Metran-303PR
Vortex Flowmeter

- **Operating fluids: water (district heating, drinking, industrial, distilled, etc.), water solutions except abrasive ones with viscosity up to $2 \cdot 10^{-6}$ m²/s (2 cSt)**
- **Process temperature range**
  1...150°C
- **Gage pressure**
  Up to 1.6 MPa
- **Internal diameter (DN) of connected pipeline:**
  25 to 300 mm
- **Flow range 0.18...2000 m³/h**
- **Turndown 1:100**
- **Volume reference accuracy**
  (σ) ±1.0%
- **Outputs:**
  - Analog-pulse;
  - Unified analog 4-20mA (20-4mA) (option);
  - Digital HART/Bell202 (option);
  - LCD (option) to display values of flow, accumulated volume, temperature, operating time, self-diagnostic codes
- **Availability of explosion-proof version; explosion protection marking ExiaIICT6X (option)**
- **Explosion Protection Certificate for Electrical Equipment issued by VNIIFTRI #ROCC RU.GB06.V00191**
- **Power Supply: DC source with constant voltage of 18 to 42 V**
- **Temperature compensation of flow charateristic within small flow values**
- **Setup, readjustment, HART calibration**
- **Extended self-diagnostics of flowmeter units**

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DESIGN FEATURES

The operating principle is given in the Introductory section of Metran-300PR, Metran-303PR, Metran-320 and Metran-305PR Vortex Flowmeters.

For design features of flow tube versions depending on standard sizes, refer to Table 1

Table 1

Features	Flowmeter Version as per Mounting Style		
	Metran-303PR-A	Metran-303PR-B	Metran-303PR
Standard size, DN, mm	25...100	150, 200	250, 300
Signal pickup diagram	single-beam		two-beam
Connecting unit design	Confuser-Diffuser, i.e. conic passages, made in flow tube	Confuser-Diffuser, i.e. branch pipes of special form, mounted on pipeline separately from flow tube	No branch pipes and conic passages

The main feature of Metran-303PR is availability of explosion-proof version. The electronic module for explosion-proof flowmeter is designed to meet GOST R 51330.0 and GOST R 51330.10 requirements.

Current and voltage in electrical circuits of explosion-proof flowmeter are limited to I.S. values, as flowmeter shall operate together with I.S. barriers of *intrinsically safe electrical circuit* explosion protection type with *ia* explosion protection level for explosive mixtures of IIC subgroup per GOST R 51330.11

FLOWMETER OPERATION WITH HART

HART Communication Protocol provides bidirectional data communication between the flowmeter and HART master devices.

There are capabilities of operation with HART Protocol:
- Process value reading,
- Setup and readjustment of output parameters,
- Damping time setting,
- Analog output calibration,
- Calibration factor setting,
- Diagnostics of contingency events caused by process,
- Self-diagnostics of individual flowmeter units,
- Recording/archiving the set process values to Excel.

Operation of HART Protocol for Metran-303PR flowmeter exactly meets requirements of HART Protocol specification, hence the flowmeter is compatible with any HART device.

All HART commands can be classified as 3 groups, i.e. universal, common-practice and transmitter-specific. The universal commands are supported by all HART-compatible devices, common-practice commands are used for wide variety of devices, and access to transmitter-specific commands is still available only with Metran software and hardware, i.e. HART-Master Configuration Program v3.5 and Metran-650* Portable HART Communicator. The flowmeter simultaneously operates both with the software and the device, and executes all their commands.

A special reading/writing command for unique flowmeter parameters is implemented in Metran-303PR Flowmeter to record:
- Access password for mode programming;
- URL and LRL of measure flow (Qmin and Qmax), m^3/h;
- Damping time, sec;
- Pulse value of analog-pulse signal, m^3/pls;
- Pulse width of analog-pulse signal, ms.

Equipment of other manufacturers senses the flowmeter as an abstract device supporting HART Protocol regardless of its functionality.

To connect the flowmeter to the PC with installed HART-Master*, it is required to use Metran-681* HART Modem. When flowmeters operates in multipoint mode, it is possible to connect up to 15 flowmeters to the PC via HART Modem. In this case, communication is only digital.

To connect more flowmeters, it is necessary to use Metran-670* HART Multiplexer with Mux-Master* software.

* For more detailed information on HART devices, refer to the relevant section of the Catalog.

FLOWMETER COMMUNICATION CAPABILITIES

Table 2

Parameter	PC Indication (HART-Master)	LCD Indication	HART Readjustment
Flow Tube Serial No.	+		
Flowmeter Serial No.	+		
Measurement Range, m^3/h Qmin, Qmax	+		
Instantaneous Flow Rate, m^3/h	+	+	
Accumulated Volume, m^3	+	+	
Operating Time*, h	+	+	
Analog Output Value, mA	+		
Range Percentage, %	+		
Vortex Generation Frequency, Hz	+		
Fluid Temperature*, ˚C	+	+	
Analog Measurement Range**, QLRL, QURL, m^3/h	+		+
Pulse Value of Analog-Pulse Signal, m^3/pls	+		+
Pulse Width of Analog-Pulse Signal, ms	+		+
Damping Time, sec	+		+
Access Password for Mode Programming			+
Metrological Factors of Flowmeter***	+		+
Contingency Events	Relevant Message and Status	Relevant Code	
Analog Output Alarm	Relevant Message		+
Flowmeter Network Address	+		+

* Operating time and temperature of measure fluid are displayed on LCD by one line by turn with interval of 2 sec.
** Analog measurement range Q_{LRL}, Q_{URL} is set within 0…Qmax in accordance with Section *Analog Signal Parameters*.
*** Metrological factors can be changed only by certified Metran Service Centers.

FLOWMETER OPERATION IN CONTINGENCY MODE

Table 3

Contingency Event	Flowmeter Behavior					
	Analog Output	Digital Output (H-Master)			Analog-Pulse Output	LCD
		Reading	Message	Tag		
No flow, Q=0	I=(3.9±0.05) mA I=(20.8±0.05) mA* I=(4.0±0.05) mA** I=(20.0±0.05) mA*	Q=0	Primary Variable out of Range	No Flow	No Pulse Generation	Q=0, Code 0
Q≤0.8Qmin	I=(3.9±0.05) mA I=(20.8±0.05) mA* I=(4.0±0.05) mA** I=(20.0±0.05) mA*	Q=0		Flow < Min Permissible for DN	No Pulse Generation	Q=0, Code L
Q>1.5 Qmax	I=(3.9±0.05) mA I=(20.8±0.05) mA*	Q=0		Flow > Max Permissible for DN	No Pulse Generation	Q=0, Code H
Chaotic Vortex Generation	I=(3.9±0.05) mA I=(20.8±0.05) mA*	Q=0		Exceeded Dispersion Threshold	No Pulse Generation	Q=0, Code D
Q=QLRL at QLRL = 0**	I=(4.0±0.05) mA I=(20.0±0.05) mA*	Q=0		-	-	-
Alarm Function for Analog Output						
Q≤QLRL at QLRL≥Qmin per Table 4	I=(3.9±0.05) mA I=(20.0±0.05) mA*	Q=Qchng (actual value)	Primary Variable out of Range; Analog Output is limited	-	Q=Qchng (actual value)	Q=Qchng (actual value)
Q≥QURL at QURL≤Qmax per Table 4	I=(4.0±0.05) mA I=(20.0±0.05) mA*			-		

* At decreasing characteristic of analog output (20-4 mA).
** At Q_{LRL} = 0 m^3/h (refer to Section *Analog Output Parameters*).

FLOWMETER DIAGNOSTICS

In case of failure, a relevant status is displayed on PC. It is possible to determine the following failures of the flowmeter with the help of HART-Master:
- EEPROM error;
- Microcontroller reset via WDT;
- I2C communication error;
- Temperature transmitter fault;
- Fault of flowmeter archive (as for accumulated volume and operating time).

DATA LOGGING

HART-Master enables creating process parameter archives and storing them in MS Excel format. The user sets flowmeter polling interval and number of measurements to be stored. There are the following settings by default:
- number of measurement is 100;
- flowmeter polling interval is 10 sec.

The archives have reference purposes and cannot be used for custody transfer.

DAMPING TIME SETTING

Damping time of 0.5 sec is set at release from manufacturing and can be changed during operation from 0.5 to 85 with the help of HART Protocol.

BASIC SPECIFICATIONS

● **Nominal diameters (DN) of the pipeline** where flowmeters are to be mounted, flow measurement limits, recommended** output pulse value and width are given in Table 4.

Table 4

DN, mm	Measurement Limits, m^3/h				Pulse Value C_1**, m^3/pls	Pulse Width τ_1**, ms
	Qmin	Q1*	Q2*	Qmax		
25	0.18	0.3	0.6	9	0.001	99±4
32	0.25	0.5	1.0	20		
50	0.4	1.0	2.0	50	0.01	
80	1	2.5	5.0	120		
100	1.5	4.0	8.0	200		
150	5	8.0	16.0	400	0.1	
200	6	14.0	28.0	700		
250	12	34.0	68.0	1400		
300	18	48.0	96.0	2000		

* Q1 and Q2 are transient flow values, which result in changing metrological characteristics.

** Specified pulse value and width of analog-pulse signal are recommended and set by the manufacturer by default when releasing from production. Other pulse values (C_2) and widths (τ_2) are available and can be changed during operation (refer to Section *Analog-Pulse Output Parameters*).

● **Outputs**
- Passive analog-pulse;
- Unified analog 4-20 mA (20-4 mA) proportional to volumetric flow (optional);
- Digital HART/Bell202 (optional);
- 3-line LCD (optional).

● **Output Parameters**

- Analog-Pulse Signal

Low signal level is 0 mA, high signal level is 7...10 mA, load resistance is 0...1.8 kOhm. The load should be galvanically connected to a positive supply terminal. For load resistance depending on supply voltage, refer to Table 7 and Figure 1.

For standard values of pulse value (C_1) and pulse width (τ_1), refer to Table 4. Other pulse values (C_2) and widths (τ_2) are available and can be changed via HART Protocol during operation. Recommended pulse values are selectable from 0.0001; 0.001; 0.01; 0.1;1.0 m^3/pls. When selecting pulse value and width, the following conditions should be met:

- Pulse width $\tau_2 = 16.4 \cdot n$,

where n - a whole number; $\tau_2 \le 256$ ms,
- Maximum possible pulse width is 256 ms,
- Pulse-repetition interval is $T_2 \ge \tau_2 + 1$, ms,
- Output pulse value

$$C_2 \ge T_2 \cdot Qmax / 3.6 \cdot 10^6, \ m^3/pls,$$

where Qmax - value of maximum flow as per Table 4.

- Unified Analog Signal 4-20 mA (20-4 mA):

Physical Layer, 2-wire circuit (current loop).

For limiting values of load resistance depending on supply voltage, refer to Table 7 and Figure 2.

Characteristics of analog output can be readjusted from linearly increasing to linearly decreasing, and vice versa.

Flow measurement limits of analog output (Q_{LRL}...Q_{URL}) can be readjusted from 0* to Qmax per Table 4, and the following condition should be met:

$Q_{URL} - Q_{LRL} \ge 0.1Qmax$,

where Qmax - the value of maximum flow per Table 4.

* If 4 mA corresponds to zero flow (Q_{LRL}=0 m^3/h), the value of 4 mA output remains constant within the flow range from 0 to 0.8Qmin (Refer to Section *Flowmeter Operation in Contingency Mode*).

- Digital HART/Bell202 Signal
Physical Layer, current loop, 4-20 mA.
Application Layer (universal, common-practice and transmitter-specific commands), refer to SPGK.5211.000.00 DP *Description of Application Layer for Digital Protocol*.

- LCD
3-line display, where the following values are displayed simultaneously and line by line:
- Instantaneous flow rate, m^3/h;
- Accumulated volume, m^3, cumulative sum;
- Operating time, h/fluid temperature, °C.

Operating time and temperature are displayed in one line by turns with interval of 2 sec.
In case of contingency events caused by technological process, the corresponding code is displayed on LCD (refer to Section *Flowmeter Operation in Contingency Mode*).

● **Volume and flow accuracy according to flowmeter output** are provided in Table 5.

Table 5

Accuracy	Accuracy Limits, %
Reference accuracy of volume via analog-pulse signal Reference	
accuracy of flow and volume via digital signals at flows Q:	
$Q2 < Q \le Qmax$	±1.0
$Q1 < Q \le Q2$	±1.5
$Qmin \le Q \le Q1$	±3.0
Reference accuracy of flow via analog signal * at flows Q:	
$Q2 < Q \le Qmax$	±1.0
$Q1 < Q \le Q2$	±1.5
$Qmin \le Q \le Q1$	±3.0
	Plus reduced error less than 0.2% of set measurement range value
Reference accuracy of volume via LCD at flows Q:	
$Q2 < Q \le Qmax$	±1.0 plus 1 low-order digit
$Q1 < Q \le Q2$	±1.5 plus 1 low-order digit
$Qmin \le Q \le Q1$	±3.0 plus 1 low-order digit
Reference accuracy of instantaneous flow rate via LCD at flows Q:	
$Q2 < Q \le Qmax$	±1.5 plus 1 low-order digit
$Q1 < Q \le Q2$	±2.0 plus 1 low-order digit
$Qmin \le Q \le Q1$	±3.5 plus 1 low-order digit
Reference accuracy of operating time via digital signal	±0.1
Reference accuracy of operating time via LCD	±0.1 plus 1 low-order digit

* Additional reduced flow accuracy via analog output caused by ambient temperature change from (20±3)°C to any temperature within operating temperature range should not exceed ±0.1% of output range per 10°C.

● **Fluid Pressure Loss** in the flowmeter at flow Q does not exceed, MPa:
$\Delta P=3.2 \cdot 10^{-5}(Q/Q1)^2$ - for DN 150...300 Flowmeter;
$\Delta P=4.8 \cdot 10^{-5}(Q/Q1)^2$ - for DN 25...100 Flowmeter;
Q1, m^3/h - flow transition value per Table 4.

OPERATION CONDITIONS

Fluid Flow Parameters:

Temperature	1...150°C;
Pressure	up to 1.6 MPa;
Viscosity	up to $2 \cdot 10^{-6}$ m^2/s

Minimum pressure required for flowmeter operation:
$Pmin=3\Delta P+1.3Psv(t)$,
where ΔP, MPa (kgf/cm^2) - pressure loss in flowmeter at flow Q,
$Psv(t)$, MPa (kgf/cm^2) - saturated vapor pressure of fluid at its actual temperature t.

External Factor Parameters
Ambient Temperature:
- for version w/o LCD -40...60°C;
- with LCD -10...60°C

Relative humidity is up to 95% at temperature ≤35°C w/o moisture condensation.
Atmospheric pressure is 630...800 mmHg.
Intensity of external variable and constant magnetic field is with up to 400 A/m.

The flowmeter meets EMC requirements per GOST R 51649 and GOST R 51522.

The flowmeter is vibration-resistant as per #4 version per GOST12997.
Dust and Water Tightness as per IP65 per GOST14254-96.

● **Explosion Protection**
Metran-303PR has *Intrinsically Safe Electrical Circuit* explosion protection type of *extra explosion-proof* level, explosion protection marking is ExialICT6X per GOST R51330.0 and GOST R51330.10 (optional). It can be installed into hazardous areas, including areas with generation of explosive mixtures of IIC Category per GOST 51330.11.

● **Power Supply**

The flowmeter shall be powered by an external dc power supply. Supply voltage depending on flowmeter versions should meet values provided in Table 6.

Ex flowmeters are powered from I.S. Barrier circuits or Power Supply Units of Exia explosion protection type. Peak current in loop should not exceed 120 mA .

Ex flowmeters with digital output are to be powered by Power Supply Units or Barriers supporting HART signal.

Table 6

Flowmeter Version	Supply Voltage, V	
	Minimum	Maximum
General Industrial	18	42
Explosion-proof		24

RECOMMENDED TYPES OF POWER SUPPLY AND I.S. BARRIERS

Table 7

Flowmeter Version	Power Supply	I.S. Barrier	Manufacturer
Metran-303PR, Metran-303PR-HART	Metran-602, -604 Metran-601B	-	Metran IG, CJSC
Metran-303PR-Ex	Metran-602-Ex	Metran-632-Ex-Izobar	
Metran-303PR-Ex-HART	Metran-661-Smart	Metran-631-Ex-Izobar	
		D1010S (1k), D1010D (2k)	Valcom
		9303/13-22-11; 9001/51-280-110-14	Stahl

* For more detail information about Power Supply Units and I.S. Barriers, refer to the relevant Section of this Catalog.

● Power Consumption of the Flowmeter is 1.5 W max.

● **Limiting values of load resistance** for various output signals depending on supply voltage are given in Table 8 and Figures 1 and 2.

Table 8

Supply Voltage U, V	Limiting Load Resistance, Ohm		Note
	Rmin	Rmax	
for analog-pulse signal			
18...42	0	(U-6) / 0.01; Rmax≤1800	
for analog signal 4-20 (20-4) mA			
18...36	0	42 (U-12)	
36...42	50 (U-36)		
18...42	250		When using HART signal

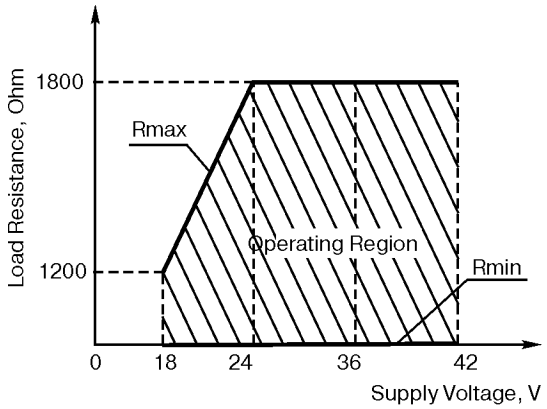


Fig.1. For Analog-Pulse Output.

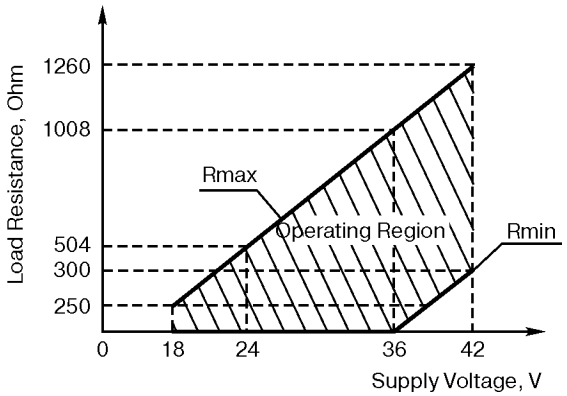


Fig.2. For 4-20 mA Output.
For Flowmeter with HART signal, Rmin=250 Ohm.

PIPELINE MOUNTING

The flowmeter is installed according to "sandwich" type, i.e. it is installed between two special flanges (A, B versions) or per GOST 12820-80 (A version, and DN 250, 300 DN), using pins and nuts with washers (refer to Figure).

Straight run lengths according to preset flow friction are given in Table 9.

Table 9

Flow Friction Type	Upstream/Downstream Straight Run Lengths
Taper angle: up to 30˚, terete elbow fitting, full-open valve or ball valve	5DN/2DN
Square elbow, sludge pan, filter, array elbow fitting, control fitting*	10DN/5DN*

* When mounting the vortex meter, it is recommended to install straightening vanes (refer to Section *Repair Kit*) after specified local flow frictions. Straightening vanes allow reducing straight run lengths up to 5DN/2DN.

The meter complete with straight run set of the required sizes (KMCh K2, K3, refer to Tables 10, 11) is available on request.

Horizontal, vertical and sloping pipe mounting is permissible provided that total volume of straight run and flow tube is completely filled with fluid. There should be no air in a pipeline. It is not recommended to mount the meter downstream.

Internal pipeline diameter where Metran-303PR meter is installed should be in line with the values given in Table 13. Otherwise pipe-line parts neighboring to the meter should be replaced by straight runs of suitable pipe lengths given in Table 13 or KMCh straight runs specified in the order.

List of pipes recommended for straight runs is provided in Table 13.

During meter operation, the stop valves installed upstream and downstream outside straight runs should be completely open.

Vibration frequency and amplitude in the place of meter installation should not exceed 10 Hz and 0.05 mm correspondingly.

Explosion-proof flow meters can be used in hazardous areas indoors and outdoors as per PUE, Chapter 7.3, and other regulatory documents specifying use of electrical equipment in explosive conditions.

Overall and mounting dimesions according to meter version are given in Table 12.

It is forbidden to install flow meters in flooded underground heat extraction chambers and premises.

ELECTRIC WIRING

Cables and wires connecting the meter and secondary devices are to be laid in metal hoses or tubes.

It is recommended to use pilot cables with plastic or rubber insulation and signal cables with polyethylene insulation.

Shielded cable with insulating sheath is recommended if the meter is close to laying areas of electric installation over 0.5 kVA. Insulated conductors of the same cable can be used as signal circuits, but insulation resistance should be 50 MOhm minimum.

It is forbidden to place communication lines of the meter and secondary devices close to power cables.

Length of communication lines for pulse output signal should not exceed 200 m, resistance of each conductor is 20 Ohm maximum.

Length of communication lines for analog and digital output signals should not exceed 1500 m, and in hazardous area 1000 m.

External meter circuits through cable gland (code of electrical meter wiring is C) should be connected with the help of cable with outer diameter of 8-10 mm.

When using a power supply integrated into a secondary device, make sure it is galvanically isolated from other circuits. Electric wiring should be carried out with the help of 2- or 3-wire cable (e.g. RPShM 2x0.35; RPShM 3x0.35).

When using an self-contained power supply, electric wiring should be carried out with the help of 2-wire cable (e.g.RPShM 2x0.35 or MKSh 2x0.35). It is permissible to use separate wires with 0.35 mm^2 section.

Frame grounding is not required if the meter is supplied through galvanically isolated channel. When a block of meters is supplied by a single power supply without galvanic isolation, voltage potential between flow tubes should be equal by their reliable grounding. Grounding should be carried out by connecting the wire with section of 2.5 mm^2 minimum from a grounding bus to a special terminal of flowmeter housing.

EXTERNAL WIRING DIAGRAMS

General Requirements

Connect wires to the terminal block if the flowmeter has gland lead-in.

Total resistance of all loads in a control system should be no less than 250 Ohm for HART flowmeters, and maximum total resistance should be determined by parameters of a certain Power Supply Unit or I.S. Barrier.

HART Communicator and HART Modem can be connected to any point of current loop for HART flow meters.

When using analog output signal for general industrial flow meters, load may be connected both to positive and negative terminal of a Power Supply Unit.

When using analog and analog-pulse output signals simultaneously for general industrial flow meters, connect load through analog signal only to positive terminal of a Power Supply Unit.

This Catalog includes wiring diagrams for flow meters with Metran Power Supply Units and I.S. Barriers.

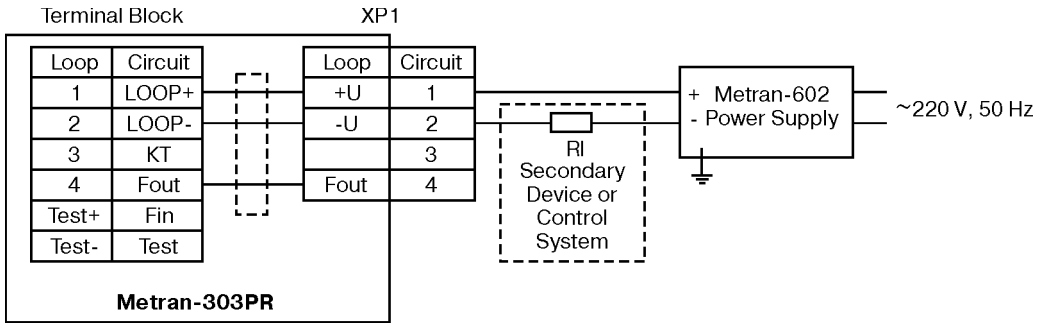


Fig.3. Wiring Diagram for General Industrial Flow Meter with Analog Output.

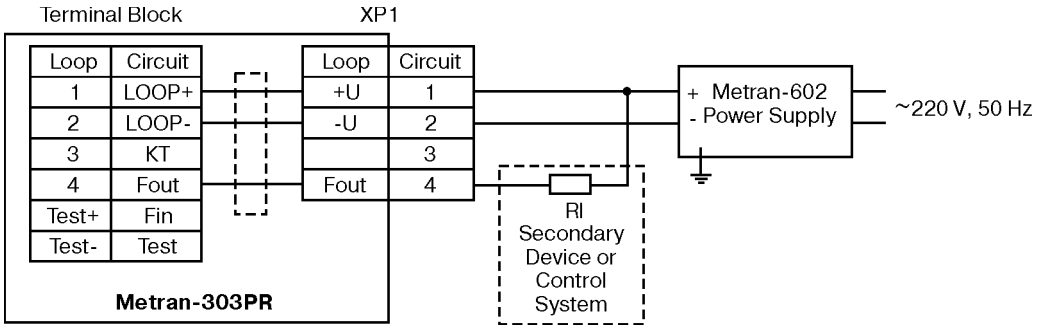


Fig.4. Wiring Diagram for General Industrial Flow Meter with Analog-Pulse Output.

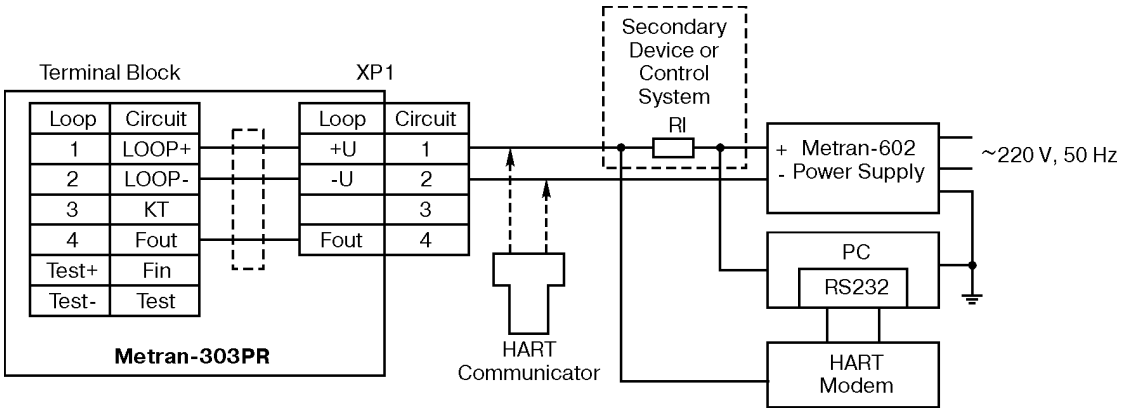


Fig.5. Wiring Diagram for General Industrial Flow Meter with Digital Output.

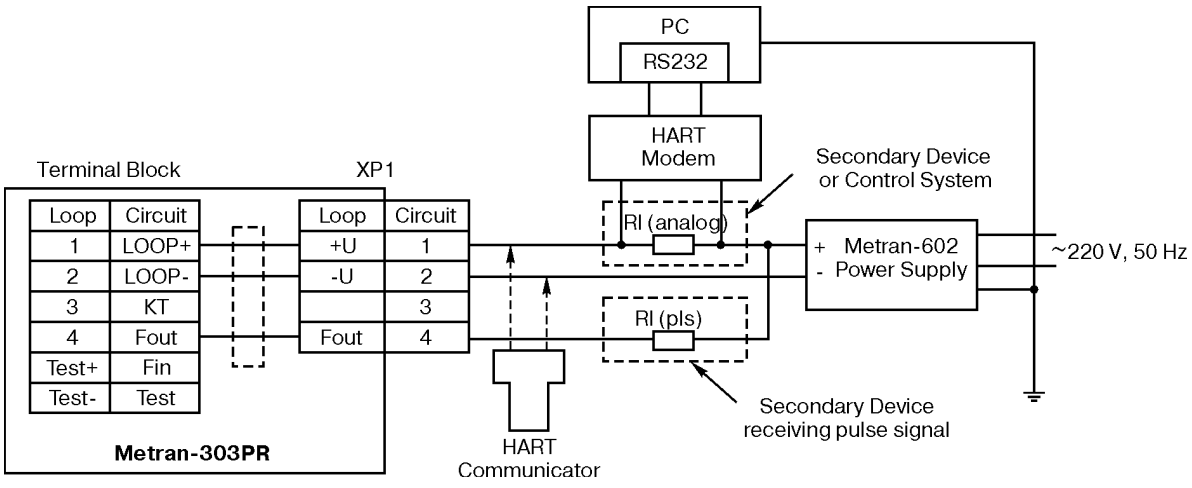


Fig.6. Wiring Diagram for General Industrial Flow Meter with All Outputs Used Simultaneously.

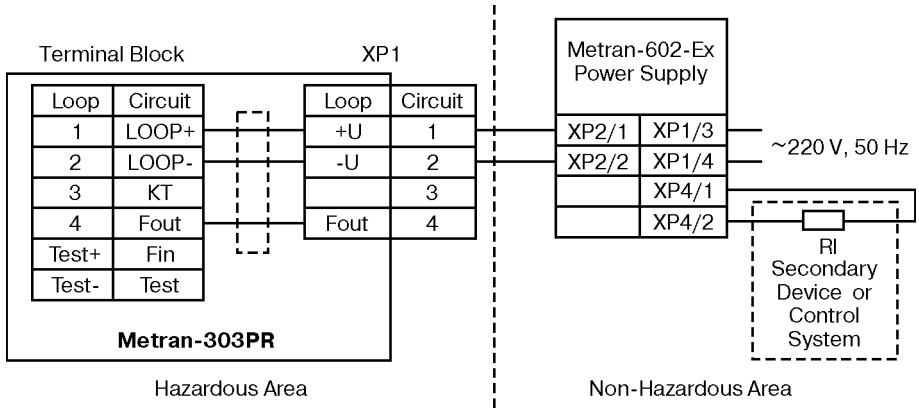


Fig.7. Wiring Diagram for Explosion-proof Flow Meter with Ex Power Supply Unit via Analog Output.

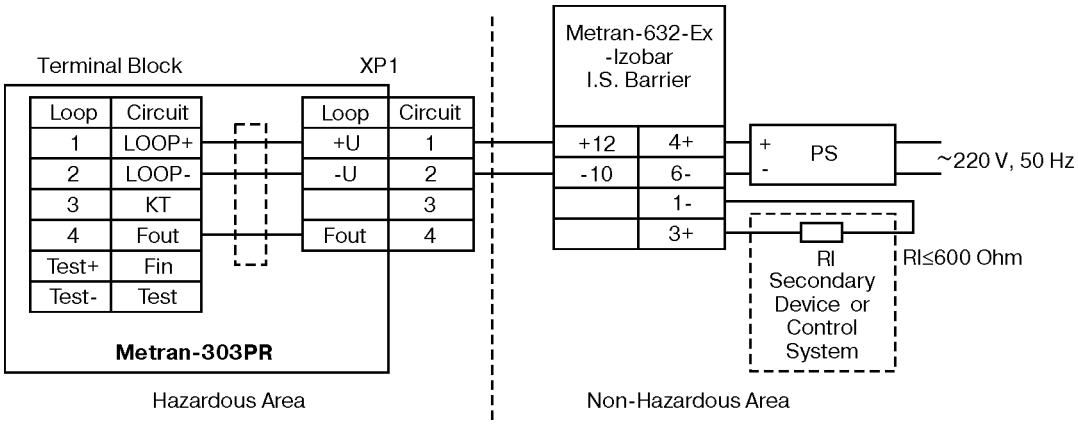


Fig.8. Wiring Diagram for Explosion-proof Flow Meter with General Industrial Power Supply Unit via Analog Output.

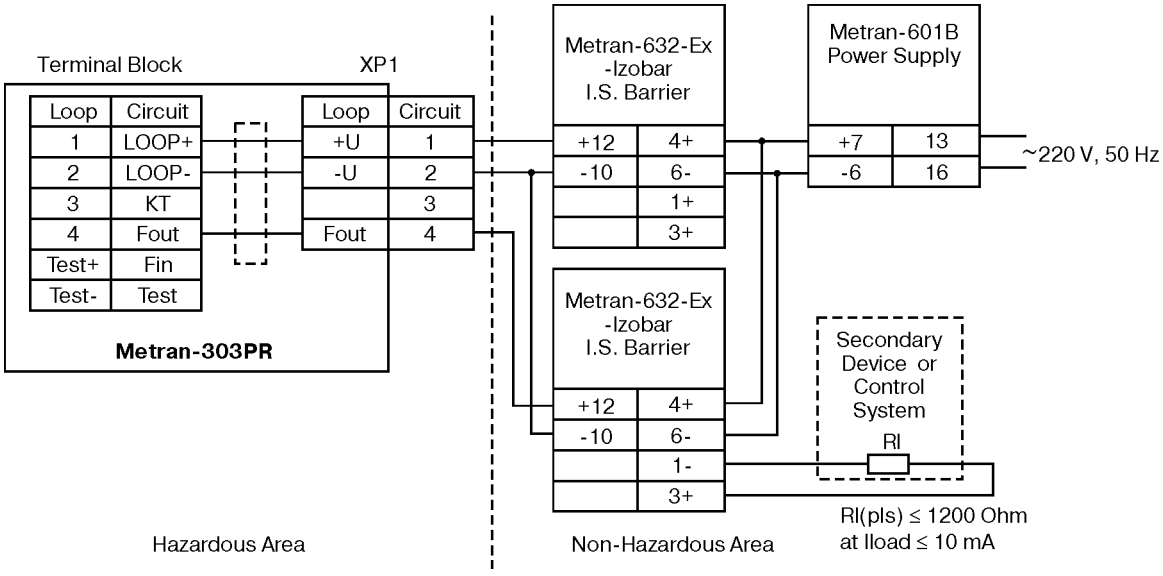


Fig.9. Wiring Diagram for Explosion-proof Flow Meter with General Industrial Power Supply Unit via Current-Pulse Output.

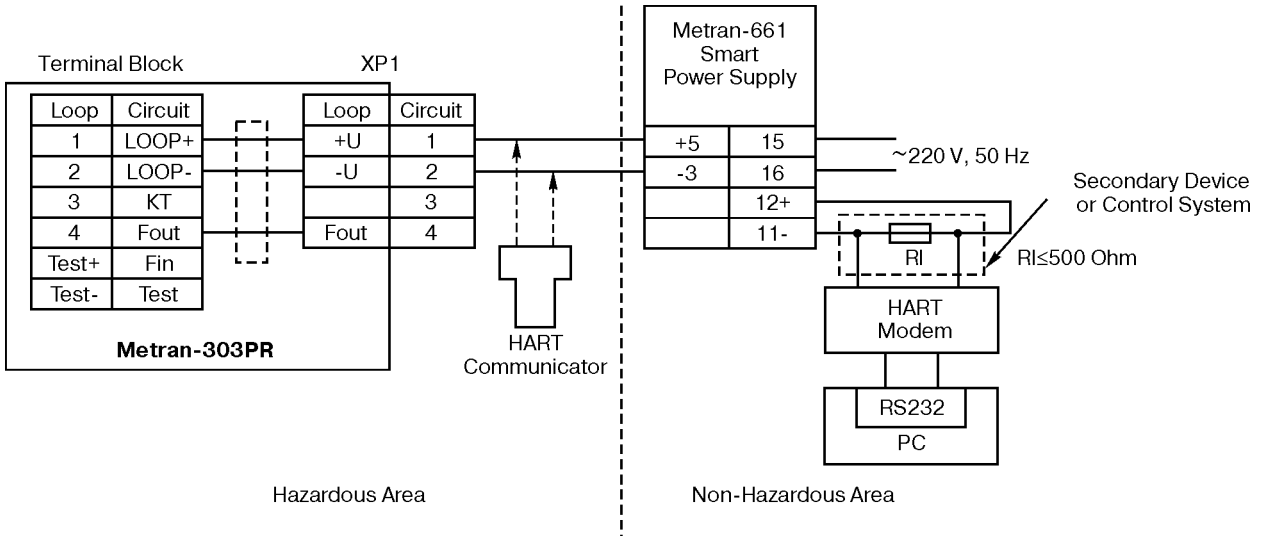


Fig.10. Wiring Diagram for Explosion-proof Flow Meter with Ex Power Supply Unit via HART Signal.

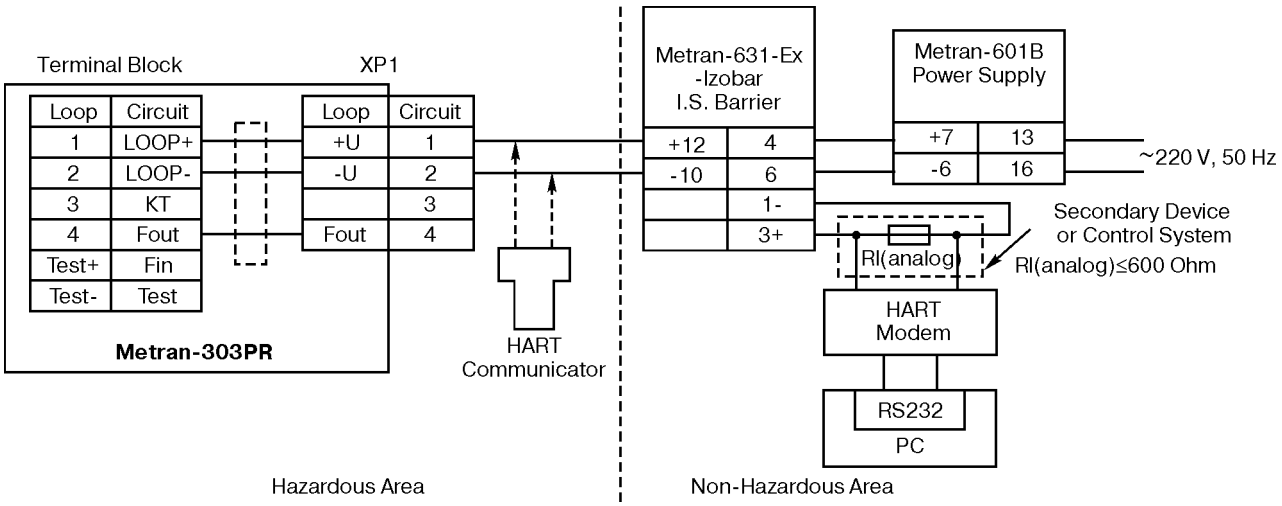


Fig.11. Wiring Diagram for Explosion-proof Flow Meter with General Industrial Power Supply Unit via HART Signal.

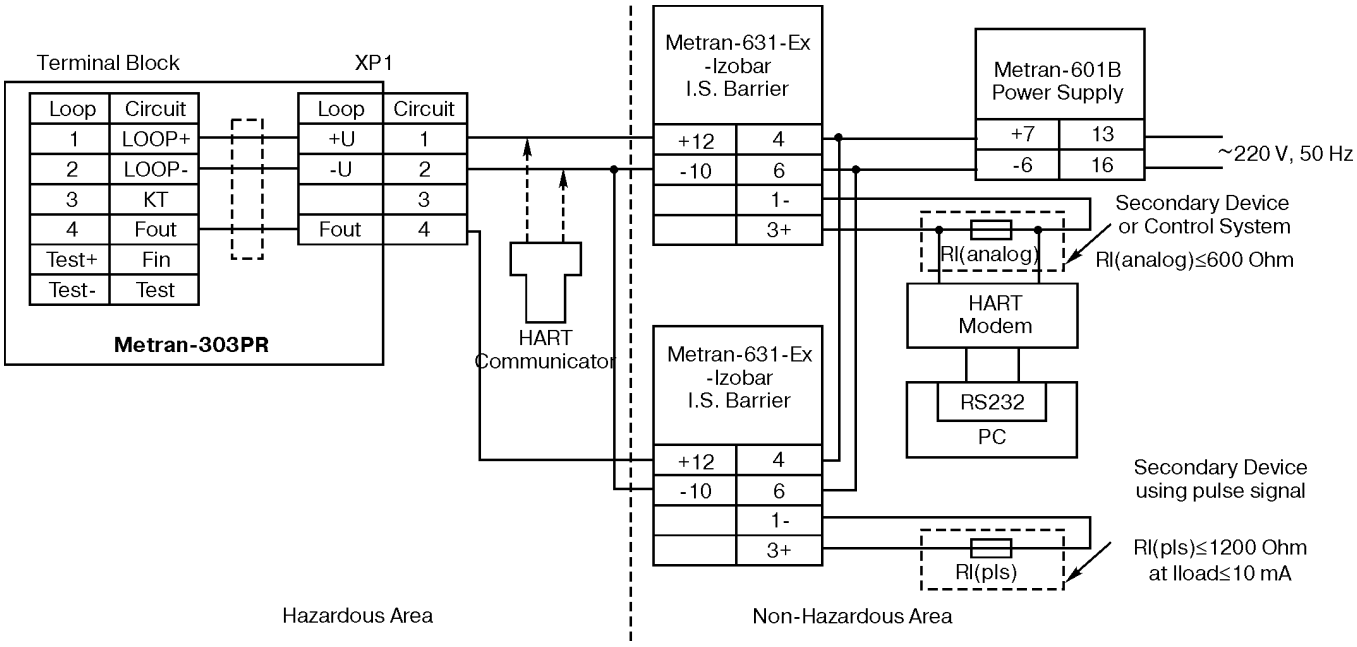


Fig.12. Wiring Diagram for Explosion-proof Flow Meter with General Industrial Power Supply Unit with All Outputs Used Simultaneously.

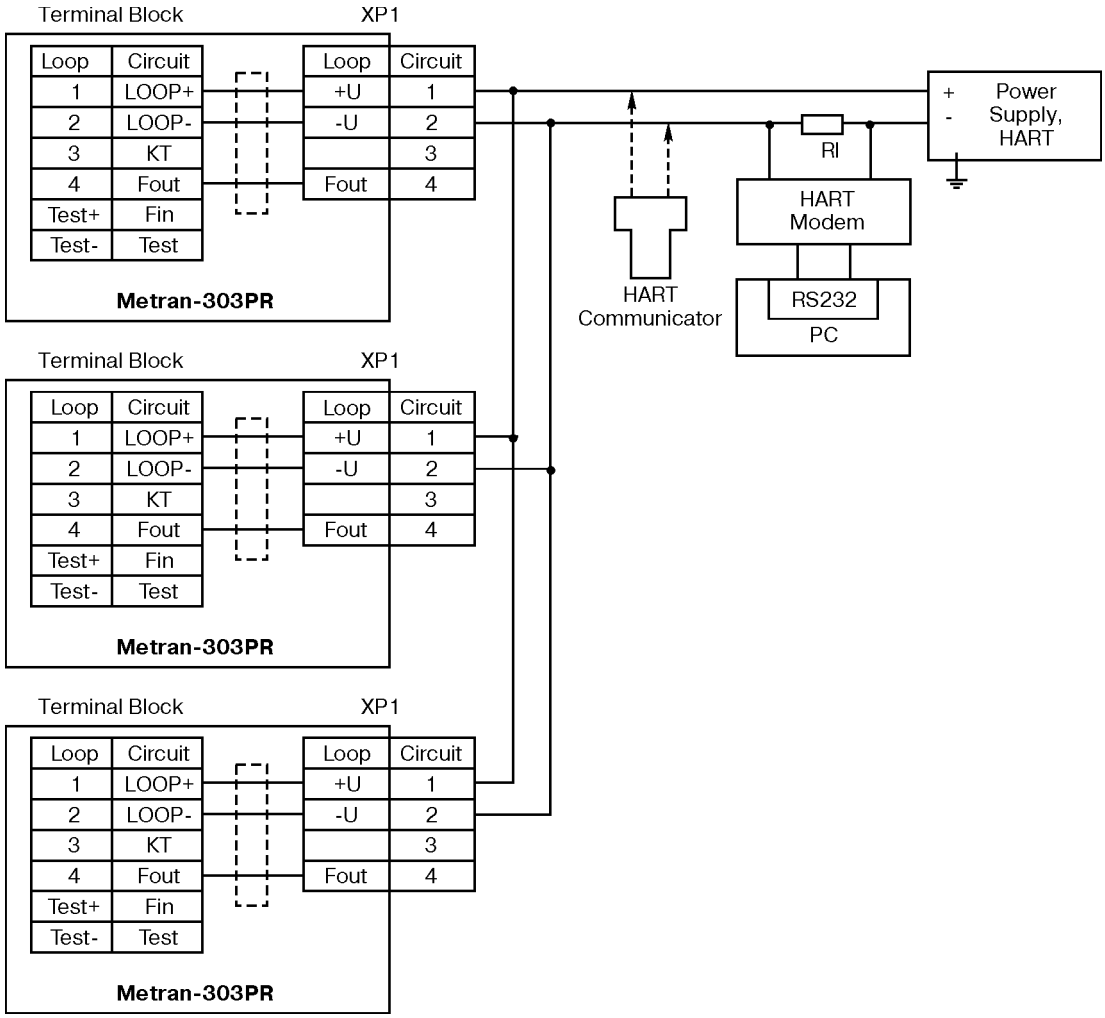


Fig.13. Multidrop Mode for Flow Meters using HART Signal (not recommended for Intrinsic Safety requirements).

Output current of a power supply unit should be no less than total useful current of all flow meters (4 mA per flow meter), current surge at switching on should not exceed 25 mA per flow meter.

WARRANTY

Warranty period: 18 months from the date of commissioning.

Average life time is 12 years.

MTBF is 50,000 h.

DELIVERY SET

- Flowmeter 1 unit
- Product Data Sheet 1 copy
- Operation Manual 1 copy
- Mounting Kit 1 kit
- Socket 1 unit
- Packaging 1 unit

The delivery set may be completed with options (refer to Section *Repair Kit*):

- Extra bluff body;
- Demounting tool;
- End cap for bluff body replacement during calibration;
- Process insert;
- Straightening vane.

HART-Master software is available on request.

ORDERING INFORMATION

Metran-303PR-Ex - 50 - A - 0.01* - 01 - 42 - H - I - S - K1 - TU4213-051-12580824-96**

1 2 3 4 5 6 7 8 9 10 11

1. Code of Flowmeter version:
   Metran-303PR - General Industrial;
   Metran-303PR-Ex - Explosion-proof.
2. Internal pipe diameter DN, mm (Table 4).
3. Code of meter design (Table 1).
4. Pulse value of output signal (Table 4, or acc. to Section *Analog-Pulse Signal Parameters*);
5. Material type code of flow tube (Table 10).
6. Code of analog output availability:
   42 - with linearly increasing characteristic (4-20 mA);
   24 - with linearly decreasing characteristic (20-4 mA).
7. Code of HART signal availability (H).
8. Code of LCD availability (I).
9. Electrical connection code:
   - Gland lead-in (S);
   - Socket connector (ShR).
10. Code of Mounting Kit (KMCh) (Table 11).
11. Specifications.

MATERIALS OF WETTED PARTS

Table 10

Component	Code of Flow Tube Material	
	1	**2**
Metran-303ПРR-A (DN 25...100 mm); Metran-303PR (DN 250, 300 mm)		
Flange	Steel 25	Steel 12Cr18Ni10Ti
Gasket (to seal flanges)	Paronite PON or PON-A	
Housing, body	Steel 12Cr18Ni10Ti	
Bluff body	Steel 14Cr17Ni2 or 09Cr16Ni4Nb	
Ring (to seal bluff body)	Rubber IRP-1338 or K-69	
Straight run*: - Flange - Pipe	 Steel 25 Refer to Table 11	 Steel 12X18H10T Refer to Table 11
Metran-300PR-B (DN 150, 200 mm)		
Branch pipe	Steel 25	Steel 12Cr18Ni10Ti
Gasket (to seal branch pipes)	Paronite PON or PON-A	
Housing, body	Steel 12Cr18Ni10Ti	
Bluff body	Steel 14Cr17Ni2 or 09Cr16Ni4Nb	
Ring (to seal bluff body)	Rubber IRP-1338 or K-69	
Gaskets (to seal bluff body)	Polytetrafluorethylene, steel 12Cr18Ni10Ti	
Straight run*: - Flange - Branch pipe - Pipe	 Steel 25 Steel 25 Refer to Table 11	 Steel 12Cr18Ni10Ti Steel 12Cr18Ni10Ti Refer to Table 11

* On request, only for Metran-303PR-A.

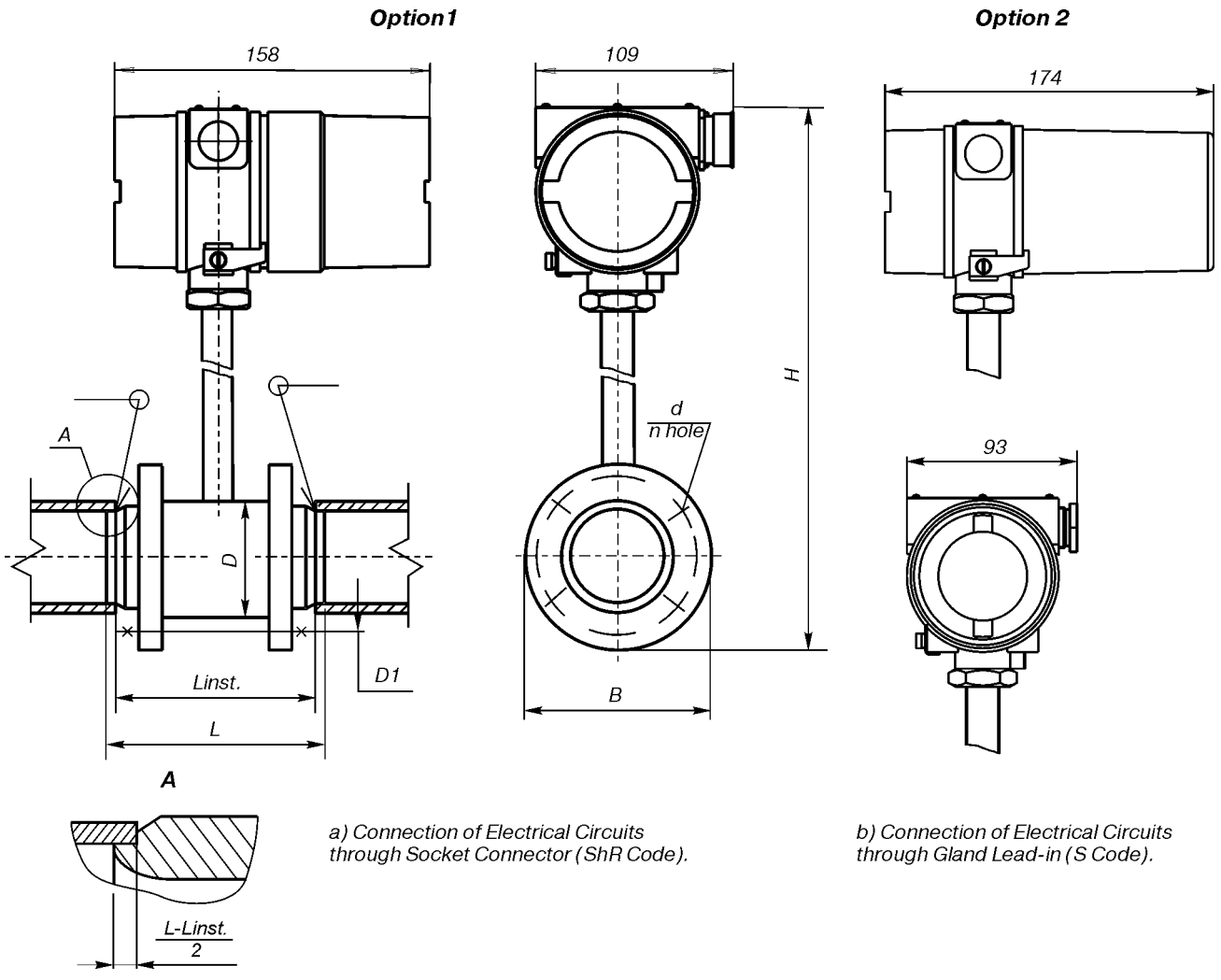
CODES OF MOUNTING KITS

Table 11

Code of Mounting Kit	Mounting Parts	
	Flowmeter of A Version (DN 25...100 mm)	Flowmeter of B Version (DN 150, 200 mm)
K0	Gaskets	Gaskets
K1	Specific flanges, gaskets, nuts, spring washers, round washers, pins	Specific flanges, branch pipes, gaskets, nuts, spring washers, round washers, pins
K2	Straight run 2DN, straight run 5DN, gaskets, nuts, spring washers, round washers, pins	Flanges, straight run 2DN, straight run 5DN, gaskets, nuts, spring washers, round washers, pins
K3	Straight run 5DN, straight run 10DN, gaskets, nuts, spring washers, round washers, pins	Flanges, straight run 5DN, straight run 10DN, gaskets, nuts, spring washers, round washers, pins
K4	Flanges as per GOST 12820-80 of Version 1, gaskets, nuts, spring washers, round washers, pins	-

Note:
1. Number of parts included into Mounting Kit is indicated in the Product Data Sheet.
2. DN 250 and 300 mm flowmeters are supplied with Mounting Kit as per K0 or K4 code.

DIMENSIONAL AND MOUNTING DRAWINGS



a) Connection of Electrical Circuits through Socket Connector (ShR Code).

b) Connection of Electrical Circuits through Gland Lead-in (S Code).

Fig.14. Metran-303PR-B Flowmeter, DN 150, 200.

Option 1. With analog-pulse output (standard version), as well as with additional analog and/or digital output.
Option 2. With LCD.

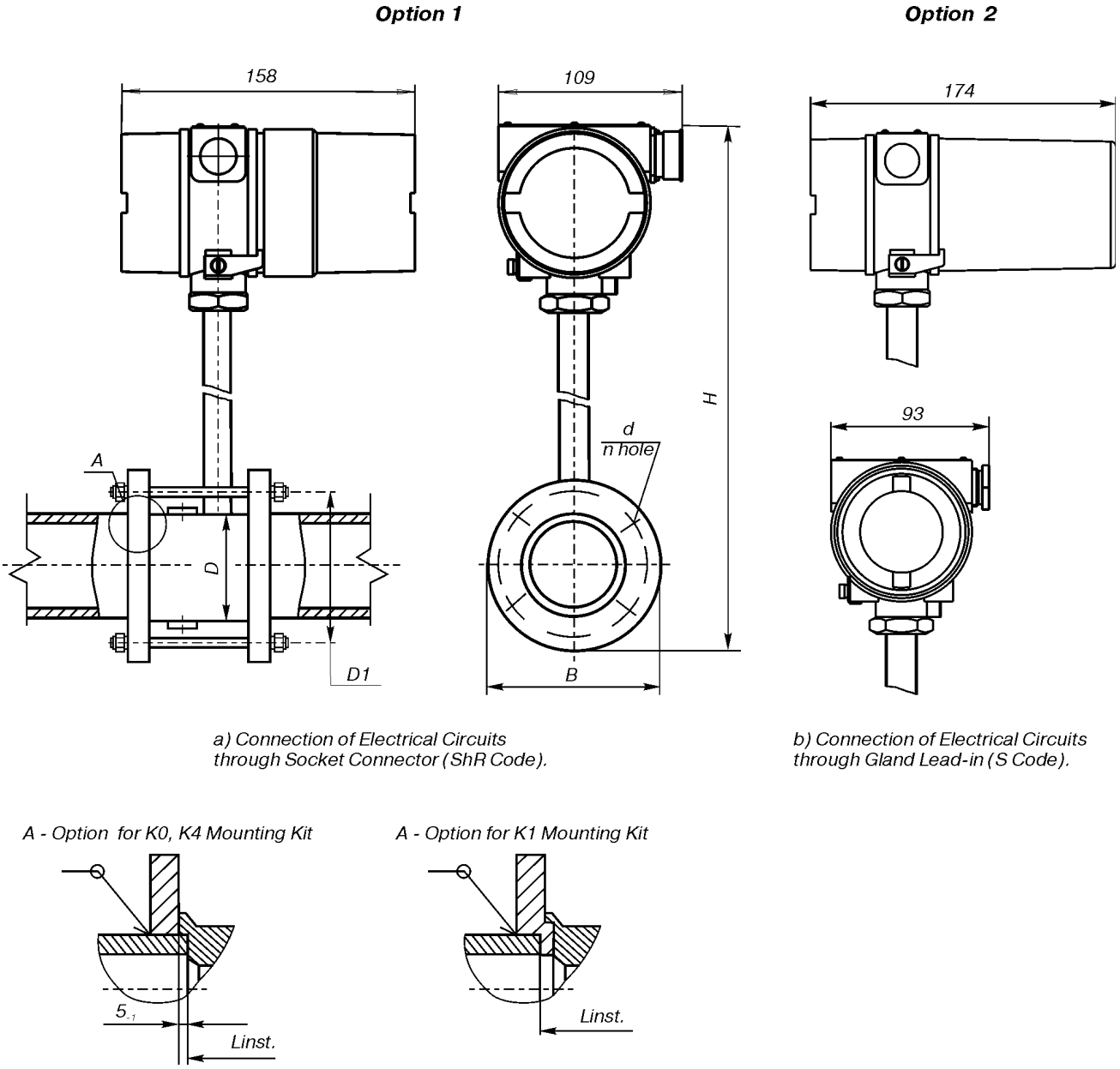


Fig.15. Metran-303PR-A Flowmeter, DN 25...100.

Option 1. With analog-pulse output (standard version), as well as with additional analog and/or digital output.
Option 2. With LCD.

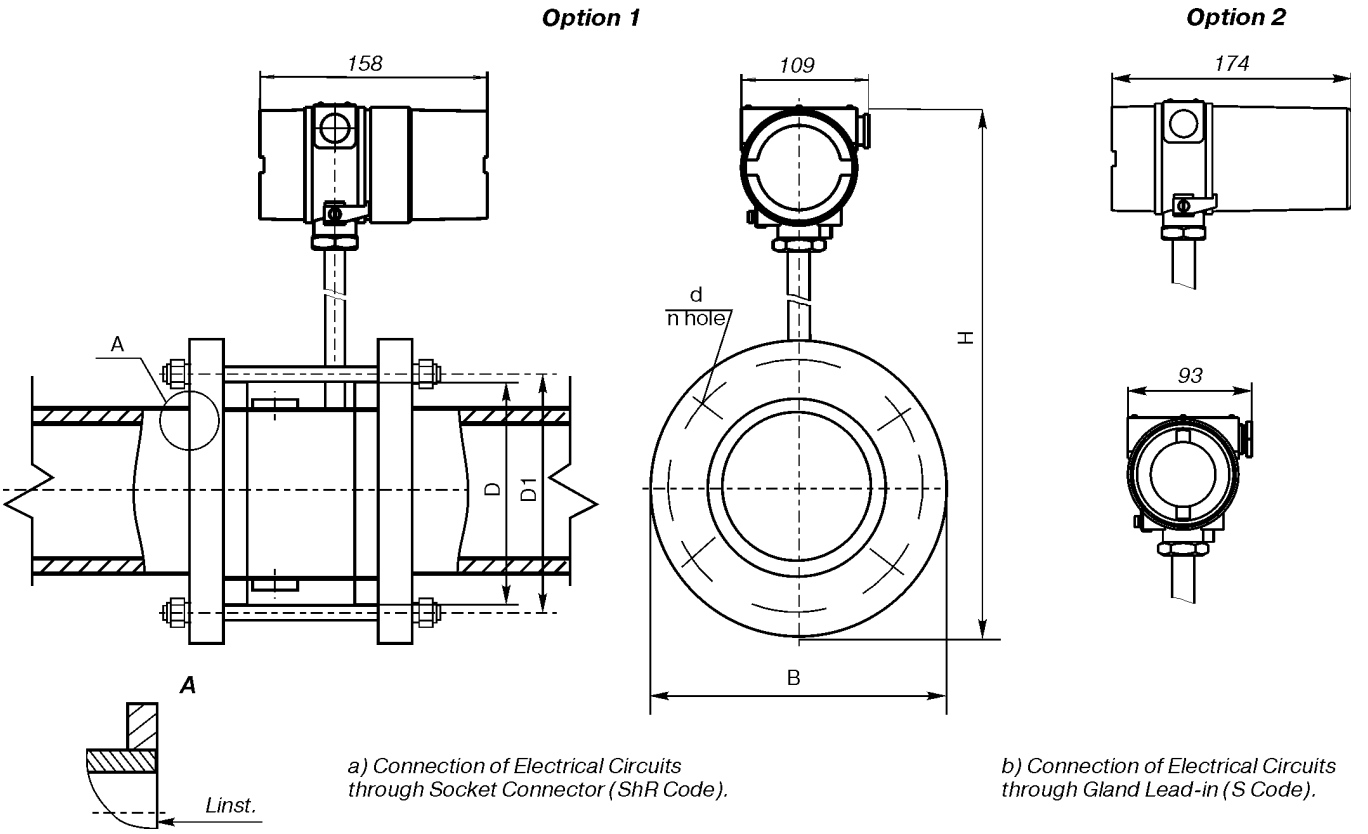


Fig.16. Metran-303PR Flowmeter, DN 250, DN300.

Option 1. With analog-pulse output (standard version), as well as with additional analog and/or digital output.
Option 2. With LCD.

For Figures 14-16

DN, mm	Metran-303PR-B, DN 250, 300 mm									Metran-303PR-A							
	B, mm	D, mm	D1, mm	Linst, mm	H, mm	L, mm	d, mm	n, units	Weight, kg	B, mm	D, mm	D1, mm	Linst, mm	H, mm	d, mm	n, units	Weight, kg
25	-	-	-	-	-	-	-	-	-	115	60	85	62/86	300	14	4	2.8
32	-	-	-	-	-	-	-	-	-	135	65	100	64/88	314	18	4	3.0
50	-	-	-	-	-	-	-	-	-	160/ 144	75	125/ 110	64/88	331/ 323	18	4	3.3
80	-	-	-	-	-	-	-	-	-	195/ 178	110	160/ 145	99/ 125	358/ 349	18	8/4	5.3
100	-	-	-	-	-	-	-	-	-	215/ 192	130	180/ 160	114/ 144	378/ 366	18	8	8.3
150	244	165	210	222	457	278	18	8	17.0	-	-	-	-	-	-	-	-
200	334	205	295	283	558	343	22	12	25.0	-	-	-	-	-	-	-	-
250	405	329	355	210	665	-	22	12	35.0	-	-	-	-	-	-	-	-
300	460	384	410	210	720	-	22	12	38.0	-	-	-	-	-	-	-	-

Note:
1. Sizes for flowmeters with mounting kit K0 and K4 are indicated in numerator of fraction, and flowmeters with mounting kit K1 in term of fraction.
2. Flowmeter weight is specified excluding weight of mounting kit.

PIPES FOR STRAIGHT RUN

Table 13

DN, mm	Dint, mm	Material Code			
		01			02
		Pipe		Equivalent Pipe	Pipe
25	26±0.3	Pipe	Dint 26x3.0 GOST 8734-75 GOST 8733-74	Pipe	32x3.0 GOST 10704-91 VSt3sp2 GOST 10705-80	Pipe 32x3.0-12Cr18Ni10Ti GOST 9941-81
32	33±0.4	Pipe	Dint 33x2.5 GOST 8734-75 GOST 8733-74	Pipe or Pipe	38x2.5 GOST 10704-91 VSt3sp2 GOST 10705-80 38x2.5 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 38x2.5-12Cr18Ni10Ti GOST 9941-81
50	50±0.4	Pipe	Dint 50x3.5 GOST 8734-75 GOST 8733-74	Pipe or Pipe	57x3.5 GOST 10704-91 VSt3sp2 GOST 10705-80 57x3.5 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 57x3.5-12Cr18Ni10Ti GOST 9941-81
80	82±0.66	Pipe	Dint 82x3.5 GOST 8734-75 GOST 8733-74	Pipe or Pipe	89x3.5 GOST 10704-91 VSt3sp2 GOST 10705-80 89x3.5 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 89x3.5-12Cr18Ni10Ti GOST 9941-81 or Pipe 89x3.5-08Cr18Ni10Ti GOST 9940-81
100	100±0.8	Pipe	Dint 100x4 GOST 8734-75 GOST 8733-74	Pipe or Pipe	108x4.0 GOST 10704-91 VSt3sp2 GOST 10705-80 108x4.0 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 108x4.0-12Cr18Ni10Ti GOST 9941-81
150	151±1.21	Pipe	Dint 151x4 GOST 8734-75 GOST 8733-74	Pipe or Pipe	159x4.0 GOST 10704-91 VSt3sp2 GOST 10705-80 159x4.0 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 159x4.0-08Cr18Ni10Ti GOST 9940-81
200	208±1.64	Pipe	Dint 208x6 GOST 8734-75 GOST 8733-74	Pipe or Pipe	219x6.0 GOST 10704-91 VSt3sp2 GOST 10705-80 219x6.0 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 220x6.5-12Cr18Ni10Ti GOST 9941-81
250	261±2.7	Pipe	273x6.0 GOST 10704-91 GOST 10705-80	Pipe	273x6.0 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 273x6.0-08Cr18Ni10Ti GOST 9941-81
300	311±3.0	Pipe	325x7.0 GOST 10704-91 GOST 10705-80	Pipe	325x7.0 GOST 8732-78 VSt3sp2 GOST 8731-74	Pipe 325x7.0-08Cr18Ni10Ti GOST 9941-81