Dual Fuel – HP Controller
WF-DFHP1

Application

This controller is used with split heat pump and gas furnace, without plenum heater or any resistance auxiliary unit. This provides all control and interface functions between the HP outdoor unit, room thermostat, utility load control device, temperature sensing outdoor and warm air delivery. The heat pump auxiliary or supplementary is any gas or oil furnace with standard fan center or wiring terminal block.

The furnace blower can be standard single speed or ECM variable speed. This controller interfaces with both the G and the Y terminal on the furnace.

Features

- Simple and easy to use, conventional, heat/cool, 4-wire room thermostat
- Direct connection and interface to basic, single stage, air source heat pump
- Self-contained outdoor sensing balance point switchover
- Furnace blower G and Y – energize for HP, de-energize for gas
- Blower purge cycles when changing modes
- Standard Electro load control, blue wires function and interface
- Standard Electro front panel **override** switch
- Front panel LED's – POWER ON, ELECTRIC MODE, HP ON, THERMOSTAT, GAS

Options

- HP defrost, forces GAS
- Plenum warm air sensing with timeout delay (secondary switchover)
- Safety backup SOT-S features
- WF-ANZ* allows set point field changes

DO NOT DESTROY THIS MANUAL. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICE TECHNICIAN.

Drawings: **HH113**
HH114
HH350
XX017

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Installation

⚠ CAUTION

This unit can only be used for its intended design as described in this manual. Any internal wiring changes, modifications to the circuit board, modifications or bypass of any controls, or installation practices not according to the details of this manual will void the product warranty, the CSA/us certification label, and manufacturer product liability. Electro Industries cannot be held responsible for field modifications, incorrect installations, and conditions which may bypass or compromise the built-in safety features and controls.

⚠ WARNING

OBSERVE ELECTRIC POLARITY AND WIRING COLORS. FAILURE TO OBSERVE COULD CAUSE ELECTRIC SHOCK AND/OR DAMAGE TO THE EQUIPMENT.

Reference hookup drawing HH113.

The 24-volt source for the complete system is contained within the gas or oil furnace. In most cases 40VA transformer is considered minimum, verify 40VA is large enough for the specific heat pump to be connected.

Controller Mounting

1. Any convenient location (usually next to the furnace) between the outdoor unit, room thermostat, and furnace wiring block.
2. This controller is totally low voltage, class 2.
3. Except for the two sensors, all hookup cables or wiring must be field provided.

Temperature Sensors

Outdoor sensor (OT) – extend sensor to an outdoor location properly sampling the outdoor temperature. The north side may pick up too much shading and winds, but the south side should be avoided unless there is a position which will shade the sun. Install bracket with the sensor tip up (cable downward).

Use care in selecting location so the sensor does not pick up false temperature from the heat pump outdoor unit, from refrigerant line sets, dryer vent, reflection off of steel siding, etc. Also do not install the sensor in a plastic box because it will falsely trap and pick up radiant sun temperature.

Duct Sensor (ST) – install in the warm air plenum, at least 12” above the heat pump A-coil. Locate to one side so the air coming through the A-coil passes over the sensor tip. The ST sensor does not have an end cap; the small black electronic part just within the tube end is the actual temperature sensor. It is desirable for the air coming out of the A-coil to pass as close as possible to the black tip without warm-up or dampening delay.

The key is getting this sensor in the maximum warm air stream, the air coming through the A-coil fins will all be on the edge of the plenum.

> **Note**: The black tip inside of the white tube is the sensor itself. It must be positioned slightly sticking out of the white tube. The only purpose of the white tube is physical protection, once it is installed it is okay to push out the sensor ¼” to ½” to make it more sensitive and faster responding to the warm air stream.

Other Sensor Related Comments
The factory supplied OT cable is 25 feet. If additional cable length is required, you must use the following rules for extending the cable.

- Use unshielded (low capacitance, preferred twisted) 3 or 4-wire low voltage cable.
- 50 feet is maximum (total).
- Do not, under any circumstances, use leftover wires within the thermostat cable going out to the outdoor unit.
- Route the sensor cable making sure you do not crimp, cut, staple, or damage the cable in any way.
- Keep sensor cables at least 12" away from any line voltage wiring, romex, etc.

For easy sensor cable disconnect and reconnect, the WarmFlo board has a plug-in 4-place terminal block. Before disconnecting, you will notice two red wires are under one screw and two white wires is under the COM screw. The black wire represents the data information from each sensor and must be connected to the appropriate OT or ST screw.

The sensor has polarity, is sensitive to wrong voltage, must be protected from static voltage, etc. Do not cross connect or inadvertently short out sensor wires with power on. Permanent destruct damage may result.

Room Thermostat

⚠NOTE

The installer must be familiar with the manufacturer's low voltage wiring terminology, screw terminal terminology/colors, etc. This manufacturer's terminology must be related to Electro Industries' screw terminal identification within this controller. The intent of this instruction manual is **not** to train each installer on the terminology related to the specific product you are installing.

1. This controller can only use **conventional, heat/cool, 4-wire** room thermostat.
2. Route and connect basic 4-wire stat cable between the mounted roomstat and the upper left terminal block.
3. This is a letter by letter, wire by wire connection – R, W, G, Y.

HP Outdoor Unit

1. Typically this requires a 5 or 6-wire cable. Although only basic four are required for normal operation.
2. Minimum connections, route and connect the four wires from the upper right terminal block – R, Y, RV (O), C – to same function wires or terminal screws in the outdoor unit.
3. Optional defrost direct control – connect the 5th wire from the bottom brown pigtail to a typical W1 or W2 wire on the outdoor unit which goes high **during defrost only**.
    a. Comment – the defrost tab input (brown pigtail) provides its voltage direct to the gas furnace W. Thus the gas furnace will immediately come on with 24 volts on this wire. The normal operation of this controller continues with an HP-Y OUT needed to continue the heat pump compressor during the defrost cycle. Do not use "E" for defrost. This controller's program also masks out any supply or plenum temperature sensing and restarts MU when the voltage on this brown wire goes to 0.
    b. It is the heat pump outdoor unit logic or manufacturers responsibility to drop this wire to 0 volts at the end of defrost **and** any other condition where defrost is interrupted, short cycles, lost, etc. A typical example – if the room thermostat is satisfied or in the middle of defrost or a utility load control interrupts HP-Y, this brown wire must go to 0 to make sure the gas furnace is not "hard on" and overheats or damages the building.

Furnace Fan Center or Wiring Strip

1. Typically a 4 or 5-wire cable is required.
2. Route and connect the minimum 4 wires – R, W, C, G – from the bottom left terminal block to the furnace wiring strip.
3. If this is an ECM variable speed blower there is a requirement to bring the blower to a higher speed during heat pump operation. In this case you will use a 5-wire cable and connect Y to Y (see "Additional Hookup" section for other comments and options for furnaces which have Y1 and Y2).

Installation Setup

Switchover dial – this inside dial setting determines the lowest outdoor temperature heat pump operation. If warm air sensing is used, there may be operating times when the heat pump is terminated and the gas furnace is used above this setting.

Switchover Dial	
0 = 0°	4 = 20°
1 = 5°	5 = 30°
2 = 10°	6 = 40°
3 = 15°	7 = 45°

Factory default – #3

Warm Air Sensing Control – this is active only with temperatures **above switchover** and if the duct sensor is connected and installed.

See the next section, explaining the operation.

Min Warm Air	
0 = Disable	4 = 98°
1 = 92°	5 = 100°
2 = 94°	6 = 102°
3 = 96°	7 = 104°

Factory default – #3

RV Logic Selection – on the inside top of the control board are three pins with a peg jumper. This jumper must be in place and in a position over the H or C depending upon whether the RV wire should be high during heating or cooling. Comment – the majority of the heat pump manufacturers' products are high during cooling; therefore, the shorting jumper should be over the C.

WarmFlo Analyzer or PC Software – see Troubleshooting section, there are six variables which can be accessed via the normal WarmFlo Analyzer plug-in port.

Additional Hookup or Special System Equipment Concerns

Disable ST and Min Warm Air function – if there is a desire to use only switchover dial selection (based upon outdoor temp, OT), set "Min Warm Air" dial to 0.

Special Oil Furnace Comment
This controller is designed to interface directly with a furnace fan center containing 24-volt transformer (40VA or larger), blower relay, and a "W" function to operate the furnace. If this installation is for an **oil furnace** with only oil control "T and T" terminals, a special fan center will need to be added with an isolation relay at the "W" terminal so only isolated contacts are connected to the oil burner master control

"T and T". Another choice is to use a standard fan center and order EE-5053 relay with accompanying HD001 instruction sheet.

2-Stage Gas Furnace
From Electro's experience all 2-stage gas furnaces must have a W1 before the furnace reacts to a W2 or special variable burner second control wire. Realizing this, the W2 functions from a 2H/2C roomstat can go directly to the furnace terminal block. There are some furnace manufacturers with a special variable burner and a special wire from the thermostat (typically V), simply route around this unit directly to the furnace. This controller properly handles W1 which is the main control function for the furnace.

Variable Speed Furnace, ECM Blower Motor – as previously stated and normally configured the bottom left terminal block "Y"goes to 24 volts whenever the heat pump is running – either roomstat Y or W input (the W input has a 10-second turn on delay and 60-second off delay). If the furnace has a single Y or a Y1 representing its programmed top speed, this would be the normal connection.

If you are not implementing the intermediate speed option with a special relay mentioned in the next paragraph, you probably should connect the controller Y to the furnace Y2 for the furnace highest speed, especially required during cooling.

If the furnace has a Y1 and a Y2 and you desire to run the heat pump at a lower speed during intermediate outdoor temperatures, it is possible to add an optional relay which will automatically provide a furnace Y2 if the plenum delivery temperature is above 105° or below 20° outdoor. With this relay and proper connection, temperatures between switchover (or 20°) and 105° will be at Y1 speed. Plenum temperature above 105° and below 20° (assuming the switchover is less than 20°) will be at Y2 speed. With this relay wired as shown on drawing HH114 cooling (thermostat Y) always provides Y2 speed. Warning – you must use EE-5053 relay, any old relay will not work, could actually damage the SPD B driver circuit.

Defrost Make-Up Heat, Using Gas Furnace
If during hookup (reference HP Outdoor Unit section) the gas furnace defrost heat option was selected, the installer needs to have a concern on whether the gas furnace will overheat the refrigerant coil or have excessive heat build-up after defrost causing outdoor unit high pressure. If this is the case there is an optional 100° sensor which can be installed between the gas furnace and the bottom of the A-coil to make sure the gas furnace does run too long on defrost causing compressor high pressure.

Order sensor probe EM5713 and install between the gas furnace outlet and the indoor coil inlet.

This will require a 7/8" hole and simply inserting this probe into the gas furnace air stream. Using the two wires from this sensor, series connect between the outdoor unit W1 and this controller board brown wire (T5). In essence, this 100° sensor will open the W call to the gas furnace when the gas furnace outlet reaches 100°. The gas furnace blower should continue as normal in the defrost mode, because there is a continued call for heat.

Remotely Located Standby Override Switch
On the bottom of the board is an "SBSW" tab. Using an external switch between this "SBSW" tab and a common tab provides the same function as the front override switch. Whichever switch is in the up or override position takes priority. In other words, they **both** need to be in the down position during **cooling**.

> **Note 1**: All override switches (front panel and any options) must be in normal or electric position during cooling.
>
> **Note 2**: Do not change either switch position during active heat call.

Blower purge cycles – whenever there is a transfer from heat pump to standby, the furnace blower is on for 60 seconds, the furnace W is held off.

Whenever there is a transfer from standby to heat pump, the heat pump "Y" is held off for 3 minutes with the furnace "G" function active.

Rapid OT or ST temperature change – when either sensor real time value crosses a set point or threshold point during an active W input (heat call), there must be a completion of the heat call before the mode or temperature triggered condition changes the internal operation. Typical example – changing an OT temperature with Analyzer or ice or changing the switchover settings, cycle the room thermostat to send it to the opposite condition.

Stat override timer (SOT-S) – built into this controller is a programmed timer which begins at room thermostat heat call (W goes high). When this timer runs out, there is an automatic switchover to standby or gas. Any time during this set time there is an interrupt with a W input (or the end of heat call) the timer is terminated and again at 0.

The factory provided default is 90 minutes. This can be field changed with the WarmFlo Analyzer feature. A setup of "00" disables this function.

Front Panel Monitor Lights

Top green – **POWER ON** – indicates 24-volt source, active. Also can blink if bad sensor.

Amber – **ELECTRIC MODE** – illuminated, the heat should be able to be controlled by room thermostat. Not illuminated, conditioned for gas furnace operation.

Amber – **HP ON** – 24 volts at the upper right terminal block, Y screw.

Red – **THERMOSTAT** – room thermostat has 24 volts on either upper left W or Y.

Red – **GAS** – the lower left terminal block W screw has 24 volts.

Operational Sequence

Below switchover point – the setting of SW OVER selects ODT value.

1. Each thermostat call – immediate gas, same as basic standby.

Above switchover – the SW OVER dial switch determines ODT, but ST can also cause GAS.

1. THERMOSTAT call – HP on.
2. 10-minute delay (use MU set pt.) – begin ST monitor.
3. Use min. warm air dial setting to determine a new switchover point (DT).
4. If ST is above DT, no action, continue ST monitor.
5. If the ST is below DT for continuous 10 seconds, declare switchover to gas for the remainder of THERMOSTAT cycle.
6. Standard 1-minute blower purge cycle.

Options

1. Dial switch position 0 disables the above and HP/gas is only controlled by SW OVER setting.
2. SOT-S is active for a long-term switch to gas.
3. E input, hardware switchover to GAS.

Front Panel Override Switch (Up)

1. Each thermostat call – immediate gas, same as basic standby.

Utility Load Control – Standard Blue Wire Function.

1. Each thermostat call – immediate gas, same as basic standby (blower purge cycles apply).

HP Defrost

1. Outdoor unit W1 (or W2) connected to bottom right T5 tab (CT scrapped off) – decal "Defrost-W1".
2. Immediate W1 connects its voltage to gas furnace – W.
3. HP-Y is still a stat function and remains high.
4. Gas furnace G remains high.
5. ST monitor is disabled, MU restarts.

Cooling – THERMOSTAT call – Y conditions heat pump reversing valve (depends upon RV logic jumper) and simply controls output Y. Standard Load Control interrupts compressor.

Troubleshooting

WarmFlo Analyzer, Field Setup Changes – normal WF-ANZ* or WarmFlo PC software allows the following field modifications. The column on the right is the factory default.

SOT-S (timer which begins at THERMOSTAT and switches to standby)	90 minutes
MU (delay time before ST begins monitor)	10 minutes
OT offset	0
ST offset	0
SPD B – ST	105°
SPD B – OT	20°

E Tab Input – jumpering the E to W is the same as standby mode.

Rapid OT or ST temperature change – when either sensor real time value crosses a set point or threshold point during an active W input (heat call), there must be a completion of the heat call before the mode or temperature triggered condition changes the internal operation. Typical example – changing an OT temperature with Analyzer or ice or changing the switchover settings, cycle the room thermostat to send it to the opposite condition.

Bad sensor, safety – if the internal logic detects open sensor wire, incorrectly wired sensor, or some bad sensor transmitted value conditions; the green LED reverts to a pulsing mode.

- OT sensor – approximately 1/10 second blip every ½ second
- ST sensor – two, 1/10 second blips every ½ second
- Both bad – ½ second on and ½ second off, alternating

Bad sensor, operating default condition – the detection of bad sensor forces the controller to a fixed stage operation.

- OT sensor
  - Goes to 0°, same as forced standby
  - Analyzer screen reads "254" or "BAD"
- ST sensor
  - Same as above
  - Switchover dial has total control

Analyzer readout, sensor temperature constant 32° or 0° – these two values represent digital bit patterns that are hard to predict an error function. A blinking green light may or may not be experienced. Typically the cable is too long, wrong type of sensor wire, or some electrical interference on the sensor cable.

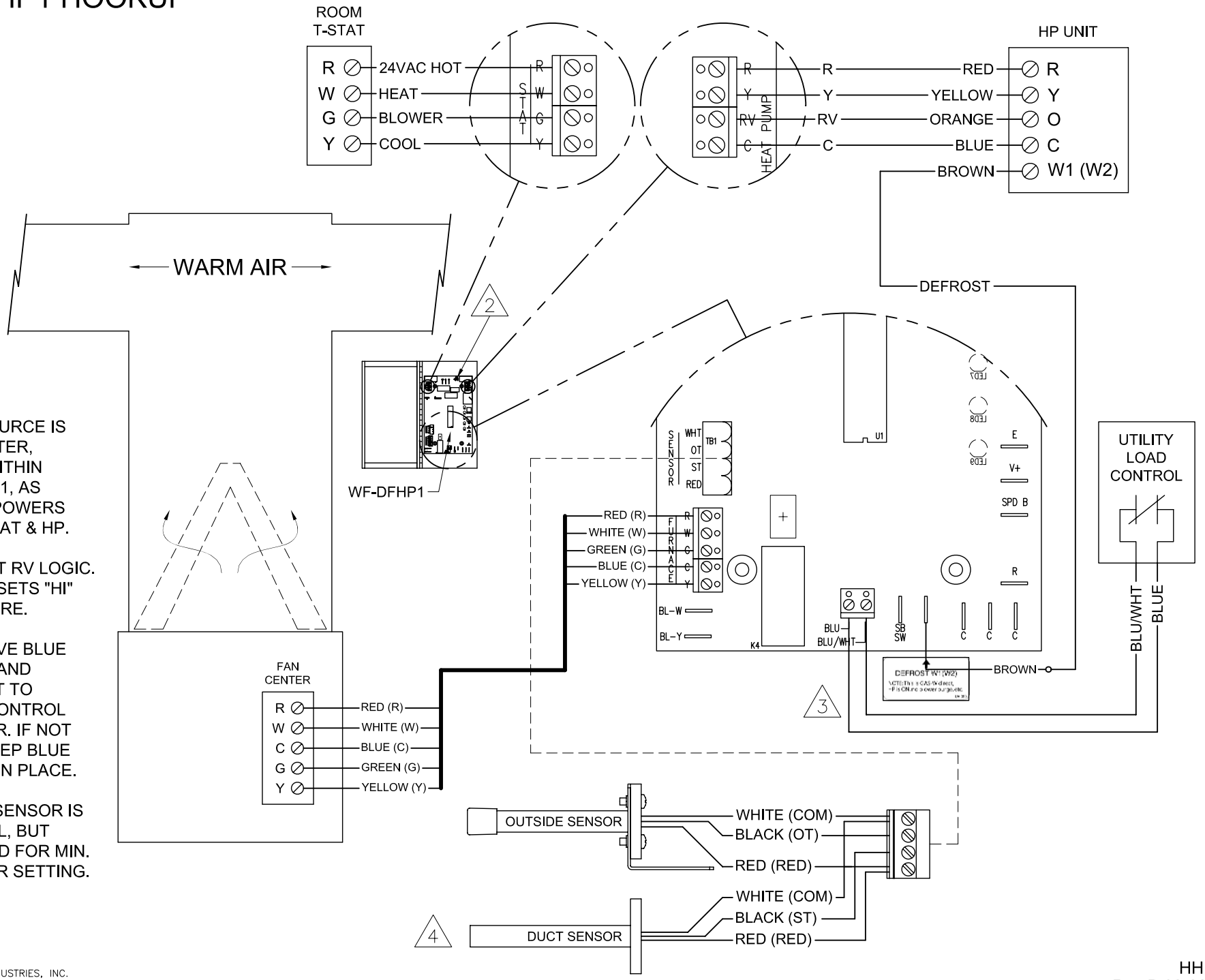
Operational Conditions, Forcing Standby – these conditions are also monitored by the front panel EL mode light being off.

1. Utility Load Control
2. SOT S timeout
3. OT below switchover set point - configuration mode setup dial switch also defines switchover function
4. Front override switch
5. ST not above min warm set point and MU time

Operational Conditions Which May Prevent Standby or Gas On

1. No call for heat - T-call LED is off
2. LED EL ON mode- utility is not controlling or front panel is not in override
3. Somehow stat terminal block Y is also energized or at 24 volts
4. Board K1 or K2 open/inoperative
5. Hang-up - power down, 10 seconds, power up

WF-DFHP1 HOOKUP



NOTES:

1. 24V SOURCE IS FAN CENTER, FUSED WITHIN WF-DFHP1, AS SHOWN POWERS ROOM STAT & HP.

2. SELECT RV LOGIC. JUMPER SETS "HI" ON RV WIRE.

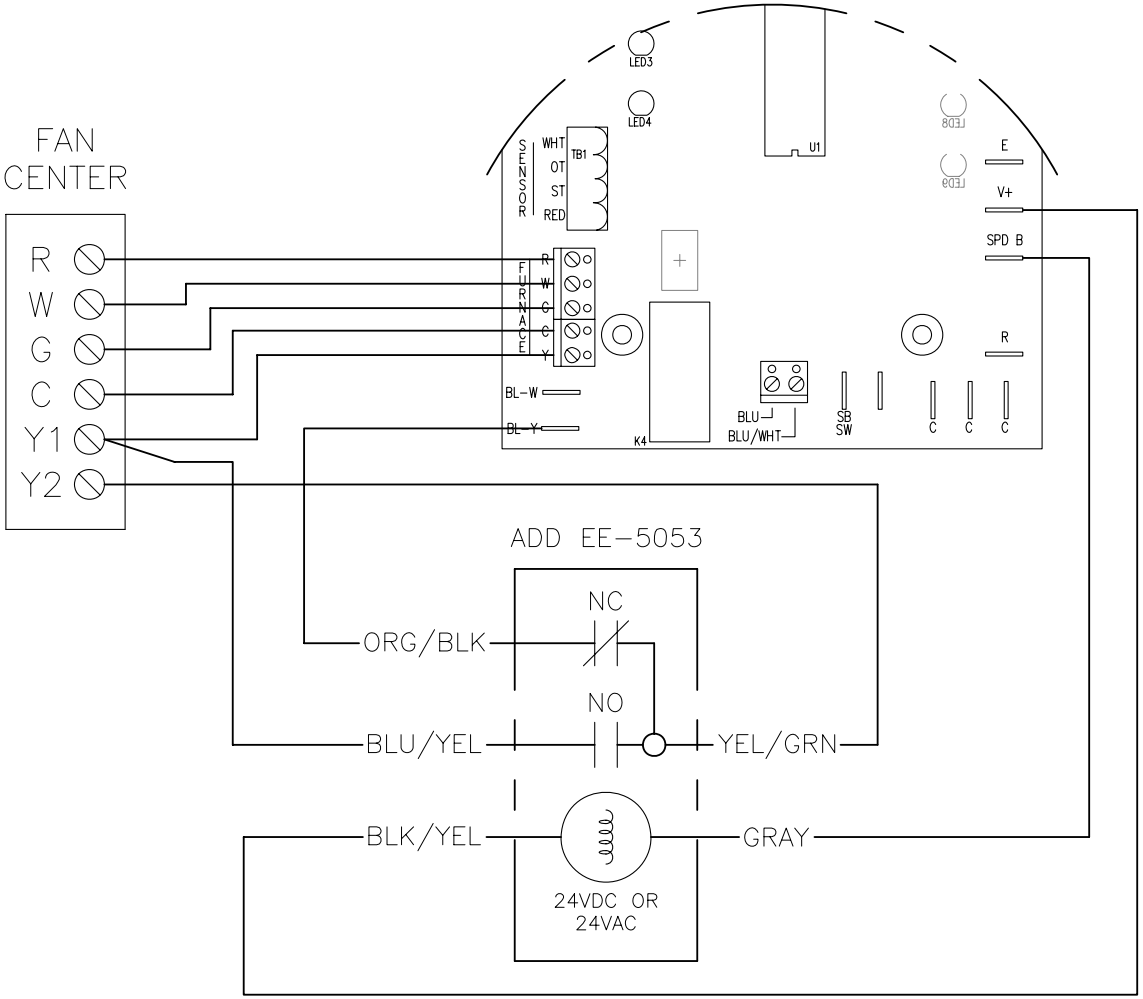
3. REMOVE BLUE JUMPER AND CONNECT TO UTLITY CONTROL RECEIVER. IF NOT USED, KEEP BLUE JUMPER IN PLACE.

4. DUCT SENSOR IS OPTIONAL, BUT REQUIRED FOR MIN. WARM AIR SETTING.

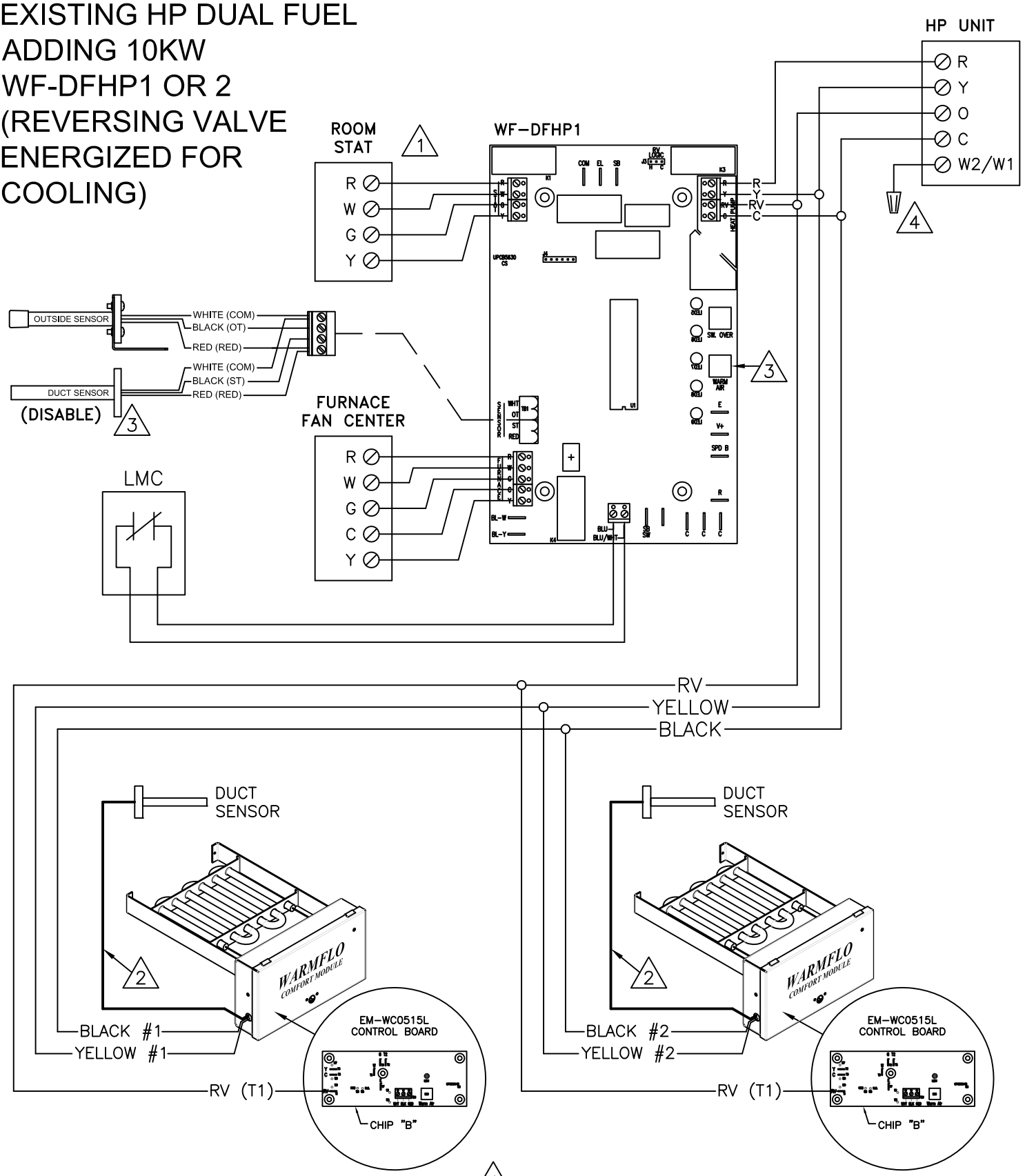
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HH113
Rev.B 09-22-06

WF-DFHP1
VARIABLE-SPEED BLOWER - FURNACE WITH Y1 & Y2
(REQUIRES ADDED EE-5053 RELAY)



EXISTING HP DUAL FUEL ADDING 10KW WF-DFHP1 OR 2 (REVERSING VALVE ENERGIZED FOR COOLING)

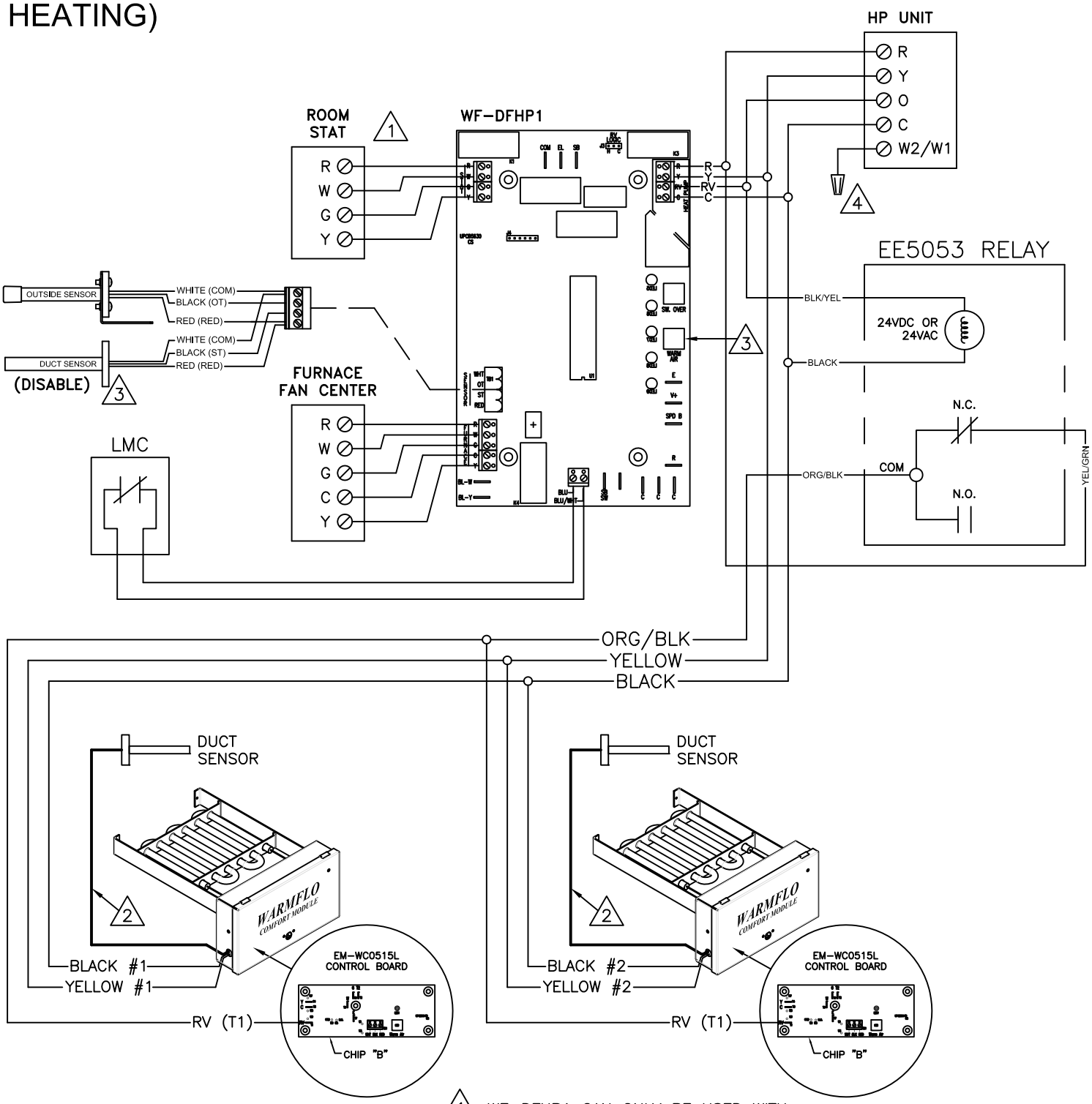


1. WF-DFHP1 CAN ONLY BE USED WITH BASIC H/C STAT (NOT HP STAT).
2. 5-FOOT SENSOR CABLE
3. IN THIS APPLICATION, SET MIN. WARM AIR DIAL TO 0 (ZERO).
4. SUGGEST NO DEF CONNECTION WF SENSOR WILL TURN ON HEAT.

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HH350 P1
Rev. C 06-09-09

EXISTING HP DUAL FUEL
ADDING 10KW
WF-DFHP1 OR 2
(REVERSING VALVE ENERGIZED FOR HEATING)



1. WF–DFHP1 CAN ONLY BE USED WITH BASIC H/C STAT (NOT HP STAT).
2. 5–FOOT SENSOR CABLE
3. IN THIS APPLICATION, SET MIN. WARM AIR DIAL TO 0 (ZERO).
4. SUGGEST NO DEF CONNECTION WF SENSOR WILL TURN ON HEAT.

ELECTRO INDUSTRIES, INC.
MONTICELLO, MN 55362

Electro Industries Residential Limited Product Warranty

Effective November 1, 2009

Electro Industries warrants to the original owner, at the original installation site, for a period of two (2) years from date of original purchase, that the product and product parts manufactured by Electro Industries are free from manufacturing defects in materials and workmanship, when used under normal conditions and when such product has not been modified or changed in any manner after leaving the plant of Electro Industries If any product or product parts manufactured by Electro Industries are found to have manufacturing defects in materials or workmanship, such will be repaired or replaced by Electro Industries Electro Industries, shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Electro Industries may request that the materials be returned to Electro Industries at owner's expense for factory inspection. The determination as to whether product or product parts shall be repaired, or in the alternative, replaced, shall be made by Electro Industries or its authorized representative.

Electro Industries will cover labor costs according to the Repair / Replacement Labor Allowance Schedule for a period of ninety (90) days from the date of original purchase, to the original owner, at the original installation site. The Repair / Replacement Labor Allowance is designed to reduce the cost of repairs. This Repair / Replacement Labor Allowance may not cover the entire labor fee charged by your dealer / contractor.

TWENTY YEAR (20) LIMITED WARRANTY ON BOILER ELEMENTS AND VESSELS

Electro Industries warrants that the boiler elements and vessels of its products are free from defects in materials and workmanship through the twentieth year following date of original purchase. If any boiler elements or vessels are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

TWENTY YEAR (20) LIMITED WARRANTY ON SPIN FIN ELEMENTS

Electro Industries warrants that the spin fin elements of its products are free from defects in materials and workmanship through the twentieth year following date of original purchase. If any spin fin elements are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

FIVE YEAR (5) LIMITED WARRANTY ON OPEN WIRE ELEMENTS

Electro Industries warrants that the open wire elements of its products are free from defects in materials and workmanship through the fifth year following date of original purchase. If any open wire elements are found to have a manufacturing defect in materials or workmanship, Electro Industries will replace them.

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CONDITIONS AND LIMITATIONS:

1. This warranty is limited to residential, single family dwelling installations only. Any commercial or multi-unit dwelling installations fall under the Electro Industries Commercial Limited Product Warranty.
2. Electro Industries shall not be liable for performance related issues resulting from improper installation, improper sizing, improper duct or distribution system, or any other installation deficiencies.
3. If at the time of a request for service the original owner cannot provide an original sales receipt or a warranty card registration then the warranty period for the product will have deemed to begin the date the product is shipped from the factory and **NOT** the date of original purchase.
4. The product must have been sold and installed by a licensed electrician, plumbing, or heating contractor.
5. The application and installation of the product must be in compliance with Electro Industries specifications, as stated in the installation and instruction manual, and all state, provincial and federal codes and statutes. If not, the warranty will be null and void.
6. The purchaser shall have maintained the product in accordance with the manual that accompanies the unit. Annually, a qualified and licensed contractor must inspect the product to assure it is in proper working condition.
7. All related heating components must be maintained in good operating condition.
8. All lines must be checked to confirm that all condensation drains properly from the unit.
9. Replacement of a product or product part under this limited warranty does not extend the warranty term or period.
10. Replacement product parts are warranted to be free from defects in material and workmanship for ninety (90) days from the date of installation. All exclusions, conditions, and limitations expressed in this warranty apply.
11. Before warranty claims will be honored, Electro Industries shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Remedies under this warranty are limited to repairing or replacing alleged defective product or product parts. The decision whether to repair or, in the alternative, replace products or product parts shall be made by Electro Industries or its authorized representative.

THIS WARRANTY DOES NOT COVER:

1. Costs for labor for diagnosis, removal or reinstallation of an alleged defective product or product part, transportation to Electro Industries, and any other materials necessary to perform the exchange, except as stated in this warranty. Replacement material will be invoiced to the distributor in the usual manner and will be subject to adjustment upon verification of defect.
2. Any product or product part that has been damaged as a result of being improperly serviced or operated, including, but not limited to, the following: operated during construction phase, with insufficient water or air flow; allowed to freeze; subjected to flood conditions; subjected to improper voltages or power supplies; operated with air flow or water conditions and/or fuels or additives which cause unusual deposits or corrosion in or on the product; chemical or galvanic erosion; improper maintenance or subject to any other abuse or negligence.
3. Any product or product part that has been damaged as a result of natural disasters, including, but not limited to, lightning, fire, earthquake, hurricanes, tornadoes or floods.
4. Any product or product part that has been damaged as a result of shipment or handling by the freight carrier. It is the receiver's responsibility to claim and process freight damage with the carrier.
5. Any product or product part that has been defaced, abused or suffered unusual wear and tear as determined by Electro Industries or its authorized representative.
6. Workmanship of any installer of the product or product part. This warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
7. Transportation charges for any replacement product, product part or component, service calls, normal maintenance; replacement of fuses, filters, refrigerant, etc.

THESE WARRANTIES DO NOT EXTEND TO ANYONE EXCEPT THE ORIGINAL PURCHASER AT RETAIL AND ONLY WHEN THE PRODUCT IS IN THE ORIGINAL INSTALLATION SITE. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.

ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED WITH RESPECT TO ALL PURCHASERS OR OWNERS. ELECTRO INDUSTRIES IS NOT BOUND BY PROMISES MADE BY OTHERS BEYOND THE TERMS OF THESE WARRANTIES. FAILURE TO RETURN THE WARRANTY CARD SHALL HAVE NO EFFECT ON THE DISCLAIMER OF THESE IMPLIED WARRANTIES.

ALL EXPRESS WARRANTIES SHALL BE LIMITED TO THE DURATION OF THIS EXPRESS LIMITED WARRANTIES SET FORTH HEREIN AND EXCLUDE ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM THE BREACH THEREOF. SOME STATES OR PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY. PRODUCTS OR PARTS OF OTHER MANUFACTURERS ATTACHED ARE SPECIFICALLY EXCLUDED FROM THE WARRANTY.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER RIGHTS WHICH VARY UNDER THE LAWS OF EACH STATE. IF ANY PROVISION OF THIS WARRANTY IS PROHIBITED OR INVALID UNDER APPLICABLE STATE OR PROVINCIAL LAW, THAT PROVISION SHALL BE INEFFECTIVE TO THE EXTENT OF THE PROHIBITION OR INVALIDITY WITHOUT INVALIDATING THE REMAINDER OF THE AFFECTED PROVISION OR THE OTHER PROVISIONS OF THIS WARRANTY.