

Design and Installation Manual Ecologix Pool Package (Indoor)

The Ecologix pool package is designed specifically for connection to a tankless water heater. The Pool Package comes standard with a stainless steel shell & tube heat exchanger for chlorine pool applications. Titanium shell & tube heat exchangers are available for salt water pool applications.

The Pool Package system comes pre-wired ready to connect to the pool pump or timer circuit. (115 VAC) 230 VAC available as a special order.

The cabinet is constructed from aluminum coated steel with a resilient powder coat finish to withstand years of rust free service.

The pool package can be used with a wide range of supply water temperatures. A domestic hot water tempering valve maybe required for high temperature systems. (refer to local codes)



Capacity Selection Tables

Pool Heating Performance

	Supply water temperature (F)	Capacity (Btu/hr)	Tankless * heaters required
PP250	130	70,000	1
	140	80,000	1
	160	120,000	1
	160	180,000	2
PP500	130	160,000	2
	140	180,000	2
	160	250,000	2

(50 gpm pool side flow; pool temperature 72 °F)

*Assumes 180,000 BTUH input water heater

Spa / Hot Tub Heating Performance

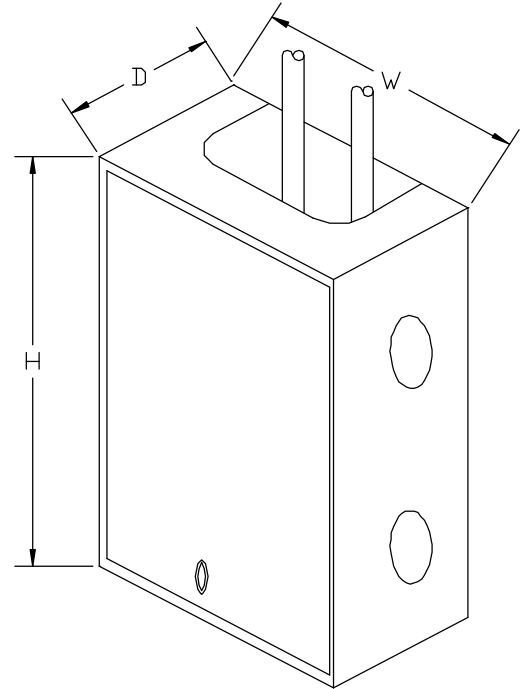
	Supply water temperature (F)	Capacity (Btu/hr)	Tankless * heaters required
PP250	130	30,000	1
	140	40,000	1
	160	60,000	1
PP500	130	45,000	1
	140	65,000	1
	160	100,000	1
	130	65,000	2
	140	90,000	2
	160	140,000	2

(20 gpm tub side flow; tub temperature 104 °F)

General

The Pool Package May be installed with any orientation to simplify piping connections.

The Pool Package comes factory wired with an integral water temperature sensor. The control comes wired with an interlock circuit for an Ecologix air handler. This Interlock interrupts pool heating when the house thermostat is calling for heat. This feature provides priority control for home comfort heating over pool heating.



Physical properties

Model	Cabinet Dimensions			Heat source connections	Pool Piping Connections	Shipping Weight
	H	W	D			
PP250	24"	14.5"	8"	3/4"	1 1/2" PVC	50
PP500	24"	14.5"	8"	1"	2" PVC	60

Capacity Tables for Tank Type Water Heaters and Boilers

Pool Heating Performance

	Supply Water Temperature (F)	Capacity (Btu/hr)	Primary Flow Rate (gpm)
PP250	140	120,000	12
	160	180,000	18
	180	250,000	25
PP500	140	380,000	38
	160	440,000	44
	180	500,000	50

(50 gpm pool side flow; pool temperature 72 °F ;
Primary loop temperature drop 20 ° F)

Spa / Hot Tub Heating Performance

	Supply Water Temperature (F)	Capacity (Btu/hr)	Primary Flow Rate (gpm)
PP250	140	30,000	3
	160	80,000	8
	180	130,000	13
PP500	140	80,000	8
	160	200,000	20
	180	300,000	30

(20 gpm tub side flow; tub temperature 104 °F ;
Primary loop temperature drop 20 ° F)

Pool Package Sizing Guideline

- calculating time to heat pool

$$PTM = 62.4 \times (L \times W \times D) \quad \text{or} \quad (Btu/F) \quad \text{or} \quad \frac{(Btu/hr)}{(F/hr)}$$

$$PTM = 8.34 \times (\text{Total US gallons})$$

The pool thermal mass (PTM) is equivalent to the heat input (Btu/hr) required to raise the pool temperature at a rate of one degree Fahrenheit per hour.

$$H = \frac{PTM \times (TR)}{\text{Time}} \quad (Btu/hr)$$

$$\text{Time} = \frac{PTM \times TR}{H} \quad (hr)$$

Where:

- L = **Length** of pool (feet)
- W = **Width** of pool (feet)
- D = average **Depth** of pool (feet)
- PTM = **Pool Thermal Mass** (Btu/F)
- H = **Heating capacity** of pool package (Btu/hr) (see capacity tables)
- TR = **Temperature Rise** from cold pool temperature to desired temperature (° F)
- Time = **Time** to heat pool to desired temperature (hours)

- calculating heat loss without pool cover

$$H = 10.6 \times L \times W \times TD \quad Btu/hr$$

Where:

- 10.6 = A constant that takes into account wind velocities
- L = **Length** of pool (feet)
- W = **Width** of pool (feet)
- H = **Heating capacity** of pool package (Btu/hr) (required to maintain temperature)
- TD = **Temperature difference** between outdoor air and pool water (°F)

The selected heating capacity of the pool package must be greater than the requirement to meet the heat loss without the cover and greater than the capacity required to bring the pool up to temperature in the desired time.

It is **STRONGLY** recommended that a pool cover be used instead of trying to size the pool heater to maintain temperature during periods of non-use in cold weather.

Pool Package Sizing Guideline

Pool Heating Needs - EXAMPLE

A homeowner has a pool that measures 20' x 30' x 4' average depth
In central Florida the homeowner can expect his pool spring and fall temperature to be 65°F without the benefit of heating. The homeowner does not anticipate swimming in their outdoor pool any time when the air temperature is below 65°F.

Thermal mass of the pool is:

$$\text{PTM} = 62.4 \times (\text{L} \times \text{W} \times \text{D})$$
$$\text{PTM} = 62.4 \times 30 \times 20 \times 4 = \mathbf{149,760} \text{ (Btu/hr) / (F/hr)}$$

In words, it will take 149,760 Btu/hr of heating capacity for every degree F per hour of desired temperature rise.

Selecting a PP250 at 160°F the pool can be heated at a rate of just under 1°F rise per hour
The same package at 140°F will heat the pool at ½°F per hour.

When the homeowner warms his pool to 78°F:

Time to heat pool from 65°F to 78°F using a tank-less water heater:

$$\text{Time} = \text{PTM} \times \text{TR} / \text{H}$$

Where:

PTM = **Pool Thermal Mass** (Btu/F)

TR = **Temperature Rise** from cold pool temperature to desired temperature (° F)

H = **Heating capacity** of pool package (Btu/hr) (see capacity tables)

$$\text{Time} = 149760 \times (78^\circ - 65^\circ) / 120,000^* = 16 \text{ hours @ } 160^\circ\text{F water temperature}$$

$$\text{Time} = 149760 \times (78^\circ - 65^\circ) / 80,000^* = 24 \text{ hours @ } 140^\circ\text{F water temperature}$$

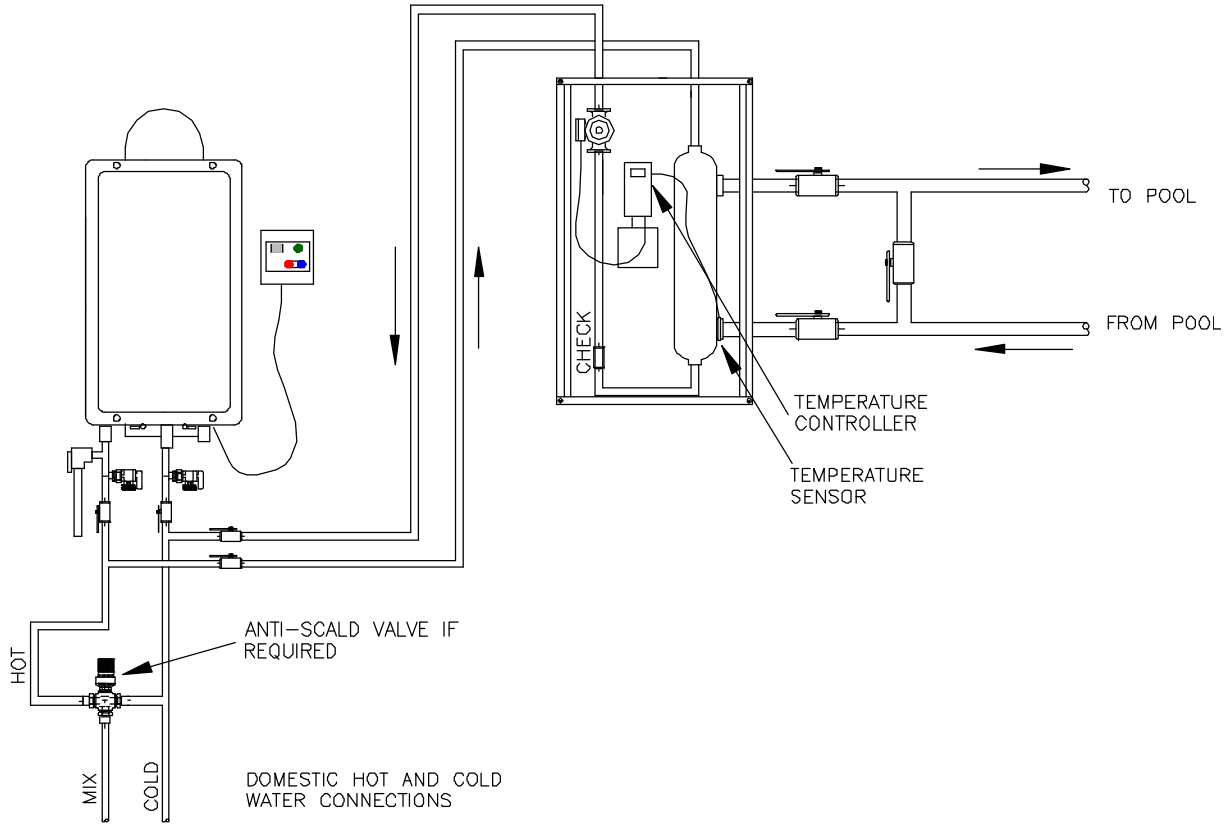
* These values come from the capacity tables for tank-less water heaters

To calculate the required capacity to maintain the pool temperature:

$$\begin{aligned} \text{H} &= 10.6 \times \text{L} \times \text{W} \times \text{TD} \\ &= 10.6 \times 20 \times 30 \times (78^\circ - 65^\circ) = 82,680 \text{ Btu/hr} \end{aligned}$$

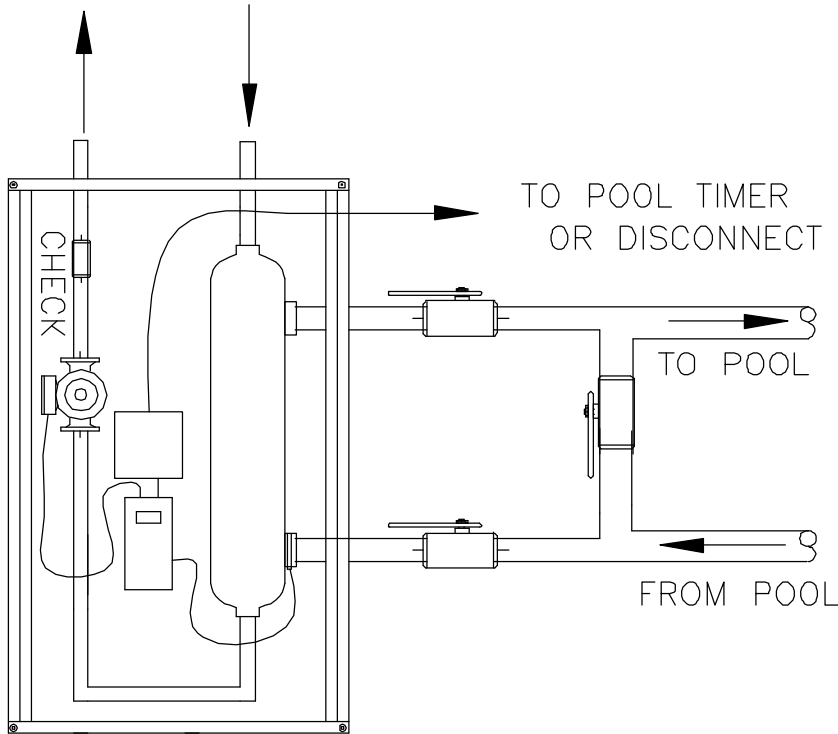
At 140°F water heater temperature the pool will just be able to maintain temperature with the pool cover off at 65°F air temperature. At this rate of fuel consumption, the homeowner would not be happy to see the fuel bill for leaving the pool cover off for an extended period.

Plumbing Schematic



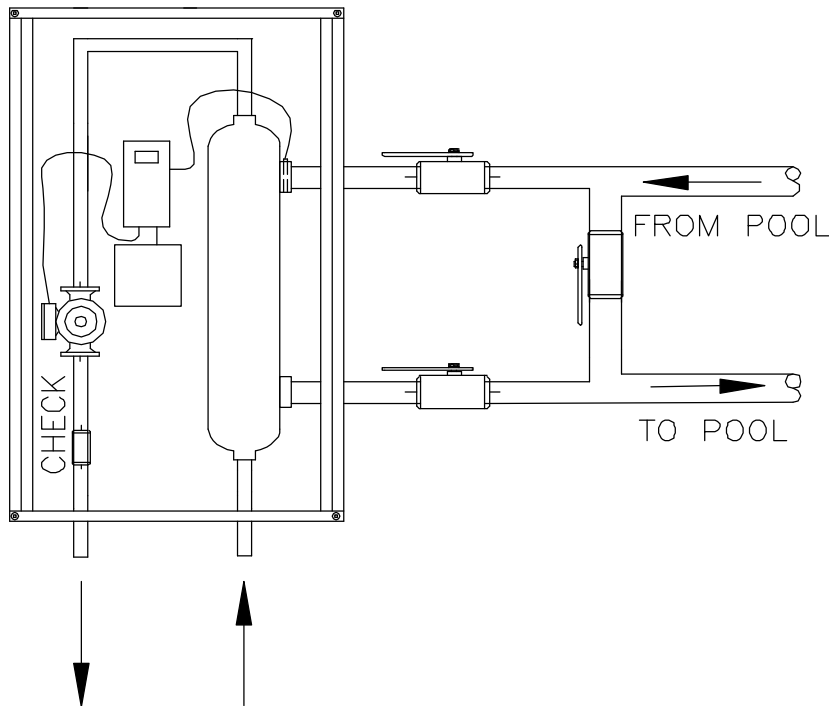
The pool package series comes factory wired with integral water temperature sensor and thermostatic control for easy installation.

Mounting



Fasten the Pool Package to wall or sturdy backboard through pre-punched screw holes provided in the back of the cabinet.

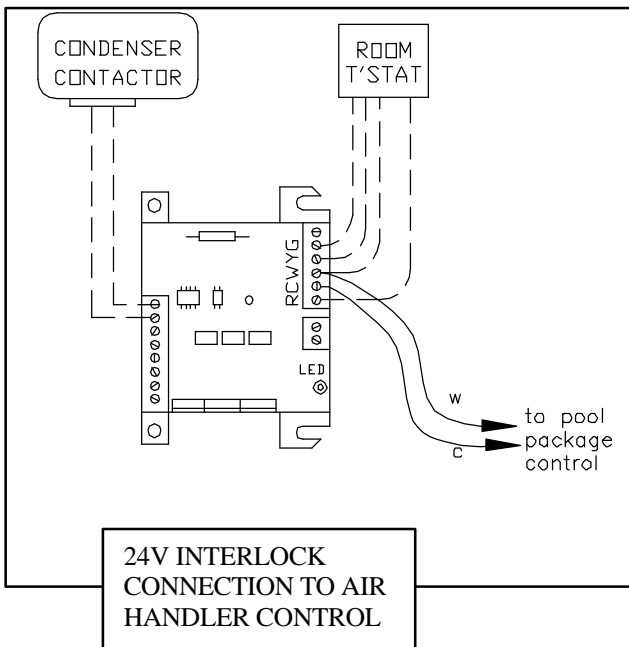
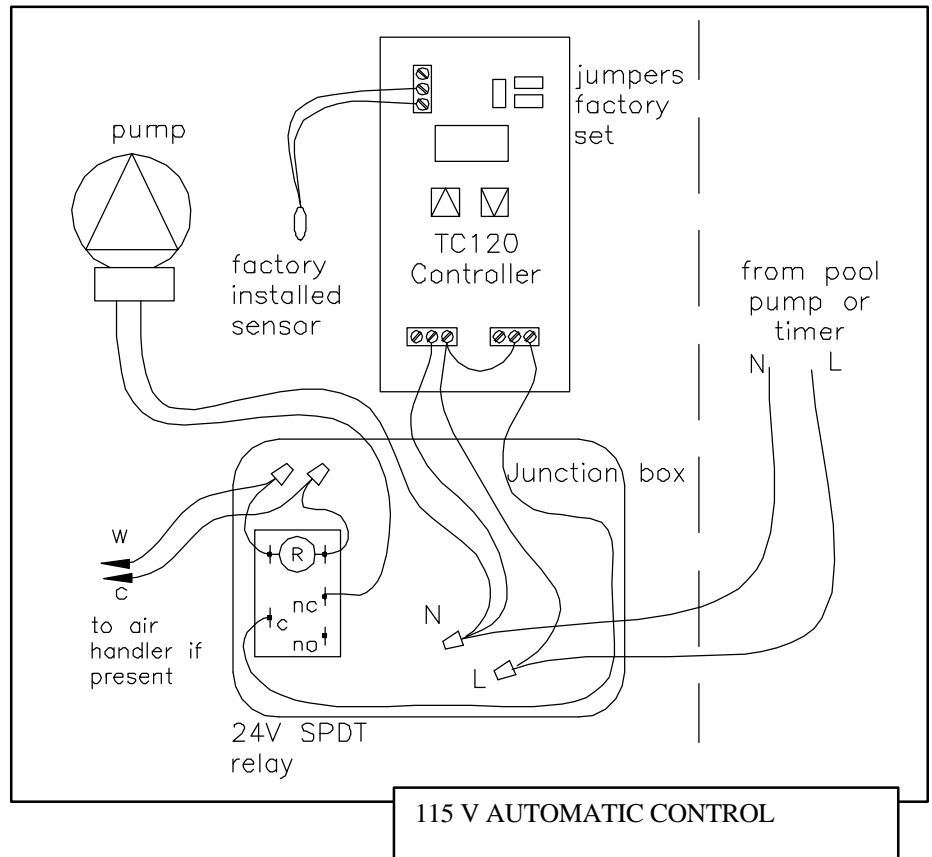
The pool package can be installed with the piping connections facing up for installations where the package is mounted inside the home or inside a weatherproof enclosure or building. This orientation minimizes the potential for air locks in the piping system.



Wiring Diagrams

The PP250 & PP500 Pool packages comes pre-wired for automatic control. The PP250 & PP500 comes wired for 115Volts/1ph/60hz systems.

230 V pool package is also available through special order.



The wiring diagram above depicts a factory wired control connected to a typical pool timer. Actual timer connections may vary depending on model.

The control comes wired with an interlock circuit for an Ecologix air handler. This interlock interrupts pool heating when the house thermostat is calling for heat. This feature provides priority control for home comfort heating over pool heating. Connection to the air handler control is shown below.

For 230 V Pool Package wiring diagram consult factory.

The Johnson control in this unit has been programmed in our factory with the following settings:

Control Function	Display Symbol	Factory Setting	Description
Setpoint	SP	76°F	Temperature value at which the equipment is switched on or off.
Differential	dIF	2°F	Establishes the difference in temperature between the cut-in value and the cutout value.
Anti-short cycle delay	Asd	1 Minute	Establishes the minimum time between run cycles.
Temperature Offset	OFS	0 Degrees	Establishes a set secondary setpoint .
Sensor Failure Operation	SF	0 (Output relay will de-energize upon sensor failure.)	Establishes whether output relay remains energized in the event of sensor failure.
Temperature Units	F or C	°F	Temperature value measured in degrees Celsius or Fahrenheit .
Temperature Offset Indicator	BIN	N/A	N/A in this application
Cooling or heating mode	Snowflake or flame symbol	Heating Mode	Heating or Cooling Application.

PROGRAMMING YOUR CONTROL:

1. Press and hold MENU button for two seconds or until the display flashes SP.
2. Press the Up or Down arrows to toggle between the control functions.
3. Press MENU to display the functions current value.
4. Press Up or Down until the desired value is displayed.
5. Most Importantly, Press MENU to save the new value.



Parts List

Part No.	Description
SB250	B-250 Shell & Tube heat exchanger
SB500	B-500 Shell & Tube heat exchanger
SB250Ti	B-250 Titanium Shell & Tube heat exchanger
SB500Ti	B-500 Titanium Shell & Tube heat exchanger
GUP26-96BF (115 VAC)	Grundfos pump UP26-96BF brass flange (115 VAC)
GUP26-96BF (230 VAC)	Grundfos pump UP26-96BF brass flange (230 VAC)
GUP26-99BF (115 VAC)	Grundfos pump UP26-99BF brass flange (115 VAC)
GUP26-99BF (230 VAC)	Grundfos pump UP26-99BF brass flange (230 VAC)
xELR001	Single Pole Double Throw Relay
xPLC006	Check Valve - 3/ 4" vertical lift
xPLC008	Check Valve - 1 " vertical lift
TC120 (115 V)	Temperature Control A419-ABC-1C
TC120-4X (230 V)	Temperature Control A419-AEC-1C



Warranty- Pool Package

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This **pool package** 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, which failed within two years of purchase, subject to the **terms** below.

Five-Year Heat Exchanger

Ecologix Heating Technologies Inc will provide a replacement Shell & Tube heat exchanger that fails within five years from the date of purchase subject to the **terms** below and the following limitations:

1. Stainless steel heat exchangers *cannot* be used with seawater or salt water.
2. Titanium heat exchangers may be used for salt-water pool and spa heating provided the operating outlet temperature does not exceed 110F.
3. Warranty is void and shall not apply if unit fails from faulty installation and operation of chlorinator.
4. Chlorinators must feed downstream of the heat exchanger and have an anti-siphoning device to prevent chemical back up in the heat exchanger when the pump is shut off.
5. When adjusting the chlorinator feeder or shock chlorinating the pool, isolate the heat exchanger (by closing isolation valves and opening by-pass line) until chlorine levels return to normal.
6. Ecologix Heating Technologies Inc. does not warrant heat exchangers exposed to corrosive water/element harmful to the structural integrity and durability of the product. (Please refer to recommended chemical levels in Table 1

Chemical	Levels
Free Chlorine	1.0 - 3.0 ppm
PH	7.2-7.8
Calcium Hardness	200 – 400 ppm
Alkalinity	100 – 150 ppm
Total dissolved solids	Less than 1,000 ppm
Bromine	2.0 – 4.0 ppm
Copper	0 ppm
Chlorine	Less than 140 ppm

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.