НПО ПАС

С 1994 ГОДА

СИСТЕМЫ ГАЗОВОГО ПОЖАРОТУШЕНИЯ

Gas Fire-Extinguishing Modules and Auxiliary Equipment

Product Catalog

Contents

Introduction

ООО «НПО ПАС» (NPO Fire Automation Service LLC) was established in 1994. At present, ООО «НПО ПАС» is a modern company specialized in the field of integrated fire alarm and gas fire-extinguishing systems.

For more than 25 years of its existence, ООО «НПО ПАС» develops and manufactures a full range of automatic gas fire-extinguishing systems.

Equipment manufactured by the company is used in various fields:

- at civil facilities;
- on Russian Railways rolling stock;
- at facilities subordinate to the Russian Maritime Register of Shipping (RMRS) and Russian River Register (RRR);
- by the oil, gas and chemical industry;
- at special facilities which are subject to strict requirements for seismic resistance, resistance to impacts up to 20g, and explosion protection.

This catalog contains a description of the products which are process components of gas fire-extinguishing systems, namely:

Gas fire-extinguishing modules and auxiliary equipment.

For correct selection and use of the equipment, the company has developed Гамма Поток, application which makes hydraulic calculations required by the regulatory documents applicable to fire extinguishing. The Гамма Поток application is based on the procedure agreed with EMERCOM of Russia. In order to confirm the calculations made using the Гамма Поток application, verification tests were carried out for some gaseous fire-extinguishing agents.

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Gas Fire-Extinguishing Modules
Application of Gas Fire-Extinguishing Module

The gas fire-extinguishing module (hereinafter referred to as the "module") is intended for long-term storage and release of gaseous fire-extinguishing agent (GFEA). All approved GFEA can be used in the module.

The module is used for extinguishing fires of class A, B and C and energized electrical equipment.

The module is used for the making of modular and centralized fire-extinguishing installations.

The module consists of a cylinder and a release device (ЗПУ).

Modules are manufactured in several designs and differ in the following parameters:

- working pressure;
- cylinder capacity;
- release device diameter;
- release device type;
- cylinder type.

Selection of Module Design

Module Working Pressure

The module can have the following working pressure values:

- low pressure (60 bar);
- high pressure (150 bar).

The module for the working pressure of 60 bar is intended for storage of freons (except Freon 23) and FK-5-1-12. The module for the working pressure of 150 bar is used for storage of CO_2, compressed gases (nitrogen, argon, Inergen) and for Freon 23.

Pressure monitoring by means of a pressure gauge is used for a module filled with freons (except Freon 23), FK-5-1-12 and compressed gases. Weight monitoring of GFEA weight is used instead of pressure monitoring for a module filled with CO_2 and Freon 23.

Module Capacity

Module capacity is from 6 to 160 l. Module capacity is chosen based on the required GFEA amount for fire extinguishing. As a rule, during designing modules are selected with a capacity which ensures their smallest number in the standard reserve. Thereat, it is necessary to meet the regulatory requirement to the minimum module filling factor: Kf = 0.44 kg/l from the maximum filling (except compressed gases).

GFEA amount filled in a module depends on gas type and module capacity. GFEA type and module filling parameters are given in Table 1.

Table 1. Module filling parameters

GFEA type	Maximum filling factor, kg/l	Pressure at 20 °C, bar (pressure of propellant gas)	
		Modules of type МПГ-60	Modules of type МПГ-150
Freon 125	0.9	30	–
Freon 227ea	1.15	30	–
Freon 318Ц	1.2	30	–
Freon 114B2	1.5	30	–
FK-5-1-12	1.2	50	–
Sulfur hexafluoride	1.05	30	–
Carbon dioxide	0.7	–	Weight monitoring
Freon 23	0.86		
Nitrogen	0.15	—	128 1
Argon	0.22		
Inergen	0.181		

Diameter of Module Release Device (ЗПУ)

The module has a release device (ЗПУ) with nominal diameter of 24 and 40 mm.

The release device with the diameter of 24 mm is installed on the module having the working pressure:

- 60 bar, capacity of 6 to 60 l, intended for freon storage (except Freon 23) and FK-5-1-12;
- 150 bar, capacity of 20 to 100 l, intended for storage, as a rule, of CO_2 and compressed gases (nitrogen, argon, Inergen).

The release device with the diameter of 40 mm is installed on the module having the working pressure:

- 60 bar, capacity of 80 to 160 l, intended for freon storage (except Freon 23) and FK-5-1-12;
- 150 bar, capacity of 80 to 100 l, intended solely for storage of Freon 23.

Type of Module Release Device (ЗПУ)

The module can be equipped with release devices of different types (designs):

- with a burst disk (actuation by pyrotechnical actuator ПУО-2), type 1;
- with a shut-off valve and solenoid valve (actuation by solenoid of type "-ЭР" ("-ЭРВ") and pneumatic actuation "-П"), type 2;
- with a shut-off valve and actuation membrane (with actuation by solenoid "-ЭМ" and pneumatic actuation of type "-ППУ"), type 3. At present, the modules of this type are out of production and are not used for new projects. However, since modules are still in operation, modules can be manufactured on request (e.g., additional purchase of reserve, etc.).

The most reliable is the release device with a burst disk (type 1).

Advantages of a module with this release device design are, firstly, the following:

- high actuation reliability due to absence of actuation mechanisms and use of highly reliable pyrotechnical actuator (P(t) = 0.999 in 17 years);
- high leak tightness (there is no detachable valve-seat connection);
- high resistance to mechanical impacts (seismic impact, vibration impact resistance, seismic resistance);
- the module does not require regular maintenance and training of actuating mechanisms due to their absence;
- each module is activated by an individual electric actuation circuit which is constantly monitored by the device.

The design of the release device with a burst disk has no actuation mechanisms. The module with a burst disk actuates from a pyrotechnical actuator ПУО-2 (see section "Actuators"). The actuator ПУО-2 is activated by an electric pulse from Gamma-01 monitoring and control device and other instruments and devices which ensure the actuation and monitoring parameters. A control device should be selected taking into account the need for provision of an actuation pulse with consideration of cable length.

Upon actuation of the pyrotechnical actuator ПУО-2, which is a miniature gas generator, the burst element under the high pressure of generated gases breaks down along the structurally calculated cross-section and opens the GFEA passage into the pipeline of the automatic gas fire-extinguishing system.

Connection to an adapting (terminal) block is made in compliance with the diagram shown in Fig. 1.

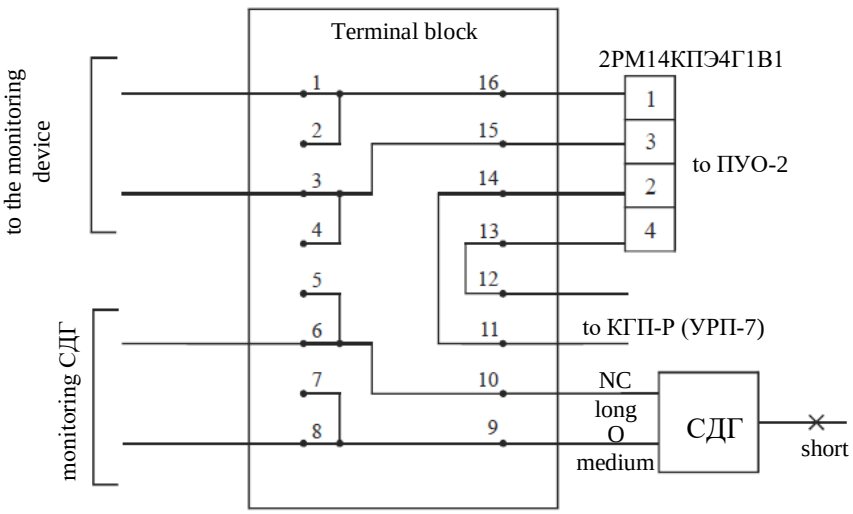


Fig. 1. Electric connection diagram for a module with a burst disk

Justification for application of the module with a shut-off valve (type 2) can be:

- the need to use explosion-proof equipment;
- restrictions on the used control device as regards the number of actuation circuits for simultaneous actuation of a large number of modules;
- special requirement to manual actuation of a large group of modules from one manual actuation element (e.g., requirement to installations on sea ships);
- special fire-extinguishing systems (e.g., with a requirement of module filling after actuation without dismounting from the facility, etc.).

Combined electric/pneumatic actuation circuits are used for simultaneous actuation of a group of modules if one electric actuation circuit is available. Modules with a shut-off valve are selected for this:

- a forcing module with electric actuation ("-ЭР", "-ЭРВ");
- other modules have pneumatic actuation ("-П").

The forcing module is linked to other modules by pneumatic actuation lines (see Section "Pneumatic actuation manifold КПП2Э"). It should be understood that pneumatic actuation lines, due to peculiarities of modules with pneumatic actuation, are not checked for operability during mounting, acceptance tests and further operation.

The module with solenoid actuation has manual mechanical actuation by means of a handle on the solenoid. The solenoid is included in the module. A solenoid with a shut-off valve, installed on the module of type 2, has two explosion protection versions: the standard version and explosion-protection version.

The solenoid is activated by Gamma-01 monitoring and control device and other instruments and devices which ensure the actuation parameters. A control device should be selected taking into account the need for provision of an actuation pulse with consideration of cable length.

The module with electric actuation by a solenoid actuates trouble-free upon supply of a direct current pulse with the voltage not less than 20 V and duration of 1 s minimum into the solenoid winding (maximum voltage is 28 V, direct current resistance of the solenoid coil is 32^{+4}_{-2} Ohm). Current intensity during integrity check of the solenoid actuation circuit is 0.1 A maximum, monitoring direct current is 10 mA maximum throughout the service life.

The explosion-proof module is intended for operation in explosion-hazardous zones of rooms according to explosion protection marking: **1 Ex d mb IIC T6 Gb, IP66**.

Connection to an adapting (terminal) block on module "-ЭР" is made in compliance with the diagram in Fig. 2. Explosion-proof module "-ЭРВ" is connected in compliance with the diagram in Fig. 3.

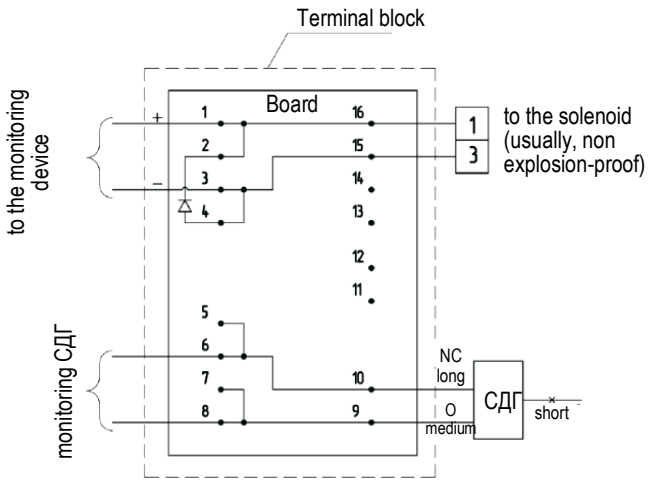


Fig. 2. Electric connection diagram for a module "-ЭР" with a shut-off valve

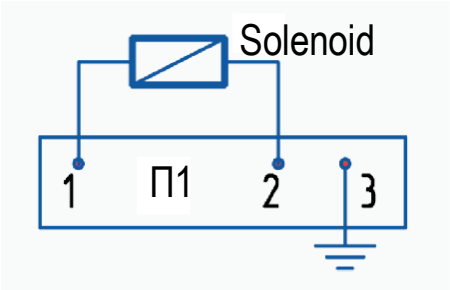


Fig. 3. Schematic electric diagram of solenoid actuator ПЭ-1 for explosion-proof module "-ЭРВ"

The release device of this type (type 2) is a reusable release device, it has no expendable elements and does not require release device disassembly after actuation for operability restoration.

Type of Module Cylinder

The following cylinder types are used in the module:

- БК-6601-400 ТУ cylinder with capacity of 6 to 100 l;
- ГОСТ 949 cylinder with capacity of 20 to 50 l (with "-У" marking);
- ТУ 1413-011-18074387-2011 cylinder with capacity of 120 and 140 l (with "-М" marking);
- ТУ 1410-001-13055988-05 cylinder with capacity of 160 l (with "-А" marking);
- ТУ 1410-007-29416612-2005 cylinder with capacity of 20 to 100 l (with "-Л" marking).

The cylinder of БК type is made of high-strength alloy weathering steel with internal polymeric coating. The module with such a cylinder has the service life of 15 years until the first technical examination, which is minimum 1.5 to 3 times longer than provided by other module manufacturers. Mass perfection factor (ratio of cylinder weight to its capacity) is 0.5–0.65 (light-weight cylinder design with retained capacity due to the use of conversion technologies). The cylinder design is protected by an author certificate.

A cylinder type should be chosen taking into account differences in the following indicators:

- time frame for cylinder re-examination;
- cylinder (module) service life;
- module weight;
- module cost.

The main operational characteristics of modules are given in Table 2.

Table 2. Operational characteristics of modules

Indicator	Value
Operation temperature, °C	from –40 to +50
GFEA release time, s, maximum:	
– for freons, FK-5-1-12 and sulfur hexafluoride	10
– for CO_2 and compressed gases (nitrogen, argon, Inergen)	60
Service life, including shelf life in warehouse premises, years, minimum:	
– with cylinders as per ТУ 1410-007-29416612-2005 («-Л») and ТУ 1413-011-18074387-2011 (-«М»)	30 years
– with cylinders as per БК-6601-400 ТУ	25 years
– with cylinders as per ГОСТ 949 (-«У») and ТУ 1410-001-13055988-05 (-«А»)	20 years
Time till the first re-examination, years:	
– with cylinders as per ТУ 1410-007-29416612-2005 («-Л») and ТУ 1413-011-18074387-2011 («-М»)	15 years
– with cylinders as per БК-6601-400 ТУ	15 years, then in 5 years
– with cylinders as per ГОСТ 949 (-«У») and ТУ 1410-001-13055988-05 (-«А»)	10 years, then in 5 years
Number of actuations within 25 years, times, minimum	
– Module of type 1	5
– Module of type 2	25
Warranty period, years	4
GFEA residue in the module, kg	maximum 0.5

Nomenclature and Designation of Modules

Burst Disk-Operated Fire-Extinguishing Module (Type 1)

Structure of designation of a module with a burst disk:

МПГ ХХХ-ХХХ-ХХ-Х-Х-Х

1 2 3 4 5 6 7

Where 1 is abbreviated module name;
2 is working pressure, bar;
3 is cylinder capacity, l;
4 is nominal diameter of release device, mm;
5 is identification code of cylinder design:

- no designation – БК-6601-400 ТУ cylinder;
- "У" – ГОСТ 949 cylinder;
- "М" – ТУ 1413-011-18074387-2011 cylinder;
- "А" – ТУ 1410-001-13055988-05 cylinder;
- "Л" – ТУ 1410-007-29416612-2005 cylinder;

6 is version of release device design:

- no designation – for one direction of GFEA release;
- "2" – for two directions of GFEA release;

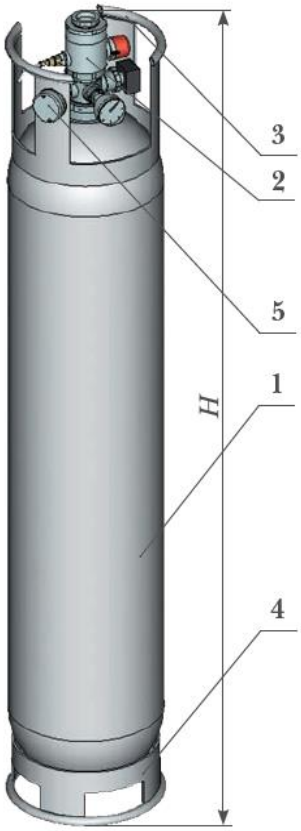
7 is module position during operation:

- no designation – vertical;
- "Г" – horizontal.

Example of designation of module of type 1 when ordering:
МПГ 60-100-40-Л
Where МПГ is module name;
60 is working pressure, bar;
100 is cylinder capacity, l;
40 is nominal diameter of release device, mm;
Л is ТУ 1410-007-29416612-2005 cylinder;
— is for one directions of GFEA release;
— is vertical position.

Overall view of a module with burst disk with one release device (for one direction) is shown in Fig. 4, with two release devices (for two directions) is shown in Fig. 5.

The nomenclature of produced modules of type 1 and weights and dimensions are given in Tables 3a and 3b.



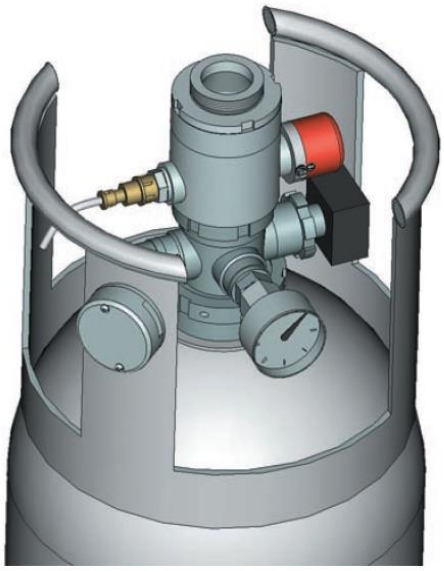
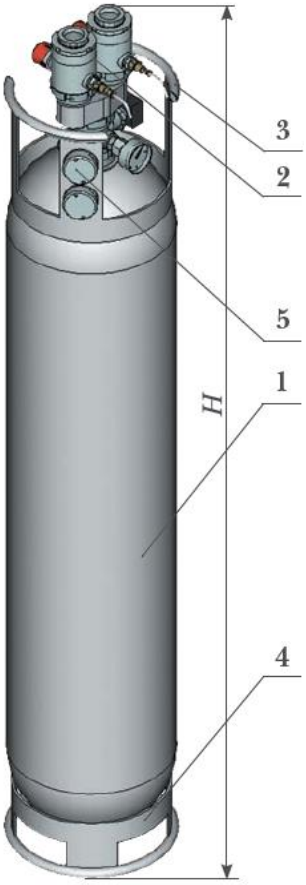


Fig. 4. Overall view of a module with one release device with a burst disk (for one direction)
1 – cylinder;
2 – release device;
3, 4 – upper and lower backup ring;
5 – terminal block.



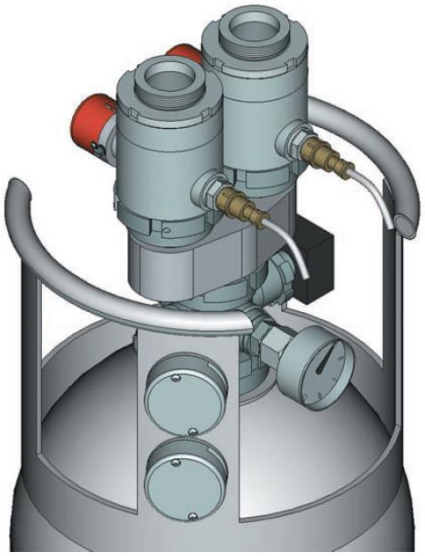


Fig. 5. Overall view of a module with two release device with a burst disk (for two directions)
1 – cylinder;
2 – release device;
3, 4 – upper and lower backup ring;
5 – terminal blocks.

Table 3a. Nomenclature of modules with a vertical burst disk

Module type	Height, mm	Diameter, mm	Weight, kg (maximum)	Note
МПГ 60-6-24	470	255	17,9	Module for one direction
МПГ 60-12-24	587		19,1	
МПГ 60-16-24	670		20,6	
МПГ 60-20-24	752		22,4	
МПГ 60(150)-35-24 *	860	311 (316)	31,4 (33,6)	
МПГ 60(150)-50-24	1061		37,4 (40,7)	
МПГ 60(150)-60-24	1190		41,9 (45,6)	
МПГ 150-80-24	1472		54,6	
МПГ 150-100-24	1713		66,4	
МПГ 60(150)-80-40	1482		51,1 (56,6)	
МПГ 60(150)-100-40	1723		61,9 (69,9)	
МПГ 60-120-40-М	1659	357	96	
МПГ 60-140-40-М	1906		108	
МПГ 60-160-40-А	2063	380	91,4	
МПГ 60(150)-20-24-У	1005	219	35,7	
МПГ 60(150)-25-24-У	1165		41,7	
МПГ 60(150)-32-24-У	1365		51,5	
МПГ 60(150)-40-24-У	1615		67,1	
МПГ 60(150)-50-24-У	1910		81,6	
МПГ 60(150)-20-24-Л	915	229	39,3	
МПГ 60(150)-40-24-Л	955	317	74,4	
МПГ 60(150)-50-24-Л	1067		83,2	
МПГ 60(150)-60-24-Л	1202		93,4	
МПГ 150-80-24-Л	1500		109,7	
МПГ 150-100-24-Л	1720		123	
МПГ 60(150)-80-40-Л	1505		113,8	
МПГ 60(150)-100-40-Л	1721		127,3	
МПГ 60-6-24-2	540	255	19,5	Module for two directions
МПГ 60-12-24-2	655		20,6	
МПГ 60-16-24-2	740		22,1	
МПГ 60-20-24-2	820		23,9	
МПГ 60(150)-35-24-2	928	311 (316)	32,9 (35,1)	
МПГ 60(150)-50-24-2	1129		38,9 (42,2)	
МПГ 60(150)-60-24-2	1257		43,4 (47,1)	
МПГ 150-80-24-2	1539		56,1	
МПГ 150-100-24-2	1780		67,9	
МПГ 60(150)-80-40-2	1545		56,2 (61,7)	
МПГ 60(150)-100-40-2	1785		65,6 (73,6)	
МПГ 60-120-40-М-2	1744	357	100	
МПГ 60-140-40-М-2	1991		112	
МПГ 60-160-40-А-2	2147	380	91,9	
МПГ 60(150)-20-24-У-2	1070	219	37	
МПГ 60(150)-25-24-У-2	1230		43	
МПГ 60(150)-32-24-У-2	1430		52	
МПГ 60(150)-40-24-У-2	1680		67	
МПГ 60(150)-50-24-У-2	1980		83	

Table 3a, continued

Module type	Height, mm	Diameter, mm	Weight, kg (maximum)	Note
МПГ 60(150)-20-24-Л-2	873	229	40,8	Module for two directions
МПГ 60(150)-40-24-Л-2	1026	317	75,9	
МПГ 60(150)-50-24-Л-2	1134		84,7	
МПГ 60(150)-60-24-Л-2	1270		94,9	
МПГ 150-80-24-Л-2	1570		111,2	
МПГ 150-100-24-Л-2	1790		124,5	
МПГ 60(150)-80-40-Л-2	1573		117,4	
МПГ 60(150)-100-40-Л-2	1788		130,9	
Note: – Module weight includes the transport plug and does not include ПУО-2 and GFEA. – When modules are installed on load-cell platforms ПВТ, module height from the floor is increased by 60–80 mm, adjustable. – * Weights and dimensions for module designs for different working pressure.				

Table 3b. Nomenclature of modules with a horizontal burst disk

Module type	Height, mm	Diameter, mm	Weight, kg (maximum)	Note
МПГ 60-16-24-Г	670	311 (316)	20,4	Module for one direction
МПГ 60(150)-35-24-Г *	860		31,2 (33,4)	
МПГ 60(150)-50-24-Г	1061		36,8 (44,8)	
МПГ 60(150)-60-24-Г	1190		41,1 (44,8)	
МПГ 150-80-24-Г	1472		53,4	
МПГ 150-100-24-Г	1713		64,8	
МПГ 60-20-24-Л-Г	915	229	39,3	
МПГ 60(150)-40-24-Л-Г	955	317	74,4	
МПГ 60(150)-50-24-Л-Г	1067		83,2	
МПГ 60(150)-60-24-Л-Г	1202		93,4	
МПГ 150-80-24-Л-Г	1502		109,7	
МПГ 150-100-24-Л-Г	1724		123	
МПГ 60-16-24-2-Г	737	311 (316)	21,9	Module for two directions
МПГ 60(150)-35-24-2-Г	928		32,7 (34,9)	
МПГ 60(150)-50-24-2-Г	1129		38,9 (41,6)	
МПГ 60(150)-60-24-2-Г	1190		41,1 (44,8)	
МПГ 150-80-24-2-Г	1539		54,9	
МПГ 150-100-24-2-Г	1780		66,3	
МПГ 60-20-24-Л-2-Г	978	229	40,8	
МПГ 60(150)-40-24-Л-2-Г	1018	317	75,9	
МПГ 60(150)-50-24-Л-2-Г	1135		84,7	
МПГ 60(150)-60-24-Л-2-Г	1270		94,9	
МПГ 150-80-24-Л-Г-2	1570		111,2	
МПГ 150-100-24-Л-Г-2	1792		124,5	
Note: – Module weight includes the transport plug and does not include ПУО-2 and GFEA. – * Weights and dimensions for module designs for different working pressure.				

Fire-Extinguishing Module with Shutoff Valve and Solenoid Valve (Type 2)

Structure of designation of a module with a shut-off valve and solenoid valve:

МПГ ХХХ-ХХХ-ХХ-Х-ХХ
1 2 3 4 5 6

Where 1 is abbreviated module name;
2 is working pressure, bar;
3 is cylinder capacity, l;
4 is nominal diameter of release device, mm;
5 is identification code of cylinder design:

- no designation – БК-6601-400 ТУ cylinder;
- "У" – ГОСТ 949 cylinder;
- "М" – ТУ 1413-011-18074387-2011 cylinder;
- "А" – ТУ 1410-001-13055988-05 cylinder;
- "Л" – ТУ 1410-007-29416612-2005 cylinder;

6 is module actuation method:

- "ЭР" – electric, by a solenoid and backup manual;
- "П" – pneumatic;
- "ЭРВ" – electric (explosion-proof), by a solenoid and backup manual.

Example of designation of module of type 2 when ordering:
МПГ 60-80-40-П
Where МПГ is module name;
60 is working pressure, bar;
80 is cylinder capacity, l;
40 is nominal diameter of release device, mm;
— is БК-6601-400 ТУ cylinder;
П is with a pneumatic actuator.

The nomenclature and weights and dimensions of produced modules of type 2 are given in Table 4.

Overall view of module of type 2 is shown in Fig. 6.

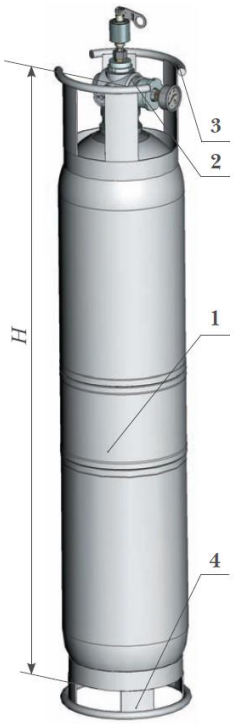


Fig. 6. Overall view of a module with a shut-off valve and solenoid valve

1 – cylinder; 2 – release device;
3, 4 – upper and lower backup ring.

Table 4. Nomenclature of a module with a shut-off valve and solenoid valve

Module type	Height to the outlet nipple axis, ±5 mm	Diameter, mm	Weight, kg (maximum)
МПГ 60-6-24-ЭР (-П, -ЭРВ) *	325	255	19
МПГ 60-12-24-ЭР (-П, -ЭРВ)	440		20
МПГ 60-16-24-ЭР (-П, -ЭРВ)	525		21
МПГ 60-20-24-ЭР (-П, -ЭРВ)	605		24
МПГ 60(150)-35-24-ЭР (-П, -ЭРВ) **	715	311 (316)	33 (35)
МПГ 60(150)-50-24-ЭР (-П, -ЭРВ)	920		38 (42)
МПГ 60(150)-60-24-ЭР (-П, -ЭРВ)	1055		43 (46)
МПГ 150-80-24-ЭР (-П, -ЭРВ)	1330		56
МПГ 150-100-24-ЭР (-П, -ЭРВ)	1570		67
МПГ 60(150)-80-40-ЭР (-П, -ЭРВ)	1350		51 (56)
МПГ 60(150)-100-40-ЭР (-П, -ЭРВ)	1595		59 (67)
МПГ 60(150)-20-24-У-ЭР (-П, -ЭРВ)	860 ± 10	219	43
МПГ 60(150)-25-24-У-ЭР (-П, -ЭРВ)	1000 ± 10		49
МПГ 60(150)-32-24-У-ЭР (-П, -ЭРВ)	1220 ± 10		59
МПГ 60(150)-40-24-У-ЭР (-П, -ЭРВ)	1465 ± 10		70
МПГ 60(150)-50-24-У-ЭР (-П, -ЭРВ)	1765 ± 10		83
МПГ 60(150)-20-24-Л-ЭР (-П, -ЭРВ)	766	229	40
МПГ 60(150)-40-24-Л-ЭР (-П, -ЭРВ)	806	317	79
МПГ 60(150)-50-24-Л-ЭР (-П, -ЭРВ)	916		87
МПГ 60(150)-60-24-Л-ЭР (-П, -ЭРВ)	1052		98
МПГ 150-80-24-Л-ЭР (-П, -ЭРВ)	1351		116
МПГ 150-100-24-Л-ЭР (-П, -ЭРВ)	1573		130
МПГ 60(150)-80-40-Л-ЭР (-П, -ЭРВ)	1380		118
МПГ 60(150)-100-40-Л-ЭР (-П, -ЭРВ)	1593		132
МПГ 60-120-40-М-ЭР (-П, -ЭРВ)	1527	357	100
МПГ 60-140-40-М-ЭР (-П, -ЭРВ)	1774		
МПГ 60-160-40-А-ЭР (-П, -ЭРВ)	1931	380	92
Note: – Module weight includes the transport plug and does not include GFEA. – When modules are installed on load-cell platforms ПВТ, module height from the floor is increased by 60-80 mm, adjustable. – * Weights and dimensions for module designs with different actuation method. – ** Weights and dimensions for module designs for different working pressure.			

When ordering an explosion-proof module "-ЭРВ", cable entry type should be selected (specified) from those given in Table 5.

Table 5. Types of cable entries

Designation	Cable entry	Minimum diameter after armor termination, mm	Maximum outer diameter, mm
ПАС 780.00.000	КВВ-2-1 ЦКЛГ.687151.000-02-04 ЦКЛГ.687151.000 ТУ	10	13
ПАС 780.00.000-01	КВВ-4-1 ЦКЛГ.687151.000-06-04 ЦКЛГ.687151.000 ТУ	–	13
ПАС 780.00.000-02 *	FAL1IKB ТУ 3400-007-72453807-07	6–12	8–17
ПАС 780.00.000-03	FAL S1IKB ТУ 3400-007-72453807-07	12–15	17–25
Note: * Design ПАС 780.00.000-02 is preferable; other designs are supplied only in cases justified by the customer.			

Application of Module

General

The module is used at protected facilities individually and in a group. The module is used individually, as a rule, in modular installations and in small installations when one module is sufficient for fire extinguishing in the room. In other cases, the module is used in a group.

Module of type 1 with a burst disk (Fig. 7) should be chosen for individual and group installation. Module of type 2 with a shut-off valve with solenoid and pneumatic actuation (Fig. 8) should be used in a group in case of need for their simultaneous actuation from one electric actuation circuit.

Depending on module application method, installation items will be required for:

- fastening of the module;
- connection of the module to a pipeline (manifold) and nozzles.

Depending on facility conditions, the following variants of module application are possible:

- individual:
  - wall mounting (and/or floor mounting), connection to release device УВ;
  - wall mounting (and/or floor mounting), connection to a pipeline;
- group:
  - mounting in a support stand, connection to a manifold;
  - wall mounting (and/or floor mounting), connection to a manifold.

Installation and test items should be used when connecting a distribution pipeline to a module or a group of modules:

- piping elements:
  - nozzles;
  - sleeves with a lock nut for nozzles;
  - union joints;
- items for pipeline tests:
  - portable test cylinder БИП;
  - nipple БИП (or adapter for connection БИП);
  - plugs;
  - shut-off and pressure gauge assembly.

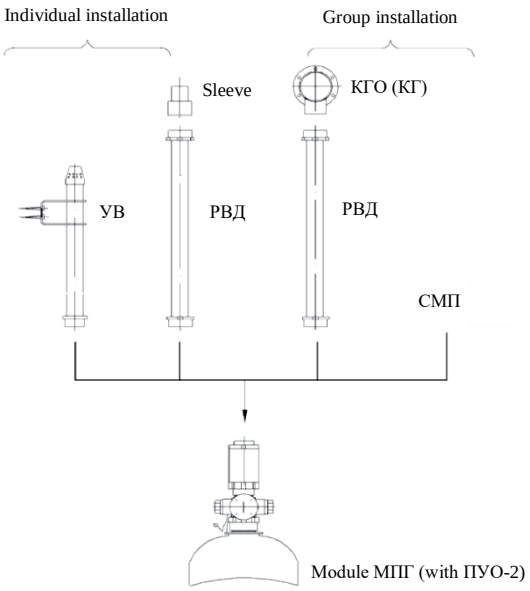


Fig. 7. Diagram of use of modules of type 1 with a burst disk and installation items

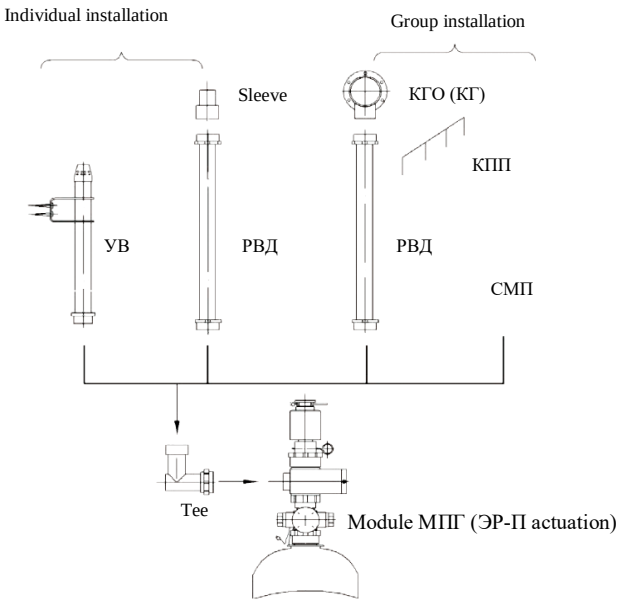


Fig. 8. Diagram of use of modules of type 2 with a shut-off valve and installation items

Individual and Group Installation of Module (Type 1)

Individual Installation of Module (Type 1)

Module of type 1 with a burst disk in case of individual installation can be connected to release device УВ or be connected to a distribution pipeline.

In case of individual installation of module **with release device УВ** (Fig. 9), the following installation and other items should be used:

- fixing clamps ХЖ, ХП or СКМм for module wall mounting;
- release device УВ;
- pressure alarm СДГ;
- actuator ПУО-2 for module actuation;
- gaseous fire-extinguishing agent.

The following can also be required:

- load-cell weighing device УВТМ for modules filled with carbon dioxide or Freon 23;
- support frame РМ-1;
- decorative screen panel ЭД-1 (ЭДР-1) for module sheltering.

Release device УВ must be mounted observing the requirements for its secure fastening.

In case of individual installation of module, for connection **to a distribution pipeline** (Fig. 10), the following installation and other items should be used:

- fixing clamps ХЖ, ХП or СКМм for module wall mounting;
- high pressure hose РВД;
- sleeve РВД 24(40)-pipe OD;
- pressure alarm СДГ;
- actuator ПУО-2 for module actuation;
- gaseous fire-extinguishing agent.

The following can also be required:

- load-cell weighing device УВТМ for modules filled with carbon dioxide or Freon 23;
- support frame РМ-1;
- decorative screen panel ЭД-1 (ЭДР-1) for module sheltering.

Instead of fixing clamps or together with clamps, it is allowed to use mounting КМП for module fixing to the floor (except modules with ГОСТ 949 cylinders). Mounting КМП is not compatible with installation of УВТМ.

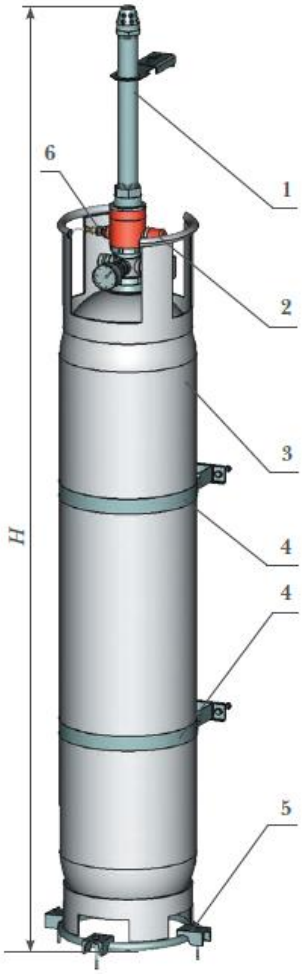


Fig. 9. Module with a burst disk and release device УВ
1 – release device УВ;
2 – pressure alarm СДГ;
3 – module;
4 – fixing clamps;
5 – floor mounting КМП;
6 – ПУО-2.

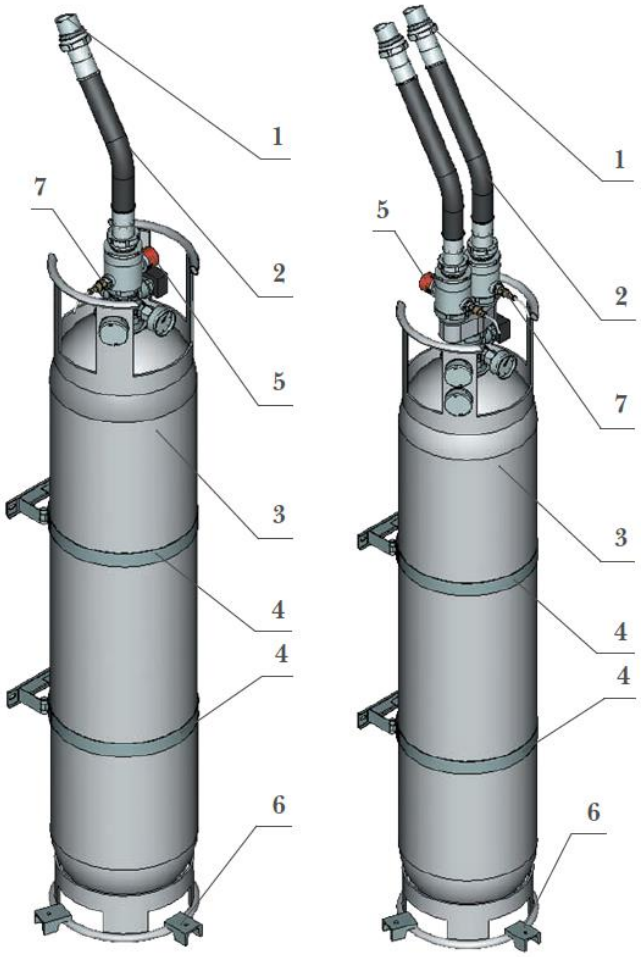


Fig. 10. Module with a burst disk and hose РВД
1 – sleeve РВД-pipe;
2 – РВД;
3 – module;
4 – fixing clamps;
5 – pressure alarm СДГ;
6 – floor mounting КМП;
7 – ПУО-2.

Examples of a system with module type 1 of individual installation:

- With a release device УВ

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-50-24-Л	pcs	1
Freon 125	kg	45
Actuator ПУО-2	pcs	1
Pressure alarm СДГ	pcs	1
Fixing clamp ХЖ-316 (and/or floor mounting of module КМП)	pcs (set)	2 (1)
Release device УВ 24-100 (specify the height)	pcs	1

- With РВД (connection to a distribution pipeline)

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-80-40	pcs	1
Freon 227	kg	82
Actuator ПУО-2	pcs	1
Pressure alarm СДГ	pcs	1
СКМм-1-316 (and/or floor mounting of module КМП)	pcs (set)	2 (1)
РВД 50.1SN.M56x2,0-0,6	pcs	1
Sleeve РВД 40-pipe OD (OD is chosen from the typical designs)	pcs	1
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design

- With РВД for a module for two directions

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 150-32-24-2-У	pcs	1
Carbon dioxide CO_2	kg	22
Actuator ПУО-2	pcs	2
Pressure alarm СДГ	pcs	2
Fixing clamp ХП-219	pcs	2
РВД 25.2SN. M39x2,0-0,6	pcs	2
Sleeve РВД 24-pipe OD (OD is chosen from the typical designs)	pcs	2
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design
Load-cell weighing device УВТМ-1	set	1

Note: For a module with carbon dioxide and Freon 23, it is necessary to order floating fixing clamps and a weighing device set (see Section "Weighing devices").

Group Installation of Modules (Type 1)

Modules with a burst disk can be assembled in a group of 2 to 10 pieces and installed in a support stand or fastened to the wall (floor).

If a group of modules **is installed in a support stand** (Fig. 11), the following installation and other items should be used:

- single-row support stand СМПм (or other);
- pressure alarm СДГ;
- actuator ПУО-2 for module actuation for each module;
- gaseous fire-extinguishing agent.

The following can also be required:

- manual actuation devices УРП-7 or КГП-Р;
- load-cell weighing device УВТМ for modules filled with CO_2 or Freon 23;
- decorative screen panel ЭДС for module sheltering in the stand.

If a group of modules **is used without a support stand**, the following installation and other items should be used:

- fixing clamps ХЖ, ХП or СКМм for module wall mounting;
- high pressure hoses РВД;
- single-row gas manifold КГ (КГО);
- manifold wall mounting ККС;
- pressure alarm СДГ;

- actuators ПУО-2 for module actuation for each module;
- gaseous fire-extinguishing agent.

The following can also be required:

- manual actuation devices УРП-7 or КГП-Р;
- load-cell weighing device УВТМ for modules filled with CO_2 or Freon 23;
- decorative screen panel ЭДС for module sheltering.

Instead of fixing clamps or together with clamps, it is allowed to use mounting КМП for module fixing to the floor (except modules with ГОСТ 949 cylinders). Mounting КМП is not compatible with installation of УВТМ.

Manifold wall mounting should take into account the location of the manifold nipples, outlet holes of modules and permissible bending radius of РВД.

All modules with a burst disk have individual electric actuation, therefore only a part of the modules in a group can be actuated. A group of modules can be used both as an operating one for fire extinguishing and as a standby one.

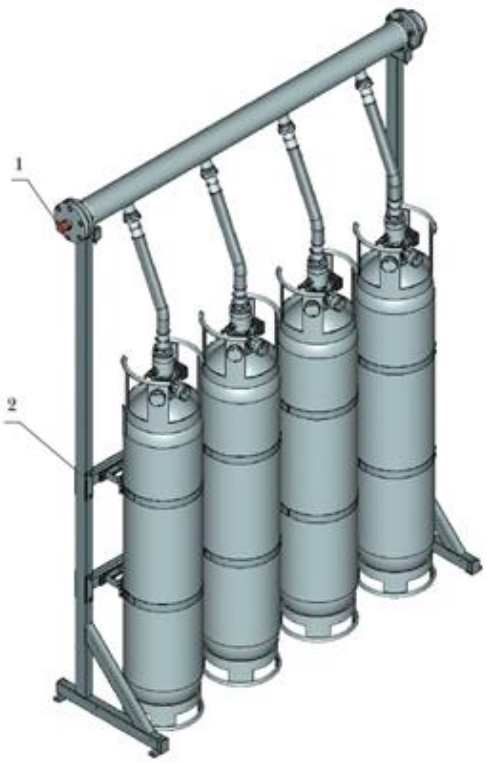


Fig. 11. Modules with a burst disk in a support stand
1 – СДГ;
2 – Support stand.

Examples of a system with module type 1 of group installation:

- In a support stand

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-100-40	pcs	3
Freon 125	kg	270
Actuator ПУО-2	pcs	3
Pressure alarm СДГ	pcs	1
Support stand СМПм-3-(80)100-40	pcs	1
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design
Decorative screen panel ЭДС-3-100	pcs	1

- Without a support stand

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-60-24-Л	pcs	4
FK-5-1-12	kg	240
Actuator ПУО-2	pcs	4
Pressure alarm СДГ	pcs	1
СКМм-4-316 (and/or floor mounting of module КМП)	pcs (set)	1 (4)
РВД 25.2SN.M39x2,0-0,6	pcs	4
Gas manifold КГ-4-60	pcs	1
Manifold wall mounting ККС-2-6	pcs	1
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design
Decorative screen panel ЭДС-4-60	pcs	1

Note: For a module with carbon dioxide and Freon 23, it is necessary to order floating fixing clamps and a weighing device set (see Section "Weighing devices").

Individual and Group Installation of Module (Type 2)

Individual Installation of Module (Type 2)

Only module with actuation by solenoid "-ЭР" can be installed individually. In case of individual installation, a module is connected to release device УВ or a distribution pipeline.

In case of individual installation of module **with release device УВ** (Fig. 12), the following installation and other items should be used:

- terminal block for a module with electric actuation;
- fixing clamps ХЖ, ХП or СКМм for module wall mounting;
- tee ЗПУ24(40);
- release device УВ;
- pressure alarm СДГ;
- gaseous fire-extinguishing agent.

The following can also be required:

- load-cell weighing device УВТМ for modules filled with carbon dioxide or Freon 23;
- support frame РМ-1;
- decorative screen panel ЭД-1 (ЭДР-1) for module sheltering.

Release device УВ must be mounted observing the requirements for its secure fastening.

In case of individual installation of module **for connection to distribution pipeline** (Fig. 13), the following installation and other items should be used:

- terminal block for a module with electric actuation;
- fixing clamps ХЖ, ХП or СКМм for module wall mounting;
- tee ЗПУ24(40);
- high pressure hose РВД;
- sleeve РВД 24(40)-pipe OD;
- pressure alarm СДГ;
- gaseous fire-extinguishing agent.

The following can also be required:

- load-cell weighing device УВТМ for modules filled with carbon dioxide or Freon 23;
- support frame РМ-1;
- decorative screen panel ЭД-1 (ЭДР-1) for module sheltering.

Instead of fixing clamps or together with clamps, it is allowed to use mounting КМП for module fixing to the floor (except modules with ГОСТ 949 cylinders). Mounting КМП is not compatible with installation of УВТМ.

Modules with the capacity of 80 and 100 l filled with Freon 23 must be connected to a pipeline so that hose РВД50.4SH.M56x2-0.6 is in the horizontal position (Fig. 14). This connection ensures operability of the weighing platform for leak monitoring.

Examples of a system with module type 2 of individual installation:

- With a release device УВ

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-50-24-Л-ЭР	pcs	1
Terminal block	set	1
Freon 227	kg	45
Tee ЗПУ24	pcs	1
Pressure alarm СДГ	pcs	1
СКМм-1-316 (and/or floor mounting of module КМП)	pcs	2 (1)
Release device УВ-24-170	pcs	1

- With РВД (connection to a distribution pipeline)

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-80-40-Л-ЭР	pcs	1
Terminal block	set	1
FK-5-1-12	kg	70
Tee ЗПУ40	pcs	1
Pressure alarm СДГ	pcs	1
СКМм-1-316 (and/or floor mounting of module КМП)	pcs	2 (1)
РВД 50.1SN.M56x2,0-0,6	pcs	1
Sleeve РВД 40-pipe OD (OD is chosen from the typical designs)	pcs	1
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design

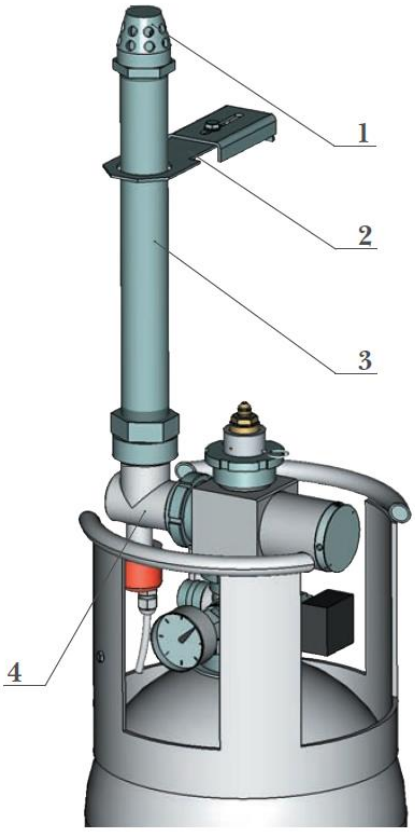


Fig. 12. Overall view of release device УВ on a module with a shut-off valve
1 – nozzle;
2 – bracket;
3 – pipeline;
4 – tee (not included in УВ).

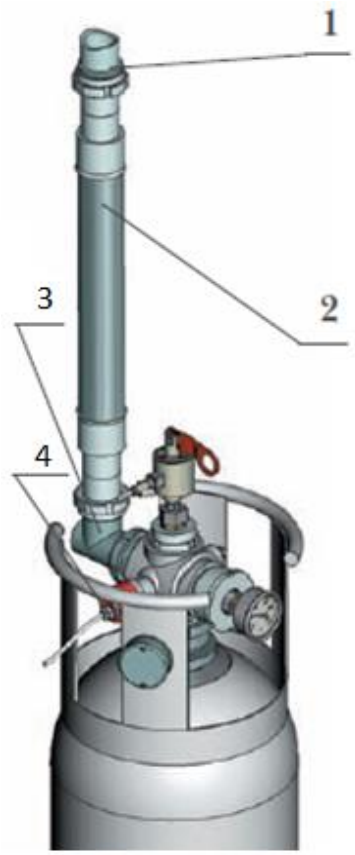


Fig. 13. Overall view of connection of a module with a shut-off valve to hose РВД
1 – sleeve РВД-pipe;
2 – hose РВД;
3 – tee;
4 – pressure alarm.

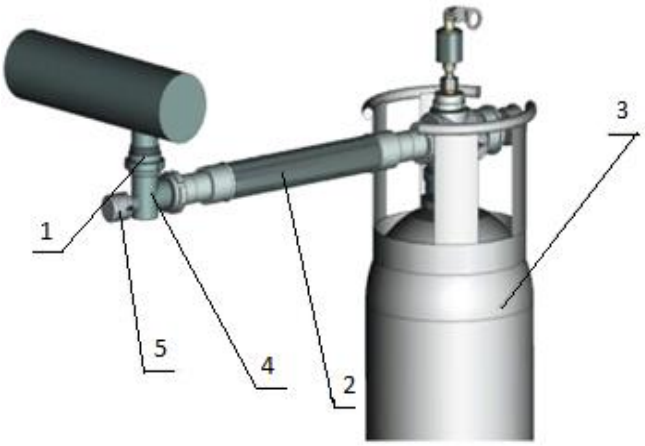


Fig. 14. Overall view of connection of a module with a shut-off valve to hose РВД located in the horizontal position
1 – sleeve РВД-pipe;
2 – hose РВД;
3 – module;
4 – tee;
5 – pressure alarm.

Group Installation of Modules (Type 2)

Modules can be assembled in a group of 2 to 10 pieces and installed in a support stand or fastened to the wall (floor). The first in the group must be a module with electric actuation, which is the forcing one for the other modules with pneumatic actuation (Figs. 15). The module with a solenoid has manual backup actuation.

When installing a group of modules **in a support stand**, the following installation and other items should be used:

- terminal block for a module with electric actuation;
- single-row support stand of type СМПм (СМПм-У, СМАм);
- tees ЗПУ24(40);
- pneumatic actuation manifold of type КПП2Э;
- pressure alarm СДГ;
- gaseous fire-extinguishing agent.

The following can also be required:

- load-cell weighing device УВТМ for modules filled with carbon dioxide or Freon 23;
- decorative screen panel ЭДС for module sheltering.

When installing a group of modules **with the capacity of 80 and 100 l filled with Freon 23**, (Fig. 30) the following installation and other items should be used:

- terminal block for a module with electric actuation;
- single-row support stand of type СМНм;
- tees ЗПУ40;
- pneumatic actuation manifold КПП2Э;
- load-cell weighing device УВТМ;
- pressure alarm СДГ;
- gaseous fire-extinguishing agent.

If a group of modules **is used without a support stand**, the following installation and other items should be used:

- terminal block for a module with electric actuation;
- fixing clamps ХЖ, ХП or СКМм for module wall mounting;
- tees ЗПУ24(40);
- high pressure hoses РВД;
- single-row gas manifold КГ (КГО);
- manifold wall mounting ККС;
- pneumatic actuation manifold of type КПП2Э;
- pressure alarm СДГ;
- gaseous fire-extinguishing agent.

The following can also be required:

- load-cell weighing device УВТМ for modules filled with carbon dioxide or Freon 23;
- decorative screen panel ЭДС for module sheltering.

For an operating and standby group of modules used in a centralized installation at a fire-extinguishing station it is recommended to use manifold non-return valves of type КО-24(40) or mainline non-return valves of type КО-150-DN.

Instead of fixing clamps or together with clamps, it is allowed to use mounting КМП for module fixing to the floor. Mounting КМП is not compatible with installation of УВТМ.

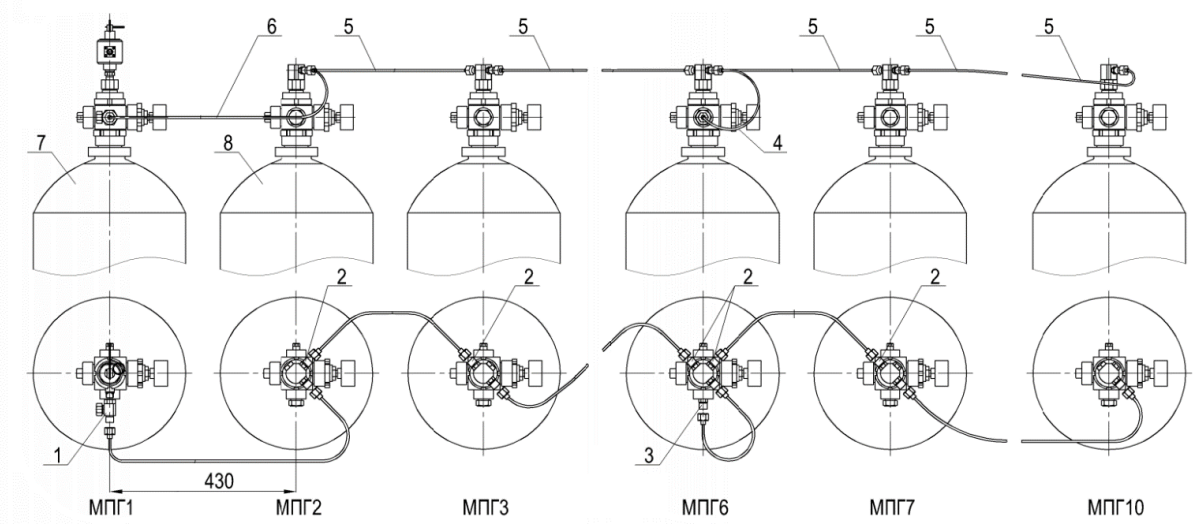


Рис. 15. Installation of fire-extinguishing modules of type 2 in a group of 7 to 10 pieces
1 – Drain valve G1/2-M16;
2 – Nipple КПП;
3 – Nipple КПП G1/2;
4 – РВД ВД-8 1SN-22,5-450-2DK(r)-M16x1,5;
5 – РВД ВД-8 1SN-22,5-650-2DK(r)-M16x1,5;
6 – РВД ВД-8 1SN-22,5-850-2DK(r)-M16x1,5;
7 – Module "-ЭР" ("-ЭРВ");
8 – Module "-П",

Example of a system with module type 2 of group installation:

- In a support stand

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 60-100-40-ЭР	pcs	1
Terminal block	set	1
Gas fire-extinguishing module МПГ 60-100-40-П	pcs	2
Freon 125	kg	270
Tee 3ПУ40	pcs	3
Pressure alarm СДГ	pcs	1
Support stand СМПм-3-(80)100-40	pcs	1
Pneumatic actuation manifold КПП2Э-3	pcs	1
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design

- In a support stand, filling with Freon 23

Name	Meas. unit	Q-ty
Gas fire-extinguishing module МПГ 150-80-40-ЭР	pcs	1
Terminal block	set	1
Gas fire-extinguishing module МПГ 150-80-40-П	pcs	1
Freon 23	kg	136
Tee 3ПУ40	pcs	2
Pressure alarm СДГ	pcs	1
Support stand СМНм-2-80-40-ХП	pcs	1
Pneumatic actuation manifold КПП2Э-2	pcs	1
Ceiling nozzle (chosen from the typical designs)	pcs	as per the design
Sleeve for nozzle with lock nut DN	pcs	as per the design
Weighing device УВТМ	pcs	1

Auxiliary Equipment

Distribution Device

The distribution device (hereinafter referred to as the "device") is intended for passing of gaseous fire-extinguishing agent (GFEA) from the common station manifold of centralized installation to one of several protected directions.

According to its functional purpose, the device pertains to the actuating portion of the equipment package of security/firefighting automatics and gas fire extinguishing.

For "civil" (commercial) facilities, ООО «НПО ПАС» manufactures two types of the distribution device:

- universal distribution device (УРУ);
- distribution devices (РУ).

The device is provided with a pressure alarm for issue of a signal on GFEA supply into the pipeline СДГ (СДУ-М).

In the automatic (remote) control mode, both device types are activated (opened) by electric actuation from actuator ПУО-2. ПУО-2 is activated by an electric pulse from Gamma-01 monitoring and control device and other instruments and devices which ensure the actuation and monitoring parameters. A control device should be selected taking into account the need for provision of an actuation pulse with consideration of cable length. ПУО-2 is not included in the device and is ordered separately. ПУО-2 is supplied in a leak-proof plastic container (Fig. 44).

Both device types, according to the requirements of GOST for distribution devices, have manual actuation. The peculiarities of each device type are described in the corresponding section of this catalog.

Test plugs, ordered separately, must be used instead of the device for pipeline strength and tightness tests. Test plugs are supplied in a set. The set includes two plugs, seals and fasteners (for flanged plugs).

Universal Distribution Device УРУ

Versatility of the distribution device of type УРУ is determined by the possibility of actuation by different control pulses: an electric and a backup manual one, pneumatic and backup manual one (facilities of RMRS and RRRS), and, optionally, the possibility of remote monitoring of device state ("open" – "closed") and manual actuation delay.

The device is opened both when there is no GFEA pressure in the device and when GFEA is present in the device.

The device is closed manually when there is no pressure in the device.

Overall view of УРУ is shown in Figs. 17 and 18.

The main device parameters are given in Table 5.

Table 5. УРУ main parameters

Device type	DN	Dimensions, maximum, mm			Working pressure, bar	Weight, kg, maximum	Actuation pulse parameters	Working temperature range, °C	Type of test plug
		A	H	B					
УРУ 25-150-ЭР	25	180	210	330	150	10	Current pulse from 0.7 to 2.5 A for one heating filament of ПУО-2 Rectangular pulse duration is minimum 0.1 s	from –40 to +55	ЗИР-УРУ25
УРУ 32-150-ЭР	32	180	210	330		10			ЗИР-УРУ32
УРУ 50-150-ЭР	50	180	245	400		15			ЗИР-УРУ50
УРУ 80-150-ЭР	80	200	385	460		30			ЗИФ-УРУ80
УРУ 100-60-ЭР	100	220	440	510	60	45			ЗИФ-УРУ100
УРУ 125-60-ЭР	125	250	440	590		66			ЗИФ-УРУ125
УРУ 150-60-ЭР	150	280	510	650		95			ЗИФ-УРУ150

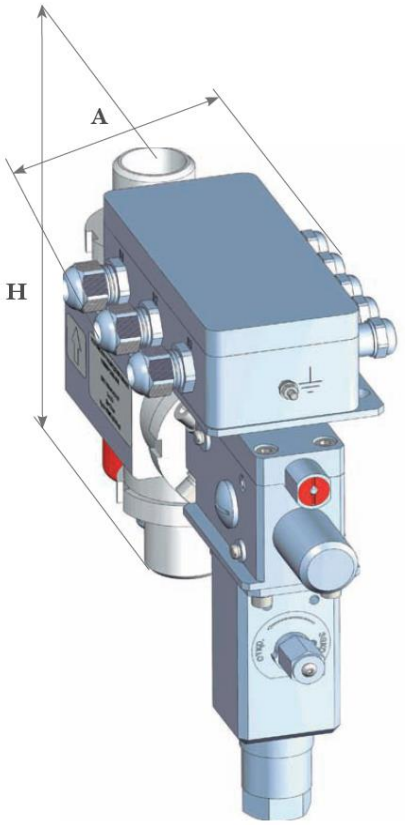


Fig. 17. Overall view of УРУ (DN 25, DN 32, DN 50)
Cables from ПУО-2 and СДГ are conventionally not shown

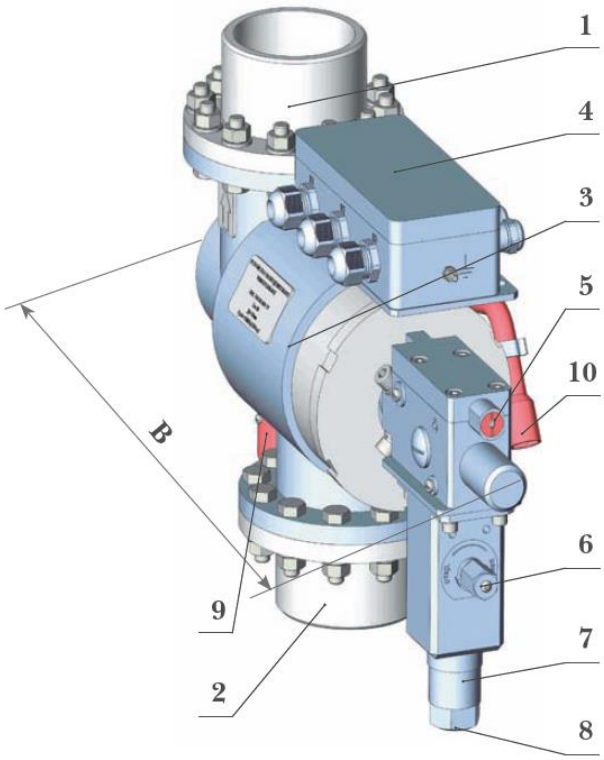


Fig. 18. Overall view of УРУ (DN 80, DN 100, DN 125, DN 150)
1 – outlet nipple (flange);
2 – inlet nipple (flange);
3 – housing;
4 – junction box;
5 – state indicator (“open” – “closed”);
6 – manual actuation control bolt;
7 – pusher (replaceable assembly);
8 – installation place for ПУО-2;
9 – СДГ;
10 – manual actuation handle.
Cables from ПУО-2 and СДГ are conventionally not shown.

Recommendations on mounting of УРУ are given in Fig. 19 and Table 6.

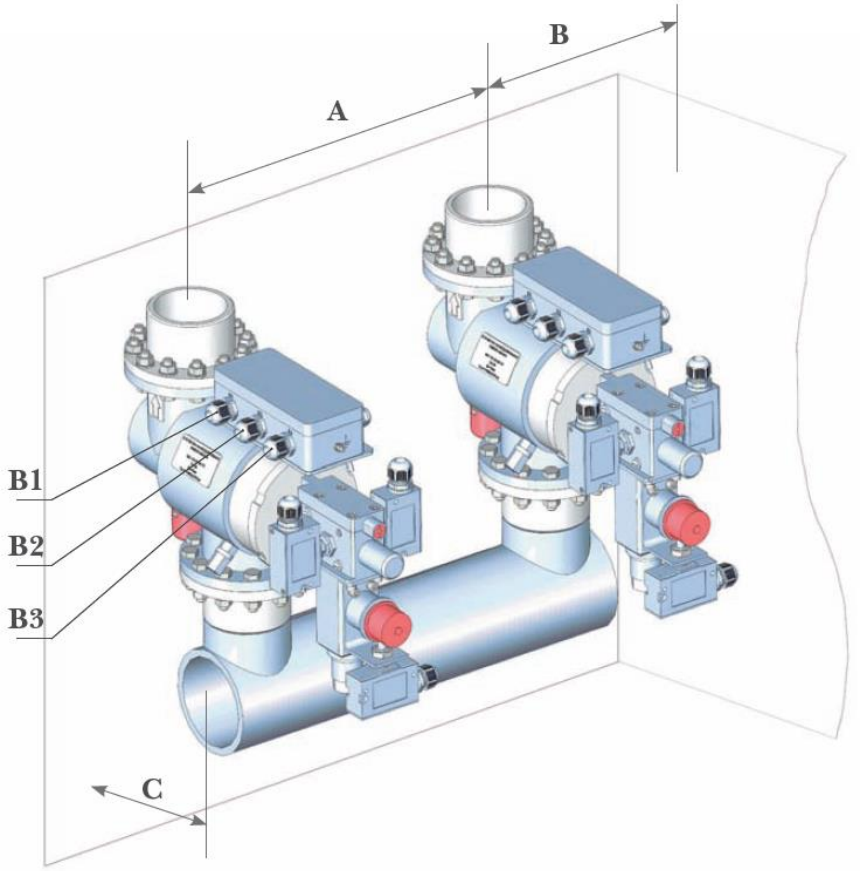


Fig. 19. Recommendations on mounting УРУ

B1, B2, B3 – cable glands (PGA-16-14) for connection cables to monitoring and control instruments (cable outer diameter is 9–14 mm);

C – minimum distance from the pipeline axis to a wall or to other equipment.

Table 6. Recommendations on mounting УРУ

Identification code	A, mm (min.)	B, mm (min.)	C, mm (min.)
УРУ 25-150	300	450	120
УРУ 32-150	300	450	120
УРУ 50-150	350	450	150
УРУ 80-150	400	450	200
УРУ 100-60	400	450	300
УРУ 125-60	480	450	350
УРУ 150-60	480	450	400

Diagram of connection of УРУ of design "-ЭР" to monitoring and control instruments is given in Fig. 20

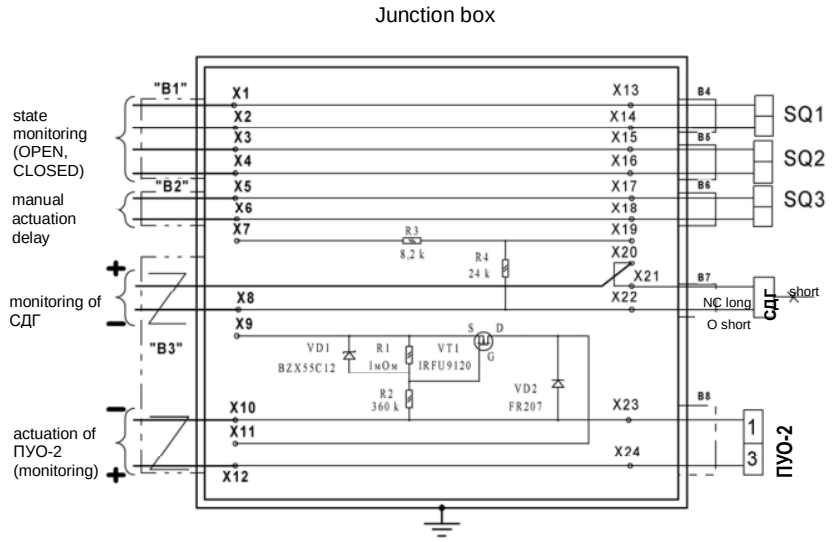


Fig. 20. Diagram of connection of УРУ of design "-ЭР" to monitoring and control instruments

B1, B2, B3 are cable glands (PGA-16-14) for entry of cables from monitoring and control instruments.

Jumpers X11-X12 and X19-X20 installed by the manufacturer must be removed.

Example of УРУ ordering information:

Name	Designation	Q-ty, pcs
Distribution device	УРУ 80-150-ЭР	1
Actuator	ПУО-2	1

List of parts and assemblies for restoration after actuation of distribution devices with electric actuation (SPTA):

Part, assembly name	Designation	Q-ty, pcs	Note
Pusher	ПАС 783.00.050	1	Assembled with sealing ring for ПУО-2
Actuator	ПУО-2	1	

Ordering information for SPTA: SPTA set УРУ ПАС 790.00.100

Distribution Device РУ

The distribution device of type РУ (Figs. 22 and 23) consists of a housing with a burst disk, nipples for welding. For connection of initiator cartridge ПУО-2 to the control device actuation circuit, the supply scope of РУ includes a terminal block and a cable harness with a plug connector of type 2РМ14. ПУО-2 is installed in the housing of РУ and connected to the terminal block in compliance with the diagram shown in Fig. 21.

Manual activation of РУ is performed by means of manual actuation devices УРП-7 or УСП101-Р. Manual actuation devices are autonomous pyrotechnical sources of an electric pulse which is necessary for actuation of ПУО-2. УРП-7 in case of individual installation can be installed directly on the distribution device housing. Single actuation switch КОП-Р can be used in case of group installation. From 1 to 12 distribution devices can be connected to single actuation switch КОП-Р. Manual actuation device is not included in РУ and is ordered separately. Distribution device РУ shall not be used without manual actuation.

The distribution device operates in any spatial position. РУ is mounted at the facility by welding of nipples, included in the device set, to a manifold (pipeline). During mounting, the direction of GFEA supply shown on the device must be observed.

The nomenclature and characteristics of produced РУ are given in Table 7.

Table 7. РУ nomenclature and characteristics

Device type	DN	L, mm	OD, mm	Weight, kg	Working pressure, bar	Actuation pulse parameters	Working temperature range, °C	Type of test plug
РУ-25-150	25	234	30	2.0	150	Actuation pulse current per one bridge of ПУО-2 is 0.7–2.5 A. Pulse duration is minimum 0.1 s	–35 to +50	ЗИР-РУ 24
РУ-32-150	32	268	40	5.0				ЗИР-РУ 32
РУ-50-150-01	50	249	58	7.0				ЗИР-РУ 50-01
РУ-70-150	70	296	80	15.0				ЗИФ-РУ 70
РУ-100-150	100	332	108	40.0				ЗИФ-РУ 100
РУ-150-80	150	352	168	55.0	80			ЗИФ-РУ 150

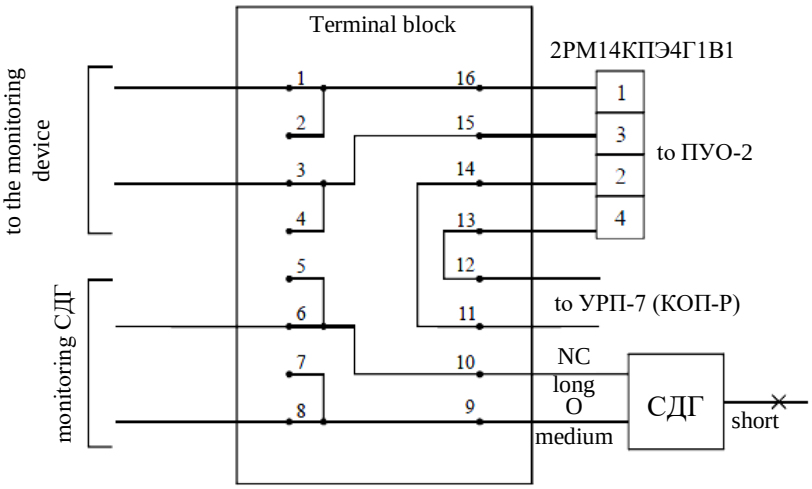


Fig. 21. Electric connection diagram for the distribution device РУ

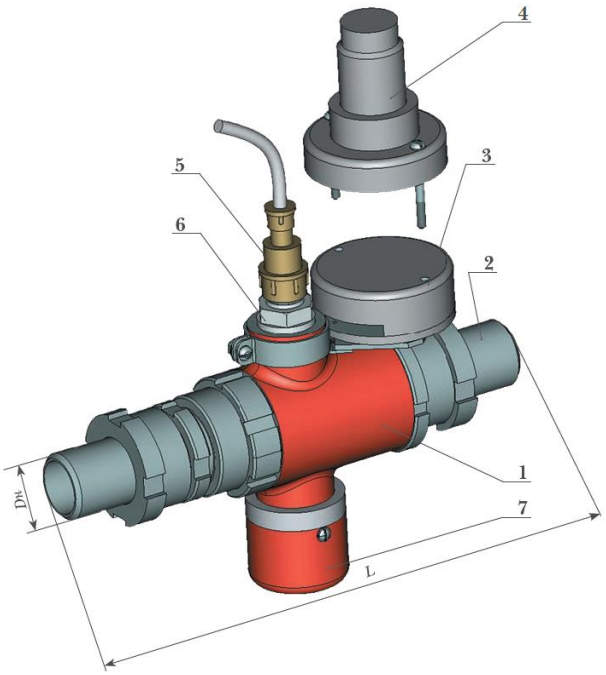


Fig. 22. Overall view of distribution device РУ with the diameter of 25, 32 and 50 mm
1 – housing;
2 – nipple;
3 – terminal block;
4 – manual actuation device УРП-7 (not included in РУ);
5 – cable harness with plug connector;
6 – actuator ПУО-2;
7 – pressure alarm СДГ (СДУ-М).

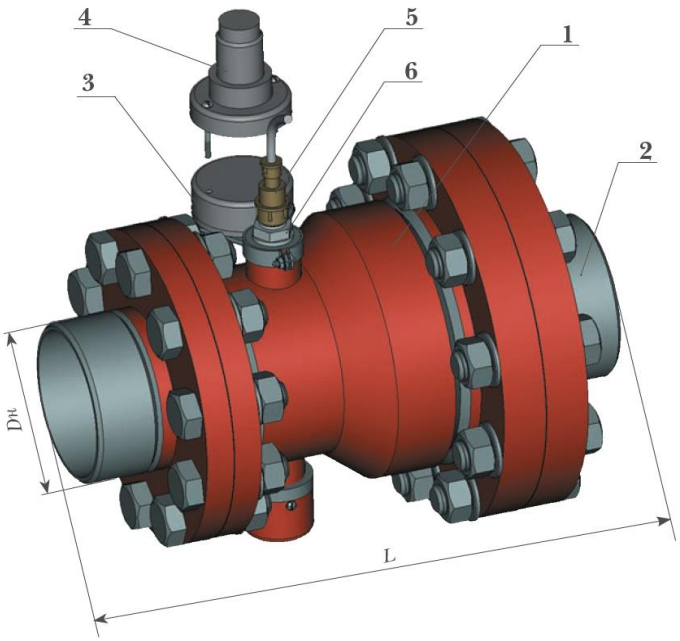


Fig. 23. Overall view of distribution device РУ with the diameter o 70, 100 and 150 mm
1 – housing;
2 – nipple;
3 – terminal block;
4 – manual actuation device УРП-7 (not included in РУ);
5 – cable harness with plug connector;
6 – actuator ПУО-2;
7 – pressure alarm СДГ (СДУ-М).

Example of ordering information:

Name	Designation	Q-ty, pcs
Distribution device	РУ-100-150	1
Actuator	ПУО-2	1
Manual actuation device	УРП-7 *	1
Note: * УРП-7 can be substituted by single actuation switch КОП-Р, one per a group of up to 12 distribution devices.		

Release Device УВ

Attention! The УВ given in this section are not used with FK-5-1-12.

Release device УВ replaces special distribution piping and consists of a pipeline, nozzle and bracket for device wall mounting.

УВ is connected directly to the release nipple of the module release device with burst disk (type 1). Connection of УВ to the module with a shut-off valve (type 2) is made via a tee. Overall view of УВ is shown in Figs. 24 and 25. Standard size of УВ should be chosen taking into account the nominal diameter of the module release device (24 or 40 mm).

The release device has nozzle НГС-24 with surface area of release holes 452 mm^2 for modules with DN24 and nozzle НГС-40 with surface area of release holes 1264 mm^2 for modules with DN40.

The jet of GFEA flowing from the nozzle is directed upwards to the room ceiling. The release device design ensures GFEA release within the standard time up to 10 s for freons, up to 60 s for compressed GFEA and carbon dioxide.

The release device is used in case of individual installation of modules. The release device is ready for mounting and has a number of advantages:

- strength and tightness tests are not required since it is a factory product and not made by the mounting organization at the facility;
- hydraulic calculations are not required, it is certified within the module;
- GFEA atomization efficiency is confirmed by factory tests;
- reduction of mounting work time.

УВ is used for protection of rooms which have no isolated extinguishing zones (false floor, suspended ceiling) and obstacles (racks, equipment stands, partitions, height from the floor structure less than 0.5 m) for free propagation of the fire-extinguishing gas jet. In large rooms where extinguishing requires several modules with УВ, they should be arranged uniformly along the perimeter.

Height of УВ shall be chosen taking into account the height of the module on which it will be installed. The УВ nozzle shall be arranged in the protected room so that distance from the nozzle to the room ceiling is within 0.5–1.0 m. The nozzle should be above the equipment (cabinets, stands, racks, etc.) installed in the protected room. УВ shall not be used in rooms where multi-tier arrangement of nozzles is possible.

Release device УВ must be mounted observing the requirements of the operational document for УВ to its secure fastening.

The nomenclature of devices is given in Table 8.

For modules МПГ150-XXX-24 charged with compressed GFEA (argon, nitrogen, Inergen), in case of their application with УВ, a throttle set consisting of a washer and a rubber sealing ring must be additionally used. The throttle set is installed between УВ and ЗПУ of the module for modules of type 1 or between УВ and the release device tee for modules of type 2.

Ordering information for the throttle set: Throttle set

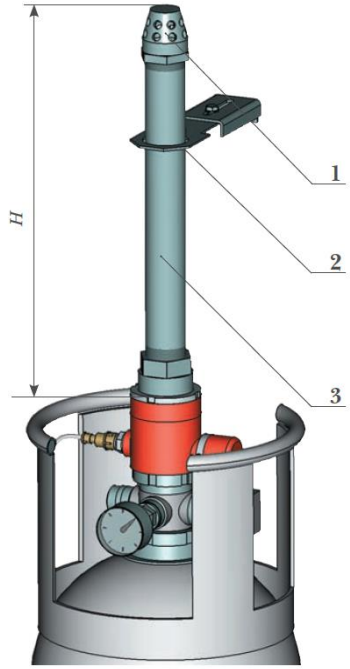


Fig. 24. Overall view of release device УВ on a module with a burst disk
1 – nozzle; 2 – bracket; 3 – pipeline.

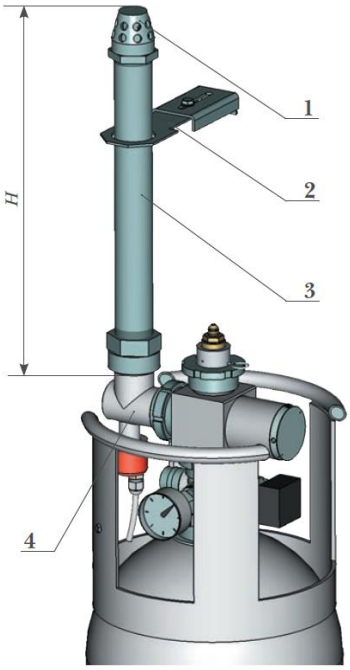


Fig. 25. Overall view of release device УВ on a module with a shut-off valve
1 – nozzle; 2 – bracket; 3 – pipeline;
4 – tee (not included in the set of УВ).

Table 8. Nomenclature of release device

Device name	Device height (with nozzle) H, mm	Nominal diameter of release device
УВ-24-220	2200	24
УВ-24-200	2000	
УВ-24-170	1700	
УВ-24-150	1500	
УВ-24-130	1300	
УВ-24-100	1000	
УВ-24-065	650	
УВ-24-045	450	
УВ-40-220	2200	40
УВ-40-200	2000	
УВ-40-170	1700	
УВ-40-160	1600	
УВ-40-150	1500	
УВ-40-130	1300	
УВ-40-105	1050	
УВ-40-055	550	

Structure of release device designation:
УВ-XX-XXX
1 2 3
Where 1 is device name;
2 is nominal diameter of release device on the module, mm;
3 is device height, cm.

Example of ordering information: Release device УВ-24-130

High Pressure Hose РВД

High pressure hose РВД is used for connection of the module release device to a pipeline or to a gas manifold КГ (КГО) of a gas fire-extinguishing installation.

There are two standard sizes of hoses РВД with the nominal diameters of 25 and 50 mm corresponding to the diameters of the module release device (24 and 40 mm).

When using a module with a burst disk (type 1), the release device hose is connected directly to the release nipple of the module release device. When using a module with a shut-off valve (type 2), hose РВД is connected to the module release device via Тее ЗПУ24 or Тее ЗПУ40.

Connection of one module (one hose РВД) to a pipeline should be made using the end welded adapter "sleeve РВД24(40)-pipe OD".

For independent making of a manifold, use the radius welded adapter Nipple ШТ24(40)-pipe OD.

Leak tightness of threaded connections of РВД is ensured by the rubber rings included in the supply scope of the module, adapters РВД, tees and manifolds. The minimum permissible bending radius for the РВД during mounting on the product and during operation is 500 mm.

Overall view of hose РВД and technical characteristics are given in Fig. 26 and Table 9.

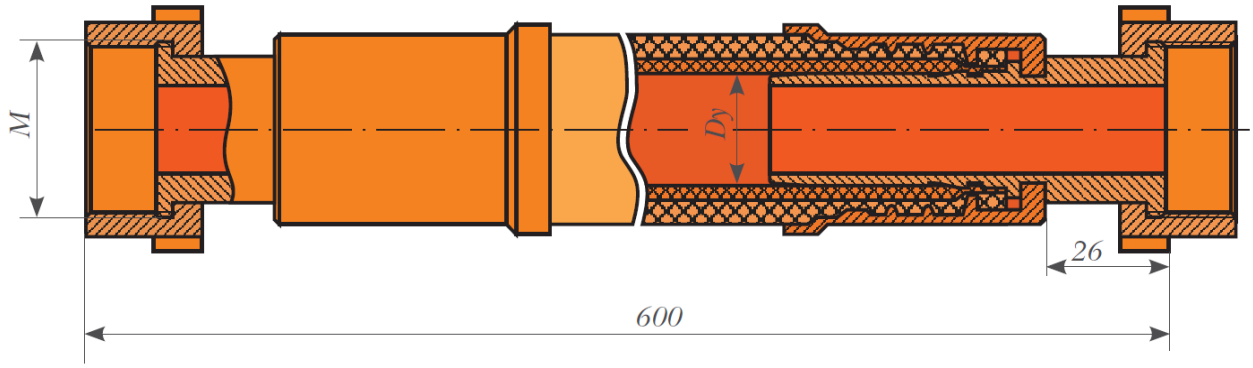


Fig. 25. High pressure hose

Table 9. РВД specification

Ordering information for РВД	DN, mm	M	P work., bar	Length, mm	Type РВД to pipe sleeve (ordering information)
РВД25.2SN.M39x2,0-0,6	25	M39x2	165	600	Sleeve РВД24-pipe OD * Nipple ШТ24-pipe OD *
РВД50.1SN.M56x2,0-0,6	50	M56x2	60	600	Sleeve РВД40-pipe OD * Nipple ШТ40-pipe OD *
РВД50.4SH.M56x2,0-0,6 (for Freon 23 and modules with the capacity of 80 and 100 l)	50	M56x2	150	600	Sleeve РВД40-pipe OD * Nipple ШТ40-pipe OD *
Note: When ordering sleeve РВД and nipple ШТ, specify the pipe OD chosen from the typical designs.					

Example of ordering information: РВД 25.2SN. M39x2,0-0,6

Adapter РВД-Pipe

There are two variants of high pressure hose connection to piping:

- end connection using Sleeve РВД24(40)-pipe OD;
- lateral connection using Nipple ШТ24(40)-pipe OD.

Sleeve РВД24(40)-Pipe OD

Sleeve РВД24(40)-pipe OD (Fig. 26) is intended for welding to a pipeline end and ensures pipeline connection to hose РВД. Parameter OD in the sleeve name corresponds to pipeline outer diameter. Value of OD is chosen from the typical series (see Table 9). The sleeve is supplied together with a rubber sealing ring.

Table 9. Typical designs of sleeve РВД24(40)-pipe OD

РВД type	Sleeve type	Outer diameter of connected pipeline, OD, mm											
РВД25.2SN.M39x2,0-0,6	Sleeve РВД24-pipe OD	18	20	22	24	28	30	32	34	36	38	40	42
РВД50.1SN.M56x2,0-0,6	Sleeve РВД40-pipe OD	28	30	34	36	42	48	53	56	60	65	–	–

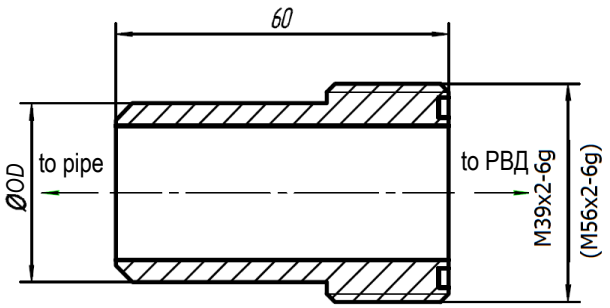


Fig. 26. Sleeve РВД24(40)-pipe OD

Example of ordering information: Sleeve РВД40-pipe OD48

Nipple ШТ24(40)-Pipe OD

Nipple ШТ24(40)-pipe OD (Fig. 27) is intended for welding to the pipeline side surface and ensures pipeline connection to hose РВД.

Parameter OD in the sleeve name corresponds to pipeline outer diameter. The nipple is supplied together with a rubber sealing ring.

Table 10. Designs of nipple ШТ24(40)-pipe OD

РВД type	Nipple type	Outer diameter of connected pipeline, OD, mm
РВД25.2SN.M39x2,0-0,6	Nipple ШТ24-pipe OD	Specified when ordering
РВД50.1SN.M56x2,0-0,6	Nipple ШТ40-pipe OD	Specified when ordering

Example of ordering information: Nipple ШТ24-pipe OD32

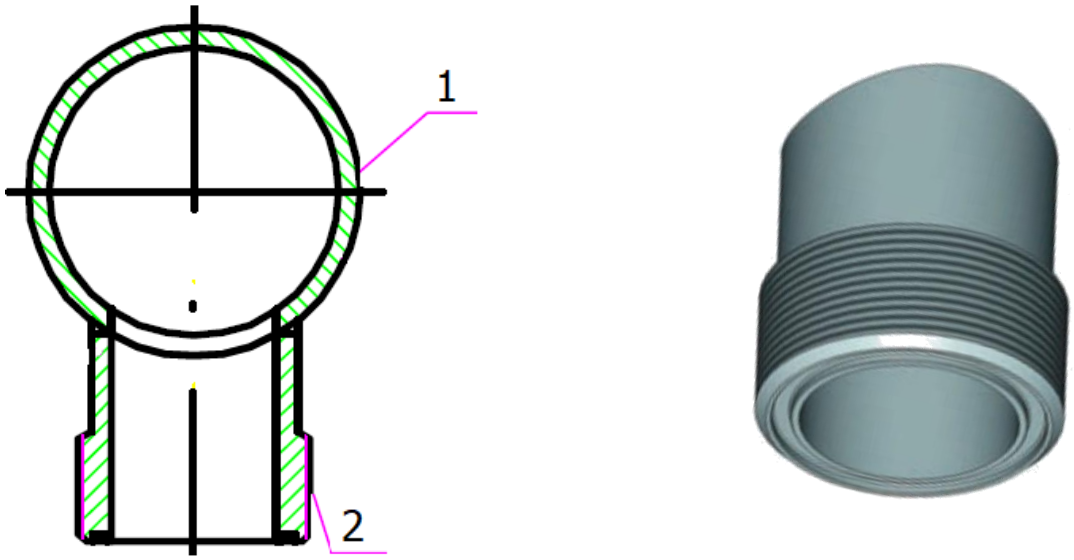


Fig. 27. Nipple ШТ24(40)-pipe OD
1 – pipeline (manifold);
2 – nipple.

Tee ЗПУ

The tee is intended for connection of the release device of the module with a shut-off valve (type 2) to hose РВД (in case of individual and group installation) and to release device УВ. The tee is manufactured with two nominal diameters corresponding to the release device DN:

- DN 24;
- DN 40.

Overall view of the tee and dimensions are given in Fig. 28.

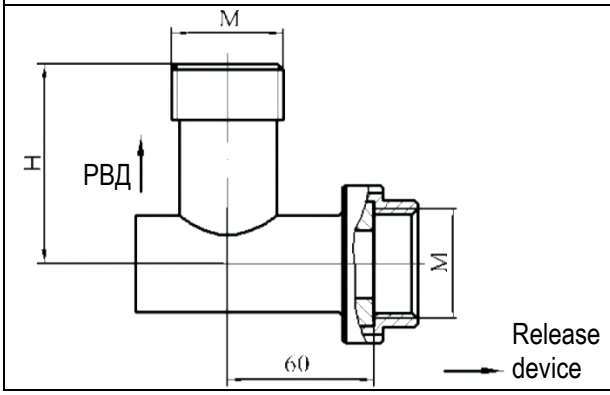
Figure	M	H, mm	Ordering information
	M39x2	71	Tee ЗПУ24
	M56x2	65	Tee ЗПУ40

Fig. 28. Tee overall view and dimensions

Ordering information for tees:
Tee ЗПУ XX
1 2
Where 1 is conventional name;
2 is nominal diameter, 24 or 40 mm.

Example of ordering information: Tee ЗПУ24

Support Stand

The support stand is intended for fastening and group connection of modules to a station or mainline pipeline within centralized or modular fire-extinguishing units.

Modules in a support stand are arranged in one row and fastened to the stand by means of rigid or floating fixing clamps. From 2 to 10 modules can be installed in a support stand. Modules are connected to a manifold using hoses РВД.

The stand is fastened to the floor by means of anchor bolts. The user may independently set the "right" or "left" direction of the release device of a manifold in the stand.

The stand is supplied in disassembled state. Structurally the stand is dismountable, and it is a set of equipment for assembly in a unified product at the site of its operation.

The stand is assembled from typical profiled elements, have a movable telescopic connection on the lateral supports, which allows for partial adjustment of manifold height.

The support stand is manufactured in four models:

- Support stand СМПм.
  Intended for placement of all module types with capacity of 35 to 100 l (except modules with capacity of 80 and 100 l filled with Freon 23) with cylinders as per БК-6601-400 ТУ, ТУ 1410-007-29416612-2005 ("-Л") and ГОСТ 949 ("-У").
- Support stand СМАм.
  Intended for placement of all module types with the working pressure of 60 bar, capacity of 120 to 160 l with cylinders as per ТУ 1413-011-18074387-2011 and ТУ 1410-001-13055988-05.
- Support stand СМНм.
  Intended for modules of type 2 with the working pressure of 150 bar, capacity of 80 and 100 l, filled with Freon 23, with cylinders of type БК-6601-400 ТУ and ТУ 1410-007-29416612-2005 with horizontal location of hoses РВД.
- Support stand СМС.
  It is used in areas with a risk of shock acceleration of up to 20g. Information on this stand can be obtained by request and on the website.

Support Stand СМПм and СМАм

Stand СМПм and СМАм consists of:

- support frame (together with fixing clamps Х or ХП);
- single-row gas manifold КГ for a specified number of modules;
- high pressure hoses РВД.

Modules of type 2 should be connected to the high pressure hose using the following items: Tee ЗПУ24 or Tee ЗПУ40. The tees are ordered separately.

Depending on design assignment and requirements to the stand, additional equipment installed in the stand can be ordered (supplied under a separate order):

- gas pressure alarm СДГ or СДУ-М;
- УВТМ weighing device for automated weight monitoring of GFEA in the modules;
- pneumatic actuation manifold КПП2Э for combined electropneumatic actuation of a group of modules of type 2 (with actuation by solenoid "-ЭР" and pneumatic actuation "-П");
- non-return valves КО-24 or КО-40;
- decorative screen panel ЭДС or ЭДСА.

Overall view of single-row support stand СМПм and СМАм is shown in Fig. 29.

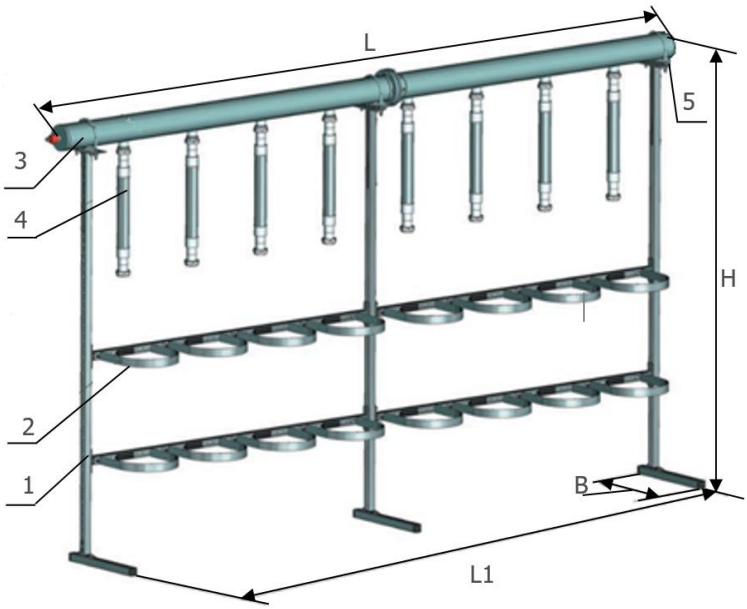


Fig. 29. Overall view of single-row support stand СМПм and СМАм
1 – support frame; 2 – fixing clamp (Хм or ХП) (included in the frame);
3 – manifold КГ; 4 – РВД; 5 – manifold mounting set.

The nomenclature of produced stands СМПм for modules with cylinders as per БК-6601-400 ТУ and ТУ 1410-007-29416612-2005 is given in Table 11.

The nomenclature of produced stands СМПм for modules of type "-У" with cylinders as per ГОСТ 949 is given in Table 12.

Table 11. List of СМПм support stands for modules with 35 to 100 l cylinders meeting БК-6601-400 ТУ and ТУ 1410-007-29416612-2005

<table>
<tr><th>Support stand code</th><th>Length, L, mm</th><th>Length, L1, mm</th><th colspan="4">Height min, мм</th><th>Height max, H, mm</th><th>Width, B, mm</th></tr>
<tr><th colspan="3">Modules, l:</th><th>35</th><th>40</th><th>50</th><th>60</th><th></th><th></th></tr>
<tr><td>СМПм-2-35(60)-24
СМПм-2-35(60)-24-ХП</td><td>1250</td><td>940</td><td rowspan="10">1489</td><td rowspan="10">1600</td><td rowspan="10">1689</td><td rowspan="10">1809</td><td rowspan="2">2115</td><td rowspan="19">500</td></tr>
<tr><td>СМПм-3-35(60)-24
СМПм-3-35(60)-24-ХП</td><td>1680</td><td>1380</td></tr>
<tr><td>СМПм-4-35(60)-24
СМПм-4-35(60)-24-ХП</td><td>2110</td><td>1820</td><td rowspan="4">2135</td></tr>
<tr><td>СМПм-5-35(60)-24
СМПм-5-35(60)-24-ХП</td><td>2540</td><td>2260</td></tr>
<tr><td>СМПм-6-35(60)-24
СМПм-6-35(60)-24-ХП</td><td>2970</td><td>2660</td></tr>
<tr><td>СМПм-7-35(60)-24
СМПм-7-35(60)-24-ХП</td><td>3485</td><td>3160</td><td>2145</td></tr>
<tr><td>СМПм-8-35(60)-24
СМПм-8-35(60)-24-ХП</td><td>3925</td><td>3600</td><td rowspan="2">2150</td></tr>
<tr><td>СМПм-9-35(60)-24
СМПм-9-35(60)-24-ХП</td><td>4365</td><td>4040</td></tr>
<tr><td>СМПм-10-35(60)-24
СМПм-10-35(60)-24-ХП</td><td>4805</td><td>4480</td><td>2155</td></tr>
<tr><th colspan="3">Modules, l:</th><th colspan="2">80</th><th colspan="2">100</th><th></th></tr>
<tr><td>СМПм-2-80(100)-24-ХП</td><td>1250</td><td>940</td><td rowspan="24">2089</td><td rowspan="24" colspan="2">2289</td><td rowspan="2">2750</td></tr>
<tr><td>СМПм-3-80(100)-24-ХП</td><td>1680</td><td>1380</td></tr>
<tr><td>СМПм-4-80(100)-24-ХП</td><td>2110</td><td>1820</td><td rowspan="3">2770</td></tr>
<tr><td>СМПм-5-80(100)-24-ХП</td><td>2540</td><td>2260</td></tr>
<tr><td>СМПм-6-80(100)-24-ХП</td><td>2970</td><td>2660</td></tr>
<tr><td>СМПм-7-80(100)-24-ХП</td><td>3485</td><td>3160</td><td>2780</td></tr>
<tr><td>СМПм-8-80(100)-24-ХП</td><td>3925</td><td>3600</td><td rowspan="2">2785</td></tr>
<tr><td>СМПм-9-80(100)-24-ХП</td><td>4365</td><td>4040</td></tr>
<tr><td>СМПм-10-80(100)-24-ХП</td><td>4805</td><td>4480</td><td>2790</td></tr>
<tr><td>СМПм-2-80(100)-40</td><td>1250</td><td>940</td><td rowspan="2">2785</td></tr>
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<tr><td>СМПм-5-80(100)-40</td><td>2540</td><td>2260</td><td rowspan="2">2820</td></tr>
<tr><td>СМПм-6-80(100)-40</td><td>2970</td><td>2660</td></tr>
<tr><td>СМПм-7-80(100)-40</td><td>3485</td><td>3160</td><td>2830</td></tr>
<tr><td>СМПм-8-80(100)-40</td><td>3925</td><td>3600</td><td rowspan="2">2840</td></tr>
<tr><td>СМПм-9-80(100)-40</td><td>4365</td><td>4040</td></tr>
<tr><td>СМПм-10-80(100)-40</td><td>4805</td><td>4480</td><td>2850</td></tr>
</table>

Table 12. List of СМПм support stands for modules with cylinders meeting ГОСТ 949

Support stand code	Length, L, mm	Length, L1, mm	Height min, мм		Height max, H, mm	Width, B, mm
Modules, l:			40	50		
СМПм-2-40(50)-24-У СМПм-2-40(50)-24-У-ХП	1250	940	2129	2449	2810	500
СМПм-3-40(50)-24-У СМПм-3-40(50)-24-У-ХП	1680	1380				
СМПм-4-40(50)-24-У СМПм-4-40(50)-24-У-ХП	2110	1820			2830	
СМПм-5-40(50)-24-У СМПм-5-40(50)-24-У-ХП	2540	2260				
СМПм-6-40(50)-24-У СМПм-6-40(50)-24-У-ХП	2970	2660				
СМПм-7-40(50)-24-У СМПм-7-40(50)-24-У-ХП	3485	3160			2840	
СМПм-8-40(50)-24-У СМПм-8-40(50)-24-У-ХП	3925	3600			2845	
СМПм-9-40(50)-24-У СМПм-9-40(50)-24-У-ХП	4365	4040				
СМПм-10-40(50)-24-У СМПм-10-40(50)-24-У-ХП	4805	4480			2850	

Structure of СМПм support stand identification code:

СМПм –Х–ХХХ–ХХ–Х–ХХ

1 2 3 4 5 6

Where 1 is an abbreviated name of the support stand;
2 is number of modules in the support stand (2 to 10);
3 is module capacity, l;
4 is nominal diameter of an outlet bore of a module release device (DN24, DN40);
5 is identification code of cylinder design:

- no identification – cylinder meeting БК-6601-400 ТУ or ТУ 1410-007-29416612-2005;
- У – cylinder meeting ГОСТ 949;

6 is fixing clamp type:

- no identification – fixing clamp (of type Хм);
- ХП – fixing clamp of floating type.

Example of ordering information: Support stand СМПм-5-(80)100-40

List of available СМАм support stands is given in Table 13.

Table 13. List of СМАм support stands for modules of 120-160 l capacity

Support stand code	Length, L, mm	Length, L1, mm	Height min, мм		Height max, H, mm	Width, B
Modules, l:			**120**	**140**		
СМАм-2-120(140)-40-М	1400	1133	2245	2495	2995	500
СМАм-3-120(140)-40-М	1920	1633				
СМАм-4-120(140)-40-М	2400	2133	2260	2510	3010	
СМАм-5-120(140)-40-М	2920	2633	2280	2530	3030	
СМАм-6-120(140)-40-М	3400	3133				
СМАм-7-120(140)-40-М	4000	3693	2290	2540	3040	
СМАм-8-120(140)-40-М	4500	4193	2300	2550	3050	
СМАм-9-120(140)-40-М	5000	4693				
СМАм-10-120(140)-40-М	5500	5193	2310	2560	3060	
Modules, l:			**160**			
СМАм-2-160-40	1400	1133	2655		3390	
СМАм-3-160-40	1920	1633				
СМАм-4-160-40	2400	2133	2670		3420	
СМАм-5-160-40	2920	2633	2690		3440	
СМАм-6-160-40	3400	3133				
СМАм-7-160-40	4000	3693	2700		3450	
СМАм-8-160-40	4500	4193	2710		3460	
СМАм-9-160-40	5000	4693				
СМАм-10-160-40	5500	5193	2720		3470	

Structure of СМАм support stand identification code:
СМАм-XX-XX-40-X
1 2 3 4 5
Where 1 is an abbreviated name of the support stand;
2 is number of modules in the support stand (2 to 10);
3 is module capacity, l;
4 is nominal diameter of an outlet bore of a module release device;
5 is identification code of cylinder design:

- no identification – cylinder meeting ТУ 1410-001-13055988-05;
- М – cylinder meeting ТУ 1413-011-18074387-2011;

Example of ordering information: Support stand СМАм-2-120(140)-40-М

Support Stand СМНм

The support stand of СМНм version (Fig. 30) is designed for modules of type 2 rated for 150 bar working pressure and having 80 and 100 l capacity, filled with Freon 23, with cylinders meeting БК-6601-400 ТУ and ТУ 1410-007-29416612-2005 having horizontal high pressure hoses.

СМНм support stand comprises:

- РМНм support frame;
- КГ single-row gas manifold for a specified number of modules;
- high pressure hoses (РВД50.4SH.M56x2.0-0.6);
- tees (ordered separately);
- manifold fastening set.

Use Tee ЗПУ40 to connect high pressure hoses to the modules. The tees are ordered separately.

Optional equipment is available for ordering as appropriate to install on СМНм support stand:

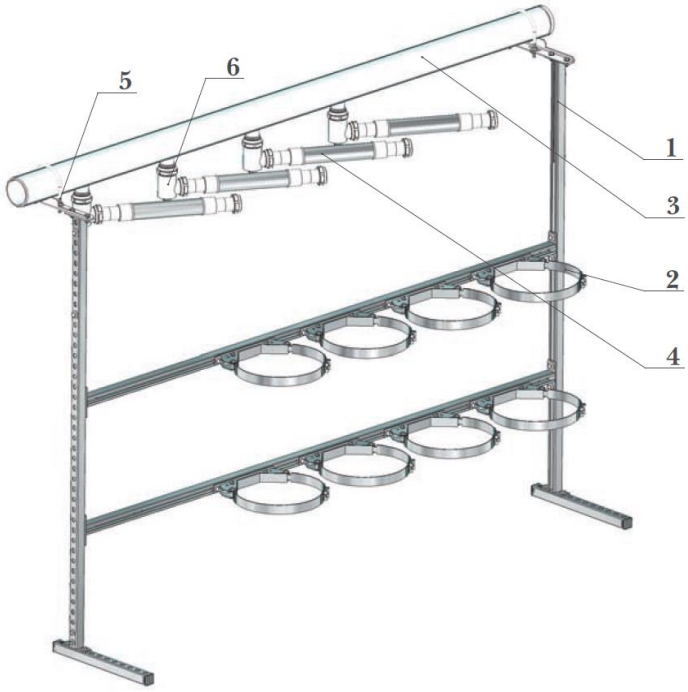
- gas pressure alarm: СДГ or СДУ-М;
- УВТМ weighing device for automated weight monitoring of gaseous fire-extinguishing agents (GFEA) in the modules;
- КПП2Э pneumatic actuation manifold for combined solenoid and pneumatic actuation of type 2 module group (with "-ЭР" solenoid actuator and pneumatic actuator "-П");
- КО-40 non-return valves.

This support stand is not compatible with ЭДС (ЭДСА) decorative screen panels.

List of available СМНм support stands is given in Table 14.

Table 14. List of support stands СМНм

Support stand code	Length, L, mm	Length, L1, mm	Height min, мм	Height max, H, mm	Width, B
СМНм-2-80-40-ХП	1820	1580	1449	1815	665
СМНм-3-80-40-ХП	2260	2020			
СМНм-4-80-40-ХП	2700	2460		1830	
СМНм-5-80-40-ХП	3140	2900		1850	
СМНм-6-80-40-ХП	3540	3300			
СМНм-7-80-40-ХП	4120	3800		1860	
СМНм-8-80-40-ХП	4560	4240		1875	
СМНм-9-80-40-ХП	5000	4680			
СМНм-10-80-40-ХП	5440	5120		1885	
СМНм-2-100-40-ХП	1820	1580	1769	2095	
СМНм-3-100-40-ХП	2260	2020			
СМНм-4-100-40-ХП	2700	2460		2110	
СМНм-5-100-40-ХП	3140	2900		2130	
СМНм-6-100-40-ХП	3540	3300			
СМНм-7-100-40-ХП	4120	3800		2140	
СМНм-8-100-40-ХП	4560	4240		2155	
СМНм-9-100-40-ХП	5000	4680			
СМНм-10-100-40-ХП	5440	5120		2165	



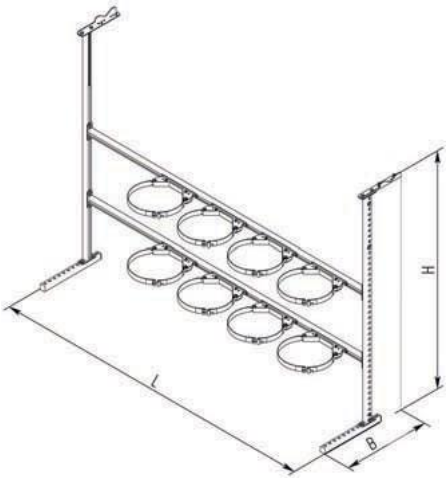


Fig. 30 – Support stand СМНм
1 – support frame;
2 – fixing clamp of floating type;
3 – КГН manifold;
4 – РВД;
5 – manifold fastening set;
6 – tee (ordered separately).

Structure of СМНм support stand identification code:
СМНм-ХХ-ХХ-40-ХП
1 2 3 4 5
Where 1 is an abbreviated name of the support stand;
2 is number of modules in the support stand (2 to 10);
3 is module capacity, l;
4 is nominal diameter of an outlet bore of a module release device;
5 is ХП – fixing clamp of floating type.

Example of ordering information: Support stand СМНм-5-100-40-ХП

Support Frame

The support frame is designed for fastening a module or a module group.

One set of the support frame can be used to fasten 1 to 10 modules.

Depending on the module height, the frame is equipped with one or two cross bars with holes for installation of appropriate fixing clamp. Combination of the support frame and the clamps ensures secure fastening of the module.

The support frame is delivered knocked down. The frame is fixed on the floor using anchor bolts (the anchor bolts are not included in the supply scope). A multi-cylinder support frame (at least 2 modules) is fabricated of standard components; its side supports have an adjustable telescopic joint allowing some changes in height when positioning the manifold.

Based on the structure, the support frames can be divided into the following types:

- PM-1 single-cylinder support frame.
  Used for modules of 16 to 160 l capacity.
- PMм multi-cylinder support frame.
  Used for modules of 35 to 100 l capacity.
- PMAм multi-cylinder support frame.
  Used for modules of 120 to 160 l capacity.
- PMHм multi-cylinder support frame.
  Used for modules of 80 and 100 l capacity filled with Freon 23.
- PMC multi-cylinder support frame.
  It is used in areas with a risk of shock acceleration of up to 20g.

Detailed information on PMHм and PMC support frames is available on request and on the website.

Single-Cylinder Support Frame PM-1

The support frame for a single module has three versions different in height dependent on the module capacity. ХЖ or ХП fixing clamps (ordered separately) are to be used for support frame PM-1.

General arrangement of PM-1 is presented in Figs. 31 and 32. List of available support frames is given in Table 15.

Table 15. List of PM-1 support frames

Support frame code (ordering information)	Number of cross bars	Feasibility for module type (capacity, l)
Рама монтажная РМ-1	2	32У, 40У, 50У, 50, 60, 80, 100
Рама монтажная РМ-1-01	1	16, 20, 20У, 25У, 35
Рама монтажная РМ-1-02	2	120, 140, 160

Fig. 31. General arrangement of PM-1

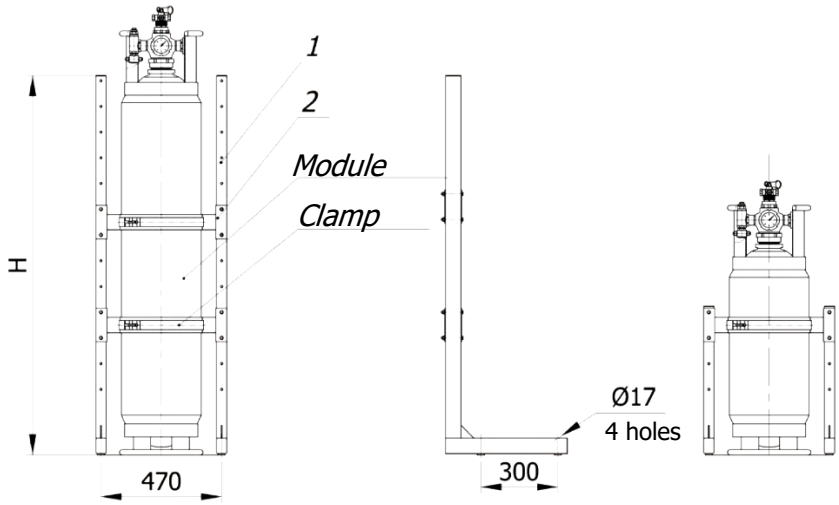


Fig. 32. Diagram of module installation into PM-1. 1 – upright; 2 – cross bar.

Multi-Cylinder Support Frames РМм and РМАм

List of available support frames for fastening of two (or more) modules is given in Tables 16, 17 and 18 respectively. The supply scope of the multi-cylinder support frame includes a base, an upright, a cross bar and clamps.

Table 16. List of РМм support frames for modules 35-100 l cylinders meeting БК-6601-400 ТУ and ТУ 1410-007-29416612-2005 ("-Л")

Support frame code	Dimensions, mm		
	Length, L	Width, B	Height, H
РМм-2-35(60) РМм-2-35(60)-ХП	940	1420	500
РМм-3-35(60) РМм-3-35(60)-ХП	1380		
РМм-4-35(60) РМм-4-35(60)-ХП	1820		
РМм-5-35(60) РМм-5-35(60)-ХП	2260		
РМм-6-35(60) РМм-6-35(60)-ХП	2660		
РМм-7-35(60) РМм-7-35(60)-ХП	3160		
РМм-8-35(60) РМм-8-35(60)-ХП	3600		
РМм-9-35(60) РМм-9-35(60)-ХП	4040		
РМм-10-35(60) РМм-10-35(60)-ХП	4480		
РМм-2-80(100) РМм-2-80(100)-ХП	940	2055	
РМм-3-80(100) РМм-3-80(100)-ХП	1380		
РМм-4-80(100) РМм-4-80(100)-ХП	1820		
РМм-5-80(100) РМм-5-80(100)-ХП	2260		
РМм-6-80(100) РМм-6-80(100)-ХП	2660		
РМм-7-80(100) РМм-7-80(100)-ХП	3160		
РМм-8-80(100) РМм-8-80(100)-ХП	3600		
РМм-9-80(100) РМм-9-80(100)-ХП	4040		
РМм-10-80(100) РМм-10-80(100)-ХП	4480		
Note: The height values are given for the frame with completely lowered bracket mounts.			

Table 17. List of РМм support frames for modules with 40 and 50 l cylinders meeting ГОСТ 949 ("-У")

Support frame code	Dimensions, mm		
	Length, L	Width, B	Height, H
РМм-2-40У(50У) РМм-2-40У(50У)-ХП	940	1420	500
РМм-3-40У(50У) РМм-3-40У(50У)-ХП	1380		
РМм-4-40У(50У) РМм-4-40У(50У)-ХП	1820		
РМм-5-40У(50У) РМм-5-40У(50У)-ХП	2260		
РМм-6-40У(50У) РМм-6-40У(50У)-ХП	2660		
РМм-7-40У(50У) РМм-7-40У(50У)-ХП	3160		
РМм-8-40У(50У) РМм-8-40У(50У)-ХП	3600		
РМм-9-40У(50У) РМм-9-40У(50У)-ХП	4040		
РМм-10-40У(50У) РМм-10-40У(50У)-ХП	4480		
Note: The height values are given for the frame with completely lowered bracket mounts.			

Structure of a support frame identification code:
РМм ХХ–ХХХ–ХХ
1 2 3 4
Where 1 is an abbreviated name of the support frame;
2 is number of modules in the support frame (2 to 10);
3 is module capacity, l;
4 is fixing clamp type:

- no identification – fixing clamp of Хм type;
- ХП – fixing clamp of floating type.

Example of ordering information: Support frame РМм-5-80-ХП

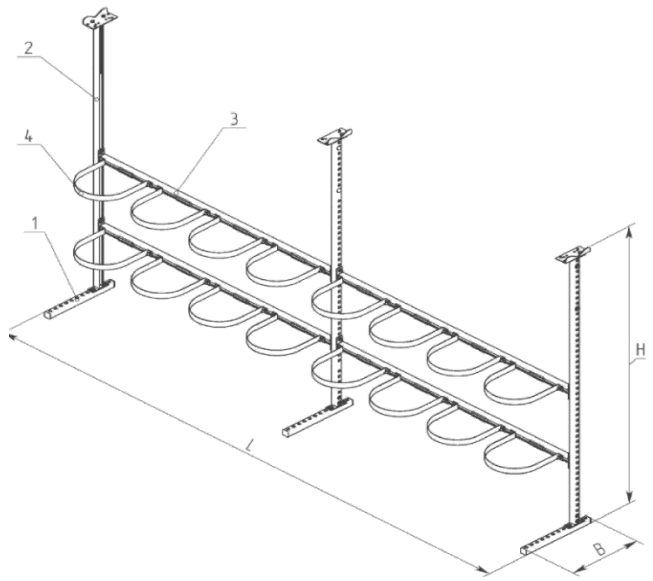


Fig. 33. General arrangement of the multi-cylinder support frame
1 – base;
2 – upright;
3 – cross bar;
4 – fixing clamp.

Table 18. List of PMAм support frames for modules 120-160 l

Support frame code	Dimensions, mm		
	Length, L	Length, L	Length, L
PMAм-2-120(140)-M	1133	2175	500
PMAм-3-120(140)-M	1633		
PMAм-4-120(140)-M	2133		
PMAм-5-120(140)-M	2633		
PMAм-6-120(140)-M	3133		
PMAм-7-120(140)-M	3693		
PMAм-8-120(140)-M	4193		
PMAм-9-120(140)-M	4693		
PMAм-10-120(140)-M	5193		
PMAм-2-160	1133	2585	
PMAм-3-160	1633		
PMAм-4-160	2133		
PMAм-5-160	2633		
PMAм-6-160	3133		
PMAм-7-160	3693		
PMAм-8-160	4193		
PMAм-9-160	4693		
PMAм-10-160	5193		
Note: The height values are given for the frame with completely lowered bracket mounts.			

Structure of a support frame identification code:
PMAм–XX–XX-X
1 2 3 4
Where 1 is an abbreviated name of the support frame;
2 is number of modules in the support frame (2 to 10);
3 is module capacity, l.
4 is identification code of cylinder design:

- no identification – cylinder meeting ТУ 1410-001-13055988-05;
- M – cylinder meeting ТУ 1413-011-18074387-2011;

Example of ordering information: Support frame PMAм-5-160

Frameless Installation of Modules

The following equipment is used for installation of a module or a group of modules without using a support frame:

- СКМм module wall mounting;
- fixing clamps (Хм, ХЖ, ХП);
- КМП module floor mounting.

Module Wall Mounting СКМм

СКМм module wall mounting is designed to fix a module or a group of modules on a wall or other sturdy vertical structure (Fig. 34).

СКМм is used for spare module storage or for module connection to a fire-extinguishing system without using the support stand.

One СКМм set can be used to install 1 to 10 modules with one fixing clamp per module. It is recommended to use two СКМм fixing clamps to install modules of more than 1 m height.

СКМм comprises:

- a beam of 40 mm height;
- Хм type fixing clamps for module fastening;
- Connecting elements to assemble fixing clamps with a mounting profile.

СКМм does not include components to mount the profile on the wall, these are to be selected based on the wall (structure) parameters. A maximum diameter of the mounting component is 16 mm.

There are five types of СКМм available, they differ in fixing clamp sizes:

- СКМм-219 is for У-labeled modules;
- СКМм-229 is for Л-labeled modules of 20 l capacity;
- СКМм-260 is for modules of 6 to 20 l capacity;
- СКМм-316 is for modules of 35 to 100 l capacity;
- СКМм-XXX is for modules of 120 and 140 l capacity;
- СКМм-400 is for modules of 160 l capacity.

СКМм wall mount is delivered knocked down. Table 19 contains a list and sizes of СКМм.

Table 19. СКМм list and sizes

СКМм type (n is number of modules)	L (length), mm										B (width), mm
	1	2	3	4	5	6	7	8	9	10	
СКМм-n-219	430	860	1290	1720	2150	2580	3010	3440	3870	4300	255
СКМм-n-229											262
СКМм-n-260											290
СКМм-n-316											365
СКМм-n-											
СКМм-n-400	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	417

Structure of a wall mounting identification code:
СКМм – X – XXX
1 2 3
Where 1 is name of the product;
2 is number of installed modules (1 to 10);
3 is fixing clamp diameter, mm.

Example of ordering information: Wall mount СКМм-1-316

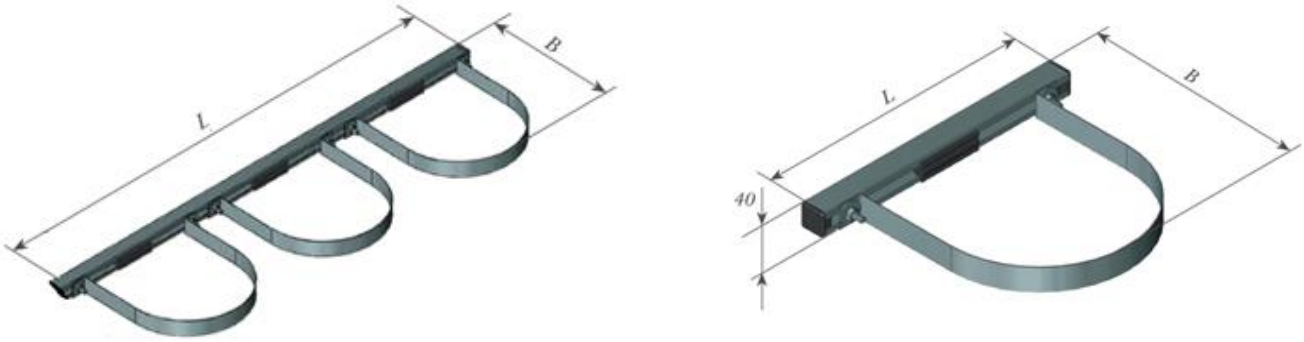


Fig. 33. General arrangement. СКМм wall mount

Clamp

The fixing clamp is designed to fasten the module to the support frame, wall or other load-bearing structure.

Three types of the fixing clamps are available:

- Хм type fixing clamp (Fig. 34);
- ХЖ type fixing clamp (Fig. 35);
- ХП type fixing clamp (Fig. 36).

A fixing clamp of a rigid type (ХЖ and Хм) allows no movement of the module. A fixing clamp of a floating type (ХП) allows some movement of the module in a vertical plane and is used in combination with УВТМ weighing device. The clamp types are available in several versions with diameters correspondent to module cylinders.

Appropriate fixing clamps are included (depending on the type) into the sets of support stands, support frames, and СКМм wall mountings, so they are not to be ordered separately.

In general, one fixing clamp is enough to install a module of up to 1 m height, and the height above 1 m requires two fixing clamps per module.

Seismic resistance of the modules fastened with ХЖ rigid type clamps makes 9 points on the MSK-64 scale.

Structure of a fixing clamp identification code:
ХЖ (ХП, Хм) – ХХХ
1 2
Where 1 is abbreviated name of the fixing clamp;
2 is module cylinder diameter, mm.

Example of ordering information: Fixing clamp of rigid type ХЖ-316

Table 20. Overall and mounting dimensions of the fixing clamps

Module type depending on the cylinder type and capacity	D, mm	L, mm			A, mm			L, mm		
		ХЖ	ХП	Х	ХЖ	ХП	Х	ХЖ	ХП	Х
МПГ (capacity: 20–50 l, У)	219	254	240	300	158	155	110,5	224	220	263
МПГ (capacity: 20 l, Л)	229	254	240	300	158	155	117,5	224	220	263
МПГ (capacity: 6–20 l, БК)	260	254	240	335	177	155	135,5	224	220	299
МПГ (capacity: 35–100 l, БК and Л)	316	310	300	396	203	203	152	280	280	360
МПГ (capacity: 120 and 140 l, М)	357	330	—	436	220	—	176	300	—	400
МПГ (capacity: 160 l, А)	400	310	—	463	247	—	189	280	—	427

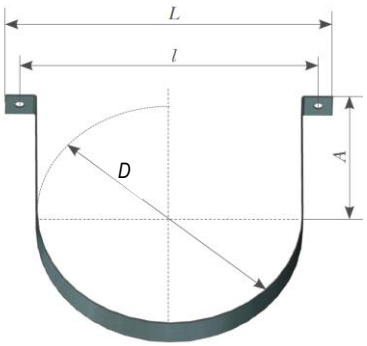


Fig. 34. Fixing clamp of type Хм

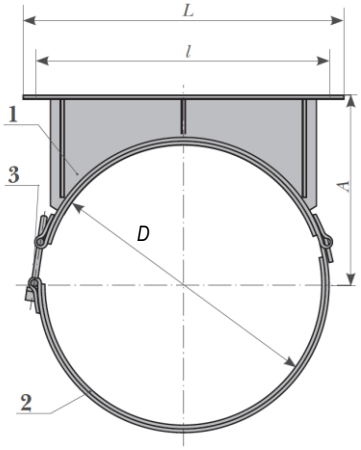


Fig. 35. Fixing clamp of rigid type ХЖ
1 – bracket;
2 – saddle; 3 – screw.

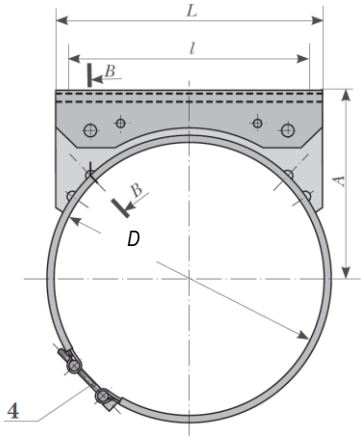


Fig. 36. Fixing clamp of floating type ХП
1 – bracket; 2 – axis;
3 – saddle; 4 – screw.

Module Floor Mounting КМП

КМП module floor mounting is used for individual and group installation of modules without the support stand. The mounting does not fit for У-labeled modules with a cylinder meeting ГОСТ 949. The mounting is used when the module cannot be mounted on a wall or when it is required to optimize robustness of the installation.

The module is attached to the floor using three brackets (Figs. 37 and 38).

There are two versions of the mounts:

- КМП for modules having capacity 35-160 l;
- КМП-01for modules having capacity of 20 l and below.

Ordering information: Module floor mounting КМП (КМП-01)

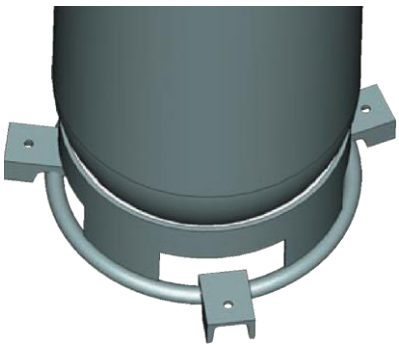


Fig. 37. Module floor mounting КМП

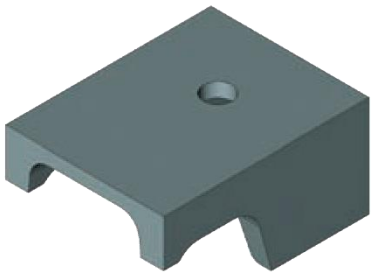


Fig. 38. General arrangement of one bracket (3 pcs in the set)

Gas Manifold

A gas manifold is designed for a single-row group connection of the modules to a station or main pipeline.

The manifolds differ in the following:

- structure type (with flanged connections labeled as КГО, with welded connections labeled as КГ);
- number of installed modules (2 to 10);
- nominal diameter of a nipple for module connection (24 or 40 mm);
- center-to-center distance between the nipples (430 or 500 mm).

Process plugs for nipples (M39x2 or M56x2) should be ordered to test the assembled pipelines.

The manifold is included in the support frame sets (it is attached to the stand frame) or used separately. For the separate use, the manifold shall be installed using ККС mounting.

Gas Manifold КГО

The КГО manifold consists of three main parts connected with flanges: a pipeline with nipples, a nipple for welding to a main pipeline and an end plug. The end plug has a nipple for СДГ (СДУ-М) pressure alarm installation. The flanged connections facilitate installation of the manifold.

General arrangement of КГО manifold is presented in Fig. 39. Table 21 contains КГО type manifold list and parameters.

Table 21. Specification of a single-row gas manifold КГО

Manifold code	Diameter, mm		Length, mm	Thread type	Working pressure, bar
	Outer	Inner			
КГО-2-24	50	42	1014	M39x2	150
КГО-3-24			1444		
КГО-4-24	68	58	1874		
КГО-5-24			2304		
КГО-6-24			2734		
КГО-2-40	83	71	1014	M56x2	60
КГО-3-40			1444		
КГО-4-40	95	80	1874		
КГО-5-40	114	98	2304		
КГО-6-40			2734		
КГО-2-40-500	83	71	1100		
КГО-3-40-500			1600		
КГО-4-40-500	95	80	2100		
КГО-5-40-500	114	98	2600		
КГО-6-40-500			3100		

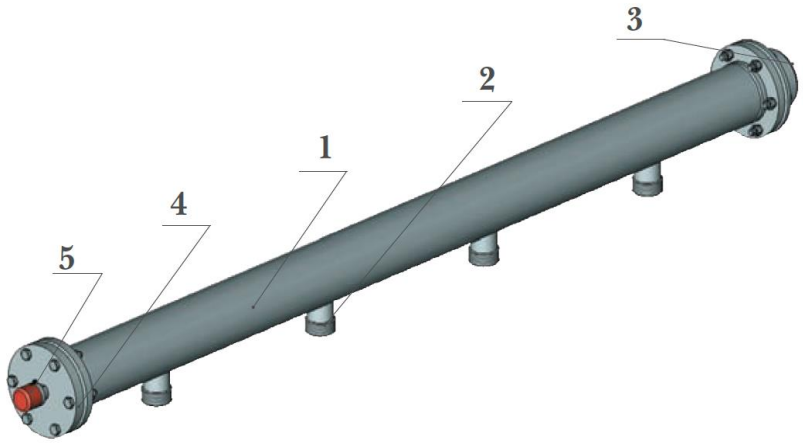


Fig. 39. General arrangement of manifold КГО
1 – manifold;
2 – nipple for high pressure hose;
3 – welded nipple;
4 – plug;
5 – pressure alarm (not included in КГО manifold set).

Structure of a gas manifold identification code:
КГО-Х-ХХ-ХХХ
1 2 3 4
Where 1 is name of the product;
2 is number of nipples for module connection (2 to 6);
3 is nominal diameter of a nipple for module connection (24 or 40 mm);
4 is center-to-center distance between the nipples:

- not indicated – 430 mm;
- 500 – 500 mm.

Example of ordering information: Gas manifold КГО-5-24

Gas Manifold КГ

The КГ manifold consists of two main parts: a pipeline with nipples and an end plug. The end plug has a nipple for a СДГ (СДУ-М) pressure alarm installation.

General arrangement of КГ manifold is presented in Fig. 40. Table 22 contains КГ type manifold list and parameters.

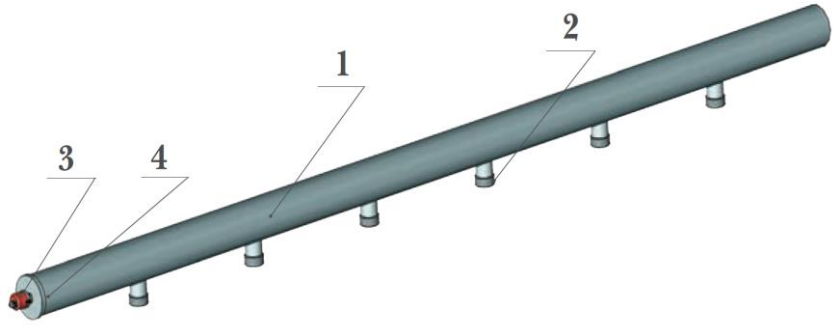


Fig. 40. General arrangement of КГ manifold
1 – manifold;
2 – nipple for high pressure hose;
3 – pressure alarm (not included in КГ manifold set);
4 – plug.

Table 22. Specification of a КГ single-row gas manifold

Manifold code	Diameter, mm		Length, mm	Thread type	Working pressure, bar
	Outer	Inner			
КГ-2-24	50	42	1250	M39x2	150
КГ-3-24			1680		
КГ-4-24	68	58	2110		
КГ-5-24			2540		
КГ-6-24			2970		
КГ-7-24	76	64	3485		
КГ-8-24	83	71	3925		
КГ-9-24			4365		
КГ-10-24	89	77	4805		
КГ-2-40	83	71	1250	M56x2	
КГ-3-40			1680		
КГ-4-40	95	79	2110		
КГ-5-40	114	98	2540		
КГ-6-40			2970		
КГ-7-40	121	109	3485		
КГ-8-40	133	119	3925		
КГ-9-40			4365		
КГ-10-40	140	124	4805		
КГ-2-40-500	83	71	1400		
КГ-3-40-500			1920		
КГ-4-40-500	95	79	2400		
КГ-5-40-500	114	98	2920		
КГ-6-40-500			3400		
КГ-7-40-500	121	109	4000		
КГ-8-40-500	133	119	4500		
КГ-9-40-500			5000		
КГ-10-40-500	140	124	5500		

Structure of a gas manifold identification code:
КГ-Х-ХХ-ХХХ
1 2 3 4
Where 1 is name of the product;
2 is number of nipples for module connection;
3 is nominal diameter of nipples for module connection (24 or 40 mm);
4 is center-to-center distance between the nipples:

- not indicated – 430 mm;
- 500 – 500 mm.

Example of ordering information: Gas manifold КГ-5-24

Manifold Wall Mounting KKC

The KKC manifold wall mounting is available in two versions different in number of the connected modules:

- KKC 2-6 for connection of 2 to 6 fire-extinguishing modules. Supply scope of KKC 2-6 includes two brackets.
- KKC 7-10 for connection of 7 to 10 fire-extinguishing modules. Supply scope of KKC 7-10 includes three brackets.

The manifold shall be installed taking into consideration the requirements of the applicable operation manuals (manifold positioning height, positioning of manifold nipples relative to the outlets of the modules accounting for the acceptable bend radius of the high pressure hoses specified for installation and operation).

General arrangement of the KKC manifold wall mounting is given in Fig. 41.

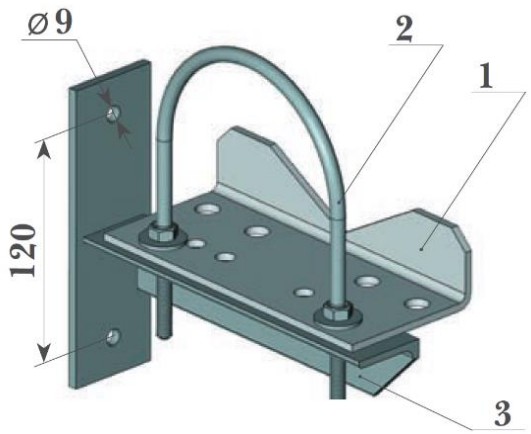


Fig. 41. General arrangement of the manifold wall mounting KKC
1 – saddle;
2 – yoke (not included in manifold set);
3 – base.

Structure of a manifold wall mounting identification code:
KKC - X-X
1 2
Where 1 is name of the product;
2 is number of fire-extinguishing modules (2-6 or 7-10).

Example of ordering information: Manifold wall mounting KKC-2-6

Non-Return Valve KO

The non-return valve is designed for the following:

- to prevent migration of GFEA from spare fire-extinguishing modules to empty modules of the main set after actuation;
- to prevent release of GFEA from the spare fire-extinguishing modules to the fire-extinguishing station during a repair of the installation when the main set of modules is removed;
- to seal pipelines and equipment at special circumstances (at testing, purging, redundant fire-extinguishing stations, in offshore installations, etc.)

There are two types of the non-return valves:

- KO-24(40) manifold non-return valve, individual for each fire-extinguishing module;
- KO-150-DN mainline non-return valve installed on a main pipeline (manifold).

The valve is designed for working pressure of 150 bar. The valve is a gas-tight device. The non-return valve operates in any spatial position. At the site, the non-return valve is installed by nipple welding (in case of a mainline non-return valve) or using a threaded connection (in case of a manifold non-return valve). When installing the valve, observe a direction of GFEA supply indicated on the device.

Manifold Non-Return Valve

The manifold non-return valve has threaded connections and is installed between the РВД hose and the nipple of the gas manifold КГО (КГ).

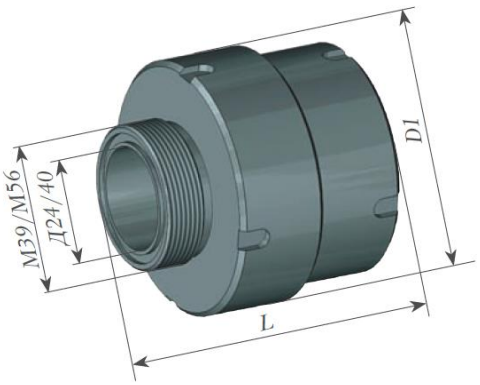
The valves are available in two versions corresponding to a nominal diameter of module release device: 24 and 40 mm for modules. Tightness of the connection between the valve and manifold, valve and HP hose is ensured by rubber rings included in supply scope of the non-return valve.

General arrangement and specification of the non-return valve are presented in Fig. 42 and Table 23.

Table 23. Specification of the manifold non-return valve

Identification code of the valve	Nominal diameter, mm	Dimensions, mm			Working pressure, bar	Weight, kg, maximum
		D1	L	M		
KO-24	24	79	68	M39x2	150	2
KO-40	40	108	83	M56x2		3

Structure of an identification code of the manifold non-return valve:
KO-XX
1 2
Where 1 is abbreviated name of the valve;
2 is nominal diameter, mm.



Example of ordering information:
Manifold non-return valve KO-40

Fig. 42. General arrangement of manifold non-return valve of DN24, DN40

Mainline Non-Return Valve

The mainline non-return valve has welded nipples and is installed on pipelines of fire-extinguishing systems at positions specified by design drawings.

The valve is available in several versions with different nominal diameters. The valve is a disassemblable device with threaded (DN up to 50 mm inclusive) or flanged connections (DN above 50 mm).

General arrangement and specification of the mainline non-return valves are presented in Figs. 43, 44, and Table 28.

Table 24. Specification of the mainline non-return valve

Identification code of the valve	Nominal diameter, mm	Dimensions, mm			Working pressure, bar	Weight, kg, maximum	Minimum opening pressure differential, bar
		D	D1	L			
KO-150-25	25	32	72	172	150	2.3	4
KO-150-32	32	40	78	177		2.9	3
KO-150-40	40	50	88	176		4.8	2
KO-150-50	50	62	102	184		6.6	2
KO-150-80	80	94	214	198		17.5	1.5
KO-150-100	100	114	232	198		26.3	1
KO-80-150	150	164	325	286	80	38	1

Structure of an identification code of the mainline non-return valve:
KO-XXX-XX
1 2 3
Where 1 is abbreviated name of the valve;
2 is working pressure, bar;
3 is nominal diameter, mm.

Example of ordering information: Mainline non-return valve KO-150-50

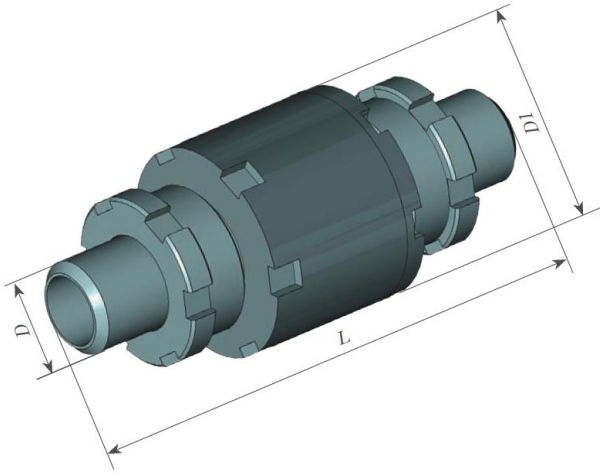


Fig. 43. General arrangement of the mainline non-return valve of DN25, DN32, DN40, and DN50

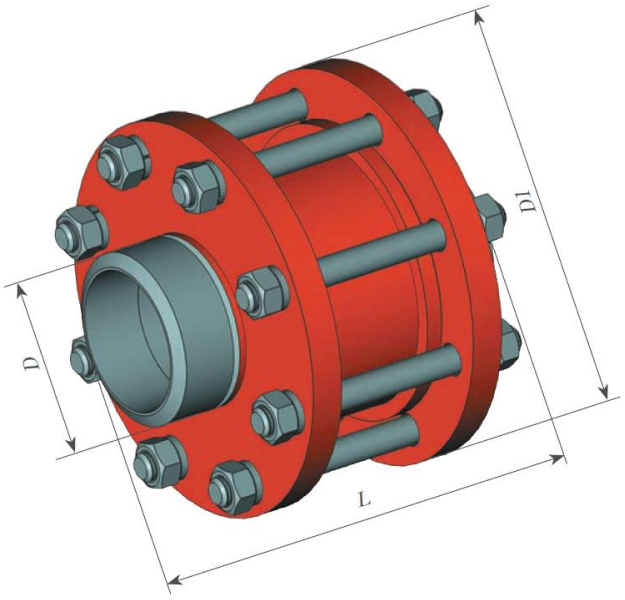


Fig. 44. General arrangement of the mainline non-return valve of DN80, DN100, and DN150

Pneumatic Actuation Manifold КПП2Э

The pneumatic actuation manifold is used for module group installation with combined solenoid and pneumatic actuation.

The pneumatic actuation manifold is designed to receive a pneumatic actuation pulse from "-ЭР" booster module with an electrical activation and to transmit the pulse to "-П" module with pneumatic actuation.

The pneumatic actuation manifold provides simultaneous actuation of all the pneumatic actuation modules in a group. The group can include 1 to 9 pneumatic actuation modules (beside the booster module).

The КПП2Э manifold consists of a high pressure hoses (РВД), connection nipples and a drain valve which are assembled together and installed at the place of fire-extinguishing module installation.

General arrangement of КПП2Э manifold is presented in Figs. 45 and 46. Supply scope of various manifold versions is given in Table 25.

Table 25. Supply scope of pneumatic actuation manifold КПП2Э

Item No.	Product identification	Manifold code								
		КПП2Э-2	КПП2Э-3	КПП2Э-4	КПП2Э-5	КПП2Э-6	КПП2Э-7	КПП2Э-8	КПП2Э-9	КПП2Э-10
Number of products, pcs										
1	Drain valve	1	1	1	1	1	1	1	1	1
2	РВД08-21,5-650 (М16х1,5)	-	1	2	3	4	5	6	7	8
3	Nipple КПП	-	1	2	3	4	6	7	8	9
4	Nipple КПП G1/2	-	-	-	-	-	1	1	1	1
5	РВД08-21,5-450 (М16х1,5)	-	-	-	-	-	1	1	1	1
6	РВД08-21,5-850 (М16х1,5)	1	1	1	1	1	1	1	1	1

Structure of an identification code of the pneumatic actuation manifold:
КПП2Э - Х
1 2
Where 1 is manifold code;
2 is total number of modules in a group.

Example of ordering information: Pneumatic actuation manifold КПП2Э-5

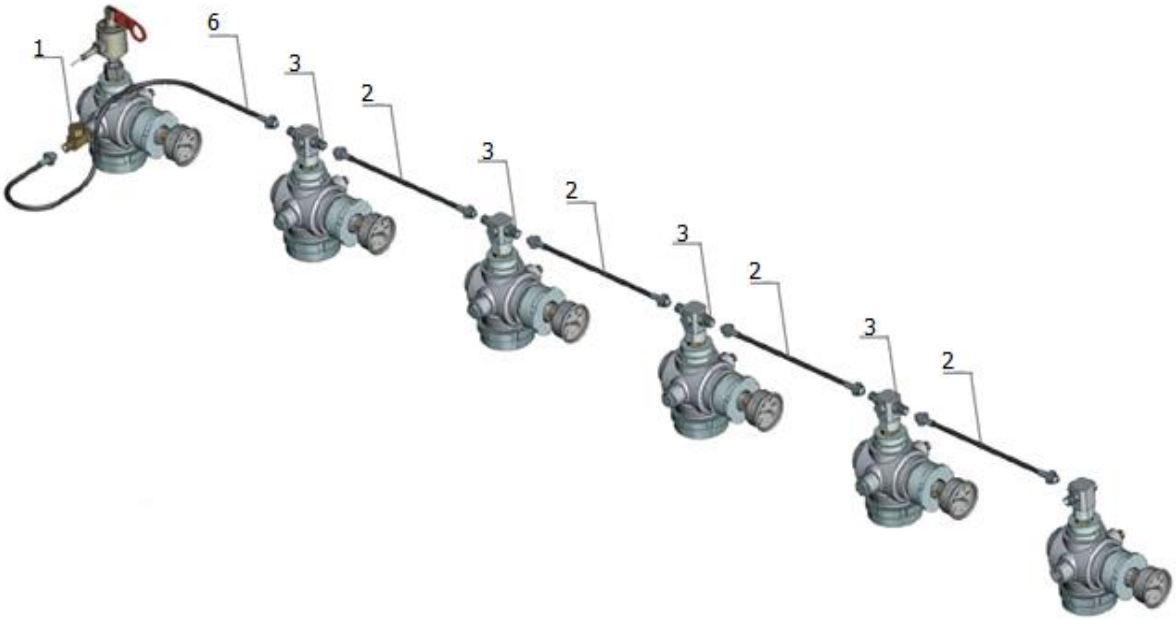


Fig. 45. Example of the КПП2Э manifold installation for a group of no more than 6 modules.
Numbering of the items according to Table 29

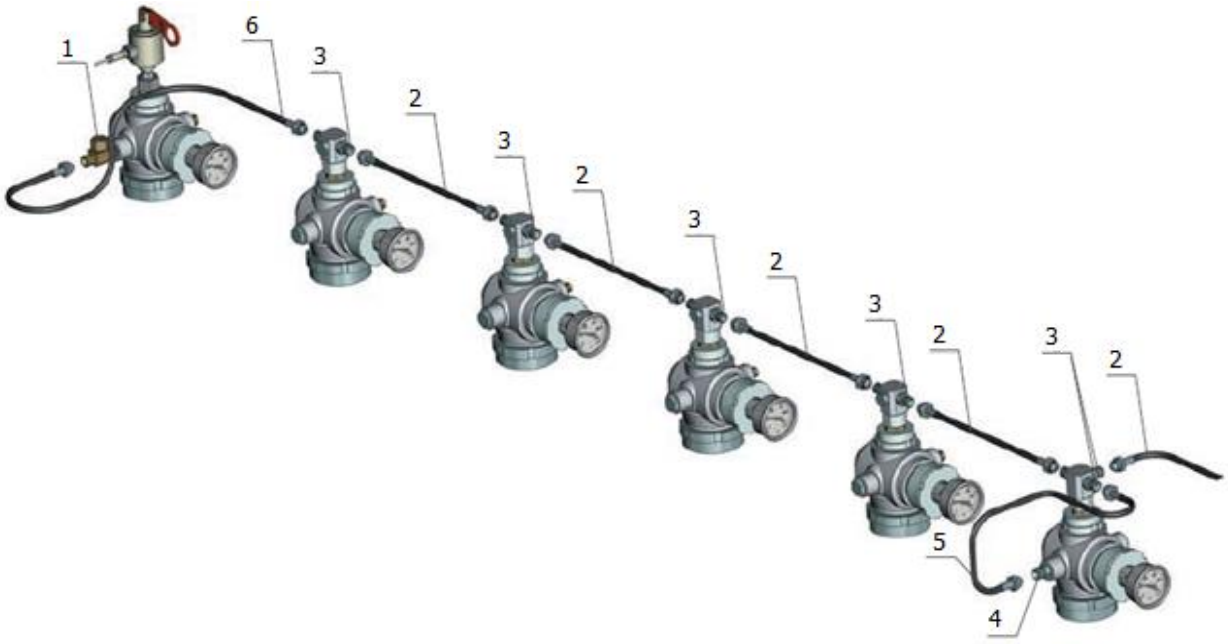


Fig. 46. Example of the КПП2Э manifold installation for a group of more than 6 modules (7 to 10 pcs).
Numbering of the items according to Table 29

Actuators

The actuators provide actuation of a module and/or distribution device in an automated and manual mode. This section describes devices of an automated and manual actuation, which are not assembled with the products at the factory but included (when ordered separately) in supply scope of the products and installed by an installation contractor at the site.

Such actuators include the following devices:

- actuator ПУО-2;
- manual actuation device УРП-7;
- group actuation switch КГП-Р;
- single actuation switch КОП-Р.

The products with solenoid or pneumatic actuation (e.g., type 2 modules) have the correspondent device within a release device of the module. Parameters of the solenoid and pneumatic actuator are described in "Type of module release device" and "КПП2Э pneumatic actuation manifold" sections.

Actuator ПУО-2

The ПУО-2 actuator (Fig. 47) is designed for electrical actuation of a distribution device РУ (УРУ) and a module with a burst disk.

The ПУО-2 actuator is a miniature gas generator. When the generator is triggered, the generated gases bring high pressure to the burst disk of the module release device or the distribution device РУ (УРУ).

ПУО-2 has high reliability of actuation making 0,999 during 17 years of service life. ПУО-2 has two independent triggering glow filaments insulated from a body.

A triggering pulse to the ПУО-2 actuator is generated by Gamma-01 monitoring and control device or other instruments and devices serving for triggering and control. A control device should be selected taking into account the need for provision of an actuation pulse with consideration of cable length.

Basic electrical ratings of the ПУО-2 actuators:

- resistance of a bridge (each of 2 bridges): 5 to 7 Ohm;
- insulation resistance at normal environment conditions: at least 2 MOhm;
- dielectric breakdown resistance: at least (500 ± 25) V during 1 minute;
- fail-safe actuating current: 0.7–2.5 A per each bridge or 1.4–5.0 A for both bridges connected in parallel at rectangular pulse duration of at least 0.1 s within temperature range of ±60 °C;
- the device shall not be actuated at passage of current not exceeding 0.1 A across every bridge during 5 minutes;
- wetting current of each bridge shall not exceed 0.003 A at continuous control of the device circuits.

ПУО-2 is installed into a body of a module release device or a distribution device and connected to a socket adapter (intermediate terminal block), installed at the upper enclosure of the module or the distribution device.

ПУО-2 is supplied in a sealed plastic container. ПУО-2 is not included in the supply scope of a module or a distribution device and ordered separately.

The module supply scope includes a cable harness with type 2РМ14 socket connector. When appropriate (in case of loss or breakage), the harness can be ordered separately.

Ordering information: Actuator ПУО-2
Ordering information: Cable harness for ПУО-2

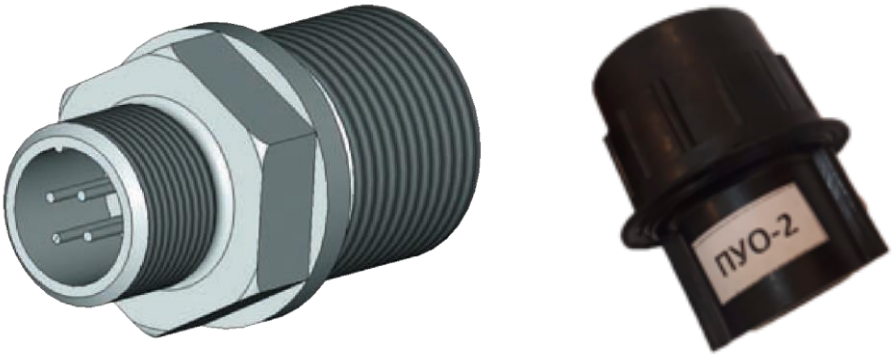


Fig. 47. General arrangement of ПУО-2 and view of the transportation plastic container

ПУО-2 Dummy Initiator Cartridge

The ПУО-2 dummy initiator cartridge is used as a load instead of the ПУО-2 actuator at commissioning and testing. The dummy is connected to the actuation circuit of the instrument and manual actuator circuit. There are two versions of ПУО-2 dummies available:

- ПУО-2 dummy with LED indication (for ППКУОП Gamma-01 only);
- versatile ПУО-2 dummy with fuse links (safety cutoff).

The ПУО-2 dummy with LED indication has bi-colored light-emitting diode for visual indication of triggering pulse detection. LED of any color is on during the triggering pulse feeding thus indicating detection of the pulse. This version of the ПУО-2 dummy initiator cartridge can be recommended for commissioning works.

Direct-current resistance of the dummy makes 6.8 Ohm.

General arrangement and wiring diagram are presented in Figs. 48 and 49.

Ordering information: ПУО-2 dummy initiator cartridge with LED

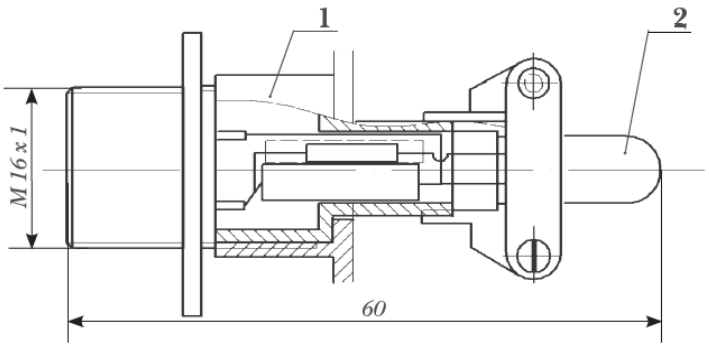


Fig. 48. ПУО-2 dummy with LED
1 – connector 2РМ14БПН4Ш1В1;
2 – bi-color LED.

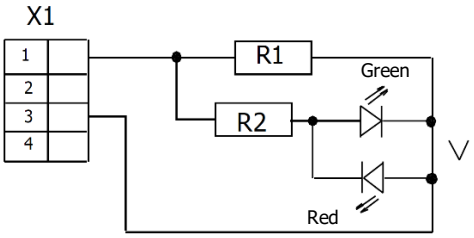


Fig. 49. Wiring diagram of the ПУО-2 dummy with LED

The versatile ПУО-2 LED has fuse links (safety cutoffs), which blow out at triggering pulse to ensuring operation of the ПУО-2 actuator. Detection of the triggering pulse can be proved by blowing out of the fuse link (safety cutoff), which can be detected automatically by the control instrument (when this option is available), or by measuring the fuse link resistance. This version of ПУО-2 dummy initiator cartridge can be recommended for testing of a fire-extinguishing system as well as for a trial running of the system.

Direct-current resistance of the dummy makes 6.8 Ohm.

General arrangement and wiring diagram are presented in Figs. 50 and 51.

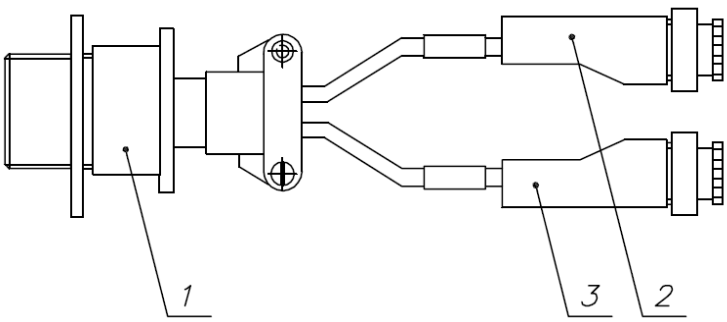
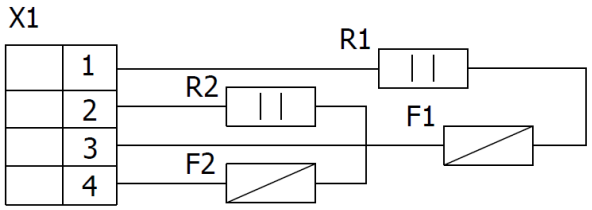


Fig. 50. Versatile ПУО-2 dummy
1 – connector 2РМ14БПН4Ш1В1;
2 – Actuator ПУО-2 dummy based on ВП1-1 0.5A fuse link; "Нить 1" (Filament 1) labeling;
3 – Actuator ПУО-2 dummy based on ВП1-1 0.5A fuse link; "Нить 2" (Filament 2) labeling.



R1 6.8 Ohm, F1 ВП1-1 0,5А – filament 1
R2 6.8 Ohm, F2 ВП1-1 0,5А – filament 2

Fig. 51. Wiring diagram of the versatile ПУО-2 dummy

Ordering information: Versatile dummy initiator cartridge ПУО-2

When ordering the versatile ПУО-2 dummy initiator cartridge, specified number of additional fuse links can be supplied.

Ordering information: ВП1-1 0,5А fuse link for ПУО-2 dummy

Manual Actuation Device УРП-7

Manual actuation device УРП-7 (Fig. 52) is designed for manual triggering of actuator ПУО-2 installed in the type 1 module (with a burst disk) and in the distribution device РУ (УРУ).

The manual actuation device is an independent pyrotechnical source of electrical pulse required for actuation of ПУО-2. УРП-7 is switched on by an embedded mechanical initiator. To initiate УРП-7 action, it is required to remove a cap (2), and pull out the cord (5) using the ring (6). УРП-7 is a one-shot device, and it is to be restored after each use.

УРП-7 connected in parallel provides simultaneous actuation of up to 6 ПУО-2 (up to 6 modules).

УРП-7 can be installed directly on the module and the distribution device or in the immediate vicinity of them.

УРП-7 is not included in the supply scope of a module and РУ, and is ordered separately.

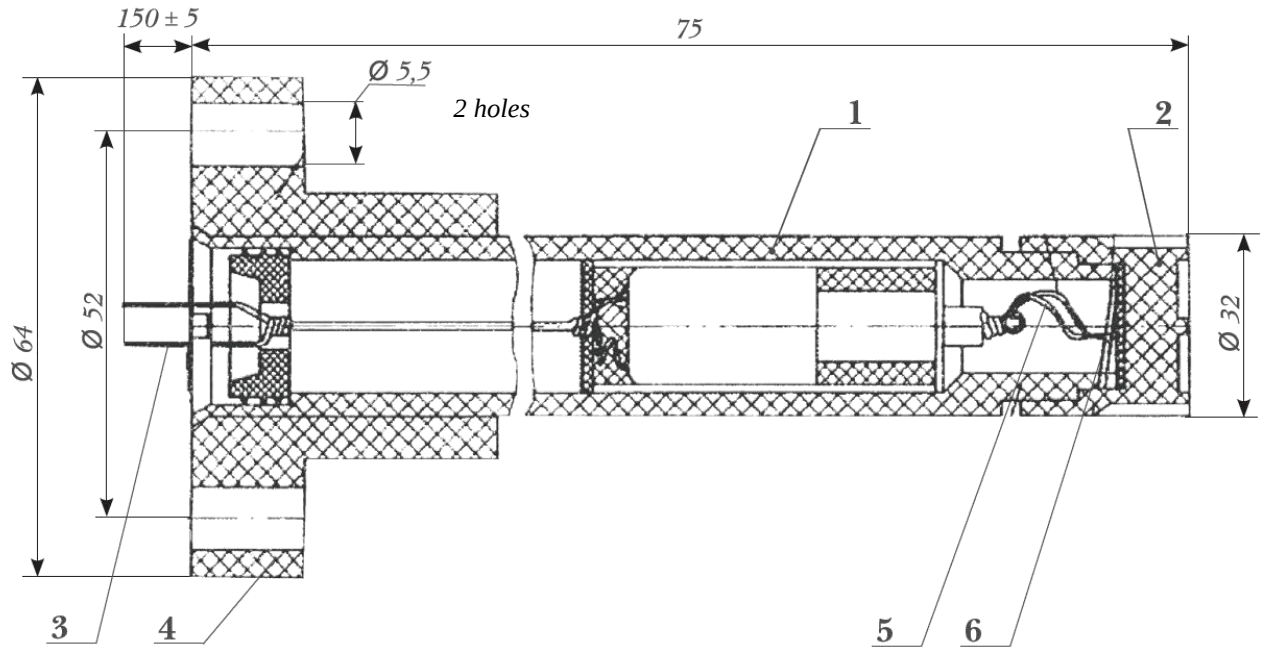


Fig. 52. Manual actuation device УРП-7
1 – body; 2 – cap; 3 – wire; 4 – base; 5 – cord; 6 – ring.

УРП-7 specification:

- Minimum electrical current intensity in the pulse at load of (4.0 ± 0.1) Ohm: at least 2 A;
  - time required to attain maximum current value: at least 1 s;
  - pulse amplitude: at least 9 V.
- Pulse duration: 1 s.
- Insulation resistance between outputs and a body at tester voltage not exceeding 100 V: 10 kOhm minimum.
- УРП-7 is suitable for operation in the following environment:
  - relative air humidity of up to 98% and temperature of 25 °C;
  - within the temperature range of ±60 °C.

Ordering information: Manual actuation device УРП-7

Group Actuation Switch КГП-Р

Group actuation switch КГП-Р (Fig. 53) is designed for a local manual actuation of a group of type 1 modules (with a burst disk). One group can include up to 6 modules.

КГП-Р has a body with a flap cover. Inside the body there are two УРП-7 devices (main and standby) and a rotary wafer switch allowing to select number of simultaneously actuated modules (1 to 6).

External connection of КГП-Р with the load is made using 2РМ27Б24Г1В1 socket of the connector (4). The socket is included in the switch scope. The cable harness is not included in the supply scope.

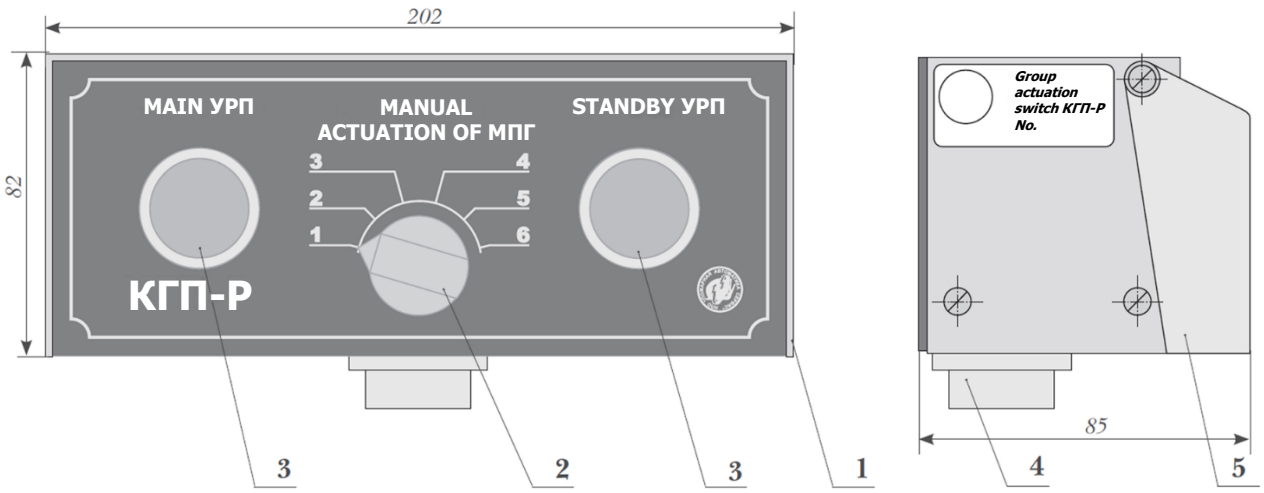


Fig. 53. Switch КГП-Р
1 – body; 2 – switch; 3 – УРП-7; 4 – connector; 5 – flap cover.

Specification:

- КГП-Р is resistant to environment impacts and remains operable:
  - within the temperature range of ±50 °C;
  - at relative air humidity of 100% at temperature of +50 °C.
- КГП-Р enclosure is made in compliance with ГОСТ 14254-96 and has IP44 degree of protection.
- КГП-Р dimensions: 212x97x95 mm.
- Weight: 1.1 kg.

Ordering information: Group actuation switch КГП-Р

Cable Harness КГП-Р

КГП-Р cable harness (Fig. 54) is designed to connect the КГП-Р group actuation switch to the modules with a burst disk and actuation from the ПУО-2 devices. The cable harness can be made by an installation contractor following the Rules of Harness Making described in the operation manual of КГП-Р ПАС 054.00.000 РЭ.

Table 26. List of cable harness with applications

Product identification	Application
Жгут КГП-Р-2П	for a group of 2 modules
Жгут КГП-Р-3П	for a group of 3 modules
Жгут КГП-Р-4П	for a group of 4 modules
Жгут КГП-Р-5П	for a group of 5 modules
Жгут КГП-Р-6П	for a group of 6 modules

Fig. 54. Cable harness КГП-Р

Single Actuation Switch КОП-Р

Single actuation switch КОП-Р (Fig. 55) is designed for local manual selective actuation of distribution devices РУ. From 1 to 12 distribution devices can be connected to single actuation switch КОП-Р.

КОП-Р has a body with a flap cover. Inside the body there are two УРП-7 devices (main and standby) and a rotary wafer switch allowing to select number of actuated РУ (1 to 12).

External connection of КОП-Р with the load is made using 2РМ27Б24Г1В1 socket of the connector (4). The socket is included in the switch scope. The cable harness is not included in the supply scope.

КОП-Р is installed using four М4 screws. КОП-Р is located near the РУ group.

Ordering information: Single actuation switch КОП-Р

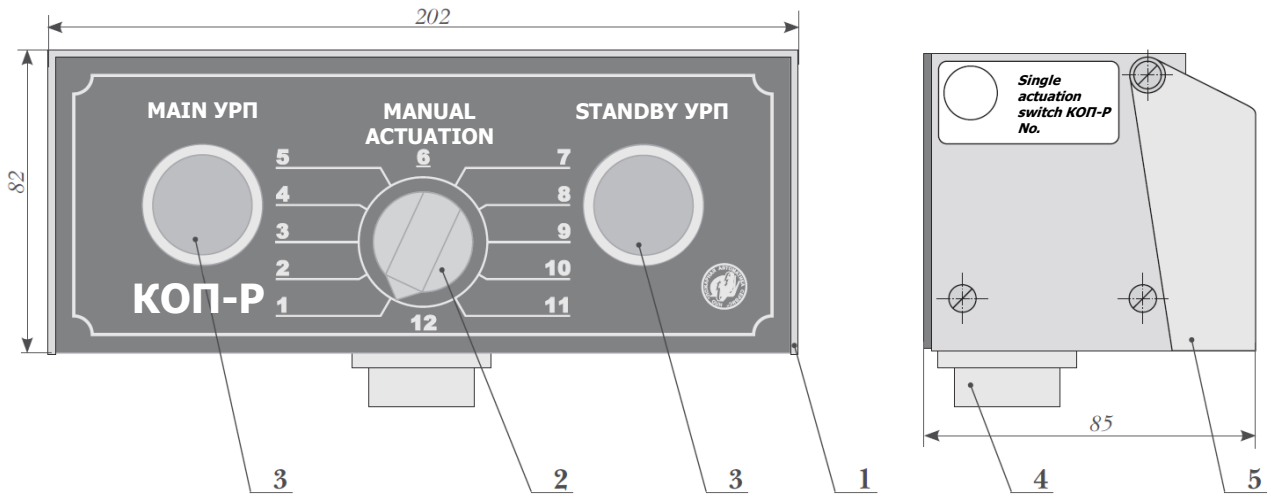


Fig. 55. General arrangement of КОП-Р
1 – body; 2 – rotary wafer switch; 3 – УРП-7; 4 – connector; 5 – flap cover.

Weighing Device

The weighing device is designed for an automated weight monitoring (leakage monitoring) of GFEA in a form of liquefied gases without a propellant gas (carbon dioxide, Freon 23) in the modules in the course of operation.

There are two types of the weighing devices available:

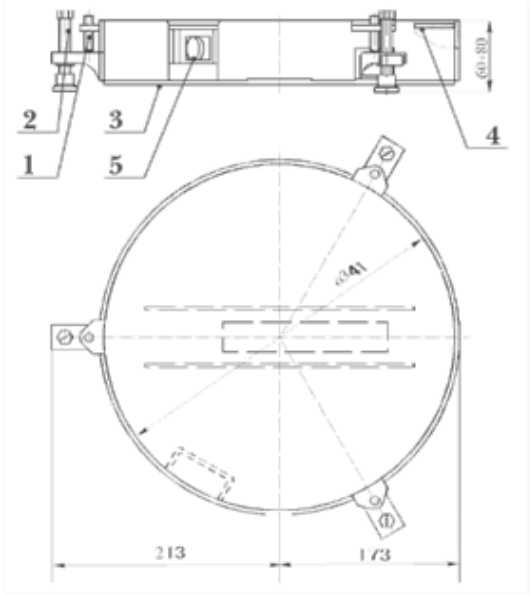
- УВТМ load-cell weighing device (standard version);
- КСКМ weight monitoring kit (explosion-proof version).

УВТМ Load-Cell Weighing Device

УВТМ weighing device is designed for an automated weight monitoring (leakage monitoring) of GFEA in a form of liquefied gases without a propellant gas (carbon dioxide, Freon 23) in the modules in the course of operation.

The weighing device comprises a set of weight controller ВК-2.1, 1 to 8 load-cell weighing platforms (ПВТ) and a power supply unit (with a battery). Number of the ПВТ correspond to the number of gas fire-extinguishing modules installed in a group. Layout of the device component connections is given in Fig. 56.

Load-cell weighing platform ПВТ is designed for installation of a module on it and consists of a base (3), support (4), load cell (3), adjustment screws (2), locking screws (1), and a connection cable (5) (see Fig. 57). The locking screws (1) are used to block the ПВТ load cell and transfer the platform to inactive position (for transportation, storage, etc.).



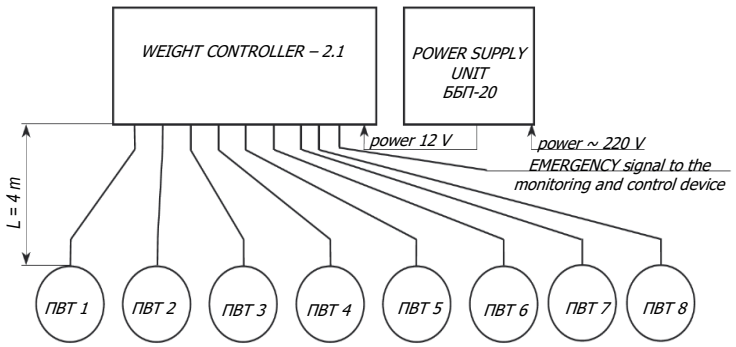


Fig. 56. Layout

Fig. 57. Load-cell weighing platform ПВТ
1 – locking screw; 2 – adjustment screws; 3 – base;
4 – support; 5 – connecting cable.

Weight controller ВК 2.1 is an electronic device converting a signal from the ПВТ load cell into the data signals on a display. The controller generates Emergency sound and light signal and opens a relay dry contact when the GFEA weight in the module is below the threshold value. Operation and calibration of the weight controller are carried out following the operation manual of the device.

When operating, the device sequentially polls ПВТ and, when the monitored weight is below the set threshold value, the device generates the Emergency signal. Weight controller ВК-2.1 actuates light and sound alarm and opens the relay dry contact.

Installation, connection, setting and operation of the ПВТ platform with weight controller ВК-2.1 are performed following the applicable operation manuals. Length of a cable connecting ПВТ with the controller makes 6 m. Controller ВК-2.1 is designed for connection of up to 8 ПВТ platforms, which positioning relative to controller is restricted by the connecting cable length. The cables are connected to controller ВК-2.1 via cable glands, maximum diameter of the connected cables shall not exceed 6 mm.

Specification:

- ПВТ weighting capacity, kg: 300.
- ББП-20 power voltage, V: 220 (AC mains).
- ВК-2.1 controller power voltage, V: 7.5 to 35, DC.
- ВК-2.1 controller consumed current, A, not exceeding 0.25.
- Number of connected ПВТ platforms, pcs: 1 to 8.
- A degree of protection ensured by the enclosure according to ГОСТ 14254-96:
  - ПВТ: IP65;
  - ВК-2.1: IP56;
  - ББП-20: NA.
- Weight of components, kg:
  - ПВТ weight, kg: 7.3;
  - ВК-2.1 weight, kg: 0.4;
  - ББП-20 weight, kg: 1.8.

The weighing device is supplied as a set. Versions of УВТМ are different in number of the weight platforms in the set as specified in Table 27.

Table 27. Components of УВТМ load-cell weighing device

Name of the component	Number of pcs (set)							
	УВТМ-1	**УВТМ-2**	**УВТМ-3**	**УВТМ-4**	**УВТМ-5**	**УВТМ-6**	**УВТМ-7**	**УВТМ-8**
Load-cell weighing platform ПВТ	1	2	3	4	5	6	7	8
Weight controller ВК-2.1	1	1	1	1	1	1	1	1
Power supply unit ББП-20 *	1	1	1	1	1	1	1	1
Battery 12 V, 7 A·h *	1	1	1	1	1	1	1	1
Cable ties **	set	set	set	set	set	set	set	set
Note: * Standard set. Upon request, the ББП-20 with a battery can be excluded or replaced with other power supply unit. ** The ties are to be used for installation into the support stand.								

Structure of the device code for ordering:
УВТМ-Х
1 2
Where 1 is weighing device name;
2 is number of weighing platforms in a set (1 to 8).

Example of ordering information: Weighing device УВТМ-5

КСКМ weight monitoring kit

КСКМ weight monitoring kit is a set of equipment for sites where explosion protection is required. The kit includes the following:

- СКМ-4 weight control system manufactured by ООО Tekhnologiya (Moscow) www.tdevices.ru;
- a set of ties to fasten the cables to the stand;
- transportation package.

Configuration of СКМ-4 equipment manufactured by ООО Tekhnologiya (Moscow) is given in Table 28.

Table 28. Configuration of СКМ-4 equipment

Name	Number, pcs	Explosion-proof marking
Weight controller ВК-3.4 (4 channels)	1	0ExiaIICT6
Weight platform ПТВ-ВЗ-300 (D340) (4 m cable)	1–4 *	0ExiaIICT6
Power supply unit БИ-ИП-8С	1	ExiaIICT
Intrinsically safe barrier БИБ-02-24С	1	ExiaIICT
Note: * Number of weighing platforms: 1 to 4.		

Specification:

- Weighing capacity of the platform: 300 kg.
- Platform diameter: 340 mm.
- Degree of enclosure protection:
  - platform: IP 66;
  - controller: IP 44.

For ease of use, ООО «НПО ПАС» has made kits КСКМ - 1…4 with a number of connected platforms of 1 to 4. The kit is placed in a single transportation package along with design documents.

The offered kits are described in Table 29.

Table 29. Kits for GFEA control

Name	Number, pcs				
	СКМ-4	Weighing platform *	Power supply unit	Intrinsically safe barrier	Controller
КСКМ - 1	1	1	1	1	1
КСКМ - 2	1	2	1	1	1
КСКМ - 3	1	3	1	1	1
КСКМ - 4	1	4	1	1	1
Cable ties **		set	set	set	set
Transportation package		set	set	set	set
Note: * Cable length is 4 m. ** Used to fasten the cables in the support stands.					

Overall view of СКМ-4 equipment is presented in Figs. 58, 59, and 60.

Fig. 68. Controller

Fig. 59. Load-cell platform

Fig. 60. Power supply unit

For detailed information on СКМ-4 weight control system see: www.tdevices.ru.

Nozzle

The nozzle is designed to form a flow of GFEA at the outlet of the distribution pipeline in a particular way.

There are various types of nozzles available:

- НГПд(м) ceiling-mounted nozzle – for liquefied GFEA with or without the propellant gas;
- НФ gas nozzle – for FK-5-1-12 GFEA;
- НГПФд ceiling-mounted nozzle with a filter – for liquefied GFEA for hole diameter less than 3 mm.
- НГЛд local extinguishing nozzle;

All the nozzles have female thread. The nozzle is installed by screwing it on a threaded end of a bushing with a counter nut (Fig. 62) (or on a pipe with an appropriate threading) using a packing material (e.g., ФУМ strip). To ensure secure fastening of the nozzle, tighten the counter nut at the bushing. For pipeline testing, install a plug instead of the nozzle.

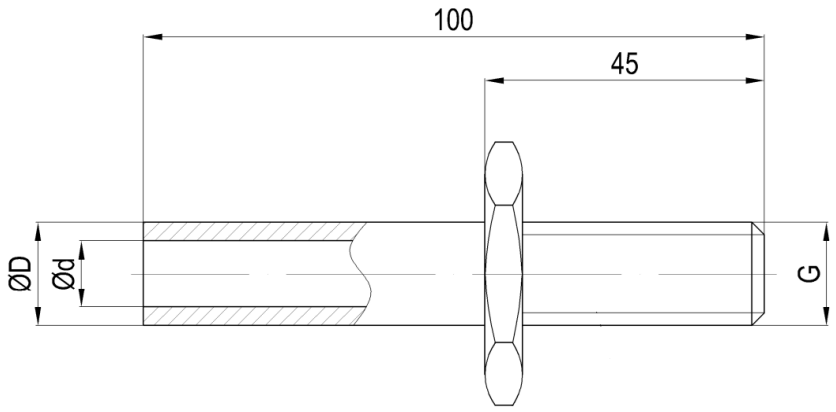


Fig. 61. A plug for a nozzle with a counter nut

Table 30. The overall and connecting dimensions of a plug for a nozzle with a counter nut

G	D, мм	d, мм
1/2-A	21	15
5/8-A	23	17
3/4-A	27	19
1-A	34	26
1 1/4-A	42	34
1 1/2-A	48	40
2-A	60	50

Example of ordering information: A plug for a nozzle with G1/2" counter nut

НГП Ceiling-Mounted Nozzle

НГП nozzle (Fig. 62) is available with imperial (НГПд) and metric (НГПм) thread. Nozzle flow rate: 0.7. Working pressure, bar: 150.

The nozzle is made of steel 20, of stainless steel and brass.

Specification of nozzles are given in Tables 31, 32 and 33.

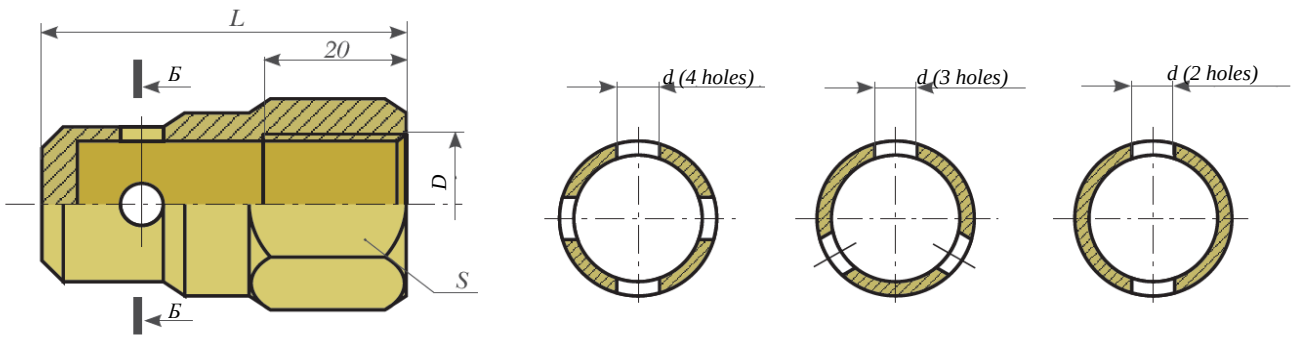


Fig. 62. НГП ceiling-mounted nozzle

Structure of the nozzle coding for ordering:
XXX(x) X.X-X,X-XX
1 2 3 4 5
Where 1 is name of the nozzle;
2 is imperial (д) or metric (м) thread;
3 is nozzle code (see Tables 33 and 34);
4 is diameter of nozzle holes, mm;
5 is identification code of a nozzle material.

Example of ordering information: Nozzle НГПд 3.1-10.0-01

Table 31. НГПд specification

Code	DN, mm	D	L, mm	Maximum diameter of holes, d, mm	$\Sigma F_{отв}$, мм^2	No. of holes	Radius of liquefied GFEA spraying, m	S, mm	Type and size of a bushing and a plug for a nozzle with a counter nut
$НГП_д$ 8.1	12	G 3/8	49	5.5	95	4	3.0	24	G $^3/_8$
$НГП_д$ 8.2				6.0	85	3			
$НГП_д$ 8.3				8.0	101	2			
$НГП_д$ 8.4				10.0	79	1			
$НГП_д$ 1.1	16	G 1/2	53	7.5	177	4	3.5	27	G $^1/_2$
$НГП_д$ 1.2				8.0	151	3			
$НГП_д$ 1.3				10.0	157	2			
$НГП_д$ 1.4				12.0	113	1			
$НГП_д$ 7.1	18	G 5/8	60	8.5	227	4	4.0	27	G $^5/_8$
$НГП_д$ 7.2				9.0	191	3			
$НГП_д$ 7.3				11.0	190	2			
$НГП_д$ 2.1	20	G 3/4	60	9.5	284	4	4.5	32	G $^3/_4$
$НГП_д$ 2.2				10.0	236	3			
$НГП_д$ 2.3				12.0	226	2			
$НГП_д$ 3.1	25	G1	70	12.0	452	4	5	41	G 1
$НГП_д$ 3.2				13.0	398	3			
$НГП_д$ 3.3				16.0	402	2			
$НГП_д$ 4.1	32	G 1 1/4	81	15.0	706	4	5	50	G 1 $^1/_4$
$НГП_д$ 4.2				17.5	721	3			
$НГП_д$ 4.3				20.0	628	2			
$НГП_д$ 5.1	40	G 1 1/2	92	18.0	1017	4	5	55	G 1 $^1/_2$
$НГП_д$ 5.2				20.0	942	3			
$НГП_д$ 5.3				25.0	981	2			
$НГП_д$ 6.1	50	G 2	105	22.5	1589	4	5	70	G 2
$НГП_д$ 6.2				25.0	1472	3			
$НГП_д$ 6.3				30.0	1413	2			

Note: The table specified maximum diameters of the nozzle outlet holes.
When required according to hydraulic calculations, the nozzle can be manufactured with different sizes of the holes but not exceeding the d value.

Table 32. НГПм specification

Code	DN, mm	D	L, mm	Maximum diameter of holes, d, mm	$\Sigma F_{отв}$, мм^2	No. of holes	Radius of liquefied GFEA spraying, m	S, mm	Type and size of a bushing and a plug for a nozzle with a counter nut
НГПм 8.1	12	M18x1,5	49	5.5	95	4	3.0	24	DN12 (M18x1,5)
НГПм 8.2				6.0	85	3			
НГПм 8.3				8.0	101	2			
НГПм 8.4				10.0	79	1			
НГПм 1.1	16	M22x1,5	53	7.5	177	4	3.5	27	DN16 (M22x1,5)
НГПм 1.2				8.0	151	3			
НГПм 1.3				10.0	157	2			
НГПм 1.4				12.0	113	1			
НГПм 2.1	18	M24x1,5	58	8.5	227	4	4.5	30	DN18 (M24x1,5)
НГПм 2.2				9.0	191	3			
НГПм 2.3				11.0	190	2			
НГПм 3.1	20	M27x1,5	58	9.5	284	4	4.5	32	DN20 (M27x1,5)
НГПм 3.2				10.0	236	3			
НГПм 3.3				12.0	226	2			
НГПм 4.1	26	M33x1,5	68	12.0	452	4	5	41	DN26 (M33x1,5)
НГПм 4.2				13.0	398	3			
НГПм 4.3				16.0	402	2			
НГПм 5.1	36	M42x1,5	81	16.0	804	4	5	46	DN36 (M42x1,5)
НГПм 5.2				18.5	806	3			
НГПм 5.3				22.0	760	2			
НГПм 6.1	40	M48x1,5	92	18.0	1018	4	5	55	DN40 (M48x1,5)
НГПм 6.2				20.0	942	3			
НГПм 6.3				25.0	982	2			
НГПм 7.1	50	M64x1,5	105	22.5	1590	4	5	75	DN50 (M64x1,5)
НГПм 7.2				25.0	1473	3			
НГПм 7.3				30.0	1414	2			

Note: The table specified maximum diameters of the nozzle outlet holes.
When required according to hydraulic calculations, the nozzle can be manufactured with different sizes of the holes but not exceeding the d value.

Table 33. Nozzle material and coating

Material		Coating
Grade	Identification code	
Steel 20 ГОСТ 1050	01	Ц9
Steel 14Х17Н2 ГОСТ 5632	02	No coating
Brass ЛС59-1 ГОСТ 15527	04	No coating

НФ Gas Nozzle

НФ nozzle (Fig. 63) is designed for release and uniform distribution of FK 5-1-12 gaseous fire-extinguishing agent. НФП nozzle (ceiling) has a spraying angle of 360°, and НФС nozzle (wall) has a spraying angle of 180°. The nozzle structure comprises of a body with an orifice plate of variable bore diameter and a retaining ring.

The D1 hole diameter is determined by a hydraulic calculations of a fire-extinguishing installation.

Nozzle flow rate makes 0.65.

Table 34. НФ nozzle specification

Code	DN, mm	D, mm	Hole diameter, D1 *, mm		Spraying angle, deg.	Length, mm
			min	max		
НФП 3/8 - XX **	12	G 3/8	3	10	360	52
НФС 3/8 - XX			3	7	180	
НФП 1/2 - XX	16	G 1/2	3	13	360	56
НФС 1/2 - XX			3	9.2	180	
НФП 5/8 - XX	18	G 5/8	3	15	360	65
НФС 5/8 - XX			3	10.6	180	
НФП 3/4 - XX	20	G 3/4	3	18	360	91
НФС 3/4 - XX			3	12.8	180	
НФП 1 - XX	25	G 1	3	22.5	360	96
НФС 1 - XX			3	16	180	
НФП 1 1/4 - XX	32	G 1 1/4	3	30	360	
НФС 1 1/4 - XX			3	21.3	180	
НФП 1 1/2 - XX	40	G 1 1/2	3	35.5	360	
НФС 1 1/2 - XX			3	25.2	180	
НФП 2 - XX	50	G 2	3	44.5	360	
НФС 2 - XX			3	31.6	180	

Note: * The value is determined by hydraulic calculations.
** Calculated value of the hole diameter D1.

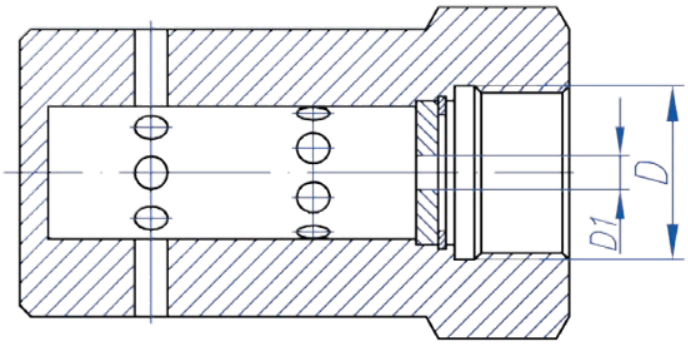


Fig. 63. НФ gas nozzle

Structure of a nozzle identification code:
XXX X—X
1 2 3
Where 1 is name of the nozzle (НФП or НФС);
2 is nominal diameter of the nozzle;
3 is hole diameter, mm.

Example of ordering information: Nozzle НФП 3/4-10,5

НГПФд Ceiling-Mounted Nozzle with a Filter

НГПФд ceiling-mounted nozzle with a filter is used when the calculated diameter of nozzle holes makes 1.5 to 2.9 mm (Fig. 64).

Basic specification:

- working pressure, MPa: 14.7;
- material: stainless steel;
- type of the female thread: G3/8”;
- flow rate: 0.7–0.8;
- number of holes: one (aligned with a nozzle axis) to four (around the circumference at equal distance).

Example of ordering information: Nozzle НГПФд 8.4-2.5-02

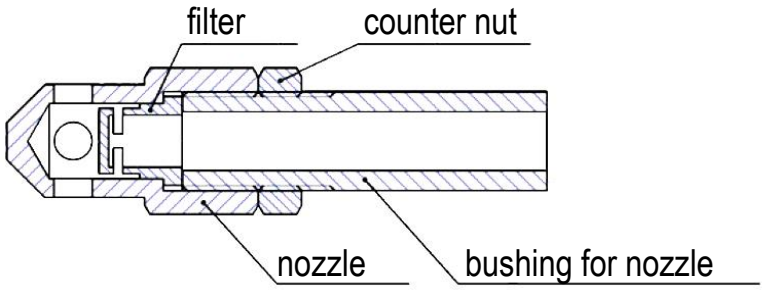


Fig. 64. НГПФд ceiling-mounted nozzle

НГЛд Local Extinguishing Nozzle

НГЛд gas nozzle (Fig. 65) is used for local fire extinguishing.

Table 35. Parameters НГЛд

Code	DN, mm	D, mm	Hole diameter, D1 *, mm		No. of holes
			min	min	
НГЛд 8.1-3.1-04	12	G 3/8"	3,1	3,1	4
НГЛд 1.1	16	G 1/2"	3,1	7,5	4
НГЛд 3.1	25	G 1"	3,1	11,0	4
Примечание: * — значение определяется гидравлическим расчётом;					

Basic specification:

- working pressure, MPa: 14.7;
- material: brass, stainless steel;
- type of the female thread: G3/8", G1/2", G1";
- spraying diameter, m: 1 to 1.3;
- distance to an object, m: 3 to 4;
- flow rate: 0.7 to 0.8.
-

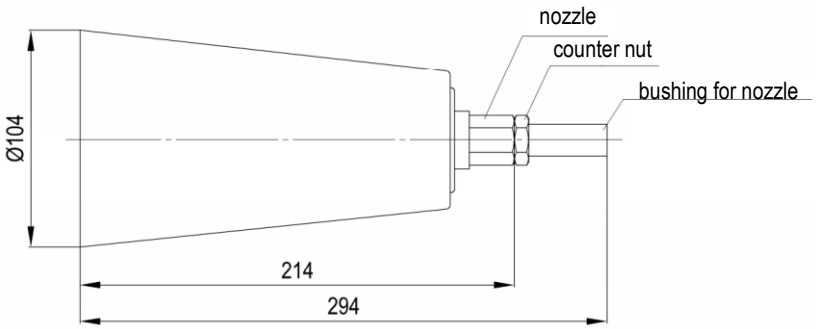


Рис. 65. НГЛд local extinguishing nozzle

Structure of a nozzle identification code:
НГЛд Х.1-Х.Х-04
1 2 3 4
Where 1 is name of the nozzle;
2 is nozzle code (see Tables 33 and 34);
3 is diameter of nozzle holes, mm;
4 is identification code of a nozzle material.

Example of ordering information: Nozzle НГЛд 1.1-3.5-04

Pressure Alarm

The pressure alarm is designed to feed a signal on GFEA entering to a piping system of the gas fire-extinguishing installation when a module or a distribution device РУ (УРУ) is actuated.
There are two types of the pressure alarm:

- СДГ gas pressure alarm;
- СДГ-Ex Ex gas pressure alarm.

The module and КГ (КГО) gas manifold have a nest for installation of the pressure alarm. To install the СДГ on a pipeline, a welded nipple СДГ and a gasket are manufactured.

СДГ Gas Pressure Alarm

СДГ gas pressure alarm and the versatile СДУ-М pressure alarm are interchangeable.
Supply scope of the РУ (УРУ) distribution devices includes the СДГ.
СДГ general arrangement and wiring diagram are presented in Figs. 66 and 67.

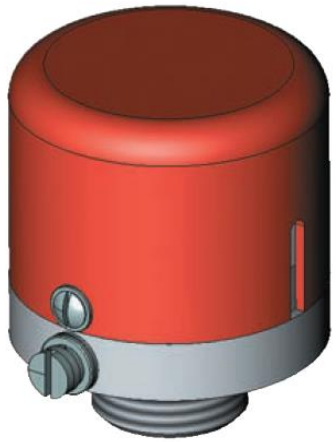


Fig. 66. General arrangement of СДГ pressure alarm

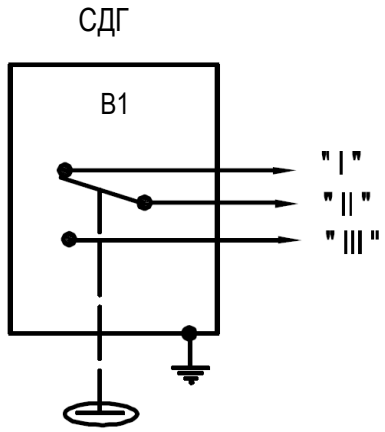


Fig. 67. Wiring diagram of СДГ pressure alarm

Table 36. СДГ basic specification

The pressure alarm terminals allow connection of the following circuits:	
– AC voltage of 0.2 to 125 V, A	3
– DC voltage of 0.2 to 30 V, A	5
Working pressure of the gas medium under stem, MPa	15.0
Minimum actuation pressure of the pressure alarm, MPa	0.3–0.7
Actuation time of the pressure alarm, maximum, s	2
Weight of the pressure alarm, kg	0.15
Operation temperature, °C	–35 to +50

Ordering information: Gas pressure alarm СДГ

Ordering information: Nipple СДГ

СДГ-Ex Ex Gas Pressure Alarm

СДГ-Ex gas pressure alarm is designed for operation on hazardous areas of buildings according to explosion-proof marking **0ExiaIICT6**, ГОСТ Р 52350.14-2006, Chapter 7.3 of ПУЭ and other regulatory documents covering use of electrical equipment in areas with a risk of explosion.

СДГ-Ex gas pressure alarm has a metal body with a sealable cap. The body has a screw type earth clamp of 4 mm diameter and earthing mark. The cap is sealed and not detachable. An external end of cable for connection has a length of 0.45 m. "Intrinsically-safe circuit" type of protection is provided by СДГ-Ex pressure alarm power supply via a certified БИБ-02 safe barrier of a monitoring and control device such as Gamma-01 Ex. СДГ-Ex gas pressure alarm has a degree of protection against external impacts meeting ГОСТ 14254-96, i.e. IP54.

Other specifications are the same as for СДГ.

СДГ-Ex Ex pressure alarm general arrangement and wiring diagram are presented in Figs. 68 and 69.

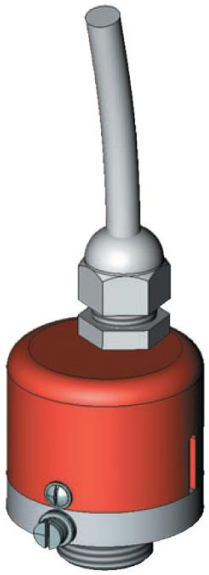


Fig. 68. General arrangement of СДГ-Ex pressure alarm

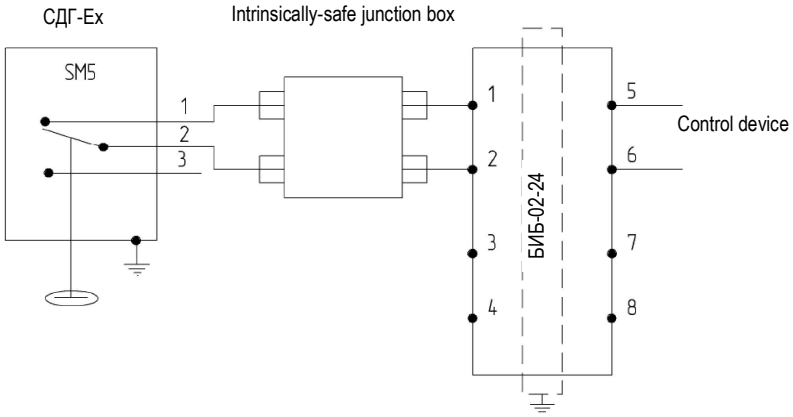


Fig. 69. Wiring diagram of СДГ-Ex

Ordering information: Gas pressure alarm СДГ-Ex

Portable Test Cylinder БИП

Portable test cylinder БИП is designed for purging pipelines with air and testing them for strength and tightness.

There are two БИП versions of 40 and 50 l capacity.

БИП working pressure is 150 bar.

БИП includes a cylinder of 40 (or 50) l meeting ТУ 1410-007-29416612-2005, a valve, a pressure gauge and a hose with a nipple having M16x1,5 female thread at one of the ends (Fig. 70).

To connect БИП to piping (Fig. 72), the following is used (any of the options):

- БИП connecting nipple kit including a nipple to be welded on a pipeline, plugs and gaskets;
- БИП-Р24(40) adapter – a threaded adapter installed on a manifold (pipeline) instead of a hose;
- БИП-1/2 adapter – a threaded adapter installed on a pipeline instead of СДГ (СДУ-М) pressure alarm.

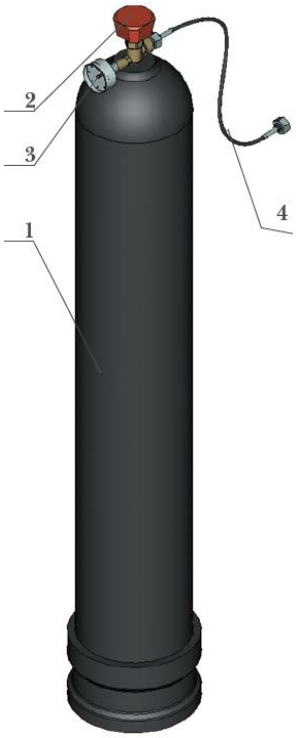


Fig. 70. Portable test cylinder БИП
1 – cylinder;
2 – valve;
3 – pressure gauge;
4 – hose.

Example of БИП ordering information:

Name	Meas. unit	Q-ty
БИП-150-40Л portable test cylinder	pcs	1
Shut-off and pressure gauge assembly	pcs	1
БИП-Р24 adapter	pcs	as per the design

Shut-off and pressure gauge assembly (Fig. 71) shall be used for testing pipelines for strength and tightness. The assembly is designed to control pressure in the pipeline.

The shut-off and pressure gauge assembly consists of a tee fitting, a valve and a pressure gauge. The assembly has threaded nipples and is installed into a gap between БИП and piping.

The nipple, adapters and the shut-off and pressure gauge assembly are not included in БИП scope and are ordered separately.

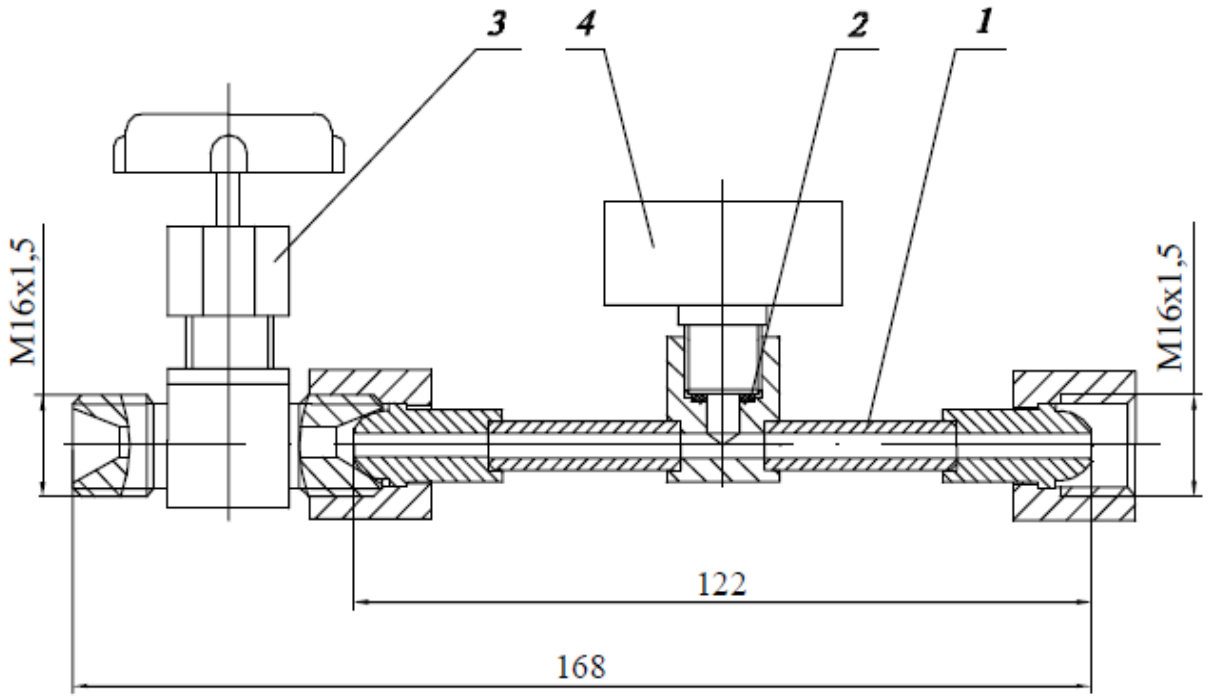


Fig. 71. Shut-off and pressure gauge assembly
1 – tee fitting;
2 – gasket;
3 – АЗТ-10-4/250 shut-off valve, КС7102 version;
4 – pressure gauge, 250 bar.

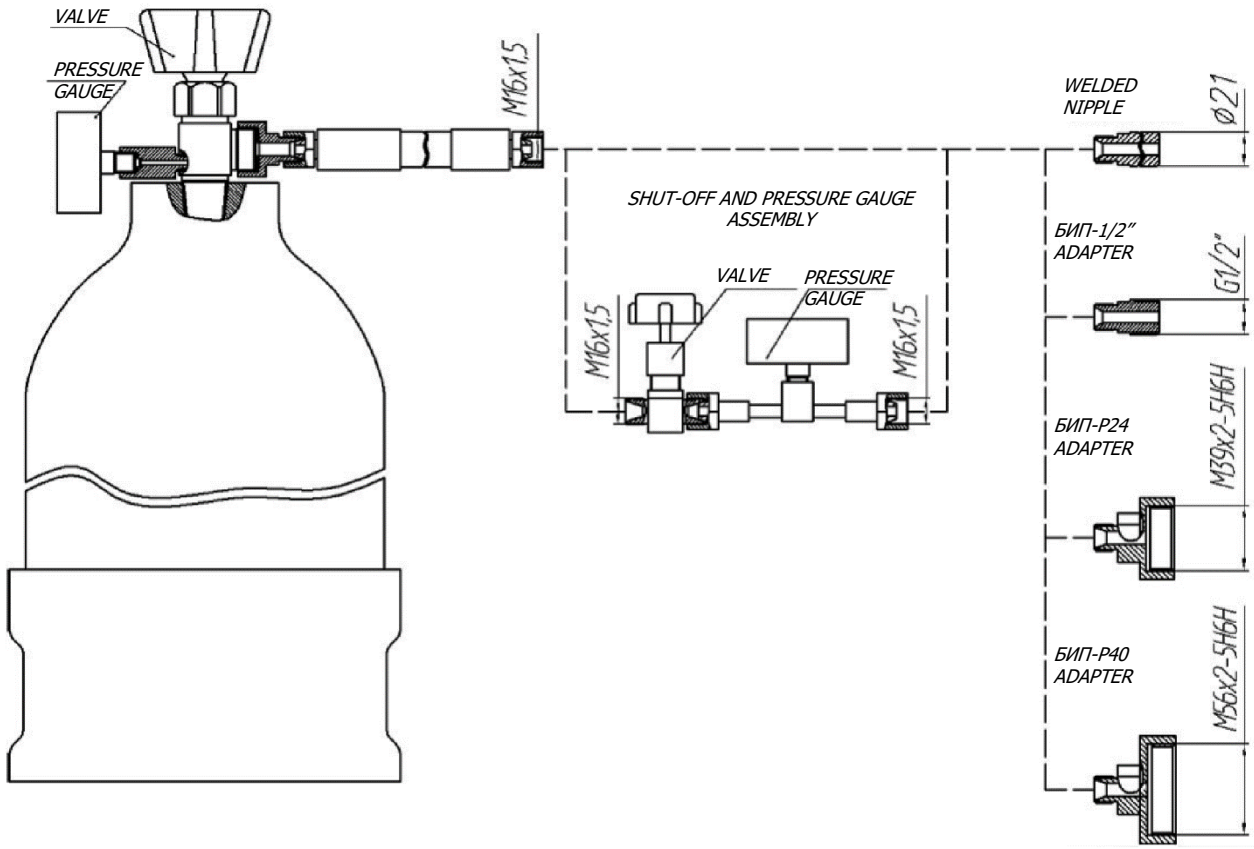


Fig. 72. БИП connection options

Refilling Device

The refilling device (ЗП) (Fig. 73) is designed to fill the modules with fire-extinguishing gases.

The refilling device is connected to the refilling nipple of the module release device. A procedure of refilling device use is described in the module operation manual.

The list of the devices is given in Table 37.

Table 37. List of ЗП

ЗП type	Modules type	GFEA	D, mm
ЗП – 8	Тип 1 и 3	Liquefied gases (freons, CO_2)	8
ЗП – 1,5		Pressurized gases (nitrogen, argon, Inergen)	1,5
ЗП – 2 – М39	Тип 2	Liquefied and Pressurized gases	
ЗП – 2 – М56			

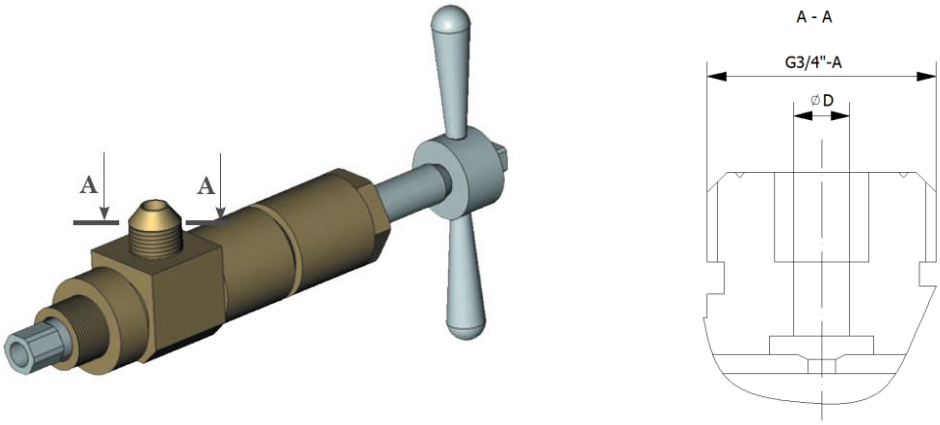


Fig. 73. Refilling device

Ordering information: Refilling device ЗП-2-М39

To fill type 2 modules, refilling adapters (Fig. 74) are used. The adapters allow module refilling via a release device outlet bore.

Ordering information:
Refilling adapter for M39 (type 2 module of DN24);
Refilling adapter for M56 (type 2 module of DN40).

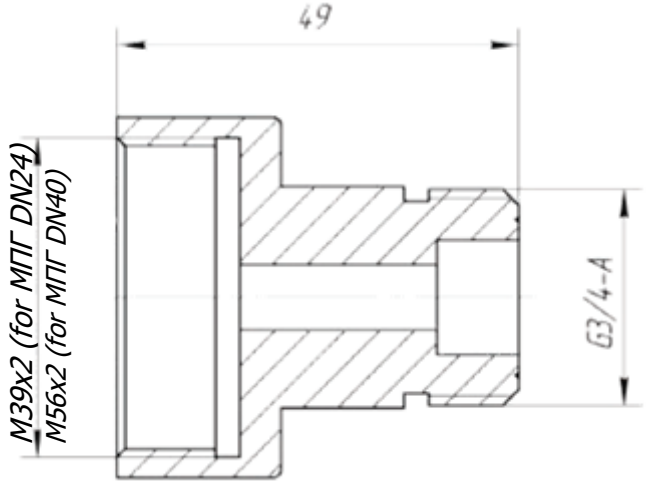


Fig. 74. Refilling adapter

Union Pipe detachable connections

Two types of pipe detachable connections are made:

- Union;
- Flanged connection Ф

Union

The union (Figs. 75 and 76) is designed for threaded pipeline connections of gas fire-extinguishing system where space for welding in situ is restricted.

The union is pre-welded to the ends of pipeline sections to facilitate installation of the piping in a protected area thus eliminating the need of welding in the area.

The union is designed for 15 MPa pressure.

Typical design versions of the unions are given in Table 37.

Table 38. Union typical design versions

Union DN12/OD18
Union DN16/OD22
Union DN20/OD28
Union DN22/OD28
Union DN24/OD30
Union DN25/OD32
Union DN30/OD36
Union DN32/OD38
Union DN40/OD48
Union DN48/OD56
Union DN68/OD76

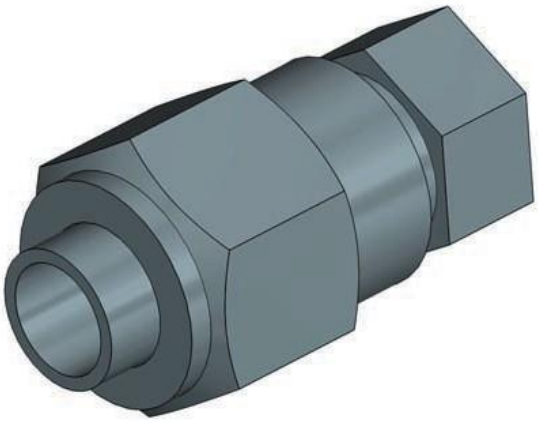


Fig. 75. General arrangement.
Union DN12/OD18

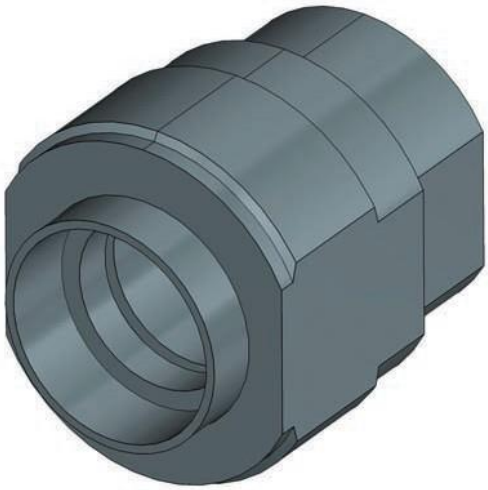


Fig. 76. General arrangement.
Union DN40/48

Flanged connection Φ

The flanged connection Φ (fig. 77) is intended for connecting the pipelines of the fire extinguishing system.

Table 39. Union typical design versions

Code	d, mm	d1, mm	D, mm	L, mm	Pp, MPa	Weight, kg
Φ-70-150	70	80	150	128	15,0	4,1
Φ-80-150	80	92	158	128		4,6
Φ-100-150	100	114	194	136		9,8
Φ-125-60	126	140	232	136	6,0	12,2
Φ-150-60	150	168	268	136		16,6

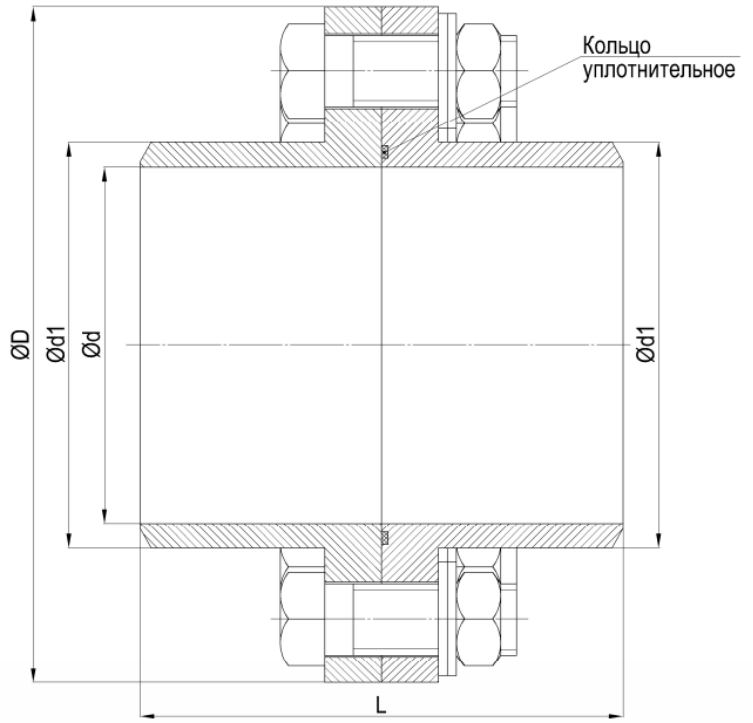


Fig. 76. General arrangement flanged connection Φ

Decorative Screen Panel

There are the following types of the decorative screen panels:

- Decorative screen panel ЭД-1 and ЭДР-1 is designed to hide a single module;
- Decorative screen panel ЭДС is designed to hide a group of modules of 20 and 100 l capacity;
- Decorative screen panel ЭДСА is designed to hide a group of modules of 120 and 160 l capacity.

Color of the screen panel is white. The upper part of the screen panel is made of a transparent material allowing visual inspection of the module status during operation. The screen panel is delivered knocked down and assembled at the site using a special wrench included in the supply scope.

Decorative Screen Panel of Type ЭД-1 and ЭДР-1

ЭД-1 and ЭДР-1 decorative screen panels are applied for the following:

- ЭД-1 decorative screen panel is designed to hide a single module fastened to a wall with fixing clamps or to a floor with special mounts.
- ЭДР-1 decorative screen panel is designed to hide a single module to a wall with fixing clamps or to a floor with special mounts or fastened to PM-1 support frame.

The fixing clamps and PM-1 support frame are ordered separately.

Side sections have brackets with holes for additional screen panel fastening to a wall.

Table 40. ЭД-1 and ЭДР-1 decorative screen panels types and dimensions

Screen panel type	Dimensions HxWxD, mm	Screen panel type	Dimensions HxWxD, mm
ЭД-1-20У	1035x460x483	ЭДР-1-20У	1035x577x510
ЭД-1-25У	1195x460x483	ЭДР-1-25У	1195x577x510
ЭД-1-32У	1395x460x483	ЭДР-1-32У	1395x577x510
ЭД-1-40У	1645x460x483	ЭДР-1-40У	1645x577x510
ЭД-1-50У	1940x460x483	ЭДР-1-50У	1940x577x510
ЭД-1-20	780x460x483	ЭДР-1-20	780x577x510
ЭД-1-35	890x460x483	ЭДР-1-35	890x577x510
ЭД-1-50	1095x460x483	ЭДР-1-50	1095x577x510
ЭД-1-60	1235x460x483	ЭДР-1-60	1235x577x510
ЭД-1-80	1505x460x483	ЭДР-1-80	1505x577x510
ЭД-1-100	1780x460x483	ЭДР-1-100 (100 & 120l)	1780x577x510
		ЭДР-1-140 (140 & 160l)	2100x577x510

Structure of a screen panel identification code:
XXX – 1 – XXX X
1 2 3 4
Where 1 is name (ЭД or ЭДР);
2 is number of modules;
3 is module capacity, l;
4 is module cylinder type:

- no identification – for all except cylinder ГОСТ 949-73;
- У – cylinder meeting ГОСТ 949-73.

Example of ordering information: ЭДР-1-100

Decorative Screen Panel of Type ЭДС

ЭДС decorative screen panel (Figs. 77 and 78) is designed to hide a group of modules of 20 and 100 l capacity installed in СМПм support stand or fastened to a wall using the fixing clamps or wall mounting.

Versions of the screen panels are different in the following:

- number of hidden modules;
- cylinder capacity and type.

Side sections of ЭДС screen panels have brackets for fastening to СМПм support stands or a wall.

Table 41. Decorative screen panels types and dimensions

Screen panel type	Dimensions HxLxB, mm, to hide n modules				
	2	3	4	5	6
ЭДС-n-40У	1645x1022x435	1645x1462x435	1645x1902x435	1645x2342x435	1645x2742x435
ЭДС-n-50У	1940x1022x435	1940x1462x435	1940x1902x435	1940x2342x435	1940x2742x435
ЭДС-n-35	890x1022x435	890x1462x435	890x1902x435	890x2342x435	890x2742x435
ЭДС-n-50	1095x1022x435	1095x1462x435	1095x1902x435	1095x2342x435	1095x2742x435
ЭДС-n-60	1235x1022x435	1235x1462x435	1235x1902x435	1235x2342x435	1235x2742x435
ЭДС-n-80	1505x1022x435	1505x1462x435	1505x1902x435	1505x2342x435	1505x2742x435
ЭДС-n-100	1780x1022x435	1780x1462x435	1780x1902x435	1780x2342x435	1780x2742x435

Screen panel type	Dimensions HxLxB, mm, to hide n modules			
	7	8	9	10
ЭДС-n-40У	1645x3242x435	1645x3690x435	1645x4125x435	1645x4562x435
ЭДС-n-50У	1940x3242x435	1940x3690x435	1940x4125x435	1940x4562x435
ЭДС-n-35	890x3242x435	890x3690x435	890x4125x435	890x4562x435
ЭДС-n-50	1095x3242x435	1095x3690x435	1095x4125x435	1095x4562x435
ЭДС-n-60	1235x3242x435	1235x3690x435	1235x4125x435	1235x4562x435
ЭДС-n-80	1505x3242x435	1505x3690x435	1505x4125x435	1505x4562x435
ЭДС-n-100	1780x3242x435	1780x3690x435	1780x4125x435	1780x4562x435

Structure of a screen panel identification code:

ЭДС – X – XX X

1 2 3 4

Where 1 is name;
2 is number of hidden modules (2 to 10);
3 is module capacity, l;
4 is module cylinder type:

- no identification – cylinder meeting БК-6601-400 ТУ and ТУ 1410-007-29416612-2005;
- У – cylinder meeting ГОСТ 949-73.

Example of ordering information: ЭДС-6-100

Decorative Screen Panel of Type ЭДСА

ЭДСА decorative screen panel (Figs. 78 and 79) is designed to hide a group of modules of 120 and 160 l capacity installed in СМАм support stand or fastened to a wall using the fixing clamps or wall mounting.

Versions of the screen panels are different in the following:

- number of hidden modules;
- cylinder capacity and type.

Side sections of ЭДС screen panels have brackets for fastening to СМАм support stands or a wall.

Table 42. Decorative screen panels types and dimensions

Screen panel type	Width, L, mm	Height, H, mm	Depth, B, mm
ЭДСА-2-140	1184	2100	474
ЭДСА-2-160			
ЭДСА-3-140	1684		
ЭДСА-3-160			
ЭДСА-4-140	2184		
ЭДСА-4-160			
ЭДСА-5-140	2684		
ЭДСА-5-160			
ЭДСА-6-140	3184		
ЭДСА-6-160			
ЭДСА-7-140	3744		
ЭДСА-7-160			
ЭДСА-8-140	4244		
ЭДСА-8-160			
ЭДСА-9-140	4744		
ЭДСА-9-160			
ЭДСА-10-140	5244		
ЭДСА-10-160			

The decorative screen ЭДСА-Х-140 is used for modules with a capacity of 120 and 140 liters.

Structure of a decorative screen identification code:
ЭДСА – Х – ХХ
1 2 3
Where 1 is name;
2 is number of hidden modules (2 to 10);
3 is module capacity, l;

Example of ordering information: ЭДСА-5-140

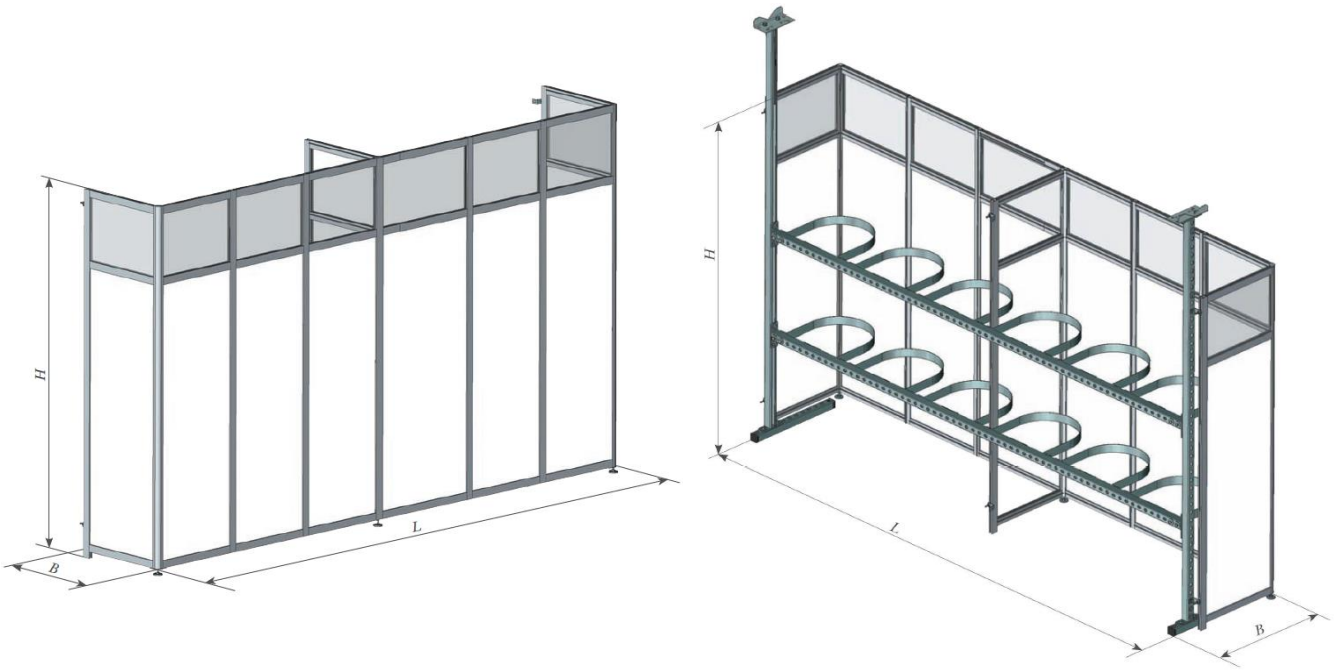


Fig. 78. General arrangement of type ЭДС-6 (ЭДСА-6) decorative screen panel
(The frame is not included in the supply scope)

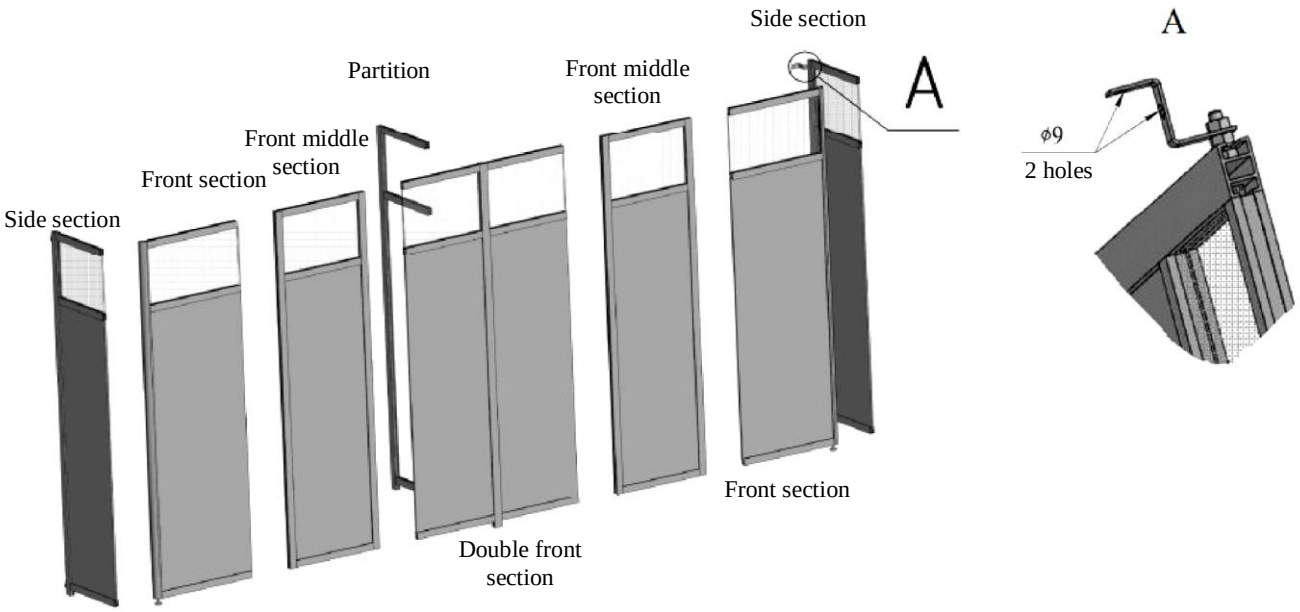


Fig. 79. Supply scope for ЭДС-6 decorative screen panel as an example

Overpressure relief valve КСИДв

КСИДв overpressure relief valve (Fig. 80) is designed to protect the room and the equipment located in it from the effects of overpressure of gas generated during the release of a gas extinguishing agent into the room, after the gas fire extinguishing installation is triggered.
КСИДв is manufactured in two versions:

- the usual version, for placement on the enclosing structure that is not in contact with the external environment;
- thermal insulation version (version "T"), for placement on the enclosing structure in direct contact with the external environment.

КСИДв corresponds to the climatic version of the УХЛ, placement category 2 according to GOST 15150-69, but in the operating temperature range from minus 60 to plus 80 ° C and relative humidity of 98% at a temperature of 35 ° C.
Type of working environment: Freons, FK-5-1-12, CO2, compressed gases, air
The tightness class of the shut-off body when tested with air according to GOST 9544-2015 – «C»

The structure of the designation КСИДв:
КСИДв — XXXX — XX X
1 2 3 4
where: 1 is the name;
2 — the area of the passage section, cm^2;
3 — nominal opening pressure of the shut-off valve, kPa;
4 — execution

- without designation — normal;
- "T" — thermal insulation.

Table 43. Basic specifications

КСИДв type	The area of the passage section with the flap fully open, cm2	The pressure of the beginning of the opening of the shut-off body, kPa	Overall dimensions, mm Length x height x width	Weight, not more than, kg
КСИДв-300-0,5	300	0,5±0,15	512x145x130	4,8
КСИДв-300-0,5-Т				5,7
КСИДв-300-1,2		1,2±0,2		8,5
КСИДв-300-1,2-Т				8,7
КСИДв-600-0,5	600	0,5±0,15	640x160x167	7,1
КСИДв-600-0,5-Т				7,7
КСИДв-600-1,2		1,2±0,2		11,9
КСИДв-600-1,2-Т				12,6
КСИДв-1200-0,5	1200	0,5±0,15	764x225x233	12,5
КСИДв-1200-0,5-Т				12,8
КСИДв-1200-1,2		1,2±0,2		21,9
КСИДв-1200-1,2-Т				21,5
КСИДв-1800-0,5	1800	0,5±0,15	869x284x283	17,8
КСИДв-1800-0,5-Т				20,4
КСИДв-1800-1,2		1,2±0,2		33,0
КСИДв-1800-1,2-Т				34,2

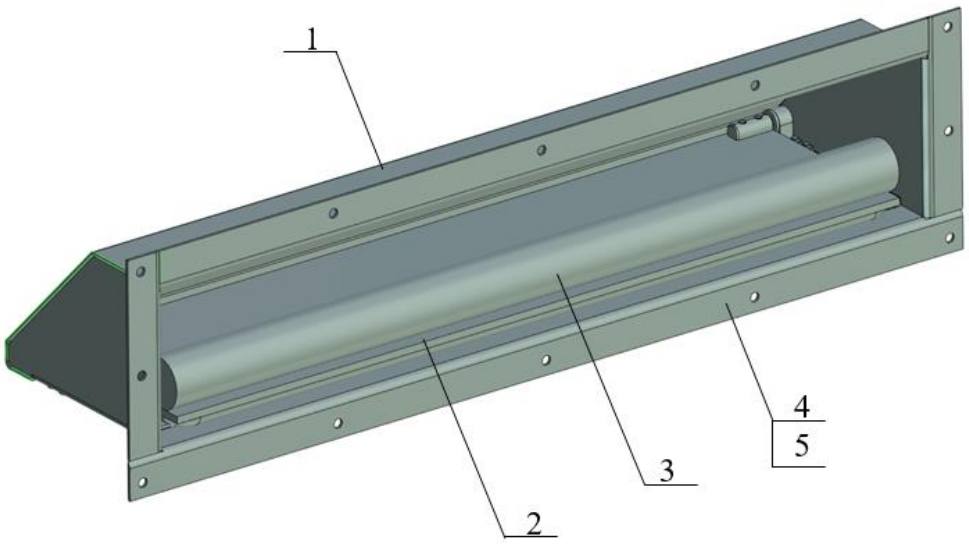


Рис. 80. General arrangement КСИДв
1 — housing;
2 — flap;
3 — cargo;
4 — flange;
5 — sealer

For decorative closure of the outlet, the КСИДв overpressure relief valve is used with the Р-КСИДв grating.

Table 44. Basic specifications Р-КСИДв

Р-КСИДв type	Overall dimensions, mm Length x width	Weight, not more than, kg
Р-КСИДв-300	524x200	1,9
Р-КСИДв-600	652x225	2,6
Р-КСИДв-1200	796x325	4,61
Р-КСИДв-1800	894x425	6,71

The structure of the designation Р-КСИДв:
Решетка Р-КСИДв — XXXX
1 2
where: 1 is the name;
2 — the area of the passage section, cm^2;

Pressure Gauge with Switch Contacts

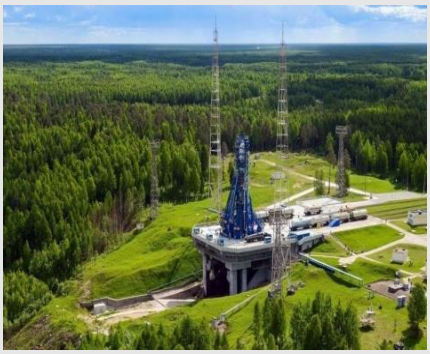
The pressure gauge with switch contacts (ЭКМ) is designed to automate control of propellant gas leakage from a gas fire-extinguishing module filled with freon and FK-5-1-12 at working pressure of 60 bar.

ЭКМ pressure gauge is not included in the fire-extinguishing module scope and shall be ordered separately, however concurrently with module ordering.

When the ЭКМ pressure gauge is ordered along with the module, the manufacturer (ООО «НПО ПАС») installs the pressure gauge on the module and no addition installation works are eliminated.

Ordering information:

Pressure gauge with switch contacts

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