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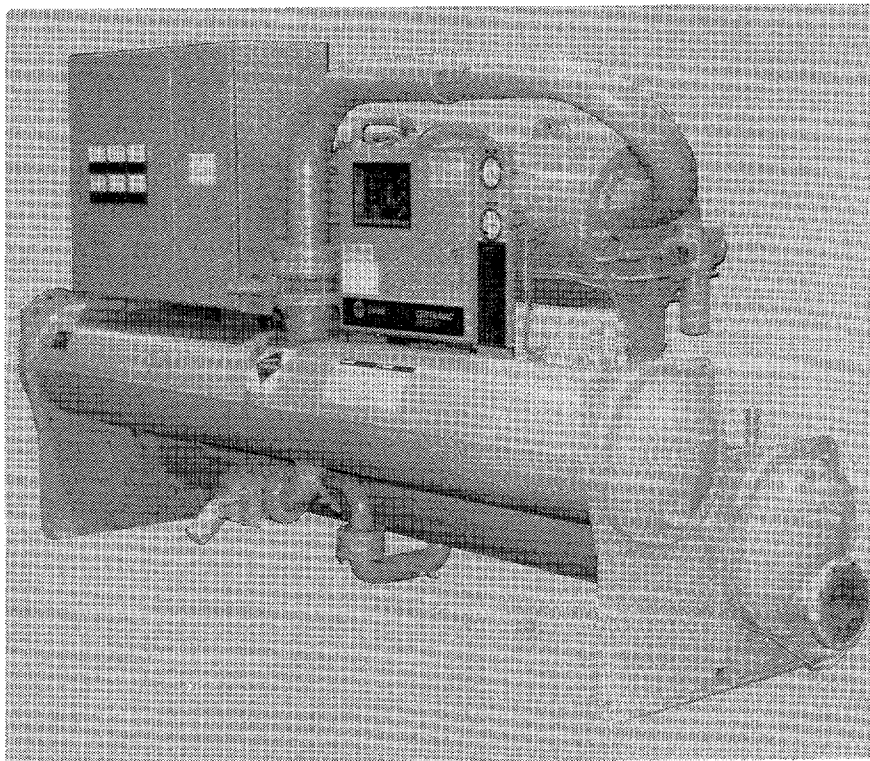
Wiring

RTHA-W-2A

Library	Service Literature
Product Section	Refrigeration
Product	Rotary Liquid Chillers – Water-Cooled
Model	RTHA
Literature Type	Unit Wiring
Sequence	2A
Date	July, 1991
File No.	SV-RF-RLC-RTHA-W-2A-791
Supercedes	RTHA-W-2

Series R Water-Cooled Rotary Liquid Chillers

“J_, K_, LO, MO, NO, PO” Design
Sequence



Models

RTHA-130
RTHA-150
RTHA-180
RTHA-215

RTHA-255
RTHA-300
RTHA-380
RTHA-450

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

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For further information on this product or other Trane products, refer to the "Trane Service Literature Catalog", ordering number IDX-IOM-1. This catalog contains listings and prices for all service literature sold by Trane. The catalog may be ordered by sending a \$15.00 check to:
The Trane Company, Service Literature Sales, 3600 Pammel Creek Road, La Crosse, WI 54601.

To help ensure optimum performance, be sure to specify quality Trane parts.

The Trane Company
La Crosse, Wisconsin 54601-7599
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General Information

World environmental scientists have concluded, based on the best currently available evidence, that ozone in our upper atmosphere is being reduced due to release of CFC fully halogenated compounds.

Prior to installation, operation, service or maintenance on this equipment, refer to "Refrigerant Emission Control" in the RTHA Installation-Operation-Maintenance manual.

Literature Change History

RTHA-W-2 (December 1990)

Original issue of manual; provides typical field connection diagrams, electrical schematics and connection diagrams for 130-300 ton RTHA units of "J_, K_, LO, MO" design sequences.

RTHA-W-2A (July 1991)

First revision of manual, updating electrical schematics and diagrams to include active oil return. Applies to RTHA units of "J_, K_, LO, MO, NO, PO" design sequence.

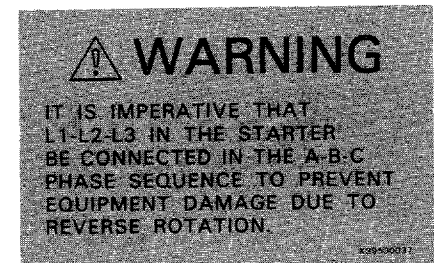
Note: The typical wiring diagrams in this manual are representative of "J_, K_, LO, MO, NO, PO" design sequence units and are provided only for general reference. **These diagrams may not reflect the actual wiring of your unit.** For specific electrical connection and schematic information, always refer to the wiring diagrams which were shipped with your unit.

Unit Electrical Data

To determine the specific electrical characteristics of a particular chiller, always refer to the nameplates mounted on the unit.

A summary of the unit and compressor motor electrical data is published in the RTHA Installation-Operation-Maintenance manual that was shipped with this unit.

WARNING: It is imperative that L1-L2-L3 in the starter be connected in the A-B-C sequence, to prevent equipment damage due to reverse rotation.





All RTHA Units

The diagrams in this section are representative of all RTHA units, with unit-mounted or remote-mounted starter panels.

Figure 1
Field Wiring Layout and
Sensor Location Schematic
for RTHA Units

(continued on next page)

NOTES:

1. DASHED LINES INDICATE FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SALES OPTION. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS. OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY.
3. AUXILIARY CONTROLS FOR A CUSTOMER SPECIFIED OR INSTALLED LATCHING SAFETY TRIPOUTS.
4. THE FOLLOWING CAPABILITIES ARE OPTIONAL -- THEY ARE IMPLEMENTED AND WIRED AS REQUIRED FOR A SPECIFIC SYSTEM APPLICATION.
 - A CHILLED WATER RESET -- REQUIRES MATCHED PAIR OF THERMISTORS FOR 4RT1 AND 4RT2. IF AMBIENT TEMP BASED CHILLED WATER RESET IS REQUIRED, USE THE STANDARD SUPPLIED LEAVING EVAP WATER TEMP SENSOR (4RT1) FOR 4RT6 AS AN AMBIENT TEMP SENSOR.
 - C ENTERING EVAP TEMP SENSOR -- REQUIRES MATCHED PAIR OF THERMISTORS FOR 4RT1 AND 4RT2.
 - D ENTERING AND LEAVING CONDENSER WATER TEMP SENSORS MATCHED PAIR OF THERMISTORS FOR 4RT3 AND 4RT4.
 - E TRACER MONITORING PACKAGE INCLUDES OPTIONS "C" AND "D". IF AMBIENT TEMP BASED CHILLED WATER RESET IS REQUIRED, USE THE STANDARD SUPPLIED LEAVING EVAP WATER TEMP SENSOR (4RT1) FOR 4RT6 AS AN AMBIENT TEMP SENSOR.
 - F ICE MAKING OPTION INCLUDES 4RT5, AND 4RT9. 4RT1 IS CONNECTED TO THE ICE MAKER CONTROL PANEL (4RT5) WHEN ICE MAKING OPTION IS PRESENT.
5. FOR SENSOR DESCRIPTION SEE 5706-0917.

WIRING REQUIREMENTS:

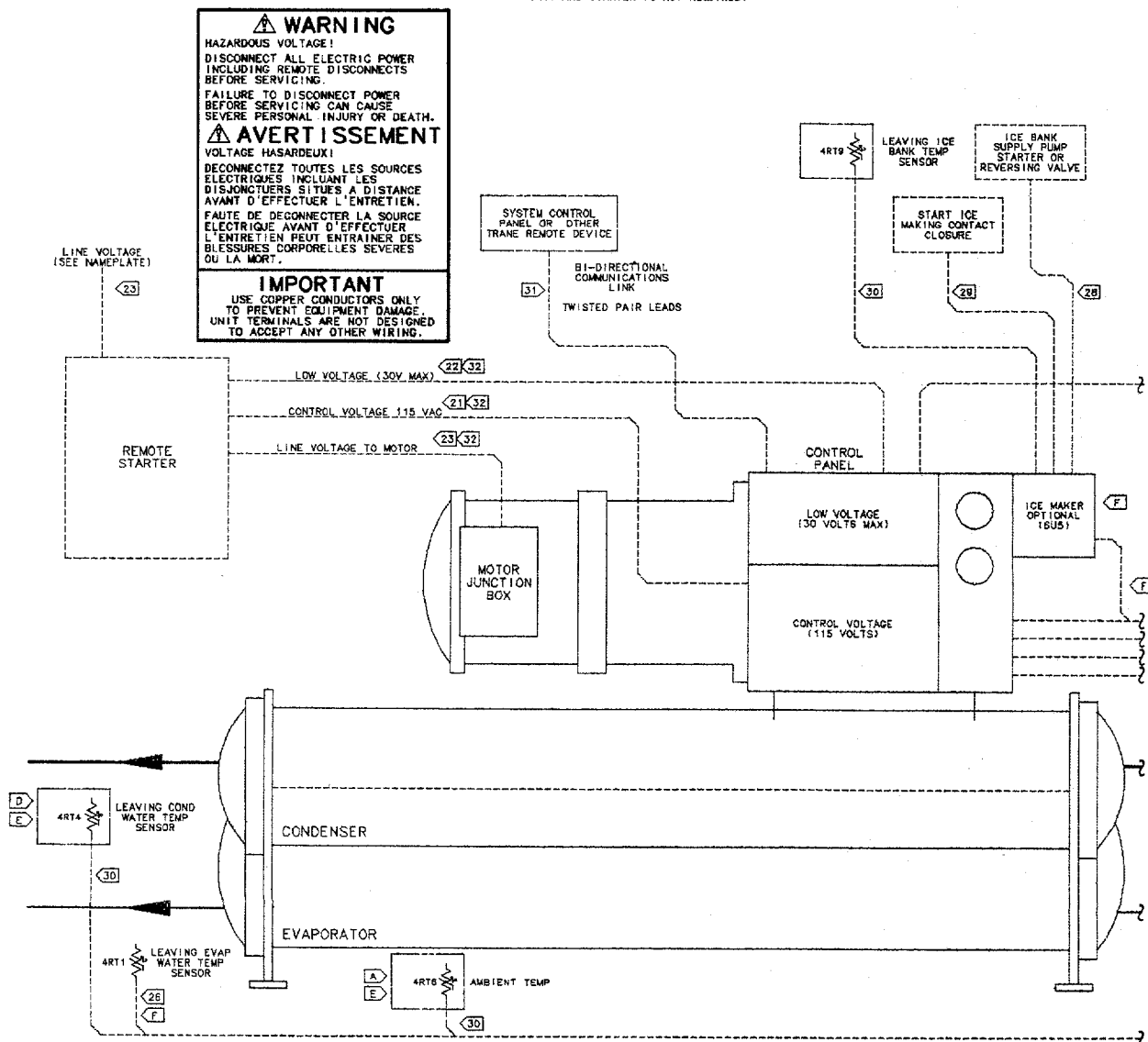
DO NOT RUN LOW VOLTAGE WIRE (30 VOLTS MAX) IN CONDUIT OR RACEWAY WITH HIGHER VOLTAGE WIRE.

REQUIRED WIRING:

- 21 8 WIRES #14 AWG 600V
- 22 8 WIRES #14-#16 AWG 600V. RUN IN SEPARATE CONDUIT. USE #16 AWG UP TO 250 FT ONEWAY OR #14 AWG UP TO 400 FT ONEWAY.
- 23 USE COPPER WIRES ONLY. READ TABLE 1 DIRECTLY IN UNIT NAMEPLATE RUA TO DETERMINE WIRE SIZE AND ARRANGEMENT. UNIT MOUNTED STARTERS DO NOT REQUIRE ANY MOTOR LEADS.
- 24 4 WIRES #14 AWG 600V. SEPARATE 115 VAC POWER IS REQUIRED TO STARTER.
- 25 2 WIRES #14 AWG 600V
- 26 2 WIRES #14-#16 AWG 600V. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE WIRE. SEE TABLE 2.

OPTIONAL WIRING:

- 27 3 WIRES #14 AWG 600V. SEPARATE 115 VAC POWER SUPPLY IS REQUIRED.
- 28 2 WIRES #14 AWG 600V. SEPARATE 115 VAC POWER SUPPLY IS REQUIRED.
- 29 2 WIRES #14 AWG 600V.
- 30 2 WIRES #14-#16 AWG 600V. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE WIRE. SEE TABLE 2.
- 31 SHIELDED TWISTED PAIR, 30V OR LESS #14-#16 AWG 600V. MAX LENGTH 5000 FT. DO NOT RUN IN CONDUIT WITH HIGHER VOLTAGE WIRE.
- 32 IF UNIT IS SUPPLIED WITH MOUNTED STARTER. FIELD WIRING BETWEEN UNIT AND STARTER IS NOT REQUIRED.

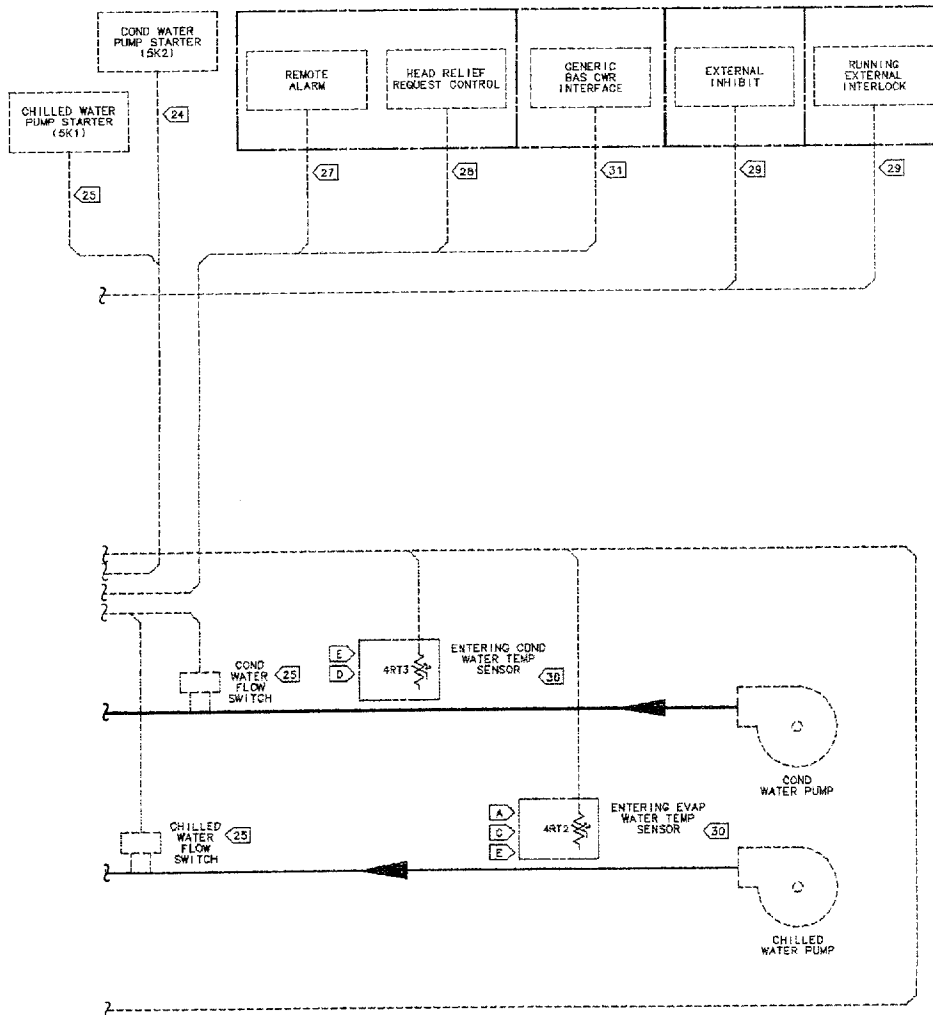


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TABLE 2	
WIRE SIZE	MAXIMUM LENGTH FOR SENSOR LEADS
14 AWG	5000 FT
16 AWG	2000 FT
18 AWG	1000 FT

TABLE 1 RECOMMENDED WIRE SELECTION TABLE (REF. 1990 NEC) RATED LOAD AMPS (NAMEPLATE RLA)																
MIN WIRE SIZE COPPER 90°C	0 TO 2000 VOLTS								0 TO 2000 VOLTS							
	SUPPLY LEADS FOR ALL STARTERS MOTOR LEADS FOR ACROSS-THE-LINE, AUTO-TRANSFORMER OR PRIMARY REACTOR TYPE STARTERS								MOTOR LEADS FOR STAR DELTA STARTER							
	1 CONDUIT 3 WIRES	1 CONDUIT 6 WIRES	2 CONDUITS 3 WIRES EA	2 CONDUITS 6 WIRES	3 CONDUITS 3 WIRES	3 CONDUITS 6 WIRES	4 CONDUITS 3 WIRES	4 CONDUITS 6 WIRES	1 CONDUIT 6 WIRES	2 CONDUITS 3 WIRES EA	2 CONDUITS 6 WIRES EA	3 CONDUITS 3 WIRES EA	3 CONDUITS 6 WIRES EA	4 CONDUITS 3 WIRES EA	4 CONDUITS 6 WIRES EA	5 CONDUITS 3 WIRES EA
8	44	*	*	*	*	*	*	*	60	75	*	*	*	*	*	*
6	60	*	*	*	*	*	*	*	82	103	*	*	*	*	*	*
4	76	*	*	*	*	*	*	*	104	131	*	*	*	*	*	*
3	89	*	*	*	*	*	*	*	121	151	*	*	*	*	*	*
2	104	*	*	*	*	*	*	*	143	179	*	*	*	*	*	*
1	120	*	*	*	*	*	*	*	165	206	*	*	*	*	*	*
0	136	217	272	408	435	544	580	815	187	234	375	468	562	703		
00	156	249	312	468	499	624	780	935	215	268	430	537	645	805		
000	180	288	360	540	576	720	900	1080	248	310	496	620	744	931		
0000	208	332	416	624	665	832	1040	1248	286	358	573	717	880	1075		
250	232	371	464	696	742	928	1160	1392	320	400	640	800	960	1200		
300	256	409	512	768	819	1024	1280	1536	353	441	706	882	1089	1324		
350	280	448	560	840	896	1120	1400	1680	386	482	772	965	1198	1440		
400	304	486	608	912	972	1216	1520	1824	419	524	838	1048	1257	1572		
500	344	550	688	1032	1100	1376	1720	2064	474	593	948	1186	1423	1778		
600	380	608	760	1140	1216	1520	1900	2280	524	655	1048	1310	1572	1965		

* CONDUCTORS TO THE STARTER AND MOTOR CONNECTED IN PARALLEL MUST BE STRICALLY JOINED AT BOTH ENDS TO FORM A SINGLE CONDUCTOR. MUST BE SIZED 90% OF LARGER (NEC 310-4). EACH PHASE MUST BE EQUALLY REPRESENTED IN EACH CONDUIT.

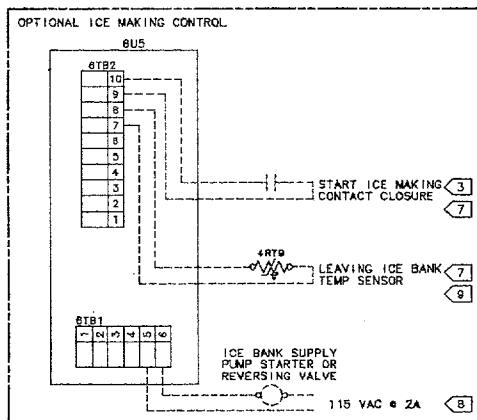
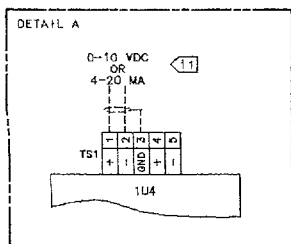
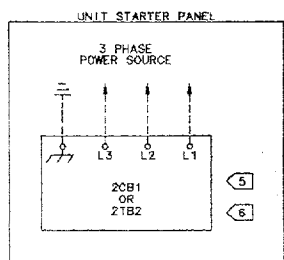
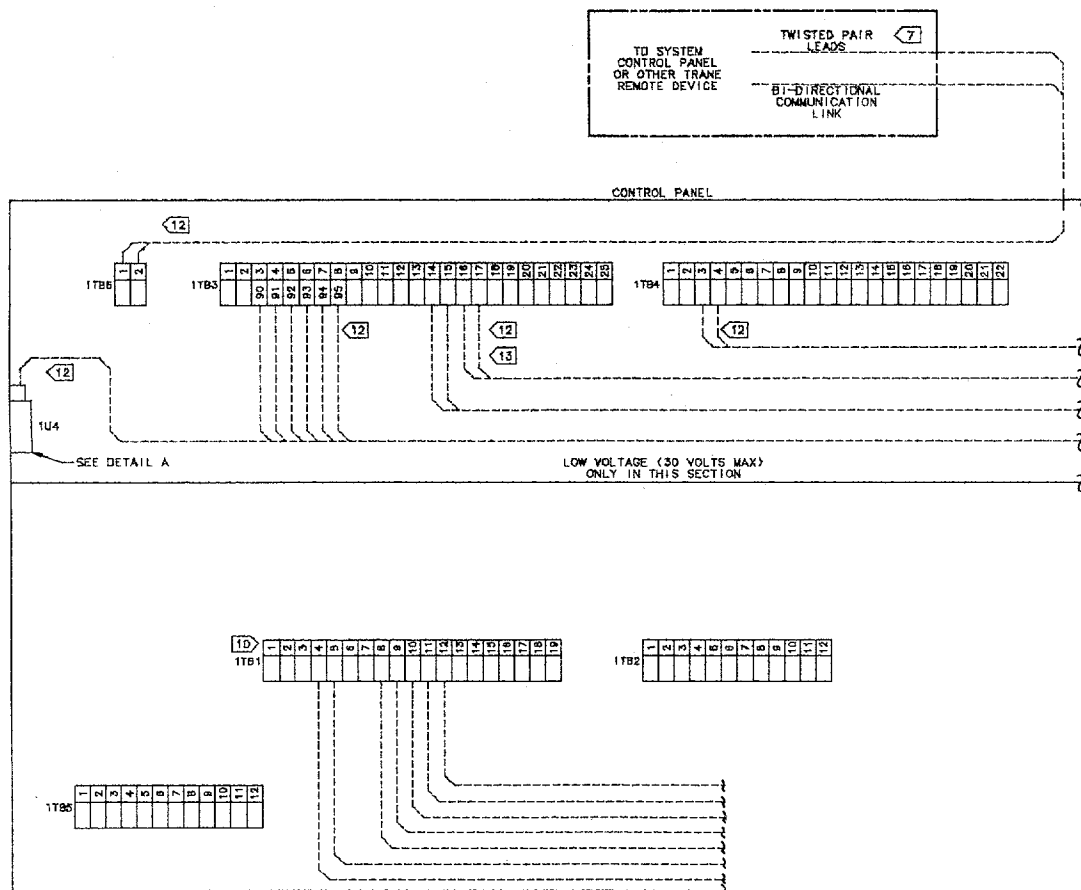


RTHA Units with Unit-Mounted Starter Panel

The diagrams that appear in this section are representative of RTHA units equipped with a unit-mounted starter panel.

Figure 2
Field Wiring Diagram for RTHA
Units with Unit-Mounted Starters

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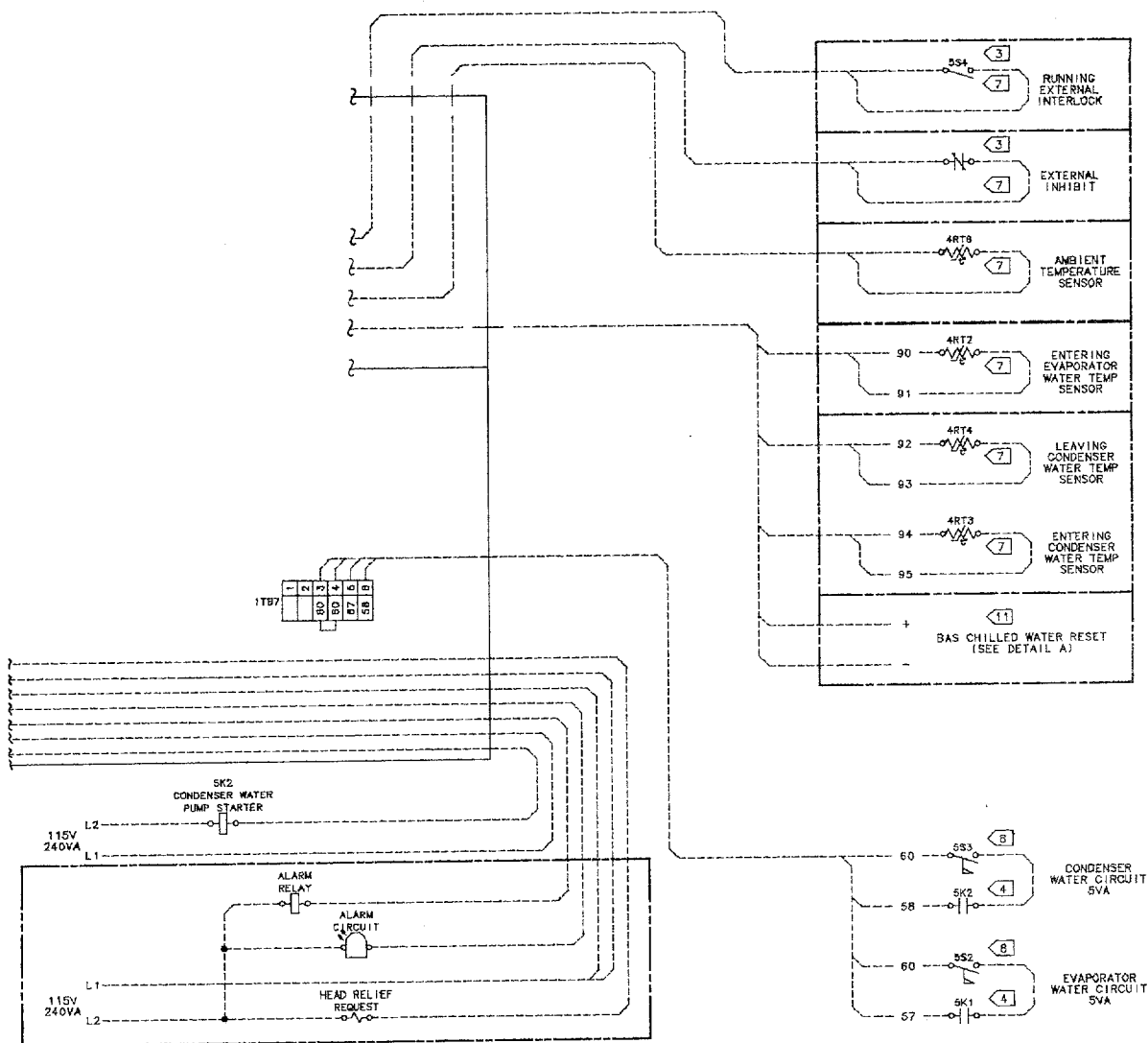


⚠ WARNING
HAZARDOUS VOLTAGE!
 DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.
 FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

⚠ AVERTISSEMENT
VOLTAGE HASARDEUX!
 DECONNECTEZ TOUTES LES SOURCES ELECTRIQUES INCLUANT LES DISJONCTEURS SITUES A DISTANCE AVANT D'EFFECTUER L'ENTRETIEN.
 FAUTE DE DECONNECTER LA SOURCE ELECTRIQUE AVANT D'EFFECTUER L'ENTRETIEN PEUT ENTRAINER DES BLESSURES CORPORELLES SEVERES OU LA MORT.

IMPORTANT
 USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

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CUSTOMER NOTE:

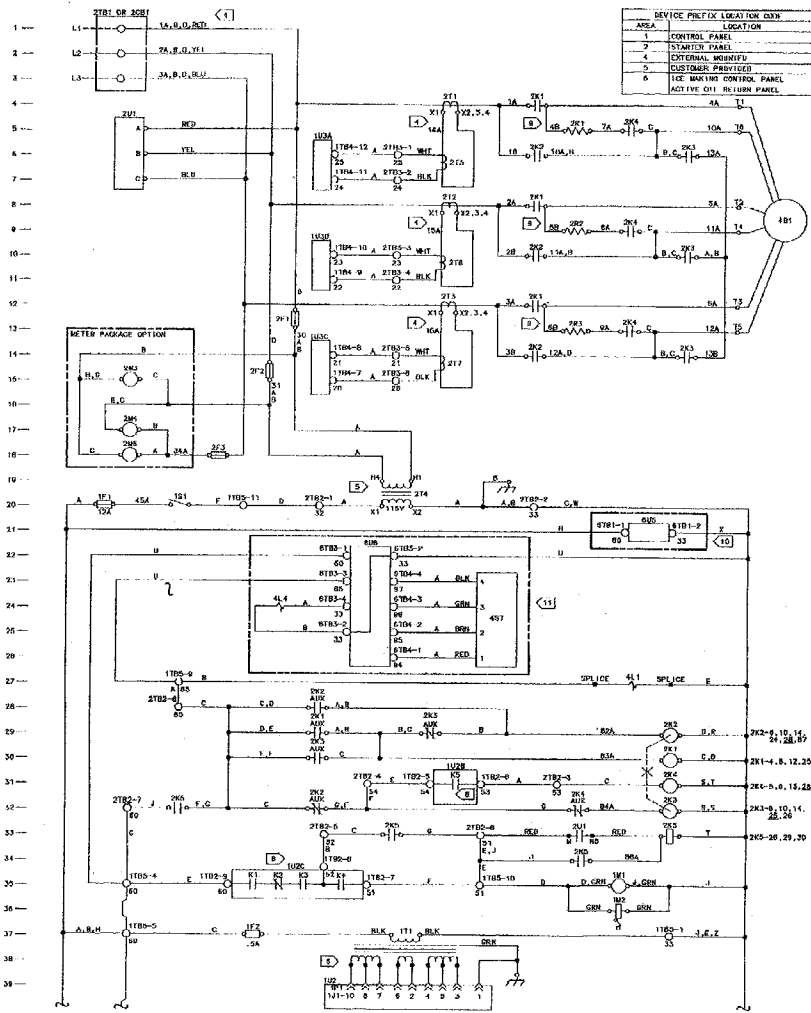
1. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS
PUMP LINES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE
SALES OPTION. CHECK SALES ORDER TO DETERMINE IF WIRING IS
REQUIRED FOR SPECIFIC OPTION.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL
ELECTRICAL CODE, THE STATE AND LOCAL REQUIREMENTS. OTHER
COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS
SHALL APPLY.
3. CUSTOMER SUPPLIED CONTACTS MUST BE COMPATIBLE WITH DRY
CONTACT UNIT 12 VDC 45MA. GOLD PLATED CONTACTS RECOMMENDED.
4. RECOMMENDED CIRCUIT: COMPONENTS SUPPLIED BY OTHERS. 5K1
AND 5K2 ARE AUX CONTACTS ON PUMP STARTERS; 5S2 AND 5S3
ARE FLOW SWITCHES IN APPROPRIATE WATER CIRCUITS.
5. RETIGHTEN TERMINALS A MINIMUM OF 24 HOURS AFTER INITIAL
INSTALLATION. DO NOT OVERTIGHTEN.
6. COPPER WIRE - SIZED PER NEC, BASED ON UNIT NAMEPLATE RLA
PLUS TRANSFORMER LOAD IN L1 AND L2. PHASING OF 3 PHASE
INPUT: L1 TO A, L2 TO B, L3 TO C WHERE ABC REPRESENTS
STANDARD PHASE ROTATION.
7. 30V OR LESS 4-1/2 WIRE TO 600V WIRE. DO NOT RUN IN CONDUIT
WITH HIGHER VOLTAGE WIRE.
8. 115V AC #14 AWG 600V WIRE.
9. LEAVING ICE BANK TEMP. SENSOR SUPPLIED BUT MUST BE FIELD
INSTALLED AND CONNECTED.

10 FIELD WIRED ELECTRICAL LOADING IS NOT TO EXCEED THE FOLLOWING CONTACT RATINGS:

TERMINALS	DEVICE	RATED VOLTAGE (VAC)	RATED V/A
1TB1-4, 5	1U1K6	120	240
1TB1-6, 10	1U1K4-2	120	240
1TB1-9, 10	1U1K4-1	120	240
1TB1-11, 12	1U1K3	120	240

11. NEGATIVE SIGNAL INPUTS ARE GROUNDED TO UCP ENCLOSURE, FOR CORRECT OPERATION. EXTERNAL EQUIPMENT SIGNALS SHALL BE ISOLATED OR FLOATING WITH RESPECT TO UCP ELECTRICAL SERVICE GROUND AND SHALL BE DERIVED FROM A SEPARATE SIGNAL SOURCE. SPECIAL CONSIDERATION MUST BE GIVEN TO 4-20 MA SIGNALS. IF THE CURRENT SOURCE REGULATES CURRENT FLOW ON THE NEGATIVE LEAD, USE A SEPARATE SIGNAL SUPPLY. A HIGH-IMPEDANCE LOOP ISOLATOR IN EACH CHANNEL IS NECESSARY TO INSTALL A LOOP ISOLATOR IN EACH CHANNEL TO PREVENT LOOP INTERFERENCE.
12. USE TWISTED, SHIELDED PAIR 18 AWG WIRE (BELDEN 8760 OR EQUIVALENT) OR CLASS 1 WIRING ONLY.
13. WHEN EXTERNAL INHIBIT IS USED AND ICE MAKING CONTROL IS SUPPLIED ON UNIT, EXTERNAL INHIBIT CONTACT MUST BE WIRED IN SERIES WITH RT2.

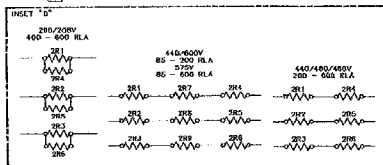
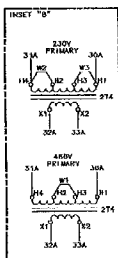
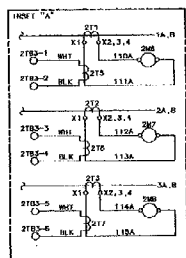
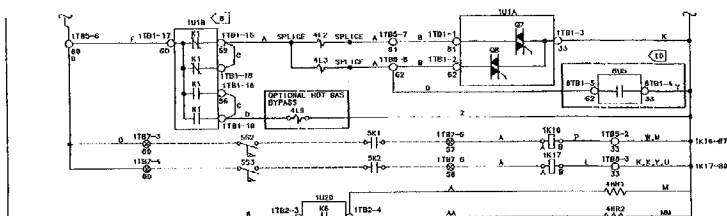
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REVIEW DESIGNATION	DESCRIPTION	LINE NUMBER
1701	FUSE, 25A PRIMARY	20
1702	FUSE, 15A PRIMARY	37
1703	FUSE, 15A	37
1704	FUSE, 15A	37
1705	FUSE, 15A	37
1706	RELAY, 250V INTERFERENCE	45
1707	RELAY, 250V INTERFERENCE	45
1708	RELAY, 250V INTERFERENCE	45
1709	RELAY, 250V INTERFERENCE	45
1710	RELAY, 250V INTERFERENCE	45
1711	RELAY, 250V INTERFERENCE	45
1712	RELAY, 250V INTERFERENCE	45
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1795	RELAY, 250V INTERFERENCE	45
1796	RELAY, 250V INTERFERENCE	45
1797	RELAY, 250V INTERFERENCE	45
1798	RELAY, 250V INTERFERENCE	45
1799	RELAY, 250V INTERFERENCE	45
1800	RELAY, 250V INTERFERENCE	45

Figure 3
System Schematic Diagram for
RTHA Units with Unit-Mounted
WYE Delta Starters - Page 1

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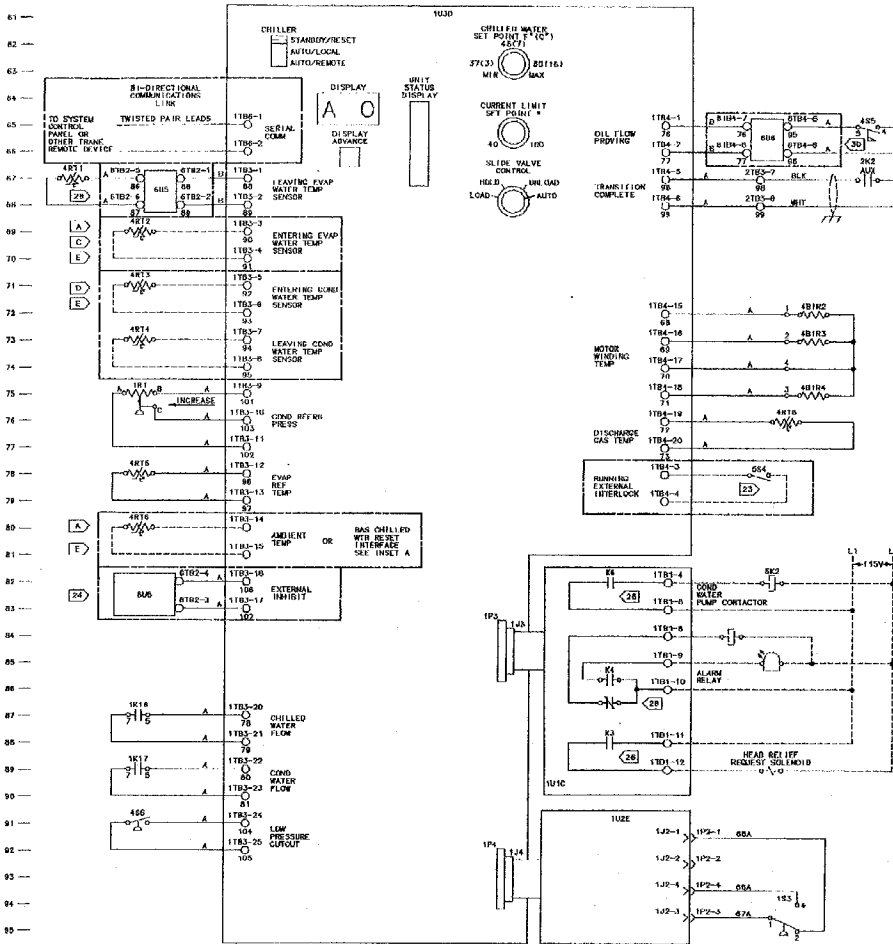
- NOTES:
1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C (77°F); AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL TERMINALS TIGHTENED OFF AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
 2. SOLID LINES INDICATE TRAIL WIRING, DASHED LINES INDICATE FIXED WIRING. PHANTOM LINES INDICATE OPTIONAL FEATURES.
 3. NUMBERED ALONG THE RIGHT SIDE OF THE SCHEMATIC, DESIGNATE THE LOCATION OF THE CONTACTS BY LINE NUMBER. AN UNDERLINED NUMBER INDICATES A NORMALLY CLOSED CONTACT, AN OPEN UNDERLINE BELOW THE LINE NUMBER POINTING UPWARDS INDICATES A TIMED CONTACT WHICH BEGINS TIMING WHEN ENERGIZED.

WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER
INCLUDING REMOTE DISCONNECTS
BEFORE SERVICING.
FAILURE TO DISCONNECT POWER
BEFORE SERVICING CAN CAUSE
SEVERE PERSONAL INJURY OR DEATH.

AVERTISSEMENT
VOLTAJE PELIGROSO!
DESCONECTE TODAS LAS FUENTES
ELECTRICAS INCLUIDAS LAS
DESCONECTAS SITUADAS A DISTANCIA
ANTES DE EFECTUAR EL MANTENIMIENTO.
FALTA DE DESCONECTAR LA FUENTE
ELECTRICA ANTES DE EFECTUAR
EL MANTENIMIENTO PUEDE ENTRAÑAR LESIONES
CORPORALES SEVERAS O LA MUERTE.

IMPORTANT
USE COPPER CONDUCTORS ONLY
TO PREVENT EQUIPMENT DAMAGE.
UNIT TERMINALS ARE NOT DESIGNED
TO ACCEPT ANY OTHER WIRING.

4. IF METER PACKAGE OPTION IS REQUIRED SEE INSET "D".
5. 240V/5/0 VUL PRIMARY SHOWN. SEE INSET "B" FOR OTHER VOLTAGES.
6. SEE SERVICE MANUAL FOR INDIVIDUAL SECONDARY VOLTAGES.
7. THREE PHASE POWER SUPPLY VOLTAGE SEE UNIT NAMEPLATE.
8. RELAY COILS, NOT SHOWN, CONTACTS ARE CONTROLLED BY THE LOGIC OF THE MICRO-MODULE (MOD). SEE SCHEMATIC OF OPERATION LINES 105-119 PAGE 2.
9. RESISTOR SHOWN FOR 240/208V AND 200-400 VLA. FOR OTHER VOLTAGES AND VLA SEE INSET "D".
10. OPTIONAL ICE MAKING CONTROL (RUS).
11. OPTIONAL ACTIVE OIL RETURN (OOR).



NOTES:

21. DASHED LINES INDICATE FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SIZES OR TYPE. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
22. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS; OTHER GOVERNMENT APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. ALL WIRING TO THIS UNIT IS LOW VOLTAGE (150 VOLTS MAX) ONLY.
23. MANUAL RESET IS ACCOMPLISHED BY MOVING THE CHILLER UNIT, LINE 11, FROM STANDBY/RESET TO "AUTO". MANUAL RESET IS ALSO REQUIRED FOR A TRIP OUT OF THE RUNNING EXTERNAL INTERLOCK, LINE 79.
24. AUXILIARY TERMINAL CONNECTIONS FOR A CUSTOMER SPECIFIED OR INSTALLED NON-LATCHING UNIT START/STOP SIGNAL. TERMINALS 118-16 AND 118-17 MUST BE WIRING TO EXTERNAL INTERLOCK OR ICE MAKING CONTROL. IS NOT USED.
25. THE FOLLOWING CAPABILITIES ARE OPTIONAL. THEY ARE UNTESTED AND WIRING AS REQUIRED FOR SPECIFIC SYSTEM APPLICATION.
26. CHILLED WATER RESET. REQUIRES MATCHED PAIR OF THERMISTORS FOR 4RT1 & 4RT2, LINES 67 & 69. IF AMBIENT TEMP SENSED CHILLED WATER RESET IS REQUIRED, USE STD DIPPED LEAVING CHAMP WATER TEMP SENSOR (4RT1 LINE 67) FOR 4RT2 LINE 69 AS AN AMBIENT TEMP SENSE.
27. ENTERING EVAP TEMP SENSOR. REQUIRES MATCHED PAIR OF THERMISTORS 4RT1 & 4RT2, LINES 67 & 69.
28. ENTERING AND LEAVING CONDENSER WATER TEMP SENSES MATCHED PAIR OF THERMISTORS FOR 4RT3 & 4RT4. 1 INCH 21 & 23.
29. TRACER MONITORING PACKAGE INCLUDES OPTIONS C AND D.
30. REMOTE GENERIC BAS CHILLED WTR RESET INTERFACE. MUST BE USED WITH CHILLED WATER RESET INTERFACE PANEL OPTION.
31. RELAY COILS NOT SHOWN. CONTACTS ARE CONTROLLED BY THE LOGIC OF THE MICRO-MODULE I/O. SEE SEQUENCE OF OPERATION LINES 182 - 115.
32. NEGATIVE SIGNAL INPUTS ARE GROUNDED TO UOP ENCLOSURE. FOR CORRECT OPERATION, EXTERNAL EQUIPMENT SIGNALS SHALL BE ISOLATED OR FLOATING WITH RESPECT TO UOP ELECTRICAL SERVICE GROUNDING AND ISOLATED FROM EACH OTHER. SPECIAL CONSIDERATION MUST BE GIVEN TO 4-20 MA SIGNALS. IF THE CURRENT SOURCE SIGNALS CURRENT FLOW IN THE NEGATIVE LEAD, USE A SEPARATE POWER SUPPLY FOR EACH CHANNEL. IN SOME APPLICATIONS IT MAY BE NECESSARY TO INSTALL A LOOP ISOLATOR IN EACH CHANNEL TO PREVENT LOOP INTERFERENCE.
33. OPTIONAL ICE MAKING CONTROL SHOWN SEE INSET B FOR WIRING WHEN OPTION IS NOT USED.
34. LEAVING ICE BANK SENSOR IS TRAP SENSOR NOT FIELD INSTALLABLE.
35. OPTIONAL ACTIVE OIL RETURN CONTROL SHOWN SEE INSET C FOR WIRING WHEN OPTION IS NOT USED.

WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.
FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

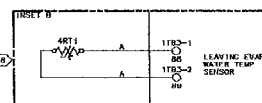
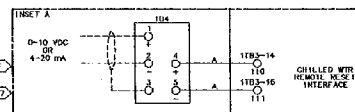
AVERTISSEMENT
VOLTAGE HAZARDEUX!
DECONNECTEZ TOUTES LES SOURCES ELECTRIQUES INCLUANT LES DISCONNECTS SITUES A DISTANCE AVANT D'EFFECTUER L'ENTRETIEN.
FAUTE DE DECONNECTER LA SOURCE ELECTRIQUE AVANT D'EFFECTUER L'ENTRETIEN PEUT ENTRAINER DES BLESSURES CORPORELLES SEVERES OU LA MORT.

IMPORTANT
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

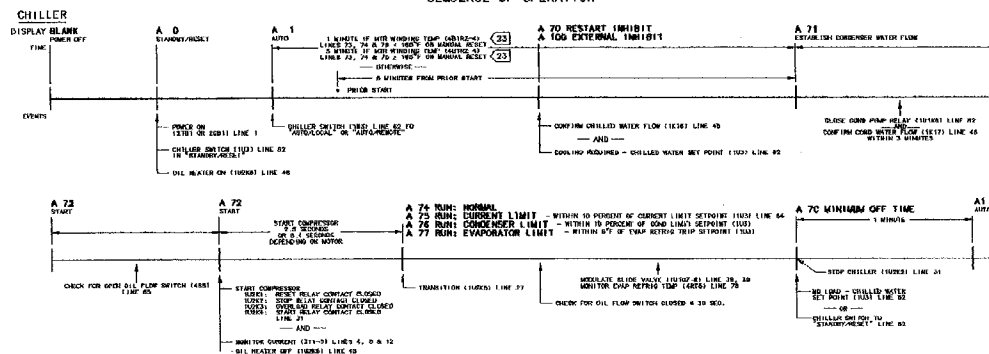
Figure 4
System Schematic Diagram for
RTHA Units with Unit-Mounted
WYE Delta Starters - Page 2

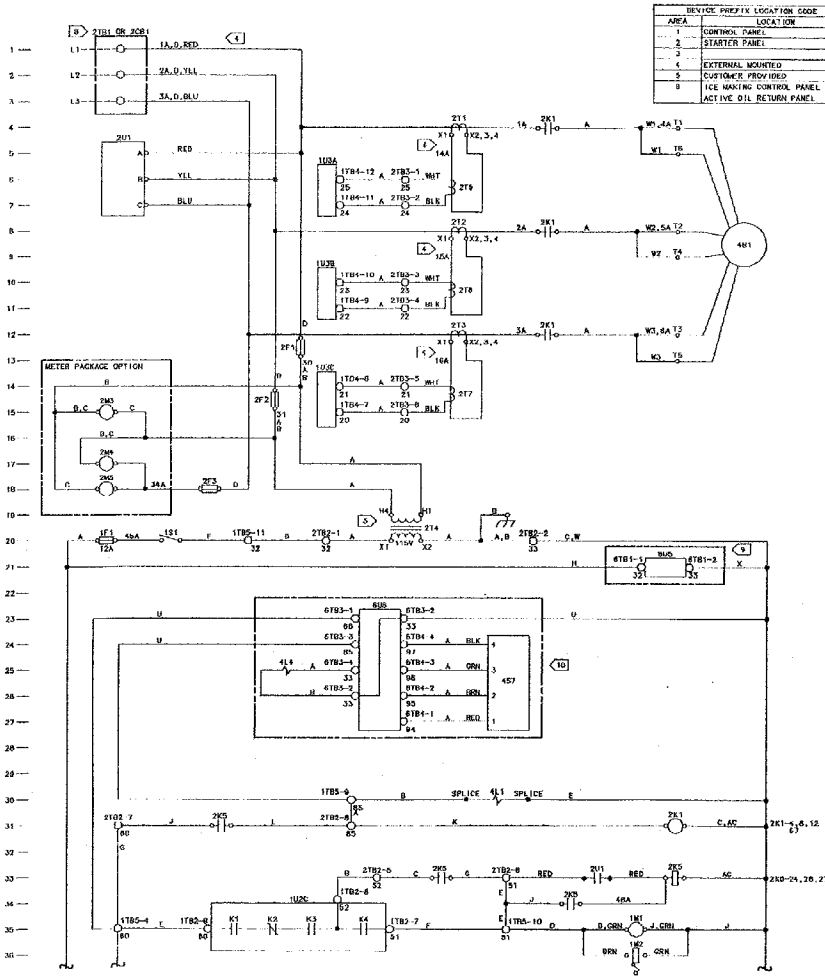
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SEQUENCE OF OPERATION



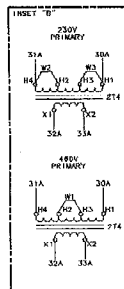
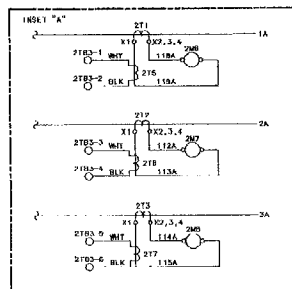
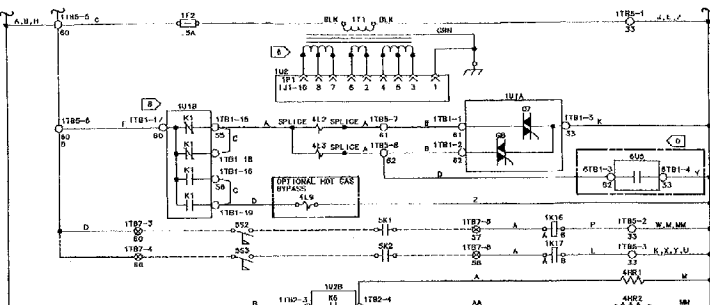


OFFICE	DESCRIPTION	LINE
W1	TRIP, CONTROL CIRCUIT	20
W2	FUSE, 111 PRIMARY	37
W3	JACK	131-134
W4	PLUG	131-134
W5	RELAY, 552 INTERFACE	45
W6	RELAY, 553 INTERFACE	46
W7	POWER METER	35
W8	START METER	36
W9	COND. PRESS. TRANSDUCER	75
W10	SERVICE SWITCH	20
W11	HIGH PRESSURE OUTPUT	34
W12	POWER SUPPLY TRANSFORMER	37
W13	TERMINAL BLOCK, REL. OUTPUT	1101
W14	TERMINAL BLOCK, POWER SUPPLY	1102
W15	TERMINAL BLOCK, MICRO-WID INPUT	1103
W16	TERMINAL BLOCK, MICRO-WID INPUT	1104
W17	TERMINAL BLOCK, MICRO-WID INPUT	1105
W18	TERMINAL BLOCK, MICRO-WID INPUT	1106
W19	TERMINAL BLOCK, MICRO-WID INPUT	1107
W20	RELAY, OUTPUT MODULE	1114-C
W21	RELAY, NOT GAS BYPASS ENABLE	111 K1
W22	RELAY, HEAD RELIEF REQUEST	111 K3
W23	RELAY, ALARM	111 K4
W24	RELAY, COND. WATER PUMP	111 K6
W25	RELAY, VALVE LEAK	111 G7
W26	ICE VALVE, UNLOAD	111 G8
W27	POWER SUPPLY OUTPUT MODULE	112A-G
W28	NO START INJAY	112 R1
W29	STOP RELAY	112 K2
W30	OVERLOAD RELAY	112 K3
W31	COMP. START RELAY	112 K4
W32	OIL HEATER RELAY	112 K5
W33	MICRO MODULE	112A-C
W34	STARTER CIRCUIT BREAKER OR NON-FUSED MECHANICAL DISCONNECT SWITCH	20B1
W35	FUSE, 214 PRIMARY	21 1, 2, 3, 21-3
W36	CONTACTOR, STARTER	21K
W37	PILOT RELAY	21K
W38	VOLT METER	21K3, 4, 5
W39	AMP METER	21K6, 7, 8
W40	CURRENT TRANSFORMER, LARGE	21-1, 2
W41	CURRENT TRANSFORMER, SMALL	21-7
W42	LINE TERMINAL BLOCK	2101
W43	CONTROL TERMINAL BLOCK	2102
W44	LOW VOLTAGE TERMINAL BLOCK	2103
W45	PHASE REVERSAL MONITOR	2101
W46	COMPRESSOR MOTOR	401
W47	MOTOR WINDING TEMP SENSOR	401R2, 3, 4
W48	OIL TANK HEATER	401R1
W49	OIL TANK HEATER	401R2
W50	MASTER SOLENOID VALVE	41
W51	LOAD SOLENOID VALVE	41.2
W52	DISCHARGE SOLENOID VALVE	41.3
W53	OIL RETURN SOLENOID VALVE	41.4
W54	NOT GAS BYPASS VALVE	41.5
W55	OIL FLOW SWITCH	45
W56	OPTICAL SENSOR	457
W57	LEAVING EVAP SENSOR	461, 104
W58	ENTERING EVAP SENSOR	461.2
W59	LEAVING COND SENSOR	461.3
W60	ENTERING COND SENSOR	461.4
W61	EVAP REEF TEMP SENSOR	461.5
W62	AMBIENT TEMP SENSOR	461.6
W63	DISCHARGE TEMP SENSOR	461.7
W64	LEAVING ICE MAKER TEMP SENSOR	461.8
W65	EVAP WATER PUMP CONT. AUC	461.9
W66	COND WATER PUMP CONT. AUC	461.10
W67	WATER FLOW SWITCH	461.11
W68	WATER FLOW SWITCH	461.12
W69	RAIN SPILL FAULT SWITCH	461.13
W70	ICE MAKING CONTROL PANEL	461.14
W71	ACTIVE OIL RETURN CONTROL PANEL	461.15
W72	TERMINAL BLOCK HIGH VOLTAGE	461.16
W73	TERMINAL BLOCK CONTROL SIGNAL	461.17
W74	TERMINAL BLOCK HIGH VOLTAGE	461.18
W75	ACTIVE OIL RETURN	461.19
W76	TERMINAL BLOCK CONTROL SIGNAL	461.20
W77	ACTIVE OIL RETURN	461.21

Figure 5
System Schematic Diagram for
RTHA Units with Unit-Mounted
X-Line Starters - Page 1

(continued on next page)

- NOTES:
1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C (77°F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED ON, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
 2. SOLID LINES INDICATE TRAPE WIRING, DASHED LINES INDICATE FIELD WIRING, PHANTOM LINES INDICATE OPTIONAL, IF ALTERN.
 3. NUMBERS ALONG THE RIGHT SIDE OF THE SCHEMATIC INDICATE THE LOCATION OF THE CONTACTS BY LINE NUMBER. AN UNDERLINED NUMBER INDICATES A NORMALLY CLOSED CONTACT. AN OPEN ARROWHEAD BELOW THE LINE NUMBER POINTING UPWARD INDICATES A TIMED CONTACT WHICH BECOMES TIMING WHEN ENERGIZED.
4. IF AMMETER-VOLTMETER OPTION IS REQUIRED SEE INSET "A".
5. 280/275 VOLT PRIMARY SHOWN. SEE INSET "B" FOR OTHER VOLTAGES.
6. SEE SERVICE MANUAL FOR INDIVIDUAL SECONDARY VOLTAGES.
7. THREE PHASE POWER SUPPLY VOLTAGE SEE UNIT NAMEPLATE.
8. RELAY COILS NOT SHOWN. CONTACTS ARE CONTROLLED BY THE LOGIC OF THE MICRO-MODULE (105). SEE SCHEDULE OF OPERATION LINES 102-113 PAGE 2.
9. OPTIONAL IDC MARKING CONTROL (6051).
10. OPTIONAL ACTIVE OIL RETURN (6051).



WARNING

HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER
INCLUDING REMOTE DISCONNECTS
BEFORE SERVICING.
FAILURE TO DISCONNECT POWER
BEFORE SERVICING CAN CAUSE
SEVERE PERSONAL INJURY OR DEATH.

AVERTISSEMENT

VOLTAJE DANGEREUX!
DECONNECTEZ TOUTES LES SOURCES
ELECTRIQUES INCLUANT LES
DISCONNECTS SITUES A DISTANCE
AVANT D'EXECUTER L'ENTRETIEN.
FAUTE DE DECONNECTER LA SOURCE
ELECTRIQUE AVANT D'EXECUTER
L'ENTRETIEN PEUT ENTRAINER DES
BLESSURES CORPORELLES SEVERES
OU LA MORT.

IMPORTANT

USE COPPER CONDUCTORS ONLY
TO PREVENT EQUIPMENT DAMAGE.
UNIT TERMINALS ARE NOT DESIGNED
TO ACCEPT ANY OTHER WIRING.



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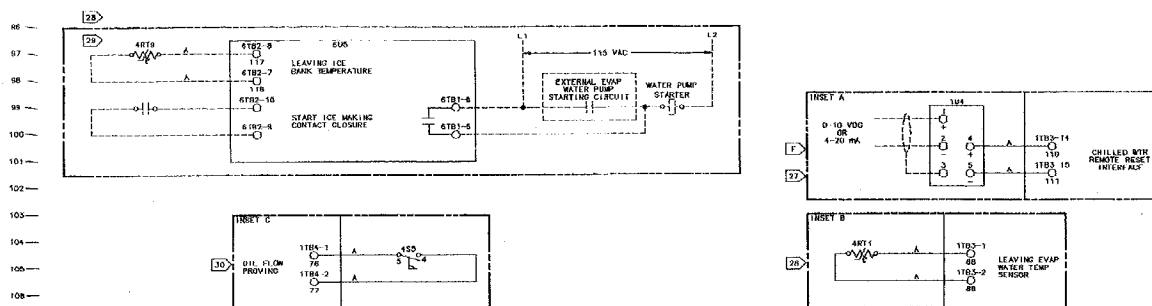
⚠ WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER
INCLUDING REMOTE DISCONNECTS
BEFORE SERVICING.
FAILURE TO DISCONNECT POWER
BEFORE SERVICING CAN CAUSE
SEVERE ELECTRICAL INJURY OR DEATH.

⚠ AVERTISSEMENT
VOLTAJE PELIGROSO!
DESCONECTE TODAS LAS FUENTES
ELÉCTRICAS INCLUIDAS LAS
DESCONECTORES SITUADAS A DISTANCIA
ANTES DE REALIZAR EL SERVICIO.
FALTA DE DESCONECTAR LA FUENTE
ELÉCTRICA ANTES DE EFECTUAR
EL SERVICIO PUEDE CAUSAR LESIONES
O LA MUERTE.

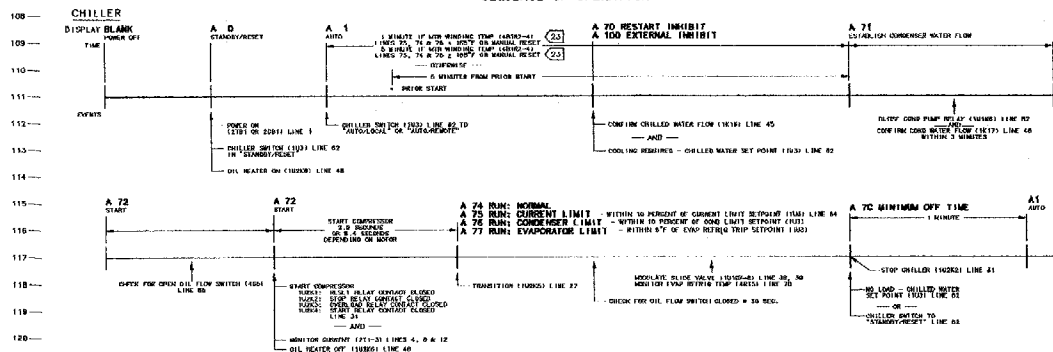
⚠ IMPORTANT
USE COPPER CONDUCTORS ONLY
TO PREVENT EQUIPMENT DAMAGE.
UNIT TESTS MAY BE REQUIRED
TO ACCEPT ANY OTHER WIRING.

Figure 6
System Schematic Diagram for
RTHA Units with Unit-Mounted
X-Line Starters – Page 2

(continued on next page)



SEQUENCE OF OPERATION



ICE MAKER

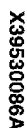
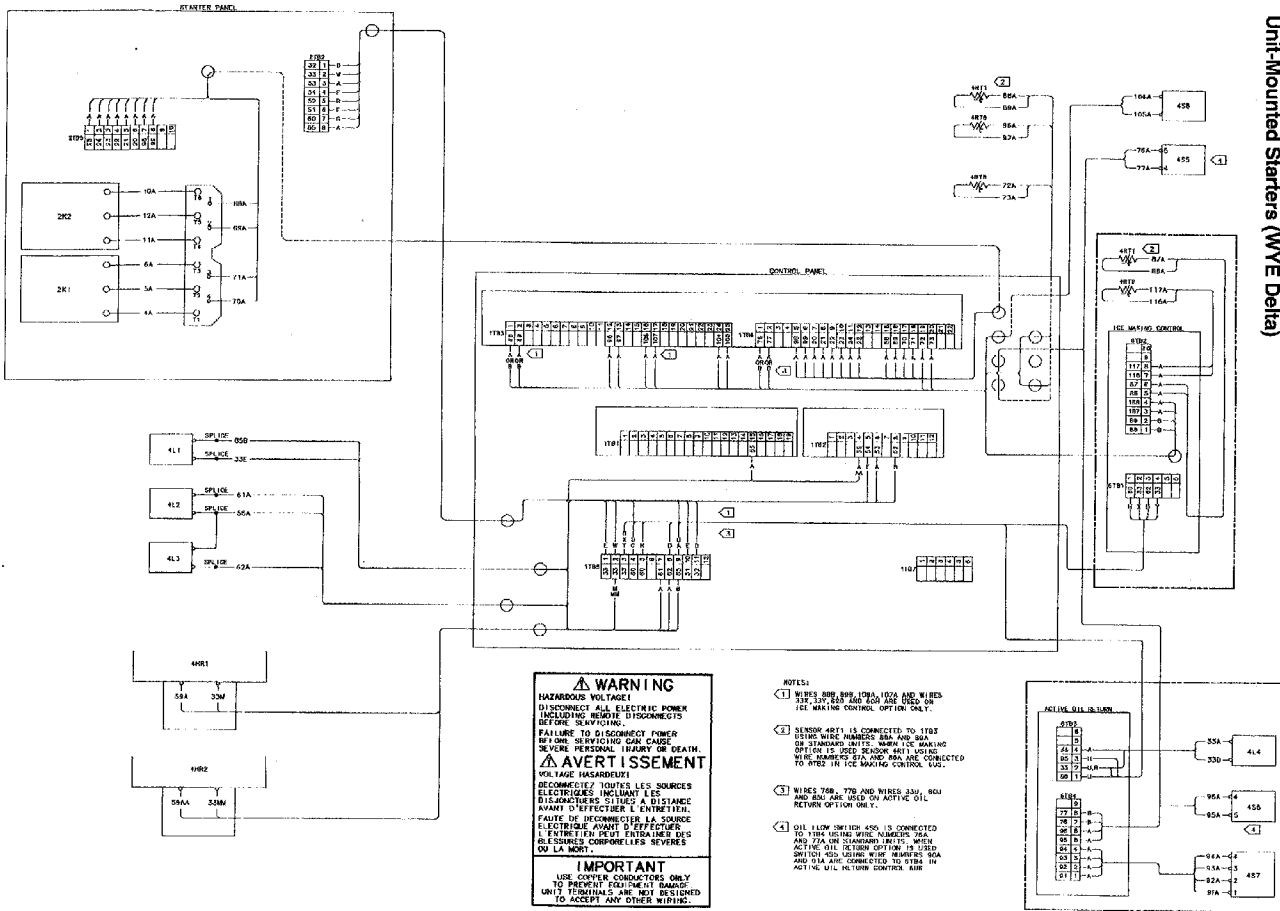


Figure 9
Unit Component Interconnection
Diagram for RTHA Units with
Unit-Mounted Starters (WYE Delta)

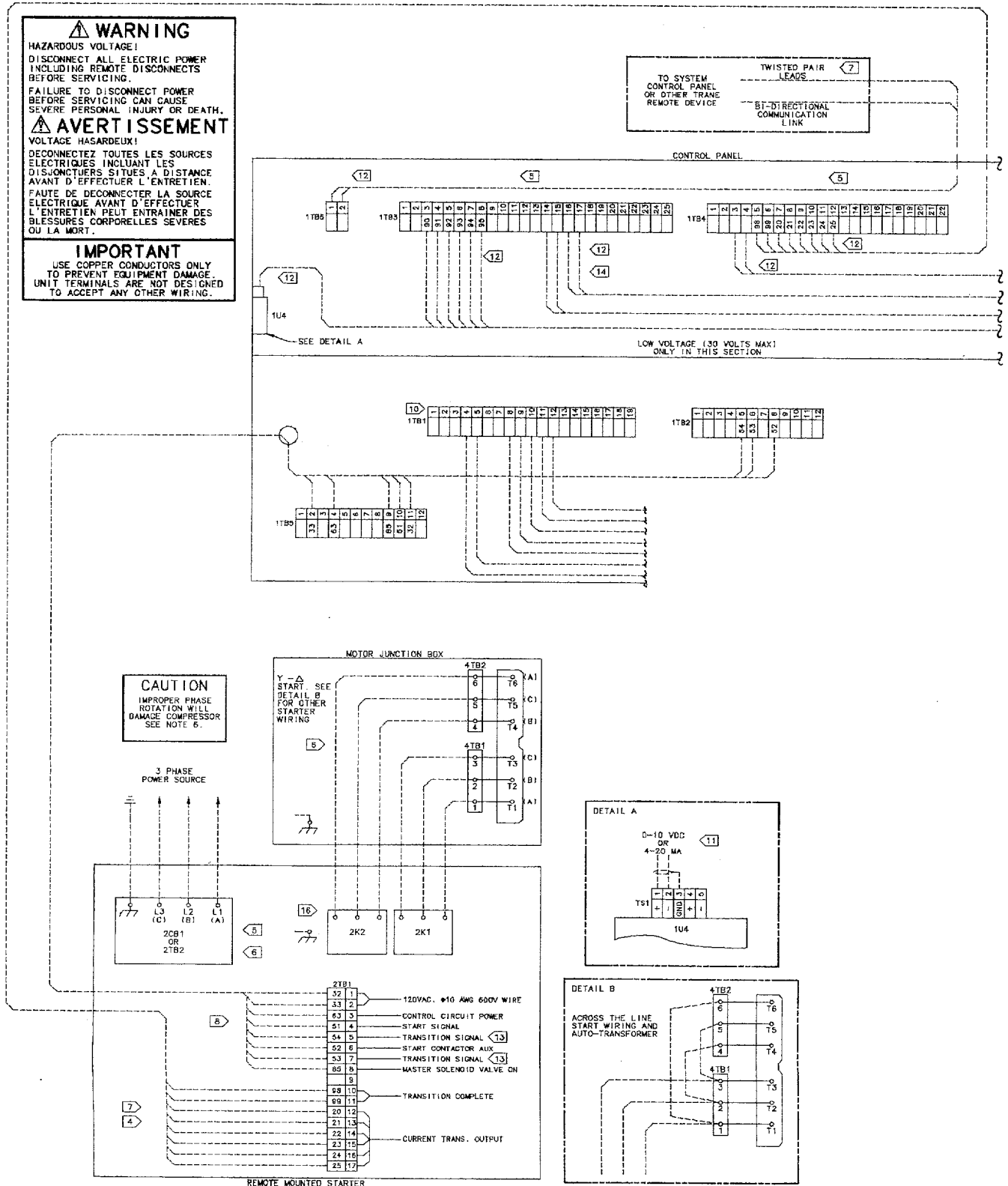


RTHA Units with Remote-Mounted Starter Panel

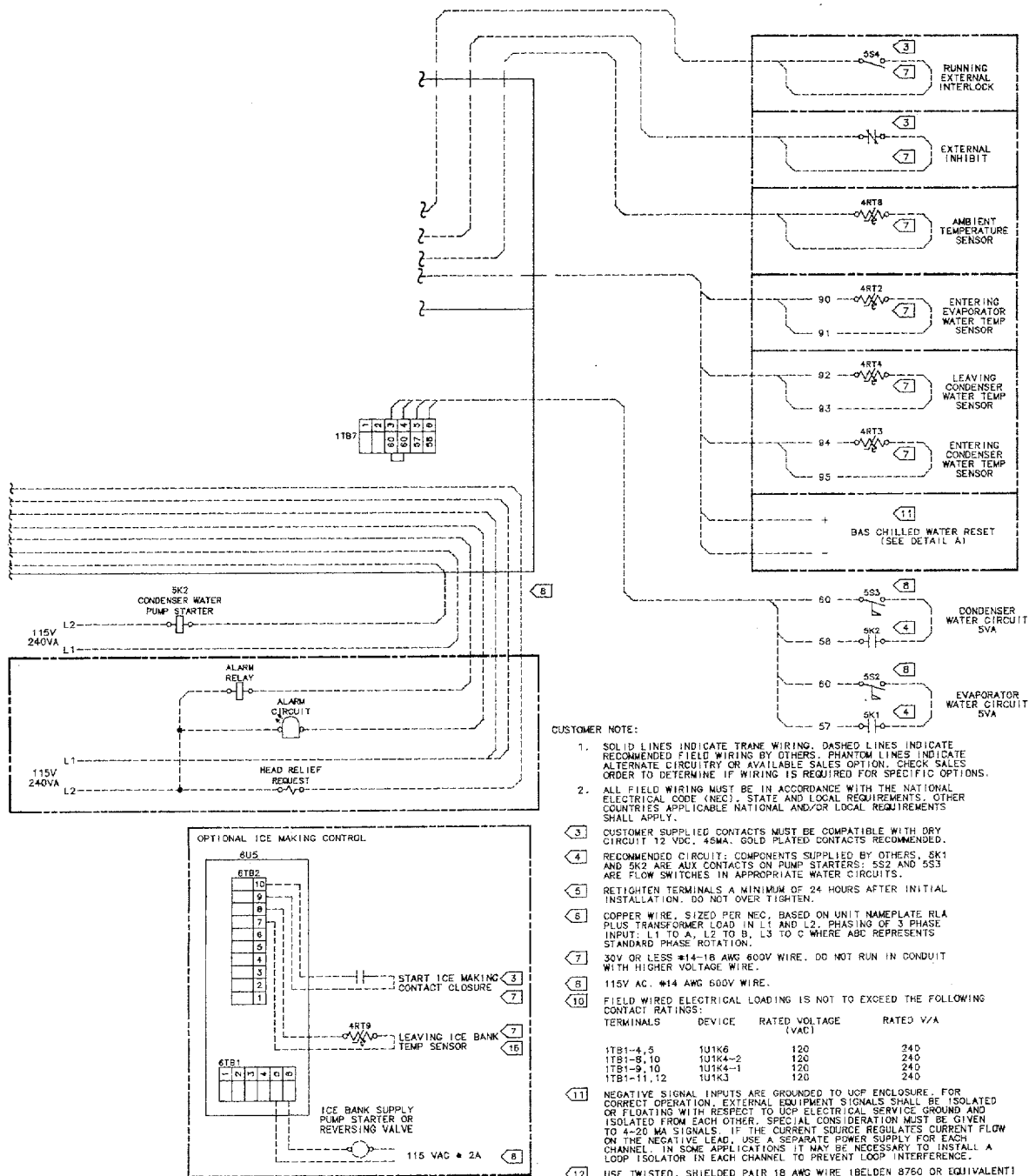
The diagrams that appear in this section are representative of RTHA units equipped with a remote-mounted starter panel.

Figure 10
Field Wiring Diagram for
RTHA Units with
Remote-Mounted Starters

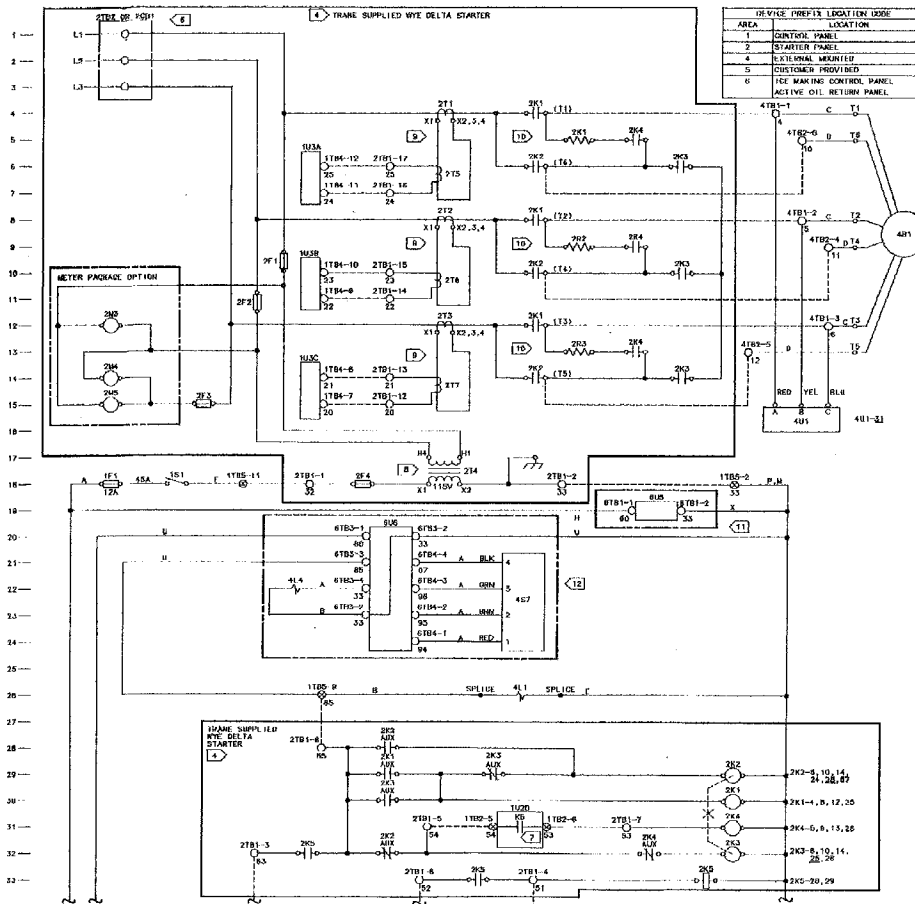
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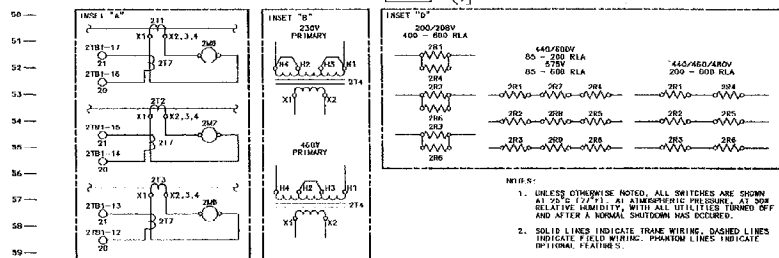


AREA	DESCRIPTION
1	CONTROL PANEL
2	STARTER PANEL
4	EXTERNAL MOUNTED
5	CUSTOMER PROVIDED
6	ICE MAKING CONTROL PANEL
7	ACTIVE OIL RETURN PANEL

DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1F1	FUSE, CONTROL CIRCUIT	10
1F2	FUSE, 115V PRIMARY	30
1A1-1A4	JACK	10
1K16	RELAY, 655 INTERFERENCE	46
1K17	RELAY, 655 INTERFERENCE	47
1M1	ANALOG METER	34
1M2	START METER	34
1M3	COND. PRESS. TRANSDUCER	75
1S1	SERVICE SWITCH	10
1S2	HIGH PRESSURE DISCUT	84
1T1	POWER SUPPLY TRANSFORMER	38
1T2	TEMP BLOCK REL. OUTPUT	10
1T3	TEMP BLOCK POWER SUPPLY	10
1T4	TEMP BLOCK MICRO-AND INPUT	10
1T5	TEMP BLOCK MICRO-AND INPUT	10
1T6	TEMP BLOCK MICRO-AND INPUT	10
1T7	TEMP BLOCK CUSTOMER CONNECT	10
1U1A-C	RELAY, OUTPUT MOD	SHEET 2
1U1	RELAY, HOT GAS BYPASS FAN	47
1U1 K3	RELAY, HEAD RELIEF REQUEST	88
1U1 K5	RELAY, ALARM	85
1U1 K6	RELAY, COND. WATER PUMP	92
1U1 K7	RELAY, VALVE-LOAD	42
1U1 K8	RELAY, VALVE-UNLOAD	42
1U1 K9	RELAY, VALVE-UNLOAD	42
1U1 K10	RELAY, VALVE-UNLOAD	42
1U1 K11	RELAY, VALVE-UNLOAD	42
1U1 K12	RELAY, VALVE-UNLOAD	42
1U1 K13	RELAY, VALVE-UNLOAD	42
1U1 K14	RELAY, VALVE-UNLOAD	42
1U1 K15	RELAY, VALVE-UNLOAD	42
1U1 K16	RELAY, VALVE-UNLOAD	42
1U1 K17	RELAY, VALVE-UNLOAD	42
1U1 K18	RELAY, VALVE-UNLOAD	42
1U1 K19	RELAY, VALVE-UNLOAD	42
1U1 K20	RELAY, VALVE-UNLOAD	42
1U1 K21	RELAY, VALVE-UNLOAD	42
1U1 K22	RELAY, VALVE-UNLOAD	42
1U1 K23	RELAY, VALVE-UNLOAD	42
1U1 K24	RELAY, VALVE-UNLOAD	42
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1U1 K26	RELAY, VALVE-UNLOAD	42
1U1 K27	RELAY, VALVE-UNLOAD	42
1U1 K28	RELAY, VALVE-UNLOAD	42
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1U1 K30	RELAY, VALVE-UNLOAD	42
1U1 K31	RELAY, VALVE-UNLOAD	42
1U1 K32	RELAY, VALVE-UNLOAD	42
1U1 K33	RELAY, VALVE-UNLOAD	42
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1U1 K41	RELAY, VALVE-UNLOAD	42
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1U1 K97	RELAY, VALVE-UNLOAD	42
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1U1 K99	RELAY, VALVE-UNLOAD	42
1U1 K100	RELAY, VALVE-UNLOAD	42

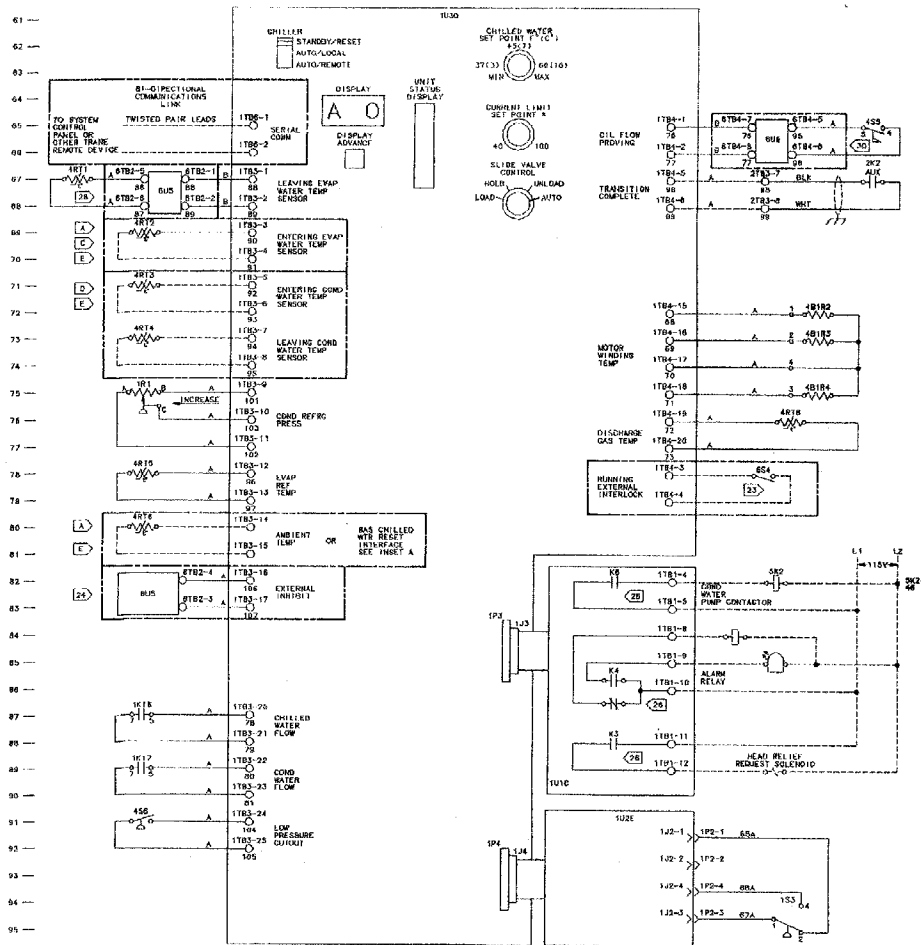
Figure 11
System Schematic Diagram
for RTHA Units with
Remote-Mounted WYE Delta
Starters - Page 1

(continued on next page)



6TB2	TERM BLOCK CONTROL SIGNAL ICE CONTROL	87.82 97
6TB3	TERM BLOCK HIGH VOLTAGE ACTIVE OIL RETURN	20
6TB4	TERM BLOCK CONTROL SIGNAL ACTIVE OIL RETURN	20.85

- 4 REMOVE A-B STARTER SHOWN AND WIRING BETWEEN CONTROL PANEL AND STARTER. HUMANITARIAN SIMILAR FIRE ARRESTOR TYPES OF STARTERS. SEE STARTER MANUFACTURER'S WIRING DIAGRAM FOR SPECIFIC STARTER WIRING.
- 5 SEE SERVICE MANUAL FOR INDIVIDUAL SECONDARY VOLTAGES.
- 6 120V PHASE POWER SUPPLY VOLTAGE 122.1V BY NAMEPLATE.
- 7 REPLY LINES NOT SHOWN. CONTACTS ARE CONTROLLED BY THE LOGIC OF THE MICROPROCESSOR (1102). SEE SEQUENCE OF OPERATION LINES 102-110 "B" 2.
- 8 220/275 VOLT PRIMARY SHOWN. SEE INSET "B" FOR OTHER VOLTAGES AND PLA SEE INSET "D".
- 9 IF METER PACKAGE OPTION IS REQUIRED SEE INSET "A".
- 10 RESISTOR SHOWN FUS 200/700W AND 200-400/PLA. FOR OTHER VOLTAGES AND PLA SEE INSET "D".
- 11 OPTIONAL ICE MAKING CONTROL (1802).
- 12 OPTIONAL ACTIVE ICE RETURN INLET.



NOTES:

21. DASHED LINES INDICATE FIELD WIRING BY OTHERS. PHANTOM LINES INDICATE ALTERNATE CIRCUITS NOT ON AVAILABLE PAGES OR TYPING. CHECK SALES ORDER TO DETERMINE IF WIRING IS REQUIRED FOR SPECIFIC OPTIONS.
22. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS, OTHER COUNTRIES APPLICABLE NATIONAL AND/OR LOCAL REQUIREMENTS SHALL APPLY. ALL WIRING TO 115V, 100A & 100V IS LOW VOLTAGE (30 VOLTS MAX) ONLY.
23. MANUAL RESET IS ACCOMPLISHED BY MOVING THE CHILLER SWITCH, LINE 62, FROM STANDBY/RESET TO AUTO. MANUAL RESET IS ALSO REQUIRED FOR A TEST OUT BUS TO THE RUNNING EXTERNAL INTERLOCK, LINE 78.
24. AUXILIARY TERMINAL CONNECTIONS FOR A CUSTOMER SPECIFIC OR UNINSTALLED REMOTE-CONTROL UNIT START/STOP SIGNAL. TERMINALS 115-10 AND 115-17 MUST BE JUMPED IF EXTERNAL INTERLOCK OR ICE MAKING CONTROL IS NOT USED.
25. THE FOLLOWING CAPABILITIES ARE OPTIONAL - THEY ARE UNWIRING AND WIRING AS REQUIRED FOR SPECIFIC SYSTEM APPLICATION.
26. CHILLED WATER RESET - REQUIRES MATCHED PAIR OF THERMISTORS FOR RT1 & RT2. LINE 67 & 69. IF AMBIENT TEMP BASED CHILLED WATER RESET IS REQUIRED, USE THE SUPPLIED LEAVING EVAP WATER TEMP SENSOR (ART1) LINE 67 FOR RT1. LINE 69 AS AN AMBIENT TEMP SENSOR.
27. ENTERING EVAP TEMP SENSOR - REQUIRES MATCHED PAIR OF THERMISTORS RT1 & RT2. LINES 67 & 69.
28. ENTERING AND LEAVING CONDENSER WATER TEMP SENSORS MATCHED PAIR OF THERMISTORS FOR ART3 & ART4 LINES 71 & 73.
29. TRASH MONITORING PACKAGE INCLUDES OPTIONS C AND D.
30. REMOTE REMOTE CHILLED WATER RESET INTERNALS MUST BE USED WITH CHILLED WATER RESET INTERFACE PANEL, OPTION B.
31. RELAY COILS NOT SHOWN. CONTACTS ARE CONTROLLED BY THE LOGIC OF THE MICRO-MODULE 1101. SEE DISCUSSION OF OPERATION LINES 102 - 110.
32. NEGATIVE SIGNAL INPUTS ARE GROUNDED TO UXP ENCLOSURE. FOR CORRECT OPERATION EXTERNAL EQUIPMENT SIGNALS SHALL BE ISOLATED OR FLOATING WITH RESPECT TO UXP ELECTRICAL SERVICE GROUND AND ISOLATED FROM EACH OTHER. SPECIAL CONSIDERATION MUST BE GIVEN TO THE CURRENT SOURCE. IF THE CURRENT SOURCE REGULATES CURRENT FLOW ON THE NEGATIVE LEAD, IN SOME APPLICATIONS IT MAY BE NECESSARY TO INSTALL A LOAD ISOLATOR IN EACH CHANNEL TO PREVENT LOOP INTERFERENCE.
33. OPTIONAL ICE MAKING CONTROL SHOWN SEE INSET B FOR WIRING WHEN OPTION IS NOT USED.
34. LEAVING ICE BANK SENSOR IS FRAME SUPPLIED BUT FIELD INSTALLED.
35. OPTIONAL ACTIVE OIL RETURN CONTROL SHOWN SEE INSET C FOR WIRING WHEN OPTION IS NOT USED.

⚠ WARNING

HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.
FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

⚠ AVERTISSEMENT

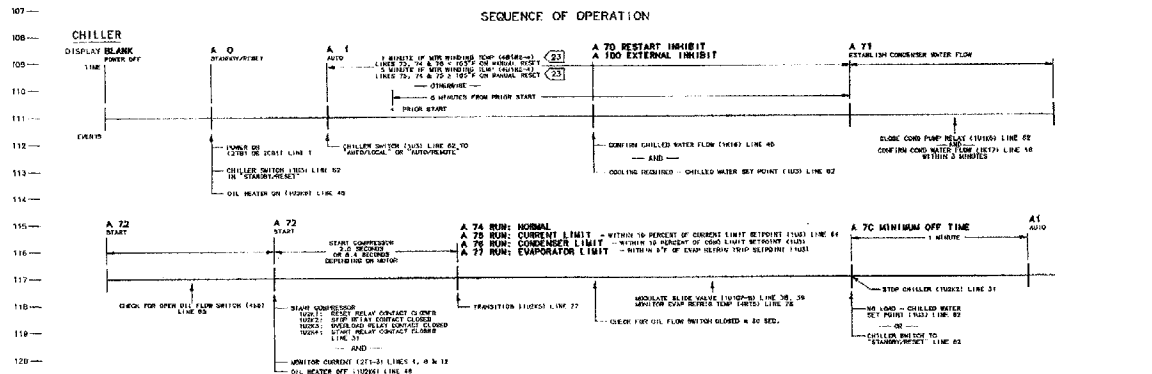
VOLTAGE HASARDEUX!
DECONNECTEZ TOUTES LES SOURCES ELECTRIQUES INCLUANT LES DISJONCTEURS SITUES A DISTANCE AVANT D'EXECUTER L'ENTRETIEN.
FAUTE DE DECONNECTER LA SOURCE ELECTRIQUE AVANT D'EXECUTER L'ENTRETIEN PEUT ENTRAINER DES BLESSURES CORPORELLES SEVERES OU LA MORT.

IMPORTANT

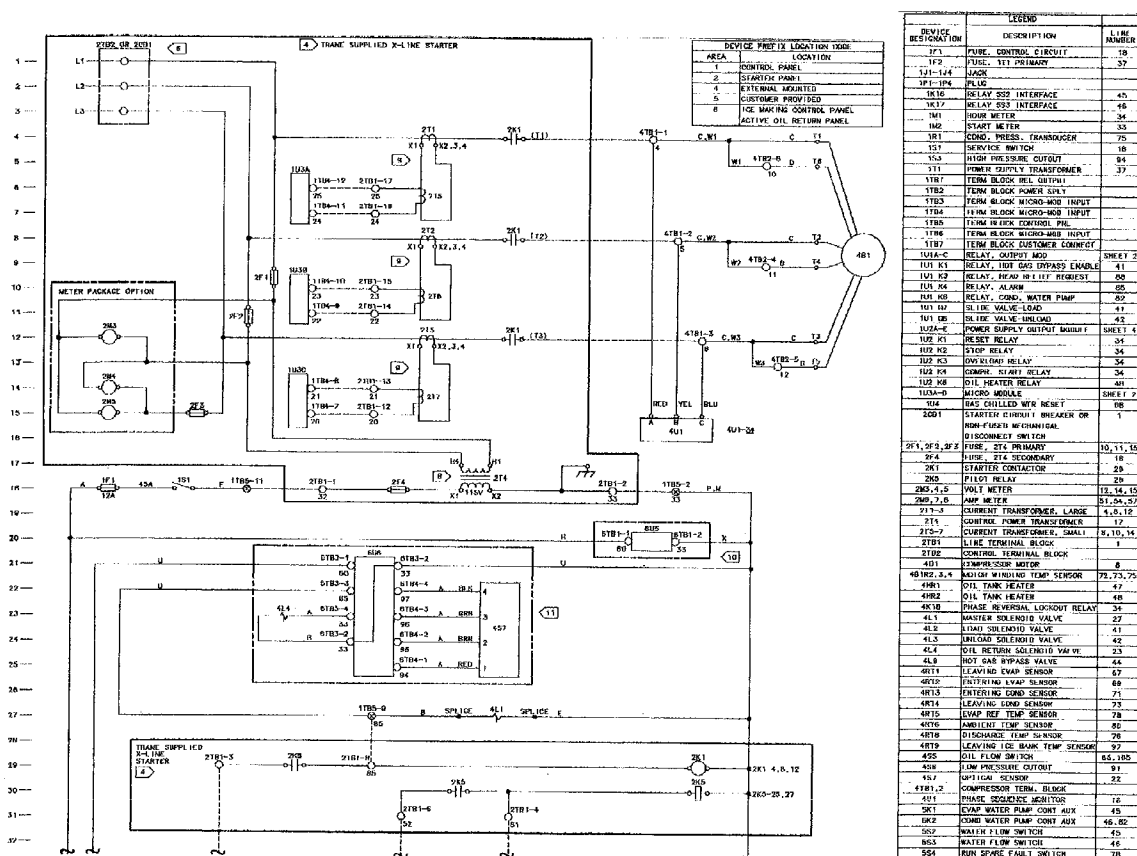
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

Figure 12
System Schematic Diagram
for RTHA Units with
Remote-Mounted WYE Delta
Starters - Page 2

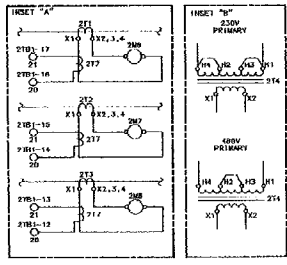
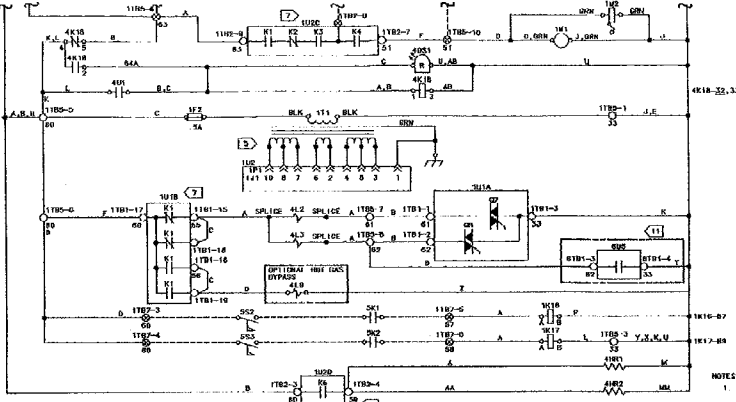
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805	ICE MAKING CONTROL PANEL	20.43
806	ACTIVE OIL RETURN CONTROL PANEL	21.85
807	HEAVY BLOCK HIGH VOLTAGE ICE CONTROL	20.43
808	HEAVY BLOCK CONTROL SIGNAL ICE CONTROL	21.85
809	HEAVY BLOCK HIGH VOLTAGE ACTIVE OIL RETURN	21.85
810	HEAVY BLOCK CONTROL SIGNAL ACTIVE OIL RETURN	22.90

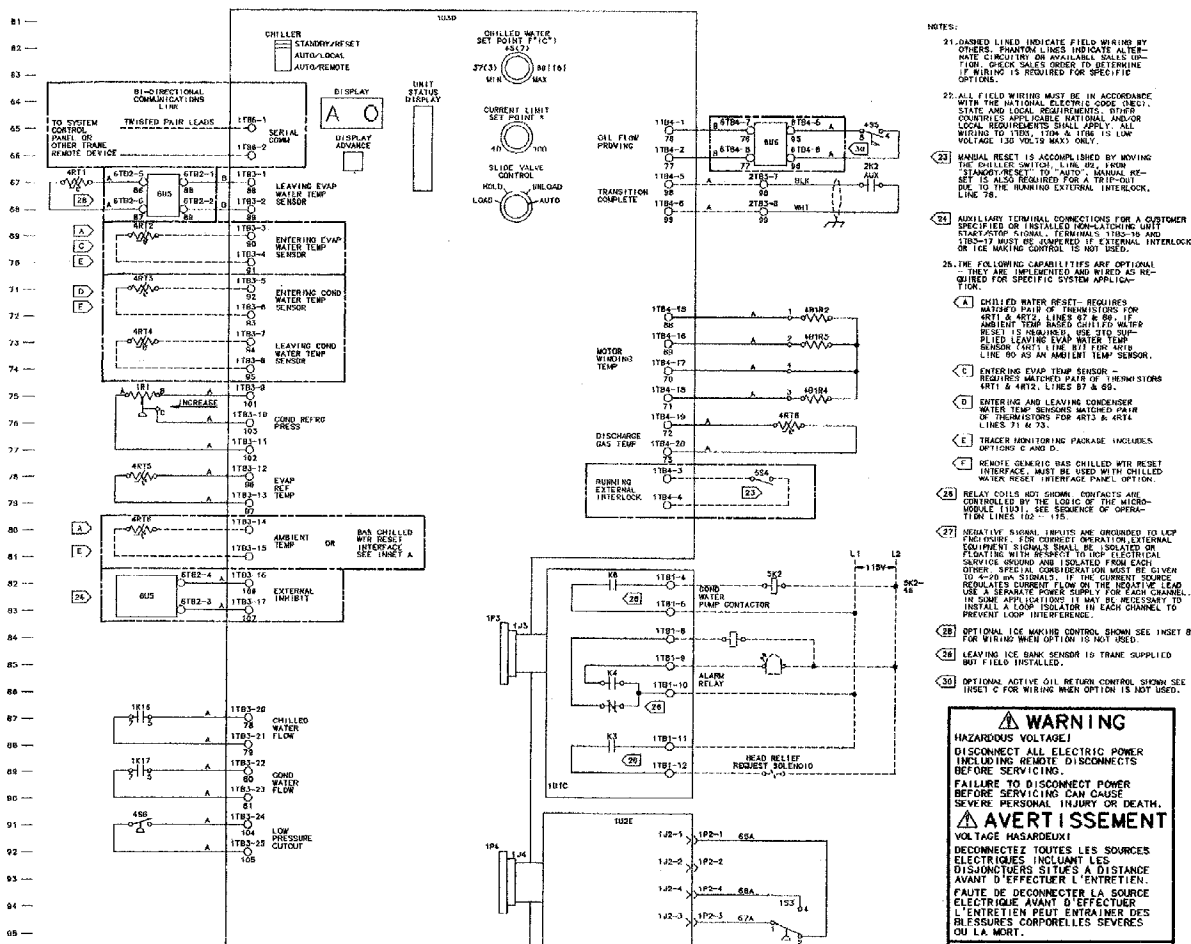


WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING.
FAILURE TO DISCONNECT POWER BEFORE SERVICING CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.
AVERTISSEMENT
VOLTAGE HAZARDEUX!
DECONNECTEZ TOUTES LES SOURCES ELECTRIQUES INCLUANT LES DISJONCTEURS SITUES A DISTANCE AVANT D'EFFECTUER L'ENTRETIEN.
FAUTE DE DECONNECTER LA SOURCE ELECTRIQUE AVANT D'EFFECTUER L'ENTRETIEN PEUT ENTRAINER DES BLESSURES CORPORELLES SEVERES OU LA MORT.
IMPORTANT
USE COPPER CONDUCTORS ONLY TO PREVENT EQUIPMENT DAMAGE. UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT ANY OTHER WIRING.

- NOTES:
1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C (77°F) AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED ON, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
 2. SOLID LINES INDICATE TRAW WIRING; DASHED LINES INDICATE FIELD WIRING. PHANTOM LINES INDICATE OPTIONAL FEATURES.
 3. RANGES ALONG THE RIGHT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF THE CONTACTS BY LINE NUMBER. AN UNDERLINED NUMBER INDICATES A NORMALLY CLOSED CONTACT. AN UPPER ARROWHEAD BELOW THE LINE NUMBER POSITIVE UPWARD INDICATES A TRIP CONTACT WHICH BEGINS TRIP WHEN ENERGIZED.
 4. REMOTE X-LINE STARTER SHOWN AND WIRING BETWEEN CONTROL PANEL AND STARTER REMAIN SIMILAR FOR VARIOUS TYPES OF STARTERS. USE STARTER WIRING DIAGRAM FOR SPECIFIC STARTER.
 5. SEE SERVICE MANUAL FOR INDIVIDUAL SECONDARY VOLTAGES.
 6. THREE PHASE POWER SUPPLY VOLTAGE SEE UNIT NAMEPLATE.
 7. RELAY COILS NOT SHOWN. CONTACTS ARE CONTROLLED BY THE LOGIC OF THE MICRO-MODULE (M2). SEE SEQUENCE OF OPERATION LINES 105-120 PAGE 2.
 8. DOMESTIC VOLT. PRIMARY SHOWN. SEE INSET "B" FOR OTHER VOLTAGES.
 9. IF METER PACKAGE OPTION IS REQUIRED SEE INSET "A".
 10. OPTIONAL ICE MAKING CONTROL (805).
 11. OPTIONAL ACTIVE OIL RETURN (806).

Figure 14
System Schematic Diagram
 for RTHA Units with
 Remote-Mounted X-Line Starters

(continued on next page)



33



BUS					
ICEMAKER					
DEFINITION					
BT82					
117.0	A				
118.2	A				
97.1	A				
490.5	A				
106.4	A				
107.3	A				
88.2	B				
88.1	B				
BT81					
1	2	3	4	5	6
H	T	C	Y		
BUS					
ACTIVE DIL					
CAPTION					
BT84					
6					
13					
85.3	U				
33.2	U, B				
60.1	U				
BT84					
77.8	B				
78.7	B				
94.6	A				
95.5	A				
94.4	A				
95.3	A				
92.7	A				
91.1	A				

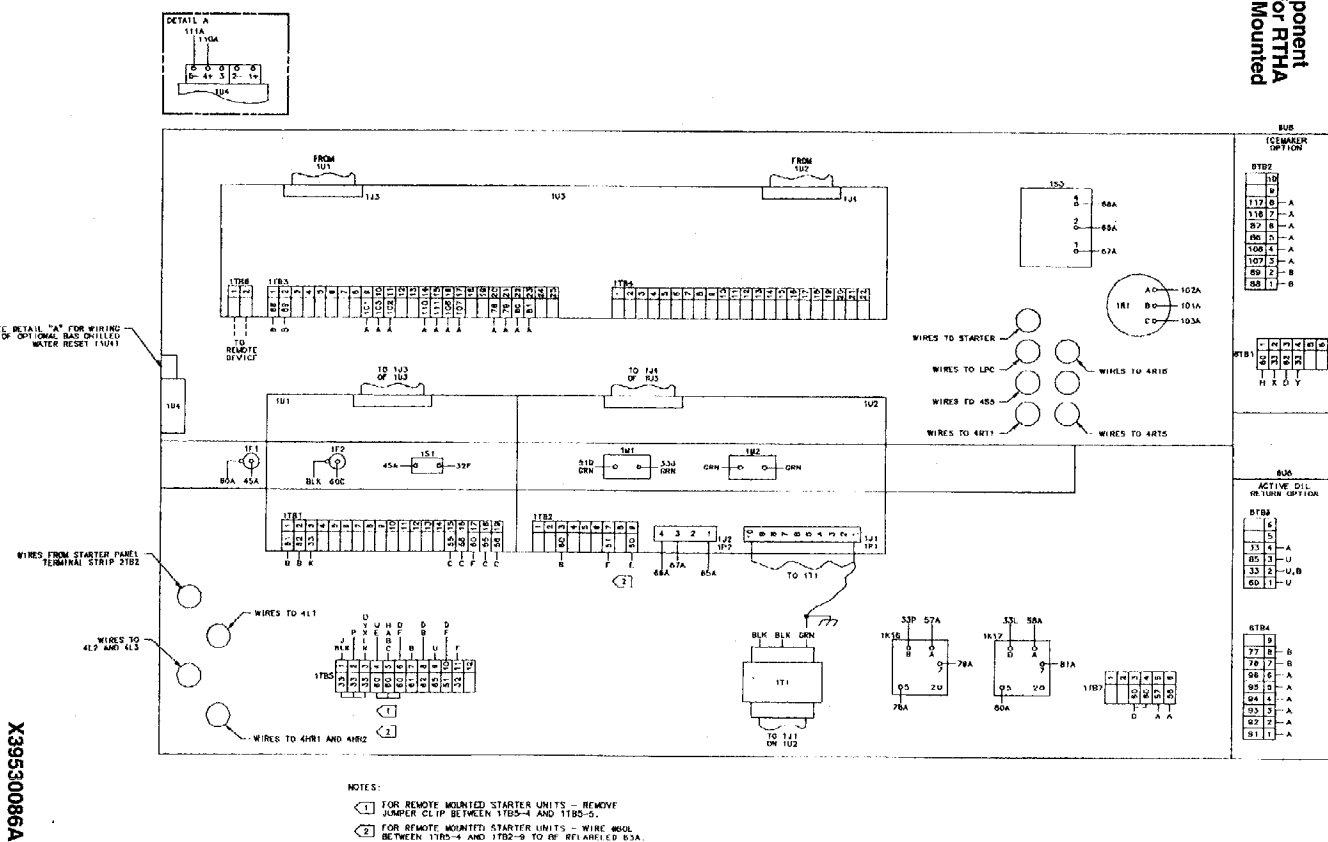


Figure 16
Unit Component Location
Diagram for RTHA Units with
Remote-Mounted Starters

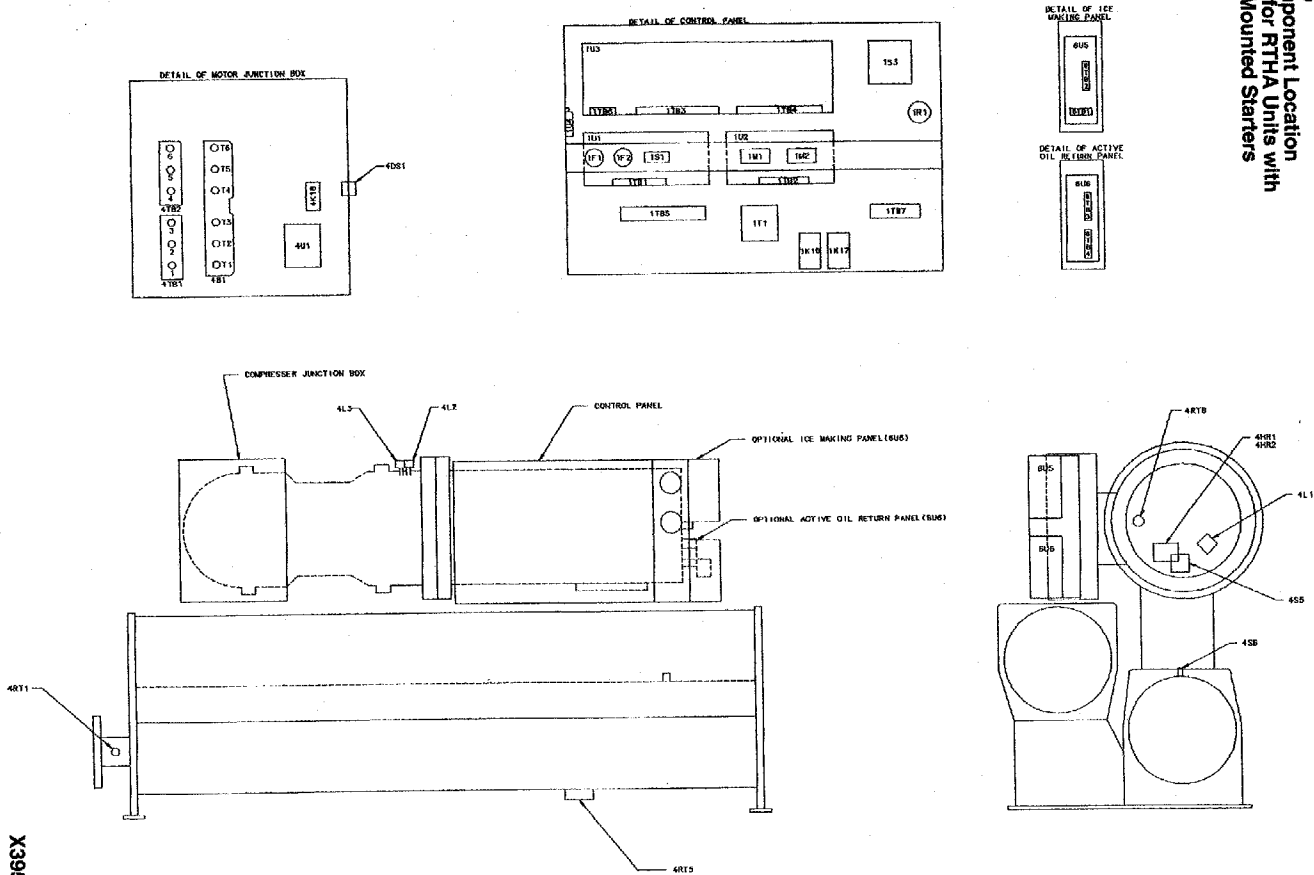


Figure 17
Unit Component Interconnection
Diagram for RTHA Units with
Remote-Mounted Starters

