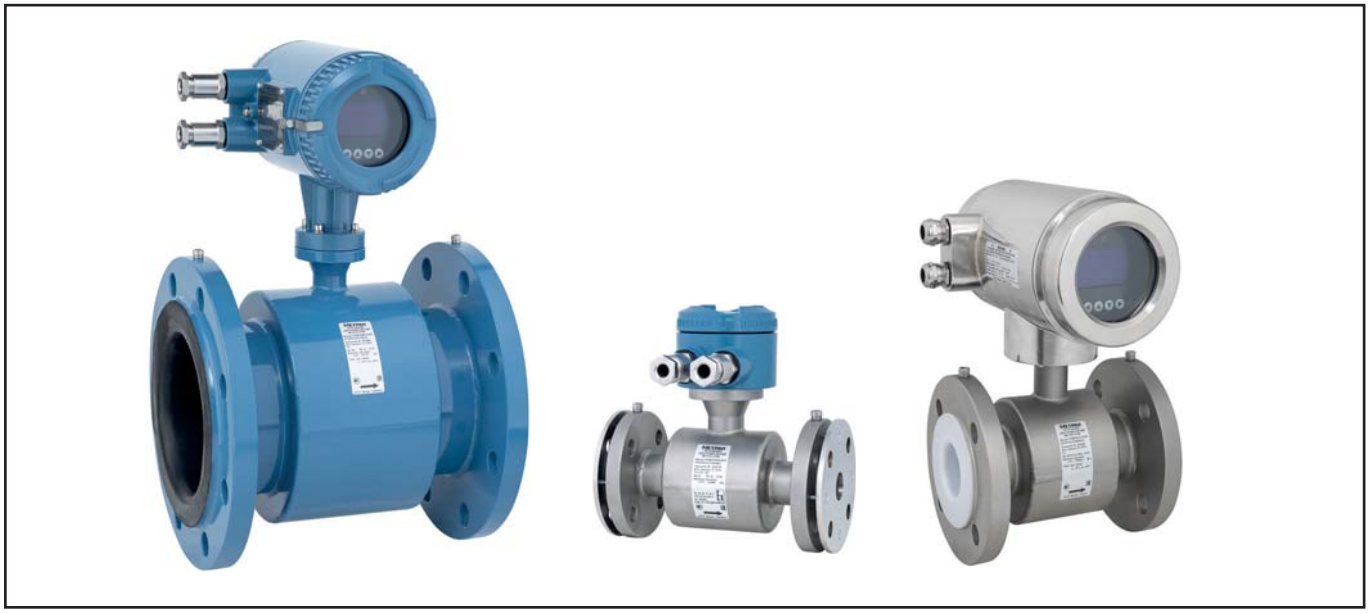
Metran-370M Magnetic Flowmeters



- **Process fluids: liquids with a minimum conductivity of 5 µS/cm**
- **DN: 3 to 1000 mm**
- **Reference accuracy:**
  - Standard reference accuracy of ±0.5% of rate
  - High reference accuracy of ±0.2% of rate
- **Process pressure: up to 42 MPa**
- **Process temperature: up to 180 °C**
- **Output: frequency/pulse, 4-20 mA, HART, Modbus, Profibus communications**
- **Integral or remote transmitter mounting**
- **Explosion-proof version**
- **Straight runs: 5 DN upstream and 2 DN downstream, version for operation without straight runs**
- **Verification interval is 5 years**
- **Simulation verification procedure without taking flowmeter out of line and without process shutdown**

Metran-370M Magnetic Flowmeters are designed to measure volumetric flow rate and volume of conducting liquids, pulps, emulsions, etc. They are used in process control systems in power, metals, chemical, food and beverage, pulp and paper, and other industries, including liquid custody transfer.

Key benefits:

- Measuring flow of corrosive fluids
- A wide range of models and sizes
- Various liner and electrode materials
- High measurement accuracy
- No pressure loss

The following flowmeter models are available:

- Metran-370MF – flanged
- Metran-370MR – reducer
- Metran-370MS – for measuring flow rate of pulps and slurries
- Metran-370MP – for high process pressure
- Metran-370MW – wafer
- Metran-370MH – hygienic.

DESIGN AND OPERATION

Metran-370M Flowmeters include a flow sensor and a transmitter. The sensor is installed directly into the pipeline and is a stainless steel pipe with flanges welded to it (for flanged design) and lined with non-conductive material. In the pipe, two magnetic coils and two electrodes isolated from the pipe are installed. Electrodes and coils are sealed in the housing consisting of two semi-cylinders welded to two rings mounted on the pipe. A stand hosting a terminal board for transmitter connection is attached to the housing. An electronics compartment, output terminals, power and grounding terminals are installed in the transmitter housing. Flowmeters are equipped with a local display and display standard outputs required for recording, adjustment and process control.

The principle behind magnetic flowmeters is based on the interaction of a moving conductor (an electrically conductive liquid) with a magnetic field according to Faraday's law of electromagnetic induction: an electromotive force (EMF) arises in a conductor moving perpendicular to the magnetic field. It is proportional to the velocity of the conductor. In this case, the direction of the EMF is perpendicular to both the conductor motion and the magnetic field. The magnetic field is formed with coils. The induced voltage is measured by the transmitter using flowmeter electrodes located flush with the lining. The measured voltage is amplified and processed by the transmitter, followed by flowmeter output generation.

BASIC PERFORMANCE SPECIFICATIONS

Metran-370MF

Figure 1. General Arrangement of Metran-370MF, Metran-370MS, Metran-370MP

Flanged sensor flowmeter. Used in most magnetic flowmeter applications: water, solutions, acids, bases, etc. A wide range of available sizes and options. Fig. 1 features models with installed lining protectors.

Specifications

Table 1

DN	3 to 1000 mm
Liner material	polyurethane, neoprene, hard rubber, PFA, PTFE, FEP, ceramic
Electrode material	316L stainless steel, alloy B-2, alloy C-276, titanium, tantalum, platinum-rhodium alloy, tungsten carbide coated stainless steel, titanium diboride
Maximum process pressure	5.1 MPa
Process connection	PN10 to PN40 per EN 1092-1, Class 150, Class 300 per ASME B 16.5 with raised face sealing surface, under special order
Version	general industrial and explosion-proof (Exd)
Accuracy	standard reference accuracy of ±0.5% of rate high reference accuracy of ±0.2% of rate
Ambient temperature	–40 to 60 °C
Process temperature	refer to limitations depending on the selected liner
Velocity range	0.1 to 15 m/s
IP rating	IP65, IP66/68, IP66/67
Grounding options	grounding straps, third electrode and fourth electrode, grounding rings

Metran-370MR

Flanged sensor and reducer flowmeter. Used when it's impossible to meet the straight run requirement and when the fluid velocity is not sufficient. Reducers increase liquid velocity in the flow tube making reliable low flow measurement available for this model. Eliminates the need for straight pipe runs.

Specifications

Table 2

DN	50 to 300 mm
Liner material	neoprene, hard rubber
Electrode material	316L stainless steel, alloy B-2, alloy C-276, titanium, tantalum, platinum-rhodium alloy, tungsten carbide coated stainless steel
Maximum process pressure	10.2 MPa
Process connection	PN10 to PN40 per EN 1092-1 with raised face sealing surface, Class 150, Class 300 per ASME B 16.5 with raised face and ring type joint sealing surface, under special order
Version	general industrial and explosion-proof (Exd)
Accuracy	standard reference accuracy of ±0.5% of rate high reference accuracy of ±0.2% of rate
Ambient temperature	–40 to 60 °C
Process temperature	refer to limitations depending on the selected liner
Velocity range	0.1 to 10 m/s
IP rating	IP65, IP66/68, IP66/67
Grounding options	grounding straps, third electrode and fourth electrode, grounding rings

Figure 2. General Arrangement of Metran-370MR

Metran-370MS

Flanged sensor flowmeter for measuring pulps and slurries causing significant measurement noise. An increased coil drive frequency helps to eliminate overlapping of noise generated by highly concentrated solids and the signal. This ensures reliable flow measurement for liquids with a concentration of solids up to 55%. Used in mining, pulp and paper and other industries. Available only with wall mount transmitter.

Specifications

Table 3

DN	15 to 1000 mm
Liner material	polyurethane, neoprene, hard rubber, PFA, FEP, ceramic
Electrode material	316L stainless steel, alloy B-2, alloy C-276, titanium, tantalum, platinum-rhodium alloy, tungsten carbide coated stainless steel, titanium diboride
Maximum process pressure	10.2 MPa
Process connection	PN10 to PN100 per EN 1092-1 with raised face sealing surface, Class 150, Class 300, Class 600 per ASME B 16.5 with raised face and ring type joint sealing surface, under special order
Version	general industrial and explosion-proof (Exd)
Accuracy	standard reference accuracy of ±0.5% of rate
Ambient temperature	–40 to 60 °C
Process temperature	refer to limitations depending on the selected liner
Velocity range	0.1 to 15 m/s
IP rating	IP65, IP66/68, IP66/67
Grounding options	grounding straps, third electrode and fourth electrode, grounding rings

Metran-370MP

Flanged sensor flowmeter for liquid flow measurement at increased process pressure up to 42 MPa.

Specifications

Table 4

DN	25 to 250 mm
Liner material	PFA
Electrode material	316L stainless steel, nickel alloy B-2, nickel alloy C-276, titanium
Maximum process pressure	42 MPa
Process connection	PN63, PN100 per EN 1092-1 with raised face sealing surface, Class 600, Class 900, Class 1500, Class 2500 per ASME B 16.5 with ring type joint sealing surface, under special order
Version	general industrial and explosion-proof (Exd)
Accuracy	standard reference accuracy of ±0.5% of rate high reference accuracy of ±0.2% of rate
Ambient temperature	–40 to 60 °C
Process temperature	refer to limitations depending on the selected liner
Velocity range	0.1 to 15 m/s
IP rating	IP65, IP66/68, IP66/67
Grounding options	grounding straps, grounding rings

Metran-370MW

Cost-effective solution with wafer sensor. Not used for high pressure processes.

Specifications

Table 5

DN	25 to 200 mm
Liner material	PFA, PTFE, FEP
Electrode material	316L stainless steel, nickel alloy B-2, nickel alloy C-276
Maximum process pressure	1.6 MPa
Process connection	wafer
Version	general industrial and explosion-proof (Exd)
Accuracy	standard reference accuracy of ±0.5% of rate high reference accuracy of ±0.2% of rate
Ambient temperature	–40 to 60 °C
Process temperature	refer to limitations depending on the selected liner
Velocity range	0.1 to 15 m/s
IP rating	IP65, IP66/68, IP66/67
Grounding options	process connection, third electrode

Figure 3. General Arrangement of Metran-370MW

Metran-370MH

Flowmeter with hygienic sensor and Tri-Clamp process connection. Usually used in food, beverage, and pharmaceutical applications.

Specifications

Table 6

DN	15 to 200 mm
Liner material	PFA
Electrode material	316L stainless steel, nickel alloy B-2, nickel alloy C-276
Maximum process pressure	1.6 MPa
Process connection	Tri-Clamp, slotted nut
Version	general industrial and explosion-proof (Exd)
Accuracy	standard reference accuracy of ±0.5% of rate high reference accuracy of ±0.2% of rate
Ambient temperature	–40 to 60 °C
Process temperature	–20 to 180 °C
Velocity range	0.1 to 15 m/s
IP rating	IP65, IP66/68, IP66/67
Grounding options	process connection

Figure 4. General Arrangement of Metran-370MH

Transmitters

There are two types of transmitters available for each flowmeter model, i.e., field mount and wall mount. Transmitters differ in their mounting style and access to the terminal block. Application with flow sensors, measurement capabilities, functionality and outputs are similar.

Field mount is a standard integral mount transmitter. It may be used remotely using a bracket for wall or 50 mm pipe mount (included in the delivery set) and a remote cable.

Table 7

Mounting	integral and remote up to 100 m
Housing material	aluminum alloy coated with phenol-formaldehyde resin or 304 stainless steel
Version	general industrial and explosion-proof (Exd)
Supply voltage	85-250 VAC, 20-36 VDC
Power consumption	12 W maximum when powered from DC supply 20 VA maximum when powered from AC supply
Outputs	frequency/pulse 0-5000 Hz, 4-20 mA, HART, RS-485 Modbus, Profibus DP, Profibus PA
Ambient temperature	–50 to 60 °C
IP rating	IP65, IP66/67
Display	backlit OLED, control with 4 keys or infrared remote control (optional)
Additional features	alarm relay; three totalizers: forward and reverse flow, net total; 5 access levels; diagnostics and process noise filter; empty pipe detection, etc.

Wall mount is only used remotely in cases where it is convenient for the user to place the transmitter on the wall using a bolted connection and as part of Metran-370MS flowmeter.

Table 8

Mounting	remote up to 100 m
Housing material	aluminum alloy coated with phenol-formaldehyde resin
Version	general industrial
Supply voltage	85-250 VAC, 20-36 VDC
Power consumption	12 W maximum when powered from DC supply 20 VA maximum when powered from AC supply
Outputs	frequency/pulse 0-5000 Hz, 4-20 mA, HART, RS-485 Modbus, Profibus DP, Profibus PA
Ambient temperature	–50 to 60°C
IP rating	IP65
Display	backlit OLED (370MS – LCD), control with 4 keys
Additional features	alarm relay; three totalizers: forward and reverse flow, net total; 5 access levels; diagnostics and process noise filter; empty pipe detection, etc.

Figure 5. Transmitters

Measurement Ranges

Volumetric flow rate ranges (Q) depending on flowmeter DN and flow velocity (V) are given in the table below. Flowmeter DN is selected based on the specific value of process flow rate and may be less than the pipe size. In this case, reducers and required straight runs are installed.

Table 9

DN, mm	Volumetric Flow Rate Q, m^3/h		
	Q_{min} at V_{min}=0.1 m/s	Q at V=0.5 m/s (Q at V=0.3 m/s for Metran-370MR)	Q_{max} at V_{max}=15 m/s (Q_{max} at V_{max}=10 m/s for Metran-370MR)
3	0.003	0.013	0.382
6	0.01	0.051	1.526
10	0.028	0.141	4.239
15	0.064	0.318	9.538
20	0.113	0.565	16.956
25	0.177	0.883	26.494
32	0.289	1.447	43.407
40	0.452	2.261	67.824
50	0.707	3.533 (2.121)	105.98 (70.65)
65	1.19	5.97 (3.57)	179.1 (119.4)
80	1.81	9.04 (5.43)	271.3 (180.86)
100	2.83	14.13 (8.49)	423.9 (282.6)
125	4.42	22.08 (13.26)	662.34 (441.56)
150	6.36	31.79 (19.08)	953.78 (635.85)
200	11.3	56.52 (33.9)	1696.0 (1130.4)
250	17.66	88.31 (52.98)	2649.0 (1766.25)
300	25.43	127.2 (76.29)	3815.0 (2543.4)
350	34.62	173.1	5193.0
400	45.0	226.1	6782.0
450	57.0	286.1	8584.0
500	71.0	353.3	10598.0
600	102.0	508.7	15260.0
700	138.0	692.4	20771.0
800	181.0	904.3	27130.0
900	229.0	1145.0	34336.0
1000	283.0	1413.0	42390.0

Liner Material

Table 10

Liner	Description
Polyurethane	High abrasion resistance, suitable for slurries with small particles and drilling water. Not for harsh environments. Process temperature: –10 to 60 °C (up to 80 °C short-term). Process pressure: 6 MPa maximum. DN: 15 to 1000 mm.
Neoprene	Excellent elasticity, good abrasion resistance. Resistant to low-strength acids, bases, salts and other fluids. Not resistant to corrosion by strong oxidants. Suitable for sea water. Process temperature: –10 to 60 °C (up to 80 °C short-term) Process pressure: 6 MPa maximum. DN: 40 to 1000 mm.
Hard rubber	Suitable for measuring hydrochloric acid, acetic acid, oxalic acid, ammonia water, phosphoric acid, sulphuric acid to 50%, sodium hydroxide, potassium hydroxide. Used for common acids, bases and salts, not resistant to corrosion by strong oxidants. Process temperature: –10 to 60 °C (up to 80 °C short-term). Process pressure: 6 MPa maximum. DN: 40 to 1000 mm.
PFA	High resistance to chemical compounds. Recommended in case of possible vacuum in the pipeline. Process temperature: –20 to 120 °C. –10 to 160 °C (up to 180 °C short-term) for high temperature version. Process pressure: 42 MPa maximum. DN: 3 to 1000 mm.
PTFE	Excellent chemical resistance, application with hydrochloric, sulphuric, nitric acid, bases and various organic solvents. Not suitable for fluids containing solids. Process temperature: –20 to 120 °C. –20 to 120 °C (up to 150 °C short-term) for high temperature version. Process pressure: 10 MPa maximum. DN: 15 to 1000 mm.
FEP	Chemical resistance is similar to PTFE. Process temperature: –10 to 130 °C (up to 150 °C short-term). Process pressure: 42 MPa maximum. DN: 3 to 1000 mm.
Ceramic	Withstands high temperatures, erosion and wear. Fully resistant to vacuum. Process temperature: –20 to 120 °C. –10 to 180 °C for high temperature version. Process pressure: 1.6 MPa maximum. DN: 25 to 350 mm.

Electrode Material

Table 11

Material	Description
316L stainless steel	Used with low-corrosion liquids.
Hastelloy B-2 nickel alloy	Resistant to hydrochloric acid of all concentrations up to the boiling point, phosphoric and sulfuric acid at concentrations up to 60%. Also resistant to copperas, phosphates, hydrofluoric acid, various organic acids, bases and salts.
Hastelloy C-276 nickel alloy	Resistant to acids: nitric acid up to 10%, salicylic acid, acetic acid, boric acid, oil acid, cresylic acid, phosphoric acid, fatty acids, methanoic acid. Also resistant to their salts. Resistant to oxidizing ferric and cupric salts, sea water, glycerin, methyl alcohol, caustic soda.
Titanium	Resistant to corrosive media, such as sea water, chlorine salt solutions, hypochlorite salts, nitric acid, various organic acids and bases. Not resistant to reducing high-purity acids, such as sulphuric acid, hydrochloric acid.
Tantalum	High resistance to corrosive media. Suitable for all chemical media, except for hydrofluoric acid, fuming sulphuric acid and bases.
316L coated with tungsten carbide	High hardness and wear resistance
Platinum/iridium	Applicable with all chemical media, except for ammonium salt
Titanium diboride (TiB_2)	Moderate corrosion resistance. Available only with ceramic liner for media causing extreme wear.

Material properties described in Tables 10 and 11 are given for reference only. To select a flowmeter for abrasive or corrosive processes, please contact Customer Support Center or a Local Sales Office.

Approvals

Flowmeters comply with the following Customs Union Technical Regulations:
- CU TR 004/2011 On Low Voltage Equipment Safety
- CU TR 020/2011 On Electromagnetic Compatibility of Technical Equipment.

Explosion-proof flowmeters comply with Customs Union Technical Regulations (CU TR) 012/2011 On Safety of Equipment Designed for Operation in Explosive Environments, GOST 31610.0-2014 (IEC 60079-0:2011) and have Explosion-Proof Enclosure protection type (d) per GOST IEC 60079-1-2013 with marking:

1EX db IIB T6 Gb X

$-25\ ^{\circ}C \le T_{amb} \le 60\ ^{\circ}C$ – transmitter;
$-20\ ^{\circ}C \le T_{amb} \le 60\ ^{\circ}C$ – sensor.

Remote control has Intrinsically Safe Electrical Circuit (i) protection type per GOST 31610.11-2014 (IEC 60079-11:2011) with marking:

1EX ib IIB T4 Gb X

$0\ ^{\circ}C \le T_{amb} \le 50\ ^{\circ}C$.

Circuit parameters: $U_0 = 3.6$ V, $I_0 = 0.6$ mA, $P_0 = 2.16$ mW.

X sign, which follows marking, means it is required to observe the requirements (special conditions) given in the Ex approval certificate.

Flowmeters with PTFE, PFA, hard resin liners and stainless steel, Hastelloy electrodes are approved for use with food and drinking water.

Flowmeters are seismic resistant when earthquake grade is 9 on MSK-64 scale and they are installed up to 70 m above grade level.

Access Levels

There are several levels of access to flowmeter settings, each with a specific password. Passwords can be changed by the user if necessary in accordance with a local policy.

Each access level corresponds to a specific available functionality:
- Access level 1. The user can view configuration parameters.
- Access level 2. The user can also change a number of parameters sufficient to commission the flowmeter and can enable alerts.
- Access level 3. The user can also reset totalizer and control the noise filter.
- Access level 4. The user can also control flowmeter calibration.
- Access level 5. The user can also change passwords for access levels 1-4.

Sealing

The transmitter is equipped with clips to protect covers from accidental opening. Clips have holes that can be used for sealing if required locally.

Measurement Error

Flowmeters are included in the Federal Information Fund for Ensuring the Uniformity of Measurements.

Error limits in measuring volumetric flow rate and volume at flow velocity (V) of 0.5 to 15 m/s (0.3 to 10 m/s for Metran-370MR):
- ±0.5% of rate – standard accuracy version,
- ±0.2% of rate – high accuracy version.

Error limits at flow velocity of 0.1 to 0.5 m/s (0.1 to 0.3 m/s for Metran-370MR):
- ±(0.25/V)% of rate for standard accuracy flowmeters,
- ±(0.1/V)% of rate for high accuracy flowmeters,
- ±1% for DN 3 mm.

When verification is performed by simulation, permissible error limits in volumetric flow rate and volume measurements for the model with ±0.2% error are assumed to be ±0.5% of rate.

Flow measurement at flow velocity lower than 0.1 m/s is possible but not rated.

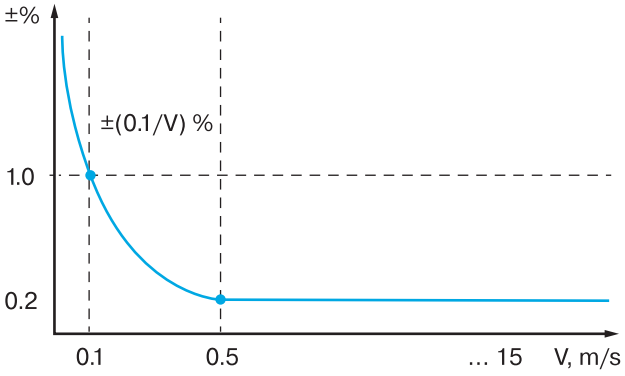


Figure 6. High Accuracy Flowmeter Error Chart

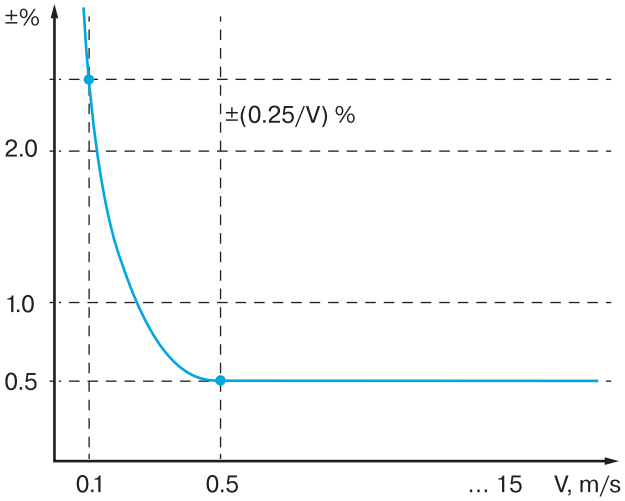


Figure 7. Standard Accuracy Flowmeter Error Chart

Verification

Verification interval is 5 years.

Verification is performed using one of the two methods: flow lab or simulation on site with no process shutdown.

Simulation verification includes two main stages: 1) measuring parameters of flow sensor coils and comparing them with the values obtained in manufacturing and recorded in the flowmeter technical data sheet; 2) connecting the flow simulator (by default, 8714) and comparing the set velocities with those obtained at the flowmeter output as a result of simulation. Next, deviations are calculated and compared with the tolerances specified in the verification procedure. If all the results are within the specified tolerances, the flowmeter is considered to have passed the simulation verification.

For simulation verification capability, the flowmeter model string shall include DV option. The option includes recording factory parameters of coils and installing connectors for 8714 simulator.

Diagnostics and Alerts

- Empty pipe diagnostics
- Diagnostics of exceeding maximum flow rate
- Low flow diagnostics
- Flow instability control
- Open circuit
- Noise filter with possibility to configure level and filter response delay

The noise filter allows you to fine-tune the meter to operate in noisy processes, especially when working with fluids with a high content of solid particles. Solids rub against electrodes causing measurement noise, and the output has a typical sawtooth shape. With the filter on and properly adjusted, the output will be significantly more stable.

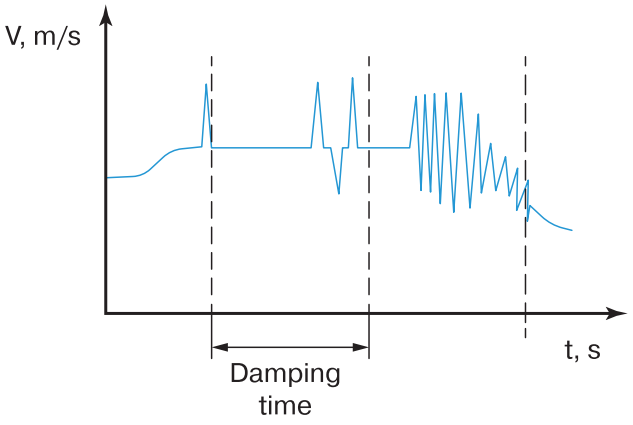


Figure 8. Output without Filtration

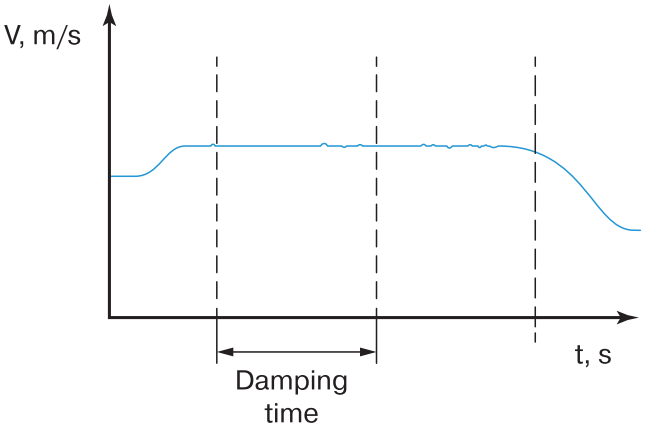


Figure 9. Output with Configured Filter

Local Operator Interface

Local operator interface (LOI) is a transmitter control center. The LOI includes the display and four keys. Using keys, the operator can access transmitter functions to change configuration parameters, check totals, etc. The LOI is integrated into the transmitter housing. The display remains visible at ambient temperatures from –40 to 60 °C. At temperatures below, contrast decrease is possible. Depending on the access level, different LOI functionality is available to the user.

The LOI continuously displays the following information:

- Current flow rate and direction
- Flow rate units
- Flow direction
- Alarms
- Flow rate scale and its percentage depending on flowmeter configuration
- The following parameters are displayed alternately: forward flow totalizer; reverse flow totalizer; net flow totalizer; current flow velocity, etc.

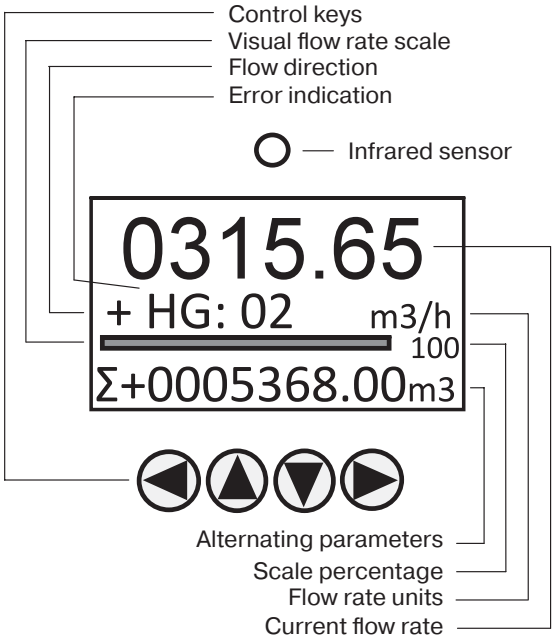


Figure 10. Field Mount Transmitter LOI

Infrared Remote Control

It is designed to control the flowmeter when opening the transmitter cover is undesirable or unacceptable. For example, if it is located in corrosive or explosive environments.

The LOI board of the field mount transmitter has an infrared sensor capable of reading control signals. Control is performed through the glass of the transmitter front cover when the remote control is directed at the flowmeter display (infrared sensor). The remote control operates reliably at a distance of at least 3 meters.

The remote control has buttons for navigating through menu items, saving parameters, and entering numeric data.

Ingress protection of the remote control is IP20. It may be used in hazardous locations.

Powered by a CR2032 battery.

Figure 11. Infrared Remote Control

Outputs

Active frequency/pulse output, open collector type.

Maximum switching current is 32 mA, maximum switching voltage is 30 V. Galvanic isolation from the housing and other outputs. Pulse output range is 0 to 1000 pulses/sec. Frequency output range is 1 to 5000 Hz. Frequency/pulse output corresponds to instantaneous flow rate in frequency mode and to fluid volume in pulse mode.

Active 4-20 mA and HART digital output.

Analog signal is galvanically isolated from the flowmeter housing, pulse signal and transferred via the current loop separately from flowmeter power lines (four-wire diagram). The analog signal is powered by the flowmeter internal power supply that is galvanically isolated from the supply circuits and the flowmeter housing. Analog output corresponds to instantaneous flow rate.

Analog output can operate in three modes:

- Measurement, output current is within 4-20 mA;
- HART multidrop, output current is fixed at 4 mA;
- Flow measurement in two directions (4-12 mA, 12-20 mA). 4-12 mA current loop range is used for reverse flow, 12-20 mA current loop range is used for forward flow.

250 Ohm minimum load is required for HART communications.

Device Description (DD) files required to integrate the flowmeter into HART Communicators, AMS Device Manager and other host systems may be downloaded at https://metran.com/.

Modbus digital signal based on RS-485 standard.

Provides flowmeter communication with other devices using a signal via a separate two-wire communication line and meets RS-485 interface requirements and Modbus protocol specifications. RTU mode is used for communication.

Modbus exchange rate is set from the following range of possible values: 1200; 2400; 4800; 9600; 19200; 38400 baud.

Stop bits: 1 or 2.

Parity: EVEN, ODD, NO parity.

Factory settings:

- Exchange rate: 9600 baud;
- Address 001;
- 1 stop bit;
- Parity: No Parity.

RS-485/RS-232 or RS-485/USB protocol converters are used for flowmeter configuration via Modbus protocol. ModBus-Master, a specialized software used to configure and diagnose flowmeters with Modbus digital signal, is available at https://metran.com/.

ModBus-Master

ModBus-Master is a simple and convenient tool for working with all Metran flowmeters. It supports the following features when working with Metran-370M:

- Read real-time information about the flowmeter, its settings, measured variables and totalizers;
- Full flowmeter configuration to fit the fluid;
- Zero adjustment;
- Frequency/pulse and analog output configuration;
- Read and configure diagnostic messages;
- Configuration of advanced diagnostics, including noise filters, etc.

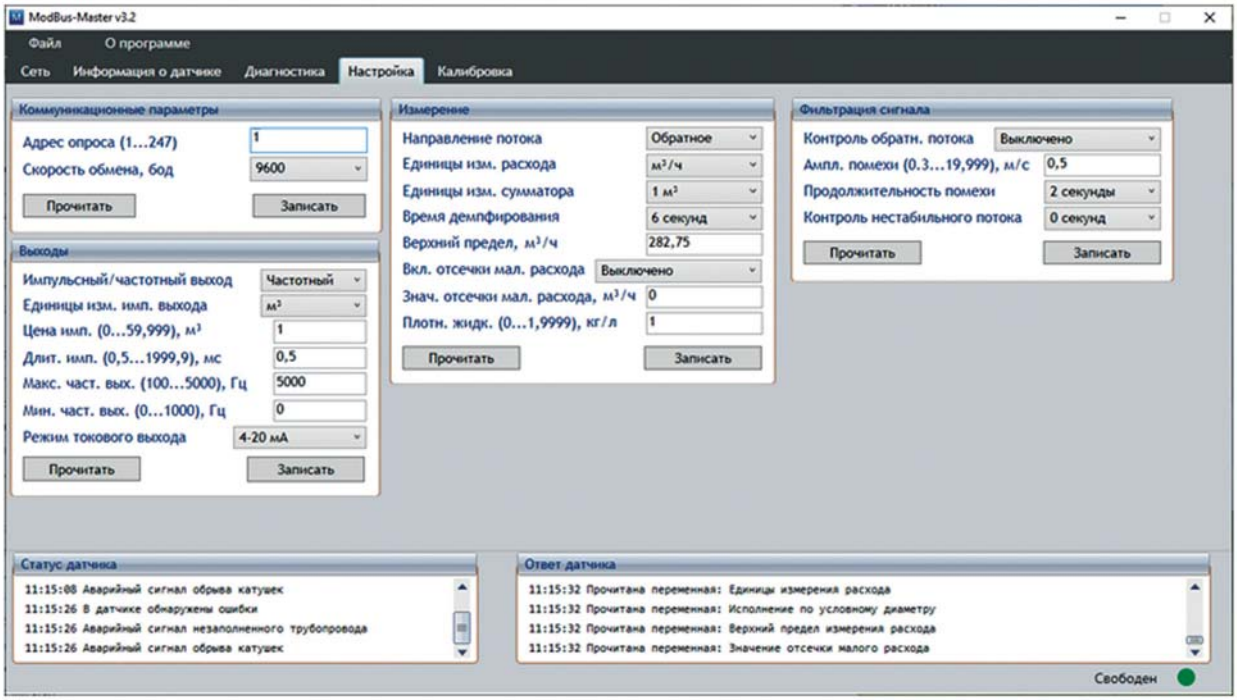


Figure 12. Flowmeter Configuration in ModBus-Master

MOUNTING

The flowmeter shall be installed in a location that ensures the flow tube remains full during operation. Flowmeters may be installed in vertical, horizontal, or inclined pipelines. If the device is installed in a vertical or inclined pipeline, liquids shall flow upwards. The mounting location shall ensure operation and convenient maintenance. Mounting examples are shown in Figure 11.

Standard requirements to straight runs are at least 5 DN upstream and 2 DN downstream from the electrode plane. Refer to Figure 12. Metran-370MR has reducers, so it is allowed to install it without meeting the straight run requirements (up to 0 DN upstream and 0 DN downstream). Refer to Figure 4.

It is allowed to use a mounting kit with reducers that fits closely to the flowmeter mating flange at an angle of $\alpha/2$, where $\alpha = 15^{\circ}$ is the maximum allowable narrowing for a reducer. Refer to Figure 13.

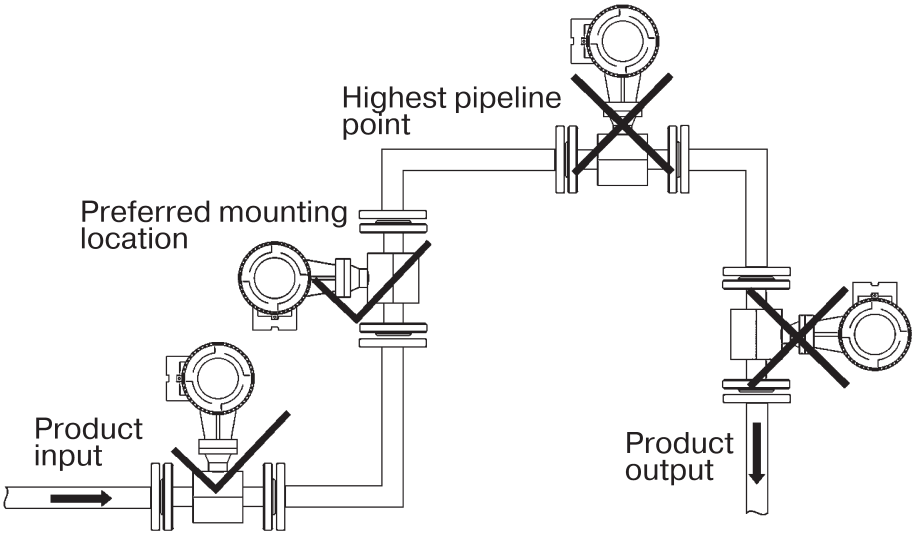


Figure 13. Preferred Flowmeter Mounting Location

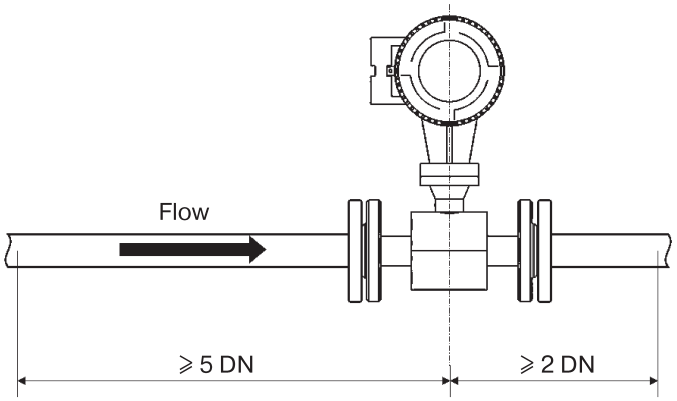


Figure 14. Straight Run Requirement (except Metran-370MR)

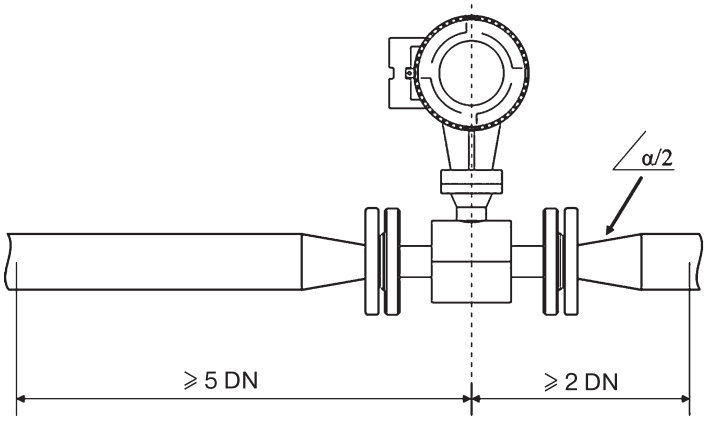


Figure 15. Straight Run Requirement when Using a Mounting Kit with Reducers

DIMENSIONAL DRAWINGS

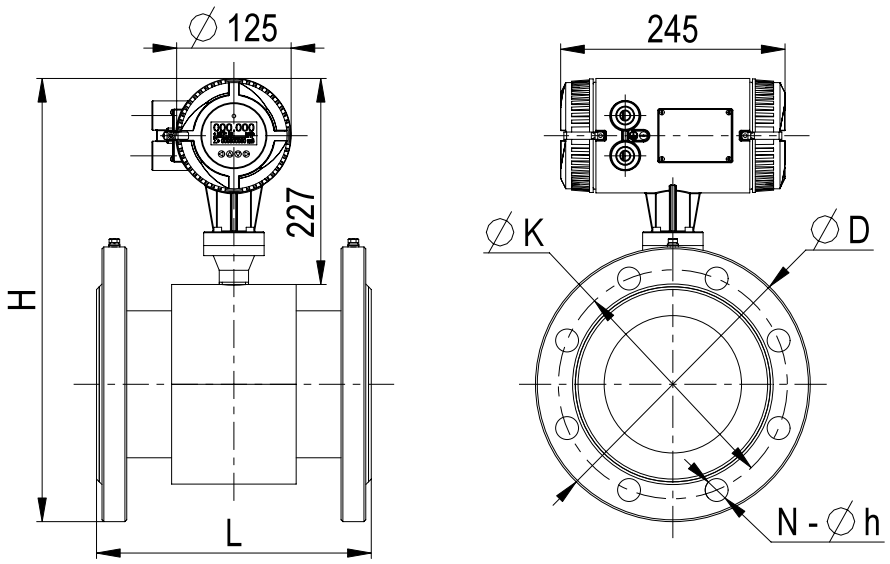


Figure 16. Metran-370MF, Metran-370MS and Metran-370MP with Integral Mount Transmitter

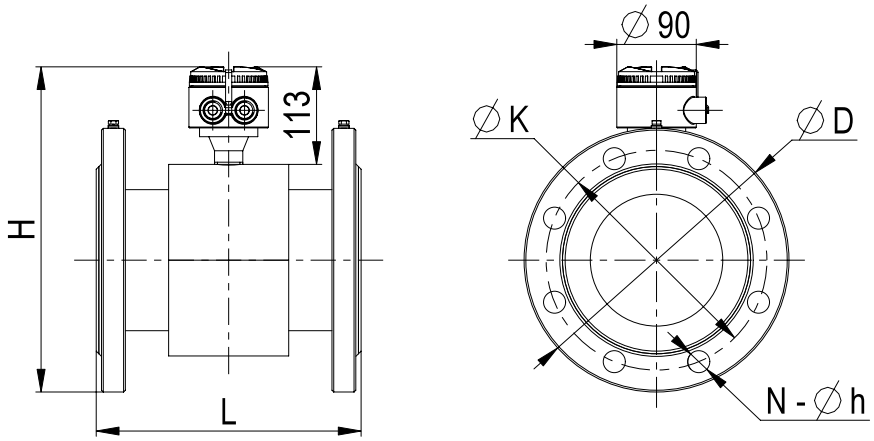


Figure 17. Metran-370MF, Metran-370MS and Metran-370MP with Remote Mount Transmitter

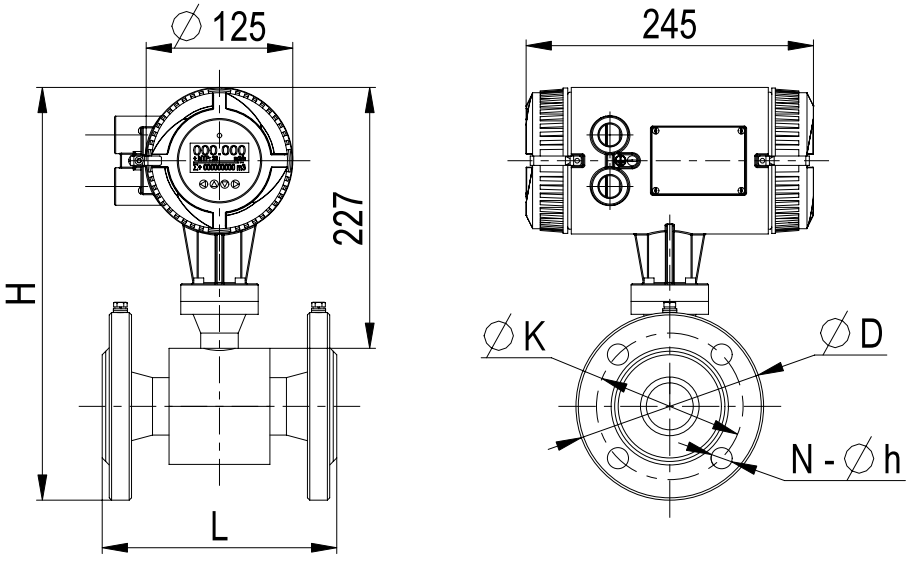


Figure 18. Metran-370MR with Integral Mount Transmitter

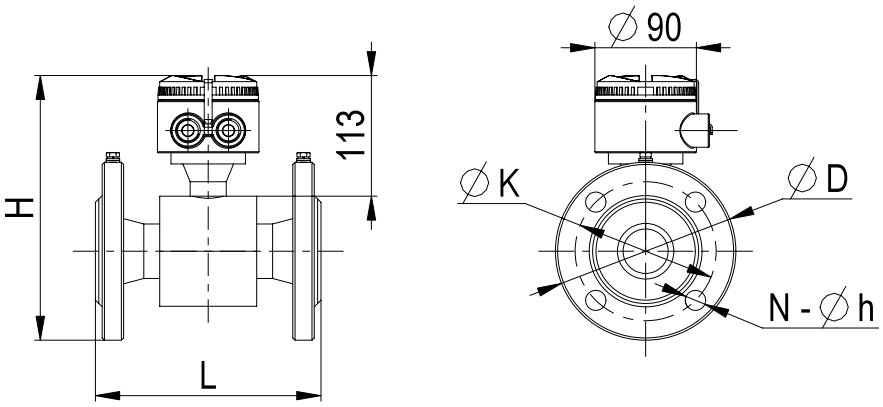


Figure 19. Metran-370MR with Remote Mount Transmitter

Dimensions of Metran-370MF, Metran-370MS, Metran-370MP and Metran-370MR

Table 12

DN	Flange Standard	Flange Rating	H, mm, max*		L, mm	∅ D, mm	∅ K, mm	N, pcs.	∅ h, mm
			Integral Mount	Remote Mount					
3	EN 1092-1 GOST 33259	PN10	320	205	150	90	60	4	14
6			320	205	150	90	60	4	14
10			320	205	150	90	60	4	14
15			322	208	200	95	65	4	14
20			327	213	200	105	75	4	14
25			332	218	200	115	85	4	14
32	EN 1092-1 GOST 33259 (range 2)		344	230	200	140	100	4	18
40			354	240	200	150	110	4	18
50			370 (374)	256 (260)	200	165	125	4	18
65			387 (377)	273 (263)	200	185	145	8	18
80			403 (392)	289 (278)	200	200	160	8	18
100			422 (419)	308 (305)	250	220	180	8	18
125			447 (434)	333 (320)	250	250	210	8	18
150			480 (462)	366 (348)	300	285	240	8	22
200			537 (504)	423 (390)	350	340	295	8	22
250			607 (562)	493 (448)	450 350**	395 390***	350	12	22
300			658 (630)	544 (516)	500 350**	445	400	12	22
350			707	600	550 400**	505	460	16	22
400			770	658	600	565	515	16	26
450			820	708	600	615	565	20	26
500			872	760	600	670	620	20	26
600			994	882	600	780	725	20	30
700			1094	982	700	895	840	24	30
800			1204	1092	800	1015	950	24	33
900			1304	1192	900	1115	1050	28	33
1000			1411	1299	1000	1230	1160	28	36

* The values are given for Metran-370MF, Metran-370MS. For Metran-370MR, the values are given in brackets.
** The values are given for Metran-370MF with ceramic liner.
*** The values are given for GOST 33259 (range 2)

Table 12 (Continued)

DN	Flange Standard	Flange Rating	H, mm, max*		L, mm	∅ D, mm	∅ K, mm	N, pcs.	∅ h, mm
			Integral Mount	Remote Mount					
* The values are given for Metran-370MF, Metran-370MS. For Metran-370MR, the values are given in brackets. ** The values are given for Metran-370MF with ceramic liner. *** The values are given for GOST 33259 (range 2)									
3	EN 1092-1 GOST 33259 (range 2)	PN16	320	205	150	90	60	4	14
6			320	205	150	90	60	4	14
10			320	205	150	90	60	4	14
15			323	209	200	95	65	4	14
20			328	214	200	105	75	4	14
25			333	219	200	115	85	4	14
32	EN 1092-1 GOST 33259 (range 2)		345	231	200	140	100	4	18
40			355	241	200	150	110	4	18
50			377 (374)	257 (260)	200	165	125	4	18
65			388 (377)	274 (263)	200	185	145	4	18
80			404 (392)	290 (278)	200	200	160	8	18
100			423 (419)	309 (305)	250	220	180	8	18
125			448 (434)	334 (320)	250	250	210	8	18
150			481 (462)	367 (348)	300	285	240	8	22
200			538 (504)	424 (390)	350	340	295	12	22
250			614 (567)	500 (453)	450 350**	405	355	12	26
300			667 (638)	553 (524)	500 350**	460	410	12	26
350			723	609	550 400**	520	470	16	26
400			777	664	600	580	525	16	30
450			834	720	600	640	585	20	30
500			897	783	600	715	650	20	33
600			1015	901	600	840	770	20	36
700			1101	987	700	910	840	24	36
800			1209	1095	800	1025	950	24	39
900			1309	1195	900	1125	1050	28	39
1000			1434	1320	1000	1255	1170	28	42

Table 12 (Continued)

DN	Flange Standard	Flange Rating	H, mm, max*		L, mm	∅ D, mm	∅ K, mm	N, pcs.	∅ h, mm
			Integral Mount	Remote Mount					
* The values are given for Metran-370MF, Metran-370MS. For Metran-370MR, the values are given in brackets. ** The values are given for Metran-370MF with ceramic liner. *** The values are given for GOST 33259 (range 2)									
3	EN 1092-1	PN25	324	210	150	95	65	4	14
6			324	210	150	95	65	4	14
10			324	210	150	95	65	4	14
15			324	210	200	95	65	4	14
20			329	215	200	105	75	4	14
25			334	220	200	115	85	4	14
32	EN 1092-1 GOST 33259 (range 2)		346	232	200	140	100	4	18
40			356	242	200	150	110	4	18
50			372 (374)	258 (260)	200	165	125	4	18
65			389 (377)	275 (263)	200	185	145	8	18
80			405 (392)	291 (278)	200	200	160	8	18
100			432 (427)	318 (313)	250	235	190	8	22
125			459 (444)	345 (330)	250	270	220	8	26
150			489 (469)	375 (355)	300	300	250	8	26
200			549 (514)	435 (400)	350	360	310	12	26
250			625 (577)	511 (463)	450 350**	425	370	12	30
300			681 (650)	567 (536)	500 350**	485	430	16	30
350			742	628	550 400**	555	490	16	33
400			799	685	600	620	550	16	36
450			847	733	600	670	600	20	36
500			906	792	600	730	660	20	36
600			1024	910	600	845	770	20	39
700			1128	1014	700	960	875	24	42
800			1240	1126	800	1085	990	24	48
900	EN 1092-1		1340	1226	900	1185	1090	28	48
1000			1458	1344	1000	1320	1210	28	56

Table 12 (Continued)

DN	Flange Standard	Flange Rating	H, mm, max*		L, mm	∅ D, mm	∅ K, mm	N, pcs.	∅ h, mm
			Integral Mount	Remote Mount					
* The values are given for Metran-370MF, Metran-370MS. For Metran-370MR, the values are given in brackets. ** The values are given for Metran-370MF with ceramic liner. *** The values are given for GOST 33259 (range 2)									
3	EN 1092-1	PN40	324	210	150	95	65	4	14
6			324	210	150	95	65	4	14
10			324	210	150	95	65	4	14
15			324	210	200	95	65	4	14
20			329	215	200	105	75	4	14
25			334	220	200	115	85	4	14
32			346	232	200	140	100	4	18
40			356	242	200	150	110	4	18
50			372 (374)	258 (260)	200	165	125	4	18
65			389 (377)	275 (263)	200	185	145	8	18
80			405 (392)	291 (278)	200	200	160	8	18
100			432 (427)	318 (313)	250	235	190	8	22
125			459 (444)	345 (330)	250	270	220	8	26
150			489 (469)	375 (355)	300	300	250	8	26
200			557 (522)	443 (408)	350	375	320	12	30
250			638 (589)	524 (475)	450 350**	450	385	12	33
300			696 (665)	582 (551)	500 350**	515	450	16	33
350			755	641	550 400**	580	510	16	36
400			819	705	600	660	585	16	39
450			855	744	600	685	610	20	39
500			919	805	600	755	670	20	42
600			1046	932	600	890	795	20	48
700			1145	1031	700	995	900	24	48
800			1268	1154	800	1140	1030	24	56
900			1373	1259	900	1250	1140	28	56
1000			1478	1364	1000	1360	1250	28	56

Table 12 (Continued)

DN	Flange Standard	Flange Rating	H, mm, max*		L, mm	∅ D, mm	∅ K, mm	N, pcs.	∅ h, mm
			Integral Mount	Remote Mount					
* The values are given for Metran-370MF, Metran-370MS. For Metran-370MR, the values are given in brackets. ** The values are given for Metran-370MF with ceramic liner. *** The values are given for GOST 33259 (range 2)									
15	ANSI	Class 150 (Slip-On)	319	205	200	88.9	60.45	4	15.7
20			324	210	200	98.6	69.85	4	15.7
25			328	214	200	108.0	79.25	4	15.7
32			333	219	200	117.3	88.9	4	15.7
40			343	229	200	127.0	98.6	4	15.7
50			364 (368)	250 (254)	200	152.4	120.7	4	19.1
65			384 (373)	270 (259)	200	177.8	139.7	4	19.1
80			399 (387)	285 (273)	200	190.5	152.4	4	19.1
100			427 (424)	313 (310)	250	228.6	190.5	8	19.1
125			449 (436)	335 (322)	250	254.0	215.9	8	22.4
150			477 (459)	363 (345)	300	279.4	241.3	8	22.4
200			539 (506)	425 (392)	350	342.9	298.5	8	22.4
250			613 (568)	499 (454)	450 350**	406.4	362.0	12	25.4
300			677 (649)	563 (535)	500 350**	482.6	431.8	12	25.4
350			729	615	550 400**	533.4	476.3	12	28.4
400			785	671	600	596.9	539.8	16	28.4
450			830	716	600	635.0	577.9	16	31.75
500			888	774	600	698.5	635.0	20	31.75
600			1005	891	600	812.8	749.0	20	35.1
700			1109	995	700	927.1	863.6	28	35.1
800			1225	1111	800	1060.5	977.9	28	41.2
900			1329	1215	900	1168.4	1085.9	32	41.2
1000			1440	1326	1000	1289.1	1200.1	36	41.2

Table 12 (End)

DN	Flange Standard	Flange Rating	H, mm, max*		L, mm	∅ D, mm	∅ K, mm	N, pcs.	∅ h, mm
			Integral Mount	Remote Mount					
* The values are given for Metran-370MF, Metran-370MS. For Metran-370MR, the values are given in brackets. ** The values are given for Metran-370MF with ceramic liner. *** The values are given for GOST 33259 (range 2)									
15	ANSI	Class 300 (Slip-On)	322	208	200	95.2	66.55	4	15.7
20			333	219	200	117.3	82.5	4	19.0
25			336	222	200	123.9	88.9	4	19.0
32			341	227	200	133.3	98.5	4	19.0
40			357	243	200	155.4	114.3	4	22.3
50			370 (375)	256 (261)	200	165.1	127.0	8	19.0
65			390 (380)	276 (266)	200	190.5	149.3	8	22.3
80			408 (397)	294 (283)	200	209.5	168.1	8	22.3
100			439 (436)	325 (322)	250	254.0	200.1	8	22.3
125			462 (449)	348 (335)	250	279.4	234.9	8	22.3
150			496 (478)	382 (364)	300	317.5	269.7	12	22.3
200			558 (525)	444 (411)	350	381.0	330.2	12	25.4
250			632 (587)	518 (473)	450 350**	444.5	387.3	16	28.4
300			696 (668)	582 (554)	500 350**	520.7	450.8	16	31.7
350			754	640	550 400**	584.2	514.3	20	31.7
400			810	696	600	647.7	571.5	20	35.0
450			868	754	600	711.2	628.6	24	35.0
500			926	812	600	774.7	685.8	24	35.0
600			1056	942	600	914.4	812.8	24	41.1
25	ANSI	Class 600 (Slip-On)	336	222	200	124.0	88.9	4	19.1
32			341	227	200	133.4	98.6	4	19.1
40			357	243	200	155.4	114.3	4	22.4
50			370	256	200	165.1	127.0	8	19.1
65			390	276	250	190.5	149.4	8	22.4
80			408	294	250	209.5	168.1	8	22.4
100			449	335	300	273.1	215.9	8	25.4
125			488	374	300	330.2	266.7	8	28.4
150			515	401	350	355.6	292.1	12	28.4
200			577	463	400	419.1	349.3	12	31.75
250			664	550	450	508.0	431.8	16	35.1
300			715	601	500	558.8	489.0	20	35.1
350			764	650	550	603.3	527.1	20	38.1
400			829	715	650	685.8	603.3	20	41.1
450			884	770	650	743.0	654.1	20	44.5
500			948	831	650	812.8	723.9	24	44.5
600			1068	954	700	939.8	838.2	24	50.8

Notes
1. Dimensions of flowmeters with flanged process connection ANSI Class 600, 900, 1500, 2500 (Weld neck) and EN 1092-1 PN63, PN100 are available on request.
2. Dimensions of flowmeters with flanged process connection GOST 33259 (range 1) are available on request.
3. Dimensions of flowmeters DN 3 and 6 mm (mounting dimension DN 15 mm) are available on request.

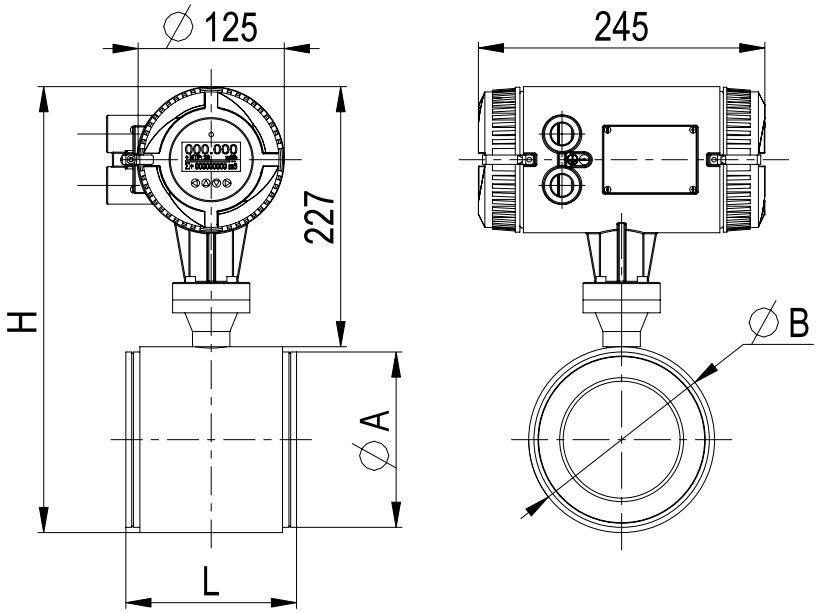


Figure 20. Metran-370MW with Integral Mount Transmitter

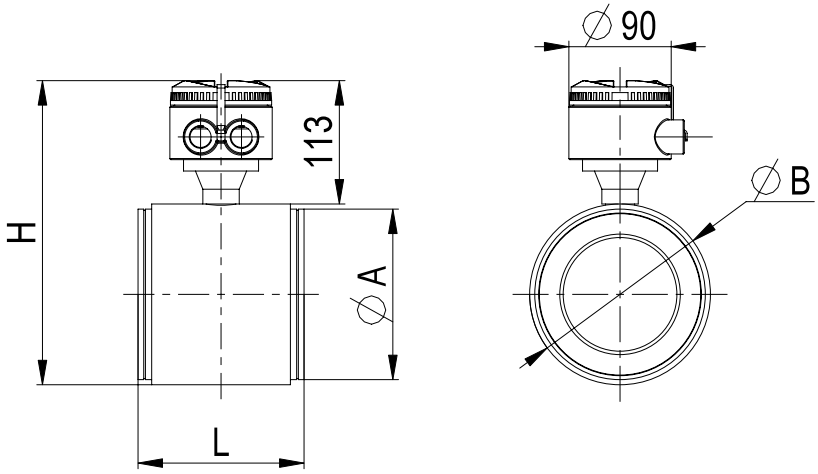


Figure 21. Metran-370MW with Remote Mount Transmitter

Dimensions of Metran-370MW

Table 13

DN	H, mm		L, mm	∅B, mm	∅A, mm
	Integral Mount	Remote Mount			
25	295	181	98	68	60
32	303	189	98	76	68
40	316	202	98	89	74
50	329	215	98	102	90
65	347	233	146	120	110
80	359	245	146	132	120
100	386	272	146	159	150
150	446	332	196	219	204
200	491	377	228	264	250

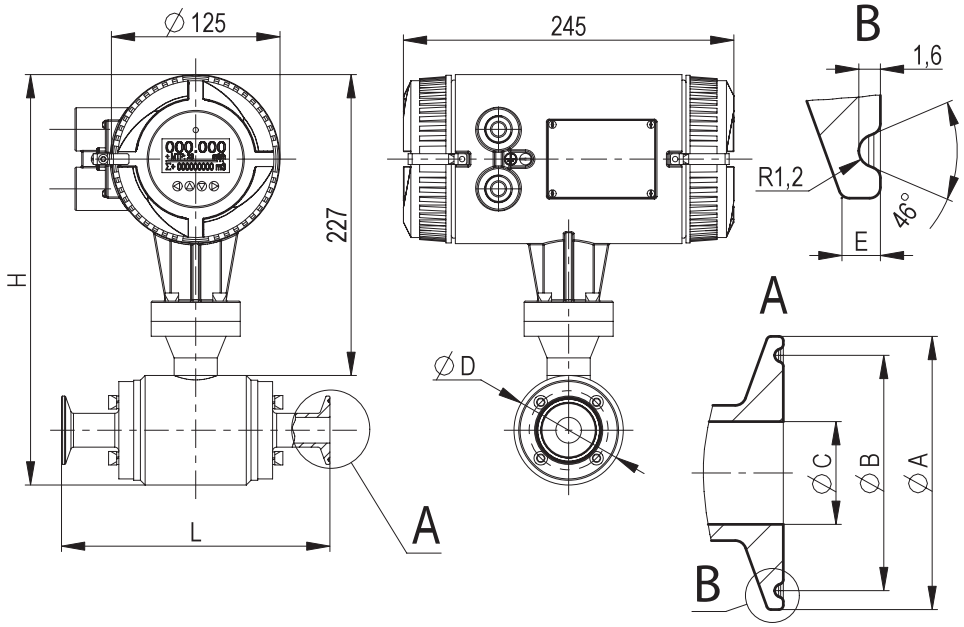


Figure 22. Metran-370MH with Integral Mount Transmitter

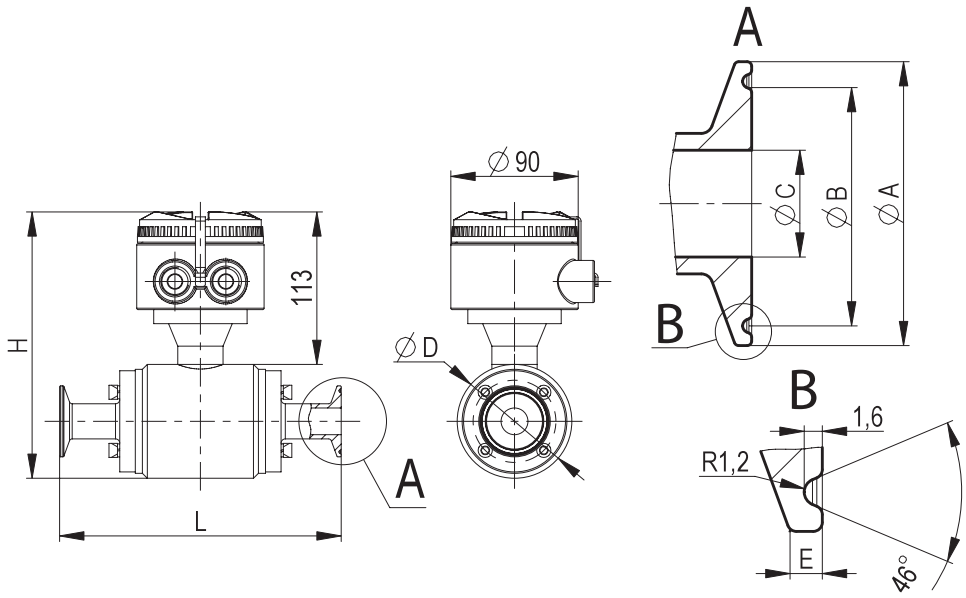


Figure 23. Metran-370MH with Remote Mount Transmitter

Dimensions of Metran-370MH

Table 14

DN	H, mm		L, mm	∅A, mm	∅B, mm	∅C, mm	E, mm	∅D, mm
	Integral Mount	Remote Mount						
15	303	188	200	50.5	43.5	16	2.85	76
20	310	191	200	50.5	43.5	19	2.85	83
25	310	191	200	50.5	43.5	24	2.85	83
32	321	202	200	50.5	43.5	31	2.85	94
40	321	202	200	50.5	43.5	35	2.85	94
50	335	216	200	64.0	56.5	45	2.85	108
65	342	223	250	77.5	70.5	59	2.85	115
80	362	243	250	91	83.5	72	2.85	135
100	386	267	250	119	110	98	2.85	159
125	410	291	300	145	136	129	3.6	183
150	446	327	300	183	174	150	3.6	219
200	488	369	350	233.5	225	199	3.6	261

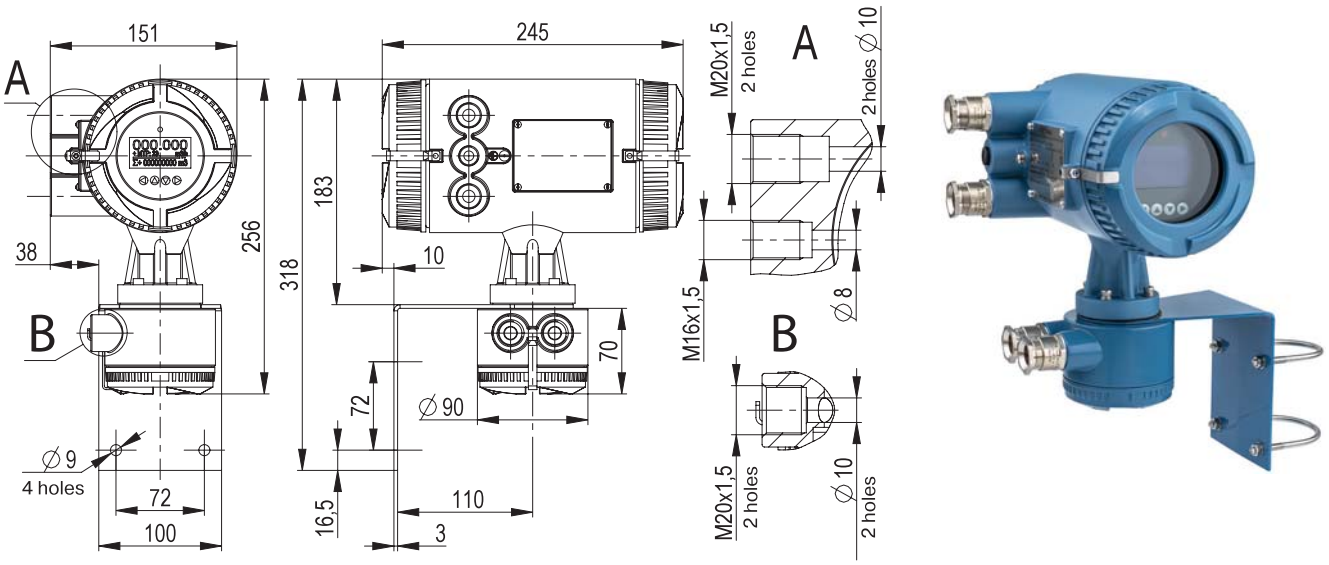


Figure 24. Field Mount Remote Transmitter (on a Bracket)

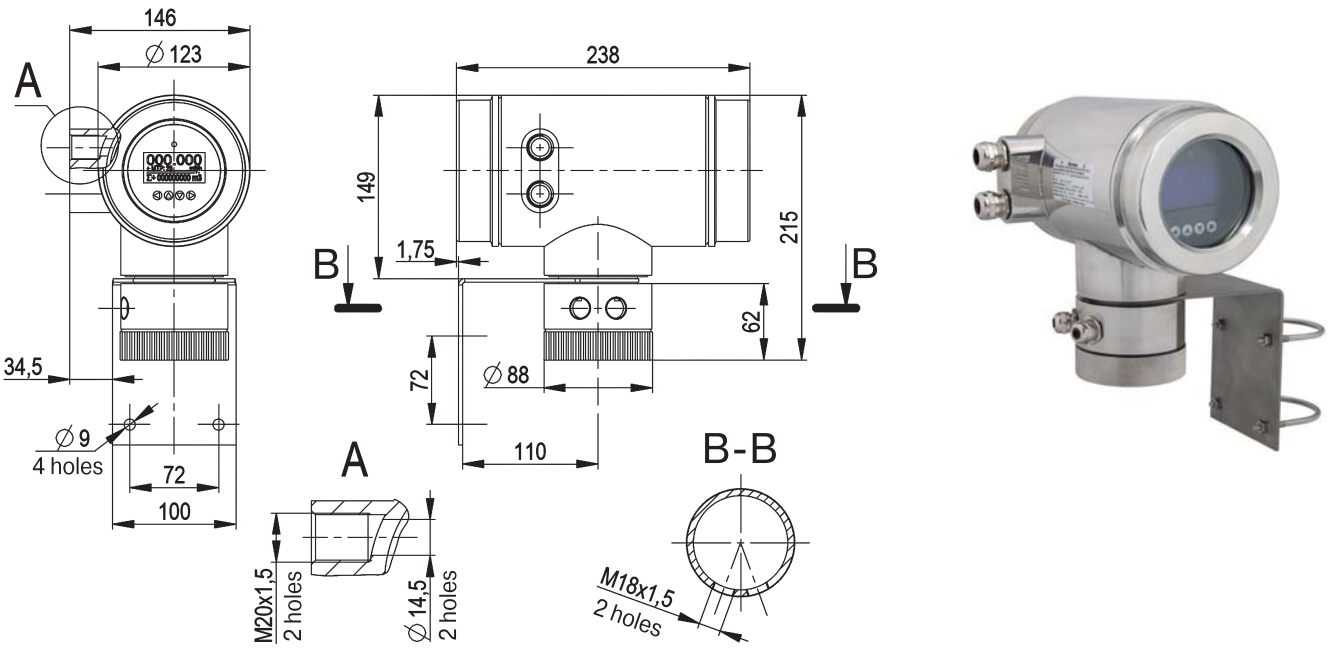


Figure 25. Field Mount Remote Stainless Steel Transmitter (on a Bracket)

Flow

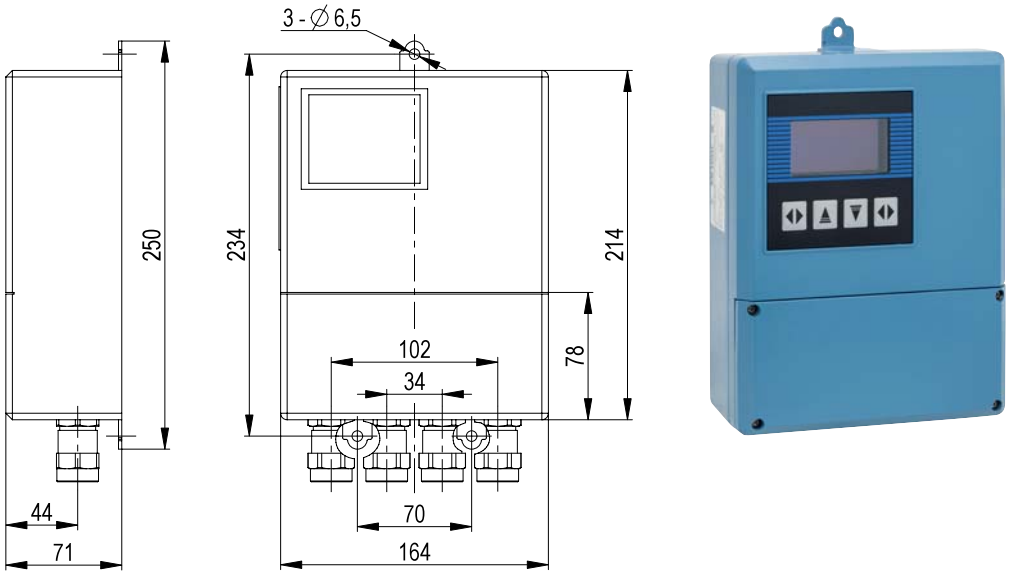


Figure 26. Wall Mount Remote Transmitter

WARRANTY

Flowmeters are warranted for 12 months from the date of commissioning or for 18 months after their delivery, whichever period expires first.

MTBF is 100 000 hours minimum.

Average lifetime is at least 15 years.

The manufacturer guarantees that the flowmeter meets the specifications provided that the user follows the rules of transportation, storage and operation.

DELIVERY SET

- Flowmeter
- Technical Data Sheet
- Operation Manual

Upon customer's request and at extra cost, the following options are available:

- Mounting kit (mating flanges, gaskets and fixtures)
- Cable entries to meet the requirements of the installation point
- Spare parts
- 24 VDC power supply
- Metran-683 HART-USB modem

MODEL STRING STRUCTURE

Table 15

	Option Code															
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
Metran-370M	**F**	**025**	**A**	**S**	**D25**	**ST**	**B2**	**T**	**00**	**EX**	**DC**	**5**	**H**	**65**	**Z**	**MS**	**RC**

Table 16

Option Code	Option Description	Applicability					
		370MF	370MR	370MS	370MP	370MW	370MH
Metran-370M	Metran-370M Magnetic Flowmeter	●	●	●	●	●	●
I	**Version**						
F	Flanged	●					
R	Flanged with reducers		●				
S	Flanged for pulps and slurries			●			
P	Flanged for high pressure				●		
W	Wafer					●	
H	Hygienic						●
II	**Flow Tube Nominal Diameter**						
003	DN 3 mm (mounting dimension – DN 10 mm)	●					
0A3	DN 3 mm (mounting dimension – DN 15 mm)	●					
006	DN 6 mm (mounting dimension – DN 10 mm)	●					
0A6	DN 6 mm (mounting dimension – DN 15 mm)	●					
010	DN 10 mm	●					
015	DN 15 mm	●		●			●
020	DN 20 mm	●		●			●
025	DN 25 mm	●		●	●	●	●
032	DN 32 mm	●		●	●	●	●
040	DN 40 mm	●		●	●	●	●
050	DN 50 mm	●	●	●	●	●	●

Table 16 (Continued)

Option Code	Option Description	Applicability					
		370MF	370MR	370MS	370MP	370MW	370MH
II (Continued)	**Flow Tube Nominal Diameter** (Continued)						
065	DN 65 mm	●	●	●	●	●	●
080	DN 80 mm	●	●	●	●	●	●
100	DN 100 mm	●	●	●	●	●	●
125	DN 125 mm	●	●	●	●		●
150	DN 150 mm	●	●	●	●	●	●
200	DN 200 mm	●	●	●	●	●	●
250	DN 250 mm	●	●	●	●		
300	DN 300 mm	●	●	●	●		
350	DN 350 mm	●		●	●		
400	DN 400 mm	●		●	●		
450	DN 450 mm	●		●	●		
500	DN 500 mm	●		●	●		
600	DN 600 mm	●		●	●		
700	DN 700 mm	●		●			
800	DN 800 mm	●		●			
900	DN 900 mm	●		●			
K00	DN 1000 mm	●		●			
III	**Liner Material**[1)]						
T	PTFE	●				●	
F	FEP	●		●		●	
A	PFA	●		●	●	●	●
N	Neoprene	●	●	●			
P	Polyurethane	●		●			
R	Hard rubber	●	●	●			
C[2)]	Ceramic	●		●			
IV	**Housing and Flange Material (Junction Box Material at Remote Mount)**						
C	Carbon steel (aluminum)	●	●	●	●	●	
P	304 stainless steel (aluminum)	●	●	●	●	●	●
S	316L stainless steel (aluminum)	●	●	●	●	●	●
R[19)]	304 stainless steel (304 stainless steel)	●	●	●	●	●	●
Q[19)]	316 stainless steel (304 stainless steel)	●	●	●	●	●	●
V	**Process Connection**						
D10	Flanged EN1092-1 PN10, Type 01, Raised Face (B1)	●	●	●			
D16	Flanged EN1092-1 PN16, Type 01, Raised Face (B1)	●	●	●			
D25	Flanged EN1092-1 PN25, Type 01, Raised Face (B1)	●	●	●			
D40	Flanged EN1092-1 PN40, Type 01, Raised Face (B1)	●	●	●[4)]			
G10	Flanged GOST 33259 range 1, PN10, Type 01, Version B	●	●	●			
G16	Flanged GOST 33259 range 1, PN16, Type 01, Version B	●	●	●			
G25	Flanged GOST 33259 range 1, PN25, Type 01, Version B	●[15)]	●	●[15)]			
P10	Flanged GOST 33259 range 2, PN10, Type 01, Version B	●	●	●			
P16	Flanged GOST 33259 range 2, PN16, Type 01, Version B	●	●	●			
P25	Flanged GOST 33259 range 2, PN25, Type 01, Version B	●[15)]	●	●[15)]			
A01	Flanged ANSI Class 150, Slip-On, Raised Face	●[3)]	●	●[4)]			
A03	Flanged ANSI Class 300, Slip-On, Raised Face	●[3)]	●	●[4)]			
R03	Flanged ANSI Class 300, Slip-On, Ring Type Joint Face	●[4)]	●	●[4)]			
R06	Flanged ANSI Class 600, Slip-On, Ring Type Joint Face			●[4)]			
J06	Flanged ANSI Class 600, Weld Neck, Ring Type Joint Face				●		
J09	Flanged ANSI Class 900, Weld Neck, Ring Type Joint Face				●		
J15	Flanged ANSI Class 1500, Weld Neck, Ring Type Joint Face				●		
J25	Flanged ANSI Class 2500, Weld Neck, Ring Type Joint Face				●[14)]		
W16	Wafer (PN16)					●	
T16	Tri-Clamp (PN16)						●
N16[16)]	DIN 11851 (PN16)						●
X99	Special order	●	●	●	●	●	●

Flow

Table 16 (Continued)

Option Code	Option Description	Applicability					
		370MF	370MR	370MS	370MP	370MW	370MH
VI	**Process Temperature Version**						
ST	Standard	●	●	●	●	●	●
HT [5)]	High temperature	●			●	●	
VII	**Electrode Material, Number and Type**						
S2	316L stainless steel, 2 measurement (meas.)	●	●	●	●		●
B2	Nickel alloy B-2, 2 meas.	●	●	●	●		●
C2	Nickel alloy C-276, 2 meas.	●	●	●	●		●
N2	Titanium, 2 meas.	●	●	●	●		
T2	Tantalum, 2 meas.	●	●	●			
P2	Platinum-rhodium alloy, 2 meas.	●	●	●			
W2	Tungsten carbide coated stainless steel, 2 meas.	●	●	●			
X2 [2)]	Titanium diboride, 2 meas.	● [6)]		● [6)]			
S3	316L stainless steel, 2 meas., 1 grounding	● [7)]	●	●		●	
B3	Nickel alloy B-2, 2 meas., 1 grounding	● [7)]	●	●		●	
C3	Nickel alloy C-276, 2 meas., 1 grounding	● [7)]	●	●		●	
N3	Titanium, 2 meas., 1 grounding	● [7)]	●	●			
T3	Tantalum, 2 meas., 1 grounding	● [7)]	●	●			
P3	Platinum-rhodium alloy, 2 meas., 1 grounding	● [7)]	●	●			
W3	Tungsten carbide coated stainless steel, 2 meas., 1 grounding	● [7)]	●	●			
S4	316L stainless steel, 2 meas., 2 grounding	● [8)]	●	● [8)]			
B4	Nickel alloy B-2, 2 meas., 2 grounding	● [8)]	●	● [8)]			
C4	Nickel alloy C-276, 2 meas., 2 grounding	● [8)]	●	● [8)]			
N4	Titanium, 2 meas., 2 grounding	● [8)]	●	● [8)]			
T4	Tantalum, 2 meas., 2 grounding	● [8)]	●	● [8)]			
P4	Platinum-rhodium alloy, 2 meas., 2 grounding	● [8)]	●	● [8)]			
W4	Tungsten carbide coated stainless steel, 2 meas., 2 grounding	● [8)]	●	● [8)]			
VIII	**Transmitter Mount**						
T	Integral (aluminum transmitters with two cable entries and LOI)	●	●		●	●	●
D	Integral (aluminum transmitters with three cable entries and LOI)	●	●		●	●	●
S [19)]	Integral (304 stainless steel transmitter with two cable entries and LOI)	●	●		●	●	●
R	Remote (bracket version, aluminum transmitter with two cable entries and LOI)	●	●		●	●	●
P	Remote (bracket version, aluminum transmitter with three cable entries and LOI)	●	●		●	●	●
N [19)]	Remote (bracket version, 304 stainless steel transmitter with two cable entries and LOI)	●	●		●	●	●
W	Remote (wall mount)	●	●	●	●	●	●
IX	**Remote Cable Length and Version**						
000	No (integral mount)	●	●		●	●	●
101	10 m, standard temperature version	●	●	●	●	●	●
102	20 m, standard temperature version	●	●	●	●	●	●
103	30 m, standard temperature version	●	●	●	●	●	●
104	40 m, standard temperature version	●	●	●	●	●	●
105	50 m, standard temperature version	●	●	●	●	●	●
106	60 m, standard temperature version	●	●	●	●	●	●
107	70 m, standard temperature version	●	●	●	●	●	●
108	80 m, standard temperature version	●	●	●	●	●	●
109	90 m, standard temperature version	●	●	●	●	●	●
110	100 m, standard temperature version	●	●	●	●	●	●
201	10 m, low temperature version	●	●	●	●	●	●
202	20 m, low temperature version	●	●	●	●	●	●
203	30 m, low temperature version	●	●	●	●	●	●
204	40 m, low temperature version	●	●	●	●	●	●
205	50 m, low temperature version	●	●	●	●	●	●
206	60 m, low temperature version	●	●	●	●	●	●
207	70 m, low temperature version	●	●	●	●	●	●
208	80 m, low temperature version	●	●	●	●	●	●
209	90 m, low temperature version	●	●	●	●	●	●
210	100 m, low temperature version	●	●	●	●	●	●

Table 16 (Continued)

Option Code	Option Description	Applicability					
		370MF	370MR	370MS	370MP	370MW	370MH
X	**Hazardous Location Certifications**						
OL	No (general industrial version)	●	●	●	●	●	●
EX [18)]	Explosion-proof version	●	●	●	●	●	●
XI	**Power Supply**						
AC	85-250 V AC	●	●	●	●	●	●
DC	20-36 V DC	●	●	●	●	●	●
XII	**Error of Rate**						
5	±0.5% of rate (standard accuracy version)	●	●	●	●	●	●
2	±0.2% of rate (high accuracy version)	● [9)]	●		● [9)]	●	●
XIII	**Outputs [17)]**						
H	4-20 mA + HART; Modbus RTU; frequency/pulse	●	●	●	●	●	●
M	4-20 mA + Modbus RTU (RS-485); frequency/pulse	●	●	●	●	●	●
A	4-20 mA + PROFIBUS PA; frequency/pulse	●	●		●	●	●
P	4-20 mA + PROFIBUS DP; frequency/pulse	●	●		●	●	●
XIV	**Flowmeter IP**						
65	IP65 – sensor and transmitter	●	●	●	●	●	●
68 [10)]	IP66/IP68 – sensor, IP65 – transmitter	●	●	●	●	●	●
67	IP66/67 – sensor, IP66/67 – transmitter	●	●		●	●	●
A8 [10)]	IP66/68 – sensor, IP66/67 – transmitter	●	●		●	●	●
XV	**Factory Options**						
Z	Standard product	●	●	●	●	●	●
X	ETO product	●	●	●	●	●	●
XVI	**Other Options (optional)**						
	Grounding Rings and Lining Protectors (Material, Number)						
GS1	Grounding ring, 316L stainless steel, 1 pc.	●	●	●			
GB1	Grounding ring, nickel alloy B, 1 pc.	●	●	●			
GC1	Grounding ring, nickel alloy C, 1 pc.	●	●	●			
GN1	Grounding ring, titanium, 1 pc.	●	●	●			
GT1	Grounding ring, tantalum, 1 pc.	●	●	●			
OS2	Grounding ring, 316L stainless steel, 2 pc.	●	●	●			
OB2	Grounding ring, nickel alloy B, 2 pc.	●	●	●			
OC2	Grounding ring, nickel alloy C, 2 pc.	●	●	●			
ON2	Grounding ring, titanium, 2 pc.	●	●	●			
OT2	Grounding ring, tantalum, 2 pc.	●	●	●			
LP1	Lining protector, 304 stainless steel, 1 pc.	●	●	●			
LS1	Lining protector, 316L stainless steel, 1 pc.	●	●	●			
MP2	Lining protector, 304 stainless steel, 2 pc.	●	●	●			
MS2	Lining protector, 316L stainless steel, 2 pc.	●	●	●			
	Mounting Band						
CD	Mounting band					●	
	Special Certification						
SC	Sanitary certificate [11)]	●	●	●	●	●	●
	Remote Control [12)]						
RC	Infrared remote control	●	●		●	●	●
	Factory Reports						
P1	Hydrostatic test report	●	●	●	●	●	●
Q4	Flow test report	●	●	●	●	●	●
	Version for Foreign Supply						
BL	Version according to the document requirements for the Republic of Belarus						

Table 16 (End)

Option Code	Option Description	Applicability					
		370MF	370MR	370MS	370MP	370MW	370MH
	Verification						
PV	Primary verification with a mark in the Technical Data Sheet and a verification record in Arshin Federal State Information System	●	●	●	●	●	●
IV [20)]	Primary simulation verification with a mark in the Technical Data Sheet and a verification record in Arshin Federal State Information System	●	●	●	●	●	●
BV [21)]	Primary verification for the Republic of Belarus with a mark in the Technical Data Sheet	●	●	●	●	●	●
	Verification Documents						
QM	Verification Certificate	●	●	●	●	●	●
QP	Verification Report	●	●	●	●	●	●
	ETO Number [13)]						
_XXXXX	ETO number	●	●	●	●	●	●

1) There are DN use limitations.
2) Used only in combination with options: liner material – ceramic, measurement electrode material – titanium diboride, housing and flange material – 304 stainless steel, process connection – flanged (EN1092-1 PN10, PN16, PN25, PN40; ANSI Class 150, Class 300 Raised Face).
3) Only DN 15 – DN 1000.
4) Only DN 15 – DN 600.
5) Only for liner materials: PFA, PTFE, ceramic and only with remote transmitter mount.
6) Only DN 25 – DN 350.
7) Only DN 15 and more.
8) Only DN 50 and more.
9) Only DN 15 – DN 500 (DN 25 – DN 500 for Metran-370MP).
10) Only with remote transmitter mount and remote cable of standard temperature version.
11) Only for versions with liner material – hard rubber, PFA, PTFE and electrode material – 316L stainless steel, nickel alloy B2, nickel alloy C-276.
12) Only for integral and remote mount flowmeters with transmitter on a bracket.
13) Character 1 – separator, characters 2-6 – ETO number. The option takes the value _1234A, _1234B. Mandatory for X special version option.
14) Only DN 25 – DN 300.
15) Only up to DN 800.
16) Only up to DN 150.
17) If a HART device is ordered, the flowmeter also supports Modbus communications. If a Profibus device is ordered, HART and Modbus protocols are not available.
18) Except for versions with terminal block and/or transmitter material – stainless steel (options R, Q) and stainless steel (options S, N) respectively.
19) Except for Ex versions.
20) Only for DN 350 – 1000 mm.
21) Requires BL option.

Model string structure, availability and combinability may be changed.

Metran-370M Magnetic Flowmeter Data Sheet

General Information		
Customer: _____		Date of Completion: _____
Contact Name: _____		Tel./Fax: _____
Address: _____		email: _____
Data Sheet No. _____	Project Item: _____	Quantity: _____

Process Fluid Information	
Process Fluid: _____	Fluid Type: _____
Composition (for mixture): _____	Concentration (for solution): _____ %
Conductivity: _____ (µS/cm)	Density at Operating Conditions: _____ kg/m3
☐ abrasive: up to _____ % of so lids; particle size up to _____ mm	Flammable: ☐ yes ☐ no
Material Applicability: ☐ PTFE; ☐ FEP; ☐ PFA; ☐ Neoprene; ☐ Polyurethane; ☐ Hard rubber; ☐ Ceramic; ☐ Don't know ☐ 316L SST; ☐ Hastelloy B-2; ☐ Hastelloy C-276; ☐ Titanium; ☐ Tantalum; ☐ Platinum/iridium; ☐ Tungsten carbide coated stainless steel; ☐ Titanium diboride; ☐ Don't know	

Process Information					
Measured Flow:	Min _____	Rated _____	Max _____	_____	(specify units)
Process Pressure:	Min _____	Rated _____	Max _____	_____	(specify units)
Process Temperature:	Min _____	Rated _____	Max _____	°C	

Pipe Information		
Pipe Outside Diameter: _____ mm; or Pipe Inside Diameter: _____ mm;	Wall Thickness: _____ mm	Material: _____
Flange Standard: _____	Pipe Liner, Material: _____	
Is pipeline narrowing possible at the place of flowmeter installation? ☐ yes ☐ no		

Flowmeter Requirements	
Required Volumetric Flow Rate Reference Error of Rate: %	
Flowmeter Version: ☐ Flanged; ☐ Wafer; ☐ Other:	
Ambient Temperature: _____ to _____ °C	Flowmeter Power Supply: ☐ 20-36 VDC; ☐ 85-265 VAC
Housing and Flange Material: ☐ carbon steel; ☐ 304 stainless steel; ☐ 316L stainless steel	
Transmitter Type: ☐ Field integral; ☐ Field remote with cable _____ meters (100 m max); ☐ Wall mount remote with cable _____ meters (100 m max)	
☐ General industrial version; ☐ Explosion-proof version (Exd)	
Output: ☐ 4-20 mA + HART and frequency/pulse; ☐ RS-485 Modbus, 4-20 mA and frequency/pulse ☐ Profibus PA, 4-20 mA and frequency/pulse; ☐ Profibus DP, 4-20 mA and frequency/pulse	
Options include: ☐ IP68 for flow sensor (only remote mount transmitter)	
Grounding Rings: ☐ 1 pc. ☐ 2 pc.	Lining Protectors: ☐ 1 pc. ☐ 2 pc.

Accessories, Services	
☐ Mating flanges	☐ With straight runs and reducers (reducer flowmeter)
☐ Power supply	☐ Cable entries, specify requirements: _____
☐ supervision, commissioning	☐ Infrared RC ☐ Extended warranty: _____

Notes
_____ _____

Spare Parts
for Metran-370M Magnetic Flowmeters

Table 1

Product, Part Name	Applicability
Infrared remote control	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N
Remote cable set (for coils and electrodes), standard temperature version (–20 to 60 °C), 10 m / 20 m / 30 m / 40 m / 50 m / 60 m / 70 m / 80 m / 90 m / 100 m	All models. Transmitter option codes R, P, N, W; cable option codes 101 to 110
Remote cable set (for coils and electrodes), low temperature version (–40 to 60 °C), 10 m / 20 m / 30 m / 40 m / 50 m / 60 m / 70 m / 80 m / 90 m / 100 m	All models. Transmitter option codes R, P, N, W; cable option codes 201 to 210
Metran-370M electronics module (field transmitter, HART, 24 VDC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code H; power supply option code DC
Metran-370M electronics module (field transmitter, HART, 220 VAC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code H; power supply option code AC
Metran-370M electronics module (field transmitter, Modbus, 24 VDC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code M; power supply option code DC
Metran-370M electronics module (field transmitter, Modbus, 220 VAC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code M; power supply option code AC
Metran-370M electronics module (wall mount transmitter, HART, 24 VDC, includes OLED)	All models except Metran-370MS. Transmitter option code W; output option code H; power supply option code DC
Metran-370M electronics module (wall mount transmitter, HART, 220 VAC, includes OLED)	All models except Metran-370MS. Transmitter option code W; output option code H; power supply option code AC
Metran-370M electronics module (wall mount transmitter, Modbus, 24 VDC, includes OLED)	All models except Metran-370MS. Transmitter option code W; output option code M; power supply option code DC
Metran-370M electronics module (wall mount transmitter, Modbus, 220 VAC, includes OLED)	All models except Metran-370MS. Transmitter option code W; output option code M; power supply option code DC
Metran-370M electronics module (field transmitter, Profibus PA, 24 VDC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code A; power supply option code DC
Metran-370M electronics module (field transmitter, Profibus DP, 24 VDC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code P; power supply option code DC
Metran-370M electronics module (field transmitter, Profibus PA, 220 VAC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code A; power supply option code AC
Metran-370M electronics module (field transmitter, Profibus DP, 220 VAC, includes OLED)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N; output option code P; power supply option code AC
Metran-370M electronics module (slurry transmitter, HART, 24 VDC, includes LCD)	Metran-370MS. Transmitter option code W; output option code H; power supply option code DC
Metran-370M electronics module (slurry transmitter, HART, 220 VAC, includes LCD)	Metran-370MS. Transmitter option code W; output option code H; power supply option code AC

Table 1 (End)

Product, Part Name	Applicability
Metran-370M transmitter housing (field integral with 2 cable entries, aluminum, general industrial, includes covers)	All models except Metran-370MS. Transmitter option code T; hazardous location certification code OL
Metran-370M transmitter housing (field integral with 2 cable entries, aluminum, explosion-proof, includes covers)	All models except Metran-370MS. Transmitter option code T; hazardous location certification code EX
Metran-370M transmitter housing (field remote with 2 cable entries, aluminum, general industrial, includes covers, remote mount terminal block, mounting bracket, clips)	All models except Metran-370MS. Transmitter option code R; hazardous location certification code OL
Metran-370M transmitter housing (field remote with 2 cable entries, aluminum, explosion-proof, includes covers, remote mount terminal block, mounting bracket, clips)	All models except Metran-370MS. Transmitter option code R; hazardous location certification code EX
Metran-370M transmitter housing (wall mount/slurry, aluminum, general industrial, includes covers)	All models. Transmitter option code W
Metran-370M transmitter housing (field integral, stainless steel, general industrial, includes covers)	All models except Metran-370MS. Transmitter option code S; hazardous location certification code OL
Metran-370M transmitter housing (field remote, stainless steel, includes covers)	All models except Metran-370MS. Transmitter option code N; hazardous location certification code OL
Metran-370M transmitter housing (field integral with 3 cable entries, aluminum, general industrial, includes covers)	All models except Metran-370MS. Transmitter option code D; hazardous location certification code OL
Metran-370M transmitter housing (field integral with three cable entries, aluminum, explosion-proof, includes covers)	All models except Metran-370MS. Transmitter option code D; hazardous location certification code EX
Metran-370M transmitter housing (field remote with 3 cable entries, aluminum, general industrial, includes covers, remote mount terminal block, mounting bracket, clips)	All models except Metran-370MS. Transmitter option code P; hazardous location certification code OL
Metran-370M transmitter housing (field remote with 3 cable entries, aluminum, explosion-proof, includes covers, remote mount terminal block, mounting bracket, clips)	All models except Metran-370MS. Transmitter option code P; hazardous location certification code EX
Housing for remote mount terminal block, Metran-370M (aluminum, general industrial, includes cover)	All models. Transmitter option codes R, P, N, W; sensor option codes C, P, S; hazardous location certification code OL
Housing for remote mount terminal block, Metran-370M (aluminum, explosion-proof, includes cover)	All models. Transmitter option codes R, P, N, W; sensor option codes R, Q; hazardous location certification code OL
Housing for remote mount terminal block, Metran-370M (stainless steel, general industrial, includes cover)	All models except Metran-370MS. Transmitter option codes T, D, S, R, P, N
OLED for Metran-370M (for field mount transmitter)	All models except Metran-370MS. Transmitter option code W
OLED for Metran-370M (for wall mount transmitter)	All models except Metran-370MS. Transmitter option code W
LCD for Metran-370M (slurry)	Metran-370MS. Transmitter option code W