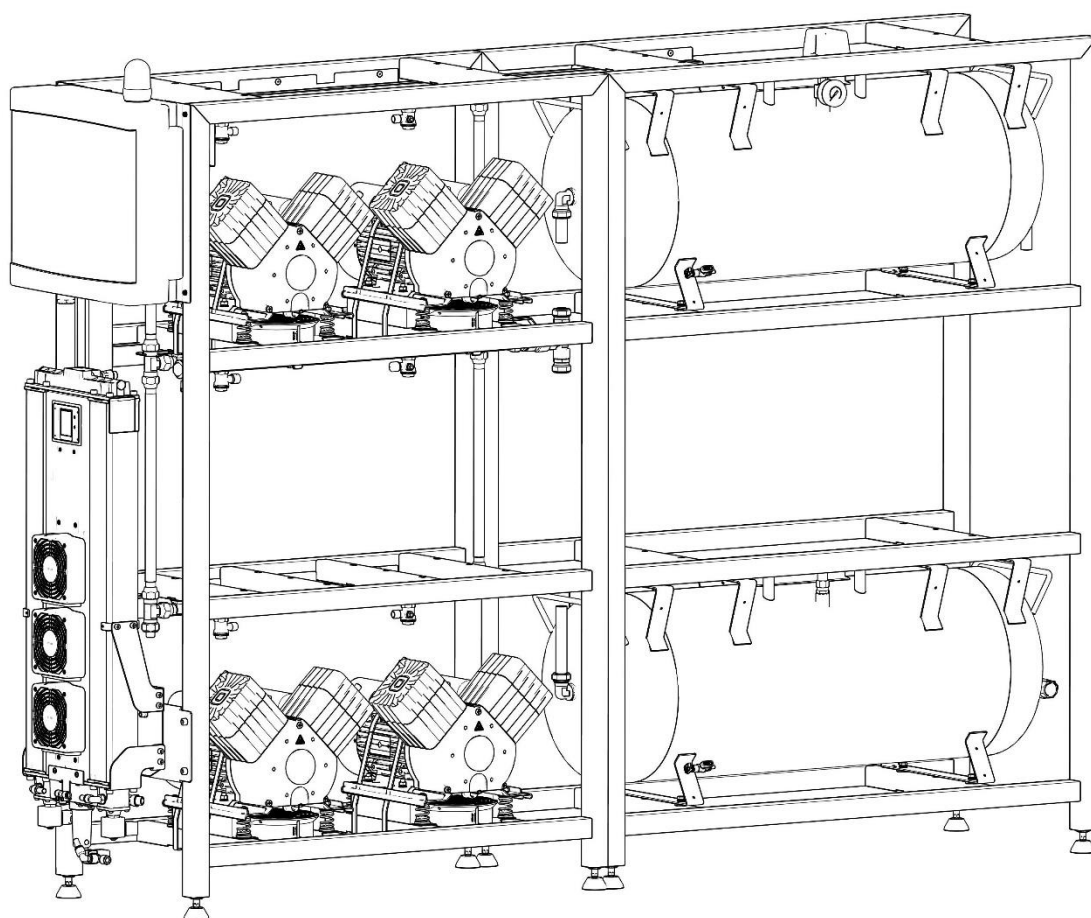




DK50 4X2VT/M

EN USER MANUAL



COMPRESSOR

DK50 4x2VT/M



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DATE OF LAST REVISION

09/2024

NP-DK50-Nx2VTM-ADM-A-
EN-6_07-2024
112000580-0001

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GENERAL INFORMATION

Carefully read this user manual before using the product and carefully store it for future reference. The user manual aids in the proper use, including installation, operation and maintenance, of the product.

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, processes and

names.

The Slovak version represents the original version of the user manual. The 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.

The user manual is original and the translation is performed with the best available knowledge.

1. CONFORMITY WITH THE REQUIREMENTS OF THE EUROPEAN UNION

This product conforms to the requirements of the European Union 2006/42/EC, 2014/29/EU, 2014/35/EU, 2014/30/EU, 2011/65/EU and is safe if used in compliance with the intended use and if all safety

instructions are followed.

User manual is in compliance with requirements of Directive 2006/42/EC.

2. SYMBOLS

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



General warning



Warning - risk of electric shock



Warning - compressor is controlled automatically



Warning - hot surface



General caution



Read the operating instructions



Refer to instruction manual



CE – marking












Serial number



Article number



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

3. DEVICE USE

3.1. Intended use

The compressor is used as source of clean oil-free compressed air intended to be used in industry and laboratories, where parameters and properties of the compressed air are suitable.

The compressor is exclusively intended to compress air without content of explosive or chemically unstable substances.

The compressor is intended for operation in clean and dry rooms.

3.2. Incorrect use



Contamination risk.

Air from the compressor is without additional treatment not suitable for breathing and direct contact with food.



Explosion risk.

The product is not intended for operation in rooms with explosion risk.

The compressor must not be used to compress aggressive gases.

The compressor must not be operated in premises with occurrence of flammable vapors.

The compressor must not be operated in other conditions as mentioned in Technical data.

Any other use of the product beyond the intended use is considered as incorrect use. The manufacturer is not responsible for any damages or injuries as a result of incorrect use or disobedience to instructions stated in this User manual. All risks shall be solely borne by the user/operator.

4. GENERAL SAFETY INSTRUCTIONS

The product is designed and manufactured so that any risks connected with its use are minimized and the product is safe for the user

and surrounding when used according to the intended use and the instructions stated below are followed.

4.1. Required qualification of the personnel

- Each user must be trained by the manufacturer or an organization authorized by the manufacturer or instructed on the device operation by other trained user.
- Installation, new settings, changes, extensions and repairs of the product may be performed by the manufacturer or an organization authorized by the manufacturer (hereinafter qualified technician).
- Otherwise the manufacturer is not responsible for safety, reliability and correct functioning of the product.

4.2. General instructions

- When operating the compressor, all acts and local regulations valid in the place of use must be observed. The operator and user are responsible for following the applicable regulations.
- Before every use, the user must check, if the device is functioning correctly and safely. Before building the compressor in other devices, the supplier must assess, if the supplied air and construction of the device comply with the requirements of the specified intended use. Taking this into account, follow the product technical data. Assessment of conformity shall be performed by the manufacturer – supplier of the final product.

4.3. Protection from dangerous voltage and pressure

- 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 any damage to the connected compressed air system and electrical circuits before use. Replace damaged pneumatic and electrical conductors immediately.
- Immediately disconnect the product from the mains (remove the power cord from the socket) in hazardous situations or when a technical malfunction occurs.
- Never adjust or use the safety valve to release the air pressure in the air tank.
- Never adjust or use pressure relief valves to release air pressure from the device.

4.4. Original spare parts and accessories

- Only the use of original parts guarantees the safety of operating personnel and flawless operation of the product itself. Only accessories and replacement parts specified in the technical documentation or expressly approved by the manufacturer may be used.
- The warranty does not cover damage resulting from the use of other accessories and replacement parts as specified or recommended by the manufacturer and the manufacturer has no related liability.

5. 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 and drain condensate from the tank and from the condensate separator on the dryer.



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



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



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



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



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

5.1. Ambient conditions

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

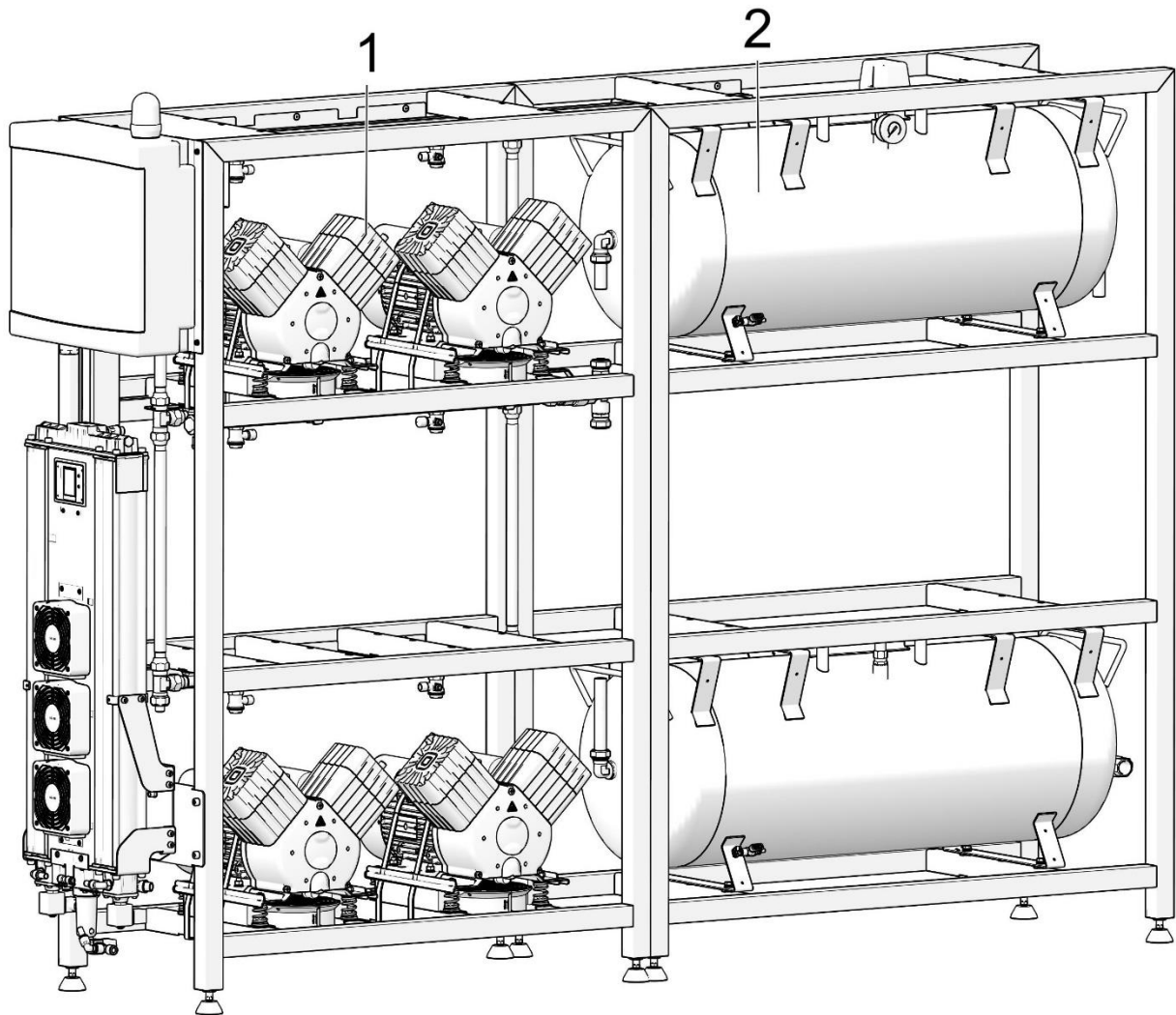
Temperature	-25°C to +55°C, do 24h at up to +70°C
Relative humidity	max. 90% (non-condensing)

PRODUCT DESCRIPTION

6. VARIANTS

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

DK50 4x2VT/M	Composed of modules:
	1 compressor module with adsorption dryer - 4x2V air pumps
	2 air tank module – 2x110 l



DK50 4x2VT/M

7. ACCESSORIES

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

Set of compressed air outlet filters

The compressor may be equipped with a set of filters if specified. The filter set may be

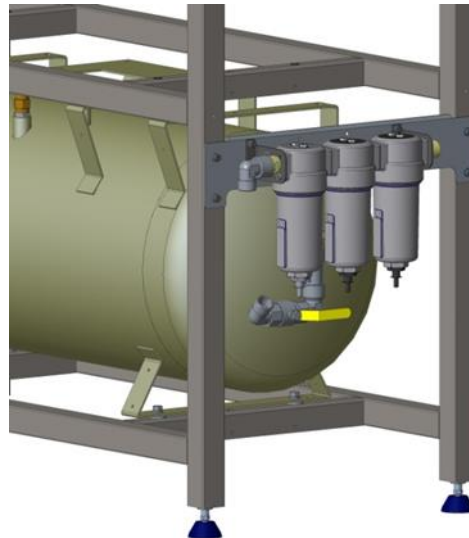
equipped with an air pressure regulator.



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

Type	Use	Level of filtration (µm)	Bypass function*	Article number
FS 40F		1		604014119-000
FS 40M	DK50 4x2VT/M	1+0,1	no	604014119-004
FS 40S		1+0,01		604014119-024
FS 40AH		1+AC+HC(0,01)		604014119-005

*) 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.



Set of filters

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 4x2VT/M	604014125-000

Filter set brackets



A suitable bracket must be ordered for every filter set.

Type	Use	Article number
Compressor-mounted bracket	DK50 4x2VT/M	603014137-000
Wall-mounted bracket		603014120-000

8. PRODUCT FUNCTION

8.1. Compressor with adsorption dryer

The compressor air pumps (1) draw in air through the inlet filter and compress it through a non-return valve and into a manifold, from which it is routed to the adsorption dryer (3) through a connecting hose. From the inlet to the dryer module, the air is first cooled in the integrated cooler (16) and then moves through the condensate separator (24), entering the active chamber with adsorbent (15), where the

air is then dried. A portion of the dry air is routed into the second, regenerating chamber, where the air removes moisture from the adsorbent and is released together with the trapped condensate into the surroundings. Chamber operation (desiccant regeneration) is cyclically switched. Dry and filtered air then passes through the non-return valve into the air tank (2).

Description for figures 1-3:

- | | |
|----------------------------------|--|
| 1. Air pump | 17. Inlet valve module |
| 2. Air tank | 18. Regeneration solenoid valve |
| 3. Adsorption dryer | 19. Outlet from condensate separator and regeneration valves |
| 4. Electrical box / switchboard | 20. Compressed air inlet |
| 5. Frame | 21. Air outlet |
| 6. Pressure switch | 22. Dryer display |
| 7. Compressed air outlet | 23. Dryer fan |
| 8. Pressure gauge | 24. Condensate separator |
| 9. Safety valve | 25. Condensate drain solenoid valve |
| 10. Magnetic holder | 26. Three-pole circuit breaker |
| 11. Condensate collection vessel | 27. Single-pole circuit breaker |
| 12. Outlet module | 28. LOGO control electronics |
| 13. Electrical panel | 29. Indicator |
| 14. Bushing | 30. Contactor |
| 15. Dryer chamber | 31. Thermal overcurrent relays |
| 16. Cooling module | |

Fig. 1: Compressor with adsorption dryer

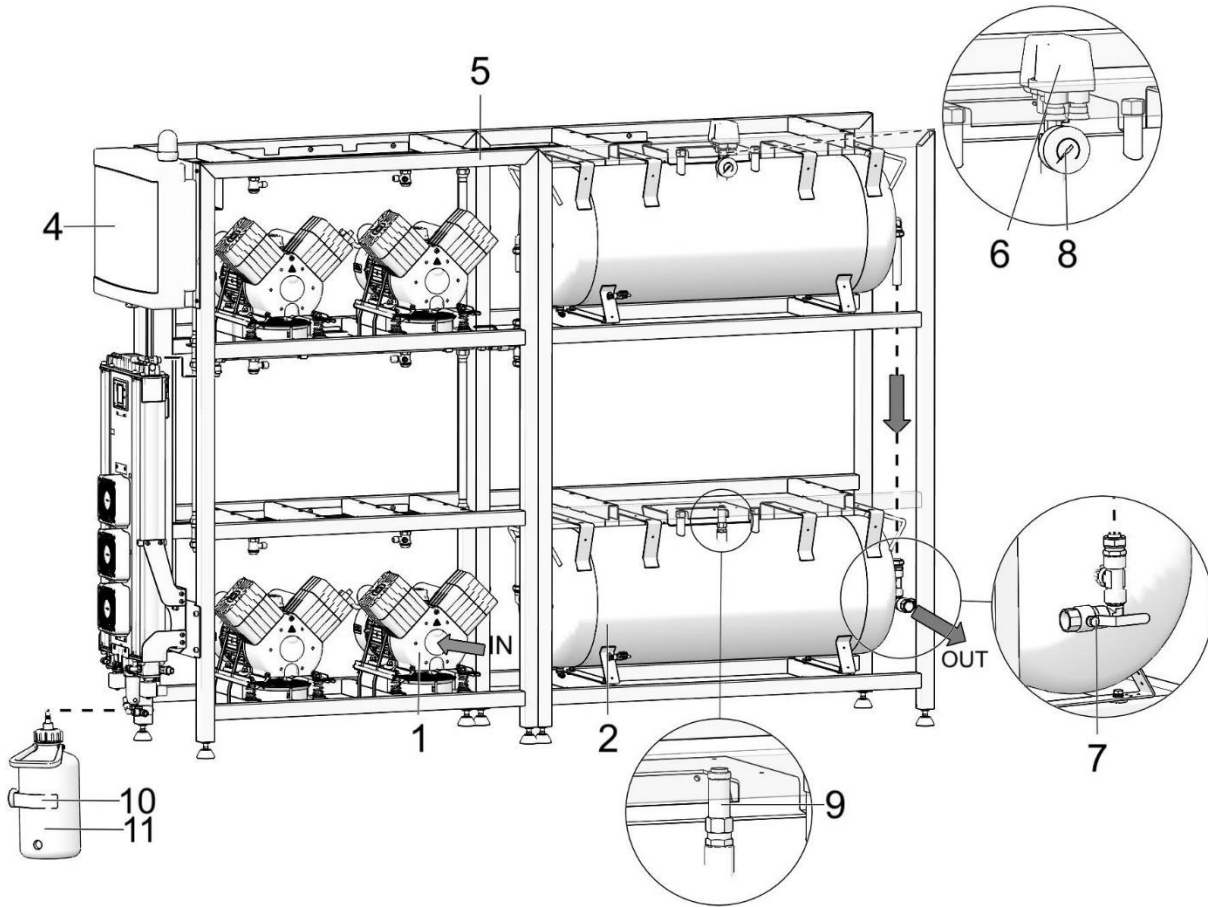


Fig. 2: Adsorption dryer

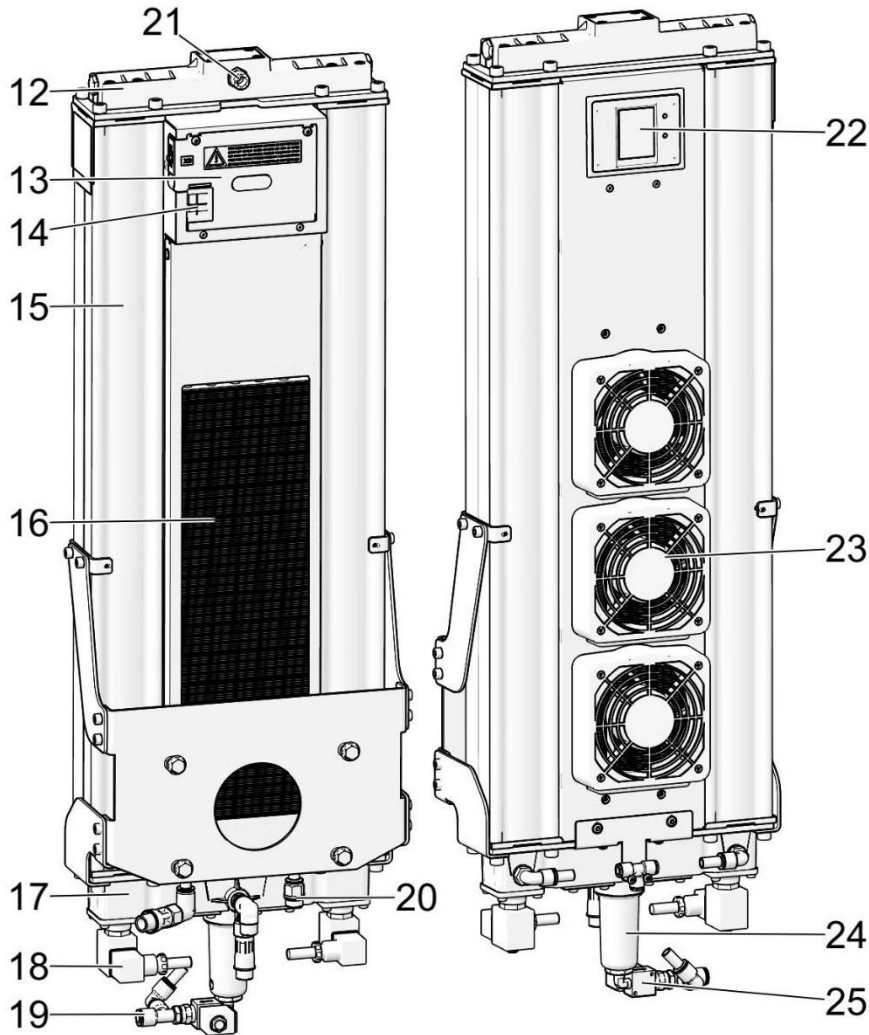
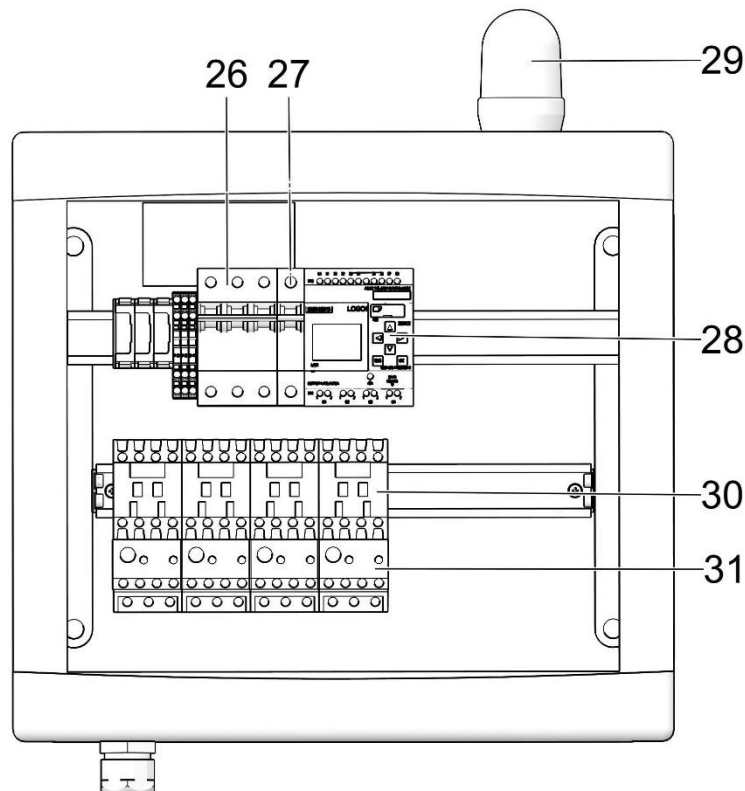


Fig. 3: Electrical box/ switchboard

The range of the pressure switch on the configured assemblies may only be adjusted after prior consultation with the manufacturer.



Adjusting the pressure setting of the safety valve is expressly prohibited.



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, an increase in flow resistance through the drying media, etc.), and therefore the repeated opening of the relief valve requires a dryer function check and repairs if necessary.

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



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

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

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 4x2VT/M	
Rated voltage, Frequency ^{a)}	V, Hz	3x400, 50	
Capacity at 6 bar (FAD) PDP -20°C -40°C	l/min	470	450
Working pressure ^{b)}	bar	6.0 – 8.0	
Rated current	A	13.5	13.5
Main circuit protection device rating	A	25	
Mail electrical feeder	mm ²	4	
Enclosure		IP10	
Motor power	kW	1.2	
Air tank volume	l	220	
Air quality - filtration	µm	-	-
Maximum operating pressure of safety valve	bar	12,0	
Noise level at 5 bar (L _{pA})	dB	≤72	
Operating mode	%	S1-100	
PDP drying performance at 7 bar ^{d)}	°C	≤ -20	≤ -40
Time to fill air tank from 0 to 7 bar	s	190	200
Net weight ^{c)}	kg	341	
Dimensions (net) w x d x h	mm	2360x510x1730	
Required cooling air changes in space	m ³ /h	1000	

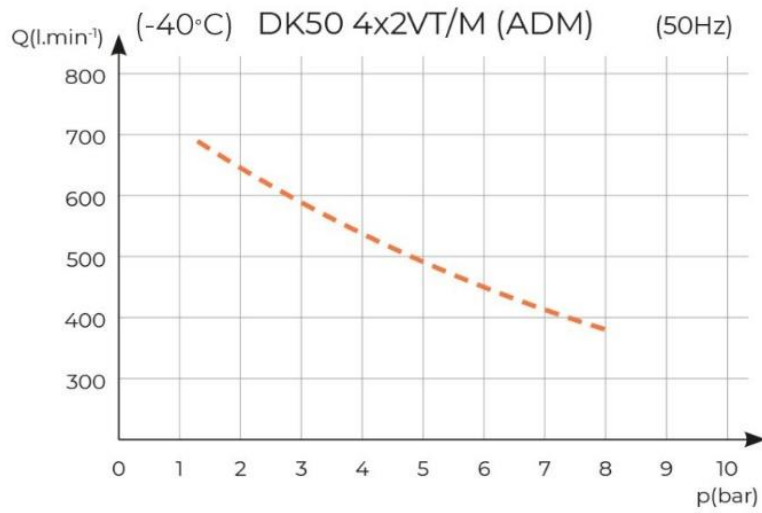
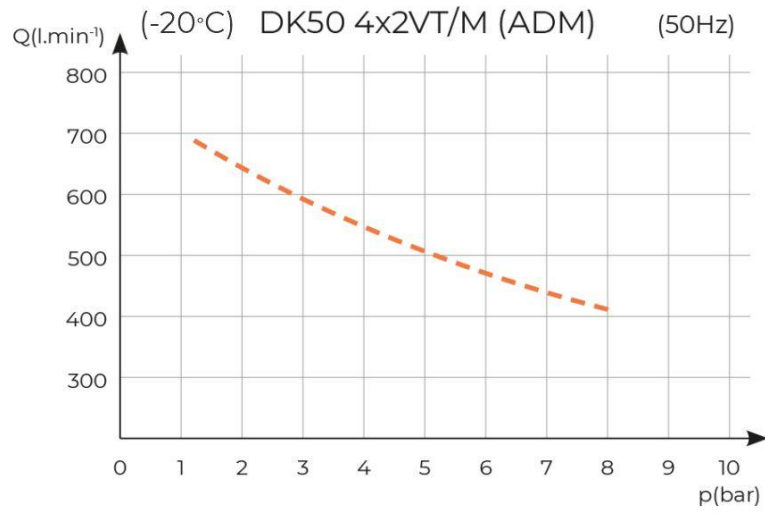
^{a)} Specify the compressor version when ordering

^{b)} Consult any other range of pressure with the supplier

^{c)} Weight is indicative and only applies to the product without accessories

^{d)} Applies to ambient temperatures of <30°C PDP – pressure dew point

Dependence of compressor output on working pressure



Working pressure 8 – 10 bar		DK50 4x2VT/M	
Rated voltage, Frequency ^{a)}	V, Hz	3x400, 50	
Capacity at 8 bar (FAD) PDP -20°C -40°C	l/min	380	370
Working pressure ^{b)}	bar	8.0 – 10.0	
Rated current	A	12.5	12.5
Main circuit protection device rating	A	25	
Main electrical feeder	mm ²	4	
Enclosure		IP10	
Motor power	kW	1.2	
Air tank volume	l	220	
Air quality - filtration	µm	-	-
Maximum operating pressure of safety valve	bar	12.0	
Noise level at 5 bar (L _{pA})	dB	≤72	
Operating mode	%	S1-100	
PDP drying performance at 7 bar ^{d)}	°C	≤ -20	≤ -40
Time to fill air tank from 0 to 7 bar	s	235	240
Net weight ^{c)}	kg	341	
Dimensions (net) w x d x h	mm	2360x510x1730	
Required cooling air changes in space	m ³ /h	1000	

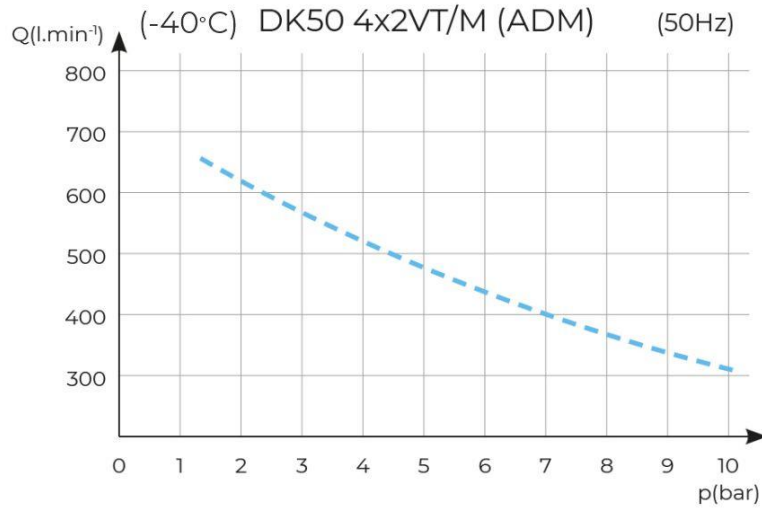
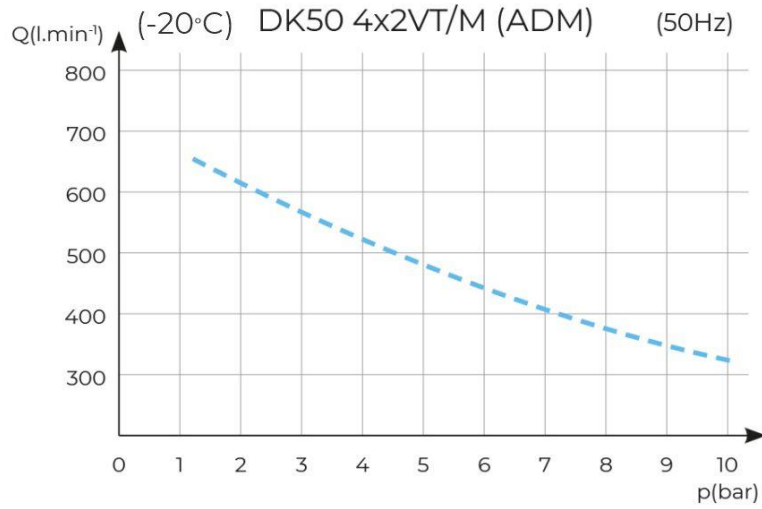
^{a)} Specify the compressor version when ordering

^{b)} Consult any other range of pressure with the supplier

^{c)} Weight is indicative and only applies to the product without accessories

^{d)} Applies to ambient temperatures of <30°C PDP – pressure dew point

Dependence of compressor output on working pressure



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	0,8	0,71	0,60

INSTALLATION



Risk of incorrect installation.

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

9. INSTALLATION CONDITIONS

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



Risk of damage to the device.

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

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

chapter).



Burn or fire hazard! Caution! Hot surface!

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

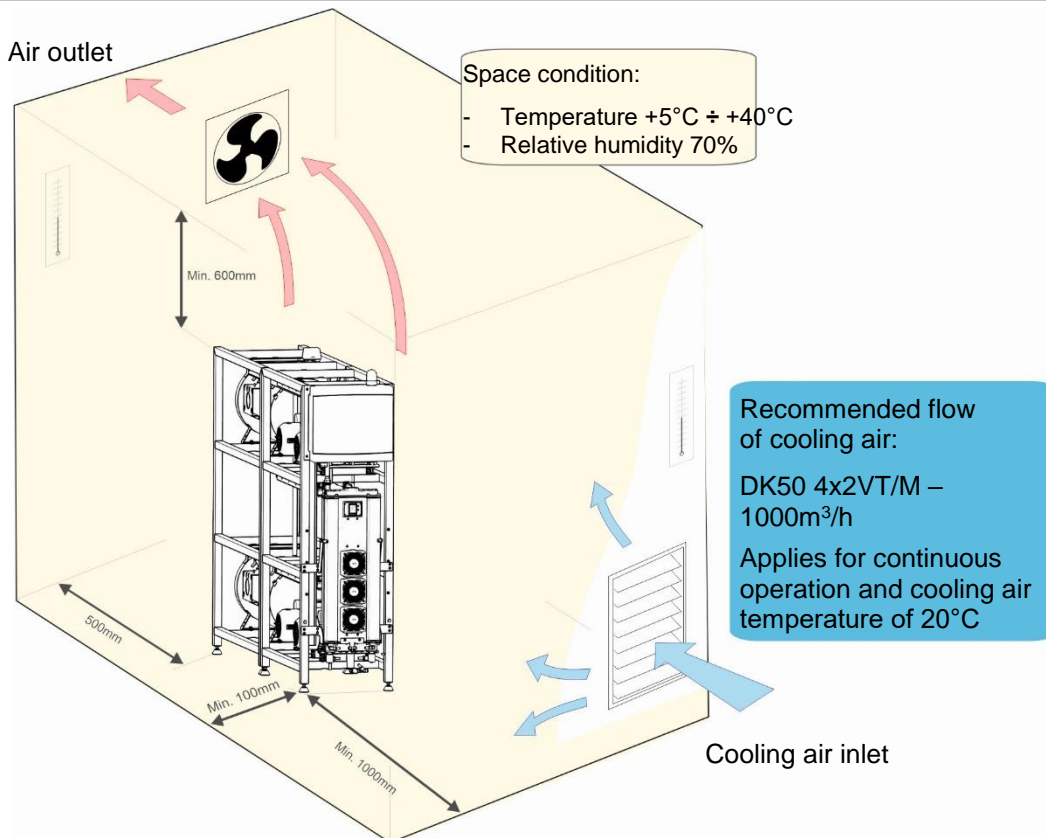


High temperature hazard

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



Ensure the power cords and air hoses are not damaged. The power cord must not show signs of stress and must be kept without tension (placing any objects on it is prohibited), and subjecting the cord to external heat in any form is prohibited.

Fig. 4: Equipment installation

10. COMPRESSOR ASSEMBLY

10.1. Handling and releasing the compressor

- Unpack the compressor (compressor modules, dryer and air tank) from the packaging and remove the transport anchors from the pallet. All modules are secured to pallets.
- Use a fork lift or similar hoisting equipment to handle and position the product.
- Position the compressor module at the site of installation (Fig. 5).

Fig. 5: Handling the compressor module

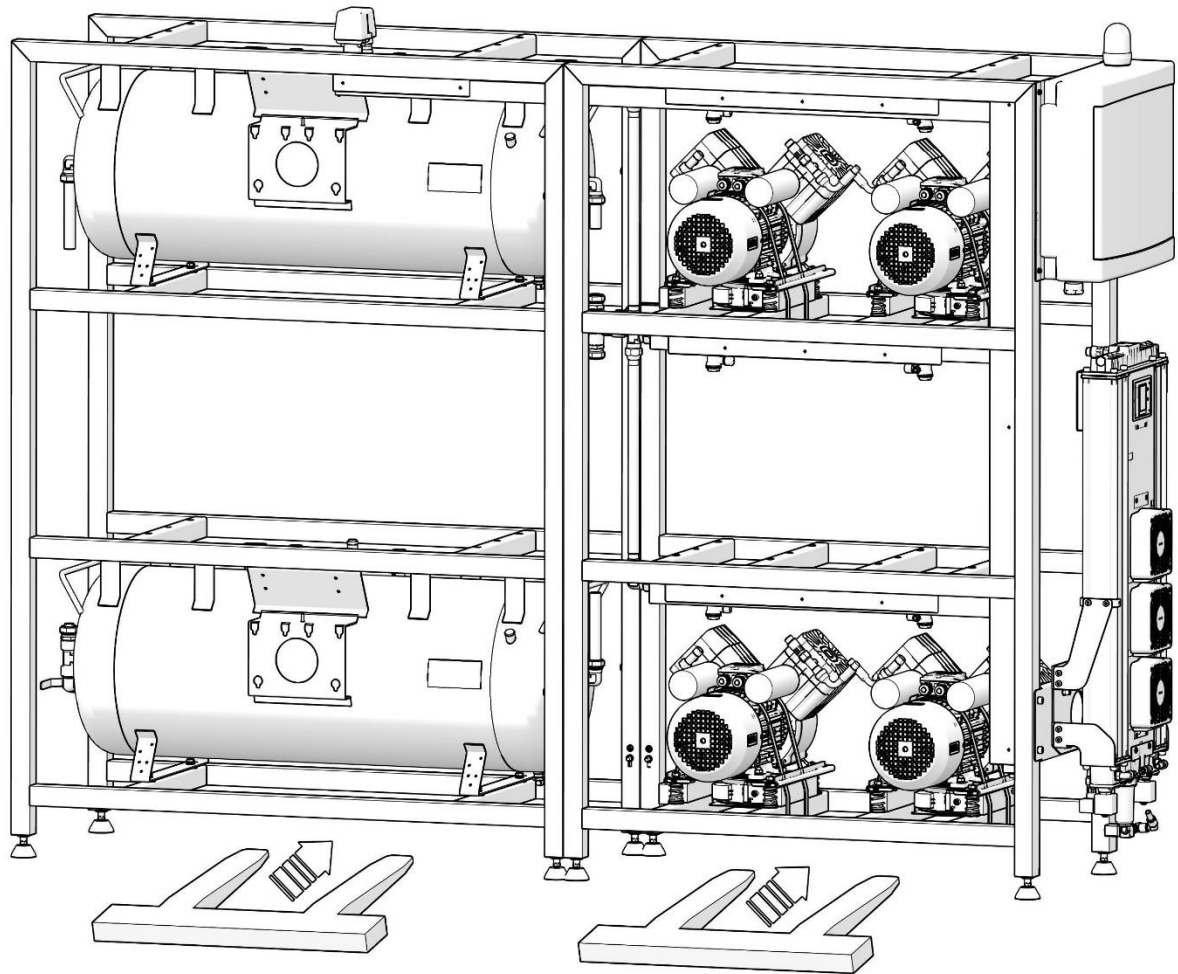


Fig. 6: Levelling the compressor

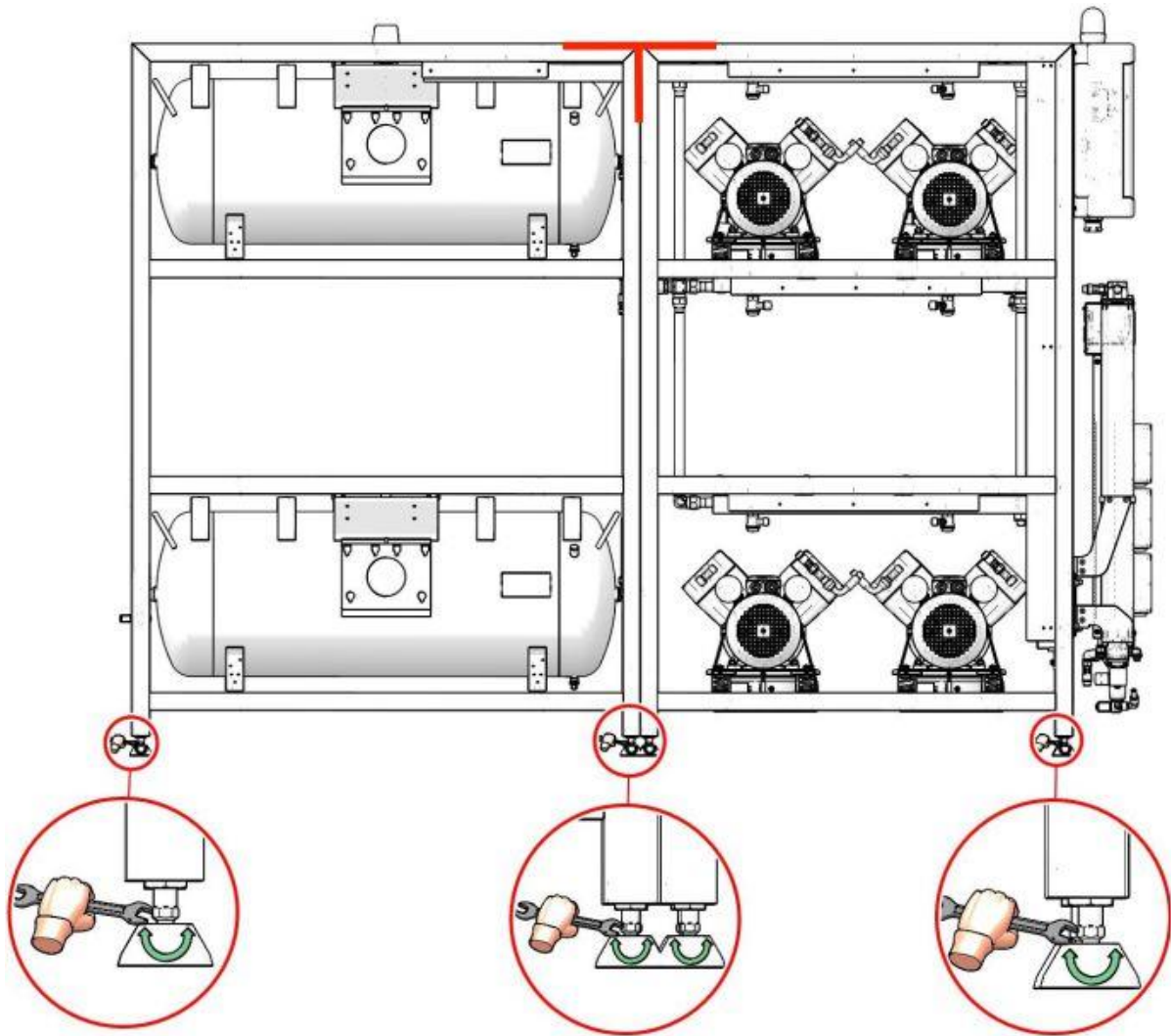
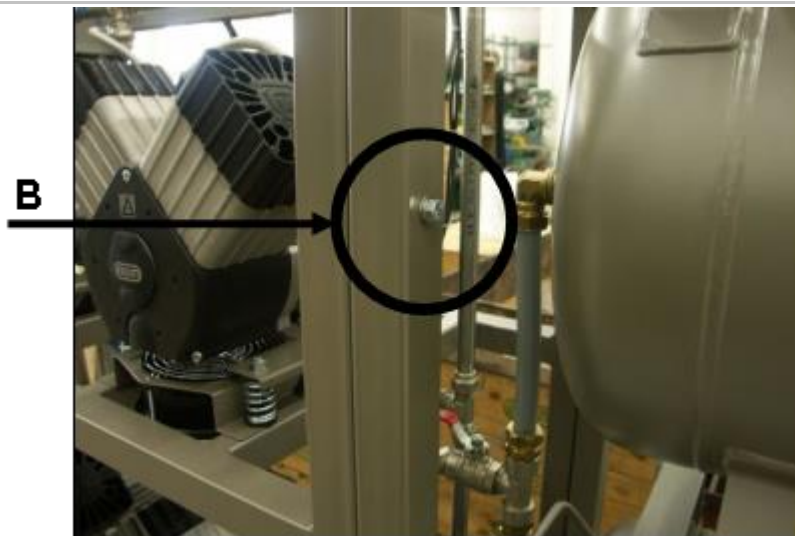


Fig. 7: Frame installation

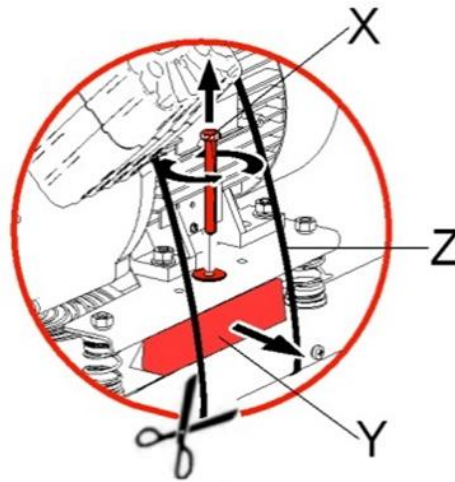




Prior to installation, ensure that the compressor is free of all transport packaging and stabilizers to avoid any risk of damage to the product.

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

Fig. 8: Releasing the air pumps



- Remove the transport stabilisers from the air pumps (X, Y, Z) (Fig. 8).
- DK50 4x2VT/M – 8x mounts.

11. PNEUMATIC CONNECTION

Connect the compressed air lines at (C) and connect the equipment to the compressed air

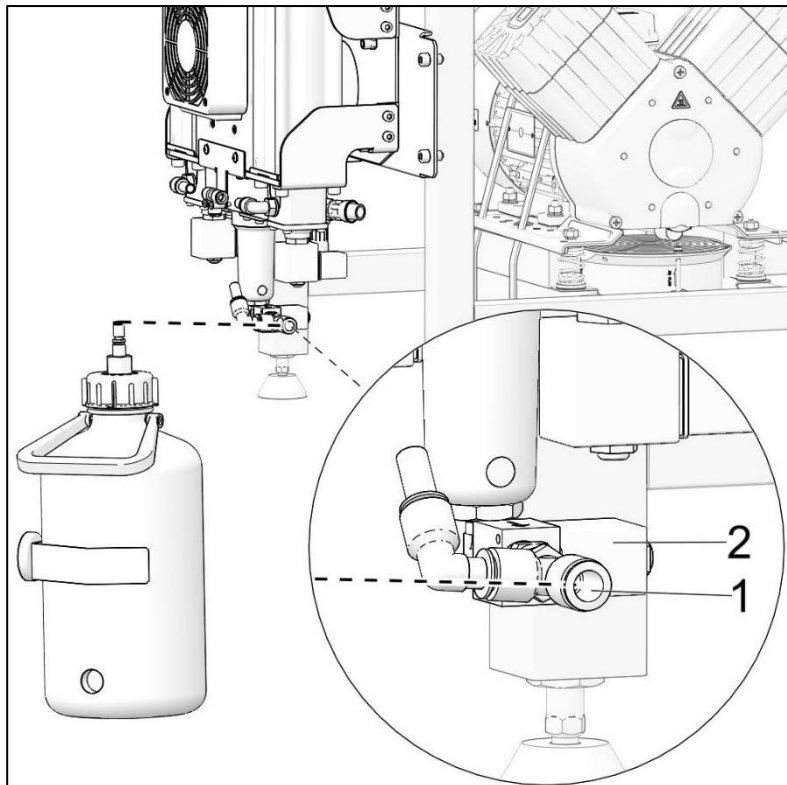
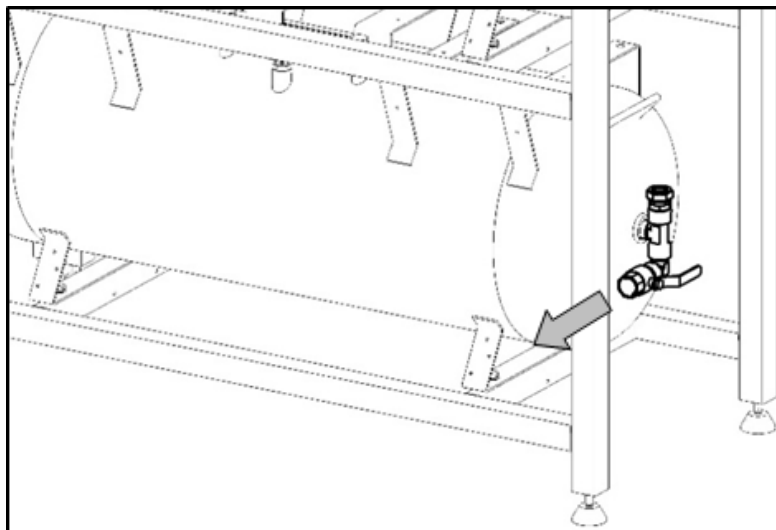
system from the G3/4" threaded outlet ball valve.



Fig. 9: Pneumatic connection

Condensate outlet from dryer**Injury hazard.****Do not connect the condensate drain directly to a waste drain!
Passers-by may be injured!**

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

**Fig. 10: Condensate drain****A G3/4" (F) ball valve is installed on the compressed air outlet from the air tank.****Fig. 11: Air outlet from the air tank**



Potential for damage to pneumatic components.

Ensure the air hoses are not kinked.

12. 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.

Cord type (minimum requirements) H05 VV-F_5G10



Risk of electric shock.

Ensure full compliance with all local electrical codes. The mains voltage and frequency must comply with the data stated on the nameplate on the equipment.

Fig. 12: Connecting the protective PE conductors

- Connect the disconnected PE protective conductors and then the grounding wire after connecting (D).



Fig. 13: Connecting the electrical cables

- Connect the disconnected electrical cables (E) to the terminal strips in the electric motor boxes. Insert the cables into the electrical installation trays and enclose with a cover.

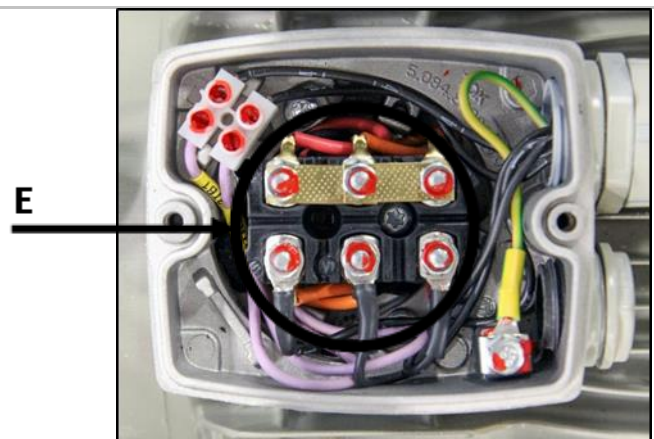
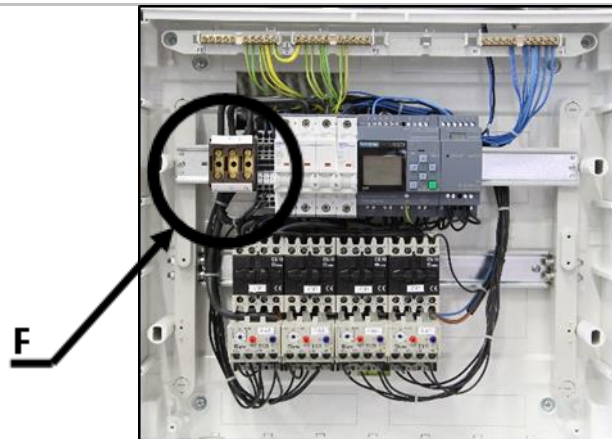
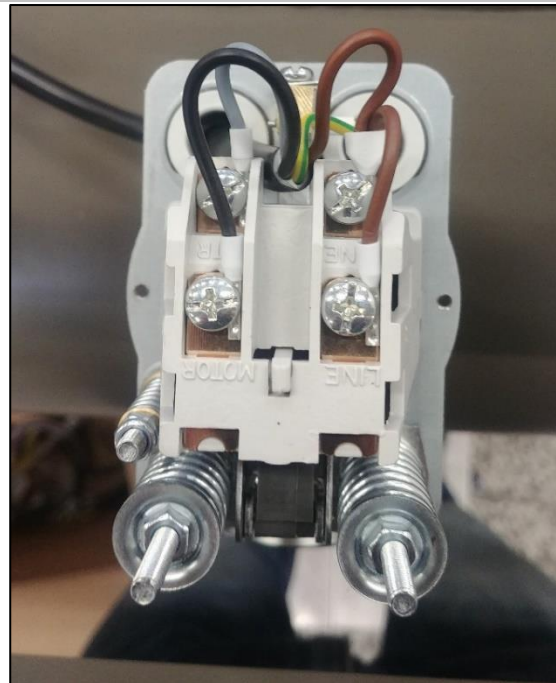


Fig. 14: Connecting the power cord

- Connect the TN-S mains to the power supply terminal in the equipment's junction box (F). Connect the electrical components to the mains in accordance with the valid electrical standards and regional regulations.

**Fig. 15: Connecting the cable to the pressure switch**

- Connect the loose cord to the pressure switch per the schematic, or Fig. 15, tighten the screws and secure with paint.



Fire hazard and risk of electric shock.

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

13. COMMISSIONING

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

automatic condensate drain is connected to the collection vessel.

- Check the date and time settings on the LOGO! controller (see chap. 15.1)
- Configuring the language on the dryer display (see chap. 18.2)
- Configuring the date and time on the

dryer display (see chap. 18.3)

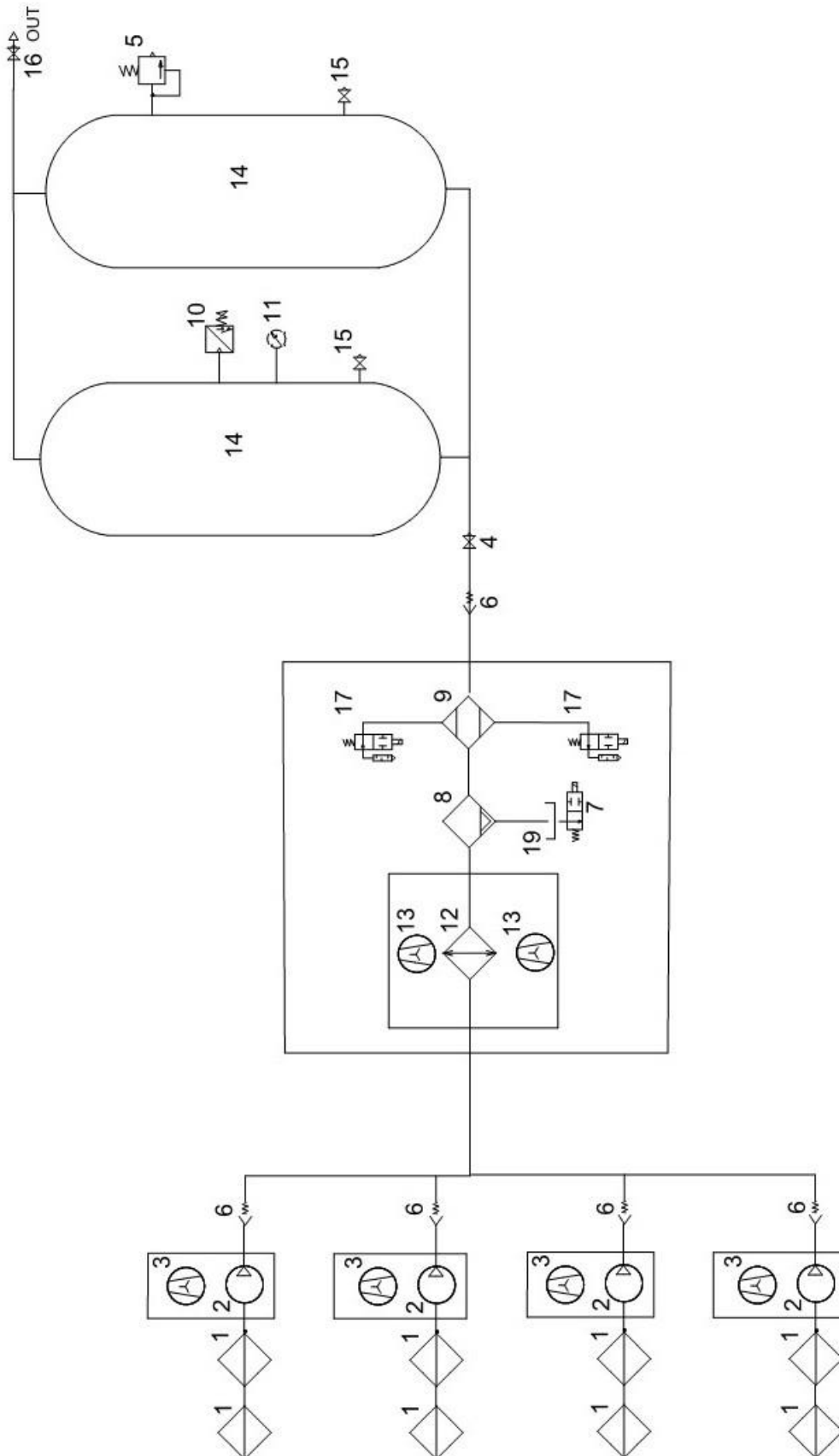
- Check the drying mode settings (see chap. 18.4)



The compressor is not equipped with a backup power supply.

14. PNEUMATIC DIAGRAMS

DK50 4x2VT/M



Description to pneumatic diagrams:

- | | |
|------------------------------------|-----------------------------------|
| 1. Inlet filter | 11. Pressure gauge |
| 2. Air pump | 12. Cooler |
| 3. Compressor fan | 13. Cooler fan |
| 4. Ball valve | 14. Air tank |
| 5. Safety valve | 15. Condensate drain valve |
| 6. Non-return valve | 16. Outlet valve |
| 7. Condensate drain solenoid valve | 17. Dryer solenoid valve - outlet |
| 8. Condensate separator | 18. |
| 9. Dryer | 19. Condensate collection vessel |
| 10. Pressure switch | |

OPERATION

ONLY TRAINED PERSONNEL MAY OPERATE THE EQUIPMENT!



Potential for damage to pneumatic components.



Risk of electric shock.

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).

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



Burn or fire hazard.



Risk of damage to the dryer.

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

The dryer may be damaged if operated at ambient temperatures that are higher than the maximum working temperature (ambient temperature >30°C or inlet air temperature of >100°C)



Warning - compressor is controlled automatically.



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

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.

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

15. SWITCHING THE COMPRESSOR

After the pressure switch (6) is activated and circuit breakers FA13 (26) and FA14 (27) are turned to position I, the compressor air pumps sequentially come online (the air pumps in the second column or shelf react with a 2 s delay). Circuit breaker FA13 (26) functions as the main switch.

The air pumps switch on (at ≤6 bar) and off (at ≥8 bar) automatically and are controlled by the LOGO! (28) controller and the pressure switch (6) based on compressed air usage.

If the motor surface temperature exceeds 40°C, the temperature switches automatically turn on the compressor cooling fans, switching

them off once the temperature decreases to approximately 32°C.

15.1. Controller LOGO!

This controller controls the compressors monitors and signals alarms (as described below) and displays the number of operating hours. It is composed of a base module and an expansion module. The base module includes a display and the cursor (control) buttons ▲, ▼, ►, ◀, OK and ESC. The expansion module has LED indicators for RUN and STOP.

The following appears:

- Press **ESC** on the controller repeatedly until the main menu appears.

>Set Clock..
S/W time
Sync

Start the controller program as follows:

- press **▲** or **▼** to move the “>” cursor on the display to **Start** and press **OK** to confirm

>Program
Card..
Setup..
Start



Never press OK if the cursor “>” is at Program! This menu provides access to windows with software functional blocks. Changes to the parameters in these blocks have a direct effect on the functionality of the equipment!

pumps; this status is indicated by an activated HA beacon and a message on the display.

- **medium priority alarm** – triggered by a malfunction in one or more air pumps and the equipment supplies air to the central compressed air system using only functional air pumps; this status is indicated by a flashing HA beacon and message on the display.

Alarms and alarm signalling

The equipment automatically checks the functionality of specific parts of the equipment and indicates when maintenance service is needed. The controller determines an alarm as any situation in which the equipment functionality does not match the standard conditions.



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

The individual alarms are indicated by an alarm signal indicated by an activated HA beacon (29), with one or more alarm messages on the controller's display.

Low priority alarm conditions

The equipment is equipped to monitor and signal maintenance intervals. Maintenance intervals are whole number multiples of 2000 operating hours $I = n \times 2000$ hours ($n = 1, 2, 3, \dots$). The maintenance of specific components pursuant to the attached Table 2 must be performed once a maintenance interval is passed. This condition is indicated by an activated yellow HA beacon and an information message on the display:

Alarms are classified based on their severity into:

- **low priority alarms** – signal a maintenance interval $I = n \times 2000$ hours ($n = 1, 2, 3, \dots$) and the equipment supplies air to the central compressed air system using all air

**MAINTENANCE
TIME
CALL SERVICE**

**Press & hold
Esc + ▼ 3 sec.
for interval
reset**



Maintenance intervals are counted from the moment the equipment is first started up.

This table must be inserted into the compressor maintenance log along with Table 3 in which maintenance work, inspections of

the equipment during each maintenance interval and other records regarding the equipment will be recorded.



This signal from the controller must be cancelled once the maintenance work related to a service interval signal is completed by pressing and holding ESC and ▼ for 3 seconds. Cancelling this signal also resets the maintenance interval to a value of 2000.

Medium priority alarm conditions

The equipment is equipped to monitor and signal compressor malfunctions. Such a situation may occur for mechanical or electrical reasons in any of the compressors. This is frequently accompanied by an increase in the current draw. This trips the thermal over current protection in the FA device for the respective air pump or air pumps (the blue button is in position M and the yellow off indicator is not pressed).

Such alarm is signalled by a flashing HA beacon –P1 and an the following message appears on the display:

MOTOR FAILURE CALL SERVICE!

Press & hold Esc + ▲ 3 sec. for alarm reset

The beacon will continue to flash after the air pump malfunction is remedied. Turn off the alarm by pressing and holding **ESC** and **▲** together for 3 seconds.

be turned off during maintenance work by pressing and holding **ESC** and **▲** together for 3 seconds. Malfunctions are temporarily indicated by a flashing display on the controller and the subsequent message:

The flashing beacon function and alarm may

If display is flashing then motor failure still

remains! Check motors or relays FA

This message automatically disappears once the malfunction on the air pump is remedied and it is placed back into service.



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

One the alarm is over, the service interval is indicated by the activated HA beacon.

16. SWITCHING OFF THE COMPRESSOR

Use circuit breakers FA13 and FA14 to switch off the equipment for service or other reasons. Vent the air tanks by disconnecting from the

central compressed air circuit and opening the outlet valve or the drain valves.

AD DRYER

17. PRINCIPLE OF OPERATION

The dryer is controlled by a signal from the compressor pressure switch.

When the compressor is running, compressed air enters the cooler where it is cooled, and a portion of the condensed moisture is separated in the integrated cyclical separator. Solenoid valve V3 is located in the bottom of the separator, and it drains off the condensate from the separator at regular intervals.

Air then passes to the chamber of logic valve OR1 which senses the pressure. If the pressure in the valve chamber does not reach $P1 = 3$ bar, regeneration solenoid valves V1 and V2 (normally closed type) remain closed and regeneration is not initiated. If the pressure in the chamber of the logic valve reaches minimum 3 bar, chamber switching is initiated using the logic described in point 17.1.

When the signal from the compressor pressure switch deactivates, regeneration valves V1 and V2 open for a short time to vent the compressor aggregate and to vent the dryer chamber.

Dryer venting and regeneration is completed via the hose shared with the condensate separator drain and for this reason the condensate outlet cannot be connected directly to a drain

17.1. Dryer regeneration

Dryer regeneration is initiated when working pressure $P1 = 3$. During regeneration, valves V1 and V2 switch cyclically, whereby there is a short delay (dT) to equalise the pressures in the chambers and during which both valves are closed before each switching cycle.

Working pressure is in chamber 1 and the chamber is in the drying phase, while there is atmospheric pressure in chamber 2 and this chamber is in the regeneration phase. The chamber is regenerated by air passing

through the dryer nozzle.

17.2. Warning system

Every warning is indicated by a corresponding visual signal (see Chapter 20) and the visual signal flashes. Call an authorised service provider to conduct repairs required in the event of a failure.

Warning states indicate a potential failure of the device. Therefore, warning signals may not be deactivated.

All warning signals are intermittent – when the cause of the warning no longer exists, the warning signals are deactivated.

Operator's position. No specific operator's position is required. The operator may remain within range of a visual warning signal depending on actual operating conditions.

Low pressure. This signal is active when the dryer pressure sensor reads low pressure in the dryer under the defined limit of 3 bar. An air leak from the compressor/dryer, malfunction of the control solenoid valves on the dryer or a software error may activate this alarm during operation.

High pressure. This signal is active when the dryer pressure sensor reads an increase in pressure over the high limit. The aggregate will then shut down and remain shut-down until the pressure decreases. If the aggregate does not shut down, excess pressure is vented by the safety valve on the compressor's air tank.

High dew point. This signal is active when the dew point sensor reads a high dew point value.

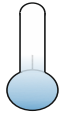
Expiration of service interval. This signal is activated until service is performed and the interval reset, or a new service interval is entered.

18. USER INTERFACE / SETTINGS

18.1. Meaning of symbols on the display



Symbol representing the user manual, or to read the user manual.



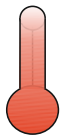
Symbol expressing the ambient temperature (from 25°C) related to the selected mode.

The program adjusts the chamber pre-filling in the given mode.



Symbol expressing the ambient temperature (from 25°C to 30°C) related to the selected mode.

The program adjusts the chamber pre-filling in the given mode.



Symbol expressing the ambient temperature (over 30°C) related to the selected mode.

The program adjusts the chamber pre-filling in the given mode.



Back to the main menu on the 4 main screens.



Go back.



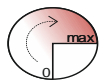
Symbol for the service interval.



Symbol for when the dryer chamber is currently in regeneration.



Symbol for when the dryer chamber is currently drying.



Symbol for chamber pre-filling – equalisation of pressure in chambers.



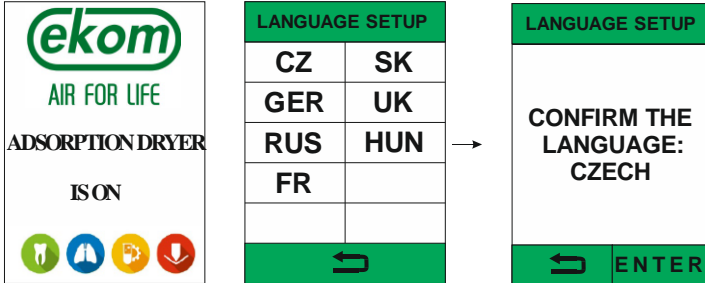
Indication the device is operating

Indication of an alarm state
(on until the alarm state no longer)

18.2. Initial language settings for the user interface

The option to select a language appears when the program is first launched. The service

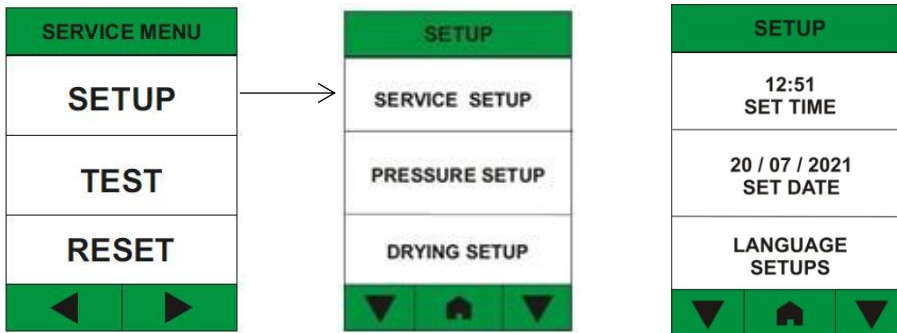
technician selects the given language during installation based on the geographic location of the dryer installation. The program saves and remembers this setting. The option does not appear when the program is restarted.



18.3. Setting the date and time during commissioning

It is recommended to set the date and time during commissioning. These settings are changed in the service menu in the SETUP

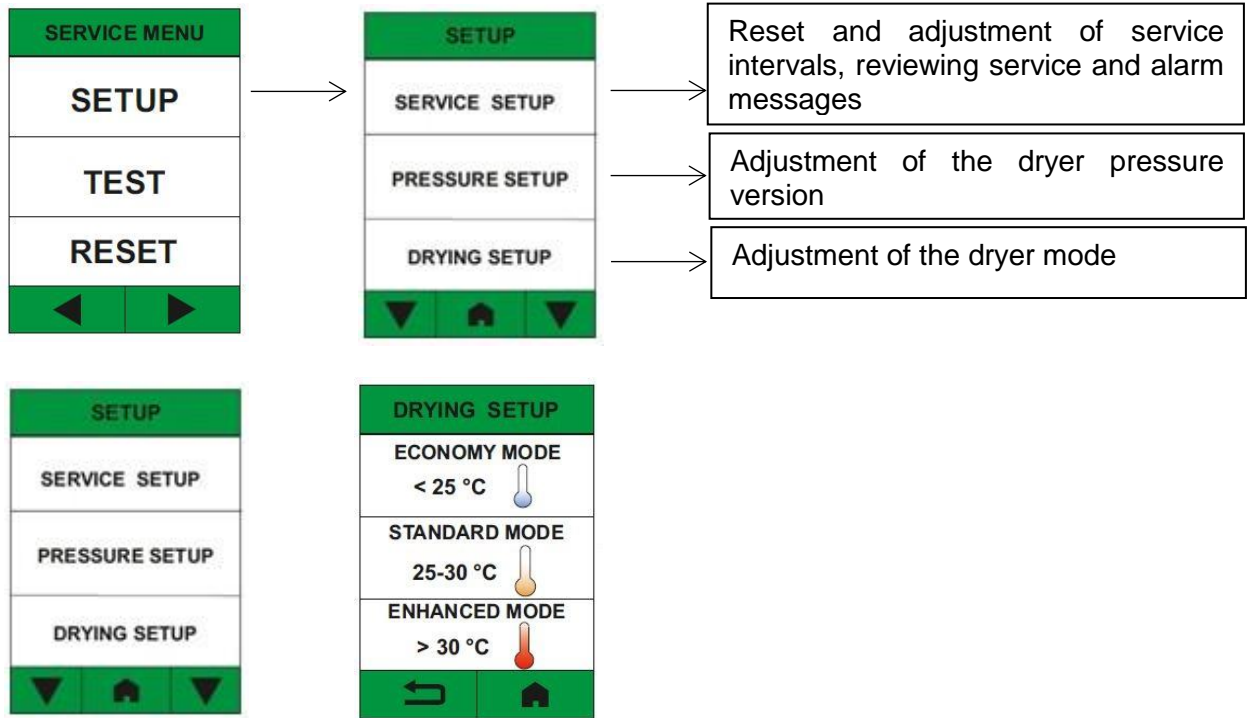
section. Access to the service menu is protected by a code (1992).In SETUP you have to tap down arrow to set date and time. In the same way, it is possible to reset the user interface language via LANGUAGE SETUP..



18.4. Setting the drying mode during commissioning

It is recommended to set the air-drying mode

during commissioning. These settings are changed in the service menu in the SERVICE SETUP section. Access to the service menu is protected by a code.



The drying mode is set based on the expected pressure range in which the device will operate and the version of the compressor (with or without a cabinet).

- compressor without a cabinet $t_0 < 25\text{ °C}$ - set to ECONOMY mode
- compressor without a cabinet $t_0 = 25\text{ °C}$

- 30 °C - set to STANDARD mode
- compressor without a cabinet $t_0 > 30\text{ °C}$ - set to ENHANCED mode
- compressor in cabinet - set to ENHANCED mode

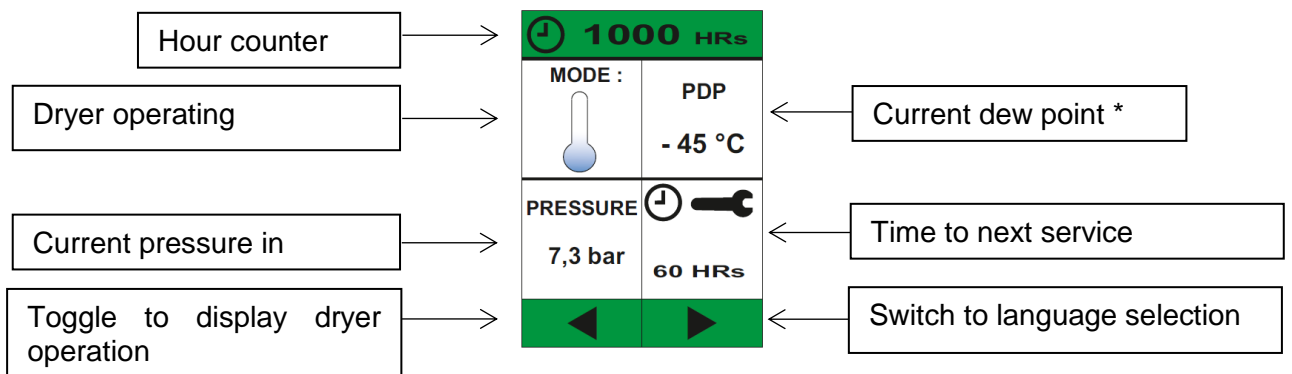
t_0 - ambient temperature

19. MAIN SCREENS

The home screen opens once the user interface language and drying mode are set. There are 4 main screens accessed from the home screen.

The arrows at the bottom of the screen are used to navigate between the individual screens.

19.1. Home screen



(*this information is only shown if the compressor is equipped with a dew point sensor)

- Basic information and measured parameters are shown on the dryer

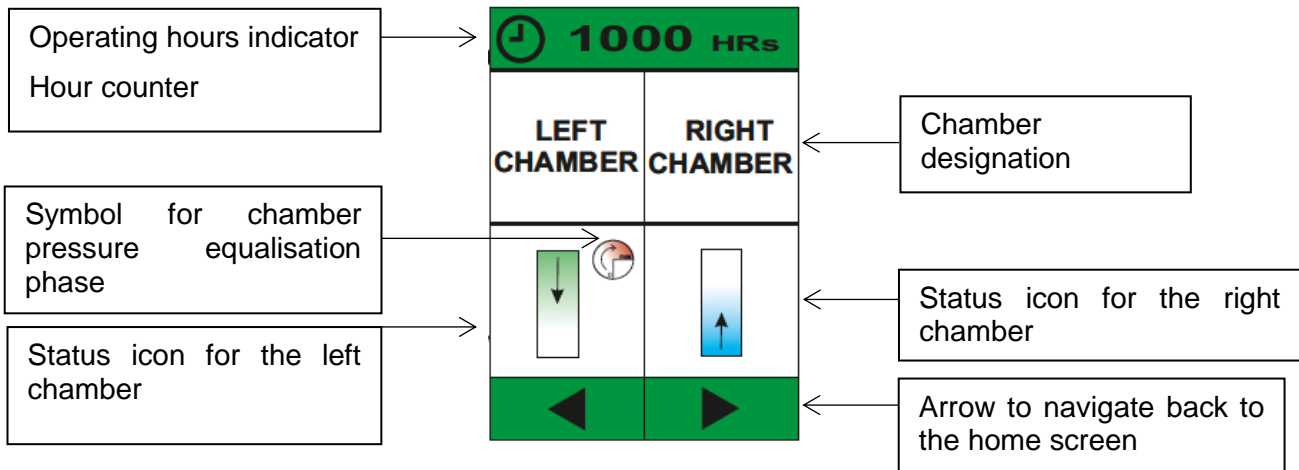
home screen. The dryer operating hours indicator is located at the top of the screen. The home screen has 4 main tiles that display the following information:

- Dryer operating mode (see chap. 18.1)
- Current pressure in the dryer (min. working pressure to activate dryer

regeneration is 3 bar)

- Current pressure dew point value (only for compressors equipped with dew point sensors)
- Remaining time to the next service interval (see chap. 20.1, 20.2 – service intervals).

19.2. Dryer operation screen



The dryer operating hours indicator is located at the top of the screen. The dryer operation screen is also divided into 4 tiles, which

describe the dryer chamber working cycles using a graphical depiction of the operating states of each chamber.



Symbol for when the dryer chamber is currently in regeneration.

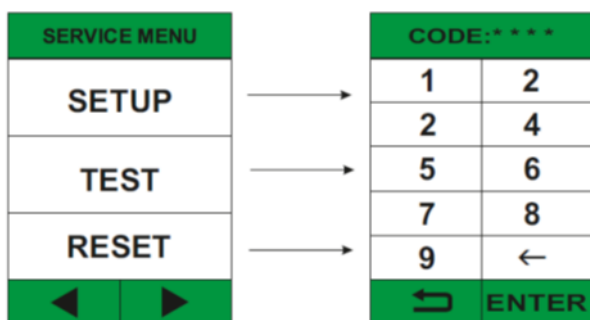


Symbol for when the dryer chamber is currently drying.



Symbol for chamber pre-filling – equalisation of pressure in chambers.

19.3. Service menu screen



The service menu is intended exclusively for service personnel. Access to individual menu

items is password (1992) protected.

20. INDICATION OF MAINTENANCE AND ALARM STATES

The adsorption dryer controller is capable of measuring selected parameters (pressure and pressure dew point in versions with a dew point sensor) and for assessing the basic dryer operating states.

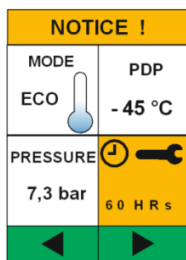
Based on the measured parameters and service details, the controller displays

information on faults using the following notifications and warnings.



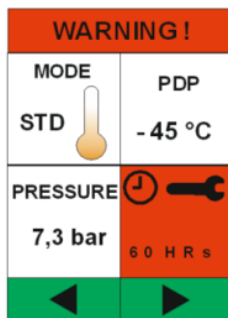
The compressor beacon does not light up in the event of a fault in the adsorption dryer!

20.1. Notification – Upcoming service interval



- 100 operating hours prior to the next service interval a **yellow notification appears (“Notice!”)**. The service tile also lights up orange.
- The remaining hours to the next service interval are also displayed.
- The warning is shown until service is completed and the service interval is reset.

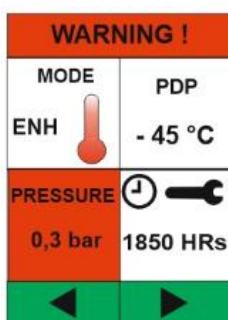
20.2. Warning – Service interval exceeded



- A red warning is shown (“Warning!”) once the service interval has lapsed. The service tile also lights up red.
- The warning is shown until service is completed and the service interval is reset.
- The hours to the next service interval are also displayed.
- A list of warnings is saved in the “Warning log”
- The dryer continues operating normally

20.3. Alarm conditions

Low / high pressure



- A red warning is shown (“Warning!”) if low pressure (<3 bar) or high pressure (> 8.5 bar, or > 10.5 bar depending on the pressure version) is detected. At the same time, the current pressure tile lights up red.
- The warning is displayed as long as the alarm condition endures.
- A list of warnings is saved in the “Warning log”
- The dryer is not operating normally, regeneration is not initiated, the compressor must be shut down



A high dew point alarm may appear when the unit is first placed into service. The alarm will persist until the dryer regenerates. The regeneration time of the dryer depends on many parameters of use of the device. Dryer regeneration should take no more than 24 dryer working hours. If the dryer cannot meet the dew point set-point during the first 24 hours, please contact service personnel.

20.4. „Call Service“ screen



- The “Call Service” screen alternates with the main screen if a notification or warning occurs.

PRODUCT MAINTENANCE**21. PRODUCT MAINTENANCE**

The operator should carry out device checks regularly in the intervals defined by applicable regulations. Test results must be recorded.

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 21.1) 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 21.1) may only be performed by the operator's trained personnel.

Only use manufacturer-approved replacement parts and accessories.



Danger of injury or equipment damage.

Prior to commencing compressor maintenance, it is necessary to:

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

Prior to commencing dryer maintenance work, first:

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



Venting compressed air poses an injury hazard.

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

**Burn hazard.**

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

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

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



Turn off the circuit breakers at the switchboard before starting any subsequent maintenance work.

21.1. Maintenance intervals

Time interval	Once a day		Once a week		Once a year		Once every 2 years		2000 h	4000 h	6000 h	8000 h	10000 h	12000 h	16000 h	20000 h	Chap.	Set of replacement parts	Performed by	
	x		x																operator	qualified technician
Check of product operation	x																21.2	-		
Check compressor fans operation		x															Visual check of rotation during air pump operation	-		
Equipment inspection								x		x							21.3	-		
Compressor fan replacement														x				035300016-000		
Replacement of cassettes with adsorbent media ADM 500													x				See the service manual	603022485-000		
Inspection of electrical connections									x		x	x	x				21.4	-		
Check the operation of the non-return valves										x		x					21.9	-		
Check of safety valve																	21.7	-		
Inlet filter replacement																	21.6	025200139-000 025200150-000		

Time interval	Once a year										Set of replacement parts	Perform ed by			
	Once a day	Once a week	Once a year	Every 2 years	2000 h	4000 h	6000 h	8000 h	10000 h	12000 h			16000 h	20000 h	
Replacement of the dryer's solenoid valve												x	See the service manual	025300117-001	qualified technician
Replacement of the dryer's logic valve ball						x						x	See the service manual	069000317-000	
Compressor performance check						x	x	x	x	x			21.8	-	
Check pneumatic connections for leaks						x	x	x	x	x			21.3	-	

21.2. Check of product operation

- Check air pump 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.

21.3. 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 air pump for normal operation and noise levels.
- Fan operation check – the fans must be running during the defined compressor work cycles.
- Check the filter condition – clean dirty

filters or replace with new filters.

- Check the solenoid valves in the valve module.
- Check the operation of the automatic condensate drain.
- Call in service personnel if a malfunction is suspected.

21.4. Inspection of electrical connections



Risk of electric shock.

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

- Check the mechanical operation of main circuit breaker FA13.
- Check the power cord, conductors connected to the X1 terminal strip and the main circuit breaker FA13 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 FA1-6, contactors KM1-6, 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.

21.5. Condensate drain



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

Regularly empty the condensate collection vessel.



Switch off the compressor every time before emptying the vessel!

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

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

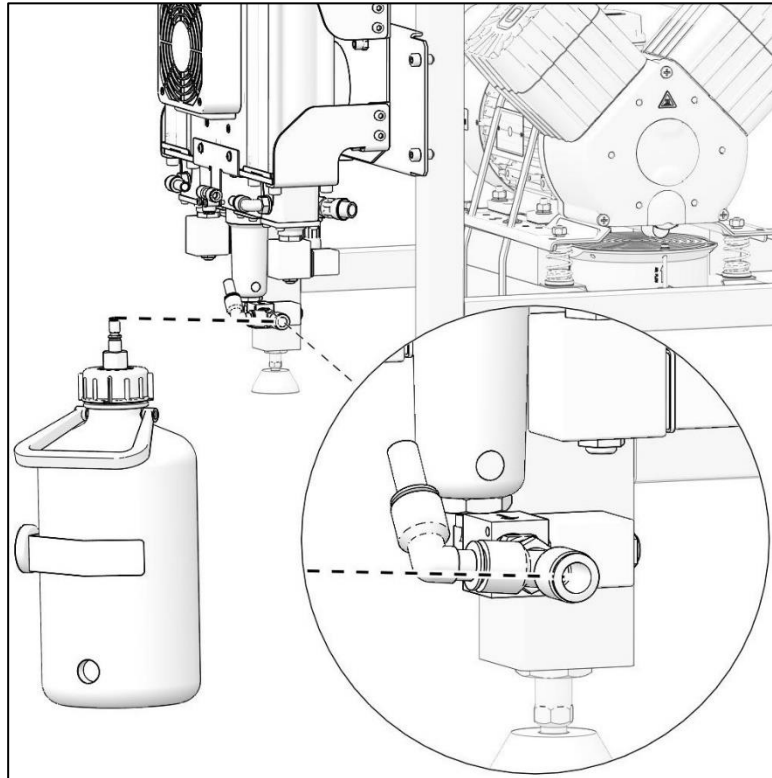


Fig. 16: Check of the condensate collection vessel

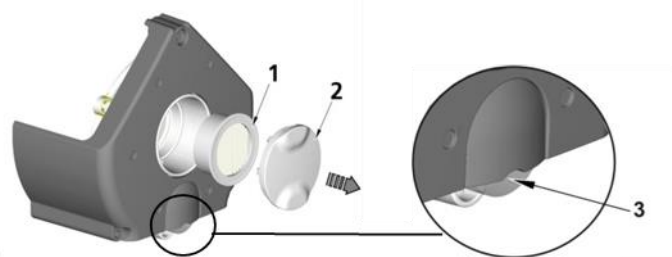
21.6. Inlet filter replacement



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.

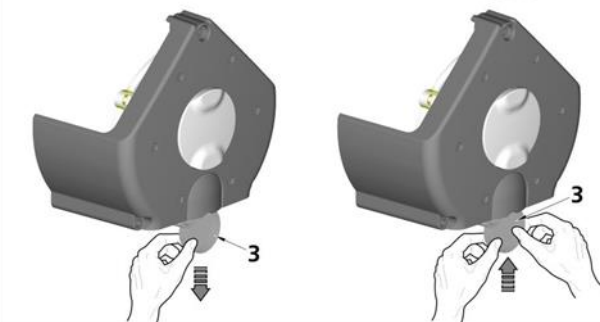


Fig. 17: Inlet filter replacement

21.7. Check of safety valve



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

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

Never adjust a safety valve.

- 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.



Venting compressed air poses an injury hazard.

Wear safety glasses when inspecting a safety valve.

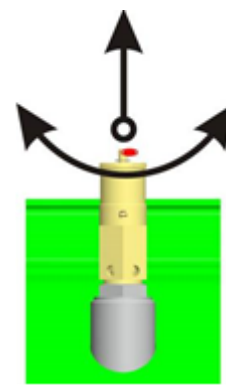


Fig. 18: Check of safety valve

21.8. 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.

21.9. 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 air pump 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 non-return valves.

Air tank:

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



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

21.10. 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. 19: Check of solenoid valve operation

21.11. Check the function of the pressure switch

Every pressure switch has a defined hysteresis of ~2 bar. Functionality is checked visually. If the air pumps reach the upper limit, the pressure switch must disconnect the motors from the power. The process is reversed and the motors started at the low pressure limit.

21.12. Dew point sensor calibration

It is recommended to calibrate the dew point sensor every 2 years on compressors equipped with this sensor. Calibration is performed by the manufacturer (Vaisala) and must be ordered online.

Sensor calibration ordering process:

- Visit the website www.vaisala.com,

and then navigate to the *Services* section and select *Calibration and repair services*.

- Then enter the type of sensor (sensor type: **DMT143**) and select a calibration type, then follow the provided instructions.

21.13. 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.

22. 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, close the condensate drain valve and disconnect the equipment from the mains.

23. 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.

TROUBLESHOOTING

Risk of electric shock.

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



Working with pressurised pneumatic components poses a risk of injury.

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



Troubleshooting may only be performed by a qualified service technician.



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

Never adjust a safety valve.

Malfunction	Possible cause	Solution
Compressor does not start	Problem with electrical power source	Main breaker is off
	Power loss	Check mains voltage
		Loose terminal in switchboard – tighten
		Check the primary power connection - replace if damaged
Pressure switch failed	Check terminals and operation of the pressure switch - replace if damaged	
Any of the air pumps does not start up (indicator is on)	Loss of power to motor	Check mains voltage
		Check the function of the contactor, and thermal relays - replace if damaged
		Loose terminals at the motor terminal strip - tighten or replace if damaged or broken
	Motor winding shorted, damaged /open thermal protection/ high ambient temperature	Replace the motor / decrease the ambient temperature
	Seized up piston or other moving component (mechanical damage to a moving part)	Replace damaged parts
Controller malfunction	Check controller operation, check to ensure software is present - replace if damaged or upload the correct program	
RUN/STOP indicator is not green	Loss of connection between controller and expansion module	Check connection – replace if damaged
	Power loss	Check mains voltage
		Loose terminal in switchboard – tighten
	Problem with electrical power source	Check the primary power connection - replace if damaged
Controller or expansion module malfunction	Main breaker is off	
Air pumps switch often, even without demand for air	Air leak in compressed air distribution system	Replace failed controller or expansion module
	Leaky check valves	Check compressed air distribution system – seal loose joints
		Test check valves and clean, or replace if damaged

	Leak through solenoid valves once regeneration is complete	Clean the check valve - replace if damaged
	Leak at pressure sensor and safety valve	Test their function and clean, or replace if damaged
Output of certain air pumps is reduced, extended run cycle Output of certain air pumps is reduced, extended run cycle	Air pump leaking	Check connections on the air pump for leaks – tighten leaking connections
	Worn piston rings	Replace worn piston
	Gasket between cylinder head and valve plate damaged	Replace gasket, tighten
	Air pump leaking	Check connections on the air pump for leaks – tighten leaking connections
One of the air pumps is noisy (knocking, metal noises)	Damaged motor bearing	Replace damaged bearing
	Damaged piston bearing, piston rod	Replace damaged piston
	Failed (cracked) rubber mount spring	Replace damaged spring with new spring
High ambient temperature causes compressors to switch off in vertical stacks (overheating)	Lack of ventilation in compressor room	Secure suitable ambient conditions
	Cooling fans for aggregates, cooler and enclosure do not work	Defective fans - replace Defective temperature switch - replace
Degraded drying performance – high-pressure dew point (condensed water in the air)	Low operating pressure	Reduce the demand for air, check the output from the compressed air source, fix any leaks in the distribution system
	Regeneration solenoid valve not working	Check coil operation, replace if damaged
	Air regeneration nozzle plugged	Clean or replace the nozzle (see product maintenance)
	Cooling fan not working	Check the power source to the fan Replace damaged fan
	Dirty cooler	Inspect the cooler and clean as necessary
	Silencer plugged at outlet from regeneration valve	Inspect the silencers. Clean or replace the silencer if flow resistance is too high or if heavily soiled.
Dryer emitting high levels of noise	Damaged fan	Replace damaged fan
	Damaged silencer	Replace the silencer
	Air leaking through relief valve at dryer inlet	Check the dryer connection to the mains and dryer connections, check dryer operation, check the dryer's working pressure, and replace defective components.
Air leaking through relief valve at dryer inlet	Compressor running at high working pressure	Check the compressor's working pressure setting
	Dryer inlet solenoid valve not working	Check coil operation, replace if damaged Inspect the condition of the valve - clean the valve or replace if problems persist
	High pressure in equipment resulting from plugged filters	Check the internal filters and accessory filter assemblies. Clean or replace dirty filters.

Once a fault is cleared and after reassembling the dryer, the condensate must be drained from the air tank, then dry the air tank, and the

dryer must be regenerated, best when using continuous compressor operation at a pressure of around 7.0 bar for a period of at

least 1 hour.



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

24. 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.

ANNEX

25. INSTALLATION RECORD

1. Product: (model) DK50 4x2VT/M		2. Serial number:	
3.1. User's name:			
3.2. Address of installation:			
4. Equipment connected to the compressor:			
5. Installation / Commissioning:		6. Contents of operator training:	
Product completeness check **	Y	Description of the product and functions**	Y
	N		N
Documentation completeness check **	Y	Product operation: turning on/off, controls, control procedures, data on the display panel, warnings, operation in warning conditions**	Y
	N		N
Installation/connection to equipment **	Y	Product maintenance: maintenance intervals, maintenance procedure, service intervals, operating activities**	Y
	N		N
Functional test **	Y	Safety measures, warnings – their meaning and compliance **	Y
	N		N
Notes:			
7. Operator instructed on safety measures, operations and maintenance:			
Name:		Signature:	
Name:		Signature:	
Name:		Signature:	
8. Installation and instruction performed by: First name/Last name		Signature:	
Company:		Address:	
Phone:			
Email:		Date:	
9. Distributor:			
Company:		Address:	
Contact person:			
Phone:		Email:	

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



DK50 4X2VT/M

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