TRANE® AIR CONDITIONING

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PRODUCT TAB - LIQUID CHILLERS-RECIPROCATING Cold Generator Water-Cooled
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LITERATURE FILE NO.

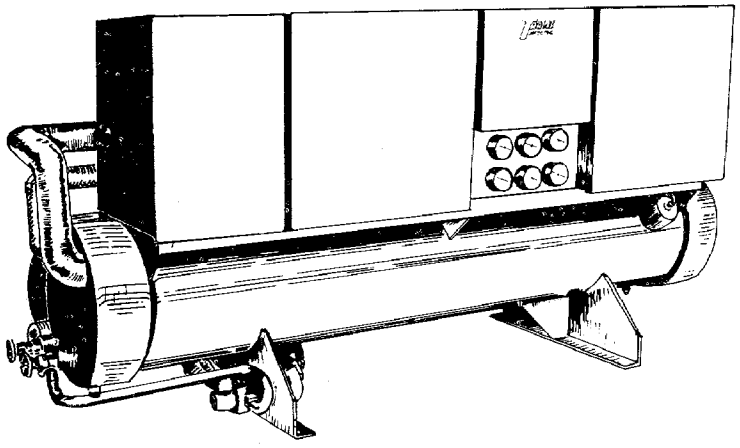
CGWA-W-20

UNIT WIRING

Since the Trane Company has a policy of continuous product improvement, it reserves the right to change specifications and design without notice. The installation and servicing of the equipment referred to in this booklet should be done by qualified, experienced technicians.

FEBRUARY, 1981

LIQUID CHILLERS - RECIPROCATING WATER-COOLED COLD GENERATOR ®



MODELS
CGWA-0800-RB or RC
CGWA-1000-RB or RC
CGWA-1200-RB or RC

DUAL MODEL R COMPRESSORS
'B' AND 'C' DESIGN SEQUENCE

CAUTION: The wiring diagrams that appear in this manual are typical. The actual wiring of your unit may differ. To prevent unit damage, refer to the "as wired" electrical diagrams provided with the unit for specific information.

COMMERCIAL AIR CONDITIONING DIVISION
LA CROSSE, WISCONSIN 54601
PRINTED IN U.S.A.

MODEL NUMBER DESCRIPTION

Trane products are identified by a multiple character model number that precisely identifies a particular type of unit. An explanation of the multiple character number is shown below. It will enable the owner or Service Engineer to define operation, components and accessories.

DIGIT NUMBER	1 2	3	4	5 6 7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
MODEL NUMBER	CG	W	A	080	1	R	B	5	1	C	C	5	C	4	B	3	6	1	E

UNIT MODEL
CG COLD GENERATOR

UNIT TYPE
W = WATER COOLED CONDENSING

DEVELOPMENT SEQUENCE

COOLING CAPACITY
010 = 10 TON
015 = 15 TON
020 = 20 TON
025 = 25 TON
030 = 30 TON
040 = 40 TON
050 = 50 TON
060 = 60 TON
075 = 75 TON
080 = 80 TON
100 = 100 TON
120 = 120 TON
150 = 150 TON
180 = 180 TON
200 = 200 TON

VOLTAGE & START CHARACTERISTICS UNITS WITH E, F, M & R COMP'S
1 = 460/60/3 PW
2 = 575/60/3 PW
3 = 230/60/3 PW
4 = 460/60/3 X-L
5 = 575/60/3 X-L
6 = 200/60/3 PW
S = SPECIAL
N = NONE
(PW = IS FOR PART WINDING START)
(X-L = IS FOR ACROSS THE LINE START)

COMPRESSOR IDENTIFICATION
M = M COMPRESSOR
R = R COMPRESSOR
E = E COMPRESSOR
J = J COMPRESSOR

DESIGN SEQUENCE
A = 1ST DESIGN
B = 2ND DESIGN
ETC.

COMPRESSOR MOTORS
5 = HERMETIC MOTOR
6 = SPECIAL
7 = NONE

CONTROL VOLTAGE
1 = 115
2 = 230
4 = NONE

CHILLER
A = ONE UNDERSIZE
B = TWO UNDERSIZE
C = STANDARD
D = ONE OVERSIZE
E = TWO OVERSIZE
F = NONE
G = SPECIAL

CONDENSER
A = ONE UNDERSIZE
B = TWO UNDERSIZE
C = STANDARD
D = ONE OVERSIZE
E = TWO OVERSIZE
F = NONE
G = SPECIAL
H = STANDARD SIZE HIGH PRESSURE
J = ONE OVERSIZE HIGH PRESSURE
K = ONE UNDERSIZE HIGH PRESSURE

UNIT CYCLE CONTROL DEVICES
1 = ANTI-RECYCLE 1 COMPRESSOR CIRCUIT
2 = ANTI-RECYCLE 2 COMPRESSOR CIRCUITS
3 = PERIODIC PUMP OUT/ANTI-RECYCLE 1 COMPRESSOR CIRCUIT
4 = PERIODIC PUMP OUT/ANTI-RECYCLE 2 COMPRESSOR CIRCUITS
5 = NONE
6 = SPECIAL

SYSTEM LOAD CONTROL DEVICES
A = LOAD LIMIT 1 COMPRESSOR CIRCUIT
B = LOAD LIMIT 2 COMPRESSOR CIRCUITS
C = NONE
D = SPECIAL

UNIT ELECTRIC CONTROL DEVICES
1 = LOW VOLTAGE RELAY
2 = PHASE REVERSAL RELAY
3 = PHASE FAILURE RELAY
4 = NONE
5 = SPECIAL
6 = SINGLE SOURCE POWER BOX W/C.B.

THERMOSTAT OR UNLOADING METHOD
A = 2 STEP ELECTRIC
B = 3 STEP ELECTRIC
C = 4 STEP ELECTRIC
D = 6 STEP ELECTRIC
E = 8 STEP ELECTRIC
F = 2 STEP PNEUMATIC ELEC.
G = 3 STEP PNEUMATIC ELEC.
H = 4 STEP PNEUMATIC ELEC.
J = 6 STEP PNEUMATIC ELEC.
K = 8 STEP PNEUMATIC ELEC.
L = SUCTION ELEC. UNLOADERS
M = NO UNLOADERS AND NO ACTUATOR
N = NONE
P = SPECIAL

CONTINUOUS OPERATION CONTROL DEVICES
1 = HOT GAS BYPASS 1 COMPRESSOR CIRCUIT
2 = HOT GAS BYPASS 2 COMPRESSOR CIRCUITS
3 = NONE
4 = SPECIAL

APPROVAL AGENCY
1 = U.L.
2 = C.S.A.
3 = U.L./C.S.A.
4 = ARI
5 = SPECIAL
6 = NONE

TRANSFORMER
1 = WITH
2 = WITHOUT
S = SPECIAL

MISCELLANEOUS
B = WITH MUFFLER
C = WITHOUT MUFFLER
D = ATTENUATOR
E = SEE S.O.
G = SPECIAL
H = UNIT ISOLATORS - NEOPRENE IN SHEAR *
J = UNIT ISOLATORS - SPRING ISOLATORS *
K = PACKED STOCK *
L = MEDIUM AMBIENT
N = AUX. CONDENSER
P = DESUPERHEATER
R = PRESSURE GAUGE PIPING

CUSTOMER CONNECTION DIAGRAM

CGWA

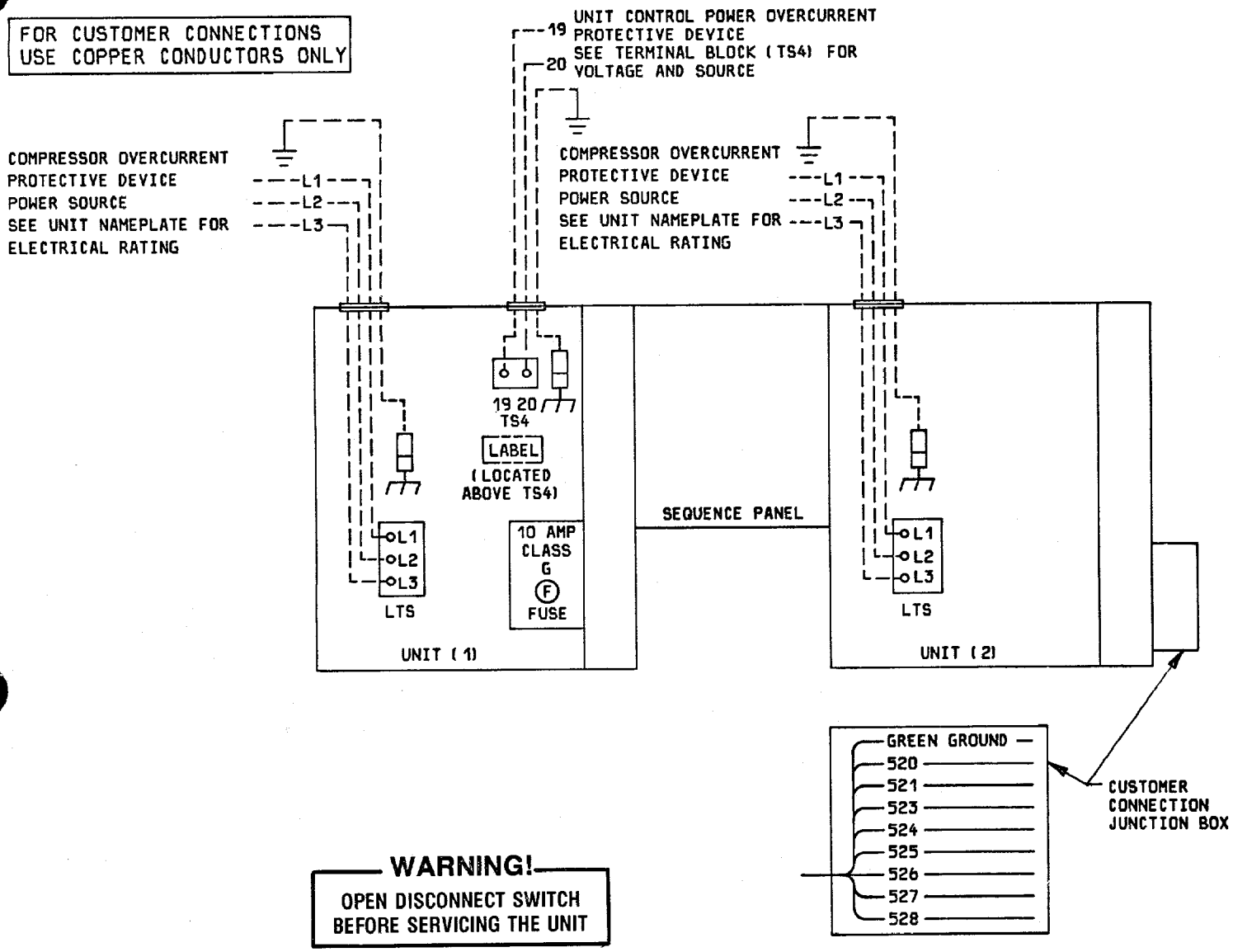


FIGURE 1 - Customer Connection Diagram

2305-0872

ELECTRICAL SEQUENCE OF OPERATION

CGWA WITH DUAL R COMPRESSOR

COMPONENT OPERATION

Motor Protection (MP)

The motor protector will stop the compressor motor if a motor winding overheats, or if there is insufficient lubricating oil pressure. The winding temperatures are sensed by the motor temperature sensors (MTS) embedded in each motor winding. The lubrication oil pressure is constantly monitored during compressor operation by the differential pressure switch (DPS). If MTS and DPS are satisfied, contacts M1 and M2 of the motor protector will be closed. If MTS senses an over temperature condition, or DPS senses insufficient lubricating oil pressure, contacts M1 and M2 will open and stop the compressor. If the compressor is stopped because of over temperature condition, the motor protector will automatically reset and close the M1 and M2 contacts when the motor windings cool. If the compressor is stopped because of insufficient lubricating oil pressure, the motor protector must be manually reset by pressing the reset button. This will reclose the M1 and M2 contacts.

Reset Relay (RR)

The purpose of the reset relay is to lock out the compressor if the compressor motor overloads (OL), motor protector (MP), or high pressure control (HPC) opens. RR has one pair of normally closed contacts. When the safety controls are closed, the coil of RR is shorted out of the circuit. If the compressor motor overloads or motor protector opens, current will energize the RR coil. The normally closed RR contacts will then open to lock the RR coil in the circuit. Since the RR coil is a high impedence coil, all devices in series with it will drop out. RR may be reset by opening switch SW. RR contacts will then close.

Antirecycle Timer and Periodic Pumpout

The antirecycle timer/timed periodic pumpout device is a single timer consisting of a motor, a clutch and two pair of normally closed contacts. The timer has two functions: 1) The antirecycle feature prevents rapid cycling of the compressor; 2) The timed periodic pumpout feature will periodically pump out the evaporator if sufficient refrigerant has migrated to it. Interval is factory set at 15 minutes.

Each refrigerant circuit is equipped with the device. Operation is described for one circuit only.

When compressor one stops, CR4 is de-energized. Contacts of CR4 will close to energize the clutch of timer TR3(1). Both sets of TR3(1) contacts will open instantly for a predetermined period. During this period, compressor restart is prevented. At the end of the timing cycle, both sets of TR3(1) contacts will close. When the contacts close, one set will allow the compressor to restart if a cooling load exists. If no cooling is required, the other set of TR3(1) contacts will allow the compressor to restart and pump out the evaporator if sufficient refrigerant has accumulated to close the low pressure control (LPC). Also, CR4 is energized, opening its contacts and resetting the time period.

Compressor Unloader Valves (CUV)

The compressor unloader valve must be de-energized to load the compressor.

CONTROL SEQUENCE

Control sequence assumes sequence switch (SS) in "1-2" position.

Close all disconnects and switches. Both compressor crankcase heaters (CCH) and time delay relay TDR10 (0.3 second time delay) are immediately energized. Start the chilled water pump. Current will feed through LTC, HPC, RR, OL, MP, and SW to the chilled water pump interlock (MS2). When chilled water flow is proven by the flow switch (FS), current is fed to the thermostat (TC). TC sensing bulb is located in the return water.

Loading The First Compressor

On an increase in cooling load, return water temperature will rise. On a rise in return water temperature, the first stage contacts of the thermostat (TC) close to energize control relay 1CR. 1CR contacts close and, if timer TR3(1) is timed out and all safety controls, low temperature control (LTC), high pressure control (HPC), motor protector (MP) and overloads (OL) are satisfied and TDR10 is closed, 11CR will energize. 11CR contacts close to energize the condenser water pump (MS3) and the cooling tower fan starter (MS4). Power feeds through the MS3 interlock to energize CR1, solenoid liquid valve SLV1 and compressor unloader valve CUV1. When SLV1 is energized, it opens to allow sufficient refrigerant to enter the evaporator to close the low pressure control (LPC). Power then passes through CR1 contacts and LPC to energize CR4 and compressor contactor 1M, starting the compressor (across the line start only). On units equipped with part winding start, 1M contacts close to energize the start windings of the compressor motor and the timer TR. In approximately one second TR contacts close to energize compressor contactor 2M, 2M contacts close to energize the run windings of the compressor motor.

If return water temperature continues to increase, TC closes its second set of contacts to energize 2CR. 2CR contacts open to de-energize compressor unloading valve CUV1. The lead compressor is now fully loaded.

Loading The Second Compressor

If return water temperature continues to increase, TC closes its third set of contacts and energizes timer TR2. When TR2 times out (0.5 seconds), 3CR is energized. 3CR contacts close and energize timer TR3(2). When TR3(2) times out, its contacts close and if all safety controls (HPC, OL, MP, LTC) are closed, CR1, SLV1, CUV1 and 12CR energize since the condenser pump is already operating. When SLV1 energizes, it opens to allow sufficient refrigerant into the evaporator to close the low pressure control (LPC).

Power then passes through CR1 and LPC contacts to energize CR4 and compressor contactor 1M, starting the compressor (across the line start only). CR4 contacts open to de-energize the clutch of TR3(2). On units equipped with part winding start, 1M contacts close to energize the start windings of the compressor motor and also energize timer TR. In approximately one second, TR contacts close to energize compressor contactor 2M. 2M contacts close to energize the run windings of the compressor.

Unloading The Second Compressor

As the load decreases, return water temperature drops. TC opens its fourth set of contacts to de-energize 4CR when return water temperature drops to the fourth stage setpoint. 4CR contacts close to energize CUV1 and unload the second compressor. If return water temperature continues to decrease, TC opens its third set of contacts to de-energize 3CR when return water temperature drops to the third stage setpoint. 3CR contacts open to de-energize CR1 and SLV1. The compressor continues to run through the 1M interlock to pump down the circuit until suction pressure drops to the low pressure control (LPC) setpoint. LPC contacts then open to stop the compressor. CR4 contacts close, energizing the TR3(2) clutch. TR3(2) contacts open, preventing restart of the second compressor for a period of 15 minutes.

Unloading The First Compressor

If return water temperature continues to decrease, TC opens its second set of contacts to de-energize 2CR when return water temperature drops to the second stage setpoint. 2CR contacts open to de-energize CUV1, unloading the first compressor.

If return water temperature continues to decrease, TC opens its first set of contacts to de-energize 1CR when return water temperature drops to the first stage setpoint. 1CR contacts open, de-energizing 11CR, CR1 and SLV1. The compressor will continue to run through 1M interlock to pump down the circuit until suction pressure drops to the low pressure control (LPC) setpoint. LPC contacts then open to stop the compressor, condenser water pump and cooling tower fans. CR4 contacts close to energize TR3(1) clutch. TR3(1) contacts open preventing restart of the compressor for a period of 15 minutes.

TABLE 1 - Electrical Data

WIRING DATA 60 CYCLE, 3 PHASE									MOTOR ELECTRICAL DATA 60 CYCLE, 3 PHASE			
UNIT SUPPLY					COMPRESOR CIRCUIT (PER COMP)			CONTROL CIRCUIT	COMPRESSOR			
UNIT SIZE	RATED VOLTAGE	(2) MIN. CKT AMP.	(3) MAX. FUSE SIZE	(4) REC. TIME DELAY FUSE	(5) MIN. CKT AMP.	(6) MAX. FUSE SIZE	(7) REC. TIME DELAY FUSE	REC. FUSE SIZE	NO.	VOLTAGE UTILIZATION RANGE	(8) RLA (ECH)	(9) LRA (ECH)
080R	200	295	400	350	164	250	200	15	2	280-220	131	729
	230	266	350	300	148	250	175	15	2	207-253	118	631
	460	133	175	150	74	125	90	15	2	414-506	59	315
	575	106	—	125	59	100	70	15	2	517-633	47	245
100R	200	362	500	400	202	350	250	15	2	180-220	161	910
	230	315	450	350	175	300	225	15	2	207-253	140	792
	460	158	225	175	88	150	110	15	2	414-506	70	396
	575	126	175	150	70	125	90	15	2	517-633	56	315
120R	200	394	500	450	219	350	300	15	2	180-220	175	990
	230	342	500	400	190	300	225	15	2	207-253	152	860
	460	171	250	200	95	150	125	15	2	414-506	76	430
	575	137	200	150	77	125	90	15	2	417-633	61	346

NOTES:

1. Use copper conductors only.
2. Minimum circuit ampacity is 125 percent of the largest compressor RLA plus 100 percent of the second compressor RLA per NEC 440-32 and NEC 440-33.
3. Maximum fuse size is 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA per NEC 440-33.
4. Recommended time delay fuse is approximately 150 percent of the largest compressor RLA plus 100 percent of the second compressor RLA.
5. Minimum circuit ampacity is 125 percent of the compressor RCA per NEC 440-32.
6. Maximum fuse size is 225 percent of the compressor RCA per NEC 440-22.
7. Recommended time delay fuse is approximately 150 percent of the compressor RLA.
8. RLA (rated load amps) rated in accordance with ARI standard 590-76.
9. Full winding LRA for part winding starter units. Part winding starter standard on 200V and 230V units (optional on 460V).

'B' DESIGN SEQUENCE

'B' Design Sequence indicates that the unit is UL and/or CSA certified. The design sequence of any individual unit is indicated by the tenth digit of the model number on the unit nameplate (See "Model Number Description"). 'B' design sequence is distinguished by the presence of an R2 terminal on the compressor motor protector module.

'B' DESIGN INDEX

STANDARD UNITS

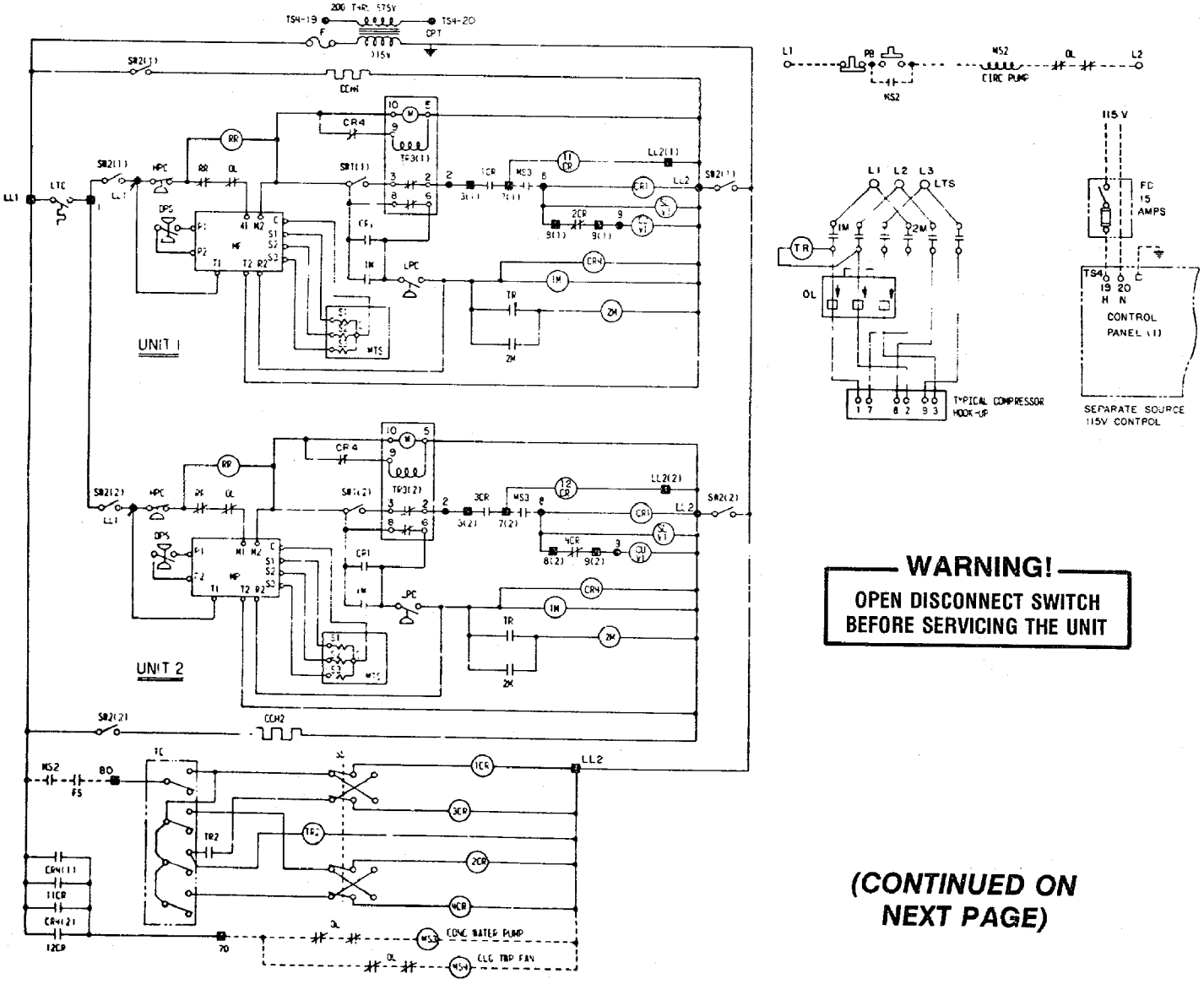


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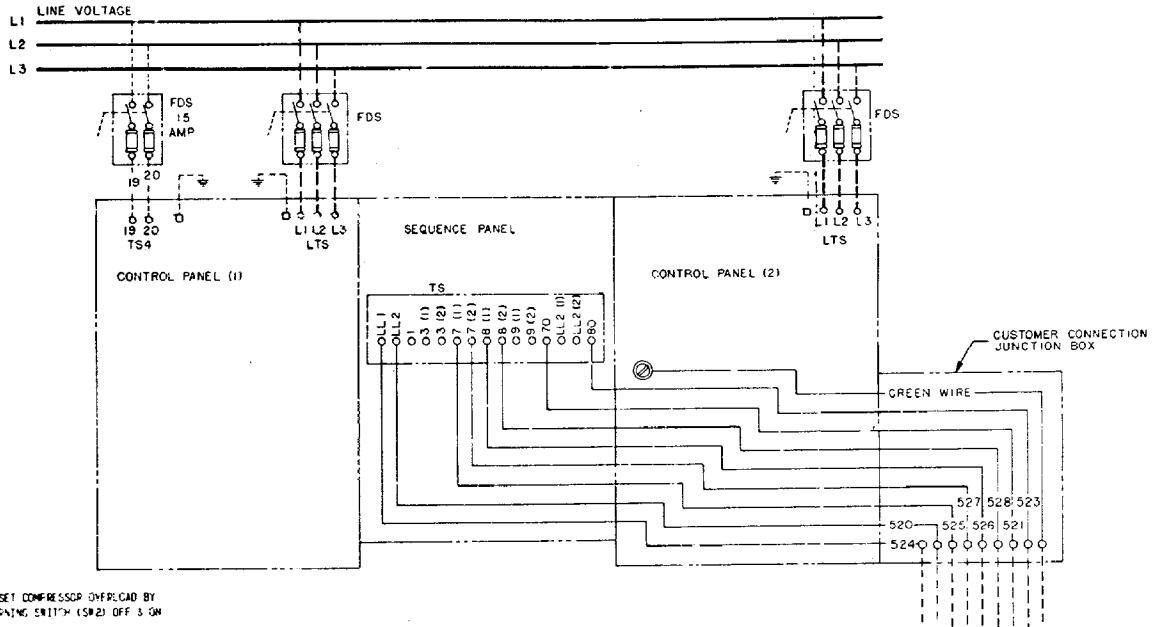
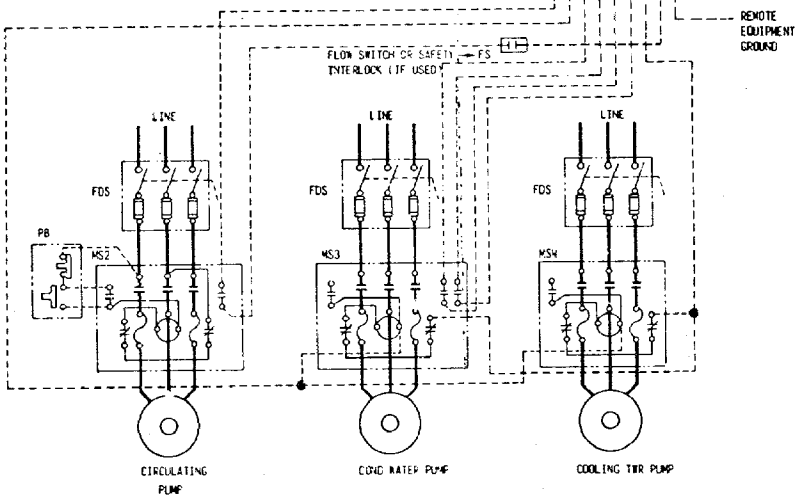
FIGURE 2 - Line Wiring Diagram. Standard Unit With Part Winding Start (Antirecycle Timer and Periodic Pumpout Standard Equipment)

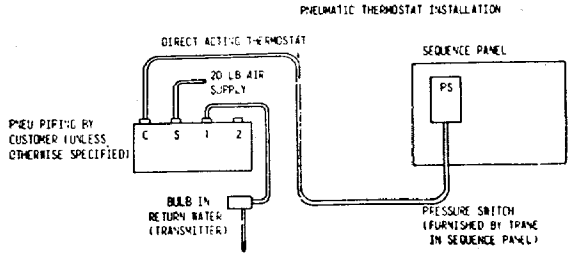


ITEM	DESCRIPTION
1M & 2M	3 POLE CONTACTOR W/INTERLOCK
TR	TIMING RELAY - DELAY APPROX 1 SEC
TR2	TIMING RELAY - DELAY APPROX 5 SEC
SW1(1) & (2)	ON - OFF SWITCH SPST
TC	TEMPERATURE CONTROL (ELECT OR PNEU ELECT)
LTC	LOW TEMPERATURE CONTROL
HPC	HIGH PRESSURE CONTROL
DPS	DIFFERENTIAL PRESSURE SWITCH
LPC	LOW PRESSURE CONTROL
OL	OVERLOAD RELAY
MTS	MOTOR TEMPERATURE SENSOR
CR1	COMPRESSOR START RELAY
CPT	CONTROL POWER TRANSFORMER
CP4	CONTROL RELAY - 1 NO & INC ANTI-RECYCLE
1.3 11&12CW	CONTROL RELAY 1 NO
2 & 4 CR	CONTROL RELAY 1 NO
SS	SEQUENCE SWITCH
CCH 1 & 2	CRANKCASE HEATER - CONTROL VOLTAGE
SW2(1) & (2)	ON-OFF SWITCH - 3 PST
SLV1(1) & (2)	SOLENOID LIQUID VALVE
CUV1(1) & (2)	COMPRESSOR UNLOADER VALVE
PB	PUSH BUTTON STATION
MS3 & 4	MAG STARTER & SEPARATE CONTROL
MS2	MAG STARTER W/LINE VOLT COIL
F	FUSE
FS	FLOW SWITCH (IN CHILLED WATER)
RR	RESET RELAY
MP	COMBINATION MOTOR PROTECTOR AND OIL PRESSURE CONTROL
TS4	TERMINAL STRIP (2-POLE)
TR3(1)&(2)	TIMING RELAY-ANTI-RECYCLE W/NO CONTACTS
LTS	LINE TERMINAL STRIP
TS	TERMINAL STRIP (5-POLE)



■— INDICATES TERMINALS IN SEQUENCE PANEL
●— INDICATES TERMINALS IN UNIT PANELS (1) & (2)
—— WIRING BY TRANE
– – – WIRING BY CUSTOMER

NOTES:
1. All material external to control panel and unit to be customer furnished and wired unless specified on sales order.
2. Starters MS3 and MS4 are wired internally for control voltage of system.



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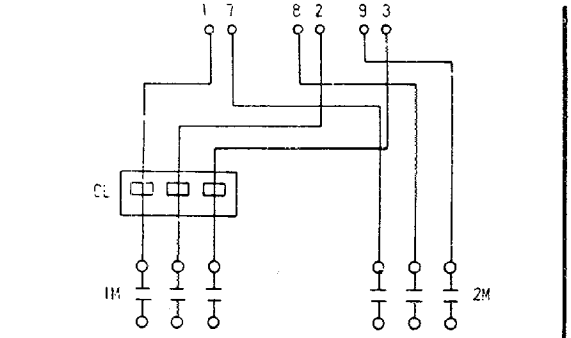
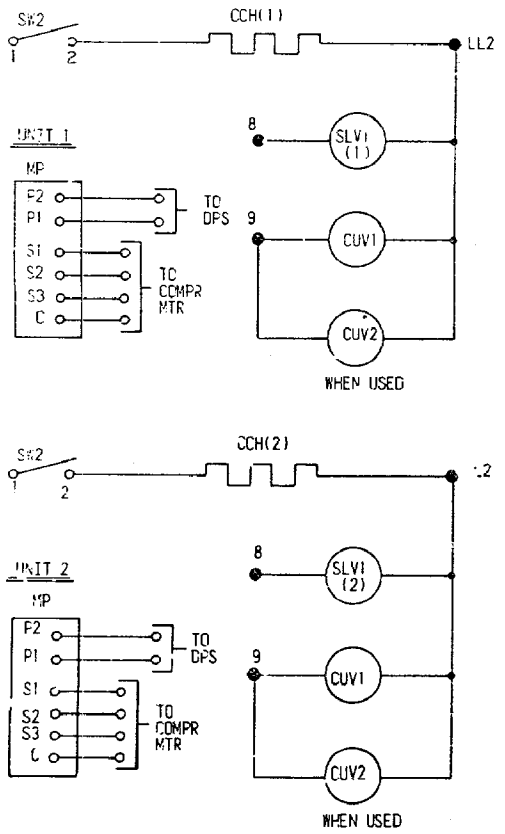
2304-4625B

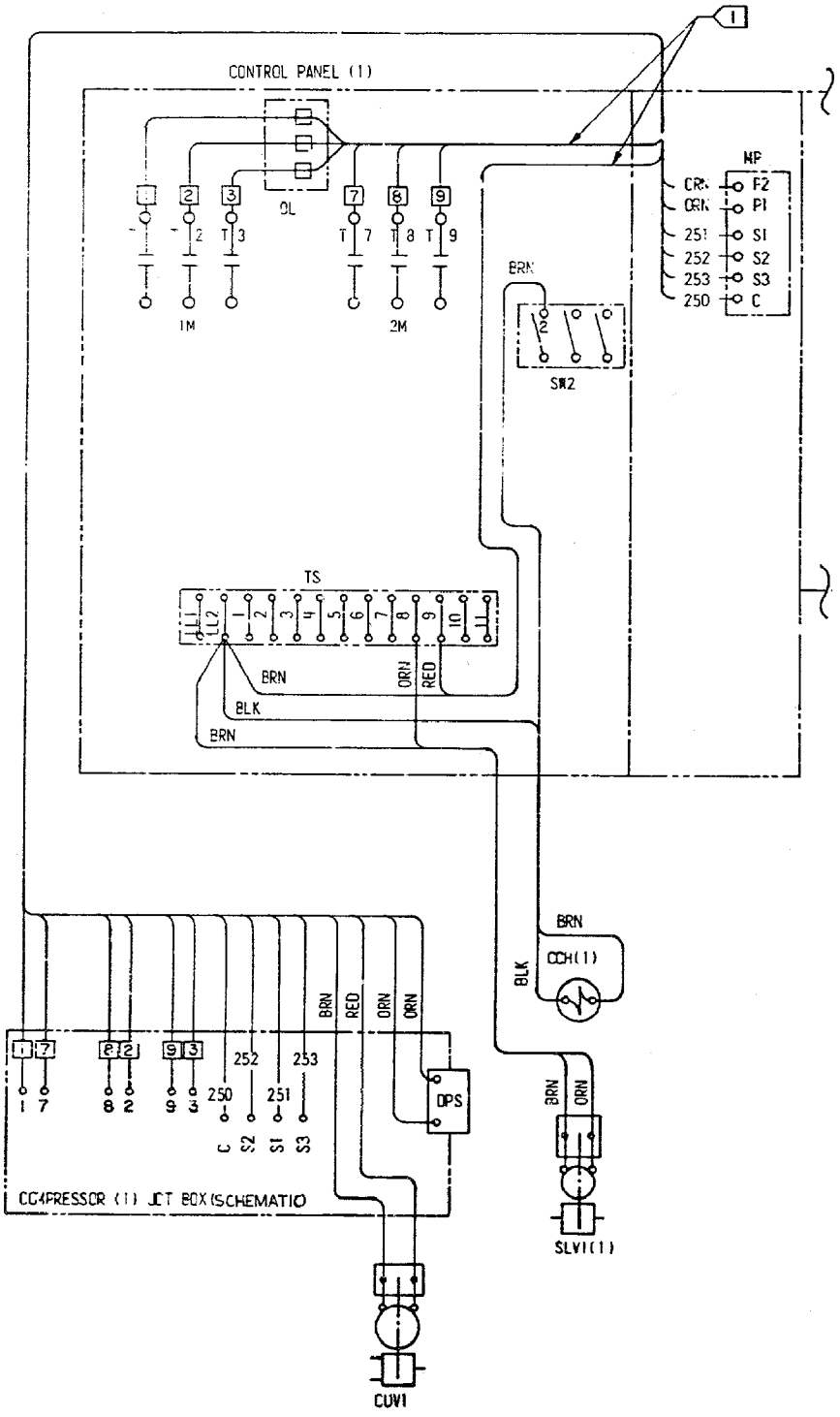


TYPICAL COMPRESSOR MOTOR HOOK-UP(SCHEMATIC)



LINE DIAGRAM

ITEM	DESCRIPTION
1M & 2M	CONTACTOR
TS	TERMINAL STRIP
SLV1(1)&(2)	SOLENOID LIQUID VALVE
CUV1 & 2	COMPR UNLOADER VALVE
MP	MOTOR PROTECTOR
CCH(1) & (2)	CRANKCASE HEATER
SW2	ON-OFF SWITCH
OL	OVERLOAD RELAY
DPS	DIFFERENTIAL OIL PRESS SWITCH

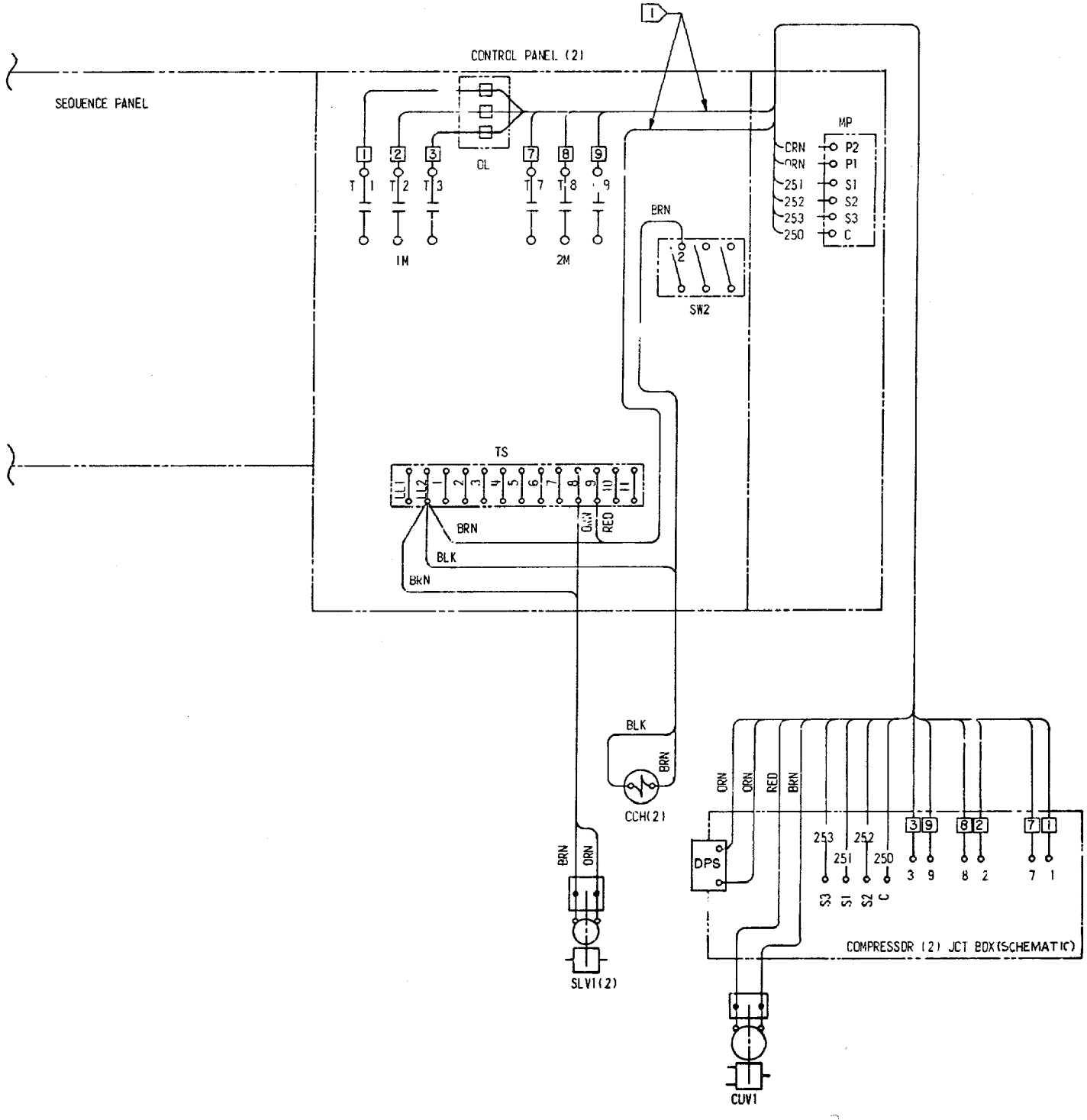


WARNING!
OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

NOTES:
1. Power or control wires are not to touch rubber channel around cutout.
2. ● Indicates terminals in control panels (1) and (2) compressor motor terminal location will vary with compressor used.
3. Remote start units to have terminal blocks in place of contactors.

(CONTINUED ON NEXT PAGE)

FIGURE 3 - Interconnection Wiring Diagram. Standard Unit With Part Winding Start



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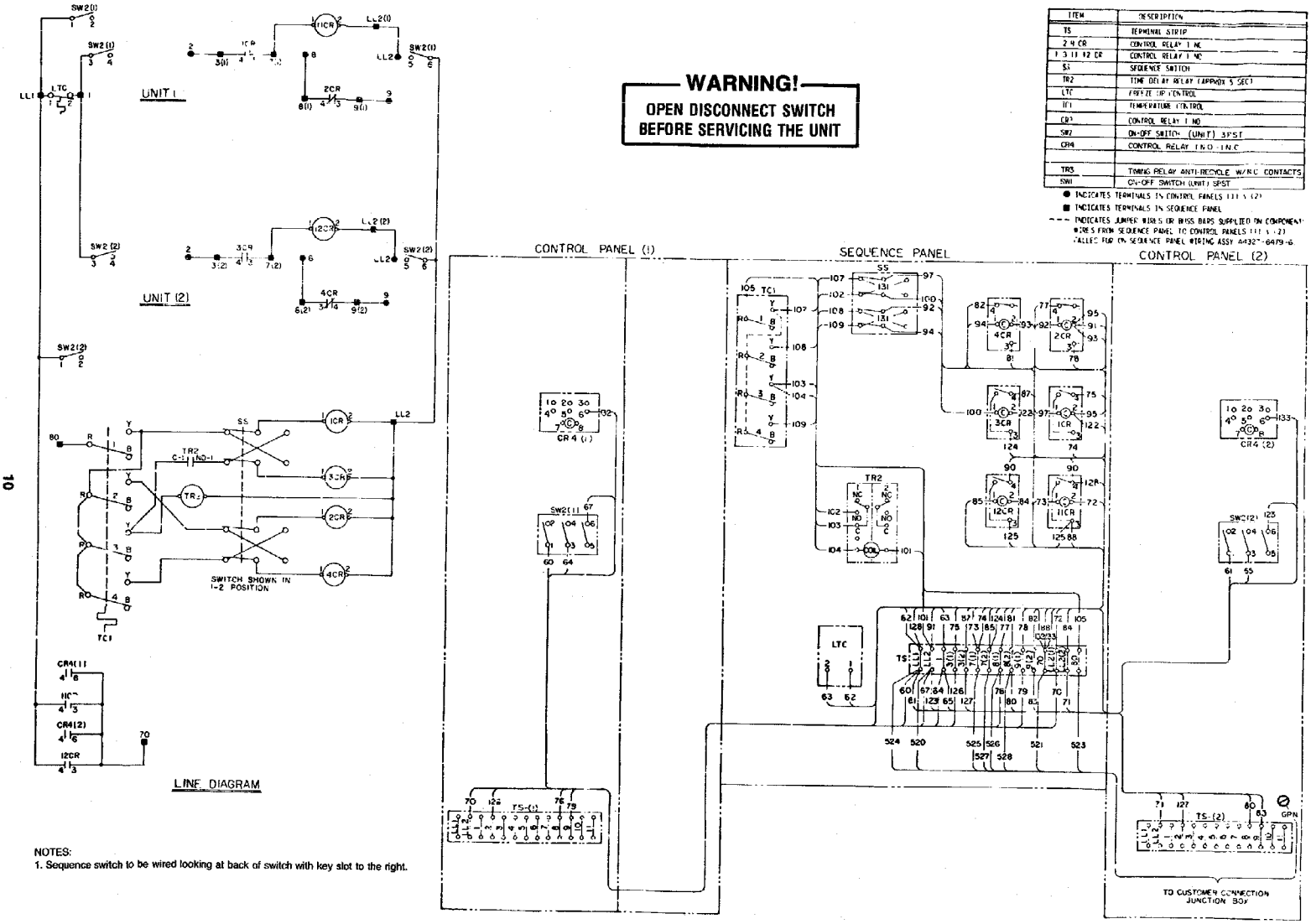
2303-1196K



NOTES:
1. Sequence switch to be wired looking at back of switch with key slot to the right.

FIGURE 4 - Sequence Panel Wiring Diagram. Standard Unit With 4-Step Electric Control

2304-4659A

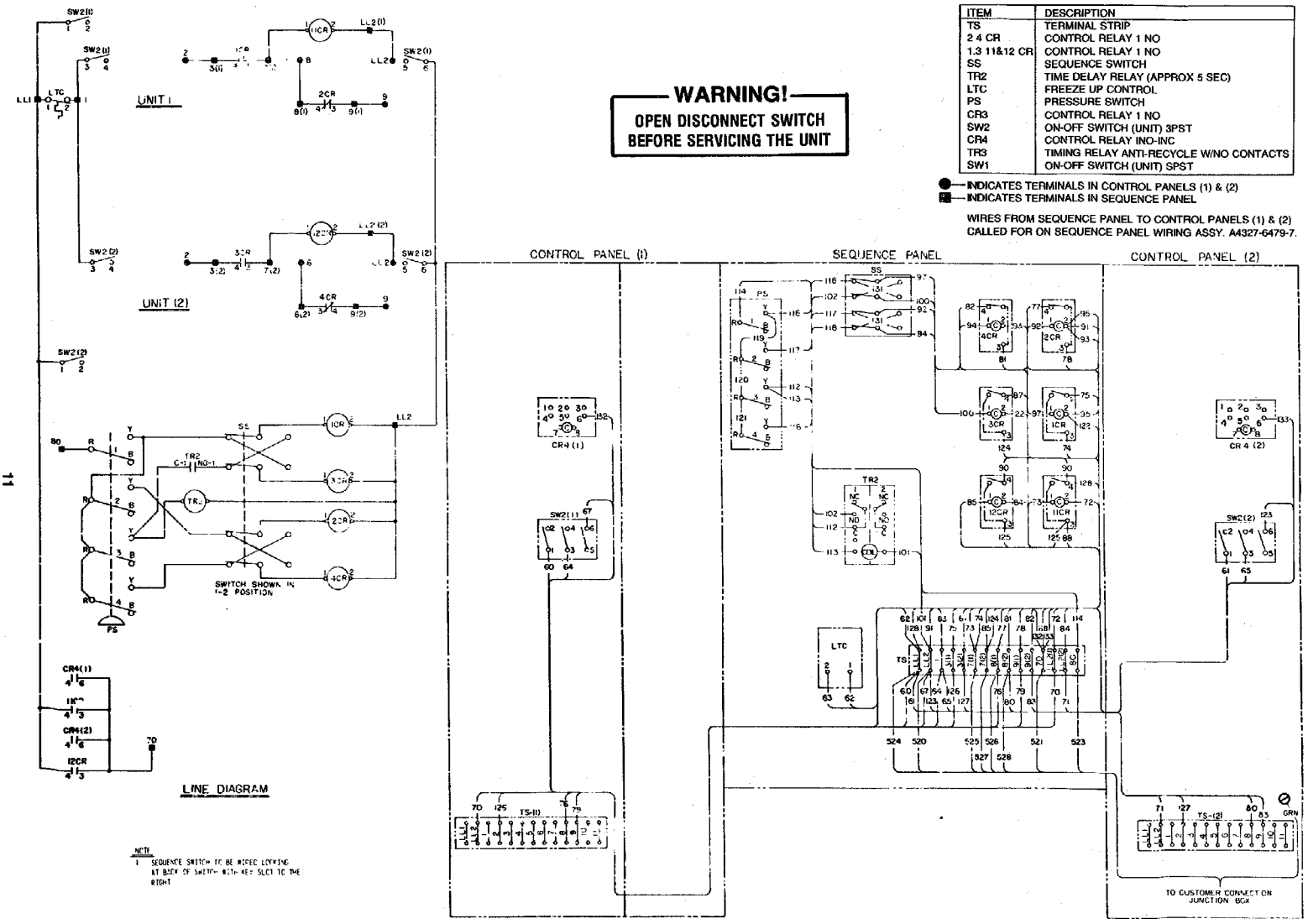


FIGURE 5 - Sequence Panel Wiring Diagram. Standard Unit With 4-Step Pneumatic/Electric Control

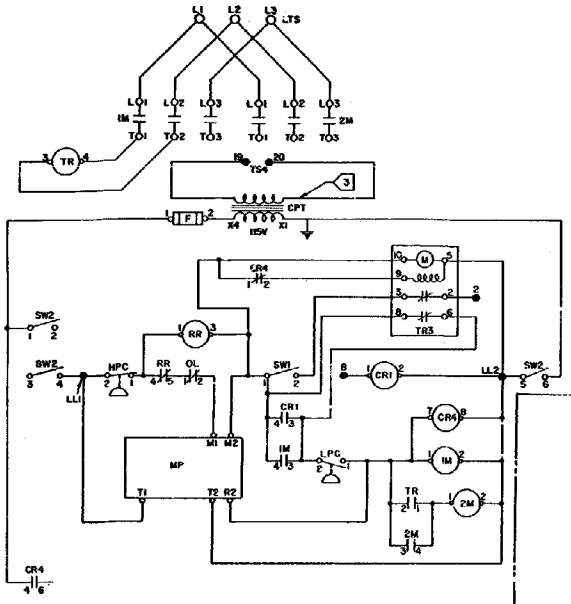
2304-4660A

CGWA-W-20

ITEM	DESCRIPTION
MP	MOTOR PROTECTOR & OIL PRESSURE CONTROL
LPC	LOW PRESSURE CONTROL
HPC	HIGH PRESSURE CONTROL
SW1	ON-OFF SWITCH SPST
SW2	ON-OFF SWITCH 3PST
F	FUSE 10 AMP
OL	OVERLOAD RELAY
1M & 2M	3 POLE CONTACTOR W/INTERLOCK
TR	TIMING RELAY - DELAY APPROX. 1 SEC.
RR	RESET RELAY
CR1	COMPRESSOR START RELAY - N.O.
CR4	CONTROL RELAY 1 N.O. - 1 N.C.
TS	TERMINAL STRIP - 13 POLE
LTS	LINE TERMINAL STRIP
CPT	CONTROL POWER TRANSFORMER
TS4	TERMINAL STRIP - 2 POLE
TR3	TIMING RELAY ANTIRECYCLE W/N.O. CONTACTS

WARNING!

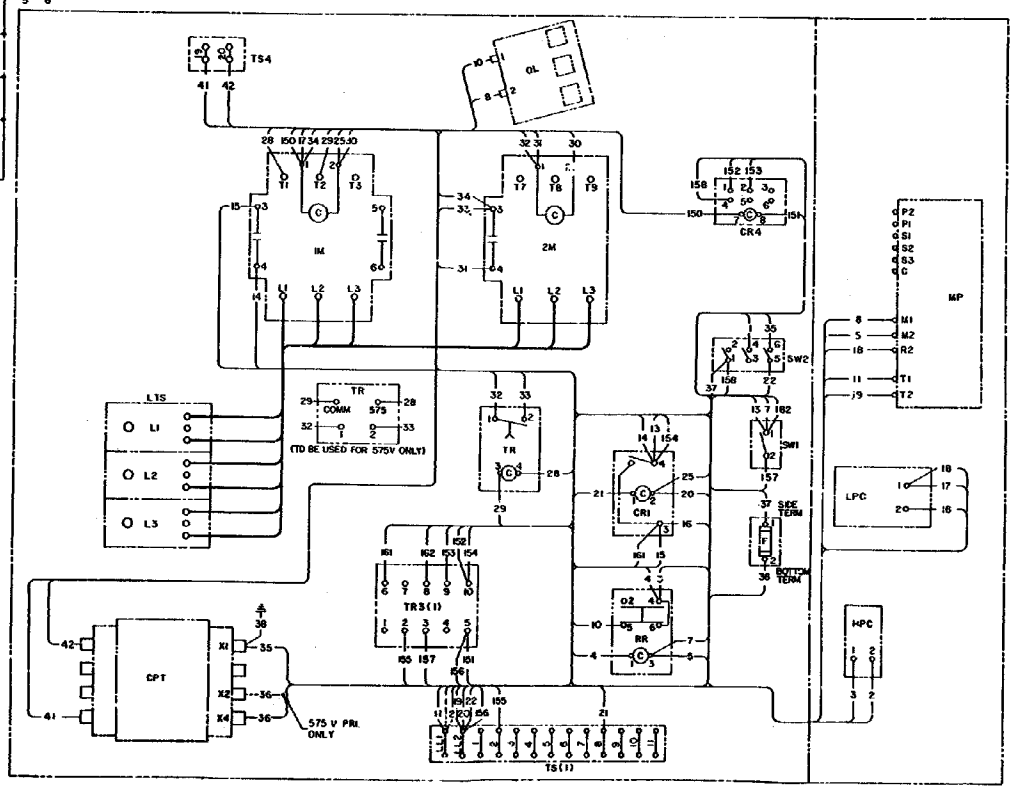
OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT



LINE DIAGRAM

NOTES

1. FOR CONTROL WIRING SEE A4327-8628-2.
2. TS-4 MUST HAVE NO'S 19 & 20 PRINTED ON WHITE MARKING STRIP (USE BLACK BALL POINT PEN).
3. WHEN USING 575V TIME DELAY RELAY, REMOVE THE ¼" FORK TERMINALS FROM WIRES 32 & 33, REPLACE WITH ¼ STRAIGHT TERMINALS CODE 60444001 WIRE 3 28 & 29, REMOVE THE ¼" FORK TERMINALS AND REPLACE WITH ¼ STRAIGHT TERMINALS CODE 69700M.



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FOR PROPER VOLTAGE HOOK-UP REFER TO SALES ORDER OR UNIT NAMEPLATE						
PRIMARY CONNECTIONS			115V SECONDARY		230V SECONDARY	
VOLTS	CONNECT	LINES ON	CONNECT	LINES ON	CONNECT	LINES ON
200		H1 & H2	X1 TO X3 X2 TO X4	X1 & X4	X2 TO X3	X1 & X4
230	H1 TO H3 H2 TO H4	H1 & H4	X1 TO X3 X2 TO X4	X1 & X4		
460	H2 TO H3	H1 & H4	X1 TO X3 X2 TO X4	X1 & X4	X2 TO X3	X1 & X4
575		H1 & H2		X1 & X2		

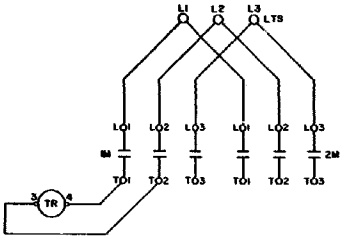
FIGURE 6 - Connection Wiring Diagram. Control Panel #1. Standard Unit With Part Winding Start

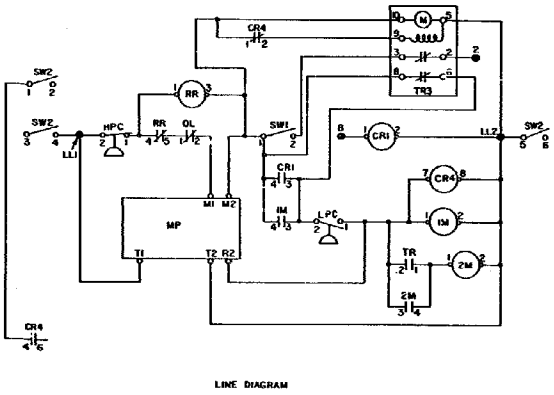
2304-4647A

ITEM	DESCRIPTION
MP	COMB MOTOR PROTECTOR & OIL PRESS CONTROL
LPC	LOW PRESSURE CONTROL
HPC	HIGH PRESSURE CONTROL
SW1	ON-OFF SWITCH - SPST
SW2	ON-OFF SWITCH - 3PST
OL	OVERLOAD RELAY
1M&2M	3 POLE CONTACTOR W/INTERLOCK
TR	TIMING RELAY - DELAY APPROX 1 SEC
RR	RESET RELAY
CR1	COMPRESSOR START RELAY - NO
CR4	CONTROL RELAY 1 NO - 1 NC
TS	TERMINAL STRIP - 13 POLE
LTS	LINE TERMINAL STRIP
TR3	TIMING RELAY ANTI-RECYCLE W/NO CONTACTS

WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT





LINE DIAGRAM

NOTES

1. FOR CONTROL WIRING SEE 44327-8628-A.
2. WHEN USING 575V TIME DELAY RELAY, REMOVE THE #8 FORK TERMINALS FROM WIRES 32 & 33, REPLACE WITH 1/4 STRAIGHT TERMINALS CODE EK44400 WIRES 28 & 29, REMOVE THE #6 FORK TERMINALS AND REPLACE WITH 1/4 STRAIGHT TERMINALS CODE 187004

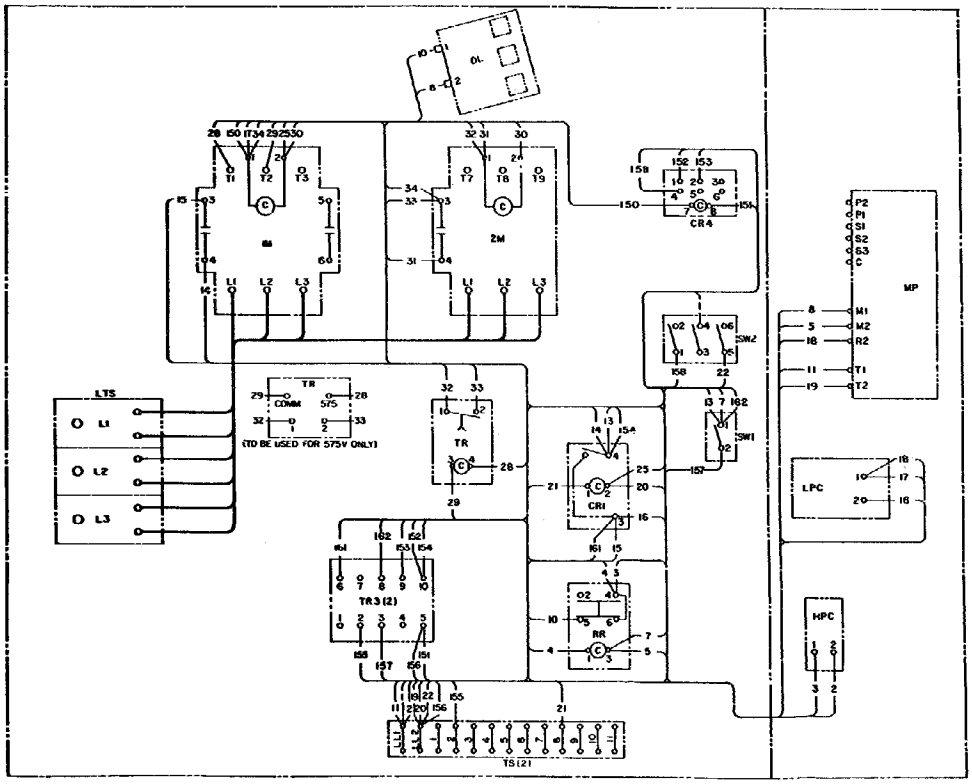
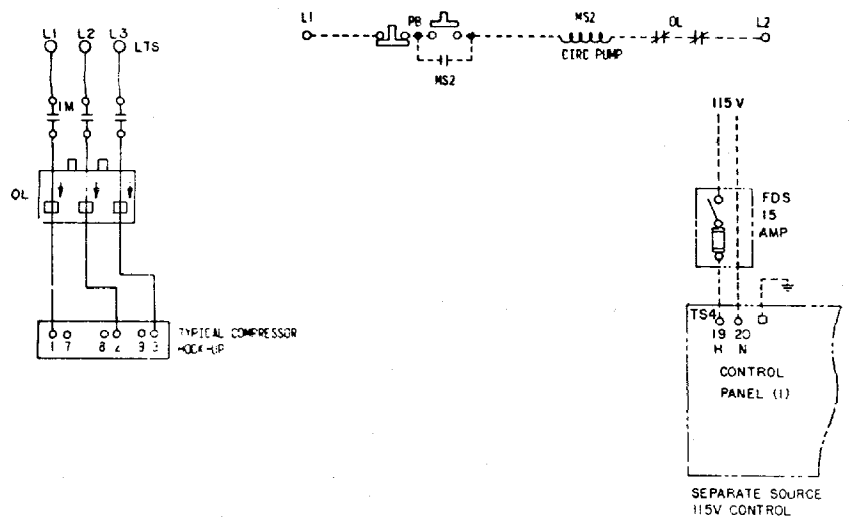


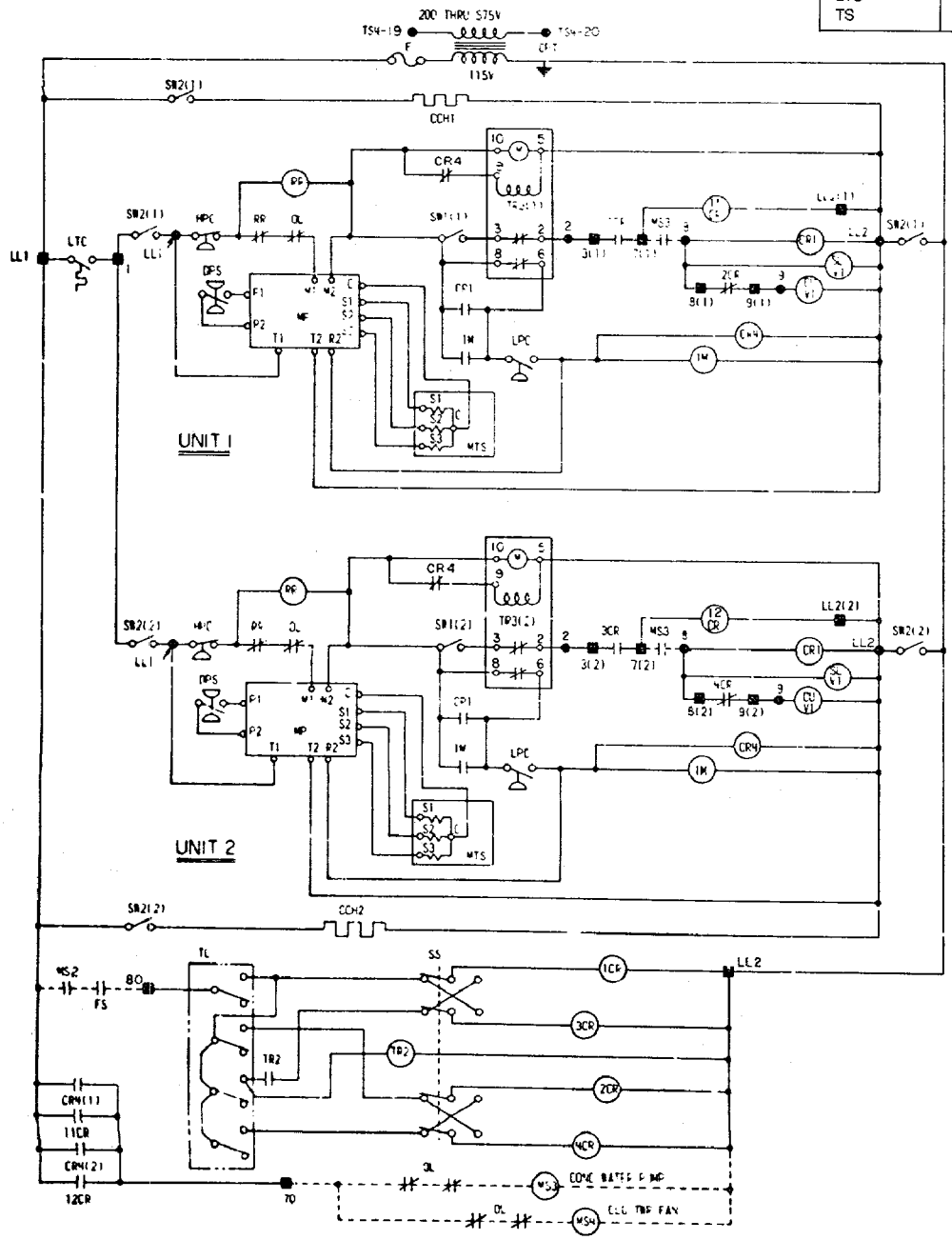
FIGURE 7 - Connection Wiring Diagram. Control Panel #2. Standard Unit With Part Winding Start

2304-4648A

CGWA-W-20



ITEM	DESCRIPTION
1M	3 POLE CONTACTOR W/INTERLOCK
TR2	TIMING RELAY - DELAY APPROX. 5 SEC.
SW1(1) & (2)	ON-OFF SWITCH SPST
TC	TEMPERATURE CONTROL (ELECT. OR PNEU. ELECT.)
LTC	LOW TEMPERATURE CONTROL
HPC	HIGH PRESSURE CONTROL
DPS	DIFFERENTIAL PRESSURE SWITCH
LPC	LOW PRESSURE CONTROL
OL	OVERLOAD RELAY
MTS	MOTOR TEMPERATURE SENSOR
CR1	COMPRESSOR START RELAY
CPT	CONTROL POWER TRANSFORMER
CR4	CONTROL RELAY - 1 N.O. & 1 N.C. ANTIRECYCLE
1,3,11,12 CR	CONTROL RELAY 1 N.O.
2 & 4 CR	CONTROL RELAY 1 N.C.
SS	SEQUENCE SWITCH
CCH 1 & 2	CRANKCASE HEATER - CONTROL VOLTAGE
SW2(1) & (2)	OFF-ON SWITCH 3PST
SLV1(1) & (2)	SOLENOID LIQUID VALVE
CUV1(1) & (2)	COMPRESSOR UNLOADER VALVE
PB	PUSHBUTTON STATION
MS3 & 4	MAG STARTER W/ SEPARATE CONTROL
MS2	MAG STARTER W/ LINE VOLT COIL
F	FUSE
FS	FLOW SWITCH (IN CHILLED WATER)
RR	RESET RELAY
MP	COMB. MOTOR PROTECTOR & OIL PRESSURE CONTROL
TS4	TERMINAL STRIP 2-POLE
TR3(1) & (2)	TIMING RELAY - ANTIRECYCLE W/ N.C. CONTACTS
LTS	LINE TERMINAL STRIP
TS	TERMINAL STRIP (15 POLE)

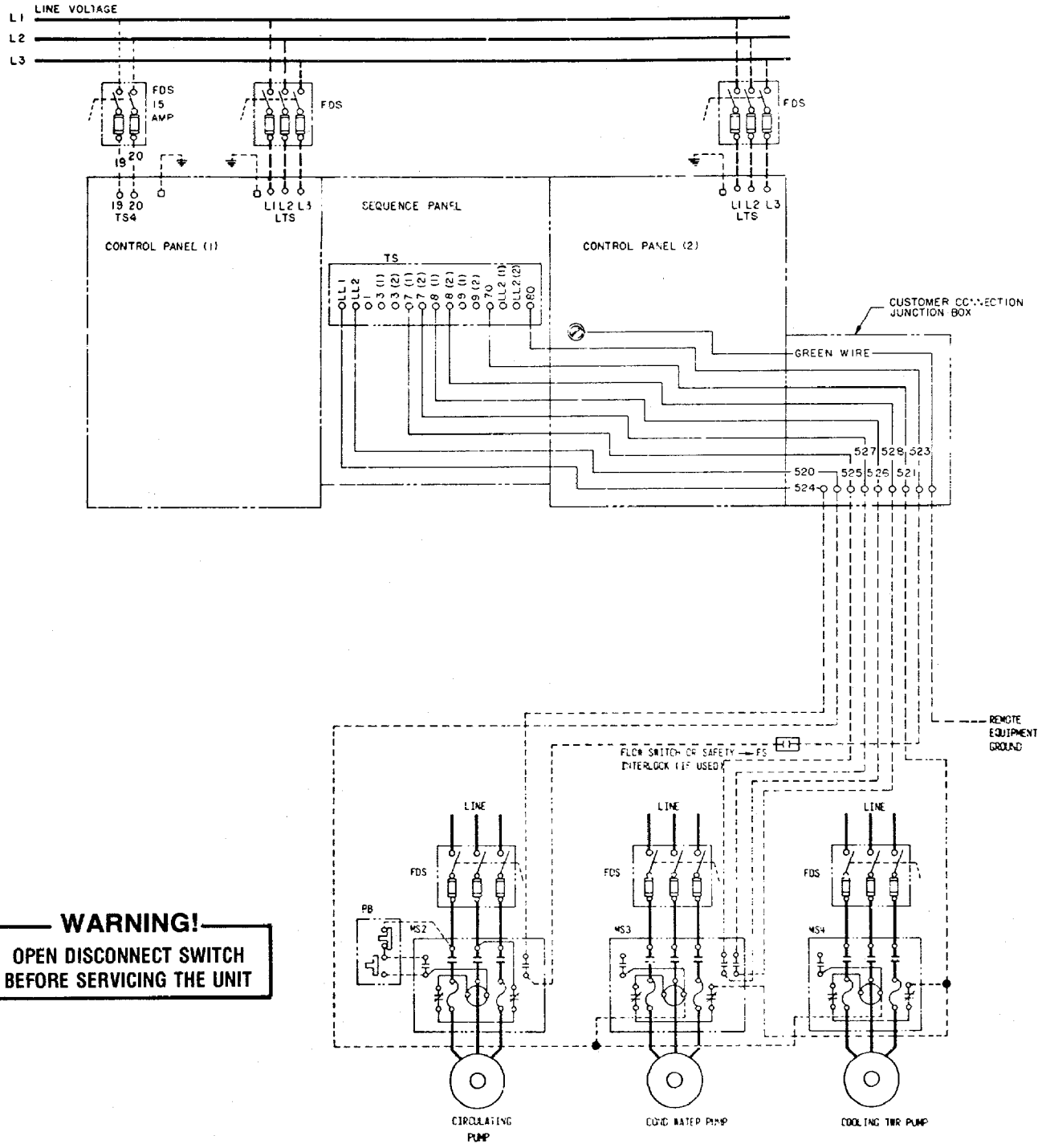


■—INDICATES TERMINALS IN SEQUENCE PANEL
●—INDICATES TERMINALS IN UNIT PANELS (1) & (2)
——WIRING BY TRANE
- - -WIRING BY CUSTOMER

RESET COMPRESSOR OVERLOAD BY TURNING SWITCH (SW2) OFF & ON

(CONTINUED ON NEXT PAGE)

FIGURE 8 - Line Wiring Diagram. Standard Unit With Across The Line Start



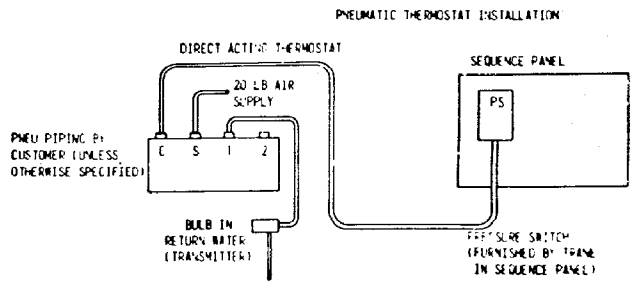
WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

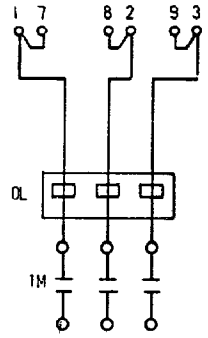
NOTES

1. ALL MATERIAL EXTERNAL TO CONTROL PANEL AND UNIT TO BE CUSTOMER FURNISHED & WIRED UNLESS SPECIFIED ON SALES ORDER
2. STARTERS MS3 & MS4 ARE WIRED INTERNALLY FOR CONTROL VOLTAGE OF SYSTEM

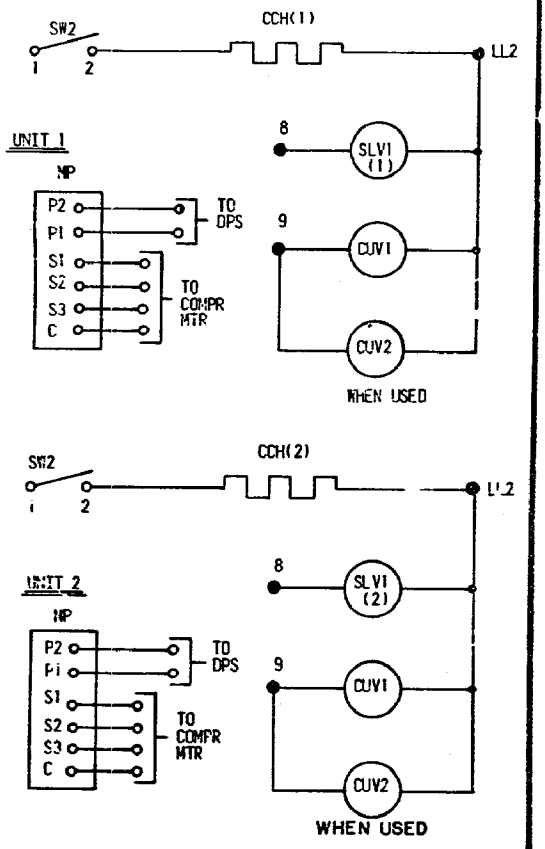
(CONTINUED FROM PREVIOUS PAGE)



2304-4626B

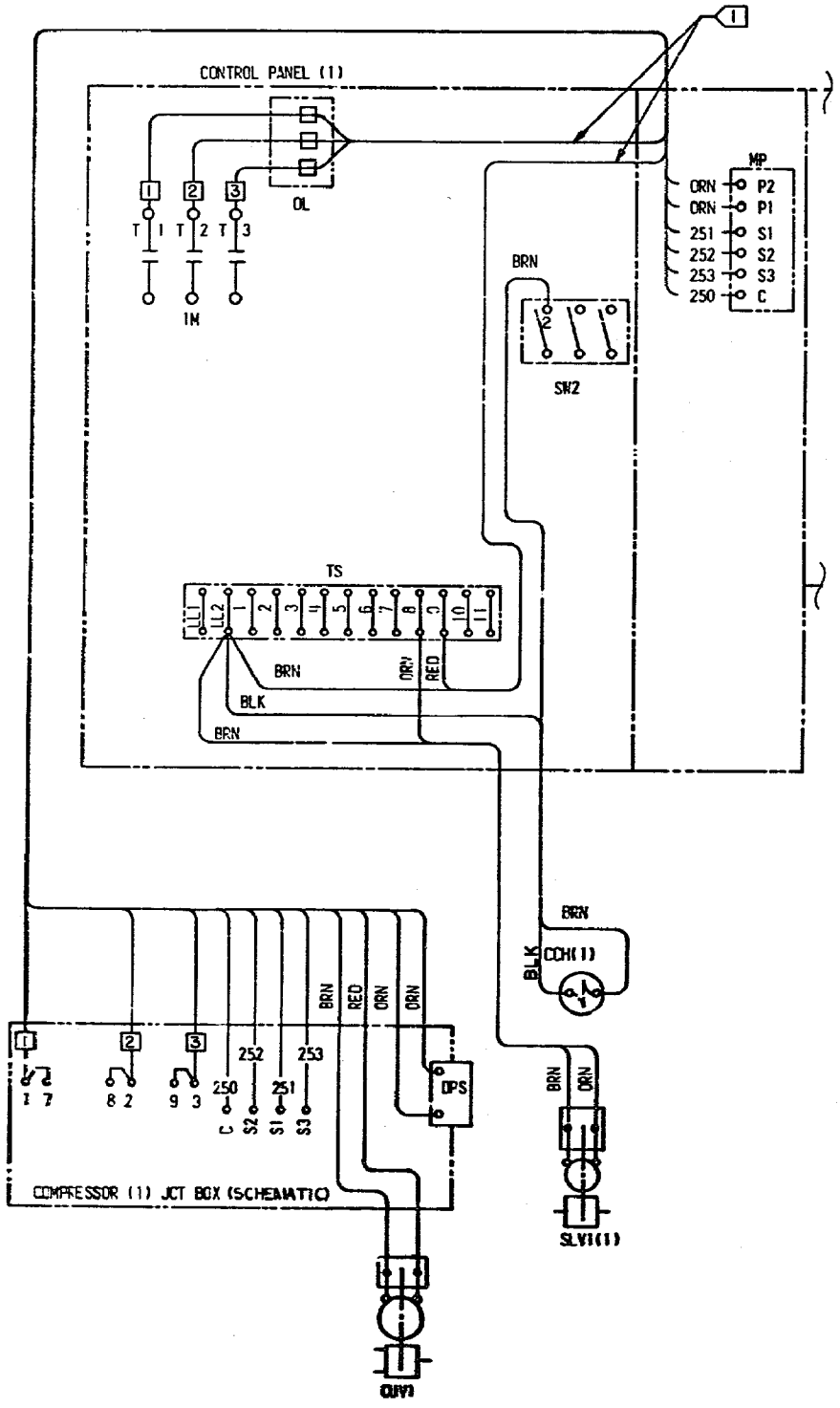


TYPICAL COMPRESSOR MOTOR HOOK-UP (SCHEMATIC)



LINE DIAGRAM

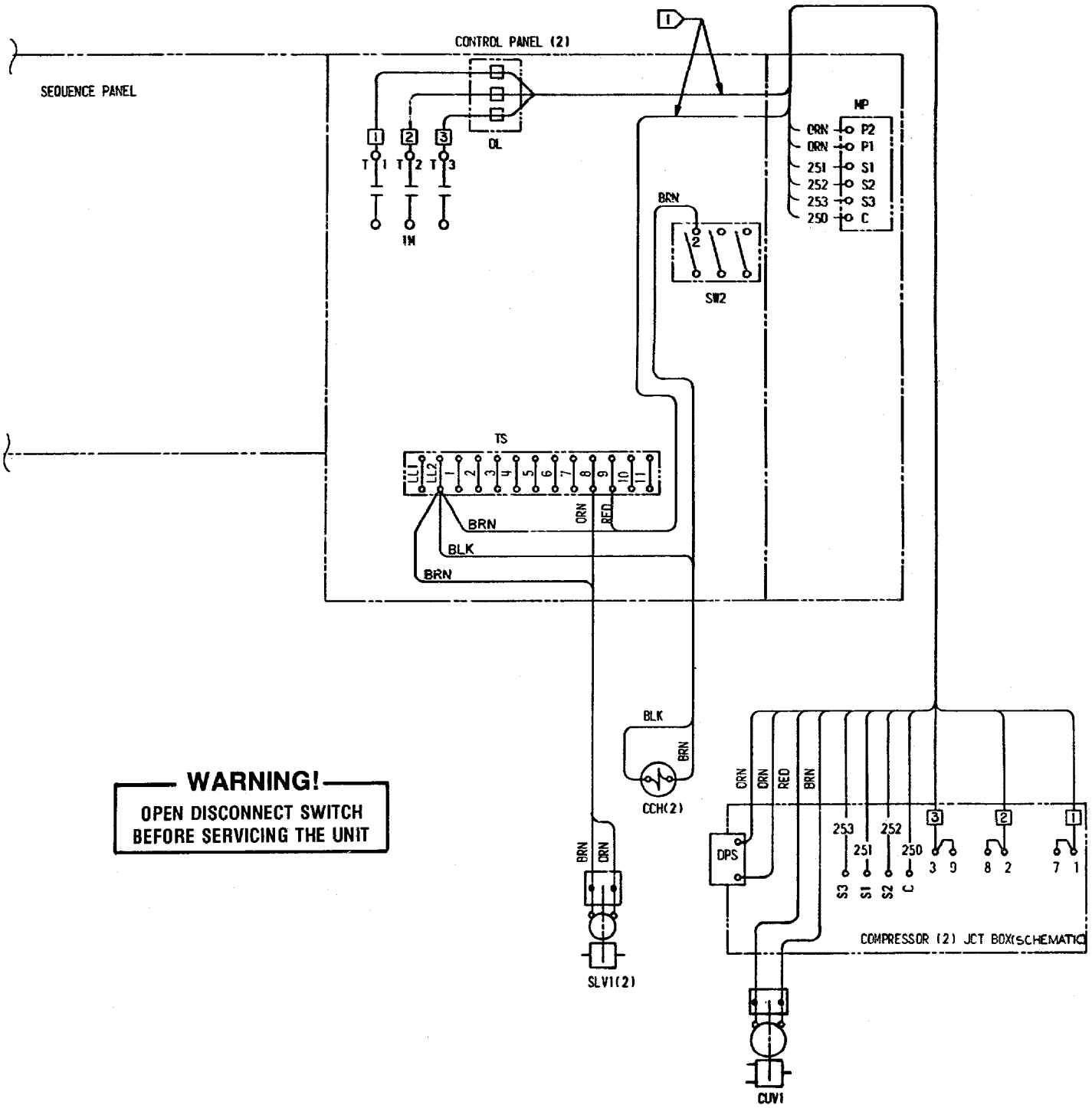
ITEM	DESCRIPTION
TS	TERMINAL STRIP
1M	CONTACTOR
SLV1(1)&(2)	SOLENOID LIQUID VALVE
CUV1 & 2	COMPR UNLOADER VALVE
MP	MOTOR PROTECTOR
CCH(1) & (2)	CRANKCASE HEATER
SW2	ON OFF SWITCH
OL	OVERLOAD RELAY
DPS	DIFFERENTIAL OIL PRESS SWITCH



NOTE:
1. POWER OR CONTROL WIRES ARE NOT TO TOUCH RUBBER CHANNEL AROUND CUTOUT
2. ● INDICATES TERMINALS IN CONTROL PANELS (1) & (2) COMPRESSOR MOTOR TERMINAL LOCATION WILL VARY WITH COMPRESSOR USED

(CONTINUED ON NEXT PAGE)

FIGURE 9 - Interconnection Wiring Diagram. Standard Unit With Across The Line Start

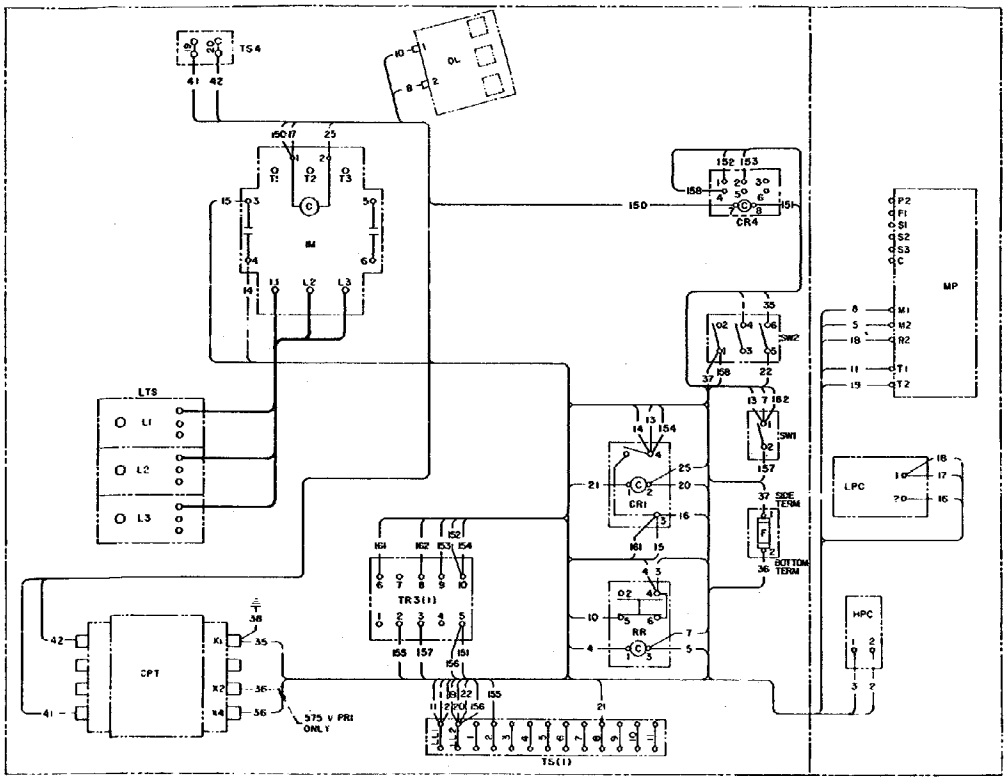


WARNING!

OPEN DISCONNECT SWITCH
BEFORE SERVICING THE UNIT

(CONTINUED FROM PREVIOUS PAGE)

ITEM	DESCRIPTION
MP	COMB MOTOR PROTECTOR & OIL PRESS CONTROL
LPC	LOW PRESSURE CONTROL
HPC	HIGH PRESSURE CONTROL
SW1	ON-OFF SWITCH - SPST
SW2	ON-OFF SWITCH - 3 PST
F	FUSE NO AMP
OL	OVERLOAD RELAY
1M	1 POLE CONTACTOR W/INTERLOCK
RR	RESET RELAY
CR1	COMPRESSOR START RELAY - NO
CR4	CONTROL RELAY - 1 NO - 1 NC
TS	TERMINAL STRIP - 13 POLE
LTS	LINE TERMINAL STRIP
CPT	CONTROL POWER TRANSFORMER - 750 KVA
TS4	TERMINAL STRIP - 2 POLE
TR3	TIMING RELAY ANTI-RECYCLE W/NO CONTACTS



NOTES:
1. For control wiring see A4327-8628-5
2. TS4 must have No's 19 & 20 printed on white marking strip (use black ball point pen).

WARNING!
OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

FOR PROPER VOLTAGE HOOK-UP REFER TO SALES ORDER OR UNIT NAMEPLATE						
PRIMARY CONNECTIONS			115V SECONDARY		230V SECONDARY	
VOLTS	CONNECT	LINES ON	CONNECT	LINES ON	CONNECT	LINES ON
200		H1 & H2	X1 TO X3 X2 TO X4	X1 & X4	X2 TO X3	X1 & X4
230	H1 TO H3 H2 TO H4	H1 & H4	X1 TO X3 X2 TO X4	X1 & X4		
460	H2 TO H3	H1 & H4	X1 TO X3 X2 TO X4	X1 & X4	X2 TO X3	X1 & X4
575		H1 & H2		X1 & X2		

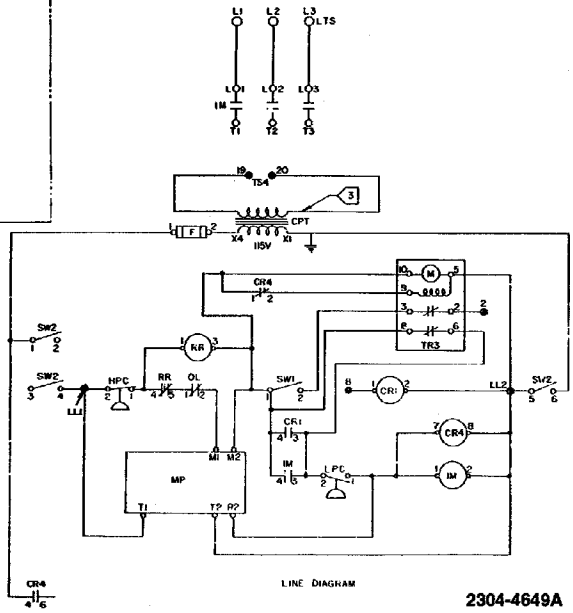
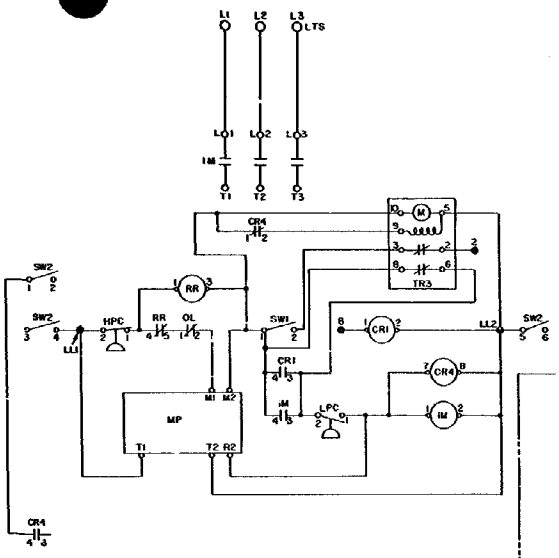


FIGURE 10 - Connection Wiring Diagram. Control Panel #1. Standard Unit With Across The Line Start

2304-4649A



LINE DIAGRAM

WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

ITEM	DESCRIPTION
MP	COMB MOTOR PROTECTOR & OIL PRESSURE CONTROL
LPC	LOW PRESSURE CONTROL
HPC	HIGH PRESSURE CONTROL
SW1	ON-OFF SWITCH - SPST
SW2	ON-OFF SWITCH - 3PST
OL	OVERLOAD RELAY
1M	3 POLE CONTACTOR W/INTERLOCK
RR	RESET RELAY
CR1	COMPRESSOR START RELAY - NO
CR4	CONTROL RELAY 1 NO - 1 NC
TS	TERMINAL STRIP - 13 POLE
LTS	LINE TERMINAL STRIP
TR3	TIMING RELAY ANTI-RECYCLE W/NC CONTACTS

NOTE

1. FOR CONTROL WIRING SEE A4327-8628-7.

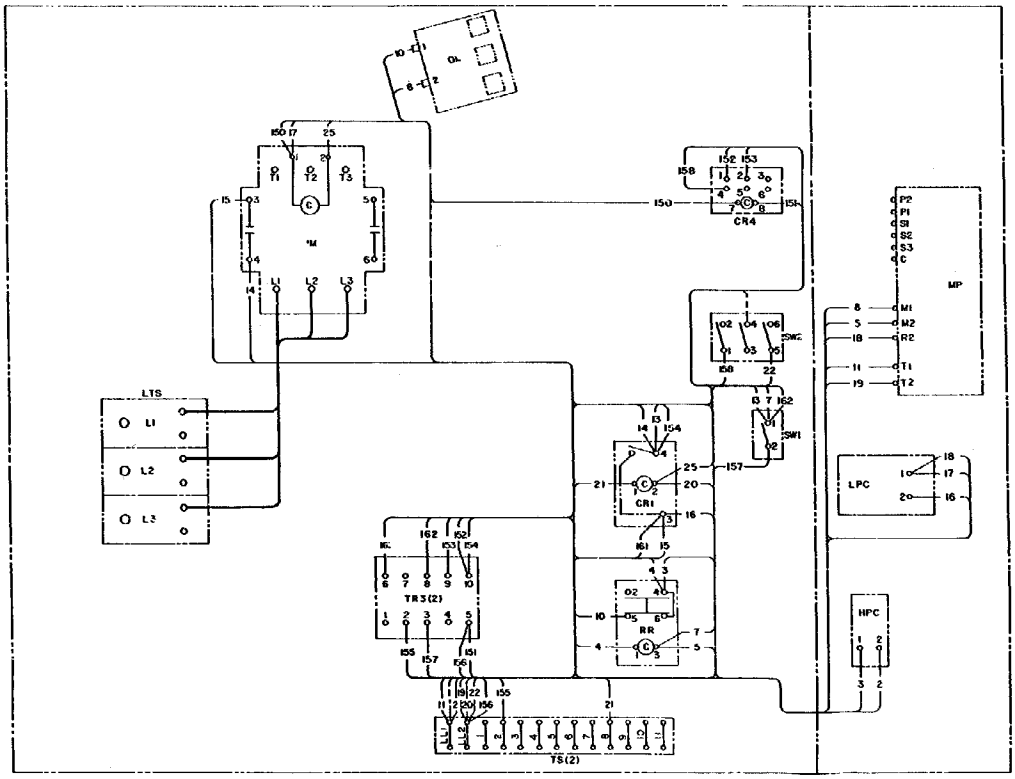
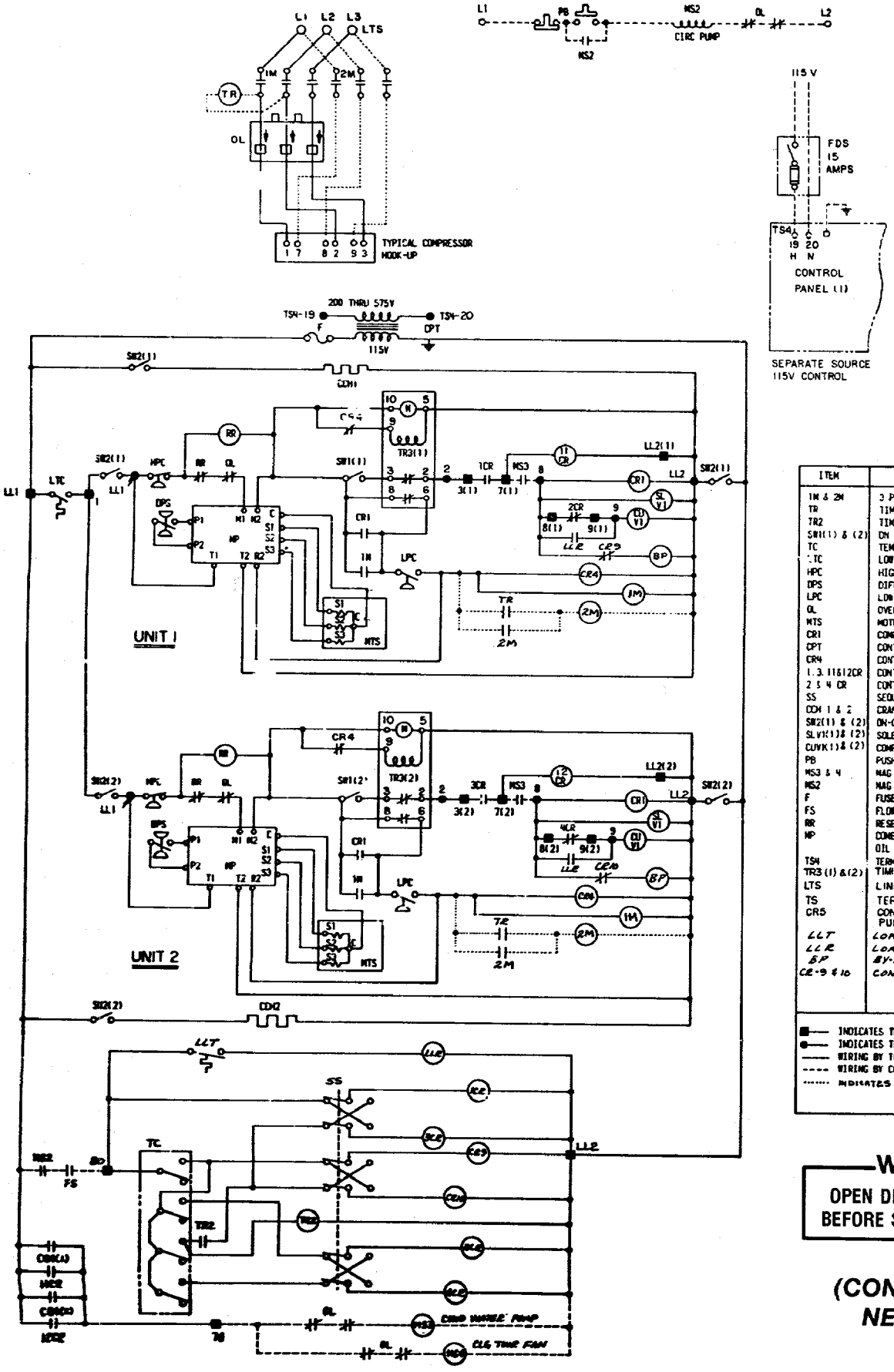


FIGURE 11 - Connection Wiring Diagram. Control Panel #2. Standard Unit With Across The Line Start

2304-4650A

CGWA-W-20

HOT GAS BYPASS UNITS



RESET COMPRESSOR OVERLOAD BY TURNING SWITCH (SW2) OFF & ON

ITEM	DESCRIPTION
1M & 2M	3 POLE CONTACTOR W/INTERLOCK
TR	TIMING RELAY - DELAY APPROX 1 SEC
TR2	TIMING RELAY - DELAY APPROX 5 SEC
SW1(1) & (2)	ON - OFF SWITCH SPST
TC	TEMPERATURE CONTROL (ELECT OR PNEU ELECT)
LTC	LOW TEMPERATURE CONTROL
HPC	HIGH PRESSURE CONTROL
DPS	DIFFERENTIAL PRESSURE SWITCH
LPC	LOW PRESSURE CONTROL
OL	OVERLOAD RELAY
MTS	MOTOR TEMPERATURE SENSOR
CR1	COMPRESSOR START RELAY
CPT	CONTROL POWER TRANSFORMER
CR4	CONTROL RELAY - 1 NO & 1 NC - ANTI-RECYCLE
1, 3, 11&12CR	CONTROL RELAY 1 NO
2, 5, 4 CR	CONTROL RELAY 1 NC
SS	SEQUENCE SWITCH
CCH 1 & 2	CRANKCASE HEATER - CONTROL VOLTAGE
SW2(1) & (2)	ON-OFF SWITCH - 3 PST
SLV1(1)& (2)	SOLENOID LIQUID VALVE
CUVK1)& (2)	COMPRESSOR UNLOADER VALVE
PB	PUSH BUTTON STATION
MS3 & 4	MAG STARTER W/SEPARATE CONTROL
MS2	MAG STARTER W/LINE VOLT COIL
F	FUSE
FS	FLOW SWITCH (IN CHILLED WATER)
RR	RESET RELAY
MP	COMBINATION MOTOR PROTECTOR AND OIL PRESSURE CONTROL
TS4	TERMINAL STRIP (2-POLE)
TR3 (1) &(2)	TIMING RELAY-ANTI-RECYCLE W/NC CONTACTS
LTS	LINE TERMINAL STRIP
TS	TERMINAL STRIP (15-POLE)
CR5	CONTROL RELAY- 2 N.O. PERIODIC PUMP OUT
LLT	LOAD LIMIT THERMOSTAT
LLR	LOAD LIMIT RELAY
BP	BY-PASS SOLENOID
CR-9 & 10	CONTROL RELAY - N.C. - HG.B.P.

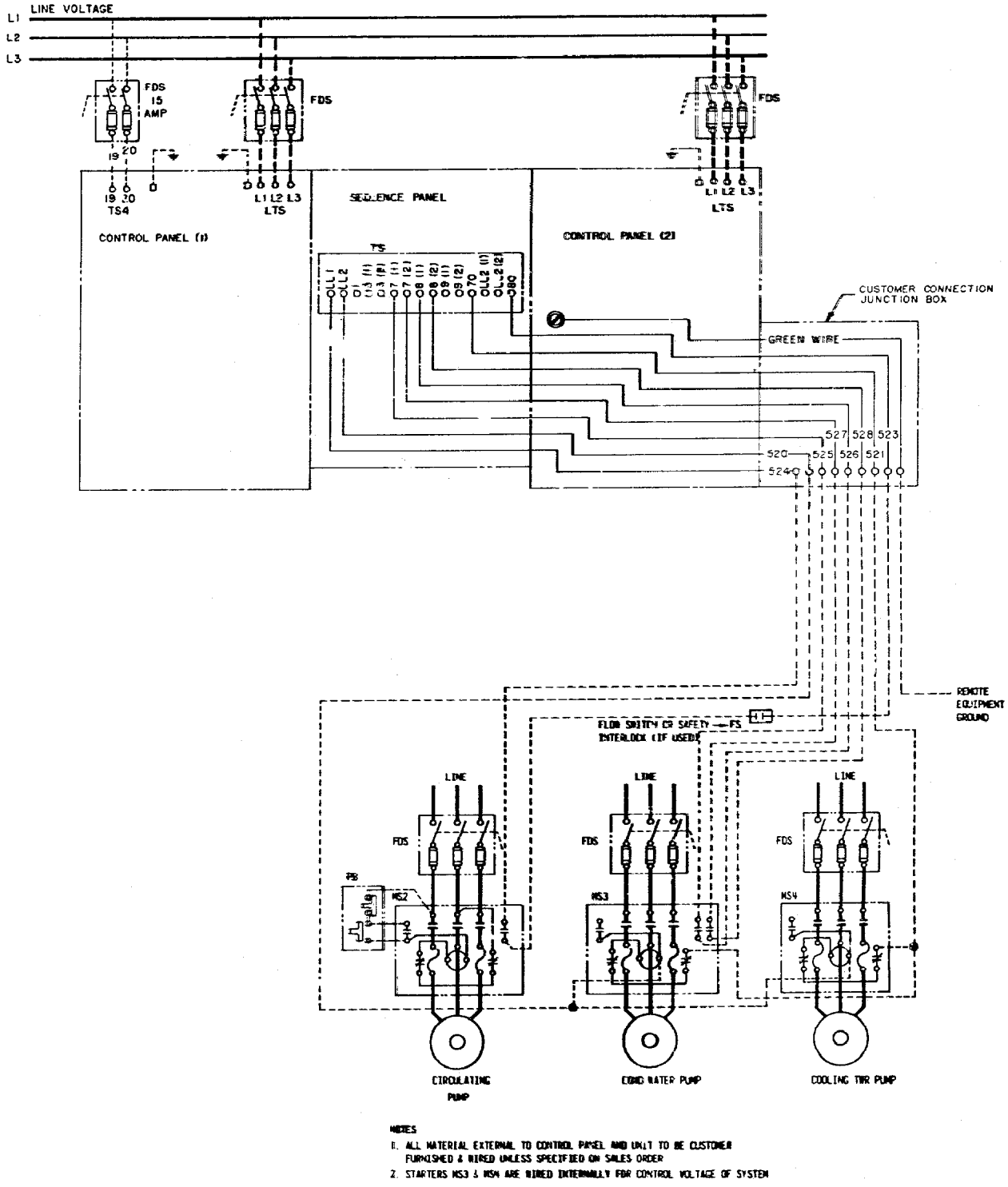
■— INDICATES TERMINALS IN SEQUENCE PANEL
●— INDICATES TERMINALS IN UNIT PANELS (1) & (2)
—— WIRING BY TRANE
---- WIRING BY CUSTOMER
····· INDICATES PART WINDING START BY TRANE

WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

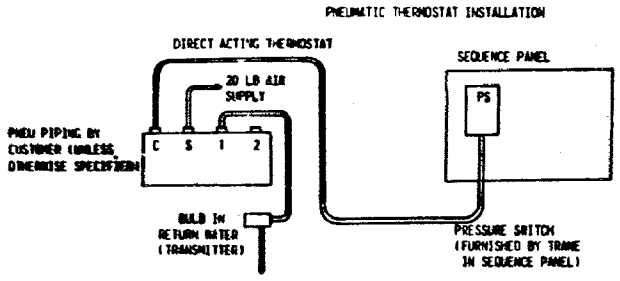
(CONTINUED ON NEXT PAGE)

FIGURE 12 - Line Wiring Diagram. Hot Gas Bypass Unit With Load Limit Thermostat



NOTES

1. ALL MATERIAL EXTERNAL TO CONTROL PANEL AND UNIT TO BE CUSTOMER FURNISHED & WIRED UNLESS SPECIFIED ON SALES ORDER
2. STARTERS MS3 & MS4 ARE WIRED INTERNALLY FOR CONTROL VOLTAGE OF SYSTEM



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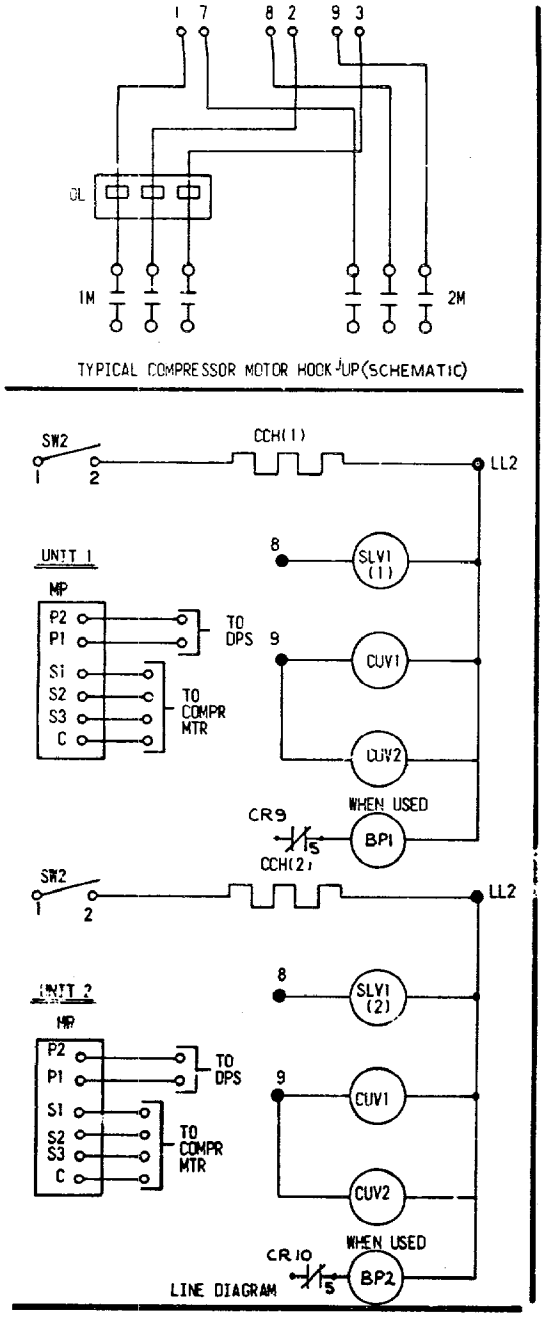
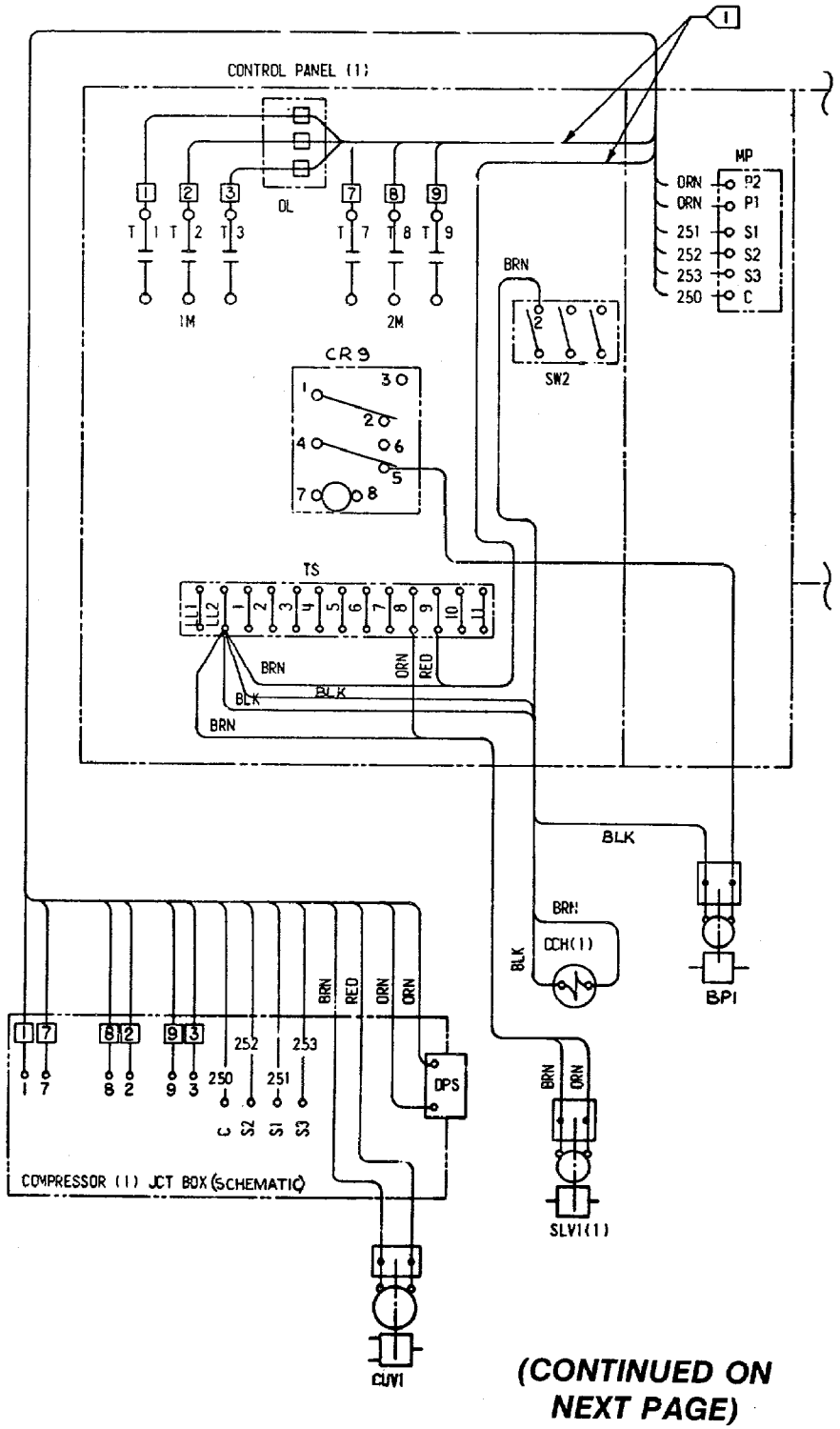
2304-8012A





(CONTINUED ON NEXT PAGE)

ITEM	DESCRIPTION
1M & 2M	CONTACTOR
TS	TERMINAL STRIP
SLV1(1)&(2)	SOLENOID LIQUID VALVE
CUV1 & 2	COMPR UNLOADER VALVE
MP	MOTOR PROTECTOR
CCH(1) & (2)	CRANKCASE HEATER
SW2	ON-OFF SWITCH
OL	OVERLOAD RELAY
DPS	DIFFERENTIAL OIL PRESS SWITCH
BP-1&2	HOT GAS BY-PASS SOLENOID

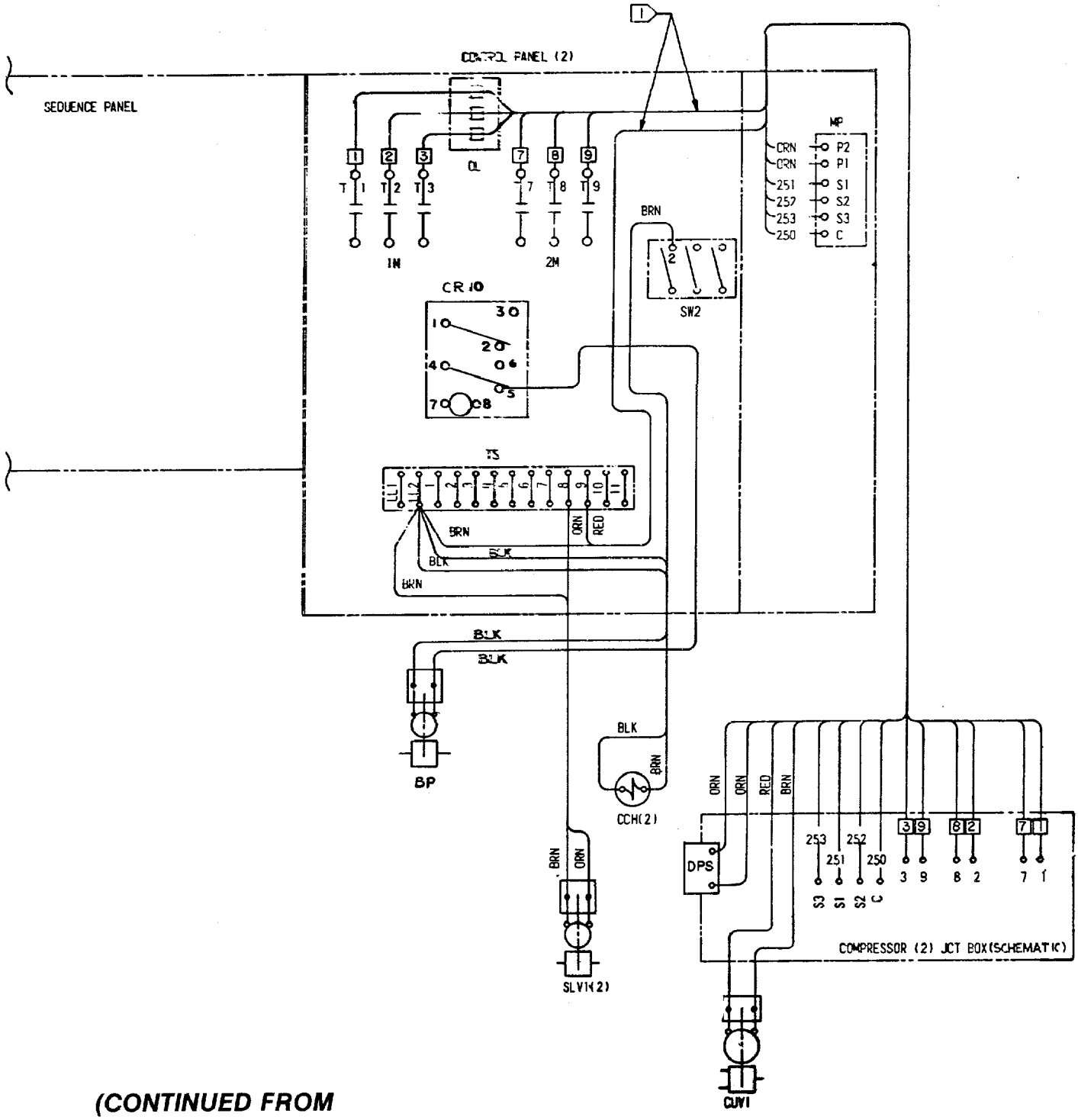
WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

NOTES:

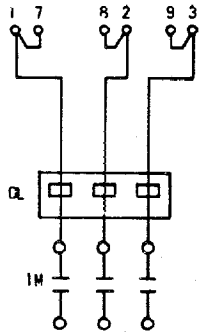
1. POWER OR CONTROL WIRES ARE NOT TO TOUCH RUBBER CHANNEL AROUND CUTOUT
2. ● INDICATES TERMINALS IN CONTROL PANELS (1) & (2). COMPRESSOR MOTOR TERMINAL LOCATION WILL VARY WITH COMPRESSOR USED

FIGURE 13 - Interconnection Wiring Diagram. Hot Gas Bypass Unit With Part Winding Start

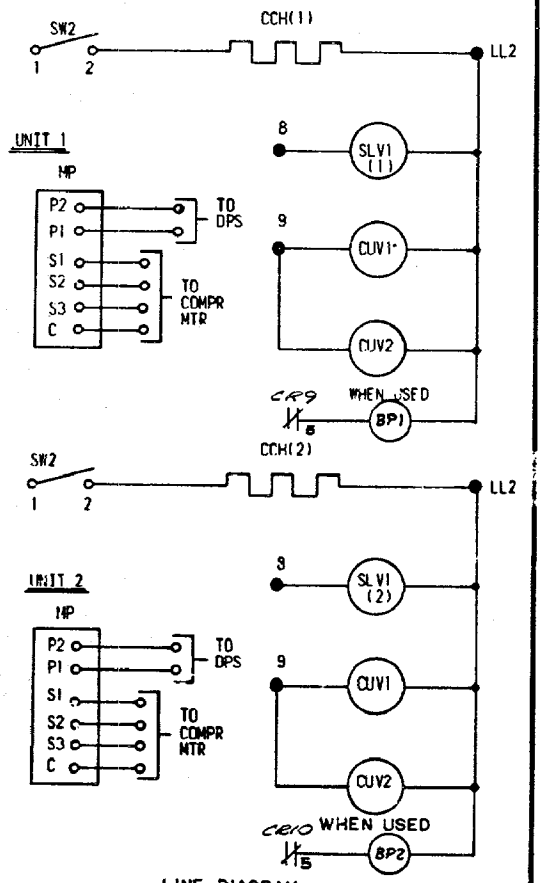


(CONTINUED FROM PREVIOUS PAGE)

2304-8331A

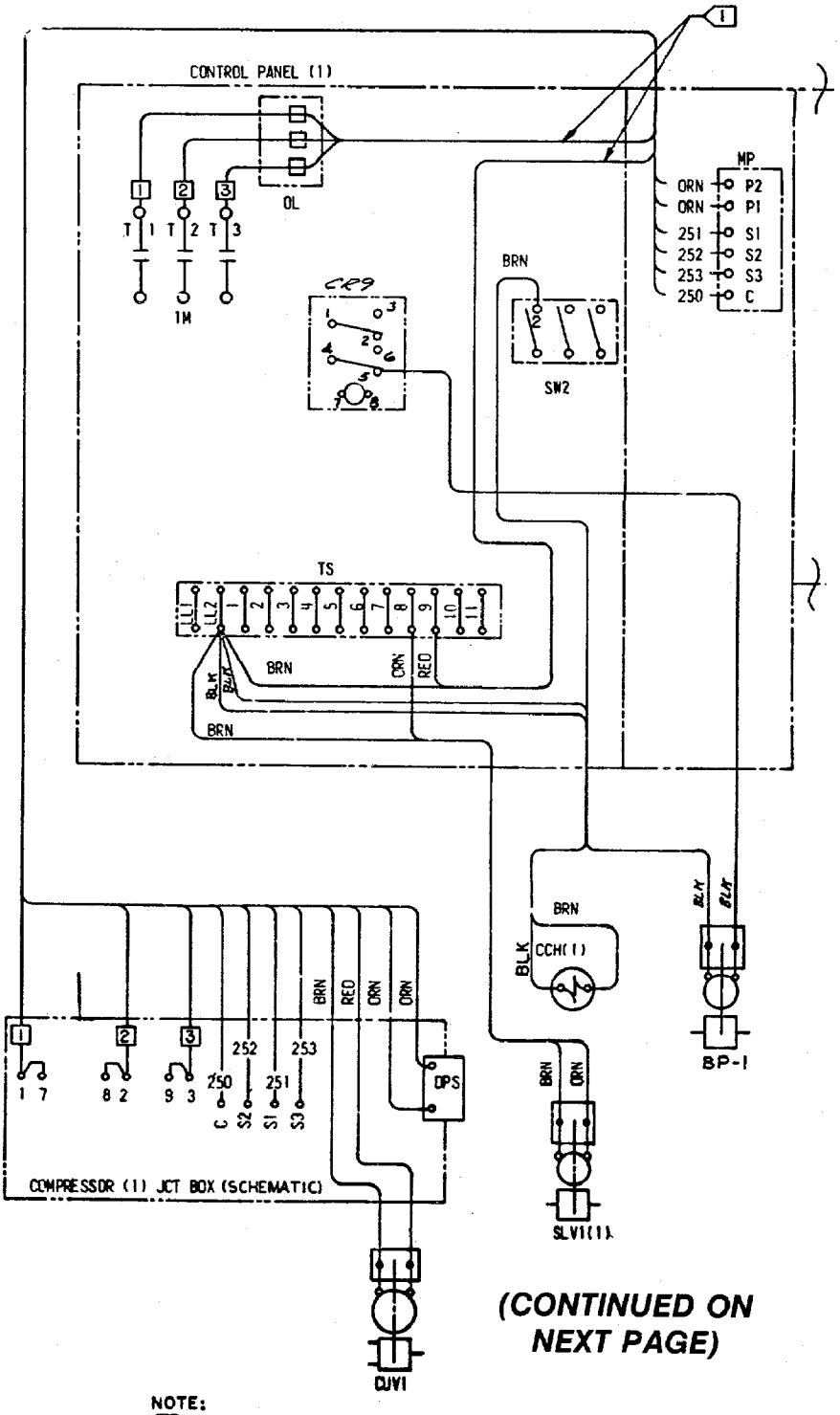


TYPICAL COMPRESSOR MOTOR HOOK-UP (SCHEMATIC)



LINE DIAGRAM

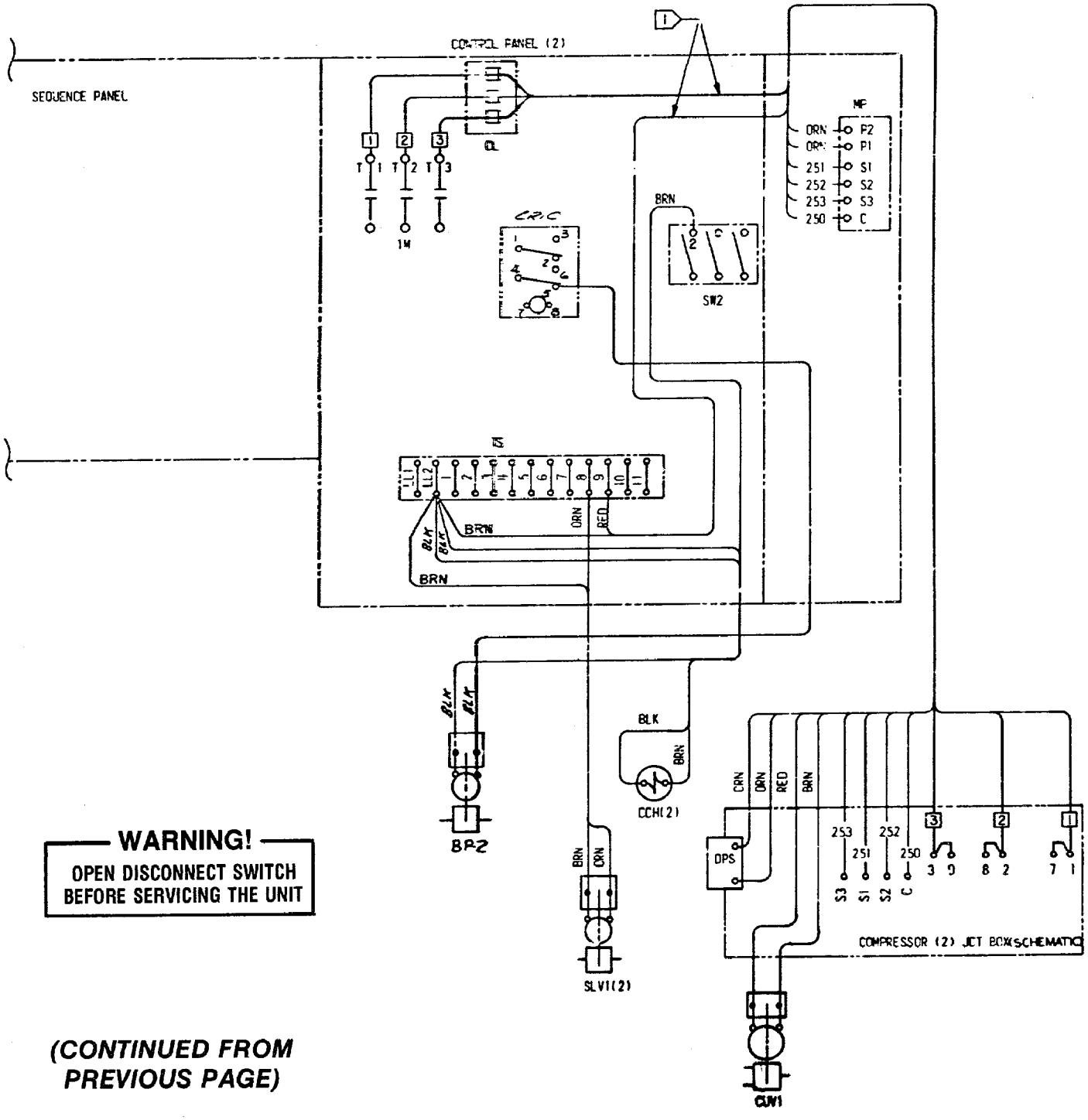
ITEM	DESCRIPTION
TS	TERMINAL STRIP
1M	CONTACTOR
SLV1(1)&(2)	SOLENOID LIQUID VALVE
CUV1 & 2	COMPR UNLOADER VALVE
MP	MOTOR PROTECTOR
CCH(1)&(2)	CRANKCASE HEATER
SW2	ON OFF SWITCH
OL	OVERLOAD RELAY
DPS	DIFFERENTIAL OIL PRESS SWITCH
BP-1&2	HOT GAS BY-PASS SOLENOID



(CONTINUED ON NEXT PAGE)

NOTE:
1. POWER OR CONTROL WIRES ARE NOT TO TOUCH RUBBER CHANNEL AROUND CUTOUT
2. ● INDICATES TERMINALS IN CONTROL PANELS (1) & (2) COMPRESSOR MOTOR TERMINAL LOCATION WILL VARY WITH COMPRESSOR USED.

FIGURE 14 - Interconnection Wiring Diagram. Hot Gas Bypass Unit With Across The Line Start



WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

(CONTINUED FROM PREVIOUS PAGE)

2304-8174A

ITEM	DESCRIPTION
TS	TERMINAL STRIP
2, 4 CR	CONTROL RELAY 1 N.C.
1,3,11,12 CR	CONTROL RELAY 1 N.C.
SS	SEQUENCE SWITCH
TR2	TIME DELAY RELAY (APPROX. 5 SEC.)
LTC	FREEZE-UP CONTROL
TC1	TEMPERATURE CONTROL
CR3	CONTROL RELAY 1 N.O.
SW2	ON-OFF SWITCH (UNIT) 3PST
CR4	CONTROL RELAY 1 N.O. 1 N.C.
CR9 & 10-LLR	CONTROL RELAY 2 N.O. 2 N.C.
TR3	TIMING RELAY ANTIRECYCLE W/N.C. CONTACTS
SW1	ON-OFF SWITCH (UNIT) SPST

WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

● INDICATES TERMINALS IN CONTROL PANELS (1) & (2)

■ INDICATES TERMINALS IN SEQUENCE PANEL

— — INDICATES JUMPER WIRES OR BUSS BARS SUPPLIED ON COMPONENT WIRES FROM SEQUENCE PANEL TO CONTROL PANELS (1) & (2) CALLED FOR ON SEQUENCE PANEL WIRING ASSY. A4428-7630-02.

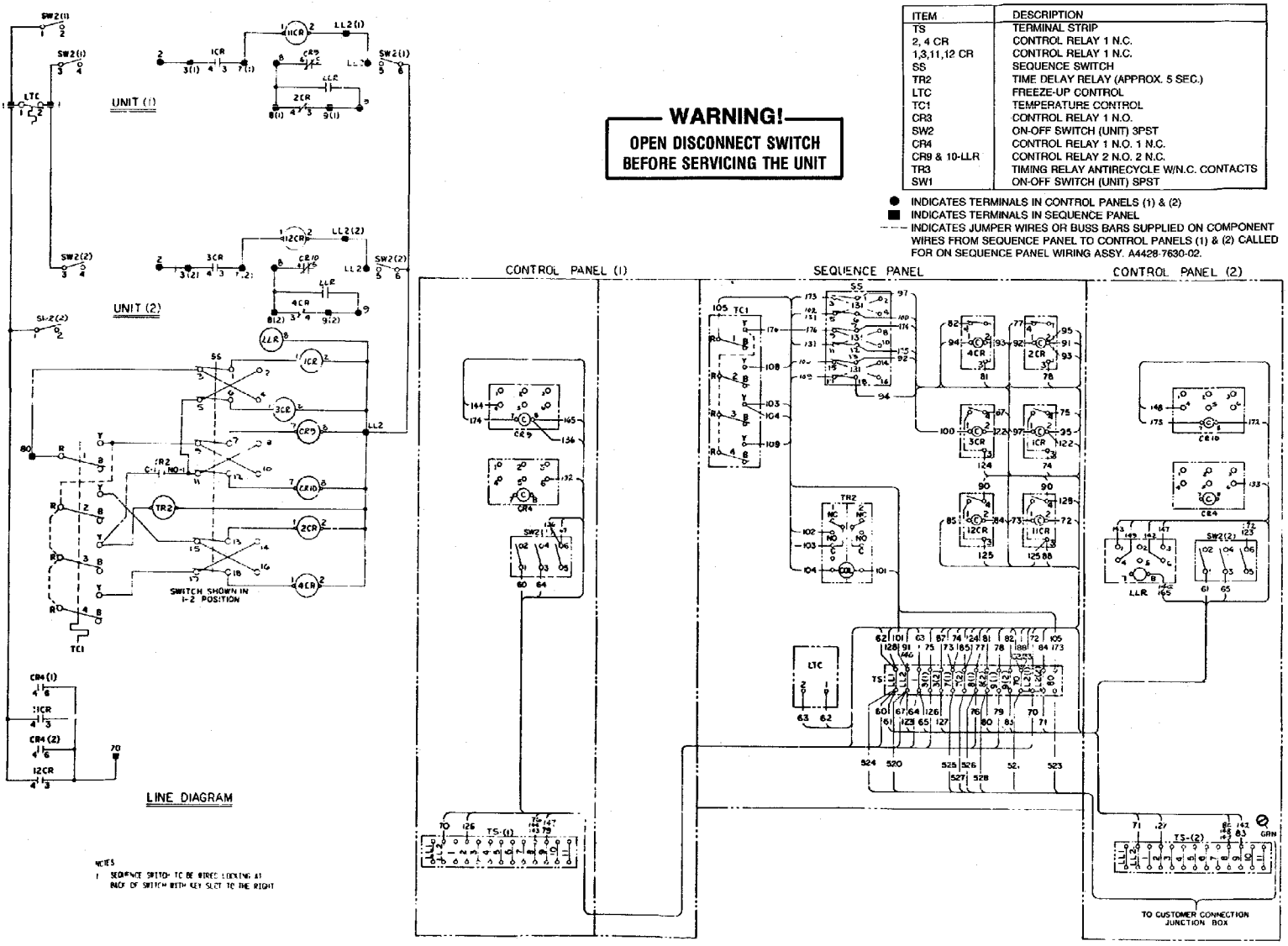


FIGURE 15 - Sequence Panel Wiring Diagram. Hot Gas Bypass Unit With Load Limit Thermostat and 4-Step Electric Control

2304-8015D

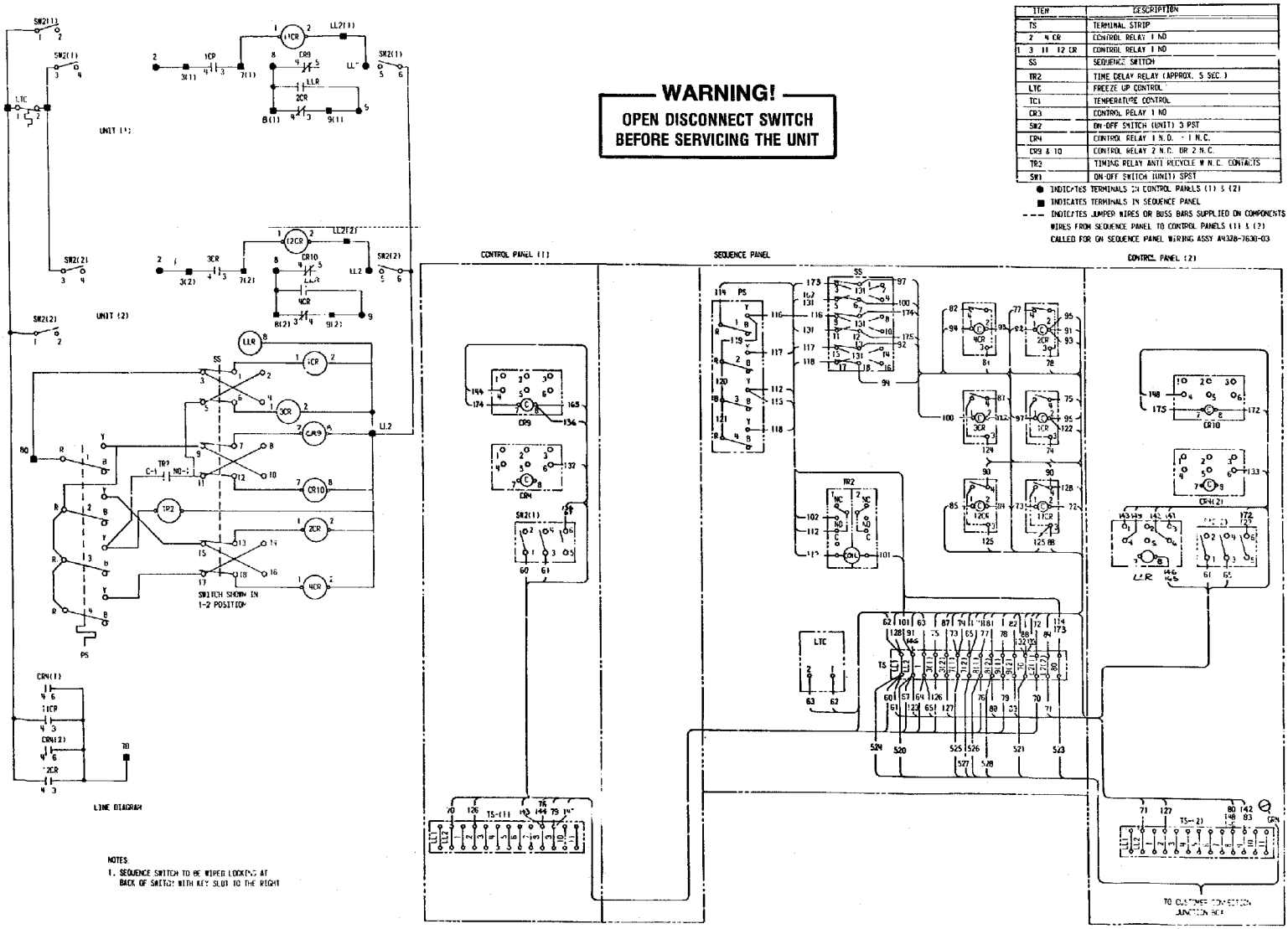
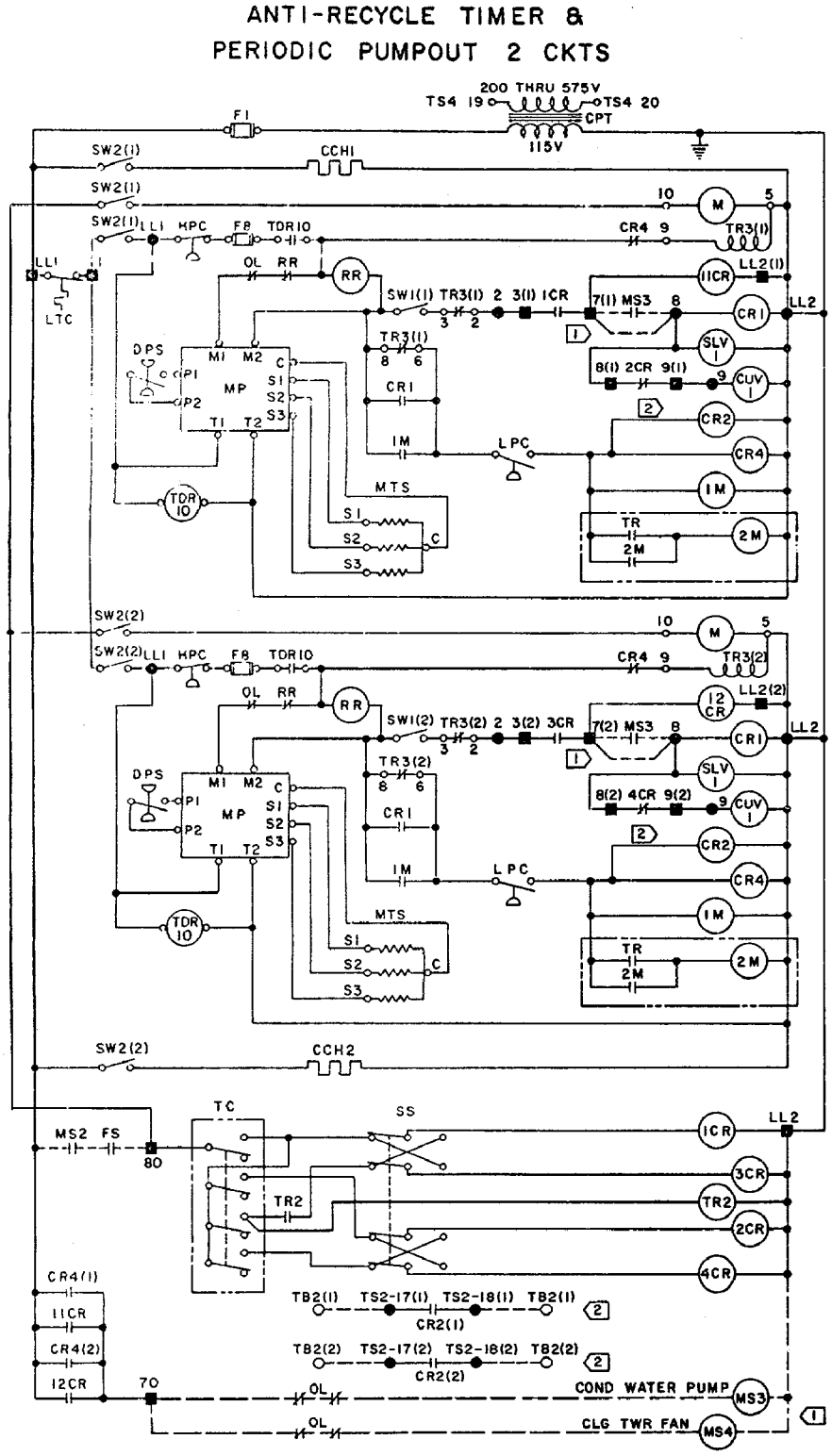


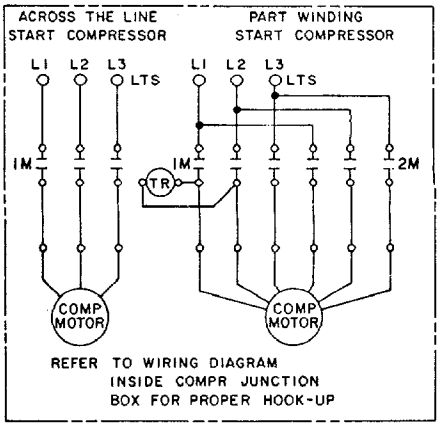
FIGURE 16 - Sequence Panel Wiring Diagram. Hot Gas Bypass Unit With Load Limit Thermostat and 4-Step Pneumatic/Electric Control **2304-8333B**

'C' DESIGN SEQUENCE

'C' Design Sequence indicates that the unit is not UL or CSA certified. The design sequences of any individual unit is indicated by the tenth digit of the model number on the unit nameplate (See "Model Number Description"). 'C' design sequence is distinguished by the absence of an R2 terminal on the compressor motor protector module.

IMPORTANT: 'C' Design Supplementary Connection and Sequence Panel wiring diagrams must be used in conjunction with the appropriate 'B' design diagram. The 'C' design diagrams show only those modifications made to the existing 'B' design wiring under the new 'C' design sequence.





ITEM	DESCRIPTION
1, 3, 11 & 12CR	CONTROL RELAY 1 N.O.
2 & 4 CR	CONTROL RELAY 1 N.C.
IM & 2M	3 POLE CONTACTOR W/ INTERLOCK
BP	BY PASS SOLENOID-HOT GAS
CPT	CONTROL POWER TRANSFORMER
CCH1 & 2	CRANKCASE HEATER
CR1	COMPR START RELAY N.O.
CR2(1) & (2)	CONTROL RELAY N.O. REMOTE AIR CONDENSER
CR3(1) & (2)	CONTROL RELAY N.O.
CR4(1) & (2)	CONTROL RELAY 1 N.O & 1 N.C. ANTI-RECYCLE TIMER
CUV1	COMPRESSOR UNLOADER VALVE
DPS	DIFFERENTIAL PRESSURE SWITCH
F	FUSE
FS	FLOW SWITCH
HPC	HIGH PRESSURE CONT-MANUAL RESET
LLR	LOAD LIMIT RELAY
LLT	LOAD LIMIT THERMOSTAT
LPC	LOW PRESSURE CONT-MANUAL RESET
LTC	LOW TEMPERATURE CONTROL
MS2	MAG START W/LINE V COIL-N.O. INTLK
MP	COMB MOTOR PROT AND OIL PRESSURE CONTROL-MANUAL RESET
MTS	MOTOR TEMPERATURE SENSOR
OL	OVERLOAD RELAY
RR	RESET RELAY
SLV1	SOLENOID LIQUID VALVE
SS	SEQUENCE SWITCH
SW1(1) & (2)	ON-OFF SWITCH SPST
SW2(1) & (2)	ON-OFF SWITCH 3 PST
TC	TEMPERATURE CONTROL (ELEC OR PNEU ELEC)
TR	TIMING RELAY-DELAY APPROX 1 SEC.
TR2	TIMING RELAY-DELAY APPROX 5 SEC.
TR3(1) & (2)	TIMING RELAY-ANTI-RECYCLE N.C.
TS2	TERMINAL STRIP-REMOTE AIR CONDENSER
TS4	TERMINAL STRIP - 2 POLE
CR9 & 10	CONT RELAY N.C.-BY PASS SOLENOID
MS3 & 4	MAG STARTER W/ SEPARATE CONTROL
M	ANTI-RECYCLE TIMER MOTOR
TDR10	TIME DELAY RELAY-APPROX .3 SEC
TB2(1) & (2)	TERM BLOCK-AIR COND PANEL
——■——	INDICATES TERMINALS IN SEQUENCE PANEL
——●——	INDICATES TERMINALS IN UNIT PANELS (1) & (2)
———	WIRING BY TRANE CO.
- - - - -	WIRING BY CUSTOMER
———	INDICATES TRANE CO. SUPPLIED OPTIONAL FEATURE

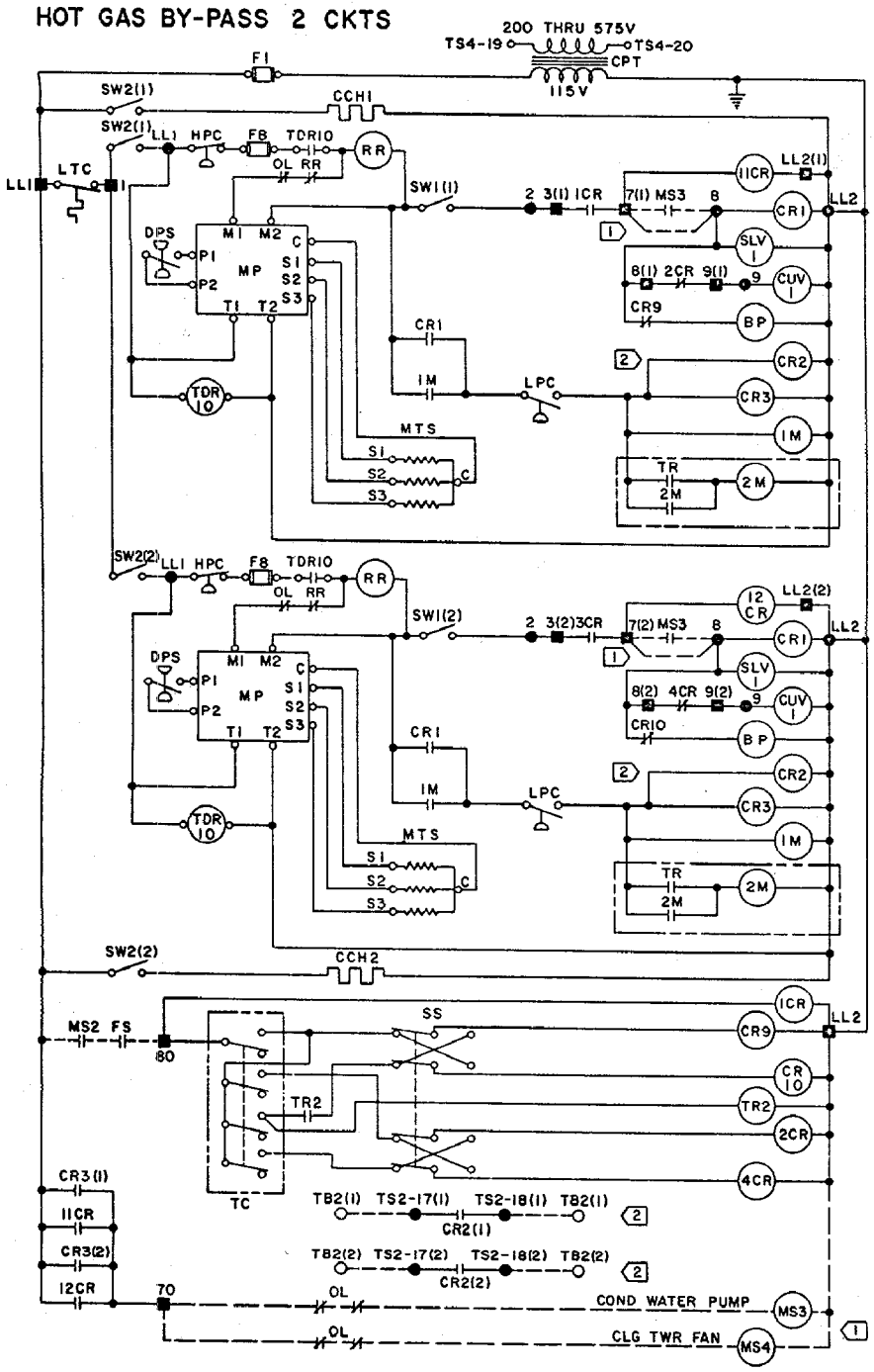
WARNING!

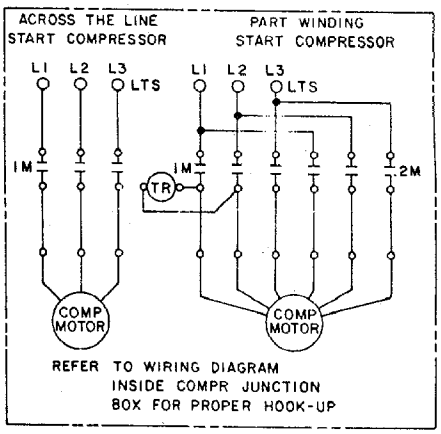
OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

NOTES:

1. OL, MS3 & MS4 ARE USED ON CGWA & CCUA UNITS WITH WATER COOLED CONDENSING
2. TB2 & CR2 USED ON CCUA UNITS WITH TRANE AIR CONDENSING
3. LLT & LLR USED ON LOAD LIMIT OPTION ONLY

FIGURE 17 - Line Wiring Diagram. Standard Unit With Part Winding or Across The Line Start **2305-0948B**





ITEM	DESCRIPTION
1,3,11 & 12CR	CONTROL RELAY 1 N.O
2 & 4 CR	CONTROL RELAY 1 N.C.
1M & 2M	3 POLE CONTACTOR W/ INTERLOCK
BP	BY PASS SOLENOID - HOT GAS
CPT	CONTROL POWER TRANSFORMER
CCH1 & 2	CRANKCASE HEATER
CR1	COMPR START RELAY N.O.
CR2(1) & (2)	CONTROL RELAY N.O. REMOTE AIR CONDENSER
CR3(1) & (2)	CONTROL RELAY N.O.
CR4(1) & (2)	CONTROL RELAY 1 N.O & 1 N.C. ANTI-RECYCLE TIMER
CUV1	COMPRESSOR UNLOADER VALVE
DPS	DIFFERENTIAL PRESSURE SWITCH
F	FUSE
FS	FLOW SWITCH
HPC	HIGH PRESSURE CONT - MANUAL RESET
LLR	LOAD LIMIT RELAY
LLT	LOAD LIMIT THERMOSTAT
LPC	LOW PRESSURE CONT-MANUAL RESET
LTC	LOW TEMPERATURE CONTROL
MS2	MAG START W/ LINE V COIL-N.O. INTLK
MP	COMB MOTOR PROT AND OIL PRESSURE CONTROL - MANUAL RESET
MTS	MOTOR TEMPERATURE SENSOR
OL	OVERLOAD RELAY
RR	RESET RELAY
SLV1	SOLENOID LIQUID VALVE
SS	SEQUENCE SWITCH
SW1(1) & (2)	ON-OFF SWITCH SPST
SW2(1) & (2)	ON-OFF SWITCH 3 PST
TC	TEMPERATURE CONTROL (ELEC OR PNEU ELEC)
TR	TIMING RELAY - DELAY APPROX 1 SEC.
TR2	TIMING RELAY - DELAY APPROX 5 SEC.
TR3(1) & (2)	TIMING RELAY - ANTI-RECYCLE N.C.
TS2	TERMINAL STRIP - REMOTE AIR CONDENSER
TS4	TERMINAL STRIP - 2 POLE
CR9 & 10	CONT RELAY N.C. - BY PASS SOLENOID
MS3 & 4	MAG STARTER W/ SEPARATE CONTROL
M	ANTI-RECYCLE TIMER MOTOR
TDR10	TIME DELAY RELAY - APPROX .3 SEC
TB2(1) & (2)	TERM BLOCK-AIR COND PANEL
—■—	INDICATES TERMINALS IN SEQUENCE PANEL
—●—	INDICATES TERMINALS IN UNIT PANELS (1) & (2)
———	WIRING BY TRANE CO.
- - - -	WIRING BY CUSTOMER
———	INDICATES TRANE CO. SUPPLIED OPTIONAL FEATURE

WARNING!

OPEN DISCONNECT SWITCH BEFORE SERVICING THE UNIT

NOTES:

1. OL, MS3 & MS4 ARE USED ON CGWA & CCUA UNITS WITH WATER COOLED CONDENSING
2. TB2 & CR2 USED ON CCUA UNITS WITH TRANE AIR CONDENSING
3. LLT & LLR USED ON LOAD LIMIT OPTION ONLY

FIGURE 18 - Line Wiring Diagram. Hot Gas Bypass Unit With Part Winding or Across The Line Start **2305-0948B**

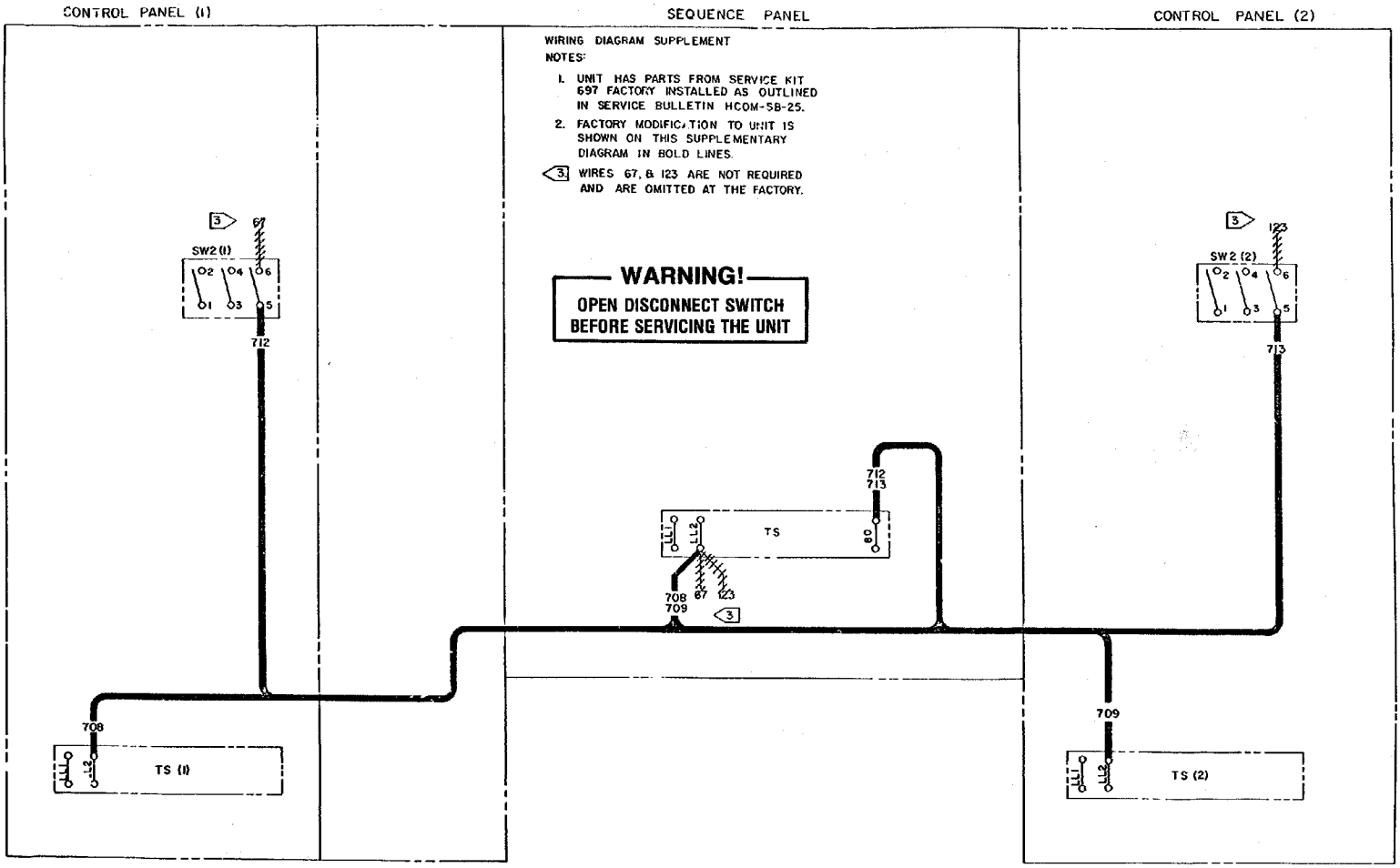


FIGURE 19 - Supplementary Sequence Panel Wiring Diagram - Standard Unit. Refer to the Appropriate 'B' Design Diagram.

2305-0946

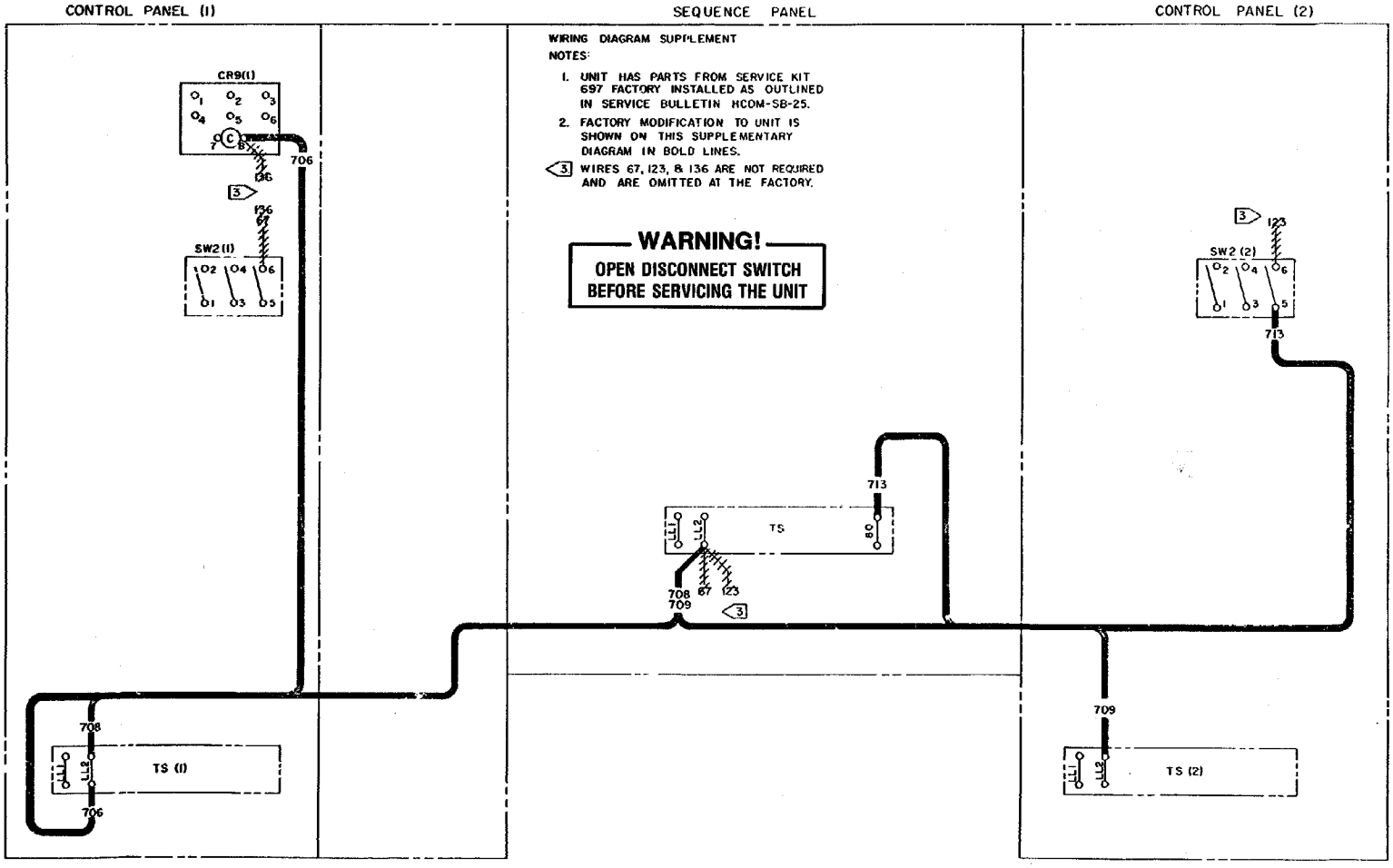


FIGURE 20 - Supplementary Sequence Panel Wiring Diagram. Control Panel #1. Hot Gas Bypass 1 Circuit, Antirecycle Timer Periodic Pumpout 1 Circuit. Refer to the Appropriate 'B' Design Diagram With These Options.

2305-0922

CGWA-W-20

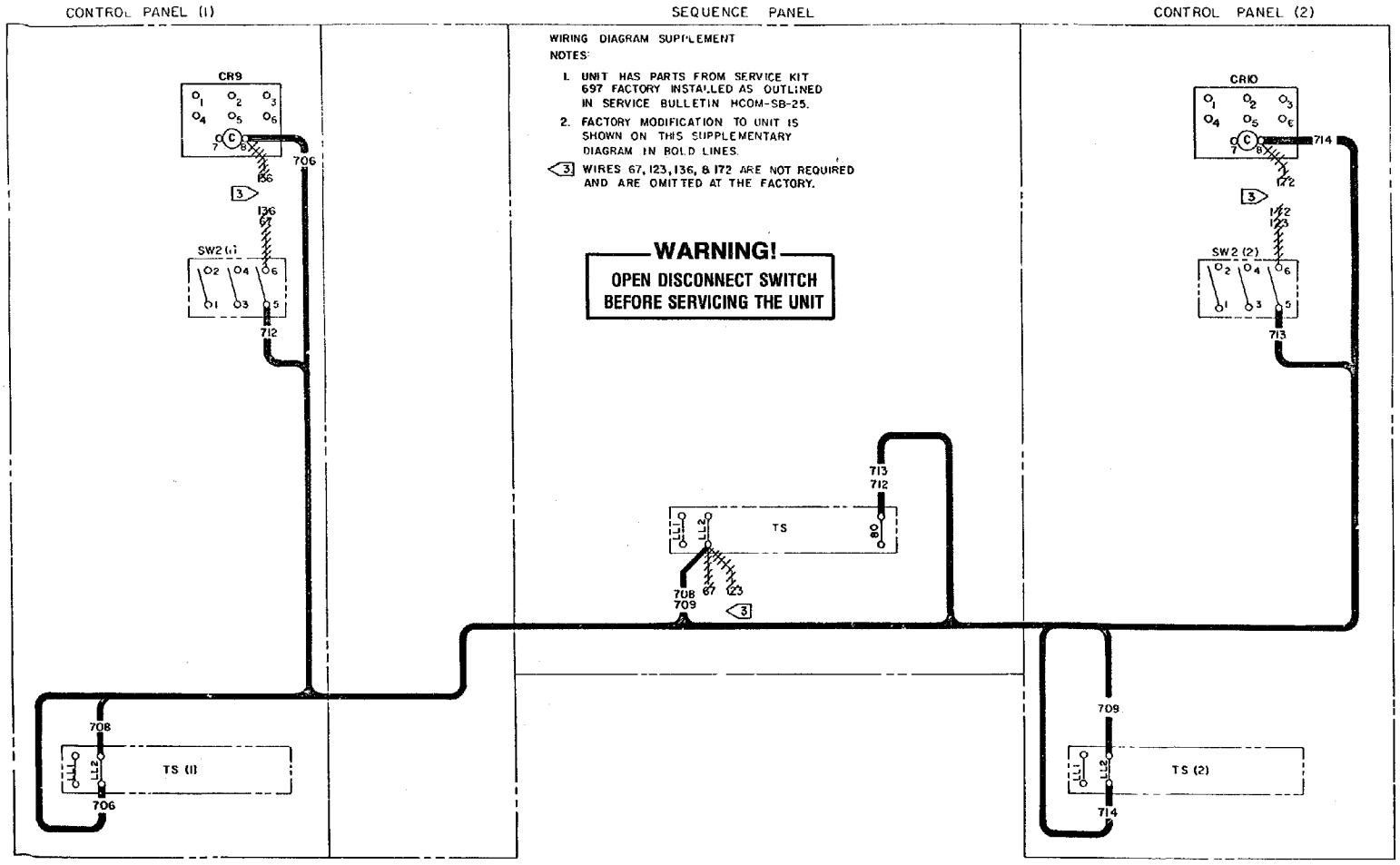


FIGURE 21 - Supplementary Sequence Panel Wiring Diagram. Standard Unit. Refer to the Appropriate 'B' Design Diagram For A Standard Unit. **2305-0945**

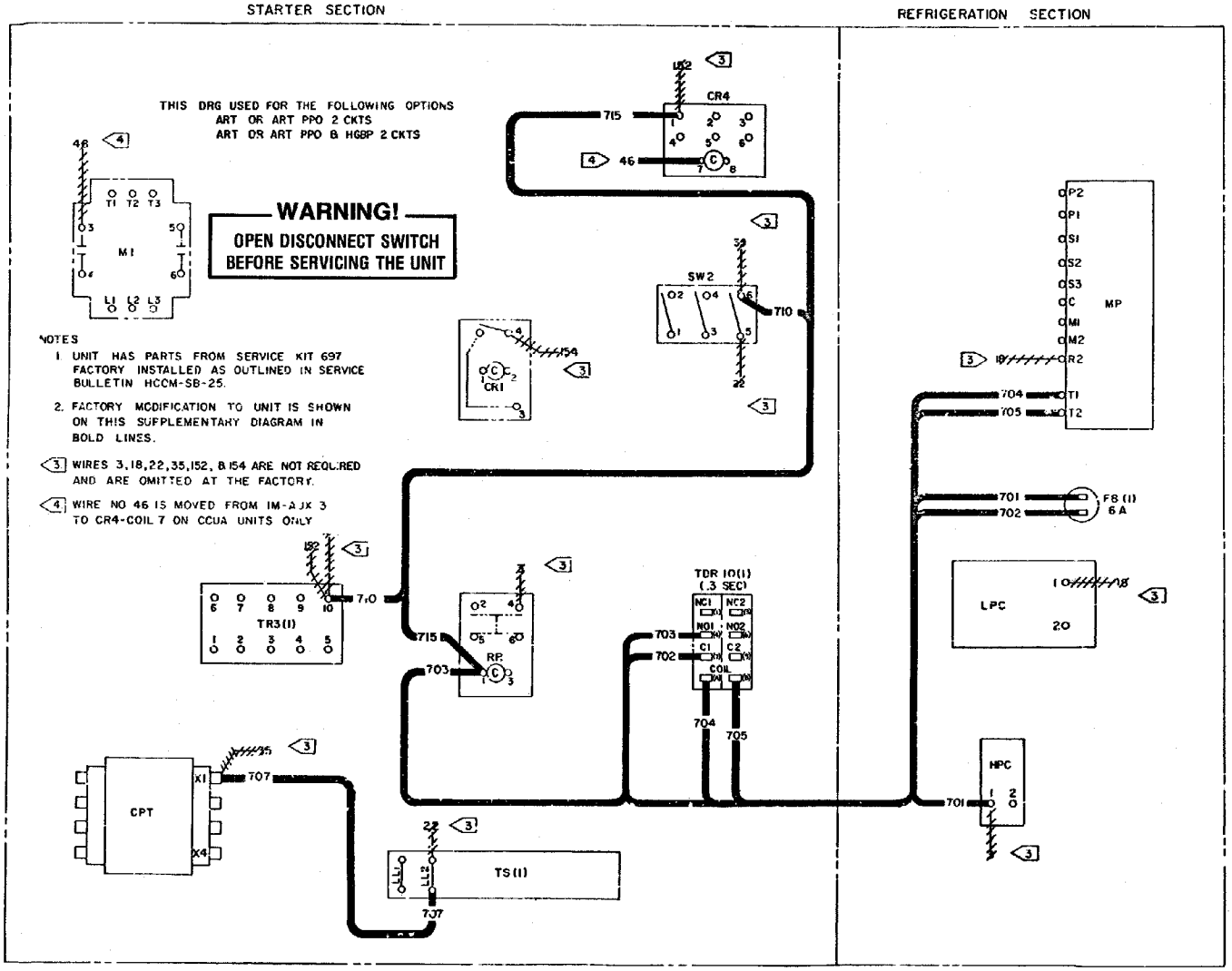


FIGURE 22 - Supplementary Connection Wiring Diagram. Control Panel #1. Standard Unit or Hot Gas Bypass 2 Circuits. Refer To The Appropriate 'B' Design Diagram With These Options.

2305-0947A

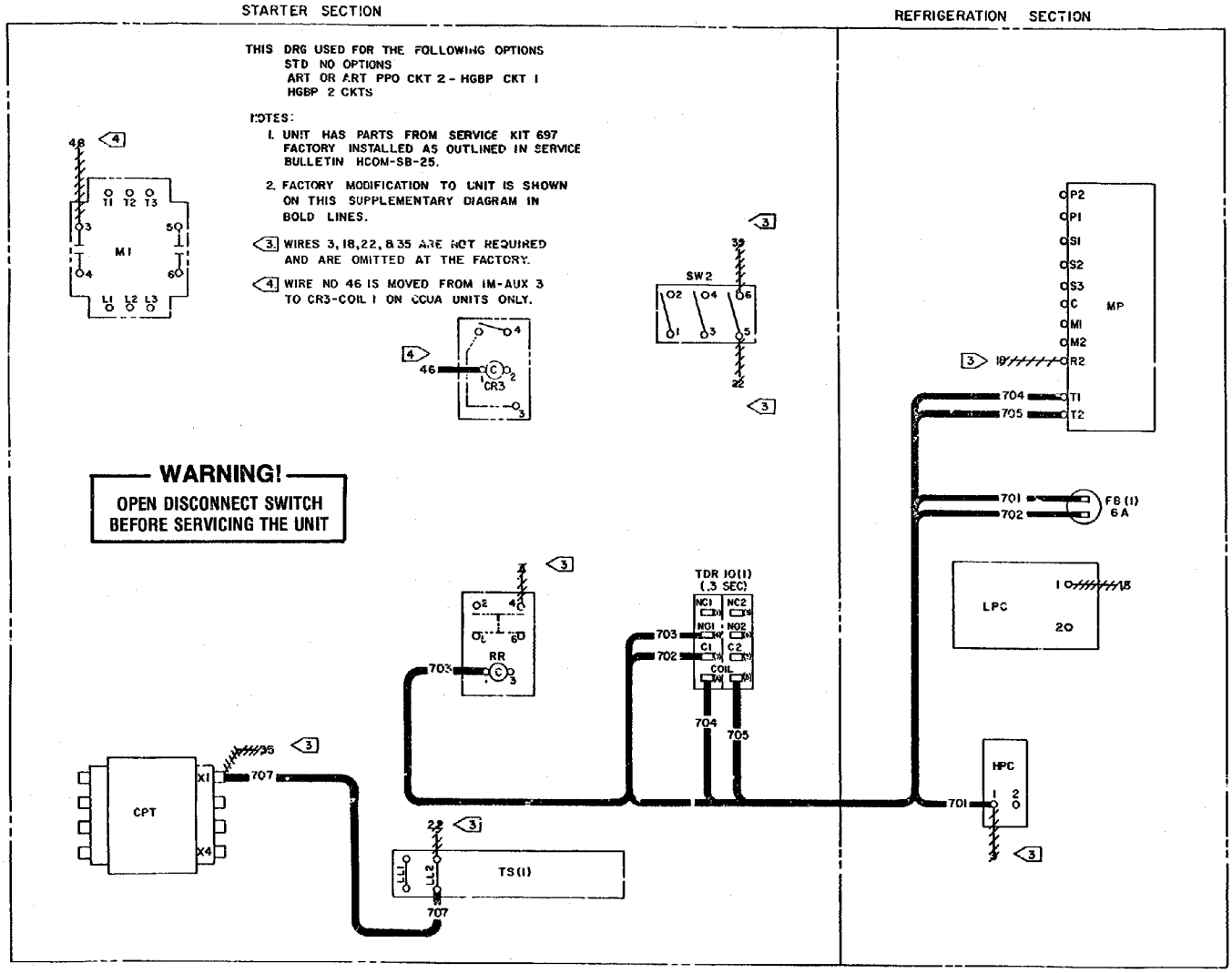


FIGURE 23 - Supplementary Connection Wiring Diagram. Hot Gas Bypass 1 Circuit, Antirecycle Timer and Periodic Pumpout 1 Circuit. Refer to the Appropriate 'B' Design Diagram With These Options. 2304-0930B

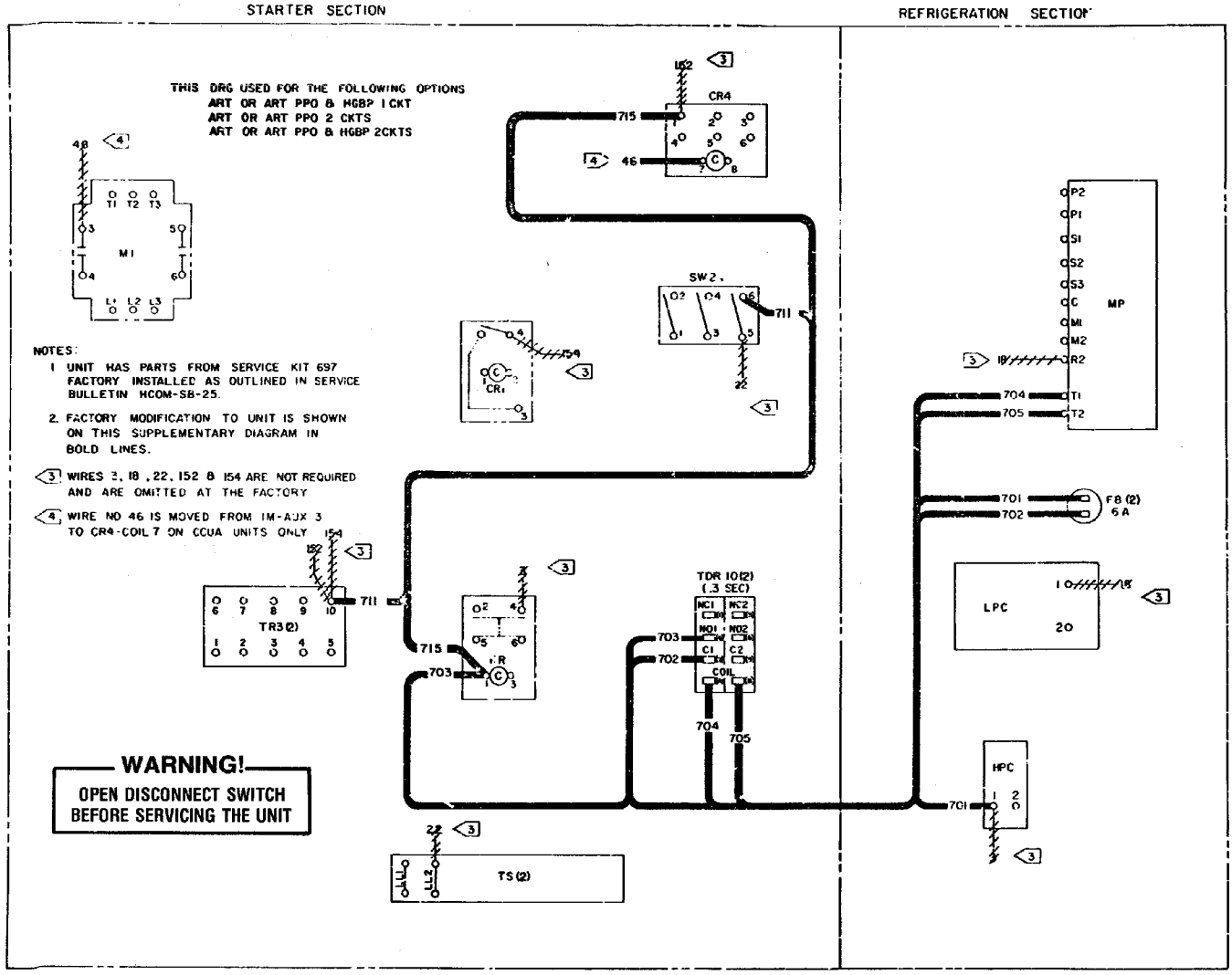


FIGURE 24 - Supplementary Connection Wiring Diagram. Control Panel #2. Hot Gas Bypass 1 or 2 Circuits. Refer to the Appropriate 'B' Design Diagram With These Options. 2305-0933B