1. INTRODUCTION

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

1.2. HOW TO USE THE MACHINE

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

1.3. RESPECTED NORMS
The refrigerated display cabinet has been manufactured in respect of the safety issues relevant to the following norm:

- Directive No. 2000/68/CE  : Low tension
- Directive No. 97/23/EC (P.E.D.) : European Pressure Equipment
- Norm CEI 17-13/1 (EN 60498/1) : Realization of Electric Installations
- Norm CEI EN 60335-1 (CEI 61-150) : Safety of household and similar electrical appliances
- Norm CEI EN 60335-2-24 (CEI 61-66) : Special norms for refrigerators, freezers and ice machines
- UL 747
- NSF 7

1.4. RESPONSIBILITY
Oscartek declines any responsibility relevant to damages on persons, animals and/or products in case of:

- No respect of in force norms
- Installation, which is not conform to the instructions manual
- No observance of all maintenance operations, which are suggested in this manual
- No previously agreed change operations with the manufacturer
- No proper use of the refrigerated display cabinet, for which the machine has been produced.

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

2. DISPLAY CASE DATA PLATE

2.1. DATA PLATE CONTENT

![Sample Data Plate]

1. Commercial name of the unit
2. Identification number
3. Production date
4. Voltage
5. Phases
6. Frequency
7. Compressor type
8. Number of compressor
9. Refrigerant type
10. Refrigerant weight
11. Climatic case (Cl.3 = +25°C/65% U.R.; Cl. 4 = +30°C/55% U.R.)
12. Test pressure - system high pressure side
13. Test pressure - system low pressure side
14. Nominal power/current absorbed during defrost
15. Max power absorbed during defrost
16. Nominal power absorbed by heating elements (only if higher than 100W)
17. Lighting nominal power
3. INSTALLATION

3.1. MACHINE HANDLING

- The wall showcase handling, from the truck to the final place, has to be made by any truck-lift, which is proper to its weight. The showcase shall be always balanced in order to ensure personnel integrity and machine functionality.
- The showcase can be shipped with or without wood packaging. In case wood crate will be used, will have a pallet base for an easy forklift handling. The pallet, however, should be handle in the central position.
- During the shipment, it is necessary to avoid any crash or shake of the wall showcase in order to not damage its frame, especially its glasses.
- Do not drag the wall showcase on the floor and do not push it on the upper glasses.
- In case the wall showcase has front or side room-glasses avoids its shipment by air.

3.2. STOCK OF THE SHOWCASE

- Whenever the showcase has to be stoked, follow carefully what suggested before.
- Environmental temperature during the showcase stock can have following range -15°C and +55°C and humidity between 30% and 80%.
- The wall showcase has always to be protected by sunrays and raining.
- In case the wall showcase has to remain in stock quite long time before its use, keep it with its packaging in order to maintain its protection.

3.3. PACKAGING REMOVE

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

3.4. SHOWCASE POSITION

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

- Floor has to be levelled perfectly, on the contrary keep the wall showcase on the horizontal position in order to guarantee a perfect defrosting water drain and avoid boring compressor noises.
- The wall showcase has to be under the sun-rays in order to have its better refrigeration performance, has to remain inside the local or to be sheltered by window curtain. If what described above is not observed, it can determine an increase of temperature of displayed product and an increasing power consume.
- The wall showcase has not to be under air currents due to open doors or windows, or under roof ventilators or under air condition outlets. In case will be not respected the above suggestions it can arise an increasing of temperature of the displayed product and/or an increasing ice phenomena on the evaporator and internal fans, which compromise the correct cold air circulation and product consistence.
- The wall showcase has not to be placed close any heat source as heaters, ovens, etc
- The wall showcase has to have a sufficient place in order to ensure a correct custom service, to make an easy maintenance operation, to guarantee the right air flow necessary to make cold the condenser. Besides the warm air which flows out has to no have any obstacle or to invest other equipments in order to not reduce the correct functions.

3.5. REMOTE CONDENSING UNIT PLACING

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

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

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

WARNING!
Although the wall showcase has main switch breaking both the phases. Before any maintenance operation disconnect the electrical supply of the wall showcase. (pic.3.6).

3.7. HYDRAULIC CONNECTION - REMOTE CONDENSING UNIT

- In the case then wall showcaset has a remote condensing unit, it is necessary make the connection of defrosting water outlet with the main water drain outlet.
### MURO OPTIMA D24 SELF SERVE

<table>
<thead>
<tr>
<th>TECHNICAL FEATURES</th>
<th>MURO OPTIMA D24 1000</th>
<th>MURO OPTIMA D24 1250</th>
<th>MURO OPTIMA D24 1500</th>
<th>MURO OPTIMA D24 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Dimensions (L-D-H)</td>
<td>Inches: 39 3/8&quot; - 24&quot; - 33 1/2&quot;</td>
<td>49 3/16&quot; - 24&quot; - 33 1/2&quot;</td>
<td>59 1/16&quot; - 24&quot; - 33 1/2&quot;</td>
<td>78 3/4&quot; - 24&quot; - 33 1/2&quot;</td>
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<tr>
<td>Crated Dimensions (L-D-H)</td>
<td>Inches: 46&quot; - 30&quot; - 40&quot;</td>
<td>55&quot; - 30&quot; - 40&quot;</td>
<td>66&quot; - 30&quot; - 40&quot;</td>
<td>84&quot; - 30&quot; - 40&quot;</td>
</tr>
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<td></td>
<td>MM: 1168 - 762 - 1016</td>
<td>1397 - 762 - 1016</td>
<td>1676 - 762 - 1016</td>
<td>2133 - 762 - 1016</td>
</tr>
<tr>
<td>BTU's @ +14°F Evap Temp</td>
<td>BTU'S: 2600</td>
<td>3320</td>
<td>3650</td>
<td>4220</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Power Supply</td>
<td>(V/Hz): 220V/60Hz</td>
<td>220V/60Hz</td>
<td>220V/60Hz</td>
<td>220V/60Hz</td>
</tr>
<tr>
<td>Amperage</td>
<td>(A): 4A</td>
<td>6A</td>
<td>7A</td>
<td>8.5A</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>°F: 40°F</td>
<td>40°F</td>
<td>40°F</td>
<td>40°F</td>
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<tr>
<td>Net Weights</td>
<td>Kg/Lb: 130Kgs / 286Lbs</td>
<td>200Kgs / 440Lbs</td>
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* 55°F Ambient and 55% Relative humidity
* Floor sink recommended on these models

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* 55°F Ambient and 55% Relative humidity
* Floor sink recommended on these models
REFRIGERATION AND ELECTRICAL SYSTEM CABLE CONNECTION GUIDE

AGD  DIGITAL FLAVOURS DISPLAY FEEDER
AEL  ELECTRONIC BALLAST
AP   SERVICE VALVE
CA   SUCTION CAPILLARY
CAR  AIR CONDENSER
CE   ELECTRONIC CONTROL
CN   MULTIPOLAR CONNECTOR
CO   COMPRESSOR
D    D I O D
DEV  SHUNT
DR   REMOTE DISPLAY
EM   PHOTOCELL EMITTER
EV   EVAPORATOR
F    FUSE
FD   FILTER DRIER
FLF  WATER FLOW SWITCH
FR   COMPRESSOR THERMAL PROTECTION
HL   COMPRESSOR ALARM LIGHT
I    GENERIC SWITCH
IEC  WATER EVAPORATION BIN SWITCH
IGD  DIGITAL FLAVOURS DISPLAY
H    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 SPHINES 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-HEAT SWITCH
R   LIGHTING BALLAST
RAD  RECIFIER
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 DEFOSTING ELEMENT
RES6 WATER EVAPORATION HEATING ELEMENT
RES7 TOP LIGHTING FIXTURE HEATING ELEMENT
RES8 LATERAL GLASS SUPPORT HEATING ELEMENT
RES9 FRONT BAND HEATING ELEMENT
RES10 COUPLING BAND HEATING ELEMENT
RES11 SERVICE TOP HEATING ELEMENT
RES12 UPPER BAND/DOR FRAME HEATING ELEMENT
RES13 HOT DRY/BAIN MARIE DISPLAY HEATING ELEMENT
RES14 ANTI-FOG SUCTION AIR BAND HEATING ELEMENT
RES15 WARM SHELF HEATING ELEMENT
RES16 SIDE BANDS/FRONT GLASS HINGE HEATING ELEMENT
RES17 DEHUMIDIFICATION HEATING ELEMENT
RES18 DEFOSTING WATER DRAIN HEATING ELEMENT
RES19 RING FRAME HEATING ELEMENT
RES20 SIDE BAND HEATING ELEMENT
RES21 SUCTION AIR GLASS HEATING ELEMENT
RES22 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 CARtridge 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 DELAY
RICV PHOTOCELL RECEIVER
RIS  RESERVE . ANTI-FOG HEATING 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
SHDG FLAVOURS DISPLAY DIGITAL SYSTEM
SL  LIQUID SEPARATOR
SLA  WATER LEVEL PROBE
SPC  COMPRESSOR LIGHT
SPMC  WARM SHELF LIGHT
SPR  ELECTRIC SUPPLY LIGHT
SPS DEFOSTING LIGHT
SS  DEFOSTING PROBE
ST  TEMPERATURE PROBE
STR  LIGHTING STARTER
SU  HUMIDITY PROBE
T  TEMPERATURE CONTROL
TI  WINTER THERMOMETER
TC  CAPILLARY TUBE
TE  TIMER
TER  THERMOMETER
TF  FUSIBLE PLUG
TMC  WARM SHELF THERMOSTAT
TP  LIGHTING FIXTURES REFRIGERATOR THERMOSTAT
TRA  TRANSFORMER
TRC  ELECTRONIC CONTROL TRANSFORMER
TREV WATER EVAPORATION HEATER ELEMENT THERMOSTAT
TS  SECURITY THERMOSTAT
TVC  CONDENSER FAN THERMOSTAT
VF  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  EVAPORATING PRESSURE REGULATION VALVE
VS  GENERAL USE SOLENOID VALVE
VSA  SOLENOID WATER VALVE
VSAB  BY-PASS SOLENOID WATER VALVE
VSC  REVERSER CYCLE SOLENOID VALVE
VSL  LIQUID SOLENOID VALVE
VSS  DEFOSTING SOLENOID VALVE
VT  POWER REGULATOR
VV  GLASS FAN
X1  CABINET CONNECTIONS
X2  EXTERNAL ELECTRIC PANEL CONNECTIONS
X3  CONDENSING UNIT CONNECTIONS
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 herein. It cannot be used as a safety device.
- Check the application limits before proceeding.

1.2 CAUTION

- 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 formation of condensation.
- Make sure all electrical connections before any kind of maintenance.
- If the probe is not accessible by the End User, the instrument must not be opened.
- In case of failure or fault operation send the instrument back to the distributor or to "Dxell SA 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 power supply are separated and far enough from each other, without crossing or interfacing.
- In case of applications in industrial environments, the use of mains filters (for mod. FT1) in parallel with inductive loads could be useful.

2. GENERAL DESCRIPTION

Model XW60L, format 32x186mm, 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 RTC 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 operated 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 X445-CX, to a network line ModBus-RTU compatible such as the dxell monitoring units of X-WEB family. It allows to program the controller by means the HOT KEY programming keyboard.

3. CONTROLLING LOADS

3.1 COMPRRESSOR

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point. 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 "CDE" and "CFE".

3.2 DEFROST

Two defrost modes are available through the "DFE" parameter: defrost through electrical heater (DFE = EL) and hot gas defrost (DFE = HG). The defrost interval depends on the presence of the RTC (optional). If the RTC is present it is controlled by means of parameter "DFE":
- with DFE = HI the defrost is made every "DFE" time – standard way for controller without RTC.
- with DFE = 15C, 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 (DFM) and two defrost modes: timed or controlled by the evaporator's probe (DFP).

At the end of defrost cycling time is started, its length is set in the DFM parameter. With DFM = 0 the defrosting time is disabled.

3.3 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the "FAN" parameter:
- FAN = C fans will switch on and off with the compressor and not run during defrost.
- FAN = A 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 "DFD" parameter.

FAN = C \( \neq Y \) 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 the temperature is lower than set in "FST".

3.3.1 Forced activation of fans

This function managed by the Fst 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 Fst parameter, the fans are switched on. With Fst = 0 the function is disabled.

3.3.2 Cyclic activation of the fans with compressor off.

When Fst = c or y (fans in parallel to the compressor), by means of the Fc0 and Fc0 parameters the fans can carry on and off cycles even if the compressor is switched off. When the compressor is stopped the fans go on working for the Fc0 time. With Fc0 =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

(IE. 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; HI: heating, CL: cooling;
- SAA Set point for auxiliary relay
- SBY Differential for auxiliary relay
- AIP Probe for auxiliary relay
- SDi 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 SBY 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 AIP = 0 (no probe for auxiliary output).

In this case the relay 1-3 can be activated only by digital input with [IF or [IF] = AUS.

3.4.2 On/off relay – oA3 = onF

In this case the relay is activated when the controller is turned on and deactivated 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 = CP, 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 = AL, the relay 1-3 operates as alarm relay. It is activated every time an alarm happens. Its status depends on the B/A parameter. If "B/A = Y", the relay is silenced by pressing any key.
If "B/A = n", the alarm relay remains on until the alarm condition recovers.

3.4.6 Night blind management during energy saving cycles

With oA3 = NES, 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 confirms an operation.

[DEF] To start a manual defrost.

[UP]: To see the main stored temperature; in programming mode it decreases the parameter values.

[DOWN]: To see the min stored temperature; in programming mode it increases the parameter values.

To switch the instrument off, if oA3 = oFF.

To switch the light if oA3 = Lig.

KEY COMBINATIONS:

To lock & unlock the keyboard.
**6.6.1 HOW TO ENTER THE HIDDEN MENU**

1. Enter the Programming mode by pressing the SET + key for 3s (the “CH” or “FF” LED starts blinking).
2. Release the keys, then press again the SET + keys for more than 7s. The Pr2 label will be displayed immediately followed by 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 + until 10s without pressing a key.

**NOTE:** If none parameter is present in Pr1, after 3s the “Sp” message is displayed. Keep the keys pressed until the Pr2 message is displayed.

**NOTE:** The set value is stored even when the procedure is ended 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 +".

**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 3s 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 + 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 “Pen” message will be displayed.

**6.9 THE ON/OFF FUNCTION**

With "off = 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:** Lights 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 data and defrost start time.

**REGULATION**

- **Hy Differential:** (0.1 + 25°C / 0.1-25°F) Interventional 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 / 90°F) Sets the minimum value for the set point.
- **Us Maximum set point:** (SET + 1°C / SET + 2°F) Set the maximum value for set point.
- **Ot Thermostat probe calibration:** (-12°C to 12°C, -12°F to 12°F) Adjust to allow correct offset of the thermostat probe.
- **PP2 Evaporator probe presence:** n: present; the defrost time by steps, y: present; the defrost time by temperature.
- **PP3 Evaporator probe calibration:** (-12°C to 12°C, -12°F to 12°F) Adjust to allow correct offset of the evaporator probe.
- **PP4 Third probe calibration:** (P): n: not present; the terminals 13-14 operate as digital input; y: present; the terminals 13-14 operate as third probe.
- **AC Antishort cycle delay:** (0-50 min) minimum interval between the compressor stop and the following restart.
- **AC1 2nd compressor delay at start-up:** (0-255a) Used if OA3 = GP2 time interval between the switching on of the first compressor and the second one.
- **Percentage of the first and second 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, for the following formula (mA/127°F)4 = P2.

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

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

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

- **COF Compressor OFF time with faulty probe:** (0-255) 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, Alu, All have to be checked and modified if necessary.

- **rES Resolution (for °C):** (1 = °C; 0 = 0.1 °C) allows decimal point display.
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.
AL1 Low temperature alarm of condenser: (-55°C±15°C) when this temperature is reached the L2 alarm is signalled, possibly after the AD2 delay.
AL2 High temperature alarm of condenser: (+55°C±15°C) when this temperature is reached the H2 alarm is signalled, possibly after the AD2 delay.
AM2 Differential for temperature condenser alarm recovery: (0.15°C±25°C; 1.45°F)
AQ2 Condenser temperature alarm delay: (0-255 min) time interval between the detection of the condenser alarm condition and alarm signalling.
AD5 Condenser temperature alarm delayed after start-up: (from 0.0 min to 23.5 min; 10 sec).
BL2 Compressor with low temperature alarm of condenser: nA = no; compressor keeps on working; Y = yes, compressor is switched off till the alarm is present; in any case regulation returns to AC low temperature mode.
AC2 Condenser alarm off with high temperature alarm of condenser: nA = no; compressor keeps on working; Y = yes, compressor is switched off till the alarm is present; in any case regulation returns to AC low temperature mode at minimum.

AUXILIARY RELAY
ibA Alarm relay silencing (with a3A=ALn): nA = 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.
AL4 Fourth relay configuration (1-3; 1DEF; FA; 0do; nA): 0T: alarm; L: light; AuS: Auxiliary relay; on: always on with instrument on; db: neutral zone; cp2: second compressor; 1DEF: do not select; ihA: heats; nhB: night blind.
ApO Alarm relay polarity: it sets if the alarm relay is open or closed when an alarm happens. CL: terminals 1-3 closed during an alarm; dp4: terminals 1-3 open during an alarm.

DIGITAL INPUTS
1IP 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.
1IF Digital input configuration (15-16): 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 deactivation cycle; AUS = not enabled; HtM = high temperature alarm condition; gH = heating; E5 = Energy saving; Hfd = Holiday alarm (disable [only with RT]); oF = to switch the controller off.
1id (0-255 min) with 1IF = EAL or 1IF = bAL digital input alarm delay (13-14): delay between the detection of the external alarm condition and its signalling.
1IfD = df: door opening signalling delay with 1IF = PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.
1IP 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.
1IF 2nd digital input configuration (15-16): 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 deactivation cycle; AUS = not enabled; HtM = high temperature alarm condition; gH = heating; E5 = Energy saving; Hfd = Holiday alarm (disable [only with RT]); oF = to switch the controller off.
1id (0-255 min) with 1IF = EAL or 1IF = bAL 2nd digital input alarm delay (13-19): delay between the detection of the external alarm condition and its signalling.
1IfD = df: door opening signalling delay with 1IF = PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.
1pS Pressure switch number: (0 -15) Number of activation of the pressure switch, during the “did” interval, before signalling the alarm event (2IF = PAL).
If the nS activation in the did time is reached, switch off and on the instrument to perform the trip.  
como Compressor and fan status when open door: nO = normal; Fan = Fan OFF; CPr = Compressor OFF; F, C = Compressor and fan OFF.
1rd Outputs restart after alarm: nO = outputs not affected by the alarm; y = outputs are restarted with the alarm.

HE5 Temperature increase during the Energy Saving cycle:
+3°C to +0°C (30°C to 2°C) it changes to increasing value of the set point during the Energy Saving cycle.

To SET CURRENT TIME AND WEEKLY HOLIDAYS (ONLY FOR MODELS WITH RTC)
Hr Current hour (0 - 23 h)
Mn Current minute (0 - 59min)
dAy Current day (Sun = SA)
Hd First weekly holiday (Sun = su) Set the first day of the week which follows the holiday times.
Hd2 Second weekly holiday (Sun = Su) Set the second day of the week which follows the holiday times.
N.B. NhH1H2 can be set also as “nu” value (Not Used).

To SET ENERGY SAVING TIMES (ONLY FOR MODELS WITH RTC)
IE Energy Saving cycle start during workdays: (0 + 26h 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 1F120°C during workdays.
IE Energy Saving cycle length during workdays: (0 - 24h 00 min) Sets the duration of the IE Energy Saving cycle on workdays.
jE Energy Saving cycle start on holidays: (0 - 25h 50 min.)
jE Energy Saving cycle length on holidays: (0 - 25h 40 min.)

To SET DEFROST TIMES (ONLY FOR MODELS WITH RTC)
LD1=LD6 Workday defrost start (0 - 25h 30 min.) These parameters set the beginning of the 6 programmable defrost cycles during workdays. Ex. When LD2 = 12.4 the second defrost start at 12°C during workdays.
SD1=SD6 Holiday defrost start (0 - 25h 30 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°C during holidays.
N.B. To disable a defrost cycle set it to “nu”(not used). Ex. if LD2 = su, the sixth defrost cycle is disabled.

Ad Serial address (1-244): Identifies the instrument address when connected to a ModBUS compatible monitoring system.
Installing and Operating Instructions

11.1 CUT OUT

11.2 STEEL FINISHING MOUNTING

8. DIGITAL INPUTS

The first digital input 13-14 is enabled with P3P = n.
With P3P = n and i2F = i2F the second digital input is disabled.
The free voltage digital inputs are programmable by the "1F" and "2F" parameters.

8.1 GENERIC ALARM (i1F or i2F = EAL)

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

8.2 SERIOUS ALARM MODE (i1F or i2F = bAL)

When the digital input is activated, the unit will wait for "didl" delay before sending the "CA" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is deactivated.

8.3 PRESSURE SWITCH (i1F or i2F = PAL)

If during the time interval set by "didl" parameter, the pressure switch has reached the number of activation of the "iPS" 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 "iPS" activation in the didl 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 "edc" parameter: no normal (any change) Fan = Fan OFF, CPR = Compressor OFF, F. C. = Compressor and fan OFF.

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 elapsed.

8.6 SWITCH THE AUXILIARY RELAY (i1F or i2F = AUS)

With o3A = AUS the digital input switched the status of the auxiliary relay

8.7 INVERSION OF THE KIND OF ACTION: HEATING-COOILING (i1F or i2F = Hctt)

This function allows to invert the regulation of the controller: from cooling to heating and vice-versa.

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 "1F" and "2P" parameters. HP or IP = CL: the input is activated by closing the contact. HP or IP = POP: 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 TTLRS485 converter, X485-CX, to connect the instrument to a monitoring system ModBUS-RTU compatible such as the X4E0600/300/3000.

10. X-REP OUTPUT - OPTIONAL

As optional, an X-REP can be connected to the instrument, through 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 150x211 mm hole, and fixed using two screws on 3 x 2 mm. To obtain an IPR 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 circuits by the cooling holes.

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.

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 thermistor probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coolest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

12.2 HOW TO USE THE HOT KEY

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

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

14. ALARM SIGNALS

<table>
<thead>
<tr>
<th>Message</th>
<th>Cause</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>i1F</td>
<td>Room probe failure</td>
<td>Compressor output is ON, to set &quot;CA&quot; and &quot;COP&quot;</td>
</tr>
<tr>
<td>i2F</td>
<td>Evaporator probe failure</td>
<td>Defrost and is timed</td>
</tr>
<tr>
<td>r1F</td>
<td>Third probe failure</td>
<td>Outputs unchanged</td>
</tr>
<tr>
<td>r2F</td>
<td>Fourth probe failure</td>
<td>Outputs unchanged</td>
</tr>
<tr>
<td>r3A</td>
<td>Maximum temperature alarm</td>
<td>Outputs unchanged</td>
</tr>
<tr>
<td>r4A</td>
<td>Condenser high temperature</td>
<td>It depends on the &quot;Act&quot; parameter</td>
</tr>
</tbody>
</table>
14.1 SILENCING BUZZER / ALARM RELAY OUTPUT
If "0A" = "Y", the buzzer and the relay are silenced by pressing any key.
If "0A" = "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 tested probe; they automatically stop some seconds after the probe resets normal operation. Check connections before replacing the probe.
Temperature alarms "HA", "LHA" and "L2A" automatically stop as soon as the temperature returns to normal values.
Alarm "SA" and "CA" (with "IF=HL") recover as soon as the digital output is disabled.
Alarm "CA" (with "IF=LP") remains only by switching off and on the instrument.

14.3 OTHER MESSAGES
If the display is not in P1, D3, D4, the selected probe is not enabled.

15. TECHNICAL DATA
Housing: self-extinguishing A5S
Case: max 32×165 mm, depth 83 mm
Mounting: panel mounting in a 100×30 mm panel cut-out with two screws.
Distance between the holes 100 mm
Protection: IP20, Frontal protection: IP65 with frontal gasket and REL (optional)
Connections: Screw terminal block 3×2 mm² heat-resistant wiring and 5 mm² Faston
Power supply: 220Vac or 110Vac/24Vac 10%
Power absorption: 8W 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 PT100 probes.
Digital inputs: 2 time voltage
Relay outputs: Total current on loads MAX 20A
Compressor: relay SPST 8 or 6NC, A: 250Vac
fans: relay SPST 8 or 6NC, A: 250Vac
Alarm: relay SPST 8 or 6NC, A: 250Vac
Other output: buzzer (optional)
Serial output: TTL standard, Communication protocol: Modbus - RTU
Data storage: on the non-volatile memory (EEPROM)
Internal clock back-up: 24 hours (only for models with RTC)
Kind of action: 18, Pollution degree: 2, Software class: A,
Rated impulse voltage: 2500V
Voltage: 2500V
Operating temperature: 0-50°C, Storage temperature: -30-85°C,
Relative humidity: 20-85% (no condensing)
Measuring and regulation range: NTC probe -100°C to 100°C, PTC probe -50°C to 150°C
Resolution: 0.1°C or 1°F (selectable), Accuracy (ambient temp. 25°C) ±0.3°C or ±1 digit

16. CONNECTIONS

17. DEFAULT SETTING VALUES

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>°C/F Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>set point</td>
<td>0-15</td>
<td>0-15°F</td>
</tr>
<tr>
<td>P2</td>
<td>LS</td>
<td>0-50</td>
<td>0-90°F</td>
</tr>
<tr>
<td>P3</td>
<td>US</td>
<td>0-110</td>
<td>0-200°F</td>
</tr>
<tr>
<td>P4</td>
<td>OE</td>
<td>-12°C-120°C</td>
<td>-10°F-248°F</td>
</tr>
<tr>
<td>P5</td>
<td>PE</td>
<td>-12°C-120°C</td>
<td>-10°F-248°F</td>
</tr>
<tr>
<td>P6</td>
<td>IF</td>
<td>-12°C-120°C</td>
<td>-10°F-248°F</td>
</tr>
<tr>
<td>P7</td>
<td>ODR</td>
<td>0-25°C</td>
<td>68°F</td>
</tr>
</tbody>
</table>

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

18. DIFFERENTIAL FOR EMERGY SAVING

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
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<tr>
<td>P7</td>
<td>ODR</td>
<td>0-25°C</td>
<td>68°F</td>
</tr>
</tbody>
</table>

Non-number of regulation pressure switch O = 15 15 P1
Compressor and fans status when open door none 0 | none |
Regulation restart with open door alarm n = Y 1 Y |

19. EMERGENCY OFFERED SAVINGS CYCLE START DURING WORKING TIMES

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
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</tr>
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<tbody>
<tr>
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<tr>
<td>P7</td>
<td>ODR</td>
<td>0-25°C</td>
<td>68°F</td>
</tr>
</tbody>
</table>

Non-number of regulation pressure switch O = 15 15 P1
Compressor and fans status when open door none 0 | none |
Regulation restart with open door alarm n = Y 1 Y |

20. EMERGENCY OFFERED SAVINGS CYCLE LENGTH DURING WORKING TIMES

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>°C/F Level</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>P7</td>
<td>ODR</td>
<td>0-25°C</td>
<td>68°F</td>
</tr>
</tbody>
</table>

Non-number of regulation pressure switch O = 15 15 P1
Compressor and fans status when open door none 0 | none |
Regulation restart with open door alarm n = Y 1 Y |

21. EMERGENCY OFFERED SAVINGS CYCLE START ON HOLIDAYS

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>°C/F Level</th>
</tr>
</thead>
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<tr>
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<td>PE</td>
<td>-12°C-120°C</td>
<td>-10°F-248°F</td>
</tr>
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</tr>
<tr>
<td>P7</td>
<td>ODR</td>
<td>0-25°C</td>
<td>68°F</td>
</tr>
</tbody>
</table>

Non-number of regulation pressure switch O = 15 15 P1
Compressor and fans status when open door none 0 | none |
Regulation restart with open door alarm n = Y 1 Y |

22. EMERGENCY OFFERED SAVINGS CYCLE LENGTH ON HOLIDAYS

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
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<th>°C/F Level</th>
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</tr>
<tr>
<td>P7</td>
<td>ODR</td>
<td>0-25°C</td>
<td>68°F</td>
</tr>
</tbody>
</table>

Non-number of regulation pressure switch O = 15 15 P1
Compressor and fans status when open door none 0 | none |
Regulation restart with open door alarm n = Y 1 Y |
<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>°C/°F</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ld1*</td>
<td>1st workdays defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>6.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Ld2*</td>
<td>2nd workdays defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>13.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Ld3*</td>
<td>3rd workdays defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>21.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Ld4*</td>
<td>4th workdays defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>0.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Ld5*</td>
<td>5th workdays defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>0.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Sd1*</td>
<td>1st holiday defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>6.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Sd2*</td>
<td>2nd holiday defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>13.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Sd3*</td>
<td>3rd holiday defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>21.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Sd4*</td>
<td>4th holiday defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>0.0</td>
<td>rtc</td>
</tr>
<tr>
<td>Sd5*</td>
<td>5th holiday defrost start</td>
<td>0 - 23h 59 min. - nu</td>
<td>0.0</td>
<td>rtc</td>
</tr>
</tbody>
</table>

* Only for model with real time clock

1 Only for XW60L with X-REP output

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