

## Control Manual

## CM

Group: Wall Mounted Package  
Part Number: CLIWP CM  
Date: 29 May 2023

## CLIWP Series Direct Expansion Unit with Scroll Compressor

### Model

3 RT / 5 RT

Refrigerant HFC-410A

60 Hz



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**Manufactured in an ISO 9001 certified facility**



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## SAFETY WARNINGS

This manual provides information on the control data of the Comfort Flex CLIWP series.

**NOTE:** Installation and maintenance should be performed only by qualified personnel who are familiar with local codes and regulations and who have experience with this type of equipment.

### ⚠ DANGER ⚠

LOCK OUT/LABEL all power sources before starting, pressurizing, depressurizing or shutting down the chiller. Disconnect electrical power before servicing equipment. More than one disconnection may be required to deenergize the unit. Failure to follow this warning to the letter can result in serious injury or death. Be sure to read and understand the installation, operating and service instructions in this manual.

### ⚠ WARNING ⚠

Electric shock danger. Improper handling of this equipment can cause personal injury or equipment damage. This equipment must be properly grounded. Control panel connections and maintenance should be performed only by personnel knowledgeable in the operation of the equipment being controlled. Disconnect electrical power before servicing equipment. Be sure to install a earth leakage breaker. Failure to install a earth leakage breaker may result in electric shock or fire.

### ⚠ CAUTION ⚠

Static sensitive components. Static discharge during handling of the electronic circuit board can cause damage to components. Use a static strap before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

### ⚠ CAUTION ⚠

When moving refrigerant to/from the cooler using an auxiliary tank, a grounding strap should be used. An electrical charge builds up when halo-carbon refrigerant travels in a rubber hose. A grounding strap should be used between the auxiliary refrigerant tank and the cooler end sheet (ground to ground), which will safely carry the charge to ground. Failure to follow this procedure may result in damage to sensitive electronic components.

### ⚠ WARNING ⚠

If refrigerant leaks from the unit, there is a potential choking danger as the refrigerant will displace air in the immediate area. Be sure to follow all applicable published industry-related standards and local, state, and federal statutes, regulations, and codes if refrigerant is produced. Avoid exposing refrigerant to an open flame or other ignition source.

### ⚠ WARNING ⚠

Polyolester oil, commonly referred to as POE oil, is a synthetic oil used in many refrigeration systems and may be present in this Comfort Flex product. POE oil, if it ever comes in contact with PCV/CPVC, will coat the inside wall of the PVC/CPVC pipe and cause environmental stress fractures. Although there is no PCV/CPVC pipe in this product, keep this in mind when selecting piping materials for your application, as system failure and property damage could occur. Consult the pipe manufacturer's recommendations to determine appropriate pipe applications.

## DANGER IDENTIFICATION INFORMATION

### ⚠ DANGER ⚠

Danger indicates a dangerous situation which, if not avoided, will result in death or serious injury.

### ⚠ WARNING ⚠

Warning indicates a potentially dangerous situation which may result in property damage, personal injury or death if not avoided

### ⚠ CAUTION ⚠

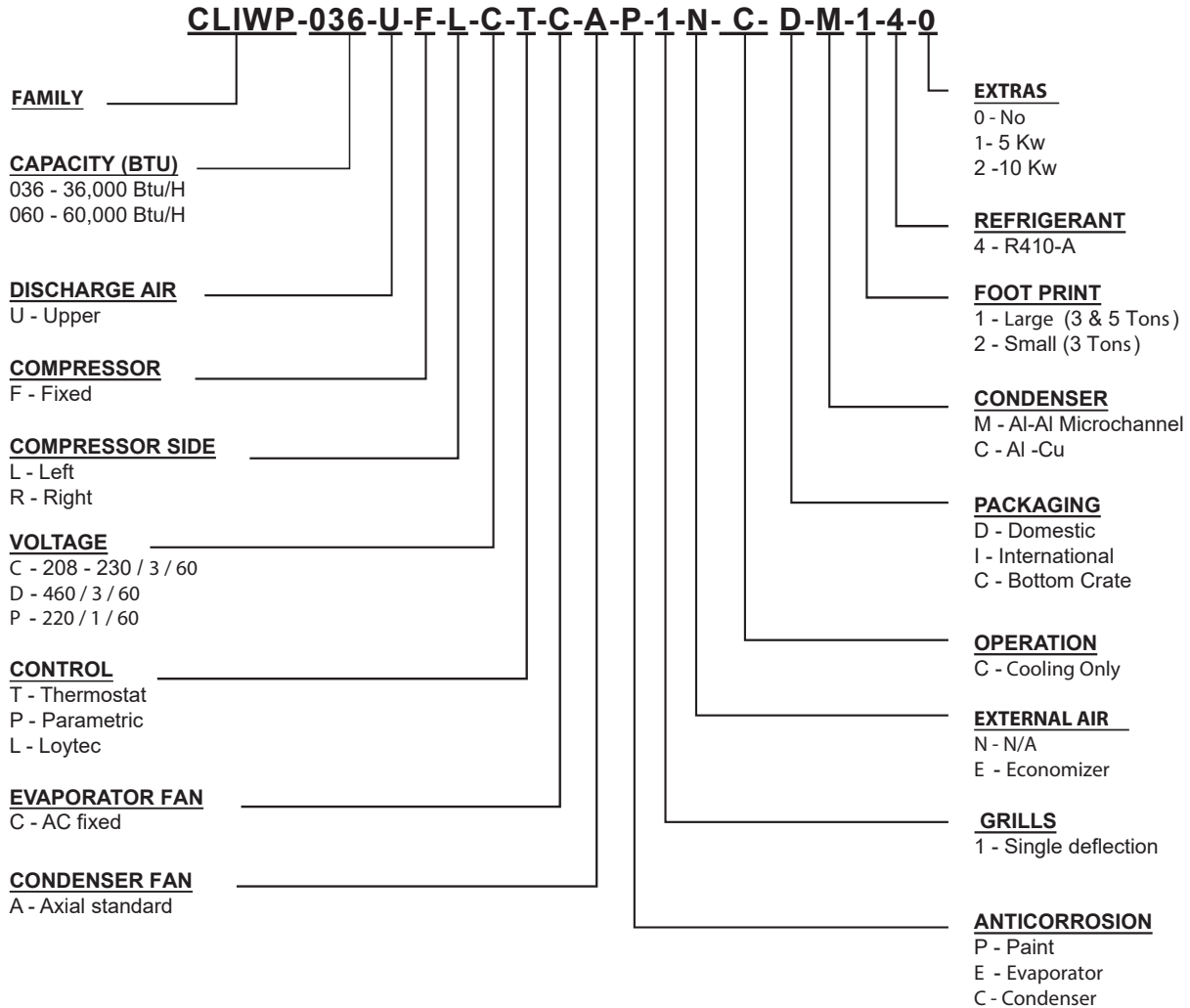
Caution indicates a potentially dangerous situation which may result in minor injury or equipment damage if not avoided.

**NOTES:** Indicate important details or clarifying statements for the information presented.

Comfort Flex's CLIWP series direct expansion Wall Attached Package cooling systems are complete, self-contained, automatic chillers designed for outdoor installation. The package units are fully assembled, factory wired, charged and tested.

The electrical control center includes all operating controls and equipment protection necessary for reliable automatic operation. Components housed in a weatherproof control panel.

### NOMENCLATURE



## FEATURES / BENEFITS

### EFFICIENCY

CLIWP units are designed to meet the needs of any project for telecommunications networks, data centers, laboratories, schools, hospitals and industrial use.

CLIWP units have diverse applications and can be installed individually or in any combination to achieve the exact capacity of the project. Their high efficiency and easy operation achieves the desired temperatures accurately, quickly and with efficient energy consumption.

The CLIWP units can work 1 + 1 (by means of a separately purchased sequencer), i.e., one in operation and one in backup. The units have different connectivity and remote monitoring options using the most common protocols such as ModBus, BACnet and TCP/IP.

### SELF CONTAINED AND SELF SPACE SAVING

The CLIWP unit is completely self-contained. All its components are inside the cabinet. It uses no usable space in the room to be conditioned, it is installed on an exterior wall with a minimum volume, without requiring roof areas or exterior floors.

### EASY TO INSTALL

The equipment is assembled, wired, charged with refrigerant, oil and is systematically factory tested to ensure that you will have a quick and trouble-free installation.

### DESIGN

The work carried out by our engineering and development department has resulted in equipment with high efficiency in design and optimum performance during operation.

The selection of high quality main components, our quality processes and the control system during manufacturing, guarantee a high performance and safety equipment.

All major components are rigorously tested and validated before installation. Each engineered unit has undergone long hours of rigorous testing to ensure the efficiency, safety, durability and quality of the entire system.

All external paint is baked-on and meets the most stringent quality standards (ASTM-B117 1500 hour salt spray test).

The selection of high-end compressors and heat exchangers ensures the capacity and high efficiency of the equipment.

All our equipment has a reduced footprint, which facilitates installation and maintenance maneuvers, being able to make use of stairs, doors and service elevators to move the equipment.

### COMMUNICATION

Our equipment can be connected / integrated through different communication protocols; such as TCP/IP, ModBUS and BacNet\*\*, the most common protocols used in the Air Conditioning industry.

Our equipment keeps track of all programmable variables in real time, such as system load monitoring, specific alarms of the refrigeration cycle, and the electrical system. As well as detection of external factors such as fire or flood (optional sensors).

The control system ensures the correct operation of the equipment by monitoring in real time the condition of the major components (high or low refrigerant pressure, compressor conditions and electrical power monitoring).

In case of failure, the event will be recorded for later analysis, facilitating the location of a possible failure and its solution.

\* Depends on the type of control.

\*\* The available communication protocols depend on the type of control.

### MAINTENANCE

The simplicity in the design of the equipment allows for maximum ease of preventive/corrective maintenance. All major components are available to maintenance personnel by simply opening the service panels.

If an emergency shutdown occurs, the digital control of the equipment will indicate in detail the cause of the alarm, helping to facilitate and accelerate the solution of the alarm.

### TESTS

This task is charged with the refrigerant necessary for proper operation based on the customer's installation conditions.

The units are tested at full load operation, thermal load and line voltage at actual operating conditions.

**NOTE: The warranty policy requires that startup and commissioning be performed by qualified personnel authorized by the manufacturer.**

## ElectroFin® E-Coat Coil coating corrosion resistant factory-applied

ElectroFin® E-Coat is a flexible, water-based, cationic epoxy polymer using an electrodeposition coating process designed specifically for heat transfer coils in heating, air conditioning and refrigeration systems. The PPG POWERCRON® HE (high edge) technology enhances fin edge coverage through a polymerized through a unique polymer that controls the flow characteristics of the coating.

### Electrofin® E-Coat Meets The Following Testing Standards

- ASTM B117 / DIN 53167 Salt spray test - over over 15,000 hours.
- ASTM G85 Annex A3 SWAAT Salt Spray Test with modified salt - 3000 hours.
- Division 23 specification for main construction VA for High Humidity Installations.
- CID AA-52474A (GSA)



## TECHNICAL FEATURES

PROPERTY	TEST METHOD	PERFORMANCE
Dry layer thickness	ASTM D7091	0.6-1.2 mils / 15-30 µm
Brightness - 60 degrees	ASTM D523	55-75
Pencil hardness	ASTM D3363	2H minimum
Inmersion water	ASTM D870	1000 hours
Cross hatch adhesion	ASTM D3359	5B
Direct impact	ASTM D2794	160 in-lb
Salt spray corrosion	ASTM B117 / DIN 53167	More of 15,000 hours
Humidity	ASTM D2247	1000 minimum hours
Reduction of heat transfer	--	Less than 1%
Improved flap coating	--	Up to 30 flaps per inch
pH range	--	3-12
Temperature limits	--	-40°F to 325°F / -40°C to 163°C (Dry load)

## CONTROL

### CLIWP CONTROL BY LOYTEC LIOB-585

LIOB-585 I/O controllers are compact, IP-enabled, programmable automation stations for LonMark systems and BACnet/IP networks with physical inputs and outputs and integrated graphical display.



### COMMUNICATION

The LIOB-585 I/O Controller is equipped with two Ethernet ports including a built-in Ethernet. This makes it possible to build a daisy-chain line topology of up to 20 devices, which reduces network installation costs. Devices with dual Ethernet ports also allow configuring a redundant Ethernet installation (ring topology) which increases reliability. The redundant Ethernet topology is enabled by the Rapid Spanning Tree Protocol (RSTP), which is supported by most managed switches.

Technology data points are automatically exposed as OPC tags for higher-level OPC client applications, higher-level OPC client applications or the L-WEB system through the integrated OPC server that provides SSL encrypted Web Services (OPC XML-DA) or UA secure conversation (OPC UA).

The L-IOB I/O controllers also enable data exchange via global connections (network-wide data exchange), offer AST™ functions (Alarming, Scheduling, and Trending), store customized graphic pages for display on LWEB-802/ 803, and can be seamlessly integrated into the LWEB-900 building management system.

LIOB-585 I/O controllers implement the BACnet Building Controller (B-BC) profile and are BTL certified.

### IOT INTEGRATION

The IoT function (Node.js) makes it possible to connect the system to almost any cloud service either to upload historical data to analysis services, deliver alarm messages to alarm processing services or to operate parts of the control system via a cloud service (e.g. scheduling based on web calendars or reservation systems).

It is also possible to process information from the Internet, such as weather data, into forecast-based control. Finally, the JavaScript core also makes it possible to implement serial protocols to non-standard equipment in primary plant control.

### HARDWARE INSTALLATION

An LIOB-58x I/O controller is connected to a BACnet network using the Ethernet/IP port of the L-IOB device. The device must be powered, for example, with an LPOW-2415A power supply.

### BACNET START-UP OR CONFIGURATION

For LIOB-58x models, the initial IP and BACnet configuration must be performed on the LCD user interface or the web user interface. On the LCD interface of the LIOB-48x/58x, the IP address and Ethernet status is displayed instead of the PLC status. The menu items are shown below.

Figure 1. LCD user interface main screen



Turn the jog dial to navigate between menu items and press to enter a menu or go to selection mode. When in selection mode, turn the jog dial to change the value and press again to exit selection. The data points icon (Folder Icon) allows you to navigate through the data points of the device.

LIOB-48x/58x devices can additionally host a LIOB-45x/55x device in LIOB-IP mode. In this case, there will be an additional LIOB-IP menu on the main screen.

The device configuration icon (Gear Icon) allows configuring the basic device settings. Navigate, for example, to the Device Management submenu "Device Management", shown in Figure 2.

Figure 2. Device management menu on the LCD user interface.

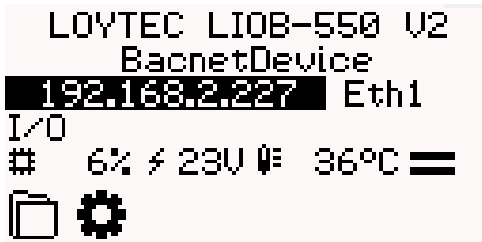


This menu offers you, for example, the following options for the basic configuration of the device:

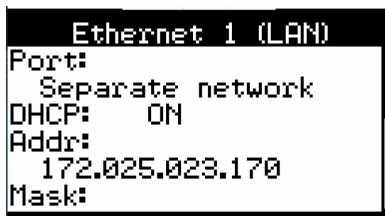
<b>TCP/IP configuration (LIOB-48x/58x)</b>	IP configuration page (IP address, etc.).
<b>Send identification messages</b>	Send a service pin message (LIOB-18x/48x) or an I-Am message (LIOB-58x).
<b>Restart system</b>	By choosing this option, the device performs a hard reset.
<b>Delete DP configuration</b>	By choosing this item, the user can clear the entire data point configuration of the device.
<b>Factory settings</b>	By selecting this option, the user can reset the entire device to factory defaults.
<b>PIN</b>	Allows the default PIN to be changed to any 4-digit number to protect certain operations on the LCD user interface. The user will be prompted to enter the PIN in the protected areas.
<b>Contrast</b>	Change the display contrast.
<b>Language</b>	Change the LCD language. Note that this requires a restart of the device.
<b>Reset I/O counters</b>	Resets all I/O counters such as pulse count values.

**To set the IP address on the LCD:**

1. Navigate to the IP address on the main screen and press the button.



2. Navigate to the required input fields, press and change the value. Press again to set the value. Continue to the next field.



3. Finally navigate to Save and Restart and press.
4. Confirm the reboot and the device will reboot with the new IP address.

**To set the BACnet device ID through the LCD display:**

1. On the main LCD screen, navigate to the Device Setup "" option.
2. Then navigate to the BACnet menu "".
3. In that menu, navigate to the ID entry to enter the device ID. The field is divided into two controls, one for thousands and one for singles, to simplify entering large numbers.



4. Once the device ID has been entered, the device name is automatically mounted using that device ID, if no other name has been configured in the web interface.
5. For the changes to take effect, the device must be rebooted. To do this, you can select the menu option

**STATUS LED OF LIOB-58X/59X**

The meaning of the LED signals for the LIOB-58x/59x models is shown in Table .

**Table 1. LIOB-58x/59x Status LED Patterns**

Behavior	Description	Comment
Shutdown	No traffic	No packets are received or transmitted.
Blinking GREEN	Traffic	L-IOB device is receiving or transmitting packets.
ORANGE	Manual Mode	At least one I/O is in manual mode.
RED	Error	An error has occurred (e.g. a sensor is disconnected).
Red flashing at 0.5 Hz and "LIOB Fallback" displayed on LCD interface	Cancellation of the reservation	The primary program image is corrupted and the L-IOB has started the backup image. In this case, the program must be updated again.



## CONTROL

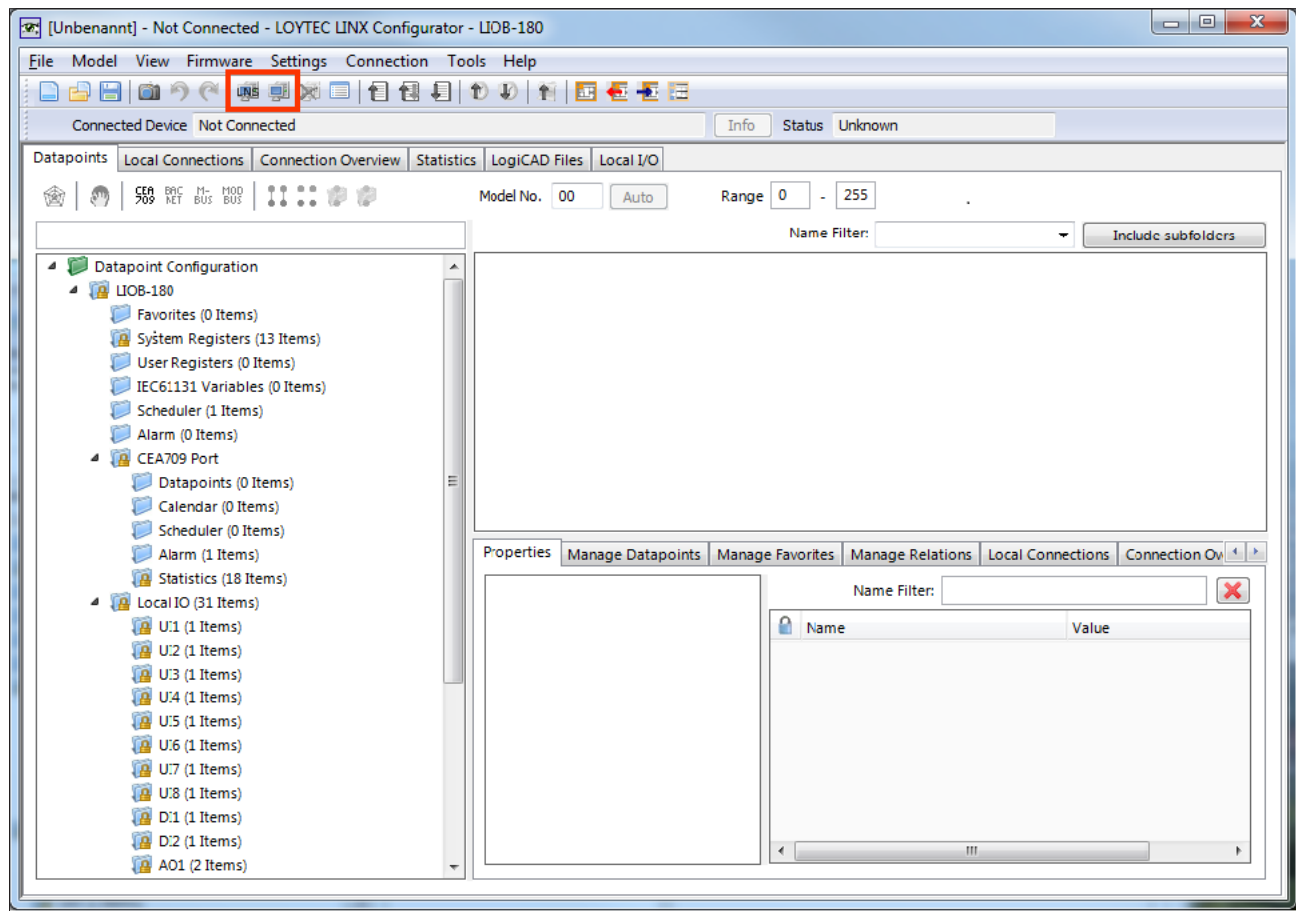
### INTRODUCTION TO THE L-INX CONFIGURATOR

Before setting up a working IEC61131 program, it is necessary to configure the data points of the L-IOB device. These may be I/O data points, network variables, registers, etc. Before executing the following steps, install the L-INX Configurator software from the 'setup.exe' file. This file can be downloaded from [www.loytec.com](http://www.loytec.com).

#### To start a configurator project:

1. Start the L-INX Configurator software by selecting Windows Start → Programs → LOYTEC LINX Configurator → LOYTEC LINX Configurator. The application starts and displays the data point manager screen as shown in Figure 7.
2. When the device is online, connect to the device by clicking the connection speed button on the LNS or device as indicated by the red rectangle in Figure 7.
3. For detailed information on how to create data points, etc., refer to the LINX configurator user manual.

Figure 3. Main screen of the L-INX Configurator.



### EXPANSION MODULE CONFIGURATION

The L-INX Configurator uses a separate tab for I/O configuration. I/O configuration can be done off-line and is shown in the following steps.

1. For LIOB-48x/58x models, select the L-IOB tab and then LIOB-LOCAL.



2. The I/O available on that L-IOB device are shown in the **Inputs / Outputs** table.

**Inputs / Outputs**

Nr	TerminalNr	Terminal	Name	Hardware type
1	1	UI1	UI1	IN Analog/Digital
2	2	GND12	GND UI1-UI2	IN Analog/Digital
3	3	UI2	UI2	IN Analog/Digital
4	4	UI3	UI3	IN Analog/Digital

3. To adapt the I/O name, double-click on the name in the **Name** column and edit it, e.g. 'RoomTemp'.

Nr	TerminalNr	Terminal	Name	Hardware type
1	1	UI1	RoomTemp	IN Analog/Digital

4. Select (or multi-select) an I/O in the list of **Inputs/Outputs** and look at the list of **Object Parameters** below. These parameters can be used to configure the I/O.

**Object parameters**

Nr	DP Create	OPC	PLC In	PLC Out	Parameter name	Parameter value	Unit	Range	Description
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Name	RoomTemp			Terminal name
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	HardwareType	IN Analog/Digital			Terminal type
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SignalType	Voltage 0-10V			Type of the input/output signal

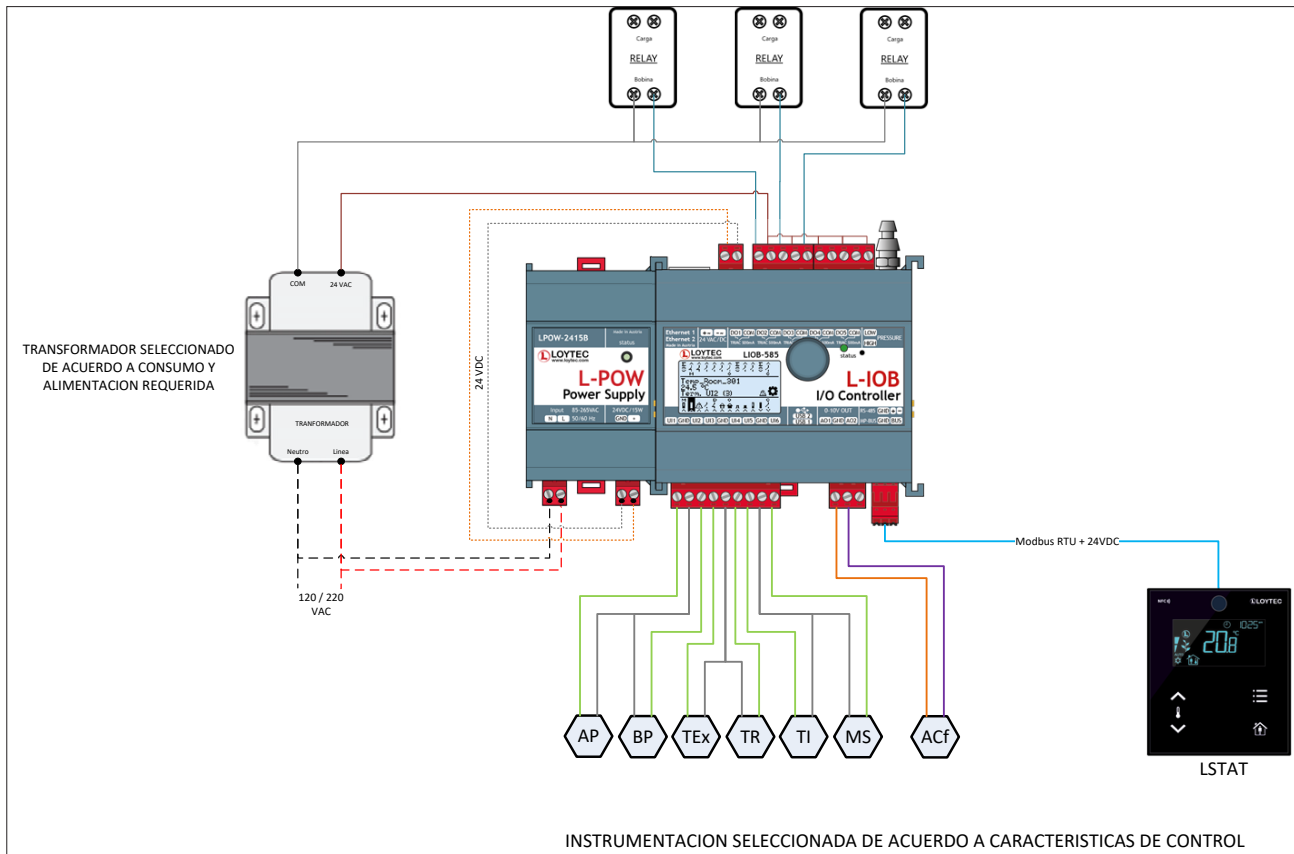
5. In the Data points tab, the data points for the I/O have been created. These data points can be used, for example, in the IEC61131 logiCAD program. For the inputs, the data point L1\_x\_Uland\_Input will be used to read an input value and for the outputs the data point L1\_x\_DOand\_Output will be used to set an output value.

**LOYTEC INPUTS AND OUTPUTS**

NAME	NOMENCLATURE	SENSOR TYPE	I/O PHYSICS	AI	DI	AO	DO (TRIAC)	SPD (500 Pa)
High Pressure	AP	N.O. Switch	UI-1		1			
Low Pressure	BP	N.O. Switch	UI-2		1			
Outdoor Temp.	TEx	Thermistor 10KM II	UI-3	1				
Return Temp.	TR	Thermistor 10KM II	UI-4	1				
Injection Temp.	TI	Thermistor 10KM II	UI-5	1				
Motor Saver	MS	N.O. Switch	UI-6		1			
AP Vent. Condenser	Apv	Relay 24 VAC	DO-1				1	
AP Evaporator	Apc	Relay 24 VAC	DO-2				1	
AP Compressor	APdx	24 VAC Relay	DO-3				1	
AC Free Cooling	ACf	0-10 VDC	AO-1			1		
Zone Temp.	TZ			LSTAT (MODBUS RTU)				
<b>Total points per Ctrl</b>				<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>0</b>

## CONTROL

Figure 4. Loytec Inputs / Outputs Diagram.



### USE OF CLIWP SYSTEM.

The CLIWP system has a digital thermostat which can be used as a temperature sensor or in this case it is configured so that the equipment can be turned on and the system points can be modified.

The following describes the use of the LSTAT thermostat as shown in Fig. 9 and the indicators it contains; in this case the icons shown are part of the CLIWP system startup system.

Figure 5. Thermostat LSTAT

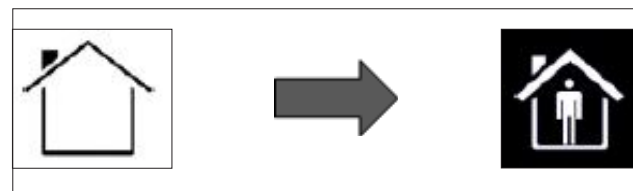


### System startup:

In order to start the system, press the house icon located at the bottom of the thermostat.



After pressing the icon you will notice that the icon on the screen will change as shown in the following images.



Once the above steps have been completed, the evaporator fans will start up. During this process the displayed time icon will be shown on the display.



Once the evaporator fan start time is over, the condenser fan will start and then the compressor will start, during the process of these last two steps the following icons will be displayed.



Once the system is turned on, the temperature of the site can be observed from the main screen.



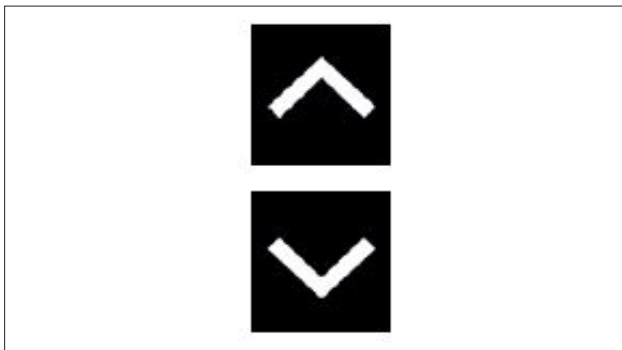
To change the temperature set point, press the icon shown below on the thermostat.



Once the previous step is done, the display screen will change.



Entering the screen with the SPT legend, the up and down keys can be used to change the desired value from the LSTAT.



Once the above steps have been performed and the desired set point has been selected, if you need to go back to the main screen, press the menu button mentioned above again.

**Free cooling:**

The CLIWP system has a free cooling working mode which has the function of detecting when the outdoor temperature is lower than the indoor temperature, so when the temperature probe reflects these values it automatically turns off the condenser fan and the compressor in order to let the air in through the damper with the help of the evaporator fan. When this action happens the display will change to green and show the following icon:



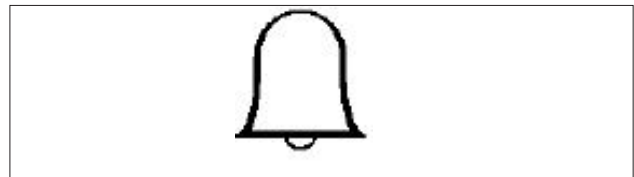
**LOYTEC CONTROLLER ALARMS**

The CLIWP system has 3 alarms: The first alarm is triggered by the low pressure switch and the second alarm is triggered by the high pressure switch, these alarms are digital signals which are programmed so that when an event happens where either of the 2 pressure switches becomes open at that moment the controller stops the operation of the system allowing the compressor work not to continue until both the high and low pressure has been restored.

The third alarm is a digital signal which is activated by the phase monitoring device, which has the function of activating an electrical signal to the controller at the time it detects an over current or an unbalance of electric current.

The way in which the system detects the faults is through the LSTAT digital thermostat interface which, as soon as there is an alarm in the system caused by any of the 3 conditions mentioned above, will show an alarm icon as shown in Figure 10.

*Figure 6. Alarm*



When a high pressure or low pressure alarm is activated, the system will initiate an auto reset routine which has the function to allow it to work without the need to reset it from the thermostat, the allowed number of auto reset is 3 times after having fulfilled these conditions, the system will alarm and as a consequence it will completely stop the system operation showing an icon in the display as the following one:



When this alarm occurs, the icon in the image must be pressed.



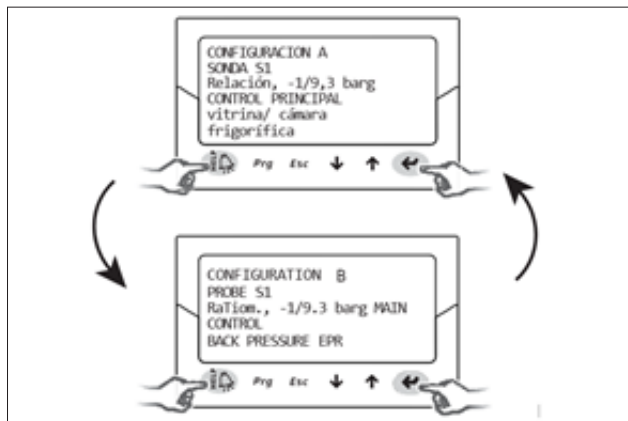
## CONTROL

### SWITCHING FROM ONE DRIVER TO ANOTHER



#### Procedure

Press the Help and Enter keys simultaneously. Forced switching during parameter programming leads to displaying the parameters of driver A and driver B on the same screen.



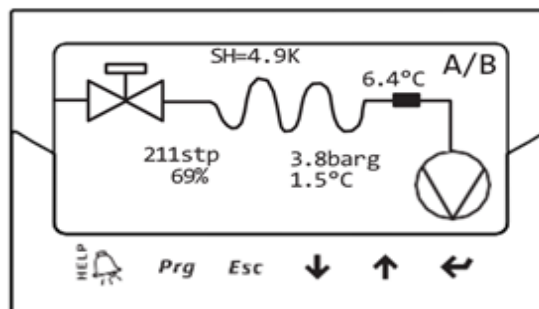
**NOTE: The S1 probe parameter is common to both drivers, the main control parameter is set for each driver.**

### DISPLAY MODE

The Display mode allows to display the variables useful to know the system operation.

The variables displayed depend on the type of control chosen.

1. Press Esc one or more times to go to the standard display.
2. Select the driver A or B for which you want to display the variables (see par. 3.3);
3. Press UP/DOWN: the display shows a graph of the superheat variables, the valve opening percentage, the evaporating temperature and pressure and the suction temperature;
4. Press UP/DOWN: the display variables appear and in the queue the displays of the electrical connections of the probes and valve motors;
5. Press Esc to exit the Display mode.
6. For the complete list of the variables used according to the type of control.



### PROGRAMMING MODE (DISPLAY)

Parameters can be changed via the front keypad. Access is different depending on the user level: support (installer) and manufacturer parameters.

#### Modification of the Assistance parameters.

The Support parameters, as well as the parameters for controller start-up, also include those for input configuration, output relay, overheating set point or control type in general and protection thresholds.

#### Procedure:

1. Press Esc one or more times to go to the standard display and select the driver A or B from which you want to modify the parameters.
2. Press Prg: the display shows a screen asking for the PASSWORD.
3. Press ENTER and enter the password for the Assistance level, starting from the rightmost digit and confirming each digit with ENTER;
4. If the value entered is correct, the first modifiable parameter appears: network address.
5. Press UP/DOWN to select the parameter to be modified.
6. Press ENTER to move to the parameter value.
7. Press UP/DOWN to change the value.
8. Press ENTER to save the new parameter value.
9. Repeat steps 5, 6, 7, 8 to modify the other parameters.
10. Press Esc to exit the procedure for modifying the Assistance parameters. The display automatically returns to the standard mode.



#### NOTES:

- If an out-of-range value is inserted during the configuration of a parameter, it is not accepted and after a short time the parameter returns to the value preceding the modification.

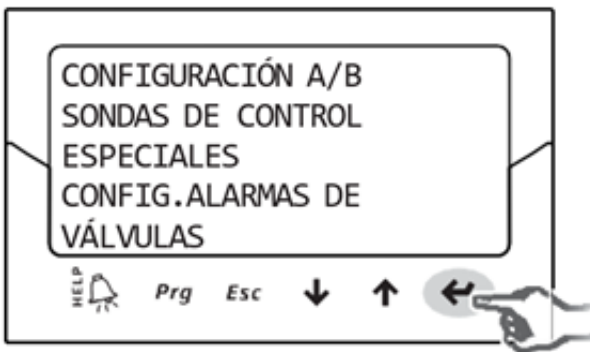
- If no key is pressed, the display automatically returns to the standard display after 5 minutes.
- To set a negative value, position with Enter on the leftmost digit and press Up/Down.

## MODIFICATION OF THE MANUFACTURER'S PARAMETERS

The Manufacturer level allows the configuration of all controller parameters, and therefore, in addition to the Assistance parameters, the parameters corresponding to the management of alarms, probes and valve configuration.

### Procedure:

1. Press Esc one or more times to go to the standard display.
2. Select the A or B driver for which you want to change the parameters.
3. Press Prg: the display shows a screen asking for the PASSWORD;
4. Press ENTER and enter the password for the Manufacturer level: 66, starting from the rightmost digit and confirm each digit with ENTER.
5. If the value entered is correct, the list of parameter categories appears:
  - Configuration
  - Probes
  - Control
  - Special
  - Alarm configuration
  - Valve
6. Press UP/DOWN to select the category and ENTER to access the first parameter of the category.
7. Press UP/DOWN to select the parameter to be changed and ENTER to move to the parameter value.
8. Press UP/DOWN to modify the value.
9. Press ENTER to save the new parameter value.
10. Repeat steps 7, 8 and 9 to modify the other parameters.
11. Press Esc to exit the Manufacturer parameter modification procedure.



### NOTES:

- The entry at the Manufacturer level allows modification of all controller parameters.
- If an out-of-range value is entered during the configuration of a parameter, it is not accepted and the parameter returns to the value before the modification after a short time.
- If no key is pressed, the display automatically returns to the standard display after 5 minutes.

## NETWORK ADDRESS

The network address assigns the controller an address for serial connection to a supervisory system via RS485 and to a pCO controller via pLAN, tLAN, Modbus®. It is a common parameter for both driver A and B.

Parameter/description	Predet.	Min	Max	UM
Configuration				
Network address	198	1	207	-

In the case of network connection of the RS485/Modbus® models, it is also necessary to set the communication speed in bits per second, by means of the parameter "Network settings".

## REFRIGERANT

The type of refrigerant is essential for the calculation of superheat. It is also used to calculate the evaporating and condensing temperature from the pressure probe measurement.

Parameter/description	Predet.
Configuration	
Refrigerant	R404A

## VALVE

By setting the valve type, all the control parameters are automatically defined based on the construction data of each model. In the manufacturer's programming mode it will then be possible to fully customize the control parameters in case the valve used is not present in the predefined list. In such a case, the controller will indicate the modification by marking the valve type as "Custom".

Parameter/description	Predet.
Configuration	
Valve:	CAREL
1= CAREL ExV;	EXV

### NOTES:

- The configuration of two CAREL ExV valves connected together must be selected whenever two CAREL ExV valves are to be connected to the same terminal, to achieve parallel or complementary operation;
- As indicated above, regulation is only possible with CAREL ExV valves;
- Not all CAREL valves can be connected.

## CONTROL

### PRESSURE PROBES S1 AND S2

By setting the type of pressure probe S1 for driver A and S2 for driver B, the measuring range and alarm range are defined based on the construction data of each model and generally indicated on the card placed in the probe.

Parameter	Description
S1	NTC temperature sensor
S2	Suction pressure transducer from 0 to 45 bar

**NOTE: If two pressure probes S1 and S2 are installed, they must be of the same type. It is not possible to use one proportional and one electronic probe.**

**NOTE: In the case of ducted systems where the same pressure probe is shared between twin1 and twin2 controllers, choose the normal option for driver A of the twin1 controller and the “remote” option for the other drivers.**

Example: If you want to use for driver A and B the same pressure probe P1, type: 4...20mA, -0,5...7 barg  
For driver A of twin 1 controller select: 4...20mA, -0.5...7 barg.  
For driver B of twin 1 controller and for driver A and B of twin 2 controller select: remote 4...20mA, -0.5...7 barg.

#### NOTES:

- The default measurement range is always in bar gauge (barg). In the Manufacturer menu, you can customize the parameters corresponding to the measuring range and alarms if the probe used is not in the standard list. If the measuring range is modified, the driver will detect the modification and indicate the probe type S1 and S3 as “Custom”;
- The driver software takes the unit of measurement into account. If a measuring range is selected and then the unit of measurement is changed (from bar to psi), the driver automatically updates the measuring range limits and alarm limits. By default, the main control probes S2 and S4 are set to “NTC CAREL”. Other probe types can be selected in the service menu.
- Unlike the pressure probes, the temperature probes do not have any parameters corresponding to the measuring range that can be changed, and therefore only the models listed can be used (see the chapter on “Functions” and the parameter list). In any case, in the manufacturer’s programming mode, you can customize the probe alarm signal limits.

### MAIN CONTROL

When setting the main control, the operating mode of each driver is defined.

Parameter/description	Predet.
1= channeled counter/chamber	Counter/channeled camera

The superheat set point and all the parameters relative to PID control, the operation of the protectors and the meaning and use of probes S1/S3 and S2/S4 will be automatically set to the values recommended by CAREL according to the selected application.

During this initial configuration phase, only the superheat control modes from 1 to 10 can be set, which differ according to the application (chiller, refrigerated counter, etc ).

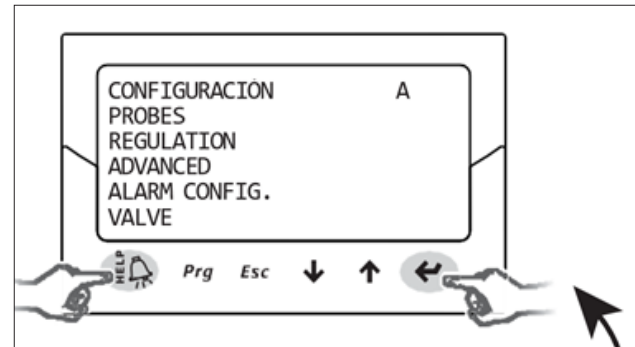
In case of errors in the initial settings, these parameters can be accessed later and changed in the service or manufacturer menu. If the default controller parameters are reset, the display will show the guided start-up procedure again at the next start-up.

### CHECKS AFTER INITIAL START-UP

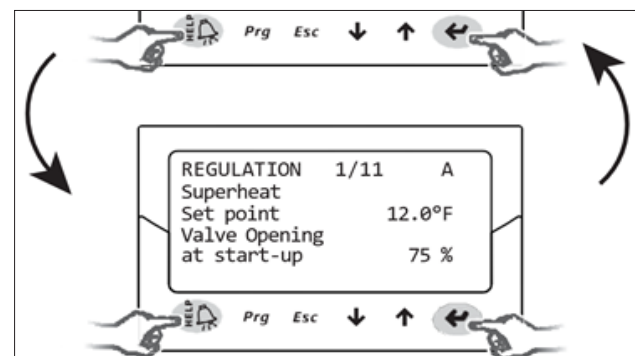
After the first start-up:

- Check that the valve performs a complete closing cycle for alignment.
- Set, if necessary, in the Assistance or Manufacturer programming mode, the overheating set point (if you do not want to maintain the one recommended by CAREL depending on the application) and the protection thresholds (LOP, MOP, etc ).

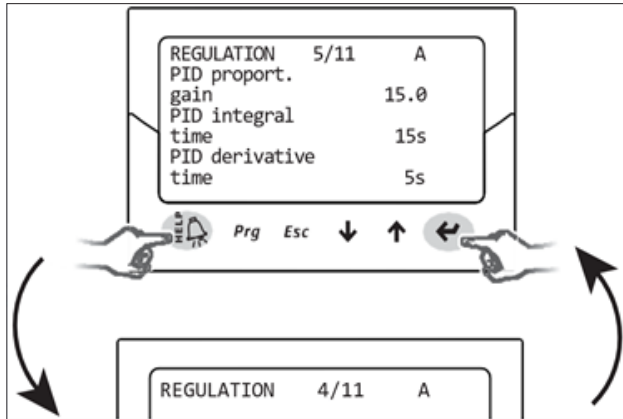
### STEPS FOR PARAMETER SETTING AND SEPOINT SUPER HEAT.



As mentioned in the display programming mode section, enter the regulation menu.

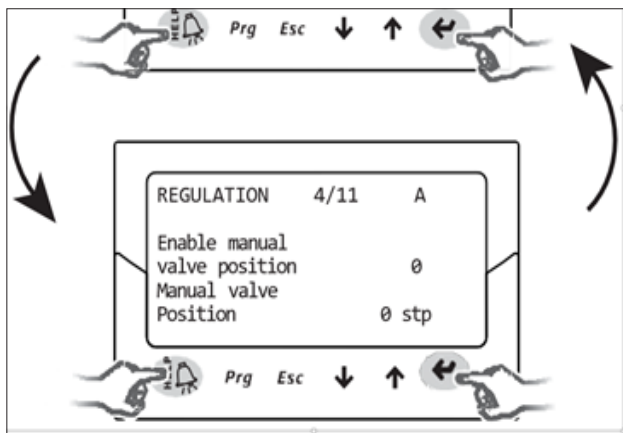


By pressing the **down** key, scroll the regulation menu to number 1. Press **enter** and use the **up** and **down** keys to select the desired super heat setpoint, then press the **enter** key and then the **esc** key to return to the menu selection.



By pressing the **down** key, scroll the adjustment menu to number 5.  
 Press enter and use the **up** and **down** keys to verify that these parameters are set.

**Warning:** these parameters should only be manipulated by a professional.



By pressing the **up** or **down** key, scroll the regulation menu to number 4. In case you need to adjust the measurements or tests for the electronic valve, from this menu you can select the desired opening for the valve.

**Warning:** These parameters should only be manipulated by a professional.

## CLIWP CONTROL BY UNIVERSAL 7 DAY THERMOSTAT P722Uc



### FRONT PANEL CONTROLS

#### System heating/off/cooling mode switch:

Set this switch to HEAT to control your heating system and COOL to control your cooling system. The OFF position will disable the heating and cooling units.

#### Fan mode switch, auto/on:

When in AUTO, the fan (if present in your system) will cycle on and off only when heating or cooling. In the ON position, the fan will run constantly at all times with or without a heating or cooling demand.

#### Multifunction, slide switch:

It provides easy access to common settings, and should always remain in RUN, unless a particular point is being modified.

**NOTE:** When the thermostat is in the non-programmable "Manual" mode, all 5 switch positions will function as RUN, except the "FILT/ENERGY" location.

#### Up/Down buttons:

The UP and DOWN buttons are used to control the set temperature or adjust any other item on the display. Usually, a flashing item can actually be adjusted.

#### Hold button:

This button activates and deactivates the manual hold temperature application, which maintains a fixed set temperature indefinitely without following a program routine.

#### Postpone button:

This button activates and deactivates the POSTPONER function, which overrides the set temperature for a modifiable duration.

#### EMER button:

For heat pump systems: this button activates the Emergency Heat mode and prevents the outdoor unit from running. For conventional systems (without heat pumps), this button will have no effect on the normal RUN mode.



## CONTROL

### NEXT button:

This is used when setting items such as software options and temperature programs.

When items on the display are flashing during settings. Pressing the NEXT button will allow the flashing item to be changed.

## SYSTEM SETTING

Configuration options for how the thermostat will operate, along with the choice of the particular type of your system, are made using an on-screen menu.

### To enter the configuration menu:

Move the System Mode switch to the OFF position and then press and hold the EMER button for approximately 5 seconds until the display changes. The menu will always start with item #1 and advances to each of the following items with a single press of the NEXT button. The options for each item are changed using the UP and DOWN buttons.

### Item #01 (Clock format):

[12 hrs, default] This displays the clock time using the standard AM and PM values.

[24 hr] This displays the clock time using the military time format (e.g. 22:00 hours, without using AM or PM).

### Item #02 (Temperature scale):

[F, default] Display all temperature values in Fahrenheit.  
[C] Display all temperature values in Celsius.

### Item #03 (Thermostat type):

[Programmable, Default] Use this setting to follow a program routine.  
[Manual] This setting omits the program routine and operates as a manual style non-programmable thermostat. This is very basic and only displays the room temperature and sets the temperature on the display without a clock.

### Item #04 (Amount of the period):

[4P, default] The thermostat uses four periods per day, called MORN, DAY, EVE and NITE.

[2P] The thermostat uses two periods per day called DAY and NITE.

### Item #05 (Early recovery):

[Off, default] Temperature schedule values begin to be presented exactly at the period start times.

[On] Early recovery affects how the transition occurs when switching from the NITE period to the MORN period and when switching from the DAY period to the EVE period. The thermostat calculates how long it takes your home to recover from a setback on a daily basis and turns on early to achieve the set goal of the next program period by the period start time. While in recovery, the word RECOV (Recovery) will appear on the display.

### Item #06 (Time delay):

[5, default] The thermostat waits 5 minutes before turning the system back on after the last time it was turned on. This internal delay prevents rapid cycling and provides wallpack protection. The 5 minute setting is fine for most applications.  
[2] Same operation as above but decreased by 2 minutes between status changes.

### Item #07 (Temperature swing adjustment):

A thermostat operates by turning the heating or cooling system on and off whenever the room temperature varies from the desired set temperature. The amount of this variation is called "swing".

Use the UP/DOWN buttons to change the value of the number between 1 and 9. The system should typically run between 3 and 6 cycles per hour. A lower swing value increases the number of cycles per hour, so that the room temperature is more accurate and constant. A higher swing value causes the system to stay on for a longer duration each time and decreases the number of cycles per hour.

## CONFIGURATION DAY AND TIME

1. Set the Set Slide switch to the DAY/TIME position. With the day flashing, press UP or DOWN to set the day of the week.
2. Press NEXT and the clock will begin to flash. Use UP or DOWN to set the time, making sure the AM/PM indication is correct.
3. Holding down the UP or DOWN buttons will cause the clock digits to scroll rapidly.
4. Return the Set Slide switch to the RUN position when finished.

## COOLING OPERATION

Cooling operation can be obtained by setting the Set Slide switch to the RUN position and selecting COOL on the system mode switch, and adjusting the temperature using the UP or DOWN buttons. When the thermostat is first turned on, it will follow a default temperature routine that is pre-set at the factory. Alternatively, you can use the HOLD button to maintain a set temperature.

## TEMPERATURE PROGRAMMING

To set a temperature program, choose the cooling mode.

1. Move the setting slide switch to TEMP PROG mode. The programming will start on a Monday.
2. Use the UP/DOWN buttons to modify the start time for the MORN period and then press the NEXT button to advance.
3. Use the UP/DOWN buttons to set the fixed temperature for the MORN period and press the NEXT button to advance.
4. Now modify the start period and set the temperature for the DAY period, pressing the NEXT button after each point to advance.
5. Repeat these same steps to modify the start times and temperatures for the EVE and NITE periods.

