th>Torr</th>
<th>at</th>
<th>lb/ft², psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/m², Pa</td>
<td>1</td>
<td>10⁻⁶</td>
<td>10⁻³</td>
<td>7.5×10⁻³</td>
<td>9.869×10⁻⁶</td>
</tr>
<tr>
<td>bar</td>
<td>100×10³</td>
<td>1</td>
<td>10³</td>
<td>750.062</td>
<td>0.987</td>
</tr>
<tr>
<td>mbar</td>
<td>10×10⁻³</td>
<td>1</td>
<td>1</td>
<td>750.062×10⁻³</td>
<td>0.987×10⁻³</td>
</tr>
<tr>
<td>Torr</td>
<td>133.322</td>
<td>1.333×10⁻³</td>
<td>1.333</td>
<td>1</td>
<td>1.316×10⁻³</td>
</tr>
<tr>
<td>at</td>
<td>101.325×10⁻¹</td>
<td>1.013</td>
<td>1.013×10⁻¹</td>
<td>760</td>
<td>1</td>
</tr>
<tr>
<td>lb/ft², psi</td>
<td>6.895×10⁻³</td>
<td>68.948×10⁻³</td>
<td>68.948</td>
<td>51.715</td>
<td>68.046×10⁻³</td>
</tr>
</tbody>
</table>

Pressure units used in the vacuum technology

<table>
<thead>
<tr>
<th>mbar</th>
<th>Pascal</th>
<th>Torr</th>
<th>mmWs</th>
<th>psi</th>
<th>inch of merc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>mbar</td>
<td>1</td>
<td>100</td>
<td>750.062×10⁻³</td>
<td>10.2</td>
<td>14.504×10⁻³</td>
</tr>
<tr>
<td>Pascal</td>
<td>10×10⁻³</td>
<td>1</td>
<td>7.5×10⁻³</td>
<td>0.102</td>
<td>0.145×10⁻³</td>
</tr>
<tr>
<td>Torr</td>
<td>133.322</td>
<td>133.322</td>
<td>13.595</td>
<td>19.337×10⁻³</td>
<td>3.937×10⁻²</td>
</tr>
<tr>
<td>mmWs</td>
<td>9.81×10⁻²</td>
<td>9.81</td>
<td>7.356×10⁻²</td>
<td>1</td>
<td>1.422×10⁻²</td>
</tr>
<tr>
<td>psi</td>
<td>68.948</td>
<td>6.895×10⁻³</td>
<td>51.715</td>
<td>703</td>
<td>1</td>
</tr>
<tr>
<td>inch of merc.</td>
<td>33.86</td>
<td>3.386×10⁻¹</td>
<td>25.4</td>
<td>345</td>
<td>0.491</td>
</tr>
</tbody>
</table>

Linear measures

<table>
<thead>
<tr>
<th></th>
<th>mm</th>
<th>m</th>
<th>inch</th>
<th>ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1</td>
<td>10⁻³</td>
<td>39.37×10⁻³</td>
<td>3.281×10⁻³</td>
</tr>
<tr>
<td>m</td>
<td>10⁻³</td>
<td>1</td>
<td>39.37</td>
<td>3.281</td>
</tr>
<tr>
<td>inch</td>
<td>25.4</td>
<td>25.4×10⁻³</td>
<td>1</td>
<td>8.333×10⁻²</td>
</tr>
<tr>
<td>ft</td>
<td>304.8</td>
<td>0.305</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

Temperature conversion

<table>
<thead>
<tr>
<th></th>
<th>Kelvin</th>
<th>Celsius</th>
<th>Rankine</th>
<th>Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelvin</td>
<td>1</td>
<td>°C+273.15</td>
<td>°R+59</td>
<td>°F+459.67+59/9</td>
</tr>
<tr>
<td>Celsius</td>
<td>K-273.15</td>
<td>1</td>
<td>°R-491.69×5</td>
<td>5/9×°F-17.778</td>
</tr>
<tr>
<td>Rankine</td>
<td>K/9</td>
<td>(°C×9/5)+491.69</td>
<td>1</td>
<td>°F+459.67</td>
</tr>
<tr>
<td>Fahrenheit</td>
<td>9/5×K-459.67</td>
<td>9/5×(°C+17.778)</td>
<td>°R-459.67</td>
<td>1</td>
</tr>
</tbody>
</table>
B: Default Parameters

The following values are activated when the default parameters are loaded (→ § 36):

<table>
<thead>
<tr>
<th>Default</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>0FF</td>
<td></td>
</tr>
<tr>
<td>5×10⁻⁴ mbar</td>
<td></td>
</tr>
<tr>
<td>1×10⁻² mbar</td>
<td></td>
</tr>
<tr>
<td>1000 Torr</td>
<td></td>
</tr>
<tr>
<td>0FF</td>
<td></td>
</tr>
<tr>
<td>mbar</td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>nor</td>
<td></td>
</tr>
<tr>
<td>0FF</td>
<td></td>
</tr>
<tr>
<td>2 Digits</td>
<td></td>
</tr>
<tr>
<td>9600</td>
<td></td>
</tr>
<tr>
<td>0FF</td>
<td></td>
</tr>
<tr>
<td>Auto</td>
<td></td>
</tr>
<tr>
<td>0FF</td>
<td></td>
</tr>
<tr>
<td>0FF</td>
<td></td>
</tr>
<tr>
<td>Auto</td>
<td></td>
</tr>
<tr>
<td>Auto</td>
<td></td>
</tr>
</tbody>
</table>
Appendix

C: Firmware Update

If your CENTER ONE firmware needs updating, e.g. for implementing a new gauge type, please contact your local Leybold Vakuum service center.

User parameters

Most of the settings you may have defined in the Parameter and Test mode will not be affected by a firmware update. To be sure, note your parameter settings before upgrading the firmware (→ 89).

Preparing CENTER ONE for a program transfer

• Turn CENTER ONE off
• Connect CENTER ONE with the serial COM1 (COM2) interface of your PC via a 9-pin D-Sub extension cable (the firmware of CENTER ONE cannot be loaded from a Mac).
• With a pin (ø<2 mm) depress the switch behind the rear panel and turn CENTER ONE on.

After power ON, the display remains dark.
Appendix

Programmtransfer

1. Unpack the self extracting file *.exe or the packed*.zip file.

2. If you have not connected CENTER ONE to the COM1 interface:
   Open the batch file Update BG509763-A, …
   … edit the interface, …
   … and save the new setting.

3. Start batch file Update BG509763-A.
Appendix

The new firmware is transmitted to CENTER ONE.

Starting CENTER ONE with the updated firmware

If the program transfer was successful, quit the Update mode by turning CENTER ONE off.

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

CENTER ONE is now ready for operation. To be sure, check that the current parameter settings are identical with the previously defined settings (→ 89).
Appendix

D: Literature

[1] www.oerlikon.com
Operating Manual
THERMOVAC Transmitter TTR 90
GA 09.220/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
THERMOVAC Transmitter TTR 91, TTR 91 S
GA 09.222/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
THERMOVAC Transmitter TTR 96 S
GA 09.223/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
THERMOVAC Transmitter TTR 211 S
GA 09.216/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
THERMOVAC Transmitter TTR 100,
TTR 100 S2
GA 09.221/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
THERMOVAC Transmitter TTR 101,
TTR 101 S2
300344581_002_A0
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
PENNING Transmitter PTR 225
GA 09.308/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland
Appendix

[8] www.oerlikon.com
Operating Manual
CERAVAC Transmitter CTR 90
GA 09.040/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
CERAVAC Transmitter CTR 91
GA 09.040/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
IONIVAC Transmitter ITR 90
GA 09.420/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
IONIVAC Transmitter ITR 100
GA 09.414/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

[12] www.oerlikon.com
Operating Manual
PENNINGVAC Transmitter PTR 90
GA 09.313/1.02
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Operating Manual
IONIVAC Transmitter ITR 200
17200137_002_00
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

Gebrauchsanleitung
Messkopf DI 200, DI 201, DI 2000, DI 2001,
DI 2001 rel
GA09611_001_A1
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland
Appendix

Gebrauchsanleitung
CERAVAC-Transmitter CTR 100
17200257_001_00
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland

[16] www.oerlikon.com
Gebrauchsanleitung
CERAVAC-Transmitter CTR 101
130002066_001_A0
Oerlikon Leybold Vacuum GmbH,
D–50968 Köln, Deutschland
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EC Declaration of Conformity

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herewith declares that the products specified and listed below which we have placed on the market, comply with the applicable EC Council Directives. This declaration becomes invalid if modifications are made to the product without agreement of Oerlikon Leybold Vacuum GmbH. Compliance with the EMC Directives requires that the components are installed within a system or machine in a manner adapted to EMC requirements.

Product designation: Single-Channel Controller
Type designation: CENTER ONE
Catalogue No.: 230002
235002

The product complies to the following European Council Directives:
• Directive on Low Voltage (2006/95/EC)

The following harmonised standard has been applied:
• EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use
  Part 1: General requirements
• EN 61000-3-2 EMC: Limits for harmonic current emissions
• EN 61000-3-3 + A1 + A2 EMC: Limitation of voltage changes, voltage fluctuations and flicker
• EN 61000-6-2 EMC: Generic standards - Immunity for industrial environments
• EN 61000-6-3 EMC: Generic standards - Emission standard for residential, commercial and light-industrial environments

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