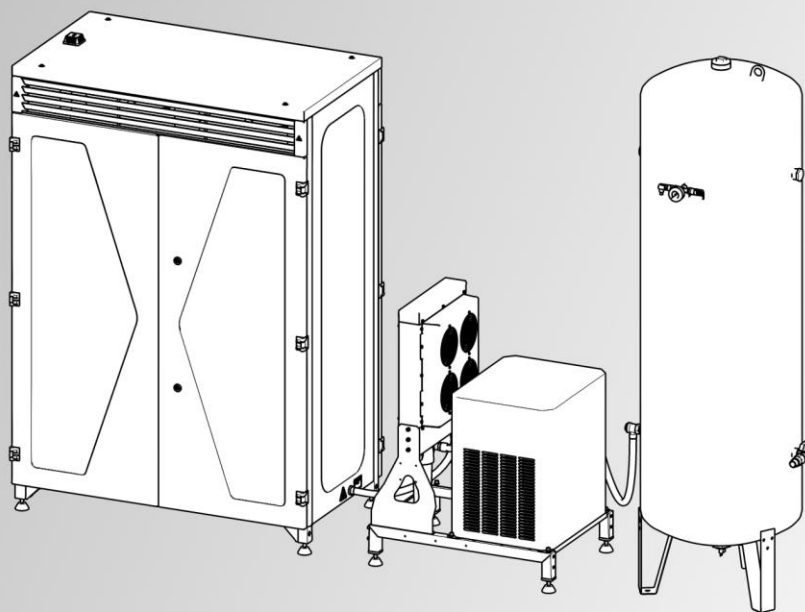


OIL-FREE

AIR FOR LIFE

DK50 4X4VRT/M

DK50 6X4VRT/M



USER MANUAL

EN

ekom[®]

May 2017

Z1787/2017
Reworked (user manual)

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IMPORTANT INFORMATION

1. CE MARKING

Products marked with the **CE** mark of compliance meet the safety guidelines of the European Union (93/42/EEC).

2. WARNING

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

2.1. General warnings

- The user manual serves to aid in the proper installation, operation and maintenance of the product. The user manual is delivered with the equipment and must be kept close to it at all times. Following this manual precisely is the prerequisite for the proper use of the equipment in the defined manner.
- Equipment containing the condensing dryer is provided with a separate manual for these components.
- Only the original packaging ensures protection of the equipment during transport. Original packaging should be kept if necessary to return the equipment later. The manufacturer provides no warranty for damages caused by faulty packaging during the transport of equipment returned during the warranty period.
- Use a fork truck or other suitable type of handling equipment to transport and move the equipment
- The manufacturer only guarantees the safety, reliability and function of the equipment if:
 - installation, new settings, changes, modifications and repairs are performed by the manufacturer or its representative, or a service provider authorized by the manufacturer.
 - the equipment is used pursuant to the user manual..

2.2. General safety warnings

- Operation of the equipment must be in compliance with all local codes and regulations. The operator and user are responsible for following all appropriate regulations in the interests of performing work safely.
- Only the use of original parts can guarantee the safety of operating personnel and reliable operation of the equipment. Only use accessories and parts mentioned in the technical documentation or expressly approved by the manufacturer.
- The manufacturer accepts no liability for damages or related risks from the use of any accessories or parts that are not mentioned in the technical documentation or expressly approved by the manufacturer. The warranty does not cover damages originating from the use of accessories or consumable materials other than those specified or recommended by the manufacturer.
- The user must be convinced of the proper function and safe condition of the equipment before each and every use.

















- The user/operator must be able to correctly and safely operate the equipment. The user must be trained to operate the equipment and have the required level of experience.
- Create operating instructions for personnel operating the equipment
- Use hearing protection when starting up the equipment, during operation and any time it is running.
- Operation of the equipment in areas in which flammable gas mixtures, such as operating rooms, or in areas where flammable mixtures of solids, such as coal dust, may be present is prohibited.
- Flammable materials represent an explosion hazard!
- Operating the equipment in damp or wet areas is prohibited
- If any adverse effects or problems arise in direct connection with the use of the equipment, the user must inform their supplier immediately.

2.3. Electrical system safety warnings

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

3. WARNINGS AND SYMBOLS

The following labels and symbols are used in the Installation, Operation and Maintenance Manual and on the equipment and its packaging to indicate important details and information:

	Information, instructions and cautions to prevent health and property damages.
	Caution! Dangerous electric voltage.
	Read the user manual
	CE mark of compliance
	The compressor is remote-controlled and may start without warning.
	Warning! Hot surface!
	Earth (ground) connection
	Terminal for ground connection
	Fuse
	Alternating current
	Handling mark on package – FRAGILE
	Handling mark on package – THIS WAY UP
	Handling mark on package – DO NOT EXPOSE TO RAIN
	Handling mark on package – TEMPERATURE RANGE
	Handling mark on package – LIMITED STACKING
	Mark on package – RECYCLABLE MATERIAL

4. STORAGE AND TRANSPORT CONDITIONS

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



The original compressor packaging must be used for transport whenever possible. The compressor is shipped in a vertical position and must be secured using transport straps.



Protect the compressor from humid and dirty environments and extreme temperatures during transport and storage. A compressor in its original packaging can be stored in a warm, dry and dust-free area. Do not store near any chemical substances.



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



The compressor 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 hoses and drain the condensed water.

Ambient conditions for storage and transport

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

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

5. TECHNICAL DATA

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

Temperature: +0°C to +40°C,
Max. relative humidity: 70%,
Max. absolute humidity: 15 g/m³.

Tab. 1

Type		DK50 4x4VRT/M	DK50 4x4VRTS/M
Output at 6 bar	l/m	1040	1040
Voltage / frequency	V/HZ	3 x 400 / 50	3 x 400 / 50
current draw (max.)	A	22	22
Main circuit breaker	A	25	25
Main feeder gauge	mm ²	4	4
Enclosure		IP10	IP30
Air tank capacity	l	500	500
Working pressure	bar	6 ÷ 8	6 ÷ 8
Safety valve	bar	10	10
Noise level	dB	80	69
Total weight of compressor (net)	kg	461	594
Weight - compressor module	kg	268	401
Weight - dryer module	kg	66	66
Weight of air tank	kg	127	127
Compressor dimensions, total (w x d x h)	mm	3000 x 705 x 2100	3000 x 705 x 2100
Dimensions - compressor module (w x d x h)	mm	1240 x 630 x 1750	1250 x 705 x 1790
Dimensions – ED108 dryer module (w x d x h)	mm	760 x 550 x 1015	760 x 550 x 1015
Air tank dimensions (w x d x h)	mm	770 x 705 x 2100	770 x 705 x 2100
Operating mode		S1 – 100%	S1 – 100%
Dryer performance with condensation dryer (ED108) (PDP*)		+3°C	+3°C
Time to fill air tank from 0 to 7 bar	s	150	150
Recommended cooling air changes in space	m ³ /h	2250	2250
Electrical class		class I.	class I.

Tab.2

Type		DK50 6x4VRT/M	DK50 6x4VRTS/M
Output at 6 bar	l/m	1560	1560
Voltage / frequency	V/Hz	3 x 400 / 50	3 x 400 / 50
Current draw (max.)	A	32	32
Main circuit breaker	A	32 A	32 A
Main feeder gauge	mm ²	6 mm ²	6 mm ²
Enclosure		IP10	IP30
Air tank capacity	l	500	500
Working pressure	bar	6 ÷ 8	6 ÷ 8
Safety valve	bar	10	10
Noise level	dB	83	72
Total weight of compressor (net)	kg	540	676
Weight - compressor module	kg	350	483
Weight - dryer module	kg	66	66
Weight of air tank	kg	127	127
Compressor dimensions, total (w x d x h)	mm	3000 x 705 x 2100	3000 x 705 x 2100
Dimensions - compressor module (w x d x h)	mm	1240 x 630 x 1750	1250 x 705 x 1790
Dimensions - ED108 dryer module (w x d x h)	mm	760 x 550 x 1015	760 x 550 x 1015
Air tank dimensions (w x d x h)	mm	770 x 705 x 2100	770 x 705 x 2100
Operating mode		S1 – 100%	S1 – 100%
Dryer performance with condensation dryer (ED108) (PDP*)		+3°C	+3°C
Time to fill air tank from 0 to 7 bar	s	105	105
Recommended cooling air changes in space	m ³ /h	3000	3000
Electrical class	-	class I.	class I.

(*) Apply the correction factor for the ED108 dryer

5.1. Free air delivery (FAD) correction due to elevation

FAD correction table

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

FAD output related to conditions:

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

5.2. Dryer performance correction

ED108 dryer reference values

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

ED108 dryer correction factors

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

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

The cooler cools the compressed air to a temperature of ~19°C higher than the ambient temperature. Therefore:

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

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)

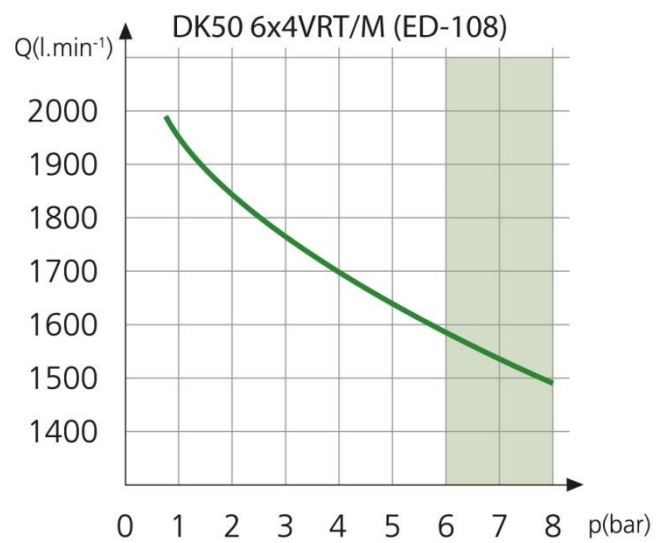
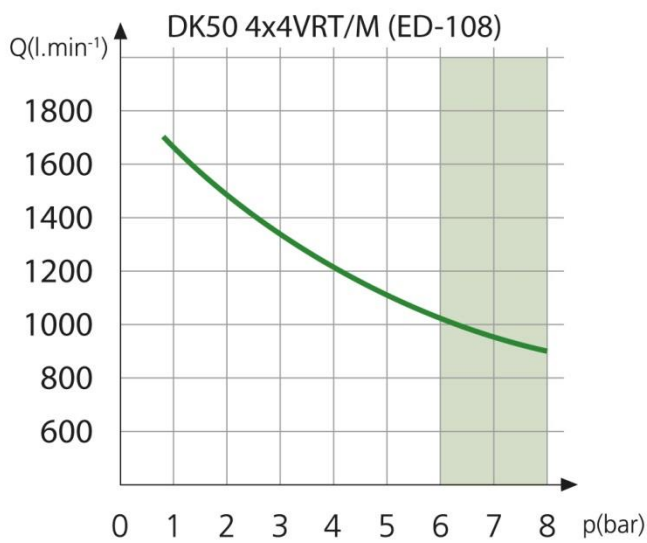
F_{C1} = working pressure correction factor

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



6. PRODUCT DESCRIPTION

6.1. Model variations and their uses

The compressor is used as a central source of clean, oil-free compressed air to power individual devices and equipment with compressed air used in large dental clinics and laboratories, in hospitals and other settings where the parameters and properties of the compressed air are suitable to the specific application.



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

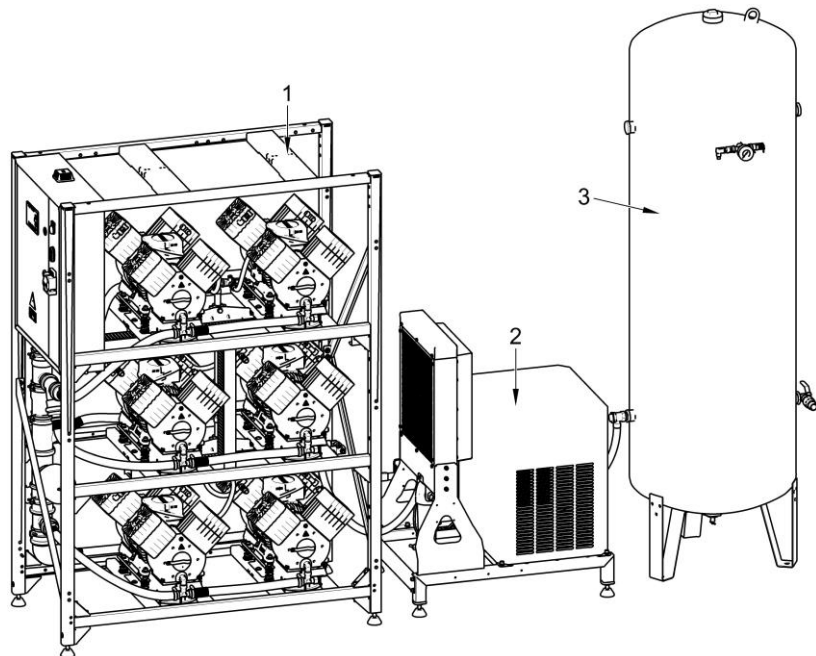
Any use of the equipment outside the framework defined herein is considered inappropriate use. The manufacturer is not liable for any damages or injury occurring as a result of inappropriate use.

6.2. Delivery includes

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

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

Fig. 1a Compressor without enclosure

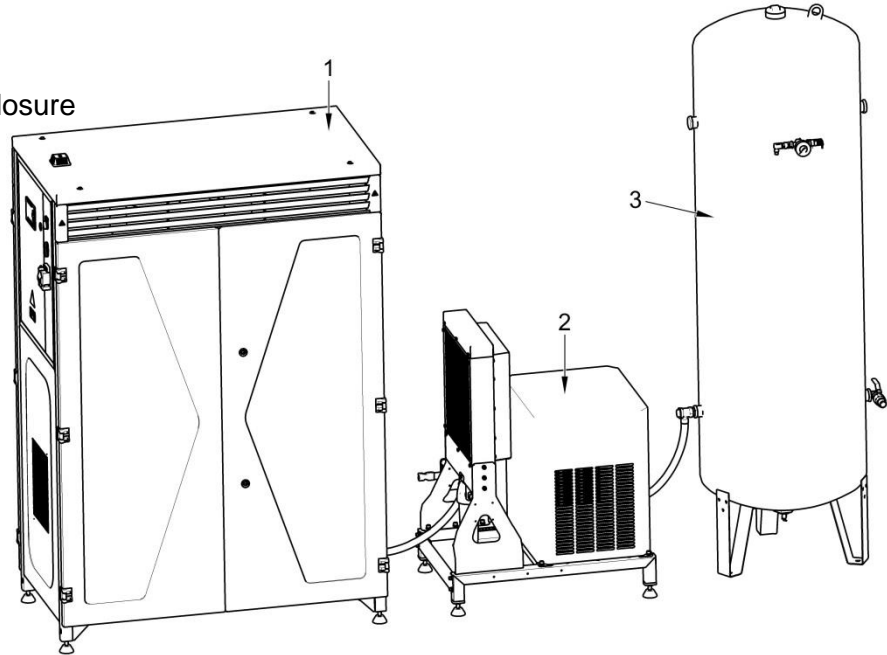


1. Compressor module
2. Dryer module
3. Air tank module

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

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

Fig. 1b Compressor with enclosure



6.3. Accessories

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

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

6.3.1. DK50 4x4VRT/M performance enhancement kit

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

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

Compressor type	Central intake	Dryer type	Rated voltage / working pressure	Kit article no.	
DK50 4x4VRT/M	no	ED-108	3 x 400 V/50 Hz 6-8 bar	447000001-024	
DK50 4x4VRTS/M					
DK50 4x4VRT/M	yes	ED-108		3 x 400 V/50 Hz 6-8 bar	447000001-025
DK50 4x4VRTS/M					

6.3.2. Central aggregate intake kit

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

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

6.3.3. Set of compressed air outlet filters

The compressor may be equipped with a set of filters if needed. A pressure regulator may be added to the set of filters. The set of filters is fully compatible with all compressors listed above.

	Level of filtration	Pressure regulator	Kit article no.
SET OF FILTERS	3 µm	yes	447000001-010
	3 µm - 0.3 µm		447000001-011
	3 µm - 0.01 µm		447000001-012
	3 µm	no	447000001-014
	3 µm - 0.3 µm		447000001-015
	3 µm - 0.01 µm		447000001-016



If a higher level of air filtration is required, this specification must be agreed upon with the supplier and made clear in the order.

6.3.4. Compressor module enclosure (soundproofing)

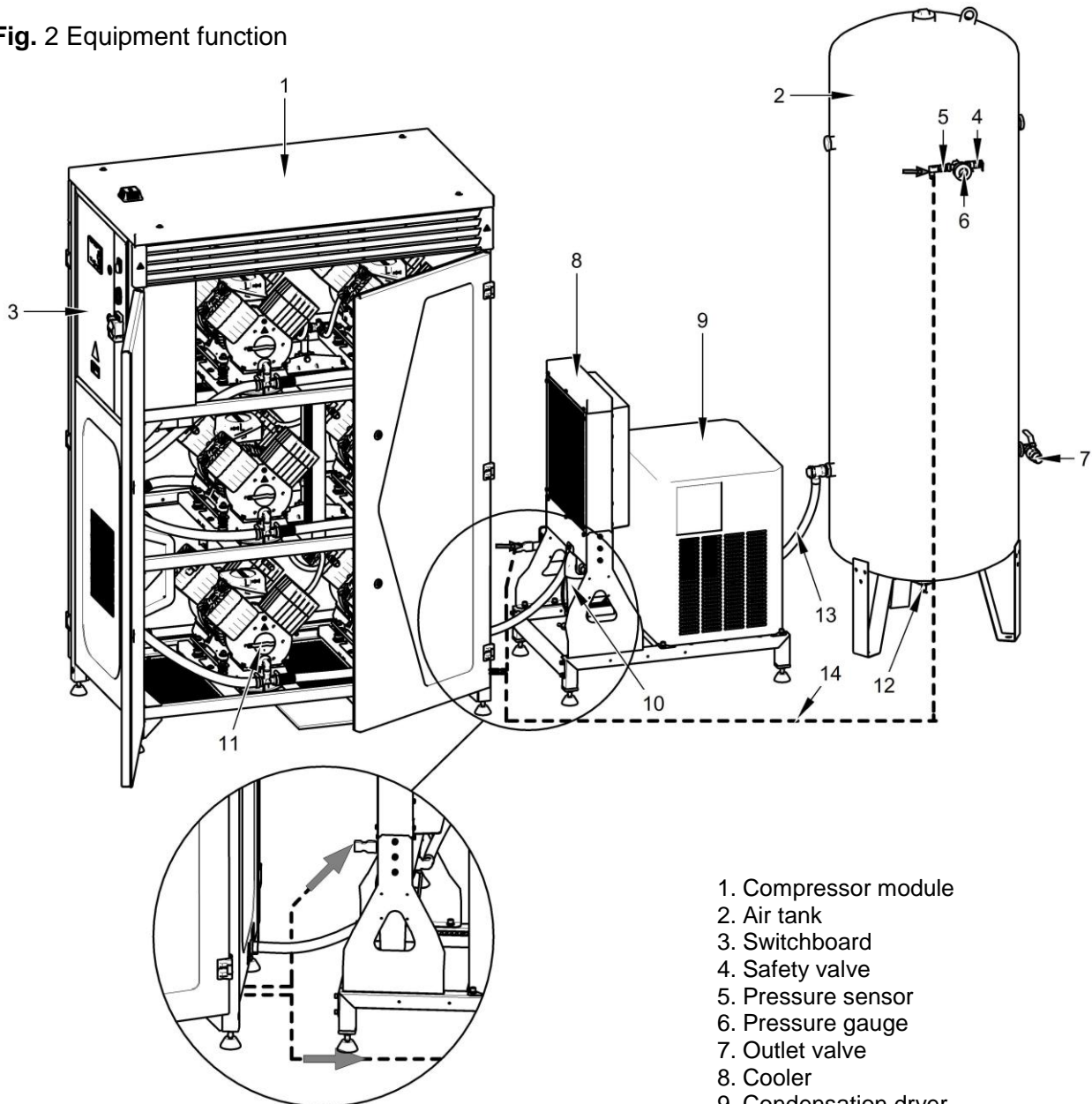
Enclosing the compressor module reduces the noise generated by the compressor by up to 11 dB(a) compared to the existing module while ensuring sufficient cooling for the aggregates themselves for S1 class continuous operations.

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

7. EQUIPMENT FUNCTION

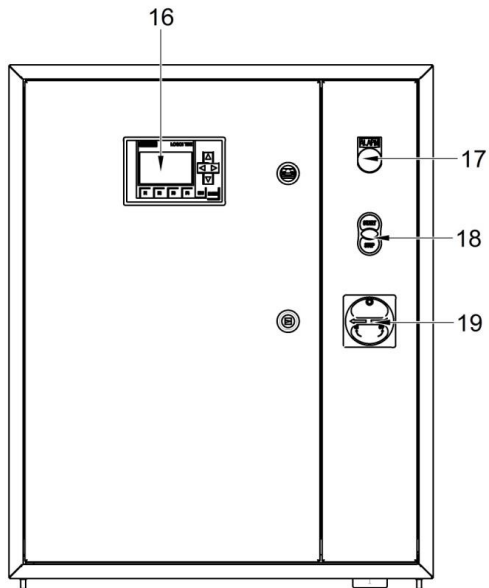
The compressor produces oil-free, dry, filtered compressed air to power pneumatic devices and equipment used in dental clinics and laboratories, hospital departments and more.

Fig. 2 Equipment function

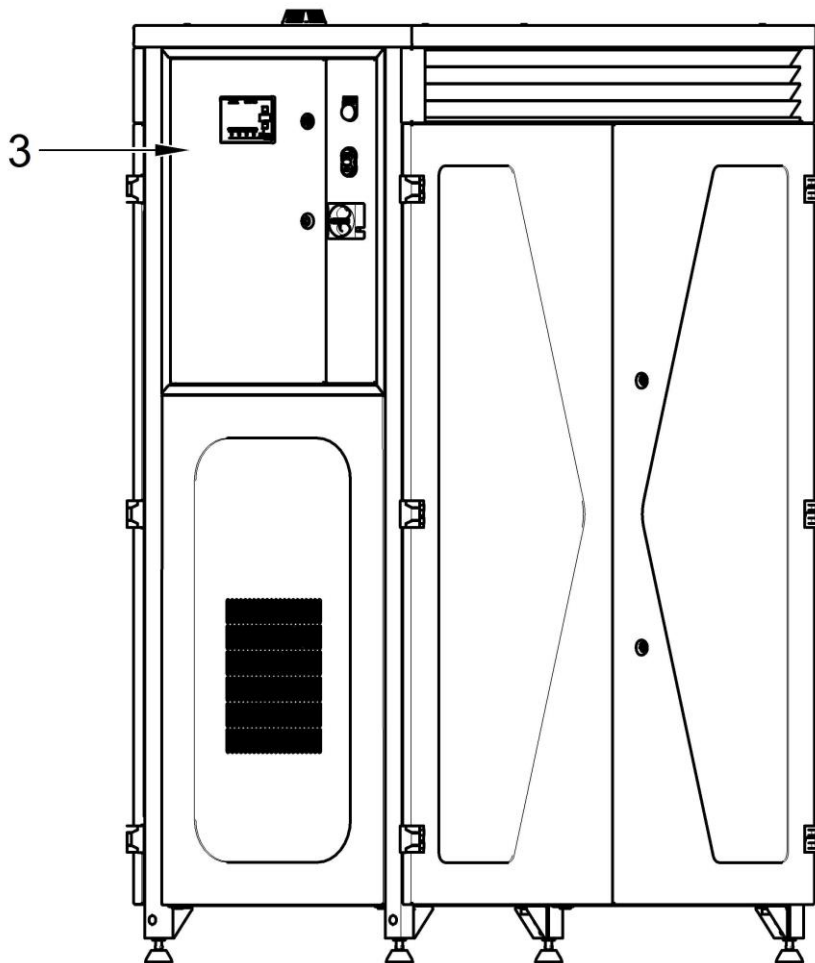


1. Compressor module
2. Air tank
3. Switchboard
4. Safety valve
5. Pressure sensor
6. Pressure gauge
7. Outlet valve
8. Cooler
9. Condensation dryer
10. Water separator
11. Aggregate
12. Drain valve
13. Connecting hoses
14. Electric cables

Fig. 3 Electrical box / switchboard

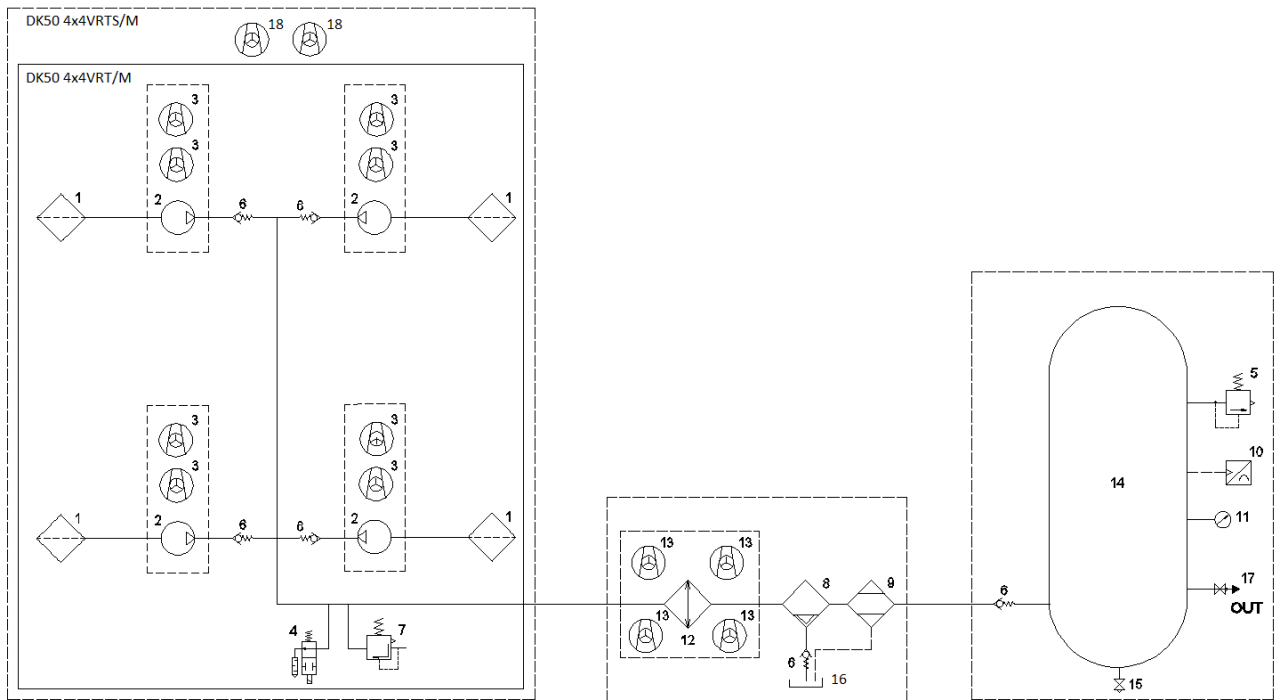


- 3. Electrical box / switchboard
- 16. Display
- 17. Alarm indicator
- 18. Start/stop button
- 19. Main switch



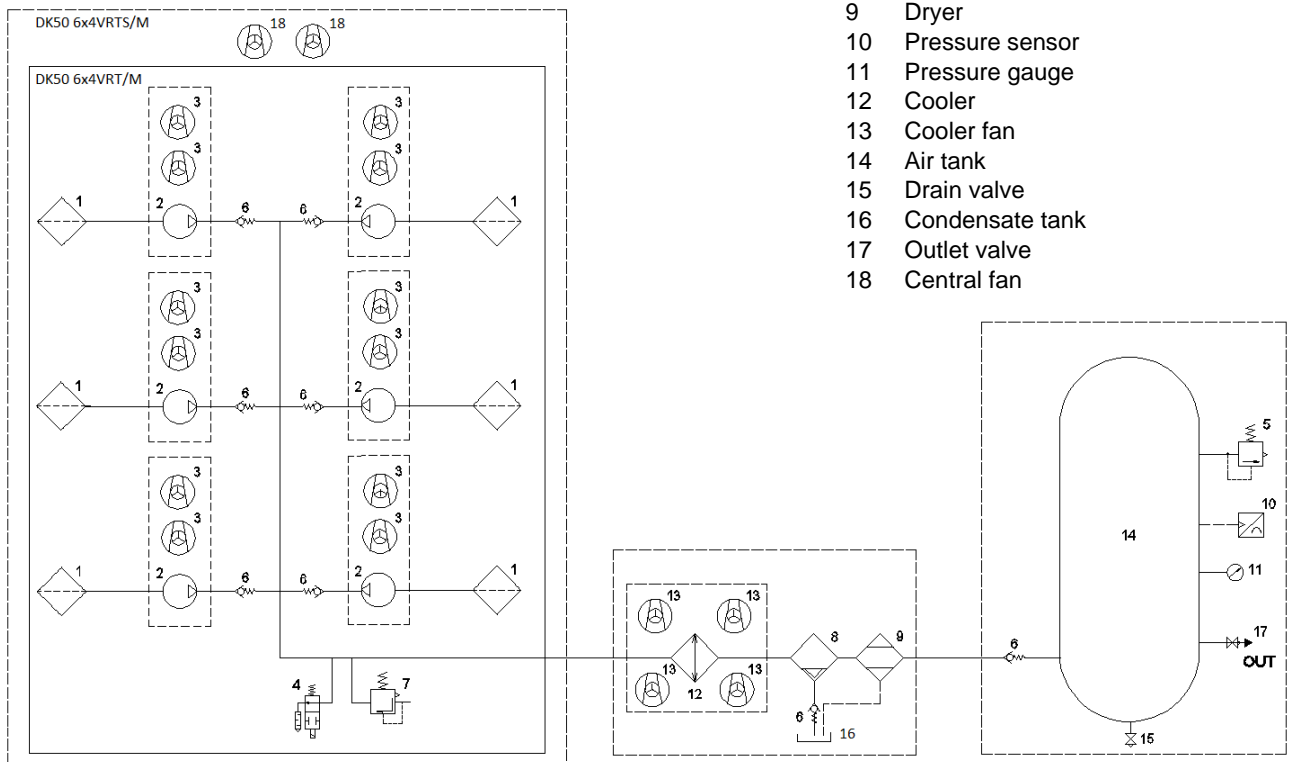
8. PNEUMATIC SCHEMATIC

DK50 4x4VRT/M and DK50 4x4VRTS/M



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

DK50 6x4VRT/M a DK50 6x4VRTS/M



The motors may be switched off by pressing the STOP button (18), the P1 indicator (17) turns off and the display returns to the start screen.

NORMAL OPERATIONS

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

The display has two screens during normal operations:

- Motors are on

PRESSURE - current operating pressure
 TEMP_OUT - equipment ambient temperature
 TEMP_IN - temperature inside an enclosed compressor
 - Text "N/A" - only displayed for the compressor models with no enclosure)
 COMPRESSOR ON – all aggregates are switched on
 HOURS RUN - operating hours
 TIME-TO-GO MN - time remaining until next service / maintenance (in hours).

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	M	N	:	2	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

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

SWITCHING OFF THE COMPRESSOR

Pressing the STOP button (18) switches off the compressor aggregates and the P1 indicator turns off.

9.1. Controller – operation – alarms

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

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

The monitored values of these parameters, alarms and maintenance intervals are shown on the display. An alarm is generated if the temperature limits exceed the critical levels. The controller panel has four cursor buttons ▲, ▼, ►, ◀, ESC and OK buttons and four function buttons F1- F4 to control the following

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
																0	h
S	e	t	u	p	N	e	w	I	n	t	e	r	v	a	l	:	
H	o	l	d	F	4	l	e	a	s	t	5	s	e	c			

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

9.1.2. Alarms



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



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

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

Low priority alarm conditions

- Expiration of defined maintenance / service interval.

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

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

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
																0	h
S	e	t	u	p	N	e	w	I	n	t	e	r	v	a	l	:	
H	o	l	d	F	4	l	e	a	s	t	5	s	e	c			

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

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

Call in service personnel to perform the required service.

Note: Only service personnel may reset to a new service interval

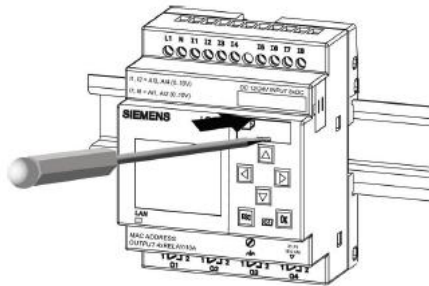
Confirm the completion of maintenance / service by pressing F4 and holding for at least 5 seconds. The screen then changes back to normal operating mode

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

DATA ACQUISITION

Data is recorded on a micro SD card in a slot in the base module. (See the illustration). The figure shows the location of the micro SD card onto which alarms and operating events are logged. Information is saved in .CSV format files. The system records data sequentially into 50 files, with each file containing up to 20.000 lines.

Copying data from the SD card is conducted by manually removing the card and manually reading it using Excel on a PC or remotely over an Ethernet network.



ETHERNET CONNECTION

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

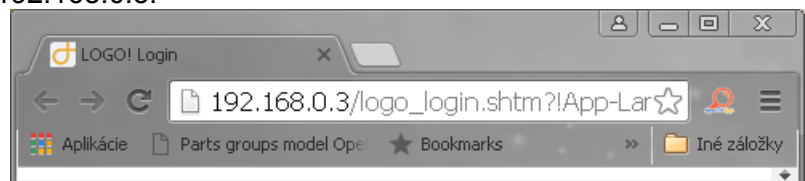
1. Use the RJ-45 connector on the switchboard door to connect a cable to the Ethernet network
2. The user shall then request IT staff to connect the compressor to the customer's Ethernet network. The equipment comes with pre-set IP addresses: BM=192.168.0.3, TDE=192.168.0.2, subnet =255.255.255.0.
3.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

Web server

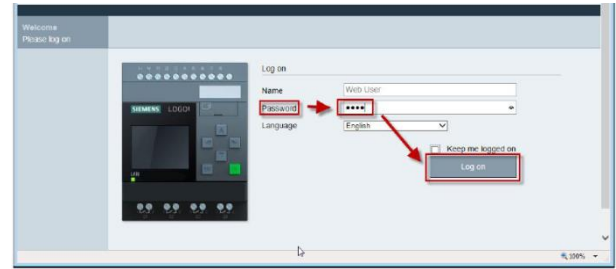
The controller has an integrated Web Server function that permits compressor operation to be monitored using a PC, smartphone or tablet using a conventional web browser (Mozilla, Opera, Safari, Google Chrome, etc.)

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

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



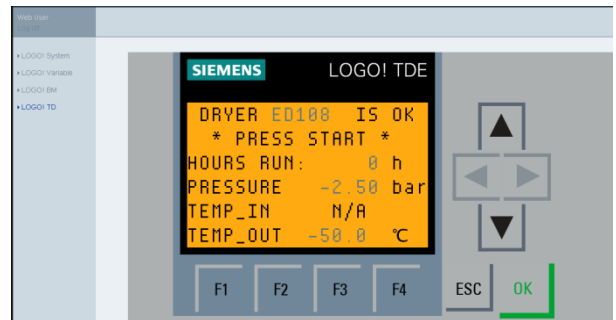
Then enter the password “LOGO” and click on the “Log on” button.



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



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



Monitoring memory variables.

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

Variables assigned based on addresses and models may be viewed in the MAPPING PARAMETERS table (see the Annexes – Page 45).

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

Del	Range	Address	Type	Display Format	Value	Mod/Value	Modify
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:

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

Logging out of the web server

Click on the button in the upper left corner.



INSTALLATION

10. CONDITIONS FOR USE

The compressor may only be installed and operated in dry, well-ventilated and dust-free environments.

The compressor must be installed so that it is accessible at all times for operating and maintenance. Please ensure that the nameplate on the device is readily accessible.

The compressor shall be installed on a flat surface with sufficient carrying capacity (be aware of the weight of the product, see Technical data).

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



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



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

Compressed air outlet

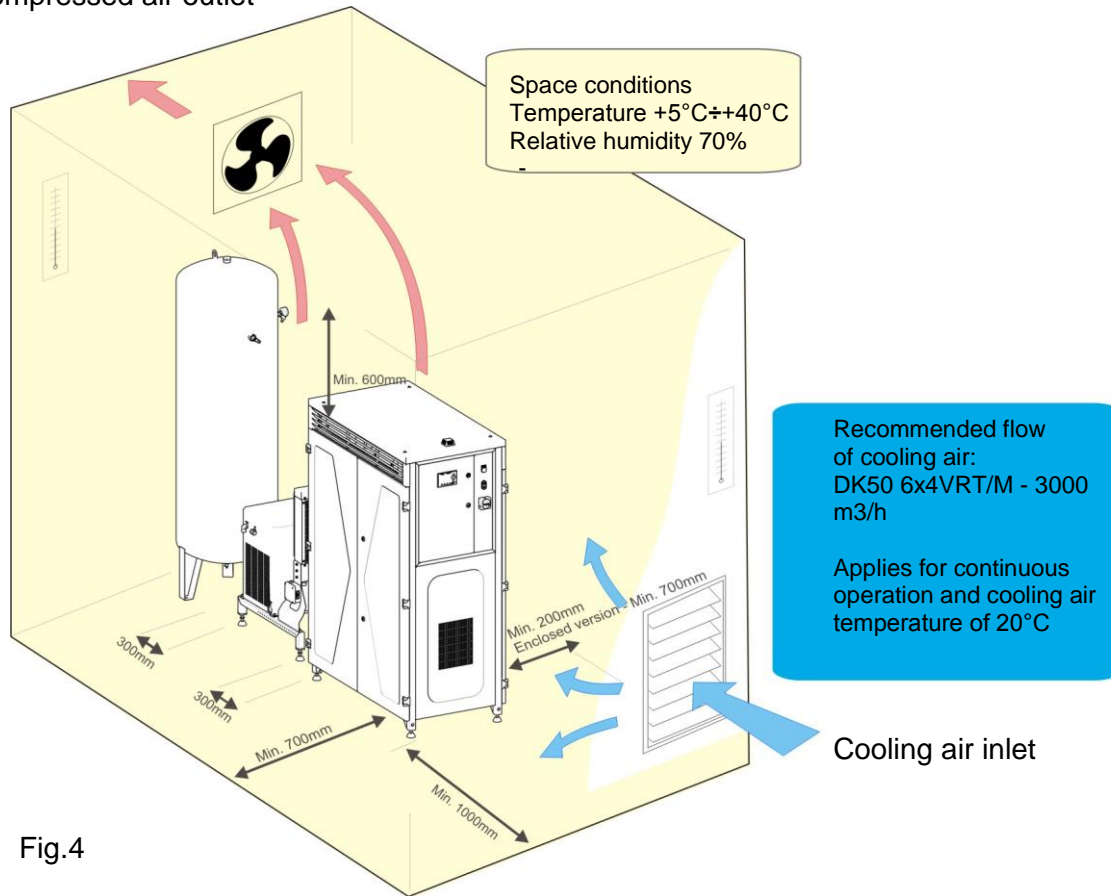


Fig.4

Environmental requirements:

Temperature: +5°C to +40°C,
Max. relative humidity: 70%,
Max. absolute humidity: 15 g/m³.

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




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

Fire hazard!

11. PLACEMENT OF THE COMPRESSOR

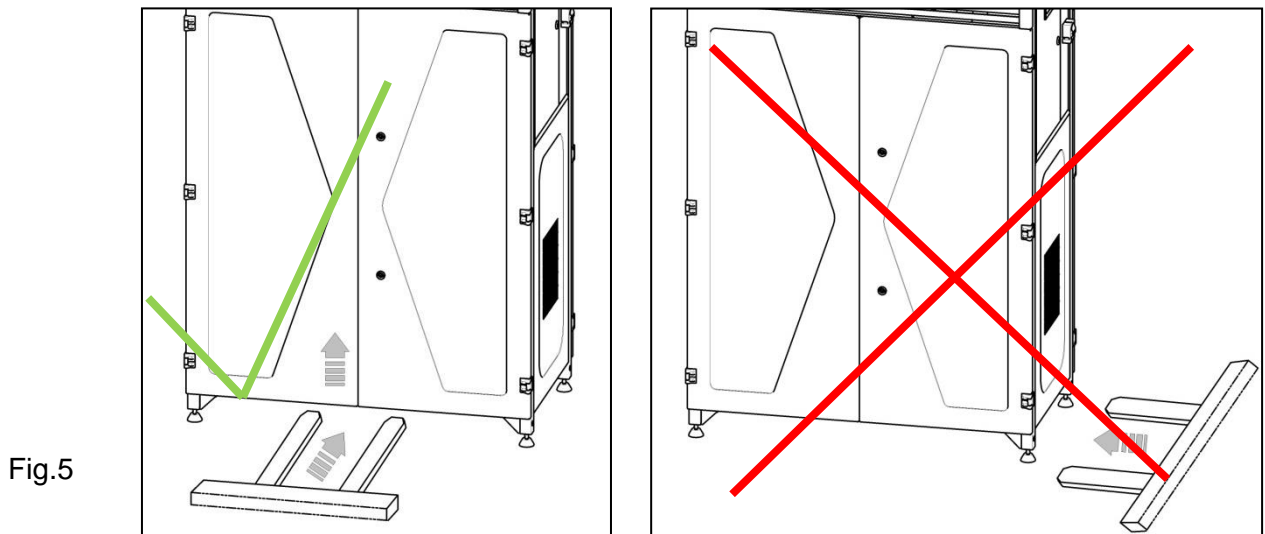
The equipment shall only be installed by a qualified professional.

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

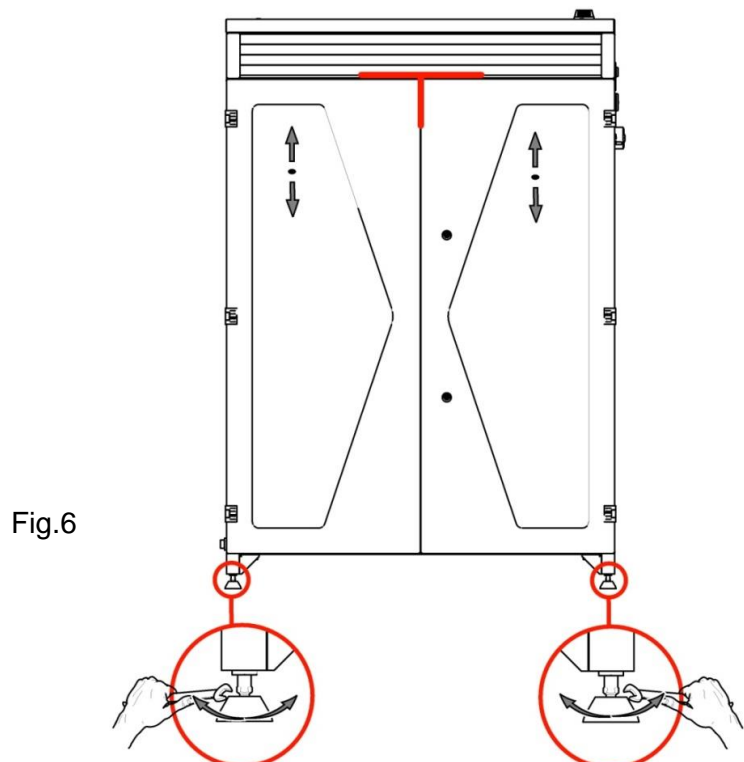
11.1. Handling

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


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



Level the compressor assembly. (Fig. 6)



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

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

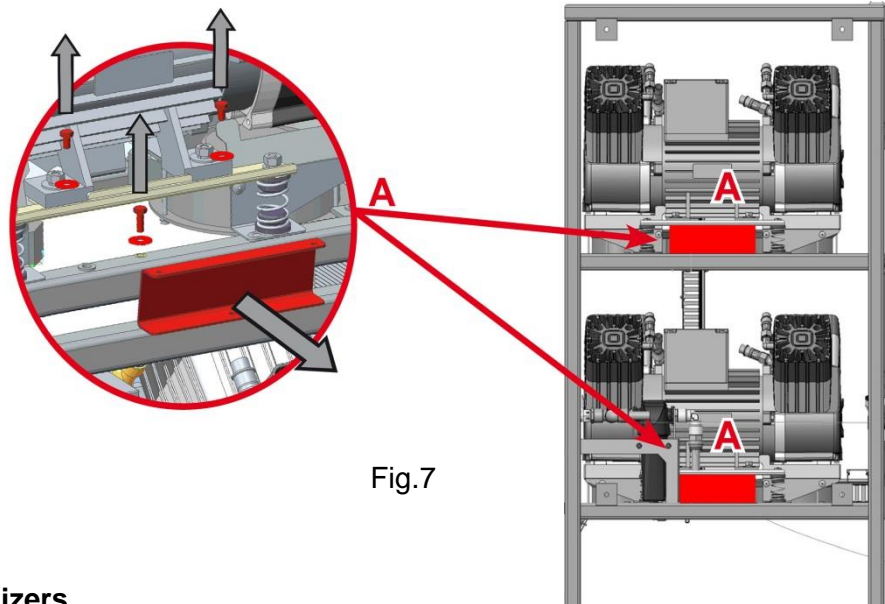


Fig.7

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

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

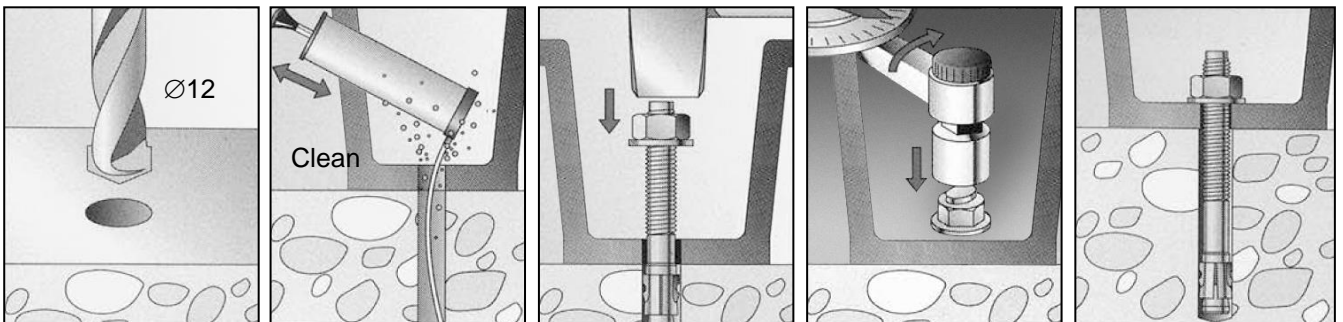


Fig.8

12. PNEUMATIC CONNECTIONS

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

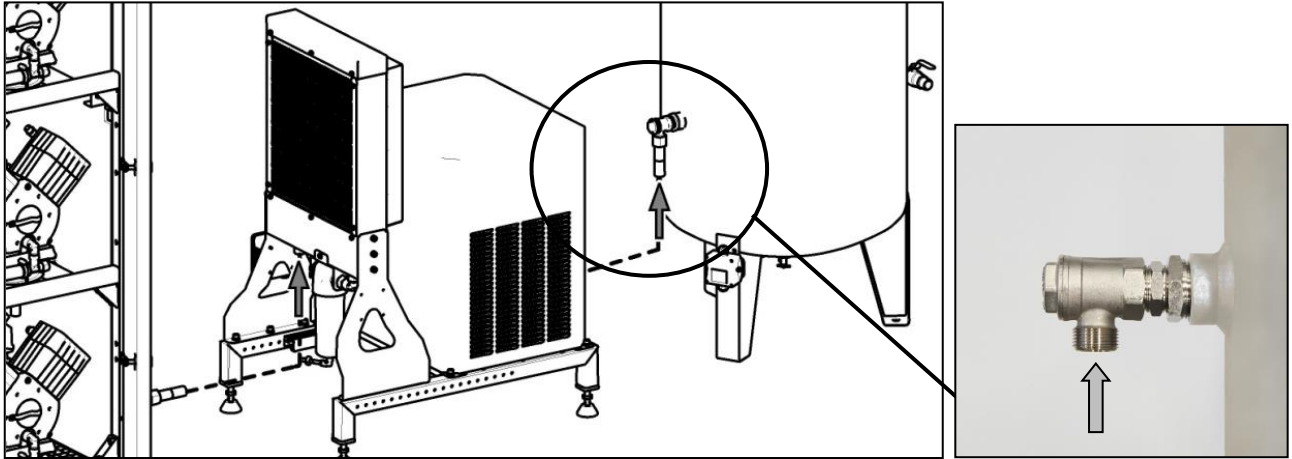
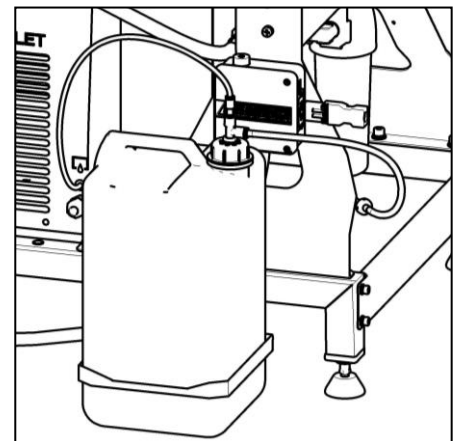


Fig.9

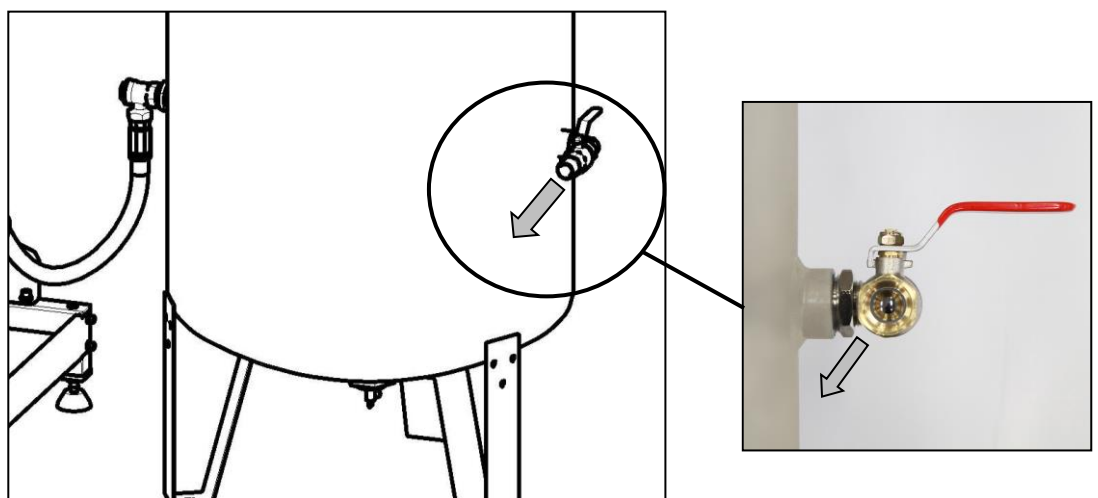
- Connect the hoses from the water separator and the condensate drain from the dryer to connectors at the canister valves (Fig.10).

Fig.10



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

Fig.11



13. ELECTRICAL CONNECTIONS



Only a qualified electrician may install electrical components!



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

The product is delivered without a power cord

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

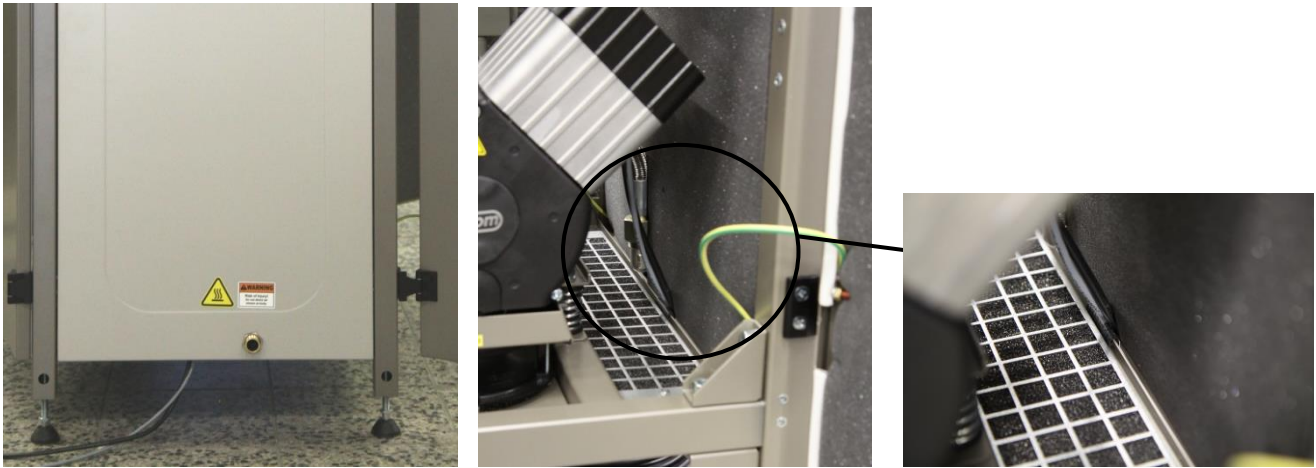


Fig.12

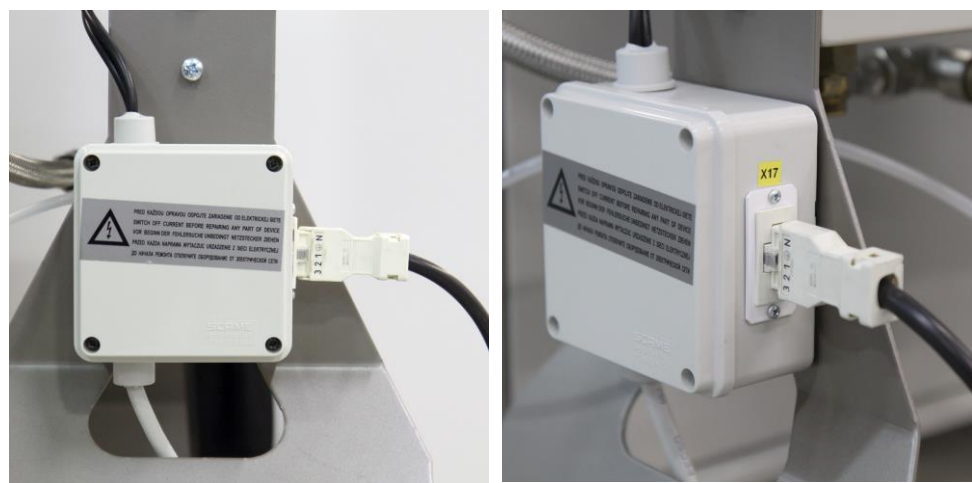


Fig.13

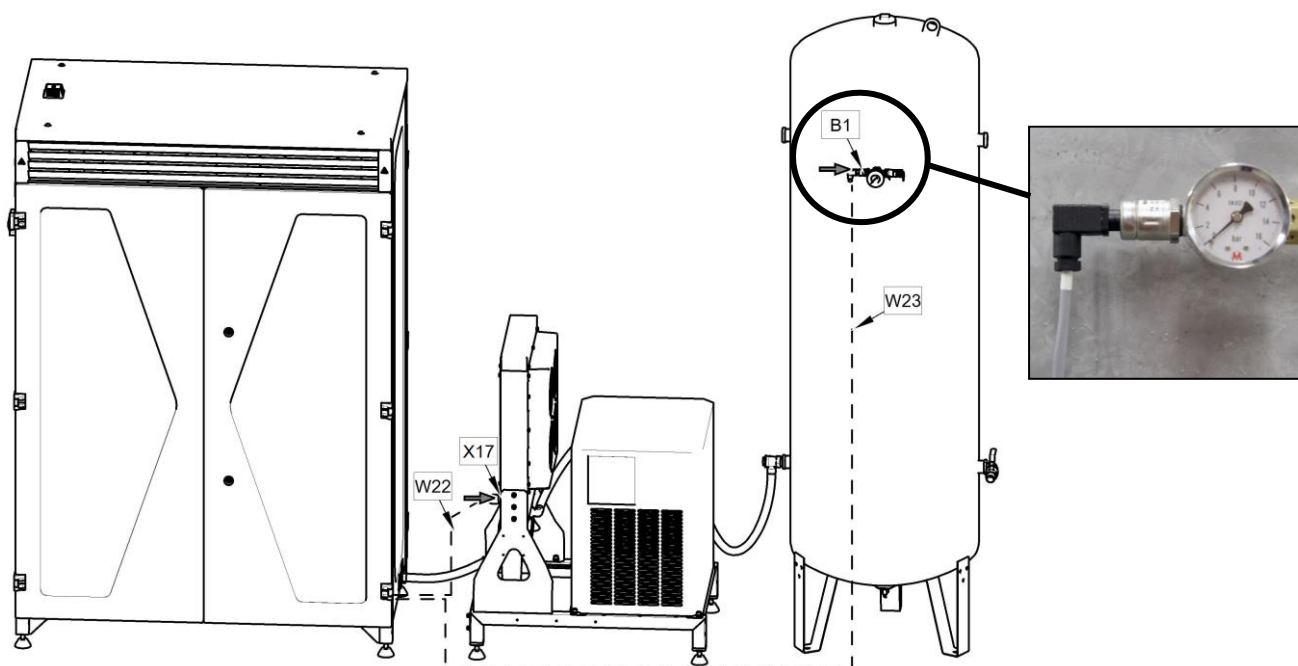
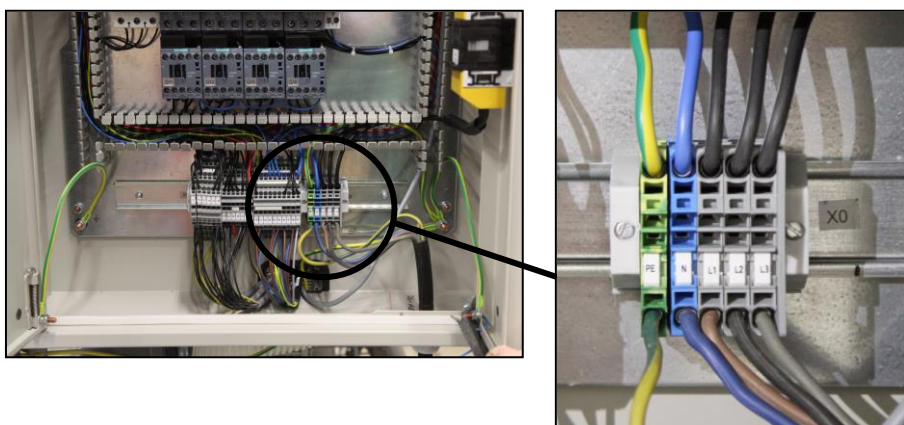


Fig.14

- Connect the power cord conductors to the power terminals L1, L2, L3, N/BU/, PE/GNYE/. (Fig 15).
- Recommended configuration of phase conductors: L1-BN, L2-BK, L3-GY

Cord type (minimum requirements) H05 VV-F_ 5G6

Obr.15



- Press the “START” button (18) on the switchboard.
 The display shows:
 HOURS RUN: operating hours
 PRESSURE: current pressure
 TEMP_IN: internal temperature (only for enclosed compressors)
Note: The TEMP_IN parameter displays N/A in the case of the unenclosed models
 TEMP_OUT: compressor ambient temperature

D	R	Y	E	R	E	D	1	0	8		i	s	O	K
*		P	R	E	S	S		S	T	A	R	T	*	
H	O	U	R	S		R	U	N	:			0		h
P	R	E	S	S		U	R	E			6	.	2	9
													b	a
													r	
T	E	M	P	_	I	N					9	.	0	°C
T	E	M	P	_	O	U	T				1	7	.	3
													°C	

The first aggregate switches on and the other aggregates turn on gradually and the white P1 indicator is on. The pressure sensor monitors the pressure in the air tank. The aggregates operate in automatic mode and are switched on and off (see the Technical Data chapter and the working pressure section) by the controller based on compressed air demand. The compressors shut down individually once the switching pressures are reached. The motors may be switched off by pressing the STOP button (18), the P1 indicator (17) turns off and the display returns to the start screen.

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



Check all compressed air line connections for possible compressed air leaks. Remedy any leaks that are discovered.

Slowly open the outlet valve to the ON position. The compressor assembly should activate and run until pressure in the entire compressed air system stabilises. The pressure switch then sequentially turns off the compressor aggregates.

Complete a record for the installation of the compressor assembly and commissioning (see the Annexes – Page. 47).

SHUTTING DOWN THE COMPRESSORS

Pressing the STOP button switches off the compressors and the P1 indicator turns off.

16. SWITCHING OFF THE COMPRESSOR

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

Vent the air tank by disconnecting from the central compressed air circuit and opening the outlet valve (Fig. 1) or the drain valve.

MAINTENANCE

17. EQUIPMENT MAINTENANCE

Warning!

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

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



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



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

Only trained professionals may perform this work as follows:



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

17.1. Maintenance intervals



The following maintenance intervals are applicable to equipment with max. operating pressures of 8 bar!

Warning!

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

Tab.3

Time interval	once a day	once a week	once a year	once every 2 years	2000	4000	6000	8000	10000	12000	Chapter	Set of spare parts	Performed by
Product function check	x										17.2		user
Cleaning the compressor intake filters (*)		x									17.8		user
Cleaning the dryer filter screen, Check the condensate drain, Check the temperature on the display		x									See the dryer manual on the CD		user
Clean the dryer condenser, check dryer operation					x	x	x	x	x	x	See the dryer manual on the CD		user
Check compressor fan operation		x									Visual check of rotation during aggregate operation		user
Replace float in separator						x		x		x	17. 7.	025200146-000	qualified professional
Cleaning the compressor intake filters (*)					x	x	x	x	x	x	17.8		qualified professional
Compressor intake filter replacement (*)					x	x	x	x	x	x	17.8	604031770-000	qualified professional
Equipment inspection					x	x	x	x	x	x	17.3		qualified professional
Cleaning the dryer filter screen, Check the condensate drain, Check the temperature on the display											See the dryer manual on the CD		qualified professional

Time interval	once a day	once a week	once a year	once every 2 years	2000	4000	6000	8000	10000	12000	Chapter	Set of spare parts	Performed by
Check compressor fan operation					x	x	x	x	x	x	Visual check of rotation during aggregate operation		qualified professional
Check electrical connections					x	x	x	x	x	x	17. 4.	-	qualified professional
Check operation of check valves						x		x		x	See the service manual		qualified professional
Check pressure sensor operation					x	x	x	x	x	x	See the service manual		qualified professional
Check pressure relief valve					x	x	x	x	x	x	Fig. 21		qualified professional
Check temperature sensor switching function					x	x	x	x	x	x	See the service manual		qualified professional
Replacement of piston group with bearing							x			x		604031764-000(**) 604031765-000(***)	qualified professional
Check safety valve operation			x			x		x		x	17.6.		qualified professional
Check solenoid valve operation						x		x		x	See the service manual		qualified professional
Compressor intake filter replacement					x	x	x	x	x	x	17.5	604031761-000(**) 604031762-000(***)	qualified professional
Compressor performance check					x	x	x	x	x	x	17.9		
Conduct a "repeated test" pursuant to EN 62353				x							17.1		qualified technician
Check pneumatic connections for leaks					x	x	x	x	x	x	17.3	-	

(*) enclosed compressor

(**) applies to DK50 6x4VRT/M

(***) applies to DK50 4x4VRT/M

17.2. Functional check

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

17.3. Leak check compressed air connections and inspect the equipment

Leak check:

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

Equipment inspection:

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

17.4. Inspection of electrical connections:



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

Inspection

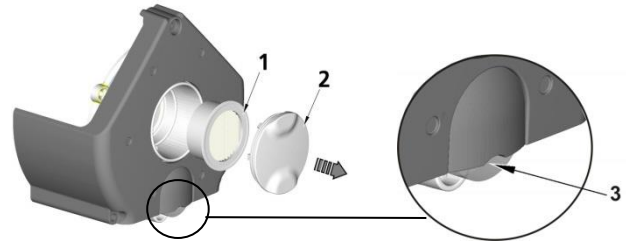
- Check the mechanical function of the main switch Q10 and the START-STOP buttons, S1 and S2.
- Check the power cord, conductors connected to the X1 terminal strip and the main switch to ensure they are undamaged. Inspect to ensure the connection terminals are properly supported to relieve tension.
- Check to ensure all screw terminals on all conductors are tight (motor circuit breakers Q1 to Q6, mains circuit breakers F1 to F3, contactors Q11 to Q16 and Q20 to Q21, etc.) Tighten all loose conductors with a screwdriver.
- Visually inspect the connection of individual cables to the terminal strip X1 (spring clips) and the LOGO! control system (screw terminals).
- Inspect all screw terminals for the protective green and yellow PE grounding conductor in the electrical box, the motor section, the cooling unit and the pressure vessel. Tighten any loose terminals. Inspect the connector X50 (dryer and cooler) and the pressure sensor (B1) (on the pressure vessel)

17.5. Aggregate intake filter replacement (Fig. 17)

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

Inlet filter replacement:

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



Pre-filter replacement:

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

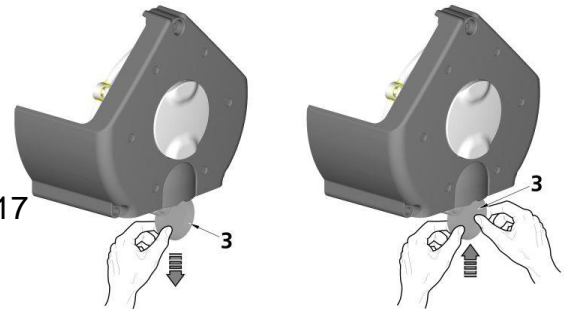


Fig. 17

17.6. Check safety valve operation (Fig. 18)

 **Filters located in the compressor aggregate enclosure cover must be replaced at defined intervals!**

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

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

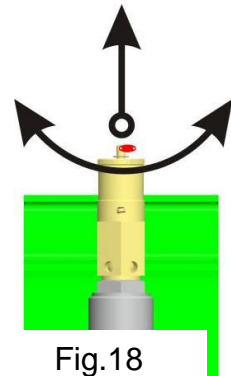


Fig.18

17.7. Float replacement



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

(Fig. 19)

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.

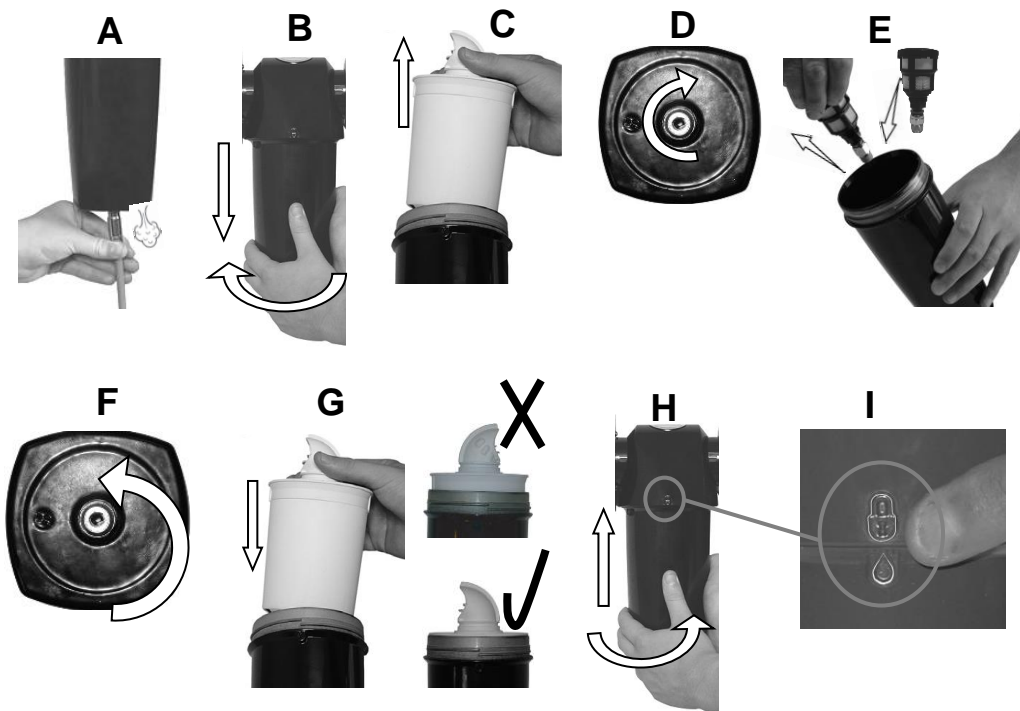


Fig.19

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

(*) - only applicable to enclosed products.

Clean or replace the inlet filters at defined intervals (Table 3) using the following procedure:

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

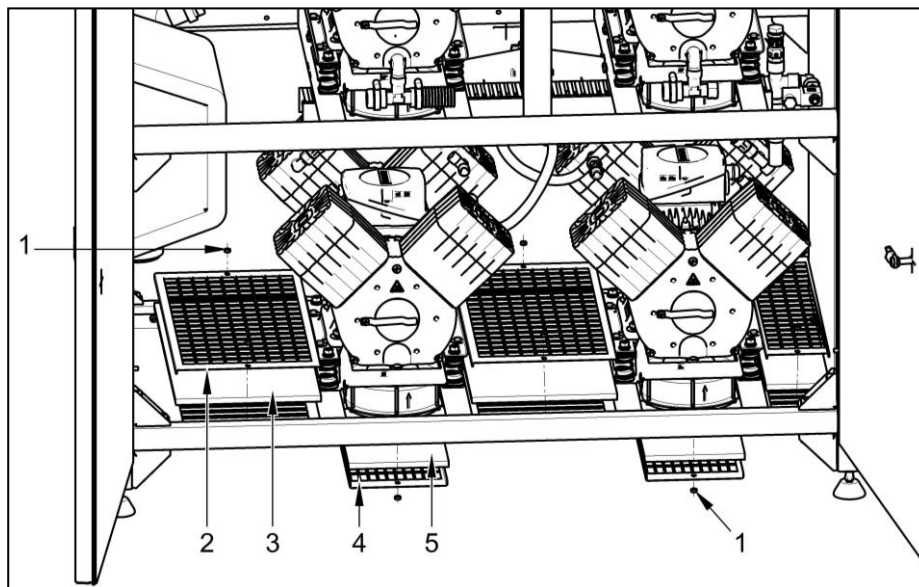


Fig.20

17.9. 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

TROUBLESHOOTING

18. TROUBLESHOOTING COMMON PROBLEMS

⚠ Disconnect the equipment from the electrical mains before starting work!

Troubleshooting may only be performed by trained service professionals!

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

Pressure relief valve (PRV)

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

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

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

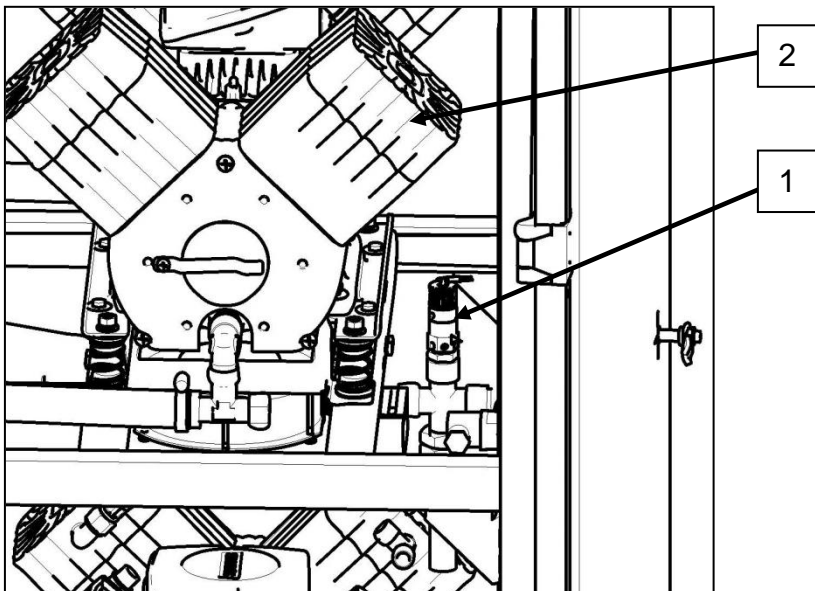


Fig. 21

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

Tab.4

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

one another switch on (overheating)	enclosure cooling fans do not operate	Defective temperature switch – replace
	ED108 dryer	See the dryer manual on the CD
High compressed air dew point	Condensation dryer off	Turn on the dryer, drain condensate found in the air tank
	Dryer malfunction	Call in professional service

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

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

19. REPAIR SERVICE INFORMATION

The manufacturer or an authorised supplier provides warranty and non-warranty repairs. Troubleshooting may only be performed by trained service professionals!

ANNEX**20. 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:	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.lid	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/5/17 1:14 PM		File:	6x4VRTM_BOTH_V4.00.Ild	Page:	2 / 2

21. INSTALLATION RECORD

1. Product: (model) DK50 4x4VRT/M DK50 6x4VRT/M DK50 4x4VRTS/M DK50 6x4VRTS/M		2. Serial number:	
3.1. User's name:			
3.2. Address of installation:			
4. Equipment connected to the compressor:			
5. Installation / Commissioning:		6. Contents of operator training:	
A. Product completeness check **	Y	A. Description of the product and functions	Y
	N		N
B. Documentation completeness check **	Y	B. Product operation: turning on/off, controls, control procedures, data on the display panel, alarms, operation in alarm conditions **	Y
	N		N
C. Installation/connection to equipment **	Y	C. Product maintenance: maintenance intervals, maintenance procedure, service intervals, operating activities **	Y
	N		N
D. Functional test **	Y	D. 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:			
E-mail :		Datum:	
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 4X4 VRT/M

DK50 6X4 VRT/M



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