



**ATEX INSTRUCTIONS MANUAL**  
**Differential pressure gauges**  
 (complement to the mounting/setting leaflet)  
**M7000 ... Series**



**SAFETY PRECAUTIONS**

**You must read carefully all the instructions of this manual. You must not start the installation before taking these instructions into account. This equipment might receive some hazardous voltages. If you do not consider these instructions, you risk facing serious corporal and/or material injuries.**

**Before setting up your installation, check the model suit your application. The wiring of this equipment must be executed with the in force rules by a qualified staff.**

**1 GENERAL WARNINGS**

**1.1 PREMISE**

Before installation of the instruments follow the recommendations listed in European normative EN 837-2.

In particular is necessary to check if:

- Required security level is compatible with the safety markings indicated on instrument dial.
- Process fluid is compatible with wetted parts indicated on instrument dial.

**WARNING** When instrument is installed on dangerous fluids like oxygen, acetylene, or fluids that are inflammables or toxics or dangerous for the environment, please check carefully that instrument is suitable for these applications.

**WARNING** Especially for use with oxygen the instrument dial must show the word "OXYGEN" and the international symbol of "Oil-free". Pressure gauges must not come in contact with oils or greases not compatibles with oxygen.

**WARNING** In the event of installation in potentially explosives atmospheres, the instrument dial must show the markings foreseen from ATEX 94/9/EC directive. Installation is possible only following the rules foreseen

**1.2 NOTES ON APPLICABILITY OF PRESSURE DEVICES DIRECTIVE (PED 97/23/CE)**

Georgin differential pressure gauges M7000 are considered "pressure accessories", according art. 1 clause 1.2.4.

Instruments with static pressure higher than 200 bar are manufactured according A module of the directive and must have CE logo on dial.

Instruments with static pressure lower than 200 bar must not be marked with CE logo but are manufactured according to art. 3 clause 3 "sound engineering practice" (SEP).

**1.3 INSTRUMENT MEASURING RANGE**

Verify that measuring range of instrument is suitable with working conditions of the pressure circuit/plant. Normal operating pressure must be:

- Within 75 % of dial range for steady pressures
- Within 60 % of dial range for pulsating pressures

The choice of non-suitable range, or not suitable model, or non-suitable installation, causes not proper functioning and shorter working life of instrument.

**1.4 ADMITTED OVER PRESSURES**

Accidental over pressures are admitted for short periods, provided that they remain within the values indicated in the catalogue and on dial (maximum static pressure).

**1.5 STATIC PRESSURE (LINE PRESSURE)**

Static pressure (line pressure) must be lower or equal to the maximum static pressure value indicated on dial.

**1.6 AMBIENT TEMPERATURE**

Instruments are designed to work with an ambient temperature between -20°C/+60°C (-4°F/+140°F). It is recommended to verify that the pressure gauge installation position is not subjected to direct heat sources, both for convection or radiation: if this is not possible, please foresee a protective screen. Temperature variations of sensing element, compared with reference temperature, cause indications drift (accuracy errors) of about ±0.6 % of read value, every 10 °C of ambient temperature variation.

**1.7 PROCESS FLUID TEMPERATURE**

Instruments are designed to work with a process fluid temperature within -25°C/+100°C (-13°F/+212°F).

If instrument is filled with dampening fluid, maximum temperatures admitted of process fluid, are indicated in table 1.

In event of installations on steam, we recommend to follow installation sketches of Figure 3 and suggestions indicated in paragraph 2.3.

**1.8 MECHANICAL VIBRATIONS**

Verify that chosen position for the installation is not subjected to continuous mechanical vibrations, because this will cause accuracy errors and shorter working life of instrument. If this is not possible, it is recommended to use instruments filled with dampening liquid.

**1.9 PULSATING PRESSURES**

In the event that instrument is subjected to pulsating pressures, please foresee a dampening protection by using appropriated accessories.

**1.10 INSTALLATION IN POTENTIALLY EXPLOSIVE ATMOSPHERES (GAS AND DUST)**

The instrument can be installed in potentially explosives atmospheres only if on dial are indicated the markings showed on figure 1. The temperature classification of the instrument depends only from the working conditions (maximum ambient and process fluid temperature). The differential pressure gauges series M7000 does not contain any potential ignition source

Figure 1 – Dial markings



Ambient temperature	Max process temperature			Temperature class	
	Dry	Liquid filled		Gas	Dust
		Glycerin	Silicon		
-25/+65°C	65°C	65°C	65°C	T6	T85°C
	85°C	85°C	85°C	T5	T100°C
	100°C	100°C	100°C	T4	T135°C



## 2 INSTALLATION

### 2.1 PROCESS CONNECTIONS

Differential pressure gauges require particular care in the designing and realization of the connecting lines between pressure taps and instrument. The connecting lines must be considered like integral parts of the same instrument, because they bring the process fluid from the pressure taps to the sensing element of the instrument. The sealing of process connection is normally guaranteed by using:

- A flat gasket, if using cylindrical connections
- A sealing material, such as PTFE tape, if using tapered connections (NPT or BSPT).

The serration torque depends only from gasket type.

**WARNING:** When pressure is applied for the first time to the mounted instrument, please check the sealing of the connection, especially when instrument is mounted with dangerous and/or toxic and/or aggressive fluids. Please be very careful with this check, if process fluid is dangerous.

### 2.2 PANEL (FLUSH) OR SURFACE (WALL) MOUNTING

Instrument must be connected to the process by using a flexible piping: this for to prevent mechanical solicitations on instrument due principally to temperature variations.

### 2.3 MOUNTING ON STEAM APPLICATIONS (FIGURE 3)

When instrument is used on steam applications is necessary to foresee a coil siphon, mounted between process and instrument connection. The coil siphon must be filled with water, for to avoid that steam enter into the instrument.

In the event that instrument is occasionally subjected to vacuum, is necessary to shape the process piping in a way that the coil siphon remain always water filled. The possible accuracy error, given from weight of water column, could be compensated by using the micrometric adjustment on the pointer (see paragraph 4.1.2).

### 2.4 LEVEL MEASUREMENT ON PRESSURIZED VESSELS – WET PIPE

Install the instrument as indicated in Figure 1.

Be sure that dimension "K" must be higher than 0,5mt. and that measuring field of the instrument is suitable with the pressure value:  $Dp=y.H$  (where y is the specific weight of the fluid in the vessel).

The barrel "B" must have a sufficient capacity for to maintain, during the time, the liquid level at maximum value (MAX).

Connection piping must have a diameter of about 13mm. (1/4"BSP).

When installation is complete, close the valves V1 and V2, and open the valves V3, V4 and V5. Introduce from purging plug S2 on the barrel "B", the process fluid, purging the air from the purging plug "S" (near V2).

When purging is done, close the plug "S" and refill the liquid in the barrel "B".

To purge from plug "-" on the instrument first and after from plug "+". After close both plugs Refill again the liquid on the barrel "B" and after close the plug "S2".

Close the valve "V5" and open the valves "V1" and "V2". Instrument is now in service

#### NOTES:

At level MAX will correspond  $Dp=0$

At level MIN will correspond  $Dp=y.H$

A intermediate levels will correspond  $Dp=L.y$

Figure1 : Level measurement on pressurized vessels - wet pipe

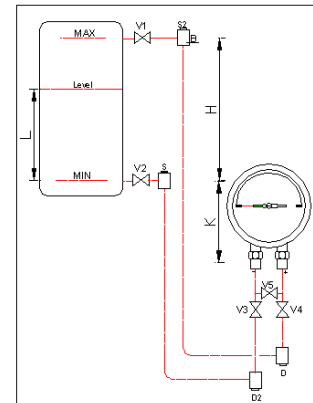


Figure 2 : Level measurement on pressurized vessels - dry pipe

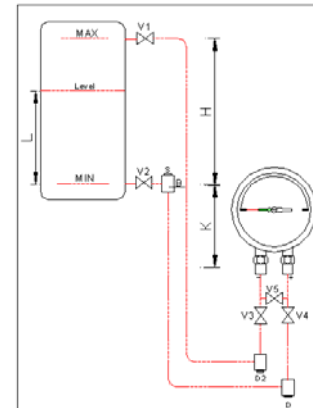
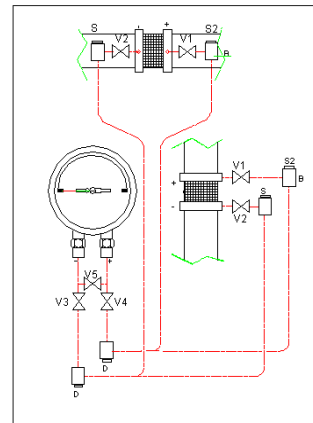


Figure 3 : Measurement of pressure drops of filters - for liquids or steam



### 2.5 LEVEL MEASUREMENT ON PRESSURIZED VESSELS – DRY PIPE

Install the instrument as indicated in Figure 2.

Be sure that dimension "K" must be higher than 0,5mt. and that measuring field of the instrument is suitable with the pressure value:  $Dp=y.(H+K)$  (where y is the specific weight of the fluid in the vessel).

Connection piping must have a diameter of about 13mm. (1/4"BSP).

When installation is complete close the valves V1, V2 and V5, open the valves V3 and V4.

Then open the purging plug "D2".

Introduce from purging plug "S" the process fluid, purging the air from purging plug "+" on the instrument.

When purging is done the instrument will indicate the pressure  $Dp=y.K$  corresponding to MIN level of the vessel.

Close S and D2 and open slowly first valve V2 and after valve V1.

### 2.6 MEASUREMENT OF PRESSURE DROPS ON FILTERS FOR LIQUIDS

Install the instrument as indicated in Figure 3.

Be sure that valve V5 is open and that valves V1 and V2 are closed.

With functioning circuit, proceed as follow :

Open slowly valve V2.

Purge the differential system of the instrument by using the purging plugs "+" and "-".

Purge the air from the barrel "B" by using the plug "S2".

Close the valve V5 and open slowly valve V1.

Instrument is now in service.

### 2.7 MOUNTING ON STEAM APPLICATIONS:

Install the instrument as indicated in Figure 3.

Be sure that valves V1 and V2 are closed and that valves V3, V4 and V5 are open.

Proceed with the filling of pipings from plugs S and S2, purging the air from purging plugs "+" and "-" on the instrument.

With functioning circuit, open slowly valve V2, close valve V5 and open slowly valve V1.

Instrument is now in service.

### 2.8 MEASUREMENT OF PRESSURE DROPS ON FILTERS FOR GAS

Install the instrument as indicated in Figure 4.

Avoid horizontal piping parts for to eliminate condense stagnations.

Be sure that valves V1 and V2 are closed and that valve V5 is open.

With functioning circuit, open valve V2, close valve V5 and open slowly valve V1.

Instrument is now in service.

## 2.9 FLOW MEASUREMENT FOR LIQUIDS

Install the instrument as indicated in Figure 5. Be sure that pressure taps on the measuring flange are on same level.  
Connection piping must have a diameter of about 13mm. (1/4" BSP).

When installation is complete, close the root valves V1 and V2, then open the valves V3, V4 and V5.

Open the plugs S e S2 and introduce from one of them the process liquid, till when the liquid exit from opposite plug.

Purge the air from purging plugs "+" and "-" on the instrument, then close them. Close the plugs S and S2 and check the instrument zero.

Then close the valve V5. With functioning circuit, open slowly valves V1 and V2. The instrument will show the DP corresponding to passing flow.

## 2.10 FLOW MEASUREMENT FOR GAS

Install the instrument as indicated in Figure 6. Position the instrument above the pressure taps on the measuring flanges, avoiding horizontal shape of piping. Connection piping must have a diameter of about 13mm. (1/4" BSP).

When installation is complete, close the root valves V1 and V2, then open the valves V3, V4 and V5.

With functioning circuit, check the zero of the instrument, then close valve V4, open valves V1 and V2, close the valve V5.

The instrument will show the DP corresponding to passing flow.

Figure 4 :

Measurement of pressure drops on filters for gas

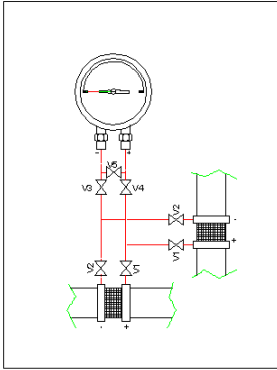


Figure 5 :

Flow measurement for liquids

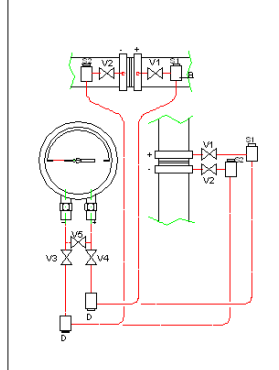
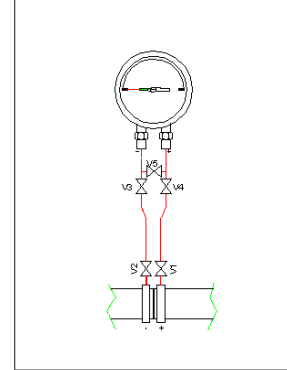


Figure 6 :

Flow measurement for gas



## 3 CALIBRATION AND CHECK

As good practice, is better to make a complete check of the instruments twice per year.

The calibration check is normally made by comparing the instrument with a suitable test instrument. Check is carried out on the main divisions of the dial, following the prescription of European normative EN 837.

It is possible to make a fast check of functioning and accuracy of the instrument, verifying the pointer indication at beginning of scale (zero indication).

If zero pointer indication, at atmospheric pressure, is within the 2% of range, it will be highly probable that instrument is in good efficiency. A zero drift of more than 2% could mean a stress fatigue of the instrument.

Every pressure gauge that has been subjected to abnormal working conditions must be substituted.

**WARNING:** The check of the instrument, during the working operations, will be possible only if the same is equipped with relevant manifold and if the process fluid is not toxic or dangerous. (See typical installation Figures 2/7).

**WARNING:** Every instrument that, also apparently, shows elevated indication errors, must be immediately removed from the service, especially if process fluid is dangerous or toxic.

## 4 MAINTENANCE

The instrument doesn't need any particular maintenance. Do not lubricate the moving parts because this could attract dust and to form particles and impurities that could produce malfunctions or accuracy errors.

**WARNING:** In event of accidental breaking of instrument transparent, it is necessary to substitute it immediately, taking care of removing all the small pieces into the case. The substitution of transparent is mandatory if instrument is mounted in potentially explosives atmospheres with dust.

### 4.1 ZERO ADJUSTMENT OF INSTRUMENT

Before doing any operation on the instrument, be sure that connection piping are corresponding to the relevant drawing. Eventual restrictions, sedimentations, air bubbles or condensates could give wrong indication. Remember always that connection piping is integral parts of the instrument.

#### 4.1.1 CHECK OF ZERO VALUE

Close the instrument interception valves V3 and V4, and then open the by-pass valve V5.

The instrument pointer will return itself at zero. If this does not happen, then purge the air from purging plugs "+" and "-" located on the instrument.

#### 4.1.2 ZERO ADJUSTMENT PROCEDURE

If, after having made the operations of paragraph 4.1.1., if the instrument pointer is within the zero value of +/- 10% remove the bayonet ring and the transparent and, by acting on the regulating screw, bring back the pointer at zero value. Then mount again the transparent and the bayonet ring on the instrument.

If pointer is positioned outside the zero value +/-10 %, the instrument need more complex operations, such as the charge of the differential cell, the check of internal stops against overpressures and, eventually, the re-calibration.

These operations must be made at manufacturer workshop, because they require more complex procedures and equipment's.

### 4.2 INSTRUMENT WITH LIQUID FILLING

The level of dampening fluid must be periodically controlled. If a further filling is necessary, we recommend however to don't fill over 75 % of case diameter.

### 4.3 CLEANING

External cleaning of the instrument could be done by using a sponge with soaped water.

Internal cleaning, necessary in case you need to verify calibration with a hydraulic press, could be made by using compressed air inside the socket hole.

Please be careful to the process fluid traces that could remain inside the sensing element, especially if fluid is toxic or dangerous

## 5 PUT OUT OF SERVICE

Before to dismount the instrument from the working circuit is necessary to control that:

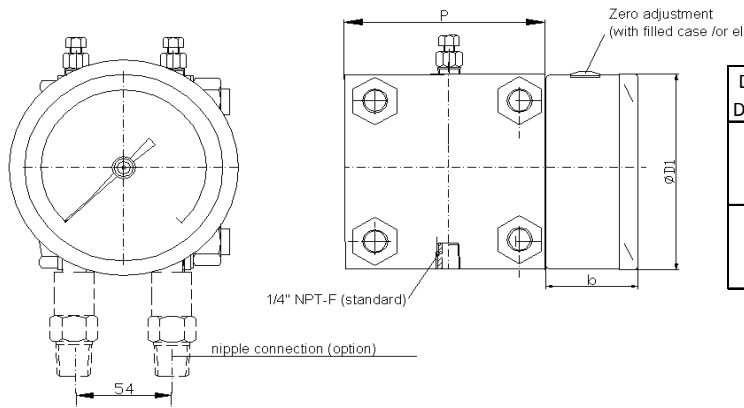
- Instrument is isolated from process fluid
- No pressure is present inside the instrument
- Temperature of the case is not excessive

Please be careful to the process fluid traces that could remain inside the sensing element, especially if fluid is toxic or dangerous.

## 6 DEMOLITION

The instrument is essentially made in stainless steel. Therefore, after removing transparent, gasket, plugs and after removing all the process fluid traces from the wetted parts (especially if fluid is dangerous for peoples or ambient) the instrument could be recycled or scraped

## 7 DIMENSIONS

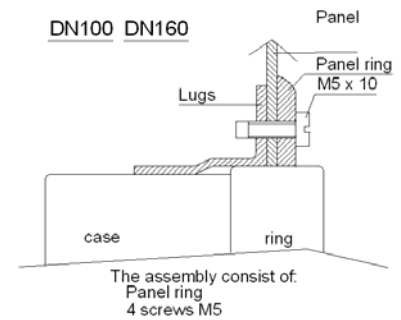
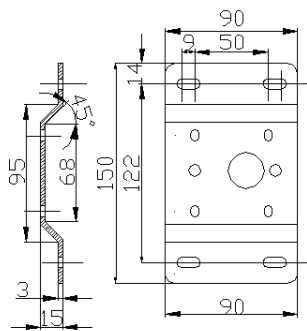
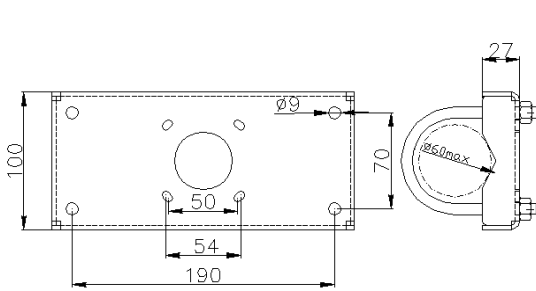


DN Boitier DN Housing	Echelle	P □			b	D1
		PN 40/100	PN 250	PN 400		
100	< 160mbar	140mm	-	-	51mm	100mm
	250mbar	100mm				
	> 400mbar	88mm				
160	< 160mbar	140mm	-	-	51mm	160mm
	250mbar	100mm				
	> 400mbar	88mm				

**2" PIPE MOUNTING BRACKET**

**WALL MOUNTING FLANGE**

**PANEL MOUNTING**



DECLARATION DE CONFORMITE  
STATEMENT OF CONFORMITY



We, **REGULATEURS GEORGIN** - 14/16 rue Pierre SEMARD - 92320 CHATILLON - FRANCE

Declare under our own responsibility that **Differential Manometers series M7000**, manufactured according technical specification SP 03 Rev.0 of 05/09 comply to the essential requirements of Directive **ATEX 94/9/CE**.  
The instruments M7000 does not contain potential source of ignition. Their maximum surface temperature depends only from the operating conditions (maximum temperature of process fluid)

The conformity to the Directive is evaluated with form VIII (manufacturing internal checks);

The technical file N° FT09/001 was deposited on 07/10/2009 at the notified body :

TUV SUD  
Via G. Carducci 125 edificio 23  
20099 Sesto San Giovanni (MI) - Italia

The instruments are classified as :

Type	Marquage / Marked	Normes / Standards
M7000	<b>Ex</b> II 2GD c T(see table) IP65 T(see table)	EN 13463-1 prEN 13463-5

The temperature classification depends only from the operating conditions, according the following table :

Ambient temperature	Maximum operative temperature			Temperature class (Gas)	Temperature class (Dust)
	Standard	Liquid filled (Glycerin)	Liquid filled (Silicone)		
-25 ... +65°C	60	60	60	T6	T 85°C
	85	85	85	T5	T 100°C
	110	100	100	T4	T 135°C

Châtillon, le 05/06/09

The Product Manager  
Cyril LINTANFF