

## Metran-55 Small-Size Pressure Transmitters

OKP code 42 1200



- **Measurable media:**  
liquid, steam, gas (including oxygen gas)
- **Pressure range:**  
min 0-0.06 MPa;  
max 0-100 MPa
- **Output:** 4-20, 0-5, 0-20 mA;  
4-20, 0-5 mA - for microprocessor-based (MP) transmitters
- **Ambient temperature:**  
-40...70°C
- **Version as per GOST 12997:**  
traditional; oxygen; explosion proof (ExialICT5X, ExibICT5X, 1ExdsIIBT4/H<sub>2</sub>X)
- **Verification interval:**  
2 years,  
3 years - for MP transmitters
- **Dust and water tightness:**  
IP55,  
IP65 - for MP transmitters
- **Entered into the State Register of measuring instruments, Certificate #18375-03**
- **Sanitary and Epidemiological Statement #74.50.01.510P.000536.04.04 dated as of 07.04.04**

Metran-55 Small-Size Transmitters are designed for different industries, self-test systems, process control systems and provide continuous conversion of gage (DI), absolute (DA) pressure, vacuum (DV), gage vacuum pressure DIV) of neutral and corrosive media into a unified current output.

Design simplicity, reliability, small size, low cost provide keen customers' demand.

Advantages of MP version transmitters:

- measurement accuracy  $\pm 0.15\%$  ;
- turndown 10:1;
- continuous self-diagnostics;
- built-in RF-interface filter;
- microprocessor-based electronics;
- two buttons adjustment.

**MAIN SPECIFICATION AND PARAMETERS**

Table 1

Transmitter	Model	URL (Upper range limit) per GOST 22520, MPa		Maximum Reference Accuracy for Transmitters (except MP), ±γ %		
			MP			
<b>Absolute Pressure Transmitters (DA)</b>						
Metran-55-DA Metran-55-Ex-DA Metran-55-Vn-DA	505	0.6; 1.0; 1.6; 2.5	0.25; 0.4; 0.6; 1.0; 1.6; 2.5	0.25; 0.5; 1.0		
	506	4.0; 6.0; 10.0; 16.0	1.6; 2.5; 4.0; 6.0; 10.0; 16.0			
<b>Gage Pressure Transmitters (DI)</b>						
Metran-55-DI Metran-55-Ex-DI Metran-55-Vn-DI	515	0.6; 1.0; 1.6; 2.5	0.25; 0.4; 0.6; 1.0; 1.6; 2.5	0.25; 0.5; 1.0		
	516	4.0; 6.0; 10.0; 16.0	1.6; 2.5; 4.0; 6.0; 10.0; 16.0			
	517	25; 40; 60; 100	10; 16; 25; 40; 60; 100			
	518	0.1; 0.16; 0.25; 0.4; 0.6	0.06; 0.1; 0.16; 0.25; 0.4; 0.6			
<b>Vacuum Pressure Transmitters (DV)</b>						
Metran-55-DV Metran-55-Ex-DV Metran-55-Vn-DV	528	0.1	0.06; 0.1	0.25; 0.5; 1.0		
<b>Gage Vacuum Pressure Transmitters (DIV)</b>						
Metran-55-DIV Metran-55-Ex-DIV Metran-55-Vn-DIV	535	vacuum	gage pressure	vacuum	gage pressure	0.25; 0.5; 1.0
		0.1	0.5	0.1; 0.1; 0.1	0.15; 0.3; 0.53	
		0.1	0.9	0.1	0.9	
		0.1	1.5	0.1	1.5	
		0.1	2.4	0.1	2.4	

LRL (lower range limit) of DA, DI, DV transmitters is equal to zero.  
 For DIV transmitters the value equal to zero is within a measurement range.  
 No oxygen version is available for 517 transmitters.  
 MP transmitter can be reset to any URL specified in Table 1 for the corresponding model.

● **Accuracy limits for MP transmitters**

Table 2

Accuracy Code	Maximum Reference Accuracy within Adjustment Ranges, ±γ %	
	$P_{max} \geq P_u \geq P_{max} / 6$	$P_{max} / 6 > P_u \geq P_{max} / 10$
015	0.15	0.2
025	0.25	
050	0.5	

**P<sub>u</sub>** - URL indicated in Table 1 according to GOST22520.  
**P<sub>max</sub>** - max URL for given model of transmitter (total of absolute max. URL of gage pressure (P<sub>max</sub>) and vacuum (P<sub>max(-)</sub> for NP transmitters).

### ● Influencing Factors

Table 3

Effect	Additional Accuracy
Change of ambient temperature by 10°C	<p><b>For transmitters with accuracy <math>\gamma = \pm 0.25; \pm 0.5\%</math>:</b></p> $\pm(0.3 + 0.1 \frac{P_{max}}{P_u}) \% \quad (\text{for all models except 528})$ $\pm 0.9\% \text{ of output turndown (for model 528)}$ <p><b>For transmitters with accuracy <math>\gamma = \pm 1.0\%</math>:</b></p> $\pm(0.5 + 0.1 \frac{P_{max}}{P_u}) \% \quad (\text{for all models except 528})$ $\pm 1.1\% \text{ of output turndown (for model 528)}$ <p><b>For MP transmitters with accuracy code 015:</b></p> $\pm(0.05 + 0.04 \frac{P_{max}}{P_u}) \%$ <p><b>For MP transmitters with accuracy code 025, 050:</b></p> $\pm(0.1 + 0.05 \frac{P_{max}}{P_u}) \%$
Vibration	$\pm 0.5\% \text{ of output turndown:}$ $\gamma_f = \pm 0.1 \frac{P_{max}}{P_u} \% \text{ (for MP transmitters)}$

● **Output** for transmitters of industrial version is 0-5, 0-20, 4-20 mA; for transmitters with explosion protection type "Ex" is 4-20 mA

● **Climatic type** of transmitters corresponds to UHL 3.1, U2 or T3 per GOST 15150 (version group V4, C4, C1 per GOST 12997). The transmitters are designed for operation at ambient temperature indicated in "Climatic type codes", Table 5

● The transmitters of climatic type UHL3.1 and U2 are **proof against ambient relative humidity** to  $(95 \pm 3)\%$  at 35°C and lower temperatures without moisture condensation. The transmitters of T3 version are proof against ambient relative humidity 100% at 35°C and lower temperatures with moisture condensation.

● **Dust and water tightness** per GOST 14254:  
**IP55,**  
**IP65** - for MP transmitters

● The transmitters are designed to operate at atmospheric pressure 84.0 - 106.7 kPa and correspond to group **P1** per GOST 12997

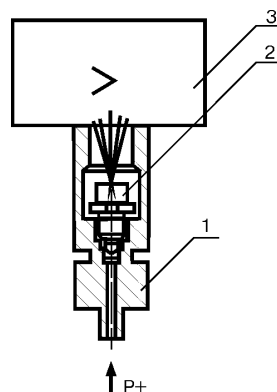
● **Mechanical effect stability** of the transmitters corresponds to vibration-proof version **V3** per GOST 12997 **on mechanical effect stability**

● The transmitters withstand **overload** by test pressure **1.25 times more URL for the model** (without change of parameters after effect). The transmitters with URL 100 MPa withstand **overload** by test pressure **110 MPa** (without change the parameters after effect)

### DESIGN AND OPERATION

Metran-55 consists of a pressure converter, i.e. a measuring unit (MU) and an electronic converter (EC).

Measurable pressure is supplied to the working cavity of the transmitter and directly affects the pickoff measuring diaphragm, causing diaphragm bending.



- 1 - measuring unit;  
2 - pickoff;  
3 - electronic converter

Sensor is a single-crystal sapphire wafer with silicon film strain gages (Silicon-on-Sapphire structure) that is connected to metal diaphragm of the pickoff. Strain gages are connected in bridge circuit. Measuring diaphragm deformation (pickoff diaphragm deformation) results to proportional change of strain gages resistance and unbalance of bridge circuit. An electrical signal goes from bridge circuit output to electronic unit and there it is converted to unified current signal.

MP transmitters operate in two modes:

- pressure measurement mode;
- mode of set and control of measurement parameters

In pressure measurement mode the transmitters continuously control its work and form the message in output reduction form in case of failure detection.

MP transmitters have two built-in buttons located under the electronic converter cover. They provide setting outputs corresponding to low (1) and upper (2) maximum values of measurable parameter. MP transmitters have LED built into the housing that provides visual control of the transmitter adjustment.

MP transmitters are multirange and can be reset to any standard or non-standard measurement range within limits of the specified model (Table 1) and provide adjustment to offset measurement range.

MP transmitters have a filter of industrial radio noise built into the electronic converter.

### POWER CONSUMPTION

Voltage is supplied to transmitters from DC source. Supply voltage and load resistance are specified in Tables 4, 5.

Table 4

Output, mA	Supply Voltage, U, V	Load Resistance, kOhm	
		Rmin	Rmax
0-5	36±0.72	0.2	2.5
4-20 0-20		0.05	1.1
4-20	13...42	(U-35) / I <sub>max</sub>	(U-U <sub>min</sub> ) / I <sub>max</sub>

**U<sub>min</sub>** = 13 V; **I<sub>max</sub>** = 20 mA.

It is possible to supply the transmitters with 0-5 mA output by voltage 24 -42 V from a DC power supply.

#### For MP transmitters

Table 5

Output, mA	Supply Voltage, U, V	Load Resistance, Ohm	
		Rmin	Rmax
0-5	22...42	0	R <sub>max</sub> ≤ 100 (U - 10)
4-20	12...42	0 at U ≤ 36 V R <sub>min</sub> ≥ 50 (U - 36) at U > 36 V	R <sub>max</sub> ≤ 42 (U - 12)

Metran-55-Ex transmitters are powered from intrinsically safe circuits of barriers (units) with explosion protection "intrinsically safe electrical circuit" , "ia", "ib" level for explosive blends of subgroup IIC per GOST R 51330.0, but max. output voltage of barriers U<sub>0</sub> should not exceed 24 V and max. output current I<sub>0</sub> should not exceed 120 mA.

**Power** consumed by the transmitter is no more than:

0.5 VA - for transmitters with 0-5 mA output;

1.0 VA - for transmitters with 4-20, 0-20 mA output.

### MOUNTING

Transmitters should be mounted on-site according to the Operation Manual.

During on-site transmitter mounting, connectors from the place of pressure tap shall be laid in the shortest distance. If temperature of working medium is higher than permissible ambient temperature, the transmitter shall be mounted on connecting line of 0.5 m minimum and 15 m maximum.

### WEIGHT

Metran-55, Metran-55-Ex: 0.6 kg maximum

Metran-55-Vn: 0.9 kg.

### RELIABILITY

Average service life is 12 years, and 7 years for transmitters of oxygen version.

Mean-time-between-failures including maintenance is:

- 100, 000 hr,

- 150, 000 hr for MP transmitters.

### VERIFICATION

Verification interval is:

- 2 years,
- 3 years for MP transmitters.

Verification procedure is according to MI4212-012-2001.

### DELIVERY SET

- Transmitter;
- Mounting part set (optional);
- Operation Manual;
- Verification Procedure MI4212-012-2001;
- Product Data sheet.

The following options are available upon customer's request and at extra cost:

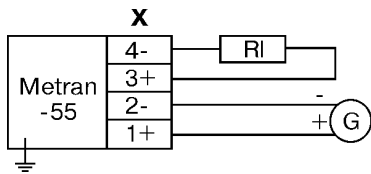
- Power supply units;
- Secondary devices;
- High potential barriers

### WARRANTY

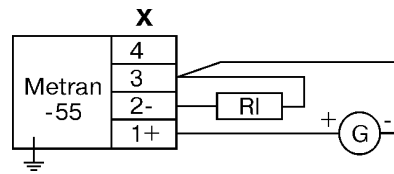
Warranty period is 18 months from the date of commissioning.

**EXTERNAL WIRING DIAGRAMS**

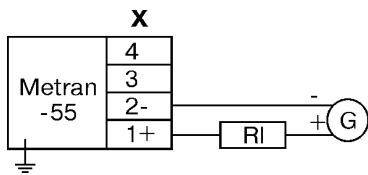
For transmitters with 0-5, 0-20 mA output



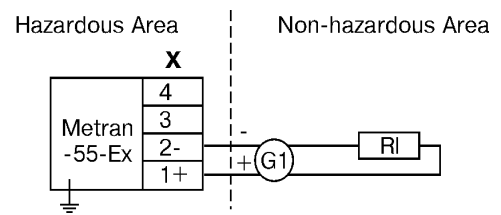
Option of load connection for transmitter with 4-20 mA output



For transmitters with output 4-20 mA  
2-wire line



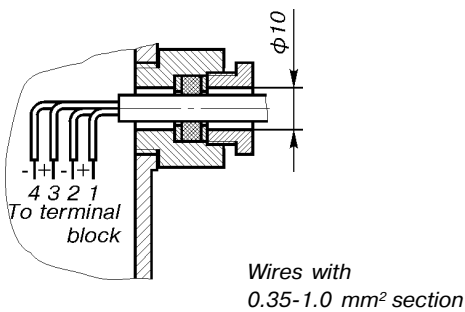
For explosion-proof version "Ex" (4-20 mA)



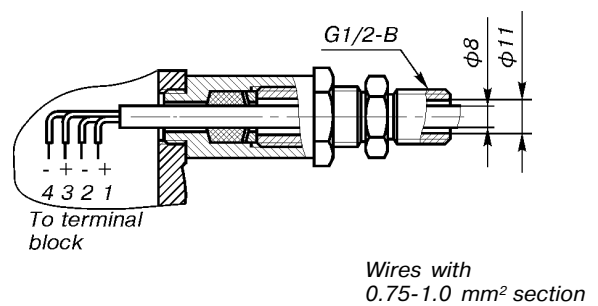
- G** - DC power supply;
- G1** - intrinsically safe barrier or power supply unit with ExialIC or ExibIIC level;
- RI** - load resistance;
- X** - terminal block or connector.

**ELECTRIC CONNECTION**

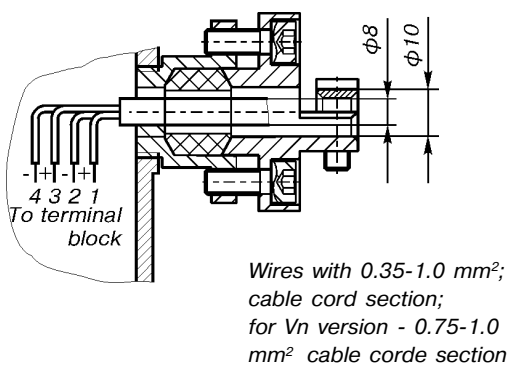
**Gland lead-in\* (code C)**



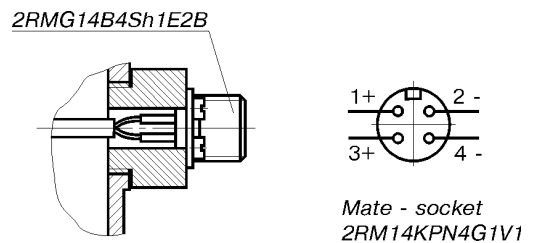
**Gland lead-in\* for "Vn" version**



**Gland lead-in\*  
with cable fixation (code C2)**



**Plug (code ShR)**



\* Cable is not supplied.

**ORDERING INFORMATION**

<b>METRAN-55-DI</b>	-	<b>515</b>	-	<b>MP</b>	-	<b>t1</b>	-	<b>015</b>	-	<b>0.6 MPa</b>	-	<b>42</b>	-	<b>M20</b>	-	<b>ShR</b>	-	<b>K</b>	-	<b>TU</b>
<b>METRAN-55-Ex-DI</b>		2		3		4		5		6		7		8		9		10		11
<b>METRAN-55-Vn-DI</b>																				
		1																		

1. Transmitter (Table 1).
2. Model (Table 1).
3. Code (only for MP transmitters).
4. Climatic type code (Table 6).
5. Accuracy code - for MP transmitter (Table 2), absolute value of accuracy - for the other transmitters (Table 1).
6. URL (Table 1).
7. Output code (Table 7).
8. Mounting part code (Table 8).
9. Electric connector code (Table 9).
10. "K" is indicated on the transmitters for operation on gas oxygen and oxygen-containing mixed gas, pressure does not exceed 16 MPa.
11. Transmitter mounting bracket code (Fig.5) - since 07.01.05.
12. Specifications:  
 TU 4212-009-12580824-98,  
 TU 4212-009-12580824-2002 - for MP transmitters.

**CLIMATIC TYPE CODE**

Table 6

Code	Climatic Version per GOST 15150	Limiting Ambient Temperatures during Operation, °C
t 1	UHL 3.1	5...50
t 2		-10...50
t 3		5...70
t 4	U2	-30...50
t 5		-42...50
t 6		-42...70
t 7	T3	-10...55
t 8		-25...70
t 9		-25...55
<b>For MP transmitters</b>		
t 1	UHL 3.1	5...50
t8	T3	-25...70
t10	U2	-40...70

**MOUNTING PART CODE**

Table 8

Code	Mounting parts
M20	Nipple with coupling nut M20x1.5 for connection to external diameter of pipe 14 mm
M12	Connector M12x1.5

**ELECTRIC CONNECTOR CODE**

Table 9

Code	Electrical connector
S	Gland lead-in for cable with diameter no more than 10 mm
S2	Gland lead-in with cable fixation
ShR (for MP)	Plug: male 2RMG14B4Sh1E2B GEO.364.140TU

Note: ShR connector is not applied for Metran-55-Vn.

**OUTPUT CODE**

Table 7

Code	Output, mA
42	4 - 20
05	0 - 5
02	0 - 20*

\* Not applied for MP.

OVERALL AND CONNECTION DIMENSIONS

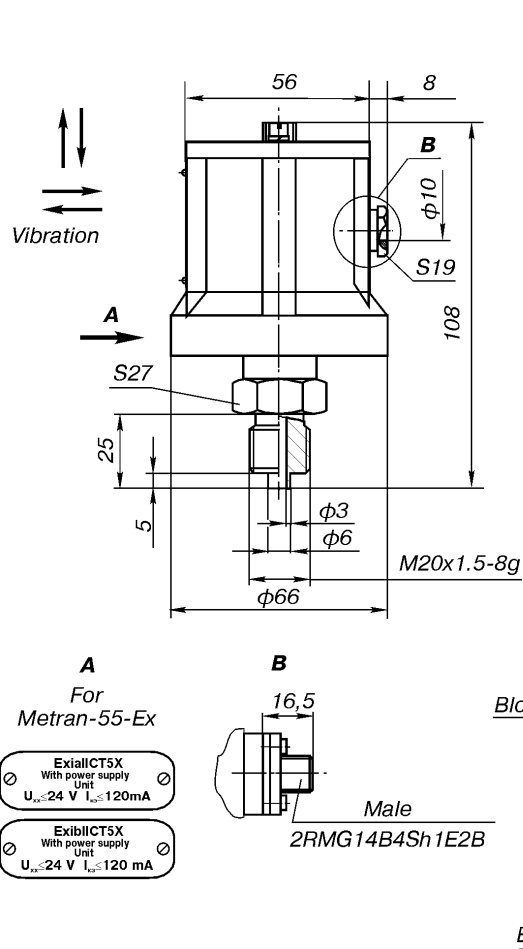


Figure 1. Metran-55, Metran-55-Ex, models 515, 516, 517, 518, 528, 535.

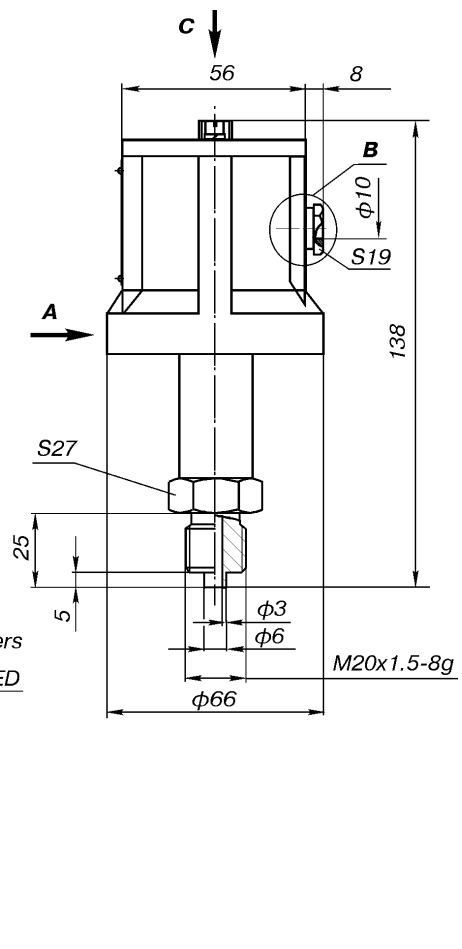


Figure 2. Metran-55, Metran-55-Ex, models 505, 506.

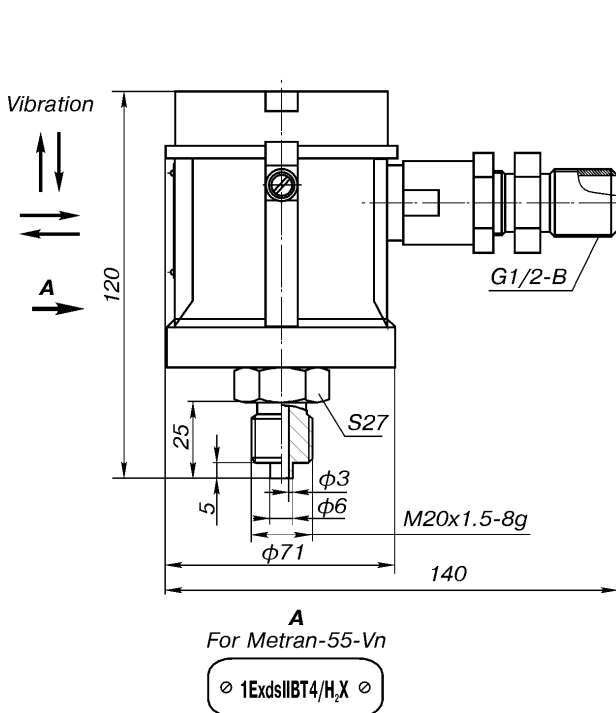


Figure 3. Metran-55-Vn, models 515, 516, 517, 518, 528, 535.

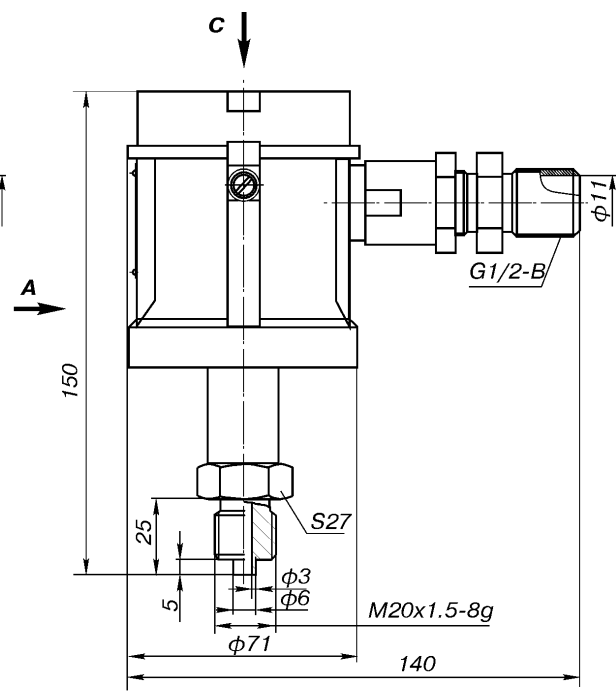


Figure 4. Metran-55-Vn, models 505, 506.

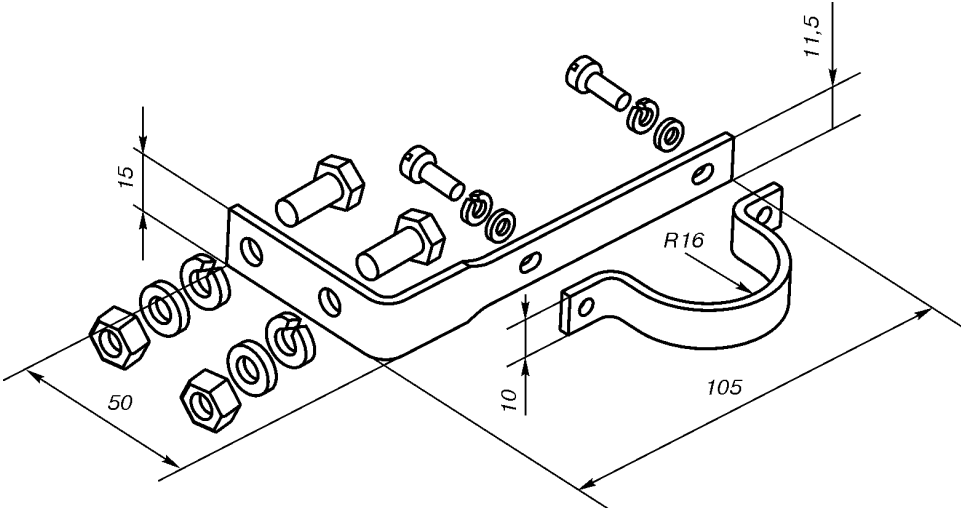


Fig.5. Transmitter's bracket for mounting on wall or mounting support.