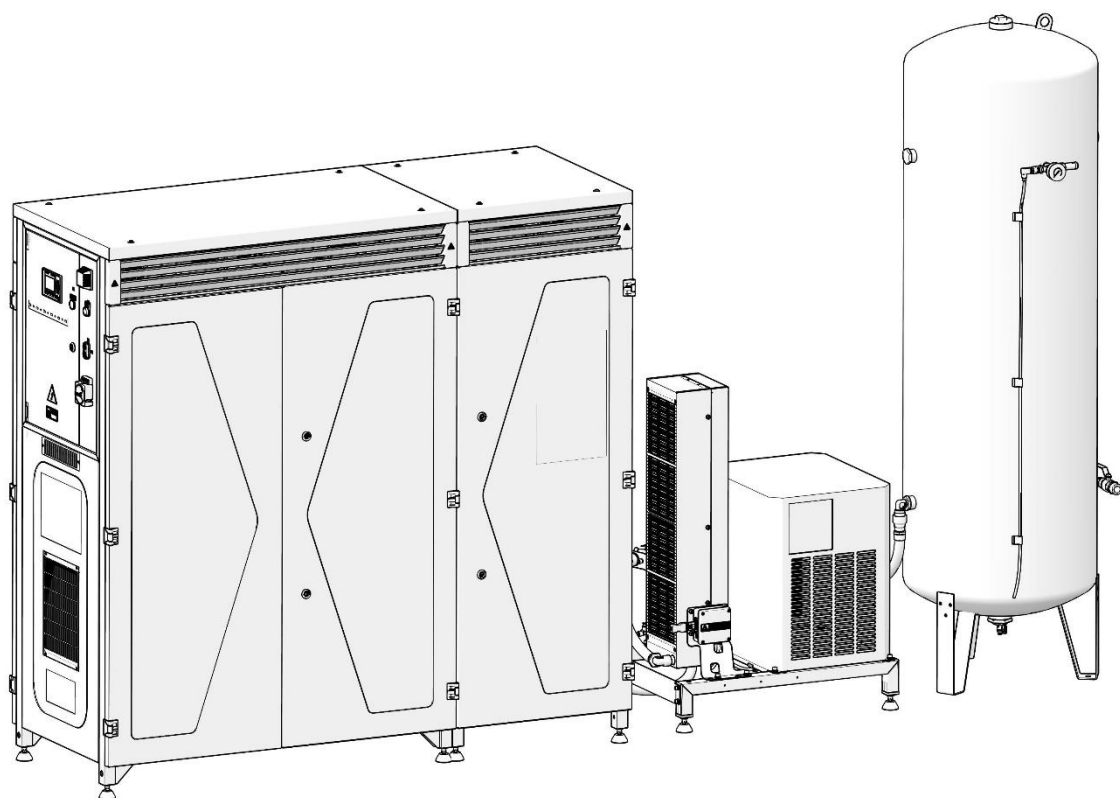




# DK50 9X4VRT/M

EN USER MANUAL



CE



COMPRESSOR

DK50 9x4VRT/M



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## IMPORTANT INFORMATION

### 1. CONFORMITY WITH THE REQUIREMENTS OF EUROPEAN UNION DIRECTIVES

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.**

Any use of the product outside the framework of its intended use is considered improper use. The manufacturer is not liable for any damages or injury resulting from misuse.

### 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



Refer to instruction manual



CE – marking



Medical device



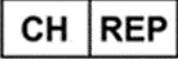
Serial number



Article number



Unique Device Identifier

|                                                                                     |                                             |
|-------------------------------------------------------------------------------------|---------------------------------------------|
|    | Swiss Authorised Representative             |
|    | Swiss Importer                              |
|    | Protecting earthing                         |
|    | Terminal for ground connection              |
|    | Alternating current                         |
|    | 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 condensing-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 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).
- 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.

### 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       | +0°C to +50°C |
| Relative humidity | 90%           |



**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.

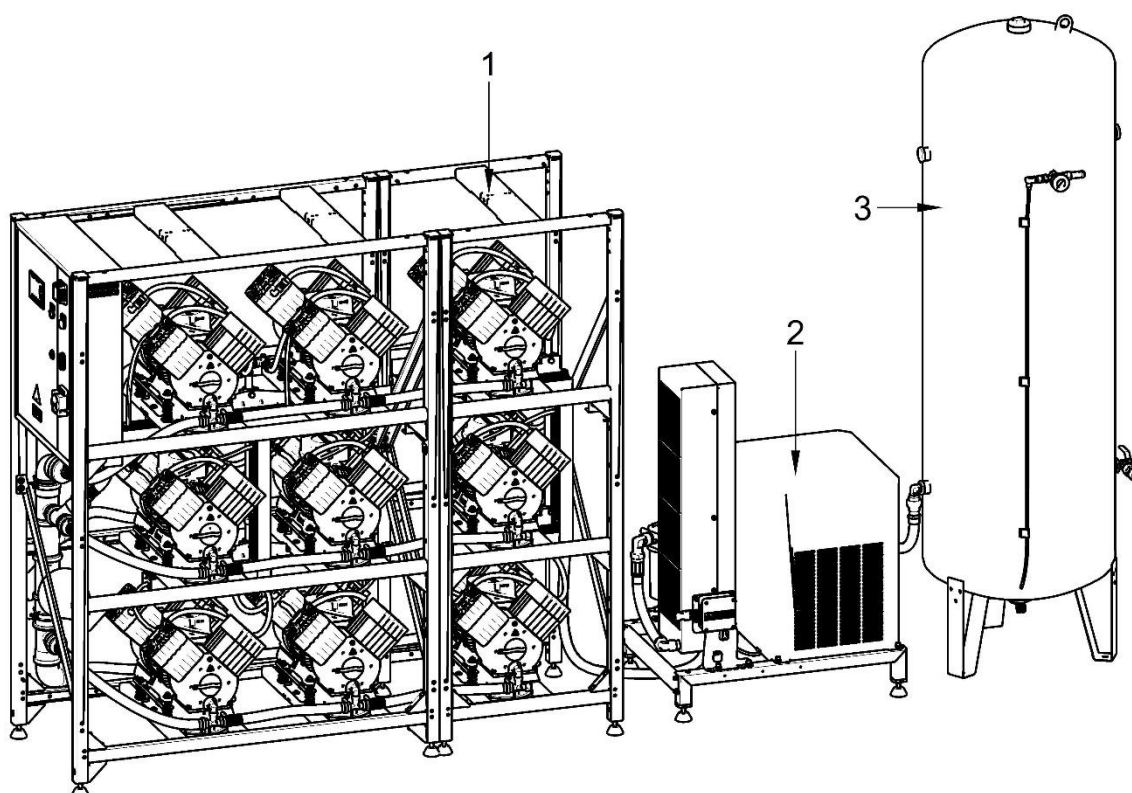


Storing or shipping the equipment in any conditions other than those specified below is prohibited.

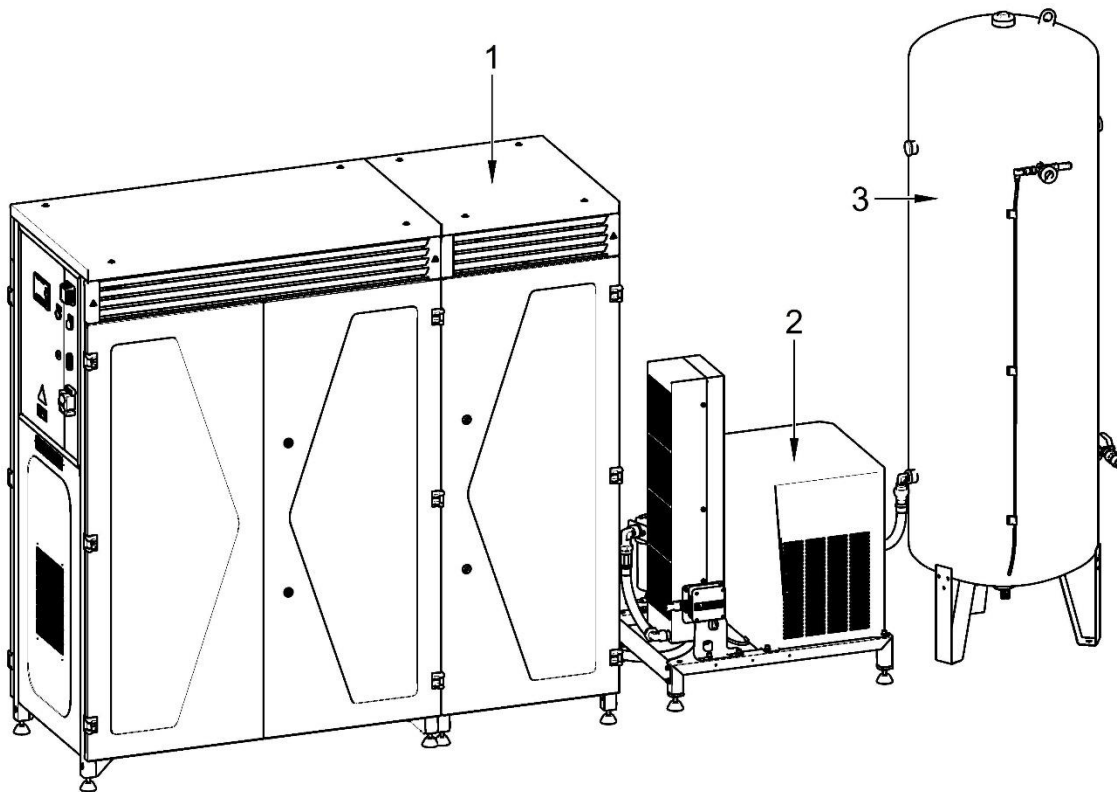
**PRODUCT DESCRIPTION****7. VARIANTS**

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

|                      |                                                                  |
|----------------------|------------------------------------------------------------------|
| <b>DK50 9x4VRT/M</b> | Compressor without enclosure comprised of the following modules: |
| 1                    | a compressor module with 9 compressor aggregates and controls    |
| 2                    | a (condensing) dryer module with connection hoses                |
| 3                    | air tank module                                                  |



|                       |                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------|
| <b>DK50 9x4VRTS/M</b> | Compressor with enclosure comprised of the following modules:                                     |
|                       | 1 a compressor module with 9 compressor aggregates and controls along with a soundproof enclosure |
|                       | 2 a (condensing) dryer module with connection hoses                                               |
|                       | 3 air tank module                                                                                 |



## 8. ACCESSORIES

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

### 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 | Article number |
|-----------------|----------------|
| DK50 9x4VRT/M   | 447000001-067  |
| DK50 9x4VRTS/M  | 447000001-066  |

### 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 <sup>a)</sup> | Article number |
|---------|---------------|--------------------------|-------------------------------|----------------|
| FS 41F  | DK50 9x4VRT/M | 1                        | no                            | 604014119-006  |
| FS 41M  |               | 1+0.1                    |                               | 604014119-010  |
| FS 41S  |               | 1+0.01                   |                               | 604014119-025  |
| FS 41AH |               | 1+C+HC (0.01)            |                               | 604014119-011  |

<sup>a)</sup> 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 9x4VRT/M | 604014125-000  |

### Filter set brackets



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

| Type                       | Use           | Article number |
|----------------------------|---------------|----------------|
| Compressor-mounted bracket | DK50 9x4VRT/M | 603022576-000  |
| Wall-mounted bracket       |               | 603014120-000  |

### 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 | Article number |
|-----------------|---------------------|----------------|
| DK50 9x4VRT/M   | yes                 | 447000001-068  |
| DK50 9x4VRT/M   | no                  | 447000001-069  |

## 9. PRODUCT 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.

**Descriptions for figures 1-2:**

- |                       |                          |
|-----------------------|--------------------------|
| 1. Compressor module  | 11. Compressor aggregate |
| 2. Air tank           | 12. Drain valve          |
| 3. Switchboard        | 13. Connecting hoses     |
| 4. Safety valve       | 14. Electric cables      |
| 5. Pressure sensor    | 15. –                    |
| 6. Pressure gauge     | 16. Display              |
| 7. Outlet valve       | 17. Alarm indicator      |
| 8. Cooler             | 18. Start / stop button  |
| 9. Condensation dryer | 19. Main switch          |
| 10. Water separator   | 20. Temperature sensor   |

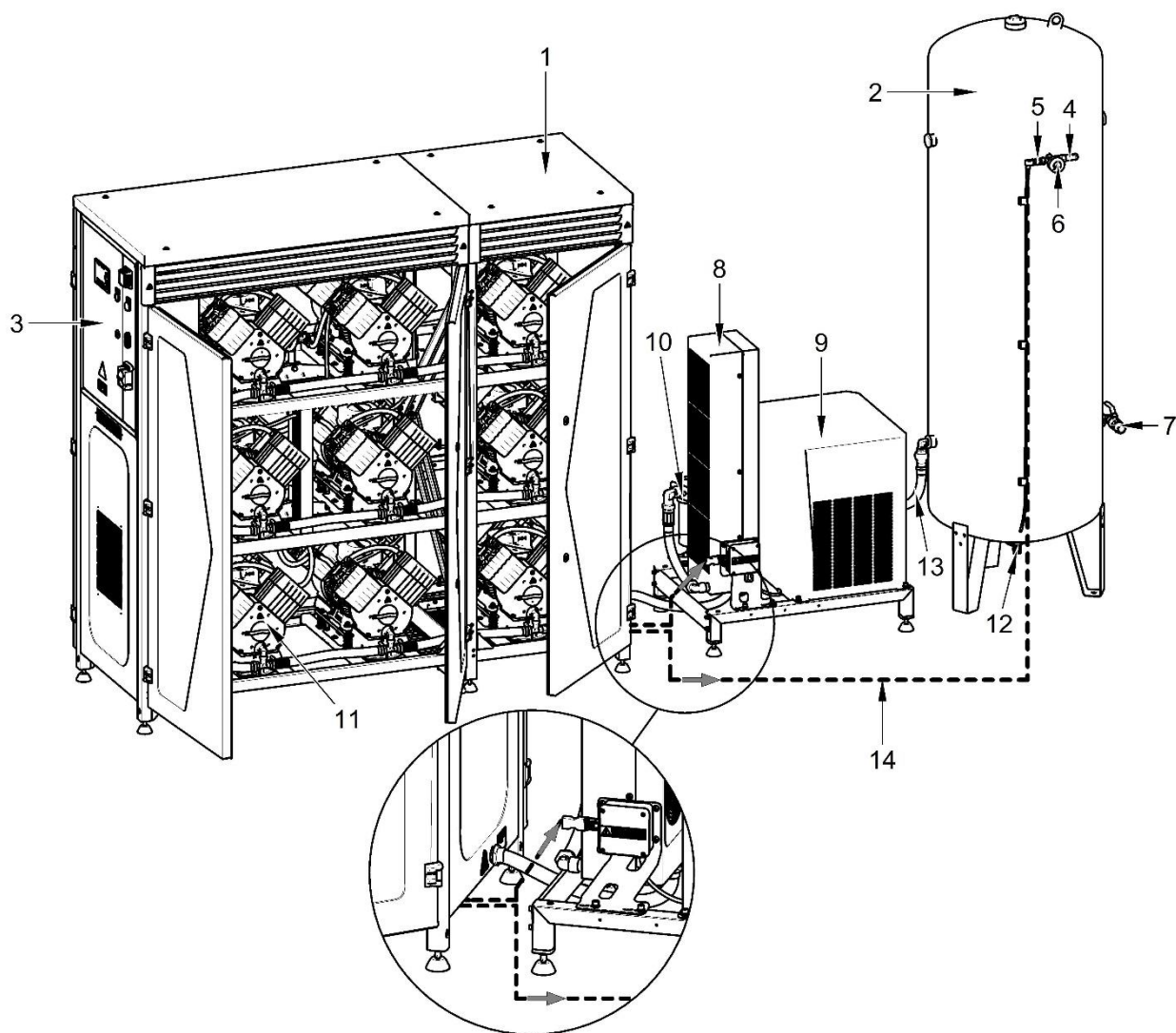
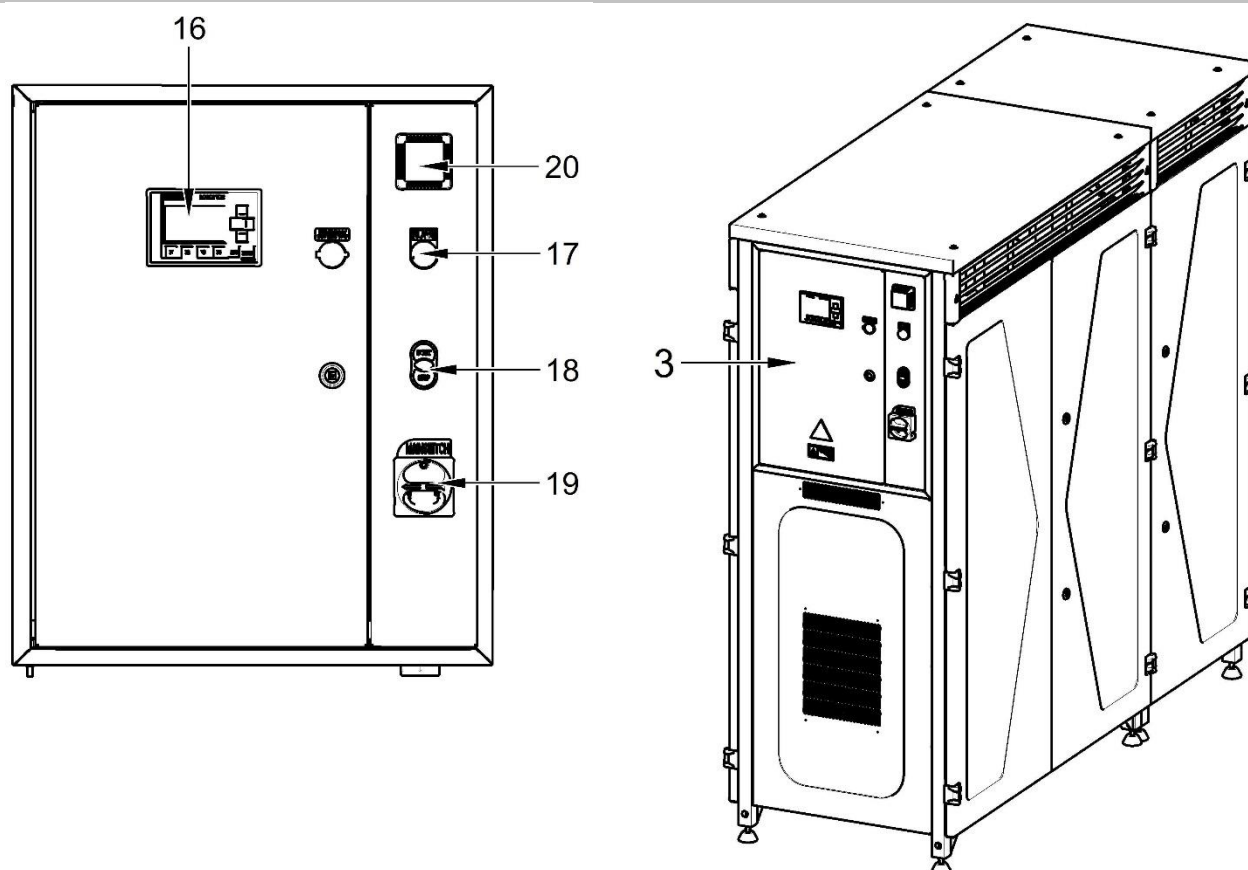
**Fig. 1 - Compressor**

Fig. 2 – Electrical box / switchboard



**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%

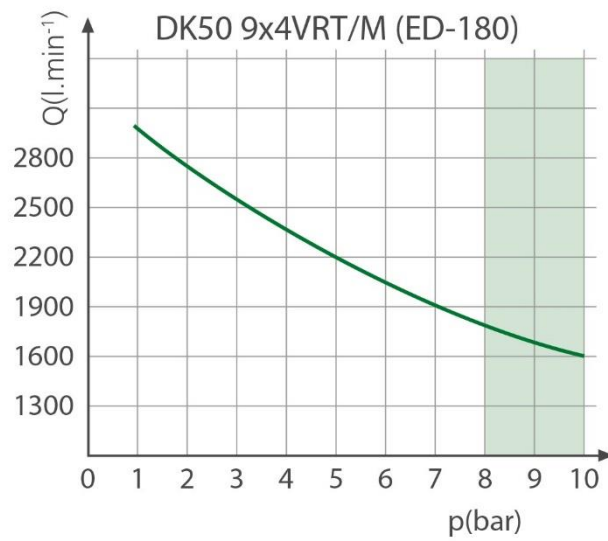
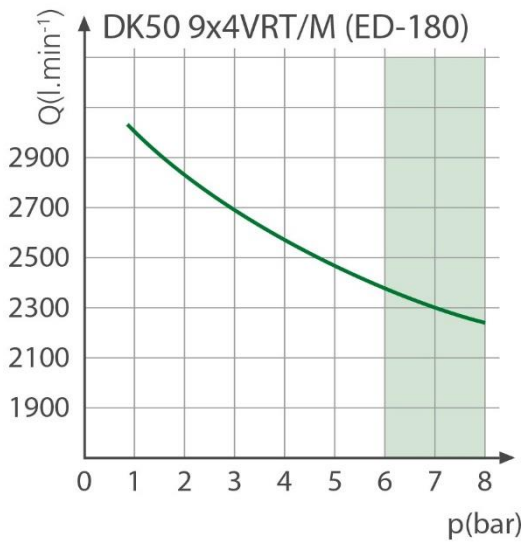
| Working pressure 6 – 8 bar                                             |                   | DK50 9x4VRT/M | DK50 9x4VRTS/M |
|------------------------------------------------------------------------|-------------------|---------------|----------------|
| Rated voltage, Frequency                                               | V, Hz             | 3x400 50      | 3x400, 50      |
| Capacity at 6 bar (FAD)                                                | l/min             | 2380          | 2380           |
| Working pressure                                                       | bar               | 6.0 – 8.0     | 6.0 – 8.0      |
| Rated current                                                          | A                 | 45            | 45             |
| Main circuit breaker                                                   | A                 | 50            | 50             |
| Main feeder gauge                                                      | mm <sup>2</sup>   | 10            | 10             |
| Enclosure                                                              |                   | IP10          | IP30           |
| Air tank volume                                                        | l                 | 500           | 500            |
| Air quality - filtration                                               | µm                | -             | -              |
| Maximum operating pressure of safety valve                             | bar               | 10            | 10             |
| Noise level at 5 bar (L <sub>pA</sub> )                                | dB                | ≤ 85          | ≤ 74           |
| Operating mode                                                         | %                 | S1-100        | S1-100         |
| Dryer performance with condensation dryer (ED180) (PDP <sup>a)</sup> ) | °C                | +3            | +3             |
| Time to fill air tank from 0 to 7 bar                                  | s                 | 50            | 50             |
| Net weight                                                             | kg                | 747           | 817            |
| Weight - compressor module                                             | kg                | 540           | 610            |
| Weight - dryer module                                                  | kg                | 80            | 80             |
| Weight of air tank                                                     | kg                | 127           | 127            |
| Dimensions (net) w x d x h                                             | mm                | 3800x705x2100 | 3800x705x2100  |
| Dimensions - compressor module                                         | mm                | 1840x630x1730 | 1840x630x1730  |
| Dimensions – ED180 dryer module                                        | mm                | 760x580x1050  | 760x580x1050   |
| Air tank dimensions                                                    | mm                | 770x705 x2100 | 770x705 x2100  |
| Recommended cooling air changes in space                               | m <sup>3</sup> /h | 3250          | 3250           |
| Classification under EN 60601-1                                        |                   | Class I.      |                |

<sup>a)</sup> Apply the correction factor for the ED180 dryer

| Working pressure 8 – 10 bar                                            |                   | DK50 9x4VRT/M  | DK50 9x4VRTS/M |
|------------------------------------------------------------------------|-------------------|----------------|----------------|
| Rated voltage, Frequency                                               | V, Hz             | 3x400, 50      | 3x400, 50      |
| Capacity at 8 bar (FAD)                                                | l/min             | 1780           | 1780           |
| Working pressure                                                       | bar               | 8.0 – 10.0     | 8.0 – 10.0     |
| Rated current                                                          | A                 | 47             | 47             |
| Main circuit breaker                                                   | A                 | 50             | 50             |
| Main feeder gauge                                                      | mm <sup>2</sup>   | 10             | 10             |
| Enclosure                                                              |                   | IP10           | IP30           |
| Air tank volume                                                        | l                 | 500            | 500            |
| Air quality - filtration                                               | µm                | -              | -              |
| Maximum operating pressure of safety valve                             | bar               | 11             | 11             |
| Noise level at 5 bar (L <sub>pA</sub> )                                | dB                | ≤ 85           | ≤ 74           |
| Operating mode                                                         | %                 | S1-100         | S1-100         |
| Dryer performance with condensation dryer (ED180) (PDP <sup>a)</sup> ) | °C                | +3             | +3             |
| Time to fill air tank from 0 to 7 bar                                  | s                 | 50             | 50             |
| Net weight                                                             | kg                | 747            | 817            |
| Weight - compressor module                                             | kg                | 540            | 610            |
| Weight - dryer module                                                  | kg                | 80             | 80             |
| Weight of air tank                                                     | kg                | 127            | 127            |
| Dimensions (net)<br>w x d x h                                          | mm                | 3800x705 x2100 | 3800x705 x2100 |
| Dimensions - compressor module                                         | mm                | 1840x630 x1730 | 1840x630 x1730 |
| Dimensions – ED180 dryer module                                        | mm                | 760x580x1050   | 760x580x1050   |
| Air tank dimensions                                                    | mm                | 770x705 x2100  | 770x705 x2100  |
| Recommended cooling air changes in space                               | m <sup>3</sup> /h | 3250           | 3250           |
| Classification under EN 60601-1                                        |                   | Class I.       |                |

<sup>a)</sup> Apply the correction factor for the ED180 dryer

### 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        |

### 9.1. Dryer performance correction

ED180 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.) |

ED180 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:

$$t_{inlet} = t_0 + 19^{\circ}\text{C}$$

It means E.G. at ambient temperature of  $t_0 = 16^{\circ}\text{C}$ ,  $t_{inlet} = 16^{\circ} + 19^{\circ} = 35^{\circ}\text{C} \rightarrow F_{C2} = 1.0$

| 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 |    |      |      |      |  |  |  |
|-------------------------------------------|----|------|------|------|--|--|--|
| $t_0$ (°C)                                | 25 | 30   | 35   | 40   |  |  |  |
| $F_{C4}$                                  | 1  | 0.96 | 0.92 | 0.88 |  |  |  |

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

## 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 warranty card)

## 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.
- 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.



### **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.



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<sup>3</sup>

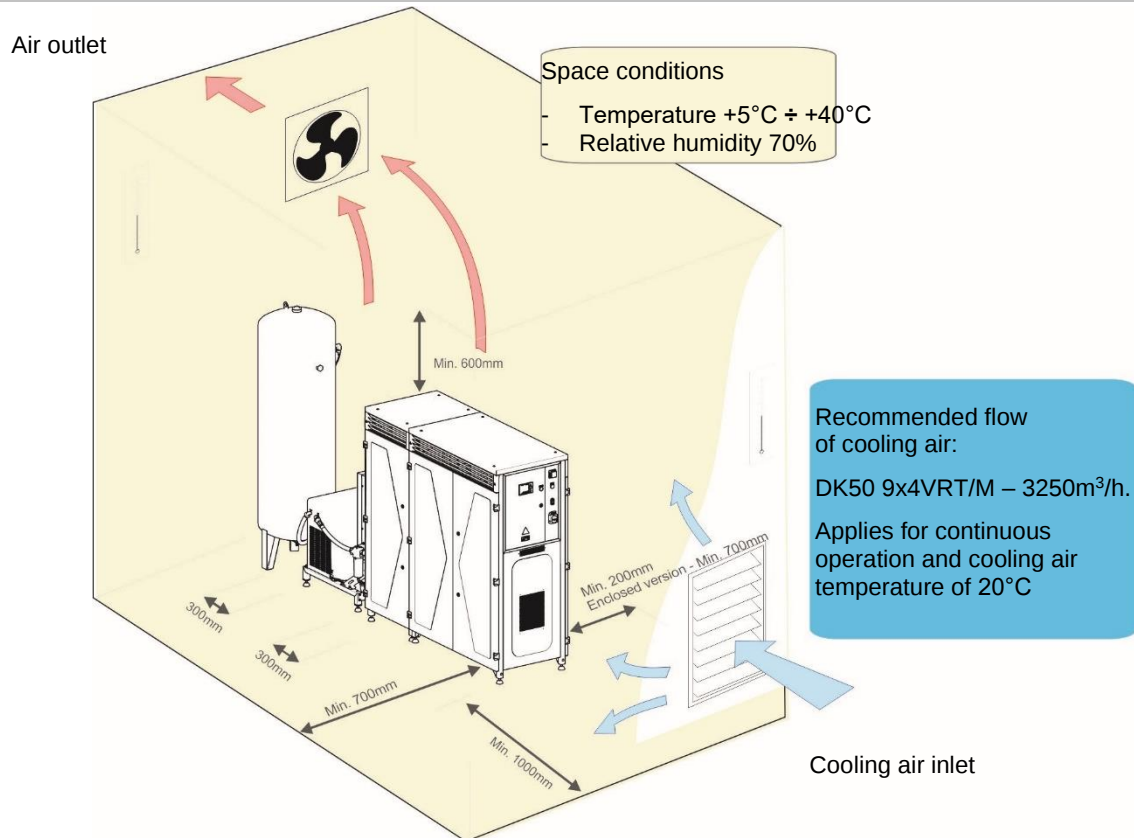
- Approximately 70% of the electrical energy used by the compressor aggregates is converted to heat, and therefore the rooms in which the compressor is installed must have additional ventilation to provide sufficient air exchange for cooling purposes (see the Technical Data chapter).



**Burn or fire hazard! Caution!**  
**Hot surface!**

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

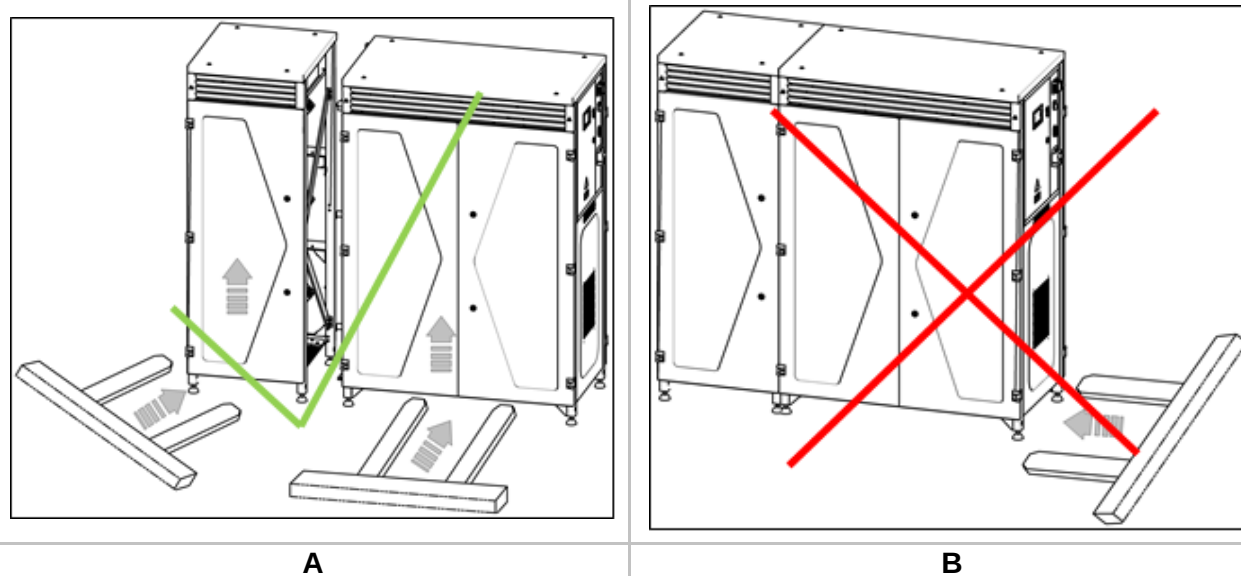
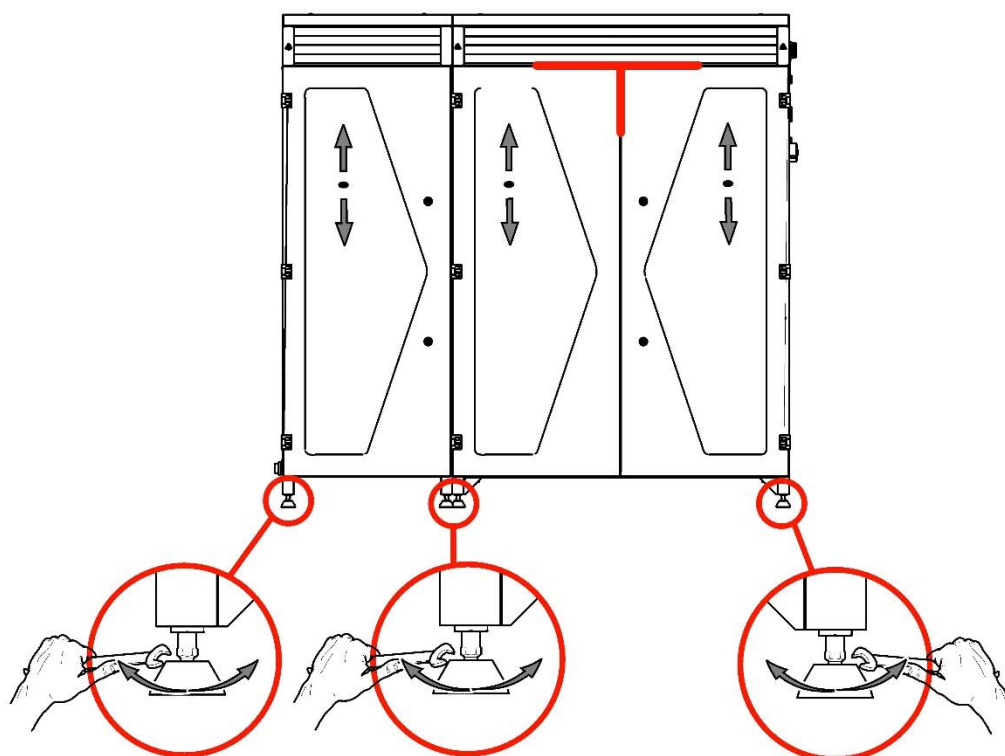
**Fig. 3: Equipment installation**



## 11. COMPRESSOR ASSEMBLY

### 11.1. Handling and releasing the compressor

- Unpack the compressor 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)

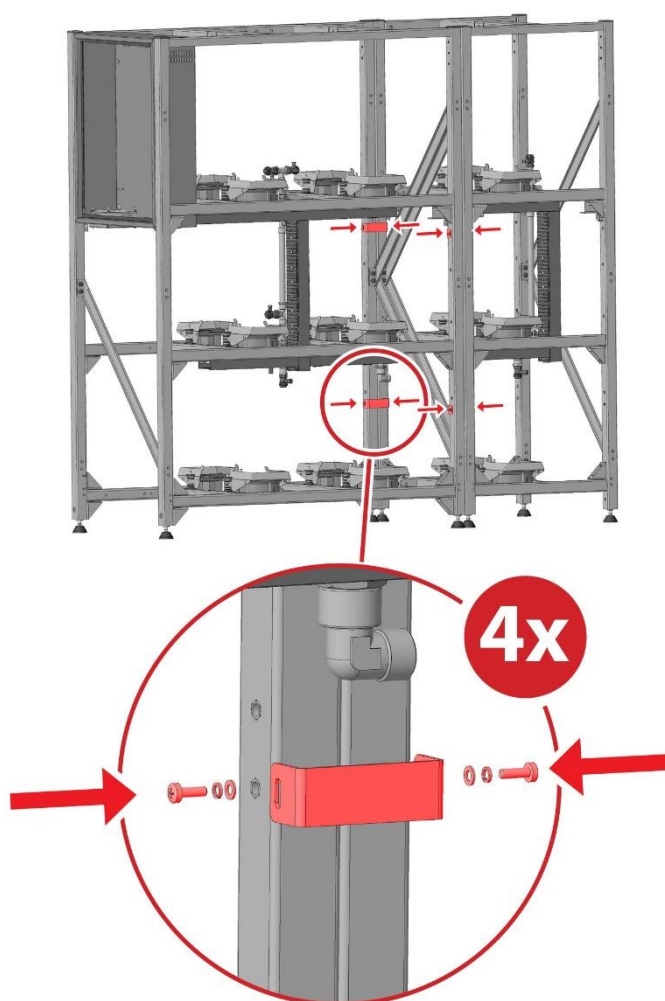
**Fig. 4: Handling the compressor module****Fig. 5: Levelling the compressor**

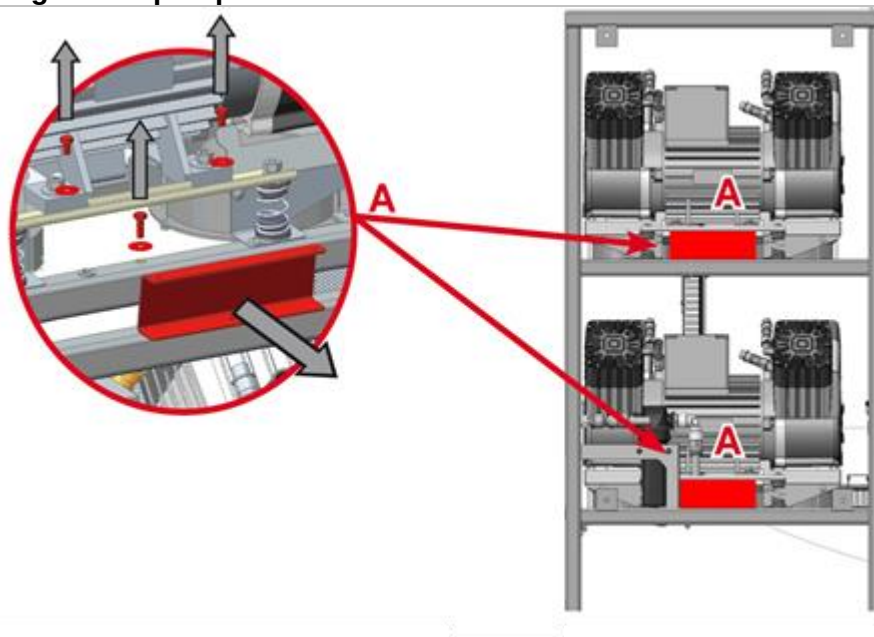


Prior to installation, ensure that the compressor is free of all transport packaging and stabilizers to avoid any risk of damage to the product.

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

Fig. 6: Frame installation

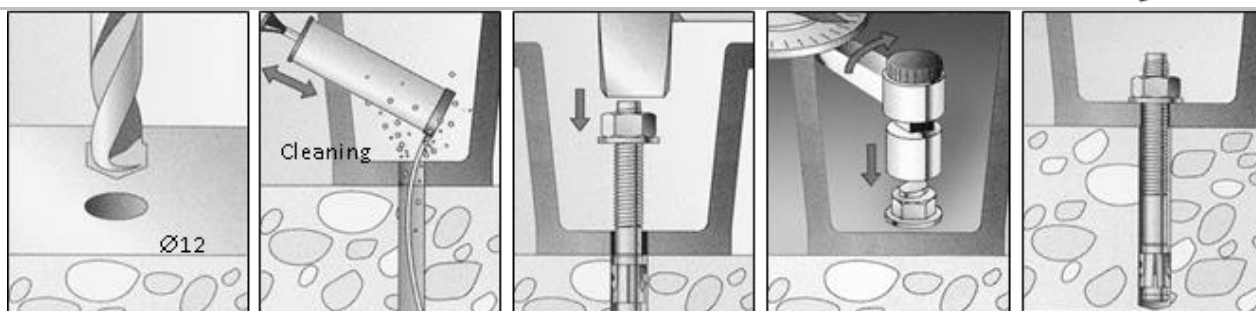


**Fig. 7: Releasing the air pumps**

- Remove the transport stabilisers from the air pumps (Fig. 7).
- DK50 9x4VRT/M – 18 mounts.

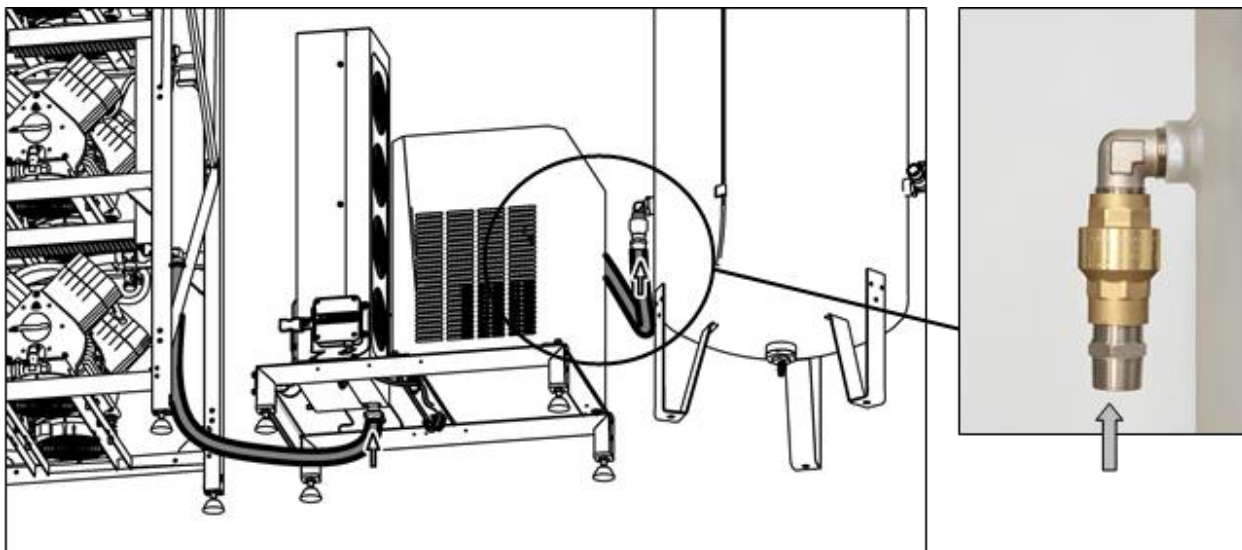
**Fig. 8: Handling the air tank module**

- Position the air tank at the site of installation and anchor it to the floor



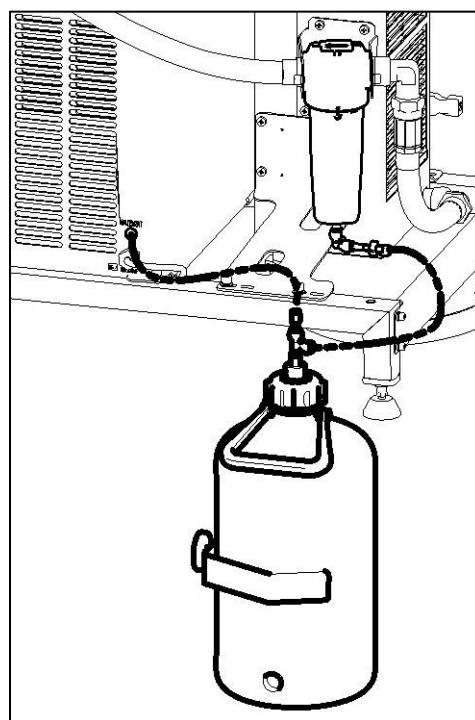
## 12. PNEUMATIC CONNECTION

Compressor module – dryer module – connect the air tank with the provided hoses.



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

- Connect the hoses from the water separator and the condensate drain from the dryer to connectors at the vessel valves



**Fig. 10**

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

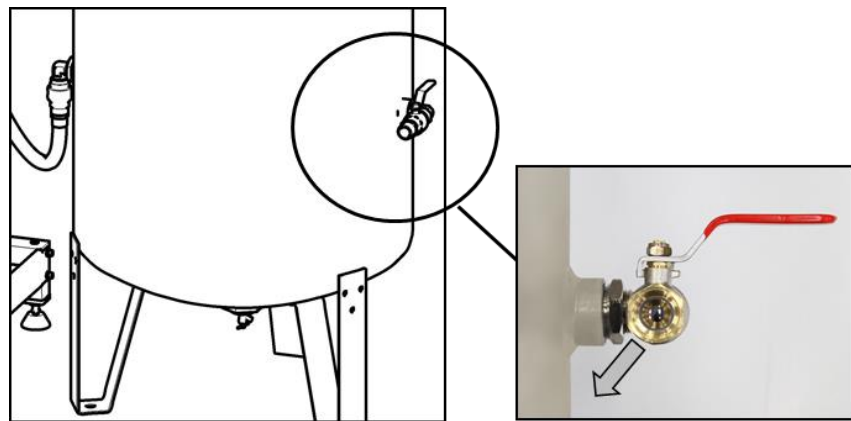


Fig. 11



**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 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)

**The manufacturer recommends protecting cabling loose on the floor (W22, W23) with**

**a cable bridge.**

- Connect the individual power cord conductors to the power terminals L1, L2, L3, N(BU), PE(GN/YE). (Fig. 12)
- Recommended configuration of phase conductors: L1-BN, L2-BK, L3-GY.
- Cord type (minimum requirements) H05 VV-F\_5G10.

Route the power cord out of the enclosure as illustrated (Fig. 16).



**Fire hazard and risk of electric shock.**

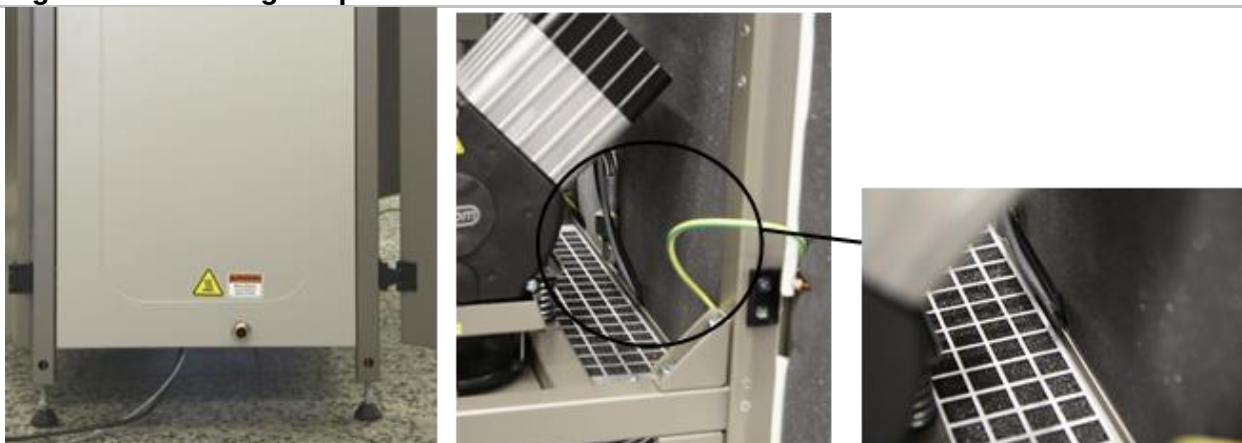
**Ensure the electrical cable does not touch hot parts of the device or connecting hoses.**



**Fire hazard and risk of electric shock.**

**Electrical cord must not be broken.**

**Fig. 12: Connecting the power cord**



**Fig. 13**

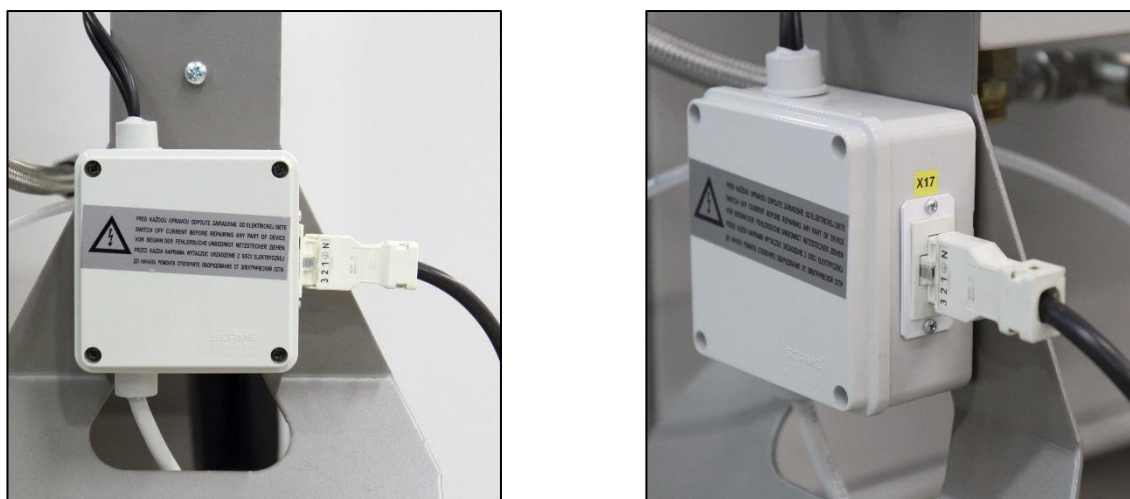


Fig. 14

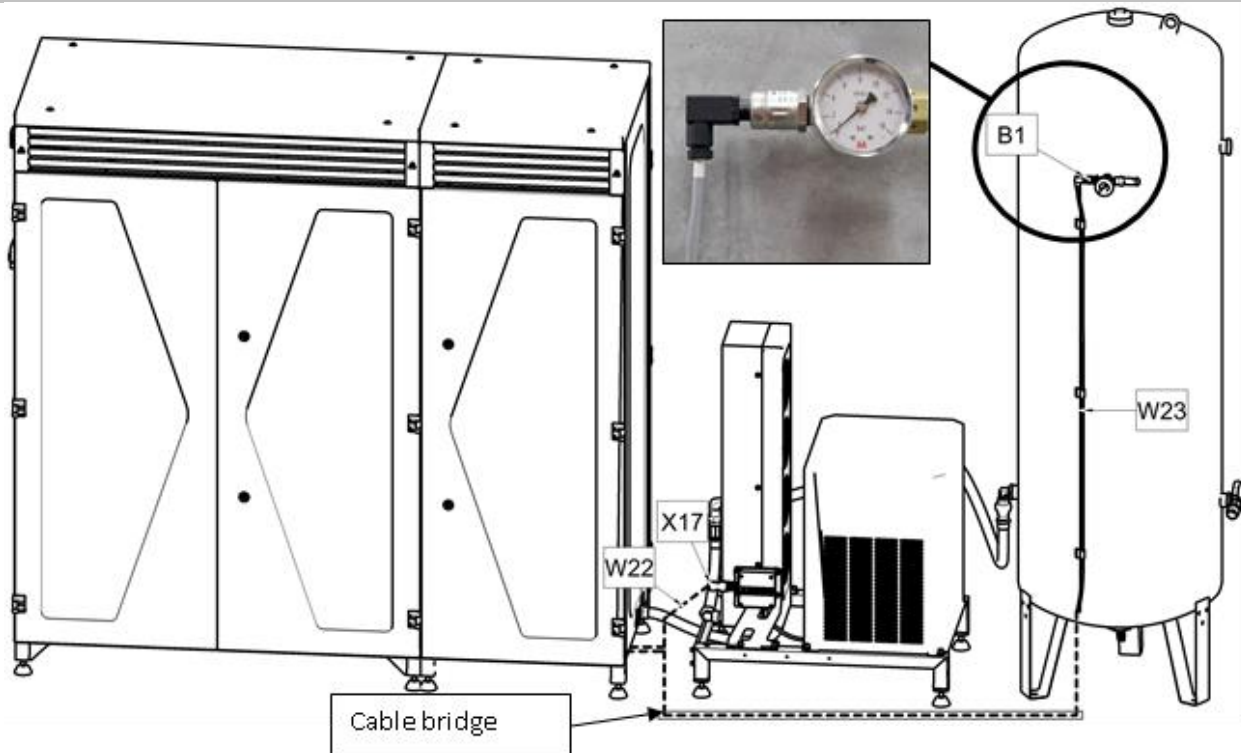
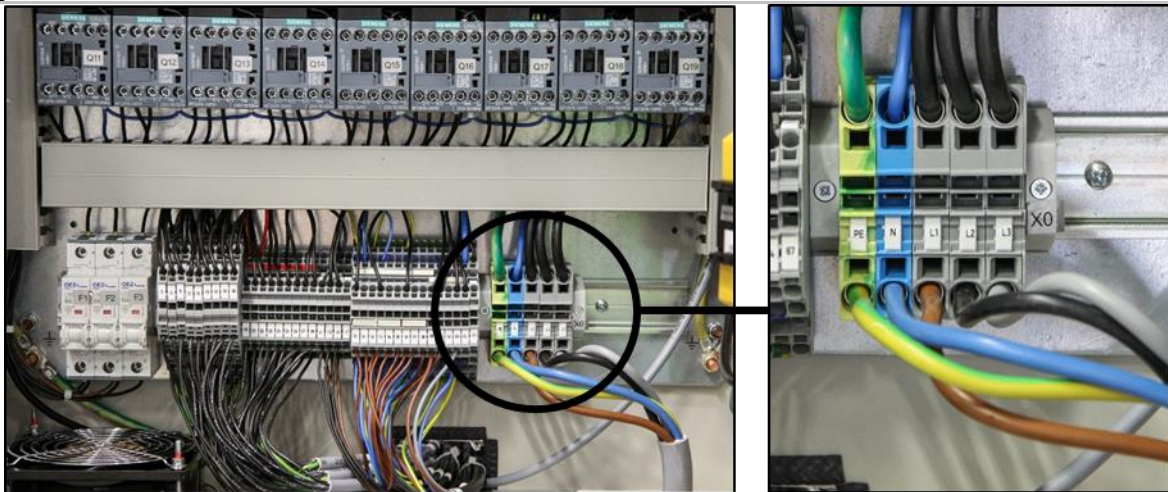


Fig. 15



**Fig. 16: Electrical cord**



### Description of air pump controls

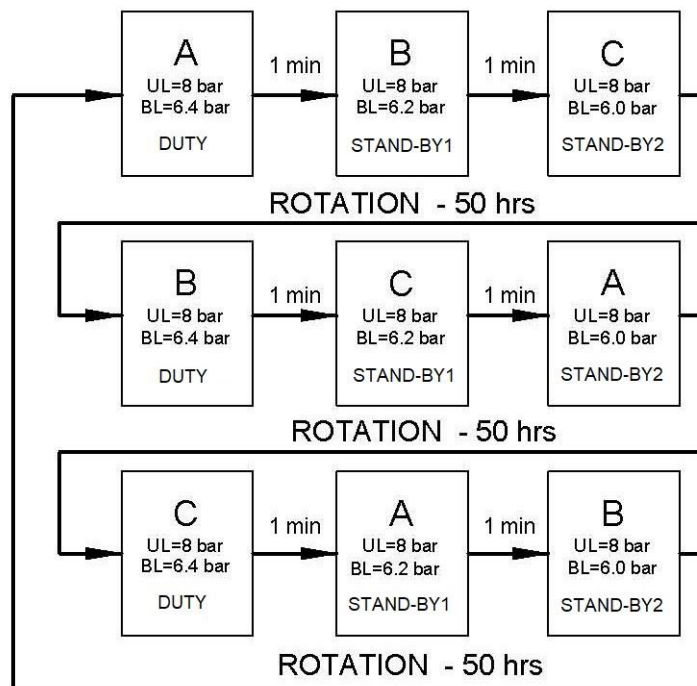
The air pumps are controlled in sets of three based on real demand. One of the three is always set as the DUTY (e.g. M1-3) and the others as STAND-BY1 (e.g. M4-6) and STAND-BY2 (e.g. M7-9). The STAND-BY sets operate under the following conditions (Fig. 17):

- A waiting period (pressurising to the

upper limit) of 1 minute;

- The activation pressures are below 6.4 bar (STAND-BY1) and then below 6.2 bar (STAND-BY2);
- Motor failure in the DUTY section.

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

**Fig. 17: Air pump controls**

A – motors M1-M3

B – motors M4-M6

C – motors M7-M9

UL – upper limit

BL – bottom limit → DUTY=6.4, STAND-BY1=6.2, STAND-BY2=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'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.

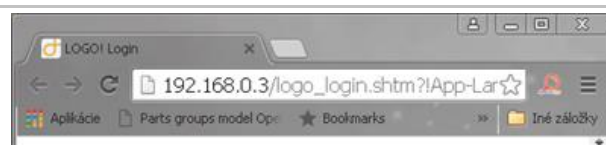
- 4 The user then configures the IP addresses (specific, requested) based on the manual (see the service manual) or uses the compressor manufacturer's technical support for such purposes.

### 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! TD” 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.



## 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.

Select the variable parameters 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:

| Variable |       |         |       |                |        |           |
|----------|-------|---------|-------|----------------|--------|-----------|
| Del      | Range | Address | Type  | Display Format | Value  | Mod/Value |
| X        | VM    | 0       | DWORD | SIGNED         | 0      | ✓         |
| X        | VM    | 4       | WORD  | SIGNED         | -250   | ✓         |
| X        | VM    | 6       | WORD  | SIGNED         | -500   | ✓         |
| X        | VM    | 8       | WORD  | SIGNED         | -500   | ✓         |
| X        | VM    | 10      | DWORD | SIGNED         | 120000 | ✓         |
| X        | VM    | 14      | DWORD | SIGNED         | 0      | ✓         |
| X        | VM    | 26      | WORD  | SIGNED         | -50    | ✓         |
| X        | VM    | 28      | WORD  | SIGNED         | 0      | ✓         |

Buttons: Add Variable, Modify All Values

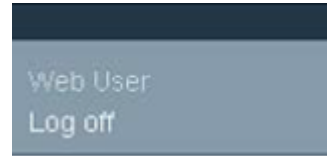
**Note:**

- 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.

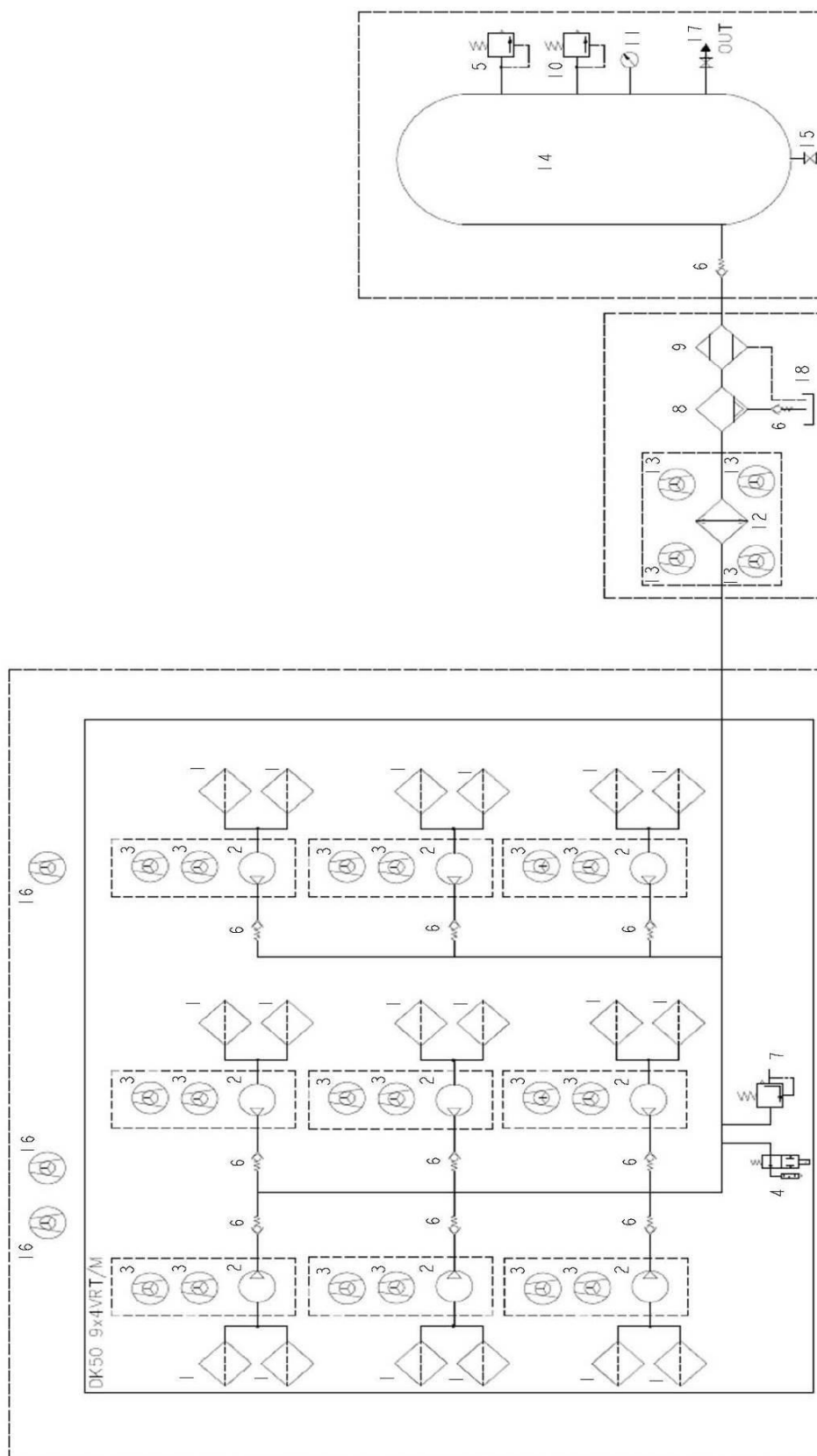
- Check to ensure the outlet valve is in the OFF position.



**The compressor is not equipped with a backup power supply.**

## 15. PNEUMATIC DIAGRAM

**DK50 9x4VRT/M, DK50 9x4VRTS/M**



**Description to pneumatic diagram:**

- |                          |                                  |
|--------------------------|----------------------------------|
| 1. Inlet filter          | 10. Pressure sensor              |
| 2. Aggregate             | 11. Pressure gauge               |
| 3. Compressor fan        | 12. Cooler                       |
| 4. Solenoid valve        | 13. Cooler fan                   |
| 5. Safety valve          | 14. Air tank                     |
| 6. Non-return valve      | 15. Drain valve                  |
| 7. Pressure relief valve | 16. Central fan                  |
| 8. Condensate separator  | 17. Outlet valve                 |
| 9. Dryer                 | 18. Condensate collection vessel |

**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 air pump 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).



**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.**



## 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

- 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).

|   |   |   |   |   |   |   |   |   |   |   |            |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|------------|---|---|---|
| P | R | E | S | S | U | R | E |   |   |   | 5 . 3 8    | b | a | r |
| T | E | M | P | _ | O | U | T |   |   |   | 1 7 . 3 °C |   |   |   |
| T | E | M | P | _ | I | N |   |   |   |   | 9 . 0 °C   |   |   |   |
|   | C | O | M | P | R | E | S | S | O | R |            | O | N |   |
| H | O | U | R | S |   | R | U | N |   |   | 0 h        |   |   |   |
| T | I | M | E | - | T | O | - | G | O |   | MN :       | 2 | 0 | 0 |
|   |   |   |   |   |   |   |   |   |   |   |            | 0 | 0 | h |

- 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).

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | R | E | S | S | U | R | E |   |   | 6 | . | 2 | 9 |   | b | a | r |   |   |
|   |   |   | S | T | A | N | D | B | Y |   |   | M | O | D | E |   |   |   |   |
|   |   |   | C | O | M | P | R | E | S | S | O | R |   | O | F | F |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| H | O | U | R | S |   |   | R | U | N |   |   |   |   | 0 | h |   |   |   |   |
| T | I | M | E | - | T | O | - | G | O |   |   | M | N | : | 2 | 0 | 0 | 0 | h |

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).

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:

## SHUTTING DOWN THE COMPRESSORS

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

## Controller – operation – alarms

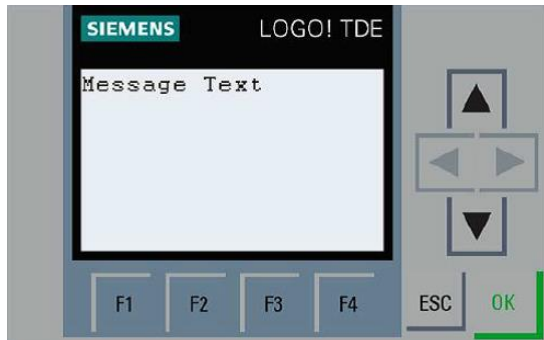
The controller controls the aggregates, monitors their operation, parameters and malfunctions, generates alarms and indicates required maintenance intervals.

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.

### 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**:

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.

| M A I N T E N A N C E   D I S P L A Y : |  |  |  |             |  |  |  |           |  |     |  |
|-----------------------------------------|--|--|--|-------------|--|--|--|-----------|--|-----|--|
| / 2 0 0 0   h o u r s /                 |  |  |  |             |  |  |  |           |  |     |  |
| H O U R S                               |  |  |  | R U N :     |  |  |  | 0 h       |  | 0 m |  |
| T i m e - t o - g o                     |  |  |  | M N :       |  |  |  | 2 0 0 0 h |  |     |  |
| T O T A L                               |  |  |  | H O U R S : |  |  |  |           |  | 0 h |  |
| N U M B E R                             |  |  |  | o f   M N : |  |  |  |           |  | 0 x |  |

By pressing **F3**:

This permits browsing through different auxiliary screens. E.g. displays the number of overload faults for motors M1 to M9 (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.

| F A I L U R E S |  |  |   |  |  | M O T O R S T A R |  |  |   |  |  |
|-----------------|--|--|---|--|--|-------------------|--|--|---|--|--|
| M 1 :           |  |  | 0 |  |  | M 2 :             |  |  | 0 |  |  |
| M 3 :           |  |  | 0 |  |  | M 4 :             |  |  | 0 |  |  |
| M 5 :           |  |  | 0 |  |  | M 6 :             |  |  | 0 |  |  |
| M 7 :           |  |  | 0 |  |  | M 8 :             |  |  | 0 |  |  |

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.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | E | R | V | I | C | E | A | C | C | O | R | D | I | N | G | t | o |
| I | N | S | T | R | U | C | T | I | O | N | S | f | o | r | U | S | E |
| T | O | T | A | L | H | O | U | R | S | : |   |   |   |   |   | 1 | h |
|   |   |   | H | O | U | R | S | R | U | N | : |   |   |   |   | 0 | h |
| S | e | t | u | p | N | e | w | I | n | t | e | r | v | a | l | : |   |
| H | o | l | d | F | 4 | I | e | a | s | t | 5 | s | e | c |   |   |   |

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

### 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.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S | E | R | V | I | C | E | A | C | C | O | R | D | I | N | G | t | o |
| I | N | S | T | R | U | C | T | I | O | N | S | f | o | r | U | S | E |
| T | O | T | A | L | H | O | U | R | S | : |   |   |   |   |   | 1 | h |
|   |   |   | H | O | U | R | S | R | U | N | : |   |   |   |   | 0 | h |
| S | e | t | u | p | N | e | w | I | n | t | e | r | v | a | l | : |   |
| H | o | l | d | F | 4 | I | e | a | s | t | 5 | s | e | c |   |   |   |

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

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.

[illegible]

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

[illegible]

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

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | R | E | S | S | U | R | E | : |   |   |   | 3 | . | 8 | 8 |   | b | a | r |
|   |   |   |   |   | S | I | G | N | A | L | I | N | G |   |   |   |   |   |   |
| L | O | W |   | P | R | E | S | S | U | R | E |   | M | O | D | E |   |   |   |
| / | l | e | s | s |   | t | h | e | n |   | 5 |   | b | a | r | / |   |   |   |
| H | O | U | R | S |   | R | U | N | : |   |   |   |   | 0 |   |   |   |   |   |
| T | I | M | E | - | t | o | - | G | O |   | M | N | : | 2 | 0 | 0 | 0 |   |   |

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.

- 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

[illegible]

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 – Q9) is tripped due to current overload).

The display flashes red. Other aggregates operate normally.

|  |  |   |   |   |   |   |   |   |   |   |   |   |   |  |  |  |  |
|--|--|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|
|  |  | M | O | T | O | R | M | 1 |   |   |   |   |   |  |  |  |  |
|  |  | M | O | T | O | R | M | 2 |   |   |   |   |   |  |  |  |  |
|  |  | M | O | T | O | R | M | 3 |   |   |   |   |   |  |  |  |  |
|  |  | M | O | T | O | R | M | 4 | F | A | U | L | T |  |  |  |  |
|  |  | M | O | T | O | R | M | 5 | F | A | U | L | T |  |  |  |  |
|  |  | M | O | T | O | R | M | 6 |   |   |   |   |   |  |  |  |  |

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.

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.**

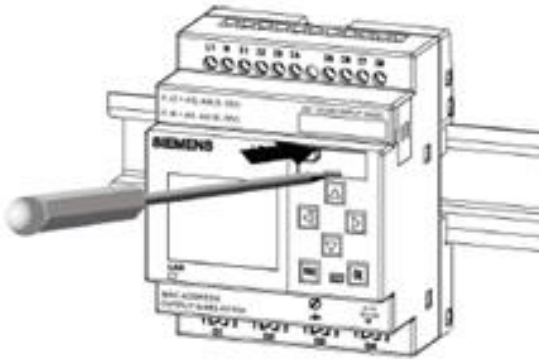


**All error signals are connected to controller output K3:Q3.2 and to terminals X1:44 and X1:45 (in the control panel) as NON VOLT ALARM SIGNALS.**

## Data 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.



## 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 or the drain valve.



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

**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 Chapter 18.1) 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.



**Venting compressed air poses an injury hazard.**

Wear eye protection, i.e. goggles, when venting compressed air from the compressed air circuit.



**Burn hazard.**

When the compressor is running or shortly thereafter, certain portions of the air pump, 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:



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



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

### 18.1. Maintenance intervals

| Time interval                                                                                      | Performed by operator    |                                                     |         |         |         | qualified technician |        |        |        |
|----------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------|---------|---------|---------|----------------------|--------|--------|--------|
|                                                                                                    | Set of replacement parts | Chap.                                               | 16000 h | 12000 h | 10000 h | 8000 h               | 6000 h | 4000 h | 2000 h |
| Product function check                                                                             | -                        | 18.2                                                |         |         |         |                      |        |        |        |
| Cleaning the compressor intake filters <sup>a)</sup>                                               | -                        | 18.8                                                |         |         |         |                      |        |        |        |
| Cleaning the dryer filter screen, Check the condensate drain, Check the temperature on the display | -                        | See the dryer manual on the CD                      |         |         |         |                      |        |        |        |
| Clean the dryer condenser, check dryer operation                                                   | -                        | See the dryer manual on the CD                      |         | x       | x       | x                    | x      | x      | x      |
| Check compressor fan operation                                                                     | -                        | Visual check of rotation during aggregate operation |         |         |         |                      |        |        |        |
| Replace float in separator                                                                         | 025200146-000            | 18.7                                                |         | x       |         | x                    |        | x      |        |
| Cleaning the compressor inlet filters <sup>a)</sup>                                                | -                        | 18.8                                                |         | x       | x       | x                    | x      | x      | x      |
| Compressor inlet filter replacement <sup>a)</sup>                                                  | 604031770-000            | 18.8                                                |         | x       | x       | x                    | x      | x      | x      |
| Equipment inspection                                                                               | -                        | 18.15                                               |         | x       | x       | x                    | x      | x      | x      |
| Once every 2 years                                                                                 |                          |                                                     |         |         |         |                      |        |        |        |
| Once a year                                                                                        |                          |                                                     |         |         |         |                      |        |        |        |
| Once a week                                                                                        |                          |                                                     |         |         |         |                      |        |        |        |
| Once a day                                                                                         | x                        |                                                     |         |         |         |                      |        |        |        |

| 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         |
|----------------------------------------------------------------------------------------------------------|------------|-------------|-------------|--------------------|--------|--------|--------|--------|---------|---------|---------|-----------------------------------------------------|--------------------------|----------------------|
|                                                                                                          |            |             |             |                    |        |        |        |        |         |         |         |                                                     |                          |                      |
| Cleaning the dryer filter screen,<br>Check the condensate drain,<br>Check the temperature on the display |            |             |             |                    |        | x      | x      | x      | x       | x       |         | See the dryer manual on the CD                      | -                        | qualified technician |
| Check compressor fan operation                                                                           |            |             |             |                    | x      | x      | x      | x      | x       | x       |         | Visual check of rotation during aggregate operation | -                        |                      |
| Replacement of compressor fans (6-8bar)                                                                  |            |             |             |                    |        |        |        |        |         | x       |         |                                                     | 035300016-000            |                      |
| Replacement of compressor fans (8-10bar)                                                                 |            |             |             |                    |        |        |        |        | x       |         |         |                                                     | 035300016-000            |                      |
| Check electrical connections                                                                             |            |             |             |                    | x      | x      | x      | x      | x       | x       |         | 18.4                                                | -                        |                      |
| Check operation of non-return valves                                                                     |            |             |             |                    | x      | x      |        | x      |         | x       |         | 18.10                                               | -                        |                      |
| Check pressure sensor operation                                                                          |            |             |             |                    | x      | x      | x      | x      | x       | x       |         | 18.13                                               | -                        |                      |
| Check pressure relief valve                                                                              |            |             |             |                    | x      | x      | x      | x      | x       | x       |         | 18.15                                               | -                        |                      |
| Check temperature sensor switching function                                                              |            |             |             |                    | x      | x      | x      | x      | x       | x       |         | See the service manual                              | -                        |                      |

| Time interval                                      | Performed by | Set of replacement parts | Chap. | qualified technician |        |        |        |         |         |         |
|----------------------------------------------------|--------------|--------------------------|-------|----------------------|--------|--------|--------|---------|---------|---------|
|                                                    |              |                          |       | 2000 h               | 4000 h | 6000 h | 8000 h | 10000 h | 12000 h | 16000 h |
| Replacement of piston group with bearing (6-8bar)  |              | 604031764-000            |       |                      |        |        | x      |         |         |         |
| Replacement of piston group with bearing (8-10bar) |              | 604031764-000            |       |                      |        | x      |        |         | x       |         |
| Check safety valve operation                       |              | -                        | 18.6  |                      | x      |        | x      |         | x       |         |
| Check solenoid valve operation                     |              | -                        | 18.11 |                      | x      |        | x      |         | x       |         |
| Compressor inlet filter replacement                |              | 604031761-000            | 18.5  | x                    | x      | x      | x      | x       | x       |         |
| Compressor performance check                       |              | -                        | 18.9  | x                    | x      | x      | x      | x       | x       |         |
| Conduct a "repeated test" pursuant to EN 62353     |              | -                        | 18.1  |                      |        |        |        |         |         |         |
| Check pneumatic connections for leaks              |              | -                        | 18.3  | x                    | x      | x      | x      | x       | x       |         |
| a) enclosed compressor                             |              |                          |       |                      |        |        |        |         |         |         |

### 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.
- 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).

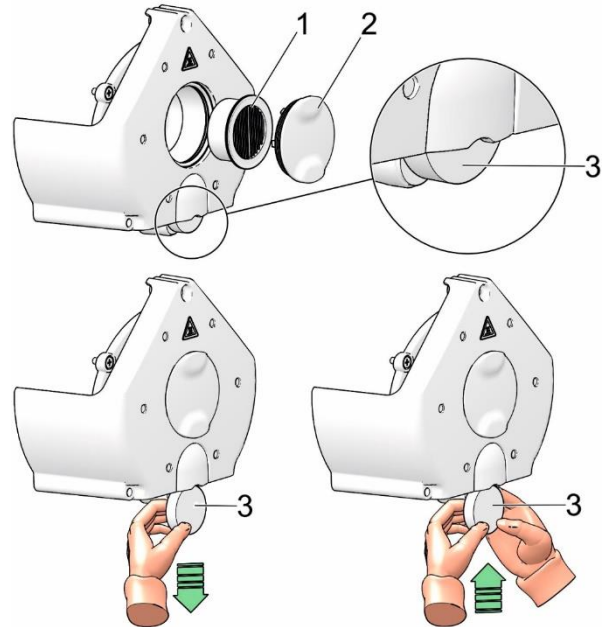
### 18.5. Inlet filter replacement



The filters located in the compressor air pump 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. 18: Inlet filter replacement

### 18.6. 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.

- 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.

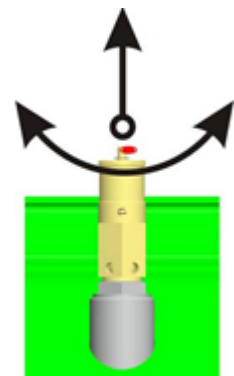


Fig. 19: Check of safety valve

### 18.7. Float replacement



**Working with pressurised pneumatic components poses a risk of injury.**

**Before interfering with the equipment, vent the air tank to zero pressure.**

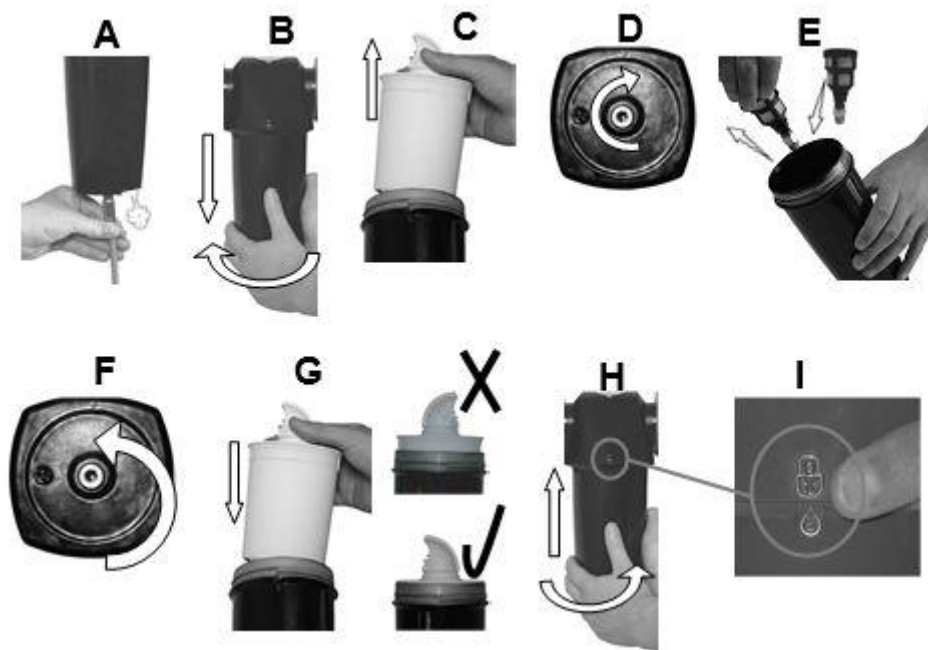


**Risk of electric shock.**

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

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.



**Fig. 20: Float replacement**

### 18.8. Cleaning/replacing the compressor's intake filters <sup>a)</sup>

<sup>a)</sup> - only applicable to enclosed products. Clean or replace the inlet filters at defined intervals 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).

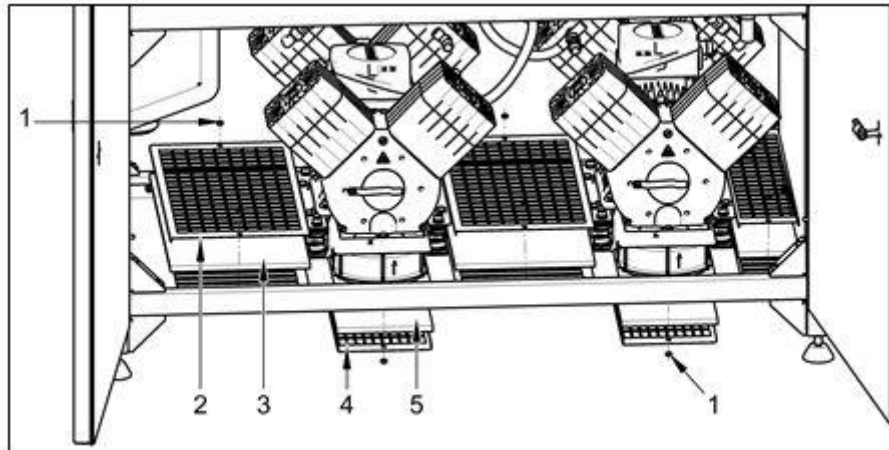


Fig. 21

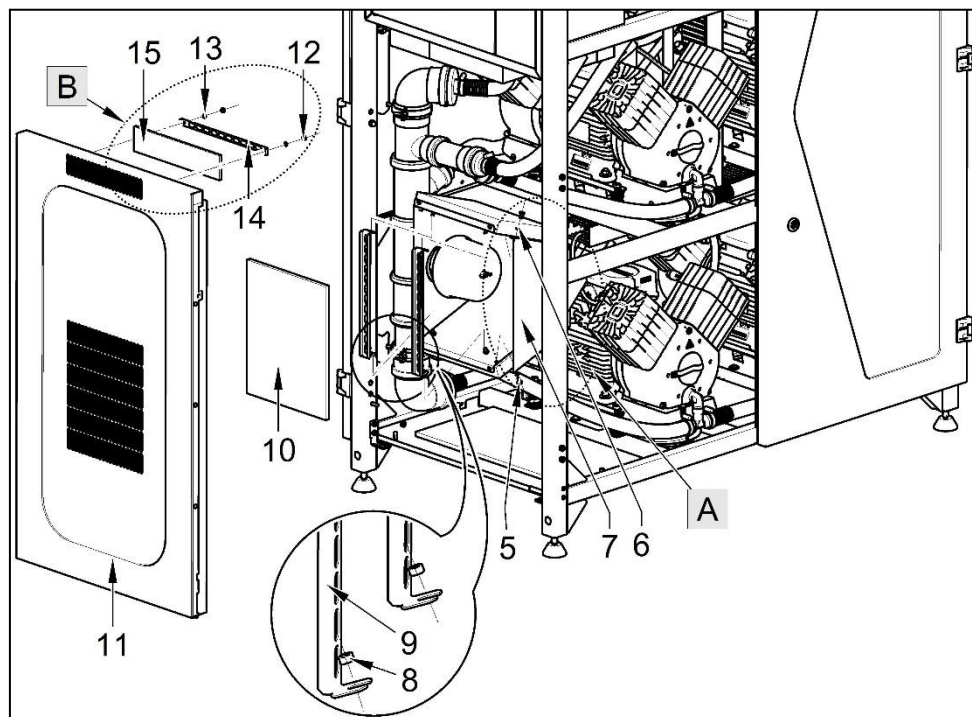


Fig. 22

### 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 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 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 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. 23: Check of solenoid valve operation

### 18.12. Checking the operation of temperature sensor switching

This check is conducted using the LOGO!TDE



Fig. 24

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 where the instantaneous temperature values are shown on the starting screen in STOP mode (Fig. 24).

display must also change. The B4 sensor is not connected on uncovered versions and the display shows N/A.

### 18.13. Check the function of pressure sensor

Functionality is checked visually using the TDE screen, which shows the compressed air value. Changes in air usage must be reflected in pressure changes on the display.

### 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.**

### 18.15. 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!**

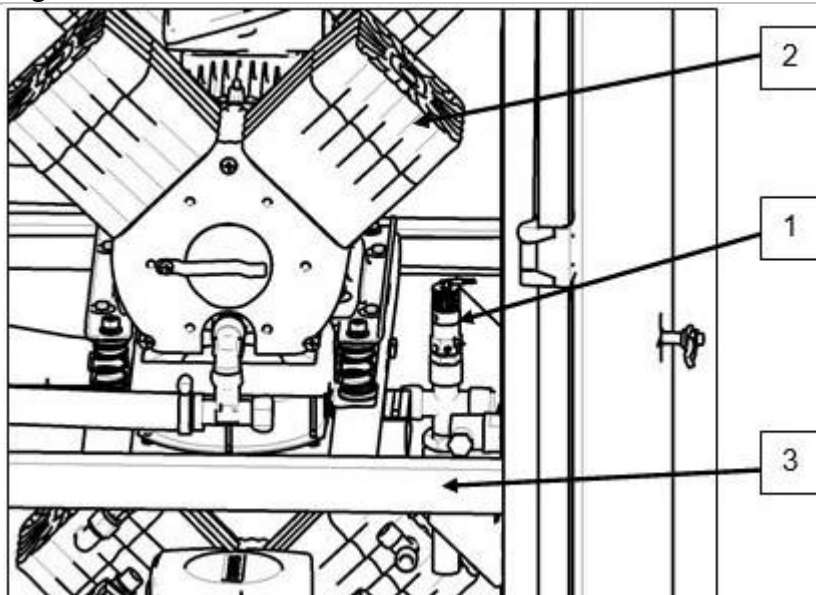


**Consultation with the manufacturer is required before any adjustment is made to the relief valve!**

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

Fig. 25

Description for figure 25:



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

**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                                                            |
| Some compressor aggregates do not start (indicators are on)          | Pressure switch failed                                                            | Check terminals and operation of the pressure switch - replace if damaged                                          |
|                                                                      | 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 component (mechanical damage to a moving part)   | Replace damaged parts                                                                                              |
| RUN/STOP indicator is not green                                      | Controller malfunction                                                            | Check controller operation, check to ensure software is present - replace if damaged or upload the correct program |
|                                                                      | 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                                                            |
| Compressor aggregates switch frequently, even with no compressed air | Problem with electrical power source                                              | Main breaker is off                                                                                                |
|                                                                      | Controller or expansion module malfunction                                        | Replace failed controller or expansion module                                                                      |
|                                                                      | Air leak in compressed air distribution system                                    | Check compressed air distribution system – seal loose joints                                                       |
|                                                                      | Leaky check valves                                                                | Test check valves and clean, or replace if damaged                                                                 |

|                                                                                            |                                                               |                                                                           |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------|
| demand                                                                                     | 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                      |
| Functionality of certain compressor aggregates is reduced, run cycles are extended         | 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                                    |
| High compressed air dew point                                                              | ED180 dryer                                                   | See the dryer manual on the CD                                            |
|                                                                                            | Condensation dryer off                                        | Turn on the dryer, drain condensate found in the air tank                 |
|                                                                                            | Dryer malfunction                                             | Call in professional service                                              |

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.

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.

## 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. Switch off the compressor using the main switch (13) (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.

- 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.

**ANNEX****22. MAPPING PARAMETERS**

Parameter VM Mapping

| ID | Block                                   | Parameter        | Type  | Address |
|----|-----------------------------------------|------------------|-------|---------|
| 1  | C019 HOURS RUN [Hours Counter]          | OT - hour:minute | DWord | 0       |
| 2  | SF018 PRESSURE [Mathematic instruction] | Aq amplified     | Word  | 4       |
| 3  | SF023 TEMP_OUT [Analog Amplifier]       | Ax, amplified    | Word  | 6       |
| 4  | SF052 TEMP_IN [Analog Amplifier]        | Ax, amplified    | Word  | 8       |
| 5  | C019 HOURS RUN [Hours Counter]          | MN - hour:minute | 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 - hour:minute | 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: | Vaneh 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:         | 8x4VRTM_BOTH_V4.00.0ld | Page:        | 1 / 2                |

**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 |
| 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.ild | Page:        | 2 / 2                |

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NP-DK50-9x4VRTM\_ED-EN-11\_10-2024  
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