

GRAPHIX ONE GRAPHIX TWO GRAPHIX THREE

Vacuum Gauge Controller

Operation Manual GA300553102_002_C2

Catalog No.

230680V01
230681V01
230682V01



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1. Legal Notices

1.1 Validity

The GRAPHIX controller is available in three different versions which differ as to their number of measurement channels, power consumption and weight. These Brief Instructions apply to all three versions. A label is located on the left-hand side of the instrument. When communicating with the Leybold GmbH, the information given on this label is important.

Item No.	Product	Version	Serial No.	Label
230680V01	GRAPHIX ONE Controller Single channel measuring instrument for active vacuum sensors	1.11.00 et seq.	1 et seq.	
230681V01	GRAPHIX TWO Controller Two channel measuring instrument for active vacuum sensors	1.11.00 et seq.	1 et seq.	
230682V01	GRAPHIX THREE Controller Three channel measuring instrument for active vacuum sensors	1.11.00 et seq.	1 et seq.	

Table 1 –Validity

1.2 Conforming Utilisation

The GRAPHIX controller is a display and operating unit with a graphic user interface for sensors with an analogue or digital interface of the company Leybold GmbH or from other manufacturers. Depending on the version, the unit offers one or several channels and is used in combination with sensors from the series THERMOVAC, IONIVAC, PENNINGVAC and CERA VAC as well as DU sensors for the measurement of pressures above and below atmospheric pressures (vacuum). It is also possible to use sensors made by other manufacturers by entering a variable analogue logarithmic or analogue linear characteristic ranging from 0 to 10 Volt. Operate all connected sensors in agreement with the information given in the corresponding Operating Instructions.

The following sensors can be operated with the GRAPHIX controller:

Sensor	Type	Display
THERMOVAC	TTR81N TTR90 / TTR91 / TTR91N TTR96S / TTR96SN TTR211 / TTR216S TTR911 / TTR911N TTR916 / TTR916N	TTR... (TTR?)
	TTR911N (RS232)	TTR911_D
THERMOVAC	TTR100 / TTR100S2 TTR101 / TTR101N TTR101S2 / TTR101S2N	TTR... (TTR10X)
	TTR101N (RS232)	TTR101N_D
	TTR200N (RS232)	TTR200N

Sensor (continued)	Type	Display
IONIVAC	ITR90 / ITR90N ITR200S / ITR200SN ITR200SL / ITR200SLN	ITR...
PENNINGVAC	PTR81N PTR225 / PTR225N PTR225S / PTR225SN PTR237 / PTR237N	PTR... (PTR?)
	PTR225N (RS232)	PTR225N_D
PENNINGVAC	PTR82N PTR90 / PTR90N	PTR... (PTR90?)
	PTR90N (RS232)	PTR90N_D
	PTR200N (RS232)	PTR200N
CERAVAC	CTR90 / CTR91 CTR100 / CTR100N CTR101 / CTR101N	CTR... (CTR?)
DU sensor	DU200 / DU201 DU2000 / DU2001	DU...
DU relative pressure sensor	DU2001 rel.	DUrel
Further sensors	Corresponding to characteristics	CUSTOM

Table 2 – Approved sensors



NOTICE:

Based on the technical data please check first whether your measuring instrument suits your kind of application.

1.3 Responsibility and Warranty

Leybold GmbH will not assume any responsibility or warranty in case the operator or third persons

- do not observe the information given in this document.
- do not use the product as intended.
- modify the product in any way (conversions, repair work etc).
- operate the product with accessories not listed in the corresponding product documentation.

Subject to technical alterations without prior notice. The figures are not binding.

1.4 Shipping Damage

- Examine the shipping package as to any external damage
- In case any damage is determined file a damage report to the forwarding agent and the insurer
- Retain the packaging material since damages can only be claimed when returning the instrument in the original packaging of the manufacturer
- Examine the delivery to ensure that it is complete
- Examine the instrument as to any visually apparent damage



DANGER: Damaged Product.

Commissioning or operating a damaged product is dangerous to life.

2. Safety

2.1 General Information

The GRAPHIX is supplied ready for immediate operation. These Operating Instructions shall assist you during commissioning of the instrument. For further informations please refer to the detailed Operating Instructions on the supplied USB stick.

2.2 Key to Symbols

Important instructions relating to technical safety and safe operation are emphasised by symbols.



DANGER or WARNING:

Information designed to prevent any kind of injury to persons.



DANGER:

Information designed to prevent injury to persons and damage to equipment in connection with electricity.



NOTICE:

General information pointing to further information, respectively reference sections.

2.3 Basic Safety Information

- During all work like installation, maintenance and repair activities, comply with the pertinent safety regulations.



DANGER: Mains Voltage

Coming into contact with components at mains voltage level within the instrument can be dangerous to life when inserting objects or allowing liquids to enter the instrument



WARNING: Improper Utilisation

Improper utilisation of the instrument can damage it. For this reason operate, respectively use the instrument only in agreement with the manufacturer's specifications.



WARNING: Wrong Connection and Operating Data.

Wrong connection and operating data can damage the instrument. Comply with all specified connection and operating data.

3. Installation

3.1 Mechanical Installation

The GRAPHIX CONTROLLER can be used as follows:

- Rack installation
- Front panel cut-out installation
- Benchtop instrument



WARNING: Powering down

Install the instrument or place it so that you are in a position to operate the mains power switch at any time or to ensure that the instrument can be deenergised at any time.

3.2 Connections

Figure 1, page 7 depicts the connection options on the rear of the GRAPHIX controller.

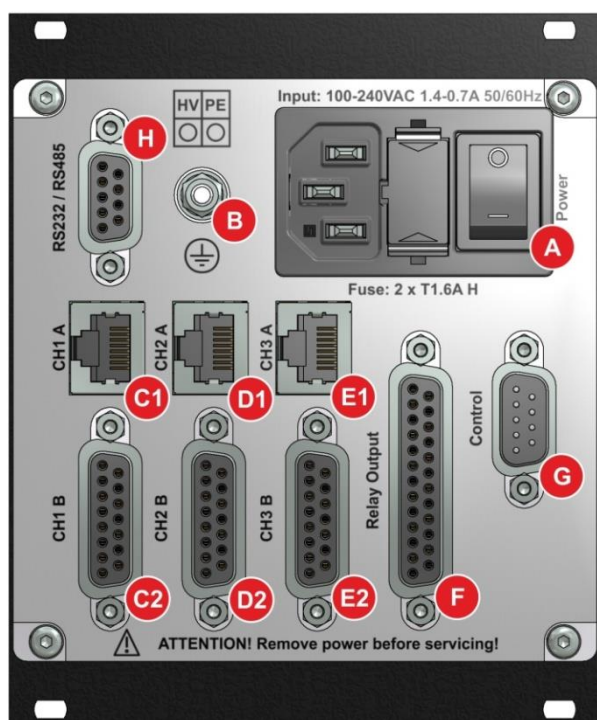


Figure 1 – Rear of the instrument

- A Mains power connection with mains switch and instrument fuses
- B Earth connection
- C1/C2 Connection of measurement channel 1 for sensors (CH1 A und CH1 B)
- D1/D2 Connection of measurement channel 2 (for GRAPHIX TWO and THREE only) for sensors (CH2 A and CH2 B)
- E1/E2 Connection of measurement channel 3 (for GRAPHIX THREE only) for sensors (CH3 A and CH3 B)
- F Relay output connection (Relay Output)
- G Analogue output, chart recorder output and external control connection (Control)
- H RS232 or RS485 interface connection (RS232 / RS485)



CAUTION: Impermissible Sensors.

Connecting sensors which have not been designed to be operated in connection with the GRAPHIX controller or which do not comply with current EMC guidelines can impair operation of the instrument or even damage it. Always operate the GRAPHIX controller with approved sensors. Chapter 1.2 – Conforming Utilisation, page 4.



CAUTION: Multiple Sensors.

Only a single sensor may be connected to each measurement channel. Otherwise the connected sensors will suffer damage. Connect to each measurement channel precisely one sensor only.

4. Operation

4.1 Switching ON and Switching OFF

- Switch the instrument on through its main switch.

After switching on, the GRAPHIX controller will run the following:

- Display of the start screen with the version number
 - Re-establishing of the most recently setup parameters
 - Identification of the connected measuring instruments
 - Enabling of the measurement mode with measurement display mode Normal, Big or Chart (depending on the most recent setting)
- Switch the instrument off through its main switch.



CAUTION: Waiting Time

Wait for at least five seconds before switching the instrument on again.

4.2 Display

The GRAPHIX controller makes different display modes possible. You may select between the following display modes:

Normal

Default display mode, which provides all important information on the connected sensors.

Chart

Graphic display of the pressure history of the connected sensors. Besides the pressure history, also the measured values for the individual channels are displayed.

Big

The display is limited to displaying the measured values of the connected sensors using a large font.

Speedo

Pressure reading for the connected sensor of one selected channel is in the shape of a speedometer. The mantissa is displayed as a round progress, whereas the exponent is displayed centrally.

Leak Test

Display mode for the Leak Test function. Besides the leak rate, current pressure, total time and remaining time are displayed.

The selection is made using the channel menu button  or the parameter Display Mode in the parameter group Display of the main menu.

4.3 Controls

The GRAPHIX controller is operated through the buttons displayed through the graphic TFT touch display. Since this is a resistive type of touchpanel, entries are possible even when using gloves.

Main Menu Buttons

Pressing the touchscreen for a duration of approximately 1 second displays the main menu (👉📖 Figure 2 and Figure 3, page 9). You can also use the display mode selection window. Here you may access different parameters and instrument functions. These have been arranged by way of parameter groups within which you can view or change the corresponding parameters or enable functions. In this way you may configure your GRAPHIX controller and also utilise further functions offered by the instrument.

Channel Menu Buttons

Briefly touching the desired channel invokes the channel menu (👉📖 Figure 4, page 9) of the respective channel. Here you can control the sensor connected to the respective channel. The available setup options depend on the connected type of sensor. Moreover, you can change in the channel menu the display mode from measured values to graphic.



Figure 2 – Main Menu 1/2



Figure 3 – Main Menu 2/2



Figure 4 – Channel Menu (example)

- To select, tap the centre of the buttons or symbols.



NOTICE:

The touchscreen is capable of processing only one input signal at a time. It is not permissible to simultaneously tap the touchscreen at several points since then no defined control will be possible.

4.4 Symbols

4.4.1 Symbols for the Controls

Symbol	Designation	Explanation
	Next	Next menu page
	Previous	Previous menu page
	Up	Scroll upward in the selection list
	Down	Scroll downward in the selection list
	Return	Return to the previous display
OK	OK	Accept / confirm
	Configuration	Start the main menu
	Display Mode	Change display mode
	Normal	Enabling display mode Normal
	Big	Enabling display mode Big
	Chart	Enabling display mode Chart
	Leak Test	Enabling display mode Leak Test
	Speedo Channel 1	Enabling display mode Speedo for channel 1
	Speedo Channel 2	Enabling display mode Speedo for channel 2
	Speedo Channel 3	Enabling display mode Speedo for channel 3
	Scale up	Zoom out time scale
	Scale down	Zoom in time scale
	Start	Start a function
	Stop	Stop a function
	HV On	Switch high vacuum sensor ON
	HV Off	Switch high vacuum sensor OFF
	HV On/Off n.a.	It is not possible to turn on or off the high vacuum measurement circuit manually because of parameter settings.
	Degas On	Switch degas ON
	Degas Off	Switch degas OFF
	Help	Start help for current function or operation of the instrument

Table 3 – Symbols for the controls

4.4.2 Symbols for the Language Selection

Symbol	Designation	Explanation
	Language selection	Start language selection menu
	English	Select menu language EN (English)
	German	Select menu language DE (German)
	Chinese	Select menu language CN (Chinese)
	French	Select menu language FR (French)
	Italian	Select menu language IT (Italian)
	Japanese	Select menu language JP (Japanese)
	Spanish	Select menu language ES (Spanish)
	Korean	Select menu language KN (Korean)
	Russian	Select menu language RU (Russian)
	Polish	Select menu language PL (Polish)
	Turkish	Select menu language TR (Turkish)

Table 4 – Symbols for language selection

4.4.3 Status and Warning Symbols

Symbol	Designation	Explanation
	Status Calibration Factor	Gas type correction factor differs from 1
	Status Offset	Offset differs from 0
	Status HV On	PENNINGVAC sensor is ON
	Status HV 1 On	Filament 1 of the IONIVAC sensor is ON
	Status HV 2 On	Filament 2 of the IONIVAC sensor is ON
	Status Degas	Degassing is active
	Notice	Sensor status indicates “Notice”
	Error	Sensor status indicates “Error”
	SP Off	Switching threshold disabled (pressure high)
	SP On	Switching threshold enabled (pressure low)

Table 5 – Status indicating and warning symbols

4.5 Measuring Mode

The measuring mode is the standard mode of operation. Here the measured values of the sensors in the display modes Normal, Big or Chart are shown. Additionally status messages (🔑📖 Table 6, page 12) and/or error messages (🔑📖 Table 7, page 16) can be displayed.

Display	Description
....	No sensor connected.
FS?	Full Scale? Connected analogue CERAVAC sensor has not been specified. Make a selection, in order to specify the sensor.
S-OFF	High vacuum measurement circuit of the PENNINGVAC sensors PTR81N, PTR225, TR225N, PTR225S, PTR225SN, PTR237 or PTR237N has been switched off.
Measuring value	Connected sensor is identified and in specified measuring range.
Measuring value and additional warning symbol  in the display mode Normal and Speedo or Measuring value displayed by a yellow font in the display modes Chart, Big and Leak Test as well as for the other channels in the display mode Speedo	Description depends on the connected sensor: • Pirani adjustment of the connected IONIVAC sensor of ITR90 series is insufficient. • Filament 1 of the connected IONIVAC sensor of ITR200 series is defective. • Connected CERAVAC sensor of CTR101 series is in the heating phase.

Table 6 – Status messages measured values display

After switching on, the GRAPHIX controller will automatically resume the last measurement display mode, which was selected. When running the main menu and not making an entry for more than 60 seconds, then the instrument will revert back to the measured values display.

5. Maintenance and Service

5.1 Maintenance

The GRAPHIX controller does not require any special maintenance work.

5.2 Configuration

With the help of this parameter group they have the possibility of securing and of restoring your system parameters. In addition a suitable memory at the USB interface must be. Further resetting of the system parameters is possible on factory-installed settings.

5.2.1 Save Data

To save the configuration parameters of your GRAPHIX controller proceed as follows:

- Connect the USB stick with the USB socket at the front side of the equipment.
- In the measurement mode, tap the touchscreen for approximately 1 second.
 - The main menu with an overview of the parameter groups is displayed.
- To scroll, use the button .
- On the next page, main menu page 2/2 is displayed. The current page number is displayed in the upper section of the display.
- In the main menu 2/2, tap on the parameter group Configuration.
- In the parameter group Configuration, tap on the button **Save Data**.
 - The rest process starts.
 - On the memory at the USB interface the folder RECOVERY is installed.
 - Configuration data are stored in a file with the format rescue.txt on the USB stick in the folder RECOVERY.
 - After the reset process has been completed the instrument will automatically restart with the default parameters.
 - The GRAPHIX controller will now be ready for operation again.
- When not wanting to run the reset, tap the button  to cancel the reset process.
 - The main menu is then displayed again.

5.2.2 Restore Data

To restore the saved configuration parameters secured on an USB stick in the listing RECOVERY in the file rescue.txt proceed as follows:

- Connect the USB stick with the USB socket at the front side of the equipment.
- In the measurement mode, tap the touchscreen for approximately 1 second.
 - The main menu with an overview of the parameter groups is displayed.
- To scroll, use the button .
- On the next page, main menu page 2/2 is displayed. The current page number is displayed in the upper section of the display.
- In the main menu 2/2, tap on the parameter group Configuration.
- In the parameter group Configuration, tap on the button **Restore Data**.
 - The question „Are you sure?“ is displayed to ensure that you really want to run the reset.
- When not wanting to run the reset, tap the button  to cancel the reset process.
 - The main menu is then displayed again.
- To run the process, tap the button **Restore now**.
 - The rest process starts.
 - After the reset process has been completed the instrument will automatically restart with the default parameters.

5.2.3 Factory Setup

Use it this function, in order to put the equipment back to default parameters.



NOTICE:

Any parameters, which you have set up, will no longer be available after the reset. Therefore before updating save the parameters you have specifically set up (→ Chapter 5.2.1 Save Data, page 13).

To reset your GRAPHIX controller proceed as follows:

- In the measurement mode, tap the touchscreen for approximately 1 second.
 - The main menu with an overview of the parameter groups is displayed.
- To scroll, use the button .
- On the next page, main menu page 2/2 is displayed. The current page number is displayed in the upper section of the display.
- In the main menu 2/2, tap on the parameter group Configuration.
- In the parameter group Configuration, tap on the button **Factory Setup**.
 - The question „Are you sure?” is displayed to ensure that you really want to run the reset.
- When not wanting to run the reset, tap the button  to cancel the reset process.
 - The main menu is then displayed again.
- To run the update, tap the button **Reset now**.
 - The rest process starts.
 - After the reset process has been completed the instrument will automatically restart with the default parameters.
 - The GRAPHIX controller will now be ready for operation again.

5.3 Update Function

Should your GRAPHIX controller require a more current firmware, for example, in order to utilise new functions or sensors, please contact your next service office of Leybold GmbH or inform yourself through the Leybold homepage.

5.3.1 Preparations

The firmware for the GRAPHIX controller is made available by way of a compressed *.zip file on the Leybold homepage.

- Unpack the file to the root directory of a suitable USB stick.
- Connect the USB stick to the USB socket provided for it on the front side of the instrument.

5.3.2 Updating

To update your GRAPHIX controller proceed as follows:

- In the measurement mode, tap the touchscreen for approximately 1 second.
 - The main menu with an overview of the parameter groups is displayed.
- To scroll, use the button .
- On the next page, main menu page 2/2 is displayed. The current page number is displayed in the upper section of the display.
- In the main menu 2/2, tap on the parameter group Update.
- In the parameter group Update, tap on the button **Start update**.
 - The question „Are you sure?“ is displayed to ensure that you really want to run the update.
- When not wanting to run the update, tap the button  to cancel the update process.
 - The main menu is then displayed again.
- To run the update, tap the button **Start update**.
 - On the memory at the USB interface is installed the folder RECOVERY.
 - Configuration data are stored in a file with the format rescue.txt on the USB memory in the folder RECOVERY.
 - The update process starts.
 - After the update process has been completed the instrument will automatically restart.
 - The GRAPHIX controller will now be ready for operation again.



NOTICE:

Wait for the instrument to restart automatically after the update process has run. While the update process is running do not switch the instrument off. Avoid an interruption of the voltage supply of the system. Avoid powering down the instrument while updating is in progress.

After having run the update, all parameter settings will have been reset to their factory defaults. Restore configuration data stored automatically with the update procedure (  Chapter 5.2.2 Restore Data, page 13).

6. Troubleshooting

6.1 Indication of Errors

A malfunction in the GRAPHIX Controller is displayed by an error message on the screen or issued by an error number via the serial interface. Additionally, an entry is made into the error memory list, from which the 20 most recently registered errors can be displayed on the screen (🔗📖 Chapter 6.2 Error Log, page 17) as well as read out via serial interface. The following tables give a survey on all recognisable sensor errors (🔗📖 Table 7, page 16) and device errors (🔗📖 Table 8, page 17).

6.1.1 Sensor Errors

Error description (Error Log)	Display (TFT display)	Error number (Interface)	Cause and remedy
no error	Measuring value	0	Attached sensor is recognized and in the specified measuring range.
Sensor-ID short circuit		1	Error in the electric circuit of sensor identification.
Sensor-ID unknown or not available		2	Identification resistor of sensor identification unknown or missing.
No sensor signal	Error-S ¹	3	Fault affecting the connection to the sensor. The message will only be displayed in the display field of the affected measurement channel. Acknowledge this message by selecting and terminating the channel menu at the corresponding channel.
Analog sensor signal out of range - too high	Error-H ¹	4	The measurement signal from the sensor is significantly above the permissible range.
Analog sensor signal out of range - too low	Error-L ¹	5	The measurement signal from the sensor is significantly below the permissible range.
Communication error digital sensor signal	Error-00 ¹	6	Communication error. Failure in the data transfer to IONIVAC sensors of ITR90, ITR200 and CTR-N series.
Error electronic/EEPROM	Error-40 ¹	7	Electronics/EEPROM error with IONIVAC sensors of ITR200 series.
Error pirani	Error-04 ²	8	Pirani error with IONIVAC sensors of ITR90 series.
Both filaments broken	Error-10 ¹	9	Hot cathode error (both filaments defectively) with IONIVAC sensors of ITR200 series.
One filament broken	Error-20 ²	10	Hot cathode error (filament 1 defectively) with IONIVAC sensors of ITR200 series.
Error pirani	Error-90 ¹	11	Pirani error with IONIVAC sensors of ITR90 series.
Pirani adjustment out of range	Error-50 ²	12	Pirani adjustment deficient with IONIVAC sensors of ITR90 series.
Error ion gauge	Error-80 ¹	13	Hot cathode error (filament defectively) with IONIVAC sensors of ITR90 series.

Table 7 – Sensor errors

¹ In addition to display of the error in place of the measured value, the warning symbol  blinks in display modes Normal or Speedo. The error message is displayed in red font for the display modes Chart, Big and Leak Test as well as for the other channels in display mode Speedo. The error signal relay toggles according to the settings.

² In addition to the measured value, the warning symbol  glows in display modes Normal or Speedo. The error message is displayed in yellow font for the display modes Chart, Big and Leak Test as well as for the other channels in display mode Speedo.

6.1.2 System Errors

Error description (Error Log)	Display (TFT display)	Error number (Interface)	Cause and remedy
no error	none	0	System works error-free.
Error usb file open	none	1	File on USB stick cannot be opened. Check the attached USB memory stick.
Error usb folder open	none	2	Folder on USB stick cannot be opened. Check the attached USB memory stick.
Error usb file closing	none	3	File on USB stick cannot be stored. Check the attached USB memory stick.
Error usb write	none	4	USB stick not recordably. Check the attached USB memory stick.
Error usb read	none	5	USB stick not readably. Check the attached USB memory stick.
Error read eeprom	none	6	EEPROM of the equipment not readably. Contact your next Leybold GmbH service office.
Error write eeprom	none	7	EEPROM of system not recordably. Contact your next Leybold GmbH service office.
Error init eeprom	none	8	EEPROM error of system. Contact your next Leybold GmbH service office.

Table 8 – System errors

6.2 Error Log

The GRAPHIX Controller stores the errors recognized by the system. They have the possibility of being able to be been noticeable the last 20 errors. Important information on the display area is represented (  Fig. 5, page 17).

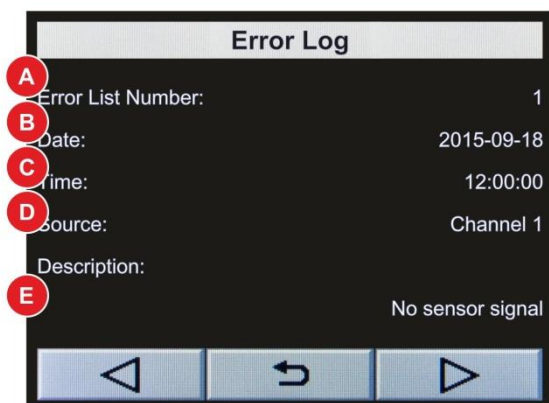


Fig. 5 – Error log

- A Error number 1 – 20
(1 = freshest error)
- B Date of displayed error
- C Time of displayed error
- D Error source:
Channel 1 = Sensor error at channel 1
Channel 2 = Sensor error at channel 2
Channel 3 = Sensor error at channel 3
Device = System error
- E Error description
(  Table 7, page 16 and Table 8, page 17)

To select the error log of your GRAPHIX controller proceed as follows:

- In the measurement mode, tap the touchscreen for approximately 1 second.
 - The main menu with an overview of the parameter groups is displayed.
- To scroll, use the button .
- On the next page, main menu page 2/2 is displayed. The current page number is displayed in the upper section of the display.
- In the main menu 2/2, tap on the parameter group Error Log.
 - The display with error number 1 (last error) is opened.
- To select from the list, use the buttons  and  or enter the value for the desired sensor directly.
 - The in each case selected value is displayed with a green background.
- To save, tap the button .
- The setup value is saved.
- To exit, tap the button .
- The parameter selection display is displayed again.

6.3 Help in Case of Malfunctions

If the malfunction persists even after having exchanged the sensor or there is an error, which you cannot do according to the specifications in Table 7, page 16 or Table 8, page 17, please contact your next Leybold service office.

6.4 Replacing the Built-in Fuses

To replace blown instrument fuses use only the type of fuse 1.6 A H as printed on the rear of the instrument. The two instrument fuses are located in the fuse insert at the mains filter (  Figure 1, page 7). The fuse insert can be prised out with a small screwdriver.

6.5 Repair

Send any defective products for repair to the next Leybold service office. The Leybold GmbH will not assume any responsibility or warranty in case of repair work done by the operator or third persons on the GRAPHIX controller.

7. Storing and Waste Disposal

7.1 Packaging

Please retain the original packaging. You will need this packaging when storing your GRAPHIX controller or shipping it back to Leybold GmbH.

7.2 Shelving

The multichannel gauge 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.

7.3 Waste Disposal

As to waste disposal of the instrument, the branch specific and local waste disposal and environmental regulations for systems and electronic components apply.

When returning the instrument, proper waste separation and waste disposal is ensured by Leybold GmbH.

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