



Wiring Diagrams

DIAGRAM INDEX

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SAFETY CONSIDERATIONS

Installing, starting up, and servicing this equipment can be hazardous due to system pressures, electrical components, and equipment location (roofs, elevated structures, etc.).

Only trained, qualified installers and service mechanics should install, start up, and service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning coils. All other operations should be performed by trained service personnel.

When working on the equipment, observe precautions in the literature and on tags, stickers, and labels attached to the equipment. Follow all safety codes. Wear safety glasses and work gloves. Use care in handling, rigging, and setting bulky equipment.

	ELECTRIC SHOCK HAZARD Open all remote disconnects before servicing this equipment.
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SEQUENCE OF OPERATION

Off Cycle — During unit off cycle, crankcase heaters is energized. If ambient temperature is below 36 F (2 C), cooler heaters (if equipped) are also energized.

Start-Up — When the unit Enable/Off/Remote switch is set to the ENABLE position, the 24-v control circuit will be energized. When there is a call for cooling and all safety devices are satisfied, the compressor will start unloaded after a delay of 1 to 3 minutes. The low pressure and oil pressure safety switches (if so equipped) will be bypassed for a 20-minute period after the compressor has been started.

CAPACITY CONTROL — At first call for cooling, the microprocessor starts the compressor and lead fan stage. The liquid line solenoid valve (LLSV) remains closed, permitting a pumpout on start-up. After pumpout, the valve opens and, if necessary, additional outdoor fans are energized. Crankcase heaters are deenergized when a compressor is started. As additional cooling is required, unloaders are deenergized. Speed at which capacity is added or reduced is controlled by 1) temperature deviation from the set point and 2) rate of temperature change of the chilled fluid.

The Main Base Board (MBB) responds to temperature of supply chilled water to cycle the compressor and to control compressor unloading and loading steps.

Solenoid-operated cylinder bank unloaders, energized by the MBB, vary compressor capacity by unloading and loading cylinders to match cooling load requirements. See Table 1.

Hot gas bypass valve, standard on 30GTN015 (50 Hz) and 30GTN020 (60 Hz), is energized by the MBB. Valve allows hot gas to pass directly into the cooler circuit on the final step of unloading. Hot gas bypass maintains constant suction pressure and permits unit to operate at lower loads with less compressor cycling. Valve starts to open when suction pressure drops to about 62 psig (427 kPa). If chilled water set point is lower or higher than 44 F (6.7 C), decrease or increase the valve setting for proper operation.

When no further cooling is called for, LLSV closes and compressor and fans continue to run while pumping down the cooler.

Table 1 — Capacity Control Steps

UNIT 30GTN	Hz	CONTROL STEPS	% CAPACITY	OPERATING CYCLES
015	50	*	—	2
		1	50	2
		2	100	4
	60	1	33	2
		2	67	4
		3	100	6
020	50	1	33	2
		2	67	4
		3	100	6
	60	*	—	2
		1	50	2
		2	100	4
025,030	50/60	1	33	2
		2	67	4
		3	100	6
035	60	1	33	2
		2	67	4
		3	100	6

*Uses hot gas bypass.

LEGEND AND NOTES FOR FIG. 1-3

LEGEND

A	— Alarm
ALM	— Alarm
C	— Contactor, Compressor
CB	— Circuit Breaker
CH	— Crankcase Heater
CHC	— Cooler Heater Cable
CHT	— Cooler Heater Thermostat
COTP	— Compr. Over Temperature Protection
COMP	— Compressor
CR	— Control Relay
CWFS	— Chilled Water Flow Switch
CWP	— Cooler Water Pump
EMM	— Energy Management
FC	— Outdoor-Fan Contactor
FIOP	— Factory-Installed Option
FM	— Outdoor-Fan Motor
FU	— Fuse
GCS	— Ground Current Sensing
GND	— Ground
HGBP	— Hot Gas Bypass Solenoid
LLSV	— Liquid Line Solenoid Valve
LPS	— Low-Pressure Switch
LWT	— Leaving-Water Temperature
OAT	— Outdoor-Air Temperature
OPS	— Oil Pressure Switch
PL	— Plug
POT	— Potentiometer
R	— Relay (Condenser)
SPT	— Space Temperature
SW	— Switch
T	— Thermistor
TB	— Terminal Block
TDR	— Time-Delay Relay
TOR	— Toroid
TRAN	— Transformer
UL	— Unloader
	Terminal Block
	Terminal (Unmarked)
	Terminal (Marked)
	Splice
	Factory Wiring
	Field Wiring
	To install common potential only. Not to represent wiring.

NOTES:

1. Factory wiring is in accordance with the National Electrical Codes. Any field modifications or additions must be in compliance with all applicable codes.
2. Use 75 C min wire for field power supply.
3. All circuit breakers 'Must Trip Amps' are equal to or less than 156% FLA.
4. All field interlock contacts must have a minimum rating of 2 amps at 24 vac sealed. See field interlock wiring.
5. Compressor and fan motors are thermally protected — three phase motors protected against primary single phasing conditions.
6. On 208/230, 380, 460, 575 units, interchange fan motor connections 1 and 3 to ensure counterclockwise fan rotation.
7. Control circuit power should be supplied from a separate source. A field supplied disconnect, with 7 amp maximum circuit protection, must be provided. Connect control circuit power to terminals 1 and 2 of TB4. Connect neutral of supply to terminal 2 of TB4.

8. Terminals 9 and 10 of TB5 are for field connection of remote On-Off. The contact must be rated for dry circuit application capable of handling a 5 vdc 1 mA to 20 mA load.
9. Voltage requirements:

MAIN POWER	CONTROL POWER
208/230-3-60	115-1-60
460-3-60	115-1-60
575-3-60	115-1-60
380-3-60	220-1-60
380/415-3-50	230-1-50

The diagram illustrates the wiring for the MotorMaster Controller, showing connections for Field, Power, Supply, and various sensors and actuators. The main components and their connections are as follows:

- Field:** Connected to TB1 (11) and TB1 (12).
- Power:** Connected to TB1 (12) and TB1 (13).
- Supply:** Connected to TB1 (13) and TB1 (14).
- Equip GND:** Connected to TB1 (14) and TB1 (15).
- Neutral:** Connected to TB1 (15) and TB1 (16).
- MotorMaster Controller:**
 - Sensor:** Connected to TB1 (11) and TB1 (12).
 - MotorMaster Controller:** Connected to TB1 (12) and TB1 (13).
 - MotorMaster Controller:** Connected to TB1 (13) and TB1 (14).
 - MotorMaster Controller:** Connected to TB1 (14) and TB1 (15).
 - MotorMaster Controller:** Connected to TB1 (15) and TB1 (16).
- Wiring Details:**
 - Field:** 06E...0... (575V), 06D...01... (575V), 06E...1... (575V), 06E...6... (380V), 06E...9... (380V).
 - Power:** 06D...06... (460, 380/415V), 06D...13... (380V), 06E...12... (208/230V).
 - Supply:** 06D...06... (460, 380/415V), 06D...13... (380V), 06E...12... (208/230V).
 - Equip GND:** 06D...06... (460, 380/415V), 06D...13... (380V), 06E...12... (208/230V).
 - Neutral:** 06D...06... (460, 380/415V), 06D...13... (380V), 06E...12... (208/230V).

Fig. 1 — Power Schematic, 30GTN015-035 Units

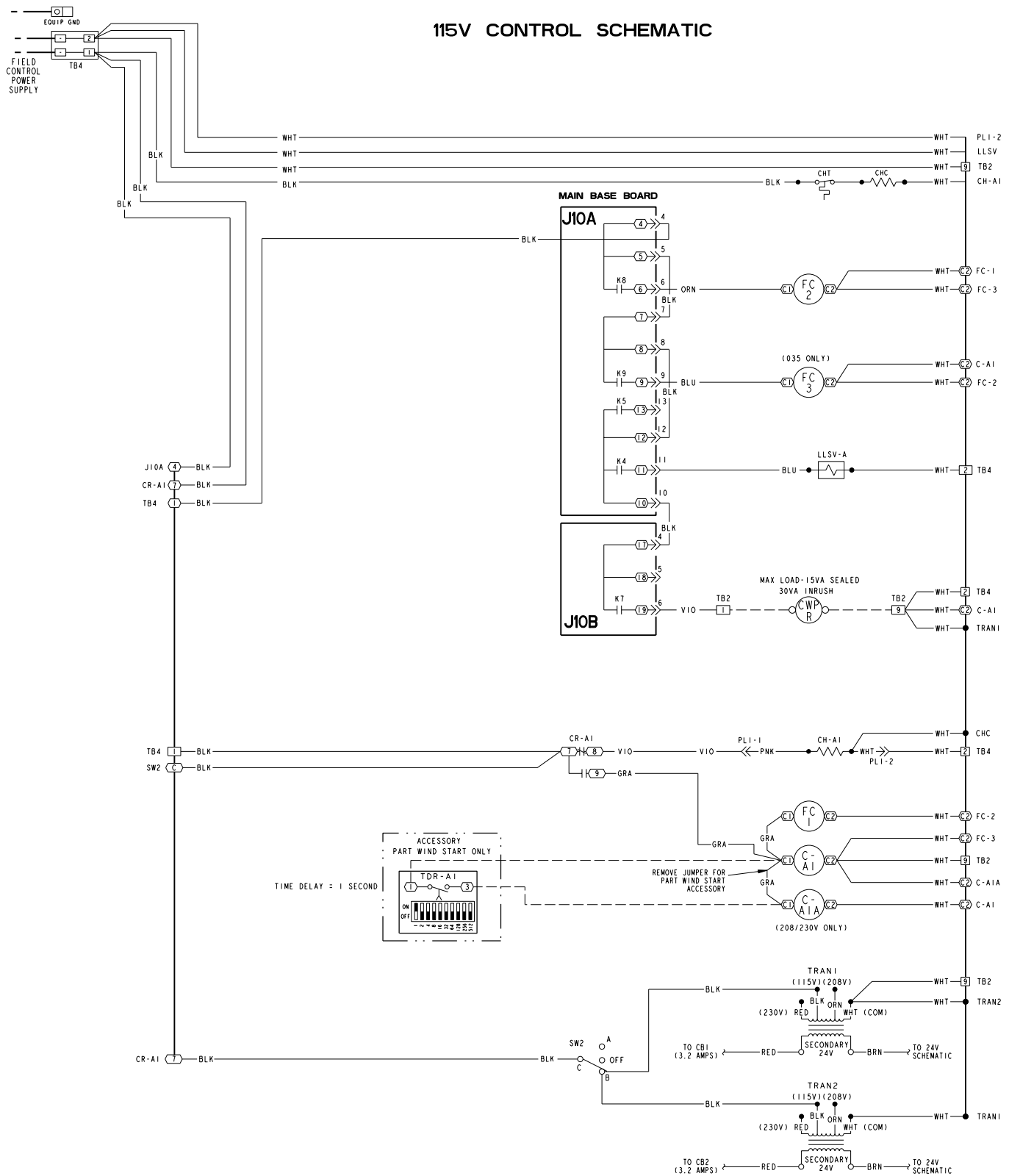
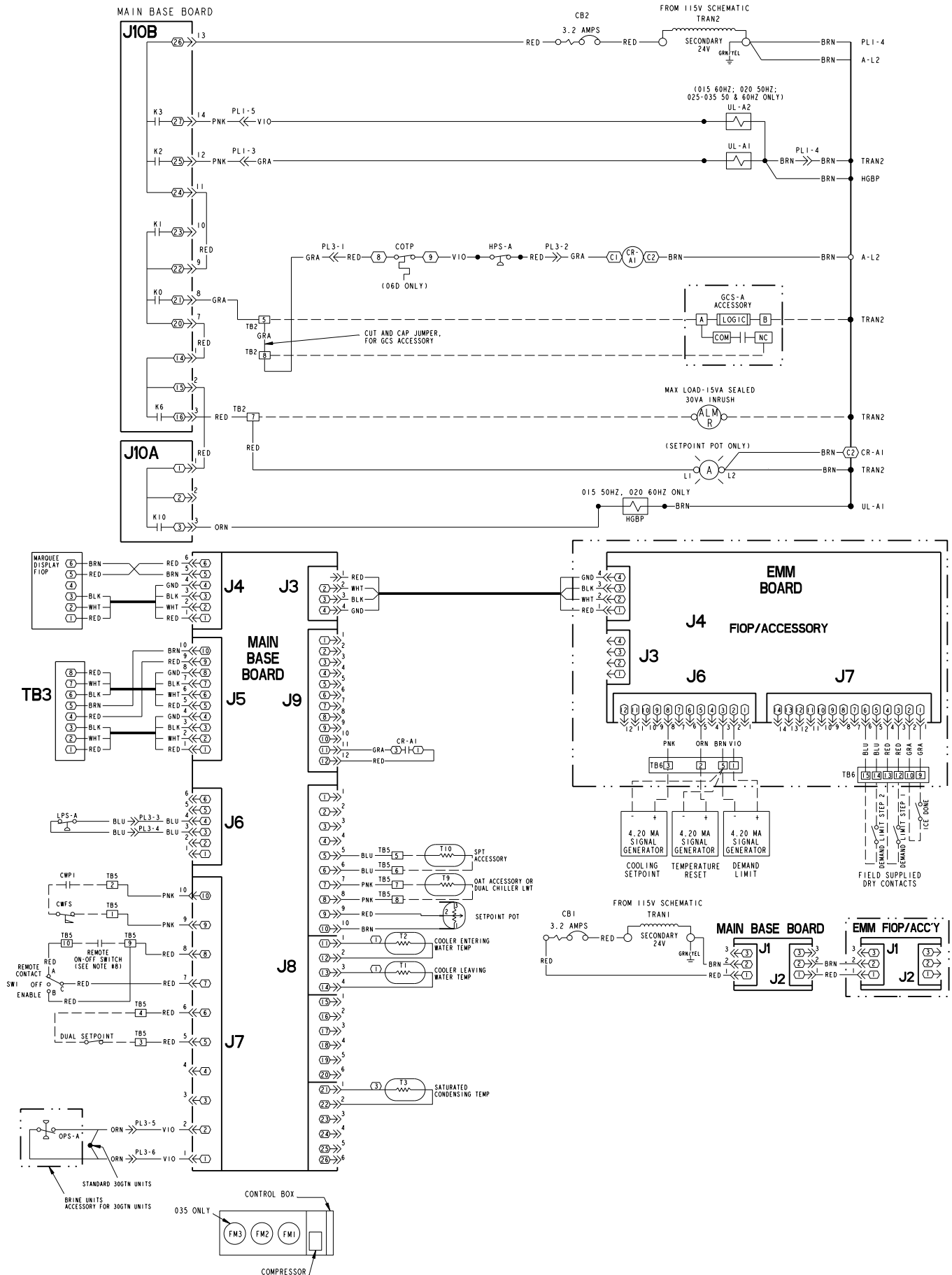
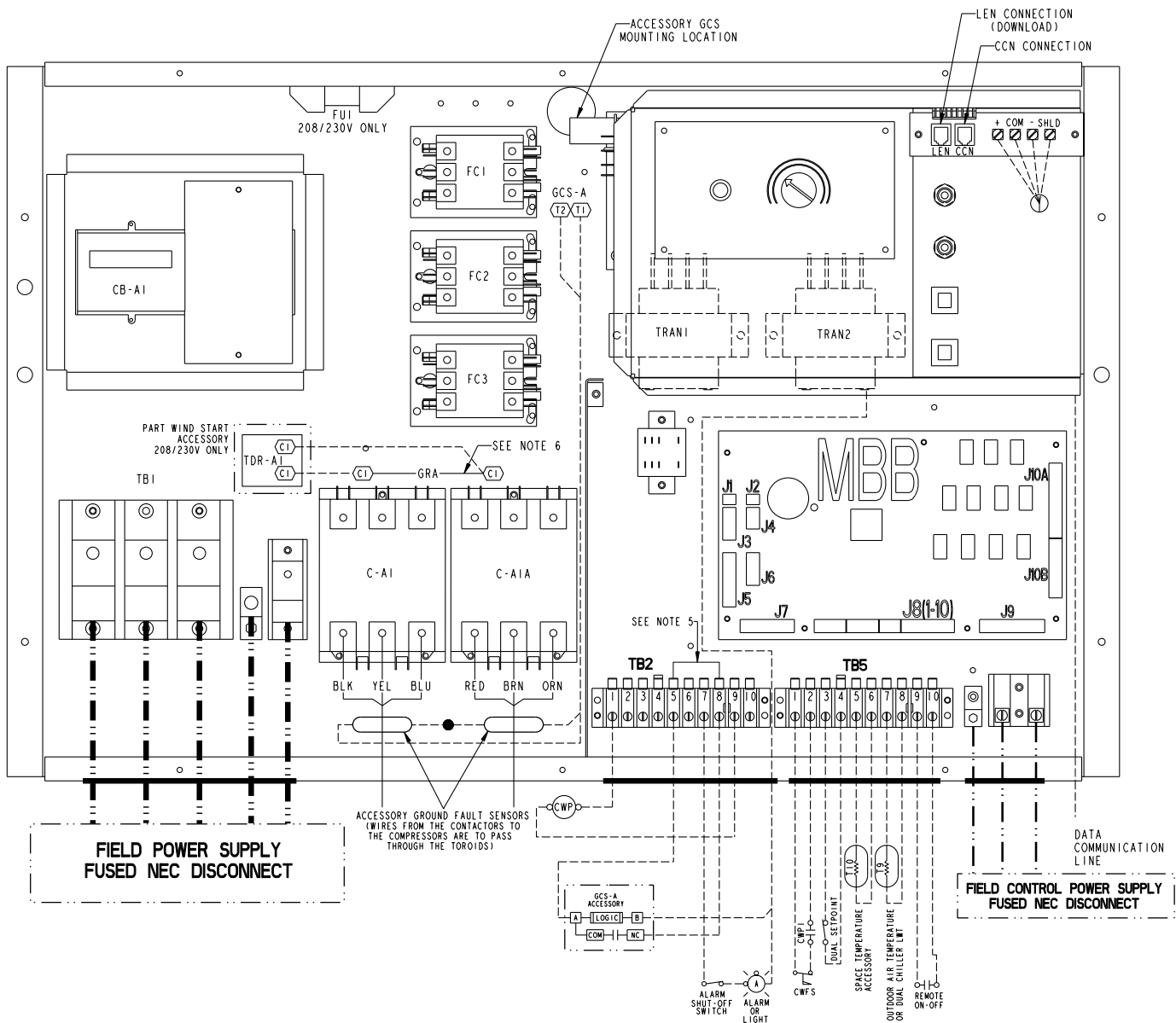


Fig. 2 — 115-V Control Schematic, 30GTN015-035 Units

LOW VOLTAGE CONTROL SCHEMATIC





NOTES:

1. Factory wiring is in accordance with the National Electrical Code. Any field modifications or additions must be in compliance with all applicable codes.
2. Connect separate source of control power from field-supplied fused disconnect to terminal 1 of TB4. Neutral side must be connected to terminal 2. This provides power for the unit control circuit, cooler heater and compressor crankcase heater.
3. All field interlock contacts must have a minimum rating of 360 va pilot duty plus capacity required for field-installed equipment.
4. For internal unit wiring, reference wiring book or unit wiring label diagram.
5. For GCS accessory, remove jumper wire between terminals 5 and 8 on terminal block TB2.
6. For part wind start accessory, remove gray jumper wire between C-A1-C1 and C-A1A- C1. Time-delay relay shown is suggested mounting position.
7. Voltage requirements:

MAIN POWER	CONTROL POWER
208/230-3-60	115-1-60
460-3-60	115-1-60
575-3-60	115-1-60
380-3-60	220-1-60
380/415-3-50	230-1-50

LEGEND

C	Compressor Contactor
CCN	Carrier Comfort Network
CWFS	Chilled Water Flow Switch
CWP	Chilled Water Pump
CWPI	Chilled Water Pump Interlock
FC	Fan Contactor
FU	Fuse
GCS	Ground Current Sensor
LEN	Local Equipment Network
MBB	Main Base Board
NEC	National Electrical Code
TB	Terminal Block
TDR	Time-Delay Relay
TRAN	Transformer
---	Field Power Wiring
---	Field Control Power Wiring
---	Factory-Installed Wiring
---	Field Wiring

Fig. 4 — Component Arrangement and Field Wiring Diagram, 30GTN015-035 Units

