

# INSTALLATION INSTRUCTIONS

## Low Ambient Head Pressure Controller

DALOWAMB001A00 to DALOWAMB011A00

### For Split Systems

6 to 12.5 Ton Split Cooling Unit

6 to 10 Ton Split Heat Pump Unit

These instructions must be read and understood completely before attempting installation

## Safety Labeling and Signal Words

### DANGER, WARNING, CAUTION, and NOTE

The signal words **DANGER**, **WARNING**, **CAUTION**, and **NOTE** are used to identify levels of hazard seriousness. The signal word **DANGER** is only used on product labels to signify an immediate hazard. The signal words **WARNING**, **CAUTION**, and **NOTE** will be used on product labels and throughout this manual and other manual that may apply to the product.

**DANGER** - Immediate hazards which will result in severe personal injury or death.

**WARNING** - Hazards or unsafe practices which could result in severe personal injury or death.

**CAUTION** - Hazards or unsafe practices which may result in minor personal injury or product or property damage.

**NOTE** - Used to highlight suggestions which will result in enhanced installation, reliability, or operation.

### Signal Words in Manuals

The signal word **WARNING** is used throughout this manual in the following manner:

 **WARNING**

The signal word **CAUTION** is used throughout this manual in the following manner:

 **CAUTION**

### Signal Words on Product Labeling

Signal words are used in combination with colors and/or pictures or product labels.

## PACKAGE USAGE


UNIT	COOLING STAGES	VOLTAGE	PART NUMBER
CAS 072-151	1	208/230-3-60	DALOWAMB001A00
CAS 072, 091	1	460-3-60	DALOWAMB002A00
CAS 072-151	1	575-3-60	DALOWAMB003A00
CHS 072-121	1	208/230-3-60	DALOWAMB004A00
CHS 072, 091	1	460-3-60	DALOWAMB005A00
CHS 072-121	1	575-3-60	DALOWAMB006A00
CAS 120, 150	2	575-3-60	DALOWAMB007A00
CAS 121, 151	1	460-3-60	DALOWAMB008A00
CHS 121	1	460-3-60	DALOWAMB009A00
CAS 120, 150	2	208/230-3-60	DALOWAMB010A00
CAS 120, 150	2	460-3-60	DALOWAMB011A00

## SAFETY CONSIDERATIONS


Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.


Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes, the current editions of the National Electrical Code (NEC) NFPA 70. In Canada refer to the current editions of the Canadian Electrical Code CSA C22.1.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury. Understand these signal words: DANGER,

WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

 <b>WARNING</b>
<b>ELECTRICAL SHOCK HAZARD</b>
Failure to follow this warning could cause personal injury or death.
Before beginning any modification on unit, always turn off main power switch to unit and install lockout tag. Unit may have more than one power switch.

 <b>CAUTION</b>
<b>CUT HAZARD</b>
Failure to follow this caution may result in personal injury.
Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate clothing.

## PACKAGE CONTENTS

DALOWAMBO											
01A00	02A00	03A00	04A00	05A00	06A00	07A00	08A00	09A00	10A00	11A00	ITEM
1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	<b>Motormaster I Control/Sensor</b>
		1 qty			1 qty	1 qty					<b>Transformer, 575V to 460V</b>
1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	1 qty	<b>Mounting Bracket</b>
2 qty	2 qty	2 qty	2 qty	2 qty	2 qty	2 qty	2 qty	2 qty	2 qty	2 qty	<b>Outdoor Fan Motor (1 and 3)</b>
	1 qty	1 qty		1 qty	1 qty	1 qty					<b>Fan Motor Capacitor (CAP1)</b>
1 qty	1 qty	1 qty				2 qty	1 qty		2 qty	2 qty	<b>Time Delay Relay (TDR)</b>
			1 qty	1 qty	1 qty			1 qty			<b>Speed Control Bypass Relay (SCB)</b>
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	<b>Mounting Supplies</b>
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	<b>Wiring Supplies</b>

## INSTALLATION

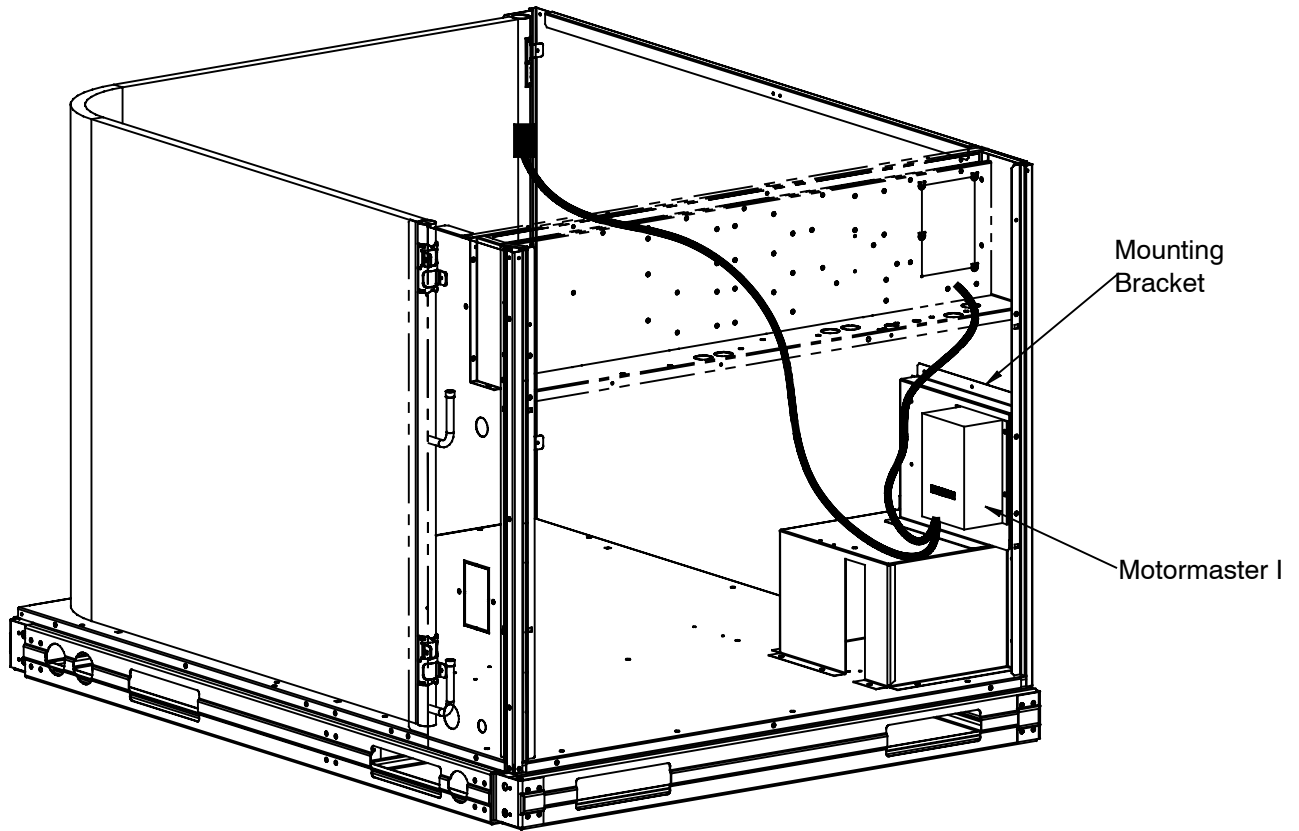
1. Disconnect power to the unit.
  2. Disconnect condenser (outdoor) fan motor (OFM) wires at the contactor and capacitor. Note position of fan blades in relation to fan orifice.
  3. Remove OFM(s) from unit.
  4. Remove fan blade(s) from motor(s).
  5. Replace the OFM(s).
  6. Re-install fan blade(s). Ensure that fan blade is properly located in the orifice. Refer to the base unit installation instructions for further details.
  7. In some cases the OFM change out also requires the capacitor it uses to change. Refer to the Package Contents table (previous page) and the motor nameplate, to determine if the capacitor needs to be changed.

Unscrew the capacitor strap carefully so that it can be reused. Remove the capacitor and store it in a safe place or discard properly. Using the capacitor strap, safely secure the new correct capacitor in the same location the old one was. Connect the wires the same way they were disconnected.
  8. Install the mounting bracket in the position shown in Fig. 1 using the sheet metal screws included with the accessory.
  9. Mount Motormaster® I controller on the mounting bracket. (See Fig. 1.) The controller must be mounted vertically with leads at the bottom. To ensure electrical ground, use the serrated head mounting screws provided.

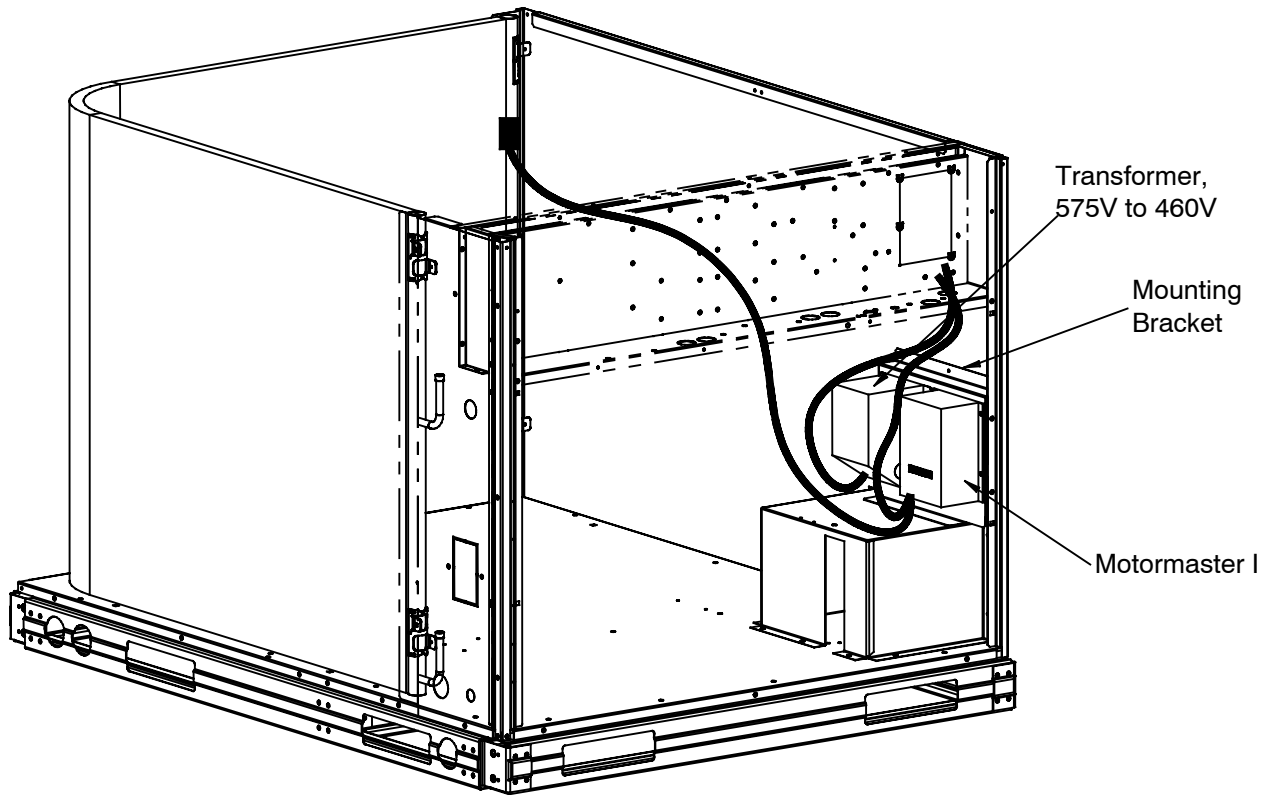
For 575 V units, the supplied transformer (575 V to 460 V) also mounts to the bracket.
  10. Route sensor wire from bottom of Motormaster I control to sensor location as specified in Fig. 2. On round-tube plate fin coils, fasten the sensor to the defined location on the piping connection end of the coil with the provided bolt. On microchannel coils, fasten the sensor to the defined location on the opposite piping connection end of the coil with wire tie(s).
  11. **For cooling-only units**—Mount the supplied time delay relay (TDR) in the control box. See Fig. 6 for location.
  12. **For heat pump units**—Mount the supplied speed control bypass relay (SCB) in the control box. See Fig. 6 for location.
  13. Rewire unit for the new or replaced parts (outdoor fan motors, Motormaster control, plus time delay relays, speed control bypass relay and 575 to 460V transformer, as applicable). Use the provided wire assemblies. Refer to the unit label wiring diagram. (See Fig. 3–5.)
- NOTE:** The 575V to 460V transformer (HT01AH858) is used as an auto-transformer (buck boost transformer), not as a traditional step down isolation transformer therefore it must be wired as per unit label wiring diagram. (See Fig. 3–5.)
14. Coil up all excess wire and secure it.
  15. Wind baffles are required to prevent wind cross currents from causing abnormally low condensing temperatures. Use 20-gauge sheet metal. See Fig. 7 and Table 1 for details on wind baffle fabrication.
  16. Reconnect power to the unit.

**FIGURE 1**

**Motormaster Controller Mounting**



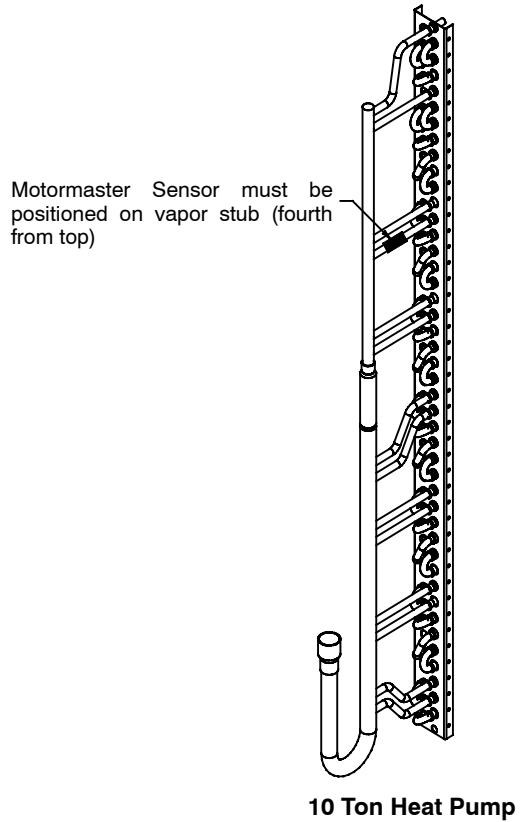
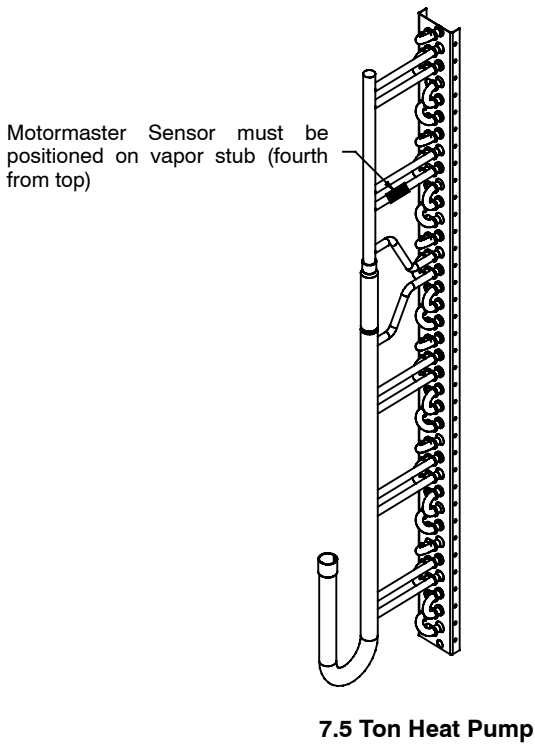
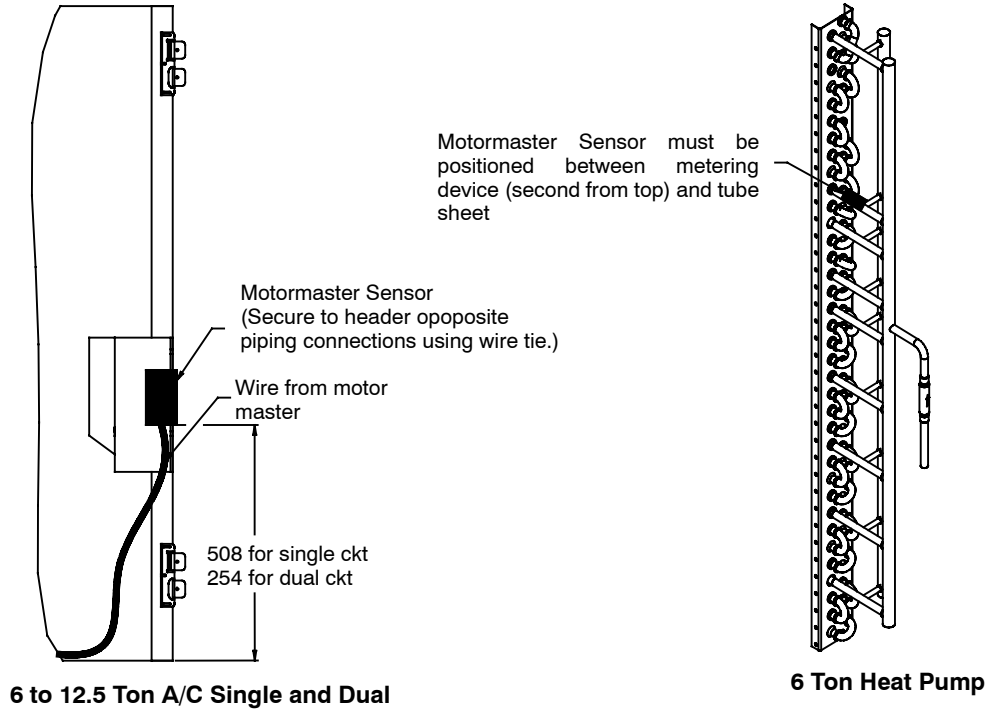
**208/230v & 460v**



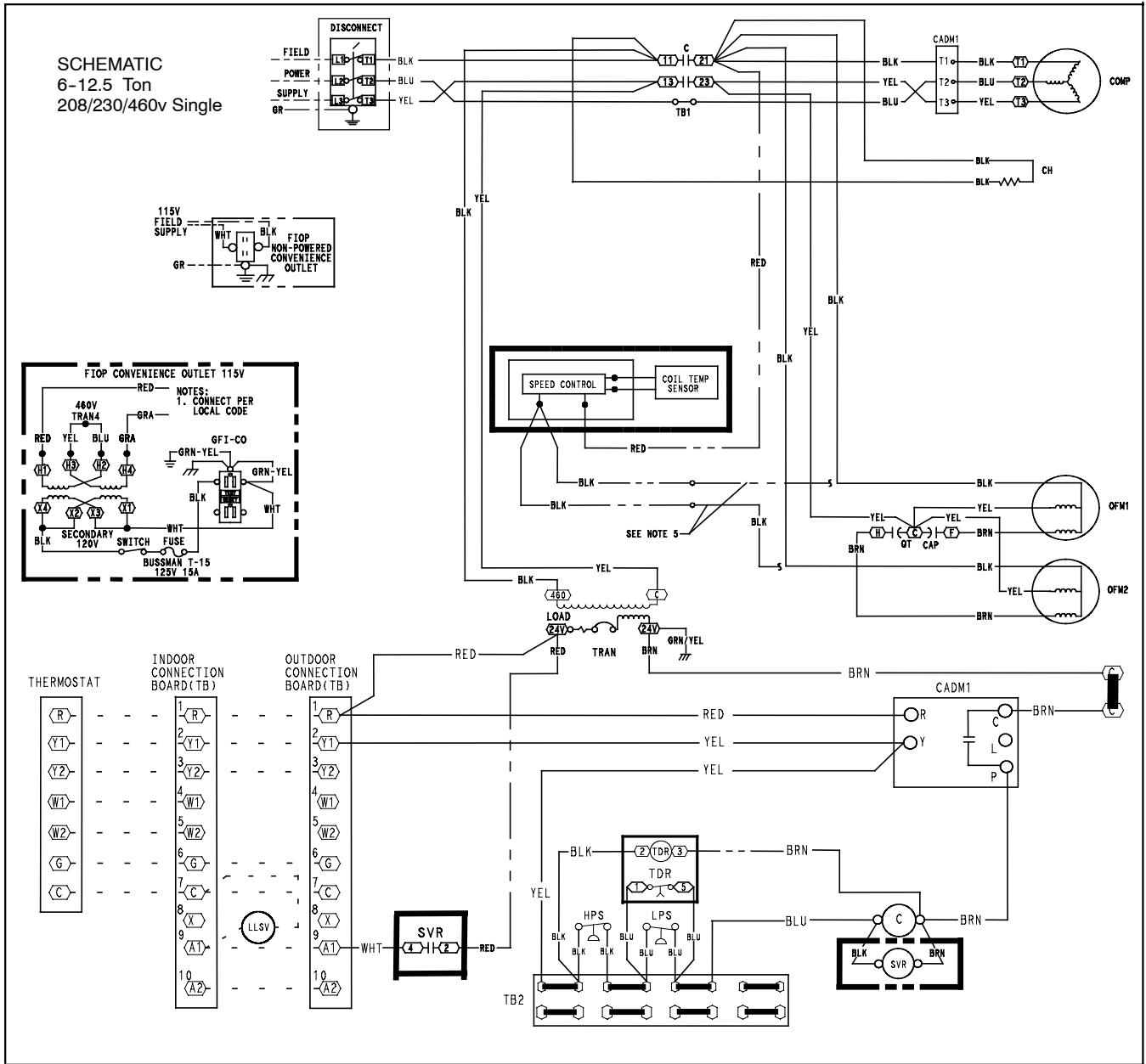
**575v**

**FIGURE 2**

**Sensor Locations**

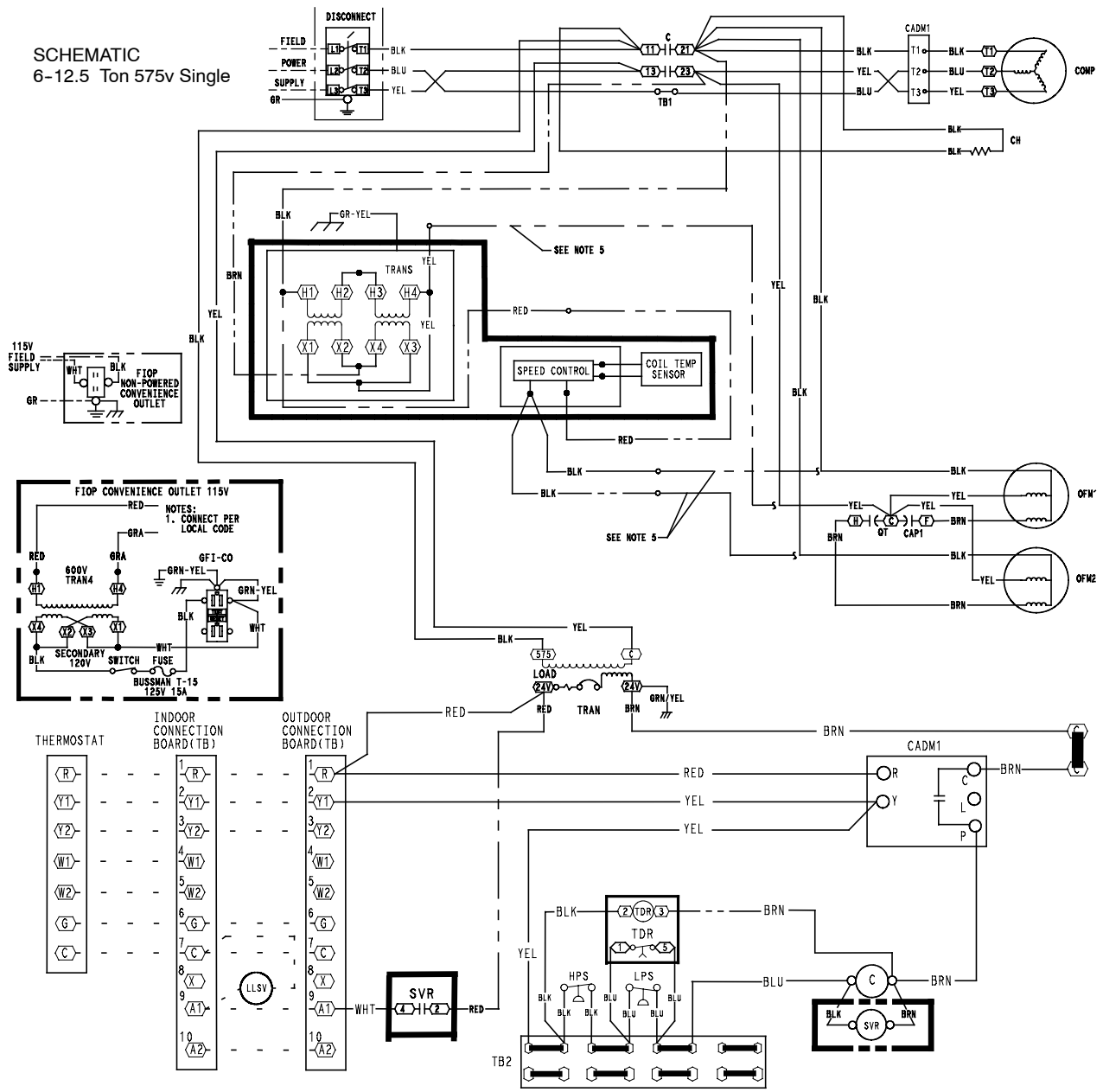


**FIGURE 3 A** Motormaster Wiring Details - CAS072, 091, 121, 151 - 208/230/460V

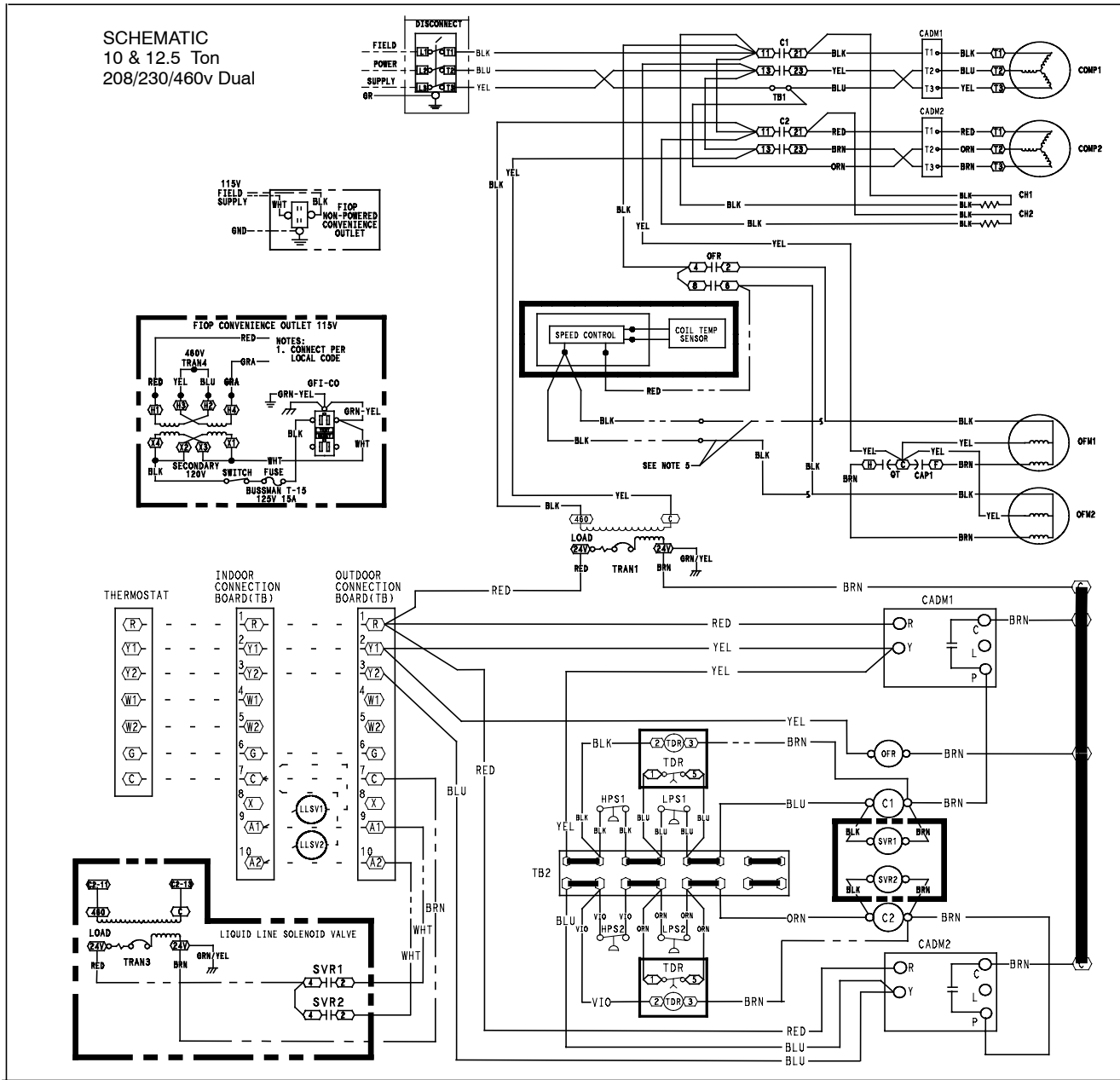


**FIGURE 3B** Motormaster Wiring Details - CAS072, 091, 121 - 575V

**SCHEMATIC**  
6-12.5 Ton 575v Single



**FIGURE 4 A** Motormaster Wiring Details - CAS120, 150 - 208/230/460V





**FIGURE 4B** Motormaster Wiring Details - CAS120, 150 - 575V

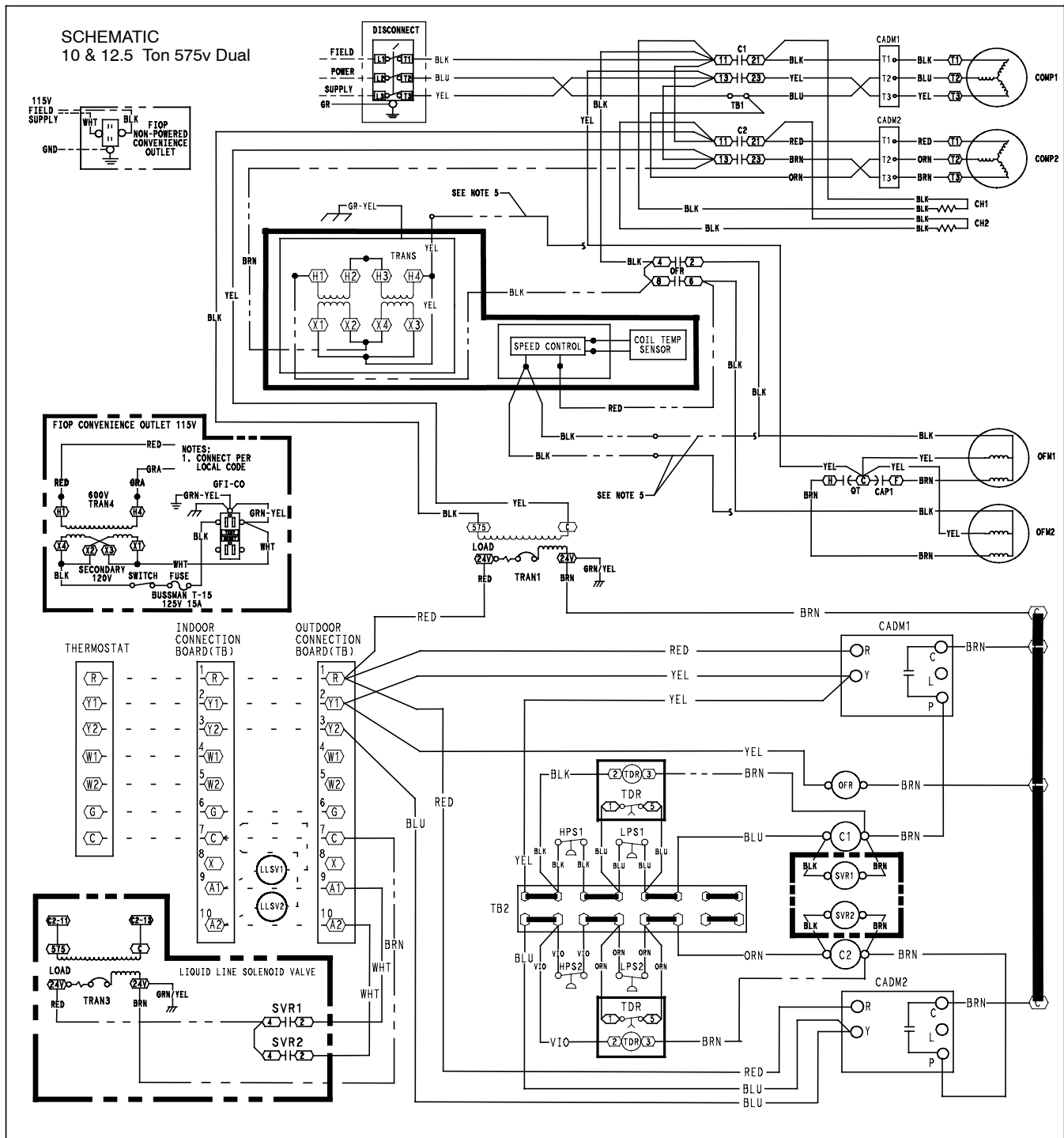
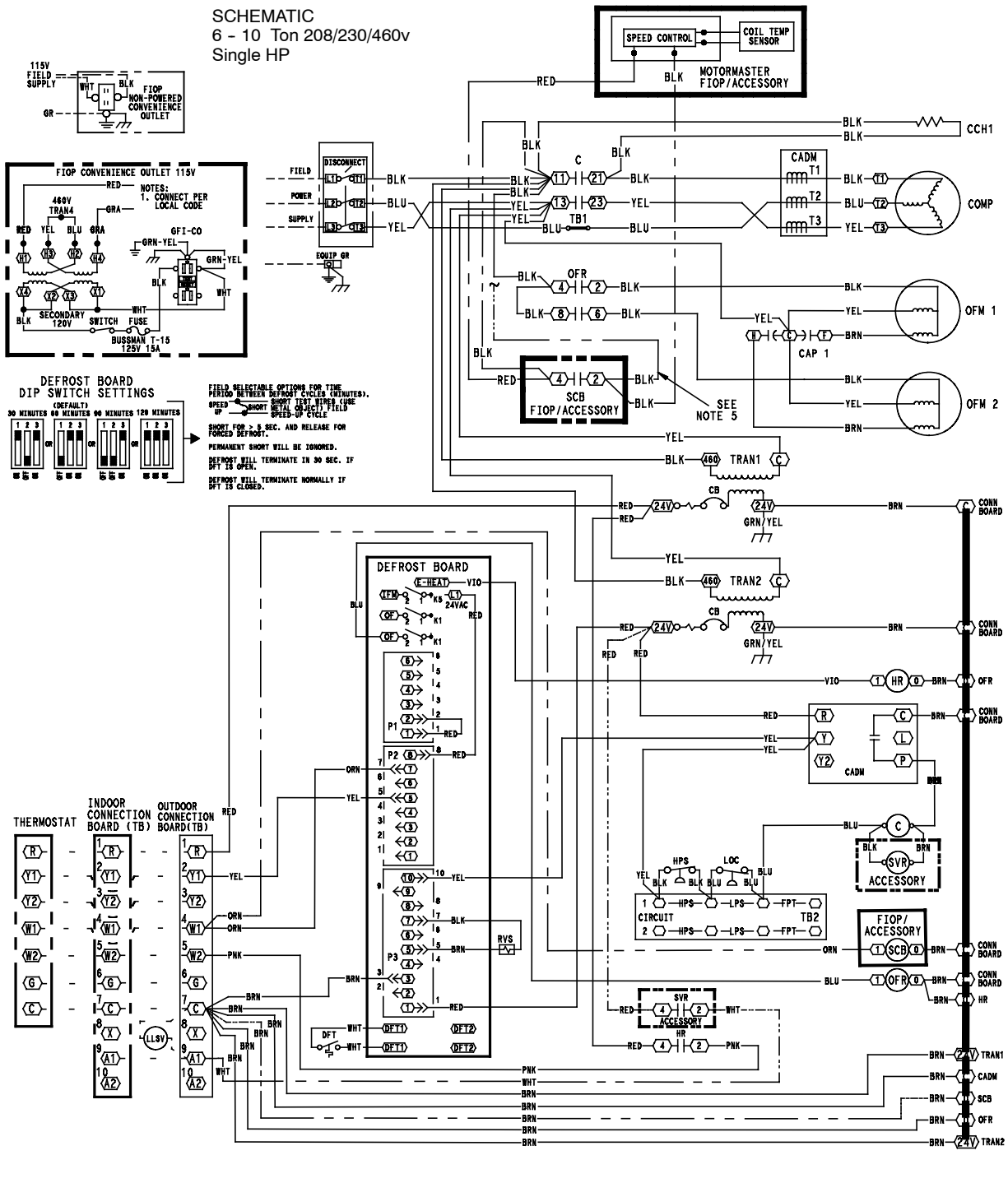


FIGURE 5 A

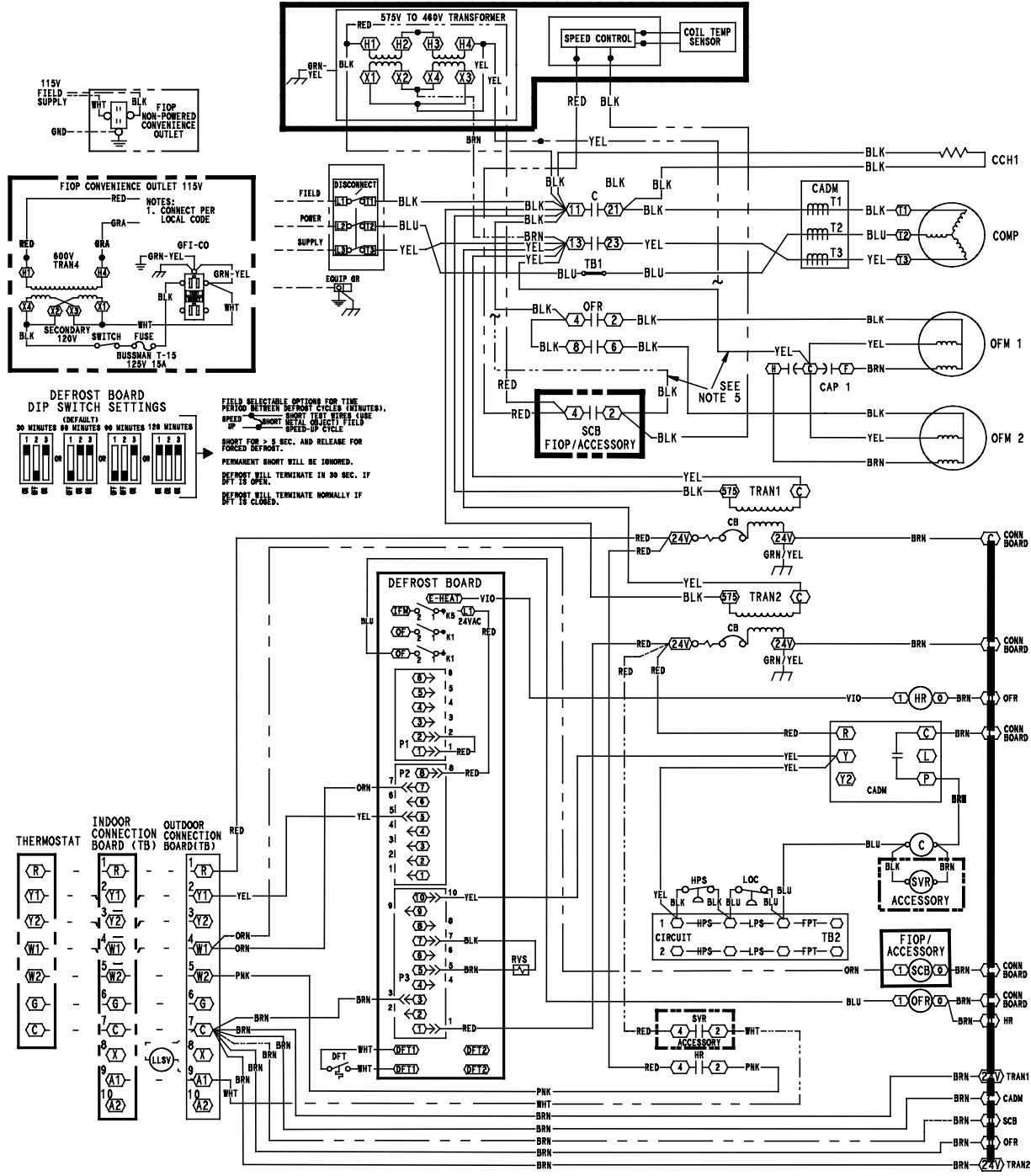
Motormaster Wiring Details - CHS072, 091, 121 - 208/230/460V

SCHMATIC  
6 - 10 Ton 208/230/460v  
Single HP



**FIGURE 5B** Motormaster Wiring Details - CHS072, 091, 121 - 575V

**SCHEMATIC**  
6 - 10 Ton 575v Single HP



**FIELD CONTROL WIRING**

- △ FIELD SPLICE
- ⊗ MARKED WIRE
- ⊙ TERMINAL (MARKED)
- TERMINAL (UNMARKED)
- ⊠ TERMINAL BLOCK
- SPLICE
- FACTORY WIRING
- - - FIELD CONTROL WIRING
- FIELD POWER WIRING
- - - ACCESSORY OR OPTIONAL WIRING
- ▬ TO INDICATE COMMON POTENTIAL ONLY, NOT TO REPRESENT WIRING

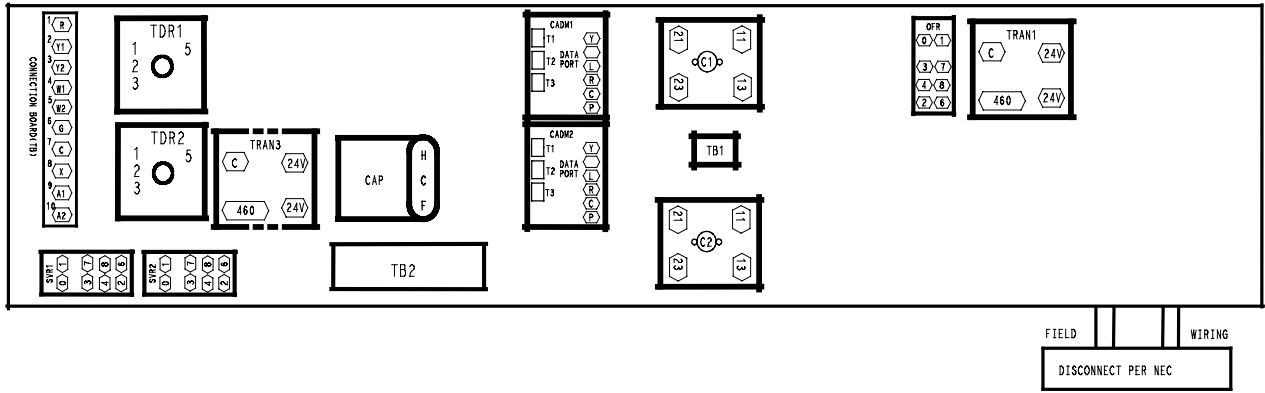
**LEGEND**

- C CONTACTOR, COMPRESSOR
- CAP CAPACITOR
- CH CRANKCASE HEATER
- CADM COMFORT ALERT - DIAGNOSTICS
- COMP COMPRESSOR MOTOR
- DFB DEFROST BOARD
- DFT DEFROST THERMOSTAT
- EQUIP EQUIPMENT
- FPT FREEZE PROTECTION THERMOSTAT
- FU FUSE
- GR GROUND
- HPS HIGH PRESSURE SWITCH
- HR HEATER RELAY
- LLSV LIQUID LINE SOLENOID VALVE
- LOC LOSS OF CHARGE SWITCH
- OFM OUTDOOR FAN MOTOR
- OFR OUTDOOR FAN RELAY
- RVS REVERSING VALVE SOLENOID
- SCB SPEED CONTROL BYPASS
- SVR SOLENOID VALVE RELAY
- TB TERMINAL BLOCK
- TRAN TRANSFORMER

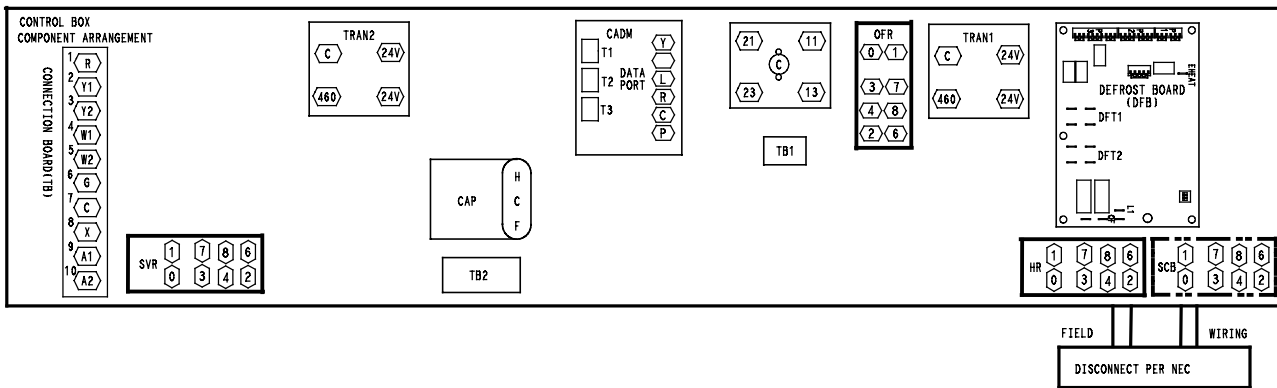
**NOTES**

1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. USE COPPER CONDUCTOR'S ONLY.
3. COMPRESSORS AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
4. TRANSFORMER IS WIRED FOR 460V UNIT.
5. ON UNITS WITH SPEED CONTROL, REMOVE BLACK WIRE BETWEEN CONTACTOR TERMINAL 1 AND OFR TERMINAL 4 AT CONTACTOR TERMINAL 11 AND CONNECT TO SCB TERMINAL 2.

**FIGURE 6 A** Component Locations - CAS Cooling Only Shown



**FIGURE 6 B** Component Locations - CHS Heat Pump Shown



**FIGURE 7** Wind Baffles

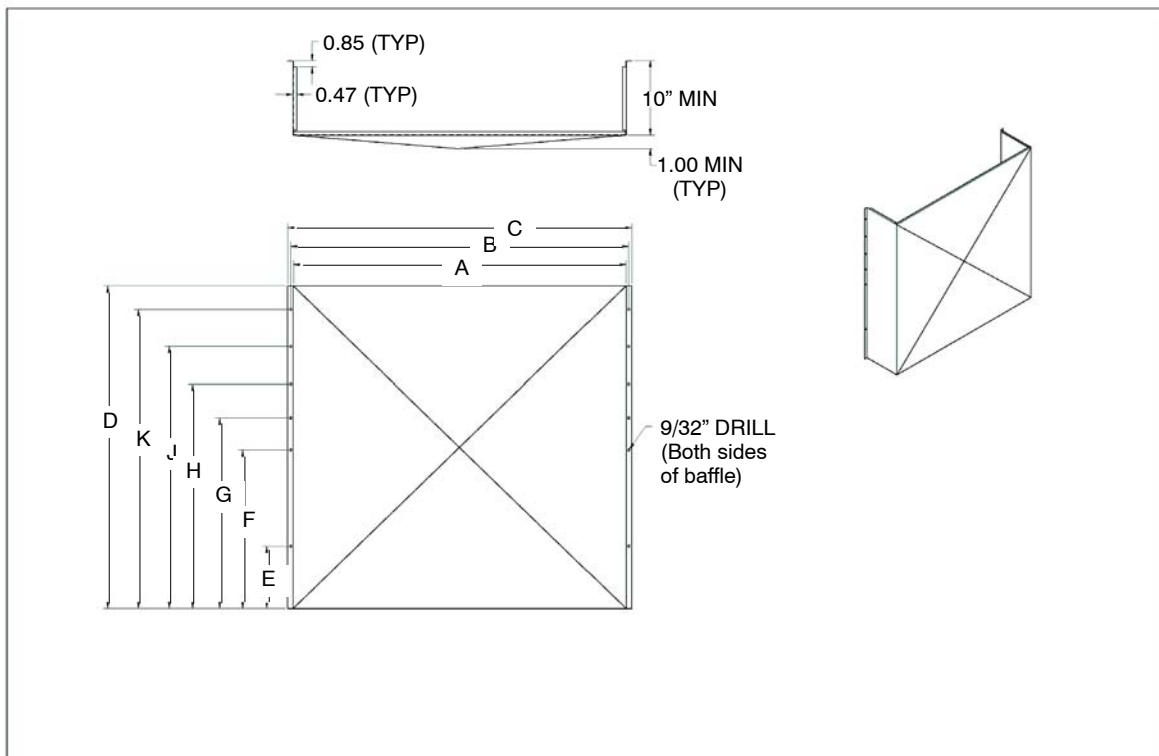


TABLE 1 - WIND BAFFLE DIMENSIONS

DIMENSIONS - INCHES											
UNIT	BAFFLE	A	B	C	D	E	F	G	H	J	K
CAS072	LEFT SIDE	32 1/2	33 1/4	34	35 1/4	6	18	34 1/8	-	-	-
	BACK	40 1/2	41 1/4	42	35 1/4	4 1/2	18	32 5/8	-	-	-
CAS091	LEFT SIDE	44 1/2	45 1/4	46	35 1/4	6	18	34 1/8	-	-	-
	BACK	40 1/2	41 1/4	42	35 1/4	4 1/2	18	32 5/8	-	-	-
CAS120 CAS121	LEFT SIDE	44 1/2	45 1/4	46	43 1/8	8 3/8	21 2/8	29	40	-	-
	BACK	40 1/2	41 1/4	42	43 1/8	7 1/8	20	29	38 3/4	-	-
CAS150 CAS151	LEFT SIDE	44 1/2	45 1/4	46	43 1/8	8 3/8	21 1/4	29	40	-	-
	BACK	40	40 3/4	41 1/2	43 1/8	7 1/8	20	29	38 3/4	-	-
	RIGHT SIDE	24 1/2	25	25 3/4	43 1/8	6 7/8	19 3/4	29	38 1/2	-	-
CHS072	LEFT SIDE	28 1/4	29	29 3/4	35 1/4	1 1/4	9 1/4	17 1/4	25 1/4	33 1/4	-
	BACK	40 1/4	41	41 3/4	35 1/4	4 1/8	11 1/8	18 1/8	25 1/8	32 1/8	-
CHS091	LEFT SIDE	28 1/4	29	29 3/4	35 1/4	1 1/4	9 1/4	17 1/4	25 1/4	33 1/4	-
	BACK	40	40 3/4	41 1/2	35 1/4	4 1/2	18	32 5/8	-	-	-
	RIGHT SIDE	24 3/8	25 1/8	25 7/8	35 1/4	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	-
CHS121	LEFT SIDE	28 1/4	29	29 3/4	43 1/8	1 1/4	9 1/4	17 1/4	25 1/4	33 1/4	41 1/4
	BACK	40	40 3/4	41 1/2	43 1/8	6 7/8	19 3/4	28 3/4	38 1/2	-	-
	RIGHT SIDE	24 1/4	25 1/8	25 7/8	43 1/8	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	39 1/4

DIMENSIONS - MM											
UNIT	BAFFLE	A	B	C	D	E	F	G	H	J	K
CAS072	LEFT SIDE	826	845	864	895	151	457	865	-	-	-
	BACK	1029	1048	1067	895	113	457	827	-	-	-
CAS091	LEFT SIDE	1130	1149	1168	895	151	457	865	-	-	-
	BACK	1029	1048	1067	895	113	457	827	-	-	-
CAS120 CAS121	LEFT SIDE	1130	1149	1168	1095	212	539	737	1015	-	-
	BACK	1029	1048	1067	1095	180	507	737	983	-	-
CAS150 CAS151	LEFT SIDE	1130	1149	1168	1095	212	539	737	1015	-	-
	BACK	1016	1035	1054	1095	180	507	737	983	-	-
	RIGHT SIDE	616	635	654	1095	174	501	737	977	-	-
CHS072	LEFT SIDE	719	738	757	895	33	236	439	643	846	-
	BACK	1023	1042	1061	895	106	284	461	639	817	-
CHS091	LEFT SIDE	719	738	757	895	33	236	439	643	846	-
	BACK	1016	1035	1054	895	113	457	827	-	-	-
	RIGHT SIDE	618	637	656	895	109	287	465	643	820	-
CHS121	LEFT SIDE	719	738	757	1095	33	236	439	643	846	1049
	BACK	1016	1035	1054	1095	175	502	732	978	-	-
	RIGHT SIDE	618	637	656	1095	109	287	465	643	820	998

## OPERATION

Fan on/off control in single-circuit cooling-only units (CAS) is provided by the compressor contactor.

Fan on/off control in dual-circuit cooling-only units (CAS) and heat pump units (CHS) is provided by an outdoor fan relay (OFR). In heat pumps, the OFR is controlled by defrost control board (DFB).

Fan motor speed in cooling mode is regulated by the temperature sensor for a minimum coil condensing temperature of approximately 100° at higher outdoor ambient temperature and 80°F at lower ambient.

For heat pump units, the speed control bypass relay (SCB) is used to bypass the speed control during the heating mode, resulting in full fan speed at all times.

To override the speed control for full fan speed operation during service or maintenance, either a) remove sensor and place in hot water >120°F, or b) rewire to bypass control by connecting speed control input and output power wires.

## TROUBLESHOOTING

OBSERVATION	POSSIBLE REMEDY
Fans won't start	Check power & wiring Check sensor location Check sensor resistance CAS, CHS - check OFR
Cooling - Slow fan speed at start or during low outdoor ambient	Normal operation
Cooling - Slow fan speed above 85°F outdoor ambient (should be full speed)	Check sensor location Check sensor resistance Check fan motor capacitor
Cooling - motor current into speed control is greater than motor nameplate FLA	Normal operation Up to 30% higher amps at partial speed at low ambient
Heating - Full fan speed	Normal operation
Heating - Slow fan speed (should be full speed)	Check wiring Check SCB relay for speed control bypass

TEMPERATURE		RESISTANCE
F +-2	C +-1	Ohms, nominal
-22	-30	88350
-4	-20	48485
14	-10	27650
32	0	16325
50	10	9950
68	20	6245
77	25	5000
86	30	4028
104	40	2663
122	50	1801
140	60	1244
158	70	876