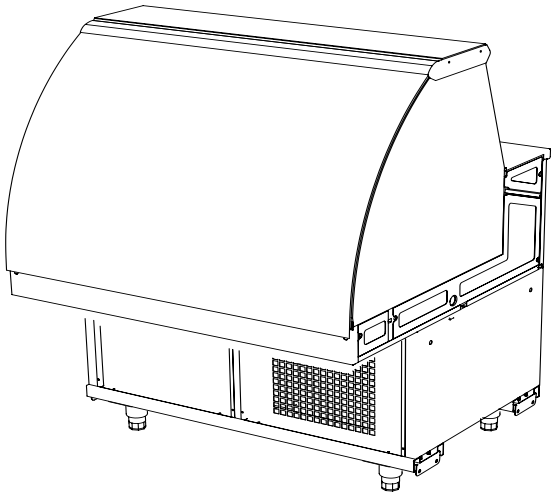
Refrigerated Showcases

SERIES 750-900

Ⓔ

MAINTENANCE AND USER MANUAL



CIAM spa - Viale dei Pini, 120
06081 Petrignano d'Assisi Perugia
ITALY

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e-mail: info@ciamgroup.it

1. GENERAL INFORMATION

This documentation is edited in compliance with that defined in point 1.7.2 of Directive EC 37/98 concerning the approximation of laws of the Member States relating to machinery.
The content of this manual is of a strictly technical nature and is the property of CIAM Spa, it is therefore forbidden to reproduce, reveal or modify, partially or completely, its content without written authorisation.
Any infringement will be legally pursued.

1.1 Warnings for the purchaser

The manual, as well as the EC certificate of conformity, is an integrating part of the machine and must accompany it always, whether it is transferred or resold. It is up to the user to keep all the documentation intact for consultation, during the machine entire life-span.
In case of loss or destruction, it is possible to request a copy from CIAM Spa specifying the exact model, serial number and year of manufacture.
The manual reflects the technical state at the time of supply. The writing company reserves the right to make any amendments to its products it sees fit, without having to update manuals and plants relating to previous production batches.
The manufacturing company declines any responsibility for production anomalies and damages caused by the machine to things, persons and animals occurred in the following cases:

- Improper use of the plant or use on behalf of unsuitable or unauthorised personnel
- Power supply defects
- Insufficient or lack of periodic maintenance
- Amendments or interventions not agreed and authorised by the manufacturer
- Use of unoriginal spare parts or not specific for the model
- The total or partial non compliance with these instructions

The responsibility for applying the safety prescriptions reported below is of the technical personnel responsible for the activities on the machine, who must ascertain that the authorised personnel:

- is trained to carry out the requested activity
- is aware of and scrupulously observes the prescriptions contained in this document
- is aware of and applies the general safety regulations to the machine.

The non compliance with the safety regulations can cause injuries to personnel and damage the components and control unit of the machine.
The comprehensive reading of this manual cannot, in any case, replace an adequate experience of the operators.
The user can, at any time, contact the dealer to request information additional to that contained herewith, as well as signal any improvement proposals.

1.2 Introduction

The CIAM group has always used top quality materials and their introduction in the company, their storage and their production use is constantly controlled in order to guarantee there are no damages, deteriorations and malfunctionings.
All the constructive elements have been designed and built to guarantee a high safety and reliability standard.
All the display cabinets are submitted to rigid tests before being delivered. However, a good performance in time of the purchased product, depends on the correct use and an adequate maintenance.
We therefore invite you to scrupulously read this manual containing the necessary indications to maintain the aesthetic and functioning features of your display cabinet unaltered.

☞	**NOTE**
	IN ORDER NOT TO COMPROMISE THE FUNCTIONING AND SAFETY OF THE MACHINE, INSTALLATION AND PARTICULARLY COMPLEX MAINTENANCE ARE NOT DOCUMENTED IN THIS MANUAL AND ARE CARRIED OUT BY THE WRITING COMPANY SPECIALISED TECHNICIANS

The use and maintenance manual contains the necessary information to comprehend the functioning modalities of the machine and the correct use of the same, in particular: the technical description of the various functioning groups, appliances and safety systems, functioning, use of instruments and interpretation of any diagnostic signals, main procedures and information relating to routine maintenance interventions.
For the correct use of the machine it is necessary that the work environment is in compliance with the safety and hygiene regulations in force.

!	**WARNING**
	BEFORE USING THE MACHINE, THE INSTALLERS AND USERS MUST READ AND COMPREHEND ALL THE INSTRUCTIONS CONTAINED HEREWITH.

1.3 Manufacturer's address

CIAM spa
Head office and establishment:

06083 Bastia Umbra (PG) Italy
Viale Europa, 120

Tel. (+39) 075 80161 Fax. (+39) 075 8016215

http://www.ciamgroup.it e-mail: info@ciamgroup.it

INSTRUCTIONS FOR REQUESTING INTERVENTIONS

For assistance, the user must contact the dealer from whom he has purchased the appliance. The writing company is always at the disposal of the Client for any requests of information or clarification relating to the use, maintenance, installation, etc., via e-mail address: service@ciamgroup.it.

1.4 Safety regulations in the manual

The purpose of the prescriptions, indications, regulations and respective safety notes described in the various chapters of the manual, is that to define a series of behaviours and obligations to be complied with when carrying out the various activities, in order to operate in safe conditions for personnel, appliance and surrounding environment.
The reported safety regulations are aimed at the authorised and trained personnel commissioned to carry out the various activities and operations of:

- transport
- installation
- functioning
- handling use
- maintenance
- cleaning
- decommissioning and dismantling which constitute the only use modalities provided for the machine in question.

!	**ATTENTION**
	THE COMPREHENSIVE READING OF THIS MANUAL CANNOT, IN ANY CASE, REPLACE AN ADEQUATE EXPERIENCE OF THE USER, THEREFORE CONSTITUTING ONLY A USEFUL REMINDER OF THE TECHNICAL FEATURES AND THE MAIN OPERATIONS TO BE FULFILLED.

1.5 Symbols used

Certain symbols are used in the manual to recall the readers' attention and highlight certain particularly important aspects of the treatment.
The following table describes the meaning of the different symbols used.

SYMBOL	MEANING	NOTES
	Danger	Indicates a danger with risk of injury, even death, for the user. Pay maximum attention to the blocks of text indicated by this symbol.
	Attention	Represents a warning of possible deterioration or damage to the machine, appliance or another personal object of the user. Pay maximum attention to the blocks of text indicated by this symbol.
	Warning Note	Indicates a warning or a note on the key functions or useful information. Pay maximum attention to the blocks of text indicated by this symbol.
	Supplementary information	The blocks of text which contain complementary information are introduced by this symbol. This information has no direct relation with the description of a function or the development of a procedure. They can be cross-referenced to other complementary documentation, such as attached use instructions manuals, technical documents or to other sections of this manual.
	Avoid damaging the material	Indication relating to a strong risk of damaging a piece, for example by using a wrong tool or mounting following an incorrect procedure.
	Special tool	Indicates that the use of a tool or special appliance is effectively necessary.
	Visual observation	Indicates to the reader that he must proceed to a visual observation. This symbol is also found in the use instructions. It is requested that the user reads a measuring value, checks a signal, etc.
	Auditory observation	Indicates to the reader that he must proceed to an auditory observation. This symbol is also found in the use instructions. It is requested that the user listens to a functioning noise.

2. DIMENSIONAL SIZES AND TECHNICAL SPECIFICATIONS

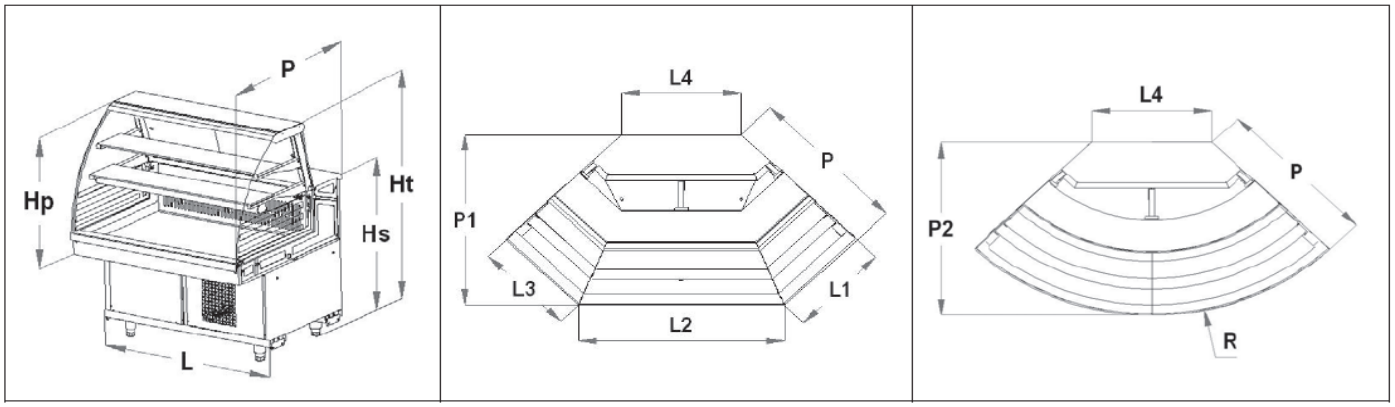
2.1 USE DESTINATION

This refrigerating equipment is exclusively enabled for the display and sale of confectionery and delicatessen products. It is also possible to display small sized packaged dairy products and sliced packaged cold cuts, positioned in such a way not to exceed the load limits indicated in the manual.
The manufacturer does not answer for damages caused to things, persons or the same equipment due to product preservation different to that specified above.

2.2 Equipment dimensions

2.2.1 Series 900

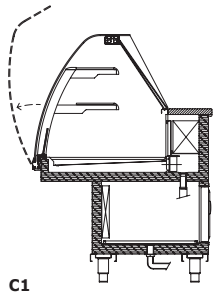
The sizes highlighted in the following two paragraphs represent, respectively: **Hp**=plate height – **Hs**=service counter height– **Ht**=total height – **P**=depth display cabinet – **L**=length display cabinet – **P1**=depth shaped display cabinet – **L4**=length rear side – **L1**=**L3**=length front oblique sides – **L2**=length front side – **P2**=depth spherical display cabinet – **R**=display cabinet radius.

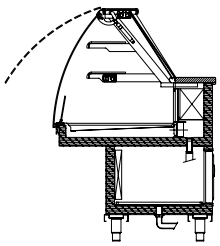
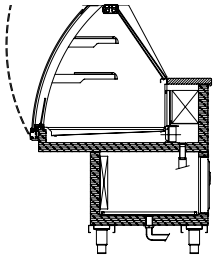
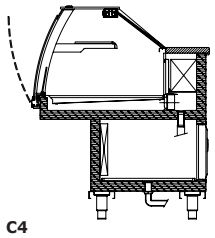
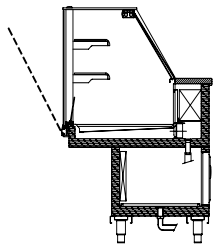
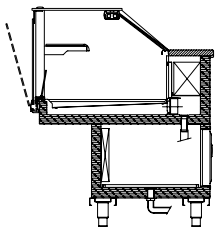


Unable to insert all codes present in the catalogue in the following table, the products have been grouped together in families which completely represent, with regard to dimensional features, the entire range with that code. As an example, considering the family with codes "V9C1.....150", they have the same dimensional features as:

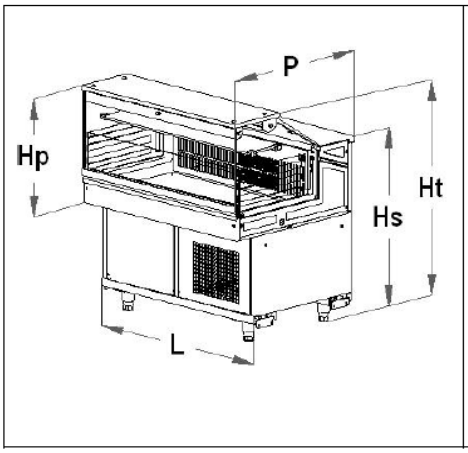
- V9C1FLRS150 - V9C1MNRS150 - V9C1PLRS150F1 - V9C1PLRS150F2 -

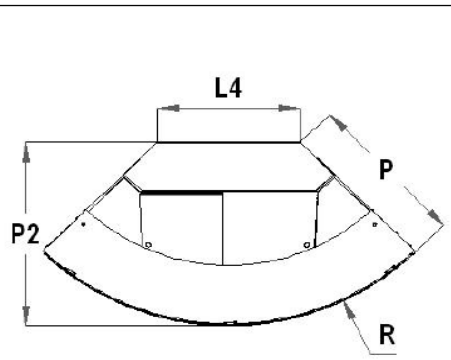
- V9C1FLRV150 - V9C1MNRV150 - V9C1PLRV150F1 - V9C1PLRV150F2

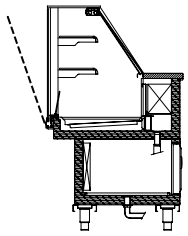
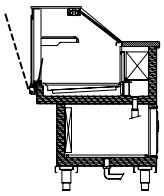
	MODEL	LINEAR					SHAPED ANGLE						SPHERICAL ANGLE			
		P (mm)	L (mm)	Hp (mm)	Hs (mm)	Ht (mm)	P (mm)	P1 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	P (mm)	P2 (mm)	L4 (mm)	R (mm)
 C1	V9C1.....100	966	1000	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....CE100	996	1000	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....150	966	1500	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....CE150	996	1500	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....200	966	2000	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....CE200	996	2000	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....250	966	2500	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....300	966	3000	789	931	1343	-	-	-	-	-	-	-	-	-	-
	V9C1.....Ap90	-	-	789	931	1343	966	1108	601	1198	601	682	-	-	-	-
C1	V9F(V)(R) C1 10	924	1000	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 CE 10	954	1000	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 15	924	1500	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 CE 15	954	1500	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 20	924	2000	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 CE 20	954	2000	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 25	924	2500	790	940	1343	-	-	-	-	-	-	-	-	-	-
	V9F(V)(R) C1 30	924	3000	790	940	1343	-	-	-	-	-	-	-	-	-	-
C1	V9F(V)(R) C1 Ap90	-	-	-	-	-	924	1065	584	1162	584	682	-	-	-	-

	MODEL	LINEAR					SHAPED ANGLE						SPHERICAL ANGLE			
		P (mm)	L (mm)	Hp (mm)	Hs (mm)	Ht (mm)	P (mm)	P1 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	P (mm)	P2 (mm)	L4 (mm)	R (mm)
	V9C2.....100	966	1000	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....CE100	996	1000	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....150	966	1500	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....CE150	996	1500	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....200	966	2000	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....CE200	996	2000	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....250	966	2500	781	931	1322	-	-	-	-	-	-	-	-	-	-
	V9C2.....300	966	3000	781	931	1322	-	-	-	-	-	-	-	-	-	-
C2	V9C2.....Ap90	-	-	781	931	1322	-	-	-	-	-	-	966	1105	669	1439
	V9C3.....100	966	1000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....CE100	996	1000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....150	966	1500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....CE150	996	1500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....200	966	2000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....CE200	996	2000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....250	966	2500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C3.....300	966	3000	789	931	1330	–	–	–	–	–	–	–	–	–	–
C3	V9C3.....Ap90	–	–	789	931	1330	–	–	–	–	–	–	966	1107	682	1449
	V9C4.....100	966	1000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C4.....150	966	1500	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C4.....200	966	2000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C4.....250	966	2500	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C4.....300	966	3000	609	931	1150	–	–	–	–	–	–	–	–	–	–
C4	V9C4.....Ap90	–	–	609	931	1150	–	–	–	–	–	–	966	1107	682	1449
	V9C5.....100	966	1000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....CE100	996	1000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....150	966	1500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....CE150	996	1500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....200	966	2000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....CE200	996	2000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....250	966	2500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V9C5.....300	966	3000	789	931	1330	–	–	–	–	–	–	–	–	–	–
C5	V9C5.....Ap90	–	–	789	931	1330	–	–	–	–	–	–	966	1107	682	1449
	V9C6.....100	966	1000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C6.....150	966	1500	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C6.....200	966	2000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C6.....250	966	2500	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V9C6.....300	966	3000	609	931	1150	–	–	–	–	–	–	–	–	–	–
C6	V9C6.....AP90	–	–	609	931	1150	–	–	–	–	–	–	966	1107	682	1449

2.2.2 Series 750





	MODEL	LINEAR					SHAPED ANGLE						ROUND ANGLE			
		P (mm)	L (mm)	Hp (mm)	Hs (mm)	Ht (mm)	P (mm)	P1 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	P (mm)	P2 (mm)	L4 (mm)	R (mm)
 A1	V7A1....100	816	1000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V7A1....150	816	1500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V7A1....200	816	2000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V7A1....250	816	2500	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V7A1....300	816	3000	789	931	1330	–	–	–	–	–	–	–	–	–	–
	V7A1....AP90	–	–	789	931	1330	–	–	–	–	–	–	816	957	682	1299
 A2	V7A2....100	816	1000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V7A2....150	816	1500	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V7A2....200	816	2000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V7A2....250	816	2500	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V7A2....300	816	3000	609	931	1150	–	–	–	–	–	–	–	–	–	–
	V7A2....AP90	–	–	609	931	1150	–	–	–	–	–	–	816	957	682	1299

2.3 LOAD LIMITS

It is necessary to observe the following rules when stocking the display cabinet:

- arrange the product evenly, avoiding empty areas
- arrange the product so as not to exceed the load limit provided (see drawings following page).

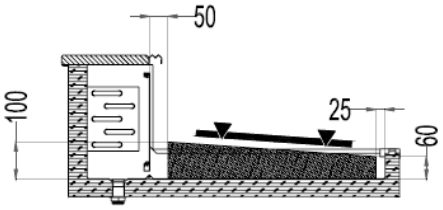
!	**WARNING**
	IT IS FUNDAMENTAL NOT TO EXCEED THE LIMIT PROVIDED IN ORDER NOT TO ALTER THE CORRECT AIR CIRCULATION AND THEREFORE AVOID A HIGHER PRODUCT TEMPERATURE AND A POSSIBLE RISK OF ICE BLOCKS FORMING ON THE EVAPORATOR

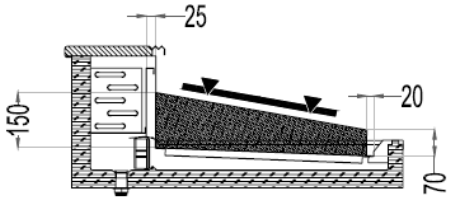
- It is recommended to rotate the products, using those which have been in the display cabinet longer.

!	**WARNING**
	CERTAIN CONFECTIONERY PRODUCTS, ESPECIALLY THOSE GARNISHED WITH CREAM OR CUSTARD, WITH THE PASSING OF TIME, ARE SUBJECT TO DETERIORATION. REMEMBER THAT THE DISPLAY CABINET IS A SELLING DISPLAY AND NOT FOR PRESERVATION!

All the plate sections are reported in the following figure. The part highlighted with a dark line represents the area in which the refrigerated product has to be placed.

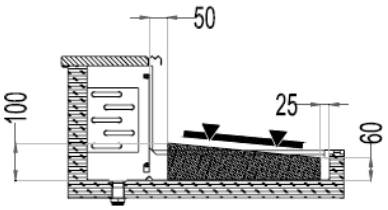
SERIES 900

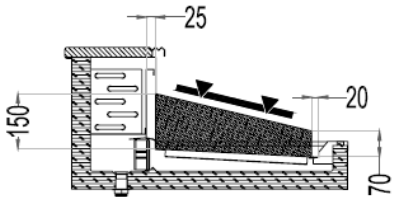




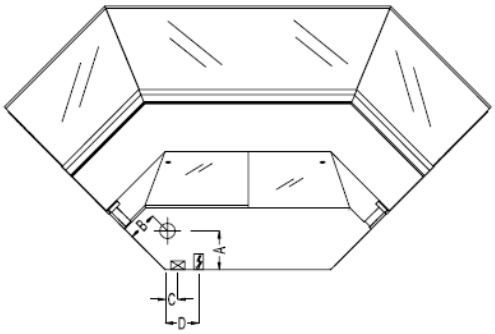
STATIC AIRED

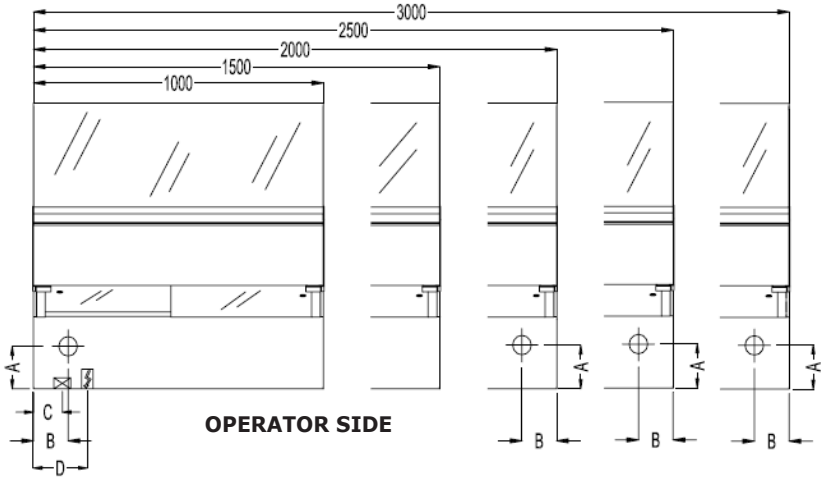
SERIES 750





CLIENT SIDE





OPERATOR SIDE

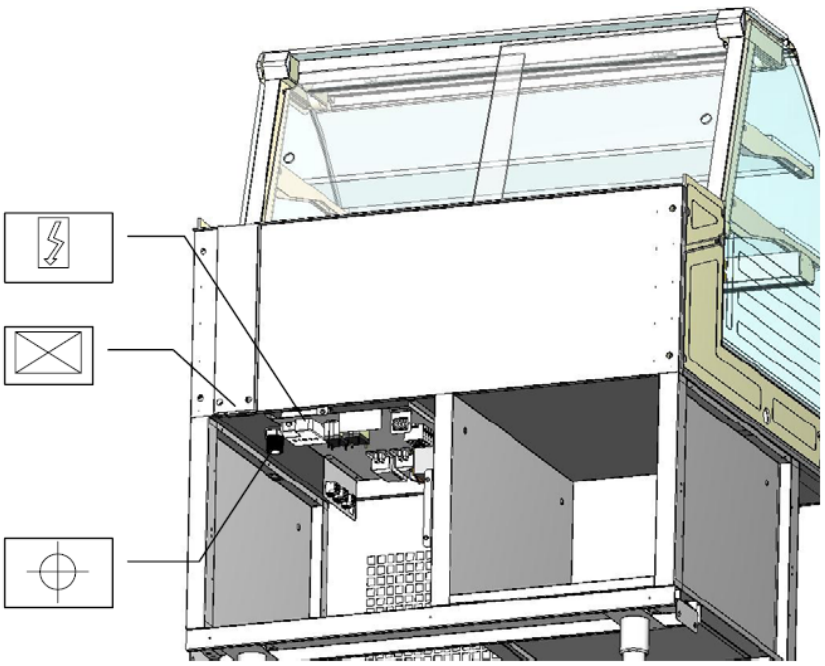
2.4 PIPING POSITION AND ELECTRIC CONTROL BOARD

			MODELS					
			100	150	200	250	300	Ap90
Drain condensation outlet *		number	1	1	2	2	2	1
		A (mm)	160	160	160	160	160	160
		B (mm)	120	120	120	120	120	120
Refrigerating piping **		C (mm)	90	90	90	90	90	50
Electric power supply ***		D (mm)	200	200	200	200	200	150

* The drain (or drains) condensing outlet position is indicated in the drawings. Such drain is in PVC with one inch threading; already connected to a corrugated 75cm long flexible pipe with male terminal with 32mm connection.

** The point in which the two refrigerated plant pipes come out of the plate is indicated in the drawings (external diameter ø10mm for suction and ø6mm for liquids). In case the motor is not supplied or supplied disconnected, the pipes extend for about a meter inside the equipment compartment underneath the terminal board, always in correspondence of the indicated point.

*** The point of the terminal board in which the spider box is positioned and to which the general power supply of the same board arrives is indicated in the drawings; already connected three pole cable about 1.5m long with plug socket.



!	**WARNING**
	DO NOT CONFUSE THE OUTLET DIAMETERS OF THE REFRIGERATING PLANT PIPES (10MM FOR SUCTION AND 6MM FOR LIQUIDS) WITH THE DIMENSIONS OF THE PIPES WHICH NEED TO BE EXTENDED IN CASE OF INTERNAL CONDENSING UNIT. IN SUCH CASE, THE PIPING SECTIONS WILL DEPEND UPON THE REQUESTED POWER, THE UNIT POSITION, ENVIRONMENTAL CONDITIONS, ETC.
☞	**IMPORTANT NOTE**
	IN CASE OF EXTERNAL CONDENSING UNIT, IT IS RECOMMENDED TO CONTACT THE CIAM TECHNICAL DEPARTMENT TO CORRECTLY PROPORTION THE ENTIRE PLANT.

3. MACHINE DESCRIPTION

2.5 Technical specifications

The following table reports the main technical features of the machine in question.

3.1 General description and functioning principles

Dear Client,
Ciam Group, happy to include you amongst its clients, trusts that the appliance purchased by you fully satisfies your expectations.
For operator safety, the display cabinets' devices must be kept constantly efficient.
For this purpose, this manual illustrates the use and maintenance of the display cabinet and it is the operators' responsibility and duty to scrupulously comply with it.

3.2 Machine composition

The Series 750-900 Refrigerating Display Cabinets are constituted by an individual cabinet on which all the functional devices necessary to make it a professional and efficient product for its use destination are mounted on (see paragraph 2).
The series 750-900 refrigerated display cabinets are constituted by:

- a base frame in which a reserve refrigerated module can be inserted.
- a product containing plate (display cabinet)
- condensing unit group (if supplied with internal motor)
- electronic components group
- control board

In case the display cabinet is supplied with external condensing unit, apart from this one, an electric control board is supplied.

4. SAFETY

4.1 General information

The purchaser must train the users on the risk, safety devices and general accident prevention regulations provided by the EU Directives and the laws of the country where the display cabinet is installed.
The users/operators must be aware of the location and functioning of all controls and features of the machine.
They must have also fully read this manual.
The maintenance interventions must be carried out by qualified operators after having opportunely arranged the machine.

	**DANGER**
	THE TAMPERING WITH OR UNAUTHORISED REPLACEMENT OF ONE OR MORE PARTS OF THE MACHINE, THE ADOPTION OF ACCESSORIES WHICH MODIFY THE USE OF THE SAME AND THE USE OF SPARE PARTS MATERIALS DIFFERENT TO THOSE RECOMMENDED, CAN CAUSE INJURIES.

The equipment must always be disconnected from the mains before carrying out any type of intervention.
Interventions on electric parts or components of the refrigerating plant must be carried out by skilled personnel, in compliance with the regulations in force.

4.1.1 Personnel training.

!	**ATTENTION**
	THE MACHINE IS DESTINED FOR PROFESSIONAL USE.

The purchaser must ensure that the personnel using the machine and the maintenance technician, are opportunely instructed and trained.
For this purpose, the manufacturer is available for suggestions, clarifications and whatever is necessary for the operator and technician to use the machine correctly.
The manufacturer can be contacted via e-mail: service@ciamgroup.it.

4.1.2 Applied Directives and technical reference regulations

The SERIES 750-900 Refrigerated Display Cabinets have been designed, manufactured and tested in compliance with the following EU Directives:

- Machinery Directive 98/37/EC regarding the approximation of laws of the Member States relating to the machines
- Electromagnetic Compatibility Directive2004/108/EC
- Low Voltage Directive 2006/95/EC (referred to the use of compliant material)

The reference regulations according to which the cabinet has been tested and certified are:

EN-ISO 23953; EN 60335-2-89; EN 61000-3-2; EN 61000-3-3; EN 55014.

ENVIRONMENTAL CLIMATIC CLASSES.

These cabinets have been processed in compliance with climatic class 4 (30°C; U.R. 55%):

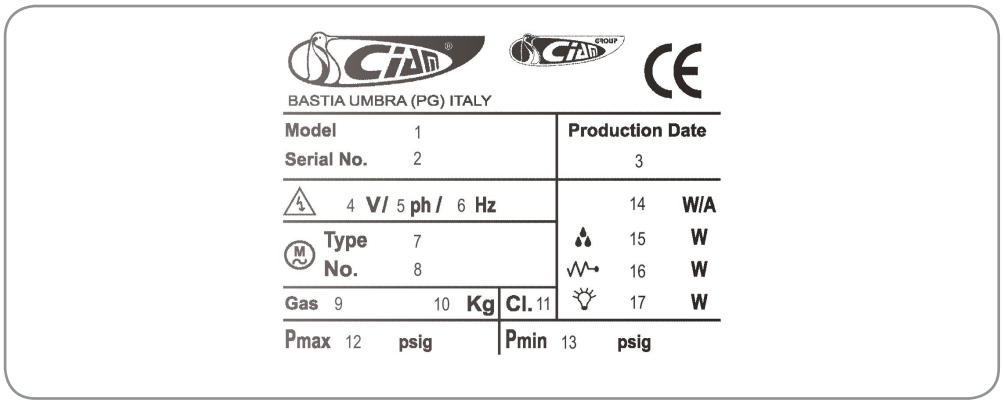
It is excluded from the application field of Directive EEC 97/23 (PED) as it falls within Art.3, paragraph 3.

The risk analysis performed and the solutions implemented by CIAM group have allowed the removal of the majority of residual risks.
It is still obligatory to unconditionally stick to the instructions in this manual, which contain all necessary technical information for correct installation, commissioning, use and maintenance.

4.1.3 Machine Certification

The display cabinet is supplied with a CE Declaration of Conformity for essential safety requirements according to Directive 98/37/EC, Low Voltage Directive 2006/95/EC and the Electromagnetic Compatibility Directive 2004/108/EC.
The facsimile of the identification plaque placed on the machine and of the CE Declaration of Conformity now follow.

	NOTE
	ANY AMENDMENTS MADE TO THE MACHINE IMMEDIATELY VOIDS ALL CE CERTIFICATION. IN THIS CIRCUMSTANCE THE MANUFACTURER DECLINES ALL RESPONSIBILITY.



1. Appliance business name
2. Appliance identification serial number
3. Appliance production date
4. Electric power supply voltage
5. Number of phases of electric power supply
6. Frequency of electric power supply
7. Refrigerating compressor model
8. Number of compressors used
9. Type of coolant used
10. Coolant weight
11. Reference climatic class for the appliance functioning (Cl.3 = +25°C/60% U.R.; Cl.4 = +30°C/55% U.R.)
12. Plant high pressure side pressure test
13. Plant low pressure side pressure test
14. Nominal power/current absorbed during refrigeration
15. Maximum power absorbed during defrosting
16. Nominal power absorbed by the heating elements (only if higher than 100W)
17. Lighting nominal power

4.1.4 Intended use and limits of usage

This refrigerating equipment is used exclusively for the display and sale of confectionary and delicatessen products. It is also possible to display small sized packaged dairy products as well as sliced and packaged cold cuts, which need to be positioned in a way that does not exceed the load limits indicated within this manual.

!	**ATTENTION**
	USING THE MACHINE FOR ANY USE OTHER THAN FOR PRESERVING AND DISPLAYING FOODSTUFFS IS CONSIDERED AS IMPROPER USE. IN THIS CIRCUMSTANCE ALL RESPONSIBILITY IS DECLINED IN CASE OF DAMAGE TO THINGS AND/OR PEOPLE, AND, FURTHERMORE, VOIDS ALL WARRANTY. THE MANUFACTURER DECLINES ALL RESPONSIBILITY IN CASE OF TAMPERING WITH THE MACHINE FOR NON AUTHORISED AMENDMENTS OR FOR MAINTENANCE OPERATIONS PERFORMED BY UNQUALIFIED STAFF.

	**DANGER**
	IN CASE OF ANOMALOUS MACHINE BEHAVIOUR, ANY TYPE OF INTERVENTION IS TO BE PERFORMED BY MAINTENANCE OPERATORS.

4.2 Disposal of worn-out materials

Under normal functioning conditions the machine does not pollute the environment.
At the end of the display cabinet functioning life-span or whenever it is necessary to definitely place the equipment out of service, it is recommended to:

- Make the display cabinet unusable by disconnecting the electric power supply.
- Remove any sliding closures, sides, or panelling that could constitute a source of danger.
- Remove all rubber parts (Seals, etc...)

IMPORTANT INFORMATION FOR THE USER ACCORDING TO DIRECTIVE "RAEE" 2002/96/EC AND SUCCESSIVE MODIFICATION 2003/108/EC DEALING WITH ELECTRIC AND ELECTRONIC EQUIPMENT WASTE.
According to Directive "RAEE" 2002/96/EC and successive modification 2003/108/EC, if the purchased equipment is marked with the following symbol of a crossed out rubbish container with wheels, it means that after the product life-span it needs to be collected separately from other waste.
Separate collection of this equipment for recycling, once its life-span has been exceeded, is organised and managed by the manufacturer.
Therefore, the user who wishes to dispose of this equipment must contact the manufacturer and follow the method used to allow separate collection for recycling of equipment that has reached the end of its life-span.
Suitable collection for successive start-up of the equipment for recycling, treatment and compatible environmental disposal contributes in avoiding possible negative effects on the environment and on health, and favours the re-use and/or recycling of the materials composing the equipment.

!	**ATTENTION**
	THE ILLEGAL DISPOSAL OF THE PRODUCT ON BEHALF OF THE HOLDER, IMPLIES THE APPLICATION OF ADMINISTRATIVE SANCTIONS PROVIDED BY THE REGULATION IN FORCE.

	IMPORTANT
	IN CASE THE SYMBOL OF THE CROSSED OUT RUBBISH CONTAINER WAS NOT PRESENT ON THE EQUIPMENT, IT MEANS THAT THE DISPOSAL OF THE SAME PRODUCT IS NOT THE MANUFACTURERS' RESPONSIBILITY. IN SUCH CASE, HOWEVER, THE REGULATION IN FORCE REGARDING THE WASTE DISPOSAL ARE VALID.

The refrigerating circuit components must not be cut and/or separated but must be taken to the specialised centres intact for the recovery of the refrigerating gas.
Specific regulations exist in every nation regarding the disposal of these materials in order to safeguard the environment.
It is the Client or Maintenance operator obligation to be aware of the laws in force in this regard in his country and to operate in order to comply with these legislations.

!	**ATTENTION**
	REMEMBER TO COMPLY WITH THE LAWS IN FORCE WITH REGARD TO THE DISPOSAL OF REFRIGERATING LIQUID OR MINERAL OILS.

	**SUPPLEMENTARY INFORMATION**
	FURTHER INFORMATION ON THE DISPOSAL MODALITIES OF REFRIGERATING LIQUID AND OILS AND OTHER SUBSTANCES CAN BE FOUND ON THE SAFETY CARD RELATING TO THE SAME SUBSTANCES.

4.3 Safety applied on the machine

The machines provided with the following safety devices

Safety present on the Machine
FIXED PROTECTIONS
SECTIONING THE ELECTRIC POWER SUPPLY

4.3.1 Fixed protections

The fixed type protections are constituted by fixed perimeter covers, which function is to prevent access to the internal parts of the equipment.

	**DANGER**
	FOLLOWING MAINTENANCE , IT IS FORBIDDEN TO RE-START THE MACHINE, WITHOUT CORRECTLY RESTORING THE PANELS.

	**ATTENTION**
	Periodically check that the fixed covers and respective attachments to the structure are intact, with particular attention to the protection panels.

4.3.2 Sectioning the electric energy

The appliance is not equipped with a sectioning device able to remove the electric power supply voltage to the two poles (phase and neutral) at the same time. In fact, pressing the OFF key on the electronic control unit only stops the display cabinet functioning, but does not remove the current from the electric components inside the display cabinet (lights, fans and electric terminal board). The sectioning can happen through the plug socket, but it is recommended that the installer positions, upstream of the appliance, a **multiple pole switch** which guarantees the complete disconnection of the display cabinet from the mains.

	**DANGER**
	PRESSING THE OFF KEY ON THE ELECTRONIC CONTROL UNIT STOPS THE DISPLAY CABINET FUNCTIONING BUT DOES NOT CAUSE THE SECTIONING OF THE ELECTRIC ENERGY. IT IS THEREFORE COMPULSORY, IN CASE OF MAINTENANCE INTERVENTION, TO COMPLETELY DISCONNECT THE DISPLAY CABINET FROM THE MAINS BY REMOVING THE **MAINS PLUG** OR ACTING ON THE **MAIN SWITCH**, INSTALLED UPSTREAM OF THE DISPLAY CABINET.

	**DANGER**
	THE SECTIONING SWITCH CANNOT BE PADLOCKED IN THE OPEN CIRCUIT POSITION. THEREFORE REMEMBER, IN CASE OF MAINTENANCE INTERVENTION WHERE THE OPERATOR IS NOT ABLE TO PREVENT THE ACCIDENTAL CLOSURE OF THE CIRCUIT ON BEHALF OF OTHERS, TO COMPLETELY DISCONNECT THE APPLIANCE FROM THE MAINS.

4.4 Residual risks

The areas or parts at risk have been evaluated during planning. All precautions have been taken to avoid risks to persons and damages to the SERIES 750-900 Refrigerated Display Cabinets as indicated in the previous paragraphs.

Position 1	**Position ON, circuit CLOSED, machine with voltage**
Position 2	**Position OFF, circuit OPEN, machine without voltage**

!	**ATTENTION**
	PERIODICALLY CHECK THE FUNCTIONING OF ALL SAFETY DEVICES. DO NOT DISMANTLE THE MACHINE FIXED TYPE PROTECTIONS. DO NOT INTRODUCE OBJECTS OR FOREIGN TOOLS IN THE APPLIANCE OPERATION AND WORK AREA.

Despite the machine being equipped with the above stated safety systems, certain risks still remain which cannot be removed but reduced, through corrective actions on behalf of the final integrator and correct operational modalities.

Following is a summary of the risks which remain on the machine during:

- Normal functioning
- Regulation and adjustment
- Maintenance
- Cleaning.

4.4.1 Electrocution

- Risk of break or damage with possible lowering in the safety level of the electric appliance components following a short circuit.
- Before inserting the electric power supply, ensure there are no maintenance interventions in process.

!	**ATTENTION**
	BEFORE CONNECTING, CHECK THAT THE D.C. CURRENT IN THE INSTALLATION POINT IS NOT HIGHER TO THAT INDICATED ON THE PROTECTION SWITCHES PRESENT ON THE ELECTRIC CONTROL BOARD. IF SO, THE USER MUST ARRANGE FOR THE APPROPRIATE LIMIT DEVICES.

!	**ATTENTION**
	IT IS FORBIDDEN TO CARRY OUT ANY TYPE OF ELECTRIC MODIFICATION IN ORDER NOT TO CREATE ANY UNFORESEEN ADDITIONAL DANGERS AND RISKS.

4.4.2 Fire

	**DANGER**
	IN CASE OF FIRE IMMEDIATELY DISCONNECT THE MAIN SWITCH FROM THE MAINS.

4.4.3 Explosive atmosphere

The machine is not suitable to work in classified environments.

- It is forbidden to use the same in an atmosphere classified or partially classified.

4.4.4 Slipping

Any leaks of lubricants in the areas around the machine can cause personnel to slip.

- Check there are no leaks and always keep such areas clean.

4.4.5 Tripping

The untidy material deposit can generally constitute a danger of tripping and partially, or completely, limit the escape ways in case of need.

Ensure operational, transit areas and escape ways are not obstructed and in compliance with the regulations in force.

4.4.6 Circuit faults

Due to possible faults, the safety circuits may loose part of their efficiency with relative lowering of safety level.

- Periodically check the functioning status of the safety devices present on the machine.

4.5 Monitory plaques

Due to the residual risks, of various nature, identified on the machine, CIAM Spa has equipped the SERIES 750-900 Refrigerating Display Cabinets with danger, warning and obligatory monitory plaques, defined in compliance with the European regulation relating to the graphic symbols to be used on the plants (Directive 92/58/EEC).
The plaques in question are in a clearly marked position.

!	**ATTENTION**
	IT IS FORBIDDEN TO REMOVE THE MONITORY PLAQUES PRESENT ON THE MACHINE. MABO SRL DECLINES EVERY RESPONSIBILITY ON THE SAFETY OF THE SERIES 750-900 REFRIGERATED DISPLAY CABINETS IN CASE OF NON COMPLIANCE WITH SUCH PROHIBITION.

!	**ATTENTION**
	THE USER MUST REPLACE THE MONITORY PLAQUES WHICH, FOLLOWING WEAR, ARE ILLEGIBLE.

5. INSTALLATION

5.1 General information

!	**ATTENTION**
	CAREFULLY READ THE FOLLOWING AS THE INSTALLATION OPERATIONS (INCLUDING MOUNTING AND START-UP) CAN CAUSE RISKS FOR THE UNSKILLED PERSONNEL, AS THEY REQUIRE KNOWLEDGE OF THE MACHINE.

5.2 Choosing a room and verification of the requisites for the installation

The machine installation area must be sufficiently wide to respect the:
- operational spaces
- passage ways
- escape ways

The floor of the room chosen for the installation must be regular, levelled and in compliance with the application specifications and able to support the machine weight specifications.

The room must also be equipped with attachments for electric and fluidics energy necessary for the functioning of the machine.
The room must be equipped according to the safety regulations in force in the using country and guarantee airing and earthing of the appliances.

!	**ATTENTION**
	TO HOIST THE PACKAGES, AN ADEQUATE HOISTING MEAN IS NECESSARY, BEARING IN MIND THE SAFETY MARGINS PROVIDED BY LAW AND SAFETY REGULATIONS IN FORCE.

5.3 Moving the appliance

- As far as possible, the operational area must be free from materials which can prevent or limit the view, create obstruction or tripping.
- The packages composing the machine must only be moved using a hoisting trolley with adequate power and capacity for the weight of the appliance to be moved, as per the technical table of the specific appliance purchased. If necessary, hoisting accessories of approved type and adequate capacity, higher than the weight to be hoisted, can be used. The machines' weight is reported in the technical data table of the same.
- It is therefore the responsibility of the installer to use hoisting means of adequate capacity.
- Before hoisting the appliance, check there are no mobile parts or tools on the same.
- Check that the load is correctly balanced: slightly lift the load from the ground and check, before proceeding further, that it is horizontal. If not, lay down the load, reallocate the slings and repeat the operation until correctly balanced.
- In case of hoisting with forks, check that they are only in contact with the lower part of the appliance frame and not with other perishable parts (carter, power supply cord etc.), which might compromise the safety of the product during start-up.

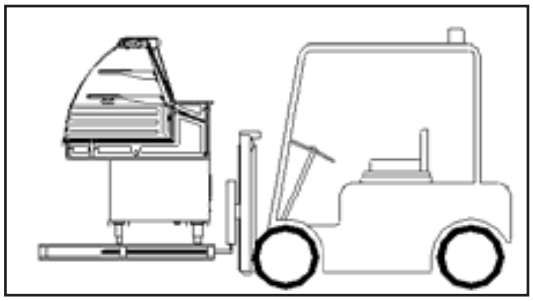
!	**ATTENTION**
	TO HOIST THE PACKAGES AN ADEQUATE MEAN IS NECESSARY, BEARING IN MIND THE SAFETY MARGINS PROVIDED BY LAW AND SAFETY REGULATIONS IN FORCE.

!	**ATTENTION**
	IN CASE OBSTRUCTIONS, AND/OR OPERATIVE SITUATION, DO NOT ALLOW THE OPERATOR TO HAVE A PERFECT VIEW, PERSONNEL WITH THE TASK OF SIGNALLING SHOULD BE PLACED OUTSIDE THE ACTION RANGE OF THE HOISTING MEAN.

Once the perfect balance has been obtained, proceed to hoisting and moving the load.

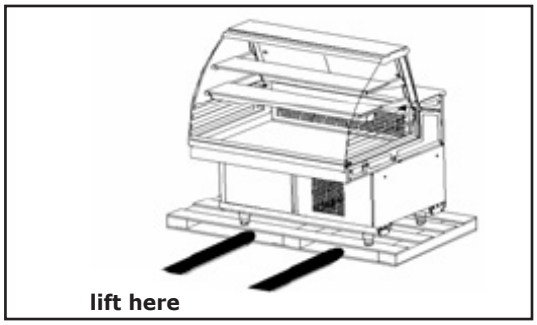
	**ATTENTION**
	NEVER TRANSIT UNDERNEATH SUSPENDED LOADS. NEVER MOVE THE LOAD OVER PERSONNEL OPERATING IN THE INSTALLATION AREA.

- The moving, from the transport mean to the final site, must be carried out with adequate hoisting and moving mean for the weight of the appliance, which should always be in a stable equilibrium for the integrity of personnel and of the same appliance (fig.5.1.1).



(fig.5.1.1).

- The appliance can be transported with or without packaging: if present, it is provided with a step-board for moving with fork lift. In any case, the application point of the hoisting means or the blades of the elevator mean, must be respectively centred on the centre line of the appliance (fig.5.1.2).



(fig.5.1.2).

- During transport, do not let the appliance undergo crashes or jolts in order not to damage the structure, especially the glass one.
- Do not drag the appliance on the floor and do not push it forcing the glass mount.

5.4 Storing the appliance

- For storing with packaging, pay attention to that reported with regard to the same packaging.
- The storing temperature can be between -15°C and +55°C and humidity between 30% and 90%.
- The appliance must **always** be protected from sun and bad weather.
- Should the appliance stay in a warehouse for a long time before being used, leave it inside its original packaging, which guarantees the most adequate protection.

5.5 Unpacking the appliance

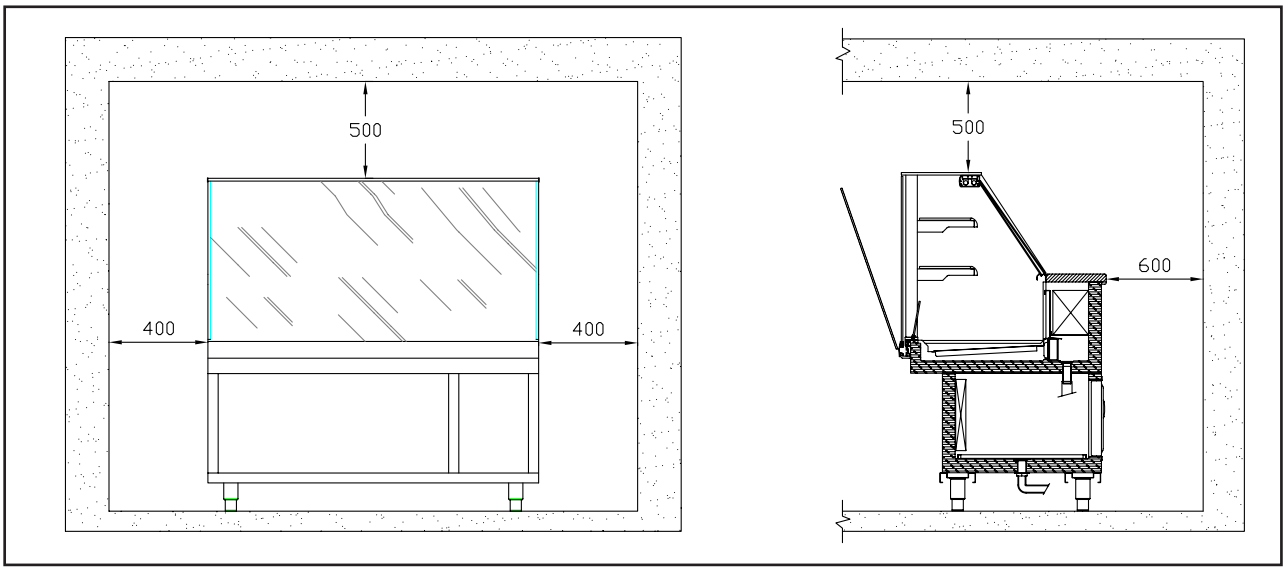
Before accepting the appliance from the carrier, check its condition.
Should there be evident damages, show them to the carrier and sign, with reserve, the packing list.
Any damages caused by transport or incorrect storage, cannot be attributed to the manufacturer.

5.6 Installation, positioning and environmental conditions:

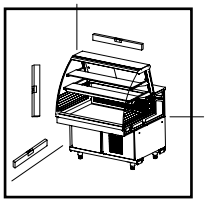
For the correct positioning, carry out the following operations:
Position the display cabinet leaving a space sufficient for the safe use and maintenance, as provided by the normative UNIEN 292/2.

!	**ATTENTION**
	THE NON COMPLIANCE WITH THE DISTANCES INDICATED, AS WELL AS NOT GUARANTEEING A CORRECT FUNCTIONING OF THE APPLIANCE, CAN ALSO PREVENT ANY MAINTENANCE INTERVENTION.

In case a step-board for the operator is present, it must have an easily removable part in correspondence with the condensing unit so that it can be removed for maintenance operations.



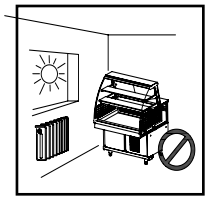
Check that there is a suitable earthing plant as provided by the respective EN.



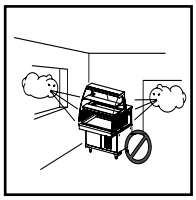
Ensure that the condensing compressor group is in a free air change condition.

The appliance must be positioned flat (check with spirit level) in order to guarantee better functioning.

Ensure that the appliance is installed away from sources of heat (radiators, stoves etc.) and away from continuous air movements (for example, caused by fans, air conditioning inlets etc.).
Do not position the appliance near currents of air (near doors, windows, air conditioning plants etc.) which exceed the speed of 0.2m/sec.

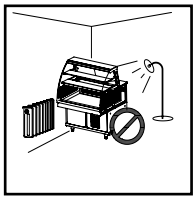


Ensure that the influence or direct exposure to sunlight and anything which might cause the temperature inside the refrigerating room to rise is not possible.
Therefore do not position the appliance near sources of heat (direct sunlight, heating plants, incandescent lamps etc.).



Do not position the appliance in rooms in the presence of explosive gasses, open air and therefore, atmospheric agents.

Once positioned in the desired area, lay it flat using the adjustable feet



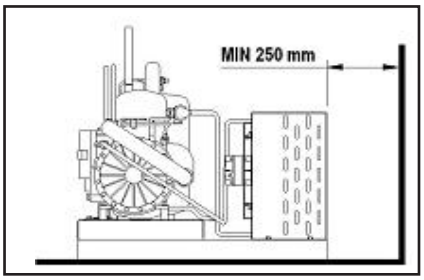
- If the cabinet is moved, repeat the levelling control.
- Before connecting the cabinet to the mains, ensure that the plaque data correspond to the electric plant features to which it will be connected.
- For the correct functioning of the cabinet, the room temperature and humidity must respect the parameters provided in normative EN-ISO 23953 - 1/2, which provides Climatic Class 3 (+25°C; U.R. 60%). (Our products satisfy the 4 +30°C; U.R. 55%)

N.B. All these operations must only be carried out by qualified personnel.

The refrigerating appliance requires precise environmental conditions in order to offer the performances for which it was designed; therefore, the housing environment, will have to respect the following indications:

- The support surface must be perfectly levelled; if not, bring the appliance into horizontal position (check with spirit level) to guarantee the perfect evacuation of the defrosting water, to avoid annoying noises caused by the vibrations and to assume a better appearance (fig.5.4.1).
- The appliance, and its displaying compartment, must not be hit by sun rays or reflections; the appliance must always be under cover, inside the premises or covered by a curtain. The non compliance with the above, causes an anomalous increase of the exposed product temperature, which cannot be remedied in any way, and an increase in energy consumption (fig.5.4.2).
- The appliance must not incur permanent air currents caused by open premises doors or windows, ceiling fans, air and air conditioning inlets facing the appliance area. The non compliance with the above, causes an anomalous increase in the exposed product temperature and an excessive build up of brine on the evaporator and fans, compromising the correct air circulation (the immediately detectable effect is the alteration in the product consistency fig.5.4.3).
- The appliance must not be placed near radiating sources of heat, such as radiators, stoves, ovens, intense sources of artificial light, etc. (fig.5.4.4).
- The appliance must have sufficient space in order to allow a correct service to customers, make the maintenance interventions easy, guarantee the necessary air inlet to the condensing cooler; the outgoing hot air from the latter must not be obstructed and must not cover other appliance, in order not to compromise the correct functioning.

5.7 Positioning the remote condensing unit



(fig.5.7).

- The remote condensing unit must be selected by qualified technical personnel depending on the requested refrigerating power and its position compared to the appliance.
- The air condensing unit must be positioned following that reported below:
- The condenser must distance about 250 mm. from any wall(fig.5.5).
- The air flow direction must be from the wall towards the compressor.
- The lowest possible temperature of the air entering the condenser must be guaranteed.
- If need be, a forced air change must be foreseen (by means of a fan) depending on the air capacity required by the condensing unit.
- The condensing unit must be fixed and stable.
- The generated noise level must not exceed those admitted in the various types of public premises (of importance is an apartment building).
- Sufficient space on all four sides must always be provided in order to make every control and maintenance intervention easy. In case there are more condensing units located in the open, a solid and anchored engine mount must be provided (eventually leaning on shock absorbing elements), equipped with sloping cover, closed side walls, the condensing air discharge wall protected by grate with holes sizes according to law and rain resistant tabs.

5.6 Appliance refrigerating - remote condensing unit connection

- The choice of pipes size and insulating thickness must be carried out by qualified technical personnel depending on the characteristic parameters.
- The length of the pipes must be as short as possible.
- The pipes installation must be up to standard and carried out by qualified personnel in order to guarantee fundamental understanding like the adequate sloping, the presence of siphon at the base of the ascent suction pipes and, eventually, at intermediate quotas, etc.

ATTENTION! An incorrect connection can cause serious damages to the appliance, especially to the compressor; the appliance manufacturer cannot be held responsible of the damages caused by an incorrect connection on behalf of third parties.

5.7 Electrical connection

- Pre-emptively ensure that the power supply voltage and electrical power available correspond to the appliance plaque data.
- The appliance must be protected by means of a multiple pole magnetothermal automatic switch with adequate features and which will also function as line sectioning main switch. This is NOT supplied but must be provided by the purchaser.

ATTENTION!

- The appliance DOES NOT foresee a main switch which removes phase and neutral at the same time.

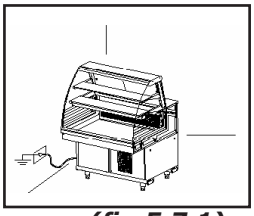
ATTENTION!

- The appliance must be connected, upstream, to a multiple pole switch, with minimum opening distance of the contacts of 3 mm., which guarantees the disconnection from the mains, accessible by whoever is using the same appliance..
- The magnetothermal automatic switch must not open the circuit on neutral but it must open it on the phases at the same time and, in any case, the opening distance of the contacts must be at least 3 mm.

N.B.The electrical network plant can only be modified by qualified personnel.

- It is compulsory that the appliance is adequately connected to an efficient earth plate (fig.5.7.1).
- The electrical plant to which the appliance is connected, must be provided with earthing.
- The electrical connection must be carried out according to the manufacturer instructions, by qualified personnel and in accordance with legislations regarding electrical plants.
- Disconnect the appliance from the mains before carrying out any maintenance intervention by acting on the multiple pole switch upstream of the appliance. (Fig.5.7.2)

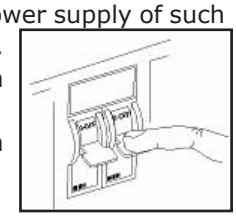
- An incorrect installation can cause damages to persons, animals or things, towards which the manufacturer cannot be held responsible.
- Train the operator on the position of the switch so that it can be quickly reached in case of an EMERGENCY.
- To guarantee a regular functioning, it is necessary that the maximum voltage variation is between +/- 6% of the nominal value and that no odd harmonic distortions are present.
- Check that the power supply line has opportune section cables and, however, not lower than 2.5 mm² and that it is protected against over-currents and earth dispersions in accordance with legislation.
- For very long power supply lines, adequately increase the cables section to compensate the relative voltage drop.



(fig.5.7.1).

5.8 Electrical connection - remote condensing unit

in case a standard external condensing unit is supplied, the technician will have to connect the power supply of such unit to the display cabinet. The operation is simplified in that, inside the display cabinet base, behind the removable grate of the equipment compartment, a terminal board is present on which a white derivation box, which can be opened like a book, is fixed.
On such box (PA 104) there are 5 clamps which names are marked on the same box cover with the following symbols: L N G 1 2.

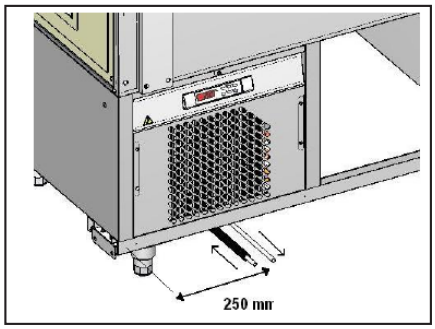


(fig.5.8).

L N G = Is the display cabinet power supply, respectively phase, neutral and earth 230 Volts, 1Ph, 50Hz.
1 2 = Is the motor power supply 230 Volts, 1Ph, 50Hz.

5.9 Hydraulic connection

- The appliance is supplied standard without condense drying tank (optional), it is therefore necessary to connect the defrosting water discharge pipe (or pipes) with the premises water network discharge.
- ATTENTION! For correct functioning, it is necessary to interpose a siphon between the appliance discharge and that of the water network.
- Should a condensing unit completely or partially cooled through water be present, it is necessary to connect the ingoing pipe (recognisable by the presence of thermal insulation) to the discharging one, of the water-cooled condenser to the water network. (Fig. 5.9)



(fig.5.9).

6. FUNCTIONING

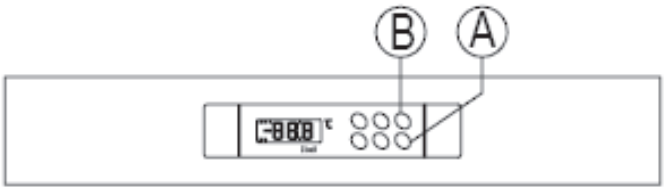
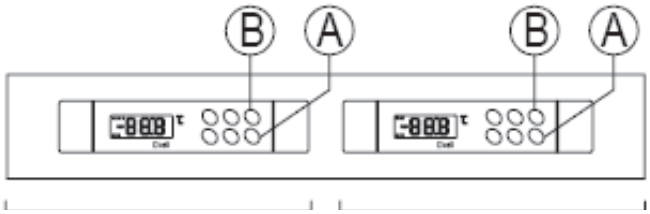
6.1 Preliminary operations

- Appliance with internal condensing unit. Before delivering to the client, the qualified technical personnel must verify the correct functioning of the entire appliance in order to achieve maximum performance.
- Appliance with remote condensing unit. Operate as in the previous point and scrupulously carry out the following checks:
- Check, with the appliance not electrically fed, that there the coolant does not leak (it is supposed that a first seal test of the plant has already been carried out during an accurate emptying through a vacuum pump).
- Check the correct loading of the coolant by means of the liquid indicator.
- Regulate the condensing pressure control system (where present).
- Perfectly regulate the expansion thermostatic valve after having, pre-emptively, completely opened the compressor carter pressure regulating valve (where present).
- Regulate the above-said regulating valve, during defrosting only.
- Regulate the high and low pressure manostats, (where present).
- Check that there is no water dripping from the pipes insulation and the joining points of the same.

6.2 Start-up

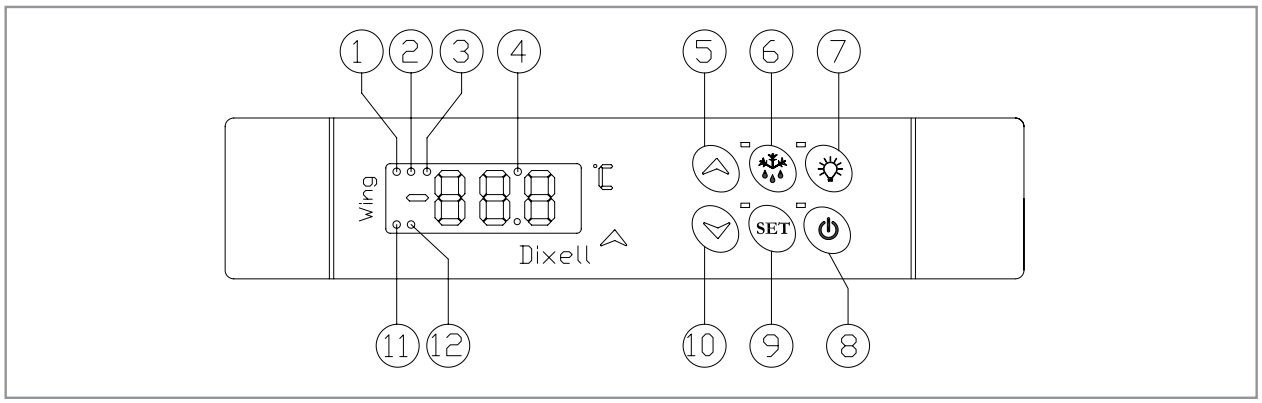
Action the main switch of the network plant.
Insert the Display Cabinet power supply plug on the socket supplied by the client, ensuring that the same has earth contact and that there are no multiple sockets connected.
Action the display cabinet main switch located on the rear protection panel.
To electrically feed the display cabinet, position the main switch on position "1".
To start-up the appliance subsequently act on: (see Fig.6.2)

- ON-OFF Key. "A"
- Lighting key. "B"
- Electronic control board, on controls panel, for setting the preservation temperature.

<table>
<tr><td colspan="2">ELECTRONIC CONTROLS PANEL</td></tr>
<tr><td>DISPLAY CABINET WITHOUT RESERVE CELL</td><td>DISPLAY CABINET WITH RESERVE CELL</td></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

(fig.6.2).

6.3 Use modality of control unit DIXELL XW60L (DISPLAY CABINET)



1. Freezing LED active
2. Defrosting LED active
3. Fan LED active
4. Compressor LED active
5. Value increase key
6. Manual defrosting key
7. Lighting key
8. ON / OFF key
9. SET key
10. Value decrease key
11. Alarm signal LED
12. Lighting LED active

- **APPLIANCE START-UP/SWITCH-OFF.**

To switch on the control unit and the refrigerating appliance press key **(8)** for about 3 sec.; to switch-off, press the same key for 3 seconds (in such condition, all control unit outputs are switched off, apart from the lighting).
The control unit starts working as soon as the temperature of the refrigerated compartment is displayed.
When the current comes back after a black-out, the control unit automatically starts working like before.

- **KEYBOARD BLOCK/UNBLOCK.**

To block the keyboard keep keys **(5)** and **(10)** pressed together for a few seconds, until the writing **"POF"** starts flashing on the display. To unblock the keyboard, keep keys **(5)** and **(10)** pressed together for a few seconds, until the writing **"POn"** starts flashing on the display.

- **LIGHTING.**

To act on the lighting press key **(7)**.

- **DISPLAY AND AMENDMENT OF SET TEMPERATURE.**

To display the set temperature press and release key **"SET"(9)**; the set temperature is immediately displayed and the LED above the same key flashes. To amend the set temperature act on keys **(5)** and **(10)**; to memorise the new temperature press key **"SET" (9)** or wait for a few seconds for the control unit to automatically exit the programming.

- **SUPPLEMENTARY DEFROSTING.**

To start the supplementary defrosting press key **(6)** for more than 2 seconds.
A supplementary defrosting resets the time count between an automatic defrosting and the subsequent one.

- **DISPLAY AND/OR AMENDMENT OF SET PARAMETERS VALUES.**

To display or amend the set parameters follow the procedure below.

- Press key **(10)** and immediately after key **"SET"(9**) until an initial writing appears on the display.
- Repeatedly press key **(5)** until the writing **"PR2"** appears.
- Press **"SET"(9)**, the writing **"0 - -"** appears with **"0"** flashing, then type password **"321"** as follows. Repeatedly press key **(5)** to pass from 0 to 3, confirm with key "**SET"(9)**; the 0 appears in second place, pass from 0 to 2 and confirm with key **"SET"(9)**; a 0 appears in third place, pass from 0 to 3 and confirm with key **"SET"(9)**. In this way, access is gained to the parameters which can be set or amended, the list of which, must be in possession of the appliance maintenance operator.
- Remember that to memorise each inserted parameter value it is necessary to press key **"SET"(9)**.
- Wait for a few seconds without pressing any key; the control unit will automatically exit the programming.

- **PROBE VALUE DISPLAY.**

To display the Probe value, especially the one relating to end defrost, it is necessary to enter from the protected menu **"PR2"**, select parameter "Prd" and press key **"SET"(9)**; the writing **"Pb1"** appears, alternating with the value of probe 1. With keys **(5)** and **(10)** it is possible to display the problems present.

- **ALARMS.**

Message	Cause	Outputs	The signal on the display remains until the alarm condition has been restored. All the alarm messages flash alternating with the temperature of probe "P1" which permanently flashes. The buzzer and the alarm output can be deactivated by pressing any key. The "EE" alarm signals the presence of data anomaly.
"P1"	Faulty thermostat probe	Output according to parameters "Con" and "Cof"	
"P2"	Faulty evaporator probe	Not amended, only signal	
-	-		
"HA"	High temperature alarm	Not amended, only signal	
"LA"	Low temperature alarm	Not amended, only signal	
"EE"	Anomaly in memory		
"dA"	Door open alarm	Not amended, only signal	
"EAL"	Alarm from digital input	Not amended, only signal	
"BAL"	Block alarm from digital input	Control outputs deactivated	
"PAL"	Manostat alarm from digital input	Control outputs deactivated	

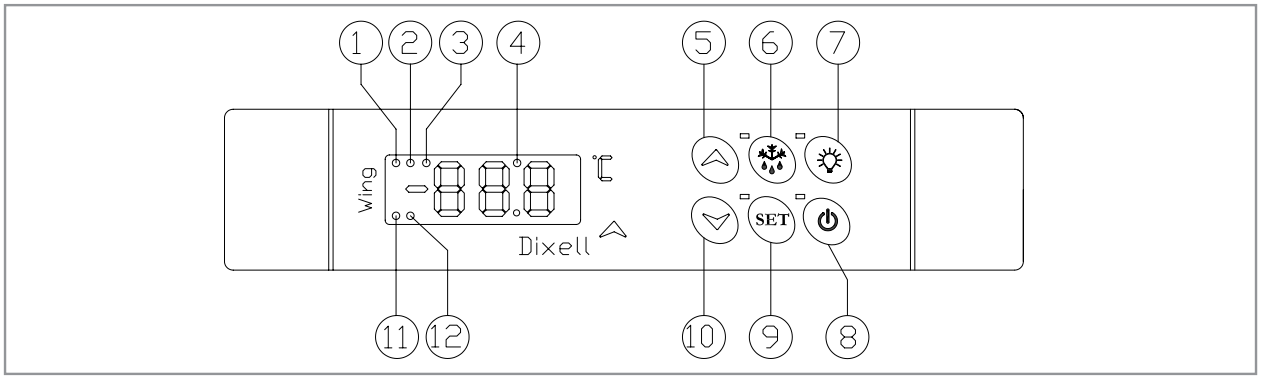
- **ALARMS RESTORING MODALITY**

- The **probe alarms "P1" and "P2"** trigger after about 10 sec. from the fault of the problem and are restored automatically 10 sec. after the probe has started to function regularly. **Before replacing a probe check its connections**.
- The **temperature alarm "HA" and "LA"** are automatically restored as soon as the thermostat temperature returns within the norm or when defrosting starts.
- In case of alarm "**EE**" , it is not possible to find a remedy and the control unit needs to be replaced.

- **AUTOMATIC DEFROSTING**

This appliance is equipped with automatic defrosting to periodically eliminate the brine present on the evaporator tabs.
All the parameters which manage the automatic defrosting phase are set by the manufacturer, ***however, their value can be amended by qualified personnel to adapt the appliance functioning to the particular work environment conditions***.

6.4. Use modalities of control unit DIXELL XW20LS (RESERVE COMPARTMENT)



1. Freezing LED active
2. Defrosting LED active
3. Fan LED active
4. Compressor LED active
5. Value increase key
6. Manual defrosting key
7. Lighting key
8. ON / OFF key
9. SET key
10. Value decrease key
11. Alarm signal LED
12. Lighting LED active

- **APPLIANCE START-UP/SWITCH-OFF.**

To switch on the control unit and the refrigerating appliance press key **(7)** for about 3 sec.; to switch-off, press the same key for 3 seconds (in such condition, all control unit outputs are switched off, apart from the lighting).
The control unit starts working as soon as the temperature of the refrigerated compartment is displayed.
When the current comes back after a black-out, the control unit automatically starts working like before.

- **KEYBOARD BLOCK/UNBLOCK.**

To block the keyboard keep keys **(4)** and **(9)** pressed together for a few seconds, until the writing **"POF"** starts flashing on the display.
To unblock the keyboard, keep keys **(4)** and **(9)** pressed together for a few seconds, until the writing **"POn"** starts flashing on the display.

- **LIGHTING.**

To act on the lighting press key **(6)**.

- **DISPLAY AND AMENDMENT OF SET TEMPERATURE.**

To display the set temperature press and release key **"SET"(8)**; the set temperature is immediately displayed and the LED above the same key flashes.
To amend the set temperature act on keys **(4)** e **(9)**; to memorise the new temperature press key **"SET" (8)**.

- **SUPPLEMENTARY DEFROSTING.**

To start the supplementary defrosting press key **(5)** for more than 2 seconds.
A supplementary defrosting resets the time count between an automatic defrosting and the subsequent one.

- **DISPLAY AND/OR AMENDMENT OF SET PARAMETERS VALUES.**

To display or amend the set parameters follow the procedure below.
- Press key **(9)** and immediately after key **"SET"(8**) until an initial writing appears on the display.
- Repeatedly press key **(4)** until the writing **"PR2"** appears.
- Press key **"SET"(8)**, the writing **"0 - -**" appears with **"0"** flashing, then type password **"321"** as follows. Repeatedly press key **(4)** to pass from 0 to 3, confirm with key "**SET"(8)**; the 0 appears in second place, pass from 0 to 2 and confirm with key **"SET"(8)**; a 0 appears in third place, pass from 0 to 3 and confirm with key **"SET"(8)**. In this way, access is gained to the parameters which can be set or amended, the list of which, must be in possession of the appliance maintenance operator.
- Remember that to memorise each inserted parameter value it is necessary to press key **"SET"(8)**.
- Wait for a few seconds without pressing any key; the control unit will automatically exit the programming.

- **ALARMS.**

Message	Cause	Outputs	The signal on the display remains until the alarm condition has been restored. All the alarm messages flash alternating with the temperature of the probe, except for "P1" which flashes permanently.
"P1"	Faulty thermostat probe	Output according to parameters "Con" and "Cof"	
"HA"	High temperature alarm	Not amended, signal only	
"LA"	Low temperature alarm	Not amended, signal only	
"EE"	Anomaly in the memory		

- **ALARMS RESTORING MODALITY**

- The **probe alarms "P1" and "P2"** trigger after about 10 sec. from the fault of the problem and are restored automatically 10 sec. after the probe has started to function regularly. **Before replacing a probe check its connections**.
- The **temperature alarm "HA" and "LA"** are automatically restored as soon as the thermostat temperature returns within the norm or when defrosting starts.
- In case of alarm "**EE**" , it is not possible to find a remedy and the control unit needs to be replaced.

- **AUTOMATIC DEFROSTING**

This appliance is equipped with automatic defrosting to periodically eliminate the brine present on the evaporator tabs.
All the parameters which manage the automatic defrosting phase are set by the manufacturer, ***however, their value can be amended by qualified personnel to adapt the appliance functioning to the particular work environment conditions***.

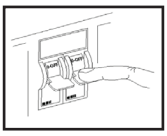
7. ROUTINE MAINTENANCE AND PERIODIC CONTROLS

6.5. Start-up of appliance equipped with ELECTROMECHANICAL CONTROL

To start-up the appliance subsequently act on: **(see Fig.6.5)**

- Main switches (1) and (6).
- Light switch (2).

(Fig. 6.5.)

<table>
<tr><td colspan="2">ELECTROMECHANICAL CONTROL PANEL</td></tr>
<tr><td>DISPLAY CABINET WITHOUT RESERVE CELL</td><td>DISPLAY CABINET WITH RESERVE CELL</td></tr>
<tr><td>ATTENTION! BEFORE CARRYING OUT ANY MAINTENANCE OR CLEANING OPERATION RESERVED TO THE USER, COMPLETELY DISCONNECT THE DISPLAY CABINET FROM THE MAINS USING THE MAIN SWITCH LOCATED UPSTREAM OF THE APPLIANCE (FIG.7), OR DISCONNECTING THE POWER SUPPLY SOCKET (SEE PARAGRAPH 4.3.2).</td><td> 
(fig.7).</td></tr>
<tr><td>1. Display compartment main switch
2. Display compartment light switch
3. Display compartment defrosting luminous warning light
4. Display compartment mechanical thermostat</td><td>5. Reserve compartment mechanical thermostat
6. Reserve compartment main switch
7. Reserve compartment thermometer</td></tr>
</table>

6.5.1. Use modalities of the DISPLAY COMPARTMENT electromechanical control

- **SETTING THE TEMPERATURE**

  Rotate thermostat knob **(4)** anti-clockwise to end run, that is, until **"0"** is in correspondence with the reference present on the fixed ring nut, exactly as shown in Fig. 6.5.
  In such condition, the display cabinet is regulated on maximum cold.
  Checking the temperature indicated by the digital thermometer, located on the internal carter underneath the service surface, regulate the temperature of the display compartment by gradually rotating the thermostat knob **(4)** clockwise; carry out such operation until the desired temperature is reached.
  Wait at least 20 minutes after every small regulation until the display compartment functioning becomes stable.

- **DISPLAYING THE TEMPERATURE**

  The display of the temperature of the display compartment is entrusted to the digital thermometer located on the internal carter underneath the service surface.
  The thermometer is powered by a battery which will have to be replaced when needed.
  Given the high relevance of the temperature indication, it is important that the battery is replaced as soon as a decrease in the distinctness of the indicated figures is noted.

- **DEFROSTING**

  Luminous warning light **(3)** remains on for the whole duration of the evaporator defrosting, periodically controlled and checked by the appropriate timer.
  During defrosting, and the immediate successive refrigeration, the temperature indicated by the thermometer will be higher than that indicated by the stable functioning conditions of the display cabinet.

6.5.1. Use modalities of the RESERVE COMPARTMENT electromechanical control

- **SETTING THE TEMPERATURE**

  Rotate thermostat knob **(5)** anti-clockwise to end run, that is, until "0" is in correspondence with the reference present on the fixed ring nut, exactly as shown in **Fig. 6.5.**
  In such condition, the display cabinet is regulated on maximum cold.
  Checking the temperature indicated by digital thermometer **(7)**, regulate the temperature of the display reserve by gradually rotating the thermostat knob **(5)** clockwise; carry out such operation until the desired temperature is reached.
  Wait at least 30 minutes after every small regulation until the reserve compartment functioning becomes stable.

8. EXTRAORDINARY MAINTENANCE

- **DISPLAYING THE TEMPERATURE**

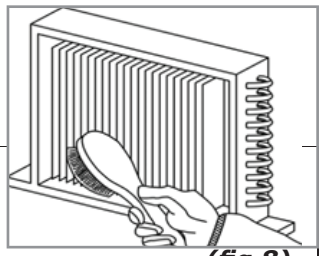
  The display of the temperature of the reserve compartment is entrusted to the digital thermometer located on the controls panel.
  The thermometer is powered by a battery which will have to be replaced when needed.
  Given the high relevance of the temperature indication, it is important that the battery is replaced as soon as a decrease in the distinctness of the indicated figures is noted.

- **DEFROSTING**

  The defrosting of the reserve cell can only be carried out manually by removing the electric power supply through main switch **(6)**.

6.6. Loading the product

- Before inserting the product to be refrigerated into the appliance, wait for it to have reached the temperature set on the control unit and the compressor has started to cycle.
- This appliance cannot be used as temperature blast-chiller but only as display, therefore, when inserting, the product must already be at preservation temperature.
- Arrange the product so as not to exceed the provided load limit (see drawings page 17).
- It is recommended to rotate the products, firstly using those which have been in the display cabinet longer.



(fig.8).

!	**WARNING**
	IT IS IMPORTANT NOT TO EXCEED THE PROVIDED LOAD LIMIT (SEE PAGE 17) IN ORDER NOT TO ALTER THE CORRECT AIR CIRCULATION AND AVOID A HIGHER PRODUCT TEMPERATURE AND POSSIBLE RISK OF ICE BLOCKS FORMING ON THE EVAPORATOR

!	**WARNING**
	CERTAIN CONFECTIONERY PRODUCTS, ESPECIALLY THOSE GARNISHED WITH CREAM OR CUSTARD, ARE SUBJECT, WITH THE PASSING OF TIME, TO DETERIORATION. REMEMBER THAT THE DISPLAY CABINET IS A SELLING DISPLAY AND NOT FOR PRESERVATION!

6.7. Use of sliding

In order to guarantee the correct use of the display cabinet, the shutter, or the sliding, must always be placed in closing position every time the selling activity allows it.

6.8. Stopping the appliance

For the permanent stopping of the appliance, it is necessary to act only on the **main switches** or the power supply plug to remove the current to the display cabinet and condensing unit.

9. INCONVENIENCES AND REMEDIES

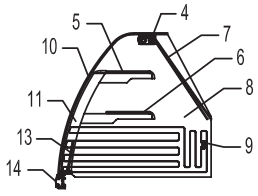
INCONVENIENCE	PROBABLE CAUSES	POSSIBLE REMEDIES
The appliance does not work.	Triggered automatic switch.	Pre-emptively find the cause of the switch intervention then re-store it.
	Main switch open.	Close the main switch.
	Control unit switched off	Press the ON button.
	Electric black-out of the premises	If the black-out should last a long time, transfer the product into a suitable refrigerator, in order to limit as much as possible its heating.
The temperature of the display compartment is not sufficiently low.	Evaporator/s completely ob-structed by ice.	Completely defrost after having transferred the entire product in a suitable refrigerator. Do not re-insert the product in the display cabinet until identified the cause of the inconvenience.
	Internal fans stopped or with damaged vents	Replace the non-functioning fans. Find the electric inconvenience if the fan seem intact. Replace the damaged vents with new ones.
	Incorrect temperature setting on electronic control unit	Set the appropriate temperature.
	Inefficient control unit	Replace the electric control unit or the temperature probes.
	Display compartment over-come by air currents or exposed to direct or reflecting insulation	Remove the excessive air currents and avoid the direct sun rays or reflections.
	Air condensing unit obstructed by dust or dirt	Carefully clean the condensing unit.
	Insufficient cooling air capacity of the air condensing unit	Remove anything which obstructs the sufficient air circulation through the condensing unit (papers, cartons, insufficciently aso-late grates, etc.).
	Insufficient coolant in the refrigerating plant	Pre-emptively find the cause of coolant leak and remove it; pro-ceed to re-load the lost coolant from a new plant emptying.
	Insufficient cooling water capacity of the water-cooled condenser	Check that the water power supply is present; if so, regulate, or replace, the regulating valve or manostat.
The product positioned on the air outlet is too hard, the one on the aspirator is too soft.	Evaporator obstructed by snow.	Check that the display compartment is not overcome by air currents, that the shutter/sliding are always closed, unless during periods of maximum selling, that the ventilation of the refrigerating compart-ment is sufficiently active and that the provided load limits have not been exceeded.
	Evaporator obstructed by ice.	As above. Additionally, check the reliability of the defrosting (start control, reliability of the refrigerating plant, end defrosting control).
	Inefficient internal fans.	Restore the fans efficiency, replacing the malfunctioning ones.
The compressor is not working or working for short periods.	Lack of appliance electric power supply.	Check if there is a black-out. Close the various switches on the power supply line.
	The control unit does not give its consent.	The relay of the control unit may be broken or the same control unit is not working. Replace the electronic control unit.

INCONVENIENCE	PROBABLE CAUSES	POSSIBLE REMEDIES
	Power supply voltage too low.	Check that the compressor clamps have a nominal voltage of220; however, a value between 198 and 242 V is admitted. Voltage lower than 198 V may cause compressor start-up inconveniences. Check the electric plant efficiency up to the compressor clamps.
	Temperature set on thermostat too high.	If the set temperature is higher than the air temperature in the display compartment, the compressor does not work. Set the most appropriate temperature if the current one is not sufficiently low.
The compressor works for long periods or constantly.	Selling premises temperature too high.	In case the appliance works correctly and it is not possible to lower the premises temperature (with airing or air conditioning plant) the compressor may also function constantly; in such case, the refrigerating plant has reached the maximum limit of its performances.
	Temperature of compressor compartment too high (remote condensing unit)	Investigate on the cause of the compressors compartment temperature rise and proceed accordingly. If, as said above, it is not possible to lower the premises temperature, the compressor may also function constantly.
	Air condensing unit obstructed.	Carefully clean the condensing unit.
	Flow of cooling air of the water-cooled condensing unit insufficient.	Check the opening of the taps, the efficiency of the regulating valve (replace it if necessary).
	Lack of coolant in the circuit.	Identify the cause for the loss of coolant and, only afterwards, restore it.
	Scarce internal ventilation.	Restore the correct ventilation removing any obstacles, replacing, if necessary, the fans.
	Evaporators extremely obstructed	Proceed to the complete defrosting of the evaporator/s and then investigate on the possible cause of the obstruction and operate accordingly.
	Thermostat regulated on a very low temperature.	Regulate the thermostat to the correct temperature.
Lack of temperature indication on the digital thermometer.	Power battery exhausted.	Insert a battery identical to the one present.
	Inefficient probe or cable interrupted.	Replace the entire digital thermometer.
	Inefficient electronics.	Replace the entire digital thermometer.
Lack of defrosting water.	Obstructed water discharge pipe.	Restore the Lack of water of the water flow through the pipe.
	Absent or inefficient defrosting.	Intervene on the defrosting commands and controls items (control unit, probes, solenoid valves, etc.) and/or on the position of the end defrosting probe.
Lack of lighting.	Light switch not closed.	Close the light switch or press the light button on the electronic control unit.
	Fluorescent lamp incorrectly inserted in the lamp holders.	Correctly insert the lamp in the appropriate lamp holders and rotate it.
	Exhausted lamp.	Replace the lamp with a new one with the same heat temperature (standard 840°K).
	Inefficient feeders.	Replace the faulty feeders.
Excessive noise level.	Display cabinet internal sheets vibrate.	Tighten all fixing screws.
	Internal fans incorrectly fixed.	Tighten all fixing screws.
	Internal fans vanes touching parts of the same.	Replace the vanes with other perfectly regulated. If the noise is caused by the dragging of the vanes on ice formed on the fans ring, intervene on the air and/or defrosting circulation.
	Pipes touching other parts of the appliance.	Avoid the pipes touching through vibration other parts of the plant; the continuous rubbing can cause breaks in the pipes and loss of coolant.
	Missing levelling of appliance.	Perfectly level the appliance.

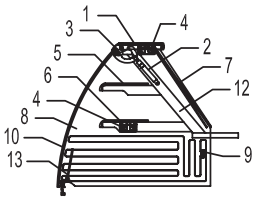
10. APPLIANCE SECTION

LIFT SERIES 900

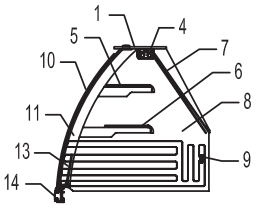
C1



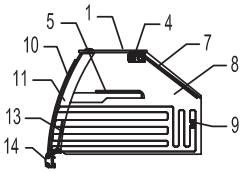
C2



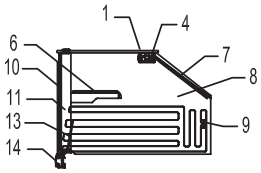
C3



C4



C5



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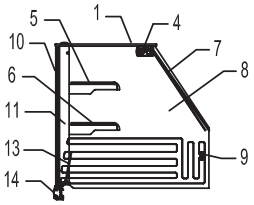
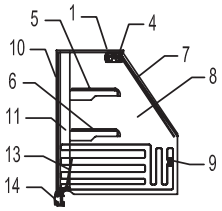
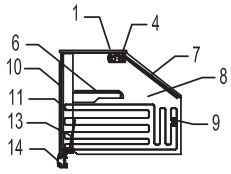


LIFT 750

A1

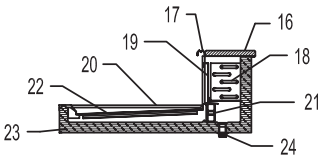


A2

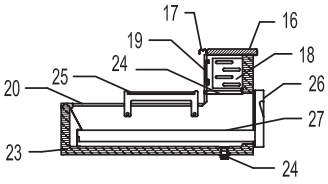


PLATE

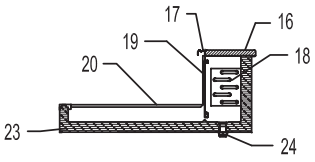
Aired



Static with drawers

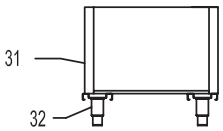


Static

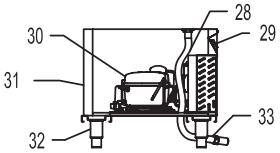


BASES

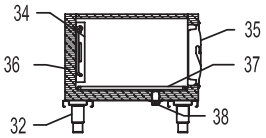
With open compartment



With equipment compartment



With reserve



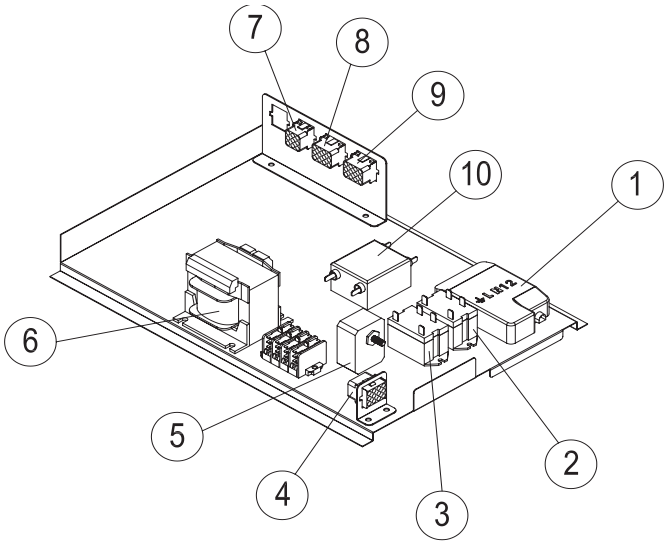
Every display cabinet complete and composed by a lift, a plate and a base each in the configurations displayed in the previous table.
N.B.: the only possible combinations relate to lift A1 and A2 of the 750 series which cannot have a plate with removable drawer.

LIFT			
N°	**DESCRIPTION**	**N°**	**DESCRIPTION**
1	Glass cap	8	Tempered transparent side glass
2	Pistons for glass opening	9	Heating serigraphy side glass
3	Pliers for front glass opening upwards	10	Front glass
4	Upper ceiling light	11	Front central upright (only on angle display cabinets and on lengths higher or equal to 2.5 meters)
5	Upper shelf	12	Rear side upright present only on lift C2
6	Lower shelf	13	Anti-condensation deflector (not necessary in C2 model)
7	Sliding in plexiglass	14	Pliers for front glass opening downwards

PLATE			
N°	**DESCRIPTION**	**N°**	**DESCRIPTION**
16	Service surface	22	Steel plate for display compartment
17	Support profile for sliding	23	Insulated tank
18	Evaporator	24	Drain outlet
19	Front grate covering evaporator	25	Lower shelf for plate with drawer
20	Steel hoop covers	26	Drawer patch
21	Fan	27	Drawer display surface

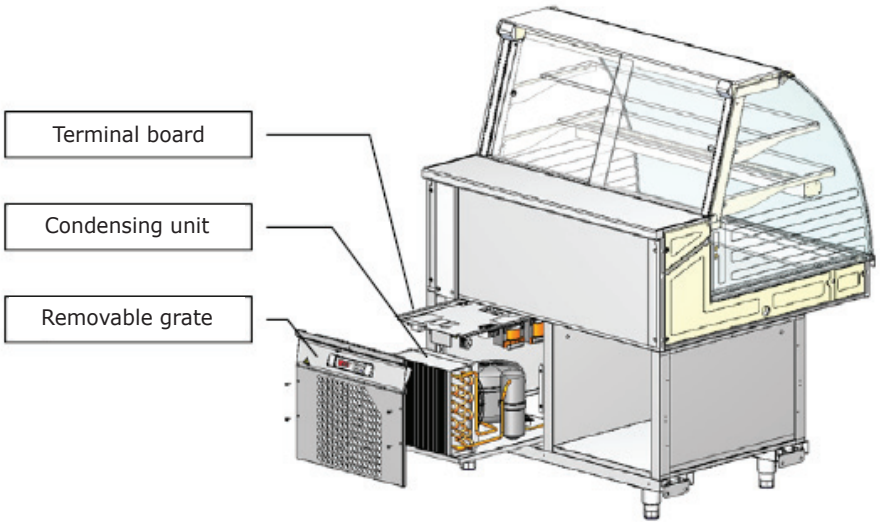
BASES			
N°	**DESCRIPTION**	**N°**	**DESCRIPTION**
28	Flexible pipe for condense outlet	34	Cell evaporator
29	Control panel	35	Cell panel
30	Condensing unit	36	Insulated cell
31	Boxed base in plasticised sheet	37	Cell bottom grate
32	Foot adjustable in height	38	Cell drain outlet
33	Condense drain outlet (PVC ø 32)		

11. TERMINAL BOARD COMPONENTS



POSITION	COMPONENT	DESCRIPTION
1	BOX PA 104	Junction box with clamps: L - N - G (phase, neutral and earth for the display cabinet main power supply) 1 - 2 (for the condensing unit power supply)
2	RELAY 1	Relay for solenoid valve control for the refrigerated tank
3	RELAY 2	Relay for solenoid valve control for the reserve cell
4	CONTROL UNIT CONNECTOR	Connector for cable extension of electronic control unit
5	POTENTIOMETER	If provided, regulates the voltage of the fans to vary ventilation ATTENTION! NEVER BRING VOLTAGE BELOW 190 VOLTS
6	TRANSFORMER	Transformer for side glass power supply (IN 230V, OUT 0-12/0-16)
7	VALVES CONNECTOR	Connector for the two solenoid valves power supply (display cabinet and reserve)
8	LIGHT CONNECTOR	Connector for T5 lamps power supply (the feeder is on the ceiling light)
9	MAIN CONNECTOR	Connector for hot wires, side glass heating and internal vents power supply
10	FILTER	Double cell 230V 10A interference prevention filter

N.B.: In case the reserve cell is not present, there is only one relay (2) which directly controls the power supply of the condensing unit. Therefore, the solenoid valves are no longer present and the "valves connector" (7) is missing.

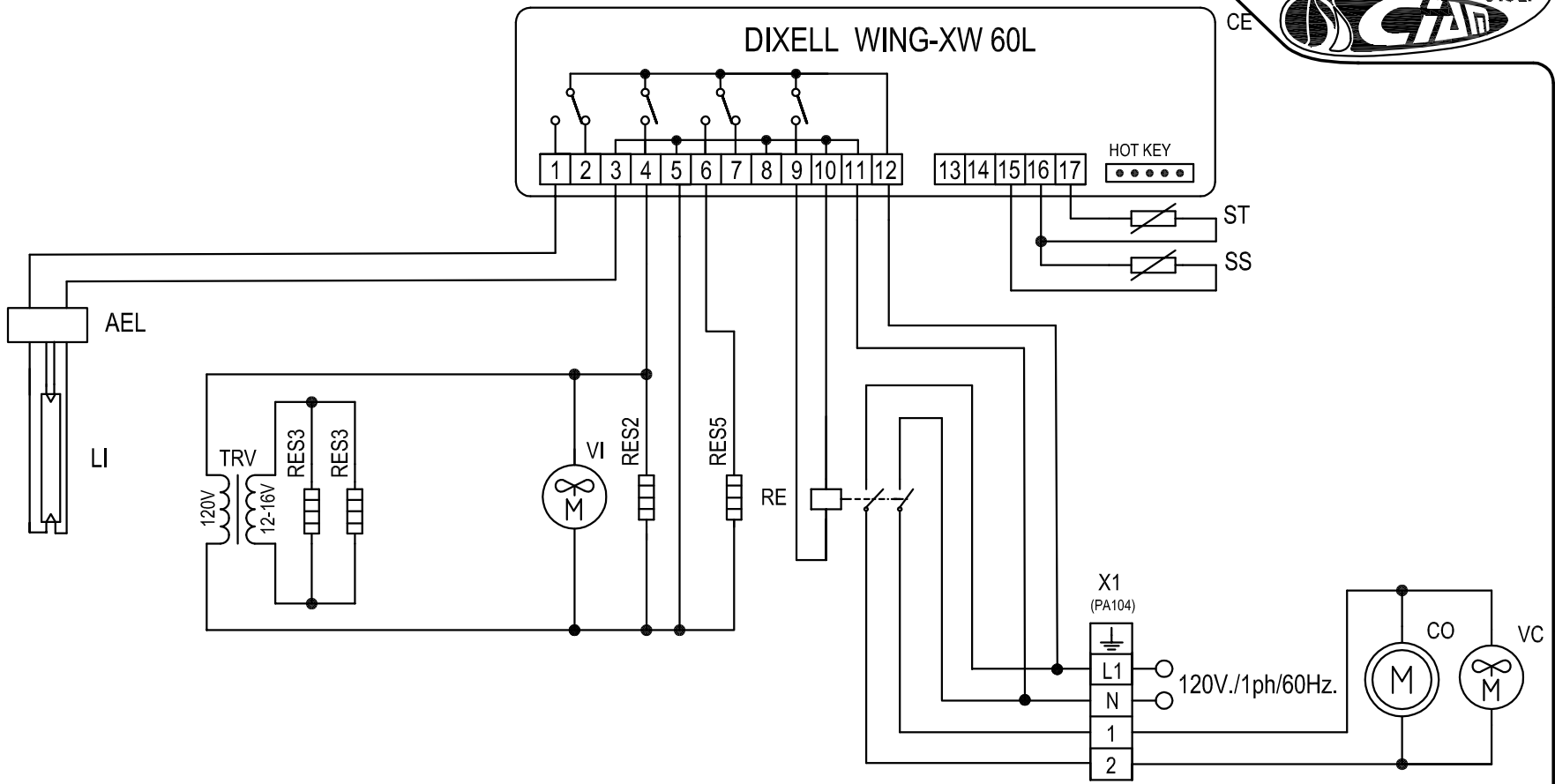


N.B.: once the steel grate has been removed, both the terminal board and the condensing unit can slide towards the operator without impediment, making any type of intervention extremely easy.

REFRIGERATION AND ELECTRICAL SYSTEM CABLE CONNECTION GUIDE

AGD	DIGITAL FLAVOURS DISPLAY FEEDER
AEL	ELECTRONIC BALLAST
AP	SERVICE VALVE
CA	SUPPLY CABLE
CAR	AIR CONDENSER
CE	ELECTRONIC CONTROL
CN	MULTIPOLAR CONNECTOR
CO	COMPRESSOR
D	DIOD
DEV	SHUNT
DR	REMOTE DISPLAY
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
LIP	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-THERMIC 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	DEFROST HEATING ELEMENT
RES6	WATER EVAPORATION HATING 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/DOOR 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	DEFROSTING WATER DRAIN HEATING ELEMENT
RES19	RING FRAME HEATING ELEMENT
RES20	SIDE BAND HEATING ELEMENT
RES21	SUCTION AIR GLASS HEATING ELEMENT
RES22	OUTLET AIR HEATING ELEMENT
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 DOORS HEATING ELEMENTS
RES33	WATER DRAIN HEATING ELEMENT
RES34	DOORS FRAME HEATING ELEMENT
RES35	COMPRESSOR CRANKCASE HEATING ELEMENT
RES36	FRONT GLASS FRAME HEATING ELEMENT
RES37	CABINET FRAME HEATING ELEMENT
RES38	HOT COMPARTMENT HEATING ELEMENT
REV	CONDENSER FAN SPEED CONTROL
REVC	CONDENSER FAN RELAY
RI	REFRIGERANT TAP
RIC	COMPRESSOR DELAYER
RICV	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
SL	LIQUID SEPARATOR
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 REGRIGERATOR THERMOSTAT
TRA	TRANSFORMER
TRC	ELECTRONIC CONTROL TRANSFORMER
TREV	WATER EVAPORATION HEATER ELEMENT THERMOSTAT
TS	SECURITY THERMOSTAT
TVC	CONDENSER FAN THERMOSTAT
V	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 REGUTATION VALVE
VS	GENERAL USE SOLENOID VALVE
VSA	SOLENOID WATER VALVE
VSAB	BY-PASS SOLENOID WATER VALVE
VSIC	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

nati per il freddo



WARNING !

BEFORE ANY MAINTENANCE OPERATION DISCONNECT THE ELECTRICAL SUPPLY OF THE CABINET BY OPENING THE MAIN SWITCH

NOTE :

- THE HATER "RES4" (HEATED FRONT GLASS) IS ONLY PRESENT WITH "C2" FRONT GLASS
- THE COMPONENTS MARKED (*) ARE OPTIONALS

Design & Tecnologia su misura

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Rugosità - Ra 3,2

QUOTE SENZA INDICAZIONE DI TOLLERANZA - Grado di precisione medio UNI 5307

0÷6 ±0,06	6÷30 ±0,1	30÷120 ±0,15	120÷315 ±0,2	315÷1000 ±0,3	1000÷2000 ±0,5	3÷6 ±1°	6÷30 e 30'	30÷120 e 20'	oltre 120 e 10'	Smussi e Raggi 0,3÷0,8

TRATT. SUPERFICIALE
Togliere Bavature
Toll. generali vedi tabella

REV.	DATA	DESCRIZIONE	VERIFICA	APPROVAZIONE
0	21/07/06	EMISSIONE		

DENOMINAZIONE
Wiring diagram (electronic control)
Refrigerated ventilated showcase V7FV-V9FV(Internal/remote,single phase,cond. unit)

SCALA

MATERIALE	Q.tà
FINITURA	Peso (Kg)

DESIGNER Mattiacci Franco

DATA 21/07/06

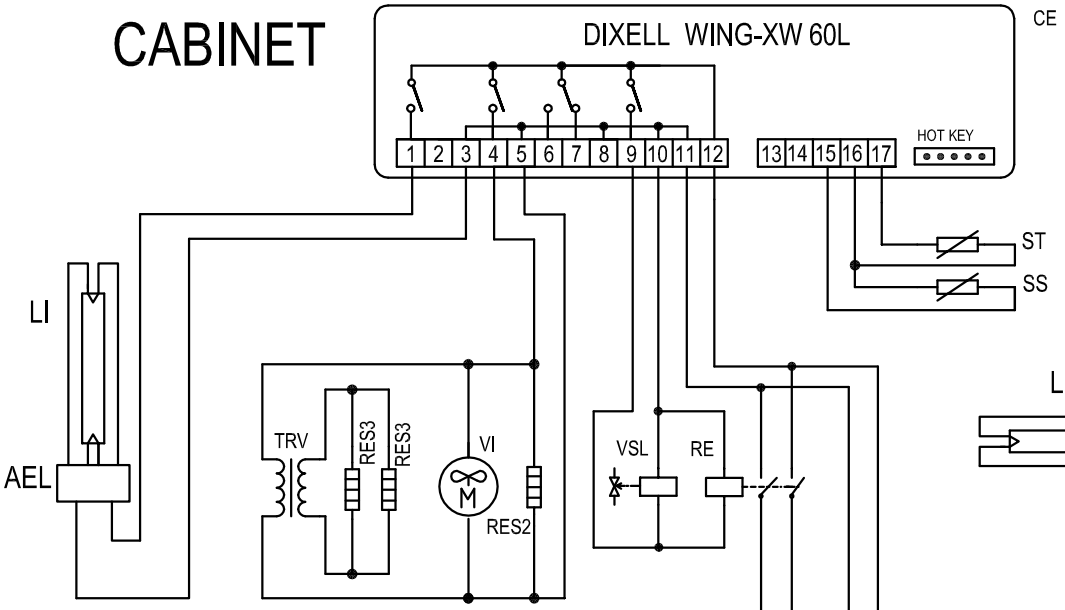
P / N
SEF 154-05-ENG

FOGLIO

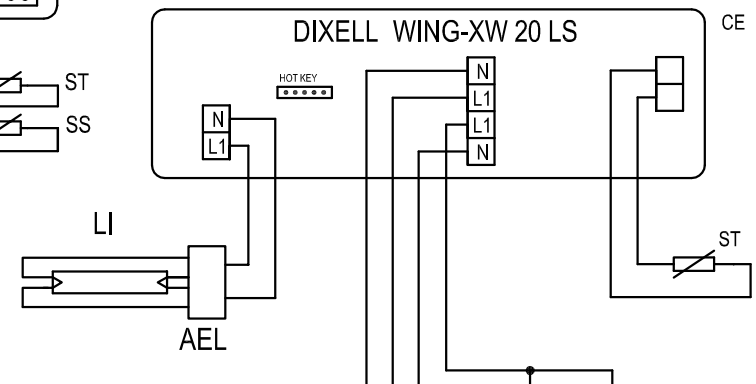
Certified Quality System ISO 9001:2000

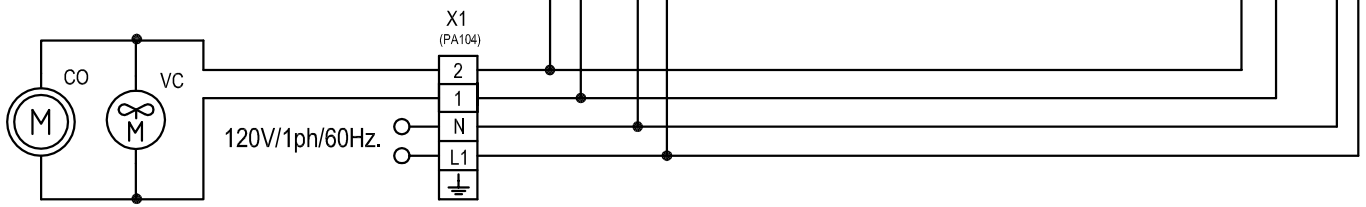
Design & Tecnologia su misura

CABINET



STORAGE





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Rugosità - Ra 3,2

QUOTE SENZA INDICAZIONE DI TOLLERANZA - Grado di precisione medio UNI 5307

0÷6	6÷30	30÷120	120÷315	315÷1000	1000÷2000	3÷6	6÷30	30÷120	oltre 120	Smussi e Raggi
±0,06	±0,1	±0,15	±0,2	±0,3	±0,5	±1°	e 30'	e 20'	e 10'	0,3÷0,8

TRATT. SUPERFICIALE
Togliere Bavature
Toll. generali vedi tabella

REV.	DATA	DESCRIZIONE	VERIFICA	APPROVAZIONE
0	28/04/05	EMISSION		

DENOMINAZIONE: Electrical Wiring Diagram
Ventilated showcase with storage

SCALA

MATERIALE	Q.tà
FINITURA	Peso (Kg)

DESIGNER: Pascolini
DATA: 28/04/05

P / N: SEF 164-05_ETL

FOGLIO

Certified Quality System ISO 9001:2000

Digital controller for medium-low temperature refrigeration applications

XW60L

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.

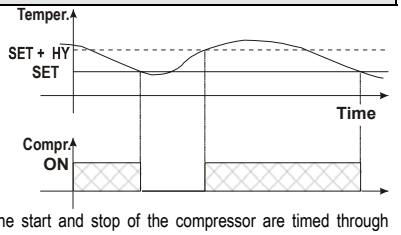
2. GENERAL DESCRIPTION

Model **XW60L**, format 38x185mm, is microprocessor based controller, suitable for applications on medium or low temperature ventilated refrigerating units. It has 4 relay outputs to control compressor, fan, defrost, which can be either electrical or reverse cycle (hot gas) and light (configurable). It could be 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. It is also provided with up to four NTC or PTC probe inputs, the first one for temperature control, the second one, to be located onto the evaporator, to control the defrost termination temperature and to managed the fan. One of the 2 digital inputs can operate as third temperature probe. The fourth probe is used to signal the condenser temperature alarm or to display a temperature.
The HOT KEY output allows to connect the unit, by means of the external module 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 "**COn**" and "**COF**".

3.2 DEFROST

Two defrost modes are available through the "**tdF**" parameter: defrost through electrical heater (**tdF = EL**) and hot gas defrost (**tdF = in**).
The defrost interval depends on the presence of the RTC (optional). If the RTC is present is controlled by means of parameter "**EdF**":
- with EdF=in the defrost is made every "**IdF**" time – standard way for controller without RTC.
- 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;

Other parameters are used to control defrost cycles: its maximum length (MdF) and two defrost modes: timed or controlled by the evaporator's probe (P2P).
At the end of defrost dripping time is started, its length is set in the Fdt parameter. With Fdt =0 the dripping time is disabled.

3.3 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the "**FnC**" parameter:
FnC = C_n: fans will switch ON and OFF with the compressor and **not run** during defrost;
FnC = o_n fans will run even if the compressor is off, and not run during defrost;
After defrost, there is a timed fan delay allowing for drip time, set by means of the "**Fnd**" parameter.
FnC = C_Y fans will switch ON and OFF with the compressor and **run** during defrost;
FnC = o_Y fans will run continuously also during defrost

An additional parameter "**FSt**" provides the setting of temperature, detected by the evaporator probe, above which the fans are always OFF. This is used to make sure circulation of air only if his temperature is lower than set in "FSt".

3.3.1 Forced activation of fans

This function managed by the **Fct** parameter is designed to avoid short cycles of fans, that could happen when the controller is switched on or after a defrost, when the room air warms the evaporator. **Functioning:** if the difference of temperature between the evaporator and the room probes is more than the value of the Fct parameter, the fans are switched on. With Fct=0 the function is disabled.

3.3.2 Cyclical activation of the fans with compressor off.

When Fnc = c-n or c-Y (fans in parallel to the compressor), by means of the Fon and FoF parameters the fans can carry out on and off cycles even if the compressor is switched off. When the compressor is stopped the fans go on working for the Fon time. With Fon =0 the fans remain always off, when the compressor is off.

3.4 LIGHT RELAY CONFIGURATION

The functioning of the auxiliary relay (terminals. 1-3) can be set by the **oA3** parameter, according to the kind of application. In the following paragraph the possible setting:

3.4.1 Auxiliary thermostat

I.E.. anti condensing heater) with the possibility of switching it on and off also by keyboard

Parameters involved:
- **ACH** Kind of regulation for the auxiliary relay: **Ht:** heating; **cL:** cooling;
- **SAA** Set point for auxiliary relay
- **SHy** Differential for auxiliary relay
- **ArP** Probe for auxiliary relay
- **Sdd** Auxiliary output off during defrost

By means of these 5 parameters the functioning of the auxiliary relay can be set.. The differential is given by the **SHy** parameter.
The auxiliary relay can be switched on also by the AUX button. In this case it remains on till it's manually switched off.

NOTE: Set **oA3 =AUS** and **ArP= nP** (no probe for auxiliary output).
In this case the relay 1-3 can be activated only by digital input with i1F or i2F = AUS.

3.4.2 On/off relay – oA3 = onF

In this case the relay is activated when the controller is turned on and de-activated when the controller is turned off.

3.4.3 Neutral zone regulation

With **oA3 = db** the relay 1-3 can control a heater element to perform a neutral zone action.
oA3 cut in = SET-HY
oA3 cut out = SET

3.4.4 Second compressor

With **oA3 = CP2,** the relay 1-3 operates as second compressor: it is activated in parallel with the relay of the first compressor, with a possible delay set in the **AC1** parameter. Both the compressors are switched off at the same time.

3.4.5 Alarm relay

With **oA3 = ALr** the relay 1-3 operates as alarm relay. It is activated every time an alarm happens. Its status depends on the **tbA** parameter: if "**tbA = y**", the relay is silenced by pressing any key.
If "**tbA** = **n**", the alarm relay remains on until the alarm condition recovers.

3.4.6 Night blind management during energy saving cycles

With **oA3 = HES,** the relay 1-3 operates to manage the night blind: the relay is energised when the energy saving cycle is activated , by digital input, frontal button or RTC (optional)

4. FRONT PANEL COMMANDS

4.1 STANDARD FRONTAL PANEL

4.2 STEEL FINISHING

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

(DEF) To start a manual defrost

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

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

To switch the instrument off, if onF = oFF.

To switch the light, if oA3 = Lig.

KEY COMBINATIONS:

+ To lock & unlock the keyboard.

SET + ▼ To enter in programming mode.

SET + ▲ To return to the room temperature display.

4.3 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
❄	ON	Compressor enabled
❄	Flashing	Anti-short cycle delay enabled
❄	ON	Defrost enabled
❄	Flashing	Drip time in progress
	ON	Fans enabled
	Flashing	Fans delay after defrost in progress.
	ON	An alarm is occurring
	ON	Continuous cycle is running
	ON	Energy saving enabled
	ON	Light on
AUX	ON	Auxiliary relay on
°C/°F	ON	Measurement unit
°C/°F	Flashing	Programming phase

5. MAX & MIN TEMPERATURE MEMORIZATION

5.1 HOW TO SEE THE MIN TEMPERATURE

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

5.2 HOW TO SEE THE MAX TEMPERATURE

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

5.3 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

1. Hold press the SET key for more than 3s, while the max. or min temperature is displayed. (rSt message will be displayed)
2. 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 (ONLY FOR INSTRUMENTS WITH RTC)

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

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

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

6.2 HOW TO SEE THE SET POINT

SET

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 SET POINT

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 (only for controller with RTC): 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.

P2P Evaporator probe presence: n= not present: the defrost stops by time; **y=** present: the defrost stops by temperature.

OE Evaporator probe calibration: (-12.0÷12.0°C; -120÷120°F). allows to adjust possible offset of the evaporator probe.

P3P Third probe presence (P3): n= not present:, the terminals 13-14 operate as digital input.; **y=** present:, the terminals 13-14 operate 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.

AC1 2nd compressor delay at start up (0÷255s) Used only if oA3 = cP2 Time interval between the switching on of the first compressor and the second one.

rtr Percentage of the second and first probe for regulation (0÷100; 100 = P1, 0 = P2): it allows to set the regulation according to the percentage of the first and second probe, as for the following formula (rtr(P1-P2)/100 + P2).

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.

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

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.

Lod Instrument display: (P1; P2, P3, P4, SET, dtr): it selects which probe is displayed by the instrument: **P1** = Thermostat probe; **P2** = Evaporator probe; **P3** = Third probe(only for model with this option enabled); **P4** = Fourth probe, **SET** = set point; **dtr** = percentage of visualization.

rEd X- REP display (*optional*): (P1; P2, P3, P4, SET, dtr): it selects which probe is displayed by X- REP: **P1** = Thermostat probe; **P2** = Evaporator probe; **P3** = Third probe(only for model with this option enabled); **P4** = Fourth probe, **SET** = set point; **dtr** = percentage of visualization.

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

dtr Percentage of the second and first probe for visualization when Lod = dtr (0÷100; 100 = P1, 0 = P2): if Lod = dtr it allows to set the visualization according to the percentage of the first and second probe, as for the following formula (dtr(P1-P2)/100 + P2).

DEFROST

EdF Defrost mode (only for controller with RTC):
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.

tdF Defrost type: EL = electrical heater; in = hot gas

dFP Probe selection for defrost termination: nP = no probe; **P1** =thermostat probe; **P2 =** evaporator probe; **P3** =configurable probe; **P4** = Probe on Hot Key plug.

dtE Defrost termination temperature: (-50÷50 °C/ -58÷122°F) (Enabled only when EdF=Pb) sets the temperature measured by the evaporator probe, which causes the end of defrost.

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: timed defrost) it sets the defrost duration, when **P2P = y** (defrost end based on temperature) it sets the maximum length for defrost.

dSd Start defrost delay: (0÷99min) This is useful when different defrost start times are necessary to avoid overloading the plant.

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.

Fdt Drip time: (0÷120 min) time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.

dPo First defrost after start-up: (y = immediately; n = after the IdF time)

dAF Defrost delay after continuous cycle: (0÷23.5h) time interval between the end of the fast freezing cycle and the following defrost related to it.

FANS

FnC Fans operating mode: **C-n**= runs with the compressor, OFF during defrost;
o-n = continuous mode, OFF during defrost;
C-Y = runs with the compressor, ON during defrost;
o-Y = continuous mode, ON during defrost;

Fnd Fans delay after defrost: (0÷255min) Interval between end of defrost and evaporator fans start.

Fct Temperature differential avoiding short cycles of fans (0÷59°C; Fct=0 function disabled). If the difference of temperature between the evaporator and the room probes is more than the value of the Fct parameter, the fans are switched on.

FSt Fans stop temperature: (-50÷50°C/122°F) setting of temperature, detected by evaporator probe, above which fans are always OFF.

Fon Fan ON time: (0÷15 min) **with** Fnc = C_n or C_y, (fan activated in parallel with compressor). it sets the evaporator fan ON cycling time when the compressor is off. With Fon =0 and FoF ≠ 0 the fan are always off, with Fon=0 and FoF =0 the fan are always off.

FoF Fan OFF time: (0÷15 min) **with** Fnc = C_n or C_y, (fan activated in parallel with compressor). it sets the evaporator fan off cycling time when the compressor is off. With Fon =0 and FoF ≠ 0 the fan are always off, with Fon=0 and FoF =0 the fan are always off.

FAP Probe selection for fan management: nP = no probe; **P1** =thermostat probe; **P2 =** evaporator probe; **P3** =configurable probe; **P4** = Probe on Hot Key plug.

AUXILIARY THERMOSTAT CONFIGURATION (terms. 1-3) – OA3 = AUS

ACH Kind of regulation for auxiliary relay: **Ht** = heating; **CL** = cooling

SAA Set Point for auxiliary relay: (-50,0÷110,0°C; -58÷230°F) it defines the room temperature set point to switch auxiliary relay.

SHy Differential for auxiliary output: (0,1 ÷ 25,5°C / 1÷255 °F) Intervention differential for auxiliary output set point.
With ACH = cL AUX Cut in is SAA + SHy; . AUX Cut out is SAA
With ACH = Ht AUX Cut in is SAA - SHy; . AUX Cut out is SAA

ArP Probe selection for auxiliary: nP = no probe, the auxiliary relay is switched only by button; **P1 =** Probe 1 (Thermostat probe); **P2 =** Probe 2 (evaporator probe); **P3 =** Probe 3 (display probe); **P4 =** Probe 4 fourth probe.

Sdd Auxiliary relay off during defrost: n = the auxiliary relay operates during defrost.
y = the auxiliary relay is switched off during defrost.

ALARMS

ALP Probe selection for alarm: nP = no probe, the temperature alarms are disabled; **P1 =** Probe 1 (Thermostat probe); **P2 =** Probe 2 (evaporator probe); **P3 =** Probe 3 (display probe); **P4 =** Fourth probe.

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/ fan recovery: (0,1÷25,5°C; 1÷45°F) Intervention differential for recovery of temperature alarm. It's also used for the restart of the fan when the FSt temperature is reached

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 start-up: (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

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.

AUXILIARY RELAY

tbA Alarm relay silencing (with oA3 =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

oA3 Fourth relay configuration (1-3): dEF, FAn: do not select it!. **ALr**: alarm; **Lig**: light; **AuS**: Auxiliary relay; **onF**: always on with instrument on; **db=** neutral zone; **cP2 =** second compressor; **dEF2:** do not select it!;. **HES:**. night blind

AoP Alarm relay polarity: it set if the alarm relay is open or closed when an alarm happens. **CL**= terminals 1-3 closed during an alarm; **oP** = terminals 1-3 open during an alarm

DIGITAL INPUTS

i1P Digital input polarity (13-14): oP: the digital input is activated by opening the contact; **CL:** the digital input is activated by closing the contact.

i1F Digital input configuration (13-14): 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**=not enabled; **Htr**= kind of action inversion (cooling – heating); **FAn= not set it; ES**= Energy saving; **HdF** = Holiday defrost (enable only with RTC); **onF =** to switch the controller off.

did (0÷255 min) **with i1F= EAL or i1F = bAL digital input alarm delay (13-14):** 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.

i2P 2nd digital input polarity (13-19): oP: the digital input is activated by opening the contact; **CL:** the digital input is activated by closing the contact.

i2F 2nd digital input configuration (13-19): 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**=not enabled; **Htr**= kind of action inversion (cooling – heating); **FAn= not set it; ES**= Energy saving; **HdF** = Holiday defrost (enable only with RTC); **onF =** to switch the controller off.

d2d (0÷255 min) **with i2F= EAL or i2F= bAL 2nd digital input alarm delay (13-19):** delay between the detection of the external alarm condition and its signalling.
with i2F= dor: door open signalling delay
with i2F= 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 and fan status when open door: no = normal; **Fan** = Fan OFF; **CPr** = Compressor OFF; **F_C** = Compressor and fan 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) it sets the increasing value of the set point during the Energy Saving cycle.

TO SET CURRENT TIME AND WEEKLY HOLIDAYS (ONLY FOR MODELS WITH RTC)

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 (ONLY FOR MODELS WITH RTC)

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 (ONLY FOR MODELS WITH RTC)

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. :<u>To disable a defrost cycle set it to "nu"(not used).</u> ***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
dP2 Evaporator probe display
dP3 Third probe display- ***optional***.
dP4 Fourth probe display.
rSE Real set point: 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 INPUTS

The first digital input 13-14 is enabled with P3P = n.
With P3P = n and i1F = i2F the second digital input is disabled
The free voltage digital inputs are programmable by the "**i1F**" and i2F parameters.

8.1 GENERIC ALARM (i1F or i2F = 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.

8.2 SERIOUS ALARM MODE (i1F or i2F = 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.

8.3 PRESSURE SWITCH (i1F or i2F = 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.**

8.4 DOOR SWITCH INPUT (i1F or i2F = dor)

It signals the door status and the corresponding relay output status through the "**odc**" parameter: **no** = normal (any change); **Fan** = Fan OFF; **CPr** = Compressor OFF; **F_C** = Compressor and fan 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.

8.5 START DEFROST (i1F or i2F = dEF)

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 SWITCH THE AUXILIARY RELAY (i1F or i2F = AUS)

With oA3 = AUS the digital input switched the status of the auxiliary relay

8.7 INVERSION OF THE KIND OF ACTION: HEATING-COOLING (i1F or i2F=Htr)

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

8.8 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.

8.9 HOLIDAY DEFROST (i1F or i2F = HDF) –ONLY FOR MODELS WITH RTC

This function enabled the holiday defrost setting.

8.10 ON OFF FUNCTION (i1F or i2F = onF)

To switch the controller on and off.

8.11 DIGITAL INPUTS POLARITY

The digital input polarity depends on the "**i1P**" and **"i2P"** parameters.
i1P or i2P =CL: the input is activated by closing the contact.
i1P or i2P=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

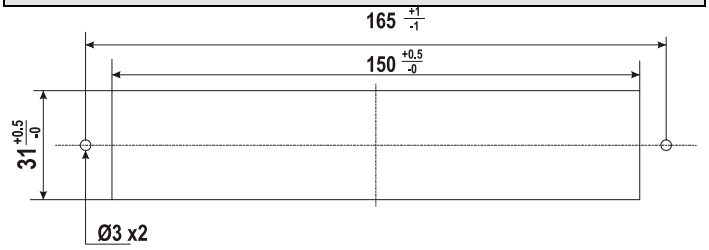
As optional, an X-REP can be connected to the instrument, trough the dedicated connector.

To connect the X-REP to the instrument the following connectors must be used CAB/REP1(1m), CAB/REP2 (2m), CAB/REP5 (5m),

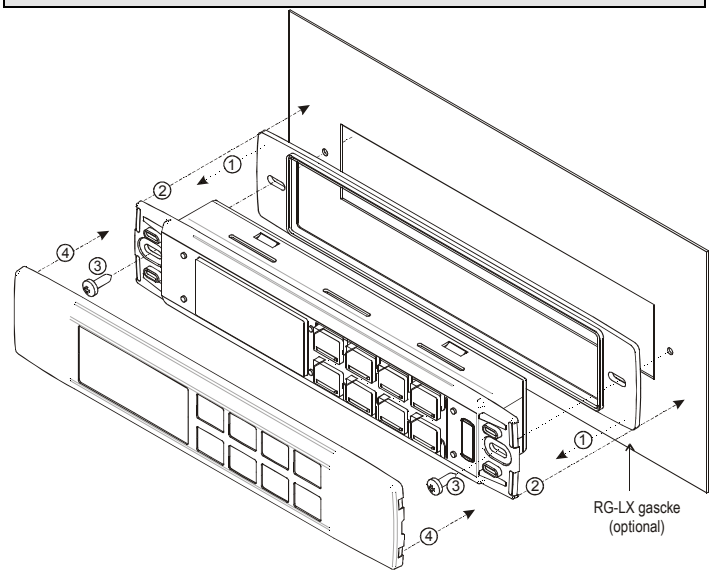
11. INSTALLATION AND MOUNTING

The controller **XW60L**, shall be mounted on vertical panel, in a 150x31 mm hole, and fixed using two screws ∅ 3 x 2mm. To obtain an IP65 protection grade use the front panel rubber gasket (mod. RG-L). 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 the air circulate by the cooling holes.

11.1 CUT OUT



11.2 STEEL FINISHING MOUNTING



12. 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.

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.

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 ▲ 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 ▲ 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

Message	Cause	Outputs
"P1"	Room probe failure	Compressor output acc. to par. "Con" and "COF"
"P2"	Evaporator probe failure	Defrost end is timed
"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

Message	Cause	Outputs
"LA2"	Condenser low temperature	It depends on the "bLL" parameter
"dA"	Door open	Compressor and fans restarts
"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 SILENCING BUZZER / ALARM RELAY OUTPUT

If "**tbA = y**", the buzzer and the relay are is silenced by pressing any key.
If "**tbA = n**", only the buzzer is silenced while the alarm relay is on until the alarm condition recovers.

14.2 ALARM RECOVERY

Probe alarms **P1**", "**P2",** "**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.

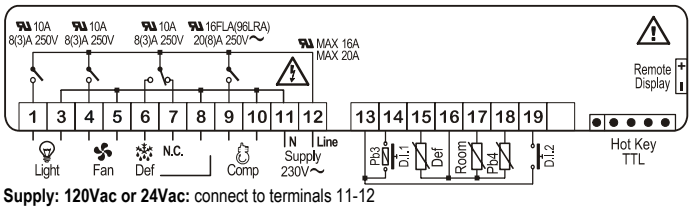
14.3 OTHER MESSAGES

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

15. TECHNICAL DATA

Housing: self extinguishing ABS.
Case: facia 38x185 mm; depth 76mm
Mounting : panel mounting in a 150x31 mm panel cut-out with two screws. ∅ 3 x 2mm.
Distance between the holes 165mm
Protection: IP20; **Frontal protection:** IP65 with frontal gasket mod RG-L. (optional)
Connections: Screw terminal block ≤ 2,5 mm² heat-resistant wiring and 6,3mm Faston
Power supply: 230Vac or. 110Vac or 24Vac ± 10%
Power absorption: 5VA max.
Display: 3 digits, red LED, 14,2 mm high.
Display: 3 digits, red LED, 14,2 mm high; **Inputs**: Up to 4 NTC or PTC probes.
Digital inputs: 2 free voltage
Relay outputs: ***Total current on loads MAX. 20A***
compressor: relay SPST 20(8) A, 250Vac
light: relay SPST 8 or 16(3) A, 250Vac
fans: relay SPST 8(3) A, 250Vac
defrost: relay SPST 8(3) A, 250Vac
Other output : buzzer (optional)
Serial output : TTL standard; **Communication protocol:** Modbus - RTU
Data storing: on the non-volatile memory (EEPROM).
Internal clock back-up: 24 hours (only for model with RTC)
Kind of action: 1B; **Pollution grade:** 2;**Software class:** A.;
Rated impulsive voltage: 2500V; **Over voltage 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



Supply: 120Vac or 24Vac: connect to terminals 11-12
The X-REP output is optional
The light relay can be also 16(5)A according to the model

17. DEFAULT SETTING VALUES

Label	Name	Range	°C/°F	Level
Set	Set point	LS÷US	-5.0	- - -
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
P2P	Evaporator probe presence	n=not present; Y=pres.	Y	Pr1
OE	Evaporator probe calibration	-12÷12°C /-120÷120°F	0.0	Pr2
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
Ac1	Second compressor start delay	0÷255s	5	Pr2
rtr	P1-P2 percentage for regulation	0 ÷ 100 (100=P1 , 0=P2)	100	Pr2
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)	-5	Pr2
COn	Compressor ON time with faulty probe	0 ÷ 255 min	15	Pr2
COF	Compressor OFF time with faulty probe	0 ÷ 255 min	30	Pr2
CF	Temperature measurement unit	°C ÷ °F	°C	Pr2
rES	Resolution	in=integer; dE= dec.point	dE	Pr1
Lod	Probe displayed	P1;P2	P1	Pr2
rEd²	X-REP display	P1 – P2 – P3 – P4 – SEt – dtr	P1	Pr2
dLy	Display temperature delay	0 ÷ 20.0 min (10 sec.)	0.0	Pr2
dtr	P1-P2 percentage for display	1 ÷ 99	50	Pr2
EdF*	Kind of interval for defrost	rtc ÷in	in	Pr2
tdF	Defrost type	EL=el. heater; in= hot gas	EL	Pr1
dFP	Probe selection for defrost termination	nP; P1; P2; P3; P4	P2	Pr2
dtE	Defrost termination temperature	-50 ÷ 50 °C	8	Pr1
IdF	Interval between defrost cycles	1 ÷ 120 ore	6	Pr1
MdF	(Maximum) length for defrost	0 ÷ 255 min	30	Pr1
dSd	Start defrost delay	0÷99min	0	Pr2
dFd	Displaying during defrost	rt, it, SEt, DEF	it	Pr2
dAd	MAX display delay after defrost	0 ÷ 255 min	30	Pr2
Fdt	Draining time	0÷120 min	0	Pr2
dPo	First defrost after start-up	n=after IdF; y=immed.	n	Pr2
dAF	Defrost delay after fast freezing	0 ÷ 23h e 50'	0.0	Pr2
Fnc	Fan operating mode	C-n, o-n, C-y, o-Y	o-n	Pr1
Fnd	Fan delay after defrost	0÷255min	10	Pr1
Fct	Differential of temperature for forced activation of fans	0÷50°C	10	Pr2
FSt	Fan stop temperature	-50÷50°C/-58÷122°F	2	Pr1
Fon	Fan on time with compressor off	0÷15 (min.)	0	Pr2
FoF	Fan off time with compressor off	0÷15 (min.)	0	Pr2
FAP	Probe selection for fan management	nP; P1; P2; P3; P4	P2	Pr2
ACH	Kind of action for auxiliary relay	CL; Ht	cL	Pr2
SAA	Set Point for auxiliary relay	-50,0÷110°C / -58÷230°F	0,0	Pr2
SHy	Differential for auxiliary relay	0,1÷25.5°C/ 1÷ 255°F	2,0	Pr2
ArP	Probe selection for auxiliary relay	nP / P1 / P2 / P3/P4	nP	Pr2
Sdd	Auxiliary relay operating during defrost	n÷y	n	Pr2
ALP	Alarm probe selection	nP; P1; P2; P3; P4	P1	Pr2
ALc	Temperat. alarms configuration	rE= related to set; Ab = absolute	Ab	Pr2
ALU	MAXIMUM temperature alarm	Set÷110.0°C; Set÷230°F	110,0	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)	2,0	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
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
oA3	Fourth relay configuration	ALr = alarm; dEF = do not select it; Lig =Light; AUS =AUX; onF=always on; Fan= do not select it; db = neutral zone; cP2 = second compressor; dF2 = do not select it; HES = night blind	Lig	Pr2
AoP	Alarm relay polarity (oA3=ALr)	oP; cL	cL	Pr2
i1P	Digital input polarity (13-14)	oP=opening;CL=closing	cL	Pr1
i1F	Digital input 1 configuration (13-14)	EAL, bAL, PAL, dor; dEF; Htr, AUS	dor	Pr1
did	Digital input alarm delay (13-14)	0÷255min	15	Pr1
i2P	Digital input polarity (13-19)	oP=opening;CL=closing	cL	Pr2
i2F	Digital input configuration (13-19)	EAL, bAL, PAL, dor; dEF; Htr, AUS	EAL	Pr2
d2d	Digital input alarm delay (13-19)	0÷255min	5	Pr2
Nps	Number of activation of pressure switch	0 ÷15	15	Pr2
odc	Compress and fan status when open door	no; Fan; CPr; F_C	F-c	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

Label	Name	Range	°C/°F	Level
Ld1*	1st workdays defrost start	0 ÷ 23h 50 min. - nu	6.0	rtc
Ld2*	2nd workdays defrost start	0 ÷ 23h 50 min. - nu	13.0	rtc
Ld3*	3rd workdays defrost start	0 ÷ 23h 50 min. - nu	21.0	rtc
Ld4*	4th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Ld5*	5th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Ld6*	6th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd1*	1st holiday defrost start	0 ÷ 23h 50 min. - nu	6.0	rtc
Sd2*	2nd holiday defrost start	0 ÷ 23h 50 min. - nu	13.0	rtc
Sd3*	3rd holiday defrost start	0 ÷ 23h 50 min. - nu	21.0	rtc
Sd4*	4th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd5*	5th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd6*	6th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Adr	Serial address	1÷247	1	Pr2
PbC	Kind of probe	Ptc; ntc	ntc	Pr2
onF	on/off key enabling	nu, oFF; ES	oFF	Pr2
dP1	Room probe display	--	-	Pr2
dP2	Evaporator probe display	--	-	Pr2
dP3	Third probe display	--	-	Pr2
dP4	Fourth probe display	--	-	Pr2
rSE	Real set	actual set	-	Pr2
rEL	Software release	--	1.8	Pr2
Ptb	Map code	--		Pr2

*** Only for model with real time clock**

[2] Only for XW60L with X-REP output

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Digital controller with off cycle defrost
XW20LS

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.

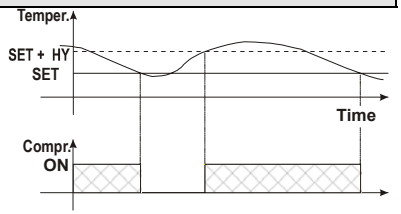
2. GENERAL DESCRIPTION

Model **XW20LS**, format 38x185mm, is a digital thermostat with off cycle defrost designed for refrigeration applications at normal temperature. It has 2 relay outputs to control compressor and light.. It could be 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. It is also provided with up to 2 NTC or PTC probe inputs, the first one for temperature control, the second one, to be located onto the evaporator and to control the defrost termination temperature. The digital input can operate as third temperature probe, to signal the condenser temperature alarm or to display a temperature.
The HOT KEY output allows to connect the unit, by means of the external module 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 "**COn**" and "**COF**".

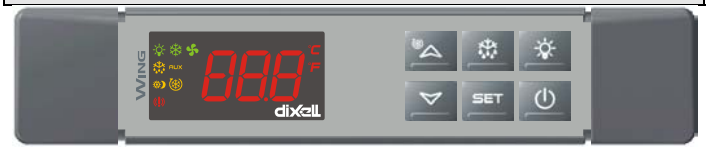
3.2 DEFROST

Defrost is performed through a simple stop of the compressor. The defrost interval depends on the presence of the RTC (optional). If the RTC is present is controlled by means of parameter "**EdF**":
- with EdF=in the defrost is made every "**IdF**" time – standard way for controller without RTC.
- 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;

Other parameters are used to control defrost cycles: its maximum length (MdF) and two defrost modes: timed or controlled by the evaporator's probe (P2P).

4. FRONT PANEL COMMANDS

4.1 STANDARD FRONTAL PANEL



4.2 STEEL FINISHING

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

(DEF) To start a manual defrost

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

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

To switch the instrument off.

To switch the light.

KEY COMBINATIONS:

UP + DOWN To lock & unlock the keyboard.

SET + DOWN To enter in programming mode.

SET + UP To return to the room temperature display.

4.3 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
❄	ON	Compressor enabled
❄	Flashing	Anti-short cycle delay enabled
❄	ON	Defrost enabled
❄	Flashing	Drip time in progress
	ON	An alarm is occurring
	ON	Continuous cycle is running
	ON	Energy saving enabled
	ON	Light on
°C/°F	ON	Measurement unit
°C/°F	Flashing	Programming phase

5. MAX & MIN TEMPERATURE MEMORIZATION

5.1 HOW TO SEE THE MIN TEMPERATURE

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

5.2 HOW TO SEE THE MAX TEMPERATURE

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

5.3 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

1. Hold press the SET key for more than 3s, while the max. or min temperature is displayed. (rSt message will be displayed)
2. 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 (ONLY FOR INSTRUMENTS WITH RTC)

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

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

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

6.2 HOW TO SEE THE SET POINT

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 SET POINT

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 (only for controller with RTC): 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.
P2P Evaporator probe presence: n= not present: **y=** present:
OE Evaporator probe calibration: (-12.0÷12.0°C; -120÷120°F). allows to adjust possible offset of the evaporator probe.
P3P Third probe presence (P3): n= not present:, the terminals operate as digital input.; **y=** present:, the terminals operate 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.
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.
rtr Percentage of the second and first probe for regulation (0÷100; 100 = P1, 0 = P2): it allows to set the regulation according to the percentage of the first and second probe, as for the following formula (rtr(P1-P2)/100 + P2).
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.
COn Compressor ON time with faulty probe: (0÷255 min) time during which the compressor is active in case of faulty thermostat probe. With COn=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.
Lod Instrument display: (P1; P2, P3, P4, SET, dtr): it selects which probe is displayed by the instrument: **P1** = Thermostat probe; **P2** = Evaporator probe; **P3** = Third probe(only for model with this option enabled); **P4** = NOT SET IT, **SET** = set point; **dtr** = percentage of visualization.
rEd X- REP display (*optional*): (P1; P2, P3, P4, SET, dtr): it selects which probe is displayed by X- REP: **P1** = Thermostat probe; **P2** = Evaporator probe; **P3** = Third probe(only for model with this option enabled); **P4** = NOT SET IT, **SET** = set point; **dtr** = percentage of visualization.
dLy Display delay: (0 ÷20.0m; resul. 10s) when the temperature increases, the display is updated of 1 °C/1°F after this time.
dtr Percentage of the second and first probe for visualization when Lod = dtr (0÷100; 100 = P1, 0 = P2): if Lod = dtr it allows to set the visualization according to the percentage of the first and second probe, as for the following formula (dtr(P1-P2)/100 + P2).

DEFROST

EdF Defrost mode (only for controller with RTC): 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.
dFP Probe selection for defrost termination: nP = no probe; **P1** =thermostat probe; **P2 =** evaporator probe; **P3** =configurable probe; **P4** = NOT SET IT.
dtE Defrost termination temperature: (-50÷50 °C/ -58÷122°F) (Enabled only when EdF=Pb) sets the temperature measured by the evaporator probe, which causes the end of defrost.
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: timed 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

ALP Probe selection for alarm: **nP** = no probe, the temperature alarms are disabled; **P1 =** Probe 1 (Thermostat probe); **P2 =** Probe 2 (evaporator probe); **P3 =** Probe 3 (display probe); **P4 =** NOT SET IT.
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 start-up: (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

AP2 Probe selection for temperature alarm of condenser: nP = no probe; **P1** =thermostat probe; **P2 =** evaporator probe; **P3** =configurable probe; **P4** = NOT SET IT.
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.

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**=not enabled; **Htr**= kind of action inversion (cooling – heating); **FAn= not set it; ES**= Energy saving; **HdF** = Holiday defrost (enable only with RTC); **onF =** to switch the controller off.
did (0÷255 min) **with i1F= EAL or i1F = bAL digital input alarm delay (1-3):** 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 (i1F= PAL).
If the nPS activation in the did time is reached, switch off and on the instrument to restart normal regulation.
odc Compressor status when open door: 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) it sets the increasing value of the set point during the Energy Saving cycle.

TO SET CURRENT TIME AND WEEKLY HOLIDAYS (ONLY FOR MODELS WITH RTC)

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 (ONLY FOR MODELS WITH RTC)

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 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 (ONLY FOR MODELS WITH RTC)

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**
dP2 **Evaporator probe display**
dP3 **Third probe display**- ***optional***.
rSE **Real set point:** 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 ONLY IF P3P = N)

8.1 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.

8.2 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.

8.3 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.**

8.4 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.

8.5 START DEFROST (i1F = dEF)

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 HOLIDAY DEFROST (i1F = HDF) –ONLY FOR MODELS WITH RTC

This function enabled the holiday defrost setting.

8.9 ON OFF FUNCTION (i1F = onF)

To switch the controller on and off.

8.10 DIGITAL INPUTS POLARITY

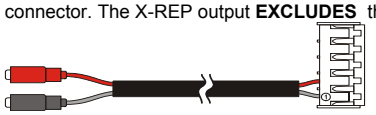
The digital input polarity depends on the "**i1P**" parameter.
i1P =CL: the input is activated by closing the contact.
i1P =OP: the input is activated by opening the contact

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, trough the HOY KEY connector. The X-REP output **EXCLUDES** the serial connection.

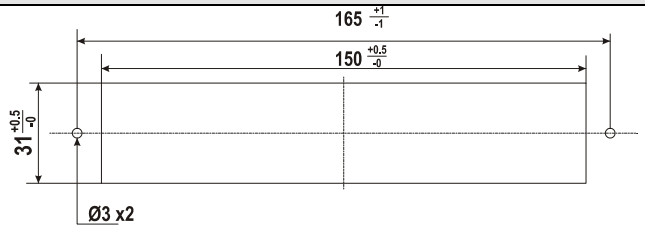


To connect the X-REP to the instrument the following connectors must be used CAB-51F(1m), CAB-52F(2m), CAB-55F(5m),

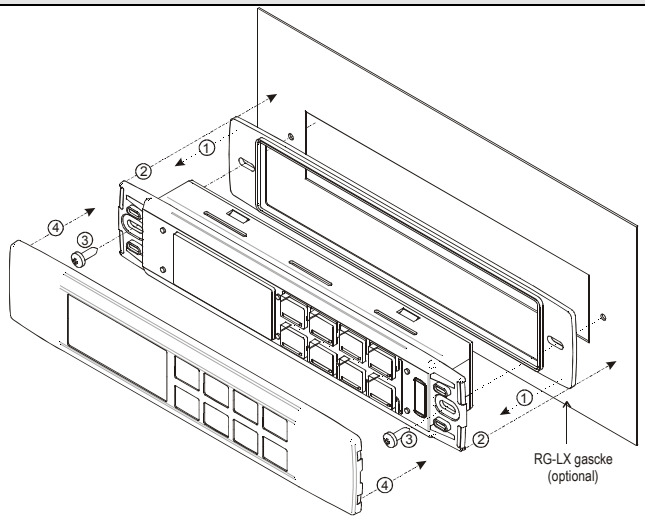
11. INSTALLATION AND MOUNTING

The controller **XW20LS**, shall be mounted on vertical panel, in a 150x31 mm hole, and fixed using two screws ∅ 3 x 2mm. To obtain an IP65 protection grade use the front panel rubber gasket (mod. RG-L). 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 the air circulate by the cooling holes.

11.1 CUT OUT



11.2 STEEL FINISHING MOUNTING



12. 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.

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.

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 ▲ 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 ▲ 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

Message	Cause	Outputs
"P1"	Room probe failure	Compressor output acc. to par. "Con" and "COF"
"P2"	Evaporator probe failure	Defrost end is timed
"P3"	Third 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 and fans restarts
"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 SILENCING BUZZER / ALARM RELAY OUTPUT

If "**tbA = y**", the buzzer and the relay are is silenced by pressing any key.
If "**tbA = n**", only the buzzer is silenced while the alarm relay is on until the alarm condition recovers.

14.2 ALARM RECOVERY

Probe alarms **P1**", "**P2",** "**P3**" 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.

14.3 OTHER MESSAGES

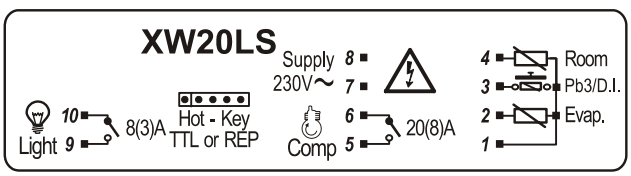
Pon	Keyboard unlocked.
PoF	Keyboard locked
noP	**In programming mode**: none parameter is present in Pr1 **On the display** or in dP2, dP3, dP4: the selected probe is nor enabled

15. TECHNICAL DATA

Housing: self extinguishing ABS.
Case: facia 38x185 mm; depth 48mm
Mounting : panel mounting in a 150x31 mm panel cut-out with two screws. ∅ 3 x 2mm.
Distance between the holes 165mm
Protection: IP20; **Frontal protection:** IP65 with frontal gasket mod RG-L. (optional)
Connections: Screw terminal block ≤ 2,5 mm² heat-resistant wiring and 6,3mm Faston
Power supply: 230Vac or. 110Vac or 24Vac ± 10%; **Power absorption:** 5VA max.
Display: 3 digits, red LED, 14,2 mm high; **Inputs**: Up to 3 NTC or PTC probes.
Digital input: 1 free voltage
Relay outputs: ***Total current on loads MAX. 20A***
compressor: relay SPST 20(8) A, 250Vac
light: relay SPST 7 A, 250Vac
Other output : buzzer (optional)
Serial output : TTL standard; **Communication protocol:** Modbus - RTU
Data storing: on the non-volatile memory (EEPROM).
Internal clock back-up: 24 hours (only for model with RTC)
Kind of action: 1B; **Pollution grade:** 2;**Software class:** A.;
Rated impulsive voltage: 2500V; **Over voltage 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

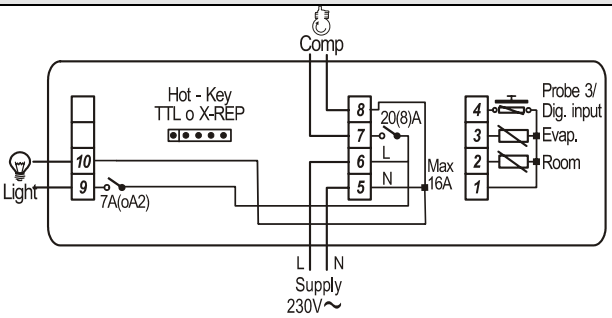
16. CONNECTIONS

16.1 XW20LS – DRY CONTACTS



Supply: 120Vac or 24Vac: connect to terminals 7-8
The X-REP output is optional

16.2 XW20LS – DIRECT CONNECTIONS OF LOAD



Supply: 120Vac or 24Vac: connect to terminals 5-6
The X-REP output is optional

17. DEFAULT SETTING VALUES

Label	Name	Range	°C/°F	Level
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
P2P	Evaporator probe presence	n=not present; Y=pres.	Y	Pr1
OE	Evaporator probe calibration	-12÷12°C /-120÷120°F	0.0	Pr2
P3P	Third probe presence	n=not present; Y=pres.	n	Pr2
O3	Third 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
rtr	P1-P2 percentage for regulation	0 ÷ 100 (100=P1 , 0=P2)	100	Pr2
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)	3.0	Pr2
COn	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÷Ht	cL	Pr1
CF	Temperature measurement unit	°C ÷ °F	°C	Pr2
rES	Resolution	in=integer; dE= dec.point	dE	Pr1
Lod	Probe displayed	P1;P2	P1	Pr2
rEd²	X-REP display	P1 – P2 – P3 – P4 – SEt – dtr	P1	Pr2
dLy	Display temperature delay	0 ÷ 20.0 min (10 sec.)	0.0	Pr2
dtr	P1-P2 percentage for display	1 ÷ 99	50	Pr2
EdF*	Kind of interval for defrost	rtc ÷in	in	Pr2
dFP	Probe selection for defrost termination	nP; P1; P2; P3; P4	nP	Pr2
dtE	Defrost termination temperature	-50 ÷ 50 °C	3	Pr1
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
ALP	Alarm probe selection	nP; P1; P2; P3; P4	P1	Pr2
ALc	Temperat. alarms configuration	rE= related to set; Ab = absolute	Ab	Pr2
ALU	MAXIMUM temperature alarm	Set÷110.0°C; Set÷230°F	110,0	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)	2,0	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	nP	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
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 temper. alarm	n(0) - Y(1)	n	Pr2
AC2	Compr. off for condenser high temper alarm	n(0) - Y(1)	n	Pr2
i1P	Digital input polarity (13-14)	oP=opening;CL=closing	cL	Pr1
i1F	Digital input 1 configuration (13-14)	EAL, bAL, PAL, dor; dEF; Htr, AUS	dor	Pr1
did	Digital input alarm delay (13-14)	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	F-c	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*	1st workdays defrost start	0 ÷ 23h 50 min. - nu	6.0	rtc
Ld2*	2nd workdays defrost start	0 ÷ 23h 50 min. - nu	13.0	rtc
Ld3*	3rd workdays defrost start	0 ÷ 23h 50 min. - nu	21.0	rtc
Ld4*	4th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Ld5*	5th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Ld6*	6th workdays defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc

Label	Name	Range	°C/°F	Level
Sd1*	1st holiday defrost start	0 ÷ 23h 50 min. - nu	6.0	rtc
Sd2*	2nd holiday defrost start	0 ÷ 23h 50 min. - nu	13.0	rtc
Sd3*	3rd holiday defrost start	0 ÷ 23h 50 min. - nu	21.0	rtc
Sd4*	4th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd5*	5th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Sd6*	6th holiday defrost start	0 ÷ 23h 50 min. - nu	0.0	rtc
Adr	Serial address	1÷247	1	Pr2
PbC	Kind of probe	Ptc; ntc	ntc	Pr2
onF	on/off key enabling	nu, oFF; ES	oFF	Pr2
dP1	Room probe display	--	-	Pr2
dP2	Evaporator probe display	--	-	Pr2
dP3	Third probe display	--	-	Pr2
rSE	Real set	actual set	-	Pr2
rEL	Software release	--	1.8	Pr2
Ptb	Map code	--		Pr2

*** Only for model with real time clock**

[2] Only for XW20LS with X-REP output

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