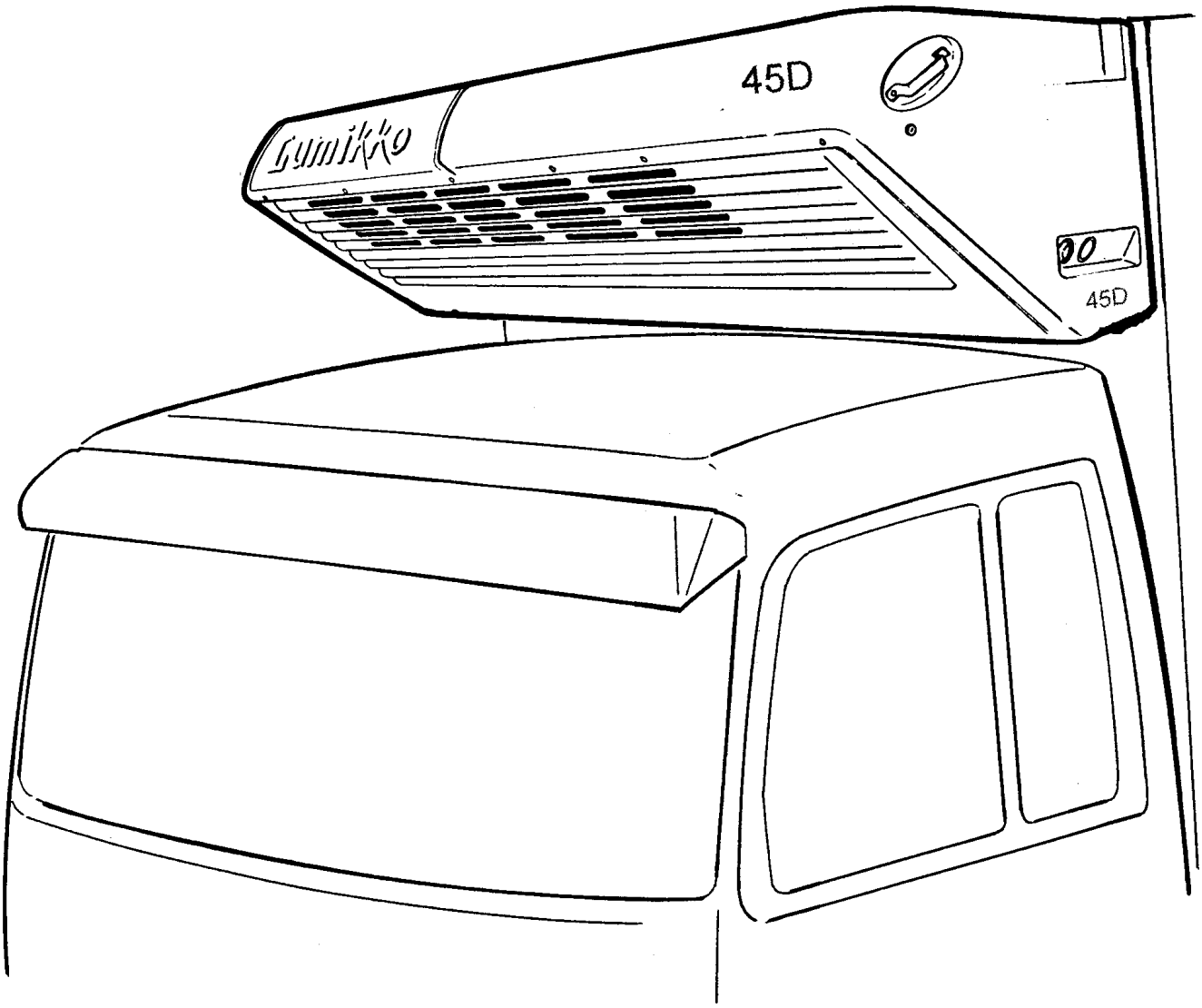
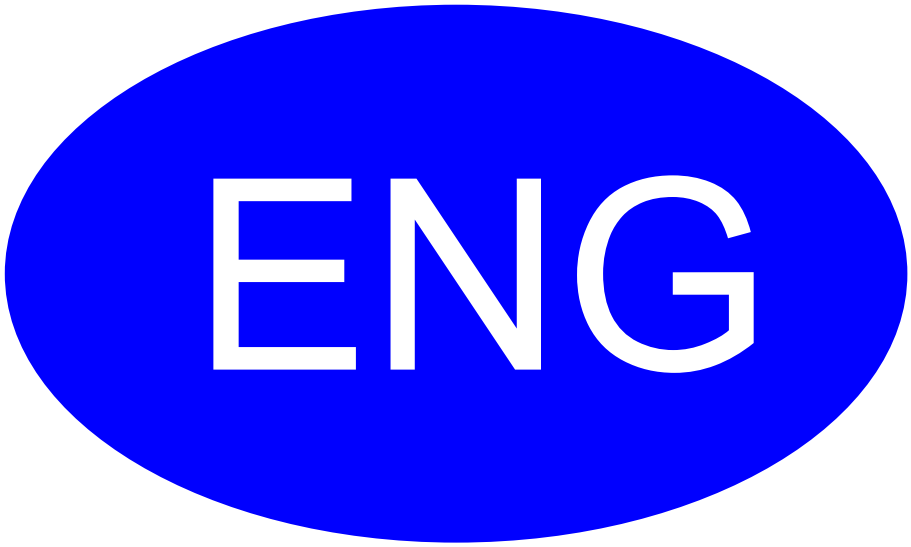
USER´S MANUAL

Lumikko 45DPlus

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EY – vaatimuksenmukaisuusvakuutus koneesta
Direktiivi 98/37/EY

EC – assurance of refrigeration unit
Directive 98/37/EC

Försäkran om EU – fordringsöverensstämmande gällande aggregat
Direktiv 98/37/EU

Valmistaja / Manufacturer / Tillverkare :

Lumikko Oy
PO BOX 304, Kylmätie 1
FIN – 60101 SEINÄJOKI, FINLAND

LUMIKKO – kylmäkone / refrigeration unit / aggregat

Vakuutamme, että valmistamamme kone täyttää seuraavien direktiivien edellyttämät vaatimukset:
98/37/EY, 73/23/ETY, 89/336/ETY

We assure that the refrigeration unit fulfils the requirements of following directives:
98/37/EC, 73/23/EEC, 89/336/EEC

Vi försäkrar att aggregatet uppfyller de fordringar av följande direktiv:
98/37/EU, 73/23/EEG, 89/336/EEG

Koneen suunnittelussa ja valmistuksessa on noudatettu seuraavia yhdenmukaistettuja standardeja:

Following harmonized standards have been applied in design and construction of unit:

Vid konstruktionen och planeringen av aggregatet har följande samordnade standardnormen tillämpats:

EN 378-1-2-3-4:2000, EN 292-1-2:1991, EN 294:1993, EN 563:1994, EN 953:1997, EN 983:1996, EN 1037:1995, EN 1050:1996, EN ISO 3744:1995

EY – vaatimuksenmukaisuusvakuutus koneen sähkölaitteista

Direktiivi 98/37/EY

EC – assurance of electrical equipment of machines

Directive 98/37/EC

Försäkran om EU – fordringsöverensstämmande gällande elektriska utrustningar av aggregat

Direktiv 98/37/EU

Valmistaja / Manufacturer / Tillverkare :

Lumikko Oy
PO BOX 304, Kylmätie 1
FIN – 60101 SEINÄJOKI, FINLAND

LUMIKKO – kylmäkone / refrigeration unit / aggregat

Vakuutamme, että valmistamamme koneen sähkölaitteet täyttävät seuraavien direktiivien edellyttämät vaatimukset:
98/37/EY, 73/23/ETY, 89/336/ETY

We assure that the electrical equipment of refrigeration unit fulfils the requirements of following directives:
98/37/EC, 73/23/EEC, 89/336/EEC

Vi försäkrar att aggregatets elektriska utrustningar uppfyller de fordringas av följande direktiver:
98/37/EU, 73/23/EEG, 89/336/EEG

Koneen suunnittelussa ja valmistuksessa on noudatettu seuraavia yhdenmukaistettuja standardeja:

Following harmonized standards have been applied in design and construction of unit:

Vid konstruktionen och planeringen av aggregatet har följande samordnade standardnormen tillämpats:

SFS EN 60439-1, SFS EN 60204-1

Seinäjoki _____

_____
Kari Saikkonen
tuotantopäällikkö
production manager
produktionschef

1 GENERAL

This manual handles LUMIKKO 45D Plus unit with standard equipment. If you have options not mentioned in this manual, contact the nearest service station or the manufacturer.

Manufacturer reserves all rights to develop this unit qualitatively without prior notice.

☒ ATTENTION: Neglecting may cause a damage.
☑ WARNING: Neglecting may cause a serious damage or injury.

1.1 SPARE PARTS

- order spare parts always through LUMIKKO service
- use always genuine spares
- components never tested in this unit may cause damage and invalidity of warranty
- when ordering spares, specify always:
  - unit type
  - serial number
  - installation date
  - spare part number

1.2 SERVICE

- it is important for safety, reliable and long-term function, that all the recommendations in this manual will be observed
- use always, when possible, authorized LUMIKKO service stations. They have genuine spare parts, tools and wiring diagrams.

1.3 SAFETY

- check regularly, that all the bolts are tightly fastened
- if you have to make holes to the unit or trailer, be sure not to bore to refrigerant tubes or wirings
- when working near the evaporator or condenser, watch out the sharp fins
- when the unit is running, stay away from rotating wheels and belts
- refrigerant R-404A must be handled carefully. It reacts with open fire forming very toxic, bad-smelling gases
- never heat up closed refrigeration circuit with open fire
- when the refrigerant R-404A comes out to open air, it freezes everything touchable nearby.

First aid to frostbite:
- cover the injured area
- sink it to warm water if available, otherwise cover with a clean clothe
- if you get refrigerant into your eyes, wash them with a lot of water and consult a doctor

Compressor oil:
- avoid contact with skin
- wash your hands properly after the work.

MANUFACTURER:

LUMIKKO OY
P.O. Box 304, FIN-60101 Seinäjoki, FINLAND
Kylmätie 1, Hyllykallio
Tel. +358 - 6 - 420 4000
Fax +358 - 6 - 414 1921
Internet: www.lumikko.com

FUNCTION

The unit is controlled by thermostat. It chooses automatically heating or cooling and it is equipped with a display.

- defrost thermostat
- diesel/electric switch S1
- glow/start switch S2
- switch S4 for compartment 2 (extra equipment)

2 START AND RUN

2.1 DIESEL DRIVE

Before starting, open the service door and check following:

1. The level of coolant.

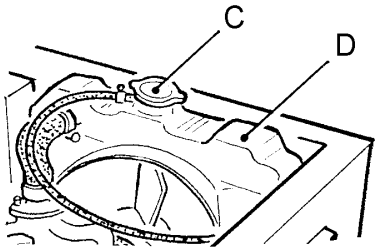


Fig. 3.1 Level of coolant

C. Cooler cap

D. Cooler

☑ WARNING

Never open the tap on expansion tank, when the motor is hot. Correct mixture is 50% water / 50% glycol.

2. Check the shape and tightness of V-belts.

- loose belts slips easily and are worn up in shorter time
- too tight belts shorten the life - time of bearings and belts
- belts are tight enough, when they move about their own thickness, when pushing by hand
- belts shouldn't move sideways
- if there are two belts side by side, change always both
- check always also the spare belts.

3. Check the oil level in diesel motor from the oil stick (1), and add if necessary, fig. 3.2.

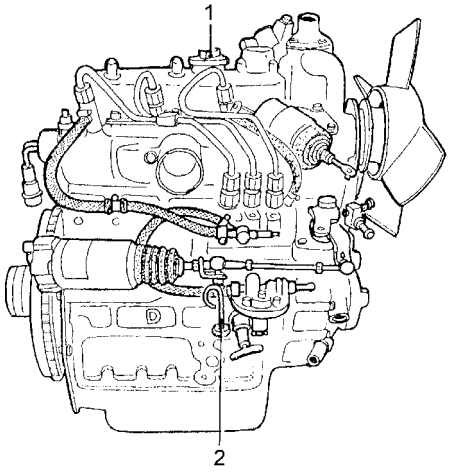


Fig. 3.2. Oil level check

1. Oil fill-in hole
2. Oil stick

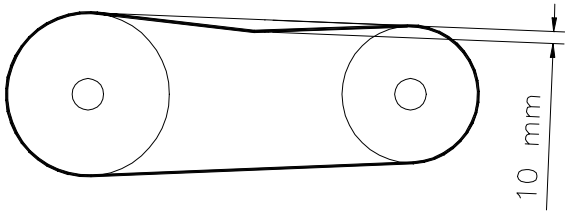


Fig. 3.1.1 V-belt tightness

2.2 STARTING THE DIESEL ENGINE

1. Turn the operation switch (S1) to DIESEL-position. Oil pressure lamp (H1) indicates, fig. 3.3.

2. Adjust the thermostat to desired value.

3. Turn the switch (S2) to GLOW-position for one minute. It is better to glow a little longer than too shortly.

4. Start the diesel motor by turning the switch (S2) to START-position.

☒ WARNING
Never start longer than 15 sec.

5. After start, check that oil pressure indicator (H1) goes off. All the indicator lamps are off, when the motor is at idle run. During heating, defrosting or cooling periods the motor runs with full speed and the lamps cooling (H4) or heating (H3) indicates the operation.

☒ ATTENTION
Oil pressure lamp (H1) must not indicate while motor is running. If it indicates, STOP the motor immediately and start troubleshooting.

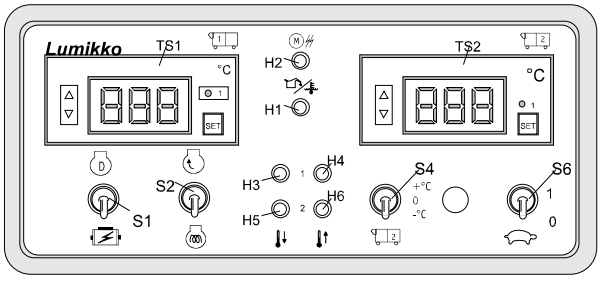
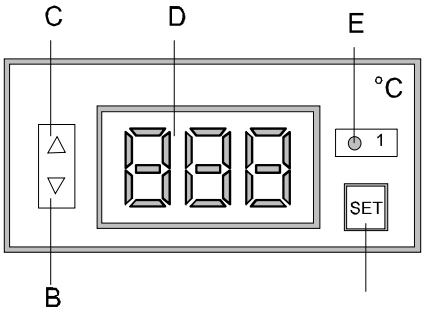


Fig. 3.3 Control panel

H4, H6	Indicator for heating
H3, H5	Indicator for cooling
H2	-"- for thermal relay
H1	-"- for oil pressure
S1	Diesel – 0 – Mains switch
S2	Glow – 0 – Start switch
S3	Manual switch for defrost
S4	Switch for rear part (compart. 2)



Thermostat:
A Temperature setting
B. Set value down
C. Set value up
D. Temp. Display
E. Indicator for heating

2.2.1 Electronic thermostat setting

There is a current value in display when no buttons are pushed. By pushing the SET-button design value is displayed. The design value grows or decreases when SET-button is pushed down with ">" or "<".

ATTN. ">" or "<" buttons must be released before SET-button, otherwise the set value won't save in the data memory.

THERMOSTAT ERROR MESSAGES:
FILL = sensor in short circuit
FIH = sensor circuit off
Contact service if either of these error messages appear in display.

2.3 STARTING IN WINTER CONDITIONS

If the ambient below -15°C, observe the following:

1. Check that winter covers are properly on the unit.
2. Diesel motor must be preheated. Block heater 230 or 24 V.(extra equipment)
3. Check that the thermostat is "asking" for heating or cooling.
4. Check out that the idle run switch is on position 1.
5. Turn the preheat switch (S2) to GLOW position for about one minute.
6. Start the diesel by turning switch (S2) to START-position.

☒ ATTENTION

Never start longer than 15 sec.

☑ WARNING

If an extra battery is needed when starting the unit it must be 12 V.
ABSOLUTELY NOT 24 V.

2.4 STOPPING THE ENGINE

Turn the switch (S1) to 0-position and engine stops after 10 sec.

☒ ATTENTION

If the engine has stopped by itself, empty fuel tank, or for some other reason, switch (S1) to 0-position, not to unload the battery.

2.5 ELECTRIC MOTOR DRIVE

☒ ATTENTION

It is very important, that the operating switch (S1) is in 0-position before connecting to the MAINS.

1. Connect the refrigeration unit to the MAINS with the cable.
2. Turn the switch (S1) to MAINS-position, unit starts automatically in 10 seconds.
3. Adjust the desired inside temperature.

☒ ATTENTION

Refrigeration unit has automatic rotation reversing switch, which controls fans rotation direction.

☑ WARNING

2.6 DISTURBANCE

If there are disturbances in MAINS -connection or electric components, the red lamp (H2) indicates and the unit will not start:
RESET AS FOLLOWS:

1. Switch (S1) to 0-position
2. Disconnect the MAINS-cable
3. Open the electric box door
4. Reset all thermal relays (F10 and F11) by pushing the button.
5. Connect the MAINS again
6. Try to restart by turning the switch (S1) to MAINS-position. If the light indicates again, contact a LUMIKKO service station.

2.7 DISTURBANCE IN ENERGY FEEDING

☑ WARNING

After energy feeding is ceased the unit will start for functional reasons after 5 seconds. After energy feeding again starts, the unit starts automatically. Observe the danger!
Turn the operating switch always in 0-position when you go near the unit.

2.8 DEFROSTING OF EVAPORATOR

Manually:
Turn the defrost switch on control panel. Defrosting starts, if there is demand. Both cooling (H4) and heating (H3) lights indicate. Refrigeration period starts automatically after defrosting is terminated.

Automatically: (normal function)
Unit's automatic system starts defrosting the evaporator in loading space.
Refrigeration starts automatically after defrosting.

3 SERVICE AND MAINTENANCE

Attention. More specific service information you will find from service and warranty book or from authorized Lumikko service station, book and electric diagram situates in the unit electric box. Be sure that you always put the book back to electric box!

3.1 DIESEL ENGINE

Daily checks before start:
- amount of coolant. When filling, use always a similar mixture as there was before. (frost resistance -45°C)
- oil level of the engine
- the condition and tightness of v-belts
- be sure, that the engine runs smoothly without extra noise.

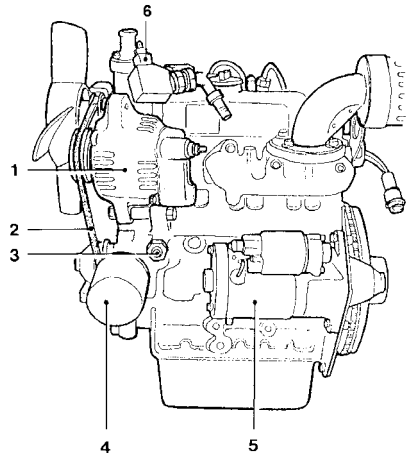
3.2 REGULAR SERVICE AND CHECK

First service of 300 hours at authorized Lumikko service station.

A. Every 300 hours:
- oil change, synthetic Neste 1 5W50
- oil filter change, fig. 4.1
- amount of coolant. At least 50 % anti-freeze
- v-belts, condition and tightness
- general condition
- general condition and liquid level of the battery
- cleaning the air filter (or change).

B. Every 1000 hours:
In addition to above (A.)
- change of fuel filter and the front filter of pump (min. twice a year)
- checking of glow plugs
- change of air filter

Fig. 4.1 Lubricating oil filter



4. Oil filter

IMPORTANT

- to get full capacity out of the engine, it is recommended to shorten the oil change intervals by 10 % when the engine gets old.
- use always same oil type, when possible
- change the oil at least once a year regardless of the running hours
- If the engine is running mostly outside the temperature range +0°C ...+30°C, change the oil 20 % more often as usual.

HINTS

- radiator: if lots of coolant has leaked, never add cold water into a hot engine. Use always same coolant and check the frost resistance.
- if the engine hasn't used, or only a little, for six months, change the oil before start
- never try to start with quick-charger.

Main components:

Diesel motor Kubota 722
output 14 kW/3600 r/min
oil amount 3,2 l
oil type Neste 1 5W-50
amount of coolant 3,0 l
Compressor Bock FKX 30

- oil amount 1,5 l
- oil type Dea Triton SE55

Electric motor

- voltage 400 V
- output 5,5 kW

Charger Nippondenso 12 V/40 A

- charging voltage 14,3 V
- transformer (mains operation)

Coolant R404A

Mains connection

- 400 V, 3-phase
- 32 A slow blow fuses

More specific technical information you will find from service and warranty book.

3.3 SPRING SERVICE

It is recommended to do this at the same time as 300 hours service.

To diesel engine, make the same routines as advised in 300 hours service.

Check also following:

- take the winter cover off
- open all the service doors in the unit for service.
- check that all the v-belts are undamaged and tight.

☒ ATTENTION

- if the refrigeration mode has been on duty only a little during winter time, connect it to the mains and run it some short periods by switching it on and off with thermostat.

When the unit is running normally, check the following:

- check the refrigerant in cooling operation. Sight glass must be totally clean while the compressor is running.

The humidity indicator must be green. If not, contact a LUMIKKO service station. Fig. 4.5

- clean the radiator and condenser
- check the fastening between the unit and trailer
- check the air filter hose
- check the spare belts
- check the water level and condition of the battery.

3.4 AUTUMN SERVICE

Before winter season, additionally to spring service, do following:

- change the fuel filter
- check the coolant level. When the engine has reached its normal running temperature, the coolant level goes up, and down again, when engine gets cool.
- check the function of the battery charger.
- when the engine cools down, check, that coolant flows properly from tank to radiator,

If the coolant doesn't flow back to radiator, contact a service station.

- test frost resistance of the coolant.
- winter cover on
- check the water pump

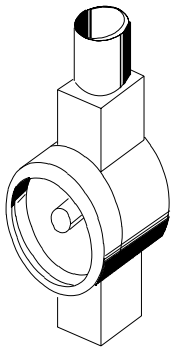


Fig. 4.5 Sight glass

If the sight glass is not clear when compressor is running, contact Lumikko service.

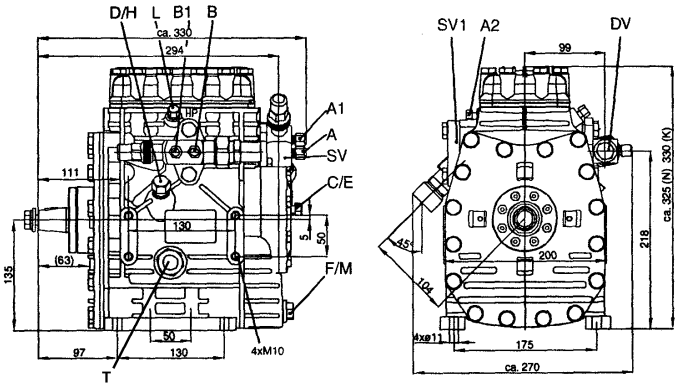


Fig. 4.6 Compressor
A1, B1 Maintenance cap
T Oil check

Attn. Oil level must be on the upper end of the glass when compressor is running.

4 SAFETY DEVICES IN THE UNIT

Compressor is equipped with high pressure and low pressure switches, which protect the compressor from damage.

4.1 SAFETY DEVICES OF DIESEL ENGINE

If the oil pressure gets too low during the run, control circuit is cut off by an oil pressure switch, a solenoid valve closes the fuel supply and the engine stops. Fig. 5.3

Possible causes:
- too little oil
- blocked oil filter

If the engine gets too warm, the fuel solenoid will be closed by an overheat thermostat.

Possible causes:
- blocked radiator
- broken fan belt
- too little coolant

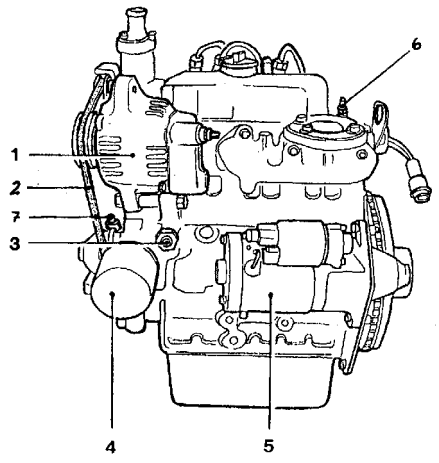


Fig. 5.3

1. Charger
2. V-belt
3. Oil pressure switch
4. Oil filter
5. Start motor
6. Overheat therm.
7. Sensor for fan

4.2 SAFETY AND SHORT CIRCUIT DEVICES OF ELECTRIC MOTORS

The over current relays are in the electric box in contactors K1 and K14. When relay goes off, lamp (H2) will indicate in control panel. Reset the relay by pushing the reset button. If the relay goes off again, the fault must be found and repaired. Never increase the preset value in relay.

There are six automatic fuses:Fi-F6
There is also automatic fuse F8 for compartment 2. Automatic fuse F12 protects the battery charger.

If fuse goes off, turn the lever to position ON. Never pass the fuse, because it protects from short circuit. Before connecting unit to the MAINS, make sure that the socket has 16 A slow blow fuses.

Fuses in electric control panel:

F1 Control circuit fuse 10 A thermostat
F2 Compressor mg-clutch fuse 10A
F3 Fuse for stop coil, cooler fan 20 A
F4 Fuse for start motor 15 A
F5 Fuse 30A
Mg-clutch for electr. motor
Gas coil
Glow plugs
F6 (/F3) Fuel pump fuses 10 A
F8 Automatic fuse compartment. 2
F10 Electric motor thermal relay
F11 Evaporator fan thermal relay
F12 Battery charger fuse 2 A

☑ WARNING

Make sure that you wont never leave the unit running by it self longer than it is necessarily.

5 ACCESSORIES

5.1 REAR PART FREEZING UNIT

Use:

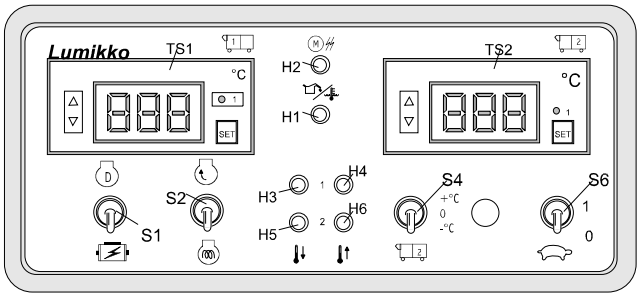
.1 In the control panel there is a thermostat TS2 for compartment 2 .Adjust the thermostat into desired temperature, fig. 6.4

2. Turn the rear part switch (S4) on cooling (+) or freezing (-) position, fig 6.4.

☒ ATTENTION

If compartment 2 operation switch is turned to freezing function compartment 2 is primary. Compartment 2 is being cooled down until thermostat will cut off. Always when compartment 2 is inaction the cooling power will be transmitted to compartment 1 until thermostat for compartment 2 starts cooling again.

If compartment 2 operation switch is turned to cooling position compartment 1 is primary. During compartment 1 cooling function fans of compartment 2 are rotating.



S4 Operating switch for rear part
FREEZING(-) – 0 – COOLING (+)

Compartment 2 heating: 400V heaters, capacity: 4,0 kW.

6 INSTRUCTIONS FOR FREEZING AND COOL TEMPERATURE TRANSPORTATION

- read this manual carefully and keep it in the truck.
- the unit must run idle, when loading or unloading with open doors.
- load always to pallet or rollers to secure a good air circulation.
- if there is a so called "suction partition wall" in the body, leave free way to the suction air.
- in warm weather, especially with deep-frozen goods, precool the body by MAINS, before loading and delivery.
- when precooling by MAINS, avoid direct sunshine.
- try to park the truck straight, or the rear part a little up, the defrost water runs out better.

The unit is equipped with manual and automatical defrost. Normally units automatic system controls evaporator defrosting, but defrost can also be made manually, if needed.

- turn the operation switch S1 to 0-position before connecting or disconnecting to MAINS (400V).
- winter cover is only for winter use.
- service the unit regularly twice a year. Neglecting the service may invalidate the warranty.

☑ WARNING

If an external power source is needed (battery), it must be 12V.
NEVER USE 24 V.

☑ WARNING

How to start with external cables:

Neglecting the following instructions may cause injury, break the battery or damage other electric equipment.

- no open fire near the battery.
- avoid spilling the battery liquid to skin, eyes, clothes and painted surfaces. Liquid may cause serious injuries or material damage.
- when working near the battery, use goggles.

Note also following:

- both batteries must be 12V.
- disconnect all electrical devices which you don't need
- start the unit as advised before

☒ ATTENTION

- if you use a battery charger, disconnect the cables from the unit.
- if you must weld the unit or trailer, disconnect:
  - charger cables
  - battery cables
- NEVER connect battery cables in reverse position.
- don't park the refrigeration unit in direct sunshine, try to find a shaded place.
- don't leave the unit without control for a long time.
- the unit starts automatically controlled by thermostat, so keep your hands off the fans, belts, wheels etc.

6.1 BATTERY

- never leave the unit without service more than a month. If it is out of operation more than that, take off the battery. Before putting back, charge the battery.
- if welding is necessary, remove battery cables.
- don't try to start the unit (diesel) with a quick-charger. It may damage electric equipment in the unit or truck.

6.2 OPERATION

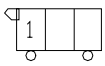
☑ WARNING

This refrigeration unit is mend for vehicle use only. It may not be used, not even temporarily, for heating or cooling personnel rooms.

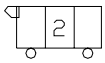
SYMBOLIEN MERKITYS

17.10.2002

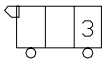
BETYDELSE AV SYMBOLER
MEANING OF SYMBOLS



1-osa (etu)
Utrymme 1 (fram)
Room 1 (front)



2-osa (keski)
Utrymme 2 (mellan)
Room 2 (middle)



3-osa (taka)
Utrymme 3 (bakre)
Room 3 (rear)

+°C

Viileä
Kyl
Cool

−°C

Pakaste
Frys
Freeze

Verkkokäyttö
Nätanslutning
Electricity

Dieselkäyttö
Diesel
Diesel

Automaattikäyttö
Automatdrift
Automatic operation

Käsikäyttö
Manuell operation
Manual operation

Käynnistys
Start
Starting

Hehku
Glödgning
Glow

Lämpörele
Termorelä
Thermal relay

Öljy/vesi
Olja/vatten
Oil/water

Jäähdytys
Avkylning
Cooling

Lämmitys
Uppvärmning
Heating

Tyhjäkäynti
Tomgång
Idling

Sulatus (1-osa)
Avfrostning (utrymme 1)
Defrost (room 1)

Sulatus (2-osa)
Avfrostning (utrymme 2)
Defrost (room 2)