Clima-Flex®
Air Conditioning
a member of DAIKIN group

Installation, Operation and Maintenance Manual

IOM

Group: Wall Mounted Package
Part Number: CLIWP IOM
Date: 11 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

Pre-Startup Checklist - Direct Expansion Unit with Scroll Compressor

Must be completed, signed and delivered to Clima Flex at least 2 weeks prior to the requested start date.

Job name	
Place of installation	
Customer order number	
Model number(s)	
G.O. Number(s)	

Electrical	Yes	No	N/A	Initials
Building controls in operation				
* Power cables connected to power block or optional disconnect switch				
Power cables have been checked for proper phasing and voltage				
All interlock scripts are complete and meet unit specifications				
Power is applied at least 12 hours prior to start-up				
Oil heaters energized at least 12 hours prior to startup				
Cooler components (EXV sensor transducers) installed and wired properly				
*Wiring complies with National Electrical Code and local codes (See NOTES)				

Various	Yes	No	N/A	Initials
Unit control shuts down / disconnects				
Factory overhaul of evaporator/condenser lines				
Leak, evacuation and charge check of all refrigeration piping/components				
Sensors, control, etc., installed				
Minimum system load of 80% of available capacity to test/adjust controls				
Attachment: Technical breakdown of selection software				
Attachment: Acknowledgement of Final Order Receipt				

NOTES: The most common problems that delay start-up and affect unit reliability are:
1. Compressor motor power cables installed in the field are too small. Questions: Contact your local Clima Flex sales representative*. Indicate the size, number and type of conductors and conduits installed:
a. From the power supply to the equipment.

_____
*** Refer to NFPA 70-2017, article 440.35.**
2. Evaporator piping is incomplete or incorrect. Provide approved piping diagrams.
3. The items on this list have been incorrectly recognized, resulting in delayed start-up and possible additional round-trip travel costs

Contractors' representative

Signature _____
Name _____
Company _____
Date _____
Phone / Mail

Clima Flex Sales Representative

Signature _____
Name _____
Company _____
Date _____
Phone / Mail

This manual contains safety instructions that must be followed during installation and maintenance of the unit. Read this manual before installing or operating this unit.

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 equipment.

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 circuit 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 Clima 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/CPCV 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.

General Description

Clima Flex's CLIWP series direct expansion wall attached package cooling systems are complete, self-contained, automatic equipment 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

CLIWP-036-U-F-L-C-T-C-A-P-1-N- C- D-M-1-4-0

FAMILY

CAPACITY (BTU)
036 - 36,000 Btu/H
060 - 60,000 Btu/H

DISCHARGE AIR
U - Upper

COMPRESSOR
F - Fixed

COMPRESSOR SIDE
L - Left
R - Right

VOLTAGE
C - 208 - 230 / 3 / 60
D - 460 / 3 / 60
P - 220 / 1 / 60

CONTROL
T - Thermostat
P - Parametric
L - Loytec

EVAPORATOR FAN
C - AC fixed

CONDENSER FAN
A - Axial standard

EXTRAS
0 - No
1- 5 Kw
2 -10 Kw

REFRIGERANT
4 - R410-A

FOOT PRINT
1 - Large (3 & 5 Tons)
2 - Small (3 Tons)

CONDENSER
M - Al-Al Microchannel
C - Al -Cu

PACKAGING
D - Domestic
I - International
C - Bottom Crate

OPERATION
C - Cooling Only

EXTERNAL AIR
N - N/A
E - Economizer

GRILLS
1 - Single deflection

ANTICORROSION
P - Paint
E - Evaporator
C - Condenser
D - Evaporator & Condenser

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.

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 equipment is charged with the refrigerant necessary for proper

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)

MODINE® Always Innovating. Always Improving.

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)

OPERATING AND STANDBY LIMITS

Maximum standby ambient temperature	120° F (48.8°C)
Maximum operating ambient temperature	110°F (43.3°C)
Minimum operating ambient temperature (standard)	64°F (18°C)
Cold air outlet temperature	(At AHRI conditions Return 80°F, 67°F, Ambient 95°F, 68°F) Oulet 60°F (15.5°C)
Maximum evaporator inlet fluid temperature	85°F (29.4°F)

NAMEPLATES

The unit nameplate is located on the outside of the unit power panel. Both the model number and serial number are located on the unit nameplates; the serial number is unique to the unit.

These numbers should be used to identify the unit in case of service, parts or warranty questions. This nameplate also contains the unit's refrigerant charge and electrical ratings. The evaporator nameplate is under the insulation and contains the serial number. The compressor nameplate is located on each compressor and provides pertinent electrical information.

⚠ WARNING ⚠

Installation should be performed by qualified personnel who are familiar with local codes and regulations.

INSPECTION

The equipment must be checked once it has arrived at its installation site for any damage. All components described in the delivery NOTE must be inspected and checked. In the event that there is evidence of damage, do not remove or repair the damaged components and immediately report the severity and type of damage to the carrier and your sales representative if possible send photographs that may help explain/detail the damage.

NOTE: Any damage detected during transport must be reported and documented to the manufacturer prior to repair.

Before installing the equipment, check that the model and voltage shown on the nameplate are correct. The manufacturer will not be responsible for any damage once the equipment is accepted.

The correct space dedicated for the maintenance of the equipment will allow a better installation and maintenance, facilitating the access to the service points for the technical personnel. Refer to the schematics presented for unit dimensions. At least one (1) meter is required to service the compressor, allow sufficient space for opening control panel doors. Refer to Figure 3 for minimum clearances. In all cases, these precedents are established for any need for compliance with local regulations.

HANDLING

When transporting the unit, the use of a forklift or crane is recommended. All units are provided with lifting points. Only these points should be used for lifting the unit as shown in Fig. 1.

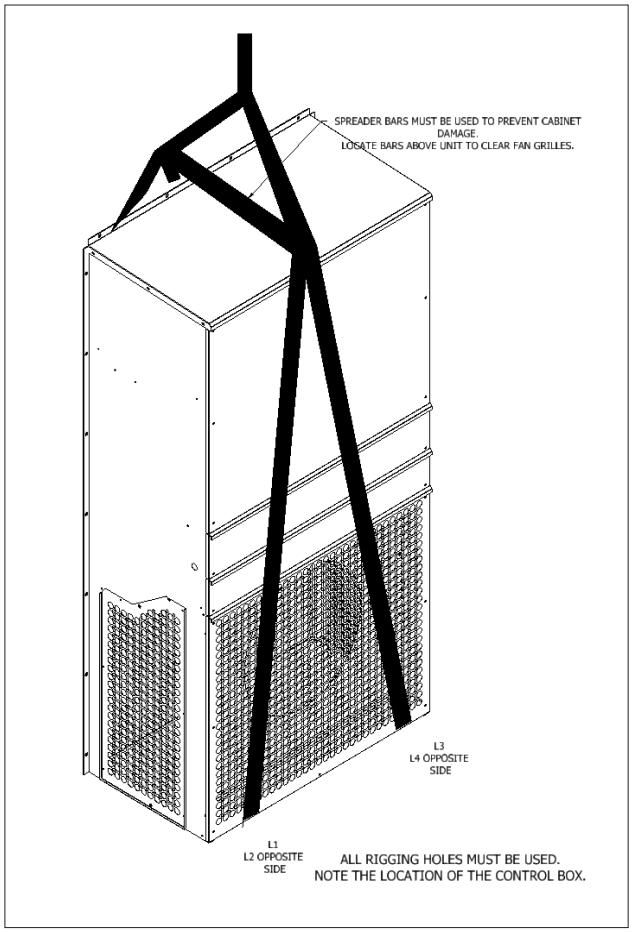
⚠ CAUTION ⚠

All lifting locations must be used to avoid damage to the unit.

⚠ DANGER ⚠

Improper rigging, lifting or moving of a unit can result in property damage, serious personal injury or death. Follow the rigging and moving instructions carefully. Do not stand under the unit while it is being lifted or installed.

Figure 1. Required elevation arrangement.



UNIT PLACEMENT

The equipment must be installed in accordance with national and local safety standards. If no local standards are applicable, the installation must be carried out in accordance with national standards.

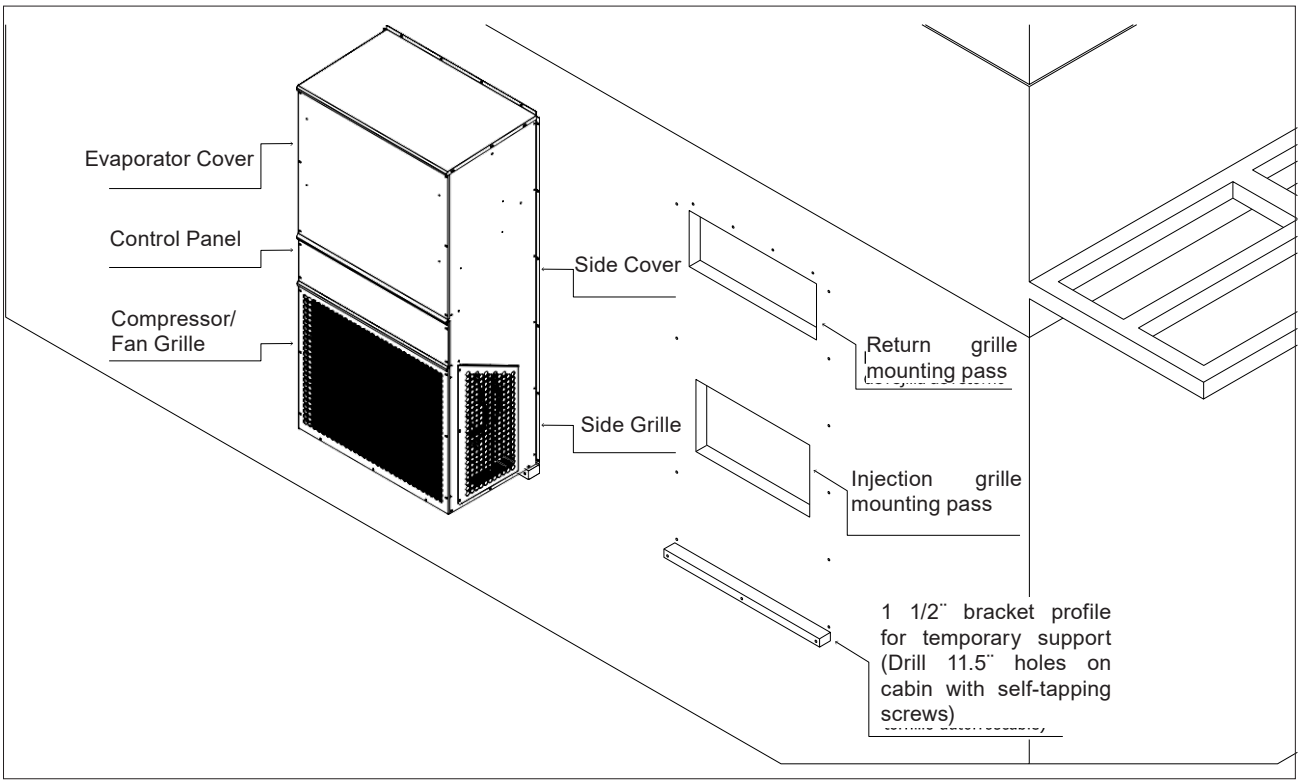
MOUNTING

The unit is installed against the wall, with passages through the wall on the outside of the space to be conditioned.
Injection and return wall openings should exceed 1/2” on each side of the unit openings so that the grille can be installed.
It must be ensured that it is well leveled and thus ensure the proper flow of refrigerant gas and compressor oil, as well as an effective condensate drain.

Installation should be done in the order shown below:

1. Verify that the mounting wall has the capacity to support the weight of the equipment. If not, consult a specialist to place an additional base (not included in the equipment).
2. Using a spirit level, mark the outside wall with a level horizontal line at the height where the base of the equipment will rest, this at 0.973m above the bottom level of the booth.
3. Prepare the injection and return openings in the outer wall by measuring from the line just marked. The equipment comes with a preparation available for different airflow passages.
4. Prepare the mounting holes, these can be pilot holes with 3/8” or 10mm drill bit for the screws to be placed in the unit and secured with nuts from the inside or screws mounted on the base to place the unit and place the nuts on the outside.
5. Secure the base mounting angle of the unit to the exterior wall with four 5/16” 1” long self-tapping screws or 8 mm and 25 mm long self-tapping screws (not included) at 21 mm below the marked line and center with the openings. Each hole spaced 296 mm apart.
6. Cold silicone seal the perimeter of the unit to prevent infiltration of rainwater into the site.
7. Then reload the unit onto the base angle making sure that the screw holes are aligned.
8. Remove the mounting bracket.

Figure 2. Distance for preparation and assembly.



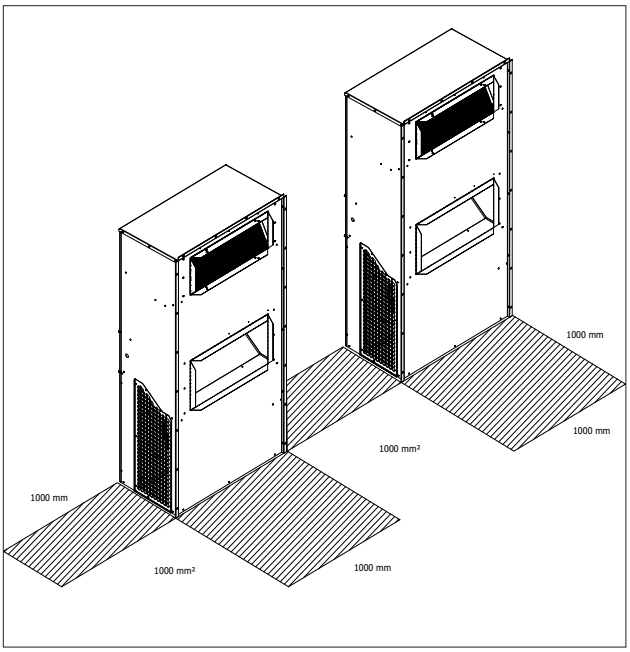
CLEANING SERVICE

The control panels are located on the front of the unit and require a minimum clearance of 1 meter. The compressor, filter-driers and line shutoff valves are accessible on each side or end of the unit.

⚠ WARNING ⚠

Do not block access to the sides or ends of the unit with piping or ductwork.
These areas must be open for service access.

Figure 3. Cleaning service.



OPERATING SPACE REQUIREMENTS

The space must be perfectly insulated to avoid infiltration and air leakage on site. The door must seal properly at closing.

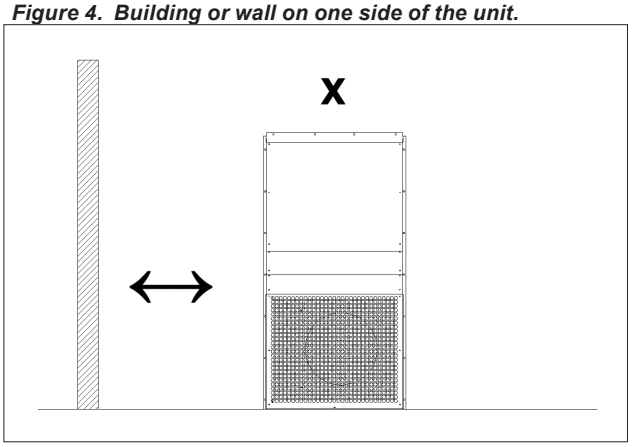
Site Considerations:

The CLIWP equipment should be mounted on a wall on the outside of the room to be conditioned, either prior to final placement or while the booth is already installed.

It is also imperative to consider a free area for air intake, condenser discharge and equipment maintenance. To ensure air intake, the unit should be mounted in a clean location, away from loose soil and external materials that may congest the condenser.

It should not be mounted near steam vents, hot air or chimneys. It is recommended that the unit be mounted at a distance greater than 2.00m from any wall, other equipment or obstruction to the passage of air (Figure 4).

Figure 4. Building or wall on one side of the unit.

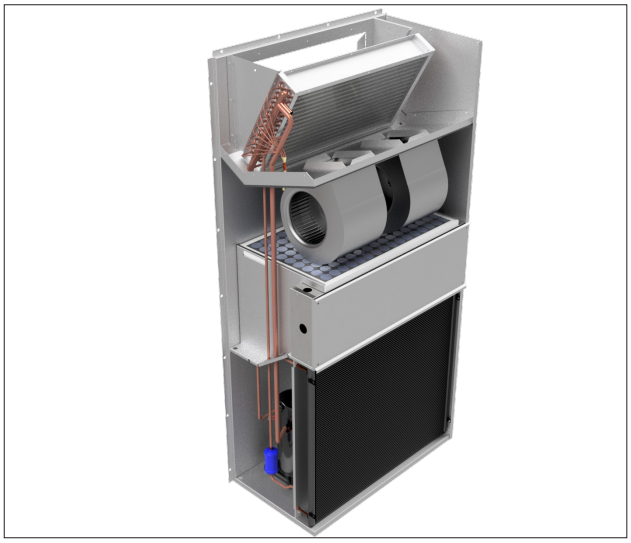


Decorative walls are often used to help conceal a unit, either on the ground or on the roof. Whenever possible, design these walls so that the combination of their open area and distance to the unit does not affect performance.

PIPE CONNECTION

The CLIWP is a self-contained, packaged unit, meaning that all refrigerant piping connections are made at the factory, so the only connection required to be made will be from the equipment drain to the on-site plumbing drain (not included in the kit).

Figure 5. Factory installed strainer



NOTE: Welded pipe connections between the filter and the evaporator are not between the filter and the evaporator are not allowed due to the possibility of slag present on the evaporator.

INJECTION AND RETURN AIR SUPPLY

These Air Conditioning units are designed to adequately distribute the air flow for telecommunications, data centers, laboratories, schools, hospitals, industrial use, etc. In addition to having a pressure drop calculated to operate only with the injection and return grilles, so no additional duct connection is required.

⚠ DANGER ⚠

Risk due to weight of the unit (+/-235 kg depending on the model) can cause serious injury. Take precautions. The use of safety equipment is not optional when handling this equipment.

CONDENSER COIL COATING AND OPTIONS

Considerations

The standard CLIWP unit coils have an aluminum alloy microchannel design with a series of flat tubes containing multiple parallel flow microchannels placed between the refrigerant collectors.

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.

SPECIFICATION FOR COIL COATING

The heat exchanger coil (HX) shall have a flexible cationic epoxy e-coat applied uniformly on all metal surfaces with no material bridging between the fins. The electrodeposition coating will ensure complete HX encapsulation of all conductive surfaces with a uniform thickness of 0.6 to 1.6 to 1.0 fof 0.6 to 1.2 mil (15 to 30 µm). The e-coat coating meets ASTM B3359 classification 5B for cross-hatch adhesión according to ASTM B3359. Corrosion durability is confirmed by tests of not less than 15,000 by testing for not less than 15,000 hours of salt spray resistance per ASTM B3359. ASTM B117 using traced aluminum as test coupons. After curing of the e-coat , HX will receive a spray-applied 2K polyurethane black topcoat to prevent to prevent UV degradation of the e-coat epoxy film. The topcoat will have a gloss of 60 (>90%) and a dry film thickness of 50 to 60 µm.

Coil Option	Non-corrosive[1]	Unpolluted marine[2]	Industrial[3]	Combined marine-industrial[4]
Standard Microchannel	+++	-	-	-
Modine Coated coils	+++	+++	+++	++

NOTES:

1. **Non-corrosive environments can be estimated by the appearance of existing equipment in the immediate area where the equipment is to be placed.**
2. **Marine environments should take into account the proximity to the coast, as well as the prevailing wind direction.**
3. **Industrial contaminants can be general or localized, depending on the immediate source of contamination (e.g. diesel fumes due to proximity to a loading dock).**
4. **The marine-industrial combination is influenced by proximity to the coast, prevailing winds, and general and localized sources of pollution.**

Figure 6. CLIWP refrigeration schemes.

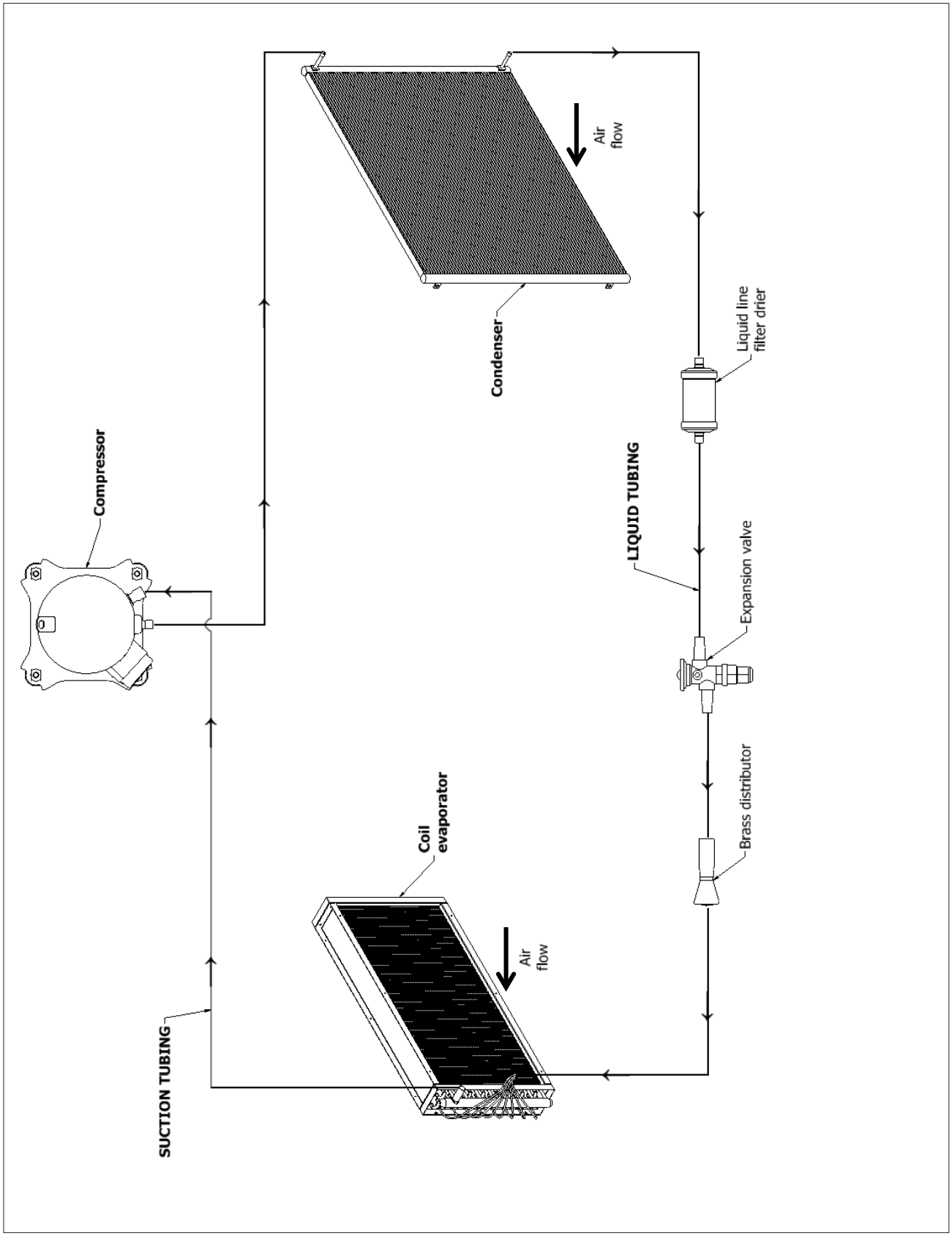


Figure 7. CLIWP cooling only 3 RT (This dwg is for small footprint and only available for 3 RT)

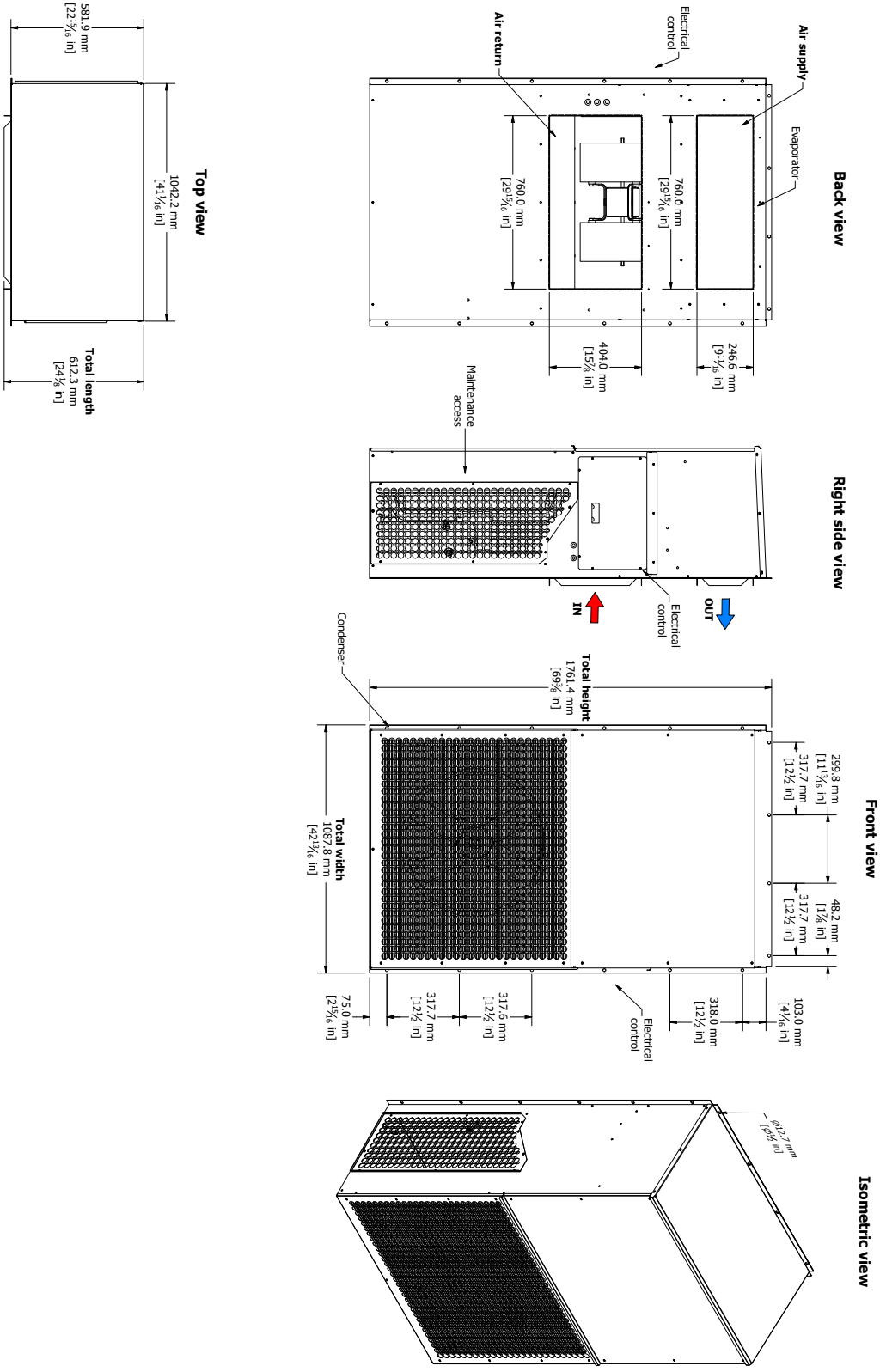


Figure 8. CLIWP Cooling Only 3 & 5 RT Standard Size.

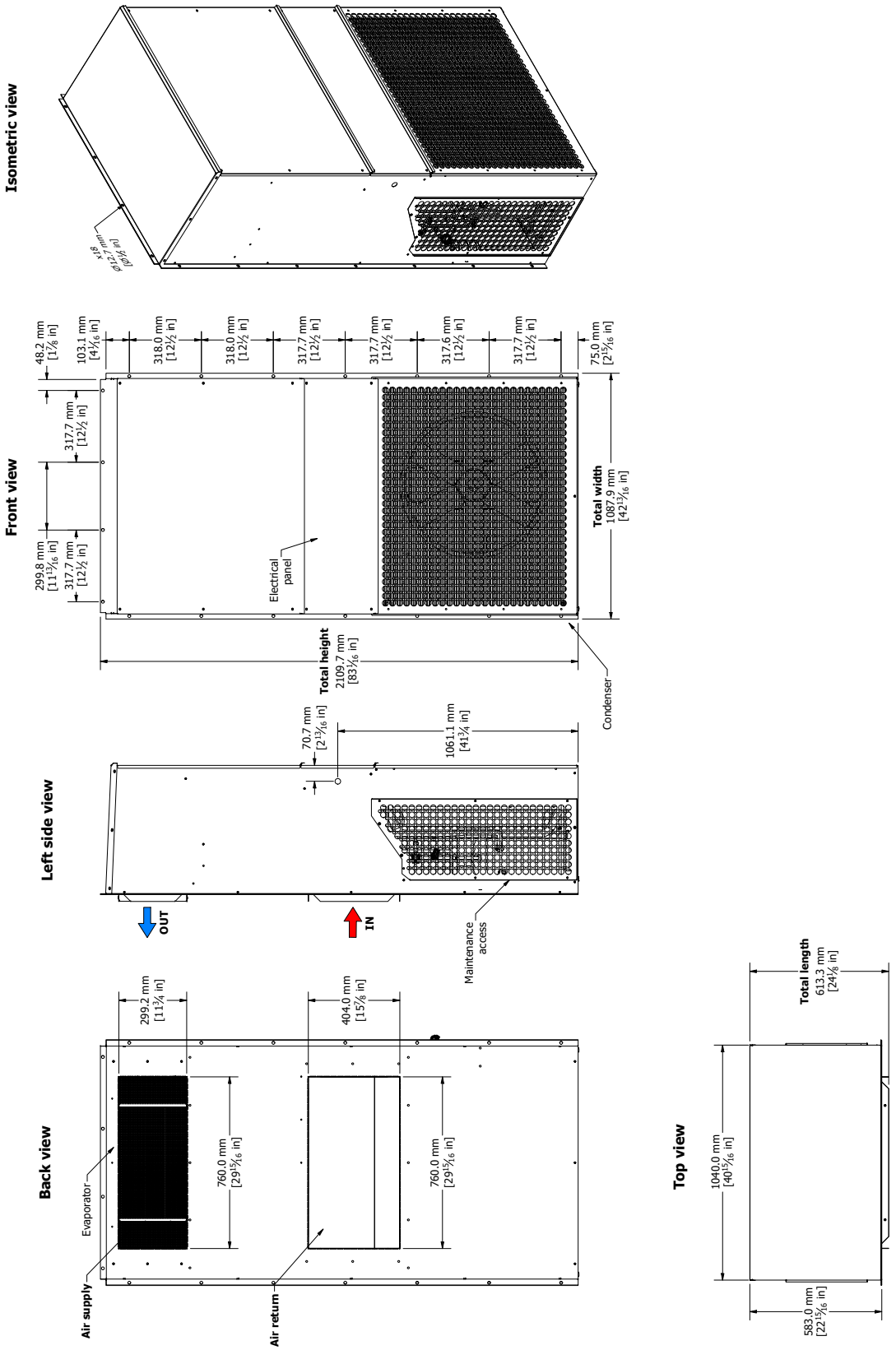
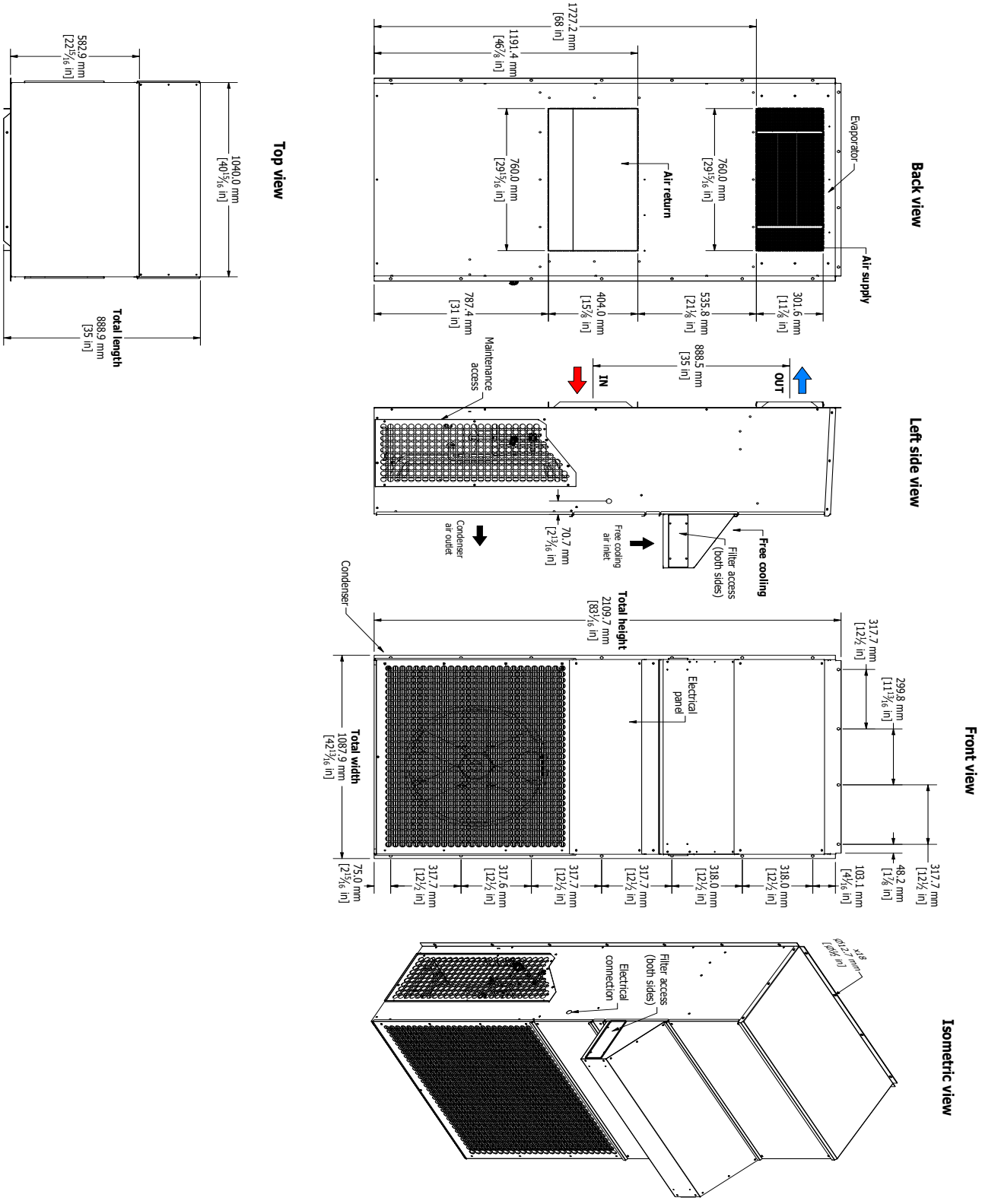


Figure 9. CLIWP Free Cooling 5 RT Dimensional Configuration.



VACUUM PROCESS

Any system that has been exposed to the atmosphere must be properly dehydrated. This is achieved with a proper vacuum procedure.
To achieve a proper vacuum, a VACUUM PUMP (not a compressor) and a VACUOMETER are required.

The procedure is as follows:

- First of all, the access points to the system must be defined. For both the low and high side, use the existing service valves on the condensing unit, i.e. the high pressure switch, connected to the smaller diameter pipe, and the low pressure switch, connected to the larger diameter pipe.
- Once this is done, the system can be drained.

Basically, it can be done in two ways:

• DILUTION METHOD

1. Turn on the vacuum pump and build up vacuum in the pump (register 1 closed).
2. Open register 1 and let the system evacuate until at least 500 microns are reached. To obtain the measurement, close register 1 and open register 2 and make the vacuum gauge feel the system pressure. After reaching 500 microns, isolate the vacuum pump and open register 3, letting the Nitrogen pass through to break the vacuum. Isolate the Nitrogen tube.
3. Vent the Nitrogen through the connection between the copper line and register 3.
4. Repeat the operation at least twice, making the third evacuation in the last phase. At the end at least 200 microns should be obtained.

⚠ WARNING ⚠

Never disconnect the copper tube from register 3, simply loosen the connection to expurgate the nitrogen.

To obtain an accurate vacuum value, isolate the vacuum pump from the system by closing register 1 and waiting about 5 minutes for an accurate measurement. If the value does not hold, the system still has moisture or there is a leak. Always check all connections (points 1, 3 and valves).

• HIGH VACUUM METHOD

1. It is applied with a vacuum pump capable of achieving a vacuum of less than 200 microns in a single evacuation. Proceed as follows:
2. Turn on the vacuum pump and then open the register 1. Subsequently, isolate the vacuum pump and open the register 2 (Fig. 10).
3. When a value of less than 200 microns is obtained (try to reach the lowest possible value), the vacuum procedure is finished.

⚠ WARNING ⚠

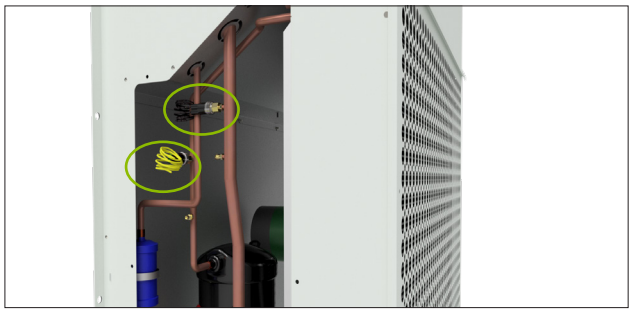
The pump oil should be changed periodically to ensure vacuum efficiency.

REFRIGERANT CHARGE

After evacuating the system properly, close the manifold registers and isolate the vacuum pump, vacuum gauge and nitrogen tube.

To make the refrigerant gas charge, replace the Nitrogen tube (Figure 10) with a refrigerant gas tube. Purge the hose connecting the tube to the service valve.

Figure 10. Service valves



Open the service valve that provides access to the refrigerant gas tube and then the manifold discharge port.
To properly charge the system, check the unit identification labels for the amount of refrigerant gas to be added to the system.

With the system stopped, charge the liquid refrigerant gas through the liquid line service valve (smaller diameter). To assist you, use a scale (if a graduated tube is not used). Wait at least 10 minutes before turning on the equipment.

Close the manifold discharge register, open the suction register and with the system running complete the charge with refrigerant gas in gas form (5% to 20% of the total). Check on the scale the weight of the refrigerant gas that was added to the system. If the charge is complete, close the manifold suction register, disconnect the suction and discharge hoses and close the pipe register.

The loading procedure is completed.

REFRIGERANT GAS RECOVERY

If for any reason there is a need to remove/lose refrigerant gas, the service valves on these units allow the refrigerant gas to be collected from the system inside the condensing unit.

Procedure:

1. Connect the manifold hoses to the service valve ports on the condensing unit.
2. Close the 1/4” liquid line service valve.
3. Turn the unit on cool down observing that the system pressures reach 2 psi.

At this time close the 3/8” suction line service valve to allow the refrigerant gas to be collected.

NOTE: The refrigerant must be adjusted by 20% to reach the evaporating temperature. You can check the charge on the next page.

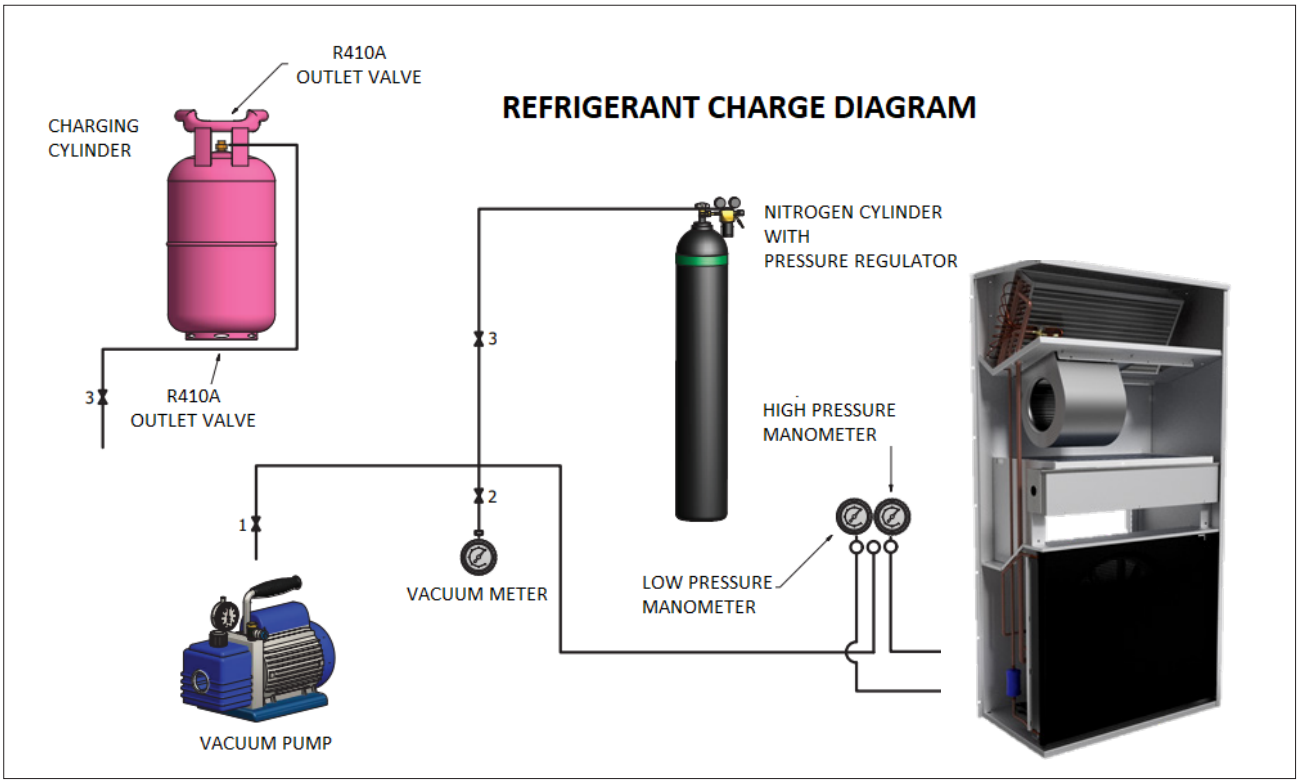
Refrigerant Charge

Table 1. Refrigerant charge.

FAMILY	RT	TXV		EXV	
		R410A (LBS)	R410A (KG)	R410A (LBS)	R410A (KG)
CLIWP	3	6	2.72	-	-
CLIWP	5	-	-	5.5	2.49

NOTE: The amount of refrigerant may vary by a certain % due to different specific situations.

Figure 11. Diagram to vacuum and refrigerant charge.



ELECTRICAL CONNECTION

CLIWP units have individual power connections per unit. The wiring inside the unit is dimensioned in accordance with the NEC®.
The required field wiring varies depending on the configuration of the unit.

Voltage limitations are:

1. Within 10 percent of nameplate rating.
2. Voltage unbalance should not exceed 2%. Since a voltage unbalance of 2% can cause a current unbalance of 6 to 10 times the voltage unbalance per NEMA MG-1, it is important that phase-to-phase unbalance be kept to a minimum.

⚠ DANGER ⚠

Qualified and licensed electricians must perform wiring. There is an electrical shock hazard that can cause serious injury or death.

Electrical wiring connections to the unit may be made with either copper or aluminum wiring, provided the size and number of wires match the equipment terminals.
All wiring must be in accordance with applicable local and national codes, including NECA/AA 10402012 for installation of aluminum wiring in buildings (ANSI). Refer to the unit nameplate and unit selection report (technical data sheet) for correct electrical ratings.

1. The control transformer is supplied and no separate 115V power is required. For single and multipoint power connections, the control transformer is on circuit #1 with control power wired from there to circuit #2. For multipoint power, disconnecting power from circuit #1 disconnects the control power from the unit.
2. The size of the wiring supplied to the control panel should be in accordance with the field wiring diagram. (See diagrams from page 17).
3. The single point power supply requires a single disconnect to supply electrical power to the unit. This power supply must have a fuse or use a circuit breaker. (Fuse value depends on unit model).
4. All field wiring terminal range values listed in the unit selection report apply to 75°C cable per NEC.
5. It must be grounded per national and local electrical codes.

⚠ CAUTION ⚠

Static discharge during handling of the circuit boards can cause damage to the components. Use an antistatic strap before performing any maintenance work. Never unplug cables, circuit board terminal blocks or plugs while the panel is powered.

USE WITH ON-SITE GENERATORS

Switching from site mains to generator power and vice versa requires the equipment to be off or the power to be disconnected for more than five seconds to avoid sending out-of-phase voltage to the same.
A properly installed and fully synchronized automatic transfer switch must be used to transfer power if the equipment is operating under load.

Generator sizing

⚠ WARNING ⚠

The generator should be sized by an electrical engineer familiar with generator applications.

Transfer Back To The Grid

Proper transfer of power from the standby generator to the grid is essential to prevent damage to the equipment and must be used to ensure proper operation of the unit.

⚠ WARNING ⚠

Stop the unit before transferring power from the generator to the mains.

Transferring power while the equipment is running can cause serious damage to the same.

The procedure required to reconnect generator power to the grid is as follows:

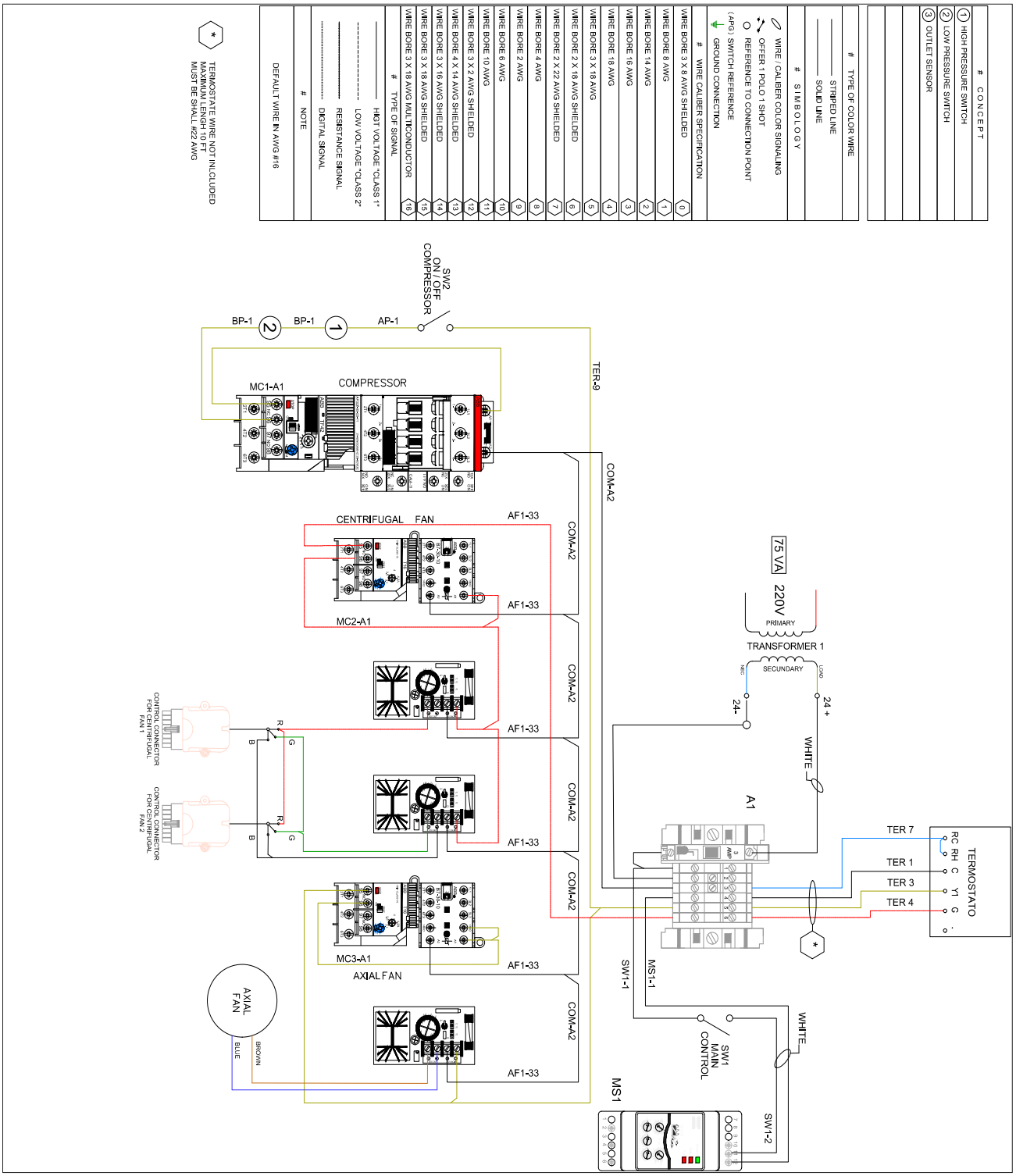
1. Set the generator to always run five minutes longer than the unit start timer, which can be set from two to sixty minutes, while keeping the equipment powered by the generator until the fully synchronized Automatic Transfer Switch properly delivers the equipment power from the site.
2. Set the transfer switch supplied with the generator to automatically shut down the equipment before the transfer is made. The automatic shutdown function can be accomplished through a BAS interface or with the “remote on/off” wiring connection shown in the field wiring diagrams.

A start signal can be given at any time after the stop signal, as the three-minute start timer will be in effect.

⚠ WARNING ⚠

When installing the earth leakage protector make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the earth leakage protector.

Figure 12. Typical field wiring diagram of cooling only unit 3RT 220V



# LIST OF CONTROL PANEL COMPONENTS			
SAP	DESCRIPTION	QTY	U/M
3000042	TRANSFORMADOR 75VA 220-480V X075CHA	1	PZA
1035910	MOTOR SAVER TRIFASICO MODELO BVTQ 220V	1	PZA
1000144	MINI CONTACTOR 24V GJL1311001R0101	2	PZA
1001053	CONTACTOR AF30Z-30-00-21 1SBL276001R2100	1	PZA
1001172	RELEVADOR TF42-24 20-24 1SAZ721201R1051	1	PZA
1034621	BLOQUE DISTRIB. TRIPO 3P 1SNL312530R0000	1	PZA
1001175	RELEVADOR T16 7.6 - 5.7-7.6 1SAZ711201R104	2	PZA
1000071	CLEMA GRIS MA2 5/5 1SNA115486R0300	6	PZA
1000301	CLEMA PORTA FUSIBLE 1SNA115657R2500	5	PZA
1000145	TOPE DE RETENCIÓN 1SNA206351R1600	4	PZA
1000166	APAGADOR DE BALANCÍN 1P-1T 4 AMP BTS-09	2	PZA
1000233	FUSIBLE 3 AMP	3	PZA
1000804	CONECTOR TIPO LENGUETA 1 OJILLO, 14-6AW	4	PZA
1000562	TAPA PARA CLEMA GRIS 118368R1600	1	PZA
1000226	TAPA PARA PORTA FUSIBLE 1SNA116951R1500	1	PZA
1001435	SENSOR DE TEMPERATURA AX0631/060	1	PZA
1000158	TORNILLO CON POSTE 1SNA176282R2300	1	PZA
1000158	TORNILLO CON POSTE 1SNA176282R2300	1	PZA
1022112	FUENTE DE ALIMENTACIÓN BPS-015	3	PZA
1000790	CONTACTO AUX. CAL4-11 1SBN010120R1011	1	PZA
1049996	TERMOSTATO / P7200U-010	1	PZA
1034404	FUSIBLE 1 AMP	2	PZA

# ELECTRICAL COMPONENT LIST			
SAP	DESCRIPTION	QTY	U/M
1000900	RESISTENCIA ELECTRICA 40W, TRIFASICA, 240 VAC	1	PZA

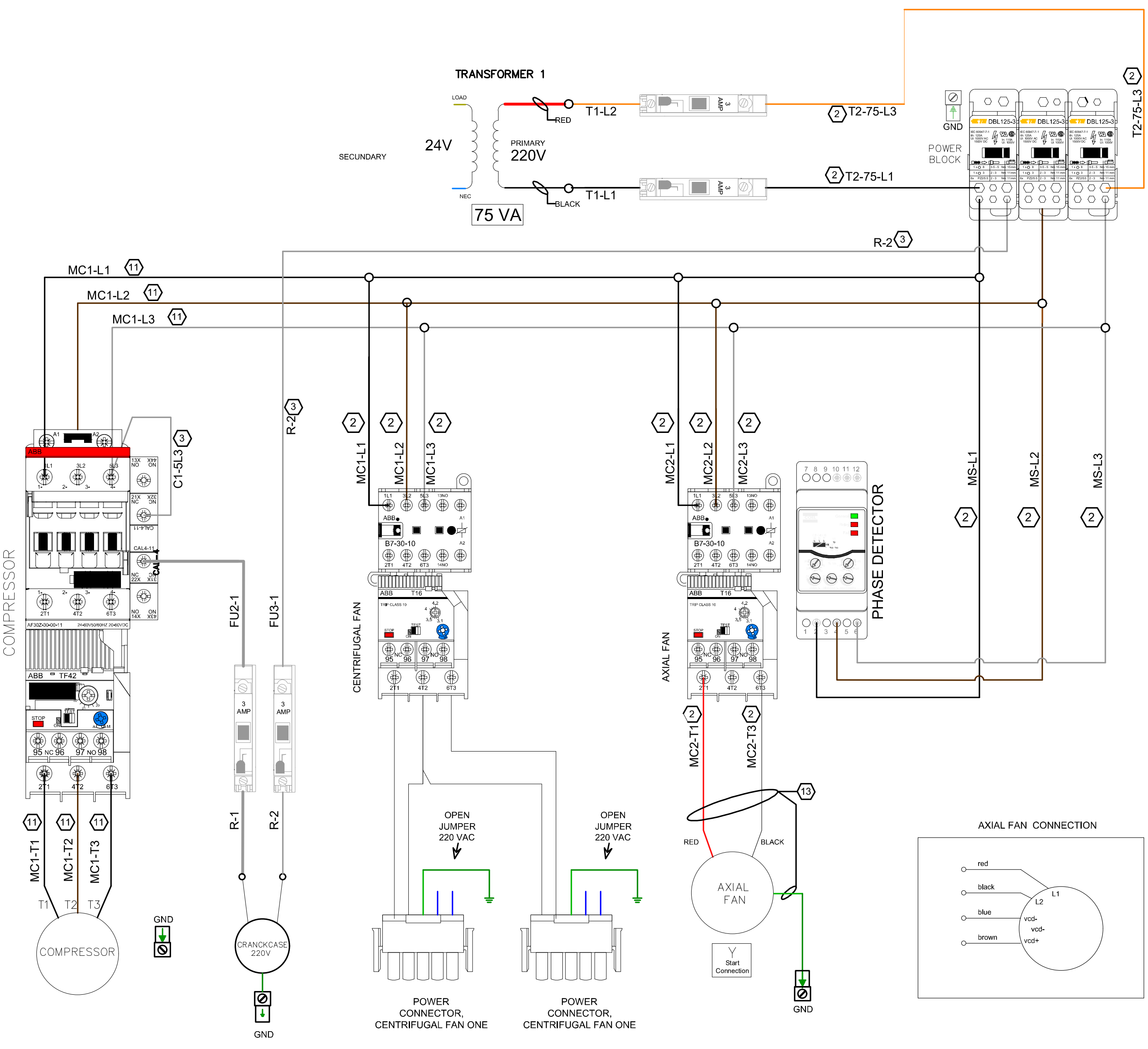
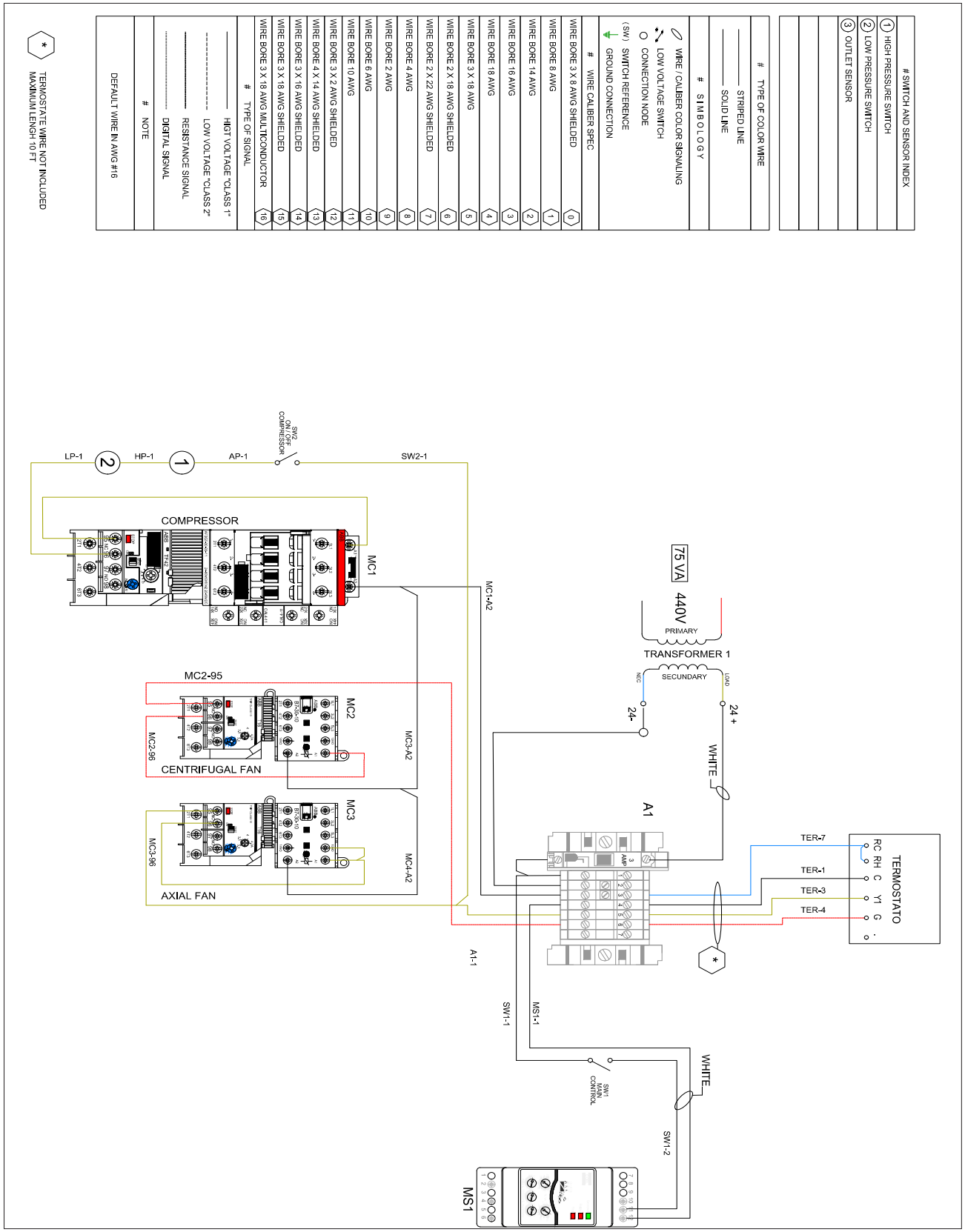


Figure 13. Typical field wiring diagram of cooling only unit 3RT 440V



# LIST OF CONTROL PANEL COMPONENTS			
SAP	DESCRIPTION	QTY	U/M
3000126	TRANSFORMADOR 75VA 220-480 V AT175F1031	1	PZA
1035911	MOTOR SAVER TRIFASICO MODELO BVTQ 440V	1	PZA
1000144	MINI CONTACTOR 24V GJL1311001R0101	2	PZA
1001053	CONTACTOR AF30Z-30-00-21 1SBL276001R2100	1	PZA
1001172	RELEVADOR TF42-24 20-24 1SAZ721201R1051	1	PZA
1034621	BLOQUE DISTRIB. TRIPO 3P 1SNL312530R0000	1	PZA
1001175	RELEVADOR T16 7.6 - 5.7-7.6 1SAZ711201R104	2	PZA
1000071	CLEMA GRIS MA2 5/5 1SNA115486R0300	7	PZA
1000301	CLEMA PORTA FUSIBLE 1SNA115657R2500	5	PZA
1000145	TOPE DE RETENCIÓN 1SNA206351R1600	4	PZA
1000166	APAGADOR DE BALANCÍN 1P-1T 4 AMP BTS-09	2	PZA
1000233	FUSIBLE 3 AMP	3	PZA
1000804	CONECTOR TIPO LENGUETA 1 OJILLO, 14-6AW	1	PZA
1000562	TAPA PARA CLEMA GRIS 118368R1600	1	PZA
1000226	TAPA PARA PORTA FUSIBLE 1SNA116951R1500	1	PZA
1001435	SENSOR DE TEMPERATURA AX0631/060	1	PZA
1000158	TORNILLO CON POSTE 1SNA176282R2300	2	PZA
1000790	CONTACTO AUX. CAL4-11 1SBN010120R1011	1	PZA
1049996	TERMOSTATO / P7200U-010	1	PZA
1034404	FUSIBLE 1 AMP	2	PZA

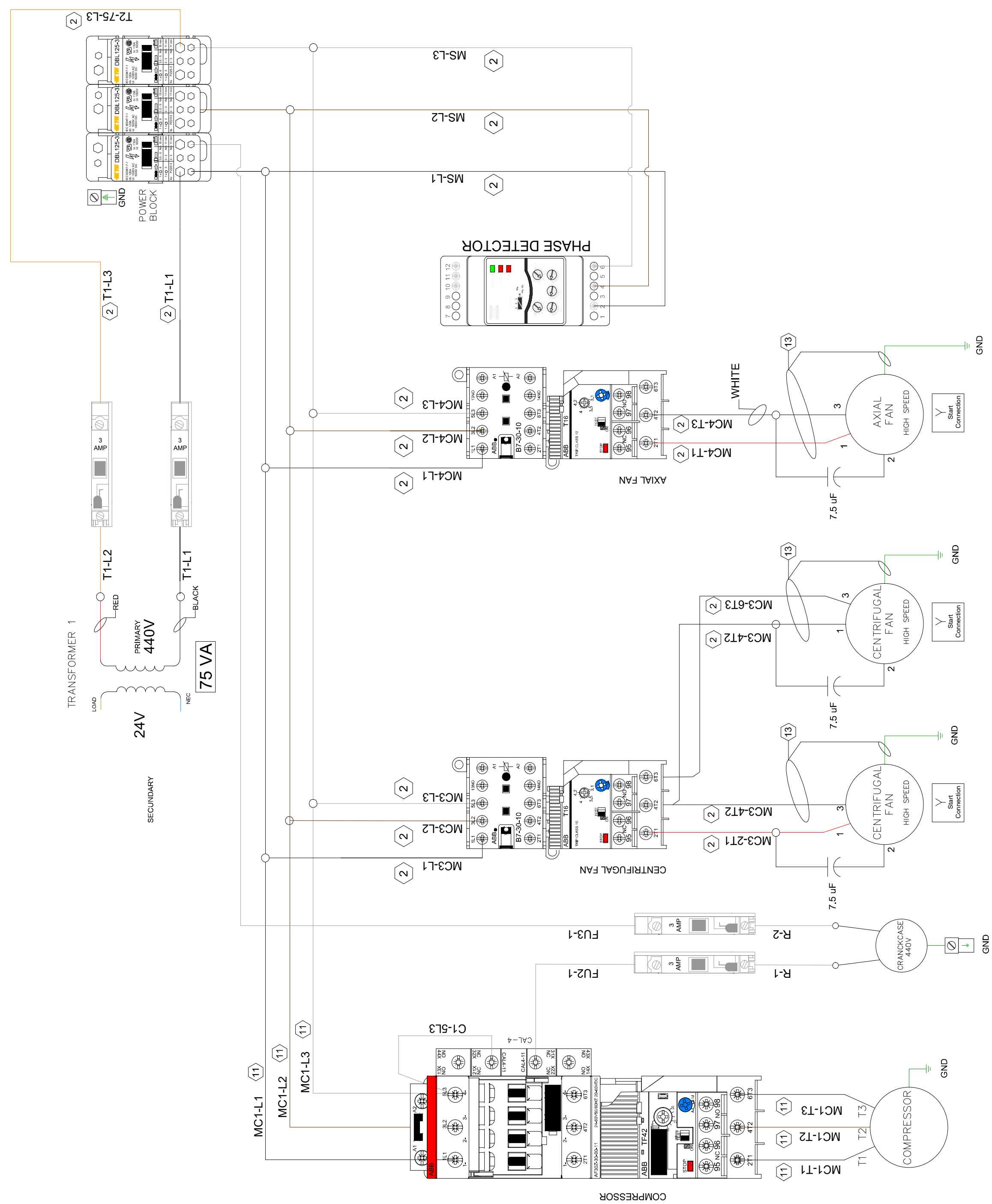
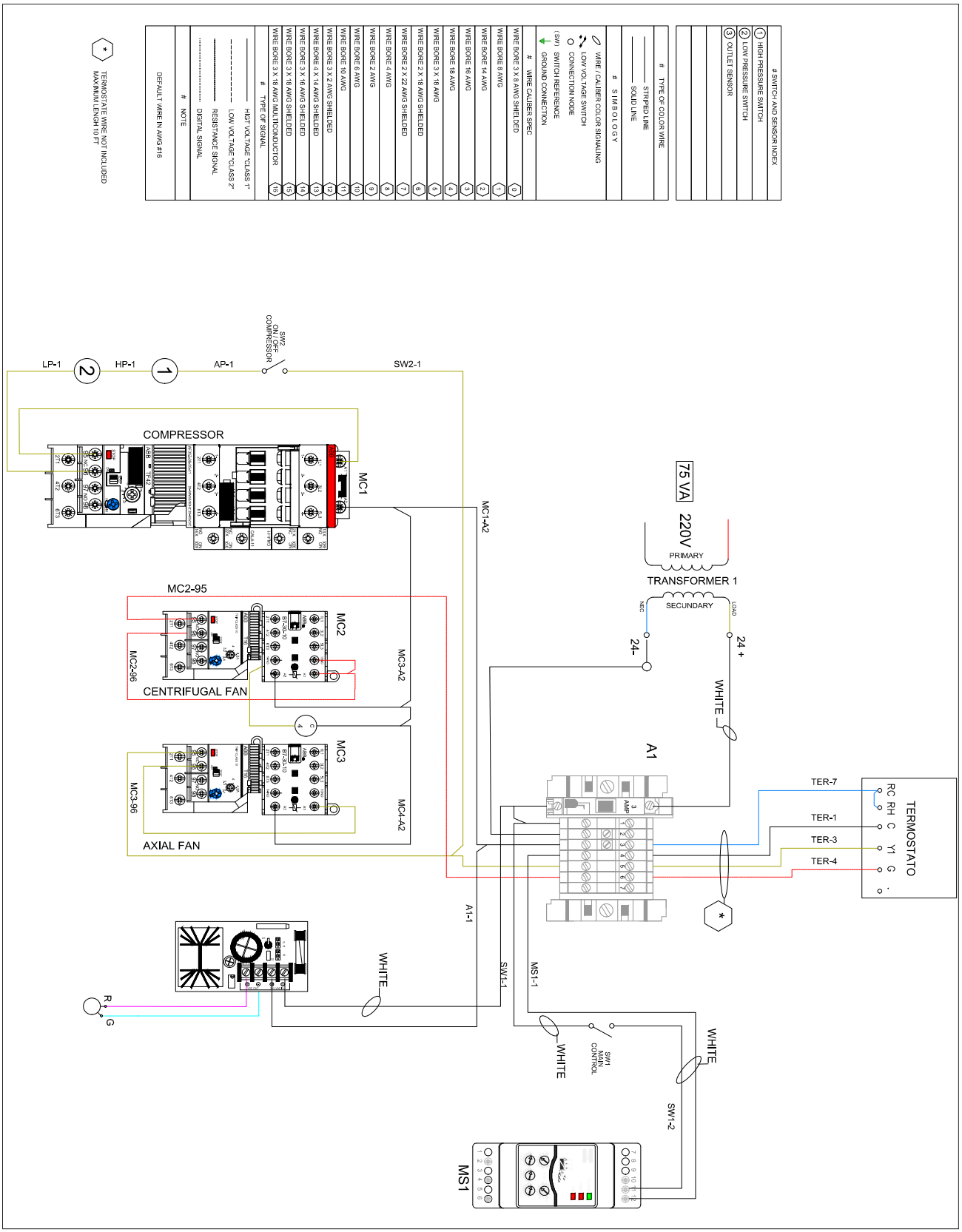


Figure 14. Typical field wiring diagram of cooling only unit 5RT 220V



LIST OF CONTROL PANEL COMPONENTS

#	SAP	DESCRIPTION	QTY	U/M
	3000042	TRANSFORMADOR 75VA 220-480 V AT175F1031	1	PZA
	1036910	MOTOR SAVER TRIFASICO MODELO 220V	1	PZA
	1000144	MINI CONTACTOR 24V GJL13110015R0101	2	PZA
	1001053	CONTACTOR AF302-30-00-21 1SBL276001R2100	1	PZA
	1001172	RELEVADOR TF42-24 2D-24 1SAZ721201R1051	1	PZA
	1034621	BLOQUE DISTRIB. TRIPO 3P 1SNL312530R0000	1	PZA
	1001175	RELEVADOR T16 7.6 - 5.7-7.6 1SAZ711201R104	2	PZA
	1000071	CLEMA GRIS MAZ 5/5 1SNA154686R0300	7	PZA
	1000301	CLEMA PORTA FUSIBLE 1SNA115657R2500	5	PZA
	1034404	FUSIBLE 1 AMP	2	PZA
	1000145	TOPE DE RETENCIÓN 1SNA206351R1600	4	PZA
	1000166	APAGADOR DE BALANCÍN 1P-1T 4 AMP BTS-09	2	PZA
	1000233	FUSIBLE 3 AMP	1	PZA
	1000804	CONECTOR TIPO LENGUETA 1 OJILLO, 14-6AW	1	PZA
	1000562	TAPA PARA CLEMA GRIS 1/8368R1600	1	PZA
	1000226	TAPA PARA PORTA FUSIBLE 1SNA116951R1500	1	PZA
	1001435	SENSOR DE TEMPERATURA AX06310060	1	PZA
	1000158	TORNILLO CON POSTE 1SNA176282R2300	2	PZA
	1000790	CONTACTO AUX, CAL4-11 1SBN010120R1011	1	PZA
	1049996	TERMOSTATO / PT200U-010	1	PZA
	1000301	CLEMA PORTA FUSIBLE 1SNA115657R2500	5	PZA
	1022112	POWER SUPPLY BPS-015	1	PZA

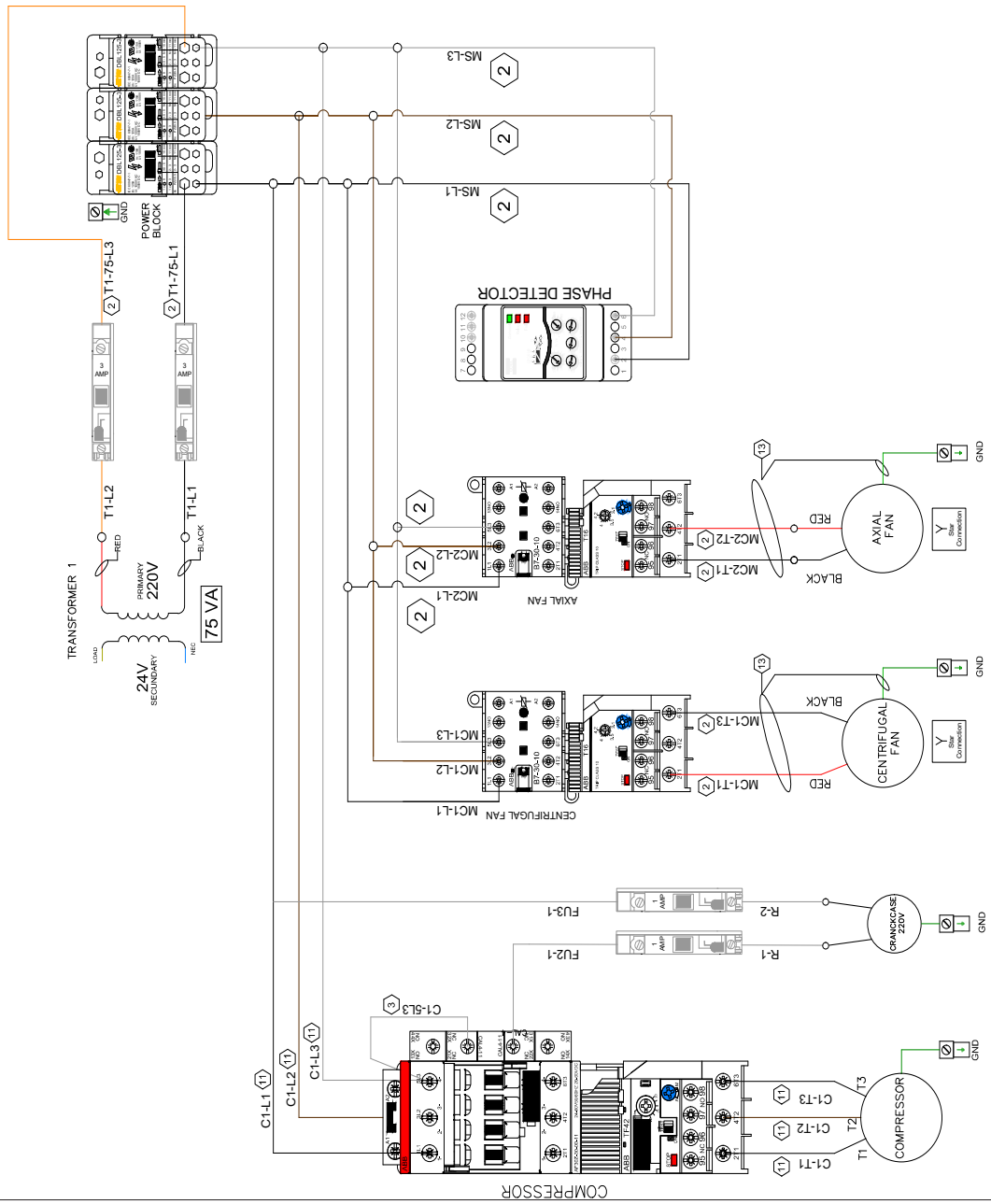
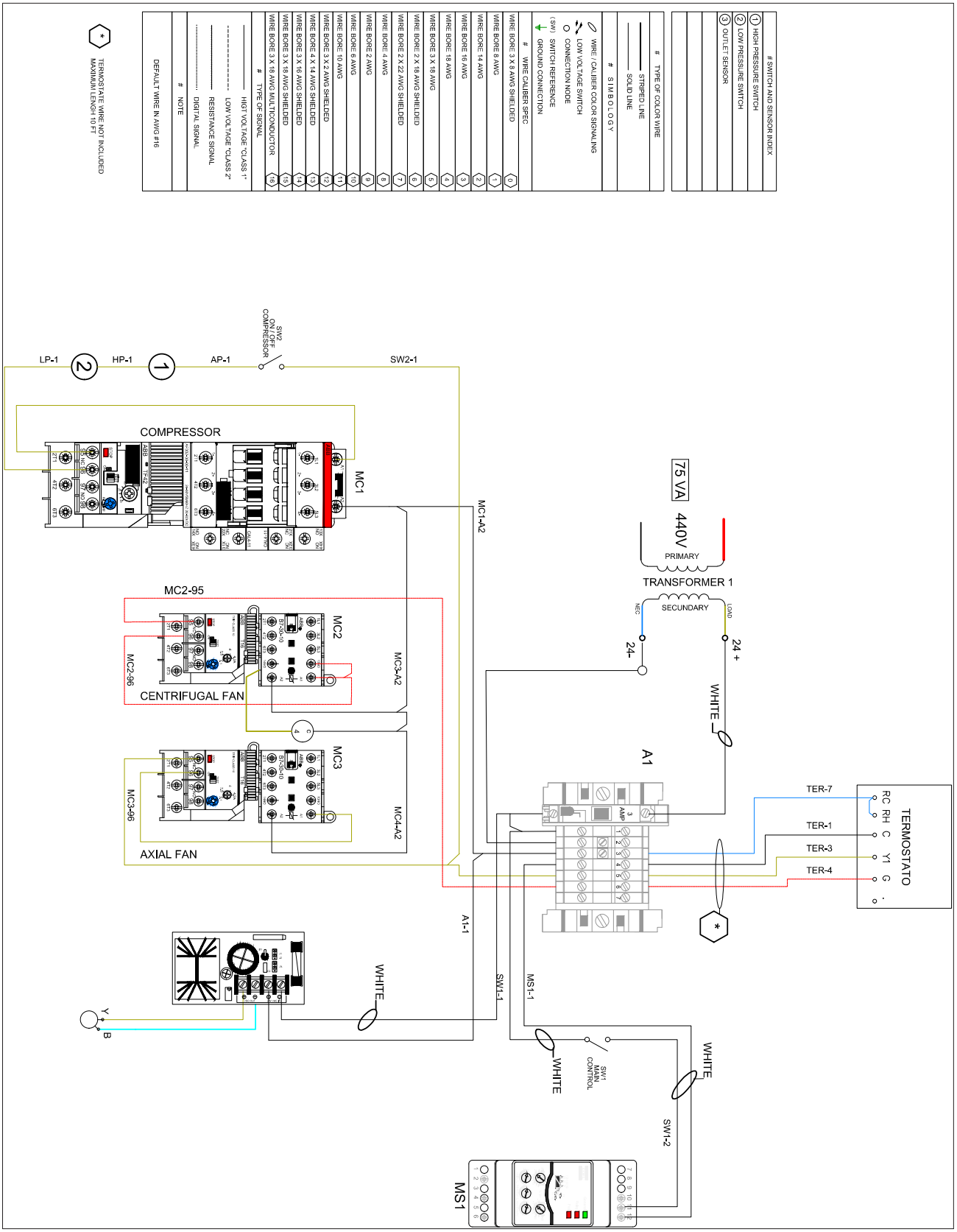


Figure 15. Typical field wiring diagram of cooling only unit 5RT 440V



LIST OF CONTROL PANEL COMPONENTS

#	SAP	DESCRIPTION	QTY	U/M
	3000146	TRANSFORMADOR 75VA 440V	1	PZA
	1035911	MOTOR SAVER TRIFASICO MODELO 440V	1	PZA
	1000144	MINI CONTACTOR 24V GJL1311001R0101	2	PZA
	1001053	CONTACTOR AF30Z-30-00-21 1SBL276001R2100	1	PZA
	1001168	RELEVADOR TF42-13 - 10-13	1	PZA
	1034621	BLOQUE DISTRIB. TRIPO 3P 1SNL312530R0000	1	PZA
	1001175	RELEVADOR T16 7.8 - 5-7.7.8 1SAZ711201R104	2	PZA
	1000071	CLEMA GRIS MA2 5/5 1SNA115486R0300	7	PZA
	1000301	CLEMA PORTA FUSIBLE 1SNA115657R2500	5	PZA
	1000145	TOPE DE RETENCIÓN 1SNA206351R1600	4	PZA
	1000166	APAGADOR DE BALANCÍN 1P-1T 4 AMP BTS-09	2	PZA
	1000233	FUSIBLE 3 AMP	3	PZA
	1000804	CONECTOR TIPO LENGUETA 1 OJILLO, 14-6AW	1	PZA
	1000562	TAPA PARA CLEMA GRIS 1183668R1600	1	PZA
	1000226	TAPA PARA PORTA FUSIBLE 1SNA116951R1500	1	PZA
	1001435	SENSOR DE TEMPERATURA AX06631060	1	PZA
	1000158	TORNILLO CON POSTE 1SNA176282R2300	2	PZA
	1000790	CONTACTO AUX. CAL4-11 1SBN010120R1011	1	PZA
	1049996	TERMOSTATO / P7200U-010	1	PZA
	1000301	CLEMA PORTA FUSIBLE 1SNA115657R2500	5	PZA
	1034404	FUSIBLE 1 A 250 Vca	2	PZA
	1022112	POWER SUPPY BPS-015	1	PZA

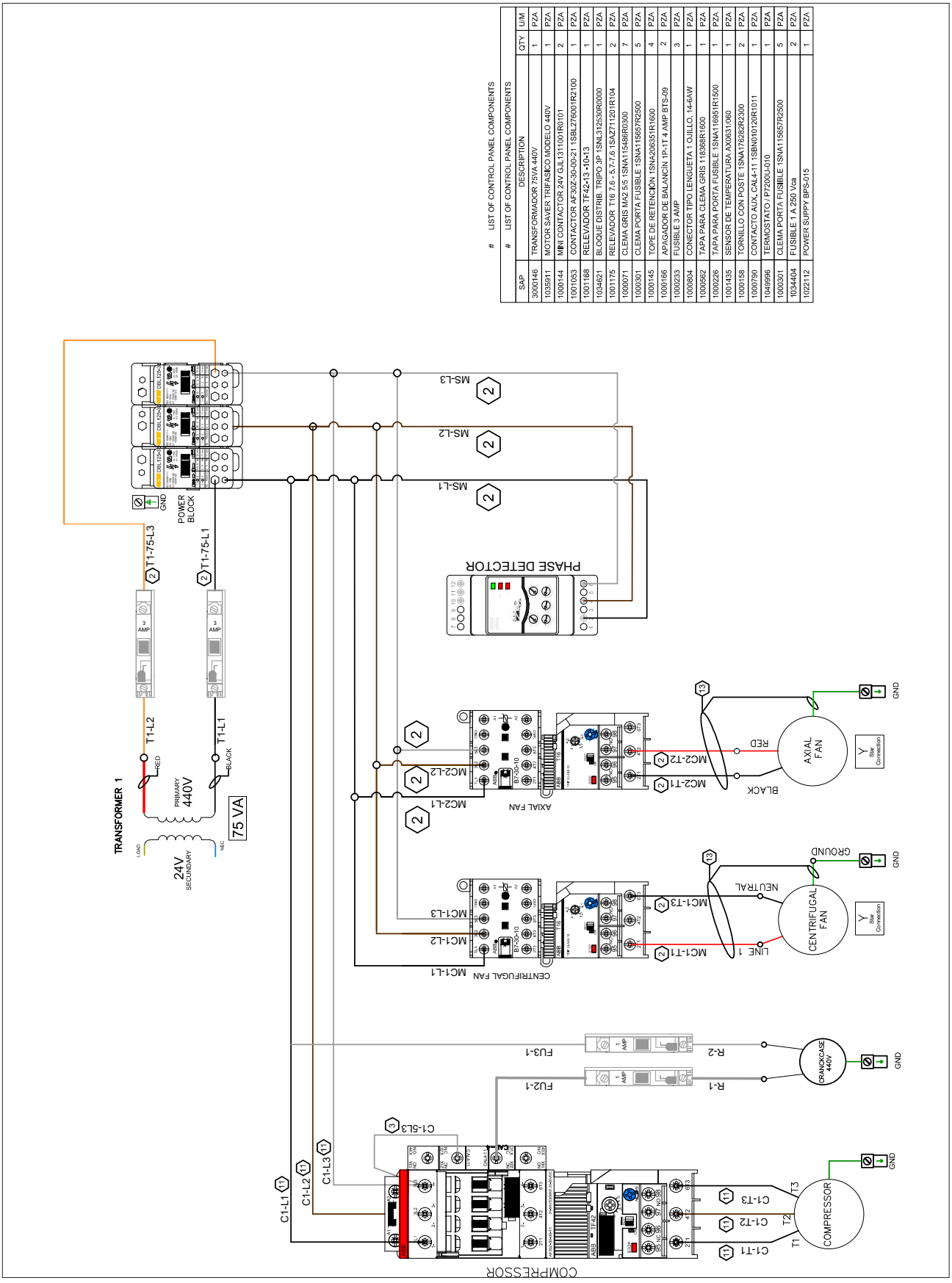
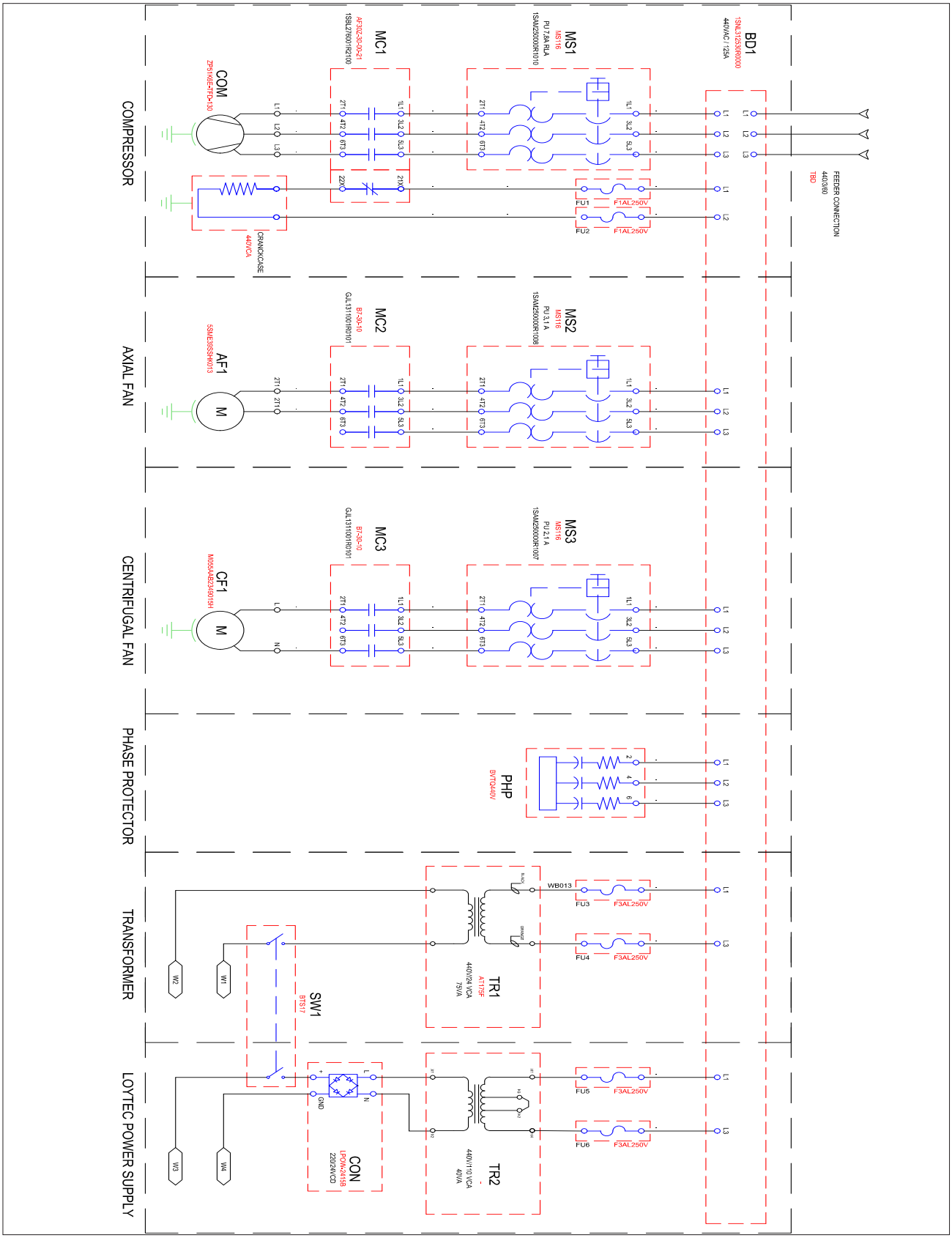
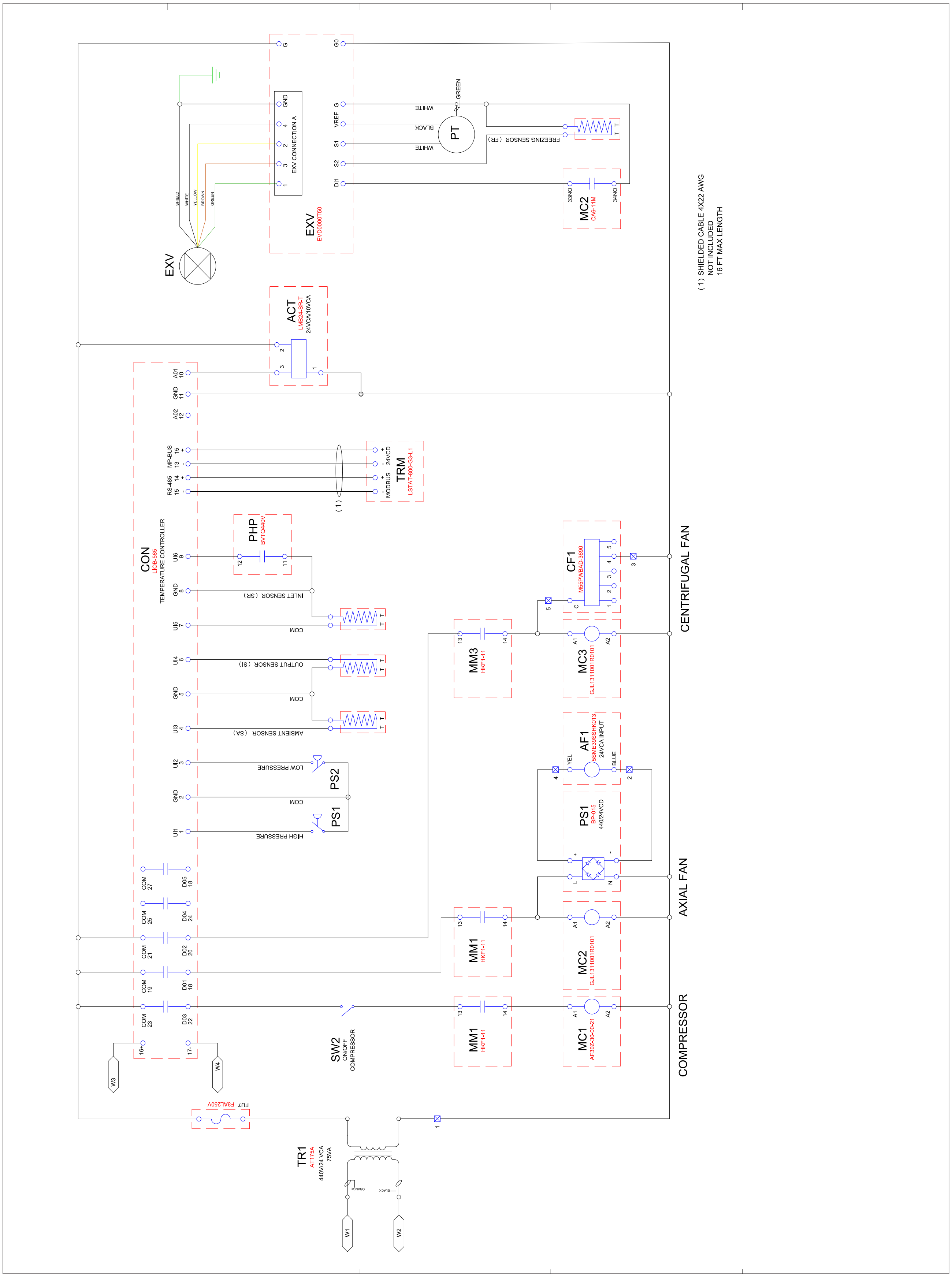


Figure 16. Cooling only diagram 5RT 440V Free Cooling




CON
LIOB-585
TEMPERATURE CONTROLLER
EXV
EVD0000T50
EXV CONNECTION A
PT
FREEZING SENSOR (FR)
MC2
CA8-11M
ACT
LM24-SR-T
24VCA/10VCA
TRM
LSTAT-800-G3-L1
PHP
BVTQ440V
INLET SENSOR (SR)
OUTPUT SENSOR (SI)
AMBIENT SENSOR (SA)
LOW PRESSURE
HIGH PRESSURE
PS2
PS1
BP-015
440/24VCD
AF1
SSME395SHK013
24VCA INPUT
CF1
M55PWBAD-3690
MM3
HKF1-11
MC3
GJL1311001R0101
MM1
HKF1-11
MC2
GJL1311001R0101
MC1
AF30Z-30-00-21
SW2
ON/OFF
COMPRESSOR
TR1
AT175A
440V/24 VCA
75VA
FU7
F3AL250V
CENTRIFUGAL FAN
AXIAL FAN
COMPRESSOR
(1) SHIELDED CABLE 4X22 AWG
NOT INCLUDED
16 FT MAX LENGTH

GENERAL DESCRIPTION

L-IOB-585 LOYTEC

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.

UNIVERSAL 7-DAY THERMOSTAT P722Uc

This thermostat can be used with most 24 volt systems: gas, oil, millivolt, electric heating and cooling systems, including heat pumps with an auxiliary/emergency heating element.

It cannot be used with: 120/240 volt heating elements (without a transformer), or on heat pumps that have a two-stage compressor (Y2).

SET POINTS

When we start configuring the unit for the first time all the preload parameters have a default value, these values are stored in permanent memory but can be changed depending on the application of the unit.

The values can be changed from the display and the submenus require a password if you want to change the values; if an option is not included in the display menu the data is only an internal value in the controller and will be visible only if that mode is selected.
The following tables have a description of each default set point

Table 2. Controller parameters and setting ranges .

Parameter	Default setting	Range
Set point	73°F (22.7°C)	59°F a 85°F (15°C a 29.4°C)
Set point Free Cooling	59°F (15°C)	50°F a 64°F (10°C a 18°C)
Freezing (return controlled)	38°F(3.3°C	Ideally, a temperature sensor should be placed in the coil to measure the refrigerant output to protect it.
Low ambient temperature	50°F (10°C)	-
High ambient temperature	115°F (46°C)	-

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.A. switch	UI-2		1			
Outdoor Temp.	TEx	Thermistor 10KM II	UI-3	1				
Return Temp.	RT	Thermistor 10KM II	UI-4	1				
Injection Temp.	TI	Thermistor 10KM II	UI-5	1				
Motor Saver	MS	N.A. 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	Relay 24 VAC	DO-3				1	
AC Free Cooling	ACf	0-10 VDC	AO-1			1		
Zone Temp.	TZ			LSTAT (MODBUS RTU)				
Total points per Ctrl				**3**	**3**	**1**	**3**	**0**

Figure 17. Loytec Inputs / Outputs Diagram.

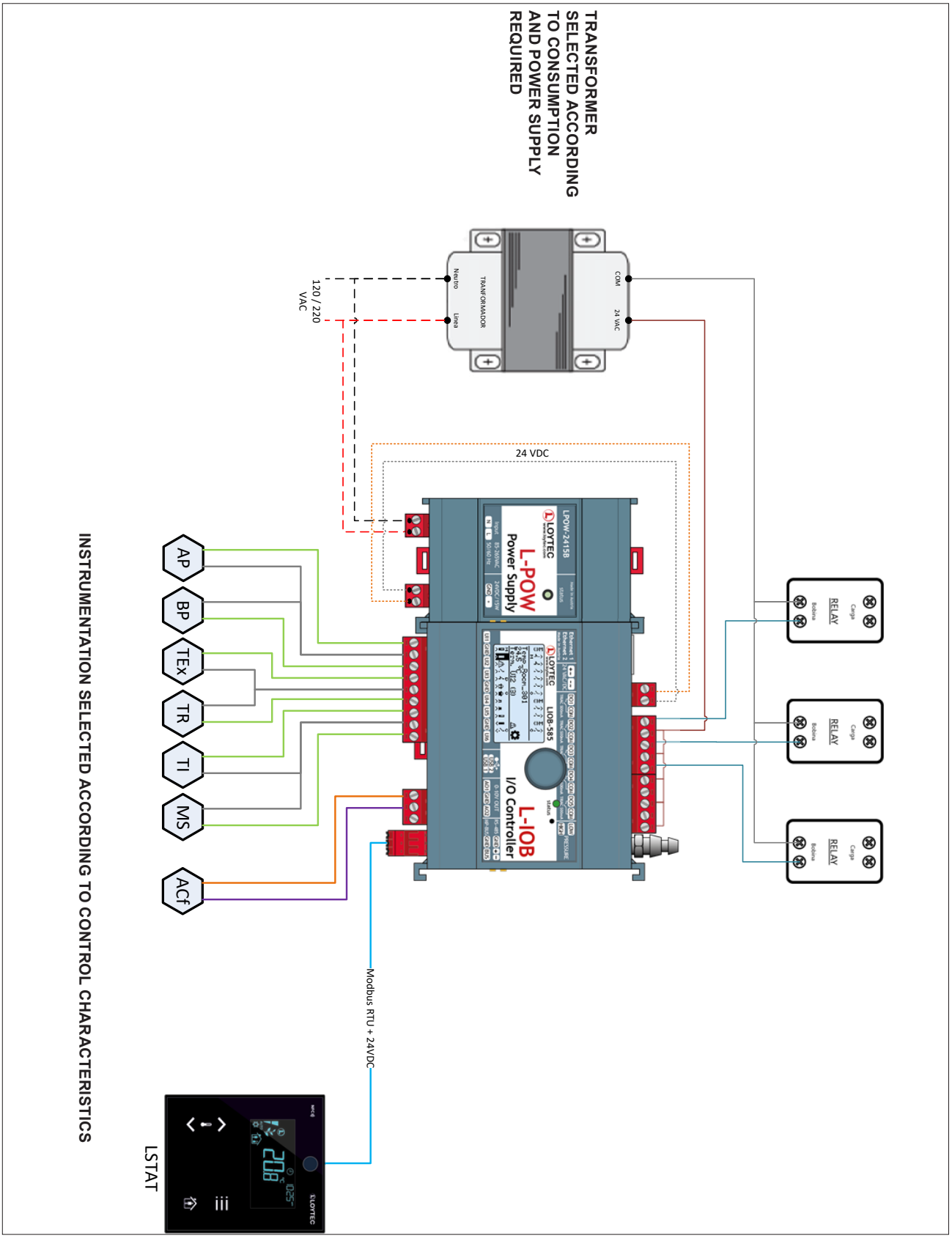
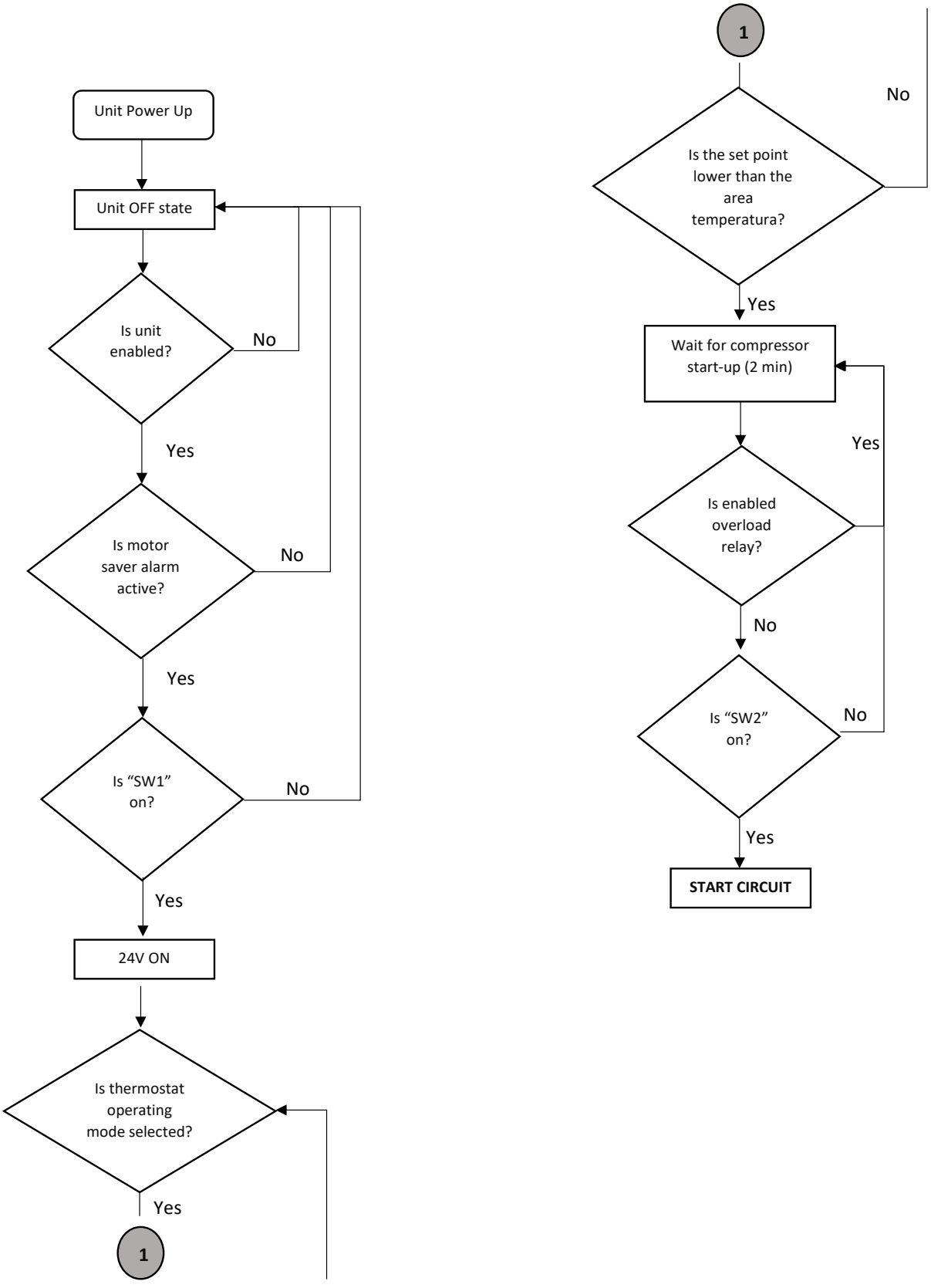


Figure 18. Sequence of operation of the unit.



COMPRESSOR CONTROL

The compressor should operate only when the circuit is in the operating or pumping state. It should not operate when the circuit is in any other state.

Compressor start-up

A compressor must start if it receives a start command from the unit capacity control logic.

Compressor shutdown

A compressor should be shut down if any of the following situations occur:

- The unit capacity control logic commands the unit to shut down.
- An unload alarm occurs and sequencing requires this compressor to be the next compressor to shut down.
- Circuit status is pumping and sequencing requires this compressor to be the next compressor to shut down.

CONTROLLER CALCULATIONS

A minimum time between compressor starts and a minimum time between compressor stop and compressor start will apply. The time values are determined by the start timer and stop timer set points. These cycle timers should not be applied by power cycling the equipment. This means that if the power is cut off, the cycle timers should not be active. These timers can be cleared by a setting on the controller.

CONDENSER FAN CONTROL

The condenser fan control should start the fan as required whenever the compressor is running in the circuit.
The fan and solenoid valve shall be off when the circuit is in the off and pre-open state.
The condenser fan digital outputs will turn on or off immediately for condenser stage changes. The condenser solenoid valve outputs will turn on immediately when a step-up stage requires the output to turn on, but will have a delay to turn off during a step-down stage.
This delay is 20 seconds. If the circuit is turned off, the capacitor solenoid valve outputs will turn off without delay.

CONDENSER FAN SPEED CONTROL CARD

You can control the speed of the capacitor motor to seek to improve the efficiency of the equipment (this point should be handled by an expert, the nominal value is 6 vcd, however you can move it from 4 to 8 depending on the best operating point).
The DS power supply model BPS-015 is used to convert 24 VAC to a regulated DC power supply for transmitters with 4 to 20 mA outputs. The output voltage can be adjusted in the field between 1.5 V and 27 V by means of a potentiometer. The 3 A fuse protects the power supply from overcurrent conditions. The snap-on bracket can be quick surface mounted on any flat surface.

EVAPORATOR MOTOR

The PerfectSpeed® ECM motor is for blowers and air circulation fans used in typical heating, ventilation and air conditioning systems.

This motor operates on typical single-phase 115 or 208-230 and 460Vac, 50 or 60 Hz power. In addition, it is equipped with an isolated control interface for receiving operating commands. All signal lines are electrically isolated from the rest of the drive electronics.

The BPM drive is designed to be compatible with 2 control interfaces. Both interface methods use the same connector pins:

- A four-wire serial interface allows the motor to receive information and operating commands from a PC or the system control board.
- The second interface allows the control to receive PWM input commands as a means of communicating with systems that cannot communicate digitally in serial form.

AC input (power connector)

Pin	115 Vac	208-230 Vac
1	Jump to 2	N/C
2	Jump to 1	N/C
3	Ground	Ground
4	Neutral	L1
5	L1	L2

Connection Layout For Wallpack Motor

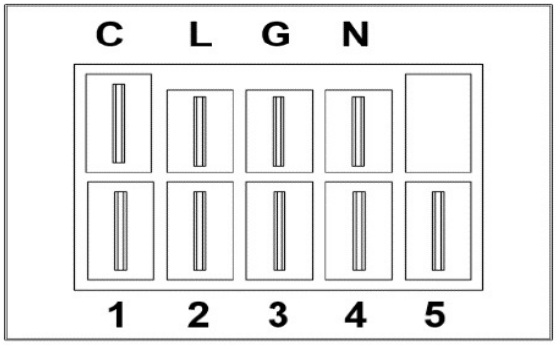


Table 3. Connection of each tap depending on its energized position

Program Tap	5 Tap Mode (Energized Tap Signal)				
	1	2	3	4	5
1	ON	OFF	OFF	OFF	OFF
2	x	ON	OFF	OFF	OFF
3	x	x	ON	OFF	OFF
4	x	x	x	ON	OFF
5	x	x	x	x	ON

OFF = The tap must be in the OFF position.
x = The tap can be either ON or OFF.

NOTE: The 24vac power cable can be switched between positions 1 and 5 to locate the best motor performance to obtain the best performance from the unit.

SUPERHEAT CONTROL STATUS OPERATION

Expansion Valve Operation (TxV)

The measurement of refrigerant flow to the evaporator is the exclusive function of a TXV. It must measure this flow at precisely the same rate at which the refrigerant is evaporated by the heat charge.

The TXV does this by keeping the coil supplied with enough refrigerant to maintain the correct superheat of the suction gas leaving the evaporator coil.

The TXV regulates flow in response to charge superheat.

If it is suspected that a TXV is not operating properly, checking for overheating is the only way to be sure. Do this with precision instrumentation to obtain meaningful results.

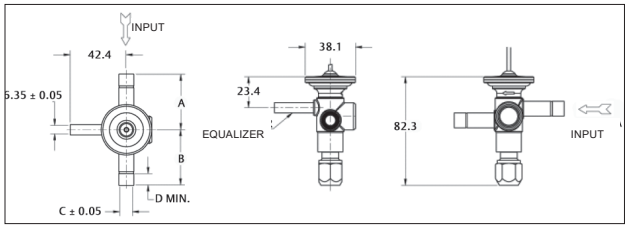
Operating superheat between 8°F and 20°F are considered normal. However, you can find the best operating point by adjusting the superheat to locate the best efficiency (electrical controls only).

Below are some “tips” to help in detecting and fixing performance failures in a TXV:

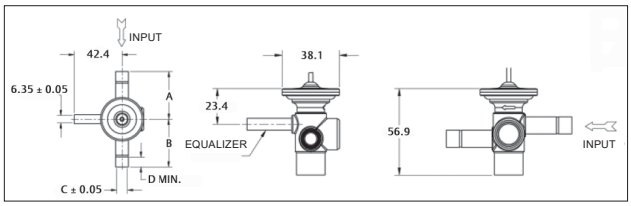
- Check the bulb to make sure it is properly connected to the suction line. If you can move the bulb manually, it is not properly secured.
- The bulb must be perfectly insulated to protect against the effects of a draft.
- Check the equalizer line for restrictions (kinks) or signs of frost. A frosted equalizer line indicates internal leakage and will require valve replacement. Repair or replacement of a bent equalizer will be necessary for the valve to operate properly.

TXVs are designed to measure the flow of liquid refrigerant. If the refrigerant at the valve inlet contains flash gas, the capacity of the valve will be reduced. Make sure that the system is properly charged and that there is some subcooling at the valve inlet before discarding the TXV.

Dimensions (Mm)



Adjustable - ODF Connections With 1/4” Equalizer



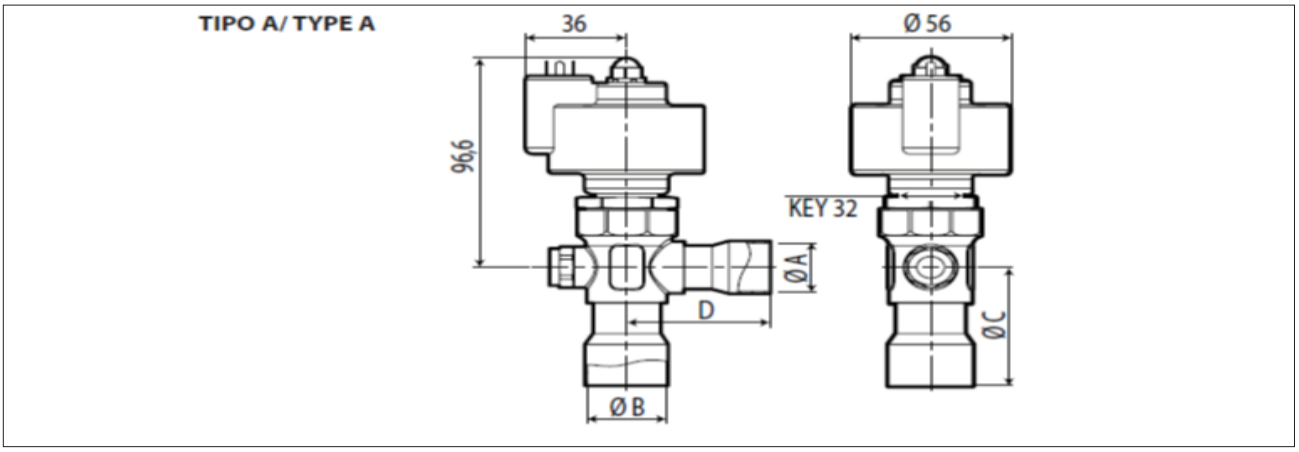
No Adjustable- Odf Connections With 1/4” Equalizer

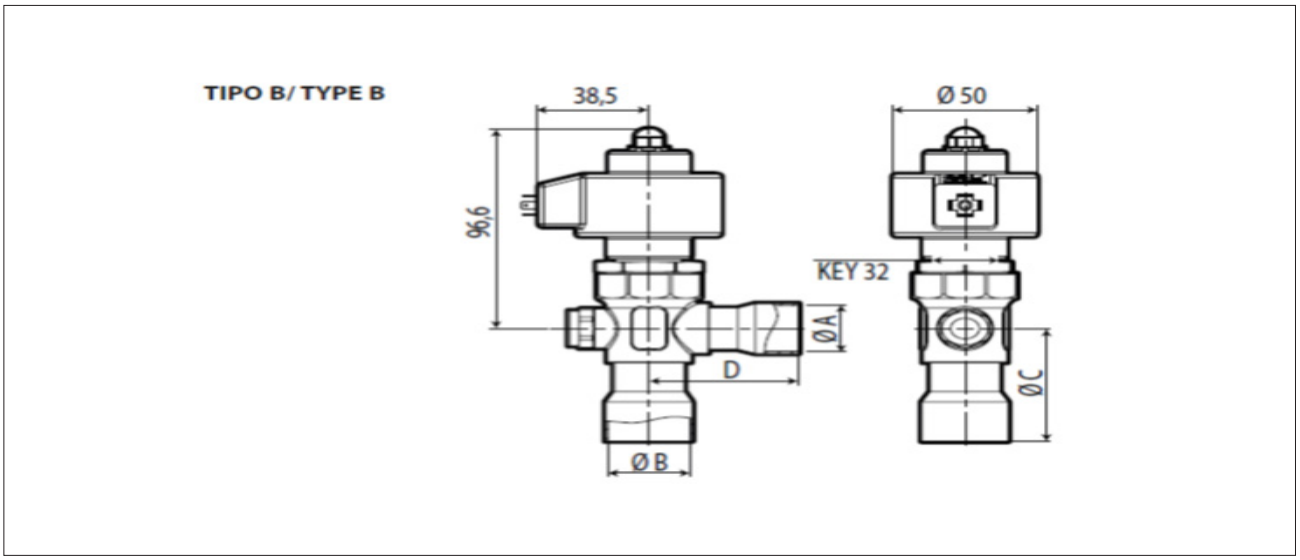
Connexions	Dimensions			
	A	B	C	D
3/8 ODF	41.9	41.9	9.6 (3/8)	8.6

Expansion Valve Operation (ExV)

The electronic valve is designed for installation in refrigeratn circuits as the refrigerant expansion device, usubg the superheat calculated by a pressure and temperature probe located at the evaporator outlet as the control signal. The inlet fluid should be suitably subcooled to prevent the valve from operating with flash gas. Valve noise may increase when refrigerant charge is insufficient or there is significant pressure drop downstream of the valve.

Dimensions (Mm)





Type of valve	A	B	C	D	Max PS	Fluid group
E3V**SSR** - E3V**HSR**	18 mm (0.71 in)	22 mm (0.87 in)	44.5 mm (1.75 in)	43 mm (1.7 inch)	60 bar	1 2
E3V**SSS** - E3V**HSS**	22 mm (0.87 inch)	28 mm (1.10 inch)	54.5 mm (2.15 inch)	52 mm (2.05 inch)	35 Bar 60 Bar	1 2
E3V**SWR** - E3V**HWR**	19.1 mm (3/4 inch)	22.2 mm (7/8 inch)	44.5 mm (1.75 inch)	43 mm (1.7 inch)	60 Bar	1 2
E3V**SWS** - E3V**HWS**	22.2 mm (7/8 inch)	28.6 mm (1+1/8 mm)	54.5 mm (2.15 inch)	52 mm (2.05 inch)	35 Bar 60 Bar	1 2

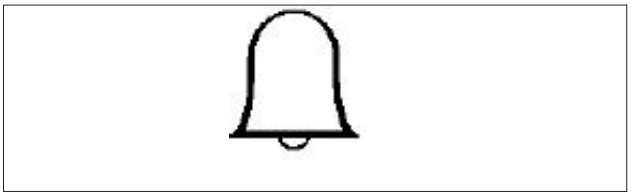
ALARMS

The CLIWP system has 3 alarms: The first alarm is activated by the low pressure switch and the second alarm is activated 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 13.

Figure 19. 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, press the icon in the image.

WP 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.

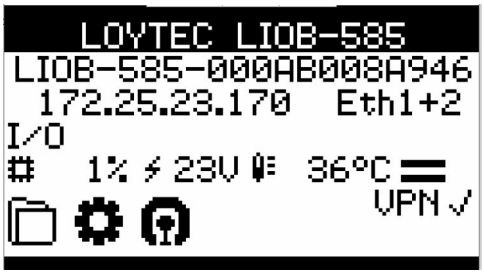
HARDWARE INSTALLATION

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.

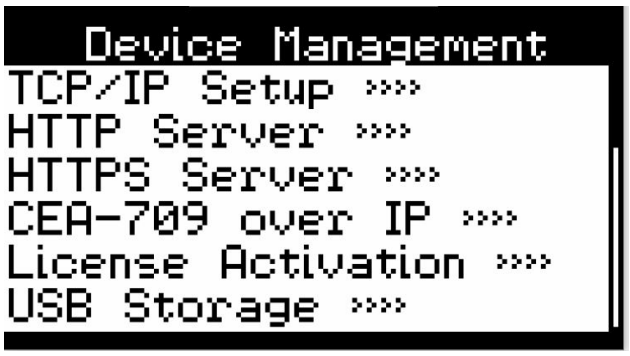
Figure 20. LCD user interface main screen



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 ( ) 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 () allows configuring the basic device settings. Navigate, for example, to the Device Management submenu "", shown in Figure 15.

Figure 21. Device management menu on the LCD user interface.

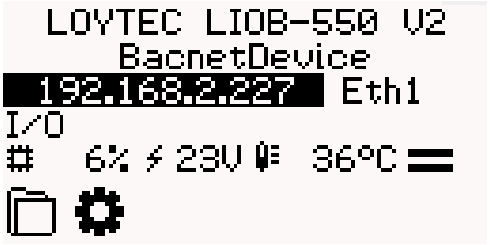


This menu offers you, for example, the following options for the basic configuration of the device:

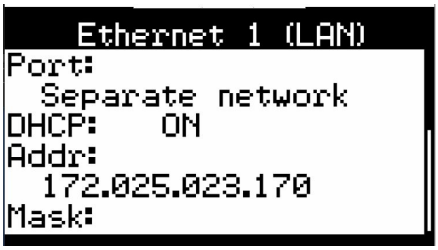
TCP/IP configuration (LIOB-48x/58x)	IP configuration page (IP address, etc.).
Send identification messages	Send a service pin message (LIOB-18x/48x) or an I-Am message (LIOB-58x).
Restart system	By choosing this option, the device performs a hard reset.
Delete DP configuration	By choosing this item, the user can clear the entire data point configuration of the device.
Factory settings	By selecting this option, the user can reset the entire device to factory defaults.
PIN	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.
Contrast	Change the display contrast.
Language	Change the LCD language. NOTE that this requires a restart of the device.
Reset I/O counters	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

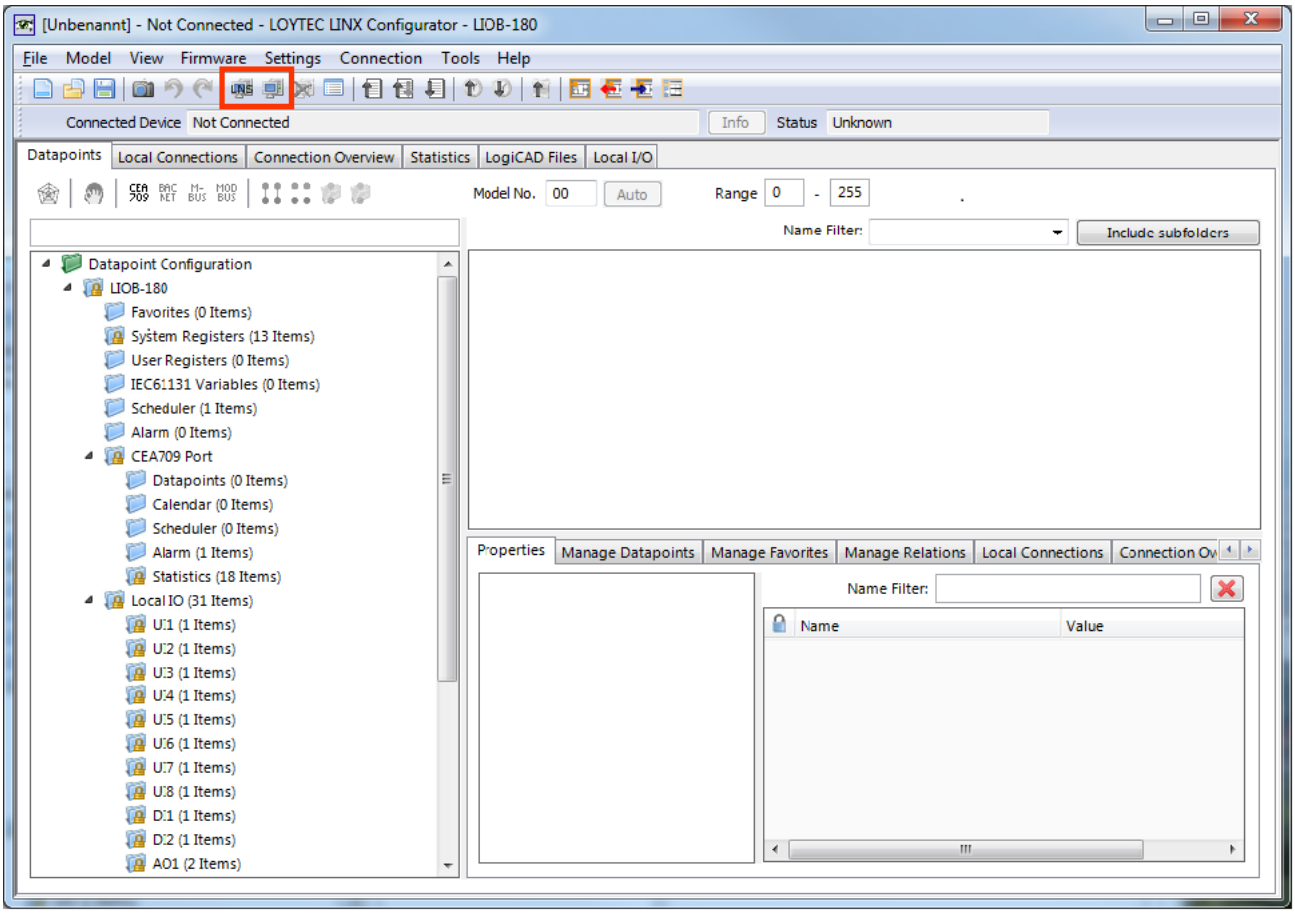
INTRODUCTION TO THE L-INX CONFIGURATOR

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.

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 16.
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 16.
3. For detailed information on how to create data points, etc., refer to the LINX configurator user manual.

Figure 22. Main screen of the L-INX Configurator.



STATUS LED OF LIOB-58X/59X

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

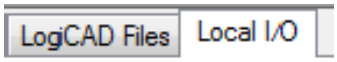
Tabla 4. LIOB-58x/59x Status LED Patterns

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.

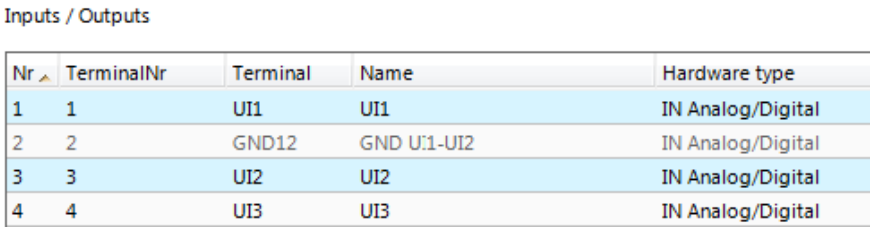
EXPANSION MODULE CONFIGURATION

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.

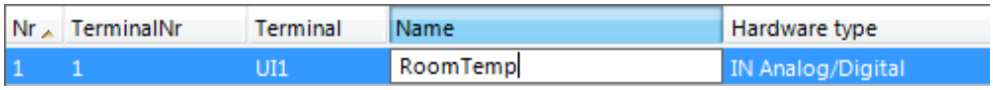
1. For LIOB-48x/58x models, select the L-IOB tab and then LIOB-LOCAL.



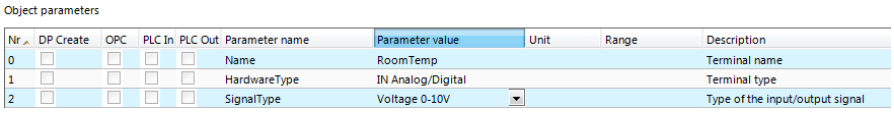
2. The I/O available on that L-IOB device are shown in the **Inputs** / **Outputs** table.



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



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.



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

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.

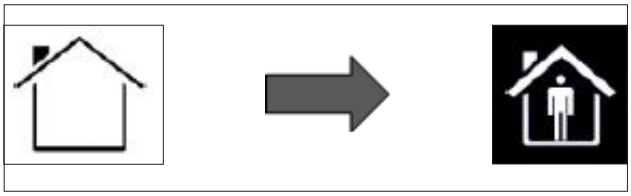
The following describes the use of the LSTAT thermostat as shown in Fig. 17 and the indicators it contains; in this case the icons shown are part of the CLIWP system startup system.

Figure 23. Thermostat LSTAT

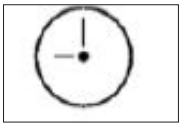
System startup:

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.



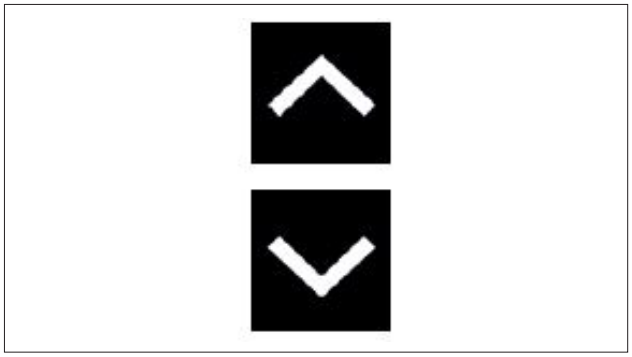
Once the evaporator fan start time is over, the condenser fan will start and then the compressor will start, during the process of these last two steps the following icons will be displayed.

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.

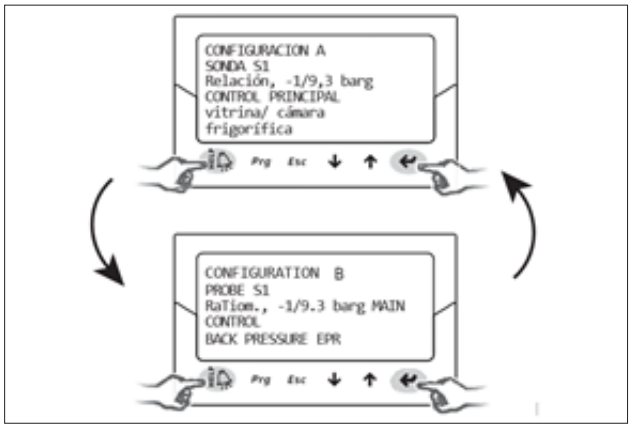
Free cooling:

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:

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.

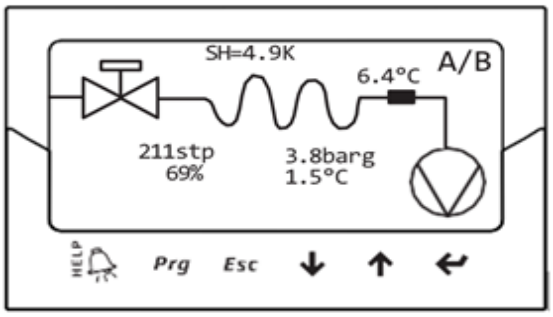


NOTE: The S1 probe parameter is common to both drivers, the main control parameter is set for each driver.

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.

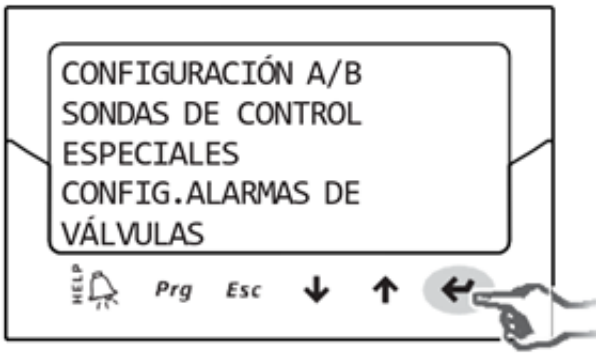
- If no key is pressed, the display automatically returns to the standard display after 5 minutes.
- To set a negative value, position with Enter on the leftmost digit and press Up/Down.

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.

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. 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 (Equipment, refrigerated counter, etc).

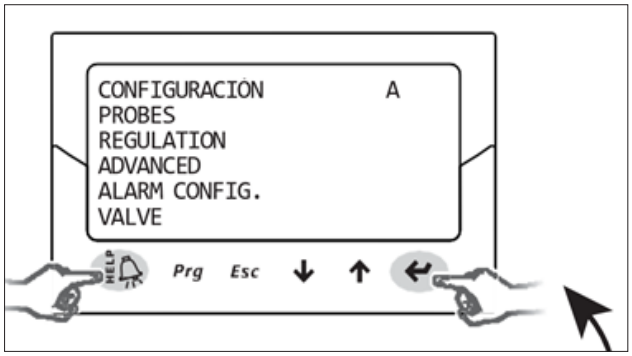
In case of errors in the initial settings, these parameters can be accessed later and changed in the service or manufacturer menu. If the default controller parameters are reset, the display will show the guided start-up procedure again at the next start-up.

CHECKS AFTER INITIAL START-UP

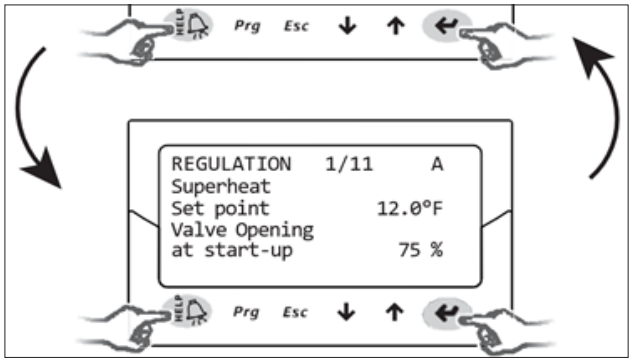
After the first start-up:

- 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).

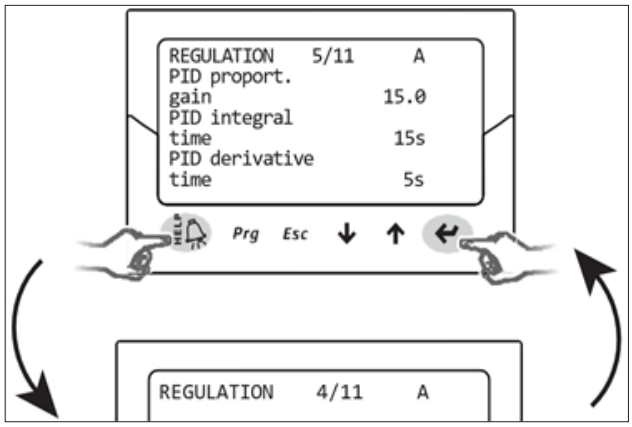
STEPS FOR PARAMETER SETTING AND SEPOINT SUPER HEAT.



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

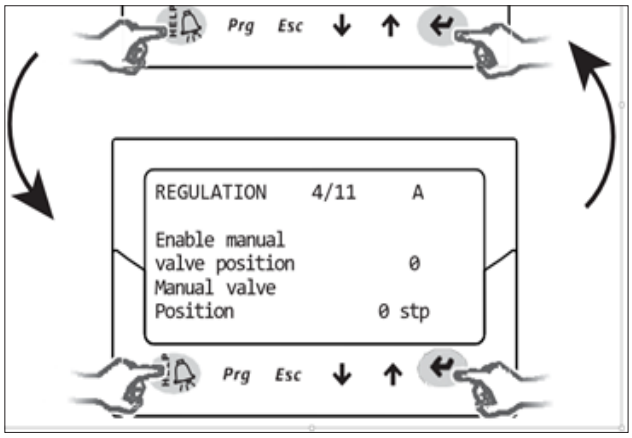


By pressing the **down** key, scroll the regulation menu to number 1.
Press **enter** and use the **up** and **down** keys to select the desired super heat setpoint, then press the **enter** key and then the **esc** key to return to the menu selection.



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.

NOTE: For better air flow you can remove the louvers from the unit.

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.

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.V

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. PressNEXT 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.

⚠ WARNING ⚠

The installer must take these procedures into account; his personnel must be qualified and certified to perform the installation in order to comply with all specifications and good practices to ensure proper operation of the unit.

PRE-START-UP CHECKLIST

The following data should be checked before putting the unit into operation.

Date:	
Place of Work:	
Location:	
Installing Contractor:	
Technician/Company:	
Unit Commissioning:	
Unit model:	
Serial number:	

PHYSICAL INSPECTION (BEFORE ELECTRICAL CONNECTION)

Check that the unit has not been damaged by handling or transport.	
Visually check for refrigerant leakage.	
Check for foreign objects in the fan discharge.	
Check that the air inlet is not obstructed and has the suggested clearance.	

NOTE: Accessories such as thermometers, pressure gauges, measuring ports, etc., are recommended but not required for operation. Are recommended but not necessary for the operation of the unit.

CHECKING THE ELECTRICAL SOURCE

The units require three-phase electrical power (if required) with grounding.

Verify that the circuit breaker is of the correct rating for the unit.	
Check that all electrical connections are secure.	
Check for false ground contacts as well as all wiring.	
Check internal control and power connections.	
Measure drive, ground, neutral and three-phase line voltage.	
Check that motor overload protection conforms to design requirements and is in automatic mode.	
Check voltage (*Motor save), which is set to supply the correct supply voltage for the drive.	

* The percentage of unbalance of the power supply must be calculated with the following formula, and adjusted with the UNBALANCE command.

UNBALANCE PERCENTAGE = [(MAXIMUM AVERAGE DEVIATION) / (AVERAGE)] X (100)

DIAGNOSTIC LIGHT INDICATORS (LED STATUS)	
Regular operation	Ever green
Delayed start	Flashing green
Reverse phase	Flashing red
Phase unbalance	Red in lapses
High/low voltage	Constant red

NOTE: The units are factory set, however the power supply may vary in each installation and due to this imbalance must be adjusted prior to start-up in order to protect the motors and electrical components of all units.

INSPECTION OF THE CONTROL PANEL

Check that the control panel is free of foreign objects.	
Power supply unit with three-phase electrical current.	
Phase unbalance should be less than 2% of average.	
Turn on each fan to ensure proper rotation.	

After completing the inspection of the above installation points and ensuring that all elements of the unit are correct, the unit can be powered up. Turn the switch on the CONTROL UNIT to the ON position to power the control unit with 24 volts.

START-UP

After turning on the controller, wait 5 minutes for the unit to be ready for operation.
The operating sequence will begin by checking all pre-programmed safety points on the unit. If all required conditions are correct, the unit will be ready to start operations.

UNIT CONTROL

To start operations, turn the ON/OFF switch to the ON position. After 6 seconds, the control will command the unit to start.

NOTE : After completing the inspection of the above installation points and making sure that all elements of the unit are correct, the unit can be turned on. Turn the switch on the CONTROL UNIT to the ON position to power the control panel with 24 volts.

MAINTENANCE

Service or maintenance of these units should be performed by experienced personnel with specific refrigeration training. Safety devices should be checked repeatedly and cycling control components should be analyzed and corrected before resetting is initiated.

The simplified design of the refrigeration circuit totally eliminates potential problems during regular operation of the unit. No maintenance is required on the refrigeration circuit as long as the unit is operated on a regular basis.

Ease of maintenance has been considered during the design phase; thus, the unit is easily accessible for service and maintenance. By accessing the panel located on the front of the unit, service and maintenance of the unit can be performed easily.

The electrical components are located in the terminal box on the top of the front panel, which allows easy access to them.

Under normal circumstances, this unit only requires a check and cleaning of the air inlet through the coil surface. This can be done on a monthly or quarterly basis depending on the environment in which the units have been installed.

When the environment is constantly invaded with grease or dust particles, the coils should be cleaned by an air conditioning service technician on a regular basis to ensure adequate cooling capacity and therefore efficient operation of the unit. The regular life span of the unit can be shortened if proper service is not performed.

For consistent durability and performance of the unit, proper maintenance should always be performed on a regular basis.

During extended periods of operation, the heat exchanger will become fouled, impairing the effectiveness and reducing the units performance. Consult your local supplier regarding the cleaning of the heat exchanger.

NOTE: The company is not responsible for the malfunction of the unit if the main cause is lack of maintenance or the operating conditions of the unit do not correspond to those recommended in this manual.

GENERAL

Routine checks and maintenance should be performed during initial operation as well as periodically during start-up. These include, liquid line checks, condensation and suction pressure measurements, as well as checking the unit for normal overheating and under cooling. A maintenance schedule is recommended at the end of this section.

COMPRESSOR MAINTENANCE

⚠ WARNING ⚠

The internal pressure and surface temperature of the compressor are hazards and can cause permanent injury.

Operators, installers and maintenance personnel require proper skills and tools.

Tube temperatures can exceed 100°C and cause severe burns.

Perform periodic service inspections to ensure system reliability.

To avoid system-related compressor problems, periodic maintenance is recommended:

- Verify that safety devices are operational and properly configured.
- Make sure the system is airtight.
- Verify compressor current consumption.
- Confirm that the system is operating in a consistent manner, check previous maintenance records and environmental conditions.
- Verify that all electrical connections are properly tightened.
- Keep the compressor clean and verify the absence of rust and oxidation on the compressor, frame, tubing and electrical connections.

ELECTRICAL TERMINALS

Electrical connections should be inspected and tightened if necessary. Heat and vibration can cause connections to loosen.

For servicing electrical components:

- Disconnect main power lines before repairing or replacing any components or cables.
- Tighten all wire connections attached to the terminal block and/or components.
- Check connectors, cables and/or components for burn marks, worn wires, etc. If any of them present these conditions, they should be repaired. or replaced.
- The voltage on the equipment should be checked with a meter periodically to ensure adequate power supply.

NOTE: Each unit comes with complete wiring. Have the diagrams handy when making connections. Electrical connections required at the time of installation are: Power line to power inlet and control wiring for the remote control. Do not wire the remote control with high voltage wires. High voltage may interfere with the control signals and/or may cause erratic or poor operation.

⚠ WARNING ⚠

Risk of electric shock, can cause injury and death.

Disconnect all power sources before inspecting the fan.

Disconnect all electrical power sources when working inside the unit. Potentially lethal voltages exist within the equipment during operation.

Review all cautions and warnings contained in this manual. Only qualified personnel should service this unit.

AIR FILTER

Any particles coming from the condenser piping, The unit requires a filter for the evaporator according to the size. It is an easy to service filter from inside the cabinet, it is located inside the machine on the electrical service hatch.

Filters are usually the most neglected device of air conditioning equipment in an environmental control system. However, to maintain efficiency, they should be continually checked and changed if required.

To replace the filters, remove the electrical service hatch, remove the old filter and put the new one in its place. No tools are required. Perform a repair on the cooling line.

INJECTION PACKAGE

A periodic inspection of the injection package includes: checking the bearings, housings, motor and motor mounts. With the engine off, inspect and remove any visible deposits from the bearings and housings.

You should also check that the hardware is tightened securely and that the motor rod rotates freely, as well as that the blades rotate freely.

REFRIGERATION SYSTEM

Cooling system components should be inspected every four months to confirm proper operation and to look for signs of wear. Although, in most cases, some evidence of operational failure is prior to component failure, periodic inspections can be a major factor in preventing most potential system failures.

REFRIGERANT LINES

Inspect all refrigerant lines and vibration isolation capillary lines and support as necessary. Visually inspect lines for possible leaks.

⚠ WARNING ⚠

Risk of explosive discharge of refrigerant at high pressure. This can cause personal injury or equipment damage. Never loosen refrigerant or electrical line connections until the compressor has been depressurized on both sides.

CONDENSER

Maintenance consists mainly of removing dirt and debris from the outer surface of the fins and repairing any damage to the fins. For units installed in corrosive environments, cleaning of the fins should be part of the regular maintenance program.

In this type of installation, dust and debris should be removed promptly to avoid build-up that will interfere with the regular operation of the unit.

⚠ WARNING ⚠

Risk of electric shock, may cause injury and death.

Risk of serious injury. Fan may start up and cause injury. Disconnect all power sources before inspecting the fan.

EXPANSION VALVE

Thermostatic

The Thermostatic Expansion Valve (TEV) keeps the evaporator supplied with enough refrigerant to meet load conditions. It has no way to turn the compressor on or off, but keeps the refrigerant itself superheated in the compressor gas suction line.

Determine the operation of the Thermostatic Expansion Valve (TEV) based on the superheat measurement.

If too little refrigerant is being fed to the evaporator, superheat will be very high. If too much refrigerant is being fed to the evaporator, the superheat will be too low.

At the factory, the Thermostatic Expansion Valve (TEV) is set for its intended application and the manufacturer recommends that no adjustment should be attempted under any conditions, only qualified personnel should make adjustments.

Electronic

The electronic valve is designed for installation in refrigeratn circuits as the refrigerant expansion device, usubg the superheat calculated by a pressure and temperature probe located at the evaporator outlet as the control signal. The inlet fluid should be suitably subcooled to prevent the valve from operating with flash gas. Valve noise may increase when refrigerant charge is insufficient or there is significant pressure drop downstream of the valve.

ANNUAL MAINTENANCE SCHEDULE

Before performing any work on the unit, make sure you have the proper Personal Safety Equipment (EPS), and that the unit is turned off and idle. It is also recommended that the unit be turned on 24 hours prior to first start-up to begin warming up the compressor crankcase.

ELECTRICAL MAINTENANCE

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Re-tighten electrical panel connectors and terminals, control parts, power and junction boxes (quarterly)	Plan	x			x			x			x		
	Real												
Physical inspection of all electrical panel connectors and relays (monthly)	Plan	x	x	x	x	x	x	x	x	x	x	x	x
	Real												
Check the amperage of all electric motors, compare them according to the nameplate of the equipment to detect anomalies (quarterly)	Plan	x			x			x			x		
	Real												
Physically check for false contacts (Monthly)	Plan	x	x	x	x	x	x	x	x	x	x	x	x
	Real												
Check the setting and condition of electrical protections and fuses; these must be within the manufacturer's specifications (Twice a month)	Plan	x		x		x		x		x		x	
	Real												
Cleaning of the electrical panel (monthly)	Plan	x	x	x	x	x	x	x	x	x	x	x	x
	Real												

PHYSICAL INSPECTION

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cleaning of the condenser with pressurized water (twice a month)	Plan	x		x		x		x		x		x	
	Real												
Refrigerant pressure check (quarterly)	Plan	x			x			x			x		
	Real												
Inspection of fan blades, cleaning of fan blades (Quarterly)	Plan	x			x			x			x		
	Real												
Compressor power consumption check to determine refrigerant loss (quarterly)	Plan	x		x		x		x		x		x	
	Real												
Compressor oil inspection (monthly)	Plan	x	x	x	x	x	x	x	x	x	x	x	x
	Real												
Review and cleaning of the inside of the equipment (Bimonthly)	Plan	x		x		x		x		x		x	
	Real												
Review of condensate drain line, must not be clogged (Quarterly)	Plan	x			x			x			x		
	Real												
Review of alarm history (monthly)	Plan	x	x	x	x	x	x	x	x	x	x	x	x
	Real												

Troubleshooting Chart

Problems	Possible causes	Possible corrective actions
Compressor does not run.	Main or compressor disconnect switch open.	Circuit breaker closed.
	Fuse damaged, circuit breakers open.	Check the electrical circuit and possible short circuit, line to ground, loss of connections or motor windings causing the failure. Replace the fuse and reset the compressor brakes, only after detecting and correcting the cause of the fault.
	Thermal overloads have tripped.	Overloads are self-resetting. Check supply voltage, operating amps, cycle times and mechanical operations. Allow time for automatic reset.
	Defective contactor or coil.	Replace.
	System shutdown by equipment protection devices.	Determine the type and cause of the shutdown and correct it before restarting the equipment. For example, low or high pressure, etc.
	No cooling required.	Wait until the unit calls for cooling.
	Liquid line solenoid does not open.	Repair or replace the solenoid. Check wiring.
	Motor electrical problems.	Check for open, shorted or bubbled motor.
	Loose wiring.	Check all wire connections and tighten all terminal screws.
Compressor makes noise or vibrates	Compressor running in reverse.	Check that the unit and compressor are on the correct phase of the line voltage.
	Inadequate piping or supports on suction or discharge.	Reposition, add or remove hangers.
	Worn compressor insulator bushing.	Replace.
	Compressor mechanical failure.	Check for possible problem in compressor failure and replace.
	Low oil level.	Check the possible problem before it damages the compressor.
High discharge pressure.	Condenser coil dirty.	Clean the coil.
	Fan does not work.	Check the electrical circuit and the fan motor.
	Fan failure.	Check the electrical circuit and possible problems before replacing the motor fan.
	Refrigerant overcharge.	Remove excess coolant and check liquid subcooling.
	Fan motor runs in reverse.	Check that the unit and fan motor are correctly supplanted by the line voltage.
	No or failed condenser caps.	Check or replace condenser caps on front and rear of unit.
	Incondensable in system.	Remove the non-condensables in the system and replace the charge.

Problems	Possible causes	Possible corrective actions
Low suction pressure.	Dirty evaporator.	Backwashing or chemical cleaning.
	Lack of refrigerant.	Check for leaks, repair and add the necessary charge. Check liquid sight glass.
	Expansion valve malfunction or failure.	Check or replace (if necessary) the valve and adjust the proper superheat.
	Solenoid value not open.	Check circuit and possible problem of solenoid valve not opening, if necessary replace.
	Liquid line filter drier fouled.	Check pressure drop or temperature for diagnostics.
	Condensing temperature too low.	Check means of regulating condenser temperature.
	Excess oil used.	If the system has excess oil, recover and adjust by observing the sight glass on the compressor.
Open motor overload relays or circuit breakers.	Voltage unbalance or out of range.	Correct power supply.
	Faulty or grounded wiring on motor.	Check electrical circuit for possible problem. Then replace compressor.
	Loose power wiring or faulty contactors.	Check all connections and tighten, if necessary replace contactors.
	High condenser temperature.	See corrective steps for high discharge pressure.
Compressor thermal protection switch open.	Operation beyond design conditions.	Correct to bring conditions within allowable limits.
	Voltage range or unbalance.	Check and correct.
	High superheat.	Set correct superheat.
	Compressor mechanical failure.	Check for possible problem. Then replace the compressor.
	Short cycling.	Check and stabilize load or correct control settings for the application.
Compressor oil level too high or too low.	Low oil level.	Check superheat, if necessary add oil.
	Solenoid valve return oil not open.	Check circuit, if necessary replace solenoid valve.
	Short cycling.	Check and stabilize load and correct control settings for the application.
	Excess liquid in crankcase - level too high.	Check crankcase heater. Check operation of the liquid line solenoid value.
	Level too high with compressor operation.	Confirm superheat is correct, remove oil.
	Operation or selection of expansion value.	Confirm superheat at minimum and maximum load conditions.
	Compressor mechanical problems.	Check for possible problem. Then replace compressor.
	Incorrect oil for application.	Check.
	Oil collapse in remote piping.	Check refrigerant piping if correction is necessary.
	Loose fitting in oil line	Repair.

Troubleshooting Chart

Problems	Possible causes	Possible corrective actions
Compressor oil level too high or too low.	Low oil level.	Check superheat, if necessary add oil.
	Solenoid valve return oil not open.	Check circuit, if necessary replace solenoid valve.
	Short cycling.	Check and stabilize load and correct control settings for the application.
	Excess liquid in crankcase - level too high.	Check crankcase heater. Check operation of the liquid line solenoid value.
	Level too high with compressor operation.	Confirm superheat is correct, remove oil.
	Operation or selection of expansion value.	Confirm superheat at minimum and maximum load conditions.
	Compressor mechanical problems.	Check for possible problem. Then replace compressor.
	Incorrect oil for application.	Check.
	Oil collapse in remote piping.	Check refrigerant piping if correction is necessary.
	Loose fitting in oil line	Repair.
Compressor thermal protection switch open.	Operation beyond design conditions.	Correct to bring conditions within allowable limits.
	Voltage range or unbalance.	Check and correct.
	High superheat.	Set correct superheat.
	Compressor mechanical failure.	Check for possible problem. Then replace the compressor.
	Short cycling.	Check and stabilize load or correct control settings for the application.

Table 5. CLIWP 3 RT (F°)

COOLING APPLICATION DATA AT NOMINAL AIR FLOW RATE														
Dry Bulb Outside Air Temperature Entering Condenser Zone Of Unit														
Model	Indoor return air (DB / WB)	Cooling capac-ity (BTUH)	"75°F	"80°F	"85°F	"90°F	"95°F	"100°F	"105°F	"110°F	"115°F	"120°F	"125°F	"131°F
CLIWP	75/62 °F	Total cooling	39,200	38,100	36,900	35,700	34,400	33,100	31,800	30,500	30,500	27,600	26,100	25,000
		Sensible cooling	33,786	32,838	31,804	30,770	29,649	28,529	27,408	26,288	26,288	23,788	22,496	21,548
	80/67 °F	Total cooling	43,100	41,900	40,600	39,300	38,000	36,600	35,200	33,800	33,800	30,800	29,200	28,100
		Sensible cooling	37,148	36,114	34,993	33,873	32,752	31,546	30,339	29,132	29,132	26,547	25,167	24,219
	85/72 °F	Total cooling	47,300	45,900	44,600	43,200	41,800	40,300	38,800	37,300	37,300	34,100	32,400	31,300
		Sensible cooling	40,768	39,561	38,441	37,234	36,027	34,735	33,442	32,149	32,149	29,391	27,926	26,977

Table 6. CLIWP 3 RT (C°)

COOLING APPLICATION DATA AT NOMINAL AIR FLOW RATE														
Dry Bulb Outside Air Temperature Entering Condenser Zone Of Unit														
Model	Indoor return air (DB / WB)	Cooling capacity (BTUH)	23.9°C"	26.6°C"	29.4°C"	32.2°C"	35°C"	37.8°C"	40.5°C"	43.3°C"	46.1°C"	48.8°C"	51.6°C"	55°C"
CLIWP	23.8/16.6 °C	Total cooling	39,200	38,100	36,900	35,700	34,400	33,100	31,800	30,500	30,500	27,600	26,100	25,000
		Sensible cooling	33,786	32,838	31,804	30,770	29,649	28,529	27,408	26,288	26,288	23,788	22,496	21,548
	26.6/19.4 °C	Total cooling	43,100	41,900	40,600	39,300	38,000	36,600	35,200	33,800	33,800	30,800	29,200	28,100
		Sensible cooling	37,148	36,114	34,993	33,873	32,752	31,546	30,339	29,132	29,132	26,547	25,167	24,219
	29.4/22.2 °C	Total cooling	47,300	45,900	44,600	43,200	41,800	40,300	38,800	37,300	37,300	34,100	32,400	31,300
		Sensible cooling	40,768	39,561	38,441	37,234	36,027	34,735	33,442	32,149	32,149	29,391	27,926	26,977

Table 7. CLIWP 5 RT (F°)

COOLING APPLICATION DATA AT NOMINAL AIR FLOW RATE												
Dry Bulb Outside Air Temperature Entering Condenser Zone Of Unit												
Model	Indoor return air (DB / WB)	Cooling capacity (BTUH)	"75°F	"80°F	"85°F	"90°F	"95°F	"100°F	"105°F	"110°F	"115°F	"120°F
CLIWP	75/62 °F	Total cooling	59,300	57,400	55,600	53,600	51,700	49,600	47,600	45,400	43,200	40,700
		Sensible cooling	43,645	42,246	40,922	39,450	38,051	36,506	35,034	33,414	31,795	29,955
	80/67 °F	Total cooling	65,100	63,200	61,100	59,100	57,000	54,800	52,500	50,200	47,800	45,100
		Sensible cooling	47,914	46,515	44,970	43,498	41,952	40,333	38,640	36,947	35,181	33,194
	85/72 °F	Total cooling	71,500	69,300	67,100	64,900	62,600	60,300	57,800	55,300	52,800	49,800
		Sensible cooling	52,624	51,005	49,386	47,766	46,074	44,381	42,541	40,701	38,861	36,653

Table 8. CLIWP 5 RT (C°)

COOLING APPLICATION DATA AT NOMINAL AIR FLOW RATE												
Dry Bulb Outside Air Temperature Entering Condenser Zone Of Unit												
Model	Indoor return air (DB / WB)	Cooling capacity (BTUH)	23.9°C"	26.6°C"	29.4°C"	32.2°C"	35°C"	37.8°C"	40.5°C"	43.3°C"	46.1°C"	48.8°C"
CLIWP	23.8/16.6 °C	Total cooling	59,300	57,400	55,600	53,600	51,700	49,600	47,600	45,400	43,200	40,700
		Sensible cooling	43,645	42,246	40,922	39,450	38,051	36,506	35,034	33,414	31,795	29,955
	26.6/19.4 °C	Total cooling	65,100	63,200	61,100	59,100	57,000	54,800	52,500	50,200	47,800	45,100
		Sensible cooling	47,914	46,515	44,970	43,498	41,952	40,333	38,640	36,947	35,181	33,194
	29.4/22.2 °C	Total cooling	71,500	69,300	67,100	64,900	62,600	60,300	57,800	55,300	52,800	49,800
		Sensible cooling	52,624	51,005	49,386	47,766	46,074	44,381	42,541	40,701	38,861	36,653

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Clima-Flex®

Air Conditioning

a member of **DAIKIN** *group*