USER MANUAL

Insulated distribution body

Refrigerating system

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Contents

General safety instructions - Personal protection

When inside the cold compartment

Always secure the doors against accidental closure by locking the handle of the open door with the appropriate key. The refrigeration plant must be turned off. The person in the cold compartment must be monitored at all times.

Working on electrics

Some of the body's electrics are at 400 volts. Touching them is highly dangerous. Do not remove lids and covers on the junction boxes and switch panel. The body's electrics must only be serviced or repaired by an authorised electrician or service engineer. The national regulations shall be fulfilled.

Power cable with plugs

Do not leave extension cable connected to power outlet if not used.
Vehicles should not pass over the refrigerated body's power cable, as this might damage the cable and possibly lead to personal injury. If the cable or a plug is damaged, replace it immediately or have it repaired by authorised staff.

Working on refrigerating system

Parts of the refrigerating system are under high pressure with the refrigerant.
Contact with the fluid/gas (refrigerant) used in the refrigerating system can cause severe frostbite and eye injuries. Do not knock or jog the refrigerating system's pipes and components, as damage to these parts may result in refrigerant squirting out.
The refrigerating system should only be serviced and repaired only by an authorised refrigeration expert or by specially trained and responsible stuff.

In the event of fire

Toxic gases may be released in the event of fire, and the pressure may rise in the refrigeration unit. If you inhale smoke from a refrigerated body or refrigeration plant that is on fire, seek medical assistance immediately. In the event of fire, the rise in pressure in the refrigeration plant makes remaining in its immediate proximity highly dangerous. Dangerous area should be marked properly (if necessary rescue team should be called).
Warn anyone in the vicinity and make sure that they reach safety.

Safety instructions for insulated body and refrigerating system

Damage to the insulated body

If cracks or holes appear in the fibreglass surface of the insulated body, e.g. following a collision, they should be sealed up immediately with, for instance, plastic film and tape. Otherwise moisture will diffuse in the body's insulation and will destroy this material. Repair the damage as quickly as possible.

Refrigerating system

The components of the refrigerating system ensure that the unit is not exposed to pressures or temperatures that might damage the refrigerating system in general and the compressor in particular. Do not change the settings, as this may lead to serious faults and, in the worst case, compressor damage. If the refrigerating system does not function normally, call in a refrigeration expert at once.

Power cable for the refrigerating system

Do not unplug the power cable while the refrigerating system is in operation. This will cause sparking, with the risk that the plug pins might soot up, resulting in malfunctions.

Use only the power cable if the connector is free of water and dirt. Be sure that no water is in the connector during the time of the connecting with the refrigerating system.

Eutectic plates (freezer plates)

Do not scratch or otherwise damage the surface of the eutectic plates, as this will put the plates at risk of complete corrosion, resulting in major damage. The fluid in the plates is non-toxic, but will nevertheless damage the goods in the body.

Do not leave the body without operation more than 3 months; this can lead to corrosion inside the plate. In such case factory warranty will not apply.

Shelf arrangement

When goods are being loaded, make sure to place at least one shelf in each of the body's nine sections. Otherwise the partitions will risk being damaged during braking, etc.

National regulations and directives shall be complied with.

Description of the refrigerating system operating principle and use

Description of refrigerating system

The kind of refrigerant in the refrigerating system is according to the standard EN 378 in group A1 (lower toxicity, no flame propagation).
The refrigerating system is a closed circuit with an electrically operated compressor.
The evaporators of the refrigerant unit consist of a number of eutectic plates containing eutectic liquid brine with a freezing point of –33°C. The eutectic plates are suspended below the roof of the refrigerated body. The process of freezing the eutectic liquid brine will accumulate a large amount of "cold", which is then used to keep the cold of the goods in the insulated body, when the refrigerating system is not in operation.
All other components of the refrigerating system and the electrics are located in a separate compartment in the insulated body called the machinery compartment.
At the same time as the refrigerating system is in operating and producing cold, heat is also generated by the condenser of the refrigerating system. With a powerful fan on the condenser, the warm air will be dissipated into the surrounding atmosphere of the insulated body. Keep the area of air inlet and air outlet on the insulated body free from everything and ensure that is no direct air-circulation between the air inlet and air outlet.

Refrigeration reliability

The inner space of the insulated refrigerated body ensures that the requirements of the veterinary authorities with regard to the carriage of frozen goods are complied with.
This means that the temperature of the air inside and the goods must remain below –18°C at all times.
The insulated body is a well-insulated box that only allows heat to penetrate slowly from the outside, as long as the doors are closed. Whenever a door is opened, warm air penetrates, affecting the temperature of the goods. The eutectic plates of the refrigerant unit should compensate for this heat input, but as the refrigerating system is by means of "stored" cold with the eutectic plates, the temperature will nevertheless rise slowly. It is therefore extremely important to keep the number and length of door openings as low as possible.

Power supply requirements for the refrigerating system

1. The mains voltage must be 3x400 V (±10%) + 0 + earth in the body inlet.
2. The mains supply must be protected with at least a 16A fuse.

How to position the refrigerating system when freezing the eutectic plates

1. The location must, as far as possible, be cool and in shade or against a north-facing wall.
2. The location must be well-ventilated.

3. The insulated body must be level.

Starting the refrigerating system

1. Check that the plugs, sockets and power supply cable are undamaged, clean and dry.
2. Check that the main switch for the refrigerating system is at “0”. It is located on the switch panel in the insulated body’s machinery compartment.
3. If there is a switch on the wall socket for the mains supply, make sure that it is on “0”.
4. Plug one end of the power cable into the socket on the insulated body.
5. Drape the power lead over the wing mirror (to avoid driving off by mistake with the cable hanging loose) and plug the other end into the mains wall socket.
6. If there is a switch on the wall socket for the mains supply, set it to “1”.
7. Start the refrigerating system by turning the main switch in the machinery compartment to “1”of the insulated body. The refrigerating system will now operating.

Switching off the refrigerating system

1. Switch the main switch in the machinery compartment of the insulated body to “0”.
2. If there is a switch on the wall socket for the mains supply, set it to “0”.
3. Unplug the power cable from the wall socket for the mains supply.
4. Unplug the power cable from the socket on the insulated body.
5. Coil the cable and put it where it will not be damaged until it is needed again.

IMPORTANT: **Never leave loose objects in the refrigerated body’s machinery compartment.**

Inspecting the refrigerating system in operation

1. Check that the refrigerating system is running quietly without noise. If this is not the case, switch the plant off immediately and call a refrigeration expert.
2. The start/stop intervals for the compressor must not be too short (min. 30 min between start and stop).

Temperatures during normal operation

Temperature in cold compartment	Morning: -30°C to -36°C Evening: -18°C (after 10 hours)
Temperature of loaded goods:	Max -22°C

Operating period

Full freezing, e.g. at initial start-up or after complete defrosting:	Max. 24 hours
Freezing when the cold compartment is already cold:	Max. 10 hours

The operating periods are only indicative, as the ambient temperature and quantity of goods in the refrigerated body will affect them.

It is furthermore an important point, that the surface of the eutectic plates is not frosted with ice.

Loading

Rational loading means that less cold is lost and the temperature in the insulated body is not increasing too much.

1. The goods should only be placed outside the cold store for an absolute minimum of time (straight from store to van).
2. Minimise the number and duration of door openings.

Distribution

1. Opening the doors briefly produces the best temperature conditions.
2. Arranging the goods tidily and in a well-organised manner minimises the number of door openings and how long they are kept open.
3. Never open more than one door at a time.

Defrosting

Atmospheric humidity will be deposited on the cold eutectic plates, in the form of white frost. This frost reduces the cooling ability of the eutectic plates while increasing the energy consumption of the refrigerating system. It is therefore very important to defrost the eutectic plates regularly. Never allow the layer of frost to become more than 20 mm thick. Defrosting can be done by means of scraping or thawing out.

1. Scraping: This should be done with a brush or soft scraper to ensure that the surface of the eutectic plates is not damaged.
2. Thawing out: Remove all goods from the refrigerated body. Leave the vehicle in a warm place with the refrigerating plant turned off and all the doors open until all the frost has melted. Water drain valves should be open. Then clean the inside of the body. This process takes a long time and should be planned carefully.
3. Water drain holes should be closed after complete defrosting process (defrosting, cleaning and drying).

NB: It is normal for more frost to form in summer than in winter, since the atmosphere is more humid in summer.

Maintenance

Daily maintenance

1. Clean the plugs, switches and power cable.
2. Clean ice and dirt off of the door mouldings.

Weekly maintenance

1. Clean up cooling unit compartment.
2. Clean ice and snow from surface of eutectic plates using special scraper.

Monthly maintenance

1. Bofrost bodies ONLY - clean the surface of the condenser with water supply hose (low pressure), so that the fins are free from dirt. All other bodies - clean the surface of the condenser with compressed air or compressed water, so that the fins are free from dirt.
2. Clean the machinery compartment.
3. Clean the rubber strips with cleaning fluid and coat with silicone.
4. Lubricate the locks with Triflow spray or Teflon dry lubricant.
5. Lubricate the latch with Omega 58 or Teflon dry lubricant.
6. Clean the central lock and lubricate with Omega 58 or non-toxic Teflon grease.

Other maintenance

Recommendation for shut off valves and adapters of the compressor:
It is strongly recommended to periodically re-torque all fixing connections to the original setting after the system has been put into operation.

The user is obliged to check the tightness of the refrigeration system every half a year (ref. EU regulation 842).

The user is obliged to check the refrigeration system according the standard EN 378.
Weekly maintenance

Troubleshooting

Variations from normal operation of the refrigerating system upon connection to the power supply (to be checked by salesperson/driver)

The refrigerating system does not start

Switch the refrigerating system off.
Check: Time switches, fuses, electric socket, plugs, power cable.
If these are okay, call in expert help.

The refrigerating system does not start, but the compressor hums for a while

Switch the plant off.
Check: Fuses, electric socket, plugs, power cable.
If these are okay, call in expert help.

The refrigerating system switches off after a while

Check: Is the fan on the condenser working? If not, call in expert help.
If the fan motor on the condenser is working, clean any dirt off of the condenser. If this does not help, call in expert help.
If the fuses cut out, call in expert help.

The refrigerating system starts, but compressor makes a strange noise

Stop the plant at once and call in expert help.

General

Carlsen Baltic must be informed of any damage to the body or irregularities in the refrigeration plant immediately.
Faults and damage within the warranty period must be repaired in accordance with Carlsen Baltic's instructions.
Declaration of Conformity is placed in company web site www.carlsenbaltic.com.