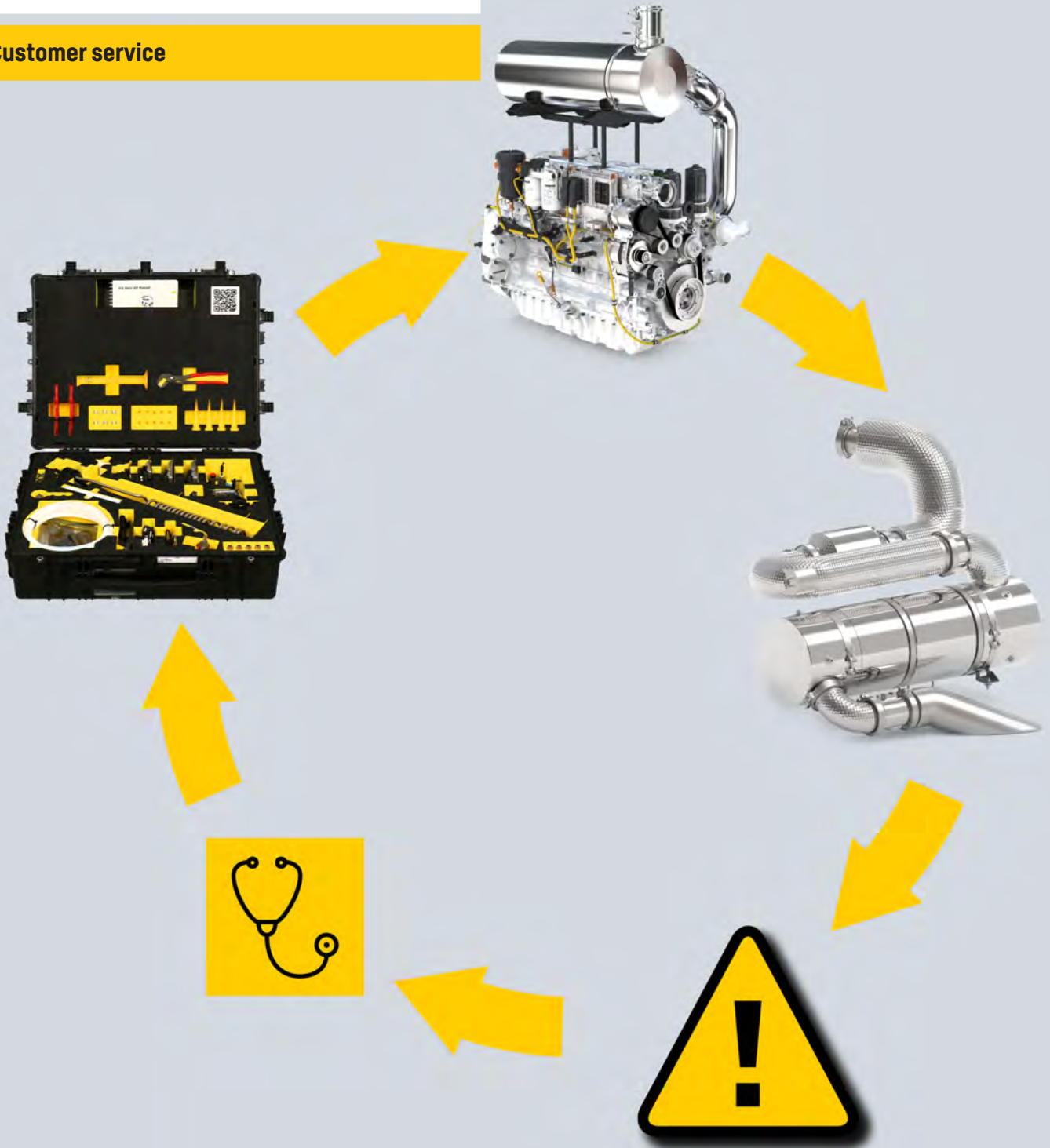


# SCR Parts Kit

[www.liebherr.com](http://www.liebherr.com)

# LIEBHERR

Customer service



## Product ID

**Designation:** Service manual  
**Type:** SCR parts kit

## Document ID

**Author:** LWN / Technical Documentation Department  
**Variant:** SCR parts kit\_A01B03  
**Version:** V01.03\_20250129

## Manufacturer

Liebherr-Werk Nenzling GmbH  
Dr. Hans Liebherr Straße 1  
6710 Nenzling  
Austria  
+43 50809 41-0  
info.lwn@liebherr.com

# Contents

	<b>Notes regarding the documentation</b>	<b>5</b>
<b>1</b>	<b>Product description</b>	<b>15</b>
1.1	Overview of exhaust system with exhaust stage V	15
1.1.1	Distinguishing feature	15
1.1.2	Diagram of exhaust system	16
1.1.3	Motors with emission stage V	17
1.2	Overview of exhaust system with exhaust stage V (Tier 4f)	18
1.2.1	Distinguishing feature	18
1.2.2	Diagram of exhaust system	19
1.2.3	Motors with emission stage IV	20
1.3	Spare parts set for SCR system	21
1.3.1	Contents of spare parts set	21
1.3.2	Parts list of spare parts set	22
1.3.3	Tool list (not included)	25
1.4	Part list optionally available tools	27
1.5	Part list of spare parts set	28
1.6	Overview of installed suction module per machine type	29
1.6.1	Construction machinery (LR, HS and FE)	29
1.6.2	Maritime machines	30
<b>2</b>	<b>Operational planning</b>	<b>35</b>
2.1	Repair process	35
2.1.1	SCR error on the monitor in the cabin	35
2.1.2	Ruling out causes of error on SCR system	35
2.1.3	Performing troubleshooting with LiDIA	35
<b>3</b>	<b>Deinstall and Install</b>	<b>41</b>
3.1	Installing air line	41
3.2	Installing air line extension	44

3.3	Deinstalling air line	46
3.4	Installing suction module	48
3.5	Deinstalling suction module	50
3.6	Installing differential pressure sensor	52
3.7	Deinstalling differential pressure sensor	54
3.8	Installing cable harness between sensors and urea pump	55
3.9	Installing NH3 control unit and NH3 sensor	56
3.10	Deinstalling NH3 control unit and NH3 sensor	58
3.11	Installing temperature sensor	60
3.12	Deinstalling temperature sensor	62
3.13	Installing NOx sensor	64
3.14	Deinstalling NOx sensor	66
3.15	Installing urea pump	67
3.16	Deinstalling the urea pump	71
3.17	Installing injector and seal	74
3.18	Deinstalling injector and seal	76
<b>4</b>	<b>Error displays on the monitor and warning levels of SCR system</b>	<b>81</b>
<b>5</b>	<b>Troubleshooting</b>	<b>85</b>
5.1	Testing sensors and actuators	85
5.1.1	Measuring the supply voltage and signal voltage of a sensor or actuator	85
5.1.2	Measuring resistance between two clamps of a sensor or actuator	86
5.1.3	Measuring resistance between two cables of motor cable harness	86

# Notes regarding the documentation

## Updates of technical documentation

---



### **WARNING**

Inadmissible or improper procedure!  
Severe injuries, damage to machine.

- Note updates of the technical documentation in MyLiebherr.

If information in the technical documentation is insufficient:

- Contact Liebherr customer service.
-

## Handling documentation

The documentation consists of individual, consecutively numbered chapters.

The sequences of the action steps described in the chapters must be observed at all times.

The illustrations in the documentation serve to convey information and principles and are usually simplified or schematic representations which do not depict the current machinery equipment.






This machine was designed and built according to the metric system of units. The numerical values in the imperial system of units are converted and rounded in the documentation.

All directional instructions in the documentation are given from the machine operator's perspective in the cabin.

## Gender-neutral language

For reasons of better readability, we use exclusively the masculine form when referring to persons and nouns related to persons in languages that have a grammatical gender. In the interest of equality, corresponding terms apply in principle to all gender identities. The masculine form is used exclusively for editorial reasons and it is used without judgement.

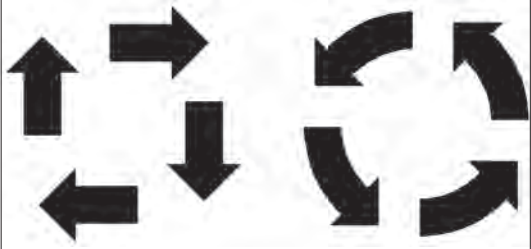
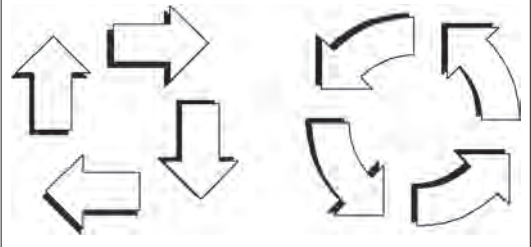
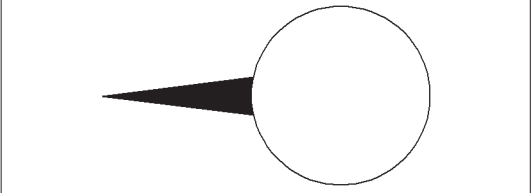

## Symbols

Symbol	Meaning
*	Optional additional equipment
	Requirement must be met
	Performing an action
	Consequence of an action
	Specific characteristics or procedures on a machine with two multi-directional control levers
	Specific characteristics or procedures on machine with multi-directional control lever and double T lever

*Symbols*

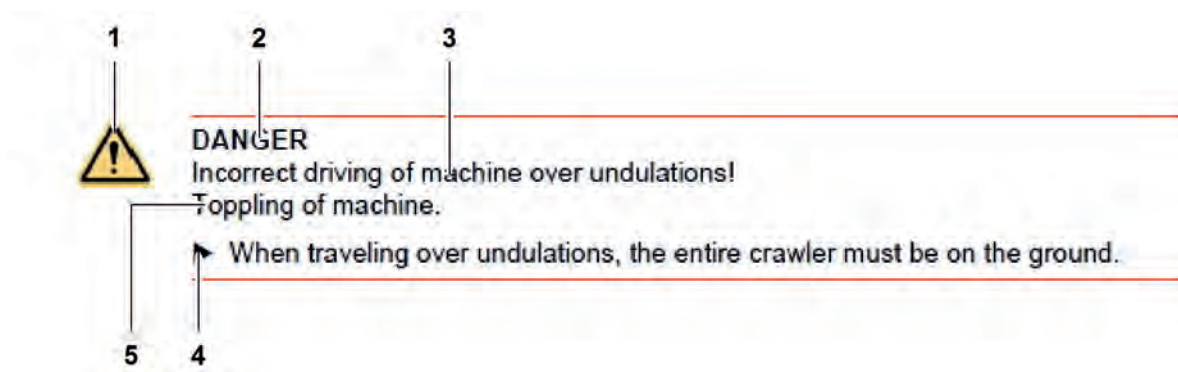


Symbols in illustrations

Symbol	Meaning
	Actions
<b>1 2 3 4 5 6 7 8 9 10</b>	Imperative sequence of multiple actions in an illustration
<b>A B C D E</b>	Random sequence of multiple actions in an illustration
	Consequences of actions
<b>1 2 3 4 5 6 7 8 9 10</b>	Consequences of actions with imperative sequence
<b>A B C D E</b>	Consequences of actions with random sequence
	Enlargement of an area or a component in the same perspective as in the illustration
	Enlargement of an area or a component in a different perspective as in the illustration

Symbols in illustrations

## Marking of safety advice



Name		Description
1	Warning signs	Warns of possible risk of injury
2	Signal word	For further information see: signal words
3	Source of danger	Explanation of danger (contexts)
4	Measures	Measures to prevent danger
5	Consequences of danger	Consequences in case of non-observance and possibly additional information required for comprehension

Marking of safety advice

## Signal words



### DANGER

Indicates an immediate dangerous situation which will result in death or serious injuries if it is not avoided.

► Refers to current action to reduce or avoid the danger(s).



### WARNING

Indicates a dangerous situation which could result in death or serious injuries if it is not avoided.

► Refers to current action to reduce or avoid the danger(s).



### CAUTION

Indicates a dangerous situation which could result in minor or moderate injuries if it is not avoided.

► Refers to current action to reduce or avoid the danger(s).

### NOTICE

Indicates a dangerous situation which could result in material damage if it is not avoided.

► Refers to current action to reduce or avoid the danger(s).

## Further markings

---



### Note

Indicates useful tips and hints.

- Refers to the current action and demonstrates how to perform actions in an easier way.
-

## Legal data

### Explanation

In the interest of our customers, we reserve the right to changes due to advanced technical developments. This documentation therefore corresponds to the state-of-the-art of the supplied machine and not the current manufacturer's state of development.

### Copyrights

Litronic is a registered trademark of the Liebherr company.

The documentation is protected by copyright law. Copying and duplicating load charts in connection with operational planning and operation of the machine is expressly permitted. Otherwise, the documentation may not be duplicated, reproduced, microfilmed, translated or converted for storage and processing in computer systems, either wholly or partially, without the written consent of the Liebherr company.

© Copyright by Liebherr

All rights reserved.

# Product description 1

# 1      Product description

# 1 Product description

## 1.1 Overview of exhaust system with exhaust stage V

### 1.1.1 Distinguishing feature

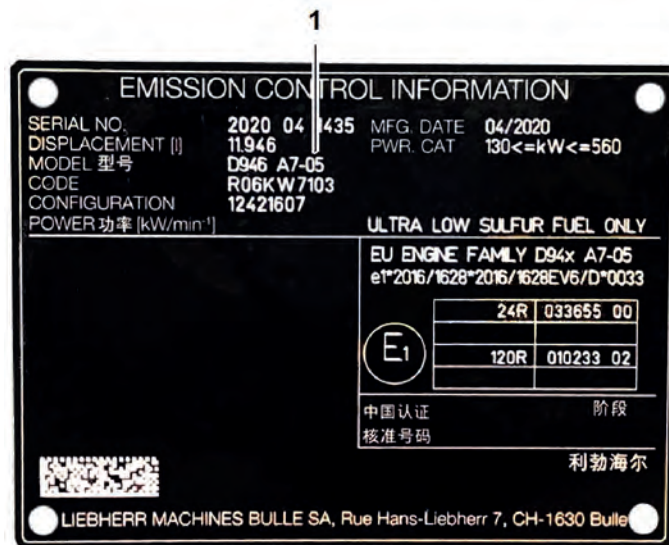


Fig. 1: Diesel engine type plate exhaust stage V

#### 1 Distinguishing feature

The exhaust stage can be found on diesel engine type plate on the distinguishing feature **1**.

Liebherr uses a DOC (catalytic converter) with exhaust stage V. The DOC ensures a longer service life of the SCRFilter module by burning of unburned fuel at temperatures over 260 °C.

The additional SCRFilter module improves the emission values again. The DOC helps with adjusting the ratio from NO to NO<sub>2</sub>. This leads to a higher NO<sub>x</sub> conversion rate in later reactions in the SCR catalytic converter. For the SCR system to function properly, all components must function flawlessly.

## 1.1.2 Diagram of exhaust system

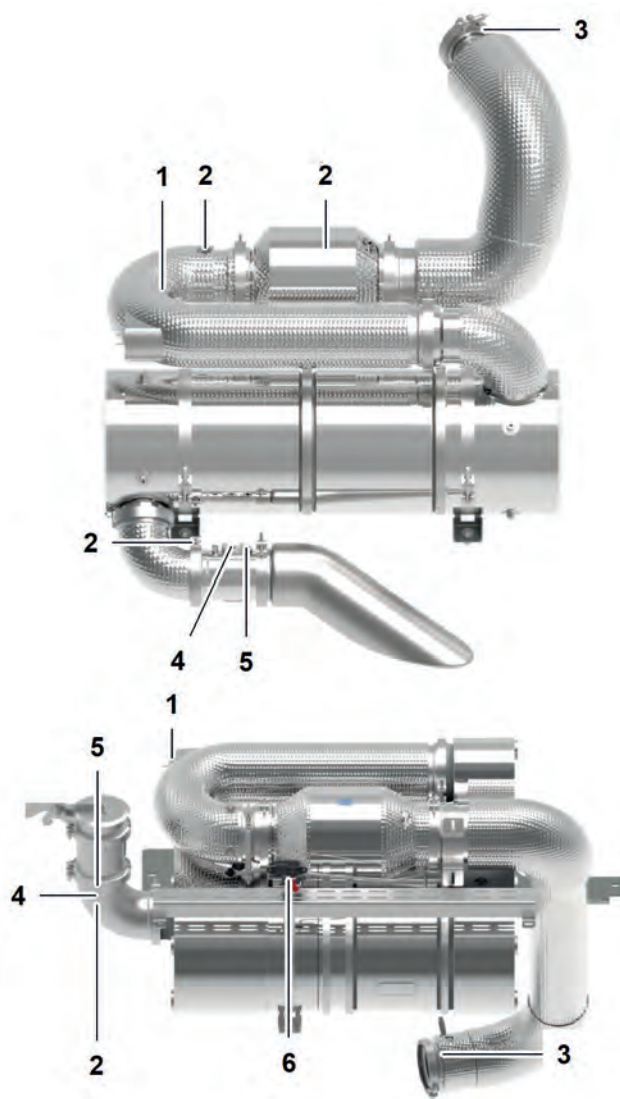


Fig. 2: Diagram exhaust system exhaust stage V

- |          |                            |          |                              |
|----------|----------------------------|----------|------------------------------|
| <b>1</b> | Injector                   | <b>4</b> | NOx sensor <i>DOWNstream</i> |
| <b>2</b> | Temperature sensor         | <b>5</b> | NH3-sensor with control unit |
| <b>3</b> | NOx sensor <i>UPstream</i> | <b>6</b> | Differential pressure sensor |

The injector **1** atomizes the air-urea mixture.

The temperature sensors **2** measure the temperature in the exhaust system branch. The temperature sensors **2** issue a warning if the temperature is too high.

NOx sensor *UPstream* **3** and NOx sensor *DOWNstream* **4** detect the lambda and NOx values before and after the exhaust gas treatment and warn if the NOx content is too high.

The NH3 sensor **5** measures the ammonia content after the exhaust gas treatment and enables the correction of DEF dosing.

The differential pressure sensor **6** is used for calculating soot deposits. The quality of the SCR Filter module is checked through measuring the differential pressure.





Fig. 3: Diagram exhaust system exhaust stage V

**7** Suction module **8** Urea pump

The suction module **7** is equipped with an optical sensor. The suction module **7** has its own control unit.

The following information is transmitted to electronic control unit (ECU) via CAN bus:

- DEF temperature
- DEF fill level
- DEF quality

The urea pump **8** suctions the urea out of the urea tank via the suction module **7** urea tank. Thus, the urea pump **8** supplies the SCR system with urea.

### 1.1.3 Motors with emission stage V

Motor type	Motor type
D944 A7-05	4 Cylinder, in-line engine
D936 A7-05	6 Cylinder, in-line engine
D946 A7-05	6 Cylinder, in-line engine
D976 A7-05	6 Cylinder, in-line engine
D9508 A7-04 (Stage V)	8 Cylinder, v-engine
D9512 A7-04 (Stage V)	12 Cylinder, v-engine

Tab. 1: Area of application exhaust system exhaust stage V

## 1.2 Overview of exhaust system with exhaust stage V (Tier 4f)

### 1.2.1 Distinguishing feature

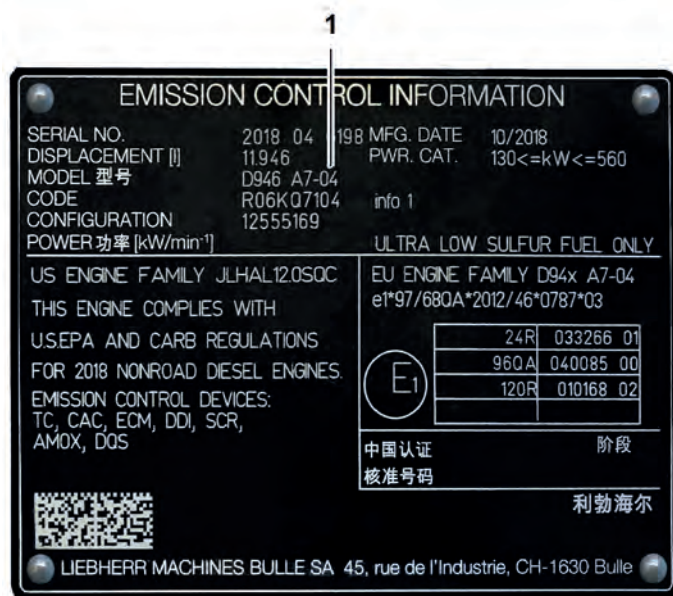


Fig. 4: Diesel engine type plate exhaust stage IV (Tier 4f)

#### 1 Distinguishing feature

The exhaust stage can be found on diesel engine type plate on the distinguishing feature **1**.

Liebherr does not use a DOC (catalytic converter) with exhaust stage IV. Instead, a thermal management ensures correct exhaust gas temperatures and a higher NO<sub>2</sub> content in the exhaust gas. To prevent forming of unwanted odors, a CUC (clean-up catalyst) is installed downstream which converts the excessive ammonia back to nitrogen oxides.

## 1.2.2 Diagram of exhaust system

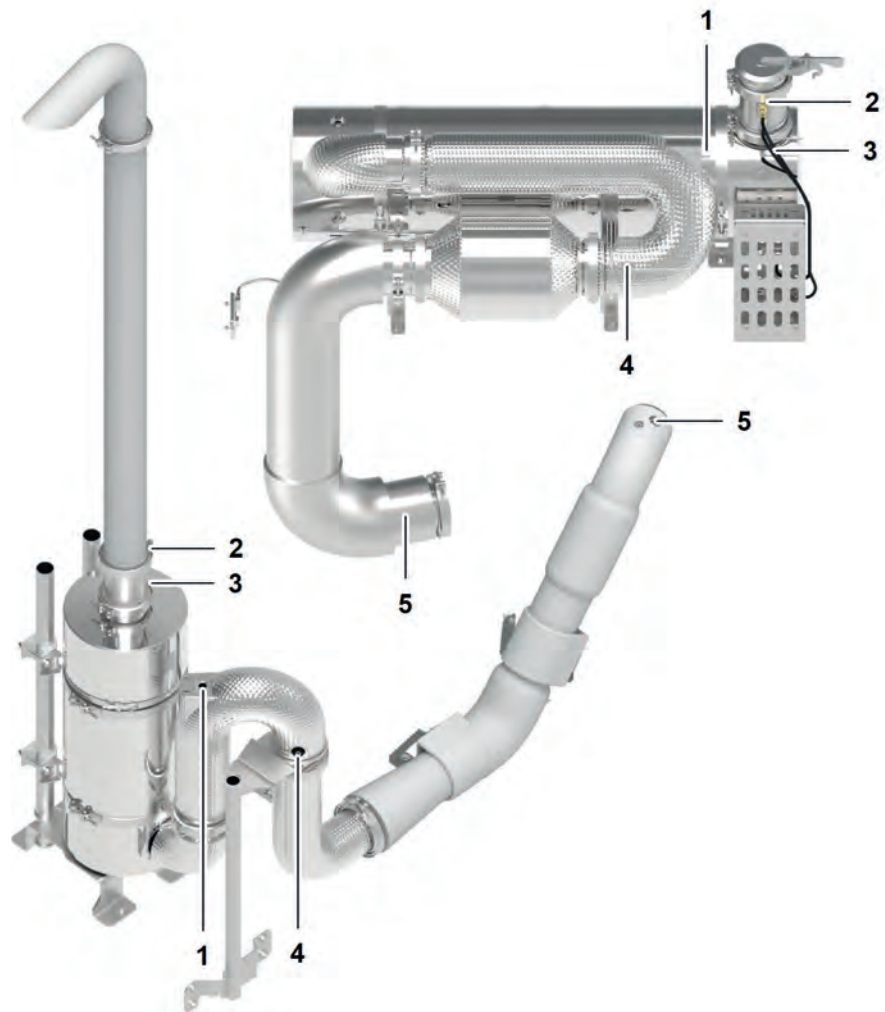


Fig. 5: Diagram exhaust system exhaust stage IV (Tier 4f)

- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| <b>1</b> Injector                     | <b>5</b> NOx sensor <i>UPstream</i> |
| <b>2</b> NH3 sensor and control unit  | <b>6</b> Suction module             |
| <b>3</b> NOx sensor <i>DOWNstream</i> | <b>7</b> Urea pump                  |
| <b>4</b> Temperature sensor           |                                     |

The injector **1** atomizes the air-urea mixture.

The NH3 sensor **2** measures the ammonia content after the exhaust gas treatment and enables the correction of DEF dosing.

NOx sensor **3** and NOx sensor **5** detect the lambda and NOx values before and after the exhaust gas treatment and warn if the NOx value is too high.

The temperature sensors **4** measure the temperature in the exhaust system branch and warn if the temperature is too high.



Fig. 6: Diagram exhaust system exhaust stage IV (Tier 4f)

**6** Suction module **7** Urea pump

The suction module **6** is equipped with an optical sensor. The suction module **6** has its own control unit.

The following information is transmitted to electronic control unit (ECU) via CAN bus:

- DEF temperature
- DEF fill level
- DEF quality

The urea pump **7** consists of the following components:

- DEF pump
- Switchover valve
- Pressure sensor for air and urea

The urea pump **7** is supplied with cooling water to prevent the urea from freezing.

### 1.2.3 Motors with emission stage IV

Motor type	Motor type
D944 A7-04	4 Cylinder, in-line engine
D936 A7-04	6 Cylinder, in-line engine
D946 A7-04	6 Cylinder, in-line engine
D9508 A7-04	8 Cylinder, v-engine
D9512 A7-04	12 Cylinder, v-engine

Tab. 2: Area of application exhaust system exhaust stage IV (Tier 4f)

## 1.3 Spare parts set for SCR system

### 1.3.1 Contents of spare parts set

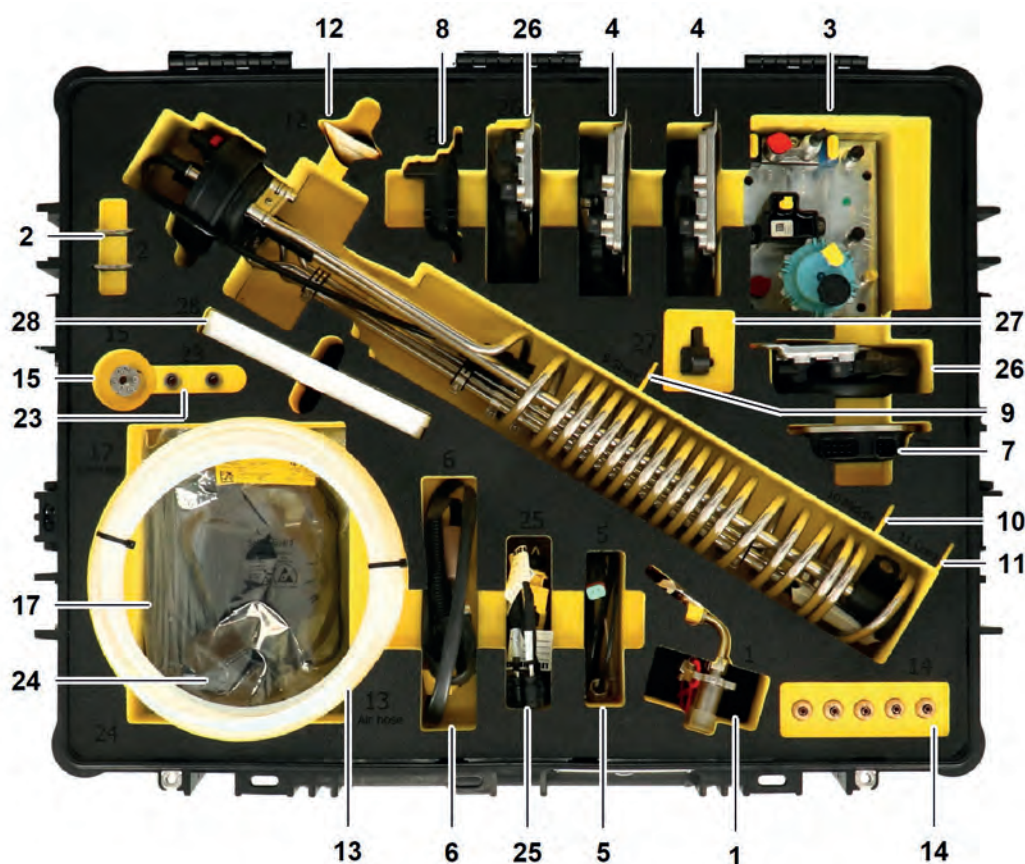


Fig. 7: Bottom of spare parts set

- |    |                              |    |                                  |
|----|------------------------------|----|----------------------------------|
| 1  | Injector (2x)                | 12 | Castrol paste                    |
| 2  | Sealing for injector (2x)    | 13 | Air line 10 m                    |
| 3  | Urea pump                    | 14 | Wira coupling (5x)               |
| 4  | NOx sensor (2x)              | 15 | Hose removing tool               |
| 5  | Temperature sensor           | 17 | Cable ties heat resistant (100x) |
| 6  | SCR NH3 sensor               | 23 | Screw connection (2x)            |
| 7  | NH3 control unit             | 24 | CAN adapter cable                |
| 8  | Differential pressure sensor | 25 | Cable set                        |
| 9  | Short suction module         | 26 | NOx sensor (2x)                  |
| 10 | Medium suction module        | 27 | Differential pressure sensor     |
| 11 | Long suction module          | 28 | Communication cable kit          |



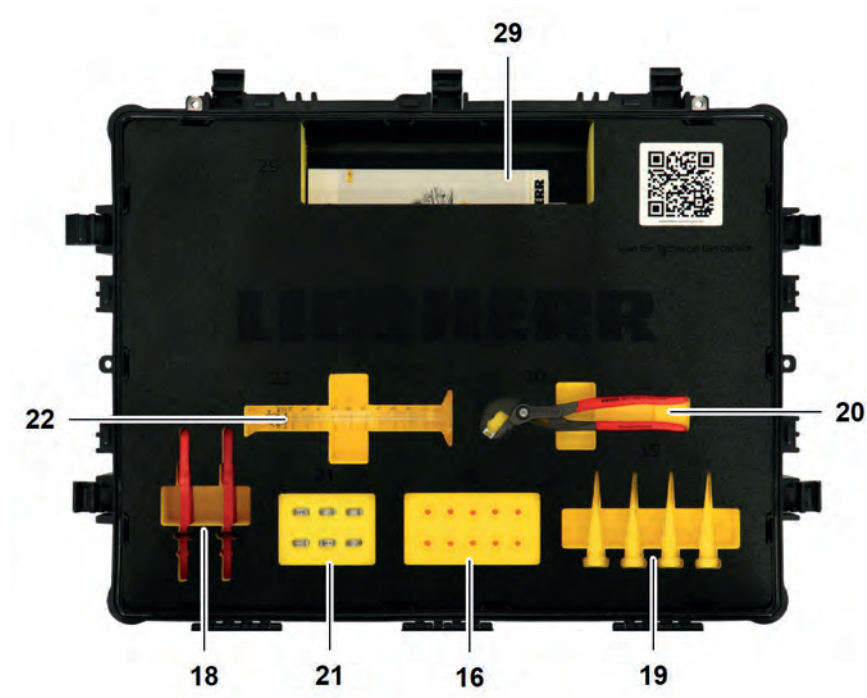


Fig. 8: Cover of spare parts set

- 18

Clamp (2x)
- 21

Hose clamp (6x)
- 16

Servicing cap (10x)
- 19

Service plug classic (4x)
- 20




Hose clamp pliers
- 22

Measuring cup\*
- 29

Documentation

1.3.2 Parts list of spare parts set

The spare parts set consists of the following components.

Position number	Name		Item code	Exhaust system	Amount
1		Injector (→ 3.18 Deinstalling injector and seal, p. 76)	10144093	Emission stage IV / V (Tier 4f)	2
2		Sealing (→ 3.18 Deinstalling injector and seal, p. 76)	10144861	Emission stage IV / V (Tier 4f)	2
3		Urea pump (→ 3.16 Deinstalling the urea pump, p. 71)	13461448	Emission stage IV / V (Tier 4f)	1




Position number	Name		Item code	Exhaust system	Amount
4		NOx sensor (→ 3.14 Deinstalling NOx sensor, p. 66)	12984315	Emission stage IV / V (Tier 4f)	2
5		Temperature sensor (→ 3.12 Deinstalling temperature sensor, p. 62)	11349182	Emission stage IV / V (Tier 4f)	1
6		SCR NH3 sensor (→ 3.10 Deinstalling NH3 control unit and NH3 sensor, p. 58)	10144038	Emission stage IV / V (Tier 4f)	1
7		NH3 control unit (→ 3.10 Deinstalling NH3 control unit and NH3 sensor, p. 58)	10144039	Emission stage IV / V (Tier 4f)	1
8		Differential pressure sensor (→ 3.7 Deinstalling differential pressure sensor, p. 54)	10127114	Emission stage V	1
9		Short suction module	13475475	Emission stage IV / V (Tier 4f)	1
10		Medium suction module	12893478		
11		Long suction module	13850642		
		(→ 3.5 Deinstalling suction module, p. 50)			
12		Castrol paste	11936175	Emission stage IV / V (Tier 4f)	1
13		Air line (→ 3.3 Deinstalling air line, p. 46)	11621764	Emission stage IV / V (Tier 4f)	10 m
14		Coupling (→ 3.3 Deinstalling air line, p. 46)	11922682	Emission stage IV / V (Tier 4f)	5

## Product description

Spare parts set for SCR system

Position number	Name		Item code	Exhaust system	Amount
15		Air Hose Removal Tool (→ 3.16 Deinstalling the urea pump, p. 71)	11621284	Emission stage IV / V (Tier 4f)	1
16		Servicing cap	11922544	Emission stage IV / V (Tier 4f)	10
17		Cable tie, heat resistant	11234767	Emission stage IV / V (Tier 4f)	100
18		Clamp, clamping range 13 mm to 19 mm	11925110	Emission stage IV / V (Tier 4f)	2
19		Service plug Classic4 to 23 mm	11270920	Emission stage IV / V (Tier 4f)	4
20		Hose clamp pliers	13192866	Emission stage IV / V (Tier 4f)	1
21		Hose clamps	12102616	Emission stage IV / V (Tier 4f)	6
23		Push-in fitting (→ 3.2 Installing air line extension, p. 44)	12001446	Emission stage IV / V (Tier 4f)	2
24		CAN adapter cable (→ 2.1 Repair process, p. 35)	12206369	Emission stage IV / V (Tier 4f)	1
25		Cable set (→ 3.8 Installing cable harness between sensors and urea pump, p. 55)	13763036	Emission stage IV / V (Tier 4f)	1










Position number	Name		Item code	Exhaust system	Amount
26		NOx sensor (→ 3.14 Deinstalling NOx sensor, p. 66)	12984316	Emission stage IV / V (Tier 4f)	2
27		Differential pressure sensor (→ 3.7 Deinstalling differential pressure sensor, p. 54)	112512199	Emission stage IV / V (Tier 4f)	1
28		Communication cable kit (→ 5.1 Testing sensors and actuators, p. 85)	113783463	Emission stage IV / V (Tier 4f)	1

Tab. 3: Parts list of spare parts set

### 1.3.3 Tool list (not included)

Make sure that the following tools are available.

Name		Characteristic
	Wrench	8, 10, 12, 14, 17, 22 mm
	Hexagon socket	8, 10, 14, 17, 22 mm
	Internal hexagon socket	5 mm
	Slotted screwdriver	4 mm L = 100 / 185 mm
	All-purpose scissors	200 mm

Name		Characteristic
	Torque wrench	5 to 60 mm 60 to 320 mm
	Peg	<i>Edding paint marker, white</i>

Tab. 4: Tool list

## 1.4 Part list optionally available tools

Item code	Name	Order amount
885318214	Wrench, chrome finish 8 mm	1
885318414	Wrench, chrome finish 10 mm	1
885318614	Wrench, chrome finish 12 mm	1
885318814	Wrench, chrome finish 14 mm	1
885319014	Wrench, chrome finish 17 mm	1
885319314	Wrench, chrome finish 22 mm	1
885346914	Hexagonal socket wrench 8 mm	1
885346314	Hexagonal socket wrench 10 mm	1
885312114	Hexagonal socket wrench 14 mm	1
885312214	Hexagonal socket wrench 17 mm	1
885312414	Hexagonal socket wrench 22 mm	1
885365314	Internal hexagon socket wrench 5 mm	1
882320614	All-purpose scissors 200 mm	1
885100214	Slotted screwdriver 4 mm L=100/ 185 mm	1
11951873	Slotted screwdriver Kraftform-Heft L= 125/223/ 1 x 5.5	1
885300614	Torque wrench	1
10566118	Torque wrench 5 to 60 mm	1
10566119	Torque wrench 60 to 320 mm	1
10224670	Marker <i>Edding paint marker, white</i>	1

Tab. 5: Optionally available tools

## 1.5 Part list of spare parts set

Item code	Position number	Name	Order amount
10144093	1	Injector	2
10144861	2	Sealing for injector	2
13461448	3	Urea pump	1
12984315	4	NOx sensor	2
11349182	5	Temperature sensor	1
10144038	6	SCR NH3 sensor	1
10144039	7	NH3 control unit	1
10127114	8	Differential pressure sensor	1
13475475	9	Short suction module	1
12893478	10	Medium suction module	1
13850642	11	Long suction module	1
11936175	12	Castrol paste	1
11621764	13	Air line	10 m
11922682	14	Wira coupling	5
11621284	15	Hose removing tool	1
11922544	16	Servicing cap	10
11234767	17	Cable tie, heat resistant	100
11925110	18	Clamp, clamping range 13 to 19 mm	2
11270920	19	Service plug <i>Classic</i> 4 to 23 mm	4
13192866	20	Hose clamp pliers	1
12102616	21	Hose clamp	6
12001446	23	Push-in fitting	2
12206369	24	CAN adapter cable	1
13763036	25	Cable set	1
12984316	26	NOx sensor	2
12512199	27	Differential pressure sensor	1
13783463	28	Communication cable kit	1
13199036	29	Documentation	1

Tab. 6: Part list

## 1.6 Overview of installed suction module per machine type

The suction module comes in three different sizes. The required suction module size depends on the size of the urea tank. The overview shows the appropriate suction module size for the corresponding machine. The appropriate SCR spare parts set is also shown.

### 1.6.1 Construction machinery (LR, HS and FE)

#### 1.6.1.1 LR crawler cranes

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
LR 1110	Short	13475475	14173598
LR 1130	Short	13475475	14173598
LR 1130.1	Short	13475475	14173598
LR 1160	Short	13475475	14173598
LR 1160.1	Short	13475475	14173598
LR 1200	Short	13475475	14173598
LR 1200.1	Short	13475475	14173598
LR 1250	Short	13475475	14173598
LR 1250.1	Short	13475475	14173598
LR 1300	Short	13475475	14173598
LR 1300.1	Short	13475475	14173598
LR 1300.2	Short	13475475	14173598
LR 1400	Short	13475475	14173598
LR 1400.1	Short	13475475	14173598
LR 1100.1	Medium	12893478	14173613

Tab. 7: Suction module for LR

#### 1.6.1.2 HS cable excavator

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
HS 8070	Short	13475475	14173598
HS 8100	Short	13475475	14173598
HS 8100.1	Short	13475475	14173598
HS 8100.2	Short	13475475	14173598
HS 8040.1	Medium	12893478	14173613
HS 8070.1	Medium	12893478	14173613
HS 8200	Medium	12893478	14173613
HS 8300.1	Medium	12893478	14173613

## Product description

Overview of installed suction module per machine type

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
HS 8300.2	Medium	12893478	14173613
HS 8130	Long	13850642	14173628
HS 8130.1	Long	13850642	14173628

Tab. 8: Suction module for HS

### 1.6.1.3 FE deep foundation equipment

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
LRB 16	Short	13475475	14173598
LRB 18	Short	13475475	14173598
LRB 19	Short	13475475	14173598
LRB 23	Short	13475475	14173598
LB 20	Short	13475475	14173598
LB 24	Short	13475475	14173598
LB 25	Short	13475475	14173598
LB 28	Short	13475475	14173598
LB 30	Short	13475475	14173598
LB 35	Short	13475475	14173598
LB 36	Short	13475475	14173598
LB 45	Short	13475475	14173598
LRH 100	Short	13475475	14173598
LRH 100.1	Short	13475475	14173598
LRH 200	Short	13475475	14173598
LBX 600	Short	13475475	14173598
LB 16	Medium	12893478	14173613
LB 20.1	Medium	12893478	14173613
LRB 355.1	Long	13850642	14173628
LB 44	Long	13850642	14173628
LB 55	Long	13850642	14173628

Tab. 9: Suction module for FE

## 1.6.2 Maritime machines

### 1.6.2.1 LHM mobile harbour cranes

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
LHM 120	Short	13475475	14173598
LHM 180	Short	13475475	14173598

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
LHM 280	Short	13475475	14173598
LPS 180	Short	13475475	14173598
LPS 280	Short	13475475	14173598
LHM 420	Long	13850642	14173628
LHM 550	Long	13850642	14173628
LHM 600	Long	13850642	14173628
LHM 800	Long	13850642	14173628
LPS 420	Long	13850642	14173628
LPS 550	Long	13850642	14173628
LPS 600	Long	13850642	14173628

Tab. 10: Suction module for LHM

### 1.6.2.2 LRS reachstacker

Machine type	Length of suction module	Item code of suction module	Item code of SCR spare parts set
LRS 545	Medium	12893478	14173613

Tab. 11: Suction module for LRS

## Product description

Overview of installed suction module per machine type



## Operational planning 2

## 2 Operational planning

## 2 Operational planning

### 2.1 Repair process

#### 2.1.1 SCR error on the monitor in the cabin

If an SCR error message of the SCR system appears on the monitor in the cabin:

- ▶ Inform Liebherr service personnel about SCR error.
- ▶ Send error via LiDAT (only for LiDAT license customers).

or

Send error via SMS or email.

#### 2.1.2 Ruling out causes of error on SCR system

Make sure the following preconditions are met:

- ☐ Machine is switched off.
- ☐ Battery disconnecter is switched off.
- ☐ Machine is secured against unauthorized use.
- ☐ Diesel engine is cooled down.
- ▶ Check urea tank for sufficient fill level.
- ▶ Check electric plug for loose connection, loose pins and moisture.
- ▶ Checking electric cables for tight fit.
- ▶ Check electric cables for damage.

#### 2.1.3 Performing troubleshooting with LiDIA

LiDIA obtains error message from control unit (ECU).



*Fig. 41: CAN adapter cable*

- 1 CAN adapter cable (position number 24 in parts list)

Overview of parts list (→ 1.3 Spare parts set for SCR system, p. 21).

Make sure the following preconditions are met:

- ☐ LiDIA is present.
- ☐ CAN adapter cable is present (position number 24 in parts list).



Fig. 42: Diagnosis plug on machine

#### 1 Diagnosis plug

The diagnosis plug is located near the main battery disconnecter or the SCR control light.

- Connect CAN adapter cable to diagnosis plug **1**.
- Connect CAN adapter cable to laptop.
- Start LiDIA.

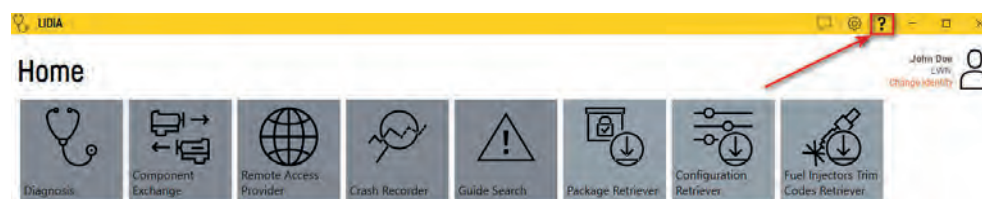


Fig. 43: Clicking button settings on the monitor

- Click button *Settings* on the monitor.

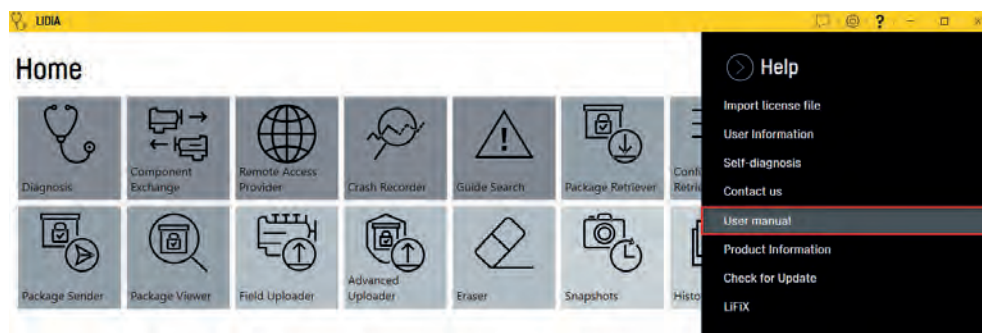


Fig. 44: Clicking button *Operator's manual* on the monitor

- Click button *Operator's manual* on the monitor.
- Perform diagnosis in accordance with LiDIA operator's manual.



## Deinstall and Install 3

# 3     Deinstall and Install



## 3 Deinstall and Install

### 3.1 Installing air line

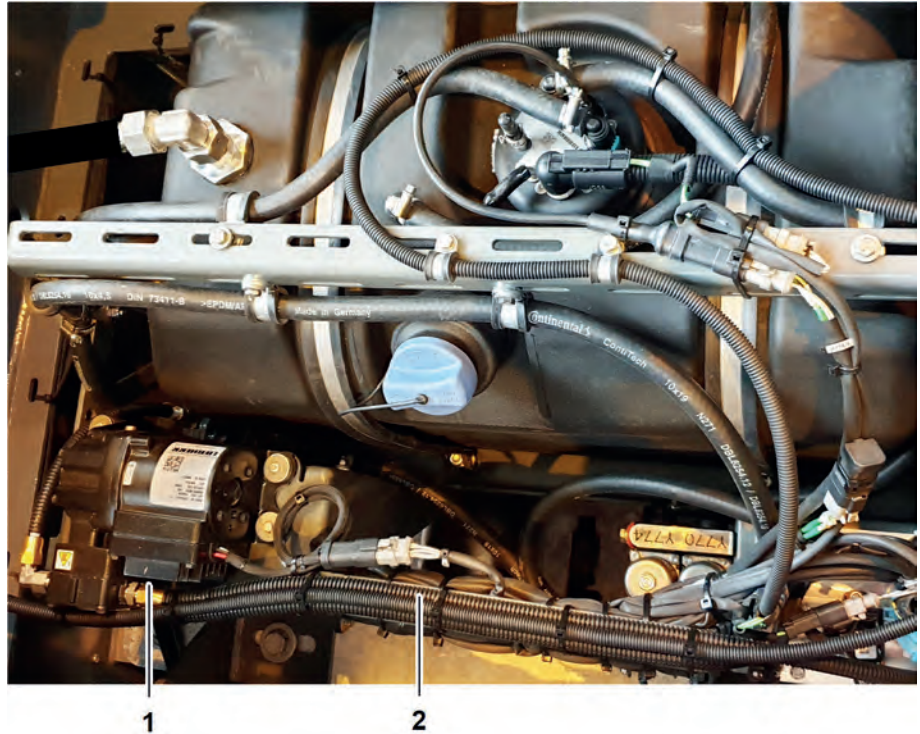


Fig. 45: Installed air line

- |  |  |
|--|--|
| <b>1</b> Coupling (position number 14 in parts list) | <b>2</b> Air line (position number 13 in parts list) |
|--|--|

Overview of parts list (→ [1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Air line (position number 13 in parts list)
- ☐ Coupling (position number 14 in parts list)
- ☐ Servicing cap (position number 16 in parts list)
- ☐ Heat-resistant cable ties (position number 17 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 17 mm
- ☐ All-purpose scissors

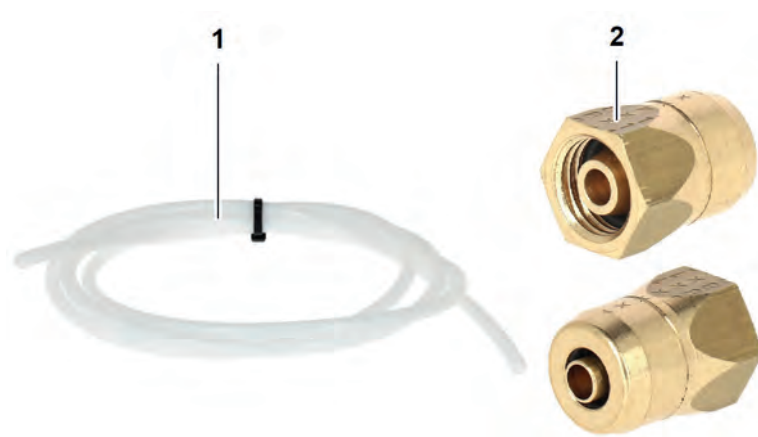


Fig. 46: Air line

**1** Air line

**2** Coupling

- ▶ Trim air line **1** to desired length.
- ▶ Make sure that air line **1** is clean on the inside.
- ▶ Connect air line **1** with coupling **2**.

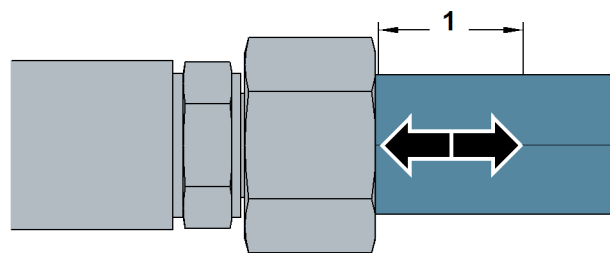


Fig. 47: Air line

**1** Axial clearance

The maximum axial clearance **1** of the air line is 2 mm.

- ▶ Checking whether air line is firmly connected with coupling: push and pull air line.

#### NOTICE

Kinked or squashed air lines!  
Failure of SCR system.

- ▶ Make sure that the maximum air line bending radius of 60 mm is not exceeded.
- ▶ Make sure that air lines are not kinked or squashed.



Fig. 48: Correct bending radius



Fig. 49: Securing air line with cable ties

- ▶ Secure air line with cable ties.
- ▶ Perform functional test with LiDIA.
  - ▷ Air line is installed.

### 3.2 Installing air line extension



Fig. 50: Push-in fitting

Overview of parts list (→ 1.3 Spare parts set for SCR system, p. 21).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Air line (position number 13 in parts list)
- ☐ Push-in fitting (position number 23 in parts list)
- ☐ Servicing cap (position number 16 in parts list)
- ☐ Heat-resistant cable ties (position number 17 in parts list)

Make sure that the following tools are available:

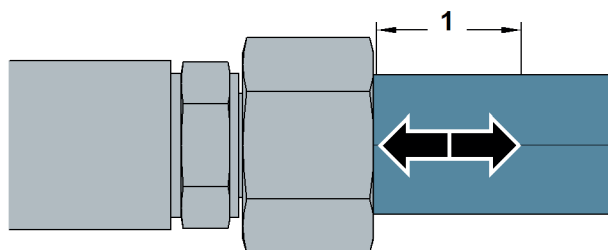
- ☐ Wrench 17 mm
- ☐ All-purpose scissors



*Fig. 51: Air line extension*

- 1** Air line                                      **2** Push-in fitting

- ▶ Trim air line **1** to desired length.
- ▶ Make sure that air line **1** is clean on the inside.
- ▶ Connect new air line **1** to push-in fitting **2**.
- ▶ Connect push-in fitting **2** to existing air line.



*Fig. 52: Air line*

- ## 1 Axial clearance

The maximum axial clearance **1** of the air line is 2 mm.

- Checking whether air line is firmly connected to push-in fitting: push and pull air line.

---

**NOTICE**

Kinked or squashed air lines!  
Failure of SCR system.

- ▶ Make sure that the maximum air line bending radius of 60 mm is not exceeded.
  - ▶ Make sure that air lines are not kinked or squashed.
- 



*Fig. 53: Correct bending radius*



*Fig. 54: Securing air line with cable ties*

- ▶ Secure air line with cable ties.
  - ▷ Air line extension is installed.

### 3.3 Deinstalling air line

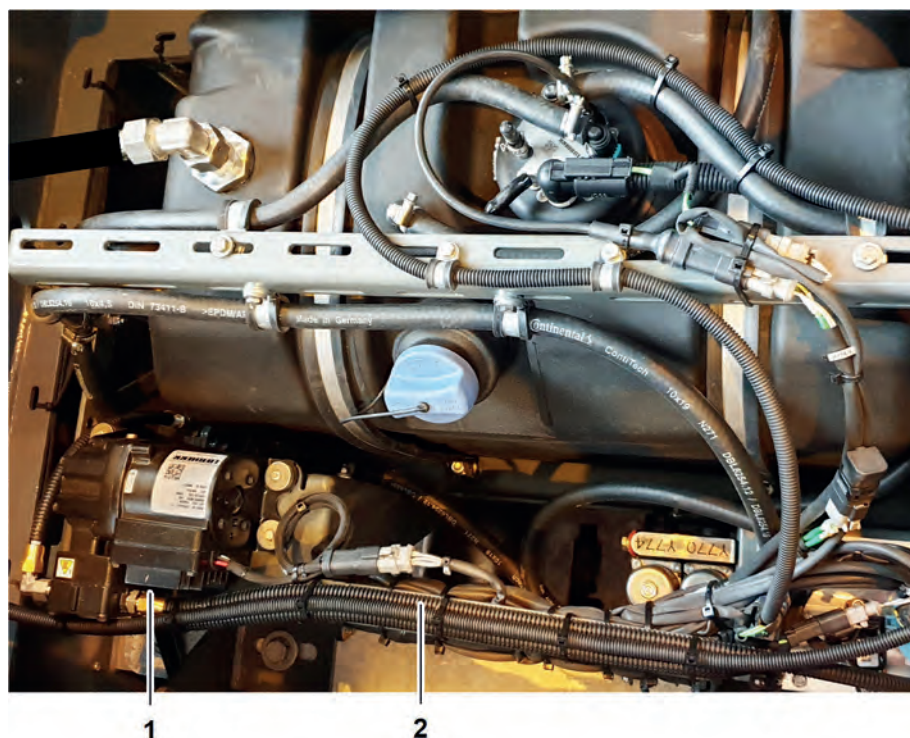


Fig. 55: Installed air line

- |   |   |
|---|---|
| <p><b>1</b> Coupling (position number 14 in parts list)</p> | <p><b>2</b> Air line (position number 13 in parts list)</p> |
|---|---|

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Servicing cap (position number 16 in parts list)

Make sure that the following tools are available:

- ☐ Air Hose Removal Tool (position number 15 in parts list)
- ☐ All-purpose scissors

- Remove cable tie if air line is damaged.

Tool *Air Hose Removal Tool* is required to deinstall an air line from the urea pump.



Fig. 56: Urea pump



- ▶ Position Air Hose Removal Tool at air line.
- ▶ Press Air Hose Removal Tool firmly into coupling.



*Fig. 57: Urea pump*

- ▶ Press Air Hose Removal Tool together and pull it out upwardly with the air line.
- ▶ Close opening of air line with servicing cap.
- ▶ Undo and detach air line.

Install air line (→ [3.1 Installing air line, p. 41](#)).

## 3.4 Installing suction module



Fig. 58: Installed suction module

- 1** Suction module (position number 9 or 10 or 11 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Suction module (a particular suction module length is required, depending on machine ([→ 3.4 Installing suction module, p. 48](#)))
- ☐ Clamp (position number 18 in parts list)

Make sure that the following tools are available:

- ☐ Slotted screwdriver
- ☐ Wrench 8 mm





Fig. 59: Suction module

- |  |  |
|--|--|
| <b>1</b> Electric plug                                   | <b>4</b> Connection for input of coolant<br>Coolant IN |
| <b>2</b> Connection for input of urea DEF<br>IN          | <b>5</b> Connection for output of urea<br>DEF OUT      |
| <b>3</b> Connection for output of coolant<br>Coolant OUT | <b>6</b> Connection VENT                               |

- ▶ Installing suction module: tighten clamp with torque of **1.5 Nm**.
- ▶ Connect electric plug **1** with socket.

#### NOTICE

Mixed-up urea lines with coolant lines!  
Damage to diesel engine or SCR system.

- ▶ Make sure that input and output are not interchanged when connecting urea lines.
- ▶ Make sure that input and output are not interchanged when connecting coolant lines.

#### NOTICE

Improper connection of quick-latch coupling!  
Damage to suction module.

- ▶ Connect quick-latch coupling with slight pressure.
- ▶ Make sure that you hear a click when connecting quick-latch coupling.
- ▶ Connect urea line **2** to connection **5** and connection.
- ▶ Connect coolant line **3** to connection **4** and connection.
- ▶ Install clamp on connection VENT **6**.
- ▶ Perform functional test with LiDIA.
  - ▷ Suction module is installed.

## 3.5 Deinstalling suction module

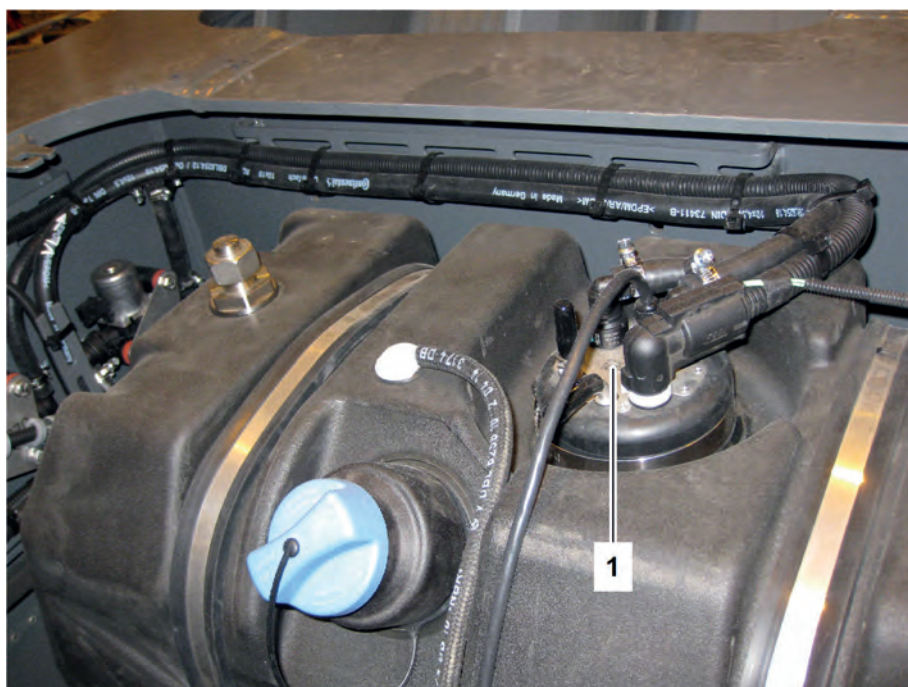


Fig. 60: Installed suction module

- 1** Suction module (depending on suction module length, position number 9 or 10 or 11 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Clamp (position number 18 in parts list)
- ☐ Service plug *Classic* (position number 19 in parts list)

Make sure that the following tools are available:

- ☐ Slotted screwdriver
- ☐ Wrench 8 mm
- ☐ All-purpose scissors
- ☐ Peg



Fig. 61: Suction module

- |          |   |          |   |
|----------|---|----------|---|
| <b>1</b> | Electric plug                                   | <b>4</b> | Connection for input of coolant<br>Coolant IN |
| <b>2</b> | Connection for input of urea DEF<br>IN          | <b>5</b> | Connection for output of urea<br>DEF OUT      |
| <b>3</b> | Connection for output of coolant<br>Coolant OUT | <b>6</b> | Connection <i>VENT</i>                        |

- ▶ Mark matching coolant lines and connections with a marker for later installation.
- ▶ Disconnect coolant lines from connection **3** and connection **4** and close them off with clamp.
- ▶ Release quick-latch couplings of coolant lines.
- ▶ Seal openings with service plugs.
- ▶ Mark matching urea lines and connections with a marker for later installation.
- ▶ Release quick-latch couplings of urea lines at connection **2** and connection **5**.
- ▶ Seal openings with service plugs.
- ▶ Disconnect electric plug **1** from socket.
- ▶ Deinstall clamp on connection *VENT* **6** on defective suction module.
- ▶ Deinstall suction module **9**.

Install suction module (→ [3.4 Installing suction module, p. 48](#)).

## 3.6 Installing differential pressure sensor

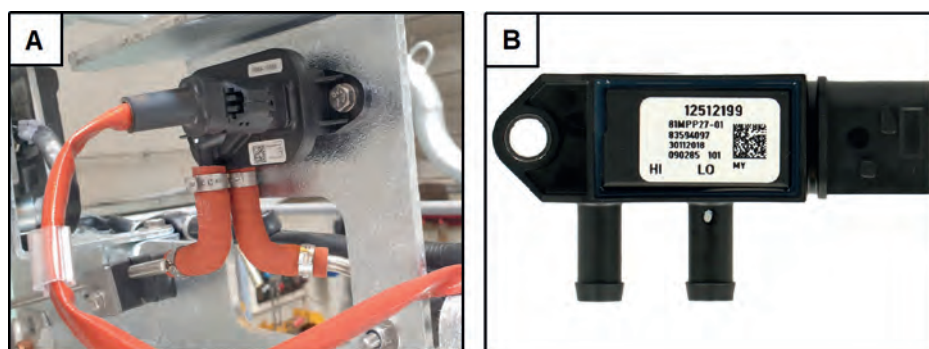


Fig. 62: Installed differential pressure sensor

**A** Differential pressure sensor  
(position number 8 in parts list)

**B** Differential pressure sensor  
(position number 27 in parts list)

Overview of parts list (→ 1.3 Spare parts set for SCR system, p. 21).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Differential pressure sensor (position number 8 or 27 in part list)
- ☐ Hose clamp pliers (position number 20 in part list)
- ☐ Hose clamp (position number 21 in part list)

Make sure that the following tools are available:

- ☐ Slotted screwdriver
- ☐ Wrench 10 mm
- ☐ Wrench 17 mm
- ☐ Torque wrench
- ☐ Socket wrench 10 mm
- ☐ All-purpose scissors
- ☐ Peg

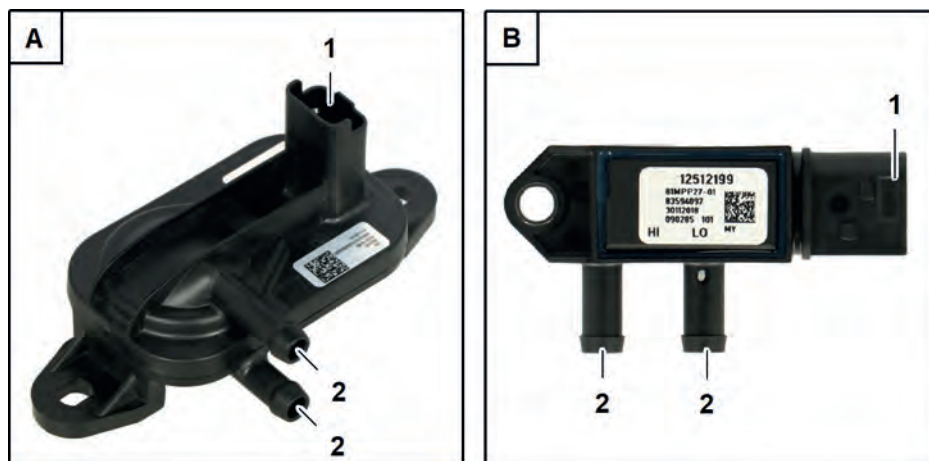


Fig. 63: Differential pressure sensor

**A** Differential pressure sensor  
(position number 8 in part list)

**B** Differential pressure sensor  
(position number 27 in part list)

**1** Socket for electric plug

**2** Connection for air line (2x)

- Installing differential pressure sensor: tighten fastening screw with a torque of **6 Nm**.

---

**NOTICE**

Mixed up air lines!

Damage to differential pressure sensor and missing control signals.

- ▶ Install air lines downstream of particle filter at connection *LOW*.
  - ▶ Install air lines upstream of particle filter at connection *HIGH*.
- 

- ▶ Install air lines at connections **2** and secure with hose clamps.
- ▶ Press hose clamps with hose clamp pliers.
- ▶ Connect electric plug with socket **1**.
- ▶ Perform functional test with LiDIA.
  - ▷ Differential pressure sensor is installed.

## 3.7 Deinstalling differential pressure sensor

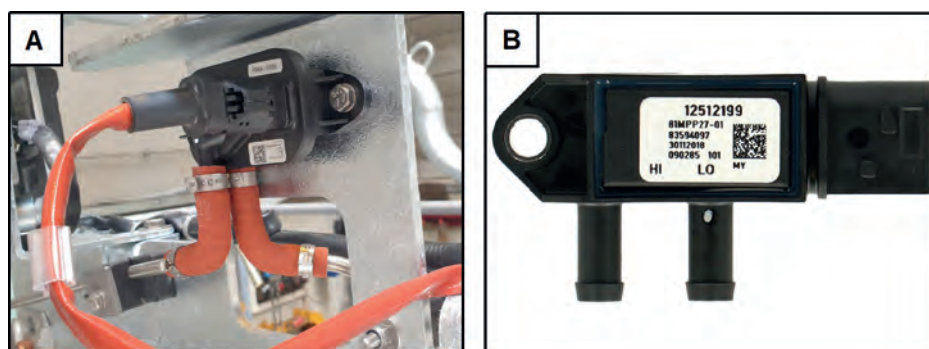


Fig. 64: Installed differential pressure sensor

**A** Differential pressure sensor  
(position number 8 in parts list)

**B** Differential pressure sensor  
(position number 27 in parts list)

Overview of parts list (→ [1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following tools are available:

- ☐ Slotted screwdriver
- ☐ Wrench 10 mm
- ☐ Wrench 17 mm
- ☐ All-purpose scissors
- ☐ Peg

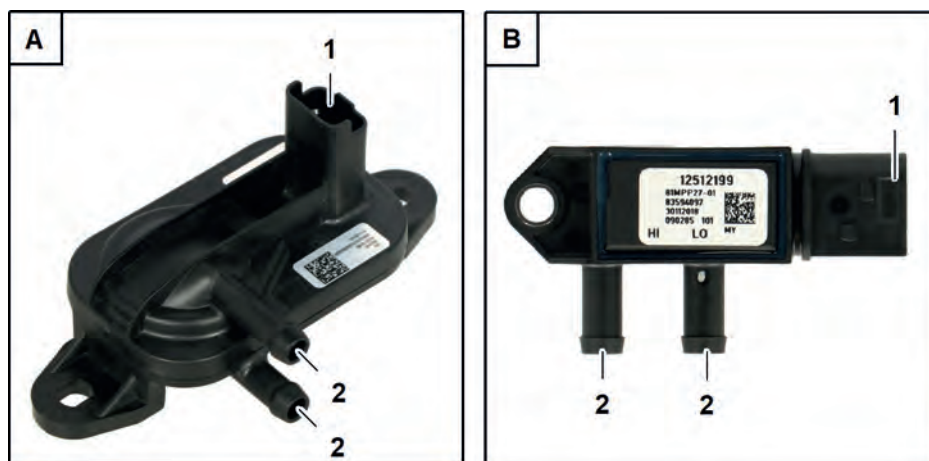


Fig. 65: Differential pressure sensor

**A** Differential pressure sensor  
(position number 8 in part list)

**B** Differential pressure sensor  
(position number 27 in part list)

**1** Socket for electric plug

**2** Connection for air line (2x)

- Mark matching air lines with a marker for later installation.
- Undo clamps at air lines and detach air lines.
- Remove electric plug from socket **1**.
- Deinstalling faulty differential pressure sensor: undo screws.

Install differential pressure sensor (→ [3.6 Installing differential pressure sensor, p. 52](#)).



### 3.8 Installing cable harness between sensors and urea pump

The cable set between sensors and urea pump prevents leaking reduction agent from damaging the cables to the sensors.

Overview of parts list (→ [1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ❑ Cable harness (position number 25 in parts list)



Fig. 66: Urea pump and cable harness

- |   |   |
|---|---|
| <p><b>1</b> Socket for Air pressure Sensor</p> <p><b>2</b> Socket for DEF pressure and temperature sensor</p> <p><b>3</b> Plug for connecting cable to urea pressure sensor</p> | <p><b>4</b> Plug for connecting urea pressure sensor</p> <p><b>5</b> Plug for connecting air pressure sensor</p> <p><b>6</b> Plug for connecting cable to air pressure sensor</p> |
|---|---|
- ▶ Connect plug **5** with socket **1**.
  - ▶ Connect plug **6** with cable.
  - ▶ Connect plug **4** with socket **2**.
  - ▶ Connect plug **3** with cable.

### 3.9 Installing NH3 control unit and NH3 sensor

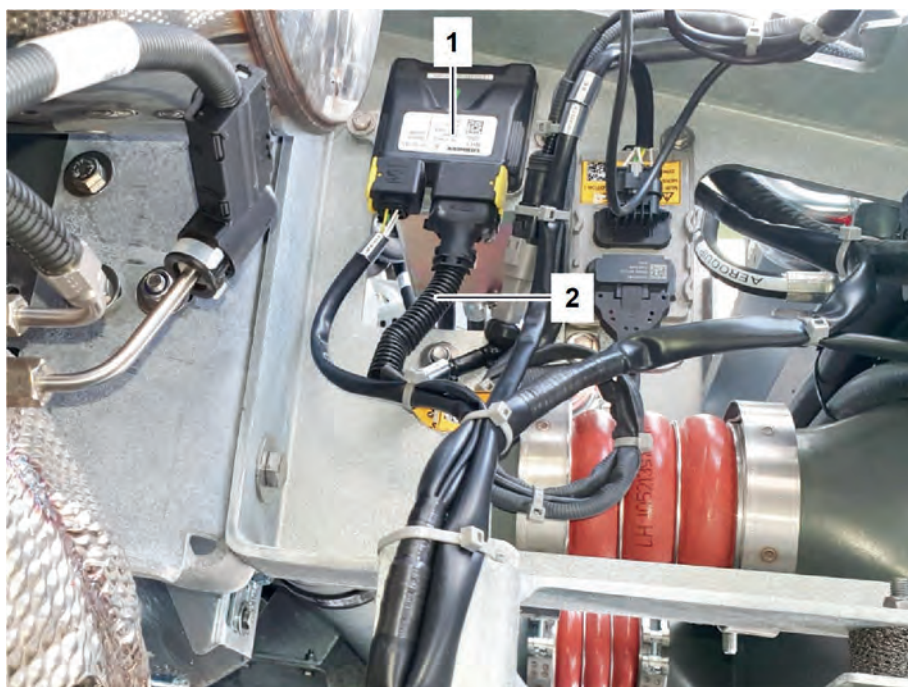


Fig. 67: Installed NH3 control unit with NH3 sensor

- |  |  |
|--|--|
| <p><b>1</b> SCR NH3 sensor (position number 6 in parts list)</p> | <p><b>2</b> NH3 control unit (position number 7 in parts list)</p> |
|--|--|

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ SCR NH3 sensor (position number 6 in parts list)
- ☐ NH3 control unit (position number 7 in parts list)
- ☐ Castrol paste (position number 12 in parts list)
- ☐ Heat-resistant cable ties (position number 17 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 10 mm
- ☐ Wrench 22 mm
- ☐ Torque wrench
- ☐ Socket wrench 10 mm
- ☐ Socket wrench 22 mm
- ☐ All-purpose scissors



Fig. 68: NH3 control unit with NH3 sensor

- |  |   |
|--|---|
| <p><b>1</b> Probe of NH3 sensor</p> <p><b>2</b> Plug of NH3 sensor</p> | <p><b>3</b> Socket for electric plug</p> <p><b>4</b> Socket for NH3 sensor plug</p> |
|--|---|



- ▶ Installing NH3 control unit: tighten fastening screws with torque of **10 Nm** to **13 Nm**.
- ▶ Connect electric plug with socket **3**.
- ▶ Wet thread of probe **1** with Castrol paste.
- ▶ Tighten probe **1** with a torque of **50 Nm**.
- ▶ Plug in NH3 control unit.
- ▶ Secure NH3 sensor with cable tie.
- ▶ Perform functional test with LiDIA.
  - ▷ NH3 control unit and NH3 sensor are installed.

### 3.10 Deinstalling NH3 control unit and NH3 sensor

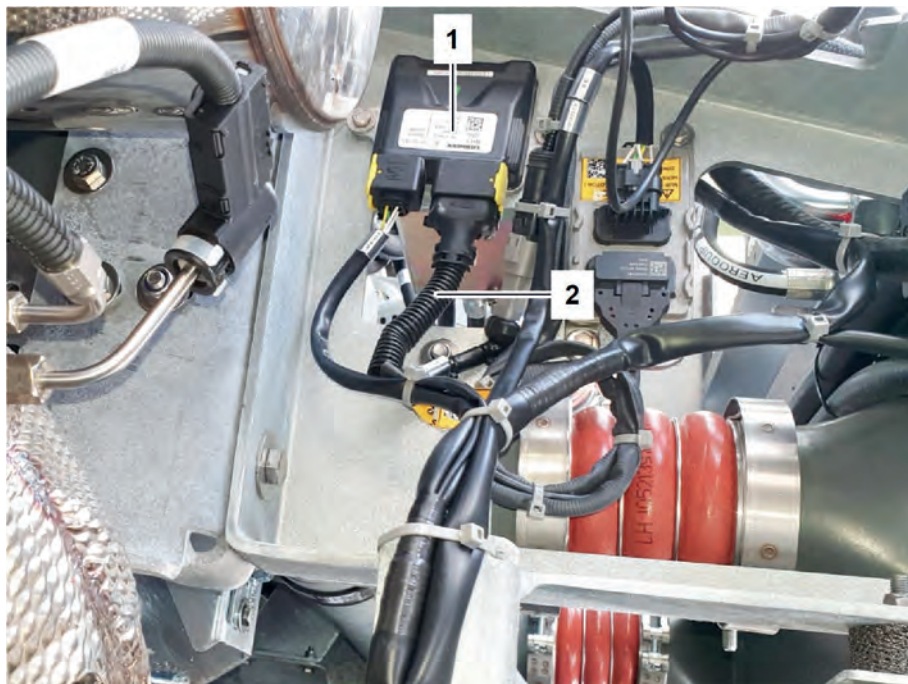


Fig. 69: Installed NH3 control unit with NH3 sensor

- |  |  |
|--|--|
| <p><b>1</b> SCR NH3 sensor (position number 6 in parts list)</p> | <p><b>2</b> NH3 control unit (position number 7 in parts list)</p> |
|--|--|

Overview of parts list (→ 1.3 Spare parts set for SCR system, p. 21).

Make sure that the following tools are available:

- ☐ Wrench 10 mm
- ☐ Wrench 22 mm
- ☐ Socket wrench 10 mm
- ☐ Socket wrench 22 mm
- ☐ All-purpose scissors



Fig. 70: NH3 control unit with NH3 sensor

- |  |   |
|--|---|
| <p><b>1</b> Probe of NH3 sensor</p> <p><b>2</b> Plug of NH3 sensor</p> | <p><b>3</b> Socket for electric plug</p> <p><b>4</b> Socket for NH3 sensor plug</p> |
|--|---|

- ▶ Remove cable tie and enclosing guard from faulty NH3 sensor.
- ▶ Disconnect plug **2** from socket **4**.
- ▶ Deinstalling faulty NH3 sensor: undo nut.

- ▶ Disconnect electric plug from socket **3**.
- ▶ Deinstalling faulty NH3 control unit: undo screws.
  - ▷ Defective NH3 control unit and NH3 sensor are deinstalled.

Install NH3 control unit and NH3 sensor (→ [3.9 Installing NH3 control unit and NH3 sensor, p. 56](#)).

## 3.11 Installing temperature sensor

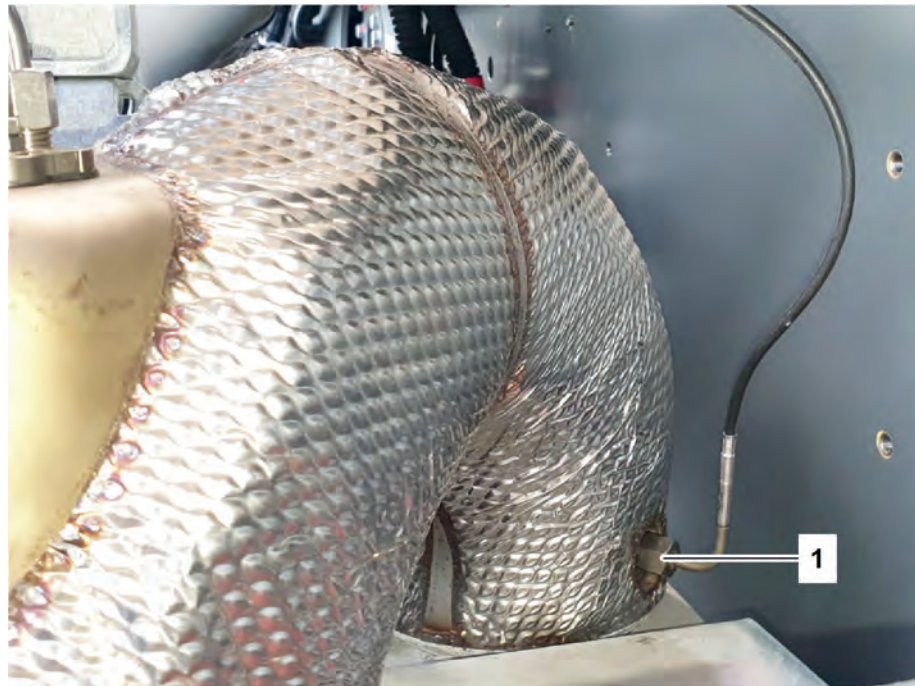


Fig. 71: Installed temperature sensor

- 1** Temperature sensor (position number 5 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Temperature sensor (position number 5 in parts list)
- ☐ Castrol paste (position number 12 in parts list)
- ☐ Heat-resistant cable ties (position number 17 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 17 mm
- ☐ Socket wrench 17 mm
- ☐ Torque wrench



Fig. 72: Temperature sensor

**1** Nut

**2** Electric plug

- ▶ Smear thread of exhaust line with Castrol paste.
- ▶ Installing temperature sensor: tighten fastening nut with torque of **35 Nm**.
- ▶ Connect electric plug **2** with socket.
- ▶ Secure temperature sensor with cable ties.
- ▶ Perform functional test with LiDIA.
  - ▷ Temperature sensor is installed.

## 3.12 Deinstalling temperature sensor



Fig. 73: Installed temperature sensor

- 1** Temperature sensor (position number 5 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following tools are available:

- ☐ Wrench 17 mm
- ☐ Socket wrench 17 mm
- ☐ All-purpose scissors



Fig. 74: Temperature sensor

- 1** Nut

- 2** Electric plug



- ▶ Remove cable tie at temperature sensor.
- ▶ Disconnect electric plug **2** from socket.
- ▶ Deinstalling temperature sensor: undo nut **1**.

Install temperature sensor (→ [3.11 Installing temperature sensor, p. 60](#)).

## 3.13 Installing NOx sensor

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ NOx sensor (position number 26 in parts list)
- ☐ Heat-resistant cable ties (position number 17 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 10 mm
- ☐ Wrench 22 mm
- ☐ Torque wrench
- ☐ Socket wrench 10 mm
- ☐ Socket wrench 22 mm
- ☐ All-purpose scissors

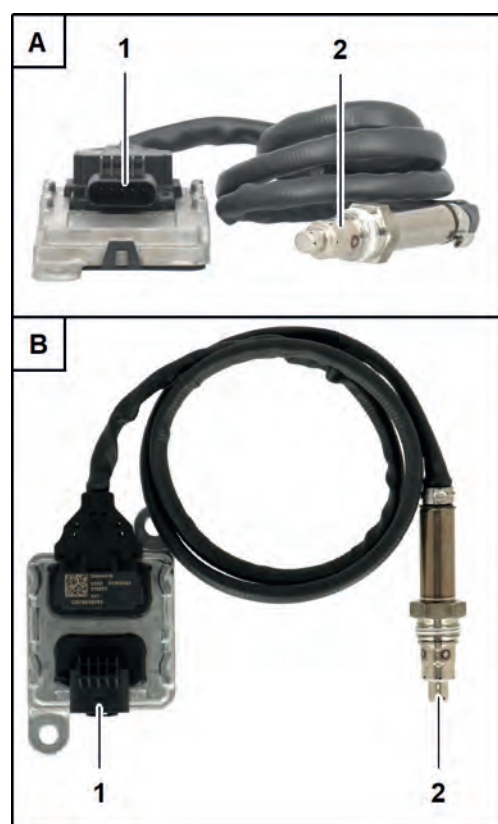


Fig. 75: NOx sensor

- |          |   |          |        |
|----------|---|----------|--------|
| <b>A</b> | NOx sensor (position number 4 in parts list)  | <b>1</b> | Socket |
| <b>B</b> | NOx sensor (position number 26 in parts list) | <b>2</b> | Probe  |

- Position NOx sensor.

If M6 screws are present:

- Installing sensor enclosure: tighten screws with tightening torque of **7 Nm**.
- or

If M8 screws are present:

Installing sensor enclosure: tighten screws with tightening torque of **17 Nm**.

- Tighten probe **2** with a tightening torque of **50 Nm**.
- Connect electric plug with socket **1**.



- ▶ Secure NOx sensor with cable ties.
- ▶ Perform functional test with LiDIA.
  - ▷ NOx sensor is installed.

## 3.14 Deinstalling NOx sensor

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following tools are available:

- ☐ Wrench 10 mm
- ☐ Wrench 22 mm
- ☐ All-purpose scissors

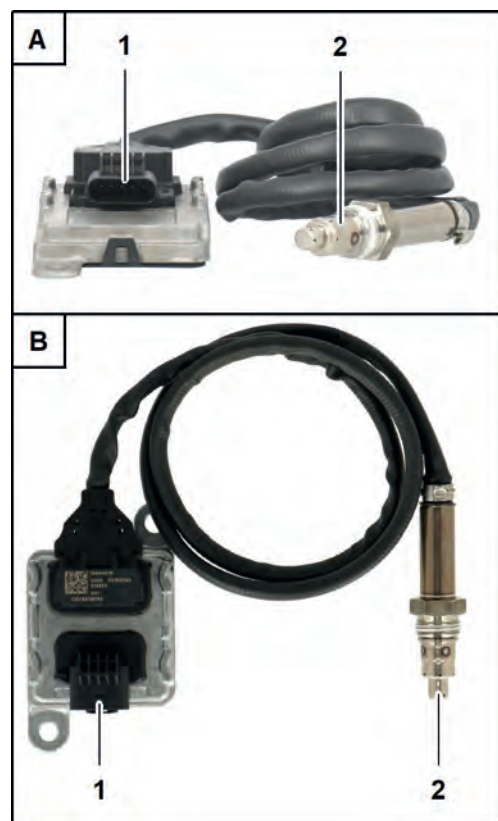


Fig. 76: NOx sensor

**26.1** Socket

**26.2** Probe

- ▶ Remove cable tie and enclosing guard from faulty NOx sensor.
- ▶ Remove probe **26.2** of faulty NOx sensor.
- ▶ Remove electric plug from socket **26.1** of faulty NOx sensor.
- ▶ Deinstalling faulty NOx sensor: undo screws and nuts.

Install NOx sensor ([→ 3.13 Installing NOx sensor, p. 64](#)).

## 3.15 Installing urea pump

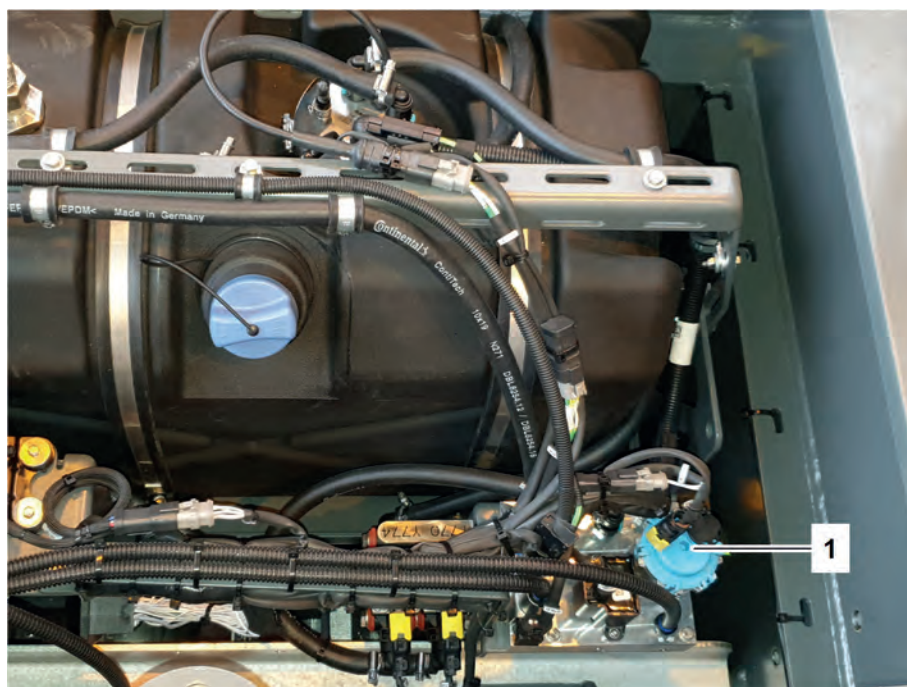


Fig. 77: Installed urea pump

- 1 Urea pump (position number 3 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

---

### NOTICE

Improper assembly of urea line or coolant lines!  
Damage to diesel engine or SCR exhaust system.

- ▶ Install marked coolant lines in correct connections.
- ▶ Install marked urea lines in correct connections.

---

### NOTICE

Improper connection of quick-latch coupling!  
Damage to urea pump.

- ▶ Make sure that quick-latch coupling is connected with little pressure.
- ▶ Make sure that you hear a click when connecting quick-latch coupling.

---

### NOTICE

Freezing of demineralized water!  
Damage to urea pump.

- ▶ Make sure that ambient temperature during installation of urea pump is at least 0 °C.
- ▶ After installation of urea pump, put machine in operation and let motor run for 5 minutes.

---

Make sure that the following spare parts from the spare parts set are available:

- ☐ Urea pump (position number 3 in parts list)

- ☐ Injection set (position number 3 in parts list)
- ☐ Servicing cap (position number 16 in parts list)
- ☐ Clamp (position number 18 in parts list)
- ☐ Service plug *Classic* (position number 19 in parts list)

Make sure that the following tools and consumables are available:

- ☐ 20 ml demineralized water
- ☐ Clean cloth for catching demineralized water
- ☐ Wrench 10 mm
- ☐ Wrench 17 mm
- ☐ Torque wrench
- ☐ Slotted screwdriver
- ☐ Socket wrench 10 mm
- ☐ Internal hexagon socket wrench 5 mm
- ☐ Marker pen

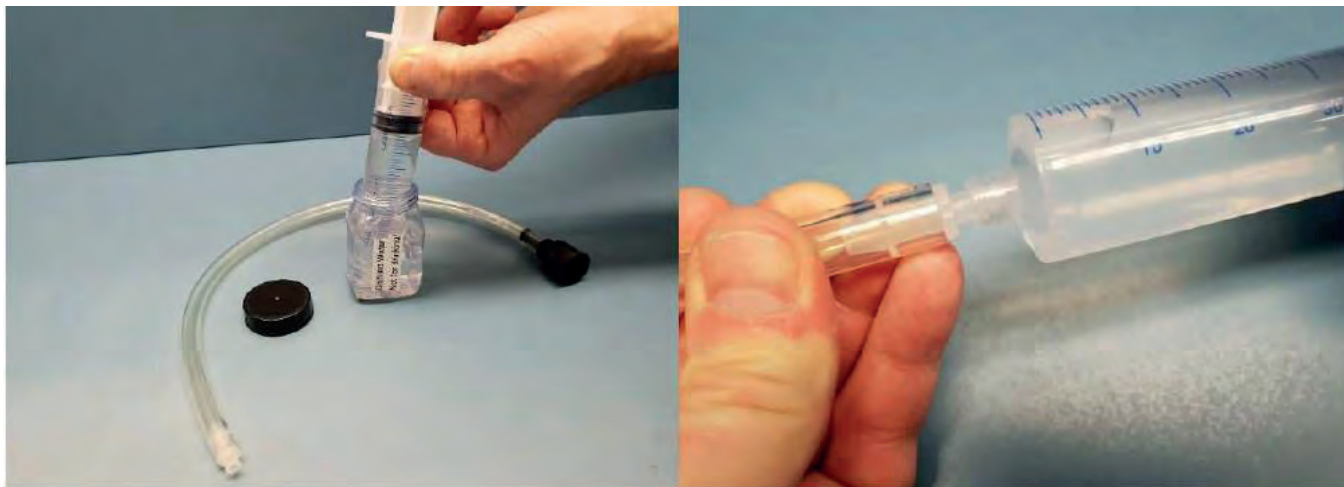


Fig. 78: Injection set

- Fill injection set with 20 ml demineralized water.

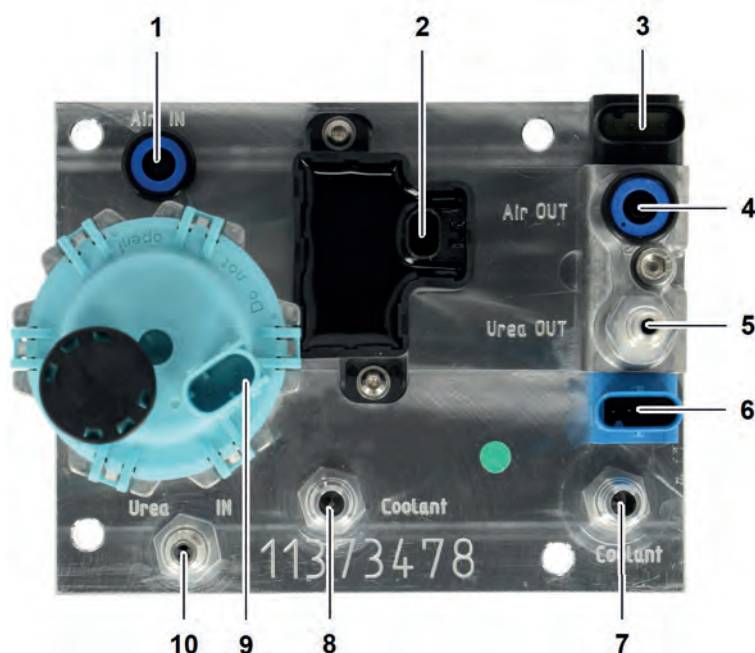


Fig. 79: Installing urea pump

- |                                  |  |
|----------------------------------|--|
| 1 Connection Air inlet           | 6 Connection DEF pressure and temperature sensor |
| 2 Connection Switch over valve   | 7 Connection Coolant outlet                      |
| 3 Connection Air pressure Sensor | 8 Connection Coolant inlet                       |
| 4 Connection Air outlet          | 9 Connection DEF-Pump                            |
| 5 Connection DEF-outlet          | 10 Connection DEF-inlet                          |

- ▶ Make sure that protective caps are present at electric connections and protect connections from moisture.
- ▶ Remove protective caps from connection *DEF-inlet* **10** and connection *DEF-outlet* **5**.
- ▶ Press in 20 ml demineralized water at connection *DEF-inlet* **10** and simultaneously catch emerging water at connection *DEF-outlet* **5** with cloth.

### Troubleshooting

Unable to press demineralized water into urea pump?  
Incorrect storage of urea pump.

- ▶ Contact Liebherr customer service.

- ▶ Installing urea pump: tighten fastening screw with tightening torque of **7 Nm**.
- ▶ Install urea line at connection *DEF-inlet* **10**.
- ▶ Install urea line at connection *DEF-outlet* **5**.
- ▶ Install air line at connection *Air inlet* **1**.
- ▶ Install air line at connection *Air outlet* **4**.
- ▶ Install coolant line at connection *Coolant outlet* **7**.
- ▶ Install coolant line at connection *Coolant inlet* **8**.
- ▶ Connect plug with connection *Switch over valve* **2**.

- ▶ Connect plug with connection *Air pressure Sensor* **3**.
- ▶ Connect plug with connection *DEF pressure and temperature sensor* **6**.
- ▶ Connect plug with connection *DEF-Pump* **9**.
- ▶ Perform functional test with LiDIA.
  - ▷ Urea pump is installed.

## 3.16 Deinstalling the urea pump

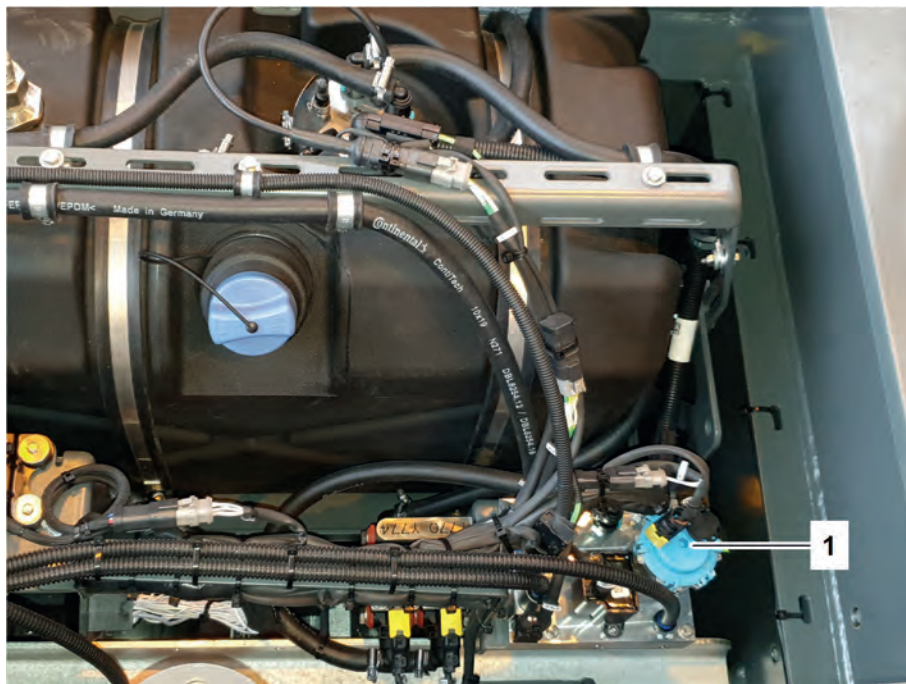


Fig. 80: Installed urea pump

- 1 Urea pump (position number 3 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

---

### NOTICE

Improper handling of electrical lines!  
Damage to urea pump

- Make sure that no electrical lines are obstructing the repair work.
- 

Make sure that the following spare parts from the spare parts set are available:

- ☐ Air Hose Removal Tool (position number 15 in parts list)
- ☐ Servicing cap (position number 16 in parts list)
- ☐ Clamp (position number 18 in parts list)
- ☐ Service plug *Classic* (position number 19 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 10 mm
- ☐ Wrench 17 mm
- ☐ Slotted screwdriver
- ☐ Marker pen



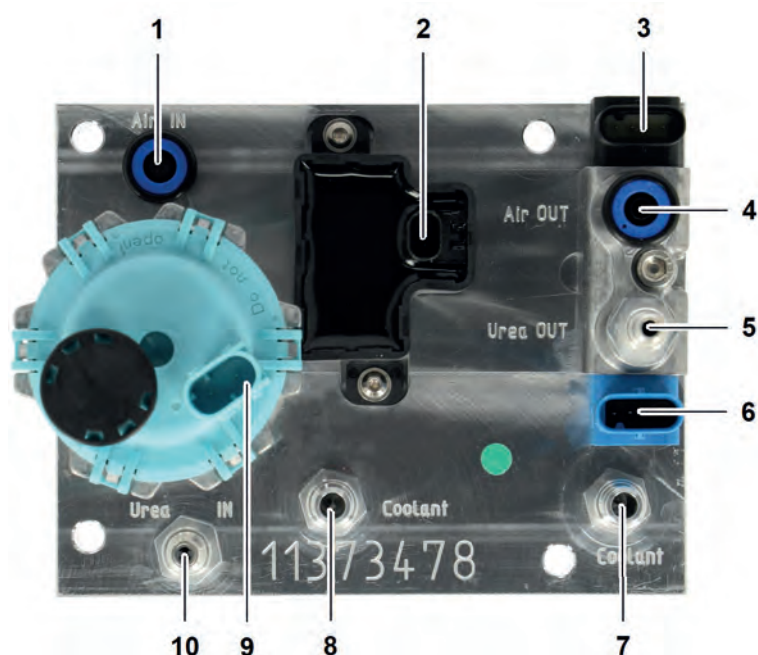


Fig. 81: Deinstalling the urea pump

- |   |                                |    |  |
|---|--------------------------------|----|--|
| 1 | Connection Air inlet           | 6  | Connection DEF pressure and temperature sensor |
| 2 | Connection Switch over valve   | 7  | Connection Coolant outlet                      |
| 3 | Connection Air pressure Sensor | 8  | Connection Coolant inlet                       |
| 4 | Connection Air outlet          | 9  | Connection DEF-Pump                            |
| 5 | Connection DEF-outlet          | 10 | Connection DEF-inlet                           |

- ▶ Mark air lines with a marker for later installation.
- ▶ Close air lines with clamp.
- ▶ Detach quick-latch coupling from connection *Coolant outlet* 7.
- ▶ Close opening with service plug *Classic*.
- ▶ Detach quick-latch coupling from connection *Coolant inlet* 8.
- ▶ Close opening with service plug *Classic*.



Fig. 82: Urea pump

- ▶ Position Air Hose Removal Tool at connection 4 of air line.
- ▶ Press Air Hose Removal Tool firmly into coupling.



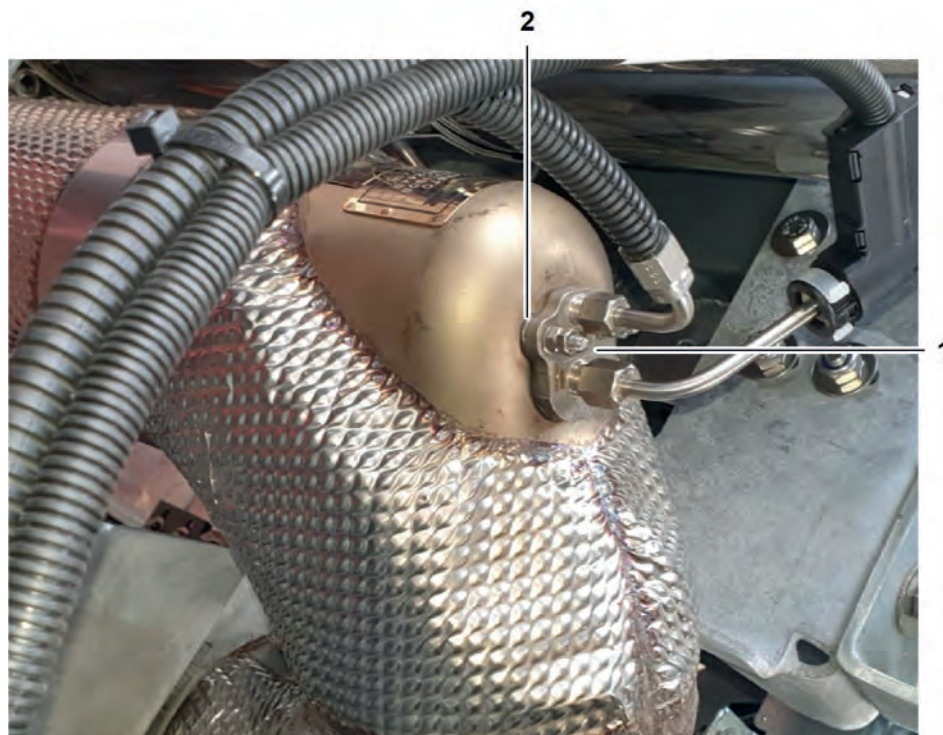


Fig. 83: Urea pump

- ▶ Press Air Hose Removal Tool together and pull it out upwardly with the air line.
- ▶ Close opening of air line with servicing cap.
- ▶ Undo and detach air line.
- ▶ Repeat procedure for air line at connection *Air inlet 1*.
- ▶ Mark urea lines with a marker for later installation.
- ▶ Close urea lines with clamp.
- ▶ Detach quick-latch of urea line from connection *DEF-outlet 5*.
- ▶ Close urea line and opening of urea pump with service plug *Classic*.
- ▶ Repeat procedure for urea line at connection *DEF-inlet 10*.
- ▶ Repeat procedure for coolant line at connection *Coolant outlet 7* and connection *Coolant inlet 8*.
- ▶ Disconnect plug from connection *Switch over valve 2*.
- ▶ Disconnect plug from connection *Air pressure Sensor 3*.
- ▶ Disconnect plug from connection *DEF pressure and temperature sensor 6*.
- ▶ Disconnect plug from connection *DEF-Pump 9*.
- ▶ Undo fastening screws and deinstall urea pump.

Install urea pump (→ [3.15 Installing urea pump, p. 67](#)).

## 3.17 Installing injector and seal



*Fig. 84: Installed injector with seal*

Injector (position number 1 in parts list)

Sealing (position number 2 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Injector (position number 1 in parts list)
- ☐ Sealing (position number 2 in parts list)
- ☐ Castrol paste (position number 12 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 8 mm
- ☐ Wrench 14 mm
- ☐ Torque wrench
- ☐ Socket wrench 8 mm
- ☐ Socket wrench 14 mm

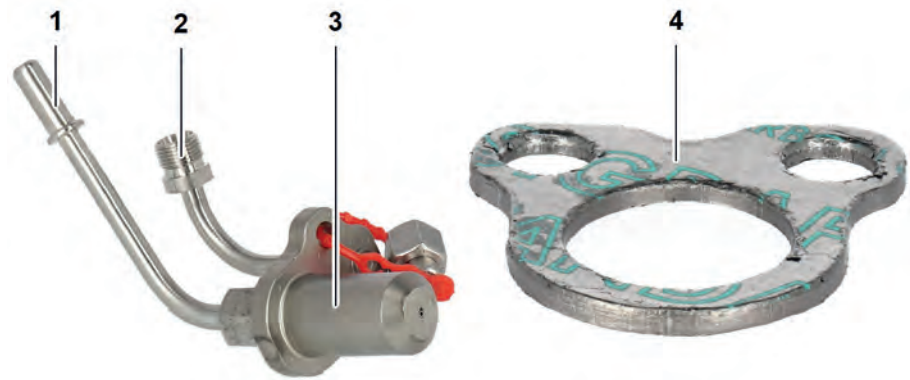


Fig. 85: Injector and sealing

- 1 Connection for urea line
- 2 Connection for air line
- 3 Injector
- 4 Sealing

- ▶ Position sealing **4** at exhaust gas mixing pipe.
- ▶ Smear thread with Castrol paste.
- ▶ Position injector **3**.
- ▶ Installing injector **3**: tighten fastening nuts with a tightening torque of **6 Nm**.
- ▶ Secure both fastening nuts with one counter nut each.
- ▶ Install air line.
- ▶ Install urea line.
- ▶ Perform functional test with LiDIA.
  - ▷ Injector is installed.

## 3.18 Deinstalling injector and seal

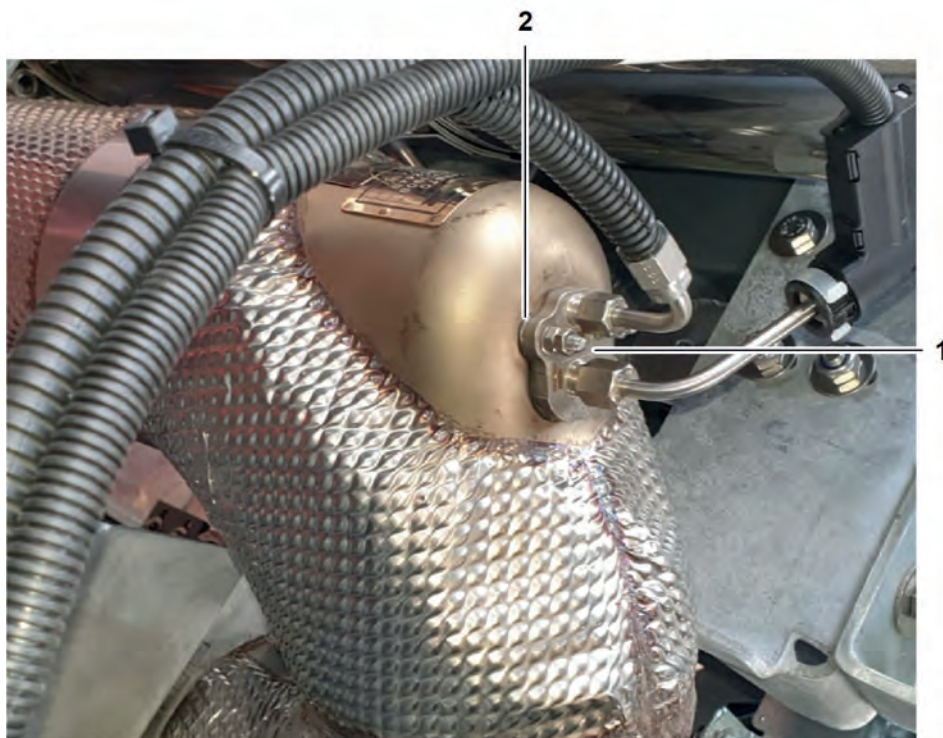


Fig. 86: Installed injector with seal

Injector (position number 1 in parts list)

Sealing (position number 2 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Servicing cap (position number 16 in parts list)
- ☐ Service plug *Classic* (position number 19 in parts list)

Make sure that the following tools are available:

- ☐ Wrench 8 mm
- ☐ Wrench 14 mm

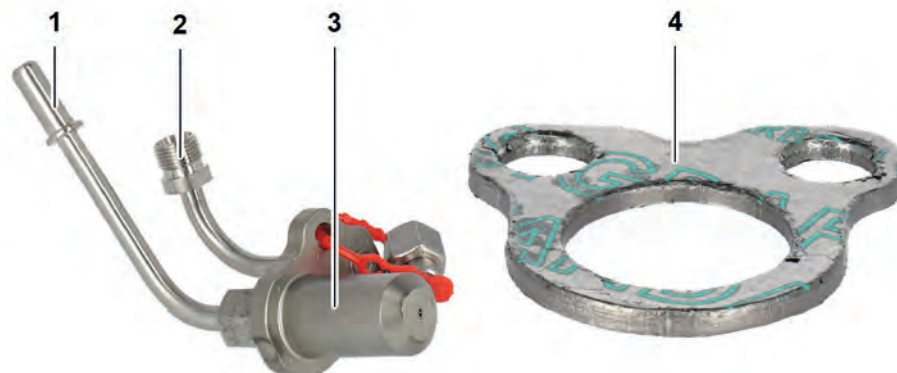


Fig. 87: Injector and sealing

**1** Connection for urea line

**2** Connection for air line

**3** Injector

**4** Sealing

- ▶ Disconnect air line from connection **2**.
- ▶ Seal opening with service closure.
- ▶ Disconnect urea line from connection **1**.
- ▶ Close opening with service plug *Classic*.
- ▶ Undo counter nuts.
- ▶ Undo fastening nuts and remove injector **3**.
- ▶ Remove sealing **4**.

Install injector with seal (→ [3.17 Installing injector and seal, p. 74](#)).

## Deinstall and Install

Deinstalling injector and seal

Error displays on the monitor and  
warning levels of SCR system

**4 Error displays on the monitor and warning levels of SCR system**



## 4 Error displays on the monitor and warning levels of SCR system

If an error at the SCR system is reported on the monitor of the machine, the error must be rectified within **200 operating minutes**.

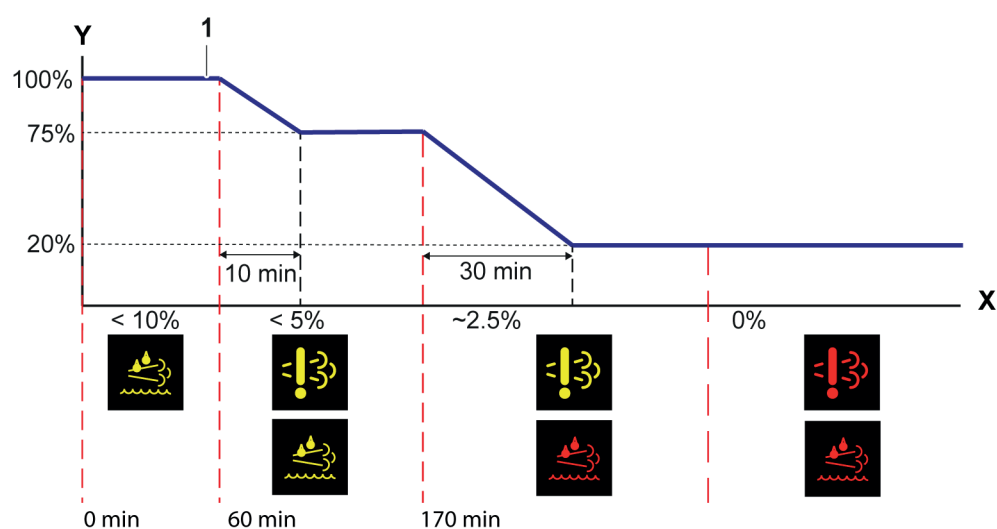













Fig. 88: Warning and malfunction strategy with low urea fill level

1 Curve of available torque  
X Fill level of urea tank  
Y Available torque of diesel engine

Display		 	 	 
Warning levels	Warning level 1	Warning level 2	Warning level 3	Warning level 4
Power	DEF light	maximum 75% Nm	maximum 20% Nm	final reduction
Time	0 to 60 min	60 to 170 min	170 to 200 min	< 200 min
High Level error Code				
P1187	SCR error			
	DEF-Level < 10 %			
P1188		SCR error		

Display				
		DEF-Level < 5 %		
P1189			SCR error	
			DEF-Level < 2.5 %	
P1190				SCR error
				DEF-Level < 0.1 %

Tab. 12: Warning levels

### Warning level 1

The following information is displayed:

- Error displays on the monitor in the cabin.
- Error code: P1187
- Power: no power reduction
- Time: 0 to 60 Minuten

### Warning level 2

The following information is displayed:

- Error displays on the monitor in the cabin
- Error code: P1188
- Power: slight power reduction, maximum torque 75 %
- Time: 60 to 170 Minuten

### Warning level 3

The following information is displayed:

- Error displays on the monitor in the cabin
- Error code: P1189
- Power: heavy power reduction from 75 % torque to maximum 20 % torque and maximum 60 % nominal speed
- Time: 170 to 200 Minuten

### Warning level 4

The following information is displayed:

- Error displays on the monitor in the cabin
- Error code: P1190
- Power: heavy power reduction from 75 % torque to maximum 20 % torque and maximum 60 % nominal speed
- Time: from 200 Minuten
- One-time repair by customer is possible. If necessary, the error can be reset by Liebherr service personnel only.

**Troubleshooting      5**

# 5 Troubleshooting

# 5 Troubleshooting

## 5.1 Testing sensors and actuators

### NOTICE

Improper testing of sensors and actuators!  
Damage to electrical system.

- ▶ Make sure that Y cables are in perfect state.
- ▶ Make sure that unused clamps of Y cable do not cause a short circuit.
- ▶ Make sure that electrical terminals with the same polarity are connected.
- ▶ Make sure that system is de-energized during assembly and disassembly of the Y cables.

### 5.1.1 Measuring the supply voltage and signal voltage of a sensor or actuator



Fig. 96: Communication cable kit (position number 28 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Y cable from communication cable kit (position number 28 in parts list)

Make sure that the following tools are available:

- ☐ Multimeter
- ☐ Slotted screwdriver
- ☐ Extension cable
- ▶ Switch off machine and secure against unauthorized use.
- ▶ Connect clamp pairs of Y cable that are not needed to one another.
- ▶ Disconnect plug from sensor or actuator.
- ▶ Connect plug to required Y cables.
- ▶ Connect extension cable with Y cable.
- ▶ Connect extension cable to Y multimeter.
- ▶ Switch on machine ignition.
- ▶ Measure voltage with multimeter.

When measurement is finished:

- ▶ Switch off machine ignition.
- ▶ Disconnect clamps from cable harness.

## 5.1.2 Measuring resistance between two clamps of a sensor or actuator



Fig. 97: Communication cable kit (position number 28 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Y cable from communication cable kit (position number 28 in parts list)

Make sure that the following tools are available:

- ☐ Multimeter
- ☐ Slotted screwdriver
- ☐ Extension cable
- ▶ Switch off machine and secure against unauthorized use.
- ▶ Connect clamp pairs of Y cable that are not needed to one another.
- ▶ Disconnect plug from sensor or actuator.
- ▶ Connect Y cable to sensor or actuator.
- ▶ Connect cable to multimeter.
- ▶ Measure resistance with multimeter.

## 5.1.3 Measuring resistance between two cables of motor cable harness



Fig. 98: Communication cable kit (position number 28 in parts list)

Overview of parts list ([→ 1.3 Spare parts set for SCR system, p. 21](#)).

Make sure that the following spare parts from the spare parts set are available:

- ☐ Y cable from communication cable kit (position number 28 in parts list)

Make sure that the following tools are available:

- ☐ Multimeter
- ☐ Slotted screwdriver
- ☐ Extension cable
- ▶ Switch off machine and secure against unauthorized use.
- ▶ Connect clamp pairs of Y cable that are not needed to one another.
- ▶ Disconnect plug from sensor or actuator.
- ▶ Disconnect ECU plug.
- ▶ Connect Y cable to desired wires.
- ▶ Measure resistance with multimeter.





# Index

## C

Construction machinery (LR, HS and FE) 29  
Contents of spare parts set 21

## D

Deinstall and Install 41  
Deinstalling air line 46  
Deinstalling differential pressure sensor 54  
Deinstalling injector and seal 76  
Deinstalling NH3 control unit and NH3 sensor 58  
Deinstalling NOx sensor 66  
Deinstalling suction module 50  
Deinstalling temperature sensor 62  
Deinstalling the urea pump 71  
Diagram of exhaust system 16, 19  
Distinguishing feature 15, 18

## E

Error displays on the monitor and warning levels of SCR system 81

## F

FE deep foundation equipment 30

## H

HS cable excavator 29

## I

Installing air line 41  
Installing air line extension 44  
Installing cable harness between sensors and urea pump 55  
Installing differential pressure sensor 52  
Installing injector and seal 74  
Installing NH3 control unit and NH3 sensor 56  
Installing NOx sensor 64  
Installing suction module 48  
Installing temperature sensor 60  
Installing urea pump 67

## L

LHM mobile harbour cranes 30

LR crawler cranes 29  
LRS reachstacker 31

## M

Maritime machines 30  
Measuring resistance between two cables of motor cable harness 86  
Measuring resistance between two clamps of a sensor or actuator 86  
Measuring the supply voltage and signal voltage of a sensor or actuator 85  
Motors with emission stage IV 20  
Motors with emission stage V 17

## N

Notes regarding the documentation 5

## O

Operational planning 35  
Overview of exhaust system with exhaust stage V 15  
Overview of exhaust system with exhaust stage V (Tier 4f) 18  
Overview of installed suction module per machine type 29

## P

Part list of spare parts set 28  
Part list optionally available tools 27  
Parts list of spare parts set 22  
Performing troubleshooting with LiDIA 35  
Product description 15

## R

Repair process 35  
Ruling out causes of error on SCR system 35

## S

SCR error on the monitor in the cabin 35  
Spare parts set for SCR system 21

## T

Testing sensors and actuators 85  
Tool list (not included) 25  
Troubleshooting 85



Find your local  
service partner.