Design and Installation Instructions

Zone Comfort™
hot water air handler
and zoned distribution system

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☐	Is the air handler hung and isolated to avoid transmitting vibration through framing and duct work?
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☐	Is outdoor cooling unit contactor wired according to the wiring diagram to provide hard-start protection and A/C guard?
☐	Are Thermostat connections correct, including cooling and continuous run connections? Do they operate their intended zone?
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☐	Is the unit accessible? Are there clearances for service and component replacement?
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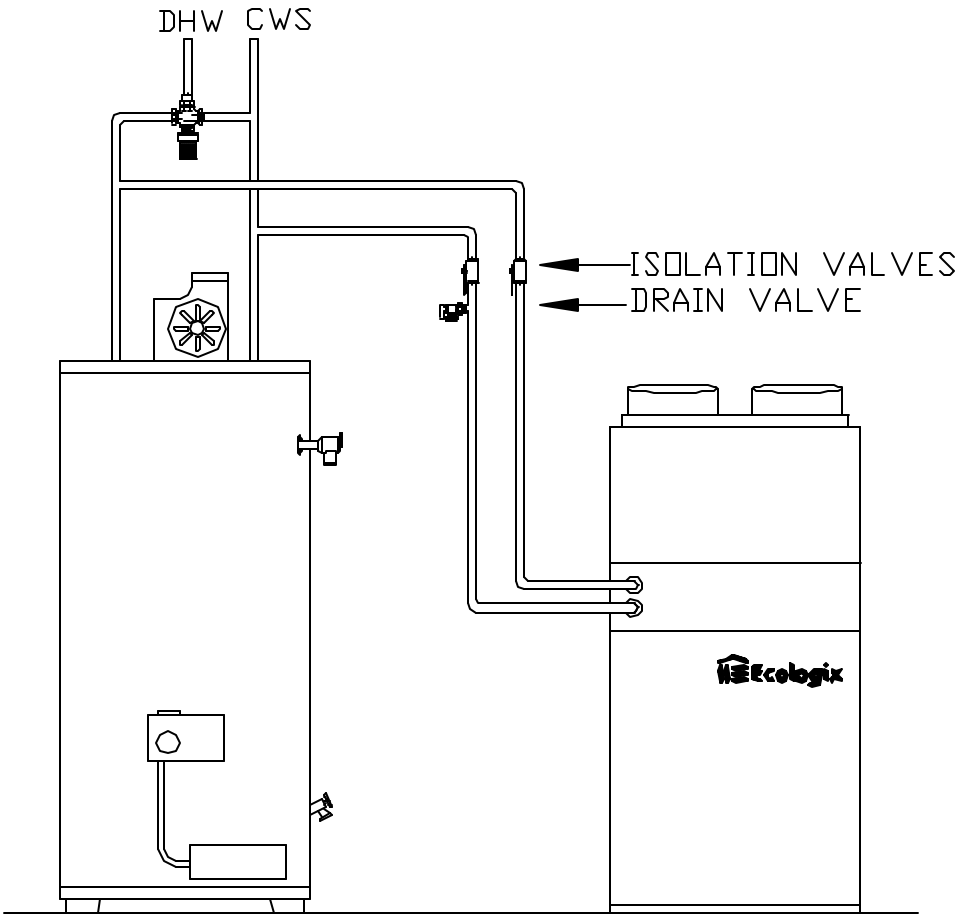
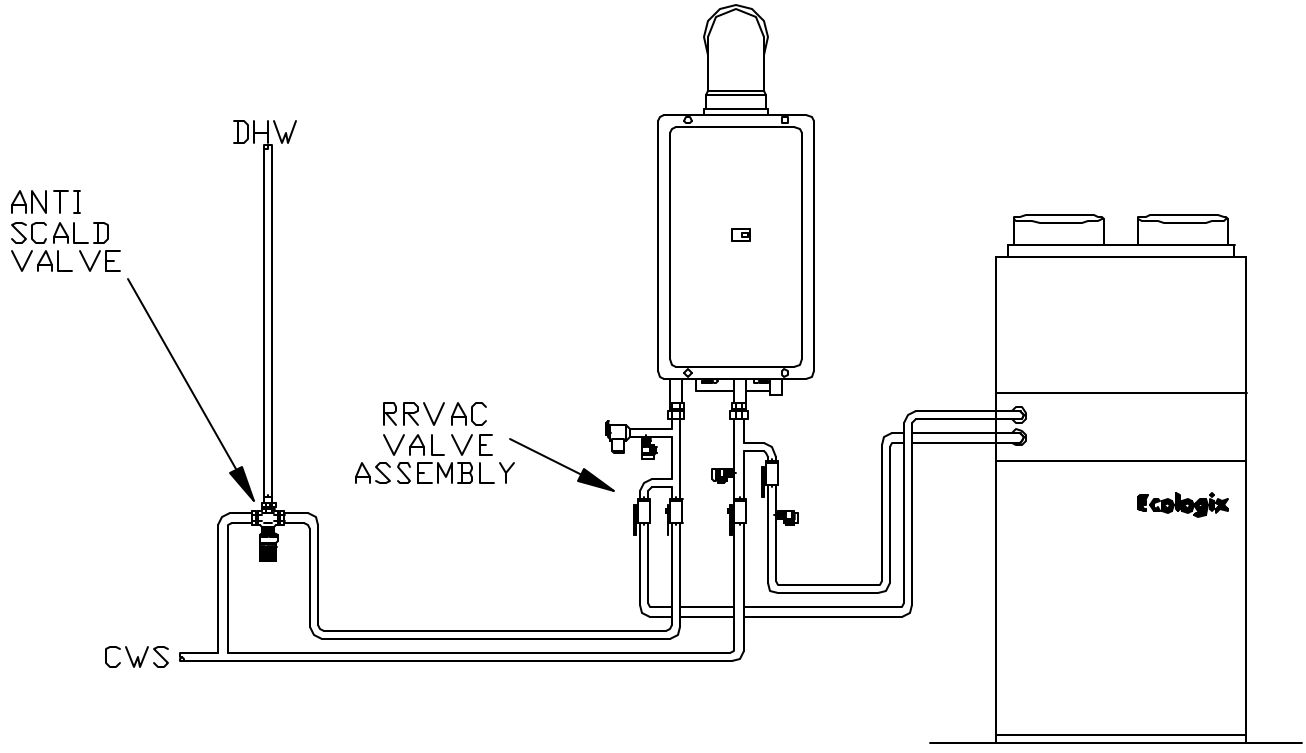
☐	Is the filter cover in place? Is a clean filter in place? Is the supplied filter rack installed?

TYPICAL PLUMBING CONNECTIONS

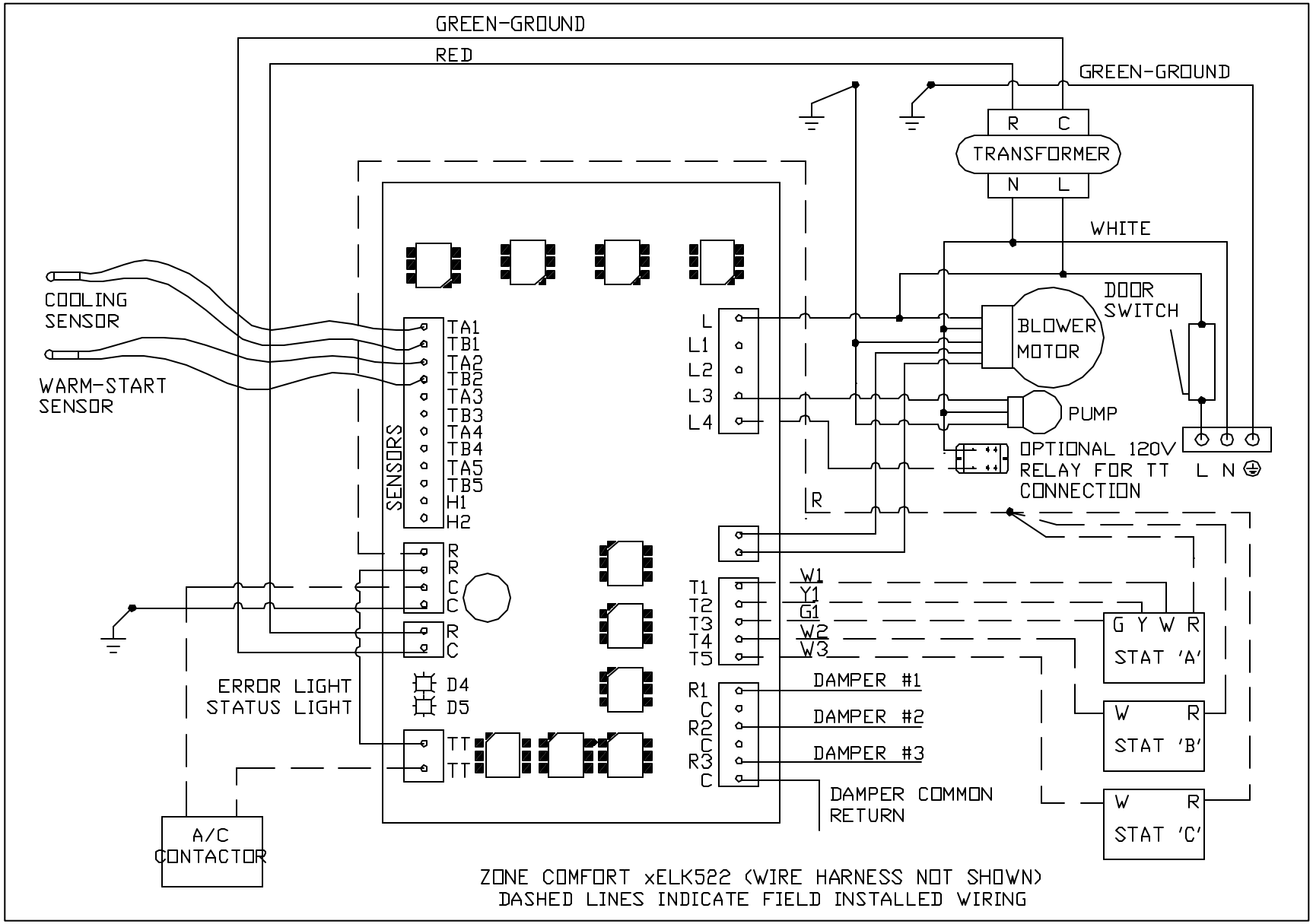




ZC-K09

ELECTRICAL WIRING DIAGRAM

REFER TO WIRING DIAGRAM IN AIR HANDLER FOR CORRECT CONFIGURATION AND CONNECTOR PIN LOCATIONS



EQUIPMENT SPECIFICATIONS AND SIZING TABLES

REFER TO Small-D design Guide for additional duct sizing options.

TABLE 1 - Air Handler Selection Table

Model	ZC-24	ZC-30	ZC-36	ZC-42	ZC-48*	ZC-60*
Minimum number of 3" outlets	24	30	36	42	48	60
Minimum Branches per Zone	6	8	9	11	12	15
Heating Capacity (Btu/h)@130ºF	35,000	41,000	46,000	49,000	52,000	58,000
Heating Capacity (Btu/h)@140ºF	41,000	48,000	54,000	57,000	61,000	67,000
Heating Capacity (Btu/h)@160ºF	53,000	62,000	69,000	74,000	78,000	86,000
Heating Capacity (Btu/h)@180ºF	65,000	76,000	85,000	91,000	96,000	105,000
Air flow rate at high speed (cfm)	720	900	1080	1260	1440	1800
Cooling Capacity (Tons)	2.0	2.5	3.0	3.5	4.0	5.0
Blower Motor Full Load (Amps)	4.9	4.9	7.3	10	10	10
Circulator Full Load (Amps)	0.8	0.8	0.8	1.0	1.0	1.0
Cabinet Width	22"	22"	22"	22"	22"	22'
Cabinet Depth	22"	22"	22"	22"	22"	22'
Cabinet Height	31.5"	31.5"	31.5"	31.5"	31.5"	31.5"
Supply and Return air	20"x20"	20"x20"	20"x20"	20"x20"	20"x20"	20"x20"
Supply and Return Water Connections	¾"	¾"	¾"	¾"	¾"	¾"
Weight-air handler only (pounds)	110	110	110	120	120	120

Heating capacity based on 70ºFreturn air, high speed, 20ºFwater temperature drop through the coil and 12.5 feet length per branch at 3" diameter

(*) Indicates a Zone Comfort system equipped with an 'A' style cooling coil.

TABLE 2 – Supply Main Duct Sizing

Main Size (inches)	Maximum Main Length							
	25	50	75	100	150	200	300	400
	Number of Branches							
4	2	2	1	1	0	0	0	0
5	5	3	2	2	1	1	1	0
6	7	5	4	3	2	2	1	1
7	10	8	6	5	4	3	2	1
8	13	12	9	7	5	4	3	3
9	16	15	13	9	8	6	5	4
10	20	20	18	13	10	8	7	5
12	28	30	26	22	18	14	10	8
14	38	40	38	34	28	20	16	12
16	50	50	50	50	40	32	25	20
18	60	65	65	65	50	40	36	30

TABLE 3

BRANCH DUCT EQUIVALENTS

Equivalent Length (ft)	Flex Duct Length (ft)	Rigid Duct Length (ft)	Total Duct Length (ft)
12.5	12.5	0	12.5
12.5	9	6	15
12.5	6	12	18
12.5	3	18	21
12.5	0	24	24

TABLE 4

EQUIVALENT LENGTHS FOR BENDS IN FLEX DUCT

Bend Radius	90?	180?
12”	0	0
8”	0	3’
4”	3’	6’
< 4”	N.R.	N.R.

TABLE 5

FACTOR MULTIPLIERS

Total Branch Length	Multiplier (duct in conditioned space)	Multiplier (duct in or adjacent to un-conditioned space)
6 feet	1.25	1
12.5 feet	1	0.8
15 feet	0.8	0.6
20 feet	0.6	0.5
25 feet	0.5	0.4
>25 feet	N.R.	N.R.

TABLE 6

EQUIVALENT LENGTHS FOR BENDS IN MAIN DUCTS

Round Duct Size	3 Section 90? elbow	5 Section 90? elbow
3”	6’	4’
4”	8’	6’
5”	10’	8’
6”	12’	10’.
7”	14’	12’
8”	16’	14’
10”	20’	16’
12”	24’	20’
14”	28’	24’

ZONE COMFORT SYSTEM WORKSHEET

Cfactor = _____
Tons = _____

Design Conditions:

Total Heat Loss = _____ btu / hr
Total Heat Gain = _____ btu / hr
= _____ tons

Air Handler Selection:

Water Temp
Model
Htg Capacity _____ BTU/Hr
Nominal air flow _____ cfm

Hfactor = _____
Total Outlets _____
per zone min _____

room number

ZONE 1

Room		Floor	(HL) Heat Loss	(CL) Heat Gain	(Oh) Req. Htg Outlets	(Oc) Req. Clg Outlets	(M) Multiplier	(Omin) Min # Outlets		(Ot) Outlets Selected
							Total Min. Outlets **A** =			
							Req. Zone Outlets (Table 1) **B** =			
							Largest of **A** and **B** =			

ZONE 2

Room		Floor	(HL) Heat Loss	(CL) Heat Gain	(Oh) Req. Htg Outlets	(Oc) Req. Clg Outlets	(M) Multiplier	(Omin) Min # Outlets		(Ot) Outlets Selected
							Total Min. Outlets **A** =			
							Req. Zone Outlets (Table 1) **B** =			
							Largest of **A** and **B** =			

ZONE 3

Room		Floor	(HL) Heat Loss	(CL) Heat Gain	(Oh) Req. Htg Outlets	(Oc) Req. Clg Outlets	(M) Multiplier	(Omin) Min # Outlets		(Ot) Outlets Selected
							Total Min. Outlets **A** =			
							Req. Zone Outlets (Table 1) **B** =			
							Largest of **A** and **B** =			

Total System Outlets = _____

INTRODUCTION

The **Zone Comfort**ä system is a heating and cooling system that enhances comfort and improves efficiency by giving more control over the distribution of conditioned air. Homeowners enjoy many benefits such as healthy indoor air, comfortable basements and cool summer evenings. Multiple thermostats provide the means to zone the home floor by floor in order to gain more control. This will virtually eliminate over or under conditioned spaces as is common in a lot of homes today.

The **Zone Comfort**ä system is designed for use in hydronic (boiler) systems or combination space and water heating systems (Combo Systems). Combo heating systems use the home's water heater to provide both the space heating and domestic hot water, eliminating the need for a furnace. The equipment can be configured for heating only, heating and cooling or cooling only applications.

The **Zone Comfort**ä duct system is much smaller than conventional ducting making it ideal for retrofit applications or where a conventional duct system would result in unsightly bulkheads and wasted space.

When used as the warm air distributor of a boiler heating system the **Zone Comfort**ä air system can provide warmer more comfortable air temperature than a gas furnace with less noise and much smaller duct requirements. This is ideal for large custom homes where a premium heating product is required that is quiet, comfortable and out of site.

HOW IT WORKS

The key to the **Zone Comfort**ä system is the level of comfort and efficiency provided by the unique control system. Zone dampers in the air handler operate to increase or decrease the capacity in each zone of the house as needed. But that's not all! The microprocessor controller makes intelligent decisions on airflow, pump speed and even the capacity when the thermostat is satisfied.

The controller employs the ***Quiet Comfort*** control strategy in order to have the capacity of the air handler meet the needs or load of the space as closely as possible. This means that the blower does not run on high speed each time the room thermostat calls for heat, rather the air handler dynamically adjusts it's capacity. The air handler runs quietly, at lower speeds, for the majority of the time.

In heating mode, when the room thermostat is satisfied the air handler does not simply turn off like a simple on-off heating device. Rather, it continues to heat the space at a lower level. This effectively reduces the rate at which the space cools, further adding to the comfort of the occupants.

Cooling mode uses a modulating strategy to maximize homeowner comfort. Blower speed is carefully controlled to optimize

dehumidification. When the humidity is high the blower runs a little slower. The air has more residence time in the evaporator coil. This results in dropping out more moisture from the air, thus maintaining the humidity in an optimum range. When the humidity is in the right range, the blower runs at a higher speed that optimizes cooling. A critical balance between dehumidification and cooling is always met. As a result the home will feel comfortable at a slightly higher temperature. Not only is comfort maximized, there is a savings realized because the room thermostat can be set a little higher.

This cutting edge approach reduces fan energy requirement, promotes better blending of the room air and less stratification within the living space.

Ecologix air handlers offer many unique features that set them apart from the competition.

Feature	ZC Series
Soft Start	S
Warm Start	O
Cool Start	S
Cooling Warm Up	S
Error & Status Lights	S
A/C Guard	S
Evaporator Coil Freeze Protection	S
Hot Water Coil Freeze Protection	O
Condenser Hard Start Protection	S
Homesafe	O
Watchdog	S

S=Standard O=Optional

Cool Start is a feature that allows the blower to run quietly until the A/C condenser is up to capacity. As the cooling effect is increased, the *Cooling Sensor* will make the blower's speed automatically adjust to suit the load. Blower modulation is only for proper dehumidification; the control does not change the output of the air conditioning compressor or the total cooling effect.

Cooling Warm Up is a feature that increases efficiency by monitoring air temperature after the condenser has turned off. The blower will run and slowly wind down until all of the cooling effect has been extracted from the cooling coil.

A/C Guard is a feature that helps reduce wear and tear of the A/C compressor from hard starts and freezing up

Condenser Freeze Protection

If the evaporator coil air temperature drops outside of the expected operating range this indicates a potential evaporator coil freeze condition. Coil freezing can lead to slugging (liquid refrigerant going back to the compressor) which will damage the compressor. The ***A/C guard*** will respond by shutting off the outdoor cooling unit to allow the system to warm up. Note that this freeze condition is not normal and may indicate blocked ducts, dirty filter or an over-sized cooling unit. The error light on the controller will flash a slow amber (one second on, one second off) when the freeze protection is activated.

Hard Start Protection

To protect the A/C compressor from starting into a load from thermostat bouncing or brief power failures, ***A/C guard*** invokes a delay until the

compressor can safely start. This means that the cooling unit will not run on initial power-up. Instead, the blower will run on low speed until the ***A/C Guard*** has allowed the compressor time for a no-load start. The error light on the controller will flash a slow amber (one second on, one second off) to indicate this process.

Heating

The objective of the heating strategy is to run the blower as quietly as possible in order to provide good air circulation at a low noise level. The fan automatically and gradually switches between speeds in order to heat the space at an optimum level. From time to time the blower will shut off to prevent over heating or at times when other internal heat sources are operating i.e. fireplaces.

On the initial call for heat, the fan ramps up to medium-high speed. The air handler will track the heatloss of the space, shifting speeds up or down as necessary. *Note: Some times the technician is taken by surprise when he disconnects the thermostat. The unit appears to run-on without a call for heat. This is normal and will not exceed 15 minutes.*

Warm Start is a feature that allows the blower to run quietly until the ductwork is flooded with warm air. If the optional ***Warm Start Sensor*** is in place, the blower's speed is automatically reduced until the ductwork is warm. This eliminates the period of room-temperature air creating uncomfortable drafts on each start up.

Coil Freeze Protection

This feature helps reduce the risk of the hot water coil failing due to freezing. The ***Warm Start Sensor*** in the air handler will activate the heat to prevent the coil from freezing. The error light on the controller will flash a slow red (one second on, one second off) to indicate the ***Coil Freeze Protection*** is in progress. This feature helps reduce the risk of coil freezing for applications when an air handler is in an unconditioned space like an attic or crawl space. This also can reduce the risk of freezing due to attached equipment failing. For example; A/C compressor contactors welding closed and causing a run on condition or an HRV or fresh air intake dumping freezing air into the ductwork.

Homesafe is a feature that is an extension of the ***Coil Freeze Protection***. The ***Coil Freeze Protection*** mode will help maintain the temperature in the home above freezing until the problem is corrected. This feature helps reduce the risk of freezing pipes in the home if the thermostat were to fail or was turned off. This feature can be used to maintain a temperature of the home at a level just above freezing (lower than most room thermostats). This can be ideal for recreational properties; however, precautions to mitigate freezing risk must be taken in the event there is equipment failure, open windows or power failure.

Soft Start is feature that smoothly starts the blower motor by applying the current gradually to eliminate that characteristic thump of relay controlled air handlers.

Watch Dog is a self-test feature. If the processor is locked-up due a voltage spike, brownout or a changeover to a standby generator, the ***Watch Dog*** will reboot the processor.

Continuous Fan

When the thermostat fan switch is set to continuous fan, the fan will run at low speed. When there is a call for heating or cooling, the normal heating or cooling speed will over-ride the continuous fan setting. Once the thermostat is satisfied, continuous fan speed will resume.

TT Connections

TT connections are easily added to the **Zone Comfort** ä air handler. Simple field wiring of a 120V relay will enable a dry contact to operate external pumps and devices. Refer to the wiring diagram on page 5 for details

Error Light Codes

The Error light (LED) is beside the Status light located on the controller next to the R and C connections and is labeled D4. More than one error may occur, however, the codes are prioritized to flash the error with the greatest importance/priority. Fast flash has a period of 1 second with the light on for ½ second and off for ½ second. Slow flash has a period of 2 seconds with the light being on for 1 second and off for 1 second.

D4 LED	**Error Codes**	
Priority	Pattern	Error
1	Solid red	Sanity Failure
2	Solid green	50 Hz Line frequency detected
3	Solid amber	
4	Slow red	Hot water Coil Freeze Protection activated, Heating mode on
5	Slow green	Room thermostat error; calls for heating and cooling at same time
6	Slow amber	A/C guard (A/C compressor lock-out) timer count down 5 minutes
7	Fast red	Warm Start Sensor or Cooling Sensor out of range or disconnected
8	Fast green	Humidity Sensor out of range or disconnected

Status Light Codes

The Status light (LED) is located on the controller next to the Error light above the T,T connections and is labeled D5. The codes are prioritized to flash the call with the greatest importance/priority. Fast flash has a period of 1 second with the light on for ½ second and light off for ½ second. Slow flash has a period of 2 seconds with the light being on for 1 second and off for 1 second.

D5 LED **Status Codes**		
Priority	Pattern	Status
1	Solid red	For 10 seconds on power up indicates a test mode.
2	Solid green	IrDA communications
3	Solid amber	Not used
4	Slow red	Call for heat interpreted from thermostat.
5	Slow green	Call for cooling interpreted from thermostat.
6	Slow amber	Heating off cycle (for 15 minutes after call for heat is satisfied)
7	Fast red	Call for continuous blower interpreted from thermostat at T3 (G)
8	Fast green	Stand by (no calls)

PRODUCT DESCRIPTION

Cabinet

All cabinets have a tough, durable low maintenance painted finish.

Cabinet dimensions are designed to provide maximum installation flexibility. Refer to installation requirements for more details.

Heating coils

All heating coils are potable water grade copper suitable for use in plumbing systems. No lead solder is used in any component construction. All coils and internal piping conform to ASTM B68 or ASTM B88 standards.

High-density aluminum fins provide maximum heat transfer for small coil surface.

Fan and Motor

All fans are wide body dynamically balanced for extra quiet operation. Multi-directional sleeve bearing motors allow mounting in any direction for maximum installation flexibility.

Circulating pump

The circulating pump is matched for maximum performance. Air handlers come with internally mounted pumps for ease of installation. Air handlers can be special ordered with external, field installed pumps, when it is desirable to locate the circulator below the air handler, such as in attic installations.

Check Valve

Check valves serve two purposes:

- protect against back-flow of water to avoid short circuiting around the water heater during domestic water use.
- protect against thermal siphoning.

Thermal siphoning is flow of water through the space heating circuit while the circulating pump is not operating due to hot water rising by natural convection. During summer months this will cause overheating, interfere with air conditioning and waste energy

All **Ecologix** air systems come supplied with spring loaded check valves. The check valve may be integral with the pump. These check-valves have been tested and proven to resist thermal siphoning for installations where the air handler elevation does not exceed the distance above the water heater shown in the table below.

Check Valves

valve size	Maximum elevation
1/2”(12mm)	25 feet(8 metres)
3/4”(20mm)	50 feet(15 metres)

EQUIPMENT SIZING AND SELECTION

Procedure

1. Conduct a complete heat loss / heat gain calculation.
2. Determine inlet water temperature
3. Select Air Handler
4. Determine three zones within the space
5. Select # outlets per room
6. Determine Duct Layout

Heat Loss / Heat Gain

Room by room calculations need to be completed using HRAI, ASHRAE, or another approved sizing methods.

Air Handler Selection

The selected air handler must be sized according to the following rules:

a) Heating capacity must be between 100 and 140 of the heat loss.
(110 to 140% for combo systems @ 130°F water temp)
b) Cooling capacity must be between 75-100% of the heat gain.

When using a boiler system, select a boiler with an output that meets or exceeds the heat loss of the space being heated. If the boiler is serving additional loads, size the boiler to meet the total combined load.

For combo heating systems, use an approved sizing method such as the Unified Combo Guidelines published by HRAI.

Define Zones

The space served by the air handler should be divided up into three zones. Each of these zones is to be served by a single main duct by the air handler. Zones can represent areas such as the basement, main floor and second floor. In some applications, it may be desirable to divide the area in to east facing, west facing and basement zones depending on solar gain.

Outlet Selection

To begin, fill out the Design Conditions found at the top of the worksheet. From the calculated heat loss / heat gain, enter the Total Heat Loss and Total Heat Gain in the spaces provided. Enter the number of tons of cooling required by dividing the Total Heat Gain by 12,000 Btu/hr/ton.

Tons = Total Heat Gain / 12,000 Btu/hr / Ton

Select the appropriate condenser for the application. For a zone control system, the rated capacity of the condenser must be between 75% and 100% of the Total Heat Gain. It should be noted that higher efficiency and lower operating costs can be realized by selecting a smaller condenser.

The air handler is selected using Table 1. Determine the inlet water temperature that will be available to the air handler. If using a combo system, this value will always be 130°F. The heating capacity of the air handler must be between 100% and 140% for a hydronic system and between 110% and 140% for combo systems. Find the inlet temperature in the left column and then follow that row across until an adequate heating capacity is found. The best selection is one that is the smallest air handler to satisfy both heating and cooling requirements. Record the numbers of outlets required with the ZC unit. Calculate the Hfactor by dividing the Heating Capacity by the # of Outlets.

HFactor = Heating Capacity / # Outlets

The Cooling Factor is used to determine the number of outlets per room. The Cfactor does not need to be calculated. The value is always 2000 for a direct expansion cooling system. Contact ecologix for specific design parameters when using chilled water systems.

The next step in the design is the individual zone calculations. Starting with Zone 1, enter all the rooms that are served by that zone. At this time, include any of the appropriate multipliers from Table 5 in the Multiplier column. It should be noted that running ducts in unconditioned spaces should be avoided if at all possible. Enter the Heat Gain (CL) of each room in the available space. Calculate the Required Cooling Outlets (Oc) by dividing the Heat Gain (CL) of the room by the Cooling Factor (Cf).

Req. Clg Outlets = Room H.G. / Clg Factor

Continue with the heating calculation in much the same manner. Enter the room heat loss, divide the heat loss by the calculated Hfactor to find the Required Number of Heating Outlets.

Req. Htg Outlets = Room H. L. / Htg Factor

Once the required number of cooling and heating outlets has been calculated, determine the minimum number of grilles per room. This is accomplished by selected the largest number between the required heating and cooling outlets. Enter this is the Minimum # Outlets (Omin) column on the worksheet.

Add the Min # of Outlets for the zone and enter the Total Minimum Outlets in the space labeled ‘A’. Using Table 1 as a reference, enter the Required Outlets per Zone in space ‘B’. Select the largest of A and B and place it in the final space labeled ‘ Largest of A and B’. At this point, carry over the minimum number of outlets to the Outlets Selected column. Add additional grilles according to where proper design practices suggest. Lastly, ensure that the Outlets Selected is equal to, if not more than the Largest of A and B.

Continue this process for the next two zones. Once complete, add the Total Outlets Selected for each zone and place the total in the Total System Outlets.

Double check to ensure that this number is greater than or equal to the number of outlets recorded under the Air Handler Selection section.

Duct Layout

Supply Mains

For each zone, plan where each supply main will run, as well as branches and outlet locations. Try to minimize the length of each main supply run while avoiding branches that run in outside walls or attics. Each zone can only be served with one supply main from the air handler.

It is important to account for any bends or tees that are incorporated in the design. Table 6 contains values for the equivalent length of various elbow sizes.

Try to avoid using tees in the duct design. However if they are necessary, do not place them within 25 feet of the connection to the air handler and attempt to balance the airflow 50/50 between each run.

Supply mains may be round or square. It should be noted that the supply main connections on the air handler are round. These may be transitioned to square ducts. Round ducts can be spiral duct, welded or snap lock seams. Rectangular duct must be at least 26 gauge for all dimensions. The aspect ratio for rectangular ducts must not exceed 2.5 to1.

The supply mains can be sized using Table 2. Note that the length used is the equivalent length (run length + fitting allowances) . Follow the column down until the number of grilles served is reach. The corresponding size in the left column is adequate for that run. Continue in this fashion until all supply mains are sized.

Fittings

All round duct elbows must be standard or long radius fittings. Round duct tee connections shall use a reducing tee, wye, or reducing tee-wye connector.

Bulkhead tees may be used only if:

a) The main length is at least 20 feet less than the maximum found in Table 6.
b) The tee is not a reducing tee.
c) The reducing transition to each branch is at least one foot downstream of the tee.
d) The largest air stream is no more than twice the smaller air stream.
e) There are no more than 8 branches in total downstream of the tee.

Square duct elbows must be radius elbows or have turning vanes. Square duct tees must be reducing tees for both downstream branches. Bullhead tees are acceptable in square duct mains provided both main branches have turning vanes.

Branches and Grilles

Greater detail on Zone Comfort duct sizing and installation practices may be found in the latest version of the Ecologix SmallD duct design guide. Please refer to the design guide reference tables for sizing 4” branch duct sizing.

Use only the approved saddles; flex duct; boots and grilles provided with the duct kit. This is a pre-engineered system that may not work with other configurations of fittings. Consult Ecologix for any substitutions.

All vertical portions of branch connections to high wall grilles must be rigid duct.

Flexible duct may be used in horizontal portions of the branch ONLY.
High wall grilles (over 6' from the floor) are preferred. If high wall grilles can not be located properly, ceiling grilles are preferred to floor grilles. In all cases, avoid locating grilles in high traffic areas. The optimum distance from an outside wall to provide coverage but not induce unwanted drafts would be 6 to 12 feet.

When determining branch locations, ensure that each is within the maximum allowable length. The system is designed to use flexible duct up to 12.5 feet. However, if longer runs are required, rigid duct can be substituted using Table 3. Any bends in the branches must also be taken into account. Table 4 contains values various bend radii and the corresponding equivalent length.

It is important to note that each branch should have a minimum equivalent length of 12.5 feet. This may mean that for short run, the flex may need to be looped. In cases such as these, the installer must retain the minimum 4" bend radius.

Return Air Ducts

Return ducts should be sized using conventional methods such as those published by HRAI. All returns are calculated with total pressure drop equal to 0.15 in.wc. This may be increased to 0.20 in. wc. when the selected equipment capacity exceeds the heat loss of the home by at least 10%.

INSTALLATION

The installer must adhere strictly to all local and national code requirements pertaining to the installation of this equipment. Detailed instructions are shipped with all accessory items and should be followed in detail.

Air Handler Mounting

The Zone Control air handler can be installed in any direction. Some precautions must be observed for some of the possible mounting positions. For installations where the access door faces up or down, select an air handler with an external pump to avoid the pump being mounted with its shaft vertical. The pump shaft must be mounted horizontally to avoid premature failure.

The air handler can be hung by securing straps through any of the existing screw holes in the cabinet. When the existing screw is too short for securing a mounting strap, a longer screw can be used provided care is taken not to damage any internal components. When fastening straps using screws other than those supplied with the cabinet, special care should be taken in the vicinity of the coil to avoid tube puncture.

The cabinet is designed so that the return air can be located on either side of the cabinet, through the bottom of the cabinet, or from the back. Position the filter rack so that the filter is readily accessible.

Install the air handler with the door firmly screwed in place to make sure the cabinet remains square.

Provide at least 2 feet (0.75 metres) of service clearance in front of the access panel of the air handler. Zero clearance is acceptable on all other faces.

Ductwork

Supply trunks may be square or round. SEAL all joints and seams with metal tape or sealing compound. Locate outlets at least 6 inches from outside walls or window coverings. One 25 ft length of flex duct will provide two 12.5ft branches

Use only Class 1 flex duct or duct connector. All vertical portions of branch connections (such as to high wall grilles) must be rigid duct. Flexible duct may only be used in horizontal portions of the branch.

Return air plenum should be the same cross sectional area as the air handler return air opening. In vertical installations, a conventional return air drop and elbow is acceptable.

Ductwork installed in unheated spaces such as attics must be installed between the insulation and the heated space. Provide at least R-12 of insulation above ducts. If cooling is required, the branch and trunk lines must be insulated and sealed with a vapour barrier prior to applying house insulation.

Risk of Freezing

Steps must be taken to prevent the hot water coil from freezing. Coils that have failed due to freezing and damage caused by frozen coils are not covered under warranty.

HRV and Fresh air connections

If a fresh air duct is required, make connection to return air plenum at least 18 inches from filter. Insulate all fresh air ducts.

Fresh air and HRV connections to ductwork can pose a risk of dumping cold air into ductwork during periods of stand-by or continuous run. Calculate mixed air stream temperatures and provide interlock controls to prevent freezing conditions.

Evaporator coils

Evaporator cooling coils that are mounted above the hot water coil pose a risk to the hot water coil in the event that the compressor contactor on the condenser sticks in the on position. When the call for cooling is satisfied, the blower will stop running and allow cold air from the evaporator coil to fall on to the hot water coil. An optional freeze protection kit is available from Ecologix that mounts between the coils. If the sensor detects a near freezing condition it will close the R and W contact, which will bring on the pump and blower until it warms up. (See catalogue No. CP-FPK) The Freeze Protection Kit cannot protect an air handler if the power to the air handler has been disconnected.

Attic and crawl spaces

Air handlers may be located in areas subject to freezing conditions. It is necessary to protect the hot water coil from freezing. The optional Freeze protection kit (Catalogue No. CP-FPK) can be used to cycle on the pump and blower when conditions get close to freezing. The Freeze Protection Kit cannot

protect piping that passes through unconditioned spaces

ELECTRICAL

Warning! - Make sure unit is properly grounded. Locate air handler on a separate electric circuit, or, if a power vented water heater is used, use the same circuit as the water heater.

All air handlers operate on 115VAC/1ph/60hz line voltage. All control circuits are 24 VAC.

Thermostat

The **Zone Comfort**ä air handlers are compatible with most thermostats. Some electronic thermostats (primarily "power robbing" types) require the addition of a resistor between the W & C terminals and the Y & C terminals. This is usually covered in the thermostat instruction manual. A 1,000 ohm, 5 watt resistor on each of the W and Y terminals will usually be enough to drain the current required to power the thermostat. Some thermostats will need 250 ohm, 10 watt resistors on each of the W and Y terminals.

The master zone requires a heat / cool thermostat whereas the slave zone must only be equipped with a heat only thermostat. This is imperative to the proper operation of the unit.

Heat Anticipator Setting

For optimum comfort the anticipator setting should be set to provide approximately 4 cycles per hour

Typical Heat Anticipator Setting	**0.25 amps**

Thermostat wire from the thermostat is connected to wire leads located on Plug J6S inside the air handler.
See Pin connector table inside the air handler for correct connection points for each thermostat.
Connect continuous run wire G for the primary thermostat ONLY. Don't gang all G wires together from all thermostats.
All R wires from the three thermostats should be ganged under one wire nut and connected to the R wire on connector J6S.
A C-gnd wire is provided for 5 wire thermostats that require both a R and C connection.

Sensors

Cooling Sensor

The cooling sensor comes installed on all **Zone Comfort**ä units. After installation, inspect the sensor to verify that it is not physically touching the coil.

Warm Start Sensor

For proper operation, the optional *warm start sensor* must be installed in the airflow downstream of the hot water coil. It should not physically touch the coil.

Sensors can be checked with an Ohm-meter by disconnecting the sensors from the controller and measuring the resistance at the J3 plug pin connections. Refer to the table: Resistance Vs. Temperature.

Resistance Vs. Temperature

K-Ohms	°C	°F
31.8	0	32
24.8	5	41
19.5	10	50
15.5	15	59
12.4	20	68
10.0	25	77
8.12	30	86
6.63	35	95
5.46	40	104
4.51	45	113
3.76	50	122
3.15	55	131
2.65	60	140

A/C Condensing Unit

To take advantage of *A/C Guard* (freeze protection and the hard start protection features), connect the wires from the A/C condenser contactor to the AC terminals on plug J7.
Note: There is a 5-minute delay before the cooling compressor starts on initial start up.

START-UP PROCEDURE

Do not start the air handler or water heater until ALL air has been purged!

1. Fill the boiler loop or water heater with water, but do not start it.
2. Purge all air from the boiler heating or domestic water system.
3. Purge all air from the space-heating loop by closing the isolation valve on the return leg of the loop and open the drain to purge air. Open the return leg isolation valve and then close the drain valve.
4. Start the boiler or water heater according to the manufacturer's instructions. Set the design water temperature and wait for the system to shut off. You can check that the water heater is set properly during the warm up by running a small amount of water into a glass in a sink while the water heater is warming up. Using a thermometer measure the temperature of the water as soon as the water heater burner shuts off. If the set-point temperature is too low or is above 140F, reset the tank control, run rater until the burner starts again and repeat the measurement.
5. Turn on the power to the air handler and set the room thermostat for heat to energize the fan and pump. If a gurgling sound is present, it should subside within one minute. If noise is still present after one minute, repeat step 3 to purge air as necessary.
6. Check pipes for heating to make sure there is flow and feel the pump motor to see if it is running hot.

SERVICE AND MAINTENANCE

Filter

The **Ecologix** air handler is provided with a reusable washable filter media. This filter should be inspected monthly and removed and vacuumed or rinsed as required. Use water only to clean the filter. The filter is designed to last for many years, but replacements can be purchased from any hardware store and cut to fit the filter rack. Pre-cut replacement filters and pleated paper filters are available from Ecologix.

Duct cleaning

If proper filter maintenance is adhered to, duct cleaning will not be required for the life of the equipment.

Coils

Air conditioning and heating coils should not require cleaning if the filter maintenance schedule is adhered to. If a filter is damaged or collapses from plugging, dust may foul the coils. If this happens, replace the filter and carefully vacuum the heating coil. The fan may need to be removed to gain access to the face of the heating coil.

Air conditioning coil

At the start of each cooling season, check the drain connection to the cooling coil to ensure it is free of debris. An easy way to do this is to blow into the tube to see if there is any obstruction. If a plugged air conditioning coil is suspected, call a service technician for testing and cleaning

Fan and motor

Check fan for dust once a year. If dirty, vacuum or wash to remove dust. Keeping the fan blades clean will reduce noise and improve the capacity and efficiency of the heating system

Pump

The circulating pump is water lubricated and should require no regular maintenance. The system control has a cycle timer to exercise the pump even during prolonged periods of no heat to avoid seizing from long idle periods.

TROUBLESHOOTING

Status Lights and Error Codes

The status and error codes help the technician troubleshoot problems by indicating what the controller interprets and what function it is performing. See the tables of status and error codes in the *How It Works* section of this manual. If the unit is lifeless, check for power at the transformer, the door switch and check the transformer for 24 VAC.
The status codes and the error codes are prioritized. This means that the error with the most serious impact must be cleared before an error with a lesser impact can be revealed. For example: a sensor out of range code will not be seen for the first 5 minutes after power up until the A/C guard timer has counted down for 5 minutes.

Thermostat Call Error

It is normal for the air handler to run at times when the call for heat has been satisfied. The status light D5 will flash a slow Amber. This mode is called the heating off cycle and will last 15 minutes or until the next call for heat. It may take a technician by surprise if the thermostat is disconnected or turned off and the air handler continues to operate.

If there is a call for cooling and call for heating at the same time, the heating call will have priority and the error light D4 will flash a slow green. Check the thermostat for correct wiring. Some electronic thermostats and power robbing thermostats apply a voltage to the W and/or Y and/or G terminal of the controller. Excessive voltage will be interpreted as a call from the thermostat. The status lights will indicate what the controller is interpreting.

If there is a call on W, Y and G at the same time, when the power is restored, the controller goes into test mode. The error code will be a solid red for the first 10 seconds. Refer to *Thermostat* in the *Electrical* section of this manual.

Pump does not run

In areas where hard water is present the pump may “stick” and fail to run. Often, closing the isolation valve on the return leg and opening the drain port so that water flows through the pump can free this. For Grundfos pumps, remove the screw-on cover from the face of the pump, and rotate the shaft one turn with a slotted screwdriver. If either method fails to free the pump, removal for cleaning or replacement is necessary. The daily pump exerciser will help prevent pump sticking.

Pump is noisy at start-up

Air is present in heating loop. If sound has not diminished within 1 minute, purge air in accordance with the *Start-Up* procedures. If heat source is a water heater, check to make sure branch connections for heating loop are horizontal to prevent the collecting of air in the heating loop. See the drawing: Typical Plumbing Connections at the front of this manual.

Water heater T&P is weeping

A check valve or back-flow preventer may have been installed in the system. Some form of pressure relief may be required. Options are:

- Install expansion tank
- Install pressure relief valve; locate outlet over laundry tub or floor drain.
- Install combination toilet tank/pressure relief valve

Insufficient or no heat

- Plugged air filter or coil. Refer to *Maintenance* section for filter care and coil cleaning.
- Air in heating loop; purge system.
- Inlet and outlet connections to air handler backwards; reverse connections.
- Water heater supply tube (dip tube) is restricted or damaged; check and/or replace.
- Supply water temperature set too low or not calibrated properly; check water temperature. In the case of water heater; If the temperature has been set low because of homeowner preference, it may be necessary to install an anti-scald valve to control the faucet temperature and raise the operating temperature of the water heater.
- Restrictions in heating loop; remove restrictions, check valve stuck, isolation valves too restrictive, left partially closed after purging or closed valve.
- Water heater supply temperature is unstable. Check water heater setting and temperature sensors for good contact on coil headers.

Cold water at hot faucet

When heat source is a water heater, the most probable cause is reverse flow through the heating loop from a stuck check valve; repair or replace valve.

Fan runs for cooling but not heating

- Room thermostat may be connected improperly. Refer to *Electrical* section or wiring schematic on door of air handler for proper installation.

Heating during Standby Mode

Probable cause is thermal siphoning. See check valve description for details; repair or replace check valve. Check elevation of air handler above water heater to see if motorized valve required for positive shut-off.

Product Warranty

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Cambridge, ON, N3C 3T2

Phone: 519-658-4330
Fax: 519-658-9384

www.ecologix.ca
info@ecologix.ca

This product is warranted by Ecologix Heating Technologies Inc to be free from defects in materials and workmanship that affect product performance under normal use and maintenance within the applicable periods specified below. Replacements furnished will carry only the un-expired portion of the original warranty.

Two-Year Parts

Ecologix Heating Technologies Inc will provide replacement parts for ANY part that fail within two years of purchase, subject to the **terms** below.

Five-Year Parts

Ecologix Heating Technologies Inc will provide replacement parts for any heating coils, cooling coils, cabinetry and piping that fail within five years of purchase, subject to the **terms** below.

Terms

- Reasonable proof of original purchase date must be provided in order to establish the effective date of the warranty, failing which, the effective date will be based on the date of manufacture plus thirty days.
  The warranty does not cover failure or damages caused by:
  - improper installation or operation
  - accident, abuse or alteration
  - operation of device at temperatures or pressures outside of the rated capacities
  - lime or scale deposits
  - corrosive operating environment
  - equipment moved from original installation location
- Replacements furnished under this warranty will be F.O.B. Ecologix Heating Technologies Inc product distribution points in the United States and Canada. They will be invoiced at regular prices. The account will be credited the full amount when the defective part is received by Ecologix, examined and approved as a valid warranty.
- Warranty applies to the original purchaser, but may be transferred to another owner provided the equipment is not moved from the original installation site.
- This warranty does not apply to labor, freight or any other cost associated with the service repair or operation of the product.
- Ecologix shall not be liable for any direct, special, incidental or consequential damages caused by the use, misuse, or inability to use this product.
- Ecologix is under no legal obligations to rectify, including but not limited to, lost profits, downtime, good will, damages to, or replacement of equipment and property
- Purchaser assumes all risk and liability of loss, damage or injury to purchaser and purchaser's property and to others and their property arising out of the use, misuse or inability to use this product.