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# DK50 4x4VRT/M
# DK50 6x4VRT/M

EN User manual

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| | |
|---|---|
| **COMPRESSOR** | **DK50 4x4VRT/M**<br>**DK50 6x4VRT/M** |

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| | |
|---|---|
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# IMPORTANT INFORMATION

## 1. CE MARKING

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.

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

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.

## 3. CONTRAINDICATIONS AND SIDE-EFFECTS

There are no contraindications or side-effects known.

## 4. WARNINGS AND SYMBOLS

The following symbols are used in the user manual, device and its packaging to denote important details and information:

- General warnings
- Warning
- Danger, electrocution hazard
- Read the operating instructions
- Refer to instruction manual
- CE conformity marking
- MD — Medical device
- SN — Serial number
- Compressor is remote-controlled and may start without warning
- Warning! Hot surface
- Earth (ground) connection
- Terminal for ground connection
- Alternating current
- Handling mark on package – FRAGILE
- Handling mark on package – THIS WAY UP
- Handling mark on package – DO NOT EXPOSE TO RAIN
- Handling mark on package – TEMPERATURE RANGE
- Handling mark on package – LIMITED STACKING
- Mark on package – RECYCLABLE MATERIAL
- Manufacturer



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## 5. WARNING

The product has been designed and manufactured to ensure it is safe for users and its surroundings when used in the defined manner. The following safety warnings must be respected. This minimises any residual risks.

### 5.1. General warnings

- The user manual serves to aid in the proper installation, operation and maintenance of the product. The user manual is delivered with the equipment and must be kept close to it at all times. Following this manual precisely is the prerequisite for the proper use of the equipment in the defined manner.

- Equipment containing the condensing dryer is provided with a separate manual for these components.

- Only the original packaging ensures protection of the equipment during transport. Original packaging should be kept if necessary to return the equipment later. The manufacturer provides no warranty for damages caused by faulty packaging during the transport of equipment returned during the warranty period.

- Use a fork truck or other suitable type of handling equipment to transport and move the equipment

- 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 equipment is used pursuant to the user manual.

### 5.2. General safety warnings

- Operation of the equipment must be in compliance 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 can guarantee the safety of operating personnel and reliable operation of the equipment. Only use accessories and parts mentioned in the technical documentation or expressly approved by the manufacturer.

- The manufacturer accepts no liability for damages or related risks from the use of any accessories or parts that are not mentioned in the technical documentation or expressly approved by the manufacturer. The warranty does not cover damages originating from the use of accessories or consumable materials other than those specified or recommended by the manufacturer.

- The user must be convinced of the proper function and safe condition of the equipment before each and every use.

- The user/operator must be able to correctly and safely operate the equipment. The user must be trained to operate the equipment and have the required level of experience.

- Create operating instructions for personnel operating the equipment

- Use hearing protection when starting up the equipment, during operation and any time it is running.

- Operation of the equipment in areas in which flammable gas mixtures, such as operating rooms, or in areas where flammable mixtures of solids, such as coal dust, may be present is prohibited.

- Flammable materials represent an explosion hazard!



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- Operating the equipment in damp or wet areas is prohibited
- If any adverse effects or problems arise in direct connection with the use of the equipment, the user must inform their supplier immediately.
- 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 must be connected to earth (grounded).
- Check the mains voltage and frequency on the equipment's nameplate and ensure they match the power system before connecting the equipment to the mains.
- Inspect the equipment for any damage and the connected air distribution system before commissioning. Replace damaged compressed air and electric lines immediately.
- Immediately disconnect the equipment from the mains if a technical failure or a dangerous situation occurs.
- During repairs and maintenance, ensure that:
  - the equipment is disconnected from the mains
  - pressure is released from all lines
- The equipment must be installed or its function expanded by the manufacturer or a qualified professional trained by the manufacturer.
- Only a qualified electrician may install electrical components!

## 6. STORAGE AND TRANSPORT CONDITIONS

The compressor is shipped from the factory in transport packaging. This protects the equipment from damage during transport.

**The original compressor packaging must be used for transport whenever possible. 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. A compressor in its original packaging can be stored in a warm, dry and dust-free area. Do not store near any chemical substances.

Keep the packaging material if possible. If not, please dispose of the packaging material in an environmentally friendly way and recycle if possible. Packaging cardboard can be recycled with paper.

**The compressor may only be transported when all air pressure has been vented. Before moving or transporting the compressor, release all air pressure from the tank and hoses and drain condensate from the air tank.**

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

**Ambient conditions for storage and transport**

The equipment may be stored in premises and on vehicles without any traces of volatile chemicals under the following conditions:

*Temperature:* *+0°C to +50°C,*
*Max. relative humidity:* *90%*



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## 7. TECHNICAL DATA

Compressors are designed for dry and ventilated indoor environments with the following conditions:

*Temperature:* *+5°C to +40°C,*
*Max. relative humidity:* *70%,*
*Max. absolute humidity:* *15 g/m$^3$.*

**Tab. 1**

| Type | | DK50 4x4VRT/M | DK50 4x4VRTS/M | DK50 6x4VRT/M | DK50 6x4VRTS/M |
|---|---|---|---|---|---|
| Output at 6 bar | l/min | 1040 | 1040 | 1560 | 1560 |
| Rated voltage / frequency | V / Hz | 3 x 400 / 50 | 3 x 400 / 50 | 3 x 400 / 50 | 3 x 400 / 50 |
| Rated current | A | 22 | 22 | 31 | 31 |
| Main circuit breaker | A | 25 | 25 | 32 | 32 |
| Main feeder gauge | mm2 | 4 | 4 | 6 | 6 |
| Enclosure | | IP10 | IP30 | IP10 | IP30 |
| Air tank capacity | l | 500 | 500 | 500 | 500 |
| Working pressure | bar | **6 ÷ 8** | **6 ÷ 8** | **6 ÷ 8** | **6 ÷ 8** |
| Safety valve | bar | 10 | 10 | 10 | 10 |
| Noise level | dB | 80 | 69 | 83 | 72 |
| Total weight of compressor (net) | kg | 461 | 594 | 540 | 676 |
| Weight - compressor module | kg | 268 | 401 | 350 | 483 |
| Weight - dryer module | kg | 66 | 66 | 66 | 66 |
| Weight of air tank | kg | 127 | 127 | 127 | 127 |
| Compressor dimensions, total (w x d x h) | mm | 3000x705 x2100 | 3000x705 x2100 | 3000x705 x2100 | 3000x705 x2100 |
| Dimensions - compressor module (w x d x h) | mm | 1240x630 x1750 | 1250x705 x1790 | 1240x630 x1750 | 1250x705 x1790 |
| Dimensions – ED108 dryer module (w x d x h) | mm | 760x550x1015 | 760x550 x1015 | 760x550 x1015 | 760x550 x1015 |
| Air tank dimensions (w x d x h) | mm | 770x705 x2100 | 770x705 x2100 | 770x705 x2100 | 770x705 x2100 |
| Operating mode | | S1 – 100% | S1 – 100% | S1 – 100% | S1 – 100% |
| Dryer performance with condensation dryer (ED108) (PDP*) | | +3°C | +3°C | +3°C | +3°C |
| Time to fill air tank from 0 to 7 bar | s | 150 | 150 | 105 | 105 |
| Recommended cooling air changes in space | m3/h | 2250 | 2250 | 3000 | 3000 |
| Electrical class | | class I. | class I. | class I. | class I. |



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**Tab.2**

| Typ | | DK50 4x4VRT/M | DK50 4x4VRTS/M | DK50 6x4VRT/M | DK50 6x4VRTS/M |
|---|---|---|---|---|---|
| Output at 8 bar | l/min | 800 | 800 | 1315 | 1315 |
| Rated voltage / frequency | V / Hz | 3 x 400 / 50 | 3 x 400 / 50 | 3 x 400 / 50 | 3 x 400 / 50 |
| Rated current | A | 23 | 23 | 33 | 33 |
| Main circuit breaker | A | 25 | 25 | 40 | 40 |
| Main feeder gauge | mm2 | 4 | 4 | 6 | 6 |
| Enclosure | | IP10 | IP30 | IP10 | IP30 |
| Air tank capacity | l | 500 | 500 | 500 | 500 |
| Working pressure | bar | **8 ÷ 10** | **8 ÷ 10** | **8 ÷ 10** | **8 ÷ 10** |
| Safety valve | bar | 11 | 11 | 11 | 11 |
| Noise level | dB | 80 | 69 | 83 | 72 |
| Total weight of compressor (net) | kg | 461 | 594 | 540 | 676 |
| Weight - compressor module | kg | 268 | 401 | 350 | 483 |
| Weight - dryer module | kg | 66 | 66 | 66 | 66 |
| Weight of air tank | kg | 127 | 127 | 127 | 127 |
| Compressor dimensions, total (w x d x h) | mm | 3000x705 x2100 | 3000x705 x2100 | 3000x705 x2100 | 3000x705 x2100 |
| Dimensions - compressor module (w x d x h) | mm | 1240x630 x1750 | 1250x705 x1790 | 1240x630 x1750 | 1250x705 x1790 |
| Dimensions – ED108 dryer module (w x d x h) | mm | 760x550x1015 | 760x550 x1015 | 760x550 x1015 | 760x550 x1015 |
| Air tank dimensions (w x d x h) | mm | 770x705 x2100 | 770x705 x2100 | 770x705 x2100 | 770x705 x2100 |
| Operating mode | | S1 – 100% | S1 – 100% | S1 – 100% | S1 – 100% |
| Dryer performance with condensation dryer (ED108) (PDP*) | | +3°C | +3°C | +3°C | +3°C |
| Time to fill air tank from 0 to 7 bar | s | 170 | 170 | 115 | 115 |
| Recommended cooling air changes in space | m3/h | 2250 | 2250 | 3000 | 3000 |
| Electrical class | | class I. | class I. | class I. | class I. |

(*) Apply the correction factor for the ED108 dryer



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### 7.1. Free air delivery (FAD) correction due to elevation

*FAD correction table*

| Elevation [MASL] | 0 - 1500 | 1501 - 2500 | 2501 - 3500 | 3501 - 4500 |
|---|---|---|---|---|
| FAD [l/m] | FAD x 1 | FAD x 0.8 | FAD x 0.71 | FAD x 0.60 |

FAD output related to conditions:

Elevation: 0 MASL
Temperature: 20°C
Atmospheric pressure: 101325 Pa
Relative humidity: 0%

### 7.2. Dryer performance correction

ED108 dryer reference values

| | | | |
|---|---|---|---|
| Temperature of air entering the dryer | $t_{inlet}$ | °C | 35 (max. 55) |
| Ambient temperature | $t_0$ | °C | 25 (max. 45) |
| Working pressure | p | bar | 7 (max. 16) |
| Pressure dew point | PDP | °C | +3 (-22 atm) |

ED108 dryer correction factors

| Correction factor for working pressure | | | | | | | |
|---|---|---|---|---|---|---|---|
| p (bar) | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| $F_{C1}$ | 0.78 | 0.85 | 0.93 | 1.0 | 1.06 | 1.11 | 1.15 |

| Correction factor for temperature of compressed air entering the dryer | | | | | | | |
|---|---|---|---|---|---|---|---|
| $t_{inlet}$(°C) | 30 | 35 | 40 | 45 | 50 | 55 | |
| $F_{C2}$ | 1.2 | 1.0 | 0.85 | 0.71 | 0.58 | 0.49 | |

The cooler cools the compressed air to a temperature of ~19°C higher than the ambient temperature. Therefore:
$t_{inlet} = t_o + 19°C$
It means E.G. at ambient temperature of $t_o = 16°C$, $t_{inlet} = 16° + 19° = 35°C \rightarrow F_{C2} = 1,0$

| Dew point correction factor | | | | | | | |
|---|---|---|---|---|---|---|---|
| PDP (°C) | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| $F_{C3}$ | 1 | 1.04 | 1.09 | 1.14 | 1.18 | 1.25 | 1.3 |

| Correction factor for ambient temperature | | | | | | | |
|---|---|---|---|---|---|---|---|
| $t_o$ (°C) | 25 | 30 | 35 | 40 | | | |
| $F_{C4}$ | 1 | 0.96 | 0.92 | 0.88 | | | |



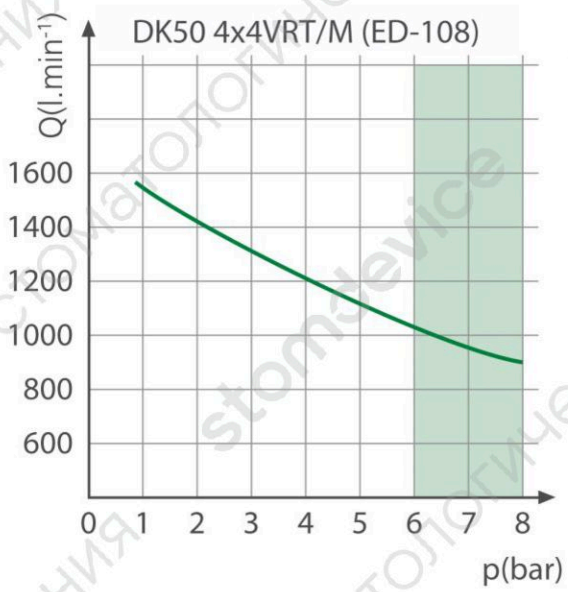
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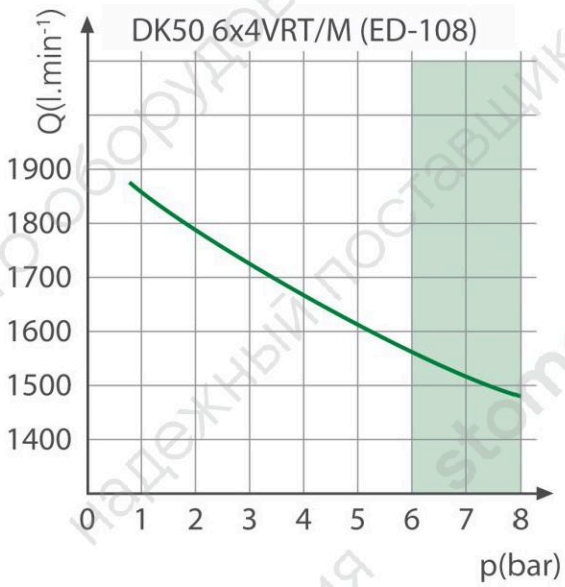
Calculation to determine dryer pressure dew point value:

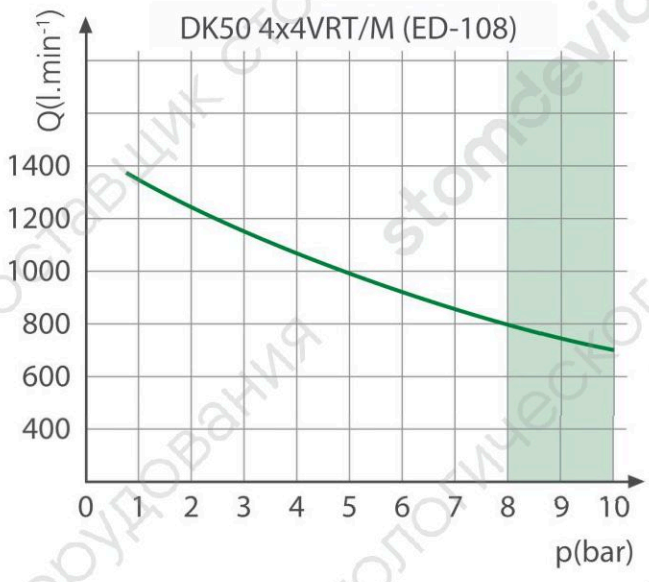
$$F_{C3} = \frac{Q_{skut}}{Q_n \cdot F_{C1} \cdot F_{C2} \cdot F_{C4}}$$

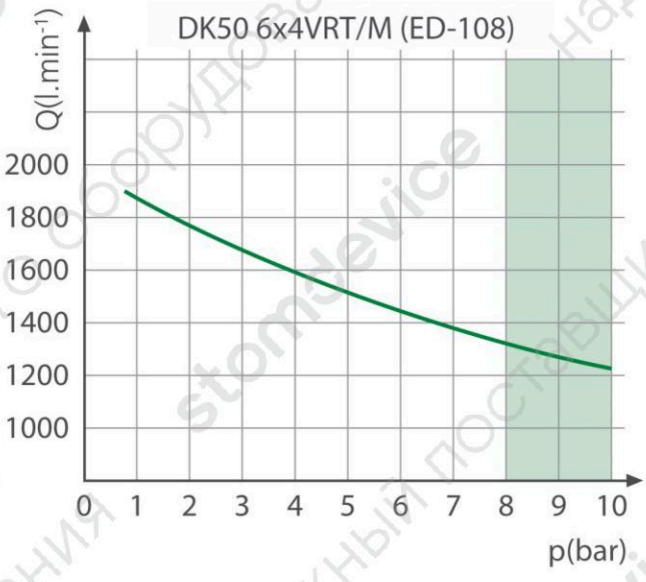
$Q_{skut}$ = actual airflow
$Q_n$ = nominal dryer flow (1800 l/m)
$F_{C1}$ = working pressure correction factor
$F_{C2}$ = correction factor for air entering the dryer
$F_{C3}$ = dew point correction factor
$F_{C4}$ = ambient temperature correction factor

See the user manual for the dryer on the CD for more information





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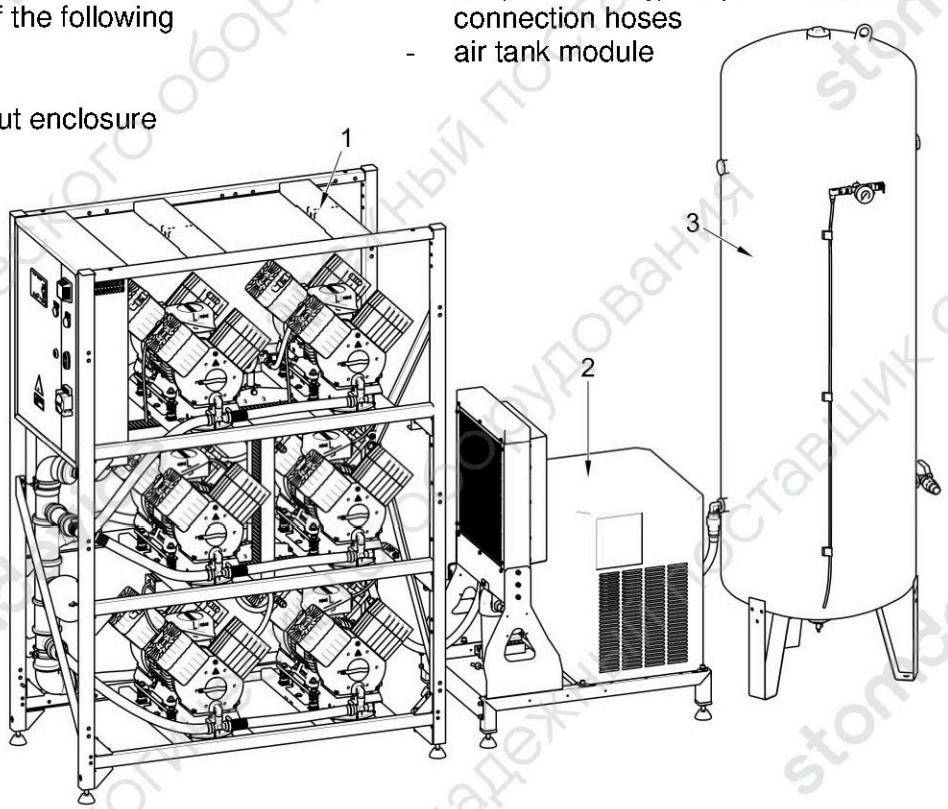
## 8. PRODUCT DESCRIPTION

### 8.1. Delivery includes

**DK50 4x4VRT/M** or **DK50 6x4VRT/M compressor** comprised of the following modules (Fig. 1a):

- compressor module with 4 or 6 compressor aggregates and controls
- a (condensing) dryer module with connection hoses
- air tank module

**Fig. 1a** Compressor without enclosure

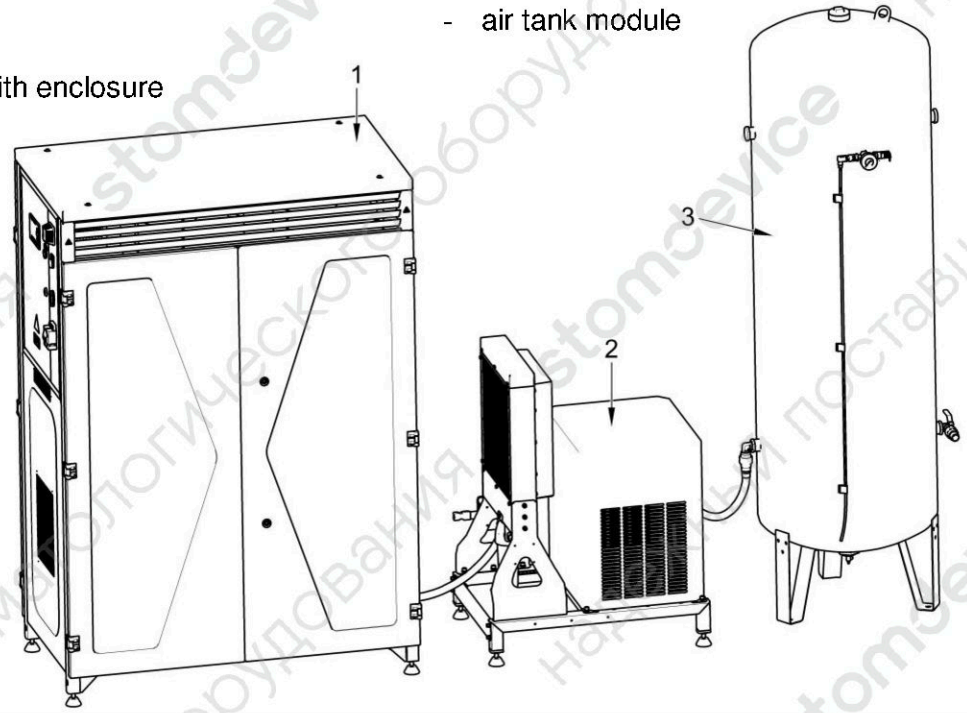



1. Compressor module
2. Dryer module
3. Air tank module

**DK50 4x4VRTS/M** or **DK50 6x4VRTS/M compressor** comprised of the following modules
(Fig. 1b):

- a compressor module with 4 or 6 compressor aggregates and controls along with a soundproof enclosure
- a (condensing) dryer module with connection hoses
- air tank module

**Fig. 1b** Compressor with enclosure






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## 8.2. Accessories

Accessories are available for compressor directly from the manufacturer (by special request in an order) or may be ordered directly from the manufacturer at a later time, see below. Individual accessories may be combined.

**Accessories not included in the standard order must be ordered separately!**

### 8.2.1. DK50 4x4VRT/M performance enhancement kit

If the performance of an existing DK50 4x4VRT compressor is insufficient, the manufacturer has developed an accessory DK50 6x4VRT/M performance enhancement 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.

| Compressor type | Central intake | Dryer type | Rated voltage / working pressure | Kit article no. |
|---|---|---|---|---|
| DK50 4x4VRT/M | no | ED-108 | 3x400V/50Hz (6-8bar) | 447000001-024 |
| DK50 4x4VRTS/M | | | 3x400V/50Hz (8-10bar) | 447000001-034 |
| DK50 4x4VRT/M | yes | ED-108 | 3x400V/50Hz (6-8bar) | 447000001-025 |
| DK50 4x4VRTS/M | | | 3x400V/50Hz (8-10bar) | 447000001-035 |

### 8.2.2. Central aggregate intake kit

This kit provides a properly sized central filter located on the compressor module with intake ducts to the individual compressors. This extends the central filter replacement interval (now every 2,000 hours) and eliminates the need to replace filters on individual compressors with simple and fast replacement of the central filter.

| Compressor type | Kit article no. |
|---|---|
| DK50 4x4VRT/M | 447000001-021 |
| DK50 4x4VRTS/M | 447000001-020 |
| DK50 6x4VRT/M | 447000001-019 |
| DK50 6x4VRTS/M | 447000001-018 |

### 8.2.3. 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 |


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| 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.

### 8.2.4. 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<br>DK50 6x4VRT/M | 604014125-000 |

### 8.2.5. Filter set brackets

**A suitable bracket must be ordered for every filter set.**

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

### 8.2.6. Compressor module enclosure (soundproofing)

Enclosing the compressor module reduces the noise generated by the compressor by up to 11 dB(a) compared to the existing module while ensuring sufficient cooling for the aggregates themselves for S1 class continuous operations.

| Compressor type | With central intake | Kit article no. |
|---|---|---|
| DK50 4x4VRT/M | yes | 447000001-022 |
| DK50 6x4VRT/M | | |
| DK50 4x4VRT/M | no | 447000001-023 |
| DK50 6x4VRT/M | | |

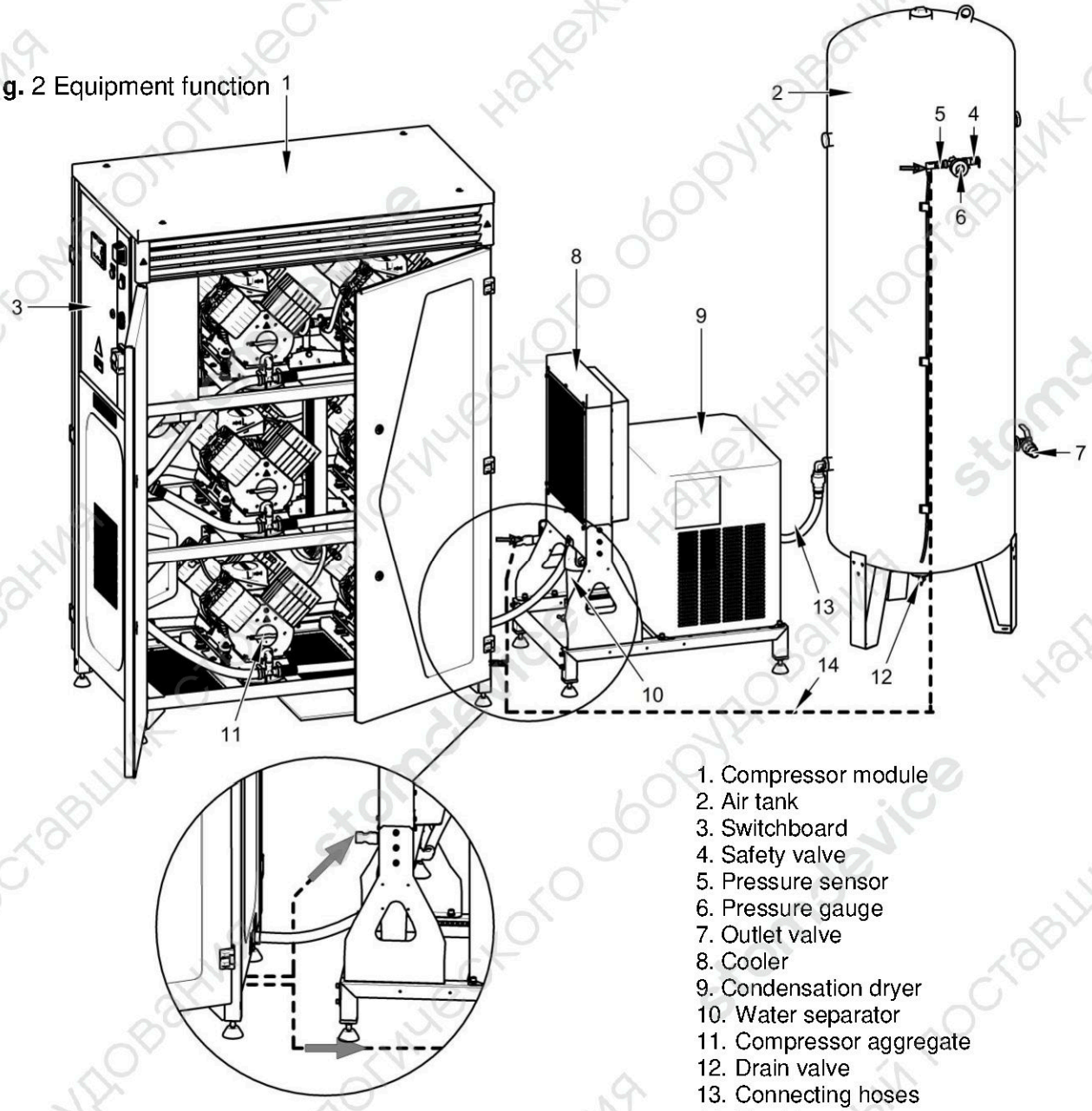


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## 9. EQUIPMENT FUNCTION

Compressor air pumps (11) draw in atmospheric air through the inlet filters and compress it through check valves and into the compressed air system. From there, the compressed air proceeds to the cooler (8), in which the compressed air is cooled for the first time and condensate is produced. The air then passes through a water separator and into the condensing dryer (9). This continues to lower the temperature of the air and produces more condensate. The temperature then rises to reduce the relative humidity. The clean, dry air then passes through a check valve and enters the air tank (2). Condensate from the water separator and the dryer is drained off into a 10 l vessel in the condensate drain kit. The dryer ensures the continuous and no-loss drying of the compressed air. The treated compressed air is then ready for additional use in the air tank.

**Fig.** 2 Equipment function

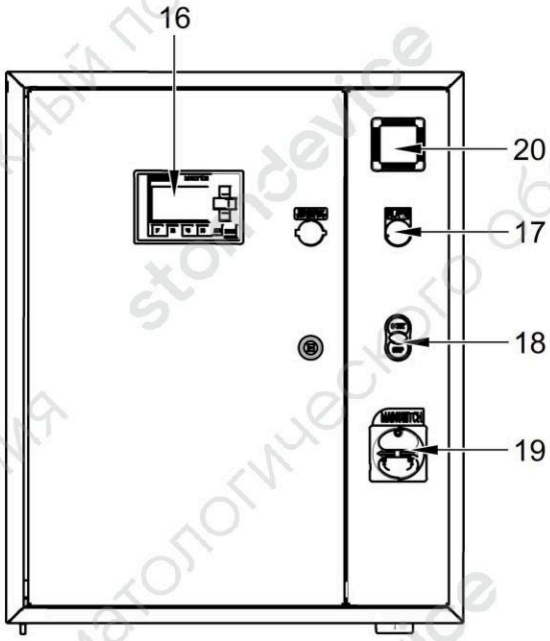



1. Compressor module
2. Air tank
3. Switchboard
4. Safety valve
5. Pressure sensor
6. Pressure gauge
7. Outlet valve
8. Cooler
9. Condensation dryer
10. Water separator
11. Compressor aggregate
12. Drain valve
13. Connecting hoses
14. Electric cables

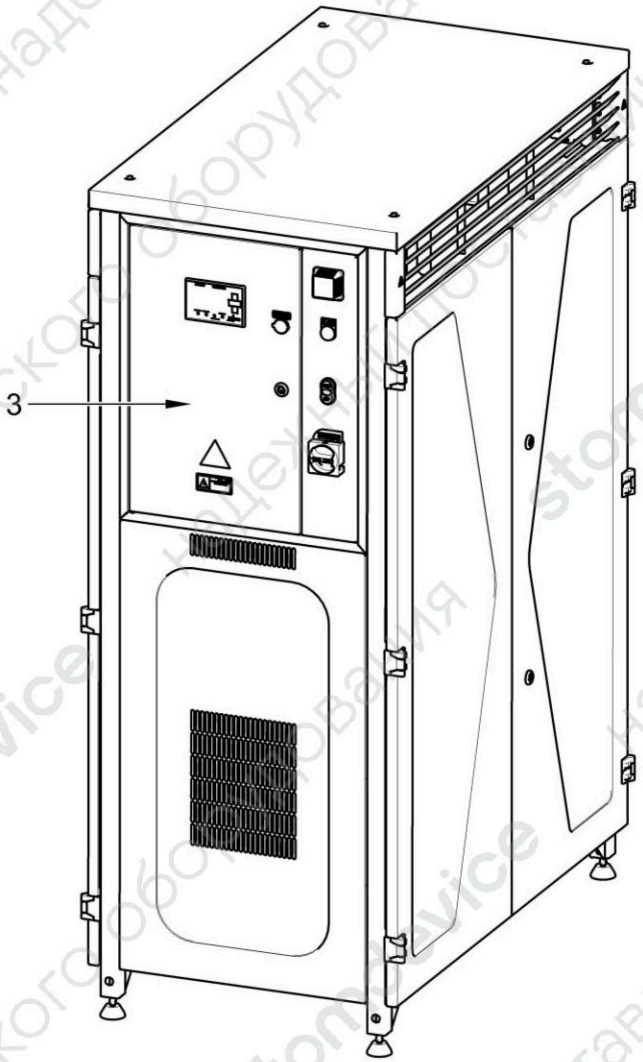


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**Fig. 3** Electrical box / switchboard




3. Electrical box / switchboard
16. Display
17. Alarm indicator
18. Start/stop button
19. Main switch
20. Temperature sensor

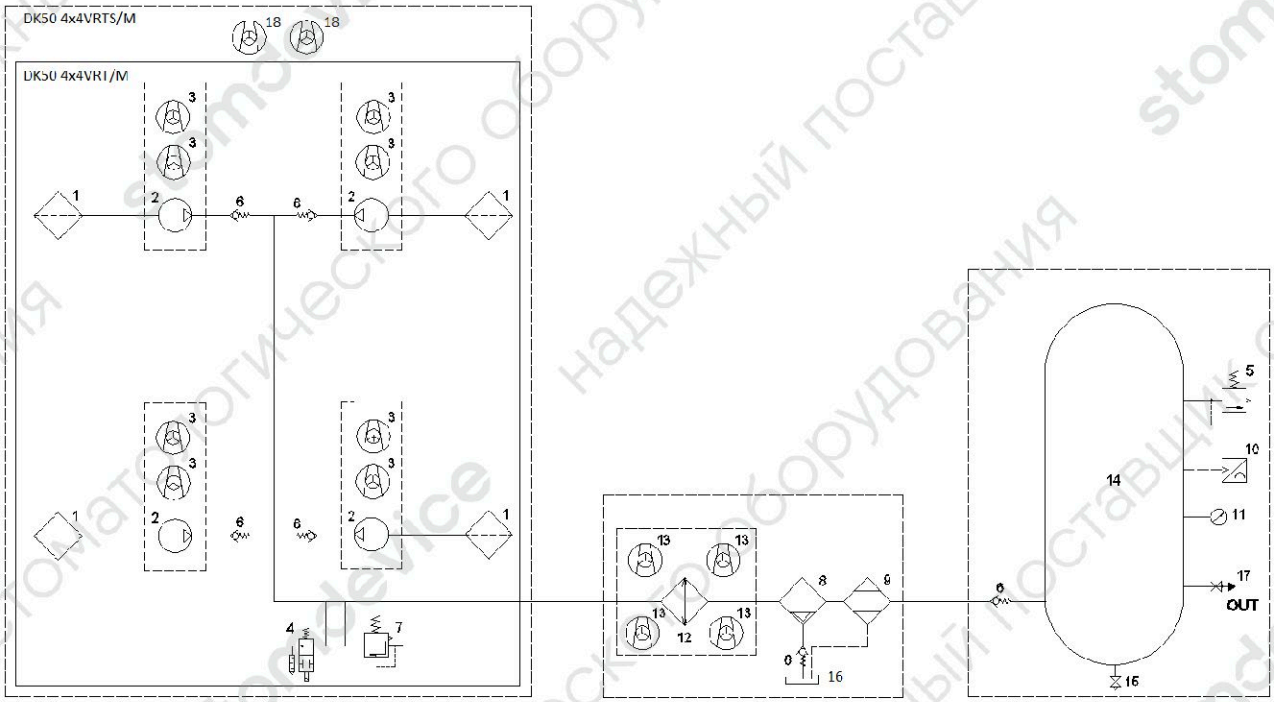





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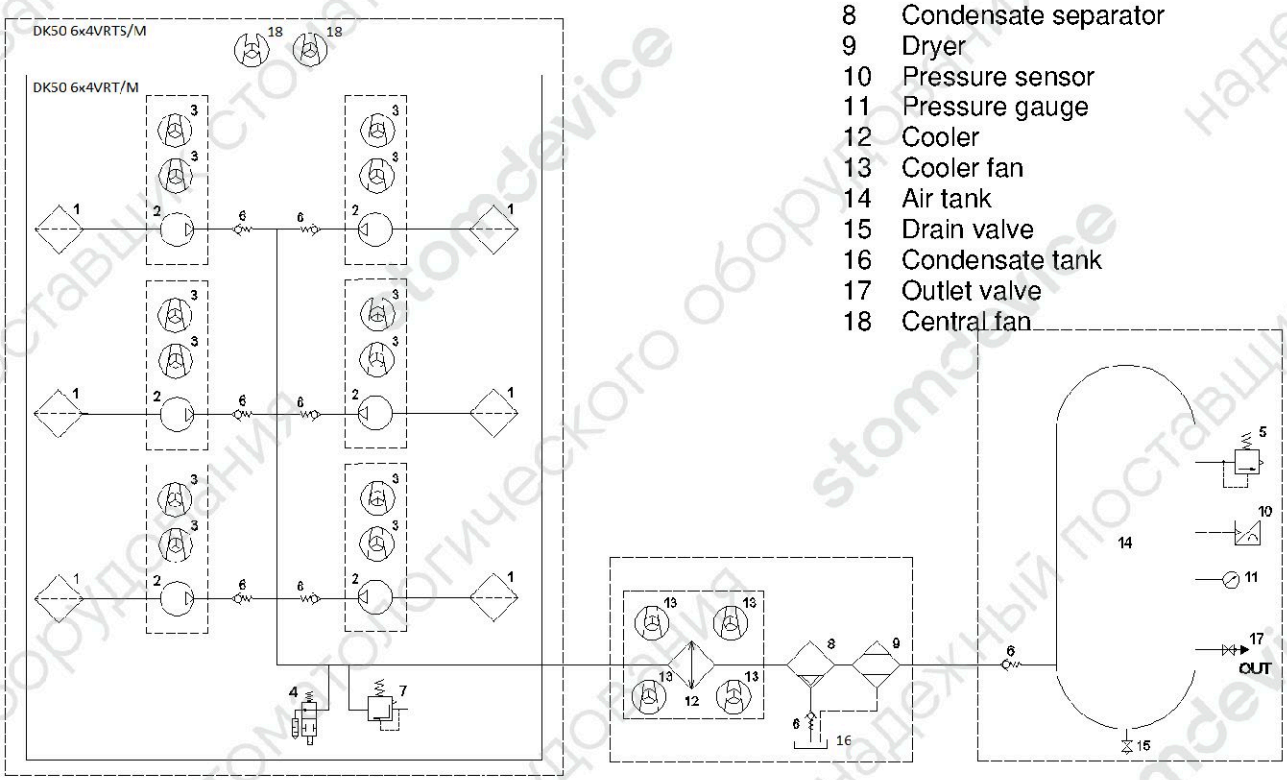
## 10. PNEUMATIC SCHEMATIC

DK50 4x4VRT/M and DK50 4x4VRTS/M




1 Inlet filter
2 Compressor aggregate
3 Compressor fan
4 Solenoid valve
5 Safety valve
6 Check valve
7 Pressure relief valve
8 Condensate separator
9 Dryer
10 Pressure sensor
11 Pressure gauge
12 Cooler
13 Cooler fan
14 Air tank
15 Drain valve
16 Condensate tank
17 Outlet valve
18 Central fan

DK50 6x4VRT/M and DK50 6x4VRTS/M






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## INSTALLATION

### 11. CONDITIONS FOR USE

The compressor may only be installed and operated in dry, well-ventilated and dust-free environments.
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 shall be installed on a flat surface with sufficient carrying capacity (be aware of the weight of the product, see Technical data).

The compressor must be positioned on the operator's side at least 70 cm from the wall to permit cooling airflow and safe operation and service.

Operating the equipment in rooms that may contain flammable substances, such as in operating rooms, coal storage areas, etc. is prohibited. Flammable materials represent an explosion hazard.

Replace all damaged electrical cords and air hoses immediately. Never put the electrical cord under tension, ensure it moves freely at all times (putting anything on the cord is prohibited) and exposing the cord to any source of heat or cold is prohibited.

**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**.

Environmental requirements:

| | |
|---|---|
| *Temperature:* | *+5°C to +40°C* |
| *Max. relative humidity:* | *70%,* |
| *Max. absolute humidity:* | *15 g/m$^3$* |

Approximately 70% of the electrical power used by the compressor aggregates is converted into heat and therefore ventilation must be provided at the compressor installation site to provide the required flow of cooling air (see the Technical Data)

**Caution! Hot surface!** Portions of the compressor heat up to high temperatures during compressor operation that may pose a hazard to materials or operating personnel.

**Fire hazard!**



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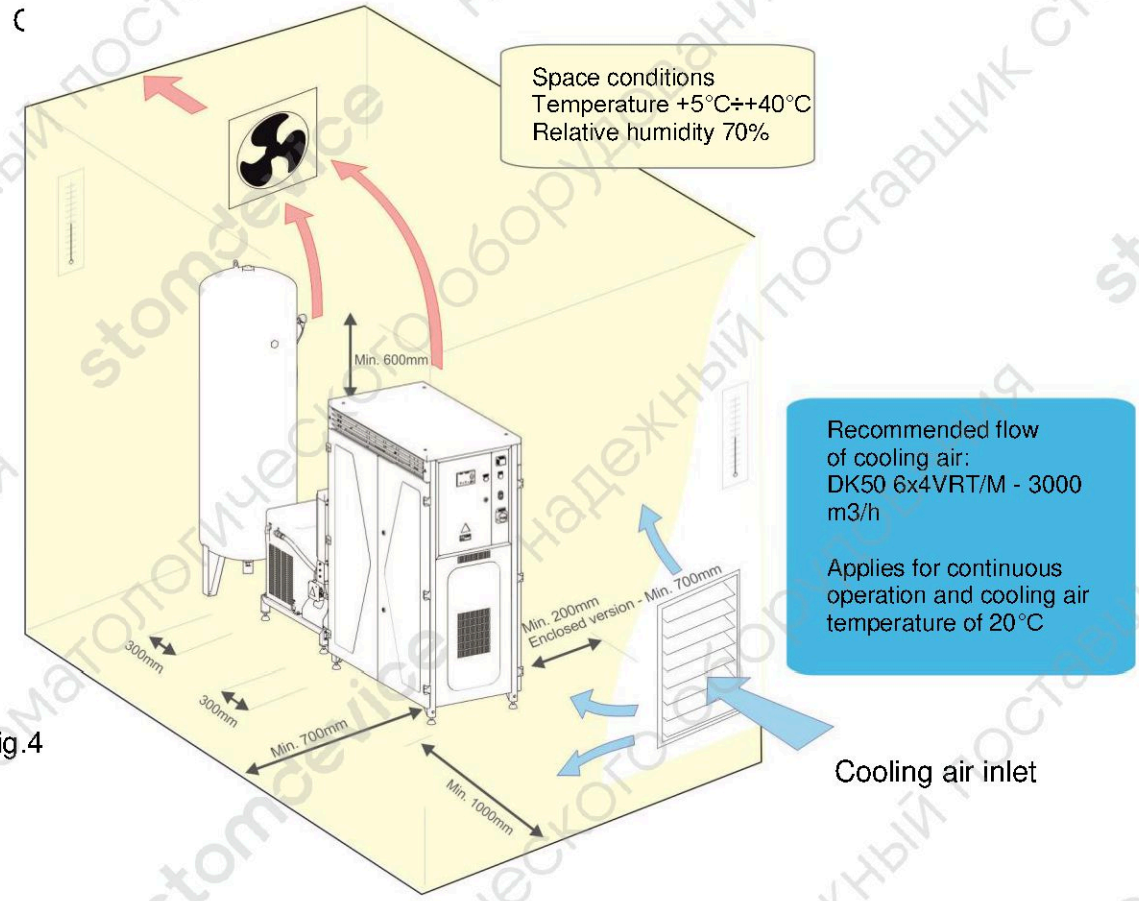



Fig.4

## 12. PLACEMENT OF THE CMPRESSOR

The equipment shall only be installed by a qualified professional.

Unpack the compressor assembly (compressor, dryer and air tank modules) to remove all packaging and release the transport anchors from the pallet. Anchors securing all modules to the pallet.

### 12.1. Handling

Use a fork truck or other suitable type of handling equipment to transport and position the equipment

Place the compressor module at the site of installation. (Fig. 5)

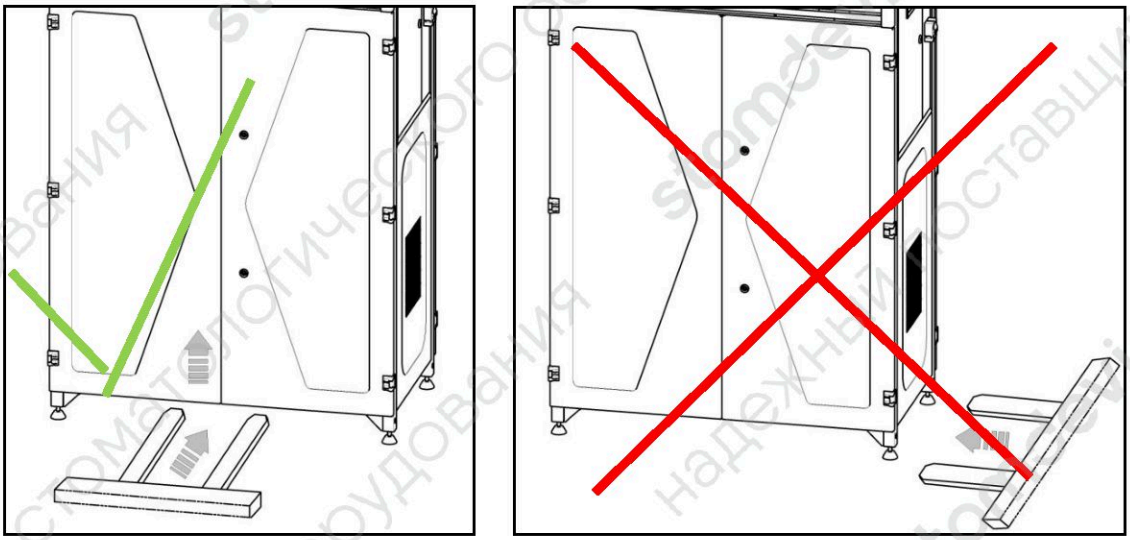


Fig.5



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Level the compressor assembly. (Fig. 6)

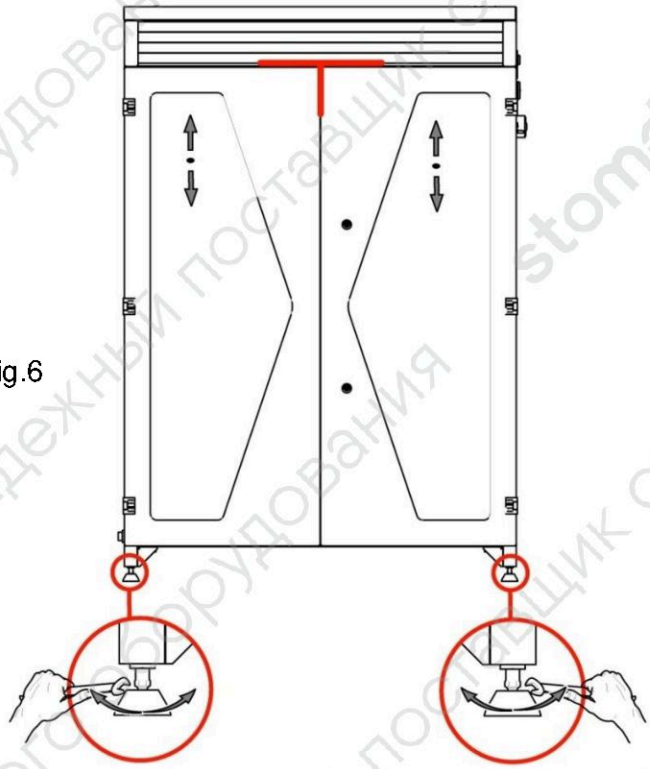


Fig.6

Remove the transport stabilizers from the aggregates. (Fig. 7)

Remove all stabilizers on the aggregates once the compressor assembly has been positioned and levelled at the site of final installation!

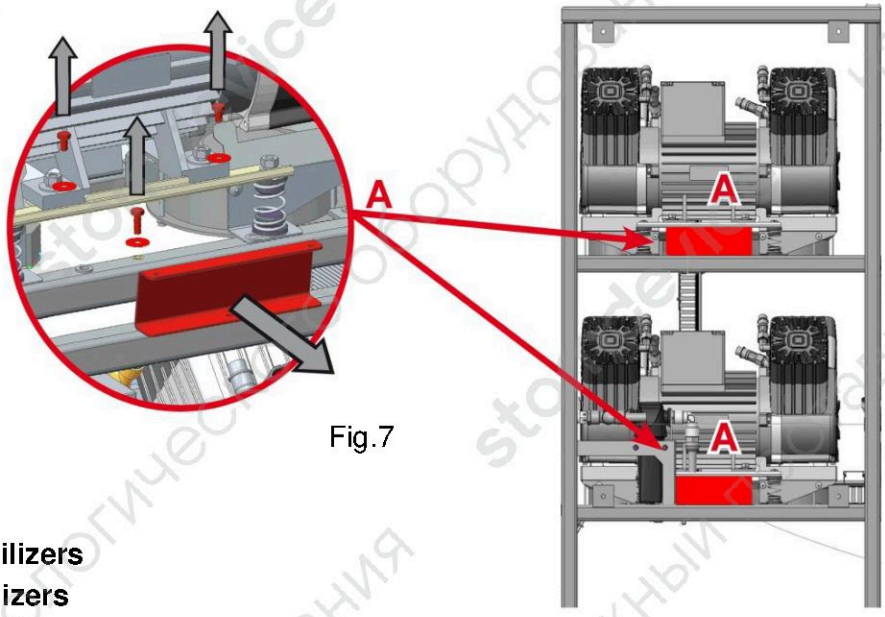



Fig.7

**Releasing aggregate stabilizers**
**DK50 4x4VRT/M - 8 stabilizers**
**DK50 6x4VRT/M - 12 stabilizers**



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Position the air tank at the site of installation and anchor it to the floor! (Fig. 8)

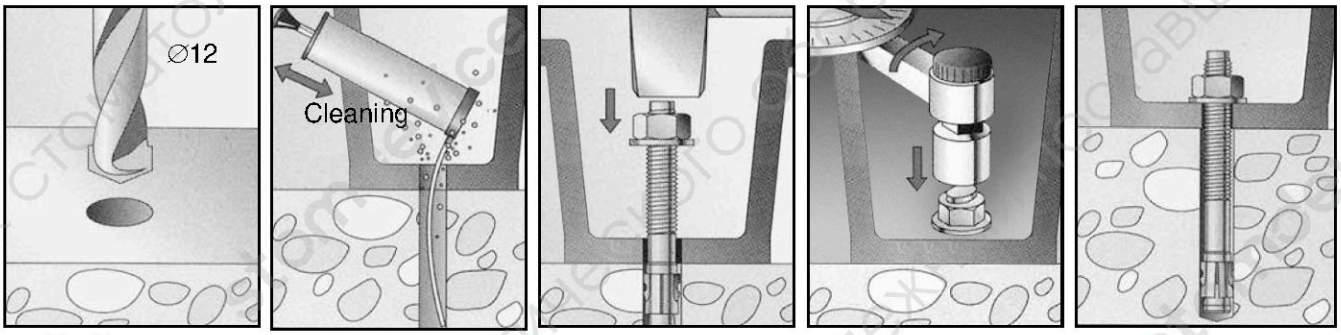



Fig.8

## 13. PNEUMATIC CONNECTIONS

Compressor module – dryer module – connect the air tank with the provided hoses. (Fig. 9)

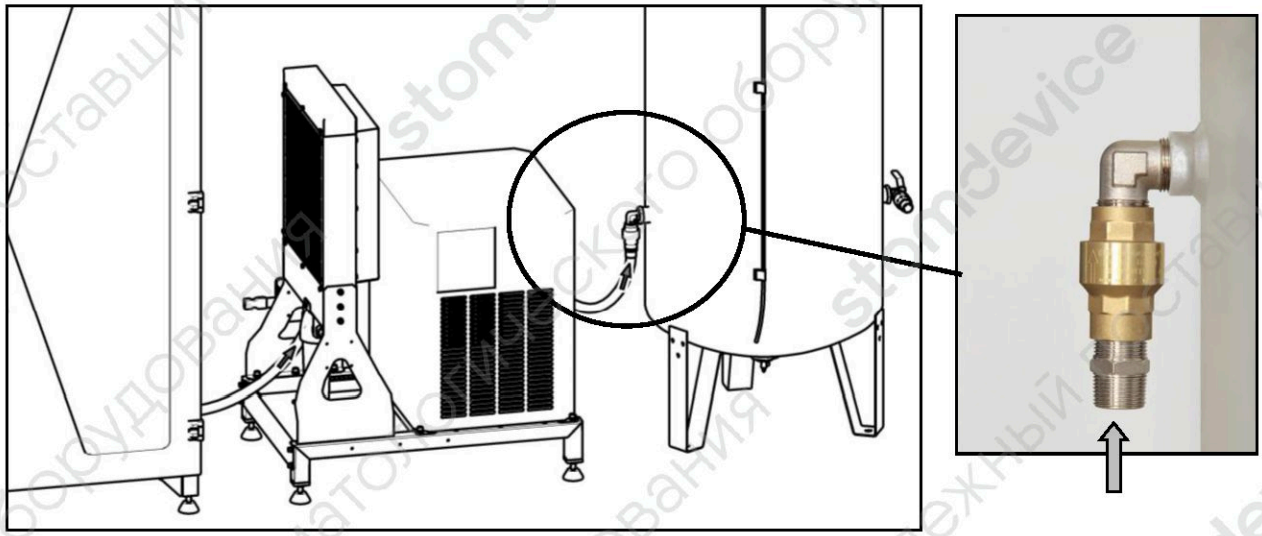


Fig.9



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- Connect the hoses from the water separator and the condensate drain from the dryer to connectors at the canister valves (Fig.10).

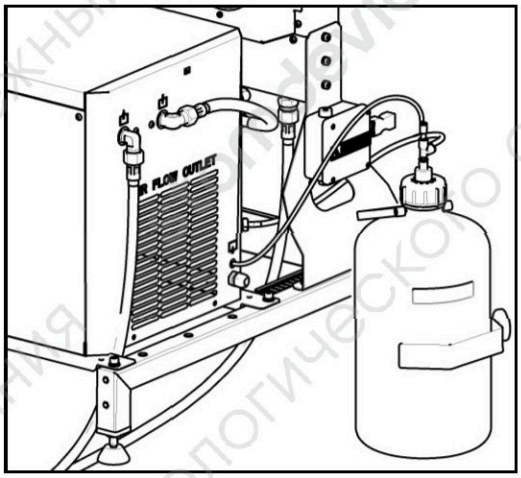


Fig.10

- A G3/4" threaded ball valve is installed on the compressed air outlet from the air tank (Fig. 11)

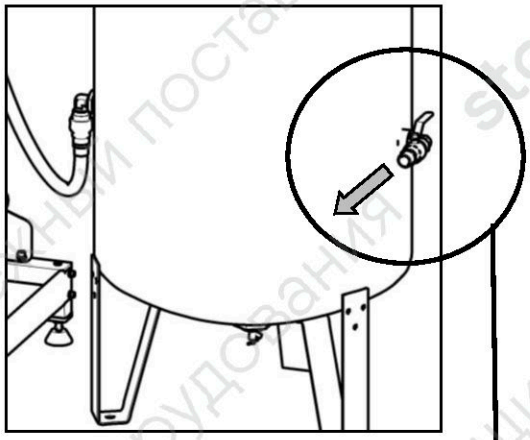




Fig.11

## 14. ELECTRICAL CONNECTIONS

Only a qualified electrician may install electrical components!

The operator shall provide electrical circuit protection for the equipment pursuant to the specifications of applicable technical standards

**The product is delivered without a power cord.**

- Connect the compressor module to the dryer module using the W22 cable (Fig. 13).
- Connect the compressor module to sensor B1 located on the air tank using the W23 cable, which is terminated with a valve connector. (Fig.12, Fig.14)

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

- Connect the power cord conductors to the power terminals L1, L2, L3, N/BU/, PE/GNYE/. (Fig 15).
- 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. 16).



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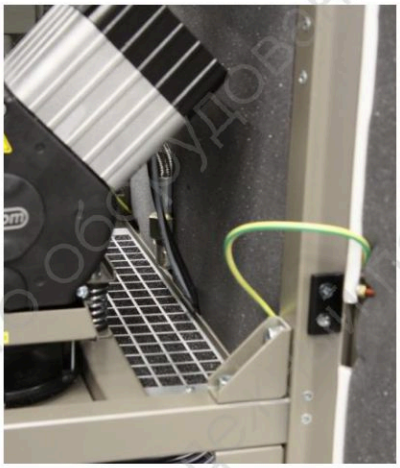




Fig.12





Fig.13

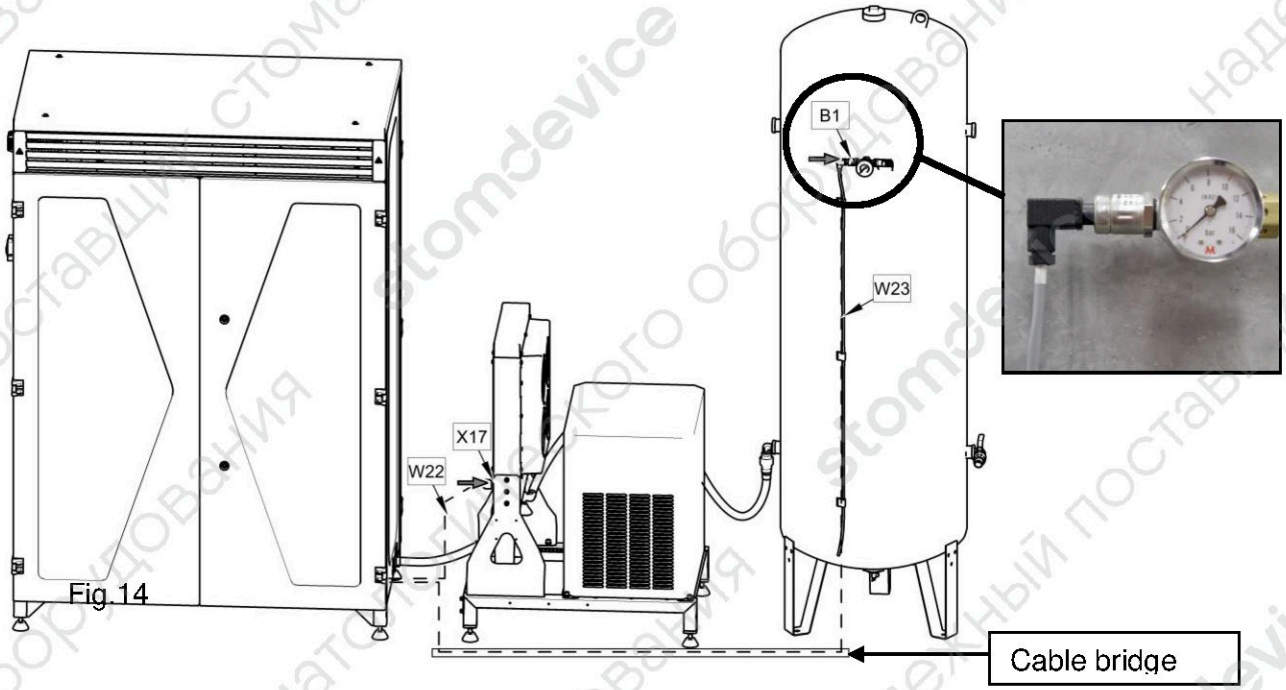



Fig.14



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Fig.15

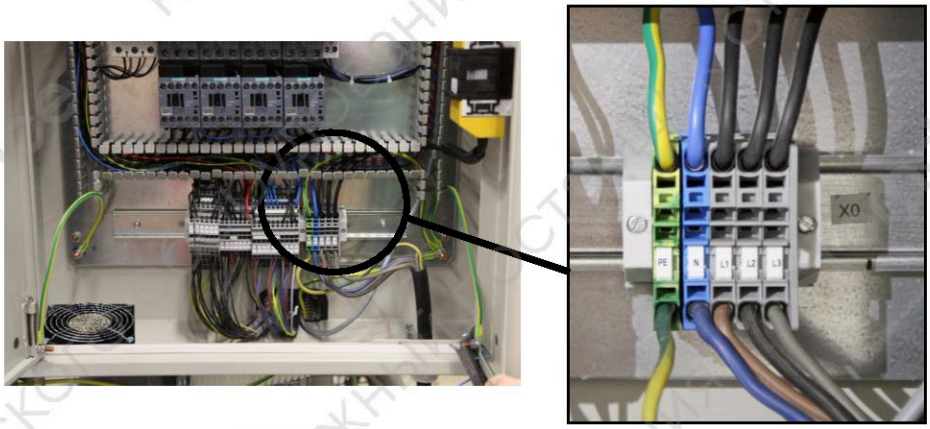
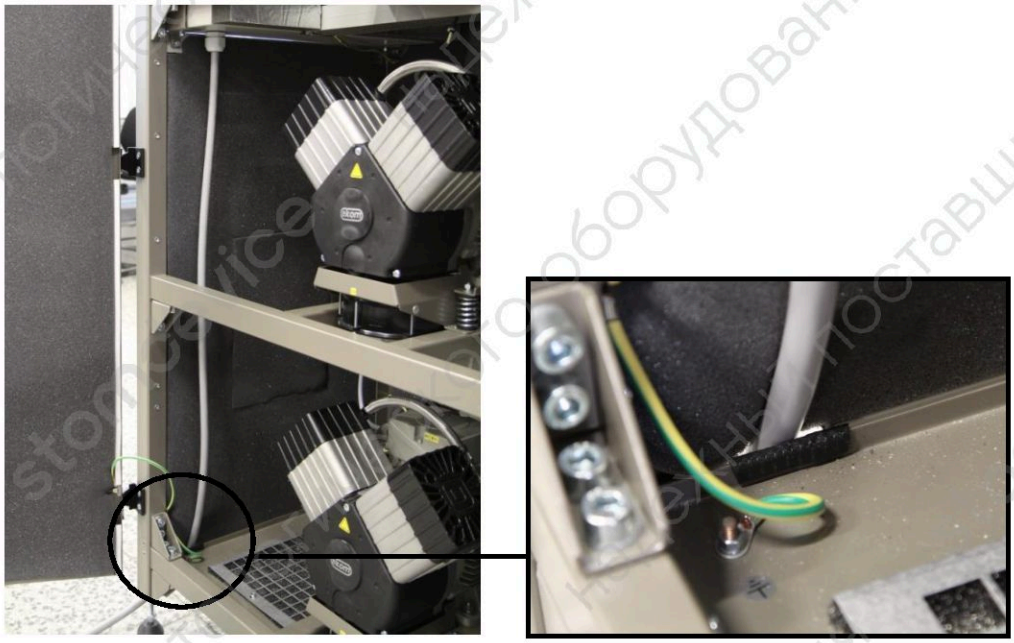



Fig.16



**Description of air pump controls**

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. 17)

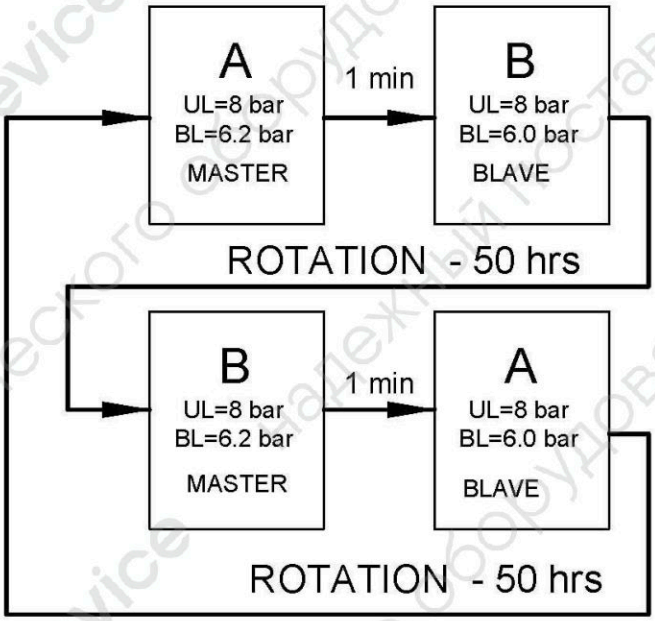
- A waiting period (pressurising to the upper limit) of 1 minute under strong demand and 2 minutes under weak demand
- Pressure drops below 6.2 bar (SLAVE)
- Motor failure in the MASTER section

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



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**Fig. 17: Air pump controls**




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

## 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 comes with pre-set IP addresses: BM=192.168.0.3, TDE=192.168.0.2, subnet =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 or 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 permits compressor operation to be monitored using 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:

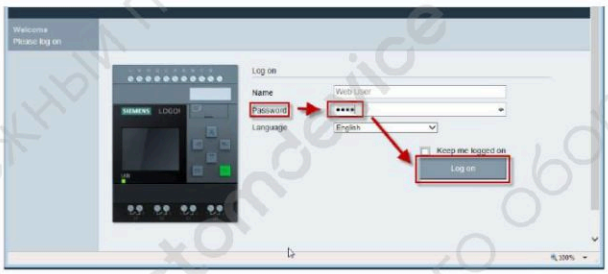
Open the web browser application on a PC, smartphone or tablet and enter the IP address of the controller's base module, in our case: **192.168.0.3.**





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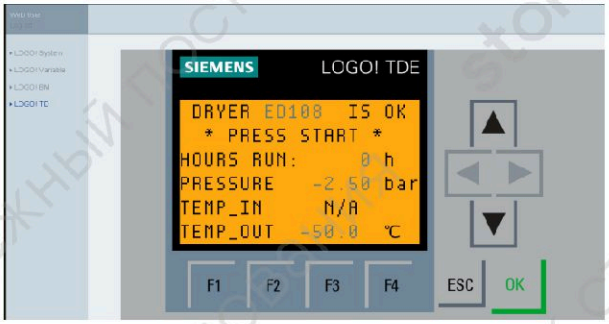
Then enter the password “LOGO” and click on the “Log on” button.



Once logged in, the browser window displays the initial screen with controller system information: module generation, model, firmware (FM), IP address and activity status.




Clicking on the “LOGO! TD” function in the browser shows the current virtual status of the external TDE text display. Display controls using the functional buttons and cursor keys are the same as in the case of the real display.

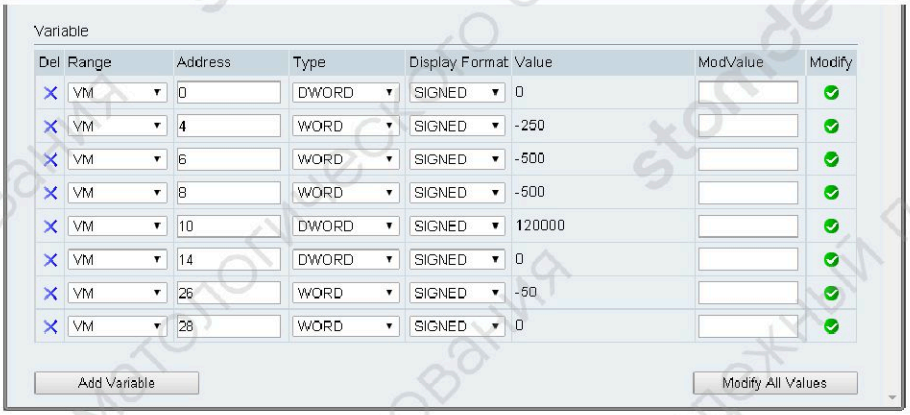



## Monitoring memory variables.

The second option for monitoring compressor parameters using selected memory variables is the “LOGO! Variable” function. Clicking on the “LOGO! Variable” button shows the screen on the display that facilitates the monitoring of selected memory variables based on mapping by the compressor manufacturer using the “Add Variable” button.

Variables assigned based on addresses and models may be viewed in the MAPPING PARAMETERS table (see the Annexes – Page 44).

Using the columns of Range, Address, Type and Display format in order defines the parameters of the specific variable (see the Annex). The value of the variable itself is displayed in the Value column. The resulting table for monitoring may appear as follows:





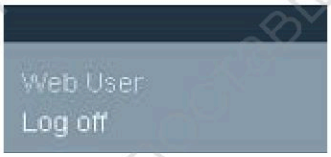
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Note:

1. The values of time-based variables are displayed in minutes. For instance, 12.000 minutes is displayed in address ten, which corresponds to 2.000 hours.
2. The values of analogue parameters (pressures and temperatures) are displayed without decimal points

Logging out of the web server

Click on the button in the upper left corner.




## OPERATION



**Disconnect the compressor from the mains in an emergency (turn off the main switch).**



**The compressor has hot surfaces. Burns may result if contact is made.**



**During prolonged operation of the compressor, the temperature inside enclosed models may exceed 40°C. At this point the enclosure cooling fan and compressor fan turn on automatically. The fan switches off once the space is cooled to below ~32°C.**



**Automatic start. The compressor automatically switches on when pressure in the air tank drops to the pressure switch's low-pressure limit. The compressor automatically switches off after reaching the pressure switch's high-pressure limit.**

## 15. COMMISSIONING

Check that all stabilizers used during transport were removed.
Check that all compressed air hose connections are secure.
Check to ensure the power cord is properly connected to the mains

Check to ensure the outlet value is in the OFF position.

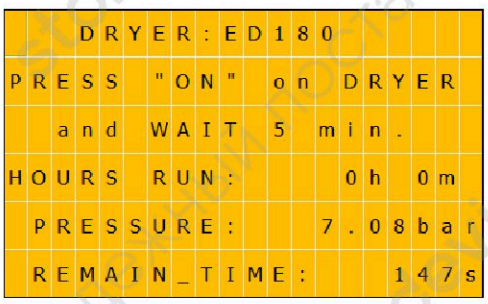
## 16. SWITCHING THE COMPRESSOR ON

(Fig. 1 - 3)

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

  DRYER: dryer model – ED108
  HOURS RUN: number of operating hours
  PRESSURE: current pressure

REMAIN. TIME: time remaining until compressor starts (300 s).






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Dryer – ED108

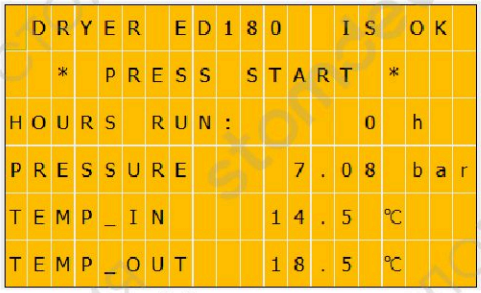
- Press and hold the ON/OFF button on the dryer panel for 1 second. The dryer motors then gradually start.
- The dryer may be shut off by pressing and holding the ON/OFF button again for 1 second. The dryer motors then switch off to ensure the space inside the dryer itself cools down and the internal pressure balances.

The dryer begins cooling the heat exchanger down.

Wait for 5 minutes, this time is shown on the display (16). Once the period is over, the display indicates that the compressor start-up process may begin.

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

The display shows:




PRESSURE: current pressure
TEMP_IN: internal temperature (only for enclosed compressors)

Note: The TEMP_IN parameter displays N/A in the case of the unenclosed models
TEMP_OUT: compressor ambient temperature

The first aggregate automatically turns on and the other aggregates then sequentially turn on. The pressure sensor monitors the pressure in the air tank.
The aggregates operate in automatic mode and are switched on and off (see the Technical Data chapter and the working pressure section) by the controller based on compressed air demand. The compressors shut down individually once the switching pressures are reached.
The motors may be shut down by pressing the STOP button (18), after which the display returns to the start screen.

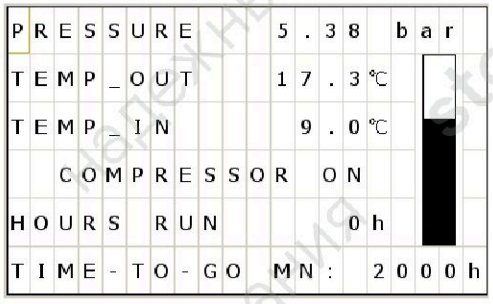
**Note:**
The START button is preset to "RETENTIVITY=ON", which means that if the compressor has been activated once using the START button, the system remembers this action and there is no need to press the START button to start up the compressor in the event of a power loss or if the compressor has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

**NORMAL OPERATIONS**

The aggregates operate in automatic mode and are switched on and off based on compressed air demand. The compressors are automatically switched on when the pressure drops in the air tank to the switching pressure. This ensures the pressure set-point in the air tank is maintained as quickly as possible.

The display has two screens during normal operations:

- Motors are on



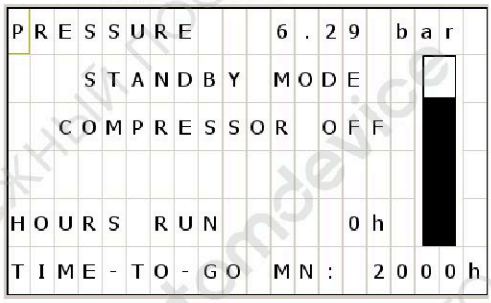

PRESSURE - current operating pressure
TEMP_OUT - equipment ambient temperature
TEMP_ IN - temperature inside an enclosed compressor

- Text "N/A" - only displayed for the compressor models with no enclosure)

COMPRESSOR ON – all aggregates are switched on
HOURS RUN - operating hours
TIME-TO-GO MN - time remaining until next service / maintenance (in hours).


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- Motors are off




PRESSURE - current operating pressure
STANDBY MODE – all aggregates are switched off
HOURS RUN - operating hours
TIME-TO-GO MN - time remaining until next service / maintenance (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 air pumps then gradually turn off at the switching pressure.

Complete a record for the installation of the compressor assembly and commissioning (see the NP - Annex chapter – Page 46).

**SHUTTING DOWN THE COMPRESSORS**

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

### 16.1. Controller – operation – alarms

The controller controls the aggregates, monitors their operation, parameters and malfunctions, generates alarms and indicates required maintenance intervals.

The controller monitors the inside and outside ambient temperature for the compressor, operating pressure and operating hours.

The monitored values of these parameters, alarms and maintenance intervals are shown on the display. An alarm is generated if the temperature limits exceed the critical levels.

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




**F1** - When an alarm is displayed this button switches to normal operating mode for 60 seconds. Screen back lighting.

**F2** - information on operating hours and maintenance intervals

**F3** - statistics on the number of motor circuit breaker trips caused by motor currents in excess of the motor circuit breaker rating

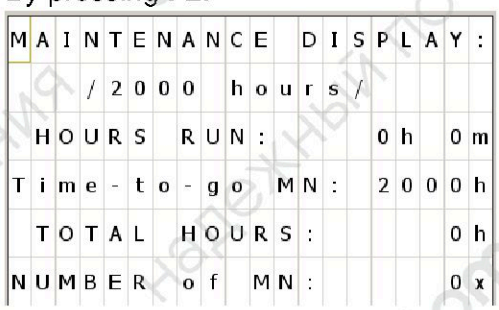
**F4** - SERVICE TECHNICIAN BUTTON (hold for 5 seconds once maintenance or service work is complete to reset the 2000-hour maintenance interval)

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

#### 16.1.1. Equipment operation

When the equipment is running, the display is in normal mode and the functional and control buttons can be used to display the following information:

By pressing **F2**:

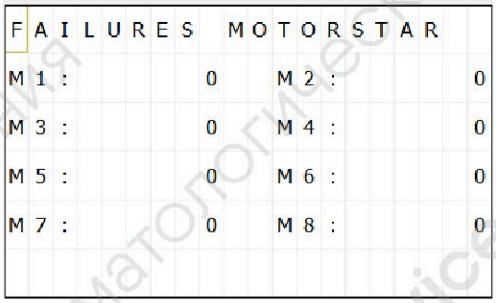




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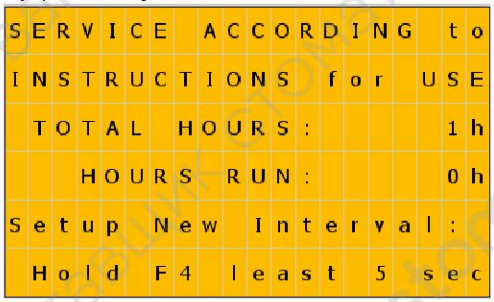
HOURS METER - aggregate operating hours
TIME-TO-GO MN - time remaining until next maintenance/service
TOTAL HOURS: - total operating hours of the compressor
NUMBER of MN – number of maintenance/service intervals, confirmed by pressing F4
The screen automatically returns to the home screen after 10 seconds.

By 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 breaker must be manually activated to the "ON" position once the fault is resolved

The screen automatically returns to the home screen after 10 seconds.
By pressing **F4**:




The F4 button is only active if the screen indicates maintenance is needed after 2,000 hours (see service maintenance alarms). Press and hold F4 for at least 5 seconds to reset this interval. The screen switches back to normal operating mode once the new maintenance interval is set.

Note: Only service personnel may reset the service interval using the F4 button.

### 16.1.2. Alarms

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

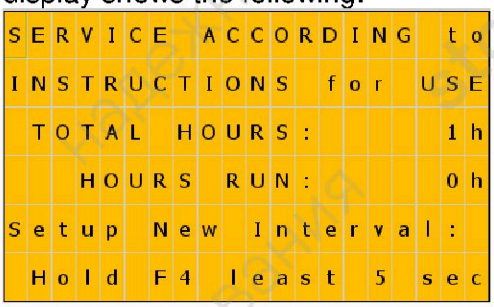
**Alarm conditions have higher priority than maintenance / service interval signals.**

The maintenance / service/ interval is counted from the first time the equipment is turned on. All alarms are accompanied by a flashing red P2 indicator (Alarm).

**Low priority alarm conditions**

- Expiration of defined maintenance / service interval.

This alarm is activated after the 2000-hour maintenance / service interval is reached. The display shows the following:




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

Note: Press "F1" to switch the screen back to normal operating mode 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 may reset to a new service interval


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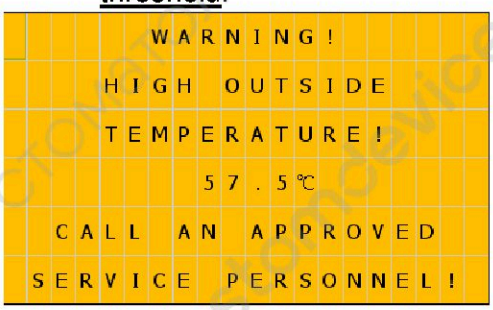
Confirm the completion of maintenance / service by pressing F4 and holding for at least 5 seconds.
The screen then changes back to normal operating mode

At this moment, the controller is set to monitor the next service interval.



All maintenance / service work shall be recorded in the compressor service log.

- Ambient temperature around compressor module exceeds the limit threshold.



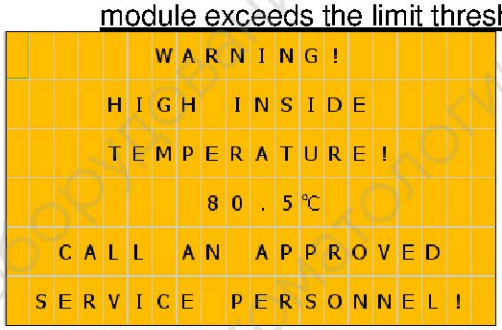

WARNING - high ambient temperature alarm.
The display flashes orange.
This alarm is displayed when the ambient temperature exceeds 40°C for at least 30 seconds. The aggregates operate normally.

The display otherwise shows the current ambient temperature

The message disappears once the temperature drops below the temperature limit.

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

- Temperature in the compressor module exceeds the limit threshold.




WARNING - alarm for high temperature inside the enclosed compressor. The display flashes orange.
This alarm is displayed when the temperature inside the enclosed compressor exceeds 70°C for at least 30 seconds.; The aggregates operate normally

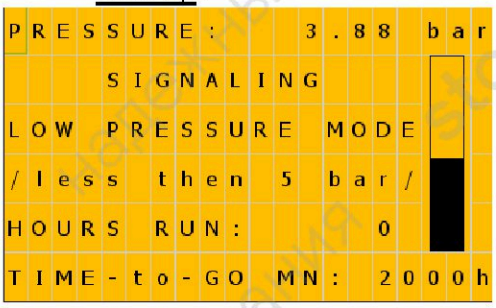
Note: The internal temperature monitoring function is not included on unenclosed compressors.

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

The message disappears once the temperature drops below the temperature limit.

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

- Low pressure alarm at compressor start-up.



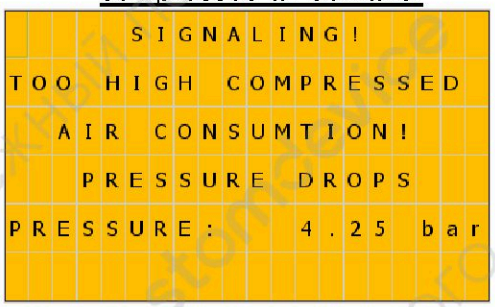

SIGNALING - low pressure alarm at compressor start-up. The display flashes orange
PRESSURE - current pressure in system
HOURS RUN – operating hours
TIME-to-GO MN – time remaining until next maintenance / service interval

The illustration on the display automatically disappears once air pressure is above 5 bar.

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


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- Low pressure alarm at high compressed air demand.

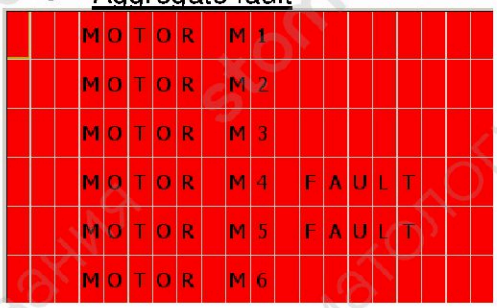



SIGNALING – low pressure alarm at high compressed air demand. The display flashes orange
PRESSURE - current pressure in system

The screen automatically disappears once air pressure rises above 5 bar.
The compressor **supplies** air to the compressed air system as needed and without restriction.

**Medium priority alarm conditions**

- Aggregate fault

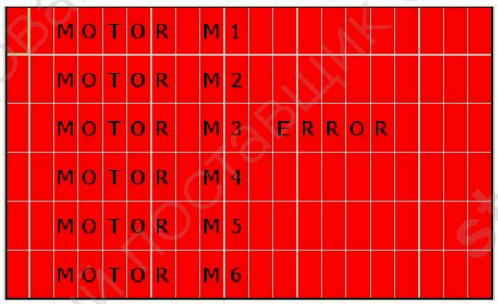



The message on the display (FAULT) and indicator P2-ALARM (17) flashing, indicates that the aggregate is not running (a motor circuit breaker (Q1 - Q6) is tripped due to current overload).
The display flashes red. Other aggregates operate normally.

The screen disappears once the fault is resolved and the motor circuit breaker is manually activated to the “ON” position and the screen for normal operating mode appears.

The compressor **supplies** compressed air to the central distribution system but only using the functional aggregates.

- Motor winding temperature fault.



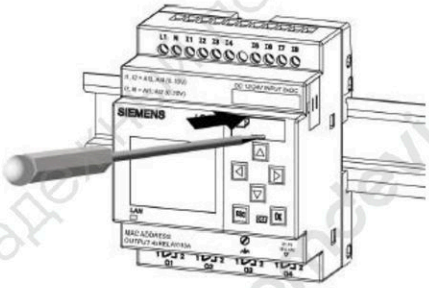

The message on the display (ERROR) and indicator P2-ALARM (17) flashing, indicate motor is faulty (unbuttoned thermal switch / B11 - B16 / winding of the motor (M1-M6). An aggregate fault may be mechanical or electrical.
Once the fault is resolved (i.e. it cools down, is repaired or replaced; the thermostat is activated), the P2 indicator is off and the display no longer indicates an alarm.
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 SIGNALS.**

**DATA ACQUISITION**

Data is recorded on a micro SD card in a slot in the base module. (See the illustration). The figure shows the location of the micro SD card onto which alarms and operating events are logged. Information is saved in .CSV format files. The system records data sequentially into 50 files, with each file containing up to 20.000 lines.
Copying data from the SD card is conducted by manually removing the card and manually reading it using Excel on a PC or remotely over an Ethernet network.





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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. 1) or the drain valve.

# MAINTENANCE

## 18. EQUIPMENT MAINTENANCE

***Warning!***
**The operator shall ensure completion of repeated testing of the equipment at least once every 24 months (EN 62353) or at intervals defined by applicable national legal regulations. A record of these test results shall be completed (e.g. per EN 62353, Annex G) together with the measurement methods.**

The equipment has been constructed and produced to keep maintenance to a minimum. The following work shall be completed to ensure the full and reliable operation of the compressor.

**Before starting compressor maintenance work, check to ensure the compressor is disconnected from the appliance to ensure the person using the appliance is not at risk and there is no risk of any other material damages!**

**Aggregate components (head, cylinder and pressure hose) are very hot when the compressor is running and just after it shuts down – do not touch these components!**

**Repair works beyond normal maintenance can be performed only by qualified personnel or he manufacturer's customer service.**
**Use only spareparts and accessories approved by the manufacturer.**

**PROTECT EYESIGHT, WEAR GOGGLES, WHEN VENTING COMPRESSED AIR FROM THE COMPRESSED AIR CIRCUIT (AIR TANK).**

Only trained professionals may perform this work as follows:

**BEFORE BEGINNING ANY OF THE FOLLOWING MAINTENANCE WORK, SWITCH OFF THE MAIN SWITCH ON THE SIDE OF THE SWITCHBOARD TO POSITION "0".**

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

**Reconnect the grounding lead if removed during service work to its previous location once the work is complete.**


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## 18.1. Maintenance intervals

***Warning!***

**The operator shall ensure completion of repeated testing of the equipment at least once every 24 months (EN 62353) or at intervals defined by applicable national legal regulations. A record of these test results shall be completed (e.g. per EN 62353, Annex G) together with the measurement methods.**

Tab.3

| Time interval | Activity tag | once a day | once a week | once a year | once every 2 years | 2000 | 4000 | 6000 | 8000 | 10000 | 12000 | 16000 | Chapter | Set of spare parts | Performed by |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product function check | A | x | | | | | | | | | | | 18.2 | | user |
| Cleaning the compressor intake filters (*) | B | | x | | | | | | | | | | 18.8 | | user |
| Cleaning the dryer filter screen, Check the condensate drain, Check the temperature on the display | C | | x | | | | | | | | | | See the dryer manual on the CD | | user |
| Clean the dryer condenser, check dryer operation | D | | | | | x | x | x | x | x | x | | See the dryer manual on the CD | | user |
| Check compressor fan operation | E | | x | | | | | | | | | | Visual check of rotation during aggregate operation | | user |
| Replace float in separator | F | | | | | | x | | x | | x | | 18. 7. | 025200146-000 | qualified professional |
| Cleaning the compressor intake filters (*) | G | | | | | x | x | x | x | x | x | | 18.8 | | qualified professional |
| Compressor intake filter replacement (*) | H | | | | | x | x | x | x | x | x | | 18.8 | 604031770-000 | qualified professional |
| Equipment inspection | I | | | | | x | x | x | x | x | x | | 18.3 | | qualified professional |
| Cleaning the dryer filter screen, Check the condensate drain, Check the temperature on the display | J | | | | | x | x | x | x | x | x | | See the dryer manual on the CD | | qualified professional |



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| Time interval | Activity tag | once a day | once a week | once a year | once every 2 years | 2000 | 4000 | 6000 | 8000 | 10000 | 12000 | 16000 | Chapter | Set of spare parts | Performed by |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Check compressor fan operation | K | | | | | x | x | x | x | x | x | | Visual check of rotation during aggregate operation | | qualified professional |
| Replacement of compressor fans (6-8bar) | L | | | | | | | | | | x | | | 035300016-000 | |
| Replacement of compressor fans (8-10bar) | | | | | | | | | | x | | | | 035300016-000 | |
| Check electrical connections | M | | | | | x | x | x | x | x | x | | 18. 4. | - | qualified professional |
| Check operation of check valves | N | | | | | | x | | x | | x | | See the service manual | | qualified professional |
| Check pressure sensor operation | O | | | | | x | x | x | x | x | x | | See the service manual | | qualified professional |
| Check pressure relief valve | P | | | | | x | x | x | x | x | x | | Fig. 23 | | qualified professional |
| Check temperature sensor switching function | R | | | | | x | x | x | x | x | x | | See the service manual | | qualified professional |
| Replacement of piston group with bearing (6-8bar) | S | | | | | | | | x | | | | | 604031764-000 (**) 604031765-000 (***) | qualified professional |
| Replacement of piston group with bearing (8-10bar) | | | | | | | | x | | | x | | | 604031764-000 (**) 604031765-000 (***) | qualified professional |
| Check safety valve operation | T | | | x | | | x | | x | | x | | 18.6. | | qualified professional |



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| Time interval | Activity tag | once a day | once a week | once a year | once every 2 years | 2000 | 4000 | 6000 | 8000 | 10000 | 12000 | 16000 | Chapter | Set of spare parts | Performed by |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Check solenoid valve operation | U | | | | | | x | | x | | x | | See the service manual | | qualified professional |
| Compressor intake filter replacement | V | | | | | x | x | x | x | x | x | | 18.5 | 604031761-000 (**) 604031762-000 (***) | qualified professional |
| Compressor performance check | X | | | | | x | x | x | x | x | x | | 18.9 | | qualified professional |
| Conduct a "repeated test" pursuant to EN 62353 | Y | | | | x | | | | | | | | 18.1 | | qualified professional |
| Check pneumatic connections for leaks | Z | | | | | x | x | x | x | x | x | | 18.3 | - | qualified professional |

(*) enclosed compressor
(**) applies to DK50 6x4VRT/M
(***) applies to DK50 4x4VRT/M



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### 18.2. Functional check

- Check aggregate operation – the aggregates should be operating normally without excessive vibration or noise. Troubleshoot any problem or call in service personnel if trouble is detected.
- Check fan operation (visually) – the fans must be running by activity of aggregates. 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. Leak check compressed air connections and inspect the equipment

**Leak check:**

- Leak check the compressed air lines when the compressor is running and under pressure.
- Use a leak detector or soapy water to check all connections for leaks. If a leak is identified, tighten or reseal the connection.

**Equipment inspection – Fig.1**

- Check the condition of the compressor aggregate for normal operation and noise levels.
- Check the operation of fans - the fans must be running during the defined compressor work cycles
- Check filter condition – clean dirty filters or replace with new filters.
- Call in service personnel if malfunction is suspected.

### 18.4. Inspection of electrical connections:

**Check all electrical connections on the equipment with the mains disconnected!**

**Inspection**

- 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 screw terminals on all conductors are tight (motor circuit breakers Q1 to Q6, mains circuit breakers F1 to F3, contactors Q11 to Q16 and Q20 to Q21, etc.) Tighten all loose conductors 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 conductor in the electrical box, 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) (on the pressure vessel)

### 18.5. Aggregate intake filter replacement

(Fig. 18)

**The filters installed in the compressor aggregate crankcases must be replaced during regular operation of the compressor.**

Inlet filter replacement:

- Pull out the rubber plug by hand (2).
- Remove the used 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 filter and re-insert.



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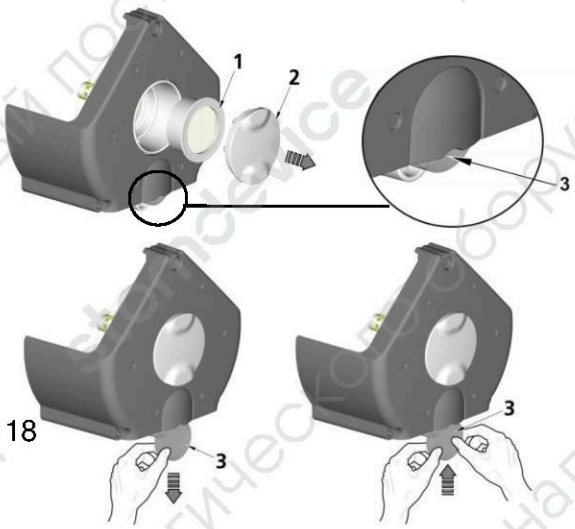



Fig. 18

### 18.6. Check safety valve operation

(Fig. 19)

**The safety valve must never be used for depressurizing the air tank. It could damage the safety valve. The valve is set to the maximum permitted pressure by the manufacturer. Adjustments are not permitted!**

**Warning! Compressed air can be dangerous. Wear eye protection (safety glasses) when venting any air.**

- Rotate the safety valve screw a few turns to the left until air vents out of the safety valve.
- Let the safety valve vent for only a few seconds.
- Rotate the screw back to the right (clockwise) down to the stop; the valve must now be closed.

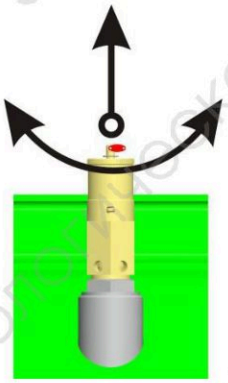


Fig. 19

### 18.7. Float replacement

**BEFORE PROCEEDING, VENT THE AIR TANK TO ZERO PRESSURE AND DISCONNECT THE EQUIPMENT FROM THE ELECTRICAL MAINS.**

(Fig. 20)
Replace the float in the water separator at the defined interval

A) Check to ensure that all pressure has been vented from the segment with the water separator.
B) Remove the separator tank.
C) Remove the condensate separator.
D) Release the float nut on the bottom of the tank.
E) Remove the worn separator float and replace with a new part.
F) Secure the float with a nut on the bottom of the tank.
G) Re-insert the condensate separator as illustrated.
H) Replace the separator tank and thread in place.
I) The tank is secure when the symbols align.



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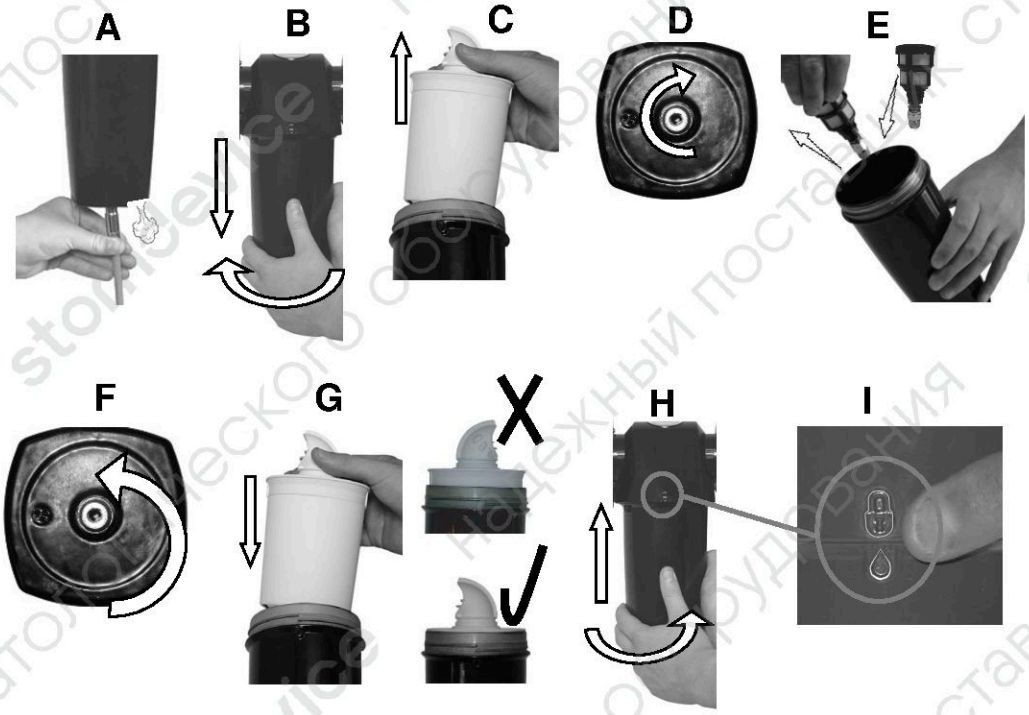



Fig.20

### 18.8. Cleaning/replacing the compressor's intake filters (*)

(Fig.21, Fig. 22)

(*) - only applicable to enclosed products.
Clean or replace the inlet filters at defined intervals (Table 3) using the following procedure:

- 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 filter if heavily contaminated in a solution of soapy water and allow to dry completely.
- Reinstall the filters once dry (reverse the procedure to reassemble).
- In Point A, remove the foam, remove the 4 screws (5), washers (6) and remove the suction filter cover (7). – (Fig. 22)
- Remove the 2 nuts (8) on the filter bracket (9) and remove the filter (10).
- In 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 filter, if heavily contaminated, in a solution of soapy water and allow to dry completely.
- Reinstall the filters once dry (reverse the procedure to reassemble).

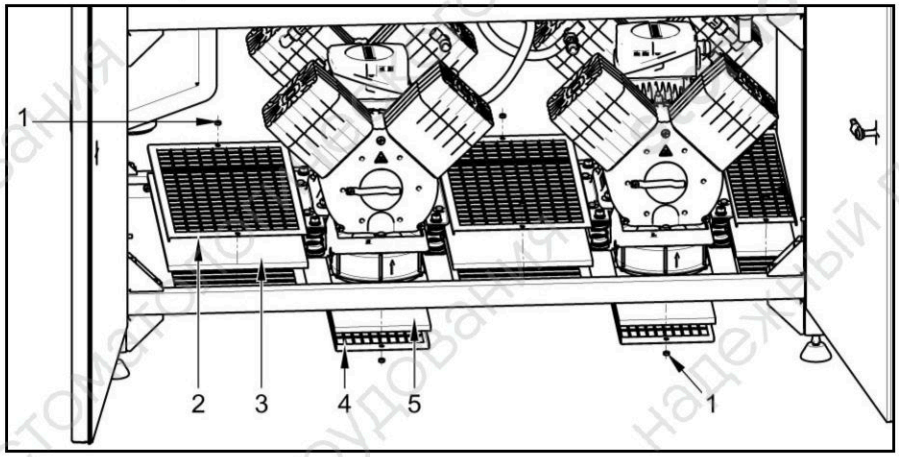



Fig.21



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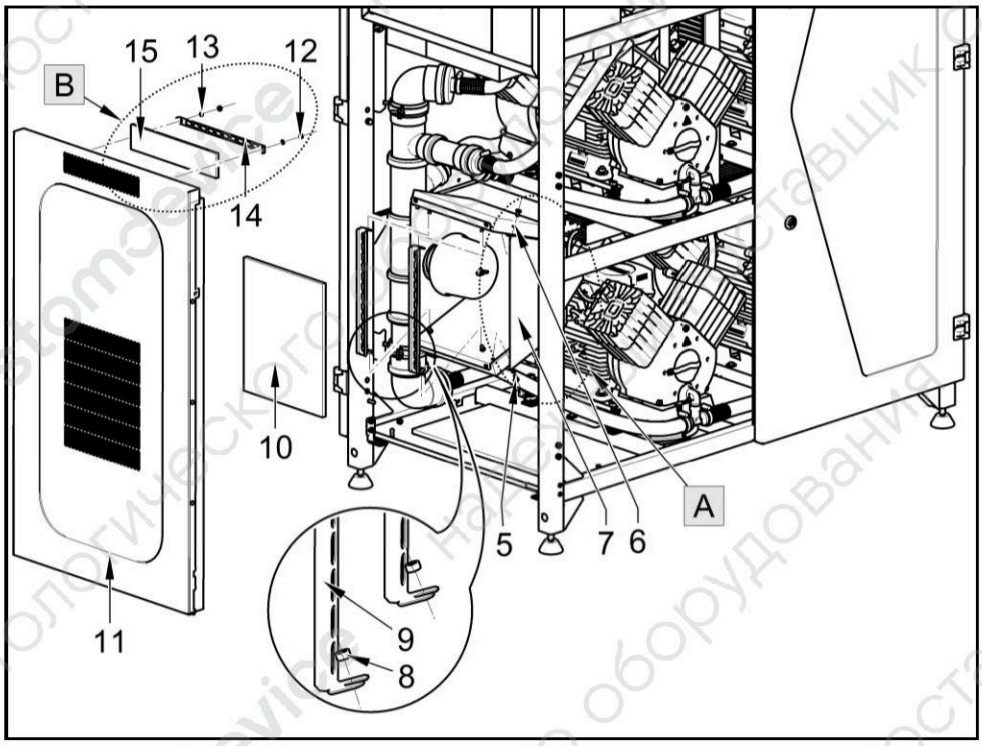



Fig. 22

### 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 operation of check valves

**Compressed air circuit:**
Check for proper operation of the check valves (3) in the pneumatic circuit by disconnecting the pressure hoses from the air pumps.

⚠ **One air pump must be operating, shut off the remaining air pumps at the current protection device in the switchboard. No air may leak through the check valves.**

**Air tank:**

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

⚠ **Inspect the check valve once the air tank is pressurised and the compressor is off. No air may leak.**

### 18.11. Check operation of solenoid valve

(Fig. 23)
Valve functionality is checked using the "Magnetic indicator" as follows: place it on the valve coil and if the motors are active, the indicator must turn, if not, the indicator does not turn.




Fig. 23


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## TROUBLESHOOTING

## 19. TROUBLESHOOTING COMMON PROBLEMS

**Caution! Disconnect the equipment from the mains before starting work!**

Troubleshooting may only be performed by trained service professionals!

**Adjusting the pressure setting of the safety valve is expressly prohibited!**

**Pressure relief valve (PRV)**

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 then closes as the pressure drops.

**Increased pressure in the compressed air system may only occur as a result of an increase in flow resistance in compressed air lines or a dryer malfunction (e.g. failed solenoid valve) and therefore dryer operation must be inspected and all repairs conducted as needed if the pressure relief valve opens repeatedly!**

**Any arbitrary adjustment of the pressure relief valve is prohibited. Please consult with the manufacturer!**
**The outlet opening on the pressure relief valve must be open at all times and compressed air outlets must not be blocked.**

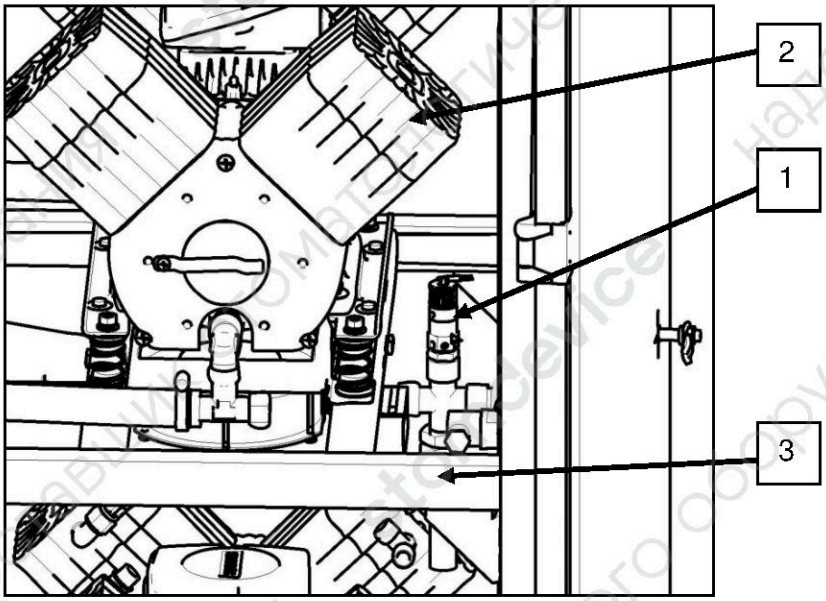



Fig. 24

1. Pressure relief valve
2. Compressor aggregate
3. Aggregate frame



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Tab.4

| FAILURE | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| None of the compressor aggregates starts | Problem with electrical power source | Main breaker is off |
| | Loss of power | Check mains voltage |
| | | Loose terminal in the electrical box - tighten |
| | | Check the main power connection - replace if damaged |
| | Failed pressure switch | Inspect the terminals and operation of the pressure switch - replace if damaged |
| Some compressor aggregates do not start (indicators are on) | Loss of power to motor | Check mains voltage |
| | | Check function of contactor and thermal relay - replace if damaged |
| | | Loose terminal on motor terminal strip - tighten terminals, replace damaged or broken terminals |
| | Motor winding shorted, damaged /open thermal protection/ high ambient temperature | Replace the motor / decrease the ambient temperature |
| | Worn piston or other moving component (mechanical damage to moving components) | Replace damaged parts |
| | Controller malfunction | Check the functionality of the controller and software – replace if damaged or reload the program |
| RUN / STOP indicator does not light up green | Open connection between controller and expansion module | Check the connection and replace if damaged |
| | Loss of power | Check mains voltage |
| | | Loose terminal in the electrical box - tighten |
| | | Check the main power connection - replace if damaged |
| | Problem with electrical power source | Main breaker is off |
| | Controller or expansion module malfunction | Replace the malfunctioning controller or module |
| Compressor aggregates switch frequently, even with no compressed air demand | Air leak in compressed air distribution system | Check compressed air distribution system – tighten the leaking connection |
| | Check valve leaking | Test check valves and clean – replace if damaged |
| | Solenoid valves leaking after regeneration | Clean the check valve – replace if damaged |
| | Leak at pressure sensor and safety valve | Check functionality and clean – replace if damaged |
| Functionality of certain compressor aggregates is reduced, run cycles are extended | Leak at compressor aggregate | Check the compressor aggregate for leaks – tighten the leaking connection |
| | Worn piston rings | Replace worn piston |
| | Gasket between cylinder head and valve plate damaged | Replace the gasket, tighten |
| | Intake filter is plugged | Replace old filter with a new filter |
| Certain compressor aggregates are noisy (knocking or metal-on-metal sounds) | Damaged motor bearing | Replace damaged bearing |
| | Damaged piston bearing, piston rod | Replace the damaged piston |
| | Failed (cracked) rubber mount spring | Replace damaged spring with new spring |
| High ambient air temperature when | Insufficient ventilation in compressor space | Secure suitable conditions |



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| | | |
|---|---|---|
| compressors on top of one another switch on (overheating) | Compressor aggregate, cooler and enclosure cooling fans do not operate | Replace the defective fan(s) |
| | | Defective temperature switch – replace |
| | ED108 dryer | See the dryer manual on the CD |
| High compressed air dew point | Condensation dryer off | Turn on the dryer,<br>drain condensate found in the air tank |
| | Dryer malfunction | Call in professional service |

Once a fault is cleared and after reassembling the dryer, all condensate trapped in the air tank must be drained off, the air tank must be dried and the dryer must be regenerated, best when using continuous compressor operation at a pressure of around 0.7 bar for a period of at least 1 hour; then check the dryness of the compressed air.

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. REPAIR SERVICE INFORMATION

The manufacturer or an authorised supplier provides warranty and non-warranty repairs.

Troubleshooting may only be performed by trained service professionals!



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## ANNEX

### 21. MAPPING PARAMETERS

**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 | Vanek Milan Ing. | EKOM spol. s. o. | Project: | STANDARD | Customer: | Absolute Air Gas, UK |
| Checked: | | | Installation: | DK50 6x4VRTSM (NDM090) | Diagram No.: | 4ZA-402 |
| Date: | 4/3/17 8:08 AM/5/5/17 1:14 PM | | File: | 6X4VRTM_BOTH_V4.00.lld | Page: | 1/2 |



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**Parameter VM Mapping**

| ID | Block | Parameter | Type | Address |
|---|---|---|---|---|
| 18 | C042 SWITCH RADIA [Up/Down counter] | Counter | DWord | 66 |
| 19 | C045 SWITCH FAN [Up/Down counter] | Counter | DWord | 70 |
| 20 | C111 MN NDM COUNT [Up/Down counter] | Counter | DWord | 74 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Creator: | Vanek Milan Ing. | EKOM spol. s. o. | Project: | STANDARD | Customer: | Absolute Air Gas, UK |
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## 22. INSTALLATION RECORD

<table>
<tr><td colspan="3">1. Product: (model)<br>DK50 4x4VRT/M DK50 6x4VRT/M<br>DK50 4x4VRTS/M DK50 6x4VRTS/M</td><td colspan="3">2. Serial number:</td></tr>
<tr><td colspan="6">3.1. User's name:</td></tr>
<tr><td colspan="6">3.2. Address of installation:</td></tr>
<tr><td colspan="6">4. Equipment connected to the compressor:</td></tr>
<tr><td colspan="3">5. Installation / Commissioning:</td><td colspan="3">6. Contents of operator training:</td></tr>
<tr><td>A. Product completeness check **</td><td>Y<br>N</td><td></td><td>A. Description of the product and functions**</td><td>Y<br>N</td><td></td></tr>
<tr><td>B. Documentation completeness check **</td><td>Y<br>N</td><td></td><td>B. Product operation: turning on/off, controls, control procedures, data on the display panel, alarms, operation in alarm conditions**</td><td>Y<br>N</td><td></td></tr>
<tr><td>C. Installation/connection to equipment **</td><td>Y<br>N</td><td></td><td>C. Product maintenance: maintenance intervals, maintenance procedure, service intervals, operating activities**</td><td>Y<br>N</td><td></td></tr>
<tr><td>D. Functional test **</td><td>Y<br>N</td><td></td><td>D. Safety measures, warnings – their meaning and compliance **</td><td>Y<br>N</td><td></td></tr>
<tr><td colspan="6">Notes::</td></tr>
<tr><td colspan="6">7. Operator instructed on safety measures, operations and maintenance:</td></tr>
<tr><td colspan="3">Name :</td><td colspan="3">Signature:</td></tr>
<tr><td colspan="3">Name:</td><td colspan="3">Signature:</td></tr>
<tr><td colspan="3">Name :</td><td colspan="3">Signature:</td></tr>
<tr><td colspan="3">8. Installation and instruction performed by – First name/Last name</td><td colspan="3">Signature:</td></tr>
<tr><td colspan="3">Company:<br>Phone:</td><td colspan="3">Address:</td></tr>
<tr><td colspan="3">Email:</td><td colspan="3">Date:</td></tr>
<tr><td colspan="6">9. Distributor:</td></tr>
<tr><td colspan="3">Company:<br>Contact person:</td><td colspan="3">Address:</td></tr>
<tr><td colspan="3">Phone:</td><td colspan="3">Email: :</td></tr>
</table>

** 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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112000285-0001

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