

# PRECISION

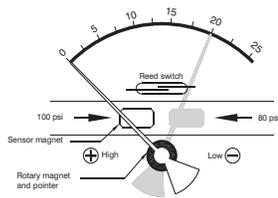
Differential Pressure Instruments



PRECISION Differential Pressure Instruments

## Selection Guide

### BASIC OPERATING PRINCIPLE



Accuracy of the instruments is +/- 2% of full scale. (Ascending)

High and Low pressures are separated by a sensor assembly consisting of a magnet, diaphragm and a range spring. The difference in pressure causes the assembly to move in proportion to the change against the range spring.

A rotary magnet, located in a separate body compartment and isolated from the acting pressures, is rotated by magnetic coupling as per the linear movement of the sensor assembly. A pointer attached to the rotary magnet indicates differential pressure on the dial.

**SWITCH :** Reed switches are located adjacent to the pressure chamber and are activated by the magnetic field.

### Applications

1. **Filtration monitoring:**  
This results in increased filter element sales and energy savings. This can be both hydraulic (including water), or gases (including air).
2. **Separator monitoring:**  
This is similar to filtration monitoring, except that it is specific to rotary air compressors to separate out oil from the clean air.
3. **Flow-rate display:**  
This uses a square root dial to measure flow through any restriction, such as an orifice, pitot tube, or existing system restriction, such as an elbow or reducer fitting.
4. **Flow balancing:**  
This uses a zero center gauge to monitor two systems to assure equal pressure.
5. **Liquid level:**  
Uses high and low pressures to read liquid level. Upper (low pressure) tap is normally in gas, and lower (high pressure) tap is in liquid.
6. **Heat exchanger safety:**  
Many heat exchangers use higher pressure on one side to ensure direction of leakage to be in fail safe mode.
7. **Clean room pressure monitoring:**  
Very low positive pressure is required in all clean rooms to control leakage to flow outwards.
8. **HVAC:**  
Differential Pressure instruments used in HVAC systems to monitor air filters.
9. **Spray booths and hoods :**  
Similar to HVAC, but to control direction of toxic gas flow.
10. **Pump output monitoring.**  
This can assure pump output levels or with a switch, indicate pump failure and shut down system.

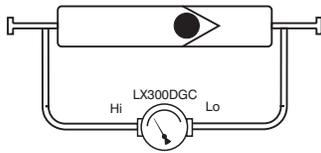
### Safety & Performance :

1. Magnetic coupling principle isolates the dial case from the pressure body.
2. Building Block concept allows wide range of materials of construction, dial size and range selection.
3. Measure differential pressure up to 1000 psid (70bar).
4. Automatically resets after line surges or cold starts, eliminates balancing of differential pressure instrument during such events.
5. The instrument is fully protected for over range up to the maximum static working pressure of the instrument from high side.

### Important Note:

1. Wetted parts of the instruments are body material, seals, Ceramic bonded magnet, range spring (302-SS) & Teflon in case of piston instrument and elastomer diaphragm material for diaphragm instruments.
2. Piston instruments are suitable to measure pressure drop across filter, strainers when fluid on both the sides of the instrument is similar, and minor migration of fluid is permissible. For dissimilar fluids or when fluid migration between the inputs is not advisable, diaphragm instruments are recommended.

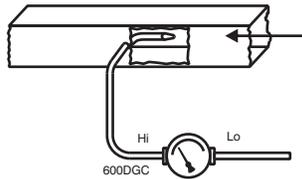
## Selection Guide



### Flow and flow direction

Reverse flow condition can be detected with the use of a differential pressure instrument. When differential pressure is measured across a restriction in the flow line, we can measure flow rate, in applications where change in direction of flow is to be detected. A center zero instrument can indicate flow direction as well as measure flow. If the fluid in the line is not flowing, the pointer will remain at zero position and will deflect in either direction depending on the direction of the flow. It also can be used with a switch.

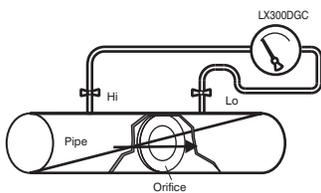
**Recommended model : LX300DGC/LX400 DGC, 300DGC/400DGC**



### Pressure monitoring

Diaphragm instruments can be used to measure static pressure with respect to atmosphere in air ducts. The static pressure tap has to be properly selected and positioned in order to get a correct reading. Factors like velocity, turbulence in duct, direction of flow, has to be considered.

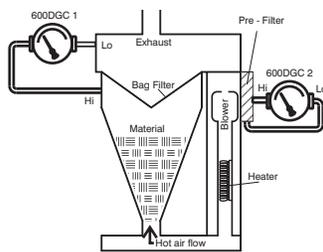
**Recommended model : 600DGC**



### Flow rate

Flow rate can be measured with a diaphragm instrument. If the diaphragm instrument is installed across a sharp edged orifice plate in a pipeline, the gauge can indicate flow rate with the help of data on pressure drop versus flow rate. Diaphragm instruments with 2 SPST switches can be used for high and low flow indications. The pressure tapping has to be at proper location in the line to avoid clogging due to moisture, dust etc. The location of the orifice also has to be as recommended by the orifice manufacturer.

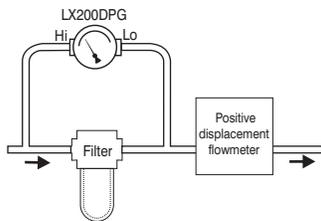
**Recommended model : 600DGC/LX300DGC/LX400DGC, 300DGC/400DGC**



### Air filter and collector/ bag filter monitoring

In pharmaceutical, food and chemical processes, small batches of compounds are to be dried. Dryers specially made for this purpose use hot dry air. Air is sucked from the room through filters and blown over heater coils. The blower forces this hot air through the compound to be dried. Part of the compound gets carried along with the air while being removed by an exhaust blower. A collector or bag filter is used to collect it. Magnetic™ instruments are used for pre-filter as well as collector filter to monitor clogging. Magnetic™ instrument with switch can start cleaning cycle of collector filter at preset differential pressure.

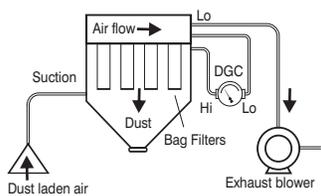
**Recommended model : LX400DGC, 400DGC, 600DGC**



### Strainer monitoring

Differential pressure instruments are used to monitor pressure drop across strainer used in line with positive displacement flow meters. Petroleum oil companies and chemical plants etc. use positive displacement flow meters to measure volume. Contaminated fluids can damage these expensive and critical flow meters. These meters need filtered fluids for proper functioning, so strainers are used. Positive displacement flow meter manufacturers specify maximum pressure drop across the meter including strainer to the buyer for designing the pumping system. If pressure drop across the strainer increases than specified, the pumping energy cost increases. Piston type differential pressure instruments therefore become ideal for this application.

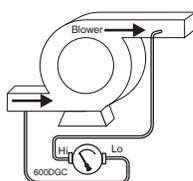
**Recommended model : LX200DPG, 200DPG**



### Collector / bag filter monitoring

Bag or collector filters are used in material handling equipment in many industries. Differential pressure instruments are used to measure pressure drop across these filters, which get choked during use. The operating range of these filters is typically between 50 to 150 mm of water. Initially the filter has a drop of around 50 mm (approx.) of water across them. During operation, the differential pressure across collector filter increases. Filter cleaning process is then started till the differential pressure falls to an acceptable level. In such applications, an instrument with a switch is very useful to initiate the cleaning cycle.

**Recommended model : LX400DGC, 400DGC, 600DGC**



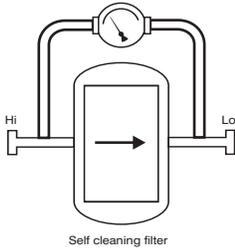
### Blower performance

Air flow through blower needs to be monitored depending on the down stream conditions and requirement of air, in order to have a energy efficient air handling system. Magnetic™ instrument can monitor differential pressure across the blower or the static pressure at the outlet of blower and give indications of low or high flow at preset pressure limits. This is useful for monitoring blower performance or controlling air flow.

**Note** - For static pressure measurement, connect high port of the instrument to the outlet of blower with low port open.

**Recommended model 600DGC**

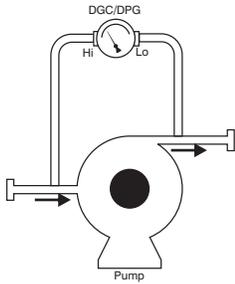
## Selection Guide



### Filter monitoring

Piston or diaphragm type differential pressure instrument with switch, compatible with fluid and measuring range are ideal for monitoring filter condition. The field adjustable switch initiates cleaning cycle in self-cleaning and back wash filters automatically at a preset differential pressure.

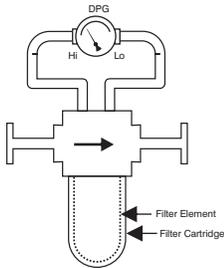
**Recommended model : LX200DPG, 200DPG**



### Pump performance

Diaphragm type differential pressure instrument can be used to monitor pump performance. Addition of switch is very useful to monitor pumps installed at remote locations. The malfunctioning of a pump or blockage in a pipeline will lead to increase or decrease in differential pressure. This change in differential pressure can be used to warn the operator for high or low settings.

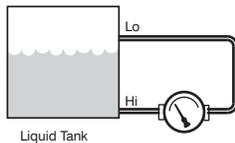
**Recommended model : LX300DGC/LX200DPG, 300DGC/200DPG**



### Filter monitoring

Piston type differential pressure instrument is the most suitable and economical solution to monitor clogging of filter elements used for various fluids. Its compact, sturdy and reliable design makes it ideal for this application. These differential pressure instruments are suitable for high to very high pressure applications. Using a differential pressure instrument across a filter will avoid premature or delayed replacement of filter element resulting in saving energy and reduced filter replacement cost.

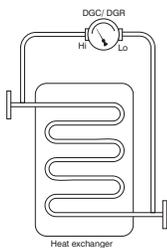
**Recommended model : LX200DPG, 200 DPG**



### Level measurement

Diaphragm instruments can be used as liquid level indicators. With high pressure port connected to a tapping at the bottom of tank and low port kept open to atmosphere as shown. Differential pressure instrument calibrated in units like mm, inches of water etc. can be used to measure liquid level as a function of head (differential pressure) which is specified by the user. If the tanks are closed or pressurised, the low pressure port can be connected to the top of the tank as shown in the figure. Regardless of the tank pressure, liquid inside will give similar head as in an open tank and the instrument will indicate level. To measure the correct level in open tanks, the instrument should be mounted at the bottom level of the tank.

**Recommended model : LX 300DGC/LX 400DGC, 300DGC/400DGC/600DGC**

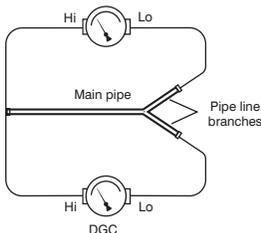


### Condition monitoring of heating or cooling system

Diaphragm type differential pressure instruments are used across heat exchangers to measure pressure difference in transformer oil cooling system. Here heat exchanger uses a higher pressure on one side to ensure direction of leakage and avoid mixing of water with oil. This is essential for safety of transformer. In transformer oil cooling systems, where oil is at a higher temperature is passed through heat exchanger with water as cooling medium. Instruments with a switch in such an application, provides a signal for alarm at a preset value of pressure differential.

Other than above, differential pressure gauge is also used to measure differential pressure across the heat exchanger where pressure drop increases due to scaling.

**Recommended model : LX300DGC/LX200DGR, 300DGC, 200DGR**

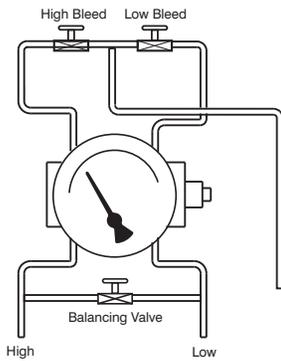


### Flow

Diaphragm type differential pressure instruments calibrated in flow units can be used to control or balance flow in branch piping system. The flow rates in the pipeline with branches can be controlled using valves.

**Recommended model : LX300DGC/LX400DGC, 300DGC/400DGC**

## Selection Guide



### Backflow prevention / portable differential pressure measuring kit.

Diaphragm type instrument Model 300 DGC with bottom and vent connection is used for checking differential pressure in the system and checking assemblies used for back flow prevention.

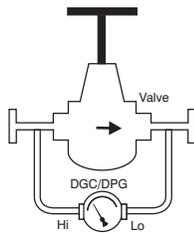
#### How to assemble a kit?

By using flexible hoses, valves and adaptors with this model with choice of various dials and materials, a portable test kit can be assembled. This compact kit is easy to carry for testing at site.

#### Other applications.

This portable kit can be also used to monitor differential pressure across flow elements like venturi, orifice, pitot tube, valves etc. Other popular applications are monitoring excessive pressure drop across equipment, flow balancing, monitoring strainers, filters, leak detection, pump performance, etc.

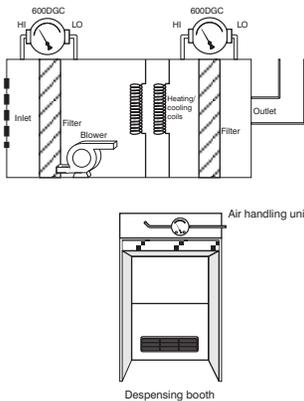
**Recommended model : LX300DGC, 300DGC**



### Flow

Flow rate adjustment is done with the help of valves in pipelines. Diaphragm, type differential pressure instruments selected as per service and range are used to control the flow rates. These gauges are also available with glycerine filling for pulsating flow conditions.

**Recommended model : LX200DPG/LX300DGC, 200DPG/300DGC**



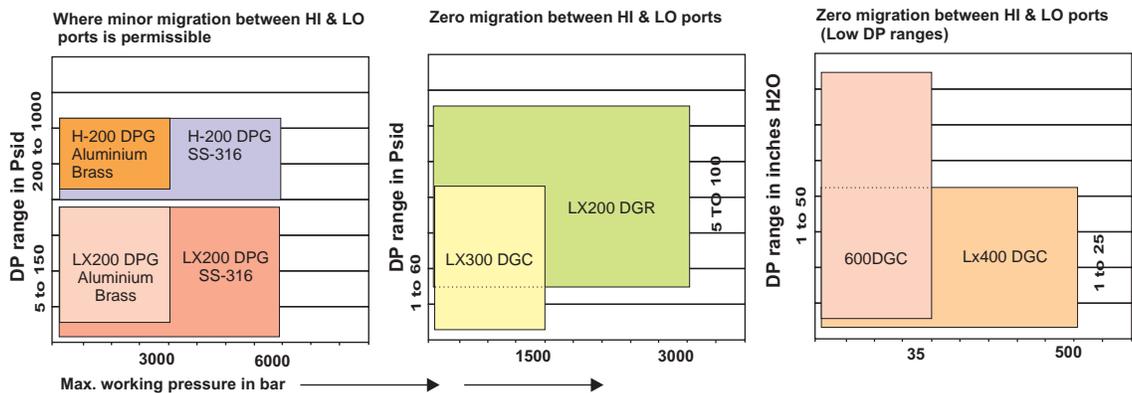
### Air filter monitoring

In pharmaceutical, hospitals, semiconductor industry sophisticated air handling and filtration units are used. These units use very high performance air filters at various locations. As the air quality and flow rate of air depends on the filter condition, these filters have to be monitored regularly. Magnetic™ instrument with switch offers a very reliable and cost effective solution for this application.

Magnetic™ instrument is also ideal for measuring pressure drop across filters used on laminar air flow benches, dispensing booths, fluid bed dryers etc.

**Recommended model : 600DGC**

### Guidelines to select an appropriate model





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