Installation & Operating Manual

Packaged Make-Up Air

Heat Models EM-MC*, EM-MD*, EM-ME*, EM-MF*, EM-MG*

Included With This Product

- Permanent washable air filter
- Powered inlet damper
- (2) temperature sensors
- (1) current transformer (CT doughnut)
- Chain kit for ceiling installations

Other Requirements

- Low voltage (Class II type) wiring when using supply CT doughnut to control Make-Up Air unit
- High voltage wiring
- Fresh air intake wall or roof vent
- Inlet/outlet ductwork

Application

This product aids in preventing building depressurization where there is single or multi-source exhaust points, coupled with a tight building envelope such as:

- Single, large exhaust source
  - Kitchen range hood
    - Single or multi-speed exhaust blower interface
- Multiple exhaust sources
  - Bathroom fan, fireplace, dryer, gas furnace, dryer, etc.

Note

- In applications where the exhaust fan utilizes a multi-speed blower, this product has the ability to sense each fan speed by monitoring the amperage of the exhaust fan motor. After completing the mechanical portion of the installation, see **Multi-Speed Setup** for further details explaining how to utilize this unique feature. Configuring the Make-Up Air unit to vary its speed to closely match the blower speed of the external exhaust source blower motor allows for balanced system operation.

Conforms to: UL STD.UL1995
Certified to: CSA STD.C22.2#236

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

Intertek

ELECTRO INDUSTRIES
Monticello, Minnesota
800.922.4138
www.electromn.com

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Product Description

This is a self-contained package with a permanent (washable) air filter, electric heating elements, modulating element temperature control, powered damper and blower. This product has been designed specifically for outside air inlet.

All models include WarmFlo electronic outlet temperature sensor and associated control circuitry to modulate the electric elements for a fixed outlet temperature. This means the electric element is only used to "make-up" or heat the outside fresh air to the preset temperature point. There is no overheating or inefficient use of the electric element.

Heating is locked out when entering air temperature is greater than 55°F (12.7°C).

All models (except EM-MB) include a multi-speed blower function; see **Basic Setup & Configuration** for further detail.

Diagrams used throughout the installation manual represent general installation requirements. Due to various model sizes available, actual unit mechanical and wiring requirements will vary dependent upon specific model.

Handling & Storage

Receiving
It is the receiver's (person and/or company signing off on the receiving Bill of Lading) responsibility to inspect for shipping damage. All shipping claims must be made by the receiver.

Storage
Packed or unpacked, the Make-Up Air unit shall not be exposed to rain, snow, or other adverse environment. This product is designed for in-building storage and installation only.

As much as possible this product must be protected throughout the construction phase to avoid accumulation of dust and moisture on the components and control box. The installing contractor is responsible for maintaining the cleanliness and quality of this unit until installation is complete and approved by the user/end customer.

Placement & Mechanical Information

This product is designed for zero clearance, but use the following mounting and spacing criteria:

1. Unit can be installed vertically or horizontally. When vertical, inlet must face down.
2. When using CT doughnut, use Class II low voltage wiring methods to connect CT to Make-Up Air unit.
3. Make mounting provisions for a 1" air space at the top.
4. The sides, any location, can be in direct contact with wood framing materials.
5. No materials shall be in contact with the cabinet housing which has a flame point less than wood, 300°F (150°C).
6. Product shall be installed in a conditioned space only.
7. Heating is locked out when entering air temperature is > 55°F (12.8°C).

Make-Up Air Product Configurator

EM-MD10-240-1-10

CFM
A = Original
B = 150 CFM
C = 350 CFM
D = 600 CFM
E = 900 CFM
F = 1050 CFM
G = 1200 CFM

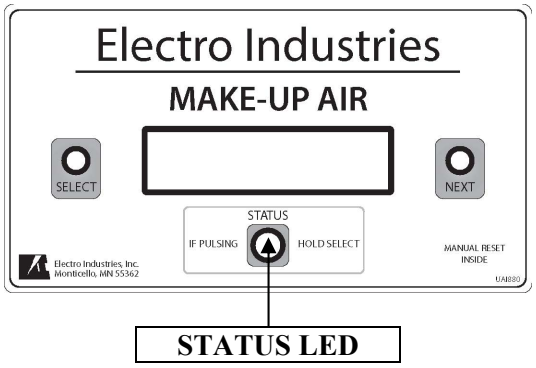
kW
00 = 0 kW
01 = 1 kW
02 = 1.6 kW
03 = 2.4/2.5 kW
05 = 4.8/5 kW
07 = 7.2 kW
08 = 7.5 kW
10 = 9.6/10 kW
14 = 14.4 kW
15 = 15 kW
20 = 20 kW
22 = 21.6 kW

Collar Size
06 = 6”
08 = 8”
10 = 10”
14 = 14”

Phase
1 = Single phase
3 = Three phase

Volts
120 = 120-volt
208 = 208-volt
240 = 240-volt

System Status



Status LED (front yellow LED) – is software driven LED which alerts the user that a message is available in the message center.

- Status LED OFF = No message is available
- Status LED Blinking = Message is available
  - To access available messages, the user must press and hold the “SELECT” button for 3 seconds.

Possible messages:

- Faulty sensor (IN and/or OUT)
- Manual hi-limit
- Automatic hi-limit
- Software hi-limit

See **Troubleshooting** section for more information on viewing available messages.

Specification Tables

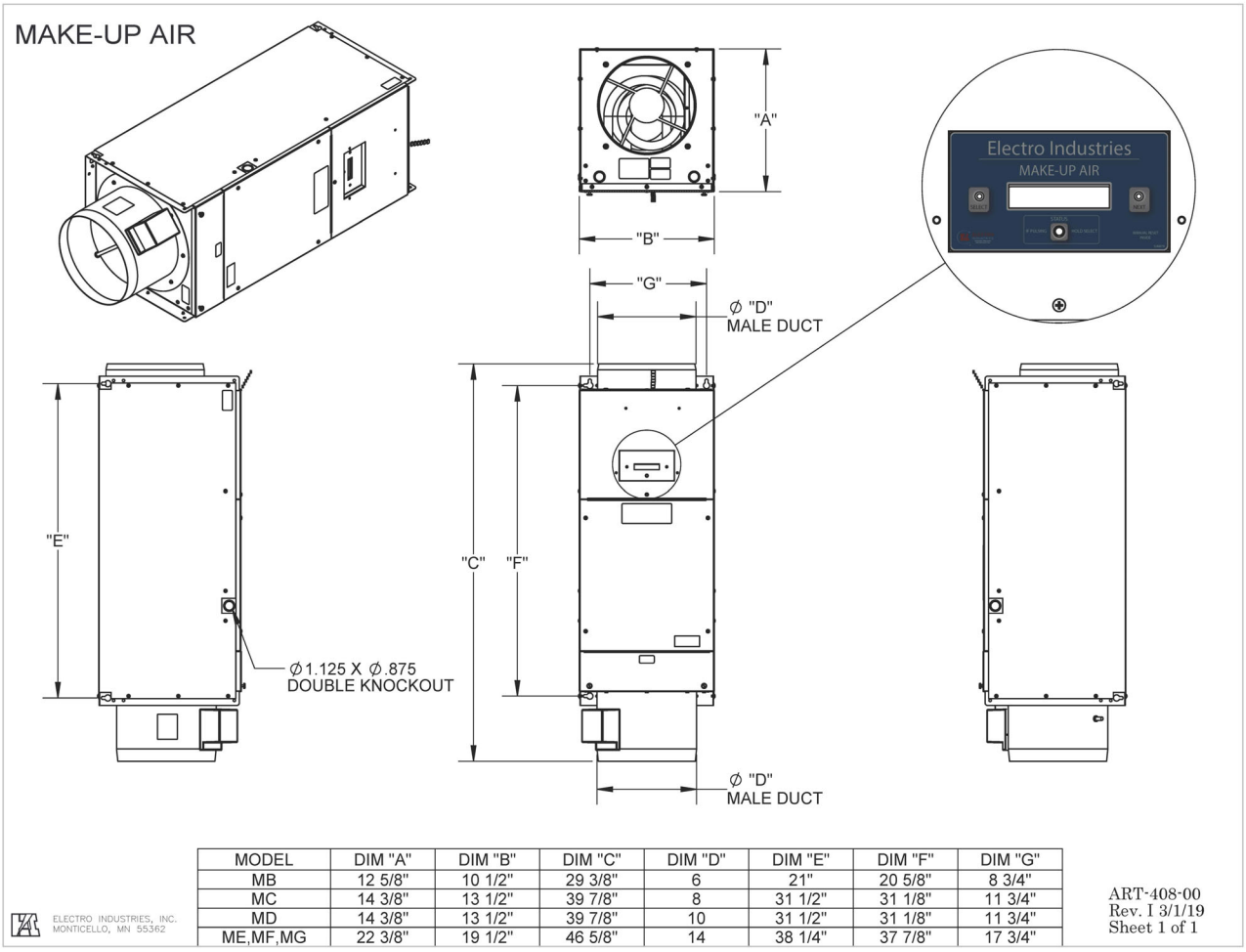
Temperature Rise & CFM Chart

Required Temp Rise	kW →	1	1.6	5	7.2	10	15	20	14.4	21.6
		CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
	80° F	39	71	197	277	395	604	790	553	869
	70° F	45	81	225	325	451	677	903	632	993
	60° F	53	95	260	379	526	790	1053	737 I	1160
	50° F	63	114	316	455	632	948	1264	885	N/A
	40° F	79	158	395	568	790	1185	N/A	1130	N/A
	30° F	105	168	526	758	1053	N/A	N/A	N/A	N/A

Specifications

Model	kW	Btu/h	Amps	Internal CB	Motor FLA	Motor HP	Phase	Voltage	CFM		Max Fuse/ HACR Amps	Duct Connection
									Max	Static		
EM-MC05-240-1-08	5/3.8	17060/12795	20.8/18.0	N/A	0.4	1/10	1	240/208	350	.50	30	8”
EM-MC05-208-3-08	4.8	16378	13.3	N/A	0.4	1/10	3	208	350	.50	20	8”
EM-MD10-240-1-10	10/7.5	34121/25591	41.7/36.1	N/A	0.8	1/5	1	240/208	600	.50	60	10”
EM-MD05-240-1-10	5/3.8	17060/12795	20.8/18.0	N/A	0.8	1/5	1	240/208	600	.50	30	10”
EM-MD10-208-3-10	9.6	32756	26.6	N/A	0.8	1/5	3	208	600	.50	35	10”
EM-MD05-208-3-10	4.8	16378	13.3	N/A	0.8	1/5	3	208	600	.50	20	10”
EM-ME15-240-1-14	15/11.3	51182/38386	62.5/54.1	60A + 30A	1.5	1/4	1	240/208	900	.50	90	14”
EM-ME10-240-1-14	10/7.5	34121/25591	41.7/36.1	N/A	1.5	1/4	1	240/208	900	.50	60	14”
EM-ME05-240-1-14	5/3.8	17060/12795	20.8/18.0	N/A	1.5	1/4	1	240/208	900	.50	30	14”
EM-ME14-208-3-14	14.4	49134	40.0	50A	1.5	1/4	3	208	900	.50	50	14”
EM-ME10-208-3-14	9.6	32756	26.6	N/A	1.5	1/4	3	208	900	.50	35	14”
EM-ME05-208-3-14	4.8	16378	13.3	N/A	1.5	1/4	3	208	900	.50	20	14”
EM-MF15-240-1-14	15/11.3	51182/38386	62.5/54.1	60A + 30A	1.5	1/4	1	240/208	1050	.50	90	14”
EM-MF10-240-1-14	10/7.5	34121/25591	41.7/36.1	N/A	1.5	1/4	1	240/208	1050	.50	60	14”
EM-MF05-240-1-14	5/3.8	17060/12795	20.8/18.0	N/A	1.5	1/4	1	240/208	1050	.50	30	14”
EM-MF14-208-3-14	14.4	49134	40.0	50A	1.5	1/4	3	208	1050	.50	50	14”
EM-MF10-208-3-14	9.6	32756	26.6	N/A	1.5	1/4	3	208	1050	.50	35	14”
EM-MF05-208-3-14	4.8	16378	13.3	N/A	1.5	1/4	3	208	1050	.50	20	14”
EM-MG20-240-1-14	20/15	68242/51182	83.3/72.1	60A + 60A	3.3	1/2	1	240/208	1200	.50	120	14”
EM-MG15-240-1-14	15/11.3	51182/38336	62.5/54.1	60A + 30A	3.3	1/2	1	240/208	1200	.50	90	14”
EM-MG10-240-1-14	10/7.5	34121/25591	41.7/36.1	N/A	3.3	1/2	1	240/208	1200	.50	60	14”
EM-MG05-240-1-14	5/3.8	17060/12795	20.8/18.0	N/A	3.3	1/2	1	240/208	1200	.50	30	14”
EM-MG22-208-3-14	21.6	73702	60.0	50A + 30A	3.3	1/2	3	208	1200	.50	80	14”
EM-MG14-208-3-14	14.4	49134	40.0	50A	3.3	1/2	3	208	1200	.50	50	14”
EM-MG07-208-3-14	7.2	24567	20.0	N/A	3.3	1/2	3	208	1200	.50	25	14”

Dimensional Drawings



MODEL	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	DIM "F"	DIM "G"
MB	12 5/8"	10 1/2"	29 3/8"	6	21"	20 5/8"	8 3/4"
MC	14 3/8"	13 1/2"	39 7/8"	8	31 1/2"	31 1/8"	11 3/4"
MD	14 3/8"	13 1/2"	39 7/8"	10	31 1/2"	31 1/8"	11 3/4"
ME,MF,MG	22 3/8"	19 1/2"	46 5/8"	14	38 1/4"	37 7/8"	17 3/4"

ELECTRO INDUSTRIES, INC.
MONTICELLO, MN 55362

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Sheet 1 of 1

Safety Consideration

⚠WARNING

BEFORE PERFORMING SERVICE OR MAINTENANCE OPERATIONS ON A SYSTEM, TURN OFF MAIN POWER SWITCHES TO THE INDOOR UNIT. IF APPLICABLE, TURN OFF THE ACCESSORY HEATER POWER SWITCH. ELECTRICAL SHOCK COULD CAUSE PERSONAL INJURY.

Installing and servicing electric heating equipment can be hazardous due high voltage and electrical components. Only trained and qualified service personnel should install, repair or service heating and air conditioning equipment. Untrained personnel can perform the basic maintenance functions of cleaning coils and cleaning and replacing filters. All other operations should be performed by trained service personnel. When working on heating and air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit and other safety precautions that may apply, such as the following safety measures:

- Follow all safety codes.
- Wear safety glasses and work gloves.

Installation Requirements

1. All installation work must be performed by trained, qualified contractors or technicians. Electro Industries sponsors installation and service schools to assist the installer. **Visit our Website at www.electromn.com for upcoming service schools.**

   ⚠WARNING

   ALL ELECTRICAL WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE AND LOCAL ELECTRIC CODES, ORDINANCES, AND REGULATIONS.

   ⚠WARNING

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

   ⚠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 safety 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.

   ⚠CAUTION

   This unit shall not be operated (either heating section or blower) until the interior of the structure is completed and cleaned. This also means all duct work must be complete with filter, etc. Manufacturer's warranty is void if this unit is operated during structure construction.

   ⚠CAUTION

   Hazards or unsafe practices could result in property damage, product damage, severe personal injury and/or death.

2. At Electro Industries the safety of the installer and the end user is of highest priority. Remember, safety is the installer's responsibility and the installer must know this product well enough to instruct the end user on its safe use. Professional installers should be trained and experienced in the areas of handling electrical components, sheet metal products, and material handling processes.

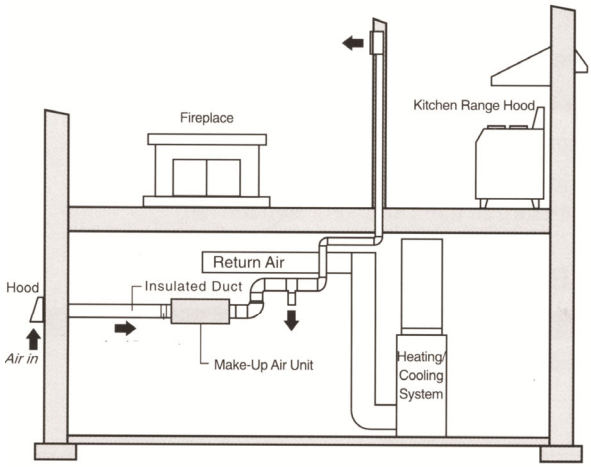
Installation Overview

This Make-Up Air unit contains interface/logic devices, one current transformer (CT doughnut), inlet and outlet temperature sensors, power open/power close damper, permanent washable filter and blower motor. Based on the application, other system components may be required to make your system operate as desired. These components must be provided by the installing contractor. These components may include but are not limited to:

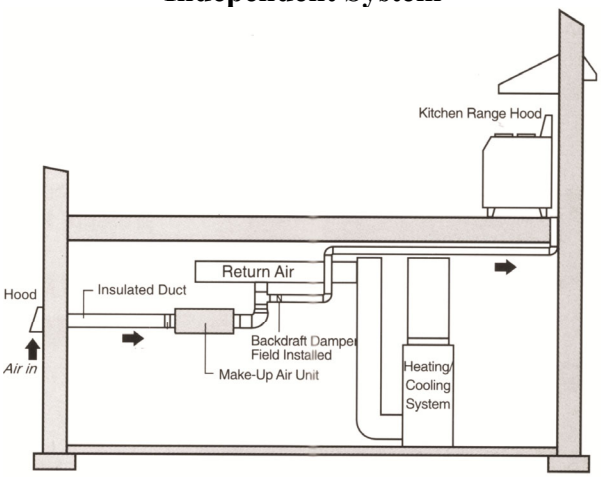
- Outside hood
- Insulated inlet ducting
- Outlet ducting
- Additional current transformers (only for multi-fan applications)
- Low voltage wiring for the current transformer (CT)
- Source power wiring

Refer to the below diagrams which show various system configurations.

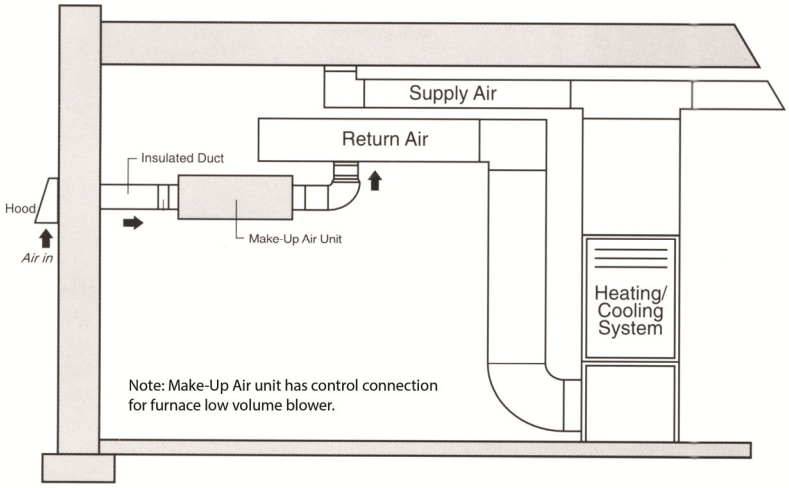
Make-Up Air Independent System



Make-Up Air Combined Return Tie-In & Independent System



Make-Up Air Return Tie-In System



Mechanical Installation

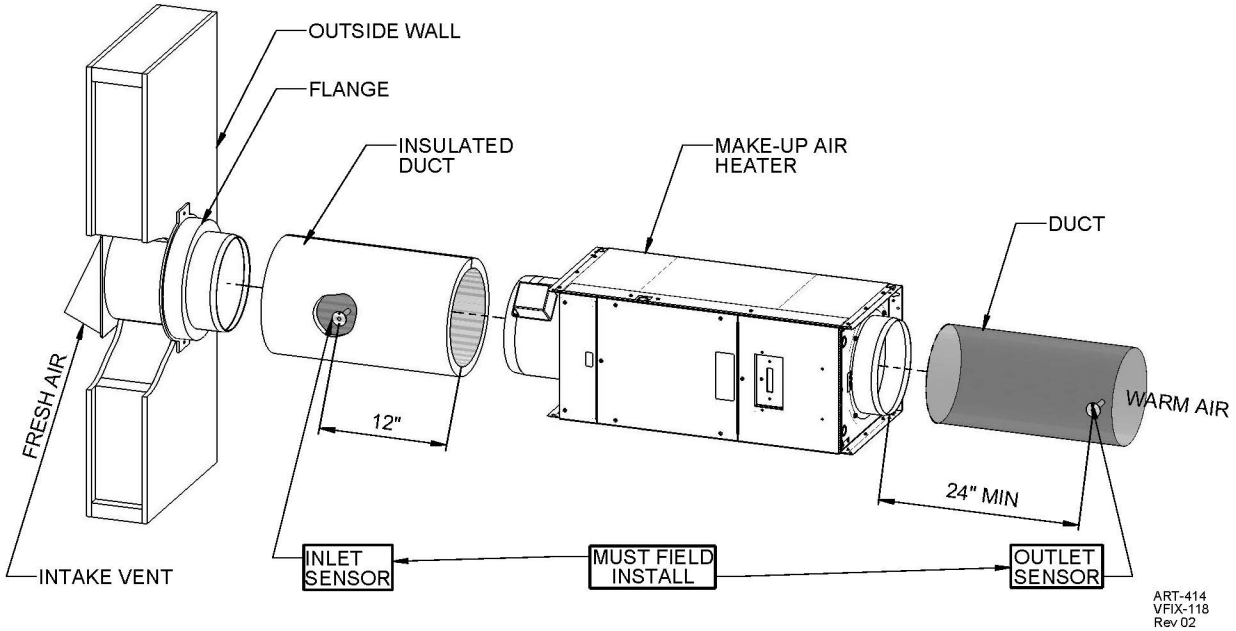
This product is designed for zero clearance, but use the following mounting and spacing criteria:

1. Unit can be installed vertically or horizontally. When vertical, inlet must face down.
2. When using CT doughnut, use Class II low voltage wiring methods to connect CT to Make-Up Air unit.
3. The sides, any location, can be in direct contact with wood framing materials.
4. No materials shall be in contact with the cabinet housing which has a flame point less than wood, 300°F (150°C).
5. Product shall be installed in a conditioned space only.
6. Heating is locked out when entering air temperature is > 55°F (12.8°C).

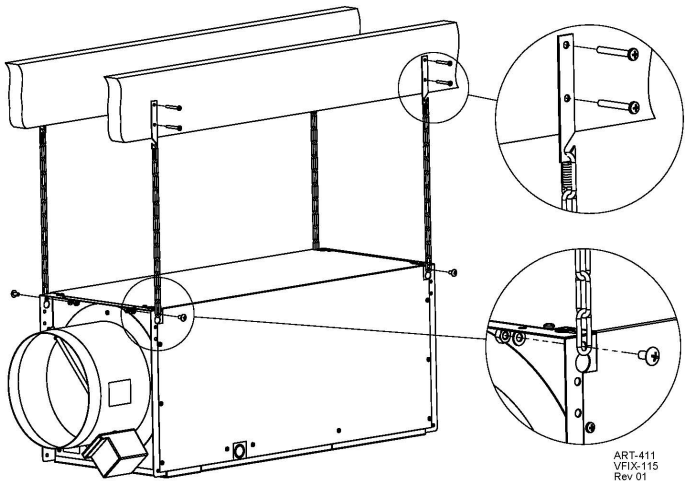
General:

1. Select a location which will provide minimal noise vibration and minimal blower noise to the building occupants.
2. The outside hood and ducting material are not included with this unit. It is the installer's responsibility to provide the necessary weather protection for the inlet.
   - In cold climates, insulated ducting **must** be used between the outside inlet air hood and the inlet of this unit.
3. Install unit with a slight air inlet incline (housing outlet end is ¼" higher than inlet end).
4. The unit can be mounted within the ceiling (between joists where it will fit) or ceiling hung, at any convenient location between the outside inlet hood and the fresh air discharge connection.
   - The "discharge connection" is wherever the conditioned fresh air is distributed within the building – furnace cold air return, special ducting, hallway register, etc.
5. The inlet and outlet ducting size is specified according to the model size and is shown in the **Dimensional Drawings** section of this manual.

Note: In cold climates, frost and or condensation may collect on metal parts of this product. External field provided insulation may be required in certain situations. The inlet damper and insulated inlet piping will prevent cold air migration and a slight incline will keep moisture collection at the inlet end.

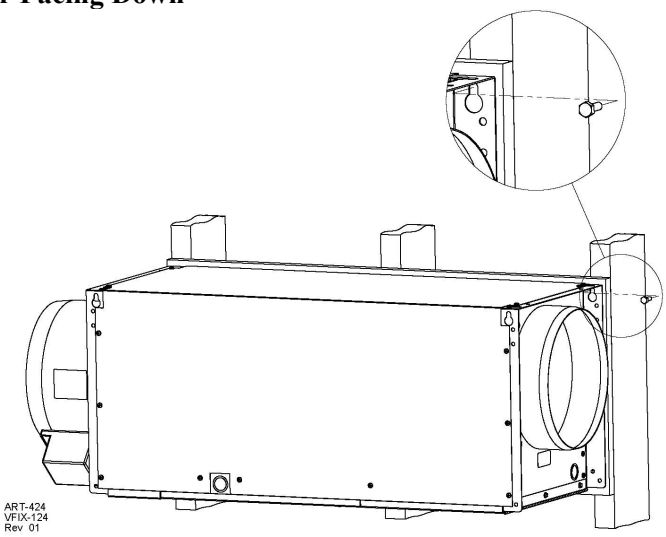


Horizontal installation – Ceiling Mount:

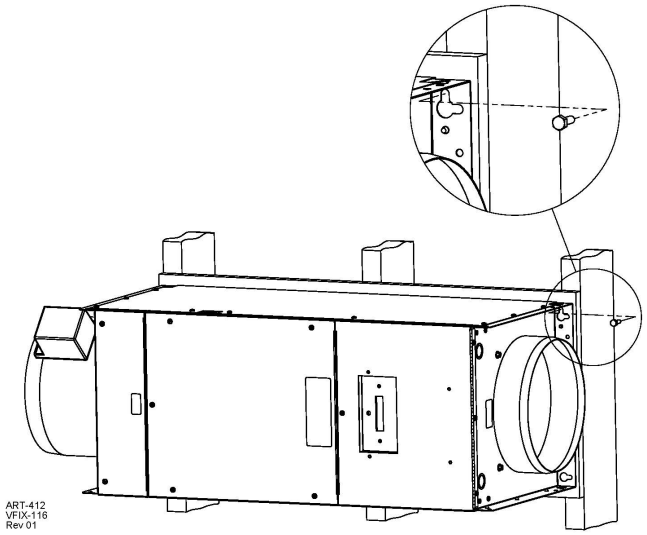


Horizontal installation – Wall Mount:

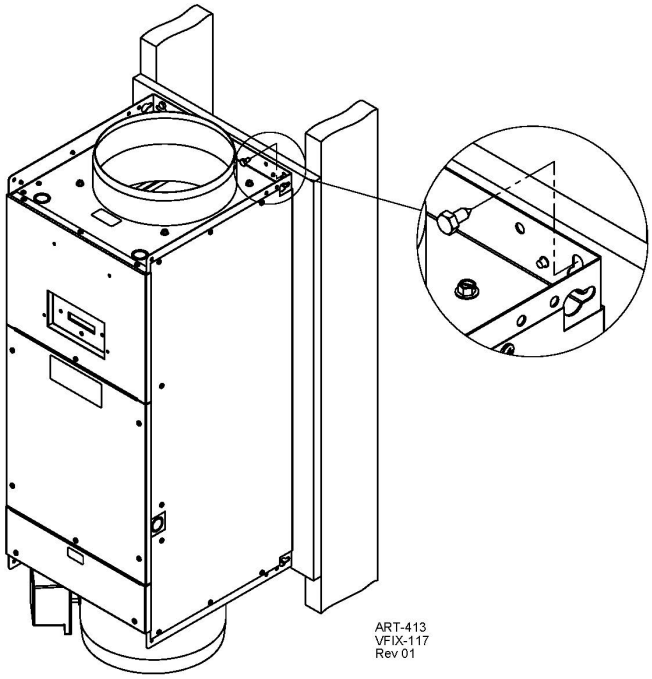
Option A: Cover Facing Down



Option B: Cover Facing Side



Vertical Installation – Wall Mount:

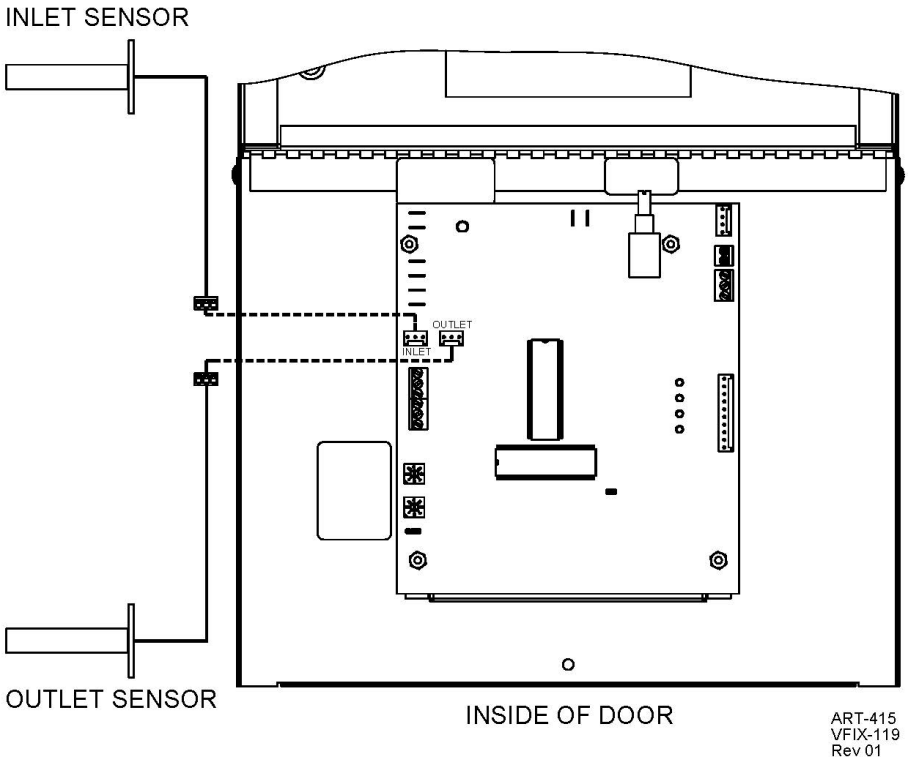


Electrical Installation

Diagrams below represent general installation requirements. Due to various model sizes available, actual unit mechanical and wiring requirements will vary dependent upon specific model.

Low Voltage Wiring

Temperature Sensors
Two temperature sensors are included, one used to sense inlet air temperature, the other to sense supply or outlet air temperature. **Without proper installation of these probes the Make-Up Air unit will not operate correctly.**



Control Wiring

There are two "tie-in" options available in connecting the Make-Up Air unit to a vent hood or other venting equipment.

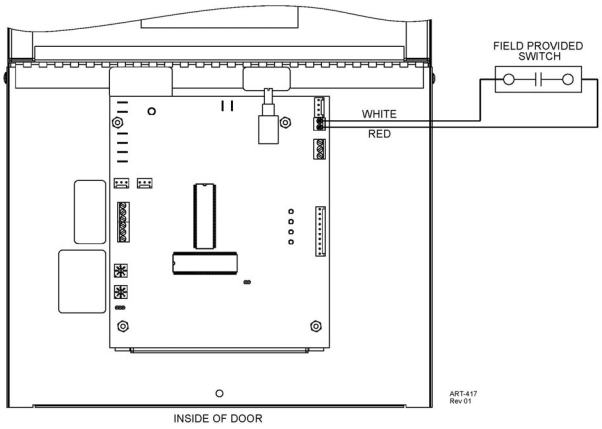
- **Option 1** – Connect an isolated "dry" switch or relay contact to the R & W terminal block (TB1).
- **Option 2** – Connect the supplied current transformer (CT) to terminal block (TB2)
  - CT terminal block (TB2) allows for connections for up to three CT's, for use in applications where multiple venting **sources** are utilized

Dry Type Switch Contact (Option 1)
This "on and off" control contact applied across R and W depends upon installation requirements and can take on several possibilities:

- Pressure differential switch
- CT with integrated switch (not CT provided with unit)
- Relay across exhaust blower motor
- End switch associated with exhaust damper/motor
- Room thermostat

Note: A switch closure between R & W (TB1) results in high speed blower output only.

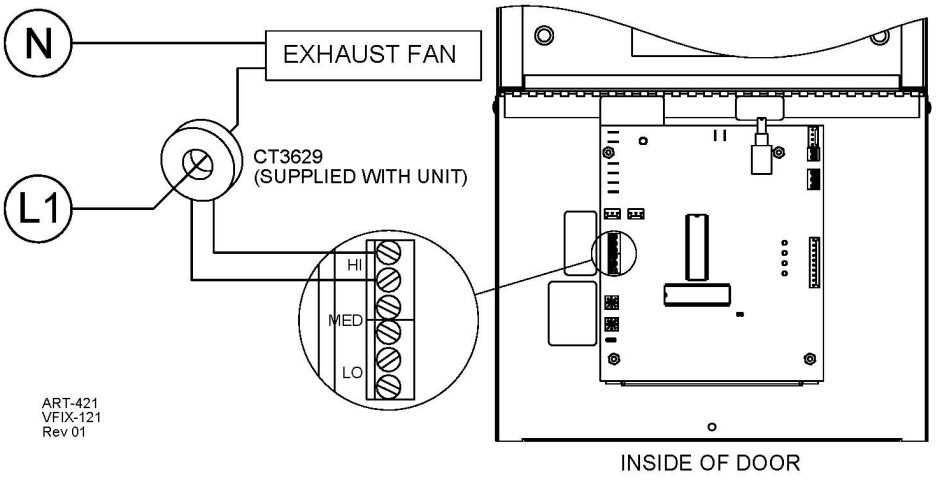
Connection Details
Connect one side of the field provided switch to the TB1 "R" and the other side of the switch to the TB1 "W".



NOTE: If using both Option 1 and Option 2, Option 1 (R&W) always has priority over Option 2 (CT). R&W results in HI fan speed only.

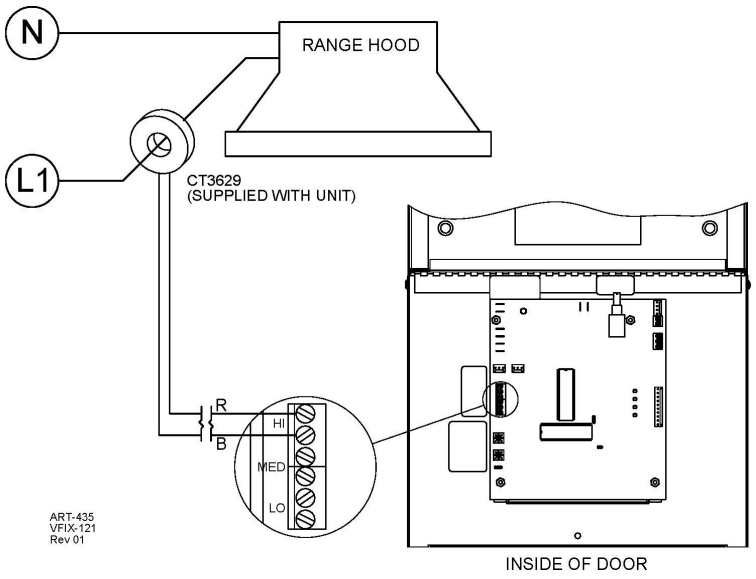
Current Transformer (Option 2)
CT terminal block (TB2) – located on the left side of the control module labeled "HI MED LO". This terminal block allows connection of up to 3 CTs, based on quantity of exhaust sources. Please refer to the **Advanced Installation** section in this manual for applications involving more than one venting source. Connect supplied CT as shown below. If the installation includes a multi or variable speed fan, see the **Basic Setup & Configuration** section for further details.

Standard installation:



*Switch closure across CT HI-MED-LO will not activate make-up air. Contact factory for special wiring application.

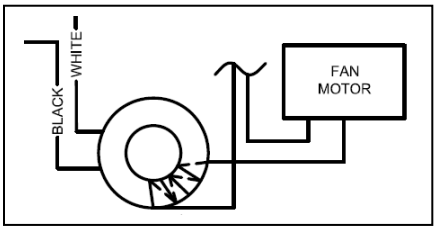
High Voltage Vent Hood Lighting



Note: For multi-speed vent hood installations, consideration must be made with vent hoods that include higher wattage lighting. It is possible that the low speed trigger point of the fan is equal to or lower than the current draw of the integrated lighting in the vent hood itself. In this case, the CT must be installed at the motor in the vent hood minus the lighting.

⚠ WARNING

DO NOT RETURN SOURCE POWER TO UNIT UNTIL CT SECONDARY IS TERMINATED AT CONTROL BOARD. OPERATING THE VENT HOOD WITHOUT THE CT TERMINATED CAN CAUSE DAMAGE TO THE CT AND A VERY HIGH SHOCK HAZARD.



Current Transformer Triggering – In order for the CT to properly communicate external exhaust source blower motor on/off activity, it may be necessary to provide one or more "wraps" of the power wire through the CT.

These steps apply to all three CT paired inputs (HI, MED and LO):

1. From the external exhaust source blower motor nameplate or with actual clamp-on current meter, note and record the external exhaust source blower motor current.
2. Depending upon the motor current, select the correct number of CT turns (see below chart).

Motor Current	CT Loops or Turns
Less than 1A	6 Wraps
2A to 3A	3 Wraps
4A to 6A	1 Wrap
Greater than 6A	0 Wraps

3. Temporarily disconnect power wire selected to feed through the CT. Depending upon the needed turns through the CT above, either extend this wire or simply put the wire through the CT hole as needed.

4. Example – required three wraps, means the wire must go through the CT, loop back around, and then loop back around the second time through before it's terminated at its original connection point.
5. The phasing or direction through the CT is not critical, simply one continuous wire.
6. The secondary side of the CT (pigtail wires) is connected at terminal block (TB2).
    a. CT black wire, connect to either:
        i. TB2-2, TB2-4 or TB2-6
    b. CT red wire, connect to either:
        i. TB2-1, TB2-3 or TB2-5.

Clothes Dryer Installations – When installing this product with a clothes dryer, make sure the power wire which services both one leg of the heating element and the drum/fan motor is used. Some dryers modulate the heating element on and off during the drying cycle which will cause the Make-Up Air unit to shut off prematurely if the CT is installed on the power leg that services the heating element only.

⚠ WARNING

DO NOT RETURN SOURCE POWER TO UNIT UNTIL CT SECONDARY IS TERMINATED AT CONTROL BOARD. OPERATING THE VENT HOOD WITHOUT THE CT TERMINATED CAN CAUSE DAMAGE TO THE CT AND A VERY HIGH SHOCK HAZARD.

Advanced Installation & Special Equipment Concerns section provides more information.

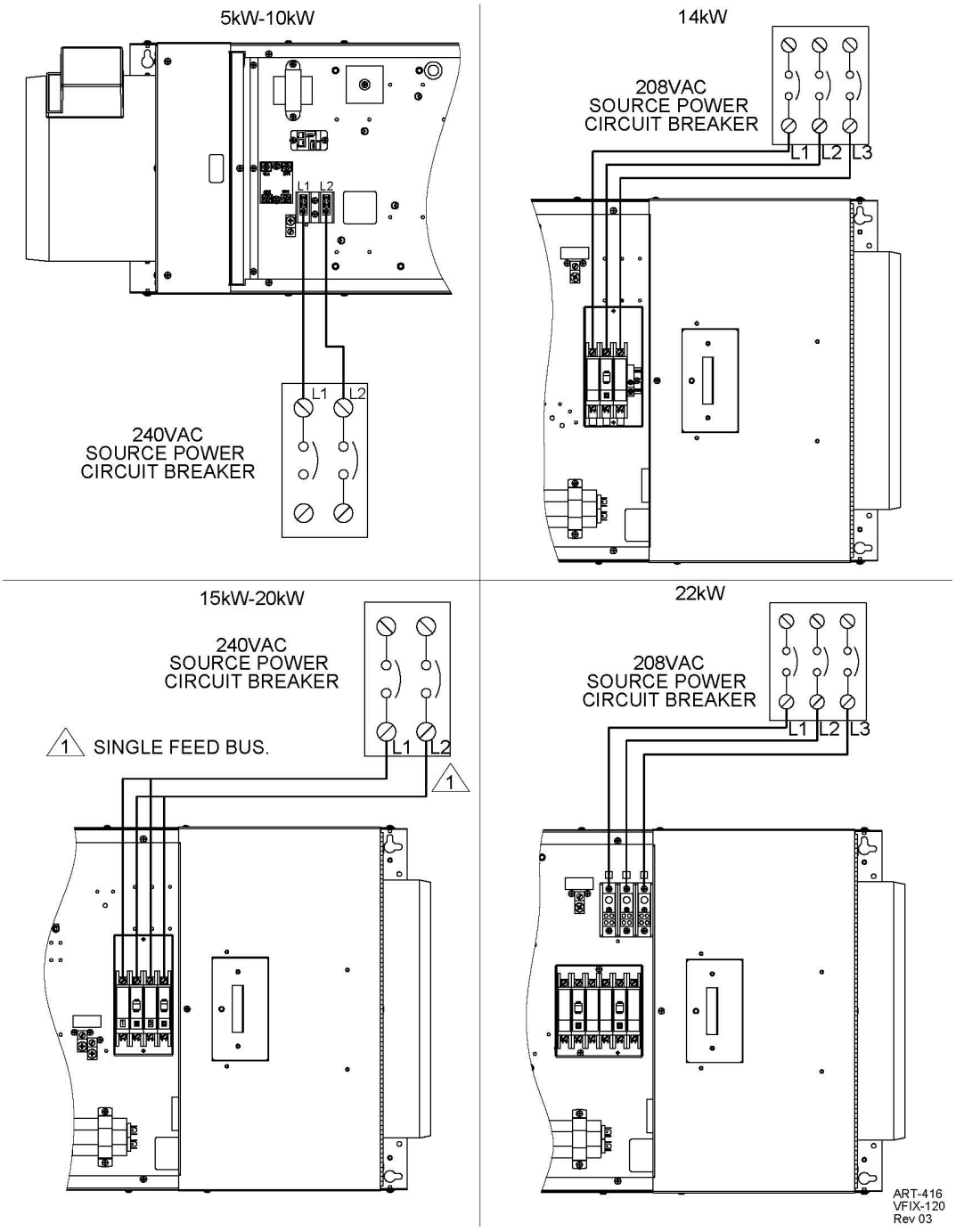
High Voltage Wiring

Service Panel Circuit Breaker(s) Sizing – based upon unit size, the specification page shows appropriate service size requirements based on UL and NEC code.

> **Note:** Larger models include factory provided circuit breaker(s). This **qualifies** as a local disconnect at the product.

Source Power – route and install proper current carrying conductors as per local code requirements, from service panel. Nameplate shows current and kW rating. Use **copper wire only**.

> **Note:** Single feed bus kit is available for larger models, order part number 5701.



Basic Setup & Configuration

Control Board Configuration

Temperature Set Point – Located on the back of the control board is a dial labeled "SET POINT". This dial is used to set the desired output temperature.

Setting the desired output temperature is completed in three steps. See **Figure 1** for temperature ranges.

- **Step 1** – Determine the required temperature output for the application.
  - **HINT:** Most Make-Up Air applications suggest an output set point typically around 50°F (10°C).
- **Step 2 –** On the backside of the control module (hinged door) is a jumper labeled "TEMP RANGE" (J21). This jumper allows for two temperature range options: HI or LO. Place the jumper to select the correct range based on the determined set point (step 1).
- **Step 3 –** using a small screwdriver, adjust the SET POINT dial according to the desired operating temperature.

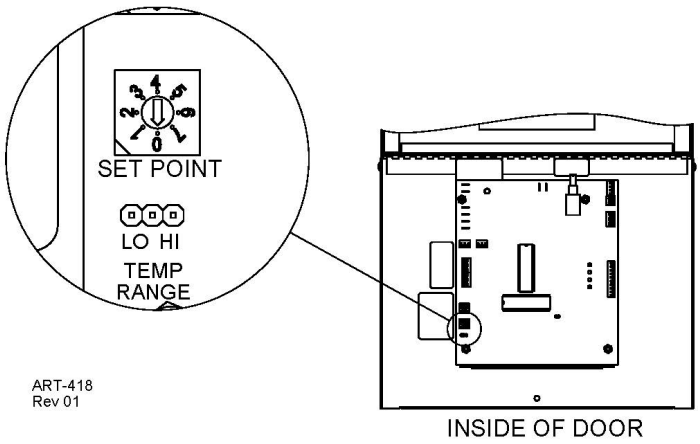


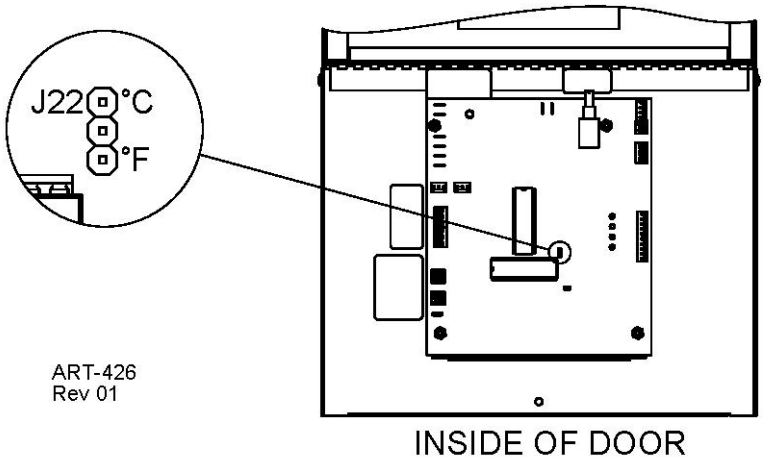
FIGURE 1

SET POINT Switch Position	HI		LO	
	°F	°C	°F	°C
0	60	13	20	-7
1	65	16	25	-4
2	70	18	30	-1
3	75	21	35	2
4	80	24	40	4
5	85	27	45	7
6	90	29	50	10
7	95	32	55	13

NOTE: Factory default:

- J21 = LO
- Switch position number 6 (50°F/10°C)

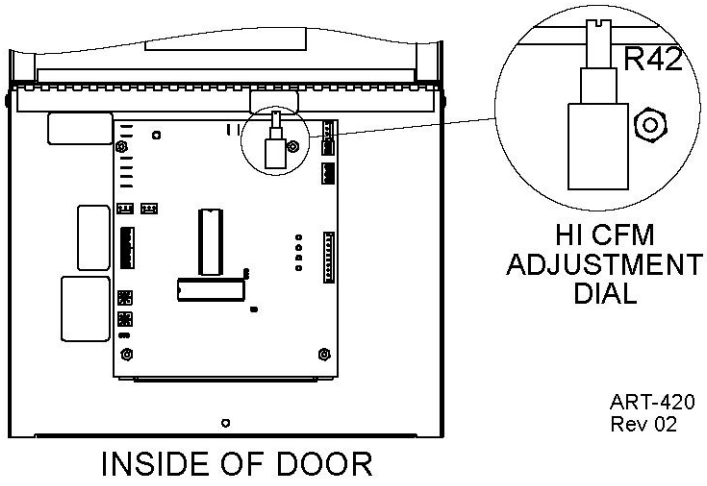
Fahrenheit/Celsius Selection – Labeled "°F °C" (J22). This jumper allows for selection of degrees Fahrenheit or Celsius to be displayed on the display.



NOTE: Factory default is °F. A power down reset is required upon changing of this jumper.

Blower Speed Adjustment – the blue adjustment dial allows for fine tuning the blower speed. If you do not need full CFM of your application and desire a larger temperature rise, the blower speed can be reduced with this adjustment dial. However, you must realize the CFM is being reduced and you must maintain the appropriate requirement for balancing the building inlet to the outlet mechanical driven air.

NOTE: Factory default setting is low, full counter-clockwise. To increase speed turn dial clockwise.



Software Configuration

Software Setup Based on Specific Application – Multiple applications exist for this product. The unit is shipped preprogrammed for a range of applications with the ability to be reprogrammed to meet others. Below are the most prevalent applications.

- **Application one** - single exhaust source *single speed* blower
- **Application two** - multiple exhaust source blower motors of different ratings
- **Application three** - single exhaust source *multi-speed* blower

Applications one and two are factory default settings and no further software setup is necessary to meet these applications.

Applications one and two sequence:

- When the CT input to CT terminal block (TB2) labeled "HI" goes active, the unit blower will go to high speed.
    - If application one, sequence ends here.

- When the CT input to CT terminal block (TB2) labeled "MED" goes active, the unit blower will go to medium speed.

- When the CT input to CT terminal block (TB2) labeled "LO" goes active, the unit blower will go to low speed.

See Nominal CFM section for typical CFM air delivery.

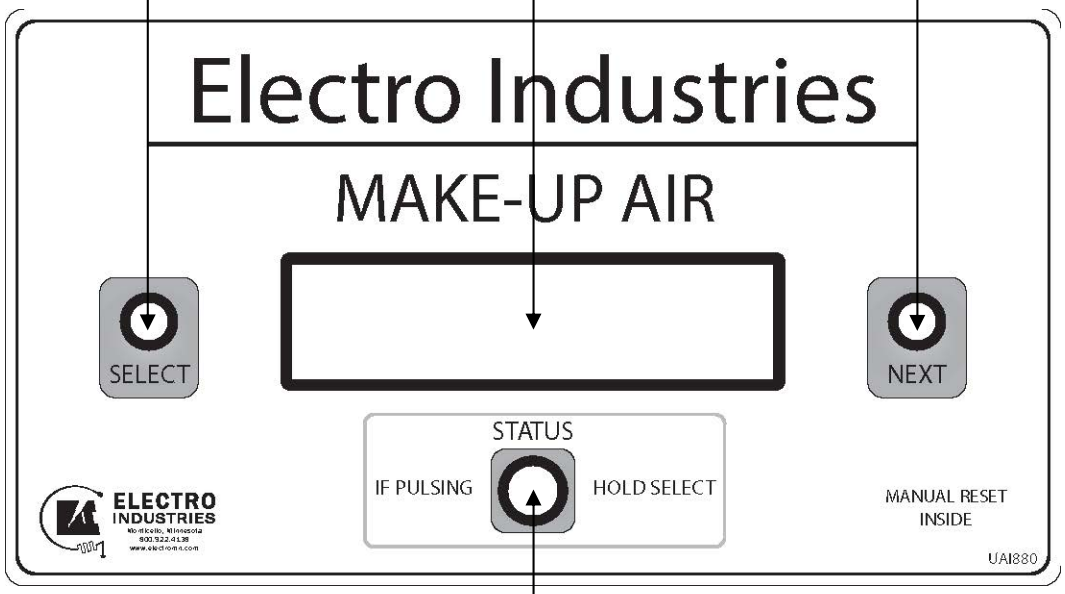
Application three – software configuration is required in order to activate the multi-speed functionality of this product when being used with a multi-speed vent hood. For instruction on how to configure for multi-speed blower interlock, see the **Multi-Speed Setup** section.

Understanding the Product Display

SELECT
Scroll through available options during installation and setup.

DISPLAY

NEXT
Select available onscreen options during field installation and setup.

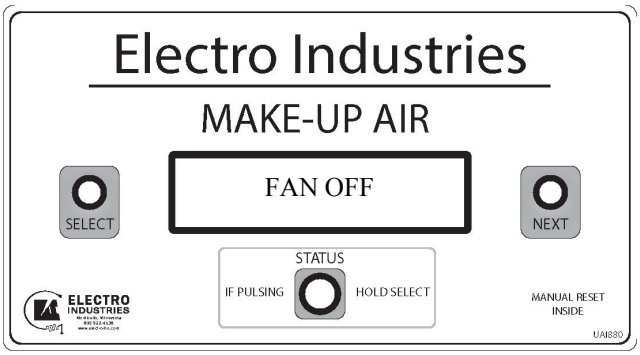


STATUS LED
Indicates whether or not a message is available:
Solid = No message available – status good
Pulsing = Message available
Note: If pulsing, press and hold select button.

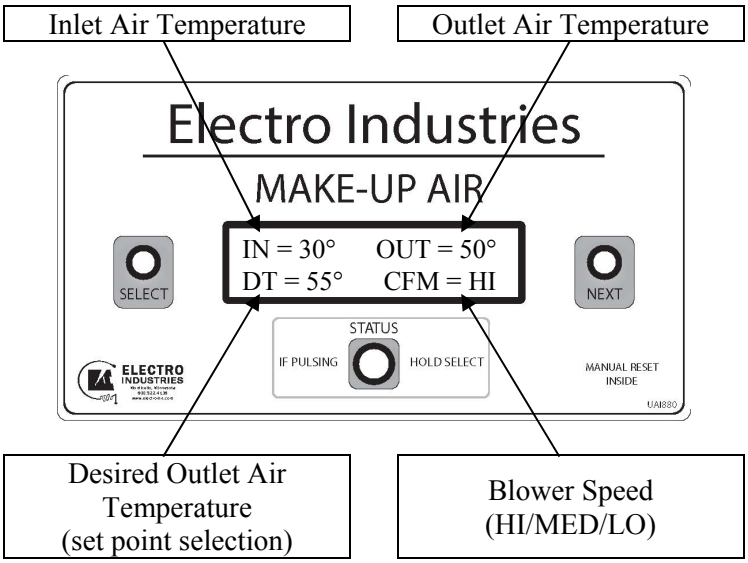
Normal Operation Screens

Under normal operating conditions, there are two screens that may be displayed based on system activity.

Screen one – Idle screen – displayed when the unit is off.



Screen two – Active screen – displayed when the unit is on.



Multi-Speed Setup

If your application includes a multi-speed blower, follow the setup steps in this section.

Step 1	Enter into "MULTI-SPD SETUP" mode: Press and hold "SELECT" and "NEXT" for 5 seconds FAN OFF
Step 2	Select "NEXT" to begin "MULTI-SPD SETUP" (select HOME to return) MULTI-SPD NEXT ← HOME
Step 3	Turn on vent hood to its highest setting, then press "NEXT" SET EXT BL – HI PRESS NEXT
	NOTE: If display reads: ERROR: 1 = 0.0A PRESS NEXT Check CT doughnut wiring to verify it is correct, then press "NEXT"
Step 4	If vent hood has a medium speed select Y, if not select N MED SPD Y ← N

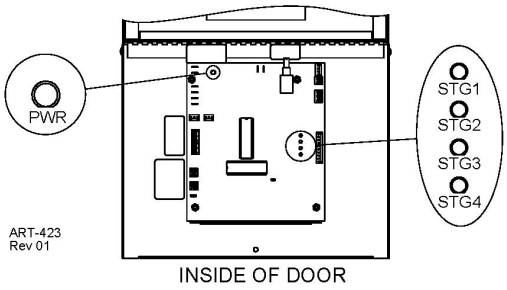
Step 5	Set vent hood to medium speed “if applicable”, then press “NEXT” SET EXT BL = MED PRESS NEXT
Step 6	If vent hood has a low speed select Y, if not select N LO SPD Y ← N
Step 7	Set vent hood to low speed “if applicable”, then press “NEXT” SET EXT BL = LO PRESS NEXT
Step 8	Press “NEXT” after vent hood has been shut off TURN OFF EXT BL PRESS NEXT

Operational Indicators

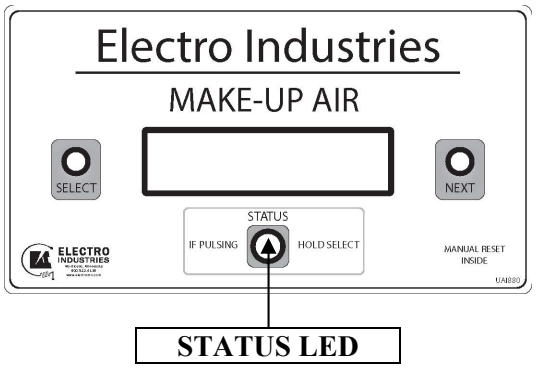
LED Monitor Lights

Green LED – is a representation of low voltage control power.

- Green LED ON = good 24VAC power and fuse is in good working condition.
- Green LED OFF = Fuse open or no 24VAC from transformer (or primary source breaker open).



Red LEDs – there are 4 red LEDs on the control, each LED represents a stage of electric heating elements.



Status LED (front yellow LED) – is software driven LED which alerts the user that a message is available in the message center.

- Status LED OFF = No message is available
- Status LED Blinking = Message is available
  - To access available messages, the user must press and hold the "SELECT" button for 3 seconds.

Possible messages:

- Faulty sensor (OT and/or ST)
- Manual hi-limit
- Software hi-limit
- Automatic hi-limit

See **Troubleshooting** section for more information on viewing available messages.

Start Up Inspection & Observations

Entering Air Temperature: Heating is locked out when entering air temperature is greater than 55°F (12.7°C).

Blower Delay/Control – At the end of a cycle, the blower continues to run for approximately 30 seconds to cool off the electric elements.

Depending upon inlet temperature, outlet temperature set point, and/or larger kW unit size; a power outage while the unit is in operation could cause the manual reset temperature limit control to open. The reset button is located inside the control section of the cabinet.

HI-LIMIT Functionality and Operation

Level One: **WarmFlo temperature control** regulates the output temperature based on system setup (see **Basic Setup & Configuration**). See **Operational Indicators** section (Red LEDs) for more information on monitoring this sequence.

Level Two: **Software detection of high temperature**. During an active cycle, the software will check for a value > 100°F (38°C). If a temperature > 100°F (38°C) is detected, all electric heating elements are disabled until the supply temperature reading drops < 90°F (32°C). The most common cause for this hi-limit is low airflow (example, dirty filter). See **Operational Indicators** section (Status LED) for more information on monitoring this sequence.

Level Three: **Automatic hi-limit/power relays.** This is a mechanical component in the air stream adjacent to the fan which opens a low voltage circuit to the control module upon temperatures > 99°F (38°C) and resets upon temperatures < 85°F (29°C). Upon the detection of this circuit being open, the control module disables the electric heating element stages. Once this automatic hi-limit resets, the control module will then re-enable the electric heating element stages. The most common cause for this hi-limit is low airflow. See **Operational Indicators** section of this manual (Status LED) for more information on monitoring this sequence.

Level Four: **Automatic hi-limit.** This is a mechanical component in series with the high voltage (240V, L2 leg) to the electric heating elements and is located inside the element chamber, top/sides. This automatic hi-limit will open at 100°F (38°C) and reset at 85°F (29°C). The most common cause for this hi-limit is low airflow. Typically these limits are detected monitoring current on the red wire with the use of a clamp-on amp meter.

Level Five: **Manual hi-limit/software detection.** This is a mechanical component which opens a low voltage circuit to the control module upon temperatures > 150°F (65°C). Upon the detection of this circuit being open, the control module disables the electric heating element stages. The electric heating element stages will remain disabled until the user manually resets the limit. The manual reset limit button is located in the control box compartment. The most common cause for this hi-limit is no blower with electric elements due to blower failure or mechanical failure of element relays. See **Operational Indicators** section of this manual (Status LED) for more information on monitoring this sequence.

Advanced Installation & Special Equipment Concerns

Override Electric Element Staging, "E" Tab Input – during an active call, spade terminal labeled "E" (T7) can be jumpered to R (24VAC HOT) to bring on all four electric element stages and bypass any temperature sensing or stage modulation functions. However, the > 55°F (12.7°C) disable still applies.

> **NOTE:** Does not apply to models with no electric heat.

G IN (T3) Tab – Shorting this tab to "R" (24VAC HOT) at any time will cause this Make-Up Air unit to turn on its blower (and open damper) without activating any electric heating elements.

> **NOTE:** Blower speed upon connection of "G IN" to "R" will be *low CFM blower only*.

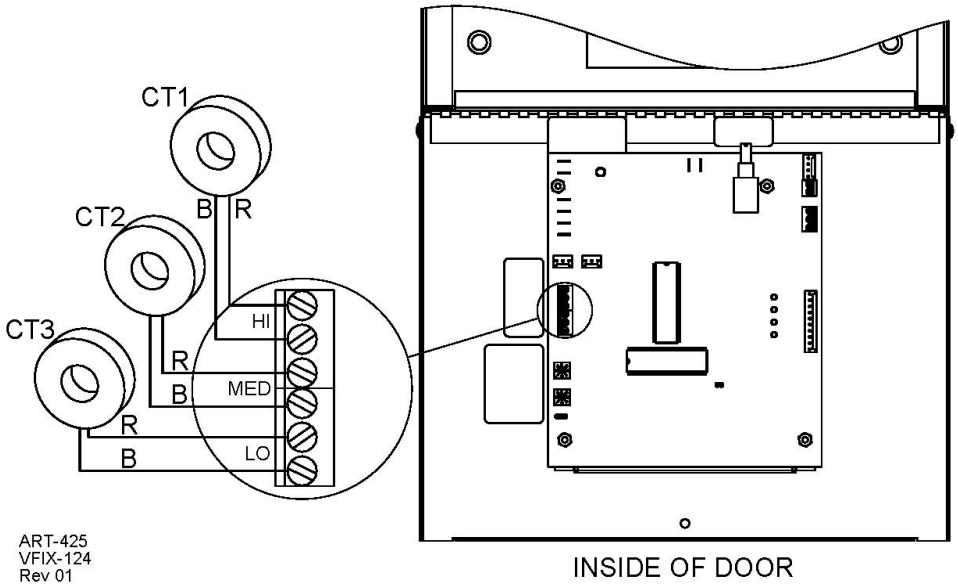
R IN NO NC –dry set of contacts (SPDT) which follows the logic of this Make-Up Air unit's blower/damper. The intention of this is to drive an external blower whenever this unit is activated.

> **Example application** would be a scenario where the Make-Up Air is discharging in the return air of a gas furnace: this contact would be used to energize the furnace blower when the Make-Up Air is activated.

FAN ON (T5) – Special output intended to be used by factory technician only. Terminal has 24VDC, do not use.

Multiple Exhaust Fan/Blower Installation
CT terminal block (TB2) – located on the left side of the control module labeled "HI MED LO". This terminal block allows connection of up to 3 CTs, based on quantity of exhaust sources.

- CT monitoring the "largest" exhaust source blower motor would connect to the inputs labeled "HI"
- CT monitoring the "mid-sized" exhaust source blower motor would connect to the inputs labeled "MED"
- CT monitoring the "smallest" exhaust source blower motor would connect to the inputs labeled "LO"



Information: CT terminal block (TB2)

- Included with this product is one CT.
  - Additional CTs are available.
  - Additional CTs can apply to any of the three terminal block pairs.
- Use only Electro Industries' CTs designed for this product (part #3629).

External Damper, Field Furnished and Installed:

Preparation or Pre-Wiring Sequence

1. Power up the Make-Up Air unit.
2. Jumper "R" and "W" screw terminal block (control board upper right).
3. Fan/blower will turn on and the internal damper will open. Observe the opening of the internal damper.
4. With the internal damper open, disconnect all three wires. Separate, do not allow the gray wire to touch either brown or violet wires.
5. Turn off the unit power and remove jumper at "R" and "W" terminal block.

External Damper <u>without</u> End Switch – Select Actuator Type and Field Wires

A. 3-wire, power open/power close, 24VAC – extend the gray/violet/brown wires from the disconnected internal damper actuator. Connect these wires to the field installed external actuator.
   - Gray – common
   - Violet – 24VAC = open
   - Brown – 24VAC = close

B. 2-wire, power open/spring return – extend wires from the internal damper actuator – gray and violet. Cap off brown wire.
   - Gray – common
   - Violet – 24VAC = open

Damper <u>with</u> End Switch

1. Depending upon the type of actuator, select A or B above and field wire as detailed above.
2. Locate the "SB IN" or "END" tab, inside control board, lower right.
3. Connect the end switch (normally open) contacts as follows:
   a. End Switch → "SB IN" tab
   b. End Switch → "C" tab (common)
4. Pull or remove J24 peg jumper (to left of "SB IN" tab).

Sequence – with J24 open, there will be no fan or heat action until the "SB IN" tab is shorted to common. With "SB IN" shorted to common, normal Electro Make-Up Air unit sequence begins.

Troubleshooting

1. This product contains several interference suppression components, but as an electronic logic product unpredictable and unusual transients or interferences may sometimes cause strange results. If this product is "acting strange", turn off the source power, count to 10, and reenergize.
2. Terminal blocks are clamp-down type. If there is no wire connected and the screw is loose, the screw may not necessarily make a good electrical contact to the inside components. Example – if you are jumpering the thermostat terminals without thermostat wire connection or if you are attempting to measure voltage on a screw head, you may get erroneous or unpredictable results if the screw is not tightened down.
3. Use general heating system logic information and basic understanding of the terminal block wiring functions when measuring voltage to determine proper operation of this module.

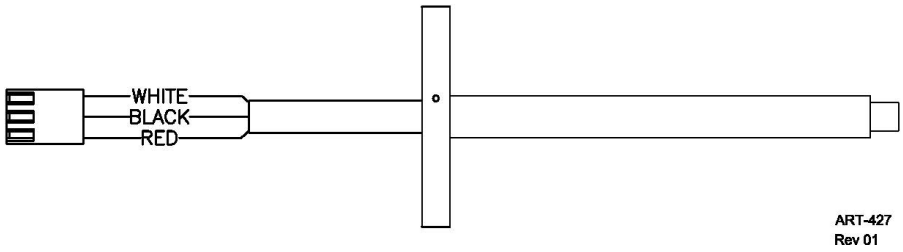
Temperature Sensors
The inlet sensor is used to determine the incoming air temperature. The incoming air temperature information is used in conjunction with the outlet sensor by the software to determine temperature differential across the unit, estimated CFM, when to lockout the heating elements during mild temperature operation, and modulate the heating elements to maintain precise temperature control.

Troubleshooting Temperature Sensors
If the message center is indicating that one of the temperature sensors is faulty, a volt-meter with DC measuring capabilities can be used to help determine the issue.

Measuring across the red and white wires, the meter should read approximately 5 volts DC. If the reading is 4 volts or less, there is a chance the sensor has shorted out. Disconnect the sensor from the terminal block and recheck the voltage on the terminal block. Voltage should read 5 volts. If not, a component on the control board itself has likely failed. If the terminal block reads 5 volts, the sensor has failed.

Temperature Sensor Detail

Red wire to J2-1 +5VDC or "RED"
Black wire to J2-2 "DATA" or "BLK"
White wire to J2-3 COM or "WHT"



Air Filter
A dirty filter can lead to poor system performance and eventual hi-limiting. It is suggested to wash filter at least twice per year. See **Routine Maintenance** section of this manual for instruction on how to wash the filter.

Troubleshooting	Solution
Display is blank and nothing is turning on	▪ This unit includes a 2A fuse located on the control board, verify it is in good working condition. ▪ If 2A fuse is open, replace. ▪ If 2A fuse is not open, check the primary and secondary side of the transformer to ensure power is available. ▪ If good primary and secondary voltage is detected, disconnect all low voltage wires (not including 24VAC secondary side of transformer) from the control module (make sure there no load/current through any monitoring / connected CTs). • If screen is still blank, replace board. • If screen illuminates and displays "FAN OFF", there is an issue with low voltage wiring.
Unit is not producing heat	▪ Check unit display. Display should show "FAN OFF" or temperature screen. • If screen is blank, check 2A fuse. ▪ If screen displays the "FAN OFF" screen, unit is not being told to turn on. • Verify field low voltage wiring is correct o CT or R & W ▪ If screen displays temperature screen, compare the OUT and DT, if ST > DT, this Make-Up Air unit will not engage the electric elements. ▪ Check the "message" LED. If blinking, see section labeled **Start Up Inspection & Observations – Message Center** for further instruction. • Manual reset limit may be open. • Manual reset limit switch located in control box. ▪ Remember the heating is locked out when entering air temperature is greater than 55°F (12.7°C). This cannot be bypassed.
Unit is not delivering adequate warm air temperature	▪ Clean the filter (lack of airflow will cause the unit to reduce its heating output). ▪ Check the "message" LED. If blinking, see section labeled **Start Up Inspection & Observations – Message Center** for further instruction. ▪ Verify correct system setup which includes but is not limited to the below: • SET POINT DIAL/HI LO Jumper • CONFIGURATION DIAL ▪ See the **Setup and Programming Instructions** for further setup details ▪ Check source amp draw to verify all elements are working correctly
The "Status LED" is blinking	▪ See section labeled **Start Up Inspection & Observations – Message Center** for further instruction.

Troubleshooting	Solution
The blower is not turning on	▪ Check unit display. Display should show "FAN OFF" or temperature screen. • If screen is blank, check 2A fuse. ▪ If screen displays the "FAN OFF" screen, unit is not being told to turn on. • Verify field low voltage wiring is correct o CT or R & W ▪ If screen displays the temperature and blower is not on, check for power to the blower motor. • If power present, verify switch R & W IN only closure between circuit board T18 and T19 (must be active call). • If no switch closure between T18 and T19, replace circuit board. • If power present and switch closure detected, replace blower. • If power is not present, check high voltage wiring.
The blower runs in "high speed" only	▪ If using the "R & W" terminals (option 1), high speed blower is the only option. ▪ If using CTs, ensure correct wiring of CTs, make sure high speed blower CT only connects to the **CT terminal block (TB2)** "HI" input. ▪ If using "Multi-Spd Setup" option, verify external exhaust blower motor is not running high speed, once verified, it is suggested you run through the "Multi-Spd Setup" again to verify correct programming (see **Basic Setup & Configuration** section**).**
The blower runs in "MED speed" only	▪ If using CTs to turn this product on, ensure correct wiring of CTs, make sure MED speed blower CT only connects to the **CT terminal block (TB2)** "MED" input. ▪ If using "Multi-SPD Setup" option, verify external exhaust blower motor is not running medium speed, once verified, it is suggested you run through the "Multi-Spd Setup" again to verify correct programming (see **Basic Setup & Configuration** section**).**
The blower runs in "LOW speed" only	▪ If using CTs to turn this product on, ensure correct wiring of CTs, make sure LOW speed blower CT only connects to the **CT terminal block (TB2)** "LO" input. ▪ If using "Multi-Spd Setup" option, verify external exhaust blower motor is not running low speed, once verified, it is suggested you run through the "Multi-Spd Setup" again to verify correct programming (see **Basic Setup & Configuration** section**).**
Condensation or frost build-up on cabinet or ductwork	▪ Insulate sections of cabinet and ductwork.

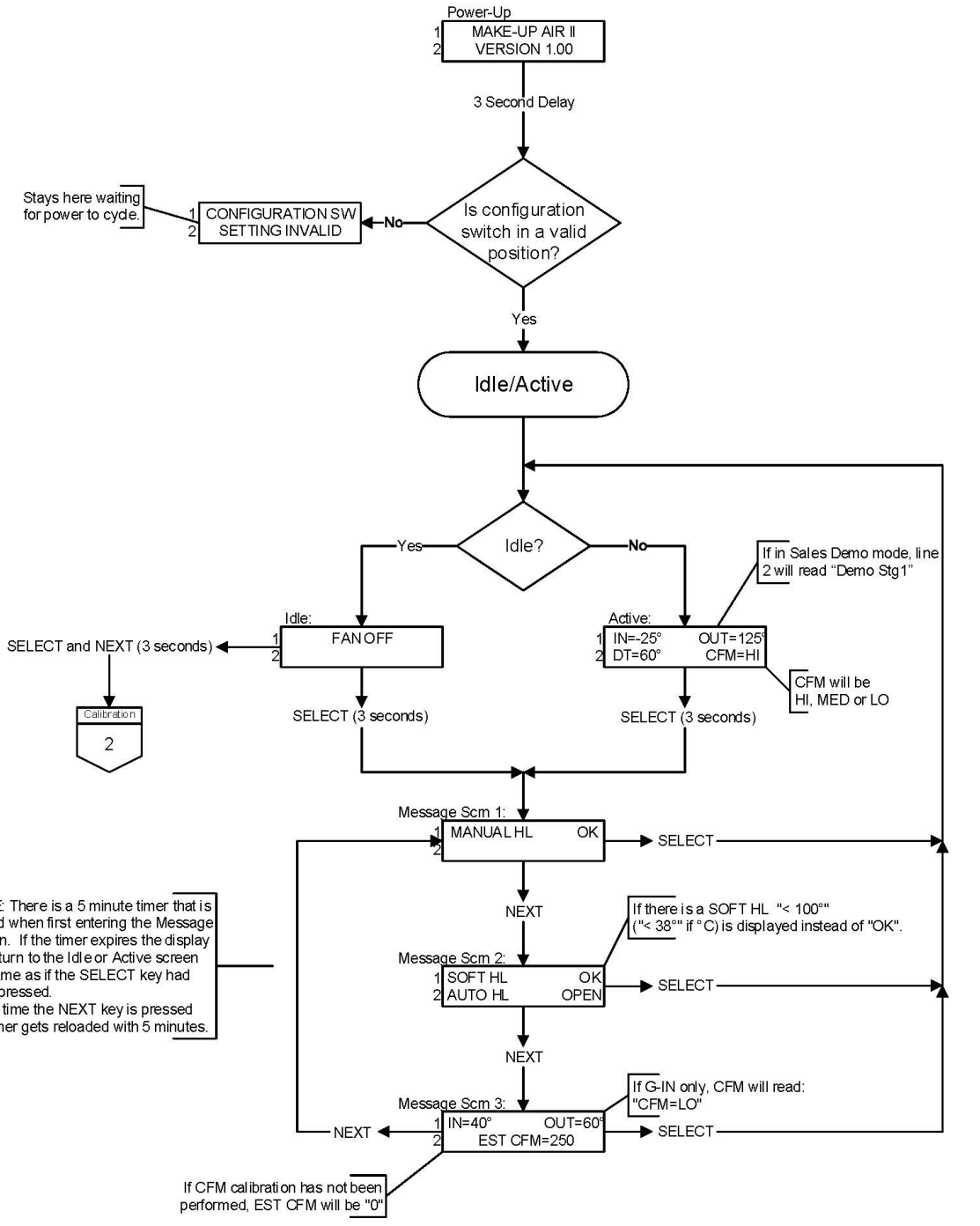
Routine Maintenance

Filter – this unit includes an air filter which is a permanent and washable filter.

Suggest at least twice per year removing filter and using standard household water to back flush collected dust/debris.

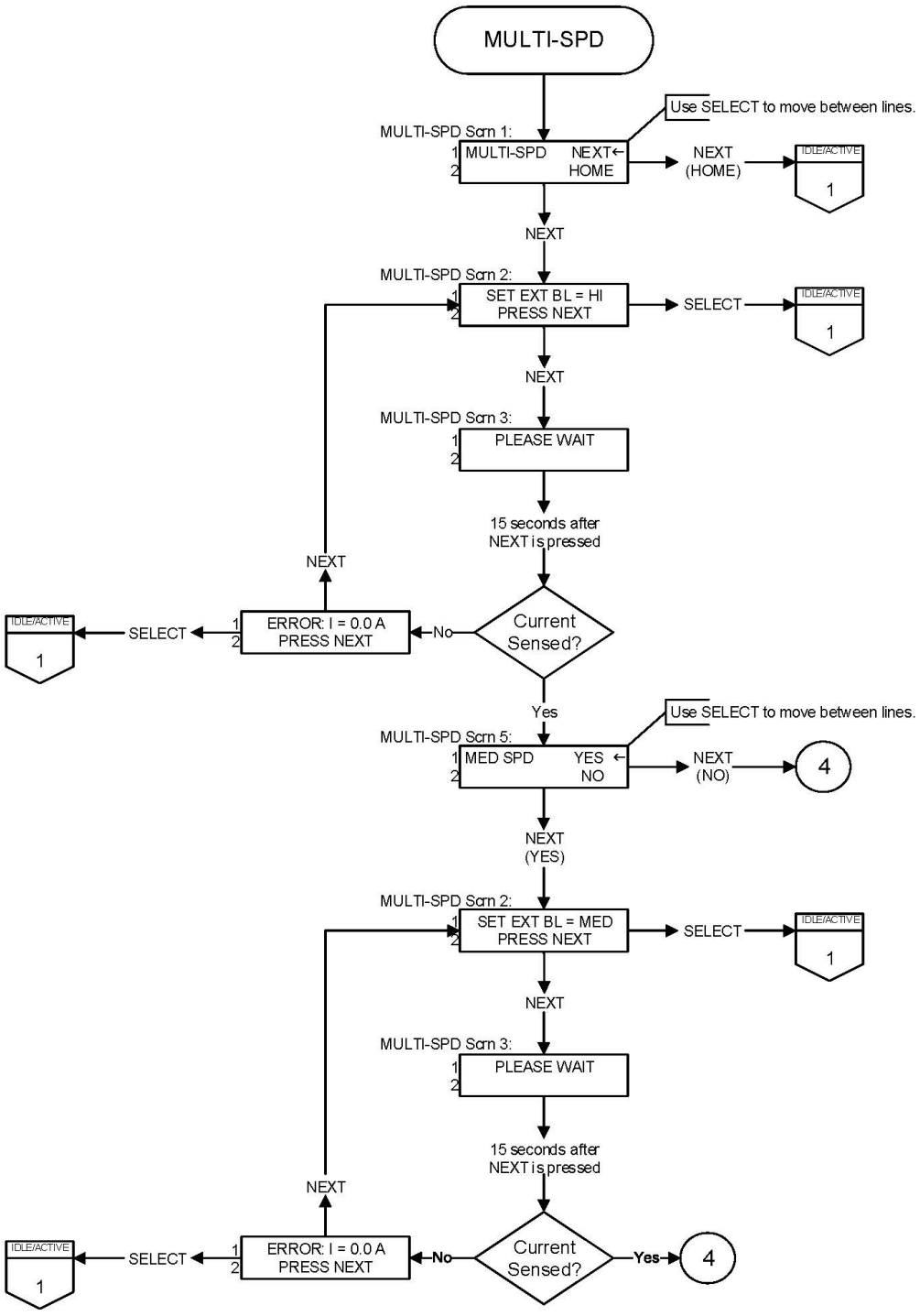
- Open small door
- Filter is simply held within channels

MAKE-UP AIR II LCD DISPLAY



03-11-14 **MU_Air_LCD.vsd** (1)

MAKE-UP AIR II LCD DISPLAY



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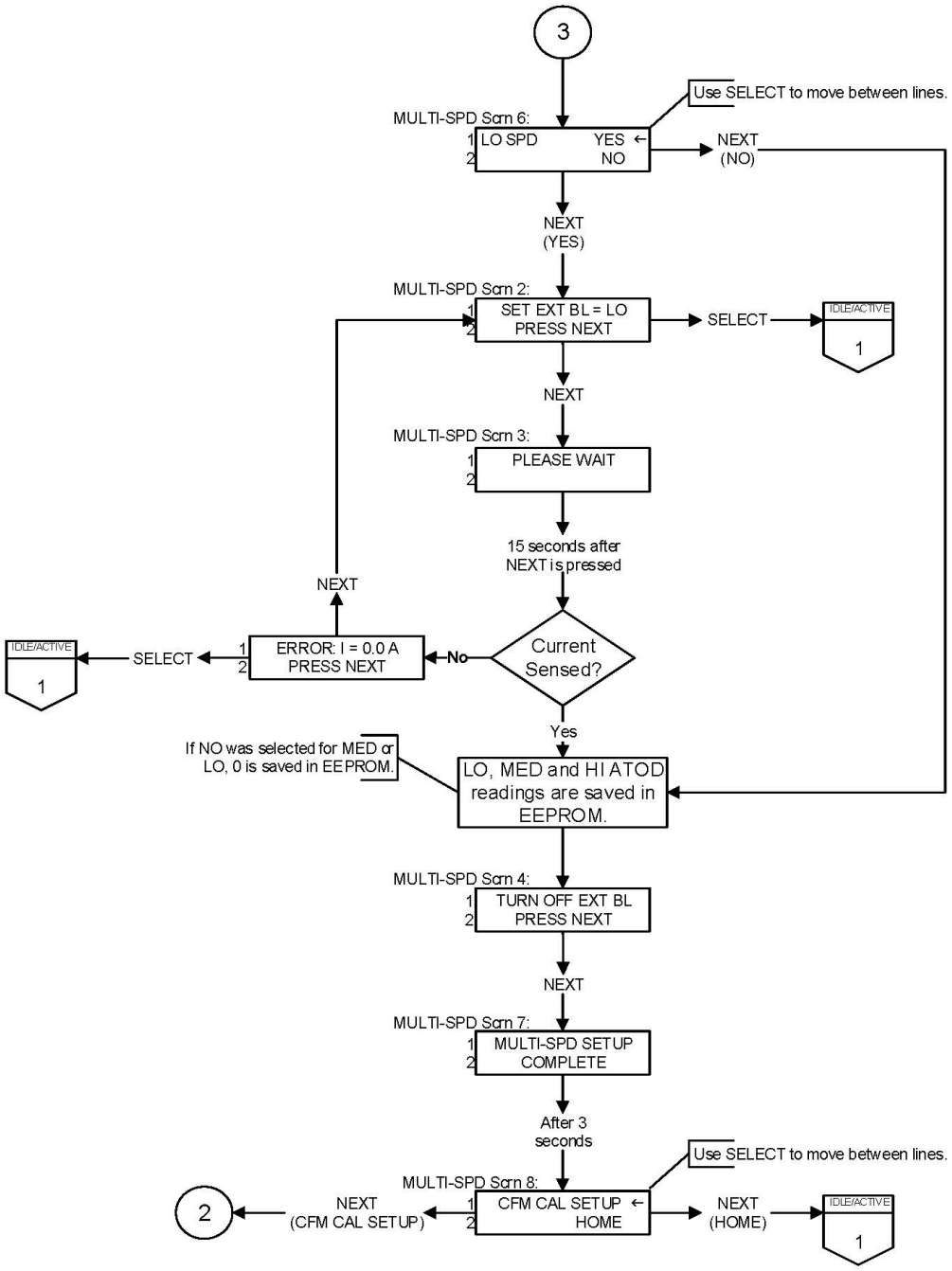
MAKE-UP AIR II LCD DISPLAY



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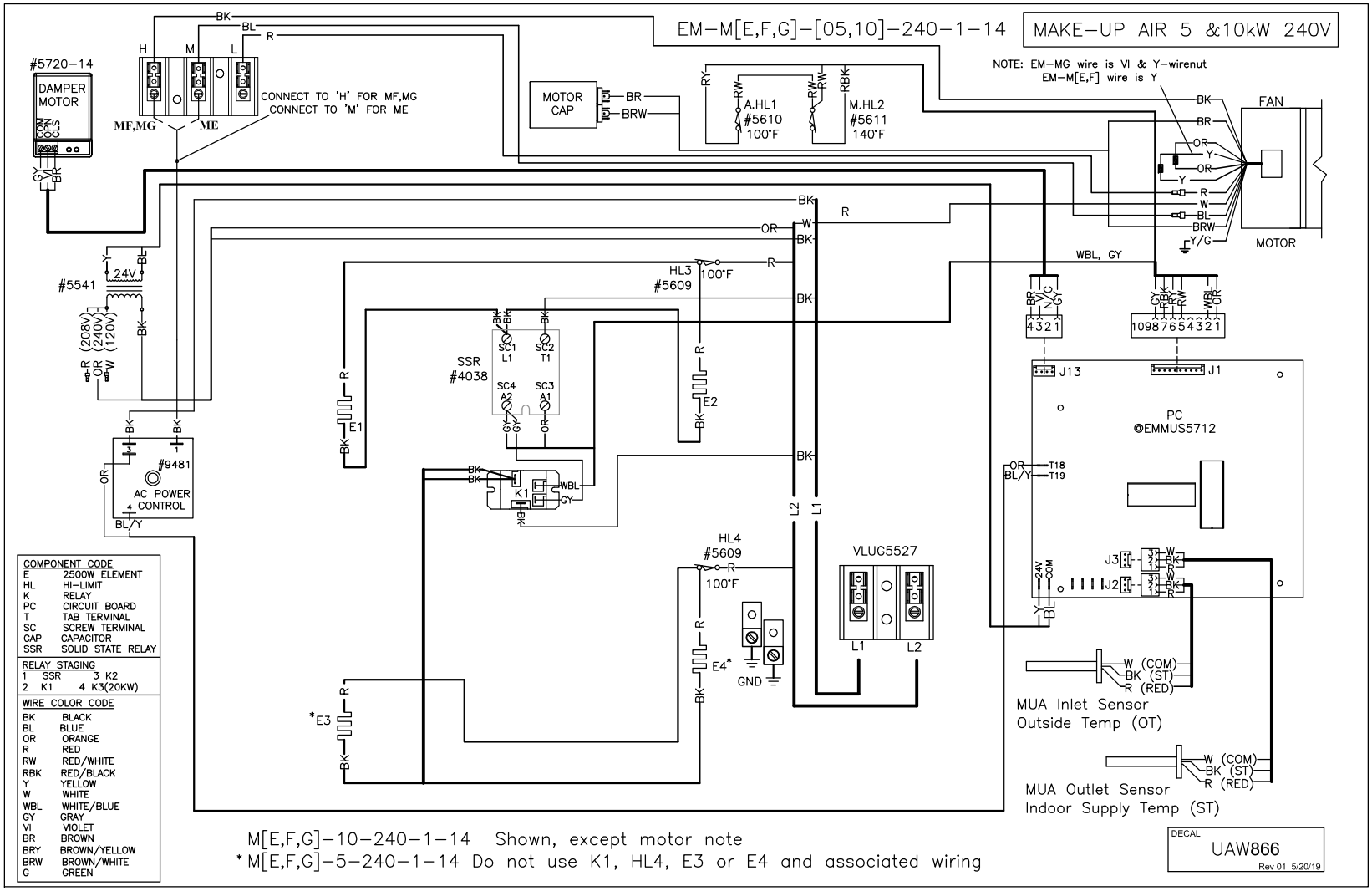
DECAL + TITLEBLOCK DO NOT PRINT AS DECAL

8.5”

5.5”



COMPONENT CODE	
E	2500W ELEMENT
HL	HI–LIMIT
K	RELAY
PC	CIRCUIT BOARD
T	TAB TERMINAL
SC	SCREW TERMINAL
CAP	CAPACITOR
SSR	SOLID STATE RELAY

RELAY STAGING			
1	SSR	3	K2
2	K1	4	K3(20KW)

WIRE COLOR CODE	
BK	BLACK
BL	BLUE
OR	ORANGE
R	RED
RW	RED/WHITE
RBK	RED/BLACK
Y	YELLOW
W	WHITE
WBL	WHITE/BLUE
GY	GRAY
VI	VIOLET
BR	BROWN
BRY	BROWN/YELLOW
BRW	BROWN/WHITE
G	GREEN

NOTES:
1. SIZE = 5.5” X 8.5”
2. COLOR = BLACK ON WHITE
3. MATERIAL = POLY WITH ADHESIVE AND LAMINATE.

Rev.01 5/20/19: Released for Development

EM-M[E,F,G]-[5,10]-240-10-14

NAME	DATE
DRAWN CRN	2/19/19
CHECKED	
APPROVED -	1:1

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Electro Industries
Monticello, MN 55362
(763)295-4138

SCALE	STATUS	REV
	Production	01

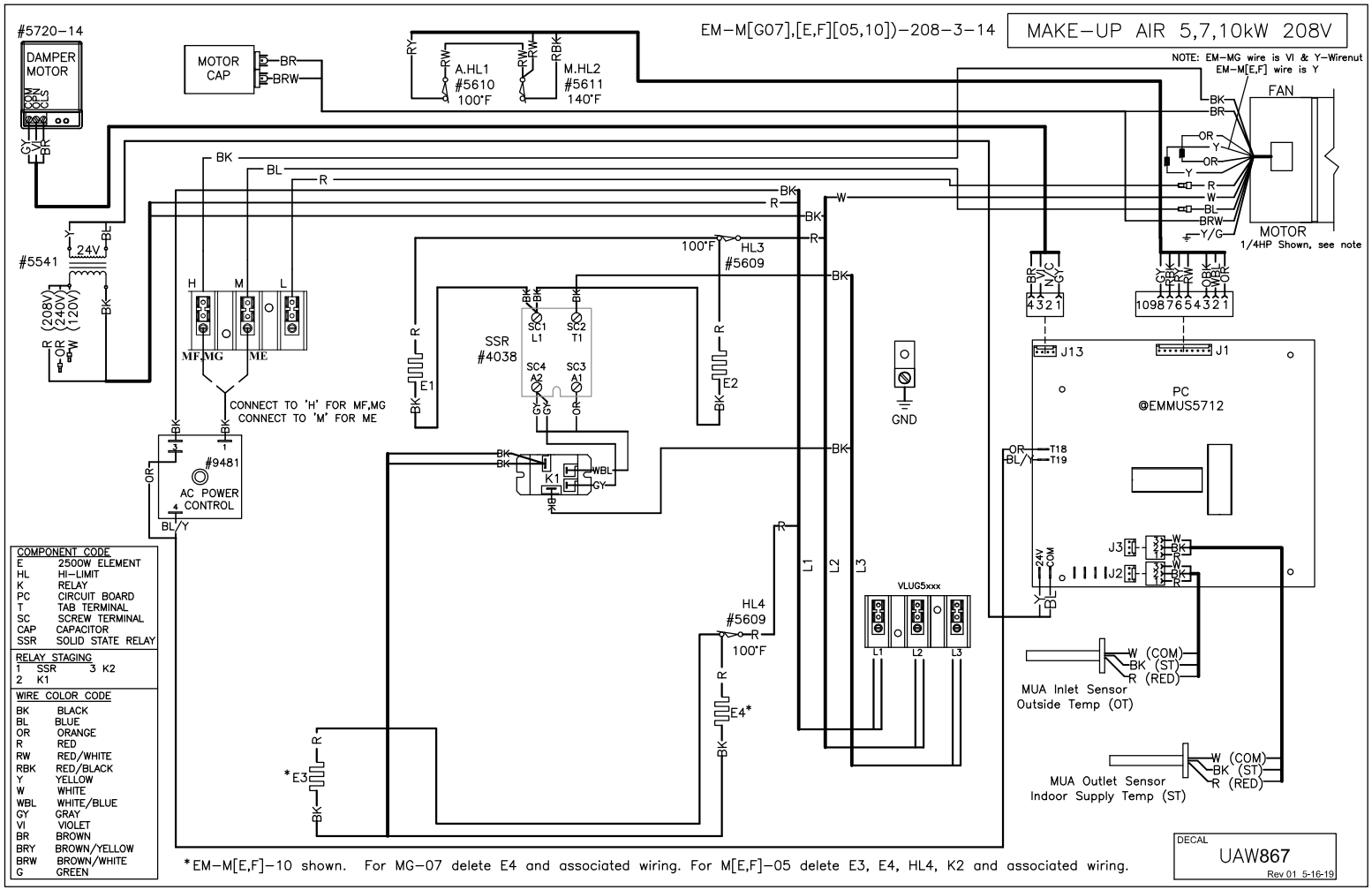
NUMBER UAW866 1 of 1

DESCRIPTION
WIRING DECAL
5,10kW MAKE–UP AIR 240V

DECAL + TITLEBLOCK DO NOT PRINT AS DECAL

8.5”

5.5”



NOTES:
1. SIZE = 5.5” X 8.5”
2. COLOR = BLACK ON WHITE
3. MATERIAL = POLY WITH ADHESIVE AND LAMINATE.

EM-M[G07],[E,F][05,10]-208

NAME	DATE
DRAWN: CRN	2/19/19
CHECKED:	
APPROVED: -	

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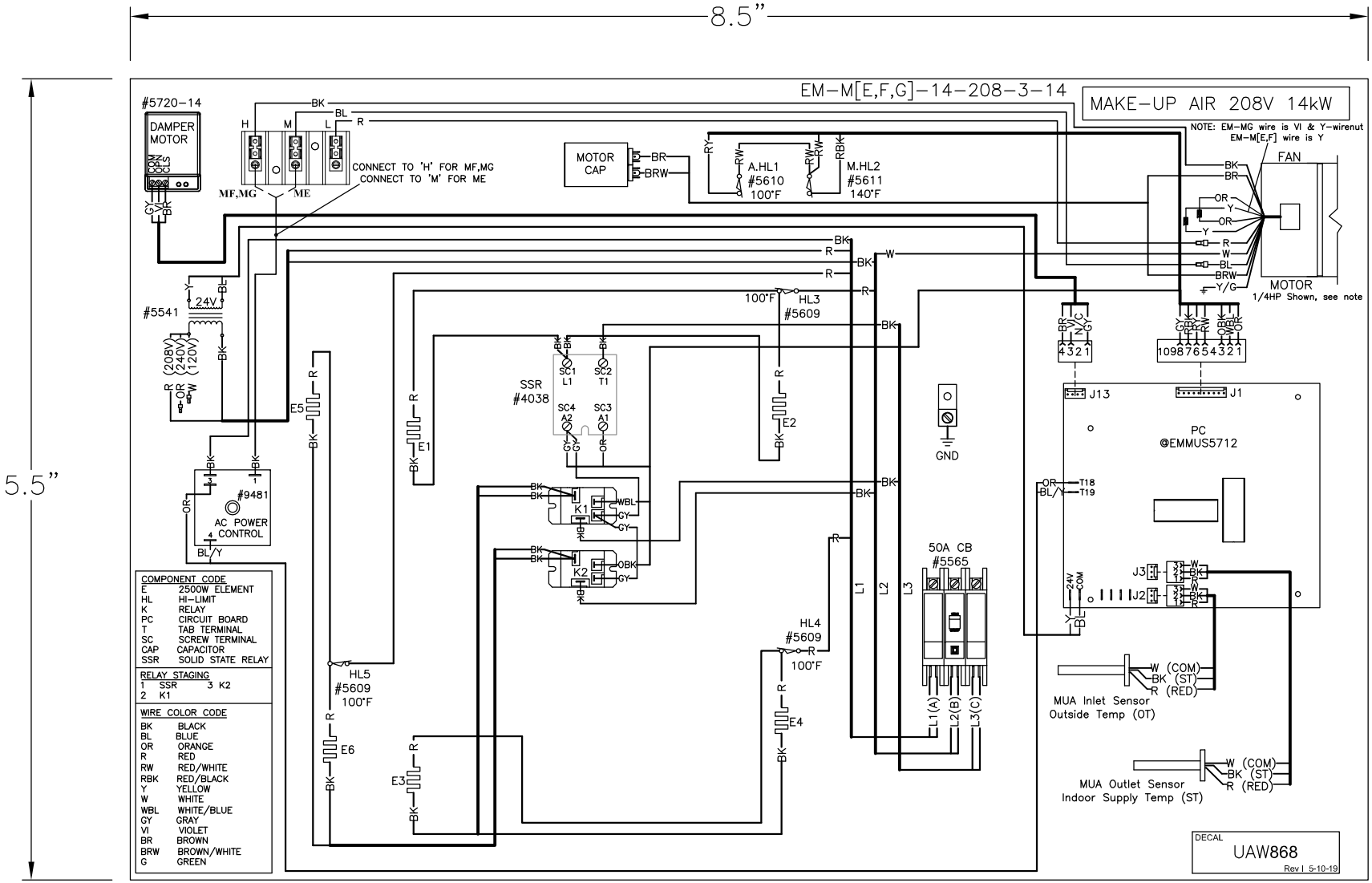
Monticello, MN 55362
(763)295-4138

NUMBER	UAW867 1 of 1
DESCRIPTION	WIRING DECAL 5,7,10KW 208V Make-Up Air II
SCALE	1:1
STATUS	Production
REV	01

Rev.01 5-16-19: Released for Development

DECAL + TITLEBLOCK DO NOT PRINT AS DECAL



COMPONENT CODE	
E	2500W ELEMENT
HL	HI–LIMIT
K	RELAY
PC	CIRCUIT BOARD
T	TAB TERMINAL
SC	SCREW TERMINAL
CAP	CAPACITOR
SSR	SOLID STATE RELAY

RELAY STAGING
1 SSR 3 K2
2 K1

WIRE COLOR CODE	
BK	BLACK
BL	BLUE
OR	ORANGE
R	RED
RW	RED/WHITE
RBK	RED/BLACK
Y	YELLOW
W	WHITE
WBL	WHITE/BLUE
GY	GRAY
VI	VIOLET
BR	BROWN
BRW	BROWN/WHITE
G	GREEN

NOTES:
1. SIZE = 5.5” X 8.5”
2. COLOR = BLACK ON WHITE
3. MATERIAL = POLY WITH ADHESIVE AND LAMINATE.

EM-M[E,F,G]-14-208-3-14

Rev.I 5–10–19: Add Vlug between Pwr Control #9481 and Fan
Rev.H 4–22–19: Add SSR code, remove #6201 text, remove BRY wire color
Rev.G 2–19–19: Clarify OT ST descriptions. Add new models. Show 1/2 and 1/4 HP wiring
Rev.F 10–4–16: Revise motor wire colors for new 4M097BG
Rev.E 1–28–16: Revise OT #6201 to "Inlet Sensor" and ST #6201 to "Outlet Sensor"

PROPRIETARY AND CONFIDENTIAL
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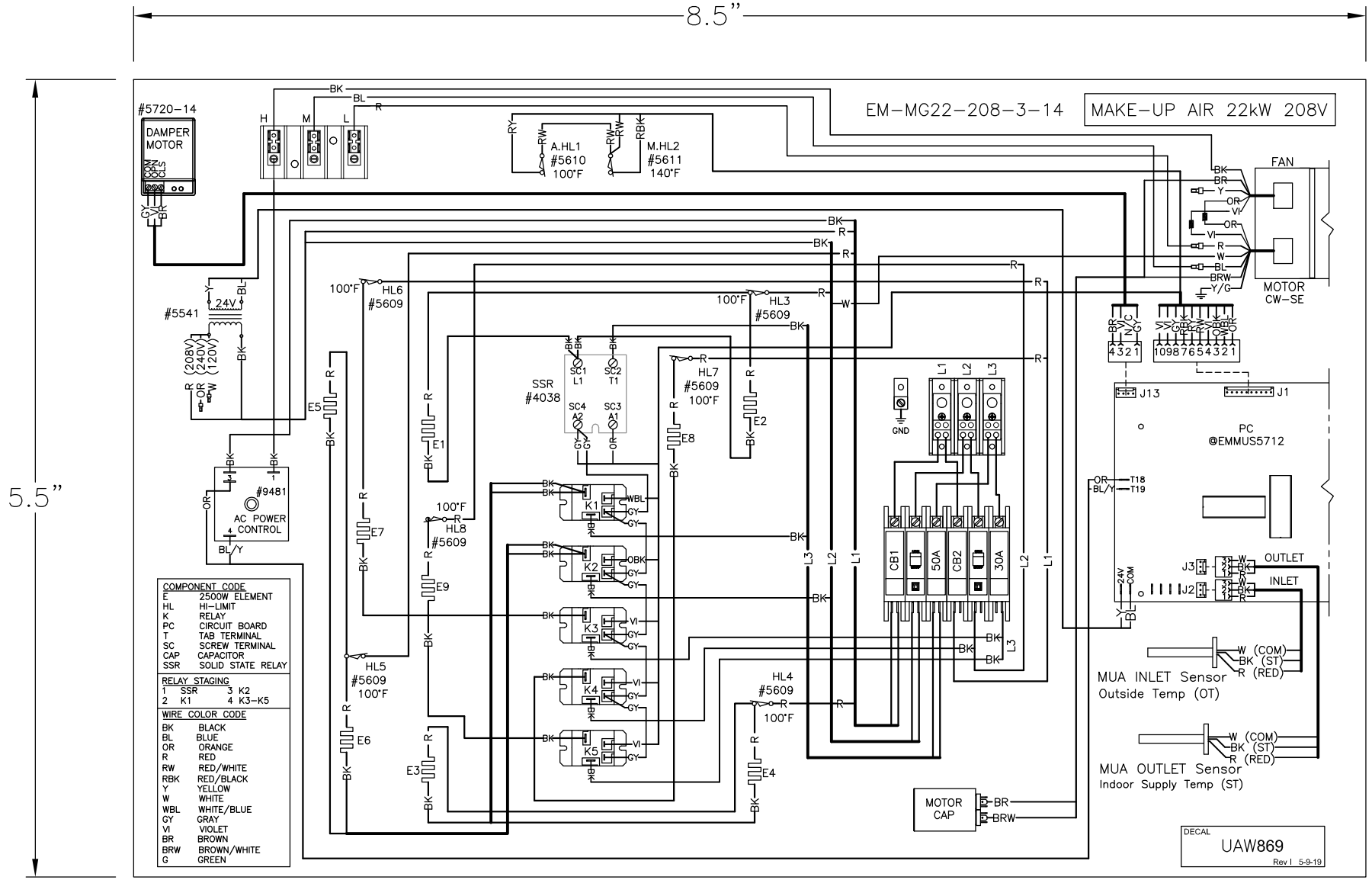
	NAME	DATE
DRAWN	BAS	5/5/14
CHECKED		
APPROVED	-	

Electro Industries
Monticello, MN 55362
(763)295-4138

NUMBER	UAW868 1 of 1
DESCRIPTION	WIRING DECAL 14KW MAKE–UP AIR
SCALE	1:1
STATUS	Production
REV	I

DECAL + TITLEBLOCK DO NOT PRINT AS DECAL



NOTES:
1. SIZE = 5.5” X 8.5”
2. COLOR = BLACK ON WHITE
3. MATERIAL = POLY WITH ADHESIVE AND LAMINATE.

Rev. I 5–9–19: Add Vlug between fan and power control #9481.
Rev. H 4–22–19: Remove #6201 text, add SSR to codes, remove BRY color wire code
Rev. G 2–18–19: Remove reference to Violet wire on wire 36. Clarify OT and ST descriptions.

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NAME	DATE
DRAWN BAS	10/1/13
CHECKED	
APPROVED -	1:1

Electro Industries
Monticello, MN 55362
(763)295-4138

SCALE	STATUS	REV
	Production	I

MAKE UP AIR II 22kW

NUMBER UAW869 1 of 1

DESCRIPTION
WIRING DECAL
22KW MAKE–UP AIR 208V

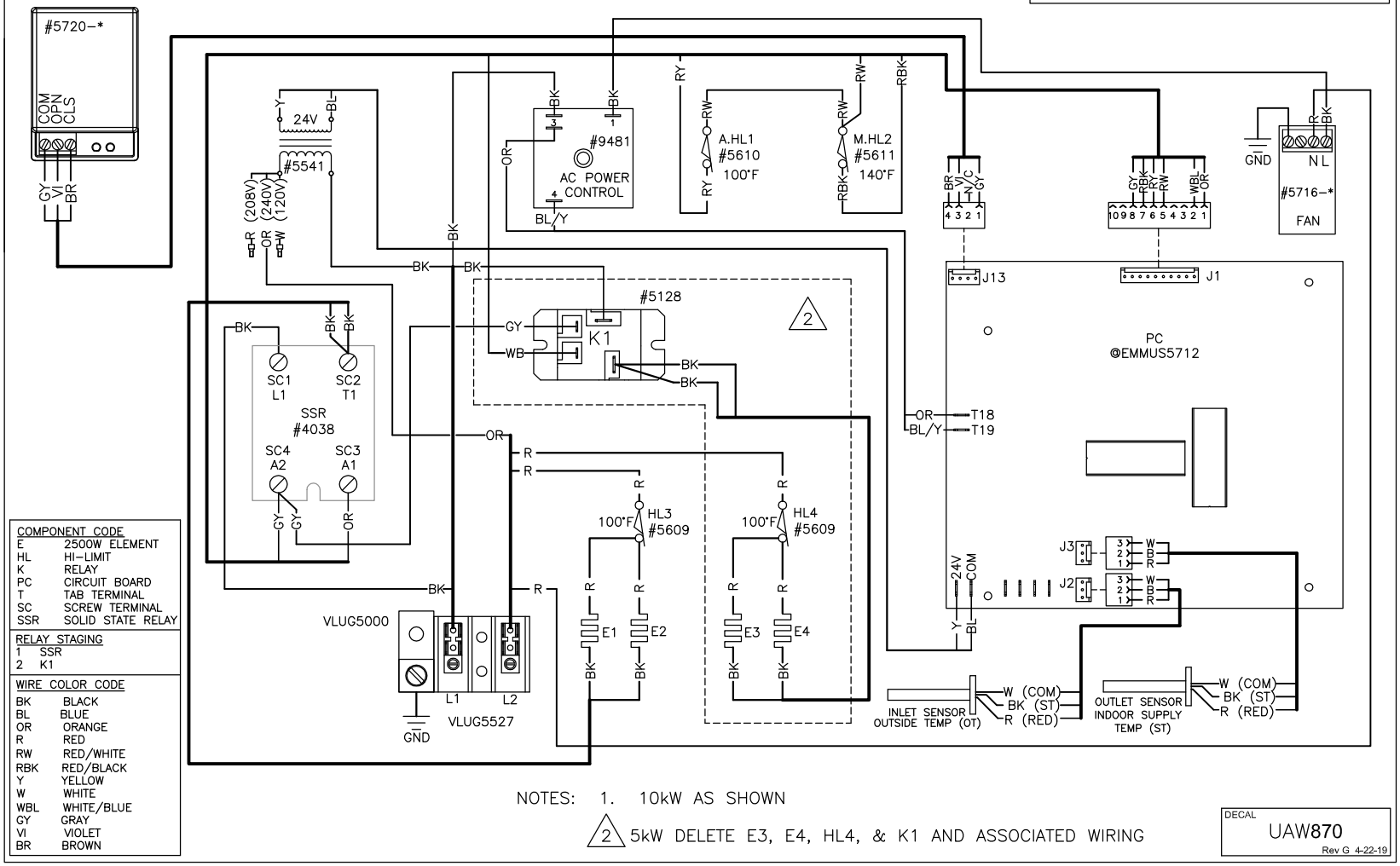
DECAL + TITLEBLOCK DO NOT PRINT AS DECAL

8.5”

5.5”

EM-MC05-240-1-08, EM-MD05-240-1-10, EM-MD10-240-1-10

MAKE-UP AIR 240/208V 1PH 5-10kW



COMPONENT CODE	
E	2500W ELEMENT
HL	HI-LIMIT
K	RELAY
PC	CIRCUIT BOARD
T	TAB TERMINAL
SC	SCREW TERMINAL
SSR	SOLID STATE RELAY

RELAY STAGING	
1	SSR
2	K1

WIRE COLOR CODE	
BK	BLACK
BL	BLUE
OR	ORANGE
R	RED
RW	RED/WHITE
RBK	RED/BLACK
Y	YELLOW
W	WHITE
WBL	WHITE/BLUE
GY	GRAY
VI	VIOLET
BR	BROWN

NOTES: 1. 10kW AS SHOWN

2 5kW DELETE E3, E4, HL4, & K1 AND ASSOCIATED WIRING

DECAL
UAW870
Rev G 4-22-19

NOTES:
1. SIZE = 5.5” X 8.5”
2. COLOR = BLACK ON WHITE
3. MATERIAL = POLY WITH ADHESIVE AND LAMINATE.

Rev. G 4-22-19: Add SSR to codes, remove #6201 text, correct model name
Rev. F 3-5-19: Convert to new models

	NAME	DATE
DRAWN	BAS	12/9/13
CHECKED		
APPROVED	-	

PROPRIETARY AND CONFIDENTIAL
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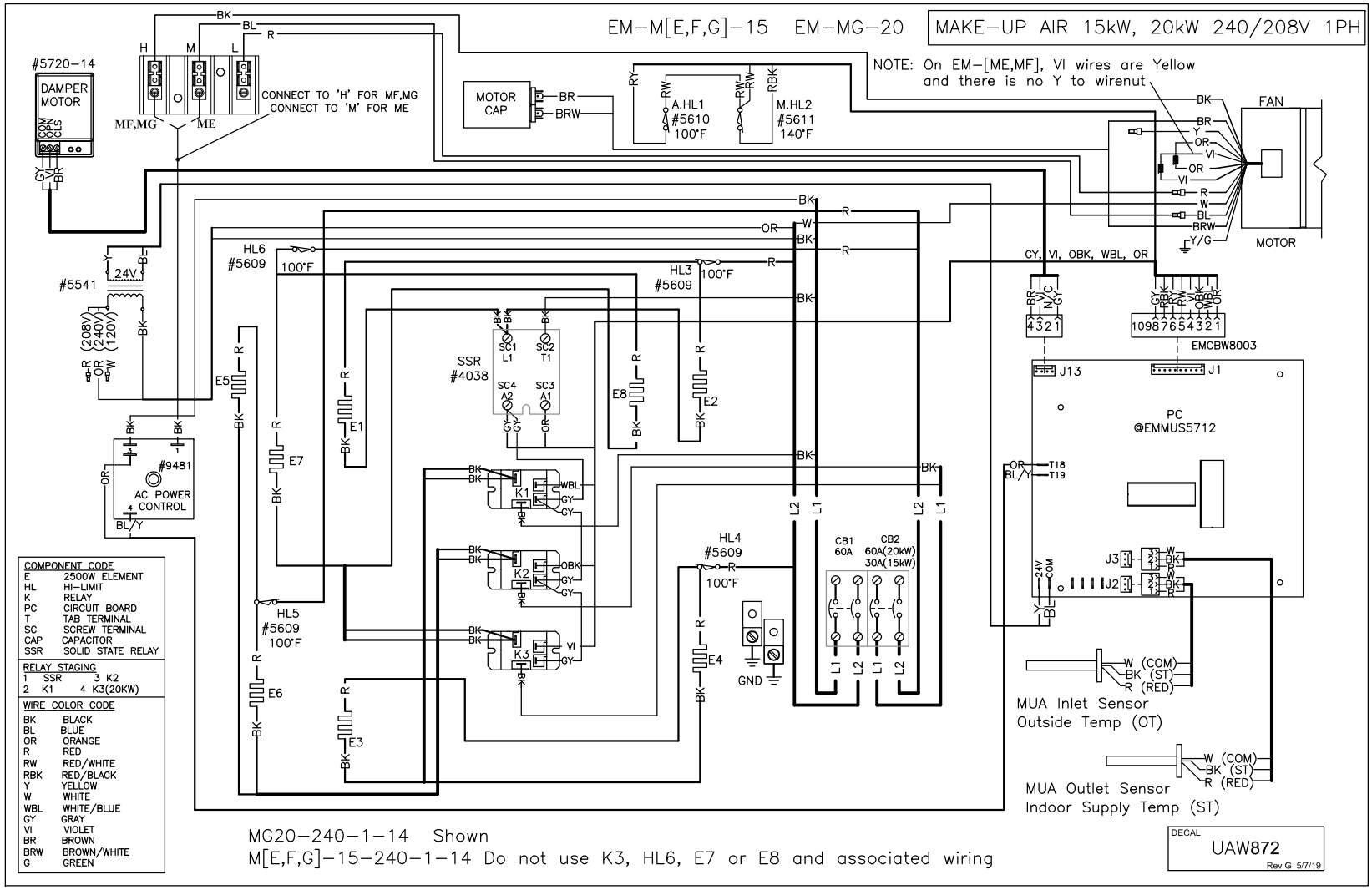
Electro Industries
Monticello, MN 55362
(763)295-4138

SCALE	STATUS	REV
1:1	Production	G

NUMBER UAW870 1 of 1

DESCRIPTION
WIRING DECAL
5kW-10kW MAKE-UP AIR II

DECAL + TITLEBLOCK DO NOT PRINT AS DECAL



NOTES:
1. SIZE = 5.5” X 8.5”
2. COLOR = BLACK ON WHITE
3. MATERIAL = POLY WITH ADHESIVE AND LAMINATE.

EM-M[E,F,G]-15, EM-MG-20

NAME	DATE
DRAWN CRN	4/9/15
CHECKED	
APPROVED -	1:1

PROPRIETARY AND CONFIDENTIAL
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Electro Industries
Monticello, MN 55362
(763)295-4138

SCALE	STATUS	REV
	Production	G

NUMBER UAW872 1 of 1

DESCRIPTION
WIRING DECAL
15kW MAKE–UP AIR II

Rev.G 5/10/19: Show fan wiring for MG20 as default. Add vlug between fan and pwr cntrl.
Rev.G 4/22/19: Add SSR code, remove #6201 text, remove BRY wire color code
Rev.F 2/18/19: Add EM–MG20–240–1–14. Clarify OT and ST descriptions. Add model names.

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.

ELECTRO INDUSTRIES
Monticello, Minnesota
800.922.4138
www.electromn.com

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.