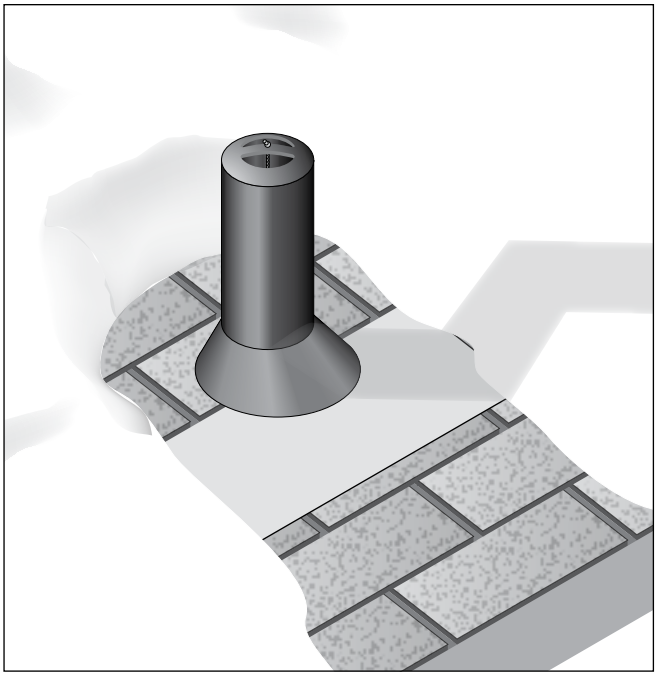
heat-line®
Freeze Protection Systems

ArcticVent®

Installation Instructions for Electric Units

AV120-03CS **AV120-03GFC**
AV240-03CS **AV240-03GFC**



Approvals

Enclosure Type 3R

Description

ArcticVent is designed for installation by professional licensed tradespersons. ArcticVent must only be used when protected by the Ground Fault Circuit protection (GFC) included in the cord-set of GFC models and with approved Ground Fault Devices when protected at the electrical panel. These products must be installed and wired in accordance with the National Electrical Code (NEC) in the USA and the Canadian Electrical Code (CEC) in Canada.

- Never bypass the Ground Fault Protection.
- Never cut, drill or alter this product in any manner.
- ALWAYS test the system ground fault device before seasonal start-up and monthly while in use.

ArcticVent GFC systems simply plug in. The CS models will require Ground Fault Circuit protection (not included) and field wiring.

Proper completion of this installation will require the expertise of plumbing/mechanical and electrical trades. This is a professional product designed to be installed by licensed tradepersons and must be inspected by the proper electrical and mechanical authorities following completion of the finished installation.

For technical support call Heat-Line a Division of Christopher MacLean Ltd. at (800) 584-4944.

This product must be installed in accordance with governing electrical, plumbing and building authorities.

CAUTION! Failure to properly install and test this product while in use may be hazardous and may result in property damage or loss of life.

Kit Contents

Qty	Description
1	ArcticVent CS or ArcticVent GFC

ArcticVent GFC

ArcticVent CS

⚠ WARNING:

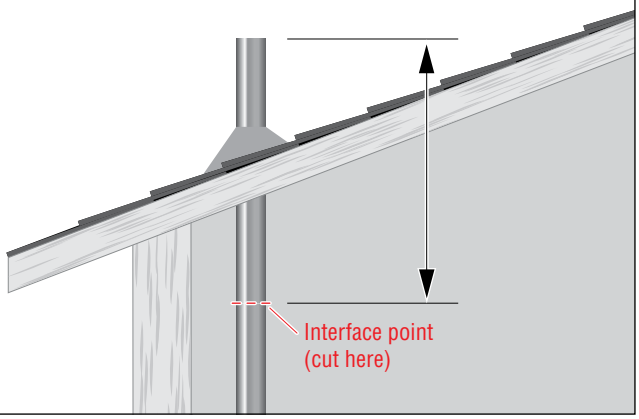
This component is an electrical device that must be installed correctly to ensure proper operation and to prevent shock or fire. Read these important warnings and carefully follow all of the installation instructions.

- To minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with the requirements of Heat-Line a Division of Christopher MacLean Ltd., agency certifications, the National Electrical Code and Canadian Electrical Code, ground-fault equipment protection must be used. Arcing may not be stopped by conventional circuit breakers.
- Component approvals and performance are based on the use of Heat-Line a Division of Christopher MacLean Ltd. specified parts only. Do not use substitute parts or vinyl electrical tape.
- This is a professional product designed to be installed by licensed tradepersons and must be inspected by the proper electrical and mechanical authorities following completion of the finished installation.

Plumbing / Mechanical Installation

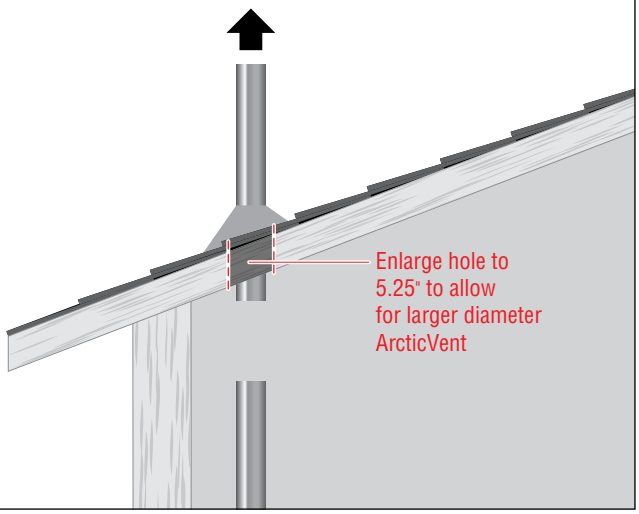
1 Retrofit Installations – (See page 3 for new installations)

- Carefully unpack the ArcticVent and inspect for any shipping damage.
- Determine the interface point of the 3-inch stack to the ArcticVent inside the dwelling.
- Use a pipe cutter or saw, cut the existing 3-inch diameter stack.



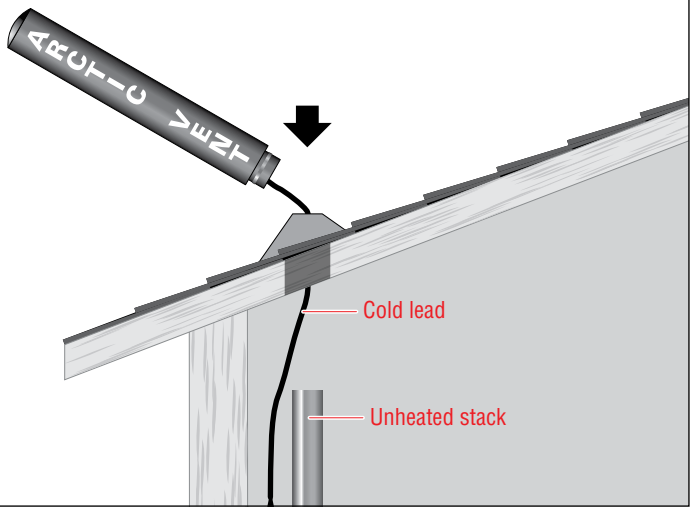
2

- Remove cut stack by pulling it up through the roof. Enlarge the hole in the roof (if necessary) to accommodate the larger diameter ArcticVent. Approximately 5.25 inches or as required.
- Common ABS fittings (not supplied) can be used to modify larger or smaller ABS vent pipes to 3-inch diameter.



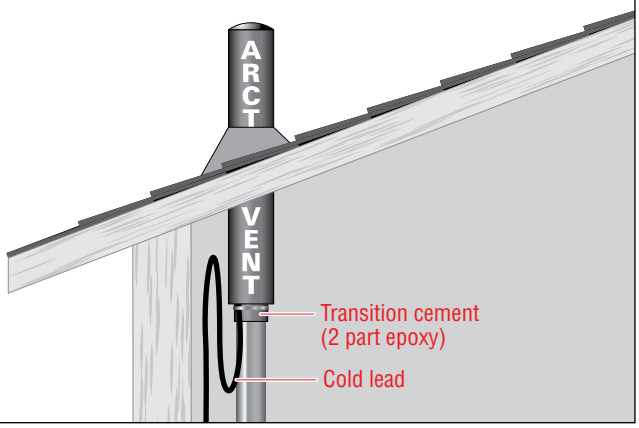
3

- Install the ArcticVent from the roof down (coupling down) and connect the ArcticVent bottom coupling to the unheated stack at the interface point using approved transition cement or 2-part epoxy.
- Be careful not to damage the cord-set when passing the vent through structures and while positioning it.
- The ArcticVent has a 5-inch outside diameter and the existing metal or neoprene flashing may require some alteration. Neoprene flashings are usually capable of accommodating the larger pipe diameter with little or no alteration but it may be very tight fitting. Non-toxic lubricants may be used to alleviate the friction while pushing ArcticVent through the Neoprene gasket.



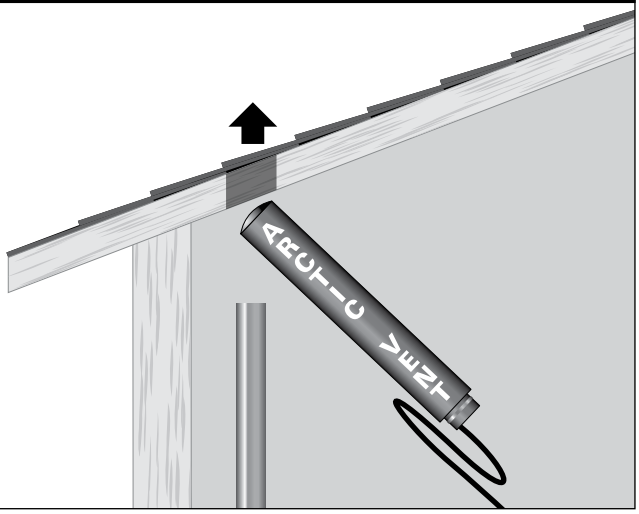
4

- Install the ArcticVent from the roof down (coupling down).
- Connect the ArcticVent bottom coupling to the unheated stack at the interface point using approved transition cement or 2-part epoxy. Be careful not to damage the cord-set when passing the vent through structures and while positioning it.
- Support may be required (not supplied) to carry the added weight (9 lbs) of the ArcticVent. Use common approved construction practices to achieve this if necessary.



1 New Installations – (See page 2 for retrofitting)

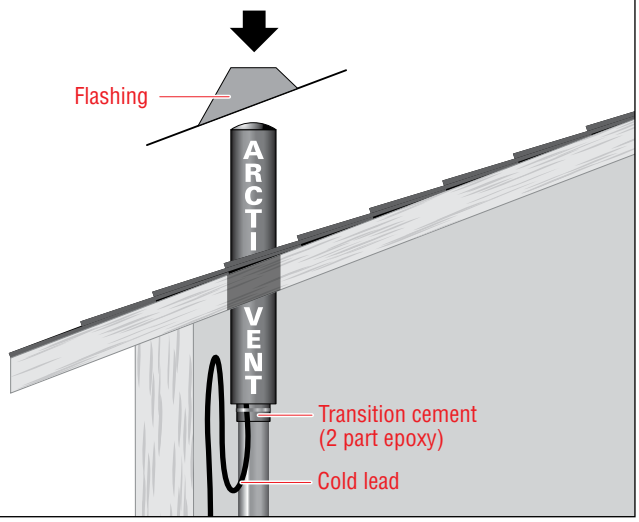
- On new installations the ArcticVent may be installed from below and pushed up through the roof and by using standard vent stack installation and flashing practices. Always be careful not to damage the electrical cord-set during installation movements and final fitting.



2

- If metal flashings or other types of flashings are used, be sure to weatherproof the ArcticVent around the flashing using standard and approved construction practices.
- Connect the ArcticVent bottom coupling to the unheated stack at the interface point using approved transition cement or 2-part epoxy. Be careful not to damage the cord-set when passing the vent through structures and while positioning it.
- Support may be required (not supplied) to carry the added weight (9 lbs) of the ArcticVent. Use common approved construction practices to achieve this if necessary.

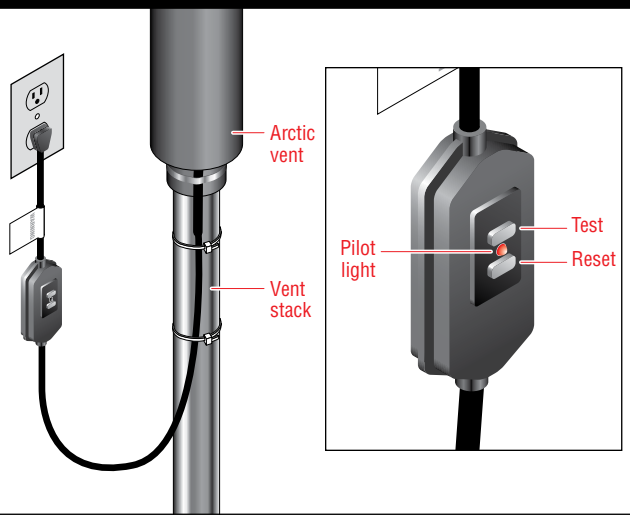
The plumbing/mechanical portion of this installation is now complete.



Electrical Installation and Testing

GFC Models

- A 15-amp 120-volt receptacle 5-15R (120 volt systems) or 240 volt receptacle 6-15R (240 volt systems) is all that is required for the power supply. When dealing with freeze protection a dedicated circuit is recommended whenever possible.
- Plug cord into an appropriate receptacle
- Push test and Re-set button
- Check for pilot light “on”
- When the pilot light is on your system is operational
- Test and Re-set monthly
- Push test button to shut system off or un-plug when not in use
- A single pole switch may be installed for easy on-off operation

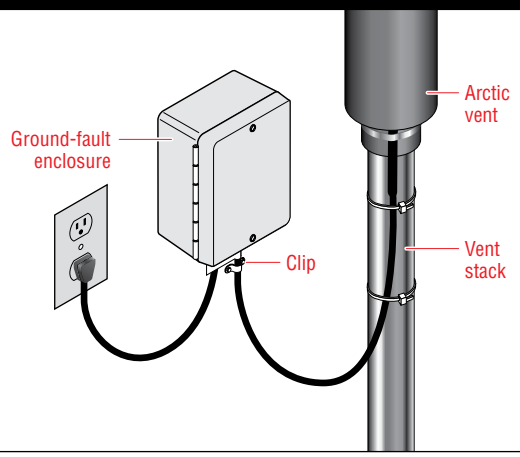


CS Models

- **GROUND FAULT PROTECTION MUST be used in the supply circuit**
- Wire the cord into an approved electrical enclosure with an approved fitting.
- Heat-Line’s GF240 or 120 HLC products can be purchased for ground fault protection and are supplied with NEMA 3R enclosures.
- GF-STAT may also be purchased to provide ground fault protection and thermostatic on/off control, NEMA-4X rated.

SAFETY WARNINGS!

- **NEVER BYPASS THE GROUND FAULT CIRCUIT PROTECTION.**
- **DO NOT USE EXTENSION CORDS WITH THIS PRODUCT.**
- **NEVER CUT OR ALTER THIS PRODUCT IN ANY MANNER.**
- **IF THE GROUND FAULT DOES NOT RESET CALL AN ELECTRICIAN.**



DISCONNECT THE ARCTICVENT IN SUMMER MONTHS OR WHEN NOT REQUIRED.

The circuit supplying the ArcticVent may be controlled by an approved ambient sensing thermostat to activate the system automatically at the freezing point if desired.

The circuit supplying the ArcticVent may also be controlled with an approved single pole switch to conveniently disconnect power when not required.

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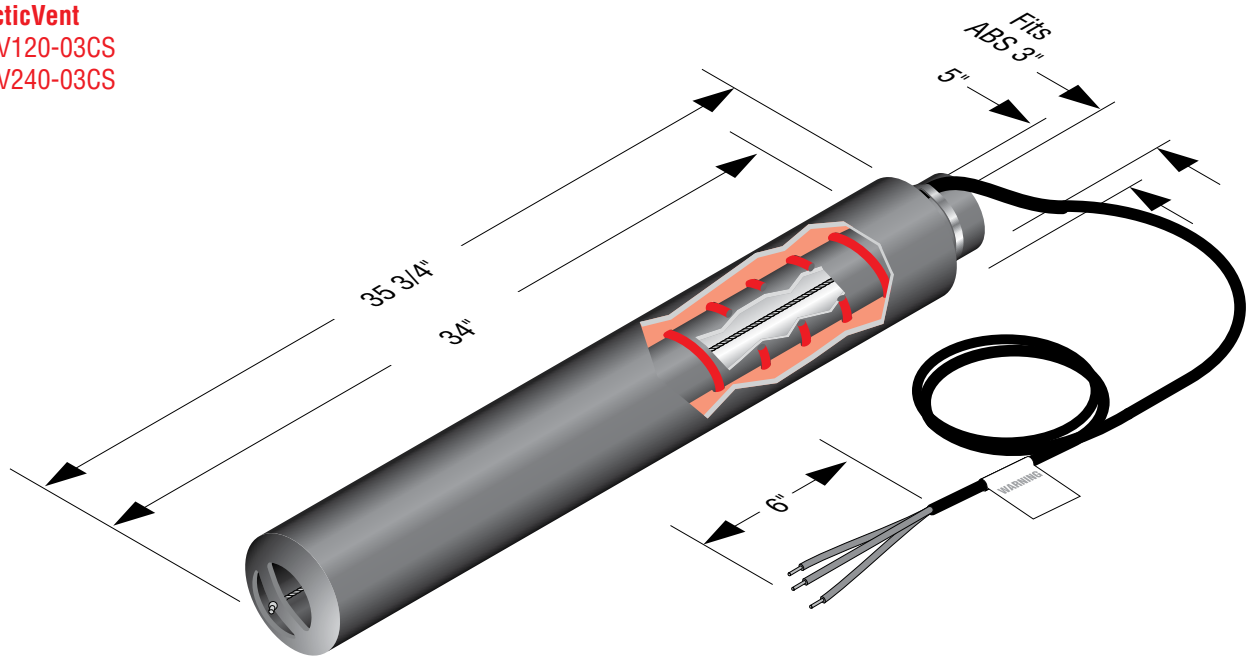
www.heatline.com

ArcticVent® CS Specification

ArcticVent
AV120-03CS
AV240-03CS



120 Volt Specifications

Voltage:	120
Watts:	75 @ 50°F
Cord set:	36" cord with 6" tails
Interface adhesive:	2-part epoxy (not included)
GFCI:	Not included (Circuit must be protected with ground fault equipment to CEC & NEC standards.)
Weight:	10 lbs

240 Volt Specifications

Voltage:	240
Watts:	75 @ 50°F
Cord set:	36" cord with 6" tails
Interface adhesive:	2-part epoxy (not included)
GFCI:	Not included (Circuit must be protected with ground fault equipment to CEC & NEC standards.)
Weight:	10 lbs

Heating Element

5 watt per foot @ 50°F, self regulating

Approvals

Enclosure Type 3R

Tubes

Outer:	5 inch
Inner	3 inch
Material:	Lexan EXL9330 Resin
Impact Resistance:	11.0 ft lb/in @ –58°F
Flame Rating:	UL – UL94 (.0590 in): V-0 (.118 in): 5VA

Suggested Coupling Adhesive

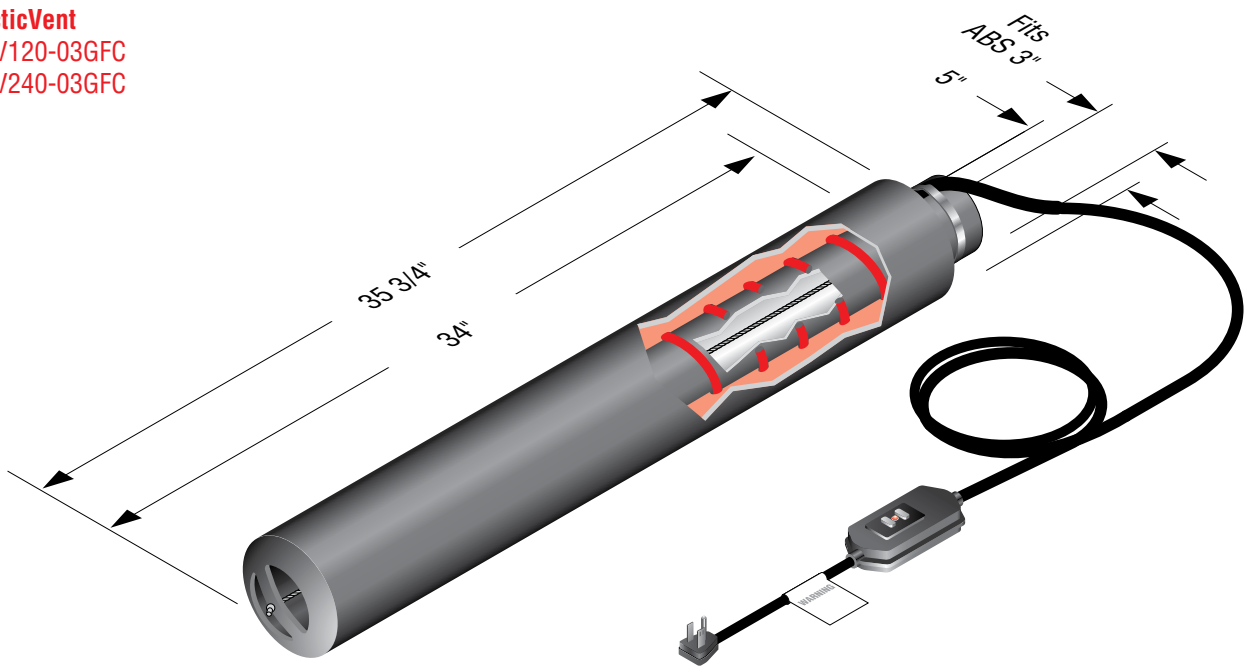
2-part epoxy or Loctite E-90FL (not included)

Part number configuration guide:
***Example:* AV120-03CS**

CS	Cord set
03	Product length in feet
120	Voltage (120 / 240)
AV	ArcticVent

ArcticVent® GFC Specification

ArcticVent
AV120-03GFC
AV240-03GFC



120 Volt Specifications

Voltage:	120
Watts:	75 @ 50°F
Cord cap:	5 -15
Cord set:	42"
Interface adhesive:	2-part epoxy (not included)
GFCI:	27 milliamp
Weight:	10 lbs

240 Volt Specifications

Voltage:	240
Watts:	75 @ 50°F
Cord cap:	6 -15
Cord set:	42"
Interface adhesive:	2-part epoxy (not included)
GFCI:	27 milliamp
Weight:	10 lbs

Approvals

Enclosure Type 3R

Heating Element

5 watt per foot @ 50°F, self regulating

Tubes

Outer:	5 inch
Inner	3 inch
Material:	Lexan EXL9330 Resin
Impact Resistance:	11.0 ft lb/in @ –58°F
Flame Rating:	UL – UL94 (.0590 in): V-0 (.118 in): 5VA

Suggested Coupling Adhesive

2-part epoxy or Loctite E-90FL (not included)

Part number configuration guide:
***Example:* AV120-03GFC**

GFC	Ground Fault Protected
03	Product length in feet
120	Voltage (120 / 240)
AV	ArcticVent

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Heat-Line
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www.heatline.com

FEDERAL SIGNAL CORPORATION

StreamLine® Low Profile Strobe Light

Models LP3P, LP3S, LP3T

PERFECT SIZE MEETS SUPERIOR PERFORMANCE

- Available in 12-48VDC, 120VAC and 240VAC
- Surface mount, T-mount, or integrated 1/2-inch NPT pipe mount
- Five dome colors
- Screw-on lens
- Low profile — Model LP3S is only 5" high
- Type 4X, IP66 enclosure
- PLC and triac compatible
- Optional dome guard for LP3S and LP3T
- UL and cUL Listed, and CSA Certified

Model LP3 low profile strobe light is a Type 4X strobe that is available in five colors: Amber, Blue, Clear, Green and Red. An optional dome wire guard is available for the LP3S and LP3T.

The LP3 is offered in three mounting configurations. LP3P features an integrated 1/2-inch NPT pipe mount. LP3S features a three-hole surface mount — ideal for control panels and other flat or flush surfaces. The "T-mount" LP3T has a popular 2-hole design for wall or flush mounting.

Both the LP3S and LP3T include a surface gasket to complete the Type 4X installation. An optional dome guard is available for use with the LP3S and LP3T. All LP3 units feature a threaded screw-on lens that allows tool-free wiring and strobe tube replacement. The strobe tube is rated for 7,000 hours.

The LP3 comes in three voltage variations: 12-48VDC, 120VAC and 240VAC. The state-of-the-art strobe mechanism produces 2.2 joules of energy, while drawing relatively low level amperage.

StreamLine® strobes feature high-quality, long-life strobe lamps which are designed to reduce tungsten build-up for longer lamp maintenance cycles. Careful consideration is given to the relationship between lamp shape and lens design for maximum light output. StreamLine products make use of surface mount technology, which provides a more powerful light in a much smaller package. The dry-electrolyte capacitor used in StreamLine products runs cooler than those used in many competitive strobes, resulting in a more reliable product that won't fail due to overheating.

Model	Voltage	Operating Current	Flash Rate/ Minute	Candela Peak[1]	Candela ECP[2]
LP3*-012/048**	12-48VDC	0.44-0.10 amps	65-95	175,000	51.5
LP3*-120**	120VAC	0.10 amps	65-95	175,000	51.5
LP3*-240**	240VAC	0.07 amps	65-95	175,000	51.5

5 yr FEDERAL SIGNAL WARRANTY

*Indicates Mounting Style: (S) Surface Mount, (P) Pipe Mount (T) T-Mount,

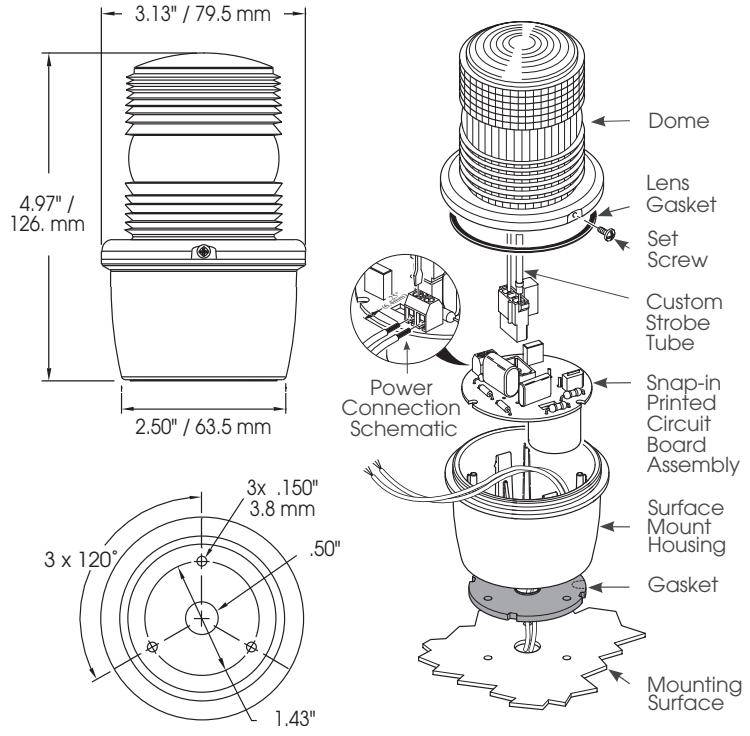
** Indicates color: (A) Amber, (B) Blue, (C) Clear, (G) Green or (R) Red

[1] Peak candela is the maximum light intensity generated by a flashing light during its light pulse

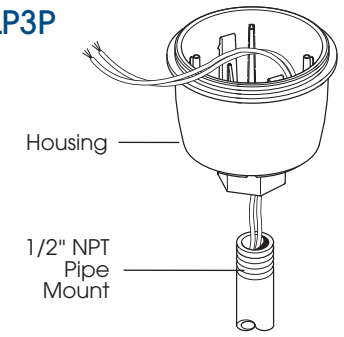
[2] ECP (Effective Candela) is the intensity that would appear to an observer if the light were burning steadily

STREAMLINE® LOW PROFILE STROBE LIGHT (LP3S/LP3P/LP3T)

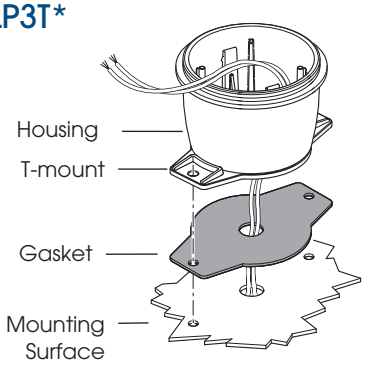
LP3S



LP3P



LP3T*



*LP3T-120 & 240VAC shown

SPECIFICATIONS

Lamp Life:	7,000 Hours	7,000 Hours
Light Source:	Strobe tube	Strobe tube
Operating Temperature:	-31°F to 150°F	-35°C to 66°C
Net Weight:	7.3 oz.	206.96 g
Shipping Weight:	8.5 oz.	240.98 g
Diameter:	3.125"	79.4 mm
Height (from bottom):		
LP3P	5.7"	144.8 mm
LP3S	4.97"	126.2 mm
LP3T	5.1"	129.5 mm

HOW TO ORDER

- Specify model, voltage and color
- Optional Accessories: Wire/Dome Guard (LP3G) for LP3S, LP3T

REPLACEMENT PARTS

Description	***Part Number***	***Description***	***Part Number***
Dome, Amber	K8589063A	Dome, Red	K8589063A-04
Dome, Blue	K8589063A-01	Strobe Tube	K149130A
Dome, Clear	K8589063A-02	Gasket Kit [1]	K858900353A
Dome, Green	K8589063A-03		

[1] Includes gasket for LP3P, LP3S, and LP3T

2645 Federal Signal Dr., University Park, IL 60484 Tel: 708.534.4756 Fax: 708.534.4852 www.federalsignal-indust.com

LINEAR AIR PUMP
HIBLOW Japan

HP series

HP-100 / HP-120 / HP-150 / HP-200

- Oxygen supply for fish breeding
- Septic tank
  (Biological contact aeration)
- Air injection for bubble bath
- Small capacity compressor

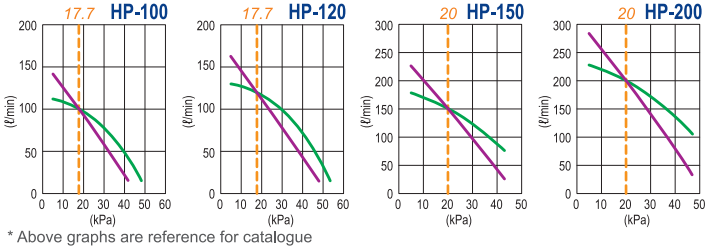
Specifications

		HP-100		HP-120		HP-150		HP-200	
Rated Voltage	V	AC220 - 240							
Power Supply Frequency	Hz	50	60	50	60	50	60	50	60
Rated Loading Pressure	kPa	17.7				20.0			
Airflow Volume	ℓ/min	100		120		150		200	
Power Consumption	W	95	100	115	125	125	155	210	250
Noise Level	dBA	38		40		45	47	46	48
Weight	kg	8.5				9.0			

* Above data is reference for catalogue

Performance Curves

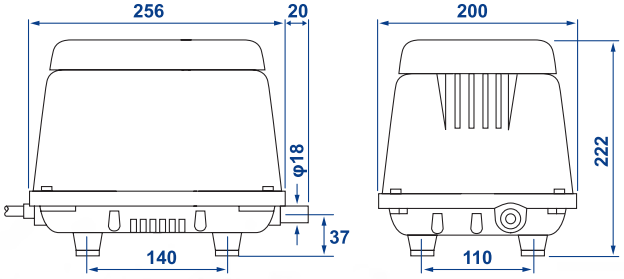
Rated Loading Pressure (kPa) — 50Hz — 60Hz



* Above graphs are reference for catalogue

Dimensions

(UNIT : mm)



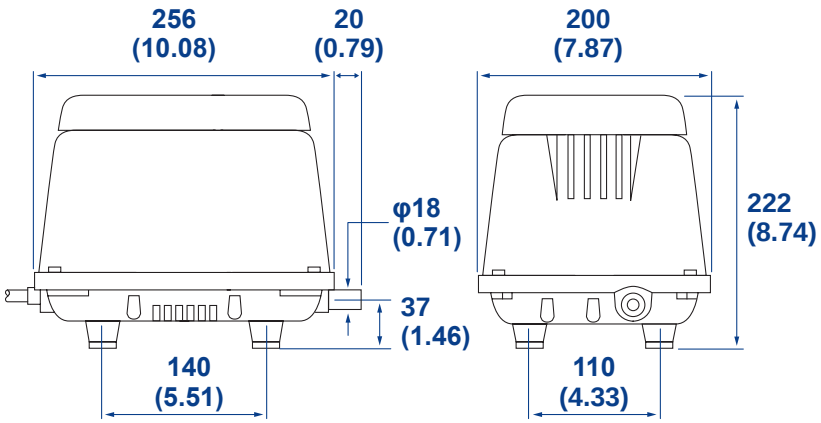
* Materials may be modified without notice.
* "HIBLOW" is a registered mark of Techno Takatsuki co., ltd.

HP-150, 200

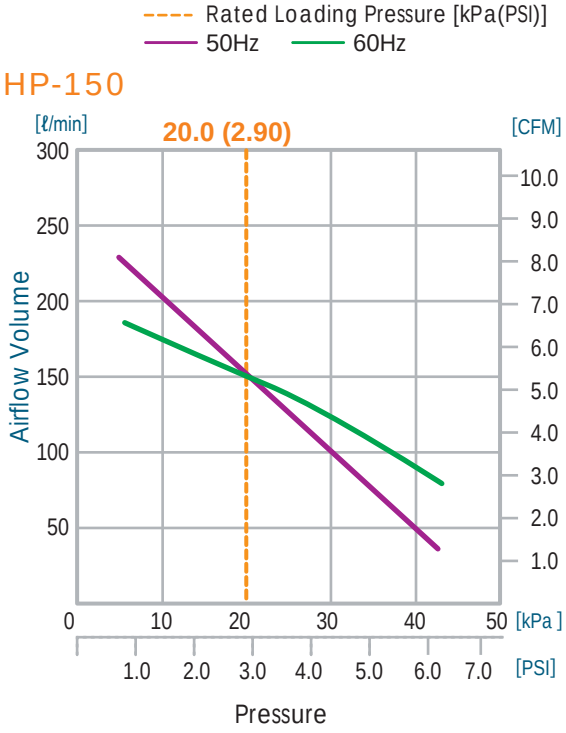
PRESSURE TYPE

Dimensions

[Unit: mm(inch)]

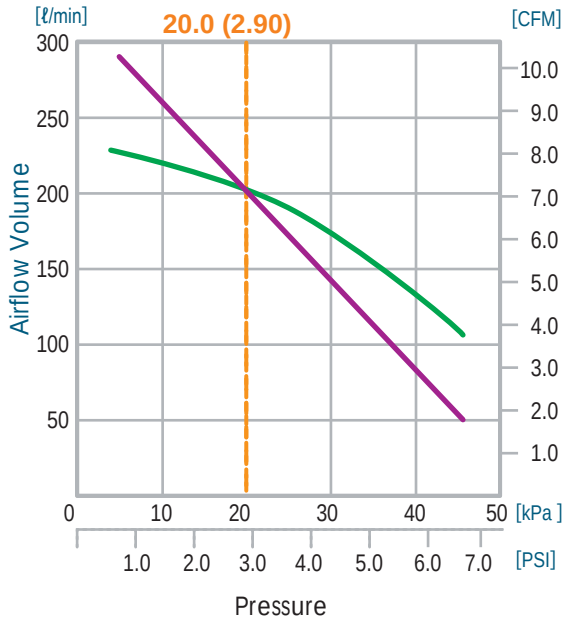


Performance Curves



Specifications

		HP-150		HP-200	
Rated Voltage	V	AC100 / 110-120 / 220-240			
Power Supply Frequency	Hz	50	60	50	60
Rated Loading Pressure	kPa	20.0			
Airflow Volume	ℓ/min	150		200	
Power Consumption	W	125	155	210	250
Noise Level	dBA	45	47	46	48
Weight	kg	9.0			



HIBLOW USA
www.hiblow-usa.com
1300 Tefft Court, Suite 8 Saline, Michigan 48176
P: 734-429-5618 F: 734-944-5163

PL-525 Effluent Filter

Description

Polylok, Inc is pleased to add its new commercial filter to its existing line of quality effluent filters. The PL-525 is rated for over 10,000 GPD (Gallons Per Day) making it one of the largest commercial filters in its class. It has 525 linear feet of 1/16" filtration slots. Like the Polylok PL-122, the new Polylok PL-525 has an automatic shut off ball installed with every filter. When the filter is removed for cleaning, the ball will float up and temporarily shut off the system so the effluent won't leave the tank. No other filter on the market can make that claim!

Ordering Information Request a Quote Related Products

Features

- Rated for 10,000 GPD (Gallons Per Day)
- 525 linear feet of 1/16" filtration
- Accepts 4" and 6" SCHD. 40 pipe
- Built in Gas Deflector
- Automatic shut-off ball when filter is removed
- Alarm accessibility
- Accepts PVC extension handle

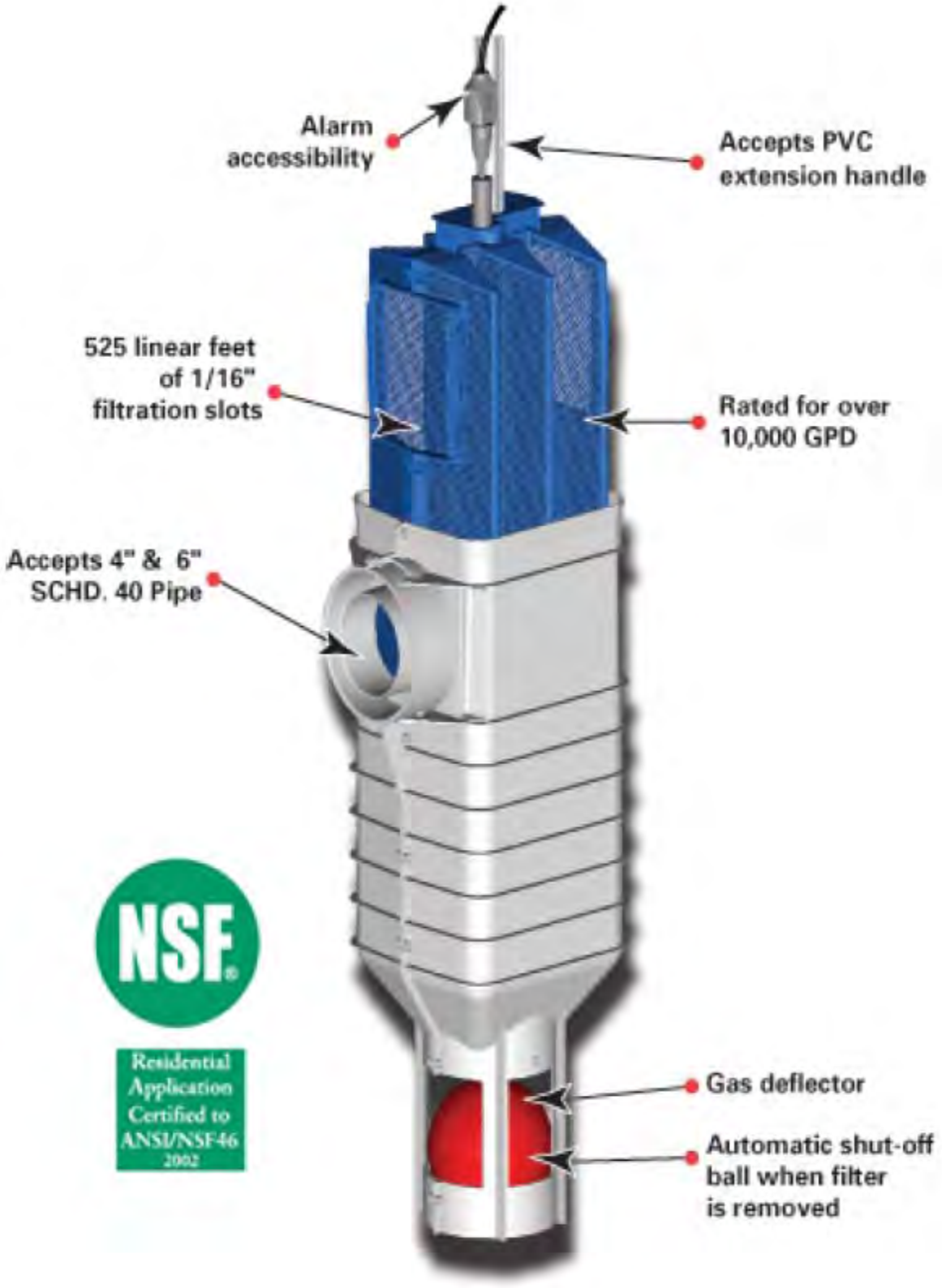
The PL-525 Effluent Filter should operate efficiently for several years under normal conditions before requiring cleaning. It is recommended that the filter be cleaned every time the tank is pumped or at least every three years. If the installed filter contains an optional alarm, the owner will be notified by an alarm when the filter needs servicing. Servicing should be done by a certified septic tank pumper or installer.

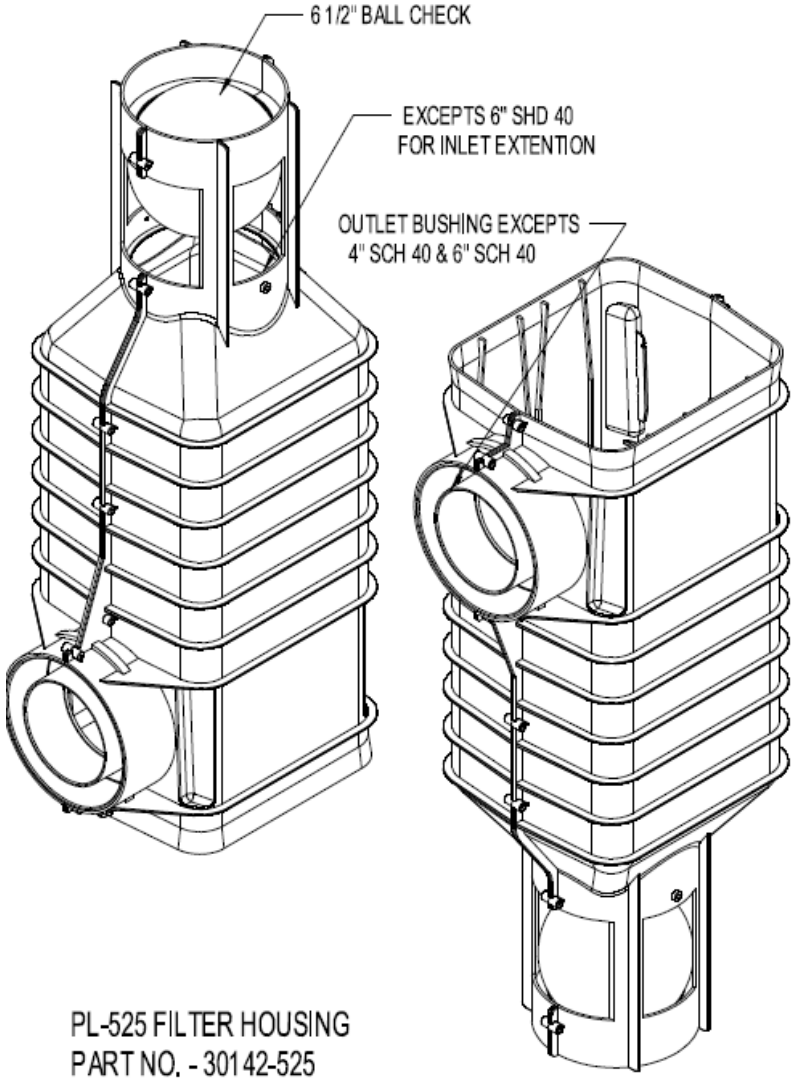
Maintenance Instructions:

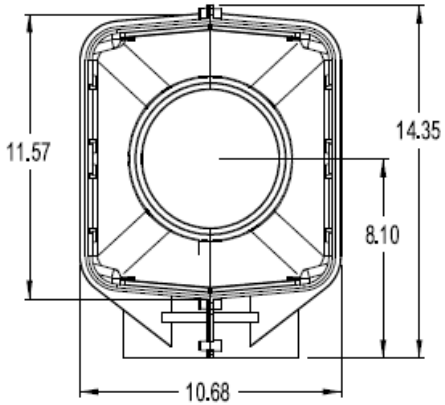
1. Locate the outlet of the septic tank.
2. Remove tank cover and pump tank if necessary.
3. Do not use plumbing when filter is removed.
4. Pull PL-525 out of the housing.
5. Hose off filter over the septic tank. Make sure all solids fall back into septic tank.
6. Insert the filter cartridge back into the housing making sure the filter is properly aligned and completely inserted.
7. Replace septic tank cover. PL-525 Installation: Ideal for residential and commercial waste flows up to 10,000 Gallons Per Day (GPD).

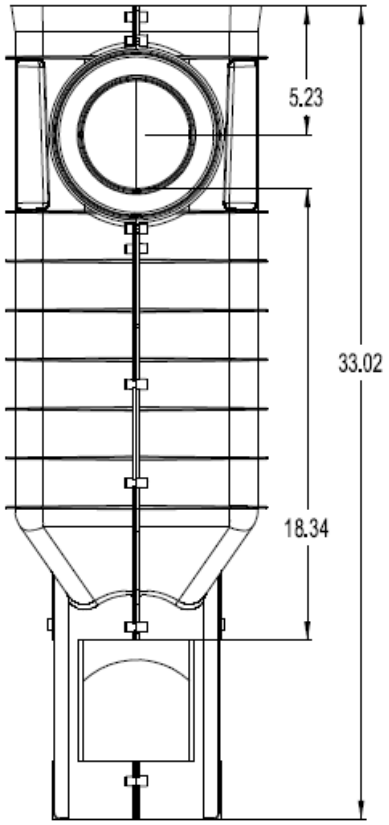
Installation Instructions:

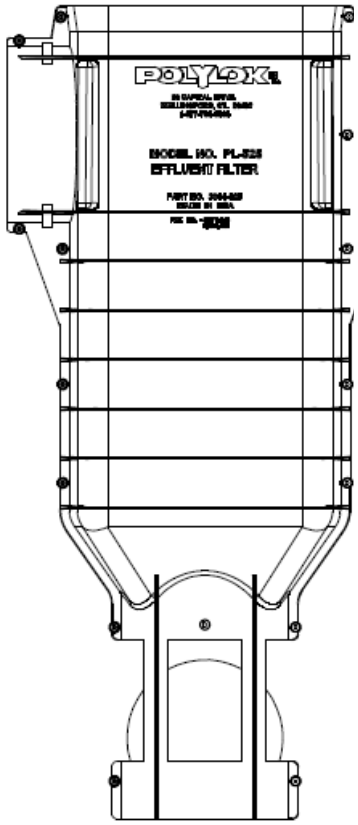
1. Locate the outlet of the septic tank.
2. Remove tank cover and pump tank if necessary.
3. Glue the filter housing to the 4" or 6" outlet pipe. If the filter is not centered under the access opening use a Polylok Extend & Lok™ or piece of pipe to center filter.
4. Insert the PL-525 filter into its housing.
5. Replace the septic tank cover.


Alarm accessibility
Accepts PVC extension handle
525 linear feet of 1/16" filtration slots
Rated for over 10,000 GPD
Accepts 4" & 6" SCHD. 40 Pipe
NSF
Residential Application Certified to ANSI/NSF46 2002
Gas deflector
Automatic shut-off ball when filter is removed









PL-525 FILTER HOUSING
PART NO. - 30142-525
MATERIAL:

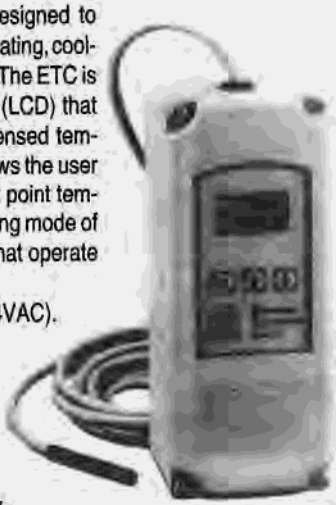
HOUSING - POLYPROPYLENE
OUTLET BUSHING - PVC
6.5 BALL - HDPE

Form No. 7515004-001 Rev. B

ETC TWO STAGE ELECTRONIC TEMPERATURE CONTROL

PRODUCT DESCRIPTION

The Ranco ETC is a microprocessor-based family of electronic temperature controls, designed to provide on/off control for commercial heating, cooling, air conditioning and refrigeration. The ETC is equipped with a liquid crystal display (LCD) that provides a constant readout of the sensed temperature, and a touch keypad that allows the user to easily and accurately select the set point temperature, differential and heating/cooling mode of the operation. Models are available that operate on either line voltage (120/208/240 VAC) or low voltage (24VAC).



APPLICATIONS

With its wide temperature setpoint range and selectable heating or cooling modes, the ETC can be used for a wide variety of applications including multiple compressor control, two stage heating, ventilation control, automatic changeover, condenser fan cycling, space and return air temperature control, water cooled condensers and control with alarm funtion.

FEATURES

- Wide setpoint temperature range (-30°F to 220°F) and differential adjustment (1°F to 30°F).
- Simple keypad programming of setpoint temperature, differential and cooling/heating modes.
- Two individually programmable stages for heating and/or cooling.
- LCD readout of sensor temperature, control settings, relay status and onboard diagnostics.
- Remote temperature sensing up to 400 feet.
- Two SPDT output relays.
- User-selectable Fahrenheit/Celsius scales.
- Lockout switch to prevent tampering by unauthorized personnel.
- Choice of line voltage and low voltage models available.
- Optional 0 to 10 volt analog output available for remote temperature indication.

SPECIFICATIONS

Input Voltage	120 or 208/240 VAC (24 VAC optional), 50/60 Hz
Temperature Range	-30°F to 220°F
Differential Range	1°F to 30°F
Switch Action	SPDT
Sensor	Thermistor, 1.94 in. long x 0.25 in. diameter with 8 ft. cable
Power Consumption	120/208/240 VAC : 100 milliamps 24 VAC : 2-6 VAC

Relay Electrical Ratings

	120V	208/240V
NO Contact		
Full-load amps	9.8 A	4.9 A
Locked rotor amps	58.8 A	29.4 A
Resistive amps	9.8 A	4.9 A
Horsepower	1/2 hp	1/2 hp
NC Contact		
Full-load amps	5.8 A	2.9 A
Locked rotor amps	34.8 A	17.4 A
Resistive amps	5.8 A	2.9 A
Horsepower	1/4 hp	1/4 hp

Pilot Duty: 125 VA at 120/208/240 VAC

Control Ambient Temperature	
Operating	-20°F to 140°F (-29°C to 60°C)
Storage	-40°F to 176°F (-40°C to 80°C)
Ambient Humidity	0 to 95%, RH, Non-condensing
0 to 10 V Output Impedance	1K
Enclosure	NEMA 1, Plastic
Agency Approvals	UL Listed, File E94419, Guide XAPX CSA Certified, File LR68340, Class 4813 02

ETC ORDERING INFORMATION

Code Number	Input Voltage	No. of Stages	0 - 10 V Output
ETC-211000-000	120/240	2	No
ETC-211100-000	120/240	2	Yes
ETC-212000-000	24	2	No
ETC-212100-000	24	2	Yes

OPERATION

Liquid Crystal Display (LCD)

The LCD display provides a constant readout of the sensor temperature and indicates if either of the two output relays is energized. When the **S1** annunciator is constantly illuminated during operation, the Stage 1 relay is energized. Likewise, when the **S2** annunciator is constantly illuminated during operation, the Stage 2 relay is energized. The display is also used in conjunction with the keypad to allow the user to adjust the setpoint temperatures, differentials and heating/cooling modes for each stage.

Control Setup

The temperature setpoint refers to the temperature at which the normally open (NO) contacts of the output relay will open. Determine the loads to be controlled and the operating modes required for each stage, cooling or heating.

- When the cooling mode is chosen, the differential is above the setpoint. The relay will de-energize as the temperature falls to the setpoint.
- When the heating mode is chosen, the differential is below the setpoint. The relay will de-energize as the temperature rises to the setpoint.

The ETC two stage control can be set up for two stages of heating, two stages of cooling or one stage cooling plus one stage heating. Refer to Figures 1, 2 and 3 for a visual representations of different control setups.

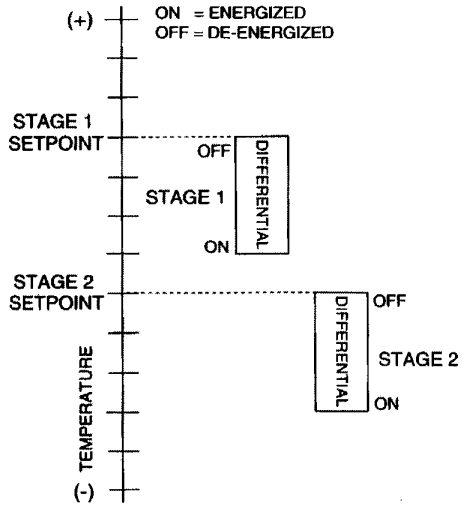


Figure 1: Two Stage Heating Example

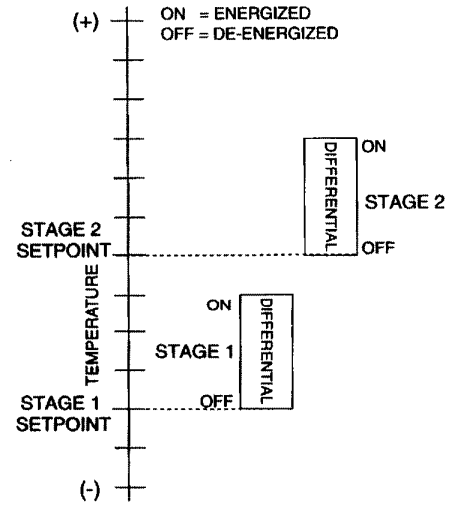


Figure 2: Two Stage Cooling Example

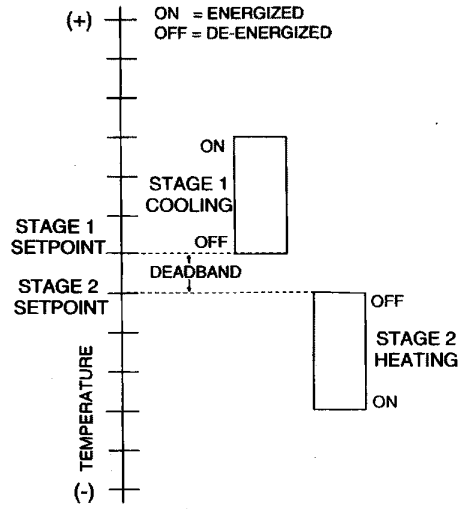


Figure 3: One Stage Cooling and One Stage Heating Example

Programming Steps and Display

The ETC two stage can be programmed in seven simple steps using the LCD display and the three keys on the face of the control.

Step 1- To start programming, press the **SET** key once to access the Fahrenheit/Celsius mode. The display will show the current status, either **F** for degrees Fahrenheit or **C** for degrees Celsius. Then press either the up ⬆ or down ⬇ arrow key to toggle between the **F** or **C** designation.

Stage 1

Step 2- Press the **SET** key again to access the stage 1 setpoint. The LCD will display the current setpoint and the **S1** annunciator will be blinking on and off to indicate that the control is in the setpoint mode. Then press either the up ⬆ key to increase or the down ⬇ key to decrease the setpoint to the desired temperature.

Step 3- Press the **SET** key again to access the stage 1 differential. The LCD will display the current differential and the **DIF 1** annunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either the up ⬆ key to increase or the down ⬇ key to decrease the differential to the desired setting.

Step 4- Press the **SET** key again to access the stage 1 cooling or heating mode. The LCD will display the current mode, either **C1** for cooling or **H1** for heating. Then press either the up ⬆ or down ⬇ key to toggle between the **C1** or **H1** designation.

Stage 2

Step 5- Press the **SET** key again to access the stage 2 setpoint. The LCD will display the current setpoint and the **S2** annunciator will be blinking on and off to indicate that the control is in the setpoint mode. Then press either the up ⬆ key to increase or the down ⬇ key to decrease the setpoint to the desired temperature.

Step 6- Press the **SET** key again to access the stage 2 differential. The LCD will display the current differential and the **DIF 2** annunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either the up ⬆ key to increase or the down ⬇ key to decrease the differential to the desired setting.

Step 7- Press the **SET** key again to access the stage 2 cooling or heating mode. The LCD will display the current mode, either **C2** for cooling or **H2** for heating. Then press either the up ⬆ or down ⬇ key to toggle between the **C2** or **H2** designation. Press the **SET** key once more and programming is complete.

Refer to Page 3 for an illustrated guide to programming the ETC.

NOTE: The ETC will automatically end programming if no keys are depressed for a period of thirty seconds. Any settings that have been input to the control will be accepted at that point.

All control settings are retained in non-volatile memory if power to ETC is interrupted for any reason. Re-programming is not necessary after power outages or disconnects unless different control settings are required.

Step	Annunciator	Description	Display
1	**F** or **C**	Fahrenheit or Celsius Scale	F
2	**S1** (blinking)	Stage 1 Setpoint Temperature	S1 70
3	**DIF 1** (blinking)	Stage 1 Differential Temperature	DIF 5
4	**C1/H1**	Stage 1 Cooling or Heating Mode	C1
5	**S2** (blinking)	Stage 2 Setpoint Temperature	S2 65
6	**DIF 2** (blinking)	Stage 2 Differential Temperature	DIF2 10
7	**C2/H2**	Stage 2 Cooling or Heating Mode	C2

TROUBLESHOOTING ERROR MESSAGES

Display Messages

E1- Appears when either the up ⬆ or down ⬇ key is pressed when not in the programming mode.
To correct: If the **E1** message appears even when no keys are being pressed, replace the control.

E2- Appears if the control settings are not properly stored in memory.
To correct: Check all settings and correct if necessary.

EP- Appears when the probe is open, shorted or sensing a temperature that is out of range.
To correct: Check to see if the sensed temperature is out of range. If not, check for probe damage by comparing it to a known ambient temperature between -30°F and 220°F. Replace the probe if necessary.

EE- Appears if the EEPROM data has been corrupted.
To correct: This condition cannot be field repaired. Replace the control.

CL- Appears if calibration mode has been entered.
To correct: Remove power to the control for at least five seconds. Reapply power. If the **CL** message still appears, replace the control.

Lockout Switch

The ETC is provided with a lockout switch to prevent tampering by unauthorized personnel. When placed in the **LOCK** position, the keypad is disabled and no changes to the settings can be made. When placed in the **UNLOCK** position, the keypad will function normally.

To access the lockout switch, disconnect the power supply and open the control. The switch is located on the inside cover about 2 inches above the bottom. (see Figure 4). To disable the keypad, slide the switch to the left **LOCK** position. To enable the keypad, slide the switch to the right **UNLOCK** position. All ETC controls are shipped with this switch in the **UNLOCK** position.

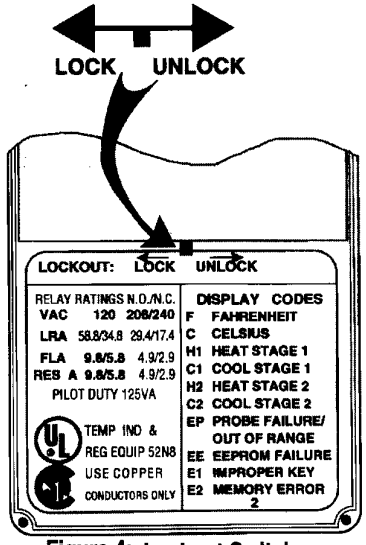


Figure 4: Lockout Switch

INSTALLATION INSTRUCTIONS

IMPORTANT

1. All ETC series controls are designed as operating controls only. If an operating control failure could result in personal injury or loss of property, a separate safety control and/or alarm should be installed.

2. The schematic drawings and other information included in these installation instructions are for the purpose of illustration and general reference only.

3. These instructions do not expand, reduce, modify or alter the Ranco Terms in any way; and no warranty or remedy in favor of the customer or any other person arises out of these instructions.

4. Ranco ETC controls have been approved by Underwriters' Laboratories as UL Listed; however, approval does not extend to their use for any other purpose. Ranco assumes no responsibility for any unconventional application of its control unless such application has been approved in writing by Ranco.

5. It is the responsibility of the installer and the user to assure that his or its application and use of all Ranco products are in compliance with all federal, state and local requirements, including, without any limitation, all requirements imposed under the National Electric Code and any applicable building codes.

CAUTION

To prevent possible electrical shock or equipment damage, disconnect electrical power to the unit before and during installation. **DO NOT** restore electrical power to unit until the control is properly installed and the cover is assembled. **DO NOT** locate the control in an explosive atmosphere as a safety hazard can result due to possible spark generation in the control. Controls are not to be located in areas of significant moisture, dirt or dust, or in a corrosive explosive atmosphere. Use of control in such environments may result in injury or damage to the persons or property (or both) and are likely to shorten the control life;
Ranco assumes no responsibility for any such use.

CONTROL MOUNTING

Mount the ETC to a wall or any flat surface using a combination of any two or more of the slotted holes located on the back of the control case. The control's components are not position sensitive, but should be mounted so that they can be easily wired and adjusted. Avoid excessive conditions of moisture, dirt, dust and corrosive atmosphere.

The ETC has provisions for 1/2 inch conduit connections. The conduit hub should be secured to the conduit before securing the hub to the plastic housing of the control. When using the conduit entry in the rear of the case, a standard plug should be inserted into the conduit hole in the bottom. Caution should be exercised not to damage the control circuit board or wiring when installing a conduit connector.

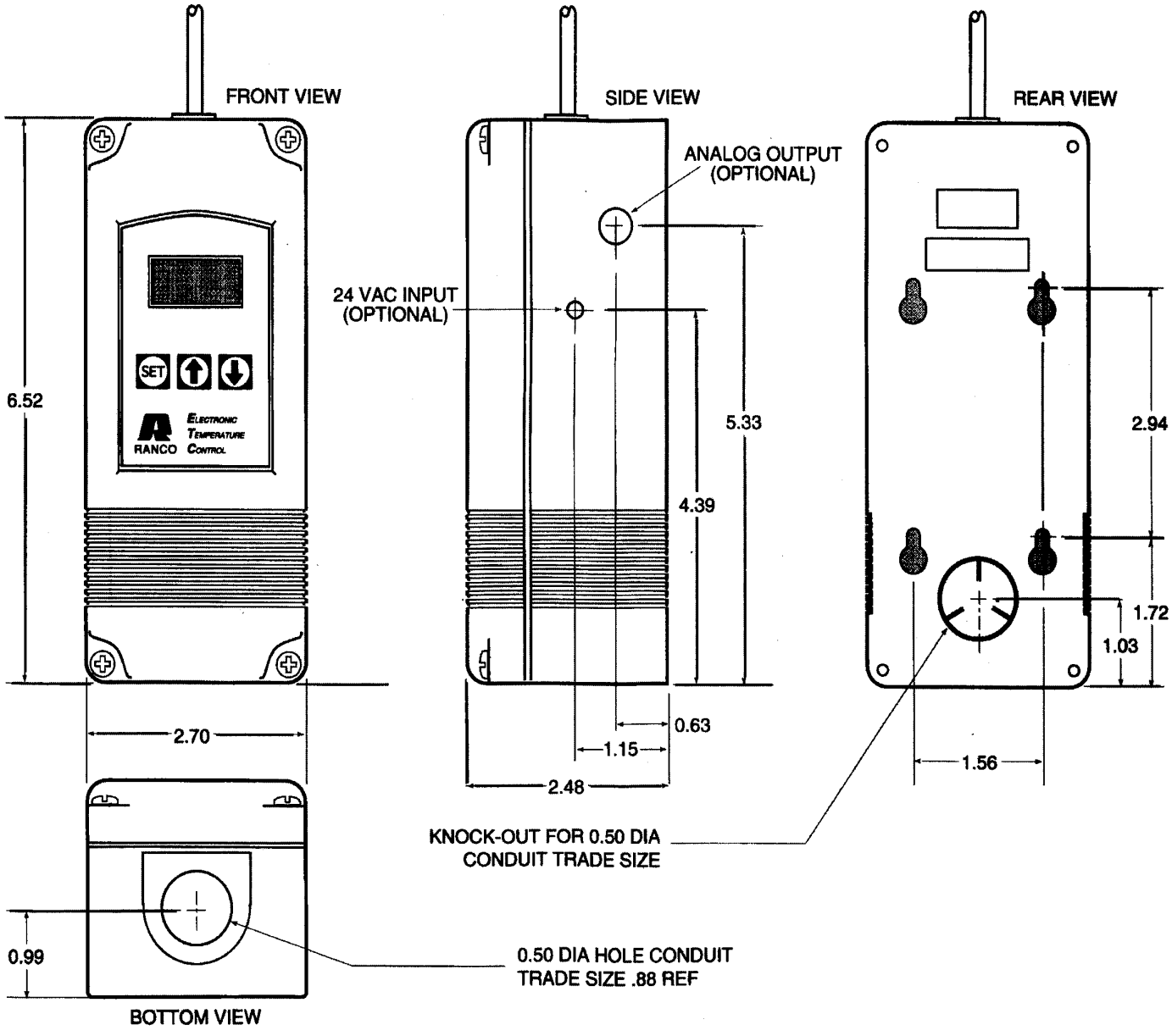


Figure 5: Dimensions (Inches)

CONTROL WIRING

General

- All wiring should conform to the National Electric Code and local regulations.
- The total electrical load must not exceed the maximum rating of the control (see Specifications).
- Use copper conductors only.
- Electrical leads should not be taut; allow slack for temperature change and vibration.

Input and Output Wiring

For typical wiring diagrams, refer to Figures 6 and 7.
All connections are made to the power (lower) circuit board. When using the 24 VAC powered models, the 24 VAC input lines must enter through the sidewall of the case. Refer to Figure 5 for location of the entry hole.

Analog Output

ETC models are available with an optional 0 to 10 volt analog output. This signal is a linear representation of the sensor temperature with 0 volts = -30°F and 10 volts = 220°F. See figure 8 for wiring information and Figure 5 for location of the entry hole. The reference for this output is designated by the "-" symbol on the wiring diagram. The output signal is designated by the "+" symbol.

Sensor Wiring

The temperature sensor leads are soldered to the circuit board so no additional connections are necessary. However, splicing is required when extending the sensor cable length beyond the standard 8 foot length supplied with the ETC. The sensor cable can be extended up to 400 feet.

A damaged sensor can be replaced by splicing a new Ranco sensor onto the sensor leads from the circuit board. The sensor is not polarity sensitive.

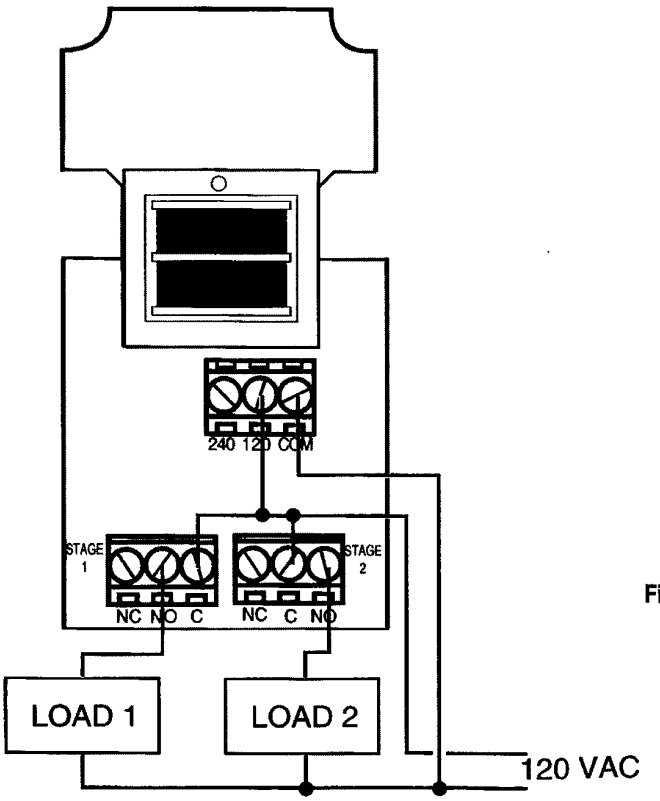


Figure 6: Typical Line Voltage Wiring Diagram.

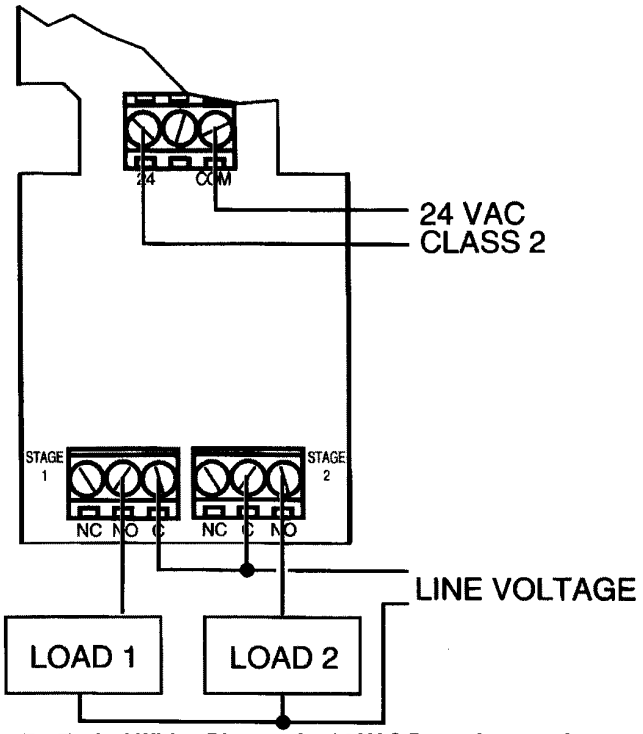


Figure 7: Typical Wiring Diagram for 24 VAC Power Input and Line Voltage Switching.

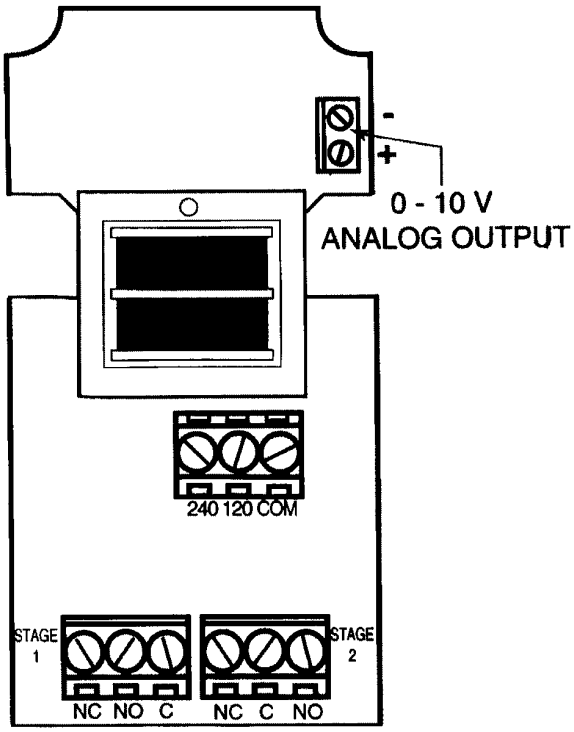


Figure 8: 0-10 V Analog Output Located on Power (Lower) Circuit Board.

FIELD REPAIRS

Field calibrating or repairs to the ETC control must not be attempted. Sensors and replacement controls are available through Ranco wholesalers

SENSOR MOUNTING

For space sensing, mount the sensor where it will be unaffected by heat/cool discharge or radiated heat sources. Spot sensing requires the sensor to be in good contact with the surface being sensed. The sensor can be inserted in a bulb well for immersion sensing.

EXTENDING SENSOR

CAUTION: Sensor wiring splices may be made external from the control. **DO NOT** attempt tyo unsolder the sensor at the control circuit board!

CAUTION: Disconnect power to control before wiring to avoid possible electrical shock or damage to the controller.

Additional cable can be spliced to the sensor cable to increase the length beyond the standard 8 feet. It can be extended up to 400 feet. The cable should be at least 22 AWG or larger to keep additional resistance to a minimum.

All splices and wire lengths added to the sensor cable should be made according to acceptable wiring practices and should conform to the National Electrical Code and local regulations. Use copper conductors only. Shielded cable is not required.

Checkout Procedure

1. Before applying power, make sure installation and wiring connections are correct.
2. Apply power to the control and observe one or more cycles of operation.
3. If performance indicates a problem, check sensor resistance to determine if sensor or control is at fault.
4. To check sensor resistance, disconnect sensor and measure the resistance across the leads while measuring temperature at the sensor.

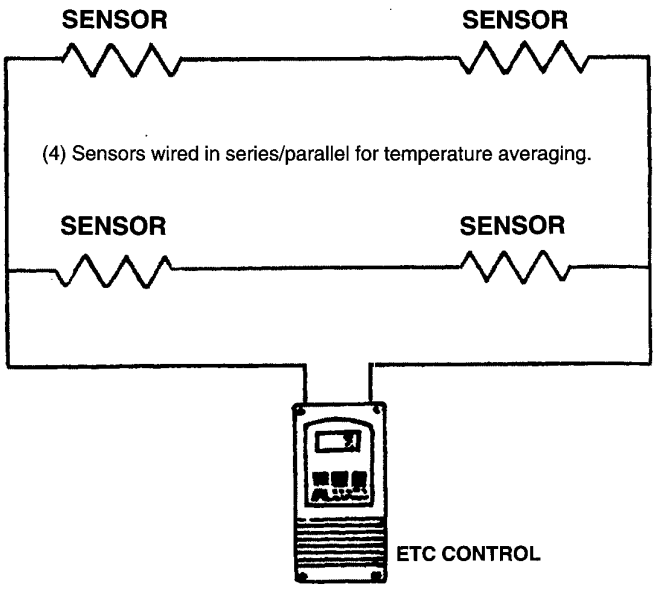


Figure 9

Replacement Sensor - Order Part No. 1309007-044

SPECIFICATIONS

The 1309007-044 sensor is a negative temperature coefficient (NTC) thermistor sensor. The sensor resistance decreases with temperature increase. It is .25 x 1.94 long with 8 feet #22 AWG cable. The termistor has a reference resistance of 30,000 ohms at 77°F (25°C).

IMPORTANT

The schematic drawings and other information included in these instructions are for the purpose of illustration and general reference only. Ranco assumes no responsiblity for any unconventional application of this control, unless such application has been approved in writing by Ranco.

Deg. C.	Deg. F.	RES. Nom.
-40	-40	1,010,000
-30	-22	531,000
-20	-4	291,200
-10	14	166,000
0	32	97,960
10	50	59,700
20	68	37,470
25	77	30,000
30	86	24,170
40	104	15,980
50	122	10,810
60	140	7,464
70	158	5,200
80	176	3,774
90	194	2,753
100	212	2,036
110	230	1,531

Figure 10:
Resistance vs Temperature of 1309007-044. Sensor including 8 foot cable.

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Invensys
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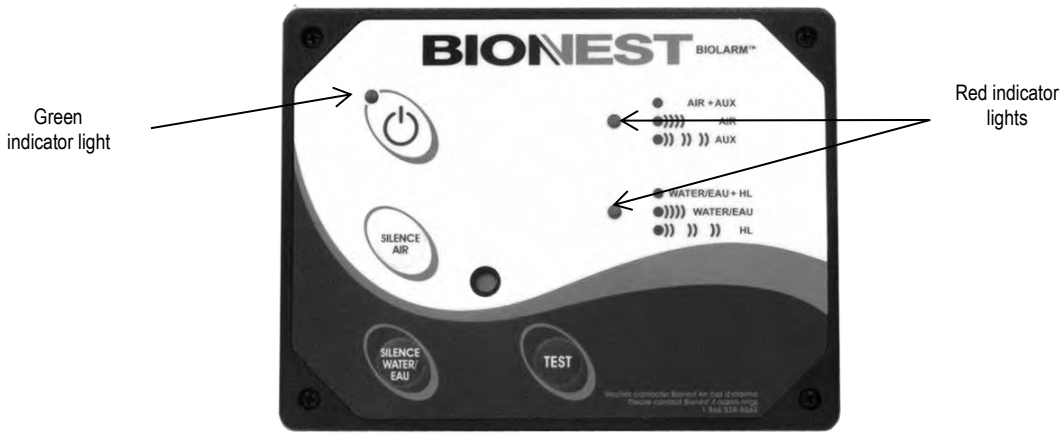
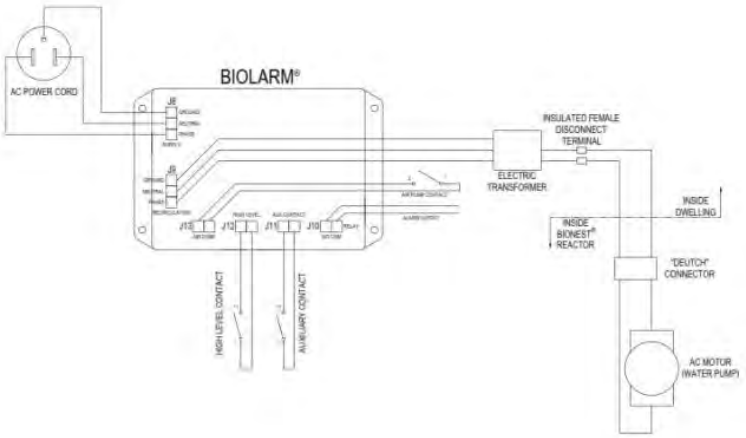
Biolarm®

The BIOLARM® control system detects any malfunction of the BIONEST® system's electrical components, such as the recirculation or air pump. It also signals any abnormality related to a high water level detected by the BIO-UV™, the BIO-PUMP™ or by an effluent filter high level float, where applicable.

This system connects into a 120 V outlet and beeps in case of a malfunction. A green indicator light signals the BIOLARM® is functioning while two (2) red lights indicate the reason for the alarm.

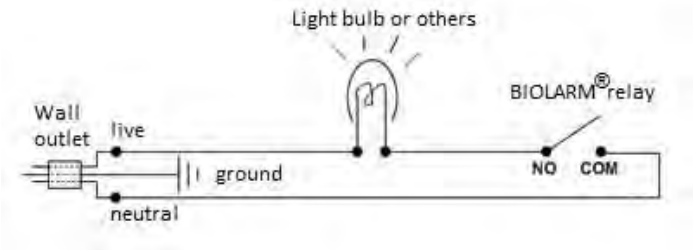


BIOLARM® electrical diagram



The BIOLARM® is equipped with a "relay" type terminal for connecting another alarm unit such as a residential alarm system, a light bulb, an emergency light, etc.

BIOLARM® relay terminal diagram



SK CEILING FAN HEATER

AIR CURTAIN

The SK ceiling fan heater is perfect for both residential and commercial buildings. Ideal for bathrooms, the SK not only efficiently heats the room but controls moisture build-up at the same time. Say goodbye to fogged up windows and mirrors! This heater's grill has rounded corners and no screws. It blends in harmoniously with the ceiling, freeing up wall space. Whether it is installed near your home's entrance, shower or bay window, it is a sensational backup heating unit when combined to a central system. By adding a wall timer, you can use it on demand. The SK is also a unit of choice in commercial spaces; it remains aesthetic as it is not exposed to vandalism. In addition, it cannot be damaged by wet mops or water splashes since it is out of reach.

A heat wave *on demand*

- **ELIMINATES MOISTURE EFFICIENTLY WHILE HEATING THE ROOM**
  perfect for bathrooms and rooms without a lot of wall space
- **HEATING FROM THE CEILING**
  increases safety and security
- **WALL TIMER**
  heating on demand (optional)
- **AN EXCELLENT CHOICE FOR DAYCARES**
  not accessible to children

Features

COLORS:
- standard: white, almond
- optional: black, light charcoal, silver, clear anodized, nickel, champagne, light bronze, dark brown (10% surcharge)

FINISH:
epoxy-polyester powdercoat

MANUFACTURING:
- 1/4 in. deep front grill
- easy access for maintenance purposes (no screws)

THERMAL PROTECTION:
thermal protection with automatic reset

WATTAGE & VOLTAGE:
see the selection table

ELEMENT:
nichrome element producing instant heat

CONTROL:
- built-in thermostat (optional)
- wall thermostat (not included)
- 60-minute timer (optional)

INSTALLATION:
- ceiling mounting (recommanded height of 8 ft, maximum of 9 ft)
- surface-mounted with surface adapter (optional)
- recessed or surface-mounted with adapter for suspended ceiling (optional)
- unit can be mounted parallel or perpendicular to ceiling beams
- approved to be recessed in mineral wool. Any other material that comes in contact with the unit can withstand heat

WARRANTY:
10 years for the element and 1 year for other components

Accessories

CODE	DESCRIPTION	PRICE
SKT1*	tamper-proof built-in thermostat (grill must be removed to access this type of thermostat)	50.25
SKTBA*	adapter for suspended ceiling (2 x 2 feet) (recessed or surface-mounted)	70.00
SKSA*	surface adapter (SK model)	58.00
SKSAII*	surface adapter (SKII model)	69.00
FD60MCW70	60-minute wall timer	44.00

Prices indicated in this catalogue are valid 90 days starting from July 1st, 2013. For all the updated prices, please refer to the Web site.
* add **W** for white or **A** for almond
* factory installed

TECHNICAL DRAWINGS: PAGE 126

Selection table

WITHOUT CONTROL	24 V CONTROL	POWER	VOLTAGE	PHASE	FLOW	WEIGHT		PRICE
code	code	watts	volts	nb.	cfm	kg	lb	
SK0501	---	500	120	1	60	5	11	198.00
SK0508	---	500	208	1	60	5	11	198.00
SK0502	---	500/375	240/208	1	60	5	11	198.00
SKII0507	---	500	277	1	60	5	11	323.00
SK0751	---	750	120	1	60	5	11	198.00
SK0758	---	750	208	1	60	5	11	198.00
SK0752	---	750/560	240/208	1	60	5	11	198.00
SKII0757	---	750	277	1	60	5	11	323.00
SK1001	---	1000	120	1	60	5	11	210.00
SK1008	---	1000	208	1	60	5	11	210.00
SK1002	---	1000/750	240/208	1	60	5	11	210.00
SKII1007	---	1000	277	1	60	5	11	335.00
---	**SKII1003C24**	1000	347	1	60	5	11	335.00
SK1251	---	1250	120	1	60	5	11	210.00
SK1258	---	1250	208	1	60	5	11	210.00
SK1252	---	1250/940	240/208	1	60	5	11	210.00
SKII1257	---	1250	277	1	60	5	11	335.00
---	**SKII1253C24**	1250	347	1	60	5	11	335.00
SK1501	---	1500	120	1	60	5	11	231.00
SK1508	---	1500	208	1	60	5	11	231.00
SK1502	---	1500/1125	240/208	1	60	5	11	231.00
SKII1507	---	1500	277	1	60	5	11	356.00
---	**SKII1503C24**	1500	347	1	60	5	11	356.00
---	---	2000	120	1	90	5	11	---
---	---	2000	208	1	90	5	11	---
SK2002	---	2000/1500	240/208	1	90	5	11	263.00
SKII2007	---	2000	277	1	90	5	11	388.00
---	**SKII2003C24**	2000	347	1	90	5	11	388.00

Prices indicated in this catalogue are valid 90 days starting from July 1st, 2013. For all the updated prices, please refer to the Web site.
add **W** for white or **A** for almond
--- not available

TROJANUVMAX™ Specification Sheet

TROJANUVMAX™ MODEL:	A	B	C	D	E	F
FLOW RATES*	<1-3 GPM	2-5 GPM	5-14 GPM	5-14 GPM	8-28 GPM	13-47 GPM
	<4-11 LPM	7-19 LPM	19-53 LPM	19-53 LPM	30-106 LPM	49-178 LPM
ELECTRICAL						
	120V/60Hz	90-140V	90-140V	90-265V	90-265V	90-265V
	230V/50Hz	190-265V	190-265V			
		50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
	25 W	27 W	43 W	43 W	67 W	102 W
DIMENSIONS						
Chamber Assembly	15.5" x 2.5"	13.5" x 3.5"	19.5" x 3.5"	19.5" x 3.5"	29" x 3.5"	43.5" x 3.5"
	39 x 6.5cm	34 x 9cm	49.5 x 9cm	49.5 x 9cm	73.5 x 9cm	110 x 9cm
Lamp/Sleeve Length	12"	9.75"	16"	16"	25.5"	39.75"
	30cm	25cm	40.5cm	40.5cm	65cm	100.5cm
Control Module	2.8" x 3.3" x 2.3"	6" x 4" x 2.5"	6" x 4" x 2.5"	9.75" x 6" x 2.5"	9.75" x 6" x 2.5"	9.75" x 6" x 2.5"
	7 x 8 x 6cm	15 x 10 x 6cm	15 x 10 x 6cm	25 x 15 x 6cm	25 x 15 x 6cm	25 x 15 x 6cm
Max. Operating Pressure	125psi	125psi	125psi	125psi	125psi	125psi
Audible/Visual Lamp Failure Alarm	✓	✓	✓	✓	✓	✓
Alarm Reset	-	-	-	✓	✓	✓
Elapsed Time Meter	-	-	-	✓	✓	✓
Dry Contact**	-	-	-	✓	✓	✓
Lamp Replacement Reminder	-	-	-	✓	✓	✓
UV Intensity Monitor	-	-	-	D Plus	E Plus	F Plus
Water Chamber Material	304 SS	304 SS	304 SS	304 SS	316 SS	316 SS
Electropolished Exterior	-	-	-	✓	✓	✓
Inlet/Outlet	3/8" FNPT	3/4" NPT	3/4" NPT	3/4" NPT	1" NPT	1" NPT

**** See sizing charts for details. Flow rates shown are at 85% UVT.***

***** Remote options cord needed for solenoid valve or remote alarm connection***

Trojan Technologies Inc.

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