

CLIV SERIES

Air cooled





REV. FEBRUARY 19th 2014
CLIMA-FLEX S.A. DE C.V.

Installation Manual CLIV Series

1. GENERAL DESCRIPTION

GENERAL DESCRIPTION

CLIMAFLEX chiller units are built with control and design in mind, assembled with technically specialized control software. Some of our features are in house production of all piping and wiring, scroll type compressors, new generation evaporators, air cooled condensers, optional hydraulic components, and several safety and security protections. Our units are ecofriendly and operate with R-410A refrigerant.

EQUIPMENT

Fully Factory assembled, and individually run tested with all required piping, wiring, and controls for operation.

MODULE

Steel base, anti-corrosive painted steel panels. Easy Access for maintenance without compromising the unit's stability.

COMPRESSORS

Two stage Scroll type hermetic compressors.

CONDENSERS

High efficiency microchannel with optional anti-corrosive coating.

EVAPORATORS

Compact Plate Heat exchangers with thermally isolated hydraulic refrigerant pipes and connections.

FANS

Low vibration and noise Axial Fans.

COMPONENTS

REFRIGERATION CONTROLS

The units are equipped with solenoid valves, expansion valves, dehydrator, and service valves.

ELECTRICAL COMPONENTS

All units are equipped with a control panel, security anti-theft devices, internal and external overheating protection, compressor drive protection, flow protection, freezing protection and electrical failure protection. The control panel has LED operation indicating lights.

HYDRAULIC COMPONENTS (OPTIONAL)

Water Pump

The drive in the water pump is TEFC (Totally Enclosed Fan Cooled) and has anti-corrosive coating on the housing.

CONTROL

The control unit allows the connection of the unit to the INTERNET, and allows the user to visualize all the unit's operating information, such as variable graphics, tendencies cycle time, diagnosis of components, alarms, etc. Access to this information renders a more efficient operation and system control.



1.1 ADVANTAGES OF CLIV SERIES CHILLER UNITS



NEW CLIV MODELS

EFFICIENCY

CLIMAFLEX water chillers are designed to comply with all requirements on all commercial projects. Air cooled **CLIV-CLIMAFLEX** units may be applied in many ways; the units can be installed as stand alone or in any number combination to get the exact required capacity for the project demands. The operation allows modulating in accordance with the building thermal load variations, and achieving the desired temperature in a precise and fast manner with high efficiency and minimum energy consumption.

CLIV CLIMAFLEX unit capacity ranges from 3 to 5 Tons.

OPERATION

CLIV CLIMAFLEX units have reduced vibration levels making them virtually silent. The overall design allows for easy, fast, and low price installation.

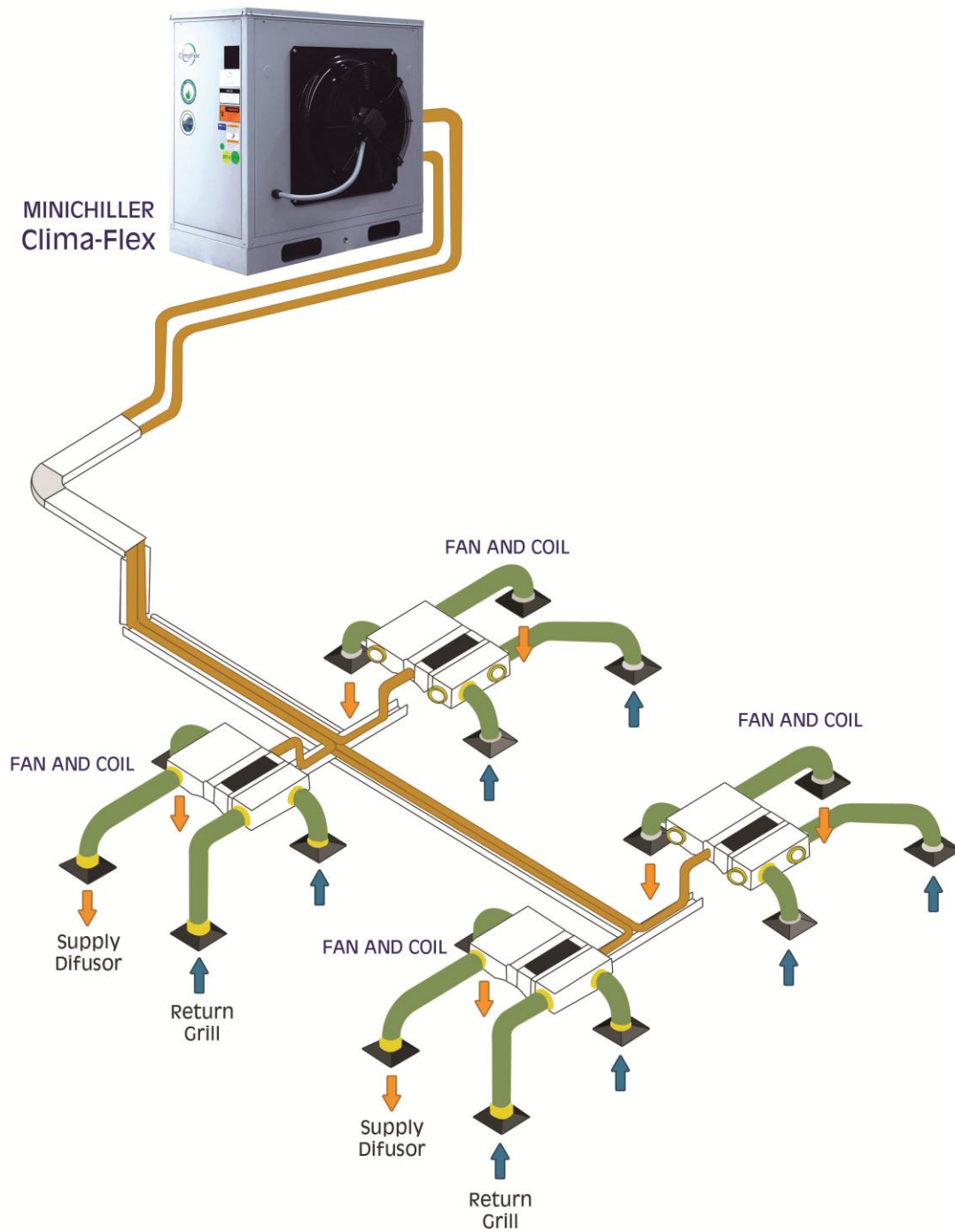
QUALITY

Each unit is carefully manufactured and individually tested under strict international standards. **CLIV CLIMAFLEX** units have state of the art components that offer a high quality product.

ENVIRONMENTALLY FRIENDLY

CLIMAFLEX units use R-410A refrigerant to reduce operating costs, and contribute to a significant reduction of CO₂ emissions. We are ecofriendly and strive to make green quality products.

1.2 CLIMA-FLEX INSTALLATION DIAGRAM



2. NOMENCLATURE

<u>CLIV</u>	<u>ACC</u>	<u>60,000</u>	<u>A</u>	<u>3</u>	<u>S</u>
1	2	3	4	5	6

1 SERIE	CLIV	Air cooled bank type module
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2 TYPE	ACC	Air Cooled Cooling Only
	ACH	Air Cooled heat-pump

3 NOMINAL CAPACITY	036	36,000 BTU/HR
	060	60,000 BTU/HR

4 FAN	A	Axial
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5 VOLTAGE	3	220/3/60
	2	440/3/60

6 COMPRESSORS	S	Two Stage
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3. CLIV UNITS

MODEL	CLIV-ACC-036-A3S-1/2	CLIV-ACC-061-A3S-1/2	CLIV-ACH-036-A3S-1/2	CLIV-ACH-061-A3S-1/2
COMPRESSOR				
Type	Scroll	Scroll	Scroll	Scroll
Refrigerant	R-410A	R-410A	R-410A	R-410A
Capacity (Tons)	3.0	5.0	3.0	5.0
Capacity(BTU / hr)	36,000	60,000	36,000	60,000
Current (AMP)	7.50	11.40	7.50	11.40
Power(KW)	2.32	3.71	3.32	3.71
FANS				
Fan Quantity	1	1	1	1
Fan Type	Axial	Axial	Axial	Axial
Total air Flow (CFM / m ³ /h)	4000	4000	4000	4000
Air entering Temperature (°C / °F)	35 ° / 95 °	35 ° / 95 °	35 ° / 95 °	35 ° / 95 °
Pressure Drop (in.w.c.)	0.4	0.4	0.4	0.4
Motor nominal capacity (HP)	1.07	1.07	1.07	1.07
All motors power (KW)	0.80	0.80	0.80	0.80
Current (AMP)	2.80	2.80	2.80	2.80
BOMBAS				
PMP number	1or2	1 or 2	1 or 2	1 or 2
Electrical characteristics	115 V / 1 PH / 60 HZ			
Operating Current (Amps)	1.80	1.80	1.80	1.80
Power (KW)	0.20	0.20	0.20	0.20
Power (HP)	1/6	1/6	1/6	1/6
PLATE HEAT EXCHANGER				
Water input temperature (°C / °F)	12.7 ° / 55 °	12.7 ° / 55 °	12.7 ° / 55 °	12.7 ° / 55 °
Water output temperature (°C / °F)	7.2 ° / 45 °	7.2 ° / 45 °	7.2 ° / 45 °	7.2 ° / 45 °
DIMENSIONS				
Length (cm / in)	109.70 / 43.19	109.70 / 43.19	109.70 / 43.19	109.70 / 43.19
Depth (cm / in)	68.73 / 27.06	68.73 / 27.06	68.73 / 27.06	68.73 / 27.06
Height (cm / in)	103.13 / 40.60	103.13 / 40.60	103.13 / 40.60	103.13 / 40.60
Water connections diameter (cm / in)	3.18 / 1 1/4	3.18 / 1 1/4	3.18 / 1 1/4	3.18 / 1 1/4
ELECTRICAL				
Electrical Characteristics	220 V / 3 PH / 60 HZ			
ESPECIFICACIONES				
HEAT PUMP	No	No	Sí	Sí
NOMINAL CAPACITY (Tons)	3.0	5.0	3.0	5.0
*ACTUAL CAPACITY (BTU / Hr)	30,800	51,900	30,800	51,900
*HEATING ACTUAL CAPACITY (BTU / Hr)	N/A	N/A	38,718	64562
TOTAL CURRENT (AMP)	10.30	14.20	10.30	14.20
TOTAL POWER (KW)	3.12	4.51	3.12	4.51
HEATING TOTAL POWER (KW)	N/A	N/A	3.24	4.70
EER	9.42	11.51	9.42	11.14
COP _R	2.89	3.37	2.89	3.37
COP _H	N/A	N/A	3.51	4.03
KW / TR	1.27	1.08	1.27	1.08

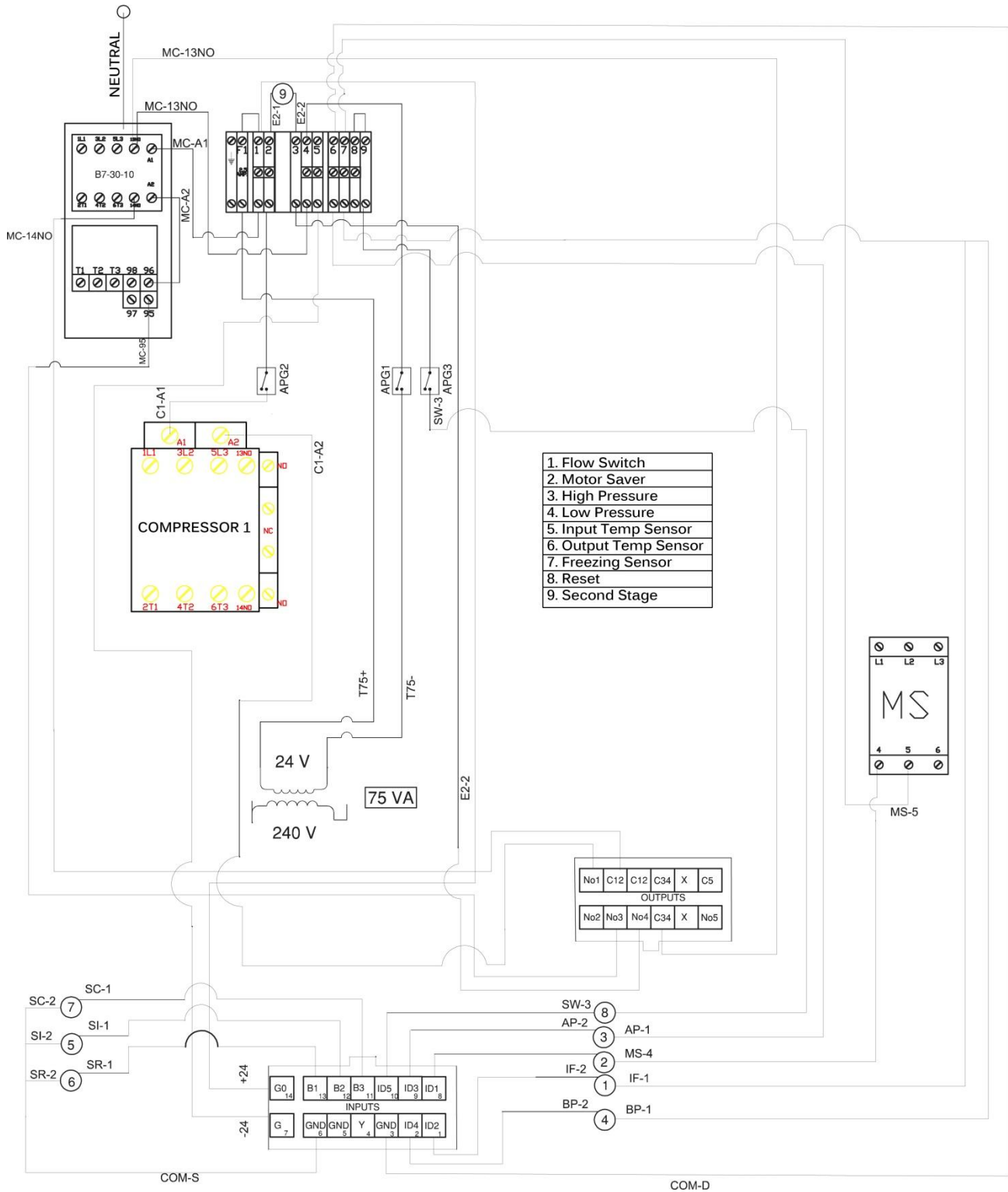
4. ELECTRICAL DATA MODEL CLIV 230VAC/60 HZ/3PHASE

Unit Model	VOLT	PH	HZ	GAUGE THW 75 °C	ELECTRICAL PROTECTION (MCA1)		MOP	MCA	COMPRESSOR			FAN		
					MIN	MAX			LRA	OPERATING AMPERAGE (1)	RLA **	CANT.	RLA	HP
CLIV-ACC-036-A3S	220	3	60	8	20	13	19.70	12.90	73	7.50	12.9	1	2.77	1 1/4
CLIV-ACC-061-A3S	220	3	60	8	29	18	28.50	17.80	110	11.40	18.4	1	2.77	1 1/4

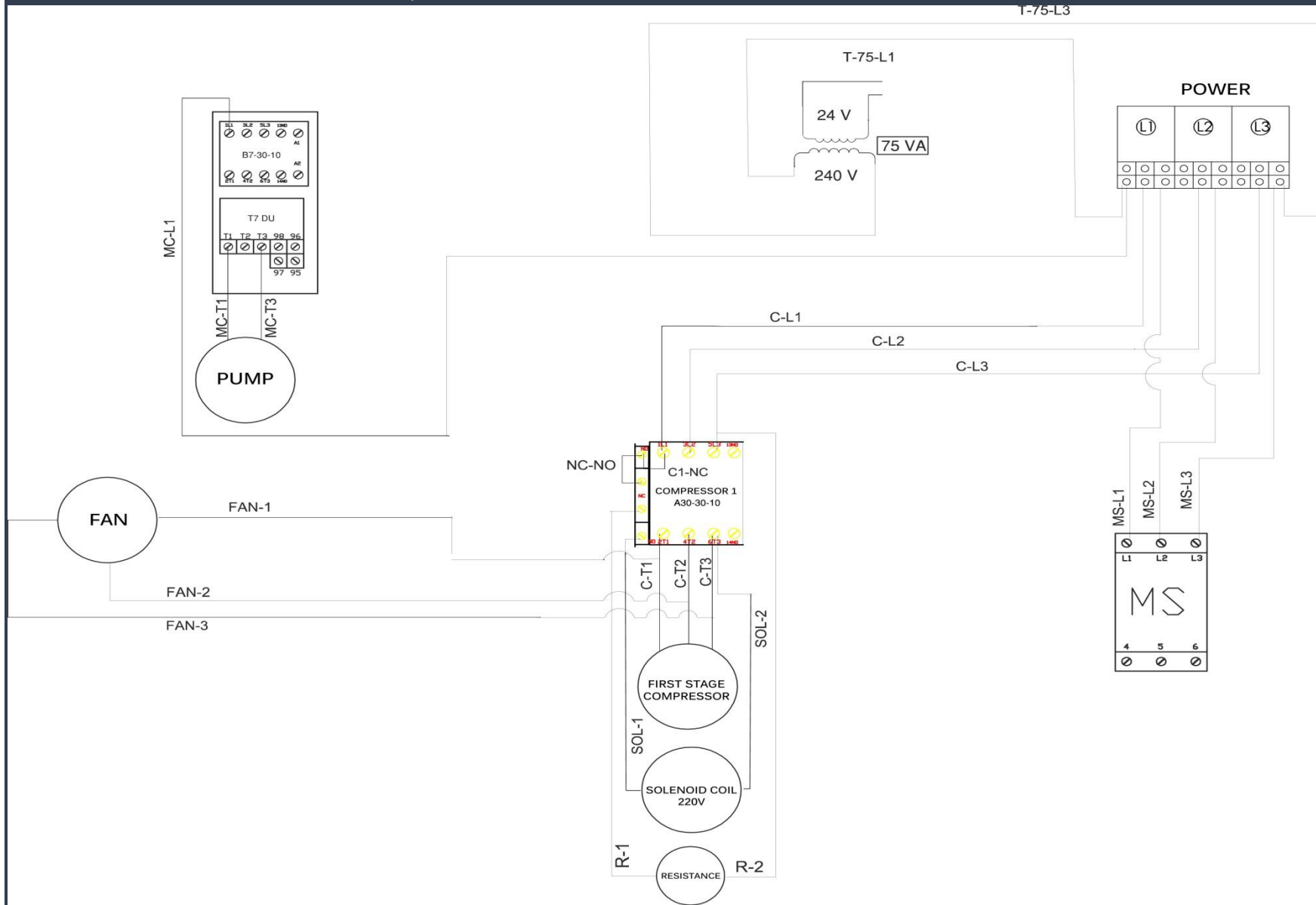
MCA	MAXIMUM CURRENT AMPACITY
MOP	MAXIMUM OPERATIONAL AMPACITY
LRA	LOCKED ROTOR AMPACITY
AMP OP	AMPACITY OF OPERATION
RLA	RATED LOAD AMPACITY
HP	HORSE POWER

5. ELECTRICAL DIAGRAM

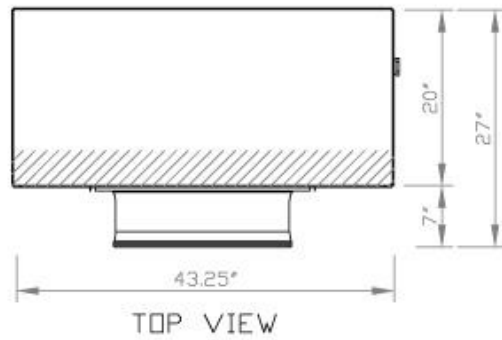
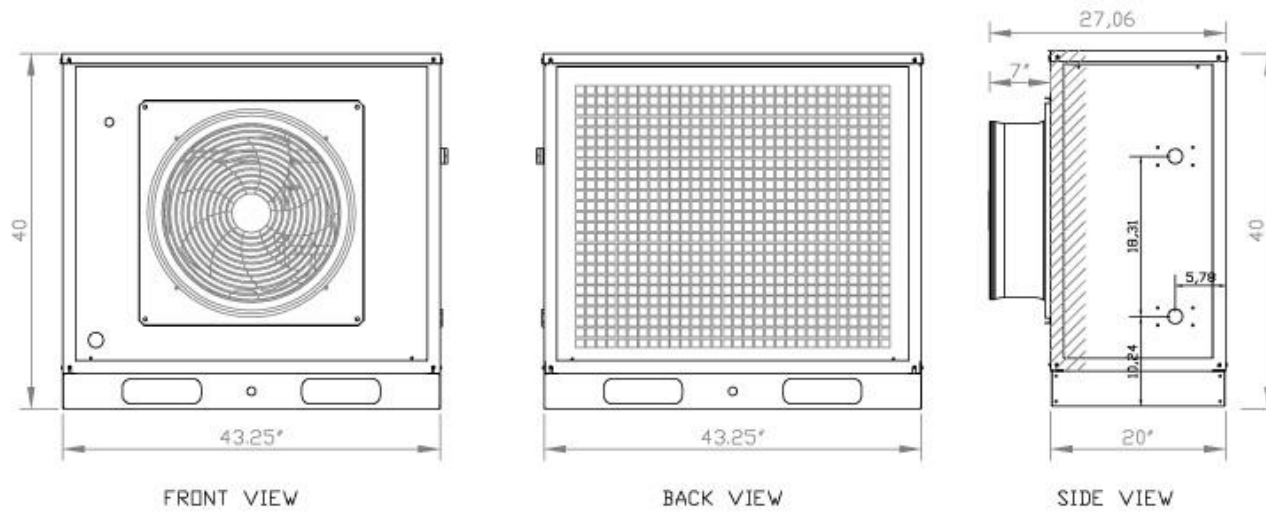
CONTROL DIAGRAM CLIV-ACC-036-A3S, CLIV-ACC-061-A3S



POWER DIAGRAM CLIV-ACC-036-A3S, CLIV-ACC-061-A3S



6. DIMENSIONS



CLIV-ACC-036-A3S	CLIV-ACH-036-A3S
CLIV-ACC-061-A3S	CLIV-ACH-061-A3S



7. Performance

45° F Output water temperature	Ambient Temperature														
	85° F / 29.5° C			90° F / 32.2° C			95° F / 35° C			100° F / 37.7° C			105° F / 40.5° C		
MODEL	(BTU/HR)	KW	EER	(BTU/HR)	KW	EER	(BTU/HR)	KW	EER	(BTU/HR)	KW	EER	(BTU/HR)	KW	EER
CLIV-ACC-036-A3S	33,000	2.99	11.04	31,900	3.12	10.22	30,800	3.27	9.42	29,600	3.42	8.65	28,400	3.59	7.91
CLIV-ACC-061-A3S	55,300	4.23	13.07	53,600	4.44	12.07	51,900	4.66	11.14	50,100	4.90	10.22	48,200	5.17	9.32

8. INSTALATION and STARTUP

8.1 INSTALATION

!! WARNING !!

To keep warranty this unit must be installed by trained personnel with expertise on water chillers installation.

Some of the voltages on the unit may be dangerous, before servicing it is recommended to totally de-energize the unit.

LOCATION

CLIV Units are designed to be installed in interiors. It is necessary that the unit has air venting, and a free air intake (see Fig 1) to allow for good air circulation and allow access for maintenance.

For fully functioning, **CLIV** units only require the connection with the hydraulic local net and power supply connection in accordance with technical data sheet.

Note: For optimal operation machinery room should be at a maximum temperature of 95 °F (35 °C)

Plan View

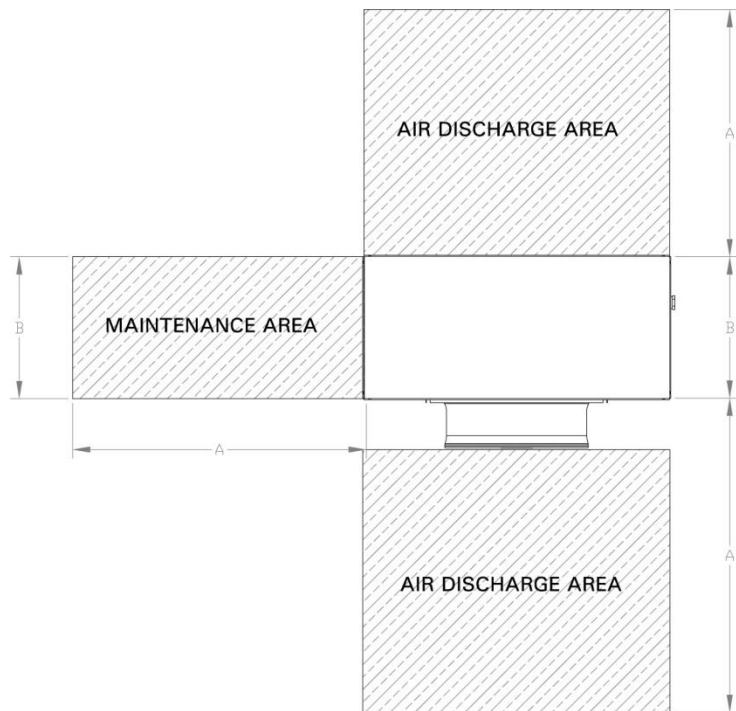


Fig. 1

MODELS	DIMENSIONS					
	A		B		C	
	cm	in	cm	in	cm	in
CLIV	100	39.5	68.73	27.06	50.95	20.06

1.1. INSTALATION

The following items must be checked before the unit's startup.

DATE: _____
 JOB SITE: _____
 LOCATION: _____
 CONTRACTOR: _____
 TECHNICIAN / COMPANY THAT PERFORMS STARTUP: _____

UNIT MODEL: _____
 SERIAL NUMBER: _____

!/\ WARNING !/ The following procedures are to be considered by the installer; their personnel must be qualified, and certified to perform installation in order to comply all specifications and good practices to assure the correct unit's operation.

1.- PHYSICAL INSPECTION (BEFORE ELECTRICAL CONECTION)

Check unit for possible transportation or handling damage.
 Visual check for refrigerant leaks.
 Only Open unit to install system piping. Do not remove connection's protection until hydraulic circuit is to be closed.
 Check for foreign objects in fan discharge.
 Check pulley alignment, and band tension.
 Check that air intake is not obstructed, and has the required space suggested on Fig. 1

2.- HYDRAULIC CIRCUIT INSPECTION

Water connections are NPT type inner thread (to identify the connection diameter, see unit's data sheet). The installation of a water filter is necessary on all hydraulic circuits in order to avoid solid particles in it, which must be installed on the return side of the circuit, and cleaned once the system's initial charge is finished.

Check water filter to be clean.
 Verify that all service valves are open.
 Check for adequate makeup water supply.
 Verify that all piping is filled with water and air has been vented out.
 Check Thermometers.
 Check Manometers.

Note: Accessories such as Thermometers, manometers, measuring ports, etc. are recommended but not necessary for the unit's operation.

!/\ WARNING !/ If hydraulic circuit contains air, it may compromise the units operation.

1.2. PREVIOUS TO STARTUP CHECKLIST

The following items must be checked, and written on a report, before unit's startup.

DATE: _____
 JOBSITE: _____
 LOCATION: _____
 INSTALLER CONTRACTOR: _____
 TECHNICIAN / COMPAÑY STARTING THE UNIT: _____

UNIT MODEL: _____
 UNIT SERIAL NÚMBER: _____

!! WARNING !! The following procedures are to be considered by the installer; their personnel must be qualified, and certified to perform installation in order to comply all specifications and good practices to assure the correct unit's operation.

1.- PHYSICAL INSPECTION (BEFORE ELECTRICAL CONECTION)

- Check unit for possible transportation or handling damage.
- Visually check for refrigerant leaks.
- Only Open unit to install system piping. Do not remove connection's protection until hydraulic circuit is to be closed.
- Check for foreign objects in fan discharge.
- Check pulley alignment, and band tension.
- Check that air intake is not obstructed and has the required space suggested on Fig. 1

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- Check water filter to be clean.
- Verify that all service valves are open.
- Check for adequate makeup water supply.
- Verify that all piping is water full and air has been vented out.
- Check Thermometers.
- Check Manometers.

Note: Accessories such as Thermometers, manometers, measuring ports, etc. are recommended but not necessary for the unit's operation.

!! WARNING !! If hydraulic circuit contains air, it may compromise the units operation.

1.2.1. ELECTRICAL SUPPLY INSPECTION

The electrical pipes are nipple NPT threaded conduit (1" inch diameter on all models) the units require 3 phase grounded electrical power.

- Verify that the thermo-magnetic switch is of correct capacity for the unit.
- Check that all electrical connections are tight.
- Check for false contacts on ground, and all wiring.
- Check internal connections for control and power.
- Measure voltage on all lines, and ground, neutral, and TF line.
- Check for overload protection on motors to be in position to design requirements, and on automatic mode.
- Check voltage monitor control (*Motor Saver), to be adjusted to supply the correct power voltage for the unit.

Note: The unit's control panel has a ventilation duct, and it must not be obstructed in any manner.



*The unbalance percentage of electrical supply should be calculated with the following formula and adjusted on the UNBALANCE TRIP knob.

$$\text{UNBALANCE PORCENTAGE} = \frac{[(\text{MAXIM AVERAGE DEVIATION})/(\text{AVERAGE})] \times 100}{1}$$

Note: CLIMA-FLEX units are previously factory adjusted however the electrical supply may vary on each installation, and due to this unbalance must be adjusted before startup in order to protect all the unit's motors and electrical components.

DIAGNOSIS INDICATING LIGHTS (LED STATUS)	
NORMAL OPERATION	CONSTANT GREEN
START DELAY	INTERMITENT GREEN
INVERTED PHASE	INTERMITENT RED
PHASE UNBALANCED	RED ON LAPSES
HIGH / LOW VOLTAGE	CONSTANT RED

1.2.2. CONTROL PANEL INSPECTION

Check the control panel to ensure that it is free of foreign objects.
Energize the unit with 3 phase electrical power. Phase unbalance must less than 2% of average.
Cycle each fan to assure rotation is correct
Cycle water pump (if applicable) to ensure that it is correctly energized.

!/\ WARNING !/

CLIV units are equipped with scroll compressors which must rotate freely or mayor damage to the compressor may happen. Check rotation previously to start.

1.3. STARTUP

After finishing the inspection of the previous installation points and making sure all the unit's items are correct the unit may be started.

1. UNIT CONTROL

Set the UNIT CONTROL switch on the ON position (Fig 2) to energize the control panel with 24 Volts.

After energizing the controller, wait five minutes for the unit to be on line and ready.

2. ON/OFF

Operation sequence will initiate by checking all security pre-programed points on the unit. If all required conditions are OK the unit will be ready to initiate operation.

To start operation set the ON/OFF switch (Fig 2) to the ON position.

After six seconds the controller will command the start of the water pump.

If water flow is detected on the pipes, the internal sequence of the unit will begin.

3. COMPRESSORS

Set the APG1 switch, 24V (Fig. 2) to the ON position afterwards set the APG2 switch also to the ON position, this will enable the compressors start cycle.

Note: The APG4 switch (Fig. 3) selects the unit's operating mode, whether is it cooling only or heat pump. If you wish to operate the unit as heat pump turn this switch to ON.



Fig. 2 Cooling Only Mode



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Operation Manual

CLIV Series

1. NOMECLATURE

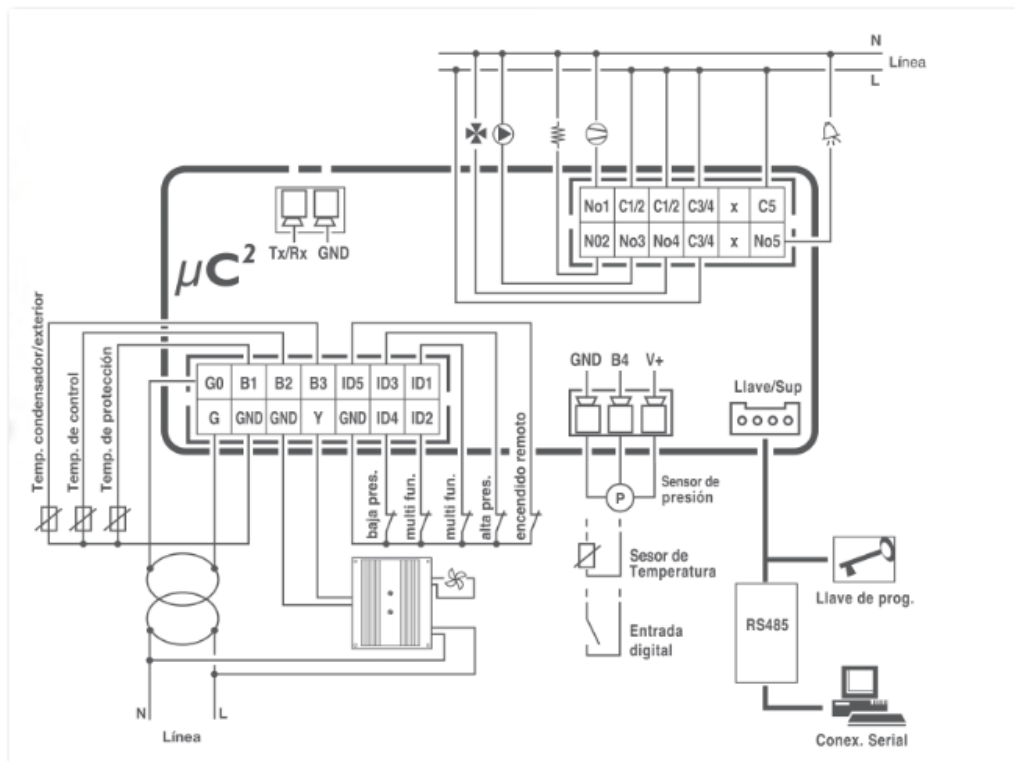


Fig. 1

No1=On / Off; COMPRESSOR AND FAN FIRST STAGE

No3=On / OFF Pump

No4=On / Off SECOND STAGE

B1=Return Sensor

B2=Supply Sensor

B3=Freezing Sensor

ID1=Motor Saver

ID2=Flow Sensor

ID3=High pressure Sensor

ID4=Low pressure Sensor

ID5=ON/OFF Remote

2. DISPLAY

This display has three figures, with a comma decimal between -99.9 and 99.9 outside this measurement range the value will be shown without the decimal (but even if not displayed, inner control will take all values with one decimal).

On normal operation the display value corresponds to the temperature read by probe B1.

On Fig 2 for this panel version the present symbols are indicated on the display and on the keyboard.



Fig. 2

2.1 DISPLAY SIMBOLOGY

Symbol	Color	Meaning		Reference refrigerant circuit
		LED On	Blinking LED	
1;2	amber	Compressor 1 or 2 ON	On Demand	1
3;4	amber	Compressor 1 or 4 ON	On Demand	2
A	amber	At least one compressor is ON		1 / 2
B	amber	Pump / Fan running	On Demand	1 / 2
C	amber	Condenser Fan ON		1 / 2
D	amber	Defrost ON	On Demand	1 / 2
Y	amber	Resistance ON		1 / 2
F	amber	Active Alarm		1 / 2
G	amber	Heat Pump Mode (P6=0)	Heat Pump Demand (P6=0)	1 / 2
H	amber	Cooling Mode (P6=0)	Cooling Mode Demand (P6=0)	1 / 2

3. ALARMS



Fig. 3

HP1= High Pressure Alarm

The unit is operating on high pressure. As the pressure reduces the alarm will reset automatically.



LP1=Low Pressure Alarm

The unit is operating on low pressure as the pressure rises the alarm will reset automatically.



TP= General Thermal switch.

Phase Alarm, with voltage problems, Motor Saver sends a signal to open the switch it will automatically reset once the problem is corrected



FL=Flow Alarm

Flow Alarm is tripped when low flow is detected, to reset the alarm and correct the problem: reset the controller unit (turn the unit Off and On).



A1=Freezing Alarm

The temperature sensor B3 Sensor (freezing) is below the programmed value. The alarm will reset once the temperature value rises.



E1=Alarm, broken return sensor

E2=Alarm, broken injection sensor

E3=Alarm, broken freezing sensor

Sensor failure alarms B1, B2, or B3 respectively; this is due to a false contact or malfunction of the sensor. It is necessary to troubleshoot the connection or change the sensor.

3.1 TEMPERATURE DISPLAY

To access the temperature on the display navigate using the Up and Down keys.



The temperature set by default is the temperature B02 = injection. Using the navigation keys you may move to B01 = return temp display and B03 = freezing temp display. These temperatures will be displayed, if no key is pressed after a few seconds the display will return to the initial screen.



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Maintenance Manual

CLIV Series

1. MAINTENANCE

1.1 HYDRAULIC MAINTENANCE

Hydraulic filters cleaning.	
Visual Inspection of all pipes for leak detection.	
Replenish Water on hydraulic circuit.	

1.2 ELECTRICAL MAINTENANCE

Check all electrical connections, power, and control panels.	
Physical inspection of all relays, and starters on the electrical panel.	
Check amperage on all motors, and compare them to plate values.	
Physically check for false contacts.	
Verify status of all electrical protections to be under the manufacturer specifications.	
Clean the electrical panels.	

1.3 PHYSICAL INSPECTION

Condenser cleaning with pressurized clean water, interval depends on ambient conditions.	
Check refrigerant load (3 months period).	
Change fan motor bearings as necessary.	
Verify electrical power consumption on compressors, to determine refrigerant leaks.	

CLIV SERIES

CLIV-ACH-061-A3S
HEAT PUMP

Mini Chiller Air Cooled Axial Fan



CLIV UNIT



COMPRESSOR

Compressor Type	Two Stages Scroll
Quantity	1
Power Consumption (kW).....	3.71
Current Consumption (A).....	11.40

FAN

Type	Axial
Air Pressure Drop (inH ₂ O).....	0.40
Air Operating Range (°F).....	55 / 120
Power Consumption (kW).....	0.80
Current Consumption (A).....	2.80

CONDENSER

Type	Microchannel
Air Flow (CFM).....	4,000
Area (ft ²).....	8.75
Air Pressure Drop (inH ₂ O).....	0.40

EVAPORATOR

Type.....	Stainless Steel Plates
Water Flow (GPM).....	12
Inlet Water Temperature (°F).....	54
Outlet Water Temperature (°F).....	44

SELECTION CONDITIONS

Elevation over sea level (ft)	0.0
Ambient temperature (°F)	95
Leaving water temperature (°F)	44

COOLING MODE

Nominal Capacity (BTU/hr)	61,000
Rated Capacity (BTU/hr)	51,900
EER (BTU/W*h)	11.51
IPLV (EER)	15.78
COP _R	3.37

HEATING MODE

Heating Capacity (BTU/hr)	64,562
Power Consumption (kW).....	4.70
COP _H	4.03
Leaving water temperature (°F).....	110

ELECTRICAL DATA

Power source (V,Φ,HZ).....	220 / 3 / 60
MOP (A)	28.50
MCA (A)	17.80
Total Current Consumption (A)	14.20
Total Power Consumption (kW).....	4.51

UNIT DATA

Refrigerant Type	R410-A
Refrigerant Weight (lbs).....	3.50
Sound Level (Db)	68
Net Weight (lbs)	319.20
Operation Weight (lbs)	327.40
Controller	Digital
Total Water Pressure Drop (ft WG)	8.50

DIMENSIONS

Length (in)	43.25
Width (in)	20.00
Height (in).....	40.00
Inlet/Outlet water (in).....	1 1/4

Standard Characteristics

- Limited Warranty for Clima-Flex units.
- 1 year warranty for functional equipment parts.
 - 2 years warranty for compressor.

Notes

1. EER and IPLV mentioned in the tables above are applied with non-ducted indoor units. Values are based on AHRI Standar 550 / 590 and are subject to change without previous notice. Performance data can be found on the AHRI website <http://www.ahridirectory.org/>
2. All communication cable to be minimum 18 AWG, 3 conductor, stranded, shielded and must comply with applicable local and national code.
3. The rated data mentioned in this technical data is applied with non-ducted indoor units.
4. Values include elevation over sea level correction factor.
5. The voltage tolerance is ±10%.
6. Power wiring cable size must comply with the applicable local and national code. Cable THW at 75°C Cal. 6.
7. Efficiency data do not consider circulator water pump.
8. Installation and maintenance must be performed by properly trained and qualified personnel equipped with the proper tools.

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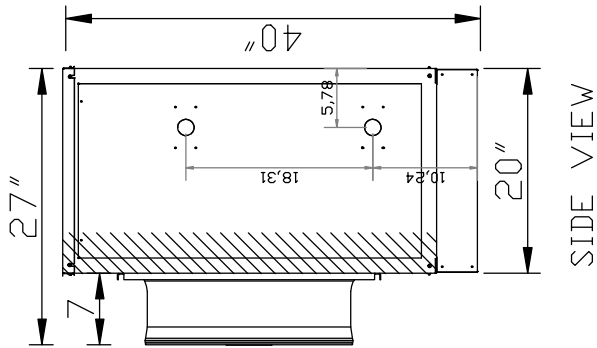
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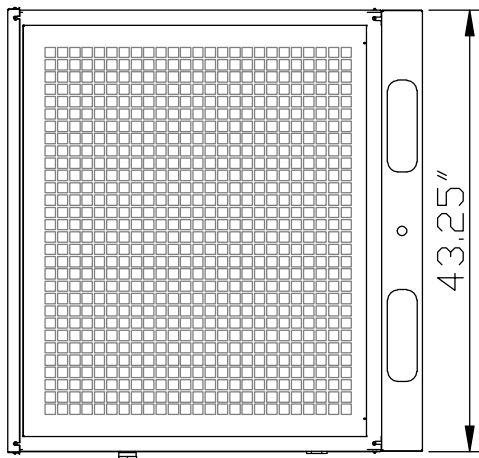
CLIV SERIES

CLIV-ACH-061-A3S
HEAT PUMP

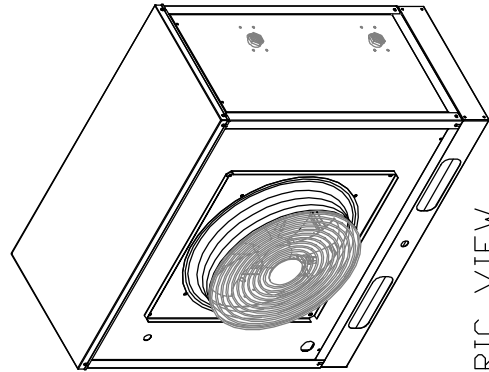
Mini Chiller Air Cooled Axial Fan



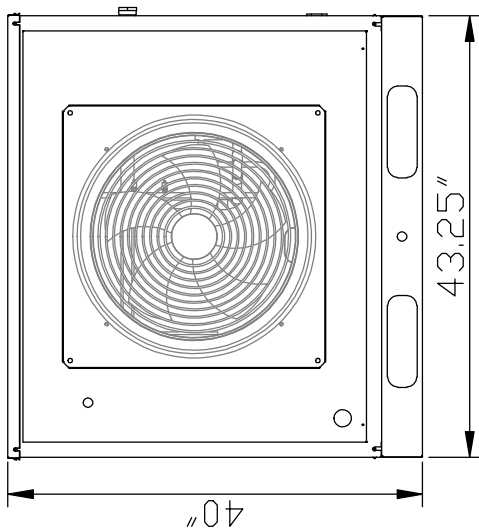
SIDE VIEW



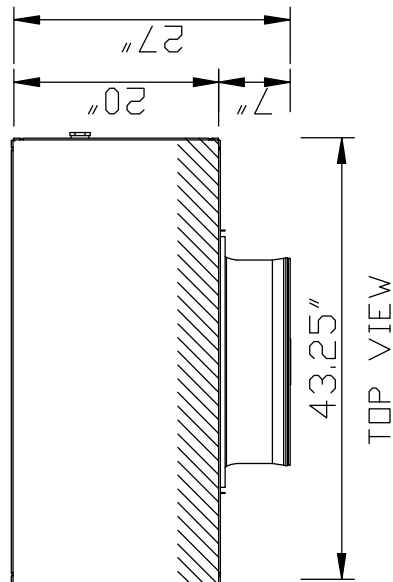
BACK VIEW



ISOMETRIC VIEW





FRONT VIEW



TOP VIEW

Clima-Flex, S.A. de C.V.

Av. Central #285 Parque Industrial Logistico / Delegacion La Pila / San Luis Potosí, México / ZIP Code 78422

Phone +52 (444) 161-5043  Facebook/clima-flex  @climaflexMexico

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