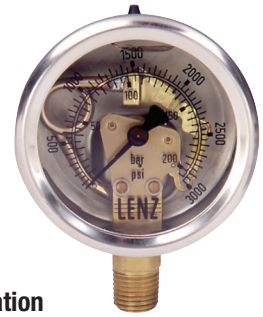
LENZ
Fluid Power Specialist

Installation and Operating Instructions
for Mechanical Pressure Gauges

Pressure range selection
To insure proper operation and long service life, the proper pressure range should be selected. For applications with constant, steady pressure, the measured pressure should be no more than 75% of the full scale range of the gauge. For applications with fluctuating pressure, the measured pressure should be no more than two-thirds of the full scale range of the gauge.

In general, it is best to choose a range that is roughly 2X the average measured pressure. This gives good over pressure protection and the highest accuracy.



Installation

The pressure gauge should be installed where exposure to heat and vibration are minimal and where the dial can be easily read. It is also important to install the gauge in a location with undisturbed and continuous flow of the pressure medium.

It is recommended that an isolating device, such as a needle valve or gauge cock, be installed between the process and the pressure gauges. This allows the gauge to be taken out of service without interruption of the process.

Connections with tapered threads, such as NPT, should be sealed by using PTFE tape (or an equivalent sealing compound) on the thread. SAE threads such as 7/16”-20 should be sealed by using the appropriate sealing washer.

The gauge should be tightened and loosened using the wrench flats on the gauge socket. Never grasp the case to thread the gauge into the pressure system fitting. Doing so may cause irreparable damage to the gauge.

For pressure gauges with flanged connections, care must be taken not to accidentally loosen the bolts that hold the upper and lower housings together.

A pressure gauge should never be removed when it is pressurized. Make sure the pressure system has been fully vented prior to removing a gauge.

Residues from the pressure medium may remain inside the pressure gauge after it has been removed from service. If these residues are hazardous or toxic, take the necessary precautions when handling and storing used gauges.

Isolating devices

The isolating device may be either a pressure gauge cock or a needle valve, depending on operating conditions and requirements.

Gauge Isolators (GV-4)
Gauge Isolators have two positions:

- OFF — The pressure medium is blocked and the pressure gauge system is open to the atmosphere.
- ON — The pressure gauge is open to the pressure medium.

Needle valves (GV-4N)

Needle valves also isolate the pressure gauge from the pressure medium, but they usually do not have any venting capabilities. Needle valves do have the advantage of restricting the flow of the pressure into the gauge which helps reduce damage by pressure spikes.

Mounting options

If the pressure system or tee-extension cannot support the weight of the instrument, then surface or wall mounting brackets or mounting flanges (front flange or rear flange) should be used.

Vibration protection
If the pressure gauge is exposed to vibration or pulsating pressure or both, then a liquid filled pressure gauge is recommended. The liquid dampens the effects of vibration making the pointer easier to read.

Temperature limits
The pressure gauge should not be used outside of its rated temperature limits as noted on the TB.PG01.708 Data Sheet specific to that gauge. At temperatures above or below these limits, the gauge accuracy will be significantly reduced and the possibility of gauge failure may exist.

Overpressure limits
LENZ gauges are generally designed to withstand up to a 130% overpressure without damage to the pressure system. For applications with overpressure spikes, a snubber or restrictor should be used. Snubbers and restrictors reduce the inlet size of the pressure gauge which causes the pressure to increase or decrease more slowly into the gauge. For applications with periods of constant overpressure, an overpressure protector should be used. The overpressure protector isolates the gauge when the pressure reaches a preset pressure value.

Pressure gauges in service

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Always open isolating devices slowly. Opening them too fast may generate sudden pressure surges that could damage the gauge.

Calibration can be confirmed in larger diameter gauges (≥ 4") by checking the position of the zero point. To do so, close the isolating device and vent the gauge to zero pressure. The pointer must over the zero box . Unless the gauge temperature is significantly higher or lower than 68°F (20°C), a pointer not returning to zero may indicate that the gauge has been seriously damaged.

Storage
The pressure gauge should remain in its original packing until installation. Storage temperature should not exceed -4°F (-20°C) or 140°F (60°C) unless specified otherwise. Consult the data sheet pertaining to the pressure gauge model. Pressure gauges removed from service should be protected from dust and humidity, preferably by using the original packing material. Residue from the pressure medium may remain in the gauge and is susceptible to temperature influences (i.e. freezing). This should be considered when storing the removed pressure gauge.

Pressure gauge safety

Pressure media such as:
- Oxygen
- Acetylene
- Flammable gases or liquids
- Toxic gases or liquids
- Steam
- Ammonia and other refrigerants

as well as portable or stationary pressure systems like:
- Air compressors
- Welding equipment
- Pressure vessels and boilers
- Life support equipment

may require pressure gauges that have been tested and/or certified to national standards and/or local safety codes. Your local LENZ representative will be able to assist you in selecting the proper gauge model.

Standards for Pressure Gauges
U.S. & Canadian Standards are set forth by The American Society of Mechanical Engineers, which publishes pressure gauge specifications in their document ASME B40.1. This document specifies standard pressure gauge types, sizes, materials, ranges, and accuracies. Copies of this standard can be purchased directly from ASME:

ASME
22 Law Drive, Box 2900
Fairfield, NJ 07007-2900
1-800-THE-ASME or (973) 882-1167
Fax: (973) 882-1717
E-mail: infocentral@asme.org

European Standards are developed and published by the European Committee for Standardization (CEN) and replace the individual standards formerly used in each European country (such as DIN standards in Germany). Copies of these standards can be obtained through:

Comité Européen de Normalisation (CEN)
Central Secretariat
rue de Stassart 36
B-1050 Brussels
Belgium

LGS GAUGE SNUBBER

GV-4N
NEEDLE VALVE

GV-4
GAUGE ISOLATOR

SIPHON

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Notes in accordance with Pressure Equipment Directive 97/23/EC

- The pressure gauges are “pressure accessories” in accordance with Article 1, Paragraph 2.1.4
- The volume of the pressure bearing housings of LENZ pressure gauges is < 0.1 L
- The pressure gauges carry CE marking for Fluid Group 1G in accordance with Annex 2, Table 1 when their permissible working pressure exceeds 200 bar

Pressure gauges that do not carry the CE mark are manufactured in accordance with Article 3, Paragraph 3 “Sound engineering practice”.

Applied standards

EN 837-1 Bourdon tube pressure gauges, dimensions, metrology, requirements and testing

EN 837-2 Selection and installation recommendations for pressure gauges

EN 837-3 Diaphragm and capsule pressure gauges, dimensions, metrology, requirements and testing

Subject to technical modifications.

Safety

WARNING!
Before installation, commissioning and operation, ensure that the appropriate pressure gauge has been selected in terms of measuring range, design and suitable wetted material (corrosion) for the specific measuring conditions. In order to guarantee the measuring accuracy and long-term stability specified, the corresponding load limits must be observed.

Only qualified persons authorised by the plant manager are permitted to install, maintain and service the pressure gauges.

For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, and refrigeration plants, compressors, etc., in addition to all standard regulations, the appropriate existing codes or regulations must also be followed.

After an external fire, pressure media can leak out, particularly at soft solder joints. All gauges must be checked and, if necessary, replaced before recommissioning the plant.

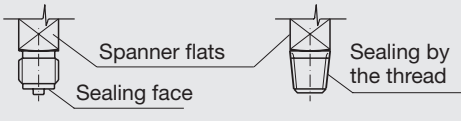
Non-observance of the respective regulations can result in serious injury and/or damage to equipment.

Mechanical connection

In accordance with the general technical regulations for pressure gauges (e.g. EN 837-2). When screwing the gauges in the force required for this must not be applied through the case or terminal box, rather only through the wrench flats provided for this purpose (using a suitable tool).

Mounting with Wrench

Correct sealing of pressure gauge connections with parallel threads must be made using suitable sealing rings, sealing washers or LENZ profile seals. The sealing of tapered threads (e.g. NPT threads) is made by providing the thread with additional sealing material such as, for example, PTFE tape (EN 837-2).



The torque depends on the seal used. Connecting the gauge using a clamp socket or a union nut is recommended, so that it is easier to orientate the gauge correctly. When a blow-out device is fitted to a pressure gauge, it must be protected against being blocked by debris and dirt. With safety pressure gauges (see dial symbol k) it must be ensured that the free space behind the blow-out back is at least 15 mm. After mounting, set the compensating valve (if available) from CLOSE to OPEN. With models 4 and 7, do not open the flange mounting screws.

Maintenance / Repairs

The instruments are maintenance-free. Checks should be carried out on a regular basis to ensure the measuring accuracy of the pressure gauge. The checks or recalitions must be carried out by qualified skilled personnel with the appropriate equipment

When dismounting, close the compensating valve (if available).

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