DIAMOND PRO
GELATO/ICE CREAM

Maintenance
And Use Manual

OSCARTEK
361-367 Beach Road
Burlingame, CA 94010
Tel: 855.885.2400 | 650.342.2400
Fax: 650.342.7400
www.oscartek.com
sales@oscartek.com
1. INTRODUCTION

PRESENTATION
Dear Client,
Oscartek is pleased to number you among its customers and relies the bought machine will match your expectation. In order to get the best performances of the machine, we recommend you to follow all suggestions and instructions, which are included in this manual.

1.2. HOW TO USE THE MACHINE

- PERMITTED USES
This refrigerated display cabinet has been manufactured for ice cream presentation and sell.
- NOT PERMITTED USES
It is absolutely forbidden the use of the refrigerated display cabinet for pharmaceutical products.

1.3. RESPECTED NORMS
The refrigerated display cabinet has been manufactured in respect of the safety issues relevant to the following norm:
- Machinery Directive N° 2006/42/CE: CE marking for machinery
- Directive N° 2008/95/CE: Low tension
- Norm CEI 17-13/1 (EN 60439/1): Realization of Electric Installations
- Norm CEI EN 60335-1 (CEI 61-150): Safety of household and similar electrical appliances
- Norm CEI EN 60335-2-24 (CEI 61-56): Special norms for refrigerators, freezers and ice machines

1.4. RESPONSIBILITY
Oscartek declines any responsibility relevant to damages on persons, animals and/or products in case of:
- No respect of in force norms
- Installation, which is not conform to the instructions manual
- No observance of all maintenance operations, which are suggested in this manual
- No previously agreed change operations with the manufacturer
- No proper use of the refrigerated display cabinet, for which the machine has been produced.

1.5. WARNING
Anytime Oscartek reserves the right to up-date the content of this manual and/or to modify the product in order to improve its quality and performance, without any previous notice and/or communication.

2. DISPLAY CASE DATA PLATE

2.1. DATA PLATE CONTENT

<table>
<thead>
<tr>
<th>Model</th>
<th>Production Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Production Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Power</th>
<th>Type</th>
<th>No.</th>
<th>Gas</th>
<th>Pmax</th>
<th>Pmin</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 V/ 5 ph/ 6 Hz</td>
<td>W/A</td>
<td>15 W</td>
<td>15 W</td>
<td>16 W</td>
<td>17 W</td>
<td></td>
</tr>
<tr>
<td>14 W</td>
<td>15 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max 12 psig</th>
<th>Min 13 psig</th>
</tr>
</thead>
</table>

---

1. Commercial name of the unit
2. Identification number
3. Production date
4. Voltage
5. Phases
6. Frequency
7. Compressor type
8. Number of compressor
9. Refrigerant type
10. Refrigerant weight
12. Test pressure – system high pressure side
13. Test pressure – system low pressure side
14. Nominal power (current absorbed during defrost
15. Max. power absorbed during defrost
16. Nominal power absorbed by heating elements (only if higher than 100W)
17. Lighting nominal power
4. INSTALLATION

4.1. MACHINE HANDLING

- The ice cream display cabinet handling, from the truck to the final place, has to be made by any truck-lift, which is proper to its weight. The display cabinet shall be always balanced in order to ensure personnel integrity and machine functionality.

- The cabinet can be shipped with or without wood packaging. In case wood crate will be used, will have a pallet base for an easy fork-lift handling. The pallet, however should be handle in the central position.

- During the shipment, it is necessary to avoid any crash or/and shake of the display cabinet in order to not damage its frame, especially its glasses.

- Do not drag the display cabinet on the floor and do not push it on the upper glasses.

4.2. STOCK OF THE DISPLAY CABINET

- Whenever the cabinet has to be stored, follow carefully what suggested before.

- Environmental temperature during the cabinet stock can have following range -15°C and +55°C and humidity between 30% and 90%.

- The display cabinet has always to be protected by sunrays and raining.

- In case the display cabinet has to remain in stock quite long time before its use, keep it with its packaging in order to maintain its protection.

4.3. PACKAGING REMOVE

Before getting the display cabinet from the forwarding agent, check its conditions. In case it will be some damages, inform the driver and sign it on shipping documents. Eventual damages relevant to the shipment and/or to the wrong stock, have not to be ascribed to the manufacturer.

4.4. DISPLAY CABINET POSITION

- The refrigerated display cabinet needs particular environmental conditions in order to offer the right performance, so that the area where it will be used has to respect following indications:

  - Floor has to be leveled perfectly, on the contrary keep the display cabinet on the horizontal position in order to guarantee a perfect defrosting water drain and avoid boring compressor noises.

  - The display cabinet has to not be under the sun-rays in order to have its better refrigeration performance, has to remain inside the local or to be sheltered by window curtain. If what described above is not observed, it can determinate an increase of temperature of displayed product and an increasing power consume.

  - The display cabinet has not to be under air currents due to open doors or windows, or under roof ventilators or under air condition outlets. In case will be not respected the above suggestions it can arise an increasing of temperature of the displayed product and/or an increasing ice phenomena on the evaporator and internal fans, which compromise the correct cold air circulation and product consistence (pic 5.4.3).

  - The display cabinet has not to be placed close any heat source as heaters, ovens, etc.

  - The display cabinet has to have a sufficient place in order to ensure a correct custom service, to make an easy maintenance operation, to guarantee the right air flow necessary to make cold the condenser. Besides the warm air which flows out has to no have any obstacle or to invest other equipments in order to not reduce the correct functions.
5.5. REMOTE CONDENSING UNIT PLACING

- According to the model of ice cream display cabinet you have No.1 or No.2 internal, or remote, condensing units.
- The remote condensing unit has to be checked by specialised technicians and according to the required refrigerating power and their position
  respect the cabinet. The condensing unit has to be placed following these points:
  - The condensing unit has to be located at least 250 mm from any eventual wall. (pic.5.5)
  - Air flow direction has to be from the eventual wall towards compressor.
  - The local, in case will be closed, has to be with enough air circulation.
  - By the condenser has to be guaranteed in any case as much as possible cold air.
  - In case will be necessary it has to be foreseen a forced air exchange by any fan according to the
    air flow of condenser.
  - The condensing units of display cabinets have to be fixed properly.
  - The generated noise has not exceed the admitted noise levels relevant to the public places,
    especially in case of domestic buildings.
  - It is always necessary a sufficient place along the four sides of the display cabinet in order to make
    easy any type of check and maintenance operations.
  - When the condensing units are external will be necessary a frame holder that has to be fixed in a
    proper way and eventually added with amortising elements. Besides this frame has to be closed with
    no-water protection grid and sufficient opening holes for ventilation.

5.6. PIPING CONNECTION BETWEEN DISPLAY CABINET AND REMOTE CONDENSING UNITS.

- The liquid and suction piping exit from the base of the display cabinet in the point indicating in the picture 5.6 The choice of piping diameter and
  insulation thickness has to be taken by specialised technical personnel, who know specific parameters.
- The choice of piping diameter and insulation thickness has to be taken by specialised technical personnel, who know specific parameters.
- The piping length has to be as short as possible.
- The piping arrangement has to be made on purpose by qualified personnel in order to guarantee the main functionalities as the right inclination,
  to have some siphons on the base of suction piping on the way up, and eventually on the intermediate elevation.

WARNING! A wrong connection may occur serious damages on the display cabinet, especially on the compressor. The display cabinet
manufacturer cannot be responsible of any damage, which can arise from a wrong connection made by third parties.

5.7. ELECTRICAL CONNECTION

- Before proceeding with electrical connection, be sure that the available electric power and tension are what is required on technical label of the
  cabinet.
- The electric connection has to be made by qualified personnel and following manufacturer’s instructions taking into
  consideration the relevant norms in force.
- The display cabinet has already a general switch, however it is necessary an omni polar switch, with a minimum distance among the contacts of 3mm.
- It is obligatory that the display cabinet will be connected properly with an efficient ground socket.

WARNING! A wrong connection may occur always to persons, animals and things, where the manufacturer cannot be considered as responsible.

WARNING!
The display cabinet has no main switch breaking both the phases.
Before any maintenance operation disconnect the electrical supply of the display cabinet (see label on the rear of the display cabinet). (pic.5.7.2).
5.8 - ELECTRICAL CONNECTION - REMOTE CONDENSING UNIT

In case the display cabinet has a remote condensing unit, the electric control panel is supplied separately; in case the display cabinet is without condensing unit, the machine can be supplied without external control panel. However the electrical connection has to be made in the point indicating in the pic. 5.8. In this point 5 connecting terminal are not fixed, they are numbered and represent:

1-2 Electrical supply
3-4 Compressor switch
5-6 Defrosting switch

Ground connecting terminal

Fig.5.8

POSITION FOR ELECTRICAL CONNECTION

5.9. IDRAULIC CONNECTION

- In case the display cabinet has an internal condensing unit by air, it is not necessary any water system connection.
- In case the display cabinet has a dipper well, it is necessary make the connection of its water outlet with the main water drain outlet; besides it is necessary set a load water tube to the dipper well, to the operator side, to the right or to the left, according to customer’s choice.
- In case the display cabinet has condensing unit working fully or partially by water, it is necessary to connect the load water tube (this is the tube with thermo insulation) with the unload water tube (this is the tube without thermo insulation), of condenser working by water, to the water line

5.10. IDRAULIC CONNECTION - REMOTE CONDENSING UNIT

- In the case then display cabinet has a remote condensing unit, it is necessary make the connection of defrosting water outlet with the main water drain outlet. In this point there is a female pipe-fitting with a rapid receptacle for a tube Ø 32 mm (see pic. 5.10)

OUTLET POINT FOR EXHAUST PIPE
PIPE FOR WATER CONDENSATION OR MIXED AIR WATER
6. WORKING

6.1. PRELIMINARY STEPS
- Model with built-in system. Before delivery to customer, it is very important that technicians will verify the correct functioning of the unit, so to obtain best possible efficiency.
- Model with remote condensing unit. Please proceed as per previous point and carry out the following operations with accuracy:
  - Verify, when the unit is out, that no leak of refrigerant is observed (systems are generally tested with reference to their wet seal)
  - Verify through the liquid-gauge that the refrigerant charge is appropriate.
  - Regulate the condensing pressure control system.
  - Regulate the expansion valve properly, after you have completely opened the valve that controls the compressor’s carter pressure.
  - Regulation of the above control valve can only be done during defrost cycle.
  - Regulate high and low pressure valves.
  - Verify that water does not leak from the insulated pipes or from the joints.

6.2. SET INTO OPERATION
In order to set the unit into operation please operate on the following buttons:
- Main switch
- ON-OFF button on the control panel (pic.6.2)
- Light button on the control panel
- Electronic control, on the control panel, for temperature setting.

![CONTROL PANEL](pic.6.2)

6.3. ELECTRONIC CONTROLLER
Refer to pic. 6.3

![pic.6.3]

- **ON-OFF FUNCTION.**
  Press the ON-OFF button (9) for 3 seconds to turn on or to turn off the display cabinet. After the start of the display cabinet, the electronic controller is working when the temperature is displayed. After a power failure, the electronic controller will again work as before.

- **HOW TO LOCK-UNLOCK THE KEYBOARD.**
  Press together the buttons (5) and (12) for more 3 seconds for locking the keyboard: the “POF” message will be displayed. It is only possible to see the temperature displayed. Press together the buttons (5) and (12) for more 3 seconds for unlocking the keyboard: the “POn” message will be displayed.

- **HOW TO SWITCH ON-OFF THE LIGHT.**
  Press the button (7).

- **HOW TO SEE AND MODIFY THE SET POINT.**
  Press and immediately release the button “SET”(11). The SET led starts blinking. To change the Set value press the buttons (5) or (12) within 10 seconds. To memorize the new set point value press the button “SET”(11).

- **HOW TO START A MANUAL DEFOSTING.**
  Press the button (6) for more than 2 seconds. The programmed interval to the next defrosting cycle will be automatically reset. Due a power failure during a manual defrosting cycle, this cycle will be breached and the programmed interval to the next defrosting cycle will be automatically reset.

- **BUTTON (8).**
  In the present electronic controller the button (8) is disabled.
HOW TO SEE AND MODIFY THE PARAMETERS VALUES.
- Press the button (12) and at the same time press the button “SET”(11) for 3 seconds: the “HY” flashing message will be displayed.
- Press the button (5) to reach the message “PR2”.
- Press the button “SET”(11), “0 - -” will be displayed with “0” flashing, after input the password “321” as follows.
- Press the button (5) three times to reach “3” and confirm with the button “SET”(11), “0” will be displayed flashing.
- Press the button (5) two times to reach “2” and confirm with the button “SET”(11), “0” will be displayed flashing.
- Press the button (5) one time to reach “1” and confirm with the button “SET”(11).
- Now it is possible to see and/or modify the parameters values.
- Remember to press the button “SET”(11) to memorize the new values.
- Wait a few seconds without pressing any button.

HOW TO SEE THE PROBES VALUES.
- Enter in “PR2” level.
- Select “Prd” parameter and press the button “SET”(11) to display “Pb1” label alternate with Pb1 value.
- Use the buttons (5) and (12) to display the other probes values.

ALARMS.

<table>
<thead>
<tr>
<th>Message</th>
<th>Cause</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>“P1”</td>
<td>Thermostat probe failure</td>
<td>Compressor output according to parameters “Con” and “Col”</td>
</tr>
<tr>
<td>“P2”</td>
<td>Evaporator probe failure</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“P3”</td>
<td>Auxiliary probe failure</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“HA”</td>
<td>Maximum temperature alarm</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“LA”</td>
<td>Minimum temperature alarm</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“EE”</td>
<td>Data or memory failure</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“AL”</td>
<td>Defrost timeout alarm</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“EAL”</td>
<td>External alarm</td>
<td>Unchanged, only message</td>
</tr>
<tr>
<td>“BAL”</td>
<td>Serious external alarm</td>
<td>Other outputs OFF</td>
</tr>
<tr>
<td>“PAL”</td>
<td>Pressure switch alarm</td>
<td>Other outputs OFF</td>
</tr>
</tbody>
</table>

The alarm message is displayed until the alarm condition is recovery. All the alarm messages are showed alternating with the cabinet temperature except for the “P1” which is flashing. To reset the “EE” alarm and restart the normal functioning press any key; the “P1” message is displayed for about 3 seconds.

ALARM RECOVERY
- Probe alarms “P1”, “P2”, and “P3” automatically stop 10 seconds after the probe restarts normal operation; check connections before replacing the probe.
- Temperature alarms “HA” and “LA” automatically stop as soon as the thermostat temperature returns to normal values or when the defrost starts.

6.4. PRODUCT LOADING
- Before loading the product inside the display cabinet, wait until the unit reaches the pre-set temperature and the compressor starts its cycle.
- Load the product only if it already has the correct storage temperature.
- Always check that the cold air inlet and outlet are not completely or partially obstructed by the product.
- The product doesn’t exceed the load limit represented in Pic.6.5.

6.5. SUGGESTED TEMPERATURES
The average storage temperatures for each kind of the refrigerated products are the following:
- Ice cream: -13 ÷ -18 °C
- Granita: -8 ÷ -12 °C
- Cake, industrial ice cream: -20 ÷ -22 °C

6.6. AUTOMATIC DEFROSTING
The present refrigerated display cabinet has an automatic defrosting to eliminate the ice and snow on the evaporator. All the parameters are pre-set by the customer, nevertheless their values can be changed by qualified technical personnel to adapt the working of the display cabinet to the particular ambient conditions.

6.7. USE OF THE CURTAIN AND THE SLIDING PANELS
In order to guarantee the correct working of the display cabinet and whenever the sales allows it, the curtain must always be rolled down or, if present, the sliding panels must be closed.

6.8. STOPPING THE UNIT
If you wish to stop the display cabinet use the main switch that simultaneously will stop the display cabinet, the condensing unit and the control panel.
7. ROUTINE MAINTENANCE AND PERIODIC CHECKS

- These kinds of operations are at client’s expenses.
- In case some malfunctioning of the unit are observed, please make sure this is not due to non-maintenance reasons, before you apply to qualified assistance.
- The accurate and periodic cleaning of the unit will reduce the risk of damages to the unit itself and to the products stored within.
- See following tab for reference.

**ATTENTION!** Before starting any maintenance and cleaning operation make sure you operate on the main switch in order to deactivate tension (pic. 7)

![Image](pic.7)

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>DESCRIPTION</th>
<th>FREQUENCY</th>
</tr>
</thead>
</table>
| Surfaces’ cleaning         | • Wash exclusively with warm water and neutral soup; rinse abundantly and wipe off with a soft cloth.  
                          | • Do not use abrasive products                | weekly             |
| Plastic surfaces’ cleaning | • Wash exclusively with warm water and neutral soup; rinse abundantly and wipe off with a soft cloth.  
                          | • Do not use alcohol, acetone and any solvent that might spoil the look and structure of the material. | weekly             |
| Glass surfaces’ cleaning   | • Use only specific products for glass cleaning  
                          | • Using water alone might lead to calcareous deposits on the glass surfaces | daily              |
| Wooden surfaces’ cleaning  | • Use exclusively a wet cloth.                 | weekly             |
| Additional defrost         | • Under particular conditions of temperature and humidity, the frost that normally forms on the evaporator and fans might increase in volume, so leading to a faulty functioning of the unit.  
                          | • If these conditions should last, the assistance of a qualified technician shall be needed. Waiting for this service, it is suggested to operate one or more defrost cycles (despite the damages this might cause to the stored product) | Waiting for qualified assistance |
| Periodic defrost           | • In order to obtain the best performance from the cooling system, we suggest to operate an extended defrost cycle.  
                          | • Before you do that, please remove displayed products from inside the cabinet, always operate an additional defrost cycle in order to remove from the evaporator the largest possible amount of frost or ice. Turn the main switch off for 5 hours (min.)  
                          | • Before re-starting the unit, make sure that frost has totally melted and wipe carefully. | max. 15 DAYS |

**ATTENTION! DO NOT CLEAN THE UNIT WITH WATER JETS**

8. EXTRAORDINARY MAINTENANCE

This type of operation has to be made by qualified technician only.

**ATTENTION!** Before operating any maintenance, make sure the tension is deactivated. (pic.11).

- Lamps’ replacement: qualified technician needed.
- Air condenser cleaning: qualified technician needed. When the fan is switched off you can clean the condenser with a compressed air jet. Never use metallic brushes. Use protection gloves (pic.8).

![Image](Pic.8.)
## 9. DEFECTS AND REMEDIES

<table>
<thead>
<tr>
<th>DEFECT</th>
<th>PROBABLE CAUSES</th>
<th>POSSIBLE REMEDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The unit does not work</td>
<td>Automatic switch released due to absorption overload</td>
<td>Re-start the automatic switch</td>
</tr>
<tr>
<td>Main switch off</td>
<td></td>
<td>Turn the main switch on</td>
</tr>
<tr>
<td>Refrigeration switch off</td>
<td></td>
<td>Turn the refrigeration switch on</td>
</tr>
<tr>
<td>Electrical black-out in the building</td>
<td></td>
<td>If the black-out does not end in a reasonable time frame, it become necessary to move the displayed product in another refrigerator</td>
</tr>
<tr>
<td>The temperature inside the display area does not get enough cold</td>
<td>The evaporator(s) is blocked by ice forming</td>
<td>Operate a complete defrost cycle after having displaced the products in another refrigerator. Do not put the product back in the cabinet until the real defect has been identified</td>
</tr>
<tr>
<td>The internal fans are damaged or not working</td>
<td></td>
<td>Replace the damaged fans. If the fans are not damaged, an electrical defect must be identified. If the fans are replaced, the blades' inclination have to be maintained unchanged</td>
</tr>
<tr>
<td>Excess of internal ventilation</td>
<td></td>
<td>Replace the fans and make sure that blades' inclination is kept unchanged</td>
</tr>
<tr>
<td>The pre-set temperature of the digital control panel is wrong</td>
<td></td>
<td>Set the correct temperature</td>
</tr>
<tr>
<td>The digital control is not working</td>
<td></td>
<td>Replace the slave module or the temperature sensor, after you made clear which one is faulty</td>
</tr>
<tr>
<td>The display area is crossed by draught or exposed to direct/reflecting sunbeams</td>
<td></td>
<td>Eliminate draughts and try to avoid sunbeams interference in any way</td>
</tr>
<tr>
<td>Air condenser is clogged by dust or dirt</td>
<td></td>
<td>Clean the condenser with accuracy</td>
</tr>
<tr>
<td>The cooling air flow of the condenser is not sufficient</td>
<td></td>
<td>Remove everything that might obstruct the air flow through the condenser</td>
</tr>
<tr>
<td>Refrigerant gas not sufficient inside the cooling system</td>
<td></td>
<td>Find and remove the leak inside the system. Refill the system with the refrigerant</td>
</tr>
<tr>
<td>The cooling water flow of the water condenser is not sufficient</td>
<td></td>
<td>Check that water supply is operating. In case it is, just regulate (or replace) the regulation valve</td>
</tr>
<tr>
<td>The product gets too hard next to air outlet and too soft next to air intake</td>
<td>Front evaporator blocked by frost</td>
<td>Verify the efficiency of the gasket seal (relatively to the glass superstructure). Verify that the display area is not crossed by draughts. Verify that backsliders (or night blind) are always closed, peak hours excepted. Verify that internal ventilation is sufficient and that the product does not exceed 10mm above the pans level. Act accordingly</td>
</tr>
<tr>
<td></td>
<td>Front evaporator blocked by ice</td>
<td>All the a.m. checks are required. Verify, in addition, the defrost cycle efficiency</td>
</tr>
<tr>
<td></td>
<td>Back evaporator blocked by ice</td>
<td>Verify that the refrigerating and electric systems of the unit are working properly</td>
</tr>
<tr>
<td></td>
<td>Internal fans are not efficient</td>
<td>Restore the efficiency of the fans by replacing the damaged ones</td>
</tr>
<tr>
<td></td>
<td>The basket seal of the glass superstructure is not sufficient</td>
<td>Verify the seriousness of the defect and make sure the draughts are minimized</td>
</tr>
<tr>
<td>Some of the products tend to soften, while some other keep the right consistence</td>
<td>The temperature inside the display area is not fit for the products that get too soft</td>
<td>Since the storage temperature cannot be appropriate for any gelato product, based on different flavours and compositions, it is suggested to display only similar products together</td>
</tr>
<tr>
<td>The compressor does not start or it does not hold operating</td>
<td>There is no electrical supply</td>
<td>Verify there is no black-out in progress. Turn all the power switches on</td>
</tr>
<tr>
<td></td>
<td>The supply tension is too low</td>
<td>Verify that nominal tension at connecting clamps is 220V; a tension between 189V and 242V will be acceptable. If the tension does not reach 189V, the compressor might have problems in starting. Verify the efficiency of electric installation including the connecting clamps to the compressor</td>
</tr>
<tr>
<td></td>
<td>The preset temperature on the thermostat is too high</td>
<td>If the preset temperature is higher than in the display area, the compressor is not going to work. Change the settings if you verify that the preset temperature is not enough low</td>
</tr>
<tr>
<td></td>
<td>The intervention of the max pressure valve (where present)</td>
<td>Identify the probable cause among the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The air condenser is blocked - The cooling fan of the air condenser is not working - The room temperature is too high - Lack of cooling water in the water condenser - The pressure valve is broken - Remove the cause</td>
</tr>
<tr>
<td>DEFECT</td>
<td>PROBABLE CAUSES</td>
<td>POSSIBLE REMEDIES</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The compressor works constantly or for too long periods</td>
<td>The temperature inside the room is too high</td>
<td>The compressor can only work constantly if there is no chance of decreasing room temperature (for instance with a.c. system)</td>
</tr>
<tr>
<td>The temperature of the compressors’ room is too high (remote comp.)</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>The air condenser is blocked</td>
<td>Clean the condenser carefully</td>
<td></td>
</tr>
<tr>
<td>Cooling air flow of the water condenser is not sufficient</td>
<td>Check the efficiency of the regulation valve and make sure that taps are turned on</td>
<td></td>
</tr>
<tr>
<td>Lack of refrigerant</td>
<td>Identify the eventual leak and refill with refrigerant</td>
<td></td>
</tr>
<tr>
<td>Internal ventilation is not sufficient</td>
<td>Restore a proper ventilation by replacing the faulty fans or by removing the eventual obstacle</td>
<td></td>
</tr>
<tr>
<td>Evaporators are extremely clogged</td>
<td>Operate a complete defrost cycle</td>
<td></td>
</tr>
<tr>
<td>The temperature set on the thermostat is too low</td>
<td>Adjust temperature settings</td>
<td></td>
</tr>
<tr>
<td>Temperature is not displayed on the digital panel</td>
<td>Flat battery</td>
<td>Replace battery</td>
</tr>
<tr>
<td>Sensor does not work properly</td>
<td>Replace digital thermostat</td>
<td></td>
</tr>
<tr>
<td>Faulty electronics</td>
<td>Replace digital thermostat</td>
<td></td>
</tr>
<tr>
<td>Defrost water missing</td>
<td>Water drain pipes are blocked</td>
<td>Remove the obstacle</td>
</tr>
<tr>
<td>Defrost cycle is not efficient</td>
<td>Vently the efficiency of control panel (slave module, sensor, solenoid valve..) and the position of the end cycle sensor</td>
<td></td>
</tr>
<tr>
<td>Lighting is not working</td>
<td>The switch is off</td>
<td>Turn the switch on</td>
</tr>
<tr>
<td>The neon lamp is not properly fitted in its case</td>
<td>Ad just the lamp by rolling it</td>
<td></td>
</tr>
<tr>
<td>Exhausted lamp</td>
<td>Replace the lamp</td>
<td></td>
</tr>
<tr>
<td>Ballasts or starter are not efficient</td>
<td>Replace faulty components</td>
<td></td>
</tr>
<tr>
<td>The unit is too noisy</td>
<td>Vibrations of internal plates</td>
<td>Tighten all the fixing screws</td>
</tr>
<tr>
<td>Internal fans are not fixed well</td>
<td>See above</td>
<td></td>
</tr>
<tr>
<td>Fans’ blades are not fixed well</td>
<td>Replace faulty fans. If there is friction between the blades and some ice formation, then act on defrost cycle settings</td>
<td></td>
</tr>
<tr>
<td>Pipes are in contact with other parts of equipment</td>
<td>Avoid any contact between pipes and other parts; a constant rubbing might wear the pipes out and give way to refrigerant leaking</td>
<td></td>
</tr>
<tr>
<td>The unit is not well levelled</td>
<td>Adjust the levelling</td>
<td></td>
</tr>
<tr>
<td>Condensation water forming on the glasses</td>
<td>Transformer is not working</td>
<td>Check that the transformer is correctly supplied - Verify the correct functioning of the transformer fuse - Replace the transformer</td>
</tr>
<tr>
<td>Heating circuit interrupted</td>
<td>Replace the glasses</td>
<td></td>
</tr>
</tbody>
</table>
REFRIGERATION AND ELECTRICAL SYSTEM CABLE CONNECTION GUIDE

AGD  DIGITAL FLAVOURS DISPLAY FEEDER
AEL  ELECTRONIC BALLAST
AP   SERVICE VALVE
CA   SUPPLY CABLE
CAR  AIR CONDITIONER
CE  ELECTRONIC CONTROL
CN  MULTIPOLAR CONNECTOR
CO  COMPRESSOR
D  DIOD
DEV  SHUNT
EM  PHOTOCELL EMITTER
EV  EVAPORATOR
F  FUSE
FD  FILTER DRIER
FLU  WATER FLOW SWITCH
FR  COMPRESSOR THERMAL PROTECTION
HL  COMPRESSOR ALARM LIGHT
I  GENERIC SWITCH
IEC  WATER EVAPORATION BIN SWITCH
IGD  DIGITAL FLAVOURS DISPLAY
II  LIGHTING SWITCH
IL  SIGHT GLASS
IMC  WARM SHELF SWITCH
INV  INVERTER
IR  REFRIGERATION SWITCH
IRP  LIGHT REFRIGERATION SWITCH
IV  INTERNAL FAN SWITCH
KM  CONTACTOR
LF  FRONT LIGHTING
LI  INTERNAL UPPER LIGHTING
LIA  FRONT LIGHTING
LIG  FLAVOURS DISPLAY LIGHTING
LJP  REAR LIGHTING
MDIG  DIGITAL MODULE FOR FLAVOURS DISPLAY
MM  SPINNING SHELVES ELECTRIC MOTOR
MUC  CONDENSING UNIT ELECTRIC CONNECTIONS
PA  HIGH PRESSURE CONTROL
PD  HIGH/LOW PRESSURE CONTROL
PO  WATER PUMP
QE  EXTERNAL ELECTRIC PANEL
QF  MAGNETIC-TERMIC SWITCH
R  LIGHTING BALLAST
RADD  RECTIFIER
RE  GENERIC RELAY
REL  ELECTRONIC BALLAST
REP  ELECTRONIC CONTROL TEMPERATURE REPEATER
RES1  COLD AIR DISCHARGE HEATING ELEMENT
RES2  FRONT PROFILE HEATING ELEMENT
RES3  RIGHT/LEFT GLASS HEATING ELEMENT
RES4  FRONT GLASS HEATING ELEMENT
RES5  DEFOST HEATING ELEMENT
RES6  WATER EVAPORATION HEATING ELEMENT
RES7  TOP LIGHTING FIXTURE HEATING ELEMENT
RES8  LATERAL GLASS SUPPORT HEATING ELEMENT
RES9  FRONT BAND HEATING ELEMENT
RES10  COUPLING BAND HEATING ELEMENT
RES11  SERVICE TOP HEATING ELEMENT
RES12  UPPER BAND/TOP FRAME HEATING ELEMENT
RES13  HOT DRY/BAIN MARIE DISPLAY HEATING ELEMENT
RES14  ANTI-FOG SUCTION AIR BAND HEATING ELEMENT
RES15  WARM SHELF HEATING ELEMENT
RES16  SIDE BANDS/FRONT GLASS HINGE HEATING ELEMENT
RES17  DEHUMIDIFICATION HEATING ELEMENT
RES18  DEFOSTING WATER DRAIN HEATING ELEMENT
RES19  RING FRAME HEATING ELEMENT
RES20  SIDE BAND HEATING ELEMENT
RES21  SUCTION AIR GLASS HEATING ELEMENT
RES22  -
RES23  REAR GLASS HEATING ELEMENT
RES24  INTERNAL GLASS HEATING ELEMENT
RES25  FRONT GLASS UPPER FRAME HEATING ELEMENT
RES26  FRONT GLASS LATERAL/LOWER FRAME HEATING ELEMENT
RES27  FRONT GLASS LATERAL FRAME HEATING ELEMENT
RES28  FRONT GLASS LOWER FRAME HEATING ELEMENT
RES29  FRONT GLASSES COUPLING PROFILE HEATING ELEMENT
RES30  DOORS FRAME MIDDLE POST HEATING ELEMENT
RES31  GLASSES PERIMETRAL FRAME HEATING ELEMENT
RES32  HEATED AIR CONDITIONER ELEMENTS
RES33  WATER DRAIN HEATING ELEMENT
RES34  DOORS FRAME HEATING ELEMENT
RES35  COMPRESSOR CRANKCASE HEATING ELEMENT
RES36  FRONT GLASS FRAME HEATING ELEMENT
REV  CONDENSER FAN SPEED CONTROL
REV C  CONDENSER FAN RELAY
RI  REFRIGERANT TAP
RIC  COMPRESSOR DELAYER
RIV  PHOTOCELL RECEIVER
RIS  RESERVE, ANTI-FOG HEATER ELEMENT
RL  LIQUID RECEIVER
RLA  WATER LEVEL ELECTRONIC CONTROL
RO  OIL HEATER ELEMENT
SAA  ABSENCE OF WATER LIGHT
SC  CONDENSER PROBE
SD  TERMINAL BOX
SDC  COMPRESSOR TERMINAL BOX
SE  PROXIMITY SENSOR
SEC  MAIN SWITCH
SFV  TANK BOTTOM HEATING COIL
SIDG  FLAVOURS DISPLAY DIGITAL SYSTEM
SLA  WATER LEVER PROBE
SPC  COMPRESSOR LIGHT
SPMC  WARM SHELF LIGHT
SPR  ELECTRIC SUPPLY LIGHT
SPS  DEFROSTING LIGHT
SS  DEFROSTING PROBE
ST  TEMPERATURE PROBE
STR  LIGHTING STARTER
SU  HUMIDITY PROBE
T  TEMPERATURE CONTROL
TI  WINTER THERMOSTAT
TC  CAPILLARY TUBE
TE  TIMER
TER  THERMOMETER
TF  FUSIBLE PLUG
TMC  WARM SHELF THERMOSTAT
TP  LIGHTING FIXTURES REFRIGERATOR THERMOSTAT
TRA  TRANSFORMER
TRC  ELECTRONIC CONTROL TRANSFORMER
TREV  WATER EVAPORATION HEATER ELEMENT THERMOSTAT
TS  SECURITY THERMOSTAT
TVC  CONDENSER FAN THERMOSTAT
TCM  COMPRESSOR FAN / GENERAL USE
VC  CONDENSER FAN
VEC  WATER EVAPORATION BIN
VES  EXPANSION VALVE
VI  INTERNAL FAN
VPA  CONDENSING PRESSURE CONTROL WATER VALVE
VR  CHECK VALVE
VRA  SUCTION PRESSURE REGULATION VALVE
VRE  EVAPOTATING PRESSURE REGULATION VALVE
VS  GENERAL USE SOLENOID VALVE
VSA  SOLENOID WATER VALVE
VSA-B  BY-PASS SOLENOID WATER VALVE
VSC  REVERSING CYCLE SOLENOID VALVE
VSL  LIQUID SOLENOID VALVE
VSS  DEFROSTING SOLENOID VALVE
VT  POWER REGULATOR
VV  GLASS FAN
X1  CABINET CONNECTIONS
X2  EXTERNAL ELECTRIC PANEL CONNECTIONS
X3  CONDENSING UNIT CONNECTIONS
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 herein. It cannot be used as a safety device.
- Check the calibration 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.
- Warming: disconnect all electrical connections before any kind of maintenance.
- If the probe 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 "Dwell s.r.l." (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 separate and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (see model TT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

Models XW270L and XW271L, 38x185 mm format, are microprocessor-based controllers suitable for applications on medium or low temperature refrigeration units. They are provided with six relay outputs to control compressor, defrost - which can be either electrical or hot gas - the evaporator fans, the lights, the alarm and the auxiliary output. In XW271L the auxiliary output is configured as anti-condensing heater. They are also provided with three NTC probe inputs, one for temperature control, one for defrost and one for defrost temperature of the evaporator and the third, optional, for the door fault. There are two digital inputs (one each) for the door switch and configurable by parameter.

The standard TTL output allows the user to connect, by means of a TTL/RS485 external module, a ModBUS-RTU compatible monitoring system and to program the parameter list with the "Flash Key".

An optional output for remote display "XW-REP" is available.

3. CONTROLLING LOADS

3.1 THE 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 "COM" and "COF".

3.2 FAST FREEZING

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

3.3 DEFROST

Three defrost modes are available through the "DF" parameter: defrost with electrical heater, hot gas or thermostatic defrost. The defrost interval is controlled by parameters "DF1" - "DF1/h" the defrost is made every "DF1" time, (DF=1) the interval "DF1" is calculated through Smart Defrost algorithm (only when the compressor is ON) and the evaporator temperature is lower than "DF1/h" parameter.

The end of the defrost cycle is controlled through the "DF" parameter.

3.4 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the "Fnc" parameter:
- Fnc-e: fans will switch ON and OFF with the compressor and not run during defrost;
- Fnc-c: fans will run continuously, but not during defrost after defrost, there is a timed delay allowing for trip time, set by means of the "Fnc" parameter;
- Fnc-d: fans will switch ON and OFF with the compressor and run during defrost;
- Fnc-d: fans will run continuously also during defrost.

Additional parameter "Fsc" provides the setting of temperature detected by the evaporator probe, above which the fans are always OFF. This can be used to make sure circulation air only if the temperature is lower than set in "Fsc".

3.5 AUXILIARY OUTPUT

The auxiliary output is switch ON and OFF by means of the corresponding button on the keyboard.

The auxiliary output of the XW271L model controls the anti-condensing heater and is automatically activated if the room temperature is lower than the "SAR" parameter.

4. KEYBOARD

To display and modify target set point, in programming mode it selects a parameter or confirm an operation.

- By holding it pressed for 3s when max or min temperature is displayed it will be erased.
- To see the max, stored temperature in programming mode it displays the parameter code or increases the displayed value. By holding it pressed for 3s the fast-freezing cycle is started.
- To see the min stored temperature in programming mode it displays the parameter code or decreases the displayed value.

- By holding it pressed for 3s the defrost is started.

Switch ON and OFF the cold room light.

- By holding it pressed for 3s Energy Saving function is started or stopped.

For XW270L model: Switch ON and OFF the auxiliary output.

For XW271L model: Switch ON and OFF the anti-condensing heater output.

Switch ON and OFF the instrument.

KEY COMBINATIONS

+ To lock and unlock the keyboard.
+ To enter the programming mode.
+ To exit the programming mode.

4.1 USE OF LEDS

Each LED is functioned in the following table.

<table>
<thead>
<tr>
<th>LED MODE</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>The compressor is running</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Programming Phase (flashing with LED ↓)</td>
</tr>
<tr>
<td>ON</td>
<td>The fan is running</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Programming Phase (flashing with LED ↓)</td>
</tr>
<tr>
<td>ON</td>
<td>The defrost is enabled</td>
</tr>
<tr>
<td>FLASHING</td>
<td>Drip time in progress</td>
</tr>
<tr>
<td>ON</td>
<td>The Fast Freezing cycle is enabled</td>
</tr>
<tr>
<td>ON</td>
<td>The Anti-Condensing heater relay (Aux) is ON</td>
</tr>
</tbody>
</table>

Function of the LEDs placed on the top left side of buttons:

<table>
<thead>
<tr>
<th>BUTTON</th>
<th>MODE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET</td>
<td>FLASHING</td>
<td>The Set point is displayed and it can be modified</td>
</tr>
<tr>
<td>SET</td>
<td>FAST FLASHING</td>
<td>The Energy Saving is enabled</td>
</tr>
<tr>
<td>DEFROST</td>
<td>ON</td>
<td>The Manual Defrost is activated</td>
</tr>
<tr>
<td>ENERGY SAVING</td>
<td>ON</td>
<td>The Energy Saving is enabled</td>
</tr>
<tr>
<td>LIGHT</td>
<td>ON</td>
<td>The Light is ON</td>
</tr>
<tr>
<td>AUX</td>
<td>ON</td>
<td>The Auxiliary output is OFF (XW270L)</td>
</tr>
<tr>
<td>HEATER</td>
<td>ON</td>
<td>The Anti-condensing heater is ON (XW271L)</td>
</tr>
<tr>
<td>ON/OFF</td>
<td>ON</td>
<td>The Instrument is OFF</td>
</tr>
</tbody>
</table>

4.2 HOW TO SEE THE MIN TEMPERATURE

1. Press and release the "<<" key.
2. The "L" message will be displayed followed by the minimum temperature recorded.
3. By pressing the "<<" key or waiting for 5s the normal display will be restored.

4.3 HOW TO SEE THE MAX TEMPERATURE

1. Press and release the ">>" key.
2. The "H" message will be displayed followed by the maximum temperature recorded.
3. By pressing the ">>" key or waiting for 5s the normal display will be restored.

4.4 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

To reset the stored temperature, when max or min temperature is displayed:
1. Press SET key until "YET" label starts blinking.

N.B. After the installation RESET the temperature stored.

4.5 HOW TO SEE AND MODIFY THE SET POINT

1. Push and immediately release the SET key; the display will show the Set point value;
2. The "H" message will be displayed followed by the maximum temperature recorded.
3. By pressing the "<<" key or waiting for 5s the normal display will be restored.
4. To memorise the new set point value push the SET key again or wait 10s.
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TO START A MANUAL DEFROST

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

TO ENTER IN PARAMETERS LIST "PR1"

To enter the parameter list "PR1" (user-accessible parameters) operate as follows:

1. Enter the Programming mode by pressing the Set and DOWN key for few seconds ( and start blinking).
2. The instrument will show the first parameter present in "PR1".

TO ENTER IN PARAMETERS LIST "PR2"

To access parameters in "PR2":
1. Enter the "PR1" level.
2. Select "PR2" parameter and press the SET key.
3. The "PR2" message is displayed, shortly followed by "off" and "on" with a flashing zero.
4. Use or to change the parameter value.
5. Press SET to store the new value and move to the following parameter.

TO LOCK THE KEYPAD

1. Keep the and keys pressed together for more than 3 s at the and keys.
2. The "OFF" message will be displayed and will remain locked. At this point it is only possible to turn the set point, or the time on the controller.
3. Pressing ON/KEY allows you to turn the set point on the controller.

TO SEE THE PROBE VALUES

1. Enter in "PR2" level.
2. Select "PdF2" parameter with or .
3. Press the "SET" key to display its value ( and LED starts blinking).
4. Use or to change its value.
5. Press "SET" to store the new value and move to the following parameter.

TO UNLOCK THE KEYPAD

Keep the and keys pressed together for more than 3 s.

ON/OFF FUNCTION

By pressing the ON/OFF key, the instrument shows "OFF" for 5 sec. and the ON/OFF LED is turned off.
During the OFF status, all the relays are switched off and the regulations are stopped; if a monitoring system is connected, it does not record the instrument data and alarm.

N.B. During the OFF status, the Light and AUDIO buttons are active.

PARAMETER LIST

REGULATION

Hy Differential: (0.1, 25.5°C, 3°C, 45°F): Intervention differential for the set point, always possible. Compresor Cut IN is Set Point Plus Differential (In). Compressor Cut OUT is at the temperature reaches the set point.
LS Minimum set point limit: (50°C, 37°C, 2°F): Sets the minimum acceptable value for the set point.
US Maximum set point limit: (71°C, 20°C, 30°F): Sets the acceptable maximum value for the set point.
Ost Outputs activation delay at start up: (0-255 min) This function is enabled at the initial start up of the instrument and inhibits any output activation for a period of time set in the parameter. (AUTO and Light can work)
AC Anti-short cycle delay: (0-30 min) Interval between the compressor stop and the following restart.
CCMT Thermostat overload: (0-220 ma) to set the length of the continuous cycle. Can be used, for instance, when the room is filled with new products.
Cond Compressor ON time with faulty probe: (0-255 min) time during which the compressor is active in case of faulty thermostat probe. When the compressor is active, the alarm is displayed.
COF Compressor OFF time with faulty probe: (0-255 min) time during which the compressor is active in case of faulty thermostat probe. When the compressor is active, the alarm is displayed.

DISPLAY

OF Temperature measurement unit: C - Celsius; F - Fahrenheit. When the measurement unit is changed the SET point and the values of the regulation parameters have to be modified.
R&S Resolution (for the): (0.1°C, 0.1°C) allows decimal point display.
In "C " in "C" 1°C

DEFROST

IDF Defrost type:
D = electrical heater (Compressor OFF)
T = thermostatic defrost. During the defrost time "MID", the heater switches ON and OFF depending on the evaporator temperature and "MID" value.
FOP = hot gas (Compressor and defrost relays ON)

EIDF Defrost mode:
In = interval mode. The defrost starts when the time "MID" is expired.
D = Smart Defrost. The time is increased only when the compressor is running (even non continuously) and only if the evaporator temperature is less than the value in "SDF" (set point for SMARTFROST).
SDF Set point for SMARTFROST: (30-20°C, 32-68°F) evaporator temperature which allows the EIDF cooling (interval between defrosts) in SMARTFROST mode.
DID Defrost termination temperature: (0-110°C, 32-230°F) (enabled only when the evaporator probe is present) sets the temperature measured by the evaporator probe which causes the end of defrost.

IFD Time between defrost cycles: (1-120 h) Determines the time interval between the beginning of two defrost cycles.

SDF (Maximum) duration of defrost: (0-255 min) When PDP = n, no evaporator probe, it sets the defrost duration, when PDP = y, defrost and based on temperature, it sets the maximum length for defrost.

EIDF Display during defrost:
D = real temperature; F = air conditioning at the defrost start;
Set = set point; DFF = "DEFO" label;
DGO = "DEFO" label.

didf Defrost display time out: (0-255 min) Sets the maximum time between the end of defrost and the restarting of the real room temperature display.

FAC Drain down time: (0-60 min) Time interval between reaching defrost temperature and the restarting of the control system operation.

D0 First defrost after start-up:
D = immediately; n = after the defrost.

DFD Defrost delay after Fast freezing: (0-230 min) after a Fast Freezing cycle, the first defrost will be delayed for this time.

FANS

FnC Fan operating mode:
Cn = running with the compressor, OFF during the defrost; C = running with the compressor, ON during the defrost; ON = continuous mode, OFF during the defrost.

FSF Fan start temperature: (50-110°C, 122-230°F) setting of temperature, detected by evaporator probe, below which the fans is always OFF.

ALARMS

ALC Temperature alarm configuration:
D = High and low alarms related to Set Point;
A = High and low alarms related to the absolute temperature.

ALC High temperature alarm setting:
AlC = E, F, 0°C or 50°C
AlC = A, AB, A - 11°C or 23°F

Where this temperature is reached and after the ALD delay time the HI alarm is enabled.

ALC Low temperature alarm setting:
ALC = D, E, -5°C or 0°F
ALC = AB, A - 5°C or 23°F - ALU

Where this temperature is reached and after the ALD delay time, the LOW alarm is enabled.

AHF Temperature alarm and fan differential: (30-110°C, 1°F-205°F) Intervention differential for temperature alarm set point and the regulation set point, always possible.

ALD Alarm delay: (0-255 min) Time interval between the detection of an alarm condition and the corresponding alarm signal.

DAC Delay of temperature alarm at start up: (0-255 min) Time interval after the alarm delay time the HI alarm is enabled.

A DH Alarm delay at the end of defrost: (0-255 min) Time interval after the detection of the temperature alarm condition at the end of defrost and the alarm signal.

AT Del of temperature alarm after closing the door: (0-255 min) Time delay to signal the temperature alarm condition after closing the door.

AB Open door alarm delay: (0-255 min) Time delay between the detection of the open door condition and its alarm signal.

BF Battery and relay alarm: (0-255 min) Time delay between the detection of the open door condition and its alarm signal.

Bukr buzzer silenced: (0-255 min) Time delay between the detection of the open door condition and its alarm signal.

BP Pressure switch number: (0-15) Number of activation of the pressure switch, during the "OL" interval, before signaling the alarm event (OL - FAIL).

PROBE INPUTS

Thermistor probe calibration: (12.0-12.0°C, 21-21°F) allows to adjust possible offset of the thermostat probe.

Evaporator probe calibration: (12.0-12.0°C, 21-21°F) allows to adjust possible offsets of the evaporator probe.
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03 Auxiliary probe calibration: (-12.0-12.0°C / -21-23°F) allows to adjust possible offsets of the evaporator probe.

PnP: 
P: present; n: not present; the distillate stops only by time; y: present; the distillate stops by temperature and time.

PnP: 
P: present; y: not present; y: present.

HE5: Temperature increase during the Energy Saving cycle: (30.0°C - 30.0°C / 86-86°F) sets the increasing value of the set point during the Energy Saving cycle.

DIGITAL INPUTS

e: Compressor and fan status when open door:

na = normal
Fan = Fan OFF
CPP = Compressor OFF
F.C = Compressor and fan OFF

HP: Door switch input polarity:

CL: the digital input is activated by closing the contact.
OP: the digital input is activated by opening the contact.

BP: Configurable digital input polarity:

CL: the digital input is activated by closing the contact.
OP: the digital input is activated by opening the contact.

DF: Digital input operating mode: configure the digital input function:

EAL = generic alarm
bAL = serious alarm mode
PAM = Pressure switch
dtFF = Start defrost
AUS = Relay AUX actuation
ES = Energy Saving
OFF = remote On/Off

did: Time interval/delay for digital input alarm: 15-255 min. Time interval to calculate the number of the pressure switch activation when DFF=OFF, if DFF=EAL or BAL (internal alarms), "did" parameter defines the time delay between the detection and the successive signalling of the alarm.

SAR: Set point for anti-condensing heater: (-10.0-10.0°C / 50-23°F) defines the room temperature setpoint to switch on the anti-condensing heater.

OTHER

Ad: RS485 serial address (1-247): Homeifies the instrument address when connected to a ModBUS compatible monitoring system.

Rel: Release software: (read only) Software version of the microprocessor.

Prb: Parameter table: (read-only) it shows the original code of the digital parameter map.

Prv: Prv display (read only) display the temperature values of the evaporator probe Prb and the auxiliary probe Prv.

PrZ: Access to the protected parameter list (read only).

DIGITAL INPUTS

The wing series can support up to 2 free contact digital inputs. One is always configured as door switch, the second is programmable in seven different configurations by the "BP" parameter.

DOOR SWITCH INPUT

It signals the door status and the corresponding relay output status through the "e: Compressor and fan status when open door:

na = normal
Fan = Fan OFF
CPP = Compressor OFF
F.C = Compressor and fan OFF

Since the door is opened, after the delay time set through parameter "did", the alarm output is enabled and the display shows the message "4A". The alarm stops as soon as the external digital input is disabled again.

CONFIRMABLE INPUT - GENERIC ALARM (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 stays just after the digital input is de-activated.

CONFIRMABLE INPUT - SERIOUS ALARM MODE (BAL)

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

CONFIRMABLE INPUT - PRESSURE SWITCH (PAM)

If during the interval time set by "did" parameter, the pressure switch has reached the number of activation of the NP5 parameter, the "PAM" pressure alarm message will be displayed. The compressor and the regulation are stopped. When the digital input is ON the compressor is always OFF.

CONFIRMABLE INPUT - START DEFROST (DFD)

It executes a defrost if there are the eight 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 "DFD" safety time is expired.

CONFIRMABLE INPUT - RELAY AUX ACTUATION (AUS)

This function allows to turn ON and OFF the auxiliary relay by using the digital input as external switch.

CONFIRMABLE INPUT - ENERGY SAVING (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.

CONFIRMABLE INPUT - REMOTE ON/OFF (ONO)

This function allows to switch ON and OFF the instrument.

DIGITAL INPUTS POLARITY

The digital inputs polarity depends on HP and BP parameters.

CL: the digital input is activated by closing the contact.
OP: the digital input is activated by opening the contact.

INSTALLATION AND MOUNTING

The instruments XW270L, XW271L shall be installed on a vertical panel, in a 150x31mm hole, and fixed using two screws Ø 3 x 2mm. To obtain an IP65 protection grade use the front panel rubber gasket (mod. KG-L). The temperature range allowed for correct operation is 0 - 50°C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let the air circulate by the cooling holes.

CUT OUT

MOUNTING WITH KEYBOARD COVER OPENING DOWNWARD

MOUNTING WITH KEYBOARD COVER OPENING UPWARD

ELECTRICAL CONNECTIONS

The instruments are provided with screw terminal block to connect cables with a cross section up to 2.5 mm² for the digital and analogue inputs. Relays and power supply have a Faston connection (6.3mm). Heat-resistant cables have to be used. 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.

N.B. Maximum current allowed for all the loads is 20A.

PROBE CONNECTIONS

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

TTL SERIAL LINE

The TTL connector allows, by means of the external module TTL/RS485, to connect the unit to a network line ModBus-RTU compatible as the didact® monitoring system U500 (Version 3.0). The same TTL connector is used to upload and download the parameter list of the "HOT KEY".
USE OF THE "PROGRA MING "KEY"

The Wing units can be PROGRAM or DOWNLO ase the parameter list from the e2 internal memory to the "Hot Key" and vice versa.

DOWNLOAD (FROM THE "HOT KEY" TO THE INSTRUMENT)

1. Turn OFF the instrument by means of the ON/OFF key, remove the TTL serial cable if present, insert the "Hot Key" and then turn ON the Wing ON.
2. Automatically the parameter list of the "Hot Key" is downloaded into the Wing memory. The "Del" message is blinking. After 10 seconds the instrument will restart working with the new parameters.
3. Turn OFF the instrument remove the "Hot Key", plug in the TTL serial cable, then turn ON again.
At the end of the data transfer phase the instrument displays the following messages:
"err" for right programming. The instrument starts regularly with the new programming.
"err" for failed programming. In this case turn the unit OFF and then if you want to restart the download again remove the "Hot Key" to abort the operation.

UPLOAD (FROM THE INSTRUMENT TO THE "HOT KEY")

1. Turn OFF the instrument by means of the ON/OFF key and remove the TTL serial cable if present, then turn ON again.
2. When the Wing unit is ON, insert the "Hot Key" and push "Set" key; the "UPL" message appears.
3. Push "Set" key to start the UPLOAD; the "UPL" message is blinking.
4. Turn OFF the instrument remove the "Hot Key", plug in the TTL serial cable, then turn ON again.
At the end of the data transfer phase the instrument displays the following messages:
"err" for right programming. In this case push "Set" key if you want to restart the programming again or remove the not programmed "Hot Key".

ALARM SIGNALS

<table>
<thead>
<tr>
<th>Message</th>
<th>Cause</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;PI&quot;</td>
<td>Thermostat probe failure</td>
<td>Alarm output ON; Compressor output according to parameters &quot;DCN&quot; and &quot;LCS&quot;</td>
</tr>
<tr>
<td>&quot;P2&quot;</td>
<td>Evaporator probe failure</td>
<td>Alarm output ON; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P3&quot;</td>
<td>Auxiliary probe failure</td>
<td>Alarm output ON; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P4&quot;</td>
<td>Maximum temperature alarm</td>
<td>Alarm output ON; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P5&quot;</td>
<td>Minimum temperature alarm</td>
<td>Alarm output ON; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P6&quot;</td>
<td>Defrost timer error</td>
<td>Alarm output OFF; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P7&quot;</td>
<td>Defrost delay timer</td>
<td>Alarm output OFF; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P8&quot;</td>
<td>Door switch alarm</td>
<td>Alarm output OFF; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P9&quot;</td>
<td>External alarm</td>
<td>Alarm output OFF; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P10&quot;</td>
<td>Serious external alarm</td>
<td>Alarm output OFF; All other outputs unchanged</td>
</tr>
<tr>
<td>&quot;P11&quot;</td>
<td>Pressure switch alarm</td>
<td>Alarm output OFF; All other outputs unchanged</td>
</tr>
</tbody>
</table>

The alarm message is displayed until the alarm condition is recovered. All the alarm messages are shown alternately with the room temperature except for the "P1" message which is flashing. To reset the "EE" alarm and start normal functioning press any key, the "PI" message is displayed for about 3s.

SILENCING BUZZER / ALARM RELAY OUTPUT

If "BBER" once the alarm signal is detected the buzzer and the relay are silenced by pressing any key. If "BBER" only the buzzer is silenced while the alarm relay is on until the alarm condition is recovered.

"EC" ALARM

The e2rS instruments are provided with an internal check for the data integrity. Alarm "EE" flashes when a failure in the memory data occurs. In such cases the alarm output is enabled.

ALARM RECOVERY

Prebe alarms, "P1" (probe failure), "P2" and "P3", they automatically stop 10s after the probe restarts normal operation. Check connections before replacing the probe.
Temperature alarms "P4" and "P5" automatically stop as soon as the thermostat temperature returns to normal values or when the defrost starts.
Door switch alarm "BBER" stop as soon as the door is closed.
External alarms "P9" and "P10": the alarm output is disabled if a "PAL" alarm is recovered by switching OFF the instrument.

TECHNICAL DATA

Housing: self-extinguishing ABS.
Case: 318x305x155 mm; depth 76mm
Mounting: panel mounting in a 150x311 mm panel cut-out with two screws, Ø 3 x 2 mm.
Distance between the holes: 181mm
Protection: IP20.
Frontal protection: IP65 with frontal gasket and RG4, (optional).
Connections: Screw terminal block and 2.5 mm², heat-resistant mouting and 6.3mm Fasten.
Power supply: 230Vac or 110Vac ± 10%.
Power absorption: 7W max.
Display: 3 digits, red LED, 0.24 mm high.
Inputs: 3 NTC probes.
Digital inputs: 2 free voltage
Relay outputs: 1 channel current and 1 output Max. 2A
compressor: relay STSP 10A A, 250mA
light relay STSP 4A (8) A, 250mA
fan relays: STSP 4A, 250mA
reference: relay STSP 10A A, 250mA
alarm: relay STSP 10A A, 250mA
auxiliary: relay STSP 10A A, 250mA
Other output: alarm buzzer
Serial output: TTL standard
Communication protocol: Modbus - RTU
Data storage: on the non-volatile memory (EEPROM).
Kind of action: 18.
Pollution grade: normal
Software class: A.
Operating temperature: 0° - 40°C
Storage temperature: -5°C - 65°C
Relative humidity: 25% - 85% (no condensation)
Measuring and regulation range: NTC probe: -40°C - +120°C
Resolution: 0.1° C or 1° F (selectable).
Accuracy (ambient temp. 23°C): ±0.5° C ±1 digit

CONNECTIONS

<table>
<thead>
<tr>
<th>XW270L</th>
<th>XW271L</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
</tr>
</tbody>
</table>

DEFAULT SETTING VALUES

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>Default</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set</td>
<td>Set point</td>
<td>15-40°</td>
<td>25</td>
<td>P1</td>
</tr>
<tr>
<td>Hyst</td>
<td>Difference</td>
<td>0-15°</td>
<td>5</td>
<td>P1</td>
</tr>
<tr>
<td>L5</td>
<td>Minimum set point</td>
<td>-50°C</td>
<td>-15°C</td>
<td>P2</td>
</tr>
<tr>
<td>US</td>
<td>Maximum set point</td>
<td>+130°C</td>
<td>+20°C</td>
<td>P2</td>
</tr>
<tr>
<td>OS</td>
<td>Outputs activation delay at start</td>
<td>0-15 min</td>
<td>0</td>
<td>P2</td>
</tr>
<tr>
<td>MC</td>
<td>Anti-shock cycle delay</td>
<td>0-15 min</td>
<td>0</td>
<td>P2</td>
</tr>
<tr>
<td>CG</td>
<td>Compressor ON time during defrosting</td>
<td>0-15 min</td>
<td>30</td>
<td>P2</td>
</tr>
<tr>
<td>CON</td>
<td>Compressor ON time with defrosting</td>
<td>0-15 min</td>
<td>15</td>
<td>P2</td>
</tr>
<tr>
<td>COZA</td>
<td>Compressor ON time with free probe</td>
<td>0-15 min</td>
<td>15</td>
<td>P2</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>CF</td>
<td>Temperature measurement unit</td>
<td>°C</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>Resolution</td>
<td>0.1°</td>
<td>0.1°</td>
<td>P2</td>
</tr>
<tr>
<td>LED</td>
<td>Local display</td>
<td>P1</td>
<td>P1</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Remote display</td>
<td>P1</td>
<td>P1</td>
<td></td>
</tr>
<tr>
<td>DEFROST</td>
<td>DEFL</td>
<td>Defrost type</td>
<td>P1</td>
<td>P1</td>
</tr>
<tr>
<td>DEFL</td>
<td>Defrost mode</td>
<td>P1</td>
<td>P1</td>
<td></td>
</tr>
<tr>
<td>DEFS</td>
<td>Set point for SMART DEFROST</td>
<td>10°C</td>
<td>10°C</td>
<td>P2</td>
</tr>
<tr>
<td>DEFT</td>
<td>Defrost temperature</td>
<td>15°C</td>
<td>15°C</td>
<td>P2</td>
</tr>
<tr>
<td>SENS</td>
<td>Difference between defrost cycles</td>
<td>5°C</td>
<td>5°C</td>
<td>P2</td>
</tr>
<tr>
<td>MAF</td>
<td>Max. minimum air flow</td>
<td>0-250 m³/h</td>
<td>0-250 m³/h</td>
<td>P2</td>
</tr>
<tr>
<td>DRY</td>
<td>Air circulation during defrost</td>
<td>P2</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>DRY</td>
<td>Air circulation during defrosting</td>
<td>P2</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>DMA</td>
<td>MAX delay of defrost</td>
<td>0-15 min</td>
<td>0-15 min</td>
<td>P2</td>
</tr>
<tr>
<td>DR4</td>
<td>Air circulation</td>
<td>0-60 min</td>
<td>0-60 min</td>
<td>P2</td>
</tr>
<tr>
<td>DRA</td>
<td>Delay of defrost after start</td>
<td>n</td>
<td>n</td>
<td>P2</td>
</tr>
<tr>
<td>DRA</td>
<td>Delay of defrost after last freezing</td>
<td>0-15 min</td>
<td>0-15 min</td>
<td>P2</td>
</tr>
<tr>
<td>FANS</td>
<td>Fans operating mode</td>
<td>P1</td>
<td>P1</td>
<td></td>
</tr>
<tr>
<td>FAN</td>
<td>Fans delay after defrost</td>
<td>0-250 min</td>
<td>0-250 min</td>
<td>P2</td>
</tr>
<tr>
<td>FAN</td>
<td>Fans stop temperature</td>
<td>50-10°C</td>
<td>50-10°C</td>
<td>P2</td>
</tr>
</tbody>
</table>

ALARMS

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>Default</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATC</td>
<td>Temperature alarm configuration</td>
<td>n-40°C</td>
<td>n-40°C</td>
<td>P2</td>
</tr>
<tr>
<td>AUTO</td>
<td>Maximum temperature alarm</td>
<td>-50-10°C</td>
<td>-50-10°C</td>
<td>P1</td>
</tr>
<tr>
<td>ALL</td>
<td>Minimum temperature alarm</td>
<td>-50-10°C</td>
<td>-50-10°C</td>
<td>P1</td>
</tr>
<tr>
<td>ATH</td>
<td>Temperature alarm and fan differential</td>
<td>0.5-15°</td>
<td>0.5-15°</td>
<td>P1</td>
</tr>
<tr>
<td>ALD</td>
<td>Temperature alarm</td>
<td>0-250 m³/h</td>
<td>0-250 m³/h</td>
<td>P2</td>
</tr>
<tr>
<td>DMD</td>
<td>Delay of temperature alarm at start up</td>
<td>0-15 min</td>
<td>0-15 min</td>
<td>P2</td>
</tr>
<tr>
<td>DMD</td>
<td>Delay of temperature alarm after closing the door</td>
<td>0-5 min</td>
<td>0-5 min</td>
<td>P2</td>
</tr>
<tr>
<td>DD</td>
<td>Open alarm delay</td>
<td>0-15 min</td>
<td>0-15 min</td>
<td>P2</td>
</tr>
<tr>
<td>DB</td>
<td>Alarm relay declining</td>
<td>n-10°C</td>
<td>n-10°C</td>
<td>P2</td>
</tr>
<tr>
<td>DEB</td>
<td>Pressure switch activation number</td>
<td>0-15</td>
<td>0-15</td>
<td>P2</td>
</tr>
</tbody>
</table>

ANALOGUE INPUTS

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>Default</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH</td>
<td>Thermistor probe calibration</td>
<td>-12°C - 120°C</td>
<td>-12°C - 120°C</td>
<td>P1</td>
</tr>
<tr>
<td>DC</td>
<td>Evaporator probe calibration</td>
<td>-12°C - 120°C</td>
<td>-12°C - 120°C</td>
<td>P1</td>
</tr>
<tr>
<td>DB</td>
<td>Temperature alarm calibration</td>
<td>-12°C - 120°C</td>
<td>-12°C - 120°C</td>
<td>P1</td>
</tr>
<tr>
<td>DEP</td>
<td>Evaporator probe pressure</td>
<td>n-10°</td>
<td>n-10°</td>
<td>P2</td>
</tr>
<tr>
<td>PRI</td>
<td>Pressure probe pressure</td>
<td>n-10°</td>
<td>n-10°</td>
<td>P2</td>
</tr>
<tr>
<td>RT</td>
<td>Temperature sensor over the Energy saving cycle</td>
<td>-30°C - 120°C</td>
<td>-30°C - 120°C</td>
<td>P2</td>
</tr>
</tbody>
</table>

DIGITAL INPUTS

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>Default</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>Open door control</td>
<td>n, n, C, P, f, C</td>
<td>f</td>
<td>P2</td>
</tr>
<tr>
<td>DPH</td>
<td>Door position display</td>
<td>n, n, C, P, f, C</td>
<td>f</td>
<td>P2</td>
</tr>
<tr>
<td>CPF</td>
<td>Configurable digital input point</td>
<td>n, n, C, P, f, C</td>
<td>f</td>
<td>P2</td>
</tr>
<tr>
<td>CP</td>
<td>Digital input configuration</td>
<td>n, n, C, P, f, C</td>
<td>f</td>
<td>P2</td>
</tr>
<tr>
<td>DM</td>
<td>Digital input alarm delay</td>
<td>0-250 min</td>
<td>0-250 min</td>
<td>P2</td>
</tr>
<tr>
<td>SAA</td>
<td>Set point for anti-condensation heater</td>
<td>-5°C - 10°C</td>
<td>-5°C - 10°C</td>
<td>P2</td>
</tr>
</tbody>
</table>

 Sith the XW271L, AUX is an anti-condensation heater.