

ELECTRIC MAKE-UP AIR

With WarmFlo® Controller

Models:

EM-WX02-240-1-08

2.5 kW, 240-Volt, Single Stage, 8” Duct Section

EM-WX05-240-1-08

5 kW, 240-Volt, Single Stage, 8” Duct Section

EM-WX10-240-1-10

10 kW, 240-Volt, 2-Stage, 10” Duct Section

Specific Application

- Air exchanger, temperature boost
- Make-up air
- Temperature comfort boost

Comment

This module is a heating element and controller to “temper” the inlet air and bring it to a comfortable level. This unit contains a built in controller with duct sensor to modulate the electric element (part of this unit) using only the required electric energy to reach comfort level. This is more than basic on/off duct heater.

Drawings: EL906, UAW890, UAW892, XX017



General

This is a packaged electric element section, using finned rod elements, with a remote sensing control package for modulating the electric elements.

The typical installation arrangement is shown in FIGURE 1.

The element power is standard 240-volt, single phase. Control is simply supplying the two control wires with 24 volts to turn the unit on.

Caution: The control contact mechanism for supplying 24 volts to the yellow and black wires must have interlocking devices to assure airflow and the proper opening of any motorized dampers. This unit depends upon an external blower or air moving device providing minimal airflow across the electric elements before “turning the unit on”. Minimum airflow relates to temperature rise needs or design, Table 2 – CFM Chart, provides these CFM numbers.

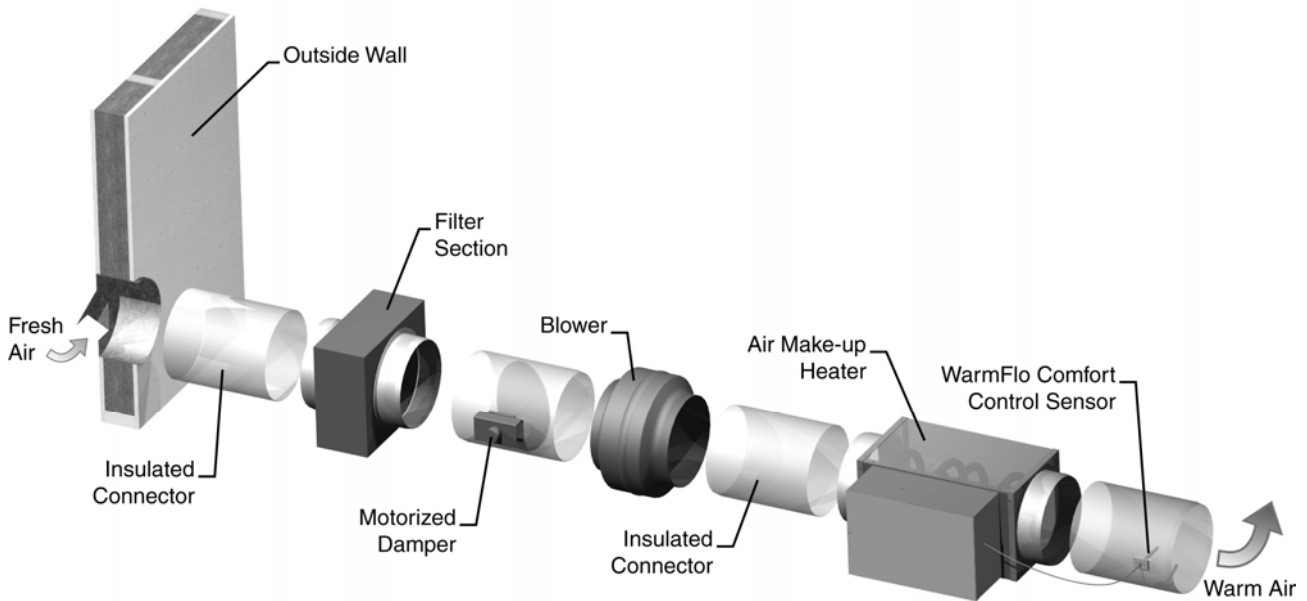


FIGURE 1

Table 1 Electrical Requirements

See “Electric Supply” on the attached document EL906.

Table 2 CFM Chart

See “Temperature Rise Chart” on the attached document EL906.

Installation Requirements

1. All installation work must be performed by trained, qualified contractors or technicians. Electro Industries, Inc., sponsors installation and service schools to assist the installer. **Visit our Website at electromn.com for upcoming product service schools.**
2. All electrical wiring must be in accordance with national electric codes and local electric codes, ordinances, and regulations.
3. Observe electric polarity and wiring colors. Failure to observe could cause electric shock and/or damage to the equipment.
4. 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 and manufacturer product liability. Electro Industries, Inc., cannot be held responsible for field modifications, incorrect installation, and conditions which may bypass or compromise the built-in safety features and controls.

Mechanical Installation

Insert this unit in a round duct arrangement. The air filtering and air moving devices are external to this unit. FIGURE 1 shows a typical arrangement.

Note: A minimum of a 24” duct section is required at the outlet for installation of the temperature sensing probe.

Clearance – Duct Surface Areas, Duct Installation, Etc.

When installed in an “inline” duct or round pipe adapter for a general distribution boost heater or air make-up application, observe the following guidelines:

1. This product must be installed in a metal duct, size of the element rack.
2. There shall be no insulation on the inside of this sheet metal duct section.
3. Any flex-pipe or other insulated pipe must be at least 24” from the electric element.
4. The control box must be positioned so it will not receive water dripping or collection of moisture.
5. See next section on duct sensor installation.

Duct Sensor

This unit is equipped with a remote temperature-sensing probe. This is a solid state probe (actually mini-micro computer chip at the end of the probe), handle with care.

Suggested installation is in the main warm air stream approximately 20 to 24 airflow inches away from the electric element. Simply drill a ½” hole in the duct, insert probe, and screw in place.

Coil and tie excess cable. It should be connected to the Red, ST, and COM screw terminals.

WARNING

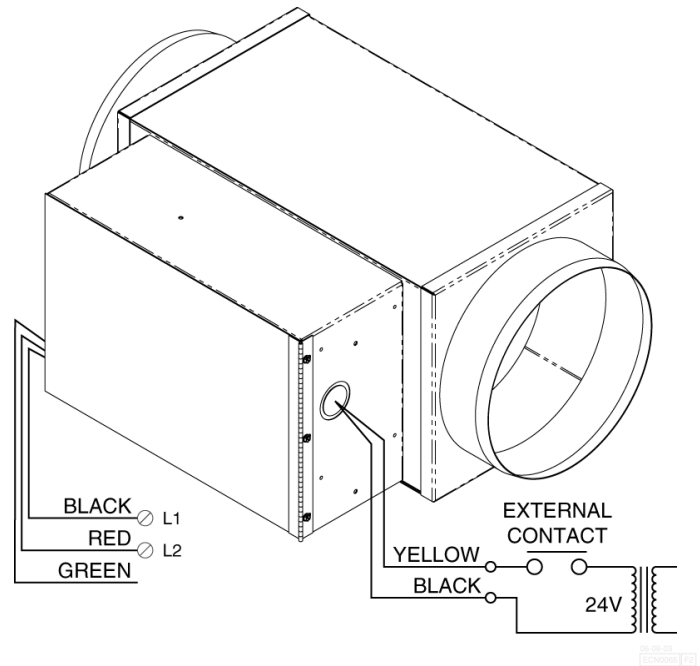
IF THE BLACK AND RED SENSOR WIRES ARE CROSSED OR INCORRECTLY INSTALLED AT THE TERMINAL BLOCK AND POWER IS TURNED ON, BURNOUT DAMAGE CAN RESULT WITHIN THE SENSOR PROBE.

Electrical Hookup

240-volt source – from the model number and nameplate determine kW size and amp draw. According to local codes, building type, wiring length, etc. use appropriate wiring conductor size and source circuit breaker. Connect to the terminal block.

Grounding – route and install appropriate size ground conductor between the ground lug and the building service panel ground bus. This must be a conductor size according to the total amp rating of the appropriate unit. Electrical conduit is not an adequate ground conductor.

Operation – this unit “turns on” or heats when 24 volts are applied to the yellow and black wires. Via an external 24-volt transformer or an external transformer applying 24 volts through an interlocking contact (airflow switch, danger end switch, etc., which is necessary to prevent unsafe operation) arrange your control circuit to apply 24VAC power when you want boost heat.



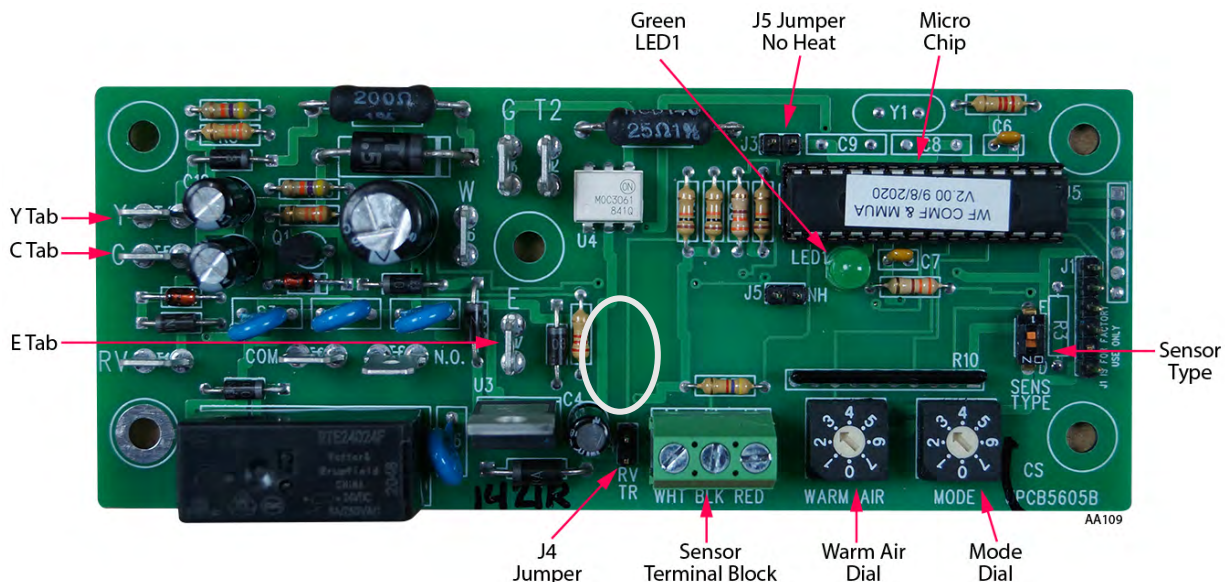
SUMMER OR COOLING DISABLE

This module must be disabled during the cooling cycle to prevent adding heat to the air conditioning operation.

Select one of the following 3 installation techniques or methods:

- Extend HP reversing valve wire to the designated “RV” tab. When jumper J4 is in place, 24VAC applied to the RV tab will disable elements. Review your heat pump’s installation manual to make certain of your heat pump’s reversing valve logic.
- Add a manual (summer) disable toggle switch between “R” and “RV” tab.
- Simply turn off 24ØV breaker during the cooling season.

Method B or C should be used for boost heater applications.



Operational Tips

Outlet Temperature Setting

The inside circuit board contains two screwdriver switches marked Ø through 7. Adjust them to select the desired set point for your application.

EX: Ideal set point = 86°

Mode Dial would be set to #4

Warm Air Dial would be set to #0

NOTE: MODE DIAL setting # 7 is not applicable to this product

Mode Dial Temperature Range Options

WARM AIR DIAL	MODE DIAL							7
	0	1	2	3	4	5	6	
0	-10	14	38	62	86	110	134	MUA II
1	-7	17	41	65	89	113	137	
2	-4	20	44	68	92	116	140	
3	-1	23	47	71	95	119	140	
4	2	26	50	74	98	122	140	
5	5	29	53	77	101	125	140	
6	8	32	56	80	104	128	140	
7	11	35	59	83	107	131	140	

Checkout and Calibration

There is no field calibration or adjustments.

Total element operation can be accomplished by jumpering system “R” (24 volts) to “E” internal terminals. In essence, this bypasses the temperature modulation function and causes the element to be full on.

However, see previous section “Summer or Cooling Disable”.

Monitor Lights

The green LED on the circuit board indicates power at the electric element or modulation of the electric element. For example, when the LED is on, full power is at the electric element.

Sequence

- A. Electric element is on for 10 seconds after the application of 24 volts AC between yellow and black wire.
- B. Electric element turns off if the temperature is above the warm air set point.
- C. If the temperature drops, the electric element modulates to bring it back to the desired temperature level.
- D. If the electric element is fully on (LED on constant) this unit cannot make up the air temperature required between the duct inlet air and the temperature set point at the sensor probe.

Troubleshooting

All service troubleshooting must be performed by trained, qualified contractors or technicians. A volt/ohm meter is required for proper diagnosing. A clamp-on amp meter is also very helpful.

1. Green LED 1 flashing two pulses every two seconds – this indicates the control board cannot read temperature sensor. Verify temperature sensor wire connections. If secure, replace sensor.
2. No heat –
Green LED 1 off:
 - a) Verify temperature set point. If the incoming air is higher than set point, the element will remain off. Adjust temperature set point to a higher setting and verify element comes on with amp meter.
 - b) If incoming air temperature is less than set point, disconnect the red/black/white sensor wires.
 - 1) If the unit starts heating and green LED 1 is pulsing, replace the temperature sensor
 - 2) If green LED 1 remains off, replace the control board

Green LED 1 on:

- a) Verify incoming 240-volt power. The 24VAC control voltage is typically sourced separately.
 - b) Verify 240-volt across element terminals.
 - 1) If 240-volt is present, shut off the power source and disconnect element wires to verify element resistance. A good element should measure approximately 10 ohms each.
 - 2) With 240V source power turned on and no 240-volt directly across the element, check the following points referencing UAW890 or UAW892 depending on your model:
 - a) Measuring across limit switch, 0V (closed) indicates the limit is okay. Measuring 240V (open), limit is bad or sensing temperatures are over 118° or 150°. With power disconnected, check ohms. If limit is below room temperature open line (OL) this indicates limit is bad.
 - b) Solid state relay (SSR) 4-wire – check for 240VAC across terminals (3, 4) and (1, 2).
 - a) 240V measured between terminals 3-4 and 0V measured between terminals 1-2 indicate the solid state relay is good
 - b) 240V between terminals 3-4 and 240V and between terminals 1-2 indicates solid state relay is bad
 - c) Mechanical K1 relays:
 - a) 240V measured across the coil and 0V measured across contacts indicates the relay is good
 - b) 240V measured across the coil and 240 measured across contacts indicate the relay is bad
 - d) If there is no control voltage present at SSR or K1 relays with green LED1 on, replace control board.
3. Not enough heat –
 - a) Check amperage draw. Approximately 8.33 amps means the element is at full power.
 - b) Verify CFM and temperature rise. High CFM will result in low temperature rise. Cold incoming air will be warmed based on the CFM Temperature Rise Chart on the attached document EL906.

Specification Sheet - Electric Make-Up Air/Boost Heater

STANDARD EQUIPMENT

- 240V, single phase - hard-wired, external fusing required
- Hi-limits, automatic reset - 118° F/150° F/180° fused link
- 20-year element warranty
- 2-year parts warranty
- Temperature sensing with full modulation
- Maintains specific temperature set point
- 8" or 10" round duct section
- Quiet DC power relays
- Thermostat end switch connection point
- Unique design allows for simplified installation
- Cooling mode element disable option
- Requires 24V external control power supply
- Made in the USA

TEMPERATURE RISE CHART*

Temperature Rise Needed		80° F	70° F	60° F	50° F	40° F	30° F
Model	Watts	CFM	CFM	CFM	CFM	CFM	CFM
EM-WX02-240-1-08	2500	99	113	132	158	198	263
EM-WX05-240-1-08	5000	197	225	262	319	393	525
EM-WX10-240-1-10	10000	393	450	525	630	787	1050

*Typically the maximum temperature rise for this product is 40° F for room air inlet. If used for make-up air, larger temperature rises are permissible, see table above.

ELECTRIC SUPPLY

Model	kW	Btu/h	Amps	Fuse	Phase	Voltage	Source CB	Shipping Weight	Minimum CFM	Duct Collar
EM-WX02-240-1-08	2.5	8,500	10.41	N/A	1-50/60	240	15	31	90	8"
EM-WX05-240-1-08	5	17,000	20.83	N/A	1-50/60	240	30	32	190	8"
EM-WX10-240-1-10	10	34,000	41.66	N/A	1-50/60	240	60	36	390	10"

CHIP CODE OPTIONS†

Switch Position	B	C	D	E	H
0	96°	20°	40°	60°	88°
1	100°	25°	52°	65°	90°
2	104°	30°	64°	70°	92°
3	108°	35°	76°	75°	94°
4	112°	40°	88°	80°	96°
5	116°	45°	100°	85°	98°
6	120°	50°	112°	90°	100°
7	124°	55°	124°	95°	102°

†Comfort level temperature setting - choose correct chip code for application. Note: Unless otherwise specified, product will be shipped with a default "D" chip.

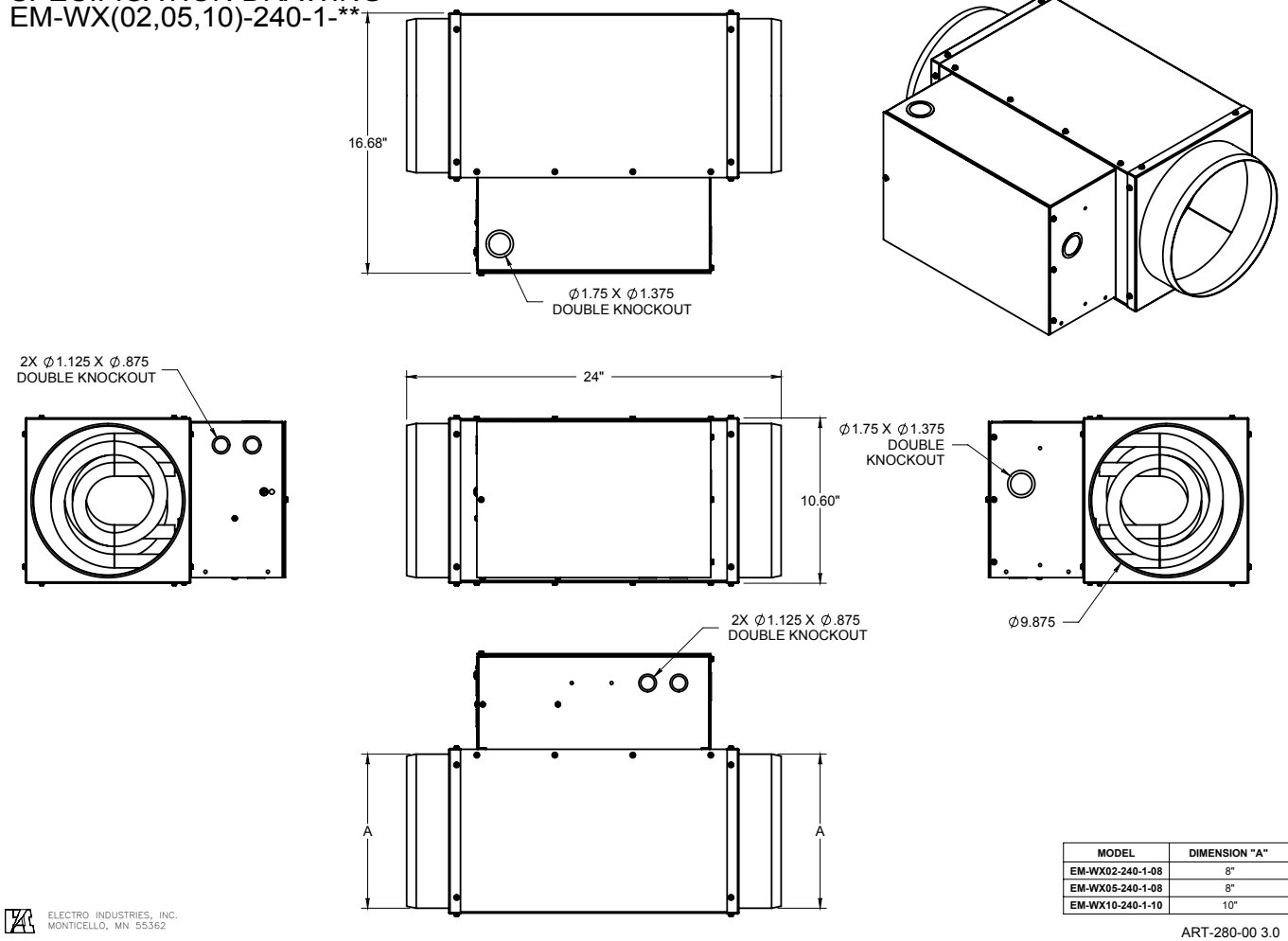
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**ELECTRO
INDUSTRIES**

Monticello, Minnesota
800.922.4138
www.electromn.com

SPECIFICATION DRAWING
EM-WX(02,05,10)-240-1-***



ELECTRO INDUSTRIES, INC.
 MONTICELLO, MN 55362

Installation Specifications

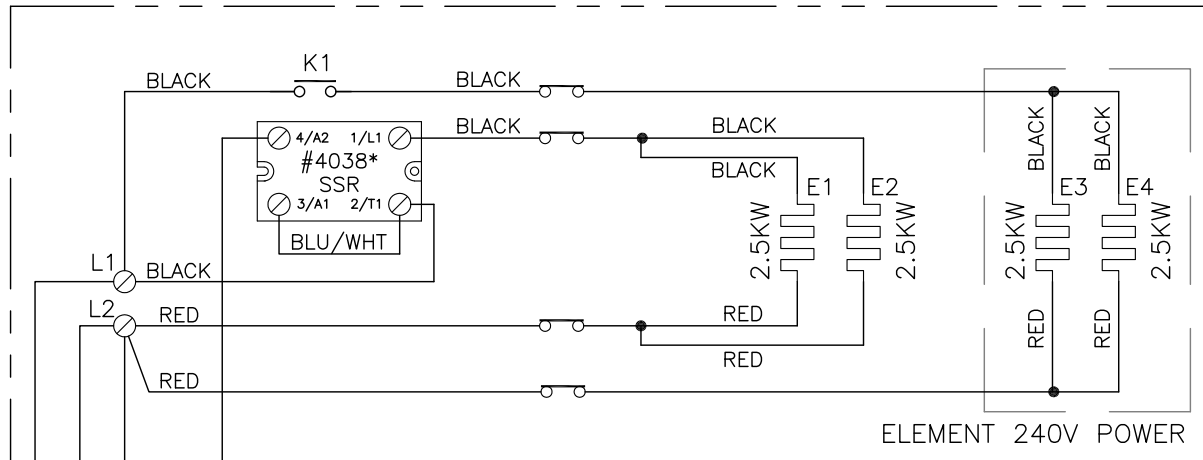
When installing this duct heater, NEC 424, Part IV, Duct Heaters, applies.

When installed in an "inline" duct or round pipe adapter for a general distribution boost heater or make-up air application, observe the following guidelines:

1. This product must be installed in a metal duct, size of element rack.
2. There shall be no insulation on the inside of this sheet metal duct section.
3. Any flex-pipe or other insulated pipe must be at least 24" from the electric element.
4. Mounting - there must be at least 2" air clearance around all sides of this sheet metal duct section.
5. If there is a need to insulate this duct section for moisture condensation or in an unheated compartment, it is permissible to wrap insulation around the exterior of this metal duct section.
6. The control box must be positioned so it will not receive dripping water or collection of moisture.

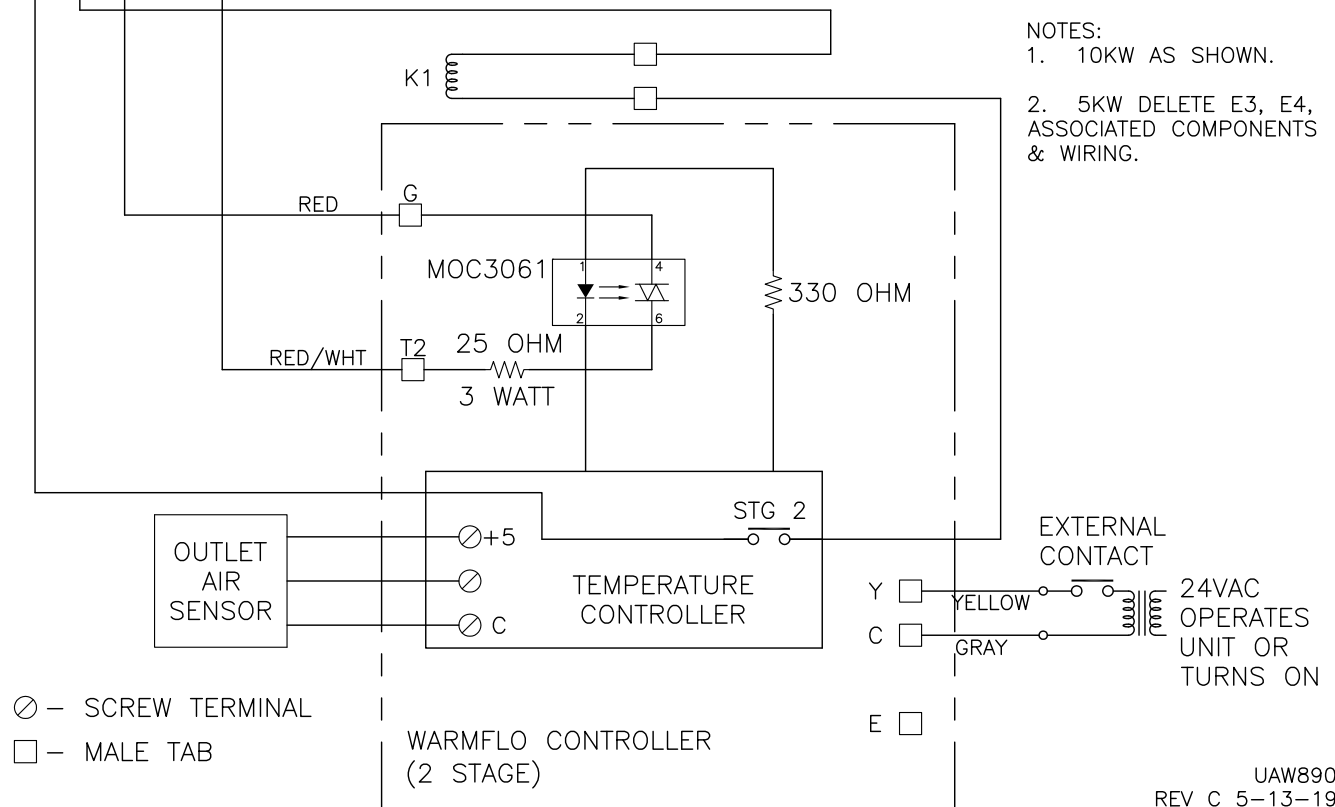
FOR MANUAL NOT TO SCALE

EM-WX05-240-1-08, EM-WX10-240-1-10



NOTES:

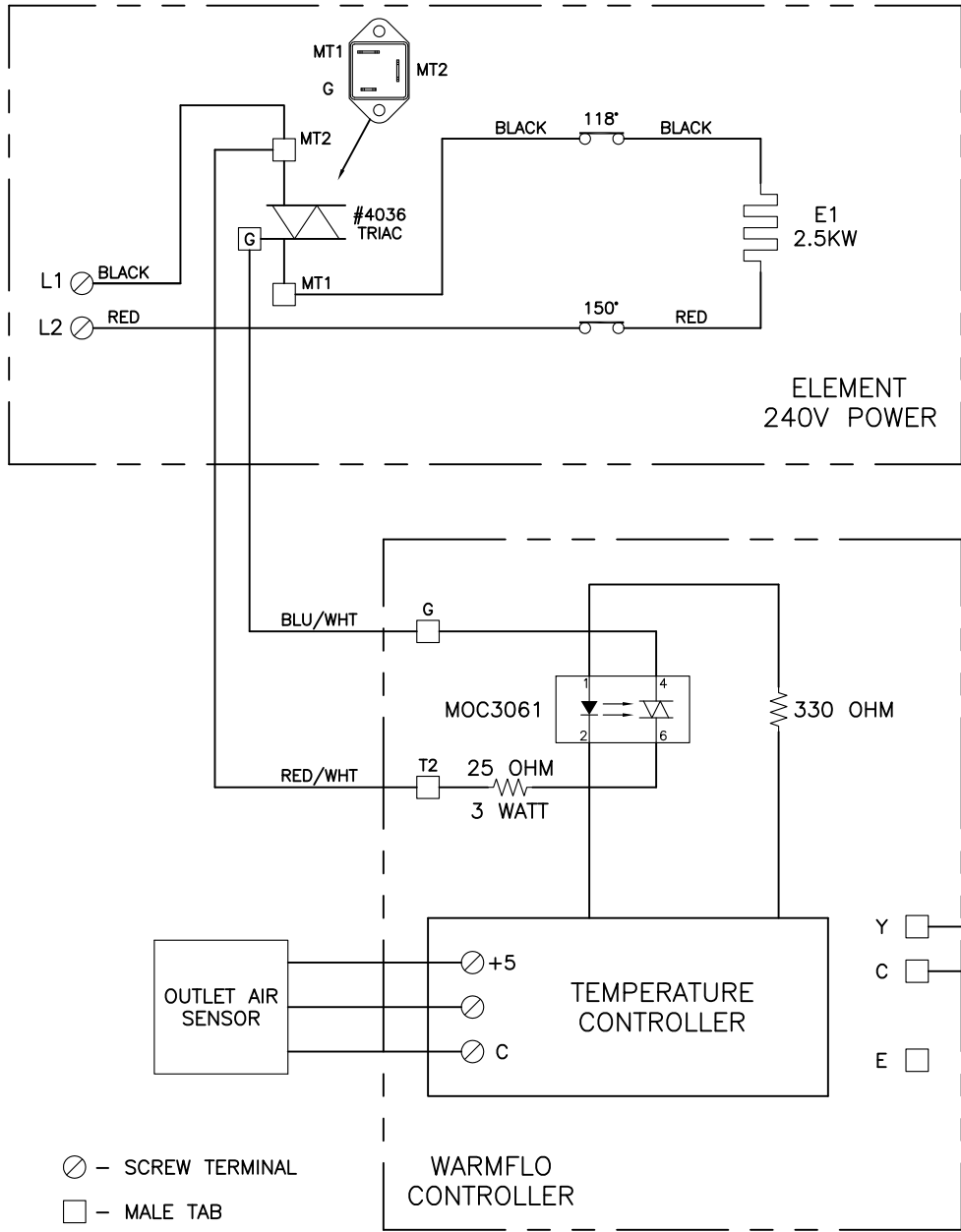
1. 10KW AS SHOWN.
2. 5KW DELETE E3, E4, ASSOCIATED COMPONENTS & WIRING.



⊙ - SCREW TERMINAL
 □ - MALE TAB

EXTERNAL CONTACT
 Y □ YELLOW
 C □ GRAY
 E □
 24VAC OPERATES UNIT OR TURNS ON

EM-WX02-240-1-08



UAW892
REV A 08-26-16

A 08-26-16	ELECTRO INDUSTRIES, INC. MONTICELLO, MN 55362		DESCRIPTION	
	DRAWN	REFERENCE DOCUMENT	EM-WX02-240-1-08 WIRING DECAL	
	CRN	EW934	SCALE	PART/ASSY/MODEL NUMBER
	CHECKED	VIEW/DRAWING TYPE	NTS	UAW892
APPROVED	DRAWING STATUS	DOCUMENT DATE	SHEET	DOCUMENT NUMBER
	PRODUCTION	08-26-16	1/1	UAW892

Electro Industries, Inc. Residential Limited Product Warranty

Effective November 1, 2009

Electro Industries, Inc. 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, Inc. 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, Inc. If any product or product parts manufactured by Electro Industries, Inc. are found to have manufacturing defects in materials or workmanship, such will be repaired or replaced by Electro Industries, Inc. Electro Industries, Inc., shall have the opportunity to directly, or through its authorized representative, examine and inspect the alleged defective product or product parts. Electro Industries, Inc. may request that the materials be returned to Electro Industries, Inc. 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, Inc. or its authorized representative.

Electro Industries, Inc. 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, 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 original purchase. If any boiler elements or vessels are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. 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 original purchase. If any spin fin elements are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. 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 original purchase. If any open wire elements are found to have a manufacturing defect in materials or workmanship, Electro Industries, Inc. will replace them.



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, Inc. 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, Inc. 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, Inc. 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, Inc. 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, Inc., 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, Inc. 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, INC. 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.