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ekom
Air for life



DK50 4x4VRT/M
DK50 6x4VRT/M

EN User manual

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COMPRESSOR

DK50 4x4VRT/M
DK50 6x4VRT/M

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IMPORTANT INFORMATION

1. CONFORMITY WITH THE REQUIREMENTS OF THE EUROPEAN UNION

This product conforms to the requirements of the Regulation (EU) on medical devices (MDR 2017/745) and is safe for the intended use if all safety instructions are followed.

2. INTENDED USE

The compressor is used as a source of clean, oil-free compressed air to power active medical devices where the parameters and properties of the compressed air are suitable for the specific application.

Any other use of the product beyond its intended use is considered an incorrect use. The manufacturer is not liable for any damages or injuries resulting from the incorrect use.



Compressed air supplied by the compressor is unsuitable for use with artificial lung ventilation devices without further filtration.

3. CONTRAINDICATIONS AND SIDE-EFFECTS

There are no contraindications or side-effects known.

4. SYMBOLS

The following symbols and marks are used in the User manual, on the device and its packaging:



General warning



Warning - risk of electric shock



Warning - compressor is controlled automatically



Warning - hot surface



General caution



Read the operating instructions



Refer to instruction manual



CE – marking



Medical device



Serial number

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Protecting earthing



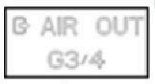
Terminal for ground connection



Fuse



Compressed air inlet



Compressed air outlet



Control wire input



Package handling label – fragile



Package handling label – this side up



Package handling label – keep dry



Package handling label – temperature limits



Package handling label – limited stacking



Package label – recyclable material



Manufacturer

5. NOTICE

The product is designed and manufactured to be safe for the user and its surrounding environment when used in the defined manner. Keep the following warnings in mind. This keeps risks to a minimum.

5.1. General warnings

CAREFULLY READ THE INSTRUCTIONS FOR USE BEFORE USING THE PRODUCT AND STORE THEM CAREFULLY FOR FUTURE USE!

- The user manual aids in correct installation, operation and maintenance of the product. It is included with the product and must be kept close to it at all times. Careful review of this manual will provide the information necessary for the proper operation of the product as intended.
- The product containing an adsorption-type dryer has a separate user manual.
- Only the original packaging ensures optimal protection of the equipment during transport. Save this packaging should you ever have to return the equipment. The manufacturer is not liable for damages caused by faulty packaging when returning a product for transport during the warranty period.
- Use a fork lift truck or similar hoisting

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equipment for any movement or handling of the product.

- This warranty does not cover damages originating from the use of accessories or consumables other than those specified or suggested by the manufacturer.
- The manufacturer only guarantees the safety, reliability and function of the equipment if:
  - Installation, new settings, changes, modifications and repairs are performed by the manufacturer or its representative, or a service provider authorized by the manufacturer.
  - The product is used pursuant to the user manual.
- The user manual corresponds to the configuration of the product and its compliance with applicable safety and technical standards at the time of its printing. The manufacturer reserves all rights for the protection of its configuration, methods and names.
- Translation of the user manual is performed in accordance with the best available knowledge. The Slovak version is to be used in the event of any uncertainties.

5.2. General safety warnings

The manufacturer designed and manufactured the product to minimise all risks when used correctly for the intended purpose. The manufacturer considers it responsible for specifying the following general safety precautions.

- Use and operation of the product must comply with all local codes and regulations. The operator and user are responsible for following all appropriate regulations in the interests of performing work safely.
- Only the use of original parts guarantees the safety of operating personnel and reliable operation of the product itself. Only use accessories and parts mentioned in the technical documentation or expressly approved by the manufacturer.
- The manufacturer assumes no liability for any damages or other risks if any accessories or parts other than mentioned in the technical documentation or expressly approved by the manufacturer are used. This warranty does not cover damages originating from the use of accessories or consumables other than those specified or suggested by the manufacturer.
- The user must make sure that the equipment is functioning correctly and safely every time it is used.
- The user / operator must be capable of safely using and properly operating the product. The user must be trained to operate the product and must be experienced.
- Create operating regulations for the person operating the product.
- Wear hearing protection when starting the product, during operation and any time it is in operation.
- Operating the product in operating premises that may contain mixtures of flammable gases such as operating rooms or in areas that may contain explosive mixtures of particulate, such as coal dust, is prohibited.
- Flammable materials pose an explosion hazard!
- Use of the product in wet or damp environments is prohibited.
- The user shall inform the supplier immediately if any problem occurs in direct connection with the operation of the equipment.
- Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and / or patient is established.

5.3. Electrical system safety warnings

- The equipment may only be connected to a properly installed socket connected to earth (grounded).

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- Before the product is plugged in, make sure that the mains voltage and frequency stated on the product are the same as the power mains.
- Check for possible damage to the product and the connected air distribution system before use. Replace damaged pneumatic and electrical conductors immediately.
- Immediately disconnect the product from the mains in hazardous situations or when a technical malfunction occurs.
- During repairs and maintenance, ensure that:
  - product is disconnected from the mains
  - pressure is released from all lines
- Only the manufacturer, or a qualified specialist trained by the manufacturer may install, modify or upgrade the product itself.
- Only a qualified electrician may install electrical components!

6. STORAGE AND TRANSPORT CONDITIONS

The compressor is shipped from the manufacturer in transport packaging. This protects the product from damage during transport.

Potential for damage to pneumatic components.

The compressor must be transported only when all air has been vented. Before moving or transporting the compressor, release all the air pressure from the tank and pressure hoses, from dryer chambers and drain condensate from the tank and from the condensate separator on the dryer.

Keep the original factory packaging in case the device needs to be returned Use the original factory packaging during transport as it provides optimum protection for the product. . If it is necessary to return the product during the warranty period, the manufacturer is not liable for damages caused by improper packaging.

The compressor is shipped in a vertical position and must be secured using transport straps.

Protect the compressor from humid and dirty environments and extreme temperatures during transport and storage. Do not store near any volatile chemical substances.

If not, please dispose of the original packaging material in an environmentally-friendly way. The packaging cardboard can be recycled with old paper.

Storing or shipping the equipment in any conditions other than those specified below is prohibited.

6.1. Ambient conditions

Products may only be stored and transported in vehicles that are free of any traces of volatile chemicals under the following climactic conditions:

Temperature	–25°C to +55°C, 24 h at up to +70°C
Relative humidity	max. 90% (non-condensing)

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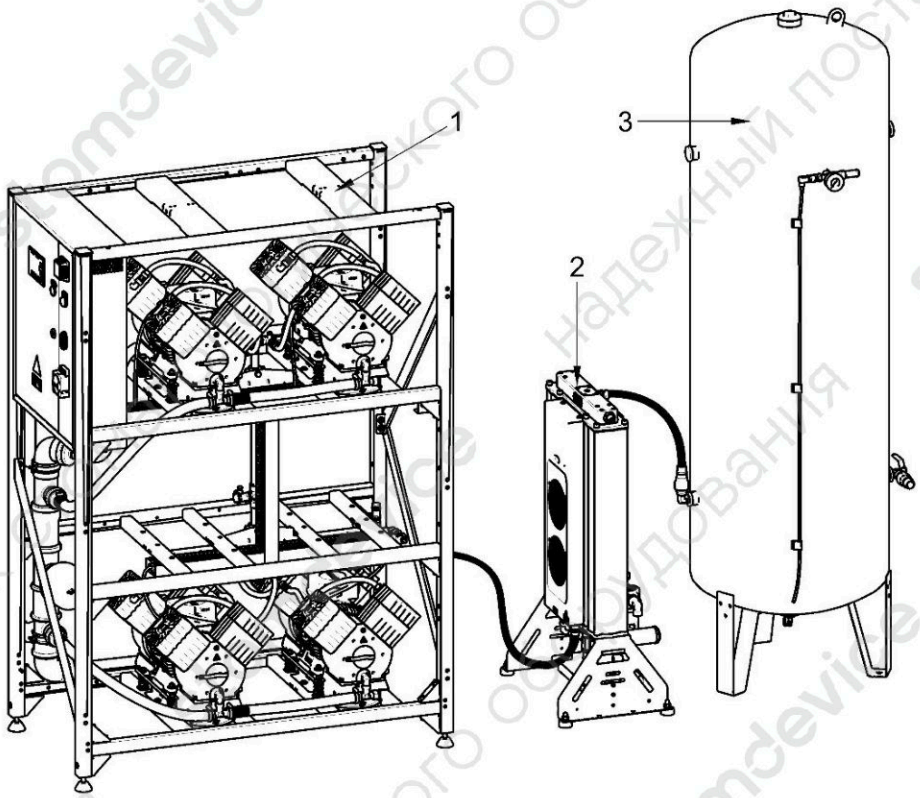
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PRODUCT DESCRIPTION

7. VARIANTS

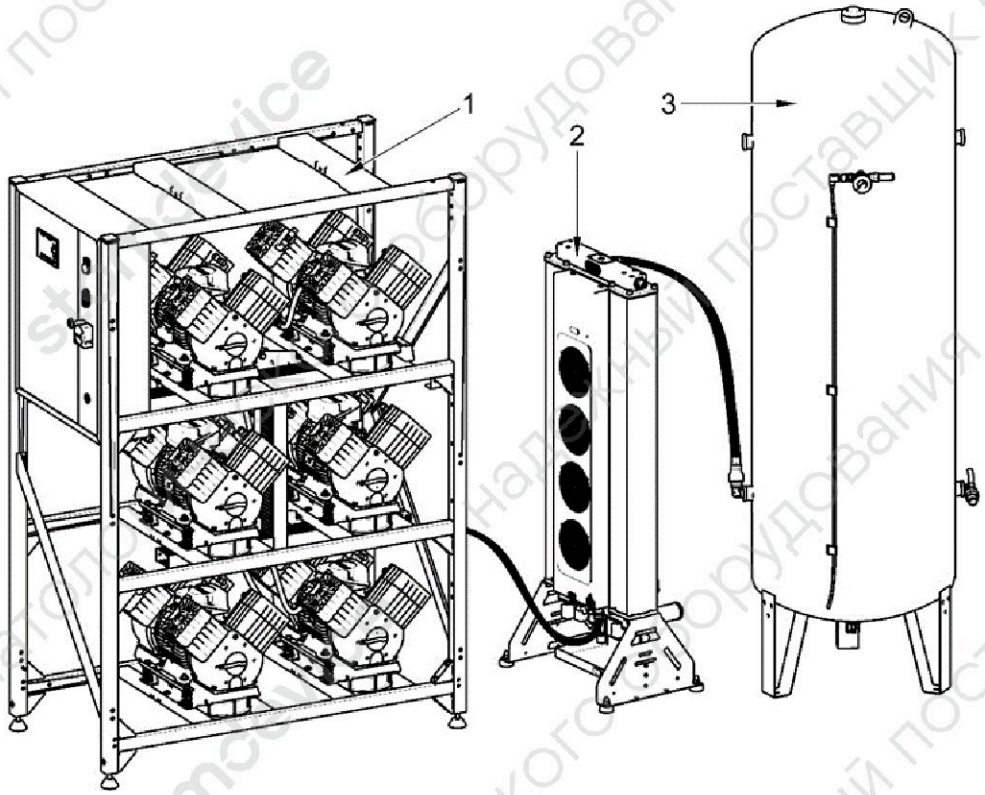
The compressor is manufactured according to its intended application in the following variants:

DK50 4x4VRT/M **DK50 6x4VRT/M**	Composed of modules: 1 compressor module with 4 or 6 aggregates and controls for the assembled unit 2 adsorption dryer with connecting hoses 3 air tank module
DK50 4x4VRTS/M **DK50 6x4VRTS/M**	Composed of modules: 1 compressor module together with a noise reducing enclosure and comprised of 4 or 6 aggregates and controls for the assembled unit 2 adsorption dryer with connecting hoses 3 air tank module

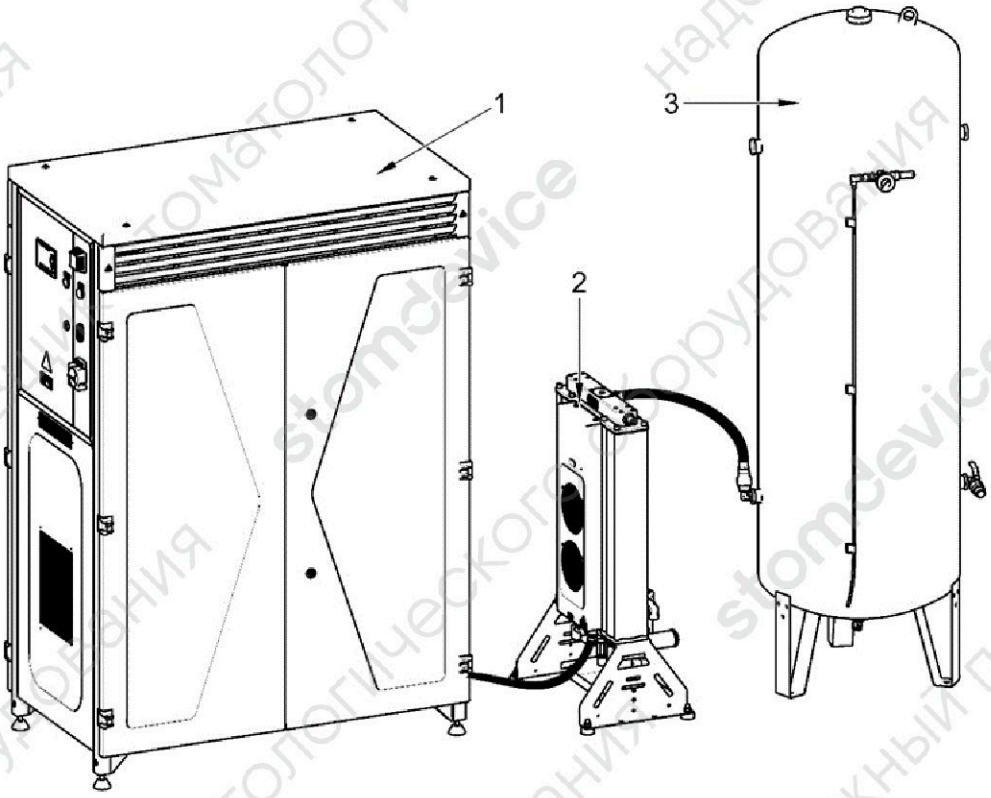


DK 50 4x4VRT/M

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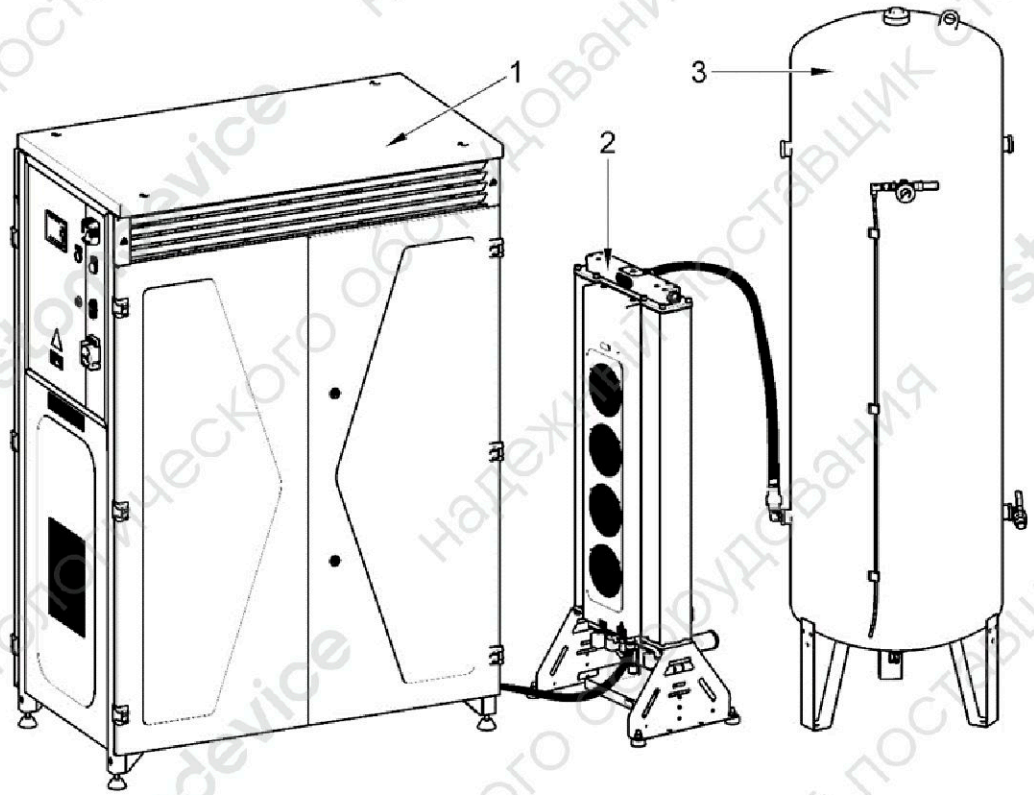


DK 50 6x4VRT/M



DK50 4x4VRTS/M

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DK50 6x4VRTS/M

8. ACCESSORIES

Accessories that are not included in the standard order must be ordered separately.

DK50 4x4VRT/M performance upgrade kit

If DK50 4x4VRT compressor performance is not keeping up with demand, a simple solution is to contact the manufacturer about the DK50 6x4VRT/M performance upgrade kit.

The DK50 4x4 VRT/M conversion kit converts the existing compressor into a fully functional DK50 6x4VRT/M compressor with the required parameters in an efficient manner at optimal cost.

Use	Central intake	Existing type of dryer	New type of dryer	Rated voltage / working pressure	Article number
DK50 4x4VRT/M	no	AD 1000E	AD 1500E	3x400 V / 50 Hz (6-8 bar)	447000009-171
DK50 4x4VRTS/M				3x400 V / 50 Hz (8-10 bar)	447000009-172
DK50 4x4VRT/M	yes	AD 1000E	AD 1500E	3x400 V / 50 Hz (6-8 bar)	447000009-173
DK50 4x4VRTS/M				3x400 V / 50 Hz (8-10 bar)	447000009-174

Central air pump intake kit

This kit provides a properly sized central intake filter located on the compressor module used to supply the intakes of the individual air pumps. This extends the central filter replacement interval (to every 2000 hours) compared to the interval for changing the filters on individual compressors, and ensures simpler and faster central filter replacement.

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Use	Article number
DK50 4x4VRT/M	447000001-021
DK50 4x4VRTS/M	447000001-020
DK50 6x4VRT/M	447000001-019
DK50 6x4VRTS/M	447000001-018

Set of compressed air outlet filters

The compressor may be equipped with a set of filters if specified. The filter set may be equipped with an air pressure regulator.

Where a different level of air filtration is required, this requirement must be agreed upon with the supplier and specified in the order.

Type	Use	Level of filtration (µm)	Bypass function *	Article number
FS 40F	DK50 4x4VRT/M	1	no	604014119-000
FS 40M		1+0.1		604014119-004
FS 40S		1+0.01		604014119-024
FS 40AH		1+AC+HC (0.01)		604014119-005

Type	Use	Level of filtration (µm)	Bypass function *	Article number
FS 41F	DK50 6x4VRT/M	1	no	604014119-006
FS 41M		1+0.1		604014119-010
FS 41S		1+0.01		604014119-025
FS 41AH		1+AC+HC (0.01)		604014119-011

*) These FS do not contain a filter bypass, which will ensure a continuous flow of air when replacing the filter element. Such a set must be ordered separately.

Filter set regulator assembly

The compressor may be equipped with a pressure regulator of the compressed air outlet if specified. The regulator must be selected according to the application to the filter set, or separately The regulator shall ensure constant pressure at the outlet.

Type	Use	Article number
Regulator complete	DK50 4x4VRT/M DK50 6x4VRT/M	604014125-000

Filter set brackets

A suitable bracket must be ordered for every filter set.

Type	Use	Article number
Compressor-mounted bracket	DK50 4x4VRT/M	603014139-000
Wall-mounted bracket	DK50 6x4VRT/M	603014120-000

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Compressor module enclosure (noise reducing)

Enclosing the compressor module reduces the noise generated by the compressor by up to 11 dB(a) compared to the compressor module without the enclosure while ensuring sufficient cooling for the air pumps themselves for S1 class continuous operation.

Use	With central intake	Article number
DK50 4x4VRT/M DK50 6x4VRT/M	yes	447000001-022
DK50 4x4VRT/M DK50 6x4VRT/M	no	447000001-023

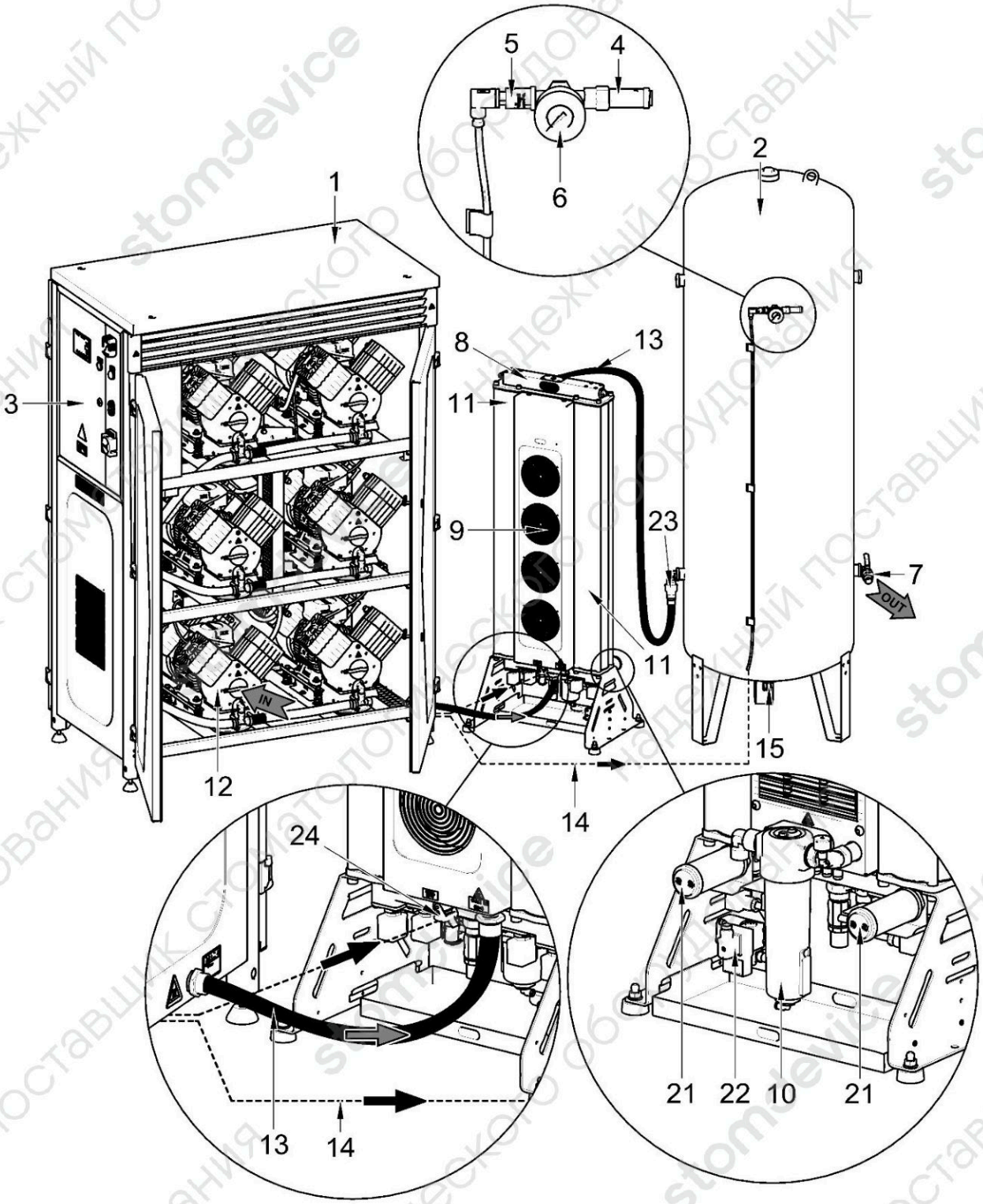
9. PRODUCT FUNCTION

9.1. Compressor with adsorption dryer

Fig. 1: Compressor aggregates (12) draw in atmospheric air through the intake filters and compress it through non-return valves into the compressed air system. A connecting hose (13) connects this system to the external adsorption dryer (8). From the inlet to the dryer module, the air is first cooled in the integrated cooler (9) and then through the condensate separator (10), entering the active chamber with adsorbent (11), where the air is dried. A portion of the air is fed into the second, regeneration chamber, where this air is used to remove moisture from the adsorbent, after which it is released through the silencer (21). The active chamber switches on a cyclical basis. Dry and filtered air then passes through the check valve into the air tank (2). The treated compressed air is ready for additional use in the air tank.

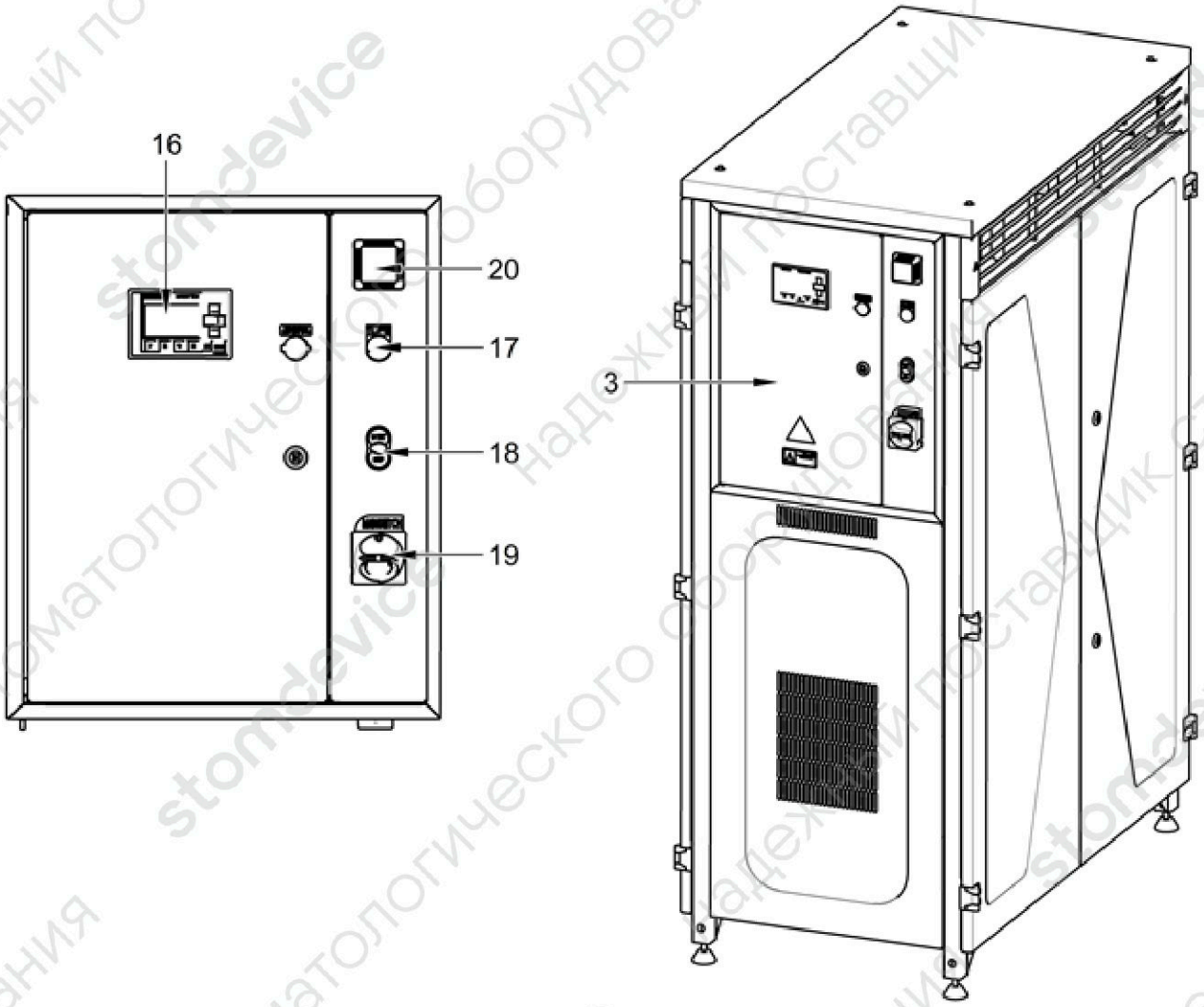
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Fig. 1 - Compressor with dryer



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Fig. 2 – Electrical box / switchboard



Descriptions for figures 1-2:

1. Compressor module
2. Air tank
3. Electrical box / switchboard
4. Safety valve
5. Pressure sensor
6. Pressure gauge
7. Outlet valve
8. Adsorption dryer
9. Integrated cooler
10. Condensate separator
11. Dryer chamber
12. Air pump
13. Connecting hoses
14. Electrical cables
15. Drain valve
16. Display
17. Indicator - alarm
18. Start/stop button
19. Main switch
20. Temperature sensor
21. Noise silencer
22. Condensate drain solenoid valve
23. Non-return valve
24. Connector

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TECHNICAL DATA

Compressors are designed for operation in dry, ventilated and dust-free indoor rooms under the following climactic conditions:

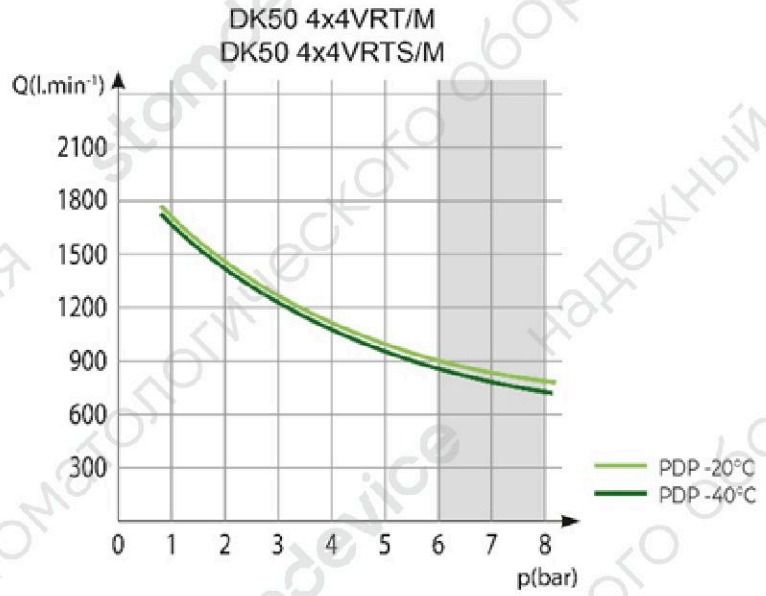
Temperature	+5°C to +40°C
Relative humidity	max. 70%

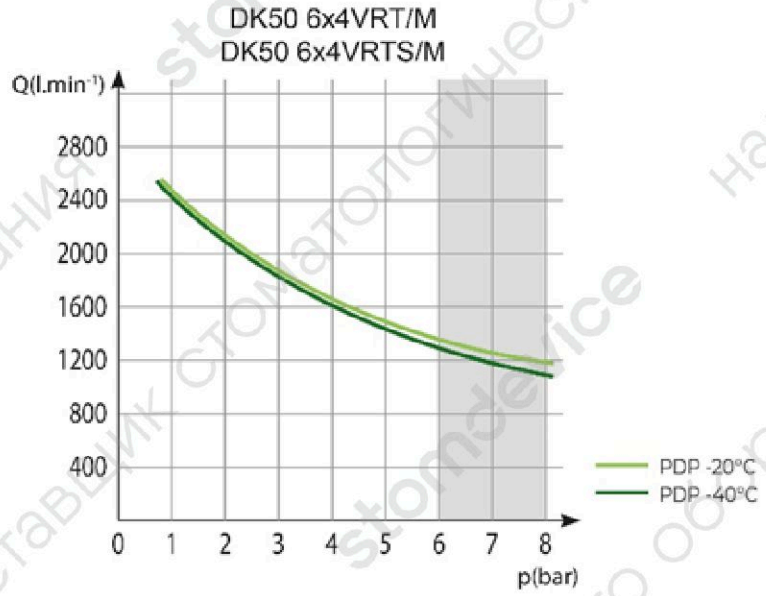
Working pressure 6 – 8 bar		**DK50 4x4VRT/M**	**DK50 4x4VRTS/M**	**DK50 6x4VRT/M**	**DK50 6x4VRTS/M**
Rated voltage Frequency [a]	V, Hz	3x400, 50	3x400, 50	3x400, 50	3x400, 50
Output at 6 bar (FAD) at PDP-20°C	l/min.	910	910	1370	1370
Output at 6 bar (FAD) at PDP-40°C	l/min.	870	870	1300	1300
Working pressure [b]	bar	6.0 – 8.0	6.0 – 8.0	6.0 – 8.0	6.0 – 8.0
Rated current	A	22	22	29	29
Main circuit protection device rating	A	25	25	32	32
Main electrical feeder	mm^2	4	4	6	6
Enclosure		IP10	IP30	IP10	IP30
Motor output	kW	2.2	2.2	2.2	2.2
Air tank capacity	l	500	500	500	500
Air quality – filtration	µm	-	-	-	-
Maximum operating pressure of safety valve	bar	10.0	10.0	10.0	10.0
Noise level at 5 bar (L_{pA})	dB	≤80	≤70	≤83	≤72
Operating mode	%	S1-100	S1-100	S1-100	S1-00
PDP drying performance at 7 bar [d]	°C	≤ -20 ≤ -40	≤ -20 ≤ -40	≤ -20 ≤ -40	≤ -20 ≤ -40
Time to fill air tank from 0 to 7 bar	s	150	150	115	115
Net weight [c]	kg	439	572	531	664
Weight - compressor module	kg	268	401	350	483
Weight - dryer module	kg	44	44	54	54
Weight of air tank	kg	127	127	127	127
Net dimensions W x L x H	mm	2875 x 2090 x 705	2875 x 2090 x 705	2875 x 2090 x 705	2875 x 2090 x 705
Dimensions - compressor module (W x L x H)	mm	1235 x 1720 x 630	1235 x 1755 x 705	1235 x 1720 x 630	1235 x 1760 x 705
Dimensions – dryer module	mm	530 x 965 x 350	530 x 965 x 350	530 x 1310 x 350	530 x 1310 x 350
Air tank dimensions (W x L x H)	mm	730 x 2090 x 705	730 x 2090 x 705	730 x 2090 x 705	730 x 2090 x 705
Required cooling air changes in space	m^3/h	2250	2250	3000	3000
Electrical class		Class I.			

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[a] Specify the compressor version when ordering
[b] Consult any other range of pressure with the supplier
[c] Weight is indicative and only applies to the product without accessories
[d] Applies to ambient temperatures of <30°C PDP – pressure dew point

Dependence of compressor output on working pressure





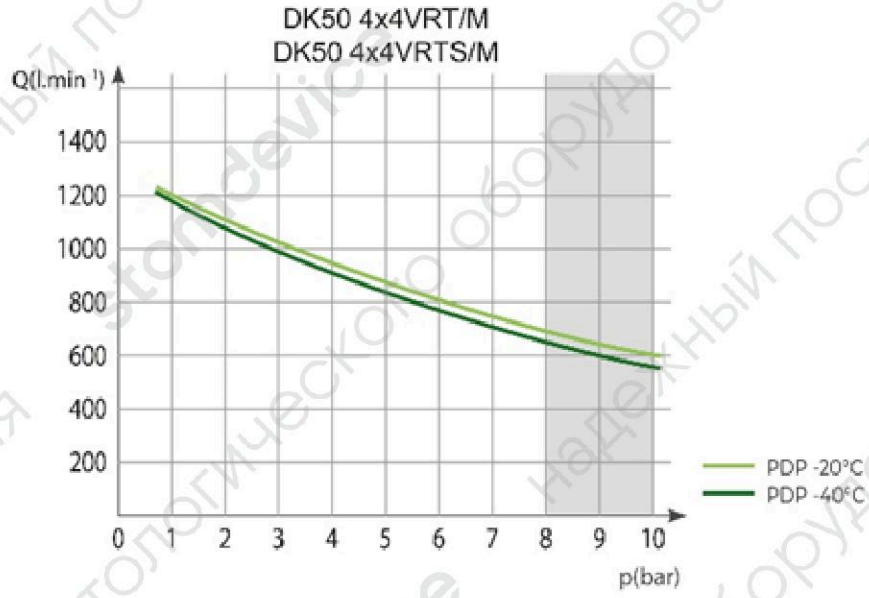
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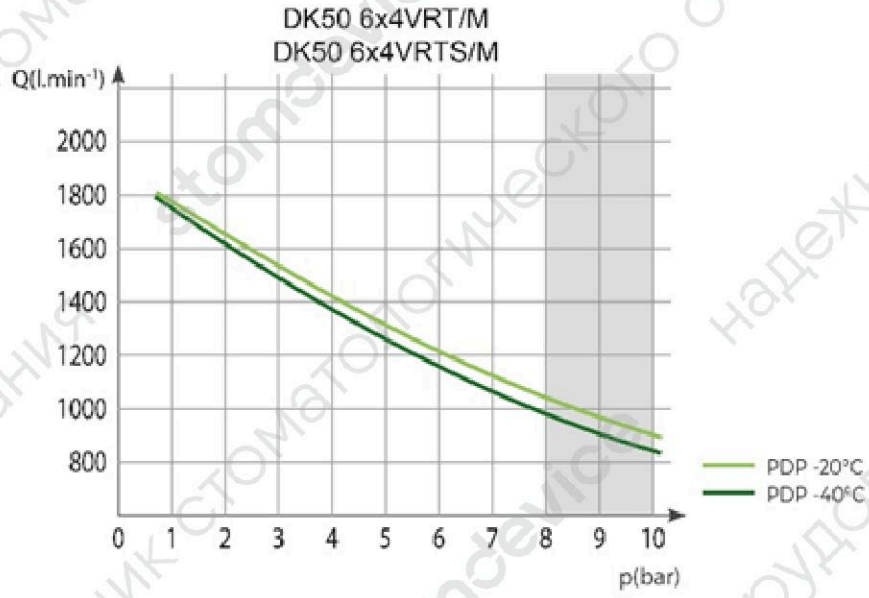
Working pressure 8 – 10 bar		DK50 4x4VRT/M	DK50 4x4VRTS/M	DK50 6x4VRT/M	DK50 6x4VRTS/M
Rated voltage Frequency [a]	V, Hz	3x400, 50	3x400, 50	3x400, 50	3x400, 50
Output at 8 bar (FAD) at PDP-20°C	l/min.	700	700	1050	1050
Output at 8 bar (FAD) at PDP-40°C	l/min.	660	660	1000	1000
Working pressure [b]	bar	8.0 – 10.0	8.0 – 10.0	8.0 – 10.0	8.0 – 10.0
Rated current	A	23	23	30	30
Main circuit protection device rating	A	25	25	32	32
Main electrical feeder	mm^2	4	4	6	6
Enclosure		IP10	IP30	IP10	IP30
Motor output	kW	2.2	2.2	2.2	2.2
Air tank capacity	l	500	500	500	500
Air quality – filtration	µm	-	-	-	-
Maximum operating pressure of safety valve	bar	11.0	11.0	11.0	11.0
Noise level at 5 bar (L_{pA})	dB	≤80	≤70	≤83	≤82
Operating mode	%	S1-100	S1-100	S1-100	S1-00
PDP drying performance at 7 bar [d]	°C	≤ -20 ≤ -40	≤ -20 ≤ -40	≤ -20 ≤ -40	≤ -20 ≤ -40
Time to fill air tank from 0 to 7 bar	s	150	150	115	115
Net weight [c]	kg	439	572	531	664
Weight - compressor module	kg	268	401	350	483
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Air tank dimensions (W x L x H)	mm	730 x 2090 x 705	730 x 2090 x 705	730 x 2090 x 705	730 x 2090 x 705
Required cooling air changes in space	m^3/h	2250	2250	3000	3000
Electrical class		Class I.			

[a] Specify the compressor version when ordering
[b] Consult any other range of pressure with the supplier
[c] Weight is indicative and only applies to the product without accessories
[d] Applies to ambient temperatures of <30°C PDP – pressure dew point

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Dependence of compressor output on working pressure





FAD correction of capacity for altitude

Capacity given in the form of FAD („Free Air Delivery“) applies to the following conditions:

Altitude	0 m.n.m.	Temperature	20°C
Atmospheric pressure	101325 Pa	Relative humidity	0%

To calculate FAD compressor capacity in dependence on altitude, it is necessary to apply correction factor according to the following table:

Altitude [m.n.m.]	0 -1500	1501 - 2500	2501 - 3500	3501 - 4500
FAD correction factor	1	0.80	0.71	0.60

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INSTALLATION

Risk of incorrect installation.

Only a qualified technician may install the compressor and place it into operation for the first time. Their duty is to train operating personnel on the use and maintenance of the equipment. An entry is made in the equipment installation record to certify installation and operator training. (see the Annex chapter)

10. INSTALLATION CONDITIONS

- The compressor may only be installed and operating in dry, well-ventilated and clean environments under the conditions specified in the Technical Data chapter.

Risk of damage to the device.

The equipment may not be operated outdoors or in otherwise wet or damp environments.

Risk of explosion.

Do not use the equipment in the presence of explosive gases, dust or combustible liquids.

- The compressor must be installed so that it is accessible at all times for operating and maintenance. Please ensure that the nameplate on the device is readily accessible.
- The compressor must stand on a flat, sufficiently stable base (be aware of the weight of the compressor, see the Technical Data chapter).
- The compressor on the operator's side must be at least 70 cm from the wall to allow air flow for cooling purposes and to ensure the safety of the operator and maintenance personnel.
- Approximately 70% of the electrical energy used by the compressor aggregates is converted to heat, and therefore the rooms in which the compressor is installed must have additional ventilation to provide sufficient air exchange for cooling purposes (see the Technical Data chapter).

Burn or fire hazard! Caution! Hot surface!

Portions of the compressor, dryer and connecting hoses between the dryer and compressor may be hot and reach hazardous temperatures during compressor operation that may harm materials or operating staff.

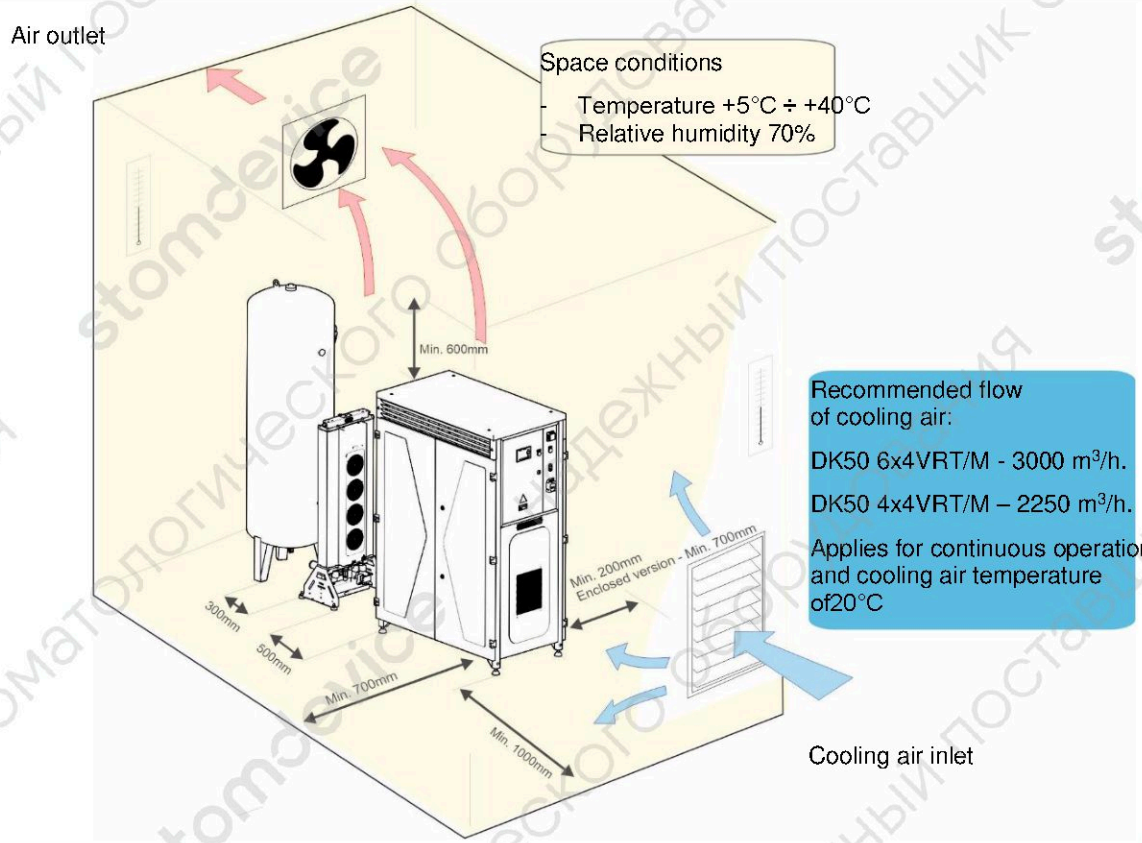
High temperature hazard

Placing air flow impediments upstream or downstream of the cooler is prohibited. The temperature of internal and external parts of the equipment may rise to hazardous levels.

You may notice a "new product" odour when you first place the product into service (for a short period of time). This odour is temporary and does not impede the normal use of the product. Ensure the space is properly ventilated after installation.

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Fig. 3: Equipment installation



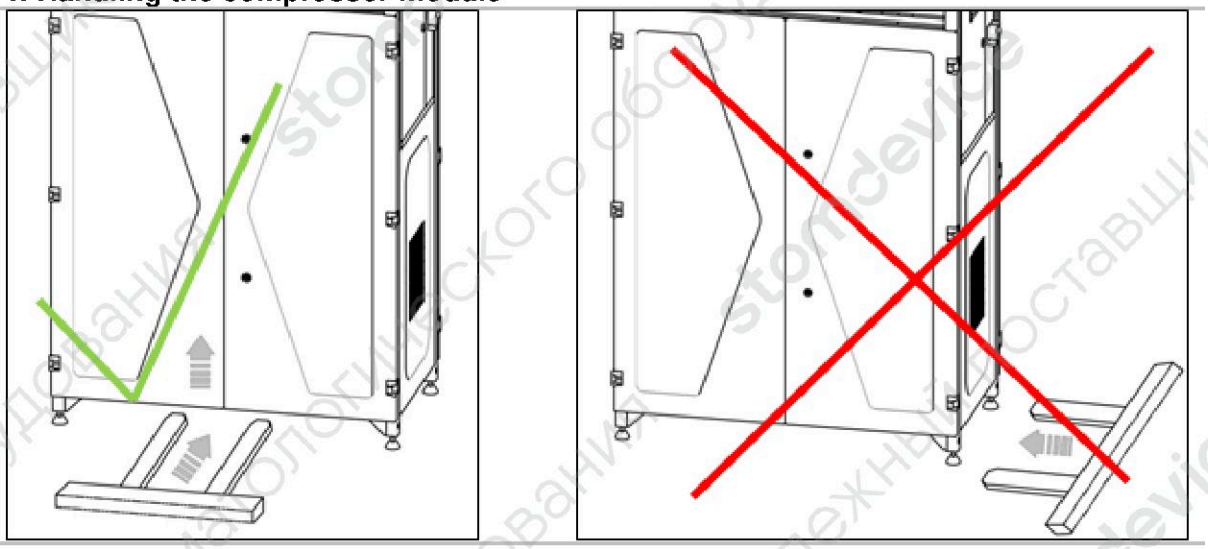
11. COMPRESSOR ASSEMBLY

11.1. Handling and releasing the compressor

- Unpack the compressor (compressor modules, dryer and air tank) from the packaging and remove the transport anchors from the pallet. All modules are secured to pallets.
- Use a fork lift or similar hoisting equipment to handle and position the product.

Position the compressor module at the site of installation. (Fig. 4 A)

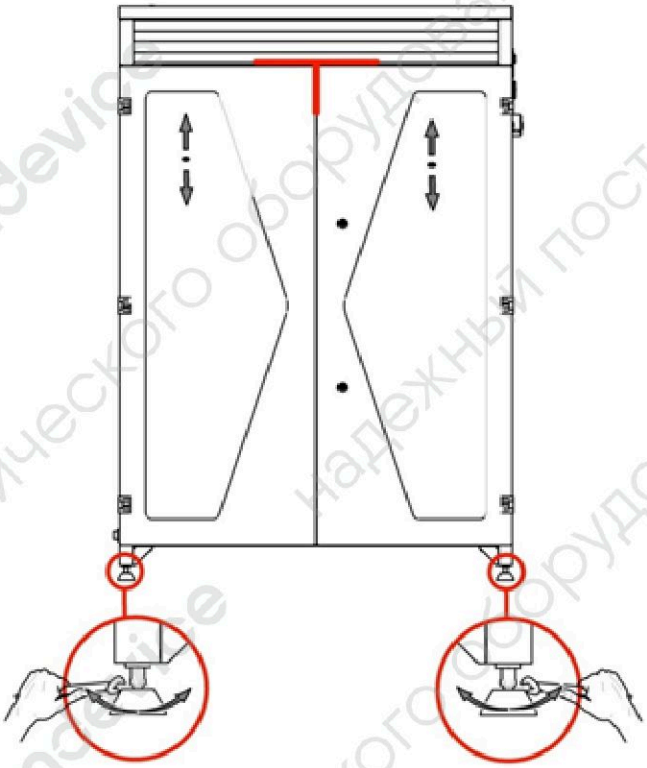
Fig. 4: Handling the compressor module



A B

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Fig. 5: Levelling the compressor

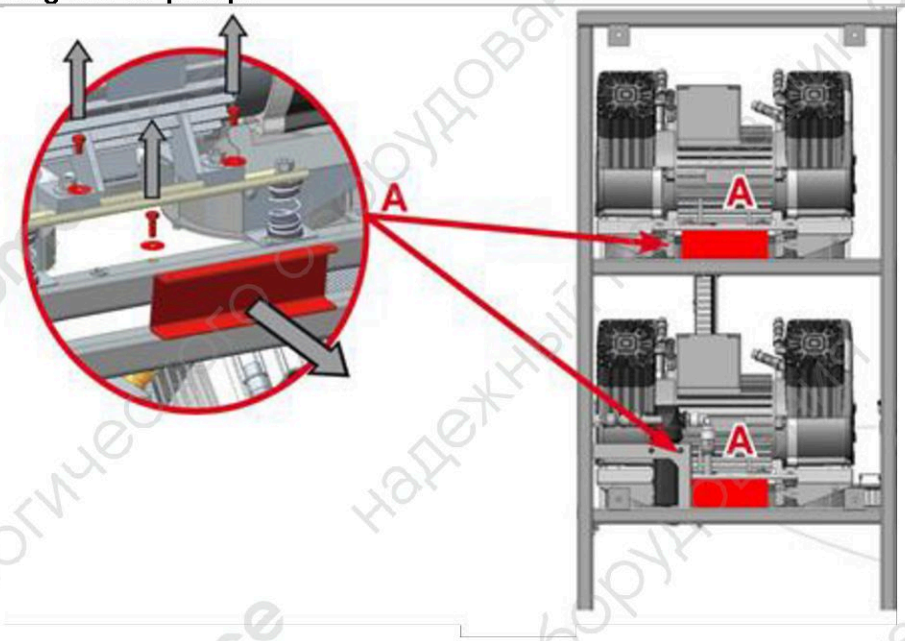


Prior to installation, ensure that the compressor is free of all transport packaging and stabilizers to avoid any risk of damage to the product.

Remove all devices used to secure the aggregates once the compressor is installed and levelled at the site of final installation.

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Fig. 6: Releasing the air pumps



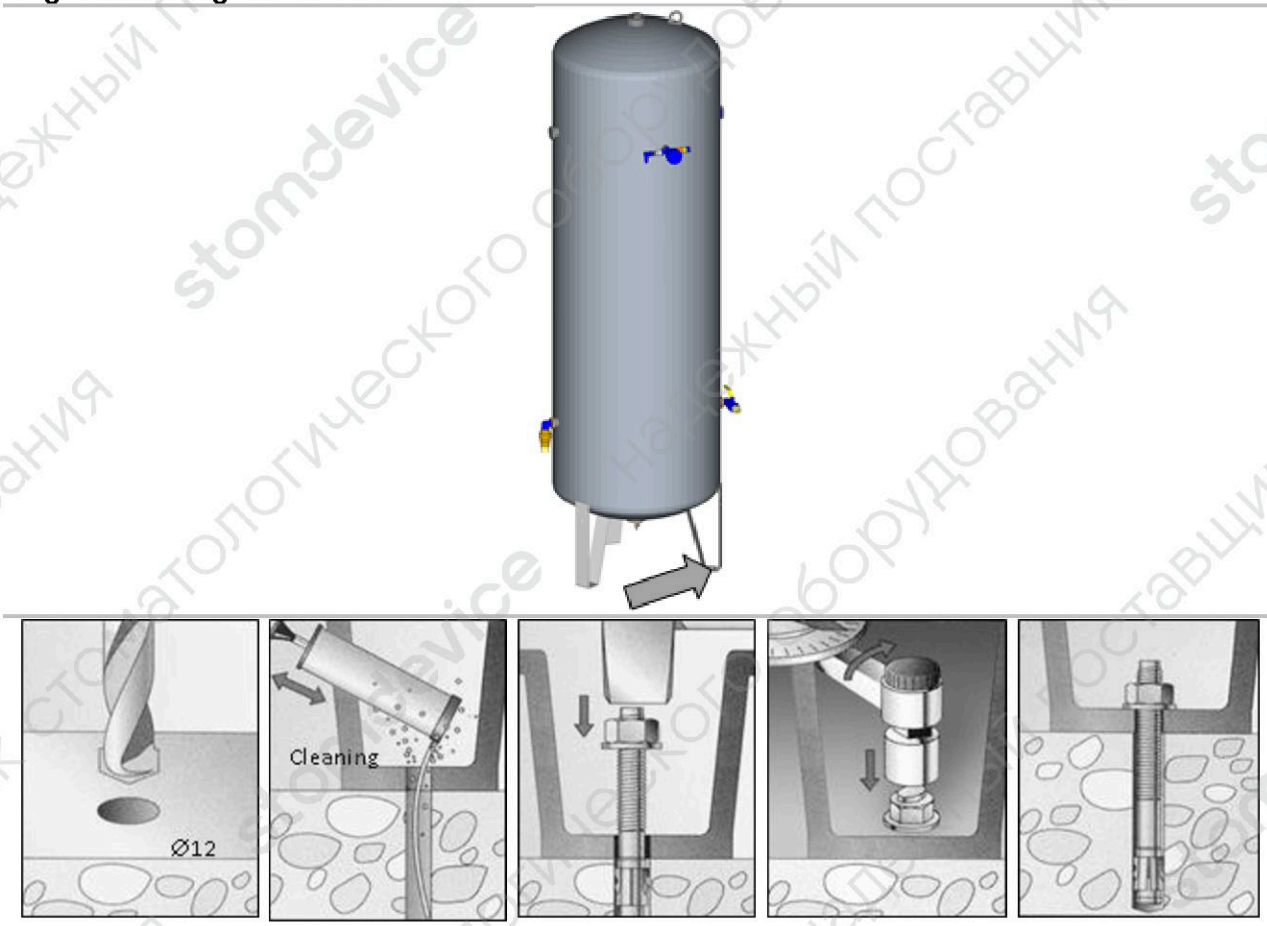
- Remove the transport stabilisers from the air pumps (Fig. 6).

- DK50 4x4VRT/M – 8 mounts.
- DK50 6x4VRT/M – 12 mounts

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Air tank assembly

Fig. 7:Handling the air tank



- Position the air tank at the site of installation and anchor it to the floor. (Fig. 7)

Assembly of the AD dryer

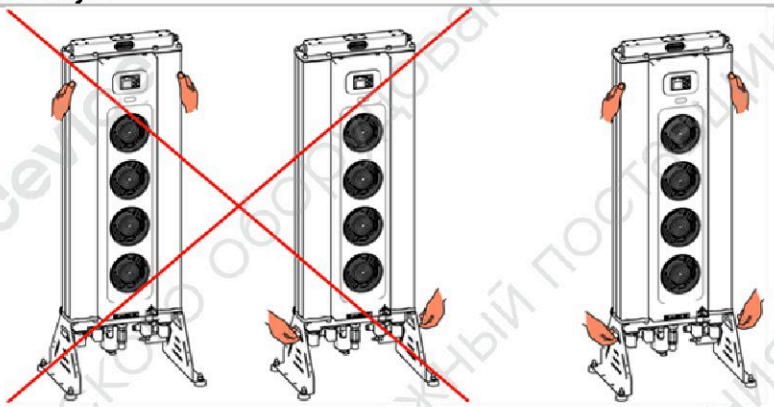
- Remove the dryer from the packaging.
- Install the dryer in its operating position (Fig. 8).

At least two persons are needed to handle the equipment.

Integrated handles are installed on the lower brackets on the product. Each person must grasp the equipment with one hand on a handle and the other behind the dryer chamber when moving the equipment.

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Fig. 8: Handling the dryer



12. PNEUMATIC CONNECTION

Connect compressor module, dryer module, and the air tank with the provided hoses. (Fig. 9)

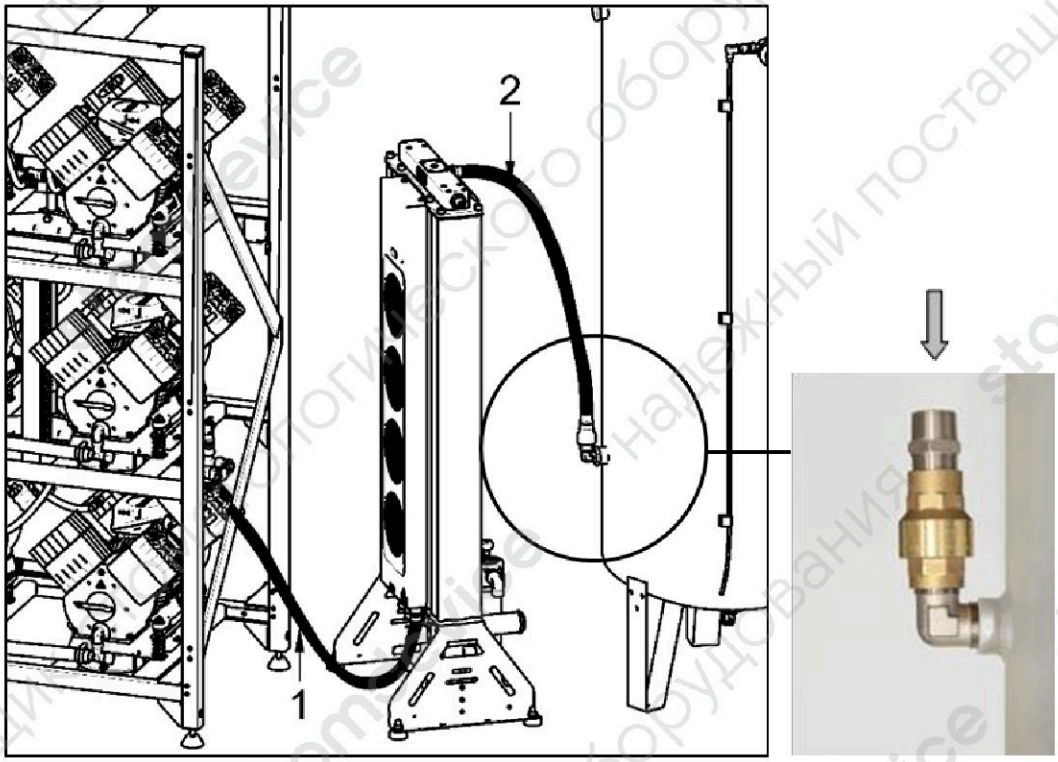


Fig. 9: Connecting the compressor module, dryer and air tank

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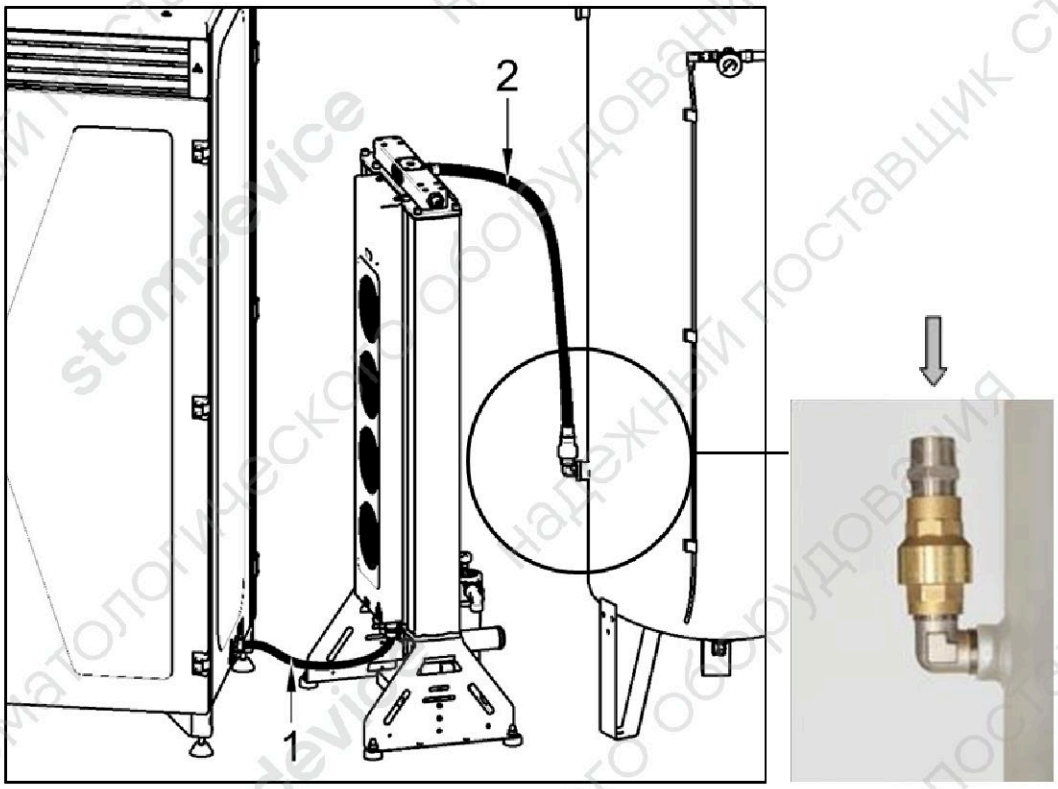


Fig. 10: Connecting the enclosed compressor module, dryer and air tank

	hose length 1 [mm]	hose length 2 [mm]
DK50 4x4VRT/M	**1000**	**1000**
DK50 4x4VRTS/M	**600**	**600**
DK50 6x4VRT/M	**1300**	**1000**
DK50 6x4VRTS/M	**600**	**1000**

AD dryer compressed air inlet

- Connect to the compressor outlet (Fig. 10).
- A G 3/4" connection is installed



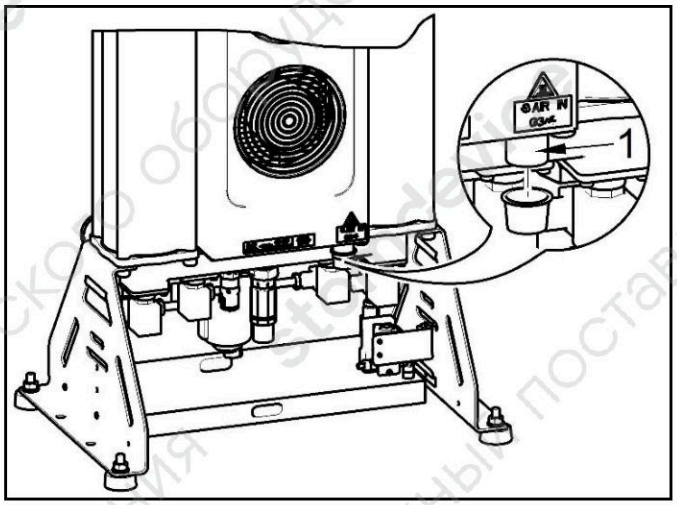


Fig. 11: Compressed air inlet

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Burn or fire hazard! Caution! Hot surface!

When installing the connecting hoses at the inlet to the air dryer, ensure that the temperature is not hazardous if it was to come into contact with an operator or other material.

AD dryer compressed air outlet

- Connect the outlet from the dryer (1) to the air inlet on the air tank.
- A G 3/4" connection is installed.



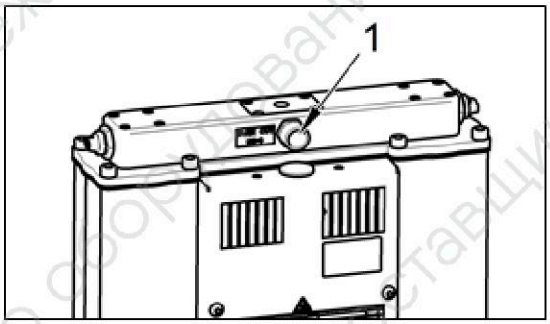
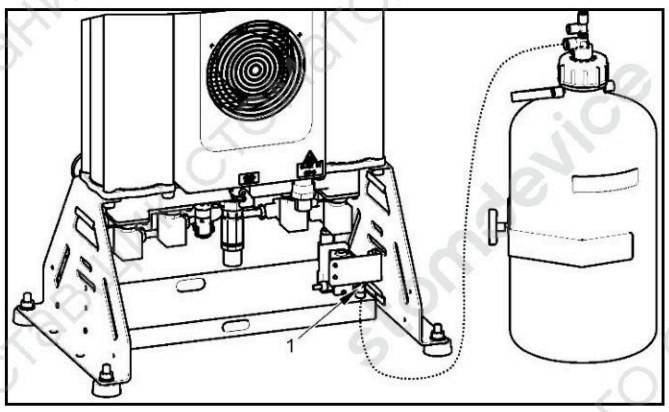


Fig. 12: Compressed air outlet

Condensate outlet from dryer

- Connect a hose to the outlet (1) from the automatic condensate drain (2) to drain piping or to the provided collection vessel.

A noise silencer is recommended when connecting directly to drain piping.



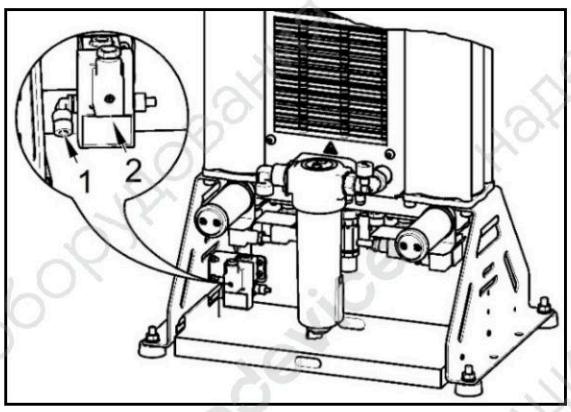


Fig. 13: Condensate drain

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A G3/4" ball valve is installed on the compressed air outlet from the air tank.

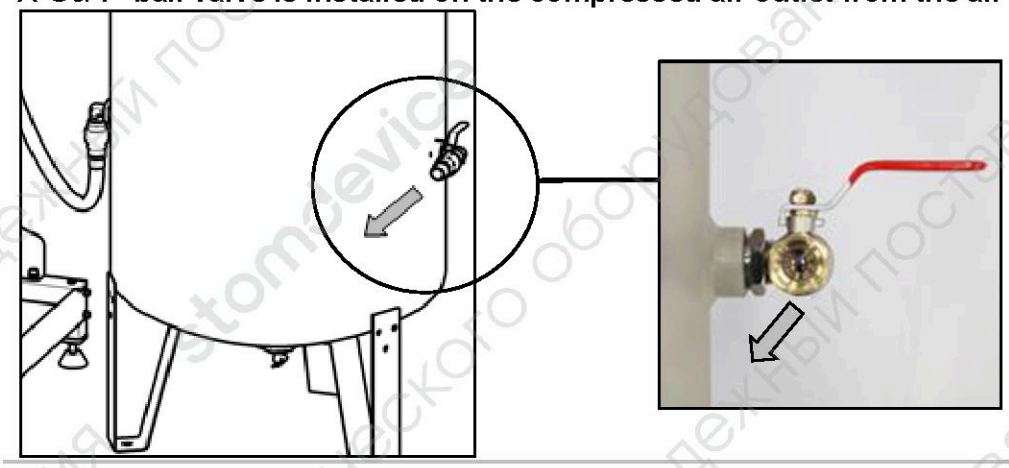


Fig. 14: Air outlet from the air tank

Potential for damage to pneumatic components.

Ensure the air hoses are not kinked.

13. ELECTRICAL CONNECTION

Unauthorised interference hazard

Only a qualified electrician may install electrical components!

Risk of damage to the device.

The operator is obliged to provide circuit protection devices for the equipment per the specifications in valid technical standards.

The product is delivered without a power cord.

- Connect the compressor module to the dryer module using cable W22 (Fig. 15).
- Connect the compressor module to pressure sensor B1 located on the air tank using cable W23, which is terminated with a valve connector. (Fig. 17)

The manufacturer recommends protecting cabling loose on the floor (W22 and W23) with a cable bridge.

- Connect the individual power cord conductors to the power terminals L1, L2, L3, N(BU), PE(GNYE). (Fig. 19)
- Recommended configuration of phase conductors: L1-BN, L2-BK, L3-GY.
- Cord type (minimum requirements) H05 VV-F_ 5G6

Route the power cord out of the enclosure as illustrated. (Fig. 18)

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Fig. 15: Connecting the compressor to the dryer

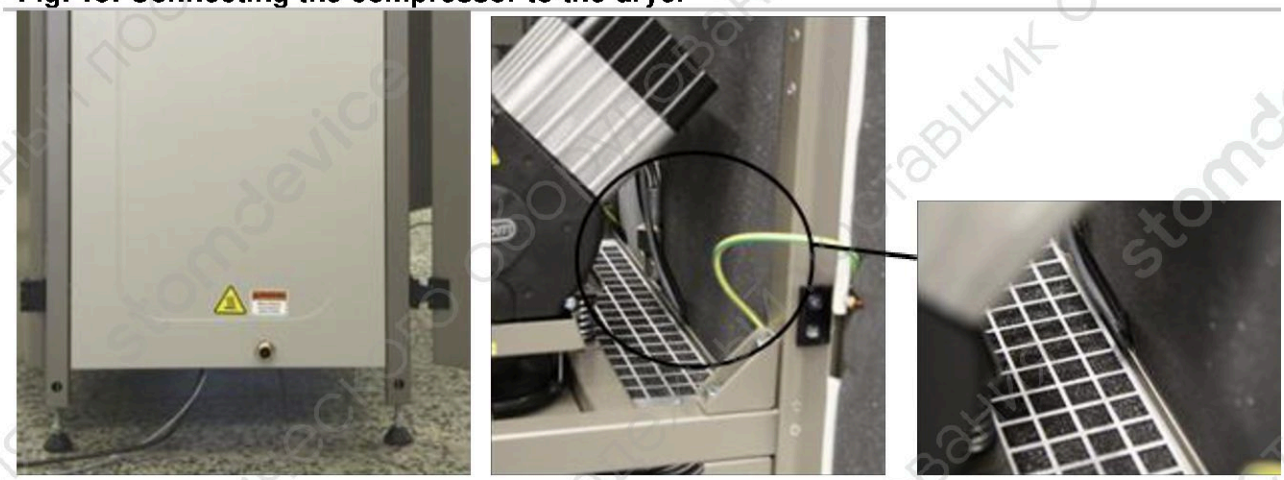
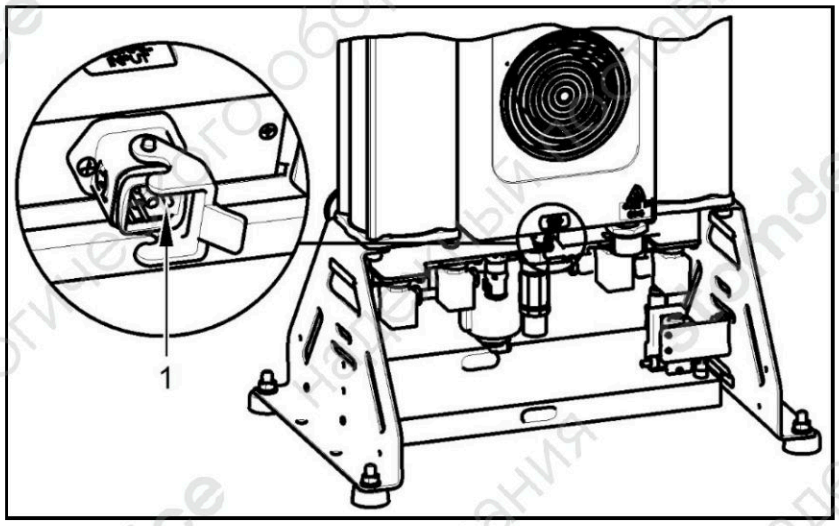
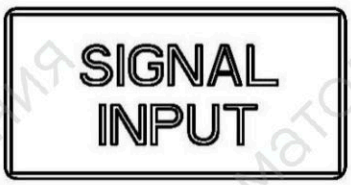


Fig. 16: Connecting the control signal

1. Harting connector





- Proper routing of the electrical cable to the dryer

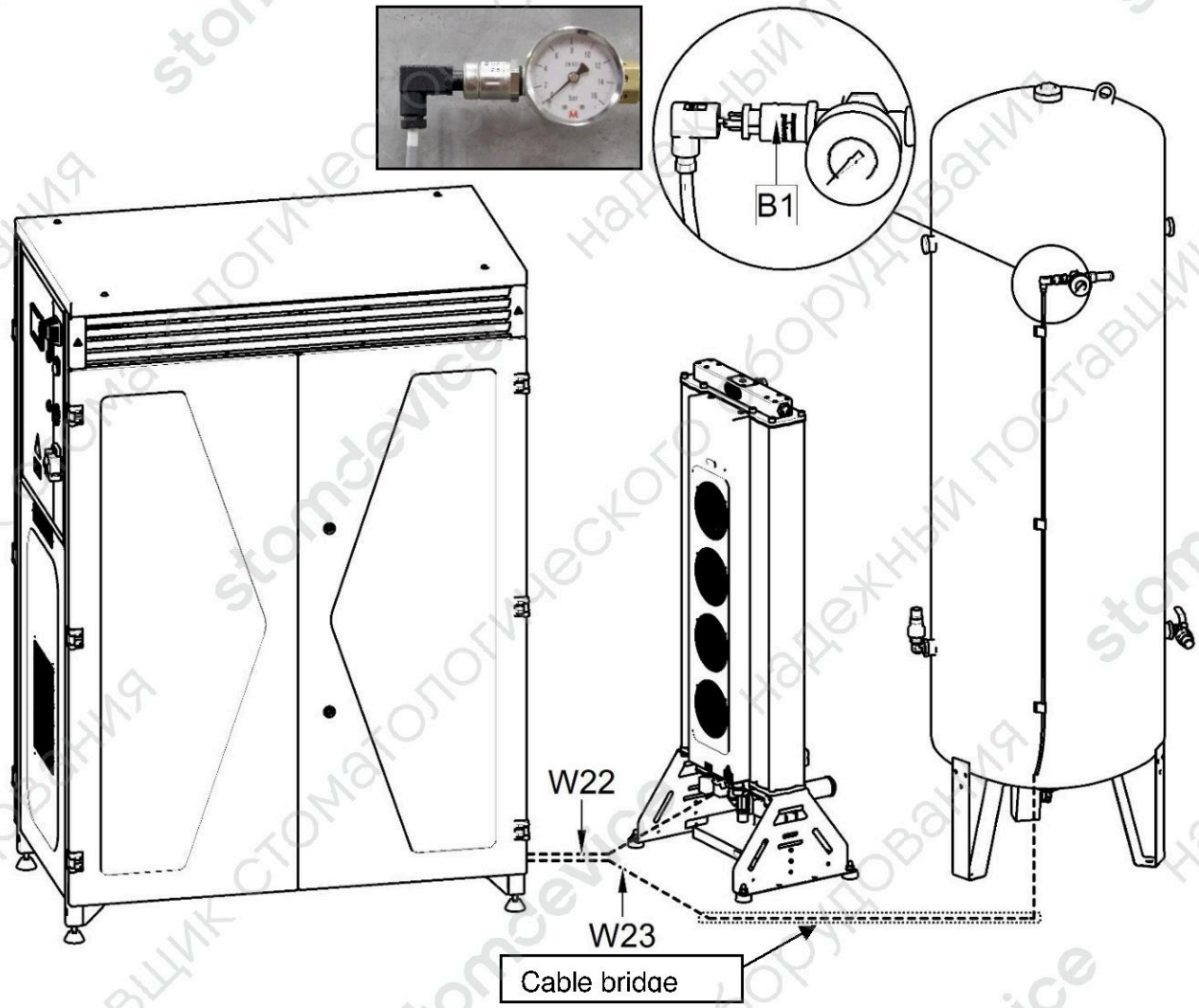


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Fire hazard and risk of electric shock.

Ensure the electrical cable does not touch hot parts of the device or connecting hoses.

Fig. 17: Connecting the compressor to the pressure sensor

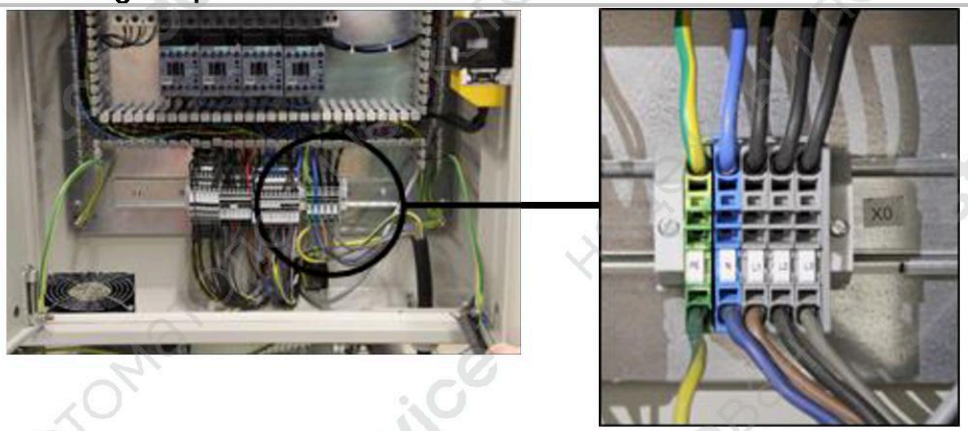


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Fig. 18: Electrical cord



Fig. 19: Connecting the power cord



Description of air pump controls (only for DK50 6x4VRTM)

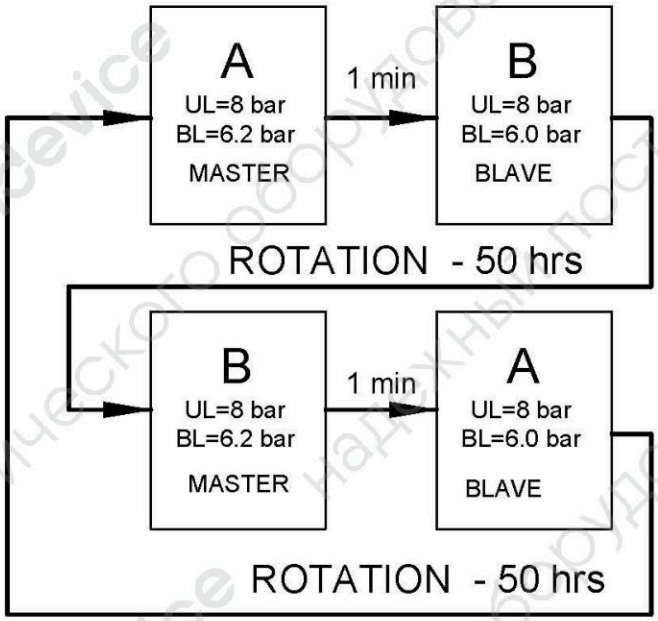
The air pumps are controlled in trios based on real demand. One trio is always set as the MASTER (e.g. M1-3) and the others as SLAVE (e.g. M4-6). The set of three Slave air pumps operate under the following conditions (see Fig. 20)

- A waiting period (pressurising to the upper limit) of 1 minute under strong demand and 2 minutes under weak demand
- Pressure drops below 6.2 bar (SLAVE)
- Motor failure in the MASTER section

The lower limit settings ROTATE every 50 hours to ensure all the air pumps are evenly loaded.

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Fig. 20: Air pump controls only for DK50 6x4VRTM



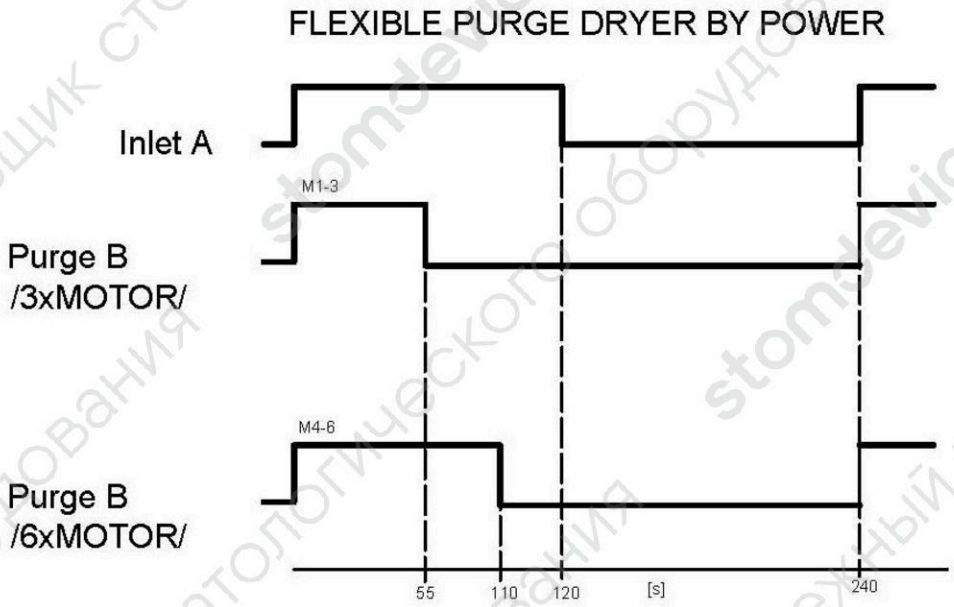
A – motors M1-M3
B – motors M4-M6
UL – upper limit
BL – bottoms limit → Master = 6.2, SLAVE = 6.0

Description of adsorption dryer solenoid valve control

The inlet valves (Inlet A and B) switch every 120 seconds.

The regeneration valves open variably based on the real load, e.g. if all motors are running, flushing is set to 110 seconds, while if one trio set is running, flushing is set to 55 seconds.

Fig. 21: Solenoid valve diagram



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Ethernet connection

The compressor may be connected to an Ethernet 10/100 M network via the controller as follows:

1 Use the RJ-45 connector on the switchboard door to connect a cable to the Ethernet network.
2 The user shall then request IT staff to connect the compressor to the customer's Ethernet network. The equipment's default IP addresses are: BM=192.168.0.3, TDE=192.168.0.2, sub-mask =255.255.255.0.
3 The user shall request the configuration of IP addresses (specific or requested) from the manufacturer before the compressor is shipped.
4 The user then configures the IP addresses (specific, requested) based on the manual (see the service manual) or uses the compressor manufacturer's technical support for such purposes.

Web server

The controller has an integrated Web Server function that facilitates compressor monitoring via a PC, smartphone or tablet using a conventional web browser (Mozilla, Opera, Safari, Google Chrome, etc.)

The process for logging into the Web Server function once the compressor is connected to an Ethernet network is as follows:

- Open the web browser on a PC, smartphone or tablet and enter the IP address of the controller (in this case 192.168.0.3).



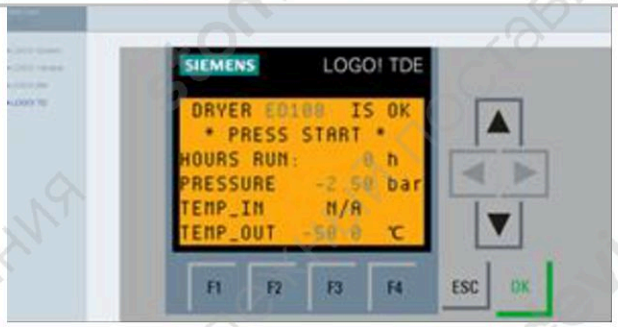
- Enter the password "LOGO" and click on the "LOG on" button.



- After logging in, the browser displays the first screen showing the system information for the controller itself: module generation, type, firmware (FW), IP address and activity status.



- Click on the "LOGO! BM" function in the browser to display the current virtual status of the display screen. Navigate through the screen using the ESC and cursor keys the same as on the real display.



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Monitoring memory variables

The "LOGO! Variable" function is the other option for monitoring compressor parameters using selected memory variables. Click the "LOGO! Variable" button on the display to bring up a screen and then use the "Add Variable" button to select specific memory variables for monitoring based on the mapping provided by the compressor manufacturer.

Variables assigned based on addresses and models may be viewed in the MAPPING PARAMETERS table (see the Annex chapter).

Select the variable parameters (per the annex) sequentially in the Range, Address, Type and Display Format columns. Variable values are shown in the Value column. The monitoring table may then appear as follows:

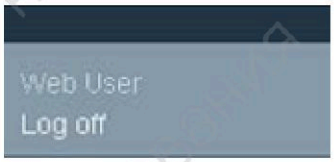


Note:

- Time values are displayed in minutes. For instance, address 10 displays 120000 in minutes, which is 2,000 hours.
- Analogue values (pressure and temperature) are displayed without decimal places.

Logging out from the Web server:

- Click on the button in the upper left corner.



14. COMMISSIONING

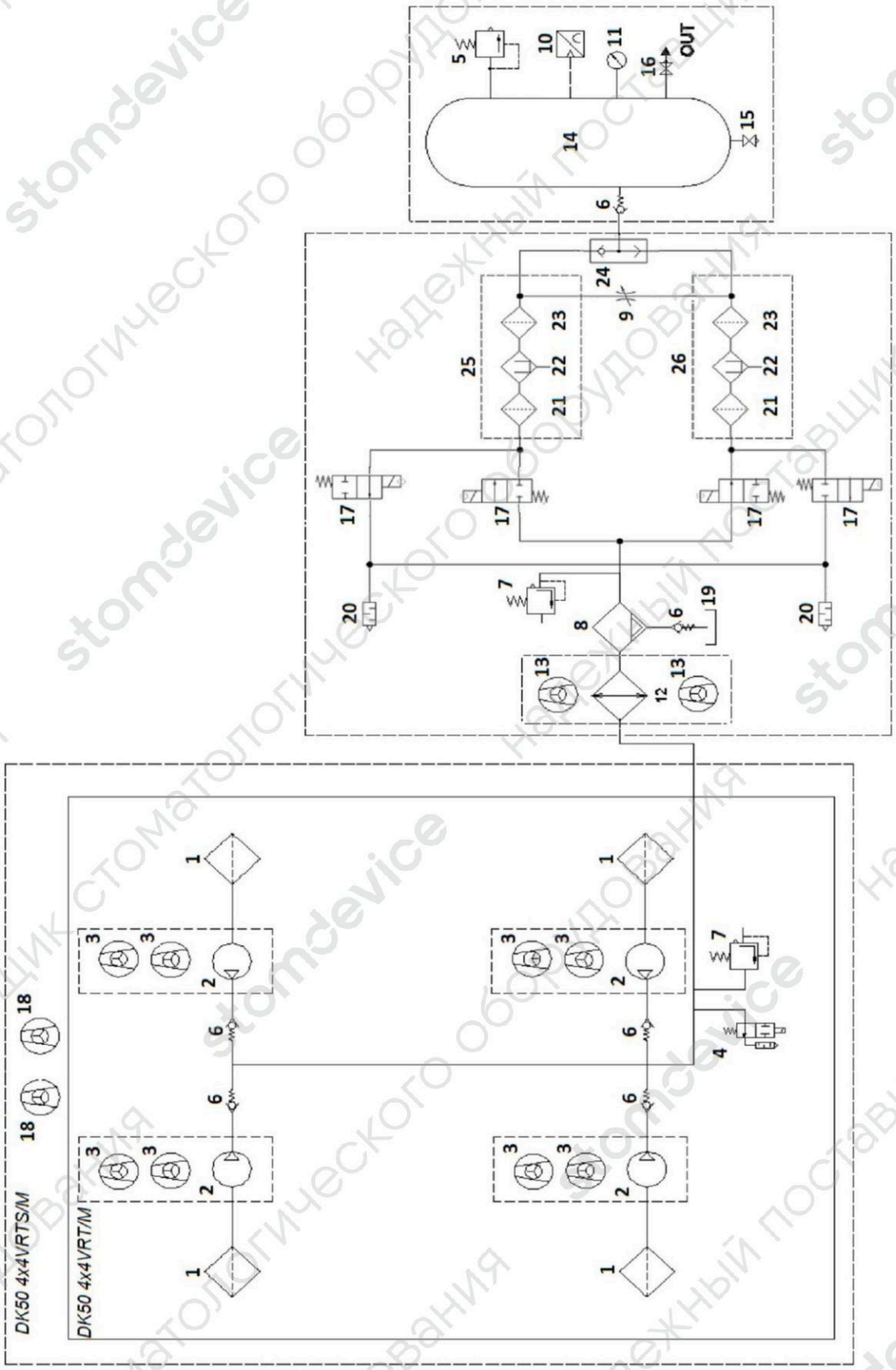
- Make sure all transport stabilizers were removed.
- Check that all compressed air hose connections are correct.
- Ensure the power cord is properly connected to the mains and other cables are connected (compressor-dryer and compressor-air tank).
- Check to ensure the outlet valve is in the OFF position.

The compressor is not equipped with a backup power supply.

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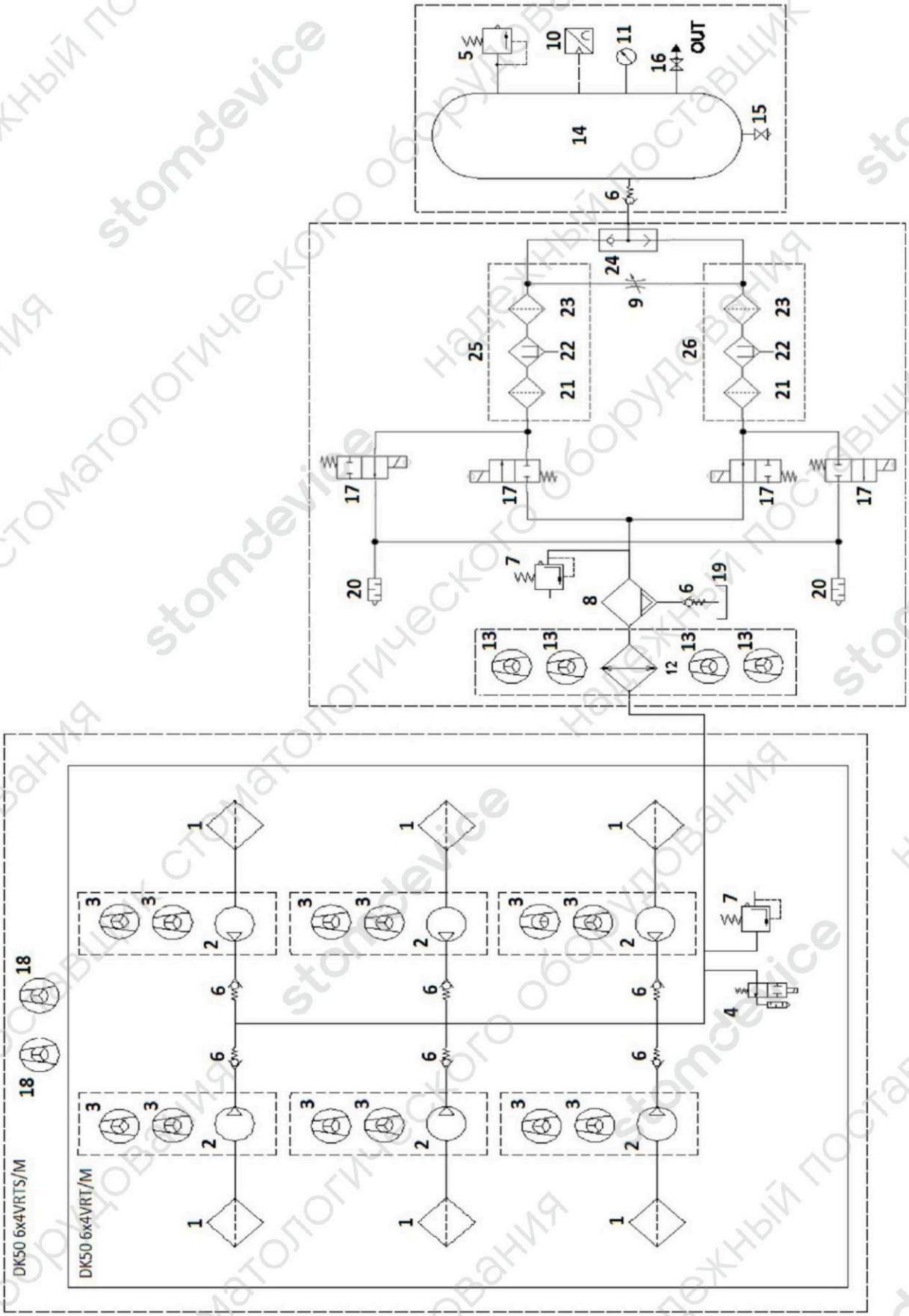
15. PNEUMATIC DIAGRAMS

DK50 4x4VRT/M, DK50 4x4VRTS/M



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DK50 6x4VRT/M, DK50 6x4VRTS/M



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Description to pneumatic diagrams:

1. Inlet filter
2. Air pump
3. Compressor fan
4. Solenoid valve
5. Safety valve
6. Non-return valve
7. Pressure relief valve
8. Condensate separator
9. Jet
10. Pressure sensor
11. Pressure gauge
12. Cooler
13. Cooler fan
14. Air tank
15. Drain valve
16. Outlet valve
17. Dryer solenoid valve
18. Central fan
19. Condensate collection vessel
20. Noise silencer
21. Coarse inlet filter
22. Adsorption filtration
23. Coarse outlet filter
24. OR logic valve
25. Dryer chamber 1
26. Dryer chamber 2

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OPERATION

ONLY TRAINED PERSONNEL MAY OPERATE THE EQUIPMENT!

Risk of electric shock.

In case of emergency, disconnect the compressor from the mains (pull out the mains plug).

Burn or fire hazard.

When the compressor is running, the connecting hose between the compressor and dryer and parts of the dryer and aggregate may be hot enough to burn people or other material.

Warning - compressor is controlled automatically.

Automatic start. The compressor automatically switches on when the pressure in the air tank drops to the pressure switch's lower limit level. The compressor automatically switches off once the pressure in the tank reaches the shut-off pressure.

Potential for damage to pneumatic components.

The working pressure settings for the pressure switch set by the manufacturer cannot be changed. Compressor operation at a working pressure below the switching pressure indicates high air usage (see the Troubleshooting chapter).

Risk of damage to the dryer.

The dryer may suffer damage if operated at ambient temperatures above its maximum working pressure as specified in the Technical Data chapter.

Required drying performance can only be achieved when following the defined operating conditions.

Drying performance will decline and the achieved dew point will drop if the dryer is operated at any pressure below the minimum working pressure.

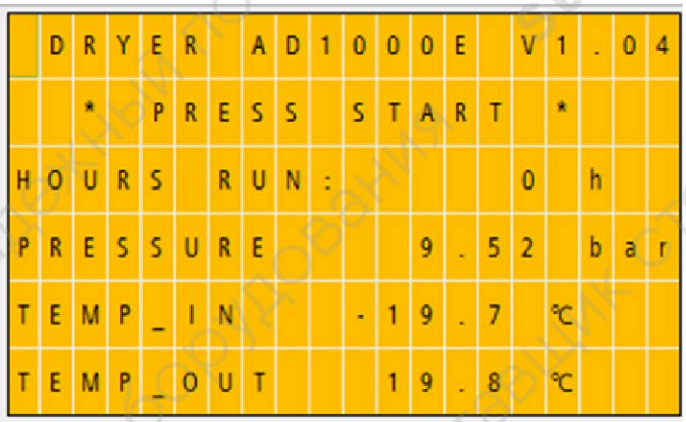
During prolonged operation of the compressor, the temperature inside the enclosed model may increase to over 40°C. At this point the cooling fan in the enclosure and the compressor fan automatically switch on. The fans switch off automatically once the space is cooled to below 32°C.

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16. SWITCHING ON THE COMPRESSOR

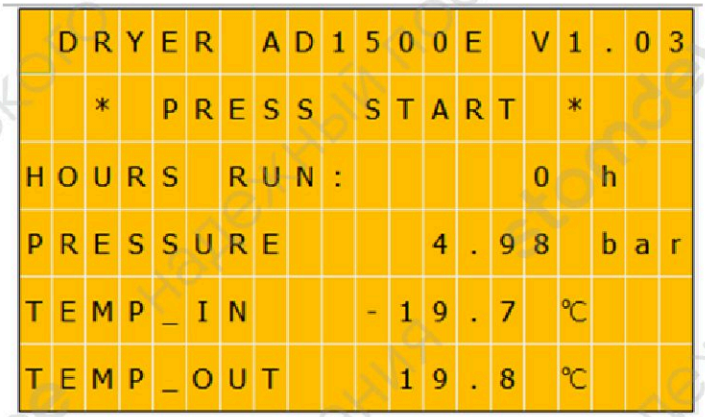
- Turn the main switch (19) into the "I" position on the compressor switchboard. The white indicator P1 (17) lights up and the display (16) on the switchboard door shows the following message:

DK50 4x4 VRTM



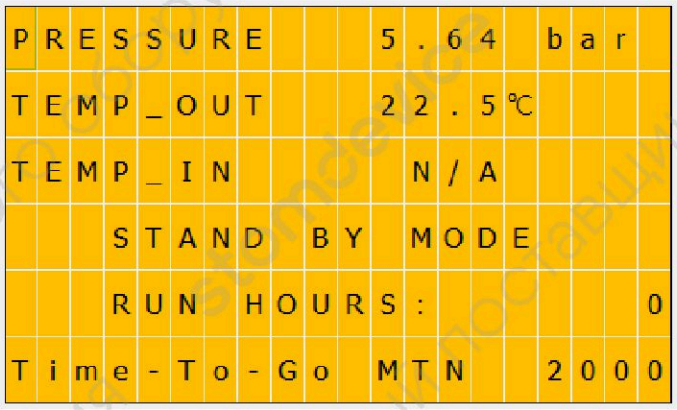
RUN HOURS: operating hours
PRESSURE: current pressure
TEMP_IN: internal temperature (only for enclosed version)
TEMP˘OUT: outdoor temperature

DK50 6x4 VRTM



- Press the "START" button (18) on the switchboard.

The display shows:



RUN HOURS: operating hours

STAND BY MODE or RUN MODE
Time-To-Go MTN: shows the time remaining until compressor maintenance is required

Note: TEMP_IN reads "N/A" for compressor models with no cover
TEMP_OUT: ambient temperature around the compressor

Press the START button to turn on all the compressor aggregates. The pressure sensor monitors the pressure in the air tank.

The aggregates operate in automatic mode, and are switched on and off (see the section on working pressures in the Technical Data

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chapter) by the controller depending on the compressed air usage. The compressors sequentially turn off once the switching pressure is reached.

The motors may be shut down by pressing the STOP button (18), after which the display returns to the start screen.

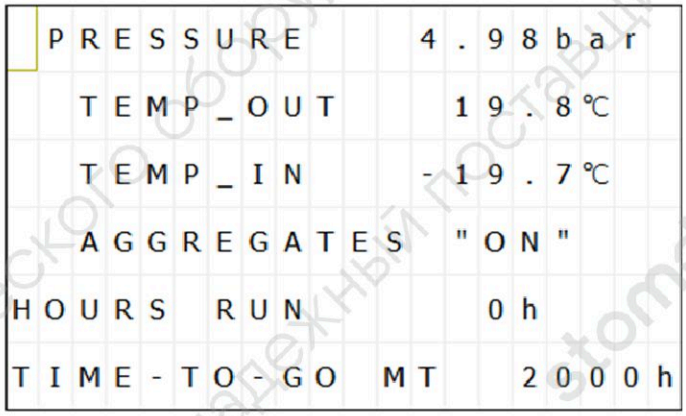
Note: The START button is pre-set to "RETENTIVITY=ON", which means that if the compressor has been activated once using the START button, the system remembers this action and there is no need to press the START button to start up the compressor in the event of a power loss or if the compressor has been turned off.

Normal operation

Aggregates operate in automatic mode and are switched on and off based on the demand for compressed air. When the pressure in the air tank drops to the switching pressure, the compressors automatically switch on in a sequence. This ensures that the required pressure is delivered to the air tank in the shortest possible time.

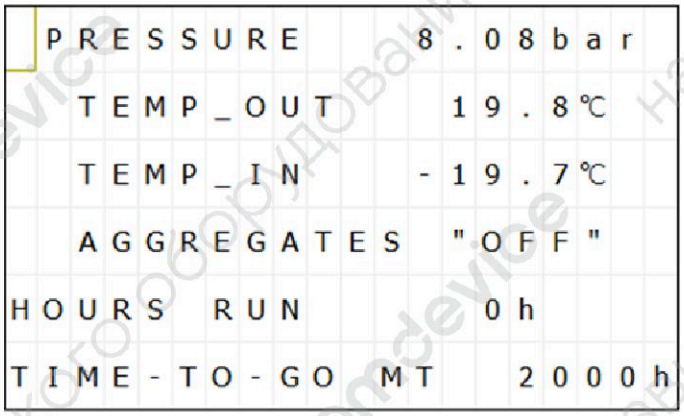
Two screens are shown on the display during the normal operation of the equipment:

- Motors are on



RUN MODE – all aggregates are switched on
RUN HOURS: operating hours
TIME-TO-GO MN - time to the next maintenance / service work (in hours).

- Motors are switched off



PRESSURE: current working pressure
STANDBY MODE – all aggregates are switched off
RUN HOURS: operating hours
TIME-TO-GO MN - time to the next maintenance / service work (in hours).

The pressure sensor monitors the pressure in the air tank. The pressure is shown on the display.

Check all air line connections and check for compressed air leaks. Remedy all leaks that are identified.

Slowly open the outlet valve to the ON position. The compressor starts and runs until the pressure in the entire compressed air system stabilises. The aggregates then gradually turn off at the switching pressure.

Complete a record for the installation of the compressor assembly and commissioning (see the Annex chapter).

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Shutting down the compressor

Press the STOP button (18) to shut down the compressors.

16.1. Controller – operation and alarms

The controller controls the aggregates, monitors their operation, analyses faults, reports alarms and indicates when maintenance is required after defined intervals are met.

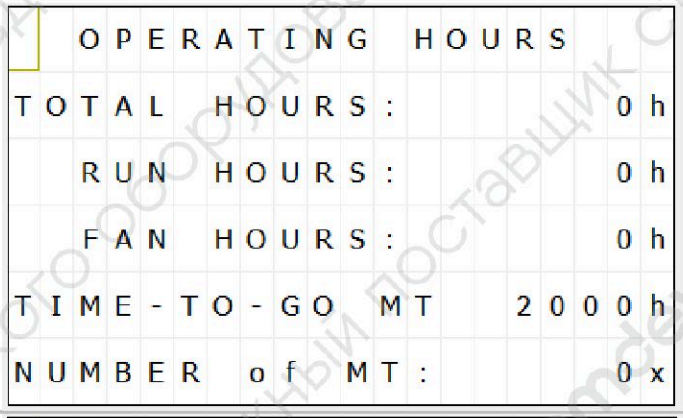
The controller assesses the ambient and internal temperature of the compressor, working pressure and operating hours.

These values, alarms and service interval information are shown on the display. Temperatures above the critical values are shown as alarms.

The control panel on the controller has four cursor buttons ▲, ▼, ►, ◄, ESC and OK buttons, and four function buttons F1-F4, which trigger the following:

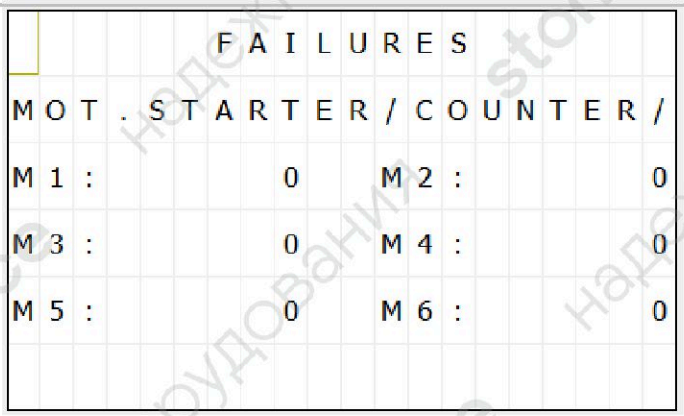
F1 - in alarm display mode, press to switch back to normal operating mode for 60 seconds. Backlit screen.

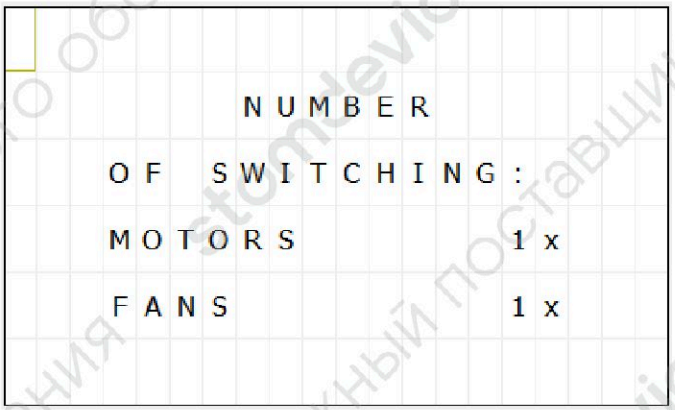
F2 – information on operating hours and maintenance intervals.



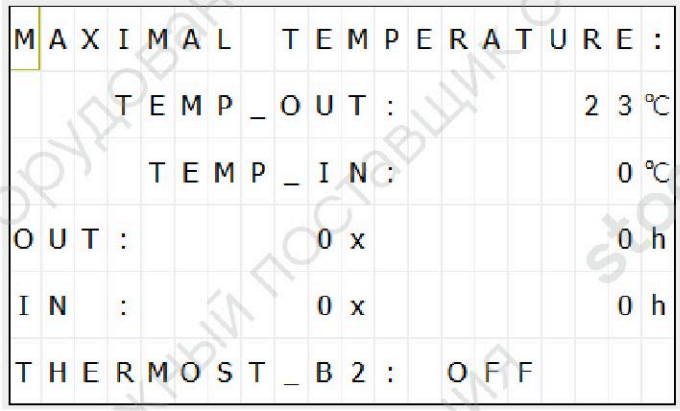
F3 – scrolls through:

- Motor malfunctions
- Number of motor starts
- Maximum temperatures





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F4 - SERVICE TECHNICIAN BUTTON
(after completing service or maintenance work - hold for 5 seconds to reset the 2,000 hour maintenance interval.)

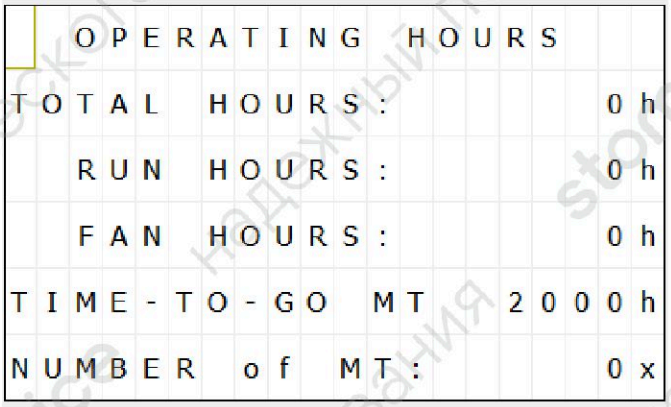
Note: Pressing F1-3 on the control panel turns on the display back light for 30 seconds.

Pressing F2:

HOURS METER - aggregate operating hours
TIME –TO –GO MN - time to next maintenance/service
TOTAL HOURS: - total compressor operating hours
NUMBER of MN – number of completed maintenance (service) checks confirmed using the F4 button
The screen automatically returns to the home screen after 10 seconds.

Equipment operation

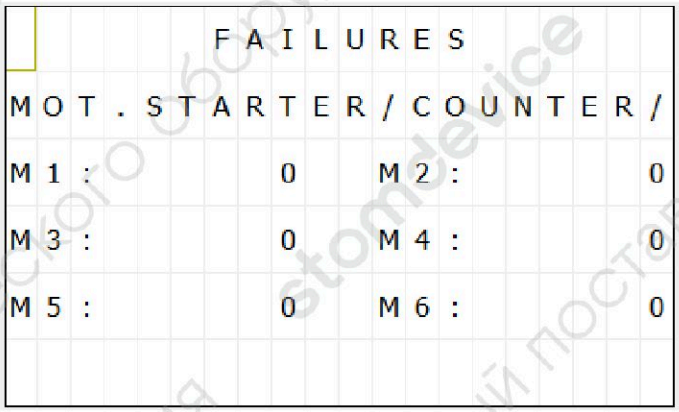
Normal operating mode is shown when the equipment is operating and the functional and control buttons are used to browse through the following:



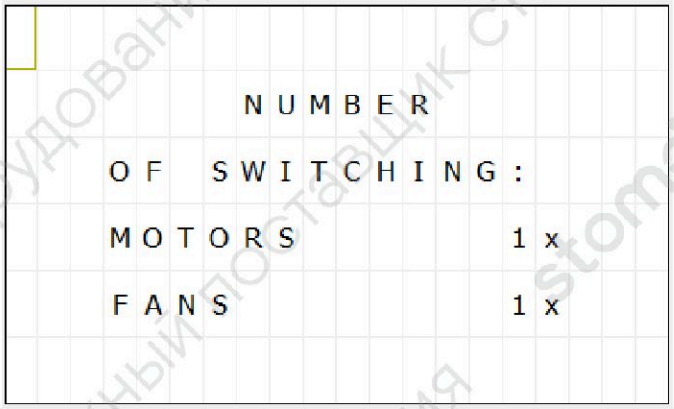
Pressing F3:

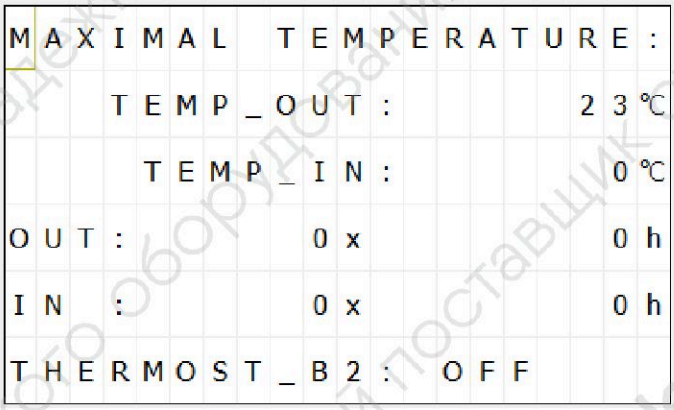
This permits browsing through different auxiliary screens. E.g. displays the number of overload faults for motors M1 to M6 (motor circuit breaker disconnects the motor from power). The circuit breakers must be manually turned to the ON position to remedy the malfunction.

The screen automatically returns to the home screen after 10 seconds.



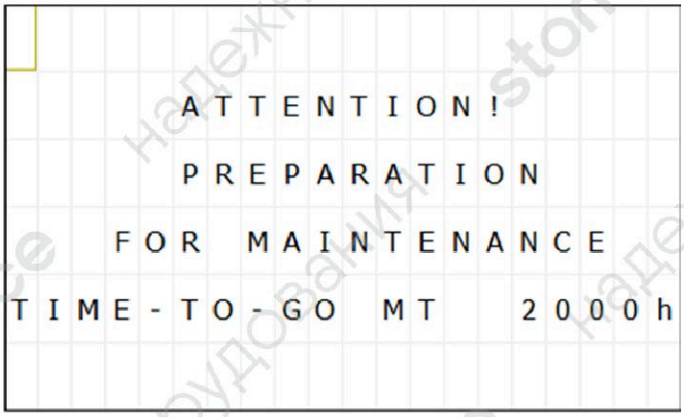
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Pressing F4:

F4 is only active if the maintenance screen appears once 2000 hours of operation have been passed (see the maintenance alarm). Press and hold F4 for at least 5 seconds to set a new interval. The screen switches back to normal operating mode once the new interval is set.
Note: Only service personnel are authorised to configure a new service interval using the F4 button.



Alarms

The equipment has an intelligent monitoring system that generates an alarm signal based on priority (medium priority alarms have higher priority than low priority alarms).

Alarm signals have a higher priority than maintenance/service interval signals.

The maintenance/service interval is measured from the first time the equipment is energised. All alarms are accompanied by a blinking red P2 (Alarm) indicator.

Low priority alarm conditions

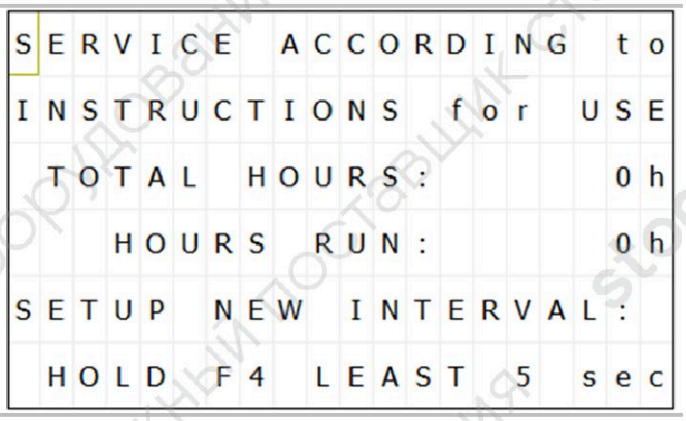
- Expiry of defined maintenance / service interval

This alarm activates once the 2,000 hour maintenance/service interval expires. The display shows the following details:

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SERVICE ACCORDING TO INSTRUCTIONS FOR USE
TOTAL HOURS - total time the equipment has been connected to power
RUN HOURS – equipment operating hours
The display flashes orange.

Note: Press F1 to switch to the normal operating mode screen for 60 seconds.



The compressor supplies air to the compressed air system as needed and without restriction.

Call in service personnel to perform the required service.

Note: Only service personnel are authorised to configure a new service interval.

Press F4 and hold for at least 5 seconds to confirm the completion of maintenance/service.

The display then changes to the normal operating mode screen.

This indicates the new maintenance interval has been set on the controller from this time forward.

Any maintenance or service work must be recorded in the compressor's service log.

- Compressor module ambient temperature exceeds the limit.

WARNING - high ambient temperature alarm.

The display flashes orange.

This alarm appears if the ambient temperature exceeds the 40°C limit for at least 30 seconds. The aggregates operate normally.

The display otherwise shows the current ambient air temperature.

The alarm clears when the temperature drops below the limit.

The compressor supplies air to the compressed air system as needed and without restriction.



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- Compressor module internal temperature exceeds the limit.

WARNING - high temperature alarm inside an enclosed compressor. The display flashes orange.

This alarm appears if the temperature inside the enclosed compressor module exceeds the 70°C limit for at least 30 seconds. The aggregates operate normally.

Note: The internal temperature monitoring function is not included on unenclosed compressors.



The display shows the current temperature inside the enclosed compressor module.

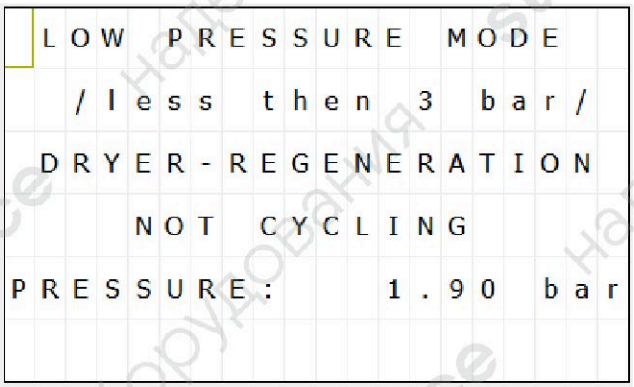
The alarm clears when the temperature drops below the limit.

The compressor supplies air to the compressed air system as needed and without restriction.

- Low pressure alarm during compressor start-up.

SIGNALING - Low pressure alarm during compressor start-up. The display is backlit and the P2 alarm indicator flashes.

LOW PRESSURE MODE - low pressure signalling in the system with the aggregates switched on.



DRYER - REGENERATION NOT CYCLING - no purging of the dryer chambers.

PRESSURE - current pressure in the system.

The information on the display automatically disappears once the air pressure is above 3 bar.

The compressor supplies air to the compressed air system as needed and without restriction.

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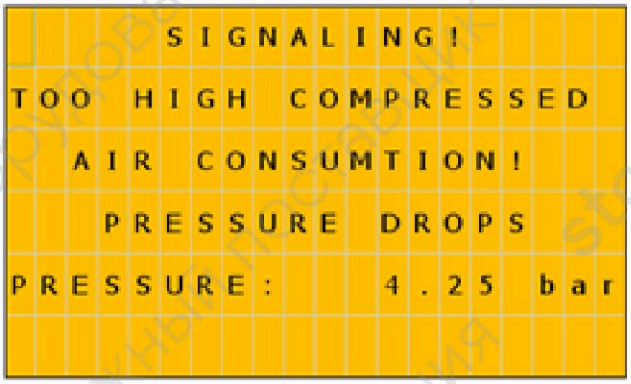
- Low pressure alarm at elevated compressed air demand.

SIGNALING – low pressure alarm at elevated compressed air demand. The display flashes orange.

PRESSURE - current pressure in the system

The display automatically disappears once the air pressure is above 3 bar.

The compressor supplies air to the compressed air system as needed and without restriction.



Medium priority alarm conditions

- Air pump malfunction

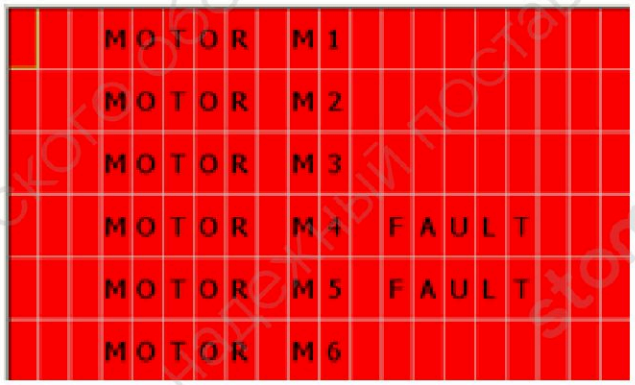
The message on the display (FAULT) and indicator P2-ALARM (17) indicate that the aggregate is not running (a motor circuit breaker (Q1 - Q6) is tripped due to current overload). The display flashes red.

The other aggregates are working normally.

The screen disappears once the malfunction is remedied and the motor circuit breaker is manually placed back in the "ON" position. The display for normal operation is shown.

The compressor only supplies compressed air to the central line through the functional aggregates.

All alarms are automatically recorded on an SD card.



Alarm signals have priority over maintenance interval signals. As such, the light will indicate an alarm from any of the aggregates.

All error signals are connected to controller output K3:Q3.2 and to terminals X1:44 and X1:45 (in the control panel) as NON VOLT ALARM SIGNAL.

Data collection

Data is recorded on a micro SD card in a slot in the base module. Malfunction and operating event data is recorded on this card. Information is saved in ".csv" formatted files. The system sequentially saves data into 50 files, each of which may have up to 20,000 lines.

To copy data from the SD card, manually remove the card and load the data using Excel onto a PC or remotely via the Ethernet network.

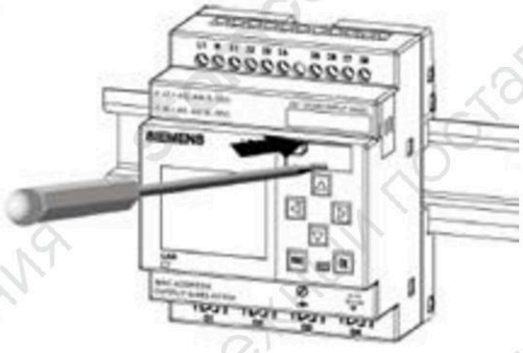


Fig. 22: Data collection

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17. SWITCHING OFF THE COMPRESSOR

Use the main switch, Q10, to switch off the compressor for maintenance or other reasons; the switch also functions as a central stop button. The compressor is disconnected from the mains with the exception of the mains terminal block X0.

Vent the air tank by disconnecting from the central compressed air circuit and opening the outlet valve (Fig. 14) or the drain valve.

Power terminals X0 remain energised even when main switch Q10 is in the "O" (off) position.

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PRODUCT MAINTENANCE

18. PRODUCT MAINTENANCE

The operator shall secure the completion of repeated testing of the equipment at least once every 24 months (EN 62353) or at the intervals defined by the applicable national regulations. A record of the test results must be made (e.g.: as per EN 62353, Annex G), along with the measurement methods.

The equipment has been designed and manufactured to keep maintenance to a minimum. The following work must be performed to preserve the proper and reliable operation of the compressor.

Unauthorised interference hazard.

Repair work outside the framework of standard maintenance (see Chapter18.1) may only be performed by a qualified technician (an organisation authorized by the manufacturer) or the manufacturer's customer service.

Standard maintenance work (see Chapter 18.1) may only be performed by the operator's trained personnel.

Only use manufacturer-approved replacement parts and accessories.

Danger of injury or equipment damage.

Prior to commencing compressor maintenance, it is necessary to:

- check if it is possible to disconnect the compressor from the appliance in order to avoid any risk of injury to the person using the appliance or other material damage;
- turn off the compressor;
- disconnect it from the mains (pulling the cord out of the mains socket);
- vent the compressed air from the air tank.

Prior to commencing dryer maintenance work, first:

- shut off the compressed air supply to the dryer
- turn the main switch on the side of the switchboard to the "0" position;
- check the pressure indicator on the dryer and if there is still pressure, it must first be vented from the dryer chamber.

Venting compressed air poses an injury hazard.

Wear eye protection, i.e. goggles, when venting compressed air from the compressed air circuit (air tank) and from the dryer chamber.

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Burn hazard.

When the compressor is running or shortly thereafter, certain portions of the air pump, the compressor's compressed air system, parts of the dryer and connecting hoses between the compressor and dryer may be hot - do not touch these components.

Allow the equipment to cool down before maintenance, service or connecting/disconnecting the compressed air supply!

The work below may only be performed by trained personnel as follows:



Before beginning any of the following maintenance work, first switch the main switch on the side of the switchboard to the "0" position.



Please follow the recommended service intervals for the equipment to ensure proper and safe operation.

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Time interval	Once a day	Once a week	Once a year	Once every 2 years	2000 h	4000 h	6000 h	8000 h	10000 h	12000 h	16000 h	Chap.	Set of replacement parts	Performed by
Check of product operation	x											18.2	-	operator
Condensate drain	x											18.5	-	
Cleaning the compressor inlet filters [a]		x										18.8	-	
Check of cooler and fan - dryer			x									18.20	-	qualified technician
Cleaning the compressor inlet filters [a]					x	x	x	x	x	x		18.8	-	
Replacement the compressor inlet filters [a]					x	x	x	x	x	x		18.8	604031770-000	
Check compressor fans operation					x	x	x	x	x	x	x	Visual check of rotation during air pump operation	-	
Compressor fan replacement (6-8 bar)											x		035300016-000	
Compressor fan replacement (8-10 bar)										x			035300016-000	
Check of cooler and cooler fan			x									18.20	-	

[a] Only applicable to compressors with enclosures
[b] Only applicable to DK50 6x4VRT/M compressors
[c] Only applicable to DK50 4x4VRT/M compressors

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Time interval	Once a day	Once a week	Once a year	Once every 2 years	2000 h	4000 h	6000 h	8000 h	10000 h	12000 h	16000 h	20000 h	Chap.	Set of replacement parts	Performed by
Inspection of electrical connections					x	x	x	x	x	x			18.4	-	qualified technician
Check the operation of the non-return valves						x		x		x			18.10	-	
Check the function of the pressure sensor					x	x	x	x	x	x			18.12	-	
Relief valve check					x	x	x	x	x	x			18.22	-	
Checking the operation of temperature sensor switching					x	x	x	x	x	x			18.12	-	
Check of safety valve			x			x		x		x			18.7	-	
Check solenoid valve operation						x		x		x			18.11	-	
Inlet filter replacement					x	x	x	x	x	x			18.6	604031761-000 [b]	
Replacement of the dryer' s internal filters									x				18.16	025200322-000	
Compressor performance check					x	x	x	x	x	x			18.9	-	

[a] Only applicable to compressors with enclosures
[b] Only applicable to DK50 6x4VRT/M compressors
[c] Only applicable to DK50 4x4VRT/M compressors

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Time interval	Once a day	Once a week	Once a year	Once every 2 years	2000 h	4000 h	6000 h	8000 h	10000 h	12000 h	16000 h	20000 h	Chap.	Set of replacement parts	Performed by
Conduct the " Repeated test" as per EN 62353				x									18	-	qualified technician
Replacement of cassettes with adsorbent media AD1000E dryer									x				18.17	603031810-000	
Replacement of cassettes with adsorbent media AD1500E dryer									x				18.17	603031804-000	
Replacement of the dryer' s logic valve ball									x				18.18	074000254-000	
Replacement of the dryer' s silencer									x				18.19	025400339-000	
Replacement of the dryer's NC solenoid valve												x	18.21	025300117-001	
Check pneumatic connections for leaks					x	x	x	x	x	x			18.3	-	

[a] Only applicable to compressors with enclosures
[b] Only applicable to DK50 6x4VRT/M compressors
[c] Only applicable to DK50 4x4VRT/M compressors

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18.2. Check of product operation

- Check aggregate condition – the aggregates should be operating normally without excessive vibration or noise. Troubleshoot any problem or call in service personnel if trouble is detected.
- Visually inspect fan operation – the fans must be operating when the aggregates are running. Troubleshoot any problem or call in service personnel if trouble is detected.
- Check to ensure the power cord, the cable for the pressure sensor on the air tank and the connecting compressed air hoses are undamaged. Replace damaged components or call in service personnel.
- Check the ambient temperature at the display – the ambient temperature must be below the temperature limit (40°C). Cool the space if the temperature is high.
- Check for alarm conditions on the display – troubleshoot and remedy all alarms.

18.3. Check the compressed air connections for leaks and inspect the equipment

Leak testing

- Check the compressor's compressed air lines for leaks during operation – pressure supplied by the compressor.
- Use a leak analyser or soapy water to check all joints and connections for leaks. Tighten or reseal the connection where leaks are found

Inspecting the equipment

- Check the condition of the compressor aggregate for normal operation and noise levels.
- Fan operation check – the fans must be running during the defined compressor work cycles.
- Check the filter condition – clean dirty filters or replace with new filters.
- Check the solenoid valves in the valve module.
- Check the operation of the automatic condensate drain.
- Call in service personnel if a malfunction is suspected.

18.4. Inspection of electrical connections



Risk of electric shock.

Inspect the product's electrical connections when the mains are disconnected.

- Check the mechanical function of the main switch Q10 and the START-STOP buttons, S1 and S2.
- Check the power cord, conductors connected to the X1 terminal strip and the main switch to ensure they are undamaged. Inspect to ensure the connection terminals are properly supported to relieve tension.
- Check to ensure all threaded conductor terminals are tight (on motor circuit breakers Q1-6, circuit protection devices F1-3, contactors Q11-16 and Q20-21, etc.). Tighten all loose terminals with a screwdriver.
- Visually inspect the connection of individual cables to the terminal strip X1 (spring clips) and the LOGO! Control system (screw terminals).
- Inspect all screw terminals for the protective green and yellow PE grounding conductors in the switchboard, the motor section, the cooling unit and the pressure vessel. Tighten any loose terminals.
- Inspect the connector X50 (dryer and cooler) and the pressure sensor (B1) (in the pressure vessel).

18.5. Condensate drain



A wet floor resulting from overflow from the vessel poses a slip hazard.

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Condensate from compressors with air dryers is automatically drained into a vessel to collect condensate.

- Monitor the level in the vessel using the markings (depending on the volume of the vessel), and empty at least once a day.

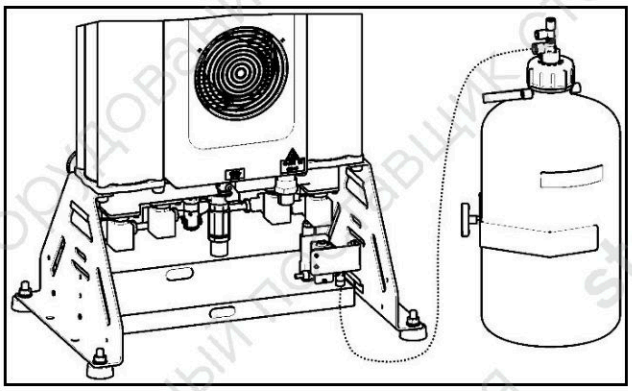


Fig. 23: Check of the condensate collection vessel

18.6. Inlet filter replacement

The filters located in the compressor aggregate enclosure cover must be replaced at defined intervals.

Intake filter replacement:

- Pull out the rubber plug by hand (2).
- Remove the dirty intake filter (1).
- Insert a new filter and replace the rubber plug.

Pre-filter replacement:

- Pull out the pre-filter by hand (3).
- Replace with a new one and insert it back.

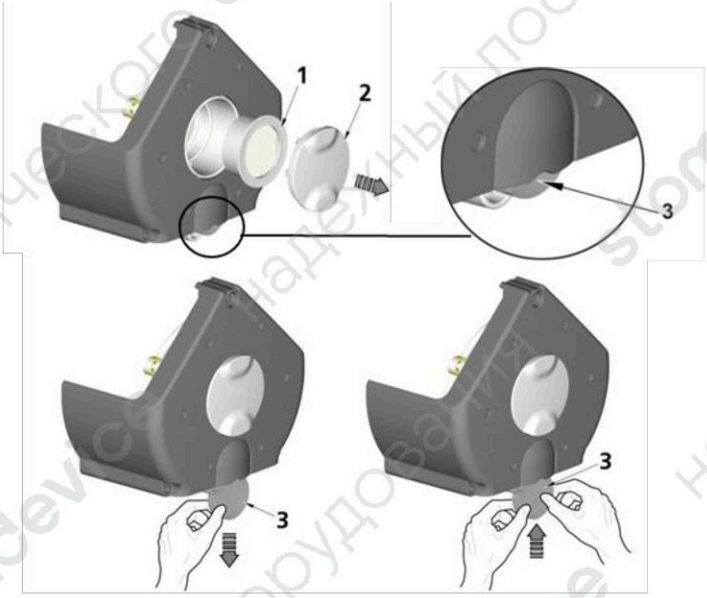


Fig. 24: Inlet filter replacement

18.7. Check of safety valve

Damage to the safety valve could cause pressure to rise to hazardous levels.

Never use the safety valve to release the air pressure in the air tank. This could damage the safety valve. The valve is set to the maximum permitted pressure by the manufacturer.

Never adjust a safety valve.

Venting compressed air poses an injury hazard.

Wear safety glasses when inspecting a safety valve.

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- Turn the screw on the safety valve several rotations to the left until the safety valve releases air.
- Let the safety valve vent for only a few seconds.
- Turn the screw to the right until it seats, closing the valve.

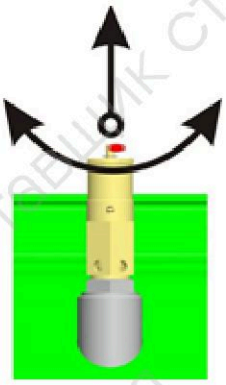


Fig. 25: Check of safety valve

18.8. Compressor intake filter cleaning/replacement

Only applicable to enclosed products.

Clean or replace the intake filters are defined intervals:

- Remove the nuts (1) and covers (4) on the lower part of the enclosure beneath the aggregates two times and remove the filters (5).
- Remove the nuts (1) and covers (2) inside the enclosure three times and remove the filters (3).
- Clean or wash the filters, if heavily contaminated, in a solution of soapy water and allow to dry completely.
- Reinstall the filters once dry (reverse the procedure to reassemble).

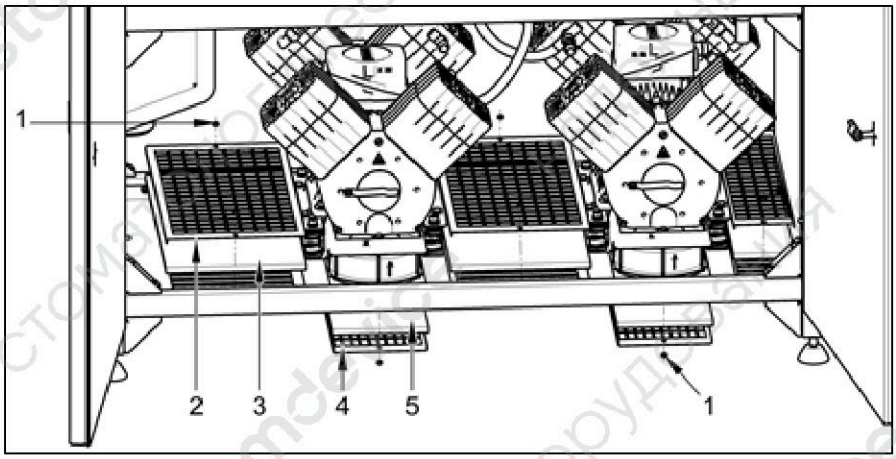


Fig. 26: Compressor inlet filter cleaning/replacement

- At Point A, remove the foam, remove the 4 screws (5), washers (6) and remove the suction filter cover (7). (Fig. 27)
- Remove the 2 nuts (8) on the filter bracket (9) and remove the filter (10).
- At Point B (on the sides (11), remove the 2 nuts (12), washers (13), release the filter bracket (14) and remove the filter (15).
- Clean or wash the filters, if heavily contaminated, in a solution of soapy water and allow to dry completely.
- Reinstall the filters once dry (reverse the procedure to reassemble).

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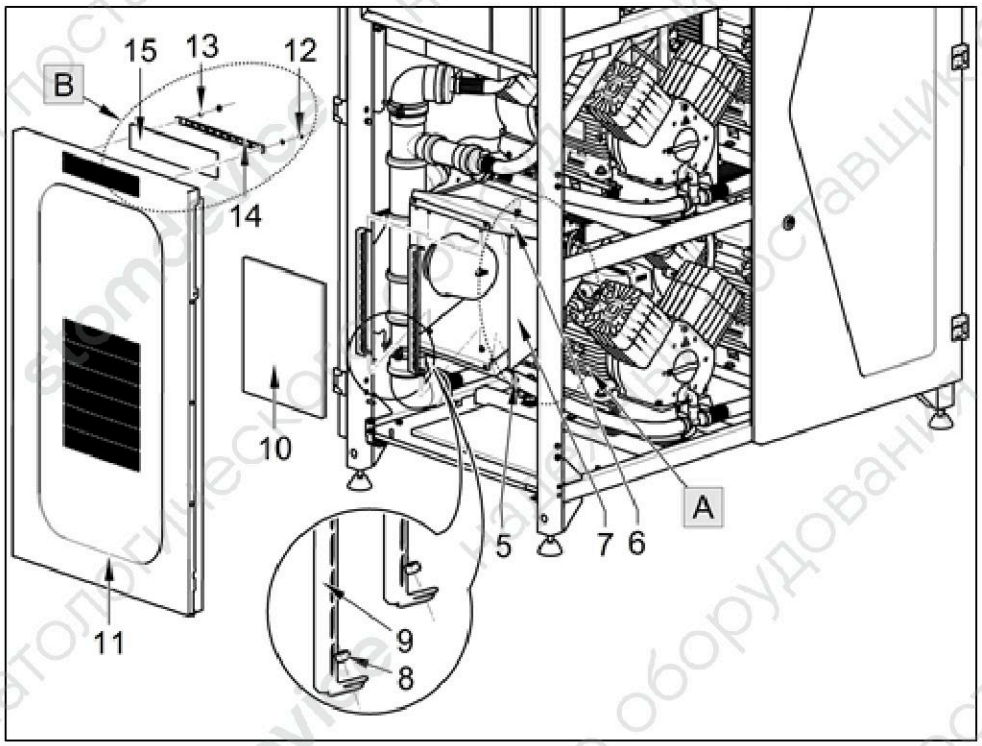


Fig. 27: Compressor inlet filter cleaning/replacement

18.9. Compressor performance check

- Turn off the compressor using the STOP button.
- Vent the air pressure in the air tank to zero.
- Turn on the compressor using the START button.
- Measure the time to fill the air tank from 0 to 7 bar.
- The measured value must be less than the data provided in the "Technical Data" table.

18.10. Check of non-return valve operation

Compressed air line:

Check for the proper operation of all non-return valves in the compressed air line and the disconnection of pressure hoses from air pumps.

One aggregate must be running at all times, while the others may be shut off using the current protection device in the switchboard. No compressed air may leak from the check valves.

Air tank:

Check for proper operation of the non-return valve on the air tank by disconnecting the pressure hose from the valve.

Check the check valve operation once the air tank has come up to pressure and with the compressor off. No compressed air may leak.

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18.11. Check of solenoid valve operation

Check their operation using the

"Magnetic indicator" fixture as follows:

- Attach the fixture to the valve coil and if the motors are active at the valve coil, the indicator must rotate and if they are out of inactive, the indicator must not rotate.



Fig. 28: Check of solenoid valve operation

18.12. Check of temperature sensor switching

Checking the functionality of temperature sensor B3 (external) and B4 (internal).

The B4 sensor is only used on covered models.

- This check is conducted using the LOGO! TDE display where the instantaneous temperature values are shown on the starting screen in STOP mode.
- The check is based on a slight change in temperature around the sensor, i.e. caused by heating, or the temperature shown on the display must also change. The B4 sensor is not connected on uncovered versions and the display shows N/A.

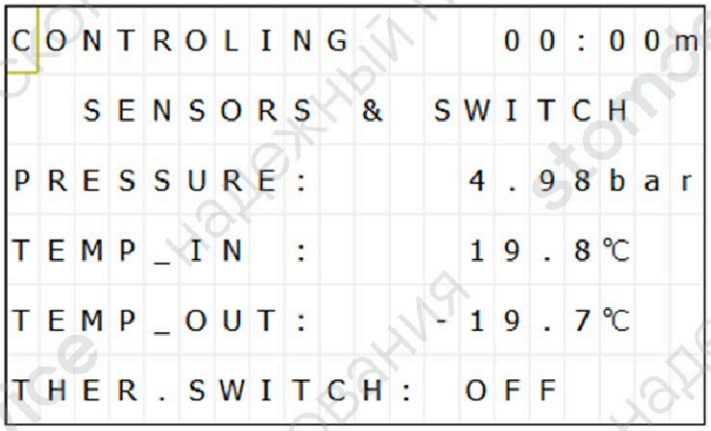


Fig. 29: Check of temperature switch switching

18.13. Check the function of the pressure sensor

This check is performed visually using the TDE screen, which shows the compressed air value. The pressure level shown on the display must change with changes in air demand.

18.14. Cleaning and disinfection of the exterior surfaces of the product

Clean and disinfect the exterior surfaces with neutral cleaning products.

Use of aggressive detergents and disinfectants containing alcohol and chlorides can lead to surface damage and discolouration.

AD dryer maintenance

18.15. Venting pressure from the dryer

The equipment is designed to permit the safe venting of pressure within 10 seconds after the compressor is shut off.

If pressure is not automatically vented from the dryer, then the pressure may be vented

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manually.

Venting compressed air poses an injury hazard

Wearing hearing protection is recommended given the noise generated by the venting process.

Shut off the compressed air source before venting pressure from the equipment

Venting pressure using the display screen

Press ESC+▼ in the display screen to vent pressure from the equipment.

- First, shut off the compressed air source.
- Then press and hold ESC+▼, which will open all the solenoid valves (inlet and regeneration) for 10 seconds and then vent the pressure from the equipment and connected pneumatic circuits and elements that are not separated from the equipment by the check valve

Manual venting of pressure

- Turn off the compressor.
- Open the vent plugs on the outlet module on the equipment (Fig. 30).

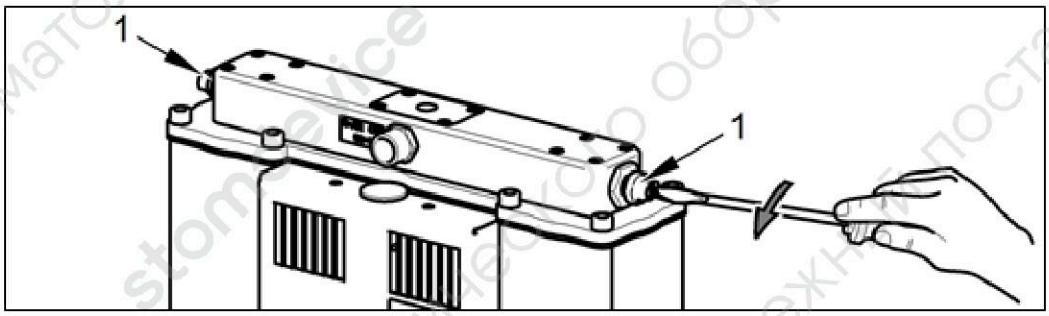


Fig. 30: Venting pressure from the dryer chambers

- Disconnect the hose (2) from the lower part of the condensate separator (3) (Fig. 31).

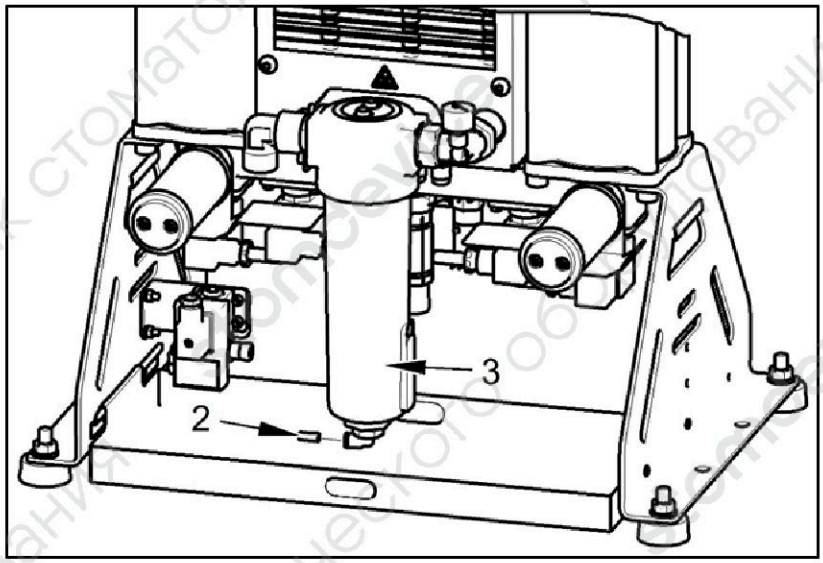


Fig. 31: Venting pressure from the cooler and condensate separator

The process of manually venting pressure from the equipment is complete after approximately 2 minutes.

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18.16. Replacement of the dryer's internal filters

Working with pressurised pneumatic components poses a risk of injury.

Prior to any work, disconnect the equipment from the mains, shut off the compressor and vent all pressure in the equipment to zero.

In normal operation, filter replacement must be performed in the upper part of the dryer at the defined interval.

- Turn off the compressor.
- Check the pressure in the dryer.
- If the dryer chambers are under pressure, proceed in accordance with Chapter 17.15.
- Unscrew the 8 screws (1).
- Disassemble the outlet panel (2) on which the filters (3) are mounted.
- Unscrew the dirty filters (3) and replace with new filters.
- Check the seal (4) on the bottom of the outlet module and replace if necessary.
- Reverse the procedure to reassemble.
- Switch on the compressor.
- Check for any dryer leaks.

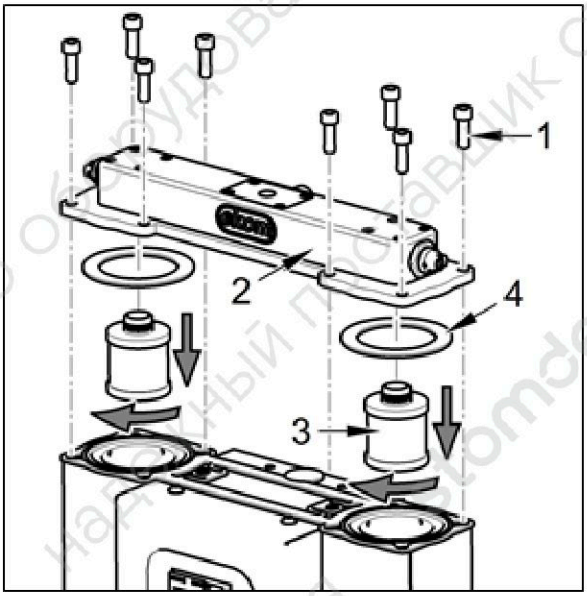


Fig. 32: Replacement of internal filters

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18.17. Replacement of cassettes with adsorbent media

In normal operation, the replacement of the cassettes with adsorbent media must be performed at the defined interval.

- Turn off the compressor.
- Check the pressure in the dryer.
- If the dryer chambers are under pressure, proceed in accordance with Chapter 17.15.
- Unscrew the 8 screws (1).
- Remove the outlet panel (2).
- Pull out and replace the cassettes (3) with new parts.
- Check the seal (4) on the bottom of the outlet module and replace if necessary.
- Reverse the procedure to reassemble.
- Switch on the compressor.
- Check for any dryer leaks.

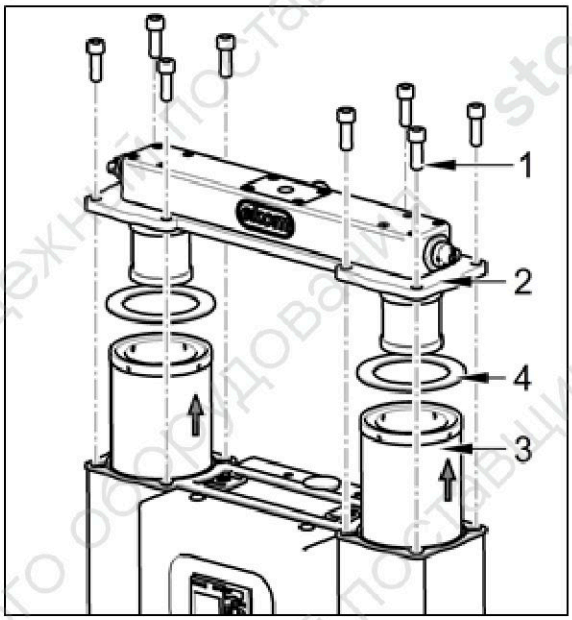


Fig. 33: Replacement of cassettes with adsorbent media

18.18. Replacement of the logic valve ball

- Turn off the compressor.
- Check the pressure in the dryer.
- If the dryer chambers are under pressure, proceed in accordance with Chapter 17.15.
- Unscrew the 4 screws (1) and remove the cover (2).
- Remove the ball cover (3).
- Replace the ball (4).
- Check the nozzles (5) and clean as necessary.
- Reverse the procedure to reassemble.
- Check for leaks and the operation of the logic valve and nozzles – check for the cyclical switching of the chambers.

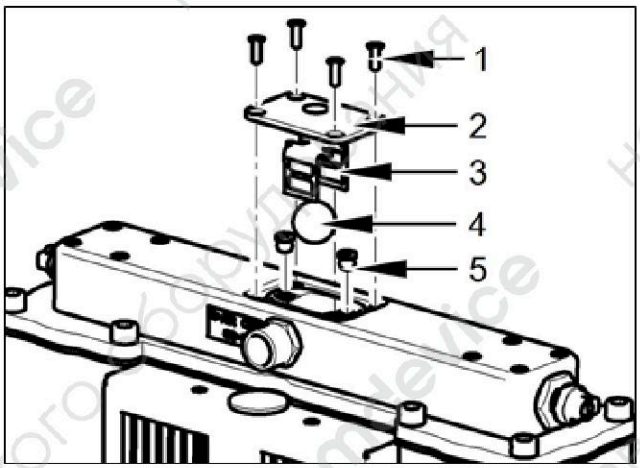


Fig. 34: Replacement of the logic valve ball

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18.19. Replacement of the dryer's silencer

Working with pressurised pneumatic components poses a risk of injury.

Operating the equipment without silencers generates high levels of noise. Only replace silencers when the equipment is shut down.

- Unscrew the silencer (1).
- Install a new silencer.

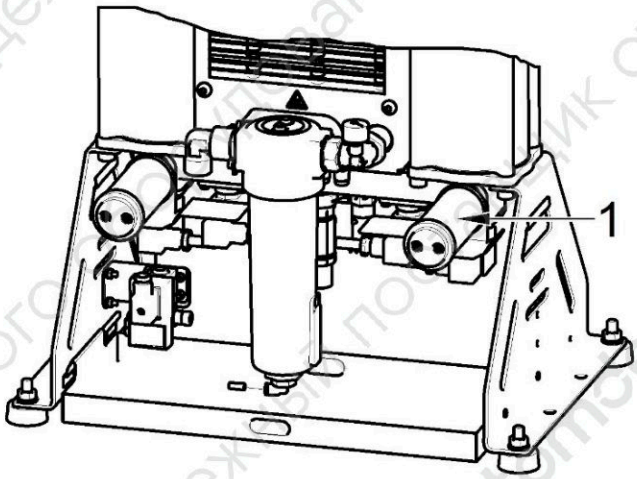


Fig. 35: Replacement of the silencer

18.20. Inspecting the cooler and fan

The equipment, in particular the compressor fan, cooler fan, and the cooler, must be kept clean to ensure efficient drying. Remove dust from the surface of the cooling fins and fans by vacuuming or blowing down with compressed air.

18.21. Replacement of solenoid valves

Risk of electric shock.

Shut off the compressed air source, turn off the equipment and disconnect it from the mains before working on the equipment.

Working with pressurised pneumatic components poses a risk of injury.

Disconnect the equipment from the mains and vent the pressure in the equipment and the pneumatic system to zero before working on the equipment.

In normal operation, the solenoid valves in the bottom of the dryer must be replaced at the defined interval.

- Turn off the compressor.
- Check the pressure in the dryer.
- If the dryer chambers are under pressure, proceed in accordance with Chapter 17.15.
- Unscrew the 1 screw from the valve connector (1).
- Disconnect the valve connector (1).

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- Unscrew the 4 screws (2).
- Remove the solenoid valve (3).
- Remove the valve seal (4-1) from the body. (Fig. 37)
- Physically clean the valve seat surface to remove any impurities.
- Physically clean the 16 screws to remove the thread locking adhesive.
- Install the solenoid valve (Fig. 37).
- Install the new valve seal (4-1).
- Install the new solenoid valve using the 4 screws (2) and use a thread locking adhesive on the threads of the screws (such as Loctite 243).
- Reattach the solenoid valve connector and attach with a screw.
- Switch on the compressor.
- Check for any dryer leaks.

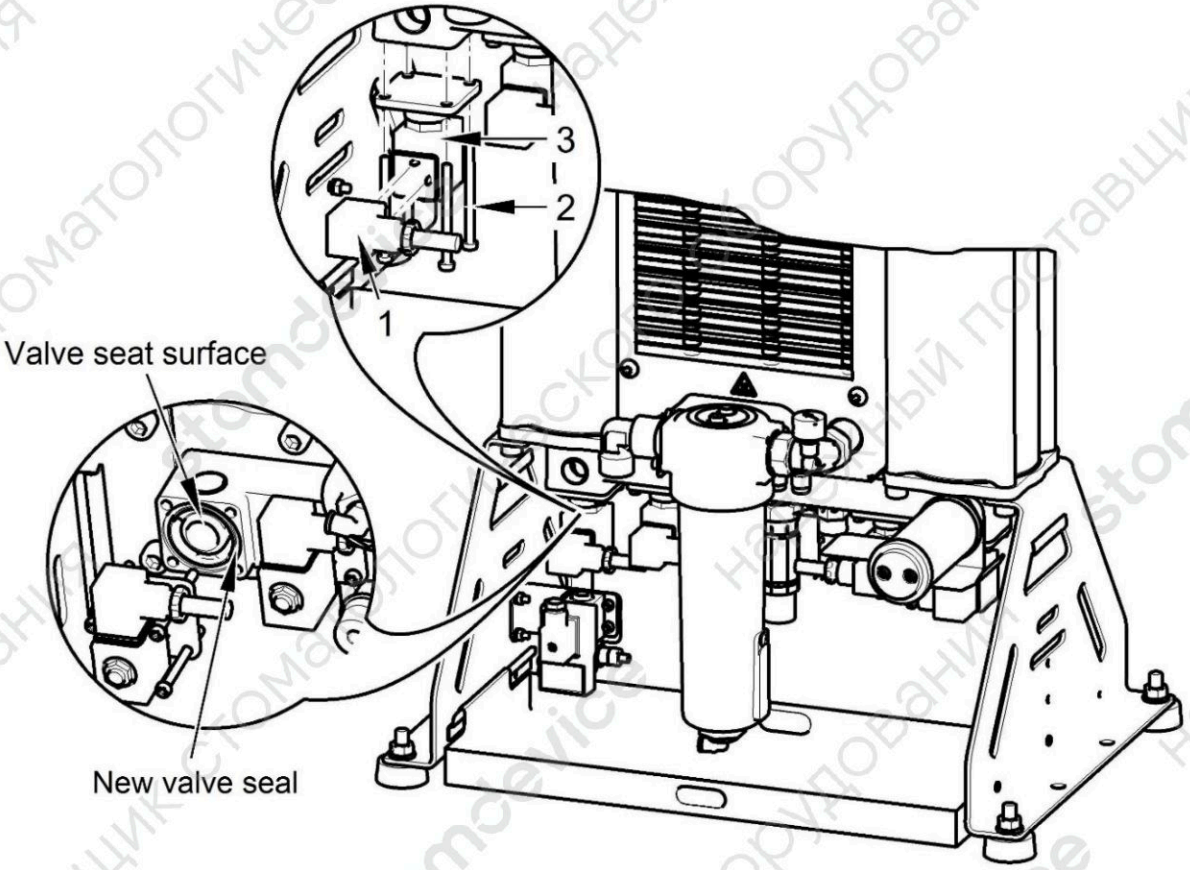


Fig. 36: Solenoid valve replacement

Solenoid valve assembly

Replacement solenoid valves are delivered as disassembled replacement parts. The new valve must be assembled before a solenoid valve is replaced.

- Mount the valve coil (4-5) onto the valve body (4-4) and secure with the nut (4-6).
- Insert the valve membrane spring (4-3) into the membrane (4-2) and the insert into the assembled valve coil and body assembly.
- Then mount the valve seal (4-1) onto the dryer body.

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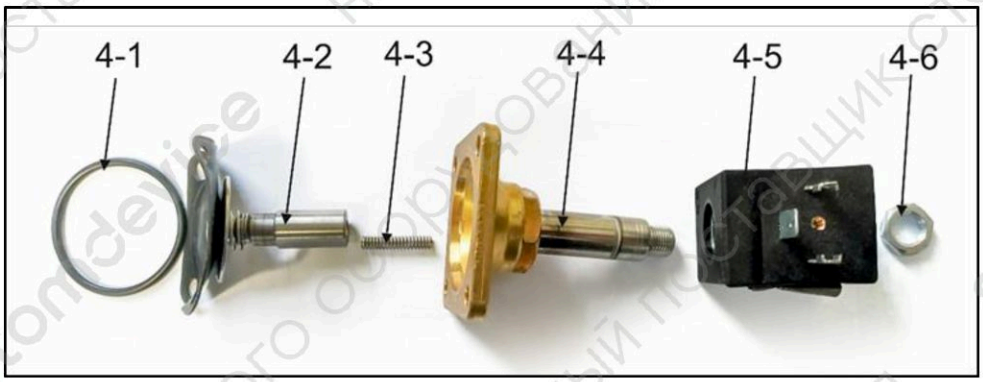


Fig. 37: Solenoid valve assembly

18.22. Pressure relief valve

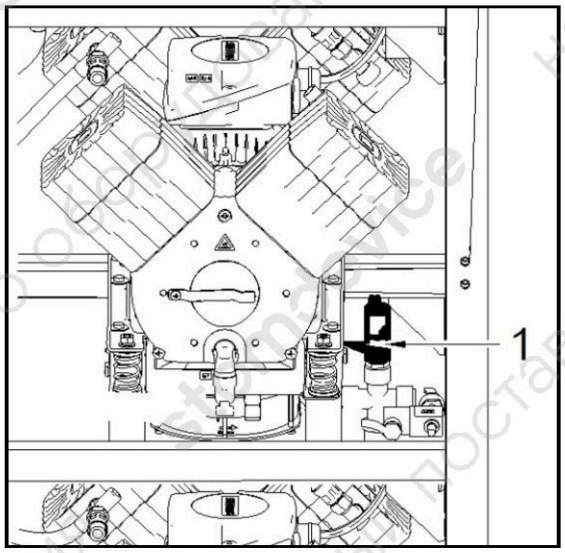
The pressure relief valve automatically begins to vent air from the system if the pressure in the compressed air circuit exceeds its pre-set value. The pressure relief valve closes as the pressure drops.

The pressure in the compressed air circuit can only increase because of an increase in flow resistance in the compressed air lines or as a result of a dryer malfunction (e.g. solenoid valve malfunction), and therefore the repeated opening of the relief valve requires a dryer function check and repairs if necessary!

Consultation with the manufacturer is required before any adjustment is made to the relief valve!

The outlet openings on the relief valve may not be blocked and the egress of compressed air through them may not be restricted.

1 Compressor pressure relief valve



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2 Dryer pressure relief valve

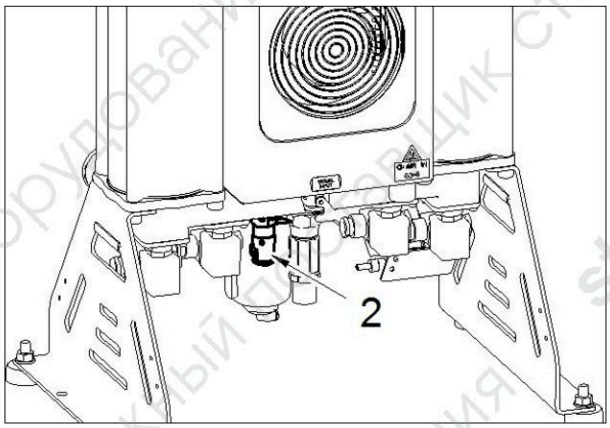


Fig. 38: Pressure relief valve

TROUBLESHOOTING

Risk of electric shock.

Before interfering with the equipment, first disconnect it from the mains (remove the power socket).

Working with pressurised pneumatic components poses a risk of injury.

Before interfering with the equipment, vent the air tank and the compressed air system to zero pressure.

Troubleshooting may only be performed by a qualified service technician.

Damage to the safety valve could cause pressure to rise to hazardous levels.

Never adjust a safety valve.

Malfunction	Possible cause	Solution
Compressor does not start	Problem with electrical power source	Main breaker is off
	Power loss	Check mains voltage
		Loose terminal in switchboard – tighten
		Check the primary power connection - replace if damaged
	Pressure switch failed	Check terminals and operation of the pressure switch - replace if damaged
Any of the air pumps does not start up (indicator is on)	Loss of power to motor	Check mains voltage
		Check the function of the contactor, and thermal relays - replace if damaged
		Loose terminals at the motor terminal strip - tighten or replace if damaged or broken
	Motor winding shorted, damaged /open thermal protection/ high ambient temperature	Replace the motor / decrease the ambient temperature
	Seized up piston or other moving	Replace damaged parts

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	component (mechanical damage to a moving part)	
	Controller malfunction	Check controller operation, check to ensure software is present - replace if damaged or upload the correct program
RUN/STOP indicator is not green	Loss of connection between controller and expansion module	Check connection – replace if damaged
	Power loss	Check mains voltage
		Loose terminal in switchboard – tighten
		Check the primary power connection - replace if damaged
	Problem with electrical power source	Main breaker is off
	Controller or expansion module malfunction	Replace failed controller or expansion module
Air pumps switch often, even without demand for air	Air leak in compressed air distribution system	Check compressed air distribution system – seal loose joints
	Leaky check valves	Test check vales and clean, or replace if damaged
	Leak through solenoid valves once regeneration is complete	Clean the check valve - replace if damaged
	Leak at pressure sensor and safety valve	Test their function and clean, or replace if damaged
Output of certain air pumps is reduced, extended run cycle	Air pump leaking	Check connections on the air pump for leaks – tighten leaking connections
	Worn piston rings	Replace worn piston
	Gasket between cylinder head and valve plate damaged	Replace gasket, tighten
	Intake filter is plugged	Replace old filter with a new filter
One of the air pumps is noisy (knocking, metal noises)	Damaged motor bearing	Replace damaged bearing
	Damaged piston bearing, piston rod	Replace damaged piston
	Failed (cracked) rubber mount spring	Replace damaged spring with new spring
High ambient temperature causes compressors to switch off in vertical stacks (overheating)	Lack of ventilation in compressor room	Secure suitable ambient conditions
	Cooling fans for aggregates, cooler and enclosure do not work	Defective fans - replace
		Defective temperature switch - replace
Degraded drying performance – high-pressure dew point (condensed water in the air)	Low operating pressure	Reduce the demand for air, check the output from the compressed air source, fix any leaks in the distribution system
	Regeneration solenoid valve not working	Check coil operation, replace if damaged
	Air regeneration nozzle plugged	Clean or replace the nozzle (see product maintenance)
	Cooling fan not working	Check the power source to the fan Replace damaged fan
	Dirty cooler	Inspect the cooler and clean as necessary
	Silencer plugged at outlet from regeneration valve	Inspect the silencers. Clean or replace the silencer if flow resistance is too high or if heavily soiled.
Dryer emitting high levels of noise	Damaged fan	Replace damaged fan
	Damaged silencer	Replace the silencer
	Air leaking through relief valve at dryer	Check the dryer connection to the mains

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	inlet	and dryer connections, check dryer operation, check the dryer's working pressure, and replace defective components.
Air leaking through relief valve at dryer inlet	Compressor running at high working pressure	Check the compressor's working pressure setting
	Dryer inlet solenoid valve not working	Check coil operation, replace if damaged
		Inspect the condition of the valve - clean the valve or replace if problems persist
	High pressure in equipment resulting from plugged filters	Check the internal filters and accessory filter assemblies. Clean or replace dirty filters.

Once a fault is cleared and after reassembling the dryer, the condensate must be drained from the air tank, then dry the air tank, and the dryer must be regenerated, best when using continuous compressor operation at a pressure of around 7.0 bar for a period of at least 1 hour.

⚠ **Check the moisture content of the air exiting the air tank (see the Technical data chapter) to prevent damage to connected downstream equipment.**

19. REPAIR SERVICE

Warranty and post-warranty repairs must be done by the manufacturer, its authorized representative, or service personnel approved by the supplier.

Attention.

The manufacturer reserves the right to make changes to the equipment without notice. Any changes made will not affect the functional properties of the equipment.

20. LONG-TERM SHUTDOWN

If the compressor will not be used for a prolonged time period, it is recommended to drain all condensate from the air tank and the condensate separator. Then turn on the compressor for 10 minutes, keeping the drain valve on the air tank open (15) (Fig. 1). Switch off the compressor using the main switch (19) (Fig. 2), close the condensate drain valve and disconnect the equipment from the mains.

21. DISPOSAL OF DEVICE

- Disconnect the equipment from the mains.
- Release the air pressure in the pressure tank by opening the drain valve (15) (Fig. 1).
- Dispose of the equipment following all applicable regulations.
- Entrust a specialised company to sort and dispose of waste.
- Worn out components have no negative environmental impact.

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Parameter VM Mapping

ID	Block	Parameter	Type	Address
1	C019 HOURS RUN [Hours Counter]	OT - hourminute	DWord	0
2	SF018 PRESSURE [Mathematic instruction]	Aq amplified	Word	4
3	SF023 TEMP_OUT [Analog Amplifier]	Ax, amplified	Word	6
4	SF052 TEMPJN [Analog Amplifier]	Ax, amplified	Word	8
5	C019 HOURS RUN [Hours Counter]	MN - hourminute	DWord	10
6	C037 COUNTER_MN [Up/Down counter]	Counter	DWord	14
7	SF025 MAX_TEMP_OUT [Max/Min]	Maximum value	Word	26
8	SF050 MAZ_TEMP+IN [Max/Min]	Maximum value	Word	28
9	C038 TOTAL HOURS [Hours Counter]	OT - hourminute	DWord	30
10	C091 HIGH CONSUMP [Up/Down counter]	Counter	DWord	34
11	C095 FAULT M1 [Up/Down counter]	Counter	DWord	38
12	C096 FAULT M2 [Up/Down counter]	Counter	DWord	42
13	C099 FAULT M3 [Up/Down counter]	Counter	DWord	46
14	C098 FAULT M4 [Up/Down counter]	Counter	DWord	50
15	C100 FAULT M5 [Up/Down counter]	Counter	DWord	54
16	C101 FAULT M6 [Up/Down counter]	Counter	DWord	58
17	C041 SWITCH MOTOR [Up/Down counter]	Counter	DWord	62

Creator	Ing. Vanek Milan	EKOM spol. s. o.	Project:		Customer:	
Checked:	Ing. Masar Jozef		Installation	DK50 6x4VRTSM/OMI orNDM/	Diagram No.:	4ZA-439
Date	5/23/17 3:33 PM/2/9/18 1T 17 AM		File:	9X4VRTM_OMI_V1 00_090218 lid	Page:	1/2

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Parameter VM Mapping

ID	Block	Parameter	Type	Address
18	C045 SWITCH FAN [Up/Down counter]	Counter	DWord	70
19	C111 MN NDM COUNT [Up/Down counter]	Counter	DWord	74
20	C130 FAULT M7 [Up/Down counter]	Counter	DWord	78
21	C119 FAULT M8 [Up/Down counter]	Counter	DWord	82
22	C088 FAULT M9 [Up/Down counter]	Counter	DWord	86

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23. INSTALLATION RECORD

EN

1. Product: (model) **DK50 4X4VRT/M** **DK50 4x4VRTS/M** **DK50 6x4VRT/M** **DK50 6x4VRTS/M**		**2. Serial number:**	
3.1. User's name:			
3.2. Address of installation:			
4. Equipment connected to the compressor:			
5. Installation / Commissioning:		**6. Contents of operator training:**	
Product completeness check **	Y N	Description of the product and functions**	Y N
Documentation completeness check **	Y N	Product operation: turning on/off, controls, control procedures, data on the display panel, alarms, operation in alarm conditions**	Y N
Installation/connection to equipment **	Y N	Product maintenance: maintenance intervals, maintenance procedure, service intervals, operating activities**	Y N
Functional test **	Y N	Safety measures, warnings – their meaning and compliance **	Y N
Notes:			
7. Operator instructed on safety measures, operations and maintenance:			
Name:		Signature:	
Name:		Signature:	
Name:		Signature:	
8. Installation and instruction performed by: First name/Last name		Signature:	
Company:		Address:	
Phone:			
Email:		Date:	
9. Distributor:			
Company:		Address:	
Contact person:			
Phone:		Email:	

** mark with an "X" in points 5 and 6 (Y - yes /N - no). Enter any observations from points 5 and 6 into the "Notes" section.

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DK50 4x4VRT/M
DK50 6x4VRT/M

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