oerlikon
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DISPLAY ONE

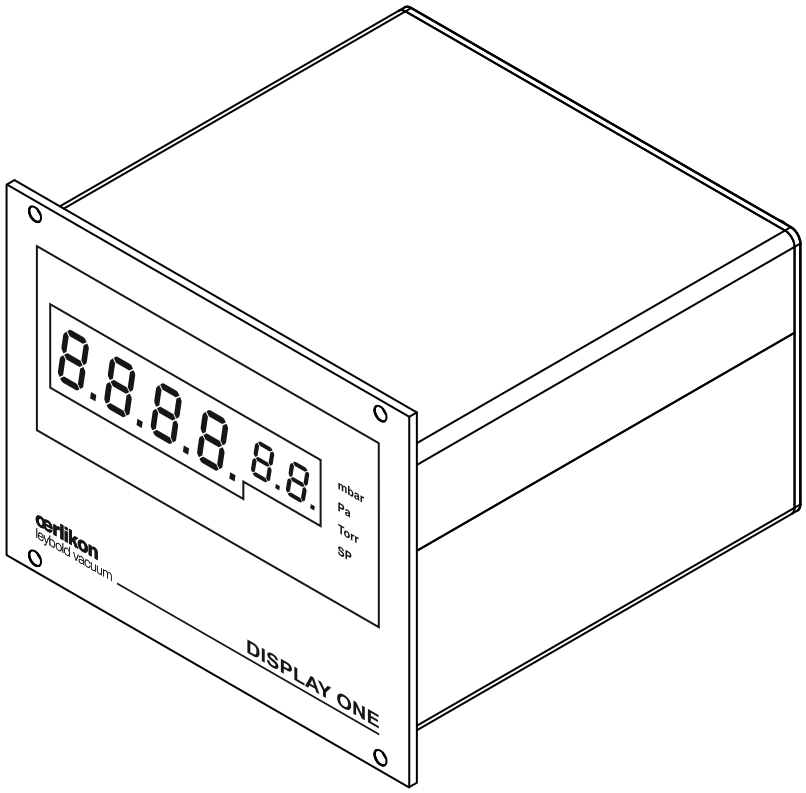
Single Channel Vacuum Display

GA09034_002_A2

Instruction Manual GA 09.034 / 3.02

Catalog Number

230001



0. Contents

0.1 List of Figures

0.2 List of Tables

1. Description

1.1 Validity

1.1.1 Catalog Number

This document is valid for the following products:

Catalog Number	Product	Version	Serial Number
230001	DISPLAY ONE with EU/US mains cord	5.1f	20000 - 29999

Table 1 – Catalog Numbers

1.1.2 Nameplate

A nameplate is located on the bottom side of the instrument. When communicating with Oerlikon Leybold Vacuum GmbH, the information on the nameplate will be needed. For this reason enter the information here:

Figure 1 – Nameplate (example)

1.2 Conforming Utilisation

The DISPLAY ONE serves as a simple power supply and display unit for the transmitters from the series THERMOVAC and PENNINGVAC and also for DU sensors.

1.3 Responsibility and Warrenty

Oerlikon Leybold Vacuum GmbH will assume no responsibility and warranty when the operator or third parties

- do not observe the information provided in this document.
- do not use this product in line with the conforming utilisation
- modify the product in any way (modifications, repair work etc.)
- operate the product with accessories which is not listed in the corresponding product documentation

The right of changes without prior announcement is reserved. The illustrations are not binding.

1.4 Transport Damages

- Check the packaging for visible damages
- Send an advice of damage to the carrier and to the insurer in case of damage
- Retain the packaging material, because the reconsignment in the original packaging of the manufacturer is prerequisite for warranty claims
- Check the consignment for completeness
- Check the instrument for visible damages

WARNING: Damaged Product.
Starting a damaged product can be perilously.

2. Safety

2.1 General

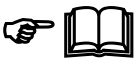
The DISPLAY ONE is supplied ready for operation. Even so, we recommend that you carefully read these Operating Instructions so as to ensure optimum operating conditions right from the start.
These Operating Instructions contain important information on the functions, installation, commissioning, operation and troubleshooting of the DISPLAY ONE.

2.2 Signs and Symbols

Important remarks concerning operational safety and protection are emphasised.

DANGER or WARNING:
Information on the prevention of injury.

DANGER:
Information on the prevention of injury by electrical impact.



REFERENCE:
General lead on further information and articles respectively.

2.3 Basic Safety Regulations

During all work, such as installation, maintenance and repair, please comply with respective safety regulations.

DANGER: Mains voltage
Coming into contact with components inside the instrument carrying the mains voltage can, when introducing object or liquids, cause danger to life.

WARNING: Improper usage
Improper usage can damage the instrument. Use the instrument only in accordance to the manufacturers' instructions.

WARNING: Incorrect connection and operation data
Incorrect connection and operation data can damage the instrument. Comply with all prescribed connection and operation data.

3. General Description

3.1 General Functional Characteristics

The DISPLAY ONE serves as a simple power supply and display unit for the transmitters from the series THERMOVAC and PENNINGVAC and also for DU sensors.

3.2 Applicable Transmitters

The following transmitters can be operated via DISPLAY ONE:

Transmitter	Type	Display
THERMOVAC	TTR90, TTR90S TTR91, TTR91S TTR96 TTR211S TTR216S	ttr (ttr^{E})
THERMOVAC	TTR100, TTR100S2 TTR101, TTR101S2	ttr 1 (ttr 1^{E})
PENNINGVAC	PTR90	Ptr90
DU Sensor	DU200, DU201	du200
DU Sensor	DU2000, DU2001	du2000

Table 2 – Applicable Transmitters

4. Technical Data

4.1 General Data

4.1.1 Mechanical Data

Dimensions:	Width: 106.0 mm (1/4 19“) Height: 84.5 mm (2 HE) Depth: 108.0 mm
Weight:	0.5 kg
Build-in depth:	ca. 150 mm (including connected plug)
Application:	Rack installation Panel mounting Benchtop instrument

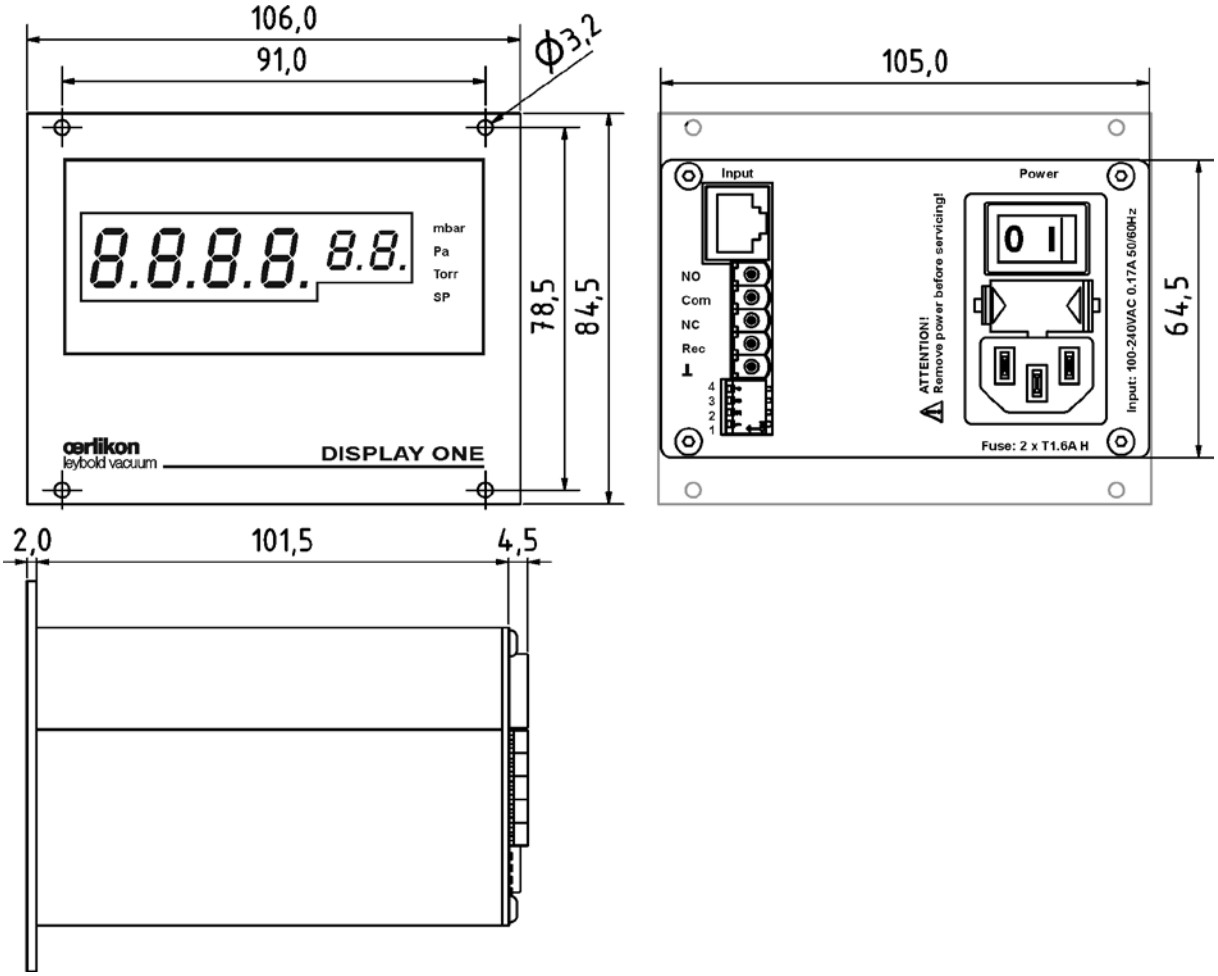


Figure 2 – Dimensions DISPLAY ONE (mm)

4.1.2 Environment

Temperature:	Storage:	-20 ... +60 °C
	Operation:	+5 ... +50 °C (sea level)
		+5 ... +30 °C (2000 m NN)
Relative humidity of the air:	max. 80 % (to 30 °C)	
	decreasing to max. 50 % (from 40 °C)	
Usage:	indoors (max. 2000 m NN)	
Contamination class:	II	
Protection class:	IP40	

4.1.3 Standards

- Compliance with Low Voltage Directive 2009/95/EG
- Compliance with EMC Guideline 2004/108/EG

International/national standards as well as specifications:

- EN 61010-1 (Electrical measuring and control equipment)
- EN 61000-6-2 (EMC compatibility)
- EN 61000-6-3 (EMC interference)

4.2 Mains Connection

Voltage:	100…240 V AC
Frequency:	50/60 Hz
Device fuses:	2 x T1.6A H
Power consumption:	max. 5 VA
Overvoltage category:	II
Protection class:	1
Connection:	Rubber connector IEC 320 C14

4.3 Measuring Channel

Number:	1	
Connection:	RJ45 (FCC 68)	
Applicable sensors:	THERMOVAC	TTR90, TTR90S
		TTR91, TTR91S
		TTR96S
		TTR211S, TTR216S
	THERMOVAC	TTR100, TTR100S2
		TTR101, TTR101S2
	PENNINGVAC	PTR90
	DU Sensor	DU200, DU201
		DU2000, DU2001

4.3.1 Transmitter Powering

Voltage:	+24 VDC ±5 %
Current:	max. 100 mA
Fuse protection:	200 mA, self-resetting
	Powering complies the requirements of a grounded low voltage (SELV-E according to EN61010).

4.3.2 Measuring Technique

Measuring ranges:	Sensor dependent (max. 2000…$5 \cdot 10^{-9}$ mbar)
Measuring rate:	50 s^{-1}
Display rate:	4 s^{-1}
Units of measuring:	mbar, Pa, Torr

4.3.3 Switching Function

Type of contact:	Changeover contact, potential-free
Load (resistive):	Switching current: max. 1 A
	Switching voltage: max. 30 V AC / 60 V DC
Service life:	Mechanical: 10^7 actuations
	Electrical: 10^4 actuations at maximum load
Connection:	Plug-in terminals, Screw terminals

4.3.4 Analog Output

Number:	1
Voltage range:	0…10 V DC
Deviation from the displayed Value :	± 0,1 %
Internal resistance:	100 Ohm
Relation between voltage and pressure:	Sensor dependent
Connection:	Plug-in terminals, Screw terminals

5. Installation

5.1 Scope of Delivery

Description	Number
DISPLAY ONE	1
Mains cord with shockproof plug (EU)	1
Mains cord with shockproof plug (US)	1
Operating Instructions (each GER and ENG)	1
Edge protection	1
Rubber feet	2
Spare fuses	2
Mating connector	2

Table 3 – Scope of Delivery

5.2 Mechanical Installation

The DISPLAY ONE can be installed as follows:

- Rack installation
- Bench top instrument
- Panel mounting

WARNING: Power disconnection
Set up or install the DISPLAY ONE in such a way that they can to operate or place at any time the power switch you surely that a power disconnection is at any time possible.

5.2.1 Rack Installation

The DISPLAY ONE is designed for being installed into a rack according (19", 2 HU).

- Affix the sub rack within the rack
- Insert the DISPLAY ONE into the sub rack
- Affix the DISPLAY ONE with 4 M2.5 screws with the instrument

5.2.2 Benchtop Instrument

When wanting to use the DISPLAY ONE as bench top instrument, please proceed as followed:

- Lay the DISPLAY ONE on its rear side.
- Push the edge protector on the bottom edge of the front panel.
- Stick the rubber feet, supplied with the instrument, to the bottom of the housing.
- Turn the DISPLAY ONE over again and place it at the desired location.

5.2.3 Panel Mounting

When wanting to install the instrument in a front panel, the following panel cut is required (☞🕮 Figure 2, page 8):

- Insert the DISPLAY ONE into the cut-out
- Affix the instrument with 4 M2.5 screws

5.3 Connections

5.3.1 Rear of the Instrument

Figure 3, page 12 shows the rear of the DISPLAY ONE. The pin assignment of the individual connections is described in the following chapters.

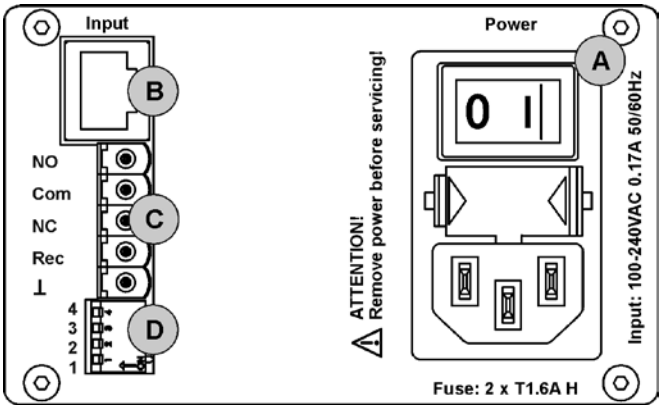


Figure 3 – Rear of the instrument

A	Mains connection with mains switch and device fuses
B	Connection for transmitter (☞🕮 Figure 4, page 13)
C	Connection for relay output and analogue output (☞🕮 Figure 5, page 13)
D	Configuration switch

5.3.2 Mains Connection

The mains connection on the rear of the instrument (☞🕮 Figure 3 A, page 12) is intended for a mains cord which on the instrument side has been fitted with a rubber connector.

DANGER: Mains voltage
Not professionally grounded devices can in case of malfunction endanger life. Use only three core mains cables respectively extension cables with a protective ground connection. Insert the mains plug only into a mains outlet with a protective ground contact.

5.3.3 Input

The connector Input (☞🕮 Figure 3 A, page 12 and Figure 4, page 13) is designed for the connection of a transmitter (☞🕮 Chapter 3.2 Applicable Transmitter, page 7). For the measuring channel an 8-pole RJ45 socket is available.

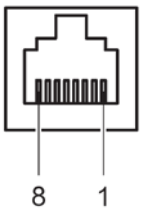


Figure 4 – Connector for Transmitter (RJ45)

1	+24 V	5	Signal ground
2	Ground	6	Ground
3	Signal	7	free
4	Ident resistor	8	Status SP

CAUTION: Improper Measuring Instruments
Measuring instruments, which are not intended for the usage with the DISPLAY ONE, can damage the device. Operate the DISPLAY ONE only with the appropriate instruments (☞🕮 Chapter 3.2 Applicable Transmitter, page 7).

Connecting:
- Connect the transmitter using a shielded 1:1-cable to the connector Input on the rear of the DISPLAY ONE.

5.3.4 Analogue Output and Relay Output

The connection (☞🕮 Figure 3 C, page 12 and Figure 5, page 13) contains the analogue output of the transmitter and if at the transmitter available, its relay output.

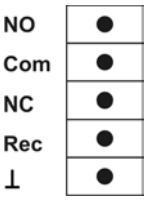


Figure 5 – Connection for Analogue Output and Relay Output
(Plug-in terminals, Screw terminals)

NO	SP Normally open contact (NO)
Com	SP Central contact (COM)
NC	SP Normally close contact (NC)
Rec	Analogue signal 0…10 V DC
⊥	Analogue ground

Connecting:
- Connect the peripheral components using a shielded cable.

DANGER: Dangerous to Touch Voltage
Voltages over 60 V DC or 30 V AC are dangerous to touch. You are allowed to switch with the connector Relay Output only voltages of 60 V DC or 30 V AC, max. 1 A. This voltage has to meet the requirements of a grounded protective low voltage (SELV-E according to EN 61010).

6. Operation

6.1 Front Panel

Figure 6, page 14 shows the front panel of the DISPLAY ONE.

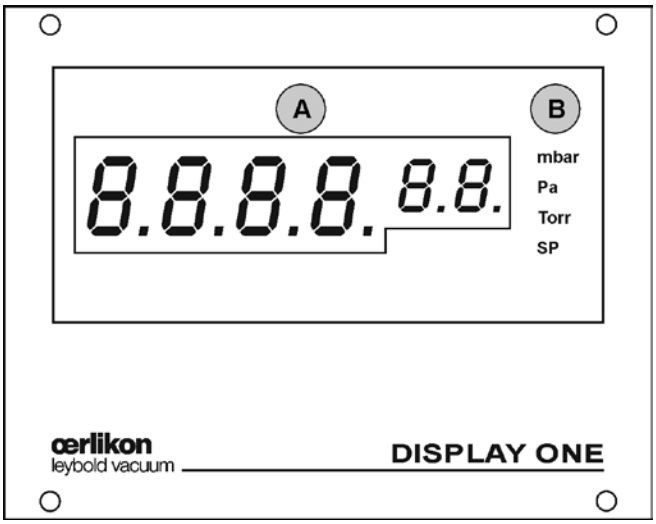


Figure 6 – Front Panel

A Display of measuring value and status message
B Display unit and Set point status

Display	Description
8.8.8.8.8.8.	Measured value or status message
mbar, Pa, Torr	Pressure unit
SP	Switching function status When the icon lights up the pressure is below the lower threshold. If the icon does not light up the pressure is above the upper threshold.

Table 4 – Display Structure and Description

6.2 Switching On and Switching OFF

6.2.1 Switching On

- Witch the mains switch on.

After switching on the DISPLAY ONE will operate the following:

- Self test
- Display test
- Display of the used software version
- Identify transmitter
- Activate the measurement mode

6.2.2 Switching Off

- Switch the mains switch off.

CAUTION: Waiting Time
Wait for at least 5 seconds before switching on the device again.

6.3 Operation Modes

The DISPLAY ONE may be operated in the following modes:

- **Measurement Mode**
  The measuring mode is the standard operating mode. Here the measured values of the sensors are displayed.
  ☞🕮 Chapter 6.4 Measurement Mode, page 15

- **Parameter Mode**
  In the parameter mode you have the possibility of changing over the configuration switch at the rear of instrument different parameters of the DISPLAY ONE.
  ☞🕮 Chapter 6.5 Parameter Mode, page 16

6.4 Measurement Mode

6.4.1 Selection

After switching on the DISPLAY ONE it will automatically run the measuring mode.

6.4.2 Description

The measuring mode is the standard mode of operation. Here the measured values of the transmitters are indicated. If no measured values can be indicated, a status message is spent (☞🕮 Table 5, page 15).
If no transmitter is attached at the measuring channel, noSEn indicated. This status message expires after 30 seconds.

Display	Pressure
oooo	Above the measurement range (DU Sensors only)
8.888^{-8}	Within the permissible range.
c8.88^{-8}	Below the measurement range (DU Sensors excluded)
c0	Lowly below the measurement range (DU Sensors only)
cc0	Middle below the measurement range (DU Sensors only)
ccc0	Large below the measurement range (DU Sensors only)

Table 5 – Display of the Measuring Mode

6.5 Parameter Mode

6.5.1 Selection

The selection of the parameters is made by the configuration switch (☞🕮 Figure 3 D, page 12) on rear of the DISPLAY ONE. Proceed in addition as follows:

- Switch the instrument off
- Set the DIP switches as requiered
- Switch the unit on once more

IMPORTANT INFORMATION:
When changing the DIP switch settings while the instrument is on, this will initially have no effect. Any changes to the DIP switch settings will only come into effect after switching the instrument on once more.

6.5.2 Description

Over the configuration switch with DIP switches 1 and 2 the mass unit is stopped as well as selected with DIP switch 3 between two or three-figure measured value announcement. With DIP switch 4 the measuring range extension for the THERMOVAC transmitters TTR101 is activated.

6.5.3 Mass Unit

The mass unit is stopped over the DIP switches 1 and 2 of the configuration switch.

Mass unit	DIP switch 1	DIP switch 2
mbar	OFF	OFF
Pa	ON	OFF
Torr	OFF	ON

Table 6 – Parameter Mass unit

- Configure the mass unit according to the Table 6 on page 16 .

6.5.4 Display Format

The display format is stopped over the DIP switch 3 of the configuration switch.

Display Format	DIP switch 3
3 digits	OFF
2 digits	ON

Table 7 – Parameter Display Format

- Configure the display format according to the Table 7 on page 16.

6.5.5 Pirani Range Extension

The Pirani range extension for the THERMOVAC transmitters is activated with DIP switch 4.

Pirani Range Extension	DIP switch 4	Display
deactivated	OFF	ttr or ttr 1
activated	ON	ttr^{E} or ttr 1^{E}

Table 8 – Parameter Pirani Range Extension

- Activate the Pirani range extension for the THERMOVAC transmitters according to the Table 8 on page 17.

7. Maintenance and Servicing

7.1 Maintenance

7.1.1 General Maintenance Advices

For external cleaning you use please a cotton cloth dampened with clear water. Do not use any aggressive or abrasive detergents.

Warning: Mains voltage
The instrument contains inside voltage carrying components. Do not introduce any objects into the openings of the instrument. Keep the instrument dry. Do not open the instrument.

7.2 Troubleshooting

7.2.1 Trouble Indication and Error Messages

A malfunction within the DISPLAY ONE is shown by an error message on the display (☞🕮 Table 9, page 18).

Error (Display)	Cause and Remedy
S-Err	Sensor error. Malfunction in the connection to the transmitter. This message will only be displayed on the display of the measuring channel.
Err Hi	Significantly above the measurement range. Replace the transmitter.
Err Lo	Significantly below the measurement range. Replace the transmitter.

Table 9 – Error Messages

7.2.2 Help in Case of Malfunctions

If the malfunction persists even after having replaced the transmitter, please get in touch with your nearest Oerlikon Leybold Vacuum GmbH Service Centre.

7.2.3 Exchange of fuses

Use for the exchange of defective device fuses exclusively the fuse type T1.6A H indicated on the rear site of controller. The both device fuses you can find in the fuse holder of mains connection (☞🕮 Figure 3, page 12), which can be pried off with a small screwdriver.

7.2.4 Repair

Defective products must be sent to your nearest Oerlikon Leybold Vacuum Service Centre for repair. The Oerlikon Leybold Vacuum GmbH cannot assume any responsibility or warranty if the operator or third persons do repair work on the DISPLAY ONE.

8. Shelving and Waste Disposal

8.1 Packaging

Please keep the original packaging. You will need this packaging in case of storing the DISPLAY ONE or shipping to the Oerlikon Leybold Vacuum GmbH.

8.2 Shelving

The DISPLAY ONE must only be stored in dry room. During storage, the following ambient conditions need to be maintained:

- Ambient temperature: -20...+60 °C
- Humidity of the air: As low as possible.
  Preferably in a sealed plastic bag with desiccant.

8.3 Waste Disposal

Regarding waste disposal the branch specific and local waste disposal and environment protection regulation for systems and electronics components are valid.
In case of return Oerlikon Leybold Vacuum GmbH will execute the professional resource separation and disposal.

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CE

EC Declaration of Conformity

We, Oerlikon Leybold Vacuum GmbH, hereby declare 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.

Designation of the products:	**DISPLAY ONE**
Model:	**Single Channel Vacuum Display**
Part-No:	**230001, 235001**

The product complies to the following European Council Directives:

- Directive 2006/95/EC related to electrical equipment designed for use within certain voltage limits
- Directive 2004/108/EC relating to electromagnetic compatibility

Related, harmonized standards:

• EN 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use
• EN 61000-6-2	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
• EN 61000-6-3	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

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Safety information
on contamination of compressors, vacuum pumps and components.

Scope

Every employer (user) is held responsible for the health and safety of his employees. This also applies to service personnel performing maintenance work either at the premises of the user or the service company in charge.

By means of the declaration attached the contractor is to be informed about any possible contamination of the compressor, vacuum pump or component sent in for servicing. Based on this information the contractor will be able to take the necessary safety precautions.

Preparation before dispatch

Before shipping any parts, the user must complete the following declaration and add it to the dispatch papers. All dispatch instructions laid down in the manual must be followed e.g.:

- Drain all service fluids
- Remove filter elements
- Seal all openings airtight
- Pack / handle appropriately
- Attach the declaration of contamination **outside** of the packaging

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Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, vacuum 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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