

# OPERATING INSTRUCTIONS



## REFRIGERATION PRESSURE GAUGES

Series FL30D / FH30D / FL70D / FH70D / F200D

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### 1 General information

Subject to technical modifications.  
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Before starting to use your pressure gauge, familiarise yourself with it, read this operational instruction carefully, and keep it for further reference. If this product is passed to a third party, this operational instruction should be passed on with it.

Precautionary statements	Meaning
WARNING!	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION!	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
Notice	Indicates hazards that could result in things other than personal injury, like property damage.

For more in-depth specifications, refer to the Data Sheets page at <http://www.jilgauges.com>.

### 2 Safety instructions

#### WARNING!

*Before installation, always double check the measuring range, design (housing and thread), and intended purpose of the selected pressure gauge.*

*To avoid serious injury to personnel and/or damage to equipment, all related regulations must be followed and enforced.*

- Make sure that the pressure gauge is suitable for the measurement of the process medium.
- Do not measure pressure that exceeds the limits of the selected pressure gauge.
- Always choose a pressure gauge based on the working pressure of the system the gauge is attached to. Usually the best approach is to select a gauge with a range around twice your system's normal working pressure.
- Third party spare parts and accessories may cause injury to personnel, or damage to equipment, thus use only approved spare parts and accessories supplied by the manufacturer.
- If hazardous media, such as oxygen, acetylene, flammable or toxic gases or liquids, and refrigeration plants, compressors, and so on are measured, follow the standards as well as all other appropriate existing related regulations.
- If flammable media is to be measured, all solder joints must be checked, and if required, replaced before installation/operation.
- Only authorised and qualified personnel is permitted to install, service and maintain pressure gauges.

### 3 Technical data

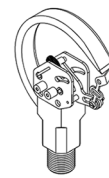
#### 3.1 Nominal sizes

- Model FL30D: NS 68 (2.5"), 80 (3.0"), 100 (4.0")
- Model FH30D: NS 68 (2.5"), 80 (3.0"), 100 (4.0")
- Model FL70D: NS 68 (2.5"), 80 (3.0"), 100 (4.0")
- Model FH70D: NS 68 (2.5"), 80 (3.0"), 100 (4.0")
- Model F200D: NS 63 (2.5")

Pressure gauges are designed according to EN 837-1.

### 3.2 Bourdon tube types

Pressure is measured by a C-shaped Bourdon tube that straightens out when pressurized.



C-shaped

C-shaped Bourdon tubes are good for measuring pressure under 100bar/1,500PSI/10,000kPa

### 3.3 Pressure limitation

- Constant pressure: 3/4 of full dial range
- Alternating, or pulsating pressure: 2/3 of full dial range
- Short time pressure: Full dial range

### 3.4 Temperature effect

Temperature changes largely influence the accuracy of the pressure gauge. The accuracy displayed on the dial face is based on tests carried out in a +20 °C (+68 °F) ambient temperature environment. Thus, if the system temperature deviates from the ambient reference temperature, based on EN 837-1, the following error rate is still acceptable:  
Max.  $\pm 0.04\%/K$  of full dial range

#### Notice:

*For maximum efficiency and accuracy, when installing the pressure gauge, make sure that the gauge can stay within its permissible temperature limits all the time. Observation may be required.*

### 3.5 Permissible temperatures

#### Ambient:

Models FL30D, FH30D, FL70D, FH70D, F200D:  
(dry) -40 ... +60 °C (-40 ... +140 °F)

#### Medium:

maximum +60 °C (+140 °F)

#### Notice:

*For maximum efficiency and accuracy, when installing the pressure gauge, make sure that the gauge can stay within its permissible temperature limits all the time. Observation may be required.*

### 3.6 Vibration effect

Pressure gauges are susceptible to vibrations, as it influences their accuracy and lifespan. Thus, if possible, install them away from any source of vibration (lead a flexible cable from the system to the gauge that is fixed on a separate, vibration-free holder).

In general, the limit that should not be exceeded:

Dry gauges: Frequency range < 150 Hz  
Acceleration < 0.7 g (7 m/s<sup>2</sup>)

### 3.7 Materials

#### 3.7.1 Wetted parts:

Models FL30D, FH30D, FL70D, FH70D, F200D: Copper alloy

#### 3.7.2 Movement:

Models FL30D, FH30D, FL70D, FH70D, F200D: Copper alloy

#### 3.7.3 Dial:

Aluminium

#### 3.7.4 Pointer:

Black finished aluminium

### 3.7.5 Housing and ring:

#### Model FL30D:

Blue colour steel (FLs30D), or plastic (FLp30D) housing and snap-in polycarbonate (PC) lens

#### Model FH30D:

Red colour steel (FHs30D), or plastic (FHp30D) housing and snap-in polycarbonate (PC) lens

#### Model FL70D:

Blue colour steel (FLs70D), or plastic (FLp70D) housing and twist-on polycarbonate (PC) lens

#### Model FH70D:

Red colour steel (FHs70D), or plastic (FHp70D) housing and twist-on polycarbonate (PC) lens

#### Model F201D:

AISI304 Stainless Steel housing and ring

### 3.7.6 Window:

Only for model F201D:

Polycarbonate (PC) (option: tempered glass)

## 4 Commissioning and operation

#### WARNING!

*Before installation, always double check the measuring range, design, and intended purpose of the selected pressure gauge.*

*During pressure testing, do not exceed the limits of the selected pressure gauge, as this may cause malfunctions, injury to personnel, or damages to the system or other equipment. It may also void the warranty.*

*The pressure gauge must only be installed, commissioned, and operated by qualified and trained personnel.*

#### CAUTION!

*Make sure that the thread type of the pressure gauge and the fitting of the system is compatible with each other. Although a BSPT male fits an NPT fitting, but it will not seal!*

*After the commissioning process, shut-off valves must be opened slowly.*

#### Notice:

*Do not expose the pressure gauge to direct sunlight during operation.*

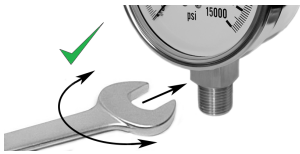
### 4.1 Mechanical connection

#### 4.1.1 Preparation

- Make sure that the system is not under pressure. Avoid pressure surges during installation at all cost.
- Make sure that at the intended position of the pressure gauge:
  - the gauge is not subjected to too much shock or vibration.
  - it can be read easily.
  - the gauge can stay within its operating temperature limits all the time.
  - nothing blocks the blow-out back/device (if applicable) and there is enough space (minimum 20mm) around the pressure gauge.
- If possible, install a shut-off valve, to simplify the disassembly/maintenance of the pressure gauge.

#### 4.1.2 Commissioning

The pressure gauge must be screwed in its place by an appropriate wrench. The force, required to secure the gauge in place, must be applied through the square shaft of the gauge connection and not through the housing. The applied force (torque) largely depends on the type of seal utilised.



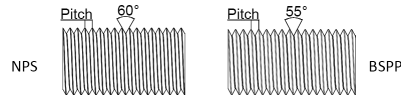
If possible, use a union (clamp socket) to fix the pressure gauge in its place, because this way, the orientation can be conveniently adjusted and if the need arises, the gauge can be quickly disconnected for maintenance or replacement.

##### CAUTION!

Make sure that the pressure connections are tight enough, before the pressure gauge is tested/used the first time.

##### 4.1.2.1 Parallel thread and sealing method

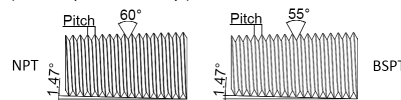
The thread shape of NPS and BSPP is straight (parallel). The main difference between the two is that NPS has a 60° included angle and Sellers thread form (flattened peaks and valleys), but BSPP has a 55° included angle and Whitworth thread form (rounded peaks and valleys).



In case of parallel threads, using an appropriate flat/profile gasket, or sealing ring is the easiest way to seal the sealing face.

##### 4.1.2.2 Tapered thread and sealing method

The thread shape of NPT and BSPT is tapered. The main difference between the two is that NPT has a 60° included angle and Sellers thread form (flattened peaks and valleys), but BSPT has a 55° included angle and Whitworth thread form (rounded peaks and valleys).



Apply PTFE tape or use paste sealant on the male thread only.

- Wrap the threads with the tape in a clockwise motion starting from the shaft. Leave the last thread exposed.
- Paste sealants are to be applied with a brush. Fill the threads with the paste completely.

##### Notice:

*If a stainless steel male connector is fitted with a stainless steel fitting, and it needs to be disassembled in the future, use a thread sealant that is designed for this kind of material.*

- For thread sizes 2" or less, both tape and paste can be used. The thread should be wrapped in four layers of tape.
- For thread sizes 2.5" and up, it is recommended to use paste sealants, but if tape is preferred to be used, wrap the thread in eight layers.

#### 4.2 Mounting position

If not otherwise indicated, pressure gauges with connectors on their bottom, centre back and lower back must be mounted in an upright position (as per EN 837-1).

#### 5 Transport, packaging and storage

##### 5.1 Transportation

Upon receipt, pressure gauges are to be checked for damages and/or faults caused by transportation. Faulty or damaged goods must be reported as soon as possible.

##### 5.2 Packaging

Leave the pressure gauge in its package until it needs to be mounted on a system. By keeping the packaging, during transportation, the pressure gauge will be properly protected from sudden impacts, or other kinds of hazards.

##### 5.3 Storage

Storage temperature: -30 ... +50 °C (-22 ... +122 °F)  
Do not expose the pressure gauge to direct sunlight or moist.

#### 6 Maintenance and cleaning

##### CAUTION!

*The pressure gauge must only be maintained and cleaned by qualified and trained personnel.*

*Do not make modifications or changes without the approval of the manufacturer, as this may cause malfunctions, injury to personnel, or damages to the system or other equipment. It may also void the warranty.*

##### 6.1 Maintenance

- In case of abnormal behaviour, direct or indirect damages, or any other faulty operation, repairs must be carried out by the manufacturer, or officially appointed, qualified personnel only.
- To ensure proper precision and accuracy, after purchase, the indicator is to be checked at least once a year. Disconnect the pressure gauge from the system and test it with a separate pressure testing device.
- Make sure to CLOSE the compensating valve (if there is any) before dismounting.

##### 6.2 Cleaning

- If the pressure gauge housing/connector, or its window gets dirty, clean them with a moist cloth. Do not use abrasive cleaning material to clean the gauge.
- If the pressure gauge needs to be returned for inspection or repair, clean the dismantled gauge with a moist cloth and remove any substance that may be dangerous to the personnel and the environment.

#### 7 Dismounting and disposal

##### CAUTION!

*The pressure gauge must only be dismantled and disposed by qualified and trained personnel.*

##### 7.1 Dismounting

Before dismantling, the system **must be depressurized**. Make sure to CLOSE the compensating valve (if there is any) before dismantling.

#### 7.2 Return

##### WARNING!

*If the pressure gauge needs to be returned for inspection or repair, remove any dangerous substances (solutions, acids, and so on) that may cause harm to the personnel and the environment.*

Pack the product in its original packaging, or similarly well protected box.

To provide adequate protection:

- Use anti-static plastic film to cover the whole pressure gauge.
- When you place the gauge into the packaging, fill the empty space with shock absorbent material.
- If available, enclose some moisture absorbing agent inside the packaging.
- Place a label on the packaging that reflects the sensitivity of the content.

##### 7.3 Disposal

It is the clear responsibility of every company or individual to ensure the safe and correct disposal of all wastes. Incorrect disposal may cause a hazard to the environment, thus dispose the product, its components, and packaging in accordance with the applicable laws and local regulations.