DUAL HEAT

Universal Controller, Interface Non-Electro Heating Products

Model HP-5046

This is an update, combining previous HP-5052A and HP-5045A. This new model is attempting to keep in the function and price range of the HP-5045A with added monitor LED's for a more user friendly product.

Application – dual heat with utility load control, various combinations of an electric primary (boiler, electric furnace, simple heat pump, etc.) with a standby gas or oil unit. Installer desires a universal and simple-to-install product which allows low voltage interface and easy wiring for any product mixture, under utility load control.

Drawings: **HH112**
HS112

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Product Capability

1. All 24-volt wiring, typically associated with room thermostat functions.
2. Wiring is typically in the mechanical room.
3. Two to four thermostat control lines.
4. Uses the electric unit 24-volt transformer for the primary system and room thermostat.
5. Air conditioner or heat pump operates from single transformer and thermostat.
6. Isolated contact to gas or oil furnace.
7. Load control, standard blue wires, closed for off-peak.
8. Optional reverse logic load control terminal.
9. Standby override switch, front panel.
10. Four LED's, front panel.
11. Option for keeping blower running during cooling load control interrupt.

Comparison of Previous Devices

HP-5045A – includes same functions plus user enhancement.

HP-5052A – this new model has a few less features, these items are not possible:

- No connection associated with reversing valve (O or B) wire
- Standby is always "W" input (heat pump, this means second stage) and does not shift to "Y"
- Blower or G function is only a basic load control contact interrupt and does not have a reversing valve or winter/summer function
- Cool mode LED

Function or Theory of Operation

Reference: Simplified Schematic HS112

1. Typically the 24-volt transformer associated with the "EL unit" is connected to its terminal block R and C. The R and C on both sides are actually the same electrical point.
2. The "PWR ON" LED illuminates indicating source voltage on terminal block R and C.
3. Blue and blue/white wires go to utility load control device.
4. Terminals 1, 2, 3, and 4 on the "roomstat" side feed directly through a relay contact to the same numbered terminals on the "EL unit" side.
5. The four relay contacts mentioned above are closed in the off-peak or "EL mode".
6. The "T-stat call" LED is a direct function of the roomstat #1 terminal.
7. The other numbered terminals (2, 3, 4) simply open between the two terminal blocks when in the load interrupt mode, EL LED is off.
8. During utility on-peak, the above four contacts open for each of the four screw terminals, plus:
    a. EL mode LED is off.
    b. A standby relay is now connected to the roomstat #1 input.
    c. Whenever the roomstat #1 input has voltage or goes high, there is a contact closure on the two brown wires.
    d. The "STANDBY ON" LED is also illuminated with the roomstat #1 input.
9. Returning from on-peak to off-peak, all four interrupt points close and the brown wires open. There is no delay or built-in circuit function to allow the gas furnace to cool off before energizing the "EL unit".
10. The front panel override switch simply creates a utility on-peak condition. Applying a contact closure from SB tab to common is the same as operating the override switch.
11. If the utility control device is opposite logic (NO=on-peak), keep the blue and blue/white wires wire nutted and extend the X1 tab and R screw voltage to the load control contact.
12. The K1 and K2 control relays are only energized during the on-peak or interrupt mode ("EL MODE"light is off).
13. Terminals 4 would typically be associated with blower control wire (G). The T1 and T2 tabs allow for external control bypass during summer load control. Also the G1 tab provides another opportunity to energize the blower during certain required conditions during load control.

Installation Basics

1. Contact interrupt #1 must be associated with heating only. If terminal #1 has voltage during cooling, a cooling load interrupt could cause standby furnace to come on.
2. The remaining three wiring points simply represent contact closures operated by the load control device (blue wires). These three contact closures can be used for any interrupt requirement, some may be related to specific connected thermostat wires (Y, G, E, etc.) or not necessarily used for all thermostat lines but could be used for such things as damper, auxiliary electric heat, etc.
3. Generally the blower (G function) is connected to #4.
4. Mechanical roomstat, heat anticipator setting – this HP-5046 does not provide true independent dual heat thermostat loading. Interrupt lines 2, 3, and 4 are simply passed through and the thermostat loading represents whatever is connected on the EL unit end. For terminal #1, in the standby mode the loading is approximately 0.2. In the non-interrupt mode installer adjusts to the requirement of the device connected to terminal #1. Suggest setting to the low side of that products requirement.

Electrical Hookup

24-volt source – connect to either "R" and "C" terminals. Each side R and C are the same point. There is no fusing.

Utility load control receiver (closed for off-peak) – extend blue and blue/white wires to this device.

Standby unit – extend the two brown wires to the typical "R" and "W" or "T" and "T". The brown wire represents an isolated contact to turn on the standby. Since it is an isolated contact there is no voltage mixing between the transformer in the furnace (or boiler) and the transformer which feeds this product's R and C.

There are two contacts in series, both would have to weld or stick to have a constant standby on.

Controlling or interrupt application – review the following application suggestions for various types of thermostats and electric units (furnace, boiler, or whatever).

Application Suggestions	Roomstat	Stat	EL Unit	Load
Basic electric furnace with gas/oil standby.	R	R	R	R
	W	1	1	W

EL furnace and A/C with gas/oil standby.	R	R	R	R
	W	1	1	W
	Y	2	2	Y
	G	4	4	G

HP5046

Electric boiler with gas/oil standby (2 pumps, independent).	R	R	R	R
	W	1	1	W

Electric boiler with gas/oil standby (1 pump, within electric).	R	R	R	R
Jumper terminal 1 to terminal 2 on roomstat side. Add 24-volt coil relay to EL unit "A" tab and common. Wire the contact of this added relay to parallel energize pump motor.	W	1	1	W

Application Suggestions	Roomstat	Stat	EL Unit	Load
Electric boiler with gas/oil standby (1 pump, in standby boiler).	R	R	R	R
Jumper terminal 1 to terminal 2 on roomstat side. Add 24-volt coil relay to EL unit #2 and common. Wire contact of this relay to parallel energize pump motor.	W	1	1	W

Packaged air source heat pump with independent gas/oil standby.	R	R	R	R
See note 1.	C	C	C	C
	W	1	1	W
	Y	2	2	Y
	E (emergency)	3	3	E (emergency)
	G	4	4	G

Water source heat pump with independent gas/oil standby.	R	R	R	R
See note 1.	C	C	C	C
	W	1	1	W
	Y	2	2	Y
	E (emergency)	3	3	E (emergency)
	G	4	4	G

HP504

EM-WM

Electro-Duct insert, EM-WM series with typical gas/oil standby.	R	R	R	R	R
See note 2.	C	C	C	C	C
	W	1	1		Y
	Y (A/C)	2	2	Y (A/C)	
	E (emergency)	3	3	E (emergency)	
	G	4	4	G	

Notes:

1. If there is an electric damper mechanism between the HP air handler and the furnace blower, spade terminal A will represent roomstat Y during standby and its voltage can be used to operate the transfer damper (24V).
2. Shown as non-HP or HP second stage stat (W). EM-WM "Y" could be connected to #2, but needs summer interrupt connection to RV.
3. Shown above the heat pump stat "E" is simply a pass through interrupt. If there is a desire to change the HP roomstat "E" function or use the "E" wire to directly initiate the standby function, more needs to be known about the roomstat sub-base and how the emergency lever function actually works. If it's a mode function, the "E" wire could energize a relay which has its contact on SB tab and common to initiate standby. However, in this case the HP roomstat "W" function is still needed to turn on the gas furnace. Another case may be where the "E" wire is actually a "call for heat" type function. In this case it could be connected to X2 tab. However, the installer must take the responsibility to make sure the heat pump or any electric can never come on when X2 is energized.

   Warning – the installer must take full responsibility of the system associated with any emergency lever or "E" wire function.

Comment – if the installation requirement is dual heat with standard gas furnace and **split** heat pump, the most common approach is not this control with duct heaters but Electro Industries' Electro-Mate, WarmFlo version. The plenum heater over an A-coil with the gas furnace blower is the only reliable and long-term dual heat solution.

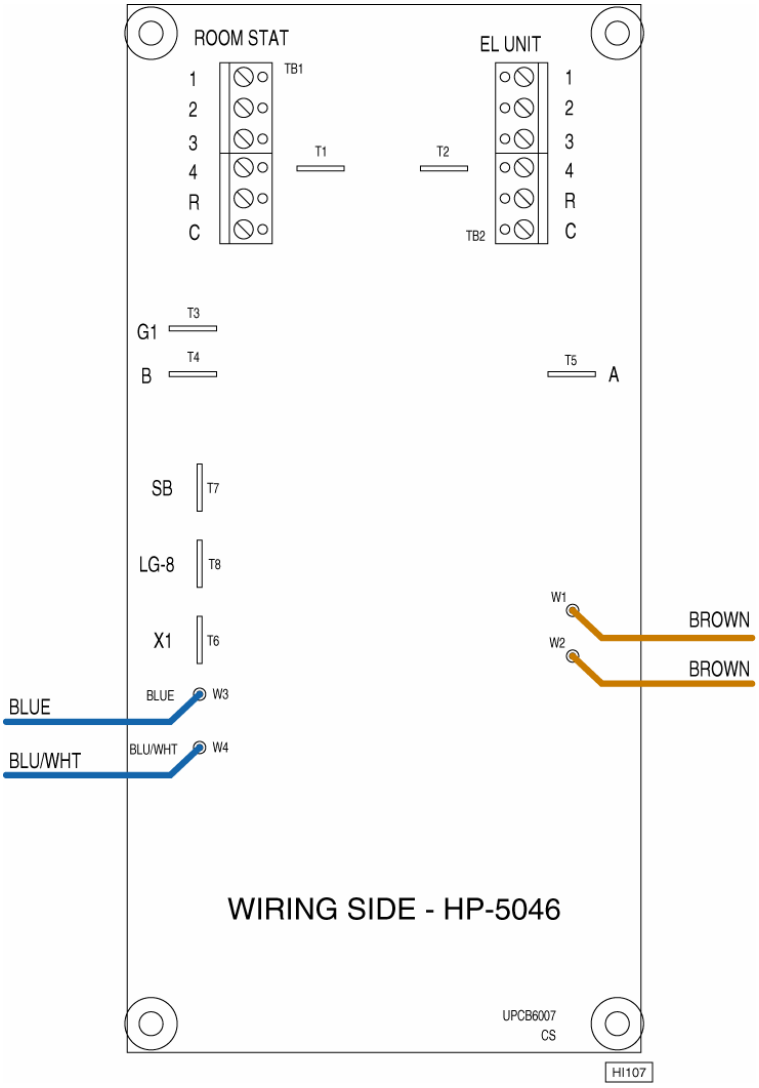
Summer/Winter Blower Selection

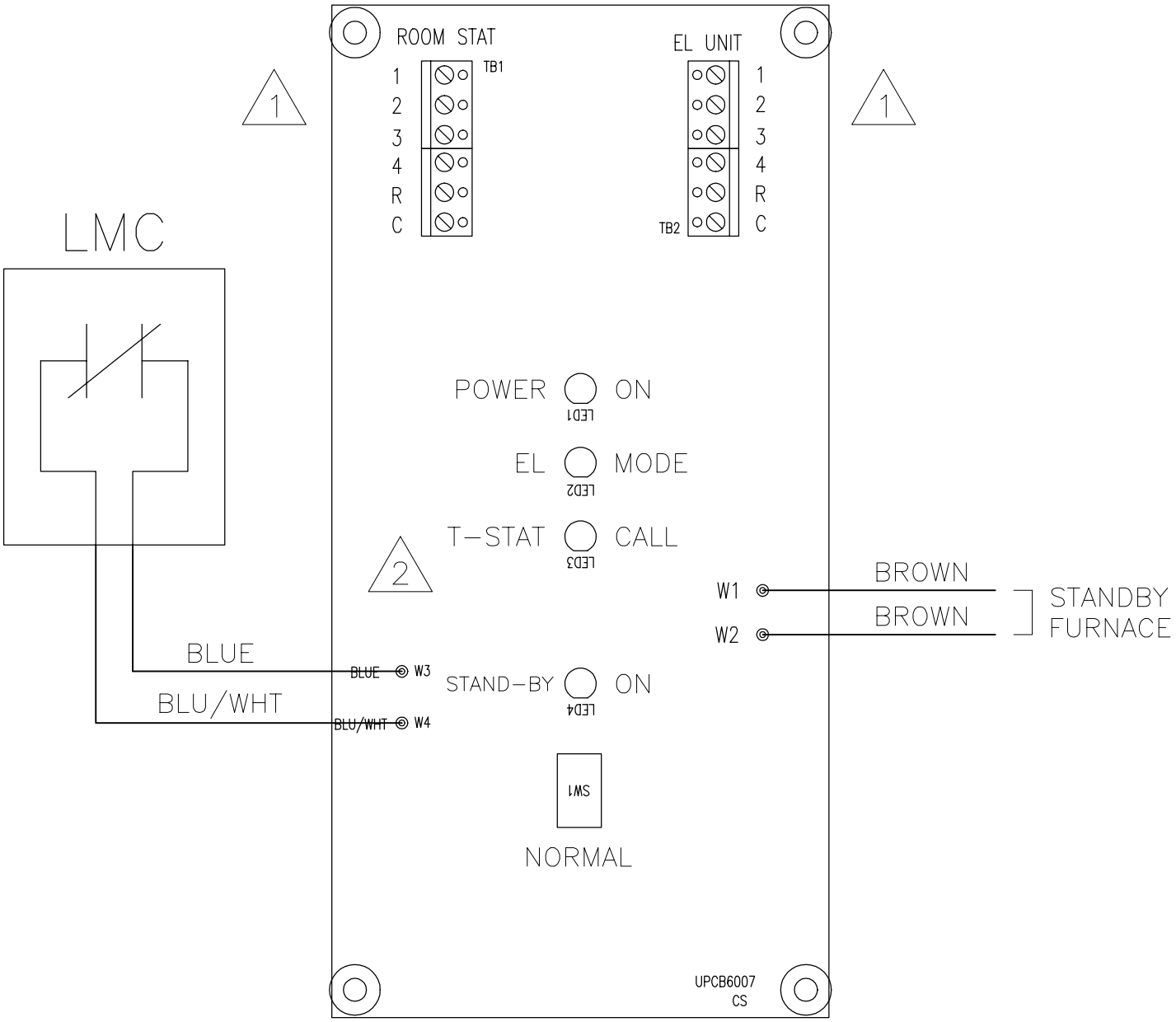
When the roomstat blower or "G" function is fed through terminal #4 and there is a utility on-peak interrupt, typically the blower is terminated. This is probably a good situation for winter. However, during summer on-peak air conditioning interrupt it is more desirable to keep blower on. This can be accomplished three ways:

1. Simply add a summer/winter toggle switch across the two spade terminals marked "T1" and "T2". This requires manual operation each spring and fall.
2. If it is a heat pump and the installer understands reversing valve wire/function, a 24-volt relay can sense the reversing valve wire and perform the contact closure function across "T1" and "T2".
3. Electro Industries has a 70° button thermostat (part #5138) which could be placed outdoors and connected to "T1" and "T2" to also operate as a temperature sensing automatic summer/winter.

Mechanical Roomstat Heat Anticipator

Set (or slightly smaller number) to the value specified by the electric furnace or electric unit connected between terminal 1 and C.



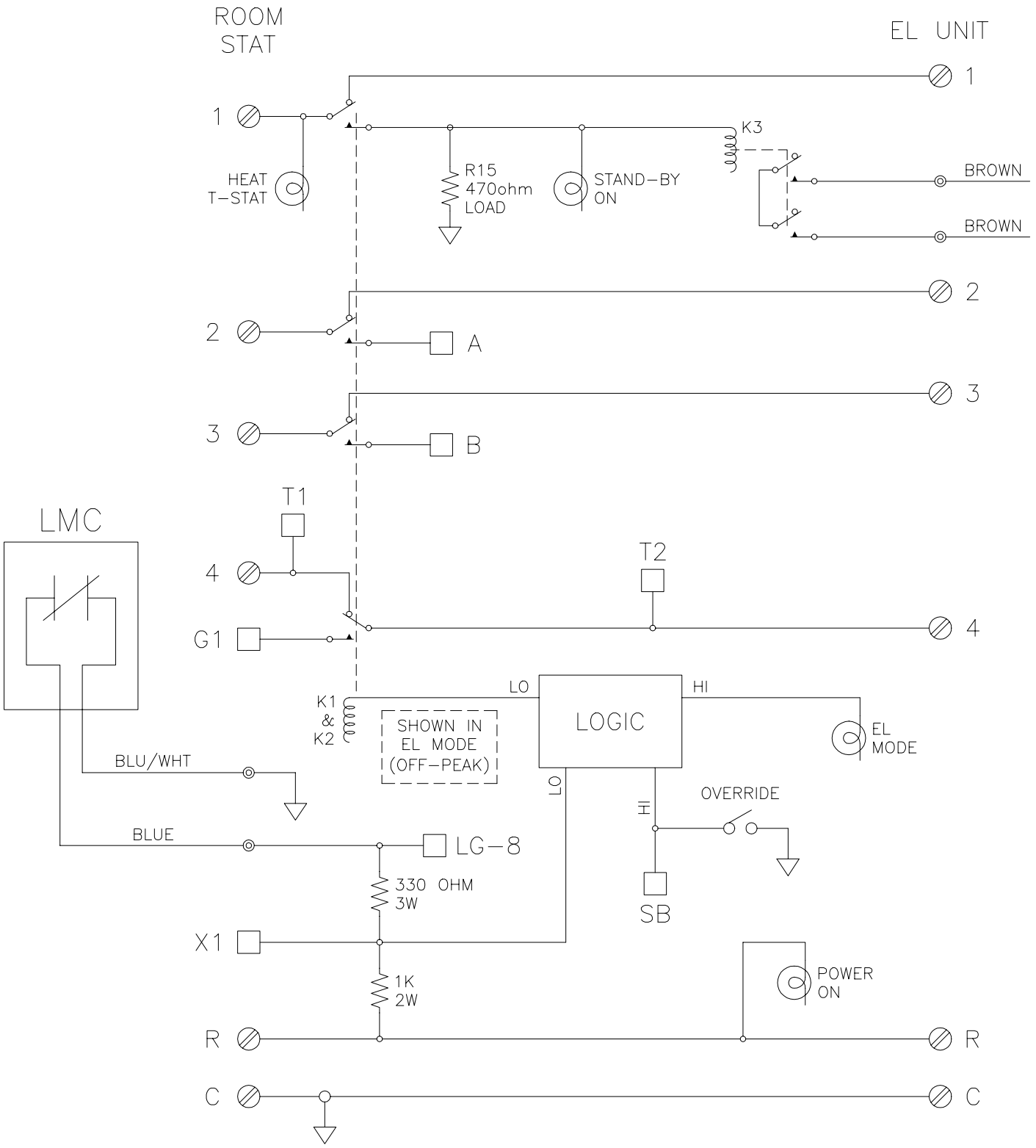


NOTES:

1. INTERNAL RELAY CONTACTS, OPEN DURING LOAD CONTROL. SEE INSTALL MANUAL FOR SUGGESTED CONNECTIONS. TERMINAL 1 MUST BE "W" OR STAT POINT USED FOR STAND-BY.

2. THIS LED RESPONDS TO TERMINAL #1.

ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362			DESCRIPTION HP-5046 HOOKUP	
DRAWN MEF	REFERENCE DOCUMENT --			
CHECKED	VIEW/DRAWING TYPE HOOKUP		SCALE NTS	PART/ASSY/MODEL NUMBER HP-5046
APPROVED	DRAWING STATUS RELEASED	DOCUMENT DATE 12-21-01	SHEET 1/1	DOCUMENT NUMBER HH112



ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362			DESCRIPTION HP–5046 ONE–LINE SCHEMATIC	
DRAWN MEF	REFERENCE DOCUMENT ––			
CHECKED	VIEW/DRAWING TYPE SCHEMATIC		SCALE NTS	PART/ASSY/MODEL NUMBER ––
APPROVED	DRAWING STATUS RELEASED	DOCUMENT DATE 02–14–02	SHEET	DOCUMENT NUMBER HS112

Electro Industries, Inc.

Limited Product Warranty

Effective February 5, 2009

Electro Industries, Inc. warrants to the original owner, at the original installation site, for a period of two (2) years from date of installation, 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 the 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 reasonable labor costs to repair defective product or product parts for ninety (90) days after installation.

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

Electro Industries, Inc. 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 installation. 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, Inc. warrants that the spin fin elements of its products are free from defects in materials and workmanship through the twentieth year following date of installation. 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, Inc. warrants that the open wire elements of its products are free from defects in materials and workmanship through the fifth year following date of installation. 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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THESE WARRANTIES DO NOT COVER:

1. Costs for labor for removal and reinstallation of an alleged defective product or product parts, 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 that has been damaged as a result of being improperly serviced or operated, including, but not limited to, the following: operated with insufficient water or airflow, allowed to freeze, subjected to flood conditions, subjected to improper voltages or power supplies, operated with airflow 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 that has been damaged as a result of natural disasters, including, but not limited to, the following: lightning, fire, earthquake, hurricanes, tornadoes or floods.
4. Any product 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 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. This warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
7. Transportation charges for any replacement part or component, service calls, normal maintenance; replacement of fuses, filters, refrigerant, etc.

CONDITIONS AND LIMITATIONS:

1. 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 thirty (30) days after the date of manufacture and **NOT** the date of installation.
2. The product must have been sold and installed by a licensed electrical contractor, a licensed plumbing contractor, or a licensed heating contractor.
3. 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 and federal codes and statutes. If not, the warranty will be null and void.
4. 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.
5. All related heating components must be maintained in good operating condition.
6. All lines must be checked to confirm that all condensation drains properly from the unit.
7. Replacement of a product or product part under this limited warranty does not extend the warranty term or period.
8. 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.
9. 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.

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