



ARCTIKO

The art of simplicity®

Service Manual LTFE 140 / 290 / 370 / 515

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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.

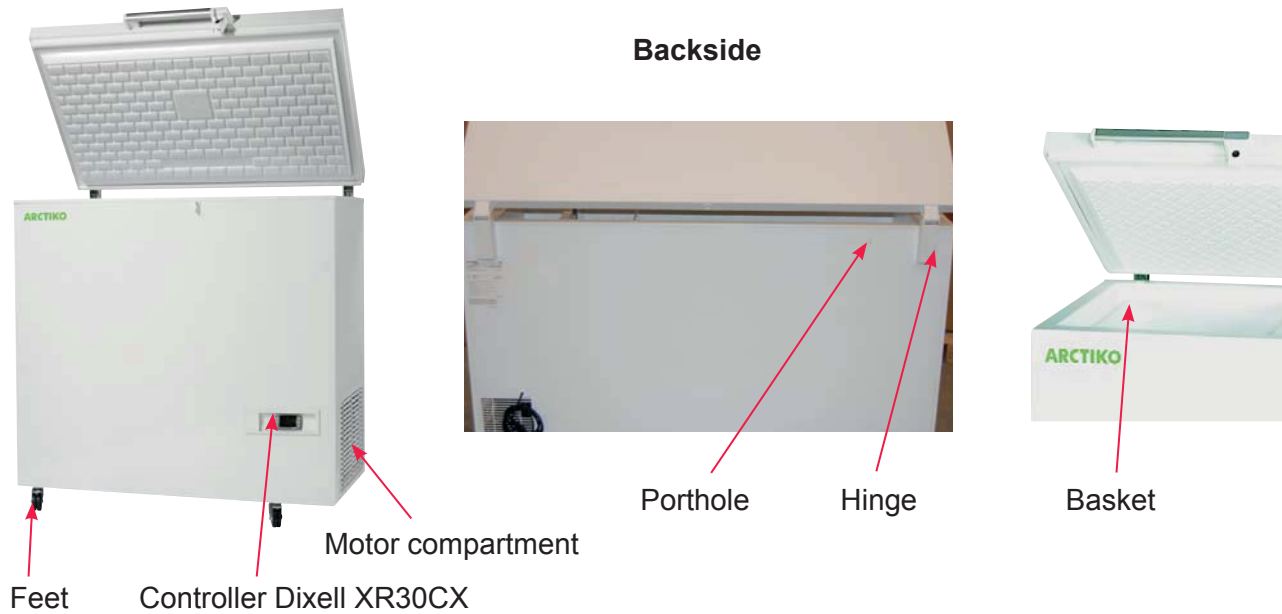
1.3 Chemical and biological safety

- 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

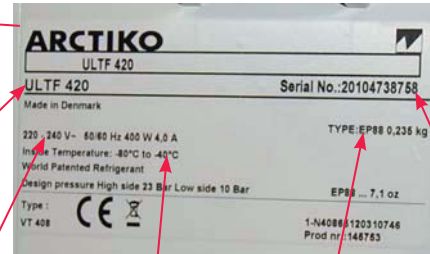
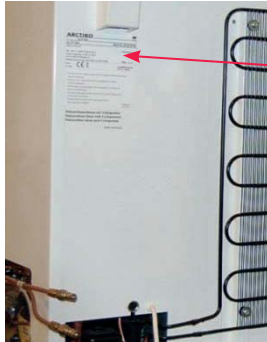
LTFE 140 / 290 / 370



LTFE 515



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 Dixell XR30CX

The controller is located in the lower right corner on the front of the freezer.



Digital display.

Adjustable high / low temperature.

Visual and audible alarm.

Contact for remote alarm.

48 hour battery backup during power failure.



Alarms:

High / low temperature (adjustable)

Power failure

Sensor error

Memory error (Eprom)

Manual defrosting. See section 4e.

See section 5 for:

Datasheet for Dixell XR30CX. See 5f.

Settings. See 5g.

Wiring diagram. See 5a/b.

Datasheet for compressor. See 5d

Spare parts list. See 5c.

2c. Model information

Model	LTFE 140	LTFE 290	LTFE 370	LTFE 515
Item code	DAI 1600	DAI 1605	DAI 1610	DAI 1615
Temp. range °C	-10/-45	-10/-45	-10/-45	-10/-45
Max. ambient temp. °C	25	25	25	25
Power supply (V)	230	230	230	230
Frequency (Hz)	50/60	50/60	50/60	50/60
Fuse (A)	10	10	10	10
AMP (A)	3	4	4	4
Power consumption (KWh/24h)	3.2	4.2	5.1	6.67
Power (KW/Hp)	*)	*)	*)	*)
No. of Compressors	1	1	1	1
Refrigerant/filling/gram	R404a / 110	R404a / 132	R404a / 142	R404a / 242

*) 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.		Test sensor.	Change controller
	The sensor is defect.		Test compressor windings.	See section 3n
	Faulty windings in compressor.		Test start relay.	See section 3k
	Start relay defect.		Use wiring-diagram.	See section 3m
	Fault in electrical installation.			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

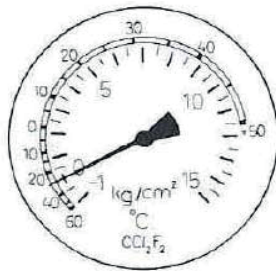
Problem	Cause	Recommended equipment	Troubleshooting	Action
The compressor runs constantly. The unit freezes normal or colder.	The sensor is incorrectly installed.			
	Sensor is defect.			
	Controller is damaged.			
	Icing on the frame.		Check the door for leaks.	See section 4a.
	The temperature is set 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	Mount the valve and check pressure.	Change compressor.
		Manometer		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.

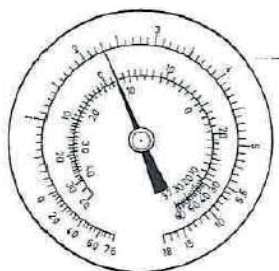


Reason: No compressor capacity

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

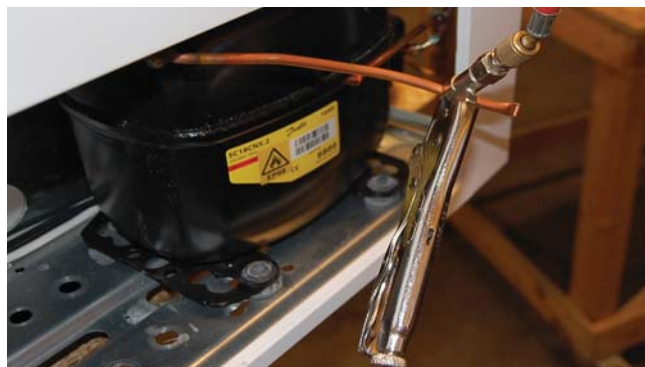
- To prevent moisture from penetrating under repair, the system must not be open for more than 15 minutes.
- Prepare spare parts components before the system is opened.
- The new connector is soldered to a tube with valve.



- 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.



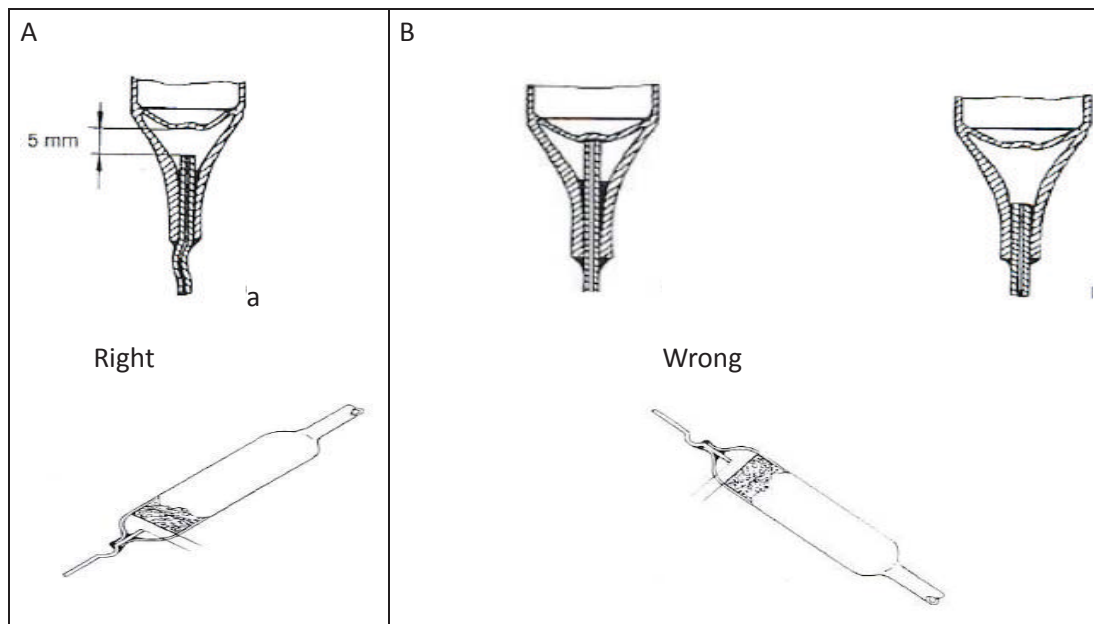
- The cooling system is evacuated with a two-stage vacuum pump for at least 30 minutes. Both from the pressure piping and process piping.
- Blow the system with nitrogen, both from the suction and the pressure side.

3e. Changing the dryfilter

- The dry filter 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 dry filter is placed after the condenser outlet, immediately before the capillary. Any opening of the cooling system, dry filter 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.



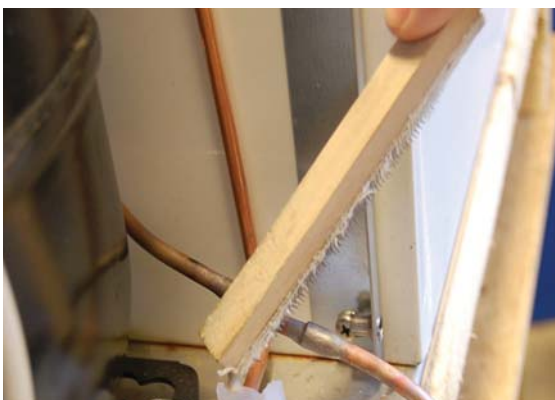
- Cut off the capillary tube with a capillary tube scissors.
- It is recommended to use a special tongs to create a wave on the capillary tube which ensures the correct positioning in the filter.



In the figure A the capillary tube is correctly installed in a dry filter. 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 to 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 dry filter 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 dry filter 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)



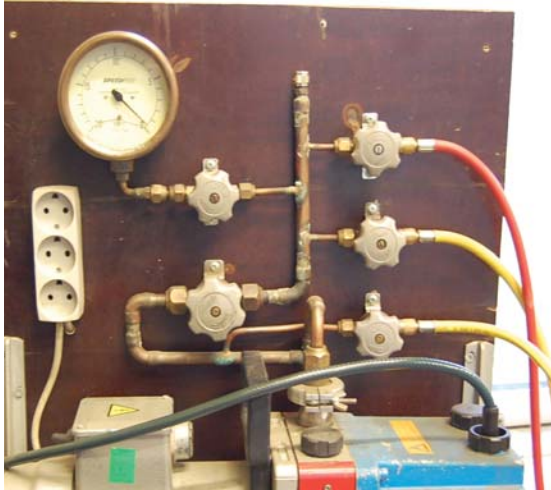
- In order to avoid decomposition of refrigerants which may remain in the system during the soldering operation, the system is blown with dry nitrogen, respectively, from the suction side respectively pressure side.
- Solder the tubes on to the compressor.
- Pressure test the system.

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 R-404a

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

Note that R-404a 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.

The temperature of the servicebottle should be between 8°C and 14°C.

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.

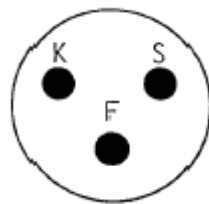
3j. Electrical troubleshooting

Before starting systematic troubleshooting, check the following:

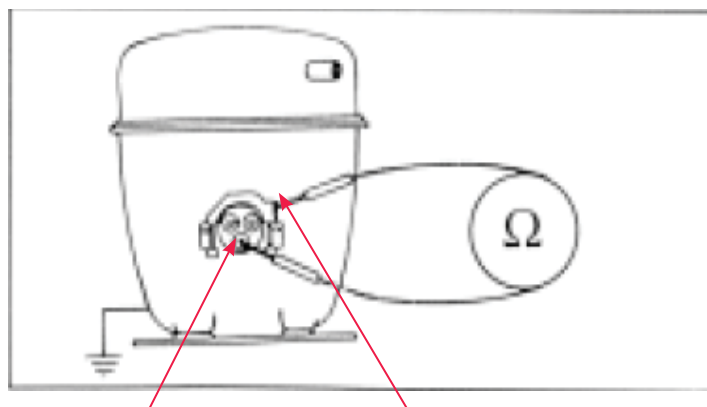
- Proper voltage is present.
- Electrical equipment used, is suitable for the compressor.
- The wires are properly installed according to wiring diagram.
- There is no transition between the live parts and ground.

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 compressors shared leg (see sketch). Showing ohmmeter a transition, the compressor is replaced.



Plug on the compressor



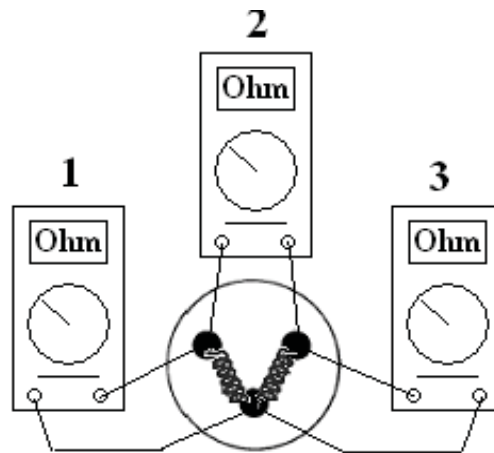
Shared leg

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.

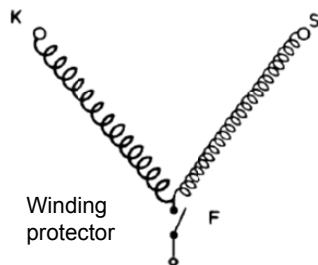
3k. Electrical fault - compressor

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 main winding 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.

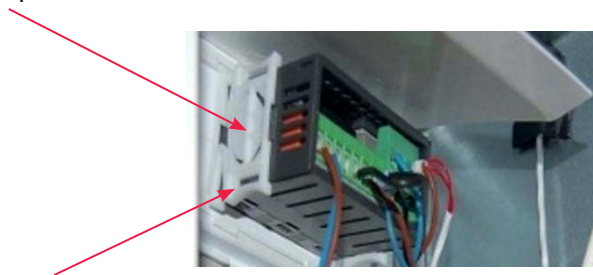
Indicates the measurement error, the compressor is replaced.

3l. Controller - demounting the display

Demounting of controller Dixell XR30CX.

The controller is located in the lower right corner on the front of the freezer in a cut-out 29 x 71 cm.

- Disconnect the power supply.
- Press the faps on both sides of the controller. See illustration.

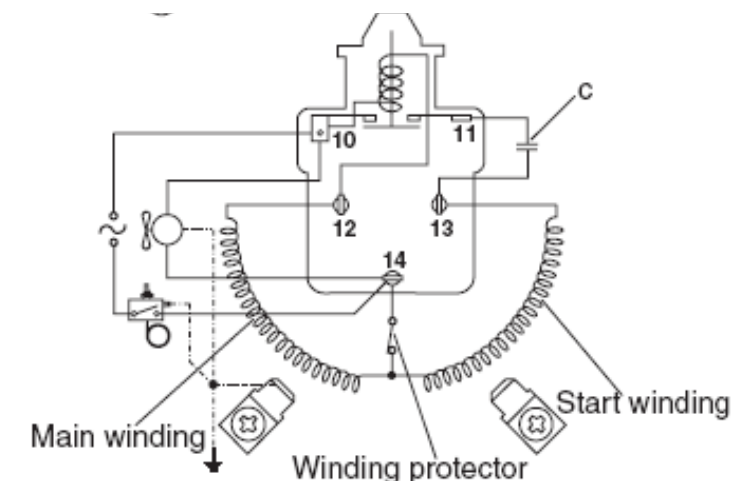


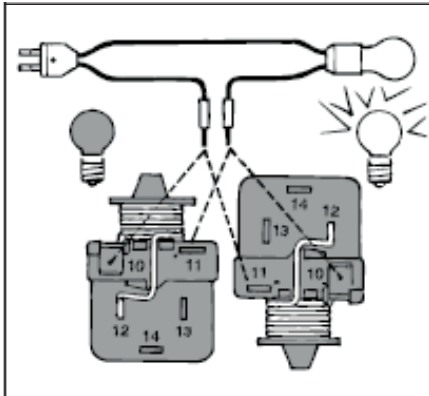
- Pull back the clips.
- Press the the controller out of the motor compartment.
- Disconnect all cables.

3m. HST-start relay, start capacitor

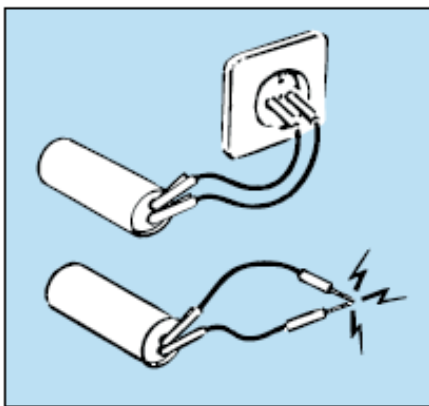
Connect a voltmeter between terminals 10 and 13 at the start of the relay. If no voltage is present, there is either a faulty cable or also start relay is defective.

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.



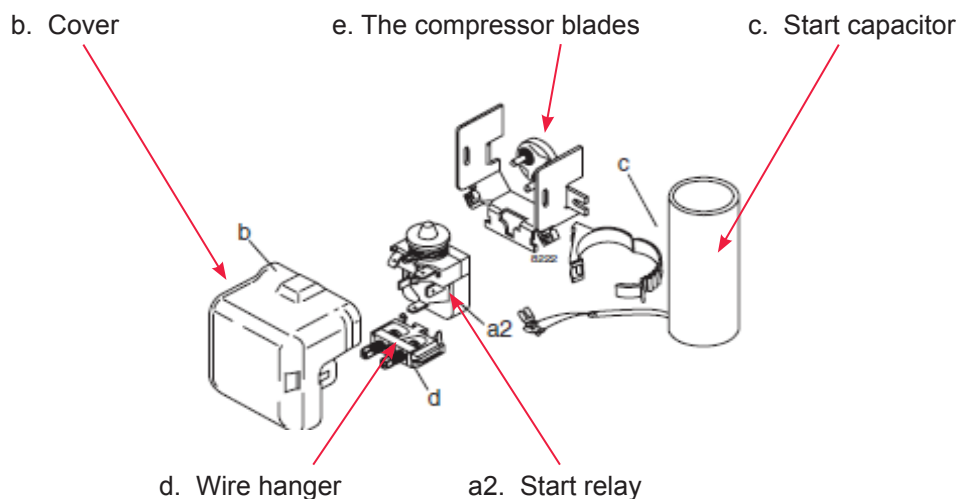
The start capacitor can be checked by injecting the normal voltage for a few seconds and than shorting it. When sparks are generated, the capacitor is in order.

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

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

The voltage connected to terminals 10 and 14.

Startkondensatoren connected to terminals 11 and 13 and clamped.



3n. Sensor for the controller

PT 100

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 100 sensor is located behind an alu. panel at the bottom of the freezer.

- Remove the partition.
- Remove the sealing material around introduction and pull out the sensor.
- Remove the sensor pins on the terminal 11 and 12 of the controller. See wiring diagram.

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



Partition

Rail



PT 100 sensor

3o. Condenser

See section 4c. for LTFE 515.

LTFE 140 / 290 / 370 have a built-in block condenser.

3p. 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.

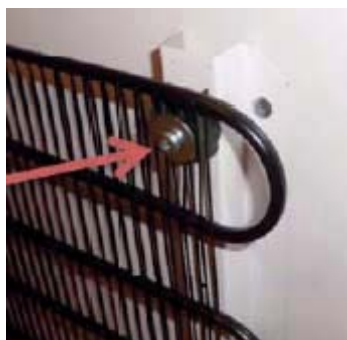
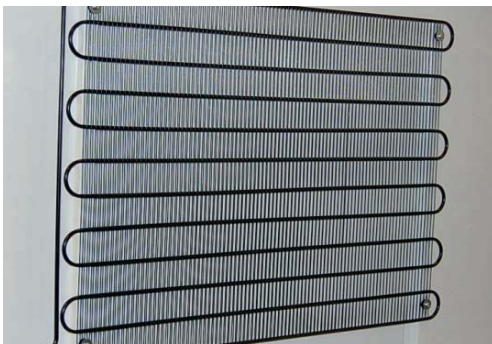
4c. Condenser

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.

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.

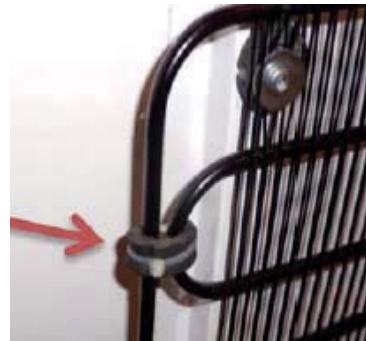
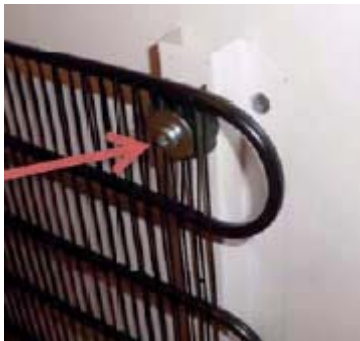


Process tube (too far)

Rubber feet



- 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.

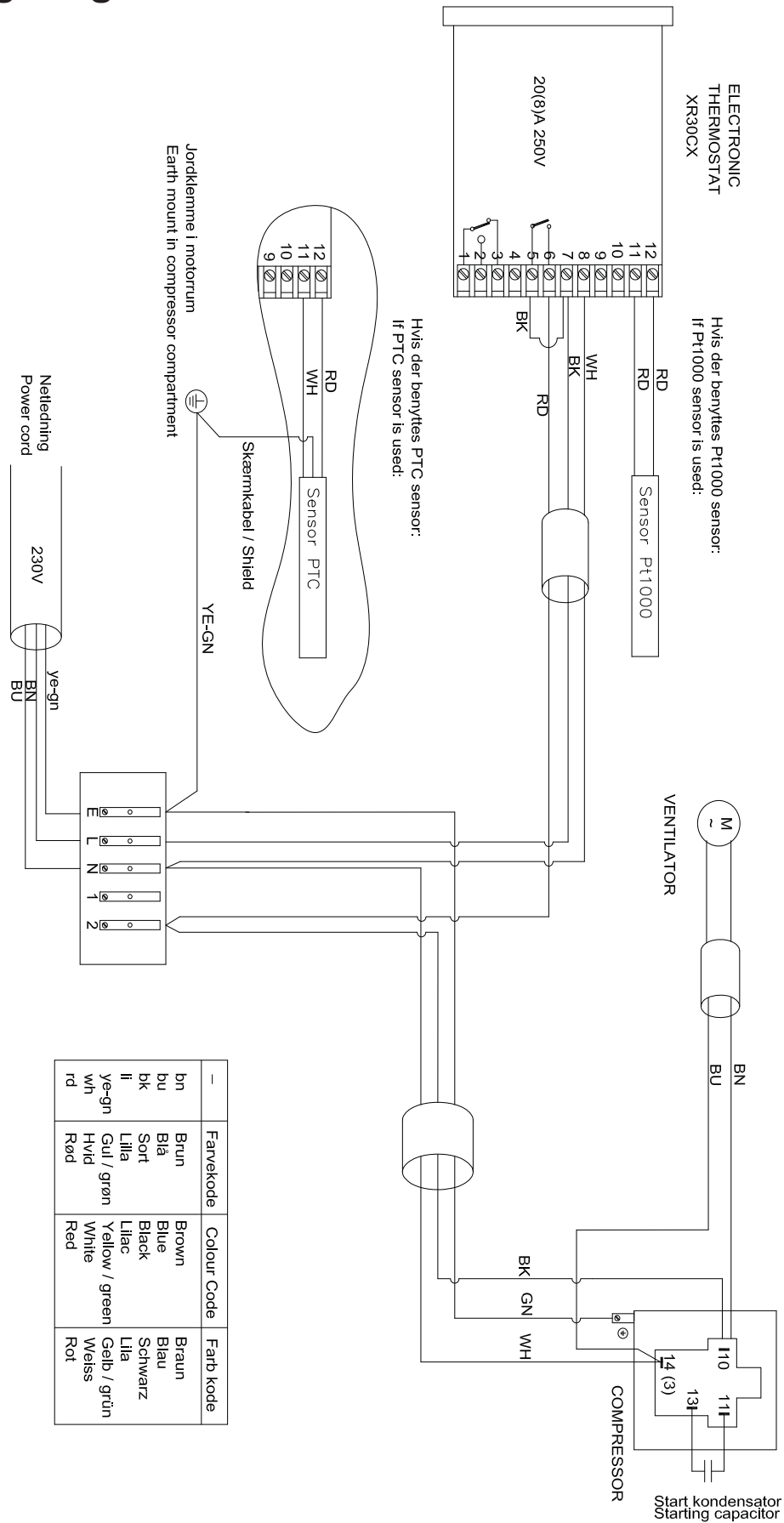
It has a lifespan of 3 years, but should be checked every six months.

Check the voltage with a voltmeter.

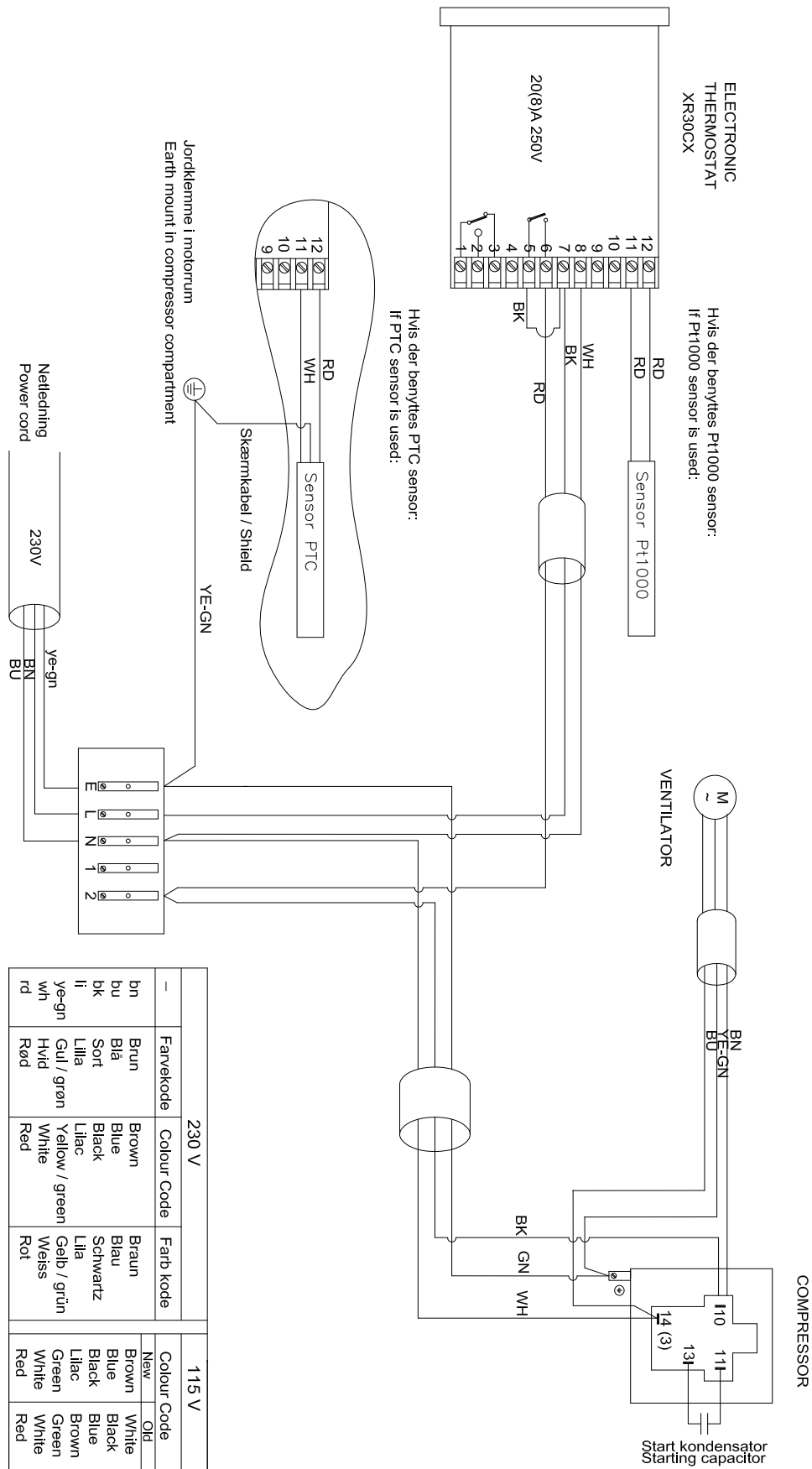


Backup battery

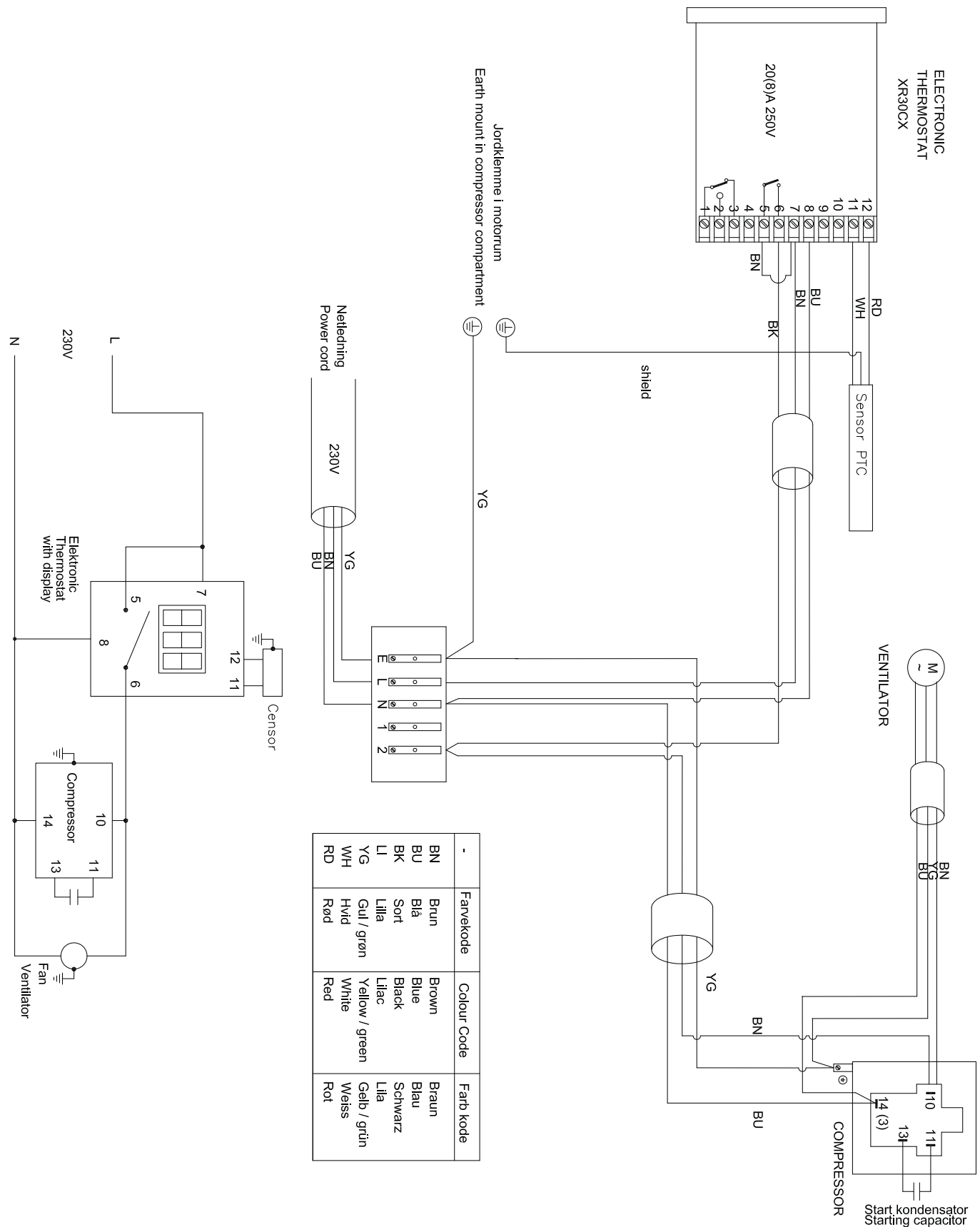
5a. Wiring-diagram LTFE 140



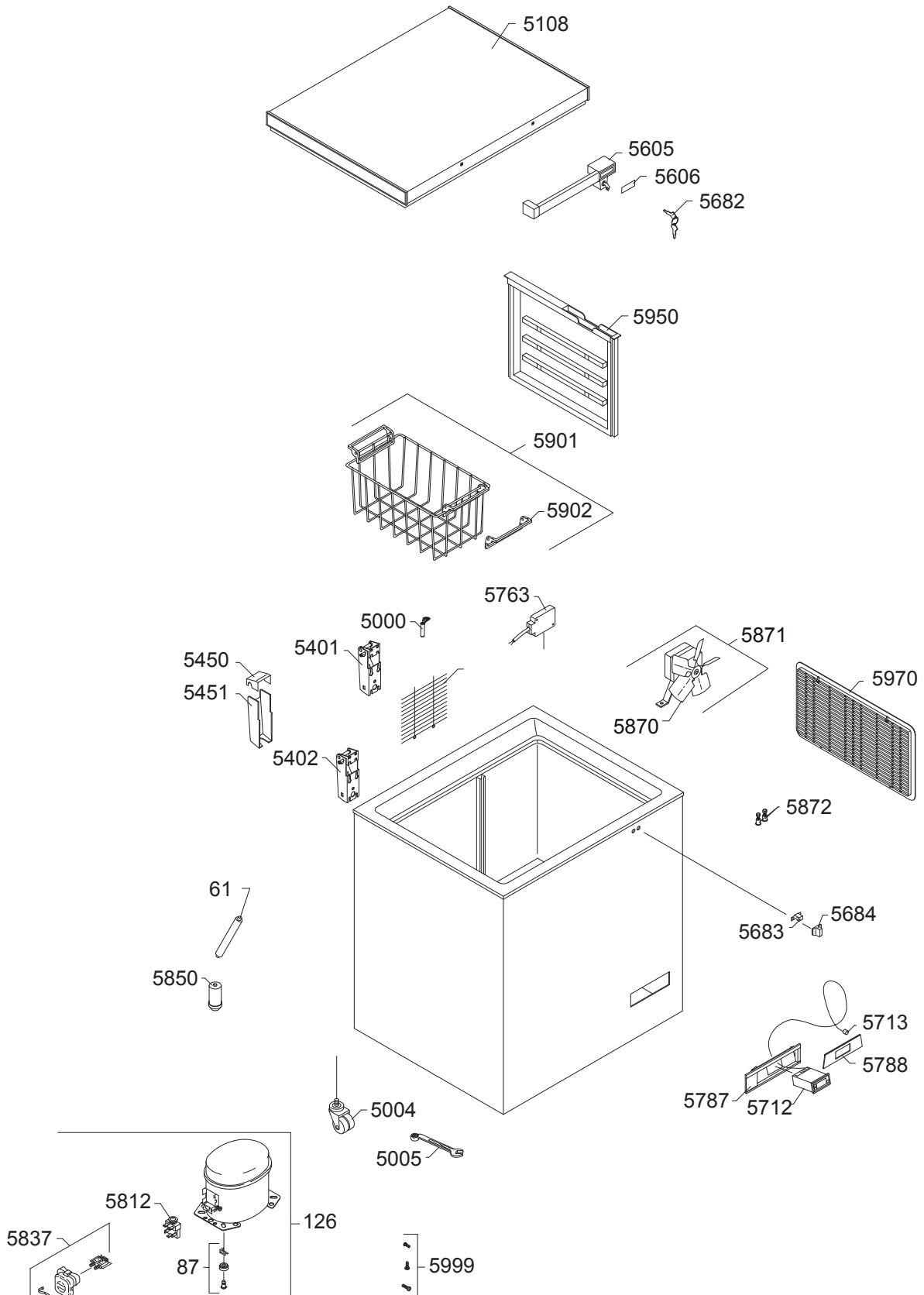
5b. Wiring-diagram LTFE 290



5c. Wiring-diagram LTFE 370 / 515



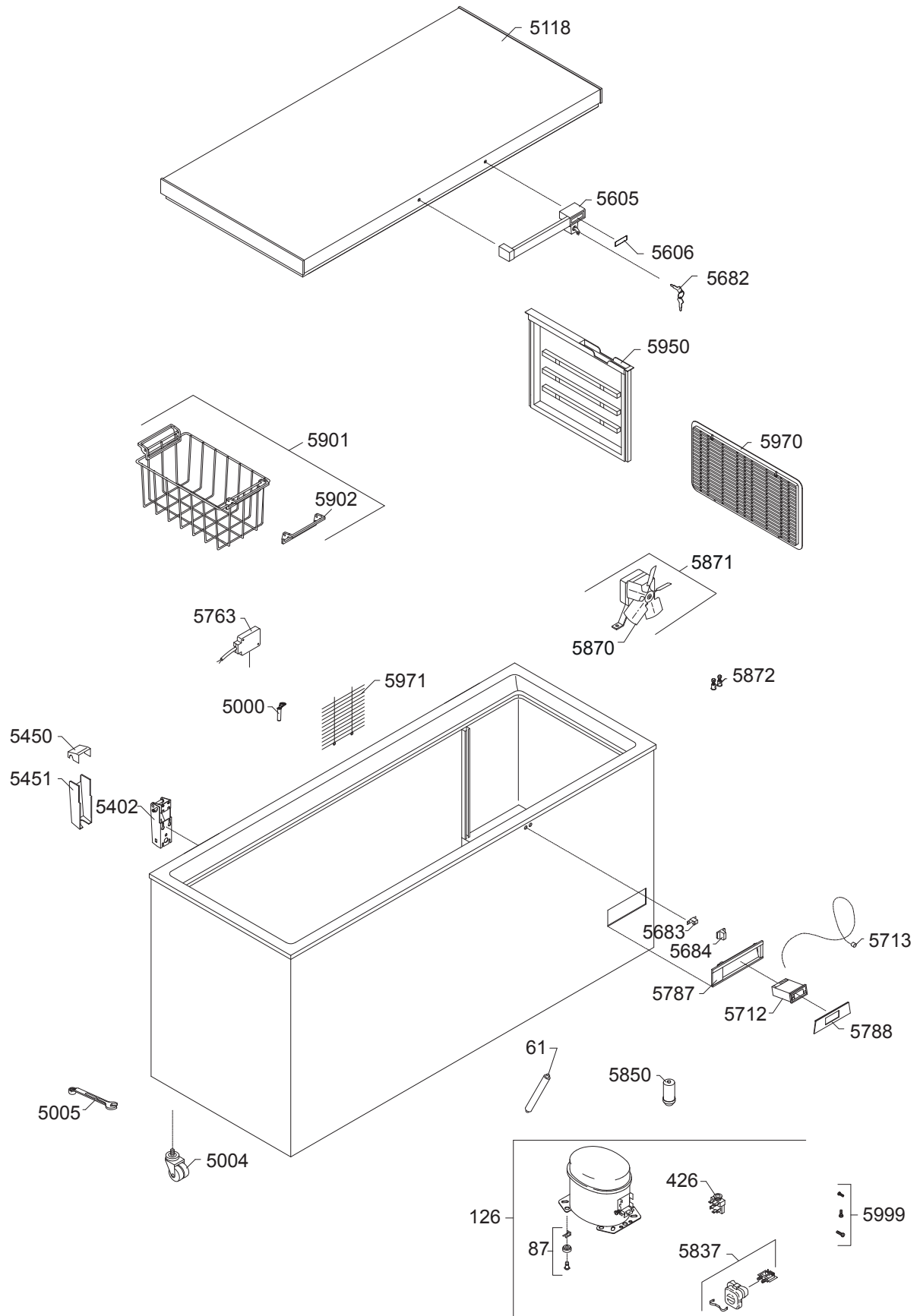
5d. Spare parts list LTFE 140



5d. Spare parts list LTFE 140

Pos. no.	Code no.	Part	Recomanded
61	5079000-01	Filter dryer 20gr.	1
87	5079007-01	Base plate fittings, set, complete	
126	5070072-01	Compressor SC12CLX.2	1
5000	5030040-01	Drain plug	
5004	5053009-01	Double castor	
5005	5032002-01	Fixed spanner, 9mm	
5108	5052057-01	Lid foamed without handle and hinges	
5401	5031008-01	Hinge without spring	
5402	5031007-01	Hinge spring 40	
5450	5030003-01	Cover top part for hinge	
5451	5030004-01	Cover bottom part for hinge	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle	
5682	5051002-01	Key	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5712	5040007-01	Controller XR30CX incl. probe	1
5713	5042013-01	Probe PT1000 for controller	1
5787	5030023-01	Control panel	
5788	5030039-01	Window for control panel	
5812	5070044-01	Starting device 117U6019	1
5837	5070018-01	Cord relief and cover	
5850	5070077-01	Starting condenser 117U5019	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan, complete	1
5872	5019052-01	Well-nut, screw, set for fan bracket	
5901	5061005-01	Basket with handle white	
5902	5062017-01	Handle for basket	
5950	5030041-01	Partition	
5970	5030006-01	Motor screen, white	
5971	5030005-01	Grill for motor compartment	
5999	5032001-01	Screw, set	
-		Refrigerant	
-	5072001-01	Cylinder deposit for refrigerant	

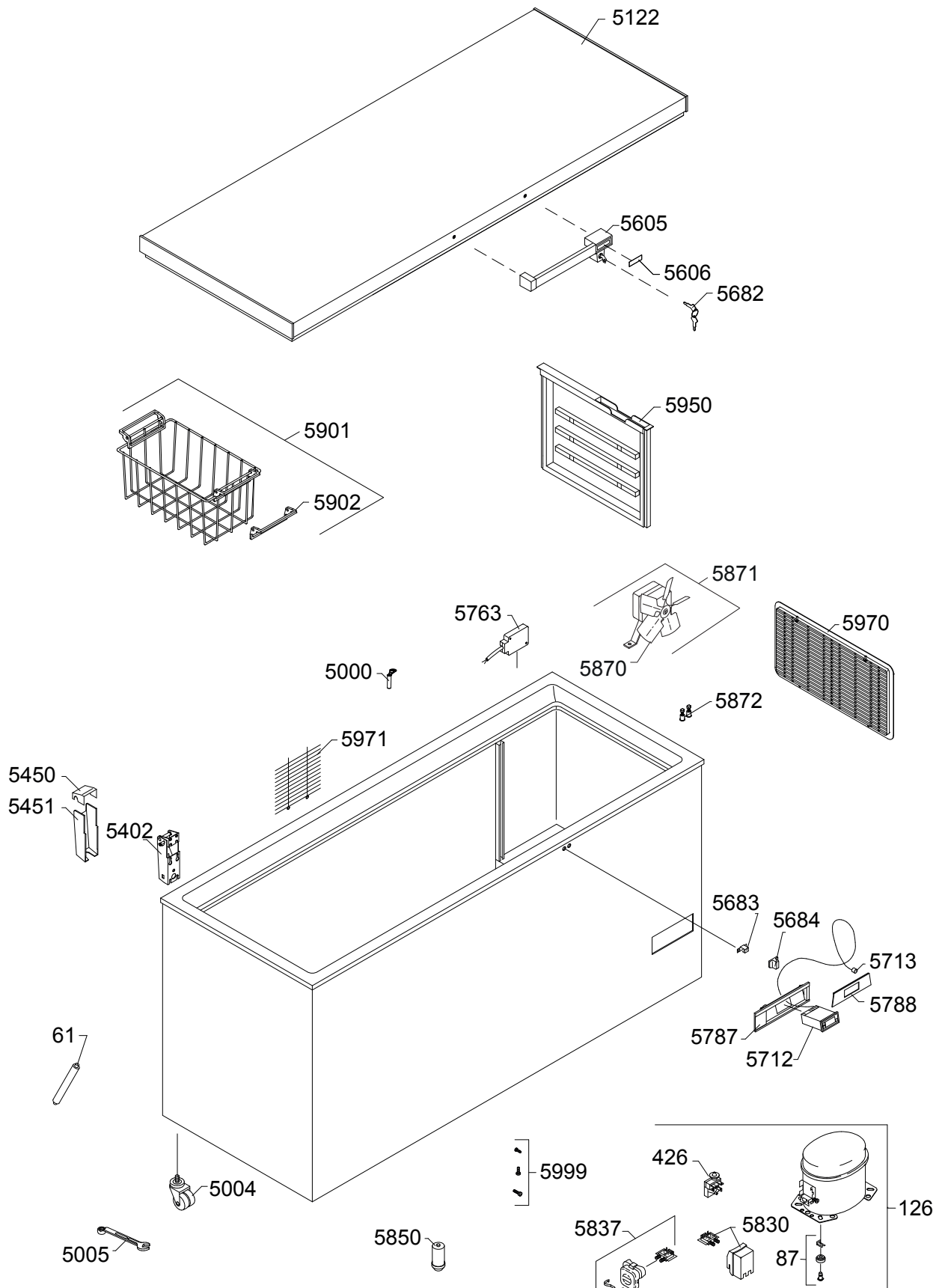
5d. Spare parts list LTFE 290



5d. Spare parts list LTFE 290

Pos. no.	Code no.	Part	Recomanded
61	5079000-01	Filter dryer 20gr.	1
87	5079007-01	Base plate fittings, set, complete	
126	5070012-01	Compressor SC15CLX.2	1
426	5070044-01	Starting device 117U6019	1
5000	5030040-01	Drain plug	
5004	5053009-01	Double castor	
5005	5032002-01	Fixed spanner, 9mm	
5118	5052058-01	Lid foamed without handle and hinges	
5402	5031006-01	Hinge spring 30	
5450	5030003-01	Cover top part for hinge	
5451	5030004-01	Cover bottom part for hinge	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle	
5682	5051002-01	Key	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5712	5040007-01	Controller XR30CX incl. probe	1
5713	5042013-01	Probe PT1000 for controller	1
5787	5030023-01	Control panel	
5788	5030039-01	Window for control panel	
5837	5070018-01	Cord relief and cover	
5850	5070021-01	Starting condenser 117U5017	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan, complete	1
5872	5019052-01	Well-nut, screw, set for fan bracket	
5901	5061005-01	Basket with handle white	
5902	5062017-01	Handle for basket	
5950	5030041-01	Partition	
5970	5030006-01	Motor screen, white	
5971	5030005-01	Grill for motor compartment	
5999	5032001-01	Screw, set	
-		Refrigerant	
-	5072001-01	Cylinder deposit for refrigerant	

5d. Spare parts list LTFE 370



5d. Spare parts list LTFE 370

Pos. no.	Code no.	Part	Recomanded
61	5079000-01	Filter dryer 20gr.	1
87	5079007-01	Base plate fittings, set, complete	
126	5070012-01	Compressor SC15CLX.2	1
426	5070044-01	Starting device 117U6019	1
5000	5030040-01	Drain plug	
5004	5053009-01	Double castor	
5005	5032002-01	Fixed spanner, 9mm	
5122	5052059-01	Lid foamed without handle and hinges	
5402	5031007-01	Hinge spring 40	
5450	5030003-01	Cover top part for hinge	
5451	5030004-01	Cover bottom part for hinge	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle	
5682	5051002-01	Key	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5712	5040007-01	Controller XR30CX incl. probe	1
5713	5042013-01	Probe PT1000 for controller	1
5787	5030023-01	Control panel	
5788	5030039-01	Window for control panel	
5837	5070018-01	Cord relief and cover	
5850	5070021-01	Starting condenser 117U5017	1
5870	5070009-01	Wings for fan	
5871	5010000-01	Fan, complete	1
5872	5019052-01	Well-nut, screw, set for fan bracket	
5901	5061005-01	Basket with handle white	
5902	5062017-01	Handle for basket	
5950	5030041-01	Partition	
5970	5030006-01	Motor screen, white	
5971	5030005-01	Grill for motor compartment	
5999	5032001-01	Screw, set	
-		Refrigerant	
-	5072001-01	Cylinder deposit for refrigerant	

This diagram illustrates the exploded view of a refrigerator assembly, showing the main body, top panel, and various internal components. The parts are labeled with numbers:

- Top Panel:** 5124 (Top panel), 5605 (Top panel hinge), 5606 (Top panel hinge), 5682 (Top panel hinge).
- Internal Components:** 5052 (Coil), 5053 (Coil), 5052 (Coil), 5901 (Basket), 5902 (Basket handle), 5401 (Basket handle), 5970 (Basket handle), 5763 (Basket handle), 5871 (Basket handle), 5870 (Basket handle), 5872 (Basket handle), 61 (Basket handle), 5713 (Basket handle), 5788 (Basket handle), 5712 (Basket handle), 5787 (Basket handle), 5684 (Basket handle), 5683 (Basket handle), 5850 (Basket handle), 5002 (Basket handle), 126 (Basket handle), 87 (Basket handle), 526 (Basket handle), 5837 (Basket handle), 5999 (Basket handle).
- Other Parts:** 5052 (Coil), 5053 (Coil), 5052 (Coil), 5901 (Basket), 5902 (Basket handle), 5401 (Basket handle), 5970 (Basket handle), 5763 (Basket handle), 5871 (Basket handle), 5870 (Basket handle), 5872 (Basket handle), 61 (Basket handle), 5713 (Basket handle), 5788 (Basket handle), 5712 (Basket handle), 5787 (Basket handle), 5684 (Basket handle), 5683 (Basket handle), 5850 (Basket handle), 5002 (Basket handle), 126 (Basket handle), 87 (Basket handle), 526 (Basket handle), 5837 (Basket handle), 5999 (Basket handle).

5d. Spare parts list LTFE 515

Pos. no.	Code no.	Part	Recomanded
61	5079000-01	Filter dryer 20gr.	1
87	5079007-01	Base plate fittings, set, complete	
126	5070012-01	Compressor SC15CLX.2	1
526	5070044-01	Starting device 117U6019	1
5000	5030040-01	Drain plug	
5002	5053017-01	Foot with pin	
5041	5030044-01	Distance piece	
5052	5079009-01	Fittings for condenser	
5053	5071018-01	Condenser	
5124	5052060-01	Lid foamed without handle and hinges	
5401	5031006-01	Hinge 30	
5402	5031007-01	Hinge 40	
5450	5030003-01	Cover top part for hinge	
5451	5030004-01	Cover bottom part for hinge	
5605	5051001-01	Handle with lock	
5606	5030000-01	Inlay for handle	
5682	5051002-01	Key	
5683	5031004-01	Catch for handle	
5684	5030001-01	Cover for catch	
5712	5040007-01	Controller XR30CX incl. probe	1
5713	5042013-01	Probe PT1000 for controller	1
5787	5030023-01	Control panel	
5788	5030039-01	Window for control panel	
5837	5070018-01	Cord relief and cover	
5850	5070021-01	Starting condenser 117U5017	1
5870	5010009-01	Wings for fan	
5871	5010000-01	Fan, complete	1
5872	5019052-01	Well-nut, screw, set for fan bracket	
5901	5061005-01	Basket with handle white	
5902	5062017-01	Handle for basket	
5970	5030006-01	Motor screen, white	
5971	5030005-01	Grille for motor compartment	
5999	5032001-01	Screw, set	
-		Refrigerant	
-	5072001-01	Cylinder deposit for refrigerant	

5e. Compressor data LTFE 140



SC12CLX.2 LBP Compressor R404A/R507 220-240V 50/60Hz

General

Code number	104L2697
Approvals	EN 60335-2-34, UL984/CSA 22.2
Compressors on pallet	80

Application

Application	LBP			
Frequency	Hz	50	60	
Evaporating temperature	°C	-45 to -10	-45 to -10	
Voltage range	V	198 - 254	198 - 254	
Max. condensing temperature continuous (short)	°C	50 (60)	50 (60)	
Max. winding temperature continuous (short)	°C	125 (135)	125 (135)	

Cooling requirements

Frequency	Hz	50			60		
Application		LBP	MBP	HBP	LBP	MBP	HBP
32°C		F ₂	-	-	F ₂	-	-
38°C		F ₂	-	-	F ₂	-	-
43°C		-	-	-	F ₂	-	-
Remarks on application:							

Motor

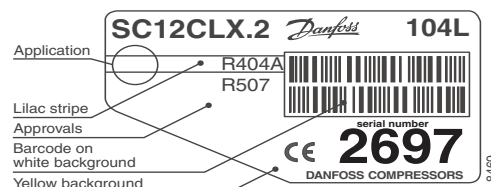
Motor type	CSIR		
LRA (rated after 4 sec. UL984), HST LST	A	19.6	-
Cut in Current, HST LST	A	19.6	-
Resistance, main start winding (25°C)	Ω	3.8	13.7

Design

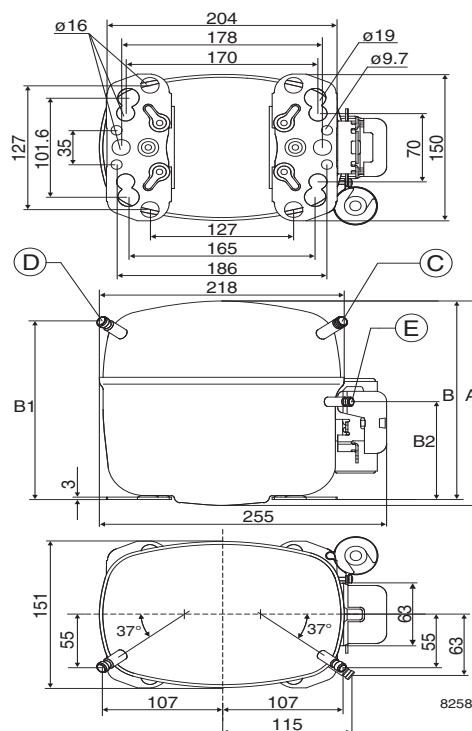
Displacement	cm ³	12.87
Oil quantity (type)	cm ³	550 (polyolester)
Maximum refrigerant charge	g	1300
Free gas volume in compressor	cm ³	1510
Weight without electrical equipment	kg	13.7

Dimensions

Height		mm	A	219
		B	213	
		B1	193	
		B2	110	
Suction connector	location/I.D. mm angle	C	8.2 37°	
	material comment	Cu-plated steel Al caps		
Process connector	location/I.D. mm angle	D	6.2 37°	
	material comment	Cu-plated steel Al caps		
Discharge connector	location/I.D. mm angle	E	6.2 37°	
	material comment	Cu-plated steel Al caps		
Oil cooler connector	location/I.D. mm angle	F	–	
	material comment	–		
Connector tolerance	I.D. mm	±0.09		
Remarks:				



- S = Static cooling normally sufficient
- O = Oil cooling
- F₁ = Fan cooling 1.5 m/s
(compressor compartment temperature equal to ambient temperature)
- F₂ = Fan cooling 3.0 m/s necessary
- SG = Suction gas cooling normally sufficient
- = not applicable in this area



230V, 60Hz, fan cooling F₂

ASHRAE LBP*

220V, 50Hz, fan cooling F₂**EN 12900 Household (CECOMAF)***230V, 60Hz, fan cooling F₂

EN 12900 Household (CECOMAF)*

220V, 50Hz, fan cooling F₂

Evap. temp. in °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15	20
Capacity in W	130	205	294	399	522	569	666	834	1026								
Power cons. in W	253	309	365	420	475	495	533	594	659								
Current cons. in A	2.77	2.88	3.00	3.13	3.29	3.35	3.46	3.65	3.86								
COP in W/W	0.51	0.66	0.81	0.95	1.10	1.15	1.25	1.40	1.56								



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5e. Compressor data LTFE 290 / 370 / 515



SC15CLX.2 LBP Compressor R404A/R507 220-240V 50Hz

General

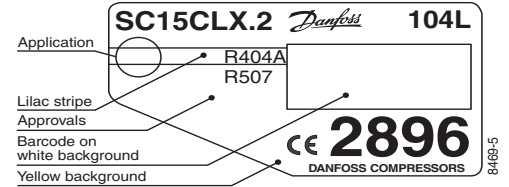
Code number	104L2896
Approvals	EN 60335-2-34
Compressors on pallet	80

Application

Application	LBP		
Frequency	Hz	50	60
Evaporating temperature	°C	-45 to -5	–
Voltage range	V	198 - 254	–
Max. condensing temperature continuous (short)	°C	50 (60)	–
Max. winding temperature continuous (short)	°C	125 (135)	–

Cooling requirements at max. ambient temperature

Frequency	Hz	50			60		
Application		LBP	MBP	HBP	LBP	MBP	HBP
32°C		F ₂	–	–	–	–	–
38°C		F ₂	–	–	–	–	–
43°C		F ₂	–	–	–	–	–
Remarks on application:							



- S = Static cooling normally sufficient
- O = Oil cooling
- F₁ = Fan cooling 1.5 m/s
(compressor compartment temperature equal to ambient temperature)
- F₂ = Fan cooling 3.0 m/s necessary
- SG = Suction gas cooling normally sufficient
- = not applicable in this area

Motor

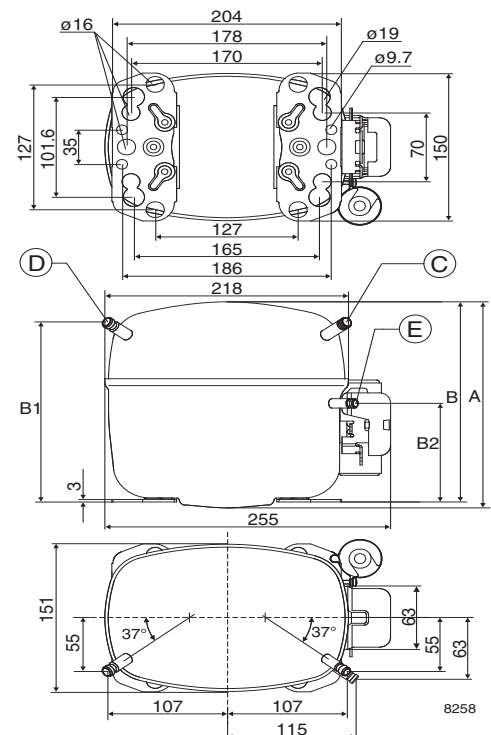
Motor type	CSIR		
LRA (rated after 4 sec. UL984), HST LST	A	19.6	–
Cut in Current, HST LST	A	19.6	–
Resistance, main start winding (25°C)	Ω	3.8	13.7

Design

Displacement	cm ³	15.28
Oil quantity (type)	cm ³	550 (polyolester)
Maximum refrigerant charge	g	1300
Free gas volume in compressor	cm ³	1510
Weight without electrical equipment	kg	13.8

Dimensions

Height	mm	A	219
		B	213
		B1	193
		B2	110
Suction connector	location/I.D. mm angle	C	10.2 37°
	material comment	Cu-plated steel Al caps	
Process connector	location/I.D. mm angle	D	6.2 37°
	material comment	Cu-plated steel Al caps	
Discharge connector	location/I.D. mm angle	E	6.2 37°
	material comment	Cu-plated steel Al caps	
Oil cooler connector	location/I.D. mm angle	F	–
	material comment	–	
Connector tolerance	I.D. mm	±0.09	
Remarks:			



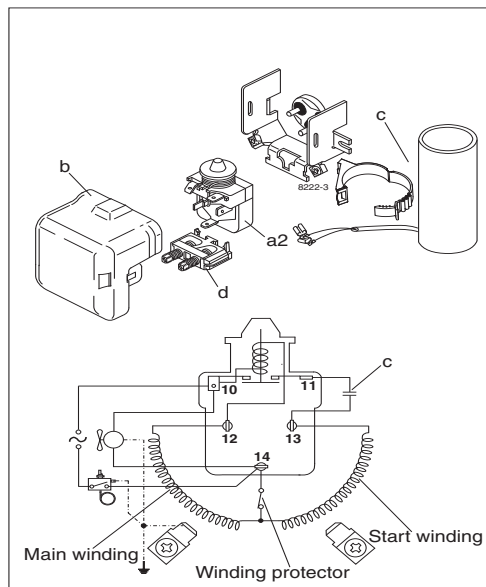
5e. Compressor data LTFE 290 / 370 / 515

EN 12900 Household (CECOMAF)* 220V, 50Hz, fan cooling F₂

Evap. temp. in °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15	20
Capacity in W	159	250	358	486	637	694	813	1017	1251	1424	1519						
Power cons. in W	301	368	433	498	565	588	634	706	783	838	867						
Current cons. in A	2.91	3.10	3.31	3.51	3.73	3.80	3.95	4.18	4.42	4.58	4.66						
COP in W/W	0.53	0.68	0.83	0.98	1.13	1.18	1.28	1.44	1.60	1.70	1.75						

ASHRAE LBP* 220V, 50Hz, fan cooling F₂

Evap. temp. in °C	-45	-40	-35	-30	-25	-23.3	-20	-15	-10	-6.7	-5	0	5	7.2	10	15	20
Capacity in W	184	290	415	564	739	805	944	1182	1457	1659	1771						
Power cons. in W	301	368	433	498	565	588	634	706	783	838	867						
Current cons. in A	2.91	3.10	3.31	3.51	3.73	3.80	3.95	4.18	4.42	4.58	4.66						
COP in W/W	0.61	0.79	0.96	1.13	1.31	1.37	1.49	1.67	1.86	1.98	2.04						



Accessories	Figure	Code number	Test conditions	EN 12900/CECOMAF*	ASHRAE LBP*
PTC starting device	6.3 mm spade connectors	—	Condensing temperature	45°C	45°C
	4.8 mm spade connectors	—	Ambient temperature	32°C	32°C
Starting relay	6.3 mm spade connectors	a2	Suction gas temperature	32°C	32°C
Cover	b	103N2009	Liquid temperature	no subcooling	32°C
Start. capacitor 80 µF	6.3 mm spade connectors	c			
Cord relief	d	103N1004			
Protection screen for PTC	—	—			

Mounting accessories	Code number
Bolt joint for one compressor	Ø: 16 mm 118-1917
Bolt joint in quantities	Ø: 16 mm 118-1918
Snap-on in quantities	Ø: 16 mm 118-1919

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5f. Safety data sheet for R-404a

Material Safety Data Sheet

R-404A

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: R-404A
DISTRIBUTOR: National Refrigerants, Inc.
661 Kenyon Avenue
Bridgeton, New Jersey 08302

FOR MORE INFORMATION CALL:
(Monday-Friday, 8:00am-5:00pm)
1-800-262-0012

IN CASE OF EMERGENCY CALL:
CHEMTREC: 1-800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
Pentafluoroethane (HFC-125)	354-33-6	44
1,1,1-Trifluoroethane (HFC-143a)	420-46-2	52
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	4

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrofluoric Acid (HF) and carbonyl halides.

POTENTIAL HEALTH HAZARDS

SKIN: Irritation would result from a defatting action on tissue. Liquid contact could cause frostbite.

EYES: Liquid contact can cause severe irritation and frostbite. Mist may irritate.

INHALATION: R-404A is low in acute toxicity in animals. When oxygen levels in air are reduced to 12-14% by displacement, symptoms of asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels, cardiac arrhythmia may occur.

INGESTION: Ingestion is unlikely because of the low boiling point of the material. Should it occur, discomfort in the gastrointestinal tract from rapid evaporation of the material and consequent evolution of gas would result. Some effects of inhalation and skin exposure would be expected.

DELAYED EFFECTS: None known.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

<u>INGREDIENT NAME</u>	<u>NTP STATUS</u>	<u>IARC STATUS</u>	<u>OSHA LIST</u>
No ingredients listed in this section			

4. FIRST AID MEASURES

SKIN: Promptly flush skin with water until all chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Get medical attention if symptoms persist.

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes (in case of frostbite water should be lukewarm, not hot) lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist.

INHALATION: Immediately remove to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention. Do not give epinephrine (adrenaline).

INGESTION: Ingestion is unlikely because of the physical properties and is not expected to be hazardous. Do not induce vomiting unless instructed to do so by a physician.

ADVICE TO PHYSICIAN: Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	Gas, not applicable per DOT regulations
FLASH POINT METHOD:	Not applicable
AUTOIGNITION TEMPERATURE:	<750°C
UPPER FLAME LIMIT (volume % in air):	None*
LOWER FLAME LIMIT (volume % in air):	None*
	*Based on ASHRAE Standard 34 with match ignition
FLAME PROPAGATION RATE (solids):	Not applicable
OSHA FLAMMABILITY CLASS:	Not applicable

EXTINGUISHING MEDIA:

Use any standard agent – choose the one most appropriate for type of surrounding fire (material itself is not flammable)

UNUSUAL FIRE AND EXPLOSION HAZARDS:

R-404A is not flammable at ambient temperatures and atmospheric pressure. However, this material will become combustible when mixed with air under pressure and exposed to strong ignition sources.

Contact with certain reactive metals may result in formation of explosive or exothermic reactions under specific conditions (e.g. very high temperatures and/or appropriate pressures).

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against possible toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

(Always wear recommended personal protective equipment.)

Evacuate unprotected personnel. Protected personnel should remove ignition sources and shut off leak, if without risk, and provide ventilation. Unprotected personnel should not return until air has been tested and determined safe, including low-lying areas.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING:

(Always wear recommended personal protective equipment.)

Avoid breathing vapors and liquid contact with eyes, skin or clothing. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Use authorized cylinders only. Follow standard safety precautions for handling and use of compressed gas cylinders.

R-404A should not be mixed with air above atmospheric pressure for leak testing or any other purpose.

STORAGE RECOMMENDATIONS:

Store in a cool, well-ventilated area of low fire risk and out of direct sunlight. Protect cylinder and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve tightly after use and when empty.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:

Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection. If prolonged contact with the liquid or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

EYE PROTECTION:

For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

RESPIRATORY PROTECTION:

None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above the PEL of 1,000 ppm, use a self-contained, NIOSH-approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH-approved gas mask with organic vapor canister.

ADDITIONAL RECOMMENDATIONS:

Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principle exposure. Provide eyewash stations and quick-drench shower facilities at convenient locations. For tank cleaning operations, see OSHA regulations, 29 CFR 1910.132 and 29 CFR 1910.133.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>	<u>OTHER LIMIT</u>
Pentafluoroethane	None	None	*1000 ppm TWA (8hr)
1,1,1-Trifluoroethane	None	None	*1000 ppm TWA (8hr)
1,1,1,2-Tetrafluoroethane	None	None	*1000 ppm TWA (8hr)

* = Workplace Environmental Exposure Level (AIHA)

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

Hydrogen Fluoride: ACGIH TLV: 3 ppm ceiling

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear, colorless liquid and vapor
PHYSICAL STATE:	Gas at ambient temperatures
MOLECULAR WEIGHT:	120
CHEMICAL FORMULA:	CHF ₂ CF ₃ , CH ₃ CF ₃ , CH ₂ FCF ₃
ODOR:	Faint ethereal odor
SPECIFIC GRAVITY (water = 1.0):	1.08 @ 21.1°C (70°F)
SOLUBILITY IN WATER (weight %):	Unknown
pH:	Neutral
BOILING POINT:	-47.8°C (-54.0°F)
FREEZING POINT:	Not Determined
VAPOR PRESSURE:	182.9 psia @ 70°F 370.9 psia @ 130°F
VAPOR DENSITY (air = 1.0):	3.43
EVAPORATION RATE:	>1
% VOLATILES:	100
FLASH POINT:	Not applicable
(Flash point method and additional flammability data are found in Section 5.)	
COMPARED TO: CC1₄ = 1	

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (CONDITIONS TO AVOID):

The product is stable.

Do not mix with oxygen or air above atmospheric pressure. Any source of high temperature, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products.

INCOMPATIBILITIES:

(Under specific conditions: e.g. very high temperatures and/or appropriate pressures) – Freshly abraded aluminum surfaces (may cause strong exothermic reaction). Chemically active metals: potassium, calcium, powdered aluminum, magnesium and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS:

Halogens, halogen acids and possibly carbonyl halides.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

HFC-125:	LC ₅₀ : 4 hr. (rat) - > 800,000 ppm / Cardiac Sensitization threshold (dog) 75,000 ppm
HFC-143a:	LC ₅₀ : 4hr. (rat) - > 540,000 ppm / Cardiac Sensitization threshold (dog) > 250,000 ppm
HFC-134a:	LC ₅₀ : 4hr. (rat) - > 500,000 ppm / Cardiac Sensitization threshold (dog) > 80,000 ppm

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

HFC-125:	Teratogenic NOEL (rat and rabbit) – 50,000 ppm Subchronic inhalation (rat) NOEL - $\geq$ 50,000 ppm / Chronic NOEL – 10,000 ppm
HFC-143a:	Teratogenic NOEL (rat and rabbit) – 50,000 ppm Subchronic inhalation (rat) NOEL - $\geq$ 50,000 ppm
HFC-134a:	Teratogenic NOEL (rat and rabbit) – 40,000 ppm Subchronic inhalation (rat) NOEL – 50,000 ppm / Chronic NOEL – 10,000 ppm

OTHER DATA:

HFC-125, HFC-134a:	Not active in four genetic studies
HFC-143a:	Not active in two genetic studies

12. ECOLOGICAL INFORMATION

Degradability (BOD): R-404A is a gas at room temperature; therefore, it is unlikely to remain in water.

Octanol Water Partition Coefficient: Unknown for mixture

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded?
If yes, the RCRA ID number is:

Not a hazardous waste.
Not applicable.

OTHER DISPOSAL CONSIDERATIONS:

Disposal must comply with federal, state, and local disposal or discharge laws. R-404A is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT PROPER SHIPPING NAME: Refrigerant gas R 404A
US DOT HAZARD CLASS: 2.2
US DOT PACKING GROUP: Not applicable
US DOT ID NUMBER: UN3337

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Components listed on the TSCA inventory
OTHER TSCA ISSUES: None

SARA TITLE III / CERCLA

“Reportable Quantities” (RQs) and/or “Threshold Planning Quantities” (TPQs) exist for the following ingredients.

INGREDIENT NAME**SARA / CERCLA RQ (lb.)****SARA EHS TPQ (lb.)**

No ingredients listed in this section

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: IMMEDIATE PRESSURE

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 “Toxic Chemicals”. CAS numbers and weight percents are found in Section 2.

INGREDIENT NAME**COMMENT**

No ingredients listed in this section

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME**WEIGHT %****COMMENT**

No ingredients listed in this section

ADDITIONAL REGULATORY INFORMATION:

R-404A is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.

WARNING: Contains Pentafluoroethane (HFC-125), 1,1,1-trifluoroethane, tetrafluoroethane, greenhouse gases which may contribute to global warming. **Do not vent** to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered.

WHMIS CLASSIFICATION (CANADA):

This product has been evaluated in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

FOREIGN INVENTORY STATUS:

EU – EINECS # 2065578 – HFC-125

2069965 – HFC-143a

223770 – HFC-134a

16. OTHER INFORMATION

CURRENT ISSUE DATE: December, 2008

PREVIOUS ISSUE DATE: August, 2007

OTHER INFORMATION: HMIS Classification: Health – 1, Flammability – 1, Reactivity – 0
NFPA Classification: Health – 2, Flammability – 1, Reactivity – 0
ANSI / ASHRAE 34 Safety Group – A1

Regulatory Standards:

1. OSHA regulations for compressed gases: 29 CFR 1910.101
2. DOT classification per 49 CFR 172.101

Toxicity information per PAFT Testing

17. DISCLAIMER

National Refrigerants, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other methods or use of the product and of the information referred to herein are beyond the control of National Refrigerants. National Refrigerants expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

MSDS: R-404A
Current Issue Date: December, 2008

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5g. Controller Dixell XR30CX

dixell

Installing and Operating Instructions

1592020530

Digital controller with off cycle defrost and AUX relay XR30CX

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1. GENERAL WARNING

1.1 PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

1.2 SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "Dixell S.p.A." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

Model XR30CX, format 32 x 74 mm, is a digital thermostat with off cycle defrost designed for refrigeration applications at normal temperature. It provides two relay outputs, one for the compressor, the other one can be used as light, for alarm signalling or as auxiliary output.. It is also provided with 2 NTC or PTC probe inputs, the first one for temperature control, the second one, optional, to connect to the HOT KEY terminals to signal the condenser temperature alarm or to display a temperature. The digital input can operate as third temperature probe. It's provided with a Real Time Clock which allows programming of up to 6 daily defrost cycles, divided into holidays and workdays. A "Day and Night" function with two different set points is fitted for energy saving

The HOT KEY output allows to connect the unit, by means of the external XJ485-CX, to a network line ModBUS-RTU compatible such as the **dixell** monitoring units of X-WEB family. It allows to program the controller by means the HOT KEY programming keyboard.

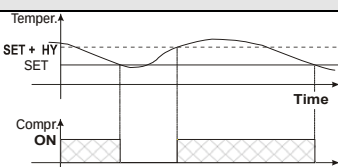
The instrument is fully configurable through special parameters that can be easily programmed through the keyboard.

3. CONTROLLING LOADS

3.1 COMPRESSOR

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again.

In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters "COF" and "COF".



3.2 DEFROST

The defrost interval is controlled by means of parameter "EdF":

- with EdF=in the defrost is made every "IdF" time,
 - with EdF = "rtc", the defrost is made in real time depending on the hours set in the parameters Ld1...Ld6 on workdays and in Sd1...Sd6 in holidays;
- Defrost is performed through a simple stop of the compressor. Parameter "MdF" controls its length.

4. FRONT PANEL COMMANDS



SET: To display target set point; in programming mode it selects a parameter or confirm an operation.

DEF (DEF) To start a manual defrost

UP (UP): To see the max. stored temperature; in programming mode it browses the parameter codes or increases the displayed value.

DOWN (DOWN) To see the min stored temperature; in programming mode it browses the parameter codes or decreases the displayed value.

OFF To switch the instrument off, if oA1 = oFF.

LIG To switch the light, if oA1 = Lig

KEY COMBINATIONS:

SET + UP To lock & unlock the keyboard.

SET + DOWN To enter in programming mode.

SET + UP To return to the room temperature display.

4.1 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
ON	ON	Compressor enabled
Flashing	Flashing	Anti-short cycle delay enabled
ON	ON	Defrost enabled
ON	ON	An alarm is occurring
ON	ON	Continuous cycle is running
ON	ON	Energy saving enabled
ON	ON	Light on
ON	ON	Auxiliary relay on
ON	ON	Measurement unit
Flashing	Flashing	Programming phase

5. MAX & MIN TEMPERATURE MEMORIZATION

5.1 HOW TO SEE THE MIN TEMPERATURE

- Press and release the **DOWN** key.
- The "Lo" message will be displayed followed by the minimum temperature recorded.
- By pressing the **UP** key again or by waiting 5s the normal display will be restored.

5.2 HOW TO SEE THE MAX TEMPERATURE

- Press and release the **UP** key.
- The "Hi" message will be displayed followed by the maximum temperature recorded.
- By pressing the **DOWN** key again or by waiting 5s the normal display will be restored.

5.3 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

- Hold press the SET key for more than 3s, while the max. or min temperature is displayed. (rSt message will be displayed)
- To confirm the operation the "rSt" message starts blinking and the normal temperature will be displayed.

6. MAIN FUNCTIONS

6.1 TO SET THE CURRENT TIME AND DAY

When the instrument is switched on, it's necessary to program the time and day.

- Enter the Pr1 programming menu, by pushing the SET + **DOWN** keys for 3s.
- The rtc parameter is displayed. Push the SET key to enter the real time clock menu.
- The Hur (hour) parameter is displayed.
- Push the SET and set current hour by the UP and Down keys, then push SET to confirm the value..
- Repeat the same operations on the Min (minutes) and dAY (day) parameters.

To exit: Push SET+UP keys or wait for 15 secs without pushing any keys.

1. Push the  key for more than 3 seconds
2.  LED switches ON and the following messages are displayed:
Hur (hour); Min (Minute); dAY (day)
3. To exit push  key or wait 5 seconds

6.2 HOW TO SEE THE SETPOINT

-  1. Push and immediately release the SET key: the display will show the Set point value;
2. Push and immediately release the SET key or wait for 5 seconds to display the probe value again.

6.3 HOW TO CHANGE THE SETPOINT

1. Push the SET key for more than 2 seconds to change the Set point value;
2. The value of the set point will be displayed and the "°C" or "°F" LED starts blinking;
3. To change the Set value push the  or  arrows within 10s.
4. To memorise the new set point value push the SET key again or wait 10s.

6.4 HOW TO START A MANUAL DEFROST

-  Push the DEF key for more than 2 seconds and a manual defrost will start.

6.5 HOW TO CHANGE A PARAMETER VALUE

To change the parameter's value operate as follows:

1. Enter the Programming mode by pressing the Set +  keys for 3s (the "°C" or "°F" LED starts blinking).
 2. Select the required parameter. Press the "SET" key to display its value
 3. Use "UP" or "DOWN" to change its value.
 4. Press "SET" to store the new value and move to the following parameter.
- To exit: Press SET + UP or wait 15s without pressing a key.
NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

6.6 THE HIDDEN MENU

The hidden menu Includes all the parameters of the instrument.

6.6.1 HOW TO ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing the Set +  keys for 3s (the "°C" or "°F" LED starts blinking).
 2. Released the keys, then push again the Set+ keys for more than 7s. The Pr2 label will be displayed immediately followed from the HY parameter.
- NOW YOU ARE IN THE HIDDEN MENU.
3. Select the required parameter.
 4. Press the "SET" key to display its value
 5. Use  or  to change its value.
 6. Press "SET" to store the new value and move to the following parameter.
- To exit: Press SET +  or wait 15s without pressing a key.
NOTE1: if none parameter is present in Pr1, after 3s the "noP" message is displayed. Keep the keys pushed till the Pr2 message is displayed.
NOTE2: the set value is stored even when the procedure is exited by waiting the time-out to expire.

6.6.2 HOW TO MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA.

Each parameter present in the HIDDEN MENU can be removed or put into "THE FIRST LEVEL" (user level) by pressing "SET + ".
In HIDDEN MENU when a parameter is present in First Level the decimal point is on.

6.7 HOW TO LOCK THE KEYBOARD

1. Keep pressed for more than 3 s the UP + DOWN keys.
2. The "POF" message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set point or the MAX o Min temperature stored
3. If a key is pressed more than 3s the "POF" message will be displayed.

6.8 TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the  and  keys, till the "Pon" message will be displayed.

6.9 THE CONTINUOUS CYCLE

When defrost is not in progress, it can be activated by holding the " key pressed for about 3 seconds. The compressor operates to maintain the "ccS" set point for the time set through the "CCt" parameter. The cycle can be terminated before the end of the set time using the same activation key " for 3 seconds.

6.10 THE ON/OFF FUNCTION

-  With "onF = oFF", pushing the ON/OFF key, the instrument is switched off. The "OFF" message is displayed. In this configuration, the regulation is disabled.
To switch the instrument on, push again the ON/OFF key.

WARNING: Loads connected to the normally closed contacts of the relays are always supplied and under voltage, even if the instrument is in stand by mode.

7. PARAMETERS

rtc Real time clock menu: to set the time and date and defrost start time.

REGULATION

Hy Differential: (0,1 ÷ 25,5°C / 1÷255 °F) Intervention differential for set point. Compressor Cut IN is Set Point + differential (Hy). Compressor Cut OUT is when the temperature reaches the set point.

LS Minimum set point: (- 50°C÷SET/-58°F÷SET): Sets the minimum value for the set point.
US Maximum set point: (SET÷110°C/ SET÷230°F). Set the maximum value for set point.

Ot Thermostat probe calibration: (-12.0÷12.0°C; -120÷120°F) allows to adjust possible offset of the thermostat probe.

P3P Third probe presence (P3): n= not present.; the terminal operates as digital input.; y= present.; the terminal operates as third probe.

O3 Third probe calibration (P3): (-12.0÷12.0°C; -120÷120°F). allows to adjust possible offset of the third probe.

P4P Fourth probe presence: (n = Not present; y = present).

o4 Fourth probe calibration: (-12.0÷12.0°C) allows to adjust possible offset of the fourth probe.

Ods Outputs activation delay at start up: (0÷255min) This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter.

AC Anti-short cycle delay: (0÷50 min) minimum interval between the compressor stop and the following restart.

CCt Compressor ON time during continuous cycle: (0.0÷24.0h; res. 10min) Allows to set the length of the continuous cycle: compressor stays on without interruption for the CCt time. Can be used, for instance, when the room is filled with new products.

CCS Set point for continuous cycle: (-50÷150°C) it sets the set point used during the continuous cycle.

CO n Compressor ON time with faulty probe: (0÷255 min) time during which the compressor is active in case of faulty thermostat probe. With CO n=0 compressor is always OFF.

COF Compressor OFF time with faulty probe: (0÷255 min) time during which the compressor is OFF in case of faulty thermostat probe. With COF=0 compressor is always active.

CH Type of action: CL = cooling; Ht = heating.

DISPLAY

CF Temperature measurement unit: °C=Celsius; °F=Fahrenheit. WARNING: When the measurement unit is changed the SET point and the values of the parameters Hy, LS, US, Ot, ALU and ALL have to be checked and modified if necessary).

rES Resolution (for °C): (in = 1°C; dE = 0.1 °C) allows decimal point display.

dLy Display delay: (0 ÷20.0m; risul. 10s) when the temperature increases, the display is updated of 1 °C/1°F after this time.

DEFROST

EdF Defrost mode:

rtc = Real Time Clock mode. Defrost time follows Ld1÷Ld6 parameters on workdays and Sd1÷Sd6 on holidays.

in = interval mode. The defrost starts when the time "Idf" is expired.

IdF Interval between defrost cycles: (0÷120h) Determines the time interval between the beginning of two defrost cycles.

MdF (Maximum) length for defrost: (0÷255min) When P2P = n, (not evaporator probe: time defrost) it sets the defrost duration, when P2P = y (defrost end based on temperature) it sets the maximum length for defrost.

dFd Temperature displayed during defrost: (rt = real temperature; it = temperature at defrost start; SET = set point; dEF = "dEF" label)

dAd MAX display delay after defrost: (0÷255min). Sets the maximum time between the end of defrost and the restarting of the real room temperature display.

ALARMS

ALC Temperature alarms configuration: (Ab; rE)

Ab= absolute temperature: alarm temperature is given by the ALL or ALU values. rE = temperature alarms are referred to the set point. Temperature alarm is enabled when the temperature exceeds the "SET+ALU" or "SET-ALL" values.

ALU MAXIMUM temperature alarm: (SET÷110°C; SET÷230°F) when this temperature is reached the alarm is enabled, after the "ALd" delay time.

ALL Minimum temperature alarm: (-50.0 ÷ SET°C; -58÷230°F when this temperature is reached the alarm is enabled, after the "ALd" delay time.

AFH Differential for temperature alarm recovery: (0,1÷25,5°C; 1÷45°F) Intervention differential for recovery of temperature alarm.

ALd Temperature alarm delay: (0÷255 min) time interval between the detection of an alarm condition and alarm signalling.

dAO Exclusion of temperature alarm at startup: (from 0.0 min to 23.5h) time interval between the detection of the temperature alarm condition after instrument power on and alarm signalling.

CONDENSER TEMPERATURE ALARM (detected by the fourth probe)

AP2 Probe selection for temperature alarm of condenser: nP = no probe; P1 =thermostat probe; P2 = evaporator probe; P3 =configurable probe; P4 = Probe on Hot Key plug.

AL2 Low temperature alarm of condenser: (-55÷150°C) when this temperature is reached the LA2 alarm is signalled, possibly after the Ad2 delay.

Au2 High temperature alarm of condenser: (-55÷150°C) when this temperature is reached the HA2 alarm is signalled, possibly after the Ad2 delay.

AH2 Differential for temperature condenser alarm recovery: (0,1÷25,5°C; 1÷45°F)

Ad2 Condenser temperature alarm delay: (0÷255 min) time interval between the detection of the condenser alarm condition and alarm signalling.

dA2 Condenser temperature alarm exclusion at start up: (from 0.0 min to 23.5h, res. 10min)

bLL Compressor off with low temperature alarm of condenser: n = no: compressor keeps on working; Y = yes, compressor is switched off till the alarm is present, in any case regulation restarts after AC time at minimum.

AC2 Compressor off with high temperature alarm of condenser: n = no: compressor keeps on working; Y = yes, compressor is switched off till the alarm is present, in any case regulation restarts after AC time at minimum.

SECOND RELAY

tbA Alarm relay silencing (with oA1=ALr):
(n= silencing disabled: alarm relay stays on till alarm condition lasts, y=silencing enabled: alarm relay is switched OFF by pressing a key during an alarm).

oA1 Second relay configuration: ALr: alarm; Lig: light; AuS: Auxiliary relay; onF: always on with instrument on; db = do not select it; dEF: do not select it!.; FAn: do not select it!.; dF2: do not select it.

AOp Alarm relay polarity: it set if the alarm relay is open or closed when an alarm happens. CL= terminals 1-2 closed during an alarm; oP = terminals 1-2 open during an alarm

DIGITAL INPUT

i1P Digital input polarity: oP: the digital input is activated by opening the contact; CL: the digital input is activated by closing the contact.

i1F Digital input configuration: EAL = external alarm: "EA" message is displayed; bAL = serious alarm "CA" message is displayed. PAL = pressure switch alarm, "CA" message is displayed; dor = door switch function; dEF = activation of a defrost cycle; AUS = to switch on the second relay if oA1 = AUS; Htr = kind of action inversion (cooling - heating); FAn = not set it; ES = Energy saving.

did: (0÷255 min) with i1F= EAL or i1F = bAL digital input alarm delay: delay between the detection of the external alarm condition and its signalling.

with i1F = dor: door open signalling delay
with i1F = PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.

nPS Pressure switch number: (0 ÷ 15) Number of activation of the pressure switch, during the "did" interval, before signalling the alarm event (i2F= PAL).

If the nPS activation in the did time is reached, switch off and on the instrument to restart normal regulation.

odc Compressor status with door open: no, Fan = normal; CPr; F_C = Compressor OFF.

rrd Outputs restart after doA alarm: no = outputs not affected by the doA alarm; YES = outputs restart with the doA alarm;

HES Temperature increase during the Energy Saving cycle : (-30,0°C÷30,0°C/-22÷86°F) it sets the increasing value of the set point during the Energy Saving cycle.

TO SET CURRENT TIME AND WEEKLY HOLIDAYS

Hur Current hour (0 ÷ 23 h)
Min Current minute (0 ÷ 59min)
dAY Current day (Sun ÷ SAT)
Hd1 First weekly holiday (Sun ÷ nu) Set the first day of the week which follows the holiday times.
Hd2 Second weekly holiday (Sun ÷ nu) Set the second day of the week which follows the holiday times.
N.B. Hd1,Hd2 can be set also as "nu" value (Not Used).

TO SET ENERGY SAVING TIMES

ILE Energy Saving cycle start during workdays: (0 ÷ 23h 50 min.) During the Energy Saving cycle the set point is increased by the value in HES so that the operation set point is SET + HES.
dLE Energy Saving cycle length during workdays: (0 ÷ 24h 00 min.) Sets the duration of the Energy Saving cycle on workdays.
ISE Energy Saving cycle start on holidays. (0 ÷ 23h 50 min.)
dSE Energy Saving cycle length on holidays (0 ÷ 24h 00 min.)

TO SET DEFROST TIMES

Ld1÷Ld6 Workday defrost start (0 ÷ 23h 50 min.) These parameters set the beginning of the 6 programmable defrost cycles during workdays. Ex. When Ld2 = 12.4 the second defrost starts at 12.40 during workdays.
Sd1÷Sd6 Holiday defrost start (0 ÷ 23h 50 min.) These parameters set the beginning of the 6 programmable defrost cycles on holidays. Ex. When Sd2 = 3.4 the second defrost starts at 3.40 on holidays.
N.B. To disable a defrost cycle set it to "nu"(not used). Ex. If Ld6=nu ; the sixth defrost cycle is disabled

OTHER

Adr Serial address (1÷244): Identifies the instrument address when connected to a ModBUS compatible monitoring system.

PbC Type of probe: it allows to set the kind of probe used by the instrument: PbC = PBC probe, ntc = NTC probe.

onF on/off key enabling: nu = disabled; oFF = enabled; ES = not set it.

dp1 Thermostat probe display

dp3 Third probe display- optional.

dp4 Fourth probe display.

rSE Real set point: (readable only), it shows the set point used during the energy saving cycle or during the continuous cycle.

rEL Software release for internal use.

Ptb Parameter table code: readable only.

8. DIGITAL INPUT (ENABLED WITH P3P = N)

The free voltage digital input is programmable in different configurations by the "i1F" parameter.

8.1 DOOR SWITCH INPUT (i1F = dor)

It signals the door status and the corresponding relay output status through the "odc" parameter: no, Fan = normal (any change); CPr, F_C = Compressor OFF.
Since the door is opened, after the delay time set through parameter "did", the door alarm is enabled, the display shows the message "dA" and the regulation restarts is rtr = YES. The alarm stops as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

8.2 GENERIC ALARM (i1F = EAL)

As soon as the digital input is activated the unit will wait for "did" time delay before signalling the "EAL" alarm message. The outputs status don't change. The alarm stops just after the digital input is de-activated.

8.3 SERIOUS ALARM MODE (i1F = bAL)

When the digital input is activated, the unit will wait for "did" delay before signalling the "CA" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

8.4 PRESSURE SWITCH (i1F = PAL)

If during the interval time set by "did" parameter, the pressure switch has reached the number of activation of the "nPS" parameter, the "CA" pressure alarm message will be displayed. The compressor and the regulation are stopped. When the digital input is ON the compressor is always OFF.

If the nPS activation in the did time is reached, switch off and on the instrument to restart normal regulation.

8.5 START DEFROST (i1F = dFr)

It starts a defrost if there are the right conditions. After the defrost is finished, the normal regulation will restart only if the digital input is disabled otherwise the instrument will wait until the "MdF" safety time is expired.

8.6 INVERSION OF THE KIND OF ACTION: HEATING-COOLING (i1F = Htr)

This function allows to invert the regulation of the controller: from cooling to heating and viceversa.

8.7 ENERGY SAVING (i1F = ES)

The Energy Saving function allows to change the set point value as the result of the SET+ HES (parameter) sum. This function is enabled until the digital input is activated.

8.8 DIGITAL INPUTS POLARITY

The digital input polarity depends on the "i1P" parameter.

i1P=CL: the input is activated by closing the contact.

i1P=OP: the input is activated by opening the contact

9. TTL SERIAL LINE – FOR MONITORING SYSTEMS

The TTL serial line, available through the HOT KEY connector, allows by means of the external TTL/RS485 converter, XJ485-CX, to connect the instrument to a monitoring system ModBUS-RTU compatible such as the X-WEB500/3000/300.

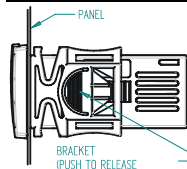
10. X-REP OUTPUT – OPTIONAL

As optional, an X-REP can be connected to the instrument, through the HOY KEY connector. The X-REP output **EXCLUDES** the serial connection.

To connect the X-REP to the instrument the following connectors must be used CAB-51F(1m), CAB-52F(2m), CAB-55F(5m),



11. INSTALLATION AND MOUNTING



Instrument XR30CX shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied. The temperature range allowed for correct operation is 0÷60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

12. ELECTRICAL CONNECTIONS

The instrument is provided with screw terminal block to connect cables with a cross section up to 2,5 mm². Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

12.1 PROBE CONNECTION

The probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

dIXEL

Installing and Operating Instructions

1592020530

13. HOW TO USE THE HOT KEY

13.1 HOW TO PROGRAM A HOT KEY FROM THE INSTRUMENT (UPLOAD)

1. Program one controller with the front keypad.
2. When the controller is ON, insert the "Hot key" and push **o** key; the "uPL" message appears followed a by flashing "End"
3. Push "SET" key and the End will stop flashing.
4. Turn OFF the instrument remove the "Hot Key", then turn it ON again.

NOTE: the "Err" message is displayed for failed programming. In this case push again **o** key if you want to restart the upload again or remove the "Hot key" to abort the operation.

13.2 HOW TO PROGRAM AN INSTRUMENT USING A HOT KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a programmed "Hot Key" into the 5 PIN receptacle and then turn the Controller ON.
3. Automatically the parameter list of the "Hot Key" is downloaded into the Controller memory, the "doL" message is blinking followed a by flashing "End".
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the "Hot Key"...

NOTE the message "Err" is displayed for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "Hot key" to abort the operation.

14. ALARM SIGNALS

Mess age	Cause	Outputs
"P1"	Room probe failure	Compressor output acc. to par. "Con" and "COF"
"P3"	Third probe failure	Outputs unchanged
"P4"	Fourth probe failure	Outputs unchanged
"HA"	Maximum temperature alarm	Outputs unchanged.
"LA"	Minimum temperature alarm	Outputs unchanged.
"HA2"	Condenser high temperature	It depends on the "Ac2" parameter
"LA2"	Condenser low temperature	It depends on the "bLL" parameter
"dA"	Door open	Compressor according to rrd
"EA"	External alarm	Output unchanged.
"CA"	Serious external alarm (i1F=bAL)	All outputs OFF.
"CA"	Pressure switch alarm (i1F=PAL)	All outputs OFF
"rtc"	Real time clock alarm	Alarm output ON; Other outputs unchanged; Defrosts according to par. "IdF" Set real time clock has to be set
rtF	Real time clock board failure	Alarm output ON; Other outputs unchanged; Defrosts according to par. "IdF" Contact the service

14.1 ALARM RECOVERY

Probe alarms "P1", "P3" and "P4" start some seconds after the fault in the related probe; they automatically stop some seconds after the probe restarts normal operation. Check connections before replacing the probe.

Temperature alarms "HA", "LA" "HA2" and "LA2" automatically stop as soon as the temperature returns to normal values.

Alarms "EA" and "CA" (with i1F=bAL) recover as soon as the digital input is disabled.

Alarm "CA" (with i1F=PAL) recovers only by switching off and on the instrument.

14.2 OTHER MESSAGES

Pon	Keyboard unlocked.
PoF	Keyboard locked
noP	In programming mode: none parameter is present in Pr1 On the display or in dP2, dP3, dP4: the selected probe is nor enabled
noA	None alarm is recorded.

15. TECHNICAL DATA

Housing: self extinguishing ABS.

Case: XR30CX frontal 32x74 mm; depth 60mm;

Mounting: XR30CX panel mounting in a 71x29mm panel cut-out

Protection: IP20; Frontal protection: XR30CX IP65

Connections: Screw terminal block ≤ 2,5 mm² wiring.

Power supply: according to the model: 12Vac/dc, ±10%; 24Vac/dc, ±10%; 230Vac ±10%, 50/60Hz, 110Vac ±10%, 50/60Hz

Power absorption: 3VA max

Display: 3 digits, red LED, 14,2 mm high; Inputs: Up to 4 NTC or PTC probes.

Digital input: free voltage contact

Relay outputs: compressor SPST 8(3) A, 250Vac; or 20(8)A 250Vac

AUX: SPDT 8(3) A, 250Vac

Data storing: on the non-volatile memory (EEPROM).

Internal clock back-up: 24 hours

Kind of action: 1B; Pollution grade: 2; Software class: A.;

Rated impulsive voltage: 2500V; Overvoltage Category: II

Operating temperature: 0÷60 °C; Storage temperature: -30÷85 °C.

Relative humidity: 20÷85% (no condensing)

Measuring and regulation range: NTC probe: -40÷110°C (-40÷230°F);

PTC probe: -50÷150°C (-58÷302°F)

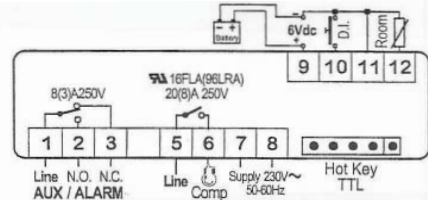
Resolution: 0,1 °C or 1°C or 1 °F (selectable); Accuracy (ambient temp. 25°C): ±0,7 °C ±1 digit

16. CONNECTIONS

The X-REP output excludes the TTL output.. It's present in the following codes:

XR30CX- xx2xx, XR30CX -xx3xx;

16.1 XR30CX – 20A COMPRESSOR

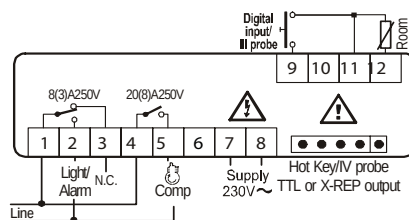


12Vac/dc supply: connect to the terminals 7 and 8.

24Vac/dc supply: connect to the terminals 7 and 8.

120Vac supply: connect to the terminals 7 and 8.

16.2 XR30CX – 20A COMPRESSOR



12Vac/dc supply: connect to the terminals 7 and 8.

24Vac/dc supply: connect to the terminals 7 and 8.

120Vac supply: connect to the terminals 7 and 8.

17. DEFAULT SETTING VALUES

Label	Name	Range	°C/°F	
Set	Set point	LS=US	3.0	---
rtc	Real time clock menu	-	-	Pr1
Hy	Differential	0,1÷25,5°C/ 1÷ 255°F	2,0	Pr1
LS	Minimum set point	-50°C÷SET/-58°F÷SET	-50,0	Pr2
US	Maximum set point	SET÷110°C/ SET ÷ 230°F	110	Pr2
Ot	Thermostat probe calibration	-12÷12°C /-120÷120°F	0,0	Pr1
P3P	Third probe presence	n=not present; Y=pres.	n	Pr2
O3	Third probe calibration	-12÷12°C /-120÷120°F	0	Pr2
P4P	Fourth probe presence	n=not present; Y=pres.	n	Pr2
O4	Fourth probe calibration	-12÷12°C /-120÷120°F	0	Pr2
OdS	Outputs delay at start up	0÷255 min	0	Pr2
AC	Anti-short cycle delay	0 ÷ 50 min	1	Pr1
CCT	Continuous cycle duration	0,0÷24,0h	0,0	Pr2
CCS	Set point for continuous cycle	(-55,0÷150,0°C) (-67÷302°F)	3	Pr2
COOn	Compressor ON time with faulty probe	0 ÷ 255 min	15	Pr2
COF	Compressor OFF time with faulty probe	0 ÷ 255 min	30	Pr2
CH	Kind of action	CL=cooling; Ht= heating	cL	Pr1
CF	Temperature measurement unit	°C ÷ °F	°C	Pr2
rES	Resolution	in=integer; dE= dec.point	dE	Pr1
dLy	Display temperature delay	0 ÷ 20,0 min (10 sec.)	0	Pr2
IdF	Interval between defrost cycles	1 ÷ 120 ore	8	Pr1
MdF	(Maximum) length for defrost	0 ÷ 255 min	20	Pr1
dFd	Displaying during defrost	rt, it, SET, DEF	it	Pr2
dAd	MAX display delay after defrost	0 ÷ 255 min	30	Pr2
ALC	Temperat. alarms configuration	rE= related to set; Ab = absolute	Ab	Pr2
ALU	MAXIMUM temperature alarm	Set÷110,0°C; Set÷230°F	110	Pr1
ALL	Minimum temperature alarm	-50,0°C÷Set/ -58°F÷Set	-50,0	Pr1
AFH	Differential for temperat. alarm recovery	(0,1°C÷25,5°C) (1°F÷45°F)	1	Pr2
ALd	Temperature alarm delay	0 ÷ 255 min	15	Pr2
dAo	Delay of temperature alarm at start up	0 ÷ 23h e 50'	1.3	Pr2
AP2	Probe for temperat. alarm of condenser	nP; P1; P2; P3; P4	P4	Pr2
AL2	Condenser for low temperat. alarm	(-55 ÷ 150°C) (-67 ÷ 302°F)	-40	Pr2
AU2	Condenser for high temperat. alarm	(-55 ÷ 150°C) (-67 ÷ 302°F)	110	Pr2

Label	Name	Range	°C/°F	
AH2	Differ. for condenser temp. alar. recovery	[0,1°C ÷ 25,5°C] [1°F ÷ 45°F]	5	Pr2
Ad2	Condenser temperature alarm delay	0 ÷ 254 (min.) , 255=nU	15	Pr2
dA2	Delay of cond. temper. alarm at start up	0.0 ÷ 23h 50'	1,3	Pr2
bLL	Compr. off for condenser low temperature alarm	n(0) - Y(1)	n	Pr2
AC2	Compr. off for condenser high temperature alarm	n(0) - Y(1)	n	Pr2
tbA	Alarm relay disabling	n=no; y=yes	y	Pr2
oA1	2 nd relay configuration	ALr = alarm; dEF = do not select it; Lig =Light; AUS =AUX; onF=always on; Fan= do not select it; db = do not select it; dF2 = do not select it	Lig	Pr2
AoP	Alarm relay polarity (oA1=ALr)	oP; cL	cL	Pr2
i1P	Digital input polarity	oP=opening; CL=closing	cL	Pr1
i1F	Digital input configuration	EAL, bAL, PAL, dor; dEF; Htr, AUS	dor	Pr1
did	Digital input alarm delay	0÷255min	15	Pr1
nPS	Number of activation of pressure switch	0 ÷ 15	15	Pr2
odc	Compress status when open door	no; Fan; CPR; F_C	no	Pr2
rrd	Regulation restart with door open alarm	n – Y	y	Pr2
HES	Differential for Energy Saving	(-30°C÷30°C) (-54°F÷54°F)	0	Pr2
Hur	Current hour	0 ÷ 23	-	rtc
Min	Current minute	0 ÷ 59	-	rtc
dAY	Current day	Sun ÷ SAT	-	rtc
Hd1	First weekly holiday	Sun÷ SAT – nu	nu	rtc
Hd2	Second weekly holiday	Sun÷ SAT – nu	nu	rtc
ILE	Energy Saving cycle start during workdays	0 ÷ 23h 50 min.	0	rtc
dLE	Energy Saving cycle length during workdays	0 ÷ 24h 00 min.	0	rtc
ISE	Energy Saving cycle start on holidays	0 ÷ 23h 50 min.	0	rtc
dSE	Energy Saving cycle length on holidays	0 ÷ 24h 00 min.	0	rtc
Ld1	1 st workdays defrost start	0 ÷ 23h 50 min. - nu	6.0	rtc
Ld2	2 nd workdays defrost start	0 ÷ 23h 50 min. - nu	13.0	rtc
Ld3	3 rd workdays defrost start	0 ÷ 23h 50 min. - nu	21.0	rtc
Ld4	4 th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Ld5	5 th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Ld6	6 th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd1	1 st holiday defrost start	0 ÷ 23h 50 min. - nu	6.0	rtc
Sd2	2 nd holiday defrost start	0 ÷ 23h 50 min. - nu	13.0	rtc
Sd3	3 rd holiday defrost start	0 ÷ 23h 50 min. - nu	21.0	rtc
Sd4	4 th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd5	5 th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd6	6 th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Adr	Serial address	0÷247	1	Pr2
PbC	Kind of probe	Ptc; ntc	ntc	Pr1
onF	on/off key enabling	nu, oFF; ES	nu	Pr2
dP1	Room probe display	--	--	Pr2
dP3	Third probe display	--	--	Pr1
dP4	Fourth probe display	--	--	Pr1
rSE	Real set point value	actual set	--	Pr2
rEL	Software release	--	--	Pr2
Ptb	Map code	--	--	Pr2

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5h. Default settings

Label	Name	Range	Set point	Pr 1/2
Set	Set point	LS-US	-47	---
Hy	Differential	0,1-25,5°C/1-225°F	1	Pr1
LS	Minimum set point	(-100°C – SET) (-148°F – SET)	-47	Pr2
US	Maximum set point	(SET – 150,0°C) (SET - 302°F)	-20	Pr2
Ot	Thermostat probe calibration	-12 - 12°C/-120 - 120°F	0	Pr1
Ods	Outputs delay at start up	0 – 255min	0	Pr2
AC	Anti-short cycle delay	0 – 50min	5	Pr1
CCt	Continuous cycle duration	0,0 – 24,0h	0,0	Pr2
CCs	Set point continuous cycle	(-100 – 150,0°C) (-148 - 302°F)	-47	Pr2
CO _n	Compressor ON time with faulty probe	0 – 255min	60	Pr2
CO _F	Compressor OFF time with faulty probe	-255min	5	Pr2
CH	Kind of action	CL=cooling;Ht=heating	CL	Pr2
CF	Temperature measurement unit	°C+°F	°C	Pr2
rES	Resolution	ln=integer; dE=dec.point	ln	Pr2
dLy	Display temperature delay	0-20,0min (10sec)	0	Pr2
IdF	Interval between defrost cycles	1-120h	0	Pr1
NdF	Maximum length for defrost	0-255min	0	Pr1
dFd	Displaying during defrost	Rt, it, Set, DEF	rt	Pr2
dAd	Max display delay after defrost	0-255min	0	Pr2
ALc	Temperature alarms configuration	rE=related to set; Ab=absolute	rE	Pr2
ALU	Maximum temperature alarm	Set-110,0°C; Set-230°F	15	Pr1
ALL	Minimum temperature alarm	Set-100,0°C-set; Set-230°F-set	50	Pr1
AFH	Differential for temperature alarm recovery	(0,1°C-25,5°C) (1°F-45°F)	1	Pr2
ALd	Temperature alarm delay	0-255min	0	Pr2
dAo	Delay of temperature alarm delay	0-23h e 50'	0	Pr2
tbA	Alarm relay disabling	n=no; y=yes	y	Pr2
Aro	Alarm relay activation with power failure	n(0); y(1)	y	Pr2
ALF	Alarm relay activation for all the alarms	n(0); y(1)	y	Pr2
bon	Time of buzzer restart after muting, in case of alarm duration	0 – 30 (min)	0	Pr2
AoP	Alarm relay polarity (OA1=ALr)	oP; cL	cL	Pr2
i1P	Digital input polarity	oP=opening; cL=closing	cL	Pr1
i1F	Digital input configuration	EAL, bAL, PAL, dor, dEF, Htr, AUS	AUS	Pr1
did	Digital input alarm delay	0 – 255min	15	Pr1
nPS	Number of activation of pressure switch	0-15	15	Pr2
odc	Compress status when open door	No; Fan; CPr, F_C	No	Pr2
rrd	Regulation restart with for open alarm	n – y	y	Pr2
HES	Differential for energy saving	(-30°C - 30°C)(-54°F - 54°F)	1	Pr2
Adr	Serial address	0 – 247	1	Pr2
Pbc	Kind of probe	Ptc; ntc	Ptc	Pr2
onF	On/off key enabling	Nu, oFF, ES	oFF	Pr2
rSE	Real set point value	Actual set	---	Pr2
rEL	Software release	---	---	Pr2

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