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.
- Dixell Srl reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

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 instrument back to the distributor or to "Dixell S.r.l." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are 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) is recommended along with the other, without crossing or intertwining.

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 can 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.

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, the compressor is started and then turned on 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 "C00" and "C0F".

3.2 DEFROST

Two defrost modes are available through the "ddF" parameter: defrost through electrical heater (ddF = EL) and hot gas defrost (ddF = in).

The defrost interval depends on the presence of the RTC (optional), if the RTC is present is controlled by means of parameter "EdC":
- with EdC=n the defrost is made every ndf time – standard way for controller without RTC;
- with EdC = "r", the defrost is made in real time depending on the hours set in the parameters Ldf, Ldf on weekdays and in Set...566 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 (PdP). 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 = 0: fans will switch ON and OFF with the compressor and not run during defrost;
- Fnc = 1: fans will run even if the compressor is off, and not run during defrost;
- Fnc = 2: fans will switch ON and OFF with the compressor and run during defrost;

After defrost, there is a timed fan delay allowing for drip time, set by means of the "Fnd" parameter.

An additional parameter "Fsc" 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 "Fsc".

3.3.1 Forced activation of fans

This function is managed by the Fct parameter 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 = 1 or o = Y (fans in parallel to the compressor), by means of the Fnc and Fct 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 Ftc time. With Fnc = 0 the fans remain always off, when the compressor is off.

4. FRONT PANEL COMMANDS

4.1 STANDARD FRONTAL PANEL

Forced activation of fans

When Fnc = 1 or o = Y (fans in parallel to the compressor), by means of the Fnc and Fct 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 Ftc time. With Fnc = 0 the fans remain always off, when the compressor is off.

4.4 Second compressor

With FcA = 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 A1C parameter. Both the compressors are switched off at the same time.

4.5 Alarm relay

With FcA = ALr the relay 1-3 operates as alarm relay. It is activated every time an alarm happens. Its status depends on the Fba parameter: if "Fba = y", the relay is silenced by pressing any key.

4.6 Night blind management during energy saving cycles

With FcA = HED, the relay 1-3 operates to manage the night blind: the relay is energized when the energy saving cycle is activated, by digital input, front button or RTC (optional).
4.3 USE OF LEDS

Each LED function is described in the following table.

<table>
<thead>
<tr>
<th>LED MODE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Compressor enabled</td>
</tr>
<tr>
<td>Flashing</td>
<td>Anti-short cycle delay enabled</td>
</tr>
<tr>
<td>ON</td>
<td>Defrost enabled</td>
</tr>
<tr>
<td>Flashing</td>
<td>Defrost time in progress</td>
</tr>
<tr>
<td>ON</td>
<td>Fans enabled</td>
</tr>
<tr>
<td>Flashing</td>
<td>Fans delay after defrost in progress.</td>
</tr>
<tr>
<td>ON</td>
<td>An alarm is occurring</td>
</tr>
<tr>
<td>Flashing</td>
<td>Continuous cycle is running</td>
</tr>
<tr>
<td>ON</td>
<td>Energy saving enabled</td>
</tr>
<tr>
<td>OFF</td>
<td>Light on</td>
</tr>
<tr>
<td>OFF</td>
<td>Auxiliary relay on</td>
</tr>
<tr>
<td>OFF</td>
<td>Measurement unit</td>
</tr>
<tr>
<td>OFF</td>
<td>Flashing Programming phase</td>
</tr>
</tbody>
</table>

5. MAX & MIN TEMPERATURE MEMORIZATION

5.1 HOW TO SEE THE MIN TEMPERATURE

1. Press and release the °C/°F key.
2. The “LO” message will be displayed followed by the minimum temperature recorded.
3. By pressing the °C/°F 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 °C/°F key.
2. The “HI” message will be displayed followed by the maximum temperature recorded.
3. By pressing the °C/°F 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, then the terminal: (in °C; dE = 0.1 °C) allows decimal point display.
2. To confirm the operation the °C/°F key 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 + °C/°F keys for 3s.
2. The rtc parameter is displayed. Push the SET key to enter the real time clock menu.
3. The Hours (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 d/a (day) parameters.

6.2 HOW TO SET THE SET POINT

1. Push SET+UP keys or wait for 15 s without pushing any key, the “SET” message will be displayed.
2. Push and immediately release the SET key, the display will show the Set point value.
3. 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 point push the °C or °F 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 3 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 + °C/°F 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 the “UP” or “DOWN” to change its value.
4. Press the SET to store the new value and move to the following parameter.

6.6 HOW TO ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing the SET + °C/°F keys for 3s (the °C or °F LED starts blinking).
2. Released the keys, then push again the SET + °C/°F keys for more than 7s. The Pr2 label will be displayed immediately followed from the HY parameter.

NOTE: If none parameter is present in Pr1, after 3s the “noF” message is displayed. Keep the keys pushed till the Pr2 message is displayed.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

6.6.1 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 + °C/°F”.

NOTE: 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 “POFF” 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 or Min temperature stored.
3. If a key is pressed more than 3s the “POFF” message will be displayed.

6.8 TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the °C/°F and SET keys, till the “POFF” message will be restored.

6.9 THE CONTINUOUS CYCLE

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

6.10 THE ONOFF FUNCTION

With °C/°F OFF, pushing the ONOFF key, the instrument is switched off. The “OFF” message is displayed. In this configuration, the regulation is disabled.

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 °C Point + differential (hy). Compressor Cut Out is when the temperature reaches the set point.

LS Minimum set point: [-50°C=SET1-58°F=SET7]; Sets the minimum value for the set point.

US Maximum set point; (SET110°C=SET320°F). Set the maximum value for set point.

O1 Thermostat probe calibration; (-12.0÷12.0°C, -120÷120°F) allows to adjust possible offset of the thermostat probe.

P2P Evaporator probe presence; °C not present: the defrost stops by time; °F 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): °C not present; the terminals 13-14 operate as digital input; °F present, the terminals 13-14 operate as third probe.

P4P Fourth probe presence (n °C not present; °F present).

P4 Fourth probe calibration: (-12.0÷12.0°C, -120÷120°F) allows to adjust possible offset of the fourth probe.

OuS Outputs activation delay at start up: (0=25mm); 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.

ACT 2nd compressor delay at start up (0=25s); Used only if O3 = P2; Time interval between the switching on of the first compressor and the second one.

rt Percentage of the second and first probe for regulation (°P10; 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).

CCI Compressor ON time during continuous cycle: (0=24.0h; res: 10min) Allows to set the length of the continuous cycle: 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÷150°C) it sets the set point used during the continuous cycle.

Compressor ON time with faulty probe: (0=25min) time during which the compressor is active in case of faulty thermostat probe. With COn compressor is always OFF.

CF Compressor OFF time with faulty probe: (0=25min) time during which the compressor is OFF in case of faulty thermostat probe. With COP 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, O1, ALL and ALL have to be checked and modified if necessary.

e Res Solution for °C: (In °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(°F for model with this option enabled); P4 = Fourth probe; SET = set point; dtr = percentage of visualization.

Ed 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(°F for model with this option enabled); P4 = Fourth probe; SET = set point; dtr = percentage of visualization.

dly Display delay: (0=20.0min; res: 10ms) When the temperature increases, the display is updated of 1 °C/°F after this time.

dtr Percentage of the first and second probe for visualization when Lod = dtr (°P100; 100 = P1, 0 = P2): If Lod > dtr 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): rc = Real Time Clock mode. Defrost time follows Ld1=Ld6 parameters on weekdays and Sd1=Sd6 on holidays.

In interval mode. The defrost starts when the time “dtr” is expired.

tdf Defrost type: EL = electrical heater, h = hot gas
dF Probe selection for defrost termination: n= no probe; P1 = thermostat probe; P2 = evaporator probe; P3 = configurable probe; P4 = Probe on Hot Key plug.
dE Defrost termination temperature (−50 ÷ +50 °C; −58 ÷ 122 °F). (Enabled only when [dF] is pressed) sets the temperature measured by the evaporator probe, which causes the end of defrost.
Idf Interval between defrost cycles: (0÷120 h) Determines the time interval between the beginning of two defrost cycles.
Mdf (Max.) length time for defrost: (0÷255 min) When P2 = n, (not evaporator temperature timed defrost) it sets the duration defined, when P2 ≠ defrost based on temperature it sets the maximum length for defrost.
Dsd Start defrost delay: (0÷99 min) This is useful when different start times are necessary to avoid overloading the plant.
FdT Temperature displayed during defrost: (rt = real temperature; it = temperature at defrost start) sets the point for the "dEF" label.
DaD MAX display delay after defrost: (0÷255 min) Sets the maximum time between the end of defrost and the restarting of the real room temperature display.
Ddt Dip time: (0÷120 min) time interval between reaching defrost termination temperature and the restarting 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) dAt Defrost delay after continuous cycle: (0÷23.5 h) time interval between the end of the fast freezing cycle and the following defrost related to it.

FANS
FinC Fans operating mode: C=c runs with the compressor, OFF during defrost; o-c = continuous mode, OFF during defrost; C-c = runs with the compressor, ON during defrost; o-c = continuous mode, ON during defrost.
Fnd Fans delay after defrost: (0÷255 min) Interval between end of defrost and evaporator fans start.
Fct Temperature differential avoiding short cycles of fans: (0÷99%; 0÷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 or N or C, y, C, y, (fan activated in parallel with compressor) it sets the evaporator fan cycling time when the compressor is off. With Fan = 0 and Fon = 0 the fan are always off, with Fon=0 and Foc = 0 the fan are always off.
Fof Fan OFF time: (0÷15 min) with Fnc = C or N or C, y, C, y, (fan activated in parallel with compressor) it sets the evaporator fan off cycling time when the compressor is on. With Fon = 0 and Fof = 0 the fan are always off, with Fon=0 and Foc = 0 the fan are always on.
Fap Probe selection for fan management: n= no probe; P1 = thermostat probe; P2 = evaporator probe; P3 = configurable probe; P4 = Probe on Hot Key plug.

AUXILIARY THERMOSTAT CONFIGURATION (terms: 14, 5): OAU = AUX
AcH Kind of regulation for auxiliary relay: H = heating; CL = cooling
SAA Set Point for auxiliary relay: (−50.0÷+110.0°C; 0°÷550°F) defines the room temperature set point, to switch auxiliary relay.
Shy Differential for auxiliary output: (0.1 ÷ +25.5 °C) = 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: n= no probe, the auxiliary relay is switched off by button; P1 = Probe 1 (Thermostat probe); P2 = Probe 2 (evaporator probe); P3 = Probe 3 (display probe); P4 = Probe 4 fourth probe.
Sad Auxiliary relay off delay after defrost: n= the auxiliary relay operates during defrost.
= y= the auxiliary relay is switched off during defrost.

ALARMS
AlP Probe selection for alarm: n= 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: (A=Off; E= Enable)
A1c The relative 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+ALL" or "SET−ALL" values.
AuM Maximum temperature alarm. (SET+110 °C; SET+230°F) if this temperature is reached the alarm is enabled, after the "ALD" delay time.
All Minimum temperature alarm. (−50.0 °C; −58.0 °F to +230 °C; 0°÷550°F) if this temperature is reached the alarm is enabled, after the "ALD" delay time.
Af1 Intervention differential for temperature alarm. (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 FS temperature is reached.
AlD Temperature alarm delay: (0÷255 min) time interval between the detection of an alarm condition and alarm signaling.
dAO Exclusion of temperature alarm at start-up: (from 0.0 min to 23.5h) time interval between the detection of the alarm condition after instrument power on and alarm signaling.

CONDENSER TEMPERATURE ALARM
Ap2 Probe selection for temperature alarm of condenser: n= no probe, P1 = thermostat probe, P2 = evaporator probe; P3 = configurable probe; P4 = Probe on Hot Key plug.
AL2 Low temperature alarm of condenser. (−55÷0°C) when this temperature is reached the LA2 alarm is signalled, possibly after the A2d delay.
Auz High temperature alarm of condenser. (55÷150°C) when this temperature is reached the HA2 alarm is signalled, possibly after the A2d delay.
A2d Differential for temperature condenser alarm recovery. (0.1÷+25.5 °C; 1÷45°F)
A2d Condenser temperature alarm delay: (0÷255 min) time interval between the detection of the condenser alarm condition and alarm signaling.
A2c Differential temperature alarm exclusion at start up: (from 0.0 min to 23.5h, res. 10min)
blC 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.
A2C 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
tpA Alarm relay silencing (with aoA): n= silencing disabled; alarm relay stays off till alarm condition lasts.
8. DIGITAL INPUTS

The first digital input 13-14 is enabled with P3P = n. With P3P = n and 1F or I2F the second digital input is disabled.

The free voltage digital inputs are programmable by the 1IF and I2F parameters.

8.1 GENERIC ALARM (1F 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 deactivated.

8.2 SERIOUS ALARM MODE (1F 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 deactivated.

8.3 PRESSURE SWITCH (1F OR I2F = PAL)

If during the internal 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 (1F OR I2F = DOR)

It signals the door status and the corresponding relay output status through the "odc" parameter: o = normal (any change), F = Fan OFF, CPF = 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 "4A" and the regulation restarts is tr = tE3. The alarm stops as soon as the external digital input is disabled. With the door open, the high and low temperature alarms are disabled.

8.5 START DEFROST (1F 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 TMS safety time is expired.

8.6 SWITCH THE AUXILIARY RELAY (1F 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 (1F OR I2F=HTR)

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

8.8 ENERGY SAVING (1F = 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 (1F OR I2F = HDF) –ONLY FOR MODELS WITH RTC

This function enabled the holiday defrost setting.

8.10 ON OFF FUNCTION (1F OR I2F = ONF)

To switch the controller on and off.

8.11 DIGITAL INPUTS POLARITY

The digital input polarity depends on the 1IP and I2IP parameters.

1IP or I2IP: the input is activated by closing the contact.

I1F or I2F: 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-WEBS00/300/000.

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/REPS (5m).

11. INSTALLATION AND MOUNTING

The controller XW65L shall be mounted on vertical panel, in a 150x31 mm hole, and fixed using two screws ø 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, excess dirt or humidity. The same recommendations apply to probes. Let the air circulate by the cooling holes.

11.1 CUT OUT

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 heater 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 in key. The “upL” message appears followed 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 “dlO” message is blinking followed 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

<table>
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<tr>
<th>Message</th>
<th>Cause</th>
<th>Outputs</th>
</tr>
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<td>Compressor output acq. to par. “Con” and “Cnf”</td>
</tr>
<tr>
<td>“P2”</td>
<td>Evaporator probe failure</td>
<td>Defrost end is timed</td>
</tr>
<tr>
<td>“P3”</td>
<td>Third probe failure</td>
<td>Outputs unchanged</td>
</tr>
<tr>
<td>“P4”</td>
<td>Fourth probe failure</td>
<td>Outputs unchanged</td>
</tr>
<tr>
<td>“A”</td>
<td>Maximum temperature alarm</td>
<td>Outputs unchanged</td>
</tr>
<tr>
<td>“AC2”</td>
<td>Condenser high temperature</td>
<td>It depends on the “AC2” parameter</td>
</tr>
<tr>
<td>“AC1”</td>
<td>Condenser low temperature</td>
<td>It depends on the “AC1” parameter</td>
</tr>
<tr>
<td>“D”</td>
<td>Door open</td>
<td>Compressor and fans restarts</td>
</tr>
<tr>
<td>“E”</td>
<td>External alarm</td>
<td>Output unchanged</td>
</tr>
<tr>
<td>“CA”</td>
<td>Serious external alarm (1F OR BAL)</td>
<td>All outputs OFF</td>
</tr>
<tr>
<td>“P”</td>
<td>Pressure switch alarm (1F OR BAL)</td>
<td>All outputs OFF</td>
</tr>
<tr>
<td>“NF”</td>
<td>Real time clock alarm</td>
<td>Alarm output ON, Other outputs unchanged; Defrosts according to par. “I1D” Set real time clock hour to be set</td>
</tr>
<tr>
<td>“D”</td>
<td>Real time clock board failure</td>
<td>Alarm output ON, Other outputs unchanged; Defrosts according to par. “I1D” Contact the service</td>
</tr>
</tbody>
</table>

14.1 SILENCING BUZZER / ALARM RELAY OUTPUT

If “trim” and the relay are silenced by pressing any key.

If “ufD” = “y”, 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 “A”, “AC1”, “AC2” automatically stop as soon as the temperature returns to normal values.

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15. TECHNICAL DATA

- **Measuring and regulation range:**
  - NTC probe:
  - Rated impulsive voltage

- **Connections:**
  - Protection:

- **Mounting:**
  - 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(3) 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)

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

- **Relative humidity:** 20-85% (no condensing)

- **Measuring and regulation range:**
  - NTC probes: -40÷110°C (-40÷230°F)
  - PTC probes: -55÷150°C (-55÷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

- **Power supply:** 230Vac or 110Vac or 24Vac ±10%
- **Power consumption:** 0.5W
- **Rating:** 250W / Over Voltage Category II

17. DEFAULT SETTING VALUES

<table>
<thead>
<tr>
<th>Label</th>
<th>Name</th>
<th>Range</th>
<th>°C/F</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set prin</td>
<td>LS=US</td>
<td>5.0</td>
<td>-</td>
<td>1P1</td>
</tr>
<tr>
<td>nD</td>
<td>Read time code menu</td>
<td>0</td>
<td>1P1</td>
<td></td>
</tr>
<tr>
<td>HP</td>
<td>Hi</td>
<td>0.1÷25°C / 32°F</td>
<td>2.0</td>
<td>1P2</td>
</tr>
<tr>
<td>LS</td>
<td>Minimum set point</td>
<td>0÷50°C / 0÷90°F</td>
<td>50.0</td>
<td>1P2</td>
</tr>
<tr>
<td>HS</td>
<td>Maximum set point</td>
<td>50°C / 122°F</td>
<td>110.0</td>
<td>1P2</td>
</tr>
<tr>
<td>F</td>
<td>Probes for temperature calibration</td>
<td>12÷21°C / 50÷70°F</td>
<td>0.0</td>
<td>P2</td>
</tr>
<tr>
<td>FP</td>
<td>Evaporator probe presence</td>
<td>min:present; Y=yes</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>OE</td>
<td>Evaporator probe calibration</td>
<td>-12÷+12°C / -50÷+54°F</td>
<td>0.0</td>
<td>P2</td>
</tr>
<tr>
<td>Q</td>
<td>Third probe calibration</td>
<td>-12÷+12°C / -50÷+54°F</td>
<td>0.0</td>
<td>P2</td>
</tr>
<tr>
<td>FP</td>
<td>Fourth probe presence</td>
<td>min:present; Y=yes</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Fourth probe calibration</td>
<td>-12÷+12°C / -50÷+54°F</td>
<td>0.0</td>
<td>P2</td>
</tr>
<tr>
<td>OD</td>
<td>Outputs delay at start up</td>
<td>0÷255 min</td>
<td>0 P2</td>
<td></td>
</tr>
<tr>
<td>AG</td>
<td>Anti-shut cycle delay</td>
<td>0÷50 min</td>
<td>1 P1</td>
<td></td>
</tr>
<tr>
<td>Asf</td>
<td>Beyond compressed start delay</td>
<td>0÷255 s</td>
<td>5 P2</td>
<td></td>
</tr>
<tr>
<td>nF</td>
<td>P2 percentage for regulation</td>
<td>0÷100.0%</td>
<td>100.0</td>
<td>P2</td>
</tr>
<tr>
<td>CC</td>
<td>Continuous cycle duration</td>
<td>0÷24h</td>
<td>1h</td>
<td></td>
</tr>
<tr>
<td>CCA</td>
<td>End pat for continuous cycle</td>
<td>0÷24h</td>
<td>1h</td>
<td></td>
</tr>
<tr>
<td>CCM</td>
<td>Continuous ON time with faulty probe</td>
<td>0÷120 min</td>
<td>15</td>
<td>P2</td>
</tr>
<tr>
<td>CCF</td>
<td>Compressor OFF time with faulty probe</td>
<td>0÷255 min</td>
<td>36</td>
<td>P2</td>
</tr>
<tr>
<td>CF</td>
<td>Temperature measurement unit</td>
<td>°C</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>JES</td>
<td>Evaporation - condensation distance</td>
<td>mm</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>Ld</td>
<td>Probe displayed</td>
<td>P1/P2</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>rF</td>
<td>K-RE display</td>
<td>P1 - P2 - P3 - P4</td>
<td>P1/P2</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>Display temperature delay</td>
<td>0÷255 min (10 sec)</td>
<td>P1/P2</td>
<td></td>
</tr>
<tr>
<td>nF</td>
<td>P1/P2 percentage for display</td>
<td>1÷99</td>
<td>50</td>
<td>P2</td>
</tr>
<tr>
<td>EAF</td>
<td>Kind of interval for defrost</td>
<td>h</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>nF</td>
<td>Voltage for defrost</td>
<td>14÷24V</td>
<td>18</td>
<td>P2</td>
</tr>
<tr>
<td>MP</td>
<td>PROBE selection for defrost activation</td>
<td>mm</td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td>MP</td>
<td>Defrost activation temperature</td>
<td>-50 +90 °C</td>
<td>8</td>
<td>P1</td>
</tr>
<tr>
<td>nF</td>
<td>Display of defrost status</td>
<td>1÷100</td>
<td>10</td>
<td>P2</td>
</tr>
<tr>
<td>MFP</td>
<td>Maximum length for defrost</td>
<td>0÷255 min</td>
<td>30</td>
<td>P2</td>
</tr>
<tr>
<td>F1</td>
<td>Start delay</td>
<td>0÷999 s</td>
<td>8</td>
<td>P1</td>
</tr>
<tr>
<td>M1</td>
<td>Defrost duration delay</td>
<td>0÷45÷720 min</td>
<td>30</td>
<td>P2</td>
</tr>
<tr>
<td>M2</td>
<td>Maximum delay after defrost</td>
<td>0÷255 min</td>
<td>30</td>
<td>P2</td>
</tr>
<tr>
<td>F2</td>
<td>Defrost training</td>
<td>0÷120 min</td>
<td>0</td>
<td>P2</td>
</tr>
<tr>
<td>M2</td>
<td>Defrost after start-up</td>
<td>0÷255 min</td>
<td>30</td>
<td>P2</td>
</tr>
<tr>
<td>G</td>
<td>Defrost delay after fast freezing</td>
<td>0÷255 min</td>
<td>30</td>
<td>P2</td>
</tr>
<tr>
<td>Fc</td>
<td>Fan operating mode</td>
<td>0÷100%</td>
<td>0÷100%</td>
<td>P1</td>
</tr>
<tr>
<td>M</td>
<td>Fan delay after defrost</td>
<td>0÷255 min</td>
<td>10</td>
<td>P2</td>
</tr>
<tr>
<td>F3</td>
<td>Differential of temperature for forced activation in fans</td>
<td>0÷9°C</td>
<td>2</td>
<td>P1</td>
</tr>
</tbody>
</table>

*Only for model with real time clock

*Only for XW60L with XW60L output

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