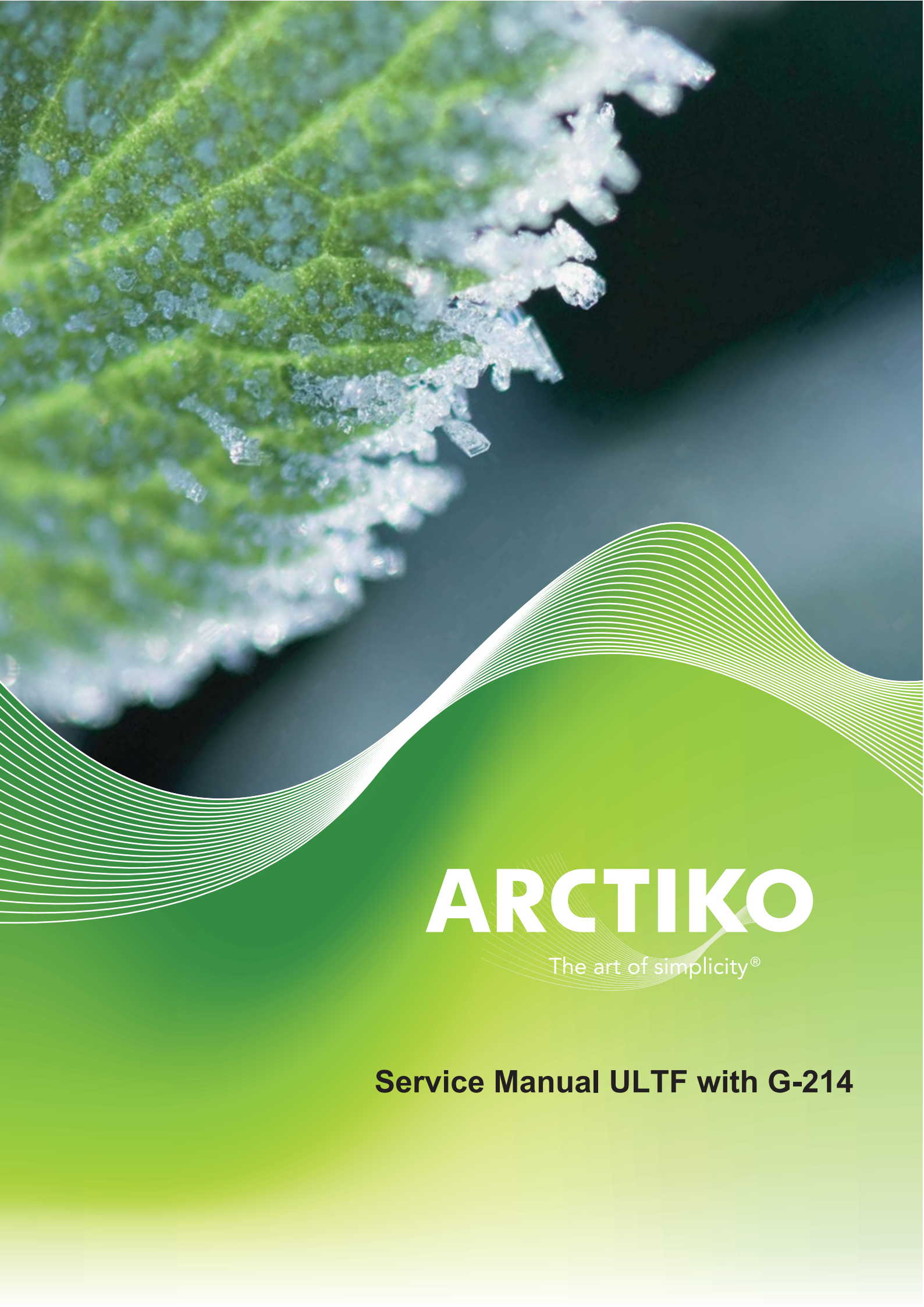




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Service Manual ULTF with G-214

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1. Working safety

This page provides general safety information for servicing the freezer.

The instruction manual includes additional information about security and cleaning of freezer.

1.1 General safety

To prevent personal and equipment damage, the electrical safety / legislation of your country must be observed.

- 1. Never expose the moving parts of the plant to physical overload.
- 2. When repairing plant parts, safety concerns must be respected.
- 3. When using tools, spare parts and equipment, the existing security concerns must be met.
- 4. Maintenance procedures described in this manual must only be performed by trained personnel.

1.2 Electrical safety

Maintenance procedures may imply a voltage hazard. Follow existing safety instructions, including the low voltage and current EU directives and other directives of your country.

Always disconnect the power to the unit before repair or parts replacement is initiated.

Use only electrical equipment which is designed for the freezer.

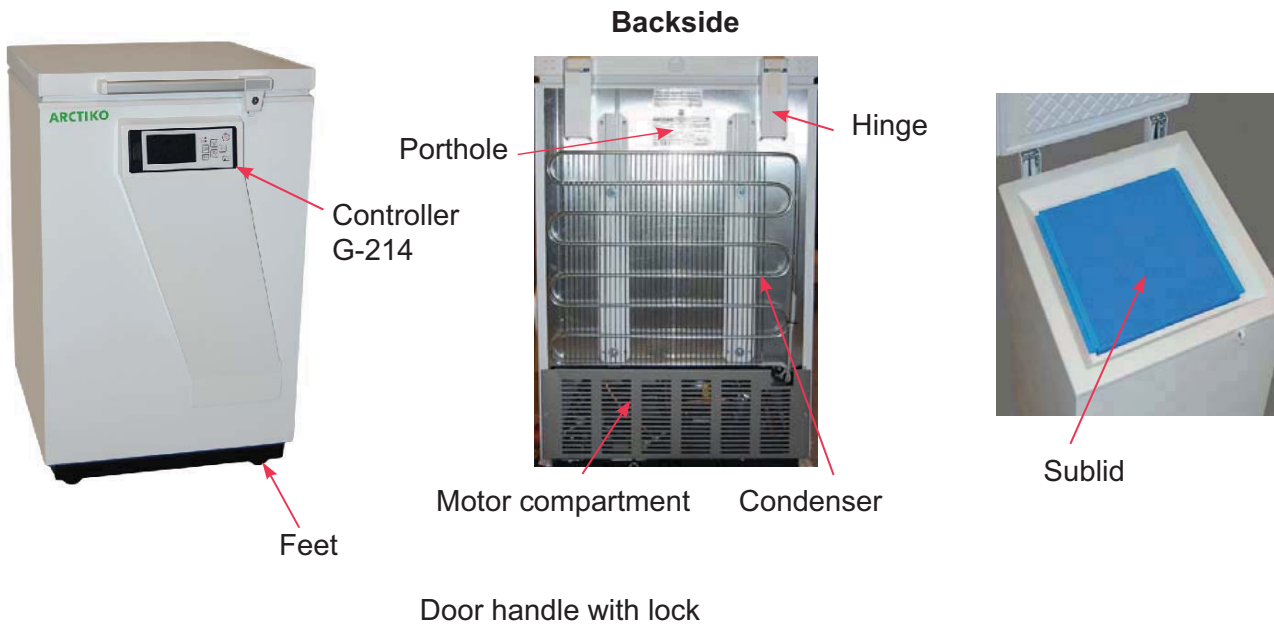
1.3 Chemical and biological safety

- Always observe the requirements for safe handling, as described below.
- Read the instruction manual before using, cleaning and servicing the freezer.
- Wear eye protection and gloves when working with refrigerants.
- Skin contact with liquid refrigerants may cause frostbite.
- Good ventilation and air extraction at the work area is required.
- Stay in environments with high concentrations of refrigerant vapors is harmful.
- Low concentrations may cause narcotic effects.
- Symptoms of this may include: headache, shortness of breath, nausea and difficulties in concentration. Possibly: Mobility / consciousness.
- Read the safety data sheet section 5e.

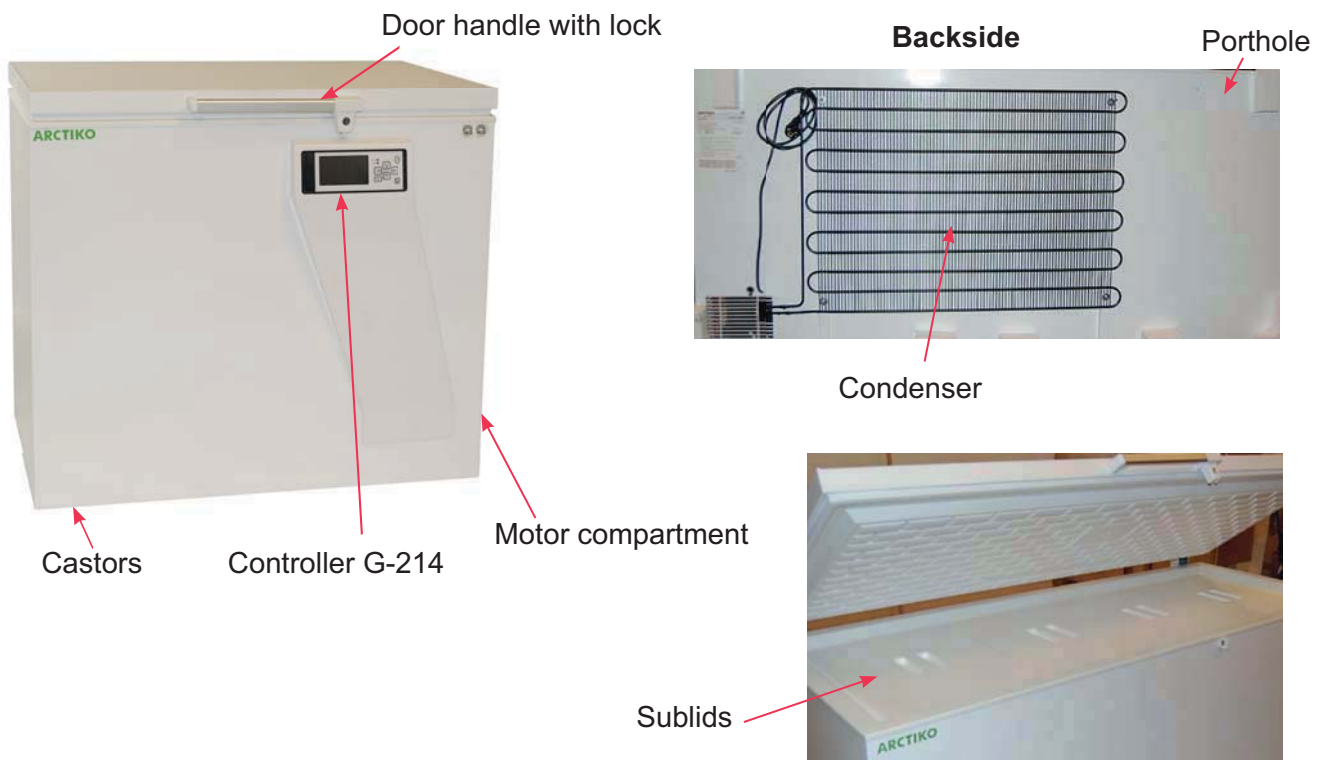
2. Information about the freezer

2a. General information about the freezer

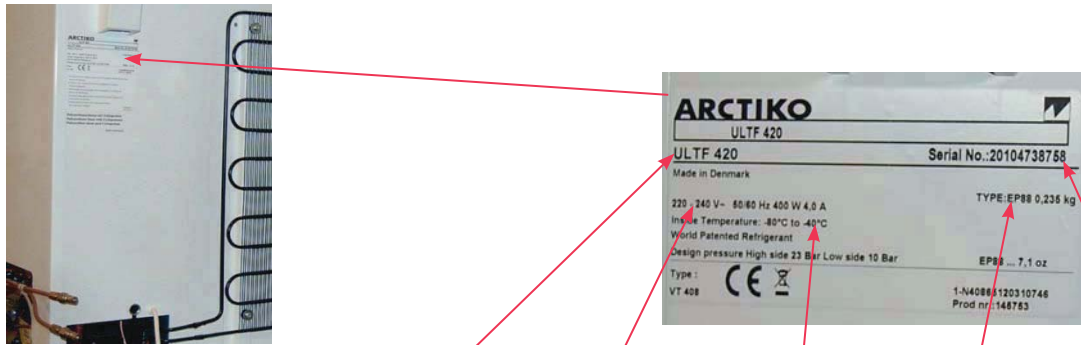
ULTF 80



ULTF 220 / 320 / 420



Label plate located on the device.



Model Voltage/Hz Temp.range Refrigerant/Filling Serial no.

When contacting the supplier it is important to inform the model and serial number.

The label plate is located behind the front panel in the engine compartment.

For technical problems: See troubleshooting schedule (3b).

2b. Controller G-214

The PCB controller board is located in the engine compartment behind the front panel.

The display is mounted in the front panel.

Data controller:

- 72 hour battery backup for alarms.
- Microprocessor with digital display.
- Temperature display and data acquisition during power failures.
- Visual and audible alarm.
- Adjustable high / low temperature / alarm.
- Integrated data logger.
- Automatic cycle of sensor failure.
- Measurement of the ambient air temperature.
- Direct download / upload from the USB memory stick.
- Display of battery voltage and ambient temperature.
- Integrated memory and data logger.
- RS 485/232 Interface.
- Contact for remote alarm.
- Prepared for GSM alarm.

Alarm for:

- High / low temp.
- Voltage Fault
- Sensor error
- Instrument error
- Front door

Display G-214



PCB board

Datasheet for controller G-214.
See section 5e.

2c. Model information

Model	ULTF 80	ULTF 220	ULTF 320	ULTF 420
Item code	DAI 0200	DAI 0213	DAI 0205	DAI 0213
Temp. range °C	-40/-86	-40/-86	-40/-86	-40/-86
Max. ambient temp. °C	25	20	20	25
Power supply (V)	230/115*			
Frequency (Hz)	50/60			
Fuse (A)	10			
AMP (A)	3	4	4	4
Power consumption (KWh/24h)	3,83	7,4	8,79	10,5
Power (KW/Hp)	0.660/0.9	*)	0.880/1.2	0.880/1.2
No. of compressors	1			
Refrigerant/filling (gram)	EP 88 / see label plate			

* Special unit - not standard

*) Power consumption is monitored over time for each element. Pt. no values.

3. Troubleshooting / Repair

3a. General operating problems

Malfunction of the device, which can arise from improper handling of the device:

Moving or long periods of inactivity of the unit:

When moving or after long periods of inactivity, you must wait 1-2 hours before the freezer is started.

Loading the freezer

When loading large quantities of items into the freezer, the temperature will rise temporarily.

Repeated lid openings

In case of repeated lid openings, leaks or faulty gaskets, the humidity will cause rime and possibility of ice formation inside the device and around the lid / sublids.

Component failure occurred during operation

Use the troubleshooting table section 3b.

3b. Troubleshooting schedule

Problem	Cause	Recommended equipment	Troubleshooting	Action
The unit does not freeze and the compressor does not start.	The socket or fuse is defect.	Universal instrument test Lamp	Check the installation.	New fuse / plug.
	Power cable is defect.		Check power cables and wiring in the engine compartment.	Repair errors. Consider using wiring diagram section 5
	The controller is defect.			Change controller
	The sensor is defect.		Test sensor.	See section 3n
	Faulty windings in compressor.		Test compressor windings.	See section 3k
	Start relay defect.		Test start relay.	See section 3m
	Fault in electrical installation.		Use wiring-diagram.	See section 5
The unit does not freeze. The compressor tries to start, but fails.	Low voltage	Voltmeter	Check voltage	Find the cause.
	Defect or faulty start relay/capacitor.	See section 3m	See section 3m	Change start relay/capacitor
	Defect compressor windings.	Ohmmeter	Check for electrical failure in the compressor.	Change the compr. See section 3f
	Defect rotor (compressor failure)			Change the compr. See section 3f
	High pressure in the cooling system.	Tapping valve Manometer Filter	Open the system and rinse the system with nitrogen.	Remove 5cm of the capillary tube. Change filter. See section 3e
	The unit has been transported horizontally.			The unit must rest a few hours before start.
	Ambient temp. low. Compr.oil too cold.	Eksternal thermometer.	Check the temp.	Find a better placement.
	May be general, if the ventilation is not sufficient.	Eksternal thermometer.	Check, that the compressor not exceeds 70°C.	Find a better placement or ventilation.
	Ambient temp. high.	Thermometer	Check ambient temp.	Find a better placement or ventilation.

3b. Troubleshooting schedule

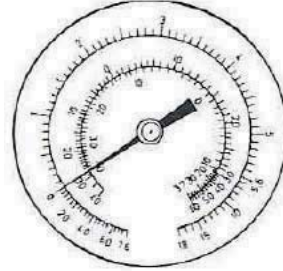
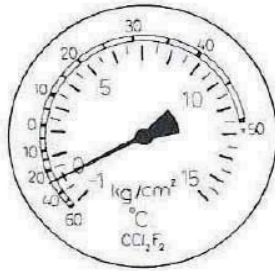
Problem	Cause	Recommended equipment	Troubleshooting	Action
The compressor runs constantly. The unit freezes normal or colder.	The sensor is in-correctly installed.			
	Sensor is defect.			
	Controller is damaged.			
	Icing on the frame.		Check the door for leaks.	See section 4a.
	The temperature is set too low.		Check the settings in the controller.	Set new values. See section 5f.
The compressor starts normally, but stops again.	Too high voltage.	Voltmeter	Measure the voltage.	Inform.
	Too high ambient temperature.	external thermometer	Check the temperature and ventilation.	Better placement or ventilation.
The unit cools too much, too little or not at all. The compressor may run continuously.	Leakage in the system.	Electronic leak-seeking, soapy water, leak seeking spray.	First check the solder points, comp, capacitor, etc.	See section 3.
	The fan is not running.	Voltmeter	Check for errors.	Replace the fan. See section 3p.
	The evaporator is blocked by ice.			
The unit cools too much or not at all. Compressor running constant.	Little or no compressor capacity.	service valve Manometer	Mount the valve and check pressure.	Change compressor. See section 3f.
Insufficient cooling.	The device has recently been filled up with a large amount of heat.			Inform the user.
	In addition, temperature of the air is too high.	external thermometer	Check temperature.	Find better ventilation or placement.
	In addition, the air temperature is too low.	external thermometer	Check temperature.	Find better ventilation or placement.

Examples of troubleshooting with a manometer connected to the process piping of the cooling system. The system is blocked:

Suction pressure is very low.

Pressure equalization takes place very slowly or not at all.

Reason: Icing or dirt in the capillary tube or filter, or blockings in the system due to other reasons.

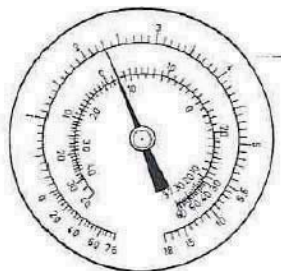


Reason: No compressor capacity

The suction pressure is too high.

The suction pressure does not change noticeably when the compressor stops.

This can be tested with a volumetric meter.



Leakage in the system

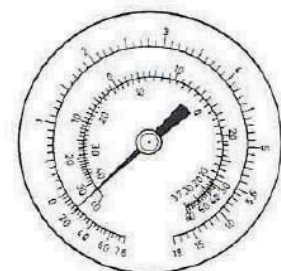
The pressure gauge indicating insufficient suction pressure.

On the pressure side the temperature increases.

Pressure equalization time is short.

Countervailing pressure is lower than expected.

Be sure that the pressure is sufficient for a pressure test.



3c. Opening of the cooling system

- To prevent moisture from penetrating under repair, the system must not be open for more than 15 minutes.
- Prepare spare parts components before the system is opened.
- The new connector is soldered to a tube with valve.



- Verify that the new filter packaging is intact and that the filter is not damaged.
- If the packaging has been broken for a longer period, the filter will be moist.

3d. Evacuation of the refrigerant

- It is recommended that the compressor is running at least 25 min. before refrigerant evacuation is undertaken. This ensures that the system is hot, so that the refrigerant easier can be pulled out of the compressor oil.
- A drilling tongs with valve is placed on the process pipe.
- The refrigerant is evacuated.



- Install a valve on the pressure tube and process pipe.

Process pipe and pressure tube fitted with a valve.



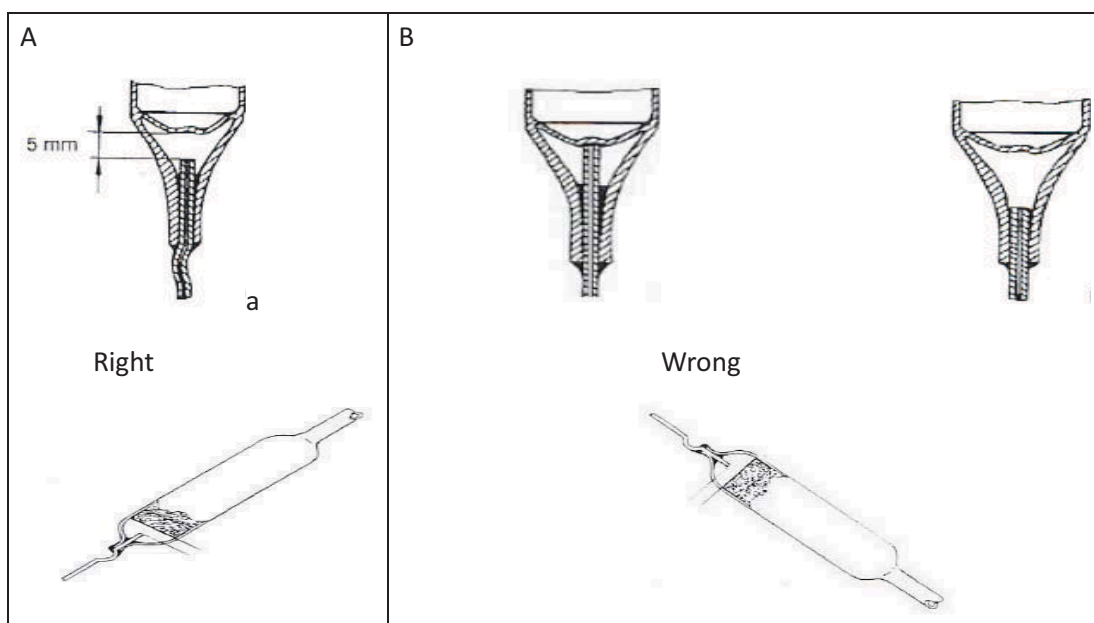
- The cooling system is evacuated with a two-stage vacuum pump for at least 30 minutes. Both from the pressure piping and process piping.
- Blow the system with nitrogen, both from the suction and the pressure side.

3e. Changing the dryfilter

- The dryfilter must pick up moisture in the system during operation and function as the capillary tube in front of the capillary tube, in order to avoid clogging. Clogged filter or capillary tube causes a pressure drop, by this the filter becomes colder and ice will block the system. The compressor is overloaded with a possibility of crash.
- The dryfilter is placed after the condenser outlet, immediately before the capillary. Any opening of the cooling system, dryfilter change to ensure the function and lifetime of the freezer.
- It is therefore recommended always to order a new filter drier, along with a new service cylinder with cooling agent.
- To prevent moisture from penetrating during the repair, the drying filter must not be open for more than 10 minutes.
- After evacuation and blowing with nitrogen, the tubes must be cleaned on both sides of the filter drier, before cutting. By doing this the pipe ends are free from impurities and metal pieces and ready for soldering.
- Cut off the pressure pipe close to the filter with a pipe cutter.



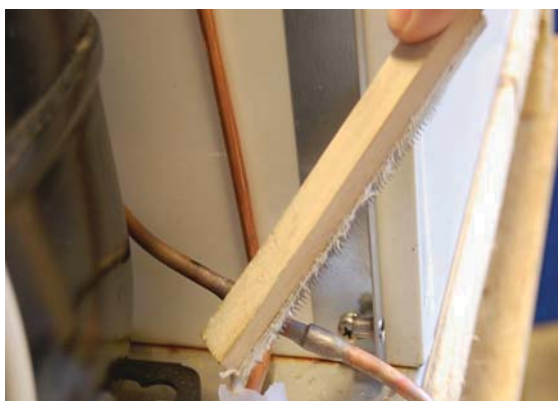
- Cut off the capillary tube with a capillary tube scissors.
- It is recommended to use a special tongs to create a wave on the capillary tube which ensures the correct positioning in the filter.



In the figure A the capillary tube is correctly installed in a dryfilter. In order to ensure efficient use of the filter, it must be positioned with an inclination of at least 150 and the capillary tube must be underneath.

In the figure B the capillary tube is too close too the web of the filter. It provides great resistance and filter blocking after a short time. Or too far away, so it will be filled with flux or solder.

- Solder the new filter.
- Clean the solder points with a wire brush.



- Flush the system with nitrogen.
- If only the dryfilter is to be replaced, the system must be pressure tested. See section 3g.

3f. Changing the compressor

- Evacuate the refrigerant of the system. See section 3d.
- All tubes are cut with a pipe cutter. Do NOT solder of.
- When replacing the compressor the dryfilter must also be replaced. See section 3e.
- The suction and pressure pipes of the compressor must be cleaned and cut with a pipe cutter just above the soldering pipe.
- Demount the compressor.
- Install the new compressor, which is prepared as described before. (3c)



- In order to avoid decomposition of refrigerants which may remain in the system during the soldering operation, the system is blown with dry nitrogen, respectively, from the suction side respectively pressure side.
- Solder the tubes on to the compressor.
- Pressure test the system.

3g. Pressure testing and leak detection

- Pressure test the system with nitrogen. The pressure must be 10 bar during a period of 2 hours.
- Check the solder points with soapy water or leak detection spray.
- In case of any leaks, empty the system for nitrogen.
- Repair and pressure test again.
- During operation leak detection must be performed on the pressure side with the compressor running. The suction side must be tested while the compressor is stopped, and the pressures are equalized.
- The nitrogen must slowly be emptied from the system.

3h. Vacuum suction / Vacuum check

A vacuum is made on two locations on the system, one on the process tube and one on the pipe branch used for testing located on the pressure tube with an explosion-proof 2-stage vacuum pump.



- The pressure should be 2 mBar or lower for at least 12 hours.
- The system is now ready for the filling of the refrigerant.

3i. Refrigerant filling with EP88

Before filling the refrigerant, a vacuum must be sucked. See section 3h.

Note that EP88 is to be supplied from a bottle containing a specific amount of refrigerant.

Common procedures for other refrigerants can not be used.

Further it is important that the entire contents of the bottle is introduced into system to ensure optimal performance.

The contents of the bottle must be mixed before use by shaking the bottle for at least 1 minute before the filling.

In order to perform the filling operation properly, it is necessary to use a capillary tube with the valve before the filling site, instead of a conventional feeding tube. The reason is that the capillary tube ensures that the entire quantity of refrigerant is introduced to the system. If an ordinary filler hose is used, it must be as short as possible.



WARNING! EP88 is flammable!

The refrigerant cylinder is weighed before use.

The cylinder must be shaken for 1 min. before use.

During the filling procedure the cylinder must be upside down.

Cylinder with manometer



Vacuum suction of the filling hose



Loading procedure

Make vacuum. See section 3h.

The cylinder with manometer is connected to the coupler of the process piping.

Remember to first make vacuum in the filling hose to empty it.

Fill the refrigerant into the system until the pressure gauge on the pressure tube shows approx. 5 bar.

Start the compressor and let it run for 2-3 min. Open to the cylinder again to get out the remaining refrigerant.

When the pressure in the bottle shows 1 bar, the bottle is empty.

It is important that the valve is closed immediately, in order to avoid that the refrigerant runs back into the cylinder.

Now the cooling system is filled with refrigerant and only needs to be closed.

Disconnect the filling hose with pressure gauge from the process piping.

Push the process piping and pressure pipes together with a special tongs.

Cut off valve with a pipe cutter.



Closing the process tube on systems with flammable refrigerants must be performed by professionals with a Lok Ring end sleeve. It is recommended NOT to solder system.

Clean the pipe with steel wool or emery cloth. Use rotational movement in order to avoid scratching the length of the tube.

Apply LokPreb to the end of the tube.

Turn the end sleeve 360° so that the LokPreb is placed around the tube.

Squeeze the end sleeve together with the special tool as shown in the illustration.

Start the freezer and control the function of the unit.

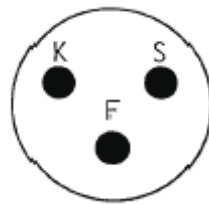
3j. Electrical troubleshooting

Before starting systematic troubleshooting, check the following:

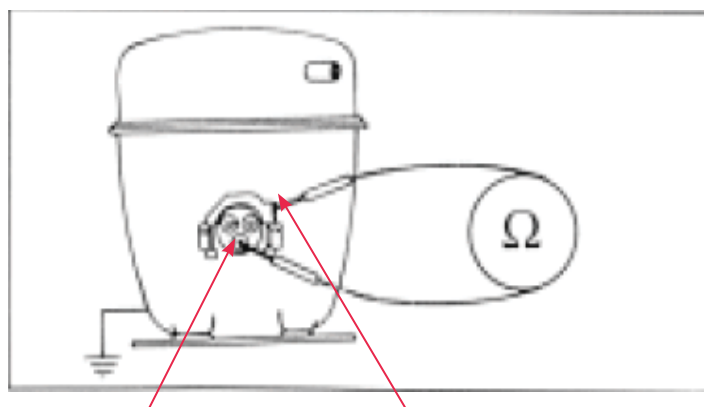
- Proper voltage is present.
- Electrical equipment used, is suitable for the compressor.
- The wires are properly installed according to wiring diagram.
- There is no transition between the live parts and ground.

Control of the transition to ground.

In order to check whether there is a transition between the conducting components and the chassis, the insulation resistance is tested by using an ohmmeter or the second high-voltage equipment. An ohmmeter can be used for a rough check. At the Ohmmeter one clamp is placed on the compressor's ground terminal. The second clamp on the compressor shared leg (see sketch). Showing ohmmeter a transition, the compressor is replaced.



Plug on the compressor



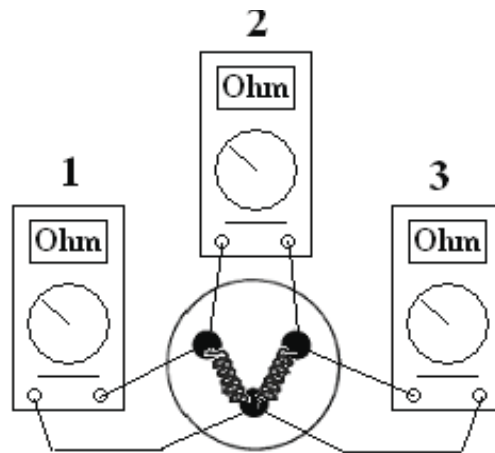
Shared leg

Ground terminal

Uses high voltage test systems with flammable refrigerants, ensure that the system is completely drained of coolant, as this can cause sparks during the test.

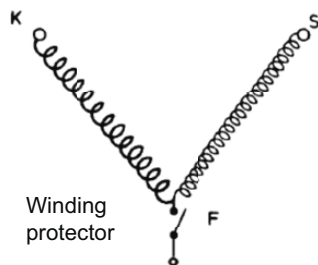
3k. Electrical fault - compressor

Remove the start relay from the compressor and use an ohmmeter to test the compressor head and start recovery. Connect ohmmeter between the common connector and start winding, then the winding is to debug. See the picture below.



Dimensions of the compressor connections to determine whether driving and startwinding are intact.

This is done by measuring the resistance of these. Carry out three resistance measurements on compressor penetrations. The sum of the two smallest measurements, the intact windings will be equal to the highest. Find if the current values of the compressor data sheet.



Ohm-measurement

By measuring the compressors with built winding protector it is extremely important to measure between K and S, as this measure will tell if this is burnt windings or an open winding protector.

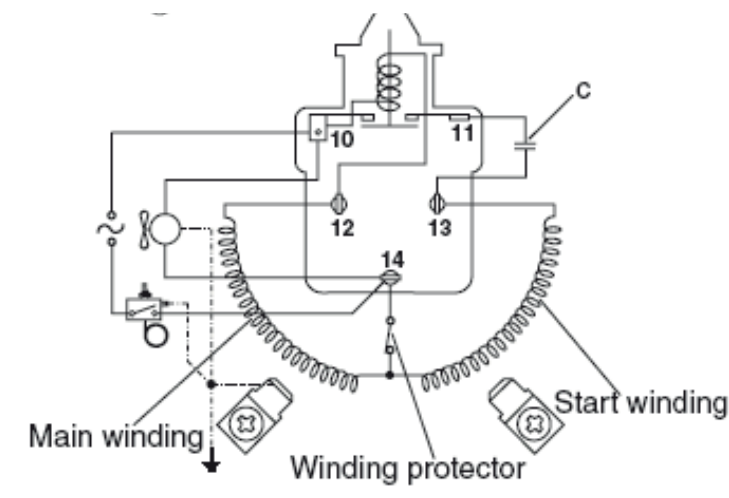
Since it is relatively small value to be measured, it would be a great advantage to use a digital ohm-meter.

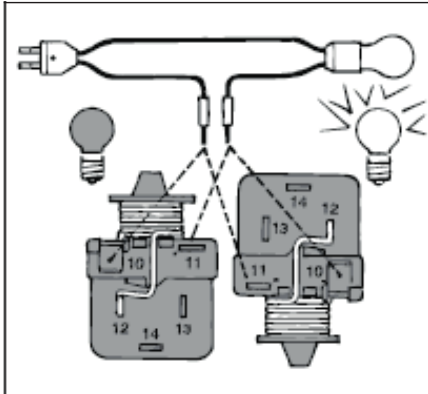
Indicates the measurement error, the compressor is replaced.

3m. HST-start relay, start capacitor

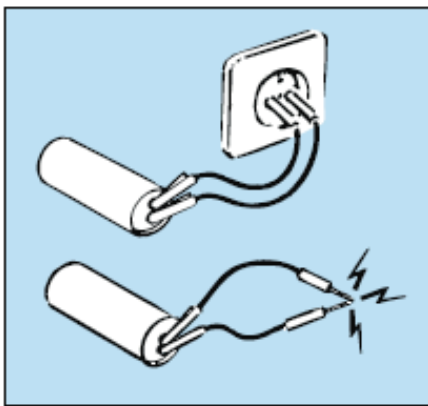
Connect a voltmeter between terminals 10 and 13 at the start of the relay. If no voltage is present, there is either a faulty cable or also start relay is defective.

Connect a voltmeter between terminals 10 and 14. If no voltage is present, the temperature sensor or its cable is defective.





A relay can be checked with an indicator light as shown in the sketch maintain end. The relay is usually ok, when in standing position is not lit, and when it is lit when the relay is upside down.



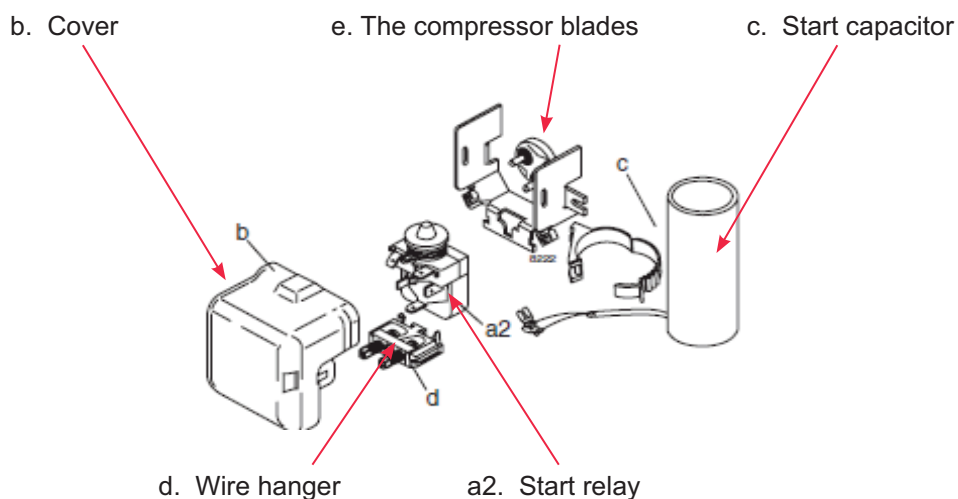
The start capacitor can be checked by injecting the normal voltage for a few seconds and than shorting it. When sparks are generated, the capacitor is in order.

When replacing the compressor should start relay and start capacitor also replaced.

Start relay is placed on the compressor's three terminal legs and clamped.

The voltage is connected to terminals 10 and 14.

The start capacitor is connected to terminals 11 and 13 and clamped.



3n. Sensor for the controller

PT 1000

A faulty sensor will typically prevent the compressor from starting.

If the sensor is covered with ice, the compressor will run more than usual and cool too much.

The easiest way to check the function of the sensor, is to place your hand around the sensor. If the temperature recorded on the display in the front panel does not rise, the sensor is faulty and needs to be replaced.

The sensor can also be tested with an ohmmeter.

The PT 1000 sensor for ULTF 80 is located behind an alu. panel at the bottom of the freezer.

- Remove the alu. panel.
- Remove the sealing material around introduction and pull out the sensor.
- Disconnect the electrical connection of the sensor in the CBS-modul.
- Mount the new sensor in reverse order.

Remember! The sensor must be replaced with a sensor with the same characteristics as the original.



Sensor ULTF80



Alu. panel

The PT 1000 sensor for ULTF220 /320 and 420 is located in the stage on the right side of the freezer.

- Remove the alu. panel.
- Remove the sealing material around introduction and pull out the sensor.
- Disconnect the electrical connection of the sensor in the CBS-modul.
- Mount the new sensor in reverse order.

Remember! The sensor must be replaced with a sensor with the same characteristics as the original.



Sensor ULTF220 / 320 / 420



Alu. panel

3n. Condenser

See section 4c.

3m. Fan

If the ventilator stops, it can cause insufficient cooling of condenser and compressors.

Electrically, the fan is connected to terminal 10 and 14 on the start relay.

Physically, the fan is placed in the motor compartment close to the compressor and fixed on the panel with 2 bolts.



Fan

Panel

4. Maintenance

4a. Rubber gasket of the lid

Rub the gasket with a suitable product, so that it stays flexible and the optimal function and tightness is secured.

Make sure the lid closes tightly so that no ice forms around the lid frame.

- Open the lid and place a piece of paper. Close the lid.
- Pull the paper.
- If the paper can not be pushed back, the adjustment is OK.
- The test is made at both the left and right side.



4b. Locks and hinges

Make sure the lock works easily and safely. If necessary, use a lubricant for locks.

Make sure the hinges are not loose.

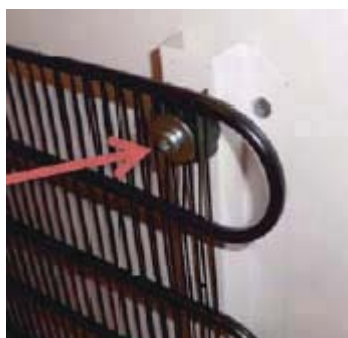
4c. Condenser

The condenser is placed on the back of the freezer and fixed with 4 screws.

The freezer should be placed with at least 10 cm free to the sides and 15 cm free at the back.

It is important that the cooling ribs are kept clean and the ambient temperature does not exceed 25°C (ULTF80/220), 20°C (ULTF320/420).

It may be necessary to change the rubber packing on the condenser corners also maybe dampen the long inlet tube with a rubber strap.



4d. Evaporator

The freezer, the lid frame and the sensor must be checked for ice.

In case of large ice formation, the freezer must be defrosted.

4e. Manual defrost

- Remove the contents of the freezer.
- Unplug the unit.
- Place a tray under the freezer and remove the plug at the bottom of the freezer.
- Leave the lid open until the ice can be removed.
- Wipe the interior cabinet with a cloth until it is dry.

When the interior cabinet is dry, cloth the plug and restart the freezer.



Plug for defrost water

4f. Noise

The following must be checked in case of noise:

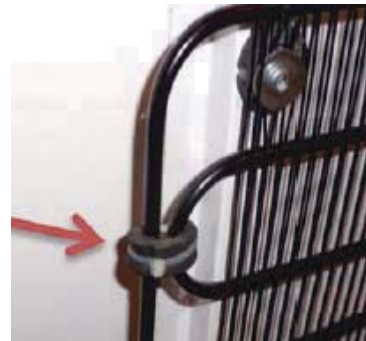
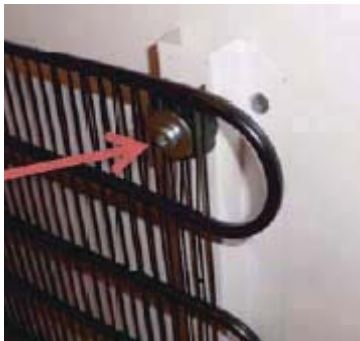
- The compressor is not tightened well.
- The rubber feet are defect or too hard.
- The compressor process tube is too long.
- The fan blades are damaged or dirty.
- The fan is not tightened well.
- The fan bushings are worn.
- The freezer is not positioned on a flat surface.



Process tube (too far)



- Long pipes can cause resonance vibrations. A rubber strap can assist. See illustration.



4g. Battery backup

The battery (6V/1,2Ah) is located in the engine compartment.

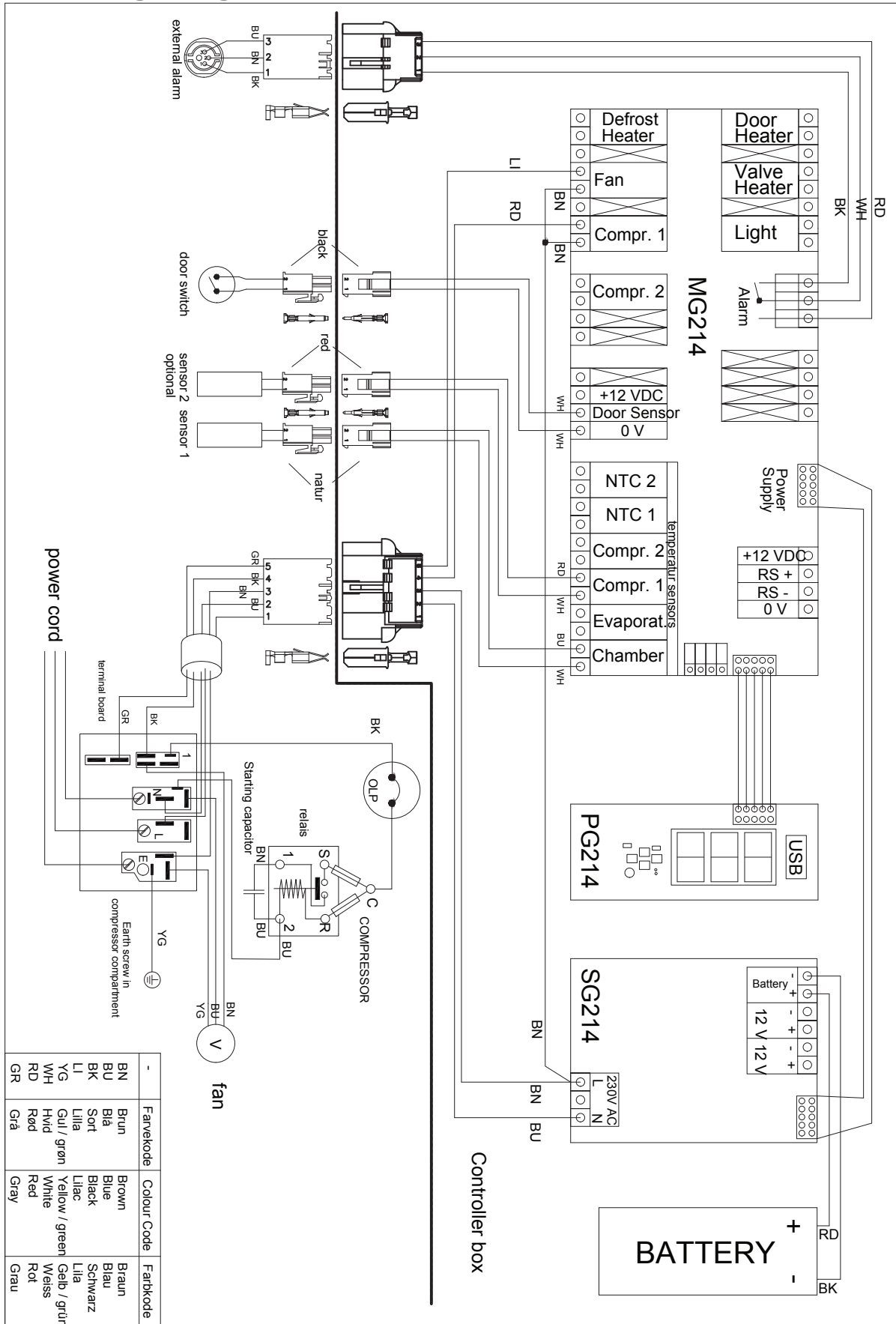
It has a lifespan of 3 years, but should be checked every six months.

Check the voltage with a voltmeter.

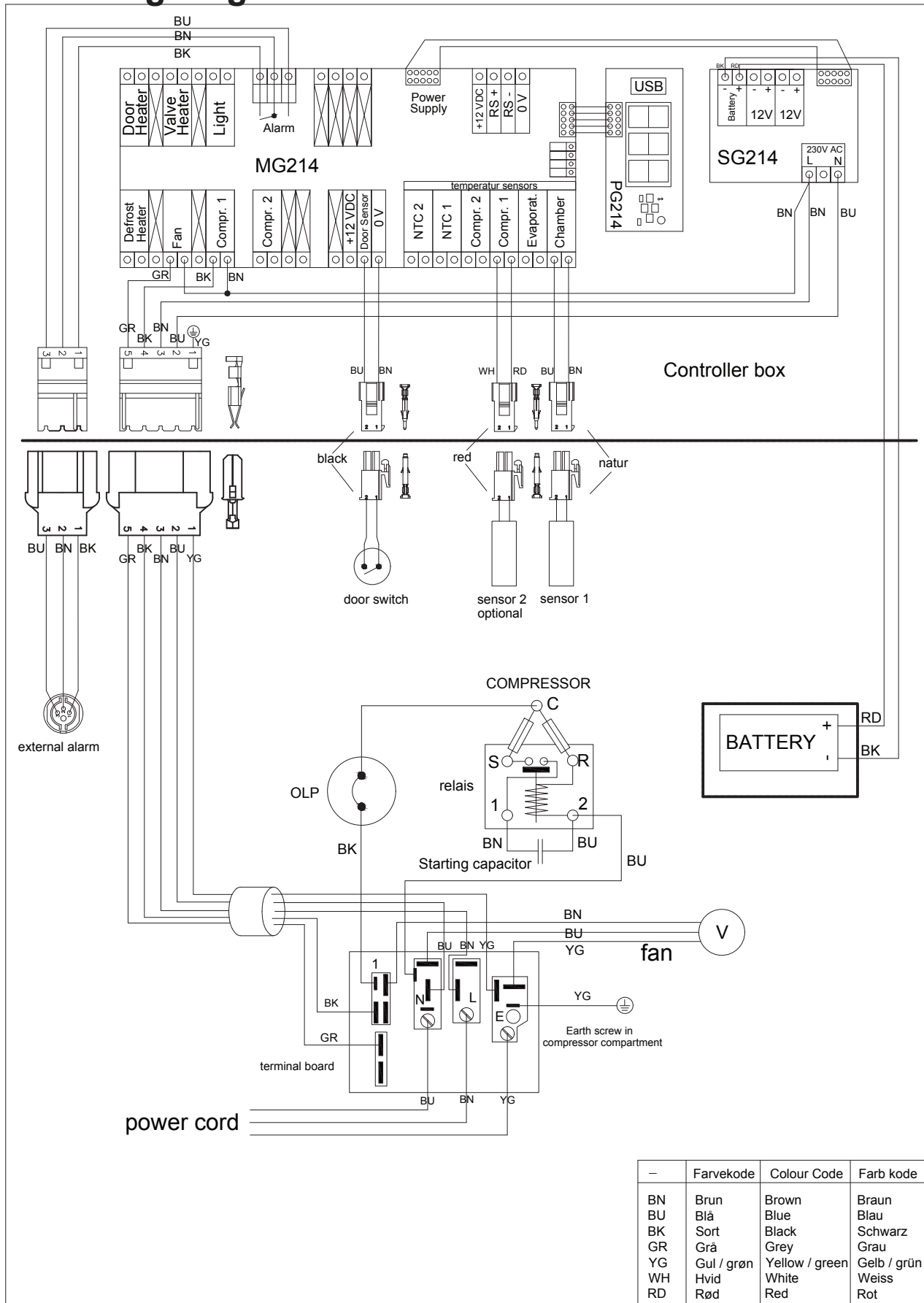


Backup battery

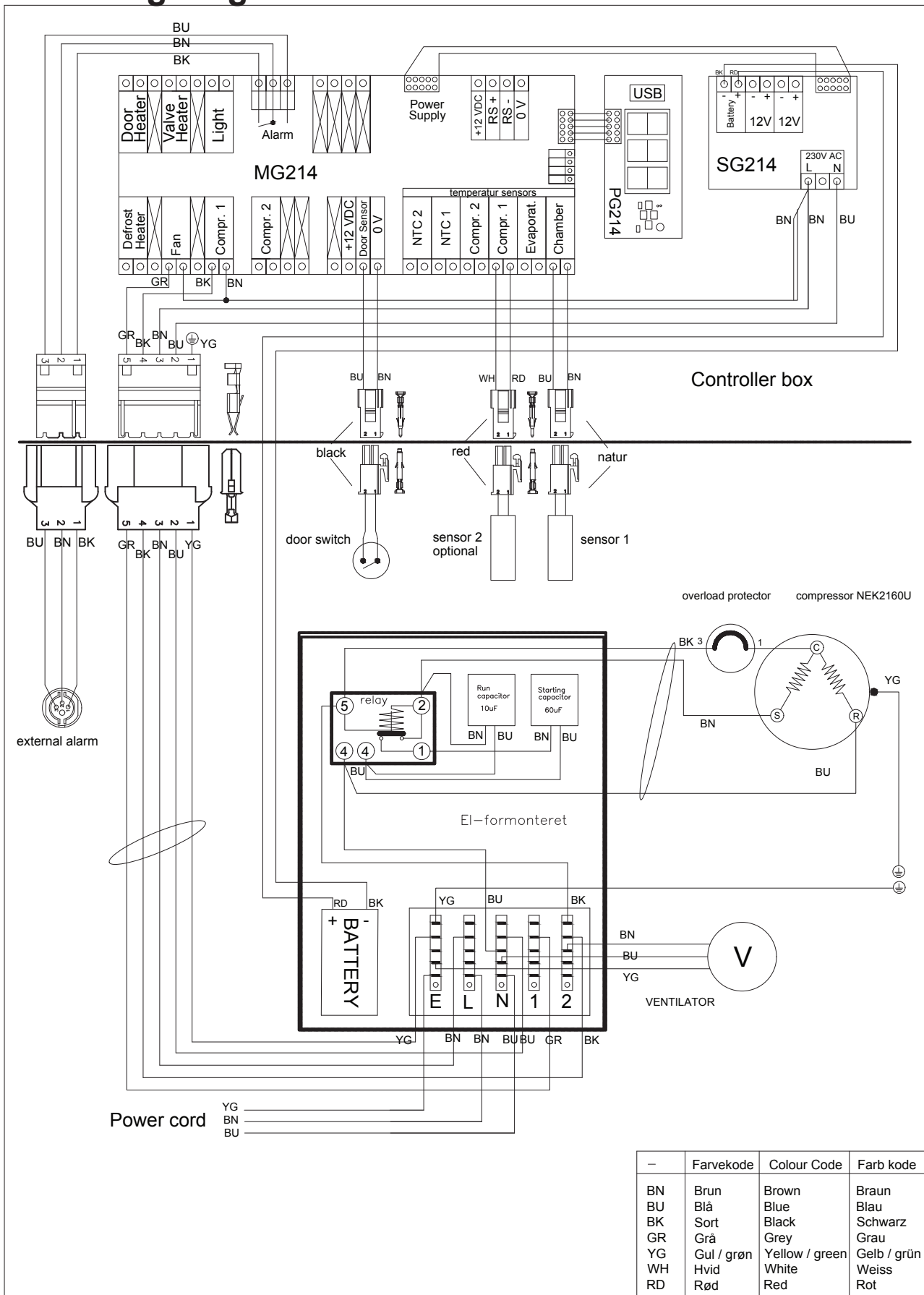
5a. Wiring diagram ULTF 80



5a. Wiring diagram ULTF 220



5a. Wiring diagram ULTF 320 / 420



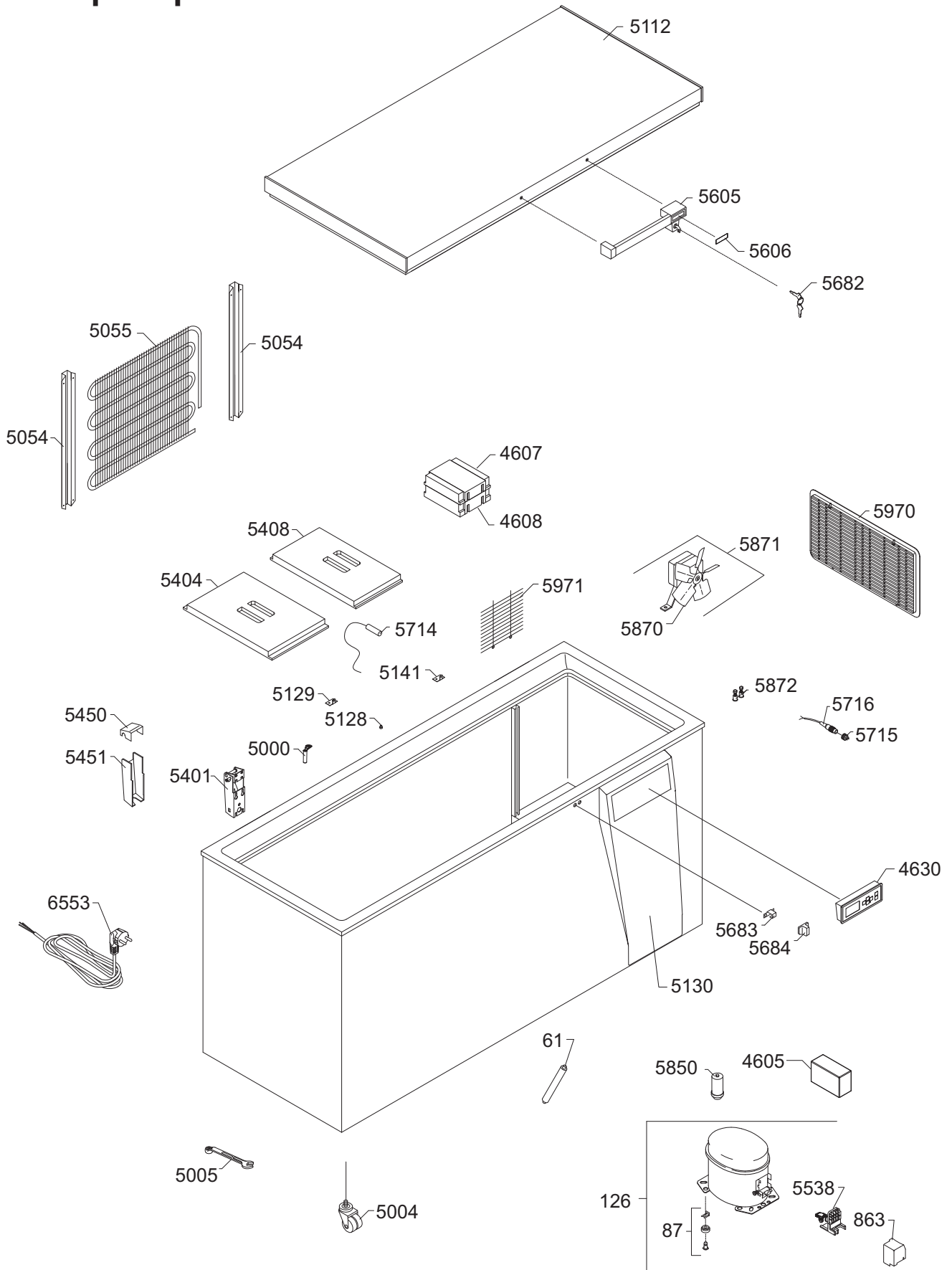
This exploded view diagram illustrates the assembly of a refrigerator. The main components and their assembly sequence are as follows:

- Top Panel (5144):** The uppermost panel of the refrigerator.
- Door Panel (5130):** The front door panel, which includes a handle (5141) and a lock (5128).
- Interior Panel (5145):** The inner panel of the refrigerator, which includes a handle (5141) and a lock (5128).
- Refrigerator Body (5130):** The main body of the refrigerator, which includes a handle (5141) and a lock (5128).
- Compressor (126):** The main refrigeration unit, which includes a handle (5141) and a lock (5128).
- Condenser Coils (5054):** The coils that circulate refrigerant, which include a handle (5141) and a lock (5128).
- Evaporator Coils (5055):** The coils that absorb heat, which include a handle (5141) and a lock (5128).
- Defrost Heater (5972):** A heater used to defrost the evaporator coils, which includes a handle (5141) and a lock (5128).
- Temperature Control (4605):** A control unit for the refrigerator, which includes a handle (5141) and a lock (5128).
- Door Switch (4607):** A switch that controls the door, which includes a handle (5141) and a lock (5128).
- Light Switch (4608):** A switch that controls the interior light, which includes a handle (5141) and a lock (5128).
- Light (5871):** The interior light, which includes a handle (5141) and a lock (5128).
- Light Socket (5870):** The socket for the interior light, which includes a handle (5141) and a lock (5128).
- Light Cord (6553):** The cord for the interior light, which includes a handle (5141) and a lock (5128).
- Light Bulb (5716):** The interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Base (5715):** The base for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5683):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5684):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (4630):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5002):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5850):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (61):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5450):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5451):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5402):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5129):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5141):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5128):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5714):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5972):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5054):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5055):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5144):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5145):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5130):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (126):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (863):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (5538):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).
- Light Bulb Socket (87):** The socket for the interior light bulb, which includes a handle (5141) and a lock (5128).

5b. Spare parts list ULTF 80

Pos. no.	Code no.	Part	Recommended
61	5079000-01	Filter dryer 20 gr.	1
87	5079007-01	Base plate fittings, set, complete	
126	5070095-01	Compressor NEK2150U, complete	1
863	5070106-01	Cover	
4605	5044001-01	Backup battery	1
4607	5041006-01	PCB-Board G-214 Controller	1
4608	5041007-01	Power supply G-214	1
4630	5043007-01	Display G-214	1
5002	5053017-01	Foot with pin	
5054	5079008-01	Fittings for condenser	
5055	5071017-01	Condenser	
5128	5032011-01	Magnet	
5129	5031164-01	Magnet bracket	
5130	5030088-01	Display cover	
5141	5031163-01	Sensor bracket	
5144	5052003-01	Lid foamed without handle and hinges	
5145	5052009-01	Sub lid ULTF80	1
5402	5031006-01	Hinge	
5450	5030003-01	Cover top part for hinge	
5451	5030004-01	Cover bottom part for hinge	
5538	5070099-01	Terminal Board, complete	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle	
5682	5051002-01	Key, set 2 pcs.	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5714	5042019-01	Temp. sensor - lenght 800 mm	1
5715	5054003-01	Chassis plug	
5716	5054002-01	Plug for remote alarm	
5850	5070101-01	Starting device	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan complete	1
5972	5030006-01	Grill for motor compartment	
6553		Mains lead	
-		Refrigerant	1
-	5072000-01	Cylinder deposit for refrigerant	1

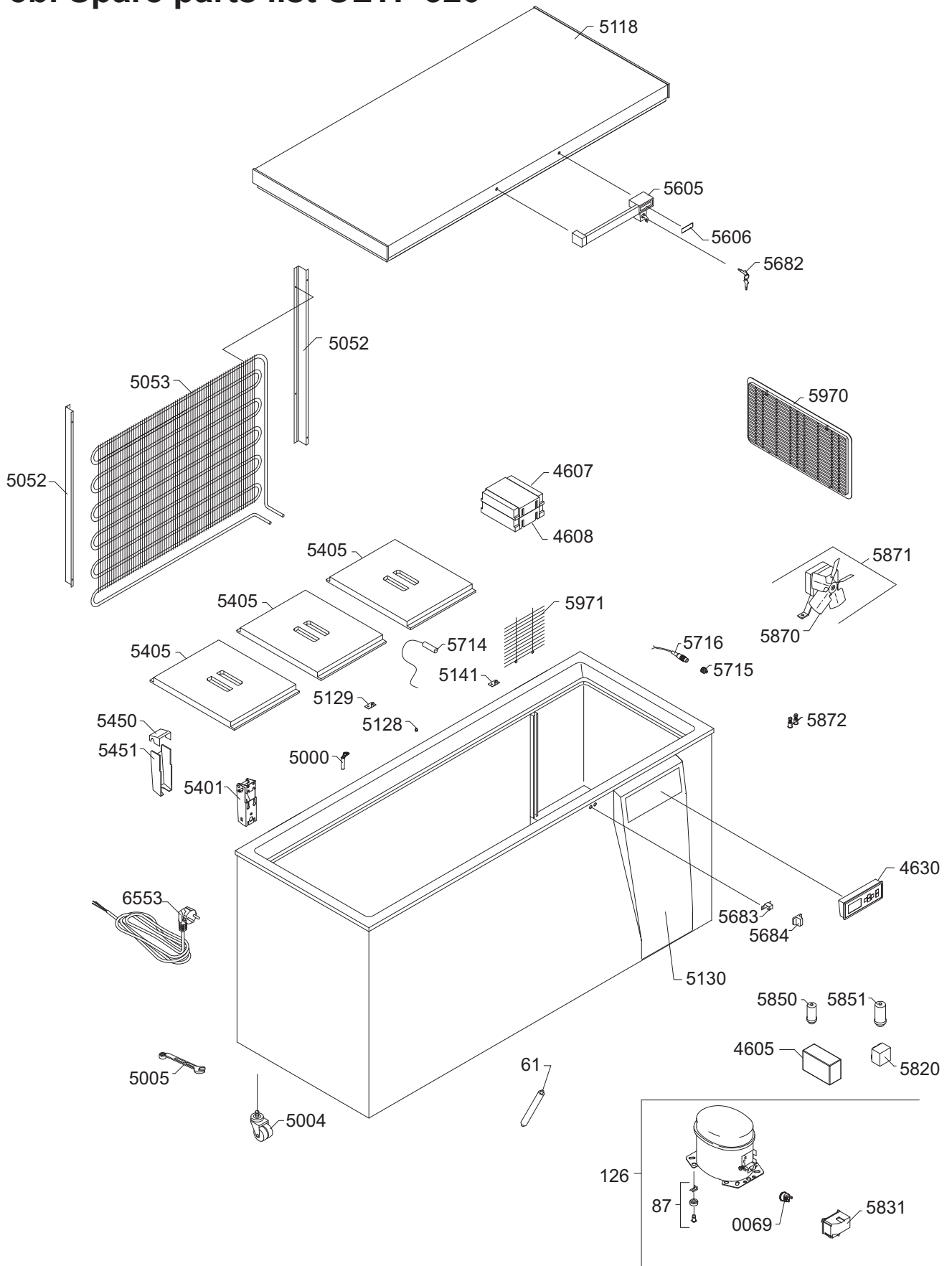
5b. Spare parts list ULTF 220



5b. Spare parts list ULTF 220

Pos. no.	Code no.	Part	Recommended
61	5079000-01	Filter dryer 20 gr.	1
87	5079007-01	Base plate fittings, set, complete	
126	5070095-01	Compressor NEK2150U, complete	1
863	5070106-01	Cover	
4605	5044001-01	Backup battery	1
4607	5041006-01	PCB-Board G-214 Controller	1
4608	5041007-01	Power supply G-214	1
4630	5043007-01	Display G-214	1
5000	5030040-01	Drain plug	
5004	5053009-01	Double castor	
5005	5032002-01	Fixed spanner, 9mm	
5054	5079008-01	Fittings for condenser	
5055	5071017-01	Condenser	
5112	5052100-01	Lid foamed without handle and hinges	
5128	5032011-01	Magnet	
5129	5031164-01	Magnet bracket	
5130	5030088-01	Display cover	
5141	5031163-01	Sensor bracket	
5402	5031006-01	Hinge	
5404	5052008-01	Sub lid, small	
5450	5030003-01	Cover top part for hinge	
5451	5030004-01	Cover bottom part for hinge	
5538	5070099-01	Terminal Board, complete	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle	
5682	5051002-01	Key, set 2 pcs.	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5714	5042018-01	Temp. sensor - lenght 400 mm	1
5715	5054003-01	Chassis plug	
5716	5054002-01	Plug for remote alarm	
5850	5070101-01	Starting device	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan complete	1
5872	5019052-01	Well-nut, screw, set for fan bracket	
5970	5030006-01	Motor screen, white plastic	
5971	5030005-01	Grill for motor compartment	
6553		Mains lead	
-		Refrigerant	1
-	5072000-01	Cylinder deposit for refrigerant	1

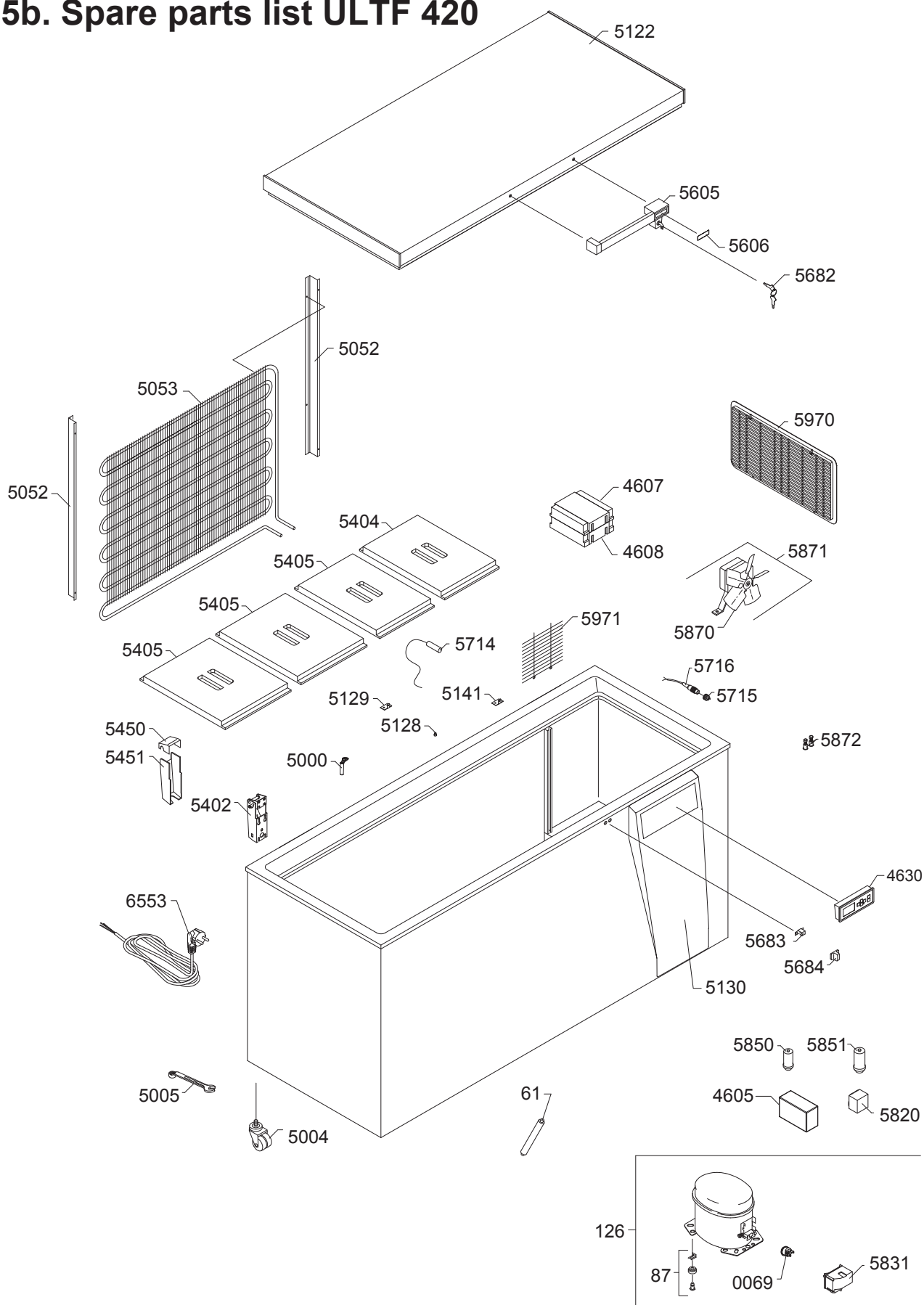
5b. Spare parts list ULTF 320



5b. Spare parts list ULTF 320

Pos. no.	Code no.	Part	Recommended
61	5079000-01	Filter dryer 20 gr.	1
69	5070103-01	Overload protector	
87	5079007-01	Base plate fittings, set, complete	
126	5070097-01	Compressor NEK2160U, complete	1
4605	5044001-01	Backup battery	1
4607	5041006-01	PCB-Board G-214 Controller	1
4608	5041007-01	Power supply G-214	1
4630	5043007-01	Display G-214	1
5000	5030040-01	Drain plug	
5004	5053009-01	Double castor	
5005	5032002-01	Fixed spanner, 9mm	
5052	5079009-01	Fittings for condenser	
5053	5071018-01	Condenser	
5118	5052034-01	Lid foamed without handle and hinges	
5128	5032011-01	Magnet	
5129	5031164-01	Magnet bracket	
5130	5030088-01	Display cover	
5141	5031163-01	Sensor bracket	
5401	5031006-01	Hinge 30	
5405	5052007-01	Sub lid, large	
5450	5030003-01	Top part for hinge cover	
5451	5030004-01	Bottom part for hinge cover	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle, neutral	
5682	5051002-01	Key, set - 2 pcs	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5714	5042018-01	Temp. sensor - lenght 400 mm	1
5715	5054003-01	Chassis plug	
5716	5054002-01	Plug for remote alarm	
5820	5070107-01	Starting device	1
5831	5070104-01	Cover	
5850	5070108-01	Starting capacitor	1
5851	5070109-01	Run capacitor	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan, complete	
5872	5019052-01	Well-nut, screw, set for fan bracket	
5970	5030006-01	Motor screen, White plastic	
5971	5030005-01	Grill for motor compartment	
6553		Mains lead	
-		Refrigerant	1
-	5072000-01	Cylinder deposit for refrigerant	1

5b. Spare parts list ULTF 420



5b. Spare parts list ULTF 420

Pos. no.	Code no.	Part	Recommended
61	5079000-01	Filter dryer 20 gr.	1
69	5070103-01	Overload protector	
87	5079007-01	Base plate fittings, set, complete	
126	5070097-01	Compressor NEK2160U, complete	1
4605	5044001-01	Backup battery	1
4607	5041006-01	PCB-Board G-214 Controller	1
4608	5041007-01	Power supply G-214	1
4630	5043007-01	Display G-214	1
5000	5030040-01	Drain plug	
5004	5053009-01	Double castor	
5005	5032002-01	Fixed spanner, 9mm	
5052	5079009-01	Fittings for condenser	
5053	5071018-01	Condenser	
5122	5052004-01	Lid foamed without handle and hinges	
5128	5032011-01	Magnet	
5129	5031164-01	Magnet bracket	
5130	5030088-01	Display cover	
5141	5031163-01	Sensor bracket	
5402	5031007-01	Hinge 40	
5404	5052008-01	Sub lid, small	
5405	5052007-01	Sub lid, large	
5450	5030003-01	Top part for hinge cover	
5451	5030004-01	Bottom part for hinge cover	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle, neutral	
5682	5051002-01	Key, set - 2 pcs	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5714	5042018-01	Temp. sensor lenght - 400 mm	1
5715	5054003-01	Chassis plug	
5716	5054002-01	Plug for remote alarm	
5820	5070107-01	Starting device	1
5831	5070104-01	Cover	
5850	5070108-01	Starting capacitor	1
5851	5070109-01	Run capacitor	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan, complete	
5872	5019052-01	Well-nut, screw, set for fan bracket	
5970	5030006-01	Motor screen, White plastic	
5971	5030005-01	Grill for motor compartment	
6553		Mains lead	
-		Refrigerant	1
-	5072000-01	Cylinder deposit for refrigerant	1



5c. COMPRESSOR TECHNICAL DATA

COMPRESSOR DEFINITION

Designation	NE K2150U
Nominal Voltage/Frequency	220-240 V 50 Hz
Engineering Number	863AA51

A - APPLICATION / LIMIT WORKING CONDITIONS

1 Type	Hermetic reciprocating compressor		
2 Refrigerant	R-290		
3 Nominal voltage and frequency	220-240 / 50	[V / Hz]	
4 Application type	Low Back Pressuure R290		
4.1 Evaporating temperature range	-40°C to -10°C	(-40°F to 14°F)	
5 Motor type	CSIR		
6 Starting torque	HST - Hight starting torque		
7 Expantion device	Capillary tube or Expansion valve		
8 Compressor cooling		Operating voltage range	
		50 Hz	60 Hz
8.1 LBP (32°C Ambient temperature)	-	-	-
8.2 LBP (43°C Ambient temperature)	-	-	-
8.3 HBP (32°C Ambient temperature)	-	-	-
8.4 HBP (43°C Ambient temperature)	-	-	-
9 Maximum condensing pressures/temperature			
9.1 Operating (gauge)	19.1	[kgf/cm²] (272 psig)	/ °C - °F
9.2 Peak (gauge)	21.2	[kgf/cm²] (301 psig)	/ °C - °F
10 Maximum winding temperature	130	[°C]	

B - MECHANICAL DATA

1 Commercial designation	1/2+	[hp]
2 Displacement	13.54	[cm ³] (0.826 cu.in)
2.1 Bore	29.362	
2.2 Stroke	10.000	
3 Lubricant charge	350	[ml] (11.84 fl.oz.)
3.1 Lubricants approved		
3.2 Lubricants type/viscosity	ESTER / ISO22	
4 Weight(with oil charge)	11.6	[kg] (25.57 lb.)
5 Nitrogen charge	-	[kgf/cm ²]

C - ELETRICAL DATA

1 Nominal Voltage/Frequency/Number of Phases	220-240 V 50 Hz 1 ~ (Single phase)	
2 Starting device type	Current Relay	
2.1 Starting device		
3 Start capacitor	64-77(330)	[µF(VAC minimum)]
4 Run capacitor	-	[µF(VAC minimum)]
5 Motor protection (external)	T0347/G6	
6 Start winding resistance	30.40	[Ω at 25°C (77°F)] +/- 8%
7 Run winding resistance	4.20	[Ω at 25°C (77°F)] +/- 8%
8 LRA - Locked rotor amperage (50 Hz)	19.50	[A] - Measured according to UL 984
9 FLA - Full load amperage L/MBP (50 Hz)	-	[A] - Measured according to UL 984
10 FLA - Full Load Amperage HBP (50 Hz)	-	[A] - Measured according to UL 984
11 Approval boards certification	VDE	



COMPRESSOR TECHNICAL DATA

D - PERFORMANCE - CHECK POINT DATA

TEST CONDITIONS: @220V50Hz			ASHRAELBP32 Fan		Evaporating temperature -23.3°C (-9.94°F) (Condensing temperature 54.4°C (129.92°F))			
Cooling capacity +/- 5%			Power consumption +/- 5%	Current consumption +/- 5%	Gas flow rate +/- 5%	EFFICIENCY RATE +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
1985	500	582	444	2.98	5.91	4.47	1.13	1.31

E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V50Hz		ASHRAE32 Fan			(Condensing temperature 35°C (+95°F))					
Evaporating temperature		Cooling capacity +/- 5%			Power consumption +/- 5%	Current consumption +/- 5%	Gas flow rate +/- 5%	EFFICIENCY RATE +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	952	240	279	273	2.45	2.81	3.49	0.88	1.02
-35	(-31)	1255	316	368	311	2.55	3.71	4.04	1.02	1.18
-30	(-22)	1637	413	480	348	2.66	4.86	4.70	1.18	1.38
-25	(-13)	2098	529	615	386	2.78	6.24	5.44	1.37	1.59
-20	(- 4)	2636	664	772	423	2.90	7.87	6.24	1.57	1.83
-15	(+ 5)	3252	820	953	459	3.03	9.74	7.09	1.79	2.08
-10	(+14)	3946	994	1156	495	3.17	11.87	7.96	2.01	2.33

TEST CONDITIONS: @220V50Hz		ASHRAE32 Fan			(Condensing temperature 45°C (+113°F))					
Evaporating temperature		Cooling capacity			Power consumption	Current consumption	Gas flow rate	EFFICIENCY RATE		
		+/- 5%			+/- 5%	+/- 5%	+/- 5%	+/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	902	227	264	279	2.47	2.66	3.24	0.82	0.95
-35	(-31)	1177	297	345	320	2.58	3.48	3.68	0.93	1.08
-30	(-22)	1531	386	449	363	2.71	4.54	4.22	1.06	1.24
-25	(-13)	1964	495	575	406	2.85	5.84	4.82	1.22	1.41
-20	(- 4)	2475	624	725	451	3.00	7.38	5.48	1.38	1.61
-15	(+ 5)	3065	772	898	497	3.18	9.18	6.17	1.56	1.81
-10	(+14)	3733	941	1094	544	3.36	11.23	6.87	1.73	2.01

TEST CONDITIONS: @220V50Hz		ASHRAE32 Fan			(Condensing temperature 55°C (+131°F))					
Evaporating temperature		Cooling capacity +/- 5%			Power consumption +/- 5%	Current consumption +/- 5%	Gas flow rate +/- 5%	EFFICIENCY RATE +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	852	215	250	285	2.49	2.52	2.98	0.75	0.87
-35	(-31)	1099	277	322	330	2.61	3.25	3.34	0.84	0.98
-30	(-22)	1425	359	417	377	2.75	4.22	3.79	0.95	1.11
-25	(-13)	1830	461	536	427	2.92	5.44	4.29	1.08	1.26
-20	(- 4)	2314	583	678	479	3.10	6.90	4.83	1.22	1.41
-15	(+ 5)	2878	725	843	535	3.32	8.62	5.38	1.36	1.58
-10	(+14)	3520	887	1031	593	3.55	10.59	5.94	1.50	1.74



COMPRESSOR TECHNICAL DATA

F - EXTERNAL CHARACTERISTICS

1 Base plate	European Standard		
2 Tray holder	No		
3 Connectors			
3.1 SUCTION	8.1 +0.10/+0.00	[mm]	(0.319" +0.004"/+0.000")
3.1.1 Material	Copper		
3.1.2 Shape	Slanted 42°		
3.2 DISCHARGE	6.1 +0.10/+0.00	[mm]	(0.240" +0.004"/+0.000")
3.2.1 Material	Copper		
3.2.2 Shape	Straight		
3.3 PROCESS	6.1 +0.10/+0.00	[mm]	(0.240" +0.004"/+0.000")
3.3.1 Material	Copper		
3.3.2 Shape	Slanted 42°		
3.4 Oil cooler (Copper)	No	[mm]	
3.5 Connector sealing	Rubber Plugs		

embraco**5c. COMPRESSOR TECHNICAL DATA****COMPRESSOR DEFINITION**

Designation	NE K2160U
Nominal Voltage/Frequency	220-240 V 50 Hz
Engineering Number	863FA51

A - APPLICATION / LIMIT WORKING CONDITIONS

1 Type	Hermetic reciprocating compressor		
2 Refrigerant	R-290		
3 Nominal voltage and frequency	220-240 / 50	[V / Hz]	
4 Application type	Low Back Pressuure R290		
4.1 Evaporating temperature range	-40°C to -10°C	(-40°F to 14°F)	
5 Motor type	CSCR		
6 Starting torque	HST - Hight starting torque		
7 Expantion device	Capillary tube or Expansion valve		
8 Compressor cooling		Operating voltage range	
		50 Hz	60 Hz
8.1 LBP (32°C Ambient temperature)	-	-	-
8.2 LBP (43°C Ambient temperature)	-	-	-
8.3 HBP (32°C Ambient temperature)	-	-	-
8.4 HBP (43°C Ambient temperature)	-	-	-
9 Maximum condensing pressures/temperature			
9.1 Operating (gauge)	19.1	[kgf/cm²] (272 psig)	/ °C - °F
9.2 Peak (gauge)	21.2	[kgf/cm²] (301 psig)	/ °C - °F
10 Maximum winding temperature	130	[°C]	

B - MECHANICAL DATA

1 Commercial designation	3/4	[hp]
2 Displacement	16.80	[cm ³] (1.025 cu.in)
2.1 Bore [mm]	31.190	
2.2 Stroke [mm]	22.000	
3 Lubricant charge	350	[ml] (11.84 fl.oz.)
3.1 Lubricants approved		
3.2 Lubricants type/viscosity	ESTER / ISO22	
4 Weight (with oil charge)	11.9	[kg] (26.23 lb.)
5 Nitrogen charge	-	[kgf/cm ²]

C - ELETRICAL DATA

1 Nominal Voltage/Frequency/Number of Phases	220-240 V 50 Hz 1 ~ (Single phase)		
2 Starting device type	Voltage Relay		
2.1 Starting device	RVA2L3C		
3 Start capacitor	53-64(330)	[μF(VAC minimum)]	
4 Run capacitor	10(440)	[μF(VAC minimum)]	
5 Motor protection	T0660/G9		
6 Start winding resistance	11.19	[Ω at 25°C (77°F)] +/- 8%	
7 Run winding resistance	3.96	[Ω at 25°C (77°F)] +/- 8%	
8 LRA - Locked rotor amperage (50 Hz)	18.00	[A] - Measured according to UL 984	
9 FLA - Full load amperage L/MBP (50 Hz)	-	[A] - Measured according to UL 984	
10 FLA - Full Load Amperage HBP (50 Hz)	-	[A] - Measured according to UL 984	
11 Approval boards certification	VDE		

D - PERFORMANCE - CHECK POINT DATA

TEST CONDITIONS: @220V50Hz			ASHRAELBP32 Fan		Evaporating temperature (Condensing temperature		-23.3°C (-9.94°F) 54.4°C (129.92°F))	
Cooling capacity +/- 5%			Power consumption +/- 5%	Current consumption +/- 5%	Gas flow rate +/- 5%	EFFICIENCY RATE +/- 7%		
[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
2488	627	729	505	2.56	7.41	4.93	1.24	1.44

E - PERFORMANCE - CURVES

TEST CONDITIONS: @220V50Hz		ASHRAE32 Fan				(Condensing temperature 35°C (+95°F))				
Evaporating temperature		Cooling capacity +/- 5%			Power consumption +/- 5%	Current consumption +/- 5%	Gas flow rate +/- 5%	EFFICIENCY RATE +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1245	314	365	308	1.70	3.68	4.04	1.02	1.18
-35	(-31)	1605	404	470	349	1.87	4.75	4.61	1.16	1.35
-30	(-22)	2062	520	604	391	2.05	6.12	5.28	1.33	1.55
-25	(-13)	2615	659	766	434	2.24	7.78	6.03	1.52	1.77
-20	(- 4)	3266	823	957	478	2.43	9.75	6.84	1.72	2.00
-15	(+ 5)	4013	1011	1176	523	2.63	12.02	7.67	1.93	2.25
-10	(+14)	4857	1224	1423	570	2.83	14.61	8.53	2.15	2.50

TEST CONDITIONS: @220V50Hz		ASHRAE32 Fan			(Condensing temperature 45°C (+113°F))					
Evaporating temperature		Cooling capacity +/- 5%			Power consumption +/- 5%	Current consumption +/- 5%	Gas flow rate +/- 5%	EFFICIENCY RATE +/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1163	293	341	317	1.75	3.43	3.66	0.92	1.07
-35	(-31)	1502	378	440	361	1.94	4.44	4.16	1.05	1.22
-30	(-22)	1934	487	567	408	2.14	5.74	4.74	1.19	1.39
-25	(-13)	2460	620	721	457	2.36	7.31	5.37	1.35	1.57
-20	(- 4)	3078	776	902	510	2.59	9.18	6.04	1.52	1.77
-15	(+ 5)	3790	955	1111	565	2.84	11.35	6.72	1.69	1.97
-10	(+14)	4596	1158	1347	623	3.10	13.83	7.38	1.86	2.16

TEST CONDITIONS: @220V50Hz				ASHRAE32 Fan		(Condensing temperature 55°C (+131°F))				
Evaporating temperature		Cooling capacity			Power consumption	Current consumption	Gas flow rate	EFFICIENCY RATE		
		+/- 5%			+/- 5%	+/- 5%	+/- 5%	+/- 7%		
°C	(°F)	[Btu/h]	[kcal/h]	[W]	[W]	[A]	[kg/h]	[Btu/Wh]	[kcal/Wh]	[W/W]
-40	(-40)	1065	268	312	327	1.77	3.14	3.26	0.82	0.95
-35	(-31)	1387	349	406	374	1.97	4.10	3.71	0.93	1.09
-30	(-22)	1799	453	527	427	2.20	5.33	4.22	1.06	1.24
-25	(-13)	2301	580	674	483	2.45	6.84	4.76	1.20	1.39
-20	(- 4)	2892	729	848	545	2.72	8.63	5.32	1.34	1.56
-15	(+ 5)	3574	901	1047	610	3.02	10.70	5.86	1.48	1.72
-10	(+14)	4346	1095	1273	681	3.34	13.07	6.38	1.61	1.87

embraco**COMPRESSOR TECHNICAL DATA****F - EXTERNAL CHARACTERISTICS**

1 Base plate	European Standard		
2 Tray holder	No		
3 Connectors			
3.1 SUCTION	8.1 +0.10/+0.00	[mm]	(0.319" +0.004"/+0.000")
3.1.1 Material	Copper		
3.1.2 Shape	Slanted 42°		
3.2 DISCHARGE	6.1 +0.10/+0.00	[mm]	(0.240" +0.004"/+0.000")
3.2.1 Material	Copper		
3.2.2 Shape	Straight		
3.3 PROCESS	6.1 +0.10/+0.00	[mm]	(0.240" +0.004"/+0.000")
3.3.1 Material	Copper		
3.3.2 Shape	Slanted 42°		
3.4 Oil cooler (Copper)	No	[mm]	
3.5 Connector sealing	Rubber Plugs		

5d. Safety data sheet for EP-88

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING:

1.1 Product identifier:

EP88

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Cooling agent

1.3 Details of the supplier of the safety data sheet:

Arctiko A/S

Lammefjordsvej 5

DK- 6715 Esbjerg N

Phone: +45 70 20 03 28

Fax: +45 70 20 03 29

Email: info@arctiko.com

1.4 Emergency telephone number

+45 82 12 12 12 (DK)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

Extremely flammable gas. May cause frostbites.

EU (67/548 or 1999/45):

Fx; R12

CLP(1272/2088):

Flam. Gas 1; H220 Press. Gas

See the full text of risk- and hazard phrases in section 16.

2.2 Label elements:

EU:

Contains: -



Extremely flammable

R12 Extremely flammable

S9 Keep container in a well-ventilated place

S16 Keep away from sources of ignition -- No smoking

- S33 Take precautionary measures against static discharges
S46 If swallowed, seek medical advice immediately and show container or label

CLP:

Contains: -



Danger

- H220 Extremely flammable gas
P403 Store in a well-ventilated place
P210 P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P243 Take precautionary measures against static discharge.
P301+P315 IF SWALLOWED: Get immediate medical advice/attention

2.3 Other hazards

May cause frostbites in case of contact with skin and eyes.

PBT/vPvB: The mixture does not meet the criteria for PBT/vPvB in accordance with REACH Annex XII

3. COMPOSITION /INFORMATION ON INGREDIENTS:

3.1 Substances

Not applicable.

3.2 Mixtures

Product description: Liquefied Gas

<u>Substance name</u>	<u>CAS no./Einecs no.</u>	<u>%:</u>	<u>Classification:</u>
Hexafluoroethane(R116)	76-16-4/200-939-8	20-30	EU: Not classified CLP: Not classified
Trifluoromethane (R23)	75-46-7/200-872-4	10-20	EU: Not classified CLP: Not classified
Propane (R290)	74-98-6/200-827-9	20-30	EU: Fx;R12 CLP: Flam. Gas 1; H220 Press. Gas
N-Butane (R600)	106-97-8/203-448-7	30-40	EU: Fx;R12 CLP: Flam. Gas 1; H220 Press. Gas

See the full text of risk- and hazard phrases in section 16.

4. FIRST AID MEASURES:

4.1 Description of first aid measures:

Inhalation:

Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Skin contact:

In case of contact with liquid spillage – flush with water for at least 15 minutes. Seek medical attention.

Eye contact:

In case of contact with liquid spillage – flush with water for at least 15 minutes. Hold the eye open. Remove contact lenses. Seek medical attention.

Ingestion:

Seek medical attention.

Burns:

Rinse with water until the pain disappears. Remove burned clothes during rinsing. If medical attention is necessary continue rinse until a doctor takes over.

4.2 Most important symptoms and effects, both acute and delayed:

High concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. May cause frostbites in case of contact with skin and eyes.

4.3 Indication of any immediate medical attention and special treatment needed:

If the person is unconscious: Call immediately a doctor or an ambulance. Show this safety data sheet to the medical staff.

5. FIREFIGHTING MEASURES:

5.1 Extinguishing media:

All known extinguishing agents can be used.

5.2 Special hazards arising from the substance or mixture:

Extremely flammable. Exposure to fire may cause containers to rupture/explode. Avoid inhalation of smoke. Incomplete combustion may form carbon monoxide, carbonyl fluoride and hydrogen fluoride.

5.3 Advice for fire-fighters:

In confined space use self-contained breathing apparatus.

Specific methods:

If possible, stop flow of product.

Move away from the container and cool with water from a protected position.

Do not extinguish a leaking gas flame unless absolutely necessary.

Spontaneous/explosive re-ignition may occur.

Extinguish any other fire.

6. ACCIDENTAL RELEASE MEASURES:

6.1 Personal precautions, protective equipment and emergency procedures:

Use protective suit. Use self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Evacuate the area. Ensure adequate air ventilation. Eliminate ignition sources.

6.2 Environmental precautions:

Try to stop release. Prevent from entering sewers, basements and work pits, or any place where its accumulation can be dangerous.

6.3 Methods and material for containment and cleaning up:

Ventilate area.

6.4 Reference to other sections:

Not applicable.

7. HANDLING AND STORAGE:

7.1 Precautions for safe handling:

Avoid inhalation and contact with skin and eyes. Keep away from sources of ignition, including electrostatic discharge.

Ensure equipment is adequately earthed. Suck back of water into the container must be prevented.

Purge air from system before introducing gas. Do not allow reflux into the container.

Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.

7.2 Conditions for safe storage, including any incompatibilities:

Segregate from oxidant gases and other oxidants in store. Keep container below 50 °C in a well ventilated place. Keep the container secured and safe from collision.

7.3 Specific end use(s):

See use in section 1.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

8.1 Control parameters:

Substance name	Exposure limit
Propane	1000 ppm / 1800 mg/m ³ (DK)
N-Butane	500 ppm / 1200 mg/m ³ (DK)

8.2 Exposure controls:

Appropriate engineering controls:

Ensure adequate ventilation.

Individual protection measures:

Do not smoke while handling product. Protect eyes and skin against splashes of liquid.

Respiratory protection:

In case of gas leak wear self-contained breathing apparatus

Eye protection:

Use goggles if there is risk of splashes of liquid.

Skin protection:

Use insulating gloves and protective suit if there is risk of splashes of liquid.

9. PHYSICAL AND CHEMICAL PROPERTIES:

9.1 Information on basic physical and chemical properties:

Appearance:	Colourless gas.
Odour:	Sweetish. Poor warning properties at low concentration
Odour threshold:	Not available
pH:	Not applicable
Melting point/freezing point:	Not available
Initial boiling point and boiling range:	Not available
Flash point:	Not available
Evaporation rate:	Not available
Flammability:	Not available
Upper/lower flammability or explosive limits:	Not available
Vapour pressure:	Not available
Vapour density:	Not available
Relative density:	Not available
Solubility(ies):	Not applicable
Partition coefficient (n-octanol/water):	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available
Explosive properties:	Not available
Oxidising properties:	Not available
Physical hazards (Flammable gas):	Flam. Gas 1; H220

9.2 Other information:

Not relevant.

10. STABILITY AND REACTIVITY:

10.1 Reactivity:

Not available.

10.2 Chemical stability:

May decompose violently at high temperature and/or pressure or in the presence of a catalyst.

10.3 Possibility of hazardous reactions:

Can form explosive mixture with air. May react violently with oxidants.

10.4 Conditions to avoid:

Keep away from heat.

10.5 Incompatible materials:

Avoid contact with oxidizing agents.

10.6 Hazardous decomposition products:

Incomplete combustion may form carbon monoxide, carbonylfluoride and hydrogenfluoride..

11. TOXICOLOGICAL INFORMATION:

11.1 Information on toxicological effects:

Hazard class	Data	Test	Source
Acute toxicity:			
Inhalation	Not available	-	-
Dermal	Not available	-	-
Oral	Not applicable	-	-
Skin corrosion /irritation	Not available	-	-
Sensitisation	Not available	-	-
CMR	Not available	-	-

Information on likely routes of exposure:

Skin, eyes and inhalation.

Inhalation

High concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination. May cause frostbites in case of contact with skin and eyes.

Skin contact:

May cause frostbites.

Eye contact:

May cause frostbites.

Ingestion:

Ingestion is not considered a potential route of exposure.

Long term effects

No known long term effects.

12. Ecological information:

12.1 Toxicity:

Aquatic Data		Test (medium)	Source
Fish	Not available	-	-
Crustaceans	Not available	-	-
Algae	Not available	-	-

12.2 Persistence and degradability:

Not available

12.3 Bioaccumulative potential:

Not available

12.4 Mobility in soil:

Not available

12.5 Results of PBT- and vPvB assessment:

Not available

12.6 Other adverse effects:

Not available

13. DISPOSAL CONSIDERATIONS:

13.1 Waste treatment methods:

Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor.

Do not discharge into any place where its accumulation could be dangerous.

Empty bottles and bottles with residues should be returned to the supplier.

14. TRANSPORT INFORMATION:

14.1 UN number:

UN 3161

14.2 UN proper shipping name

UN 3161 Liquefied gas, flammable, n.o.s. (N-butane, propane)

14.3 Transport hazard class(es)

2 (Classification code 2F)

14.4 Packing group

Not applicable.

14.5 Environmental hazards

The mixture is not an environmental hazard

14.6 Special precautions for user

Avoid transport on vehicles where the load space is not separated from the driver's compartment.

Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

Before transporting product containers:

- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

15. REGULATORY INFORMATION:

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

Young people under 18 years may not work with this product. The user must be instructed before use and be familiar with the content of this Safety Data Sheet.

15.2 Chemical safety assessment:

Not available

16. OTHER INFORMATION:

Full text of hazard- and risk-phrases in section 3:

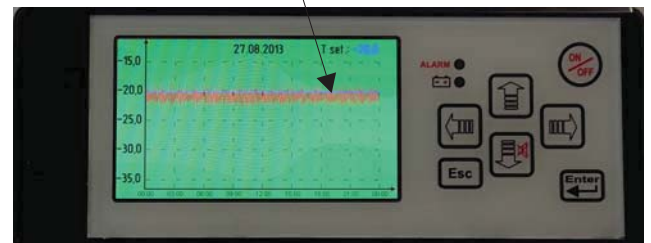
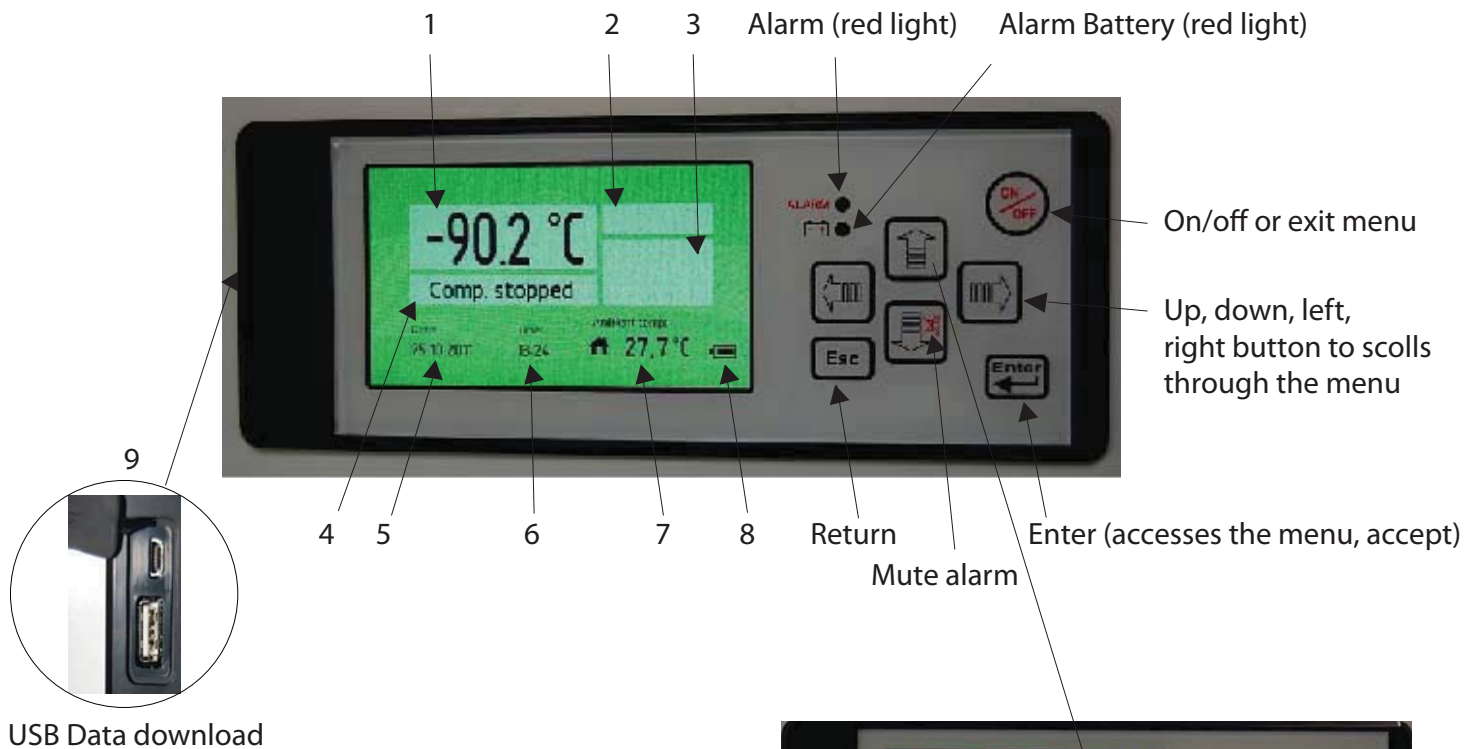
R12 Ex tremely flammable

H220 Extremely flammable gas

Since consumer is working outside of our knowledge and our control, be aware that it always is the consumers responsibility to make the necessary steps to comply with applicable regulations.

AM-Gruppen A/S, July 2010.

5e. Controller G-214



Control Panel Description

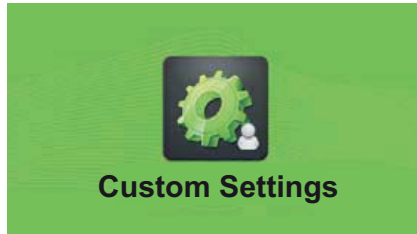
1. Temperature indicator
2. Alarm indicator
3. Alarm-icons
4. Compressor indication
5. Date indication
6. Hour indication
7. Ambient temperature indicator
8. Battery level
9. USB-Connection

Push the **UP** button in order to generate a graph.

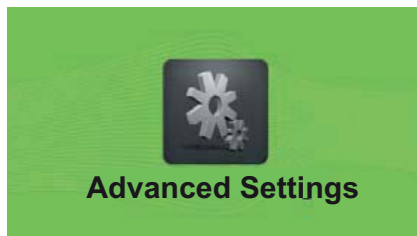
Push the **LEFT** button in order to return up to 10 days back.

Push the **Esc** button in order to exit the menu.

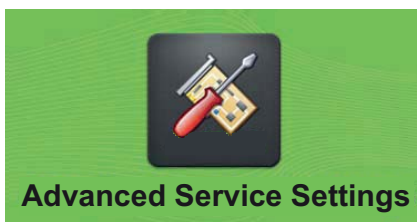
Setting icons



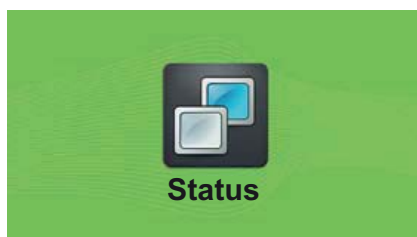
Custom Settings



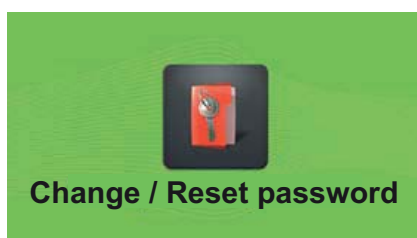
Advanced Settings



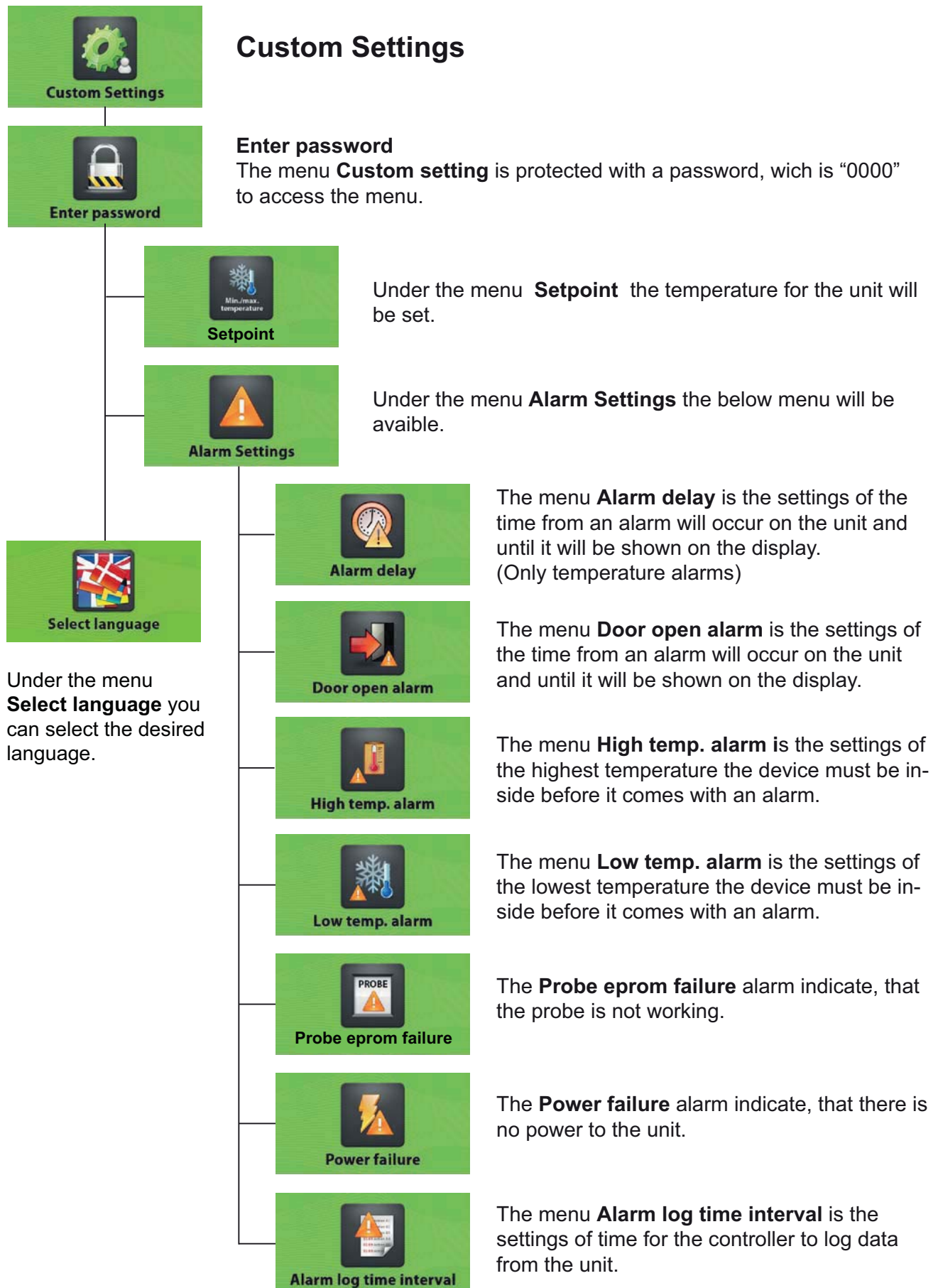
Advanced Service Settings



Status



Change / Reset password



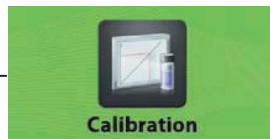


Advanced Settings



Enter password

The menu **Advanced Settings** is protected with a password which is "0000" to access the menu.



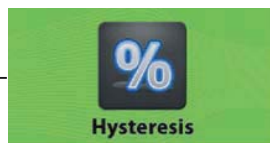
The menu **Calibration** is the settings for offset of the temperature in the display.



The menu **Automatic defrost** is the setting of the time where a defrost automatic will be performed on the unit.



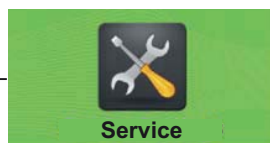
Under the menu **Manual defrost** the defrost can be started immediately.



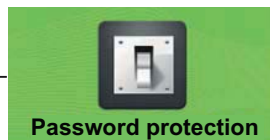
The menu **Hysteresis** is the setting of the difference from the setpoint where the compressor will start and stop.



The menu **Temp. range limits** is the settings of the maximum and minimum temperature the unit can be used for.



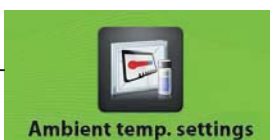
→ **Service**



The menu **Password protection** is the setting of the protection for the unit not to be turned off and is protected with a password.



The menu **Set date / time** is the setting of date and time.



The menu **Ambient temp. settings** is the adjustment of the ambient temperature.



Service

Service Settings

Under the menu **Service**, there is information about the unit, which is important for service on the unit.



Compressor hours

The menu **Compressor hours** shows, how many hours the compressor has run.



Fan hours

The menu **Fan hours** shows, how many hours the fan has run.



Probe

Under the menu **Probe** the temperature for the sensor mounted in the unit is displayed.



Probe inside unit

Under the menu **Probe inside unit** the temperature of the sensor mounted inside the unit is displayed. There is mounted a sensor as standard in the unit, but it is possible to mount 3 sensors inside the device. (Controller version)



Probe Compressor

Under the item **Probe Compressor** the temperature of the sensor mounted on the compressor is displayed. (Not all models)



Probe evaporator

Under the point **Probe evaporator** the temperature of the sensor, that is located on the condenser, is displayed.



Advanced Service Settings

Advanced Service Settings

This menu is only used by the service department at the manufacturer.



Status

Status



Current alarms

The **Current alarms** shows the alarm, which have been on the unit with data and time.



Temp. last 24 hours

The **Temp. last 24 hours** shows the temperature of the unit the last 24 hours.



Change/Reset password

Change / Reset password



Change password

Under **Change password** it is possible to change the password for **Customer Settings**, **Advanced Settings** and **Advanced Service Settings**.



Reset password

Under **Reset password** it is possible to reset the password for the **Customer Settings**, **Advanced Settings** and **Advanced Service Settings**.

Contact the manufacturer to get the password for reset password.

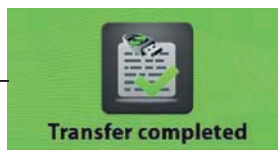
Download Data



Place the USB pen drive in the connection on the display and press the button right for **read data** from the unit to the USB pen.



The **Read data** will be shown in the display when the data is loading to the USB pen drive.



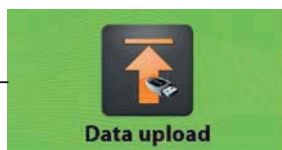
The **Transfer complete** will be shown on the display when the loading is finished and the USB pen can be removed from the display.

Open the 2 files:
data00 and **param00**
on a computer in Excel or similar.

Upload Data (Only for new settings from the manufactory)



Turn-off the display before start.
Place the USB pen drive in the connection on the display and press the button left for upload parameters from the USB pen to the unit.



The **Data upload** will be shown in the display when the data is loading to the unit.



The **Transfer complete** will be shown on the display when the loading is finished and the USB pen can be removed from the display.

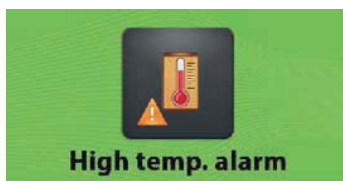
Alarms on display



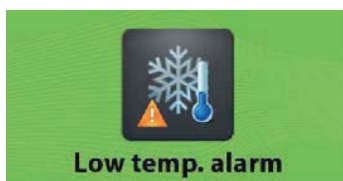
Alarm icons



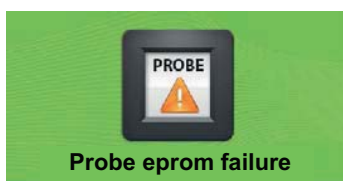
The **Door open alarm** indicate, that the door is not correct closed



The **High temperature alarm** indicate, that the temperature inside the unit is higher than permitted from setting of the unit.



The **Low temperature alarm** indicate, that the temperature inside the unit is lower than permitted from setting of the unit.



The **Probe eprom failure** alarm indicate, that the probe is not working.



The **Power failure** alarm indicate, that there is no power to the unit.



The **Low battery** alarm indicate, that the power on the battery is to low.

5f. Default settings

Description	Arctiko default settings	Customer settings
Custom Settings (Password)	0000	
Set point		
Freezer	-80,0	
Alarm Settings:		
Alarm delay		
Freezer	15 min	
Door open alarm		
Freezer	Enable	
High temp. alarm		
Freezer	-70	
Low temp. alarm		
Freezer	-90	
Probe/eprom failure		
Freezer	Enable	
Power failure		
Freezer	Enable	
Alarm log time interval		
Freezer	1	

Description	Arctiko default settings	Customer settings
Advanced Settings (Password)	0000	
Calibration		
Freezer	0,0	
Automatic defrost		
Freezer	0	
Manual defrost		
Freezer	OK	
Hysteresis		
Freezer	2,0	
Temp. range limits		
Freezer Max.	-40,0	
Freezer Min.	-86,0	

ARCTIKO

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