



Wiring Diagrams

GENERAL

This wiring book is for the 30GT015-035 air-cooled reciprocating liquid chillers with starting serial numbers of 2294F --- or higher. See Fig. 1 and 2 for component arrangement and typical wiring schematic.

SAFETY FEATURES

1. On resumption of power after a power failure, the machine will recycle automatically and bring on the compressor after a period of between 3 seconds and 5 minutes has elapsed.
2. To reset the high-pressure switch circuit, turn the ON/OFF switch to OFF position then back to ON position. Low-pressure switch will automatically reset.
3. If an 06D compressor shuts down because the over-temperature protector (COTP) opens, check unit voltage and water flow rate, and check for refrigerant leaks before restarting.
4. The specially-calibrated circuit breakers are designed and selected for hermetic refrigerating duty motor compressors.

⚠ WARNING

Use only designated overload protection.

OPERATING SEQUENCE

Control Sequence — At initial start-up, assume that all safety devices are satisfied, circuit breakers are closed, the ON/OFF switch is in the ON position, and there is a call for cooling.

After a time lag of between 3 seconds and 5 minutes (depending on unit timing logic), the compressor starts unloaded, and condenser fan no. 1 starts. Condenser fan no. 2 only starts if unit high-side pressure is above 260 psig (1793 kPa). On 30GT035, 60 Hz units only, condenser fan no. 3 is controlled by a temperature switch. Condenser fan no. 3 will start if the outdoor ambient temperature is above 70 F (21.1 C).

The liquid line solenoid remains closed for 10 seconds until the time-delay relay closes, energizing the liquid line solenoid coil. The low-pressure switch is bypassed for 2 minutes, and the unloaders are energized.

NOTE: The compressor unloads when the compressor unloader solenoid is energized.

At the end of the 2-minute bypass period, the low-pressure switch activates in the control circuit. As the demand for

cooling increases, the unit capacity increases when the temperature control switch no. 2 changes from normally closed to normally open. For the 30GT015, 50 Hz units; the 30GT020, 60 Hz units; and units with hot gas bypass, the control solenoid will close and disable the hot gas bypass.

On an additional call for cooling, temperature control switch no. 3 will change from normally closed to normally open. This will deenergize unloader no. 2 (if unit is so equipped), thereby partially loading the compressor. On all units, temperature control switch no. 4 will then change from normally closed to normally open. Unloader no. 1 will be deenergized, and the compressor will be fully loaded.

NOTE: The temperature controller regulates the unit capacity steps based on the set point deadband settings on the temperature controller and leaving cooler water temperature.

Complete Unit Stoppage

CAUSES — Interruption of supplied power, open control circuit switch (SW), open field-supplied chilled water flow switch (CWFS), open contacts in field-supplied auxiliary interlock (CWP), or compressor overtemperature protection (COTP, for 30GT015 60 Hz only), or open high-pressure switch (HPS).

RESTART — The unit recycles and restarts automatically under short-cycle 5 minute delay of control module (CM) when power is restored, or when SW is closed or when contacts in CWSF or CWP are closed (if so equipped).

Stoppage by COTP or HPS requires manual resetting of the control circuit to restart the CM 5-minute time delay. This is done by opening and closing the control circuit switch (SW).

After Stoppage by Low-Pressure Switch (LPS) — If LPS is not closed 2 minutes after compressor starts, the compressor stops and locks out and LPS must be closed before CM can recycle to restart the compressor.

If LPS opens anytime during unit operation, compressor stops and timer starts. Compressor restarts in approximately 5 minutes. For 2 minutes, LPS is bypassed. If it has not closed by this time, the compressor stops and locks out. The compressor cannot restart until LPS is closed.

⚠ CAUTION

If unit or circuit stoppage occurs more than once due to any safety device, the trouble should be corrected before any attempt is made to restart the unit.

LEGEND (for Fig. 1 and 2)

A	- Alarm
ATS	- Air Temperature Switch
BPR	- Bypass Relay
C	- Contactor, Compressor
CB	- Circuit Breaker
CH	- Crankcase Heater
CHC	- Cooler Heater Cable
CHT	- Cooler Heater Thermostat
CM	- Control Module
COMP	- Compressor
COTP	- Compressor Over Temperature Protection
CR	- Control Relay
CWFS	- Chilled Water Flow Switch
CWP	- Chilled Water Pump Interlock Contact
DLS	- Demand Limit Switch
EQUIP	- Equipment
FC	- Fan Contactor
FCPS	- Fan Cycling Pressure Switch
FM	- Fan Motor
FU	- Fuse
GND	- Ground
GCS	- Ground Current Sensing
HGS	- Hot Gas Solenoid
HPS	- High-Pressure Switch

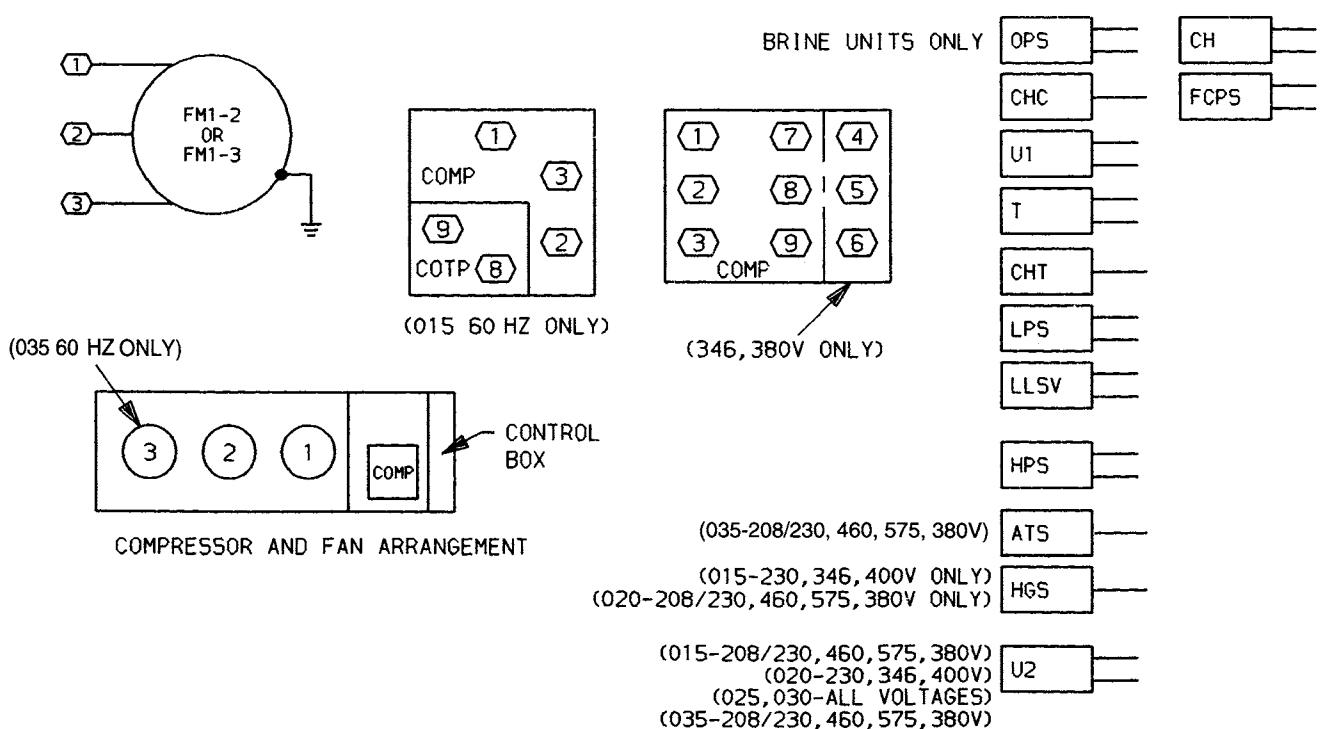
LLSV	- Liquid Line Solenoid valve
LPS	- Low-Pressure Switch
NEC	- National Electrical Code (U.S.A.)
OPS	- Oil Pressure Switch
SW	- Switch
T	- Thermistor
TB	- Terminal Block
TC	- Temperature Control
TOR	- Torroid
TDR	- Time Delay Relay
TRAN	- Transformer
U	- Unloader
	Terminal Block Connection
	Marked Terminal
	Unmarked Terminal
	Marked Splice
	Unmarked Splice
	Factory Wire
	Field Control or Power Wiring
	Indicates Common Potential. Does Not Represent Wiring

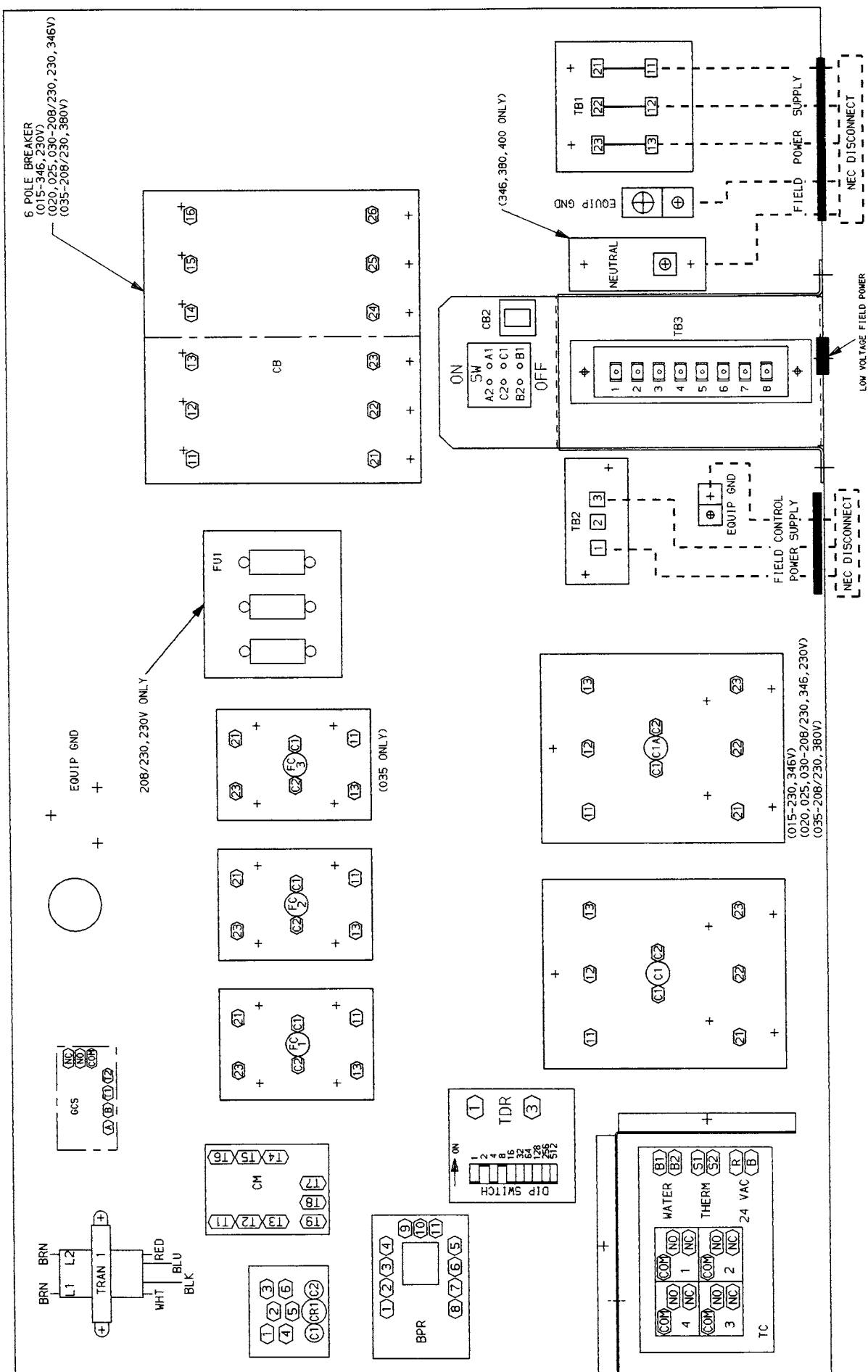
NOTES

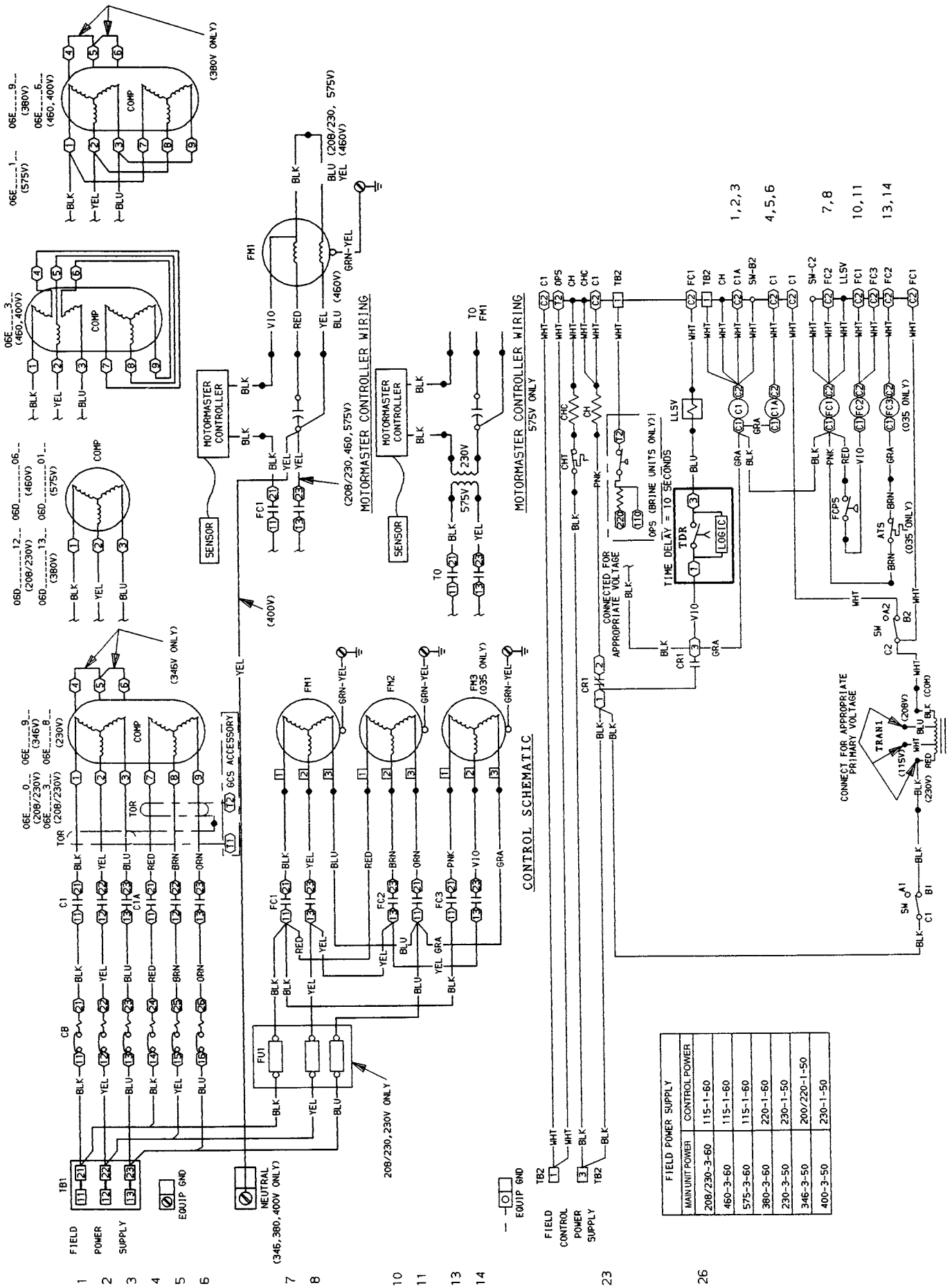
- Compressor and fan motors are thermally protected. Three-phase motors are protected against primary single-phasing conditions.
- Replacement of original wires must be with type 90°C wire or its equivalent.
- Line no. indicates location of contacts: #, # signifies single pole double throw contacts, # signifies a normally-closed contact, # signifies a normally-open contact.
- Factory wiring is in accordance with National Electrical Code (NEC, U.S.A.). Field modifications or additions must be in compliance with all applicable codes.
- Wiring for field power supply must be rated 75°C minimum. Use copper, copper-clad aluminum, or aluminum conductors.
- Control circuit power should be supplied from a separate source. A field-supplied disconnect with 7 amp maxi-

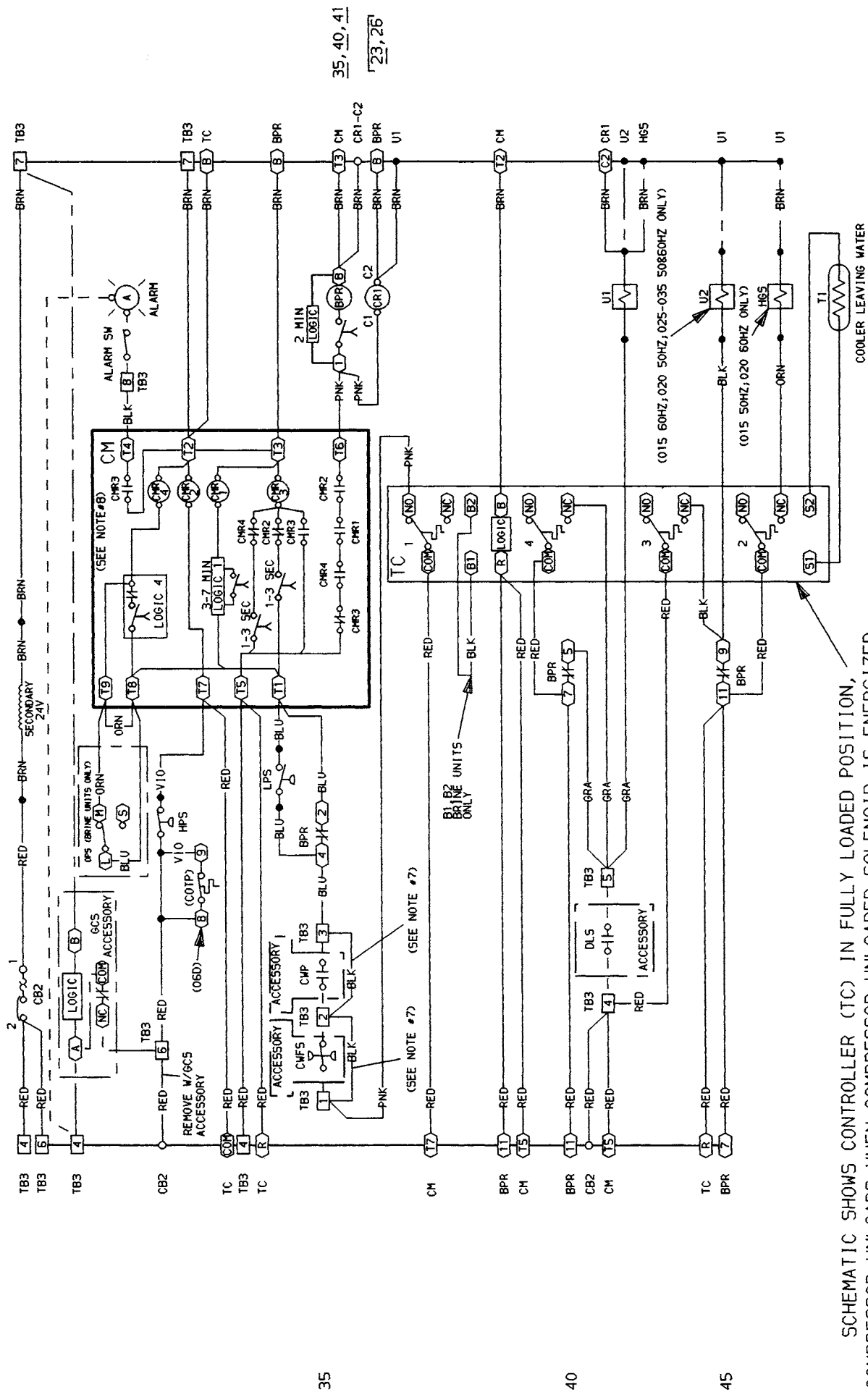
imum circuit protection must be field provided. Connect control circuit power to terminals 1 and 3 of TB2. Connect neutral of supply to terminal 3 of TB2.

- Terminals 1, 2 and 3 of TB3 are for field external interlock connections which require class 1 wiring. All field interlock contacts must have minimum rating of 2 amps at 24 vac sealed. Remove wire between terminals 1 and 2 of TB3 when chilled water flow switch is field installed. Remove wire between terminals 2 and 3 of TB3 when installing chilled water pump starter auxiliary interlock contact.
- The internal parts shown in the control module are not physically located inside the module. The module is a solid-state device, but the relays have been included in the schematic to provide a clear understanding of the control module logic.









Field-Installed Accessories — Ordering numbers for field-installed accessories are listed on 30GT015-035 price pages. For field installation of these accessories, see the installation instructions supplied with the accessories in addition to the following instructions. Refer to the unit wiring labels for complete unit wiring schematics and location of control box components.

PART WINDING START — Order Carrier part number HN67ZA001.

NOTE: All units are built as standard with across-the-line compressor start. The availability of part-wind start is as follows:

VOLTAGE

UNIT SIZE 30GT	60HZ				50HZ		
	208/230	380	460	575	230	346	400
015	*	*	*	*	†	†	††
020	†	**	††	**	†	†	††
025	†	**	††	**	†	†	††
030	†	**	††	**	†	†	††
035	†	**	††	**	NA	NA	NA

* Cannot be converted to part-wind start.

† Can be field modified to part-wind start by adding a time-delay relay (part no. HN67ZA001).

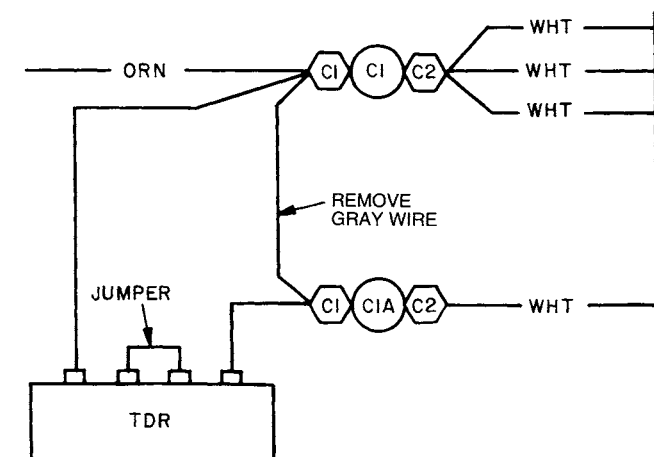
** Requires special order to change circuit breakers and contactors.

†† Requires special order to change circuit breakers and contactors and cannot use triple voltage compressor.

Installation — Drill holes in the lower left corner of control box under bypass relay (BPR). When drilling, use care not to damage the wire harness located there. Use two no. 6B-20 screws to fasten time-delay relay to control box. Remove gray (GRA) wire between C1 terminal of compressor contactor coils C1 and C1A. Wire time-delay relay part no. HN67ZA001 between C1 terminal of compressor contactor coils C1 and C1A and install jumper on center terminals. See Fig. 3.

CHILLED WATER FLOW SWITCH — (All Units.) Order Carrier part no. 30HW900003.

Installation — Remove black (BLK) wire between terminals 1 and 2 of TB3. Install chilled water flow switch between terminals 1 and 2 of TB3 as shown on unit wiring diagram.



C — Contactor
TDR — Time-Delay Relay

Fig. 3 — Time-Delay Relay Wiring

HOT GAS BY-PASS — (30GT015-035 — 60 Hz, and 30GT020-030 — 50Hz) Order part no. 30GT911054. Install per instructions in accessory package.

CONTROL TRANSFORMER — (All units with 115-v, 60 Hz control circuit power on 208, 230, 460-v units.) Order Carrier part no. HT01BE227. This transformer (750 va) is for use as an alternate source for 115-v, 60 Hz control circuit power on 30GT015-035 with 208/230 or 460 primaries.

⚠ CAUTION

Be sure all power to the unit is disconnected before starting installation. Tag disconnect to inform others unit is being worked on.

Installation

1. Mount transformer to divider panel above condenser coil inside compressor compartment. Holes must be field drilled. Fasten with 1/4 - 20 thread cutting screws. See Fig. 4. Exact mounting location of transformer is at discretion of installer. There are no wires or obstructions on reverse side of divider panel to interfere with mounting screws.
2. Wires, terminal connectors, and fuse must be field supplied. Use 16 AWG, 90 C wire with 4/64-in. thick insulation. See unit wiring label inside front access door for complete wiring schematic and control box component location.
3. Connect primary side of transformer to unit power terminal block TB1. Connect terminal 21 of TB1 to terminal H1 of transformer and terminal 22 of TB1 to proper H terminal of transformer, according to required voltage. See Fig. 5 for transformer terminal arrangement.
4. Connect terminal X1 of transformer to one side of 15 amp fuse and connect other side of fuse to terminal 1 of TB2. Secure fuse holder under transformer shield or inside control box. Connect terminal X2 of transformer to terminal 7 of TB2. Install green or yellow ground wire from terminal X2 of transformer to ground. This grounds the L2 side.

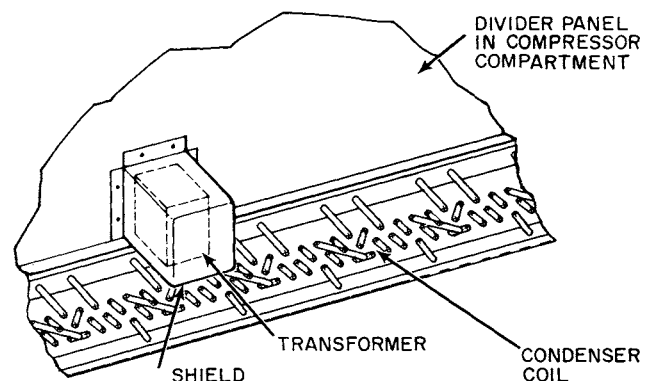


Fig. 4 — Transformer Mounted on Divider Panel

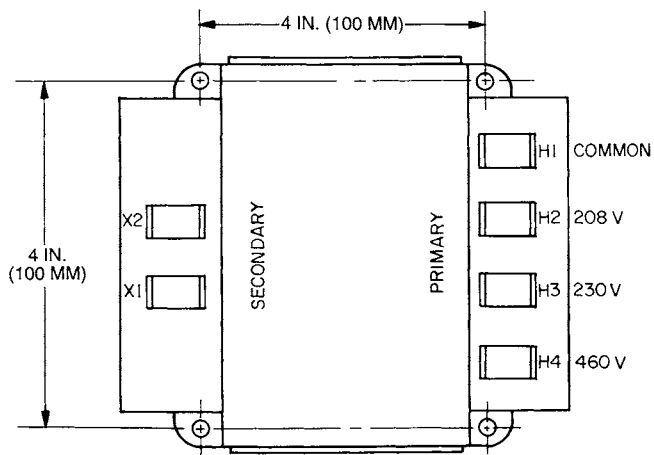


Fig. 5 — Transformer Terminal Arrangement

5. Route primary and secondary wires away from rough or sharp objects, tying or taping wires to existing harness.

6. A protective shield must be field fabricated and installed over the transformer.

LOW AMBIENT HEAD PRESSURE FAN CONTROL —
Refer to Price Pages for correct accessory part numbers, and install per instructions contained in package.

OIL PRESSURE SWITCH — (30GT020-035, 60 Hz and 30GT015-030, 50 Hz.) Order part no. 30HK900011. Install per instructions in accessory package.

