

MEDICAL AND SURGICAL AIR COMPRESSOR SYSTEMS

MEDICAL AIR STATION

Description

Medical air is typically supplied through a medical gas piping system produced by air compressors, dryers, and a filtration system. The flow rate of medical air used for respiration should be less than 80 m³/hour. Furthermore, when medical air is used, the number of terminal units operating simultaneously is quite high.

The supply of medical air in hospitals is a vital life support service that enables critically ill patients to continue breathing during mechanical ventilation.

Medical Air Plant Working Principle

The rotation of the motors creates vacuum force, drawing atmospheric air into the system. At the inlet, the air is cleaned of dust by a bacterial filter. Then, the air moves toward the rotor group with increased pressure and temperature. The coupling system cools the rotors while also ensuring air tightness. From the motor group, the oil-laden air passes into the high-pressure air tank, where the oil and air are mechanically separated. The air is then directed to the dryer, where it is completely separated from the oil. The air is then cooled by the regulator. The air is then directed to the medical system to be sent to designated hospital rooms. The oil remaining in the separation tank is sent to the radiator via a thermostatic valve and, after being cooled to the appropriate temperature, the oil returns to the rotor group.

Classification

Üzümçü Medical Air Plant is designed and manufactured in accordance with the ISO 13485 quality management system and complies with the MDD 93/42/ECC standards.

Features

The main uses of medical air in hospitals are as follows:

- Operating ventilators and incubators, where it helps reduce the effects of high oxygen concentrations by providing uncontaminated and controlled air flows,
- Used as a carrier gas for anesthetic areas,
- Used as a power source for operating surgical instruments,
- Compressors, managed by the control system, provide a continuous supply of air; even when other compressors are not operating, the other compressors in the system come into operation.

Standard Equipment

Compressors

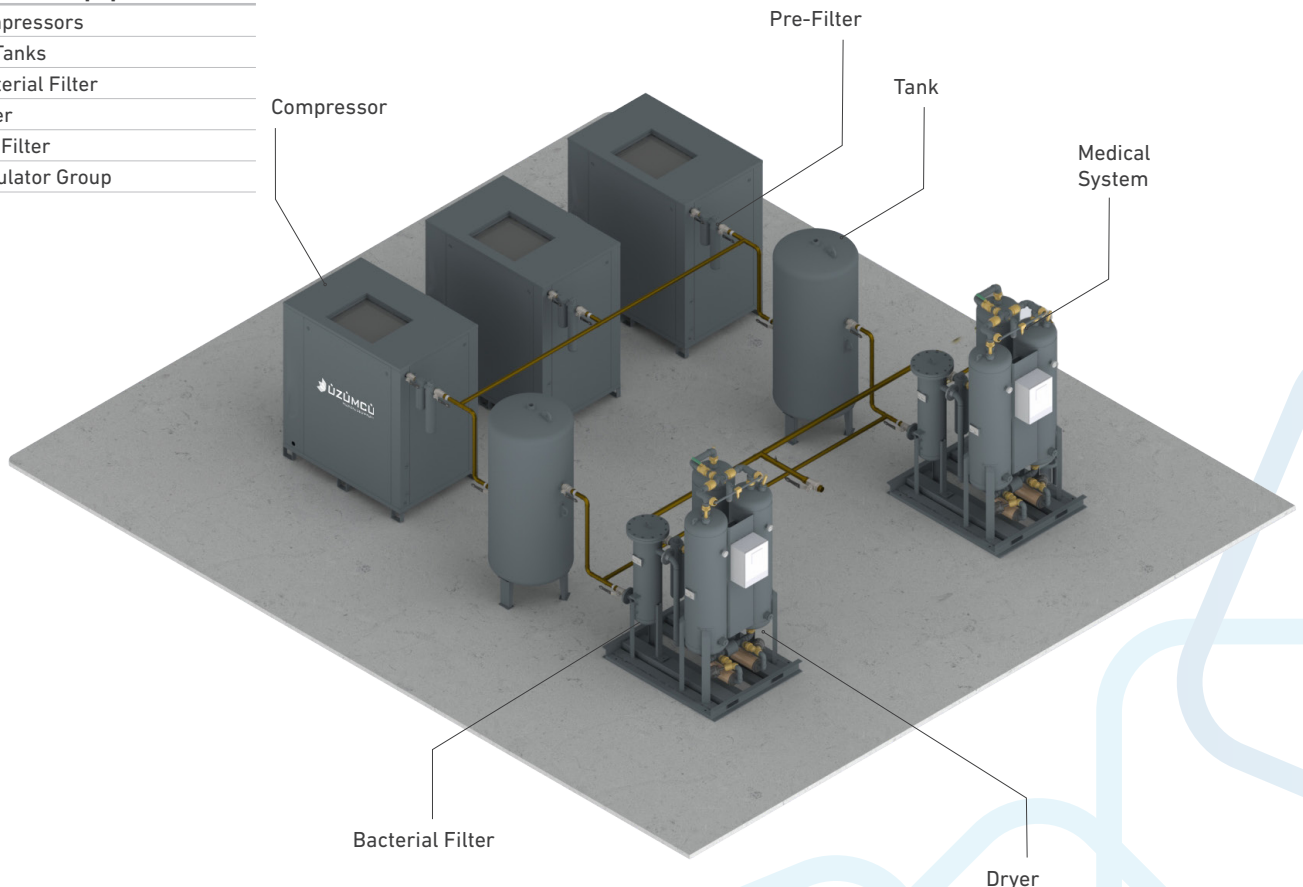
Air Tanks

Bacterial Filter

Dryer

Pre-Filter

Regulator Group



MEDICAL AIR COMPRESSOR

Description

The Medical Compressed Air System is suitable for continuous and frequent start/stop operations, providing reliable and high-quality air for all applications. Medical compressed air, the most important medical gas after oxygen, plays a critical role in the ventilation of Intensive Care Unit (ICU) patients. Additionally, it is an ideal solution in many areas such as mechanical ventilation, anesthesia applications, drug delivery via nebulizers, and testing medical devices. The medical air system is one of the most important components of Medical & Surgical Air Generator systems, which convert atmospheric air into medical or surgical air.

Working Principle

The primary goal of ÜZÜMCÜ medical compressed air systems is to produce clean, high-quality, and reliable medical and surgical air from atmospheric air. Atmospheric air is directed into the system from the compressed air tank. First, the air enters the filter, where it is purified of dust and bacteria. After being completely cleaned of bacteria, it is separated from oil using a dryer. To obtain safe and pure medical or surgical air, the air is finally passed through a bacterial filter system and converted into medical or surgical air.

Classification

Medical air systems meet the requirements specified by the European Pharmacopoeia, as well as EN ISO 7396-1 and HTM 02-01 standards.

Features

- The medical air system consists of 3 independent compressors that enhance operational safety and provide uninterrupted air supply.
- Depending on the application, the air pressure can be adjusted to 4 kPa or 7 kPa.
- System operating time is managed by electrical control units to ensure equal wear and tear of components and a long service life.
- The medical air system consists of high-quality and proven reliable components.
- Thanks to its modular design, ÜZÜMCÜ offers a wide range of compressed air systems suitable for different needs.
- Provides completely pure and oil-free air supply.
- For surgical air use, a high-flow air stream at high pressure (up to 350 L/min) is required. The medical air flow rate for respiratory purposes is 80 L/min.
- A control panel alerts the user if the pressure from the medical air central unit differs from 4 bar.



Contamination	European Pharmacopoeia
O ₂	20.4% <x<21.4%
CO ₂	<500 pp
CO	<5 ppm
SO ₂	<1 ppm
NO	<2 ppm
NO ₂	<2 ppm
H ₂ O	<67 ppm
Oil Vapor	<0.1 mg/m ³

Model	Order No	Compressor Capacity	Compressor Type	Tank Capacity	Filtration and Drying System	Operating Temperature	Number of Beds
BY-3-39	66.1832	3x52 m ³ /h	Screw Type	2x300 L	2	(+10) - (+50) C°	50-100
BY-3-84	66.1834	3x81 m ³ /h	Screw Type	2x1000 L	2	(+10) - (+50) C°	150-200
BY-3-11	66.1835	3x123 m ³ /h	Screw Type	2x1000 L	2	(+10) - (+50) C°	200-250
BY-3-13	66.1836	3x147 m ³ /h	Screw Type	2x1500 L	2	(+10) - (+50) C°	250-300
BY-3-21	66.1837	3x284 m ³ /h	Screw Type	2x2000 L	2	(+10) - (+50) C°	300-500
BY-3-26	66.1838	3x322 m ³ /h	Screw Type	2x2000 L	2	(+10) - (+50) C°	300-500

CHEMICAL DRYER

Description

The cleaning module consists of bacteria filters, dryers, and pre-filters. Dryers prevent the entry of compressed air produced by the compressor into the system by adjusting it to normal humidity levels. Models are available with capacities of 45, 85, 130, and 170 m³/h. Depending on the capacity of the plant, duplex or simplex models are available. Dryers provide a dew point of -40°C.

Compounds in the air can cause corrosion and contamination in the transmission line, leading to pressure losses in the system. The filter system separates particles, filters bacteria, and reduces the amount of water and oil to the desired level. The air dryer regulates the humidity and temperature of the air coming from the compressors. The system is a gas cooling system that can remove 99.9% of moisture at 35°C.



Model	Capacity	Type	Dew Poin (°C)	Connection Size	Weight (kg)
GZ83.80	35 m ³ /h	Chemical	- 4	1/2"	35
GZ83.81	70 m ³ /h	Chemical	- 4	1 1/2"	71
GZ83.82	130 m ³ /h	Chemical	- 4	1 1/2"	117
GZ83.83	170 m ³ /h	Chemical	- 4	1 1/2"	130
GZ83.84	216 m ³ /h	Chemical	- 4	1 1/2"	185
GZ83.85	312 m ³ /h	Chemical	- 4	1 1/2"	236

PRESSURE AIR FILTER

Description

In the first stage of the air system, atmospheric air is pressurized by compressors. This air may contain dust, bacteria, and oil (if the compressor is not oil-free). Therefore, it must be purified of these substances to provide high-quality air, which explains the importance of the ÜZÜMCÜ compressor air filter in the Medical Air System.

Classification

The compressor air filter complies with the HTM 02-01 and BS EN ISO 3549:2002 standards.

Working Principle of the Compressor Air Group

The purpose of compressor air filtration is to protect the dryer from humid and contaminated air. The first filter is a particulate filter that separates contaminants 3 microns or larger. The second filter is a coalescing filter that separates solid contaminants and oil-moisture mixtures as small as 0.1 microns. After this filter, the oil permeability is 0.1 mg/m³ (the first section of the filter system is a basic safety measure that protects the system's dryer). Next, the fine particle dryer cleans the air of solid contaminants measuring 0.01 microns, and the filter's oil permeability is 0.01 mg/m³. Finally, the air enters the activated carbon, where it is purified of oil and moisture. The pressure losses of the particle filter, coalescing filter, high-precision particle filter, and activated carbon filter are 35 mbar, 60 mbar, 80 mbar, and 60 mbar, respectively.



TECHNICAL AIR SYSTEM

Description

The Medical Air System is designed to provide air of consistent medical quality. Medical air is primarily supplied through a medical gas pipeline system where air is produced by compressors, dryers, and a filtration system.

Classification

ÜZÜMCÜ Medical Air Plants are designed and manufactured in accordance with HTM 02-01, HTM 2022, MDD 93/42/E - EC, and EN ISO 7396-1 standards.

Features

- Üzümcü Medical Air Centrals can operate in a wide capacity range with rotary screw compressors.
- Compressor capacities range from 2.2 kW to 37 kW.
- High-quality screw blocks and excellent lubrication systems ensure uninterrupted operation, stability, and reliability.
- Pressurized air dryers operating at a dew point temperature of +3-5°C are used.
- Oil-free medical air production is possible thanks to rotary screw compressors.
- The refrigerated air dryer is one of the key components of the Technical Air System; it stands out with its high corrosion resistance, economical and simple operation, minimal maintenance requirements, maximum operating time, and easier installation compared to other dryers.
- Depending on customer requirements, one or two compressors can be operated in the system.
- No additional electrical control system is added to the system; compressors age with their own integrated control systems.

Working Principle

The oil-injected rotary screw compressor is a versatile industrial machine that efficiently converts power into compressed air through continuous rotational motion. Regardless of the application, there are numerous advantages to using a rotary screw air compressor throughout your production process. Among these benefits, made possible by technological advances, is optimal energy efficiency. The oil-injected compressor takes in atmospheric air and filters out dust. Thanks to the filtration system, the rotor assembly is lubricated, reducing friction and allowing the compressor to operate more smoothly and efficiently. The air then flows into receiver tanks; here, most of the oil mechanically separated from the air returns to the compressor as it reaches a certain pressure. Atmospheric air enters a dryer containing refrigerant; as a result of the dryer's operation, the air is completely separated from oil, yielding pure medical or surgical air.

Standard Equipment

Compressors

Air Tanks

Bacterial Filter

Dryer

Pre-Filter

Regulator Group



OIL-FREE COMPRESSOR MEDICAL AIR STATION

Description

ÜZÜMCÜ offers medical air stations equipped with high-tech oil-free compressors. These new generation compressors are reliable, compact, and quiet, providing oil-free compressed air. They are designed for continuous operation and offer efficient performance with low maintenance costs. Their compact design makes them easy to install, and since they contain no oil, air discharge is trouble-free.

Classification

ÜZÜMCÜ oil-free compressors are designed and manufactured in accordance with DIN EN ISO 12100:2011-03, EN 1012-1:2011, EN 60204-1:2006, DIN EN 61000-6-3:2011-09, DIN EN 61000-6-1:2007, and IEC 60034 30 standards.

Working Principle

The compressor's loading and unloading valve controls the compressor's air intake and determines its operating modes. When the valve opens, the compressor starts air intake and operates in the "loaded" position. When the valve closes, the compressor stops air intake and switches to "idle" mode. In this mode, the compressor continues to run but does not produce air. While the compressor is running and producing pressurized air, it generally cannot intake more air. Therefore, the loading and unloading valve plays a critical role in ensuring the compressor operates efficiently and safely.

Features

- These new generation compressors are reliable, compact, quiet, and capable of producing oil-free compressed air.
- The compressors are designed for continuous operation and are extremely reliable and efficient with low maintenance costs.
- Their compact design makes installation easy and ensures smooth air discharge, as there is no oil in the system.
- The oil-free system provides 100% oil-free air and offers low noise levels for hospital environments.
- Since no oil injection is required, there is no need to invest in wastewater treatment, which is the most effective way to protect the environment.
- Maintenance of the system is easier than other compressor types due to its simple oil-free design.

• When the system operates under normal conditions:

Inlet Temperature	: +15°C+30°C
Average relative air humidity	: 20%.....80%
Inlet air quality	: Low to medium dust levels
Nominal Voltage	: 400V/50 Hz
Ambient Temperature	: 40°C
Sound Level dB(A)	: 49.....56 +/-3
Nominal Motor Power	: 2.2kW – 3.7kW – 2 x3.7kW – 3x3.7kW –4x3.7kW (Varies according to customer requirements)
Weight (kg)	: 150, 160, 335, 520, 620 (Proportional to power)
Output Diameter	: 1/2" (2.2 kW – 3.7 kW – 2 x 3.7 kW) 3/4" (3 x 3.7 kW – 4 x 3.7 kW)



Standard Equipment

Compressors

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Dryer

Pre-Filter

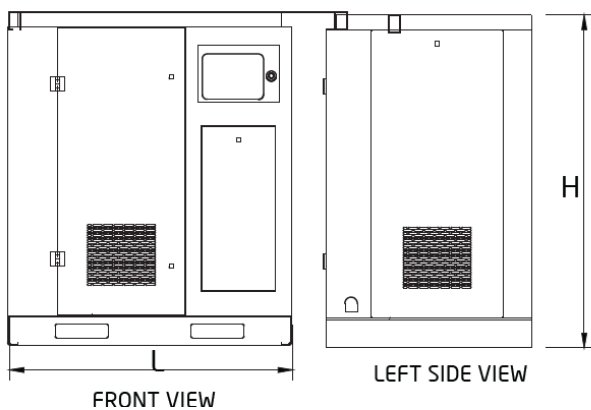
Regulator Group

MEDICAL AND SURGICAL AIR COMPRESSOR SYSTEMS

Maintenance Plan	1×Weekly	500h	4000 h within the last 1 year	8000 h within the last 2 years	When needed
Leak control	X	X	X	X	
Visual inspection	X	X	X	X	
Replacement of belts			X	X	
Replacement of non-return valve			X	X	
Replacement of air filter			X	X	X
Cleaning of coolant		X	X	X	
Inspection of safety valve			X	X	
Maintenance kit					X
Lubrication of main bearing			X	X	
Lubrication of electric motor bearings			X	X	
Replacement of scroll air nozzle					X

Model	1×Weekly	500h	4000 h within the last 1 year	When needed
GZ80.12	2x109 m³/h	Fat-free	1X100 m³/h	1500 L
GZ80.13	3x109 m³/h	Fat-free	2X100 m³/h	2x1000 L
GZ80.14	1x158 m³/h	Fat-free	1X190 m³/h	2x1000 L
GZ80.15	2x158 m³/h	Fat-free	1X190 m³/h	2x1000 L
GZ80.16	3x158 m³/h	Fat-free	2X190 m³/h	2x1500 L
GZ80.17	1x213 m³/h	Fat-free	1X210 m³/h	2x1000 L
GZ80.18	2x213 m³/h	Fat-free	1X210 m³/h	2x1500 L
GZ80.19	3x213 m³/h	Fat-free	2x210 m³/h	2x1500 L

TECHNICAL DRAWING



Product Dimensions (LxWxH)	: 750mm×630mm×850mm (2,2kW and 3,7kW)
	: 1100mm×800mm×950mm (2×3,7kW)
	: 1150mm×830mm×1380mm (3×3,7kW)
	: 1300mm×870mm×1730mm (4×3,7kW)

OIL-FREE COMPRESSOR MEDICAL AIR STATION

Description

ÜZÜMCÜ has specially designed compressed air tanks that can function as receivers in air systems, and compressed air tanks of various sizes are available according to customer needs.

Certificates

- Manufactured and tested in accordance with the BS EN 286-1:1998+A2:2005 standard.

Features

- The corrosion resistance value of the Üzümcü medical air tank is 0.5 mm.
- The pressure test value of Üzümcü compressed air tanks is 16 atm.
- The operating pressure of the system is 11 atm.
- The minimum/maximum operating temperature ranges from -10°C to +100°C.
- The wall thickness of the compressed air tanks is proportional to the tank capacity and can vary between 4 mm and 6 mm.

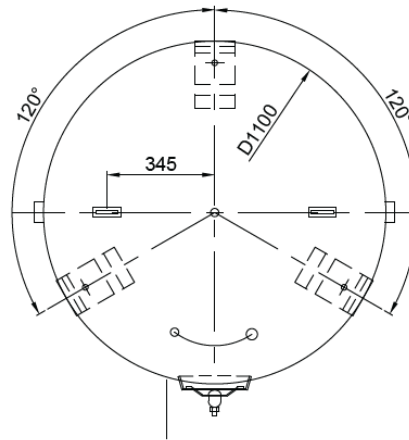
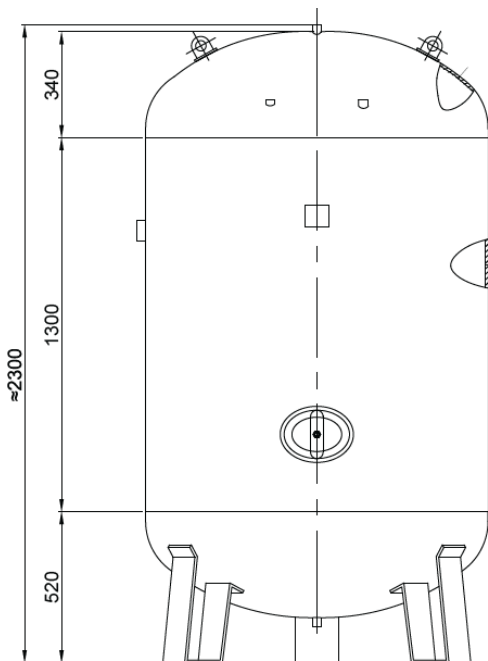
Material Information

- Compressed air tanks are manufactured from St-37 steel.
- An electrostatic paint has been applied to the Üzümcü compressed air system to provide higher corrosion resistance.



Model	GZ82.01	GZ82.02	GZ82.03	GZ82.04	GZ82.05
Capacity (L)	300	500	1000	1500	2000
Weight (kg)	130	180	300	400	450
Inlet Diameter	1 1/2"				
Diameter (mm)	480	600	850	1100	1150
Height (mm)	1990	2110	2258	2300	2355

TECHNICAL DRAWING



• The measurement unit for dimensions is mm.

MEDICAL AND SURGICAL AIR COMPRESSOR SYSTEMS

AIR COMPRESSORS

Description

Üzümcü air compressors can be safely used with high operational performance to supply pressurized air to specific rooms in the hospital. The main function of air compressors is to convert normal atmospheric air into high-pressure medical air; this air is vital for patient health and is also used for ventilating patients in the intensive care unit (ICU). Compressors are generally either oil-lubricated or oil-free. Üzümcü offers its customers high-capacity, screw-type, and quiet compressors. Depending on the hospital's design capacity, two or three compressors of equal capacity are used to ensure a continuous supply of medical air.

Classification

Üzümcü Medical Air Centrals are designed and manufactured in accordance with HTM 02-01, HTM 2022, MDD 93/42/EEC, and EN ISO 7396-1 standards.

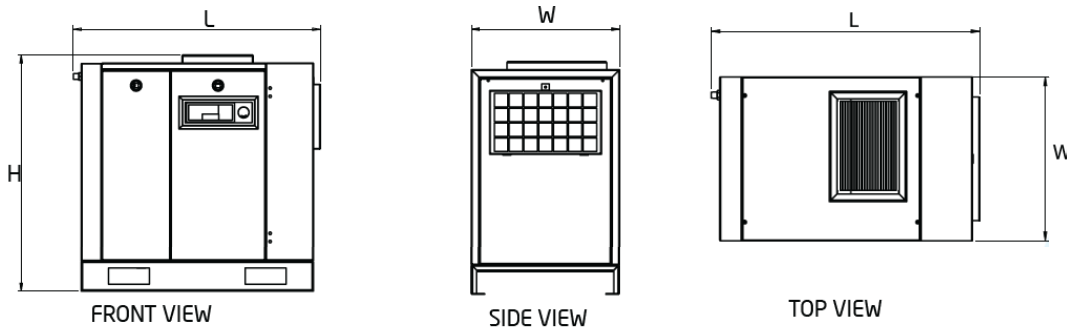
Features

- High-efficiency rotary screw block
- 400V/3-phase/50Hz IE3 efficiency class IP55 main motor
- Oil separator class, maximum oil passage at 21°C approximately 0.01 mg/m³
- Removable acoustic protective cover
- Main motor efficiency approximately 90%
- Class F main motor insulation and Class B main motor temperature rise
- Dry-type air intake filter with 3-micron resolution
- Full-flow oil filter with 10-micron resolution
- Electropneumatic open-close controlled suction valve
- Minimum pressure switch
- Minimum and maximum ambient temperature between +2°C and +43°C
- Star-delta connected motor drive system
- PLC control unit and LCD panel (if there are more than 2 compressors in the system)



Model	Compressor Capacity (m3/h)	Compressor Type	Motor Power		Sound Level dB(A)	Connection Diameter	Weight (kg)	Measurments		
			kw	hp				Lenght (mm)	Width (mm)	Height (mm)
GZ83.70	39	Screw Type	5,5	7.5	69	3/4"	272	1500	550	1325
GZ83.71	84	Screw Type		300	69	3/4"	414	1880	650	1600
GZ83.72	117	Screw Type	15	20	69	3/4"	450	1880	650	1600
GZ83.73	168	Screw Type	18.5	25	69	1"	420	1275	850	1465
GZ83.74	210	Screw Type	22	30	70	1"	414	1275	850	1465

TECHNICAL DRAWING



MEDICAL AND SURGICAL AIR COMPRESSOR SYSTEMS

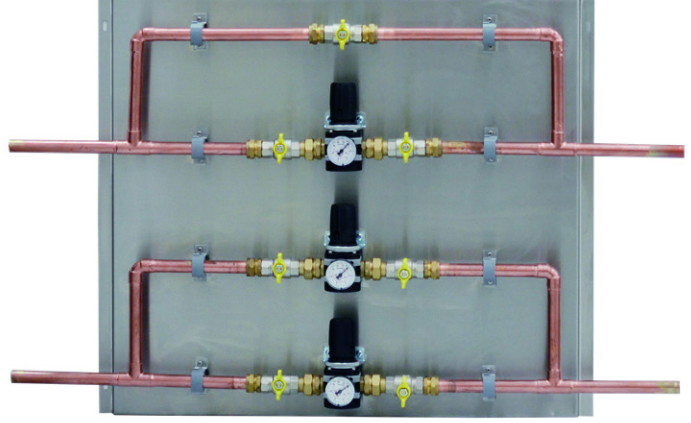
PRESSURIZED AIR REGULATOR GROUP

Description

The Air Regulator Group is the final adjustment process for air coming from the compressed air station.

Features

- Used to adjust air pressure to the required level (4 bar or 7 bar)
- Maximum working pressure is 4 MPa
- Working pressure range is between 0.05 MPa and 3 MPa
- Ambient temperature varies between -5°C and 60°C
- The port size of the compressed air regulator varies according to the regulator's capacity and ranges from 1/4" to 1"
- The system height varies between 150 mm and 224 mm, and the main rectangular cross-section of the system is 55 mm×55 mm or 75 mm×75 mm
- Compressed air can be adjusted from 4 MPa to 3 MPa and continues at a constant rate.



Model	GZ82.05	GZ82.06
Capacity (m ³ /h)	100	200

TECHNICAL DRAWING

