

## RD Pressure Relay

Code OKP 421872



- Fluid under control: gas, liquid
- Setting range from minus 90 to 1600 kPa
- One or two independent continuously adjustable settings
- Limits of permissible basic error of relay actuation:
  - gage pressure is max.  $\pm 1\%$  of settings URL;
  - head and draft is max.  $\pm 1\%$  (for RD-01  $\pm 4\%$ ) of sum of absolute values of vacuum and gage pressure settings URL
- Return zone - regulated for relay:
  - gage pressure is maximum 10% of set point upper range limit;
  - head and draft is max. 5% (for RD-0.1 is max. 7.5%) of sum of absolute values of vacuum and gage pressure settings URL
- Load is active-inductive

RD Pressure Relay (single-range, double-range) is designed to operate in the control systems of vacuum-gage and gage pressure for electrical circuit opening-completing by a magnetic reed relay after reaching pressure setting.

Advantages: sensing element (diaphragm) and disks in contact with the controlled environment, are made from alloys 36NiCrTiAl and 12Cr18Ni10Ti accordingly that ensures high corrosion resistance of the relay.

### SPECIFICATIONS

- Actuation settings range, overload pressure and other relay parameters are given in Table 1.

Table 1

Type	Name	Settings Range, kPa	Nom. Pressure of Relay Actuation, kPa	Overload Pressure, kPa	Application
RD-0.1	Vaccum-gage relay	minus 0.4 - minus 0.05 0.05 - 0.4	0.2	5	Control of vacuum-gage and gage pressure
RD-2.5		minus 2.5 - minus 0.4 0.4 - 2.5	1.2	10	
RD-12		minus 12 - minus 2.5 2.5 - 12	6.0	80	
RD-100		minus 90 - minus 12 12 - 100	50	500	
RD-400	Gage pressure relay	80 - 400	200	1000	Control of gage pressure
RD-1600		400 - 1600	800	2000	

- Relays are stable against overload pressure effect, specified in Table 1, for 1 minute period.
- Direct current and power values switching by RD contacts are given in Table 2..

Table 2

Direct Current Switching by Contacts, A	Voltage, V		Switching Power	
0.01 - 0.5	at load		at load	
	inductive	active	inductive, VA	active, W
	5 - 36	5 - 100	0.6	10

- RD Relay is designed for operation with preset parameters under the following conditions:
    - ambient temperature -30...50°C;
    - relative humidity up to 95% at 35°C;
    - vibration with frequency up to 25 Hz, movement amplitude 0.1 mm maximum.
- Exceptions to "Technical specifications" section: RD can be produced according to parameters agreed to the manufacturer.*

### DESIGN AND OPERATING PRINCIPLE

RD Relay operating principle is based on transmission of sensor elastic deformation to a switching unit when pressure or vacuum of controlled fluid affects sensor.

Controlled fluid influences the sensor through a connector. Sensor moves a magnet that affects the **magnetic reed relay contacts** by its magnetic field completing or opening electrical circuit.

Setting-up of a relay to a specific setting is performed with the help of a test pressure gage by rotation of adjusting nut. Accuracy of setup depends on a pressure gage class. Relay setting-up can be performed both to pressure increase (setting type V - upper), and to pressure decrease (setting type N - lower) sides, as well as for completeing or opening of electrical circuits.

First remove the protective case.

Rotation of adjusting nut clockwise results in decreasing of actuation setting; for vacuum-gage control relay - to increase of setting at vacuum-gage pressure control.

Having set the required value of actuating pressure, lock the adjusting nut with a setscrew, and fix protection casing with screws.

### MOUNTING

Relay is installed at the site vertically with a connector down (important for RD-0.1).

Relay is connected with the help of connector M12x1.5. For sealing, you can use gaskets in the form of lead, fiber, fluoroplastic, polyurethane or soft copper washers.

For relay mounting convenience special mounting bracket is provided (it is not included in the standard complete set) with a thin tube (material: rilsan) for control fluid supply to the relay.

Connection of RD to control system is performed by two-wire communication line with copper wires with section up to 0.5 mm<sup>2</sup>; there is a connector to connect to electric circuit.

To determine actuation error we recommend installation of a control pressure gage on a pipeline.

### MAINTENANCE

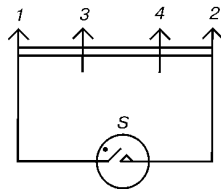
During operation it is necessary to monitor connections leak-proof, exclude cases of pressure overload over values stated in Table 1.

You must check the preset limit of the setting at least once every three months.

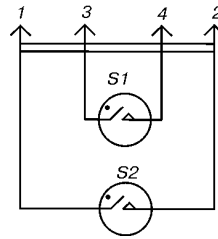
Always monitor that incoming pressure is not pulsing.

**RELAY CONNECTION**

Single-range



Double range



**OVERALL DIMENSIONS AND WEIGHT**

**RELAY**

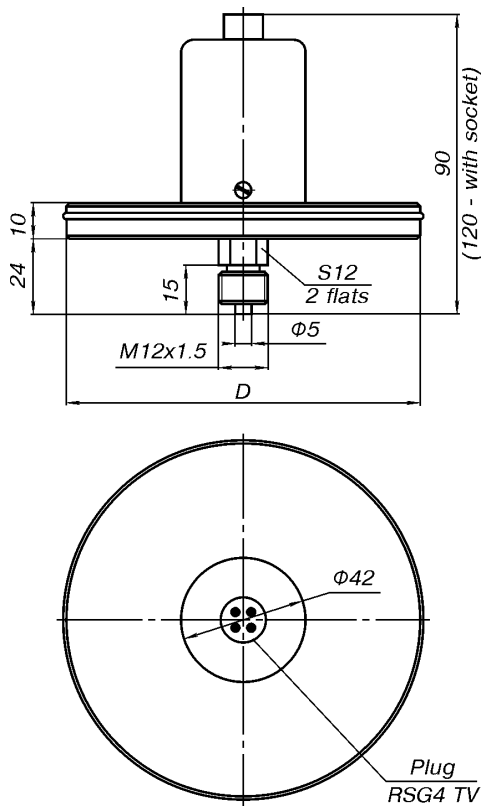


Table 3

Type	Diameter of Receiving Cavity, D, mm	Weight, kg
RD-0.1P	150	0.9
RD-2.5P	110	0.7
RD-12P	57	0.5
RD-100P	57	0.5
RD-400P	42	0.25
RD-1600P	42	0.25

**MOUNTING BRACKET**

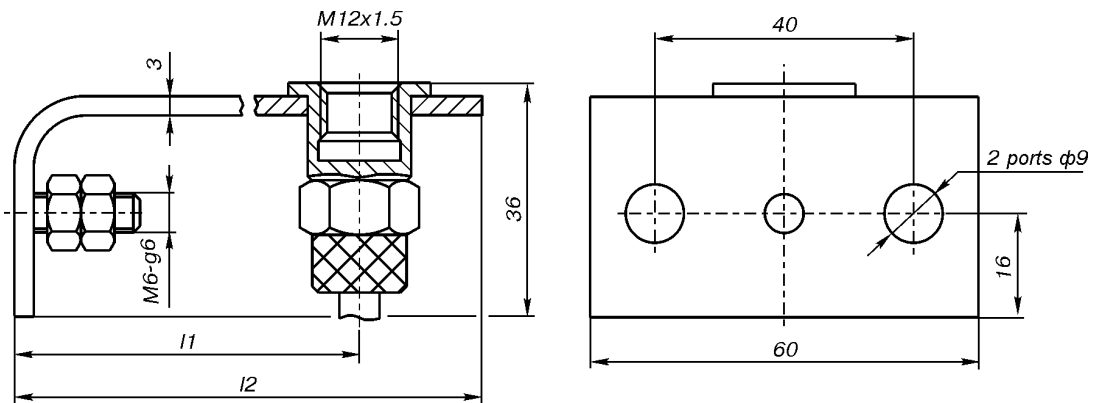


Table 4

Type	l1, mm	l2, mm	Weight, kg
RD-0.1, RD-2.5	85	100	0.5
RD-12, RD-100, RD-1400, RD-1600	40	55	0.3

**WARRANTY**

Warranty period is 18 months from the date of commissioning.

**DELIVERY SET**

- RD relay - 1 unit;
- Product Data Sheet - 1 copy.;
- Operation Manual - 1 copy per 10 RD units,
- Socket RS4 TV (with casing).
- Mounting bracket with the seal and thin tube (on request).

**ORDERING INFORMATION**

<b>RD-0.1-II - (-0.05)/0.2 - V/V - Z/R - K - TU4218-004-36897690-2002</b>					
1	2	3	4	5	6

1. Relay type:
  - I - single-range (one actuation set point);
  - II - double range (two actuation set points).
2. Defined settings (without a special request RD is supplied adjusted to nominal actuation pressure).
3. Setting type:
  - V - in case of pressure boost;
  - N - in case of pressure reduction.
4. Relay actuation mode:
  - Z - when circuit is completing;
  - P - when circuit is opening.
5. Mounting bracket.
6. Specification designation.

## RD-P Pressure Relay

Code OKP 421872



- Fluid under control: gas, liquid
- Settings range from minus 90 to 1600 kPa
- Switching contacts capacity  
~220 V, 1 A
- One continuously adjustable setting
- Limits of permissible basic error of relay actuation:
  - gage pressure is max.  $\pm 2\%$  of setting URL;
  - vacuum-gage pressure is max.  $\pm 2\%$  (for RD-P0.1  $\pm 5\%$ ) of sum of absolute values of vacuum-gage and gage pressure setting URL
- Return zone - for relay:
  - vacuum-gage pressure is max. 12% of setting URL;
  - vacuum-gage pressure is max. 5% (for RD-0.1P is max. 9%) of sum of absolute values of vacuum-gage and gage pressure setting URL
- Load is active-inductive

RD-P Pressure Relay (single-range) is designed to operate in the control systems of vacuum-gage and gage pressure for electrical circuit opening-completing by microswitch after reaching of set pressure setting value.

Advantages: sensing element (diaphragm) and disks in contact with the controlled environment, are made from alloys 36NiCrTiAl and 12Cr18Ni10Ti correspondingly that ensures high corrosion resistance of the relay.

### SPECIFICATIONS

- Actuation set point range, overload pressure and other relay parameters are given in Table 1.

Table 1

Type	Name	Settings Range, kPa	Nom. Pressure of Relay Actuation, kPa	Overload Pressure, kPa	Application
RD-0.1P	Vacuum-gage pressure relay	minus 0.4 - minus 0.05 0.05 - 0.4	0.2	5	Control of vacuum-gage and gage pressure
RD-2.5P		minus 2.5 - minus 0.4 0.4 - 2.5	1.2	10	
RD-12P		minus 12 - minus 2.5 2.5 - 12	6.0	80	
RD-100P		minus 90 - minus 12 12 - 100	50	500	
RD-400P	Gage pressure relay	80 - 400	200	1000	Control of gage pressure
RD-1600P		400 - 1600	800	2000	

- The relay is stable against overload pressure effect (specified in Table 1) for 1 minute period.
- Direct current and power values switching by RD-P contacts are given in Table 2.

Table 2

Current, Switching by Contacts, A		Voltage, max, V		Switching Power	
		at inductive load	at active load	at inductive load, VA	at active load, W
Direct current	0.01 - 0.1 A	80	100	10	20
Alternating current	0.01 - 1 A	250	250	150	250

- RD-P Relay is designed for operation with preset parameters under the following conditions:
  - ambient temperature -10...45°C;
  - relative humidity up to 75% at 27°C;
  - vibration with frequency up to 25 Hz, movement amplitude 0.1 mm maximum.

*Exceptions to "Specifications" section: RD-P can be produced according to parameters agreed to the manufacturer.*

### DESIGN AND OPERATING PRINCIPLE

RD-P Relay operating principle is based on transmission of sensor elastic deformation to a switching unit when pressure or vacuum of controlled fluid affects sensor.

Controlled fluid influences sensor through a connector. Sensor moves a rod that affects **a microswitch** completing or opening electrical circuit.

Unlike RD relay RD-P relay construction includes additional elements, protecting the relay diaphragm from overload pressure influence and keeping actuating pressure steady.

Setting-up of a relay to a specific setting can be performed by the Customer with the help of control pressure gage by rotation of the adjusting nut and the stop member. Accuracy of setup depends on pressure gage class. Relay setting-up can be performed both to pressure increase (setting type V - upper), and to pressure decrease (setting type N - lower) sides, as well as for completing or opening electrical circuits.

First remove the protective case.

Rotation of adjusting nut clockwise results in decreasing of actuation setting; for vacuum-gage control relay - to increase a setting at vacuum-gage pressure control.

Having set the required value of actuating pressure, lock the adjusting nut with a setscrew and fix protection casing with screws.

### MOUNTING

Relay is installed at the site vertically with connector down (important for RD-0.1P).

Relay is connected with the help of connector M12x1.5. For sealing, you can use gaskets in the form of lead, fiber, fluoroplastic, polyurethane or soft copper washers.

For relay mounting convenience special mounting bracket is provided (it is not included in the standard complete set) with a thin tube (material: rilsan) for control fluid supply to the relay.

Connection of RD-P to control system is performed by two-wire communication line with copper wires with section up to 0.5 mm<sup>2</sup>; there is a connector to connect to electric circuit.

To determine actuation error we recommend installation of a control pressure gage on a pipeline.

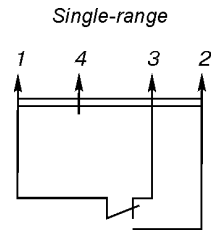
### MAINTENANCE

During operation it is necessary to monitor connections leak-proof, exclude cases of pressure overload over values stated in Table 1.

You must check the preset limit of the setting at least once every three months.

Always monitor that incoming pressure is not pulsing.

RELAY CONNECTION



1, 3 - opening contacts;  
2, 4 - completing contacts.

OVERALL DIMENSIONS AND WEIGHT

Relay

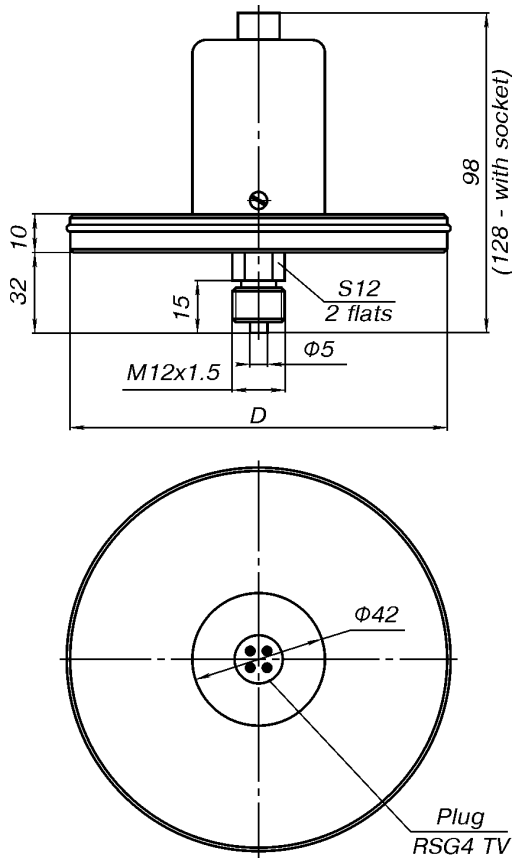


Table 3

Type	Diameter of Receiving Cavity, D, mm	Weight, kg
RD-0.1P	150	0.9
RD-2.5P	110	0.7
RD-12P	57	0.5
RD-100P	57	0.5
RD-400P	42	0.25
RD-1600P	42	0.25

MOUNTING BRACKET

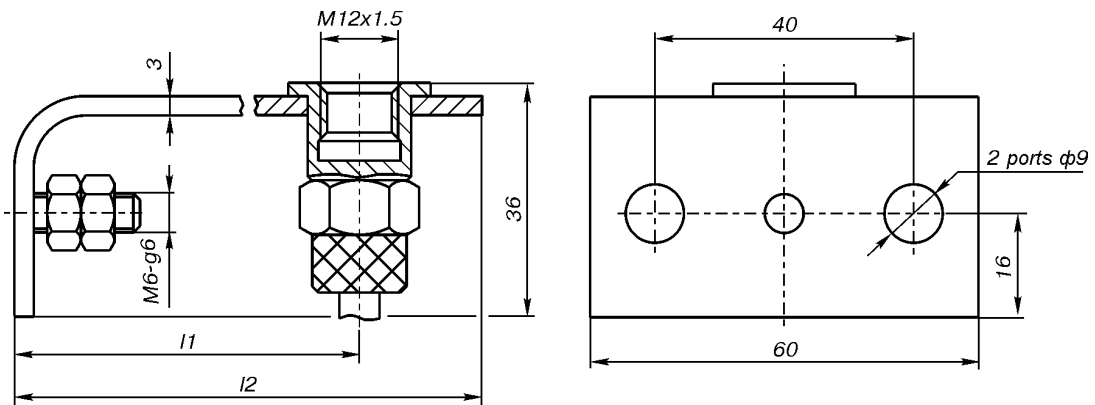


Table 4

Type	l1, mm	l2, mm	Weight, kg
RD-0.1P, RD-2.5P	85	100	0.5
RD-12P, RD-100P, RD-1400P, RD-1600P	40	55	0.3

**WARRANTY**

Warranty period is 18 months from the date of commissioning.

**DELIVERY SET**

- RD-P Relay - 1 unit;
- Product Data Sheet - 1 copy.;
- Operation Manual - 1 copy per 10 RD-P units,
- Socket RS4 TV (with casing).
- Mounting bracket with seal and thin tube (on request).

**ORDERING INFORMATION**

<b>RD-0.1P - (-0.05) - V - Z - K - TU4218-010-36897690-2004</b>					
1	2	3	4	5	6

1. Relay type:
  - I - single-range (one actuation set point);
  - II - double range (two actuation set points).
2. Defined set points (without special request RD-P is supplied adjusted to nominal actuation pressure).
3. Set point type:
  - V - in case of pressure boost;
  - N - in case of pressure reduction.
4. Relay actuation mode:
  - Z - when circuit completeng;
  - P - when circuit opening.
5. Mounting bracket.
6. Specification designation.



## RD-2.5PA Pressure Relay

Code OKP 421872



- **Very high overload capacity. Overload pressure is 150 kPa during 5 minutes period.**
- **Switching contacts power ~220 V, 1 A;**
- **Fluid under control: gas, liquid**
- **Setting actuation range is 1-5 kPa**
- **Overload pressure during 5 minutes period should not exceed the level of 150 kPa**
- **One continuously adjustable setting**
- **Limits of permissible basic error of relay actuation:  $\pm 2\%$  of setting URL**
- **Return zone: 12% of setting URL**
- **Weight: 1.1 kg**

RD-2.5PA Pressure Relay (single-range) is designed to operate in the control systems of vacuum-gage and gage pressure for electrical circuit opening-closing by the microswitch after reaching a set value of setting pressure.

Advantages: sensing element (diaphragm) and disks in contact with the controlled environment, are made from alloys 36NiCrTiAl and 12Cr18Ni10Ti correspondingly that ensures high corrosion resistance of the relay.

**The relay was designed for application at one of the Atomic Power Stations.**

**SPECIFICATIONS**

● Direct current, voltage and power switching by RD-2.5PA contacts values are given in Table 1.

Table 1

Current, Switching by Contacts, A		Voltage, max, V		Switching Power	
		at inductive load	at active load	at inductive load, VA	at active load, W
Direct current	0.01 - 0.1 A	80	100	10	20
Alternating current	0.01 - 1 A	250	250	150	250

● Relay is designed for operation with preset parameters under the following conditions:

- ambient temperature -10...45°C;
- relative humidity up to 75% at 27°C;
- vibration with frequency up to 25 Hz, movement amplitude 0.1 mm max.

**OPERATING PRINCIPLE**

RD-2.5PA Relay operating principle is based on transmission of sensor elastic deformation to a switching unit when pressure or vacuum of controlled fluid affects the sensor.

Controlled fluid influences sensor through a connector. Sensor moves a rod that affects a **microswitch** closing or opening electrical circuit.

Unlike RD relay RD-2.5PA relay construction includes additional elements, protecting the relay diaphragm from overload pressure influence and keeping actuating pressure steady.

Setting-up of a relay to a specific setting can be performed by the Customer with the help of control pressure gage by rotation of adjusting nut and a stop member. Accuracy of setup depends on pressure gage class. Relay setting-up is performed to pressure increase.

**MOUNTING**

Relay is installed at the site vertically with the connector down.

RD-2.5PA relay is connected to the system of control with the help of M12x1.5 connector. Put the sealing along the inner cone of the connector with the help of orbed nipple.

RD-2.5PA Relay connection to control system (Figure 2) is performed by copper wires with section up to 0.5 mm<sup>2</sup>; there is a terminal to connect to electric circuit.

To determine relay actuation pressure we recommend installation of a control pressure gage on a pipeline.

**MAINTENANCE**

During operation it is necessary to monitor connections leak-proof, exclude cases of pressure overload over values stated in Table 1.

You must check the preset limit of the setting at least once every three months.

Always monitor that incoming pressure is not pulsing.

**RELAY CONNECTION**

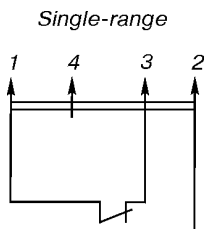


Figure 2.

**RETURN ZONE**

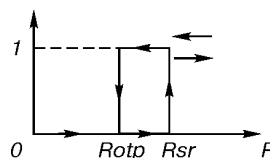


Figure 3.

P act - P actuation,  
P drb - P drawback



## RD-U, RD-PU Overload Capacity Pressure Relay

Code OKP 421872



- **High overload pressure capacity! The relay can withstand 10-50-fold overload pressure during long period**
- **Overload pressure value (gage and vacuum pressure) and its exposure time to the relay are specific each time and agreed with the manufacturer**
- **Other parameters are similar to those of RD and RD-P relays**

RD-U and RD-PU relays differ from RD and RD-P relays respectively in constructive features of pressure intake protecting the sensor (the diaphragm) from destructive overload pressure (both gage and vacuum pressure) influence.

Other constructive and technical parameters of RD-U relay and RD-PU relay fully correspond to the parameters of RD and RD-P relays respectively.

Relay designation in order is similar to RD and RD-P relays with reference designation change to RD-U and RD-PU respectively.