Description

4 Description

4.1 Overview

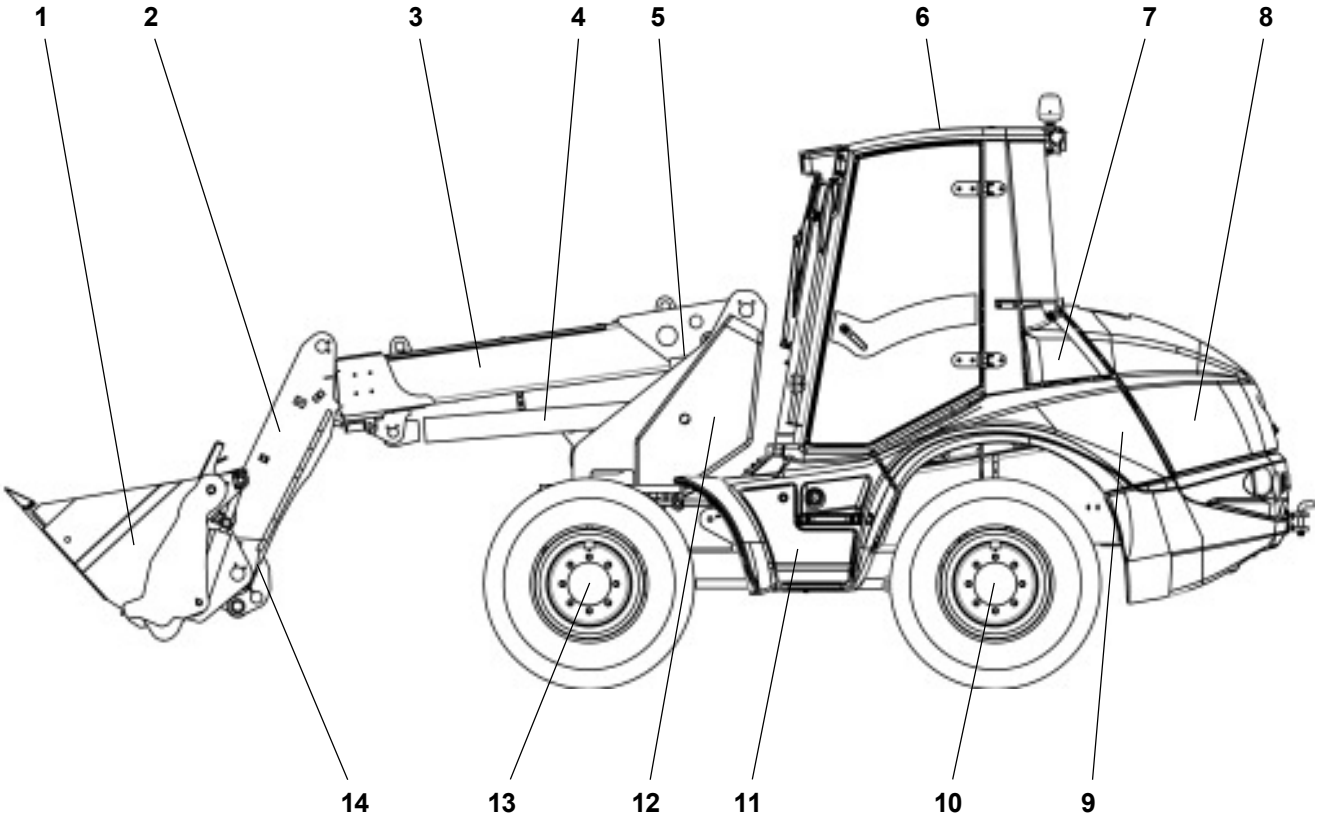

Figure 4-1

1 - Bucket/attachment
2 - Telescope head
3 - Telescope arm
4 - Lift cylinder
5 - Compensation cylinder (right loader side - not shown)
6 - Driver's cab
7 - Battery (right loader side – behind maintenance flap)
8 - Drive motor
9 - Hydraulic oil tank/filler neck (underneath the engine hood)
10 - Rear axle
11 - Tool box
12 - Revolving seat
13 - Front axle
14 - Quick-change device
15 - Fuel tank, steps at right loader side (not shown)

4.2 Loader

4.2.1 Swivel unit and axle support

Two single-acting swivel cylinders are fed by a separate gear-type pump via a servo valve. The revolving seat is connected to the cylinders by a chain drive and is thus completely free of play. Swivelling can be carried out simultaneously with lifting of the telescope arm without mutual interference.
The telescope arm's swivelling radius is 90° to the right or to the left.

CAUTION
Swivelling against the limit stops with the telescope retracted is allowed only when the engine is running at a low speed to prevent damage to the loader.

If the telescope arm is swivelled more than approx. 35°, the axle support system is automatically activated. The load-side support cylinder that affects the rear axle is subjected to hydraulic pressure by the force of the load via the support valve, counteracting the swivelled load.

NOTE
The axle support is deactivated when swivelling back.

4.2.2 Undercarriage

The axial piston pump for the hydraulic drive is driven by the diesel engine. Pressure hoses for extremely high pressure connect the axial piston pump with the axial piston engine. The axial piston engine is directly flanged to the distribution gear of the rear axle (with planetary gear). The distribution gear transmits the torque of the axial piston engine directly to the rear axle and to the front axle (with planetary gear) with a cardan shaft.

CAUTION
The maximum speed of the axial piston engine is governed by settings made at the factory. Any adjustment will render the warranty invalid.

The front and rear axles are equipped with a self-locking differential (locking value 35%).
A self-locking differential (locking value 100%) is special equipment.

4.2.3 Tyres

The following tyres are permitted:

16/70 - 20
400/70 - 20
405/70 R 20

All four tyres are of equal size. For the running direction, if applicable, see Fig. 4-2.

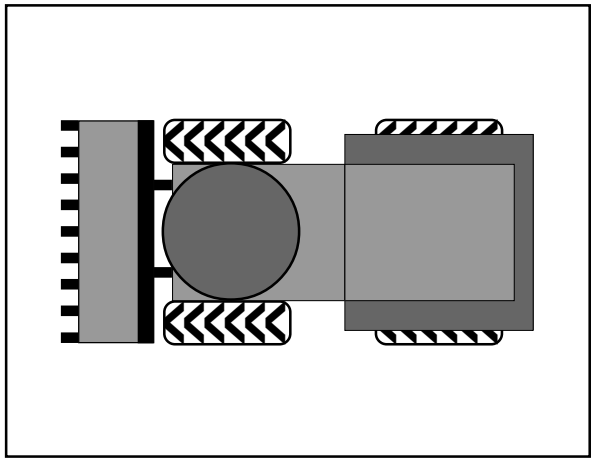

Figure 4-2

4.2.4 Steering system

The power for the hydrostatic steering system is supplied via a priority valve from a gear-type pump. With a minimum of effort on the steering wheel, the oil flow is directed by a steering unit into the steering cylinder.
Four-wheel and rear-wheel steering and crab steering can be selected by way of a toggle valve.

4.2.5 Emergency steering

The hydrostatic steering system can also be used in a limited way if the diesel engine fails. The loader can be steered using a considerable amount of manual effort.

NOTE

See chapter 7, “Towing the loader”.

4.2.6 Air filter device

Dry air filter device with safety cartridge and dust discharge valve.

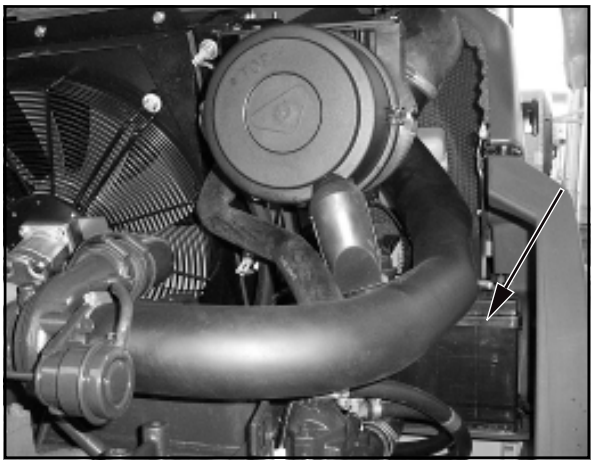

Figure 4-3

4.2.7 Battery

The motor compartment on the right side of the loader contains a maintenance-free battery (4-3/arrow) according to DIN with an increased cold start performance. The battery is to be kept clean and dry. Lightly grease the terminals with acid-free and acid-resistant grease.

CAUTION

Electric welding operations may only be performed if the battery main switch (8-42/1) has been pulled out.

4.2.8 Fuel supply system

The fuel tank is located on the right frame side bar. An electrical fuel gauge (4-16/23) in the operator’s cabin monitors the fuel level in the tank. The filler neck (4-4/arrow) is located on the right side in the cabin access area.

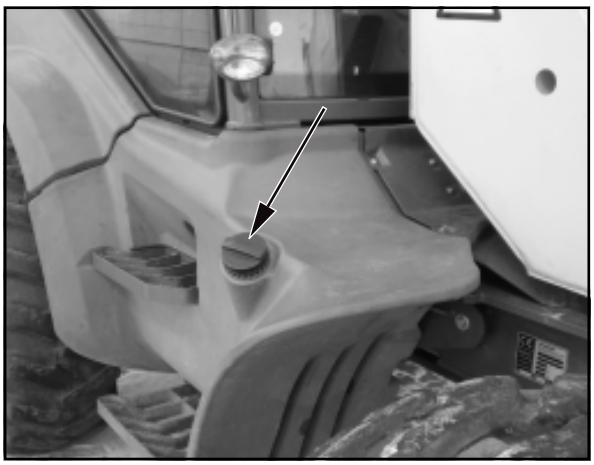

Figure 4-4

4.2.9 Lift, tip and telescoping devices

Via a servo valve a double-acting gear-type pump drives
- one lift cylinder
- one tip cylinder
- a telescope cylinder (a compensation cylinder)

All movements of the telescope arm, the telescope, the bucket, the attachments and the quick-change device are controlled from the operator’s seat by pilot valves. These pilot valves provide continuous speed control from “slow” to “fast”.

4.2.10 Bucket position indicator

In the dashboard there is an indicator lamp (4-5/arrow) indicating when the bucket floor is parallel to the ground.

NOTE
With the indicator lamp lit permanently, the bucket floor is parallel to the ground.

Figure 4-5

4.2.11 Floating position

The loader features a floating position. It is activated by moving the hand lever for working and auxiliary hydraulics (4-12/1) beyond its pressure point to the frontmost position. The hand lever remains engaged in this position until it is pulled back.

DANGER
The floating position may only be activated when the bucket is in the lowermost position.

Figure 4-6

4.2.12 Lifting device suspension(option)

When the loader must be driven over larger distances, especially with a loaded bucket, the lifting device suspension (4-6/arrow) should be activated to avoid resonant motion. This becomes even more important with increasing unevenness of the terrain and increasing speed of the loader.

4.2.13 Pipe break protection(option)

A pipe break safety valve is installed underneath the lift and tip cylinder. In the event of a pipe or hose break in the lift and/or tip system, the movements of the bucket arm and the tipping rod are blocked until the damage is repaired.

4.2.14 Dump interlock

The loader is equipped with an automatic dump interlock as series feature. This is to prevent tipping over in the upper lifting range when operating, for example, a bucket or fork-lift attachment.
In certain situations, it is feasible to further tilt up the attachment (e.g. lifting hook or front-end excavator) to extend the range of motion of the attachment, for example. This will also increase the payload and last but not least the lifting height.
Actuating toggle switch 4-12/3 disables the automatic dump interlock.

DANGER
Set the toggle switch „Dump interlock“ (4-12/3) back to its original position when work is finished. The automatic dump interlock is enabled again.

4.2.18 Equipment

4.2.18.1 Operator's cabin

Spacious ROPS panorama cabin with two lockable side doors for fully fledged entry and exit on both sides. The spacious doors opening up to 180° can be locked within the vehicle contour in two positions (gap or 180°). Tinted windows, parallel operating front wipers for maximum field of view, rear screen wiper, front and rear screen washers, entirely heatable rear screen, 2 large hinged, engaging external rear-view mirrors, tinted rooflight, height and inclination adjustable steering column, ergonomic adjustable joystick controls, sunshade, heater and fresh air system with external air filter and recirculating air function, coat hook and numerous oddment trays.

4.2.18.2 Driver's seat

Multi-position driver's seat [longitudinal adjustment of seat, longitudinal adjustment of seating area, seating area inclination, backrest inclination, armrest(s)] with weight-controlled, mechanic suspension and safety belt.

4.3 Wheel change

(1) Park the loader on a hard surface.
(2) Set the drive switch (4-13/3) to "0".
(3) Apply the parking brake (4-14/2).

(4) When changing a wheel on the front axle:
Lift and mechanically prop up the bucket arm [e.g. by inserting the bucket arm support (option) (1-1/arrow)] and lower the bucket arm until it rests on the bucket arm support.
(4) When changing a wheel on the rear axle:
Lower the attachment to the ground.

(5) Turn the ignition key (4-12/5) to the left to position "0".
(6) Secure the hand lever for the working and auxiliary hydraulics (4-12/1, 4-12/2).
(7) Ensure that the loader does not roll away by securing it on one of the wheels of the axis in both driving directions. The wheel that does **not** have to be changed is to be secured.
(8) Loosen the wheel nuts of the wheel to be changed so that they can be turned manually.
(9) Fit a suitable jack (minimum capacity 2.0 tons) from the side under the axle bridge in the vicinity of the axle fixture so that it is centred and cannot slip (4-9). Lift the front/rear axle until the wheel does not have any contact to the ground.

DANGER
- Secure the jack by a suitable support to prevent it from sinking into the ground.
- Make sure that the jack is fitted correctly.

(10) Loosen the wheel nuts completely and remove them.

(11) Lower the loader slightly with the jack until the wheel bolts are free.

(12) Push the wheel from the wheel hub by moving it back and forth. Remove the wheel and roll it aside.

(13) Mount the new wheel onto the planetary axle.

NOTE
- Pay attention to the profile position.
- If the profile position of the spare tyre does not fit, the spare tyre may only be used temporarily until a suitable tyre can be fitted.

(14) Tighten the wheel nuts by hand.

(15) Lower the front/rear axle using the jack.

(16) Tighten the wheel nuts to 500 Nm with a torque wrench.

CAUTION
Retighten the wheel nuts after the first 8-10 operating hours.

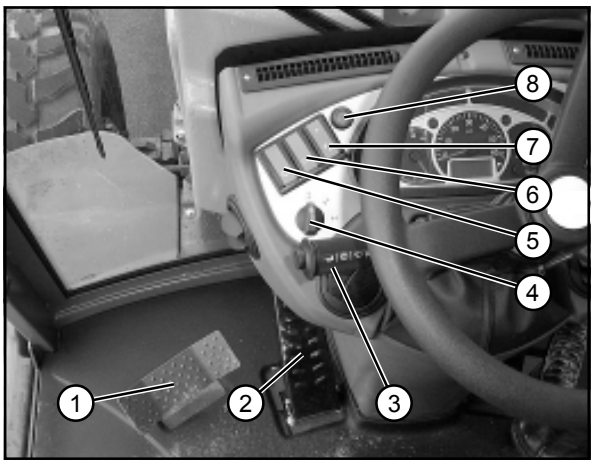

Figure 4-10

4.4 Controls

1 - Swivelling pedal
2 - Inching pedal

NOTE
Acting as a brake in the last part of the pedal travel.

3 - Steering column switch
- to the front: Turn signal, right
- to the rear: Turn signal, left
- down - Dipped beam
- centre - High beam
- up - Headlamp flasher
- Push button - Signal horn
- Turn, step 1: Windshield wiper, front
- Turn, step 2: Front windshield wiper fast
- Turn, step 3: Interval windshield wiper, front
- Push upper ring in axial direction: Windshield washer, front

4 - Steering type switching
- to the left - four-wheel steering
- centre position - rear-axle steering
- to the right - Crab steering

NOTE
For close-to-edge working.

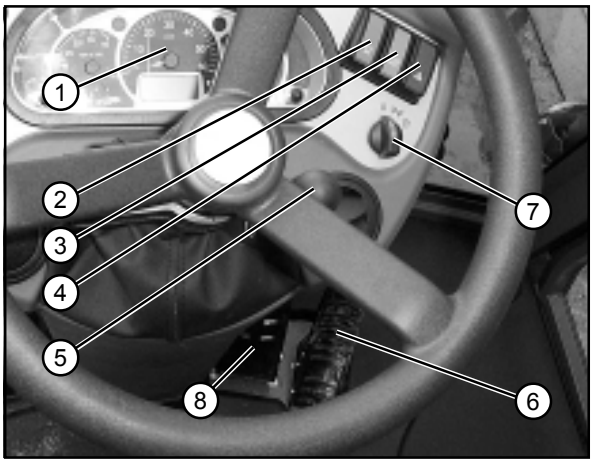

Figure 4-11

5 - Toggle switch for rear wiper/washer
6 - Toggle switch for rear window heater
7 - Button for release of quick-change device
8 - Bucket position indicator

NOTE
With the indicator lamp lit permanently, the bucket floor is parallel to the ground.

1 - Multifunction panel (see chapter 4.4.1 Fig. 4-16)
2 - Toggle switch for warning beacon (option)
3 - Toggle switch for work lights
- Position 1: front
- Position 2: front and rear

4 - Toggle switch for hazard flasher system
5 - Lock lever for steering column adjustment
- to the front/rear
- in axial steering column direction

6 - Accelerator
7 - Switch for lights
- left - Lights off
- centre - Parking light
- right - Dipped beam

8 - Service brake pedal

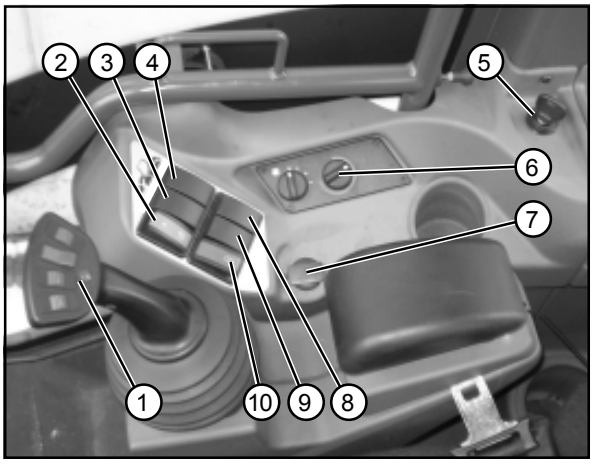

Figure 4-12

1 - Pilot valve for working and auxiliary hydraulics
2 - Toggle switch for switching off pilot control
3 - Toggle switch for dump interlock
4 - Toggle switch for permanent auxiliary hydraulics (option)
5 - Starter switch
6 - Air-conditioning system (option)/heater
7 - 2-pole socket
8 - Button for fan reversal unit (option)
9 - Toggle switch for switching rear axle support (option)
10 - Toggle switch for lifting device suspension (option)

1 - Gear shift
  - 2nd gear
  - 1st gear
  - Alpha max. (turtle symbol)
2 - Actuation of auxiliary hydraulics, 1st circuit:
  - Press upper switch half
    - Lock attachment
    - Close multipurpose bucket
  - Press lower switch half
    - Unlock attachment
      » in conjunction with 4-10/7 «
    - Open multipurpose bucket
3 - Drive switch: forward/0/reverse
4 - Actuator for differential lock (option)
5 - Actuator for telescope cylinder
  - Turn handwheel to the front:
    Extend telescope
  - Turn handwheel to the rear:
    Retract telescope
6 - Actuator for auxiliary hydraulics: 2nd circuit
  - Turn handwheel to the front:
    - Swivel out front-end excavator stick
    - Turn grab bucket in counter clockwise direction
  - Turn handwheel to the rear:
    - Swivel in front-end excavator stick
    - Turn grab bucket in clockwise direction
7 - Console adjustment: pilot valve for working and auxiliary hydraulics

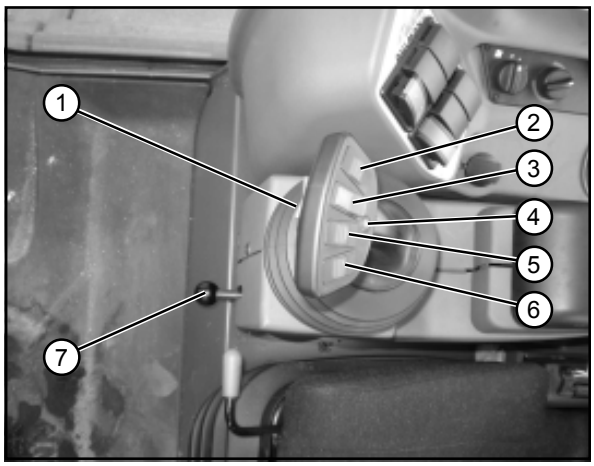

Figure 4-13

1 - Storage compartment
2 - Hand lever for parking brake

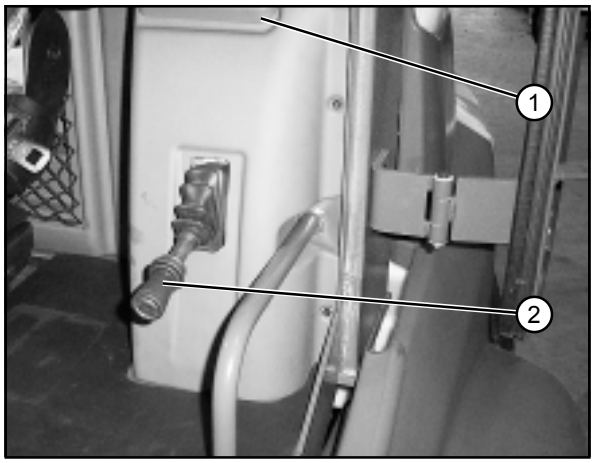

Figure 4-14

1 - Bowden cable for door
(pull Bowden cable = unlock stay device)
2 - Sliding side windows
(with lock/unlock device)
3 - Door stay device
(press door stay device = unlock stay device)
4 - Door opener (close door)

Figure 4-15

4.4.1 Multifunction panel (4-11/1)

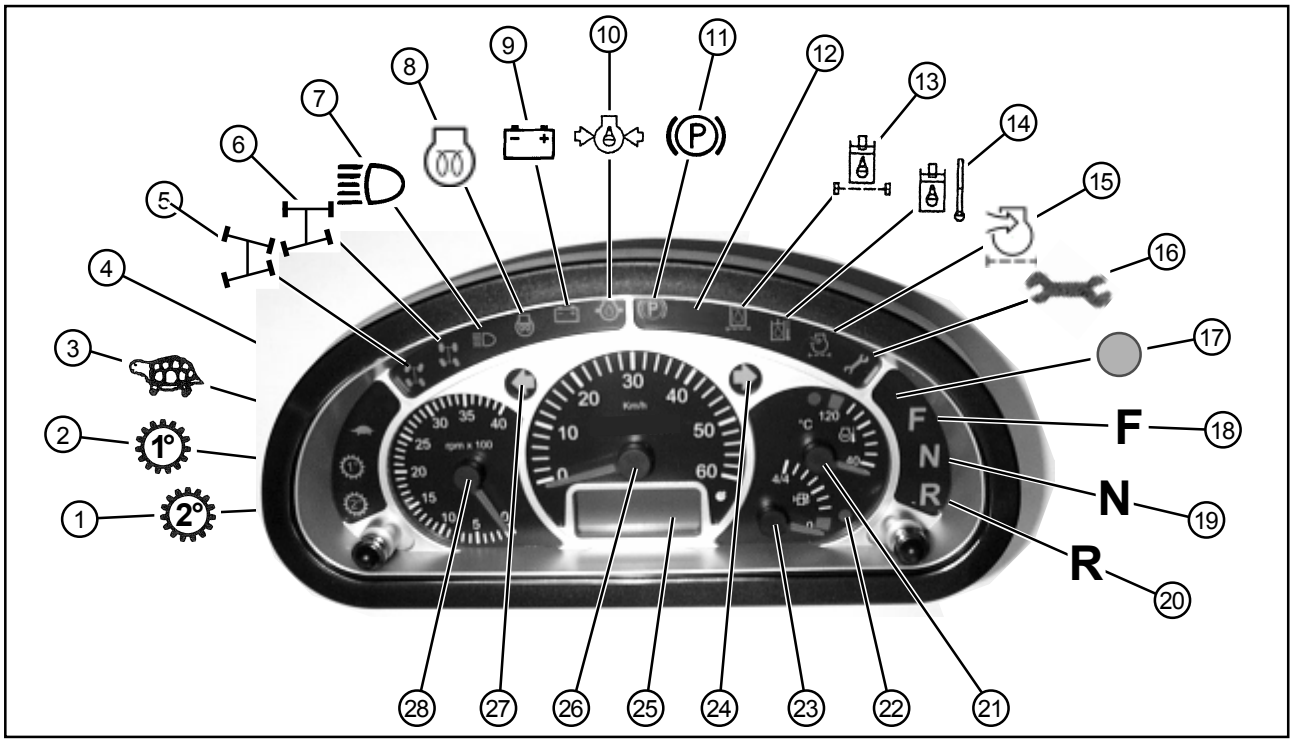

Figure 4-16

1 - Indicator lamp: 2nd gear
2 - Indicator lamp: 1st gear
3 - Indicator lamp: "Alpha max." gear
4 - free
5 - Indicator lamp: four-wheel steering
6 - Indicator lamp: rear-axle steering
7 - Indicator lamp: High beam
8 - Indicator lamp: Preheating
9 - Battery charge indicator lamp
10 - Indicator lamp: Engine oil pressure
11 - Indicator lamp: Parking brake
12 - free
13 - Hydraulic oil filter clogging indicator
14 - Warning lamp: hydraulic oil temperature
15 - Air filter clogging indicator
16 - Warning lamp: water in fuel filter (chapter 8.2.4.1)
Cooling water temperature (chapter 8.2.1.2, maintenance plan item 1.7)
17 - Indicator lamp: Differential lock
18 - Indicator lamp: Travel direction "forward"
19 - Indicator lamp: Travel direction "0-position"
20 - Indicator lamp: Travel direction "reverse"
21 - Coolant temperature gauge
22 - Indicator lamp: Fuel on reserve
23 - Fuel gauge
24 - Indicator lamp: Turn signal "right"
25 - Operating hours counter and digital clock
26 - Tachometer (fast loader)
27 - Indicator lamp: Turn signal "left"
28 - RPM meter

4.4.2 Fuses/relays

NOTE

The fuses/relays are located on the right side of the loader. Open and lock the driver's cab door. Unscrew the fastening screws (4-17/ arrows) of the cover and remove the cover.

Figure 4-17

Type 1:

1 - Interval timer (K1)
2 - ECU steering switch
3 - Relay for gear shift (K5) (fast loaders)
4 - Turn signal relay
5 - Acoustic buzzer/hydraulic oil temperature
6 - Relay for front working lights (K4)
7 - Timer relay for dump interlock (K24)
8 - Maxi relay (K25) (power supply)

Fuses:

1 -	Hazard flasher	15.0 A
2 -	Warning beacon (opt.), 2-pole socket	10.0 A
3 -	Working lights, front	20.0 A
4 -	Working lights, rear	15.0 A
5 -	Traction drive, steering	20.0 A
6 -	Hydraulics	20.0 A
7 -	Turn indicator	7.5 A
8 -	Windshield wiper/washer front/rear	20.0 A
9 -	Rear window heater	20.0 A
10 -	Heater fan motor	20.0 A
11 -	Brake lights	5.0 A
12 -	Engine shut-off	5.0 A
13 -	Parking light, left; tail light, left	5.0 A
14 -	Parking light, right; tail light, right	5.0 A
15 -	Dipped beam	15.0 A
16 -	High beam	15.0 A

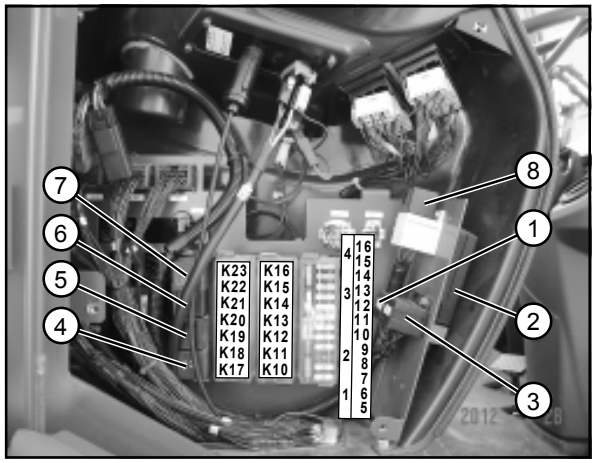

Figure 4-18

Relays:

K10 - Traction drive cut-out
K11 - Differential lock
K12 - Alpha max.
K13 - Power adjustment, forward
K14 - Power adjustment, reverse
K15 - Start-up interlock
K16 - Fan control
K17 - Dump interlock
K18 - Dump interlock
K19 - free
K20 - 2. auxiliary hydraulics circuit (opt.)
K21 - 2. auxiliary hydraulics circuit (opt.)
K22 - 1. auxiliary hydraulics circuit
K23 - 1. auxiliary hydraulics circuit

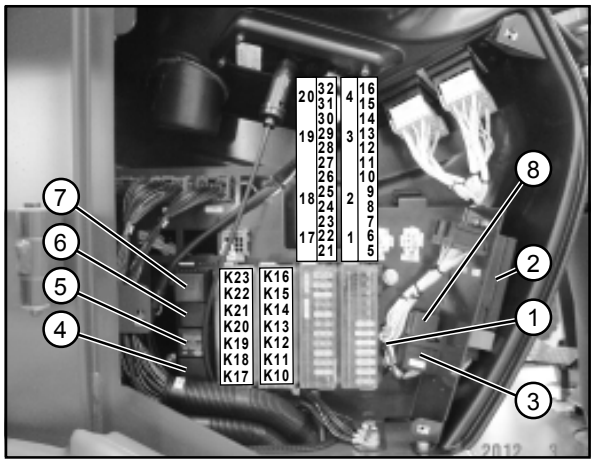

Figure 4-18

Type 2:

1 - Interval timer (K1)
2 - ECU steering switch
3 - Relay for gear shift (K5) (fast loaders)
4 - Turn signal relay
5 - Acoustic buzzer/hydraulic oil temperature
6 - Relay for front working lights (K4)
7 - Timer relay for dump interlock (K24)
8 - Maxi relay (K25) (power supply)

Fuses:

1 -	4	free
5 -	Traction drive	15,0 A
6 -	Steering	20,0 A
7 -	Hydraulics	20,0 A
8 -	Windshield wiper/washer front/rear	20,0 A
9 -	Rear window heater	20,0 A
10 -	Heater fan motor	20,0 A
11 -	Engine shut-off	10,0 A
12 -	18	free
19 -	Working lights, front	20,0 A
20 -	Working lights, rear	15,0 A
21 -		free
22 -	Drive-away interlock	5,0 A
23 -	2-pole socket	15,0 A
24 -	Radio, Interior lighting	5,0 A
25 -	Warning beacon (opt.)	10,0 A
26 -	Hazard flasher	15,0 A
27 -	Turn indicator	7,5 A
28 -	Brake lights	5,0 A
29 -	Parking light, left; tail light, left	5,0 A
30 -	Parking light, right; tail light, right	5,0 A
31 -	Dipped beam	15,0 A
32 -	High beam	15,0 A

Relays:

K10 - Traction drive cut-out
K11 - Differential lock
K12 - Alpha max.
K13 - Power adjustment, forward
K14 - Power adjustment, reverse
K15 - Start-up interlock
K16 - Fan control
K17 - Dump interlock
K18 - Dump interlock
K19 - free
K20 - 2. auxiliary hydraulics circuit (opt.)
K21 - 2. auxiliary hydraulics circuit (opt.)
K22 - 1. auxiliary hydraulics circuit
K23 - 1. auxiliary hydraulics circuit

Type 3:

Relays:

K1 - Windshield wiper/washer/interval timer
K2 - Turn signal relay
K3 - Buzzer
K4 - Timer (option)
K5 - Working lights, front
K6 - Working lights, rear (option)
K7 - Interrupt telescoping
K10 - Traction drive
K11 - Differential lock (option)
K12 - Alpha max.
K13 - Power control: forward
K14 - Power control: reverse
K15 - Start-up interlock
K16 - Fan control
K17 - Dump interlock (option)
K18 - Dump interlock (option)
K19 - Air-conditioning system (option)
K20 - 2nd auxiliary hydraulics circuit – CLOSED - (option)
K21 - 2nd auxiliary hydraulics circuit – OPEN - (option)
K22 - 1st auxiliary hydraulics circuit – CLOSED - (option)
K23 - 1st auxiliary hydraulics circuit – OPEN - (option)
K24 - Transmission controller PLC (fast loader only)
K25 - Telescoping PLC
K26 - Swivelling
K27 - High current relay (12 V/120 A)
K28 - Working platform preparation (option)
ECU - Steering system controller

Fuses:

F1 - Traction drive	10.0	A
F2 - Steering	7.5	A
F3 - Hydraulics	20.0	A
F4 - Windshield wiper/washer	20.0	A
F5 - Rear window heater	20.0	A
F6 - Heating/air condition	20.0	A
F7 - Engine shut-off, fuel pump	10.0	A
F8 - Working lights, front	15.0	A
F9 - Working lights, rear	15.0	A
F10 - Drive-away interlock	5.0	A
F11 - Socket	15.0	A
F12 - Radio/interior lighting	5.0	A
F13 - warning beacon (opt.)	15.0	A
F14 - Hazard flasher	15.0	A
F15 - Turn indicator	7.5	A
F16 - Brake lights	5.0	A
F17 - Parking light, left	5.0	A
F18 - Parking light, right	5.0	A
F19 - Dipped beam	15.0	A
F20 - High beam	15.0	A
F21 - F24 - Spare		

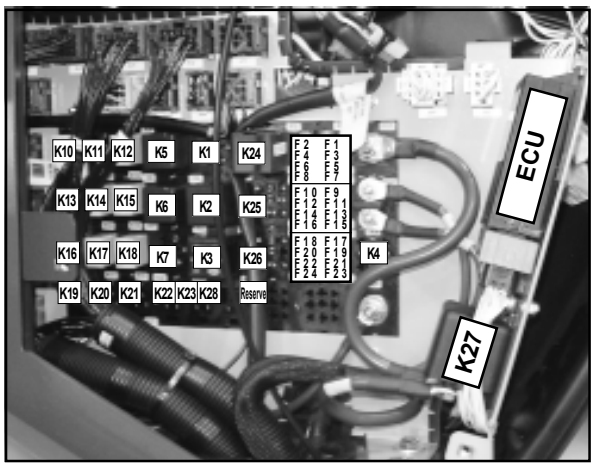

Figure 4-18

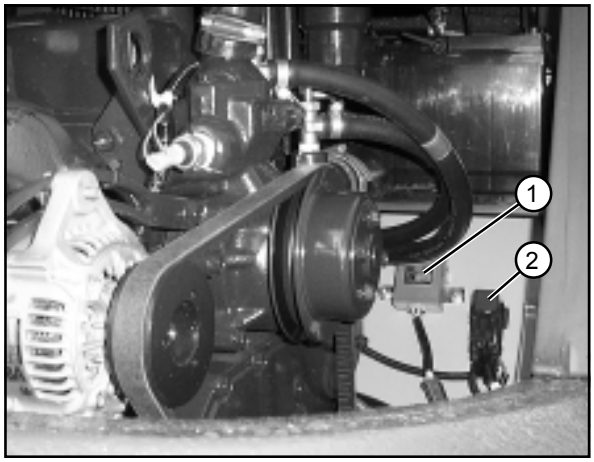

Figure 4-19

1 - Glow start controller
2 - Glow start system relay

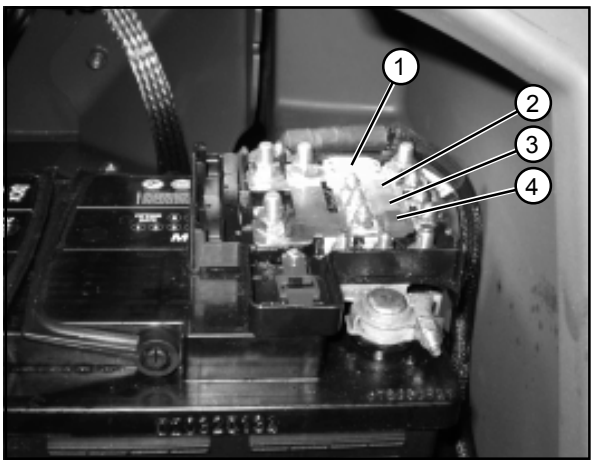

Figure 4-20

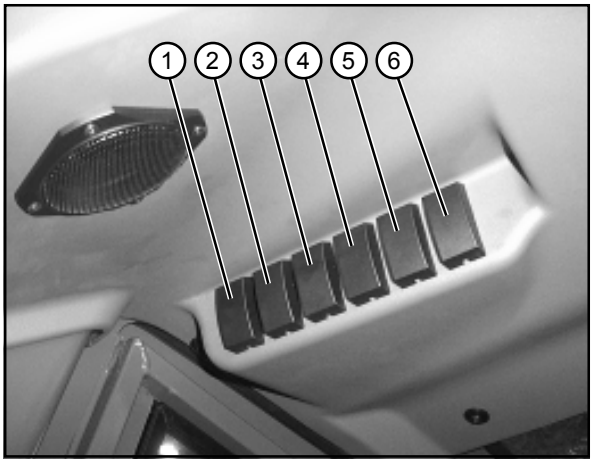

Figure 4-21

1 - Maxi fuse (100 A): Glow start system
Maxi fuse (250 A): Glow start system 63 kW engine
2 - Main fuse (100 A): Loader electrics
3 - Main fuse (30 A): Loader electrics
4 - Main fuse (50 A): Loader electrics

4.4.3 Controls at the driver's cabin ceiling

NOTE

The controls (toggle switches/pushbuttons) are located immediately above the driver's seat (4-20).

1 - Toggle switch with dual lock for "high flow" hydraulics (opt.)

NOTE

- Actuating this toggle switch adds the performance (oil flow rate) of the swivel pump to the working/auxiliary hydraulics.
- You must switch off the "high-flow" hydraulics function when driving on public roads.

2 - Toggle switch with dual lock for permanent activation of rear hydraulics (option)
3 - Double pushbutton for rear attachments (rear power lift) (opt.)
- Press upper switch half - Lower rear power lift
- Switch pressed in the lower half - Lift rear power lift
4 - Toggle switch for rear attachment (rear PTO shaft) (opt.)
5 - Toggle switch for releasing the swivel restriction (option)
6 - Toggle switch for releasing the overload cut-off (option)

4.5 Swivel restriction

The loader is equipped with a swivel restriction that prevents swivelling by more than 30° to the left and right while the telescope is extended. This swivel restriction can be enabled or disabled with a toggle switch in the dashboard (4-20/5).

1. With swivel restriction enabled:

- Swivelling by 90° to the left and right is possible while the telescope is retracted.
- When the telescope arm is swivelled by more than 30° to the left or right, the telescope can be extended only if the swivel restriction is disabled.
- Swivelling by 30° to the left and right is possible while the telescope is extended.

2. With swivel restriction disabled:

- Swivelling by 90° to the left and right is possible for all telescope positions.
- When the telescope is extended and the telescope arm is swivelled by more than 30° to the left or right and the swivel restriction is enabled in this position, only safe working movements are possible.
- Retract telescope and
- swivel to a straight forward position.

DANGER

Disable the swivel restriction for light levelling work only.

4.6 Gear shift

4.6.1 Slow loader » 20 km/h «

For the slow loader, you can choose between the hydraulic drive stages “I” (Alpha max.) and “II” (4-13/1).

Speed range in			
drive stage “I” (Alpha max.)	0	up to	5 km/h
drive stage “II”	0	up to	20 km/h

In the multifunction panel (4-16), the indicator lamp of gear stage “I” (4-16/2) lights up with both gear stages, and with gear stage “I”, the indicator lamp “Alpha max” (4-16/3) lights up additionally.

4.6.2 Fast loader » 40 km/h «

For the fast loader, you can choose between gear stages “1” and “2”, and in both gear stages between the hydraulic drive stages “I” (Alpha max.) and “II” (4-13/1).

Speed range in			
Gear stage “1”, drive stage “I”	0	up to	5 km/h
Gear stage “1”, drive stage “II”	0	up to	17 km/h
Gear stage “2”, drive stage “I”	0	up to	11 km/h
Gear stage “2”, drive stage “II”	0	up to	40 km/h

In the multifunction panel (4-16), the indicator lamp of gear stage “I” (4-16/2) lights up with gear stage “1” selected, and the indicator lamp of gear stage “2” (4-16/1) lights up with gear stage “2” selected. With drive stage “I” selected, the indicator lamp “Alpha max” (4-16/3) lights up additionally with any of the two gear stages selected.

To change the gear stage, set the drive switch (4-13/3) to “0” and the gear switch (4-13/1) to “2” or “1” (depending on the gear stage the gear switch was in before changing).

NOTE

- The gear stage engages approx. 5 seconds after the loader has come to a standstill.
- When the engine is restarted, the gear stage selected at engine shut-down will be selected again.

To change the hydraulic drive stage, set the drive direction switch to “Forward” or “Reverse” before actuating the gear switch (4-13/1).