

# Installation, Operation & Maintenance Manual

## Heat Recovery Units from 1.5 to 5 Tons



**NOTE:** Installation of this Heat Recovery Unit (HRU) should be done by licensed professionals and in accordance with state and local standards and codes.

The manufacturer accepts no responsibility for failure to follow the applicable standards and codes.

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#### Operation and Maintenance Guide

#### Warranty Information

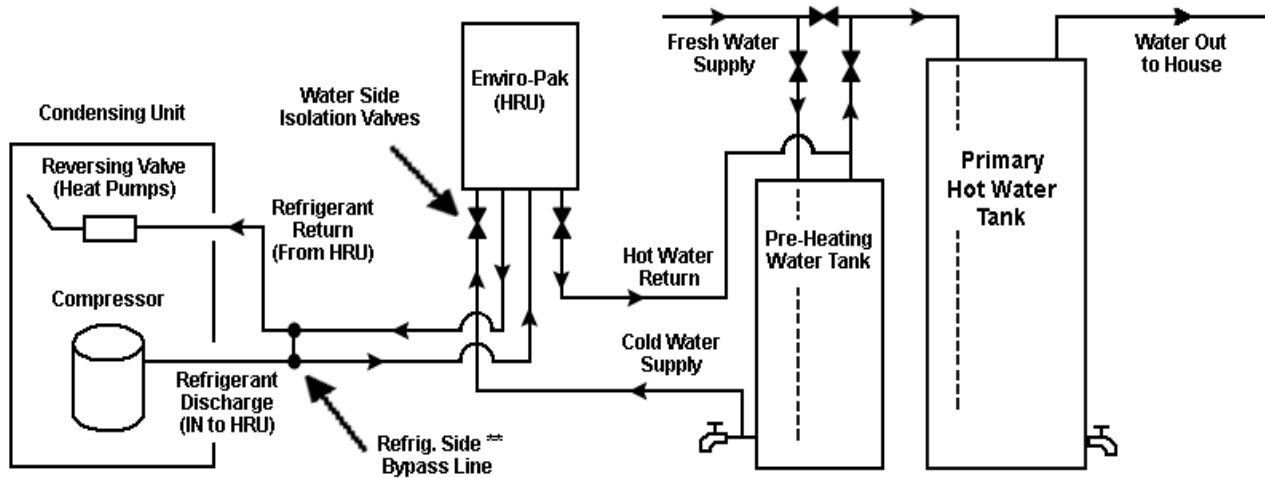
#### Replacement Parts Diagram

#### Replacement Parts List

# Enviro-Pak Heat Recovery Unit

## Installation Instructions

### RECOMMENDED SYSTEM SETUP FOR HEAT PUMP OR CONDENSING UNITS \*



**NOTE: All refrigerant and water lines should be individually insulated.**

\* Some local codes may require water drain valves and/or thermal expansion tanks (not shown here).

\*\* Bypass optional. Refrigerant isolation valves should be installed at a minimum.

### Caution

These Heat Recovery Units are designed to be used with air conditioning, refrigeration or heat pump systems using refrigerants 22, 134a or 410a only. The unit can be used on systems of 1.5 through 5 nominal cooling tons (12,000 BTU/h = 1 Ton) or horsepower with a discharge line no larger than 5/8" O.D.

Before beginning installation, be certain the air conditioning/refrigeration system and plumbing components are in proper working order. This Heat Recovery Unit is not meant to correct system problems and will not function properly when installed on malfunctioning systems.

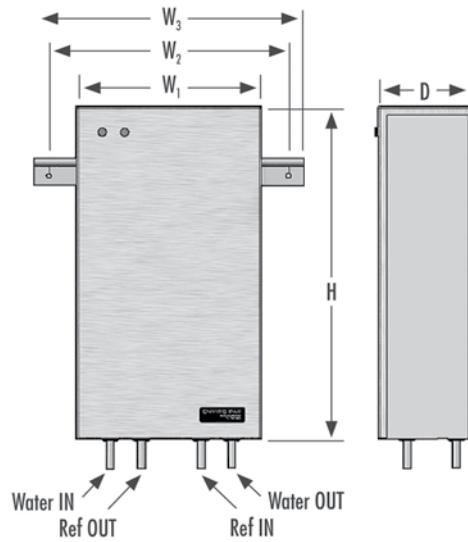
Installation of this Heat Recovery Unit **MUST** be done by a licensed A/C Refrigeration contractor and should be installed in compliance with all mandatory state and local codes. The manufacturer assumes no responsibility for code compliance.

### Locating and Setting the Enviro-Pak

- The unit may be installed in any conditioned area where the unit is not subject to freezing temperatures. The unit is designed to operate in the vertical position using the wall bracket provided.
- Ensure a clearance area of 24" around the unit should the unit require servicing.
- Before installing the unit, be sure all plumbing and refrigeration connections conform to requirements having jurisdiction.
- All electrical wiring must be in accordance with requirements of authority having jurisdiction or with the national electric code NFPA-70 or latest addition and or any state or local code requirements.
- Avoid placing the unit under sleeping areas. When installing the unit in an alcove or closet, acoustical considerations must be used to deaden possible operating sound.

## Dimensions

Enviro Pak Dimensions



### Cabinet Dimensions

W <sub>1</sub>	- 12.125"
W <sub>2</sub>	- 16.000"
W <sub>3</sub>	- 18.000"
D	- 6.250"
H	- 22.100"

### Line Connections

Water IN	} 1/2" Nominal (0.625" OD Actual)
Water OUT	
Ref IN	
Ref OUT	

## Installation

For optimal performance, the use of a pre-heating tank is recommended.

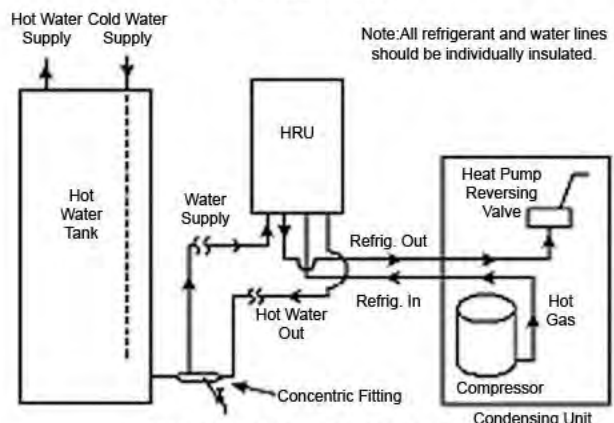
By use of the recommended setup (see above diagram) the HRU always works at the best possible thermal differential which maximizes the reduction in workload on the primary water heater. The HRU should be located as near as possible to the condensing unit and with the ports pointing down. The HRU should be located higher than the condenser (if possible) for proper

drainage in the off-cycle. Always mount high enough to prevent flooding in high precipitation areas. If the HRU must be mounted some distance from the compressor due to climatic or space constraints, consult a refrigerant line sizing chart. If due to certain constraints a preheating tank cannot be used, an alternate installation diagram has been provided (see diagram below). This type of installation requires a Concentric Fitting (Part: A-2648).

## Refrigerant Side Configuration

1. Be certain that all electrical power has been disconnected before attempting any work on the air conditioning or refrigeration system.
2. Remove refrigerant according to equipment manufacturer's instructions. Refrigerant storage or disposal must comply with all federal, state and local regulations.
3. Cut the hot gas (discharge) line between the compressor and condenser. On heat pumps, cut the line between the compressor and the reversing valve. Run properly-sized refrigerant tubing from the compressor to the port marked "Ref IN" on the Heat Recovery Unit.

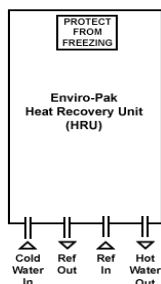
### ALTERNATE SETUP FOR SYSTEMS WITH NO PRE-HEAT TANK\*



#### HOOK-UP FOR HEAT PUMP OR CONDENSING UNIT

\* This configuration will require the use of a Concentric Fitting as some water heaters have a backflow preventer in the supply line. Incorrect installation of the Enviro-Pak could result in system damages. Local codes may require water drain valves and / or thermal expansion tanks (not shown here).

### Enviro-Pak Connection Configuration



4. Use grommets wherever refrigerant lines pass through a cabinet to prevent chafing and to maintain weather tight integrity. Be certain new refrigerant piping does not interfere with wiring or controls.
5. Test all joints for leaks. Repair any leaks found.

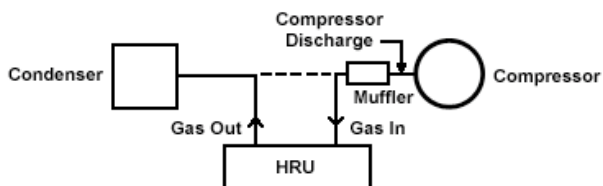
### Water Side Configuration

The standard water pump is suitable for water lines up to 50' in length each way (100' total water piping) and up to 2 stories or down pumping. For greater distances (up to 100' each way or 4 stories) please request unit with the alternate high head pump. Consult factory for distances or heights greater than these limits.

1. Turn off electrical or gas supply to water heater.
2. Turn off water supply and drain water heater or storage tank. Manufacturer recommends thorough flushing of water heater or storage tank.
3. Install a tee between the tank and drain spigot on the pre-heating water tank and then install a water line from the tee to the HRU. The return line from the HRU should go to the pre-heating water tank's water outlet side, connected by a tee. (See water piping diagram, on page 2). These lines must be insulated separately for proper performance. Manufacturer recommends 1/2" nominal copper tubing for water lines. (1/2" nominal = 5/8" Actual O.D.).

6. Evacuate and recharge system according to equipment manufacturer's instructions.
7. Insulate refrigerant lines.

**NOTE:** Good refrigeration practices must always be followed. Manufacturer recommends installation or replacement of liquid line filter-drier any time refrigeration system has been opened. Manufacturer recommends installation of muffler in discharge line between compressor and heat recovery unit.



4. The manner in which the water lines are installed must comply with local codes.
5. Manufacturer recommends installation of isolation valves on both of these water lines for service access. Please note the isolation valve locations depicted in the "Water Piping Diagram". A pressure-relief valve on either of the water lines between the valves and the heat recovery unit is also recommended.
6. Turn on water supply to water heater. Check for leaks.

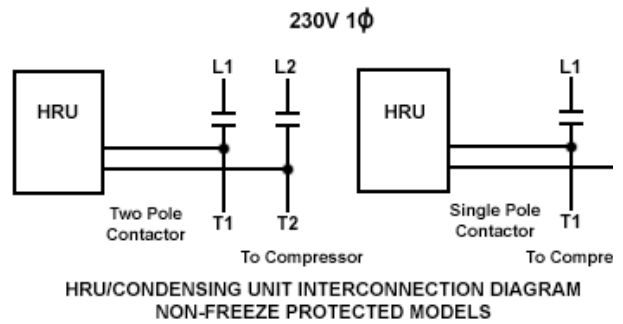
**NOTE:** All water lines must be installed by a licensed plumbing contractor and mounted in accordance with proper plumbing practices and must comply with all state and local plumbing codes and standards. The manufacturer assumes no responsibility for code compliance.

**NOTE:** For maximum benefit, turn the primary water heater aquastat(s) down to approximately 110°F or warm.

## Electrical Hook-Up

Electrical supply must conform to local codes. Refer to pump electrical data plate for electrical requirements. Manufacturer recommends 15A, 230V separate service for standard models having the standard or high head water pump. Number 14 wire with a ground, (in weather-proof conduit for exterior installation) is adequate. See Locating/Setting the Enviro-Pak on page 2.

**NOTE:** For installations where the freeze-protection circuit is needed, the unit must have a non-interrupted electrical source. Therefore, powering freeze-protected models from the load side of the contractor is not acceptable or recommended.



**NOTE:** Wiring connections must be made to L1 and L2 for activation of freeze protection circuit.

## Start Up

1. Charge air conditioning or refrigeration system to equipment manufacturer's specifications. **Do not turn on electrical supply until proper installation has been completed.**
2. Installer should follow the pump manufacturer's start-up procedure for purging air from the water lines and pump. Dry running will void the warranty.

**NOTE:** Water-Cooled pumps could be damaged if allowed to operate without water supply to pump.

3. Turn on electrical power to the Heat Recovery Unit.
4. Restore electrical or gas supply to water heater.

Enjoy your FREE HOT WATER!!

### **PROTECT FROM FREEZING!**

MANUFACTURER'S WARRANTIES COVERING MANUFACTURING DEFECTS DO NOT APPLY TO FREEZING DAMAGE. THIS APPLIANCE HAS WATER IN IT AND MUST BE TREATED AS SUCH. FREEZE PROTECTION WILL BE RENDERED INOPERATIVE IN THE EVENT OF A POWER OUTAGE. IN NORTHERN CLIMATES THE UNIT MUST BE INSTALLED IN SPACE THAT IS NOT SUBJECT TO FREEZING TEMPERATURES.

## Enviro-Pak Heat Recovery Unit Trouble-Shooting Guide

Symptom	Check	Should Be	Remedy
<b>Pump is not operating</b>  Perform steps sequentially.  Water temp should be less than 155°F.  Refrigerant temp should be more than 125°F.	(1) Voltage A-X	220-240 VAC	Locate and correct supply voltage
	(2) Voltage B-X	220-240 VAC	Replace fuse
	(3) Voltage C-X	220-240 VAC	Replace water-line thermostat
	(4) Voltage D-X	220-240 VAC	Replace gas-line thermostat
	(5) Voltage D-E	220-240 VAC	Replace pump
	(6) Voltage E-X	0 VAC	Replace Fuse
<b>Pump operates but no water circulates</b>	Obstruction in water line	Free of obstructions	De-scale or clean as necessary
	Air trapped in water line or pump	No air in water side of system	Bleed off all air from water system
<b>Pump runs, water circulates, poor or no heat transfer</b>	Scale build-up in heat exchanger	Free of scale	De-scale heat exchanger
<b>Pump Short Cycles</b>	Refrigerant Charge	Check Specifications	Correct Charge as Necessary
	Gas Line Thermostat	Close on rise, 125° F	Replace Gas Line Thermostat
	Water Line Thermostat	Open on rise, 155° F	Replace Water Line Thermostat

# Trouble-Shooting Guide

## Electrical Connections Diagram



# Enviro-Pak Heat Recovery Unit Operation and Maintenance Guide

## Operation

Once properly installed, operation of the Enviro-Pak Heat Recovery Unit is totally automatic and requires no attention.

### *Sequence of Operations (Informational use only)*

**Standard Options:** Whenever the refrigeration system is operating, hot discharge gas is passing through the Enviro-Pak's heat exchanger. When the gas reaches 125°F the "Refrigerant Gas Thermostat" will make contact and start the pump in the Enviro-Pak, pulling cool water from the "Pre-heating water tank". The HRU starts heating the water until the compressor stops or the temperature of the water cycling through the HRU reaches the 155°F preset of the "Water Thermostat", or if your model has an adjustable water aqua-stat which you can set between 120° to 160°F. The Enviro-Pak Heat Recovery Unit removes approximately 33% of the available heat from the hot discharge gas by use of a surface enhanced twisted tube inside the heat exchanger coil. When the aqua-stat is satisfied, it will shut off the pump and no heat is transferred; therefore, the hot gas is passed back to the condenser at the same temperature until more free heat is needed to heat water.

The Turbotec Enviro-Pak Heat Recovery Unit also comes equipped with a freeze protection circuit for those areas where the potential for freezing temperatures may occur. The control will activate the pump if the water temperature falls below 38°F, circulating just enough warm water so as to prevent freeze up and shuts off when the water temp reaches 48°F.

## Maintenance

Occasional cleaning of the water tube within the heat exchanger using a mild scale removing compound such as those found used in water-cooled air conditioning or refrigeration equipment may be necessary.

The cleaning can be accomplished in the following manner:

1. Close off valves on both water lines to the Heat Recovery Unit.
2. Carefully relieve pressure from water lines inside the unit either by depressing the core in the air-lock bleed-off (if equipped) or by means of a drain valve if one was installed.
3. Pump de-scaling fluid through the Heat Recovery Unit until full flow is restored.
4. Flush water passages until all traces of de-scaling fluid are removed.
5. Restore to normal operation.

**NOTE: BE SURE ALL AIR IS PURGED FROM SYSTEM BEFORE STARTING PUMP OR PUMP FAILURE MAY OCCUR!**

**CAUTION:** The Enviro-Pak Heat Recovery Unit contains electrical devices which can cause injury or death if improperly handled. Diagnosis and service of these devices should be performed by qualified service personnel only!

# **TURBOTEC'S 5 YEAR LIMITED WARRANTY FOR ENVIRO-PAK HEAT RECOVERY UNITS**

## **One Year Warranty**

The "Manufacturer" (Turbotec) warrants to the original purchaser that the "Product" (Enviro-Pak Heat Recovery units) will be free from defects in material and workmanship for one year from the date of installation of the product or 18 months from the date of shipment from the factory, whichever ever comes first. If upon examination by the manufacturer the product is shown to have a defect in material or workmanship during the warranty period, the manufacturer will repair or replace, at its option, that product which is shown to be defective.

## **Two Year Warranty**

The manufacturer further warrants to the original purchaser that the Product Heat Exchanger will be free from defects in material and workmanship for 2 years from the date of shipment from the factory. If upon examination by the manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the manufacturer will repair or replace, at its option that Product which is shown to be defective.

## **Five-Year Warranty (for residential applications only)**

The manufacturer further warrants to the original owner at the original installation site that the Product Heat exchanger assembly will be free from defects in material and workmanship for Five (5) years from the date of shipment from the factory. If upon examination by the manufacturer the heat exchanger is shown to have a defect in material or workmanship during the warranty period, the manufacturer will replace the heat exchanger assembly upon payment of a percentage of the Manufacturer's trade price in effect at the time of the claim prorated to the year in which the claim is made, as shown below

## **REPLACEMENT COST SCHEDULE**

Year of Claim	3	4	5
% of trade price, at the time claim charged to customer	40	60	80

## **This Warranty Does Not Apply:**

- if the Product has been subject to misuse or neglect, has been accidentally or intentionally damaged, has not been applied, installed, maintained or operated in accordance to the manufacturer's instructions or has been modified or altered in anyway.
- to any expense including labor or material, incurred during removal or reinstallation of the Product.
- to any auxiliary equipment furnished by others. Any warranties for such items shall be limited to those warranties offered by the original equipment manufacturer.
- to any workmanship of any installer of the product.
- to any damage to the Product due to corrosion, erosion, scaling or Product effected by oxides or chemicals or freezing

## **This Limited warranty is Conditional Upon:**

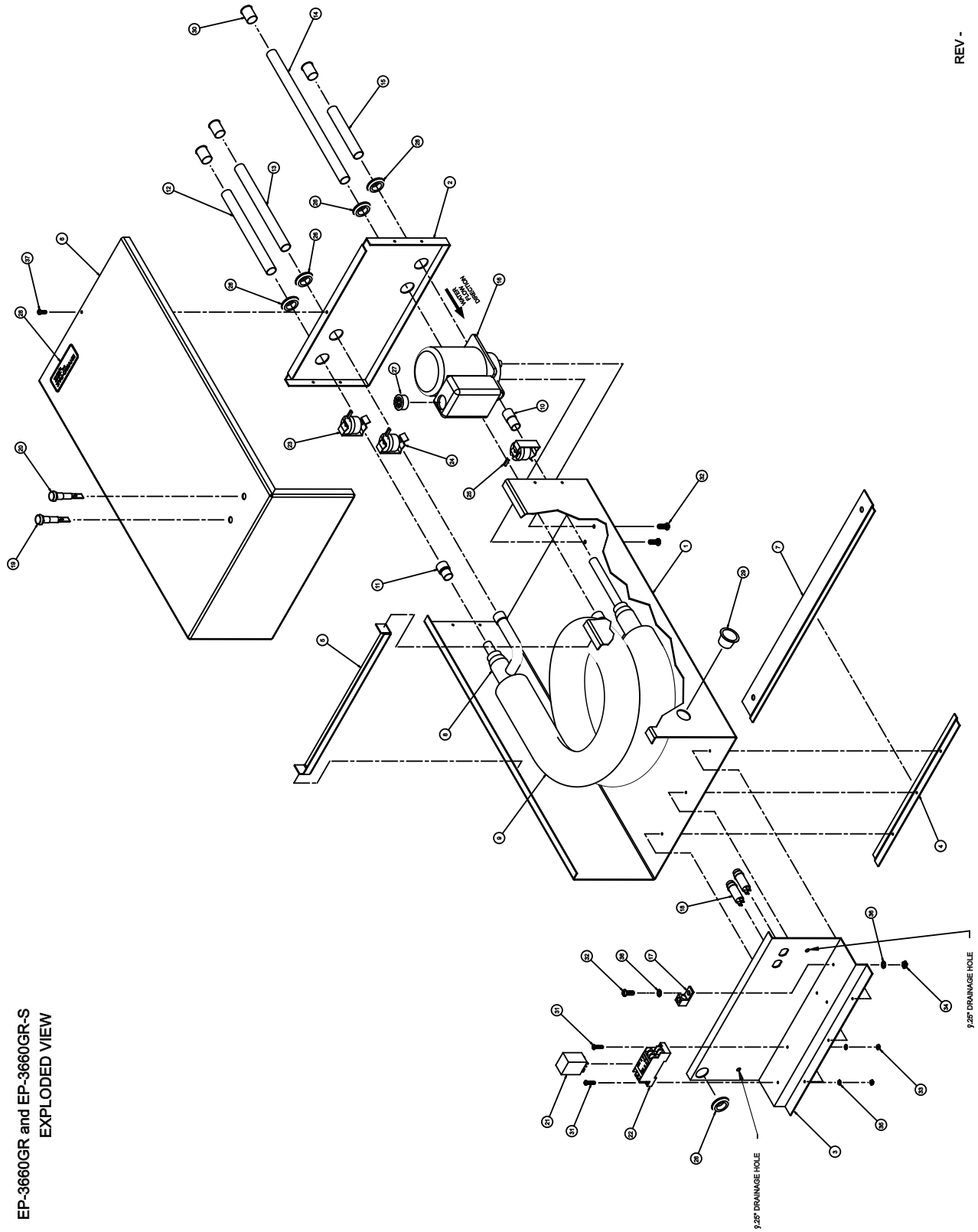
- shipment, to the manufacturer of the Product thought to be defective. Goods may only be returned with prior written approval of the manufacturer. All returns must be freight prepaid.
- determination in the reasonable opinion of the manufacturer that there exists a defect in material or workmanship.
- the residential water heat recovery unit having been installed in a single-family to two family dwelling

Repair or replacement of any part under this limited warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

**THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, AND SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HERBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE PURCHASER SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS, WHICH MAY VARY BY EACH JURISDICTION.**

This warranty is effective June 1, 2006

EP-3660GR and EP-3660GR-S  
EXPLODED VIEW



REV -

# EP-3660GR

## and

# EP-3660GR-S

## PARTS LIST

CABINET ASSEMBLY				
		PAINTED STEEL	STAINLESS-STEEL	
ITEM	QTY	PART NO.	PART NO.	DESCRIPTION
1	1	B-1588-01	B-1589-01	Cabinet Body
2	1	B-1588-02	B-1589-02	Cabinet Bottom Cap
3	1	B-1588-03	B-1589-03	Cabinet Top/Panel
4	1	B-1588-04	B-1589-04	Cabinet Mounting Brackets
5	1	B-1588-05	B-1589-05	Cabinet Inside Bracket
6	1	B-1588-06	B-1589-06	Cabinet Cover
7	1	B-1588-07	B-1589-07	Cabinet Vial Mount Bracket

HEAT EXCHANGER ASSEMBLY				
ITEM	QTY	PART NO.		DESCRIPTION
8	1	C-3862		DTHCFC-30
9	4	N-18075		Refrinex 2550 Foam Insulation
10	1	A-2515		FITTING: 025-00 Aqua x 500-D Adapt
11	1	A-2516		FITTING: 025-D Aqua x 500-D Adapt
12	1	A-2514-01		TUBE: Cu 025-00 Aqua x 750 Long
13	1	A-2517-02		TUBE: Cu 025-00 Aqua x 800 Long
14	1	A-2517-01		TUBE: Cu 025-00 Aqua x 1200 Long
15	1	A-2517-04		TUBE: Cu 025-00 Aqua x 500 Long
16	1	N-18072		Prop (220) 4000 (14)

MAIN ASSEMBLY			
ITEM	QTY	PART NO.	DESCRIPTION
17	1	N-18007	Ground Lug
18	2	N-18005	Resistor (20k x 200W Sided Flow)
19	1	N-18007	LED Light (Red)
20	1	N-18008	LED Light (Green)
21	1	N-18009	Beep Switch
22	1	N-18050	Beep Switch
23	1	N-18004	Thermistat (White Lead) Oper 55, Close 4)
24	1	N-18002	Thermistat (Red Lead) Oper 175, Close 170
25	1	N-18001	Thermistat (Blue Lead) Oper 125, Close 140
26	5	N-18003	Water Control (500)
27	1	N-18002	Universal Switching (75)
28	1	N-18000	Membrane
29	1	N-18007	Plastic Plug
30	4	A-3008-02	Plastic Cap
31	2	N-18001	Nut #8-32 5/8" long SS 18-8
32	3	N-18042	Bolt #6-24 3/8" long SS 18-8
33	2	N-18040	Nut #6-32 Machine Nut
34	1	N-18044	Nut #10-32 Machine Nut
35	2	N-18040	Lock Washer #6 External Tooth
36	2	N-18040	Lock Washer #10 External Tooth
37	1	N-18047	Bracket #8 5/8" long SS 18-8

ITEMS NOT SPECIFIED			
ITEM	QTY	PART NO.	DESCRIPTION
38	1	N-18048	Label "Water in"
39	1	N-18048	Label "Water Out"
40	1	N-18047	Label "Plug in"
41	1	N-18051	Label "Plug Out"
42	1	A-2502	Identification / Stock Warning Label
43	1	N-18053	Wing Label
44	1	A-2504	Wing Thermal Label
45	8	N-18007	Rivet 1/8" SS 18-8
46	1	N-18005	Ground Label
47	2	N-18011	Gas Valve #10/amp (Green 1/200W 250VAC)
48	8	N-18056	Wire Nut Orange Twisted
49	2	N-18067	Plug Terminal
50	4	N-18058	Capacitor 1000µF 50VDC 10% 25°C 200V
51	2	N-18071	Capacitor 1000µF 50VDC 10% 25°C 200V
52	325	N-18081	18 AWG Wire (Green)
53	500	N-18084	18 AWG Wire (Yellow)
54	170	N-18085	18 AWG Wire (Orange)
55	170	N-18086	18 AWG Wire (Red)
56	170	N-18087	18 AWG Wire (Blue)
57	170	N-18087	18 AWG Wire (Black)
58	0.025	N-18088	18 AWG Wire (White)
59	4.05	N-18089	18 AWG Wire (Bare)
60	3.25	N-18077	18 AWG Wire (Bare)
61	3.00	N-18082	1/4" Bore Polyethylene SH Coum
62	3.00	N-18083	3/8" Bore Polyethylene SH Coum

*This manual is produced by Turbotec Products, Inc., and is intended to be used as an aid to installation of Enviro-Pak Heat Recovery Units. Various applications may require installation designs or methods differing from those described in this manual. For special applications consult Turbotec or other qualified personnel for assistance.*



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