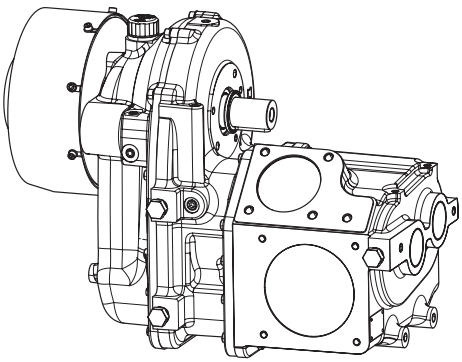
GHH RAND®

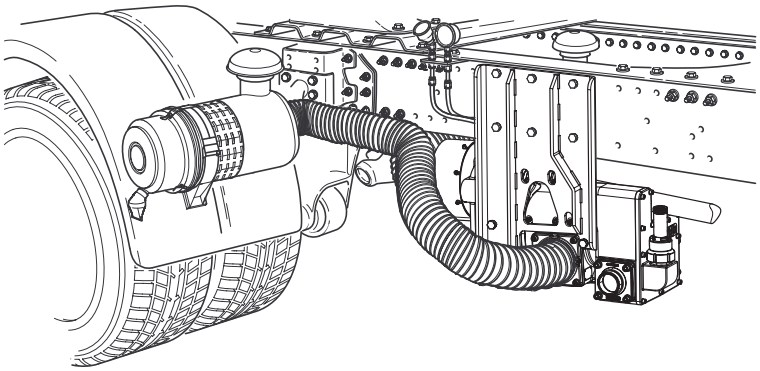
www.ingersollrand.com/ghhrandtransport

EN

Operating manual

(Translation of the original instructions)





SILU CS90
SILU CS580 LITE
SILU CS750 LITE

47757784 A

Ingersoll Rand®
Transport Solutions

DE **WICHTIG!**

Die Betriebsanleitung liegt in Ihrer Landessprache zusammen mit der Montageanleitung (englische und deutsche Ausführung) elektronisch auf der Webseite www.ingersoll.com/ghhrandtransport für den Download bereit. Auf Anfrage senden wir Ihnen auch gerne eine gedruckte Version zu.

EN **IMPORTANT!**

The operating instructions can be downloaded electronically in your language, together with the mounting instructions (in English and German) from the website www.ingersollrand.com/ghhrandtransport. On request, we will gladly send you a printed version.

CZ **DŮLEŽITÉ!**

Návod k provozu je k dispozici ke stažení v jazyce Vaší dané země společně s návodem pro montáž (anglická nebo německá verze) elektronicky na webové stránce www.ingersollrand.com/ghhrandtransport. Na vyžádání vám rádi zašleme i tištěnou verzi.

DK **VIGTIGT!**

Denne driftsvejledning på dit lands sprog ligger elektronisk og klar til download sammen med monteringsvejledningen (engelsk og tysk version) på hjemmesiden www.ingersollrand.com/ghhrandtransport. Efter forespørgsel sender vi dig også gerne en trykt version.

FR **IMPORTANT !**

Vous pouvez télécharger la manuel d'utilisation dans la langue de votre pays avec les instructions de montage (en anglais et en allemand) au format électronique sur le site Web www.ingersollrand.com/ghhrandtransport. Sur demande, nous vous enverrons volontiers une version imprimée.

IT **IMPORTANTE!**

Le istruzioni d'esercizio sono disponibili in formato elettronico per il download sul sito www.ingersollrand.com/ghhrandtransport in lingua italiana, insieme alle istruzioni per il montaggio (edizione in inglese e in tedesco). Su richiesta saremo lieti di inviarvene anche una copia in formato cartaceo.

NL **BELANGRIJK!**

De gebruikshandleiding kan samen met de montagehandleiding (Engelse en Duitse versie) in uw taal elektronisch worden gedownload van de website www.ingersollrand.com/ghhrandtransport. Op aanvraag sturen we u met alle plezier ook een gedrukte versie.

PL **WAŻNE!**

Instrukcja obsługi dostępna jest w ojczystym języku użytkownika wraz z instrukcją montażu (w języku angielskim i niemieckim) w elektronicznej formie do pobrania na stronie internetowej www.ingersollrand.com/ghhrandtransport. Na życzenie chętnie prześlemy Państwu również wersję drukowaną.

PT **IMPORTANTE!**

O manual de instruções está pronto para ser descarregado na sua língua-mãe, juntamente com o manual de montagem (versão em inglês e alemão), em formato eletrónico na página Web www.ingersollrand.com/ghhrandtransport. A pedido, podemos também fornecer-lhe uma versão impressa.

GHH RAND

FI **TÄRKEÄÄ!**

Suomenkielisen käyttöohjeen ja (englannin- ja saksankielisen) asennusohjeen voi ladata sähköisessä muodossa osoitteesta www.ingersollrand.com/ghhrandtransport. Pyydettäessä lähetämme myös tulostetun version.

BY **ВАЖНА!**

Электронную версію кіраўніцтва па эксплуатацыі на нацыянальнай мове разам з інструкцыяй па мантажы (на англійскай і нямецкай мовах) можна спампаваць на сайце www.ingersollrand.com/ghhrandtransport. Па асобным запыце мы з задавальненнем дашлем вам друкаваную версію.

SI **POMEMBNO!**

Navodila za uporabo so v elektronski obliki na voljo za prenos v vašem lokalnem jeziku skupaj z navodili za montažo (angleška in nemška različica) na spletni strani www.ingersollrand.com/ghhrandtransport. Na zahtevo vam bomo z veseljem poslali tudi tiskano različico.

Introduction

Before installing and commissioning the SILU CS90 screw compressor or the SILU CS580/750 LITE compressor kit, please read through these operating instructions carefully (the additional designation SILU is not used in the rest of these operating instructions).

The operating manual contains important instructions which must be strictly followed if trouble-free operation and a long service life are to be ensured.

Scope of application of the operating manual

These operating instructions only contain instructions for the above-mentioned screw compressor and the above-mentioned compressor kit. These operating instructions are not valid for operation of a compressor unit completed by an external installer.

Target group

The operating manual is intended for use by qualified specialist staff only.

Notes and safety instructions

The following instructions and safety instructions are used in the operating manual to warn of dangers which could lead to operating errors, injuries and tangible damage:

⚠ DANGER

DANGER warns of an imminent danger and indicates an imminent danger. This safety note warns of possible irreversible to fatal injuries.

⚠ WARNING

WARNING indicates a possible imminent danger. This safety note warns of serious or perilous injuries.

⚠ CAUTION

CAUTION indicates a possible imminent danger. This safety note warns of light injuries.

NOTICE

ATTENTION warns of possible tangible damage or malfunctions.

NOTE

NOTES contain instructions to prevent operating errors and other specific useful or important information.

GHH RAND

Contents

1 General

1.1 Application

GHH RAND builds and delivers the CS90 screw compressor and the CS580/750 LITE compressor kit, a kit for installation on silo vehicles for the connection-ready unit (compressor unit).

Because of their oil-free compression of atmospheric air and their power-to-weight ratio for installation on silo vehicles, the compressor unit is used to pneumatically convey bulk goods, such as flour, sugar, salt, animal feed, powdered chemicals, dry granulate, soda, cement, sand, lime, plaster, etc.

The products built and supplied by GHH RAND are only designed for the operation at and on utility vehicles that exclusively drive on paved roads.

A different use requires consultation with the manufacturer.

1.2 Manufacturer's address

GHH RAND
Schraubenkompressoren GmbH
Max-Planck-Ring 27
46049 Oberhausen

1.3 Identification

For the machine data, refer to the accompanying documents and the rating plate.

In order to always have the data on hand, we recommend that you enter it into the following blank space.

Compressor serial no.: _____

Unit serial no.: _____

1.4 Information for enquiries and orders

If you have enquiries or orders for spare parts and accessories, please provide details of the exact type designation and the serial number of the screw compressor or the compressor unit, for which the spare part or accessory is intended.

⚠ CAUTION

USE OF UNAUTHORISED SPARE PARTS AND ACCESSORIES!

Original replacement parts and accessories that are authorised by the manufacturer represent safety factors. The use of non-original or non-authorised replacement parts and accessories may void the liability for the resulting consequences.

- ▶ Only use original spare parts and accessories authorised and approved by the manufacturer.

1.5 Service & Support

www.ingersollrand.com/ghhrandtransport

1.6 Technical data CS90 screw compressor

Dimensions & weight CS90...		...L1x/ R1x	...L2x/ R2x
Length (approx.)	mm	598	490
Width (approx.)	mm	302	302
Height (approx.)	mm	430	430
Weight (approx.)	kg	114/113	110/109

Speed range CS90...	xxL	xxH
min. rpm	1450	1350
max. rpm	1800	1800

Maximum operating pressure
max. 2.5 bar

Oil filling quantity
approx. 3.9 litres

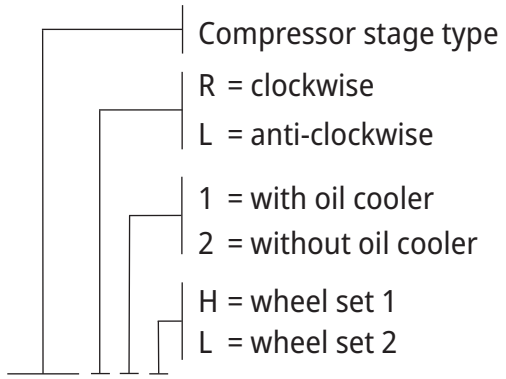
Maximum intake negative pressure
max. 65 mbar

Minimum oil pressure
min. 0.3 bar

Performance data	Unit	CS90 xxL			CS90 xxH		
Rotary valve compressor	rpm	1450	1625	1800	1350	1575	1800
Operating overpressure	**bar**	**1.5**					
Intake volume	m^3/h	453	527	600	549	662	775
Coupling output	kW	22.2	25.7	29.3	26.6	32.2	37.9
Final temperature	°C	147	147	147	147	147	148
Intake temperature max.	°C	50	50	50	50	50	50
Intake temperature min.	°C	-20	-20	-20	-20	-20	-20
Operating overpressure	**bar**	**2.0**					
Intake volume	m^3/h	437	511	585	533	647	760
Coupling output	kW	26.3	30.5	34.4	31.5	37.6	43.8
Final temperature	°C	181	178	176	177	175	173
Intake temperature max.	°C	50	50	50	50	50	50
Intake temperature min.	°C	-20	-20	-20	-20	-20	-20
Operating overpressure	**bar**	**2.5**					
Intake volume	m^3/h	421	496	569	517	631	745
Coupling output	kW	31.2	35.5	39.8	36.5	43.4	50.2
Final temperature	°C	219	212	208	211	206	202
Intake temperature max.	°C	42	44	45	44	46	48
Intake temperature min.	°C	-20	-20	-20	-20	-20	-20

All information for:	
Feed medium:	atmospheric air
Intake pressure:	1 bar (abs.)
Intake temperature:	20°C
Technical data without intake or pressure losses	

Code key type designation



1.7 Technical data CS580/750 LITE compressor kit

Dimensions & weight*		
Length (approx.)	mm	857 / 744**
Width (approx.)	mm	325
Height (approx.)	mm	430***
Weight (approx.)	kg	165

Rotational speed range	xxL	xxH
min. rpm	1450	1350
max. rpm	1800	1800

*) in mounted condition

**) L2x/R2x version without integrated oil cooler

***) Dimension up to lower edge of vehicle frame

NOTICE

DAMAGE TO THE COMPRESSOR!

Exceeding the permitted speed range leads to material damage.

► Do not operate the compressor outside of its permitted speed range.

Maximum operating pressure
max. 2.5 bar

Oil filling quantity
approx. 3.9 litres

Maximum intake negative pressure
max. 65 mbar

Minimum oil pressure
min. 0.3 bar

NOTE

The performance data of the CS580/750 LITE correspond to the CS90 screw compressor (*1.6 on page 8).*

1.8 Operating the compressor at high altitudes

If operating the compressor at high altitudes, make sure that, depending on the existing ambient pressure, the operating overpressure must be reduced in order to prevent temperature damage to the compressor.

This should be carried out in accordance with the following table:

Installation height h [m]	0	1000	1500	2000	2500	3000	3500	4000	4500
Permitted operating overpressure $p_{permitted}$ [bar]	2.53	2.25	2.11	1.99	1.87	1.75	1.64	1.54	1.44

NOTICE

TEMPERATURE DAMAGE!

An ambient temperature outside the permitted range can result in damage to the compressor.

- ▶ The existing ambient temperature or intake temperature must be in the range -20°C to +42°C.

1.9 Lubricant

We recommend using our fully synthetic high-performance lubricant, Silol.

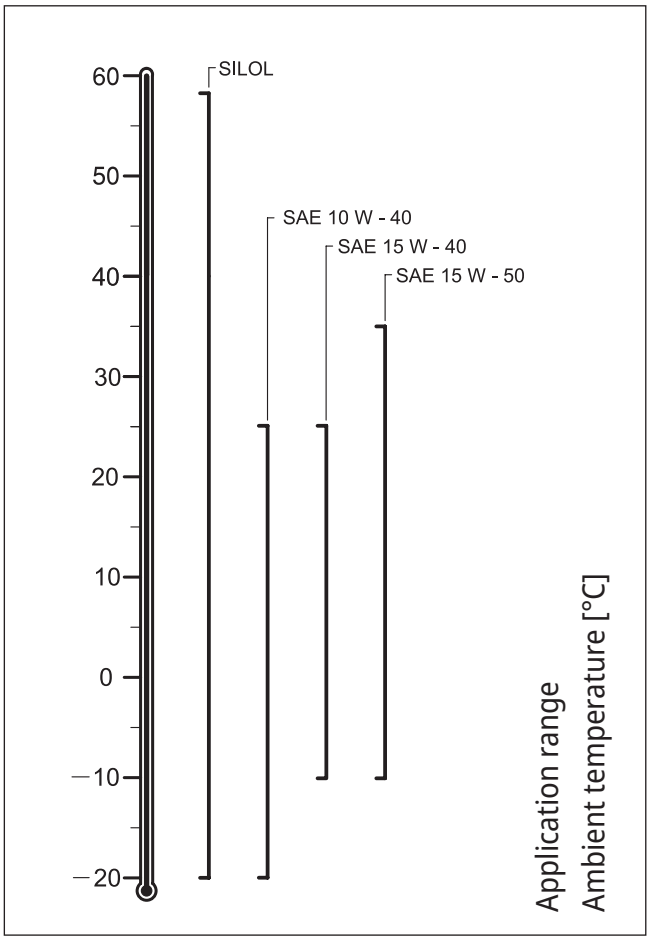
If you use exclusively Silol or Silol FG (foodgrade) the interval for an oil change **doubles** to a max. **12 months**. The period of the manufacturer's warranty for new compressor units **is extended** to **2 years**.

NOTE

For recognition of the guarantee extension, proof of the maintenance interval using Silol or Silol FG is required.

Depending on the operating conditions, brand-name motor oils with API classification SJ/CF as per SAE J183 can also be used.

The respective viscosity class (SAE class) can be taken from the following diagram.



1.10 Screw compressor type plate

The type plate is attached to the side of the screw compressor. It contains the following information:

- Type
- Serial number
- Rotational speed range
- Max. volume flow
- At max. operating pressure
- Max. power consumption

NOTE
The complete identification has certificate value and may not be changed or rendered illegible.

1.11 Compressor unit type plate

The type plate of the compressor unit contains the following information:

- Type
- Year of manufacture
- Compressor serial no.
- Unit serial no.
- Unit drive speed
- Intake volume
- Max. operating pressure

NOTE
The complete identification has certificate value and may not be changed or rendered illegible.

2 Safety

2.1 General

This operating manual contains basic instructions to be followed during operation and maintenance/repair. Therefore, this operating manual must be read by the responsible technical staff/operator prior to commissioning and it must always be available at the place of use for the screw compressor.

2.2 Authorised personnel, training and qualification

Work carried out on the compressor, such as operation and maintenance/repair, must only be carried out by persons with the appropriate authorisation, training and qualifications, who are familiar with the valid safety regulations.

Repairs or modifications must only be performed by authorised personnel who is available at any time at the service sites or at GHH RAND.

2.3 Safety-conscious work

The essential safety-related regulations for installation, operation and maintenance/repair of air compressors are contained in the following publications:

Machinery Directive 2006/42/EC

Standards, in particular:

DIN EN ISO 12100-1/2	Safety of machinery
DIN EN 1012-1	Compressors and vacuum pumps, safety requirements

The regulations of the professional associations, in particular:

BGI 666	Sample operating instructions for operation of container vehicles for granular or dust-like goods (silo vehicles).

In this context, the respectively last applicable versions of these regulations shall be authoritative. Special legal provisions and regulations, particularly safety regulations, that may apply in your company or due to local conditions must also be adhered to. In case of competing regulations, the more restrictive provisions shall be applied. You must also observe any national regulations in the respective country of use.

2.4 Safety instructions for the owner/operator

The owner/operator is responsible for ensuring that the screw compressor is in a safe operational condition. Damaged or faulty parts must be immediately replaced. If the screw compressor is used to convey combustible materials, make sure that the temperature remains below the spontaneous ignition temperature for any dust/air mixture which may be created. In accordance with the professional association regulation BGI 666, for the pneumatic transport of materials subject to dust explosion, a temperature limit of max. 120°C must be adhered to (measurement point before contact with the materials to be conveyed).

2.5 Unauthorised conversions and spare parts

Conversions and modifications to the screw compressor and screw compressor unit are not permitted.

Damage to the seal will void any warranty claims. Original replacement parts and accessories that are authorised by the manufacturer represent safety factors. The use of non-original or unauthorised replacement and accessory parts may void the liability for resulting consequences.

2.6 Incorrect operating methods

⚠ WARNING

INCORRECT OPERATING METHODS!

The operation of the compressor under incorrect conditions may lead to serious injuries and significant material damage.

- ► The compressor must only be operated under permitted conditions.

Unless approval is obtained from GHH RAND, the compressor must only be operated under the conditions stated in *chapter 1.6 on page 8* to *chapter 1.8 on page 10*.

2.7 Disposal

Compressor components, as well as operating materials used in conjunction with the compressor and compressor kit, must be disposed of observing the local regulations.

3 Operation

3.1 Safety during operation

NOTE
Also observe the safety instructions in *chapter 2 on page 12*.

⚠ DANGER

RISK OF EXPLOSION!

For the conveyance of combustible, dust-like materials, the temperature of the compressed air at the measurement point directly before contact with the material to be conveyed may not exceed the maximum value of 120°C.

- ▶ If the maximum temperature is exceeded, switch off the compressor immediately.

⚠ CAUTION

NOISE GENERATION!

A greater acoustic pressure level can result in damage to hearing.

- ▶ Wear hearing protection.

⚠ CAUTION

HOT MACHINE PARTS!

During operation, the compressor is very hot. There is a risk of burning on hot machine parts.

- ▶ Wear protective gloves.

NOTICE

OVERHEATING DUE TO EXCESSIVE RUNNING TIME!

Exceeding the max. running time results in tangible damage due to overheating.

- ▶ Adhere to the max. running time: 3 hours running time and a subsequent 1 hour pause.

NOTICE

OVERHEATING DUE TO EXCESSIVE OPERATING PRESSURE!

Exceeding the max. operating pressure results in tangible damage due to overheating.

- ▶ Do not operate the compressor at an operating pressure of more than 2.5 bar.
- ▶ In the event of operating at high altitudes, adapt the operating pressure.
- ▶ If exceeded, switch off the compressor.

3.2 Initial commissioning

Initial commissioning of the compressor is usually carried out on the premises of the system manufacturer.

It includes removing the preservation, filling the oil tank and checking the direction of rotation.

3.3 Installation

- ▶ Park the vehicle in as level a position as possible.
- ▶ Observe the permitted inclination.

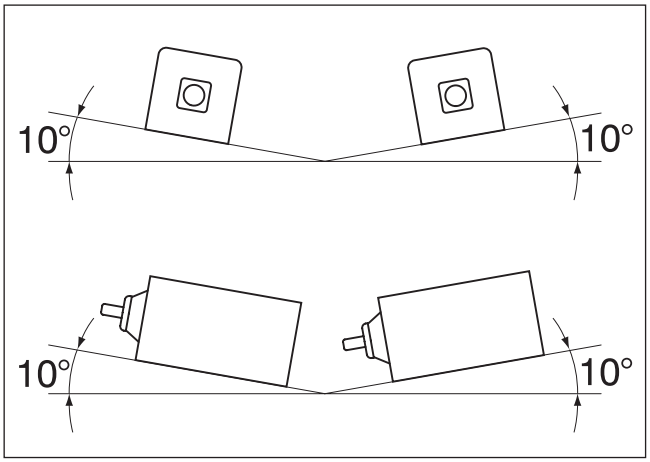
Permitted inclination

NOTICE

INSUFFICIENT LUBRICATION!

Excessive inclination results in irregular level of lubricant in the housing.

- ▶ Observe the maximum permitted inclination of the screw compressor during operation:
  - To the front and to the rear: 10°
  - To the right and left: 10°



3.4 Switching On

NOTICE

RISK OF BLOWBACK OF MATERIAL!

If the compressor is started if there is counter pressure, there is the risk of damage to the non-return valve due to blowback of material.

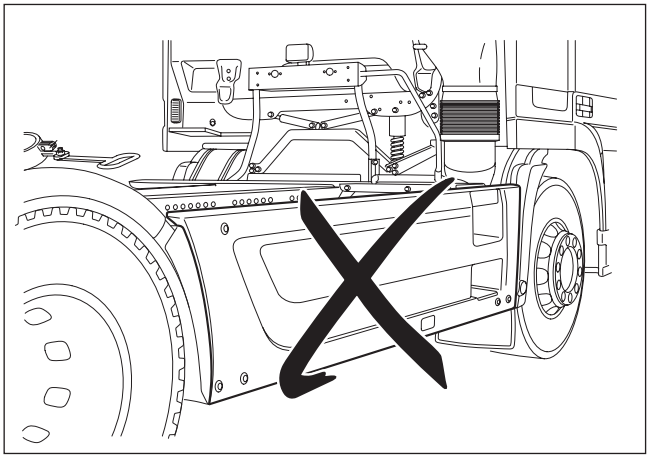
- ▶ Only start the compressor when completely depressurised.
- ▶ Never go into operation against a potentially existing counter pressure.

NOTICE

INSUFFICIENT FRESH AIR SUPPLY CS580/750!

For vehicles with side cladding installed, the side cladding must be folded down or removed before switching on the compressor unit in order to prevent temperature damage to the compressor.

- ▶ Ensure sufficient fresh air supply.



- ▶ Switch on power take-off.

3.5 Monitoring operation

3.5.1 CS90/external installation

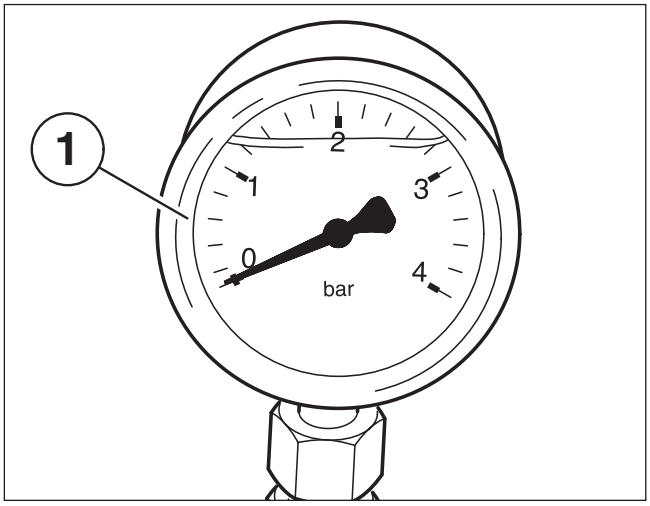
The manufacturer installs a gauge (measurement position in the following pipeline) pneumatic system to monitor the compression pressure. The system manufacturer or external installer must also install displays that monitor the intake negative pressure and the oil pressure of the compressor stage. For the operation and control of the operating displays, only the instructions from the manufacturer are applicable. The permitted operating conditions and limit values can be found in *chapter 1.6 on page 8* to *chapter 1.8 on page 10*.

NOTE
With external installations, displays from diverse manufacturers can be installed. Also observe the instructions from the manufacturer.

3.5.2 CS580/CS750 LITE

Oil pressure gauge

The oil pressure is displayed on the oil pressure gauge **(1)**.
The oil pressure may not drop below 0.3 bar.



NOTICE

LOW OIL PRESSURE!

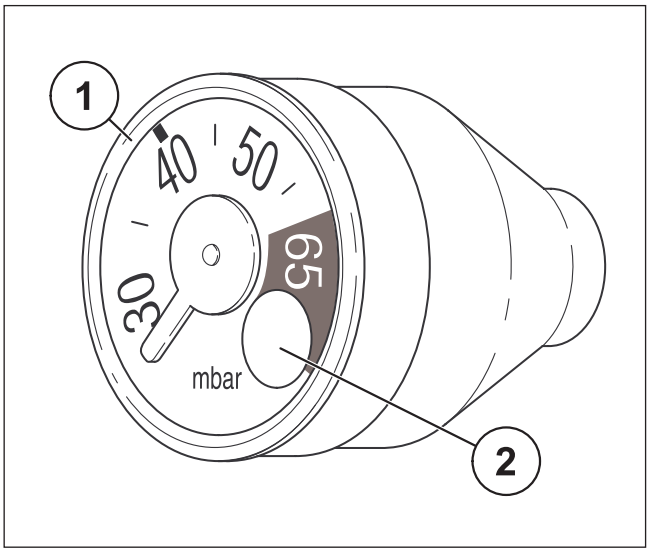
If the oil pressure is insufficient, significant tangible damage can occur.

- ▶ Do not fall below the minimum permitted oil pressure.
- ▶ If, after a short time of operation, no oil pressure is built up, switch off the compressor and check the oil level, as necessary clean the oil intake strainer.

Maintenance indicator variant 1

The negative pressure in the compressor is displayed on the maintenance indicator **(1)**.

The negative pressure must not exceed 65 mbar (red area on the maintenance indicator).



NOTICE

PERMITTED NEGATIVE PRESSURE EXCEEDED!

Excessive negative pressure (> 65 mbar) can result in overheating and damage to the compressor.

- ▶ Clean the intake filter elements of the compressor or, in the event of excessive clogging, replace the filter (*chapter 4.4.4 on page 23*).

Resetting the maintenance indicator

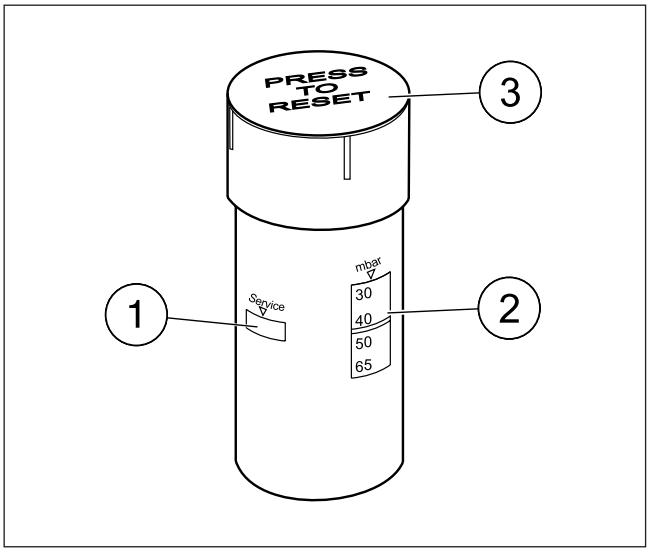
If the negative pressure has dropped to below the permitted limit (65 mbar, red area on the maintenance indicator), the maintenance indicator must be reset after rectification of the malfunction.

- ▶ Push the button **(2)** on the front of the maintenance indicator **(1)**.

Maintenance indicator variant 2

The negative pressure in the compressor is displayed on the maintenance indicator **(2)**.

The negative pressure must not exceed 65 mbar. The service display **(1)** is then red.



NOTICE

PERMITTED NEGATIVE PRESSURE EXCEEDED!

Excessive negative pressure (> 65 mbar) can result in overheating and damage to the compressor.

- ▶ Clean the intake filter elements of the compressor or, in the event of excessive clogging, replace the filter (*chapter 4.4.4 on page 23*).

Resetting the maintenance indicator

If the negative pressure has exceeded the permitted limit (service display **(1)** is red), the maintenance indicator must be reset after rectification of the malfunction.

- ▶ Push the button **(3)** on the top of the maintenance indicator **(2)**.

3.6 External oil cooler for compressor (optional)

To ensure that the compressor has an optimum service life even under extreme conditions, an external oil cooler can be connected as an option.

3.7 Function control of external oil cooler fan

A sheet of paper held in front of the radiator of a running fan must be sucked towards it.

NOTICE

DAMAGE TO THE COMPRESSOR!

The compressor can be damaged if the fan is defective.

- ▶ Check that the fan works.
  - The paper is sucked in by the fan.

3.8 Switching off

NOTICE

RISK OF BLOWBACK OF MATERIAL!

If the compressor is switched off if there is counter pressure, there is the risk of damage to the non-return valve due to blowback of material.

- ▶ Do not turn compressor off if there is counter pressure!
- ▶ If there is counter pressure, take appropriate measures to reduce pressure before switching off the compressor.

NOTE

The non-return valve installed in the compressor unit prevents the compressor from running backwards rapidly and for a long time (as a result of residual pressure in the compressed air lines of the pneumatic system) after being switched off.

- ▶ Switch off power take-off.

NOTE

Before switching off, do not manually reduce the compressor speed using the speed control.

NOTICE

COMPRESSED AIR LINE NOT DISCONNECTED!

The compressed air line ruptures if it is not disconnected from the compressor unit before starting the journey. Internal components of the compressor unit can also be damaged.

- ▶ Disconnect the compressed air line from the compressor unit before starting journey.

3.9 Preservation

If the compressor is shut down for an extended period of time, the compressor must be protected from corrosion damage using a preservative. Please consult the manufacturer for a recommendation of a suitable preservative.

4 Maintenance/repair

4.1 Safety

NOTE
Also observe the safety instructions in *chapter 2 on page 12*.

⚠ WARNING

COMPRESSED AIR IN THE SYSTEM!

There is a risk of injury due to pressurized components and lines.

- ▶ All checks and maintenance tasks must only be performed with the compressor switched off and depressurised.
- ▶ Remove the ignition key from the towing vehicle.

⚠ CAUTION

HOT MACHINE PARTS!

During operation, the compressor is very hot. There is a risk of burning on hot machine parts.

- ▶ Wear protective gloves.

NOTICE

CLEANING USING A HIGH-PRESSURE JET!

When cleaning a silo vehicle using a high-pressure jet, there is the possibility that water will ingress into the interior of the compressor and the air filter.

- ▶ A distance of 0.5 m must be maintained.
- ▶ If necessary, empty or clean the air filter.
- ▶ In order to prevent corrosion, after cleaning, the compressor must be briefly operated (approx. 10 minutes).

4.2 Observe the tightening torques

The tightening torques are specified in the following chapters.

⚠ WARNING

INCORRECT TIGHTENING TORQUE!

An incorrect tightening torque can endanger the secure attachment of the compressor, or result in damage to components due to excessive tightening torque.

- ▶ The specified tightening torques must be observed.

4.3 Maintenance Intervals

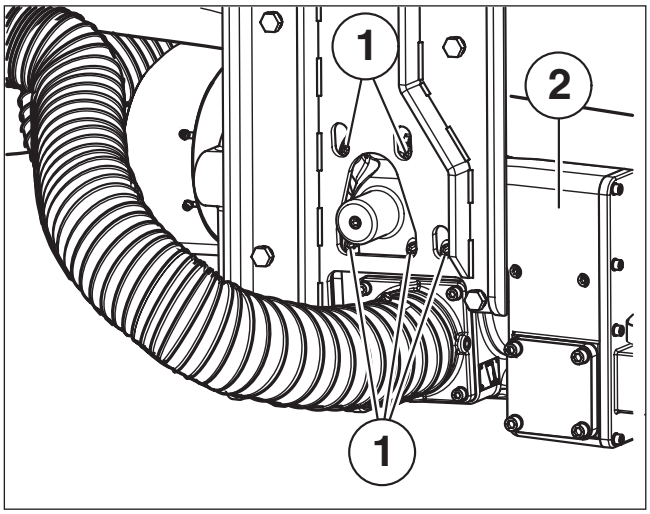
All of the maintenance and repair tasks given on this page are described in detail in the following *chapter 4.4 on page 20*.

After the first 2 operating hours	Section
Re-tighten the fastening screws on the discharge silencer.	*4.4.1*
Visually inspect the oil cooler and the lines to/from the oil cooler and compressor for leaks.	*3.6* *4.4.2*
Weekly	
Check the oil level in the compressor unit and correct as required.	*4.4.3*
Clean the intake filter or replace if the degree of contamination is excessive and reset the negative pressure maintenance indicator as required.	*4.4.4*
Quarter-annually	
Carry out a function check of the safety valve.	*4.4.5*
Carry out a function check of the check valve.	*4.4.6*
Semi-annually	
Check the oil cooler, fan screen and cool air intake for dirt and clean them if necessary.	*4.4.7*
Every six months or, if using Silol, once per year	
Carry out an oil change.	*4.4.8*
Clean the oil intake strainer.	*4.4.8*

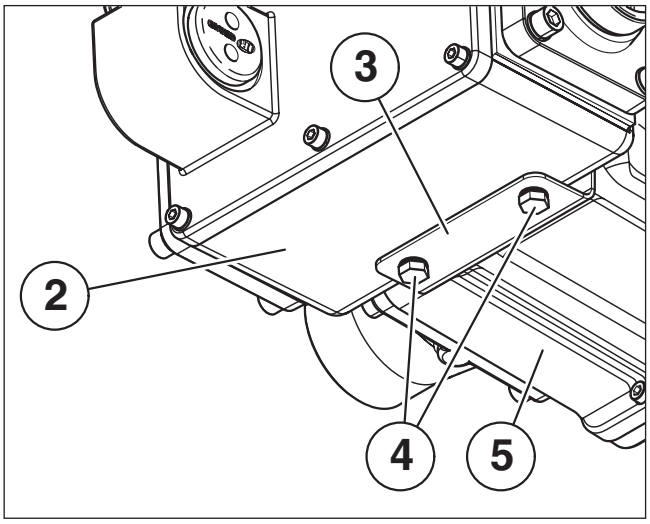
4.4 Maintenance work

4.4.1 Retighten the fastening screws on the discharge silencer

- Retighten the fastening screws **(1)** on the discharge silencer **(2)**, tightening one screw then tightening the screw opposite.
  Tightening torque (M12 A2-70): 65 Nm

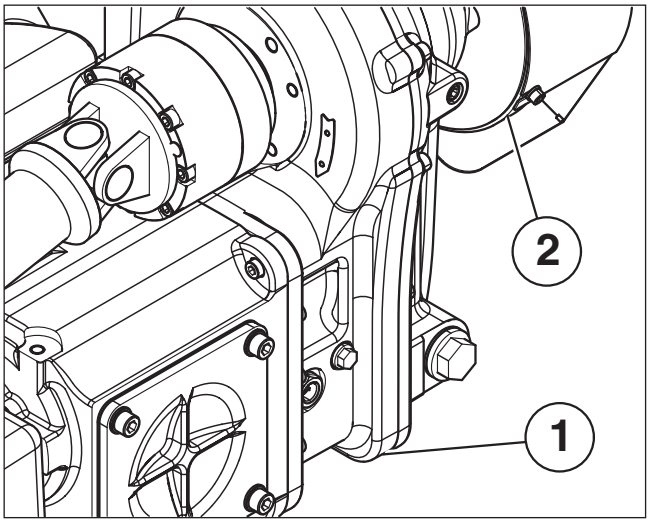


- Retighten fastening screws **(4)** of the holder **(3)** between the discharge silencer **(2)** and the compressor housing **(5)**.
  Tightening torque (M10 A2-70): 37 Nm

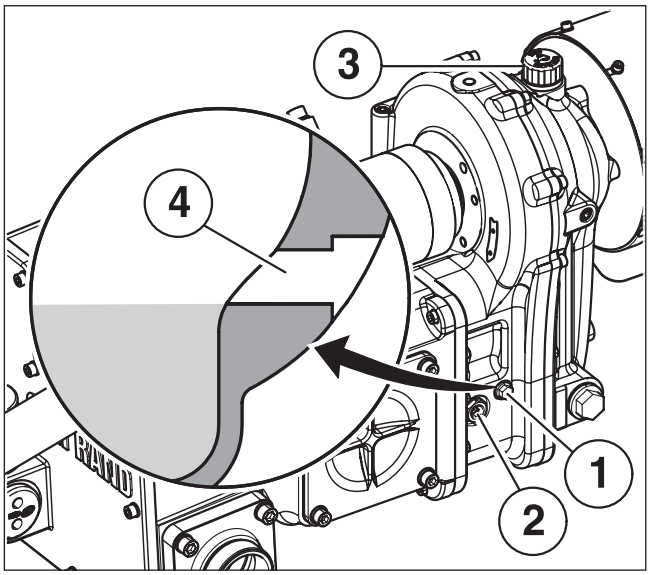


4.4.2 Checking the oil cooler and compressor for leaks

- Visually inspect the oil cooler **(2)** and compressor housing **(1)** for leaks.



4.4.3 Checking the oil level



- ▶ Check that the oil reaches the oil inspection glass **(2)**.
- ▶ Correct the oil level as needed.

If the oil level is too high (oil inspection glass is completely full):

- ▶ Unscrew and remove the locking screw **(1)** from the compressor housing. The oil flows out of the threaded hole **(4)**.
- ▶ Catch the oil and dispose of it according to the legal regulations.

If the oil level is too low (no or very little oil is visible in the oil inspection glass):

- ▶ Unscrew and remove the locking screw **(1)** from the compressor housing.
- ▶ Top up the oil. To do so, unscrew the cap **(3)** and slowly pour oil in until the oil reaches the lower edge of the threaded hole **(4)**. Alternatively, pour the oil into the compressor housing through the threaded hole with the help of a hose.

⚠ CAUTION

ENVIRONMENTAL POLLUTION THROUGH OIL!

Very small quantities of oil are sufficient to make significant amounts of potable water unusable.

- ▶ During the oil change, make sure that no oil is released into the environment.
- ▶ Dispose of the used oil in accordance with local regulations.

NOTICE

DAMAGE DUE TO INCORRECT OILS!

Incorrect oils can destroy the compressor.

- ▶ Only use specified oil (*chapter 1.9 on page 10*).

NOTICE

INCORRECT OIL LEVEL!

If the oil level is insufficient, significant tangible damage can occur. If the oil level is excessive, foaming and, thus, oil leakage can occur.

- ▶ Observe the fill quantity.

- ▶ Screw the locking screw back in.
  Tightening torque (M14x1.5): 40 Nm

NOTE

Seal ring: DIN 7603 - A14x18 - soft iron.

4.4.4 Cleaning and replacing the intake filter element

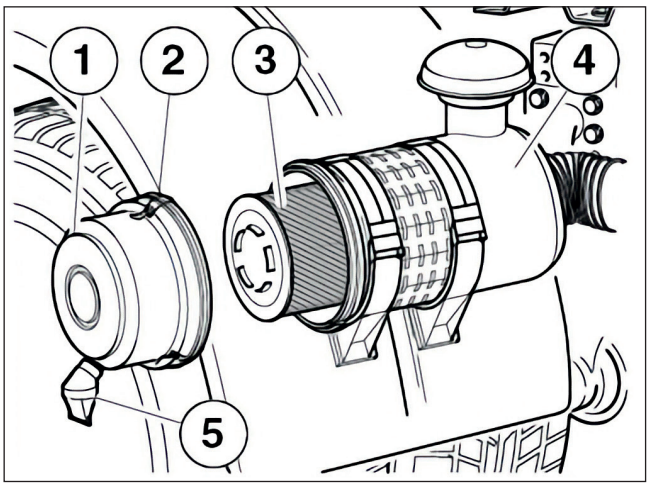
For the maintenance or replacement of the intake filter of a compressor unit based on the CS90 compressor stage (third-party manufacturer), only the instructions from the manufacturer are applicable.

NOTE
Intake filters from diverse manufacturers can be installed. Also observe the instructions from the manufacturer.

CS580/750 LITE:

Intake filter variant 1

- ▶ Unfasten the wire bracket catches **(2)** from the filter housing **(4)** and then remove the cover **(1)**.
- ▶ Remove filter elements **(3)**.
- ▶ Clean filter elements **(3)** by lightly tapping or replace if necessary.



NOTICE

INCORRECT FILTER CLEANING!
Do not clean filter elements with compressed air, benzine or other liquids.

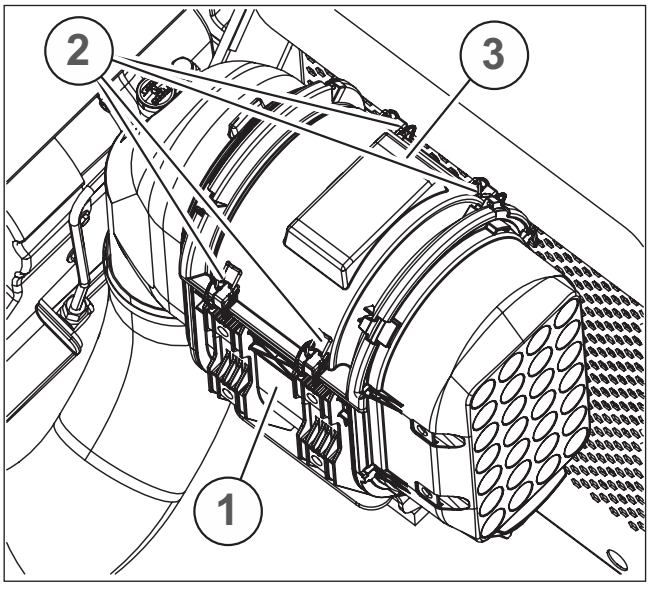
- ▶ Only clean or replace the filter element according to the instructions.

- ▶ Press the dust release valve **(5)** on the cover so that the collected dust/dirt falls out.
- ▶ Assembly occurs in reverse order.

NOTE
When replacing the cover, make sure that the dust release valve **(5)** points straight downwards. (Heed the marking "OBEN/TOP" on the front of the cover.)

Intake filter variant 2

- ▶ Unfasten the wire bracket catches **(2)** from the filter housing **(1)** and then remove the cover **(3)**.
- ▶ Clean filter cartridges by tapping gently. If necessary, replace the filter cartridges.



NOTICE

INCORRECT FILTER CLEANING!
Do not clean filter elements with compressed air, benzine or other liquids.

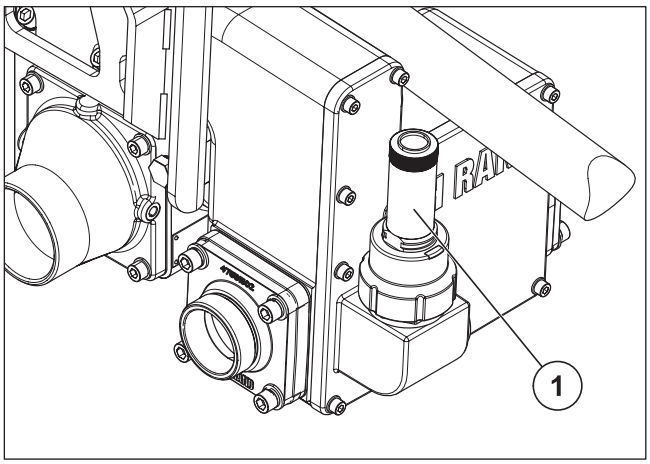
- ▶ Only clean or replace the filter element according to the instructions.

- Press the dust release valve at the bottom of the air filter housing so that the collected dust/dirt falls out.
- Reassemble the parts in reverse order.

4.4.5 Check the safety valve

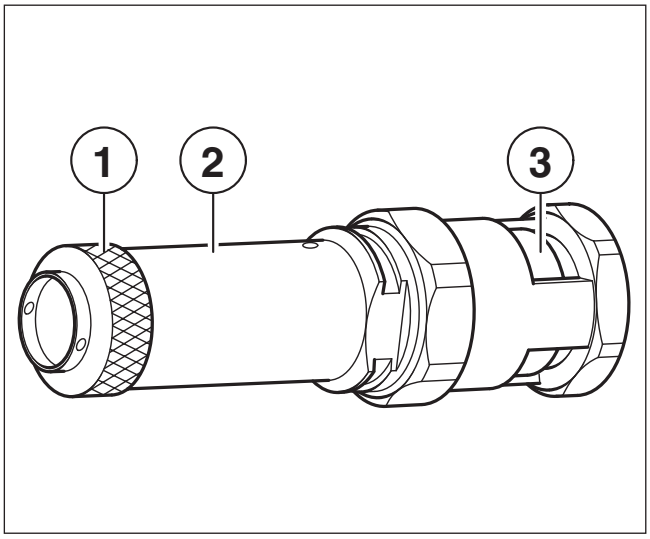
The safety valve is usually installed on the discharge silencer.

NOTE
The discharge silencers supplied by GHH RAND have an integrated safety valve **(1)**.



- In order to check the knurled nut **(1)**, release the safety valve **(2)**. The valve seat **(3)** must open when released.
- Tighten the knurled nut **(1)** on the safety valve **(2)**.
- Replace safety valve as necessary.

NOTE
When installing a new safety valve, heed the manufacturer's instructions.



⚠ WARNING

DANGER OF BURSTING!

No safety valve with a size other than the one provided and/or with a higher response pressure must be used.

- Only use the safety valves provided.

4.4.6 Check the non-return valve

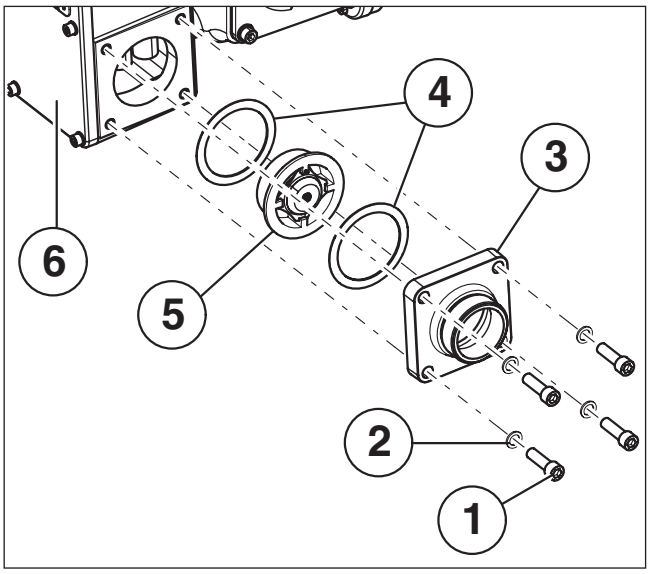
For the maintenance or replacement of the non-return valves of a compressor unit based on the CS90 compressor stage (third-party manufacturer), only the instructions from the manufacturer are applicable.

NOTE
Non-return valves from diverse manufacturers can be installed. Also observe the instructions from the manufacturer.

The discharge silencers supplied by GHH RAND have an integrated non-return valve.

CS580/750 LITE:

- Unscrew connections **(1)** with plain washers **(2)** and remove the connection flange **(3)**.
- Remove the seals **(4)** and non-return valve **(5)** from the discharge silencer **(6)**.
- Check the non-return valve **(5)** is working smoothly, replace the non-return valve **(5)** if necessary.
- Installation is carried out in the reverse sequence. Pay attention to the correct position of the non-return valve.
  Tightening torque (M12 A2-70): 25 Nm



NOTICE

DAMAGE DUE TO A DEFECTIVE NON-RETURN VALVE!

Improper assembly can cause damage.

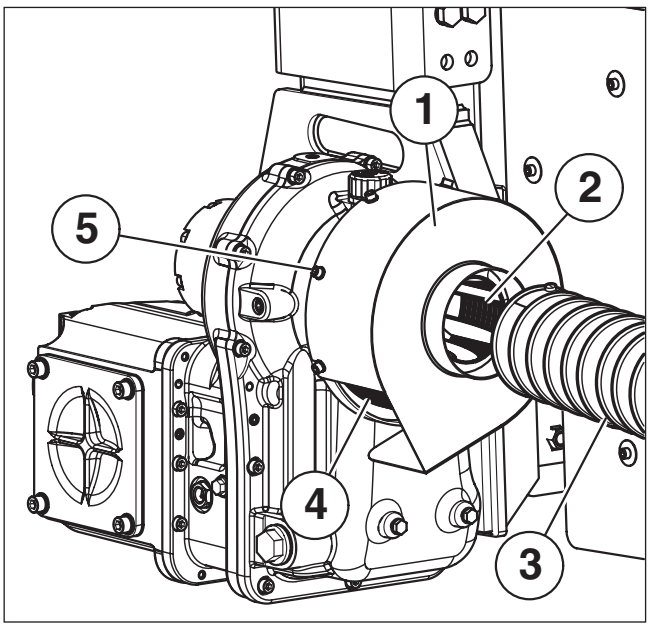
- When reassembling, always use new seals.
- Never operate the compressor unit without a non-return valve.

4.4.7 Check and clean the oil cooler, cooling fan and intake hose

- Remove the intake hose **(3)** from the supports of the cover **(1)**.
- Check the intake hose **(3)**, cooling fan **(2)** and oil cooler **(4)** for dirt. Clean components if necessary.

NOTE
For checking and cleaning of the components, it is a good idea to remove the cover **(1)**. To do this, unscrew the screws (5 / in total 6) and remove the cover **(1)**.

Reassemble the parts in reverse order.
Tightening torque (M6 8.8): 10 Nm



4.4.8 Oil change and cleaning the oil intake strainer

⚠ CAUTION

ENVIRONMENTAL POLLUTION THROUGH OIL!

Very small quantities of oil are sufficient to make significant amounts of potable water unusable.

- ▶ During the oil change, make sure that no oil is released into the environment.
- ▶ Dispose of the used oil in accordance with local regulations.

NOTICE

DAMAGE DUE TO INCORRECT OILS!

Incorrect oils can destroy the compressor.

- ▶ Only use specified oil (*chapter 1.9 on page 10*).

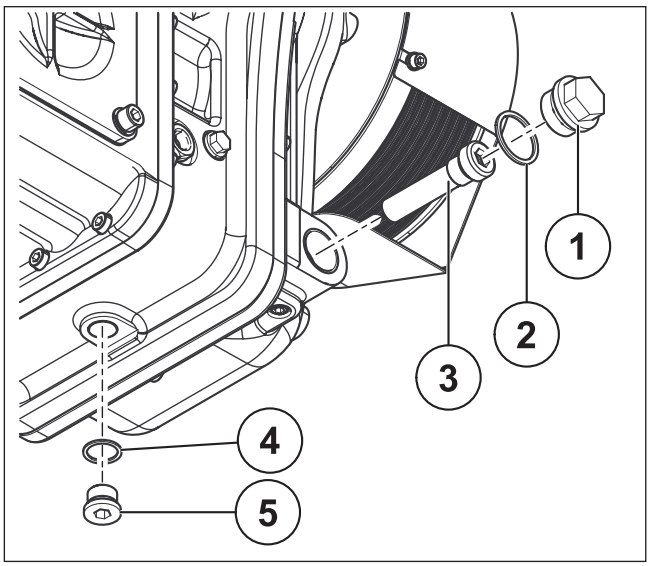
NOTICE

INCORRECT OIL LEVEL!

If the oil level is insufficient, significant tangible damage can occur. If the oil level is excessive, foaming and, thus, oil leakage can occur.

- ▶ Observe the fill quantity.

- ▶ Unscrew and remove the oil drain plugs **(1 and 5)** from the compressor housing.
- ▶ Collect the oil in a suitable container.
- ▶ Unscrew and clean the oil intake strainer **(3)**.
- ▶ Screw in the oil intake strainer **(3)**.
  Tightening torque (M20x1.5): 40 Nm
- ▶ Install the oil drain plug **(1)**, use a new seal ring **(2)**.
  Tightening torque (M33x2): 150 Nm
- ▶ Install the oil drain plug **(5)**, use a new seal ring **(4)**.
  Tightening torque (M20x1.5): 70 Nm
- ▶ Top up oil, filling quantity approx. 3.9 litres.



NOTE

Seal ring **(2)**: DIN 7603 - A33x39 - soft iron.

Seal ring **(4)**: DIN 7603 - A21x26 - soft iron.

4.4.9 Replacing the overload coupling shear bolts

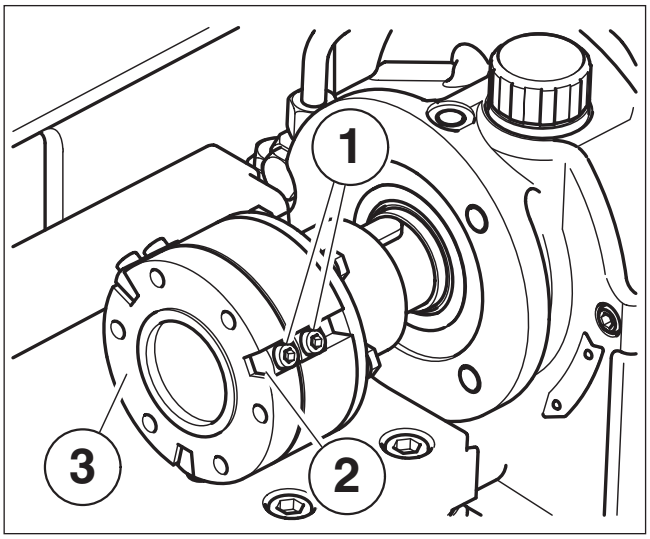
NOTE

Before installing new shear bolts, determine the cause of the shearing, *see chapter 5 on page 28*.

Check the compressor for freedom of movement by turning the drive shaft.

The shear bolts **(2)** of the overload coupling (**(3)** optional) can shear off if the torque is too high and they must be replaced as follows:

- ▶ Unscrew the hexagon socket screws **(1)** and remove the shear bolts **(2)**.
- ▶ Insert new shear bolts (type W37-B-G (brass green)) and fasten with the hexagon socket screws **(1)**.
  Tightening torque (M6 8.8): 10 Nm



NOTICE

DAMAGE TO THE TRUCK'S AUXILIARY DRIVE!

The use of non-approved shear bolts can cause damage to the truck's auxiliary drive.

- ▶ Only use the intended shear bolt type W37-B-G (brass green).

5 Faults, cause and instructions for troubleshooting

If in doubt, switch off the compressor!

Fault	Possible cause	Remedy	Section
Air quantity not sufficient	Drive speed too low	Increase drive speed to the maximum permitted speed	*1.6 - 1.8*
	Intake filter soiled / clogged	Clean or replace filter cartridges or elements as necessary	*4.4.4*
Ultimate air pressure too high	Nominal diameter of the compressed air line too small	Install new lines with a larger nominal diameter	-
	Non-return valve faulty	Check the non-return valve	*4.4.6*
	Safety valve does not open	Check the safety valve	*4.4.5*
	Drive speed too high	Reduce the drive speed to the maximum permitted speed	*1.6 - 1.8*
Ultimate air temperature too high	Intake filter soiled	Clean or replace filter cartridges or elements as necessary	*4.4.4*
	Ultimate air pressure too high	Check the safety valve	*1.6 - 1.8*
	Ambient temperature too high	Observe permitted intake temperature	*1.6 - 1.8*
Negative pressure greater than 65 mbar	Intake filter soiled	Clean or replace filter cartridges or elements as necessary	*4.4.4*
	Drive speed too high	Reduce the drive speed to the maximum permitted speed	*1.6 - 1.8*
Oil pressure less than 0.3 bar	Oil intake strainer soiled	Clean the oil intake strainer	*4.4.8*
	Oil level too low	Check oil level and top up as necessary	*4.4.3*
	Wrong type of oil	Drain oil completely and top up with specified oil	*4.4.3*
	Drive speed too low	Increase drive speed to the maximum permitted speed	*1.6 - 1.8*
	Bent or damaged oil lines on units with an external oil cooler (optional)	Check oil lines and oil cooler	*3.7*
Oil foams	Wrong type of oil	Drain oil completely and top up with specified oil	*4.4.8*
	Water in the oil		
	Oil quality different		
	Oil level too high	Check oil level and drain off oil as necessary	*4.4.3* *4.4.8*
Oil leaks	Oil level too high	Check oil level and drain off oil as necessary	*4.4.3* *4.4.8*
	Screw connections leaking	Check screw connections	-

Fault	Possible cause	Remedy	Section
Oil pressure fluctuates	Oil level too low	Check oil level and top up as necessary	*4.4.3* *4.4.8*
	Excessive inclination of the compressor	Observe the max. permitted inclination	*3.3*
Compressor does not work	Shear bolts sheared off	Replace shear bolts; Determine and remedy the cause of excessive torque	*4.4.9*
	Worn friction coupling	Replace friction coupling; Determine and remedy the cause of excessive torque	-
	Blocked compressor	Replace compressor	-
Shear bolts sheared off repeatedly	Compressor switched on/off under back pressure	Ensure there is back pressure	-
	For manual transmissions: coupling procedure too hard	Couple softer	-
	For automatic transmissions: Motor readjustment too fast with compressor operation	Have parameterisation changed by service centre	-
	Compressor stage defective	Replace compressor stage	-

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