Motormaster® I Head Pressure Controller Accessory
Split Systems 6 to 12.5 Tons

Installation Instructions

Part Numbers: CALOWAMB004A00-CALOWAMB006A00, CALOWAMB009A00
CALOWAMB030A00-CALOWAMB036A00

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IMPORTANT: Read these instructions completely before attempting to install this accessory.

SAFETY CONSIDERATIONS

Installation, start-up and servicing of this equipment can be hazardous due to system pressures, electrical components and equipment location (roofs, elevated structures, etc.)

Untrained personnel can perform the basic maintenance functions. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply. Follow all safety codes. Wear safety glasses and work gloves.

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 the 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 a hazard 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.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could cause personal injury or death.

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag. Ensure electrical service to unit agrees with voltage and amperage listed on the unit rating plate.

⚠CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in damage to equipment.

When removing panels from the unit, be careful not to damage the roof or other surfaces with the panels.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury. Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing, safety glasses and gloves when handling parts and servicing units.

GENERAL

Motormaster I solid-state head pressure control regulates outdoor (condenser) fan speed during Cooling mode operation. A temperature sensor, mounted on a return bend of the outdoor (condenser) coil, controls the speed of approved outdoor (condenser) fan motors in order to maintain a constant head pressure in the outdoor (condenser) coil. When properly installed, the control will maintain the appropriate head pressure at low ambient temperatures down to –20°F (–28°C).

On all units, the single Motormaster I control is connected to both outdoor (condenser) fan motors.

Heat Pump ONLY: Speed Control Bypass relay SCB is energized during the Heating mode. The SCB relay bypasses the Motormaster controller output to force all outdoor (condenser) fan motors to run at full speed during Heating mode.

575-V Units Only: Transformer with 460-v Motors and Control

On 575-v units, the 575-v motors installed by factory are replaced with 460-v fan motors, powered through a stepdown (575-v to 460-v) autotransformer and controlled through a 460-v Motormaster controller. See Tables 1-3 for package usage; see Tables 4-5 for package contents for cooling and heat pump units, respectively.

Table 1 — Carrier Package Usage

CARRIER			OUTDOOR COIL TYPE
Model	Size	Electrical Characteristic V-PH-60 Hz (Pos. No. 12)	Pos No. 11: A,B,C,E,M,N,P,R (Round Tube / Plate Fin)
			Motormaster CALOWAMB
38AUZ	07	208/230-3 (5)	030A00
		460-3 (6)	031A00
		575-3 (1)	033A00
	08	208/230-3 (5)	030A00
		460-3 (6)	031A00
		575-3 (1)	033A00
	12	208/230-3 (5)	030A00
		460-3 (6)	032A00
		575-3 (1)	033A00
	14	208/230-3 (5)	030A00
		460-3 (6)	032A00
		575-3 (1)	033A00
38AUD	12	208/230-3 (5)	034A00
		460-3 (6)	035A00
		575-3 (1)	036A00
	14	208/230-3 (5)	034A00
		460-3 (6)	035A00
		575-3 (1)	036A00
38AUQ	07	208/230-3 (5)	004A00
		460-3 (6)	005A00
		575-3 (1)	006A00
	08	208/230-3 (5)	004A00
		460-3 (6)	005A00
		575-3 (1)	006A00
	12	208/230-3 (5)	004A00
		460-3 (6)	009A00
		575-3 (1)	006A00

Table 2 — Bryant Package Usage

BRYANT			OUTDOOR COIL TYPE
Model	Size	Electrical Characteristic V-PH-60 Hz (Pos. No. 5)	Pos. No. 12: A,B,C,E,M,N,P,R (Round Tube / Plate Fin)
			Motormaster CALOWAMB
569J	07A/G	208/230-3 (P)	030A00
		460-3 (E)	031A00
		575-3 (T)	033A00
	08A/G	208/230-3 (P)	030A00
		460-3 (E)	031A00
		575-3 (T)	033A00
	12A/M	208/230-3 (P)	030A00
		460-3 (E)	032A00
		575-3 (T)	033A00
	14A/M	208/230-3 (P)	030A00
		460-3 (E)	032A00
		575-3 (T)	033A00
	12D/T	208/230-3 (P)	034A00
		460-3 (E)	035A00
		575-3 (T)	036A00
	14D/T	208/230-3 (P)	034A00
		460-3 (E)	035A00
		575-3 (T)	036A00
575J	07A/G	208/230-3 (P)	004A00
		460-3 (E)	005A00
		575-3 (T)	006A00
	08A/M	208/230-3 (P)	004A00
		460-3 (E)	005A00
		575-3 (T)	006A00
	12A/G	208/230-3 (P)	004A00
		460-3 (E)	009A00
		575-3 (T)	006A00

Table 3 — ICP Package Usage

ICP			OUTDOOR COIL TYPE
Model	Size	Electrical Characteristic V-PH-60 Hz (Pos. No. 7)	Pos. No. 9: A,B,C,E,M,N,P,R (Round Tube / Plate Fin)
			Motormaster CALOWAMB
CAS	072A/G	208/230-3 (H)	030A00
		460-3 (L)	031A00
		575-3 (S)	033A00
	091A/G	208/230-3 (H)	030A00
		460-3 (L)	031A00
		575-3 (S)	033A00
	121A/M	208/230-3 (H)	030A00
		460-3 (L)	032A00
		575-3 (S)	033A00
	151A/M	208/230-3 (H)	030A00
		460-3 (L)	032A00
		575-3 (S)	033A00
	123D/T	208/230-3 (H)	034A00
		460-3 (L)	035A00
		575-3 (S)	036A00
	153D/T	208/230-3 (H)	034A00
		460-3 (L)	035A00
		575-3 (S)	036A00
CHS	072A/G	208/230-3 (H)	004A00
		460-3 (L)	005A00
		575-3 (S)	006A00
	091A/M	208/230-3 (H)	004A00
		460-3 (L)	005A00
		575-3 (S)	006A00
	121A/G	208/230-3 (H)	004A00
		460-3 (L)	009A00
		575-3 (S)	006A00

Table 4 — Package Contents — Cooling Units, RTPF Coil Type

MATERIALS DESCRIPTION	ACCESSORY PACKAGE NUMBER CALOWAMB_____ / Unit Voltage						
	030A00 / 208/230-v	031A00 / 460-v	032A00 / 460-v	033A00 / 575-v	034A00 / 208/230-v	035A00 / 460-v	036A00 / 575-v
Motormaster I	1 x 230-v	1 x 460-v	1 x 460-v	1 x 460-v	1 x 230-v	1 x 460-v	1 x 460-v
Motors	2 x 230-v	2 x 460-v	2 x 460-v	2 x 460-v	2 x 230-v	2 x 460-v	2 x 460-v
Capacitor, Dual 10 mfd	—	1	—	1	—	—	1
Transformer 240x460/120x240	—	—	—	1	—	—	1
Relay, TDR HN67XZ210	1	1	1	1	2	2	2
Mounting Plate	1	1	1	1	1	1	1
Screws, No. 10x5/8	11	11	11	11	11	11	11
Screws, 1/4AB-14x5/8	—	—	—	4	—	—	4
Wires							
BLK x 12-in.	1	1	1	1	2	2	2
BRN x 22-in.	1	1	1	1	2	2	2
BLU x 12-in.	2	2	2	2	4	4	4
Wire Ties	10	10	10	10	10	10	10

Table 5 — Package Contents — Heat Pump Units, RTPF Coil Type

MATERIALS DESCRIPTION	ACCESSORY PACKAGE NUMBER CALOWAMB_____ / Unit Voltage			
	004A00 / 208/230-v	005A00 / 460-v	006A00 / 575-v	009A00 / 460-v
Motormaster I	1 x 230-v	1 x 460-v	1 x 460-v	1 x 460-v
Motors	2 x 230-v	2 x 460-v	2 x 460-v	2 x 460-v
Capacitor, Dual 10 mfd	—	1	1	—
Transformer 240x460/120x240	—	—	1	—
Relay, TDR HN67XZ210	1	1	1	1
Mounting Plate	1	1	1	1
Screws, No. 10x5/8	13	13	13	13
Screws, 1/4AB-14x5/8	—	—	4	—
Wires				
BLK x 12-in.	1	1	—	1
BRN x 22-in.	1	1	1	1
BLU x 12-in.	2	2	1	1
Wire Ties	10	10	10	10

BEFORE INSTALLATION

Check voltage of kit parts against unit voltage.

Before starting, check controller and motor voltage against unit voltage.

NOTE: 575-v units use 460-v controller and motors with step-down autotransformer.

INSTALLATION

Changing Outdoor Fan Motors (all units)

⚠ WARNING

Failure to follow this caution could result in personal injury or death.

Turn off all power to unit and install lockout tag. Power can come to unit from multiple sources. Verify power is off with a meter or probe.

1. Disconnect power to the unit. Lock-out/tag-out.
2. Remove main access panel and control box cover.
3. At run capacitor CAP, identify the YEL wire from contactor C (or C1); do not disconnect. Disconnect the two other YEL leads and the BRN leads (from OFM1 and OFM2).
4. Disconnect two OFM BLK wires per table below.

UNIT	DISCONNECT AT
38AUZ*07-12, 38AUZA14 569J*07-12A/G, 569J*14A CAS072/091/121/151	C terminal 21
38AUZM14 569J*14M CAS151*M	OFR1 and OFR2 — terminal 2
38AUDA 569J*D CAS*D**	Relay OFR Terminals 2,6
38AUDT 569J*T CAS123/153**	OFR1 and OFR2 Relays — terminal 2
38AUQ 575J CHS	Relay OFR Terminals 2,6
38AUQE12 575J*12H CHS121*H	Relays OFR1 and OFR2 Terminal 2

5. Trace the motor leads from OFM1 and OFM2 to the control box. Note wire path into the control box. Pull these leads out of the control box.
6. Remove the screws securing the OFM1 and OFM2 fan grilles from the unit top cover. Save these screws.
7. Remove the fan grille assemblies at OFM1 and OFM2 by lifting the assemblies straight up until the prop blades clear the

fan deck. Invert the grille assemblies and place on a support surface.

8. Mark the hub to indicate motor location. Measure and record the dimension of the top edge of the prop blade to the grille.
9. For each fan assembly, remove the prop fan from the motor shaft.
10. Observe the orientation of the fan motor wires at the grille and motor shell opening. Remove the fan motors from the grille center plate.
11. Attach the motors from the accessory kit to the grilles. Torque the mounting nuts onto the motor throughbolts to 20 in.-lb (2260 Nm) Do not over-tighten the nuts onto the motor throughbolt ends. Secure wires to grille as noted in Step 10.
12. Mount the prop fan onto the motor shaft. Locate the prop at the distance from the grille measured in Step 8 above. If the prop blade contacts the motor housing, adjust prop position until the prop clears the motor by 1/2 in. (12 mm). Rotate the hub on the motor shaft to position the set screw over the shaft flat. Torque the prop set screws to 84 in.-lb (9.5 Nm).
13. Position the OFM1 grille assembly over its top panel opening and carefully insert the motor wires and prop though the opening and lower into place. Secure using screws removed in Step 6. Repeat for OFM2 grille assembly.
14. Rotate the prop fan to ensure there is no interference or contact with unit piping or motor wiring.
15. Route the motor leads into the control box as noted in Step 5.

Prepare/Attach the Motormaster/Transformer

PLATE (BRACKET) 208/230-3 AND 460-3-V ONLY:

1. See Fig. 1 for Motormaster/transformer mounting plate (bracket). Note screw hole patterns on left-side (used for 575-v transformer mounting) and on right-hand side (used for Motormaster mounting).
2. Locate two screw holes for Motormaster left-side mounting.
3. Start two no. 10x5/8 screws in these holes. Engage half-length.
4. Attached the plate to inside of the unit panel per Fig. 2 with six no. 10 screws.

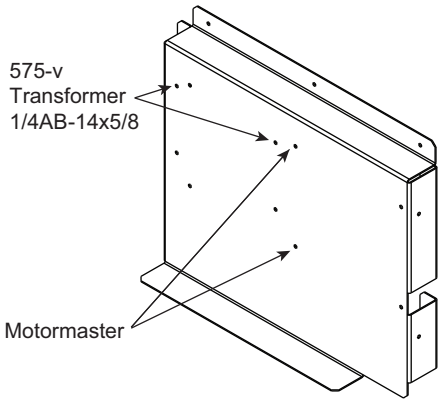


Fig. 1 — Mounting Bracket, Starter Screws

5. Handling the Motormaster assembly carefully to not damage the three long leads and the sensor cable, with leads exiting the control housing from the bottom, position the side mounting slots under the two mounting screws, and hold in place. Insert a no. 10 screw at the right side flange screw slot and tighten. Insert a second screw in the side slot and tighten. Tighten the two screws at the left side mounting slots.
6. Route the three power leads into the unit control box.
7. Route the Motormaster sensor cord to the coil (left of compressor with RTPF coil type). See Fig. 3.

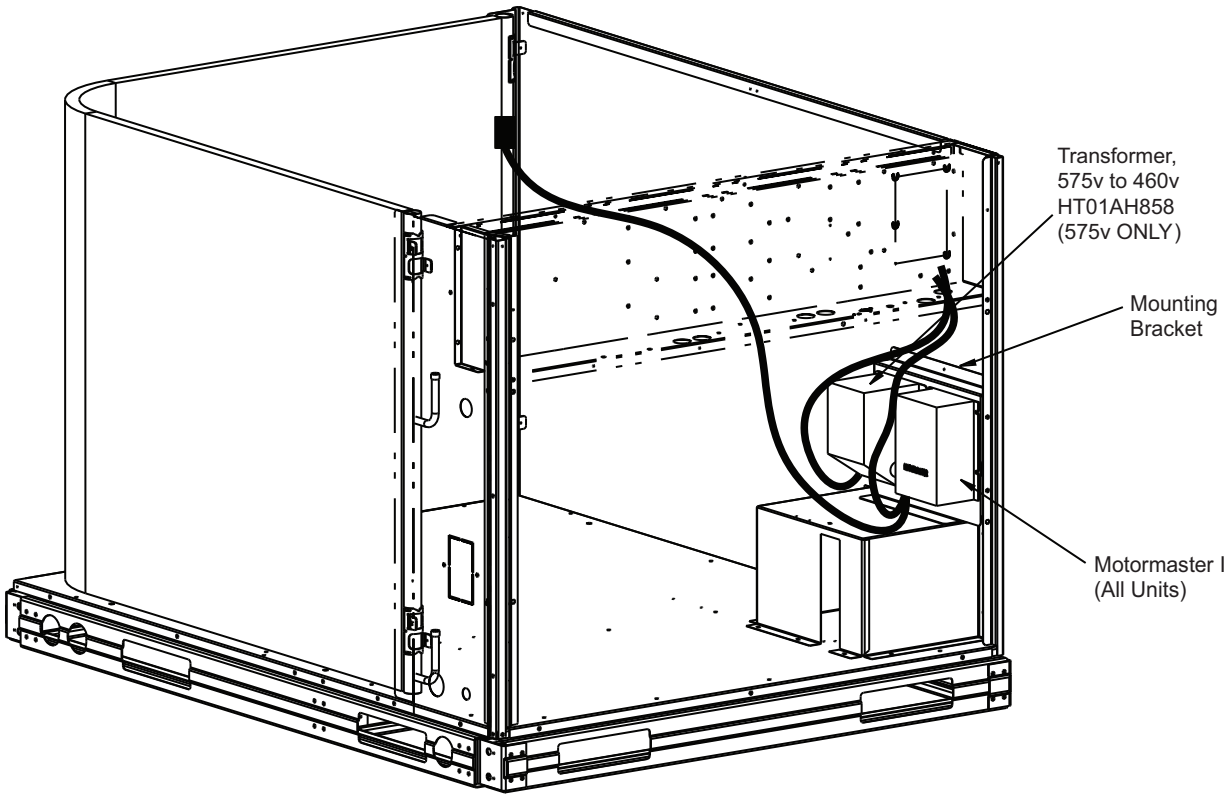


Fig. 2 — Motormaster Control Mounting

575-V ONLY:

1. See Fig. 1 for Motormaster/transformer mounting plate (bracket). Note screw hole patterns on left-side (used for 575-v transformer mounting) and on right-hand side (used for Motormaster mounting
2. Locate two screw holes for transformer top mounting.
3. Start two 1/4AB-14x5/8 screws in these holes. Engage half-length.
4. Locate two screw holes for Motormaster left-side mounting.
5. Start two no. 10x5/8 screws in these holes. Engage half-length.
6. Attached the plate to inside of the unit panel per Fig. 2 with six no. 10 screws.
7. Handling the transformer assembly carefully to not damage the four long leads, position the top mounting flange keyholes over the two mounting screws. Insert two 1/4AB-14 screws at the flange bottom screw holes. Tighten the four screws.
8. Route the four leads into the unit control box.
9. Handling the Motormaster assembly carefully to not damage the three long leads and the sensor cable, with leads exiting the control housing from the bottom, position the side mounting slots under the two mounting screws and hold in place. Insert a no. 10 screw at the right-side flange screw slot and tighten. Insert a second screw in the side slot and tighten. Tighten the two screws at the left side mounting slots.
10. Route the three power leads into the unit control box.
11. Route the Motormaster sensor cord to the coil (left of compressor with RTPF coil type). See Fig. 3.

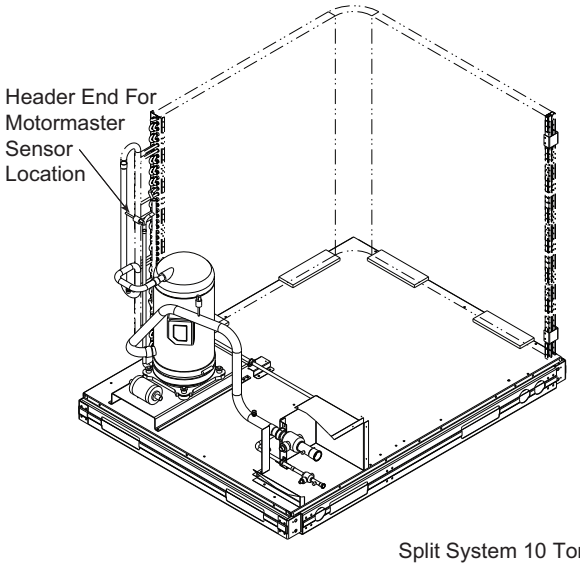


Fig. 3 — Typical Motormaster Sensor Location, RTPF Coil

Control Box Changes and Wiring

Refer to Component Location view on unit wiring label to determine location in control box for new components. (See Fig. 6-25.)

Replace CAP (460-v size 07-08/072-090 and all 575-v units)

1. Disconnect the YEL wire at run capacitor CAP center terminal.
2. Unscrew the capacitor strap at CAP carefully so that it can be reused.
3. Remove the capacitor and store it in a safe place or discard properly.
4. Using the capacitor strap, safely secure the new 10mfdx-10mfd capacitor in the original capacitor location.
5. Reconnect the YEL wire at the capacitor center terminal.

Cooling Model Units (38AUZ, 38AUD, 569J, CAS)

MOUNT TDR RELAY

Accessory packages for these cooling units will contain one or two Time Delay Relays (TDR). Refer to Component Arrangement view on the unit wiring diagram; mount the relay or relays in the unit control box in TDR positions using screws provided.

Wiring Connections

TDR WIRING

All cooling models use a single TDR across the unit's single or Circuit 1 low pressure switch. Refer to Fig. 6-25.

Locate these wires:

COLOR	LENGTH, in. [mm]
BRN	22 [559]
BLU (2 required)	12 [305]
BLK	12 [305]

1. Connect BRN wire, female quick connect end, to TDR terminal 3. Connect other end to compressor contactor C or C1 at coil terminal with BRN lead.
2. Connect BLK wire, female quick connect end, to TDR terminal 2. Connect other end to TB2 at HPS1-Out connection.
3. Connect BLU wire, female quick connect end, at TDR terminal 1. Connect other end to TB2 at LPS1-Out connection.
4. Connect second BLU wire, female quick connect end, at TDR terminal 5. Connect other end to TB2 at LPS1-In connection.

Dual Circuit Models Only

The accessory kit for these models includes a second TDR to bypass the low pressure switch in Circuit 2. Refer to Fig 6 and 7. Locate the second set of BRN, BLU and BLK wires.

1. Connect BRN wire, female quick connect end, to TDR2 terminal 3. Connect other end to compressor contactor C2 at coil terminal with BRN lead.
2. Connect BLK wire, female quick connect end, to TDR2 terminal 2. Connect other end to TB2 at HPS2-Out connection.
3. Connect BLU wire, female quick connect end, at TDR2 terminal 1. Connect other end to TB2 at LPS2-Out connection.
4. Connect second BLU wire, female quick connect end, at TDR2 terminal 5. Connect other end to TB2 at LPS2-In connection.

MOTORMASTER/OFM1/OFM2 WIRING

1. Locate the YEL and BRN leads from new OFM1 and OFM2; pull to run capacitor CAP.
2. Connect both YEL leads at CAP terminal C.
3. Connect BRN lead from OFM1 at CAP terminal F.
4. Connect BRN lead from OFM2 at CAP terminal H.
5. Locate the BLK leads from new OFM1 and OFM2; pull to CAP location.
6. Locate the two BLK leads from the Motormaster controller. Pull to CAP location.
7. Connect BLK leads from OFM1 and OFM2 to mating connectors on BLK leads from Motormaster.
8. Locate the RED lead from Motormaster controller.
9. Apply a FIELD-SUPPLIED 1/4-in. quick connect terminal on the RED lead per table in next step.

10. Connect the RED lead per the table below:

UNIT	VOLTAGE	CONNECT RED AT:	FIG.
38AUZ*07-12, 38AUZA14 569J*07-12A/G, 569J*14A CAS072/091/121/151	208/230V, 460V	Contactor C terminal 21 QC Terminal required	10, 12, 14
	575V	No connection required	11, 13, 15
38AUZM14 569J*14M CAS151*M	208/230V, 460V	Relay OFR2 terminal 6	16
	575V	Relay OFR2 terminal 6 (cut into red wire, insulate transformer side and use QC terminal for Motormaster side)	17
38AUDA 569J*D CAS****D**	208/230V, 460V	Relay OFR terminal 6 QC Terminal required	6
	575V	Relay OFR terminal 6 QC Terminal required	7
38AUDT 569J*T CAS123/153**	208/230V, 460V	Relay OFR2 terminal 6	8
	575V	Relay OFR2 terminal 6 (cut into red wire, insulate transformer side and use QC terminal for Motormaster side)	9

575-V Unit only, Transformer Connections:

38AUZ*07-12, 38AUZA14/569J*07-12A/G, 569J*14A/CAS072/091/121/151

1. Locate BLK, VIO and YEL leads from 575-v/460-v transformer.
2. At CAP, identify the YEL lead from contactor C. Follow back to contactor C and disconnect at terminal 23.
3. Connect the VIO lead from the transformer at contactor C terminal 23.
4. Connect BLK lead from transformer at contactor C terminal 21.
5. Pull YEL from transformer and YEL disconnected in Step 2 together. Cut the terminal off the factory wire, strip insulation 1/2 inch and splice YEL leads using wire connector.

38AUZM14/569J*14M/CAS151*M

1. Locate BLK, VIO, and YEL leads from 575-v/460-v transformer.
2. At CAP, identify the YEL lead from contactor C1. Follow back to contactor C1 and disconnect at terminal 13.
3. Connect the VIO lead from transformer at contactor C1 terminal 13.
4. Connect BLK lead from transformer at relay OFR2 terminal 8.
5. Pull YEL from transformer and YEL disconnected in Step 2 together. Cut the terminal off the factory wire, strip insulation 1/2 inch and splice YEL leads using wire connector.

38AUDA/569J***D/CAS 120/150

1. Locate BLK, VIO and YEL leads from 575-v/460-v transformer.
2. At CAP, identify the YEL lead from contactor C. Follow back to contactor C1 and disconnect at terminal 13.
3. Connect the VIO lead from the transformer at contactor C2 terminal 13.
4. Connect BLK lead from transformer at relay OFR terminal 8.
5. Pull YEL from transformer and YEL disconnected in Step 2 together. Cut the terminal off the factory wire, strip insulation 1/2 inch and splice YEL leads using wire connector.

38AUDT/569J***T/CAS123/153

1. Locate BLK, VIO and YEL leads from 575-v/460-v transformer.
2. At CAP, identify the YEL lead from contactor C. Follow back to contactor C1 and disconnect at terminal 13.
3. Connect the VIO lead from the transformer at contactor C2 terminal 13.
4. Connect BLK lead from transformer at relay OFR2 terminal 8.
5. Pull YEL from transformer and YEL disconnected in Step 2 together. Cut the terminal off the factory wire, strip insulation 1/2 inch and splice YEL leads using wire connector.

Heat Pump Units (38AUQ/575J/CHS)

MOUNT SCB RELAY

Accessory packages for these heat pumps include one DPST-NO relay; use for Speed Controller Bypass SCB function. Refer to Component Arrangement view on the unit wiring diagram; mount the relay in the unit control box in SCB position using screws provided.

Wiring Connections

See the table below to locate the heat pump wiring diagrams.

UNIT	VOLTAGE	FIG.
38AUQA07-12, 575J*07-12A, CHS072/091/121*A	208/230V, 460V	18
	575V	19
38AUQD07, 38AUQM08, 575J*07G, 575J*08M, CHS072*G, CHS090*M	208/230V, 460V	20
	575V	21
38AUQD08, 575J*08G, CHS091*G	460V	22
	575V	23
38AUQD12, 575J*12G, CHS121*G	208/230V, 460V	24
	575V	25

SCB RELAY WIRING

Locate these wires:

COLOR	LENGTH, in. [mm]
BRN	30 [762]
ORN	30 [762]
BLK (used on 230-v, 460-v units only)	30 [762]

1. Connect BRN wire at SCB terminal 0. Connect other end of BRN wire to unit control voltage terminal board TB, terminal C.
2. Connect ORN wire at SCB terminal 1; connect other end to terminal board TB terminal W1.
3. At OFR terminal 4, trace the BLK lead to contactor C terminal 11 and disconnect at C.
4. Pull the BLK disconnected at C in Step 4 to SCB; connect at terminal 2.

MOTORMASTER/OFM1/OFM2 WIRING

1. Locate the BLK leads from new OFM1 and OFM2; pull to OFR, connect to terminal 2 and terminal 6. (OFR 1 and 2 terminal 2 for 38AUQE12 /575J*12H/CHS121*H)
2. Locate the YEL and BRN leads from new OFM1 and OFM2; pull to capacitor CAP.
3. Connect both YEL leads at CAP terminal C.
4. Connect BRN lead from OFM1 at CAP terminal F.
5. Connect BRN lead from OFM2 at CAP terminal H.

230-V, 460-V UNIT ONLY:

1. Locate the RED lead from the Motormaster controller. Pull to SCB, connect to terminal 4.
2. Locate the BLK lead from the Motormaster controller. Pull to SCB, connect to terminal 2.
3. Connect new BLK wire at SCB terminal 4. Pull other end to contactor C.
4. At contactor C terminal 11, connect the new BLK wire.

575-V UNIT ONLY WITH TRANSFORMER:

1. Locate four leads from transformer – RED, BLK, YEL and VIO (or BRN). Locate two leads from Motormaster – RED and BLK.
2. Pull the two RED leads to relay SCB. Connect on SCB terminal 4.
3. Pull the BLK lead from Motormaster to SCB. Connect on SCB terminal 2.
4. At contactor C terminal 13, identify the YEL lead from CAP and disconnect from C. Reconnect to YEL lead from the transformer.
5. Connect the VIO (or BRN) lead from the transformer at contactor C terminal 13.
6. Connect the BLK lead from the transformer to contactor C terminal 11.

Sensor Location

UNIT WITH COPPER TUBE COIL

Sensor is attached to a transfer header tube on coil, located to the left of the compressors. Refer to Fig. 4-5 for specific tube location. Use machine screw and nut to secure sensor clamp to the tube.

Wind Baffles

Wind baffles are required to prevent wind cross currents from causing abnormally low condensing temperatures during Cooling mode operation at low outdoor temperatures.

Use 20-gauge sheet metal to fabricate wind baffles (see Fig. 26 and Tables 6-7) and mounting brackets.

Inspect Wiring / Restore Power

Visually inspect all fan motor wiring to ensure no interference with fan blades or contact with refrigerant tubing. Use wire ties to dress wires as required.

Visually inspect all wiring around and to Motormaster module and 575-v autotransformer. Coil up all excess wire and secure it next to the controller; use wire tie as required.

Replace the control box cover. Replace the unit access panel.

Remove the tag and lockout at the unit disconnect. Restore power to unit.

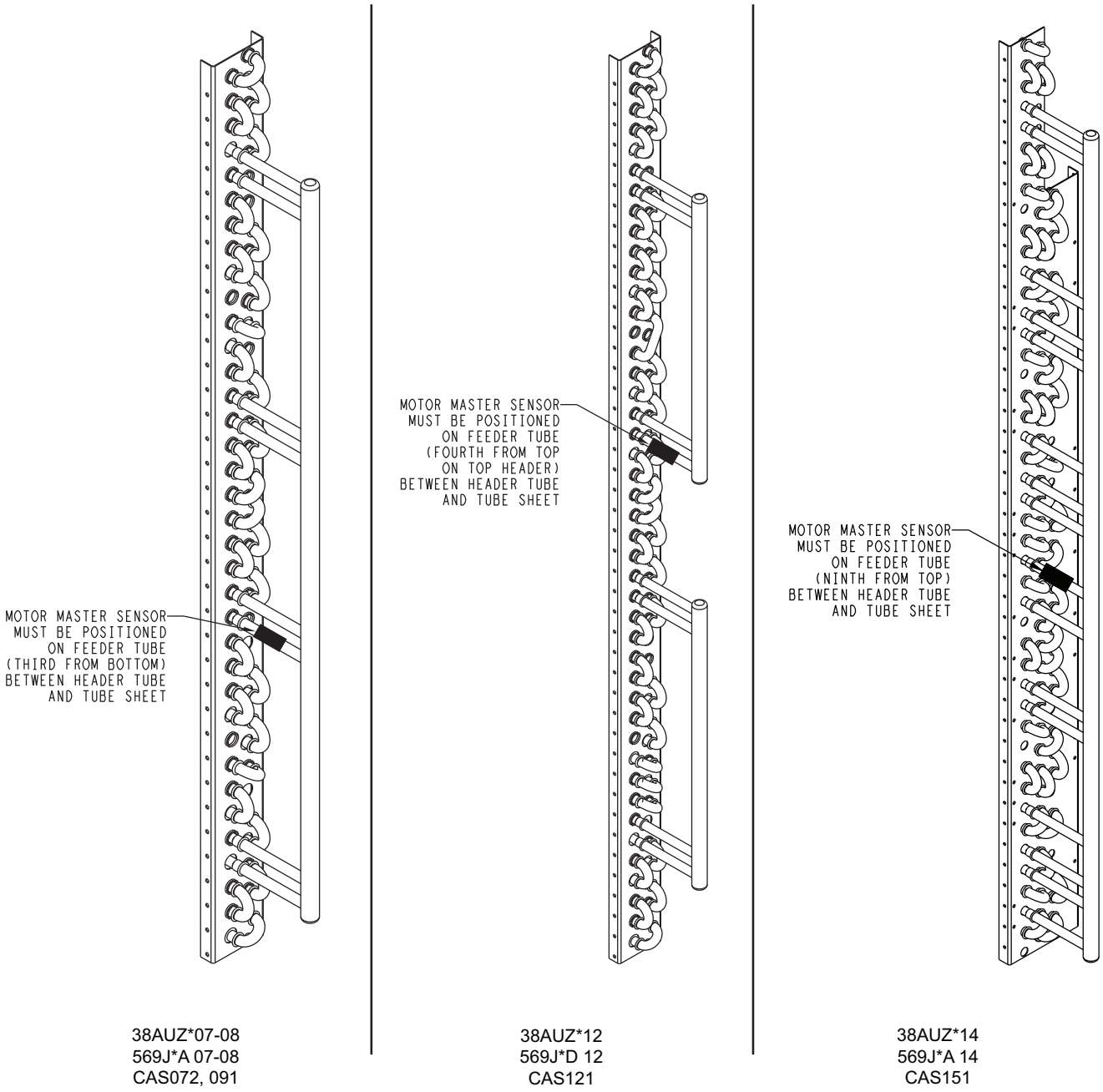


Fig. 4 — Motormaster Sensor Locations (RTPF)

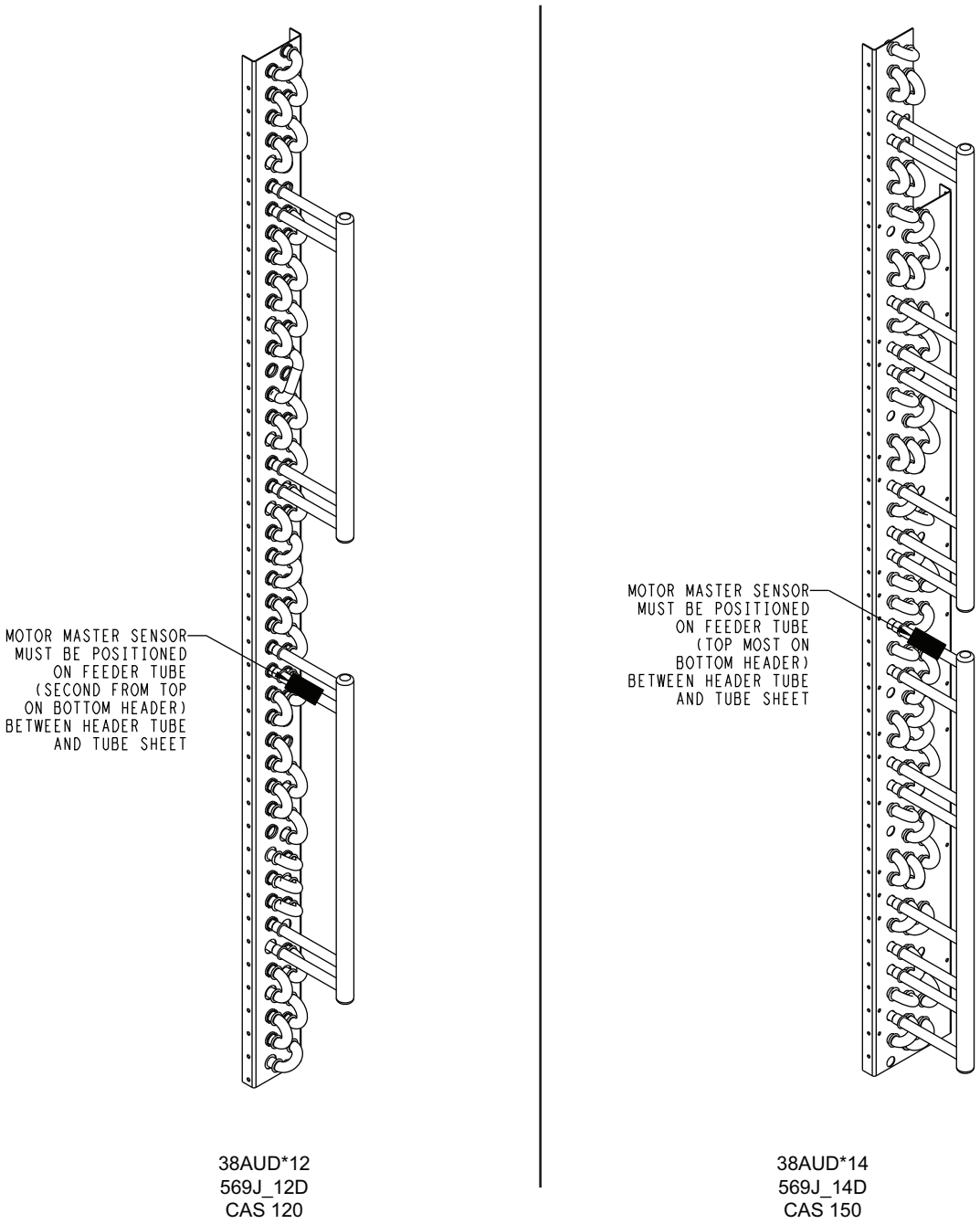
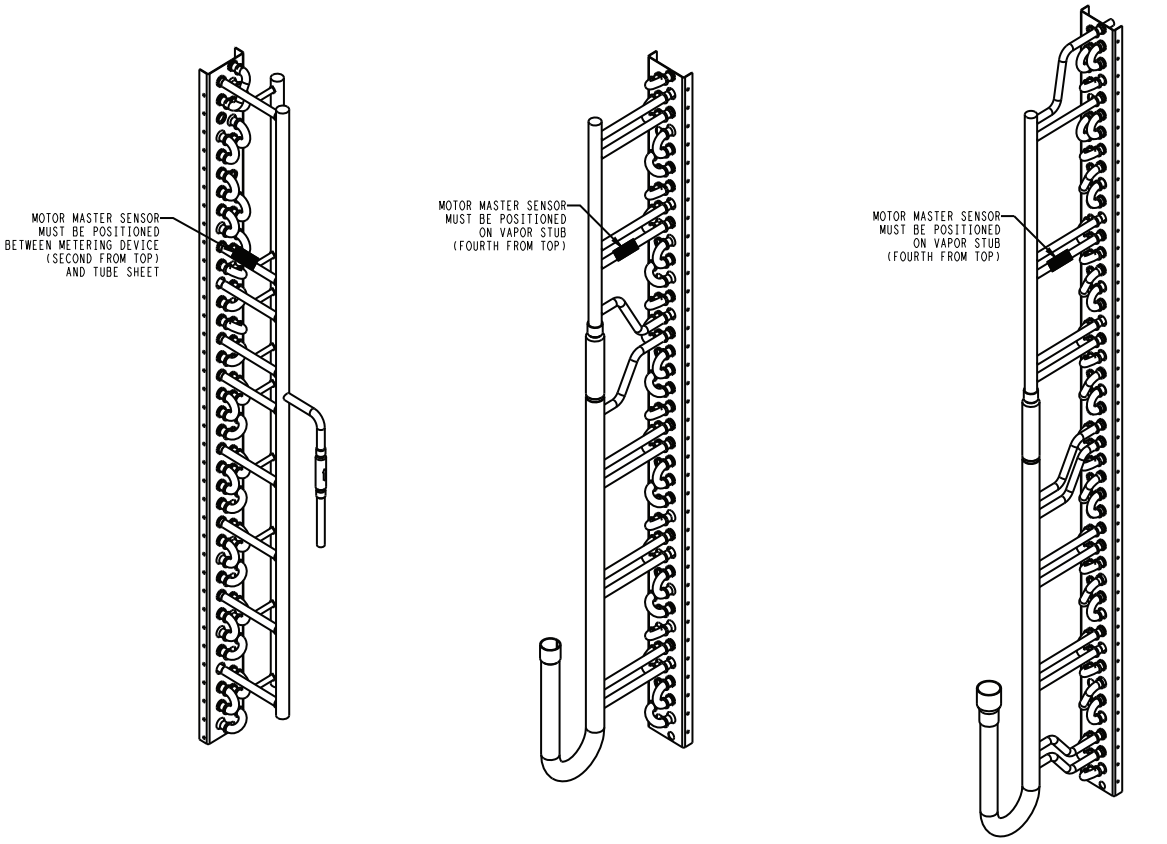


Fig. 4 — Motormaster Sensor Locations (RTPF) (cont)

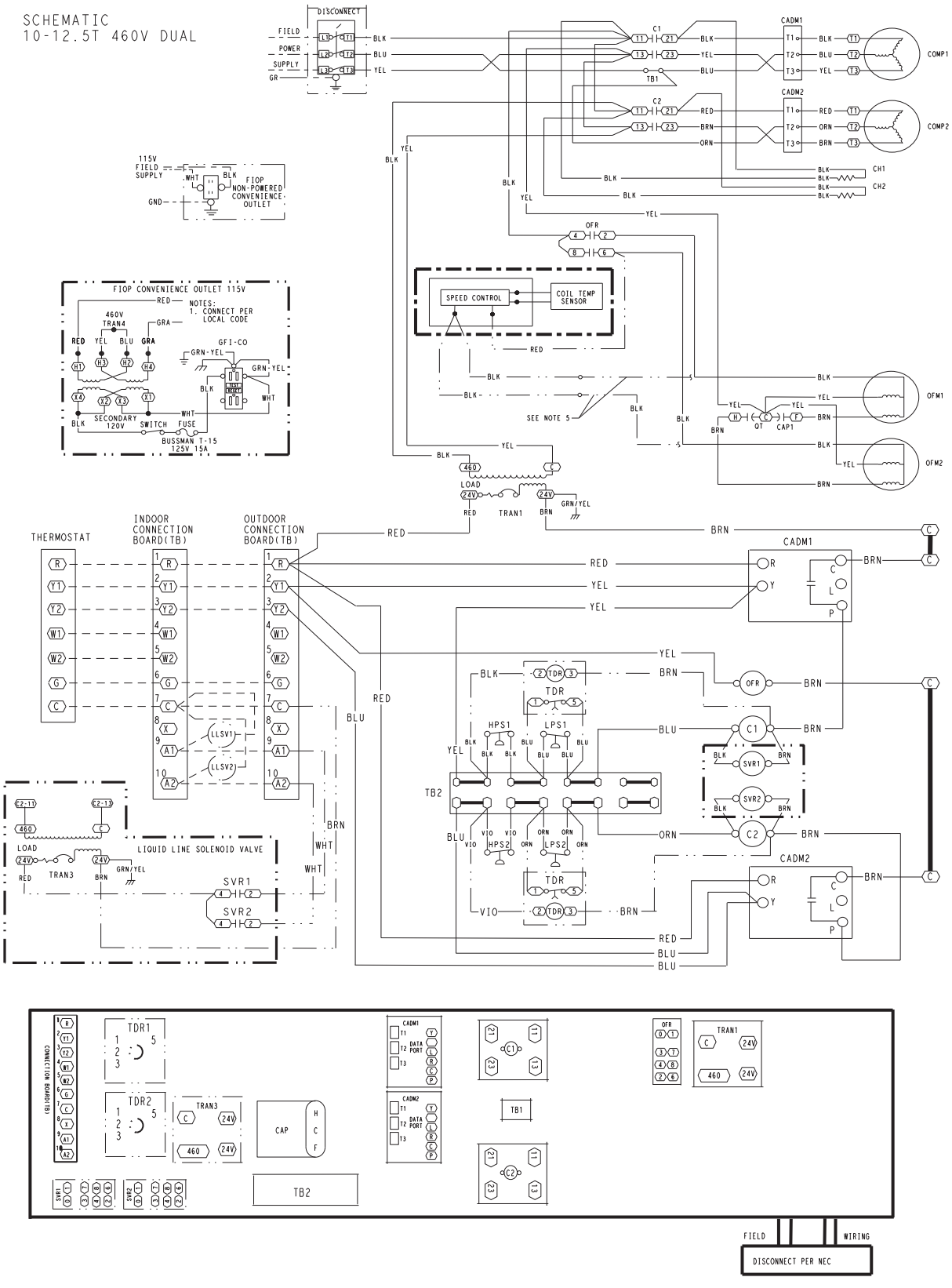


38AUQ*07
575J_07
CHS 072

38AUQB08
575J_08B
CHS 090_B

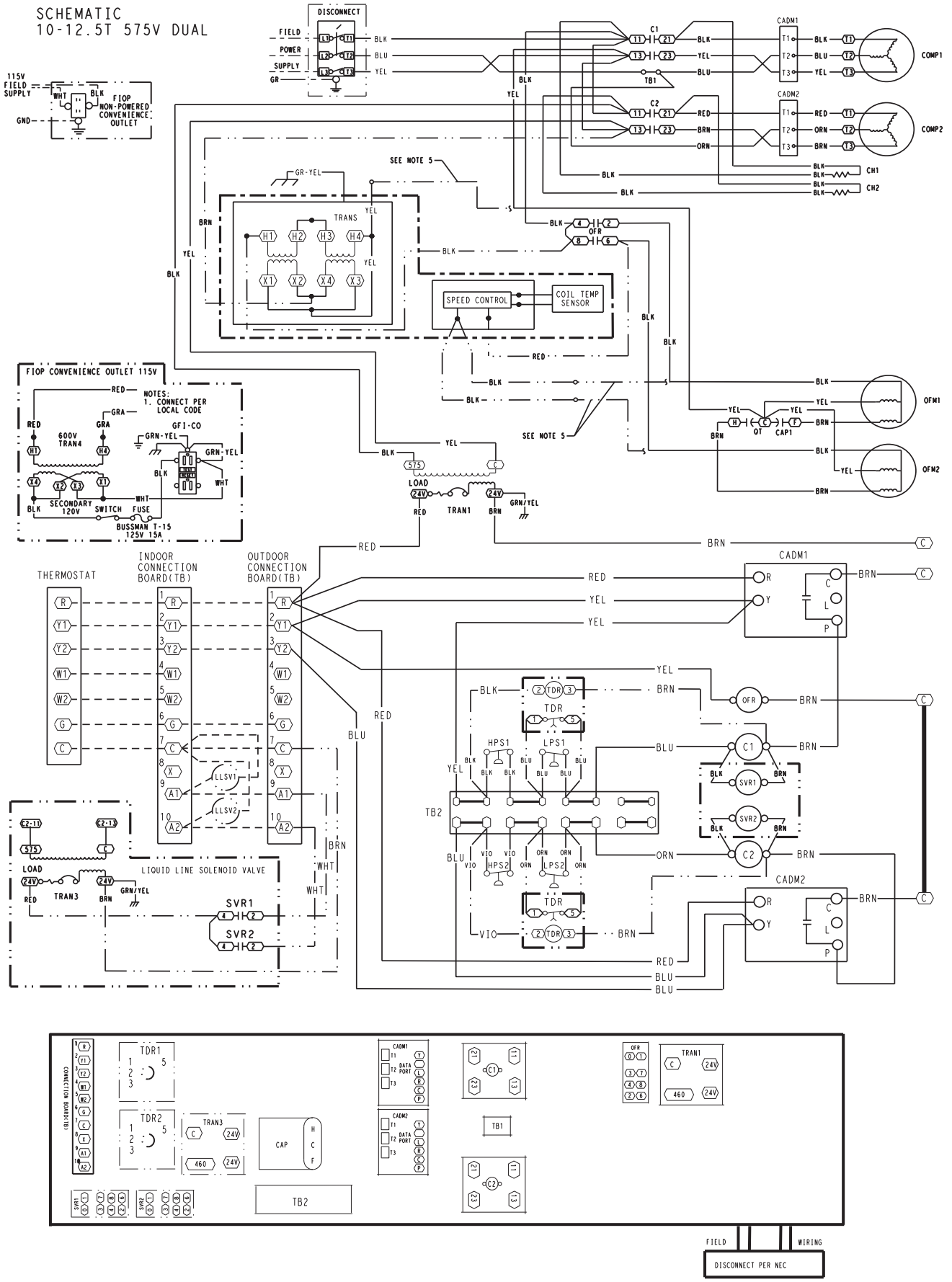
38AUQ*12, 38AUQE08,
575J_08H, 575J_12,
CHS090_H, CHS 120

Fig. 5 — Sensor Locations



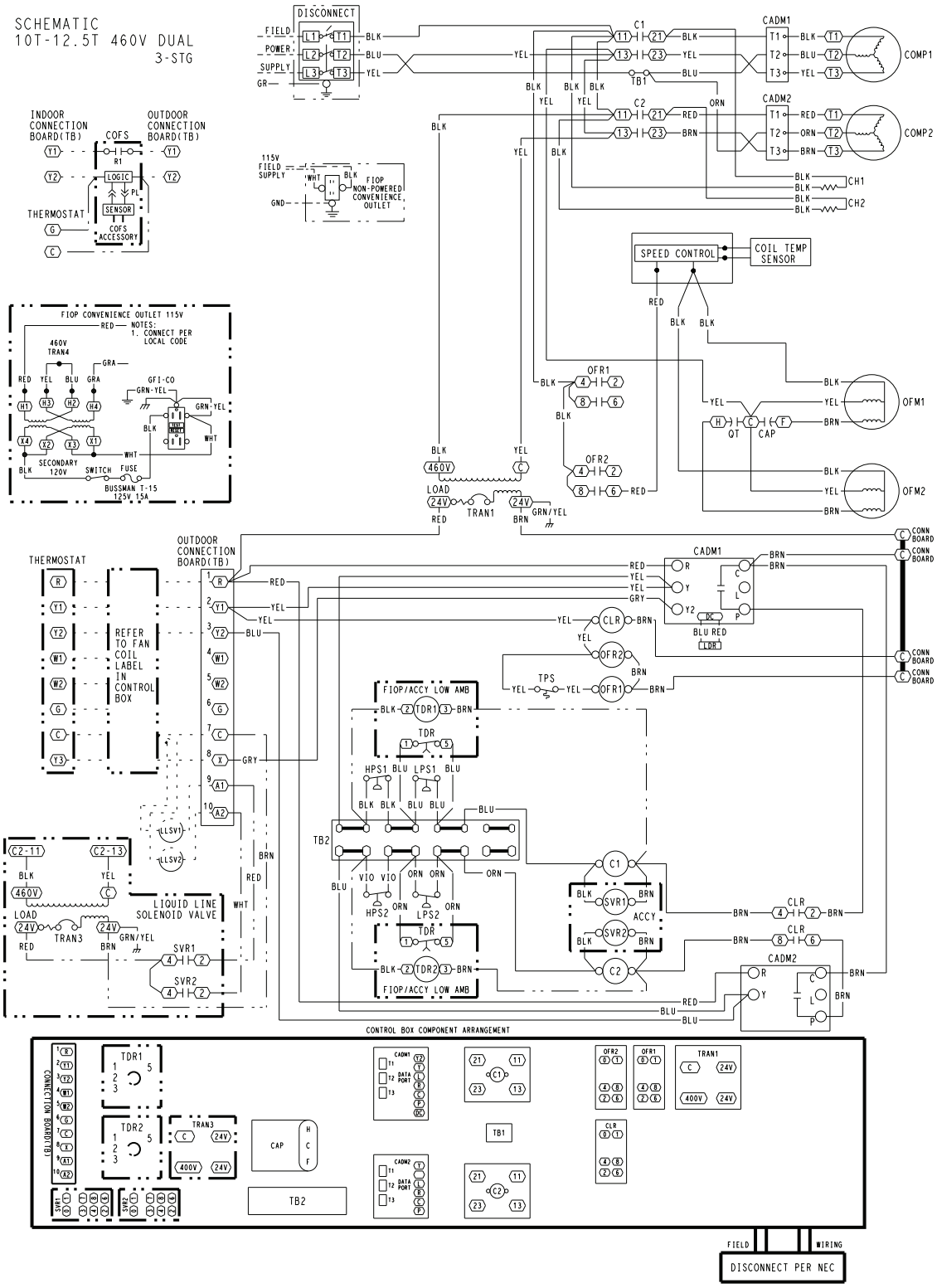
See Legend and Notes on page 33.

Fig. 6 — Motormaster Wiring Details — 38AUDA12-14, 569J*12-14D, CAS120/150*D 208/230-3-60, 460-3-60



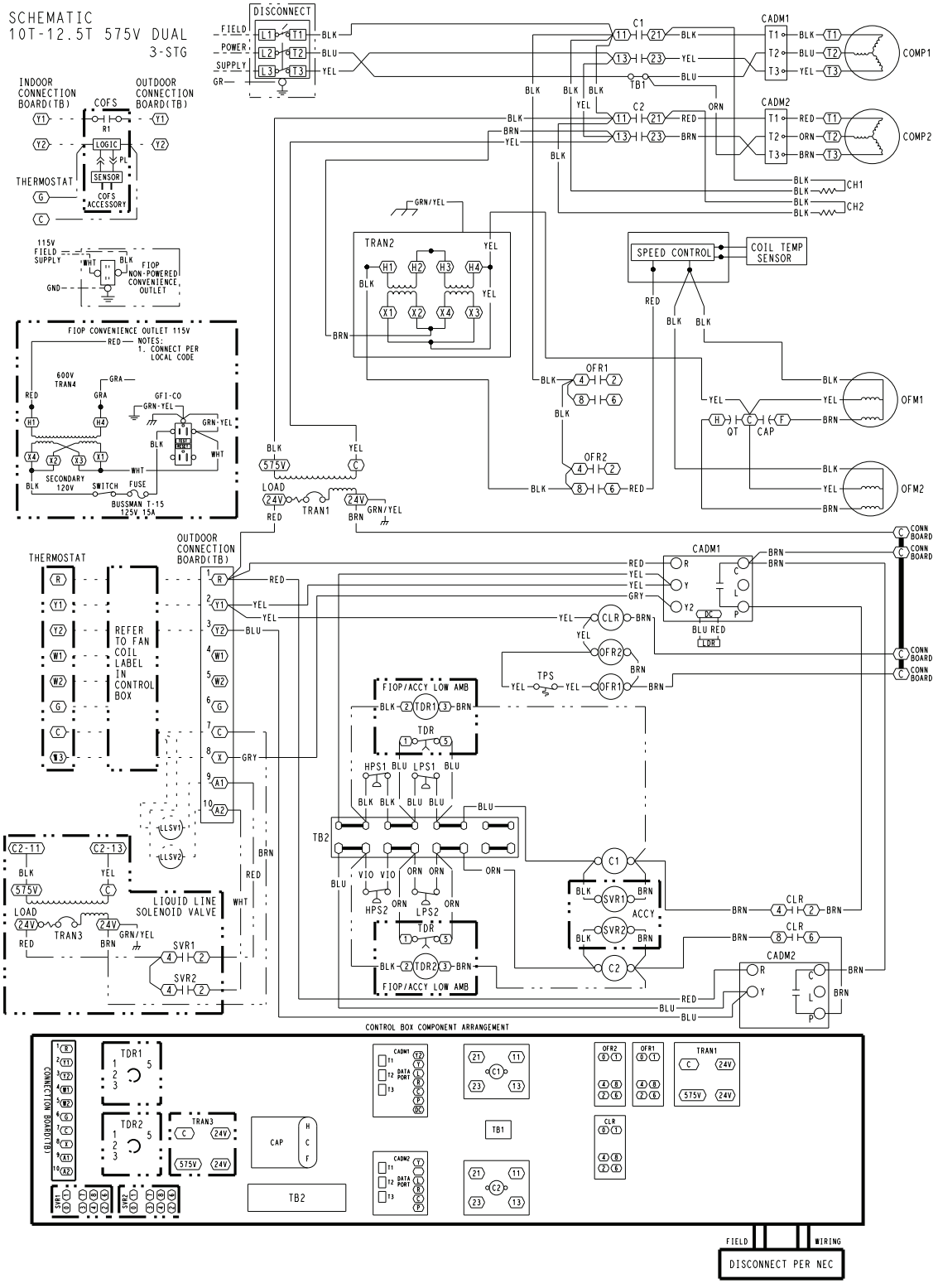
See Legend and Notes on page 33.

Fig. 7 — Motormaster Wiring Details — 38AUDA12-14, 569J*12-14D, CAS120/150*D 575V



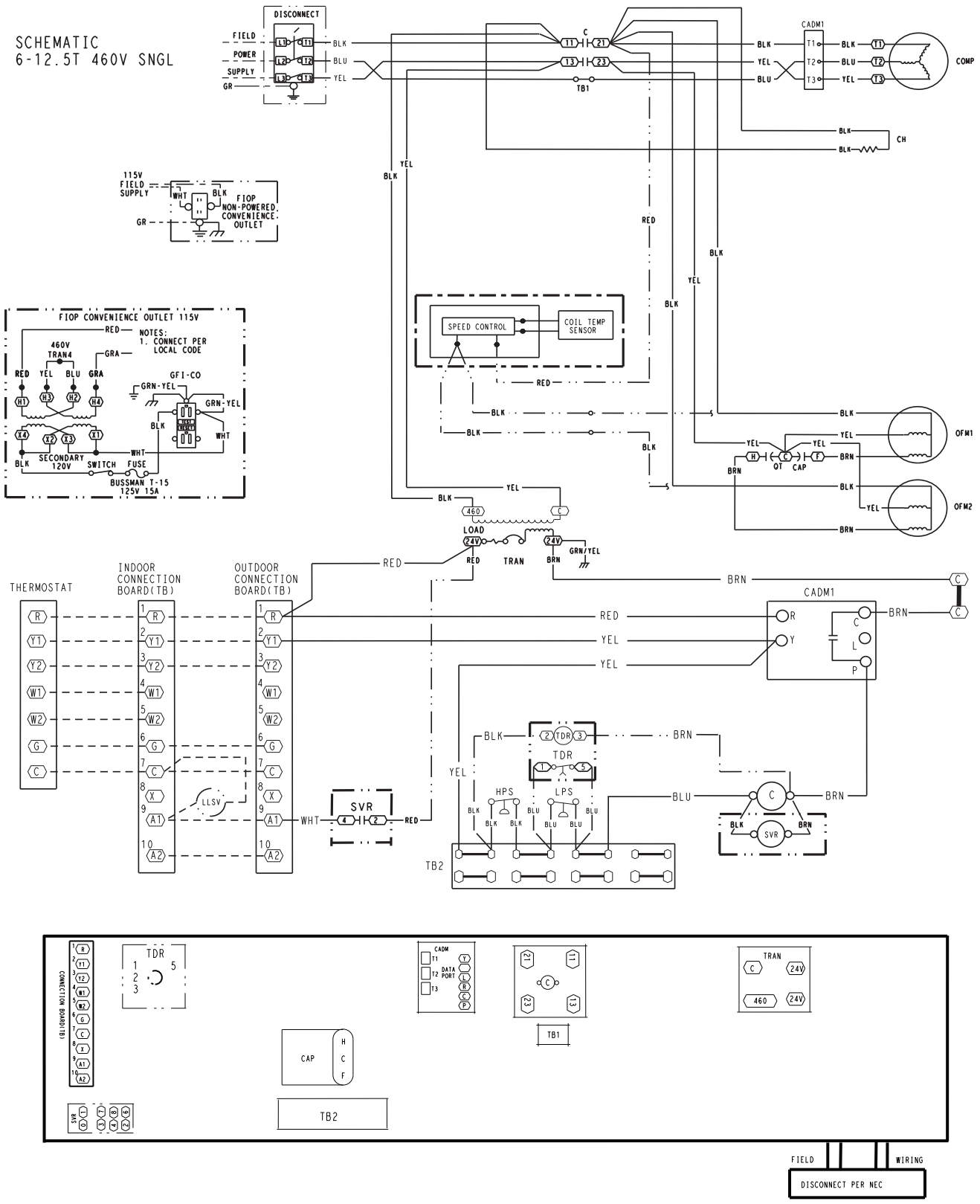
See Legend and Notes on page 33.

Fig. 8 — Motormaster Wiring Details — 38AUDT12-14, 569J*12-14T, CAS123/153 208/230-3-60V, 460-3-60V



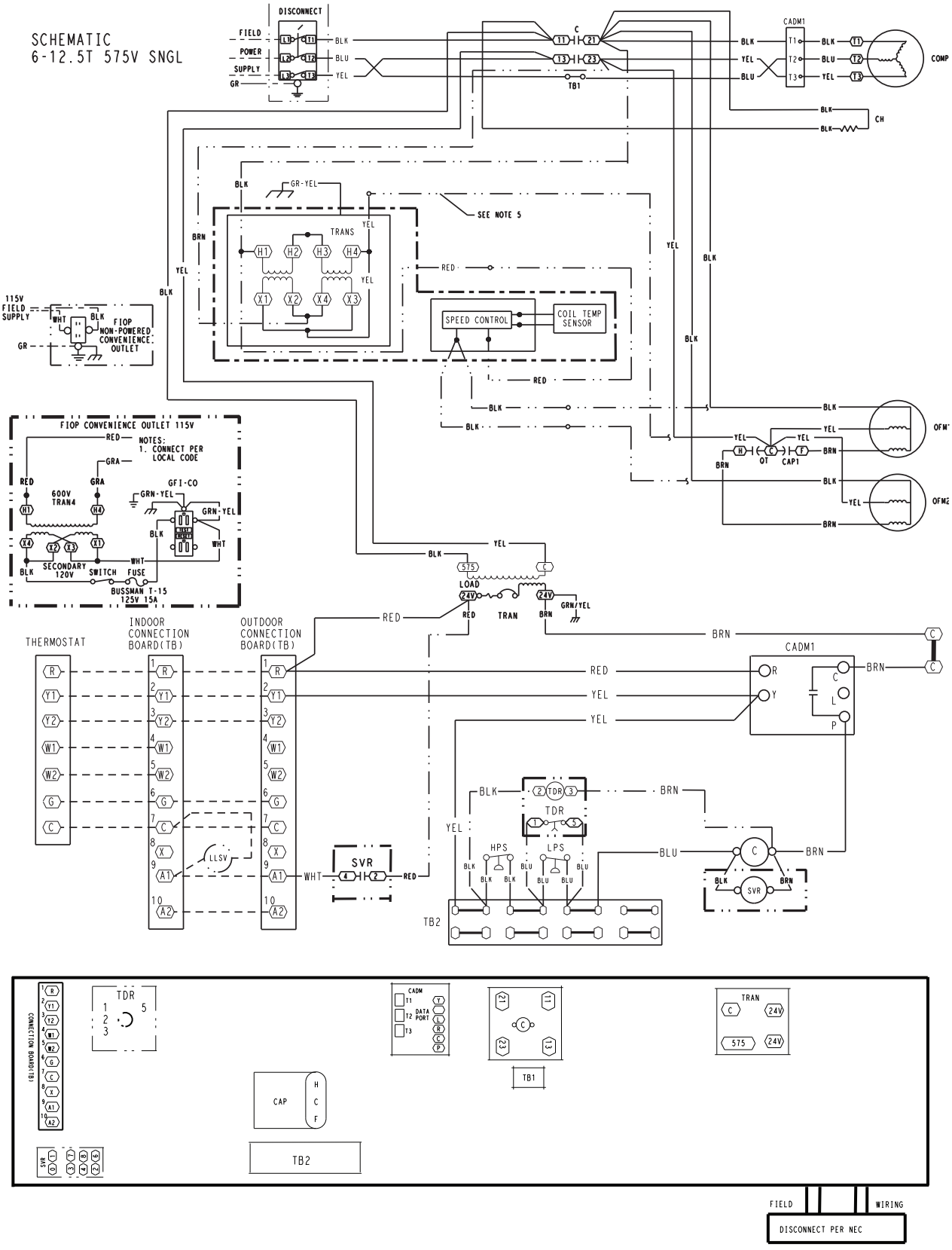
See Legend and Notes on page 33.

Fig. 9 — Motormaster Wiring Details — 38AUDT12-14, 569J*12-14T, CAS123/153 575V



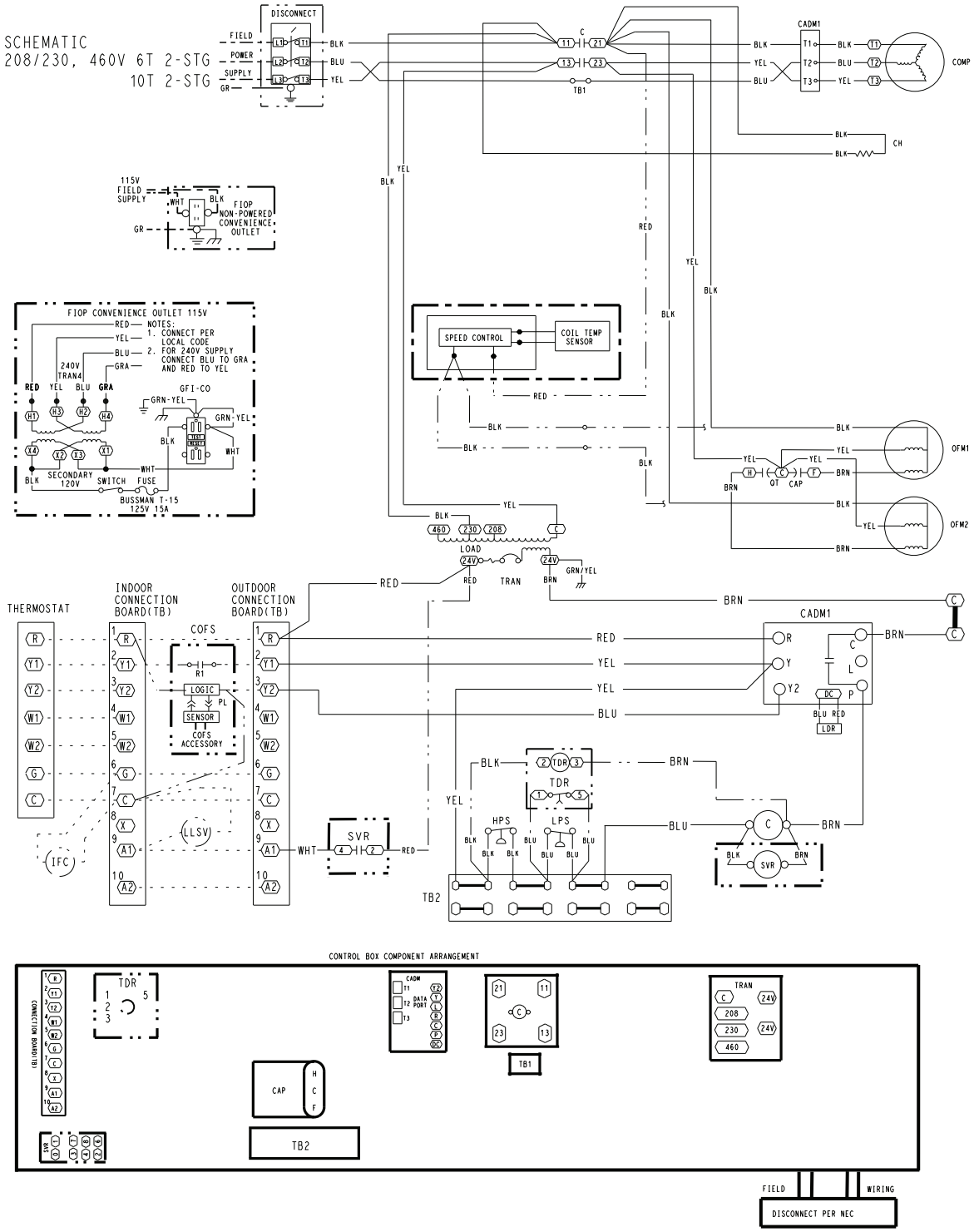
See Legend and Notes on page 33.

Fig. 10 — Motormaster Wiring Details — 38AUZA07-14, 569J*07-14A, CAS072/091/121/151*A 208/230-3-60, 460-3-60



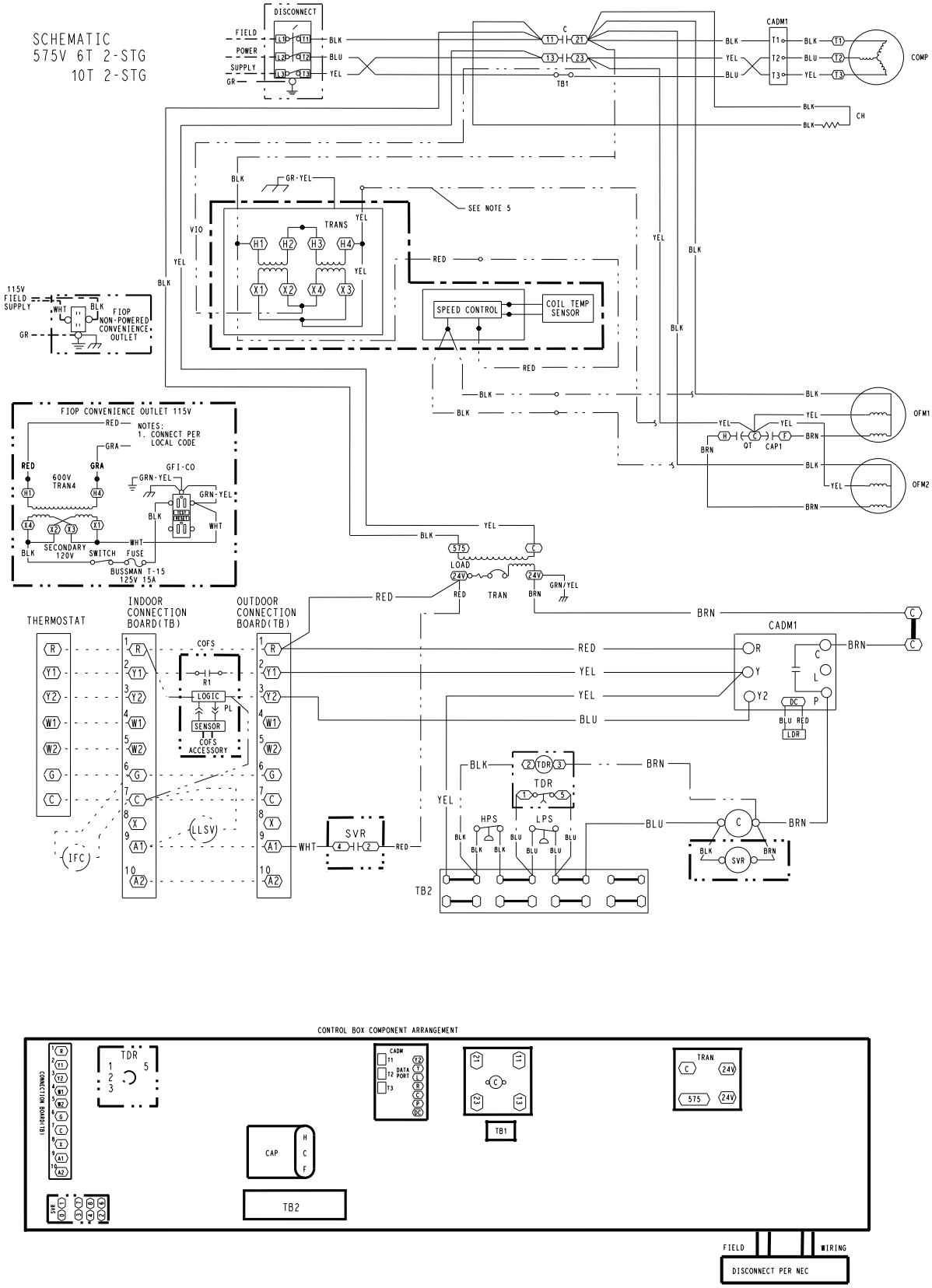
See Legend and Notes on page 33.

Fig. 11 — Motormaster Wiring Details — 38AUZA07-14, 569J*07-14A, CAS072/091/121/151*A 575V



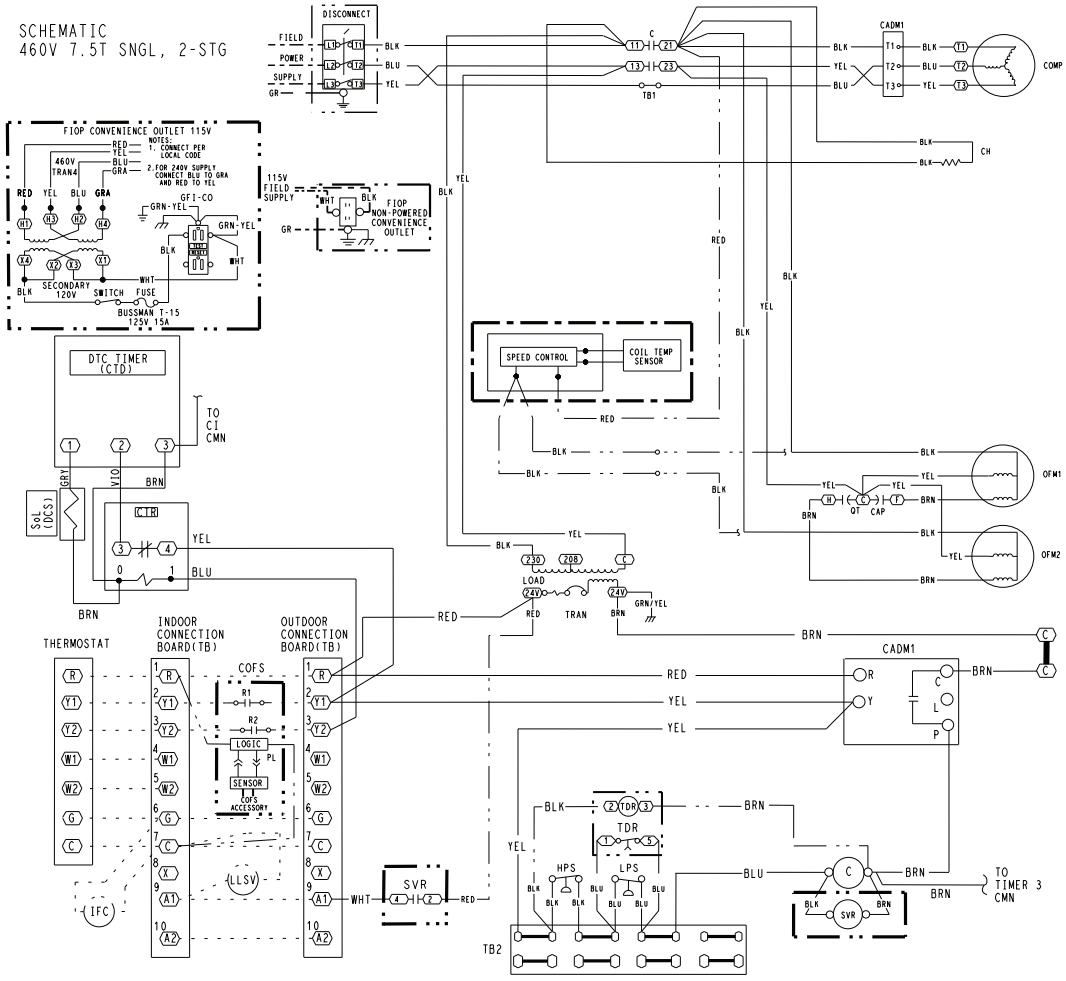
See Legend and Notes on page 33.

Fig. 12 — Motormaster Details for 2-Stage Cooling — 38AUZD07-08, 38AUZM10, 569J*07-08G, 569J*10M, CAS072/090*G, CAS121*M 208/230-3-60, 460-3-60V



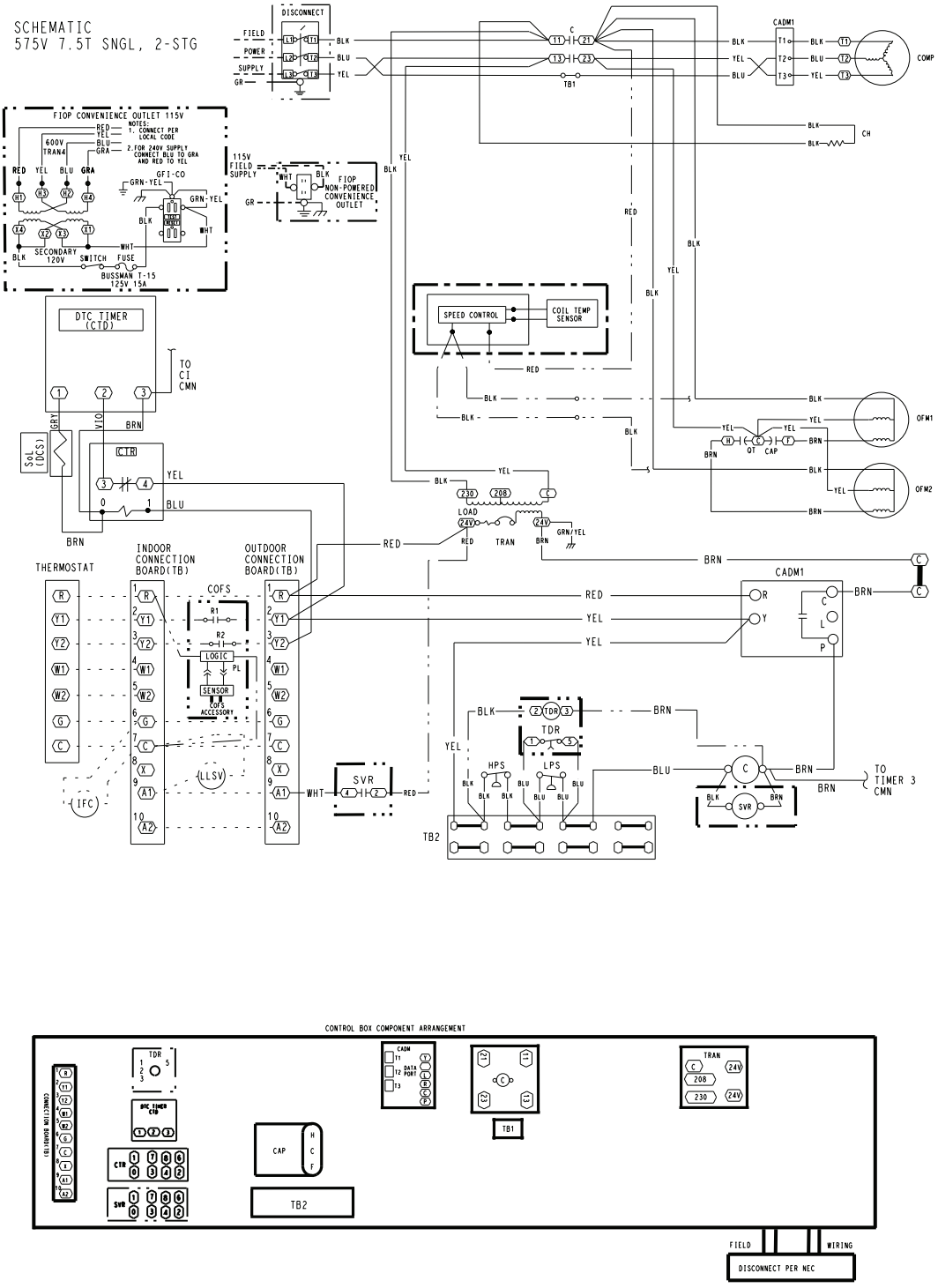
See Legend and Notes on page 33.

Fig. 13 — Motormaster Details for 2-Stage Cooling — 38AUZD07-08, 38AUZM10, 569J*07-08G, 569J*10M, CAS072/090*G, CAS121*M 575V



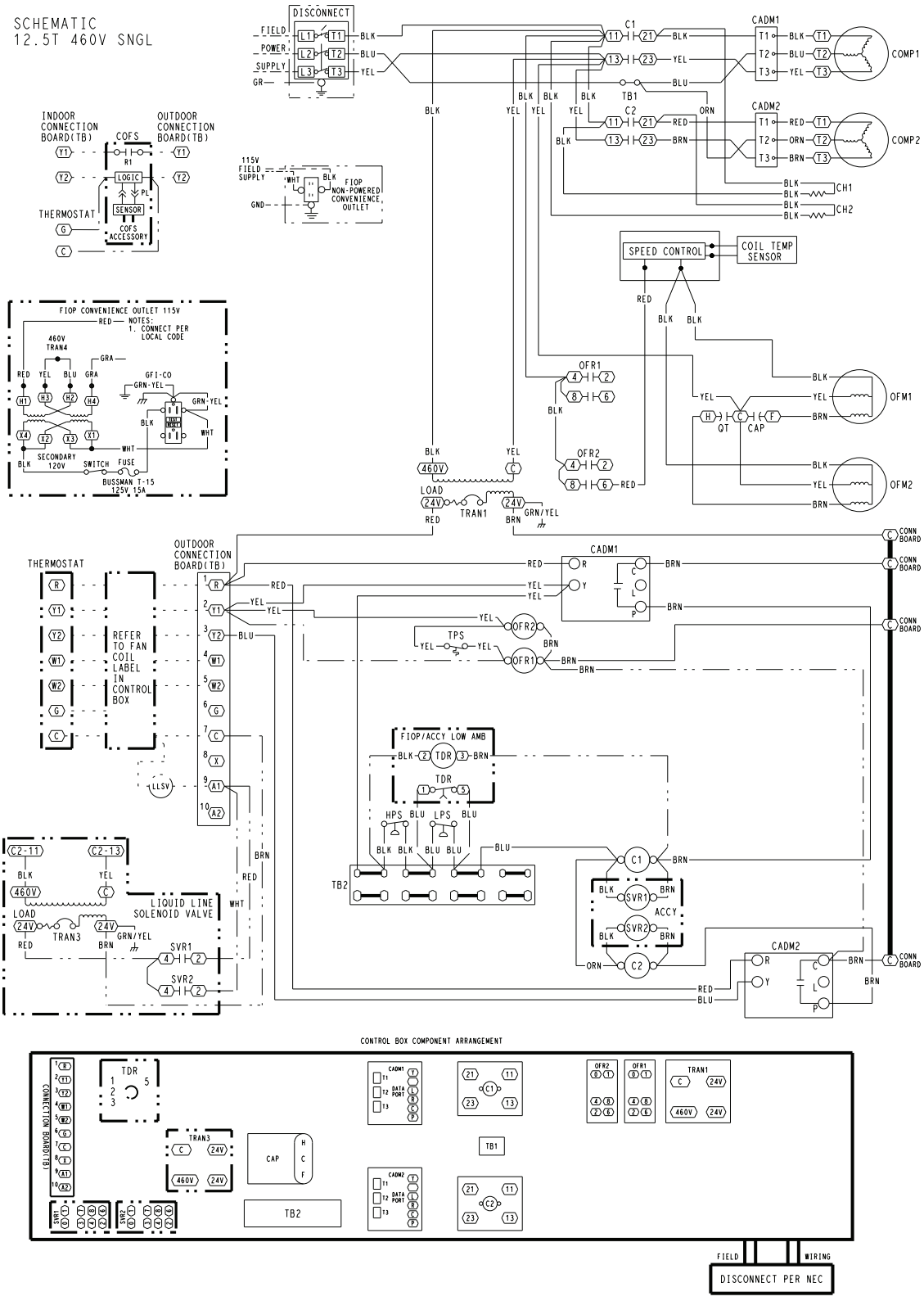
See Legend and Notes on page 33.

Fig. 14 — Motormaster Details for 2-Stage Cooling (Digital Compressor) — 38AUZD08, 569J*08G, CAS090*G 460-3-60V



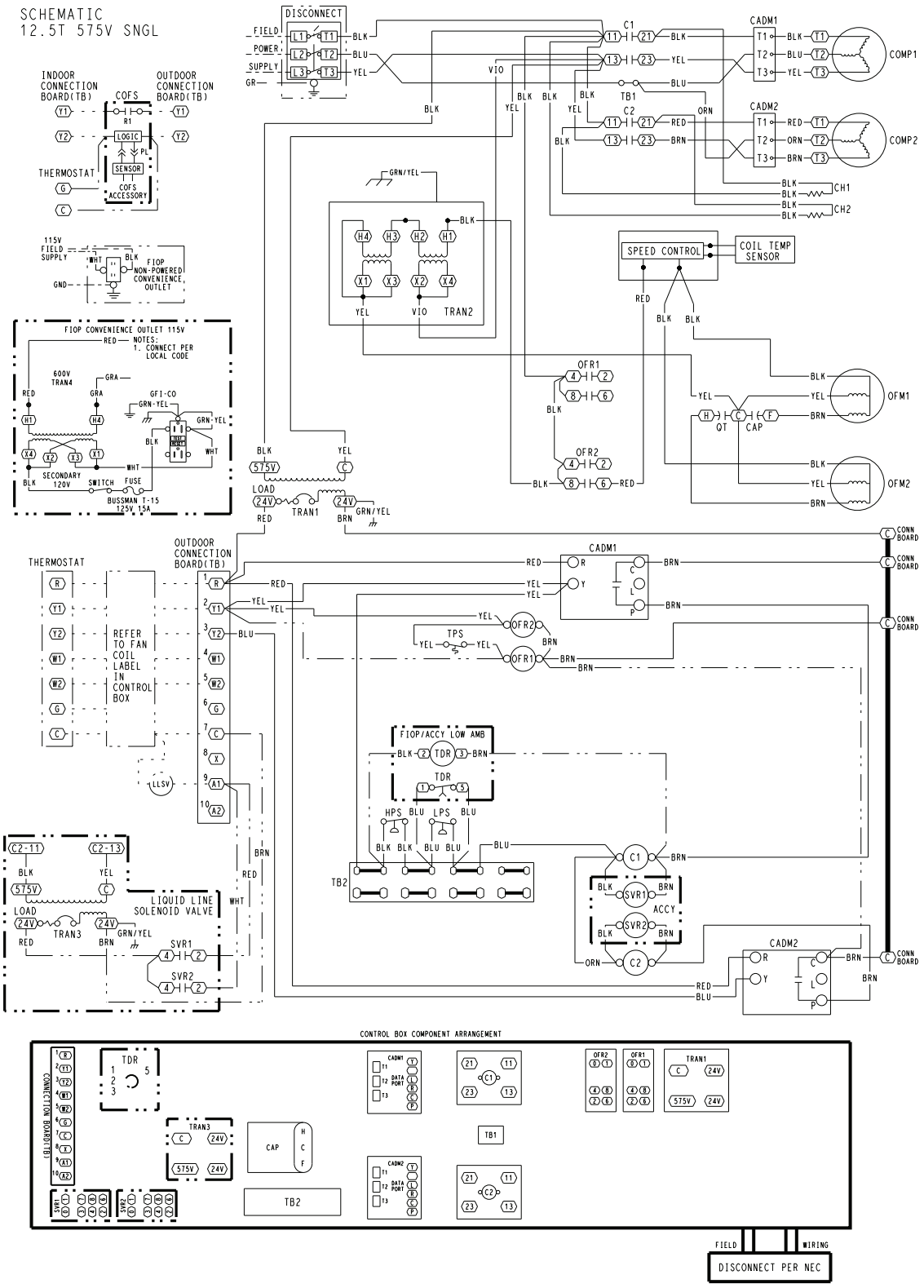
See Legend and Notes on page 33.

Fig. 15 — Motormaster Details for 2-Stage Cooling (Digital Compressor) — 38AUZD08, 569J*08G, CAS091*G 575V



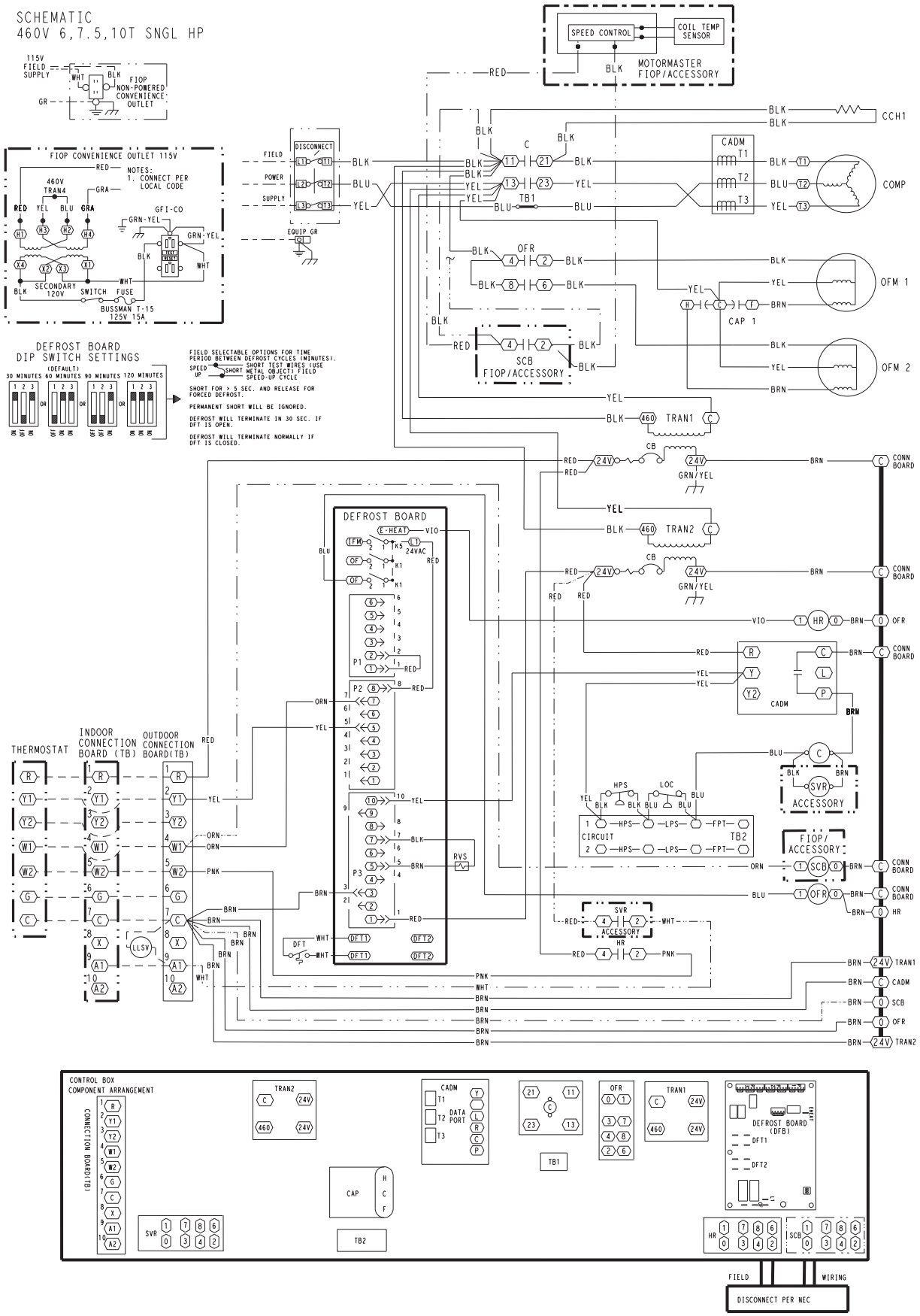
See Legend and Notes on page 33.

Fig. 16 — Motormaster Wiring Details — 38AUZM14, 569J*14M, CAS151*M 208/230-3-60, 460-3-60V



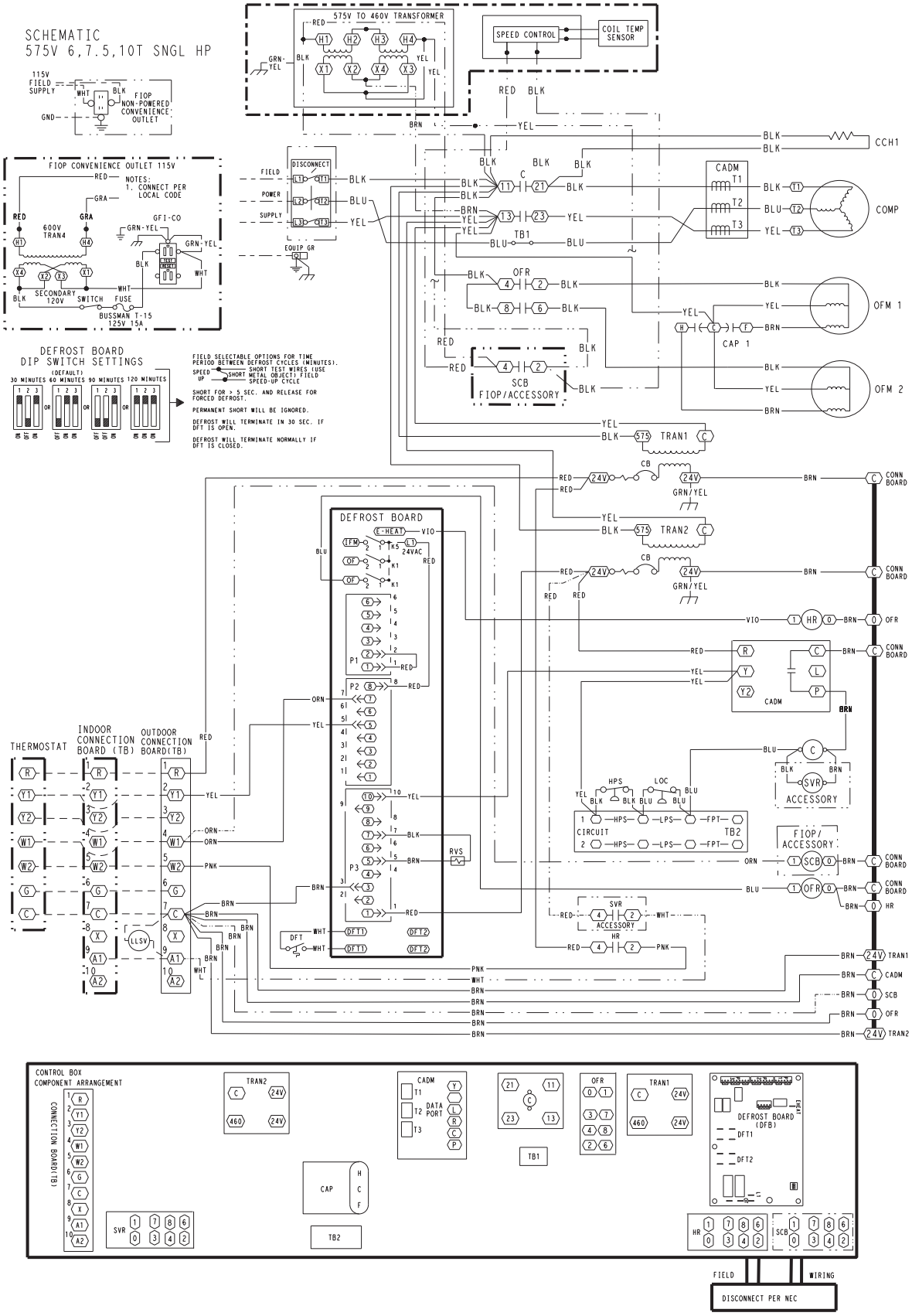
See Legend and Notes on page 33.

Fig. 17 — Motormaster Wiring Details — 38AUZM14, 569J*14M, CAS151*M 575V



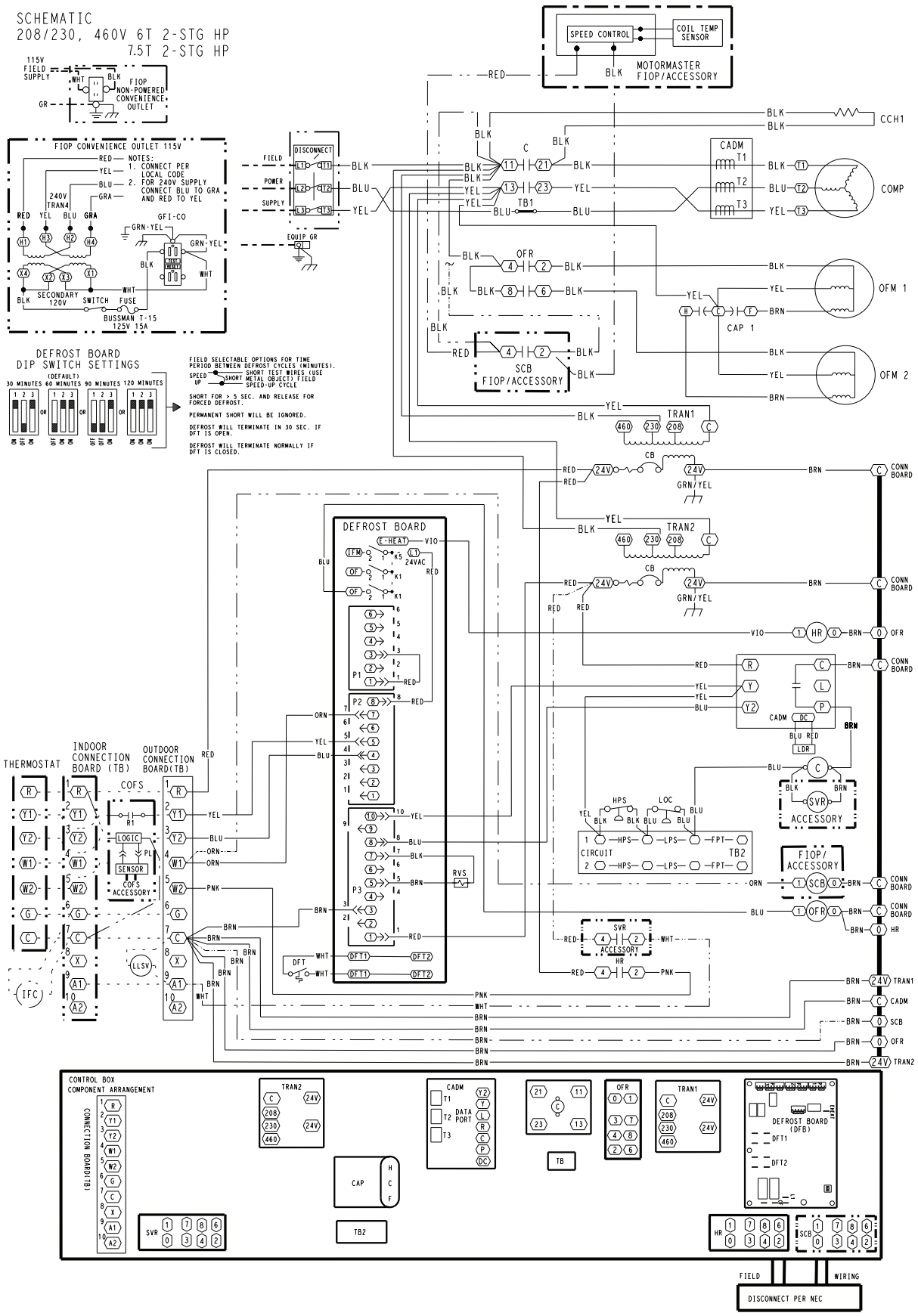
See Legend and Notes on page 33.

Fig. 18 — Motormaster Wiring Details — 38AUQA07-12, 575J*07-12A, CHS072/091/121*A 208/230-3-60, 460-3-60



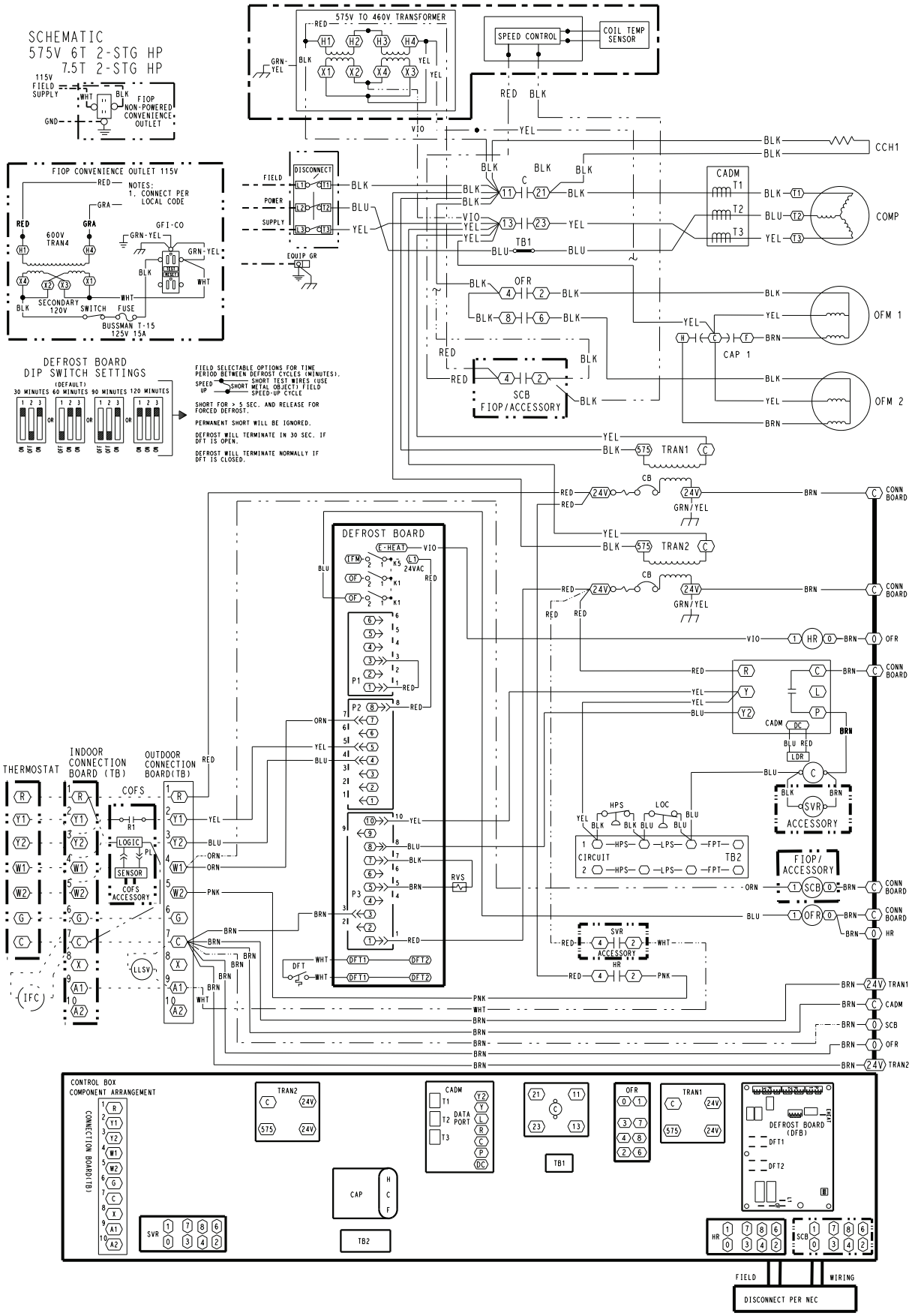
See Legend and Notes on page 33.

Fig. 19 — Motormaster Wiring Details — 38AUQA07-12, 575J*07-12A, CHS072/091/121*A 575V



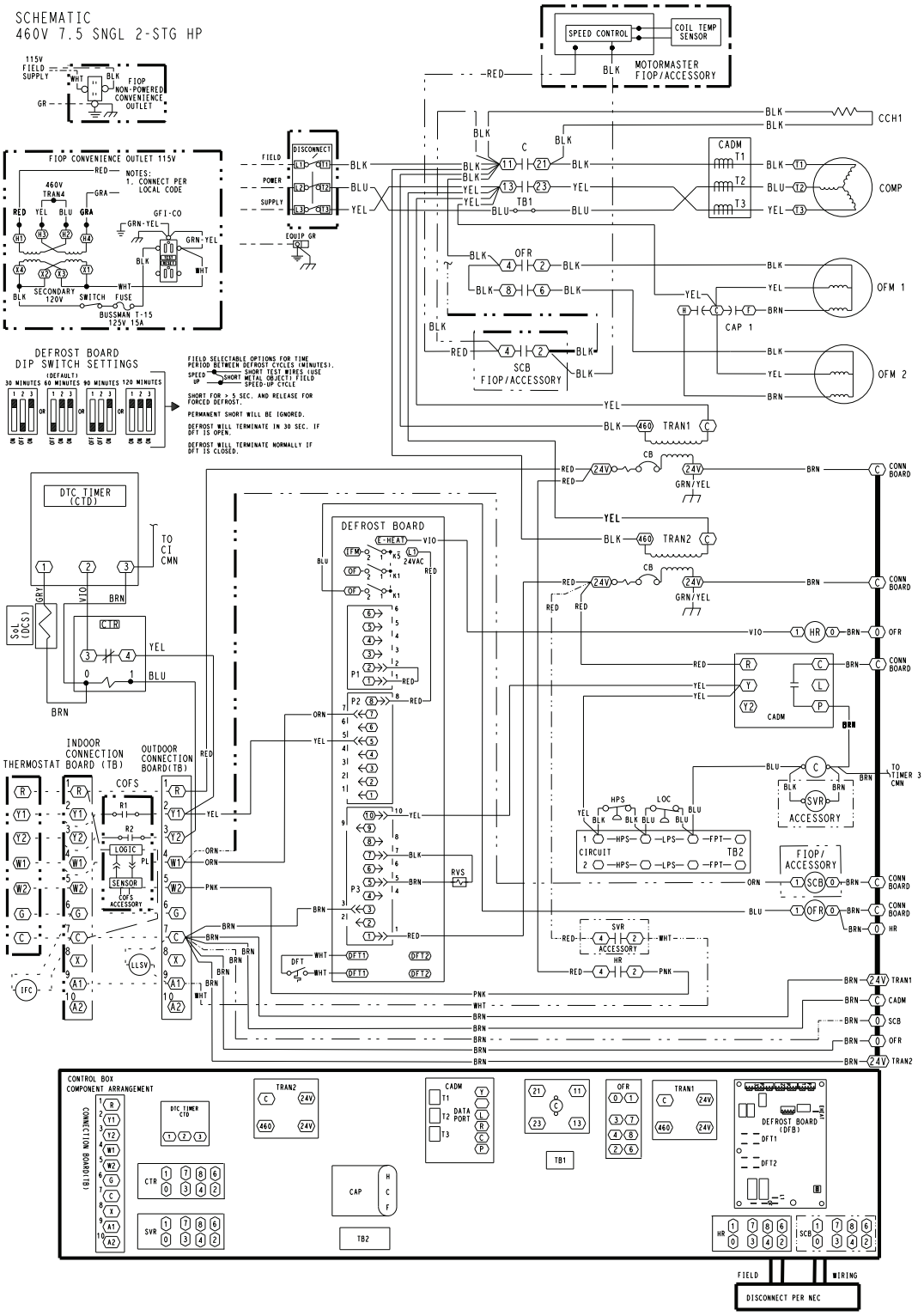
See Legend and Notes on page 33.

Fig. 20 — Motormaster Details for 2-Stage Cooling — 38AUQD07, 38AUQM08, 575J*07G, 575J*08M, CHS072*G, CHS090*M 208/230-3-60, 460-3-60V



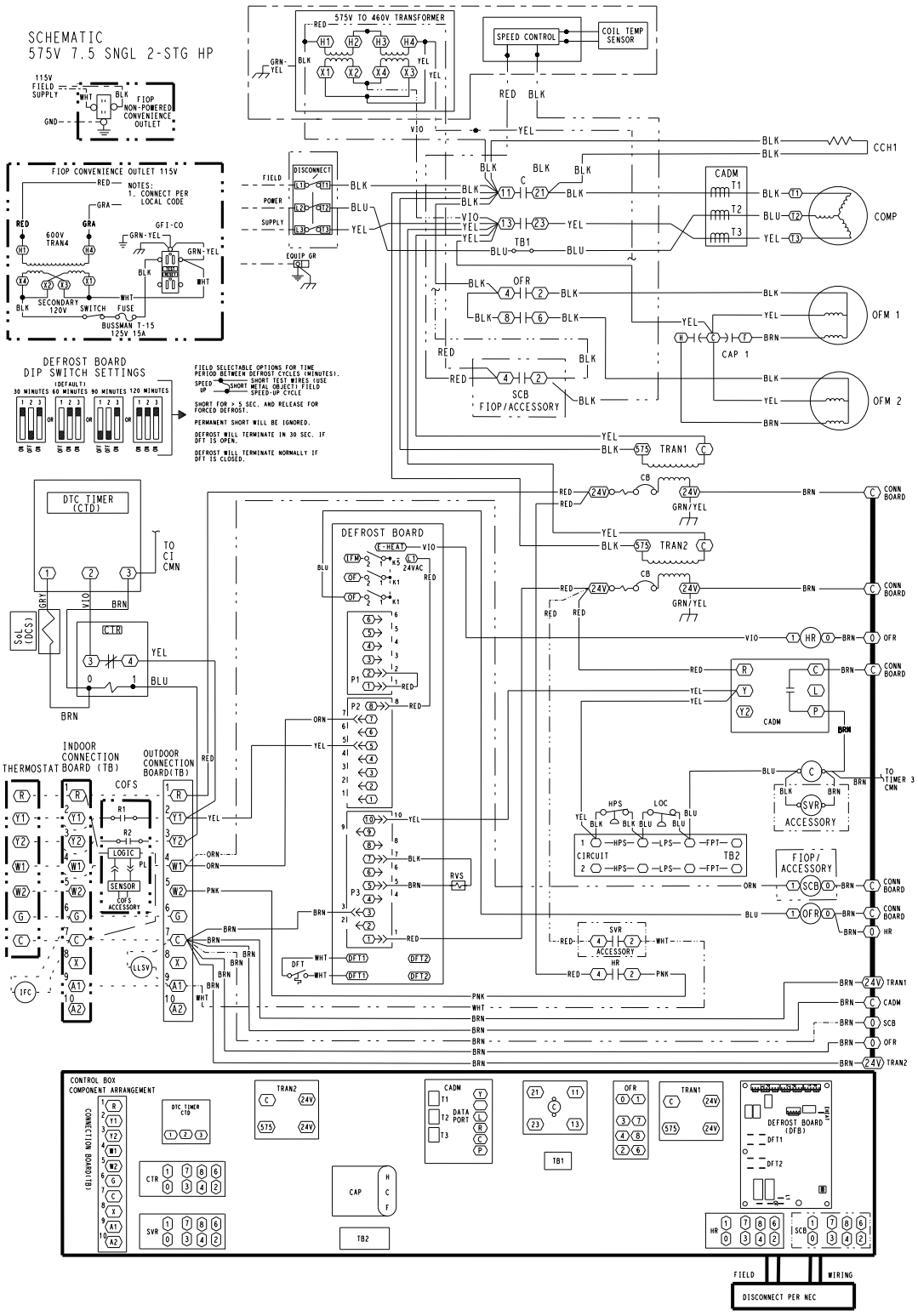
See Legend and Notes on page 33.

Fig. 21 — Motormaster Details for 2-Stage Cooling — 38AUQD07, 38AUQM08, 575J*07G, 575J*08M, CHS072*G, CHS090*M 575V



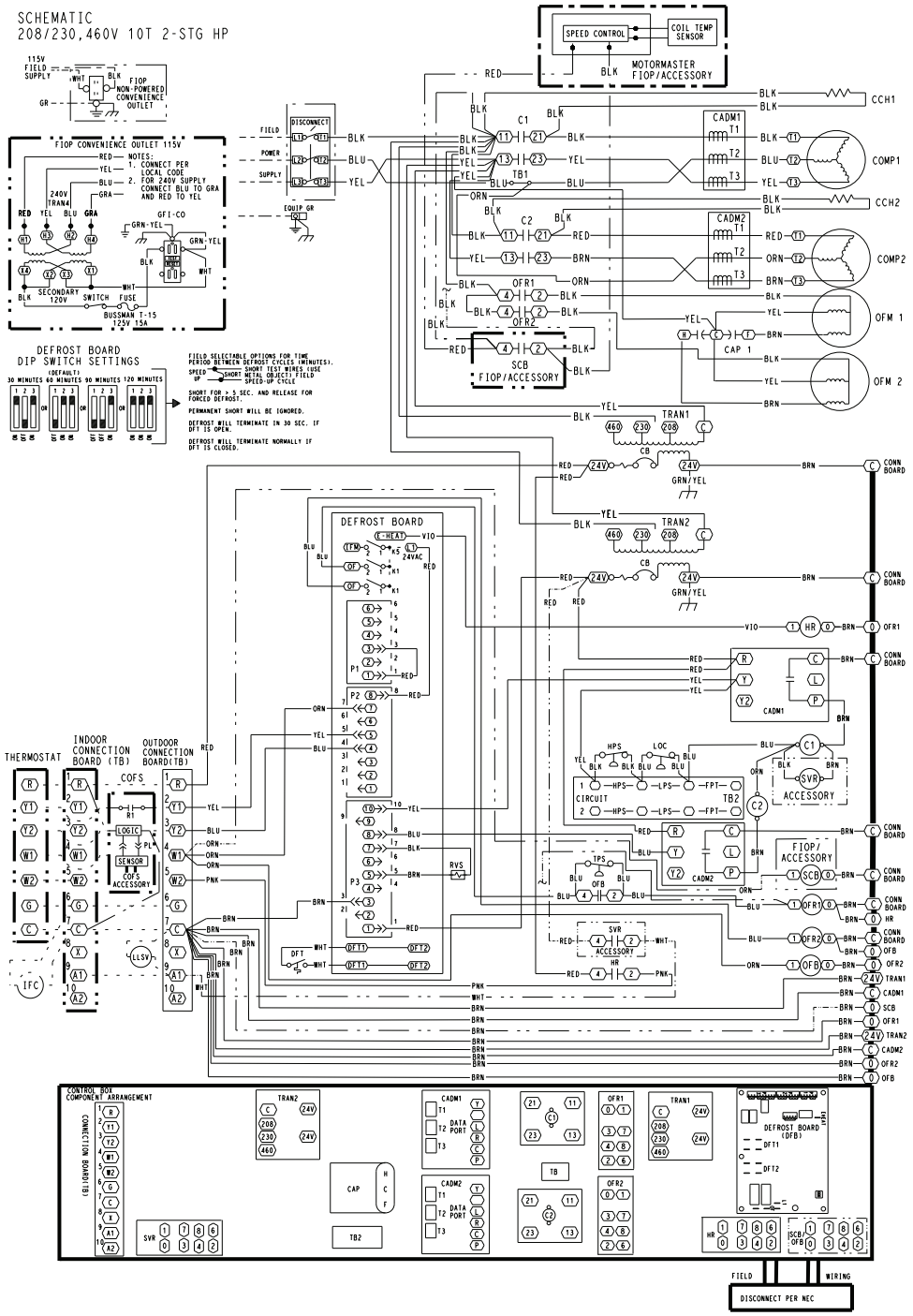
See Legend and Notes on page 33.

Fig. 22 — Motormaster Details for 2-Stage Heat Pump (Digital Compressor) — 38AUQD08, 575J*08G, CHS091*G 460-3-60V



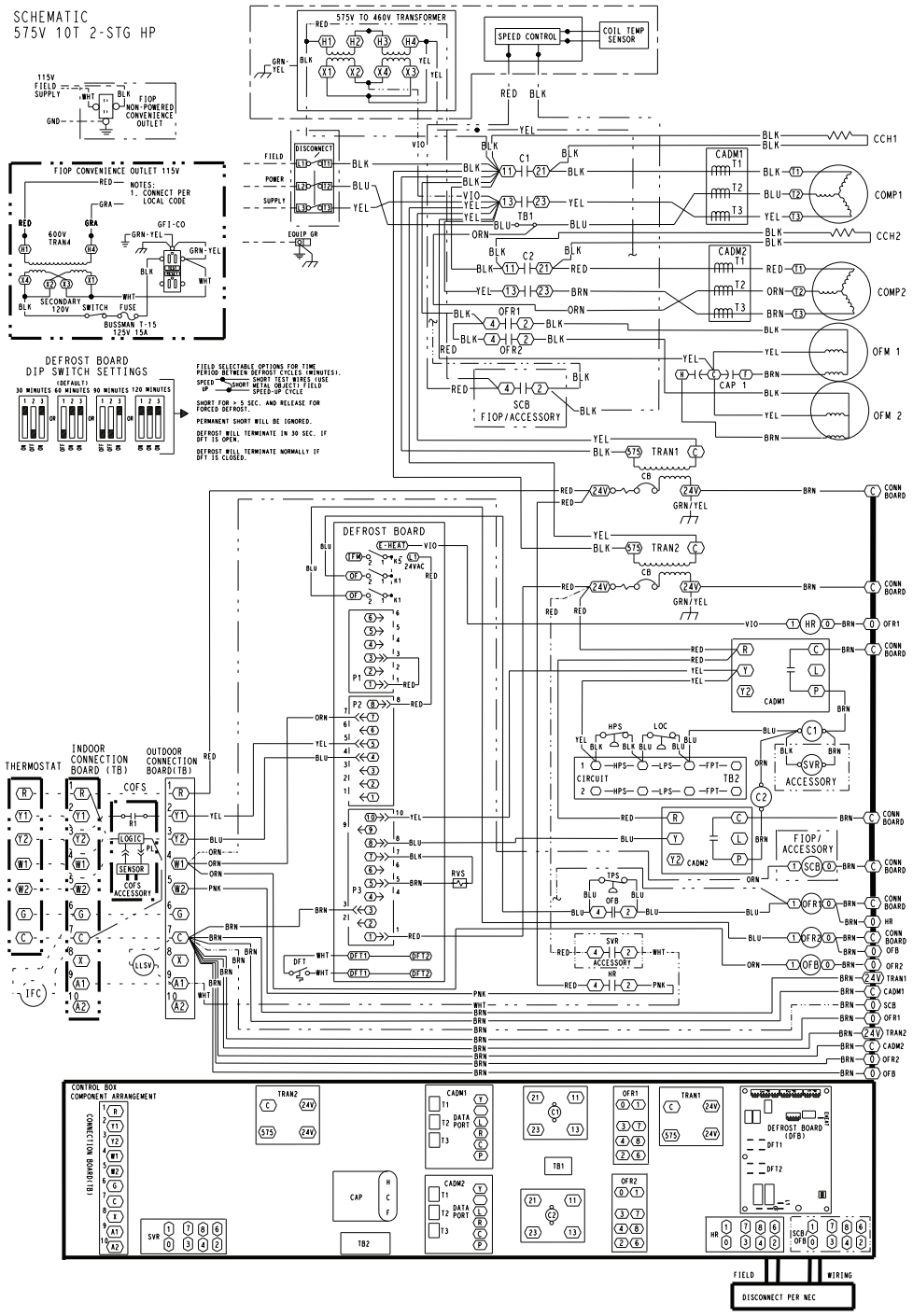
See Legend and Notes on page 33.

Fig. 23 — Motormaster Details for 2-Stage Heat Pump (Digital Compressor) — 38AUQD08, 575J*08G, CHS091*G 575V



See Legend and Notes on page 33.

Fig. 24 — Motormaster Details for 2-Stage Cooling — 38AUQD12, 575J*12G, CHS121*G 208/230-3-60, 460-3-60



See Legend and Notes on page 33.

Fig. 25 — Motormaster Details for 2-Stage Cooling — 38AUQD12, 575J*12G, CHS121*G 575V

LEGEND AND NOTES FOR FIG. 6-25

LEGEND

Field Control Wiring


Field Splice


Marked Wire


Terminal (Marked)

Terminal (Unmarked)


Terminal Block

Splice

Factory Wiring

Field Control Wiring

Field Power Wiring

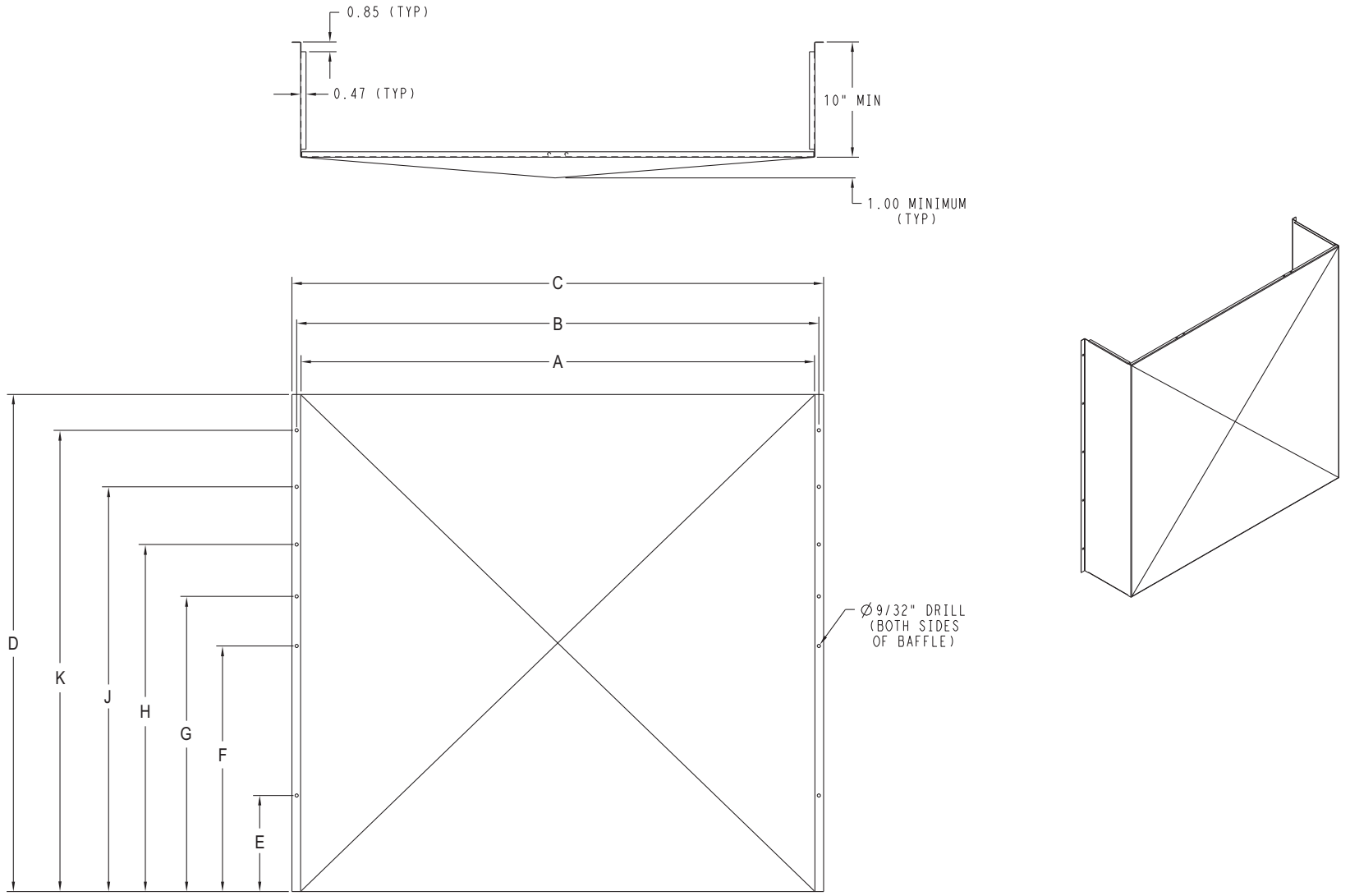
Accessory Or Optional Wiring

To Indicate Common Potential Only, Not To Represent Wiring

C — Contactor, Compressor
CAP — Capacitor
CH — Crankcase Heater
CADM — Comfort Alert — Diagnostics Module
CLR — Compressor Lock-out Relay
COFS — Condensate Overflow Switch
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
IFC — Indoor Fan Contactor
LAR — Low Ambient Relay
LAS — Low Ambient Temp Switch
LDR — Compressor Loader Plug
LLSV — Liquid Line Solenoid Valve
LOC — Loss Of Charge Switch
OFM — Outdoor Fan Motor
OFR — Outdoor Fan Relay
QT — Quadruple Terminal
RVS — Reversing Valve Solenoid
SCB — Speed Control Bypass
SVR — Solenoid Valve Relay
OFM — Outdoor Fan Motor
TB — Terminal Block
TDR — Time Delay Relay
TRAN — Transformer

NOTE(S):

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 conductors only.
3. Compressors and fan motors are thermally protected. Three phase motors are protected against primary single phasing conditions.
4. Transformer is wired for unit voltage as specified in diagram labeling and figure title. For 230V units, if unit is to be run with 208V power supply, disconnect black wire from 230V tap and connect to 208V tap.



NOTE: For dimensions, see Tables 6-7.

Fig. 26 — Wind Baffles

Table 6 — Wind Baffle Dimensions (inches)

			DIMENSIONS (in.)									
Unit	Coil Type	Baffle	A	B	C	D	E	F	G	H	J	K
38AUZ*07 569J*07 CAS072	RTPF	LEFT SIDE	28 1/2	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 1/4	11 1/4	18 1/4	25 1/4	32 1/4	—
38AUZB08 569J*08B CAS091*B	RTPF	LEFT SIDE	281/2	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 1/4	11 1/4	18 1/4	25 1/4	32 1/4	—
38AUZ*12 569J*12 CAS121	RTPF	LEFT SIDE	40 1/2	41	41 3/4	43 1/8	1 1/4	9 1/4	17 1/4	25 1/4	33 1/4	41 1/4
38AUDA12 569J*12D CAS120		BACK	40	40 3/4	41 1/2	43 1/8	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	39 1/4
38AUDT12 569J*12T CAS123	RTPF	LEFT SIDE	40 1/2	41	41 3/4	43 1/8	1 1/4	9 1/4	17 1/4	25 1/4	33 1/4	41 1/4
38AUZ*14 569J*14 CAS151		BACK	40	40 3/4	41 1/2	43 1/8	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	39 1/4
38AUD*14 569J*14 CAS150		RIGHT SIDE	25	25 1/2	26 1/4	43 1/8	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	39 1/4
38AUQ*07 575J*07 CHS072	RTPF	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	—
38AUQ*08 575J*08 CHS091	RTPF	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	—
38AUQ*12 575J*12 CHS121	RTPF	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
38AUZE08 569J*08H CAS091*H	RTPF	LEFT SIDE	28 1/2	29	29 3/4	35 1/4	1 1/4	9 1/4	17 1/4	25 1/4	3 1/4	—
		BACK	40	40 3/4	41 1/2	35 1/4	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	
		RIGHT SIDE	25	25 1/2	26 1/4	35 1/4	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	—
38AUQE08 575J*08H CHS091*H	RTPF	LEFT SIDE	28 1/2	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	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	39 1/4
		RIGHT SIDE	25	25 1/2	26 1/4	43 1/8	4 1/4	11 1/4	18 1/4	25 1/4	32 1/4	39 1/4

Table 7 — Wind Baffle Dimensions (mm)

			DIMENSIONS (mm)									
Unit	**Coil Type**	**Baffle**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
38AUZ*07 569J*07 CAS072	RTPF	LEFT SIDE	718	737	756	895	33	236	439	643	846	—
		BACK	1016	1035	1054	895	107	284	462	640	818	—
38AUZB08 569J*08B CAS091*B	RTPF	LEFT SIDE	718	737	756	895	33	236	439	643	846	—
		BACK	1016	1035	1054	895	107	284	462	640	818	—
38AUZ*12 569J*12 CAS121	RTPF	LEFT SIDE	1022	1041	1060	1095	33	236	439	643	846	1049
38AUDA12 569J*12 CAS120		BACK	1016	1035	1054	1095	107	284	462	640	818	996
38AUDT12 569J*12T CAS123	RTPF	LEFT SIDE	1022	1041	1060	1095	33	236	439	643	846	1049
38AUZ*14 569J*14 CAS151		BACK	1016	1035	1054	1095	107	284	462	640	818	996
38AUD*14 569J*14 CAS150		RIGHT SIDE	629	648	667	1095	107	284	462	640	818	996
38AUQ*07 575J*07 CHS072	RTPF	LEFT SIDE	719	738	757	895	33	236	439	643	846	—
		BACK	1023	1042	1061	895	106	284	461	639	817	—
38AUQ*08 575J*08 CHS091	RTPF	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	—
38AUQ*12 575J*12 CHS121	RTPF	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
38AUZE08 569J*08H CAS091*H	RTPF	LEFT SIDE	718	737	756	895	33	236	439	643	846	—
		BACK	1016	1035	1054	595	107	284	462	640	818	—
		RIGHT SIDE	629	648	667	895	107	284	462	640	818	—
38AUQE08 575J*08H CHS091*H	RTPF	LEFT SIDE	718	737	756	1095	33	236	439	643	846	1049
		BACK	1016	1035	1054	1095	107	284	462	640	818	996
		RIGHT SIDE	629	648	667	1095	107	284	462	640	818	996

OPERATION

Fan System Operation with Motormaster Speed Control (Motormaster)

GENERAL

As low outdoor ambient conditions or reduced condenser loads allow the Saturated Condensing Temperature to approach 100°F (38°C) at the Motormaster temperature sensor location, the Motormaster controller will reduce the outdoor fan motor speed in both outdoor fan motors. The reduction in motor speed reduces the condenser fan air quantity until the condensing temperature decrease is stabilized. While operating in this reduced load range, the Motormaster controller may command motor speeds between full rpm and zero rpm.

COOLING, SINGLE AND TANDEM COMPRESSOR

The unit's two outdoor fans are controlled through compressor contactor C1 (single compressor units) or through relay OFR (tandem compressor units). On a thermostat Y1 call for Cooling, if the CADM anti-recycle timer has expired and compressor operation is permitted, contactor C will be energized and both fan motors will start and speed will ramp up as condenser coil temperature increases.

The unit's Low Pressure Switch is equipped with a bypass time delay relay. On start-up, the time delay relay contacts close for 180 seconds, bypassing the LPS contacts and permitting system operation at cold ambient conditions. At the end of the 180 second period, if LPS contacts are closed, normal system operation continues. If the LPS contacts are still open after the 180 second period, contactor C will open and compressor and outdoor fan motors will stop. Restart will be permitted by CADM when anti-recycle time delay and all conditions allow.

COOLING, DUAL CIRCUIT

The unit's two outdoor fans are controlled through relay OFR. On a thermostat Y1 call for Cooling, the OFR is energized and Motormaster controller is energized. Until Compressor 1 starts and runs to increase the coil temperature, the two outdoor fan motors will remain at zero rpm. When Compressor 1 runs, the condenser coil temperature at the coil temperature sensor location will increase and the Motormaster will command motor speeds to increase.

The Motormaster controller temperature sensor is mounted on Circuit 1 only. If Circuit 1's compressor operation is not available, then both outdoor fan motors will be ramped down to zero rpm as Circuit 1 coil temperature cools below 80°F (27°C). Circuit 2 operation is not available when Circuit 1 is off.

The unit's Circuit 1 Low Pressure Switch (LPS1) is equipped with a bypass time delay relay. On start-up, the time delay relay contacts close for 180 seconds, bypassing the LPS1 contacts and permitting system operation of Circuit 1 at cold ambient conditions. At the end of the 180 second period, if LPS1 contacts are closed, normal system operation continues. If the LPS1 contacts are still open after the 180 second period, contactor C1 will open and Compressor 1 and outdoor fan motors will stop. Restart will be permitted by CADM1 when anti-recycle time delay and all conditions allow.

230,460-V MODELS

ACCESSORY KITS BUILT BEFORE JULY 2013

Circuit 2 does not include a bypass time relay at LPS2. Low ambient unit operation is restricted to Circuit 1. If extended operation of Circuit 2 is required to meet space load conditions, purchase accessory package CRWINSTR001A00 and install the time delay relay across LPS2.

230,460-V (ACCESSORY KITS BUILT AFTER JUNE 2013)

575-V MODELS ALL

Circuit 2 also includes a bypass time relay at LPS2. Low ambient unit operation is available on both Circuit 1 and Circuit 2 when Circuit 1 is operating properly.

HEAT PUMP MODELS

The heat pump unit's two outdoor fans are controlled through relay OFR with sequence logic from Defrost Board via output OF. Relay Speed Control Bypass (SCB) is energized during Heating to bypass the Motormaster control.

On a thermostat Y1 call for Cooling, the Defrost Board output OF will energize relay OFR; outdoor fan motor operation is enabled. If the CADM anti-recycle timer has expired and compressor operation is permitted, contactor C will be energized, compressor will start and run and condenser coil temperature will increase. Both fan motors will start and speed will ramp up as condenser coil temperature increases, reaching full speed rpm as coil temperature rises above 100°F (38°C).

On a thermostat W1 call for Heating, relay SCB is energized; its contacts bypass the Motormaster output, forcing both fan motors to run at full speed when enabled by OFR position. Defrost Board output OF energizes relay OFR; outdoor fan motors start and run at full speed.

During Heating, a Defrost cycle will cause the Defrost Board output OF to be removed; relay OFR is de-energized and both fan motors will stop for the duration of the Defrost cycle.

For troubleshooting, see Table 8, and for relevant information on speed sensor resistance, see Table 9.

Table 8 — Troubleshooting

OBSERVATION	POSSIBLE REMEDY
Fans won't start	All fans: Check power and wiring Check outdoor fan relay (OFR) Check speed control sensor location Check speed sensor resistance (see Table 9)
Cooling — Slow fan speed for fans at start or during low outdoor ambient	Normal operation
Cooling — Slow fan speed for fans above 85°F (29°F) outdoor ambient (should be full speed)	Check speed control sensor location Check speed control sensor resistance (see Table 9) 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

Table 9 — Speed Control Sensor Resistance

TEMPERATURE		RESISTANCE
°F ±2°F	°C ±1°C	Ohms, nominal
–22	**–30**	88,350
–4	**–20**	48,485
14	**–10**	27,650
32	**0**	16,325
50	**10**	9,950
68	**20**	6,245
77	**25**	5,000
86	**30**	4,028
104	**40**	2,663
122	**50**	1,801
140	**60**	1,244
158	**70**	876

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