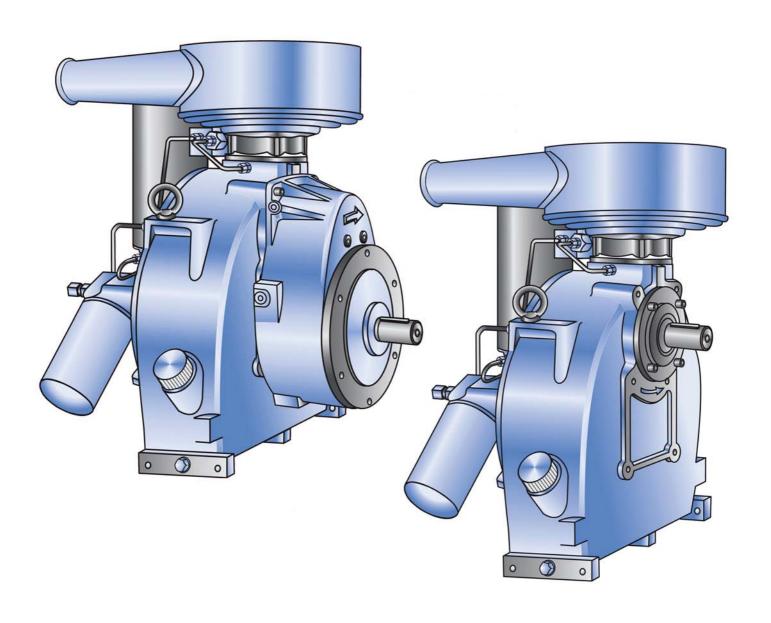


Operating Manual

SCREW COMPRESSOR COMPACT MODULE NK 100 / NK 100 G



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ROTORCOMP VERDICHTER GmbH

82110 Germering, Germany

Industriestraße 9



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1 Foreword

1.1 General

This manual contains information and regulations for the installation and operation of the NK 100 Screw Compressor Compact Module.

1.2 Scope

This documentation is applicable for the screw compressor of the type NK 100 Compact Module from the delivery date of 01/2008.

1.3 Change service

This document is not subject to the change service.

1.4 Abbreviations

bar (g) Operating pressure

(relative pressure in bar)

Bh Operating hours

DHV Minimum pressure valve

RC ROTORCOMP
SIV Safety valve
Min. Minimum
Max. Maximum
V DC Direct voltage
V AC Alternating voltage

1.5 Manufacturer's information

1.5.1 General information

This operating manual provides information on the mode of operation, installation, operation and maintenance of the NK 100. It is must therefore always be consulted on the operation and maintenance of the NK 100.

Read this operating manual carefully before commissioning the NK 100 for the first time in order to ensure proper handling, operation and maintenance from the outset.

Pay particular attention to all warnings and safety precautions.

ROTORCOMP screw compressors are carefully checked and tested prior to shipping. When your compressor arrives, the delivery scope must be checked for completeness and damage.

Any missing parts and/or transport damage must be reported immediately. A damaged compressor module must not be put into operation under any circumstances.

Always have the operating manual available for the operating personnel and make sure that operation and maintenance are carried out according to the instructions. All instructions contained in this operating manual must be observed in the specified manner and sequence in order to prevent injuries and damage to the system.

The screw compressor has been built according to the latest technology and the recognized safety rules.

Danger may nevertheless result for the user or others or for the compressor system during its use.

Any use other than described in the chapter "Purpose" is considered improper.

ROTORCOMP shall not be liable for any damage or injuries resulting from such improper use. We shall not provide any guarantee whatsoever for malfunctions and damage resulting from failure to comply with the operating manual.

The manufacturer reserves the right to carry out further technical developments without prior notice.

Always specify the model and the complete serial number from the nameplate in all correspondence. ROTORCOMP shall assume no liability whatsoever for damage or injuries which occur during handling, operation, maintenance work or repairs due to a failure to comply with the safety instructions to proceed with the usual care and caution, even if this is not expressly mentioned in this operating manual.

1.5.2 Purpose

The NK 100 is a screw compressor compact module designed for installation in a compressed-air generating station.

The sole intended use of the system is the compression of atmospheric air. The NK 100 may only be used to compress gases or other media following written approval by ROTORCOMP.

The NK 100 may only be installed by specialized companies with the corresponding know-how. The safety precautions, technical data, limits, installation guidelines and regulations for commissioning and operation specified in this operating manual must be observed and complied with.

1.5.3 Standard delivery scope

With the NK 100, ROTORCOMP offers a completely equipped, compact compressor module. The components of the standard delivery scope are described in the following chapters. Optionally available components are marked with (optional).

1.6 Warranty information, liability disclaimer

ROTORCOMP is a manufacturer of screw compressor components and not of ready-to-operate compressor systems.

RC shall only be answerable for any defects of these individual components for which it is responsible within the scope of the warranty conditions. Failure to comply with the following instructions and information shall void any and all liability. This liability disclaimer also results in the loss of claims for damages. This applies in particular in case of:

- Installation not approved by RC
- Improper use
- Operation of the compressor outside the specified limits
- Failure to observe the safety precautions and the usual care and caution
- Unsuitable operating materials (gases, oils)
- Condensate in the screw compressor
- Corrosion as subsequent damage
- Improper operation
- Insufficient maintenance, missing proof of maintenance
- Use of unsuitable tools
- Failure to use genuine spare parts
- Unauthorized modifications to the screw compressor module and/or its components

1.7 Nameplate

For the location of the nameplate, see Figure 3-1 and 3-5.

Should you have questions, please provide us with the data on the nameplate. This ensures that you receive the correct information.

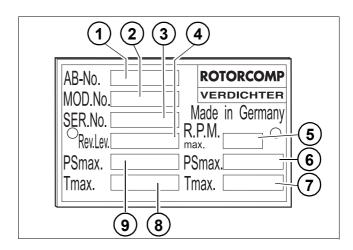


Figure 1-1

Stamping for customers outside Germany (Europe)

- 1. Order No.
- 2. Model
- 3. Serial No.
- 4. Year of manufacture
- 5. Max. rpm
- 6. Max. operating pressure in psi
- 7. Max. operating temperature °F
- 8. Max. operating temperature °C
- 9. Max. operating pressure in bar

1.2 [en] 09/2008



2 Safety precautions

Marking of safety precautions

Important instructions concerning hazards to persons, technical safety and their operational safety are especially highlighted in the following. They precede the measures to be taken and have the following meaning:



Warning:

Indicates working and operating processes which must be exactly complied with in order to prevent endangering of persons. These include information on special dangers when handling the system.



Caution:

Refers to working and operating processes which must be exactly complied with to prevent damage to or destruction of parts or all of the system.



Note:

Indicates special information for better handling during operating, inspection and adjustment processes and care work.

2.2 Safety regulations

The regulations of the respective country for putting into service and operating pressure vessels must be observed. In Germany these include:

- Directive 97/23/EC (Pressure Vessel Directive DGRL) of 05/29/1997
- Operating Safety Ordinance (BetrSichV) of 09/27/2002

2.3 General safety precautions

This operating manual contains important instructions and information on the installation, commissioning, operation and maintenance, which must be observed by the owner. As a result, it is absolutely necessary to turn over the entire documentation to the specially trained personnel of the owner or to make it available at the operating location prior to installation and commissioning. Prior to installation and commissioning, the entire operating manual must be carefully read by the specially trained personnel and then kept in a safe place. Failure to observe the safety precautions can result in a serious hazard for the personnel, the pressure vessel or the environment. Observe the chapter "Manufacturer's information"

on page 1-1 of this operating manual.

The following safety precautions only refer to the NK 100 screw compressor module and **not** to the entire compressor system.

The applicable national safety and occupational safety regulations of the respective country in which the system is operated must be complied

The manufacturer of the compressor system is responsible for including the necessary safety regulations for the operation of the compressor system in the operating manual of the compressor system.

Installation, operation, maintenance and repair may only be carried out by authorized, trained and qualified personnel.

The operating personnel is expected to safely use the working technology and follow all applicable local operating safety regulations and provisions. The owner bears the responsibility for always keeping the machine in safe operating condition. Limits (pressures, temperatures, time settings, etc.) must be permanently marked. Should a regulation contained in this list, especially with regard to safety, not comply with legal regulations, then the safer of the two applies.

[en] 09/2008 2.1

2.3.1 Special symbols





2.2 [en] 09/2008



3 Technical Description

3.1 General overview of NK 100 Screw Compressor Compact Module (standard model with electric control unit)

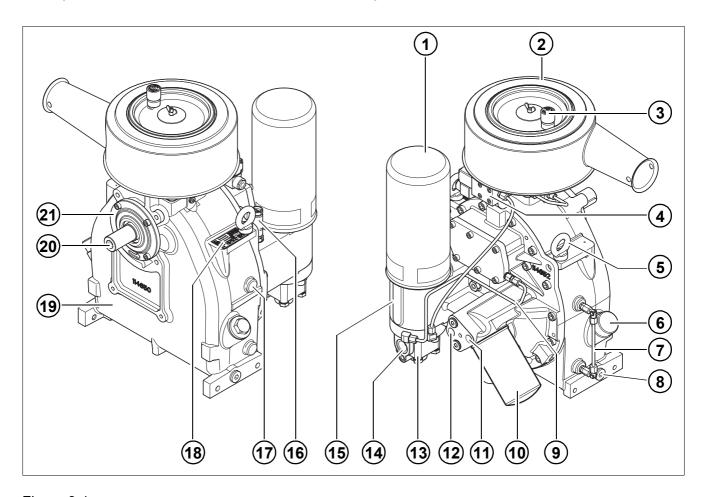


Figure 3-1

- 1. Air-oil separating element
- 2. Intake valve with air filter
- 3. Maintenance indicator for intake filter (optional)
- 4. Control unit, electric
- 5. Transport eye
- 6. Oil filler opening
- 7. Oil level monitoring (optional)
- 8. Oil drain screw
- 9. Oil separation return line with oil-extraction sight glass (optional)
- 10. Oil filter
- 11. Oil circulation/On
- 12. Oil circulation/Off
- 13. Minimum pressure valve
- 14. Compressed air outlet
- 15. Separator head
- 16. Safety valve (optional)
- 17. Temperature sensor connection (optional)
- 18. Nameplate
- 19. NK 100 basic module
- 20. Drive shaft
- 21. End cover

3.2 Flow diagram of NK 100 (electric control unit)

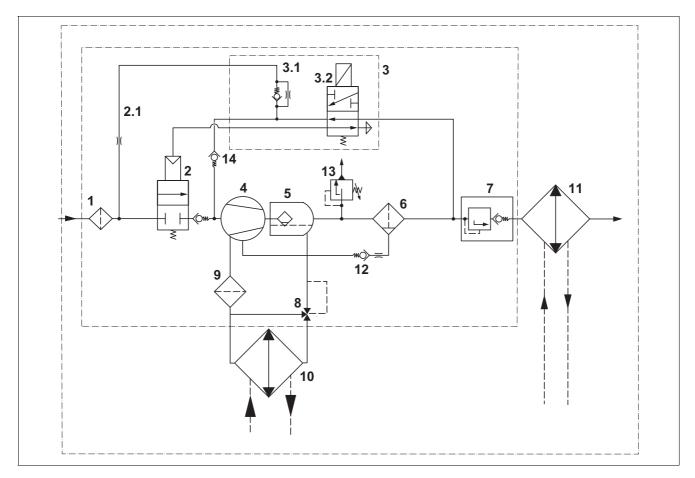


Figure 3-2

- 1. Intake filter
- Intake valve
- 2.1 No-load nozzle
- 3. Control unit (electric)
- 3.1 Discharge delay valve (EVV)
- 3.2 Solenoid valve
- 4. Screw compressor
- 5. Separator tank with pre-separation
- 6. Fine separator
- 7. Minimum pressure valve
- 8. Oil thermostat
- 9. Oil filter
- 10. Oil cooler
- 11. Air after-cooler
- 12. Non-return valve
- 13 Safety valve (optional)
- 14. Non-return valve

3.3 Operating description for NK 100 Screw Compressor Compact Module (electric)

The flow diagram shows a schematic view of the operating principle and the arrangement of the main components of the NK 100 screw compressor module with electrical control unit, regardless of any other equipment.

3.3.1 Standstill

At standstill the solenoid valve **3.2** is deenergized and the downstream devices are depressurized. The minimum pressure valve **7** set to approx. 5.5 bar at the factory is tightly closed. The intake valve **2** is closed at standstill.

3.2 [en] 09/2008



3.3.2 Starting

When starting the compressor, the solenoid valve of the control unit is energized. The intake valve 2 is closed by the spring 3-3/4. The rotors of the screw compressor 4 suck in air via the bypass hole and the non-return valve 14. This air is compressed. The pressure slowly increases in the separator tank 5. The compressed air is routed over the control piston 3-3/3 of the intake valve via the control unit 3. This opens the intake valve and the air can flow through the intake valve into the compression chamber.

3.3.3 Feed phase

During the feed phase the air drawn in flows via the intake filter 1 through the intake valve 2 directly into the compression chamber of the screw compressor 4. There the intake air is compressed and oil for lubrication and cooling is injected.

The oil-air mixture then enters the separator tank **5** in which the majority of the oil is separated from the air. The air then flows via the fine separator **6** and the minimum pressure valve **7** to the compressed air outlet.

In the fine separator **6** the oil is filtered out down to a residual content of $< 3 \text{ mg/m}^3$ and then routed back into the compressor housing via a nozzle and a non-return valve **12**.

When the compressor is switched off, the minimum pressure valve **7** with a non-return function prevents backflow of the compressed air out of the system into the compression chamber in the discharge phase.

During startup a faster pressure buildup is also ensured, which is required for optimum lubrication and oil separation.

The heat resulting during compression is dissipated via the oil-air mixture. The oil circulation also results from the pressure difference between the outlet and inlet pressure. The optimum operating temperature for the oil is adjusted by the oil thermostat 8. Depending on the oil temperature, the oil flow is routed directly via the oil cooler 10 or directly to the oil filter 9 by the oil thermostat valve. The oil then flows via the oil filter 9 to the various injection points in the compressor block.

3.3.4 No-load operation

When the final pressure in the storage tank is reached, the solenoid valve **3.1** is deenergized by a pressure switch. As a result, the compressed air over the control piston **3-3/3** of the intake valve is discharged into the atmosphere by the solenoid valve and the spring **3-5/4** closes the valve plate of the intake valve. With the deenergized solenoid valve, the discharging of the separator tank is also initiated via a piston in the control unit. When the final pressure is reached, the run-on time is started via a pressure switch.

In the run-on time the separator tank is discharged to a residual pressure of approx. 1.5 bar. If the pressure in the storage tank reaches the lower switch-on pressure in the run-on time, the solenoid valve is energized again via pressure switches. This stops the discharging of the separator tank and the intake valve opens again.

If the lower switch-on pressure is not reached in the run-on time, the system is stopped and the separator tank is completely discharged. When the lower switch-on pressure is reached, the system starts up again automatically.

3.3.5 Start-Stop mode

When the final pressure is reached in the storage tank, the system is switched off with pressure switches. The compressed air over the control piston **3-3/3** of the intake valve is discharged into the atmosphere via the solenoid valve. As a result, the spring **3-3/4** closes the valve plate of the intake valve.

With the now deenergized solenoid valve, the discharging of the separator tank is initiated via pistons in the control unit. Discharging is carried out via the discharge delay valve (EVV) **3.1**. Quick discharging down to approx. 2 bar is carried out via a non-return valve. At 2 bar the non-return valve closes and the remaining discharging is carried out via a small nozzle. This prevents the oil from foaming.

3.4 Intake valve for electric control unit

The NK 100 is equipped with an integrated intake valve mounted directly on the compressor housing.

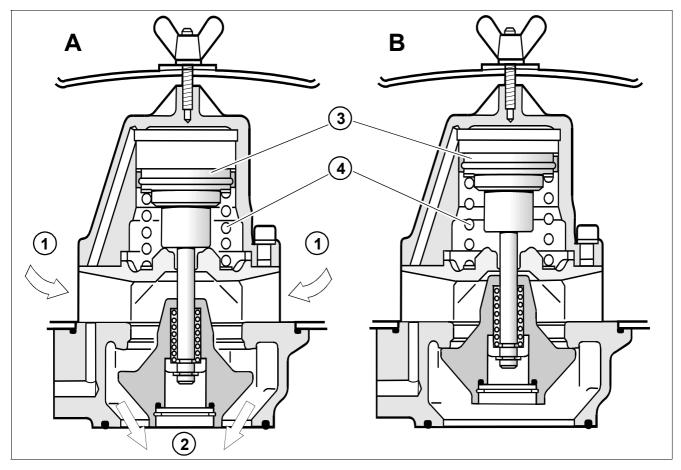


Figure 3-3

- A Intake valve opened
- **B** Intake valve closed
- 1. Air inlet
- 2. Air outlet
- 3. Control piston
- 4. Spring

3.4.1 Installation position

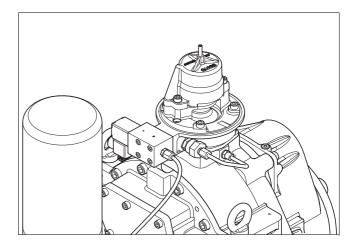


Figure 3-4

3.4 [en] 09/2008



3.5 General overview of NK 100 Screw Compressor Compact Module (transmission model with pneumatic control unit S3T)

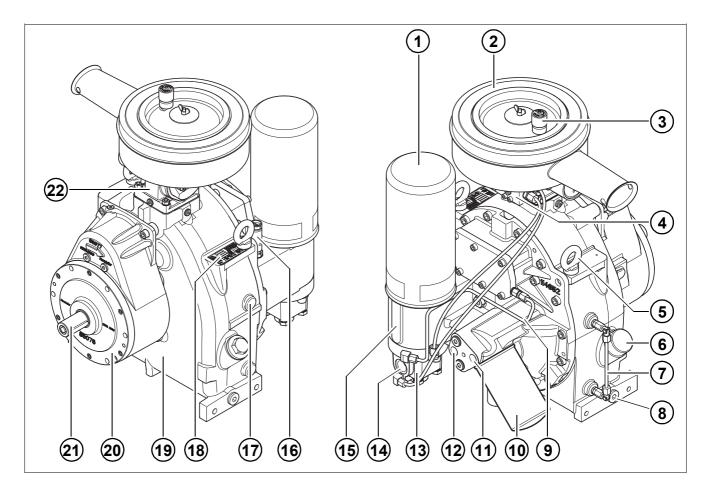


Figure 3-5

- 1. Air-oil separating element
- 2. Air filter
- 3. Maintenance indicator for intake filter (optional)
- 4. Control unit, pneumatic
- 5. Transport eye
- 6. Oil filler opening
- 7. Oil level monitoring (optional)
- 8. Oil drain screw
- 9. Oil separation return line with oil-extraction sight glass (optional)
- 10. Oil filter
- 11. Oil circulation/On
- 12. Oil circulation/Off
- 13. Minimum pressure valve
- 14. Compressed air outlet
- 15. Separator head
- 16. Safety valve (optional)
- 17. Temperature sensor connection (optional)
- 18. Nameplate
- 19. NK 100 basic module
- 20. Transmission
- 21. Drive shaft
- 22. Intake control valve

3.6 Flow diagram of NK 100 (pneumatic control unit S3T)

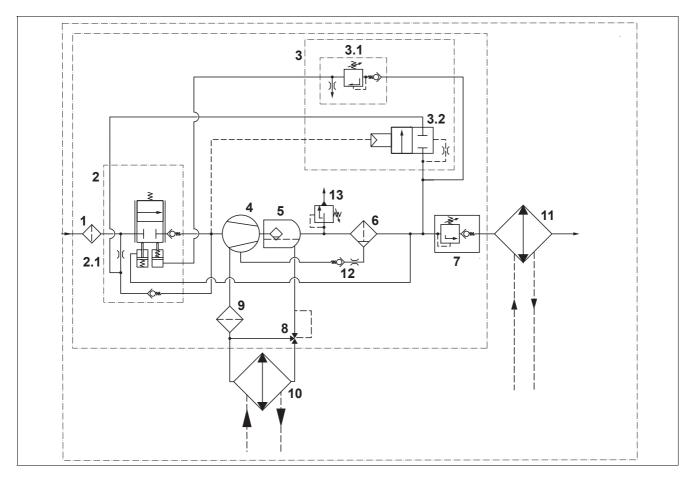


Figure 3-6

- 1. Intake filter
- 2. Intake control valve
- 2.1 Nozzle
- 3. Control unit (pneumatic)
- 3.1 Proportional control valve (positive)
- 3.2 Impulse-pressure relief valve
- 4. Screw compressor
- 5. Separator tank with pre-separation
- 6. Fine separator
- 7. Minimum pressure valve
- 8. Oil thermostat
- 9. Oil filter
- 10. Oil cooler
- 11. Air after-cooler
- 12. Non-return valve
- 13 Safety valve (optional)

3.7 Operating description for NK 100 Screw Compressor Compact Module (pneumatic)

The flow diagram shows a schematic view of the operating principle and the arrangement of the main components of the NK 100 screw compressor module with pneumatic control unit, regardless of any other equipment.

3.7.1 Standstill

At standstill the intake control valve 2 is closed by the spring 3-7/3. The downstream devices up to minimum pressure valve 7 are depressurized. The minimum pressure valve is set to approx. 5.5 bar at the factory is tightly closed. The proportional control valve 3.1 is set to operating pressure.

3.6 [en] 09/2008



3.7.2 Starting

In the startup phase the intake control valve is closed via the spring **3-7/3**. The rotors in the screw compressor **4** intake air via a bypass hole with a non-return valve in the intake control valve and relief valve.

This air is compressed and the pressure in the separator slowly increases. This pressure is routed via the control unit **3** before the holding piston **3-7/6**. This presses the holding piston toward the rear and the control piston **3-7/4** opens the intake control valve with the spring.

The desired final pressure can be set on the proportional control valve **3.1**.

When the set final pressure is almost reached, the proportional control valve **3.1** opens and compressed air is routed behind the control piston **3-7/4**. As a result, the control piston is pressed toward the front and the valve plate **3-7/5** closes the intake control valve. If the operating pressure drops, the proportional control valve closes and the intake control valve opens again. The proportional control valve steplessly controls the opening of the intake control valve depending on the operating pressure.

3.7.3 Feed mode

The air drawn in flows via the intake filter 1 through the intake control valve 2 directly into the compression chamber of the screw compressor 4. There the intake air is compressed and oil for lubrication and cooling is injected.

The oil-air mixture then enters the separator tank **5** in which the majority of the oil is separated from the air.

The air then flows via the fine separator **6** and the minimum pressure valve **7** to the compressed air outlet.

In the fine separator **6** the oil is filtered out down to a residual content of $< 3 \text{ mg/m}^3$ and then routed back into the compressor housing via a nozzle and a non-return valve **12**.

When the compressor is switched off, the minimum pressure valve **7** with a non-return function prevents backflow of the compressed air out of the system into the compression chamber in the discharge phase.

During startup a faster pressure buildup is also ensured, which is required for optimum lubrication and oil separation.

The heat resulting during compression is dissipated via the oil-air mixture. The oil circulation also results from the pressure difference between the outlet and inlet pressure. The optimum operating temperature for the oil is adjusted by the oil thermostat 8. Depending on the oil temperature, the oil flow is routed directly via the oil cooler 10 or

directly to the oil filter **9** by the thermostat valve. The oil then flows via the oil filter **9** to the various injection points in the compressor block.

3.7.4 Stopping

When switching off the system, the valve plate **3-7/5** closes the intake control valve immediately with the spring **3-7/8**. This causes pressure to build up in the intake chamber. This pressure actuates a piston in the relief valve **3.2** and the separator is discharged via holes in the relief valve and intake control valves in the intake filter **1**.

3.7.5 Switching off

When switching off the system, the intake control valve **2** operates, supported by spring pressure, as an independent non-return valve and closes the intake opening oil-tight.

3.8 Intake control valve for pneumatic control unit

The NK 100 is equipped with an integrated intake control valve mounted directly on the compressor housing.

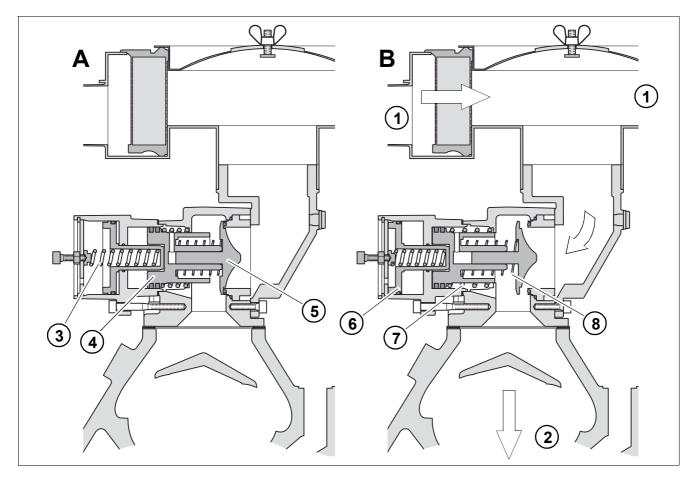


Figure 3-7

- A Intake valve closed
- B Intake valve opened
- 1. Air inlet
- 2. Air outlet
- 3. Spring of holding piston4. Control piston
- 5. Valve plate
- 6. Holding piston
- 7. Spring of control piston8. Spring of valve plate

3.8.1 Installation position

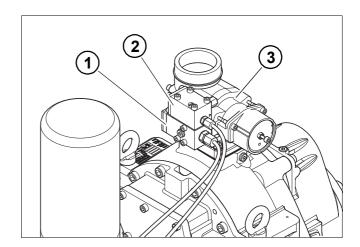


Figure 3-8

- 1. Impulse-pressure relief valve
- 2. Proportional control valve
- 3. Intake control valve

3.8 [en] 09/2008



3.9 Intake air filter

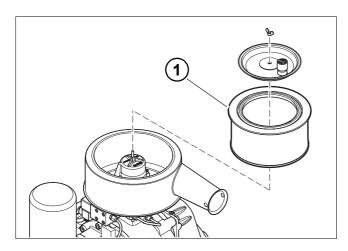


Figure 3-9

3.9.1 Micro air filter element

The RC intake air filter is mounted directly over the intake valve.

The micro air filter 1 with a fineness of 10 μ m is used for the filtering of intake air.

The constant degree of separation of almost 100% on all loading levels, the resistance to heat, cold, water, oil and fuel and a large filter area permit a long service life. As a result, the air filter element is the ideal fine filter for the filtering of intake air of compressor system.

3.9.2 Intake filter monitoring

- Maintenance indicator, optical (option)
- Maintenance indicator, electric (option)

The micro dry filter cartridges are recommended as a **1-stage filter** with a low filter resistance for **standard applications**.

\triangle

Caution:

Special applications, e.g. system installation in a heavily soiled environment, mobile systems, etc., require 2-stage filters with a somewhat higher filter resistance, however a better degree of separation for the protection of the compressor system. Filter Type/Order No.: on special request.

3.10 Fine separator

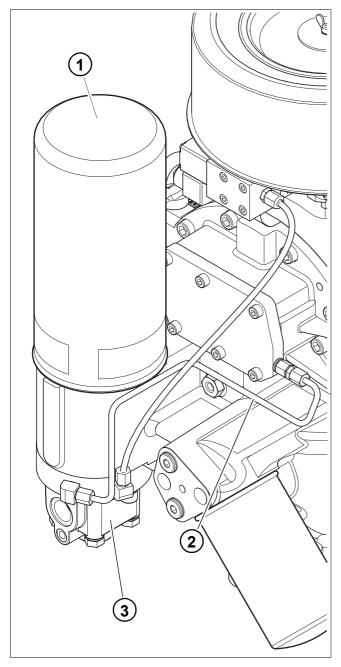


Figure 3-10

- 1. Fine separator cartridge
- 2. Oil separation return line with oil-extraction sight glass (option)
- 3. Minimum pressure valve

3.10.1 Oil intake non-return valve

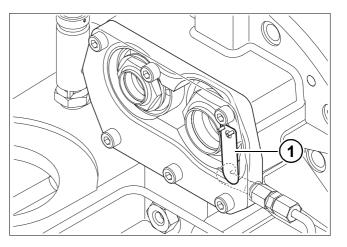


Figure 3-11

The oil intake non-return valve **1** prevents flooding of the fine separator cartridge with oil flowing back out of the screw compressor due to the pressure difference in the system when the screw compressor system is switched off.

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3.10.2 Fine separator cartridge

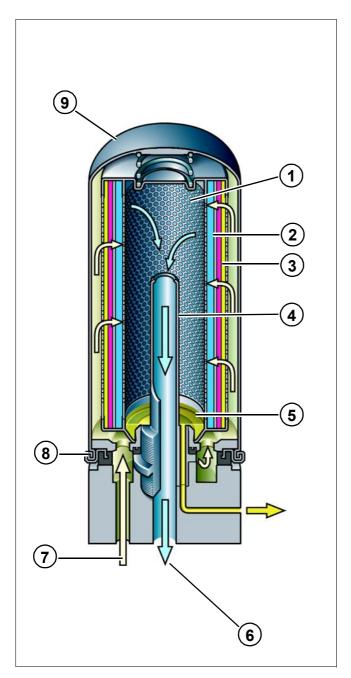


Figure 3-12

- 1. De-oiled compressed air
- 2. Post-separator
- 3. Fine separator
- 4. Pressure-resistant support pipe
- 5. Separated oil
- 6. Outlet of de-oiled air
- 7. Inlet of air-oil mixture
- 8. Sealing off
- 9. Pressure-resistant housing

The fine separator cartridge is used to recover the extremely finely distributed residual oil in the form of droplets following the pre-separation.

The fine separator cartridge separates virtually the entire residual oil from the compressed air. An optimum pre-separation in the separating tank is assumed - the better the pre-separation, the better the fine separation.

The vertical cartridge is flowed against from below, while the residual oil is separated out while flowing through the special filter element. Then it is fed into the oil circulation again.

3.10.3 Minimum pressure valve

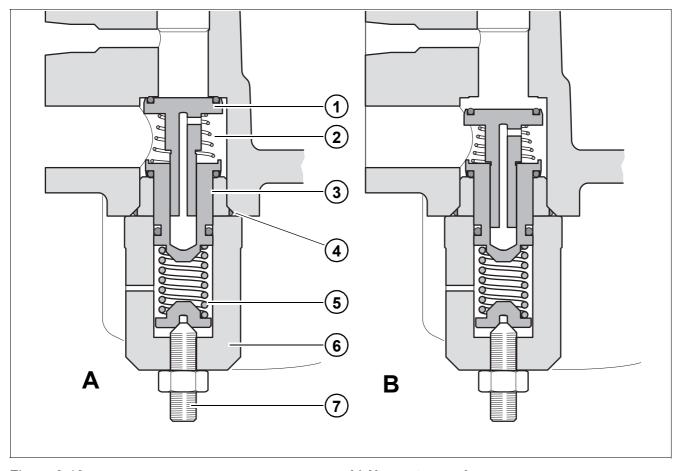


Figure 3-13

- 1. Non-return valve plate
- 2. Non-return valve spring
- 3. O-ring
- 4. Pressure holding valve piston
- 5. Pressure holding valve spring
- 6. Pressure holding valve housing
- A Minimum pressure valve closed
- B Minimum pressure valve opened

The minimum pressure valve is located on the outlet of the compressor before the air recooler and serves as:

a) Pressure holding valve

It prevents the pressure drop, in case of a lack of counter-pressure, under a minimum pressure of approx. 5.5 bar. This pressure is necessary to ensure the oil supply of the compressor. At the same time this is the condition for good oil separation.

b) Non-return valve

It prevents compressed air from flowing back out of the system or the compressed-air reservoir into the screw compressor system. As a result, the system can be completely discharged when the separator reservoir is switched off.

This valve operates automatically.

3.12 [en] 09/2008



3.11 Air-oil circulation outside compressor module

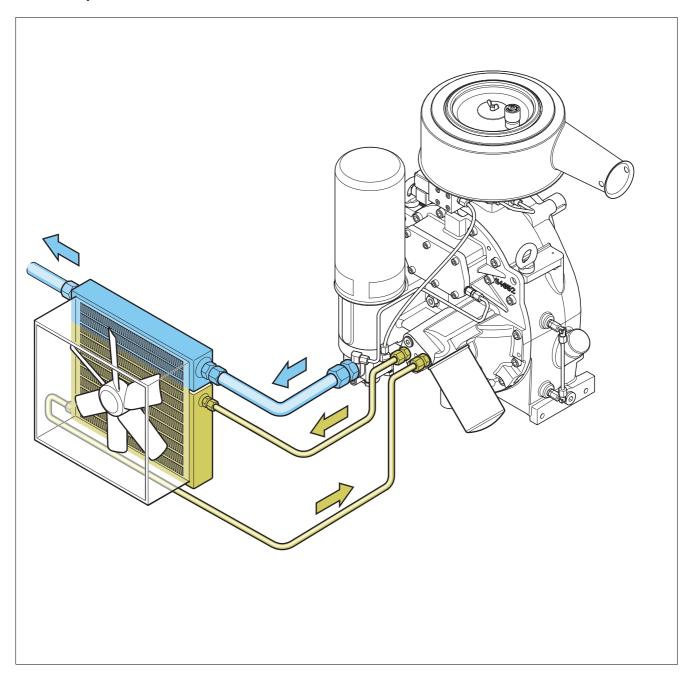


Figure 3-14

After the oil-air mixture in the fine separator cartridge has been deoiled, the compressed air flows through the air cooler and from there to the consumer.

The oil flows via a thermostat (see 3.11.2) to the oil cooler.

The cooled oil flows from the oil cooler via the oil filter back into the internal oil-air circuit of the compressor module.

3.11.1 Oil filter

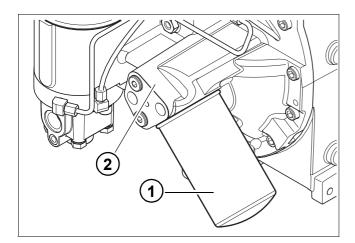


Figure 3-15

- 1. Oil filter
- 2. Bearing cap

The oil filter 1 is screwed onto the bearing cap 2.

The filter fineness is 20 µm.

The replacement filter has a bypass valve which opens with cold, high-viscosity oil or a heavily soiled filter with a pressure difference of 2.5 bar. This eliminates the undersupply of the screw compressor with oil, which results in the maximum permissible compression temperature being exceeded.

3.11.2 Oil thermostat

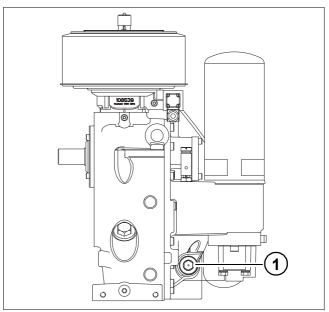


Figure 3-16

The NK 100 is equipped with an integrated oil thermostat **1**. This is located in the bearing cap before the oil filter and is accessible from outside (left side).

The oil thermostat working element can be replaced and must be selected in accordance with the operating temperature.

The oil thermostat opens the connection to the oil cooler when the operating temperature is reached and controls the maintaining of the optimum temperature of the system in the further process. In the startup phase this parameter is reached faster, and therefore the formation of condensate in the oil circulation is largely avoided. Depending on the compressor operating data, the temperature is to be between 80°C and 110°C/

176°F and 230°F (measured at compressor outlet).

When designing the cooling system, the pressure

When designing the cooling system, the pressure dew point graph (Figure 8-1) must be taken into account.

If questions arise concerning the pressure dew point, please contact ROTORCOMP.

The oil thermostat is maintenance-free. Operation of the compressor system with an impermissible overtemperature can result in a failure of the working element (in this case the working element must be replaced).



When the system is operated at 15 bar, the thermostat working element must always be adapted to the increased requirements

3.14 [en] 09/2008



3.12 Oil cooler/air after-cooler (option)

With air-cooled screw compressor systems the circulating oil is cooled down from the compressor outlet temperature to the compressor injection temperature. As an option, ROTORCOMP offers combination coolers with aluminum fins, which are connected to the air and oil circulation of the respective compressor (see Figure 3-14).

The corresponding coolers are dimensioned so that they ensure operating safety at an ambient temperature of up to 45°C/113°F. Sufficient cooling air parameters are assumed.

The cold ambient air should be fed through the cooler with a fan. A sufficient distance to the cooler must be chosen in order to achieve uniform cooling air distribution over the entire effective cooling surface.

Warning:

The safety valve must be installed prior to commissioning.

Operation of the system without a safety valve can be hazardous!

The safety valve is located on the basic module, and is provided with a test device.

While taking the pressure loss in the oil separating system into account, the blow-off pressure is a maximum of 1.5 bar above the respective operating pressure (final pressure) of the system. The valve is type-tested and leaded (manufacturer's certificate available on request).

3.13 Safety valve (SIV) (option)

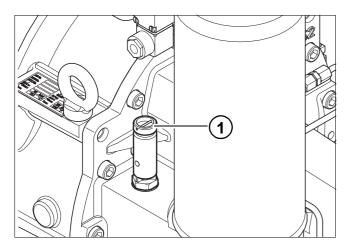


Figure 3-17

1. Knurled screw for operating test

3.16 [en] 09/2008



4 Transport

4.1 Delivery and packing

The system is delivered in suitable packing in accordance with the selected shipping method and delivery conditions.

4.2 Transport damage

Regardless of the care taken at the factory, the screw compressor module may be damaged during transport. Therefore, the screw compressor module should be checked for damage following each transport.



Caution:

A damaged module must not be put into operation under any circumstances. In case of transport damage, damage claims must be secured in your interest by calling in representatives of the transport company promptly for determination of damage, i.e.:

A) Externally recognizable damage or losses

- must be certified with a corresponding note on the freight bill before the merchandise is accepted. With rail transports, a record of the facts must also be requested from the railroad.
- With postal consignments, the damage must be certified in writing by the postal service before accepting damaged packages etc.

B) In case of damage which cannot be recognized immediately

- which are discovered during unpacking, the carrier must be notified immediately and in writing.
- If possible, leave packing materials and damaged products in an unaltered state until the facts are recorded.

Above all, comply with the complaint deadlines.

The deadlines are as follows:

- a) GERMAN FEDERAL RAILWAY:
 within 7 days
 (Paragraph 81/82 of EVO German Regulations Concerning Carriage by Rail)
- b) FORWARDING AGENT: within 7 days (Paragraph 60ADSp - General German Forwarders' Conditions)
- c) POSTAL SERVICE: immediately, at the latest 24 hours following delivery of the shipment



Note:

Each product is checked in accordance with the type and quantity prior to shipment. Should you nevertheless have a reason for complaint, please specify the Order No.

4.3 Transporting unpacked system

The screw compressor can be moved with a crane or with a lift truck or forklift truck when fastened to a transport pallet.

Warning:

Death or serious injuries due to falling cargo!

- Observe the local safety regulations!
- Select the lifting equipment in accordance with the total weight to be transported!
- Remove all loose or swinging parts before lifting the screw compressor!
- Remove drive or body components beforehand!
- Only transport the compressor module while depressurized!
- When transported on a pallet, the compressor module must be securely fastened to it!
- Do not transport the compressor module on the forks of a stacker or lift truck!
- Transport eyes are only designed for transporting the compressor module!
- Do not stand or walk under cargo during transport!

To transport on a pallet, secure the screw compressor on the pallet with angle brackets.

4.4 Transport options

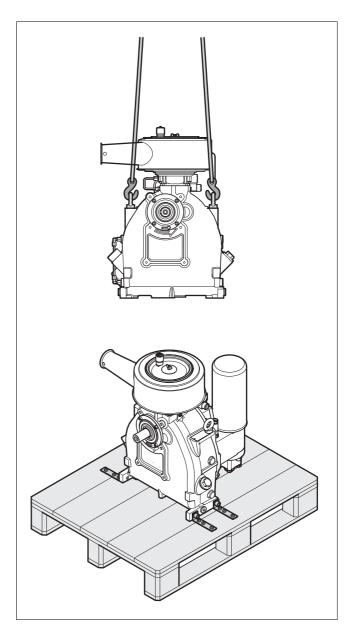


Figure 4-1

4.2 [en] 09/2008



5 Installation/Assembly

5.1 Connection thread/assembly

5.1.1 Fastening screws

Female threads are provided on the NK housing which must be used for fastening. Only suitable screws with a METRIC THREAD are to be screwed into this female thread.

5.1.2 Pipe connections

Pipe connections with a female thread for a compressed-air outlet, oil circulation, draining and control lines are provided on the NK housing. Only fittings or screw connections with a CYLINDRICAL INCH THREAD suitable for these female threads may be screwed in.

CONICAL THREADS must be avoided, as damage to the NK housing can occur when screwing in (see installation drawing).



Caution:

The maximum permissible tightening torque for all screw connections may not be exceeded. VDI 2330 (see chapter 9.2 "Tightening torques") Only screws suitable for fastening the compressor housing may be used for this purpose. Consult ROTORCOMP beforehand if necessary.

5.2 Safety precautions for installation and assembly



Caution:

- To lift the compressor module, suitable lifting equipment must be used which complies with the local safety regulations.
- All blind flanges, plugs, caps and bags with desiccant must be removed before mounting the pipes. Screw fittings and pipe connections must be of the correct size and must be suitable for the respective operating pressure.
- The air drawn in may not contain any flammable, caustic, toxic or aggressive vapors or gases whatsoever.
- Make sure that the pressure line from the compressor to the recooler or air system can expand as a result of the heat and does not come into contact with flammable materials.
- The air intake opening must be positioned so that objects, e.g. loose clothing of passersby, cannot be drawn in.
- No external force may be exerted on the air outlet valve; the connected pipe connection must be mounted torque-free.

The compressor block must be provided with a sufficiently dimensioned ground.

5.3 Installation



Caution:

- The system must be installed at a location at which the ambient air is as cool and clean as possible. Never block the air inlet. It must be ensured that the penetration of moisture with the intake air is kept to a minimum.
- Screw compressor must always be installed on a level surface and must be aligned with a level if necessary.

In exceptional cases, e.g. with mobile systems, these may only be operated up to a maximum angle of inclination of 10°.

In these cases the inclined position must be taken into account when checking the oil level and must be carried out with particular care.

The base frame for the following fastening versions must be torsionally rigid and level. The fastening of the compressor module on a base frame together with the drive motor can be designed in accordance with the following versions.

5.3.1 Fastening on base frame with screw fitting

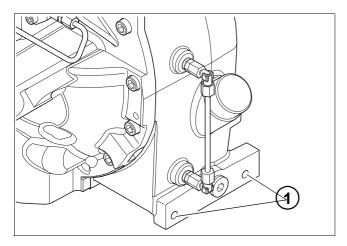


Figure 5-1



Caution:

The compressor module may only be fastened at the side holes on the compressor housing provided for this purpose.

The unit must be fastened torque-free at the respective fastening points **1** on the left and right on the base frame.

5.3.2 Drive

The compressor module is designed as an alternative for driving with electric motors, combustion motors, hydraulic motors, etc.

The power can be transmitted indirectly via a belt drive (V-belt, toothed belt, etc.) or directly via a flexible coupling.

The direction of rotation, looking at the shaft, is counterclockwise, i.e. to the left.

On the model with a transmission, the direction of rotation, looking at the shaft, is clockwise, i.e. to the right.

5.2 [en] 09/2008



5.4 Belt drive

Improper design and/or installation of the V-belt drive can result in a considerable reduction of he bearing life and/or to breakage of the drive shaft. If the drive shaft breaks and/or in case of bearing damage, ROTORCOMP can only grant a warranty if the belt driven is properly designed and executed.

The following information must be observed for this purpose.

- The belt drive must not be underdimensioned.
 The maximum design output for a belt drive is 30.0 kW at 7,200 rpm for this screw compressor.
- The belt pulley must be pushed onto the drive shaft as far as possible and secured.
- The V-belt pulleys must be balanced.
 It is not permissible to drive the belt pulley onto the drive shaft by striking it with a hammer, as this can result in bearing damage.
- When aligning the belt drive, exact parallelism without vertical and horizontal angular errors must be ensured.
- A torsionally rigid base frame for the belt drive must be installed so that it aligns exactly with the compressor module.
- "Fluttering" of the belt of the belt drive should be prevented with construction measures (axis spacing of pulleys, belt tension and stability of the base frame and tensioner).

5.5 Direct drive



Caution:

Offset and angular errors result in damage to bearings and drive shaft!

ROTORCOMP recommends installation with an elastic coupling. The alignment of the motor and compressor module must be carried out according to the instructions of the elastic coupling manufacturer.

The compressor module is provided with a centering flange for directly coupled units.

The flanged unit can be fastened stress-free on the base frame. The connection dimensions of the flange are contained in the offer drawing.

5.6 Air outlet

The pressure loss at the air outlet due to air aftercoolers, fittings, piping, etc.should be as small as possible.



Cross-sections of the outlet pipe must be generously dimensioned. Avoid pressure losses due to elbow screw fittings.

The outlet pipe must be connected stress-free to the outlet.



Warning:

Serious injuries and damage are possible in case of operation without a safety valve!

Operation without a safety valve on the separator tank is not permitted.



A possible compressed air temperature (at the outlet) of up to 110°C/230°F requires the components connected downstream, e.g. the compressed-air hose, pressure switch, air after-cooler, fittings, etc. to be designed for this temperature. We therefore recommend the installation of an air after-cooler.

When used without an air after-cooler, the high outlet temperature must be pointed out to the final customer.

5.7 Oil cooling



Note:

The cooler connection lines must be connected torque-free to the oil connections.

The following information on the design and execution of the oil cooling system must be observed.

- The oil cooling system must be designed so that the oil outlet temperature is a maximum of 105°C/220°F at the maximum intended ambient temperature.
- The oil circulation quantity is dependent on the pressure difference between the outlet and the inlet pressure of your application.
- The oil cooler must be installed so that it can be cleaned easily.

5.8 Service

Ensure good accessibility to the service points when installing the compressor module in a hous-

- Oil filling point
- Oil drain point
- Removal of the separator cartridge (removal) dimensions according to offer drawing)
- Removal of the oil filter cartridge (observe the removal dimensions specified in the offer drawing)
- Easy cleaning of the oil cooler
- Replacement of the shaft seal (removal and installation of the end cover and the bearing
- Belt drive (accessibility, specifications for correct belt tension)

5.4 [en] 09/2008



6 Commissioning

6.1 Preparation for commissioning

The components of the screw compressor are carefully checked and tested at the factory. These tests ensure that the required performance and checking data are complied with. Nevertheless, the screw compressor system should be observed during the initial operating hours.



Caution:

With regard to commissioning, the applicable regulations of the specific country must be observed. In Germany these include the Operating Safety Ordinance.

The following points must be observed prior to first commissioning:

- Direction of rotation: be sure to observe (see chapter 6.2 "Checking direction of rotation").
- The max. final pressure specified on the nameplate may not be exceeded.
- Do not switch off screw compressor systems running under load at the Emergency-Stop or main switch.
- Check the oil level (see chapter 7.2 "Oil level").
- Before each first commissioning and when recommissioning after a longer shut-down of the screw compressor compact module, always carry out the activities described in Chapter 6.4 "Recommissioning screw compressor system".
- With a belt drive: check the belt tension and belt routing (see chapter 7 "Maintenance").
- Check the position of the shut-off valve.
- Check all screw fitting and fastening screws for firm seating.

6.2 Checking direction of rotation

Direction of rotation:

Standard model rotating to the left (counterclockwise) looking at the shaft.

Transmission model rotating to the right (clockwise) looking at the shaft.



Caution:

The direction of rotation of the screw compressor must be checked during first commissioning and each time changes are made to the electrical supply line of the electric motor drive. For this purpose, switch on the drive motor briefly and then switch off again immediately.

An incorrect direction of rotation for more than 2 seconds will result in destruction in the screw compressor. Reconnect the phases of the connection cable if necessary.

6.3 Test run



Caution:

The system is discharged extremely quickly down to the opening pressure "minimum pressure valve" in the Stop mode, "with shut-off valve opened"! This can result in the oil in the separating tank foaming up.

The possible consequences include:

- Oil escaping with the discharge air
- Oil flooding the fine separator cartridges
- Compressed air containing oil when restarting the line

Therefore, the following points must be observed during the test run:

- Only switch off the system with the shut-off valve closed!
- If possible, connect the system to a compressed-air reservoir!

6.4 Recommissioning screw compressor system

Screw compressor systems switched off, shutdown or stored for longer than three months cannot be put into operation again until after the following measures have been carried out:

- Rotate the screw compressor in the direction of rotation several times by hand.
- With the screw compressor system at a complete stop, fill approx. 0.2 liters of oil (same oil type as in the oil separator tank) into the oil intake hole with a syringe.
- On models with a transmission, pour 0.25 liters of oil into the transmission via the oil filler opening.
- Rotate the screw compressor again in the direction of rotation several times by hand.
- Check the oil level in the separator tank and top up if necessary (see chapter 7 "Maintenance").
- Test the running check function for the screw compressor system for at least 15 minutes.

Warning:

The system may not be started with the feed chamber completely filled. There is a danger of considerable damage.

6.2 [en] 09/2008



7 Maintenance

7.1 Safety precautions

The owner must ensure that all maintenance, assembly and repair work is carried out by authorized, qualified, specially trained personnel, which has informed itself sufficiently in advance by studying the operating manual in detail. Following commissioning, the owner bears al responsibility and liability for equipment and assembly.

- Only use permissible or suitable tools for maintenance and repair work.
- Only use genuine spare parts.
- All maintenance and repair work must only be carried out with the machines shut down and the power supply switched off. In the process, the machine must be secured against accidental switch-on.
- Before removing pressurized parts, the unit must be effectively cut off from all pressure sources and a pressure relief of the entire system must be carried out.
- Never use flammable solvents or carbon tetrachloride to clean parts. Take precautions against toxic vapors or cleaning agents.
- Always ensure absolute cleanliness during maintenance and when conducting repair work.
 Keep dirt away from the system. Cover parts and exposed openings with a clean cloth, paper or strips of adhesive tape.
- Do not carry out welding work or any other work requiring or producing heat near the oil system.
- Make sure that no tools, loose parts or cleaning cloths are left behind in or on the system.
- Before releasing the unit for operation following maintenance or overhauling, check whether the operating pressures, temperatures, time settings and the oil level are correct, and whether the control and switch-off devices function properly.
- Electrical components, control devices, etc. must be protected against the penetration of moisture, e.g. from a steam jet.

Warning:

During all maintenance work: ACCIDENT DANGER!



Note:

All maintenance work conducted must be entered immediately in the check sheet.

7.2 Oil level

An important factor for the operating safety of the system is the oil level in the oil reservoir. The oil level check must be carried out before

commissioning the screw compressor module and then repeated every 100 operating hours.

There are two methods for performing the oil level check:

- Via the oil hose (option)
- Via the oil filler opening

The exact oil level check can only be carried out via the oil filler opening.



Warning:

Rotating, pressurized and hot components, DANGER OF INJURY!

7.2.1 Oil level check via oil hose (option)

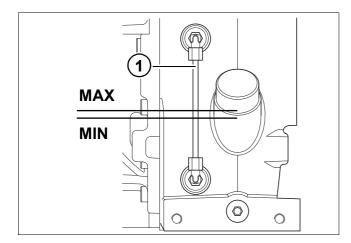


Figure 7-1

The oil hose 1 is intended for an oil level check with the system running.

If the oil level is correct at a standstill, the oil level must be within the imagined markings, i.e. the oil level is approximately equal to the oil level in the oil filler opening.

With the system running, the oil level must be visible in the oil hose. If not, conduct an oil level check via the oil filler opening.

7.2.2 Oil level check via oil filler opening



W Warning:

- The unit parts, oil and oil filler plug 1 may be over 80°C/176°F; danger of burns! Wear personal safety equipment!
- With hot oil, the oil level can be approx. 10 mm higher than with cold oil shortly after discharg-

As a result, oil may escape when the oil filler plug is opened at the maximum oil level. In this case, close the oil filler plug again immediately and carefully remove the oil which has escaped.

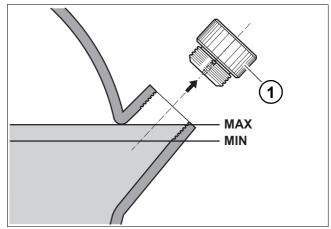


Figure 7-2



Note:

The screw cap of the oil filler neck is provided with a safety hole on the side from which oil or air escapes if there is any residual pressure in the separating tank. Wait briefly in this case.

- Switch off the system and secure it against unauthorized switch-on.
- Wait for one minute at standstill.
- Screw off the screw plug 1 of the filler neck by hand with the oil level depressurized.
- Check the oil level.

7.2 [en] 09/2008



• If necessary, top up oil of the same oil type and the same brand up to the maximum level.



Note:

The oil filler neck is positioned so that overfilling of the screw compressor system is not possible. Excess oil runs out of the filler neck again.

- Screw on the screw plug 1 firmly by hand.
- . Switch on the system.
- Check the oil filler plug for leaks and replace the O-ring if necessary.
- Carefully remove escaped, excess oil.

7.3 Oil change



Warning:

Rotating, pressurized and hot components, DANGER OF INJURY

The oil change may only be carried out at a standstill and with the screw compressor system completely discharged.

7.3.1 Oil change intervals

According to the specifications of the system manufacturer. For the reference values for the screw compressor compact module, see chapter 7.8 "Maintenance intervals".

7.3.2 Oil drain point

The system should be at operating temperature in this case.

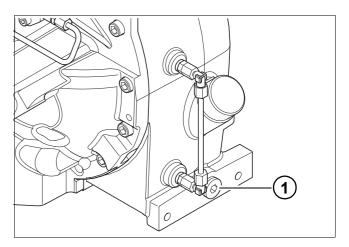


Figure 7-3



Note:

Dispose of the used oil according to the applicable regulations

- Switch off the screw compressor and then secure it against being switched on again by removing the main switch.
- Completely release the pressure in the screw compressor system.
- Slowly screw off the screw plug on the oil filler neck.
- Carefully unscrew the oil drain screw 1 and catch the used oil in a suitable container.
- Clean the oil drain screw 1 and screw in again.

7.3.3 Filling with oil



Caution:

Observe the oil recommendation, see "Lubricants and Operating Materials". Add oil of the same oil type and the same brand.

A conversion to another oil type may require flushing of the compressor module.

ROTORCOMP recommends also replacing the oil filter during an oil change.

- Replace the oil filter if necessary
- Pour oil into the filler neck on the separator tank up to the maximum level and screw the screw plug 1 onto the filler neck by hand (see Figure 7-2).
- Switch on the screw compressor and allow it to run for approx. three minutes.
- Oil level check: Top up the missing oil quantity again up to the maximum level.
- Check sheet entry (see chapter 7.7 "Maintenance check sheet").

7.4 Oil filter



W Warning:

Rotating, pressurized and hot components, DANGER OF INJURY

- The unit parts, oil and oil filler plug may be over 80°C/176°F; danger of burns!
 - Wear personal safety equipment!

The oil filter replacement may only be carried out at a standstill and with the screw compressor system completely discharged.

7.4.1 Oil filter replacement intervals

According to the specifications of the system manufacturer. For the reference values for the screw compressor compact module, see chapter 7.8 "Maintenance intervals".

7.4.2 Oil filter replacement

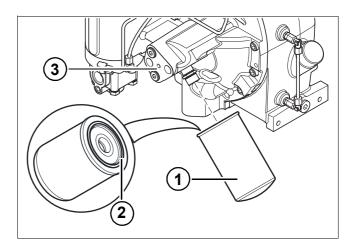


Figure 7-4

- Switch off the system and completely release the pressure in the system.
- Remove the oil filter cartridge **1** with a suitable tool, e.g. oil filter strap wrench.
- Oil the gasket 2 on the new oil filter cartridge 1 with oil of the same oil type as in the compressor module.



Note

Dispose of the old oil filter cartridge according to the applicable regulations

- The new oil filter cartridge 1 must be held vertically and filled with oil of the same oil type as in the compressor module before screwing on.
- Screw the new oil filter cartridge onto the bearing cap 3 and tighten by hand. No tool is required.
- . Switch on the screw compressor.
- The oil filter must then be checked for leaks with the system running.
- Oil level check:
 - Top up the missing oil quantity again up to the maximum level.
- Check sheet entry (see chapter 7.7 "Maintenance check sheet").

7.4 [en] 09/2008



7.5 Fine separator cartridge

Warning:

Rotating, pressurized and hot components, DANGER OF INJURY

- The unit parts and oil may be over 80°C/176°F; danger of burns!
 - Wear personal safety equipment!

The fine separator cartridge may only be replaced at a standstill and with the screw compressor system completely discharged.

7.5.1 Maintenance intervals

According to the specifications of the system manufacturer. For the reference values for the screw compressor compact module, see chapter 7.8 "Maintenance intervals".

With heavily soiled intake air or a poor oil quality, the cartridge is heavily soiled, making premature replacement necessary.

7.5.2 Replacing fine separator cartridge

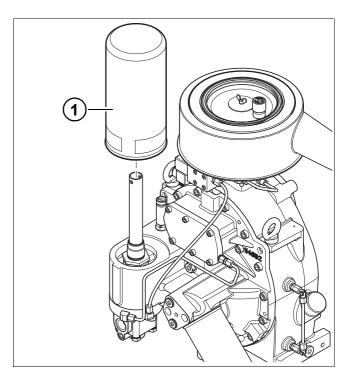


Figure 7-5



Dispose of the old fine separator cartridge according to the applicable regulations

- Unscrew the fine separator cartridge 1 with a suitable tool, e.g. oil filter strap wrench.
- Oil the gasket on the new fine separator cartridge 1 with oil of the same oil type as in the compressor module.
- Tighten the new fine separator cartridge by hand. No tool is required.
- Switch on the screw compressor system.
- . The fine separator must be checked for leaks with the system running.
- Check sheet entry (see chapter 7.7 "Maintenance check sheet").

7.5 [en] 09/2008

7.6 Intake air filter

7.6.1 Maintenance intervals

According to the specifications of the system manufacturer. For the reference values for the screw compressor compact module, see chapter 7.8 "Maintenance intervals".

In case of heavily soiled intake air, an earlier replacement of the filter element is necessary when the optical or electric maintenance indicator (optional) indicates this (perm. vacuum up to 50 mbar).

7.6.2 Replacing air filter element

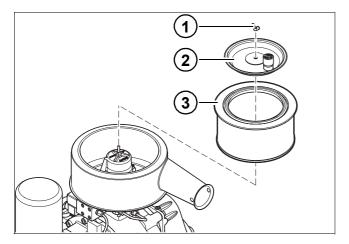


Figure 7-6



Caution:

No dirt or dust particles may get into the air inlet of the screw compressor.



Voto:

It is not permissible to clean the filter element; the filter element must always be replaced in case of soiling!

Dispose of the old air filter element according to the applicable regulations.

- Switch off the system and secure it against unauthorized switch-on.
- Screw off the wing nut 1 and remove the filter cover 2.
- Carefully remove dust from the filter housing.
- . Remove the old filter element 3.
- Insert the new filter element in the filter housing.
- Lay on the filter cover, ensuring proper positioning during assembly.
- Tighten the wing nut.
- Switch on the screw compressor system.
- Conduct a test run and an operating test.

7.6 [en] 09/2008



7.7 Maintenance check sheet

| Elapsed time meter reading | | | | | | | | |
|----------------------------|---------------------------|--------------------------------------|--------------------|--------|---|----------|--------|----------|
| | Replace air intake filter | | | | | | | |
| | | Replace oil filter cartridge | | | | | | |
| | | Replace oil fine separator cartridge | | | | | | |
| | | | Retension V-belts | | | | | |
| | | | Replace V-belt set | | | | | |
| | | | | | | • System | repair | |
| | | | | • Date | | | | |
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[en] 09/2008 7.7

7.8 Maintenance intervals



Caution:

The frequency of the maintenance intervals (oil change, replacement of oil filter, fine separator cartridge and air filter element) varies depending on the application and the operating parameters. Depending on the design of the system, maintenance interval should therefore be specified by the compressor manufacturer. These must be given priority. It is advisable to conclude a maintenance agreement. The following table provides an overview of the reference value for the NK 100 screw compressor module.

| Maintenance intervals (Bh = operating hours) | Maintenance work | See chapter | |
|---|--|--------------------------------|--|
| Before commissioning | Check oil level in separator tank | 7.2 | |
| Once after 50 Bh | Check oil level in separator tank Tighten all screw pipe fittings and electrical screw terminal fittings; check all other con- nections for firm seating | 7.2 | |
| Every 100 Bh | Check oil level in separator tank, top up in case of oil shortage Check maintenance indicator | 7.2 | |
| Every 1,000 - 6,000 Bh depending on application Recommendation: every 12 months | Replace fine separator cartridge Carry out oil change Replace oil filter Replace filter element in intake air filter Check system for leaks System inspection. | 7.5.2 7.3 7.4.2 7.6.2 | |

7.8 [en] 09/2008



8 Lubricants and Operating Materials Maintenance Parts

8.1 Lubricants and operating materials

8.1.1 Oil recommendation

RC screw compressors must be operated with an oil suitable for special requirements. This oil must be approved by the manufacturer for screw compressors. It must even be suitable under unfavorable operating conditions, such as soiling of the intake air with gases, solvent vapors and exhaust gases and at high ambient temperatures.

Suitable oil types and oil manufacturers can be specified for screw compressor on request. Refined oils (mineral oils) synthetic oils and bio oils (biodegradable) can be used as screw compressor oil.

The materials and gaskets used in the screw compressor system must be taken into account when selecting the oil type. Corrosion and other material damage may not occur.

It is not permissible to mix different oils.

8.1.2 Topping up oil

Use the same manufacturer and the same oil type as is currently in use in the screw compressor.

8.1.3 Measures at low room temperature

Sufficient room heating.

At ambient temperatures below 0°C/32°F, the system must be heated up to at least 20°C/68°F before start-up with an integrated standstill heater.

8.1.4 Piping materials

Plastic compressed-air piping systems can be attacked by the oil used in the screw compressor.

Note:

See the information sheet!

The requirements placed on the cooling oil in the screw compressor include the following:

- High resistance to aging
- High dispersive power
- Flash point: over 200°C/392°F
- Minimum foaming
- High corrosion protection
- Operating temperature: up to 110°C/230°F
- Select suitable viscosity class, e.g. ISO VG 68.



Caution:

Be sure to comply with the oil viscosity, as otherwise there is a danger for the bearing service life.

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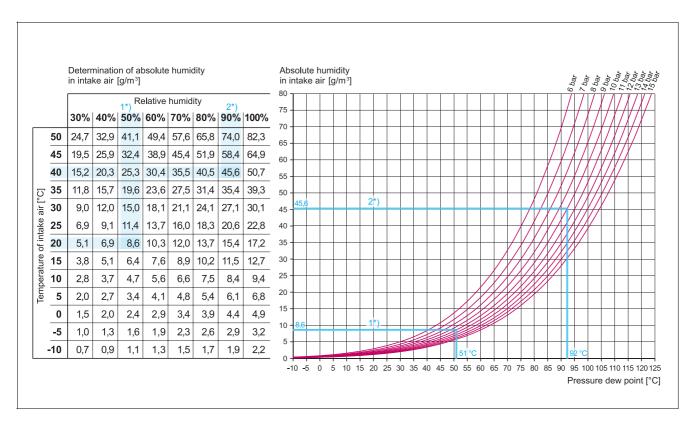


Figure 8-1 Pressure dew point graph

8.1.5 Pressure dew point of compressed air Example:

- 1*) Temperature of the intake air is 20°C/68°F, humidity is 50%, resulting in an absolute humidity of approx. 8.6 g/m³ in the intake air. At a pressure of 10 bar, the pressure dew point is approx. 51°C/124°F.
- 2*) Temperature of the intake air is 40°C/104°F, humidity is 90%, resulting in an absolute humidity of approx. 45.6 g/m³ in the intake air. At a pressure of 10 bar, the pressure dew point is approx. 92°C/198°F.

8.1.6 Temperatures



The optimum operating temperatures for the screw compressor system can only be achieved if the oil circuit components (thermostat, cooler, fan, etc.) have been properly designed and the supply and exhaust air temperatures of the installation room and the compressor system make this possible. The entire thermal economy must be calculated.

8.1.7 Condensate damage

The relative humidity and the final operating pressures must always be taken into account in accordance with the selection graph for the working temperature of the thermostat element and for the compressor operating temperature in order to prevent condensate from forming in the system.

8.1.8 Cold starts

During **compressor cold starts**, the viscosity of the oil must enable the sufficient, immediate supply of the compressor with lubricant following starting while taking into account the higher pressure losses in the oil circulation which is still cold. The higher cold-starting power requirement must not overload the compressor drive.

8.2 [en] 09/2008



8.1.9 Oil separation

The fine oil separation becomes poorer in the upper area with an increasing compressor outlet temperature.

8.1.10 Multigrade oil

The use of **multigrade oils** can cause problems in the long run, as "viscosity improvers" used are destroyed over time. The oil is then no longer secured in the upper viscosity class and a thermal stability is no longer completely ensured. Therefore, multigrade oils are not approved for use in ROTORCOMP compressors.



Caution:

Only use oils approved for screw compressors!

[en] 09/2008 8.3

8.4 [en] 09/2008



9 **Technical Data and Tightening Torques**

Technical data

| Screw compressor model | | NK 100 | NK 100 G |
|---|--------|--------|----------|
| Max. operating gauge pressure. | bar | 15 | 15 |
| | psi | 218 | 218 |
| Max. delivered quantity according to DIN 1945 up to | m³/min | 4.3 | 4.3 |
| | cfm | 150 | 150 |
| Required output up to | kW | 30 | 30 |
| (full load without fan) | hp | 40 | 40 |
| Max. speed of main rotor | rpm | 7,400 | 7,400 |
| Oil capacity, approx. | 1 | 6 | 6 |
| Machine weight without oil, approx. | kg | 98 | 124 |
| | lb | 216 | 273 |
| Compressed-air connection | inch | G 3/4" | G ¾" |
| Max. outlet temperature | °C | 110 | 110 |
| | °F | 230 | 230 |
| Max. room temperature | °C | 45 | 45 |
| | °F | 115 | 115 |

Note:

This sheet contains only general technical data for this screw compressor.

The corresponding ROTORCOMP performance sheet applies for calculation, design and measurement.

Technical data on the entire screw compressor system, drive motors, electrical system and accessory components in accordance with the corresponding data sheet of the manufacturer or supplier.

[en] 09/2008 9.1

9.2 Tightening torques



Caution:

The maximum permissible tightening torque for all screw connections may not be exceeded. VDI 2230

Unless otherwise specified, the following torques must be used. Always tighten screws/bolts with a torque wrench.

| Screw/bolt type | Thread | Max. torque |
|--------------------------------------|--------|---------------------|
| Hexagonal head bolts Allen screws | M 6 | 10 Nm (7 ft.lbs) |
| Hexagonal head bolts Allen screws | M 8 | 25 Nm (18 ft.lbs) |
| Hexagonal head bolts Allen screws | M 10 | 43 Nm (32 ft.lbs) |
| Hexagonal head bolts Allen screws | M 12 | 75 Nm (53 ft.lbs) |
| Hexagonal head bolts Allen screws | M 14 | 120 Nm (85 ft.lbs) |
| Hexagonal head bolts Allen screws | M 16 | 180 Nm (126 ft.lbs) |

9.2 [en] 09/2008



10 Troubleshooting

| Fault | Possible cause | Remedy | See chapter |
|--|--|--|-------------|
| Incorrect direction of rotation | Phases reversed | Reconnect 2 supply lines | |
| System difficult to start | Motor output insufficient | Check | |
| | Drive gear ratio "too fast" | Check | |
| | Star-delta switchover incorrect | Set | |
| | Compressor is flooded with oil | Check | |
| | System has not been discharged yet | Check | |
| | Ambient temperature too low | Check oil viscosity and belt tension | 5.3 |
| | Oil filling too viscous | Check viscosity | 8.1.1 |
| Pressure losses at filter cartridges | Pressure loss at separator cartridges too high | Replace separator cartridge | 7.5.2 |
| Combistat switches off due to excessively high temperature | Oil shortage | Check oil level in oil reservoir and top up if necessary | 7.2 |
| | Oil filter soiled | Replace oil filter cartridge | 7.4.2 |
| | Thermostat defective | Replace thermostat | |
| | Oil cooler soiled | Clean oil cooler on air side, clean on oil side if necessary | |
| | Incorrect installation a) Room ventilation b) Exhaust air blocked c) Thermal short circuit | Observe recommendation on installing system | 5.3 |
| | Combistat defective | Replace combistat | |

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| Fault | Possible cause | Remedy | See chapter |
|---|--|---|-------------|
| Safety valve blows off | Safety valve defective | Replace safety valve | |
| | Fine separator cartridge soiled | Replace cartridge | 7.5.2 |
| | System does not switch off automatically Control valve operates intermittently | Check solenoid valve | |
| Oil in compressed air | | Clean oil extraction system | |
| | Fine separator cartridge defective | Check cartridge and replace if necessary | 7.5.2 |
| | Oil level in oil reservoir too high; possibly excessive condensate | Observe oil level marking; drain and replace if necessary | 7.2 |
| System is not discharged during continuous operation, system does not | Upper switching point of network pressure monitor set too high | Readjust network pressure monitor | |
| switch off automatically in case of intermittent operation, i.e. safety valve | Solenoid valve defective Relief valve defective | Replace solenoid valve/ relief valve | |
| blows off | Minimum-pressure holding valve jammed | Check minimum-pressure holding valve for smooth movement; ensure smooth movement if necessary | |
| System continually | Solenoid valve defective | Replace solenoid valve | |
| discharges, low feed quantity | Break in electric supply line to solenoid valve | Eliminate break | |
| No or insufficient feed | Intake filter soiled | Replace filter insert | |
| quantity | Oil shortage | Check oil level and top up if necessary | 7.2 |
| | Intake control valve jams or is incorrectly positioned | Check control valve and control valve flap, clean bearings and guides, check stroke | |
| | Leaks in system | Check, seal off | |

10.2 [en] 09/2008



| Fault | Possible cause | Remedy | See chapter |
|---|---|--|-------------|
| Control valve does not open | System leaky | Check system and seal off if necessary | |
| | Solenoid valve/electrical system, bypass valve, piston gasket, minimum pressure valve do not function | Check and replace parts if necessary | |
| Control valve does not control | Pressure switch in system is set incorrectly | Check setting | |
| (two-point/stepless) | Nozzle for pneumatic control valve is of incorrect size | Replace with different nozzle diameter | |
| Oil escapes during stop | Sealing surfaces in control valve damaged, spring in control valve broken | Check parts and replace if necessary | |
| System does not discharge (discharge time 100 - 200 seconds, depending on separator size) | Solenoid valve/electrical system inoperative | Check | |
| Control valve constantly discharges | Solenoid valve/electrical system inoperative | Check | |
| Oil escapes during | Oil type incorrect | Oil change | 7.3 |
| discharging (oil foam in fine separator cartridge) | Oil foam forms during stop | Check discharge delay valve; use different nozzle diameter | |
| | Oil level too high | Drain off oil | 7.2 |

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ROTORCOMP VERDICHTER GmbH

Industriestraße 9 82110 Germering Germany

Tel.: +49 89 724 09-0 Fax: +49 89 724 09-38

info@rotorcomp.de www.rotorcomp.de

A member of BAUER GROUP