Workshop literature

STILL
ELECTRONIC
DOCUMENTATION
SYSTEM

Electric forklift truck

RX50-10
RX50-13
RX50-15
RX50-16

CE

5051 5053 5054 5055

164530 EN - 05/2011

first in intralogistics

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Motor

General technical data

Traction motor Power unit component	5060–5066	5051–5055
Manufacturer	ABM Greiffenberger	
Model	TDF 471/4DG 112 Mb-4	TDF 471/4DG 112 MC-4
Engine type	AC (delta)	
Voltage between the phases	12 V	
Rated current (nominal)	314 A	320 A
Rated output (nominal)	4.9 kW	4.9 kW
Mode of operation (nominal)	S2 — 60 min	
Protection type	IP 54	
Insulation class for the winding	F (155°C)	
Cooling	Surface/convection	
Temperature sensor	KTY84-130	
Rev sensor	Pin sensor	Sensor bearing (up to week 42/2005)
		Pin sensor (from week 42/2005)
Cable lengths	U = 165 mm	U = 350 mm
	V = 210 mm	V = 350 mm
	W = 270 mm	W = 350 mm

Installing the sensor bearing

Installation

⚠ CAUTION

The sensor bearing can easily be destroyed if it is struck.

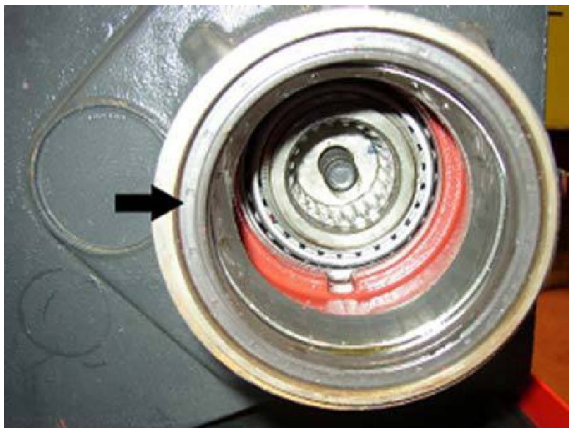
Use only the hoisting tool to hoist the sensor bearing.

– Use the mounting tool to fit the sensor bearing to the rotor shaft. ▷

– Attach the sensor bearing to the rotor shaft using the locking ring. ▷

– Insert a new sealing ring and plastic washer into the bearing shield. ▷

– Install the rotary shaft seal, ensuring that it is correctly positioned. ▷



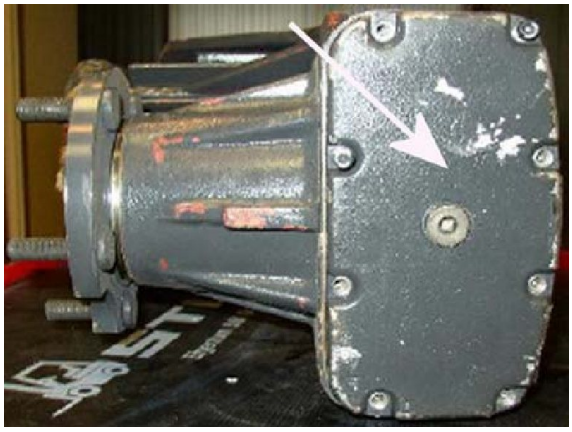
– Insert the wheel hub into the multiple splining.
– Screw in the new mounting screw until the wheel hub is in the end position.

⚠ CAUTION

Tighten the mounting screw to the specified tightening torque!

The mounting screw must not be reused.

– Attach the gearbox cover and tighten the screws. ▷



– Replace the oil drain plug sealing ring.
– Install the power unit; see chapter entitled "Installing the power unit".
– Fill with gearbox oil.
– Attach the drive wheel and tighten the wheel nuts.
– Lower the truck.
– Tighten the wheel nut.
– Check all tightening torques.
– Carry out a functional test.

Hydraulic steering

General technical data

Steering system	5051–5055
Steering unit	
Manufacturer	Sauer Danfoss
Description	Model No.: 150 G 6093
Delivery rate	40 cm^3 per revolution
Pressure relief valve	125–130 bar
Non-return valve in T	2 ±0.5 bar
Shock valves	180–185 bar
Steering pressure	
Connections P and EF	Max. 250 bar
Connections CF and LS	175 bar
Transmission ratio	

Diaphragm pressure switch	
Switching range	1.5 ±0.2 bar
Tightening torque	25 Nm

Priority valve	
Manufacturer	Hydraulik Nord Fluidtechnik
Description	Model PVPS 80-04/32-G4
Charging pressure	4 bar
Input volume	80 l/min
Load signal	Static
Tightening torques	
Hydraulic pump flange	4 x M6x35 socket head screw, 8.8, ISO 4762 10 Nm
Load Sensing LS	G1/4, 45 Nm
Directional control valve EF	G1/2, 100 Nm
Steering CF	G3/8, 100 Nm

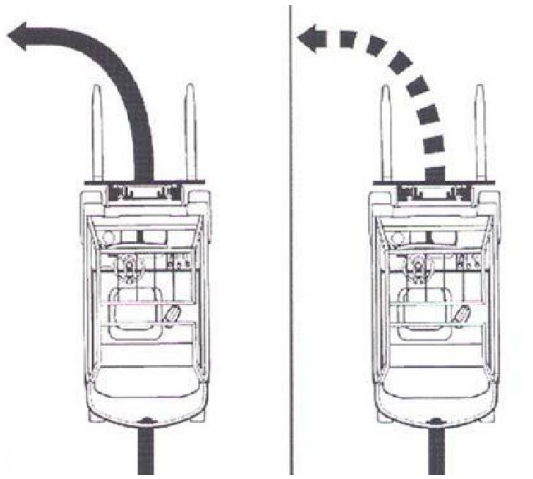
Steering motor	
Manufacturer	Sauer Danfoss
Description	Model no. 151-6403 (OMR 125 NA)
Temperature range	-30°C to +80°C
Tightening torques	
Mounting screws	46 Nm

Steering chain	
Chain tension at the clamping bolt	Hexagon nut 5 Nm

Steering-angle-dependent performance - CSC

General

In order to optimize driver comfort and operational safety, this truck is equipped with Curve Speed Control (CSC) as standard. This function ensures that the driving speed is reduced when steering. The effect becomes more powerful at higher speeds and is triggered when steering is actuated.



⚠ DANGER

Danger of truck tipping over.

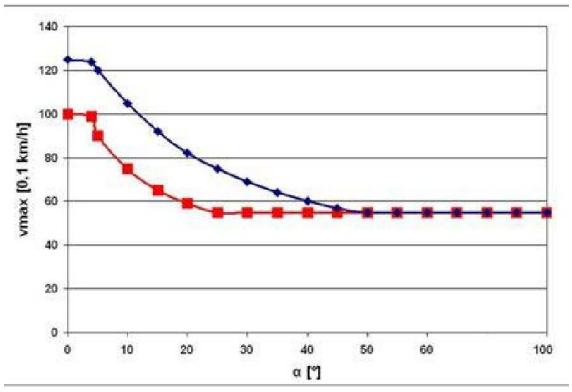
The driving speed must generally be such that the CSC does not come into action.

It is not allowed to deactivate the CSC!

Handling – operation

During operation, the speed is restricted according to the steering angle. If the driving speed is too high when cornering, the drive decelerates to the maximum speed for the current steering angle. When driving in a straight line, the maximum speed is enabled again.

Due to the different cornering behaviour, different characteristic curves are used for forwards and backwards travel. (See diagram).



Blue — forwards v_{max} = 12.5 km/h
Red — backwards v_{max} = 10 km/h

Behaviour after switching on

When the electrical system is switched on, the steering angle of the controller is always set to 90°. The speed is therefore restricted to 5.5 km/h upon activation.

The maximum driving speed is only enabled once the controller has clearly determined the steering angle. To do this, the steering must be actuated so that the 3B28 zero position sensor moves past the steering stop at both sides. This causes the increments to be recorded by the 3B29 steering angle sensor and the value is stored in the truck control unit.

Sensor system

The steering angle sensor system consists of 2 sensors:

- Steer angle neutral switch 3B28
- Steering angle sensor 3B29

The steering angle neutral switch detects straight-ahead travel and the measurement is

Wheel bearing

General technical data

Tightening torque	
Wheel hub screw	195 Nm
Wheel screw	195 Nm
Lubricant	
Wheel hub bearing Wheel bearing rotary shaft seal	Lithium soap grease to DIN 51825 - KP2K-30

Wheel bearing — wheel hub

General

The wheel hub is supported by two tapered roller bearings. The structure of the wheel hub and the spindle is designed in such a way that the bearing clearance does not have to be set using shim rings.

NOTE

The maximum axial clearance of the bearings is 0.35 mm

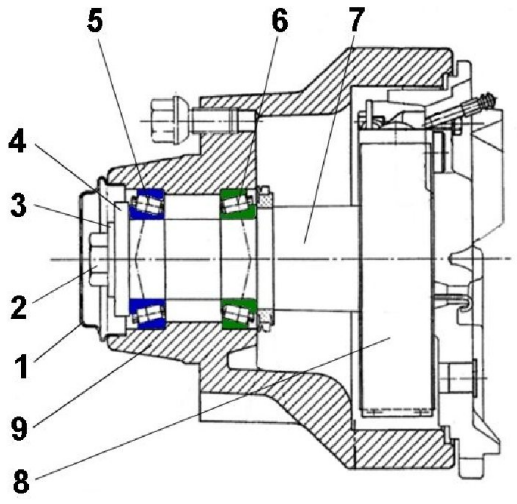
Disassembly of the brake drum

- Park the truck safely.
- Disconnect the battery male connector.
- Loosen the wheel screws.
- Jack up the truck securely on square timbers and secure against rolling away using chocks.
- Remove the wheel.
- Remove cap (1).
- Loosen hexagon head screw (2).
- Remove washers (3, 4).

NOTE

If necessary, reset the brake shoes; see the chapter entitled "Hydraulic service brake".

- Remove the brake drum (9) with the tapered roller bearings (5, 6) from the spindle (7).
- Secure the inner ring of the outer wheel bearing (5) against falling out.
- During removal, the inner ring of the inner



1 Cap
2 Hex head screw
3 Washer
4 Washer
5 Outer wheel bearing
6 Inner wheel bearing
7 Axle stub
8 Brake shoe

Parking brake

Adjusting the parking brake

General

The parking brake can only be correctly adjusted if the service brake is adjusted. The brake shoes of the service brake must always be adjusted first. See chapter entitled "Replacing the brake shoes".

⚠ CAUTION

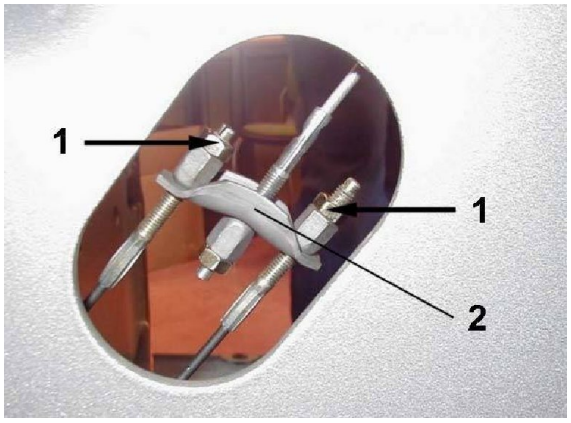
If the cable pulls have been adjusted incorrectly, it is possible that the truck may no longer be braked using the brake.

In order to prevent accidents from occurring, a brake functional test must be carried out.

For detailed information, see FEM 4.004 test log book.

adjustment

- Put brake lever in the zero position
- Adjust cable pulls at the nuts (1) until there is a play of approx. 0.5 mm
- At the same time, the rocker (2) must always be aligned at a right angle to the cable pulls.
- Apply the brake lever to the first notch; parking brake switch 1S3 switches.
- Apply brake lever to the second notch; brakes begin to grind.
- Apply brake lever to the third notch; the wheels can no longer be turned by hand
- Apply brake lever to the fourth notch; full braking efficiency.



Functional test on the ramp

- Pick up the maximum permissible load (nominal load) for the truck

NOTE

If the maximum permissible load (nominal load) is not available, the truck is to be tested with the operating company's maximum operating load.

- Drive up a gradient of at least 15% with the load facing forwards

⚠ WARNING

The truck may roll away in an uncontrolled fashion!

- Always remain seated on the truck during the brake test and actuate the service brake in the event of an emergency

Potentiometer 1B3, 1B4			
X16/7	Free		
X16/8	1B1	Green	10-V supply

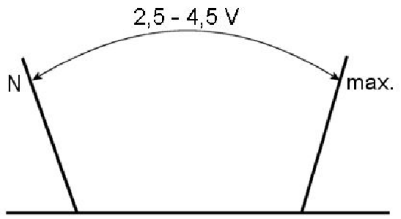
inspection

Potentiometer 1B3, 1B4	Measuring points	Measured values [Volt]
Supply voltage	X16/4 — X16/8	9.95–10.05
1B4 accelerator not actuated	X16/4 — X16/3	4.5–5.5
1B3 accelerator not actuated	X16/4 — X16/2	4.5–5.5
1B4 accelerator fully actuated forwards	X16/4 — X16/3	7.0–9.0
1B3 accelerator fully actuated forwards	X16/4 — X16/2	1.0–3.0
1B4 accelerator fully actuated backwards	X16/4 — X16/3	7.0–9.0
1B3 accelerator fully actuated backwards	X16/4 — X16/2	1.0–3.0
GND breakdown detection		11.5
VCC breakdown detection		0.5

Voltage increase

The difference in voltage between the transmitter's inactive position (N) and maximum actuation (max) is referred to as the potentiometer voltage increase.

At maximum actuation, the voltage must be at least **2.5 V** (up to a maximum of **4.5 V**) higher than in the neutral position (N).

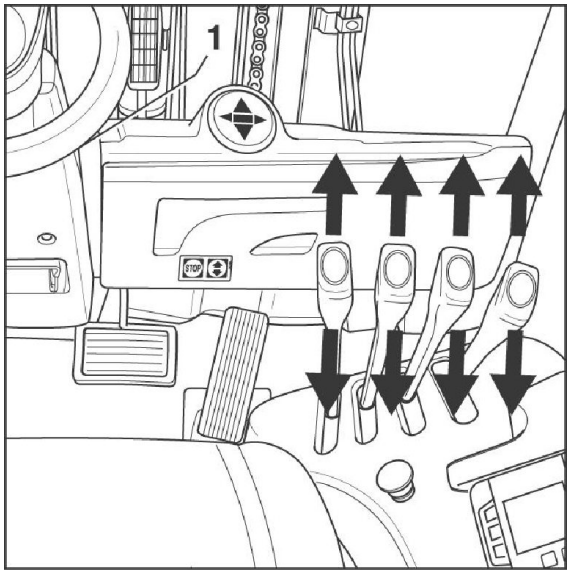


Errors	
Voltage increase too small	The maximum speed is not achieved
Voltage increase too large	No problem for the evaluation ► The maximum speed is reached but not exceeded. ► The end range of the voltage increase is ignored by the controller (dead travel)
Voltage increase significantly too large	Detection of breakdown with corresponding error message

Depressurising the hydraulics

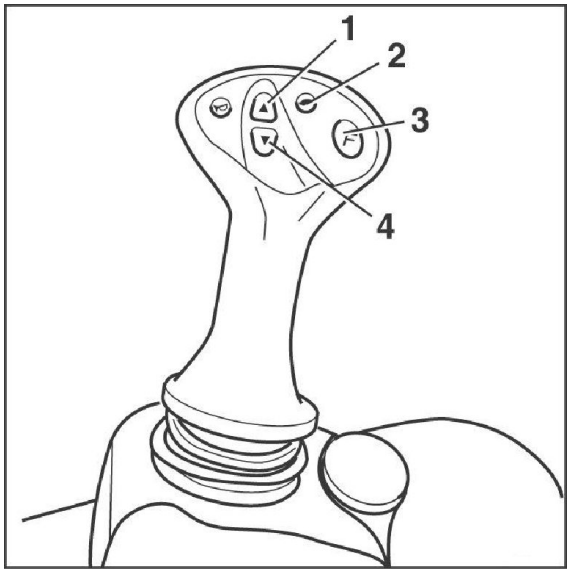
Multi-levers

- Lower the fork carriage
- Tilt back the lift mast to the stop
- Switch off key switch.
- Actuate all operating levers several times up to their end positions



Joystick

- Lower the fork carriage
- Tilt back the lift mast to the stop
- Turning on the key switch
- Press the buttons (1, 2, 3, 4) at the same time



1 Direction of travel forwards
2 Direction of travel backwards
3 Function button
4 Precision control (zoom)

Tip switch

It is not currently possible to "depressurise" the hydraulics in this way.

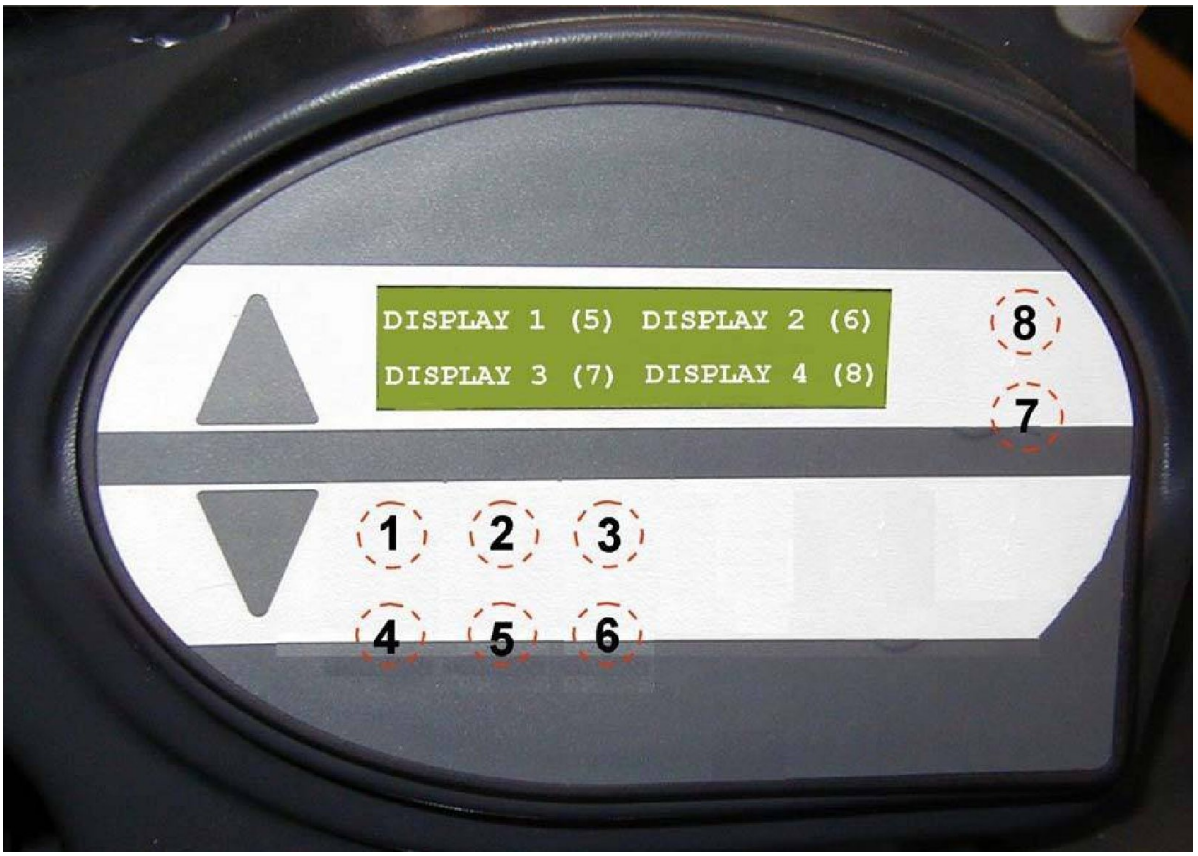
Mini-lever

It is not currently possible to "depressurise" the hydraulics in this way.

Display

Display and operating element - control processor

Button functions



1	Field 1-button	5	Field 4-button
2	Field 2-button	6	Arrow button (▼- Down)
3	Arrow button (▲- Up)	7	ENTER button
4	Field 3-button	8	ESCAPE button

Button assignment for configuration	
Field 1-button (1)	Activates display field 1 and 5
Field 2-button (2)	Activates display field 2 and 6
Arrow button (▲- Up) (3)	Scrolls up and counts up, edits
Field 3-button (4)	Activates display field 3 and 7
Field 4-button (5)	Activates display field 4 and 8
Arrow button (▼- Down) (6)	Scrolls down and counts down, edits
PRG button ↲(7)	ENTER button: switches between display level 1 and 2. In programming mode: confirmation, YES
PRG button ○(8)	ESCAPE button: in programming mode: termination, NO

General

The control processor is a combination device, consisting of an operating element and a control unit - the actual control processor. The operating

Setting the operating hours

```
VALUE     00013.9h
SET      00000.0h
```

The control processor has two independent hour meters. The starting conditions for both hour meters are established via the counter mode.

The upper line displays the actual operating hours of the control processor as counted in accordance with the setting in the counter mode. This value cannot be changed and can be read only in this menu item.

In the lower line, the operating hours can be changed in increments of 10 as often as desired. Only this variable value appears in the display for the driver.

- Activate field 4, the first decade digit flashes.
- Edit using the Up button and confirm with the ENTER key.
- The cursor moves to the next position.
- Repeat the process until all positions have been confirmed once.
- Once this process has been completed, the entire lower line flashes.

Acceleration sensor

```
CRASH SIMU. NO
VALUE            0
```

Function check of the acceleration sensor in trucks fitted with FleetManager and an accident recorder. Details are given in the separate FleetManager manual.

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The inverter analyses the signal from the traction motor temperature sensor and transmits the temperature values to the control processor.

In the control processor, the temperature values are processed in accordance with the TSA characteristic curve.

In the first stage, a fault is registered at temperature (T3) and limitation of the speed and acceleration begins.

Thanks to linear reduction, the drive is usually able to re-establish temperature management. If the traction motor temperature drops to value (T1), the fault is cleared and all limitations are removed.

If it is not possible to re-establish temperature management, stage 2 is triggered.

In the second stage, the motor current is reduced at temperature (T4). This is accomplished by limiting the setpoint values that the control processor sends to the inverter.

From temperature (T5), the motor current is reduced to such an extent that the truck may only be operated in a heavily restricted driving mode.

NOTE

Depending on the load on the truck, the reduction in motor current can bring the truck to a standstill.

Measurement electric motor

- Set the measuring device to the truck-specific test voltage.
- Measurement of windings U, V, W of the traction motor in relation to the housing.
- Measurement of the windings D2 and A1 of the pump motor in relation to the housing

The measurements must be carried out one after another for each winding.

In order to verify a frame fault on electric motors, it may be necessary to increase the test voltage to 1000 volts.

Measurement of battery

- Set the measuring device to the truck-specific test voltage.
- Measurement from the battery's positive terminal against the battery tray
- Measurement from the battery's negative terminal against the battery tray

Follow-up work

- Connect the power cables and the control cables to the inverter
- Connect the control cables, connection cables and CAN bus plugs to the pump actuator
- Connect the SAAB plugs and CAN bus plugs to the control processor
- Remove the short-circuit plugs from the temperature sensors

The connection cables and, if necessary, the CAN bus plugs, must be connected to the components according to the equipment.

Value	Plug connector	Comment	Pulsing
(1A) 3A	X62/1	Lift limitation solenoid valve	No
(1F) 3F	X80/1	Attachment solenoid valve (5th hydraulic function)	No

Converter

Converter

General

The traction motor is controlled by an converter (A). The converter is screwed to the counterweight via a heat sink and is protected by panelling.

The converter assumes the following tasks in the truck control unit:

- Controlling and regulating the traction motor
- Rev counting
- Measuring and monitoring the temperature
- Communicating with the control processor

NOTE

The converter component has been changed, but its function within the truck control unit is identical.

- *Generation 3 converter until December 2004 and subsequently as a spare part*
- *Generation 5 converter from January 2005*
- *The inverters are not interchangeable*

Temperature monitoring

The converter monitors its temperature balance by means of an internal temperature sensor. If the temperature exceeds a critical value, the traction motor current is reduced linearly and an error is generated. If the temperature balance is re-established, the error is cleared and the reduction cancelled.

NOTE

For further information about temperature monitoring, see the chapter entitled "Temperature monitoring"

T [°C]	Temperature at the converter heat sink	
T_1	75 °C	The OVERTEMPERATURE ERROR E2004 error is reset as soon as this temperature has been reached and when the temperature falls below this temperature.
T_3	80°C	Start of actual limitation of speed and acceleration The OVERTEMPERATURE ERROR E2004 error is activated. The error message re-appears in the display repeatedly.
T_4	90°C	End of the linear limitation of speed and acceleration Start of the linear regulation of the traction motor current via the converter.
T_5	115°C	End of the linear regulation of the traction motor current via the converter.

Traction battery

battery

Measuring acid density

The acid density of a full, charged battery is 1.28–1.30 kg/l.

The acid density decreases as the battery discharges. When discharged, the acid density must not fall below 1.14 kg/l.

Battery type	Acid density	Charging state
PzS (normal)	1.27 kg/l	100%
	< 1.14 kg/l	80% (deep-discharged)
PzSH (performance-enhanced) Increased acid density	1.29 kg/l	100%
	< 1.14 kg/l	80% (deep-discharged)

The acid density is tested using an acid siphon. The acid density can be read off directly on the float (areometer).

After charging, it takes a certain amount of time for the acid above the plates to mix with the acid between the plates and then settle. In order to obtain accurate values, measurements must only be taken approx. 30 minutes after charging is complete.

NOTE

The acid level (filling quantity) of the battery must be checked at regular intervals. Once the minimum mark has been reached, only top up with distilled water.

Battery capacity depending on temperature

The maximum battery capacity is only reached with an optimum temperature of 27–30°C.

	3500	Min.	1.1	1.3	1.5	1.7	1.9
		Max.	1.7	2.0	2.3	2.6	3.0
3500	5000	Min.	1.7	2.0	2.3	2.6	3.0
		Max.	2.8	3.3	3.9	4.4	5.0
5000		Min.	2.8	3.3	3.9	4.4	5.0
		Max.	4.3	5.2	6.1	6.9	7.8

5051–5055		Tilt forwards with nominal load [seconds]					
Nominal lift [mm]			Tilt angle				
From	Up to		5°	6°	7°	8°	9°
	3500	Min.	1.3	1.5	1.8	2.0	2.3
		Max.	2.0	2.4	2.8	3.2	3.6
3500	5000	Min.	2.0	2.4	2.8	3.2	3.6
		Max.	3.3	3.9	4.6	5.2	5.9
5000		Min.	3.3	3.9	4.6	5.2	5.9
		Max.	5.3	6.3	7.3	8.3	9.4

Checking

- Measurement must be performed over the entire tilt range
- Speeds must be measured at operating temperature
- For oil temperatures > 50°C, the permissible deviation from the table values is +20%

⚠ CAUTION

Operating error!

With the simultaneous actuation of more than one valve function, higher tilt speeds may occur.

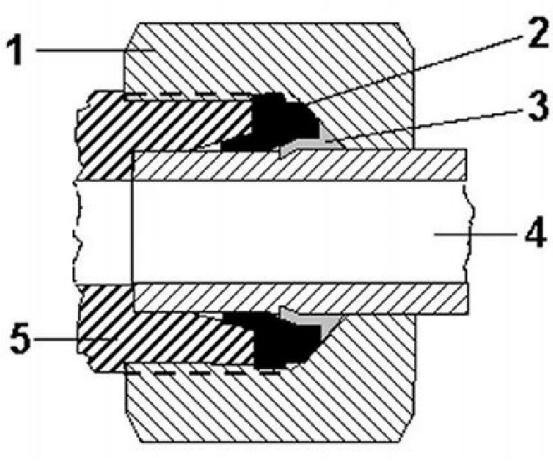
Operating speeds for lowering

5051–5055 5060–5066	Lowering speed with nominal load (m/s)		
	Telescopic mast	NiHo	Triple mast
Max. speed Single value from lift 1 and lift 2	0.60 m/s		
Min. speed Mean value from lift 1 and lift 2	0.41 m/s		

Audit

- Lift 1: Middle cylinder is extended.
- Lift 2: Outer cylinder is extended.
- Speeds must be measured at operating temperature.

– Screw the functional nut (1) with retaining ring (3) and seal (2)onto the pipe union (5) by hand ▷

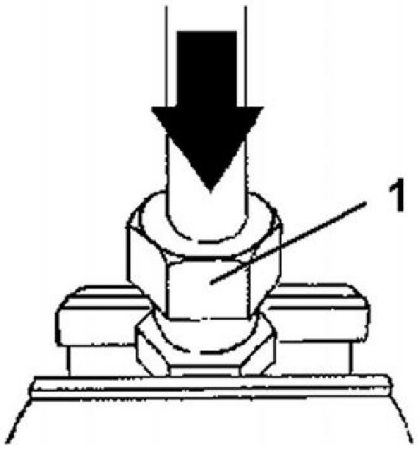


– Push the pipe end into the screw joint and press against the stop in the inner cone ▷

⚠ CAUTION

An insufficient insertion depth can lead to an insecure connection and leaks.

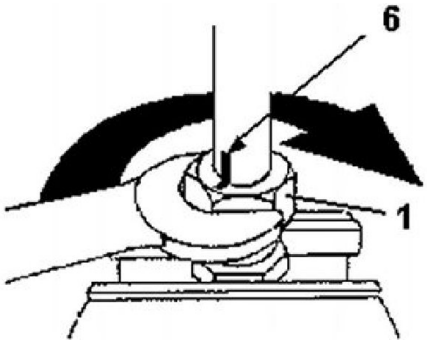
Insert pipe up to the screw stop.



– Tighten the functional nut (1) until you clearly feel an increase in connection strength, **approx. 1 to 1 ½ turns** ▷

NOTE

A marking (6) on the pipe and functional nut makes counting the turns easier.



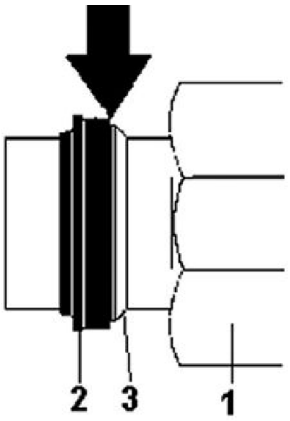
Test

– After assembly, remove the functional nut (1) ▷

– Check whether there is a gap between the sealing ring (2) and retaining ring (3)

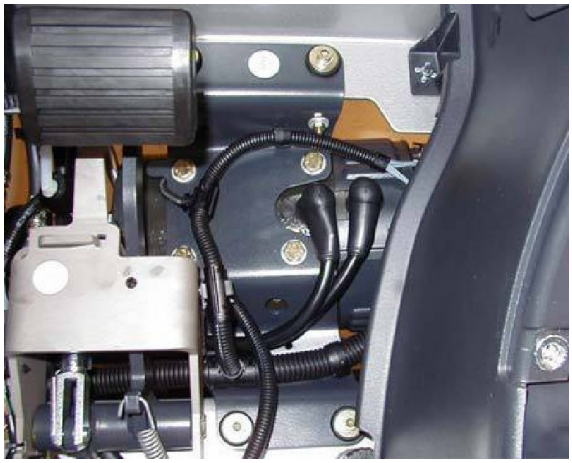
Repeat installation

– Every time you loosen the functional nut (1), please proceed as in the initial assembly



Pump motor removal

Removal



- Raise fork carriage
- Secure mast
- Disconnect battery connector
- Remove base plate with accelerator pedal
- Dismantle right cover
- Remove brake stand

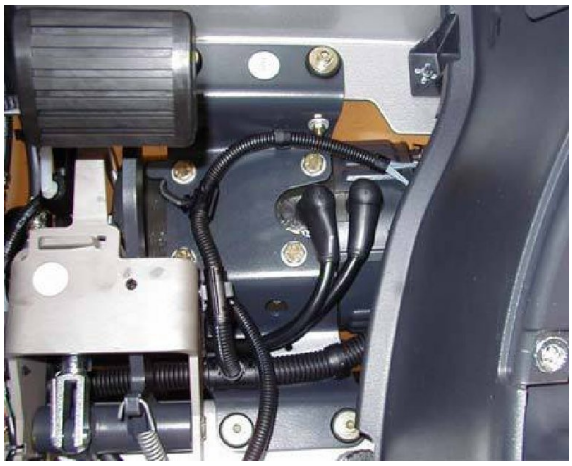
NOTE

The brake hoses can remain mounted

- Separate X14 and X15 and unscrew ports A1 and D2
- Unscrew the pipe clip for connecting the priority valve to the directional control valve from the pump motor
- Separate hydraulic pump from pump motor
- Unscrew horn
- Turn eyebolt (M8) into the pump motor housing
- Use a chain block to secure pump motor on overhead guard
- Remove 4 screws on pump motor holder
- Lift and remove pump motor using a chain block

Pump motor installation

Installation



- Attach pump motor with support on the overhead guard and move into the correct position
- Fasten pump motor holder using 4 screws in rubber mountings
- Turn and remove eyebolt from housing
- Screw horn on
- Screw hydraulic pump on
- Screw the pipe clip for connecting the priority valve to the directional control valve onto the pump motor
- Link connectors X14 and X15 and screw ports A1 and D2 on
- Install brake stand
- Install base plate, connect accelerator plug
- Trial run, functional check

Clamp locking mechanism for hand levers

General

There is a clamp locking valve for each direction. These are switched via the relay of the 5th hydraulic function. The input is also like the input for the 5th hydraulic function. The relay is activated by actuating switch (5).

Depending on the equipment, additional electrical components that correspond to all of the 5th hydraulic function components are required. The only exception is the hydraulic lever. The 4th hydraulic lever is installed with switch (5).

Configuration

NOTE

- *The parameters apply to the clamp locking mechanism for hand levers*
- *For retrofitting, the current software flash package must be loaded onto the truck.*

Service address	Value	Description
158	09	5th function input on output AND4
159	3F	5th function output, X80v
181	8B	Input 1 and 4 on reserve switch 1 X380:2
182	BC	Input2 AND4 to lifting active auxiliary2 pull/push

Electrical connections for hand levers

	E38	X380:2
	E14	X80v

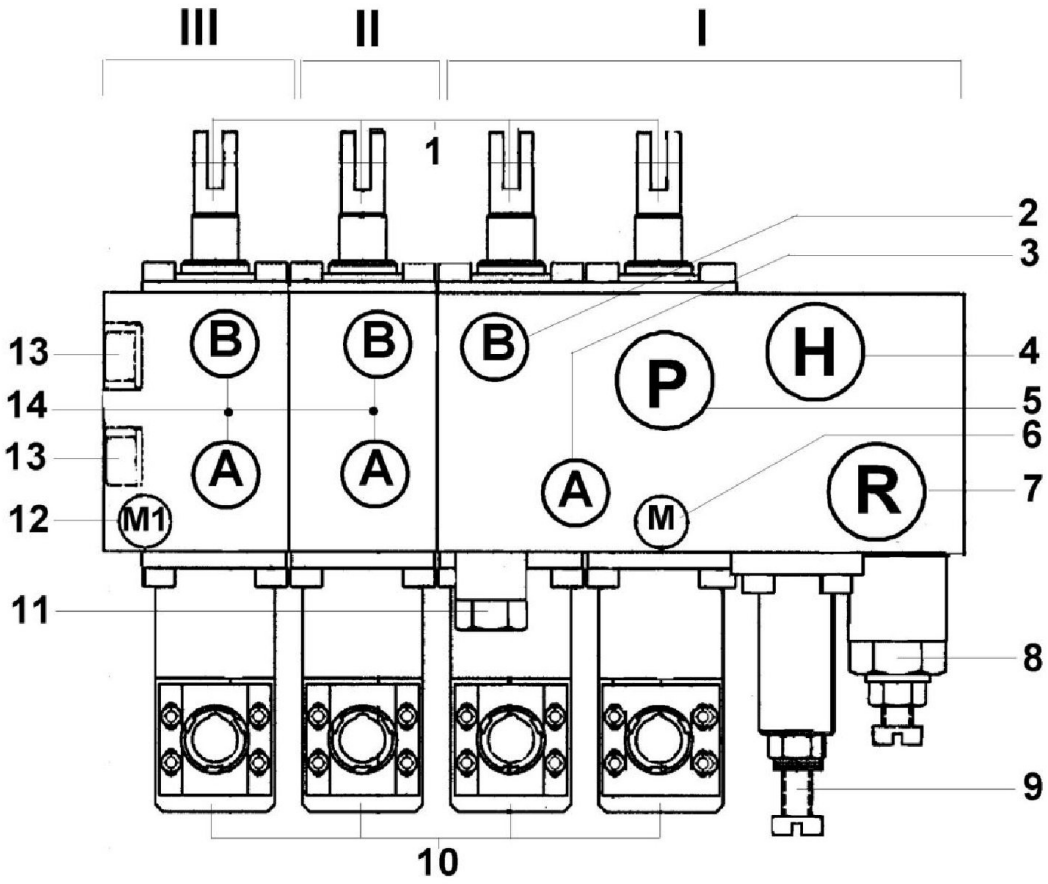
Hose line on mast

Technical data

- PA/PUR plastic hose with textile braid
- Nominal size: DN 6
- Operating pressure: 250 bar
- Burst pressure: > 840 bar at 20°C
- Temperature-resistant from -40°C to +100°C

Directional control valve - arrangement

Arrangement



Directional control valves

I	Lifting/tilting
II	Auxiliary hydraulics 1
III	Auxiliary hydraulics 2
1	Valve spool
2	Tilting — forwards
3	Tilting — backwards
4	Lifting — lowering
5	Pump line
6	Test port
7	Return — tank
8	Pressure relief valve
9	Lowering brake
10	distance sensor
11	Load holding valve, forwards
12	Pressure control unit measurement connection
13	Bolts
14	Auxiliary hydraulics

Directional control valves

The directional control valve (I) contains the sliders (1) for the lifting and tilting hydraulics.

If no further directional control valves are provided for an auxiliary hydraulics, an end plate is mounted on the tilt slider.

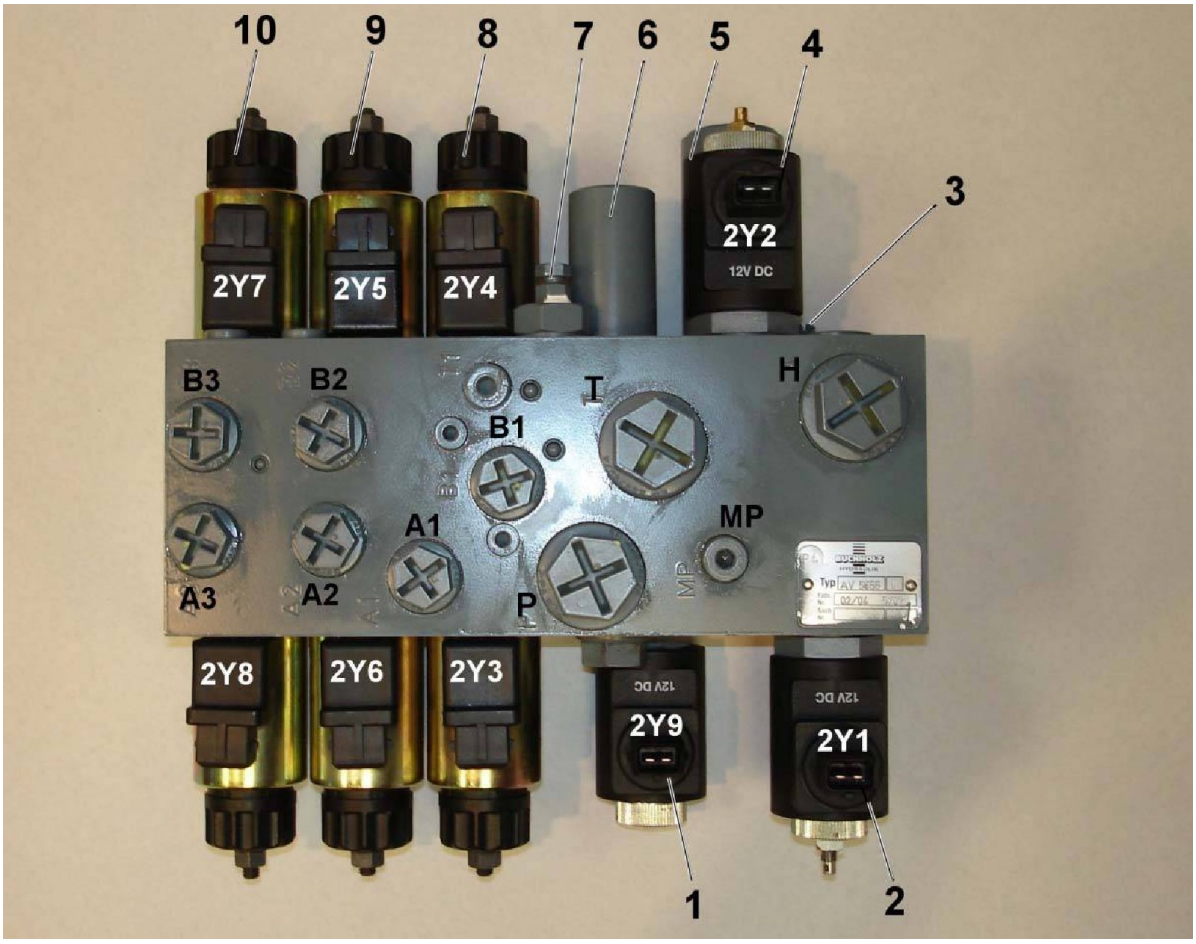
The directional control valves (II) and (III) for the auxiliary hydraulics are identical in function and design.

The directional control valve (III) for the auxiliary hydraulics is designed at the same time as the end plate. If a valve block is equipped with only an auxiliary hydraulics, only the directional control valve (III) is required.

At the measurement connection (6), the pressure of all of the consumers can be measured using a pressure gauge.

As a variant, the directional control valve (III) is equipped with an integrated adjustable pressure control unit for the 1st or 2nd auxiliary hydraulics. In this variant, the adjusted pressure is measured at connection B via the measurement connection (12).

Chassis



Valve block

1	Check valve for hydraulics blocking function
2	Lifting valve
3	Emergency lowering
4	Lowering valve
5	Lowering-balance valve (lowering brake)
6	Inlet pressure balance
7	Pressure relief valve
8	Tilting valve
9	Auxiliary hydraulics 1
10	Auxiliary hydraulics 2

solenoids

2Y1	Lifting
2Y2	Lowering
2Y3	Tilting back
2Y4	Tilt forwards
2Y5	Auxiliary hydraulics 1
2Y6	Auxiliary hydraulics 1
2Y7	Auxiliary hydraulics 2
2Y8	Auxiliary hydraulics 2
2Y9	Check valve for hydraulics blocking function

The valve spools of the directional control valves are controlled by solenoid coils in proportion to the degree of actuation of the joystick, fingertip or mini-lever.

The directional control valves for tilting, auxiliary hydraulics 1 and auxiliary hydraulics 2 are fitted on both sides with solenoid coils.

The upper solenoid coils push the valve spools down and open the connections (B) to the pressure line (P), as well as the connections (A) to the return line (T).

The lower solenoid coils push the valve spools up and open the connections (A) to the pressure line (P), as well as the connections (B) to the return line (T).

Lifting and lowering are activated by separate valve spools that are each controlled by solenoid coils.

The solenoid coil (2Y1) moves the lift valve spool and opens the connection (H) to the pressure line (P).

The solenoid coil (2Y2) pushes on the lowering valve (1) and opens the connection (H) to the return line (T).

Checking the load chains for damage

The load chains must be checked for the following external damage:

- broken joining plates
- broken bolts
- loose and crooked bolts
- surface rust
- stiff joints
- wear and tear, damage to the clamping bolt and end link

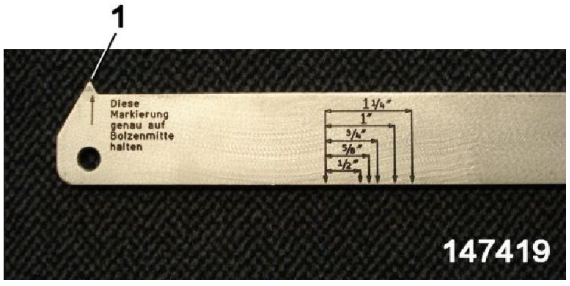
If any of the above-mentioned damage has occurred, the load chain must be changed without delay. If the load chain is damaged, it may break before reaching the permissible elongation.

NOTE

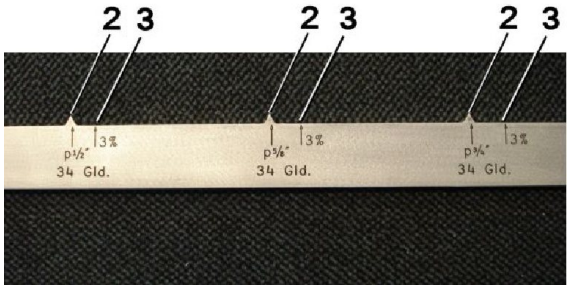
Load chains must always be changed in pairs to guarantee an even load distribution on the two chains. Change the load chains in their entirety, i.e. including clamping bolt and end link. Repairs should not be carried out on the load chains!

Measuring the chain elongation

– Hold the marking (1) on the chain wear gauge against the middle of a chain pin. ▷



– Count off 34 chain links. Depending on the size of the chain, the marking (2) indicates the normal length of 34 chain links. ▷
– The marking (3) indicates the chain length at 3% elongation.



As soon as the specified maximum elongation of 3% has been reached, the load chain must be changed.

Adjusting the load chains Telescopic mast

Removing the load chain

– Park the truck safely.
– Put the lift mast in its vertical position.
– Apply the parking brake.

Middle cylinder end dampener

General

The end dampener hydraulically brakes the piston rod before it reaches its end position when lifting the fork carriage.

The end dampener is located in the piston cover.

Function

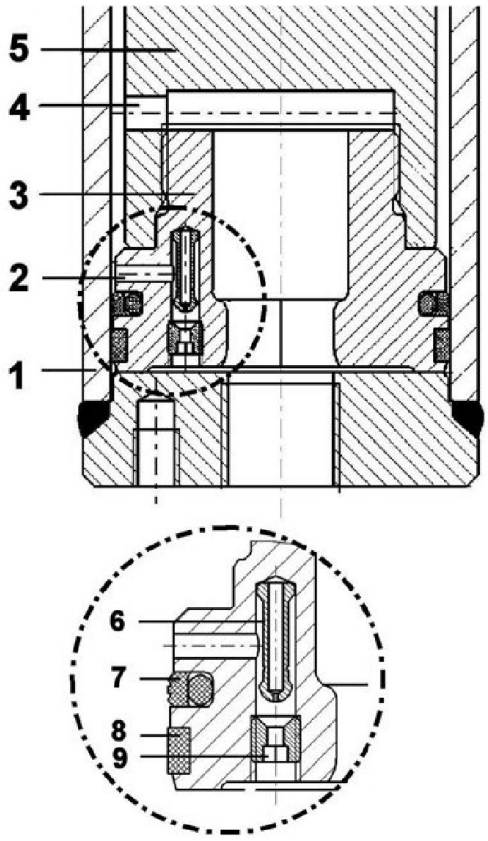
The piston rod (5) extends until the cross hole in the piston rod (4) enters the cylinder head (1). The raise speed is reduced as soon as the cross hole is covered by the cylinder head.

Once the cross hole of the piston rod(4) is entirely covered by the cylinder head, the returning hydraulic oil has no direct return path.

As a result of the increasing pressure in the cross hole inside the cylinder cover (2), the valve piston (6) is forced into contact with the threaded pin (9).

The hydraulic oil flows back throttled by the cross hole (2), the orifice in the valve piston (6) and the threaded pin (9).

This causes the piston rod to undergo hydraulic braking before reaching its end position.



1 Cylinder head
2 Cross hole in piston cover
3 Piston cover
4 Cross hole in piston rod
5 Piston rod
6 Valve piston
7 Piston packing
8 Guide ring
9 Threaded pin

Fork carriage

Fork carriage

Removal

⚠ WARNING

Beware of risk of personal injury and property damage.
Follow the safety instructions in Chapter 001.

– Apply parking brake
– Keep the mast in the vertical position
– Lift the fork carriage and set down on a square timber. ▷

– Lower the inner mast slightly until the load chains become loose.
– Loosen the locking screw on the load chains
– Detach the load chains from the fork carriage
– Lift the inner mast until the fork carriage is free of the inner mast ▷

– Disconnect the battery male connector
– Deposit fork carriage on pallet

Installation

– Place the fork carriage below the inner mast and secure with a hydraulic jack
– Carefully lower the inner mast and advance the fork carriage into the inner mast using the jack

NOTE

If the fork carriage jams in the inner mast during assembly, gently tilt the lift mast back and forth to try to advance the fork carriage into the inner mast.

– Attach the load chains to the fork carriage and secure with the locking screw

Testing

After carrying out work on the fork carriage, the lateral and radial play between the mast profile

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