3 Operating and control elements on the dashboard and in the driver's cab

1 Push-button signal horn
2 Adjustable heating nozzle
3 Fuse box (refer also to it. 14 and 17)
4 Pilot valve for working hydraulics
5 Hand lever for gear shifting
6 Hand lever for parking brake
7 Accelerator
8 Compensation tank for brake fluid
9 Brake pedals (mechanically connected)
10 Swivel pedal (mechanically connected to it. 12)
11 Pull switch "engine stop"
12 Hand lever for swivel operation (mechanically connected to it. 10)
13 Pilot valve for attachments
14 Fuse box (refer also to it. 3 and 17)
15 Commutator switch "forward - reverse"

16 Socket 24 V
17 Fuse box - drive
18 Speedometer (no standard equipment)
19 Fuel indicator
20 Combi-instrument

a)	Working hour meter		
b)	Parking brake	red	)
c)	Direction flasher	green	)
d)	Main beam	blue	)
e)	Warning light for crane hook	red	) Pilot
f)	Load control	red	) lights
g)	Not connected		)
h)	Oil pressure	red	)
k)	Hydraulic oil tank plug	red	)

21 Engine temperature indicator
22 Toggle switch for warning signal flasher
23 Toggle switch for working headlights, front
24 Toggle switch for working headlights, rear
25 Toggle switch for windscreen wipers, front
26 Toggle switch for windscreen wipers, rear
27 Toggle switch for flashing alarm lamp (no standard equipment)
28 Turn switch for heater/fan
29 Push-button "start" for KHD-engine; pull switch for Perkins engine
30 Direction indicator (flashlight)
31 Ignition-light switch
32 Differential pressure gauge for filter/ hydraulic oil)
33 Shut-off valve for suction basket hydraulic oil tank) outside driver's
34 Control switch for shut-off valve (interruption of drive)) cab rear
35 Vacuum indicator (at the air filter of the diesel engine)

Operation of shovel or attachments

Working with mounted shovel

Pilot valve (15/4) in direction A = lowering of shovel arm
Pilot valve (15/4) in direction B = lifting of shovel arm
Pilot valve (15/4) in direction C = tilting of shovel arm
Pilot valve (15/4) in direction D = dumping of shovel arm

Working with mounted crane hook

Pilot valve (15/4) in direction A = lowering of shovel arm
Pilot valve (15/4) in direction B = lifting of shovel arm
Pilot valve (15/4) in direction C = pulling of crane hook
Pilot valve (15/4) in direction D = tipping of crane hook

Working with mounted fork-lift attachment

Pilot valve (15/4) in direction A = lowering of shovel arm
Pilot valve (15/4) in direction B = lifting of shovel arm
Pilot valve (15/4) in direction C = tilting of fork-lift attachment (prongs)
Pilot valve (15/4) in direction D = tipping of fork-lift attachment (prongs)

Working with mounted grab

Pilot valve (15/4) in direction A = lowering of shovel arm
Pilot valve (15/4) in direction B = lifting of shovel arm
Pilot valve (15/4) in direction C = lifting of shovel arm extension
Pilot valve (15/4) in direction D = lowering of shovel arm extension

Pilot valve (15/13)
for attachment in direction A = opening of grab

Pilot valve (15/13)
for attachment in direction B = closing of grab

Pilot valve (15/13)
for attachment in direction C = turning of grab around the vertical axis to the left

Pilot valve (15/13)
for attachment in direction D = turning of grab around the vertical axis to the right

Working with mounted hoe

Pilot valve (15/4) in direction A = lowering of shovel arm
Pilot valve (15/4) in direction B = lifting of shovel arm
Pilot valve (15/4) in direction C = lifting of boom
Pilot valve (15/4) in direction A = lowering of boom

Pilot valve (15/13)
for attachment in direction A = pulling in of shaft

Pilot valve (15/13)
for attachment in direction B = extension of shaft

Pilot valve (15/13)
for attachment in direction C = tilting of hoe
Pilot valve (15/13)
for attachment in direction A = dumping of hoe

Working with mounted multi-purpose shovel

Pilot valve (15/4) in direction A = lowering of shovel arm
Pilot valve (15/4) in direction B = lifting of shovel arm
Pilot valve (15/4) in direction A = tilting of shovel
Pilot valve (15/4) in direction A = dumping of shovel
Pilot valve (15/4) in direction A = opening of shovel bottom
Pilot valve (15/4) in direction A = closing of shovel bottom

Swivelling of shovel arm

Swivel pedal (15/10) to the left = shovel arm swings to the left
Swivel pedal (15/10) to the right = shovel arm swings to the right

NOTE
Combined motions are possible; e.g. simultaneous lifting and swivelling.
The shovel unit may also be swivelled by operating the swivel lever (15/12) with the left hand, in case the left foot is used to brake or stop the swing shovel loader at the flank of a hill.

In case the swing shovel loader is not continuously moved during operations with the grab or hoe, the parking brake (15/6) is to be applied during operation.
When work is interrupted, the shovel or the attachment is to be lowered to the ground and the parking brake applied.

3.1 Commissioning

3.2 Starting of the diesel engine (KHD-engine)

(1) Put hand lever for parking brake (Fig. 15/6) in position "locked".

(2) Put direction switch (Fig. 15/15) in neutral position.

(3) Insert ignition key into ignition/light switch (Fig. 16/31) and turn it to the right into position "1" (generator warning lamp and warning lamp for engine oil pressure will light up).

(4) Kick down accelerator (Fig. 15/7) for about 1/3 of its travel.

(5) Press push-button "start" (Fig. 16/29). As soon as the engine ignites, release push-button and put accelerator to low speed position. Warning lamps for generator and engine oil pressure are extinguished.

ATTENTION
The maximum operating time of the starter is 10 s. If the engine does not start, repeat starting process after 1 minute.

3.3 Starting of the diesel engine with starting aid (Perkins engine)

(1) Start the diesel engine as described in section 3.2 point 1 - 4.

(2) Pull pull switch "start" (Fig. 16/29) up to the first catch (heating unit operated). Maintain temperatures below 0 °C for abt. 30 s and then pull out the switch up to the limit stop (starting process). At temperatures above 0 °C the heating process can be deleted.

3.4 Heating and ventilation system for KHD-engine

Technical data:
- Eberspächer D 1 L
- Diesel fuel abt. 0.3 l/h
- Voltage 24 V
- Heating capacity abt. 7530 kJ/h (1800 W)

The unit may be used as heating as well as ventilation system.

Commissioning:

(1) Turn the turn switch (Fig. 18)
- Position = fresh air supply
- Position = fan with heating (red field)

The pilot lamp in the turn switch (arrow) lights up in both positions.

(2) The hot or fresh air may be lead against the front windscreen through the defroster nozzle or simultaneously to the foot space. Adjust the defroster nozzle accordingly.

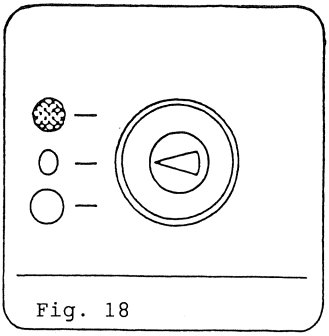

Fig. 18

Failures of the heating or fresh air unit may be removed by repeated commissioning as described above.

In case the heater does not ignite, check the fuse at the heating unit below the protecting cap or replace it, if necessary.

Putting out of operation

The unit is put out of operation when the turn switch (Fig. 18) is set to position "0".

NOTE
Maintain current supply for about 3 minutes when putting the unit out of operation. Do not interrupt current supply from accumulator.

CAUTION
Do not operate heating unit in closed rooms or during refueling.

3.5 Heating and ventilation system of Perkins-engine

Technical data:
- Aurora cab heating
- DK 242/255
- Voltage 24 V
- Heating capacity 7530 kJ/h (1800 W)

Commissioning:

Open shut-off valve (19/1). Hot cooling water of the engine passes the heater. Pull the pull switch (19/2). The fan feeds the hot air through the defroster nozzle to the front windscreen or simultaneously to the foot space through the air flap (Fig. 19/3).

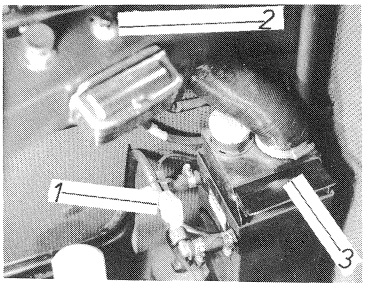

Fig. 19

3.6 Lighting system

The lighting system is switched by means of the ignition key inserted into the ignition/light switch (Fig. 16/31).

Position P = parking position - parking light switched on
Position O = Off
Position I = Electric system switched on
Position II = Position "I" and parking light switched on
Position III = Position "I", "II" and low beam switched on
Position IV = Position "I", "II", "III" and main beam switched on

The working headlights are switched by toggle switch (Fig. 16/23 and 16/24).

Electric fuses

Fig. 20

A - 1 Taillight, left
2 Taillight, right
3 Side marker lamp, left (parking light)
4 Side marker lamp, right
5 Low beam, left
6 Low beam, right
7 Main beam, left
8 Main beam, right

B - 1 Warning signal flasher
2 Flashlight
3 -
4 Signal horn
5 Instrument and indicator lamp
6 Heater
7 Windscreen wiper
8 Brake light

3.7 Operations for driving with the swing shovel loader

(1) Diesel engine is initiated as described in item 3.2 or 3.3,
(2) Preselect travelling direction (Fig. 15/15),
(3) Release parking brake (Fig. 15/6),
(4) Insert working or transport speed (Fig. 15/5),
(5) Operate accelerator (Fig. 15/7).

Swing shovel loader starts. Travelling speed is determined by the position of the accelerator.

NOTE

The direction switch may be operated during travelling. It is recommended not to switch from "forward" to "reverse" at high travelling speeds.

3.8 Operations for working with the swing shovel loader

Driving with the swing shovel loader is not problematic. The swing shovel loader may be used at working speed and at travelling speed from standstill to maximum speed. The gear is chosen in dependence of the operation.

ATTENTION

The gear shift must be used at standstill only.

The driving speed or the propulsive force of the gear inserted is achieved by kicking down the accelerator only. If a slope is to be climbed, the speed decreases to the benefit of the propulsive force despite of full throttle. The highest propulsive force is achieved with working speed at a travelling speed of nearly "0 km/h".

Propulsive forces and driving speeds are equal for "forward" and "reverse" motion.

CAUTION

If in special cases driving with slewed shovel arm is unavoidable for short distances, keep shovel or attachment directly above the tyre.

If a wheel is lifted from the ground by reason of relief, the shovel arm has to be slewed into the driving direction temporarily to stop the blocking of the axle. Subsequently the shovel arm can be slewed again.

Driving with load

In order to utilize the full driving capacity of the unit, the filled shovel or the attachment is kept closely above the ground and in frontal position of the shovel arm during driving.

Scraping/grading

The shovel arm is to be completely lowered for scraping. Depending on the nature of the ground, the position of the shovel is adjusted by the driver.

Scraping/grading may be carried out at working speed as well as at travelling speed. The gear is selected in accordance with the nature of the ground. Generally, grading is performed on the way back with shovel adjusted accordingly.

4 Shovel designs, shovel sizes

Basically, there are two shovel designs, namely:

- directly attached to the shovel arm
- connected with the shovel arm by means of quick-changing frame.

The size of the shovels is 1.0 m^3 to 1.5 m^3 according to SAE (2600 mm wide), other sizes on request.

The standard safety factor 2 according to the accident prevention regulations is applicable, regardless of the shovel size or attachment.