Installation, Operation and Maintenance Manual

Lync AEGIS

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Engineered Solutions

L-OMM-012C • 4/7/2026

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1. SAFETY CONSIDERATIONS

IMPORTANT SAFETY NOTE:

It only takes five seconds of skin contact with 140°F water to cause a second degree burn. You must protect against high water temperatures in all sinks, tubs, showers and other points of hot water contact.

Accidental scalding from hot water is a greater risk in certain facilities, including:

- Homes For The Physically or Mentally Disabled
- Hospitals
- Nursing Homes and Assisted Living Facilities
- Foster And Child Care Facilities

Potable hot water should be no more than 110°F when used for bathing or other personal use anywhere contact with hot water may be slower, or the danger of hot water contact is greater.

IMPORTANT!

Always follow local code requirements and the rulings of authorities having jurisdiction.

Thermostatically controlled mixing valves must be used in the design of the potable hot water system.

Good engineering practice mandates that thermostatically controlled mixing valves are set at 120°f or less to keep the delivered water temperature below scalding temperatures.

⚠ WARNING!

If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury. or death. Do not store or use gasoline or other flammable vapors and liquids near this or any other appliance.

⚠ WARNING!

Installation and service must be performed by a qualified installer, or service agency who must read and follow the manual before installing, servicing, or removing the unit.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury, exposure to hazardous materials, or death. Do not use matches, candles, flames, or other sources of ignition to check for gas leaks.

Fluids under pressure may cause injury to personnel or damage to equipment when released. Be sure to shut off all incoming and outgoing water shutoff valves and carefully decrease all trapped pressures to zero before performing maintenance.

The electrical connection cover must be installed at all times, except during maintenance.

A disconnect switch must be installed at the electrical service connection per local codes.

IMPORTANT!

This manual contains information required for the installation, operation and maintenance of the Lync AEGIS. Read and follow the information in this and all other provided instructions, labels and markings before installing, operating or servicing this equipment.

1.1. General Warnings

Read the following before continuing:

- This manual is an integral part of the product and must be kept for consultation.
- The controller must not be used with functions other than those described.
- Before continuing, check the application limits.
- The company reserves the right to change the composition of its products without notice.

1.2. Safety Precautions

- Use the controller only within the intended operating limits.
- The electrical panel must not be opened by unauthorized personnel.
- Make sure cables for the probes and the power supply are kept separate without twisting.

For applications in especially critical industrial environments, it may be useful to use network filters.

CAUTION!
Disconnect all electrical connections before starting any maintenance work.

2. INTRODUCTION

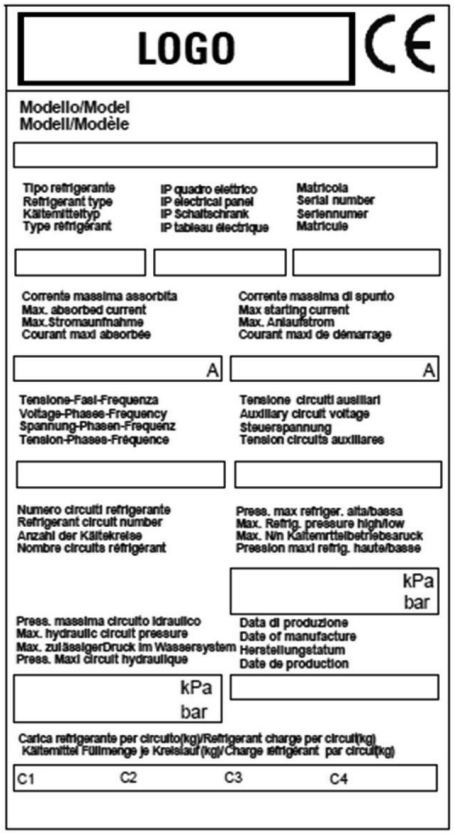
Aegis is a highly efficient, commercial heat pump solution that uses electricity and natural refrigerant-grade CO_2 to produce domestic hot water up to 185°F all year round.

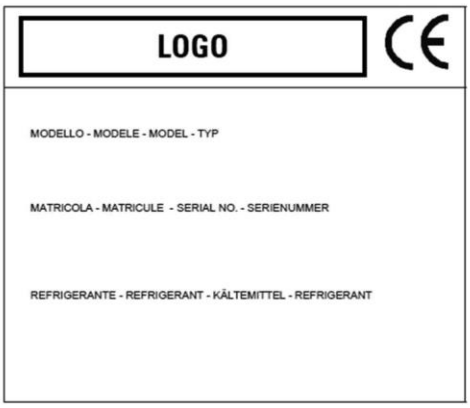
Using electricity and the superior qualities of R-744, a natural refrigerant-grade CO_2, the Aegis heat pump water heaters are one of the cleanest, most efficient and environmentally friendly ways to heat domestic water.

2.1. Aegis Models

Aegis comes in two versions: Aegis A and Aegis W. Aegis A absorbs and moves heat from the surrounding air at temperatures as low as -4°F to produce hot water. Aegis W produces hot water by absorbing and moving heat from a connected water source at temperatures as low as 14°F.

The model, serial number, power voltage, etc. are shown on labels affixed to the machine.



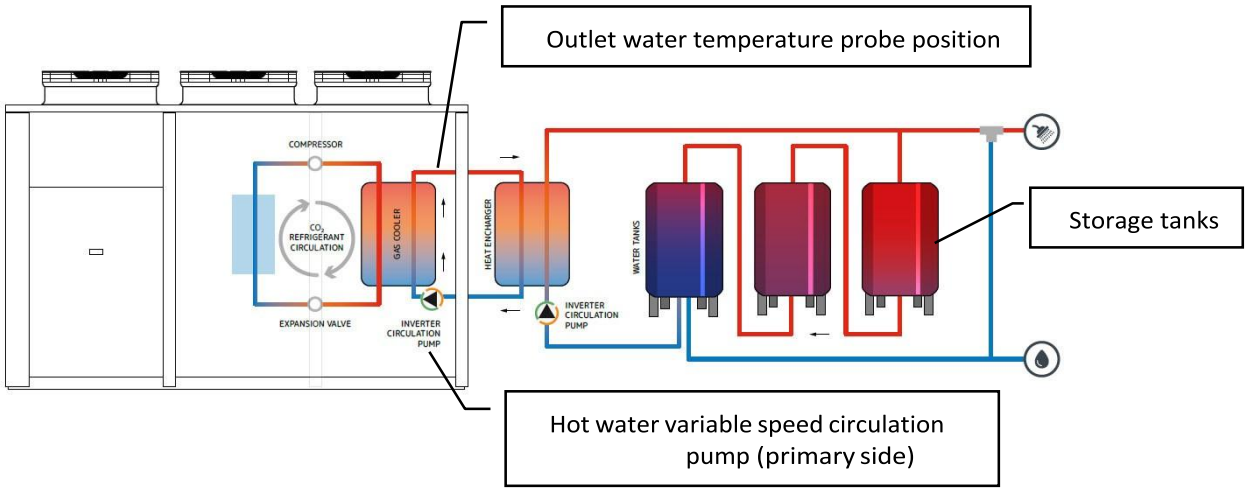


2.2. Unit Control

The unit control software is responsible for regulating the outlet water temperature from the appliance. The parameter displayed as " ST01 Set Hot Water" is user adjustable.

Additionally, the unit control manages the circulation of water in order to ensure that the correct temperature rise in the system is maintained. This will determine the need for hot water recovery by monitoring the water temperature in the storage tanks.

Please note that the delivery temperature is regulated by modulating the pump, therefore the flow of hot water at the outlet is not constant.

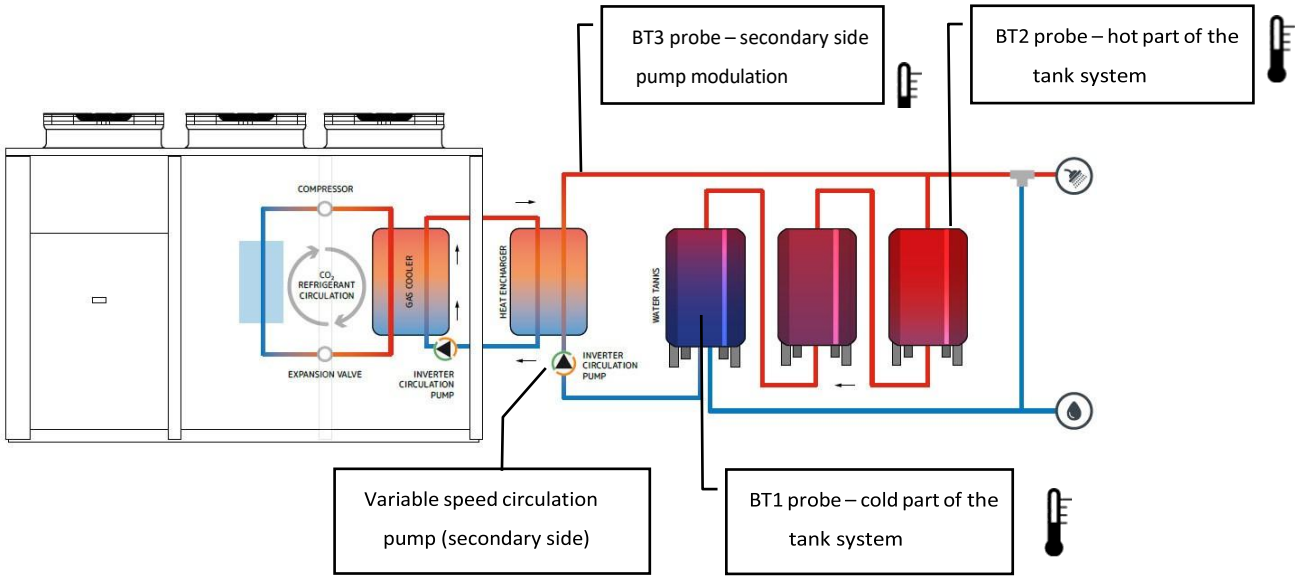


2.3. Sequence Of Operation

The hot water storage tanks used in this heating system must be equipped with the two provided temperature sensors, or other sensors meeting requirements for a NTC 10k temperature sensor. The BT2 sensor (hot side probe) is located in the top of the last storage tank in the series, near the supply outlet. The (BT1) sensor (cold side probe) is placed in the bottom of the first storage, near cold return water connection.

The optional BT3 sensor is located on the outlet of the external heat exchanger *(see dedicated section)* and is needed to modulate the inverter circulation pump placed between the heat exchanger and the storage tanks. Installation of BT1, BT2, and BT3 probes must be done by the installer prior to operation.

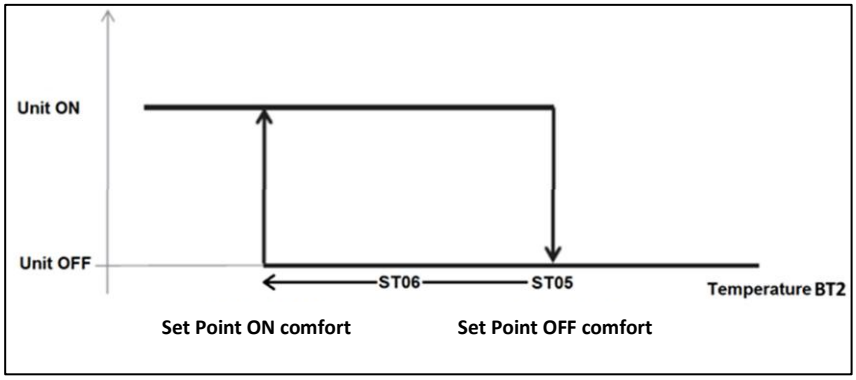
NOTE: Tanks must be hydraulically connected in series as shown below, not in parallel.



When the temperature probe BT1 reaches the value "Set point unit ON", (set point (ST03) minus differential (ST04)), the unit will be turned on. The unit will continue to heat the water to the set temperature as long as the temperature BT1 remains below the “Set point unit OFF” value (ST03). Once BT1 reaches "Set point unit OFF" the unit will be turned off.

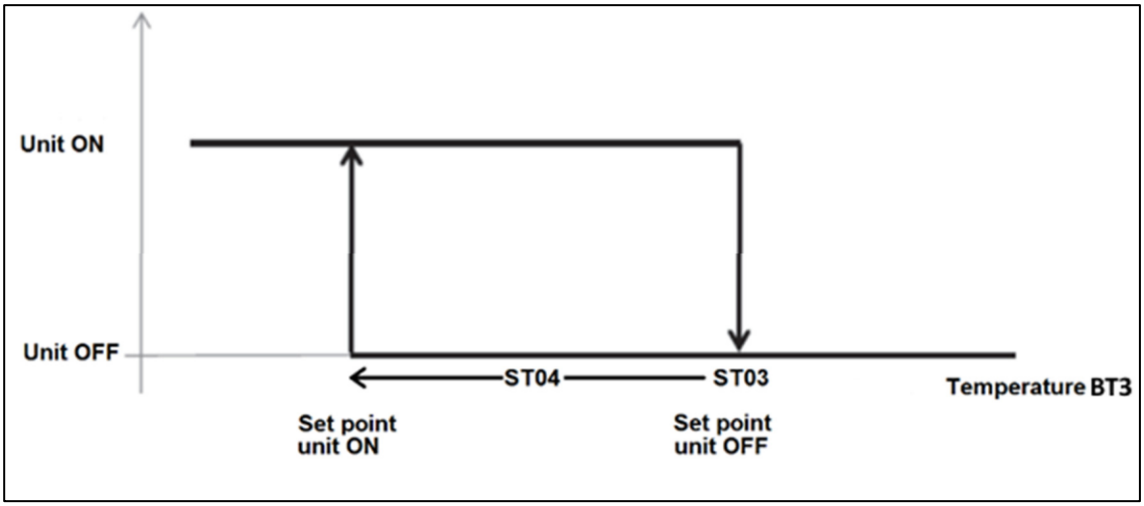
To limit the possible discomfort that can be generated by excessive heat dissipation, or excessive and rapid spillage of water from the top of the tanks, you can use the probe BT2 to operate a "comfort" function. In this case, even if the temperature BT1 is higher than the value of "Set point unit OFF", the unit continues to operate as long as the BT2 is lower than a value of "Set point comfort ON".

Operation with only the BT1 probe is allowed, while the use of the BT2 probe requires the presence of the BT1 probe. The unit will turn off only when both the BT1 and BT2 temperatures are greater than the related set points.



IMPORTANT

The unit will begin to run with only the BT1 probe, regardless of BT2 probe. If the unit runs based on the BT2 probe, regulation of the BT1 probe will also start automatically, even if the starting parameter (ST02) is OFF.



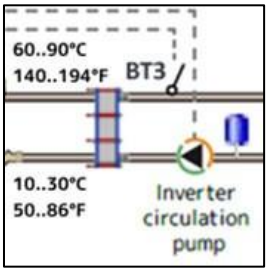
Please refer to Aegis Electronic Controller Manual (L-OMM-013) for information on enabling and choosing between local analog and remote digital input.

2.4. Version With Cool Recovery (Air Source Unit Only)

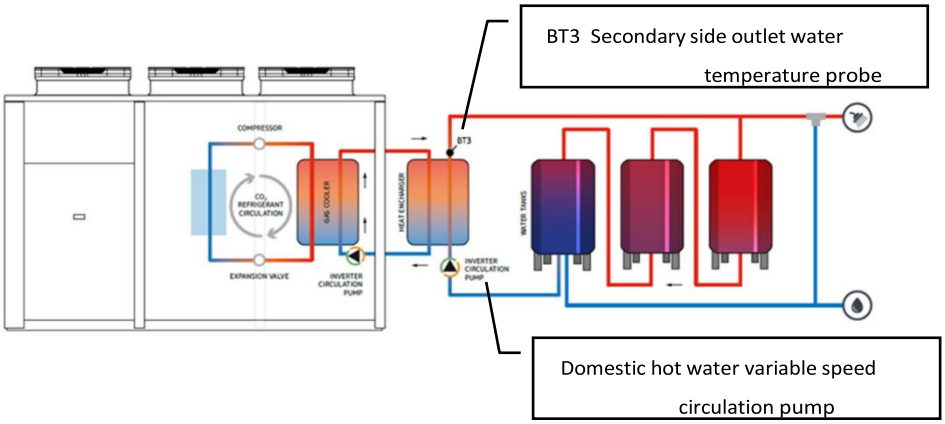
Using the cool recovery option, heat can be drawn from a water stream rather than the air, thus providing cooling to a water loop. This can be used to increase the performance of the heat pump, and also increase the performance of water loops such as a central chilled water system. Refer to the Aegis Electronic Controller Manual (L-OMM-013) for further details on how to activate and control this function. **NOTE:** This option is available only for the Air source unit.

2.5. Domestic Hot Water Pump Management

The software also manages the domestic hot water pump. The start, minimum, and maximum speed can be adjusted separately for both pumps. The domestic hot water pump can be active when the unit is in standby, but this setting is strongly not recommended, to avoid the destratification of the temperature in the tanks.



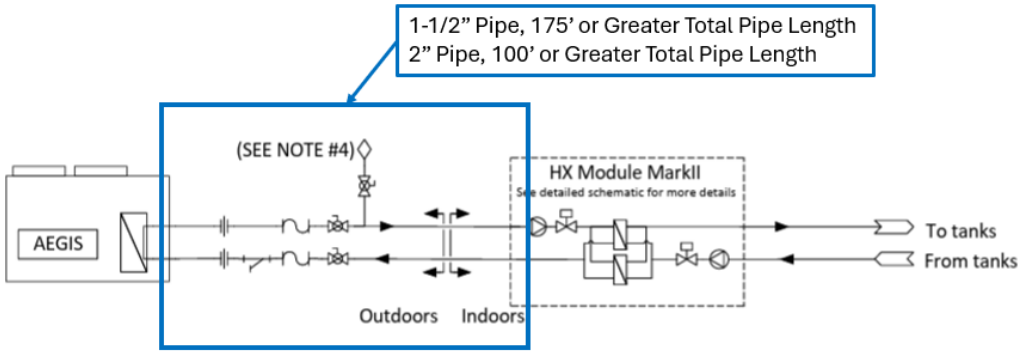
Please note that the main unit pump and the domestic hot water pump operate with coordinated set points in the sense that an offset (that can be set by the user) is subtracted from the unit set point ST1 and it is used to regulate the domestic hot water pump referred to as the BT3 probe. The user must apply a regulation offset (it must be negative) to adjust the secondary pump set point, taking the temperature losses in the plate exchanger into consideration.



NOTE: Speed regulation of the secondary side pump is independent from regulation of the internal pump. Please see Aegis Electronic Controller Manual (L-OMM-013) for details.

2.6. Extended Primary Loop, Secondary Pump Delay Function

For field configurations where the primary loop extends more than 175 feet of 1-1/2” pipe or 100 feet of 2” pipe, this function is recommended to be enabled. This function requires the installation of an ST4 sensor within 5 feet of the heat exchanger module with control wires running back to terminals inside the heat pump. Using the default Secondary Pump Delay Function settings will delay the activation of the secondary circulation pump until the primary loop supply water temperature reaches 120°F. This function prevents the potentially cold/tepid water within the secondary loop that has cooled since the last heating cycle from flowing through the primary loop until the heat exchanger module reaches the desired temperature of 120°F. Further installation details for the Secondary Pump Delay function can be found on the Watts Applied Solutions rep portal in document *2025-4-3 Aegis Extended Primary Loop, Secondary Pump Delay Function*.



2.7. High Source Water Inlet Temperature Kit

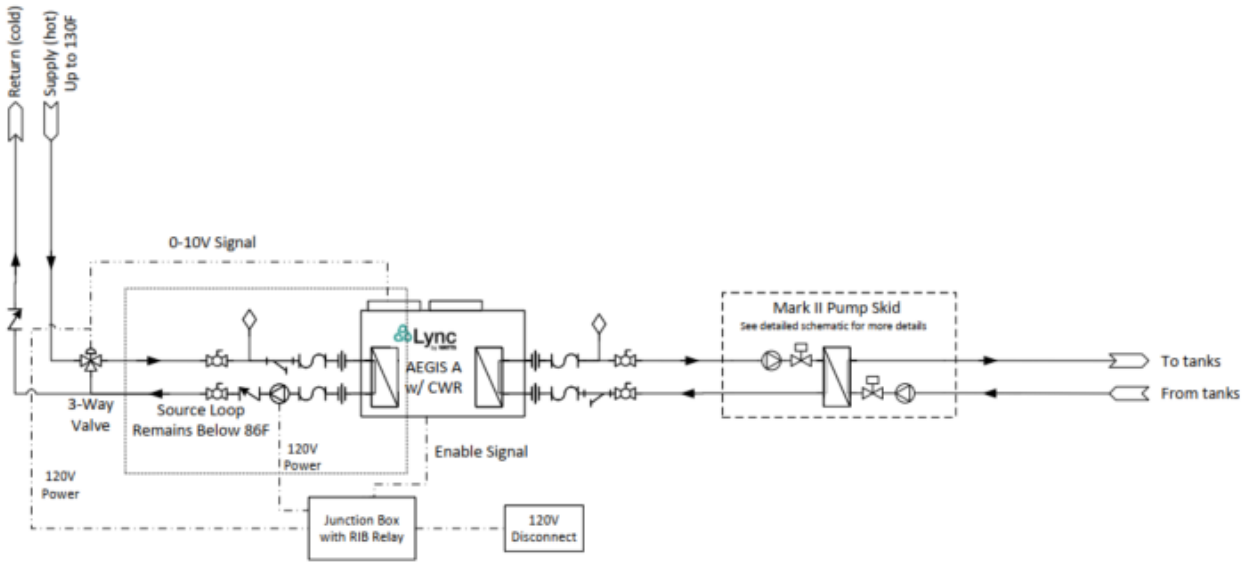
The Aegis water-source and air-source with cool water recovery heat pumps are normally limited to a maximum exiting source water temperature of 65°F which results in a maximum entering source water temperature of 86°F. Some applications for this equipment require a higher source water inlet temperature. With the addition of a modulating 3-way valve and circulating pump, a maximum source water inlet temperature of 130°F can be achieved. This option only applies to Aegis W heat pumps or Aegis A heat pumps with the Cold Water Recovery option. Lync sells the high source temperature kit separately from the Aegis heat pump. The part numbers for this kit are listed below.

Model(s)	Lync Part #	Heat Pump Source Water Connection Size (FNPT)	Belimo Valve Connection Size (FNPT)	Pump Flange Connection Size (FNPT)
250/350 W & 250/350 A with CWR Option	169160	1-1/2”	1-1/2”	1-1/2”
500 W & 500 A with CWR Option	169415	2”	2”	1-1/2”

By utilizing an additional modulating 3-way valve and circulator pump to create a small recirculation loop the heat pump will maintain a stable inlet water temperature below 86F while extracting energy as needed from a source water loop up to 130°F. The heat pump will control the 3-way valve using a 0-10Vdc signal generated from the Aegis controller to add hot water to the source recirculation loop as needed. Field supplied power of 120-volt single phase power supply at 15 Amps is required to power the 3-way valve and source pump. This function is only available in firmware 6.12.2.0 or later, if an earlier version of this firmware is on the heat pump it will need to be updated. The pump and control valve within this kit are not rated for outdoor use.

This function uses the source pump enable contacts (107 & 108) on the terminal block to supply power to the pump and valve. The 0-10Vdc signal comes from terminals 87 & 88 on heat pumps manufactured after October 2025 and any heat pump manufactured before this date will need to have the 0-10Vdc signal run directly to the PLC CN11, AO5 and Ground. More details can be found in the High Source Water Temperature Application Guide on the Lync Rep Portal

NOTE: Lync does not recommend using a regular mixing valve to temper water into the heat pump. Normal mixing valves do not have the response time required to accurately control the inlet water temperature to the heat pump in this application.



High Source Water Temperature Kit Plumbing and Electrical Drawing

2.8. Superheat Set Limit

For an inlet water temperature > 86°F (30 °C), the superheating is managed by a 3-way bypass valve in combination with specific software improvements. The High Inlet Temperature (HIT) Function limits the superheat value with the use of the bypass valve, keeping in mind both the compressor oil temperature and the compressor discharge temperature.

In order to optimize the cycle efficiency, and at the same time avoid temperatures too high for the compressor, the target superheat value is not constant, but will be adjusted according to the compressor discharge temperature and compressor oil temperature.

This superheat limit should not be changed by a user except under direction from the manufacturer, or an authorized manufacturer's representative.

2.9. High Inlet Temperature (HIT) Function

The HIT function allows the heat pump to operate even with inlet water temperatures above the standard limits. It is used:

- for the anti-Legionella treatment (tank temperature > 140°F (60 °C), *see below*)
- when domestic water recirculation is used with low water demand
- when the heat pump stops for a long time, and the tank thermally stratifies

2.10. High Pressure Set Point Calculation

The high pressure set point is not fixed. It is calculated based on inlet and outlet water temperatures and evaporation temperature. The pressure is managed by the thermostatic valve. The setpoint value falls between a minimum and maximum fixed value. Within these limits, there is a compensation curve based on the evaporator temperature, which keeps the compressor within the required operating range.

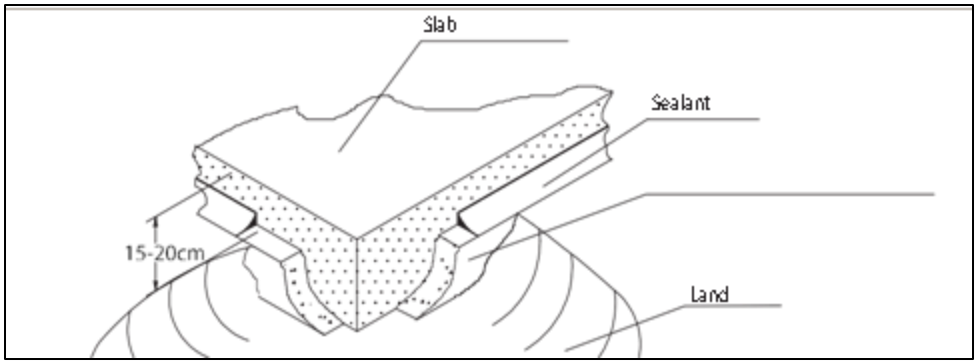
3. INSTALLATION

The Aegis A is an air source model certified for indoor or outdoor installation. It should be installed outdoors wherever possible, and with the maximum available space for air intake and maintenance. A minimum of 9 ft (3 m) of overhead clearance is required to prevent the possible recirculation of air between intake and exhaust. The Aegis W is intended for use indoors.

The following must be taken into account when choosing where to install and connect the unit:

- size and origin of the hydraulic piping
- location of the power supply
- accessibility for maintenance or repairs
- stability of the support surface
- ventilation of the air-cooled condenser
- orientation and exposure to solar radiation
- position the unit so that strong winds are not directed at the condensing coil
- do not install the machine on a dark surface (e.g. tarred surfaces), to avoid overheating
- possible sound reverberation

The clearances specified in the dimensional drawing of the unit MUST be followed. The unit must always be anchored to the ground with a solid base that is flat and horizontal with dimensions suitable for the unit, especially if the unit will be positioned on unstable ground.



Structure Of A Typical Support Slab

The slab should be on a suitable foundation with a height of about 6-8 inches (15-20 cm) above the surrounding area, and at least 12 inches (30 cm) longer and wider than the machine.

The unit emits low level vibrations so it is recommended to lay a sheet of hard rubber between the base of the unit and the supporting surface. If better vibration mitigation is required, beyond the included anti-vibration supports, contact a certified seismic engineer. In the event of installation on roofs or intermediate floors, the unit and the piping must be isolated from the walls and ceilings.

The unit should not be in close proximity to private offices, bedrooms, or areas where low sound emissions are required. Do not install the unit in narrow or confined spaces.

The machine is equipped with standard coils and should not be installed in a corrosive environment. Particular care should be taken to avoid areas with containing sodium chloride, which can aggravate corrosion due to galvanic currents. A machine with untreated coils must NEVER, be installed near a body of water, unless provided with the optional coil coating for coastal areas.

If the unit must be near water or in a highly polluted industrial environment, it is necessary to request coils with anti-corrosion surface treatment.

If there are any questions about the unit's suitability for a particular environment, contact your local Lync representative.

3.1. Spaces For Installation

The spaces needed to accommodate the unit are shown on dimensional drawings AP-A-1058, -1059, and -1060, available at lyncbywatts.com.

The evaporating coil must be allowed adequate space for airflow on both the intake and the exhaust side. In order to prevent poor unit capacity or interruptions in unit operation, it is absolutely essential to avoid the recirculation of air between the intake and the exhaust.

High walls near the unit may interfere with its functionality. Units should be installed a minimum of 9 feet (3 meters) apart.

It is advisable to leave sufficient space between the units for removing their larger components such as the exchangers, compressors, or pumps.

3.2. Minimum Room Volume

It is recommended the Aegis heat pump water heater be installed in accordance with the refrigerant requirements in ASHRAE 15. This standard outlines the minimum room size for refrigerant equipment to prevent asphyxiation if the complete refrigerant charge leaks into the room or space.

The refrigeration concentration limit (RCL) for R744 (CO2) is 3.4lbs per 1,000 cubic feet. ASHRAE 15 identifies the criteria for room sizing through the or effective dispersal volume charge (EDVC). ASHRAE 15 also has allowances for using connected spaces that can be included in the minimum room size, for further guidance please refer to ASHRAE 15.

Refrigerant Type	RCL, lbs per 1,000 ft3	Safety Group
R744, CO2	3.4	A1
R32	4.8	A2L
R134a	13	A1
R513a	20	A1
R410a	26	A1

*RCL from ASHRAE Standard 34

Aegis Model	Refrigerant Charge (lbs)	Minimum Room Volume (ft^3)	Square Footage 10ft ceiling (ft^2)	Square Footage 15ft ceiling (ft^2)
W 250	15.4	4529	453	302
W 350	17.6	5176	518	345
W 500	17.6	5176	518	345
A 250	44	12941	1294	863
A 350	55	16176	1618	1078
A 500	66	19412	1941	1294

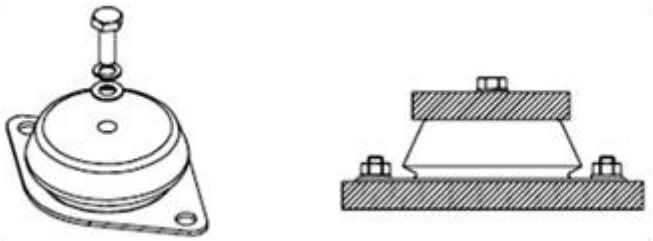
3.3. Anti-Vibration Mounts

In order to reduce vibrations, it is recommended to install the machine on rubber or spring anti-vibration mounts, supplied as an accessory.

The dimensional layout attached to the machine shows the position and load of each antivibration mount. The anti-vibration mounts must be installed before positioning the machine on the ground.

3.3.1. Rubber Anti-Vibration Mounts

The anti-vibration mount consists of an upper metal bell with a screw to fasten it to the unit base. The antivibration mount is fastened to the base through the two holes on the flange. The anti-vibration flange bears a number (45,60,70 Shore A) that identifies the hardness of the rubber support. The Aegis 250 A has (4) 60° Shore A mounts, the Aegis 350-500 A has (2) 60° and (4) 75° mounts, and the Aegis W 250-500 have (4) 75° mounts.



3.4. General Recommendations For Hydraulic Connections

WARNING!

All hydronic components must be selected for temperatures as high as 194°F (90°C)..

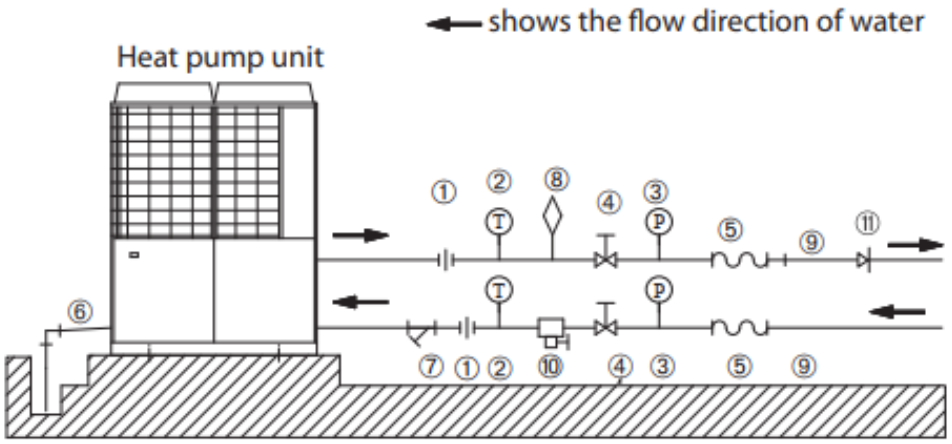
When setting up the hydraulic circuit for the gas cooler, users should use the tips and steps below, and remain in compliance with national and local regulations. It is recommended to connect the piping to the heat pumps using flexible joints in order to minimize vibrations and compensate for thermal expansion. Install the following components on the piping:

- Stop cocks, temperature and pressure indicators for maintenance and inspection.
- Sample points on the input and output pipes to read the temperature, if temperature indicators are not present.
- Shut-off valves to isolate the unit from the hydraulic circuit.
- Use metal mesh filters with openings 1/16" (1 mm) or less on the exchanger inlet pipe to protect the exchanger against slag or impurities in the pipes.
- Air vents must be installed at the highest parts of the hydraulic circuit in order to allow excess air to be released.
- Use the expansion tank and automatic charging valve to maintain the system pressure and to compensate for thermal expansion.
- Drain valves and where necessary, drain the tank to empty the system for maintenance operations or seasonal breaks.

IMPORTANT

It is highly recommended to install a safety relief valve on the hydraulic circuit. If serious problems should arise in the system (e.g. a fire breaks out), this allows the system to be drained to prevent an explosion. Always connect the drain to a pipe with a diameter no less than that of the valve opening and direct it towards the areas where the discharge cannot harm anyone.

3.4.1. Recommended Hydraulic Circuit



1. Union joint: Enables the unit to be removed for maintenance or replacement.
2. Thermometer: Used for capacity checks and operation monitoring.
3. Water pressure gauge: Checks operating status.
4. Valve: For cleaning the heat exchanger and/or replacing unit.
5. Flexible joint: Prevents vibrations through system piping.
6. Strainer (60 mesh or more): Install strainer at the inlet port to avoid any foreign matter entering the unit.
7. Check valves: Must be installed when installing multiple heat pumps.
8. Air purge valve: Install this at the highest point in the piping where air may accumulate.
9. Water piping: Water piping work must be done by a qualified installer.
10. Drain valve: Drains off the water from the system during servicing.

Recommended Water Piping

3.4.2. Key Considerations For Water Piping

Water quality: It is important to check in advance whether the feed water and hot water have good quality. Be sure to use water within the ranges specified in Section 4.3

If solid matter such as sand piping debris, scale deposits, or floating suspended solids (i.e., any corrosion product in the water), the heat-transfer surface of the heat exchanger is directly attacked by water flow, and corrosion may be created. In order to avoid such corrosion by these substances, be sure to fit a cleanable strainer (60 mesh /0.25mm or smaller) at the water inlet port of the unit to remove any debris.

Certain metals may cause localized corrosion when they make contact with each other. Including non-conductive materials between metals the metals can limit corrosion.

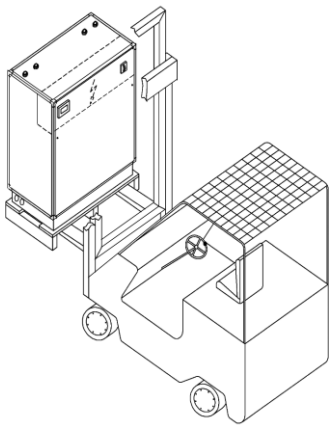
Water piping should have no leaks or air intrusion. If air is introduced at the suction side of pumps, the pump may create excess noise and performance may decrease.

For units exposed to freezing temperatures, take precautions to prevent the freezing of piping.

NOTE: Aegis A has a freeze protection function, but Aegis W does not. For either unit, it is recommended to include a proper glycol mixture in the primary loop in case of power loss if the piping will be exposed to freezing temperatures. Contact your glycol supplier for further details on freeze protection. Units installed indoors or in warmer climates should NOT have glycol included in the mixture.

3.5. Lifting And Transport

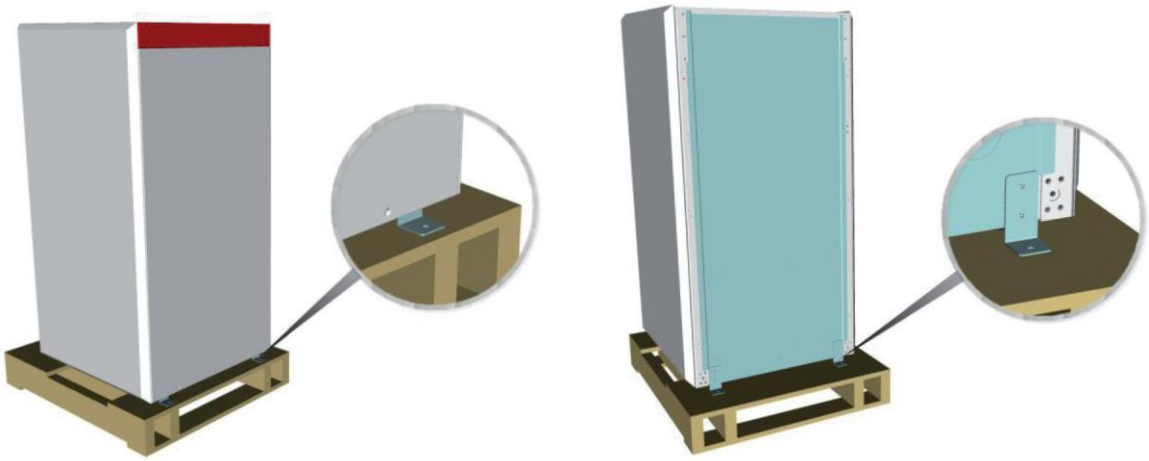
While unloading and positioning the unit, take extreme care to avoid sudden, violent movements. Avoid applying force to components of the machine. The unit may be lifted using assistance from a forklift, inserting the lifting forks in the lifting pallet (see Figure 4).



Lifting the Unit with Forklift

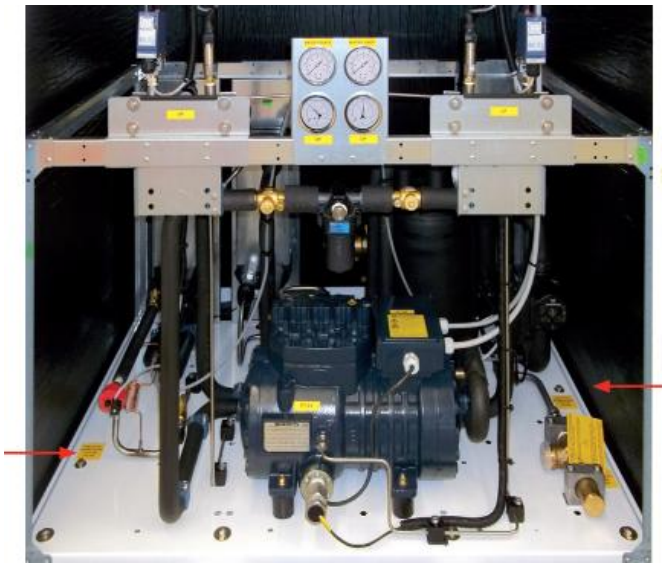
3.6. Removing Transportation Braces

During transport, the unit may be subjected to strong vibrations. To ensure that no damage occurs, transport braces were fitted prior to transport. When the unit arrives, it is necessary to remove these from the unit and the pallet.



Transport Brace Locations

IMPORTANT
After the unit has been positioned, it is necessary to remove the transportation screws between the wooden pallet and the damping platform. The number of braces depends on the size of the unit.



Transport Screw Locations

3.7. Lifting And Transport: Aegis A

During unloading and positioning, great care must be given to prevent sudden or violent maneuvers and not using machine components as lifting points.

Lift the unit using steel tubes inserted in the relative lifting holes. Use cords or belts that are long enough and spacer bars, so as not to damage the sides and lid of the unit.

NOTE: Pipes must have passages, pivots, or other fasteners to prevent straps from releasing.

Alternatively, the units can be lifted using a fork-lift truck, inserting the forks in the supporting pallet. The figure below illustrates typical lifting modes; take a look at the dimensional drawing for a clear visualization of the center of gravity.

⚠ WARNING!
Make sure that the unit is fastened well before lifting in order to prevent accidental falls or overturning.

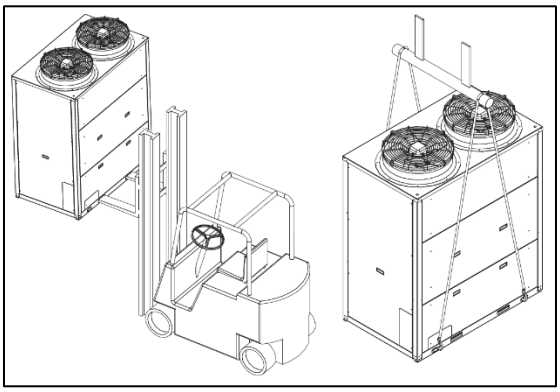


Figure 1: Typical Lifting Modes

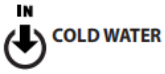
⚠ WARNING!
The pictures may appear different than your actual unit. All images in this manual are for explanation purpose only. All information and reference to lifting applies to all of our models.

4. HYDRAULIC CONNECTION

4.1. Hydraulic Connection To The Exchanger

IMPORTANT

The water inlet must be installed where the connection is marked with the following plate:



IMPORTANT

The primary circuit should be set up in such a way as to guarantee a constant flow of water to the exchanger in all operating conditions. If this is not the case, there is a risk of refrigerant returning to the compressor input in a liquid state, which could damage the compressor.

⚠ WARNING!

Do not operate hydraulic connections with open flame near or inside the unit.

IMPORTANT

To ensure the correct operation of each pump on the machine:

- Before starting, check that the pump shaft rotates freely, without mechanical impediments.
- Do NOT run the pump dry, unprimed, and below the minimum nominal water flow rate.
- Do NOT operate the pump with closed shut-off valves, on the suction and delivery side.
- NEVER use the pump when cavitation occurs.
- It is mandatory to fill and bleed the hydraulic circuit correctly before starting the pump.

4.2. Minimum Source Water Content In Plant

For water source units or air source units with cool recovery, it is important to maintain a minimum water volume in the source loop to ensure sufficient compressor runtime. The compressors can run intermittently. This is because the amount of heat power required by the system is not generally the same as what is provided by the machine.

The formula below is for calculating the minimum water content on the source loop. If the actual pipe volume is less than required, a buffer tank is required.

$$V_{min} \geq P_{tot} \times 50$$

V_{min} : *water content of tank [l]*

P_{tot} : *power capacity of the unit [kW]*

NOTE: This formula is for the volume of storage for a cold source water on W models or A models equipped with the cool recovery option.

Buffer tanks must be properly insulated to prevent condensation and to not have an adverse effect on system performance.

4.3. Water Composition

To keep your water heater operating efficiently it is critical to make sure the chemical composition of incoming water is not harmful to the heater. To prevent corrosion, fouling, and other harmful effects on the heater, the following water quality guidelines should be followed.

4.3.1. Primary (Closed) Loop

Free oxygen can cause the formation of rust (iron oxides), which degrade metallic materials. Magnetite is formed in un-inhibited water if there is electrolytic action in the presence of oxygen. Sludge is formed when calcium compounds, primarily CaCO3, are heated. Rust and magnetite, when combined with sludge, can form a very hard scale, which significantly reduces system efficiency and life expectancy of the heating system. Scale reduces heat exchange due to its low heat conductivity and so may cause very dangerous localized overheating. Waterside corrosion of all heating circuit surfaces is also a major concern.

Make-up or feed water is water added to a closed hydronic system to replenish water lost through evaporation, maintenance, or leakage. The quality of make-up or feed water, which may contain dissolved oxygen, minerals and other dissolved contaminants, is extremely important. Such introduced water must be chemically treated or strictly limited when ensuring neutral chemical conditions in boiler system water. Generally, any closed hydronic heating system should be restricted from receiving untreated makeup water of no more than 5% of the total volume of system water per year.

Lync suggests filling the primary loop to meet the following water conditions. It is important to set up a system that eliminates possible organic substances in the water that could pass through the filter and settle in the heat exchangers, which would lead to malfunction and/or damage over time.

If glycol is used in the primary loop corrosion inhibitors must be used to prevent corrosion of the copper braze material. Please consult your glycol supplier or manufacturer for further recommendations for use with stainless steel copper brazed plate heat exchangers.

Total hardness	1.2 to 3.5 grains/gallon
Langelier index	- 0.4 to + 0.4
pH	7.5 to 8.5
Electrical conductivity	10 to 500 QS/cm
Organic element	-
Hydrogen carbonate (HCO3-)	70 to 300 ppm
Sulphates (SO_4^{2-})	< 50 ppm
Hydrogen carbonate / Sulphates (HCO_3^-/SO_4^{2-})	> 1
Chlorides (Cl-)	< 50 ppm
Nitrates (NO3-)	< 50 ppm
Sulphuric acid (H2S)	< 0.05 ppm
Ammonia (NH3)	< 0.05 ppm
Sulphites (SO3), free chlorine (Cl2)	< 1 ppm
Carbon dioxide (CO2)	< 5 ppm
Metal cations	< 0.2 ppm
Manganese ions (Mn^{++})	< 0.1 ppm
Iron ions (Fe^{2+}, Fe^{3+})	< 0.2 ppm
Iron + Manganese	< 0.5 ppm
Phosphates (PO43-)	< 2 ppm
Oxygen	< 0.1 ppm

IMPORTANT

If water is used that does not meet this criteria the unit may not operate efficiently and warranty coverage may be affected. Please refer to the Aegis Heat Pump Water Heater Warranty for details.

4.3.2. Secondary (DHW) Loop

The water quality on the secondary loop must follow the EPA's national primary drinking water regulation limits. It may be necessary to de-scale the heat exchanger periodically, depending on water conditions. The frequency of cleaning can be determined locally based on the performance of the heater and calcium hardness levels shown in the table below.

Calcium Hardness Level	<3.5 grains/gal (<60 mg/L)	3.5-7.0 grains/gal (60 - 120 mg/L)	7.0-10.5 grains/gal (120 - 180 mg/L)	>10.5 grains/gal (>180 mg/L)
Suggested Cleaning Frequency	Biennially	Annually	Semi-Annually	Monthly

Hard water is generally considered to be any condition >3.5 grains/gallon (>60 mg/L). To extend the life of equipment, guarantee the highest performance, and reduce the required cleaning frequency, Lync recommends installing a scale mitigation system such as the Lync WQ-AS with OneFlow technology or WQ-SF with traditional salt-based softening technology.

4.4. Discharge of Safety Valves

⚠ WARNING!

To avoid personal injury and property damage due to valve operation, the safety valve must be installed so that any discharge runs to a safe place of disposal. Consult with your local plumbing codes and standards for any additional requirements.

4.5. Condensate Disposal

The Aegis A is equipped with two condensate drain pipes per air coil (2 for Aegis A 250, 4 for Aegis A 350-500). This allows for the proper disposal of condensate after a defrost cycle. This condensate must be piped to a drain. In the case of freezing conditions, condensate piping must be insulated and/or wrapped with a heating coil to prevent condensate freezing in the piping.

Condensate Drain Pipes

5. ELECTRIC CONNECTIONS

5.1. Overview

- The electrical connections must follow the information shown on the wiring diagram attached to the unit and the local regulations of where the unit is being installed.
- The installer must connect the grounding cable using the relevant ground clamp on the earth bar situated in the electric control board.
- Verify that the power supply voltage corresponds to the nominal data of the unit (voltage, number of phases, frequency), as stated on the plate on the machine.
- The power supply voltage must not undergo variations over ±5% and the unbalance between the phases must always be less than 2%.
- Check that the line is connected with the correct phase sequence.
- To feed in the electrical cables, use the phase sequence. The power cord is fed through the bottom part of the electric control board.
- The control circuit power supply comes from the power line via a transformer situated in the electric control board. The control circuit is protected by relevant fuses.

IMPORTANT

Use power cable fixing systems that resist abrasion and twisting stress.

Make sure there is no voltage present before performing any operation on electric parts.

The section of the cable and the line protections must follow the wiring diagram and the relevant table attached to the unit.

In cold weather, the resistances must be powered for at least 12 hours before the initial startup to allow the compressor oil to come up to temperature, and happens automatically when the master switch is closed. In warmer conditions this time may be shorter.

The unit must operate with those limits; failure to do so will immediately void the warranty.

5.2. Fan Speed Controller

The unit comes standard with a fan speed control device. This enables the unit to operate at elevated ambient air temperatures by reducing the air flow rate to the evaporator and remain within the operating envelope.

This device can also be used to reduce the sound emissions of the unit when the external air temperature tends to decrease (e.g. during the night).

This control is calibrated and inspected in the factory.

If further fan speed control is required, or higher pressures are required for ducting the unit exhaust, electrically commutated (EC) fans are available as a factory option.

⚠ WARNING!

Do not modify speed control calibrations. If this is required, please contact the manufacturer.

5.3. Powering The Crankcase Heater

In order to ensure optimal oil temperature on startup, the compressor is equipped with a crankcase heater and oil temperature sensor. To power this heater:

- Check fan direction to make sure the phase sequence is correct. Fans should be drawing air into the unit and exhausting colder air out through the top of the unit. If the coils have air coming out instead of in, then the phases are wrong and two legs should be swapped.
- Close the main switch by turning it from OFF to ON.
- Check that “OFF” appears on the display.
- Make sure that the unit’s domestic hot water demand is “OFF” and that the external enable/disable contact is open.
- Leave the machine in these conditions for at least 12 hours to power the crankcase heater.

5.4. Potential Free Contacts

The following potential free contacts are available:

- 1 contact for the alarm relay
- 1 dry contact for compressor status
- 1 dry contact for enabling the domestic hot water pump

5.5. Controller Function

Refer to the Lync Aegis Controller Manual L-OMM-013, supplied separately.

6. STARTUP

⚠ WARNING!
The machine should be started up only by authorized and qualified personnel.

6.1. Preliminary Verifications

Check for the following conditions before startup:

- Electrical connection is implemented correctly and all clamps are tightly fastened.
- Phase voltage on the RST clamps is 460 V ± 5% (line voltage should show 277V +/- 3%)). If the voltage is subject to frequent variations, contact Lync technical services or your local rep for the selection of relevant protections.
- Pressure in the refrigerant circuits is shown on the control display.
- Use a leak detector intended for R-744 refrigerant to check for any refrigerant fluid leaks.
- the power supply of the guard resistances

⚠ WARNING!
The resistances must be inserted at least 12 hours before the initial start-up, and takes place automatically when the master switch is closed.

To check the correct functioning of the resistances, check that the lower part of the compressors is hot and is at a temperature of 5-8°F (10-15°C) over the environmental temperature.

- Check that the hydraulic connections have been made correctly, with attention to the indications on the input/output plates on the machine.
- Check that the hydraulic system has been bled, thereby eliminating all residual air and loaded gradually, opening the vent devices in the upper part, which the installer would have set up together with an expansion tank of adequate capacity.

ATTENTION
Before starting-up, verify that all the closing panels of the unit are in place and secured.

WARNING
All the units are pre-loaded with refrigerant gas, so the refrigerant circuit is pressurized. There is no need to charge the refrigerant circuit before unit start up.

Additional information on startup is available in Appendix A – Aegis Startup Checklist.

6.2. Verifications During Operation

- Check that the sequence of the phases is correct. This can be verified by making sure that the fans are rotating in the correct direction (see Section 5.3). The fan should be pulling air in the side of the heat pump and directing it up out the top of the unit.
- Check that gas cooler inlet water temperature is near the electronic control setpoint.

7. CALIBRATING CONTROL COMPONENTS

ATTENTION

The control equipment should be serviced by qualified and authorized staff only. Incorrect calibration settings can cause serious damage to the unit and injuries to people.

The control equipment is entirely calibrated and tested in the factory before the unit is shipped. However, after the unit has been working for a reasonable period of time, the safety devices should be checked. The calibration settings are shown below.

Control and safety components	Activation set point	Differential
Safety valve setting: high pressure side	1740 PSI [120 bar]	n/a
Safety valve setting: low pressure side	1160 PSI [80 bar]	n/a
High pressure switch setting	1566 PSI [108 bar]	1160 PSI [80 bar]
Low pressure switch setting	290 PSI [20 bar]	580 PSI [40 bar]
Anti-freeze alarm setting	39°F (4°C)	11°F (6°C)

8. DECOMMISSIONING

8.1. Seasonal Shutdown

- The Aegis heat pump water heater is designed for year-round operation. In the case that prolonged shutdown is expected, be sure to follow these steps
- Disconnect the voltage using the machine master switch/main isolating switch.
- Drain the hydraulic system (unless it contains glycol water).
- Repeat the procedure outlined in Section 6 on successive start-ups.

8.2. Emergency Stop

To stop in an emergency, turn off the main switch to power off the entire machine.

IMPORTANT

Never modify internal electrical connections; this will render warranty rendered null and void.

Disconnect voltage from unit only in case of prolonged shutdowns.

WARNING

Do not use the main power switch to enable or disable the heat pump: this device should be used to isolate the unit from the power supply when the unit is OFF. Removing voltage entirely depowers the guard resistances, jeopardizing the integrity of the compressor.

9. PERIODIC MAINTENANCE AND INSPECTIONS

⚠ WARNING!

Before servicing the unit or accessing internal parts, make sure the power supply is disconnected. The compressor may remain live for a few minutes after the power supply has been disconnected.

Before any maintenance:

- Turn off the machine at the main switch.
- Wait at least 5 minutes.
- Use a multimeter to make sure there is no voltage at the heads of the clamps.
- Make sure that the motor has completely stopped.
- Check that the dissipator is not hot: contact with the dissipator can cause burns.

Pay special attention when operating near the finned coils as the aluminum fins are particularly sharp. The compressors, the flow pipes, and the dissipator of the inverter are hot.

9.1. Overview

It is good practice to carry out periodic inspections to verify the proper operation of the unit:

OPERATION	FREQUENCY
Check the functioning of all control and safety appliances as described previously.	Monthly
Check the tightness of the electric terminals in the power panel and inthe compressors' terminal boards. The mobile and fixed contacts of the remote controls must be cleaned periodically and must be replaced whenever they show signs of deterioration.	Monthly
Verify that there are no oil leaks from the compressor.	Monthly
Check for water or water/glycol mixture leaks in the hydraulic circuit.	Monthly
If unit is to remain out of service for a long period, drain water frompipes and heat exchanger. This is necessary whenever room temperatures are lower than freezing point of the fluid used.	Seasonal
Verify the filling of the water circuit.	Monthly
Check the heater of the compressor guard.	Monthly
Clean the metal filters in the hydraulic pipes.	Monthly
Clean the finned battery and the metal filters, if present, using compressed air. If it is clogged, use a jet of water, taking care not to bend or damage the fins of the coil.	Monthly
Perform the defrosting test.	Monthly
Verify the state, fastening, and balance of the fans.	4 months
Ensure that the noise emitted by the machine is regular.	4 months
Clean the outlets of the condensate drip tray.	Monthly

IMPORTANT

Routine maintenance of the unit is essential to the life of the machine. A lack of maintenance can cause malfunctioning and/or damage to the unit and render the warranty null and void.

9.2. Protection Of The Environment

The law regarding the regulations of use of stratospheric ozone depleting substances prohibits the dispersion of refrigerant gases in the environment and obliges holders to recover them and return them to the dealer or special collection centers at the end of their operational life.

IMPORTANT

Particular attention is recommended during maintenance to reduce refrigerant leaks.

10. DISPOSAL OF THE UNIT

When the unit has reached the end of its intended duration and must be removed and replaced, a number of measures must be taken:

- The lubricating oil of the compressors must be recovered and sent to collection centers.
- The unit's structure and components, if no longer usable, should be taken down and grouped by the type of material. The unit contains large amounts of copper and aluminum. Separating the materials will help collection, disposal, and recycling centers and minimize the environmental impact.

11. REFRIGERANT

11.1. Refrigerant Safety Data Sheets

I. Identification Of The Substance/Mixture And Of The Company/Undertaking

1.1 Product identifier	Product name	Carbon dioxide EC No (from EINECS): 204-696-9CAS No: 124-38-9 Index-Nr -
	Chemical formula	CO2
	REACH Registration number:	Listed in Annex IV/V of Regulation (EC) No1907/2006 (REACH), exempted from registration
1.2. Relevant identified uses of the substanceor mixture and uses advised against	Relevant identified uses	Industrial and professional Perform risk assessment prior to use
	Uses advised against	Consumer use
1.3. Details of the supplier of the safety data sheet	Company identification	BOC, Priestley Road, Worsley, Manchester M28 2UT
	E-Mail Address	ReachSDS@boccom
1.4. Emergency telephone number	Emergency phone numbers (24h):	0800 111 333

II. Hazards Identification

2.1. Classification of the substance or mixture	Classification acc. to Regulation (EC) No. 1272/2008/EC (CLP/GHS)	Press. Gas (Compressed gas) - Contains gas under pressure; may explode if heated.
	Classification acc. to Directive 67/548/EEC & 1999/45/EC	Not classified as hazardous to health.
	Risk advice to man and the environment	Liquefied gas

2.2. Label elements	Labelling Pictograms		
	Signal word	Warning	
	Hazard Statements	H280	Contains gas under pressure; may explode if heated
		EIGA-As	Asphyxiant in high concentrations
	Precautionary Statements	Precautionary Statement Prevention	None
		Precautionary Statement Response	None
		Precautionary Statement Storage P403	Store in a well- ventilated place
		Precautionary Statement Disposal	None

III. Composition/Information on Ingredients

Substance / Mixture:	Substance	
3.1. Substances	Substances	Carbon dioxide
	CAS No:	124-38-9
	EC No (from EINECS):	204-696-9
	REACH Registration number:	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration. Contains no other components or impurities which will influence the classification of the product
3.2. Mixtures	Not applicable	

IV. First Aid Measures

4.1. Description of first aid measures	First Aid General Information:	Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
	First Aid Inhalation:	Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
	First Aid Skin / Eye:	In case of frostbite, spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance. Immediately flush eyes thoroughly with water for at least 15 minutes.

	First Aid Ingestion:	Ingestion is not considered a potential route of exposure.
4.2. Most important symptoms & effects,both acute & delayed	In high concentrations, may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Low concentrations of CO2 cause increased respiration and headache.	
4.3. Indication of any immediate medical attention and special treatment needed	None.	

V. Fire Fighting Measures

5.1. Extinguishing media	Suitable extinguishing media	All known extinguishants can be used.
5.2. Special hazards arising from the substance or mixture	Specific hazards	Exposure to fire may cause containers to rupture and explode.
	Hazardous combustion products	None.
5.3. Advice for firefighters	Specific methods	If possible, stop flow of product. Move container away or cool with water from a protected position.
	Special protective equipment for fire-fighters	In confined space, use self-contained breathing apparatus.

VI. Accidental Release Measures

6.1. Personal precautions, protective equipmentand emergency procedures	Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Don't enter sewers, basements, pits, or any place where its accumulation can be dangerous.
6.2. Environmental precautions	Try to stop release.
6.3. Methods and material for containment and cleaning up	Ventilate area.
6.4. Reference to other sections	See also sections 8 and 13.

VII. Handling And Storage

7.1. Precautions for safe handling	Prevent water from being sucked back into the container. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Regularly check the tightness of the plant. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Do not smoke while handling product. Only experienced and properly instructed professionals should handle gases under pressure. Protect cylinders from physical damage; do not drag, roll, slide or drop. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Ensure the complete gas system has been (or is regularly) checked for leaks before use. If the user experiences any difficulty operating the cylinder valve, discontinue use and contact supplier. Close the container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Replace valve outlet caps or plugs and container caps where supplied as soon as the container is disconnected from equipment. Keep container valve outlets clean and free from contaminates, particularly oil and water. Never attempt to transfer gases from one cylinder/container to another. Avoid the suck back of water, acid and alkalis.
7.2. Conditions for safe storage, including any incompatibilities	Secure cylinders to prevent them from falling. Keep the container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in a location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.
7.3. Specific end use(s)	None.

VIII. Accidental Release Measures

8.1. Control parameters	Exposure limit value	
8.2. Exposure controls	Appropriate engineering controls	Product to be handled in a closed system. Gas detectors should be used when toxic quantities may be released. Keep concentrations well below occupational exposure limits. Oxygen detectors should be used when asphyxiating gases may be released. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider a work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation.

	Personal protective equipment	Eye and face protection	Safety eyewear, goggles or face shield to EN166 should be used to avoid exposure to liquid splashes.
		Skin protection	
		Other protection	Wear leather safety gloves and safety shoes when handling cylinders.
		Respiratory protection	Not required
		Thermal hazards	Not required
		Environmental Exposure Controls	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

IX. Physical And Chemical Properties

9.1. Information on basic physical and chemical properties. General information	Appearance/Color:	Colorless gas.
	Odor:	No odor warning properties.
	Melting point:	-56,6 °C
	Boiling point:	-78,5 °C
	Flash point:	Not applicable for gases and gas mixtures.
	Flammability range:	Nonflammable.
	Vapor Pressure 20 °C:	57,3 bar
	Relative density, gas:	1,52
	Solubility in water:	2000 mg/l
	Partition coefficient: n-octanol/ water:	0,83 log Pow
	Autoignition temperature:	Not applicable.
	Explosive properties: Explosive acc. EU legislation:	Not explosive.
	Explosive acc. transp. Reg.:	Not explosive.
	Oxidizing properties:	Not applicable.
	Molecular weight:	44 g/mol
	Sublimation point:	-78,5 °C
	Critical temperature:	31 °C
	Relative density, liquid:	1,03
9.2. Other information	Gas/vapor is heavier than air. May accumulate in confined spaces, particularly at or below ground level.	

X. Stability And Reactivity

10.1. Reactivity	Unreactive under normal conditions
10.2. Chemical stability	Stable under normal conditions
10.3. Possibility of hazardous reactions	None
10.4. Conditions to avoid	None
10.5. Incompatible materials	For material compatibility, see the latest version of ISO-11114.
10.6. Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

XI. Toxicological Information

11.1. Information on toxicological effects	In high concentrations, may cause rapid circulatory insufficiency, even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and even death.

XII. Ecological Information

12.1. Toxicity	When discharged in large quantities, may contribute to the greenhouse effect
12.2. Persistence and degradability	Not applicable
12.3. Bioaccumulative potential	Not applicable
12.4. Mobility in soil	The substance is a gas, not applicable.
12.5. Results of PBT and vPvB assessment	Not classified as PBT or vPvB.
12.6. Other adverse effects	When discharged in large quantities may contribute to the greenhouse effect. Global Warming Potential GWP: 1

XIII. Disposal Considerations

13.1. Waste treatment methods	Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place. Discharge to atmosphere in large quantities should be avoided. Contact supplier if guidance is required. **EWC Nr. 16 05 05**

XIV. Transport Information

ADR/RID	
14.1. UN number	1013
14.2. UN proper shippingname	Carbon dioxide
14.3. Transport hazardclass(es)	Class: 2 Classification Code: 2A Labels: 2.2 Hazard number: 20 Emergency Action Code: 2T
14.4. Packing group (Packing Instruction)	P200
14.5. Environmental hazards	None
14.6. Special precautions foruser	None
IMDG	
14.1. UN number	1013
14.2. UN proper shippingname	Carbon dioxide
14.3. Transport hazardclass(es)	Class 2.2 Labels: 2.2 EmS: FC, SV
14.4. Packing group (Packing Instruction)	P200
14.5. Environmental hazards	None
14.6. Special precautions for user	None
14.7. Transport in bulk according to Annex IIof MARPOL73/78 andthe IBC Code	Not applicable
IATA	
14.1. UN number	1013
14.2. UN proper shippingname	Carbon dioxide
14.3. Transport hazardclass(es)	Class: 2.2 Labels: 2.2

14.4. **Packing group (Packing Instruction)**	P200
14.5. **Environmental hazards**	None
14.6. **Special precautions foruser**	None
Other transportinformation	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the cylinder valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate Ventilation. Ensure compliance with applicable regulations.

XV. Regulatory/Other Information

Other information	Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Advice	Proper care has been taken in the preparation of this document, and no liability for injury or damage resulting from its use can be accepted. Details given in this document are believed to be correct at the time of publication.
Further information	Note: When using this document, care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

This product contains natural refrigerant.. Type of refrigerant: **R744**

GWP value: **1**

GWP is the global warming potential

The amount of refrigerant is shown on the plate with the name of the unit. It is possible that routine inspections will be required to check for leaking refrigerant in accordance with local, United States and/or Canadian standards. Contact your local Lync rep for additional information.

12. APPENDIX A – AEGIS Startup Checklist

✓	DESCRIPTION	Manual Section
	BEFORE APPLYING POWER TO THE UNIT The following actions should be completed **BEFORE** applying power to the unit.	
	Unit Location and Mounting	
	Ensure that the unit is mounted in a location with proper support. Verify that service clearances have been maintained.	3.1
	Air Source Only: Ensure sufficient air flow, as per the drawings in the instruction manual. Check the distance between multiple units to prevent cross feeding. Ensure proper clearance above the snow line.	3.1
	Your heat pump water heater should be mounted on the included vibration isolators as illustrated in the manual. Verify that these are installed properly and the nuts are tightened to torque specs in the manual.	3.2
	Air Source Only: Verify that the condensate drain has been plumbed to an appropriate drain. Note that this is not acidic, as with a boiler. If the unit is in a location where freezing is possible, this pipe needs to be insulated and heat traced.	4.5
	High Voltage Electrical	
	Verify that the voltage connection to the unit is 480VAC, 3Ø and phases are correct. See "Preparation for Directional Test" below.	6.1
	Check the external breakers and fuses for any disconnect with the label on the heat pump to ensure that the ratings of these devices are sufficient for the unit.	6.1
	Verify the wiring with ratings on the label to ensure that it meets MCA listed on unit.	6.1
	Verify that all high voltage connections are tight, and tighten them if necessary.	6.1
	Ensure that the unit is properly grounded.	5.1
	Check the pump and valve wiring on skid to be as per design.	See wiring diagrams and approved submittals
	Low Voltage Wiring	
	Ensure that all external sensors have been connected, as per the control's diagram. Inspect the wires for any signs of damage.	L-OMM-013
	Verify that the Modbus / BACNet connection has been made as per the instructions in the manual, if required.	L-OMM-013
	Primary Loop Piping **NOTE:** The unit shall be piped as per manufacture's specifications. Check the drawings for the project and verify the unit is installed as illustrated. It is recommended to not insulate the piping until after verifying that the unit is functioning properly. This will allow visual inspection of the piping for any leaks during the commissioning of the unit.	
	Ensure that an air vent has been installed in the highest part of the piping.	3.3
	Check the pressure of the primary loop to make sure it meets the specifications in the manual.	3.2.2
	Verify that the air has been removed from this loop.	3.2.2

	If used, check the glycol for pH as per the glycol manufacturer's recommended procedures, and use a refractometer to verify that the freeze point is within specification.	3.3.2
	Check the piping between skid and heat pump for any leaks. **Note:** Any leaks in this loop, no matter how small, may result in the unit faulting due to insufficient flow.	3.3.1
	Ensure that the length and diameter of the pipe are sufficient to handle the pump head as per the manual.	3.3.1
	Potable Water Piping	
	Verify that this piping has been filled with potable water.	1
	Inspect the piping for any leaks.	3.3
	Check the piping and verify that it is properly piped, as per the project drawings.	3.3.1
	Ensure that the length and diameter of the pipe are sufficient to handle the pump head as per the manual.	3.3.1
	Storage Tanks	
	If not using Lync storage tanks, check to make sure that the tanks have the required features, including inlet diffuser, upper and lower thermowells, outlet injection tee on the furthest ("hot") tank.	
	Check the manufacturer's instructions to see that the tanks have been mounted as designed.	
	If the tanks were provided with an outlet "injection tee" assembly, make sure that the tee is installed in the furthest ("hot") storage tank, not in the recirculation tank.	
	Verify that any seismic restraints are as per the engineer's plans (if any).	3
	Confirm that storage tanks are plumbed in series with one another and not parallel.	2.3
	Heat exchanger module connections need to match the drawings and the heat exchanger module instructions. Verify that the DHW ("secondary") pump draws from the bottom of the tank with the cold-water connection, and that the outlet flow is to the top of the tank furthest away from the heat pump as per the drawings.	2.3
	Check tanks and piping for any signs of leaks.	2.3
	Electrical Tanks	
	Check that the tanks have been mounted as designed, as per the manufacturer's instructions.	L-OMM-011
	Verify that the seismic restraints are as per the engineer's plans (if any).	L-OMM-011
	Confirm that the voltage connected to the tank is as per the rating on the tank's sticker.	L-OMM-011
	Make certain that the wiring rating meets the MCA rating on the tank label.	L-OMM-011
	Check all components such as breakers, fuses, and disconnects in the circuit and ensure they meet the requirements on the rating label.	L-OMM-011
	For recirculation tanks, verify that the recirculation return is into the bottom of this tank and not into the storage tanks as per approved piping drawings.	L-OMM-011
	APPLYING POWER TO THE UNIT Upon completion of all tests above, power can be applied to the unit.	
	Close the door on the electrical enclosure on the heat pump prior to switching on the breakers.	6
	Turn the main switch to auto and ensure that the enable signal (if using) is set to an open relay.	6
	Switch on the disconnect on the main panel of the heat pump. Once this is completed, the heater for the compressor oil will activate. If the ambient temperature is low, and the oil is not at the minimum operating temperature, it	6

	will continue to heat as required. This may take up to 24 hours. It may be necessary to return the following day to complete startup. The unit will not run until the compressor oil has reached target temperature. In warmer conditions this may not be required, or may occur much faster than 24 hours.	
	Follow the instructions in the manual for setting the parameters for the unit. This can be done either from the user interface on the screen located on the electrical box, or with a computer connected to the interface of the unit.	6
	Once the unit has had sufficient time for the oil to heat, switch the main switch to "Man". This will allow the unit to turn on if there is a call for heat. Make sure that sensor BT1 is reading properly in the interface and that it is below the setpoint for the unit.	6
	The fans should now activate. Make sure that they are blowing upwards and not downwards. If they are blowing the wrong direction, disconnect the breaker at the panel and switch two of the incoming phases. Power back up and verify that they are now rotating in the correct direction. The compressor is wired to rotate in the same direction as the fans, so this ensures that everything is rotating properly.	6
	After the oil temperature is verified, the compressor will be allowed to activate. Ensure the correct suction and discharge pressures are achieved.	6
	Ensure that both the primary and tank pumps are running during a call for heat.	6