



Delta[®] Rotary-Meters

224-299-2801

Instruction manual

Mode d'emploi

Betriebsanleitung

Istruzioni d'uso

Manual de instrucciones

Installatie voorschrift

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Keep this manual easily accessible for all users. Please respect all national rules for installation, operation and service of gas meters.

1 Characteristics:

See annex 1

2 Packing

The meter, depending on the size or version is delivered:

In a cardboard box, protected by polyethylene wedges

On a wood pallet, protected by a cardboard cover.

The packing shall contain the filling lubricant (except for oxygen version), plugs for the installed transmitters and this instruction manual.

2.1 Storage

If the meter is not going to be used immediately, it should be stored under cover in a clean, dry environment, in the horizontal position.

The caps fitted in the inlet and outlet pipe must stay in place until installation.

2.2 Handling

The meter is delivered without lubricant in covers. Before shipping or handling, ensure that the lubricant has been thoroughly drained from the front and the rear covers to prevent spillage into the measuring chamber. Meters should be lifted only with belt around the main body or on the eyelets.

3 Installation

3.1 General

Due to the volumetric principle of the Delta meter, its metrology is not influenced by the installation conditions. Nevertheless the respect of the following rules will insure the best use of your Delta meter:

Recommended installation:

See annex 2

- Check visually that the meter has not been damaged during transport.
- No welding is allowed with meter installed.
- The meter should be installed with the impellers horizontal (allowed deviation: $\pm 0,5^\circ$ for the 2040, $\pm 5^\circ$ for the others models).
- Never install a meter at a low point in the piping where the meter could be subject to the accumulation of water or particles.
- Vertical installation up to down is better than down to up.
- For threaded joints, the use of Teflon tape is not recommended to avoid introducing tape in the chamber.
- The meter should be installed without stress in the piping. The flanges must be correctly lined up. The tightening torque of the bolts must not exceed:

M16	M20	M24
100 Nm	150 Nm	200 Nm

Please tighten bolts in opposite pairs.

- A flexible coupling can be used to ensure a stress-free installation.
- The use of a filter, placed upstream of the meter, is advisable in gas with high particulate content. See § 3.3

Before installation:

- The piping upstream of the meter should be free of dust.
- Remove the protective caps.
- Ensure that the direction of gas flow corresponds with the arrow situated on the meter body.
- Check that the impellers turn freely.

3.2 Dimensions and weights:

See annex 3

3.3 Filtration

Rotary meters work better if there are no particles within the gas. It is advisable therefore to filter the gas upstream of the meter. Recommended level of filtration 100 µm or better.

While the meter is in service, periodically check the cleanliness of the filter, especially in the case of a new installation or after work has been performed on the upstream piping.

3.4 Lubrication

3.4.1 General

Choose the lubricant according to the operating conditions. This lubricant should be neutral and non detergent.

Important:

- A lack of lubricant could cause premature wear of the meter.
- An excess of lubricant can also induce problems. A surplus of lubricant can contaminate the measuring chamber, may degrade the metrology and cause damage to the bearings and the impellers due to the mixture of lubricant and small impurities contained in the gas.

- Always drain the end-covers before moving the meter.
- For oxygen versions (Steel version with "Ox" printed on the name plate), the standard lubricant **MUST NOT** be used. Use only oxygen compatible lubricant.

3.4.2 Choice of lubricant

Viscosity: The viscosity has been calculated to ensure mechanical and metrological performance of the meter.

Commercial references: Annex 4 contains a list of commercial lubricants usable for industrial gas except gases such oxygen and halogens. For other gases, please consult us.

The viscosity of the lubricant varies with the temperature. In annex 5 is indicated the temperature range compatible with a lubricant of viscosity as indicated by ISO 3448 at 40 °C.

3.4.3 Capacity of end covers:

See annex 6.

3.4.4 Filling and draining procedure

See annex 7 for the location of fill, drain plug and sights.

If the meter is not equipped with an internal pipe (like the 2040), both front and rear cover must be filled with lubricant.

Filling and draining operations should be carried out with the meter installed in the piping, but not pressurised, though the use of Pete's Plugs may allow lubricant levels to be „topped up“ while the meter is pressurised (up to 17,2 bar). See annex 8.

The level is correct when the lubricant passes through the centre of the sight.

For 2040 meter, lubricant level depends on the direction of flow, horizontal or vertical.

For the steel-bodied meters, lubricant is filled until it flows out of the level point.

For meters equipped with the multi-position option, ensure that the front and rear sights are in the position corresponding to the use of the meter. If required, the change is done by exchange of the sight and the corresponding plug. If it is necessary to exchange a sight and a plug, it is recommended that new seals are fitted to these components.

In some installations, stations or cabinets especially, the rear lubricant sight is not always readable. In this case, proceed as follows:

- Depressurise the meter.
- Drain the end cover.
- Using a graduated container, fill the end cover with the volume defined in annex 6.

4 Accessories

4.1 Electrical accessories

SAFETY: Gas Meters are often installed in areas where there is a risk that Gas will be present. Therefore, electrical connections to meters need to be made with consideration of the use of Ex marked equipment or otherwise approved circuits.

4.1.1 Low frequency transmitter (furnished as standard)

The meter is normally delivered with a double LF pulse output transmitter. The LF is a dry reed switch and is normally open. See the name plate of the meter and annex 9 for connection information.

4.1.2 Anti tampering

The Series 2050, 2080 & 2100 are delivered as standard with a anti tampering switch. It is a dry reed switch and is nor-

mally closed. See the name plate of the meter for connection details.

4.1.3 High frequency transmitter (furnished as option)

The meter can be delivered with a high frequency transmitter. It is an inductive sensor, and connection is to a NAMUR- type input circuit.

4.1.4 Pulse values of LF and HF transmitters: see annex 1

4.2 Filter

For flanged meters, a „Gasket-filter“ can be inserted directly upstream of the meter at the place of the standard gasket. These gasket-filters are available from DN50 to DN100. Conical filters are available from DN50 to DN150.

4.3 External dryer cartridge

For severe weather conditions, a removable dryer cartridge can be installed on the series 2050, 2080 & 2100 meters during manufacture.

4.4 Flanges

Flange DN50 PN16 or ANSI125 can be delivered to adapt a 2040 meter (thread connection) to flanges connections DN50. this gives a flange-to-flange distance of 171 mm.

5 Start-up

5.1 General

The procedure of start-up is always dependent on the installation configuration. Before pressurising the meter, the lubrication procedure should be performed. Pres-

surisation or depressurisation should be carried out with very low pressure change. The pressure change should not exceed 0.3 bar/5 P.S.I. per second. After start-up, please check the tightness of the installation.

5.2 Installation with by-pass: See annex 10

START-UP:

Begin with all valves closed.

- Slowly open the by-pass valve to pressurise the downstream piping.
- When the pressure is balanced downstream, slowly open the small upstream valve V1. The pressure variation should not exceed 0.3 bar per second.
- When the pressure is balanced in the meter, slowly open the main upstream valve and then close V1.
- Slowly open the downstream valve and check that the meter starts to register the flow.
- Gradually, close the by-pass valve. Check that the flow rate doesn't exceed the capacity of the meter.

SHUT DOWN:

- Slowly open the by-pass valve and then close the upstream and downstream valves on the meter line.
- Carefully open the small bleeder valve V2 and depressurise the meter. The pressure variation should not exceed 0.3 bar per second.
- Some gas still inside the meter and the pipe, therefore sufficient ventilation is required.

5.3 Installation without by-pass: See annex 11

START-UP:

Begin with all valves closed.

- Slightly open the upstream valve to pressurise the meter line. The pressure variation should not exceed 0.3 bar per second. When the pressure is balanced, fully open the upstream valve.
- Slightly open the downstream valve. The valve should be opened a small amount to maintain:
 - The upstream pressure in the meter line.
 - A low flowrate in the meter during the downstream pressurisation (approx. 5% Qmax).

When the downstream pressure is balanced, the downstream valve can be completely opened.

SHUT DOWN:

- Very slowly close the downstream valve and check that the meter is no longer recording.
- Close the upstream valve.
- Slowly open the small bleed valve V2. The pressure variation should not exceed 0.3 bar per second.
- Some gas still inside the meter and the pipe, therefore sufficient ventilation is required.

5.4 Meters placed after a regulator

Installation has to be done in accordance with the technical manual of the specific regulator. During pressurisation and depressurisation, insure that the pressure variation should not exceed 0.3 bar per second.

6 Maintenance

6.1 Maintenance of the meter

Once installed, the meter does not require any specific attention except a periodical check or change of the lubricant filled in the covers.

After start-up:

Natural gas: After the preliminary term of service, the lubricant level should be checked.

Other gases: After a working period of 100 hours from commissioning, the lubricant level should be checked.

If the lubricant level is appreciably low, if the lubricant is emulsified or if there is a chemical reaction between the lubricant and the gas, the lubricant should be reassessed and changed to fit the prevailing conditions.

Periodical change of lubricant:

The period between checks or changes of lubricant depends of the operating conditions (pressure variation, flowrate...).

Natural gas: Under normal conditions, lubricant has to be changed every 5 years.

Other gases: Please consult us.

Use solvent and alcohol free product to clean the meter.

Repair must be done only by qualified personal. Afterwards a tightness test with 1.1 x PS (Pmax) must be performed.

When changing pressure containing parts, ensure that spare parts that comply with the PED are used.

If used with wet gas, internal and external effect of corrosion has to be checked regularly and in case of severe corrosion, the meter has to be replaced.

6.2 Maintenance of optional equipment

6.2.1 LF and HF transmitters

These transmitters do not require any specific maintenance. The function of the transmitters can be checked by comparing the electronic index with the meter index. In case of problems, the LF can be replaced without unsealing the index of the meter (on series 2050, 2080 & 2100).

6.2.2 Filter

If an increase of pressure loss is noticed, the filter should be checked and cleaned/replaced before any maintenance on the meter.