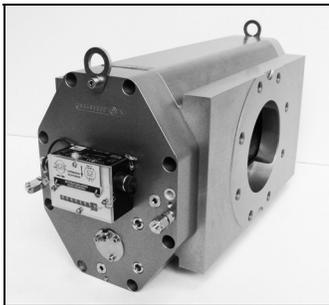
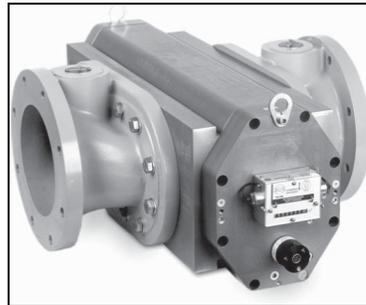


**Instruction Manual
Rotary Gas Meters**

Type IRM-3 DUO



**IRM-3 DUO G400 / G650
IRM-3 DUO 23M / 38M**



**IRM-3 DUO G1000
IRM-3 DUO 56M**

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1. Staff

These **instructions are aimed at staff** who have adequate specialist and technical knowledge (in Germany, for instance, in accordance with DVGW Codes of Practice 492 and 495 or comparable technical regulations) on the basis of their training and experience in the sector of energy and gas distribution.

2. Legal declarations

- Declaration of Conformity – see Annex C.
- Period of validity of calibration – this is based on the regulations of the country concerned, in which the rotary gas meter will be used.
- The calibration of rotary gas meters is only valid for the period of validity of calibration. Once this has elapsed, rotary gas meters may no longer be used for purposes which are subject to obligatory calibration.

3. Intended use and field of application

This product is intended

for **calibratable** volumetric metering of

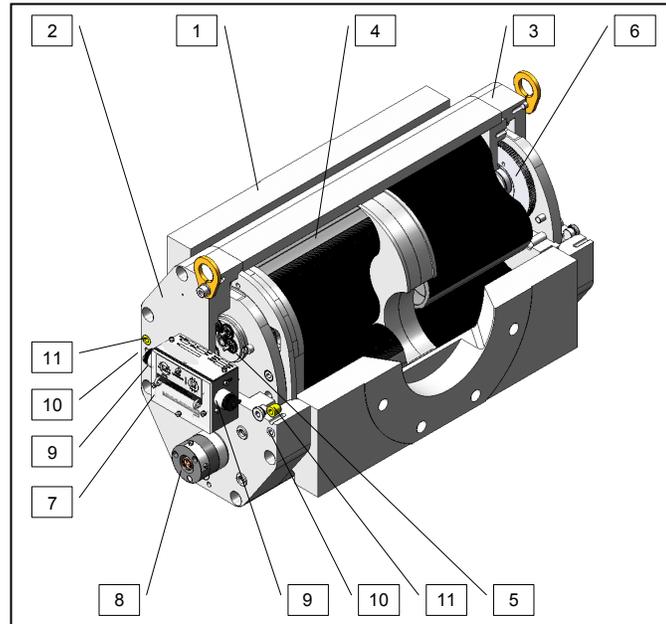
- flammable gases: natural gas/town gas/butane,
- non-flammable gases: air/nitrogen/inert gases,
- and is suitable for use in potentially explosive atmospheres of Category 2 (Zone 1) of **Class Ex II 2 G c IIC T6**

Other fields of application / media on request.

This product is **not** intended for

- metering of aggressive gases, e.g. biologically produced methane or sewage gases, oxygen.

IRM-3 DUO



- | | |
|---------------------------|-----------------------------|
| 1 - Meter housing | 7 - Index head |
| 2 - Housing cover (front) | 8 - HF pulse generator |
| 3 - Housing cover (rear) | 9 - LF pulse generator |
| 4 - Pistons | 10 - Pressure test point |
| 5 - Gear assembly | 11 - Temperature test point |
| 6 - Synchronizing gears | |

Remark: A volume corrector can be build on this rotary gas meter (optional).

Please contact your Elster-Instromet Customer Service (Tel. +49 (0)6134-605-0 / -346) for assistance in commissioning, maintenance and installation of encoders, pulse generators and volume correctors for instance.

4. Technical data

Rotary gas meters in accordance with MID Directive 2004/22/EC, according to OIML R 137-1

Type:	IRM-3 DUO	
Size:	G400 to G1000	23M to 56M
Nominal diameter:	DN 100 to DN 200	4" to 8"
Pressure ratings:	PN 10/16 or CLASS 150	
Temperature ranges:		
- gas / ambient / storage	-20 °C to +60 °C	
- gas / ambient/ storage (MID)	-25 °C to +55 °C	
Housing material:	Aluminium	
Mechanical ambient conditions:	M2	
Electromagnetic ambient conditions:	E2	

Pulse generators

LF pulse generator PCB E1 (reed contact)	Wiegand puls generator	
$U_{max} = 24 \text{ V}$	$U_{max} = 30 \text{ V}$	
$I_{max} = 50 \text{ mA}$	$I_{max} = 100 \text{ mA}$	
$P_{max} = 0.25 \text{ VA}$	$P_{max} = 600 \text{ mW}$	
$R_i = 100 \Omega$ (series resistor)		
LF pulse generator RI 23A (Reed contact – Normally Open)	LF pulse generator MDRR-DT 15-20AT (Reed contact - Normally Closed)	HF pulse generator REPROX (in accordance with IEC-EN 60947-5-6, NAMUR
$U_{max} = 30 \text{ V DC}$	$U_{max} = 30 \text{ V DC}$	$U_{rated} = 8 \text{ V DC}$
$I_{max} = 50 \text{ mA}$	$I_{max} = 50 \text{ mA}$	$I \geq 2.1 \text{ mA}$ (exposed) $I \leq 1.2 \text{ mA}$ (covered)
$P_{max} = 0.25 \text{ VA}$	$P_{max} = 0.25 \text{ VA}$	$U < 5.9 \text{ V}$ (exposed) $U > 6.8 \text{ V}$ (covered)
$R_i = 0 \Omega$ (no series resistor)		$R_i = 1 \text{ k}\Omega$

Remark: REPROX is not possible with integrated Absolute-ENCODER Index S1D (direct mounting on housing cover)

Absolute ENCODER S1 D

	Absolute ENCODER S1 D - Index
Number of indexes	2
Number of digit rollers per index	8
Safety class	IP 67
Interfaces ATEX approval	NAMUR (II 2 G EEx ia IIC T4) or SCR / SCR Plus (II 2 G EEx ib IIB T4) or M-BUS; Interface M-Bus is not ATEX-approved
LF pulse generator	Optional or retrofittable INS-10, -11, -12 $U_{max} = 24 \text{ V}$, $I_{max} = 50 \text{ mA}$, $P_{max} = 0.25 \text{ VA}$, $R_i = 100 \Omega$ (series resistor)

5. Operating location

If you ...

- wish to mix in **odorisation agents** or
- use **solenoid valves**,

please always fit them only **downstream of the meter**. Otherwise, the device may be damaged.

Ensure that the meter is placed on a vibration free site. Prolonged and violent vibrations and shocks (pipe vibrations, road movement, earth tremors, etc.) can affect the body strength and / or the performance of the meter.

Also the **flow** through the meter must be **free of vibrations / pulsations** in order to avoid measuring errors.

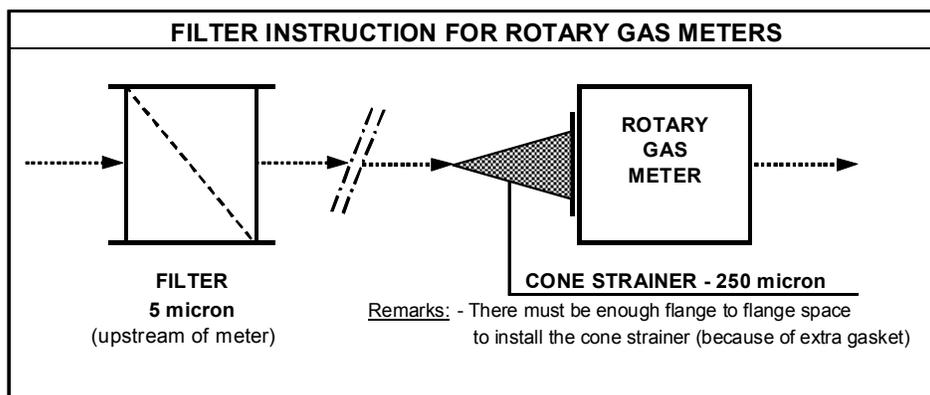
Compliance with the specified **operating and ambient conditions** as indicated on the type label, is **absolutely essential** for **safe operation** of the meter and additional equipment. Also ensure that the meter is only used for the stated medium.

The meter should never be used outside these ranges. Take the necessary precautions to prevent, in case of emergency, the meter operating outside the stated limits.

If the meter is installed in a zone classified as a hazardous area, then ensure all connections are to intrinsic safe circuits.

The gas must be dry, clean and non corrosive, otherwise the meter may be damaged.

The installation must be free of dirt, welding beads and pipe scale. The piping on the inlet side of the meter must be clean. A filter (5 microns) must be installed upstream of the meter, and a cone strainer (250 micron) on the meter inlet flange (see figure). The strainer should be cleaned after approximately 4 to 6 weeks after the first start up of the line.



In a vertical installation with flow from the **bottom upwards**, the filter should be placed above i.e. downstream of the meter.

6. Installation position, flow direction and wall clearance

Gas can be passed through the Type IRM-3 DUO rotary gas meter horizontally and vertically. (see e.g. figures 8 and 9).

Check the flow direction, as indicated on the index. When the flow direction is indicated incorrectly, the position of the cover plate can be changed (see figure 1a).

For effective humidity control a right position of the ventilated index is required. The index can be rotated by loosening the set screw two turns. After positioning the index, tighten the set screw carefully (see figure 1a).

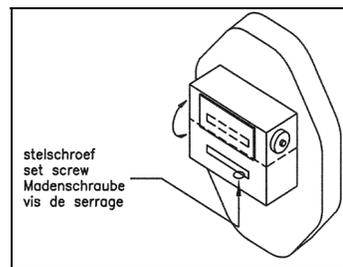


Figure 1a: Changing position of the cover plate and position of set screw for rotating index

The index head of an Encoder can be turned (by hand) up through 355° about its axis for optimum ease of reading in different installation / operating positions.

An “instrument-drive” can be rotated by loosening the three screws in front of the “instrument-drive” (see figure 1b). After positioning the “instrument-drive” tighten the screws carefully.

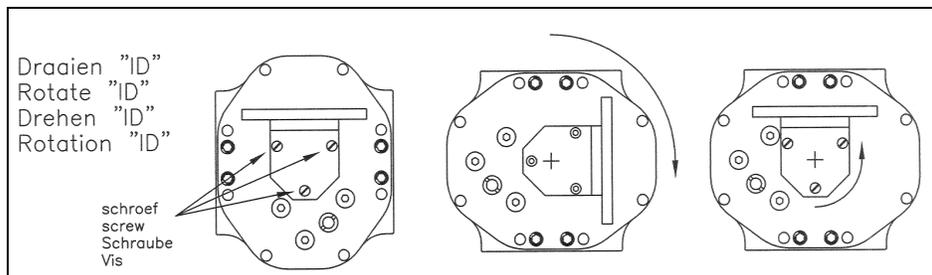


Figure 1b: Rotating an “Instrument-drive”

The meter is equipped with oil-level gauge glasses on **two sides**, so the meter must be mounted with a minimum distance (A) or (B) from the centre of the pipe to the wall, in order to facilitate access for maintenance (Figure 2a / 2b and Table 1).

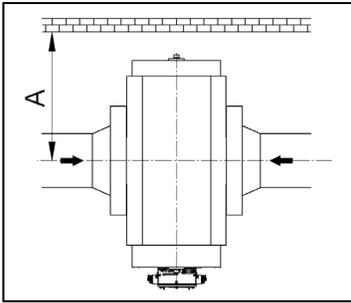


Figure 2a: IRM-3 DUO
Horizontal (L-R and R-L)

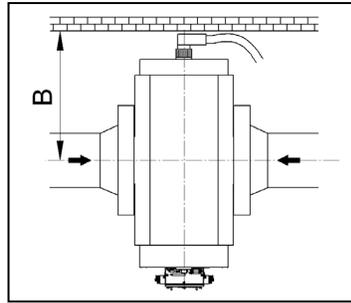


Figure 2b: IRM-3 DUO Reference meter
Horizontal (L-R and R-L)

		A		B	
		[mm]	[inch]	[mm]	[inch]
		Only for <u>Reference</u> meter. (with HF transmitter type Reprox on rear side and 90 degree cable plug-type Souriau)			
G400	23M	280	11 1/32	335	13 3/16
G650	38M	345	13 5/8	400	15 3/4
G1000	56M	450	17 3/4	505	19 7/8

Table 1: Minimum distance A and B

7. Installation / Connection

Warning! Never clean the plastic hood of the index **with a dry cloth** owing to **the risk of explosion resulting from electrostatic discharge!** Please only ever use an adequately **moistened** cloth!



When removing the product from the packaging ensure that it is lifted by using the lifting lugs mounted on the meter only.

Before installation please ensure:

- that the **protective caps and/or plastic sheeting** is or are **removed**,
- that the meter and accessories **have been inspected for transport damage**,
- that the pistons rotate easily in the measuring chamber (e.g. by blowing on them),
- that the accessories have been checked for completeness (e.g. plug connectors, oil for initial filling).

Remark: If any damage is present after inspection, do not install the meter and inform your supplier.

You will require the following items for installation:

- Suitable seals/gaskets for the relevant gases.
- For installing the meter in the pipe, use screws in accordance with applicable Standards. The screw length must be selected so that a thread reach of C [mm] (Table 2) into the meter is **guaranteed** (Figure 3). For the maximum tightening torque see table 2. Fasten flange screws crosswise.

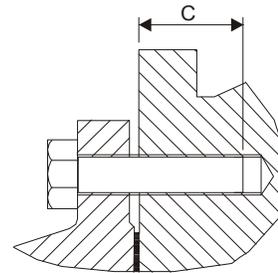


Figure 3

Flow Range	DN	Screw size		Screws per meter		Thread reach C [mm]		Maximum tightening torque [Nm]	
		DIN	ANSI	DIN	ANSI	DIN	ANSI	DIN	ANSI
G400	4"	M16	5/8" UNC	16	16	18 – 24	18 – 24	85 Nm	85 Nm
G400	6"	M20	3/4" UNC	16	16	22 – 30	22 – 30	130 Nm	130 Nm
G650	6"	M20	3/4" UNC	16	16	22 – 30	22 – 30	130 Nm	130 Nm
G1000	8"	M20	3/4" UNC	24/(16) ^(*)	16	22 – 30	22 – 30	130 Nm	130 Nm
23M	4"		5/8" UNC		16		18 – 24		85 Nm
23M	6"		3/4" UNC		16		22 – 30		130 Nm
38M	6"		3/4" UNC		16		22 – 30		130 Nm
56M	8"		3/4" UNC		16		22 – 30		130 Nm

(*): Applies to PN16/(PN10).

Remark: DIN = PN10/16 (EN 1092-1) & ANSI = Class 150 (ASME B16.5)

Table 2: Flange screws

Then install the **meter**:

- **gas-tight**,
- with the supplied accessories,
- only in **flow direction** (as marked by an arrow on the index head),
- only **unstressed**,
- the piston axes must be **horizontal**; check using a spirit level,
Remark: never install the meter with the piston axes **vertical**.
- when fitting the seals and gaskets, ensure that they are **aligned concentrically** and do not project into the flow channel,
- weatherproof.

Remark: Never use the gas meter as a distance piece during welding.

If you have specified the installation or operating position when ordering, all attachments will have been fitted in accordance with the installation position ex-works.

If you wish to **install the unit vertically at a later point**, you must turn any other attachments, e.g. volume corrector, through 90°, including gas meter (see par.6). The piston axes of the meter must still be **horizontal**.

We recommend that you contact our **Elster-Instromet Customer Service (Tel. +49 (0)6134-605-0 / -346)** for such conversion work.

8. Lubrication and maintenance

- Only use **original spare parts supplied by Elster-Instromet**.
- **Fill meter with oil before commissioning.**
- The meter **must be out of service and depressurized** before filling or adding oil.
- The quantity of oil required for operation, as well as a tube for filling, are included in the delivery.
- Use Shell Morlina S2 BL 10 oil.
- The meter is shipped **without oil** in the two reservoirs.
- The front and rear oil chambers are **not linked** with one another, so the meter **must be serviced with oil on front and rear side** of the meter.
- At **each side** of the meter there is **one** opening available for filling oil (plug A) or draining oil (plug B). There is **one** oil-level gauge glass (C) in use on the front **and one** on the rear side of the meter (Figure 5).
- The drain opening (plug B) is located at the lowest point.
- Unscrew and remove the oil filler plug (A) (Figure 5), from the front and rear housing cover.
- Fill the meter **at the front and rear side** to the **indicated level** with the oil supplied (see Figure 6).

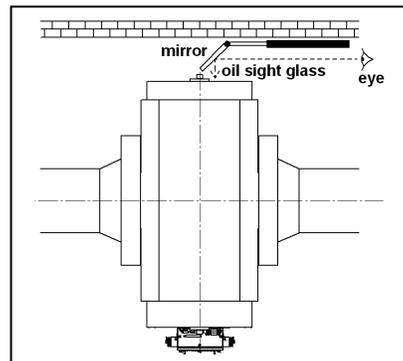


Figure 4: Filling IRM-3 DUO on rear side with mirror

- In a number of cases oil injection can be simplified by slipping the enclosed tube over the nipple, especially when the meter is near a wall. If necessary, use in this case a mirror to detect the oil level. (see Figure 4).

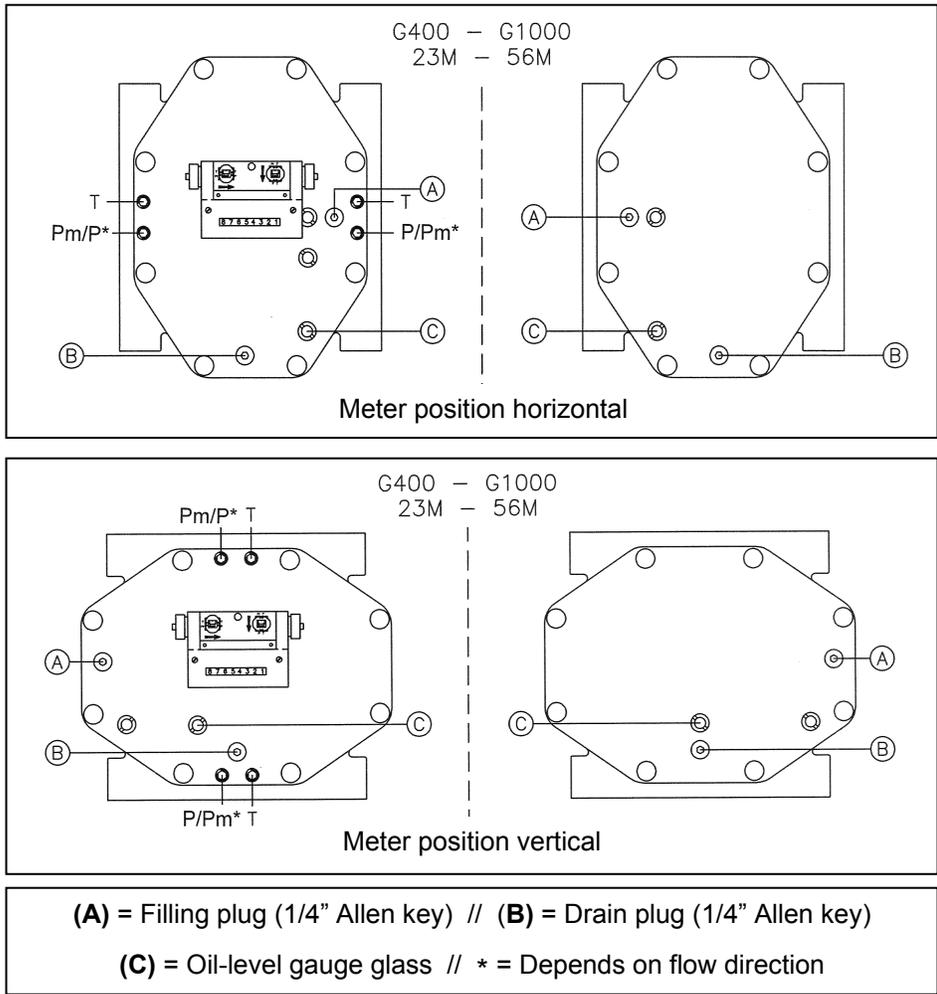


Figure 5: Permitted operating positions of oil filling and oil-level display

- The correct reading of the oil level will be found a few minutes after filling. The **maximum level** of Figure 6 is recommended.
- The required quantity of oil depends on the installation position; for guidance, see Table 3.
- **Excess lubricant can contaminate the measuring chamber.**

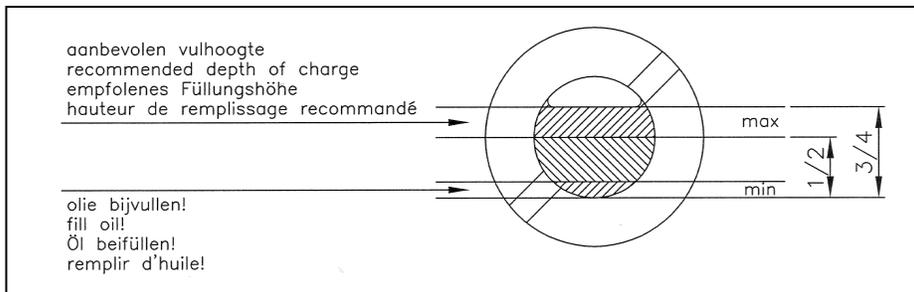


Figure 6: Recommended oil level in gauge glass

- Re-close **all** oil filler plugs (seal using O-rings).
- The time interval for checking the oil level depends on the individual operating conditions and gas qualities. Generally, check the oil level every 2 months. If the operator's experience shows otherwise, then the inspection intervals can be extended. Once it has been commissioned, the measuring instrument does not require any special servicing. In the case of operation with natural gas, the oil should generally be changed every 5 years, or earlier in the case of contamination.

Instructions for checking oil:

- During operation the oil is distributed in the meter, which means that under certain circumstances no oil is visible in the gauge glass. The **oil level** must therefore be checked once the meter has been idle for approx. 5 minutes. **To refill it, the meter must be depressurised.**
- **Never transport a rotary gas meter containing oil.** Make sure that the oil is drained out before transporting the meter (e.g. when sending the meter for repairs), **otherwise** the oil will penetrate the measuring chamber and **damage** the meter.
- The meter should be transported and stored with the rotor axis in **horizontal** position. Do not place the meter on its end or index.

First filling up, Oil reservoir = dry // Premier remplissage, Réservoir d'huile = sec Eerste vulling, Oliereservoir = droog // Erste auffüllung, Ölbehälter = trocken				
Volume Volume Volume Volumen		Installation Installatie Installation Installation	Oil reservoir Olie reservoir Réservoir d'huile Ölbehälter	Oil dosis Olie dosis Dose d' huile Öl-dosis
V [dm ³]	V [cft]			
5,530	0,1953	Horizontal Horizontaal Horizontal Horizontal	Front side / Voorzijde Face avant / Vorderseite	Max. 90 cc
			Rear side / Achterzijde Face arrière / Rückseite	Max. 90 cc
8,849 14,18	0,3125 0,5008	Vertical Verticaal Vertical Senkrecht	Front side / Voorzijde Face avant / Vorderseite	Max. 80 cc
			Rear side / Achterzijde Face arrière / Rückseite	Max. 95 cc

Table 3: Guide values for oil quantity on commissioning and for oil changes IRM-3 DUO

9. Commissioning

In order not to damage the meter,

- **slowly fill** the system until operating pressure is reached.
The pressure change should never exceed 350 mbar/sec.
You should use a bypass line for filling (recommendation: 12 mm pipe diameter).
- **Valves should be opened very carefully. The minimum time for opening and closing the pipe line should be 5 seconds during start up and working conditions.**
- Do not exceed the **measuring range**.
- Conduct a **tightness test!**

Attention: You must please note the instructions in Section 5, “Operating Location”.

Remarks after commissioning

Operation remarks

It is **not permitted** to carry out repair or maintenance **during use**. The meter is under pressure during operation and a hazardous condition may exist.

The meter may be measuring a medium with high or low temperatures. Thus, the meter may be very hot or very cold and touching the meter may cause injuries.

Maintenance and inspection remarks

Take care that, before the gas meter is removed out of the piping, the meter as well as the pipe are **not under pressure** and that its temperature is the same as the ambient temperature.

Ensure that during disassembly, the medium that is still in the pipe can be discharged. The medium may be poisonous, flammable, partially inflammable or in some other way still hazardous. Measures must be taken to prevent a dangerous situation.

Ensure during re-installation of the meter in the piping, that only the appropriate gaskets and mounting material are used. After remounting and pressuring the line a **tightness test should be performed.**

Only companies that are recognized by the manufacturer may carry out maintenance and repair of the meter.

10. Function check by means of pressure loss measurement

The correct function of the rotary gas meter can be inferred by measuring the pressure loss. If the pressure loss has increased by more than 50% compared to the value at the initial start-up, then there may be dirt, for example, in the measuring chamber that can lead to an incorrect result being obtained. In comparing the pressure loss, the load and the operating pressure must be considered.

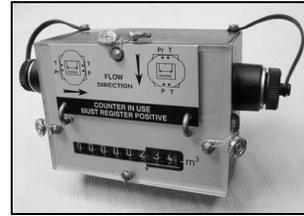
We recommend recording the pressure loss at several points in the flow when commissioning and logging these with the current operating pressure. If the current flow rate and operating pressure in later checks deviate from the original values, then the nominal pressure loss can be calculated from the original values. The pressure loss is proportional to the absolute pressure (p_{abs}) and the square of the flow rate (Q).

$$\Delta p \sim p_{abs} \cdot Q^2$$

11. Pulse generators

1. Standard LF Pulse generators on IRM-3 DUO

Standard, four LF pulse generators type Reed contact (Normally Open), are integrated in the Universal Index on two separate connection sockets. Additional there is a monitoring Reed switch (Normally Closed) for detection of line break or interferences caused by magnetic fields. The two connector sockets on the outside are of type Binder (female / six pins).



Universal Index

2. Optional LF Pulse generators on IRM-3 DUO

LF pulse generators (Type IN-S) or **Wiegand pulse generators** (Type IN-W) may be plugged onto the side of the index cover (type Encoder S1D) for **volume pulse output** to external devices (e.g. a volume corrector).



Absolute Encoder S1D

LF pulse generators Type IN-S11 are equipped with two low frequency (LF) pulse generators and an additional monitoring reed switch (PCM) for detection of line break or interferences caused by magnetic fields.



IN-S11

LF pulse generator Type IN-W11 is a Wiegand sensor module. This is a low-frequency pulser with a definite pulse width (>50 ms), which is highly reliable and ensures there is no mechanical wear.



IN-W11

Fit these pulse generators (if required) as follows onto the side of the index cover:

- Slide both **guides** of the pulse generator into the guide slot on the index cover until the guides can be heard to engage (clicking sound).
- Assign the **terminals** on the plug in accordance with the pin assignment on the meter/pulse generator.
- Use **screened cables** to the external device (in accordance with IEC-EN 60079-14)

3. HF Pulse generators on IRM-3 DUO (optional)

You can use **HF pulse generators** for higher frequencies.

HF pulse generators Type REPROX (optional) are pressure-tight assembled into the housing cover.

Remark: REPROX is not possible with integrated Absolute-Encoder index S1D.

- Assign the **terminals** on the plug in accordance with the pin assignment on the unit.
- Use a **screened cable** to the external device (in accordance with IEC-EN 60079-14).



The pulse values of the fitted pulse generators are stated on the meter.

The pin assignments of the pulse generators are stated on the type plate, or on an adhesive label on the unit. These assignments show the plan view of the pin contacts of the fitted flange connector, or the view of the soldered connection terminals of the coupler socket.

Remark: See for electrical connection plan, Annex G.

Pulse generators for subsequent installation are also available.

HF pulse generators (Type REPROX) can, however, be fitted only by the Elster-Instromet Customer Service (Tel. +49 (0)6134-605-0 / -346). By contrast, you can connect the plug yourself, as described above.

Warning! For correct usage in explosion hazardous areas it is required to observe and follow the national regulations and directives **strictly**.

All pulse generators may only be connected to **intrinsically safe device** (associated apparatus) if used in **potentially explosive atmospheres**. The certified intrinsic safety devices (barriers or interfaces) must comply with the requirements of ignition protection for category II (1/2) G, Ex ia IIC / IIB (see also Marking in Annex A).

12. Pressure test point

A straight coupling in accordance with DIN 2353 is pre-fitted on the meter housing for connection of a pressure sensor for instance.

The **pressure test point** is marked p_m and is designed for connection of $d = 6$ mm steel tube in accordance with **EN 10216-5**.

Note: We recommend that you use original Parker-Ermeto pipe unions only.

We recommend that you contact our **Elster-Instromet Customer Service (Tel. +49 (0)6134-605-0 / -346)** for conversion work and when installing additional devices.

Precautions:

To tighten the coupling nut, use two wrenches against twisting of the p -/ p_m -connection.

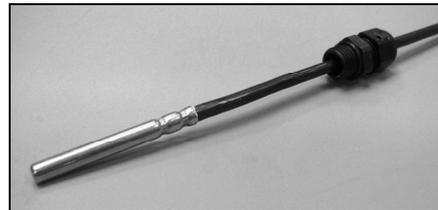
13. Temperature test point

You can use a maximum of **two temperature sensors** for **measuring the gas temperature** in the meter housing.

Note that temperature measurement on measuring systems in the open air may be influenced by the ambient temperature. For this reason, the **metering elements** outside the pipe should be **adequately insulated** against ambient temperature influences.

In order to achieve optimum thermal conduction, fill the thermowell(s) with a heat-conductive fluid or paste.

If no temperature test points in the meter housing are planned, **measure the temperature** in the pipe **upstream of the rotary gas meter** at a distance of up to $3 \times DN$.



14. Index versions (Type IRM-3 DUO)

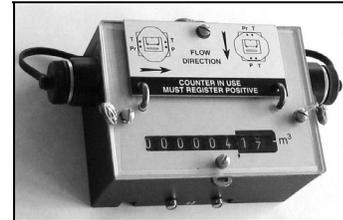
The meter can be equipped with various index versions:

Universal Index (standard)

- This is the standard version and it has two 8-digit mechanical roller indexes (depending on the flow direction, one index will be covered).
- Provides universal read-off.
- Can be rotated at least up to 100° about its axis.
- Four LF pulse generators type Reed contact (Normally Open) are integrated on two separate connection sockets, and there is one monitoring Reed switch (Normally Closed).
- Meters with a Universal Index can be used in all installation positions.
- Ventilated version.
- IP class IP44.
- Can optionally be fitted with an **auxiliary shaft**.
- Only read off from the front.
- Suitable for outdoor installation.

Index head S1 D (optional)

- It has two 8-digit mechanical roller indexes (depending on the flow direction, one index will be covered).
- Provides universal read-off.
- Can be rotated up to 355° about its axis.
- Suitable for outdoor installation.
- Designed for LF pulse generators which can be plugged on from the outside and which can be exchanged on site.
- Closed version.
- IP class IP67.
- Meters with S1 D can be used in all installation positions.
- Only read off from the front.
- Can optionally be fitted with an **auxiliary shaft**.



Universal Index



Universal Index
with auxiliary shaft



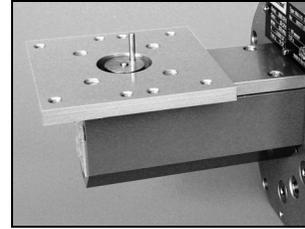
Index head S1 D



Index head S1 D
with auxiliary shaft

Instrument-drive (optional)

- This is a stand alone unit to provide a mechanical input into e.g volume corrector.
- Maximum torque “Instrument-drive”: See type plate.



Instrument Drive

15. Absolute ENCODER S1D (Optional)

- This has the same features as index head S1D.
- Can be used as main index.
- Closed version.
- IP class IP67.
- Optional available as a **top-mounted unit** (transmitter unit) on meters with **auxiliary shaft** (mechanical index drive), but only as Absolute Encoder **S1**.
- The encoder is suitable for connection to a series- connected additional device (volume corrector, data logger or bus system) in potentially explosive atmospheres (see table: Technical Data).
A device connected to the terminal box must feature at least the following approval as a related equipment for this:
[Ex ia IIC] for version with Namur interface,
[Ex ia/ib IIC/IIB] for version with SCR and SCR Plus interface.
The version with M-BUS interface is **not** ATEX-approved!



Absolute Encoder S1D



Top mounted unit

Connection of the encoder

- Use only a screened cable (IEC-EN 60079-14) to connect the encoder and ensure that the pin assignment is correct (see sticker next to the cover of the terminal box), Figure 7.

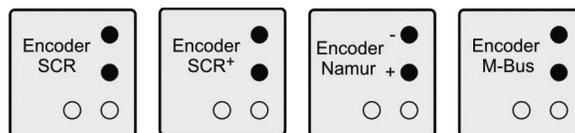


Figure 7: Encoder sticker

- When connecting the Namur interface, ensure that the 2-wire connection has the correct polarity. The M-Bus, SCR and SCR Plus interfaces are independent of the polarity.
- It is possible to apply screening and to run a cable to the meter housing or the pipe. Make sure to check in advance that the earthing system used allows earthing on both sides (earth loops and potential difference in earthing).

- The assignment of the lower two terminals in the connection box of the encoder index determines the direction of gas flow:

Bridge on lower terminals: Upper index is activated.
 Flow direction: From **right to left** or from **bottom to top**.

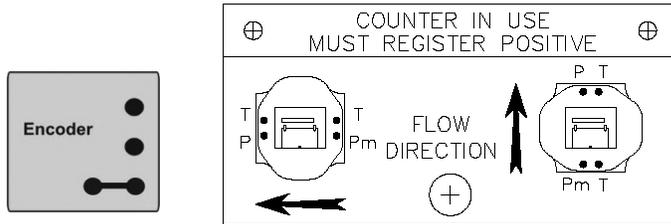


Figure 8: Flow from **right to left** or from **bottom to top**, lower terminals **assigned**.

Lower terminals unassigned: Lower index is activated.
 Flow direction: From **left to right** or from **top to bottom**.

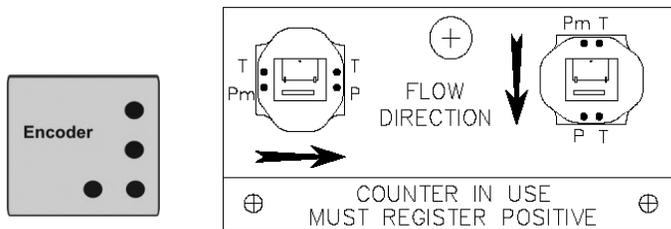


Figure 9: Flow from **left to right** or from **top to bottom**; lower terminals **unassigned**.

A pulse generator (Type LF) may be connected for pulse output to external devices (e.g. a volume corrector). Fit the pulse generator (if required) as described above in section 11.

16. Care and cleaning

- Clean off dirt on the meter only with a damp cloth. See also section 7: “Warning!”.
- Do not clean the meter and its accessories with solvent.
- Any media gentle on the applicable materials can be used as cleaning media.

17. Recycling and environmental protection

Elster-Instromet has reduced the transport packagings of the measuring instruments to the bare essentials. Packaging materials are always selected consistently with a view to recycling. The cardboard items used constitute secondary raw materials for the paperboard and paper industry. The Instapak® **foam packaging** items are **recyclable** and can be **reused**.

Plastic sheeting and strips/bands are also made of recyclable plastic. At Elster-Instromet, subsequent recycling and disposal are already elements of the product development process. When selecting the materials, we allow for reusability of the materials, suitability of materials and subassemblies for dismantling and separation, and the risks of environmental pollution and health risks when recycling and dumping on landfill sites. The rotary gas meters mainly consist of metallic materials which can be melted down again in steelworks and metallurgical plants and which can thus be reused a virtually unlimited number of times. The synthetic materials used are listed in Annex B so that sorting and separating of the materials for the purposes of subsequent recycling is possible.

The oil supplied is Shell Morlina S2 BL 10 (mineral oil), coloured red (pigment ratio 10 ml / 100 l oil) and, like all mineral oils (e.g. car engine oil), must be disposed of in an environmentally safe way.

18. Annex A

The pulse generators used in rotary gas meters meets the Ex requirements or have their own Ex approvals, and are marked in accordance with the table below:

Pulse generator Type	Designation of the sensors	Type-Examination Certificate EC Directive 94/9/EC (ATEX) IECEX Scheme Identification of the pulse generators	Manufacturer
LF pulse generators IN-S.. PCB E1	Reed contacts: KSK-1A81 -0810 KSK-1C97-1020 2322 KSK-1B90U-BV09904	TÜV 03 ATEX 2123 Ex marking:  II 2 G EEx ia IIC T4	Elster GmbH 55252 Mainz-Kastel Germany
	IN-W11 Wiegand sensor: Series 2000 magnetic sensor	FTZÚ 04 ATEX 0277 Ex marking:  II 2 G EEx ia IIC T6/T4	Elster s.r.o. 91601 Stará Turá Slovakia
		TÜV 01 ATEX 1776 Ex marking:  II 2 G EEx ia IIC T4	Elster GmbH 55252 Mainz-Kastel Germany
Absolute Encoder S1 D	Encoder system	TÜV 04 ATEX 2544 Ex marking:  II 2 G EEx ia/ib IIC/IIB T4	Elster GmbH 55252 Mainz-Kastel Germany
LF pulse generators (In Universal- and Compact- Index)	Reed contacts: RI 23A (Normally open)	Simple apparatus Passive components According to IEC-EN-60079-11 No marking	Philips
(In Universal- Index)	MDRR-DT 15-20AT (Normally closed)		Hamlin
See next page			

Pulse generator Type	Designation of the sensors	Type-Examination Certificate EC Directive 94/9/EC (ATEX) IECEX Scheme Identification of the pulse generators	Manufacturer
HF pulse Generators REPROX	Inductive proximity switches: Bi3-ISM-Y1	KEMA 03 ATEX 1188X Ex marking:  II 1 G Ex ia IIC T6	Elster-Instromet B.V. 7064 KA Silvode Netherlands
		IECEX KEM 09.0091X Ex ia IIC T6	Elster-Instromet B.V. 7064 KA Silvode Netherlands
		KEMA 02 ATEX 1090X Ex marking:  II 1 G Ex ia IIC T6	Hans Turck GmbH & Co. KG 45466 Mülheim an der Ruhr Germany
		IECEX KEM 06.0036X Ex ia IIC T6	Hans Turck GmbH & Co. KG 45466 Mülheim an der Ruhr Germany

19. Annex B

Synthetic materials used in rotary gas meters, see also section 17 “Recycling and Environmental Protection”.

Synthetic parts	Abbreviation	Chem. name
Gear assembly	POM	Polyoxymethylene
Gears and small parts	POM	Polyoxymethylene
Counter cover and counter	PC	Polycarbonate
Counter bottom section	PPA	Polyphthalamide
Digit rollers	PA12 PPO	Polyamide Polyphenylene oxide
Counter frame UI	PA12	Polyamide

20. Annex C



Declaration of Conformity Konformitätserklärung Déclaration de conformité



Product
Produkt
Produit

Gas meter – Rotary Meter
Gaszähler – Drehkolbengaszähler
Compteur de Gaz – Compteur rotatif

Type, Model
Typ, Ausführung
Type, Type de produit

IRM-3

Directive
Richtlinie
Directive

Product marking
Produkt-Kennzeichnung
Marquage de produit

EC-Directives
EG-Richtlinien
Directives européenne

Standards
Normen
Normes

EC Type-Examination
EG-Baumusterprüfung
Décision d'approbation
européenne

Surveillance Procedure
Überwachungsverfahren
Méthode à garder

Surveyor of the System
Überwachungsinstanz des Systems
Auditeur de la système

MID	PED	ATEX
CE Mxx 0102 T10198	CE 0038	Ex II 2 G c IIC T6
2004/22/EC	97/23/EC	94/9/EC
OIML R 137-1	ANSI B109.3	EN 13463-1 EN 13463-5
Notified Body 0122 NMI Certin B.V. Hugo de Grootplein 1 NL-3341 EG Dordrecht		
2004/22/EC Annex D	97/23/EC Annex III Modul H	
Notified Body 0102 Physikalisch-Technische Bundesanstalt (PTB) D-38116 Braunschweig	Notified Body 0038 Lloyd's Register UK-EC3M 4BS London	Notified Body 0344 KEMA NL-6812 AK Arnhem (construction file no. 2031040000703)

We declare as manufacturer:

Products labelled accordingly are manufactured according of the listed directives and standards. They correspond to the tested type samples. The production is subject to the stated surveillance procedure. No additional ignition sources are being created by assembly of the product's components.

Wir erklären als Hersteller:

Die entsprechend gekennzeichneten Produkte sind nach den aufgeführten Richtlinien und Normen hergestellt. Sie stimmen mit dem geprüften Baumuster überein. Die Herstellung unterliegt dem genannten Überwachungsverfahren. Durch den Zusammenbau der Produktkomponenten werden keine zusätzlichen Zündquellen erzeugt.

Déclaration du fabricant:

Les produits désignés en conséquence ont été fabriqués conformément aux exigences des Directives et Normes citées. Ils sont conformes au type éprouvé. La fabrication est soumise au Procédé de surveillance indiqué. L'assemblage des composants du produit ne génère aucune source d'allumage supplémentaire.

1.2.2011

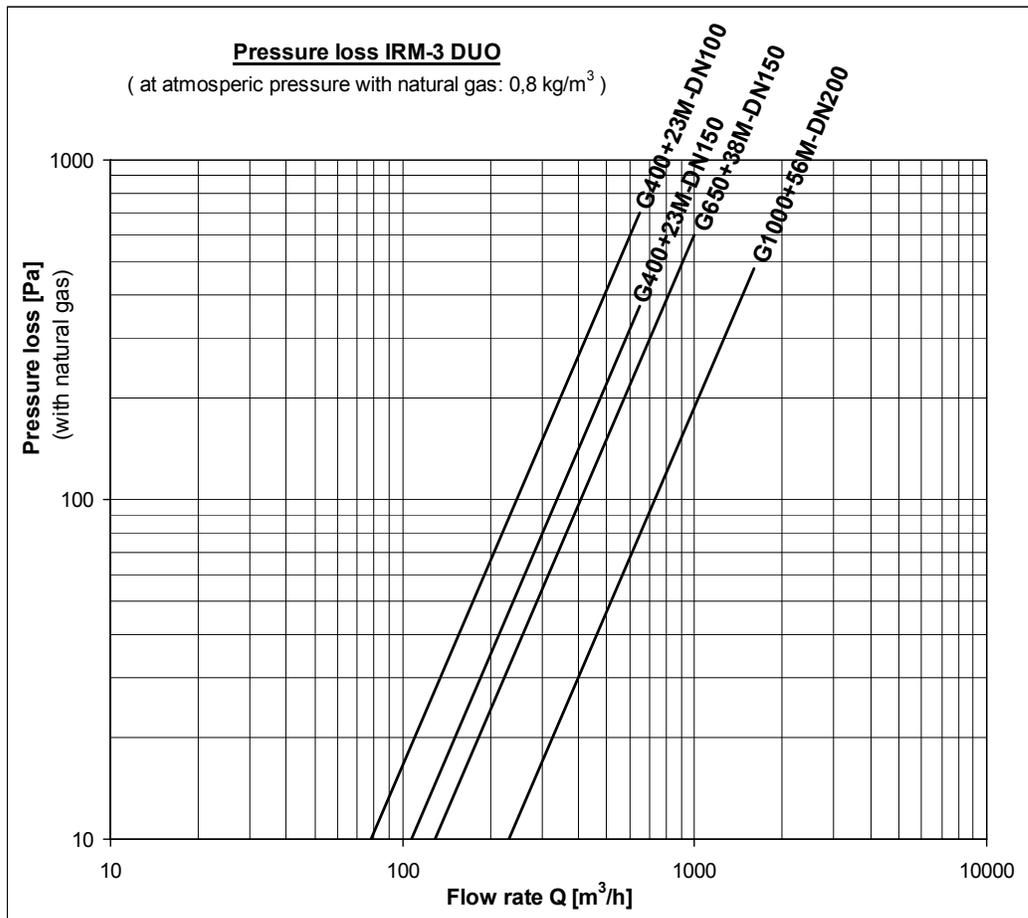
Division Director MMI
H. Dietrich

R&D Manager
M. Franz

21. Annex D

Pressure loss IRM-3 DUO

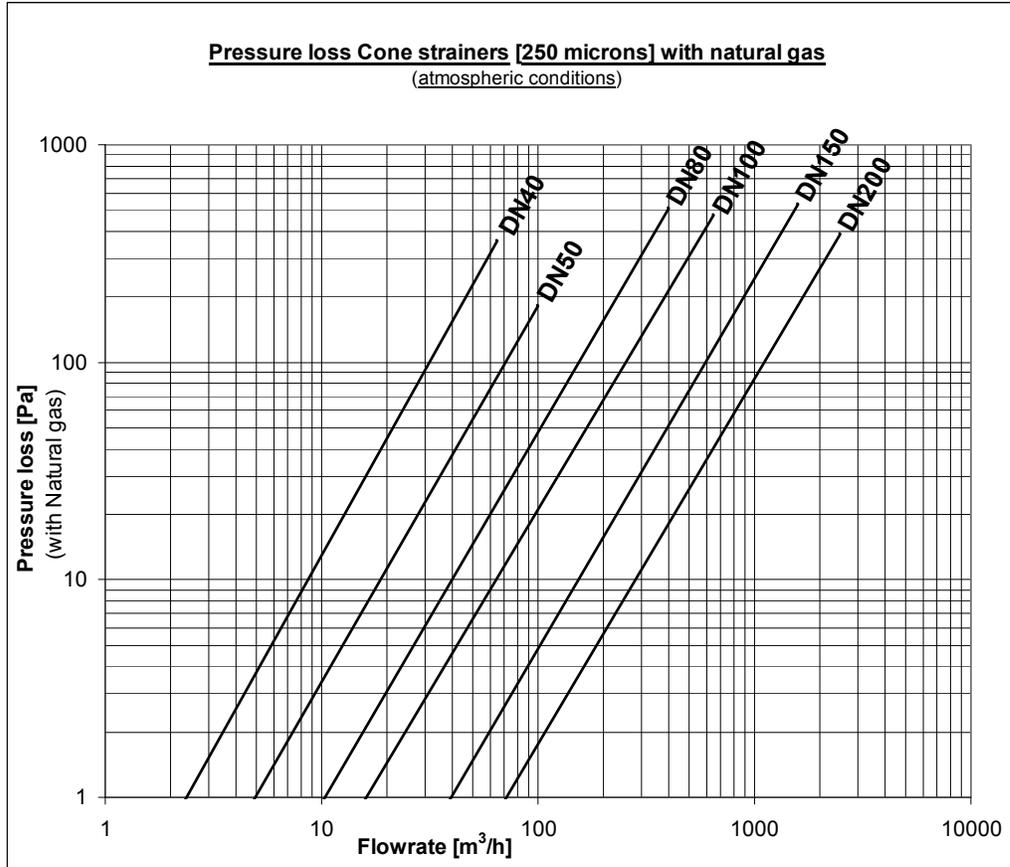
The pressure loss values refer to natural gas (0.8 kg/m^3) at atmospheric pressure. When using natural gas at higher operating pressures, these values must be multiplied by the absolute pressure (in bar).



Ref: LHR10005

Pressure loss cone strainers (250 microns)

The pressure loss values refer to natural gas (0.8 kg/m³) at atmospheric pressure.

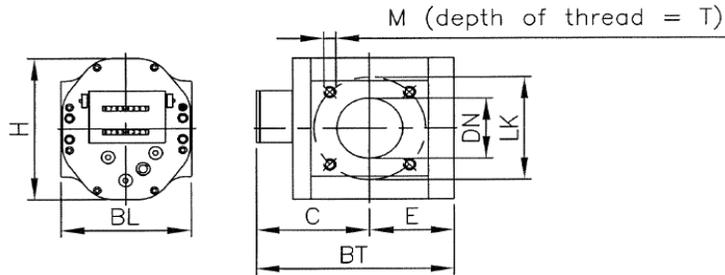


Ref. LHR10003

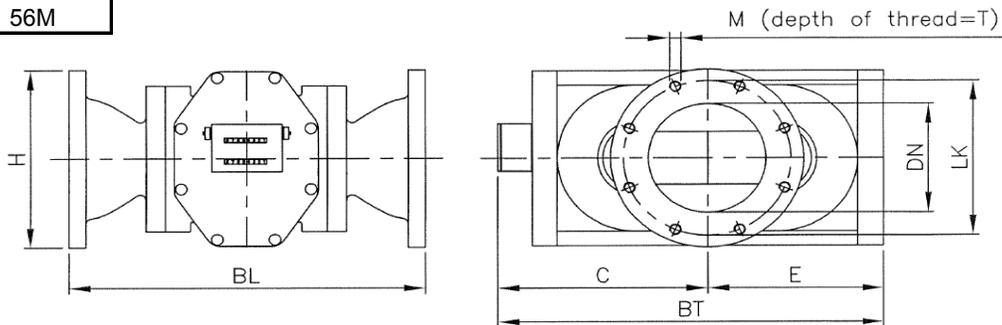
22. Annex E

Dimensions of rotary gas meters type IRM-3 DUO

G400 - G650
23M - 38M



G1000
56M



Flanges according EN 1092-1

Flow range	DN	LK	M	T	No.	H	BL	BT	C	E	WT [kg]
G400	4"	180	M16	24	8	308	241	466	270	196	46
G400	6"	240	M20	30	8	308	260	466	270	196	50
G650	6"	240	M20	30	8	308	260	598	336	262	62
G1000	8"	295	M20	30	12 / (8) ^(*)	340	600	810	442	368	113

All dimensions are in **mm** unless otherwise indicated // No. = Number of bolts

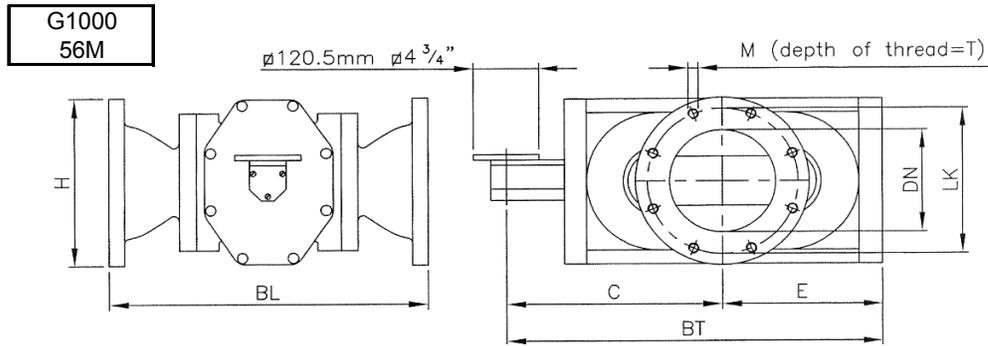
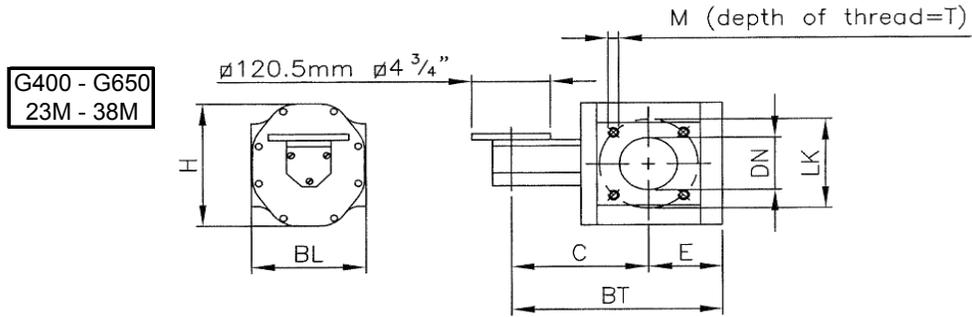
(*): Applies to PN16 / (PN10)

Flanges according ASME B16.5

Flow range	DN	LK	M	T	No.	H	BL	BT	C	E	WT [lbs]
23M	4"	7 1/2	5/8	15/16	8	12 1/8	9 1/2	18 3/8	10 5/8	7 3/4	101
23M	6"	9 1/2	3/4	1 3/16	8	12 1/8	10 1/4	18 3/8	10 5/8	7 3/4	110
38M	6"	9 1/2	3/4	1 3/16	8	12 1/8	10 1/4	23 9/16	13 1/4	10 5/16	137
56M	8"	11 3/4	3/4	1 3/16	8	13 3/8	23 5/8	31 7/8	17 3/8	14 1/2	249

All dimensions are in **inches** unless otherwise indicated // No. = Number of bolts

Dimensions of rotary gas meters type IRM-3 DUO-ID (with Instrument-Drive)



Flanges according EN 1092-1											
Flow range	DN	LK	M	T	No.	H	BL	BT	C	E	WT [kg]
G400	4"	180	M16	24	8	308	241	529	333	196	48
G400	6"	240	M20	30	8	308	260	529	333	196	52
G650	6"	240	M20	30	8	308	260	661	399	262	64
G1000	8"	295	M20	30	12 / (8) ^(*)	340	600	873	505	368	115

All dimensions are in **mm** unless otherwise indicated // No. = Number of bolts

(*): Applies to PN16 / (or PN10)

Flanges according ASME B16.5											
Flow range	DN	LK	M	T	No.	H	BL	BT	C	E	WT [lbs]
23M	4"	7 1/2	5/8	15/16	8	12 1/8	9 1/2	20 7/8	13 1/8	7 3/4	106
23M	6"	9 1/2	3/4	1 3/16	8	12 1/8	10 1/4	20 7/8	13 1/8	7 3/4	115
38M	6"	9 1/2	3/4	1 3/16	8	12 1/8	10 1/4	26	15 11/16	10 5/16	141
56M	8"	11 3/4	3/4	1 3/16	8	13 3/8	23 5/8	34 3/8	19 7/8	14 1/2	254

All dimensions are in **inches** unless otherwise indicated // No. = Number of bolts

23. Annex F

Electrical output pulse data

Pulse values IRM-3 DUO

IRM-3 DUO

IRM-3-DUO / [m³]		Ua	Low frequency pulses	High frequency pulses (option)	
Meter size (DUO)	Volume [dm ³]		LF pulse value [imp/m ³]	HF ^(*) pulse value [imp/m ³]	Frequency ^(*) at Qmax [Hz]
G400	5,53	1	1	720	130
G650	8,849	1	1	450	125
G1000	14,18	10	0,1	282	125

IRM-3 DUO / [cuft]		Ua	Low frequency pulses	High frequency pulses (option)	
Meter size (DUO)	Volume [cuft]		LF pulse value [imp/cuft]	HF ^(*) pulse value [imp/cuft]	Frequency ^(*) at Qmax [Hz]
23M	0,1953	100	0,01	20,3	130
38M	0,3125	100	0,01	12,7	134
56M	0,5008	100	0,01	8,0	124

(*): Stated values nominal, specific values can deviate

IRM-3 ID (Instrument Drive)

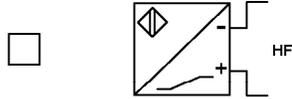
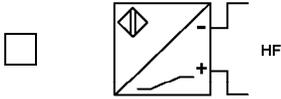
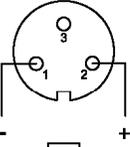
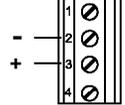
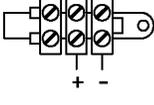
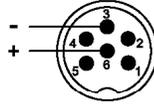
IRM-3 ID / [m³]		Ua	Low frequency pulses	High frequency pulses (option)	
Meter size (DUO)	Volume [dm ³]		LF pulse value [imp/m ³]	HF ^(*) pulse value [imp/m ³]	Frequency ^(*) at Qmax [Hz]
G400	5,53	1	N.A.	721	130
G650	8,849	1	N.A.	451	125
G1000	14,18	10	N.A.	282	125

IRM-3 ID / [cuft]		Ua	Low frequency pulses	High frequency pulses (option)	
Meter size (DUO)	Volume [cuft]		LF pulse value [imp/cuft]	HF ^(*) pulse value [imp/cuft]	Frequency ^(*) at Qmax [Hz]
23M	0,1953	100	N.A.	20,3	130
38M	0,3125	100	N.A.	12,7	134
56M	0,5008	100	N.A.	7,9	123

(*): Stated values nominal, specific values can deviate

24. Annex G

Electrical connection plan

cad: 1550473															
ZICHTBARE SITUATIE VAN DE SENSORAANSLUITING OP HET SCHOEPENWIEL / REFERENTIEWIEL OP DE GASMETER VISIBLE SITUATION FROM THE SENSOR CONNECTION ON THE TURBINE WHEEL / REFERENCE DISC ON THE GAS METER SICHTBARE SITUATION VON DEM AUFNEHMER ANSCHLUSS AUF DAS SCHAUFELRAD / REFERENZRAD AUF DEM GASZÄHLER SITUATION VISIBLE DE LA CONNEXION DU CAPTEUR SUR LA ROUE DE TURBINE / DISQUE DE RÉFÉRENCE SUR LE COMPTEUR DE GAZ															
HF		HF													
Bi3-ISM-Y1(REPROX)		IFM N95000													
Naderingsopnemer : Proximity switch : Näherungsschalter : Capteur de proximité : KEMA Nr.: 02ATEX1090X IECEx KEM 06.0036X II 1 G Ex ia IIC T6 Specificatie volgens : Specification acc. to : Spezifikation gemäss : Specification selon : IEC-EN 60947-5-6 / NAMUR		Naderingsopnemer : Proximity switch : Näherungsschalter : Capteur de proximité : PTB Nr.: 01ATEX2192 IECEx PTB 08.0058 II 1 G Ex ia IIC T4 Specificatie volgens : Specification acc. to : Spezifikation gemäss : Specification selon : IEC-EN 60947-5-6 / NAMUR													
															
<p>SOURIAU "840"</p> 				<p>ISM CONN. BOX ISM BOÎTE DE CONNEXION</p> 				<p>BARTEC CONN. BOX BARTEC BOÎTE DE CONNEXION</p> 				<p>BINDER "423" / "723" MALE</p> 			
OPNEMERS AANSLUITEN OP INTRINSIEK VEILIGE STROOMKRING (BIJV. ELSTER-INSTROMET MK15) SENSORS ARE TO BE CONNECTED TO INTRINSIC SAFE CIRCUIT (E.G. ELSTER-INSTROMET MK15) AUFNEHMERN ANSCHLIESSEN AN EIGENSICHEREN STROMKREIS (Z.B. ELSTER-INSTROMET MK15) CAPTEURS A BRANCHER SUR CIRCUIT INTRINSÈQUETIENT SURE (P.E. ELSTER-INSTROMET MK15)															
						Keuzetabel opnemers		PAGE 1/3							
REV		DWN.		DATE		CHD.		CH. REQ.		COPYHOLDERS		DRAWING NUMBER		1-550-473	
13		BBoe		28.10.10				110072							
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cad: 1550473

ZICHTBARE SITUATIE VAN DE SENSORAANSLUITING OP DE MULTI-INDEX TELWERKKOP
 VISIBLE SITUATION FROM THE SENSOR CONNECTION ON THE MULTI-INDEX COUNTER HEAD
 SICHTBARE SITUATION VON DEM AUFNEHMER ANSCHLUSS AUF DIE MULTI-INDEX ZÄHLERKOPF
 SITUATION VISIBLE DE LA CONNEXION DU CAPTEUR SUR LA COMPTEUR MULTI-INDEX

LF	LF / MF	LF / MF	HF
RI-23A / MDRR-DT	SJ2,2-N	SI3,5	BI3-ISM-Y1(REPROX)
Reedcontact : Reedcontact : Reedkontakt : Contact Reed : Simple Apparat Passive component U max.= 30Vdc I max.= 50mA P max.= 0.25W Specificatie volgens : Specification acc. to : Spezifikation gemäss : Specification selon : IEC-EN 60079-11	Spleetopnemer : Slotsensor : Schlitzinitiator : Capteur inductif : PTB Nr.: 99ATEX2219X IECEx TUN 04.0016X II 2 G Ex ia IIC T6 Specificatie volgens : Specification acc. to : Spezifikation gemäss : Specification selon : IEC-EN 60947-5-6 / NAMUR	Spleetopnemer : Slotsensor : Schlitzinitiator : Capteur inductif : KEMA Nr.: 02ATEX1090 X IECEx KEM 06.0036X II 2 G Ex ia IIC T6 Specificatie volgens : Specification acc. to : Spezifikation gemäss : Specification selon : IEC-EN 60947-5-6 / NAMUR	Naderingsopnemer : Proximity switch : Näherungsschalter : Capteur de proximité : KEMA Nr.: 02ATEX1090X IECEx KEM 06.0036X II 1 G Ex ia IIC T6 Specificatie volgens : Specification acc. to : Spezifikation gemäss : Specification selon : IEC-EN 60947-5-6 / NAMUR
	BINDER "423" / "723" FEMALE 	HARTING "staf 6" 	ISM CONN. BOX ISM BOÛTE DE CONNEXION

OPNEMERS AANSLUITEN OP INTRINSIEK VEILIGE STROOMKRING (BIJV. ELSTER-INSTROMET MK15)
 SENSORS ARE TO BE CONNECTED TO INTRINSIC SAFE CIRCUIT (E.G. ELSTER-INSTROMET MK15)
 AUFNEHMERN ANSCHLIESSEN AN EIGENSICHEREN STROMKREIS (Z.B. ELSTER-INSTROMET MK15)
 CAPTEURS A BRANCHER SUR CIRCUIT INTRINSÈQUETIENT SÛRE (P.E. ELSTER-INSTROMET MK15)



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cad: 1550473

ZICHTBARE SITUATIE VAN DE SENSORAANSLUITING OP DE MULTI-INDEX TELWERKKOP
 VISIBLE SITUATION FROM THE SENSOR CONNECTION ON THE MULTI-INDEX COUNTER HEAD
 SICHTBARE SITUATION VON DEM AUFNEHMER ANSCHLUSS AUF DIE MULTI-INDEX ZÄHLERKOPF
 SITUATION VISIBLE DE LA CONNEXION DU CAPTEUR SUR LA COMPTEUR MULTI-INDEX

LF	LF	LF	LF	LF	MF
IN-S..(Cable)	IN-S..(Female)	IN-S..(Male)	IN-S..(GDF)	IN-W..	2x Si3,5
<input type="checkbox"/> S10	<input type="checkbox"/> S15	1x <input type="checkbox"/> S11 2x <input type="checkbox"/> S12	1x <input type="checkbox"/> S11F 2x <input type="checkbox"/> S12F	<input type="checkbox"/> W11	<input type="checkbox"/>
Reedcontact : Reedcontact : Reedkontakt : Contact Reed : U max.= 24Vdc I max.= 50mA P max.= 0.25W Ri = 100Ω±20% TÜV Nr.: 03ATEX2123 II 2 G EEx ia IIC T4				Wiegand : U max.= 30Vdc I max.= 100mA P max.= 0.6W FTZÚ Nr.: 04ATEX0277 II 2 G EEx ia IIC T4(T6) TÜV Nr.: TÜV 01ATEX1776 II 2 G EEx ia IIC T4	
(White) LF 1 Ri (Brown) (Yellow) LF 2 Ri (Green) (Grey) PCM Ri (Pink)				(1) LF 1 Ri (4) (2) LF 2 Ri (5) (3) PCM Ri (6)	
(1) LF 1 Ri (2) (5) (1)* LF 2 Ri (6) (2)* (3) PCM** Ri (4)				(4) LF 1 Ri (6) (3) LF 2* Ri (5) (1) PCM Ri (2)	
(1) + LF (2) - (3) PCM Ri (4)				(1) MF 1 (4) (2) MF 2 (5)	
BINDER "423" / "723" FEMALE 		BINDER "423" / "723" MALE Pin 		BARTEC CONN. BOX BARTEC BOÎTE DE CONNEXION 	
* LF2 on 2nd connector for S12 and S12F ** PCM on 2nd connector for S12					

OPNEMERS AANSLUITEN OP INTRINSIEK VEILIGE STROOMKRING (BIJV. ELSTER-INSTROMET MK15)
 SENSORS ARE TO BE CONNECTED TO INTRINSIC SAFE CIRCUIT (E.G. ELSTER-INSTROMET MK15)
 AUFNEHMERN ANSCHLIESSEN AN EIGENSICHEREN STROMKREIS (Z.B. ELSTER-INSTROMET MK15)
 CAPTEURS A BRANCHER SUR CIRCUIT INTRINSÈQUETIENT SÛRE (P.E. ELSTER-INSTROMET MK15)



Keuzetabel opnemers

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