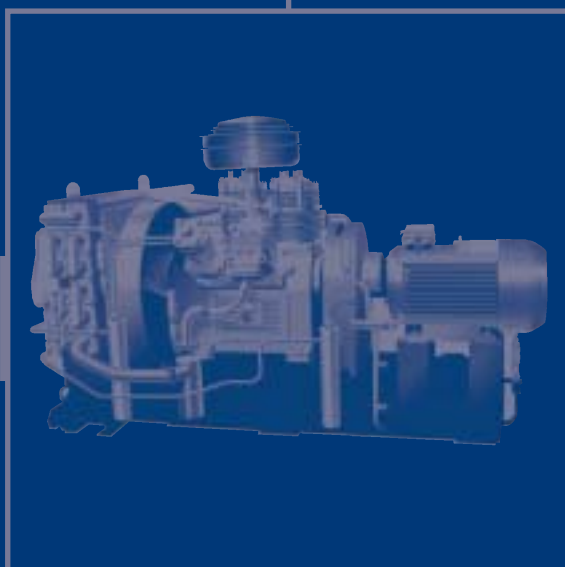




JSC "THE URAL COMPRESSOR PLANT"

COMPRESSOR AND CRYOGENIC EQUIPMENT





JSC "THE URAL COMPRESSOR PLANT"

COMPRESSOR AND CRYOGENIC EQUIPMENT



CONTENTS: COMPRESSOR EQUIPMENT

Compressor equipment the Ural Compressor Plant	4
High pressure gas compressors	5-7
Diaphragm-type compressor units	5
Compressors of 6GW1.6-2/1.1-200 type	6
Compressor units of AGW type (CNG)	7
Natural gas liquefaction stations (LNG)	8
Mobile compressor stations	9-11
Mobile nitrogen compressor stations PKSA-9/200, PKSA-5/101	9
Mobile air compressor stations PKS-8/101, PKS-16/101	10
Mobile air compressor stations UKS-400V-131, UKS-400V-P4M, UKS-630-P4M	11
High pressure air compressors	12-14
Compressor units VWV-3/100, VWV-2.3/230M	12
Compressor unit VWV-1/40	13
Compressor unit AVW-2.5/400	13
Compressor unit AVW-3.7/200M	14
Compressor unit VW-4.2/200	14
Reciprocating expanders	15
Reciprocating expanders DPV2-200/6-3M, DPV4.2-200/6-2	15
Reciprocating expander DPPG-150-200/3	15
Low pressure air compressors	16-19
Screw compressors Atlant	16
Modular-type compressor station Atlantic	17
Screw-type compressor station Atlant-75GP	17
Screw-type compressor station Atlant-45NT	18
Compressor unit AVW-6/10	18
Compressor units AVW-3/8, AVW-6/8, AVWD-6/8	19
Maintenance	32

CONTENTS: CRYOGENIC EQUIPMENT

Cryogenic equipment Uralcryotechnika	20
Liquid oxygen, nitrogen, argon and oxygen, nitrogen, argon gas supply diagram	21
Air fractionating units	22-23
Air fractionating units AgKg-0.06, AgA-0.07	22
Modular air fractionating units AgKg-0.06-1	23
Gasifiers	24-25
Gasifiers GH-1.0/1.6-0.045, GH-1.5/1.2-0.05, TGHK-1.0/0.06-1.6	24
Gasifiers GH-0.3/3.6-0.04, GH-0.6/3.0-0.1, GH-0.6/3.2-0.04 for laser cutting sets of equipment	25
The program of transfer for using gasifiers instead of cylinder principle of technical gas supply for industrial purposes	25
Gasification units	26-27
Gasification unit G-1.6/20-0.05-1	26
Fire-prevention gasification units PGHKA-1.0-0.3/1.6, PGHKA-1.0-0.9/1.6	26
Truck chassis-mounted gasification unit G-1.6/20-0.05-1	27
Air drying block KE 0903.00.000-01	27
Cryogenic storage tanks	28-29
Cryogenic chambers	28
Biological product storage vessels HB-0.5	29
Dewar flasks	29
Equipment used for the operation with technical gases	30-31
Relief chambers	30
Filling chambers	30
Discharge chambers	31
Test stand for cylinder hydraulic tests KE 9940.00.000	31
Maintenance	32





COMPRESSOR EQUIPMENT THE URAL COMPRESSOR PLANT

The Ural Compressor Plant (the UCP) was founded in 1933 as an enterprise of road-building machinery "Obldormash". During World War II the plant was engaged in production of mortar weapons: mortar BM-82 and rocket mortar BM-13 "Katyusha". In accordance with the decree of the Presidium of the Supreme Soviet of the USSR on February 17, 1946 the defense industry plant No. 760 was reorganized into the UCP.

The history of compressor building started before the plant has acquired its present name. During World War II the plant produced airfield compressor stations AKS-2.

After the war in accordance with the order of the Ministry of Defense of the USSR the UCP was engaged in manufacture of airfield compressor stations for filling of aviation systems with compressed air, oxygen and carbonic acid. On the basis of station AKS-2 a compressor station AKS-8 was designed with pressure of 230 kgf/cm², which was awarded Gold Medal, Grand Prix at the World Exhibition in Brussels in 1959.

During the Soviet period approximately 85% of the plant output had been supplied to enterprises of defense industry: universal mobile compressor stations, marine compressors and diaphragm-type compressors for refueling systems of spacecrafts.

In the eighties the plant started conversion of manufacture. During a short period of time the plant started to produce compressors for power engineering, mobile compressor stations for oil and gas industry and finished works on creation of standard diaphragm-type compressors with pressure ranging from 10 kgf/cm² to 1000 kgf/cm². That period was also marked with manufacture of reciprocating expanders.

As a result of technical re-equipment and production of new product range (the total amount of items was approaching 3000 units) in the eighties the plant turned into a powerful machine-building enterprise with 2400 employees.

In the nineties the UCP continued conversion and the product mix had been enlarged significantly. These are mobile compressor stations and mobile nitrogen stations used at oil- and gas-field construction. Stationary compressors are widely used as components of drilling rigs and gas-filling compressor stations, etc. The plant still occupies a prominent place in supply of compressor equipment for the defense industry of the country. In 2002 the enterprise got a license of the Russian Aircraft and Cosmic Agency to produce aircraft equipment. In 2004 the enterprise quality management system was certified in the Military Register.

In 2004 the enterprise quality management system was certified in conformity with the requirements of ISO 9001:2000.

The UCP is manufacturing modern equipment applicable to constantly growing requirements of operation. About 20% of all production of a UCP is exported to the CIS countries (Kazakhstan, Ukraine, Uzbekistan, etc.) and further abroad (India, Pakistan, Iran, Iraq, Vietnam, Romania, Cuba, China, etc.).

For more than 70-years history of constant development the UCP has received a recognition and trust of the consumers.

The Ural Compressor Plant is seeking for strong trading and technical partners abroad. Foreign companies looking for mutually advantageous cooperation are invited to contact International dept.



DIAPHRAGM-TYPE COMPRESSOR UNITS

The diaphragm-type compressor units are intended for compression of various dry gases, except oxygen, free of oil and mechanical particles being the result of surfaces friction. The diaphragm-type compressor units are widely used in laboratory research, oil and gas industries, chemical industry, metallurgy, medical and pharmaceuticals industries as well as in electrical industry.

There are two types of these units: with piston force up to 16 kN (of 1.6MK type) and with piston force from 16 kN to 40 kN (of 4.0MK type).

The compressor units incorporate the compressor proper, electric motor, auxiliary systems mounted on common frame, which are equipped with automatic control and emergency protection system ensuring both manual and automatic control, visual control of main parameters, and switching off of electric motor in case of deviation from the preset mode. Compressors are provided with water cooling.

Advantages and distinctive features

- The compressor units have a uniform design. They are provided with exchangeable parts (only for the units of the same type).
- They are automated and do not require service personnel to be present all the time.
- The warranty liability period is 24 months.

Product mix includes the following compressor units:

- M1 - for compression of non-aggressive gases in explosion-proof rooms;
- M2 - for compression of aggressive gases in explosion-proof rooms;
- M3 - for compression of non-aggressive gases in highly explosive rooms of class V-1a (as per the rules of electric equipment arrangement);
- M4 - for compression of aggressive gases in highly explosive rooms of class V-1a (as per the rules of electric equipment arrangement).

Technical specifications

Unit type	W	P ₁	P ₂	P	R	LxBxH	M
1.6MK-8/200	9.8	0.02 (0.2)	20 (200)	5.4	0.4	1600 x 800 x 1250	900
1.6MK-10/12.5	11	0.02 (0.2)	1.25 (12.5)	2	0.25	1225 x 700 x 1050	670
1.6MK-12/64	13.2	0.02 (0.2)	6.4 (64)	4.7	0.25	1580 x 800 x 1250	840
1.6MK-16/12.5-200	21	1.25 (12.5)	20 (200)	6.7	0.25	1700 x 900 x 1250	870
1.6MK-20/12.5	22	0.02 (0.2)	1.25 (12.5)	4.25	0.4	1500 x 800 x 1200	1040
4.0MK-20/220	20	0.02 (0.2)	22 (220)	11.4	0.64	2100 x 960 x 1360	1830
4.0MK-30/5-400	29	0.5 (5)	40 (400)	14	1.22	2150 x 950 x 1510	1780
4.0MK-60/12.5-200	70	1.25 (12.5)	20 (200)	15	1.22	2200 x 900 x 1600	1780
4.0MK-70/15-400	70	1.5 (15)	40 (400)	24	1.22	2150 x 950 x 1510	1980
4.0MK-80/50-400	80	5 (50)	40 (400)	23	1.56	2150 x 950 x 1610	1680

The delivery scope includes service documents and compressor spare parts for warranty liability period.

W, m³/h – capacity

P₁, MPa (kgf/cm²) – initial pressure

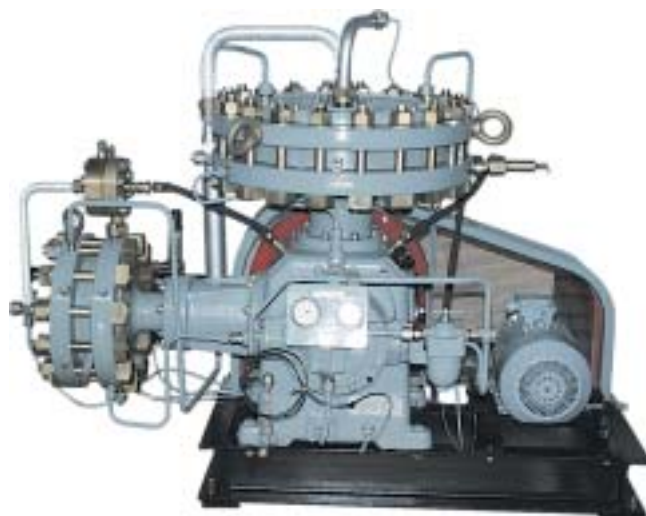
P₂, MPa (kgf/cm²) – outlet pressure

P, kW – power consumption

R, m³/h – cooling water consumption

LxBxH, mm – overall dimensions, length x width x height

M, kg – weight



1.6MK-12/64



4.0MK-60/12.5-200

COMPRESSORS OF 6GW1.6-2/1.1-200 TYPE

The compressor of 6GW1.6-2/1.1-200-1 type is designed for helium compression. The compressor of 6GW1.6-2/1.1-200-3 type is designed for hydrogen or natural gas compression up to pressure of 20 MPa (200 kgf/cm²). Compressors are intended for the production of compressed nitrogen, argon and other gases.

The compressors are provided with water cooling and electric motor drive. They are equipped with automatic control and emergency protection system ensuring manual and automatic control, visual control of main parameters during deviation from the preset mode.

Purging of water-oil separators is carried out automatically.



6GW1.6-2/1.1-200-3

Advantages and distinctive features

- The compressors are automated. They do not require the service personnel to be present all the time.
- The warranty liability period is 18 months.

The compressors can be used for pneumatic tests of pressurized vessels and pipelines.

Application

- Metallurgy.
- Chemical industry.
- Gas-processing and oil-refining industry.
- Medical industry.
- Power engineering - electric stations (including nuclear power stations) and substations.

Technical specifications	6GW1.6-2/1.1-200-1	6GW1.6-2/1.1-200-3
Gas to be compressed, inlet gas	helium	hydrogen, natural gas
Capacity, m ³ /min	1.8	2
Initial pressure, MPa (kgf/cm ²)	0.11±0.005 (1.1±0.05)	0.11±0.005 (1.1±0.05)
Outlet pressure, MPa (kgf/cm ²)	20 (200)	20 (200)
Power consumption, kW (max)	47	43
Inlet water temperature, °C	plus 30	plus 30
Cooling water consumption, m ³ /h	2.16	1.8
Overall dimensions, mm, length	2100	2100
width	1300	1300
height	1400	1400
Weight (less oil, automation and spare parts kit), kg	1680	1810

The delivery scope includes service documents and compressor spare parts for warranty liability period.

COMPRESSOR UNITS OF AGW TYPE (CNG)

The compressor units AGW-5/1.1-250, AGW-8/4-250, AGW-9/7-250, AGW-10/13-250 are intended for natural gas compression up to pressure of 25 MPa (250 kgf/cm²) being a part of automobile gas-refueling compressor stations of block-container type with gas extraction from domestic gas pipeline with gas (excessive) pressure of 0.01 MPa (0.1 kgf/cm²), 0.3 MPa (3 kgf/cm²), 0.6 MPa (6 kgf/cm²), 1.2 MPa (12 kgf/cm²) accordingly.

The compressor used in the units is piston-type, W-form, six-row with combined lubrication system - circulatory under pressure from the gear oil pump and splash. Water and oil separator provides effective purification of the outcoming compressed gas from condensed moisture and oil.

The compressor units are provided with water cooling and electric motor drive, possess a microprocessor automation system for manual and remote automated control, visual control of the main parameters, emergency (light and sound) alarm with subsequent motor stoppage in case of some deviation from the specified mode.



AGW-5/1.1-250

Advantages and distinctive features

- The compressor units are automated and do not require the service personnel to be present all the time.
 - They are characterized by smaller weight and overall dimensions in comparison with other similar compressor units.
 - They can be used for compressor drives instead of electric motor or gas motor.
 - The compressor unit is designed to work within different pressure regimes, depending on the source of natural gas.
 - The warranty liability period is 12 months.
- Six stages prolong details durability and provide balanced temperature difference.
- It is meant for operation within ambient temperature range from minus 5°C to plus 40°C.

Technical specifications

	AGW-5/1.1-250	AGW-8/4-250	AGW-9/7-250	AGW-10/13-250
Gas to be compressed, inlet gas	natural gas	natural gas	natural gas	natural gas
Capacity, m ³ /min	5	8	9	10
Initial pressure, MPa (kgf/cm ²)	0.01 (0.1)	0.3 (3)	0.6 (6)	1.2 (12)
Outlet pressure, MPa (kgf/cm ²)	25 (250)	25 (250)	25 (250)	25 (250)
Power consumption, kW (max)	100	100	100	100
Inlet water temperature, °C	plus 40	plus 40	plus 40	plus 40
Cooling water consumption, m ³ /h	9.5	9.5	9.5	9.5
Overall dimensions, mm, length	2600	2600	2600	2600
width	1550	1550	1550	1550
height	1500	1500	1500	1500
Weight, kg	3000	3000	3000	3000

The delivery scope includes service documents and compressor spare parts for warranty liability period.

NATURAL GAS LIQUEFACTION STATIONS (LNG)

The natural gas liquefaction stations (LNG) production is used to ensure high density of transported or stored natural gas using small capacity chambers and other vessels and is fit for service in temperate climate conditions 4.2.

The station is used for refueling of fuel tanks of transport vehicles equipped with internal combustion engines, such as railway, freight and automobile transport. It can also be used for aviation.

The plant can be used efficiently for gasification of small settlements that are away from gas pipelines where laying out pipelines is connected with a high labour content and has a low pay-back.

The station does not require special equipment for operation with natural gas, such as expander unit, preliminary cooling block, compressor and cleaning block, which simplifies the station operation. Refrigerating capacity is supplied to the liquefied natural gas from the air circuit with expander. Such system is more efficient in comparison with the classical cycle of Claude, by more than 16% due to higher as compared with methane (0.72 kg/m^3) density of suction through the compressor air (1.8 kg/m^3) at atmospheric pressure and a higher refrigerating capacity at adiabatic expansion in expansion.

The plant provides a possibility of operation within a wide range of pressure in gas pipeline from 1.1 to 70 kgf/cm^2 . The higher is the pressure, the higher is the output of liquid product. In the case of pressure of 70 kgf/cm^2 and throttling up to 1.1 kgf/cm^2 the capacity is more than 80 kg/h .

At natural gas liquefying the methane content at the outlet increases, and practically there is no water and carbon dioxide.

Technical specifications

LNG capacity at pressure		
in the circuit of 1.1 kgf/cm^2 , kg/h, min		50
Capacity of the compressor		
with regard to air, Nm^3/h		252
Power consumption		
of the station, kW, max		110
Equilibrium pressure		
of LNG produced, MPa		0.11–1.6
	kgf/cm^2	1.1–16
LNG chamber capacity, m^3		0.5

The level and functionality of automation is to be specified by the customer.

The enterprise is capable of developing and producing highly efficient LNG stations having a capacity up to 1000 kg/h operating in cycles of low and medium pressures on the basis of turbo-expander units.

JSC "The Ural Compressor Plant" is also capable of developing and producing liquefiers as components of existing or newly built automobile gas-refueling compressor stations.

The development and manufacture of the station is carried out in accordance with an individual order of the customer and in conformity with the specification and special features required.



MOBILE NITROGEN COMPRESSOR STATIONS PKSA-9/200, PKSA-5/101

Mobile nitrogen compressor stations PKSA-9/200, PKSA-5/101 are intended for production of flame- and explosion-proof gas mixture from atmospheric air. The oxygen content in this mixture shall not exceed 10% and shall be compressed up to pressure of 20 MPa (200 kgf/cm²) - PKSA-9/200, 10.1 MPa (101 kgf/cm²) - PKSA-5/101. Produced gas mixture is used during development, test and repair of oil and gas wells and also for other technological operations in oil and gas industry.

On customer's request the stations can be mounted on Ural or KAMAZ truck chassis. On customer's request the stations can be mounted on other the chassis.

Control over working parameters of stations are carried out with the help of microprocessor automatic system which does not demand presence of operational personnel. The stations are provided with an efficient liquid cooling system to cool compressors and are protected from external impact by means of metal body.

Advantages and distinctive features

- Oxygen concentration in gas mixture is 10%, maximum, that fully corresponds to "Safety requirements in oil and gas industry".
- The gas separating block made on the basis of half fiber optics diaphragms of USA manufacture is marked by long service life - 26000 hours and doesn't require any maintenance at the manufacturer's.
- Smaller weight and overall dimensions of the station in comparison with similar stations.
- The equipped heating system provides reliable operation at low ambient temperatures.
- The station is equipped with automobile chassis of increased cross-country capability.
- The station is provided with fuel gages, which allow controlling consumption of fuel and lubrication means.

Technical specifications

	PKSA-9/200	PKSA-5/101
Gas to be compressed, inlet gas	air	air
outlet gas	inert gas mixture	inert gas mixture
Composition of inert gas mixture		
(as per volume), % nitrogen (min)	90	90
oxygen (max)	10	10
Capacity as per nitrogen, m ³ /min	9	5
Initial pressure	atmospheric	atmospheric
Outlet pressure, MPa (kgf/cm ²)	20 (200)	10.1 (101)
Power consumption, kW (diesel motor)	270	130
Overall dimensions, mm,		
length	10300	8350
width	2500	2500
height	3200	3000
Weight, kg	19700	13750

The delivery scope includes service documents and compressors spare parts for warranty liability period.

Modernization program

Conversion of air compressor stations into nitrogen compressor stations

PKSA-9/200 mounted on Ural truck chassis



PKSA-5/101 mounted on Ural truck chassis



MOBILE AIR COMPRESSOR STATIONS PKS-8/101, PKS-16/101



PKS-8/101 mounted on Ural truck chassis



PKS-8/101 mounted on metal sledge

Mobile air compressor stations PKS-8/101, PKS-16/101 are intended for production of air compressed up to pressure of 10.1 MPa (101 kgf/cm²) used in technological processes in oil and gas industry for cleaning, purging and pressurizing of pipelines as well as for other operations.

The station incorporates a modified compressor unit with an increased capacity, liquid cooling system and microprocessor control system.

On customer's request the stations can be mounted on Ural or KAMAZ truck chassis and on metal sledge (PKS-8/101).

Compressors are liquid-cooled. The equipment of stations are protected from external impact by means of metal body.

The stations are intended to operate in temperate and severe climate: minus 45°C to plus 45°C.

Advantages and distinctive features

- Smaller weight and overall dimensions of the stations in comparison with similar stations.
- The stations are equipped with automobile chassis of increased cross-country capability.
- The sledge version of station PKS-8/101 can be used during geological survey (it is supplied to the working site on external suspension by helicopter).

Technical specifications	PKS-8/101 on Ural truck chassis	PKS-8/101 on metal sledge	PKS-16/101
Gas to be compressed, inlet gas	air	air	air
Capacity, m ³ /min	8	8	16
Initial pressure	atmospheric	atmospheric	atmospheric
Outlet pressure, MPa (kgf/cm ²)	10.1 (101)	10.1 (101)	10.1 (101)
Power consumption, kW (diesel motor)	130	130	270
Overall dimensions, mm, length	8350	5500	10300
width	2500	2500	2500
height	3000	2460	3200
Weight, kg	13500	7000	19400

The delivery scope includes service documents and compressors spare parts for warranty liability period.

PKS-16/101 mounted on KAMAZ truck chassis



MOBILE AIR COMPRESOR STATIONS

UKS-400V-131, UKS-400V-P4M, UKS-630-P4M



UKS-400V-131 mounted on ZIL-131 truck chassis

Advantages and distinctive features

- Stations are unique in their design and have no analogs in Russia and CIS.
- The stations produce the highest outlet pressure in comparison with other mobile compressor stations - 400 (UKS-400V-131, UKS-400V-P4M) and 630 (UKS-630-P4M) kgf/cm².
- There is a possibility of choosing various pressure levels: 150; 230; 350; 400 (UKS-400V-131, UKS-400V-P4M) and 150; 230; 350; 400; 630 (UKS-630-P4M) kgf/cm².
- Mobility and independence.

Mobile compressor stations UKS-400V-131, UKS-400V-P4M, UKS-630-P4M are intended for filling of flasks and vessels in field conditions with compressed air, dry and clean, free of oil and mechanical particles. The air is compressed as follows: UKS-400V-131, UKS-400V-P4M - up to 40 MPa (400 kgf/cm²), UKS-630-P4M - up to 63 MPa (630 kgf/cm²). These compressor stations are used in oil and gas industry and in geological and seismic facilities.

The stations are independent plants mounted as under: UKS-400V-131 - on ZIL-131 truck chassis, UKS-400V-P4M, UKS-630-P4M - on full trailer 2PN-4M. It is possible to install stations on Ural or KAMAZ trucks chassis.

Compressors are air-cooled. The equipment of stations is covered by a metal body.

The stations are intended to operate in temperate and severe climate: minus 50°C to plus 50°C.



UKS-400V-P4M mounted on full trailer 2PN-4M

Technical specifications	UKS-400V-131	UKS-400V-P4M	UKS-630-P4M
Gas to be compressed, inlet gas	air	air	air
Capacity, m ³ /h			
without regeneration	140	140	140
with regeneration	115	115	115
Initial pressure	atmospheric	atmospheric	atmospheric
Outlet pressure, MPa	15; 23; 35; 40	15; 23; 35; 40	15; 23; 35; 40; 63
kgf/cm ²	150; 230; 350; 400	150; 230; 350; 400	150; 230; 350; 400; 630
Power consumption, kW (diesel motor)	55	55	55
Outlet air temperature, °C	plus 60	plus 60	plus 60
Air humidity as per dew point, °C	minus 60	minus 60	minus 60
Compressed air filtration			
degree, mkm (max)	10	10	10
Overall dimensions, mm, length	6900	6770	6770
width	2400	2400	2400
height	2475	2450	2450
Weight, kg	9900	6200	6200

The delivery scope includes service documents and compressors spare parts for warranty liability period.

COMPRESSOR UNITS VWV-3/100, VWV-2.3/230M

The compressor units VWV-3/100, VWV-2.3/230M are used for air compression up to pressure of 10 MPa (100 kgf/cm²) - VWV-3/100, 23 MPa (230 kgf/cm²) - VWV-2.3/230M.

They provide a reliable source of compressed air for high voltage air-break switches, that are the components of electric station switchgears. They are widely used for general industrial purposes. Unit VWV-3/100 is also used for supplying air compressed up to the pressure of 4.5; 6.4; 7 MPa (45; 64; 70 kgf/cm²) to hydraulic accumulators of water turbine oil pressure units.

Each unit incorporates compressor, electric motor, cooling block, purging system of water-oil separators mounted on a common frame. It is provided with automatic control and emergency protection system ensuring both manual and automatic control of the unit, visual inspection of the main parameters and switching off of electric motor in case of deviation from the preset mode.

Five-stage, six-cylinder compressors of W-form, air-cooled. The unit VWV-2.3/230 is a basic unit for VWV-2.3/230M. If compared with the basic unit, the capacity is increased from 2.3 m³/min up to 2.6 m³/min.

The ways of operational costs reduction

In order to reduce operational costs for compressor units VWV-3/100 and VWV-2.3/230M the experts recommend to use oil Mobil Rarus 429. The results of Mobil Rarus 429 oil tests on compressor units VWV-2.3/230M of substations Tambovskaya, Balashovskaya, Metallurgical MES of Centre of RAO "UES of Russia" proved that operational costs are 4 times less in comparison with the use of oil K2-24.



VWV-3/100

Advantages and distinctive features

- Automated, and do not require the service personnel to be present all the time.
- Simplicity and reliability of operation. Reliability of operation under low ambient temperatures.
- The compressors are air-cooled and doesn't require additional communications for cooling water supply.
- Long service life. The warranty liability period is 18 months.
- The spare parts kits are intended for medium and major repairs.



VWV-2.3/230M

Technical specifications

	VWV-3/100	VWV-2,3/230M
Gas to be compressed, inlet gas	air	air
Capacity, m ³ /min	3	2.6
Initial pressure	atmospheric	atmospheric
Outlet pressure, MPa (kgf/cm ²)	10 (100)	23 (230)
Power consumption, kW (max)	50	55
Outlet air temperature, °C	plus 65	plus 65
Overall dimensions, mm, length	2400	2400
width	1250	1300
height	1500	1500
Weight (less oil, automation, spare parts kit), kg	1520	1950

The delivery scope includes service documents and compressor spare parts for warranty liability period.

COMPRESSOR UNIT VWV-1/40

Piston compressor unit VWV-1/40 is a modification of serial compressor unit AVW-3/8 making it possible to produce air compressed up to 4 MPa (40 kgf/cm²). The unit is used as a part of power systems of hydroelectric and heat power stations for supplying compressed air to hydroelectric power station units in the synchronous compensator mode.

The unit incorporates a compressor, drive motor, air-cooling system and an automatic control system.

The delivery scope includes service documents and compressor spare parts for warranty liability period.

VWV-1/40



Technical specifications

Gas to be compressed, inlet gas	air
Capacity, m ³ /min	1 1.5
Initial pressure	atmospheric
Outlet pressure, MPa	4 4.5
kgf/cm ²	40 45
Power consumption, kW (max)	18
Overall dimensions, mm, length	1700
width	1100
height	1300
Weight (less oil, automation, spare parts kit), kg	1100

* depending on the engine

New microprocessor-based automation system for VWV-3/100, VWV-2,3/230M, VWV-1/40, AVW-2,5/400 compressors

Advantages and distinctive features

- Compressor control cabinet, pressure gage cabinet and power unit are integrated into one block
- For the convenience of erection and operation, pressure sensors are used instead of pressure gages, which doesn't require pressure gage tubes from the compressor to the pressure gage. The scope of supply includes electric cables.
- Automation system is equipped with a smooth start device, which protects the engine from overload during start-up.
- The data related to the operation of the compressor is indicated on the controller's computer, which allows real-time monitoring of the compressor operation.
- There is a possibility to integrate several compressors into a group to provide uniform load.

COMPRESSOR UNIT AVW-2.5/400

The compressor unit AVW-2.5/400 is used for air compression up to 40 MPa (400 kgf/cm²). It is used for general industrial purposes and also can be used for pneumatic tests of pressurized vessels and pipelines.

The compressor unit VWV-2.3/230M is the basic unit for the compressor unit AVW-2.5/400. If compared with the basic unit the outlet pressure is increased from 23 MPa to 40 MPa (from 230 kgf/cm² to 400 kgf/cm²).



AVW-2.5/400

Technical specifications

Gas to be compressed, inlet gas	air
Capacity, m ³ /min	2.5
Initial pressure	atmospheric
Outlet pressure, MPa (kgf/cm ²)	40 (400)
Power consumption, kW (max)	70
Outlet air temperature, °C	plus 65
Overall dimensions, mm, length	2500
width	1300
height	1500
Weight (less oil, automation, spare parts kit), kg	1780

COMPRESSOR UNIT AVW-3.7/200M

Modernized compressor unit AVW-3.7/200M is used for air compression up to pressure of 20 MPa (200 kgf/cm²).

If supplied separately, it is used as a component of stationary and modular low capacity air separating installations as well as compressor units VW-4.2/200.

COMPRESSOR UNIT VW-4.2/200

Compressor unit VW-4.2/200 is used for air compression up to pressure of 20 MPa (200 kg/cm²). It is also used as a component of air-fractionating units of types AgKg-0.06, AgKg-0.06-1, AgA-0.07 manufactured by "Uralkriotechnika" and for general purposes in industry. It can also be used for pneumatic tests of pressurized vessels and pipelines.

The unit incorporates compressor unit AVW-3.7/200M and electric motor mounted on common frame. The unit is provided with automatic control and emergency protection system ensuring both manual and automatic control of the unit, visual inspection of the main parameters and switching off of electric motor in case of deviation from the preset mode. Compressor is provided with water cooling.

Advantages and distinctive features

- Smaller weight and overall dimensions in comparison with other similar units.
- It is automated and doesn't require service personnel to be present all the time.
- The warranty liability period is 24 months.

The compressor unit VW-4.2/200 was developed as a substitute for compressor 2VM2.5-5/221 manufactured by Krasnodar Compressor Plant incorporated in air-fractionating unit of type AgKg-0.06 manufactured by "Uralkriotechnika".



Technical specifications	AVW-3.7/200M	VW-4.2/200
Gas to be compressed, inlet gas	air	air
Capacity, m ³ /min	4.2	4.2
Initial pressure	atmospheric	atmospheric
Outlet pressure, MPa (kgf/cm ²)	20 (200)	20 (200)
Power consumption, kW (max)	85	85
Cooling water consumption, m ³ /min	0.158	0.1
Overall dimensions, mm, length	1300	2300
width	1540	1550
height	1120	1600
Weight (less oil, automation and spare parts kit), kg	1100	2000

The delivery scope includes service documents and compressor spare parts for warranty liability period.

RECONSTRUCTION OF AIR-FRACTIONATING UNITS BEING IN OPERATION WITH EXCHANGE OF COMPRESSORS AND RECIPROCATING EXPANDERS

The Ural Compressor Plant suggests replacement of compressor units and reciprocating expanders incorporated in air-fractionating units of types AgKg-0.06, AgKg-0.06-1, AgA-0.07 manufactured by "Uralkriotechnika" as well as units

of small capacities of other manufacturers. The reconstruction provides reduction of maintenance and repair costs of the obsolete equipment.

RECIPROCATING EXPANDERS DPV2-200/6-3M, DPV4.2-200/6-2

The DPV2-200/6-3M and DPV4.2-200/6-2 reciprocating expanders are designed to produce low temperatures by means of expansions of the compressed air. The expanders are used in multimode stationary and mobile air-fractionating units of small capacity to produce nitrogen and oxygen.

Each unit consists of reciprocating expander and braking motor mounted on common frame. It is equipped with control board supplying power to electric circuit or reciprocating expanders. The expander unit is provided with the system of protection against racing.

The expander design applies electromagnetic drive of the admission valve, outley parallel-current flow, lubrication-free seal of the piston.



DPV4.2-200/6-2



DPV2-200/6-3M

Application

Reciprocating expander DPV2-200/6-3M

- Air-fractionating units of types AgKg-0.06, AgKg-0.06-1, AgA-0.07 manufactured by "Uralkriotechnika" (in complete set with compressor unit VW-4.2/200).

Reciprocating expander DPV4.2-200/6-2

- Air-fractionating units of small capacity (in complete set with compressor unit AVW-3.7/200M).

Technical specifications

	DPV2-200/6-3M	DPV4.2-200/6-2
Capacity, m ³ /h	140	250
Cold-productivity, W	4300	9000
Capacity adjustment, %	100–50	100–70
Initial pressure, MPa (kgf/cm ²)	20 (200)	20 (200)
Outlet pressure, MPa (kgf/cm ²)	0.5 (5)	0.5 (5)
Inlet air temperature, °C	from minus 20 to plus 30	from 0 to plus 30
Temperature difference in expander, °C	plus 130	plus 139
Expander efficiency, % (min)	65	68
Crankshaft rotational speed, c ⁻¹ (rpm)	6.66 (400)	6.66 (400)
Overall dimensions, mm, length	1100	1500
width	670	750
height	1410	1590
Weight of delivery set, kg	415	1100

The delivery scope includes service documents and compressor spare parts for warranty liability period.

RECIPROCATING EXPANDER DPPG-150-200/3

The Ural Compressor Plant is working out the engineering samples of reciprocating expander DPPG-150-200/3 intended for complication of natural gas liquefaction stations (LNG).

Technical specifications

Capacity, m ³ /h	250
Cold-productivity, W	4000
Initial pressure, MPa (kgf/cm ²)	20 (200)
Outlet pressure, MPa (kgf/cm ²)	0.1–1.3 (1–13)
Expander efficiency, % (min)	70

SCREW COMPRESSORS ATLANT

Oil-flooded screw compressors Atlant are intended for production of compressed air with the capacity of 0.8 to 33 m³/min and the pressure of 0.75 to 1.3 MPa (7.5 to 13 kgf/cm²). They're equipped with high-reliability screw blocks produced by the world's leading manufacturers - German companies GHH-RAND and Rotorcomp.

Screw compressors Atlant successfully substitute low pressure piston-type compressors.

Application

The universal nature of the compressors allows their application in all branches of industry. They can be used for supplying compressed air to machinery equipment, various pneumatic equipment and tools as well as to other mechanisms.

Advantages and distinctive features

Low power consumption

Is provided due to the high efficiency of screw compressors, versatility thanks to the possibility of repeated start and stop depending on the mode of consumption, varying from maximum to zero. This advantage of screw compressors provides a possibility to lower the consumption of power by 30%.

Long service life

The operating time of screw compressors until major repairs amounts to 40000 hours.

Full automation

The compressors are equipped with modern high-reliability automation systems. Preheating, blow-through, condensate discharge, control over the working parameters and stoppage in case of deviations are automated and don't require service personnel to be present.

Output adjustment

The mechanism of air supply lowering allows adjusting the output and capacity of the compressor to the volume of compressed air consumption.

Compactness, low levels of noise and vibration

Thanks to the effective arrangement of units, the weight and overall dimensions of the compressors have been reduced. Low level of vibration is provided by the use of modern component parts which are mounted on the frame in a particular way. The noise-protection devices make the operation of the compressor almost noiseless.

Technical specifications

Model	Drive capacity, kW	Nominal capacity, m ³ /min	Outlet pressure, MPa (kgf/cm ²)	Overall dimensions, LxBxH, mm	Weight, kg
Atlant-7	7.5	1.2/1.0/0.8	0.75/1/1.3 (7.5/10/13)	800 x 700 x 1200	220
Atlant-11	11	1.7/1.4/1.2	0.75/1/1.3 (7.5/10/13)	800 x 700 x 1200	250
Atlant-15	15	2.2/1.9/1.6	0.75/1/1.3 (7.5/10/13)	1000 x 800 x 1500	310
Atlant-18	18.5	2.8/2.4/1.9	0.75/1/1.3 (7.5/10/13)	1000 x 800 x 1500	340
Atlant-22	22	3.3/2.9/2.4	0.75/1/1.3 (7.5/10/13)	1200 x 930 x 1600	460
Atlant-30	30	4.8/3.9/3.4	0.75/1/1.3 (7.5/10/13)	1180 x 930 x 1600	660
Atlant-37	37	5.6/4.5/4.2	0.75/1/1.3 (7.5/10/13)	1180 x 930 x 1600	720
Atlant-45	45	6.3/5.8/5.0	0.75/1/1.3 (7.5/10/13)	1290 x 1035 x 1680	850
Atlant-55	55	8.9/7.8/6.4	0.75/1/1.3 (7.5/10/13)	1350 x 1035 x 1680	860
Atlant-75	75	11.5/9.5/8.3	0.75/1/1.3 (7.5/10/13)	1650 x 1150 x 1750	1350
Atlant-110	110	18.0/15.2	0.75/1 (7.5/10)	2300 x 1800 x 2000	2500
Atlant-132	132	22.0/17.5	0.75/1 (7.5/10)	2800 x 1950 x 2100	3000
Atlant-160	160	26.0/22.5	0.75/1 (7.5/10)	2800 x 1950 x 2100	3300
Atlant-200	200	33.0	0.75 (7.5)	2800 x 1950 x 2100	3600



Atlant-75

These advantages allow positioning of screw compressors Atlant close to the air consumers, immediately on site.

Mobility

The compressors are mobile, they don't require a substructure and can be easily relocated.

The delivery scope includes service documents and compressor spare parts for warranty liability period.

MODULAR-TYPE COMPRESSOR STATION ATLANTIC

Modular-type compressor stations (MCS) Atlantic are equipped with two screw compressors of Atlant series and are intended for supply of different devices and equipment with compressed air in railroad servicing:

- for blowing out of railway switches;
- for discharge of cars of hopper-batchers;
- for compressed air supply to brake systems of railway trains;
- for compressed air supply of railroad servicing repair services.

For reliable operation of Atlantic station at temperatures below zero the MCS are provided with compressor station Atlant-45HT equipped with a unique system of prestart heating. The Atlantic stations are equipped with fire-fighting signaling system, with automatic system of powder fire-fighting, ventilation and lighting system. The stations are delivered complete, ready for operation, with internal piping system.

Modern microprocessor-based automation system of the stations makes it possible to control compressor equipment from remote control panel of dispatcher and does not require the operator to be present.

To ensure the preset capacity the Atlantic stations in accordance with the customer's requirement can be equipped with by other types of screw compressors of Atlant series. In this case the MCS are equipped with a heating system and the walls are made of sandwich panels.

In conformity with the customer's request the Atlantic modular-type compressor station can be additionally equipped with compressed air dryers, filter system air collectors, etc.

The Atlantic MCS are also used in oil-and-gas, mining and construction industries as well as in other branches of economy. The station doesn't require preparation of special foundation and construction of buildings and therefore can be easily relocated to a new place of operation that makes it possible to reduce customer's expenses for capital construction of buildings and respective facilities used for compressor stations as well as reduce time for installation, erection and commissioning.



MCS Atlantic

Technical specifications

Capacity, m ³ /min*	6
Pressure, MPa (kgf/cm ²)*	1.0 (10)
Overall dimensions, mm,	
length	5000
width	3000
height	3000
Weight, kg	6000
Compressor motor type	electric motor, 380 V, 50 Hz

* specified are features of screw compressor Atlant-45NT, the modular-type compressor station incorporates two compressors of such type

The Atlantic stations are intended for operation within temperature range from minus 45°C to plus 45°C.

SCREW-TYPE COMPRESSOR STATION ATLANT-75GP

The Atlant screw-type compressor station is intended for the use with various special-purpose vehicles. The primary purpose of the station is the supply of technological processes with compressed air.

Technical specifications

Drive capacity, kW, max	80
Nominal capacity, m ³ /min	10
Outlet pressure, MPa (kgf/cm ²)	1.0 (10)
Overall dimensions, mm, length	1100
width	500
height	1300
Weight, kg	590

Advantages and special features

- Possibility of using it in limited space of mobile machines due to small size of the station units.
- An independent oil cooler incorporating finned plate radiator and axial fan makes it possible to locate the station at various places of specialized mobile vehicle housing.
- The universal drive module with V-belt transmission. A special unit for radial forces discharge on the drive pulley of V-belt transmission provides a possibility of using any type of drive, such as hydraulic motor, electric motor and power take-off shaft.



Atlant-75GP

SCREW COMPRESSOR STATION ATLANT-45NT

Screw compressor station Atlant-45NT is a reliable source of compressed air under extreme, severe climate conditions.

Application

- As a part of drilling machines for developing oil and gas wells.

Advantages and distinctive features

- Atlant-45NT is completed with the heating-and-cooling system that provides stable work at ambient temperature from minus 40°C to plus 40°C.



Atlant-45NT

Technical specifications

Capacity, m ³ /min	6
Automatic displacement	adjustment system
Outlet pressure, MPa (kgf/cm ²)	1 (10)
Power consumption, kW (max)	45
Ambient temperature, °C	from minus 40 to plus 40
Overall dimensions, mm, length	1550
width	960
height	1260
Weight, kg	860

The delivery scope includes service documents and compressor spare parts for warranty liability period.

COMPRESSOR UNIT AVW-6/10

Piston compressor unit AVW-6/10 is intended for air compression up to pressure 1.0 MPa (10 kgf/cm²). Double-stage, six-cylinder compressor of W-form.

Application

- Main application - as a part of drilling machines used in oil and gas industry.
Often used as a replacement for compressor units 4VU1-5/9 manufactured in Melitopol Compressor Plant (in the Ukraine) with the preservation of existing foundations and communications.
- Compressed air supply to machinery equipment, various pneumatic equipment and tools at enterprises of various branches of industry.
- Railroad tracks maintenance.

Advantages and distinctive features

- As distinct from the screw compressor station Atlant-45NT, the unit can be operated within the temperature range from minus 45°C to plus 45°C.
- They are provided with electrical oil heating.
- Automated, and do require the service personnel to be present all the time.
- The compressors are air-cooled and doesn't require additional communications for cooling water supply.
- The warranty liability period is 18 months.
- The spare parts kits are intended for medium and major repairs.



AVW-6/10

Technical specifications

Gas to be compressed, inlet gas	air
Capacity, m ³ /min	6
Initial pressure	atmospheric
Outlet pressure, MPa (kgf/cm ²)	1.0 (10)
Power consumption, kW (max)	55
Outlet air temperature, °C	plus 65
Overall dimensions, mm, length	2300
width	1200
height	1650

Weight (less oil, automation, spare parts kit), kg	1500
----------------------------------------------------	------

The delivery scope includes service documents and compressor spare parts for warranty liability period.

COMPRESSOR UNITS AVW-3/8, AVW-6/8, AVWD-6/8



AVW-6/8

The general purpose industrial compressor units AVW-3/8, AVW-6/8, AVWD-6/8 are intended for compressed air supply to machinery equipment, various pneumatic equipment and tools at enterprises of various branches of industry and for blowing of throwing devices and for railroad tracks maintenance.

The compressors are double-stage and three- (AVW-3/8) and six-cylinder (AVW-6/8, AVWD-6/8) of W-form.

The drive mechanism is provided with mechanical lubrication from gear oil pump, in cylinders by means of splash lubrication. The water-oil separator ensures an effective cleaning of compressed air produced from condensed moisture and oil.

Advantages and distinctive features

- They can be used within temperature range from minus 45°C to plus 45°C.
- They are provided with electrical oil heating.
- Automated, and do require the service personnel to be present all the time.
- The compressors are air-cooled and doesn't require additional communications for cooling water supply.
- The warranty liability period is 18 months.
- The spare parts kits are intended for medium and major repairs (only for compressor units AVW-6/8).

Climatic version: AVW-3/8 is intended for operation in moderate and cold climate conditions UHL4.2 and U2, AVW-6/8 - UHL4.2., AVWD-6/8 - U2. The compressor units in climatic version U2 are provided with electric heater to heat oil in crankcase within temperature range from plus 40°C to plus 60°C prior to start after a long halt under oil temperature below plus 10°C.

Technical specifications

	AVW-3/8	AVW-6/8	AVWD-6/8
Motor type	electric drive	electric drive	diesel engine
Gas to be compressed, inlet gas	air	air	air
Capacity, m ³ /min	3	6	6
Initial pressure	atmospheric	atmospheric	atmospheric
Outlet pressure, MPa (kgf/cm ²)	0.8 (8)	0.8 (8)	0.8 (8)
Power consumption, kW (max)	29	50	—
Outlet air temperature, °C	plus 65	plus 65	plus 65
Overall dimensions, mm, length	1700	2300	3500
width	1100	1250	1500
height	1250	1300	1700
Weight (less oil, automation, spare parts kit), kg	1050	1500	3600

The delivery scope includes service documents and compressor spare parts for warranty liability period.



AVWD-6/8



CRYOGENIC EQUIPMENT URALCRYOTECHNIKA

The history of Engineering Plant "Uralcryotechnika" dates back to 1931 when the decision was made to construct oxygen-producing plant.

In May 1935 the first oxygen was produced. It is this year that is considered to be the birthday of Engineering Plant "Uralcryotechnika".

At the very beginning the plant was equipped with the Linde-Geilandt.

In 1941 the plant received the equipment evacuated from oxygen plants of Leningrad, Balashikha and Dnepropetrovsk. The manufacturing capacity of the plant has increased. During World War II was the largest oxygen-producing plant in the country.

In 1944 three plants, A-1, A-2 and Superior came to oxygen-producing shop as lend-lease aid.

During the war and afterwards the plant was renamed several times, was integrated with other enterprises and was subordinated to various ministries and departments.

In 1947 the plant commercialized a process of pure argon production.

In 1948 in accordance with the decision of "Glavkislород" the plant was handed over the manufacture of oxygen installations CK-0.5.

The end of 50-ies and the beginning of 60-ies is marked with a high increase of product output of engineering products of the works. First of all, these are orders of Ministry of Defense, Air Force and Navy.

In the 60-ies the plant has enlarged its product range. It started to produce gasifiers, filling chambers and other equipment.

In 1964 the manufacture of cryogenic transfer chambers has been started.

In 1968 as the plant was mostly dealing with cryogenic equipment, it was renamed into Sverdlovsk oxygen engineering plant.

In 1976 gas manufacturing has been stopped completely.

Almost all NPP of the former USSR and Bulgaria were equipped with the equipment manufactured by this plant. During 70-ies and 80-ies up to 20 pc of air fractionating units were exported annually to 25 countries all over the world. In 1991 export production output was almost 22% from the total production output. The equipment was exported to various countries of the Middle East, Indonesia, Korea, Pakistan, India, Vietnam, Iran, Iraq, Syria, Yemen, to various African countries, Bulgaria, Romania, Hungary, Poland, Czechoslovakia, Cuba, etc. The annual output of air fractionating units has reached 125 pc.

In 1992 the plant was renamed into Machine-building Plant "Uralcryotechnika". At that time as well as at other enterprises of the country the production output has decreased, the number of employees was reduced. But gradually the plant has been improving.

In 1998–1999 the production output of the plant increased. Until 2003 the annual growth rate of production reached 30–70%. The profit of the plant increased annually by 1.3 to 2 times.

In 2004 of JSC "Machine-building Plant "Uralcryotechnika" has transferred manufacturing base on territory of the UCP, there is now an association of two factories. Now the production of full spectrum of cryogenic equipment under trade mark "Uralcryotechnika" is continued, development of new technical equipment is conducted.

At present Engineering Plant "Uralcryotechnika" supplies cryogenic equipment practically to all branches of industry. The articles and equipment produced by the plant are used in science and medicine, vacuum industry, heat-and-power engineering, agriculture, in glasswork, in steel making industry, nuclear-power engineering, etc.

The production capacities of the plant make it possible to perform development testing and examination of the cryogenic equipment produced. Besides all types of heat exchangers and various-purpose tanks are being developed and manufactured.

Vacuum multilayer insulation used in cryogenic equipment is produced on unique equipment.

This insulation makes it possible to reduce losses of liquefied gases during transportation and storage.

At present the production range of the plant incorporates the following equipment:

- air fractionating units in stationary and mobile version for production of oxygen and nitrogen, including installations to produce oxygen of medical purity (99.7%) and high purity nitrogen (99.999%);
- nitrogen cooling systems in stationary and mobile versions;
- various purpose gasifiers in stationary and mobile versions including gasifiers for laser cutting sets of equipment;
- fire-prevention gasification units for fire prevention and fire fighting in pits and in enterprises for grain storage and processing;
- air drying blocks;
- cryogenic transfer chambers for transportation of liquefied oxygen, nitrogen and argon;
- biological products storage vessels;
- Dewar flasks;
- relief, filling and discharge chambers;
- test stands for cylinder hydraulic tests.

The Ural Compressor Plant is seeking for strong trading and technical partners abroad. Foreign companies looking for mutually advantageous cooperation are invited to contact International dept.



LIQUID OXYGEN, NITROGEN, ARGON AND OXYGEN, NITROGEN, ARGON GAS SUPPLY DIAGRAM

HIGHLY EFFICIENT AND RELIABLE ALTERNATIVE TO GAS CYLINDERS



In-house production of high quality oxygen and nitrogen is necessary for reliable operation of the enterprises located far away from technical gas manufacturers

AIR FRACTIONATING UNITS AgKg-0.06, AgA-0.07

Air fractionating unit AgKg-0.06 is used for production of gaseous and liquid oxygen (including high-purity oxygen) and nitrogen, air fractionating unit AgA-0.07 is used for high purity liquid nitrogen production from atmospheric air. The operation of air fractionating is based on the method of deep cooling that enables using of atmospheric air as a free raw material.

Advantages and distinctive features

The unit use makes it possible to give up the unreliable, labour consuming and expensive purchases of oxygen and nitrogen from other manufacturers, that is especially important for the consumers of the above-mentioned products located away from technical gas-producing enterprises.

The units are simple and reliable in operation and long lasting (the service life of the unit is 15 years, minimum). These units have a number of advantages over similar units, which are:

- high purity of the product;
- reliability;
- versatility;
- low specific energy consumption.

Standard equipment of AgKg-0.06 unit includes:

1. Air compressor plant VW-4.2/200.
2. Block of preliminary cooling.
3. Air cleaning block.
4. Control desk.
5. Air fractionating block.
6. Liquefied gas pump.
7. Expander unit DPV2-200/6-3M.
8. Filling chamber 2×5 cylinders.
9. A set of spare parts and technological lines.

Technical specifications

	AgKg-0.06	AgA-0.07
Capacity		
oxygen gas, m ³ /h	45	–
nitrogen gas, m ³ /h	60	60
liquid oxygen, kg/h	55	–
liquid nitrogen, kg/h	60	60
Purity of fractionated products		
oxygen, O ₂ volume %	99.7	–
nitrogen, O ₂ volume %	0.1	0.002
Pressure of products		
of fractionating, MPa (kgf/cm ²)		
gaseous mode	20 (200)	
liquid mode	up to 0.1 (1.0)	
Power consumption, kW		
gaseous mode	80	
liquid mode	90	
Dimensions of room for erection, except chambers, m		
length	14	
width	6	
height	5	
Weight, kg	10000	9000



MODULAR AIR FRACTIONATING UNIT AgKg-0.06-1

The unit AgKg-0.06 - in modular version is used for the production of gaseous and liquid oxygen (including high-purity oxygen for medical purposes) and nitrogen from the atmospheric air.

The unit use makes it possible to give up the unreliable, labour consuming and expensive purchases of oxygen and nitrogen from other manufacturers, which is especially important for the consumers of the above-mentioned products located away from technical gas-producing enterprises.

Advantages and distinctive features

- the unit has four modes of operation: each of the operation modes ensures creation of one of the gaseous or liquid product;
- high purity of the produced product;
- it can be located on the open platform (erection of a separate building is not required);
- short time needed for erection of the unit;
- it can be transported within a short period of time and erected in another location;
- it is suitable for operation in far away locations and out-of-the-way-places.

Technical specifications

Capacity	
oxygen gas, m ³ /h	45
nitrogen gas, m ³ /h	60
liquid oxygen, kg/h	55
liquid nitrogen, kg/h	60
Purity of fractionated products	
oxygen, O ₂ volume %	99.7
nitrogen, O ₂ volume %	0.1
Pressure of products	
of fractionating, MPa (kgf/cm ²)	
gaseous mode	20 (200)
liquid mode	up to 0.1 (1.0)
Power consumption, kW	
	120
Overall dimensions of each of the two containers-vans, m	
length	9.7
width	3.2
height	3.6
Weight of two container-vans, kg	
	30800
Operating hours until stop for heating, days	
	120



Comment on operation of air fractionating unit AgKg-0.06:

Air fractionating unit AgKg-0.06 manufactured by Engineering Plant "Uralcryotechnika" is being operated at Uchalinsky Ore Mining and Processing Enterprise. The unit was purchased instead of air fractionating unit AgKg-0.04, as the unit had exhausted its resources.

The unit provides our enterprise with oxygen to perform welding and repair works and to supply the hospitals of the city.

Standard delivery set

- two comfortable container-vans provided with heating, ventilation, natural and artificial lighting;
- air compressor plant VW-4.2/200;
- block of preliminary cooling;
- air cleaning block;
- control desk;
- air fractionating block with liquefied gas pump;
- expander unit DPV2-200/6-3M;
- filling chamber 2×5 cylinders;
- a system of water recycling;
- a set of spare parts and technological lines.

The unit has been in operation for a year, and it is functioning in accordance with technical specifications. There were no failures or serious problems with the operation of the unit. The purity of oxygen is 99.7%.

The unit is reliable and easy in maintenance. It is manufactured with high quality, has a sufficient level of automation.

Chief engineer of UGOK JSC

A.E. Zubkov

GASIFIERS

GH-1.0/1.6-0.045, GH-1.5/1.2-0.05, TGHK-1.0/0.06-1.6

Gasifiers are used for transportation, storage and gasification of liquefied oxygen, nitrogen and argon and their supply to the consumer in gaseous state.

They are used instead of high-pressure vessels as more comfortable and more efficient devices.

They are used in medicine, heavy industry and construction to perform welding and metal cutting.



GH-1.0/1.6-0.045
GH-1.5/1.2-0.05



TGHK-1.0/0.06-1.6

Design

Gasifiers GH-1.0/1.6-0.045, GH-1.5/1.2-0.05 and TGHK-1.0/0.06-1.6 represent complex units consisting of two tanks, evaporator of pressure increase and evaporator for gasification of liquefied product. Gasifiers are placed in open concrete ground.

Gasifiers GH-1.0/1.6-0.045, GH-1.5/1.2-0.05 are equipped with two independent functioning tanks that makes it possible to perform gasification of liquid products continuously.

All the equipment incorporated in gasifier TGHK-1.0/0.06-1.6 is mounted on a common frame with metal housing over the perimeter and has a shed, therefore this is mobile equipment and can be quickly installed in truck (trailer) and transferred to any location of the construction site.

Principle of operation

The principle of operation is based on creation of working pressure in the tanks filled with liquefied gas.

Pressure increase and maintenance is ensured by the pressure increase evaporator. The liquefied product is transferred into the evaporator from which gas pressurized up to 1.6 (1.2) MPa (up to 16 (12) kgf/cm²) is supplied to the consumer through two distribution valves.

Pressure is maintained automatically by pressure regulator and is controlled by the pressure gauge. The amount of liquid product filled is controlled by the level indicator - differential pressure gauge. The controlling equipment is located on the control panel.

Advantages and specific features

- economic efficiency - the use of gasifiers makes it possible to give up labour consuming and expensive transportation of technical gases in cylinders;
- small losses of product due to the use of multilayer vacuum isolation;
- no need for the operator to be constantly present and no need in external energy sources.

Gasifiers are not subject to registration in Gosgortekhnadzor.

The plant is capable of manufacturing made-to-order gasifiers of cold type for transportation and storage with the following gasification of liquid methane.

The enterprise can also manufacture gasifiers with the technical features specified by the customer.

Technical specifications

The amount of gas given to the consumer during one refueling of two tanks, m³

(recalculated for 40-liters cylinders at pressure P=150 kgf/cm², pc)

	GH-1.0/1.6-0.045	GH-1.5/1.2-0.05	TGHK-1.0/0.06-1.6
oxygen	810 (135)	1215 (202)	810 (135)
nitrogen	653 (109)	980 (163)	653 (109)
argon	792 (132)	1188 (198)	792 (132)
The amount of product to be filled in, kg (in two tanks)			
oxygen	1080	1620	1080
nitrogen	760	1140	760
argon	1320	1980	1320
Capacity, m ³ /h	0-45	0-50	0-56
Volume, m ³	1.0	1.5	1.0
Working pressure, MPa (kgf/cm ²)	0.1-1.6 (1-16)	0.1-1.2 (1-12)	0.1-1.6 (1-16)
Overall dimensions, mm,			
length	3200	2380	2500
width	2000	2000	1800
height	1500	1800	1850
Weight of empty gasifier, kg	900	1000	1300

GASIFIERS GH-0.3/3.6-0.04, GH-0.6/3.0-0.1, GH-0.6/3.2-0.04 FOR LASER CUTTING SETS OF EQUIPMENT

Gasifiers provide required purity oxygen for laser cutting thus ensuring the quality of laser cutting.

We propose to perform project development of technical gas supply system for laser cutting equipment and supply of gasifier GH-1.0/1.6-0.045 for oxygen production and high-pressure gasifiers GH-0.3/3.6-0.04, GH-0.6/3.0-0.1, GH-0.6/3.2-0.04 for nitrogen (have been specially developed for laser cutting sets of equipment).



GH-0.6/3.0-0.1

Technical specifications	GH-0.3/3.6-0.04	GH-0.6/3.0-0.1	GH-0.6/3.2-0.04
The amount of product to be filled in, kg			
nitrogen	207	414	460
Capacity, m ³ /h	0–40	0–100	0–40
Volume, m ³	0.27	0.54	0.6
Working pressure, MPa (kgf/cm ²)	0.1–3.6 (1–36)	0.1–3.0 (1–30)	0.1–3.2 (1–32)
Overall dimensions, mm, length	1600	1400	3000
width	2100	2120	1200
height	1500	1900	1500
Weight of empty gasifier, kg	550	800	1000

Comment on operation of gasifiers:

Cheliabvtormet JSC has been using gasifiers GH-1.0/1,6-0,045 and GH-1,5/1,2-0,05 type (manufactured by Engineering Plant "Uralcryotechnika" JSC, Ekaterinburg) for a long time to produce oxygen for metal cutting.

Gasifiers in comparison with cylinders make the oxygen supply system easier and significantly less expensive.

During the operation period there were no failures of operation mode. The gasifiers fully correspond to technical specifications.

The equipment is comfortable and easy in operation, and doesn't require the service personnel. The preset pressure and its consumption are maintained automatically.

Confidence in safety and reliability, high quality of manufacturer and service make it possible to cope with the tasks successfully, therefore we are among constant customers of cryogenic equipment of Uralcryotechnika JSC.

Marketing director of Cheliabvtormet JSC

V.A. Potapov

THE PROGRAM OF TRANSFER FOR USING GASIFIERS INSTEAD OF CYLINDER PRINCIPLE OF TECHNICAL GAS SUPPLY FOR INDUSTRIAL PURPOSES

GASIFIERS - ARE ECONOMIC AND RELIABLE ALTERNATIVE TO CYLINDERS

Many enterprises face the challenge of ineffective organization of supply of technical gases for industrial purposes. The main reason is wide use of gas cylinders requiring a lot of physical effort during transportation and operation of cylinders. Cylinders need to be replaced and repaired, and they have to be regularly filled.

In order to solve this problem we propose to use gasifiers instead of gas cylinders.

When you use gasifiers you will have no additional problems with refueling. Refueling of gasifiers can be carried out both from the chambers and by means of replacement of gasifier tanks.

Gasifiers are not subject to registration in Gosgortekhnadzor. That makes their installation and operation easier. The experience of enterprises that use gasifiers shows that refueling price has reduced by three times, transportation costs and man-hour costs have reduced by two times.

On the whole transfer to gasifiers instead of gas cylinders even with consideration of capital costs pays back within less than a year.

GASIFICATION UNITS

GASIFICATION UNIT G-1.6/20-0.05-1

Gasification unit G-1.6/20-0.05-1 is used for transportation and storage of liquefied oxygen, nitrogen and argon with the gasification and refueling cylinders or other tanks with gaseous product pressurized to 20 MPa (200 kgf/cm²).

Advantages and distinctive features

- portability and simplicity of operation.



Technical specifications

The amount of product to be filled in, kg	
oxygen	1730
nitrogen	1230
argon	2120
Capacity, m ³ /h	
oxygen	60
nitrogen	48
argon	60
Volume, m ³	
	1.6
Working pressure, MPa (kgf/cm ²)	
	20 (200)
Power consumption, kW	
	24
Dimensions of room for installation of the unit, m,	
length	6
width	3
height	2.5
Weight of empty gasifier, kg	
	2300

The delivery scope includes transfer chamber ZTK-1.6/0.25-1 and gasifying block including control and power cabinets, evaporator, control board, liquefied gas pump.

FIRE-PREVENTION GASIFICATION UNITS PGHKA-1.0-0.3/1.6, PGHKA-1.0-0.9/1.6

Fire-prevention gasification units PGHKA-1.0-0.3/1.6 and PGHKA-1.0-0.9/1.6 is used for storage and transportation of liquefied nitrogen followed by its gasification to create nitrogen inert media in order to localize and perform fire fighting in the pits, grain storage and basements and also for high quality storage of grain and other agricultural products and for prevention of self-ignition of goods during storage.

Unit PGHKA-1.0-0.3/1.6 is not subject to registration in Gorgostekhnadzor.



PGHKA-1.0-0.9/1.6



PGHKA-1.0-0.3/1.6

Technical specifications	PGHKA-1.0-0.3/1.6	PGHKA-1.0-0.9/1.6
The amount of product to be filled in, kg	760	730
Capacity m ³ /h	300	900
Volume, m ³	1.0	1.0
Working pressure, MPa (kgf/cm ²)	1.6 (16)	1.6 (16)
Overall dimensions, mm, length	3050	3000
width	660	1050
height	1400	1300
Weight of empty installation, kg	1500	2000

GASIFICATION UNITS

TRUCK CHASSIS-MOUNTED GASIFICATION UNIT G-1.6/20-0.05-1

The unit represents a mobile unit for filling the cylinders with oxygen, nitrogen and argon.

After a certain amount of rework gasification unit G-1.6/20-0.05-1 can be mounted practically on any chassis with the respective load lifting capacity specified by the customer. The truck is equipped with convertible filling chamber for five cylinders.

At enterprises with a large amount of cylinders and long distances of places where these cylinders are to be used the application of mobile unit will make it possible to perform refueling directly at site. One oxygen-refueling unit is sufficient for refueling about 200 of 40-liter cylinders.

Mobile gasifier TGHK-1.0/0.06-1.6 can also be mounted on a truck-chassis to provide the consumers with oxygen, nitrogen, argon and other technical gases from "wheels".

AIR DRYING BLOCK KE 0903.00.000-01



The air-drying block is used for air drying from moisture in various kinds of process diagrams requiring air preparation, also including air preparation for high voltage air circuit breakers of VNV type.

Simultaneously with air drying the air is cleaned from various impurities (oil, carbon dioxide, acetylene and other hydrocarbons).

The use of air drying block makes it possible not to reduce electric strength of inner insulation in any climatic zones under any climatic conditions and also contributes to improve the stability of operation of pneumatic devices.

The air drying block is supplied together with high-voltage switches and also as a separate device for replacement of obsolete blocks and revamping of the operating equipment.

At present the majority of enterprises of Russia and CIS countries are equipped with air drying blocks using high-voltage air switches of VNV type in the process chart.

Advantages and distinctive features

- high grade of air cleaning;
- simplicity and reliability of operation;
- longevity (the rated service life is 15 years).

Technical specifications

The amount of air subject to drying process, m ³ /h	250
Temperature of air subject to drying, °C, max	plus 40
Pressure of air subject to drying, MPa (kgf/cm ²), max	20 (200)
Grade of air drying (dew point), °C	minus 65
Absorbers service life until replacement, years, min	4
Electric heater power consumption, kW	7.5–10
Overall dimensions, mm,	
length	1500
width	1455
height	2400
Unit weight, kg	2050
Service life, years	15

CRYOGENIC STORAGE TANKS

CRYOGENIC CHAMBERS

Chambers ZTK-0.5/0.25 and ZTK-1.6/0.25 are used for long-time storage, transportation and discharge of liquefied oxygen, nitrogen and argon.

The chambers can be transported by railway, by car, by boat, they can be mounted on truck-chassis when creating special purpose trucks used for technical gas transportation.

Design and principle of operation

The chambers consist of inner tank and external housing. Pipelines, fixtures, tools and safety devices are located on the control desk of the cabinet. In the lower part of the chamber there is an evaporator to create working pressure in the chamber. The insulation of the tank is of vacuum multilayer type, therefore liquid stored in the inner tank has small losses due to evaporation considering that heat flows coming to the surface are minimum.

Advantages and distinctive features

- the chambers are reliable and simple in operation, they require short preparation of the service personnel;
- small product losses-due to the use of vacuum multilayer insulation;
- the chambers can be operated at ambient temperature from minus 50 to plus 50°C;
- they do not require special protective measures against precipitation attack and solar radiation.

The chambers are not subject to registration in Gosgortekhnadzor.

Technical specifications	ZTK-0.5/0.25	ZTK-1.6/0.25
Volume, m ³	0.5	1.6
Working pressure, MPa (kgf/cm ²)	0.25 (2.5)	0.25 (2.5)
The amount of product to be filled in, kg		
oxygen	540	1730
nitrogen	380	1230
argon	660	2120
Losses from evaporation, kg/h		
oxygen	0.17	0.39
nitrogen	0.18	0.41
argon	0.23	0.55
Overall dimensions, mm,		
length	1250	2750
width	1250	1550
height	1430	1650
Weight of empty chamber, kg	230	820

Comment on operation of cryogenic chamber ZTK-0.5/0.25:

Chamber ZTK-0.5/0.25 that is in operation at our facility was manufactured by Engineering Plant "Uralcryotechnika" in May 2005.

The chamber is used for storage and transportation of liquid nitrogen. So far no drawback have been revealed in the operation of the equipment. The chamber is convenient and is simple in operation and repair.

The equipment fully corresponds to the specifications.

We are sure that our cooperation in future will be successful and fruitful.

Head of procurement department
of FGUP Russian Federal Nuclear Center
named after Academician E.I. Zababakhin
A.A. Koryshkin



ZTK-0.5/0.25



ZTK-1.6/0.25

CRYOGENIC STORAGE TANKS

BIOLOGICAL PRODUCT STORAGE VESSELS HB-0.5

The biological product storage vessels HB-0.5 is used for storage of biological product in liquefied nitrogen and its vapors, for parts cooling in machine engineering having a diameter up to 430 mm at temperature of minus 196°C. It is widely used in cattle breeding, in medicine for storage of marrow, blood and cells for cure of burns and other material.

Design and principle of operation

The storage tank consists of inner vessel and external housing. The exit into the working volume of the vessel is carried out through the orifice. The inner vessel is provided with revolving shelves, which is set into rotation by means of detachable handle. The shelves are separated into three sections, which can accommodate bushes with two rows of canisters with the product being stored.

In machine engineering such storage tanks are used without the shelves. A safety diaphragm is installed on the housing to protect the latter in case of pressure increase in interwall space. The access into the working volume is closed by means of plug.

Technical specifications

The amount of liquefied nitrogen, kg	440
Volume, m ³	0.55
Losses from evaporation, kg/h (% per day)	0.18 (1)
Orifice diameter, mm	450
Overall dimensions, mm,	
diameter	1120
height	1180
Weight of empty storage vessel, kg	300

Comment on operation

of biological product storage vessels HB-0.5:

FGUP Sverdlovsk Livestock Breeding has been using biological product storage vessels for a long time HB-0.5 manufactured by Engineering Plant "Uralcryotechnika" (Ekaterinburg). No faults or failures have been revealed so far.

The biological product storage vessels are used for storage of stud bull sperm in liquid nitrogen at temperature of minus 196°C.

The biological product storage vessels are safe, reliable and easy in operation. They are manufactured with high quality and correspond to the technical specifications having low losses due to evaporation.

We have no negative remarks with regard to quality and operation of biological storage vessels HB-0.5.

Chief engineer of FGUP Sverdlovsk Livestock Breeding
V.E. Lapin



DEWAR FLASKS

Dewar flasks are used for transportation, carrying and storage of small amounts of liquefied oxygen, nitrogen and argon used in various branches of industry and also in hospitals. It is permitted to use Dewar flasks for storage of various items and materials in liquid nitrogen.

Dewar flasks are made of stainless steel. They represent a double-walled tank. The space between the walls is filled with vacuum-multilayer insulations.

They possess high technical features, convenient in use and have a long storage life of liquefied gases.

Technical specifications

	CD-6	CD-12
The amount of product to be filled in, kg		
oxygen	6.5	13
nitrogen	4.6	9.2
argon	8	16
Capacity, l	6	12
Losses from evaporation, g/h		
nitrogen	26	29
Orifice internal diameter, mm	59	59
Overall dimensions, mm,		
diameter	304	304
height	340	475
Weight, kg	4.5	5.6



CD-6
CD-12

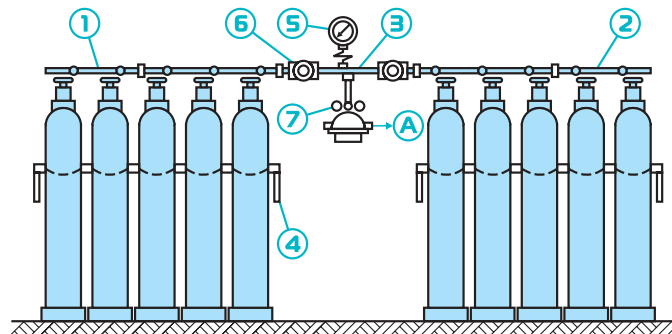
EQUIPMENT USED FOR THE OPERATION WITH TECHNICAL GASES

RELIEF CHAMBERS

Relief chambers KE 6802 000 (2×5 cylinders), KE 6801 000 (2×10 cylinders) are used for continuous centralized supply of consumers with technical gases (oxygen, nitrogen and argon) that require large amounts of gas pressurized from to 0.3 to 1.6 MPa (from 3 to 16 kgf/cm²) from cylinders with initial pressure of 20 MPa (200 kgf/cm²).

They are used in industry and in construction for welding and metal cutting. They also find application in medicine- in resuscitation departments, in surgery operating rooms and in wards, etc.

The design of chambers enables continuous operation when on one line a relief of cylinders takes place and their replacement - on the other.



1. Left line.
2. Right line.
3. Unit of line connection.
4. Shelves for cylinder fastening.
5. Pressure gauge.
6. Valve for gas supply from the line.
7. Chamber reducer.
- A. Gas outlet from the reducer.

Technical specifications

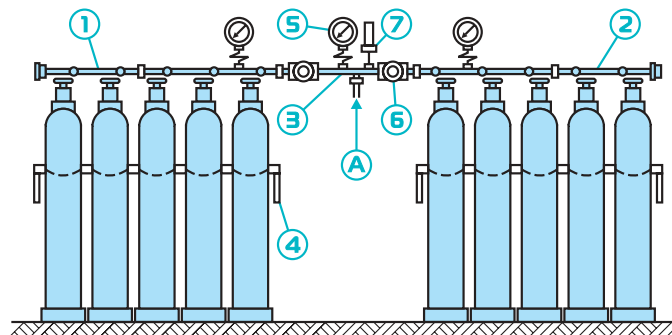
	KE 6802 000	KE 6801 000
Number of cylinders in the chamber	2×5	2×10
Working gas	oxygen, nitrogen, argon and air	
Working pressure, MPa (kgf/cm ²)	20 (200)	20 (200)
Pressure after reducer, MPa (kgf/cm ²)	0.3–1.6 (3–16)	0.3–1.6 (3–16)
Capacity, m ³ /h	250	250
Overall dimensions, mm, length	3810	6450
width	620	620
height	1600	1600
Weight, kg	76	123

FILLING CHAMBERS

Filling chambers KE 6804 000 (2×5 cylinders), KE 6803 000 (2×10 cylinders) are used for continuous centralized supply of consumers with technical gases (oxygen, nitrogen and argon) that require large amounts of gas pressurized from to 20 MPa (200 kgf/cm²).

Filling chamber KG 6860 000 (8 cylinders mounted in a special container) is manufactured in conformity with TU 26-04-570-77 and is used for continuous filling of cylinders with technical gases (oxygen, nitrogen and argon) pressurized to 20 MPa (200 kgf/cm²).

They are used for cylinder filling from air fractionating units of any capacity, high-pressure gasification units, gasifiers and high-pressure compressors.



1. Left line with pressure gauge of the line.
2. Right line with pressure gauge of the line.
3. The unit of line connection.
4. Shelves for cylinder connection.
5. Pressure gauge of the main.
6. The valve of gas supply to the line.
7. Safety valve.
- A. Gas inlet to the chamber.

Technical specifications

	KE 6804 000	KE 6803 000	KG 6860 000
Number of cylinders in the chamber	2×5	2×10	8*
Working gas	oxygen, nitrogen, argon and air		oxygen, nitrogen, argon
Working pressure, MPa (kgf/cm ²)	20 (200)	20 (200)	20 (200)
Overall dimensions, mm, length	3910	6550	1620
width	620	620	1900
height	1600	1600	2200
Weight, kg	69	106	160

* are installed in a special container

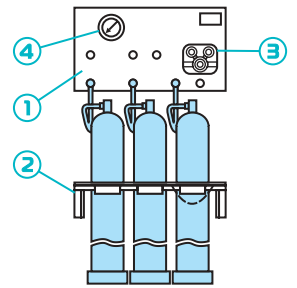
EQUIPMENT USED FOR THE OPERATION WITH TECHNICAL GASES

DISCHARGE CHAMBERS

Discharge chambers: KG 6859 000 - oxygen discharge chamber, KG 6861 000 - argon discharge chamber, KG 6862 000 - hydrogen discharge chamber.

Discharge chambers are used for supply through reducer small amounts of gas pressurized from 0.1 to 1.2 MPa (from 1 to 12 kgf/cm²) from the cylinders with initial pressure of 20 MPa (200 kgf/cm²). The oxygen chamber KG 6859 000 can be used for nitrogen and argon discharge. These chambers are used in the laboratories for supply of technical gases to the devices, etc.

Technical specifications	KG 6859 000	KG 6861 000	KG 6862 000
Working gas	oxygen, nitrogen, argon	argon	hydrogen
Working pressure, MPa (kgf/cm ²)	20 (200)	20 (200)	20 (200)
Pressure after reducer, MPa (kgf/cm ²)	0.1–1.2 (1–12)	0.1–0.7 (1–7)	0.1–0.54 (1–5.4)
Volumetric consumption, m ³ /min	0.83	0.01–0.15	0.05–0.005
Overall dimensions, mm, length	930	930	930
width	500	500	500
height	2100	2100	2100
Weight, kg	36	38	37



1. Fixture board.
2. Shelves.
3. Reducer.
4. Pressure gauge.

TEST STAND FOR CYLINDER HYDRAULIC TESTS KE 9940.00.000

Test stand for cylinder hydraulic tests is used for internal and external visual examination, washing off and hydraulic tests of cylinders having a capacity of 40 liters of water pressurized up to 22.5 MPa (225 kgf/cm²).

Technical specifications	
Capacity, pc/h	2.5
Test pressure, MPa (kgf/cm ²)	22.5 (225)
Power consumption, kW	2.5
Dimensions of room for test stand erection, m,	
length	4
width	4
height	4
Weight, kg	320



MAINTENANCE



The Ural Compressor Plant offers products and services for the generation, treatment and delivery of compressed and liquefied gases. In order to increase the reliability of the manufactured equipment and prolong its durability the plant performs after sale services of compressor and cryogenic equipment. Our principle is to optimize customer satisfaction through the package approach that includes:

- Analysis, consultation and planning.
- Spare parts. The most important spare parts are held ready.
- Service contracts.
- After-sales service.
- Installation and mounting.
- Working out of new products and adaptation of the manufactured products according to the customers' technical demands.
- If you are our customer, we are ready to train your engineers and workers.



