Leybold

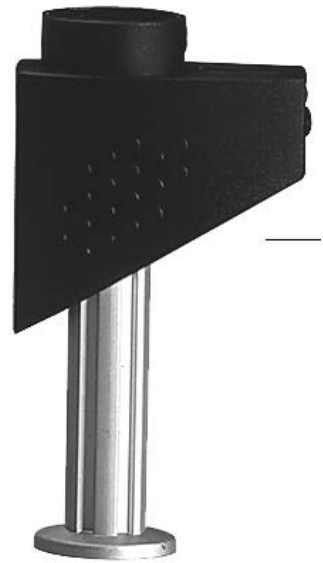
TR 211, TR 211 NPT, TR 212, TR 216

THERMOVAC Gauge Head

Operating Instructions GA09210_002_C0

Part Nos.

157 85, 896 33,
158 52, 157 87, 157 86



Contents

Obligation to Provide Information
Before installing and commissioning the device, carefully read these Operating Instructions and follow the information so as to ensure optimum and safe working right from the start.

NOTICE

The Leybold THERMOVAC **Gauge Heads** have been designed for safe and efficient operation when used properly and in accordance with these Operating Instructions. It is the responsibility of the user to carefully read and strictly observe all safety precautions described in this section and throughout the Operating Instructions. The gauge heads **must only be operated in the proper condition and under the conditions described in the Operating Instructions**. They must be operated and maintained by trained personnel only. Consult local, state, and national agencies regarding specific requirements and regulations. Address any further safety, operation and/or maintenance questions to our nearest office.

NOTICE

NOTICE is used to notify users of installation, operation, programming or maintenance information that is important, but not hazard related.

We reserve the right to alter the design or any data given in these Operating Instructions. The illustrations are not binding.

Retain the Operating Instructions for further use.

The references to diagrams, e.g. (1/5), consist of the Fig. No. and the Item No. in that order.

Description

1 Description

The THERMOVAC are vacuum gauge heads.

1.1 Design and function

The actual pressure sensing element within the gauge head TR 211 is a tungsten filament.

The THERMOVAC gauge heads TR 212 and TR 216 are made of stainless steel with a welded ceramics feed-through. The sensing element within the TR 212 is a tungsten filament, whereas the TR 216 uses a platinum filament.

The gauge heads are supplied fully aligned. Any alignment or recalibration will - if at all necessary - be required only after a longer period of operation.

The gauge heads are temperature compensated for the range from 0 °C to 40 °C.

The measurement cells can be easily exchanged should this be required. After an exchange of the sensing cell a recalibration is required by adjusting two potentiometers within in the gauge head.

1.2 Supplied equipment

- THERMOVAC gauge head
- Securing bow for connection plug

1.3 Technical data

THERMOVAC gauge head TR 211

Measurement range	$0.5 \cdot 10^{-3}$ to 10^{3} mbar
Filament temperature	110 °C
Permissible overload (absolute)	3 bar
Measurement volume	11 cm^3
Connection flange	DN 16 KF or 1/8“ NPT thread
Filament material	Tungsten

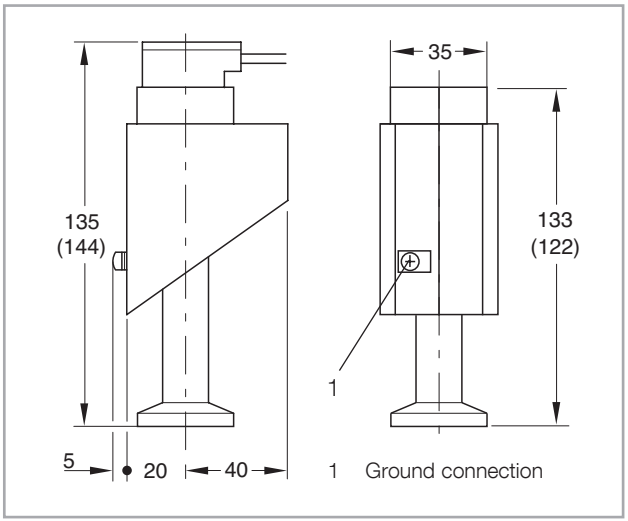


Fig.1 Dimensional drawing TR 211 / TR 212 / TR 216
(all dimensions in mm)

Material in contact with the medium	aluminium, glass, Vacon, tungsten, chrome-nickel 8020, steel nickel-plated, Epoxy adhesive
Operating temperature	0 to 40 °C
Max. ambient temperature	80 °C

THERMOVAC gauge head TR 212

Measurement range	$0.5 \cdot 10^{-3}$ to 10^{3} mbar
Filament temperature	110 °C
Permissible overload (absolute)	10 bar
Measurement volume	10 cm^3
Connection flange	DN 16 KF
Filament material	Tungsten
Material in contact with the medium	

	Stainless steel 1.4301, Tungsten, chrome nickel 8020, ceramics Al_2O_3, NiFe 42
Operating temperature	0 to 40 °C
Max. ambient temperature	80 °C

THERMOVAC gauge head TR 216

Measurement range	$0.5 \cdot 10^{-3}$ to 10^3 mbar
Filament temperature	110 °C
Permissible overload (absolute)	10 bar
Measurement volume	10 cm^3
Connection flange	DN 16 KF
Filament material	Platinum
Material in contact with the medium	Stainless steel 1.4301, platinum, chrome nickel 8020, ceramics Al_2O_3, NiFe 42
Operating temperature	0 to 40 °C
Max. ambient temperature	80 °C

1.4 Ordering information

	Part No.
THERMOVAC gauge head TR 211 KF	157 85
THERMOVAC gauge head TR 211 NPT	896 33
THERMOVAC gauge head TR 212 KF	158 52
THERMOVAC gauge head TR 216 KF	157 87
THERMOVAC gauge head TR 212 CF	157 86

1.5 Accessories

	Part No.
Replacement sensing cell TR 211 (DN 16 KF)	E157 75
Replacement sensing cell TR 211 (1/8“ NPT)	E896 34
Replacement sensing cell TR 216 (DN 16 KF)	E157 77
Small flange DN 16 KF with short tubulation, made of steel	183 06
Small flange DN 16 KF with short tubulation, made of stainless steel	868 41
Small flange DN 16 KF with long tubulation, made of stainless steel	868 51
Centering ring DN 16 KF (Al) with NBR sealing ring	183 26
Centering ring DN 16 KF made of stainless steel with FPM sealing ring	883 46
DN 10/16 KF clamping ring	183 41
Adapter centering ring DN 16/10 KF (Al-NBR ring)	183 56
Adapter centering ring DN 16/10 KF (stainless steel-FPM ring)	883 56
Round sealing ring DN 16 KF,	
NBR	239 50 510
FPM	239 70 176
For overpressure applications:	
Clamping ring	882 75
Outer support ring, steel	431 31 228

2 Installation

2.1 Conforming utilization

The THERMOVAC gauge heads are vacuum gauge heads which are operated in connection with the operating units CM 51, CM 52, TM 20, TM 21, TM 22, PM 31, CM 31, CM 32, CM 33 as well as TM 2xx, IT 230, IT 230 DS and the CM 330.

The gauge head is used for the measurement of absolute pressures in the rough and fine vacuum range in accordance with the technical data.

2.2 Unpacking and examining

Unpack the THERMOVAC gauge head immediately after delivery, even if it is to be installed at a later date.

Retain the packaging materials in the event of complaints about damage.

Carefully examine the visually. If any damage is discovered, report it immediately to the forwarding agent and insurer. If the gauge head has to be replaced, please get in touch with the orders department.

2.3 Connection of the gauge head

NOTICE

The gauge head must be installed in such a way, that when venting the vacuum system the admitted air may under no circumstances be directed straight at the gauge head. Otherwise the fine wire within the gauge head may be damaged.

Install the gauge head vertically, i.e. with the flange facing downwards. Dimensional drawing see Fig. 1. The dimensions given in brackets refer to the TR 212 and TR 216 THERMOVAC gauge head. Otherwise the dimensions are the same for both gauge heads.

The maximum permissible ambient temperature for the gauge head is 80 °C. However, at this temperature the accuracy specified for the gauge head is no longer

ensured, as the temperature compensation is only effective up to 40 °C.

If the gauge head is subjected to strong thermal radiation, it has to be protected by a suitable thermal screen. In case that heat is transferred to the gauge head via the connection cable, a section of the connection cable may be cooled by a cooling spiral.

Any contamination of the sensing cell will impair the accuracy of the pressure readings obtained. Thus special care must be taken in the presence of substances which can not be removed by solvents.

Suitable orifice plates or bends may be employed to keep any possible sources of contamination away from the gauge head.

Bent lines should be laid in such a way that no condensate can collect and in particular so that the vacuum line is not blocked.

The gauge heads are connected to the operating unit via standard gauge head cables.

For the purpose of improved resistance to interference the gauge heads from Serial No. D 9611 3001 have been equipped with an additional ground connection (1/1) (screw terminal) at the housing which is directly linked to the metal housing of the sensing cell.

The ground lines which lead to the outside (black cable with lug) on the connectors of gauge head cables

Cat. No. 162 26; 162 27 and 162 28, are used to provide a ground connection between the gauge head and the operating unit from the A-Series (ground terminal on the rear of the instrument).

NOTICE

The ground wire may only be connected if potential equalization between the flange of the vacuum apparatus and the operating unit is ensured. If necessary install the gauge head so that it is electrically isolated from the vacuum apparatus.

When operating the THERMOVAC gauge head TR 216 in connection with an operating unit from the A series (THERMOVAC TM 21, TM 22 or COMBIVAC CM 31, CM 32 or CM 33) running on a software version up to version V 2.13 you must select for the filament „FIL 1“ on parameter page 7 for the THERMOVAC channel. **If this is not observed you will have to expect a greater degree of inaccuracy in the measurements.**

From software version V 2.14 upwards the „FIL pt“ setting applies when connecting a TR 216 THERMOVAC gauge head as also described in the corresponding Operating Instructions.

Observe the filament change when operating the gauge head in connection with an operating unit CM 51 and CM 52 (see Operating Instructions CM 51 and CM 52).

The connecting plug can be safely attached to the gauge via the securing bow. To do so, push the bow over the connecting pug and let them snap in the provided holes which are in the shell.

2.4 Alignment of the gauge head in connection with THERMOVAC operating units with analogue displays

Alignment is performed as follows:

Remove the caps covering the potentiometers on the gauge head.

Vent vacuum system and set 100 % potentiometer (2/1) so that the pointer of the control unit meter shows full-scale deflection, i.e. it should point to 100 on the linear scale.

Pump down vacuum system to a pressure below $5 \cdot 10^{-4}$ mbar and set „0“ potentiometer (2/2) so that the pointer is on 0 of the meter scale.

Vent vacuum system and recheck the 100 % adjustment. Correct deviation, if any, by means of potentiometer.

If a correction of the 100 % adjustment was necessary the zero adjustment must be repeated in any case.

After having completed the alignment fit the caps to cover the potentiometers.

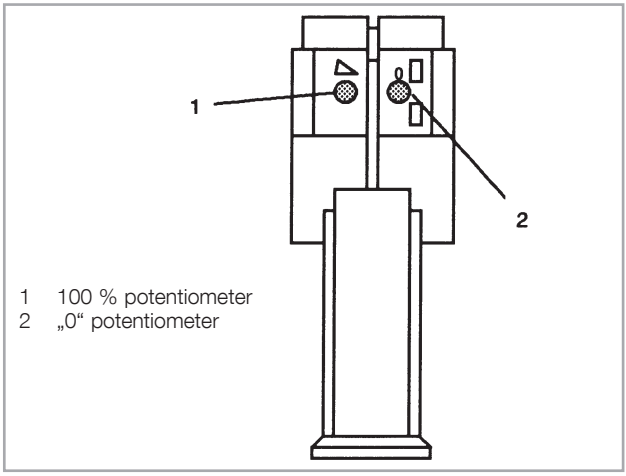


Fig. 2 Gauge head TR 211 / TR 212 / TR 216

2.5 Alignment of the gauge head in connection with operating units TM 20, TM 21, TM 22, CM 31, CM 32, CM 33, CM 51 and CM 52

For this refer to the alignment instructions given in the corresponding operating instructions.

3 Maintenance

3.1 Leybold Service

Whenever you send us in equipment, indicate whether the equipment is contaminated or is free of substances which could pose a health hazard. If it is contaminated, specify exactly which substances are involved. You must use the form we have prepared for this purpose.

A copy of the form has been reproduced at the end of these Operating Instructions: “Declaration of Contamination for Compressors, Vacuum Pumps and Components”. Another suitable form is available from www.leybold.com → Documentation → Download Documents.

Attach the form to the equipment or enclose it with the equipment.

This statement detailing the type of contamination is required to satisfy legal requirements and for the protection of our employees.

We must return to the sender any equipment which is not accompanied by a contamination statement.

3.2 Exchanging the sensing cell

One half of the housing (3/1) is fitted with plastic catches (3/2) which must properly engage in the slots (3/8) provided in the other half of the housing (3/7) so as to firmly connect the two halves of the housing (3/1) and (3/7).

Apply a screwdriver to the upper slit on the longer front so as to disengage the plastic catch (3/2) by pushing it backwards. At the same time pull both halves of the shell (3/1) and (3/7) apart a little.

Next apply a screwdriver to the lower slit on the longer front so as to disengage the plastic catch by pushing it backwards. At the same time pull both halves of the shell apart a little more.

Repeat this for the shorter front.

Detach shell (3/1).

Remove the contact spring (3/4) by loosening the fixing

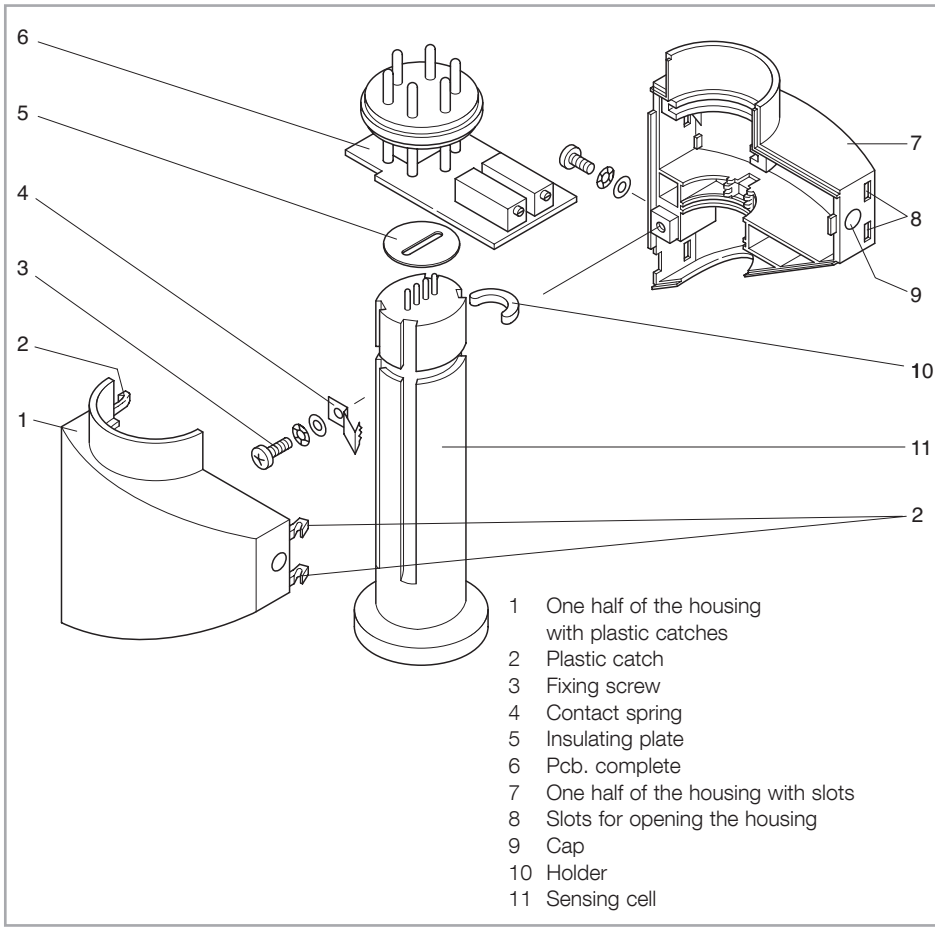


Fig. 3 Disassembled TR 211 / TR 212 / TR 216 gauge head

screw (3/3)

Remove the sensing cell (3/11) together with the pcb. and plug (3/6) from the remaining shell.

Carefully separate the sensing cell (3/11) from the pcb. (3/6).

Remove the insulating plate (3/5) from the measurement cell.

Exchange the sensing cell.

Insert insulating plate (3/5) between printed circuit board and measurement cell.

When installing a new sensing cell on the pcb. it is not required to maintain a particular polarity between the pins on the sensing cell and the mating connector.

During assembly of the gauge head make sure that the holder (3/10) has been placed in the housing shell and that the temperature sensor is pressed against the sensing cell.

The gauge head is reassembled in the reverse order.

4 Waste Disposal

Contamination

The equipment may have been contaminated by the process or by environmental influences. In this case the equipment must be decontaminated in accordance with the relevant regulations. We offer this service at fixed prices. Further details are available on request.

WARNING

Contaminated parts can be detrimental to health and environment. Before beginning with any work, first find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Separate clean components according to their materials, and dispose of these accordingly. We offer this service. Further details are available on request.

Leybold

Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, va cuum pumps and components will be carried out only if a correctly completed declaration has been submitted. Non-completion will result in delay. The manufacturer can refuse to accept any equipment without a declaration.

A separate declaration has to be completed for each single component.

This declaration may be completed and signed only by authorized and qualified staff.

Customer/Dep./Institute :

Address :

Person to contact:

Phone : Fax:

End user:

Reason for return: ☒ applicable please mark

Repair: ☐ chargeable ☐ warranty

Exchange: ☐ chargeable ☐ warranty

☐ Exchange already arranged / received

Return only: ☐ rent ☐ loan ☐ for credit

Calibration: ☐ DKD ☐ Factory-calibr.

☐ Quality test certificate DIN 55350-18-4.2.1

A. Description of the Leybold product:

Material description :

Catalog number:

Serial number:

Type of oil (ForeVacuum-Pumps) :

Failure description:

Additional parts:

Application-Tool:

Application- Process:

B. Condition of the equipment

	No [1]	Yes	No
1. Has the equipment been used	☐	☐	
2. Drained (Product/service fluid)		☐	☐
3. All openings sealed airtight		☐	
4. Purged		☐	☐

If yes, which cleaning agent

and which method of cleaning

[1] If answered with "No", go to **D**.

Contamination :	No [1]	Yes
toxic	☐	☐
corrosive	☐	☐
flammable	☐	☐
explosive [2]	☐	☐
radioactive [2]	☐	☐
microbiological [2]	☐	☐
other harmful substances	☐	☐

C. Description of processed substances (Please fill in absolutely)

1. **What substances have come into contact with the equipment** ?
   Trade name and / or chemical term of service fluids and substances processed, properties of the substances
   According to safety data sheet (e.g. toxic, inflammable, corrosive, radioactive)

X Tradename:	Chemical name:
a)	
b)	
c)	
d)	

	No	Yes
2. **Are these substances harmful ?**	☐	☐
3. **Dangerous decomposition products when heated ?**	☐	☐

If yes, which ?

[2] **Components contaminated by microbiological, explosive or radioactive products/substances will not be accepted without written evidence of decontamination.**

D. Legally binding declaration

I / we hereby declare that the information supplied on this form is accurate and sufficient to judge any contamination level.

Name of authorized person (block letters) :

Date

signature of authorized person

firm stamp

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