EWRC300/500LX

Controllers for cold rooms for on-board installation

COLDFACE

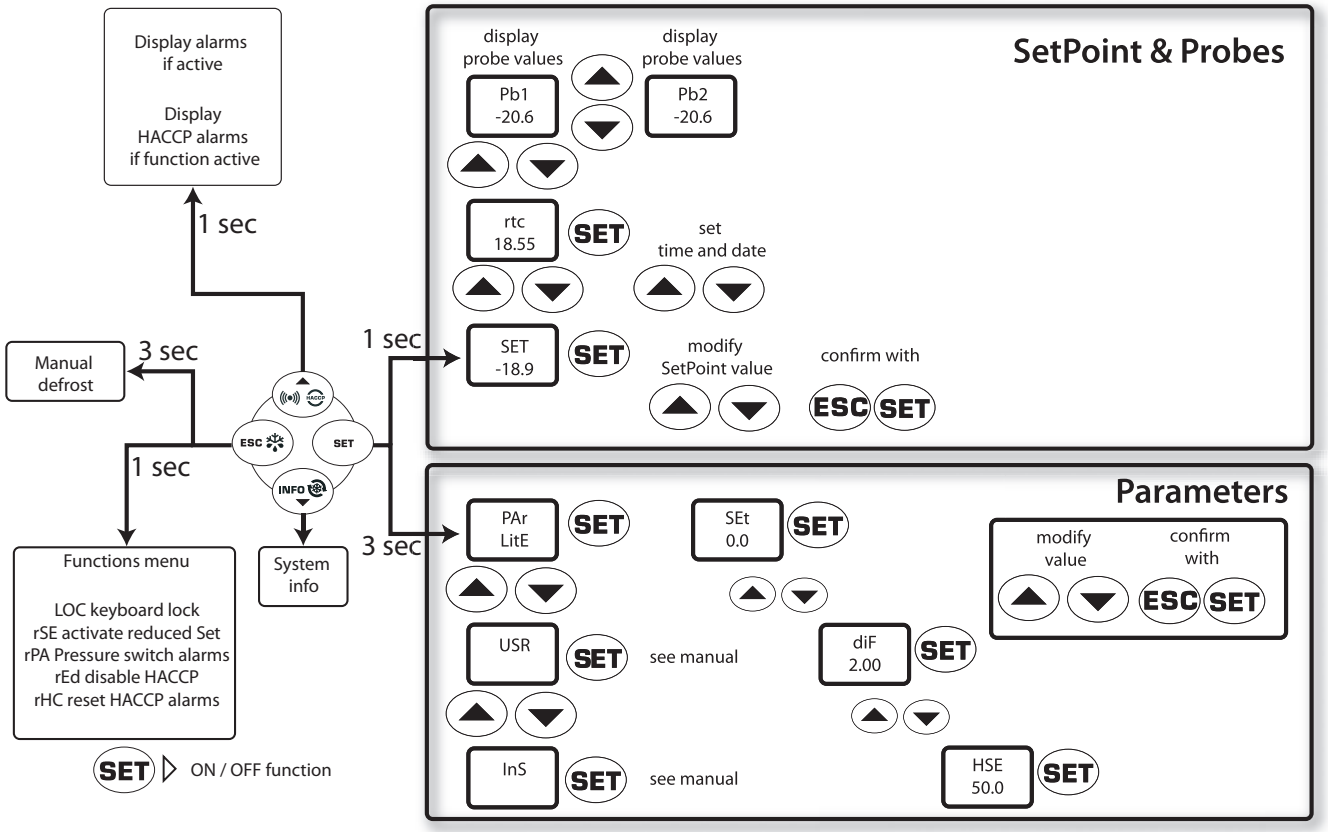
invensys
Controls Europe

English

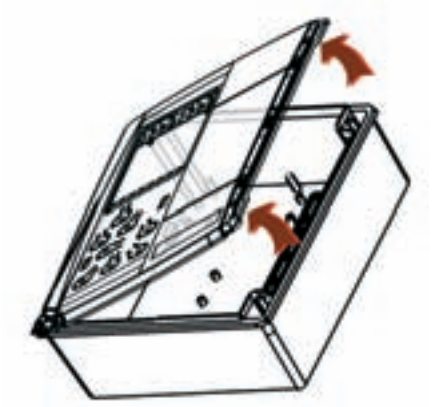
INTRODUCTION

The Coldface EWRC300/500LX series controls the temperature of a static or ventilated cold room. The instrument controls positive and negative cold rooms and is capable of managing a double evaporator and condenser probes. Coldface has 3 or 5 configurable relays depending on the model, 2 low-voltage digital inputs configurable for door switch or other devices. Models are available with clock with yearly calendar and HACCP event logging. The instrument can be connected to Televis**System** via the optional plug-in module.
The box allows for installation of a power contactor or a disconnecting switch with door lock.
This summary document contains basic information about the standard models EWRC300/500LX. For further information and different configurations, refer to the complete user manual p/n 9MA10023 which can be downloaded free of charge from the www.eliwell.it website.

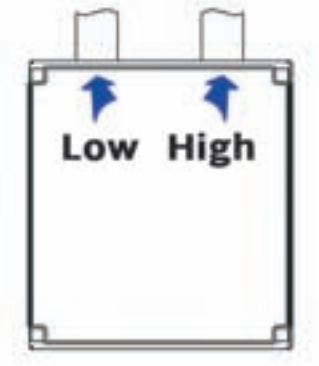
NAVIGATION DIAGRAM



MECHANICAL INSTALLATION

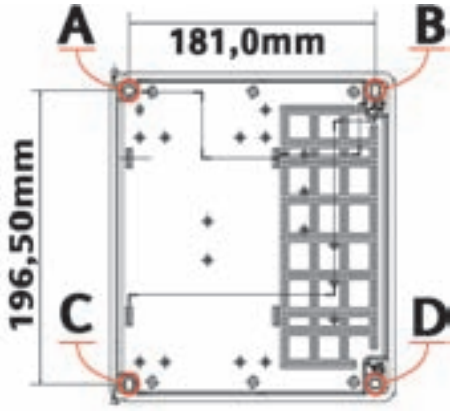


- Remove the protective plate on the right of the door
- Take out the 2 screws supplied and then open the cover.



- Drill holes in the top (or bottom) of the backplate to pass the high and low-voltage wires through.

Cable clamps must be no bigger than size PG29



- Screw the backplate to the wall using 4 screws (not supplied) to match the holes A...D.
- Shut the door and cover the screws with the corresponding plate

ELECTRICAL CONNECTIONS

Output relay (default settings)
- **OUT1** relay 1 = Compressor (or liquid line valve)
- **OUT2** relay 2 = Defrost
- **OUT3** relay 3 = Evaporator fan
- **OUT4** relay 4 = Alarm (only EWRC500LX)
- **OUT5** relay 5 = light (only EWRC500LX)

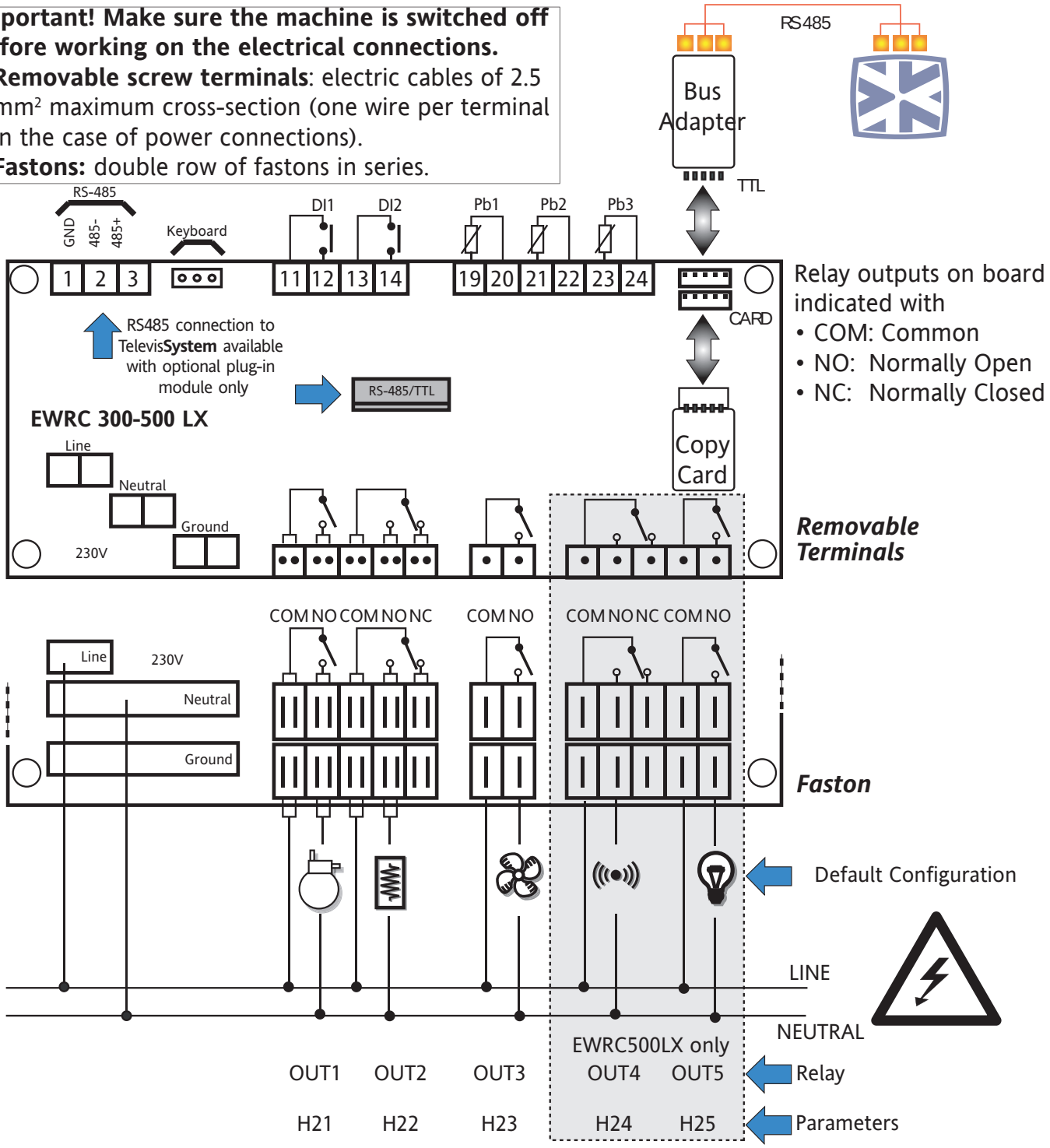
Probe inputs (default settings)
- **Pb1** = NTC cold room probe
- **Pb2** = NTC defrost end probe
- **Pb3** = Not used

To switch between NTC/PTC probe types use parameter H00. **SWITCH OFF AND RESTART THE INSTRUMENT** after making the change

Digital Inputs (default settings)
- **D.I.1** = Door switch
- **D.I.2** = Disabled

Serials
- **TTL** for connection to Copy Card
- **TTL** for connection to Televis**System**
- **RS485** available **ONLY** with optional Plugin module for connection to Televis**System.**

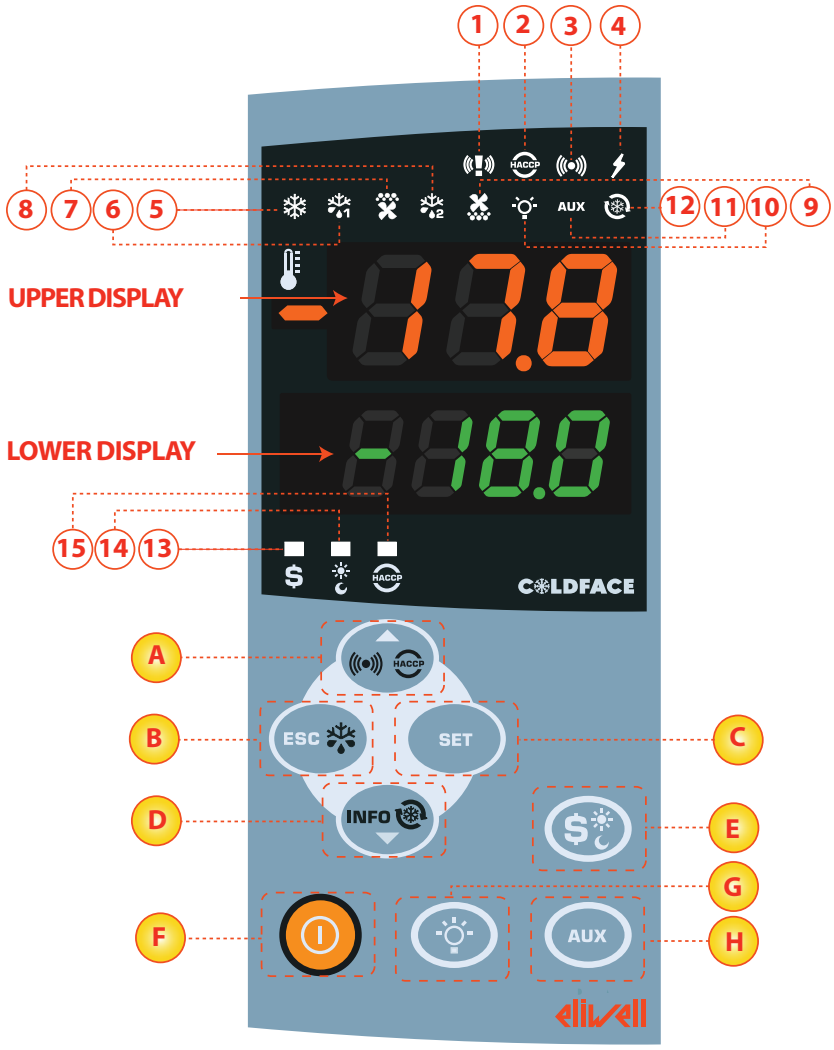
Important! Make sure the machine is switched off before working on the electrical connections.
- **Removable screw terminals**: electric cables of 2.5 mm² maximum cross-section (one wire per terminal in the case of power connections).
- **Fastons:** double row of fastons in series.



Relay outputs on board indicated with
- COM: Common
- NO: Normally Open
- NC: Normally Closed

English

DISPLAYS



UPPER DISPLAY
• 3 digits and - sign:
View:
• Operating value
• parameters label
• alarms, functions

If the upper display is blinking it means that the value of the lower display can be modified

LOWER DISPLAY
• 4 digits
View:
• parameters value
• probe values
• function state
HACCP models
• time

If the lower display is blinking it means that the displayed value can be modified

LEDs

No.	LEDs	colour	ON	BLINKING	OFF
1	PANIC	red	Panic alarm	/	No alarm
2	HACCP	red	HACCP alarm	Not displayed	No alarm
3	ALARM	red	Alarm	Silenced	No alarm
4	POWER SUPPLY	red	Power supply ON	/	Power supply OFF
5	COMPRESSOR	yellow	Compressor ON	Delay	Compressor OFF
6	DEFROST 1	yellow	defrost	drip	No defrost
7	EVAPORATOR FANS	yellow	Fans ON	Forced ventilation	Fans OFF
8	DEFROST 2	yellow	defrost	drip	No defrost
9	CONDENSER FANS	yellow	Fans ON	/	Fans OFF
10	LIGHT	yellow	Light ON	/	Light OFF
11	AUXILIARY (AUX)	yellow	AUX ON	/	AUX OFF
12	DEEP COOLING (DCC)	yellow	Drip cooling cycle ON	/	Drip cooling cycle OFF
13	ENERGY SAVING	yellow	Energy saving ON	/	Energy saving OFF
14	NIGHT & DAY	yellow	Night & Day ON	/	Night & Day OFF
15	HACCP	yellow	HACCP Menu	/	Other Menu
ON: function / alarm active; OFF: function / alarm NOT active;					

KEYS

No.	KEY	press and release	press and hold for about 3 seconds	Notes
Battery	▲ UP	•Alarms Menu (always visible) • Scroll • Increase values	/	HACCP alarms only in HACCP models and when alarms present
B	ESC	• Exit • Functions menu	• Manual defrost • Return to Main Menu	
c	SETPOINT	• Display SetPoint / probe values / time* • Confirm values • Access value edit mode (upper display blinking)	Access Parameter Edit mode	* Models with clock
Q	▼ DOWN	• Scroll • Decrease values • Display instrument INFO**	/	Configurable - see parameter H32 **See Technical Support
E	ENERGY SAVING	/	Activate energy saving	press and hold until Activate Night & Day
F	ON/OFF	/	Switch device On/Off	
G	LIGHT	/	Switch light on/off	
H	AUX	/	Activate auxiliary function	

USER INTERFACE

How to modify the SetPoint

- Press and release the SET key. The upper display will show SEt, the lower display will indicate the current SetPoint value
- Press and release the SET key once more. The upper display will show SEt blinking
- Use the UP & DOWN keys to adjust the SetPoint value
- Press the ESC key several times (or keep it pressed) to return to the normal display

How to read the probe values

- Press and release the SET key. The upper display will show SEt, the lower display will indicate the current SetPoint value
- Press and release the DOWN key. If the RTC clock is present, the time will be shown in the lower display
- Press and release the DOWN key once more. The upper display will show Pb1, the lower display will indicate the value read by the room probe
- Press and release the DOWN key once more to read the value of probe Pb2 and Pb3 if configured
- Press the ESC key to return to the normal display

How to modify the Lite Parameters

The Lite parameters are the most useful parameters and are described in this document, in the section Parameters Table.

1) Press and hold the SET key for 3 seconds until the display shows PAr / Lite
2) Press and release the SET key once more. The upper display will show the first parameter*, the lower display will indicate the current parameter value
3) Using the UP & DOWN keys, find the parameter that you wish to modify
4) Press and release the SET key once more. The upper display will show the name of the blinking parameter
5) Use the UP & DOWN to adjust the parameter value
6) Press and release SET to save the parameter value
7) Return to step 3) or press ESC several times to return to the normal display

LITE PARAMETER TABLE

This section describes the most useful parameters, which are contained in the 'Lite' folder. For a description of all User (USr) and Installer (Ins) parameters, see the user manual. Note: the 'Lite' folder parameters are NOT divided into subfolders and are always visible (no access password is required). The same parameters are also visible in the respective folders 'Compressor', 'Fans', etc. (also indicated here for easy reference) in the User (USr) and Installer (Ins) parameters menu.

PARA.	DESCRIPTION	RANGE	DEF. / U.o.M.
SEt	SETPOINT Control value within the range between the minimum set point LSE and the maximum set point HSE.	LSE...HSE	0.0 °C/°F
	COMPRESSOR		
diF	Compressor relay activation differential; the compressor stops on reaching the set point value (as indicated by the regulation probe) and restarts at a temperature value equal to the set point plus the value of the differential. Note: the value 0 cannot be set.	0.1...30.0	2.0 °C/°F
HSE	Maximum value that can be assigned to the setpoint.	LSE...302	50.0 °C/°F
LSE	Minimum value that can be assigned to the setpoint.	-55.0...HSE	-50.0 °C/°F
dtY	Type of defrost. 0= electric defrosting - compressor off (OFF) during defrosting 1 = reverse cycle defrost (hot gas) - compressor ON during defrosting 2= Free: defrosting independently of compressor	0/1/2	0
dit	Interval between the start of two subsequent defrosting cycles. 0= function disabled (defrosting NEVER performed)	0...250	6h
dEt	Defrost time-out; determines the maximum duration of the defrost cycle.	1...250	30 min
dSt	Defrost end temperature (determined by the evaporator probe Pb2).	-50.0...150	6.0 °C/°F
	FANS		
FSt	Fan stop temperature; if the evaporator probe reads a higher value than the set value, the fans are stopped. The value is either positive or negative and, depending on parameter FPt, can be either the absolute temperature or the temperature relative to the set point.	-50...150	6.0 °C/°F
Fdt	Fan activation delay after a defrosting cycle.	0...250	0 min
dt	Drip time.	0...250	0 min
dFd	Allows exclusion of the evaporator fans to be selected or not selected during defrosting. y = yes; n = no.	y/n	y
	ALARMS		
HAL	Maximum temperature alarm. Temperature value (intended either as distance from set point or as an absolute value based on Att) which, if exceeded in an upward direction, triggers the activation of the alarm signal. See Max/Min Alarms Table.	LAL...150	50.0 °C/°F
LAL	Low temperature alarm. Temperature value (intended as distance from the set point or as an absolute value based on Att) which, when exceeded downwards, triggers the activation of the alarm signal. See Max/Min Alarms Table.	-50.0...HAL	-50.0 °C/°F
dAO	Temperature alarm exclusion time after defrost.	0...999	60 min
tAO	Time delay for temperature alarm indication. Refers to high/low temperature alarms only.	0...250	0 min
	DISPLAYS		
CA1	Calibration 1. Positive or negative temperature value added to the value read from probe Pb1, according to the setting of parameter "CA".	-12.0...12.0	0 °C/°F
CA2	Calibration 2. Positive or negative temperature value added to the value read from probe Pb2, according to the setting of parameter "CA".	-12.0...12.0	0 °C/°F
ddL	Display mode during defrost. 0 = displays the temperature read by the room probe Pb1; 1 = locks the reading at the temperature value read by room probe Pb1 when defrosting starts and until the next time the set point value is reached; 2 = displays the label "deF" during defrosting and until the next time the set point value is reached (or until Ldd has elapsed).	0/1/2	1
	CONFIGURATION **NOTE: the instrument must be switched off and restarted each time these parameters are modified.**		
H00	Probe type selection, PTC/NTC. 0 = PTC; 1 = NTC.	0/1	1
H23	Configurability of digital output OUT3: 0=Disabled; 1=Compressor; 2=Defrost; 3=Fans; 4=Alarm; 5=AUX; 6=Standby; 7=Light; 8=Buzzer; 9=Evaporator 2; 10=Compressor 2; 11=Frame Heater; 12=Condenser fans.	0...12	3
H42	Pb2 Evaporator probe presence. n= not present; y= present.	y/n	y

THE INSTRUMENT ENABLES MODIFICATION OF OTHER PARAMETERS DIVIDED INTO USER LEVEL (USr) and INSTALLER LEVEL (InS)

How to modify other parameters

Installer (InS) level access - User level access is similar:

Procedure applies only to more advanced applications. In this case the parameters are arranged in folders (Compressor / Defrost / Fans etc)
1) Press and hold the SET key for 3 seconds until the display shows PAr / Lite
2) Use the UP & DOWN keys to select the parameter level concerned (Usr or Ins)
3) Press and release the SET key once more. The display will show the first folder
4) Press and release the SET key once more. The upper display will show the first parameter in the folder, the lower display will indicate the current parameter value
5) Using the UP & DOWN keys, find the parameter that you wish to modify
6) Press and release the SET key once more. The upper display will show the name of the blinking parameter
7) Use the UP & DOWN keys to adjust the parameter value
8) Press and release SET to save the parameter value
9) Return to step 5) or press ESC several times to return to the normal display

OPERATION IN DEFAULT CONFIGURATION

The instrument is configured for negative cold. For positive cold, disable the evaporator probe Pb2 (set H42=n) and set relay OUT3 (parameter H23=6) to prevent continuous ventilation.

COMPRESSOR
The compressor is active if the cold room temperature detected by Pb1 exceeds the value of SEt + differential diF. The compressor stops if the cold room temperature detected by Pb1 falls below the SEt value. The instrument includes compressor on/off protection*

DEFROST
Defrost is by means of electric heaters (parameter dty = 0) and the time counter is always active with the instrument switched on (dCt=1).
Manual defrost
Manual defrost is activated by pressing and holding the ESC key (B)
If conditions for defrosting are not present, (e.g. the evaporator probe temperature is higher than the defrost end temperature) or the parameter OdO≠0, the display will blink three times to indicate that the operation will not be performed.
Default Defrost settings
dit = 6 hours. Interval between 2 defrost cycles
dSt = 6°C. Defrost end temperature. Set by Pb2
The Defrost cycle may terminate due to time-out based on the parameter dEt.

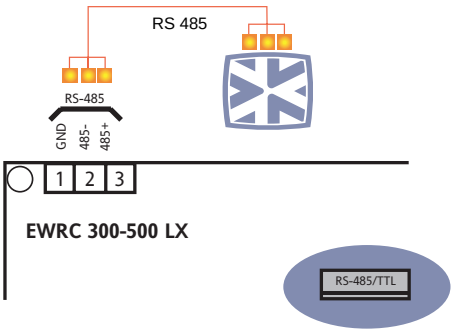
EVAPORATOR FANS
Relay OUT3 is configured as fans relay and is activated in the required cases, according to delays and parameter settings*
Default fan settings
dt = 0 min. drip time
dFd = Y. Fans off during defrosting

ALARM RELAY - EWRC500LX only
Relay OUT4 is configured as alarm relay and is activated in the case of alarms, according to delays and parameter settings*

LIGHT - EWRC500LX only
The light is activated by pressing and holding the LIGHT key (G)
Since digital input D.I. 1 is configured as door switch, relay OUT5 (light) is activated when the door is opened. The light also switches on with the instrument in standby*.
*FOR MORE INFORMATION READ the manual, p/n 9MA10023

SUPERVISION

EWRC300/500LX can be connected to:
• telecontrol system Televis**System** (°)
• third-party systems via Modbus protocol (°°)
• **Param**Manager fast parameter setting software
The connection can be made in 2 ways:
1) via TTL serial port. See Electrical Connections.
   Use the Bus**Adapter150 TTL- RS 485 interface module**
2) by direct RS-485 connection using the optional RS485/TTL plug-in module (not included).
   See figure opposite.



In both cases, use a RS485/RS232-USB PC **interface** converter and the required software licence.
(°) To configure the instrument for this purpose, open the file identified by the label "Add" and use parameters "dEA" and "FAA*
(°°) To configure the instrument for this purpose, open the file identified by the label “Add” and use parameters "dEA", "FAA", "PtY" and "StP"*
*FOR MORE INFORMATION READ the manual, p/n 9MA10023

ALARMS AND TROUBLESHOOTING

How to display the alarms
1) Press and release the UP key. The upper display will always show the label ALr. The lower display will show:
• nOnE if no alarms active
• SYS to indicate system alarms - see Alarms Table
• HACP to indicate HACCP alarms - see HACCP alarms
2) Using the UP & DOWN keys, find the type of alarm that you want to check

System alarms
The upper display will show the label ALr, the lower display will indicate the alarm code - see Alarms Table
• Using the UP & DOWN key, scroll the other alarms
• Press the ESC key to return to the previous alarm code, press the ESC key several times (or keep it pressed) to return to the normal display

HACCP ALARMS • HACCP MODELS ONLY
The instrument logs high and low temperature alarms for the cold room probe, as well as any power failures. The alarm types and the duration and start time of the alarm itself will be displayed in the alarms folder ALr. It is possible to disable the recording of alarms and/or resetting of HACCP alarms. See Functions Menu.
FOR MORE INFORMATION READ the manual, p/n 9MA10023

ALARMS TABLE

This section lists alarms associated with the default configuration of the instrument. For a description of alarms relating to custom configurations, refer to the user manual or contact Eliwell Technical Support

Folder	Cause	Effects	Remedy
E1*	Pb1 room probe faulty • measured values are outside operating range • probe faulty/short-circuited/open	• Label E1 displayed • Min/max alarm regulator disabled • Compressor operation based on parameters "Ont" and "OFt" if set for duty cycle.	• check probe type NTC/PTC (see H00) • check the probe wiring • replace probe
E2*	Pb2 defrost probe faulty • measured values are outside operating range • probe faulty/short-circuited/open	• Label E2 displayed • The Defrost cycle will end due to time-out (Parameter "dEt")	• check probe type NTC/PTC (see H00) • check the probe wiring • replace probe
AL1	Pb1 LOW temperature alarm • value read by Pb1 < LAL after time of "tAO".	• Recording of label AL1 in folder ALr • No effect on regulation	• Wait for the temperature value read by Pb1 to come back above LAL+AFd
AH1	Pb1 HIGH temperature alarm • value read by probe Pb1 > HAL after time of "tAO".	• Recording of label AH1 in folder ALr • No effect on regulation	• Wait until temperature value read by Pb1 returns below HAL-AFd.
Ad2	• end of defrost cycle due to time-out rather than due to defrost end temperature being read by the defrost probe	• Recording of label Ad2 in folder ALr	• Wait for the next defrost cycle for automatic return
OPd	• Activation of digital input (configured as door switch) See param. H11/H12 • depends on delay set by parameter td0	• Recording of label OPd in folder ALr • Regulator blocked (see param. dOA/PEA)	• close door • depends on delay set by parameter OA0
E10**	**** Only RTC models** Clock alarm • clock faulty or battery low	• Functions associated with clock not present	• contact Eliwell Technical Customer Support

ALL ALARMS
- Alarm icon permanently on
- Buzzer activation if present and alarm relay activation (OUT4) for all alarms Ad2 excluded
- Press any key to silence the alarm, the LED changes from a steady light to a blinking light. Please note: the buzzer will be deactivated while the alarm relay remains active

*E1 - E2: If simultaneous they will be shown alternately on the display at a frequency of 2 seconds

TECHNICAL SUPPORT

Please have the following information available when contacting Eliwell Technical Support:
- **IdF firmware version (e.g. 390)**
- **rEL firmware version release (e.g. 1,2,...)**
- **tAb map code**
- **rC instrument model (e.g. 300/500)**

To obtain this information:
- Press and release the DOWN / INFO key
- Press and release the DOWN key once more to display other information about the instrument
- Press the ESC key to return to the normal display

TECHNICAL DATA

DESCRIPTION		
Front panel	IP54	
Container	Bayblend FR 110	
Dimensions	front 210x245mm, depth 90mm	
Mounting	wall mounting (centre distance of holes A-B 181.0 mm; holes C-D 196.5 mm. See Mechanical Installation paragraph)	
Connections	• removable screw terminals for serial port RS-485, digital and analogue inputs • removable screw or FASTON terminals for power supply and digital relay outputs (see Wiring Diagrams) internal housing for door lock disconnecting switch, remote control switch, etc. WARNING: do not exceed the amperage limits specified on the door lock disconnector markings	
Operating temperature	-5°C...+50°C	
Storage temperature	-20°C...+85°C	
Operating humidity	10…90% RH non-condensing	
Storage humidity		
Display range	–50…110 (NTC) / –55…150 (PTC) without decimal point, on display with 3 digits + sign	
Analogue Inputs	3 NTC inputs. PTC selectable by parameter H00	
Digital inputs	2 voltage-free digital inputs configurable by parameters H11/H12	
Relay outputs	**Model EWRC300LX** • **OUT1** output SPST 2HP 12(12)A 250V~ • **OUT2** output SPDT 1HP 8(8)A 250V~ • **OUT3** output SPST 1/2HP 8(4)A 250V~	**Model EWRC500LX** • **OUT1** output SPST 2HP 12(12)A 250V~ • **OUT2** output SPDT 1HP 8(8)A 250V~ • **OUT3** output SPST 1/2HP 8(4)A 250V~ • **OUT4** output SPDT 1/2HP 8(4)A 250V~ • **OUT5** output SPST 1HP 8(8)A 250V~
Buzzer	only on models where this is provided	
Serials	• 1 TTL port for connection to Copy Card • 1 TTL port for connection to Televis**System** • 1 RS-485 serial port for connection to Televis**System** (use with optional plug-in module)	
Accuracy	better than 0.5% of end of scale +1 digit	
Resolution	1 or 0,1 °C	
Power draw	14W	
Power supply	230V~ ± 10% 50/60Hz	

WARNINGS

Important! Make sure the machine is switched off before working on the electrical connections.

The instrument is equipped with:

- **Removable screw terminals**: for connecting electric cables of 2.5 mm^2 maximum cross section (one wire per terminal in the case of power connections): for the capacity of the terminals, see the label on the instrument. The relay outputs are voltage free: they are indicated on the board with the letters COM for Common, NO for Normally Open and NC for Normally Closed contact. When current exceeds 8A on relay outputs, 2 x 2.5mm^2 cables (2 fastons) must be run out for each individual contact to ensure the temperature of the cables does not exceed 85°C.
- **Fastons:** double row of fastons in series.

Do not exceed the maximum permitted current; for higher loads, use a contactor with sufficient power capacity.

Make sure that power supply is of the correct voltage for the instrument.

Probes have no connection polarity and can be extended using a normal bipolar cable (note that the extension of the probes influences the instrument's electromagnetic compatibility (EMC): take great care with the wiring). Probe cables, power supply cables and the TTL serial cables should be routed separately from power cables.

ISO14001 Eliwell has held ISO 14000 certification for a number of years, thereby guaranteeing the effective application of its Environmental Management Policy.
Eliwell is a member of the Italian Electrical Engineering Association (Comitato Elettrotecnico Italiano) and makes an active contribution to regulatory development. This ensures that Eliwell technical developers benefit from excellent training in the fields of:

- electrical safety
- electromagnetic compatibility
- respect for the environment

Eliwell wishes to share its commitment to environmental sustainability with its customers, by reducing its paper trail and providing online access to documentation. For further information, refer to the complete user manual which can be downloaded free of charge from the www.eliwell.it website.

CONDITIONS OF USE - Permitted use

For safety reasons, the device must be installed and used according to the instructions provided. In particular, parts carrying dangerous voltages must not be accessible in normal conditions. The device must be adequately protected from water and dust with regard to the application, and must only be accessible using tools (with the exception of the front panel).
The device is suitable for use as a stand-alone unit and has been tested for safety aspects in accordance with harmonised European reference standards. It is rated:

- in terms of design, as an automatic electronic temperature controller for built-in or stand-alone installation
- in terms of automatic operating characteristics, as a type 1B controller
- in terms of software class and structure, as a class A device
- In terms of connection, as a device with flexible, external and removable cable with Y connection.
- device with pollution grade 2
- as a device with class D fire resistance
- overvoltage category grade II
- device made with class IIIa material
- ball test temperature: 80°C

Improper use

Any use other than that expressly permitted is prohibited.
Note that the relay contacts provided are of a functional type and subject to failure: any protection devices required by product standards, or suggested by common sense for obvious safety requirements, must be installed externally to the instrument.

LIABILITY AND RESIDUAL RISKS

Eliwell Controls srl declines any liability for damage due to:

- installation/uses other than those expressly specified and, in particular, failure to comply with the safety requirements of established standards and/or instructions specified in this document
- use on panels that do not provide adequate protection against electric shocks, water or dust when assembled
- use on panels allowing access to dangerous parts without having to use tools
- tampering with and/or modification of the product
- installation/use on panels which are not compliant with current standards and regulations

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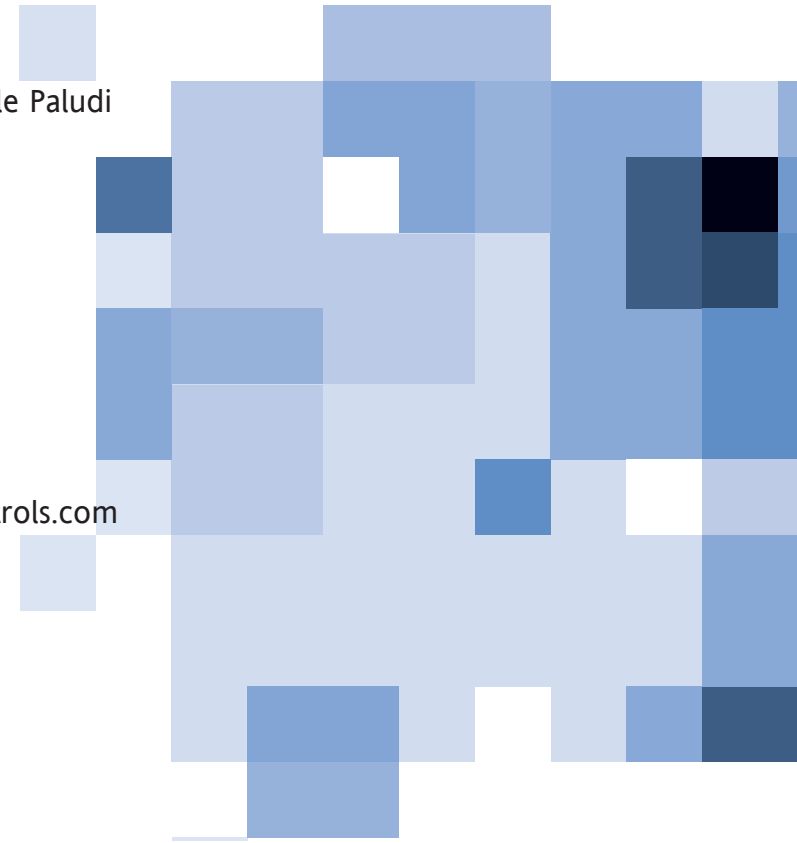

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