Installation
Operation
Maintenance

Air-Cooled Scroll Chillers

Model CGAM

20 – 130 Tons — Made in USA

⚠SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

January 2011

CG-SVX17D-EN

Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provided to alert installing contractors to potential hazards that could result in personal injury or death. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

ATTENTION: Warnings, Cautions and Notices appear at appropriate sections throughout this literature. Read these carefully.

⚠**WARNING**: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠**CAUTION**: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

NOTICE: Indicates a situation that could result in equipment or property-damage-only accidents.

Important Environmental Concerns!

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs such as HCFCs and HFCs.

Responsible Refrigerant Practices!

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified. The Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠WARNING
R-410A Refrigerant under Higher Pressure than R-22!

The unit described in this manual uses R-410A refrigerant which operates at higher pressures than R-22 refrigerant. Use ONLY R-410A rated service equipment or components with this unit. For specific handling concerns with R-410A, please contact your local Trane representative.

Failure to use R-410A rated service equipment or components could result in equipment or components exploding under R-410A high pressures which could result in death, serious injury, or equipment damage.

⚠WARNING
Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to appropriate MSDS and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA70E or other country-specific requirements for arc/flash protection PRIOR to servicing the unit.**

Failure to follow recommendations could result in death or serious injury.

⚠WARNING
Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product it may be necessary to work with live electrical components. Have a qualified, licensed electrician or other person who has been properly trained in working with live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in serious injury or death.

Trademarks

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Table of Contents

Model Number Description

Overview

This manual covers the installation, operation and maintenance of the CGAM units.

Nameplates

The CGAM unit nameplates are applied to the exterior surface of the control panel door for 20-70 Ton sizes. The 80-120 Ton sizes have a nameplate on a support beam to the right side of the starter panel.

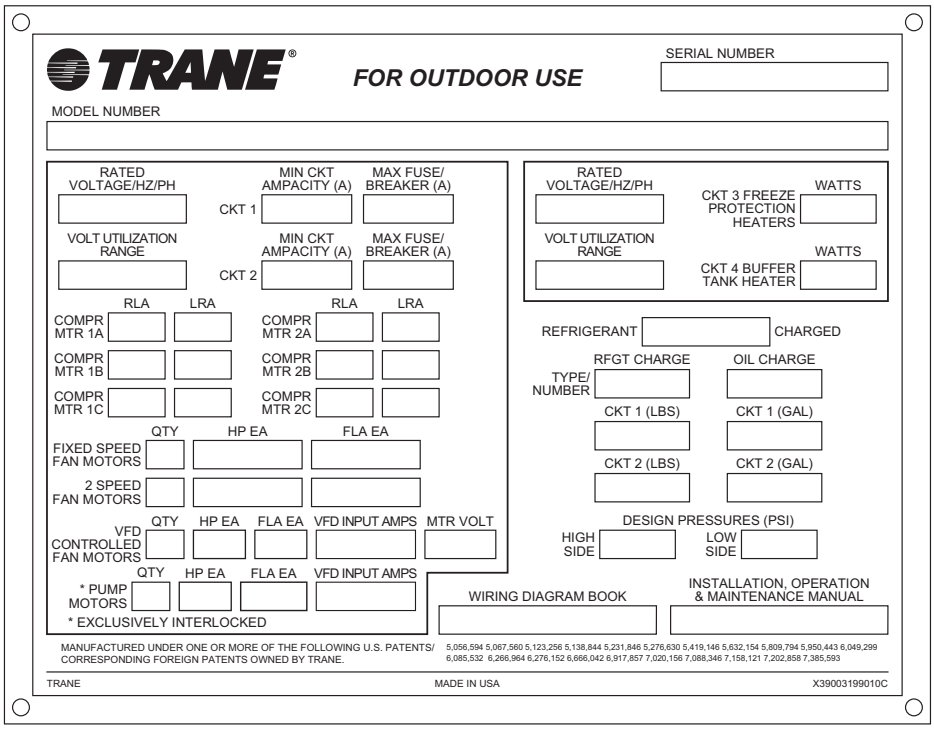
A compressor nameplate is located on each compressor.

Unit Nameplate

The unit nameplate provides the following information:

- Unit model and size descriptor.
- Unit serial number.
- Identifies unit electrical requirements.
- Lists correct operating charges of R-410A and refrigerant oil.
- Lists unit design pressures.
- Identifies installation, operation and maintenance and service data literature.
- Lists drawing numbers for unit wiring diagrams.

Figure 1. Unit Nameplate



Unit Model Number

Digit 1-4 Chiller Model
CGAM Air-Cooled Scroll Packaged Chiller

Digit 5-7 Unit Nominal Ton
020 20 Tons
026 26 Tons
030 30 Tons
035 35 Tons
040 40 Tons
052 52 Tons
060 60 Tons
070 70 Tons
080 80 Tons
090 90 Tons
100 100 Tons
110 110 Tons
120 120 Tons
130 130 Tons

Digit 8 Unit Voltage
A 208 Volt 60 Hz 3 Phase
B 230 Volt 60 Hz 3 Phase
D 380 Volt 60 Hz 3 Phase
E 400 Volt 50 Hz 3 Phase
F 460 Volt 60 Hz 3 Phase
G 575 Volt 60 Hz 3 Phase

Digit 9 Manufacturing Plant
2 Pueblo, USA

Digit 10-11Design Seq
A-Z Factory/ABU Assigned

Digit 12 Unit Type
2 High Efficiency

Digit 13 Agency Listing
X No Agency Listing
A UL Listed to US and Canadian Safety Standard

Digit 14 Pressure Vessel Code
X No Pressure Code

Digit 15 Unit Application
D Wide Ambient (0 to 125F/-18 to 52C)

Digit 16 Refrigerant Isolation Valves
2 Refrigerant Isolation Valves (Discharge Valve)

Digit 17 Seismically Rated
A Not Seismically Rated Unit
B Seismically Rated Unit

Digit 18 Freeze Protection (Factory-Installed Only)
1 With Freeze Protection (External T-Stat Control)

Digit 19 Insulation
A Factory Insulation - All Cold Parts
B Insulation for High Humidity/Low Evap Temp

Digit 20 Factory Charge
1 Full Factory Refrigerant Charge (HFC-410A)
2 Nitrogen Charge

Digit 21 Evaporator Application
A Standard Cooling (42 to 65°F/5.5 to 18°C)
B Low Temperature Processing (lower than 42°F/5.5°C)
C Ice-Making - hardwired interface (20 to 65°F/-7 to 18°C)

Digit 22 Water Connection
1 Grooved Pipe Connection

Digit 23 Condenser Fin Material
A Lanced Aluminum Fins
D Lanced Aluminum Fins w/ CompleteCoat™

Digit 24 Condenser Heat Recovery
X No Heat Recovery
1 Partial Heat Recovery w/ Fan Control

Digit 25 - Not Used
X

Digit 26 Starter Type
A Across the Line Starter/ Direct on Line

Digit 27 Incoming Power Line Connection
1 Single Point Power Connection

Digit 28 Power Line Connection Type
A Terminal Block Conn. For Incoming Lines
C Circuit Breaker
D Circuit Breaker with High Fault Rated Control Panel

Digit 29 Enclosure Type
1 Water Tight (Per UL 1995 Standard)

Digit 30 Unit Operator Interface
A Dyna-View/English
B Dyna-View/Spanish-Spain
C Dyna-View/Spanish-Mexico
D Dyna-View/French
E Dyna-View/German
F Dyna-View/Dutch
G Dyna-View/Italian
H Dyna-View/Japanese
J Dyna-View/Portuguese-Portugal
K Dyna-View/Portuguese-Brazil
L Dyna-View/Korean
M Dyna-View/Thai
N Dyna-View/Simplified Chinese
P Dyna-View/Traditional Chinese
R Dyna-View/Russian
T Dyna-View/Polish
U Dyna-View/Czech
V Dyna-View/Hungarian
W Dyna-View/Greek
Y Dyna-View/Romanian
Z Dyna-View/Swedish

Digit 31 Remote Interface (digital comm)
X No Remote Digital Communication
2 LonTalk/Tracer Summit Interface
3 Time of Day Scheduling
4 BACNet Interface

Digit 32 Ext. Chilled/Hot Water and Curr. Demand Limit Setpoint
X No Ext. Chilled Water Setpoint
A Ext Chilled Water and Demand Limit Setpoint - 4-20mA
B Ext Chilled Water and Demand Limit Setpoint - 2-10Vdc

Digit 33 Percent Capacity
X Without % Capacity
1 With % Capacity

Digit 34 Programmable Relays
X No Programmable Relays
A Programmable Relays

Digit 35 Pump Type
X No Pumps and no Contactors
8 Dual High Head Pump

Digit 36 Pump Flow Control
B Pump Flow Controlled by Variable Speed Drive

Digit 37 Buffer Tank
X No Tank
1 With Tank

Digit 38 Short Circuit Rating
A Default A Short Circuit Rating
B High A Short Circuit Rating

Digit 39 — Installation Accessories
X No Installation Accessories
1 Elastomeric Isolators

Digit 40 Water Strainer
A With Water Strainer Factory- Installed

Digit 41 Sound Attenuator Package
3 Super Quiet
5 Comprehensive Acoustic Package

Digit 42 Appearance Options
X No Appearance Options
A Architectural Louvered Panels
B Half Louvers

Digit 43 Exterior Finish
1 Standard Paint

Digit 44 Label and Literature Language
B Spanish
D English
E French and English

Digit 45 - Not Used
X

Digit 46 Shipping Package
X No Skid (Standard)
A Unit Containerization Package

Digit 47 Performance Test Options
X No Performance Test
2 1 Point Test with Report
3 Witness 1 Point Test with Report

Digit 48 Flow Switch Set Point
C 15
F 35
H 45
L 60

Digit 49 - Not Used
X

Digit 50 Specials
X None
S Special

Note: If a digit is not defined it may be held for future use.

Compressor Nameplate

The compressor nameplate provides the following information:

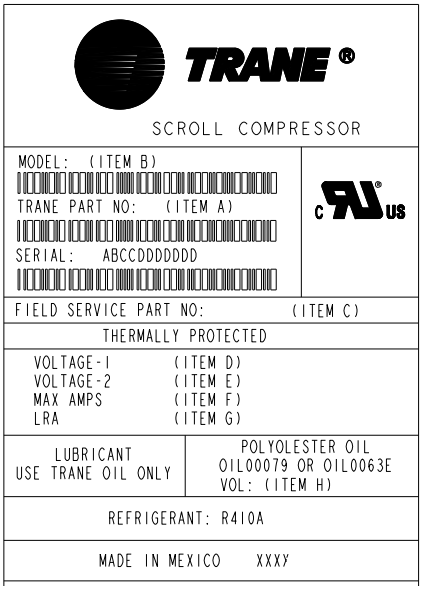
- Compressor model number.
- Compressor serial number.
- Compressor electrical characteristics.
- Utilization Range.
- Recommended refrigerant.

Model Number Coding System

The model numbers for the unit and the compressors are comprised of numbers and letter which represent features of the equipment.

Each position, or group of positions, in the number is used to represent a feature. For example, Unit Voltage, contains the number “F”. From the chart, it can be seen that a “F” in this position means that the unit voltage is 460/60/3.

Figure 2. CGAM Compressor Nameplate



Compressor Model Number

The compressor model number is located on the compressor nameplates.

Digit 1,2,3,4
CSHD - Light Commercial
CSHN - Commercial

Digit 5,6,7 – Capacity- 60 Hz AHRI Kbtu/Hr (approximate)
125 - CSHD
161 - CSHD
184 - CSHN
250 - CSHN
315 - CSHN
374 - CSHN

Digit 8 – Voltage
J - 200-230/3/60
K - 460/3/60-400/3/50
F - 230/3/50
D - 575/3/60
X - 380/3/60

Digit 9 – Unloading
(0 – no unloading)

Digit 10 – Design Sequence

Digit 11 – Protection Module Voltage
0- Int Line Break- CDHD
A - 115 VAC
B - 230 VAC
H – 24 VAC
K- 115/230 VAC -CSHN

Digit 12 – Basic Compressor Variation
M - Suction & Discharge Tube, oil equalizer with seal nut, Grade 32 POE oil

General Information

Unit Description

The CGAM units are scroll type, air-cooled, liquid chillers, designed for installation outdoors. The 20-35 ton units have a single independent refrigerant circuit, with two compressors per circuit. The 40 ton and larger units have 2 independent refrigerant circuits, with two compressors per circuit. The CGAM units are packaged with an evaporator and condenser.

Note: *Each CGAM unit is a completely assembled, hermetic -compressors packaged unit that is factory-piped, wired, leak-tested, dehydrated, charged and tested for proper control operations prior to shipment. The chilled water inlet and outlet openings are covered for shipment.*

The CGAM series features Trane's exclusive Adaptive Control logic with CH530 controls. It monitors the control variables that govern the operation of the chiller unit. Adaptive Control logic can correct these variables, when necessary, to optimize operational efficiencies, avoid chiller shutdown, and keep producing chilled water.

Each refrigerant circuit is provided with filter, sight glass, electronic expansion valve, and charging valves on the CGAM.

The evaporator is a brazed plate heat exchanger which is equipped with a water drain and vent connections in the water piping.The condenser is an air-cooled slit fin coil.

The condensers are available in three configurations depending on the tonnage of the unit. Units may be referred to the size by the condenser configuration. The three configurations are slant, V and W.

Figure 3. CGAM Slant 20-35 Ton Configuration

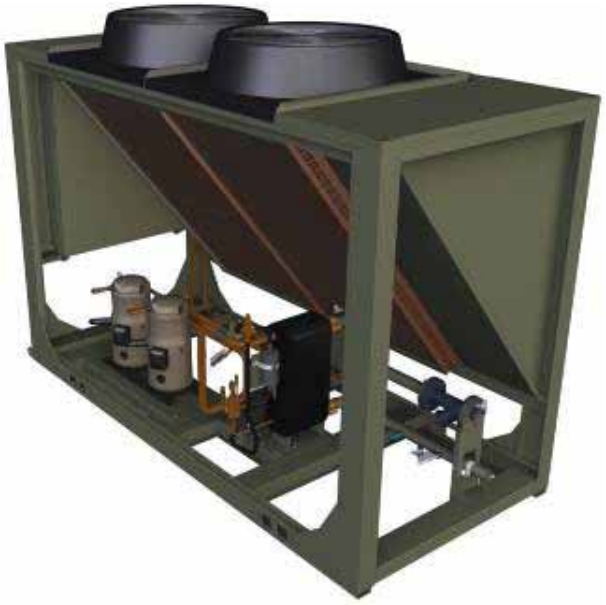


Figure 4. CGAM “V” 40-70 Ton Configuration

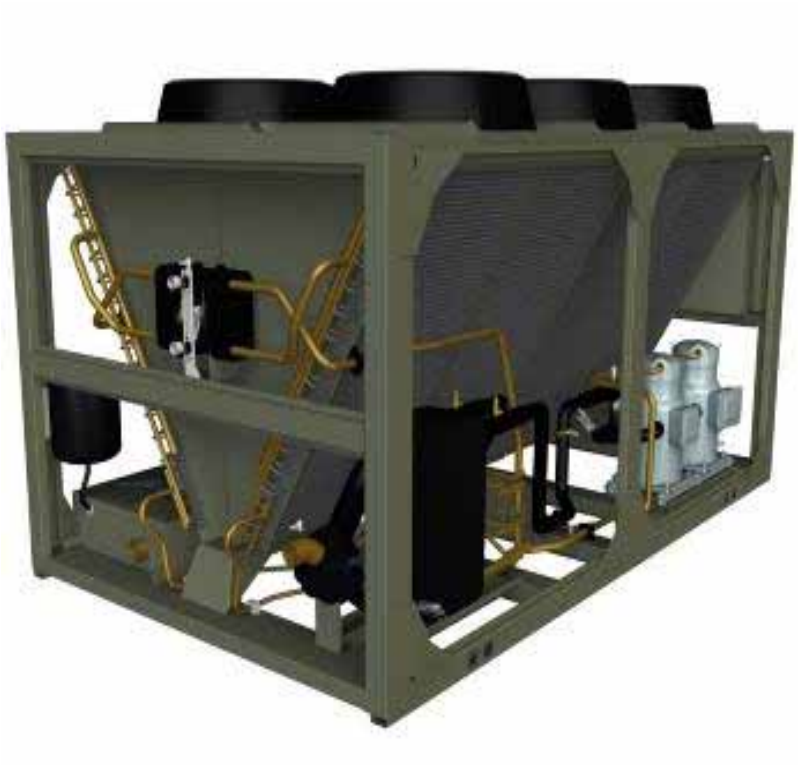


Figure 5. CGAM “W” 80-130 Ton Configuration

Accessory/Options Information

Check all the accessories and loose parts which are shipped with the unit against the original order. Included in these items will be water vessel drain plugs, rigging diagrams, electrical diagrams, and service literature, which are placed inside the control panel and/or starter panel for shipment. Also check for optional components, such as isolators.

The unit isolators and fan prop rod ship on brackets attached to the frame of the unit. The location varies by unit tonnage. The following figures show the location of these ship with items for the different sizes.

Figure 6. Slant 20 -35 Ton - Ship with Location - Isolator and Prop Rod

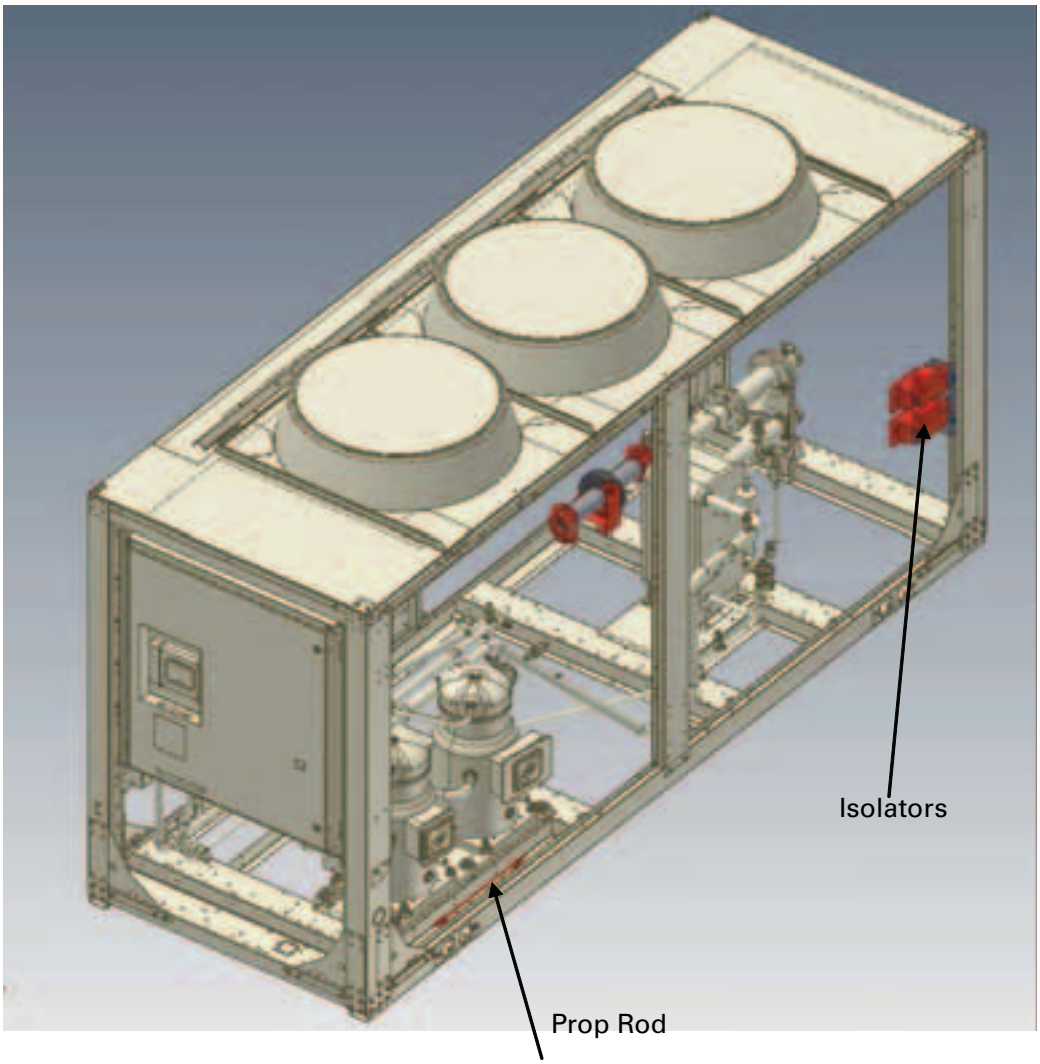


Figure 7. V 40-70 Ton - Ship with Location - Isolators and Prop Rod

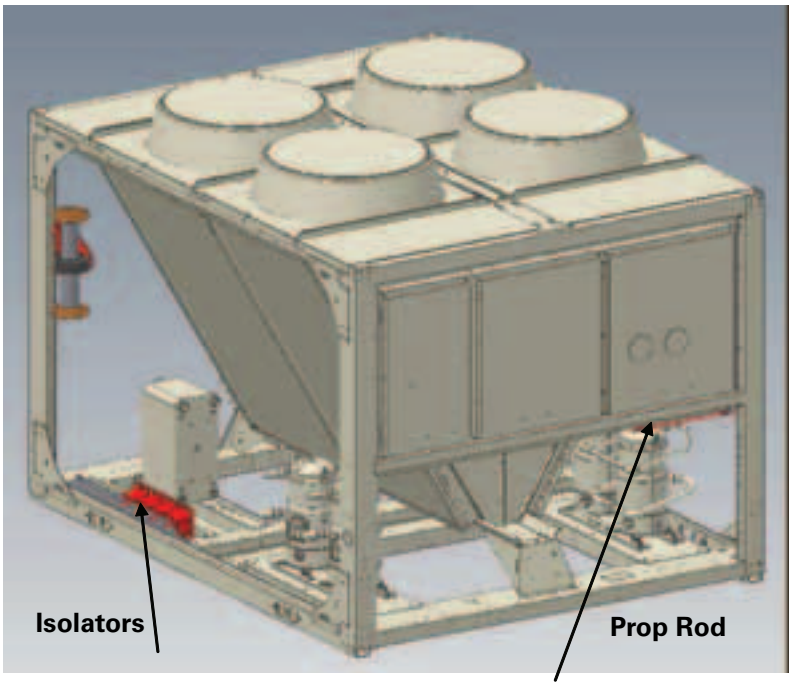
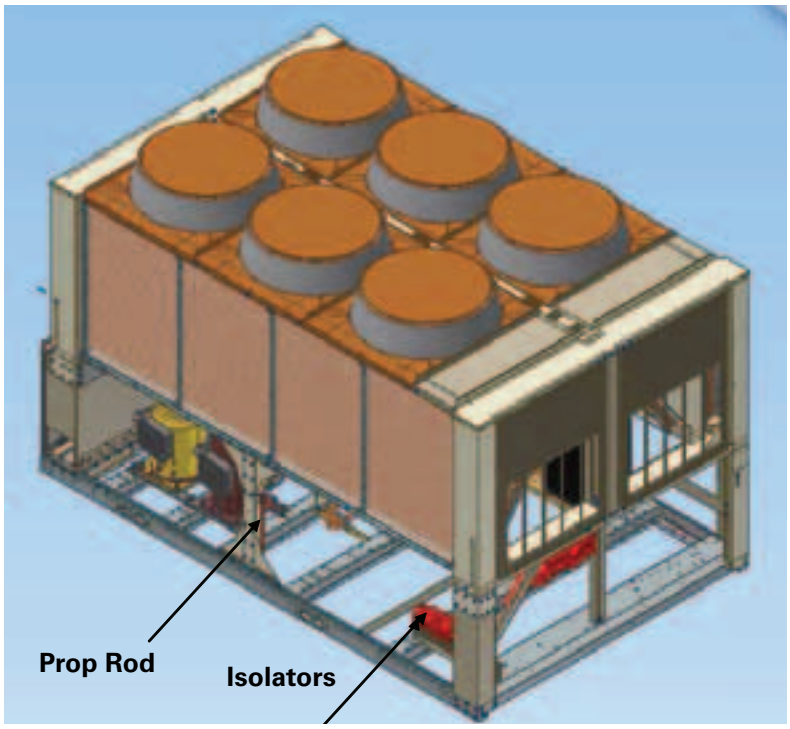


Figure 8. W 80-130 Ton - Ship with Location - Isolators and Prop Rod



General Data

Table 1. General Data - 60 Hz - IP

Size		20	26	30	35	40	52	60	70	80	90	100	110	120	130
Compressor															
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4	6
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30	20+20 +25
Evaporator															
Water storage	(gal)	1.4	2.2	2.2	3.2	2.4	4.1	5.0	7.5	7.0	9.0	10.3	11.5	11.5	12.3
Min. flow[2]	(gpm)	24	30	34	40	46	59	68	80	92	103	116	126	136	147
Max. flow[2]	(gpm)	69	89	100	117	136	176	201	238	275	307	346	375	407	440
Water connection	(in)	2	2.5	2.5	2.5	3	3	3	3	4	4	4	4	4	4
Pump Package															
Avail head pressure	(ft H2O)	80.1	79.1	72.8	70.5	67.1	59.0	78.7	66.4	63.2	59.3	71.9	65.0	75.7	63.9
Power	(HP)	5.0	5.0	5.0	5.0	5.0	5.0	7.6	7.6	10.2	10.2	10.2	10.2	15.2	15.2
Expansion tank volume	(gal)	5	5	5	5	5	5	5	5	6	6	6	6	6	6
Buffer Tank															
Buffer tank volume	(gal)	140	140	140	140	140	140	140	140	152	152	195	195	195	195
Condenser															
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4	4
Coil length	(in)	91	91	127	127	91	91	127	127	121	121	144	144	144	180
Coil height	(in)	68	68	68	68	68	68	68	68	42	42	42	42	42	42
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan															
Quantity	#	2	2	3	3	4	4	6	6	6	6	8	8	8	10
Diameter	(in)	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
Airflow per fan	(cfm)	9413	9420	9168	9173	9413	9420	9168	9173	9470	9472	9094	9096	9098	9094
Power per motor	(kW)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Motor RPM	(rpm)	840	840	840	840	840	840	840	840	840	840	840	840	840	840
Tip speed	(ft/min)	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333	6333
General Unit															
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100	15-31-46-62-81-100
Refrig charge/ circuit [1]	(lbs)	32	34	48	48	32	32	50.5	48	74	78	90	91.5	86	112
Oil charge/circuit[1]	(gal)	1.7	1.7	3.5	3.5	1.7	1.7	3.5	3.5	3.5	3.5	3.5	3.7	3.8	5.8
Min ambient	(°F)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1. Data shown for circuit one only. The second circuits always matches.
2. Flow limits are for water only.

Table 2. General Data - 60 Hz - SI

Size		20	26	30	35	40	52	60	70	80	90	100	110	120	130
Compressor															
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4	6
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30	20+20 +25
Evaporator															
Water storage	(l)	5.3	8.3	8.3	12.1	9.1	15.5	18.9	28.4	26.5	34.1	39.0	43.5	43.5	46.6
Min. flow[2]	(l/s)	1.5	1.9	2.1	2.5	2.9	3.7	4.2	5.0	5.8	6.5	7.3	7.9	8.6	9.3
Max. flow[2]	(l/s)	4.4	5.6	6.3	7.4	8.6	11.1	12.7	15.1	17.4	19.4	21.9	23.7	25.7	27.8
Water connection	(mm)	50.8	63.5	63.5	63.5	76.2	76.2	76.2	76.2	101.6	101.6	101.6	101.6	101.6	101.6
Pump Package															
Avail head pressure	(kPa)	239.4	236.4	217.6	210.7	200.6	176.4	235.2	198.5	188.9	177.3	214.9	194.3	226.3	191.0
Power	(HP)	5.0	5.0	5.0	5.0	5.0	5.0	7.6	7.6	10.2	10.2	10.2	10.2	15.2	15.2
Expansion tank volume	(l)	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	22.7	22.7	22.7	22.7	22.7	22.7
Buffer Tank															
Buffer tank volume	(l)	116	116	116	116	116	116	116	116	127	127	162	162	162	162
Condenser															
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4	4
Coil length	(mm)	2311	2311	3226	3226	2311	2311	3226	3226	3073	3073	3658	3658	3658	4572
Coil height	(mm)	1727	1727	1727	1727	1727	1727	1727	1727	1067	1067	1067	1067	1067	1067
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan															
Quantity/circuit[1]	#	2	2	3	3	2	2	3	3	2	3	4	4	4	
Diameter	(mm)	732	732	732	732	732	732	732	732	732	732	732	732	732	732
Airflow per fan	(m^3/h)	15993	16005	15577	15585	15993	16005	15577	15585	16090	16093	15451	15454	15458	15451
Power per motor	(kW)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Motor RPM	(rpm)	840	840	840	840	840	840	840	840	840	840	840	840	840	840
Tip speed	(m/s)	32	32	32	32	32	32	32	32	32	32	32	32	32	32
General Unit															
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100	15-31-46-62-81-100
Refrig charge/circuit[1]	(kg)	14.5	15.4	21.8	21.8	14.5	14.5	22.9	21.8	33.6	35.4	40.8	41.5	39.0	50.8
Oil charge /circuit[1]	(l)	6.4	6.4	13.2	13.2	6.4	6.4	13.2	13.2	13.2	13.2	13.2	14	14.4	22.0
Min ambient	(°C)	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

General Data

Table 3. General Data - 50 Hz - IP

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(gal)	1.4	2.2	2.2	3.2	2.4	4.1	5.0	7.5	7.0	9.0	10.3	11.5	11.5
Min. flow[2]	(gpm)	20	26	29	33	39	50	57	67	79	88	99	107	114
Max. flow[2]	(gpm)	59	75	85	98	115	149	170	199	234	262	296	319	341
Water connection	(in)	2	2.5	2.5	2.5	3	3	3	3	4	4	4	4	4
Condenser														
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(in)	91	91	127	127	91	91	127	127	121	121	144	144	144
Coil height	(in)	68	68	68	68	68	68	68	68	42	42	42	42	42
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity	#	2	2	3	3	4	4	6	6	6	6	8	8	8
Diameter	(in)	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
Airflow/fan	(cfm)	7796	7783	7587	7590	7795	7801	7587	7590	7827	7829	7503	7505	7506
Power/motor	(kW)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Motor RPM	(rpm)	700	700	700	700	700	700	700	700	700	700	700	700	700
Tip speed	(ft/min)	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit[1]	(lbs)	34	34	48	48	32	32	48	48	74	74	82	86	84
Oil charge/circuit[1]	(gal)	1.7	1.7	3.5	3.5	1.7	1.7	3.5	3.5	3.5	3.5	3.5	3.7	3.8
Min ambient	(°F)	0	0	0	0	0	0	0	0	0	0	0	0	0

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

Table 4. General Data - 50 Hz - SI

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(l)	5.3	8.3	8.3	12.1	9.1	15.5	18.9	28.4	26.5	34.1	39.0	43.5	43.5
Min. flow[2]	(l/s)	1.2	1.6	1.8	2.1	2.4	3.1	3.6	4.2	4.9	5.5	6.2	6.7	7.2
Max. flow[2]	(l/s)	3.7	4.8	5.4	6.2	7.3	9.4	10.8	12.6	14.8	16.5	18.7	20.2	21.6
Water connection	(mm)	50.8	63.5	63.5	63.5	76.2	76.2	76.2	76.2	101.6	101.6	101.6	101.6	101.6
Condenser														
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(mm)	2311	2311	3226	3226	2311	2311	3226	3226	3073	3073	3658	3658	3658
Coil height	(mm)	1727	1727	1727	1727	1727	1727	1727	1727	1067	1067	1067	1067	1067
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity	#	2	2	3	3	4	4	6	6	6	6	8	8	8
Diameter	(mm)	732	732	732	732	732	732	732	732	732	732	732	732	732
Airflow/fan	(m^3/h)	13245	13223	12890	12895	13244	13254	12890	12895	13298	13302	12748	12751	12753
Power/motor	(kW)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Motor RPM	(rpm)	700	700	700	700	700	700	700	700	700	700	700	700	700
Tip speed	(m/s)	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit[1]	(kg)	15.4	15.4	21.8	21.8	14.5	14.5	21.8	21.8	33.6	33.6	37.2	39.0	38.1
Oil charge/circuit [1]	(l)	6.4	6.4	13.2	13.2	6.4	6.4	13.2	13.2	13.2	13.2	13.2	14.0	14.4
Min ambient	(°C)	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

General Data

Table 5. General Data – 60 Hz – SI

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(l)	5.3	8.3	8.3	12.1	9.1	15.5	18.9	28.4	26.5	34.1	39.0	43.5	43.5
Min. flow[2]	(l/s)	1.5	1.9	2.1	2.5	2.9	3.7	4.2	5.0	5.8	6.5	7.3	7.9	8.6
Max. flow[2]	(l/s)	4.4	5.6	6.3	7.4	8.6	11.1	12.7	15.1	17.4	19.4	21.9	23.7	25.7
Water connection	(mm)	50.8	63.5	63.5	63.5	76.2	76.2	76.2	76.2	101.6	101.6	101.6	101.6	101.6
Condenser														
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(mm)	2311	2311	3226	3226	2311	2311	3226	3226	3073	3073	3658	3658	3658
Coil height	(mm)	1727	1727	1727	1727	1727	1727	1727	1727	1067	1067	1067	1067	1067
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity/circuit[1]	#	2	2	3	3	2	2	3	3	2	3	4	4	4
Diameter	(mm)	732	732	732	732	732	732	732	732	732	732	732	732	732
Airflow per fan	(m^3/h)	15993	16005	15577	15585	15993	16005	15577	15585	16090	16093	15451	15454	15458
Power per motor	(kW)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Motor RPM	(rpm)	840	840	840	840	840	840	840	840	840	840	840	840	840
Tip speed	(m/s)	32	32	32	32	32	32	32	32	32	32	32	32	32
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit[1]	(kg)	15.4	15.4	21.8	21.8	14.5	14.5	21.8	21.8	33.6	33.6	40.9	39.0	39.0
Oil charge /circuit[1]	(l)	6.4	6.4	13.2	14.0	6.4	6.4	13.2	14.0	14.4	15.1	15.5	16.3	16.7
Min ambient														
Wide ambient	(°C)	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

Table 6. General Data – 50 Hz – I-P

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(gal)	1.4	2.2	2.2	3.2	2.4	4.1	5.0	7.5	7.0	9.0	10.3	11.5	11.5
Min. flow[2]	(gpm)	20	26	29	33	39	50	57	67	79	88	99	107	114
Max. flow[2]	(gpm)	59	75	85	98	115	149	170	199	234	262	296	319	341
Water connection	(in)	2	2.5	2.5	2.5	3	3	3	3	4	4	4	4	4
Condenser														
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(in)	91	91	127	127	91	91	127	127	121	121	144	144	144
Coil height	(in)	68	68	68	68	68	68	68	68	42	42	42	42	42
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity	#	2	2	3	3	4	4	6	6	6	6	8	8	8
Diameter	(in)	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
Airflow/fan	(cfm)	7796	7783	7587	7590	7795	7801	7587	7590	7827	7829	7503	7505	7506
Power/motor	(kW)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Motor RPM	(rpm)	700	700	700	700	700	700	700	700	700	700	700	700	700
Tip speed	(ft/min)	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278	5278
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit[1]	(lbs)	34	34	48	48	32	32	48	48	74	74	90	86	84
Oil charge/circuit[1]	(gal)	1.7	1.7	3.5	3.7	1.7	1.7	3.5	3.7	3.8	4.0	4.1	4.3	4.4
Min ambient														
Wide ambient	(°F)	0	0	0	0	0	0	0	0	0	0	0	0	0

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

Table 7. General Data – 50 Hz – SI

Size		20	26	30	35	40	52	60	70	80	90	100	110	120
Compressor														
Number	#	2	2	2	2	4	4	4	4	4	4	4	4	4
Tonnage/circuit[1]		10+10	13+13	15+15	15+20	10+10	13+13	15+15	15+20	20+20	20+25	25+25	25+30	30+30
Evaporator														
Water storage	(l)	5.3	8.3	8.3	12.1	9.1	15.5	18.9	28.4	26.5	34.1	39.0	43.5	43.5
Min. flow[2]	(l/s)	1.2	1.6	1.8	2.1	2.4	3.1	3.6	4.2	4.9	5.5	6.2	6.7	7.2
Max. flow[2]	(l/s)	3.7	4.8	5.4	6.2	7.3	9.4	10.8	12.6	14.8	16.5	18.7	20.2	21.6
Water connection	(mm)	50.8	63.5	63.5	63.5	76.2	76.2	76.2	76.2	101.6	101.6	101.6	101.6	101.6
Condenser														
Quantity of coils	#	1	1	1	1	2	2	2	2	4	4	4	4	4
Coil length	(mm)	2311	2311	3226	3226	2311	2311	3226	3226	3073	3073	3658	3658	3658
Coil height	(mm)	1727	1727	1727	1727	1727	1727	1727	1727	1067	1067	1067	1067	1067
Number of rows	#	2	2	2	2	2	2	2	2	3	3	3	3	3
Fins per foot	(fpf)	192	192	192	192	192	192	192	192	192	192	192	192	192
Fan														
Quantity	#	2	2	3	3	4	4	6	6	6	6	8	8	8
Diameter	(mm)	732	732	732	732	732	732	732	732	732	732	732	732	732
Airflow/fan	(m^3/h)	13245	13223	12890	12895	13244	13254	12890	12895	13298	13302	12748	12751	12753
Power/motor	(kW)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Motor RPM	(rpm)	700	700	700	700	700	700	700	700	700	700	700	700	700
Tip speed	(m/s)	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8	26.8
General Unit														
Refrig circuits	#	1	1	1	1	2	2	2	2	2	2	2	2	2
Capacity steps	%	50-100	50-100	50-100	43-100	25-50-75-100	25-50-75-100	25-50-75-100	21-43-71-100	25-50-75-100	22-44-72-100	25-50-75-100	23-45-73-100	25-50-75-100
Refrig charge/circuit[1]	(kg)	15.4	15.4	21.8	21.8	14.5	14.5	21.8	21.8	33.6	33.6	40.9	39.0	38.1
Oil charge/circuit [1]	(l)	6.4	6.4	13.2	14.0	6.4	6.4	13.2	14.0	14.4	15.1	15.5	16.3	16.7
Min ambient														
Wide ambient	(°C)	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18

1. Data shown for circuit one only. The second circuit always matches.
2. Flow limits are for water only.

Pre-Installation

Inspection Checklist

When the unit is delivered, verify that it is the correct unit and that it is properly equipped. Compare the information which appears on the unit nameplate with the ordering and submittal information.

Inspect all exterior components for visible damage. Report any apparent damage or material shortage to the carrier and make a “unit damage” notation on the carrier's delivery receipt. Specify the extent and type of damage found and notify the appropriate Trane Sales Office.

Do not proceed with installation of a damaged unit without sales office approval.

To protect against loss due to damage incurred in transit, complete the following checklist upon receipt of the unit.

- Inspect the individual pieces of the shipment before accepting the unit. Check for obvious damage to the unit or packing material.
- Inspect the unit for concealed damage as soon as possible after delivery and before it is stored. Concealed damage must be reported within 15 days.
- If concealed damage is discovered, stop unpacking the shipment. Do not remove damaged material from the receiving location. Take photos of the damage, if possible. The owner must provide reasonable evidence that the damage did not occur after delivery.
- Notify the carrier's terminal of the damage immediately, by phone and by mail. Request an immediate, joint inspection of the damage with the carrier and the consignee.
- Notify the Trane sales representative and arrange for repair. Do not repair the unit, however, until damage is inspected by the carrier's representative.

Unit Storage

If the chiller is to be stored in ambients of 32°F or less, evaporator should be blown out to remove any liquid and refrigerant isolation valves should be closed.

If the chiller is to be stored for more than one month prior to installation, observe the following precautions:

- Do not remove the protective coverings from the electrical panel.
- Store the chiller in a dry, vibration-free, secure area.
- Units charged with refrigerant should not be stored where temperatures exceed 155°F.
- At least every three months, attach a gauge and manually check the pressure in the refrigerant circuit. If the refrigerant pressure is below 200 psig at 70 F (or 145 psig at 50 F), call a qualified service organization and the appropriate Trane sales office.

Note: *Pressure will be approximately 20 psig if shipped with the optional nitrogen charge.*

Installation Requirements

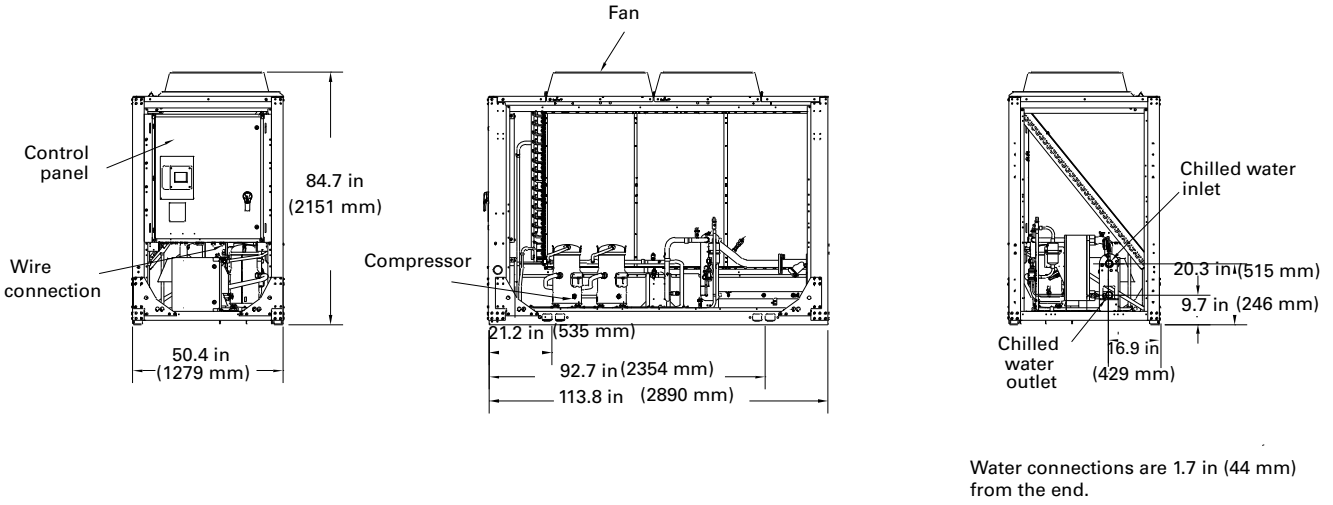
A list of the contractor responsibilities typically associated with the unit installation process is provided.

Type of Requirement	Trane Supplied Trane Installed	Trane Supplied Field Installed	Field Supplied Field Installed
Foundation			• Meet foundation requirements
Rigging			• Safety chains • Clevis connectors • Lifting beam
Isolation		• Elastomeric isolators (optional)	• Elastomeric isolators (optional)
Electrical	• Circuit breakers (optional) • Unit mounted starter		• Circuit breakers (optional) • Electrical connections to unit mounted starter • Wiring sizes per submittal and NEC • Terminal lugs • Ground connection(s) • BAS wiring (optional) • Control voltage wiring • Chilled water pump contactor and wiring including interlock • Option relays and wiring
Water piping	• Flow switch • Water strainer		• Taps for thermometers and gauges • Thermometers • Water flow pressure gauges • Isolation and balancing valves in water piping • Vents and drain • Pressure relief valves
Insulation	• Insulation • High humidity insulation (optional)		• Insulation
Water Piping Connection Components	• Grooved pipe		
Other Materials	• R-410A refrigerant (1 lb. maximum per machine as needed) • Dry nitrogen (20 psig maximum per machine as needed)		

Unit Dimensions/Weights

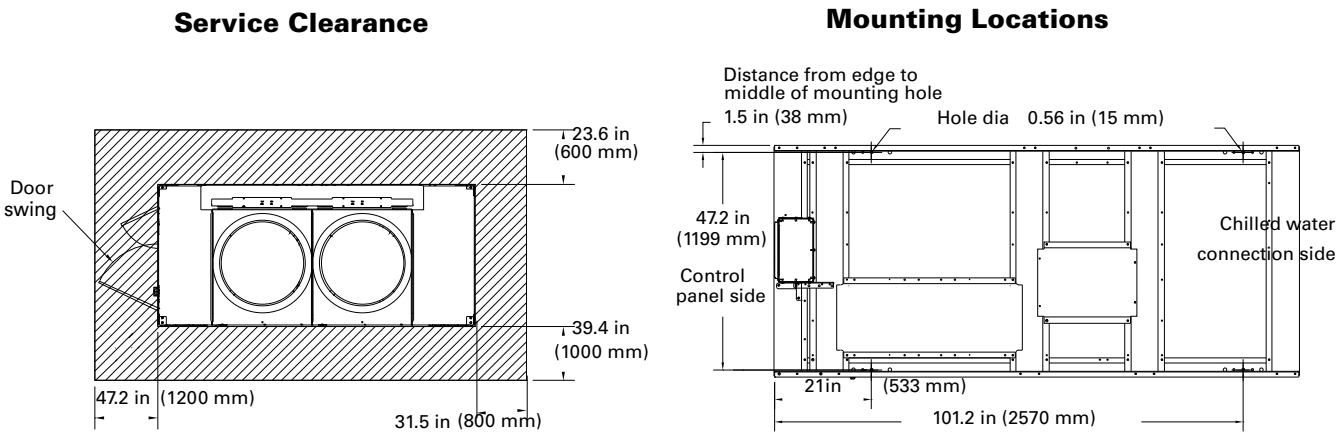
Dimensions

Figure 9. CGAM 20 and 26 ton - no options



Water connections are 1.7 in (44 mm) from the end.

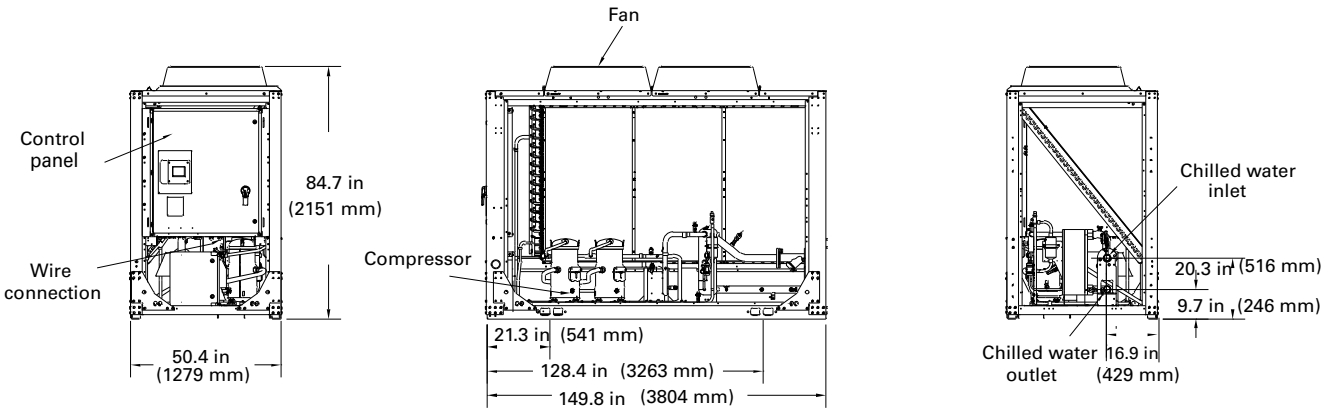
Figure 10. CGAM 20 and 26 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of four mounting locations.

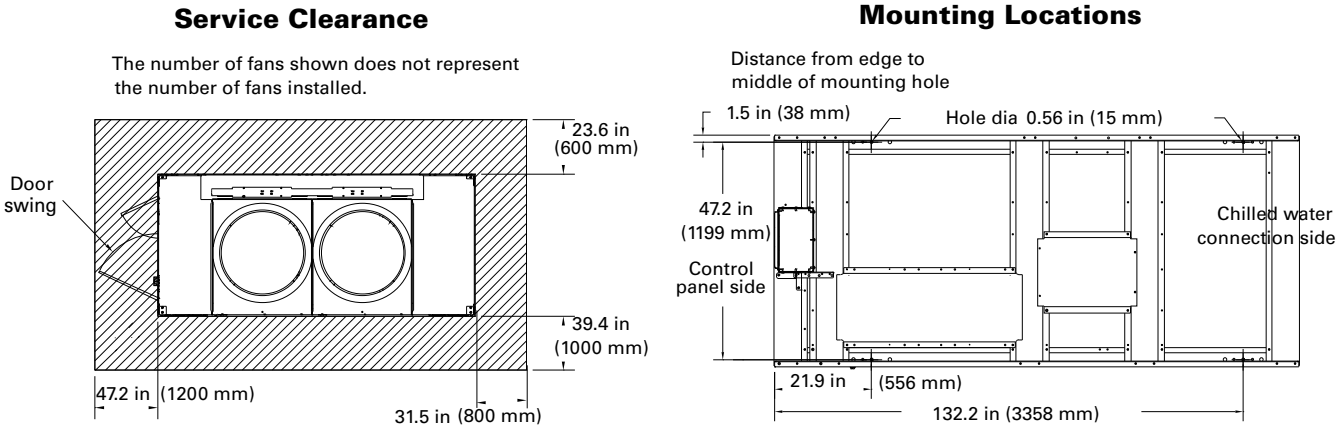
Figure 11. CGAM 30 and 35 ton - no options



The number of fans shown does not represent the number of fans installed.

Water connections are 1.6 in (40 mm) from unit end.

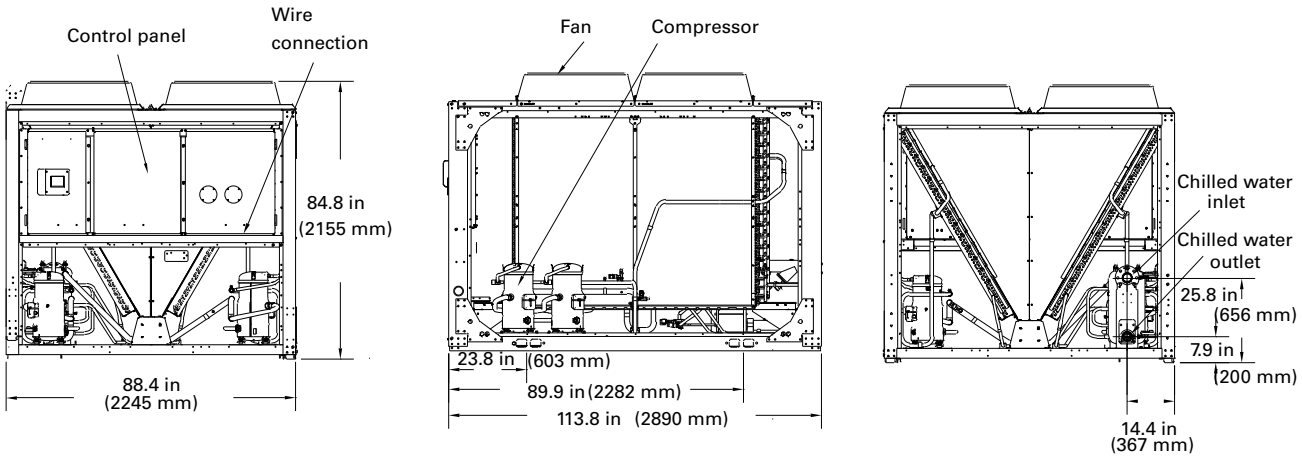
Figure 12. CGAM 30 and 35 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

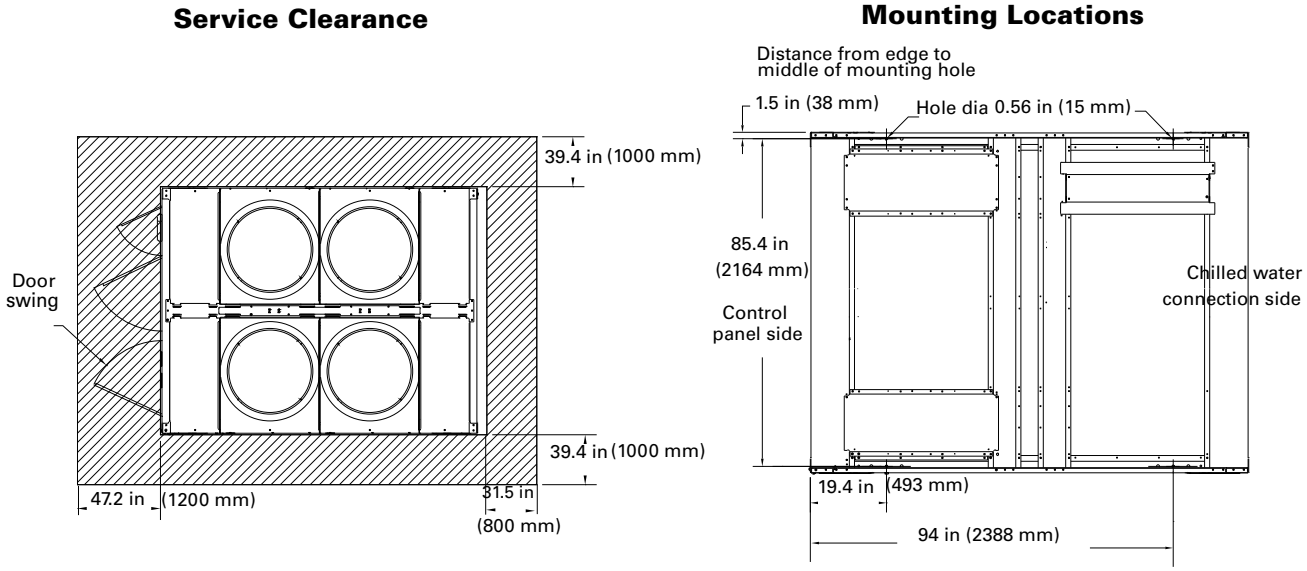
Total of four mounting locations.

Figure 13. CGAM 40 and 52 ton- no options



Water connections are even with unit end.

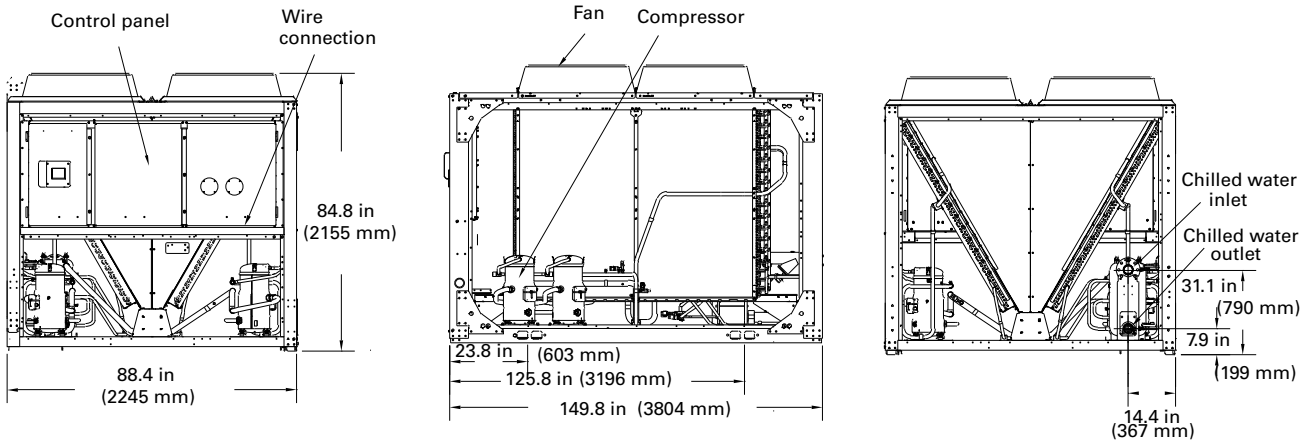
Figure 14. CGAM 40 and 52 ton- service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of four mounting locations.

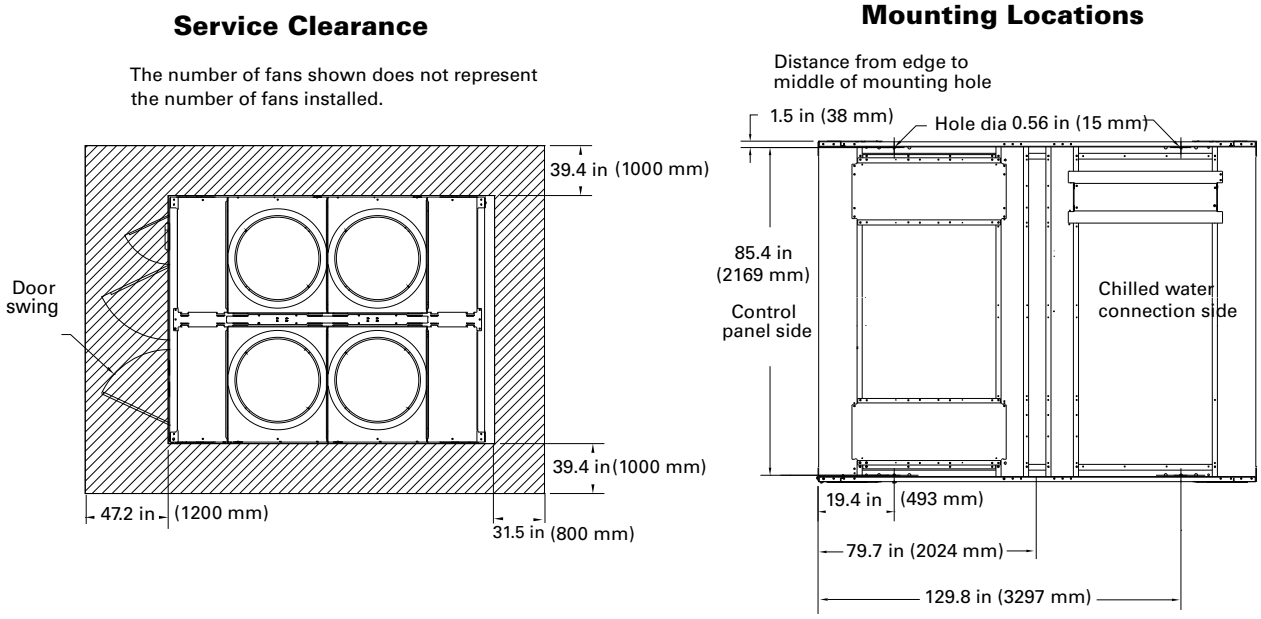
Figure 15. CGAM 60 and 70 ton - no options



The number of fans shown does not represent the number of fans installed.

Water connections are even with unit end.

Figure 16. CGAM 60 and 70 ton - service clearances and mounting locations



More clearance may be needed for airflow depending on the installation.

Total of six mounting locations.

Figure 17. CGAM 80 and 90 ton - no options

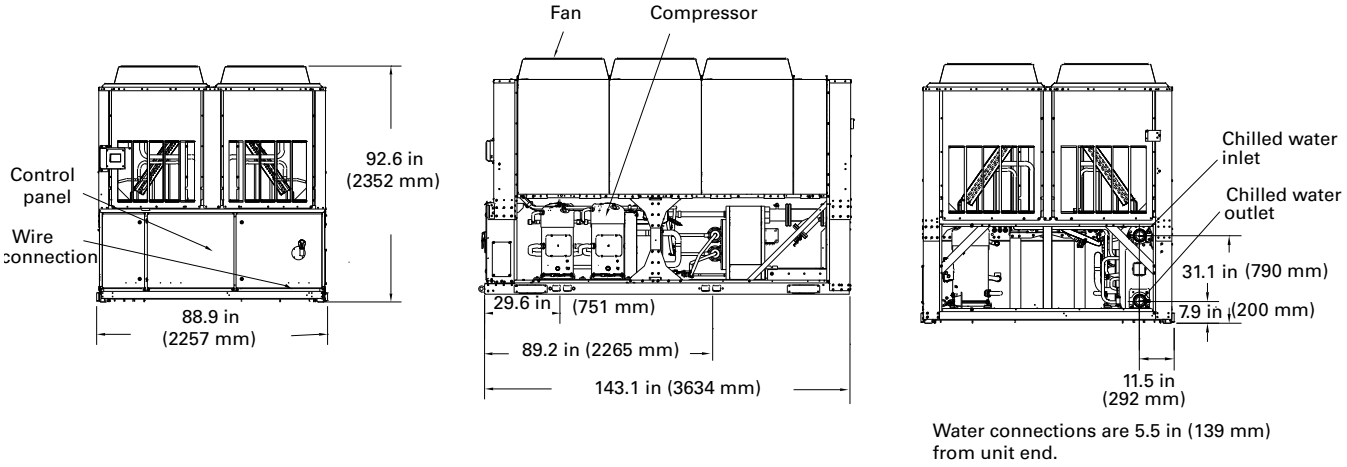


Figure 18. CGAM 80 and 90 ton - service clearances and mounting locations

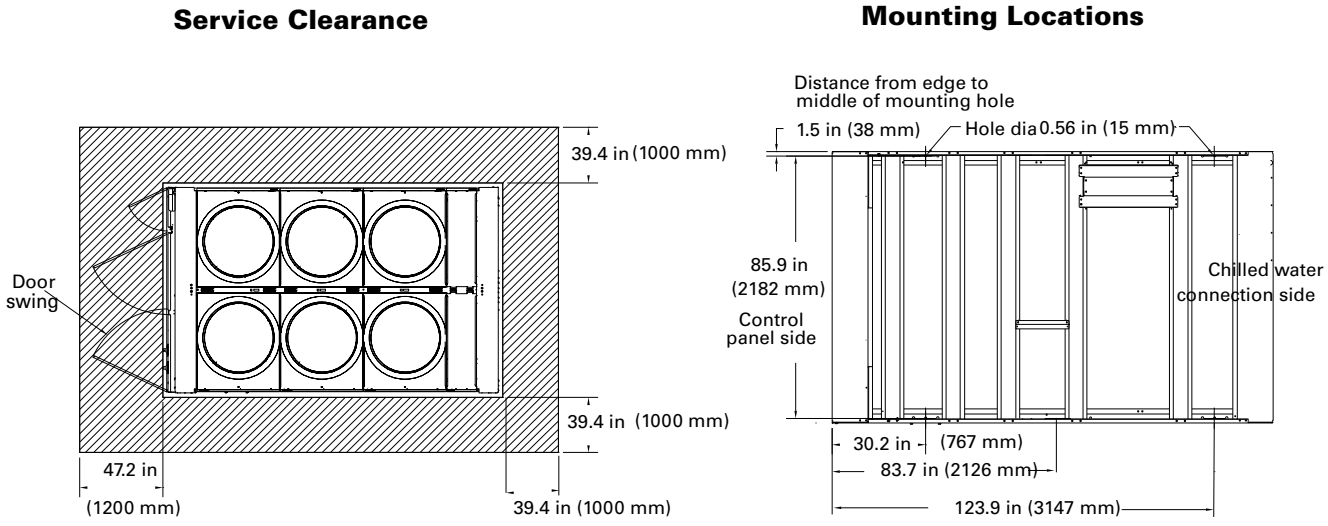
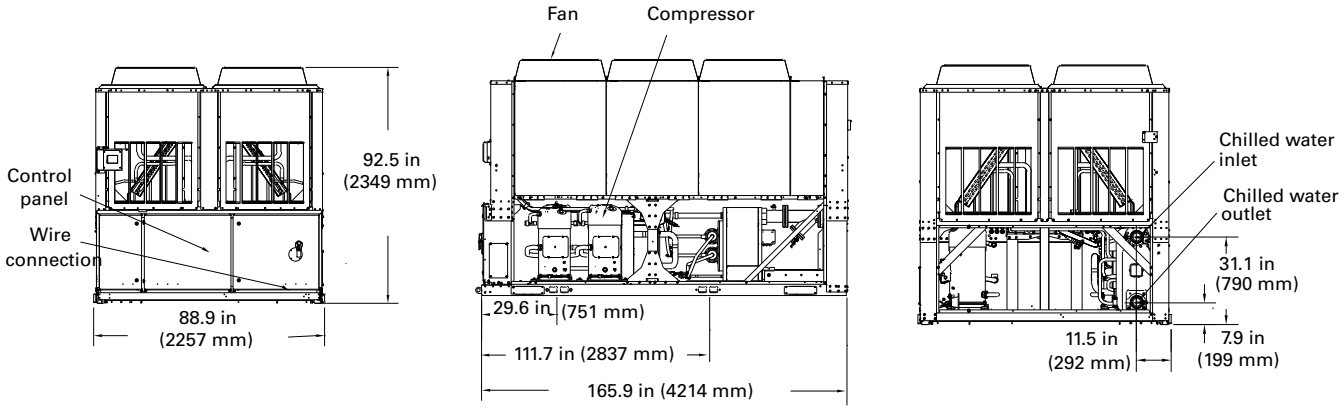


Figure 19. CGAM 100, 110 and 120 ton- no options



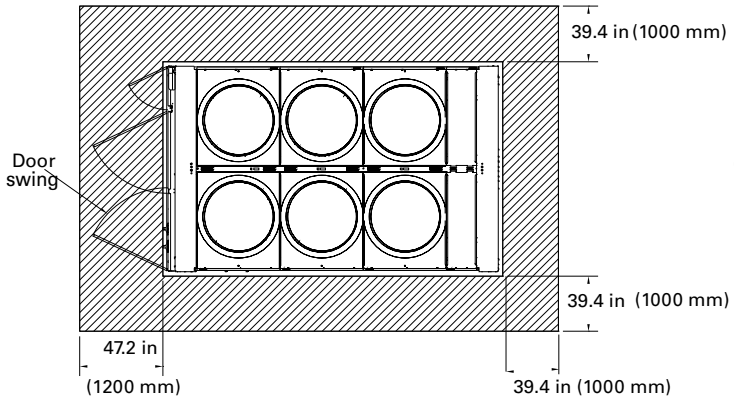
The number of fans shown does not represent the number of fans installed.

Water connections are 5.4 in (139 mm) from unit end.

Figure 20. CGAM 100, 110 and 120 ton- service clearances and mounting locations

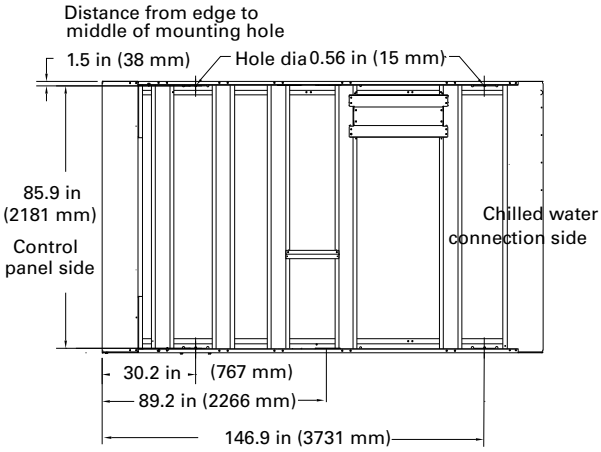
Service Clearance

The number of fans shown does not represent the number of fans installed.



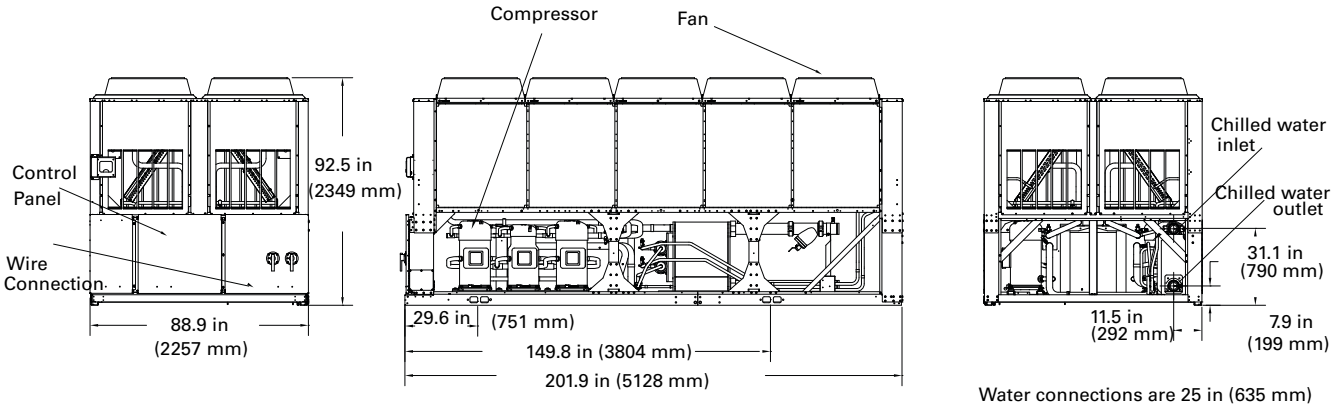
More clearance may be needed for airflow depending on the installation.

Mounting Locations



Total of six mounting locations.

Figure 21. CGAM 130 ton

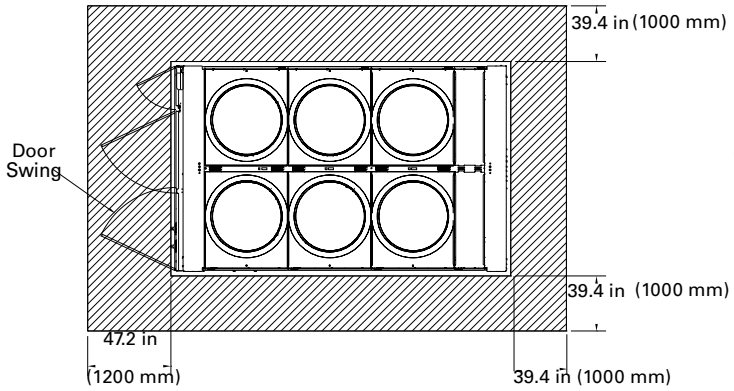


Water connections are 25 in (635 mm) from unit end.

Figure 22. CGAM 130 ton- service clearances and mounting locations

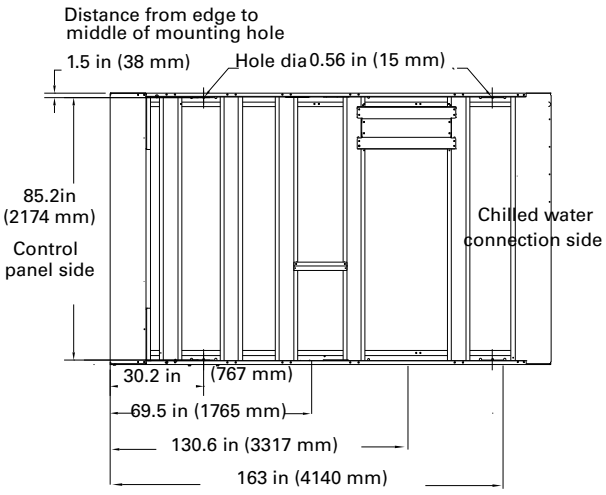
Service Clearance

The number of fans shown does not represent the number of fans installed.



More clearance may be needed for airflow depending on the installation.

Mounting Locations



Total of eight mounting locations.

Unit Dimensions - Optional Pump Package, Buffer Tank, Partial Heat Recovery

Figure 23. Sizes 20 and 26 ton — pump package, buffer tank, partial heat recovery

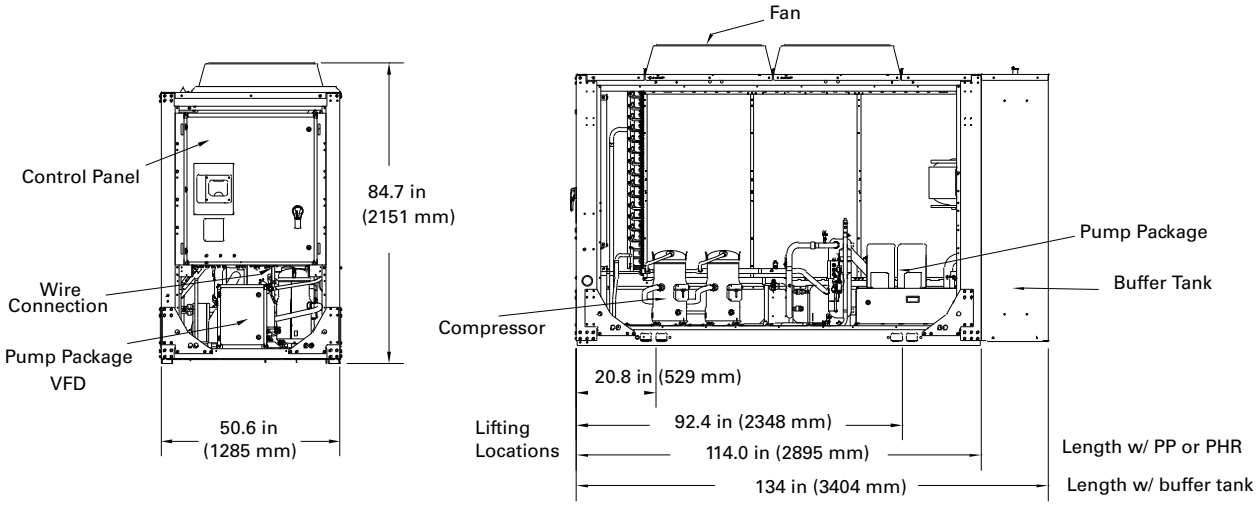


Figure 24. Sizes 30 and 35 ton — pump package, buffer tank, partial heat recovery

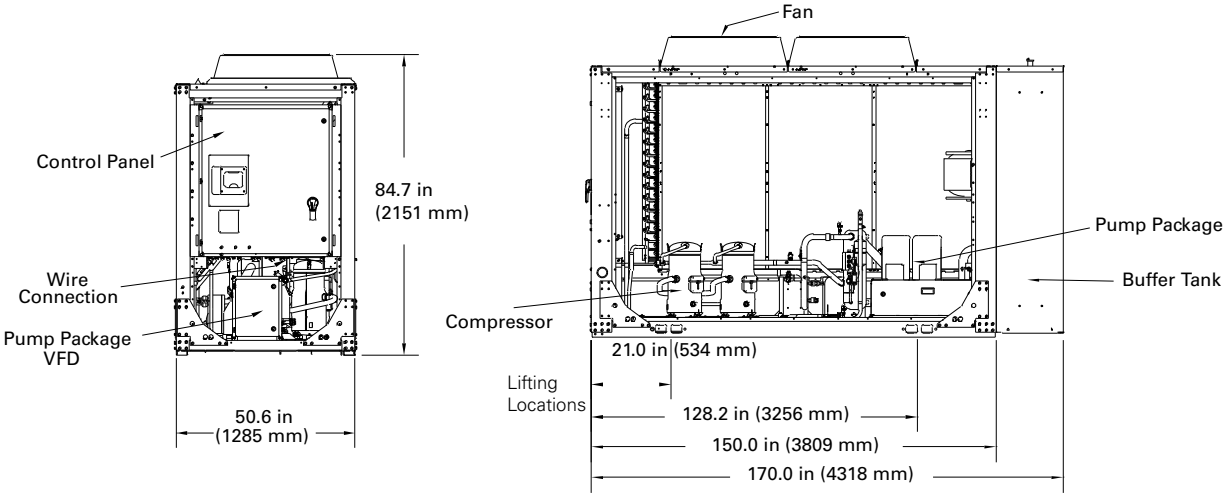


Figure 25. Sizes 40 and 52 ton — pump package, buffer tank, partial heat recovery

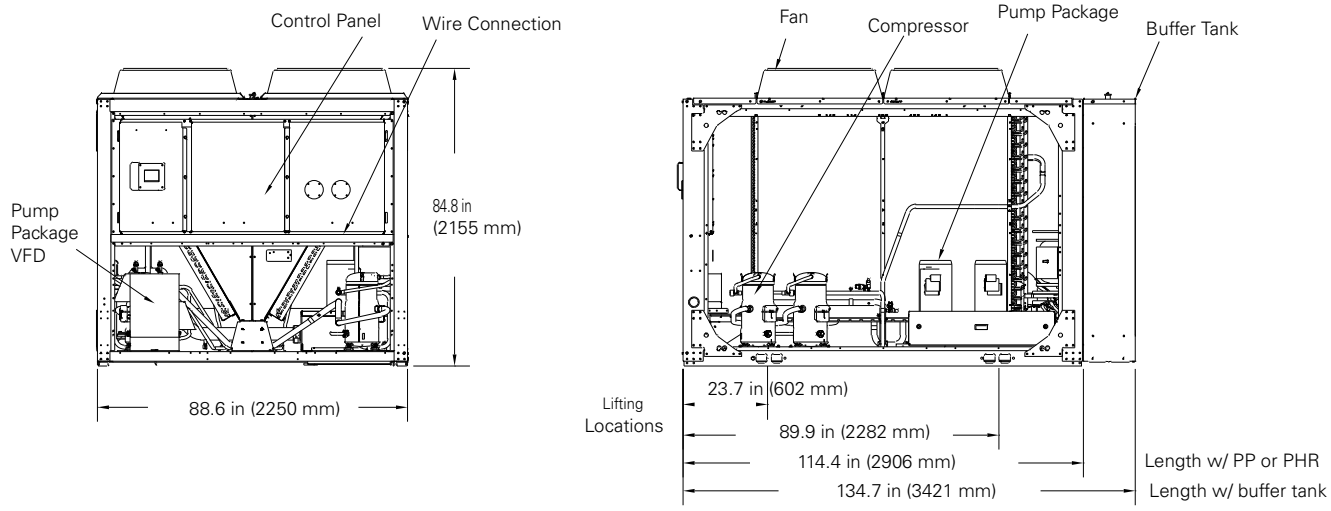


Figure 26. Sizes 60 and 70 ton — pump package, buffer tank, partial heat recovery

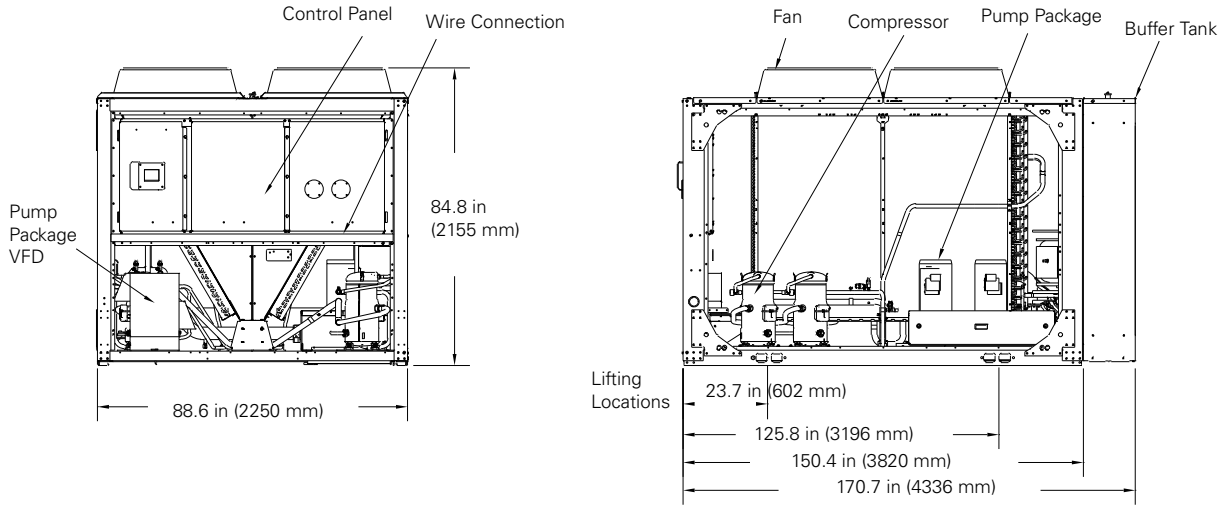


Figure 27. Sizes 80 and 90 ton — pump package, buffer tank, partial heat recovery

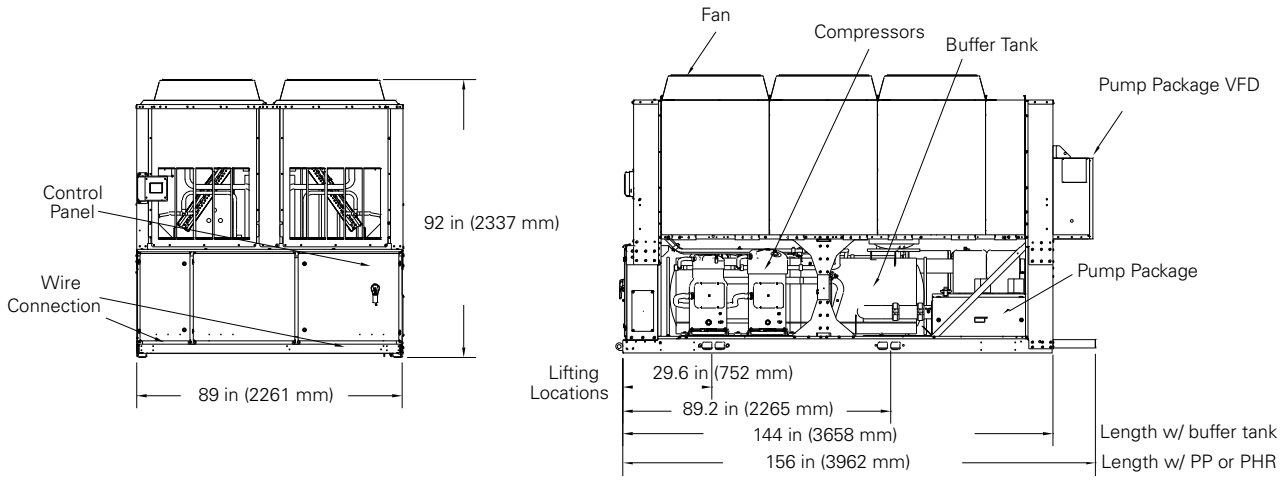


Figure 28. Sizes 100, 110 and 120 ton — pump package, buffer tank, partial heat recovery

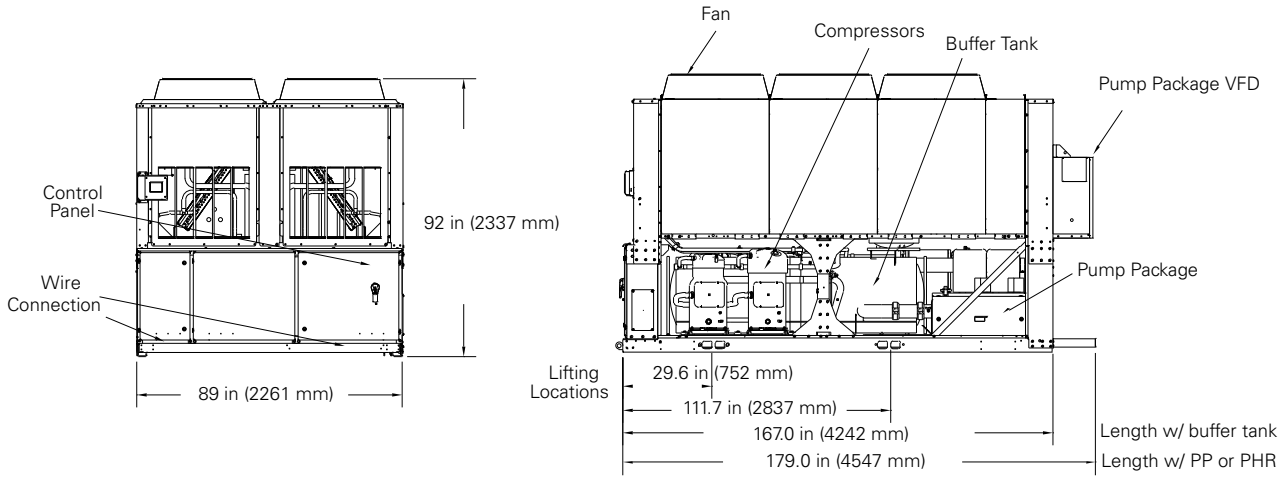
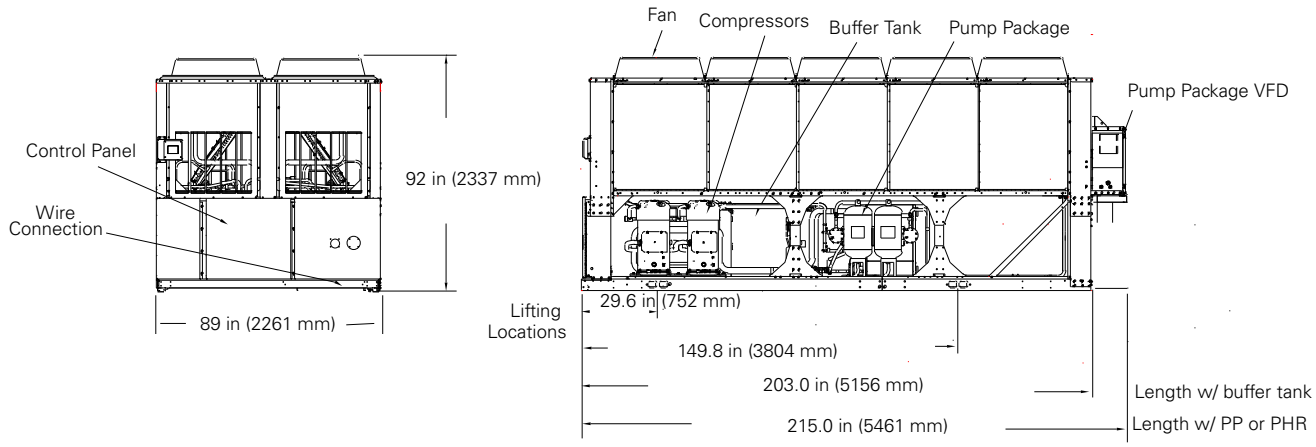


Figure 29. Size 130 ton — pump package, buffer tank, partial heat recovery



Pump Package, Partial Heat Recover and Buffer Tank - Water Connections

Figure 30. CGAM 20 and 26 ton - pump package, buffer tank, partial heat recovery unit water connections

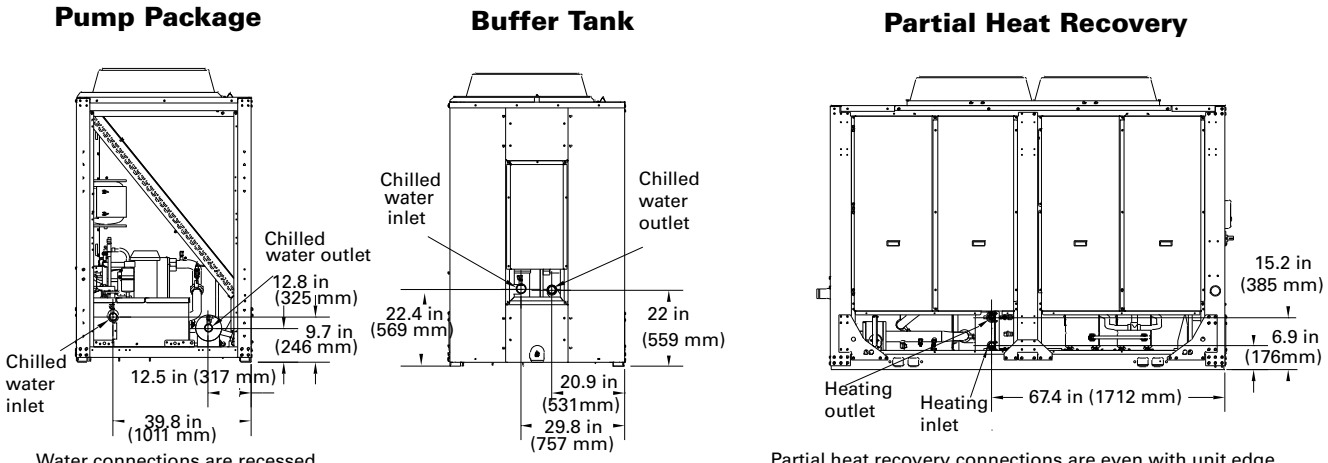


Figure 31. CGAM 30 and 35 ton - pump package, buffer tank, partial heat recovery unit water connections

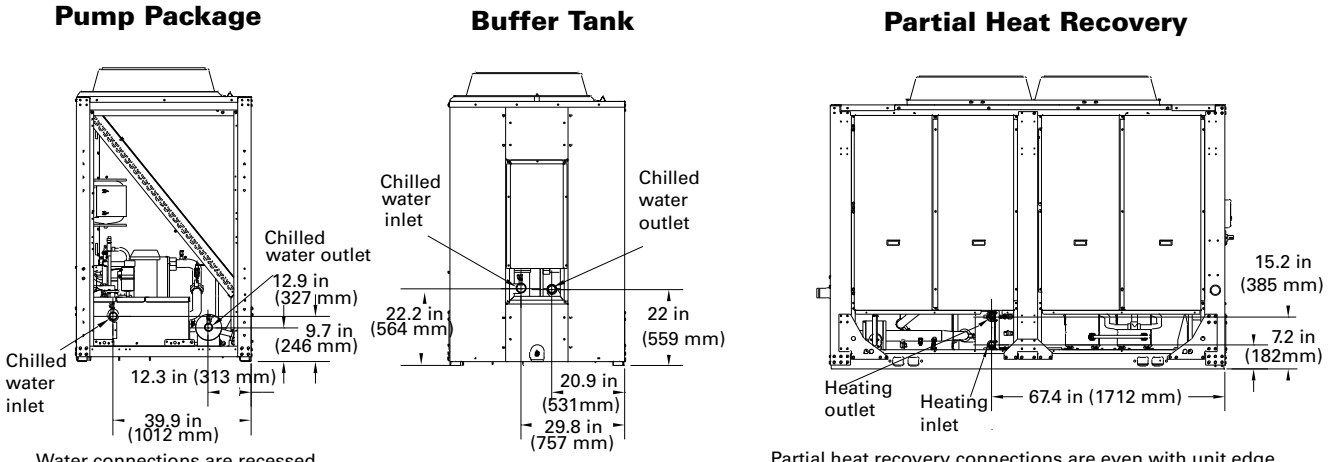
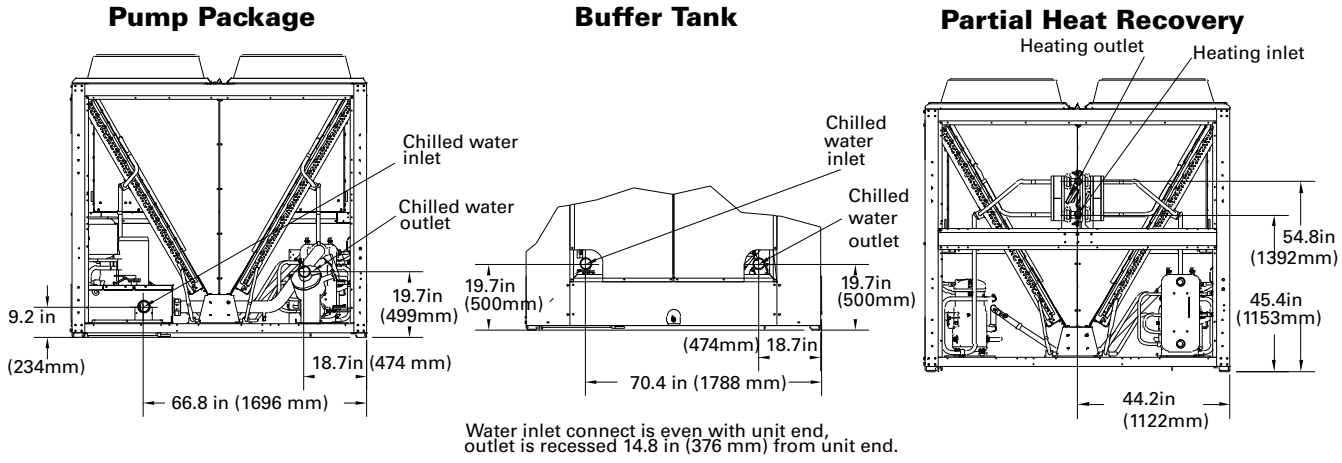


Figure 32. CGAM 40 and 52 ton- pump package, buffer tank, partial heat recovery unit water connections



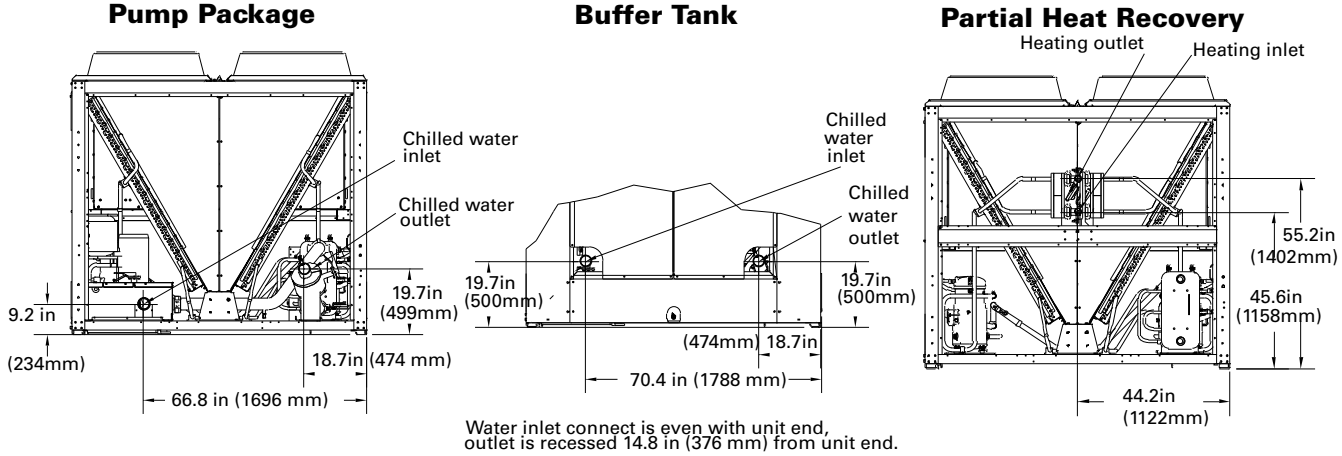
Water outlet connection is even with unit end, inlet is 6.1 in (154 mm) from unit end.

Water inlet connect is even with unit end, outlet is recessed 14.8 in (376 mm) from unit end.

Partial heat recovery connections are even with unit end.

The chilled water connections are the same as the standard unit unless pump package or buffer tank are ordered.

Figure 33. CGAM 60 and 70 ton- pump package, buffer tank, partial heat recovery unit water connections



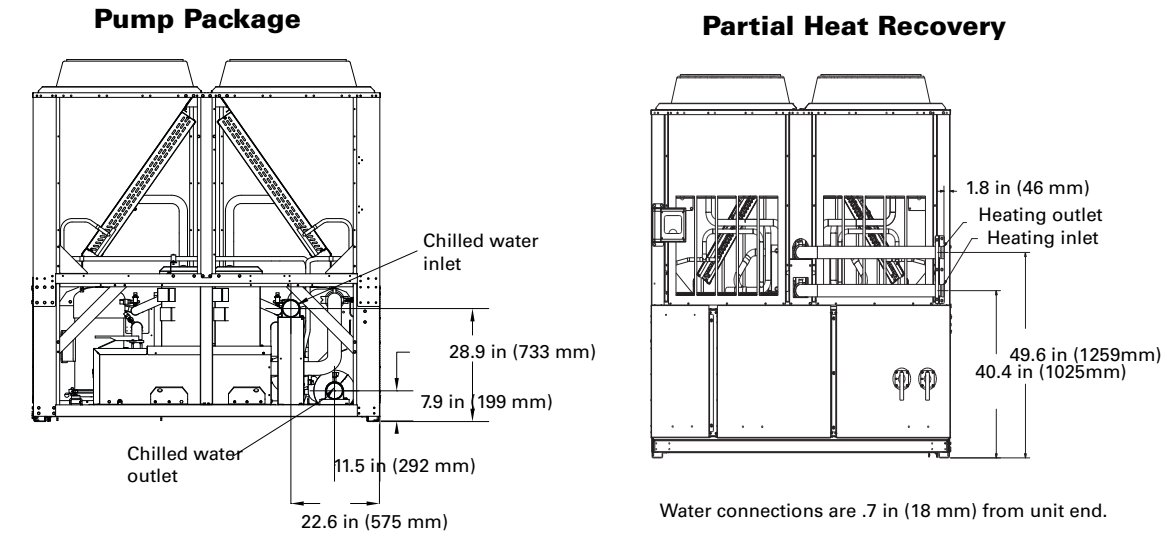
Water outlet connection is even with unit end, inlet is 6.1 in (154 mm) from unit end.

Water inlet connect is even with unit end, outlet is recessed 14.8 in (376 mm) from unit end.

Partial heat recovery connections are even with unit end.

The chilled water connections are the same as the standard unit unless pump package or buffer tank are ordered.

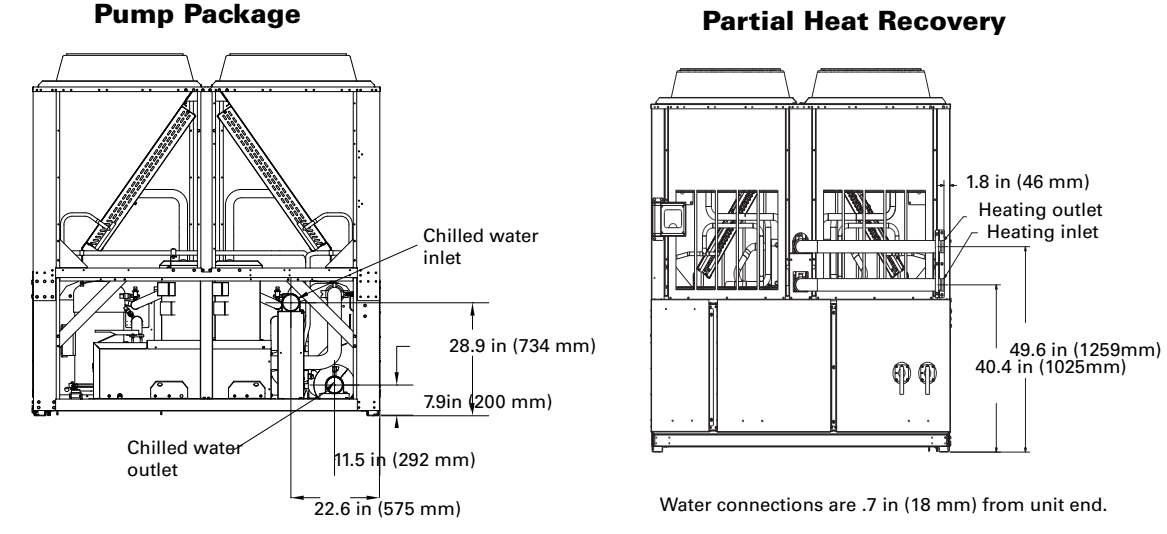
Figure 34. CGAM 80 and 120 ton- pump package unit water connections



Water connections are 5.9 in (151 mm) from unit end.

Water connections are .7 in (18 mm) from unit end.

Figure 35. CGAM 130 ton- pump package unit water connections



Water outlet connect is 25 in (635 mm) and inlet is 6.3 in (159 mm) from unit end.

Water connections are .7 in (18 mm) from unit end.

Weights

Table 8. Weights - 60 Hz - no options

Tons	Shipping Weight		Operating Weight	
	pounds	kilograms	pounds	kilograms
20	1968	892	1989	902
26	2020	916	2047	929
30	2562	1162	2588	1174
35	2592	1176	2627	1192
40	3508	1591	3537	1604
52	3589	1628	3629	1646
60	4639	2104	4687	2126
70	4702	2133	4770	2557
80	5419	2458	5483	2487
90	5677	2575	5757	2611
100	6329	2871	6420	2912
110	6357	2883	6457	2929
120	6357	2883	6457	2929
130	7511	3407	7618	3455

1. Weights based on aluminum fins.
2. Weights do not include louvers, partial heat recovery, etc.
3. All weights ±5%.

Table 9. Weights - 60 Hz - with options

Tons	With Pump				With Pump and Buffer Tank			
	Shipping Weight		Operating Weight		Shipping Weight		Operating Weight	
	pounds	kilograms	pounds	kilograms	pounds	kilograms	pounds	kilograms
20	2560	1161	2633	1194	2974	1349	4218	1913
26	2612	1185	2691	1221	3027	1373	4276	1940
30	3246	1472	3325	1508	3660	1660	4910	2227
35	3276	1486	3364	1526	3690	1674	4948	2244
40	4126	1872	4208	1909	4540	2059	5792	2627
52	4207	1908	4300	1950	4621	2096	5885	2669
60	5383	2442	5484	2488	5797	2630	7069	3206
70	5446	2470	5566	2525	5860	2658	7151	3244
80	6356	2883	6510	2953	6770	3071	8187	3714
90	6614	3000	6785	3078	7029	3188	8462	3838
100	7266	3296	7447	3378	7680	3484	9483	4301
110	7294	3309	7484	3440	7709	3497	9520	4318
120	7646	3468	4836	3554	8061	3656	9872	4478
130	8849	4014	9046	4103	9263	4202	11082	5027

1. Weights based on aluminum fins.
2. Weights do not include louvers, partial heat recovery, etc.
3. All weights ±5%.

Table 10. Weights - 50 Hz

Tons	Shipping Weight		Operating Weight	
	pounds	kilograms	pounds	kilograms
20	1893	859	1914	868
26	1946	883	1972	894
30	2463	1117	2489	1129
35	2493	1131	2528	1147
40	3358	1523	3387	1536
52	3439	1560	3480	1579
60	4441	2014	4489	2036
70	4504	2043	4572	2074
80	5168	2344	5232	2373
90	5426	2461	5507	2498
100	6078	2757	6169	2798
110	6106	2770	6206	2815
120	6106	2770	6206	2815

1. Weights based on aluminum fins.
2. Weights do not include louvers, partial heat recovery, etc.
3. All weights ±5%.

Installation - Mechanical

Location Requirements

Sound Considerations

- Refer to *Trane Engineering Bulletin Chiller Sound Ratings and Installation Guide* CG-PRB010-EN for sound consideration applications.
- Locate the unit away from sound-sensitive areas.
- Install the optional elastomeric isolators under the unit. Refer to "Unit Isolation."
- Chilled water piping should not be supported by chiller frame.
- Install rubber vibration isolators in all water piping.
- Seal all wall penetrations.

Note: *Consult an acoustical engineer for critical applications.*

Foundation

Provide rigid, non-warping mounting pads or a concrete foundation of sufficient strength and mass to support the applicable operating weight (i.e., including completed piping, and full operating charges of refrigerant, oil and water). Refer to the chapter on "Unit Dimensions/Weights" for unit operating weights. Once in place, the unit must be level within 1/4" (6.4 mm) over its length and width. The Trane Company is not responsible for equipment problems resulting from an improperly designed or constructed foundation.

Clearances

Provide enough space around the unit to allow the installation and maintenance personnel unrestricted access to all service points. Refer to submittal drawings for the unit dimensions, to provide sufficient clearance for the opening of control panel doors and unit service. Refer to the chapter on "Unit Dimensions/Weights" for minimum clearances. In all cases, local codes which require additional clearances will take precedence over these recommendations.

Rigging

Refer to Unit Dimensions/Weights section for typical unit lifting weights. Refer to the rigging label attached to the unit for further details.

Lifting Procedure

⚠WARNING
Heavy Objects!

Ensure that all the lifting equipment used is properly rated for the weight of the unit being lifted. Each of the cables (chains or slings), hooks and shackles used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift. Other lifting arrangements could cause equipment or property damage. Failure to follow recommendations above or properly lift unit could result in death or serious injury.

⚠WARNING
Improper Unit Lift!

Test lift unit approximately 24 inches to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level. Failure to properly lift unit could result in death or serious injury or possible equipment or property-only damage.

Lifting using either a single spreader bar or an H-type spreader is acceptable. Attach chains or cables to lifting beam. Lifting beam crossbars **MUST** be positioned so lifting cables do not contact the sides of the unit.

Important: *The center of gravity (CG) is never at the midpoint of the base rail lifting strap holes. A level unit lift is required for a safe lift and to prevent unit damage.*

Lifting a unit with equal length straps will NOT produce a level unit during the lift because the CG will not be at the midpoint between the base lifting holes. The following adjustments must be made to produce a level lift:

- Single spreader bar lifting method
  - If the unit CG is closer to the control panel, the straps on the control panel side of the spreader bar must be adjusted to be shorter than those on the opposite side of the spreader bar, allowing the spreader bar to move toward the control panel and over the unit CG. Several adjustments of the strap length may be required to produce a level unit during lift.
- H-type spreader bar lifting method
  - If the straps from the H bar to the unit base are the same length, the crane lifting point on the center web of the H bar must be adjusted to produce a level unit lift. See Figure 36, p. 42 for illustration.

Figure 36. H-type spreader bar adjustment for level unit lift

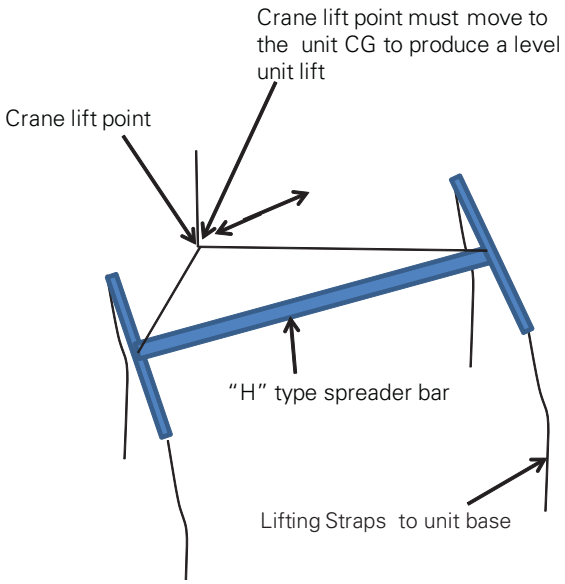


Figure 37. CGAM slant 20-35 ton rigging

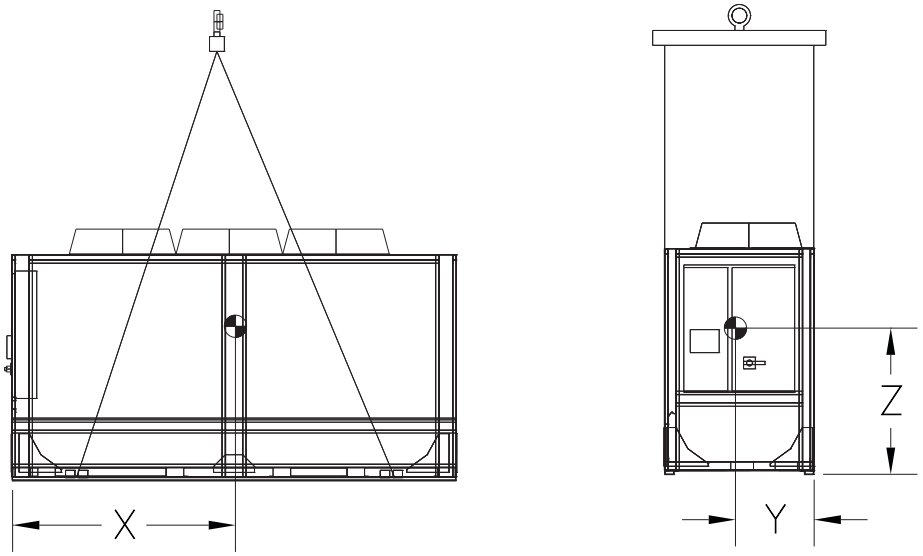


Figure 38. CGAM V 40-70 Ton Rigging

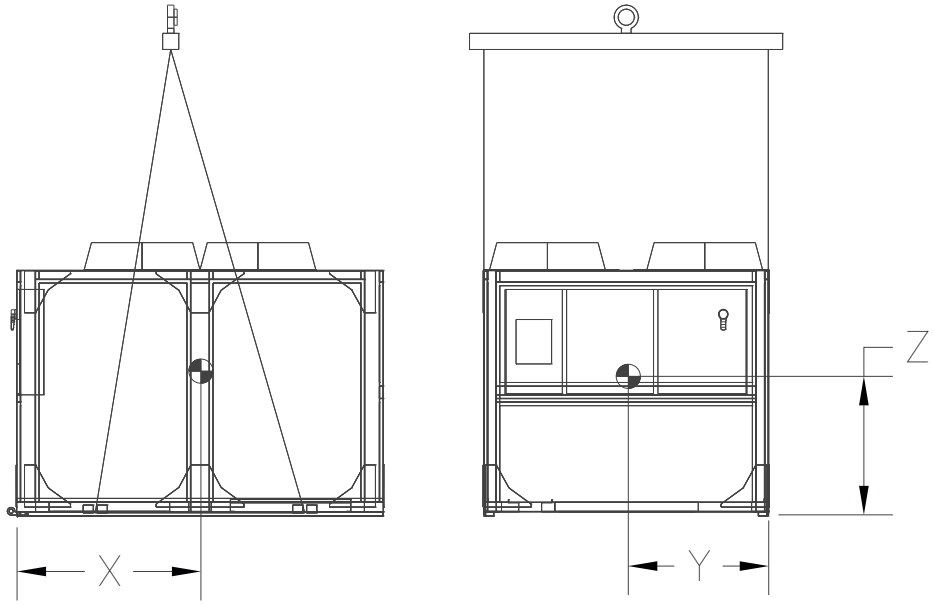


Figure 39. CGAM W 80-120 Ton Rigging

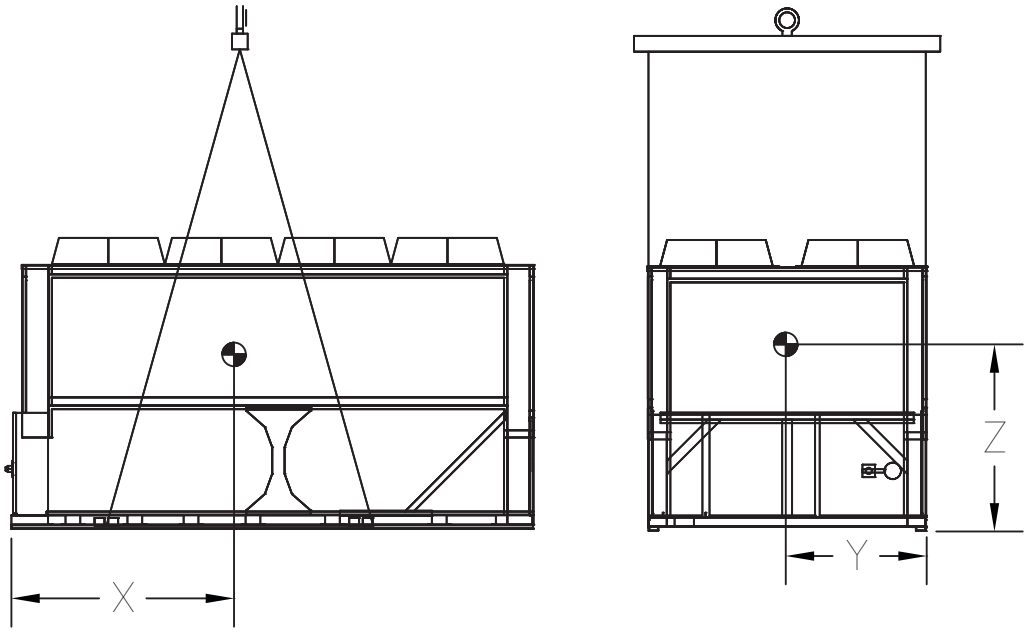


Table 11. CGAM Center of Gravity (in) - 60 Hz

Unit	Base Unit			Unit with Pump Package			Unit with Pump Package and Buffer Tank		
	X	Y	Z	X	Y	Z	X	Y	Z
Units without partial heat recovery									
20 ton	49	24	37	60	23	32	69	23	33
26 ton	49	24	37	60	23	32	69	23	33
30 ton	59	22	37	74	21	32	84	22	33
35 ton	59	22	37	74	21	32	84	22	33
40 ton	47	45	33	53	42	29	59	42	30
52 ton	48	46	32	53	43	29	59	43	30
60 ton	60	45	36	69	43	35	75	43	33
70 ton	60	46	36	69	43	34	75	43	33
80 ton	59	44	36	68	45	34	68	45	33
90 ton	59	45	36	68	45	34	67	45	33
100 ton	72	47	38	81	47	36	80	46	34
110 ton	72	47	38	81	47	36	80	47	34
120 ton	72	47	38	84	47	35	83	46	34
130 ton	86	47	39	100	47	36	101	46	35
Units with partial heat recovery									
20 ton	49	25	37	60	23	32	69	24	33
26 ton	50	24	36	60	23	31	69	23	32
30 ton	59	23	36	74	22	32	84	22	33
35 ton	59	23	36	74	22	32	84	22	32
40 ton	49	45	33	55	42	30	60	42	31
52 ton	49	46	32	55	43	29	60	43	30
60 ton	61	45	37	70	43	35	76	43	34
70 ton	62	46	36	70	43	35	76	43	34
80 ton	58	44	37	67	44	35	66	45	33
90 ton	58	45	36	66	45	34	66	45	33
100 ton	71	47	38	80	47	36	79	46	35
110 ton	71	47	38	80	47	36	79	46	35
120 ton	70	47	38	82	47	35	81	46	34
130 ton	85	47	39	99	47	36	99	46	35

Table 12. CGAM Center of Gravity (in) - 50 Hz

Unit	Base Unit			Unit with Pump Package			Unit with Pump Package and Buffer Tank		
	X	Y	Z	X	Y	Z	X	Y	Z
Units without partial heat recovery									
20 ton	49	25	39	58	24	34	68	24	35
26 ton	49	24	38	58	24	34	68	24	35
30 ton	60	23	38	72	22	33	83	22	34
35 ton	60	23	37	73	22	33	84	22	34
40 ton	48	45	33	53	43	30	60	43	31
52 ton	49	46	33	53	43	30	60	43	31
60 ton	61	45	37	70	43	35	76	43	34
70 ton	62	46	37	70	43	35	77	43	34
80 ton	60	44	37	69	45	35	68	45	34
90 ton	60	45	36	68	45	35	68	45	33
100 ton	73	47	39	82	47	37	81	47	35
110 ton	73	47	38	82	47	36	81	47	35
120 ton	73	47	38	83	47	36	82	47	34
Units with partial heat recovery									
20 ton	50	25	37	58	24	33	68	24	34
26 ton	50	25	37	58	24	33	68	24	34
30 ton	60	23	37	72	22	33	83	22	34
35 ton	60	23	37	73	22	33	84	22	33
40 ton	50	45	34	55	43	31	61	43	32
52 ton	50	46	33	55	43	30	61	43	31
60 ton	63	45	37	71	43	36	77	43	34
70 ton	64	46	37	72	43	35	78	43	34
80 ton	61	44	38	69	45	35	69	45	34
90 ton	61	45	37	69	45	35	68	45	33
100 ton	72	47	39	81	47	37	80	46	35
110 ton	72	47	39	81	47	37	80	47	35
120 ton	74	47	38	84	47	36	83	47	35

Unit Isolation and Leveling

Mounting

Construct an isolated concrete pad for the unit or provide concrete footings at each of the four unit mounting points. Mount the unit directly to the concrete pads or footings.

Level the unit using the base rail as a reference. The unit must be level within 1/4" over the entire length. Use shims as necessary to level the unit.

Elastomeric Isolator Installation (optional)

Install the optional neoprene isolators at each mounting location. Isolators are identified by part number and color.

1. Secure the isolators to the mounting surface, using the mounting slots in the isolator base plate, as shown in Figure 40. Do not fully tighten the isolator mounting bolts at this time.
2. Align the mounting holes in the base of the unit, with the threaded positioning pins on the top of the isolators.
3. Lower the unit on to the isolators and secure the isolator to the unit with a nut. Maximum isolator deflection should be approximately 1/4".
4. Level the unit carefully. Refer to "Leveling". Fully tighten the isolator mounting bolts.

Figure 40. CGAM Elastomeric Isolator

EXT	Max. Load each (Lbs)	Deflection in Inches	Fig	A	B	C	D	E	H	L	M	W	Type	Color
57	250	0.50	2	2.50	0.50	4.12	0.56	0.25	2.88	5.50	1.13	3.38	RDP3-WR-	BLACK
58	525													RED
59	750													GREEN
60	1100													GRAY
61	1500	0.50	2	3.00	0.50	5.00	0.56	0.38	2.75	6.25	1.60+/-.25	4.63	RDP4-WR-	BROWN
62	2250													RED
63	3000													GREEN
64	4000													GRAY

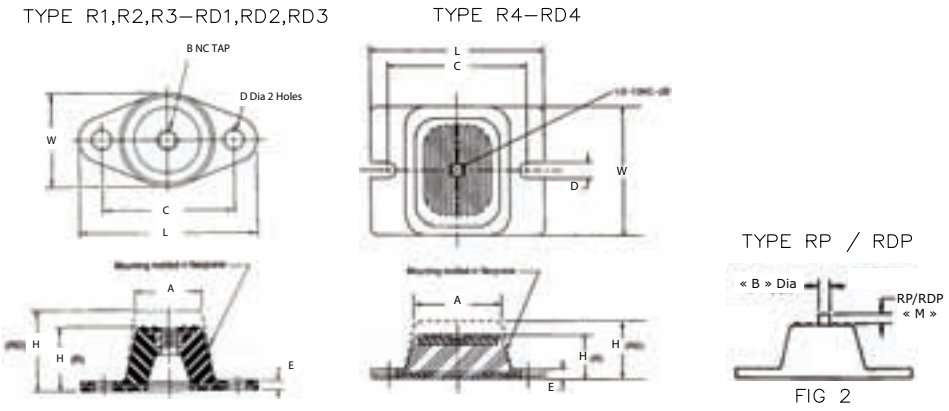


FIG 2

Mounting Point Locations and Weights

Figure 41. Mounting Point Locations

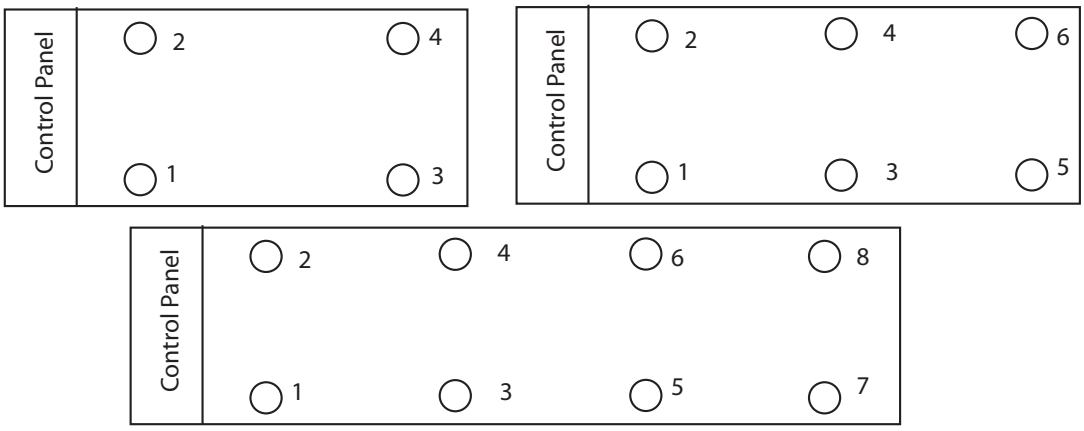


Table 13. Isolator locations - base unit - with or without partial heat recovery

	Location							
Size (ton)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
20-26	RDP-3 Grey 60	RDP-3 Grey 60	RDP-3 Grey 60	RDP-3 Grey 60	-	-	-	-
30-35	RDP-4 Brown 61	RDP-4 Brown 61	RDP-3 Grey 60	RDP-3 Grey 60	-	-	-	-
40-52	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	-	-	-	-
60-70	RDP-4 Red 62	RDP-4 Red 62	RDP-3 Gray 60	RDP-3 Gray 60	RDP-3 Gray 60	RDP-3 Gray 60	-	-
80-120	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-3 Gray 60	RDP-3 Gray 60	-	-
130	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-3 Grey 60	RDP-3 Grey 60

Table 14. Isolator locations - with pump package - with or without partial heat recovery

	Location							
Size (ton)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
20-26	RDP-3 Grey 60	RDP-3 Grey 60	RDP-3 Grey 60	RDP-3 Grey 60	-	-	-	-
30-35	RDP-4 Brown 61	RDP-4 Brown 61	RDP-4 Brown 61	RDP-4 Brown 61	-	-	-	-
40-52	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	-	-	-	-
60-90	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	-	-
100-120	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	-	-
130	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62

Table 15. Isolator locations - with pump package and buffer tank option - with or without partial heat recovery

	Location							
Size (ton)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
20-35	RDP-3 Grey 60	RDP-3 Grey 60	RDP-4 Green 63	RDP-4 Green 63	-	-	-	-
40-52	RDP-4 Brown 61	RDP-4 Brown 61	RDP-4 Grey 64	RDP-4 Grey 64	-	-	-	-
60-70	RDP-4 Brown 61	RDP-4 Brown 61	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	-	-
80-90	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	RDP-4 Red 62	-	-
100-120	RDP-4 Grey 64	RDP-4 Grey 64	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63		
130	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63	RDP-4 Green 63

Table 16. Point weights (lbs) - 60 Hz - base unit

	Isolator location															
	Without partial heat recovery								With partial heat recovery							
Size	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
20 ton	656	654	363	362	-	-	-	-	655	671	371	378	-	-	-	-
26 ton	678	663	382	375	-	-	-	-	678	682	390	392	-	-	-	-
30 ton	960	784	472	388	-	-	-	-	964	810	477	404	-	-	-	-
35 ton	969	787	489	402	-	-	-	-	867	921	601	312	-	-	-	-
40 ton	1075	1133	669	710	-	-	-	-	1068	1126	726	766	-	-	-	-
52 ton	1087	1169	688	746	-	-	-	-	1080	1161	748	805	-	-	-	-
60 ton	1052	1122	806	855	411	435	-	-	1122	1181	654	696	545	587	-	-
70 ton	1173	1098	768	716	345	672	-	-	1102	1203	657	727	561	631	-	-
80 ton	1499	1547	798	821	409	420	-	-	1605	1653	804	827	396	407	-	-
90 ton	1569	1648	824	862	420	437	-	-	1681	1760	831	868	406	424	-	-
100 ton	1358	1762	849	1056	750	640	-	-	1645	1732	733	1107	683	724	-	-
110 ton	1370	1789	857	1074	758	652	-	-	1659	1758	740	1125	690	737	-	-
120 ton	1388	1810	864	1080	758	650	-	-	1685	1783	746	1132	689	735	-	-
130 ton	1240	1298	823	1233	753	793	716	756	1320	1374	858	1278	754	791	699	736

Table 17. Point weights (lbs) - 60 Hz - with pump package

	Isolator location															
	Without partial heat recovery								With partial heat recovery							
Size	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
20 ton	734	659	668	593	-	-	-	-	736	674	673	611	-	-	-	-
26 ton	755	670	688	604	-	-	-	-	757	686	694	623	-	-	-	-
30 ton	997	750	908	661	-	-	-	-	1004	774	910	679	-	-	-	-
35 ton	1006	754	926	674	-	-	-	-	1013	778	928	693	-	-	-	-
40 ton	1189	1071	1028	945	-	-	-	-	1077	1168	1189	896	-	-	-	-
52 ton	1100	1208	1148	879	-	-	-	-	1087	1206	1213	933	-	-	-	-
60 ton	1262	943	811	871	752	811	-	-	1246	930	833	891	800	858	-	-
70 ton	1154	1095	833	792	855	814	-	-	1226	950	835	925	813	903	-	-
80 ton	1487	1533	904	937	802	834	-	-	1663	1553	809	1081	820	768	-	-
90 ton	1635	1548	818	1110	847	805	-	-	1614	1689	1064	1116	726	762	-	-
100 ton	1258	1653	1279	1148	910	1169	-	-	1344	1765	1311	1171	896	1139	-	-
110 ton	1270	1680	1289	1165	916	1183	-	-	1356	1792	1322	1187	902	1154	-	-
120 ton	1221	1788	1224	1221	1226	1224	-	-	1313	1904	1260	1245	1208	1194	-	-
130 ton	903	1253	883	1225	1218	1181	1194	1158	1053	1208	1065	1220	1084	1239	1094	1249

Table 18. Point weights (lbs) - 60 Hz - with pump package and buffer tank options

	Isolator location															
	Without partial heat recovery								With partial heat recovery							
Size	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
20 ton	486	461	1702	1592	-	-	-	-	492	472	1703	1614	-	-	-	-
26 ton	640	338	1589	1736	-	-	-	-	649	348	1588	1762	-	-	-	-
30 ton	735	594	1935	1639	-	-	-	-	745	614	1934	1660	-	-	-	-
35 ton	743	598	1954	1651	-	-	-	-	753	619	1953	1673	-	-	-	-
40 ton	887	819	2128	1987	-	-	-	-	879	812	2184	2043	-	-	-	-
52 ton	904	849	2141	2027	-	-	-	-	896	842	2201	2086	-	-	-	-
60 ton	807	761	1145	1080	1670	1574	-	-	796	750	1157	1092	1722	1626	-	-
70 ton	803	770	1149	1102	1687	1618	-	-	792	759	1162	1114	1741	1671	-	-
80 ton	1941	2009	1284	1330	878	910	-	-	2043	2111	1299	1345	860	892	-	-
90 ton	2014	2106	1311	1374	885	929	-	-	1974	2411	1369	1229	971	873	-	-
100 ton	1817	2012	1708	1903	1092	1225	-	-	1764	2354	1759	1721	1196	1170	-	-
110 ton	1830	2036	1718	1924	1097	1237	-	-	1776	2380	1770	1740	1203	1182	-	-
120 ton	1812	2022	1804	2013	1224	1367	-	-	1765	2371	1858	1832	1329	1311	-	-
130 ton	1373	1249	1355	1231	1327	1765	1313	1743	1445	1322	1400	1277	1330	1771	1293	1716

Table 19. Point Weights (lbs) - 50 Hz - base unit

	Isolator location											
	Without partial heat recovery						With partial heat recovery					
Size	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**
20 ton	612	636	351	362	-	-	612	653	358	378	-	-
26 ton	634	645	369	374	-	-	634	662	377	390	-	-
30 ton	900	758	458	390	-	-	904	784	463	406	-	-
35 ton	909	760	475	404	-	-	913	786	480	420	-	-
40 ton	927	1150	742	620	-	-	921	1141	798	676	-	-
52 ton	938	1186	762	654	-	-	932	1178	818	711	-	-
60 ton	963	1100	848	654	358	558	903	1201	725	664	578	517
70 ton	956	1108	859	679	371	599	899	1208	737	683	603	549
80 ton	1365	1406	849	877	366	380	1408	1448	886	914	386	400
90 ton	1321	1654	926	791	441	377	1494	1573	844	881	449	467
100 ton	1266	1654	816	1028	748	651	1354	1759	840	1046	735	627
110 ton	1279	1681	825	1046	756	663	1371	1792	850	1065	743	638
120 ton	1296	1702	831	1051	756	661	1330	1737	863	1087	796	694

Table 20. Point Weights (lbs) - 50 Hz - with pump package

	Isolator location											
	Without partial heat recovery						With partial heat recovery					
Size	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**
20 ton	694	645	575	525	-	-	696	660	580	544	-	-
26 ton	715	656	595	536	-	-	717	671	600	554	-	-
30 ton	930	727	812	608	-	-	937	750	814	627	-	-
35 ton	941	728	847	634	-	-	948	752	849	653	-	-
40 ton	1186	929	881	980	-	-	1178	922	937	1035	-	-
52 ton	1116	1046	982	933	-	-	1193	955	953	1073	-	-
60 ton	1032	962	902	832	795	724	1012	953	915	858	836	779
70 ton	1024	973	909	858	813	762	1009	958	928	877	861	810
80 ton	1387	1433	868	900	791	823	1433	1479	896	928	816	848
90 ton	1462	1529	894	941	797	845	1388	1624	943	1066	921	724
100 ton	1294	1356	1212	1274	792	1194	1256	1655	1259	1132	884	1135
110 ton	1309	1380	1222	1293	796	1208	1272	1688	1271	1149	889	1148
120 ton	1318	1381	1275	1338	863	1295	1182	1737	1187	1189	1192	1193

Table 21. Point Weights (lbs) - 50 Hz - with pump package and buffer tank options

	Isolator location											
	Without partial heat recovery						With partial heat recovery					
Size	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**
20 ton	454	439	1601	1532	-	-	461	450	1602	1554	-	-
26 ton	472	453	1624	1540	-	-	478	464	1625	1562	-	-
30 ton	676	563	1832	1594	-	-	686	583	1831	1615	-	-
35 ton	685	566	1869	1618	-	-	695	586	1868	1639	-	-
40 ton	807	753	2057	1945	-	-	800	746	2113	2000	-	-
52 ton	824	784	2070	1985	-	-	817	776	2126	2041	-	-
60 ton	733	685	1104	1035	1688	1587	723	674	1116	1047	1740	1639
70 ton	730	694	1108	1057	1705	1631	719	683	1120	1070	1757	1682
80 ton	1842	1909	1247	1293	868	900	1887	1954	1279	1324	891	923
90 ton	1915	2006	1274	1336	875	919	1947	2038	1309	1371	906	950
100 ton	1929	1901	1285	1856	1255	1236	2025	1993	1307	1885	1236	1214
110 ton	1943	1925	1293	1877	1261	1248	1836	2042	1699	1905	1067	1207
120 ton	1740	1948	1723	1931	1163	1305	1771	1979	1763	1971	1196	1338

Evaporator Piping

Evaporator water connections are grooved.

Thoroughly flush all water piping to the CGAM unit before making the final piping connections to the unit.

Components and layout will vary slightly, depending on the location of connections and the water source.

⚠ CAUTION
Equipment Damage!

If using an acidic commercial flushing solution, construct a temporary bypass around the unit to prevent damage to internal components of the evaporator and the pump.

⚠ CAUTION
Proper Water Treatment!

The use of untreated or improperly treated water in a Chiller may result in scaling, erosion, corrosion, algae or slime. It is recommended that the services of a qualified water treatment specialist be engaged to determine what water treatment, if any, is required. Trane assumes no responsibility for equipment failures which result from untreated or improperly treated water, or saline or brackish water.

Drainage

Locate the unit near a large capacity drain for water vessel drain-down during shutdown or repair. Evaporators are provided with drain connections. Refer to “Water Piping.” All local and national codes apply.

A vent is provided on the top of the evaporator at the chilled water inlet. Be sure to provide additional vents at high points in the piping to bleed air from the chilled water system. Install necessary pressure gauges to monitor the entering and leaving chilled water pressures.

Provide shutoff valves in lines to the gauges to isolate them from the system when they are not in use. Use rubber vibration eliminators to prevent vibration transmission through the water lines.

If desired, install thermometers in the lines to monitor entering and leaving water temperatures. Install a balancing valve in the leaving water line to control water flow balance. Install shutoff valves on both the entering and leaving water lines so that the evaporator can be isolated for service.

Evaporator Piping Components

Piping components include all devices and controls used to provide proper water system operation and unit operating safety. See Figure 42, p. 53. These components are listed below.

Figure 42. Water piping components

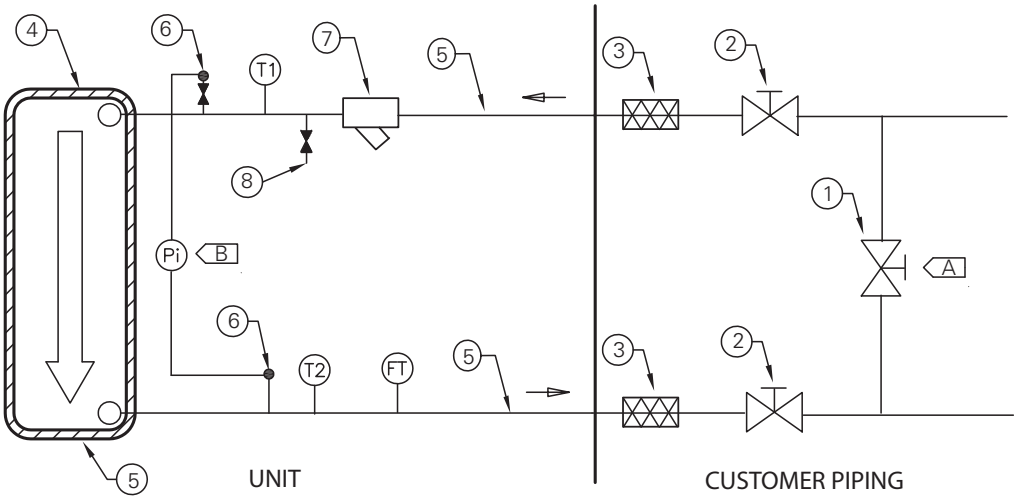


Table 22. Water piping components

Item	Description	Item	Description
1	Bypass Valve	Pi	Gauge
2	Isolation Valves	FT	Water Flow Switch
3	Vibration Eliminators	T1	Evap Water Inlet Temp Sensor
4	Evaporator Heat Exchanger	T2	Evap Water Outlet Temp Sensor
5	Water Heater	A	Isolate unit for initial water loop cleaning
6	Valve for Pressure Point	B	Brazed plate differential pressure gauge and piping not supplied. Must account for water head height difference when calculating brazed plate pressure differential.
7	Strainer		

Entering Chilled Water Piping

- Air vents (to bleed air from system)
- Water pressure gauges with shutoff valves
- Vibration eliminators
- Shutoff (isolation) valves
- Thermometers (if desired)
- Relief valve

Leaving Chilled Water Piping

- Air vents (to bleed air from system)
- Water pressure gauges with shutoff valves
- Vibration eliminators
- Shutoff (isolation) valves
- Thermometers (if desired)
- Balancing valve

NOTICE:

Water Damage!

Standard pressure is 72.5 Psig for all factory installed components on the suction side of water pump. Standard pressure of components on the discharge side of water pump is 145 Psig. You MUST drain the system FIRST before releasing the pressure. Failure to do so could result in water spray which could cause equipment and/or property damage.

Water Strainer

The water strainer is factory-installed with taps for the pressure gauges on the inlet and outlet. Install pressure gauges in order to measure differential pressure across the filter. This will help to determine when it is necessary to clean the water strainer.

Flow Switch

The flow switch is factory-installed and programmed based on the operating conditions submitted with the order. The leaving evaporator temperature, fluid type and fluid concentration affect the selected flow switch. If the operating conditions on the job site change, the flow switch may need to be replaced.

The sensor head includes 3 LEDs, two yellow and one green. Wait 15 seconds after power is applied to the sensor before evaluating LEDs for flow status. When wired correctly and flow is established, only the green LED should be lit. Following are the LED indicators:

- Green ON, both yellow OFF — Flow
- Green and outside yellow ON — No Flow
- Center yellow ON continuously — Miswire

Factory installed jumper wire W11 must be removed if using auxiliary contacts and/or additional proof of flow. See schematics in section "Unit Wiring," p. 183 for more details.

Note: *Use caution when connecting the auxiliary contacts. Terminals 1X5-3 and 1X5-9 are to be used for field connections of auxiliary contacts. Inadvertant use of 1X5-4 and 1X5-9 will result in a FALSE FLOW indication.*

NOTICE:

Equipment Damage!

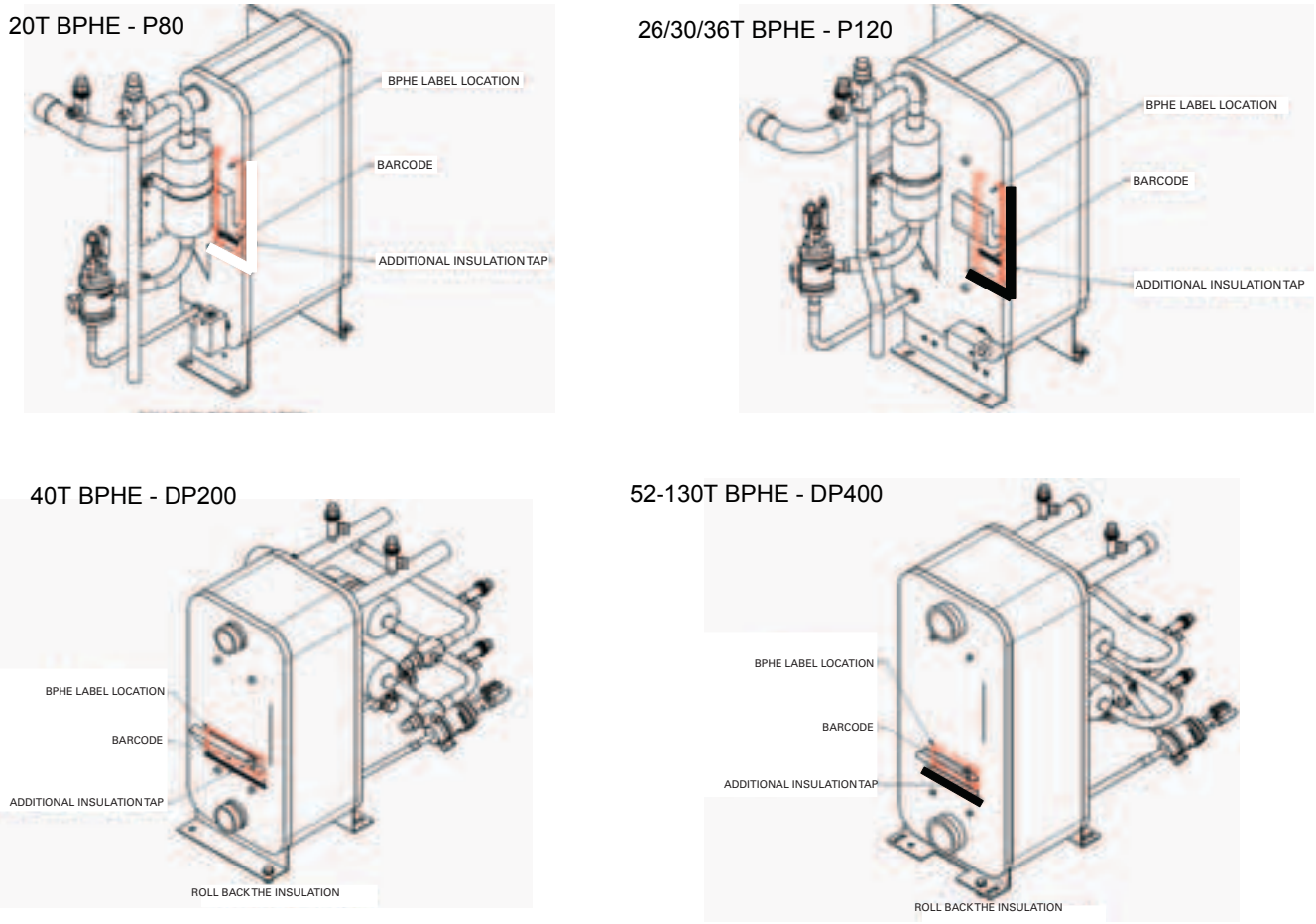
Incorrect wiring of auxiliary contacts could cause equipment damage.

If using auxiliary flow sensing, both yellow LEDs come on initially when flow is stopped. The center yellow LED will turn off after approximately 7 seconds. The LED indicators are otherwise the same as indicated above.

Evaporator Label

The BPHE evaporator label, including barcode, is located under the insulation, in the locations shown in Figure 43, p. 55. Insulation backing over this area has not been removed, so that it can be rolled back to access BPHE label.

Figure 43. BPHE label locations



Pressure Drop Curves

For overlapping pressure drop curves, see General Data Tables in section "General Information," p. 12 for limit values.

Figure 44. Total unit pressure drop curves (60 Hz)

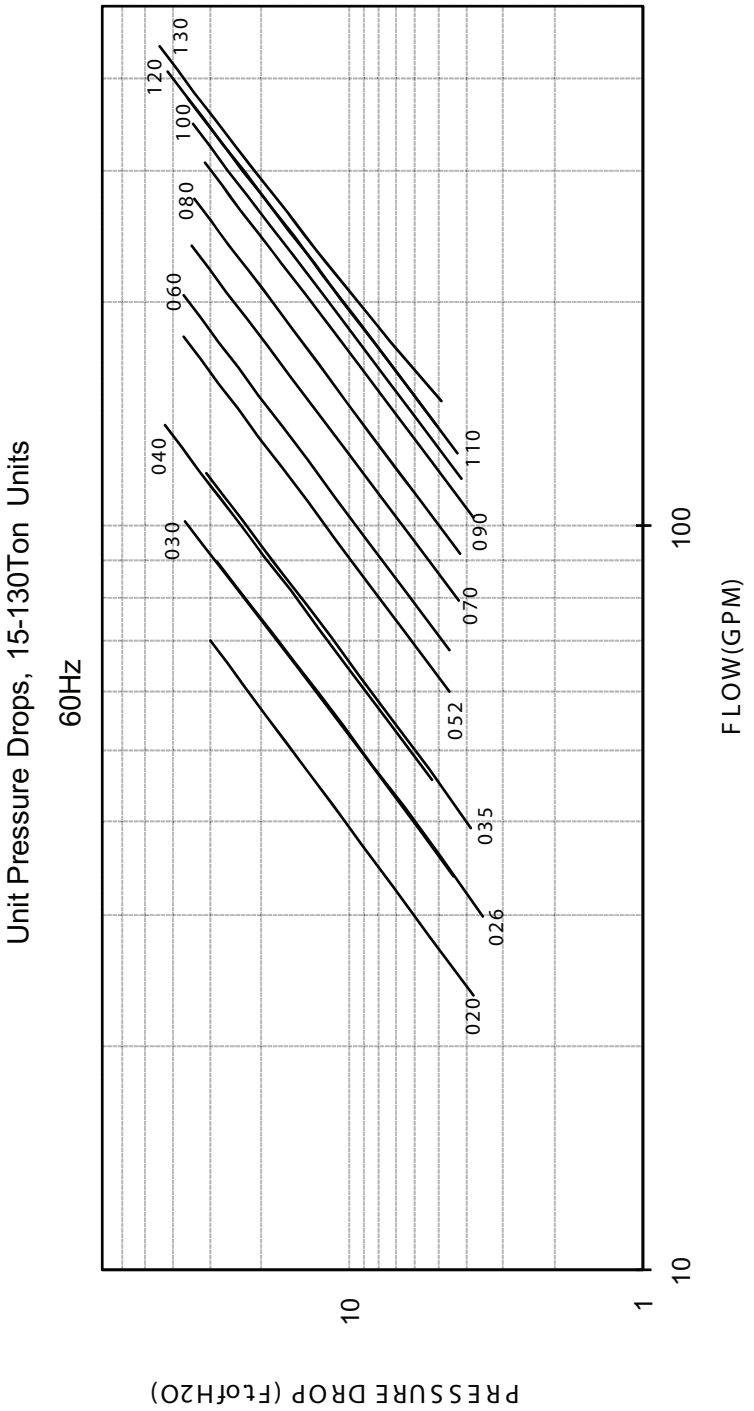
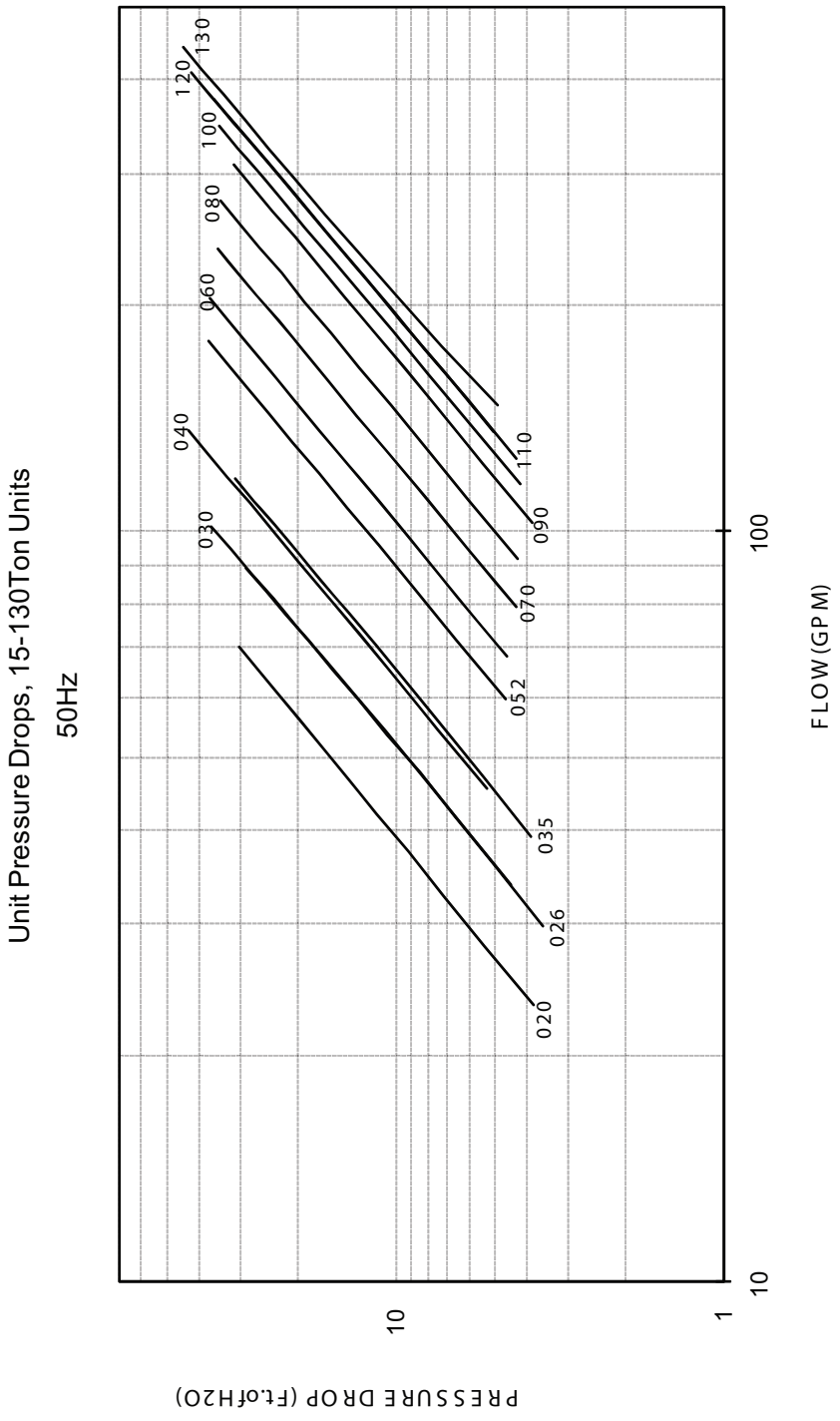


Figure 45. Total Unit Pressure Drop Curves (50 Hz)



Freeze Protection

Depending on the ambient temperature the unit may be exposed to there are up to four different options for freeze protection. They are listed in order of highest ambient (least freeze protection) to lowest ambient (most freeze protection).

5. Water pump (for protection with ambient temperatures down to 0°F)
   a. CH530 controller can start the pump when the ambient temperatures drops to prevent freezing. For this option the pump must to be controlled by the CGAM unit and this function must be validated.
   b. Water circuit valves need to stay open at all times.

OR

6. Heaters (for protection with ambient temperatures down to -20°F)
   a. Heaters are factory-installed on the evaporator and water piping and will protect them from freezing in ambient temperatures down to -20°F (-29°C).
   b. Install heat tape on all water piping, pumps, and other components that may be damaged if exposed to freezing temperatures. Heat tape must be designed for low ambient temperature applications. Heat tape selection should be based on the lowest expected ambient temperature.

OR

7. Freeze inhibitor with heaters
   a. For protection with ambient temperatures **down to -20°F**:
      i. Add a freeze inhibitor fluid to the chilled water system. The solution must be strong enough to provide protection against ice formation at the lowest anticipated ambient temperature.
      ii. Activate the heaters and heat tape on the unit.
   b. For protection with ambient temperatures **below -20°F**:
      i. Add a freeze inhibitor fluid sufficient for burst protection at the lowest anticipated ambient temperature.
      ii. Activate the heaters and heat tape on the unit.

   Note: *Use of a freeze inhibitor fluid reduces the cooling capacity of the unit and must be considered in the design of the system specifications.*

OR

8. Drain water circuit (for protection with ambients below -20°F)
   a. Shut off the power supply to the unit and to all heaters.
   b. Purge the water circuit.
   c. Blow out the evaporator to ensure no liquid is left in the evaporator.

Note: *By default the CH530 freeze protection control is enabled and will request the start of the chilled water pump with ambient temperatures less than the evaporator low leaving water temperature setpoint. The pump remains ON until the minimum evaporator water temperature is great than low leaving water temperature setpoint plus 7°C. The minimum on time for the pump is 5 minutes. If you do NOT want the CH530 to start the pump when the ambient temperature drops to freezing, disable this freeze protection control.*

NOTICE:

Equipment Damage!

All heaters have separate power from the unit. All heaters must be energized when the unit is off (unless the water circuit is drained). In the event of power loss heaters will not protect the evaporator from catastrophic damage. In order to provide freeze protection in the event of a power loss you MUST drain the evaporator or use sufficient freeze inhibitor in the evaporator.

Low Evap Refrigerant Cutout/Percent Glycol Recommendations

The table below shows the low evaporator temperature cutout for different glycol levels.

Additional glycol beyond the recommendations will adversely effect unit performance. The unit efficiency will be reduced and the saturated evaporator temperature will be reduced. For some operating conditions this effect can be significant.

If additional glycol is used, then use the actual percent glycol to establish the low refrigerant cutout setpoint.

Table 23. Low Evap Refrigerant Temp Cutout and Low Water Temp Cutout

ETHYLENE GLYCOL							PROPYLENE GLYCOL						
% Glycol	Solution Freeze Point [F]	Low Refrig Temp Cutout [F]	Low Water Temp Cutout [F]	Min Chilled Water Set Point [F] Number of compressors			% Glycol	Solution Freeze Point [F]	Low Refrig Temp Cutout [F]	Low Water Temp Cutout [F]	Min Chilled Water Set Point [F] Number of compressors		
				2	4	6					2	4	6
0	32	22	35	42	42	42	0	32	22	35	42	42	42
1	31.6	21.6	34.6	41.6	39.1	38.2	1	31.6	21.6	34.6	41.6	39.1	38.2
2	31.0	21.0	34.0	41.0	38.5	37.6	2	31.0	21.0	34.0	41.0	38.5	37.6
3	30.3	20.3	33.3	40.3	37.8	37.0	3	30.4	20.4	33.4	40.3	37.8	37.0
4	29.7	19.7	32.7	39.7	37.2	36.3	4	29.9	19.9	32.9	39.7	37.2	36.3
5	29.0	19.0	32.0	39.0	36.5	35.7	5	29.3	19.3	32.3	39.0	36.5	35.7
6	28.3	18.3	31.3	38.3	35.8	35.0	6	28.7	18.7	31.7	38.3	35.8	35.0
7	27.6	17.6	30.6	37.6	35.1	34.3	7	28.1	18.1	31.1	37.6	35.1	34.3
8	26.9	16.9	29.9	36.9	34.4	33.6	8	27.6	17.6	30.6	36.9	34.4	33.6
9	26.2	16.2	29.2	36.2	33.7	32.9	9	27.0	17.0	30.0	36.2	33.7	32.9
10	25.5	15.5	28.5	35.5	33.0	32.1	10	26.4	16.4	29.4	35.5	33.0	32.1
11	24.7	14.7	27.7	34.7	32.2	31.4	11	25.7	15.7	28.7	34.7	32.2	31.4
12	23.9	13.9	26.9	33.9	31.4	30.6	12	25.1	15.1	28.1	33.9	31.4	30.6
13	23.1	13.1	26.1	33.1	30.6	29.8	13	24.4	14.4	27.4	33.1	30.6	29.8
14	22.3	12.3	25.3	32.3	29.8	29.0	14	23.8	13.8	26.8	32.3	29.8	29.0
15	21.5	11.5	24.5	31.5	29.0	28.1	15	23.1	13.1	26.1	31.5	29.0	28.1
16	20.6	10.6	23.6	30.6	28.1	27.2	16	22.4	12.4	25.4	30.6	28.1	27.2
17	19.7	9.7	22.7	29.7	27.2	26.3	17	21.6	11.6	24.6	29.7	27.2	26.3
18	18.7	8.7	21.7	28.7	26.2	25.4	18	20.9	10.9	23.9	28.7	26.2	25.4
19	17.8	7.8	20.8	27.8	25.3	24.5	19	20.1	10.1	23.1	27.8	25.3	24.5
20	16.8	6.8	19.8	26.8	24.3	23.5	20	19.3	9.3	22.3	26.8	24.3	23.5
21	15.8	5.8	18.8	25.8	23.3	22.5	21	18.4	8.4	21.4	25.8	23.3	22.5
22	14.7	4.7	17.7	24.7	22.2	21.4	22	17.6	7.6	20.6	24.7	22.2	21.4
23	13.7	3.7	16.7	23.7	21.2	20.3	23	16.7	6.7	19.7	23.7	21.2	20.3
24	12.5	2.5	15.5	22.5	20.0	19.2	24	15.7	5.7	18.7	22.5	20.0	19.2

Table 23. Low Evap Refrigerant Temp Cutout and Low Water Temp Cutout

ETHYLENE GLYCOL							PROPYLENE GLYCOL						
% Glycol	Solution Freeze Point [F]	Low Refrig Temp Cutout [F]	Low Water Temp Cutout [F]	Min Chilled Water Set Point [F] Number of compressors			% Glycol	Solution Freeze Point [F]	Low Refrig Temp Cutout [F]	Low Water Temp Cutout [F]	Min Chilled Water Set Point [F] Number of compressors		
				2	4	6					2	4	6
25	11.4	1.4	14.4	21.4	18.9	18.1	25	14.8	4.8	17.8	21.4	18.9	18.1
26	10.2	0.2	13.2	20.2	17.7	16.9	26	13.8	3.8	16.8	20.2	17.7	16.9
27	9.0	-1.0	12.0	19.0	16.5	15.7	27	12.7	2.7	15.7	19.0	16.5	15.7
28	7.7	-2.3	10.7	17.7	15.2	14.4	28	11.6	1.6	14.6	17.7	15.2	14.4
29	6.4	-3.6	9.4	16.4	13.9	13.1	29	10.5	0.5	13.5	16.4	13.9	13.1
30	5.1	-4.9	8.1	15.1	12.6	11.8	30	9.3	-0.7	12.3	15.1	12.6	11.8
31	3.7	-6.3	6.7	13.7	11.2	10.4	31	8.1	-1.9	11.1	13.7	11.2	10.4
32	2.3	-7.7	5.3	12.3	10.4	10.4	32	6.8	-3.2	9.8	12.3	10.4	10.4
33	0.8	-9.2	3.8	10.8	10.4	10.4	33	5.5	-4.5	8.5	10.8	10.4	10.4
34	-0.7	-10.7	2.3	10.4	10.4	10.4	34	4.1	-5.9	7.1	10.4	10.4	10.4
35	-2.3	-12.3	0.7	10.4	10.4	10.4	35	2.7	-7.3	5.7	10.4	10.4	10.4
36	-3.9	-13.9	-0.9	10.4	10.4	10.4	36	1.3	-8.7	4.3	10.4	10.4	10.4
37	-5.6	-15.6	-2.6	10.4	10.4	10.4	37	-0.3	-10.3	2.7	10.4	10.4	10.4
38	-7.3	-17.3	-4.3	10.4	10.4	10.4	38	-1.8	-11.8	1.2	10.4	10.4	10.4
39	-9.0	-19.0	-5.0	10.4	10.4	10.4	39	-3.5	-13.5	-0.5	10.4	10.4	10.4
40	-10.8	-19.0	-5.0	10.4	10.4	10.4	40	-5.2	-15.2	-2.2	10.4	10.4	10.4
41	-12.7	-19.0	-5.0	10.4	10.4	10.4	41	-6.9	-16.9	-3.9	10.4	10.4	10.4
42	-14.6	-19.0	-5.0	10.4	10.4	10.4	42	-8.8	-18.8	-5.0	10.4	10.4	10.4
43	-16.6	-19.0	-5.0	10.4	10.4	10.4	43	-10.7	-19.0	-5.0	10.4	10.4	10.4
44	-18.6	-19.0	-5.0	10.4	10.4	10.4	44	-12.6	-19.0	-5.0	10.4	10.4	10.4
45	-20.7	-19.0	-5.0	10.4	10.4	10.4	45	-14.6	-19.0	-5.0	10.4	10.4	10.4
46	-22.9	-19.0	-5.0	10.4	10.4	10.4	46	-16.7	-19.0	-5.0	10.4	10.4	10.4
47	-25.1	-19.0	-5.0	10.4	10.4	10.4	47	-18.9	-19.0	-5.0	10.4	10.4	10.4
48	-27.3	-19.0	-5.0	10.4	10.4	10.4	48	-21.1	-19.0	-5.0	10.4	10.4	10.4
49	-29.7	-19.0	-5.0	10.4	10.4	10.4	49	-23.4	-19.0	-5.0	10.4	10.4	10.4
50	-32.1	-19.0	-5.0	10.4	10.4	10.4	50	-25.8	-19.0	-5.0	10.4	10.4	10.4
51	-34.5	-19.0	-5.0	10.4	10.4	10.4	51	-28.3	-19.0	-5.0	10.4	10.4	10.4
52	-37.1	-19.0	-5.0	10.4	10.4	10.4	52	-30.8	-19.0	-5.0	10.4	10.4	10.4
53	-39.7	-19.0	-5.0	10.4	10.4	10.4	53	-33.4	-19.0	-5.0	10.4	10.4	10.4
54	-42.3	-19.0	-5.0	10.4	10.4	10.4	54	-36.1	-19.0	-5.0	10.4	10.4	10.4
55	-45.0	-19.0	-5.0	10.4	10.4	10.4	55	-38.9	-19.0	-5.0	10.4	10.4	10.4

Performance Adjustment Factors

Concentration and type of glycol used will affect unit performance. If operating conditions, including concentration of freeze inhibitor, have changed since the unit was ordered, contact sales representative to rerun selection. See Figure 46, p. 61 through Figure 51, p. 63 for approximate adjustment factors.

Figure 46. Ethylene glycol performance factor - compressor power adjustment

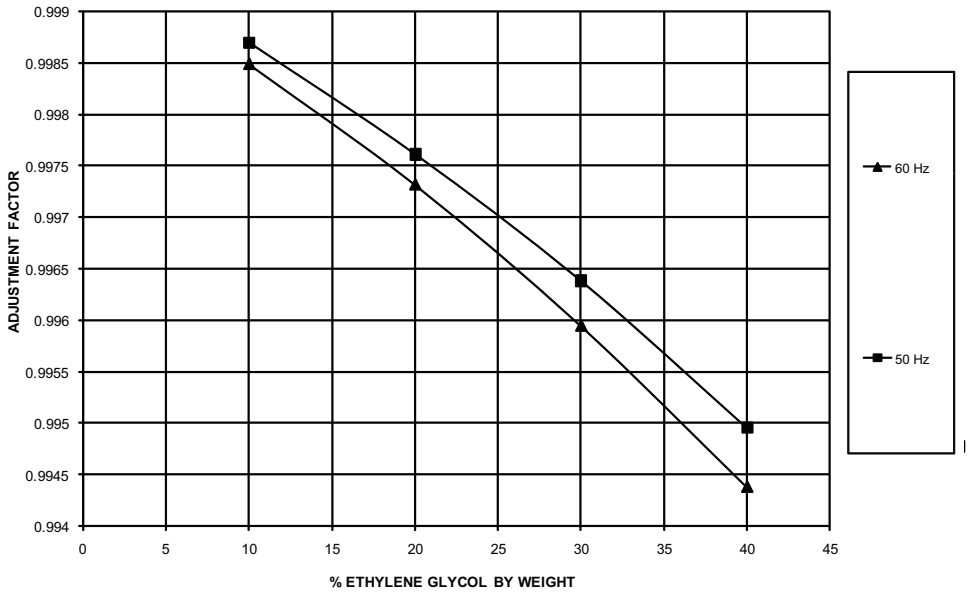


Figure 47. Propylene glycol performance factor - compressor power adjustment

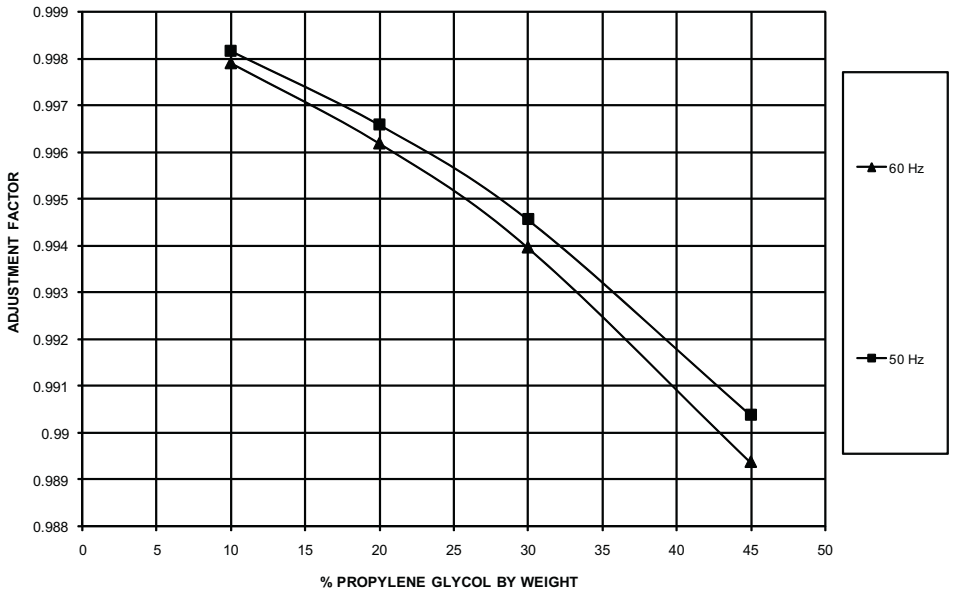


Figure 48. Ethylene glycol performance factor - GPM adjustment

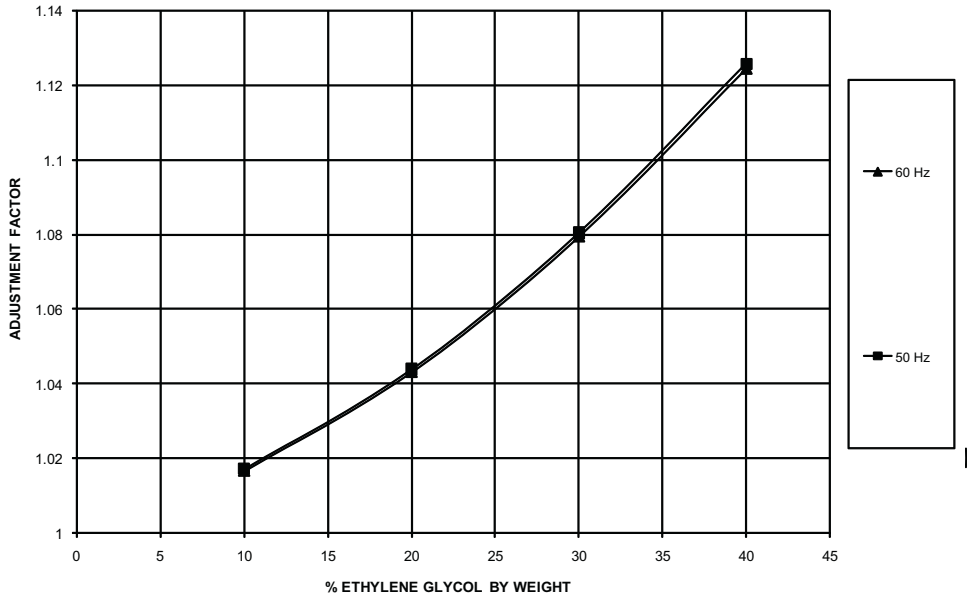


Figure 49. Propylene glycol performance factor - GPM adjustment

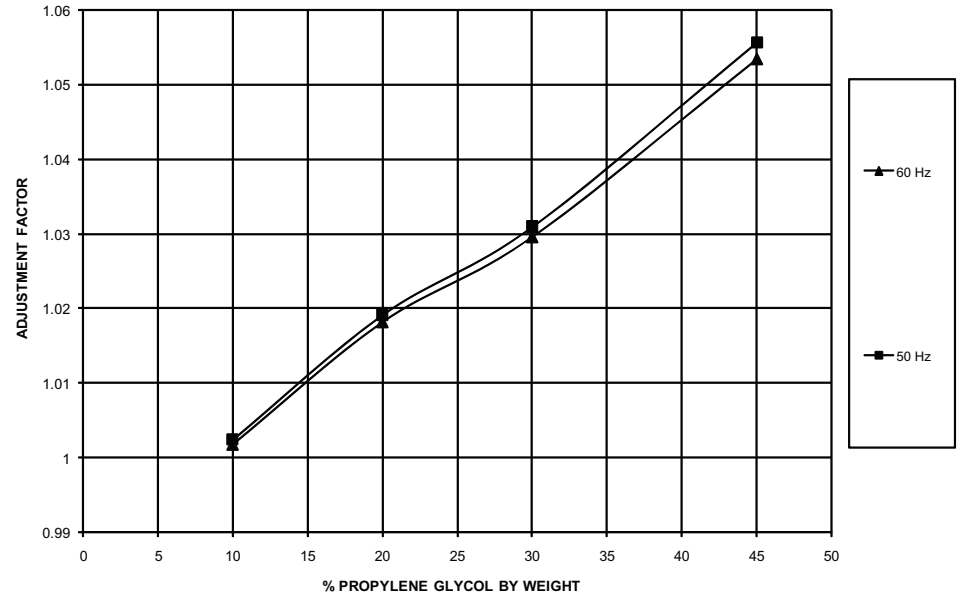


Figure 50. Ethylene glycol performance factor - capacity adjustment

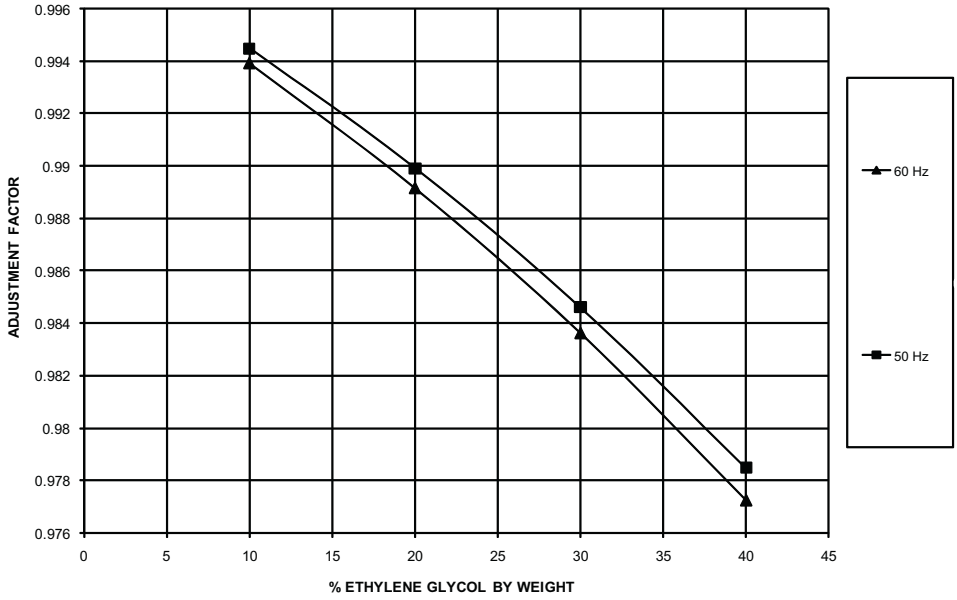
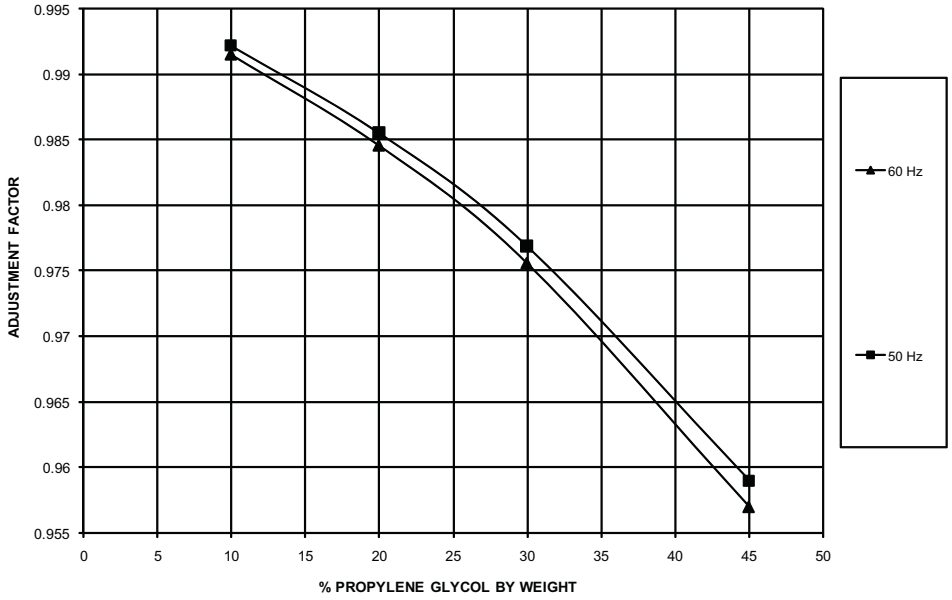


Figure 51. Propylene glycol performance factor - capacity adjustment



Partial Heat Recovery

The partial heat recovery is comprised of an auxiliary heat exchanger installed in the discharge line between the compressor and the air -cooled condenser. The heat exchanger cools compressor discharge gas and rejects the energy to a separate water loop for hot water applications. The chiller can simultaneously produce chilled and hot water.

The heating capacity is driven by the cooling demand on the chiller, the condensing temperature and the flow rate through the heat exchanger.

The partial heat recovery includes:

- Brazed plate heat exchanger
  - Units 20-35 Tons have a single braze plate heat exchanger. Units 40-130 Tons have two braze plate heat exchangers in parallel arrangement.
- Piping between the heat exchanger(s)
- Insulation of the heat exchanger(s) and water pipe
- Two temperature sensors to read the inlet/outlet hot water temperature information on the unit control display
- Heater on partial heat recovery heat exchanger(s) and water pipe
- Manual air vent
- Drain pipe

Water circulating inside the heat recovery heat exchanger should never be used for drinking water, it must be used through an indirect loop to heat or preheat hot water.

Important: *The installation must comply with the rules and legislation applicable at the jobsite location regarding the use of drinkable water. The use of the water circulating in the heat recovery exchanger as drinkable water is not recommended. An intermediate heat exchanger should be used.*

The partial heat recovery pump must run at least three minutes after the partial heat recovery fan control is disabled. During the three minutes, water flow through the brazed plate heat exchanger will gradually be reduced and the unit can be switched to conventional cooling mode without partial heat recovery fan control.

NOTICE:

Equipment damage!

If the partial heat recovery heat exchanger is drained the heater must be turned off to avoid damaging the partial heater recovery heat exchanger. The heater should only be on when the heat recovery heat exchanger has water in it.

Partial Heat Recovery Piping

A field installed safety or relief valve on the water side is required with the partial heat recovery to prevent risks resulting from a failure of the thermostat.

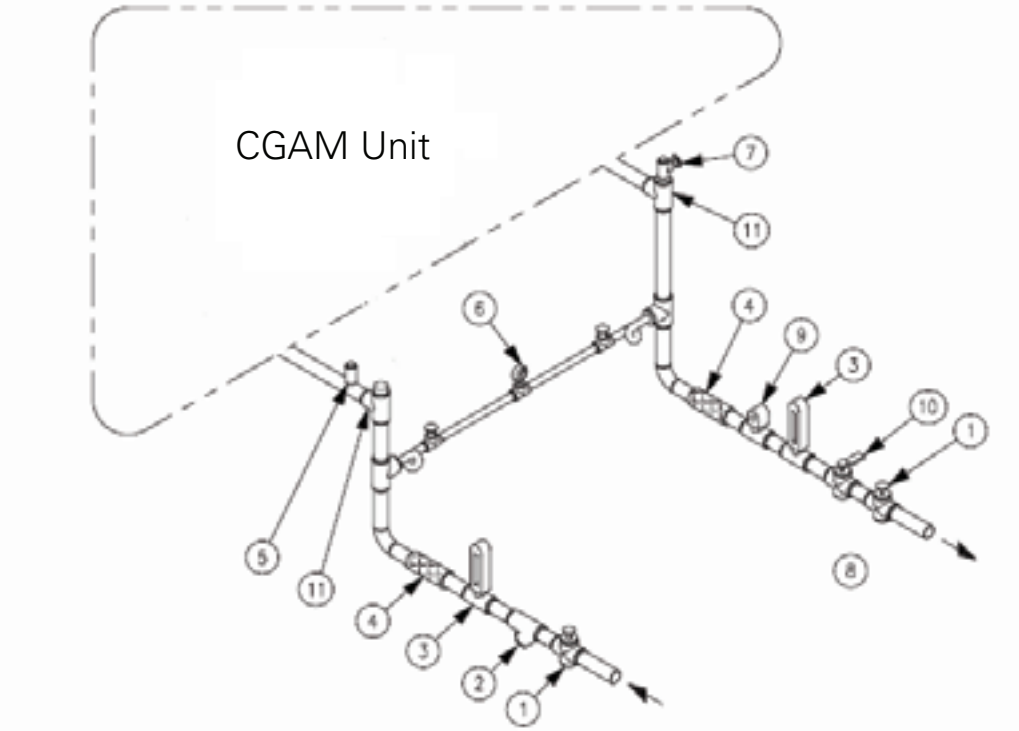
A 16 mesh strainer must be installed close to the partial heat recovery heat exchanger entering water line to protect the heat exchanger.

The partial heat recovery water temperature should be controlled via an external devise such as a 3-way valve or variable speed pump. In addition, a water tank and additional heater is suggested in the partial heat recovery loop.

Insulate water lines and other portions of the heat recovery water loop to prevent heat loss and potential injury due exposure to a hot surface.

For recommended partial heat recovery piping see below.

Figure 52. Partial Heat Recovery Piping Recommendations



Note: *In addition to those recommended for field piping, the CGAM unit includes factory installed manual air vent and water drain valve with partial heat recovery option. See Figure 73, p. 98 through Figure 75, p. 99 for partial heat recovery component locations.*

Do not use untreated or improperly treated water in the heat recovery water loop since it will cause inefficient operation and potential damage to the unit such as: reduced heat transfer between water and refrigerant, increased water pressure drop and reduced water flow.

⚠ CAUTION

Proper Water Treatment!

The use of untreated or improperly treated water in a chiller may result in scaling, erosion, corrosion, algae or slime. It is recommended that the services of a qualified water treatment specialist be engaged to determine what water treatment, if any, is required. Trane assumes no responsibility for equipment failures which result from untreated or improperly treated water, or saline or brackish water.

Partial Heat Recovery Freeze Protection

The heat recovery condenser is insulated and a factory-installed heater is installed and will protect the heat exchanger from freezing in ambient temperatures down to -20°F (-29°C).

When the ambient temperature drops to approximately 39°F (3.9°C) the thermostat energizes the heaters.

Note: *The inlet and outlet piping should be protected against freezing by one of the following methods:*

- Install heat tape on all field-installed water piping.

OR

- Add freeze inhibit fluid to the partial heat recovery water loop.

Partial Heat Recovery Pressure Drop Curves

Figure 53. Partial heat recovery pressure drop curve — 60 Hz

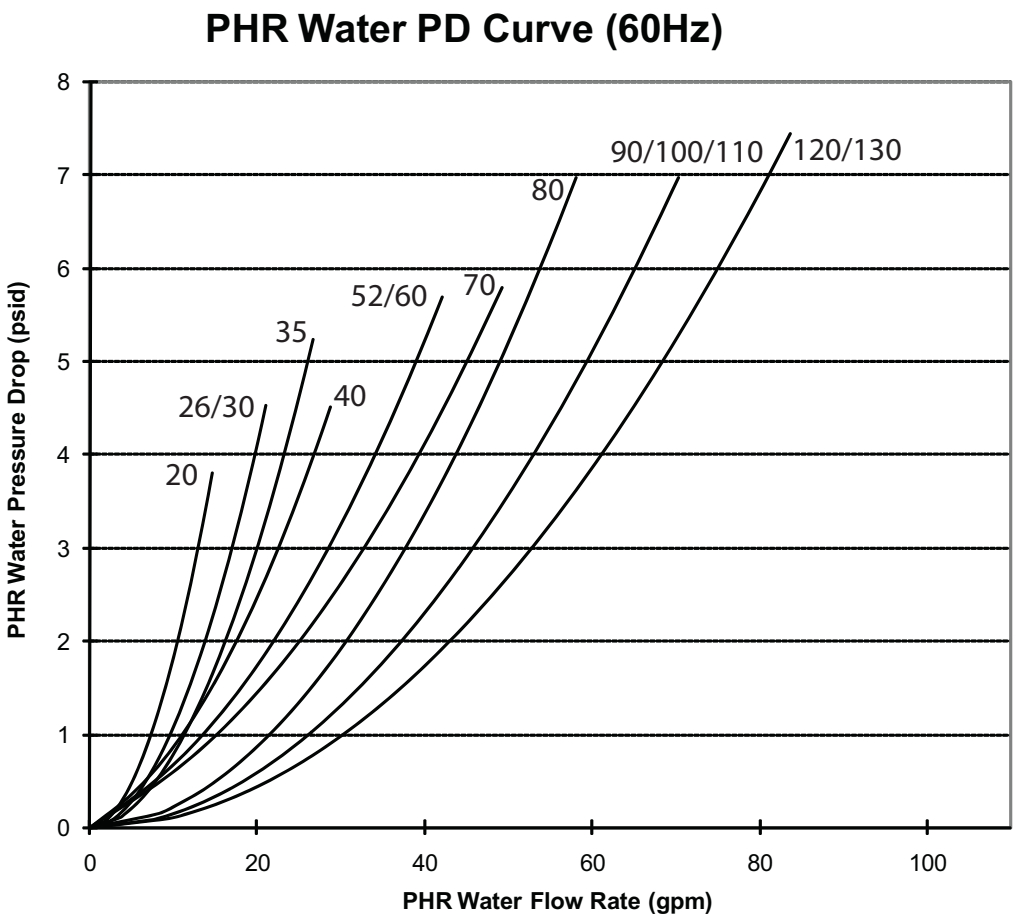


Figure 54. Partial heat recovery pressure drop curve — 50 Hz

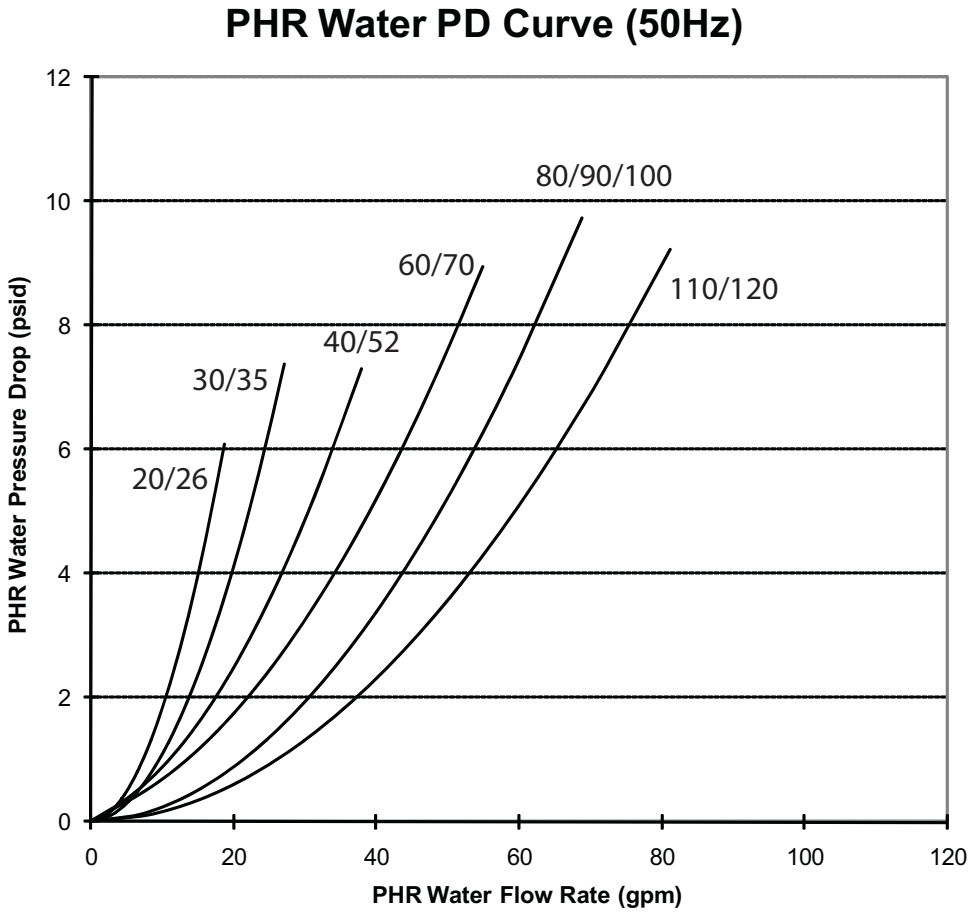


Table 24. Partial heat recovery flow rates — 60 Hz

Size		20	26	30	35	40	52	60	70	80	90	100	110	120	130
Nominal Flow Rate[a]	(gpm)	13	19	18	24	26	39	37	50	46	59	61	70	83	79
Maximum Flow Rate	(gpm)	39	39	39	39	79	79	79	79	127	127	127	127	127	127

(a) Water temperature inlet 122°F, outlet 131°F

Table 25. Partial heat recovery flow rates — 50 Hz

Size		20	26	30	35	40	52	60	70	80	90	100	110	120	130
Nominal Flow Rate[a]	(gpm)	11	15	16	20	21	30	32	40	39	47	48	58	65	11
Maximum Flow Rate	(gpm)	39	39	39	39	79	79	79	79	127	127	127	127	127	39

(a) Water temperature inlet 122°F, outlet 131°F

Note: *Partial heat recovery may function at flow rates near zero. However, heat transfer performance is severely reduced and water flow distribution is poor.*

Dual High Head Pump Package

Pump package includes: two high head pumps, VFD, expansion vessels, drainage valves, shut-off valves at entering and leaving connections. See Figure 56, p. 69.

The pump package is single point power integrated into the chiller unit power with a separate factory wired control panel. The control of the pump is integrated into the chiller controller. The CH530 displays evaporator pump starts and run-times. Freeze protection down to an ambient of -20°F (-29°C) is included as standard. The cold parts of the pump package will also be insulated. Designed with one redundant pump, the chiller controls both pumps through a lead/lag and failure/recovery functionality.

A variable speed drive is installed in an additional panel to control the pump. The inverter should be adjusted by the customer upon start up to balance the system flow and head requirements. The purpose is to save on wasted pump energy caused by a traditional balancing valve.

Note: *Speed command is also available for customer-provided variable flow input.*

Figure 55. Field water piping pump package unit

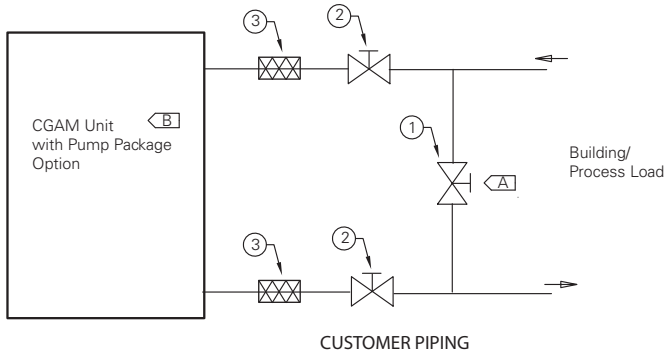


Table 26. Field water piping components - unit with pump package option

Item	Description	Item	Description
1	Bypass Valve	3	Vibration Eliminator
2	Isolator Valve		
A	Isolate unit for initial water loop cleaning		
B	See Figure 56, p. 69 for CGAM pump package unit schematic.		

Figure 56. Pump package unit schematic

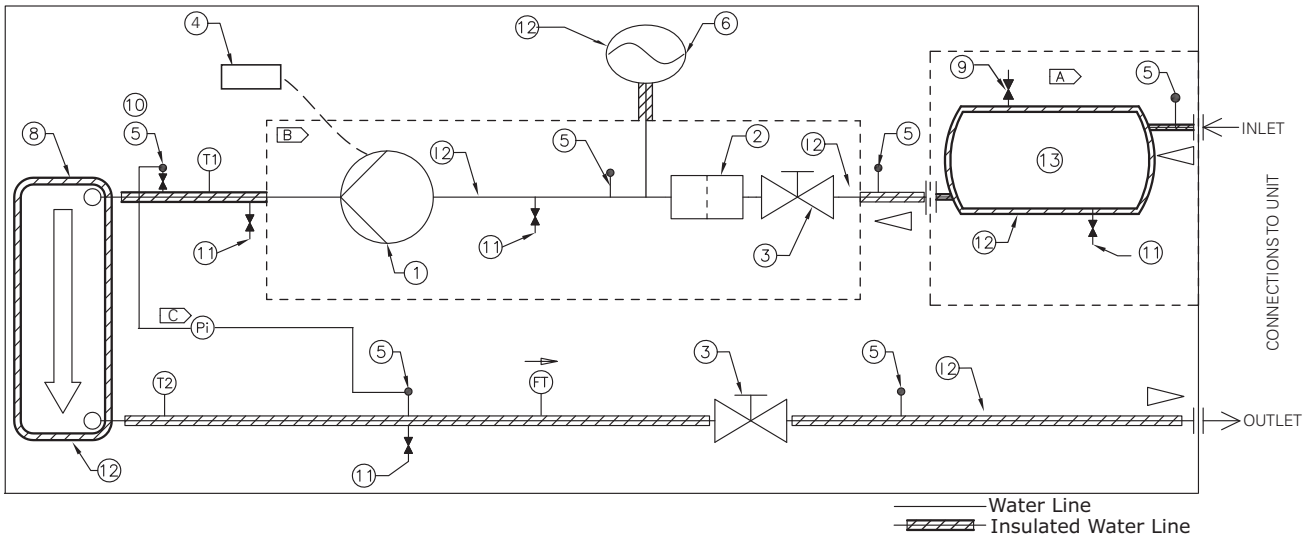


Table 27. Pump package components

Item	Description	Item	Description
1	Centrifugal Pump	8	Evaporator heat exchanger
2	Water Strainer	9	Automatic Air Vent
3	Butterfly Valve	10	Manual Air Bleed
4	Inverter	11	Drain Valve
5	Valve for Pressure Point	12	Water Heater
6	Expansion Tank	13	Buffer Tank (Optional)
7	n/a		
Pi	Gauge	A	Optional Buffer Tank
FT	Water Flow Switch	B	Insulated Pump Box
T1	Evap Water Inlet Temp Sensor	C	Brazed plate differential pressure gauge and piping not supplied. Must account for water head height difference when calculating brazed plate pressure differential.
T2	Evap Water Outlet Temp Sensor		

Figure 57. Pump package water pressure drop curve - 60 Hz

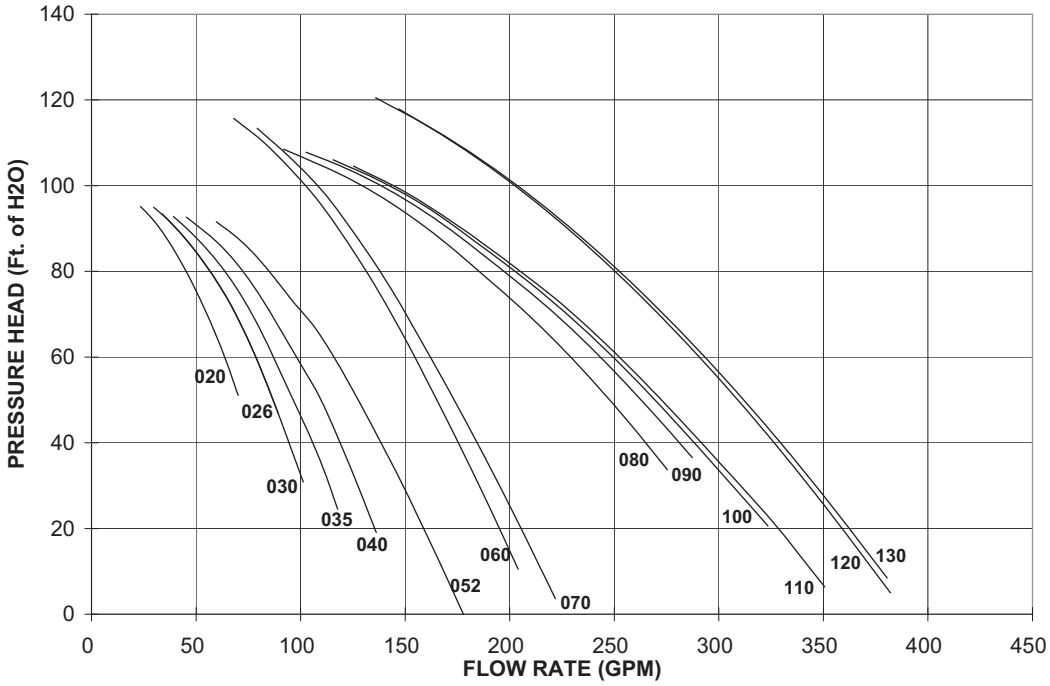
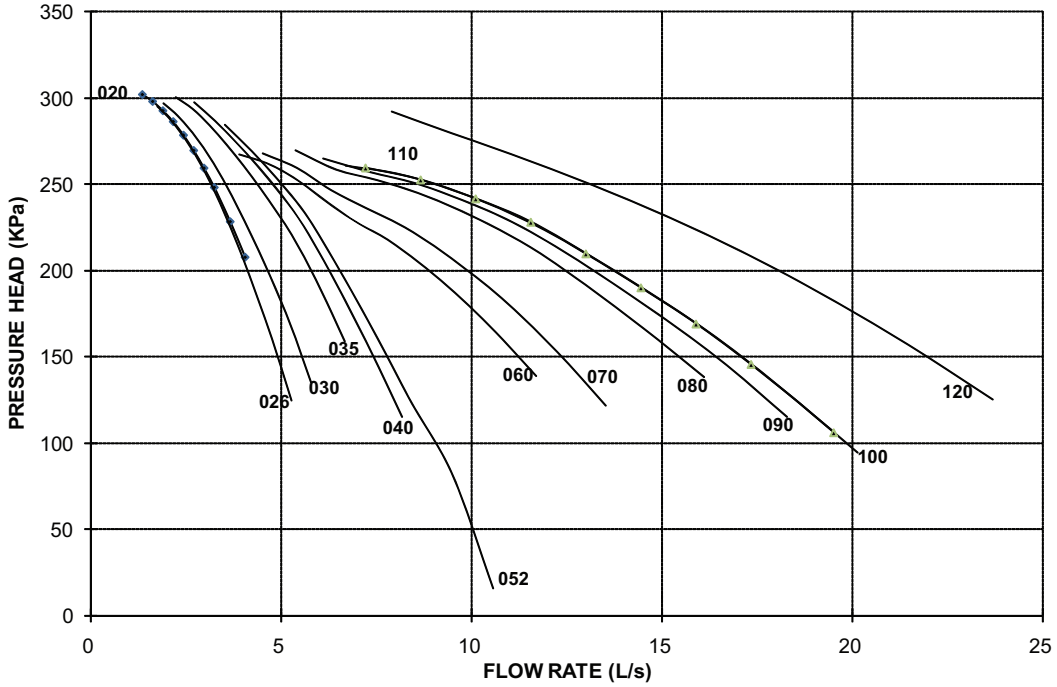


Figure 58. Pump package water pressure drop curve - 50 Hz



The following requirements must be met for proper operation of pump package:

- Maximum working pressure 150 psig
- Fluid type shown in Table 28

Table 28. Working fluid

Fluid Type	Fluid Percent (of weight)
Water	100%
Ethylene Glycol	0-40%
Propylene Glycol	0-45%

- Customer pressure drop must not exceed pump package head pressures found in section "General Information," p. 12.
- If buffer tank option is selected, customer water volume must not exceed the values in Table 29. User volume expansion capacity is defined as the additional expansion volume usable for the customer if the chiller is installed with pump package and buffer tank options.

Table 29. User volume expansion capacity

Size	Capacity (gal)
20-70T	111
80-130T	145

Installation - Electrical

General Recommendations

All wiring must comply with local codes and the National Electric Code. Typical field wiring diagrams are included at the end of the manual. Minimum circuit ampacities and other unit electrical data are on the unit nameplate. See the unit order specifications for actual electrical data. Specific electrical schematics and connection diagrams are shipped with the unit.

⚠ WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

⚠ CAUTION
Use Copper Conductors Only!

Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors may result in equipment damage.

NOTICE:
Isolate Conduits!

Do not allow conduit to interfere with other components, structural members or equipment. Control voltage (115V) wiring in conduit must be separate from conduit carrying low voltage (<30V) wiring. To prevent control malfunctions, do not run low voltage wiring (<30V) in conduit with conductors carrying more than 30 volts.

Electrical Data Tables

Table 30. Electrical Data - 60 Hz

Unit Size	Rated Power	Number Circuits	Qty Comp	Qty Fans	Fan Motor Power (kw)	Cond Fan FLA	Compressor RLA[1]	Compressor LRA[2]	No pump MCA	No pump MOPD	Pump MCA	Pump MOP
	208/60/3	1	2	2	1	6.2	39-39	267-267	106	125	122	150
	230/60/3	1	2	2	1	6.7	39-39	267-267	106	125	122	150
20	380/60/3	1	2	2	1	3.7	22-22	160-160	60	80	n/a	
	460/60/3	1	2	2	1	3.2	19-19	142-142	51	60	64	80
	575/60/3	1	2	2	1	2.6	15-15	103-103	42	50	52	60
	208/60/3	1	2	2	1	6.2	51-51	315-315	131	175	148	175
	230/60/3	1	2	2	1	6.7	44-44	315-315	117	150	134	175
26	380/60/3	1	2	2	1	3.7	26-26	177-177	69	90	n/a	
	460/60/3	1	2	2	1	3.2	21-21	158-158	56	70	69	80
	575/60/3	1	2	2	1	2.6	19-19	126-126	50	60	59	70
	208/60/3	1	2	3	1	6.2	53-53	320-320	143	175	160	200
	230/60/3	1	2	3	1	6.7	54-54	320-320	146	175	153	200
30	380/60/3	1	2	3	1	3.7	31-31	210-210	83	110	n/a	
	460/60/3	1	2	3	1	3.2	26-26	160-160	70	90	83	100
	575/60/3	1	2	3	1	2.6	21-21	135-135	57	70	66	80
	208/60/3	1	2	3	1	6.2	53-74	320-485	169	225	186	250
	230/60/3	1	2	3	1	6.7	54-67	320-485	162	225	175	225
35	380/60/3	1	2	3	1	3.7	31-40	210-260	94	125	n/a	
	460/60/3	1	2	3	1	3.2	26-33	160-215	79	110	92	110
	575/60/3	1	2	3	1	2.6	21-26	135-175	64	90	73	90
	208/60/3	2	4	4	1	6.2	39-39/39-39	267-267/267-267	197	225	214	250
	230/60/3	2	4	4	1	6.7	39-39/39-39	267-267/267-267	198	225	214	250
40	380/60/3	2	4	4	1	3.7	22-22/22-22	160-160/160-160	112	125	n/a	
	460/60/3	2	4	4	1	3.2	19-19/19-19	142-142/142-142	95	110	108	125
	575/60/3	2	4	4	1	2.6	15-15/15-15	103-103/103-103	79	90	89	100
	208/60/3	2	4	4	1	6.2	51-51/51-51	315-315/315-315	246	250	263	300
	230/60/3	2	4	4	1	6.7	44-44/44-44	315-315/315-315	220	250	237	250
52	380/60/3	2	4	4	1	3.7	26-26/26-26	177-177/177-177	129	150	n/a	
	460/60/3	2	4	4	1	3.2	21-21/21-21	158-158/158-158	106	125	119	125
	575/60/3	2	4	4	1	2.6	19-19/19-19	126-126/126-126	93	110	103	110
	208/60/3	2	4	6	1	6.2	53-53/53-53	320-320/320-320	269	300		
	230/60/3	2	4	6	1	6.7	50-50/50-50	320-320/320-320	259	300	n/a	
60	380/60/3	2	4	6	1	3.7	31-31/31-31	210-210/210-210	157	175		
	460/60/3	2	4	6	1	3.2	26-26/26-26	160-160/160-160	132	150	148	150
	575/60/3	2	4	6	1	2.6	21-21/21-21	135-135/135-135	107	125	118	125
	208/60/3	2	4	6	1	6.2	53-74/74-54	320-485/485-320	316	350		
	230/60/3	2	4	6	1	6.7	50-67/67-50	350-485/485-350	297	350	n/a	
70	380/60/3	2	4	6	1	3.7	31-40/40-31	210-260/260-210	117	200		
	460/60/3	2	4	6	1	3.2	26-33/33-26	160-215/215-160	148	175	164	175
	575/60/3	2	4	6	1	2.6	21-26/26-21	135-175/175-135	120	125	131	150

Table 30. Electrical Data - 60 Hz

Unit Size	Rated Power	Number Circuits	Qty Comp	Qty Fans	Fan Motor Power (kw)	Cond Fan FLA	Compressor RLA[1]	Compressor LRA[2]	No pump MCA	No pump MOPD	Pump MCA	Pump MOP
	208/60/3	2	4	6	1	6.2	74-74/74-74	485-485/485-485	358	400	388	450
	230/60/3	2	4	6	1	6.7	67-67/67-67	485-485/485-485	331	350	362	400
80	380/60/3	2	4	6	1	3.7	40-40/40-40	260-260/260-260	194	225	n/a	
	460/60/3	2	4	6	1	3.2	33-33/33-33	215-215/215-215	162	175	186	200
	575/60/3	2	4	6	1	2.6	26-26/26-26	175-175/175-175	131	150	150	175
	208/60/3	2	4	6	1	6.2	74-91/91-74	485-560/560-485	397	450	428	500
	230/60/3	2	4	6	1	6.7	67-85/67-85	485-560/560-485	370	450	401	450
90	380/60/3	2	4	6	1	3.7	40-55/40-55	260-310/310-260	227	275	n/a	
	460/60/3	2	4	6	1	3.2	33-42/33-42	215-260/260-215	182	200	206	225
	575/60/3	2	4	6	1	2.6	26-34/26-34	175-210/210-175	149	175	168	200
	208/60/3	2	4	8	1	6.2	91-91/91-91	560-560/560-560	444	500	475	500
	230/60/3	2	4	8	1	6.7	85-85/85-85	560-560/560-560	418	500	449	500
100	380/60/3	2	4	8	1	3.7	55-55/55-55	310-310/310-310	263	300	n/a	
	460/60/3	2	4	8	1	3.2	42-42/42-42	260-260/260-260	206	225	230	250
	575/60/3	2	4	8	1	2.6	34-34/34-34	210-210/210-210	169	200	188	200
	208/60/3	2	4	8	1	6.2	91-110/110-91	560-680/680-560	485	500	516	600
	230/60/3	2	4	8	1	6.7	85-109/109-85	560-680/680-560	473	500	504	600
110	380/60/3	2	4	8	1	3.7	55-60/60-55	310-360/360-310	275	300	n/a	
	460/60/3	2	4	8	1	3.2	42-51/51-42	260-320/320-260	226	250	250	250
	575/60/3	2	4	8	1	2.6	34-39/39-34	210-235/235-210	179	200	198	225
	208/60/3	2	4	8	1	6.2	110-110/110-110	680-680/680-680	521	600	n/a	
	230/60/3	2	4	8	1	6.7	109-109/109-109	680-680/680-680	522	600	568	600
120	380/60/3	2	4	8	1	3.7	60-60/60-60	360-360/360-360	285	300	n/a	
	460/60/3	2	4	8	1	3.2	51-51/51-51	320-320/320-320	244	250	268	300
	575/60/3	2	4	8	1	2.6	39-39/39-39	235-235/235-235	188	225	207	225
	208/60/3	2	6	10	1	6.2	74-74-91/91-74-74	485-485-560/ 560-485-485	569	600	n/a	
	230/60/3	2	6	10	1	6.7	67-67-85/85-67-67	485-485-560/ 560-485-485	531	600	578	600
130	380/60/3	2	6	10	1	3.7	40-40-55/55-40-40	260-260-310/ 310-260-260	321	350	n/a	
	460/60/3	2	6	10	1	3.2	33-33-42/42-33-33	215-215-260/ 260-215-215	261	300	285	300
	575/60/3	2	6	10	1	2.6	26-26-34/34-26-26	175-175-210/ 210-175-175	212	225	231	250

1. RLA - Rated Load Amps - Rated in accordance with UL Standard 1995.
2. LRA - Locked Rotor Amps - Based on full winding starts.
3. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of all other loads.
4. MOPD or Max fuse size - 225 percent of the largest compressor RLA plus all other loads.
5. Local codes may take precedence.
6. Voltage Utilization Range: +/- 10% of rated voltage
   Rated voltage (use range): 208/60/3 (187.2-228.8), 230/60/3(208-254), 380/60/3 (342-418), 460/60/3 (414-506), 575/60/3 (516-633)
7. One separate 120/60/1, 15 amp customer provided power connection is required to power the heaters.
8. n/a - not available

Table 31. Lug Range Size - 60 Hz

		No Pump			Pump		
Unit Size	**Rated Power**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**
	208/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
20	380/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0			
	460/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
	575/60/3	#6 - 350 MCM	#14 - 1/0	n/a	#6 - 350 MCM	#14 - 1/0	n/a
	208/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
26	380/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	n/a	n/a	n/a
	460/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
	575/60/3	#6 - 350 MCM	#14 - 1/0	n/a	#6 - 350 MCM	#14 - 1/0	n/a
	208/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
30	380/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	n/a	n/a	n/a
	460/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
	575/60/3	#6 - 350 MCM	#14 - 1/0	n/a	#6 - 350 MCM	#14 - 1/0	n/a
	208/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
	230/60/3	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM	#6 - 350 MCM
35	380/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	n/a	n/a	n/a
	460/60/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
	575/60/3	#6 - 350 MCM	#14 - 1/0	n/a	#6 - 350 MCM	#14 - 1/0	n/a
	208/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
40	380/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	n/a	n/a	n/a
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a
	208/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
52	380/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM		n/a	
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a
	208/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]			
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
60	380/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM			
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available

Table 31. Lug Range Size - 60 Hz

		No Pump			Pump		
Unit Size	**Rated Power**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**	**Terminal Blocks**	**Std Fault Ckt Breaker[1]**	**High Fault Ckt Breaker[1]**
70	208/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]			
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]			
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a
80	208/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM[2]	3/0-500 MCM[2]	3/0-500 MCM[2]
	230/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM[2]	3/0-500 MCM[2]	3/0-500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	460/60/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM	#4 - 500 MCM	3/0-500 MCM[2]	3/0-500 MCM[2]
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#4 - 500 MCM	#6 - 350 MCM	n/a
90	208/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM[2]	3/0-500 MCM[2]	3/0-500 MCM[2]
	230/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM[2]	3/0-500 MCM[2]	3/0-500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	575/60/3	#4 - 500 MCM	#6 - 350 MCM	n/a	#6 - 350 MCM	#6 - 350 MCM	n/a
100	208/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0-500 MCM[2]	3/0-500 MCM[2]
	230/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0-500 MCM[2]	3/0-500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	575/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a	#6 - 350 MCM	3/0 - 500 MCM[2]	n/a
110	208/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0-500 MCM[2]	3/0-500 MCM[2]
	230/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0-500 MCM[2]	3/0-500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	575/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a	#6 - 350 MCM	3/0 - 500 MCM[2]	n/a
120	208/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	230/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0-500 MCM[2]	3/0-500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#6 - 350 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	575/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a	#6 - 350 MCM	3/0 - 500 MCM[2]	n/a
130	208/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	230/60/3	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM[2]	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	380/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]		n/a	
	460/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
	575/60/3	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a	#4 - 500 MCM	3/0 - 500 MCM[2]	n/a

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available

Table 32. Electrical Data - 50Hz

Unit Size	Rated Power	Number Circuits	Qty Comp	Qty Fans	Fan Motor Power (kW)	Cond Fan FLA	Compressor RLA[1] [2]	Compressor LRA[1] [3]	MCA	MOPD
20	400/50/3	1	2	2	1	2.4	17-17	142-142	46	60
26	400/50/3	1	2	2	1	2.4	21-21	158-158	55	70
30	400/50/3	1	2	3	1	2.4	27-27	160-160	71	90
35	400/50/3	1	2	3	1	2.4	27-33	160-215	79	110
40	400/50/3	2	4	4	1	2.4	17-17/17-17	142-142/142-142	85	100
52	400/50/3	2	4	4	1	2.4	21-21/21-21	158-158/158-158	102	110
60	400/50/3	2	4	6	1	2.4	27-27/27-27	160-160/160-160	133	150
70	400/50/3	2	4	6	1	2.4	27-33/33-27	160-215/215-160	147	175
80	400/50/3	2	4	6	1	2.4	33-33/33-33	215-215/215-215	160	175
90	400/50/3	2	4	6	1	2.4	33-43/43-33	215-260/260-215	181	200
100	400/50/3	2	4	8	1	2.4	43-43/43-43	260-260/260-260	204	225
110	400/50/3	2	4	8	1	2.4	43-47/47-43	260-320/260-320	214	250
120	400/50/3	2	4	8	1	2.4	47-47/47-47	320-320/320-320	223	250

1. RLA - Rated Load Amps - Rated in accordance with UL Standard 1995.
2. LRA - Locked Rotor Amps - Based on full winding starts.
3. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of all other loads.
4. MOPD or Max fuse size - 225 percent of the largest compressor RLA plus all other loads.
5. Local codes may take precedence.
6. Voltage Utilization Range: +/- 10% of rated voltage
   Rated voltage (use range): 400/50/3 (360-440)
7. One separate 120/50/1, 15 amp customer provided power connection is required to power the heaters.
8. n/a - not available
9. Pump package not available with 50 Hz units.

Table 33. Lug Size Range - 50 Hz

Unit Size	Rated Power	Terminal Blocks	Std Fault Ckt Breaker[1]	High Fault Ckt Breaker[1]
20	400/50/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
26	400/50/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
30	400/50/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
35	400/50/3	#6 - 350 MCM	#14 - 1/0	#14 - 1/0
40	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
52	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
60	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
70	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
80	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
90	400/50/3	#4 - 500 MCM	#6 - 350 MCM	#6 - 350 MCM
100	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
110	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]
120	400/50/3	#4 - 500 MCM	3/0 - 500 MCM[2]	3/0 - 500 MCM[2]

1. Optional circuit breaker and high fault circuit breaker.
2. Will accept two conduits per phase in this size.
3. Copper wire only, based on nameplate Minimum Circuit Ampacity (MCA).
4. Data shown for circuit one. The second circuit is always the same.
5. n/a - not available

Installer-Supplied Components

Customer wiring interface connections are shown in the electrical schematics and connection diagrams that are shipped with the unit. The installer must provide the following components if not ordered with the unit:

- Power supply wiring (in conduit) for all field-wired connections.
- All control (interconnecting) wiring (in conduit) for field supplied devices.
- Circuit breakers.

Power Supply Wiring

⚠WARNING

Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/ state electrical codes. Failure to follow codes could result in death or serious injury.

All power supply wiring must be sized and selected accordingly by the project engineer in accordance with NEC Table 310-16.

⚠ WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

All wiring must comply with local codes and the National Electrical Code. The installing (or electrical) contractor must provide and install the system interconnecting wiring, as well as the power supply wiring. It must be properly sized and equipped with the appropriate fused disconnect switches.

The type and installation location(s) of the fused disconnects must comply with all applicable codes.

NOTICE:
Use Copper Conductors Only!

Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors may result in equipment damage.

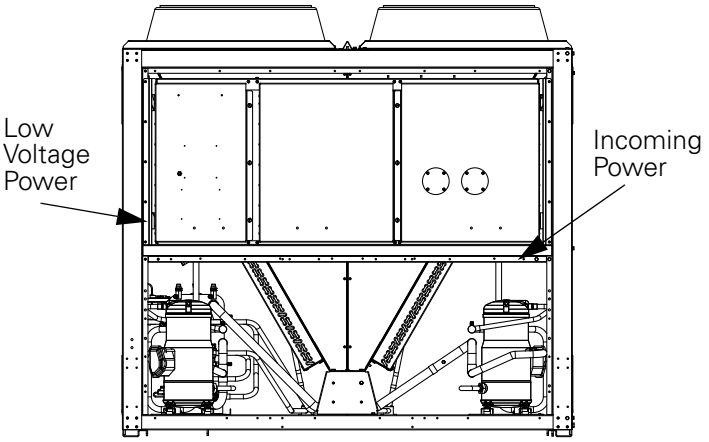
Knock-outs for wiring are located on the bottom right side of the control panel.The wiring is passed through these conduits and connected to the terminal blocks or HACR type breakers. Refer to Table 34.

To provide proper phasing of 3-phase input, make connections as shown in field wiring diagrams and as stated on the WARNING label in the starter panel. For additional information on proper phasing, refer to "Unit Voltage Phasing," p. 143. Proper equipment ground must be provided to each ground connection in the panel (one for each customer-supplied conductor per phase).

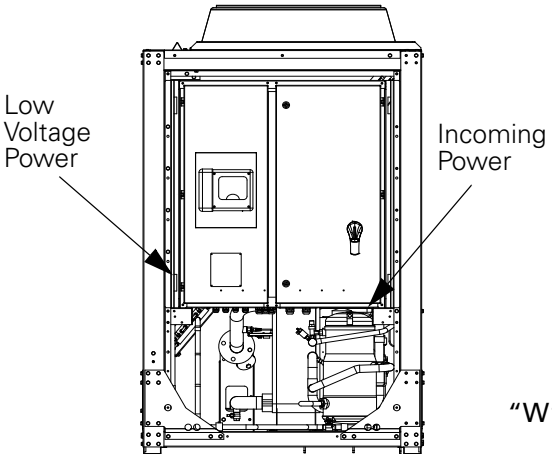
The high voltage field-provided connections are made through knockouts on the right side of the panel. The low voltage connections are made through the left side of the panel (Figure 34). Additional grounds may be required for each 115 volt power supply to the unit. Green lugs are provided for 115V customer wiring.

Table 34. Power Entrance

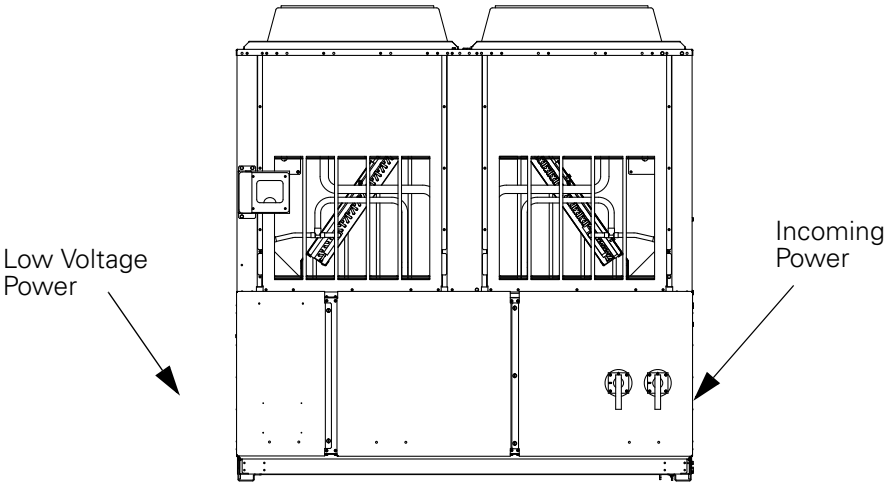
"V" Configuration 40-70 Ton



"Slant" Configuration 20-35 Ton



"W" Configuration 80-130 Ton



Control Power Supply

The unit is equipped with a control power transformer; it is not necessary to provide additional control power voltage to the unit. No other loads should be connected to the control power transformer.

All units are factory-connected for appropriate labeled voltages.

NOTICE:

Heat Tape!

Control panel main processor does not check for loss of power to the heat tape nor does it verify thermostat operation. A qualified technician must verify power to the heat tape and confirm operation of the heat tape thermostat to avoid catastrophic damage to the evaporator or partial heat recovery heat exchanger.

Heater Power Supply

The evaporator shell is insulated from ambient air and protected from freezing temperatures by a thermostatically-controlled immersion heater and strip heaters on the piping. When ever the ambient temperature drops to approximately 37°F (2.8°C) the thermostat energizes the heaters. The heaters will provide protection from ambient temperatures down to -20°F (-29°C).

It is required to provide an independent power source (115V 60-Hz-20 amp, 50Hz-15 amp), with a fused-disconnect to the heaters. The heaters are factory-wired back to the unit control panel.

Note: *If evaporator is drained, the heater must be turned off in order to avoid damaging the evaporator. The heater should only be on when the evaporator has water in it.*

Partial Heat Recovery Power Supply

The partial heat recover heat exchanger is insulated from ambient air and protected from freezing temperatures by an immersion heater. When the ambient air temperature drops to approximately 37°F (2.8°C) the thermostat energizes the heaters. The heaters will provide protection from ambient temperatures down to -20°F (-29°C).

It is required to provide an independent power source (115V 60-Hz-20 amp, 50Hz-15 amp), with a fused-disconnect to the heater. The heaters are factory-wired back to the unit control panel.

Note: *If partial heat recovery heat exchanger is drained, the heater must be turned off in order to avoid damaging the partial heat recovery heat exchanger. The heater should only be on when the heat recovery heat exchanger has water in it.*

Water Pump Power Supply

Provide power supply wiring with disconnect for the chilled water pump(s).

Interconnecting Wiring

Chilled Water Flow (Pump) Interlock

All CGAM model chillers have a factory-installed flow switch. In addition, it is recommended to use an additional field-supplied control voltage contact input through an auxiliary contact to prove flow. Connect the auxiliary contact to 1X5-3 and 1X5-9. Refer to the field wiring for details. The auxiliary contact can be a BAS signal, starter contactor auxiliary or any signal which indicates the pump is running.

Chilled Water Pump Control

An evaporator water pump output relay closes when the chiller is given a signal to go into the Auto mode of operation from any source. The contact is opened to turn off the pump in the event of most machine level diagnostics to prevent the build up of pump heat.

The relay output from 1A9 is required to operate the Evaporator Water Pump (EWP) contactor. Contacts should be compatible with 115/240 VAC control circuit. Normally, the EWP relay follows the AUTO mode of the chiller. Whenever the chiller has no diagnostics and is in the AUTO mode, regardless of where the auto command is coming from, the normally open relay is energized. When the chiller exits the AUTO mode, the relay is timed to open in an adjustable (using TechView) 0 to 30 minutes. The non-AUTO modes in which the pump is stopped, include Reset, Stop, External

Stop, Remote Display Stop, Stopped by Tracer, Start Inhibited by Low Ambient Temp, and Ice Building complete.

NOTICE:
Equipment damage!

If the microprocessor calls for a pump to start and water does not flow, the evaporator may be damaged catastrophically. It is the responsibility of the installing contractor and/or the customer to ensure that a pump will always be running when called upon by the chiller controls.

Table 35. Pump Relay Operation

Chiller Mode	Relay Operation
Auto	Instant close
Ice Building	Instant close
Tracer Override	Close
Stop	Timed to Open
Ice Complete	Instant Open
Diagnostics	Instant Open

When going from Stop to Auto, the EWP relay is energized immediately. If evaporator water flow is not established in 4 minutes and 15 seconds, the CH530 de-energizes the EWP relay and generates a non-latching diagnostic. If flow returns (e.g. someone else is controlling the pump), the diagnostic is cleared, the EWP relay is re-energized, and normal control resumed.

If evaporator water flow is lost once it has been established, the EWP relay remains energized and a non-latching diagnostic is generated. If flow returns, the diagnostic is cleared and the chiller returns to normal operation.

NOTICE:
Equipment Damage!

Do NOT enable/disable the chiller by removing water flow or equipment damage can occur.

In general, when there is either a non-latching or latching diagnostic, the EWP relay is turned off as though there was a zero time delay. The relay continues to be energized with:

A Low Chilled Water Temperature diagnostic (non-latching) unless also accompanied by an Evap Leaving Water Temperature Sensor Diagnostic.

or

A Loss of Evaporator Water Flow diagnostic (non-latching) and the unit is in the AUTO mode, after initially having proven evaporator water flow.

Note: *If pump control is used for freeze protection then the pump MUST be controlled by the CGAM CH530 control. If another method of freeze protection is used (i.e. glycol, heaters, purge, etc) then the pump may be controlled by another system.*

Chilled Water Pump Control - Field Supplied Dual Pumps

CH530 can provide pump control for two customer-supplied pumps, as long as the pump contactor coils 1A9 and connect the pump fault feedback signals 1A12 are properly connected.

In this situation, the unit will leave the factory with Evaporator Pump Control (EVPC) = No Pump Control (Pump Request Relay) (NPMP) and Evaporator Pump Fault Input (EVFI) = Installed (INST).When the contactors and pumps are set up in the field, the CH530 Service Tool (TechView) must be used to reconfigure to Evaporator Pump Control = Dual Pump Fixed Speed and Evaporator Pump Fault Input = Not Installed or Installed depending on how the fault feedback wire is connected. It is strongly recommended to install the Fault Input if possible as the controls will “hot-

swap" the pumps upon detection of a fault, and may avoid the inevitable Flow Loss diagnostic (and unit shutdown) that will result if there is no fault feedback.

When configured for Dual Pump Fixed Speed, the CH530 will swap pumps on detection of a fault (if installed), or when a flow loss or overdue event occurs. It will also switch pumps each time the overall pump request is removed and re-engaged, unless a fault is detected on one of the pumps. If faults are detected on both pumps, the unit will be shut down.

In addition to the factory installed flow switch, a field-supplied auxiliary contact is required, so that the chiller will only detect flow if a pump is running and the flow switch says flow is present.

Alarm and Status Relay Outputs (Programmable Relays)

A programmable relay concept provides for enunciation of certain events or states of the chiller, selected from a list of likely needs, while only using four physical output relays, as shown in the field wiring diagram. The four relays are provided (generally with a Quad Relay Output LLID) as part of the Alarm Relay Output Option. The relay's contacts are isolated Form C (SPDT), suitable for use with 120 VAC circuits drawing up to 2.8 amps inductive, 7.2 amps resistive, or 1/3 HP and for 240 VAC circuits drawing up to 0.5 amp resistive.

The list of events/states that can be assigned to the programmable relays can be found in Table 36. The relay will be energized when the event/state occurs.

Table 36. Alarm and Status Relay Output Configuration Table

	Description
Alarm - Latching	This output is true whenever there is any active diagnostic that requires a manual reset to clear, that affects either the Chiller, the Circuit, or any of the Compressors on a circuit. This classification does not include informational diagnostics.
Alarm - Auto Reset	This output is true whenever there is any active diagnostic that could automatically clear, that affects either the Chiller, the Circuit, or any of the Compressors on a circuit. This classification does not include informational diagnostics.
Alarm	This output is true whenever there is any diagnostic affecting any component, whether latching or automatically clearing. This classification does not include informational diagnostics
Alarm Ckt 1	This output is true whenever there is any diagnostic effecting Refrigerant Circuit 1, whether latching or automatically clearing, including diagnostics affecting the entire chiller. This classification does not include informational diagnostics.
Alarm Ckt 2	This output is true whenever there is any diagnostic affecting Refrigerant Circuit 2 whether latching or automatically clearing, including diagnostics effecting the entire chiller. This classification does not include informational diagnostics.
Chiller Limit Mode (with a 20 minute filter)	This output is true whenever the chiller has been running in one of the Unloading types of limit modes (Condenser, Evaporator, Current Limit or Phase Imbalance Limit) continuously for the last 20 minutes.
Circuit 1 Running	This output is true whenever any compressor is running (or commanded to be running) on Refrigerant Circuit 1, and false when no compressors are commanded to be running on that circuit.
Circuit 2 Running	This output is true whenever any compressor is running (or commanded to be running) on Refrigerant Circuit 2, and false when no compressors are commanded to be running on that circuit.
Chiller Running	This output is true whenever any compressor is running (or commanded to be running) on the chiller and false when no compressors are commanded to be running on the chiller.
Maximum Capacity	This output is true whenever the chiller has all compressors on. The output is false once one compressor is shut off.

Relay Assignments Using TechView

CH530 Service Tool (TechView) is used to install the Alarm and Status Relay Option package and assign any of the above list of events or status to each of the four relays provided with the option. The relays to be programmed are referred to by the relay's terminal numbers on the LLID board 1A18.

The default assignments for the four available relays of the CGAM Alarm and Status Package Option are:

Table 37. Default Relay Assignments

Relay	
Relay 1 Terminals J2 -12,11,10:	Compressor Running
Relay 2 Terminals J2 - 9,8,7:	Latching Alarm
Relay 3 Terminals J2-6,5,4:	Chiller Limit Mode
Relay 4 Terminals J2-3,2,1:	Warning

If any of the Alarm/Status relays are used, provide electrical power, 115 VAC with fused-disconnect to the panel and wire through the appropriate relays (terminals on 1A13. Provide wiring (switched hot, neutral, and ground connections) to the remote annunciation devices. Do not use power from the chiller's control panel transformer to power these remote devices. Refer to the field diagrams which are shipped with the unit.

Low Voltage Wiring

⚠ WARNING
Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow codes could result in death or serious injury.

The remote devices described below require low voltage wiring. All wiring to and from these remote input devices to the Control Panel must be made with shielded, twisted pair conductors. Be sure to ground the shielding only at the panel.

Note: *To prevent control malfunctions, do not run low voltage wiring (<30 V) in conduit with conductors carrying more than 30 volts.*

Emergency Stop

CH530 provides auxiliary control for a customer specified/installed latching trip out. When this customer-furnished remote contact 5K24 is provided, the chiller will run normally when the contact is closed. When the contact opens, the unit will trip on a manually resettable diagnostic. This condition requires manual reset at the chiller switch on the front of the control panel.

Connect low voltage leads to terminal strip locations on 1A13, J2-3 and 4. Refer to the field diagrams that are shipped with the unit.

Silver or gold-plated contacts are recommended. These customer-furnished contacts must be compatible with 24 VDC, 12 mA resistive load.

External Auto/Stop

If the unit requires the external Auto/Stop function, the installer must provide leads from the remote contact 5K23 to the proper terminals on 1A13, J2-1 and 2.

The chiller will run normally when the contact is closed. When the contact opens, the compressor(s), if operating, will go to the RUN:UNLOAD operating mode and cycle off. Unit operation will be inhibited. Closure of the contact will permit the unit to return to normal operation.

Field-supplied contacts for all low voltage connections must be compatible with dry circuit 24 VDC for a 12 mA resistive load. Refer to the field diagrams that are shipped with the unit.

NOTICE:
Equipment damage!

Do NOT enable/disable the chiller by removing water flow or equipment damage can occur.

Ice Building Option

CH530 provides auxiliary control for a customer specified/installed contact closure for ice building if so configured and enabled. This output is known as the Ice Building Status Relay. The normally open contact will be closed when ice building is in progress and open when ice building has been normally terminated either through Ice Termination setpoint being reached or removal of the Ice Building command. This output is for use with the ice storage system equipment or controls (provided by others) to signal the system changes required as the chiller mode changes from "ice

building" to "ice complete". When contact 5K16 is provided, the chiller will run normally when the contact is open.

CH530 will accept either an isolated contact closure (External Ice Building command) or a Remote Communicated input (Tracer) to initiate and command the Ice Building mode.

CH530 also provides a "Front Panel Ice Termination Setpoint", settable through TechView, and adjustable from 20 to 31°F (-6.7 to -0.5°C) in at least 1°F (1°C) increments.

When in the Ice Building mode, and the evaporator entering water temperature drops below the ice termination setpoint, the chiller terminates the Ice Building mode and changes to the Ice Building Complete Mode.

NOTICE:

Evaporator damage!

Freeze inhibitor must be adequate for the leaving water temperature. Failure to do so may result in damage to system components.

TechView may also be used to enable or disable Ice Machine Control. This setting does not prevent the Tracer from commanding Ice Building mode.

Upon contact closure, the CH530 will initiate an ice building mode, in which the unit runs fully loaded at all times. Ice building shall be terminated either by opening the contact or based on the entering evaporator water temperature. CH530 will not permit the ice building mode to be reentered until the unit has been switched out of ice building mode (open 5K20 contacts) and then switched back into ice building mode (close 5K20 contacts.)

In ice building, all limits (freeze avoidance, evaporator, condenser, current) will be ignored. All safeties will be enforced.

If, while in ice building mode, the unit gets down to the freeze stat setting (water or refrigerant), the unit will shut down on a manually resettable diagnostic, just as in normal operation.

Connect leads from 5K20 to the proper terminals of 1A16. Refer to the field diagrams which are shipped with the unit.

Silver or gold-plated contacts are recommended. These customer furnished contacts must be compatible with 24 VDC, 12 mA resistive load.

External Chilled Water Setpoint (ECWS) Option

The CH530 provides inputs that accept either 4-20 mA or 2-10 VDC signals to set the external chilled water setpoint (ECWS). **This is not a reset function.** The input defines the set point. This input is primarily used with generic BAS (building automation systems). The chilled water setpoint set via the DynaView or through digital communication with Tracer.

The chilled water setpoint may be changed from a remote location by sending either a 2-10 VDC or 4-20 mA signal to the 1A14, J2-1 and 2. The 2-10 VDC and 4-20 mA each correspond to a 10 to 65°F (-12 to 18°C) external chilled water setpoint.

The following equations apply:

Voltage Signal	Current Signal
VDC = $(8*ECWS_{°F} + 2*ECWS_{max} - 10*ECWS_{min})/ (ECWS_{max} - ECWS_{min})$	mA = $(16*ECWS_{°F} + 4*ECWS_{max} - 20*ECWS_{min})/ (ECWS_{max} - ECWS_{min})$

Note: To convert ECWS values to °F, use the following formula: °F = 1.8*(°C) + 32

If the ECWS input develops an open or short, the LLID will report either a very high or very low value back to the main processor. This will generate an informational diagnostic and the unit will default to using the Front Panel (DynaView) Chilled Water Setpoint.

TechView Service Tool is used to set the input signal type from the factory default of 2-10 VDC to that of 4-20 mA. TechView is also used to install or remove the External Chilled Water Setpoint option as well as a means to enable and disable ECWS.

External Demand Limit Setpoint (EDLS) Option

CH530 provide a means to limit the capacity of the chiller by limiting the number of compressors or stages that are allowed to run. The maximum number of compressor or stages allowed to run can vary from one to the number of stages on the unit. The staging algorithm is free to decide which compressor or stage shall be turned off or prevented from running to meet this requirement.

CH530 shall accept either a 2-10 VDC or 4-20 mA analog input suitable for customer connection to set the unit external demand limit setpoint (EDLS).

2-10 VDC and 4-20 mA shall each correspond to an EDLS range with a minimum of 0% and a maximum of 100%. The following equations exist.

Global Scroll	Voltage Signal	Current Signal
As generated from external source	Vdc = 8*(EDLS) + 2	mA = 16*(EDLS) + 4
As processed by CH530	EDLS = (Vdc - 2)/8	EDLS = (mA - 4)/16

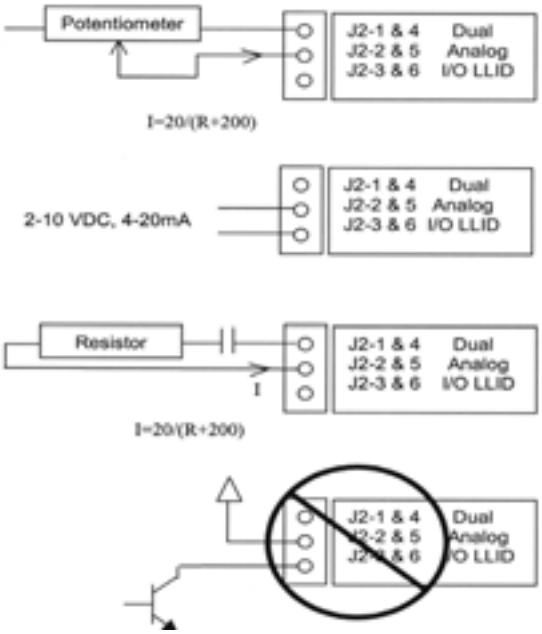
The minimum EDLS will be clamped at the front panel based on 100% / Total number of Compressors. For input signals beyond the 2-10VDC or 4-20mA range, the end of range value shall be used. For example, if the customer inputs 21 mA, the EDLS shall limit it self to the corresponding 20 mA EDLS.

ECLS and EDLS Analog Input Signal Wiring Details:

Both the ECLS and EDLS can be connected and setup as either a 2-10 VDC (factory default), 4-20 mA, or resistance input (also a form of 4-20 mA) as indicated below. Depending on the type to be used, the TechView Service Tool must be used to configure the LLID and the MP for the proper input type that is being used. This is accomplished by a setting change on the Custom Tab of the Configuration View within TechView.

The J2-3 and J2-6 terminal is chassis grounded and terminal J2-1 and J2-4 can be used to source 12 VDC. The ECLS uses terminals J2-2 and J2-3. EDLS uses terminals J2-5 and J2-6. Both inputs are only compatible with high-side current sources.

Figure 59. Wiring Examples for ECLS and EDLS



Chilled Water Reset (CWR)

CH530 resets the chilled water temperature set point based on either return water temperature, or outdoor air temperature.

The following shall be selectable:

- One of three Reset Types: None, Return Water Temperature Reset, Outdoor Air Temperature Reset, or Constant Return Water Temperature Reset.
- Reset Ratio Set Points.
- For outdoor air temperature reset there shall be both positive and negative reset ratio's.
- Start Reset Set Points.
- Maximum Reset Set Points.

The equations for each type of reset are as follows:

Return

CWS' = CWS + RATIO (START RESET - (TWE - TWL))

and CWS' > or = CWS

and CWS' - CWS < or = Maximum Reset

Outdoor

CWS' = CWS + RATIO * (START RESET - TOD)

and CWS' > or = CWS

and CWS' - CWS < or = Maximum Reset

where

CWS' is the new chilled water set point or the "reset CWS"

CWS is the active chilled water set point before any reset has occurred, e.g. normally Front Panel, Tracer, or ECWS

RESET RATIO is a user adjustable gain

START RESET is a user adjustable reference

TOD is the outdoor temperature

TWE is entering evap. water temperature

TWL is leaving evap. water temperature

MAXIMUM RESET is a user adjustable limit providing the maximum amount of reset. For all types of reset, CWS' - CWS < or = Maximum Reset.

Reset Type	Reset Ratio Range	Start Reset Range	Maximum Reset Range	Increment English Units	Increment SI Units	Factory Default Value
Return:	10 to 120%	4 to 30 F	0 to 20 F	1%	1%	50%
		(2.2 to 16.7 C)	(0.0 to 11.1 C)			
Outdoor	80 to -80%	50 to 130 F	0 to 20 F	1%	1%	10%
		(10 to 54.4 C)	(0.0 to 11.1 C)			

In addition to Return and Outdoor Reset, the MP provides a menu item for the operator to select a Constant Return Reset. Constant Return Reset will reset the leaving water temperature set point so as to provide a constant entering water temperature. The Constant Return Reset equation is the same as the Return Reset equation except on selection of Constant Return Reset, the MP will automatically set Ratio, Start Reset, and Maximum Reset to the following.

RATIO = 100%

START RESET = Design Delta Temp.

MAXIMUM RESET = Design Delta Temp.

The equation for Constant Return is then as follows:

CWS' = CWS + 100% (Design Delta Temp. - (TWE - TWL))

and CWS' > or = CWS

and CWS' - CWS < or = Maximum Reset

When any type of CWR is enabled, the MP will step the Active CWS toward the desired CWS' (based on the above equations and setup parameters) at a rate of 1 degree F every 5 minutes until the Active CWS equals the desired CWS'. This applies when the chiller is running.

When the chiller is not running the CWS is reset immediately (within one minute) for Return Reset and at a rate of 1 degree F every 5 minutes for Outdoor Reset. The chiller will start at the Differential to Start value above a fully reset CWS or CWS' for both Return and Outdoor Reset.

Percent Capacity Output Option

CH530 provides an optional percent capacity output for those customers without a communicating BAS interface. The active unit capacity (AUC) is provided through a 2-10 VDC analog ouput at 1A25 terminals J2-4 and J2-6 (GND). The active unit capacity value (in %) can be derived from the 2-10 VDC output voltage (OV) using the following calculation:

AUC = 100*(OV - 2.0V)/(10.0V - 2.0V)

Note: *The percent capacity output is based on the number and size of compressors energized, and is not adjusted for operating conditions. This value cannot be used as an accurate measure of total unit current, power or cooling capacity.*

Communications Interface options

Tracer Communications Interface

This option allows the Tracer CH530 controller to exchange information (e.g. operating setpoints and Auto/Standby commands) with a higher-level control device, such as a Tracer Summit or a multiple-machine controller. A shielded, twisted pair connection establishes the bi-directional communications link between the Tracer CH530 and the building automation system.

Note: *To prevent control malfunctions, do not run low voltage wiring (<30 V) in conduit with conductors carrying more than 30 volts.*

⚠ WARNING
Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow codes could result in death or serious injury.

Field wiring for the communication link must meet the following requirements:

- All wiring must be in accordance with the NEC and local codes.
- Communication link wiring must be shielded, twisted pair wiring (Belden 8760 or equivalent). See the table below for wire size selection:

Table 38. Wire Size

Wire Size	Maximum Length of Communication Wire
14 AWG (2.5 mm^2)	5,000 FT (1525 m)
16 AWG (1.5 mm^2)	2,000 FT (610 m)
18 AWG (1.0 mm^2)	1,000 FT (305 m)

- The communication link cannot pass between buildings.
- All units on the communication link can be connected in a “daisy chain” configuration.

LonTalk Communications Interface for Chillers (LCI-C)

CH530 provides an optional LonTalk Communication Interface (LCI-C) between the chiller and a Building Automation System (BAS). An LCI-C LLID shall be used to provide “gateway” functionality between a LonTalk compatible device and the Chiller. The inputs/outputs include both mandatory and optional network variables as established by the LonTalk Functional Chiller Profile 8040.

Installation Recommendations

- 22 AWG Level 4 unshielded communication wire recommended for most LCI-C installations
- LCI-C link limits: 4500 feet, 60 devices
- Termination resistors are required
- 105 ohms at each end for Level 4 wire
- 82 ohms at each end for Trane "purple" wire
- LCI-C topology should be daisy chain
- Zone sensor communication stubs limited to 8 per link, 50 feet each (maximum)
- One repeater can be used for an additional 4500 feet, 60 devices, 8 communication stubs

Table 39. LonTalk Points List

Inputs/Outputs	Length and Contents	SNVT / UNVT
Chiller Enable/Disable Request	2 bytes	SNVT_switch
Chilled Water Setpoint	2 bytes	SNVT_temp_p
Capacity Limit Setpoint (used by Demand Limit Setpoint)	2 bytes	SNVT_lev_percent
Operating Mode Request	1 byte	SNVT_hvac_mode
Chiller Running State	2 bytes	SNVT_switch
Active Chilled Water or Hot Water Setpoint	2 bytes	SNVT_temp_p
Actual Running Capacity	2 bytes	SNVT_lev_percent
Active Capacity Limit Setpoint (from Active Demand Limit Setpoint)	2 bytes	SNVT_lev_percent
Evaporator Leaving Water Temp	2 bytes	SNVT_temp_p
Evaporator Entering Water Temp	2 bytes	SNVT_temp_p
Alarm Description	31 bytes	SNVT_str_asc
Chiller Status 00 = Chiller off 01 = Chiller in start mode 02 = Chiller in run mode 03 = Chiller in pre-shutdown mode 04 = Chiller in service mode 03 = Cooling only 0A = Cooling with compressor not running 0B = Ice-making mode bit 0 (MSB) = in alarm mode bit 1 = run enabled bit 2 = local bit 3 = limited bit 4 = evaporator water flow	3 bytes	SNVT_chlr_status

CGAM Operating Principles

This section contains an overview of the operation of CGAM air-cooled liquid chiller equipped with microcomputer-based control systems. It describes the overall operating principles of the CGAM water chiller.

Note: *To ensure proper diagnosis and repair, contact a qualified service organization if a problem should occur.*

General

The Model CGAM units are scroll compressor air-cooled liquid chillers. These units are equipped with unit-mounted starter/control panels and operates with R-410A refrigerant.

The basic components of an CGAM unit are:

- Unit-mounted panel containing starter and Tracer CH530 controller and Input/Output LLIDS
- Scroll compressors
- Brazed plate evaporator
- Air-cooled condenser with subcooler
- Electronic expansion valve
- Optional partial heat recovery
- Related interconnecting piping.

Components of a typical CGAM unit are identified in the following diagrams.

Figure 60. Slant 20-35 ton component location

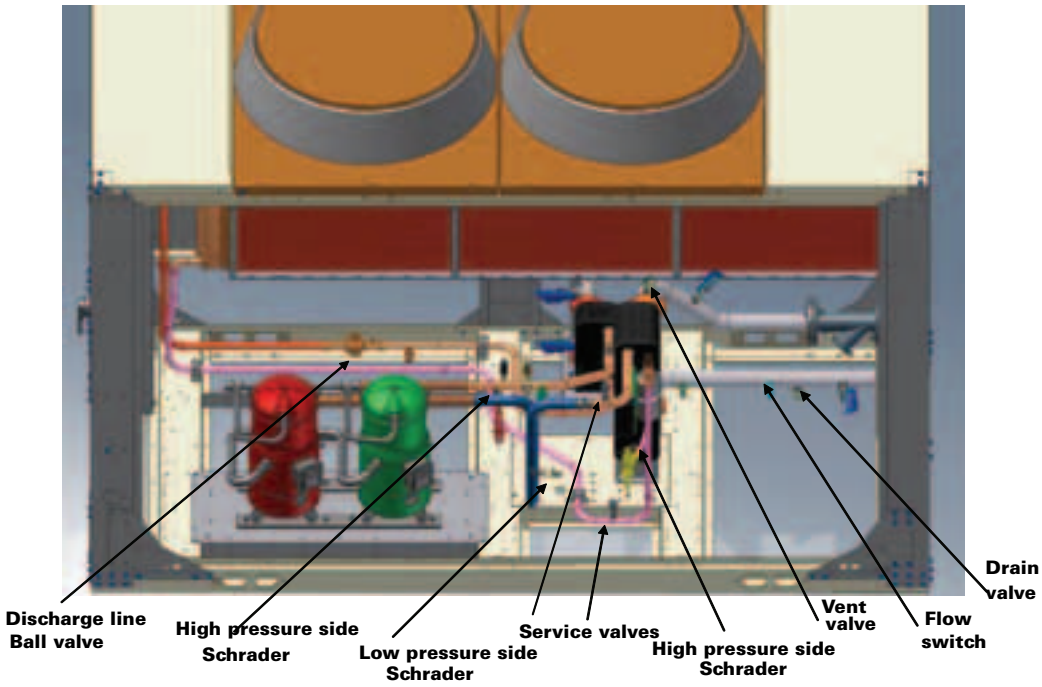


Figure 61. V 40-70 ton component location - circuit 1

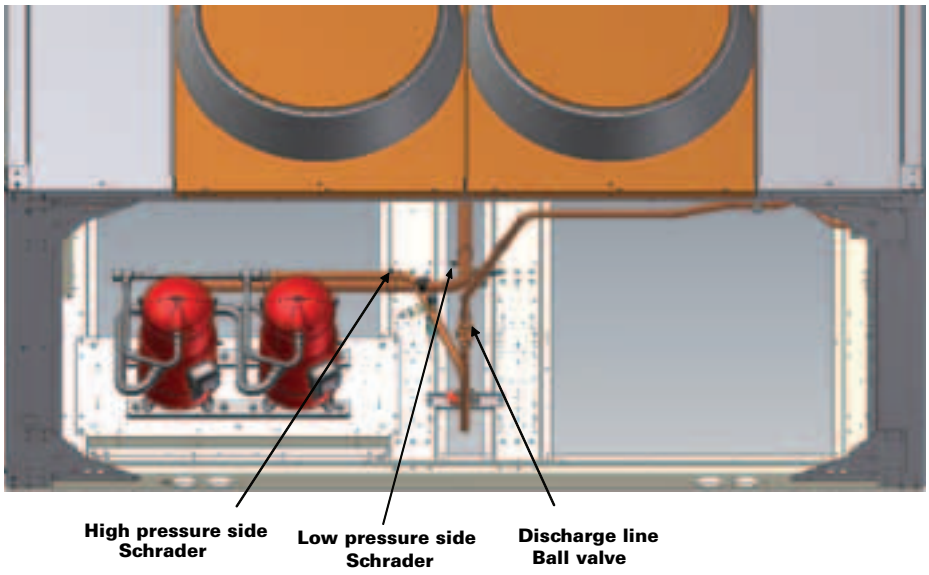


Figure 62. V 40-70 ton component location- circuit 2

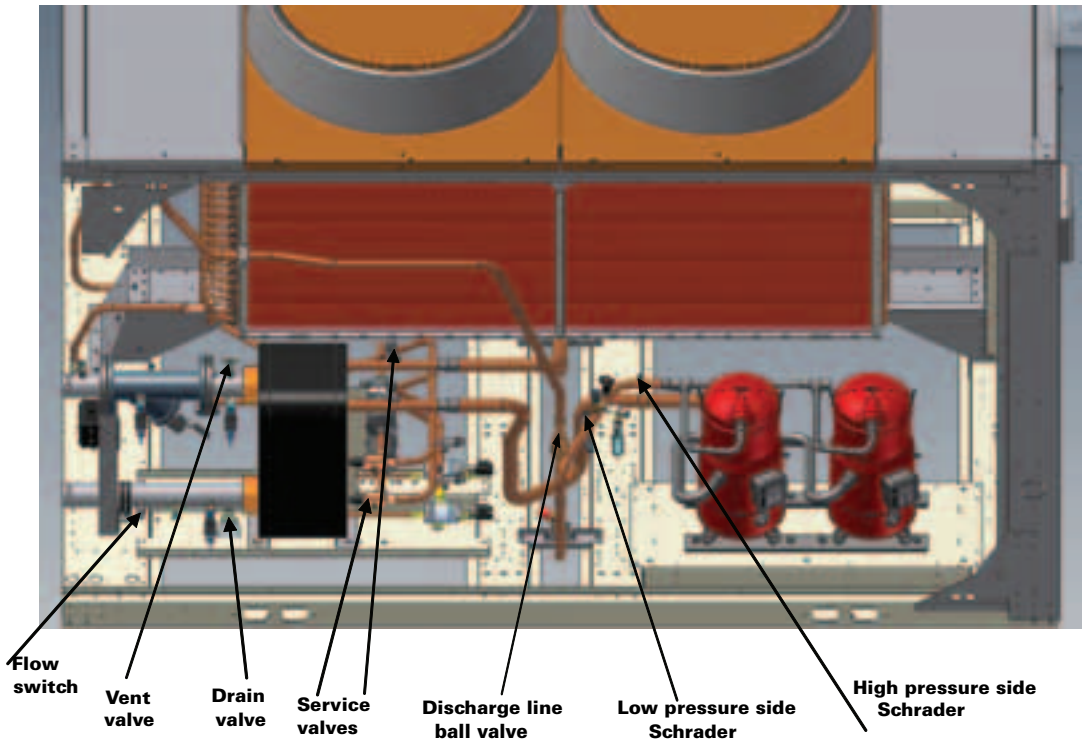


Figure 63. W 80-130 ton component location - compressor view

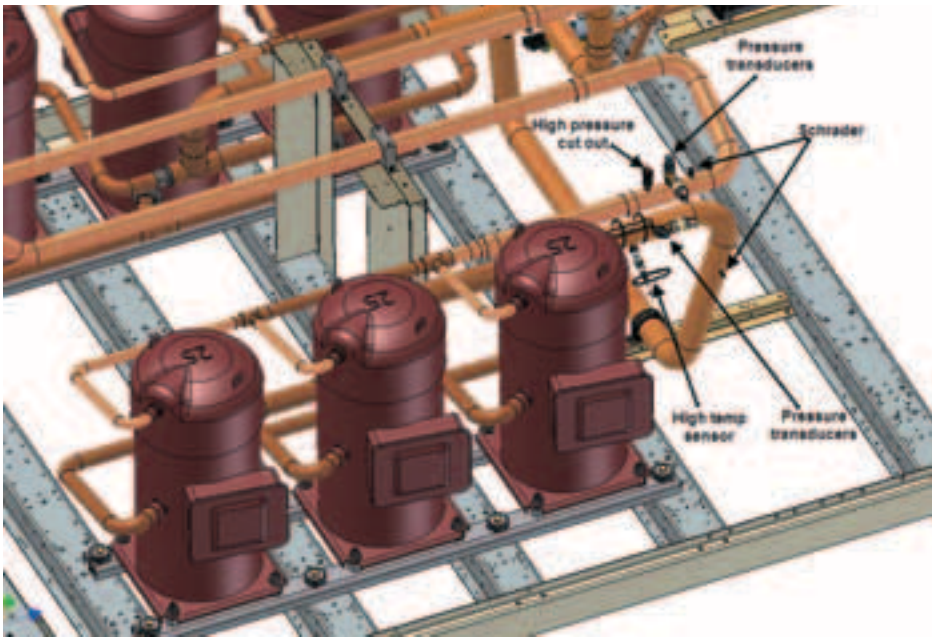
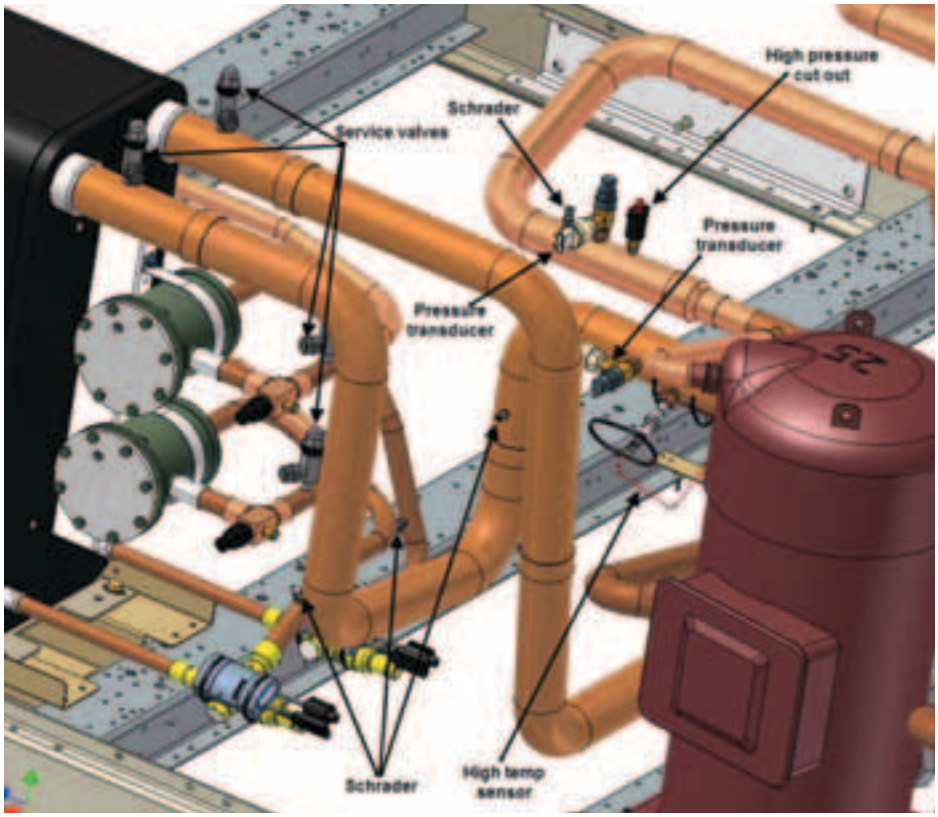


Figure 64. W 80-130 ton component location - evaporator side



Pump Package Components - Optional

Figure 65. Pump package components — slant 20-35 ton — view 1

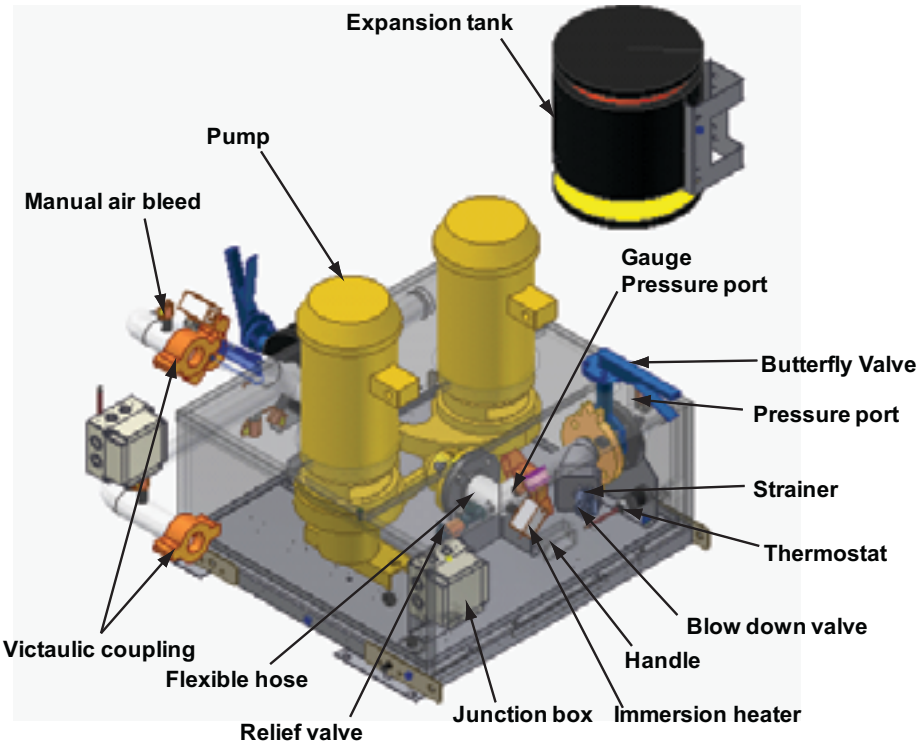


Figure 66. Pump package components — slant 20-35 ton — view 2

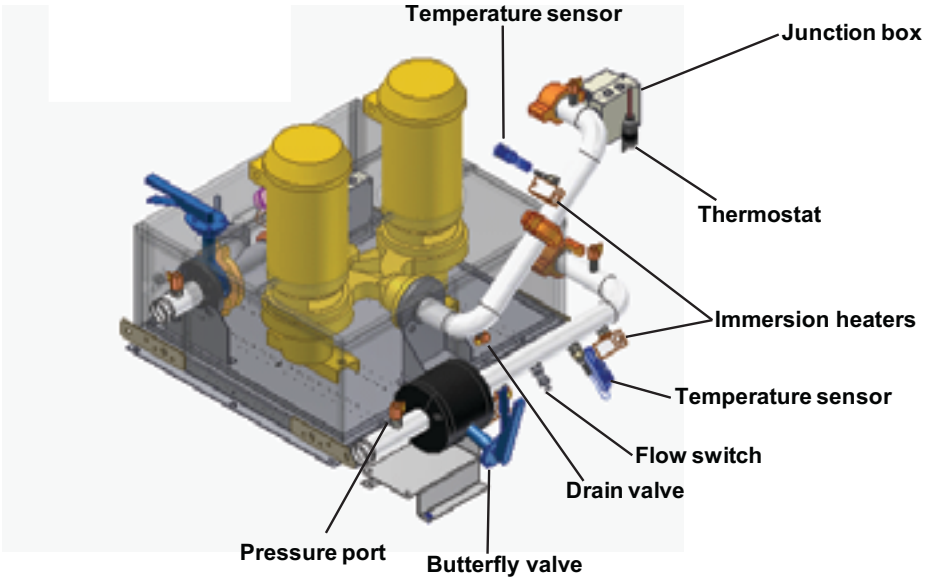


Figure 67. Pump package components — V 40-70 ton — view 1

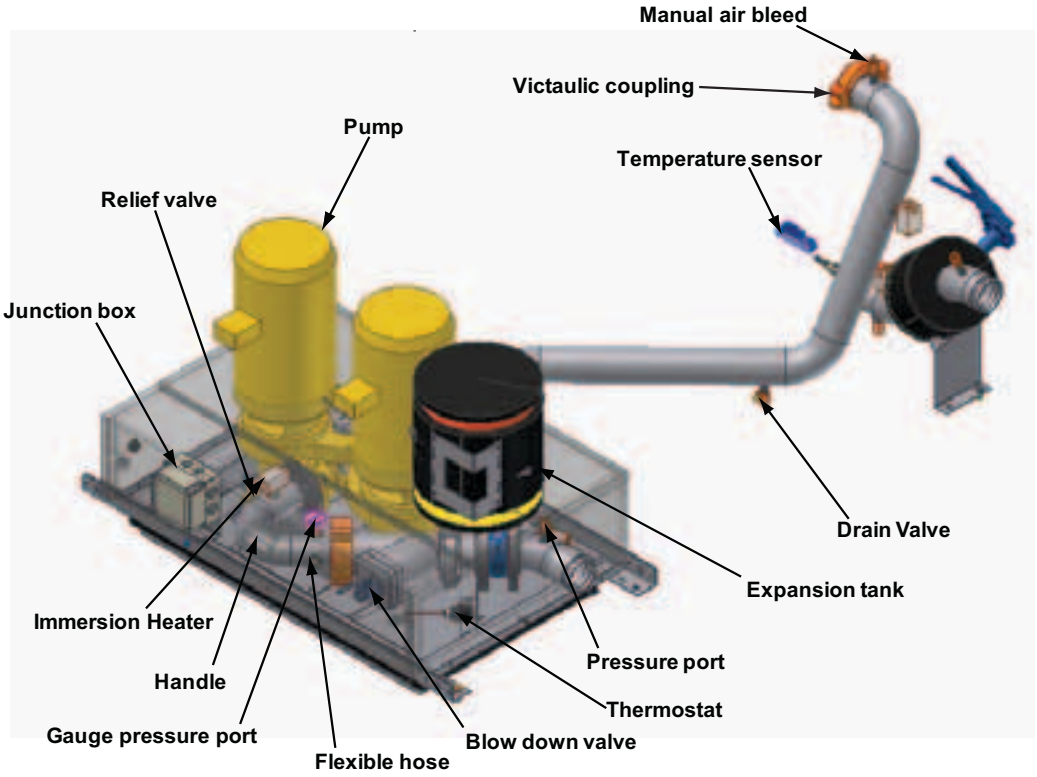


Figure 68. Pump package components — V 40-70 ton — view 2

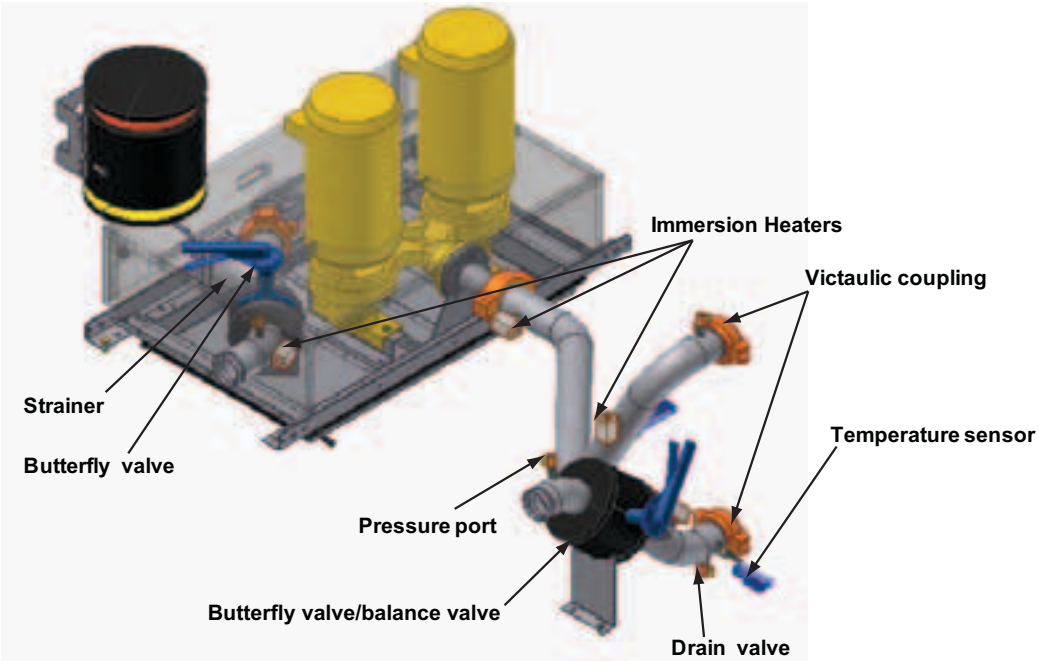


Figure 69. Pump package components — V 40-70 ton — view 3

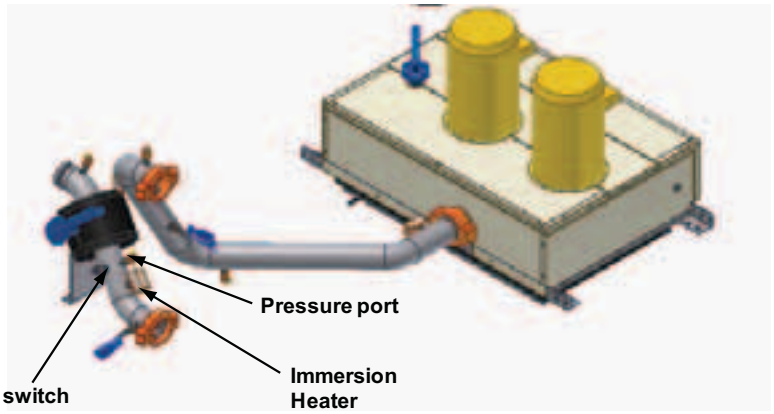


Figure 70. Pump package components — W 80-130 ton — view 1

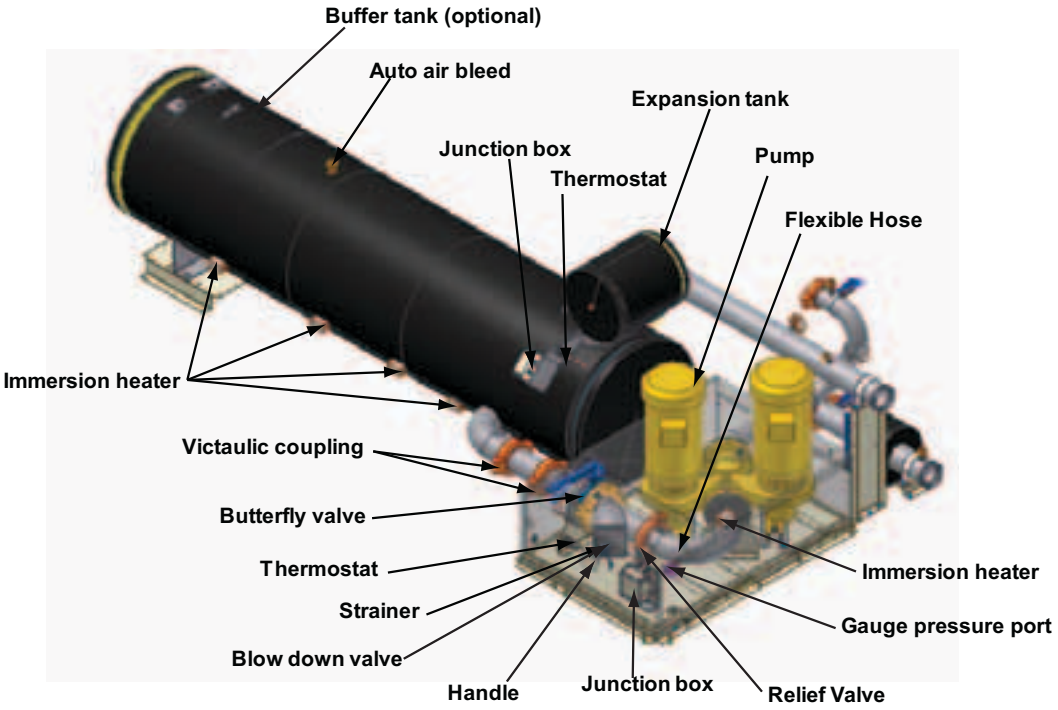
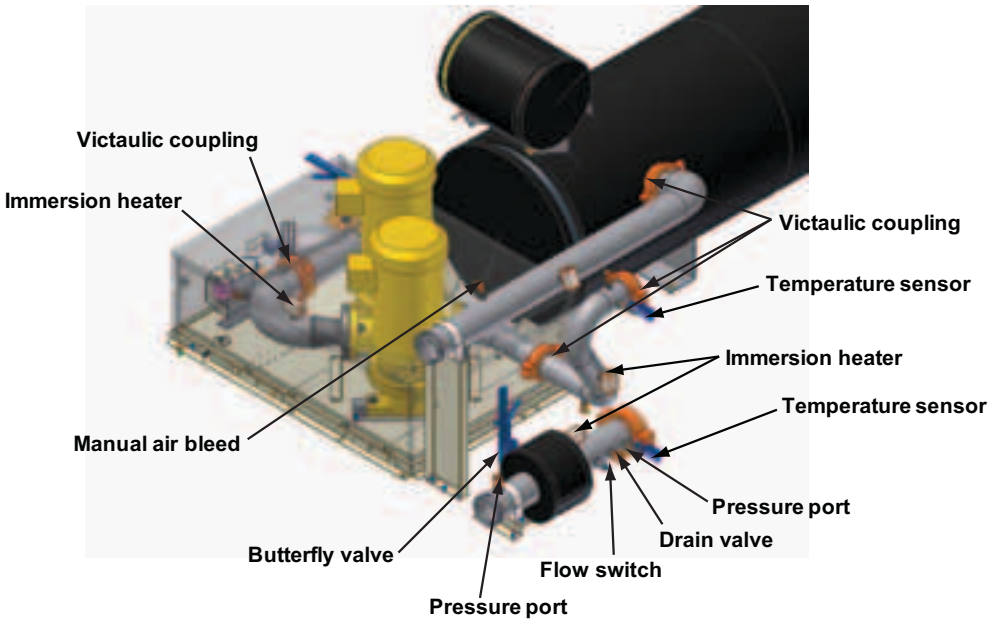
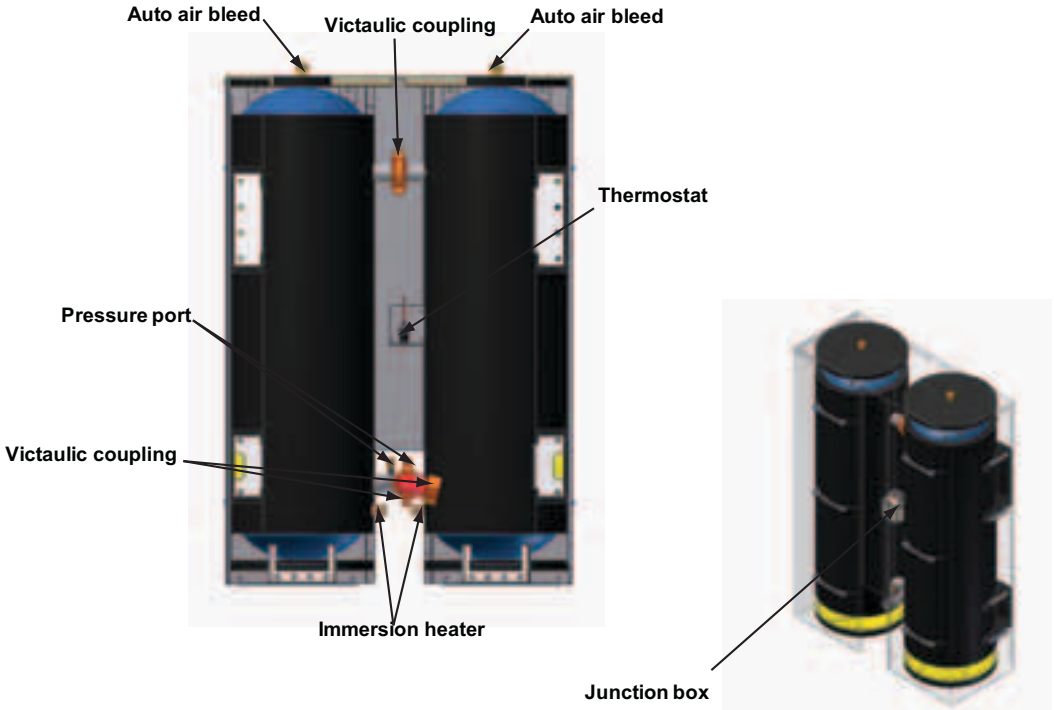


Figure 71. Pump package components — W 80-130 ton — view 2



Buffer Tank Components - Optional

Figure 72. Buffer tank components — slant 20-35 ton & V 40-70 ton



Partial Heat Recovery Components

Figure 73. Partial heat recovery components — slant 20-35 ton

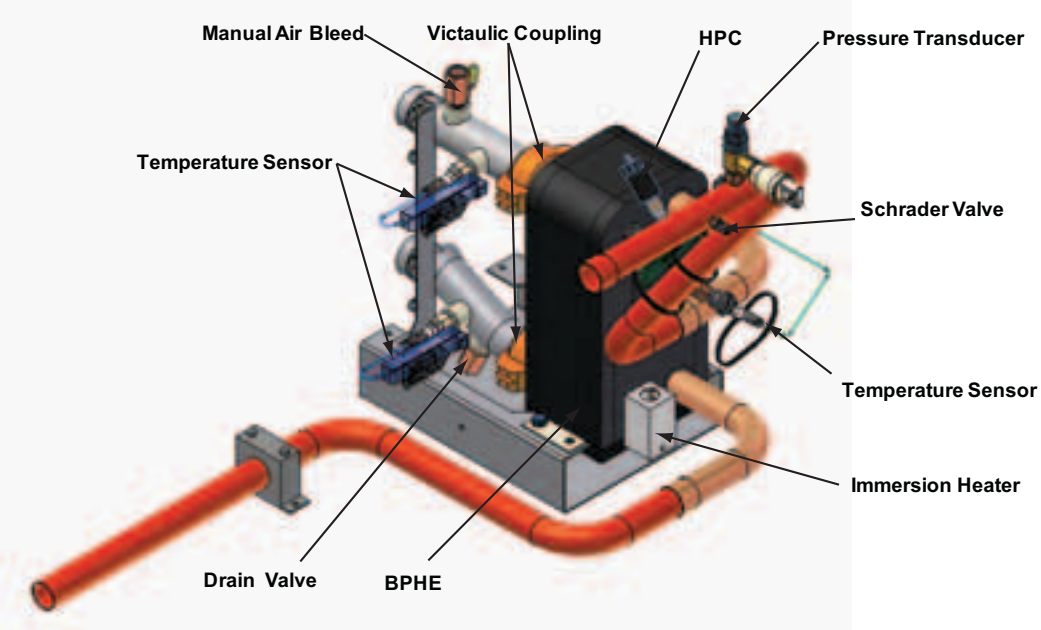


Figure 74. Partial heat recovery components - V 40-70 tons

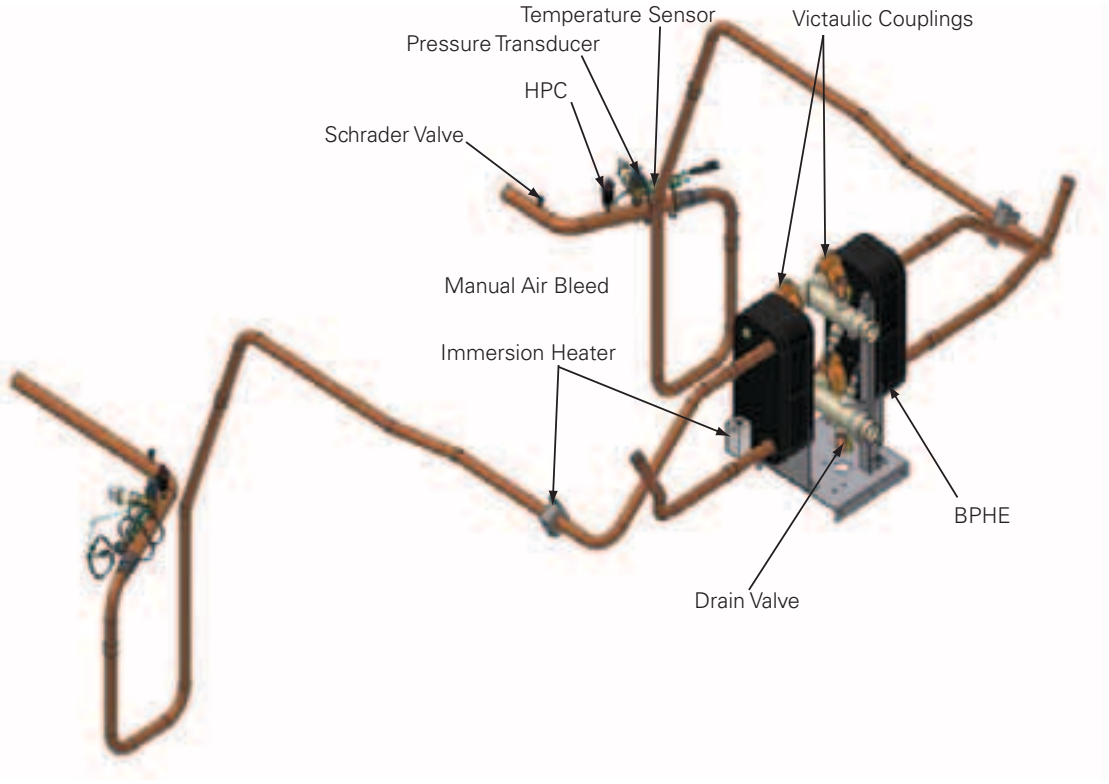
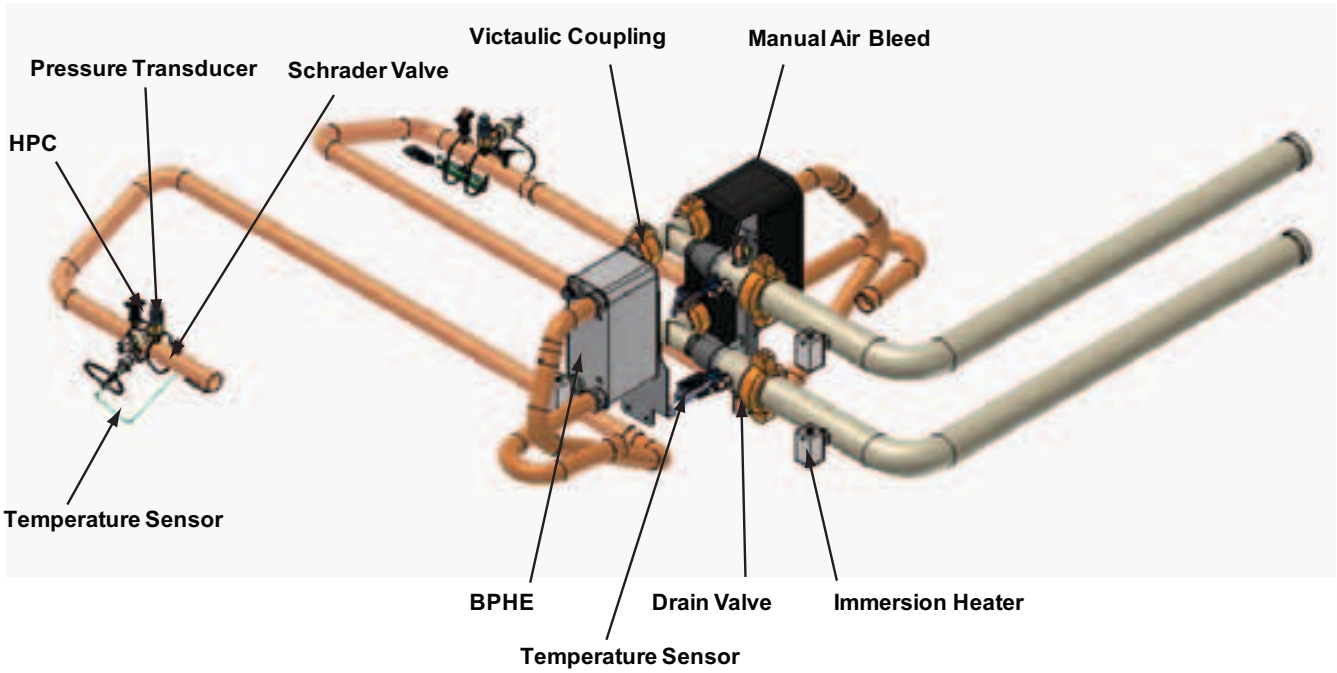


Figure 75. Partial heat recovery components — W 80-130 ton



Refrigerant Cycle

The refrigeration cycle of the Model CGAM chiller is conceptually similar to other Trane air-cooled chiller products. The CGAM chiller uses a brazed plate evaporator and an air-cooled condenser. The compressors use suction gas cooled motors and an oil management system to provide almost oil-free refrigerant to the condenser and evaporator for maximum heat transfer while lubricating and sealing compressor bearings. The lubrication system helps to assure long compressor life and contributes to quiet operation.

Refrigerant condensers in the air-cooled heat exchanger which is available in three configurations—slant, V and W—based on the CGAM nominal tonnage cooling capacity. Liquid refrigerant is metered into the brazed plate evaporator using an electronic expansion valve to maximize chiller efficiency at full and part load operation.

The CGAM chiller is equipped with a unit-mounted starter and control panel. Microprocessor-based unit control modules (Trane Tracer™ CH530) provide accurate chilled water control and provide monitoring, protection and adaptive limit functions. The adaptive nature of the controls intelligently prevent the chiller from operating outside of its limits, or compensates for unusual operating conditions while keeping the chiller running rather than simply shutting off the chiller. If problems do occur, the CH530 controls provide diagnostic messages to help the operator in troubleshooting.

Refrigerant Cycle Description

The CGAM refrigeration cycle is described using the pressure-enthalpy chart shown in Figure 76. Key State Points 1 through 5 are indicated on the chart. A schematic showing refrigerant components throughout the system is shown in Figure 77.

Refrigerant evaporation occurs in the brazed plate evaporator. Metered refrigerant vaporizes as it cools the chilled water or liquid flowing through the evaporator passages. The refrigerant vapor leaves the evaporator as superheated gas. State Point 1.

Refrigerant vapor generated in the evaporator flows to the compressor suction manifold where it enters and flows across the compressor motor windings to provide cooling. The vapor is then compressed in the compressor scroll chambers and discharged. Oil from the compressor sump lubricates the bearings and seals the small clearances between the compressor scrolls. Refrigerant vapor is discharged to the air-cooled condenser at State Point 2.

After the refrigerant vapor condenses into liquid (State Points 3 and 4) it is returned to the evaporator (State Point 5) where the refrigerant again flashes into vapor and the refrigeration cycle repeats.

Figure 76. Pressure/Enthalpy Curve

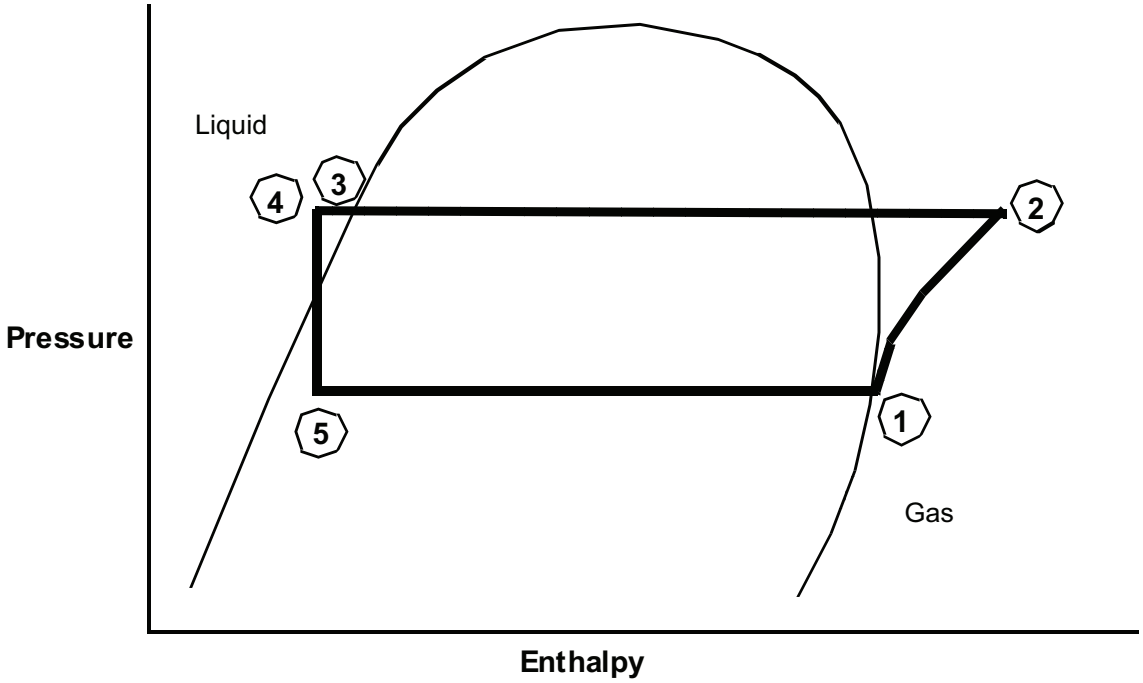
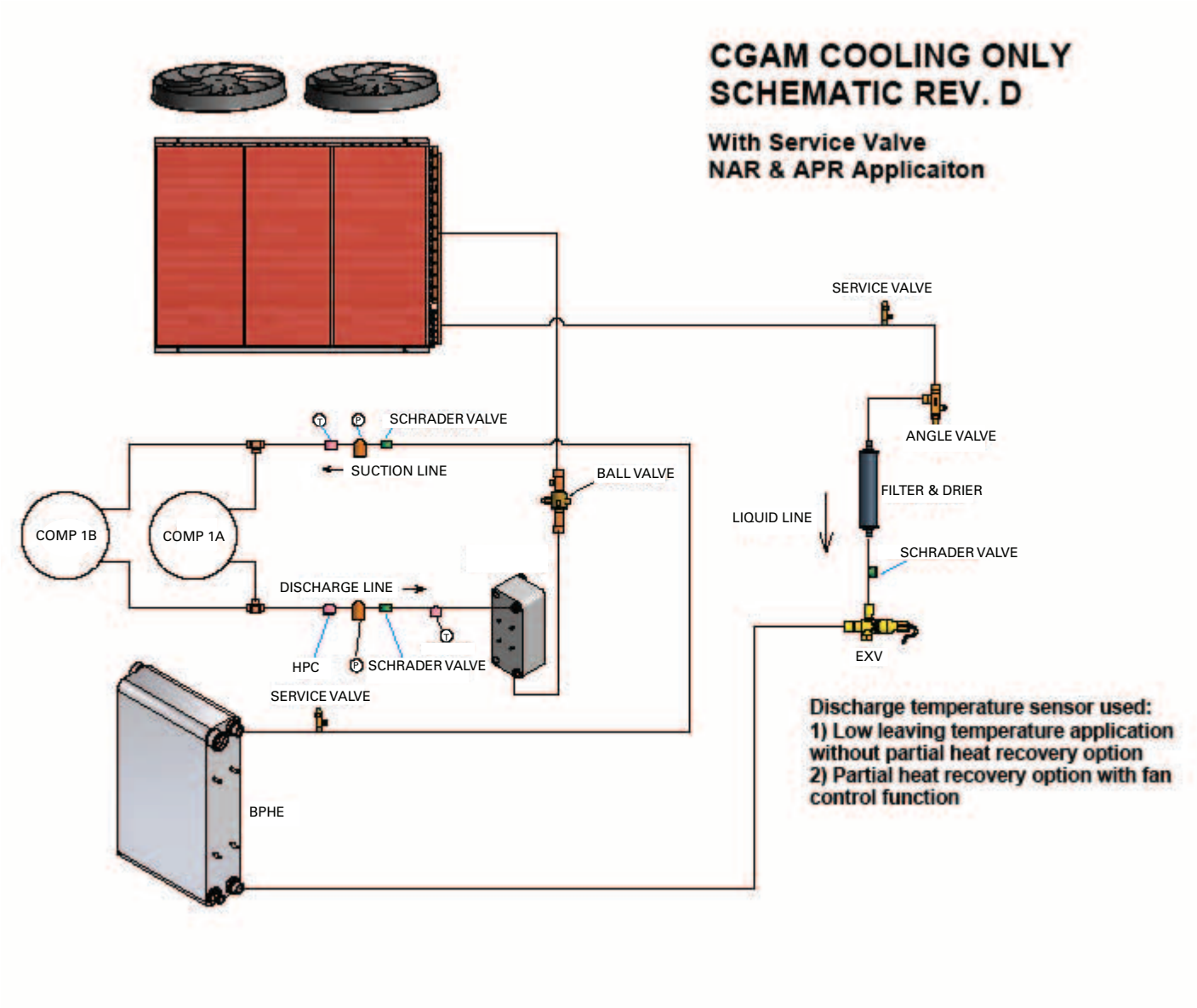


Figure 77. CGAM Refrigerant Circuit

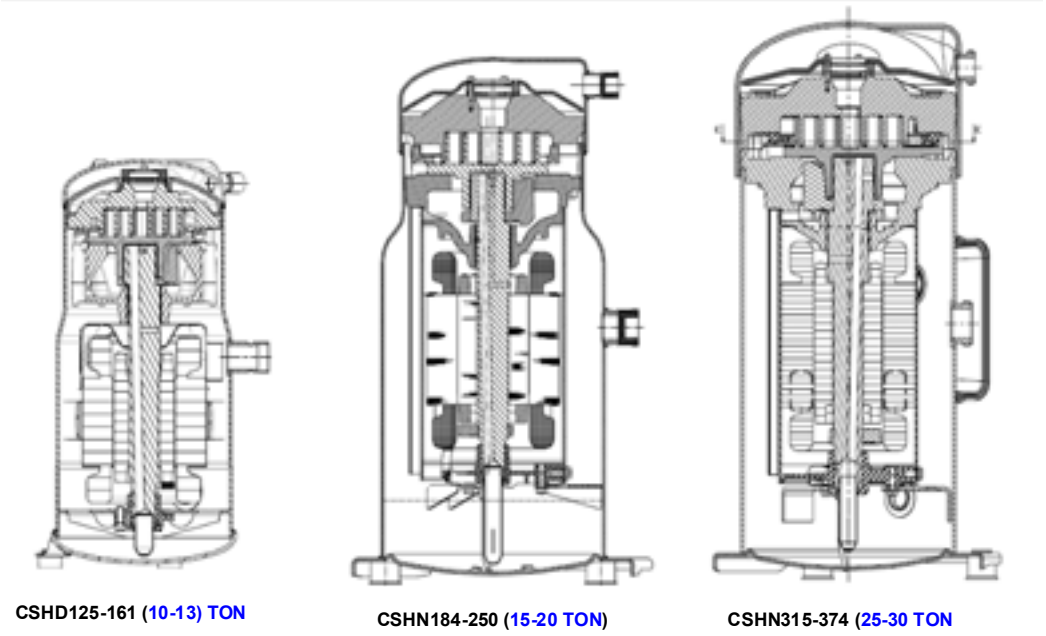


Oil System Operation (CGAM)

Overview

The oil is efficiently separated inside the scroll compressor and will remain in the scroll compressor during all run cycles. Between 1-2% of the oil circulates around with the refrigerant.

Figure 78. CGAM Scroll Compressor Sizes



CSHD125-161 (10-13) TON

CSHN184-250 (15-20 TON)

CSHN315-374 (25-30 TON

Figure 79. 10-15 Ton Compressor Internal Components

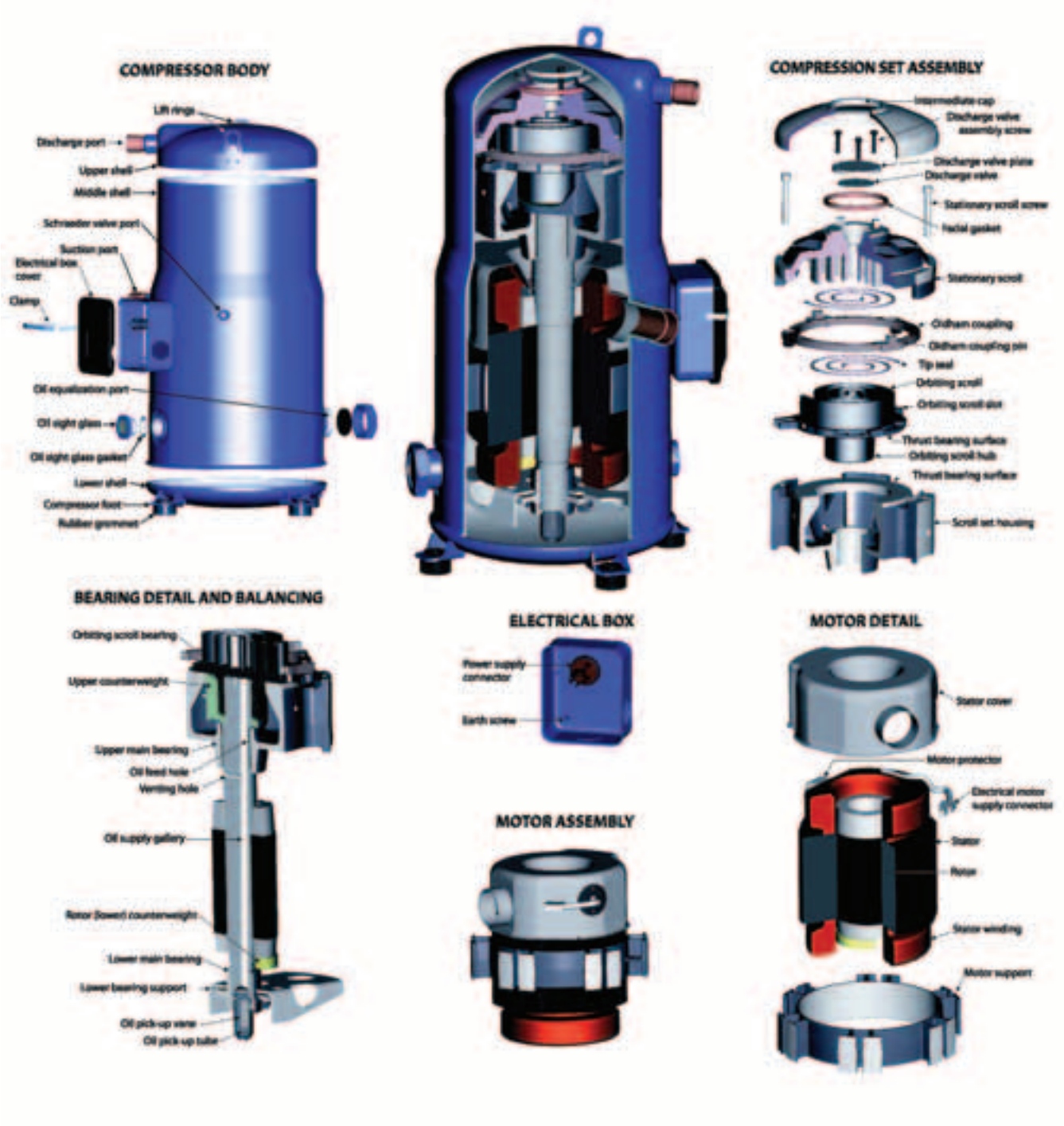
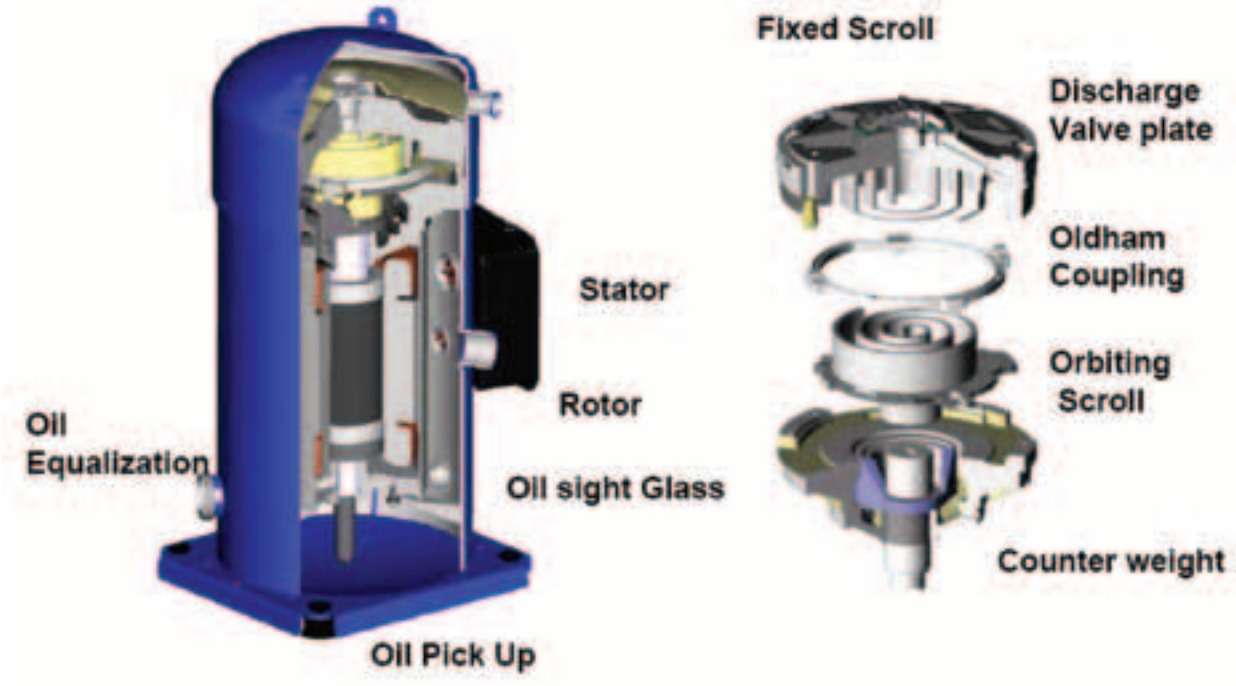


Figure 80. 15-30 Ton Compressor Internal Components



Controls Interface

CH530 Communications Overview

The Trane CH530 control system that runs the chiller consists of several elements:

- The main processor collects data, status, and diagnostic information and communicates commands to the starter module and the LLID (for Low Level Intelligent Device) bus. The main processor has an integral display (DynaView).
- Low level intelligent device (LLID) bus. The main processor communicates to each input and output device (e.g. temperature and pressure sensors, low voltage binary inputs, analog input/output) all connected to a four-wire bus, rather than the conventional control architecture of signal wires for each device.
- The communication interface to a building automation system (BAS).
- A service tool to provide all service/maintenance capabilities.

Main processor and service tool (TechView) software is downloadable from www.trane.com. The process is discussed later in this section under TechView Interface.

DynaView provides bus management. It has the task of restarting the link, or filling in for what it sees as "missing" devices when normal communications has been degraded. Use of TechView may be required.

The CH530 uses the IPC3 protocol based on RS485 signal technology and communicating at 19.2 Kbaud to allow 3 rounds of data per second on a 64-device network. A typical four-compressor CGAM will have around 30 devices.

Most diagnostics are handled by the DynaView. If a temperature or pressure is reported out of range by a LLID, the DynaView processes this information and calls out the diagnostic. The individual LLIDs are not responsible for any diagnostic functions.

Note: *It is imperative that the CH530 Service Tool (TechView) be used to facilitate the replacement of any LLID or reconfigure any chiller component. TechView is discussed later in this section.*

Controls Interface

Each chiller is equipped with a DynaView interface. The DynaView has the capability to display information to the operator including the ability to adjust settings. Multiple screens are available and text is presented in multiple languages as factory-ordered or can be easily downloaded from www.trane.com.

TechView can be connected to the DynaView module and provides further data, adjustment capabilities, diagnostics information using downloadable software.

DynaView Interface

The DynaView enclosure design is weatherproof and made of durable plastic for use as a device on the outside of the unit.

The display on DynaView is a 1/4 VGA display with a resistive touch screen and an LED backlight. The display area is approximately 4 inches wide by 3 inches high (102mm x 60mm).

Key Functions

In this touch screen application, key functions are determined completely by software and change depending upon the subject matter currently being displayed. The basic touch screen functions are outlined below.

Radio Buttons

Radio buttons show one menu choice among two or more alternatives, all visible. The radio button model mimics the buttons used on old-fashioned radios to select stations. When one is pressed, the one that was previously pressed "pops out" and the new station is selected. In the DynaView model the possible selections are each associated with a button. The selected button is darkened, presented in reverse video to indicate it is the selected choice. The full range of possible choices as well as the current choice is always in view.

Spin Value Buttons

Spin values are used to allow a variable setpoint to be changed, such as leaving water setpoint. The value increases or decreases by touching the increment (+) or decrement (-) arrows.

Action Buttons

Action buttons appear temporarily and provide the user with a choice such as **Enter** or **Cancel.**

Hot Links

Hot links are used to navigate from one view to another view.

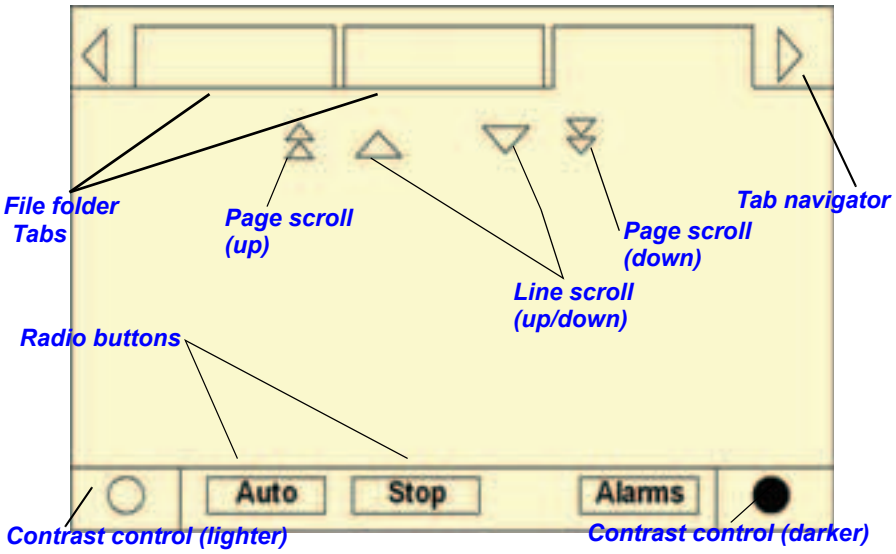
File Folder Tabs

File folder tabs are used to select a screen of data. Just like tabs in a file folder, these serve to title the folder/screen selected, as well as provide navigation to other screens. In DynaView, the tabs are in one row across the top of the display. The folder tabs are separated from the rest of the display by a horizontal line. Vertical lines separate the tabs from each other. The folder that is selected has no horizontal line under its tab, thereby making it look like a part of the current folder (as would an open folder in a file cabinet). The user selects a screen of information by touching the appropriate tab.

Display Screens

Basic Screen Format

The basic screen format appears as:



The file folder tabs across the top of the screen are used to select the various display screens.

Scroll arrows are added if more file tabs (choices) are available. When the tabs are at the left most position, the left navigator will not show and only navigation to the right will be possible. Likewise when the right most screen is selected, only left navigation will be possible.

The main body of the screen is used for description text, data, setpoints, or keys (touch sensitive areas). The Chiller Mode is displayed here.

The double up arrows cause a page-by-page scroll either up or down. The single arrow causes a line by line scroll to occur. At the end of the page, the appropriate scroll bar will disappear.

A double arrow pointing to the right indicates more information is available about the specific item on that same line. Pressing it will bring you to a subscreen that will present the information or allow changes to settings.

The bottom of the screen (Fixed Display) is present in all screens and contains the following functions. The **left circular area** is used to reduce the contrast/viewing angle of the display. **The right circular area** is used to increase the contrast/viewing angle of the display. The contrast may require re-adjustment at ambient temperatures significantly different from those present at last adjustment.

The other functions are critical to machine operation. The AUTO and STOP keys are used to enable or disable the chiller. The key selected is in black (reverse video). The chiller will stop when the STOP key is touched and after completing the Shutting Down mode.

Touching the AUTO key will enable the chiller for active cooling if no diagnostic is present. (A separate action must be taken to clear active diagnostics.)

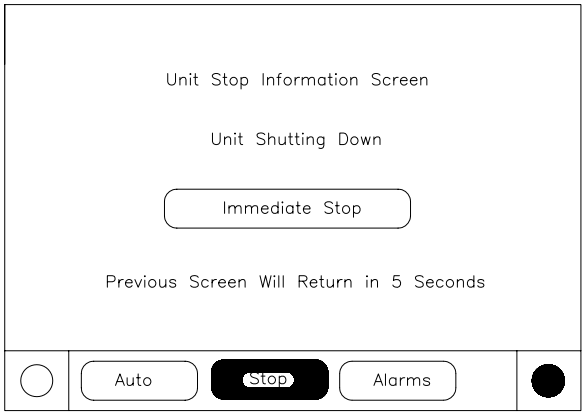
The AUTO and STOP keys, take precedence over the Enter and Cancel keys. (While a setting is being changed, AUTO and STOP keys are recognized even if Enter or Cancel has not been pressed.)

The ALARMS button appears only when an alarm is present, and blinks (by alternating between normal and reverse video) to draw attention to a diagnostic condition. Pressing the ALARMS button takes you to the corresponding tab for additional information.

Auto, Stop/Immediate Stop

The Auto and Stop keys will be presented as radio buttons within the persistent key display area. The selected key will be black.

The chiller will stop when the Stop key is touched, entering the Run Unload mode. An informational screen will be displayed for 5 seconds indicating that a second depression of an “Immediate Stop” key during this time period will result in an immediate stop. Pressing the “Immediate Stop” key while the immediate stop screen is displayed, will cause the unit to stop immediately, skipping operational pumpdown.



NOTICE

Equipment damage!

Do NOT enable/disable the chiller by removing water flow or equipment damage can occur.

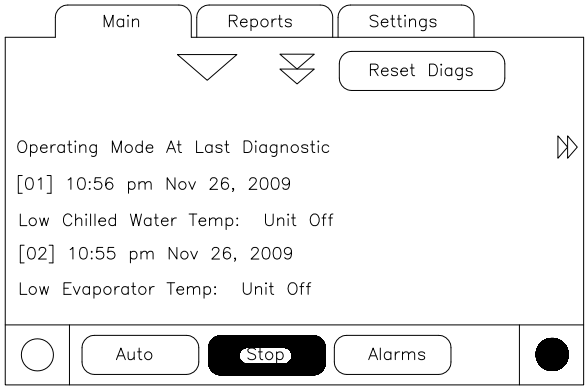
Touching the Auto key will arm the chiller for active cooling if no diagnostic is present. As in UCP2, a separate action must be taken to clear active diagnostics.

The AUTO and STOP, take precedence over the ENTER and CANCEL keys. (While a setting is being changed, AUTO and STOP keys are recognized even if ENTER or CANCEL has not been pressed.

Diagnostic Annunciation

When an active diagnostic is present, an Alarms key will be added to the persistent display area. This key will serve two purposes. The first purpose will be to alert the operator that a diagnostic exists. The second purpose is to provide navigation to a diagnostic display screen.

Diagnostic Screen

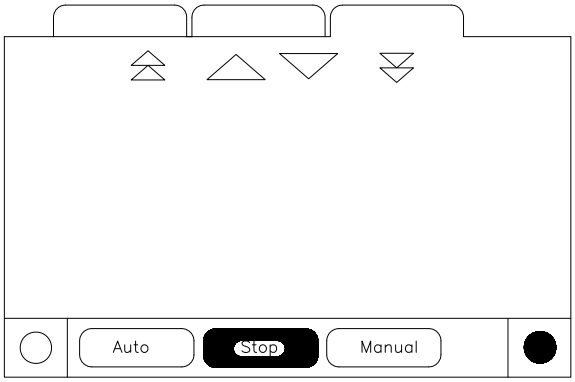


A complete listing of diagnostics and codes is included in the Diagnostic Section.

Manual Override Exists

An indicator to present the presence of a manual override will share space with the Alarms enunciator key. While a manual override exists, the space used for the Alarms key will be occupied by a “Manual” icon, that will display solid inverse color similar to the appearance of the Alarms enunciator. An Alarm will take precedence of the Manual, until the reset of active alarms, at which point the Manual indicator would re-appear if such an override exists.

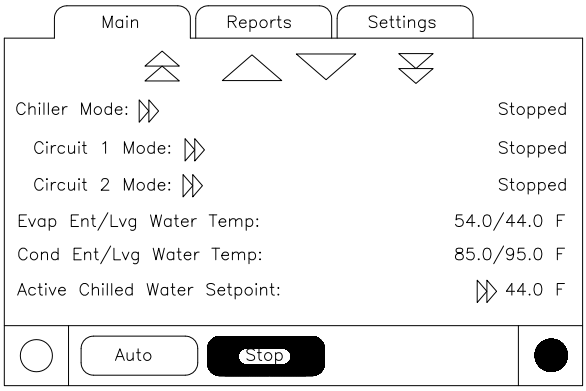
If the Manual indicator is pressed, the Manual Control Settings screen will be displayed.



Main Screen

The Main screen is a “dashboard” of the chiller. High level status information is presented so that a user can quickly understand the mode of operation of the chiller.

The Chiller Operating Mode will present a top level indication of the chiller mode (i.e. Auto, Running, Inhibit, Run Inhibit, etc.). The “additional info” icon will present a subscreen that lists in further detail the subsystem modes.



The Main screen shall be the default screen. After an idle time of 30 minutes the CH530 shall display the Main screen with the first data fields.

The remaining items (listed in the following table) will be viewed by selecting the up/down arrow icons.

Table 40. Main Screen Data Fields Table

Description	Units	Resolution
Chiller Mode (>> submodes)	enumeration	
Circuit Mode (>> submodes)	enumeration	
Circuit 1 Mode (>> submodes)	enumeration	
Circuit 2 Mode (>> submodes)	enumeration	
Evap Ent/Lvg Water Temp	F / C	0.1
Active Chilled Water Setpoint (>>source)	F / C	0.1
Active Hot Water Setpoint (>>source)	F / C	0.1
Active Demand Limit Setpoint (>>source)	%	1
Outdoor Air Temperature	F / C	0.1
Software Type	enumeration	Scroll
Software Version		X.XX

Chiller Operating Mode

The machine-operating mode indicates the operational status of the chiller. A subscreen with additional mode summary information will be provided by selection of an additional information icon (>>). The operating mode line will remain stationary while the remaining status items scroll with the up/down arrow keys.

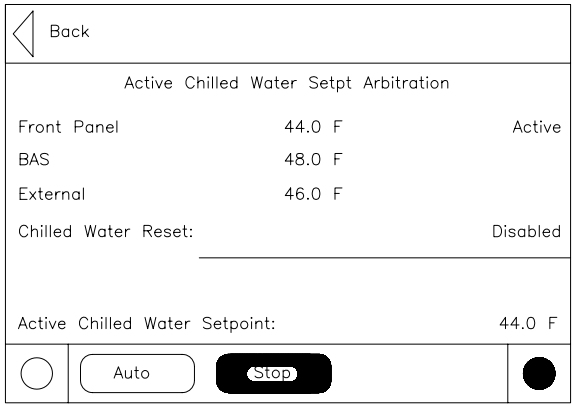
Active Chilled Water Setpoint

The active chilled water setpoint is the setpoint that is currently in use. It results from the logical hierarchy of setpoint arbitration by the main processor. It will be displayed to 0.1 degrees Fahrenheit or Celsius.

Touching the double arrow to the left of the Active Chilled Water Setpoint will take the user to the active chilled water setpoint arbitration sub-screen.

Active Chilled Water Subscreen

The active chilled water setpoint is that setpoint to which the unit is currently controlling. It is the result of arbitration between the front panel, BAS, schedule, external, and auxiliary setpoints (schedule and auxiliary not shown in the following diagram), which in turn may be subjected to a form of chilled water reset.



The chilled water reset status area in the right most column will display one of the following messages

- Return
- Constant Return
- Outdoor
- Disabled

The left column text “Front Panel”, “BAS” or “Schedule”, “External”, “Auxiliary”, “Chilled Water Reset”, and “Active Chilled Water Setpoint” will always be present regardless of installation or enabling those optional items. In the second column “-----” will be shown if that option is Not Installed, otherwise the current setpoint from that source will be shown.

Setpoints that are adjustable from the DynaView (Front Panel Chilled Water Setpoint, Auxiliary Chilled Water Setpoint) will provide navigation to their respective setpoint change screen via a double-arrow to the right of the setpoint source text. The setpoint change screen will look identical to the one provided in the Chiller Setpoints screen. The “Back” button on the setpoint change screen provides navigation back to the setpoint arbitration screen.

The “Back” button on the setpoint arbitration screen provides navigation back to the chiller screen.

Other Active Setpoints

The Active Demand Limit Setpoint will behave the same was as the Active Chilled Water Setpoint, except that its units are in percent and there is an Ice Building source in place of the Auxiliary source. Front Panel Demand Limit Setpoint will provide navigation to its setpoint change screen.

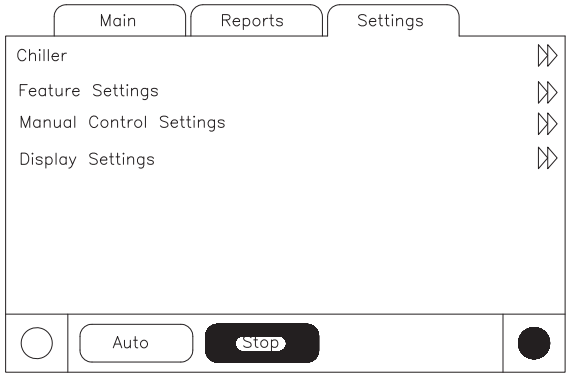
Password-Protected Settings

The user can change some settings from the DynaView display on the chiller. Other settings are password-protected. In order to change these setting the password is 314.

Settings Screen

The Settings screen provides a user the ability to adjust settings necessary to support daily tasks. The layout provides a list of sub-menus, organized by typical subsystem. This organization allows each subscreen to be shorter in length which should improve the user's navigation.

A sample Settings screen is a list of the subsystems as shown below.



Settings Sub-Screens - Table of Text, Data, Ranges, etc.

Below is the table of text, resolution, field size, enumerated selections, and data for Settings subscreens. See the functional specification “CGAM Settings and Setpoints” for further information such as ranges and operation.

Table 41. Unit

Description	Resolution or (Enumerations)	Units
Front Panel Cool	Cool	Enum
Front Panel Chilled Water Setpt:	+ or - XXX.X	Temperature
Auxiliary Chilled Water Setpt:	+ or - XXX.X	Temperature
Front Panel Demand Limit Setpt:	XXX	Percent
Front Panel Ice Build Cmd:	On/Auto	Enum
Front Panel Ice Term Setpt:	+ or - XXX.X	Temperature
Front Panel Noise Stb Cmd:	On/Auto	Enum
Setpoint Source:	(BAS/Ext/FP, Ext/ Front Panel, Front Panel), BAS/Ext/FP	Enum

Table 42. Feature Settings

Description	Resolution or (Enumerations), Default	Units
Power-Up Start Delay:	10 seconds	Seconds (MM:SS)
Cool Low Ambient Lockout:	(Enable, Disable), Enable	Enum
Cool Low Ambient Lockout Stpt:	+ or - XXX.X	Temperature
Water Pump Off Delay:	1 minute	Minutes (HH:MM)
Ice Building:	(Enable, Disable), Disable	Enum
PHR Fan Control:	(Enable, Disable), Disable	Enum

Table 42. Feature Settings

Description	Resolution or (Enumerations), Default	Units
Local Time of Day Schedule	Subscreen (see below)	
External/BAS	Subscreen (see below)	
Chilled Water Reset	Subscreen (see below)	

Table 43. External/BAS Feature Settings (subscreen of Feature Settings)

Description	Resolution or (Enumerations), Default	Units
Ext Chilled Setpt:	(Enable, Disable), Disable	Enum
Ext Demand Limit Setpoint:	(Enable, Disable), Disable	Enum
Max Capacity Debounce Time:	30 seconds	Seconds (MM:SS)
Limit Annunc Debounce Time:	30 seconds	Seconds (MM:SS)
LCI-C Diag Encoding:	(Text, Code) Text	Enum
LCI-C Diag Language:	(English, Selection 2, Selection 3) English (0)	Enum

Table 44. Chilled Water Reset Feature Settings (subscreen of Feature Settings)

Description	Resolution or (Enumerations), Default	Units
Chilled Water Reset:	(Const Return, Outdoor, Return, Disable), Disable	Enum
Return Reset Ratio:	XXX	Percent
Return Start Reset:	XXX.X	Temperature
Return Maximum Reset:	XXX.X	Temperature
Outdoor Reset Ratio:	XXX	Percent
Outdoor Start Reset:	XXX.X	Temperature
Outdoor Maximum Reset:	XXX.X	Temperature

Table 45. Control Settings

Description	Resolution or (Enumerations), Default	Units
Cooling Design Delta Temp:	XXX.X	Delta Temperature
Heating Design Delta Temp:	XXX.X	Delta Temperature
Differential to Start:	XXX.X	Delta Temperature
Differential to Stop:	XXX.X	Delta Temperature
Staging Deadband Adjustment:	XXX.X	Delta Temperature
Capacity Control Softload Time:	120 seconds	Seconds (MM:SS)
Circuit Staging Option:	(Bal Starts/Hrs, Circuit 1 Lead, Circuit 2 Lead), Bal Starts/Hrs	Enum
Compressor Staging Option:	(Fixed, Bal Starts/Hrs)	Enum
Leaving Water Temp Cutout:	XX.X	Temperature
Low Refrigerant Temp Cutout:	XX.X	Temperature

Table 45. Control Settings

Description	Resolution or (Enumerations), Default	Units
Evap Flow Overdue Wait Time:	30 seconds	Seconds (MM:SS)
Disch Press Limit Setpt:	85%	Percent
Disch Press Limit Unload Setpt:	97%	Percent

Table 46. System Manual Control Settings

Description	Resolution or (Enumerations), Default	Units	Monitor Value
Evap Water Pump	(Auto, On), Auto	Enum	1) Evap Flow status 2) Override Time Remaining
Clear Restart Inhibit Timer	(Clear Timer)		1) Restart Inhibit Time (composite value)
Capacity Control	(Auto, Manual) Auto	Enum	
Binding	Special	Special	None

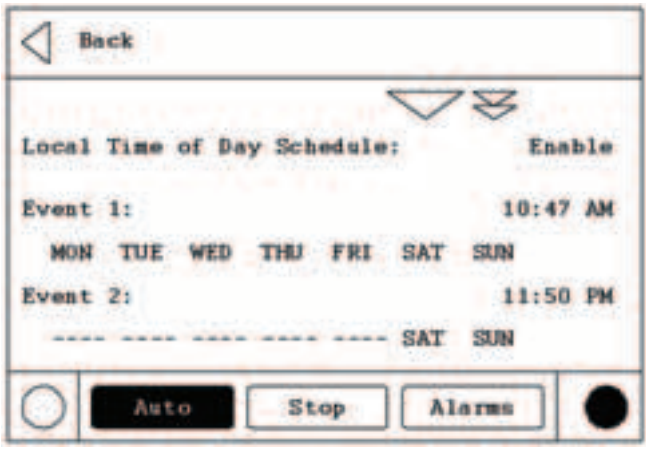
Table 47. Circuit Manual Control Settings

Description	Resolution or (Enumerations), Default	Units	Monitor Value
Front Panel Ckt Lockout	(Not Locked Out, Locked Out), Not Locked Out	Enum	
Cprsr A Lockout	(Not Locked Out, Locked Out), Not Locked Out	Enum	
Cprsr B Lockout	(Not Locked Out, Locked Out), Not Locked Out	Enum	
Cprsr C Lockout	(Not Locked Out, Locked Out), Not Locked Out	Enum	
Manual EXV Control:	(Auto, Manual), Auto	Enum	
Manual EXV Position Cmd:	XXX	Percent	EXV Status Suction Pressure
Cooling EXV Manual Ctrl:	(Auto, Manual), Auto	Enum	
Cooling EXV Manual Position Cmd:	XXX	Percent	EXV Status Suction Pressure
Cprsr A Pumpdown	Status: (Avail, Not Avail, Pumpdown) Override Subscreen command buttons: (Abort, Pumpdown) - *button is either grayed out or not shown if not available*	Enum	Suction Pressure
Cprsr B Pumpdown	Status: (Avail, Not Avail, Pumpdown) Override Subscreen command buttons: (Abort, Pumpdown) - *button is either grayed out or not shown if not available*	Enum	Suction Pressure
Cprsr C Pumpdown	Status: (Avail, Not Avail, Pumpdown) Override Subscreen command buttons: (Abort, Pumpdown) - *button is either grayed out or not shown if not available*	Enum	Suction Pressure

Local Time of Day Schedule Screen

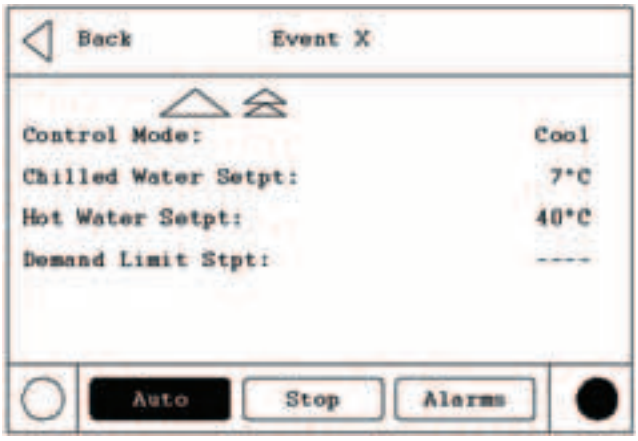
To access the Local Time of Day Schedule Screen this option must be installed in TechView. This option will then be shown under the Feature Settings screen.

This screen shows the overall feature enable/disable setting, plus a listing of all 10 events, including their event time and active days of the week.

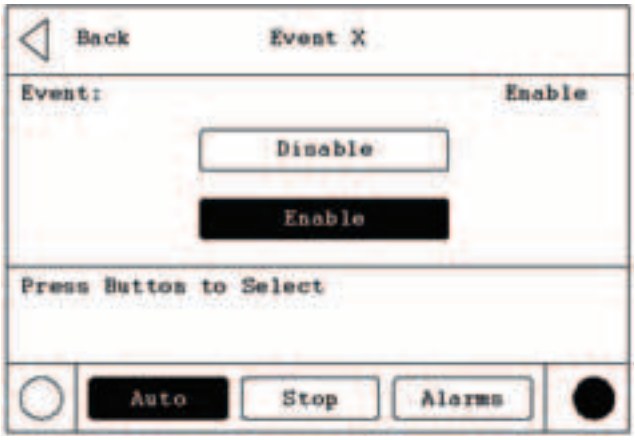


Local Settings Event Screen

This screen displays the details for a particular event, including the active days, event time, and the Local Schedule arbitrated setpoints. Selecting a given item will allow the user to modify it.

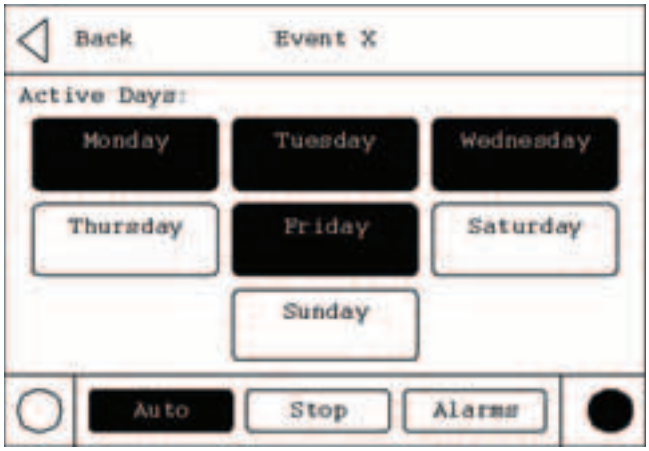


Event Enable/Disable Screen

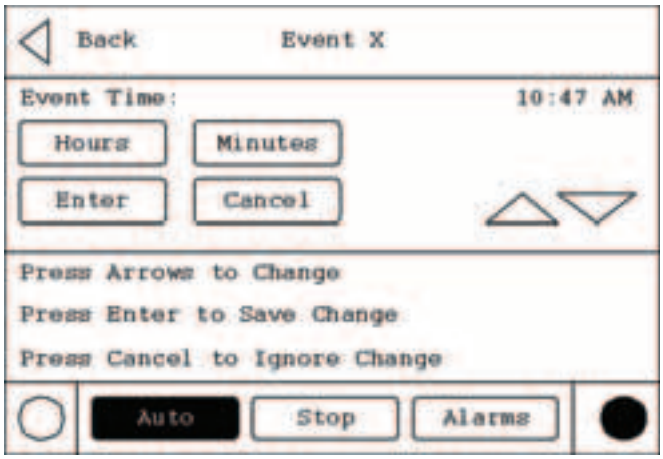


Event Active Days Screen

This screen is unusual because it does not use radio buttons, which only allow one active selection at a time. These buttons are more like “selection buttons” or check boxes. The user can select any combination of days, or none at all.



Event Time Screen



Event Arbitrated Settings Screens

For analog setpoints, the screen is slightly different than the standard screen, because there are two additional buttons - "Used" and "Not Used". Selecting "Used" will make the setting valid and allow the user to change the value. Selecting "Not Used" will make the setting invalid, and will not allow the user to change the value.

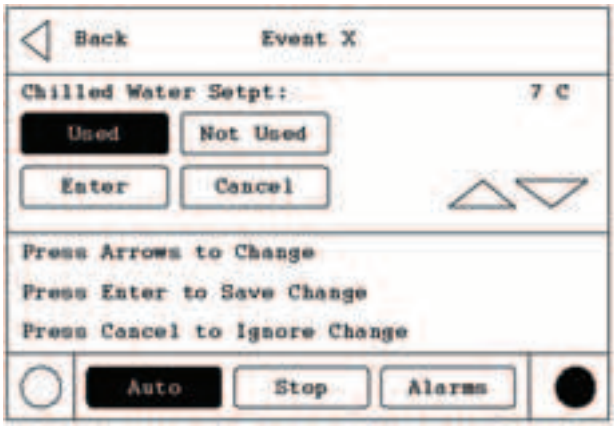


Table 48. Display Settings

Description	Resolution or (Enumerations), Default	Units
Date Format	("mmm dd, yyyy", "dd-mmm-yyyy"), "mmm dd, yyyy	Enum
Date[4]		
Time Format	(12-hour, 24-hour), 12-hour	Enum
Time of Day[4]		
Keypad/Display Lockout[3]	(Enable, Disable), Disable	Enum
Display Units	(SI, English), English	Enum
Pressure Units	(Absolute, Gauge), Gauge	Enum
Local Atmospheric Pressure:	XXX.X	Pressure (always absolute)

Table 48. Display Settings

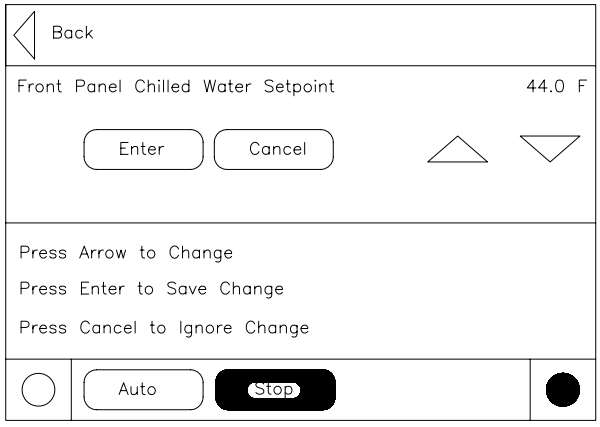
Description	Resolution or (Enumerations), Default	Units
Language[1]	(English, Selection 2, Selection 3), English (0)	Enum

(1) Language choices are dependent on what the Service Tool has setup in the Main Processor. Get Radio Button names from Main Processor setups. Language selections will include English and qty 2 alternate as loaded by TechView.
(2) Temperatures will be adjustable to 0.1 deg F or C. The Main Processor will provide the minimum and maximum allowable value.
(3) Enables a DynaView Lockout screen. All other screens time-out in 30 minutes to this screen. The DynaView Lockout Screen will have 0-9 keypad to permit the user to re-enter the other DynaView screens with a fixed password. See below for further details.
(4) The Date and Time setup screen formats deviate slightly from the standard screens defined above. See the alternate screen layouts below.
(5) Language shall always be the last setting listed on the Control Settings menu (which will also always be the last item listed on the Settings menu list). This will allow a user to easily find language selection if looking at an unrecognizable language.
(6) The pump on mode terminates after 60 minutes.

Upon selecting a Settings list all setpoints available to change along with their current value will appear. The operator selects a setpoint to change by touching either the verbal description or setpoint value. Doing this causes the screen to switch to either the Analog Settings Subscreen or the Enumerated Settings Subscreen.

Analog Setting Subscreens

Analog Settings Subscreen displays the current value of the chosen setpoint in the upper ½ of the display. It is displayed in a changeable format consistent with its type. Binary setpoints are considered to be simple two state enumerations and will use radio buttons. Analog setpoints are displayed as spin buttons. The lower half of the screen is reserved for help screens.

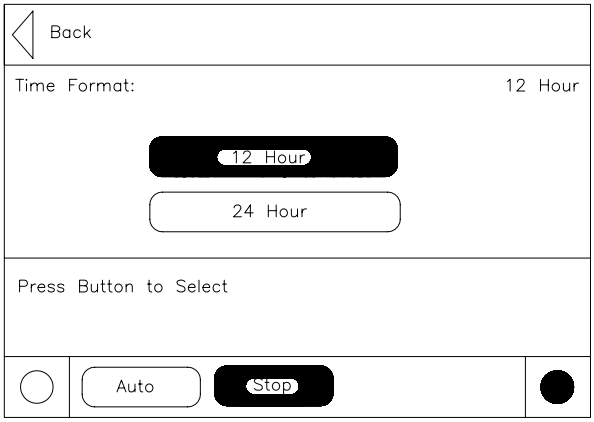


All setpoint subscreens will execute the equivalent of a Cancel key if any display activities cause the subscreen to be left before a new setpoint is entered. E.g. if the Alarms key is pressed before a new setpoint is entered, the new setpoint will be cancelled. The same applies to any time-outs.

Pressing the Auto or Stop keys will not cause a cancel since the setpoint subscreen is not left on this action.

Enumerated Settings Subscreen

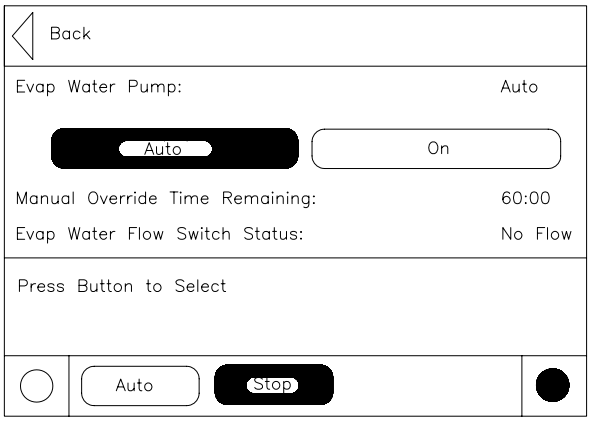
The enumerated setpoint subscreen has no cancel or enter key. Once a radio key is depressed the item is immediately set to the new enumeration value.



Mode Override Subscreens

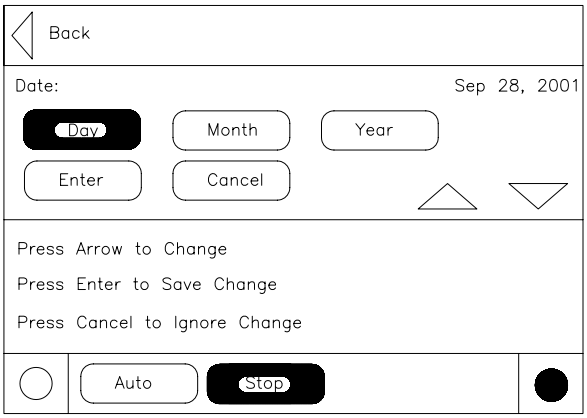
The Mode Override subscreen has no cancel or enter key. Once a radio key is depressed that new value is immediately assumed.

Mode Override for Enumerated Settings is shown below:

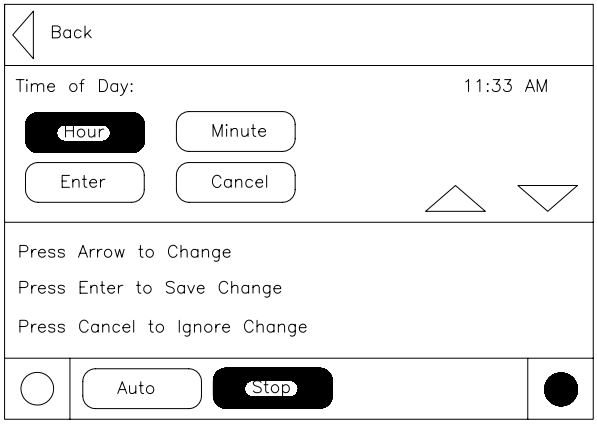


Date/Time Subscreen

The setpoint screen for setting up the CH530 date is shown below: The user must select Day, Month, or Year and then use the up/down arrows to adjust.



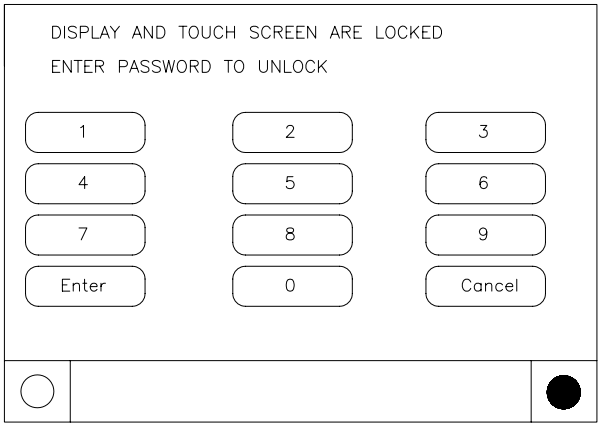
The setpoint screen for setting up the CH530 time with a 12 hour format is shown below: The user must select Hour, or Minute and then use the up/down arrows to adjust. Adjusting hours will also adjust am/pm.



Lockout Screen

The DynaView Display and Touch Screen Lock screen is shown. This screen is used if the Display and Touch Screen Lock feature is Enabled. Thirty minutes after the last key stroke this screen will be displayed and the Display and Touch Screen will be locked out until “159 Enter” is entered.

Until the proper password is entered there will be no access to the DynaView screens including all reports, all setpoints, and Auto/Stop/Alarms/Interlocks. The password “159” is not programmable from either DynaView or TechView.

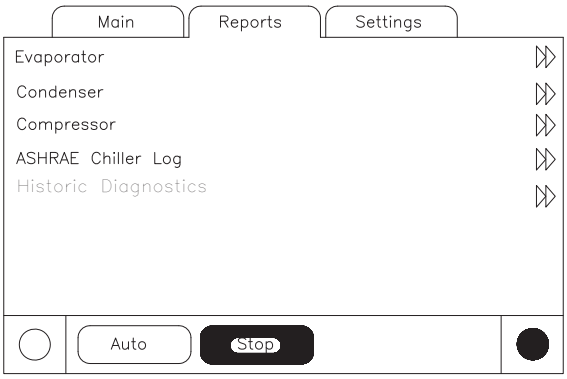


If the Display and Touch Screen Lock feature is Disabled, a similar screen including “Enter 159 to Unlock” will show if the MP temperature is approximately less than 32°F (0°C) and it has been 30 minutes after the last key stroke. Note: the main processor is equipped with an on-board temp sensor which enables the ice protection feature (OAT is not required).

Freezing rain can form on the touch panel and actuate the touch screen as the rain freezes on its surface. A specific pattern of key presses will avoid this issue.

Reports

The Reports tab will allow a user to select from a list of possible reports headings (i.e. Custom, ASHRAE Guideline 3, Refrigerant, etc.) Each report will generate a list of status items as defined in the tables that follow:



Historic Diagnostics are also included in this menu.

Table 49. Report name: System Evaporator

Description	Resolution	Units
Evap Entering Water Temp:	+ or - XXX.X	Temperature
Evap Leaving Water Temp:	+ or - XXX.X	Temperature
Evap Pump Inverter 1 Run Cmd:	On, Off	Enumeration
Evap Pump 1 Command:	On, Off	Enumeration
Evap Pump 2 Command:	On, Off	Enumeration
Evap Water Flow Switch Status:	Flow, No Flow	Enumeration

Table 50. Report name: Circuit Evaporator

Description	Resolution	Units
Suction Pressure	XXX.X	Pressure
Suction Saturated Rfgt Temp:	+ or - XXX.X	Temperature
Suction Temperature:	+ or - XXX.X	Temperature
Evap Approach Temp:	+ or - XXX.X	Temperature
EXV Position Status:	XXX.X	Percent
Heating EXV Position Status:	XXX.X	Percent

Table 51. Report name: System Condenser

Description	Resolution	Units
Outdoor Air Temperature:	+ or - XXX.X	Temperature
Heat Rcvy Entering Water Temp:	+ or - XXX.X	Temperature
Heat Rcvy Leaving Water Temp:	+ or - XXX.X	Temperature

Table 52. Report name: Circuit Condenser

Description	Resolution	Units
Discharge Pressure:	XXX.X	Pressure
Discharge Saturated Rfgt Temp:	+ or - XXX.X	Temperature
Discharge Temperature:	+ or - XXX.X	Temperature
Cond Approach Temp:	+ or - XXX.X	Temperature
Current Air Flow:	XXX.X	Percent

Table 53. Report name: System Compressor

Description	Resolution	Units
Chiller Running Time:	XXXX:XX	hr:min

Table 54. Report name: Circuit Compressor

Description	Resolution	Units
Compressor A Starts:	XXXX	Integer
Compressor A Running Time:	XXXX:XX	hr:min

Table 54. Report name: Circuit Compressor

Description	Resolution	Units
Compressor B Starts:	XXXX	Integer
Compressor B Running Time:	XXXX:XX	hr:min
Compressor C Starts:	XXXX	Integer
Compressor C Running Time:	XXXX:XX	hr:min

Table 55. Report name: System ASHRAE Chiller Log

Description	Resolution	Units
Current Time/Date:	XX:XX mmm dd, yyyy	Date / Time
Chiller Mode:		Enum
Active Chilled Water Setpoint:	XXX.X	Temperature
Active Hot Water Setpoint:	XXX.X	Temperature
Evap Entering Water Temp:	XXX.X	Temperature
Evap Leaving Water Temp:	XXX.X	Temperature
Evap Water Flow Switch Status:		Enum
Outdoor Air Temperature:	XXX.X	Temperature
Active Demand Limit Setpoint:	XXX	Percent

Table 56. Report name: Circuit ASHRAE Chiller Log

Description	Resolution	Units
Circuit Mode:		Enum
Suction Pressure:	XXX.X	Pressure
Suction Saturated Rfgt Temp:	XXX.X	Temperature
Evap Approach Temp:	XXX.X	Temperature
Discharge Pressure:	XXX.X	Pressure
Discharge Saturated Rfgt Temp:	XXX.X	Temperature
Cond Approach Temp:	XXX.X	Temperature
Compressor A Starts:	XXXX	Integer
Compressor A Running Time:	XX:XX	Hours: Minute
Compressor B Starts:	XXXX	Integer
Compressor B Running Time:	XX:XX	Hours: Minute
Compressor C Starts:	XXXX	Integer
Compressor C Running Time:	XX:XX	Hours: Minute

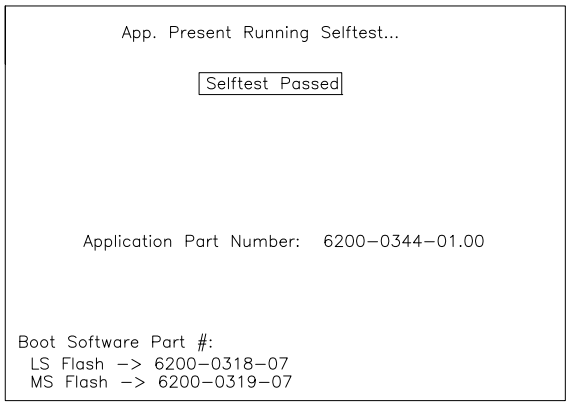
Power Up and Self Tests

Power-Up DynaView

On Power-Up DynaView will progress through three screens:

First Screen, Application Status, Boot Software P/N, Self Test and Application Time Stamp.

This screen will display for 3-10 seconds. This screen will give the status of the Application software, the Boot Software P/N, display Self Test results and display the Application Part Number (CGAM 6200-0450-01). The contrast will also be adjustable from this screen. The message “Selftest Passed” may be replaced with “Err2: RAM Error” or “Err3: CRC Failure”



Display Formats

Temperature settings can be expressed in F or C, depending on Display Units settings.

Pressure settings can be expressed in psia, psig, kPaa (kPa absolute), or kPag (kPa gauge) depending on Display Units settings.

Dashes (“-----”) appearing in a temperature or pressure report, indicates that the value is invalid or not applicable.

Languages

The languages for DynaView will reside in the main processor. The main processor will hold three languages, English, and two alternate languages. The service tool (TechView) will load the main processor with user selected languages from a list of available translations.

TechView

TechView is the PC (laptop) based tool used for servicing Tracer CH530. Technicians that make any chiller control modification or service any diagnostic with Tracer CH530 must use a laptop running the software application "TechView." TechView is a Trane application developed to minimize chiller downtime and aid the technicians understanding of chiller operation and service requirements.

Note: *Important: Performing any Tracer CH530 service functions should be done only by a properly trained service technician. Please contact your local Trane service agency for assistance with any service requirements.*

TechView software is available via Trane.com.

(http://www.trane.com/Commercial/DesignAnalysis/TechView.aspx)

This download site provides a user the TechView installation software and CH530 main processor software that must be loaded onto your PC in order to service a CH530 main processor. The TechView service tool is used to load software into the Tracer CH530 main processor.

Minimum PC requirements to install and operate TechView

- Microsoft Windows XP Professional, Windows Vista Business or Windows 7 Enterprise operating system
- Internet Explorer 6.0 or higher

- USB 2.0 or higher
- Pentium II, III or higher processor
- 128Mb RAM minimum for TechView, 1G recommended for total Windows system
- 1024 x 768 resolution of display
- CD-ROM (optional for copying TechView install to CD)
- 56K modem (optional for internet connection)
- 9-pin RS-232 serial connection (optional for connection to DynaView)

Note: *TechView was designed for the preceding listed laptop configuration. Any variation will have unknown results. Therefore, support for TechView is limited to only those operating systems that meet the specific configuration listed here. Only computers with a Pentium II class processor or better are supported; Intel Celeron, AMD, or Cyrix processors have not been tested.*

TechView is also used to perform any CH530 service or maintenance function. Servicing a CH530 main processor includes:

- Updating main processor software
- Monitoring chiller operation
- Viewing and resetting chiller diagnostics
- Low Level Intelligent Device (LLID) replacement and binding
- Main processor replacement and configuration modifications
- Setpoint modifications
- Service overrides

Software Download

Instructions for First Time TechView Users

This information can also be found at http://www.trane.com/Commercial/DesignAnalysis/TechView.aspx.

1. Create a folder titled CH530 (C:\CH530) on your hard drive. This \CH530 folder is the standard location for the installation file. Storing the installation file in this location helps you remember where it is stored and makes it easier for technical support personnel to assist you.
2. Click the **Download** link for the latest version on the TechView Software Download page. The File Download - Security Warning dialog box appears.
3. Click **Save** to copy the installation file to your hard drive. Specify the \CH530 folder you created in Step 1 on the Save dialog box.
4. Double-click the installation (.exe) file. The License Agreement dialog box appears.
5. Click **I Agree** after reviewing the License Agreement. The Choose Componenets dialog box appears. All components are selected by default. (These are the actual MP versions for all units.) Deselect any components you do not want included in the installation.

Note: *Deselecting components reduces the size of the installed application.*

6. Click **Install**. The installation dialog appears with a progress meter indicating the percentage of the installation that has occurred. An installation information file appears when the installation is complete.
7. Click **Close** to exit the installation routine.

Unit View

Unit view is a summary for the system organized by chiller subsystem. This provides an overall view of chiller operating parameters and gives you an “at-a-glance” assessment of chiller operation.

The Control Panel tab displays important operating information for the unit and allows you to change several key operating parameters. The panel is divided into four or more sub-panels (depending on the number of circuits in the unit).

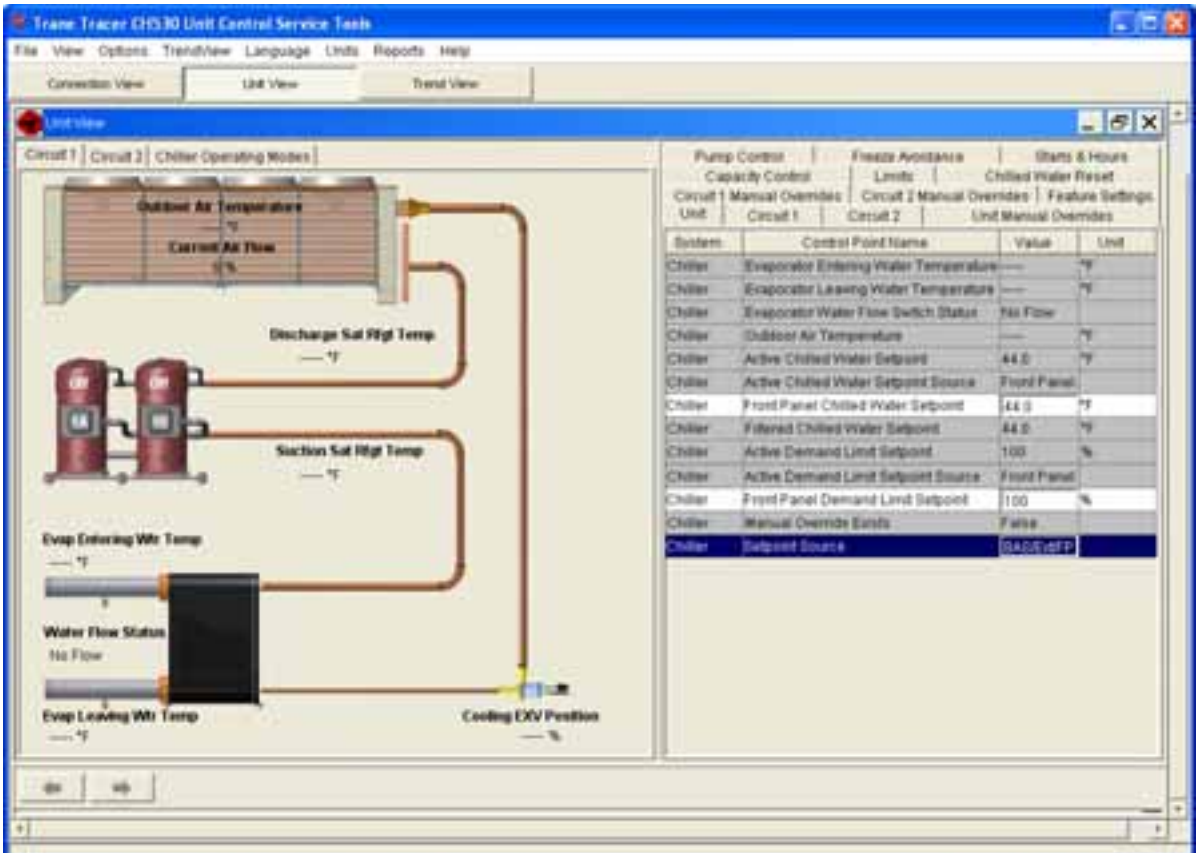
The Operating Mode tab displays the unit, circuit and compressor top level operating modes.

The Hours and Starts tab displays the number a hours (total) a compressor has run and the number of times the compressor has started. This window plays a key role in evaluating maintenance requirements.

Upon successful Local Connect TechView will display UNIT VIEW.

CGAM Unit View is shown below:

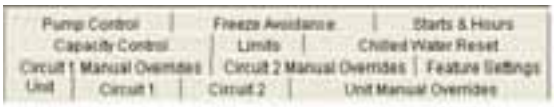
Figure 81. Unit View



The Unit View displays the system, control point name, value and unit of measure. It reflects active setpoints and allows you to make changes.

Unit View also displays, in real time, all non-setpoint data organized by tabs. As data changes on the chiller it is automatically updated in the Unit View.

Figure 82. Unit View Tabs



Circuit/Compressor Lockout

In order to lock out a circuit the user must go to the Unit View/Circuit 1 Manual Overrides Tab and then select the Front Panel Lockout for circuit 1 and/or circuit 2. It is also possible to lockout individual compressors from the same Circuit 1 Manual Overrides Tab in this view.

Table 57. Unit View Tabs - Detail

Tab	Item Type	Units	Min Value	Max Value	Default Value
Unit Tab					
Evaporator Entering Water Temperature	Status	Temp (°C)			
Evaporator Leaving Water Temperature	Status	Temp (°C)			
Evaporator Water Flow Switch Status	Status	Flow/No Flow			
Outdoor Air Temperature	Status	Temp (°C)			
Active Chilled Water Setpoint	Status	Temp (°C)			
Active Chilled Water Setpoint Source	Status	BAS/External/Front Panel/Auxiliary/ Schedule			
Front Panel Chilled Water Setpoint	Setting	Temp °C (°F)	Capacity Control Chilled Water Setpoint	20°C (68°F)	6.7°C (44°F)
BAS Chilled Water Setpoint	Status	Temp (°C)			
Local Schedule Chilled Water Setpoint	Status	Temp (°C)			
External Chilled Water Setpoint	Status	Temp (°C)			
Auxiliary Chilled Water Setpoint	Status	Temp (°C)			
Filtered Chilled Water Setpoint	Status	Temp (°C)			
Active Demand Limit Setpoint	Status	%			
Active Demand Limit Setpoint Source	Status	BAS/External/Front Panel/Auxiliary/ Schedule			
Front Panel Demand Limit Setpoint	Setting	%	Smallest Capacity Step	100	100
BAS Demand Limit Setpoint	Status	%			
Local Schedule Demand Limit Setpoint	Status	%			
External Demand Limit Setpoint	Status	%			
Active Ice Building Command	Status	Off /On			
Front Panel Ice Building Command	Setting	Auto	No Request	Ice Building Request	No Request
Active Ice Termination Setpoint	Status	Temp (°C)			
Front Panel Ice Termination Setpoint	Setting	Temp °C (°F)	-6.67°C (20°F)	0°C (32°F)	-2.78°C (27°F)
Manual Override Exists	Status	False/True			

Table 57. Unit View Tabs - Detail

Tab	Item Type	Units	Min Value	Max Value	Default Value
Setpoint Source	Setting	BAS/Ext/FP			
Circuit 1 Tab					
Suction Pressure	Status	Pressure (kPa)			
Discharge Pressure	Status	Pressure (kPa)			
Suction Saturated Refrigerant Temperature	Status	Temp (°C)			
Suction Temperature	Status	Temp (°C)			
Discharge Saturated Refrigerant Temperature	Status	Temp (°C)			
Discharge Temperature	Status	Temp (°C)			
Condenser Approach Temperature	Status	Temp (°C)			
Evaporator Approach Temperature	Status	Temp (°C)			
EXV Position Status (%)	Status	%			
Circuit 2 Tab					
Suction Pressure	Status	Pressure (kPa)			
Discharge Pressure	Status	Pressure (kPa)			
Suction Saturated Refrigerant Temperature	Status	Temp (°C)			
Suction Temperature	Status	Temp (°C)			
Suction Superheat	Status	Delta Temp (°C)			
Discharge Saturated Refrigerant Temperature	Status	Temp (°C)			
Discharge Temperature	Status	Temp (°C)			
Condenser Approach Temp	Status	Temp (°C)			
Evaporator Approach Temp	Status	Temp (°C)			
EXV Position Status (%)	Status	%			
Unit Manual Overrides Tab					
Manual Capacity Control	Setting	Auto/Manual			
Manual Capacity Control Command	Setting	Unload/Hold/Load			
Clear Restart Inhibit	Setting				
Maximum Restart Inhibit Time Remaining	Status	Time (Seconds to MM:SS)			
Manual Evaporator Pump Control	Setting	Auto/On			
Manual Evaporator Pump Override Time	Status	Time (Seconds to MM:SS)			
Circuit 1 Manual Overrides Tab					
Front Panel Lockout	Setting	Not Locked/Locked			
Compressor A Lockout	Setting	Not Locked/Locked			
Compressor B Lockout	Setting	Not Locked/Locked			
Compressor C Lockout	Setting	Not Locked/Locked			
Manual EXV Control	Setting	Auto/Manual			
Manual EXV Control Percent	Setting	%			
Compressor 1A Pumpdown Command	Setting	Abort			
Compressor 1A Pumpdown Status	Status	Available/Not Available/ In Progress/Inhibited			
Compressor 1B Pumpdown Command	Setting	Abort/Start			
Compressor 1B Pumpdown Status	Status	Available/Not Available/ In Progress/Inhibited			
Compressor 1C Pumpdown Command	Setting	Abort/Start			

Table 57. Unit View Tabs - Detail

Tab	Item Type	Units	Min Value	Max Value	Default Value
Compressor 1C Pumpdown Status	Status	Available/Not Available/ In Progress/Inhibited			
Suction Pressure	Status	Pressure (kPa)			
Circuit 2 Manual Overrides Tab					
Front Panel Lockout	Setting	Not Locked/Locked	Auto	Stop	Auto
Compressor A Lockout	Setting	Not Locked/Locked	Auto	Stop	Auto
Compressor B Lockout	Setting	Not Locked/Locked	Auto	Stop	Auto
Compressor C Lockout	Setting	Not Locked/Locked	Auto	Stop	Auto
Manual EXV Control	Setting	Auto/Manual			
Manual EXV Control Percent	Setting	%			
Compressor 2A Pumpdown Command	Setting	Abort/Start			
Compressor 2A Pumpdown Status	Status	Available/Not Available/ In Progress/Inhibited			
Compressor 2B Pumpdown Command	Setting	Abort/Start			
Compressor 2B Pumpdown Status	Status	Available/Not Available/ In Progress/Inhibited			
Compressor 2C Pumpdown Command	Setting	Abort/Start			
Compressor 2C Pumpdown Status	Status	Available/Not Available/ In Progress/Inhibited			
Suction Pressure	Status	Pressure (kPa)			
Feature Settings Tab					
Local Atmospheric Pressure	Setting	Pressure (kPa)	68.9 kPa	110.3 kPa	101.4 kPa
Power-Up Start Delay	Setting	Time (Seconds)	0	600	0
Operational Pumpdown Temperature Setpoint	Setting	Temp °C (°F)	-26°C (-14.8°F)	-10°C (14°F)	-17.78°C (0°F)
External Chilled Water Setpoint	Setting	Disable/Enable			Disabled
External Demand Limit Setpoint	Setting	Disable/Enable			Disabled
Limit Annunciation Debounce Time	Setting	Time (Seconds)	0s	3600s	1200s
Maximum Capacity Annunciation Debounce Time	Setting	Time (Seconds)	0s	3600s	1200s
Ice Building Feature	Setting	Disable/Enable			Disabled
EXV Recalibration Time	Setting	Time (Seconds)	?	?	
Capacity Control Tab					
Cooling Design Delta Temperature	Setting	Delta Temp °C (°F)	1°C (33.8°F)	12°C (53.6°F)	5.56°C (42°F)
Differential To Start	Setting	Delta Temp °C (°F)	1°C (33.8°F)	6°C (42.8°F)	2.78°C (37°F)
Differential To Stop	Setting	Delta Temp °C (°F)	1°C (33.8°F)	7°C (44.6°F)	2.78°C(37°F)
Staging Deadband Adjustment	Setting	Delta Temp °C (°F)	-1°C (30.2°F)	5°C (41°F)	0°C (32°F)
Circuit Staging Option	Setting	Balance Strts-Hrs/ Circuit 1 Lead/ Circuit 2 Lead			Balance Starts Hours
Compressor Staging Option	Setting	Fixed Sequence/ Balanced Strts-Hrs			Fixed Sequence
Compressor Start Delay Time	Setting	Time (Seconds)	0 s	600 s	60 s
Capacity Control Softload Time	Setting	Time (Seconds)	0 s	3600 s	900 s
Limits Tab					
Cooling Low Ambient Lockout	Setting	Disable/Enable			Enabled
Cooling Low Ambient Lockout Setpoint	Setting	Temp °C (°F)	-20°C (-4°F)	20°C (68°F)	-10°C (14°F)
Discharge Pressure Limit Setpoint	Setting	%	80%	120%	85%

Table 57. Unit View Tabs - Detail

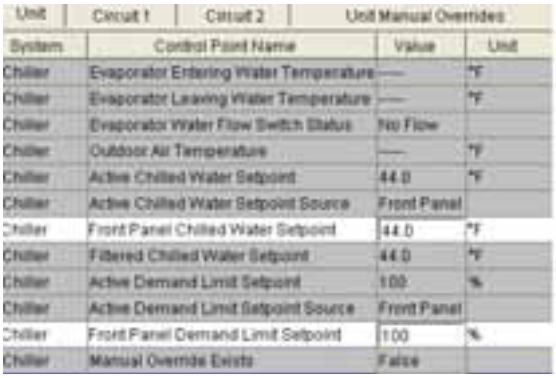
Tab	Item Type	Units	Min Value	Max Value	Default Value
Discharge Pressure Limit Unload Setpoint	Setting	%	90%	120%	97%
Restart Inhibit Free Starts	Setting	Starts			2
Restart Inhibit Start To Start Time	Setting	Time (Minutes)			6 min
Chilled Water Reset Tab					
Chilled Water Reset Type	Setting	Disable/Return/Outdoor Air/Constant			
Return Reset Ratio	Setting	%	10%	120%	50%
Return Start Reset	Setting	Delta Temp °C (°F)	2.22°C (36°F)	16.67°C (62°F)	5.55°C (42°F)
Return Maximum Reset	Setting	Delta Temp °C (°F)	0°C (32°F)	11.11°C (52°F)	2.78°C (37°F)
Outdoor Reset Ratio	Setting	%	-80%	80%	10%
Outdoor Start Reset	Setting	Temp °C (°F)	10°C (50°F)	54.44°C (130°F)	32.22°C (90°F)
Outdoor Maximum Reset	Setting	Delta Temp °C (°F)	0°C (32°F)	11.11°C (52°F)	2.78°C (37°F)
Cooling Design Delta Temperature	Setting	Delta Temp °C (°F)	1°C (33.8°F)	12°C (53.6°F)	5.56°C (42°F)
Pump Control Tab					
Evaporator Water Flow Switch Status	Status	No Flow/Flow			
Evap Pump Inverter 1 Run Command	Status	Off/On			
Evaporator Pump 1 Command	Status	Off/On			
Evaporator Pump 2 Command	Status	Off/On			
Evap Pump Off Delay	Setting	Time (Minutes)	0 min	30 min	1 min
Evap Flow Overdue Wait Time	Setting	Time (Seconds)	300 s	3600 s	1200 s
High Evaporator Water Temp Setpoint	Setting	Temp °C (°F)			55°C
Freeze Avoidance Tab					
Leaving Water Temp Cutout	Setting	Temp °C (°F)	-18.33°C (-1°F)	2.22°C (36°F)	2.22°C (36°F)
Low Refrigerant Temperature Cutout	Setting	Temp °C (°F)	-28.33°C (-19°F)	2.22°C (36°F)	-5.56°C (22°F)
Evaporator Pump Freeze Avoidance	Setting	Disable/Enable			Enabled
Evap Pump Freeze Avoidance Adaptive Learning	Setting	Fixed/Adaptive			Enabled
Evap Pump Freeze Avoidance Time Constant	Setting	Time (minutes)	2 min	360 min	10 min
Evap Pump Freeze Avoidance Temp Margin	Setting	Delta Temp °C (°F)	0°C (32°F)	5°C (41°F)	2°C (35.6°F)
Starts and Hours Tab					
Chiller Running Time	Status	Time (Sec to HH:MM)			
Compressor 1A Starts	Status	Starts			
Compressor 1A Running Time	Status	Time (Sec to HH:MM)			
Compressor 1B Starts	Status	Starts			
Compressor 1B Running Time	Status	Time (Sec to HH:MM)			
Compressor 1C Starts	Status	Starts			
Compressor 1C Running Time	Status	Time (Sec to HH:MM)			
Compressor 2A Starts	Status	Starts			
Compressor 2A Running Time	Status	Time (Sec to HH:MM)			
Compressor 2B Starts	Status	Starts			
Compressor 2B Running Time	Status	Time (Sec to HH:MM)			
Compressor 2C Starts	Status	Starts			
Compressor 2C Running Time	Status	Time (Sec to HH:MM)			
Evaporator Water Pump 1 Starts	Status	Starts			
Evaporator Water Pump 1 Running Time	Status	Time (Sec to HH:MM)			

Table 57. Unit View Tabs - Detail

Tab	Item Type	Units	Min Value	Max Value	Default Value
Evaporator Water Pump 1 Starts	Status	Starts			
Evaporator Water Pump 1 Running Time	Status	Time (Sec to HH:MM)			
Heat Recovery Tab					
Partial heat recovery (PHR) Fan Control	Setting	Disable/Enable			
PHR Leaving Water Temperature Setpoint	Setting	Temp (°C)			
PHR Leaving Water Temperature Adjustment	Setting	Delta Temp (°C)			
Generic Monitoring Tab					
Generic Temp Sensor	Status	Temp (°C)			
Generic Pressure Sensor	Status	Pressure (kPa)			
Generic Analog Monitor	Status	Current (mA)			
Generic Low Volt Monitor	Setting	Open/Closed			
Generic High Volt Monitor	Setting	Off/On			

The items that can be modified show up in white. The items that cannot be modified show up in gray.

Figure 83. Fields in White



To change the setpoint enter a new value for the setpoint into the text field.

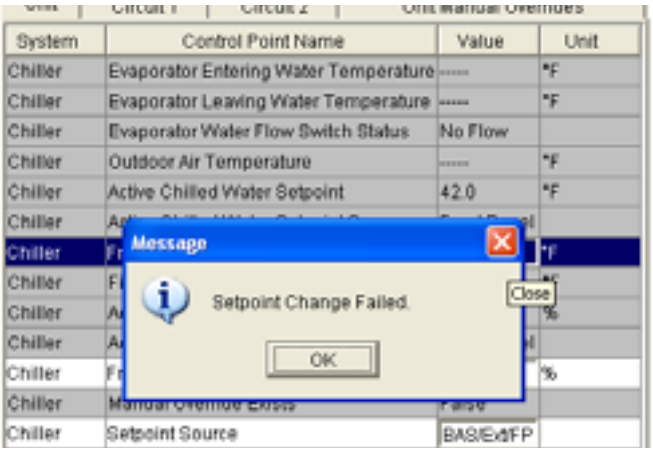
Figure 84. Change Setpoint

If the entered value is outside the given range, the background turns red.

Figure 85. Change Out of Range

If the value entered is not valid, an error message will display and the change will not occur.

Figure 86. Setpoint Change Failed



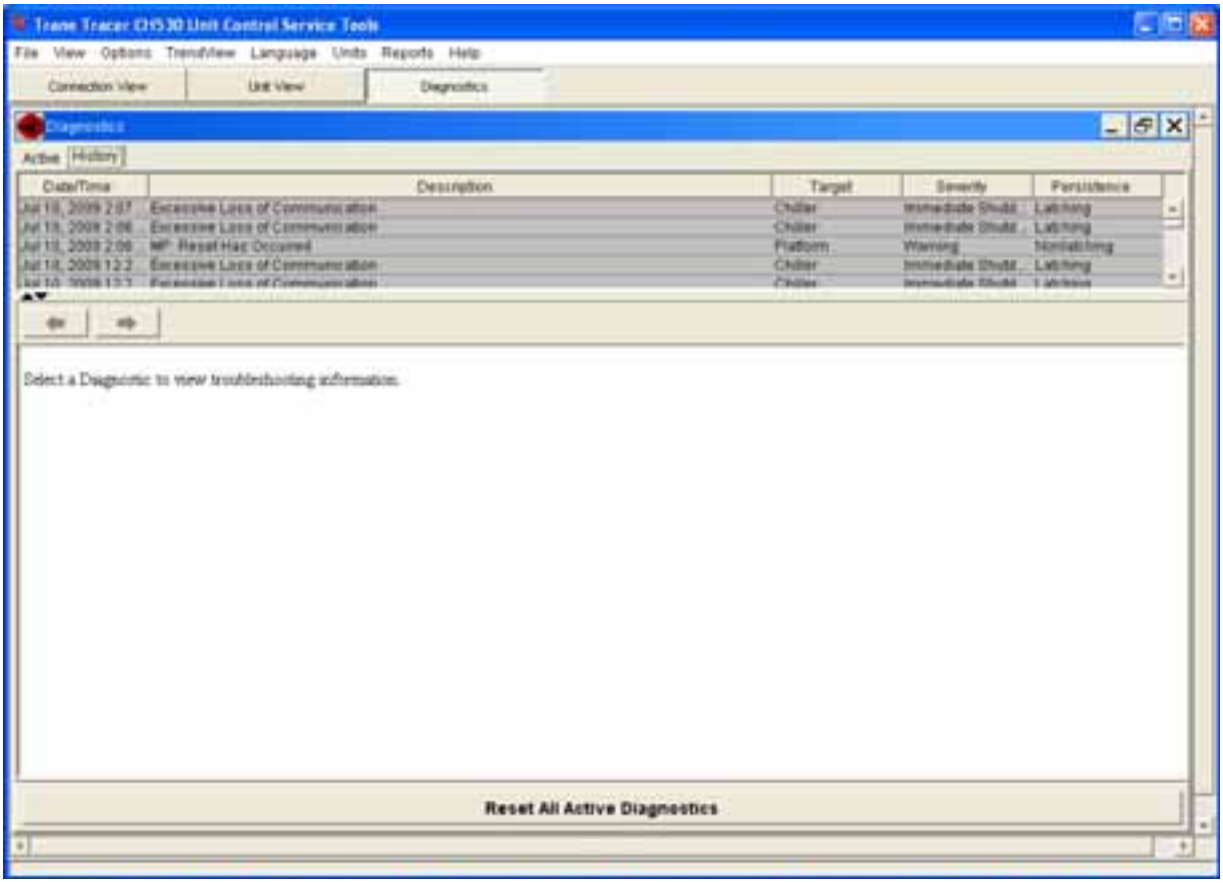
Diagnostics View

This window lists the active and inactive (history) diagnostics. There can be up to 60 diagnostics, both active and historic. For example, if there were 5 active diagnostics, the possible number of historic diagnostics would be 55. You can also reset active diagnostics here, (i.e., transfer active diagnostics to history and allow the chiller to regenerate any active diagnostics).

Resetting the active diagnostics may cause the chiller to resume operation.

The Active and History diagnostics have separate tabs. A button to reset the active diagnostics displays when either tab is selected.

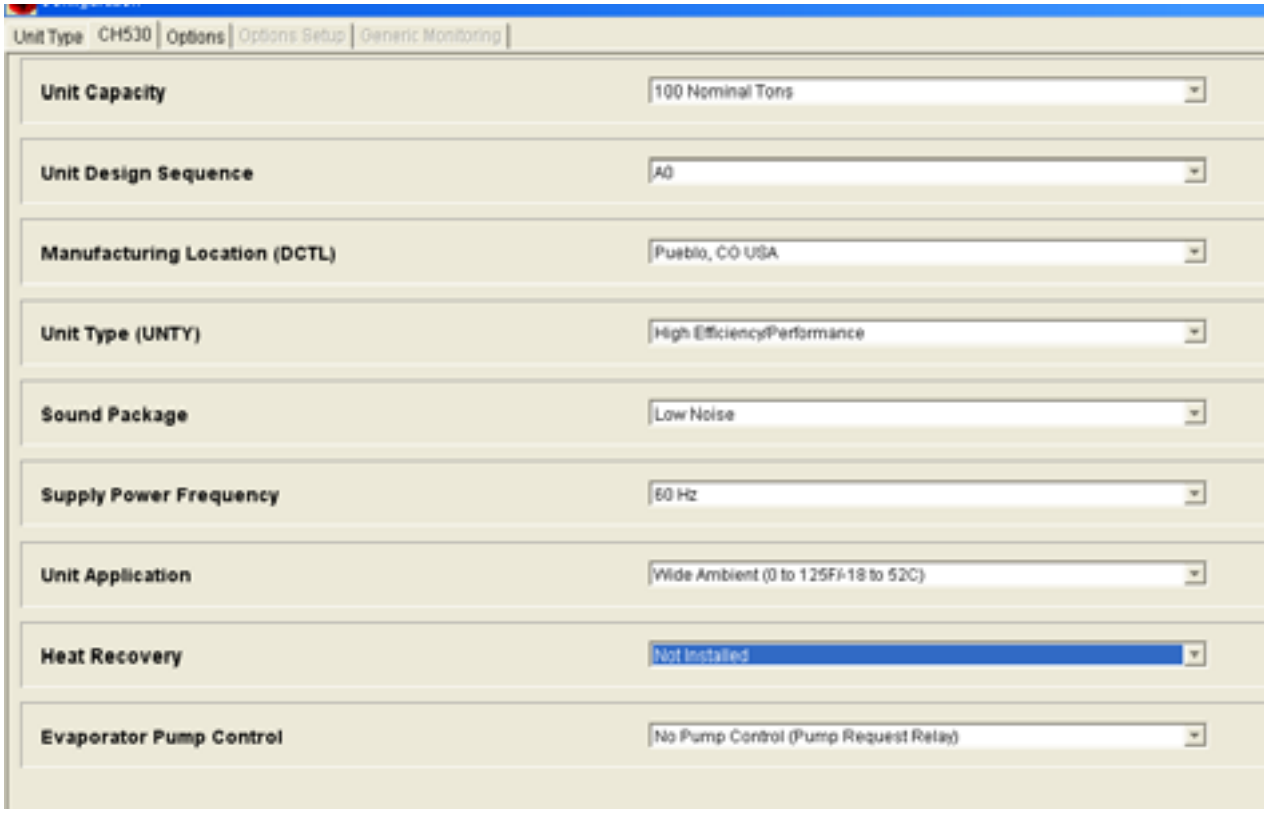
Figure 87. Diagnostic View



Configuration View

This view is under the CH530 tab and displays the active configuration and allows you to make changes to the unit configuration.

Figure 88. Configuration View - CH530 Tab



Configuration View allows you to define the chiller's components, ratings, and configuration settings. These are all values that determine the required installed devices, and how the chiller application is run in the main processor. For example, a user may set an option to be installed with Configuration View, which will require devices to be bound using Binding View. And when the main processor runs the chiller application, the appropriate steps are taken to monitor required inputs and control necessary outputs.

Any changes made in the Configuration View, on any of the tabs, will modify the chiller configuration when you click on the Load Configuration button (located at the base of the window). The Load Configuration button uploads the new configuration settings into the main processor.

Selecting the Undo All button will undo any configuration setting changes made during the present TechView connection and since the last time the Load Configuration button was selected.

Table 58. Configuration View Items - CH530 Tab

Item	Description
Basic Product Line	CGAM - Air-Cooled Scroll Packaged Chiller CXAM - Air-Cooled Scroll Heat Pump (TAI, EPL only)
Unit Capacity	020 Nominal Tons 023 Nominal Tons (TAI, EPL only) 026 Nominal Tons 030 Nominal Tons 035 Nominal Tons 039 Nominal Tons (EPL only) 040 Nominal Tons 045 Nominal Tons (EPL only) 046 Nominal Tons (TAI, EPL only) 052 Nominal Tons 060 Nominal Tons 070 Nominal Tons 080 Nominal Tons 090 Nominal Tons 100 Nominal Tons 110 Nominal Tons 120 Nominal Tons
Unit Design Sequence	Factory Assigned
Manufacturing Location	Epinal, France Pueblo, USA Taicang, China Curitiba, Brazil
Unit Type	Standard Efficiency/Performance (EPL only) High Efficiency/Performance
Sound Package	High Duty (EPL and TAI only) Standard Noise Low Noise
Supply Power Frequency	60 Hz 50 Hz
Unit Application	Standard Ambient (EPL and TAI only) Low Ambient (EPL and TAI only) High Ambient (EPL and TAI only) Wide Ambient
Heat Recovery	No Heat Recovery Partial Heat Recovery w/ Fan Control Partial Heat Recovery w/o Fan Control (EPL and TAI only)
Evaporator Pump Control	No Pump Flow Control Single Pump Fixed Speed (TAI, EPL only) Single Pump Variable Speed (TAI, EPL only) Dual Pump Fixed Speed (TAI, EPL only) Dual Pump Variable Speed

A couple of additional tabs in Configuration View allow you to change other unit configuration options using the Options tab and the Options Setup tab. The features that are installed on the Options Tab will control what is displayed on the Options Setup tab.

Figure 89. Configuration View - Options Tab

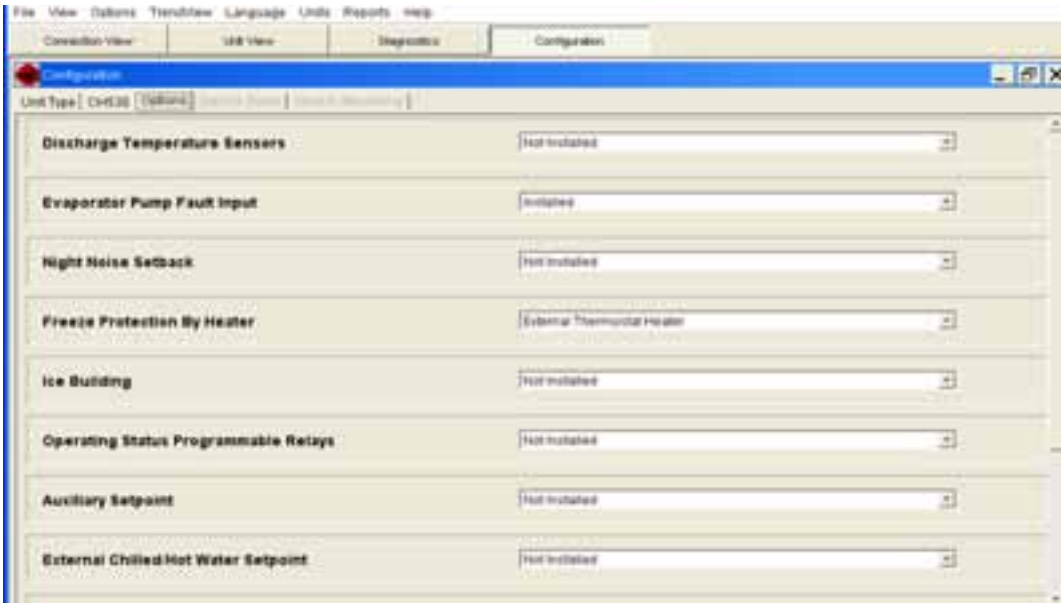
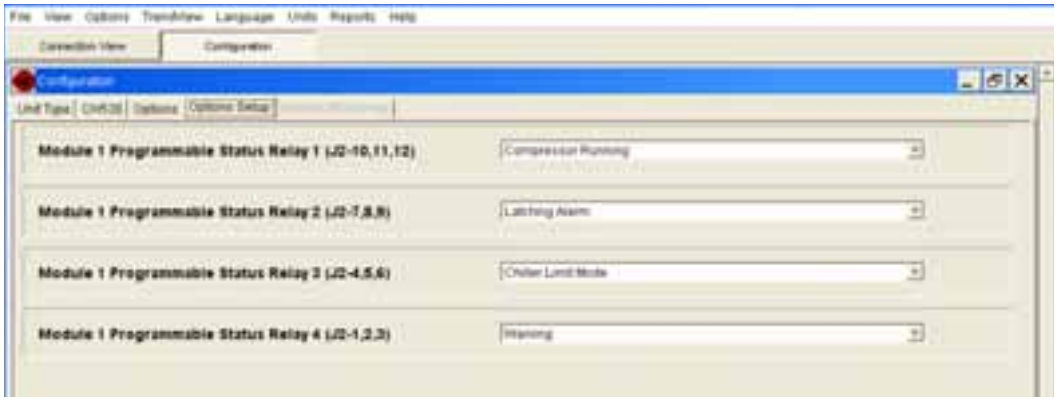


Figure 90. Configuration View - Options Setup Tab

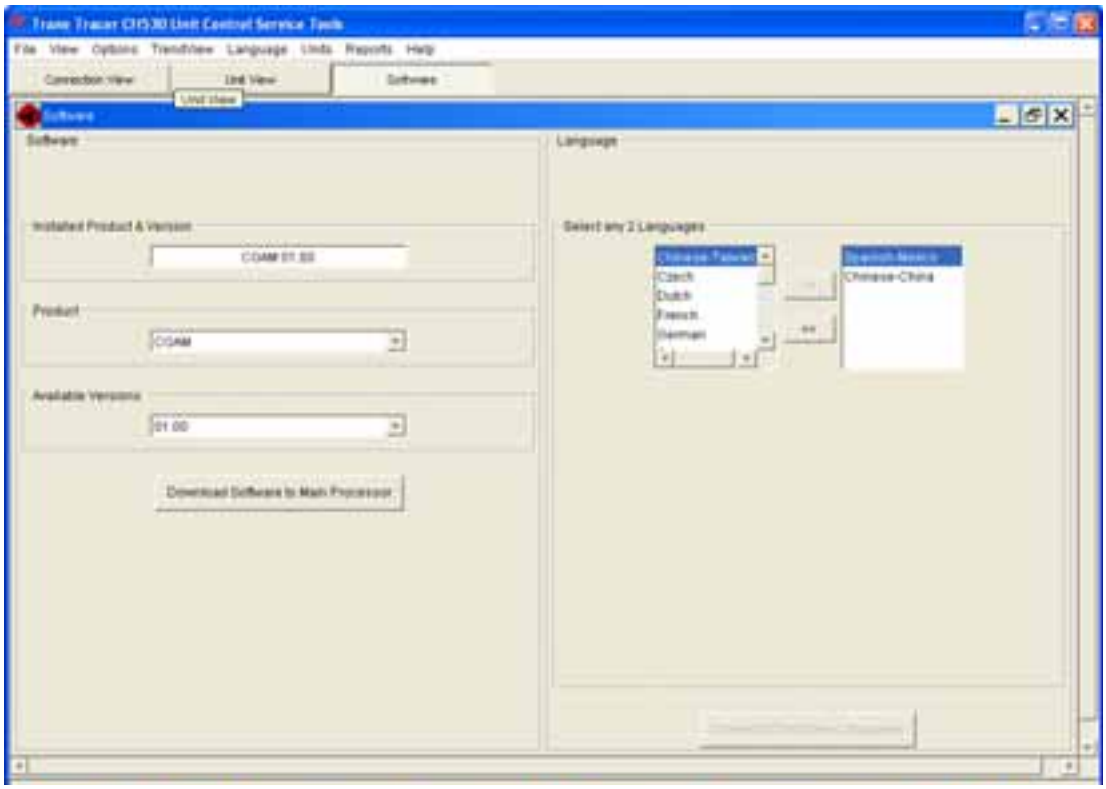


Software View

Software view allows you to verify the version of chiller software currently running on the EasyView or DynaView and download a new version of chiller software to the EasyView or DynaView.

You can also add up to two available languages to load into the DynaView. Loading an alternate language file allows the DynaView to display its text in the selected alternate language, English will always be available.

Figure 91. Software View



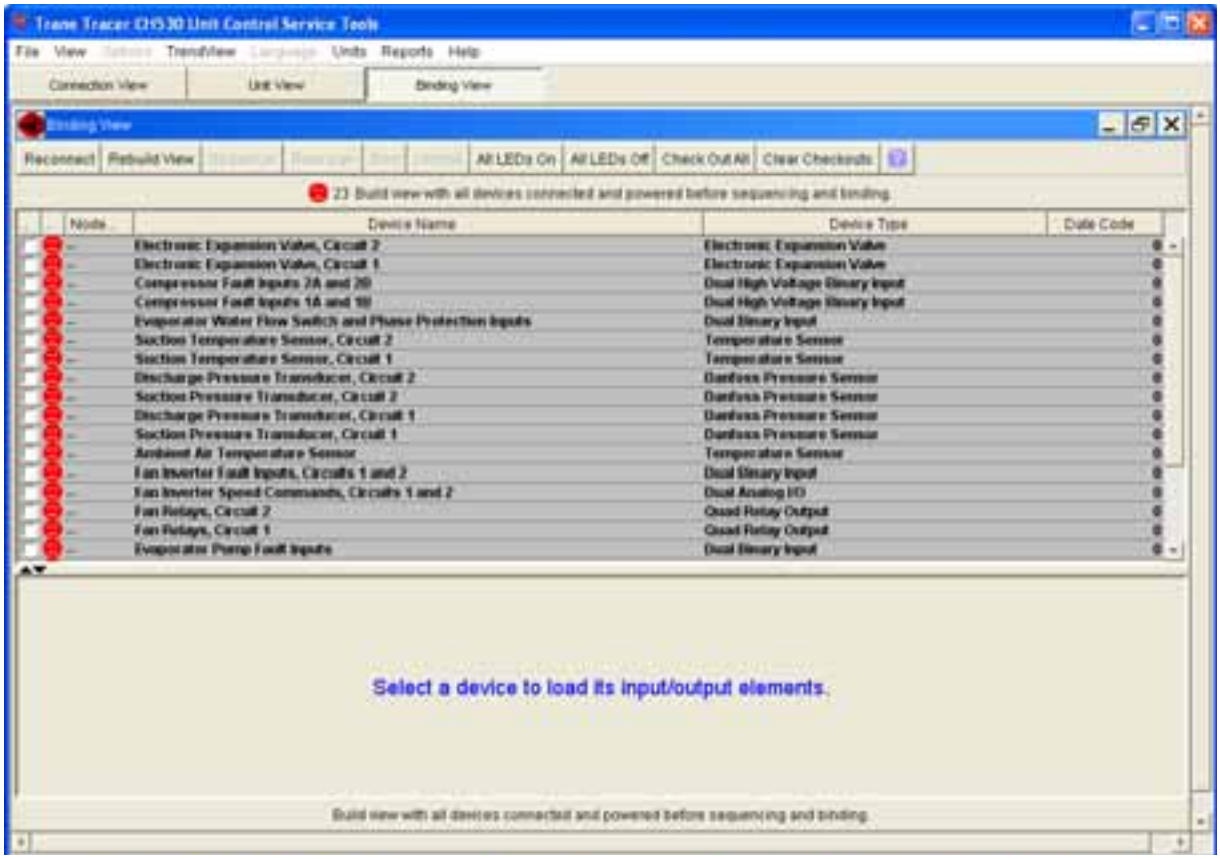
Binding View

Binding View allows you to assess the status of the network and all the devices connected as a whole, or the status of individual devices by using status icons and function buttons.

Binding View is essentially a table depicting what devices and options are actually discovered on the network bus (and their communication status) versus what is required to support the configuration defined by the feature codes and categories. Binding View allows you to add, remove, modify, verify, and reassign devices and options in order to match the configuration requirements.

Whenever a device is installed, it must be correctly configured to communicate and to function as intended. This process is called binding. Some features of Binding View are intended to serve a second purpose; that is diagnosing problems with communication among the devices.

Figure 92. Binding View



Replacing or Adding Devices

If a device is communicating but incorrectly configured, it might not be necessary to replace it. If the problem with the device is related to communication, attempt to rebind it, and if the device becomes correctly configured, it will then communicate properly.

If a device that needs to be replaced is still communicating, it should be unbound. Otherwise, it will be necessary to rebuild the CH530 network image for Binding View to discover that it has been removed. An unbound device stops communicating and allows a new device to be bound in its place.

It is good practice to turn the power off while detaching and attaching devices to the CH530 network. Be sure to keep power on the service tool computer. After power is restored to the CH530 network, the reconnect function in Binding View restores communication with the network. If the service tool computer is turned off, you must restart TechView and Binding View.

If a device is not communicating, the binding function displays a window to request manual selection of the device to be bound. Previously-selected devices are deselected when the function starts. When manual selection is confirmed, exactly one device must be selected; if it is the correct type, it is bound. If the desired device cannot be selected or if multiple devices are accidentally selected, you can close the manual selection window by clicking on No and repeat the bind function.

Pre-Start Checkout

When installation is complete, but prior to putting the unit into service, the following pre-start procedures must be reviewed and verified correct:

⚠ WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injuryInspect all wiring connections to be sure they are clean and tight.

- Verify that all refrigerant valves are “OPEN”

⚠ CAUTION
Compressor Damage!

Do not operate the unit with the compressor, oil discharge, liquid line service valves and the manual shutoff on the refrigerant supply to the auxiliary coolers “CLOSED”. Failure to “OPEN” all valves may cause serious compressor damage.

- Check the power supply voltage to the unit at the main power fused-disconnect switch. Voltage must be within the voltage utilization range stamped on the unit nameplate. Voltage imbalance must not exceed 2 percent. See “Unit Voltage Imbalance,” p. 143.
- Check the unit power phasing to be sure that it has been installed in an “ABC” sequence. See “Unit Voltage Phasing,” p. 143.

⚠ WARNING
Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

- Verify that the compressor oil sump heaters are installed tightly around the compressor. Energize and verify heaters are operational using a temperature probe. See Table 59, p. 141.

Table 59. Compressor oil sump heater summary[(a)]

Heater Group	Heater Description	Heater Designation(s)
Compressor Oil Sump	Compr 1A, Ckt 1	3M1E1
	Compr 1B, Ckt 1	3M2E1
	Compr 1C, Ckt 1	3M3E1
	Compr 2A, Ckt 2	4M1E1
	Compr 2B, Ckt 2	4M2E1
	Compr 2C, Ckt 2	4M3E1

(a) Not all heaters are present on all unit configurations. See schematics and component locations in section“Unit Wiring,” p. 183.

- Verify that the VSD blanket and optional pump VSD heaters are operational. See Table 60, p. 142. Install jumper across thermostat and verify each heater is functioning. See section “Unit Wiring,” p. 183 for component locations.

Table 60. Operational heater summary

Heater Group	Thermostat Designation	Jumper Terminals	Heater Description	Heater Designation(s)
VSD Blanket	1S2	1X4-1 to 1X4-25	Blanket, 1A36	1E1, 1E2
			Blanket, 1A37	1E3
Pump VSD Enclosure (optional)	5S4	5X4-1 to Wire 632	Pump VSD Enclosure	5E9

- Fill the evaporator chilled water circuit. Vent the system while it is being filled. Open the vents on the top of the evaporator during filling and close when filling is completed.

⚠ CAUTION
Proper Water Treatment!

The use of untreated or improperly treated water may result in scaling, erosion, corrosion, algae or slime. It is recommended that the services of a qualified water treatment specialist be engaged to determine what water treatment, if any, is required. Trane assumes no responsibility for equipment failures which result from untreated or improperly treated water, or saline or brackish water.

- Close the fused-disconnect switch(es) that supplies power to the chilled water pump starter.

⚠WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

- Start the chilled water pump to begin circulation of the water. Inspect all piping for leakage and make any necessary repairs.
- With water circulating through the system, adjust water flow and check water pressure drop through the evaporator.
- Prove all Interlock and Interconnecting Wiring Interlock and External.
- Check and set, as required, all CH530 Menu Items.
- Stop the chilled water pump.

Unit Voltage Power Supply

⚠WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Voltage to the unit must meet the criteria given. Measure each leg of the supply voltage at the unit's main power fused-disconnect. If the measured voltage on any leg is not within specified range, notify the supplier of the power and correct the situation before operating the unit.

NOTICE:

Equipment Damage!

Inadequate voltage to the unit may cause control components to malfunction and shorten the life of relay contact, compressor motors and contactors.

Unit Voltage Imbalance

Excessive voltage imbalance between the phases of a three-phase system can cause motors to overheat and eventually fail. The maximum allowable imbalance is 2 percent. Voltage imbalance is determined using the following calculations:

$$\% \text{ Imbalance} = \frac{(l_x - l_{ave}) \times 100}{l_{ave}}$$

$$V_{ave} = \frac{(V_1 + V_2 + V_3)}{3}$$

$^{L}V_X$ = phase with greatest difference from V_{ave} (without regard to sign)

For example, if the three measured voltages are 221, 230, and 227 volts, the average would be:

$$\frac{221 + 230 + 227}{3} = 226$$

The percentage of imbalance is then:

$$\frac{100(221 - 226)}{226} = 2.2\%$$

This exceeds the maximum allowable (2%) by 0.2 percent.

Unit Voltage Phasing

It is important that proper rotation of the compressors be established before the unit is started. Proper motor rotation requires confirmation of the electrical phase sequence of the power supply. The motor is internally connected for clockwise rotation with the incoming power supply phased A, B, C.

Basically, voltages generated in each phase of a polyphase alternator or circuit are called phase voltages. In a three-phase circuit, three sine wave voltages are generated, differing in phase by 120 electrical degrees. The order in which the three voltages of a three-phase system succeed one another is called phase sequence or phase rotation. This is determined by the direction of rotation of the alternator. When rotation is clockwise, phase sequence is usually called "ABC", when counterclockwise, "CBA".

This direction may be reversed outside the alternator by interchanging any two of the line wires. It is this possible interchange of wiring that makes a phase sequence indicator necessary if the operator is to quickly determine the phase rotation of the motor.

Proper compressor motor electrical phasing can be quickly determined and corrected before starting the unit. Use a quality instrument, such as the Associated Research Model 45 Phase Sequence Indicator.

8. Press the Stop key on the Clear Language Display.
9. Open the electrical disconnect or circuit protection switch that provides line power to the line power terminal block(s) in the starter panel (or to the unitmounted disconnect).
10. Connect the phase sequence indicator leads to the line power terminal block, as follows:

Phase Sea. Lead	**Terminal**
Black (Phase A)	L1
Red (Phase B)	L2
Yellow (Phase C)	L3

11. Turn power on by closing the unit supply power fused-disconnect switch.
12. Read the phase sequence on the indicator. The "ABC" LED on the face of the phase indicator will glow if phase is "ABC".
13. If the "CBA" indicator glows instead, open the unit main power disconnect and switch two line leads on the line power terminal block(s) (or the unit mounted disconnect). Reclose the main power disconnect and recheck the phasing.

⚠ CAUTION
Equipment Damage!

Do not interchange any load leads that are from the unit contactors or the motor terminals.

14. Reopen the unit disconnect and disconnect the phase indicator.

⚠ WARNING
Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

Water System

Flow Rates

NOTICE:

Equipment Failure!

Establish a balanced chilled water flow through the evaporator. The flow rates should fall between theminimum and maximum values. Flow rates outside the recommended range could cause evaporator failure.

Establish a balanced chilled water flow through the evaporator. The flow rates should fall between the minimum and maximum values. Chilled water flow rates below the minimum values will result in laminar flow, which reduces heat transfer and causes either loss of EXV control or repeated nuisance, low temperature cutouts. Flow rates that are too high can cause tube erosion.

Pressure Drop

Measure water pressure drop through the evaporator at the field-installed pressure taps on the system water piping. Use the same gauge for each measurement. Measure flow at the field-installed supply and return. This will include valves, strainers, and fittings in the pressure drop readings.

Pressure drop readings should be approximately those shown in the Pressure Drop Charts in the Installation-Mechanical section.

Start Up Checklist

Figure 93. Start Up Checklist

CGAM Mandatory Start Up Checklist		
*******This checklist is not intended to be a substitution for the contractors installation instruction.* *This checklist is intended to be a guide for the Trane technician just prior to unit 'start-up'. Many of the recommended checks and actions could expose the technician to electrical and mechanical hazards.* *Refer to the appropriate sections in the unit manual for appropriate procedures, component specifications and safety instructions.***		
Job Name	***Serial #***	
Job Location	***Model #***	
Sales Order #	***Ship Date***	
Unit DL # (special units)	***Date***	
Starting Sales Office	***Technician***	
Except where noted; it is implied that the technician is to use this checklist for inspection / verification of prior task completed by the general contractor at installation. *Use the line item content to also record the associated values onto the Trane unitary packaged equipment log.*		*Complete*
1.) Unit clearances adequate for service and to avoid air recirculation etc.		☐
2.) Unit exterior inspected		☐
3.) Compressor oil sump heaters connected tightly a n d working properly for **24 hours** prior to arrival of Trane technician performing start up		☐
4.) Correct voltage supplied to unit and electric heaters (imbalance not to exceed 2%)		☐
5.) Unit power phasing (A-B-C sequence) proper for compressor rotation and pump rotation.		☐
6.) Copper power wiring meets sizing requirement in job submittal		☐
7.) Unit properly grounded		☐
8.) All automation and remote controls installed/wired		☐
9.) All wiring connections tight		☐
10.) Prove chilled water side Interlock and Interconnecting Wiring Interlock and externals (chilled water pump)		☐
11.) Field installed control wiring landed on correct terminals (external start/stop, emergency stop, chilled water reset…)		☐
12.) Verify all refrigerant and oil valves are open/back seated		☐
13.) Pump Package (if installed)		
a.) Pump shaft able to rotate freely		☐
b.) Full of working fluid		☐
c.) Shutoff valve in open position.Flush line valves in open position.		☐
d.) Automatic air bleed functioning properly		☐
e.) Relief valve functioning properly		☐

14.) Compressor oil levels (1/2 -3/4 high in glass) proper	☐
15.) Verify chilled water strainer is clean and free of debris and evaporator chilled water circuits are filled	☐
16.) Close the fused-disconnect switch(es) that supplies power to the chilled water pump starter	☐
17.) Start the chilled water pump to begin circulation of the water. Inspect piping for leaks and repair as necessary	☐
18.) With water circulating through the system, adjust water flow and check water pressure drop through evaporator	☐
19.) Adjust the chilled water flow switch for proper operation	☐
20.) Return chilled water pump to auto	☐
21.) Verify all CH530 Menu Items on DynaView and KestrelView	☐
22.) Fan amperages within nameplate specs	☐
23.) All panels/doors secured prior to start-up	☐
24.) All coil fins inspected and straightened	☐
25.) Rotate fans before starting unit to inspect for potential audible and visual signs of rubbing	☐
Start unit	☐
26.) Press AUTO key. The unit will start if the chiller control calls for cooling and the safety interlocks are closed	☐
27.) Check the EXV sight glasses after sufficient time has elapsed allowing entering and leaving water to stabilize	☐
28.) Check the evaporator and the condenser refrigerant pressure under Refrigerant Report on CH530 TechView	☐
29.) Confirm Superheat and subcooling values are normal	☐
30.) Compressor operation normal and within amperage rating	☐
31.) Operating log completed	☐
32.) Press stop key	☐
33.) Inspect fans again after being under load to ensure no signs or rubbing exist	☐
34.) Verify the chilled water pump runs for at least 1 minute after the chiller is commanded to stop (for normal chilled water systems)	☐
Comments:	
****For content inquires contact Trane Tech Services*	

Unit Start-Up Procedures

Sequence of Operation

Power Up

The Power up chart shows the respective DynaView screens during a power up of the main processor. This process takes from 30 to 45 seconds depending on the number of installed Options. On all power ups, the software model will always transition through the 'Stopped' Software state independent of the last mode. If the last mode before power down was 'Auto', the transition from 'Stopped' to 'Starting' occurs, but it is not apparent to the user.

Figure 94. Power Up

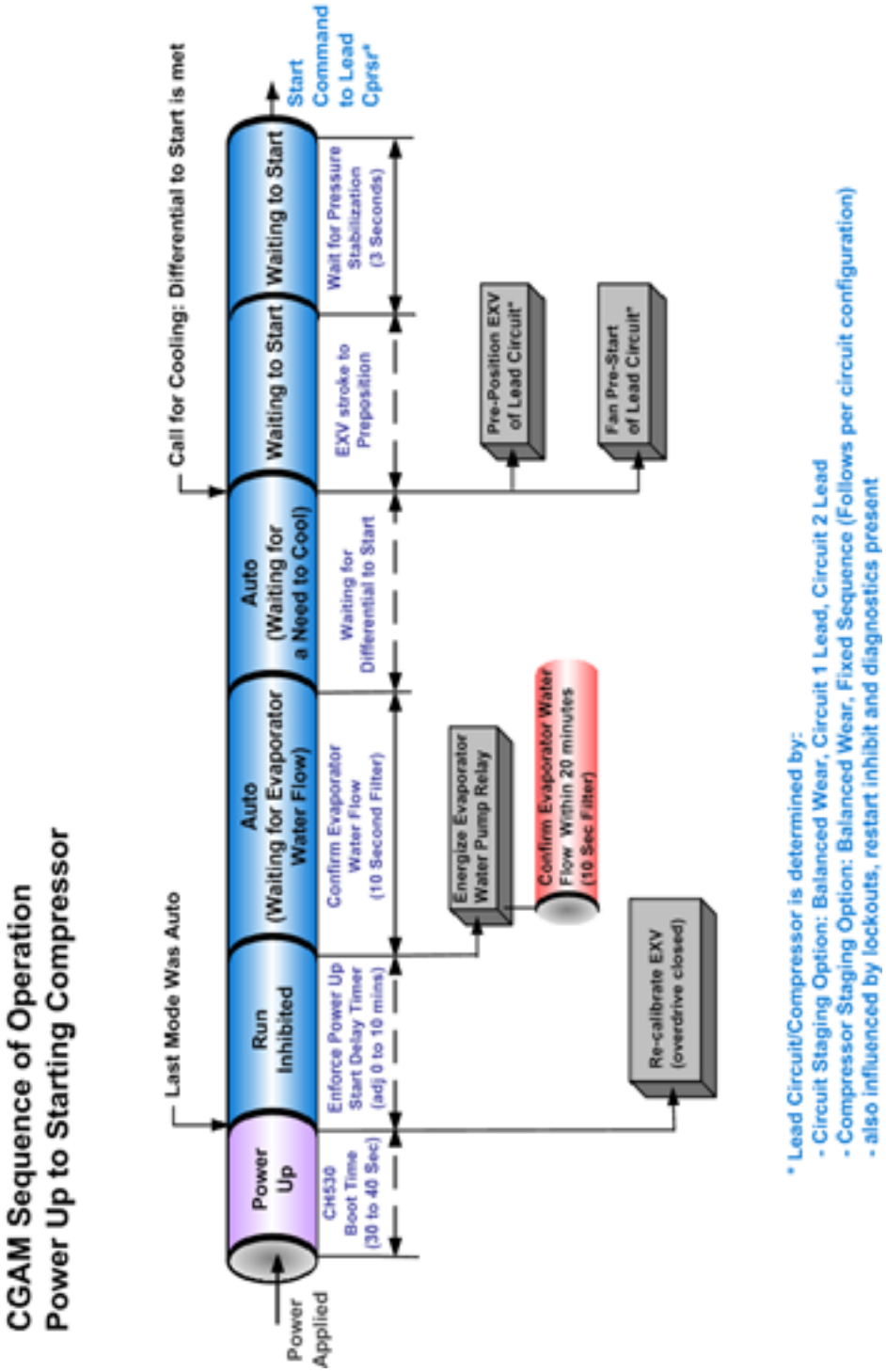
Power Up to Starting

The Power up to starting diagram shows the timing from a power up event to energizing the compressor. The shortest allowable time would be under the following conditions:

15. No motor restart inhibit
16. Evaporator Water flowing
17. Power up Start Delay setpoint set to 0 minutes
18. Adjustable Stop to Start Timer set to 5 seconds
19. Need to cool

The above conditions would allow for a minimum power up to starting compressor time of 95 seconds.

Figure 95. Power Up to Starting



Stopped to Starting:

The stopped to starting diagram shows the timing from a stopped mode to energizing the compressor. The shortest allowable time would be under the following conditions:

20. No motor restart inhibit
21. Evaporator Water flowing
22. Power up Start Delay Timer has expired
23. Adjustable Stop to Start Timer has expired
24. Need to cool

The above conditions would allow the compressor to start in 60 seconds.

⚠ CAUTION
Refrigerant!

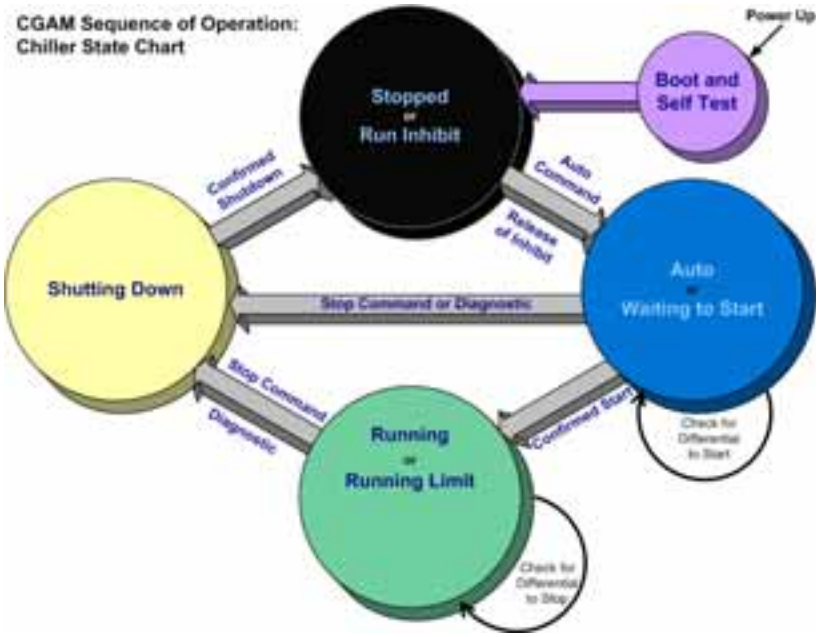
If both suction and discharge pressures are low but sub-cooling is normal, a problem other than refrigerant shortage exists. Do not add refrigerant, as this may result in overcharging the circuit.

Use only refrigerant specified on the unit nameplate (R-410A) and OIL00080 (1 gallon). Failure to do so may cause compressor damage and improper unit operation.

⚠ CAUTION
Equipment Damage!

Ensure that the oil sump heaters have been operating for a minimum of 24 hours before starting. Failure to do so may result in equipment damage.

Figure 96. Chiller State Chart



Start-Up

⚠ CAUTION
Equipment Damage!

Ensure that the oil sump heaters are connected properly and are operating properly for a minimum of 24 hours before starting. Failure to do so may result in equipment damage.

If the pre-start checkout, has been completed, the unit is ready to start.

1. Press the STOP key on the CH530.
2. As necessary, adjust the setpoint values in the CH530 menus using TechView.
3. Close the fused-disconnect switch for the chilled water pump. Energize the pump(s) to start water circulation.
4. Check the service valves on the discharge line, suction line, oil line and liquid line for each circuit. These valves must be open (backseated) before starting the compressors.

⚠ CAUTION
Compressor Damage!

Catastrophic damage to the compressor will occur if the oil line shut off valve or the isolation valves are left closed on unit start-up.

5. Press the AUTO key. If the chiller control calls for cooling and all safety interlocks are closed, the unit will start. The compressor(s) will load and unload in response to the leaving chilled water temperature.
6. Verify that the chilled water pump runs for at least one minute after the chiller is commanded to stop (for normal chilled water systems).

Note: *Once the system has been operating for approximately 30 minutes and has become stabilized, complete the remaining start-up procedures, as follows:*

7. Check the evaporator refrigerant pressure and the condenser refrigerant pressure under Refrigerant Report on the CH530 TechView.

Note: *The pressures are referenced to sea level (14.6960 psia). This value is adjustable in TechView.*

8. Check the EXV sight glasses after sufficient time has elapsed to stabilize the chiller. The refrigerant flow past the sight glasses should be clear. Bubbles in the refrigerant indicate either low refrigerant charge or excessive pressure drop in the liquid line or a stuck open expansion valve. A restriction in the line can sometimes be identified by a noticeable temperature differential between the two sides of the restriction. Frost will often form on the line at this point. Proper refrigerant charges are shown in the General Data tables.

Note: *Important! A clear sight glass alone does not mean that the system is properly charged. Also check system subcooling, liquid level control and unit operating pressures.*

9. Measure the system subcooling.
10. A shortage of refrigerant is indicated if operating pressures are low and subcooling is also low. If the operating pressures, sight glass, superheat and subcooling readings indicate a refrigerant shortage, gas-charge refrigerant into each circuit, as required. With the unit running, add refrigerant liquid charge slowly thought the suction line service valve until operating conditions become normal.

Print out a Chiller Service Report from TechView to file a start-up claim and to keep for reference with the chiller.

Seasonal Unit Start-Up Procedure

1. Close all valves and re-install the drain plugs in the evaporator heads.
2. Service the auxiliary equipment according to the start-up/maintenance instructions provided by the respective equipment manufacturers.
3. At this point, all air must be removed from the system (including each pass). Close the vents in the evaporator chilled water circuits.
4. Open all the valves in the evaporator chilled water circuits.
5. If the evaporator was previously drained, vent and fill the evaporator and chilled water circuit. When all air is removed from the system (including each pass), install the vent plugs in the evaporator water boxes.

⚠ CAUTION
Equipment Damage!

Ensure that the oil sump heaters have been operating for a minimum of 24 hours before starting. Failure to do so may result in equipment damage.

⚠ CAUTION
Compressor Damage!

Catastrophic damage to the compressor will occur if the oil line shut off valve or the isolation valves are left closed on unit start-up.

Limit Conditions

CH530 will automatically limit certain operating parameters during startup and run modes to maintain optimum chiller performance and prevent nuisance diagnostic trips. These limit conditions are noted in Figure 61, p. 152.

Table 61. Limit Conditions

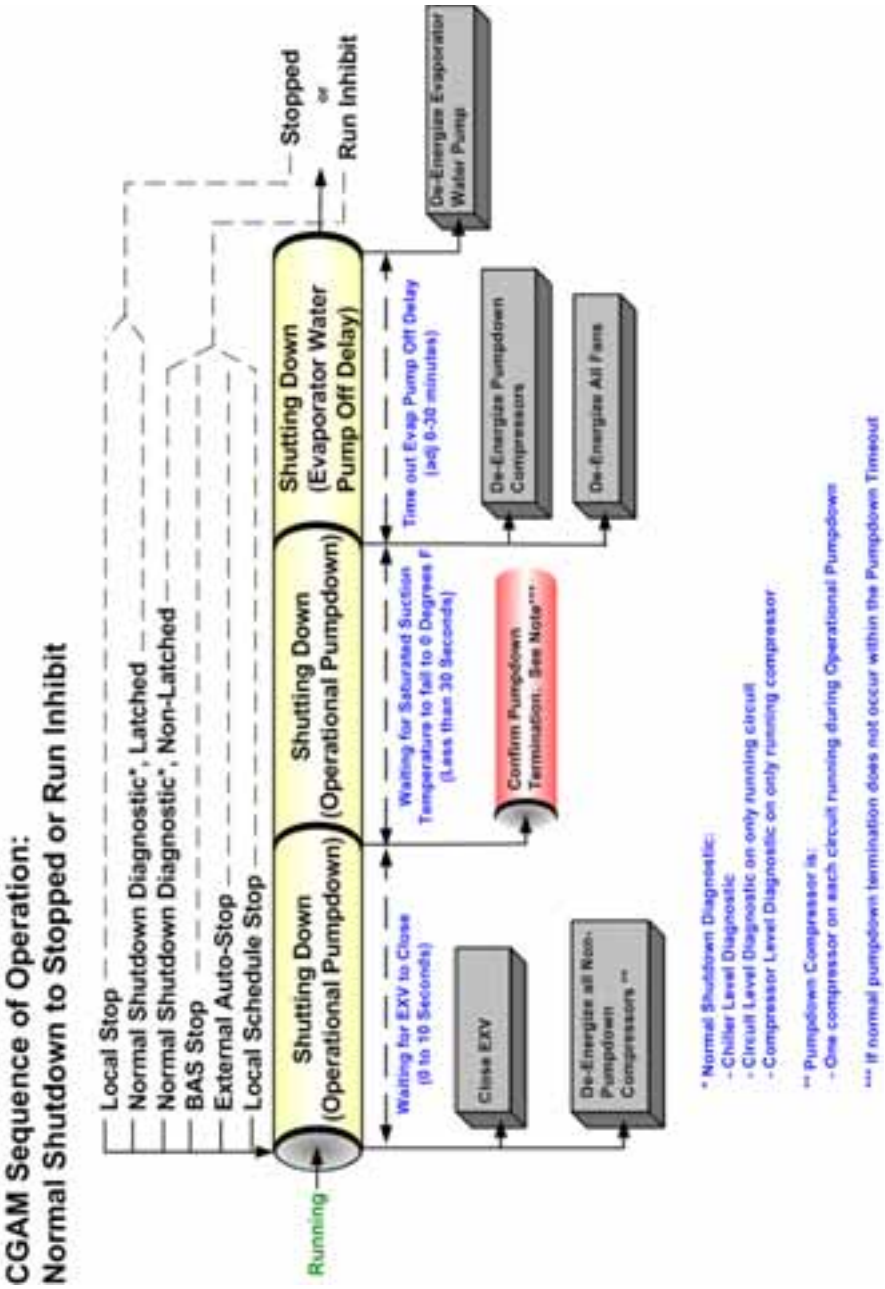
Running - Limited	The chiller, circuit, and compressor are currently running, but the operation of the chiller/compressor is being actively limited by the controls. Further information is provided by the sub-mode.
Capacity Limited by High Cond Press	The circuit is experiencing condenser pressures at or near the condenser limit setting. The compressor will be unloaded to prevent exceeding the limits.
Capacity Limited by Low Evap Rfgt Temp	The circuit is experiencing saturated evaporator temperatures at or near the Low Refrigerant Temperature Cutout setting. The compressors will be unloaded to prevent tripping.

Unit Shutdown

Normal Shutdown to Stopped

The Normal Shutdown diagram shows the Transition from Running through a Normal (friendly) Shutdown. The Dashed lines on the top attempt to show the final mode if you enter the stop via various inputs.

Figure 97. Normal Shutdown



Seasonal Unit Shutdown

1. Perform the normal unit stop sequence using the <Stop> key.

Note: *Do not open the starter disconnect switch. It must remain closed to provide power to the compressor oil sump heaters.*

2. Verify that the chilled water and pumps are cycled off. If desired, open the disconnect switches to the pumps.
3. Verify that the compressor oil sump heaters are installed tightly around the compressor. Energize and verify heaters are operational using a temperature probe. See Table 62, p. 154.

Table 62. Compressor oil sump heater summary[a]

Heater Group	Heater Description	Heater Designation(s)
Compressor Oil Sump	Compr 1A, Ckt 1	3M1E1
	Compr 1B, Ckt 1	3M2E1
	Compr 1C, Ckt 1	3M3E1
	Compr 2A, Ckt 2	4M1E1
	Compr 2B, Ckt 2	4M2E1
	Compr 2C, Ckt 2	4M3E1

(a) Not all heaters are present on all unit configurations. See schematics and component locations in section"Unit Wiring," p. 183.

4. Verify that the freeze protection heaters are operational. See Table 63, p. 154. Install jumper across thermostat and verify current flow. See section "Unit Wiring," p. 183 for component locations.

NOTICE:
Equipment Damage!

If the chiller evaporator or evaporator water piping is drained of water, the evaporator immersion heater must be de-energized. Failure to de-energize the heater will cause it to burn out.

Table 63. Freeze protection heater summary[a]

Heater Group	Thermostat Designation	Jumper Terminals	Heater Description	Heater Designation(s)
Evaporator and Water Pipe Heaters	5S1	5X1-2 to 5X1-3	Evaporator	5E1
			Evap Entering Water Piping	5E4, 5E18
			Evap Leaving Water Piping	5E5, 5E19
			Water Pump Piping	5E6, 5E14
			Partial Heat Recovery (optional)	5E10, 5E11, 5E16, 5E17
			Expansion Tank (included in pump package option)	5E7
Pump Package (optional)	5S2	5X2-1 to 5X2-2	Water Pump Piping	5E13, 5E15
Buffer Tank (optional)	5S3	Across thermostat	Buffer Tank	5E2, 5E8, 5E12, 5E13

(a) Not all heaters are present on all unit configurations. See schematics and component locations in section"Unit Wiring," p. 183.

Note: *See "Freeze Protection," p. 58 for more information on freeze protection requirements.*

5. Once the unit is secured, perform the maintenance identified in the following sections.

Maintenance

Periodic Maintenance

General

Perform all maintenance procedures and inspection at the recommended intervals. This will prolong the life of the chiller and minimize the possibility of malfunctions.

Use an "Operator's Log" to record the unit's operating history. The log serves as a valuable diagnostic tool for service personnel. By observing trends in operating conditions, an operator can anticipate and prevent problem situations before they occur.

If the unit is not operating properly during maintenance inspections, consult the "Diagnostic and Troubleshooting" section of this manual.

Weekly Maintenance

Verify that compressor oil sump heaters are connected tightly around the compressor.

After the chiller has been operating for approximately 30 minutes and the system has stabilized, check the operating pressures and temperatures and complete the following checks:

Check the evaporator and condenser refrigerant pressures in the Refrigerant Report menu of the CH530 display. Pressures are referenced at sea level (14.6960 psia).

Check the electronic expansion valve sight glasses. (Note: The electronic expansion valve is commanded closed at unit shutdown and if the unit is off, there will be no refrigerant flow through the sight glasses. Only when a circuit is running will refrigerant flow be present.) The refrigerant flow through the sight glasses should be clear. Bubbles in the refrigerant indicate either low refrigerant charge or excessive pressure drop in the liquid line. A restriction in the line can sometimes be identified by a noticeable temperature differential between the two sides of the restriction. Frost may often form on the liquid line at this point. Correct refrigerant charges are shown in the General Data Tables.

NOTICE:

A clear sight glass alone does not mean that the system is properly charged. Also check the system superheat, subcooling and unit operating pressures.

NOTICE:

Use only manifold gauge sets designed for use with R-410A refrigerant. Use only recovery units and cylinders designed for the higher pressure of R-410A refrigerant and POE oil.

NOTICE

Compressor Liquid Slugging!

Only add liquid in the suction line when the compressor is running. Use extreme caution to meter liquid refrigerant into the suction line slowly. If liquid is added too rapidly, compressor oil dilution and oil pumpout could occur. Failure to follow the above could result in compressor failure or reduced compressor life.

Check the system superheat, subcooling, evaporator temperature drop (Delta-T), evaporator water flow, evaporator approach temperature, compressor discharge superheat, condenser approach and compressor RLA.

Normal operating conditions at AHRI Conditions (55-44°, 95° ambient, .0001ffe) are:

- Evaporator Pressure: 120 psig
- Evaporator Approach: 5-10°F
- Evaporator Superheat: 12°F
- Electronic Expansion Valve: 40-50 percent open

- Evaporator Temperature Drop (Delta-T): 10°F
- Compressor Discharge Temperature: 63°F or more
- Compressor Suction Temperature: 20°F or more
- Condensing Pressure: 420-440 psig
- Condensing Approach Temperature: 25°F
- System Subcooling: 15-20°F
- Compressor RLA: 100 percent

If operating pressures and sight glass conditions seem to indicate a refrigerant shortage, measure the system superheat and subcooling. Refer to "System Superheat" and "System Subcooling."

If operating conditions indicate a refrigerant overcharge, remove refrigerant at the liquid line service valve. Allow refrigerant to escape slowly to minimize oil loss. Use a refrigerant recovery cylinder and do not discharge refrigerant into the atmosphere.

⚠CAUTION
Freezing Temperatures!

Do not allow liquid refrigerant to contact skin. If it does, treat the injury similar to frostbite. Slowly warm the affected area with lukewarm water and seek immediate medical attention. Direct contact with liquid refrigerant could cause minor or moderate injury.

Inspect the entire system for unusual conditions and inspect the condenser coils for dirt and debris. If the coils are dirty, refer to "Coil Cleaning" in this manual.

Monthly Maintenance

Complete all weekly maintenance procedures.

Measure and record the evaporator superheat. Refer to "Evaporator Superheat."

Measure and record the system subcooling. Refer to "System Subcooling."

Manually rotate the condenser fans to ensure that there is proper clearance on the fan shroud openings.

⚠WARNING
Rotating Components!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

Annual Maintenance

Complete all weekly and monthly maintenance checks.

Check the oil level and refrigerant charge. Routine changing of oil is not required.

Have a qualified laboratory perform a compressor oil analysis to determine system moisture content and acid level. This analysis is a valuable diagnostic tool.

Contact a qualified service provider to leak test the chiller, check operating and safety controls, and to inspect electrical components for proper operation. Leak testing my be accomplished using soap solution or with electronic or ultrasonic leak detectors.

Inspect all piping components for leaks and damage. Clean all water strainers.

NOTICE:

Equipment Damage!

If the CGAM chiller evaporator or evaporator water piping is drained of water, the evaporator immersion heater must be de-energized. Failure to de-energize the heater will cause it to burn out.

Clean and repaint any components that show corrosion.

Clean the condenser coils. Refer to "Coil Cleaning" in this manual.

⚠WARNING
Rotating Components!
Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury

Clean the condenser fans. Check the fan assemblies for proper clearance in the fan shroud openings and for motor shaft misalignment or abnormal end-play, vibration and noise.

Compressor Service Information

Compressor Electrical Connections

It is very important that CSHD compressors used in Trane Model CGAM chillers are wired correctly for proper rotation. These compressors will not tolerate reverse rotation. Verify correct rotation/ phasing using a rotation meter. Proper phasing is clockwise, A-B-C. If wired incorrectly a CSHD compressor will make excessive noise, will not pump and will draw about half the normal current. It will also become very hot if allowed to run for an extended period.

NOTICE:

Equipment Damage!

Do not "bump" the compressor to check rotation as incorrect rotation could cause compressor motor failure in as little as 4 to 5 seconds!

It is also very important that CSHN compressors used in Trane Model CGAM chillers are wired correctly for proper rotation. Correct rotation of CSHN compressors is also clockwise, with A-B-C phasing. Improper rotation of the CSHN compressors is indicated by a compressor module trip, noisy operation, no pressure difference on manifold gauges and low amp draw.

Motor Protection

Internal motor protection is provided on model CSHN compressors (15, 20, 25 and 30T sizes). LED indicators are as follows:

- Green — No Fault
- Red — Fault

See Table 64, p. 158 for fault diagnostic indications on the protection module. Manual reset is required at the module.

Table 64. Compressor fault indicators on protection module (CSHN compressors only)

Fault	LED on	LED off	LED on	LED off
PTC Overheat	40 ms	460 ms	40 ms	460 ms
PTC Reset Delay Active	80 ms	920 ms	80 ms	920 ms
Phase Loss	500 ms	500 ms	500 ms	500 ms
Wrong Phase Sequence	120 ms	120 ms	120 ms	120 ms

Note: *Internal motor protection is not available on CHSD compressors (10 and 13T sizes).*

Oil Level

Oil should also be visible in the sight glass when the compressor is running. When operating, each compressor in a tandem or trio set may have a different oil level.

To check compressor oil level, refer to the label near the compressor sight glass. The compressor(s) must be off. Wait three minutes. With tandem or triple compressors the oil level will equalize after shutdown. Compressor oil level should be clearly visible within the sight glass when the compressors are off.

Oil Fill, Removal and Capacity

The Model CSHN compressors have an oil charging valve with a dip tube that goes to the bottom of the compressor. This can be used to add or remove oil from the compressor.

Model CSHD compressors have a Schrader valve in the middle of the compressor which is used to add oil. To remove oil from these compressors, the system refrigerant charge must be removed and then the oil can be removed using a suction style hand pump and tube in the oil equalizer tube fitting. Oil can also be added to these compressors through the oil equalizer tube fitting. Care must be taken to prevent moisture from entering the system when adding oil.

Compressor Oil Capacity

CSHD 125, 161 — 7 Pints

CSHN 184 —14.2 Pints

CSHN 250 —15.2 Pints

CSHN 315 —16.2 Pints

CSHN 374 —17.2 Pints

Use only Trane OIL00080 (1 gallon). Do not use any other POE oil.

NOTICE:

Equipment Damage!

Never reuse oil.

Oil Testing

Use Trane Oil Testing Kit KIT06815 only for testing lubricating oil in the Model CGAM chiller. Note that the POE oil used in this product is very hygroscopic and easily absorbs and retains moisture. The acceptable moisture content is less than 100 ppm and acceptable acid level is less than 0.5 TAN. Note that refrigerant and moisture is very difficult to remove from this oil using vacuum. Also note that once the seal on a container of POE oil is opened, the oil must be used.

In the event of a compressor failure, always test the oil with an acid test kit to determine whether the compressor failure was mechanical or electrical. This is important because it dictates correct cleanup procedure.

Compressor Operational Pump Down

The operational pump down is used to manage the refrigerant charge and prevent liquid slugging into the compressors, oil dilution and oil starvation. The pump down will be completed by the last operating compressor in the refrigerant circuit and occurs during normal shutdown conditions. The electronic expansion valve will close.

The operational pump down sequence will end when:

- Saturated evaporator temperature drops below the operational pump down set point
- Compressor pressure differential exceeds 348 psid (Condensing Pressure - (Evaporator Pressure x 2.9)
- When the operational pump down time expires (60 x (100/circuit capacity %))
- An immediate shutdown diagnostic occurs
- A pressure transducer fails

Compressor Service Pump Down Procedure

The Service Pump down procedure is used to store the Model CGAM refrigerant in the condenser. The condenser is sized to hold the entire refrigerant charge.

Procedure:

- Select compressor to use for pump down.
- All chiller safeties remain in effect.
- Evaporator water flow must be proven
- Condenser fans operate normally
- Manually close refrigerant liquid line service valve

Note: *The service pumpdown algorithm expects the liquid line service valve to be closed during service pumpdown. The EXV will open, allowing the refrigerant between the liquid line service valve and EXV to be pumped out.*

Service pump down is complete when:

- Service pump down time expires (60 x (100/circuit capacity %))
- Saturated evaporator pressure falls below Low Pressure Cutout x1.15 for one second

After pump down terminates, the MP automatically puts circuit into lockout. Pump down can also be terminated by “Abort Pump down” in service tool, an immediate shutdown diagnostic occurs or a pressure transducer fails.

Oil Equalizer Line

CSHN Compressors

The oil equalizer line is equipped with a Rotolock fitting for easy removal. Torque values for tightening these fitting is 100 ft.-lbs, plus or minus 10 ft. lbs.

Drain the oil to a level below the oil equalizer tube fitting before removing the oil equalizer line. This must be done on both compressors. Use the oil drain valve on the compressor. If the oil is drained below the level of the oil level sight glass, it will be below the oil equalizer line level. Pressurize the low side of the compressor using nitrogen to help drain the oil. No more than 10 psig of pressure will be needed.

CSHD Compressors

CSHD compressors do not have an oil drain valve. Therefore, before removing the oil equalizer line, the system refrigerant charge must be recovered before draining the oil. Use a catch pan to catch the oil when the compressor oil equalizer line is loosened to ensure that oil does not spill out of

the compressor when the equalizer line is removed. The torque value for the Rotolock fitting on CSHD compressors is 64 ft.-lbs., plus or minus 2 ft.-lbs.

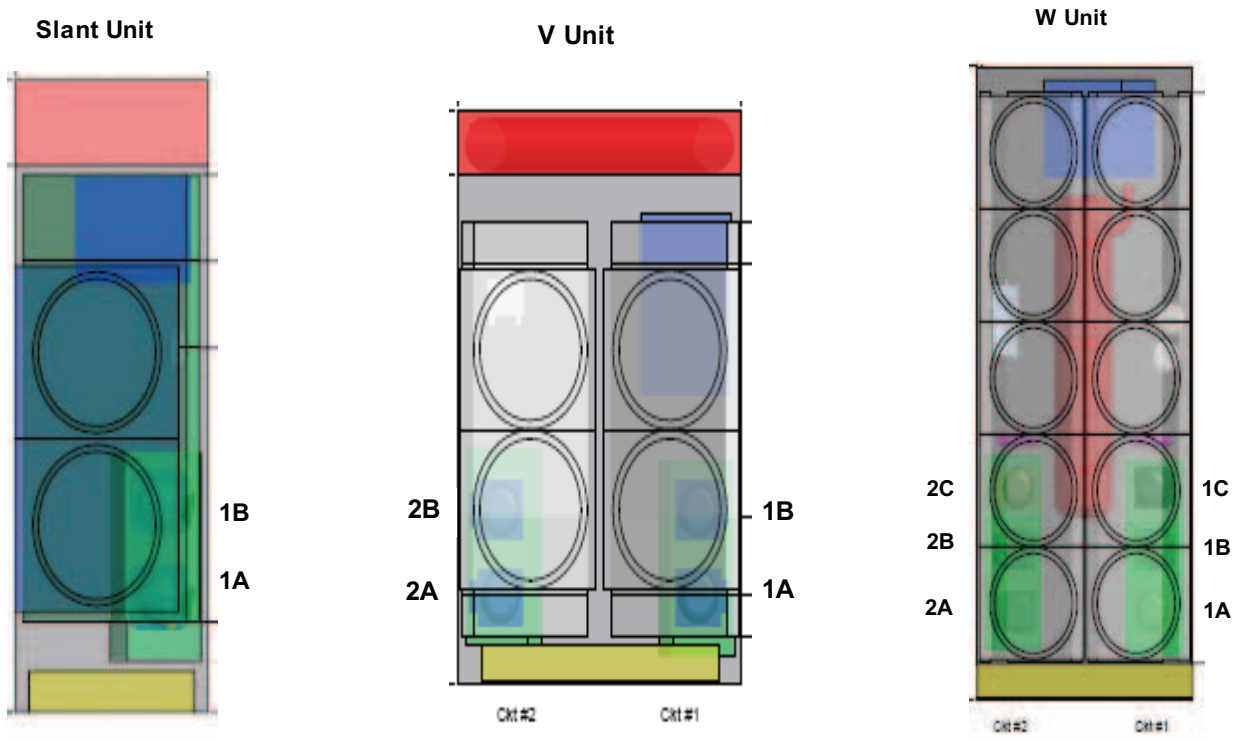
Tandem Compressor Suction Restrictors

Since most tandem compressor sets use unequal size compressors, these combinations require the use of a restrictor in the suction line of one or more compressors in order to provide correct oil level balance between compressors when they are operating. See the table below for correct restrictor applications. A figure showing where compressors are installed in the different units is also shown.

Table 65. Compressor Manifold Order

Unit Nominal Size (tons)	Compressor Size					
	1A	1B	2A	2B	Restrictor Size mm	Location
020	10	10	N/A		N/A	
023	10	13			25/23	1A
026	13	13			N/A	
030	15	15			N/A	
035	15	20			31	1A
039	20	20			N/A	
045	20	25			31	1A
050	25	25			N/A	
040	10	10	10	10	N/A	
046	10	13	13	10	25/23	1A & 2B
052	13	13	13	13	N/A	
060	15	15	15	15	N/A	
070	15	20	20	15	31	1A & 2B
080	20	20	20	20	N/A	
090	20	25	25	20	31	1A & 2B
100	25	25	25	25	N/A	
110	25	30	30	25	31	1A & 2B
120	30	30	30	30	N/A	

Table 66. Compressor Locations



Compressor Replacement

If the CGAM chiller suffers a failed compressor, use these steps for replacement:

Each compressor has lifting eyes. Both lifting eyes must be used to lift the failed compressor. DO NOT LIFT A COMPRESSOR USING A SINGLE LIFTING EYE. Use proper lifting techniques, a spreader bar and rigging as for lifting both compressors simultaneously.

Compressor weights by compressor model are:

- CSHD 125 - 142 lbs.
- CSHD 161 - 155 lbs.
- CSHN 184 - 234 lbs.
- CSHN 250 - 238 lbs.
- CSHN 315 - 337 lbs.
- CSHN 374 - 362 lbs.

After a mechanical failure of a compressor, it is necessary to change the oil in the remaining compressor and also replace the liquid line filter drier. After an electrical failure of a compressor, it will also be necessary to change the oil in the remaining compressor, replace the liquid line filter drier and add a suction filter drier with clean-up cores.

Note: *Do not alter the refrigerant piping in any way as this can affect compressor lubrication.*

Note: *Do not add a filter drier within 10 inches of the elbow for CSHD compressors, or within 16 inches of the elbow for CSHN compressors.*

Refrigerant System Open Time

Model CGAM chillers use POE oil and therefore refrigerant system open time must be kept to a minimum. The following procedure is recommended:

Leave a new compressor sealed until it is ready to be installed in the unit. Maximum system open time is dependent upon ambient conditions, but do not exceed one hour open time.

Plug the open refrigerant line to minimize moisture absorption.

Always change the liquid line filter drier.

Evacuate the system to 500 microns or below.

Do not leave POE oil containers open to the atmosphere. Always keep them sealed.

Mechanical Compressor Failure

Replace the failed compressor(s) and change the oil in the remaining compressor(s) along with the refrigerant system liquid line filter drier.

Electrical Compressor Failure

Replace the failed compressor and change the oil in the other compressor(s). Also add a suction filter with cleanup cores and change the liquid line filter drier. Change filters and oil until the oil no longer test acidic. See "Oil Testing."

Compressor Motor Megging

Motor megging determines the electrical integrity of the compressor motor winding insulation. Use a 500 volt megger. A less than 1 meg-ohm reading is acceptable and 1000 ohms per nameplate volts is required to safely start the compressor.

Compressor Current Imbalance

Normal current imbalance could be 4 to 15 percent with balanced voltage due to motor design. Each phase should register 0.3 to 1.0 ohms and each phase should be within 7 percent of the other two phases. Phase to ground resistance must be infinity.

Note: *Maximum allowable voltage imbalance is 2 percent.*

Refrigerant Piping

The compressor suction and discharge lines are copper. In most instances, piping may be reused. If piping is not reusable, order the correct service parts. Cut all tubing with a tubing cutter to prevent copper filings from entering the system. Cut the tubing in a straight length of pipe after the compressor connection has been unsweated. The line can then be reinstalled using a slip coupling and brazing.

NOTICE:

Equipment Damage!

The compressor suction line configuration must not be changed in any way. Changing compressor suction line configuration will compromise proper oil return to the compressor(s).

Compressor Electrical Terminal Box

Be sure to protect the terminal box when unbrazing or brazing compressor refrigerant piping connections

Compressor Oil Sump Heaters

Compressor oil sump heaters must be energized at least 24 hours before starting the CGAM chiller. This is required to boil refrigerant out of the oil before startup. Ambient temperature is not a factor and the oil sump heaters must always be energized prior to startup.

Condenser Maintenance

Condenser Coil Cleaning

Clean the condenser coils at least once a year or more frequently if the unit is in a "dirty" environment. A clean condenser coil will help to maintain chiller operating efficiency. Follow the detergent manufacturer's instructions to avoid damaging the condenser coils.

To clean the condenser coils use a soft brush and a sprayer such as a garden pump type or a high-pressure type. A high quality detergent such as Trane Coil Cleaner (Part No. CHM-0002) is recommended.

Note: *If detergent mixture is strongly alkaline (pH value greater than 8.5, an inhibitor must be added).*

Evaporator Maintenance

NOTICE:

Equipment Damage!

The factory-installed immersion heater must be de-energized if the BPHE evaporator is drained of water for any reason. Failure to de-energize the immersion heater will cause it to burn out.

The Trane Model CGAM liquid chiller uses a brazed plate heat exchanger (BPHE) evaporator with factory-installed electronic flow switch (IFM efector) that is positioned in the evaporator water pipe. The evaporator inlet also includes a factory-installed immersion heater for freeze protection and a water strainer that must be kept in place to keep debris out of the evaporator.

Note: *Strainer maintenance is critical to proper operation and reliability. Any particles larger than 1mm entering the BPHE evaporator may cause the evaporator to fail, requiring replacement.*

Acceptable BPHE evaporator water flow rate is 1.5 to 3.6 GPM per nominal unit ton capacity. To maintain 54-44 F in/out chilled water temperatures, the nominal water flow rate is 2.4 GPM per ton.

Minimum water flow rate must be maintained to avoid laminar flow, potential evaporator freezing, scaling and poor temperature control. The microprocessor and capacity control algorithms are designed to take a 10 percent change in water flow rate per minute while maintaining a ±2°F (1.1°C) leaving water temperature control accuracy. The chiller tolerates up to 30 percent per minute water flow variation as long as the flow is equal to or greater than minimum flow requirements.

Maximum water flow is 18 feet per second. Flow rates greater than this will cause excessive erosion.

The BPHE evaporator is difficult to clean should it become plugged with debris. Indications of a plugged BPHE evaporator include "wet" suction due to lack of heat exchange, loss of superheat control, depressed discharge superheat (superheat less than 63°F), compressor oil dilution and/or starvation and premature compressor failure.

Evaporator Replacement

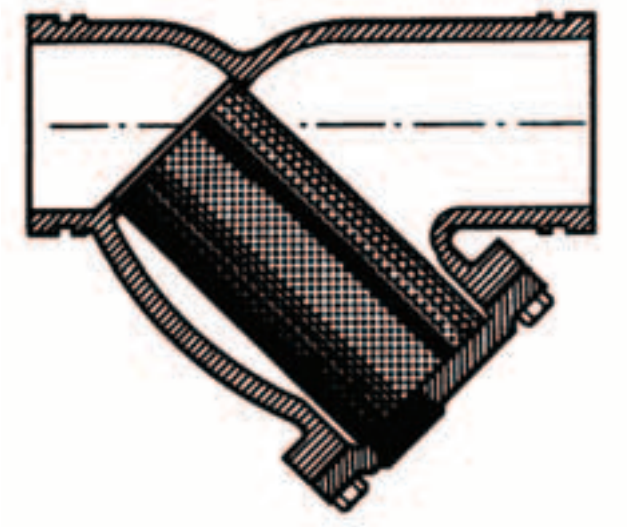
If the CGAM evaporator requires replacement, it is very important that the new evaporator be replaced correctly and with the correct refrigerant and water piping connections. The refrigerant inlet/liquid connection is at the bottom of the evaporator and the refrigerant outlet/suction

connection is at the top of the evaporator and both are on the same side. Pay particular attention to evaporators with dual circuits. Avoid cross-circuiting when installing the new evaporator.

Water Strainer Maintenance

Factory-installed water strainer is a Y-type design. The stainer is equipped with a blow-down valve. The strainer is a 16 mesh (approximately 1 mm) material.

Figure 98. Water Strainer - Y type



For maximum efficiency, a differential pressure gauge installed across the inlet and outlet will indicate pressure loss due to clogging and may be used as a guide to determine when cleaning is required. The taps for the pressure gauges are included as standard from the factory.

Normally when differential pressure reaches 5-10psi, the screen must be cleaned. The strainer is equipped with a blow-down valve on the cover plate. To clean open and flush out until any sediment is removed.

Pump Package Maintenance

Rust Prevention

Pumps not immediately placed into service, or removed from service and stored, must be properly prepared to prevent excessive rusting.

- Pump port protection plates must not be removed until the pump is ready to connect to the piping.
- Rotate the shaft periodically (at least monthly) to keep rotating element free and bearings fully functional.
- For long term storage (3 months or longer), prevent internal rust buildup and possibility of freezing by performing the following steps:
    - Remove the plugs at the top and bottom of the casing.
    - Drain or blow out all water.
    - As an optional step, it is acceptable to rustproof or pack the casing with moisture absorbing material and cover the flanges.

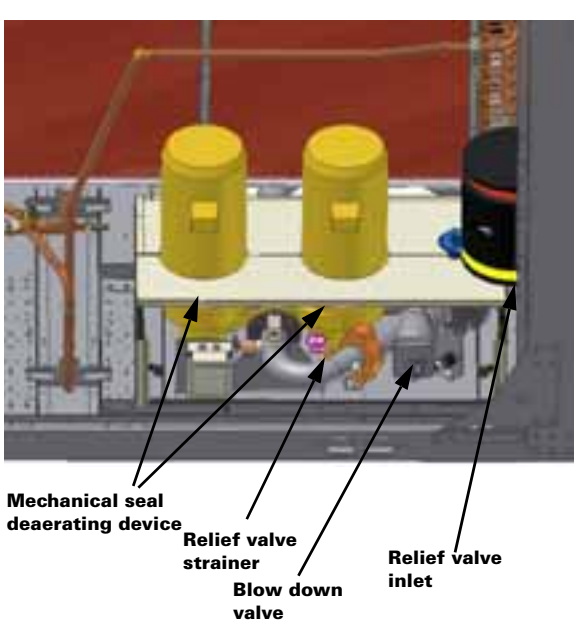
When returning pumps to service

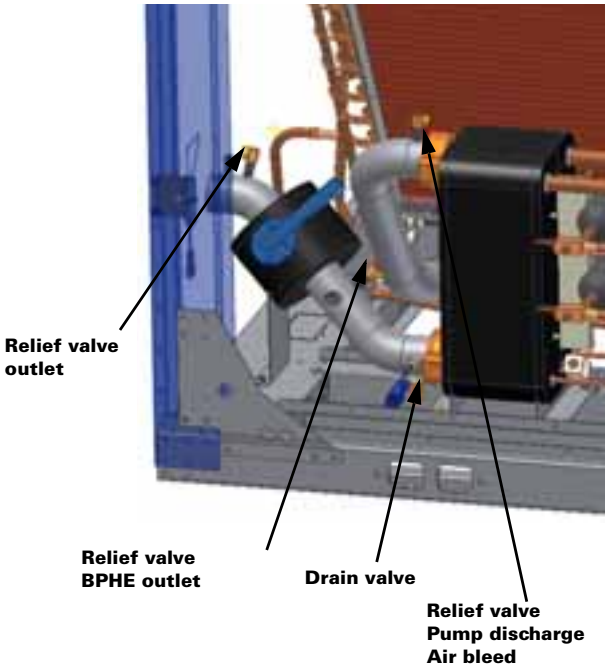
- Remove drying agent from the pump, if used.
- Reinstall plugs at the top and bottom of the casing.

Accessing Pump Package Components for Servicing

To access pump package components for servicing, unlock the access panel door, and remove. Remove remaining top panel(s). See ** for location of bleed, drain and flush valves.

Figure 99. Pump package valve locations





Pump Motor Seal Service

Each pump motor includes a mechanical seal to prevent leakage from the pump housing. The pump motor must be removed to service the mechanical seal. See "Pump Package Motor Lifting," p. 166. See Table 67, p. 165 for pump motor weights. Follow replacement instructions included in the seal kit.

Table 67. Pump weights

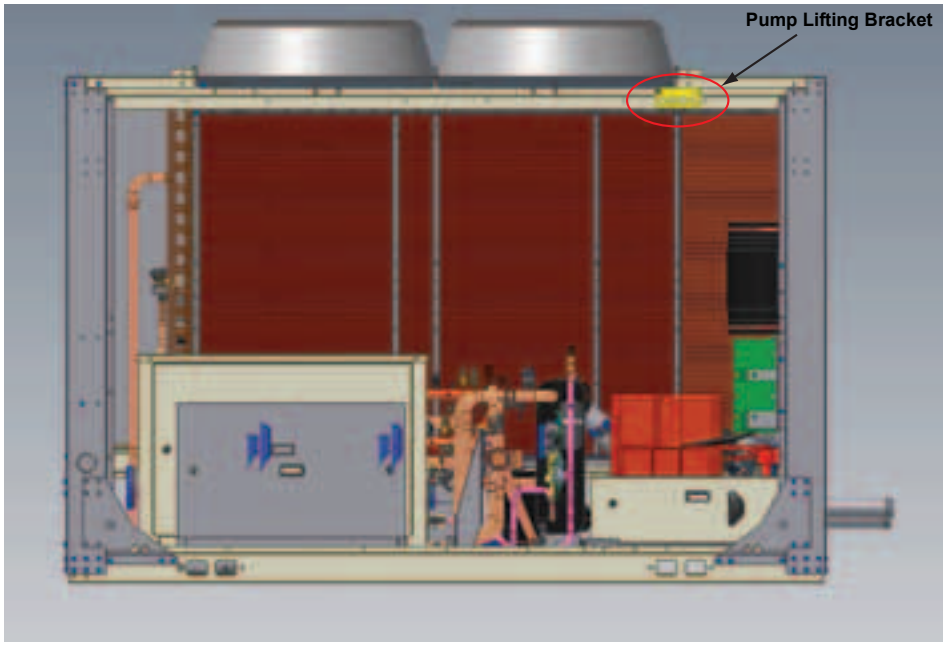
	Motor Weight - Single Pump		Motor Weight - Pump Pair		Pump Weight Less Motors		Total Pump & Motor Weight	
Unit Size	**lbs**	**kg**	**lbs**	**kg**	**lbs**	**kg**	**lbs**	**kg**
20-52	86	39	172	78	138	63	310	141
60-70	133	60	266	121	138	63	404	183
80-110	154	70	308	140	196	89	504	229
120-130	242	110	484	220	196	89	680	308

Pump Package Motor Lifting

20-70 Ton — Slant, V Frame Units

- Attach block and tackle to lifting bracket which is attached to condenser from directly above pump package, shown in Figure 100, p. 166.
- Attach lifting cables around pump motor, or to pump motor hooks, where available.

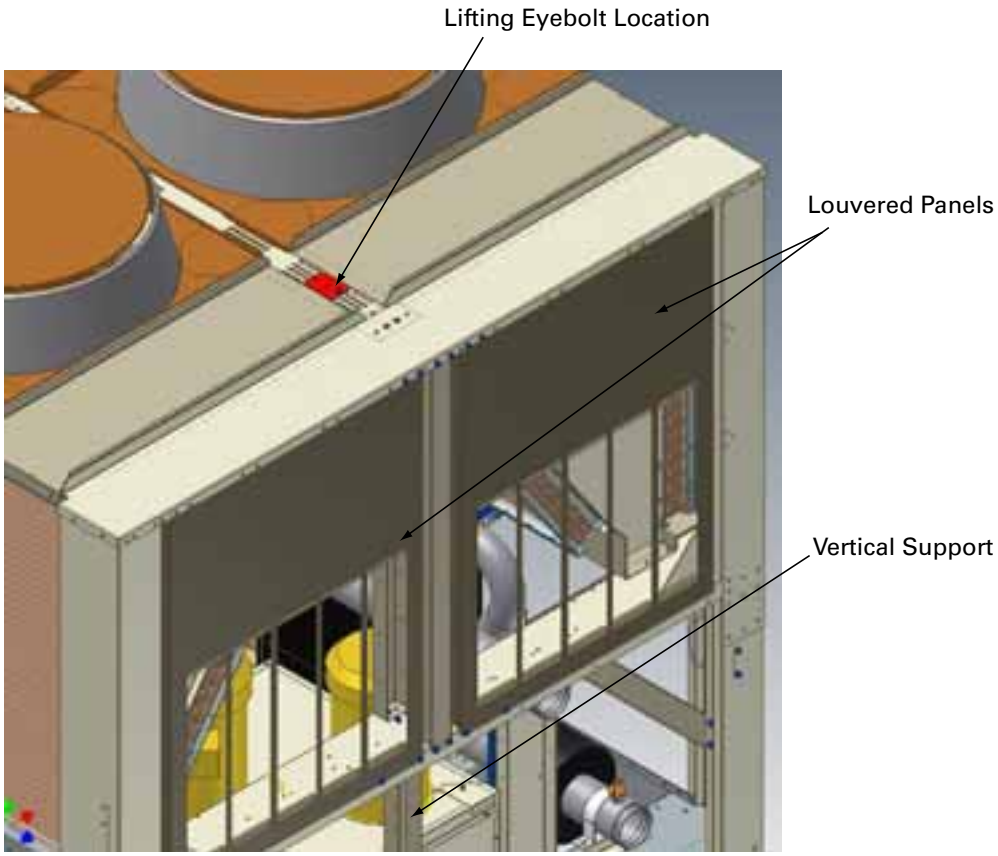
Figure 100.Pump lifting bracket—20-70 ton — Slant, V Frame



80-130 Ton — W Frame Units

- Remove louvered panels and center condenser box frame vertical support as shown in Figure 101, p. 167.
- Attach block and tackle to 3/8″ x 16 lifting eyebolt which is located in the top of the condenser box as shown in Figure 101, p. 167.
- Motor and pump must be separated and removed through opening created by removal of loubered panels and vertical support.
- Attach lifting cables to motor hooks to remove.

Figure 101.Pump lifting bracket — 80-130 ton — W Frame



Diagnostics

Explanatory Comments

Diagnostic Text:

Black text is intended for use on TechView. It has no intrinsic length limit. It should contain few or no abbreviations.

Blue (italicized) *text is intended for use on DynaView. It has a 40 character length limit for English and other European languages, based on 8 pixel character width (DynaView's display is 320 pixels wide). The text should be abbreviated as necessary to meet the length limit. Trane standard abbreviations or ASME standard abbreviations (ASME Y14.38-1999 or later) should be used wherever possible.*

Orange (underlined) text is intended for use on LCI-C. LCI-C has a 28 character length limit for English and other European languages, based on one character per byte (LCI-C diagnostic text has a 28 byte limit). It should be abbreviated as necessary to meet the length limit. Trane standard abbreviations or ASME standard abbreviations (ASME Y14.38-1999 or later) should be used wherever possible. "Comm:" is the standard abbreviation for "Comm Loss:" in order to leave enough space for the rest of the diagnostic text.

Legacy Hex Code: Three digit hexadecimal code used on all past products to uniquely identify diagnostics.

Diagnostic Name and Source: Name of Diagnostic and its source. Note that this is the exact text used in the User Interface and/or Service Tool displays.

The following codes were added to cover the unmapped diagnostics:

- 6B6: Unknown Chiller Diagnostic
- 6B7: Unknown Compressor Diagnostic

Affects Target: Defines the "target" or what is affected by the diagnostic. Usually either the entire **Chiller**, or a particular **component** is affected by the diagnostic (the same one as the source), but in special cases functions are modified or disabled by the diagnostic. **None** implies that there is no direct affect to the chiller, sub components or functional operation.

Severity: Defines the severity of the above effect. **Immediate** means immediate shutdown of the effected portion, **Normal** means normal or friendly shutdown of the effected portion, **Special Mode** means a special mode of operation (limp along) is invoked, but without shutdown, and **Warning** means an Informational Note or Warning is generated.

Persistence: Defines whether or not the diagnostic and its effects are to be manually reset (Latched), or can be either manually or automatically reset (Nonlatched).

Active Modes [Inactive Modes]: States the modes or periods of operation that the diagnostic is active in and, as necessary, those modes or periods that it is specifically not active in as an exception to the active modes. The inactive modes are enclosed in brackets, [ ]. Note that the modes used in this column are internal and not generally annunciated to any of the formal mode displays

Criteria: Quantitatively defines the criteria used in generating the diagnostic and, if nonlatching, the criteria for auto reset. If more explanation is necessary a hot link to the Functional Specification is used.

Reset Level: Defines the lowest level of manual diagnostic reset command which can clear the diagnostic. The manual diagnostic reset levels in order of priority are: **Local** and **Remote**. A diagnostic that has a reset level of Local, can only be reset by a local diagnostic reset command, but not by the lower priority remote Reset command whereas a diagnostic listed as Remote reset can be reset by either.

Help Text: Provides for a brief description of what kind of problems might cause this diagnostic to occur. Both control system component related problems as well as chiller application related problems are addressed (as can possibly be anticipated). These help messages will be updated with accumulated field experience with the chillers.

Main Processor Diagnostics

Diagnostic Name	Affects	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
MP: Reset Has Occurred *MP: Reset Has Occurred* **MP: Reset Has Occurred**	Chiller	Warning	NonLatch	All	The main processor has successfully come out of a reset and built its application. A reset may have been due to a power up, installing new software or configuration. This diagnostic is immediately and automatically cleared and thus can only be seen in the historic diagnostic list.	NA
MP: Non-Volatile Block Test Error *MP: Non-Volatile Block Test Error* **MP: NV Block Test Error**	Platform	Warning	Latch	All	MP has determined there was an error with a block in the Non-Volatile memory. Check settings.	
MP: Non-Volatile Memory Reformatted *MP: Non-Volatile Memory Reformatted* **MP: NV Memory Reformatted**	Platform	Warning	Latch	All	MP has determined there was an error in a sector of the Non-Volatile memory and it was reformatted. Check settings.	Remote
MP: Could not Store Starts and Hours *MP: Could not Store Starts and Hours* **MP: Starts and Hours Failure**	Platform	Warning	Latch	All	MP has determined there was an error with the previous power down store. Starts and Hours may have been lost for the last 24 hours.	Remote
Check Clock *Check Clock* **Check Clock**	Platform	Warning	Latch	All	The real time clock had detected loss of its oscillator at some time in the past. Check / replace battery? This diagnostic can be effectively cleared only by writing a new value to the chiller's time clock using the TechView or DynaView's "set chiller time" functions.	Remote
Phase Protection Fault *Phase Protection Fault* **Phase Protection Fault**	Chiller	Immediate	NonLatch	All	Phase protection module recognized a phase loss or phase reversal of the line power.	Local
Low Pressure Cutout *Low Pressure Cutout* **Low Pressure Cutout**	Circuit	Immediate	Latch	All	The suction refrigerant pressure fell below the low pressure cutout trip point. See the Very Low Suction Pressure below for more details.	Local
Very Low Suction Pressure – Circuit 1 *Very Low Suction Pressure – Circuit 1* **Very Low Suct Press – Ckt 1**	Chiller	Immediate	Latch	All [circuit in manual lockout]	The circuit's suction pressure dropped below (Low Pressure Cutout Setpoint (kPa absolute) * 0.5) regardless of whether or not compressors are running on that circuit. This diagnostic was created to prevent compressor failures due to cross-binding by forcing an entire chiller shutdown. If a given circuit is locked out, the suction pressure transducer associated with it will be excluded from causing this diagnostic.	Local

Very Low Suction Pressure – Circuit 2 *Very Low Suction Pressure – Circuit 2* **Very Low Suct Press – Ckt 2**	Chiller	Immediate	Latch	All [circuit in manual lockout]	The circuit's suction pressure dropped below (Low Pressure Cutout Setpoint (kPa absolute) * 0.5) regardless of whether or not compressors are running on that circuit. This diagnostic was created to prevent compressor failures due to crossbinding by forcing an entire chiller shutdown. If a given circuit is locked out, the suction pressure transducer associated with it will be excluded from causing this diagnostic.	Local
High Discharge Temperature *High Discharge Temperature* **High Discharge Temperature**	Circuit	Immediate	NonLatch	Ckt Energized [Ckt Not Energized]	The discharge temperature exceeded the limits for the compressor.	Local
High Discharge Temperature Lockout *High Discharge Temperature Lockout* **High Discharge Temp Lockout**	Circuit	Immediate	Latch	All	High discharge temperature diagnostics occurred over 210 minutes.	
Compressor Fault *Compressor Fault* **Compressor Fault**	Cprsr	Immediate	NonLatch	All	The compressor fault switch input is open. See Table 64, p. 158 for CSHN compressor protection module diagnostics indicators.	Local
Compressor Fault Lockout *Compressor Fault Lockout* **Compressor Fault Lockout**	Cprsr	Immediate	Latch	All	The compressor fault switch input remained open for more than 35 minutes. Five compressor fault diagnostics have occurred within the last 210 minutes.	Local
BAS Failed to Establish Communication *BAS Failed to Establish Communication* **BAS Failed to Establish Comm**	Chiller	Special	NonLatch	At power-up	The BAS was setup as "installed" and the BAS did not communicate with the MP within 15 minutes after power-up.	Remote
BAS Communication Lost *BAS Communication Lost* **BAS Communication Lost**	Chiller	Special	NonLatch	All	The BAS was setup as "installed" at the MP and the LCI-C LLID lost communications with the BAS for 15 continuous minutes after it had been established.	Remote
LCI-C Software Mismatch: Use BAS Tool *LCI-C Software Mismatch: Use BAS Tool* **LCI-C Software: Use BAS Tool**	Chiller	Warning	NonLatch	All	LCI-C Neuron software and LCI-C IPC3 software do not match. Load new LCI-C Neuron software using LonTalk service tool.	Remote
External Chilled/Hot Water Setpoint *External Chilled/Hot Water Setpoint* **Ext Chilled/Hot Water Setpt**	Chiller	Warning	NonLatch	All	a. Function Not "Enabled": no diagnostics. B. "Enabled ": Out-Of-Range Low or Hi or bad LLID, set diagnostic, default CWS/HWS to next level of priority (e.g. Front Panel SetPoint). This Warning diagnostic will automatically reset if the input returns to the normal range.	Remote
External Demand Limit Setpoint *External Demand Limit Setpoint* **External Demand Limit Setpt**	Chiller	Warning	NonLatch	All	a. Function Not "Enabled": no diagnostics. B. "Enabled ": Out-Of-Range Low or Hi or bad LLID, set diagnostic, default DLS to next level of priority (e.g. Front Panel SetPoint). This Warning diagnostic will automatically reset if the input returns to the normal range.	Remote
Circuit Pumpdown Terminated *Circuit Pumpdown Terminated* **Circuit Pumpdown Terminated**	Circuit	Warning	Latching	Operational/ Service Pumpdown [All Except Operational and Service Pumpdown]	The procedure did not terminate normally by reaching the termination pressure within the allotted time. See "Compressor Operational Pump Down," p. 159 or "Compressor Service Pump Down Procedure," p. 159.	Remote

Chilled Water Flow (Entering Water Temp) *Chilled Water Flow (Entering Water Temp)* **Chilled Wtr Flow (Ent Temp)**	Chiller	Immediate	Latching	Any Ckt(s) Energized [No Ckt(s) Energized]	The entering evaporator water temp fell below the leaving evaporator water temperature by more than 3°F for 100°F-sec while at least one compressor was running.	Remote
Inverted Water Temp (Heating) *Inverted Water Temp (Heating)* **Inverted Wtr Temp (Heating)**	Chiller	Immediate	Latching	Unit energized and all ckts' reversing valves in heating direction [Unit de-energized or any ckt's reversing valve in cooling direction]	The leaving evaporator water temp fell below the entering evaporator water temperature by more than 3°F for 100°F-sec. There is a 60 second ignore time after the condition to enable the diagnostic is met. During the ignore time, the temperature error is not integrated.	Remote
Low Evap Leaving Water Temp: Unit Off *Low Evap Leaving Water Temp: Unit Off* **Low Evap Leav Wtr Temp: Off**	Chiller or Circuit	Warning and Special Action	NonLatch	Unit in Stop Mode, or in Auto Mode and No Ckt(s) Energized [Any Ckt Energized]	a. The leaving chilled water temperature fell below the leaving water temp cutout setting for 30 degree F seconds while the Chiller is in the Stop mode, or in Auto mode with no compressors running. Energize Evap Water pump Relay until diagnostic auto resets, then return to normal evap pump control. Automatic reset occurs when the temp rises 2°F above the cutout setting for 30 minutes. When this diagnostic is active AND Leaving Water Temperature sensor diagnostic (loss of comm or out of range) the Evap Water pump relay shall be de-energized. b. If evaporator protection temperature sensors are installed, the effect is on the appropriate circuit. Else, the effect is on the chiller.	Remote
Low Evap Leaving Water Temp: Unit On *Low Evap Leaving Water Temp: Unit On* **Low Evap Leav Wtr Temp: On**	Chiller or Circuit	Immediate and Special Action	NonLatch	Any Ckt[s] Energized [No Ckt(s) Energized]	The chilled water temp. fell below the cutout setpoint for 30 degree F Seconds while a compressor was running. Automatic reset occurs when the temperature rises 2 °F above the cutout setting for 2 minutes. This diagnostic shall not de-energize the Evaporator Water Pump Output. If this diagnostic is active the Low Evap Leaving Water Temp: Unit Off diagnostic shall be suppressed. If evaporator protection temperature sensors are installed, the effect is on the appropriate circuit. Else, the effect is on the chiller.	Remote
Low Refrigerant Temperature *Low Refrigerant Temperature* **Low Refrigerant Temperature**	Circuit	Immediate	Latch	Circuit Energized [Service Pumpdown, Operational Pumpdown]	The suction saturated refrigerant temperature dropped below the Low Refrigerant Temperature Cutout Setpoint for 16.67°C-seconds (30°F-seconds). See "Low Refrigerant Temperature Cutout," p. 132 for min/max information or "Capacity Limited by Low Evap Rfgt Temp," p. 152 for limit conditions.	Local

High Evaporator Water Temperature *High Evaporator Water Temperature* **High Evap Water Temperature**	Chiller	Info and Special Action	NonLatch	Only effective if either 1) Evaporator Water Flow Overdue, 2) Evaporator Water Flow Lost, 3) Low Evap Water Temp: Unit Off, diagnostic is active.	The leaving water temperature exceeded the high evap water temp setting (TV service menu settable – default 55.0°C (131°F)) for 15 continuous seconds. The evaporator water pump relay will be de-energized to stop the pump, but only if it is running due to one of the diagnostics listed on the left. The diagnostic will auto reset and the pump will return to normal control when the temperature falls 2.778°C (5°F) below the trip setting. The primary purpose is to stop the evaporator water pump and its associated pump heat from causing excessive water-side temperatures and water-side pressures when the unit is not running but the evap pump is on due to either Evaporator Water Flow Overdue, Evaporator Water Flow Lost, or Low Evap Water Temp – Unit Off diagnostics. This diagnostic will not auto clear solely due to the clearing of the enabling diagnostic. *at unit installation, especially reversible units, high evap water temp setting will need to be written.	Remote
High Suction Refrigerant Pressure *High Suction Refrigerant Pressure* **High Suction Rfgt Press**	Chiller	Immediate	NonLatch	All	Any circuit's suction pressure has risen above 95% of the high pressure cutout setting. The evaporator water pump relay will be de-energized to stop the pump regardless of why the pump is running. The diagnostic will auto reset and the pump will return to normal control when all circuits' suction pressures fall below 85% of the high pressure cutout setting. The primary purpose is to stop the evaporator water pump and its associated pump heat from causing refrigerant side pressures close to the relief valve setting when the chiller is not running, such as could occur with Evaporator Water Flow Overdue, Evaporator Water Flow Lost, or Low Evap Water Temp – Unit Off diagnostics. This condition is unlikely unless a discharge isolation valve is installed and closed.	Remote
High Pressure Cutout *High Pressure Cutout* **High Pressure Cutout**	Circuit	Immediate	Latch	All	The high pressure cutout switch recognized a high pressure. See High Suction Refrigerant Pressure above for more details.	Local
High Discharge Refrigerant Pressure *High Discharge Refrigerant Pressure* **High Discharge Rfgt Press**	Circuit	Immediate	Latch	All	Discharge pressure exceeded the high pressure cutout setpoint + 100 kPa. Likely cause: failed or incorrectly set high pressure cutout switch. Prevents release of refrigerant through relief valve.	Local
Emergency Stop *Emergency Stop* **Emergency Stop**	Chiller	Immediate	Latch	All	Emergency Stop input is open.	Local
Starts/Hours Modified *Starts/Hours Modified* **Starts/Hours Modified**	Cprsr	Warning	NonLatch	All	A counter for compressor starts or hours has been modified by TechView. This diagnostic is immediately and automatically cleared and thus can only be seen in the historic diagnostic list.	NA

Evaporator Pump 1 Starts/Hours Modified *Evaporator Pump 1 Starts/Hours Modified* **Evap Pmp Starts/Hrs Modified**	Chiller	Warning	NonLatch	All	A counter for evaporator pump 1 starts or hours has been modified by TechView. This diagnostic is immediately and automatically cleared and thus can only be seen in the historic diagnostic list.	NA
Evaporator Pump 2 Starts/Hours Modified *Evaporator Pump 2 Starts/Hours Modified* **Evap Pmp Starts/Hrs Modified**	Chiller	Warning	NonLatch	All	A counter for evaporator pump 2 starts or hours has been modified by TechView. This diagnostic is immediately and automatically cleared and thus can only be seen in the historic diagnostic list.	NA
Evaporator Water Flow Lost *Evaporator Water Flow Lost* **Evap Water Flow Lost**	Chiller	Immediate and Special Action	NonLatch	All	After the pump request was activated, water flow was established and then lost. Special action is to keep the evap pump request active in a diagnostic override mode. See "Chilled Water Pump Control," p. 81 for more details.	Remote
Evaporator Water Flow Lost Lockout *Evaporator Water Flow Lost Lockout* **Evap Water Flow Lost Lockout**	Chiller	Immediate	Latch	All	Four (4) water flow loss events occurred ina moving 4 day time window. Corrective action is needed to identify and eliminate the cause. See "Chilled Water Pump Control," p. 81 for more details.	Local
Evaporator Water Flow Overdue *Evaporator Water Flow Overdue* **Evap Water Flow Overdue**	Chiller	Immediate and Special Action	NonLatch	All	After the pump request was activated, the evaporator water flow overdue wait time elapsed before water flow was established. Special action is to keep the evap pump request active in a diagnostic override mode. See "Chilled Water Pump Control," p. 81 for more details.	Remote
Evaporator Water Flow Lost – Pump 1 *Evaporator Water Flow Lost – Pump 1* **Evap Water Flow Lost**	Chiller	Warning and Special Action	NonLatch	All	For dual evaporator pump configurations only. Evaporator Water Flow Lost diagnostic occurred while Pump 1 was the selected pump. See "Chilled Water Pump Control - Field Supplied Dual Pumps," p. 82 for more details.	Remote
Evaporator Water Flow Lost – Pump 2 *Evaporator Water Flow Lost – Pump 2* **Evap Water Flow Lost**	Chiller	Warning and Special Action	NonLatch	All	For dual evaporator pump configurations only. Evaporator Water Flow Lost diagnostic occurred while Pump 2 was the selected pump. See "Chilled Water Pump Control - Field Supplied Dual Pumps," p. 82 for more details.	Remote
Evaporator Water Flow Overdue – Pump 1 *Evaporator Water Flow Overdue – Pump 1* **Evap Water Flow Overdue**	Chiller	Warning and Special Action	NonLatch	All	For dual evaporator pump configurations only. Evaporator Water Flow Overdue diagnostic occurred while Pump 1 was the selected pump. See "Chilled Water Pump Control - Field Supplied Dual Pumps," p. 82 for more details.	Remote
Evaporator Water Flow Overdue – Pump 2 *Evaporator Water Flow Overdue – Pump 2* **Evap Water Flow Overdue**	Chiller	Warning and Special Action	NonLatch	All	For dual evaporator pump configurations only. Evaporator Water Flow Overdue diagnostic occurred while Pump 2 was the selected pump.See "Chilled Water Pump Control - Field Supplied Dual Pumps," p. 82for more details.	Remote
Fault Detected: Evaporator Water Pump 1 *Fault Detected: Evaporator Water Pump 1* **Fault: Evap Water Pump**	Chiller	Normal or Warning and Special Action	NonLatch	All	For systems with no evaporator pump or a single evaporator pump, a normal shutdown shall be performed. For multiple pump systems, detection of a pump fault will generally cause pump control to switch to the redundant pump. See "Chilled Water Pump Control - Field Supplied Dual Pumps," p. 82 for more details.	Remote

Fault Detected: Evaporator Water Pump 2 *Fault Detected: Evaporator Water Pump 2* **Fault: Evap Water Pump**	Chiller	Normal or Warning and Special Action	NonLatch	All	For systems with no evaporator pump or a single evaporator pump, a normal shutdown shall be performed. For multiple pump systems, detection of a pump fault will generally cause pump control to switch to the redundant pump. See "Chilled Water Pump Control - Field Supplied Dual Pumps," p. 82 for more details.	Remote
Fan Fault *Fan Fault* **Fan Fault**	Circuit	Warning	Latch	All	The fan deck is indicating a fault.	Local
Fan Inverter Fault *Fan Inverter Fault* **Fan Inverter Fault**	Circuit	Warning	NonLatch	All	The fan inverter fault input is ignored for the first 5 seconds of start up to allow variable speed drives to power up.	Local
Low Suction Superheat *Low Suction Superheat* **Low Suction Superheat**	Circuit	Immediate	Latch	Ckt Energized [Ckt Not Energized]	Measured suction superheat stays below 2.22 °C for one continuous minute, with a 1 minute ignore time fro m the start of the circuit. Suction Superheat = suction temp – sat. suction temp.	Local
High Compressor Pressure Differential *High Compressor Pressure Differential* **High Cprsr Press Diff**	Circuit	Immediate	Latch	Ckt Energized [Ckt Not Energized]	Compressor involute pressure differential (discharge pressure [absolute] – volume ratio * suction pressure [absolute]) exceeds 2550 kPa differential, or exceeds 1862 kPa differential for 30 continuous minutes. Nominal volume ratio for R410A compressors is 2.9.	Local
Low Differential Refrigerant Pressure *Low Differential Refrigerant Pressure* **Low Differential Rfgt Press**	Circuit	Normal	Latch	Ckt Energized [Ckt Not Energized]	The system differential pressure for the respective circuit was below 90 psid for more than 4000 psid-sec, with a 2.5 minute ignore time from the start of the circuit.	Local
Low Discharge Saturated Temperature *Low Discharge Saturated Temperature* **Low Discharge Sat Temp**	Circuit	Normal	Latch	Ckt Energized [Ckt Not Energized]	The discharge saturated temperature for the respective circuit was below 20 °C for more than 3750 °C-sec, with a 10 minute ignore time from the start of the circuit. Integration starts after the ignore time is completed.	Local
Software Error 1001: Call Trane Service *Software Error 1001: Call Trane Service* **Software Error 1001**	All functions	Immediate	Latch	All	A software monitor has detected a condition in which there was a continuous 1 minute period of compressor operation, with no Evaporator water flow. The presence of this software error message suggests an internal software problem has been detected. The events that led up to this failure, if known, should be recorded and transmitted to Trane Controls Engineering.	Local
Software Error 1002: Call Trane Service *Software Error 1002: Call Trane Service* **Software Error 1002**	All functions	Immediate	Latch	All	A software monitor has detected a condition in which there was a continuous 1 minute period of compressor operation, with a misaligned state machine. Reported if state chart misalignment occurred inferred form the Capacity Control, Circuit, or Compressor State Machines being in *Stopped state* or *Inactive state* while a compressor was operating and this condition existed for at least 1 minute. The presence of this software error message suggests an internal software problem has been detected. The events that led up to this failure, if known, should be recorded and transmitted to Trane Controls Engineering.	Local

Software Error 1003: Call Trane Service *Software Error 1003: Call Trane Service* **Software Error 1003**	All functions	Immediate	Latch	All	A software monitor has detected a condition in which there was a continuous 1 minute period of compressor operation, with a misaligned state machine. Reported if state chart misalignment occurred inferred from the Capacity Control, Circuit, or Compressor State Machines remaining in the *Stopping state* for more than 4 minutes with operating compressors. The presence of this software error message suggests an internal software problem has been detected. The events that led up to this failure, if known, should be recorded and transmitted to Trane Controls Engineering.	Local
fNo Total Heat Recovery *No Total Heat Recovery* **No Total Heat Recovery**	Heat Recovery	Normal	NonLatch	Unit energized and THR control enabled [Unit de-energized or THR disabled]	This diagnostic is only effective if all the following requirements are met: 1. Unit is running. 2. THR Control is enabled 3. THR entering water temperature is less than 4°C, or discharge temperature integral is greater than Discharge Temperature Integral Limit in all the energized circuits. It shall be de-activated when any one of the following requirements is met: 1. THR entering water temperature is greater than 5°C, and the discharge saturated temperature is greater than minimum discharge saturated temperature in at least one energized circuit. 2. THR entering water temperature is invalid (comm loss or sensor diagnostic) 3. Total Heat Recovery Control disabled 4. No compressor energized.	Remote
Loss of Charge *Loss of Charge* **Loss of Charge**	Circuit	Immediate	Latch	Ckt Energized [Ckt Not Energized]	This feature is active on cooling-only units, not on heat pumps (even during cooling mode). The circuit must have EXV superheat control.	Local

Sensor Failure Diagnostics

Notes: *1. The following sensor failure diagnostics will not occur unless that input or output is required to be present by the particular configuration and installed options for the unit.*
2. Sensor diagnostics are named by the Functional Name of the input or output that is no longer sending a valid value to the Main Processor, indicating a sensor failure. Some LLIDs may have more than one functional output associated with it. Refer to the unit's wiring diagrams to relate the occurrence of such sensor failure diagnostics back to the physical LLID boards that they have been assigned to (bound).

Diagnostic Name	Affects	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Evaporator Entering Water Temp Sensor *Evaporator Entering Water Temp Sensor* **Evap Ent Water Temp Sensor**	Chiller	Normal	Latch	All	Bad Sensor or LLID.	Remote
Evaporator Leaving Water Temp Sensor *Evaporator Leaving Water Temp Sensor* **Evap Leav Water Temp Sensor** r	Chiller	Normal	Latch	All	Bad Sensor or LLID	Remote

Outdoor Air Temp Sensor *Outdoor Air Temp Sensor* **Outdoor Air Temp Sensor**	Chiller	Normal	Latch	All	Bad Sensor or LLID.	Remote
Discharge Pressure Transducer *Discharge Pressure Transducer* **Discharge Pressure Xdcr**	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Suction Pressure Transducer *Suction Pressure Transducer* **Suction Pressure Xdcr**	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Suction Temperature Sensor *Suction Temperature Sensor* **Suction Temperature Sensor**	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Discharge Temperature Sensor *Discharge Temperature Sensor* **Discharge Temperature Sensor**	Circuit	Immediate	Latch	All	Bad Sensor or LLID	Remote
Heat Recovery Entering Water Temp Sensor *Heat Recovery Entering Water Temp Sensor* **HR Entering Wtr Temp Sensor**	Chiller	Warning	Latch	All	Bad Sensor or LLID	Remote
Heat Recovery Leaving Water Temp Sensor *Heat Recovery Leaving Water Temp Sensor* **HR Leaving Wtr Temp Sensor**	Chiller	Warning	Latch	All	Bad Sensor or LLID	Remote

Communication Diagnostics

Note: *1. The following communication loss diagnostics will not occur unless that input or output is required to be present by the particular configuration and installed options for the chiller. 2. Communication diagnostics (with the exception of "Excessive Loss of Comm" are named by the Functional Name of the input or output that is no longer being heard from by the Main Processor. Many LLIDs, such as the Quad Relay LLID, have more than one functional output associated with it. A comm loss with such a multiple function board, will generate multiple diagnostics. Refer to the Chiller's wiring diagrams to relate the occurrence of multiple communication diagnostics back to the physical llid boards that they have been assigned to (bound).*

Diagnostic Name	Affects	Severity	Persistence	Active Modes [Inactive Modes]	Criteria	Reset Level
Excessive Loss of Comm *Excessive Loss of Comm* **Excessive Loss of Comm**	Chiller	Immediate	Latch	All	Loss of comm with 10 or more of the LLIDs configured for the system has been detected. This diagnostic will suppress the callout of all subsequent comm loss diagnostics. Check power supply(s) and power disconnects – troubleshoot LLID bus using TechView.	Remote
Comm Loss: External Auto/Stop *Comm Loss: External Auto/Stop* **Comm: External Auto/Stop**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Emergency Stop *Comm Loss: Emergency Stop* **Comm: Emergency Stop**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

Comm Loss: External Ice Building Control Input *Comm Loss: Ext Ice Building Ctrl Input* **Comm: Ext Ice Building Ctrl**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall revert to normal (non-ice building) mode regardless of last state.	Remote
Comm Loss: Outdoor Air Temperature *Comm Loss: Outdoor Air Temperature* **Comm: Outdoor Air Temp**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evap Leaving Water Temp *Comm Loss: Evap Leaving Water Temp* **Comm: Evap Leav Water Temp**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evap Entering Water Temp *Comm Loss: Evap Entering Water Temp* **Comm: Evap Ent Water Temp**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Discharge Pressure Transducer *Comm Loss: Discharge Pressure Transducer* **Comm: Discharge Press Xdcr**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Suction Pressure Transducer Comm Loss: Suction Pressure Transducer **Comm: Suction Pressure Xdcr**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Ext Chilled/Hot Wtr Setpoint *Comm Loss: Ext Chilled/Hot Wtr Setpoint* **Comm: Ext Chil/Hot Wtr Setpt**	Chiller	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall discontinue use of the External Chilled/Hot Water Setpoint source and revert to the next higher priority for setpoint arbitration	Remote
Comm Loss: Ext Demand Limit Setpoint *Comm Loss: Ext Demand Limit Setpoint* **Comm: Ext Demand Limit Setpt**	Chiller	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall discontinue use of the External Demand Limit Setpoint source and revert to the next higher priority for setpoint arbitration	Remote
Comm Loss: Auxiliary Setpoint Command *Comm Loss: Auxiliary Setpoint Command* **Comm: Auxiliary Setpt Cmd**	Chiller	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Chiller shall discontinue use of the Auxiliary Setpoint and revert to the Chilled Water Setpoint based on setpoint arbitration	Remote
Comm Loss: High Pressure Cutout Switch *Comm Loss: High Pressure Cutout Switch* **Comm: High Press Cutout Sw**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

Comm Loss: Evaporator Water Flow Switch *Comm Loss: Evaporator Water Flow Switch* **Comm: Evap Water Flow Sw**	Chiller	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Local BAS Interface *Comm Loss: Local BAS Interface* **Comm: Local BAS Interface**	Chiller	Warning and Special Action	NonLatch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Use the last values sent from BAS.	Remote
Comm Loss: Compressor Fault Input *Comm Loss: Compressor Fault Input* **Comm: Compressor Fault Input**	Cprsr	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Compressor Run Command *Comm Loss: Compressor Run Command* **Comm: Cprsr Run Command**	Cprsr	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Fan Control Relays *Comm Loss: Fan Control Relays* **Comm: Fan Control Relays**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Fan Fault *Comm Loss: Fan Fault* **Comm: Fan Fault**	Circuit	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Fan Inverter Speed Command *Comm Loss: Fan Inverter Speed Command* **Comm: Fan Inverter Speed Cmd**	Circuit	Warning and Special Action	NonLatch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Revert to fixed-speed fan algorithm using remaining fans.	Remote
Comm Loss: Fan Inverter Fault *Comm Loss: Fan Inverter Fault* **Comm: Fan Inverter Fault**	Circuit	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Revert to fixed-speed fan algorithm using remaining fans.	Remote
Comm Loss: Op Status Programmable Relays *Comm Loss: Op Status Programmable Relays* **Comm: Op Status Relays**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Anti-Freeze Heater Relay *Comm Loss: Anti-Freeze Heater Relay* **Comm: Anti-Freeze Heater Rly**	Chiller	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evaporator Water Pump 1 Relay *Comm Loss: Evaporator Water Pump 1 Relay* **Comm: Evap Water Pump Relay**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

Comm Loss: Evaporator Water Pump 2 Relay *Comm Loss: Evaporator Water Pump 2 Relay* **Comm: Evap Water Pump Relay**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evaporator Pump 1 Fault Input *Comm Loss: Evaporator Pump 1 Fault Input* **Comm: Evap Pump Fault Input**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evaporator Pump 2 Fault Input *Comm Loss: Evaporator Pump 2 Fault Input* **Comm: Evap Pump Fault Input**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evap Pump Inverter 1 Run Command *Comm Loss: Evap Pump Inverter 1 Run Cmd* **Comm: Evap Pmp Inv 1 Run Cmd**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evap Pump Inverter 1 Fault Input *Comm Loss: Evap Pump Inv 1 Fault Input* **Comm: Evap Pmp Inv 1 Flt Inp**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Evap Pump Inverter 1 Frequency Feedback *Comm Loss: Evap Pump Inv 1 Freq Feedback* **Comm: Evap Pmp Inv 1 Freq**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Suction Temperature *Comm Loss: Suction Temperature* **Comm: Suction Temperature**	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Heat/Cool Switch *Comm Loss: Heat/Cool Switch* **Comm: Heat/Cool Switch**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Electronic Expansion Valve *Comm Loss: Electronic Expansion Valve* **Comm: EXV**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Cooling EXV *Comm Loss: Cooling EXV* **Comm: Cooling EXV**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Heating EXV *Comm Loss: Heating EXV* **Comm: Heating EXV**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

Comm Loss: External Night Noise Setback Input *Comm Loss: Ext Night Noise Setback Input* **Comm: Ext Night Noise Inp**	Chiller	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. External input is excluded from arbitration logic per standard arbitration rules.	Remote
Comm Loss: Night Noise Setback Relay *Comm Loss: Night Noise Setback Relay* **Comm: Night Noise Setbk Rly**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Phase Protection Fault Input *Comm Loss: Phase Protection Fault Input* **Comm: Phase Protect Flt Inp**	Chiller	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Discharge Temperature Sensor *Comm Loss: Discharge Temperature Sensor* **Comm: Discharge Temp Sensor**	Circuit	Immediate	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Subcooler Shutoff Valve Relay *Comm Loss: Subcooler Shutoff Valve Relay* **Comm: Subcooler Shut Vlv Rly**	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Reversing Valve *Comm Loss: Reversing Valve* **Comm: Reversing Valve**	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Percent Capacity Output *Comm Loss: Percent Capacity Output* **Comm: Percent Capacity Out**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Receiver Fill Valve Relay *Comm Loss: Receiver Fill Valve Relay* **Comm: Receiver Fill Vlv Rly**	Circuit	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Power Factor Correction Fault *Comm Loss: Power Factor Correction Fault* **Comm: Pwr Fac Correction Flt**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Supplemental Heat Relay 1 *Comm Loss: Supplemental Heat Relay 1* **Comm: Supplemental Heat Relay 1**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote

Comm Loss: Supplemental Heat Relay 2 *Comm Loss: Supplemental Heat Relay 2* **Comm: Supplemental Heat Relay 2**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Supplemental Heat Relay 3 *Comm Loss: Supplemental Heat Relay 3* **Comm: Supplemental Heat Relay 3**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Supplemental Heat Relay 4 *Comm Loss: Supplemental Heat Relay 4* **Comm: Supplemental Heat Relay 4**	Chiller	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Heat Recovery Entering Water Temperature Sensor *Comm Loss: HR Entering Water Temperature* **Comm: HR Entering Water Temp**	Heat Recovery	Warning or Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. Warning for Partial Heat Recovery. Normal shutdown for Total Heat Recovery.	Remote
Comm Loss: Heat Recovery Leaving Water Temperature Sensor *Comm Loss: HR Leaving Water Temperature* **Comm: HR Leaving Water Temp**	Heat Recovery	Warning	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: Heat Recovery Three Way Valve *Comm Loss: Heat Recovery Three Way Valve* **Comm: HR Three Way Valve**	Heat Recovery	Normal	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period.	Remote
Comm Loss: External Heat Recovery Input *Comm Loss: External Heat Recover Input* **Comm: Ext Heat Recover Inp**	Heat Recovery	Warning and Special Action	Latch	All	Continual loss of communication between the MP and the Functional ID has occurred for a 35-40 second period. External Input is excluded from arbitration logic per standard arbitration rules.	Remote

Main Processor- Boot Messages and Diagnostics

DynaView Display Message	Description Troubleshooting
Boot Software Part Numbers: LS Flash --> 6200-0318-XX MS Flash --> 6200-0319-XX	The "boot code" is the portion of the code that is resident in all MPs regardless of what application code (if any) is loaded. Its main function is to run power up tests and provide a means for downloading application code via the MP's serial connection. The Part numbers for the code are displayed in the lower left hand corner of the DynaView during the early portion of the power up sequence and during special programming and converter modes. See below. For the EasyView, the extension of the boot code part number is displayed for approximately 3 immediately following power up. // This is normal, but you should provide this information when contacting Technical Service about power up problems.
Err2: RAM Pattern 1 Failure	There were RAM errors detected in RAM Test Pattern #1. // Recycle power, if the error persists, replace MP.

Err2: RAM Pattern 2 Failure	There were RAM errors detected in RAM Test Pattern #2. //Recycle power, if the error persists, replace MP.
Err2: RAM Addr Test #1 Failure	There were RAM errors detected in RAM Address Test #1. // Recycle power, if error persists, replace MP.
Err2: RAM Addr Test #2 Failure	There were RAM errors detected in RAM Address Test #2. //Recycle power, if the error persists, replace MP.
No Application Present Please Load Application...	No Main Processor Application is present – There are no RAM Test Errors. // Connect a TechView Service Tool to the MP's serial port, provide chiller model number (configuration information) and download the configuration if prompted by TechView. Then proceed to download the most recent application or specific version as recommended by Technical Service.
MP: Invalid Configuration	MP has an invalid configuration based on the current software installed
MP Application Memory CRC Error	App software inside the MP failed its own checksum test. Possible causes: application software in the MP is not complete – software download to the MP was not completed successfully - or MP hardware problem. Note: User should attempt to reprogram the MP if this diagnostic occurs.
App Present. Running Selftest…. Selftest Passed	An application has been detected in the Main Processor's nonvolatile memory and the boot code is proceeding to run a check on its entirety. 8 seconds later, the boot code had completed and passed the (CRC) test. // Temporary display of this screen is part of the normal power up sequence.
App Present. Running Selftest… Err3: CRC Failure	An application has been detected in Main Processor's nonvolatile memory and the boot code is proceeding to run a check on its entirety. A few seconds later, the boot code had completed but failed the (CRC) test. //Connect a TechView Service Tool to the MP's serial port, provide chiller model number (configuration information) and download the configuration if prompted by TechView. Then proceed to download the most recent application or specific version as recommended by Technical Service. Note that this error display may also occur during the programming process, if the MP never had a valid application any time prior to the download. If the problem persists, replace the MP.
A Valid Configuration is Present	A valid configuration is present in the MP's nonvolatile memory. The configuration is a set of variables and settings that define the physical makeup of this particular chiller. These include: number/airflow,/ and type of fans, number/and size of compressors, special features, characteristics, and control options. // Temporary display of this screen is part of the normal power up sequence.
Err4: UnHandled Interrupt Restart Timer: [3 sec countdown timer]	An unhandled interrupt has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application and allow a normal restart of chiller as appropriate. // This condition might occur due to a severe electro-magnetic transient such as can be caused by a near lightening strike. Such events should be rare or isolated and if no damage results to the CH.530 control system, the Chiller will experience a shutdown and restart. If this occurs more persistently it may be due to an MP hardware problem. Try replacing the MP. If replacement of the MP proves ineffective, the problem may be a result of extremely high radiated or conducted EMI. Contact Technical Service. If this screen occurs immediately after a software download, attempt to reload both the configuration and the application. Failing this, contact Technical Service.
Err5: Operating System Error Restart Timer: [3 sec countdown timer]	An Operating System error has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application and allow a normal restart of chiller as appropriate. // See Err 4 above
Err6: Watch Dog Timer Error Restart Timer: [3 sec countdown timer]	A Watch Dog Timer Error has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application allowing a normal restart of chiller as appropriate.
Err7: Unknown Error Restart Timer: [3 sec countdown timer]	An unknown Error has occurred while running the application code. This event will normally cause a safe shutdown of the entire chiller. Once the countdown timer reaches 0, the processor will reset, clear diagnostics, and attempt to restart the application allowing a normal restart of chiller as appropriate
Err8: Held in Boot by User Key Press [3 sec countdown timer]	A touch was detected during boot indicating the user wanted to stay in boot mode. This mode can be used to recover from a fatal software error in the application code. Cycle power on the MP to clear this error if it was unintentional.
Converter Mode	A command was received from the Service Tool (TechView) to stop the running application and run in the "converter mode". In this mode the MP acts as a simple gateway and allows the TechView service computer to talk to all the LLIDS on the IPC3 bus.
Programming Mode	A command was received by the MP from the TechView Service Tool and the MP is in the process of first erasing and then writing the program code to its internal Flash (nonvolatile) Memory. Note that if the MP never had a prior application already in memory, the error code "Err3"will be displayed instead of this, during the programming download process.

Unit Wiring

This section provides field wiring diagrams, electrical schematics and connection diagrams for 20-130 ton CGAM units.

Unit Wiring

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DEVICES, DESCRIPTIONS & DESIGNATIONS

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	MAIN PANEL/AUXILIARY PANEL
2	NOT USED
3	REFRIGERATION CIRCUIT 1
4	REFRIGERATION CIRCUIT 2
5	UNIT MOUNTED
6	CUSTOMER PROVIDED

LEGEND

DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
	MAIN PANEL/AUXILIARY PANEL	
1A1	DYNAVIEW MAIN PROCESSOR MODULE	678
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LEGEND

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GENERAL & FLAG NOTES

GENERAL NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C (77F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. DASHED LINE ENCLOSURES AND/OR DASHED DEVICE OUTLINES INDICATE COMPONENTS PROVIDED BY THE FIELD.PHANTOM LINE ENCLOSURES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SALES OPTIONS. SOLID LINE INDICATES WIRING BY TRANE.
3. NUMBERS ALONG THE RIGHT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF CONTACTS BY LINE NUMBER. AN UNDERLINED NUMBER INDICATES A NORMALLY CLOSED CONTACT.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS.
5. CLASS 1 FIELD WIRING INSULATION RATING IS REQUIRED TO BE EQUAL TO OR GREATER THAN THE EQUIPMENT SUPPLY VOLTAGE RATING. CLASS 2 FIELD WIRE INSULATION TO BE RATED AT 300V MINIMUM.

FLAG NOTES:

1. ALL UNIT POWER WIRING MUST BE COPPER CONDUCTORS ONLY, HAVE A MINIMUM INSULATION TEMPERATURE RATING OF 90°C AND BE SELECTED AT 75°C RATINGS.
2. TERMINAL BLOCK 1X1 IS PROVIDED AS STANDARD ON ALL UNITS PNCO=TERM. CIRCUIT BREAKER 1Q1 PNCO=CB AVAILABLE AS OPTION. TERMINAL BLOCK IS REPLACED WITH CIRCUIT BREAKER WHEN THIS OPTION IS SELECTED.
3. ELECTRONIC PROTECTION MODULE USED FOR 15–30 TON COMPRESSORS ONLY.
   FOR 10–13TON COMPRESSOR CONTROL CIRCUIT, TERMINALS (16,19), (16,20) ARE JUMPED BY W4 AND W5. TERMINALS (15,18), (15,17) ARE JUMPED BY W6, AND W7 IN V CONFIGURATION. (NTON= 020, 026, 040 OR 052)
4. REFER TO FAN CHART FOR VALID FAN CONFIGURATIONS.
5. TRANSFORMER FOR 575V UNITS ONLY. (VOLT=575) AND (UAPP=CATC OR WIDC)
6. PUMP PACKAGE:
   – AT LEAST ONE PUMP IS ALWAYS PRESENT AND IS EITHER FIELD OR FACTORY SUPPLIED.
   – WHEN PUMPS ARE FACTORY SUPPLIED, THEY WILL BE DUAL PUMPS.
7. OPTIONAL DUAL FACTORY SUPPLIED EVAP WATER PUMPS. WIRING SHOWN IS FOR VSD OF PUMP PACKAGE. (PTYP=DHHP)
8. OPTIONAL DUAL CUSTOMER SUPPLIED EVAP WATER PUMP(S). 6M2 WIRING PRESENT FOR DUAL PUMP CONFIGURATION ONLY. PUMP CONTROL CONFIGURATION SHOWS WIRING WITH CONTACTORS AND OVERLOAD RELAYS. PUMP(S) CAN ALSO BE POWERED BY CUSTOMER CONTROLLED VSD(S). PUMP STARTER FAULT SIGNAL(S) TO BE FIELD WIRED TO 1A12 (INSET "V").
9. CUSTOMER SUPPLIED PUMP RUN SIGNAL TO BE FIELD WIRED TO 1A9.
10. WIRING FOR 200V/460V UNIT SHOWN. SEE INSET "B" FOR CONTROL POWER TRANSFORMER WIRING OF OTHER VOLTAGES.
11. CONTACT CLOSURE ENABLES ICE MAKING, WHEN ICE MAKING OPTION IS ORDERED. (EVLT=ICE)
12. CLASS 1 FIELD WIRED MODULE.
13. RELAY AT 120VAC: 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, 1/3 HP 7.2 FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.
14. FIELD ASSIGNED PROGRAMMABLE RELAYS. STAT=PRLY
15. CUSTOMER SUPPLIED POWER, 120V
16. ONLY USED WHEN PUMP PACKAGE OPTION IS ORDERED. (PTYP=DHHP)

4 REFER TO FAN CHART FOR VALID FAN CONFIGURATIONS.

5 TRANSFORMER FOR 575V UNITS ONLY. (VOLT=575) AND (UAPP=CATC OR WIDC)

6 PUMP PACKAGE:
– AT LEAST ONE PUMP IS ALWAYS PRESENT AND IS EITHER FIELD OR FACTORY SUPPLIED.
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7 OPTIONAL DUAL FACTORY SUPPLIED EVAP WATER PUMPS. WIRING SHOWN IS FOR VSD OF PUMP PACKAGE. (PTYP=DHHP)

8 OPTIONAL DUAL CUSTOMER SUPPLIED EVAP WATER PUMP(S). 6M2 WIRING PRESENT FOR DUAL PUMP CONFIGURATION ONLY. PUMP CONTROL CONFIGURATION SHOWS WIRING WITH CONTACTORS AND OVERLOAD RELAYS. PUMP(S) CAN ALSO BE POWERED BY CUSTOMER CONTROLLED VSD(S). PUMP STARTER FAULT SIGNAL(S) TO BE FIELD WIRED TO 1A12 (INSET "V").

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10 WIRING FOR 200V/460V UNIT SHOWN. SEE INSET "B" FOR CONTROL POWER TRANSFORMER WIRING OF OTHER VOLTAGES.

11 CONTACT CLOSURE ENABLES ICE MAKING, WHEN ICE MAKING OPTION IS ORDERED. (EVLT=ICE)

12 CLASS 1 FIELD WIRED MODULE.

13 RELAY AT 120VAC: 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, 1/3 HP 7.2 FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.

14 FIELD ASSIGNED PROGRAMMABLE RELAYS. STAT=PRLY

15 CUSTOMER SUPPLIED POWER, 120V

16 ONLY USED WHEN PUMP PACKAGE OPTION IS ORDERED. (PTYP=DHHP)

17 ONLY USED WHEN BUFFER TANK OPTION IS ORDERED. (BTNK=BTNK)

18 THE CONTACTS FOR AUTO STOP AND EMERGENCY STOP SWITCHES ARE JUMPERED AT THE FACTORY BY JUMPERS W2 & W3 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED, REMOVE THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.

19 PHASE PROTECTION RELAY USED ONLY FOR CIRCUIT(S) WITH 10 TON AND 13 TON COMPRESSORS (NTON = 20, 26, 40 or 52).

20 NOT PRESENT WHEN BOTH OF THE COMPRESSORS ARE LESS THAN 15 TON (NTON = 20, 26, 40 or 52).

21 GROUND SCREW IN MAIN CONTROL PANEL.

22 INSIDE THE PUMP VSD ENCLOSURE, MOUNTED ON UNIT FRAME WITH PTYP=DHHP

23 ONLY USED WHEN PARTIAL HEAT RECOVERY (CDHR = PRTF) OPTION IS ORDERED.

24 COMPRESSOR HEATER WIRE COLOR IS DETERMINED BY VOLTAGE IN CHART.

25 PRESENT ON "V" FRAME UNITS NTON = 40, 52, 60 or 70.

26 PRESENT ON "W" FRAME UNITS NTON = 80, 90, 100, 100, 120 or 130.

27 NOT PRESENT ON "W" FRAME UNITS NTON = 80, 90,

28 DISCHARGE REFIGERANT TEMPERATURE SENSOR PRESENT FOR ALL THE FOLLOWING OPTIONS: UNITS WITH ICEMAKING OPTION (EVLT = ICE), UNITS WITH LOW TEMPERATURE PROCESS COOLING (EVLT = PROC) , UNITS WITH PHR FAN CONTROL OPTION (CDHR = PRTF).

29 REFER TO FIELD WIRING DIAGRAM FOR SUGGESTED WIRING.

30 JUMPERS W10 AND W11 ARE INSTALLED BY THE FACTORY ON UNITS ORDERED WITH FIELD PROVIDED PUMPS (PTYP = NONE). JUMPERS W10 AND W11 ARE TO BE REMOVED WHEN PUMPS AND CONTROL ARE INSTALLED.

31 FUSES 1F38, 1F39, 1F40 PRESENT ON ALL SLANT (NTON = 20, 26, 30 or 35) AND V (NTON = 40, 52, 60 or 70) CONFIGURATIONS. PRESENT FOR W (NTON = 80, 90, 100, 110, 120 or 130)CONFIGURATION WHEN LINE VOLTAGE IS 575VAC (VOLT = 575).

35 VENTILATION FAN PRESENT WHEN LINE (VOLT = 200, 230VAC, 380 or 400).

36 1A41, BACNET INTERFACE MODULE USED WHEN (COMM = BCNT).

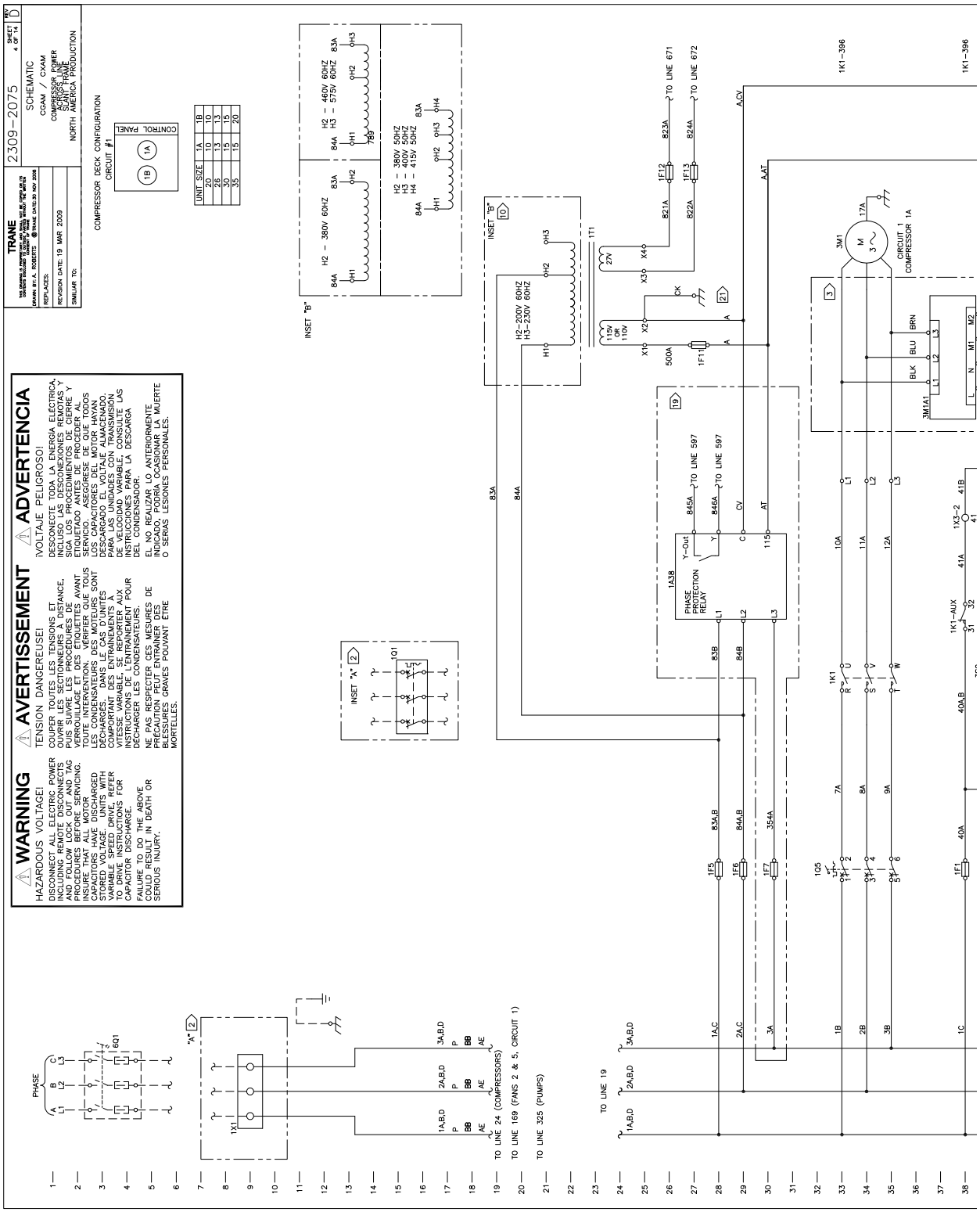
37 THERMOSTATS ARE REQUIRED IN THE COMPRESSOR JUNCTION BOXES ON ALL UNITS WITH COMMERCIAL COMPRESSORS AND SOUND WRAPS TO PREVENT THE PROTECTION MODUAL FROM GETTING TOO HOT. (NTON=30, 35, 60, 70, 80, 90, 100, 110, 120 or 130) (HRTZ = 60 AND SATT = LNUN OR HRTZ = 50 AND SATT = STDN)

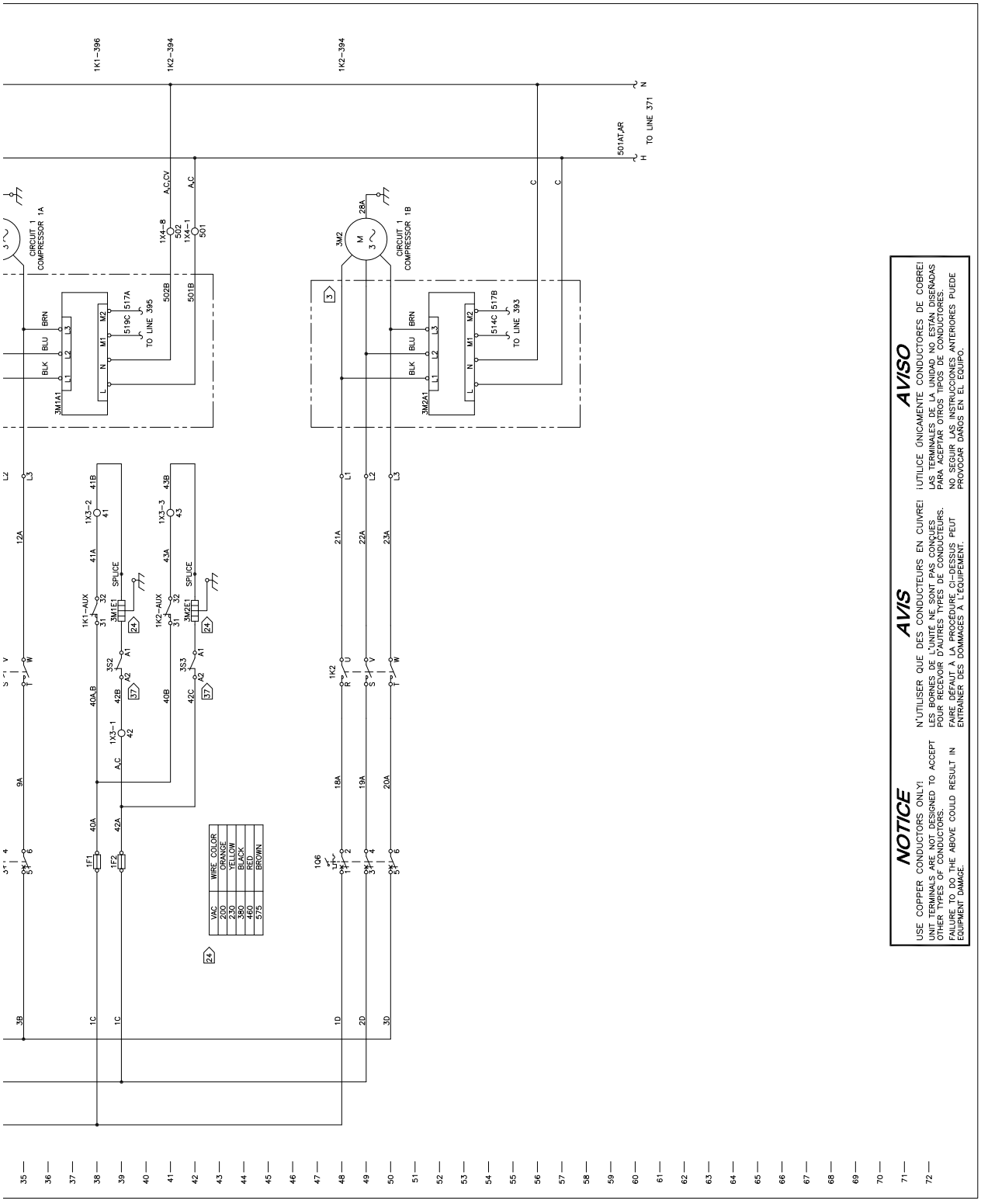
38 THE SAME PUMP MOTOR IS USED FOR 200/230 & 480V UNITS WIRE CONNECTIONS SHOWN FOR BOTH OPTIONS VERIFY WHAT VOLTAGES CHILLER IS BEFORE WIRING.

39 PRESENT ON UNITS NTON=130

40 PRESENT ON UNITS NTON=20, 26, 30, 35 AND PTYP=DHHP

20-35 Ton - "Slant Frame" - Compressor Power Circuit 1




NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAINER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
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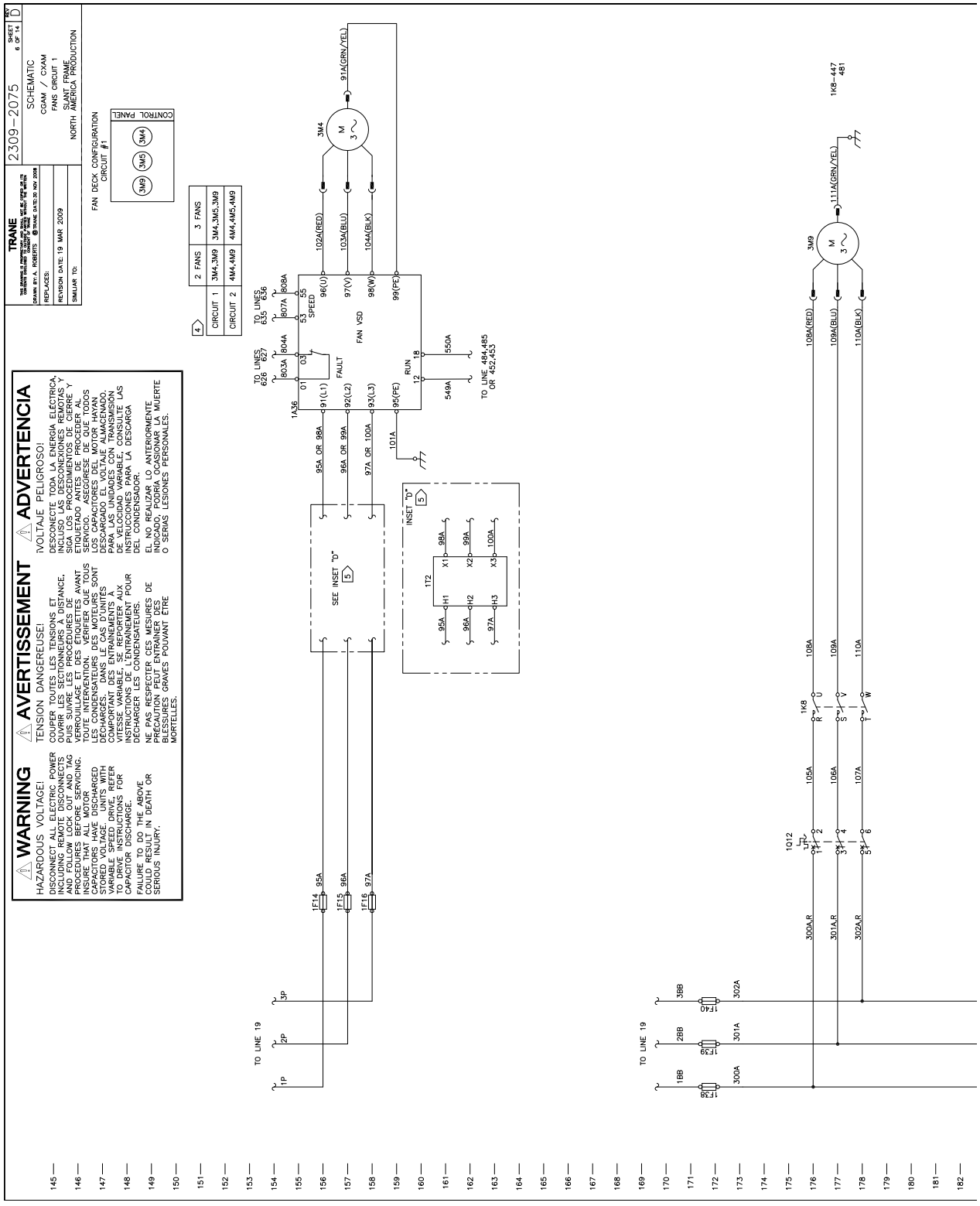
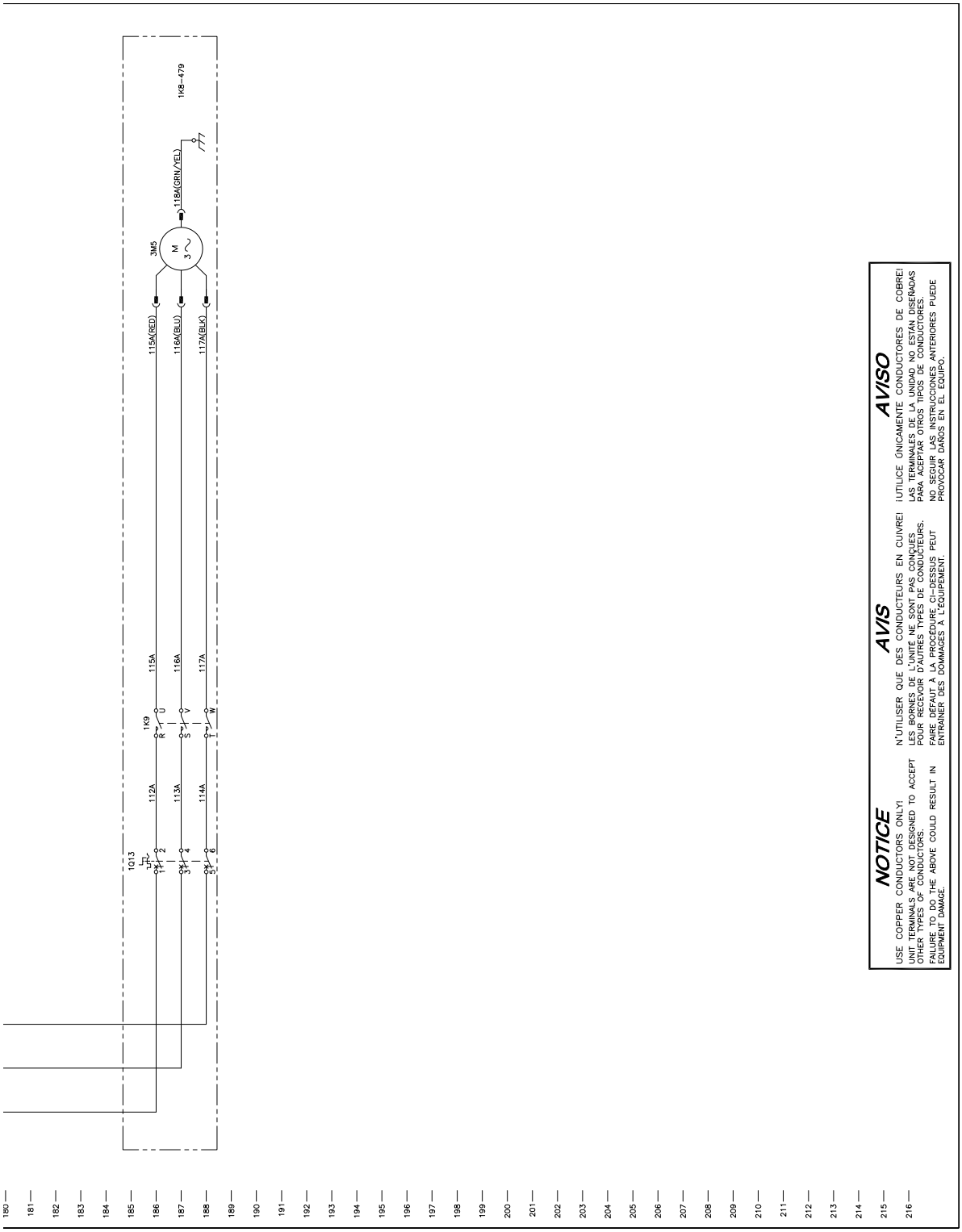
1K1-396
1K2-394
1K2-394
CIRCUIT 1 COMPRESSOR 1A
CIRCUIT 1 COMPRESSOR 1B
3M1A1
3M2A1
TO LINE 395
TO LINE 393
TO LINE 371
1K1-AUX
1K2-AUX
SPLICE
1X3-1
1X3-2
1X3-3
1X4-8
1X4-1
3S2
3S3
1K2
1F1
1F2
1C6
WIRE COLOR
ORANGE
YELLOW
BLACK
RED
BROWN
VAC
200
230
380
460
575

20-35 Ton - "Slant Frame" - Fan Power Circuit 1




1Q13
1K9
112A
113A
114A
115A
116A
117A
115A(RED)
116A(BLU)
117A(BLK)
3M5
M
3
118A(GRN/YEL)
1K8-479
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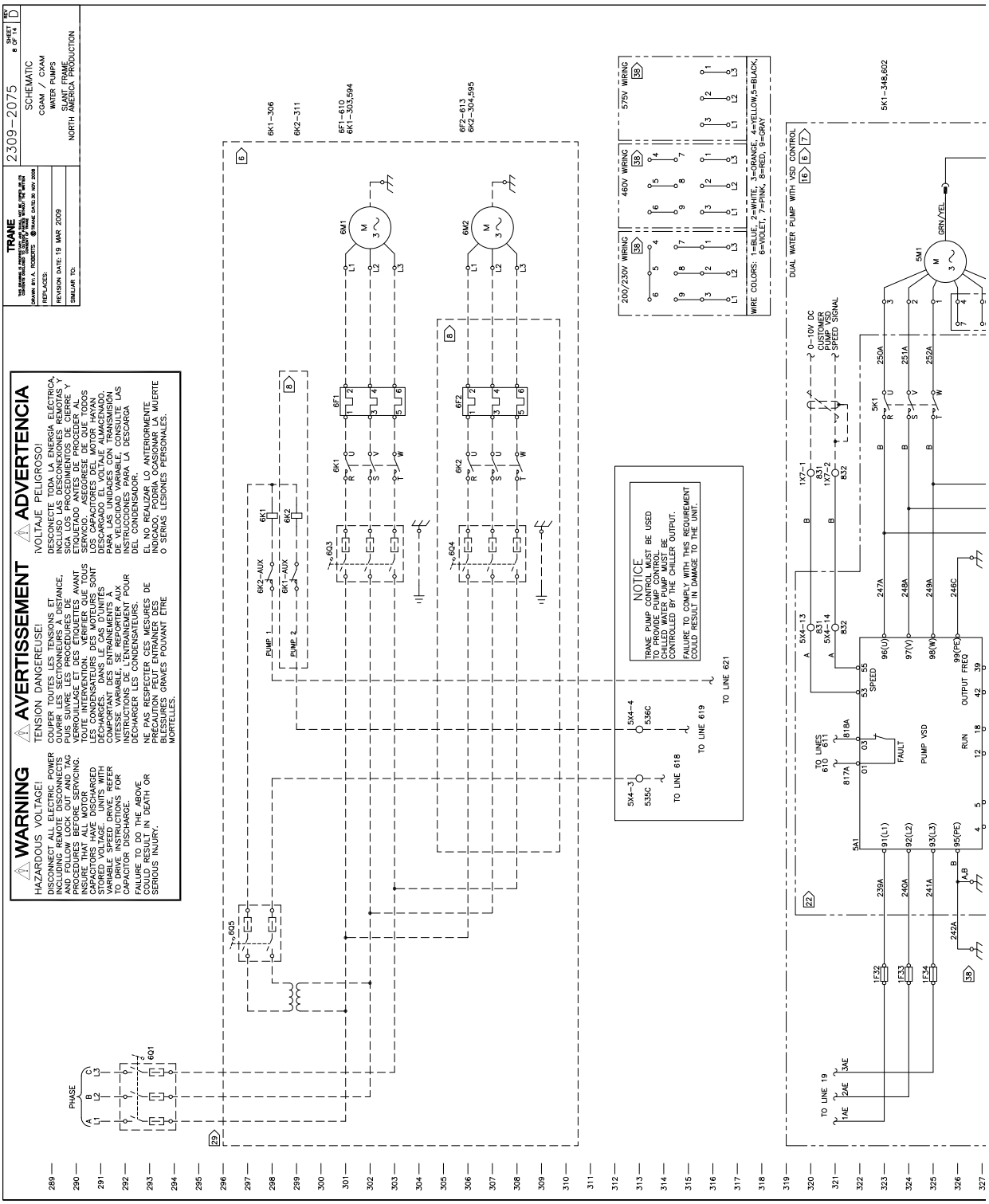
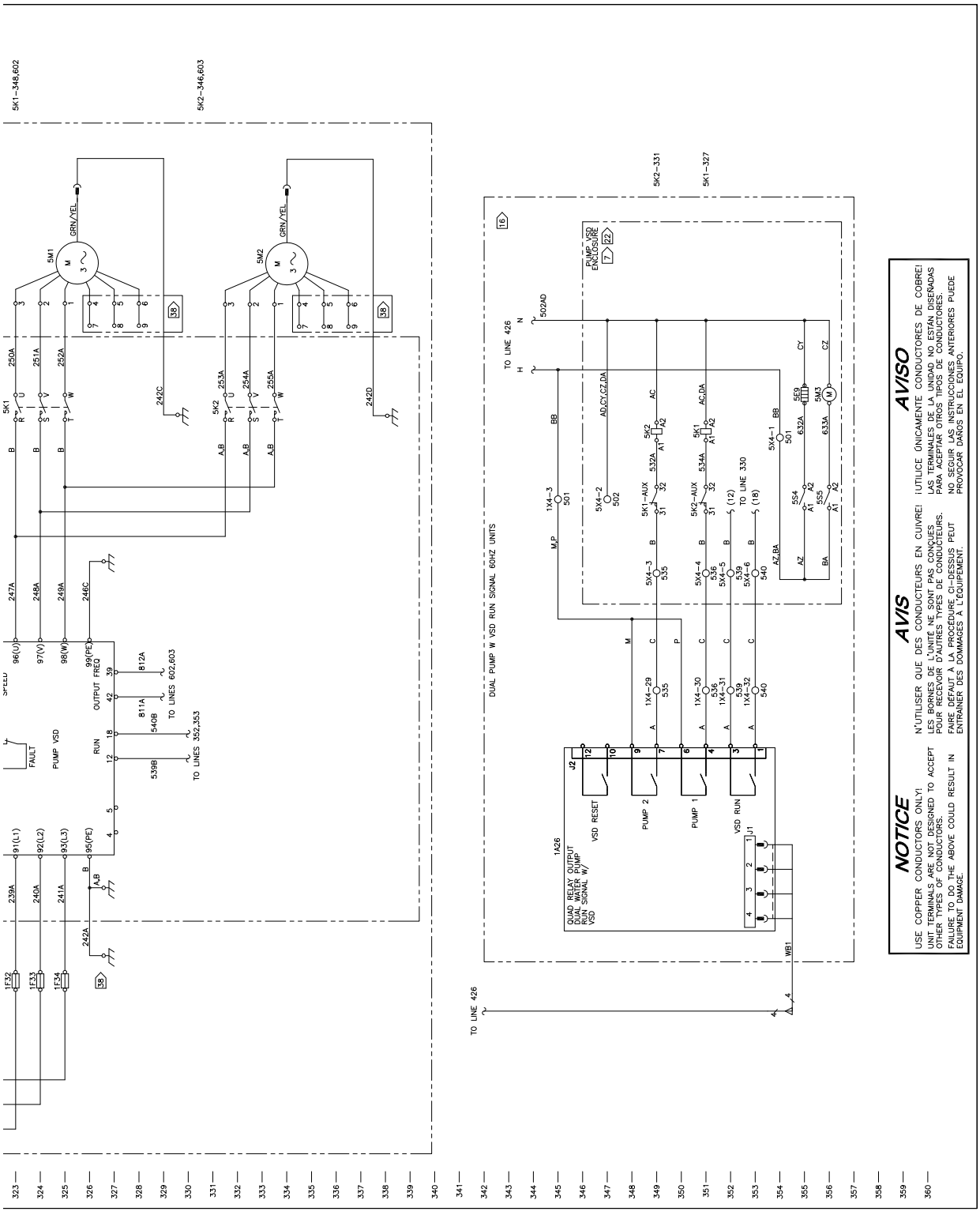
Unit Wiring

20-35 Ton - "Slant Frame" - Pump Power/Control




5K1-348,602
5K2-346,603
5M1
5M2
GRN/YEL
5K1
5K2
250A
251A
252A
253A
254A
255A
242C
242D
247A
248A
249A
246C
239A
240A
241A
242A
1F32
1F33
1F34
96(U)
97(V)
98(W)
99(PE)
91(L1)
92(L2)
93(L3)
95(PE)
FAULT
PUMP VSD
RUN
OUTPUT FREQ
812A
811A
540B
539B
TO LINES 602,603
TO LINES 352,353
DUAL PUMP W VSD RUN SIGNAL 60HZ UNITS
TO LINE 426
5022AD
PUMP VSD ENABLE/RUN
5K2-331
5K1-327
1X4-3
501
5X4-2
502
5K1-AUX
5K2-AUX
5K2
5K1
5X4-1
5E9
5M3
632A
633A
5S4
5S5
1X4-29
1X4-30
1X4-31
1X4-32
5X4-3
5X4-4
5X4-5
5X4-6
535
536
539
540
TO LINE 330
1A26
QUAD RELAY OUTPUT
DUAL WATER PUMP
RUN SIGNAL W/
VSD
J2
J1
VSD RESET
PUMP 2
PUMP 1
VSD RUN
WB1
NOTICE
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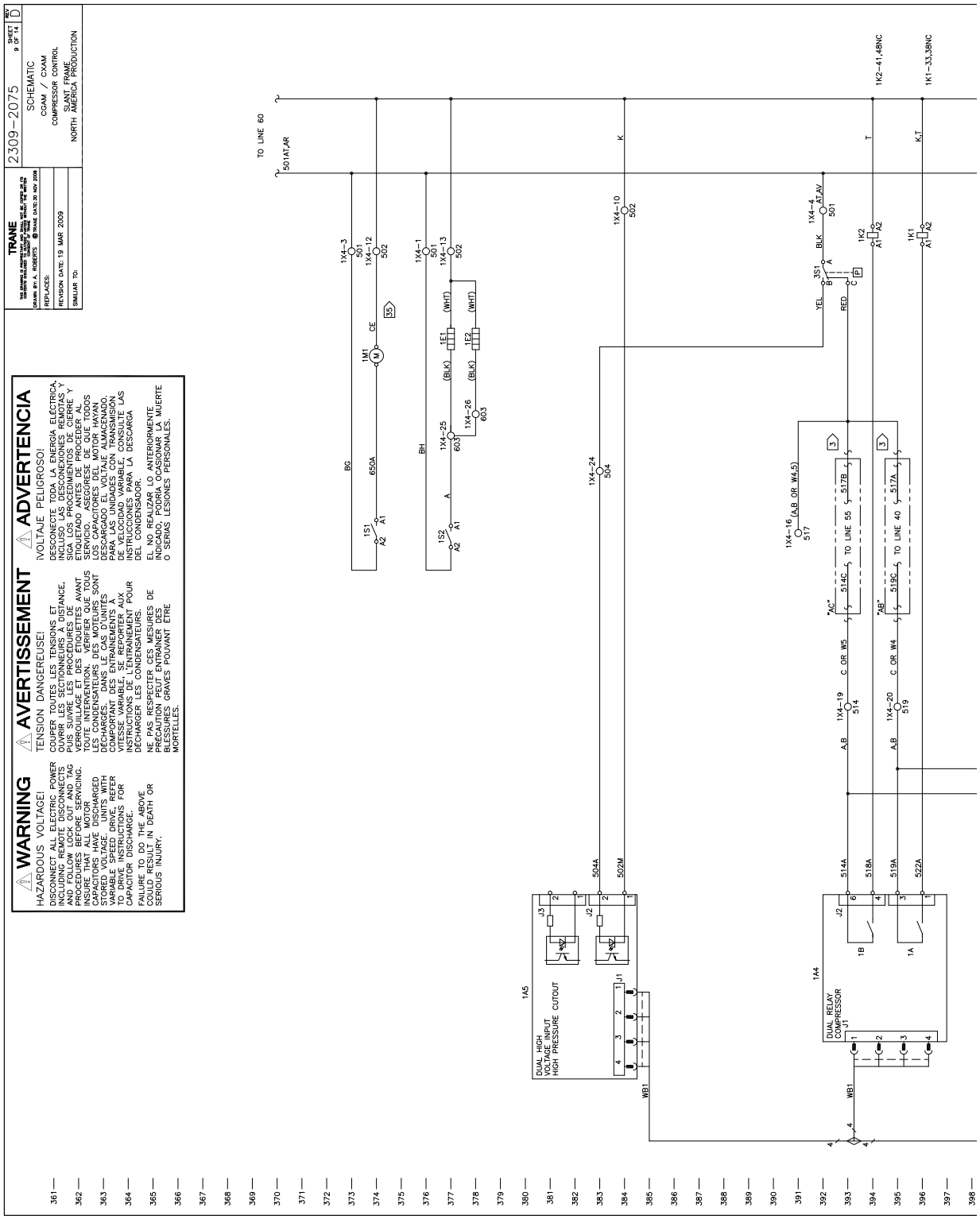
WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.
FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET OUVRIR LES DISCONNECTS A DISTANCE, PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE ET DES ETIQUETTES AVANT TOUTE INTERVENTION. VERIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
ADVERTENCIA
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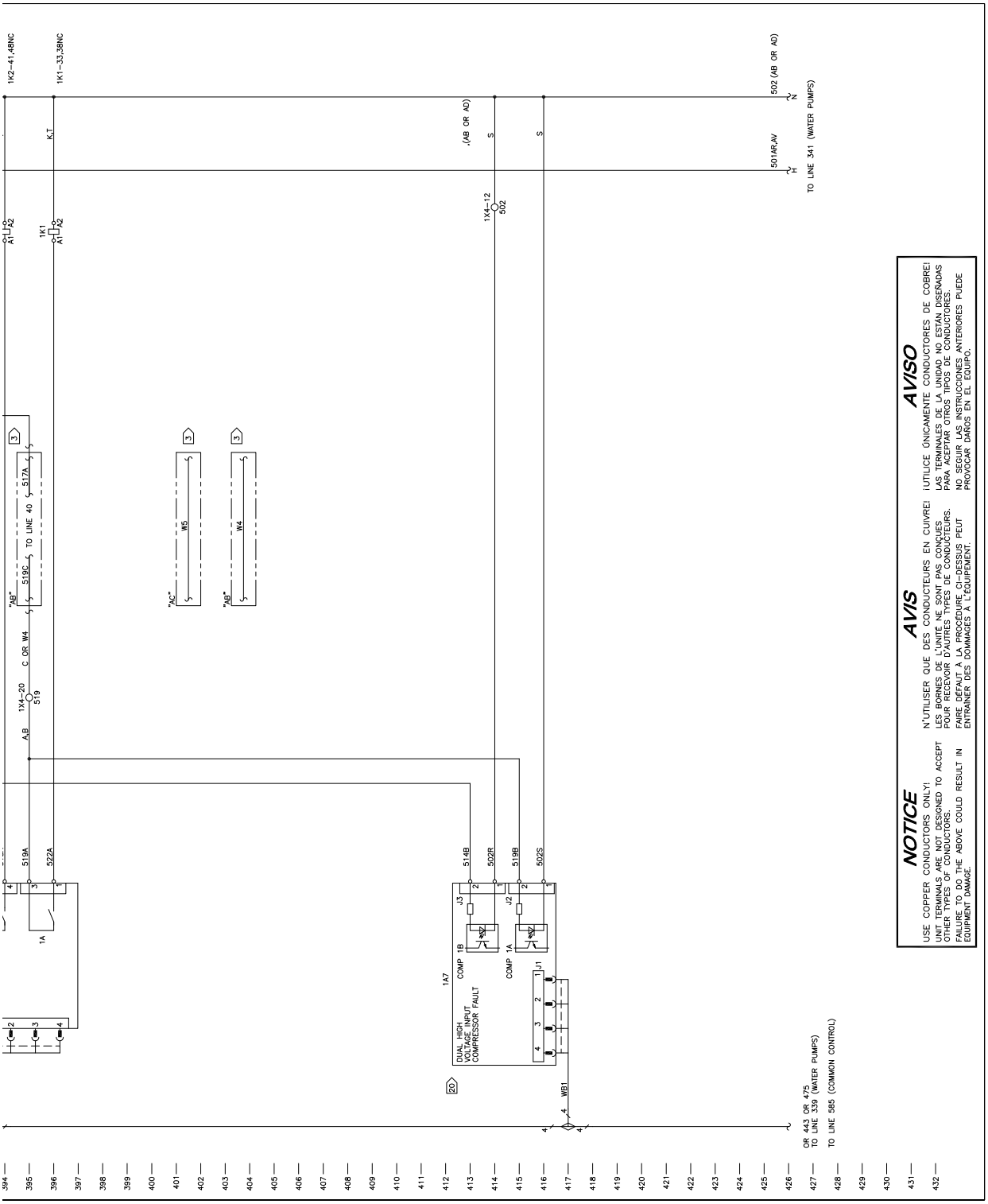
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
TRANE
DRAWN BY: A. ROBERTS
REPLACES:
REVISION DATE: 19 MAR 2009
SIMILAR TO:
2309-2075
SHEET 9 OF 14
REV D
SCHEMATIC
CGAM / CXAM
COMPRESSOR CONTROL
SLANT FRAME
NORTH AMERICA PRODUCTION
TO LINE 60
501A1,AR
1S1
1S2
1M1
CE
35
650A
BG
BH
1X4-3
1X4-12
1X4-1
1X4-13
1X4-25
1X4-26
1E1
1E2
(WHT)
(BLK)
603
1X4-10
502
1X4-24
504
1X4-16 (A,B OR W4,5)
517
1X4-4
A1,AV
3S1
YEL
RED
BLK
1K2
1K1
1K2-41,48NC
1K1-33,38NC
K
T
K,T
"AC"
"AB"
514C
519C
517B
517A
TO LINE 55
TO LINE 40
1X4-19
514
1X4-20
519
C OR W5
C OR W4
A,B
504A
502M
J3
J2
J1
1A5
DUAL HIGH VOLTAGE INPUT HIGH PRESSURE CUTOUT
WB1
1A4
DUAL RELAY COMPRESSOR
514A
518A
519A
522A
1B
1A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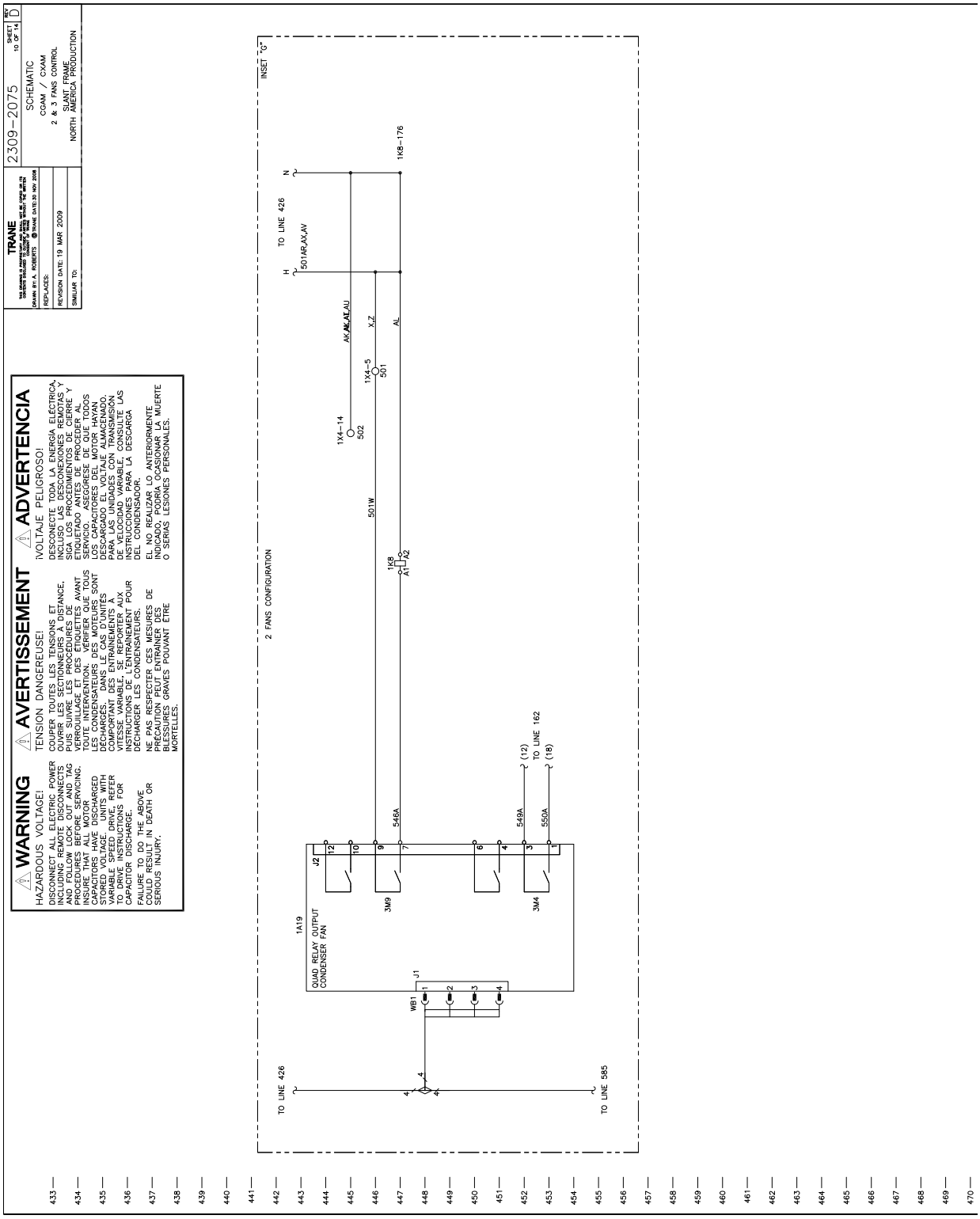
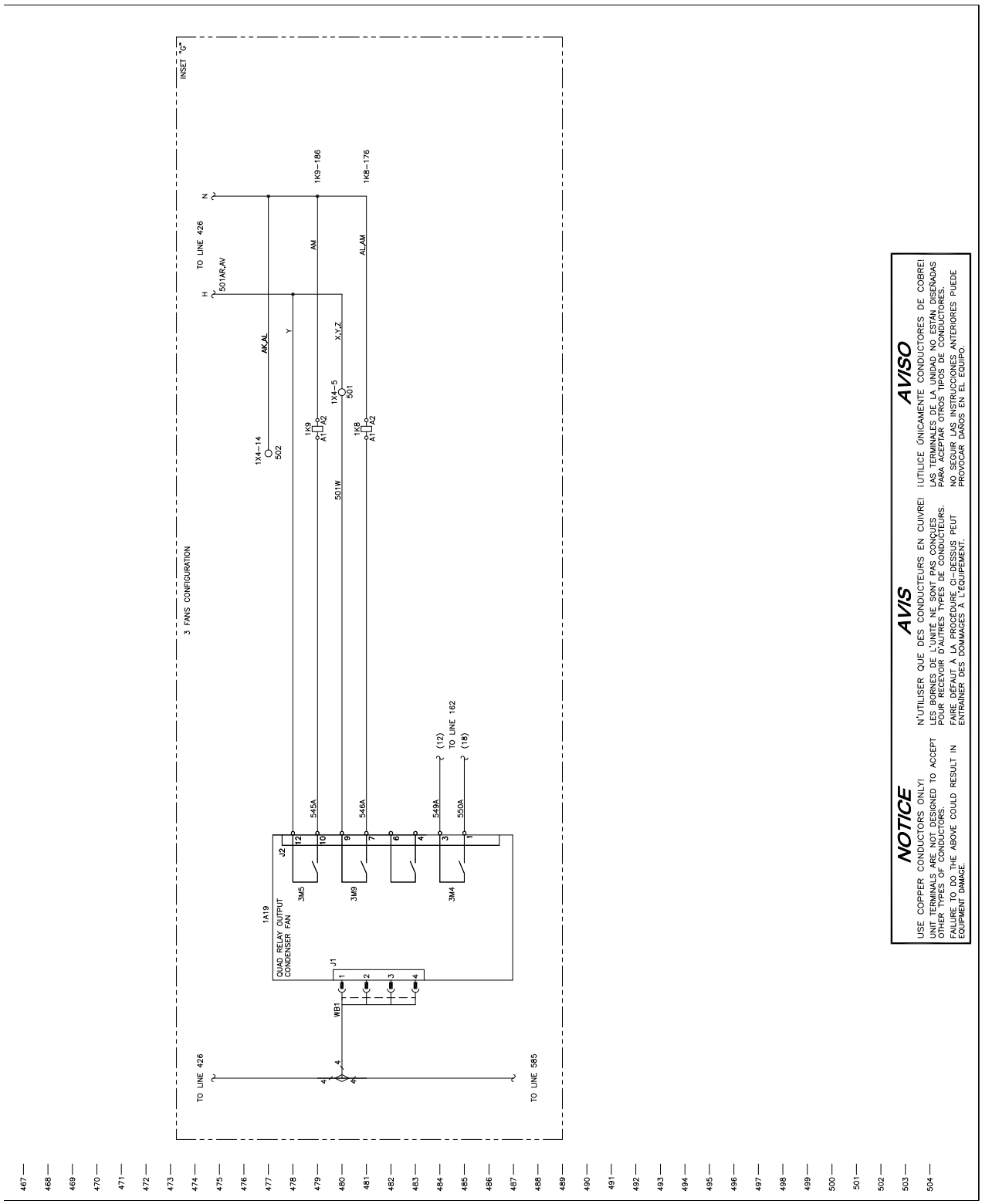
1K2—41,48NC
1K1—33,38NC
1K1
1X4—12
1X4—20
1A7
COMP 1B
COMP 1A
DUAL HIGH VOLTAGE INPUT COMPRESSOR FAULT
J1
J2
J3
519A
522A
519
519C
517A
514B
502R
519B
502S
WB1
W4
W5
"AB"
"AC"
502 (AB OR AD)
501AR,AV
TO LINE 341 (WATER PUMPS)
OR 443 OR 475
TO LINE 339 (WATER PUMPS)
TO LINE 585 (COMMON CONTROL)
TO LINE 40

20-35 Ton - "Slant Frame" - Fan Control, 2 & 3 Fan Units




INSET "G"
3 FANS CONFIGURATION
TO LINE 426
501AR,AV
N
H
1K9-186
1K8-176
AK,AL
AM
AL,AM
Y
X,Y,Z
1X4-14
502
1X4-5
501
1K9
1K8
501W
1A19
QUAD RELAY OUTPUT
CONDENSER FAN
J2
J1
3M5
3M9
3M4
545A
546A
549A
550A
(12)
(18)
TO LINE 162
WB1
TO LINE 426
TO LINE 585
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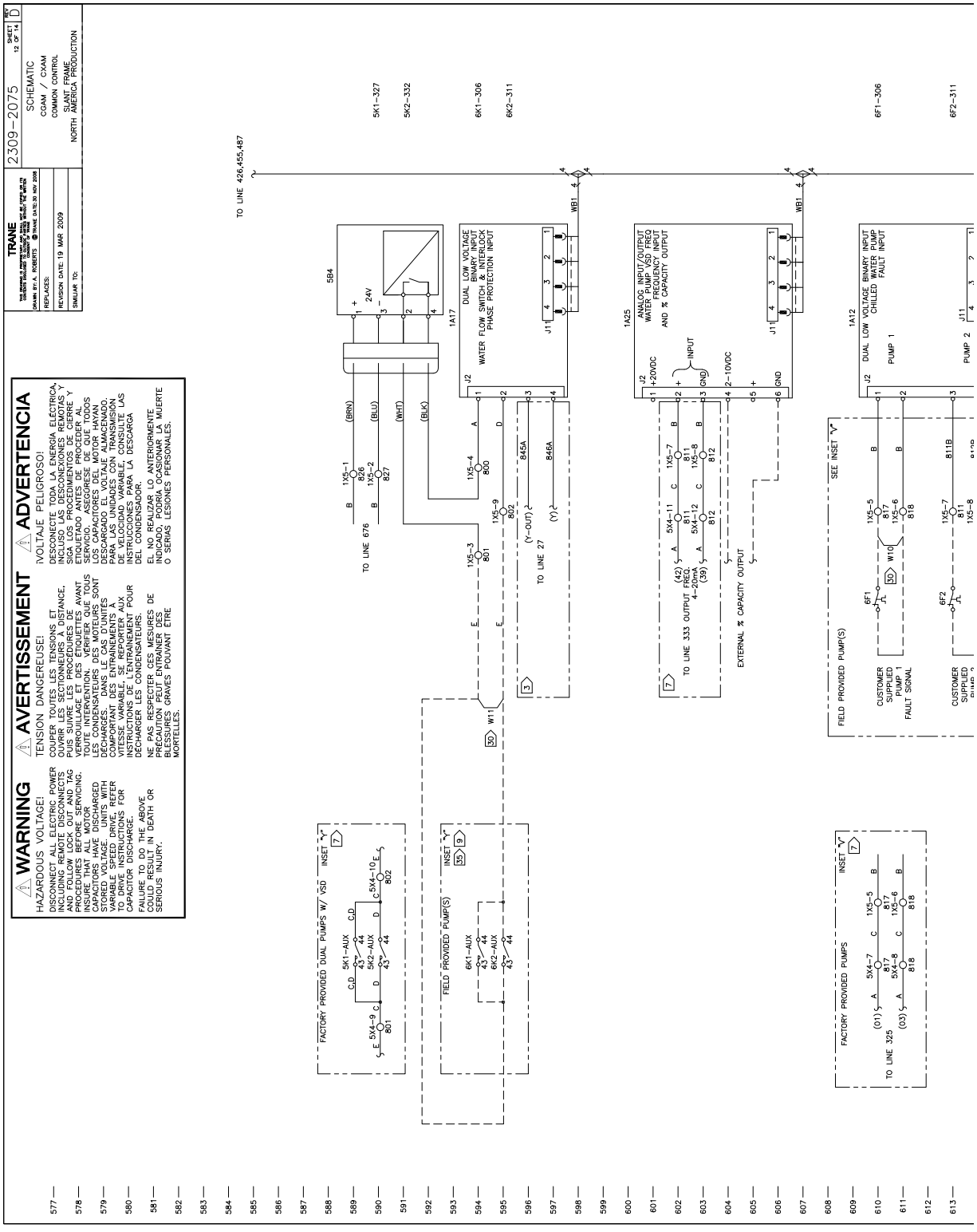
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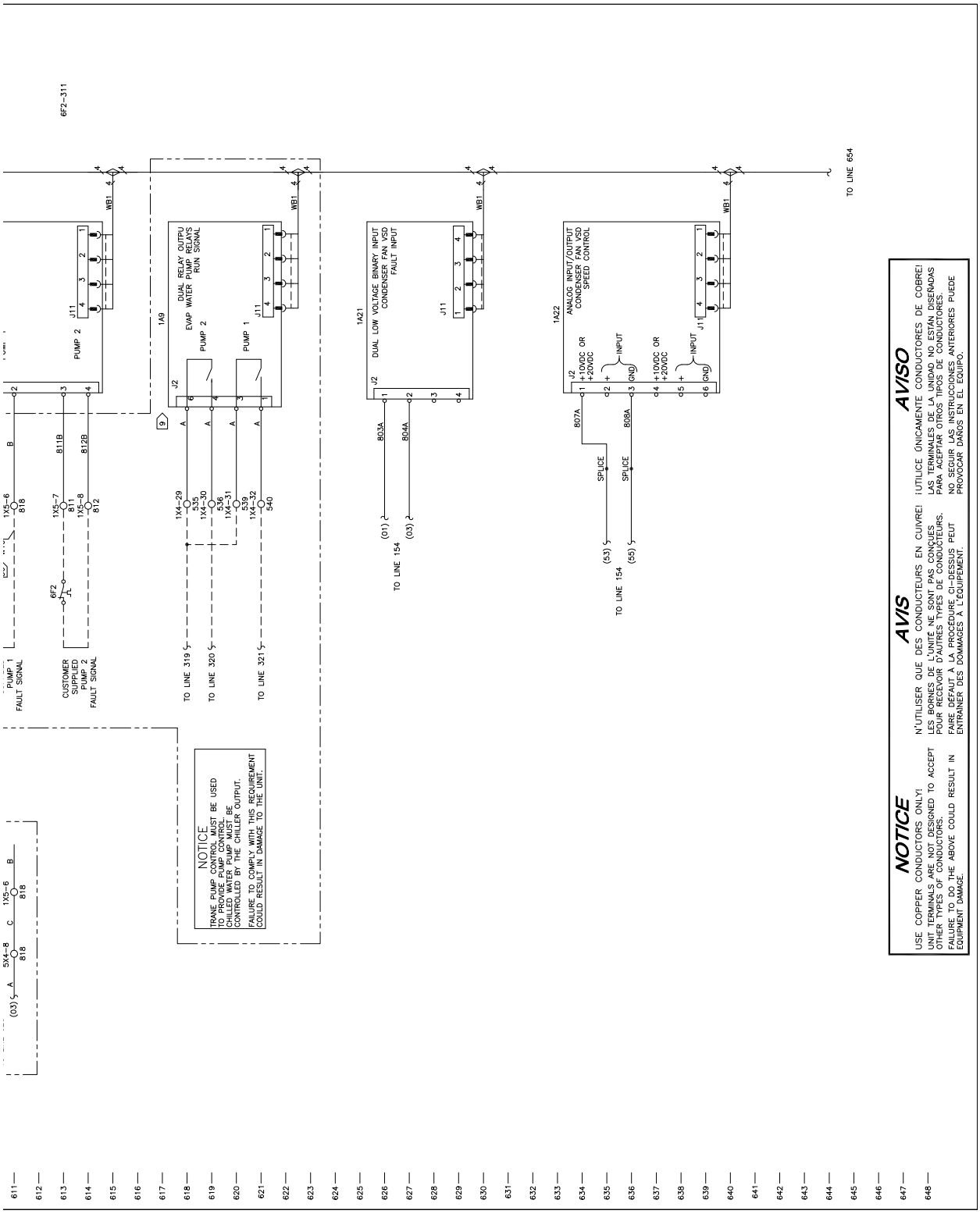
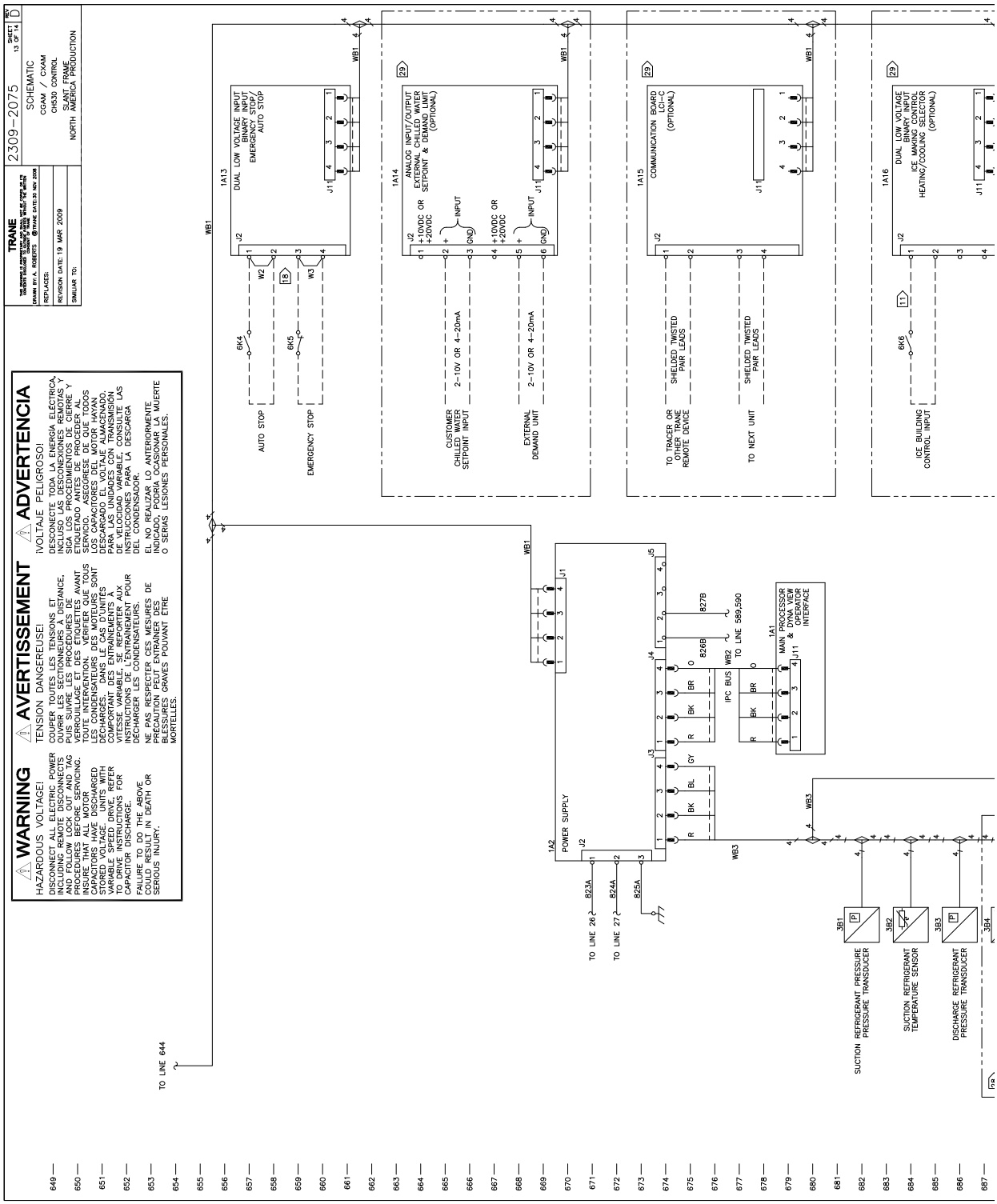
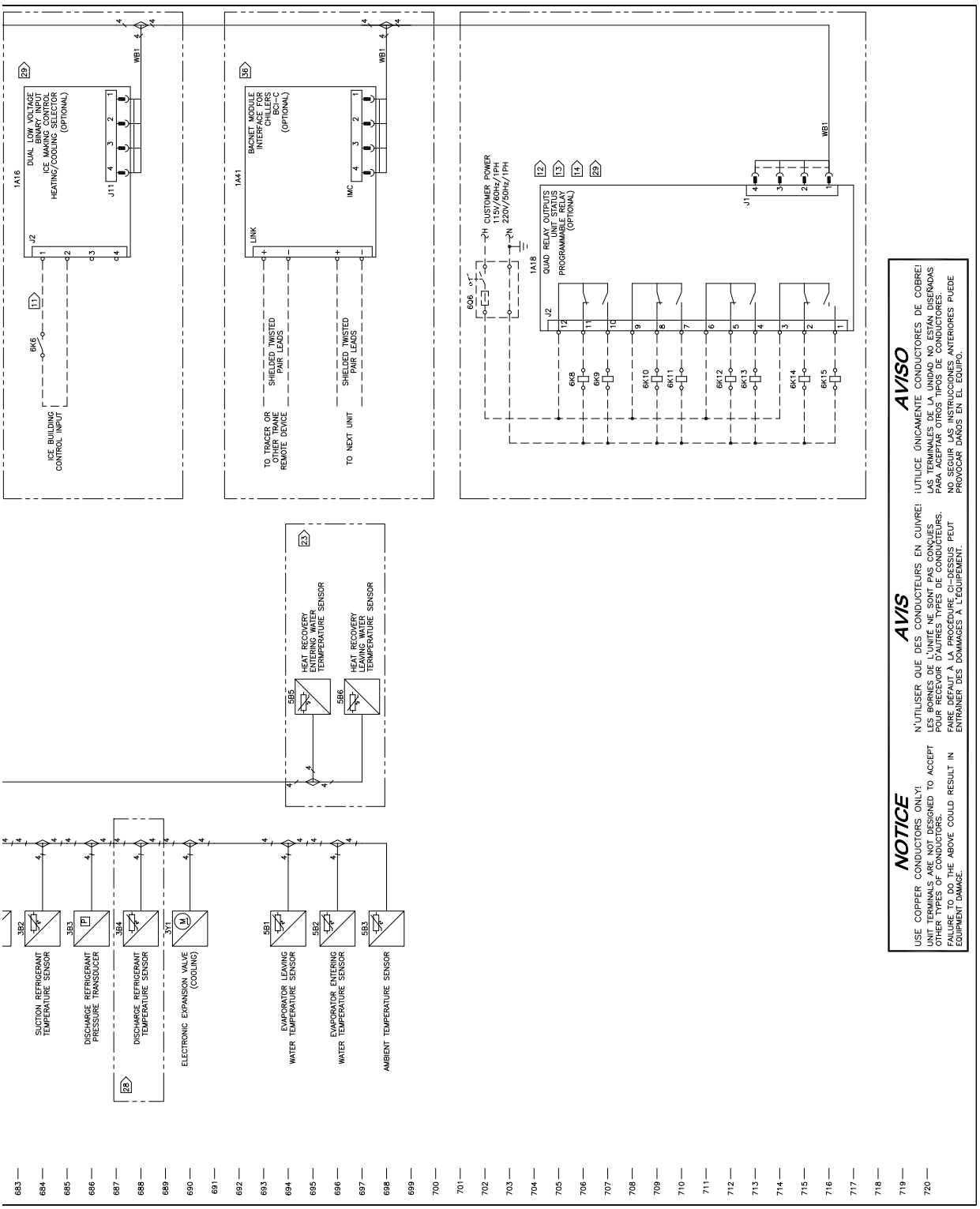
TRANE
2309-2075
SCHEMATIC
CGAM / CXAM
COMMON CONTROL
SLANT FRAME
NORTH AMERICA PRODUCTION
SHEET 12 OF 14
REV D
REVISION DATE: 19 MAR 2009
TO LINE 426,455,487
5K1-327
5K2-332
6K1-306
6K2-311
6F1-306
6F2-311
5B4
1A17
DUAL LOW VOLTAGE BINARY INPUT WATER FLOW SWITCH & INTERLOCK PHASE PROTECTION INPUT
1A25
ANALOG INPUT/OUTPUT WATER RESET, FREQUENCY INPUT AND % CAPACITY OUTPUT
1A12
DUAL LOW VOLTAGE BINARY INPUT CHILLED WATER PUMP FAULT INPUT
PUMP 1
PUMP 2
FACTORY PROVIDED DUAL PUMPS W/ VSD
FIELD PROVIDED PUMP(S)
FACTORY PROVIDED PUMPS
FIELD PROVIDED PUMP(S)
SEE INSET "A"
INSET "A"
TO LINE 676
TO LINE 27
TO LINE 333 OUTPUT FREQ. 4-20mA
TO LINE 325
EXTERNAL % CAPACITY OUTPUT
CUSTOMER SUPPLIED PUMP 1 FAULT SIGNAL
CUSTOMER SUPPLIED
24V
+20VDC
2-10VDC
INPUT
GND
W11
W10
WB1


NOTICE
TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL. CHILLED WATER PUMP MUST BE CONTROLLED BY THE CHILLER OUTPUT.
FAILURE TO COMPLY WITH THIS REQUIREMENT COULD RESULT IN DAMAGE TO THE UNIT.
NOTICE
USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.
PUMP 1 FAULT SIGNAL
CUSTOMER SUPPLIED PUMP 2 FAULT SIGNAL
DUAL RELAY OUTPU EVAP WATER PUMP RELAYS RUN SIGNAL
DUAL LOW VOLTAGE BINARY INPUT CONDENSER FAN VSD FAULT INPUT
ANALOG INPUT/OUTPUT CONDENSER FAN VSD SPEED CONTROL
+10VDC OR +20VDC
INPUT
GND
SPLICE
TO LINE 319
TO LINE 320
TO LINE 321
TO LINE 654
TO LINE 154

20-35 Ton - "Slant Frame" - Common Control





NOTICE

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FAIRE DÉFAUT À LA PROCÉDURE CI–DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.

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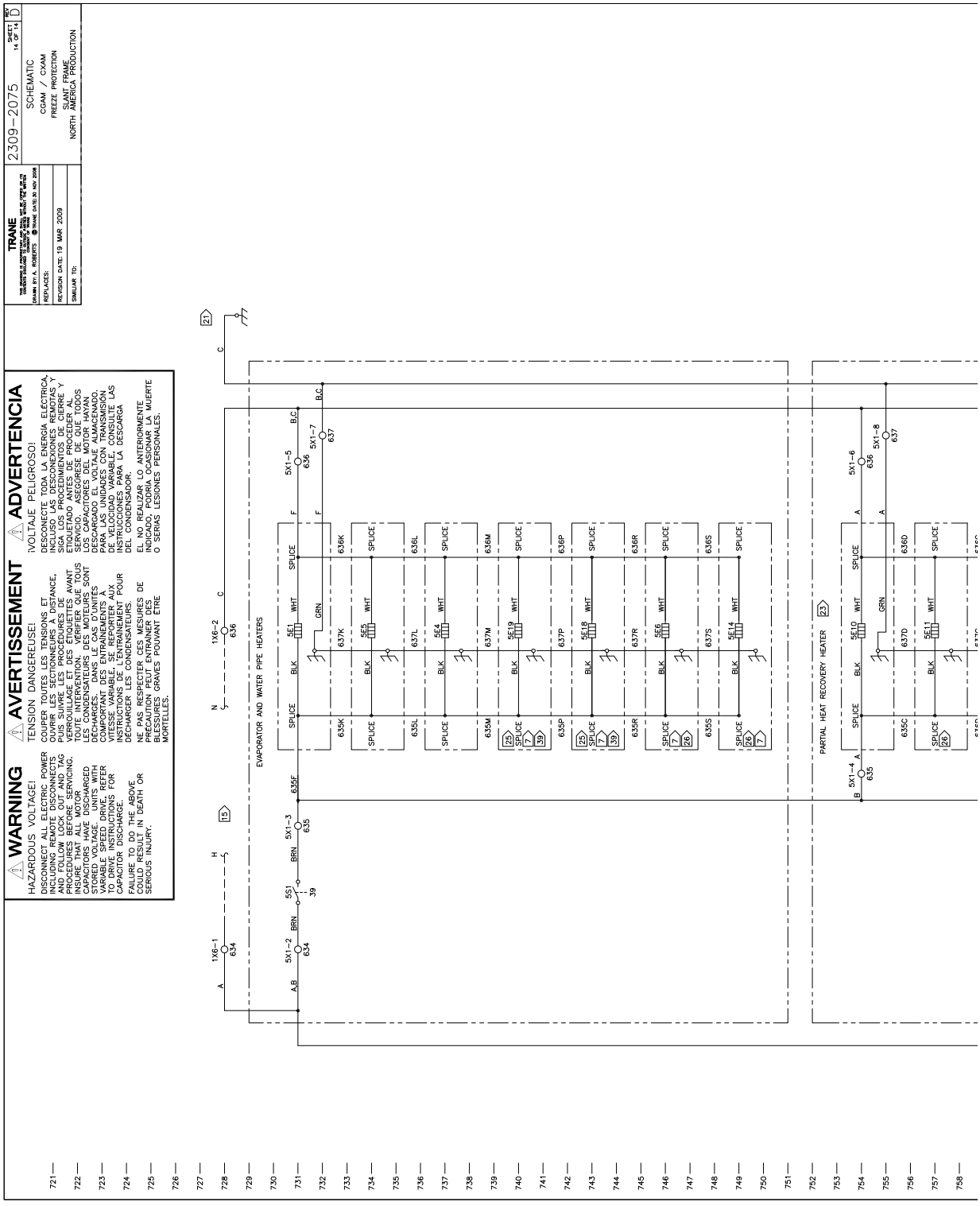
WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. MAKE SURE ALL CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO LOCAL INSTRUCTIONS FOR CAPACITOR DISCHARGE.
FAILURE TO DO THE ABOVE, COULD RESULT IN DEATH OR SERIOUS INJURY.
AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET D'ÉTIQUETAGE AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
ADVERTENCIA
¡VOLTAJE PELIGROSO!
DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON TRANSMISIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
TRANE
2309-2075
SHEET: 14 OF 14
REV: D
SCHEMATIC
CGAM / CXAM
FREEZE PROTECTION
SLANT FRAME
NORTH AMERICA PRODUCTION
REPLACES:
REVISION DATE: 19 MAR 2009
SIMILAR TO:
EVAPORATOR AND WATER PIPE HEATERS
PARTIAL HEAT RECOVERY HEATER
1X6-1
1X6-2
5X1-2
5X1-3
5X1-4
5X1-5
5X1-6
5X1-7
5X1-8
5S1
5E1
5E4
5E5
5E6
5E10
5E11
5E14
5E18
5E19
SPLICE
WHT
BLK
BRN
GRN
BLU
634
635
636
637
635F
635K
635L
635M
635P
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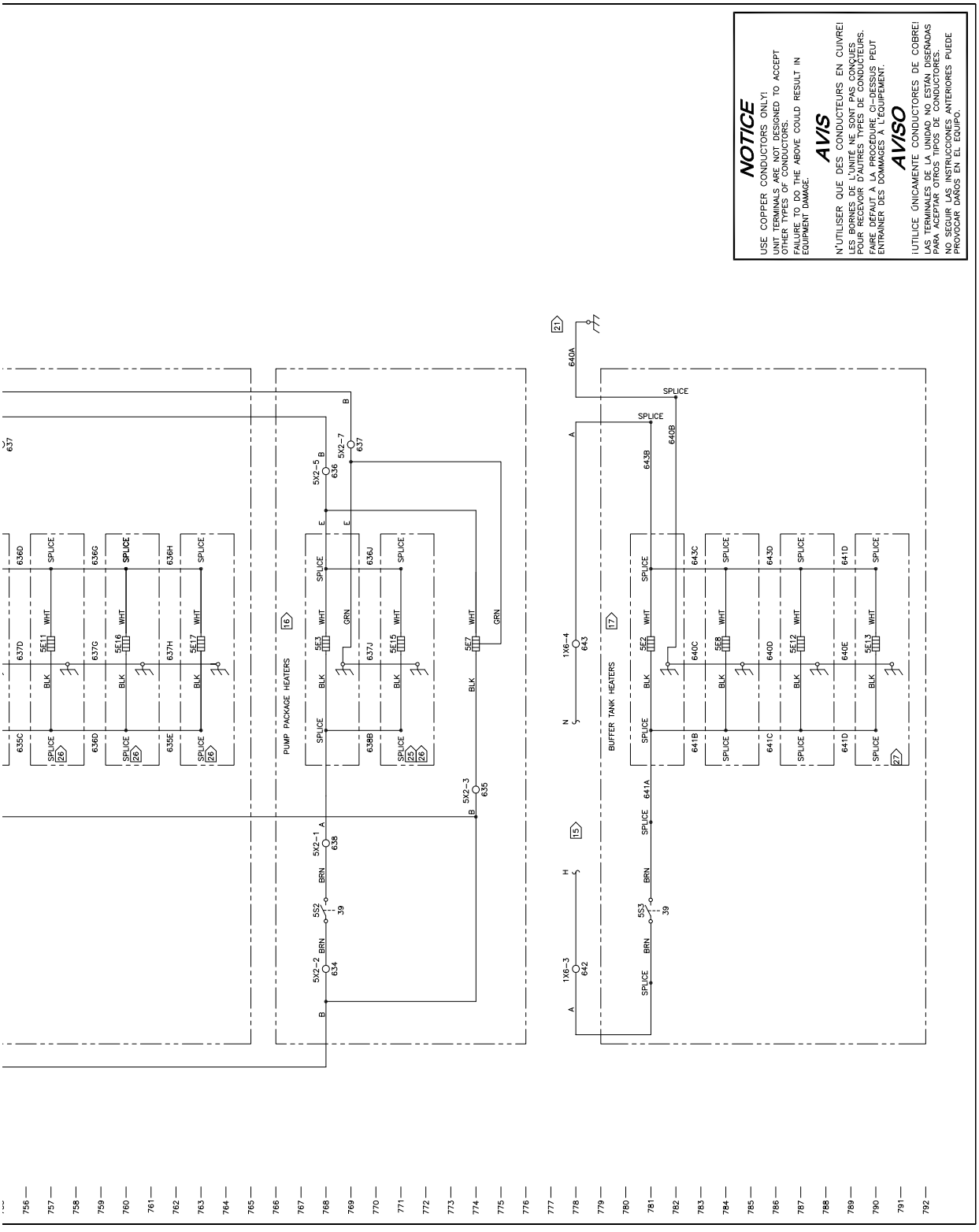
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PUMP PACKAGE HEATERS
BUFFER TANK HEATERS
SPLICE
WHT
BLK
GRN
BRN

40-70 Ton - "V Frame" - Table of Contents

TRANE	2309–2075	SHEET 1 OF 14	REV D
THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE	SCHEMATIC		
DRAWN BY: A. ROBERTS ©TRANE DATE: 30 NOV 2008	CGAM / CXAM		
REPLACES:	TABLE OF CONTENTS		
REVISION DATE: 19 MAR 2009	V FRAME		
SIMILIAR TO:	NORTH AMERICA PRODUCTION		

TABLE of CONTENTS

DEVICES, DESCRIPTIONS & DESIGNATIONS

TRANE	2309–2075	SHEET 2 OF 14	REV D
THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO ANY THIRD PARTY WITHOUT THE WRITTEN CONSENT OF TRANE	SCHEMATIC		
DRAWN BY: A. ROBERTS © TRANE DATE: 30 NOV 2008	CGAM / CXAM		
REPLACES:	DEVICE DESIGNATORS		
REVISION DATE: 19 MAR 2009	V FRAME		
SIMILIAR TO:	NORTH AMERICA PRODUCTION		

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	MAIN PANEL/AUXILIARY PANEL
2	NOT USED
3	REFRIGERATION CIRCUIT 1
4	REFRIGERATION CIRCUIT 2
5	UNIT MOUNTED
6	CUSTOMER PROVIDED

LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
MAIN PANEL/AUXILIARY PANEL		
1A1	DYNAVIEW MAIN PROCESSOR MODULE	678
1A2	POWER SUPPLY MODULE	669
1A3	COMPRESSOR MOTOR CONTROL; QUAD RELAY OUTPUT	387
1A5	HIGH PRESSURE CUTOUT; DUAL HIGH VOLTAGE BINARY INPUT	380
1A6	COMPRESSOR FAULT, 2A & 2B, DUAL HIGH VOLTAGE BINARY INPUT	405
1A7	COMPRESSOR FAULT, 1A & 1B, DUAL HIGH VOLTAGE BINARY INPUT	412
1A9	CHILLED WATER PUMP CONTROL, DUAL RELAY OUTPUT	617
1A12	CHILLED WATER PUMP FAULT, DUAL LOW VOLTAGE BINARY INPUT	609
1A13	EXTERNAL EMERGENCY STOP/AUTO STOP, DUAL LOW VOLTAGE BINARY INPUT	656
1A14	EXTERNAL CHILLER WATER SETPOINT DEMAND &LIMIT; ANOLOG INPUT/OUTPUT	663
1A15	COMMUNICATION, LCI–C, DUAL LOW VOLTAGE BINARY INPUT	673
1A16	ICE MAKING CONTROL, DUAL LOW VOLTAGE BINARY INPUT	683
1A17	CHILLED WATER FLOW AND INTERLOCKS, DUAL LOW VOLTAGE BINARY INPUT	593
1A18	UNIT OPERATING STATUS, QUAD RELAY OUTPUT	704
1A19	CONDENSER FAN CONTROL CIRCUIT 1, QUAD RELAY OUTPUT	443 OR 477
1A20	CONDENSER FAN CONTROL CIRCUIT 2, QUAD RELAY OUTPUT	459 OR 490
1A21	FAN INVERT FAULT INPUT, DUAL LOW VOLTAGE BINARY INPUT	625
1A22	FAN VSD CONTROL, ANALOG INPUT/OUTPUT	633
1A25	PUMP VSD FREQUENCY, ANOLOG INPUT/OUTPUT OR % CAPACITY	600
1A26	DUAL CHILLED WATER PUMP CONTROL WITH VSD, QUAD RELAY OUTPUT	345
1A36	VSD, CONDENSER FAN 2A, CIRCUIT 1	155
1A37	VSD, CONDENSER FAN 2A, CIRCUIT 2	227
1A38	RELAY, PHASE PROTECTION, CIRCUIT 1	26
1A41	BACNET COMMUNICATION INTERFACE FOR CHILLERS	692
1E1	HEATER, BLANKET, 1A36	377
1E2	HEATER, BLANKET, 1A36	378
1E3	HEATER, BLANKET, 1A37	379
1F1,1F2	FUSE, COMPRESSOR HEATER, CIRCUIT 1	38,39
1F3,1F4	FUSE, COMPRESSOR HEATER, CIRCUIT 2	98,99
1F5,1F6	FUSE, CONTROL POWER TRANSFORMER, PRIMARY	28,29
1F7	FUSE, PHASE PROTECTION RELAY, CIRCUIT 1	30
1F11	FUSE, CONTROL POWER TRANSFORMER, SECONDARY, 115V	27
1F12–1F13	FUSE, CONTROL POWER TRANSFORMER, SECONDARY, 24V	26,27
1F14–1F16	FUSE, FAN 1A, CIRCUIT 1	156,157,158
1F17–1F19	FUSE, FAN 2A, CIRCUIT 2	228,229,230
1F32–1F34	FUSE, VSD, PUMP	323,324,325
1F38–1F40	FUSE, FANS CIRCUIT 1	172
1F44–1F46	FUSE, FANS CIRCUIT 2	244
1K1	CONTACTOR, COMPRESSOR 1A, CIRCUIT 1	33,396
1K2	CONTACTOR, COMPRESSOR 1B, CIRCUIT 1	48,394

LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBEP
REFRIGERATION CIRCUIT 1		
3B1	TRANSDUCER, SUCTION REFRIGERANT PRESSURE, CIRCUIT 1	682
3B2	SENSOR, SUCTION REFRIGERANT TEMPERATURE, CIRCUIT 1	684
3B3	TRANDUCER, DISCHARGE REFRIGERANT PRESSURE, CIRCUIT 1	686
3B4	SENSOR, DISCHARGE REFRIGERANT TEMPERATURE, CIRCUIT 1	688
3M1	MOTOR, COMPRESSOR 1A, CIRCUIT 1	34
3M1A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 1A, CIRCUIT 1	36
3M1E1	HEATER, COMPRESSOR 1A, CIRCUIT 1	39
3M2	MOTOR, COMPRESSOR 1B, CIRCUIT 1	49
3M2A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 1B, CIRCUIT 1	52
3M2E1	HEATER, COMPRESSOR 1B, CIRCUIT 1	42
3M4	MOTOR, FAN 1, CIRCUIT 1	156
3M5	MOTOR, FAN, CIRCUIT 1	186
3M9	MOTOR, FAN, CIRCUIT 1	176
3S1	HIGH PRESSURE CUTOUT SWITCH, CIRCUIT 1	392
3S2	THERMOSTAT, COMPRESSOR 1A HEATER	39
3S3	THERMOSTAT, COMPRESSOR 1B HEATER	42
3Y1	EXPANSION VALVE, COOLING, CIRCUIT 1	690
REFRIGERATION CIRCUIT 2		
4B1	TRANDUCER, SUCTION REFRIGERANT PRESSURE, CIRCUIT 2	682
4B2	SENSOR, SUCTION REFRIGERANT TEMPERATURE, CIRCUIT 2	684
4B3	TRANDUCER, DISCHARGE REFRIGERANT PRESSURE, CIRCUIT 2	686
4B4	SENSOR, DISCHARGE REFRIGERANT TEMPERATURE, CIRCUIT 2	688
4M1	MOTOR, COMPRESSOR 2A, CIRCUIT 2	93
4M1A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 2A, CIRCUIT 2	96
4M1E1	HEATER, COMPRESSOR 2A, CIRCUIT 2	99
4M2	MOTOR, COMPRESSOR 2B, CIRCUIT 2	108
4M2A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 2B, CIRCUIT 2	112
4M2E1	HEATER, COMPRESSOR 2B, CIRCUIT 2	102
4M4	MOTOR, FAN 1, CIRCUIT 2	228
4M5	MOTOR, FAN, CIRCUIT 2	258

1F38–1F40	FUSE, FANS CIRCUIT 1	172
1F44–1F46	FUSE, FANS CIRCUIT 2	244
1K1	CONTACTOR, COMPRESSOR 1A, CIRCUIT 1	33,396
1K2	CONTACTOR, COMPRESSOR 1B, CIRCUIT 1	48,394
		60,
1K4	CONTACTOR, COMPRESSOR 2A, CIRCUIT 2	93,390,
1K5	CONTACTOR, COMPRESSOR 2B, CIRCUIT 2	108,388,
1K8	CONTACTOR, FAN 3M9	176,447,481
1K9	CONTACTOR, FAN 3M5	186,479
1K14	CONTACTOR, FAN 4M9	248,463,494
1K15	CONTACTOR, FAN 4M5	258,492
1M1	FAN, MAIN CONTROL PANEL VENTILATION	374
1Q1	CIRCUIT BREAKER	15
1Q5	CIRCUIT BREAKER, COMPRESSOR, 3M1, CIRCUIT 1	33
1Q6	CIRCUIT BREAKER, COMPRESSOR, 3M2, CIRCUIT 1	48
1Q8	CIRCUIT BREAKER, COMPRESSOR, 4M1, CIRCUIT 2	93
1Q9	CIRCUIT BREAKER, COMPRESSOR, 4M2, CIRCUIT 2	108
1Q12	MANUAL MOTOR STARTER, FAN 3M9, CIRCUIT 1	176
1Q13	MANUAL MOTOR STARTER, FAN 3M5, CIRCUIT 1	186
1Q18	MANUAL MOTOR STARTER, FAN 4M9, CIRCUIT 2	248
1Q19	MANUAL MOTOR STARTER, FAN 4M5, CIRCUIT 2	258
1S1	THERMOSTAT, MAIN CONTROL PANEL VENTILATION	374
1S2	THERMOSTAT, VSD HEATER BLANKET	377
1T1	TRANSFORMER, CONTROL POWER	23
1T2	AUTOTRANSFORMER, FAN VSD, CIRCUIT 1	160
1T3	AUTOTRANSFORMER, FAN VSD, CIRCUIT 2	233
1X1	BLOCK, TERMINAL – CUSTOMER POWER DISTRIBUTION	8
1X3	BLOCK, TERMINAL – COMPRESSOR HEATER, CIRCUIT 1	VARIES
1X4	BLOCK, TERMINAL – FACTORY CONTROL WIRING, 115VAC	VARIES
1X5	BLOCK, TERMINAL – FACTORY CONTROL WIRING, 0–10VDC	VARIES
1X6	BLOCK, TERMINAL – CUSTOMER CONTROL WIRING, 115VAC	VARIES
1X7	BLOCK, TERMINAL – CUSTOMER CONTROL WIRING, 0–10VDC	VARIES
1X9	BLOCK, TERMINAL – COMPRESSOR HEATER, CIRCUIT 2	VARIES

4M4	MOTOR, FAN 1, CIRCUIT 2	228
4M5	MOTOR, FAN, CIRCUIT 2	258
4M9	MOTOR, FAN, CIRCUIT 2	248
4S1	HIGH PRESSURE CUTOUT SWITCH, CIRCUIT 2	386
4S2	THERMOSTAT, COMPRESSOR 2A HEATER	99
4S3	THERMOSTAT, COMPRESSOR 2B HEATER	102
4Y1	EXPANSION VALVE, COOLING, CIRCUIT 2	690
	UNIT MOUNTED	
5A1	VSD, WATER PUMP CONTROL	322
5B1	SENSOR, EVAPORATOR LEAVING WATER TEMPERATURE	694
5B2	SENSOR, EVAPORATOR ENTERING WATER TEMPERATURE	696
5B3	SENSOR, AMBIENT TEMPERATURE	698
5B4	SENSOR, WATER FLOW	588
5B5	SENSOR, HEAT RECOVERY ENTERING WATER TEMP	695
5B6	SENSOR, HEAT RECOVERY LEAVING WATER TEMP	697
5E1	HEATER, EVAPORATOR	731
5E2	HEATER, BUFFER TANK	781
5E3	HEATER, WATER PUMP PIPING	768
5E4,5E18	HEATER, EVAPORATOR ENTERING WATER PIPING	737,743
5E5,5E19	HEATER, EVAPORATOR LEAVING WATER PIPING	734,740
5E6	HEATER, WATER PUMP PIPING	746
5E7	HEATER, EXPANSION TANK	774
5E8	HEATER, BUFFER TANK	784
5E9	HEATER, PUMP VSD ENCLOSURE	355
5E10	HEATER, PARTIAL HEAT RECOVERY	754
5E11	HEATER, PARTIAL HEAT RECOVERY	757
5E12	HEATER, BUFFER TAN K	787
5E13	HEATER, BUFFER TANK	790
5E14	HEATER, WATER PUMP PIPING	749
5E15	HEATER, WATER PUMP PIPING	771
5E16	HEATER, PARTIAL HEAT RECOVERY	760
5E17	HEATER, PARTIAL HEAT RECOVERY	763
5K1–5K2	CONTACTOR, PUMP PACKAGE W/ VSD	323,331,349,351
5M1	MOTOR, FACTORY PROVIDED, CHILLED WATER PUMP 1	326
5M2	MOTOR, FACTORY PROVIDED, CHILLED WATER PUMP 2	334
5M3	MOTOR, FAN PUMP VSD ENCLOSURE VENTILATION	356
5X1	BLOCK, TERMINAL – EVAPORATOR AND WATER PIPE HEATERS	VARIES
5X2	BLOCK, TERMINAL – PUMP PACKAGE HEATERS	VARIES
5X3	BLOCK, TERMINAL – BUFFER TANK HEATERS	VARIES
5X4	BLOCK, TERMINAL – PUMP VSD AUXILIARY PANEL HEATER	VARIES
5S1	THERMOSTAT, EVAPORATOR & WATER PIPES, HEATERS	731
5S2	THERMOSTAT, PUMP PACKAGE, HEATERS	768
5S3	THERMOSTAT, BUFFER TANK, HEATERS	781
5S4	THERMOSTAT, PUMP VSD AUXILIARY PANEL HEATER	355
5S5	THERMOSTAT, PUMP VSD AUXILIARY PANEL FAN	356
	CUSTOMER PROVIDED	
6F1–6F2	RELAY, CUSTOMER PROVIDED, OVERLOAD PROTECTION, CHILLED WATER PUMP	301,306
6K1	RELAY, CUSTOMER PROVIDED, CHILLED WATER PUMP 1	299,301
6K2	RELAY, CUSTOMER PROVIDED, CHILLED WATER PUMP 2	298,306
6K4	RELAY, EXTERNAL INPUT, AUTO/STOP	657
6K5	RELAY, EXTERNAL INPUT, EMERGENCY STOP	659
6K6	RELAY, EXTERNAL INPUT, ENABLE ICE MAKING	684
6K8–15	RELAY, CUSTOMER PROVIDED, UNIT STATUS, (PROGRAMMABLE)	706 TO 716
6M1	MOTOR, CUSTOMER PROVIDED, CHILLED WATER PUMP 1	301
6M2	MOTOR, CUSTOMER PROVIDED, CHILLED WATER PUMP 2	306
6Q1	FUSED DISCONNECT CUSTOMER SUPPLIED 3 PHASE, POWER SUPPLY	3,292
6Q3–6Q4	FUSED DISCONNECT CUSTOMER SUPPLIED 3 PHASE, CHILLED WATER PUMP	301,306
6Q5	FUSED DISCONNECT CUSTOMER SUPPLIED 2 PHASE, CHILLED WATER PUMP	297
6Q6	FUSED DISCONNECT CUSTOMER SUPPLIED 1 PHASE, CONTROL POWER SUPPLY	702

TRANE	2309–2075	SHEET 3 OF 14	REV D
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DRAWN BY: A ROBERTS © TRANE DATE: 30 NOV 2008	CGAM / CXAM		
REPLACES:	NOTES		
REVISION DATE: 19 MAR 2009	V FRAME		
SIMILIAR TO:	NORTH AMERICA PRODUCTION		

GENERAL & FLAG NOTES

GENERAL NOTES:

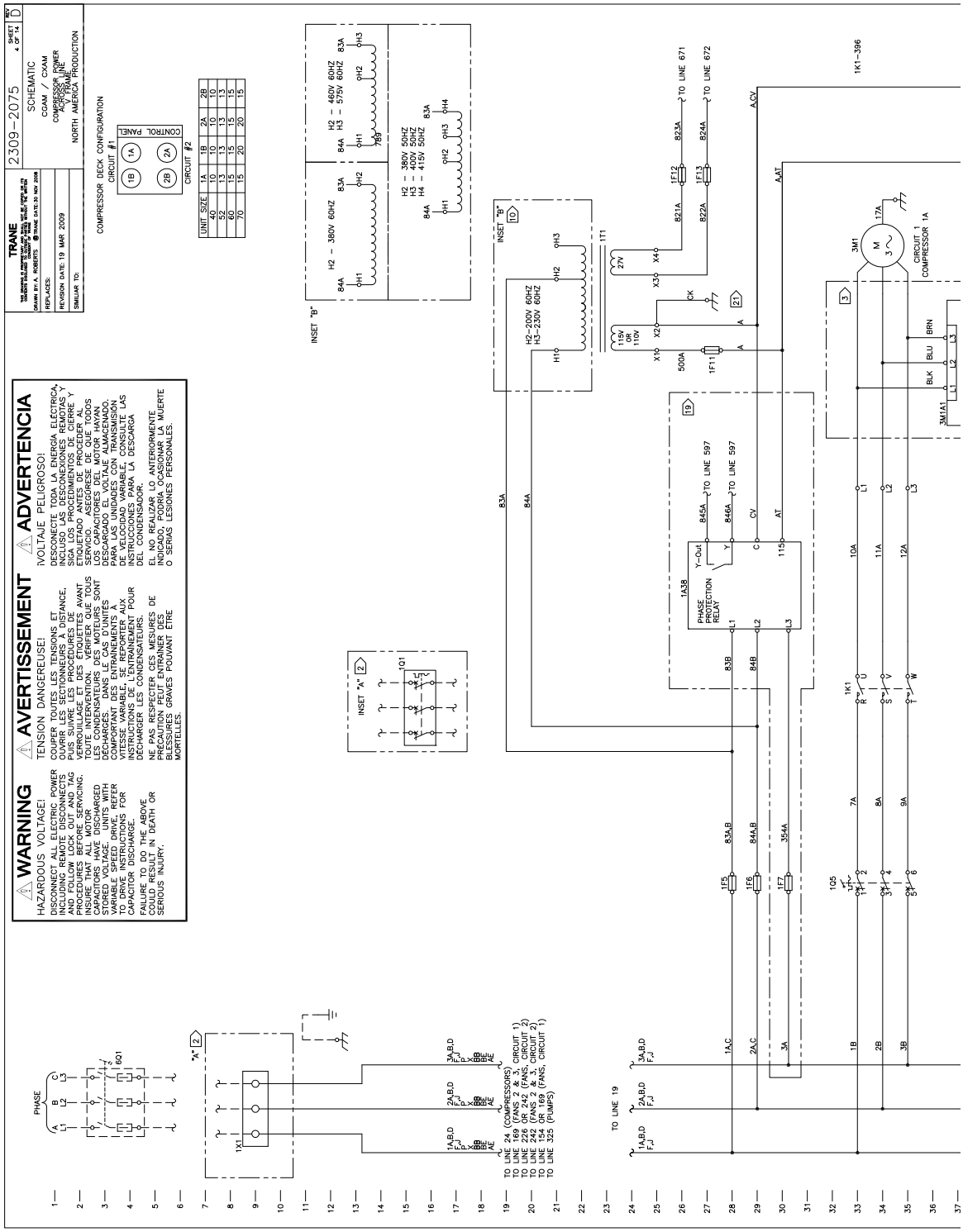
1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C (77F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. DASHED LINE ENCLOSURES AND/OR DASHED DEVICE OUTLINES INDICATE COMPONENTS PROVIDED BY THE FIELD.PHANTOM LINE ENCLOSURES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SALES OPTIONS. SOLID LINE INDICATES WIRING BY TRANE.
3. NUMBERS ALONG THE RIGHT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF CONTACTS BY LINE NUMBER. AN UNDERLINED NUMBER INDICATES A NORMALLY CLOSED CONTACT.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS.
5. CLASS 1 FIELD WIRING INSULATION RATING IS REQUIRED TO BE EQUAL TO OR GREATER THAN THE EQUIPMENT SUPPLY VOLTAGE RATING. CLASS 2 FIELD WIRE INSULATION TO BE RATED AT 300V MINIMUM.

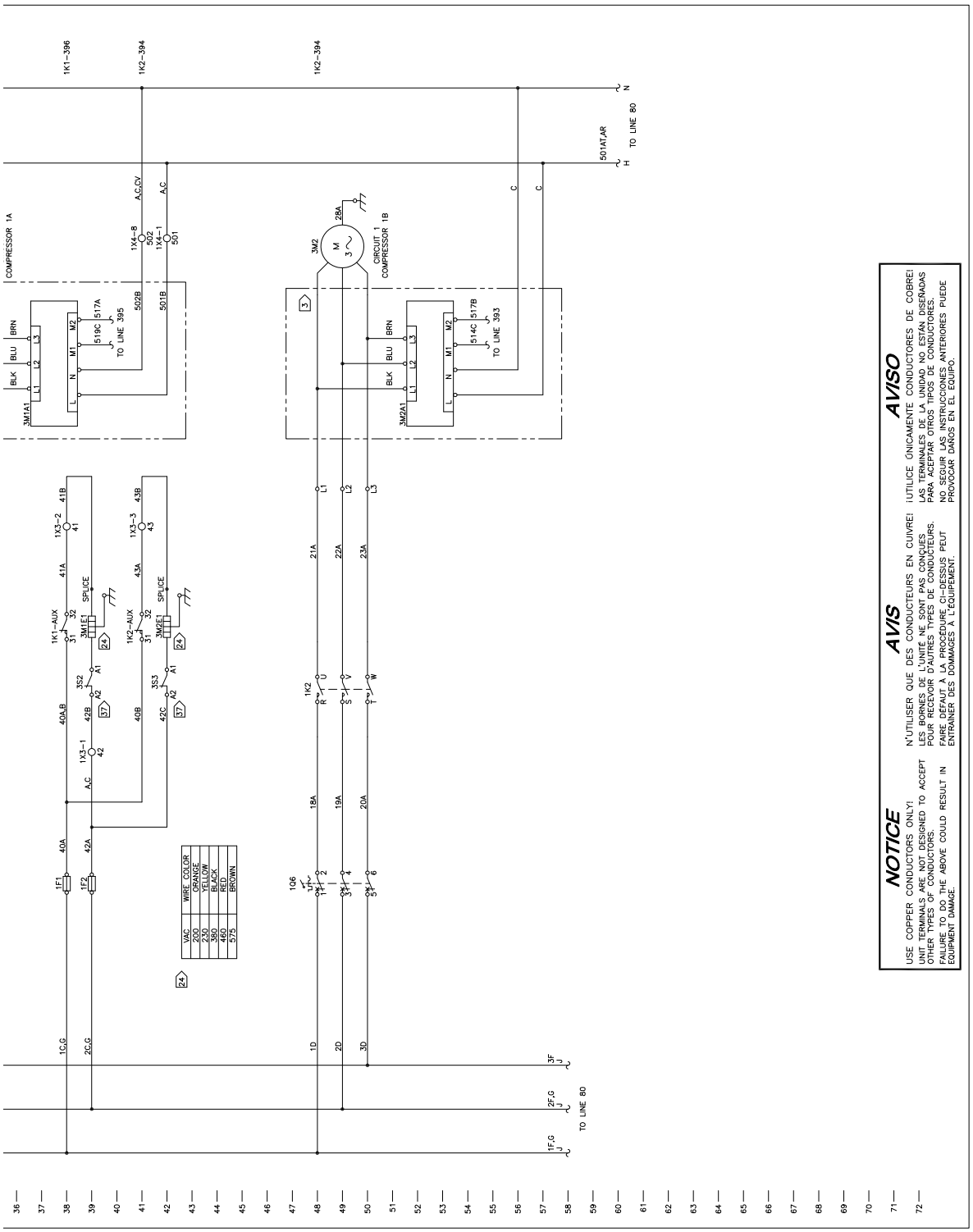
FLAG NOTES:

1. ALL UNIT POWER WIRING MUST BE COPPER CONDUCTORS ONLY, HAVE A MINIMUM INSULATION TEMPERATURE RATING OF 90°C AND BE SELECTED AT 75°C RATINGS.
2. TERMINAL BLOCK 1X1 IS PROVIDED AS STANDARD ON ALL UNITS PNCO=TERM. CIRCUIT BREAKER 1Q1 PNCO=CB AVAILABLE AS OPTION. TERMINAL BLOCK IS REPLACED WITH CIRCUIT BREAKER WHEN THIS OPTION IS SELECTED.
3. ELECTRONIC PROTECTION MODULE USED FOR 15–30 TON COMPRESSORS ONLY.
   FOR 10–13TON COMPRESSOR CONTROL CIRCUIT, TERMINALS (16,19), (16,20) ARE JUMPED BY W4 AND W5. TERMINALS (15,18), (15,17) ARE JUMPED BY W6, AND W7 IN V CONFIGURATION. (NTON= 020, 026, 040 OR 052)
4. REFER TO FAN CHART FOR VALID FAN CONFIGURATIONS.
5. TRANSFORMER FOR 575V UNITS ONLY. (VOLT=575) AND (UAPP=CATC OR WIDC)
6. PUMP PACKAGE:
   – AT LEAST ONE PUMP IS ALWAYS PRESENT AND IS EITHER FIELD OR FACTORY SUPPLIED.
   – WHEN PUMPS ARE FACTORY SUPPLIED, THEY WILL BE DUAL PUMPS.
7. OPTIONAL DUAL FACTORY SUPPLIED EVAP WATER PUMPS. WIRING SHOWN IS FOR VSD OF PUMP PACKAGE. (PTYP=DHHP)
8. OPTIONAL DUAL CUSTOMER SUPPLIED EVAP WATER PUMP(S). 6M2 WIRING PRESENT FOR DUAL PUMP CONFIGURATION ONLY. PUMP CONTROL CONFIGURATION SHOWS WIRING WITH CONTACTORS AND OVERLOAD RELAYS. PUMP(S) CAN ALSO BE POWERED BY CUSTOMER CONTROLLED VSD(S). PUMP STARTER FAULT SIGNAL(S) TO BE FIELD WIRED TO 1A12 (INSET "V").
9. CUSTOMER SUPPLIED PUMP RUN SIGNAL TO BE FIELD WIRED TO 1A9.
10. WIRING FOR 200V/460V UNIT SHOWN. SEE INSET "B" FOR CONTROL POWER TRANSFORMER WIRING OF OTHER VOLTAGES.
11. CONTACT CLOSURE ENABLES ICE MAKING, WHEN ICE MAKING OPTION IS ORDERED. (EVLT=ICE)
12. CLASS 1 FIELD WIRED MODULE.
13. RELAY AT 120VAC: 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, 1/3 HP 7.2 FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.
14. FIELD ASSIGNED PROGRAMMABLE RELAYS. STAT=PRLY
15. CUSTOMER SUPPLIED POWER, 120V
16. ONLY USED WHEN PUMP PACKAGE OPTION IS ORDERED. (PTYP=DHHP)
17. ONLY USED WHEN BUFFER TANK OPTION IS ORDERED. (BTNK=BTNK)

11. CONTACT CLOSURE ENABLES ICE MAKING, WHEN ICE MAKING OPTION IS ORDERED. (EVLT=ICE)
12. CLASS 1 FIELD WIRED MODULE.
13. RELAY AT 120VAC: 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, 1/3 HP 7.2 FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.
14. FIELD ASSIGNED PROGRAMMABLE RELAYS. STAT=PRLY
15. CUSTOMER SUPPLIED POWER, 120V
16. ONLY USED WHEN PUMP PACKAGE OPTION IS ORDERED. (PTYP=DHHP)
17. ONLY USED WHEN BUFFER TANK OPTION IS ORDERED. (BTNK=BTNK)
18. THE CONTACTS FOR AUTO STOP AND EMERGENCY STOP SWITCHES ARE JUMPERED AT THE FACTORY BY JUMPERS W2 & W3 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED, REMOVE THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.
19. PHASE PROTECTION RELAY USED ONLY FOR CIRCUIT(S) WITH 10 TON AND 13 TON COMPRESSORS (NTON = 20, 26, 40 or 52).
20. NOT PRESENT WHEN BOTH OF THE COMPRESSORS ARE LESS THAN 15 TON (NTON = 20, 26, 40, or 52).
21. GROUND SCREW IN MAIN CONTROL PANEL.
22. INSIDE THE PUMP VSD ENCLOSURE, MOUNTED ON UNIT FRAME WITH PTYP=DHHP
23. ONLY USED WHEN PARTIAL HEAT RECOVERY (CDHR = PRTF) OPTION IS ORDERED.
24. COMPRESSOR HEATER WIRE COLOR IS DETERMINED BY VOLTAGE IN CHART.
25. PRESENT ON "V" FRAME UNITS NTON = 40, 52, 60 or 70.
26. PRESENT ON "W" FRAME UNITS NTON = 80, 90, 100, 100, 120 or 130.
27. NOT PRESENT ON "W" FRAME UNITS NTON = 80, 90,
28. DISCHARGE REFIGERANT TEMPERATURE SENSOR PRESENT FOR ALL THE FOLLOWING OPTIONS: UNITS WITH ICEMAKING OPTION (EVLT = ICE), UNITS WITH LOW TEMPERATURE PROCESS COOLING (EVLT = PROC) , UNITS WITH PHR FAN CONTROL OPTION (CDHR = PRTF).
29. REFER TO FIELD WIRING DIAGRAM FOR SUGGESTED WIRING.
30. JUMPERS W10 AND W11 ARE INSTALLED BY THE FACTORY ON UNITS ORDERED WITH FIELD PROVIDED PUMPS (PTYP = NONE). JUMPERS W10 AND W11 ARE TO BE REMOVED WHEN PUMPS AND CONTROL ARE INSTALLED.
31. FUSES 1F38, 1F39, 1F40 PRESENT ON ALL SLANT (NTON = 20, 26, 30 or 35) AND V (NTON = 40, 52, 60 or 70) CONFIGURATIONS. PRESENT FOR W (NTON = 80, 90, 100, 110, 120 or 130)CONFIGURATION WHEN LINE VOLTAGE IS 575VAC (VOLT = 575).
33. FUSES 1F44, 1F45, 1F46 PRESENT ON ALL V (NTON = 40, 52, 60 or 70) CONFIGURATIONS. PRESENT FOR W (NTON = 80, 90, 100, 110, 120 or 130) CONFIGURATION WHEN LINE VOLTAGE IS (VOLT = 575).
35. VENTILATION FAN PRESENT WHEN LINE (VOLT = 200, 230VAC, 380 or 400).
36. 1A41, BACNET INTERFACE MODULE USED WHEN (COMM = BCNT).
37. THERMOSTATS ARE REQUIRED IN THE COMPRESSOR JUNCTION BOXES ON ALL UNITS WITH COMMERCIAL COMPRESSORS AND SOUND WRAPS TO PREVENT THE PROTECTION MODUAL FROM GETTING TOO HOT. (NTON=30, 35, 60, 70, 80, 90, 100, 110, 120 or 130) (HRTZ = 60 AND SATT = LNUN OR HRTZ = 50 AND SATT = STDN)
38. THE SAME PUMP MOTOR IS USED FOR 200/230 & 480V UNITS WIRE CONNECTIONS SHOWN FOR BOTH OPTIONS VERIFY WHAT VOLTAGES CHILLER IS BEFORE WIRING.
39. PRESENT ON UNITS NTON=130
40. PRESENT ON UNITS NTON=20, 26, 30, 35 AND PTYP=DHHP

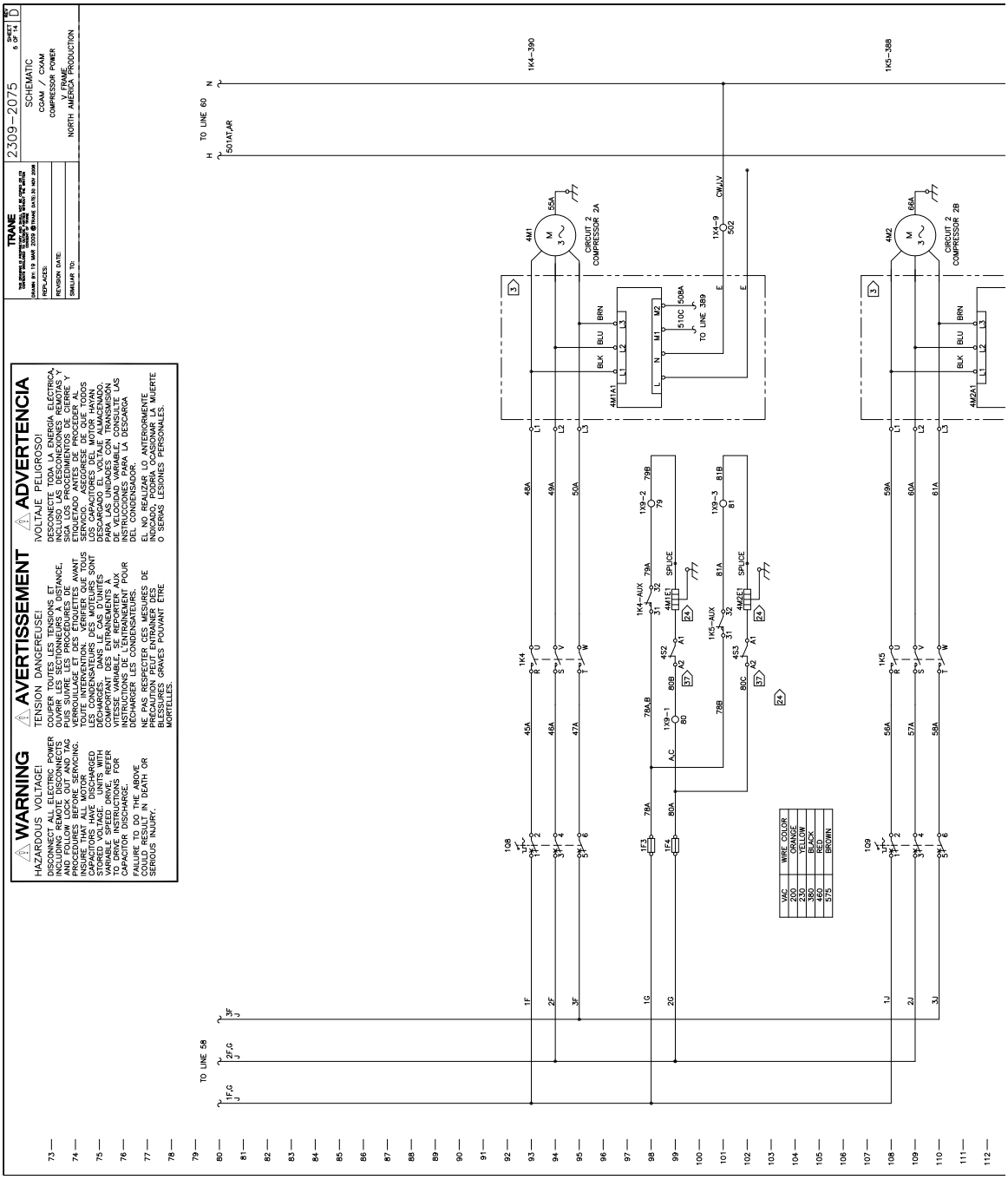
40-70 Ton - "V Frame" - Compressor Power Circuit 1

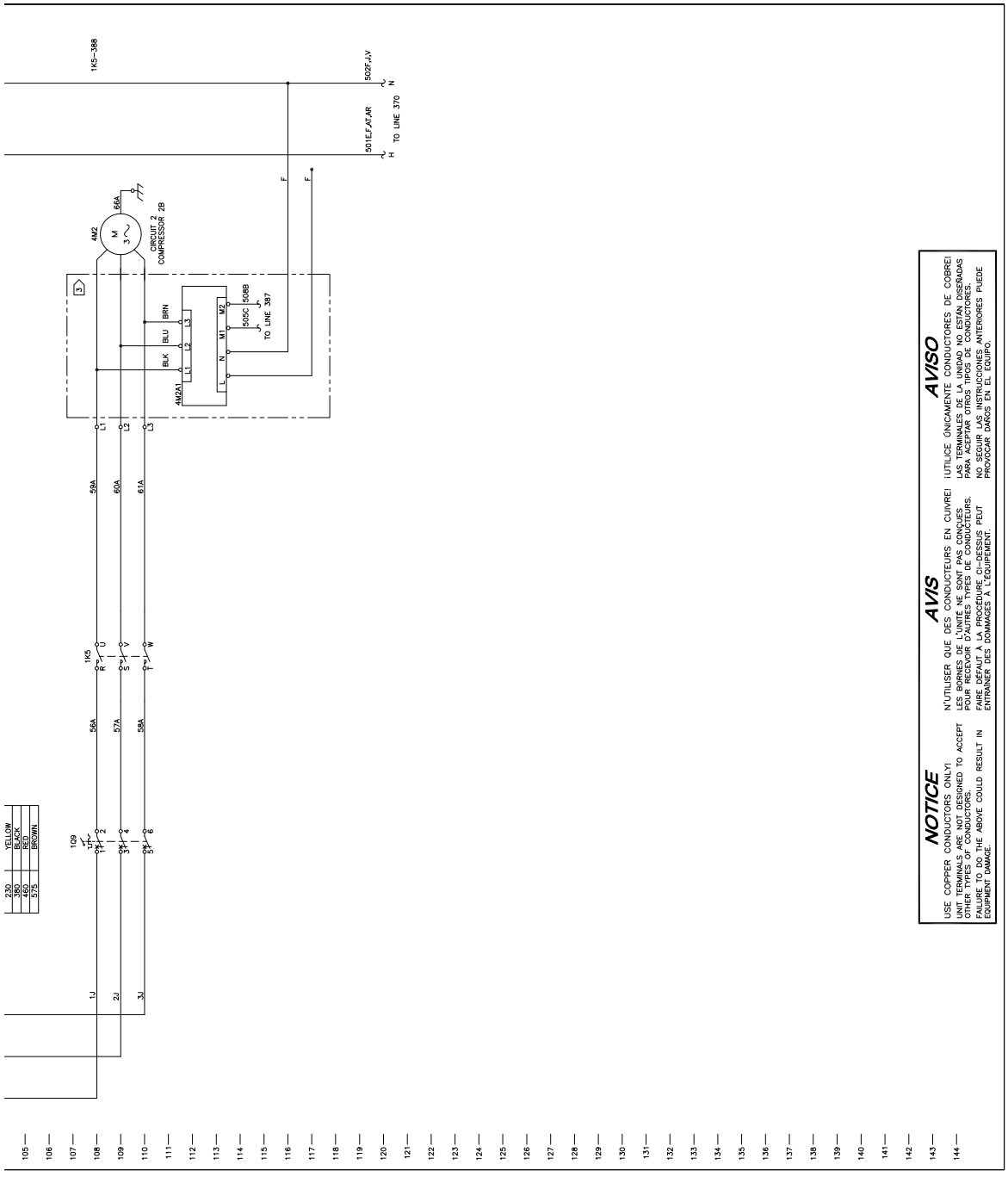



1K1-396
1K2-394
1K2-394
COMPRESSOR 1A
CIRCUIT 1 COMPRESSOR 1B
TO LINE 80
TO LINE 395
TO LINE 393
TO LINE 80
NOTICE
USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAINER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.
VAC
200
230
380
460
575
WIRE COLOR
ORANGE
YELLOW
BLACK
RED
BROWN

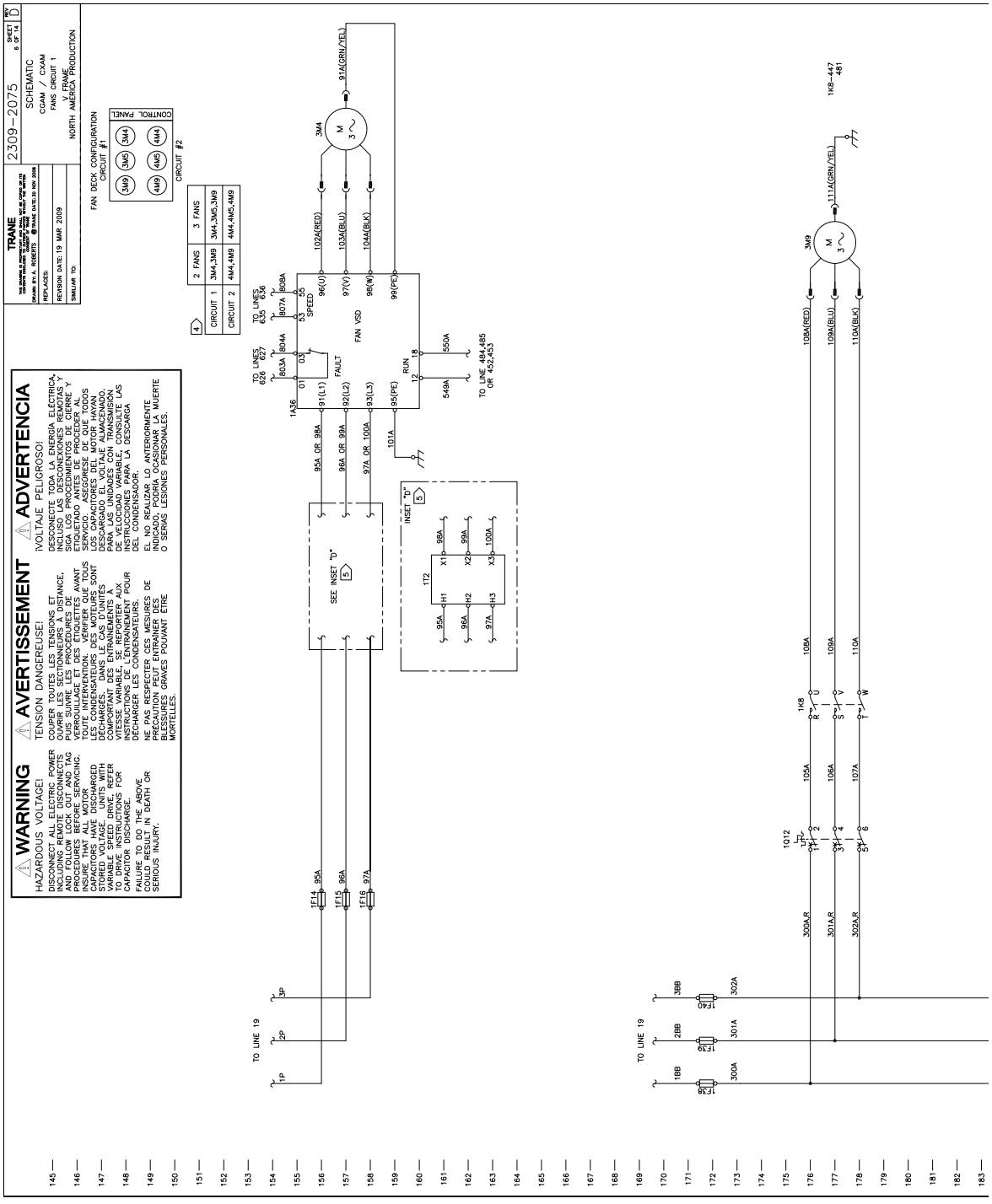
Unit Wiring

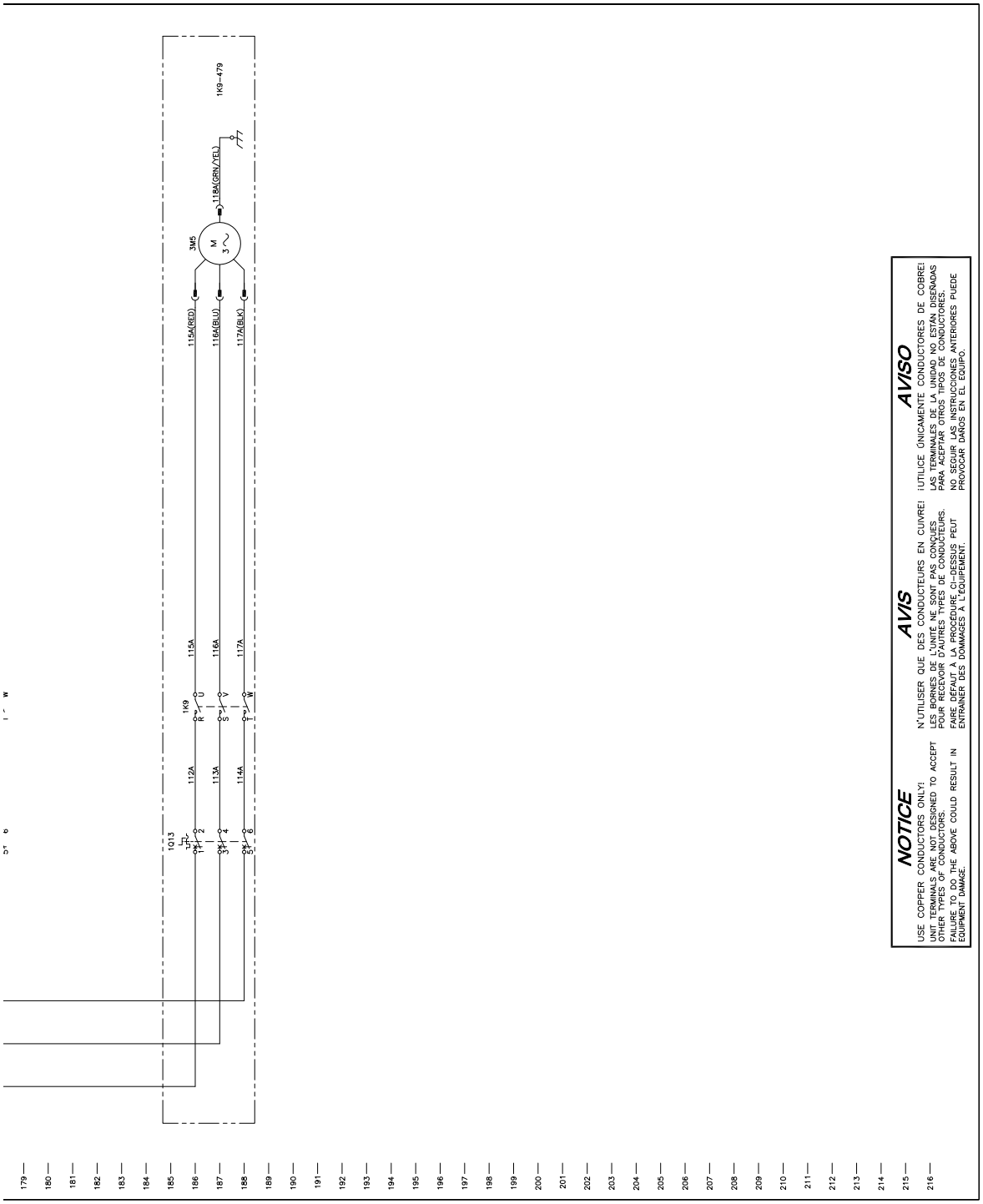
40-70 Ton - "V Frame" - Compressor Power Circuit 2




NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DEFAUT A LA PROCEDURE CI-DESSUS PEUT ENTRAINER DES DOMMAGES A L'EQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.
CIRCUIT 2 COMPRESSOR 2B
4M2
66A
1K5
59A
60A
61A
56A
57A
58A
1J
2J
3J
1K5-388
502F,J,V
501E,F,AT,AR
TO LINE 370
505C 508B
TO LINE 387
4MZ2A1
BLK
BLU
BRN
230 YELLOW
380 BLACK
460 RED
575 BROWN

40-70 Ton - "V Frame" - Fan Power Circuit 1




1Q13
112A
113A
114A
1K9
115A
116A
117A
3M5
115A(RED)
116A(BLU)
117A(BLK)
118A(GRN/YEL)
1K9-479
NOTICE
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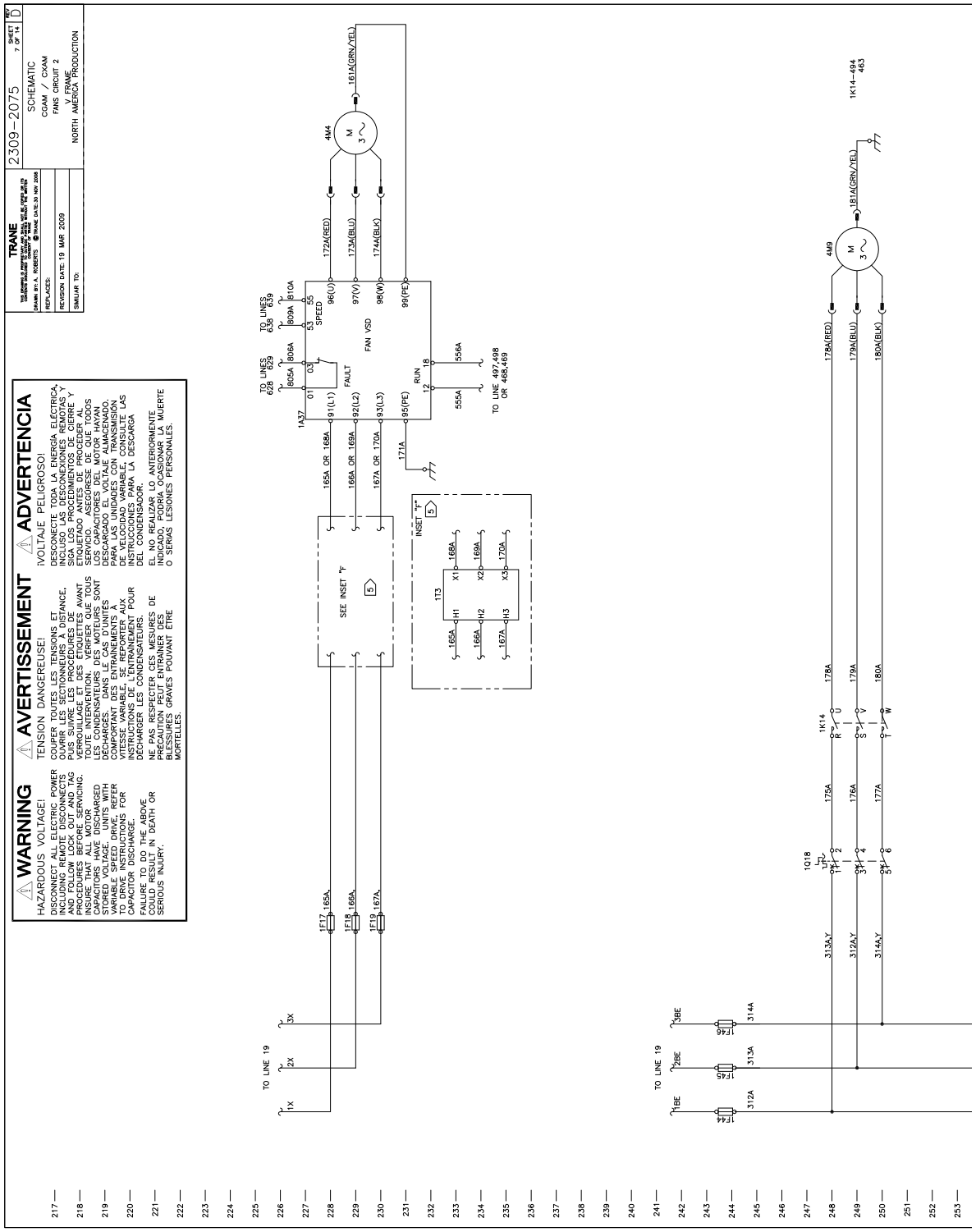
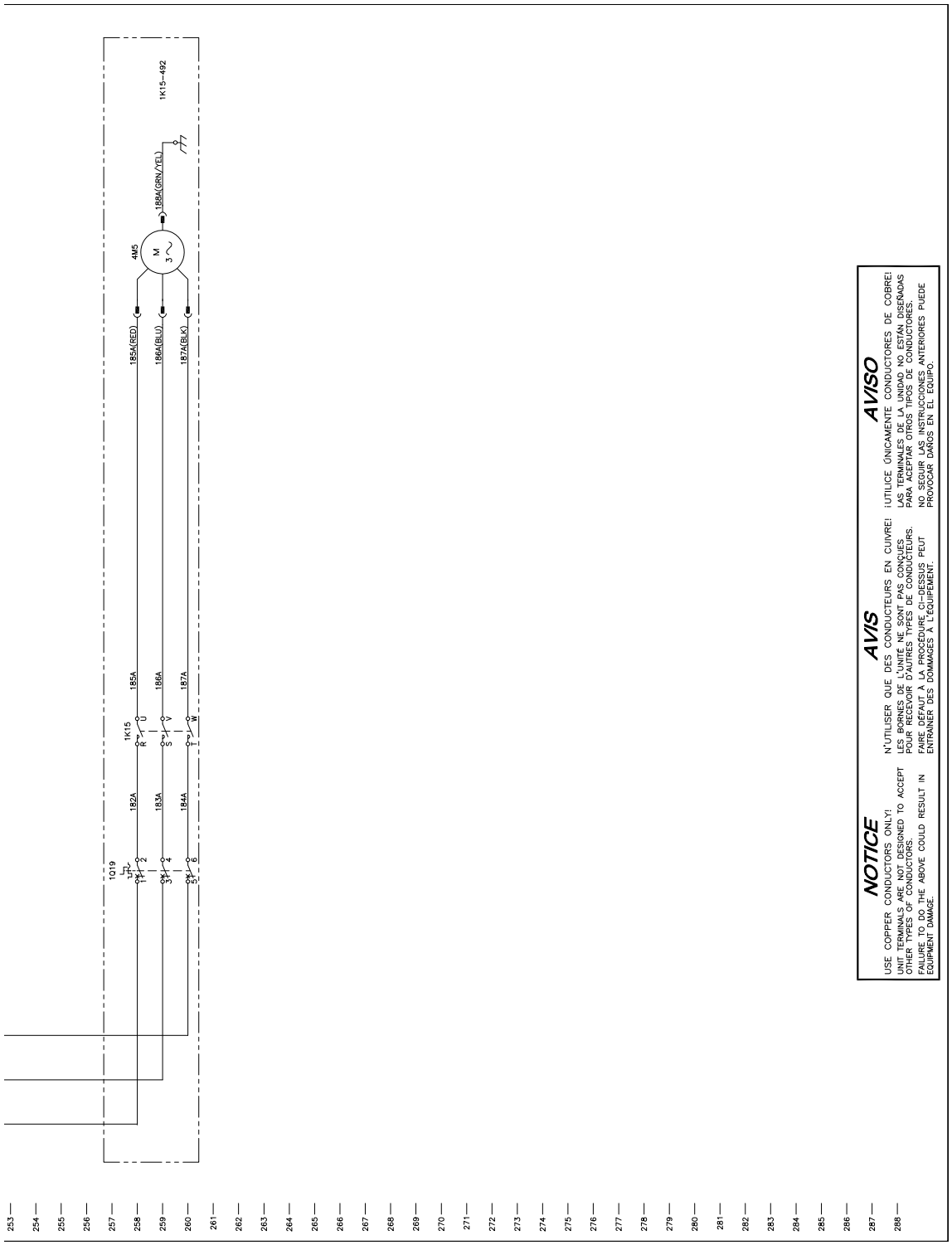
FAILURE TO DO SO MAY RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
LE NON-RESPECT DE CES INSTRUCTIONS PEUT ENTRAINER DES DOMMAGES À L'EQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO HACERLO PUEDE PRODUCIR DAÑOS ANTERIORES AL EQUIPO.

40-70 Ton - "V Frame" - Fan Power Circuit 2




1K15—492
1O19
1K15
182A
183A
184A
185A
186A
187A
4M5
M
3
185A(RED)
186A(BLU)
187A(BLK)
188A(GRN/YEL)
NOTICE
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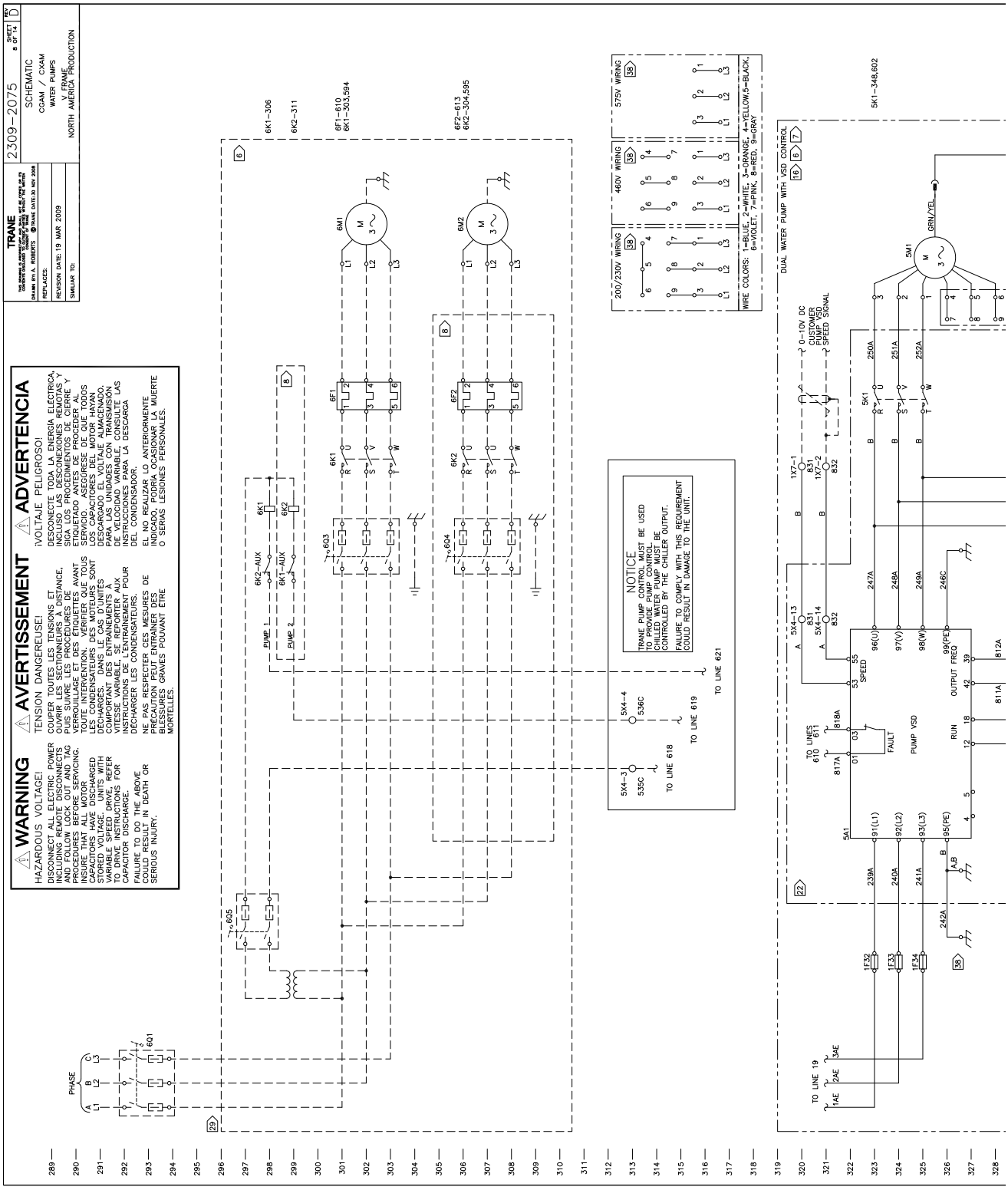
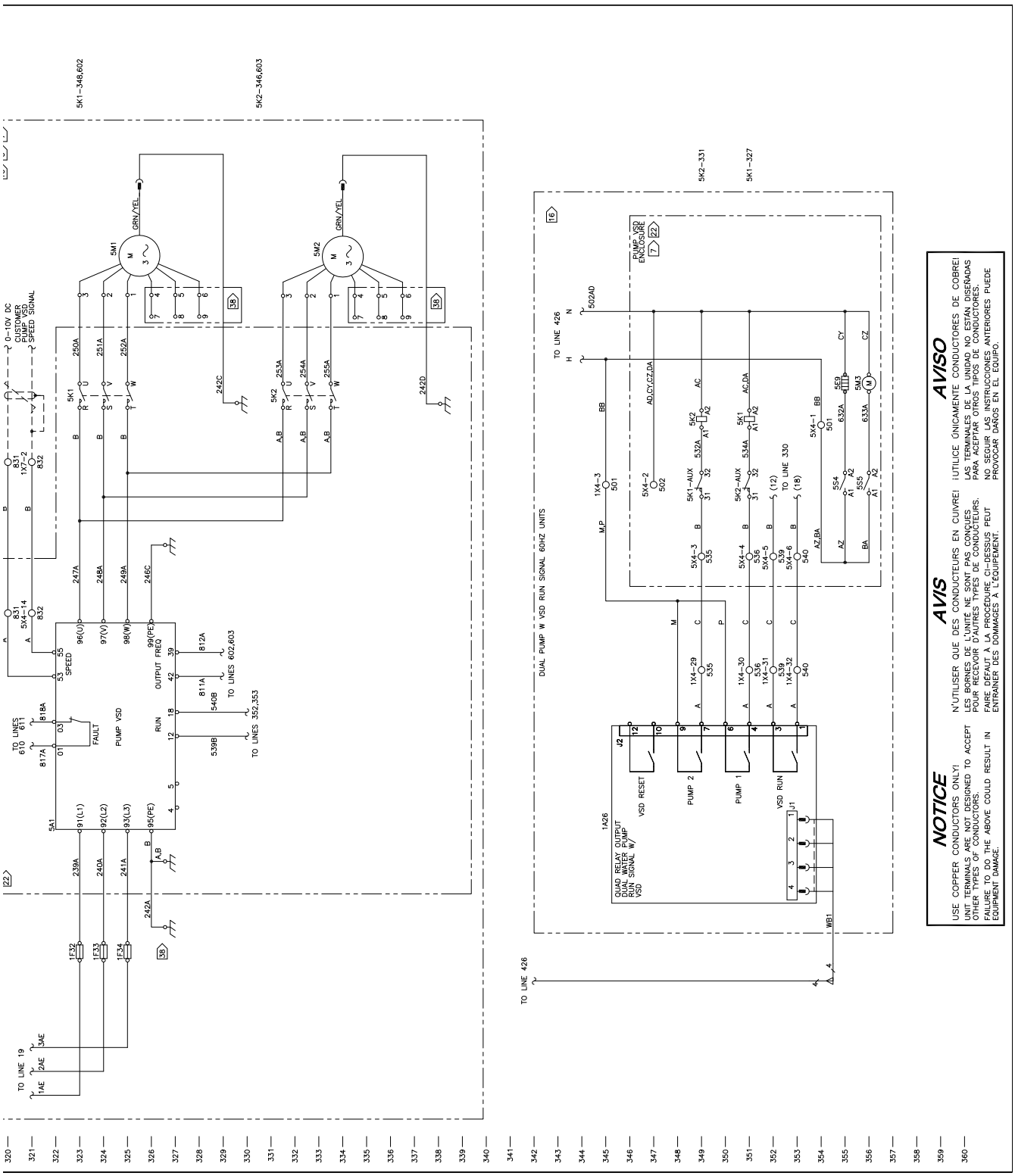
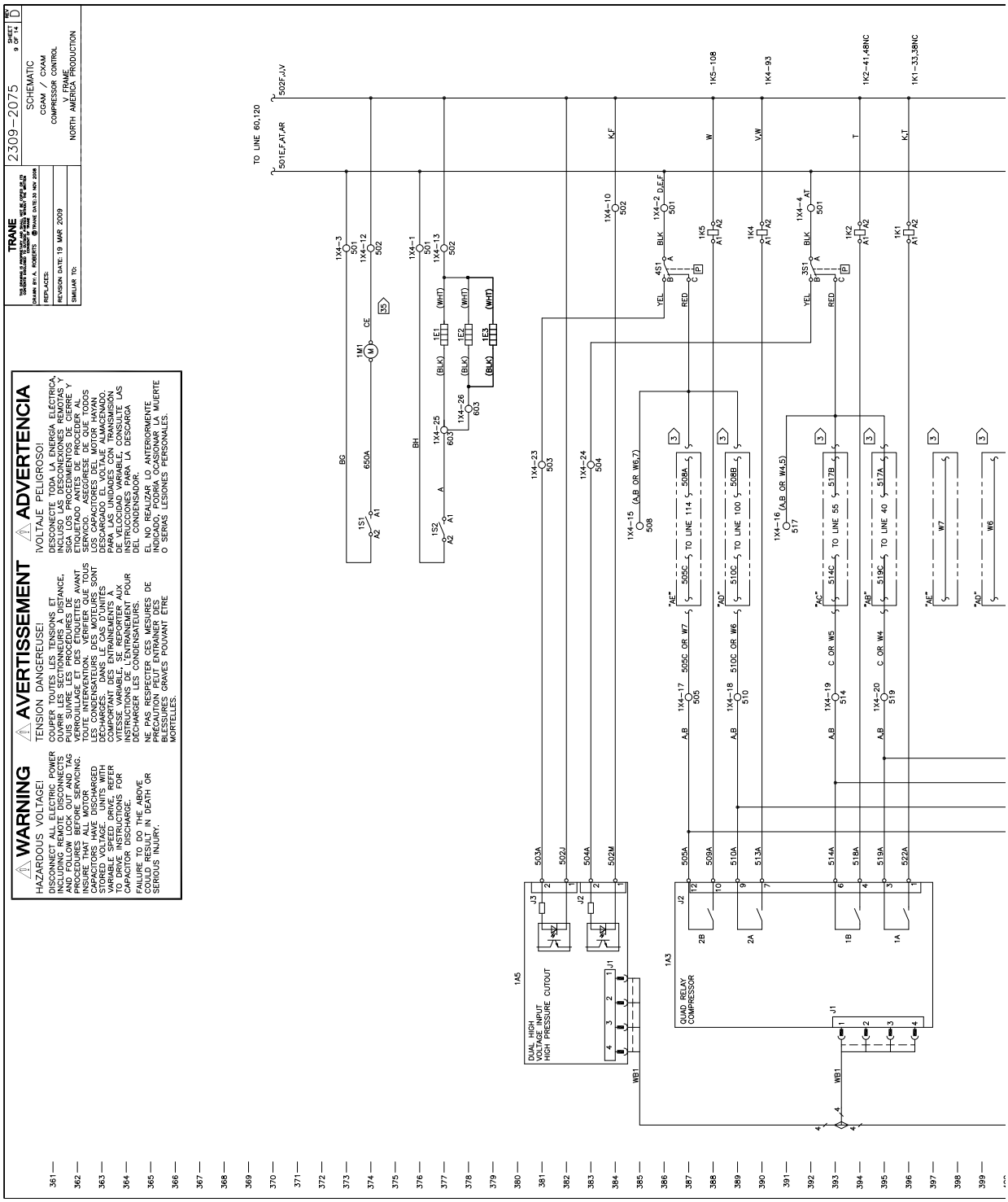
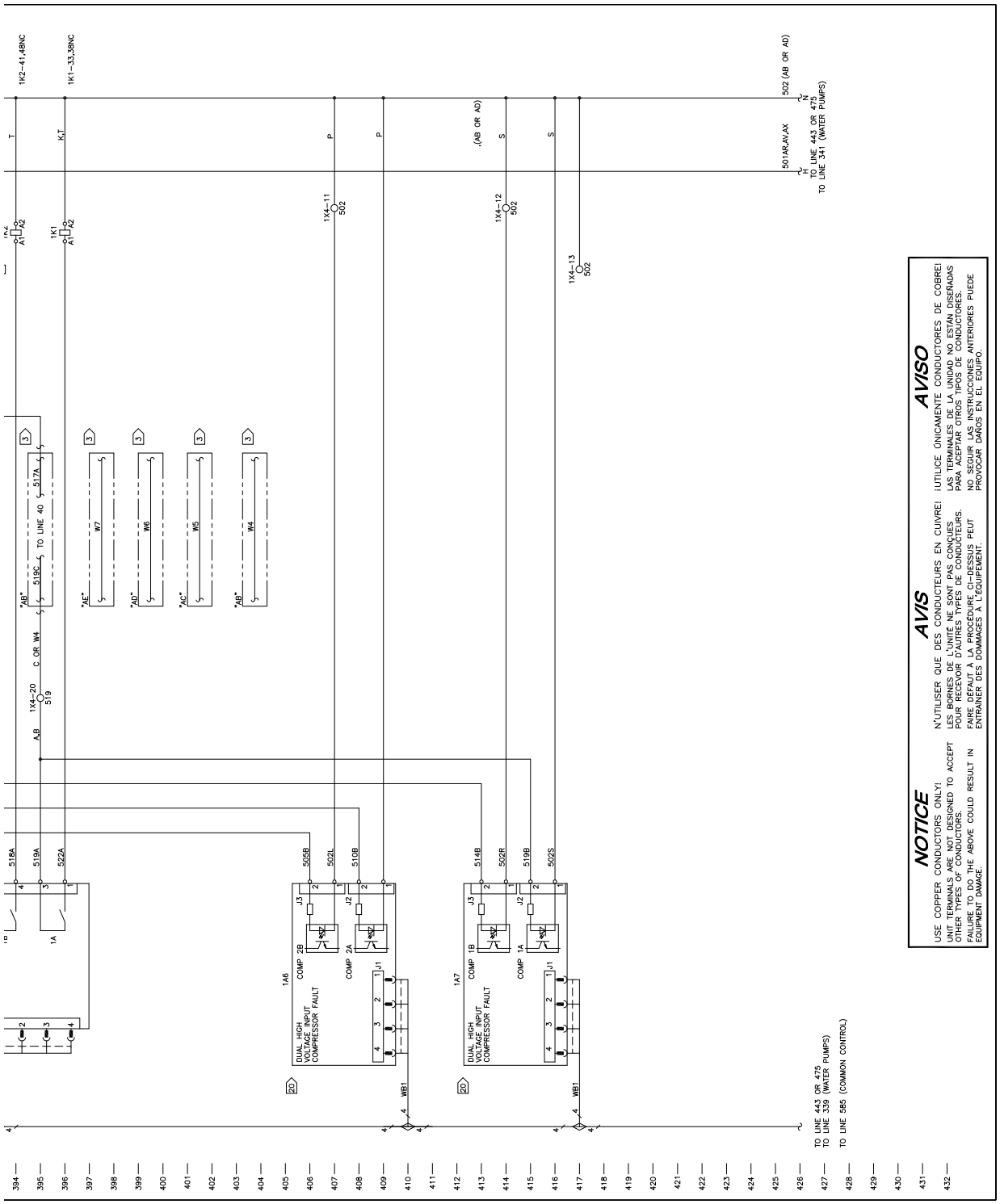
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DÉFAUT À LA PROCÉDURE CI—DESSUS PEUT ENTRAINER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.

40-70 Ton - "V Frame" - Pump Power/Control




5K1–348,602
5K2–346,603
5K1–327
5K2–331
DUAL PUMP W VSD RUN SIGNAL 60HZ UNITS
PUMP VSD ENCLOSURE
TO LINE 426
TO LINE 19
0–10V DC CUSTOMER PUMP VSD SPEED SIGNAL
5M1
5M2
GRN/YEL
FAULT
PUMP VSD
RUN
OUTPUT FREQ
SPEED
VSD RESET
PUMP 2
PUMP 1
VSD RUN
TO LINES 602,603
TO LINES 352,353
TO LINE 330
1A26
QUAD RELAY OUTPUT PUMP RUN SIGNAL W/VSD
NOTICE
USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO ESTAN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.


WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED BEFORE TOUCHING. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE. FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
ADVERTENCIA
¡VOLTAJE PELIGROSO!
DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO ANTES DE TOCARLOS. PARA LAS UNIDADES CON TRANSMISIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERÍAS LESIONES PERSONALES.
AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS, ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LES UNITÉS COMPORTANT DES ENTRAINEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAINEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
TRANE
2309-2075
SCHEMATIC
CGAM / CXAM
COMPRESSOR CONTROL
V FRAME
NORTH AMERICA PRODUCTION
REVISION DATE: 19 MAR 2009
TO LINE 60,120
501E,F,AT,AR
502F,JV
1S1
1S2
1M1
650A
603
1E1
1E2
1E3
(BLK)
(WHT)
1X4-3
1X4-12
1X4-1
1X4-13
1X4-25
1X4-26
1X4-23
1X4-24
1X4-15 (A,B OR W6,7)
1X4-16 (A,B OR W4,5)
1X4-10
1X4-2
1X4-4
4S1
3S1
YEL
RED
BLK
1K5
1K4
1K2
1K1
1K5-108
1K4-93
1K2-41,48NC
1K1-33,38NC
K,F
W
V,W
T
K,T
1A5
DUAL HIGH VOLTAGE INPUT HIGH PRESSURE CUTOUT
1A3
QUAD RELAY COMPRESSOR
J1
J2
J3
WB1
1X4-17
1X4-18
1X4-19
1X4-20
505
510
514
519
505A
509A
510A
513A
514A
518A
519A
522A
502J
502M
503A
504A
505C OR W7
510C OR W6
C OR W5
C OR W4
505A
510B
517B
517A
519C
TO LINE 114
TO LINE 100
TO LINE 55
TO LINE 40
W7
W6
"AE"
"AD"
"AC"
"AB"
2B
2A
1B
1A
A,B
35
3


NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO SO OR TO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. FAIRE DEFAUT A LA PROCEDURE CI-DESSUS PEUT ENTRAINER DES DOMMAGES A L'EQUIPEMENT.
AVISO
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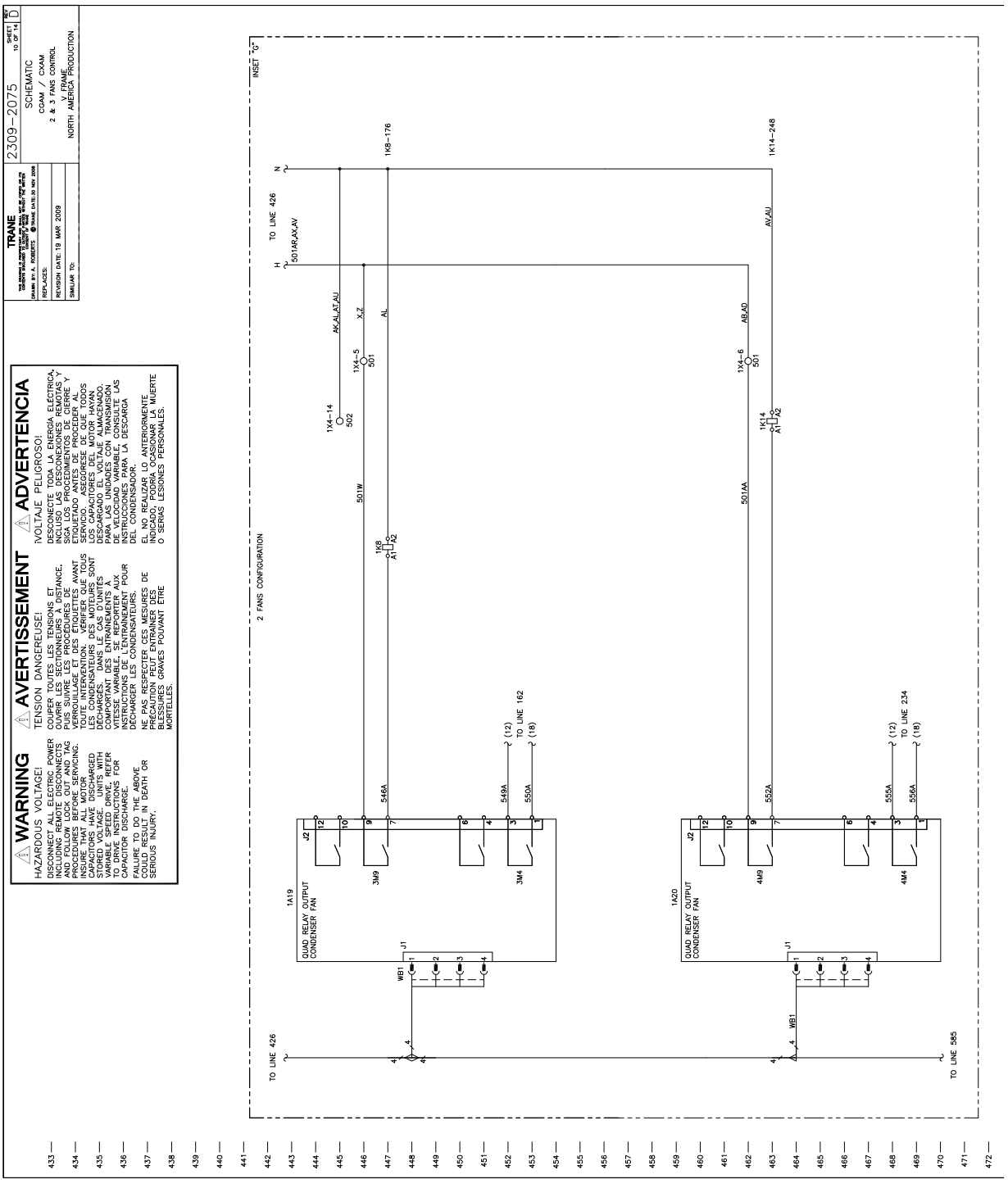
1K2—41,48NC
1K1—33,38NC
1X4—20
519
A,B
C OR W4
"AB"
519C
TO LINE 40
517A
"AE"
"AD"
"AC"
"AB"
W7
W6
W5
W4
1K4
1K1
A1
A2
K,T
1X4—11
1X4—12
1X4—13
502
P
S
(AB OR AD)
501-AR,AV,AX
TO LINE 443 OR 475 (WATER PUMPS)
502 (AB OR AD)
518A
519A
522A
1A
505B
502L
510B
514B
502R
519B
502S
1A6
1A7
COMP 2B
COMP 2A
COMP 1B
COMP 1A
J1
J2
J3
DUAL HIGH VOLTAGE INPUT COMPRESSOR FAULT
WB1
TO LINE 443 OR 475 (WATER PUMPS)
TO LINE 339 (WATER PUMPS)
TO LINE 585 (COMMON CONTROL)


TRANE
2309–2075
SHEET 1 OF 14
SCHEMATIC
CGAM / CXAM
2 & 3 FANS CONTROL
V FRAME
NORTH AMERICA PRODUCTION
REVISION DATE: 19 MAR 2009
WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO SERVICE MANUAL FOR CAPACITOR DISCHARGE.
FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. APPORTER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES PRÉALABLES PEUT PROVOQUER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
ADVERTENCIA
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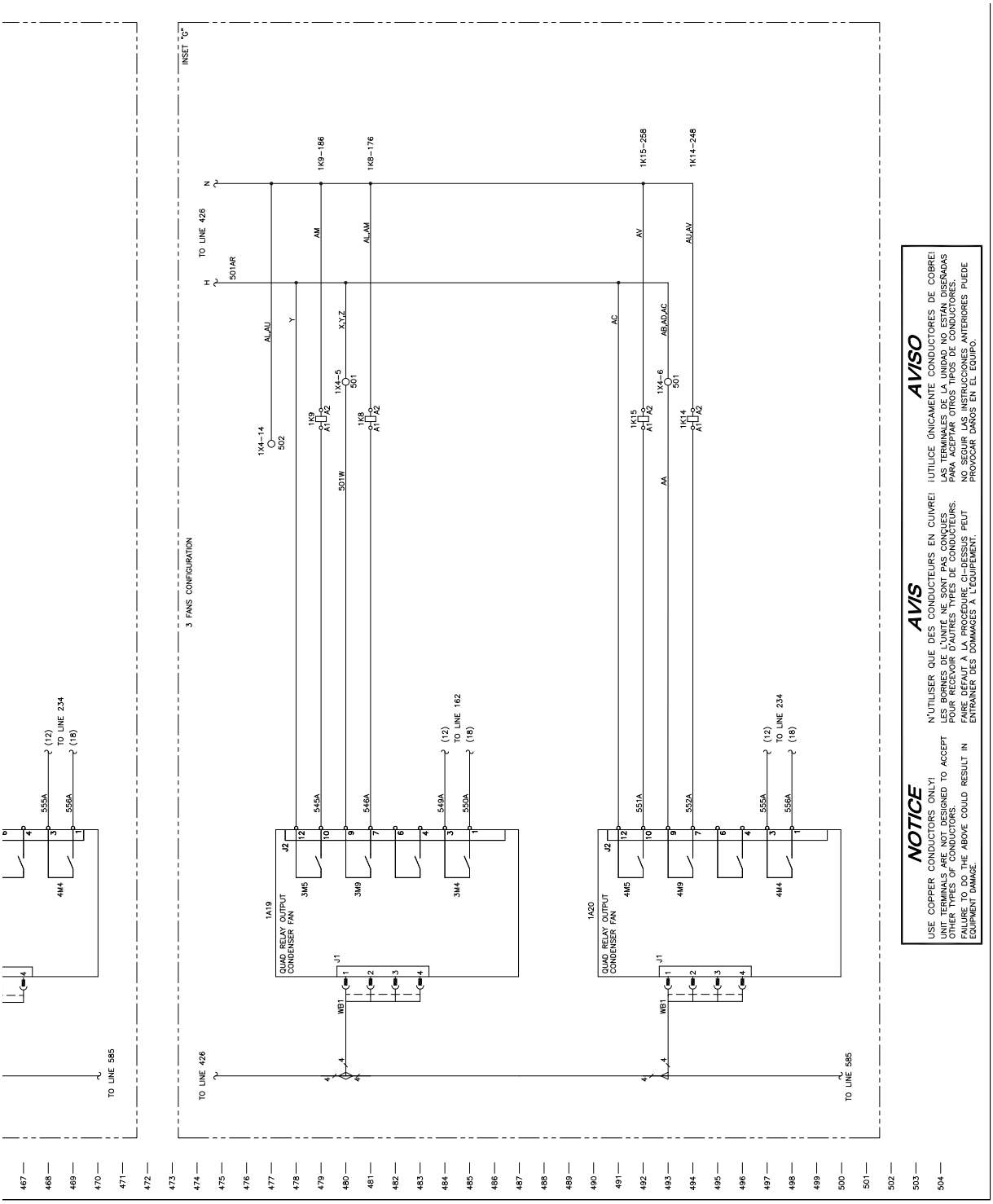
EL NO REALIZAR LO ANTERIORMENTE MENCIONADO PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
2 FANS CONFIGURATION
INSET "C"
TO LINE 426
TO LINE 585
TO LINE 162
TO LINE 234
1A19
1A20
QUAD RELAY OUTPUT CONDENSER FAN
J1
J2
WB1
1K8
1K14
1X4–14
1X4–5
1X4–6
3M9
3M4
4M9
4M4
546A
549A
550A
552A
555A
556A
501W
501AA
AK,AL,AT,AU
X,Z
AL
AB,AD
AV,AU
1K8–176
1K14–248


3 FANS CONFIGURATION
INSET "G"
TO LINE 426
TO LINE 585
501AR
1K9-186
1K8-176
1K15-258
1K14-248
1X4-14
1X4-5
1X4-6
1K9
1K8
1K15
1K14
1A19
1A20
QUAD RELAY OUTPUT CONDENSER FAN
J1
J2
WB1
3M5
3M9
3M4
4M5
4M9
4M4
545A
546A
549A
550A
551A
552A
555A
556A
TO LINE 162
TO LINE 234
NOTICE
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AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DEFAUT À LA PROCÉDURE CI-DESSUS PEUT ENTRAINER DES DOMMAGES À L'ÉQUIPEMENT.
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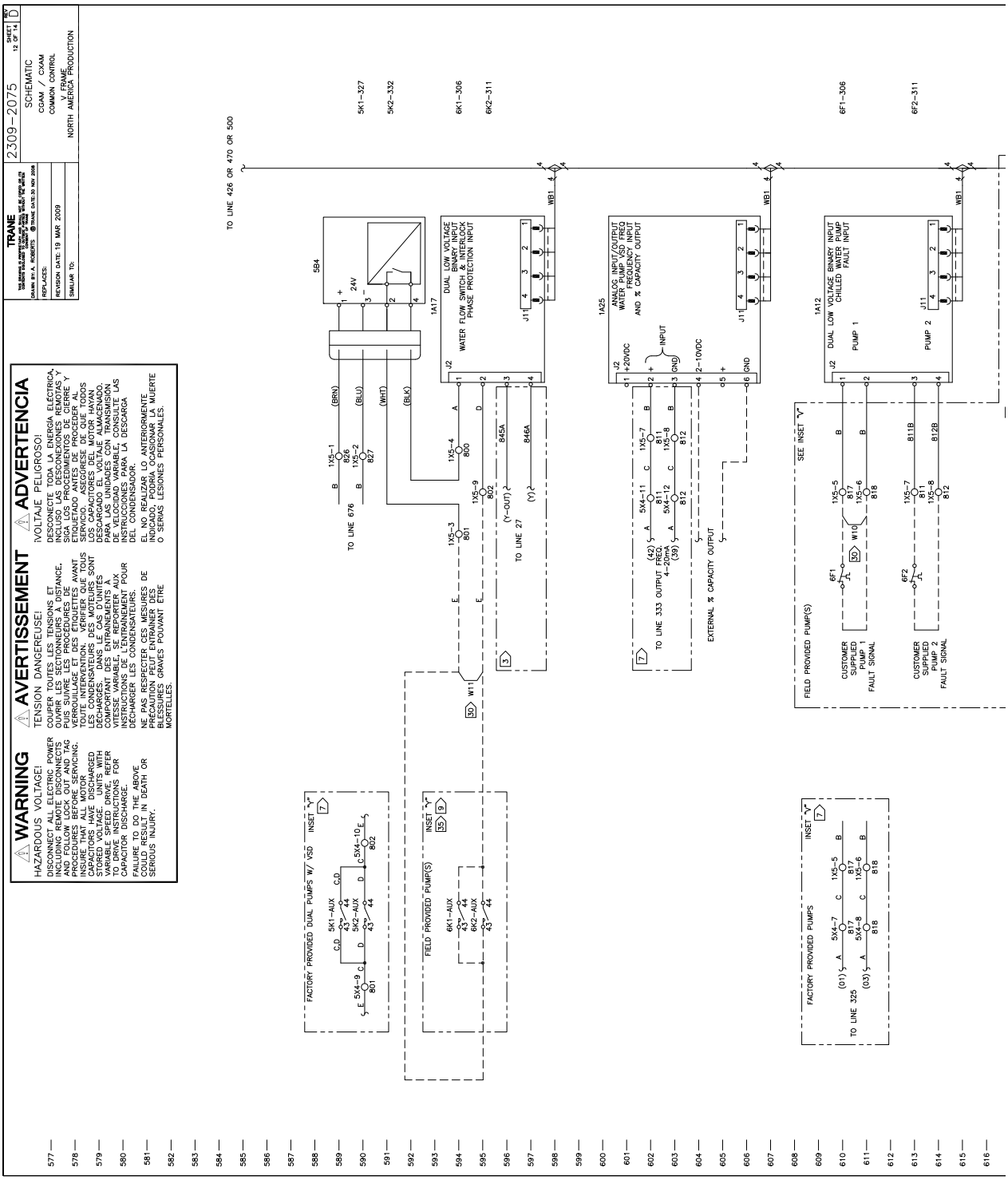
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.


WARNING
HAZARDOUS VOLTAGE!
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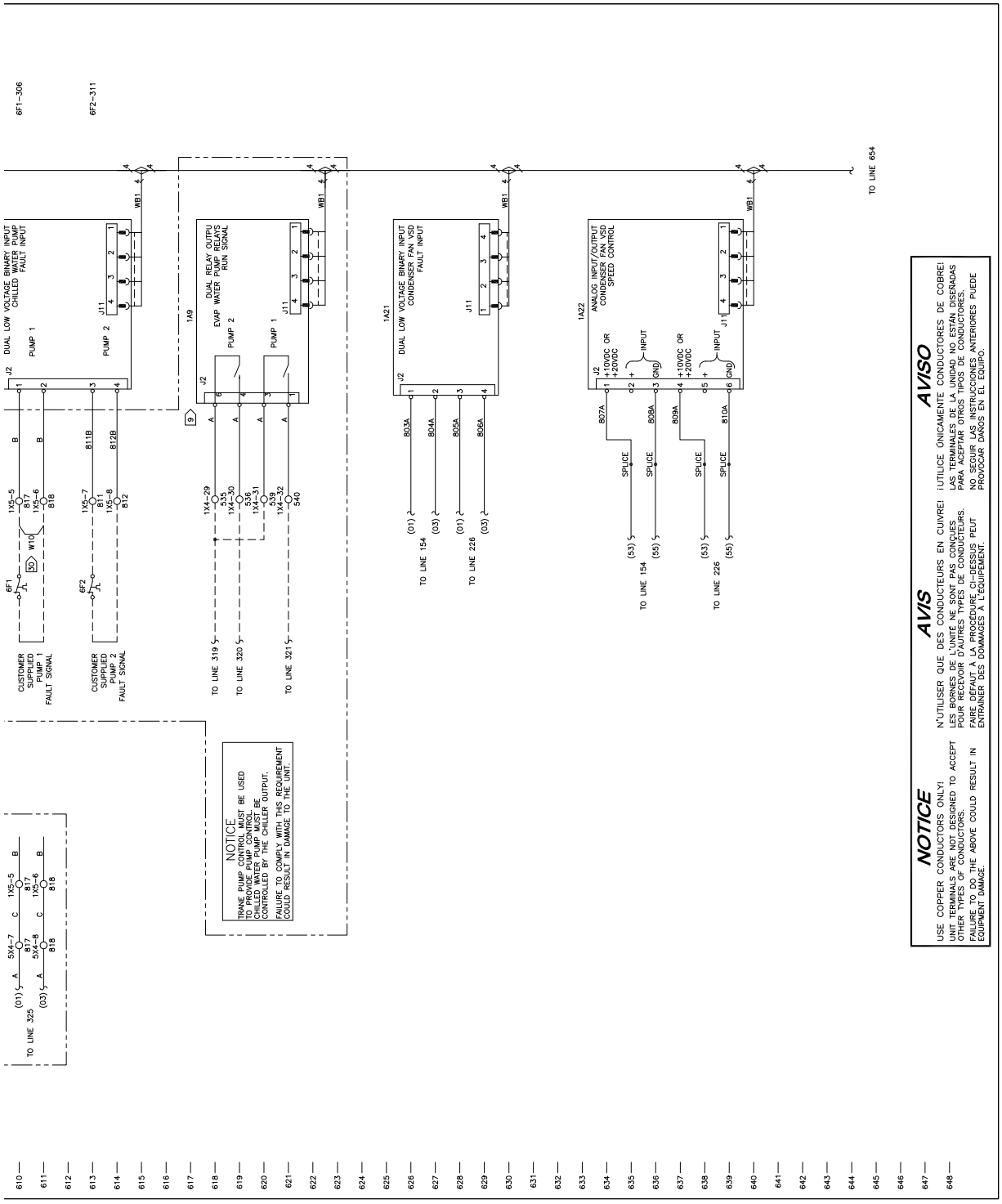
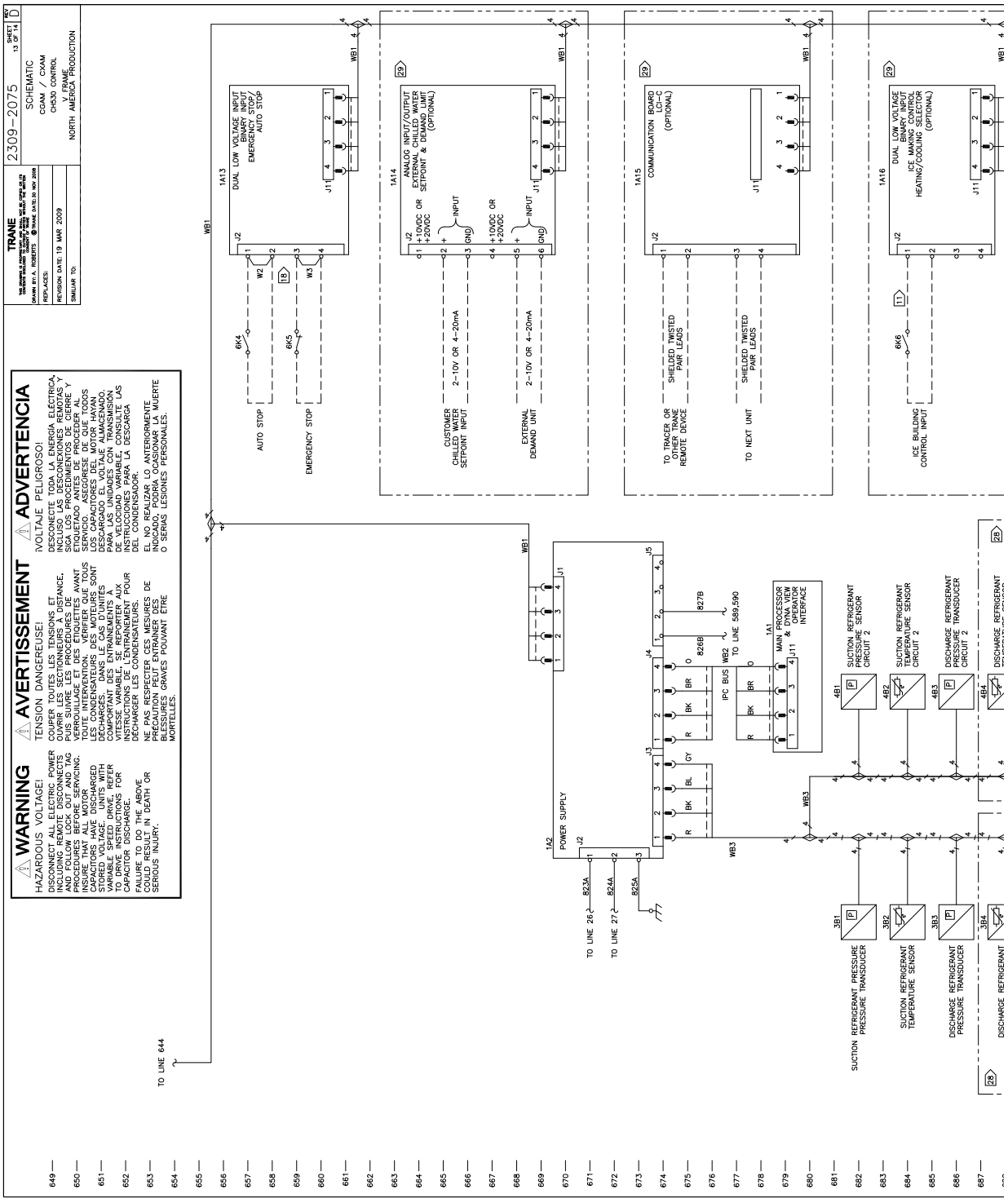
FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
AVERTISSEMENT
TENSION DANGEREUSE!
DISCONNECTER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
ADVERTENCIA
¡VOLTAJE PELIGROSO!
DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ESPERE CINCO MINUTOS PARA QUE LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON TRANSMISIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
EL NO REALIZAR LO ANTERIORMENTE INDICADO PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
TRANE
2309-2075
SHEET 12 OF 14
SCHEMATIC
CGAM / CXAM
COMMON CONTROL
4 TO 7 FRAME
NORTH AMERICA PRODUCTION
DRAWN BY: A. ROBERTS
REPLACES:
REVISION DATE: 19 MAR 2009
SIMILAR TO:
TO LINE 426 OR 470 OR 500
5K1-327
5K2-332
6K1-306
6K2-311
6F1-306
6F2-311
584
1A17
DUAL LOW VOLTAGE BINARY INPUT WATER FLOW, SWITCH & INTERLOCK PHASE PROTECTION INPUT
1A25
ANALOG INPUT/OUTPUT WATER PUMP VSD FREQ WATER FREQUENCY INPUT AND % CAPACITY OUTPUT
1A12
DUAL LOW VOLTAGE BINARY INPUT CHILLED WATER PUMP FAULT INPUT
PUMP 1
PUMP 2
FACTORY PROVIDED DUAL PUMPS W/ VSD
FIELD PROVIDED PUMP(S)
FACTORY PROVIDED PUMPS
SEE INSET "Y"
EXTERNAL % CAPACITY OUTPUT
CUSTOMER SUPPLIED PUMP 1 FAULT SIGNAL
CUSTOMER SUPPLIED PUMP 2 FAULT SIGNAL
TO LINE 676
TO LINE 27
TO LINE 333 OUTPUT FREQ. 4-20mA
TO LINE 325
(BRN)
(BLU)
(WHT)
(BLK)
+24V
+20VDC
2-10VDC
INPUT
GND


NOTICE
TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL. CHILLED WATER PUMP MUST BE CONTROLLED BY THE CHILLER OUTPUT. FAILURE TO COMPLY WITH THIS REQUIREMENT COULD RESULT IN DAMAGE TO THE UNIT.
NOTICE
USE COPPER CONDUCTORS ONLY! UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS. FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE! LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS. FAIRE DEFAUT A LA PRECITUE CI-DESSUS PEUT ENTRAINER DES DOMMAGES A L'EQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE! LAS TERMINALES DE LA UNIDAD NO ESTAN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES. NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.
DUAL LOW VOLTAGE BINARY INPUT CHILLED WATER PUMP FAULT INPUT
DUAL RELAY OUTPU EVAP WATER PUMP RELAYS RUN SIGNAL
DUAL LOW VOLTAGE BINARY INPUT CONDENSER FAN VSD FAULT INPUT
ANALOG INPUT/OUTPUT CONDENSER FAN VSD SPEED CONTROL
CUSTOMER SUPPLIED PUMP 1 FAULT SIGNAL
CUSTOMER SUPPLIED PUMP 2 FAULT SIGNAL
TO LINE 319
TO LINE 320
TO LINE 321
TO LINE 325
TO LINE 154
TO LINE 226
TO LINE 654
SPLICE
+10VDC OR +20VDC
INPUT
PUMP 1
PUMP 2


TRANE
2309-2075
SCHEMATIC
CGAM / CXAM
CROSS CONTROL
V FRAME
NORTH AMERICA PRODUCTION
DRAWN BY A. ROBERTS
REVISION DATE: 19 MAR 2009
SIMILAR TO:
SHEET 13 OF 13
REV D
WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVES REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.
FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET, OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE ET D'ETIQUETAGE AVANT TOUTE INTERVENTION. VERIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGES. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAINEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
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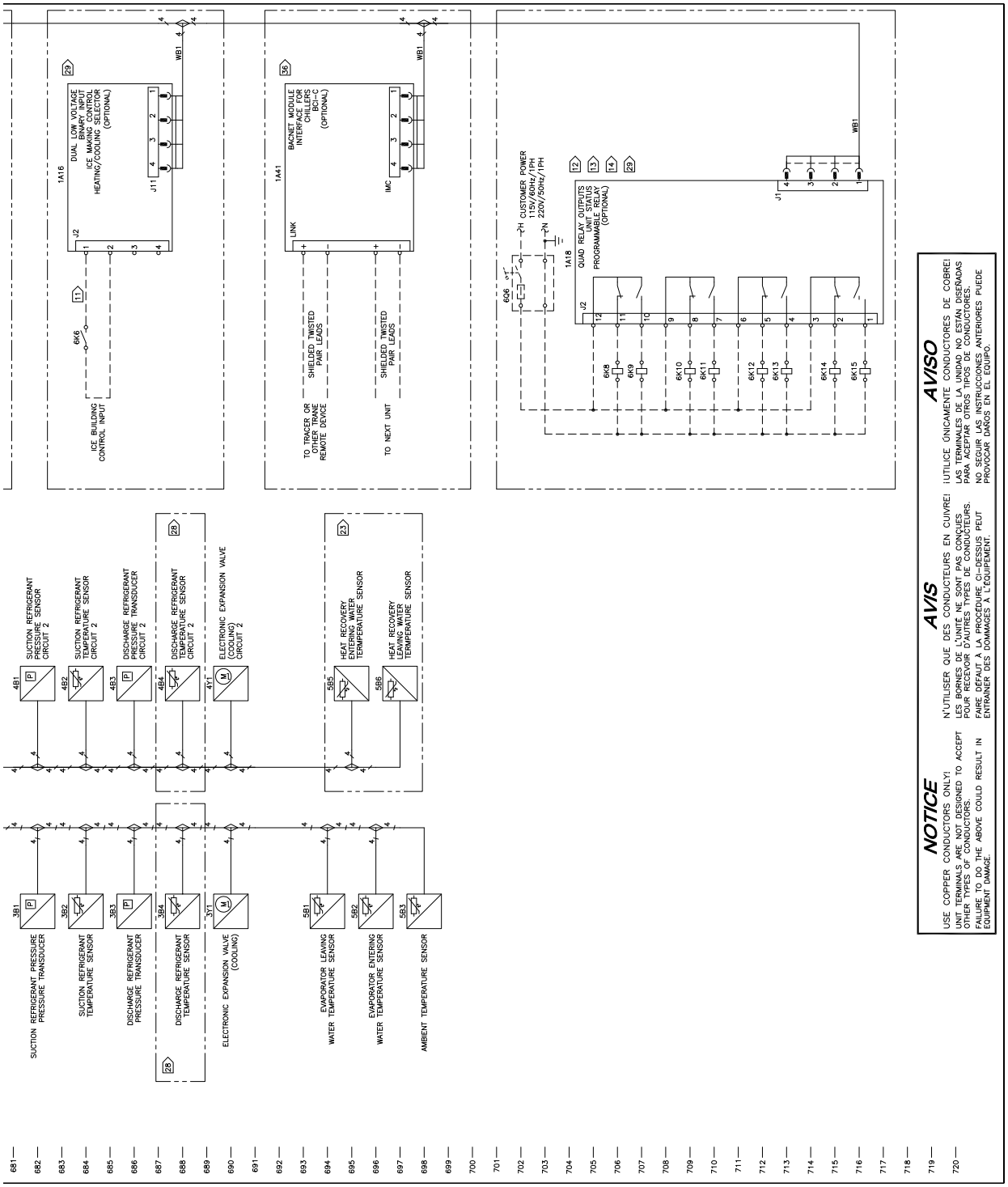
EL NO REALIZAR LO ANTERIORMENTE INDICADO PODRÍA CAUSAR LA MUERTE O SERIAS LESIONES PERSONALES.
TO LINE 644
WB1
1A13
DUAL LOW VOLTAGE INPUT BINARY INPUT EMERGENCY STOP/ AUTO STOP
J2
J11
6K4
AUTO STOP
6K5
EMERGENCY STOP
W2
W3
18
1A14
ANALOG INPUT/OUTPUT EXTERNAL CHILLED WATER SETPOINT & DEMAND LIMIT (OPTIONAL)
+10VDC OR +20VDC
INPUT
GND
CUSTOMER CHILLED WATER SETPOINT INPUT
2-10V OR 4-20mA
EXTERNAL DEMAND UNIT
1A15
COMMUNICATION BOARD LCI-C (OPTIONAL)
TO TRACER OR OTHER TRANE REMOTE DEVICE
SHIELDED TWISTED PAIR LEADS
TO NEXT UNIT
1A16
DUAL LOW VOLTAGE BINARY INPUT ICE MAKING CONTROL HEATING/COOLING SELECT (OPTIONAL)
ICE BUILDING CONTROL INPUT
6K6
11
29
1A2
POWER SUPPLY
TO LINE 26
TO LINE 27
823A
824A
825A
IPC BUS
WR2
TO LINE 589,590
826B
827B
1A1
MAIN PROCESSOR DYNA VIEW OPERATOR INTERFACE
3B1
SUCTION REFRIGERANT PRESSURE TRANSDUCER
3B2
SUCTION REFRIGERANT TEMPERATURE SENSOR
3B3
DISCHARGE REFRIGERANT PRESSURE TRANSDUCER
3B4
DISCHARGE REFRIGERANT
4B1
SUCTION REFRIGERANT PRESSURE SENSOR CIRCUIT 2
4B2
SUCTION REFRIGERANT TEMPERATURE SENSOR CIRCUIT 2
4B3
DISCHARGE REFRIGERANT PRESSURE TRANSDUCER CIRCUIT 2
4B4
28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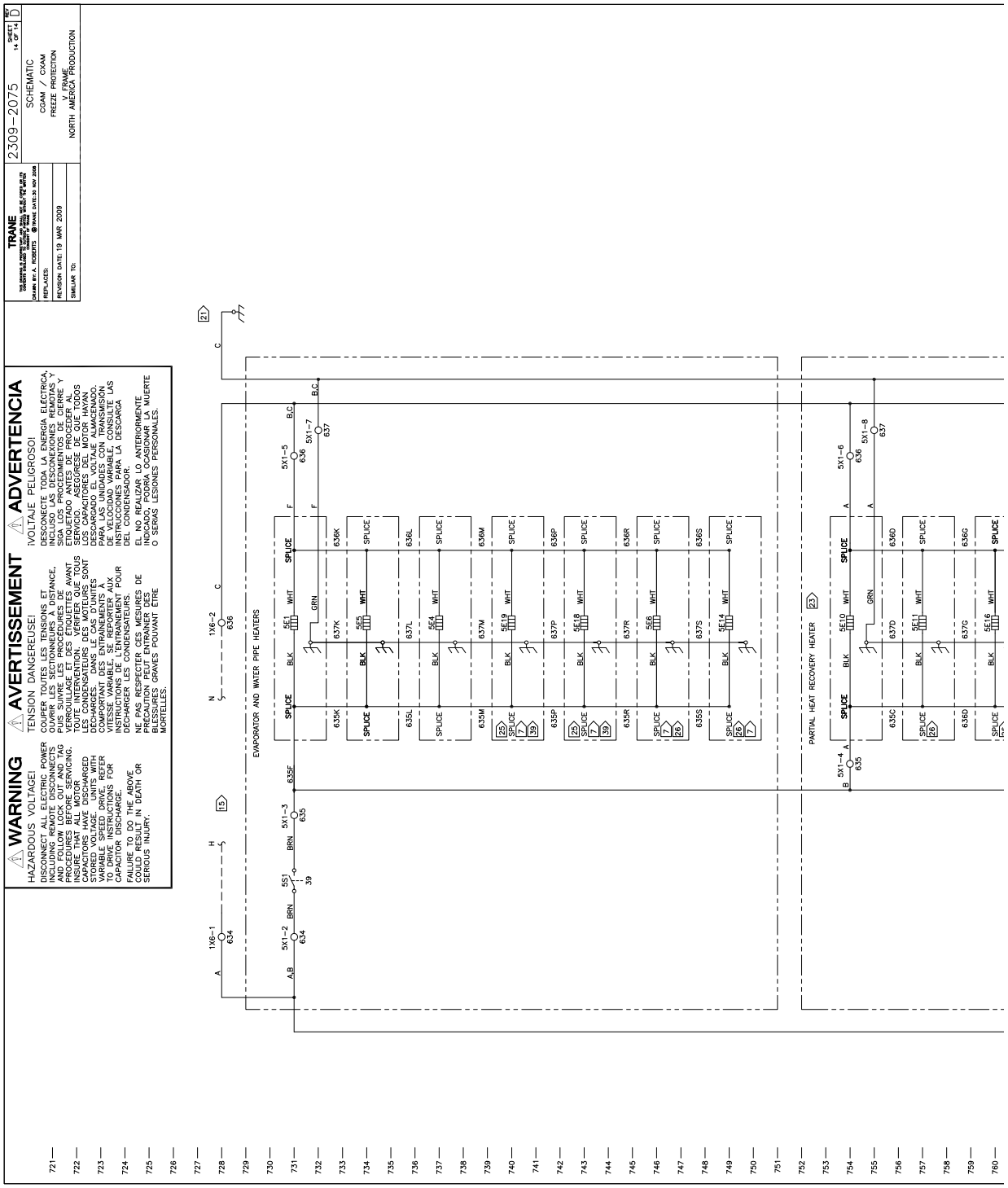
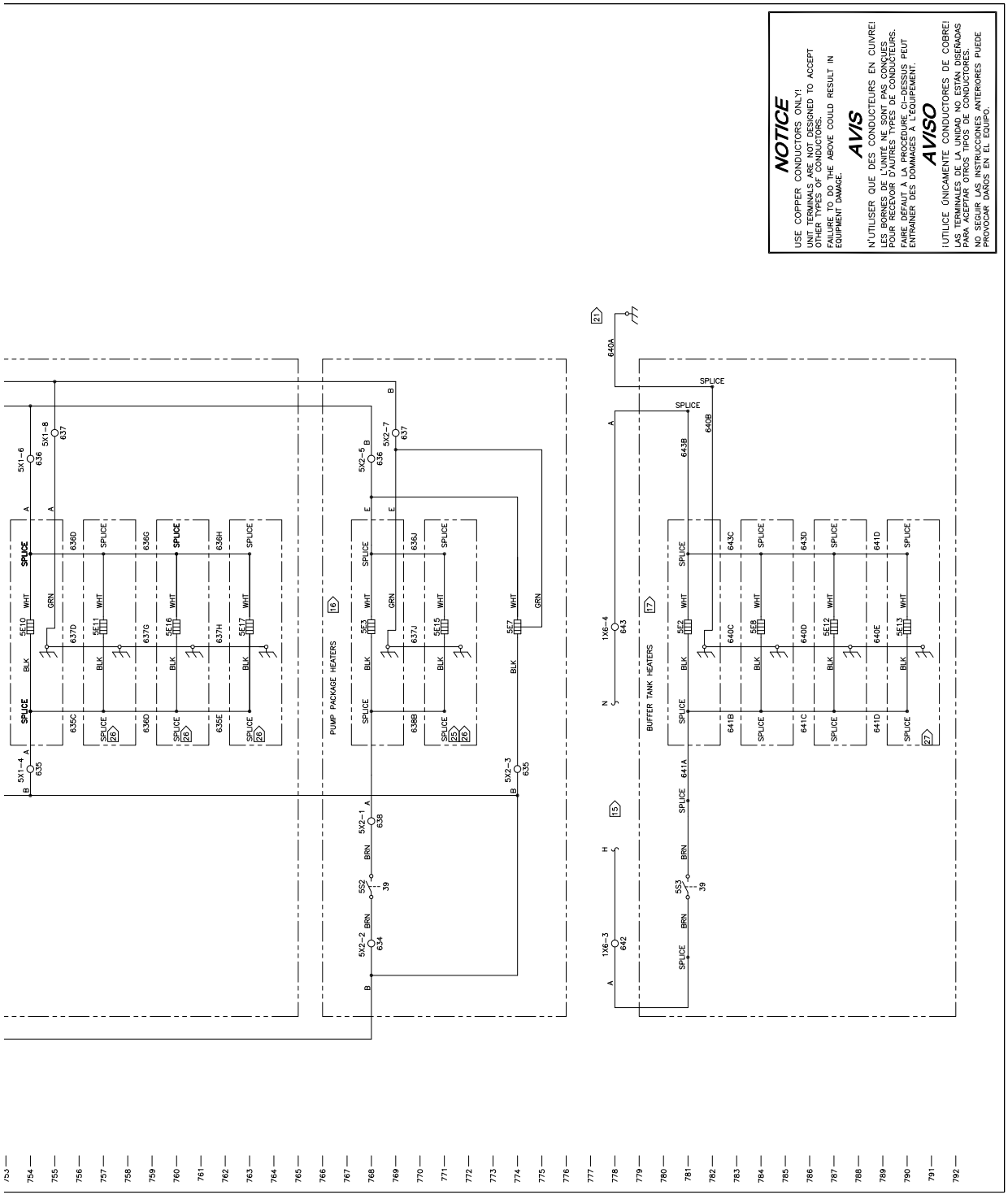
1A16
DUAL LOW VOLTAGE BINARY INPUT ICE MAKING CONTROL HEATING/COOLING SELECTOR (OPTIONAL)
ICE BUILDING CONTROL INPUT
1A41
BACNET MODULE INTERFACE FOR CHILLERS BCI-C (OPTIONAL)
TO TRACER OR OTHER TRANE REMOTE DEVICE
SHIELDED TWISTED PAIR LEADS
TO NEXT UNIT
1A18
QUAD RELAY OUTPUTS UNIT STATUS PROGRAMMABLE RELAY (OPTIONAL)
CUSTOMER POWER 115V/60Hz/1PH 220V/50Hz/1PH
SUCTION REFRIGERANT PRESSURE SENSOR CIRCUIT 2
SUCTION REFRIGERANT TEMPERATURE SENSOR CIRCUIT 2
DISCHARGE REFRIGERANT PRESSURE TRANSDUCER CIRCUIT 2
DISCHARGE REFRIGERANT TEMPERATURE SENSOR CIRCUIT 2
ELECTRONIC EXPANSION VALVE (COOLING) CIRCUIT 2
HEAT RECOVERY ENTERING WATER TERMPERATURE SENSOR
HEAT RECOVERY LEAVING WATER TERMPERATURE SENSOR
SUCTION REFRIGERANT PRESSURE TRANSDUCER
SUCTION REFRIGERANT TEMPERATURE SENSOR
DISCHARGE REFRIGERANT PRESSURE TRANSDUCER
DISCHARGE REFRIGERANT TEMPERATURE SENSOR
ELECTRONIC EXPANSION VALVE (COOLING)
EVAPORATOR LEAVING WATER TEMPERATURE SENSOR
EVAPORATOR ENTERING WATER TEMPERATURE SENSOR
AMBIENT TEMPERATURE SENSOR

40-70 Ton - "V Frame" - Freeze Protection

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POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DÉFAUT À LA PROCÉDURE CI-DESSUS PEUT
ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.
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PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE
PROVOCAR DAÑOS EN EL EQUIPO.
PUMP PACKAGE HEATERS
BUFFER TANK HEATERS
SPLICE
WHT
GRN
BLK
BRN

TRANE	2309–2075	SHEET 1 OF 14	REV D
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DRAWN BY: A. ROBERTS ©TRANE DATE: 30 NOV 2008	CGAM / CXAM		
REPLACES:	TABLE OF CONTENTS		
REVISION DATE: 19 MAR 2009	W FRAME		
SIMILIAR TO:	NORTH AMERICA PRODUCTION		

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DEVICES, DESCRIPTIONS & DESIGNATIONS

TRANE	2309-2075	SHEET 2 OF 14	REV D
THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE. DRAWN BY: A. ROBERTS ©TRANE DATE:30 NOV 2008	SCHEMATIC		
REPLACES:	CGAM / CXAM		
REVISION DATE: 19 MAR 2009	DEVICE DESIGNATORS		
SIMILIAR TO:	W FRAME NORTH AMERICA PRODUCTION		

DEVICE PREFIX LOCATION CODE	
AREA	LOCATION
1	MAIN PANEL/AUXILIARY PANEL
2	NOT USED
3	REFRIGERATION CIRCUIT 1
4	REFRIGERATION CIRCUIT 2
5	UNIT MOUNTED
6	CUSTOMER PROVIDED

LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
MAIN PANEL/AUXILIARY PANEL		
1A1	DYNAVIEW MAIN PROCESSOR MODULE	678
1A2	POWER SUPPLY MODULE	669
1A3	COMPRESSOR MOTOR CONTROL; QUAD RELAY OUTPUT	387
1A4	COMPRESSOR MOTOR CONTROL; DUAL RELAY OUTPUT	399
1A5	HIGH PRESSURE CUTOUT; DUAL HIGH VOLTAGE BINARY INPUT	380
1A6	COMPRESSOR FAULT, 2A & 2B, DUAL HIGH VOLTAGE BINARY INPUT	405
1A7	COMPRESSOR FAULT, 1A & 1B, DUAL HIGH VOLTAGE BINARY INPUT	412
1A8	COMPRESSOR FAULT, 2C & 1C, DUAL HIGH VOLTAGE BINARY INPUT	419
1A9	CHILLED WATER PUMP CONTROL, DUAL RELAY OUTPUT	617
1A12	CHILLED WATER PUMP FAULT, DUAL LOW VOLTAGE BINARY INPUT	609
1A13	EXTERNAL EMERGENCY STOP/AUTO STOP, DUAL LOW VOLTAGE BINARY INPUT	656
1A14	EXTERNAL CHILLER WATER SETPOINT DEMAND &LIMIT; ANOLOG INPUT/OUTPUT	663
1A15	COMMUNICATION, LCI-C, DUAL LOW VOLTAGE BINARY INPUT	673
1A16	ICE MAKING CONTROL, DUAL LOW VOLTAGE BINARY INPUT	683
1A17	CHILLED WATER FLOW AND INTERLOCKS, DUAL LOW VOLTAGE BINARY INPUT	593
1A18	UNIT OPERATING STATUS, QUAD RELAY OUTPUT	704
1A19	CONDENSER FAN CONTROL CIRCUIT 1, QUAD RELAY OUTPUT	477 OR 517 OR 547
1A20	CONDENSER FAN CONTROL CIRCUIT 2, QUAD RELAY OUTPUT	490 OR 528 OR 560
1A21	FAN INVERT FAULT INPUT, DUAL LOW VOLTAGE BINARY INPUT	625
1A22	FAN VSD CONTROL, ANALOG INPUT/OUTPUT	633
1A25	PUMP VSD FREQUENCY, ANOLOG INPUT/OUTPUT OR % CAPACITY	600
1A26	DUAL CHILLED WATER PUMP CONTROL WITH VSD, QUAD RELAY OUTPUT	345
1A36	VSD, CONDENSER FAN 2A, CIRCUIT 1	155
1A37	VSD, CONDENSER FAN 2A, CIRCUIT 2	227
1A41	BACNET COMMUNICATION INTERFACE FOR CHILLERS	692
1E1	HEATER, BLANKET, 1A36	377
1E2	HEATER, BLANKET, 1A36	378
1E3	HEATER, BLANKET, 1A37	379
1F1,1F2	FUSE, COMPRESSOR HEATER, CIRCUIT 1	38,39
1F3,1F4	FUSE, COMPRESSOR HEATER, CIRCUIT 2	98,99
1F5,1F6	FUSE, CONTROL POWER TRANSFORMER, PRIMARY	28,29
1F11	FUSE, CONTROL POWER TRANSFORMER, SECONDARY, 115V	27
1F12-1F13	FUSE, CONTROL POWER TRANSFORMER, SECONDARY, 24V	26,27
1F14-1F16	FUSE, FAN 1A, CIRCUIT 1	156,157,158
1F17-1F19	FUSE, FAN 2A, CIRCUIT 2	228,229,230
1F32-1F34	FUSE, VSD, PUMP	323,324,325
1F35-1F37	FUSE, FANS CIRCUIT 1	182
1F38-1F40	FUSE, FANS CIRCUIT 1 - w/575V	172
1F41-1F43	FUSE, FANS CIRCUIT 2	254
1F44-1F46	FUSE, FANS CIRCUIT 2	244
1K1	CONTACTOR, COMPRESSOR 1A, CIRCUIT 1	33,396
1K2	CONTACTOR, COMPRESSOR 1B, CIRCUIT 1	48,394
1K3	CONTACTOR, COMPRESSOR 1C, CIRCUIT 1	60,403

LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBEP
REFRIGERATION CIRCUIT 1		
3B1	TRANSDUCER, SUCTION REFRIGERANT PRESSURE, CIRCUIT 1	682
3B2	SENSOR, SUCTION REFRIGERANT TEMPERATURE, CIRCUIT 1	684
3B3	TRANDUCER, DISCHARGE REFRIGERANT PRESSURE, CIRCUIT 1	686
3B4	SENSOR, DISCHARGE REFRIGERANT TEMPERATURE, CIRCUIT 1	688
3M1	MOTOR, COMPRESSOR 1A, CIRCUIT 1	34
3M1A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 1A, CIRCUIT 1	36
3M1E1	HEATER, COMPRESSOR 1A, CIRCUIT 1	39
3M2	MOTOR, COMPRESSOR 1B, CIRCUIT 1	49
3M2A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 1B, CIRCUIT 1	52
3M2E1	HEATER, COMPRESSOR 1B, CIRCUIT 1	42
3M3	MOTOR, COMPRESSOR 1C, CIRCUIT 1	60
3M3A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 1C, CIRCUIT 1	64
3M3E1	HEATER, COMPRESSOR 1C, CIRCUIT 1	45
3M4	MOTOR, FAN 1, CIRCUIT 1	156
3M5	MOTOR, FAN, CIRCUIT 1	186
3M6	MOTOR, FAN, CIRCUIT 1	206
3M7	MOTOR, FAN, CIRCUIT 1	196
3M9	MOTOR, FAN, CIRCUIT 1	176
3S1	HIGH PRESSURE CUTOUT SWITCH, CIRCUIT 1	392
3S2	THERMOSTAT, COMPRESSOR 1A HEATER	39
3S3	THERMOSTAT, COMPRESSOR 1B HEATER	42
3S4	THERMOSTAT, COMPRESSOR 1C HEATER	45
3Y1	EXPANSION VALVE, COOLING, CIRCUIT 1	690
REFRIGERATION CIRCUIT 2		
4B1	TRANDUCER, SUCTION REFRIGERANT PRESSURE, CIRCUIT 2	682
4B2	SENSOR, SUCTION REFRIGERANT TEMPERATURE, CIRCUIT 2	684
4B3	TRANDUCER, DISCHARGE REFRIGERANT PRESSURE, CIRCUIT 2	686
4B4	SENSOR, DISCHARGE REFRIGERANT TEMPERATURE, CIRCUIT 2	688
4M1	MOTOR, COMPRESSOR 2A, CIRCUIT 2	93
4M1A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 2A, CIRCUIT 2	96
4M1E1	HEATER, COMPRESSOR 2A, CIRCUIT 2	99
4M2	MOTOR, COMPRESSOR 2B, CIRCUIT 2	108
4M2A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 2B, CIRCUIT 2	112
4M2E1	HEATER, COMPRESSOR 2B, CIRCUIT 2	102
4M3	MOTOR, COMPRESSOR 2C, CIRCUIT 2	120
4M3A1	ELECTRONIC PROTECTION MODULE, COMPRESSOR 2C, CIRCUIT 2	123
4M3E1	HEATER, COMPRESSOR 2C, CIRCUIT 2	105
4M4	MOTOR, FAN 1, CIRCUIT 2	228
4M5	MOTOR, FAN, CIRCUIT 2	258
4M6	MOTOR, FAN, CIRCUIT 2	278
4M7	MOTOR, FAN, CIRCUIT 2	268
4M9	MOTOR, FAN, CIRCUIT 2	248
4S1	HIGH PRESSURE CUTOUT SWITCH, CIRCUIT 2	386

1F35–1F37	FUSE, FANS CIRCUIT 1	182
1F38–1F40	FUSE, FANS CIRCUIT 1 – w/575V	172
1F41–1F43	FUSE, FANS CIRCUIT 2	254
1F44–1F46	FUSE, FANS CIRCUIT 2	244
1K1	CONTACTOR, COMPRESSOR 1A, CIRCUIT 1	33,396
1K2	CONTACTOR, COMPRESSOR 1B, CIRCUIT 1	48,394
1K3	CONTACTOR, COMPRESSOR 1C, CIRCUIT 1	60,403,
1K4	CONTACTOR, COMPRESSOR 2A, CIRCUIT 2	93,390,
1K5	CONTACTOR, COMPRESSOR 2B, CIRCUIT 2	108,388,
1K6	CONTACTOR, COMPRESSOR 2C, CIRCUIT 2	120,401,
1K8	CONTACTOR, FAN 3M9	176,481,522,552
1K9	CONTACTOR, FAN 3M5	186,479,519,549
1K10	CONTACTOR, FAN 3M7	196,520,550
1K11	CONTACTOR, FAN 3M6	206,554
1K14	CONTACTOR, FAN 4M9	248,494,533,565
1K15	CONTACTOR, FAN 4M5	258,492,530,562
1K16	CONTACTOR, FAN 4M7	268,531,563
1K17	CONTACTOR, FAN 4M6	278,567
1M1	FAN, MAIN CONTROL PANEL VENTILATION	374
1Q1	CIRCUIT BREAKER	15
1Q5	CIRCUIT BREAKER, COMPRESSOR, 3M1, CIRCUIT 1	33
1Q6	CIRCUIT BREAKER, COMPRESSOR, 3M2, CIRCUIT 1	48
1Q7	CIRCUIT BREAKER, COMPRESSOR, 3M3, CIRCUIT 1	60
1Q8	CIRCUIT BREAKER, COMPRESSOR, 4M1, CIRCUIT 2	93
1Q9	CIRCUIT BREAKER, COMPRESSOR, 4M2, CIRCUIT 2	108
1Q10	CIRCUIT BREAKER, COMPRESSOR, CIRCUIT 2	120
1Q12	MANUAL MOTOR STARTER, FAN 3M9, CIRCUIT 1	176
1Q13	MANUAL MOTOR STARTER, FAN 3M5, CIRCUIT 1	186
1Q14	MANUAL MOTOR STARTER, FAN 3M7, CIRCUIT 1	196
1Q15	MANUAL MOTOR STARTER, FAN 3M6, CIRCUIT 1	206
1Q18	MANUAL MOTOR STARTER, FAN 4M9, CIRCUIT 2	248
1Q19	MANUAL MOTOR STARTER, FAN 4M5, CIRCUIT 2	258
1Q20	MANUAL MOTOR STARTER, FAN 4M7, CIRCUIT 2	268
1Q21	MANUAL MOTOR STARTER, FAN 4M6, CIRCUIT 2	278
1S1	THERMOSTAT, MAIN CONTROL PANEL VENTILATION	374
1S2	THERMOSTAT, VSD HEATER BLANKET	377
1T1	TRANSFORMER, CONTROL POWER	23
1T2	AUTOTRANSFORMER, FAN VSD, CIRCUIT 1	160
1T3	AUTOTRANSFORMER, FAN VSD, CIRCUIT 2	233
1X1	BLOCK, TERMINAL – CUSTOMER POWER DISTRIBUTION	8
1X3	BLOCK, TERMINAL – COMPRESSOR HEATER, CIRCUIT 1	VARIES
1X4	BLOCK, TERMINAL – FACTORY CONTROL WIRING, 115VAC	VARIES
1X5	BLOCK, TERMINAL – FACTORY CONTROL WIRING, 0–10VDC	VARIES
1X6	BLOCK, TERMINAL – CUSTOMER CONTROL WIRING, 115VAC	VARIES
1X7	BLOCK, TERMINAL – CUSTOMER CONTROL WIRING, 0–10VDC	VARIES
1X9	BLOCK, TERMINAL – COMPRESSOR HEATER, CIRCUIT 2	VARIES
4M3E1	HEATER, COMPRESSOR 2C, CIRCUIT 2	105
4M4	MOTOR, FAN 1, CIRCUIT 2	228
4M5	MOTOR, FAN, CIRCUIT 2	258
4M6	MOTOR, FAN, CIRCUIT 2	278
4M7	MOTOR, FAN, CIRCUIT 2	268
4M9	MOTOR, FAN, CIRCUIT 2	248
4S1	HIGH PRESSURE CUTOUT SWITCH, CIRCUIT 2	386
4S2	THERMOSTAT, COMPRESSOR 2A HEATER	99
4S3	THERMOSTAT, COMPRESSOR 2B HEATER	102
4S4	THERMOSTAT, COMPRESSOR 2C HEATER	105
4Y1	EXPANSION VALVE, COOLING, CIRCUIT 2	690

UNIT MOUNTED		
5A1	VSD, WATER PUMP CONTROL	322
5B1	SENSOR, EVAPORATOR LEAVING WATER TEMPERATURE	694
5B2	SENSOR, EVAPORATOR ENTERING WATER TEMPERATURE	696
5B3	SENSOR, AMBIENT TEMPERATURE	698
5B4	SENSOR, WATER FLOW	588
5B5	SENSOR, HEAT RECOVERY ENTERING WATER TEMP	695
5B6	SENSOR, HEAT RECOVERY LEAVING WATER TEMP	697
5E1	HEATER, EVAPORATOR	731
5E2	HEATER, BUFFER TANK	781
5E3	HEATER, WATER PUMP PIPING	768
5E4,5E18	HEATER, EVAPORATOR ENTERING WATER PIPING	737,743
5E5,5E19	HEATER, EVAPORATOR LEAVING WATER PIPING	734,740
5E6	HEATER, WATER PUMP PIPING	746
5E7	HEATER, EXPANSION TANK	774
5E8	HEATER, BUFFER TANK	784
5E9	HEATER, PUMP VSD ENCLOSURE	355
5E10	HEATER, PARTIAL HEAT RECOVERY	754
5E11	HEATER, PARTIAL HEAT RECOVERY	757
5E12	HEATER, BUFFER TAN K	787
5E13	HEATER, BUFFER TANK	790
5E14	HEATER, WATER PUMP PIPING	749
5E15	HEATER, WATER PUMP PIPING	771
5E16	HEATER, PARTIAL HEAT RECOVERY	760
5E17	HEATER, PARTIAL HEAT RECOVERY	763
5K1–5K2	CONTACTOR, PUMP PACKAGE W/ VSD	323,331,349,351
5M1	MOTOR, FACTORY PROVIDED, CHILLED WATER PUMP 1	326
5M2	MOTOR, FACTORY PROVIDED, CHILLED WATER PUMP 2	334
5M3	MOTOR, FAN PUMP VSD ENCLOSURE VENTILATION	356
5X1	BLOCK, TERMINAL – EVAPORATOR AND WATER PIPE HEATERS	VARIES
5X2	BLOCK, TERMINAL – PUMP PACKAGE HEATERS	VARIES
5X3	BLOCK, TERMINAL – BUFFER TANK HEATERS	VARIES
5X4	BLOCK, TERMINAL – PUMP VSD AUXILIARY PANEL HEATER	VARIES
5S1	THERMOSTAT, EVAPORATOR & WATER PIPES, HEATERS	731
5S2	THERMOSTAT, PUMP PACKAGE, HEATERS	768
5S3	THERMOSTAT, BUFFER TANK, HEATERS	781
5S4	THERMOSTAT, PUMP VSD AUXILIARY PANEL HEATER	355
5S5	THERMOSTAT, PUMP VSD AUXILIARY PANEL FAN	356
CUSTOMER PROVIDED		
6F1–6F2	RELAY, CUSTOMER PROVIDED, OVERLOAD PROTECTION, CHILLED WATER PUMP	301,306
6K1	RELAY, CUSTOMER PROVIDED, CHILLED WATER PUMP 1	299,301
6K2	RELAY, CUSTOMER PROVIDED, CHILLED WATER PUMP 2	298,306
6K4	RELAY, EXTERNAL INPUT, AUTO/STOP	657
6K5	RELAY, EXTERNAL INPUT, EMERGENCY STOP	659
6K6	RELAY, EXTERNAL INPUT, ENABLE ICE MAKING	684
6K8–15	RELAY, CUSTOMER PROVIDED, UNIT STATUS, (PROGRAMMABLE)	706 TO 716
6M1	MOTOR, CUSTOMER PROVIDED, CHILLED WATER PUMP 1	301
6M2	MOTOR, CUSTOMER PROVIDED, CHILLED WATER PUMP 2	306
6Q1	FUSED DISCONNECT CUSTOMER SUPPLIED 3 PHASE, POWER SUPPLY	3,292
6Q3–6Q4	FUSED DISCONNECT CUSTOMER SUPPLIED 3 PHASE, CHILLED WATER PUMP	301,306
6Q5	FUSED DISCONNECT CUSTOMER SUPPLIED 2 PHASE, CHILLED WATER PUMP	297
6Q6	FUSED DISCONNECT CUSTOMER SUPPLIED 1 PHASE, CONTROL POWER SUPPLY	702

TRANE	2309–2075	SHEET 3 OF 14	REV D
THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE.	SCHEMATIC		
DRAWN BY: A ROBERTS © TRANE DATE: 30 NOV 2008	CGAM / CXAM		
REPLACES:	NOTES		
REVISION DATE: 19 MAR 2009	W FRAME		
SIMILIAR TO:	NORTH AMERICA PRODUCTION		

GENERAL & FLAG NOTES

GENERAL NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C (77F), AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF, AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. DASHED LINES INDICATE RECOMMENDED FIELD WIRING BY OTHERS. DASHED LINE ENCLOSURES AND/OR DASHED DEVICE OUTLINES INDICATE COMPONENTS PROVIDED BY THE FIELD.PHANTOM LINE ENCLOSURES INDICATE ALTERNATE CIRCUITRY OR AVAILABLE SALES OPTIONS. SOLID LINE INDICATES WIRING BY TRANE.
3. NUMBERS ALONG THE RIGHT SIDE OF THE SCHEMATIC DESIGNATE THE LOCATION OF CONTACTS BY LINE NUMBER. AN UNDERLINED NUMBER INDICATES A NORMALLY CLOSED CONTACT.
4. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC), STATE AND LOCAL REQUIREMENTS.
5. CLASS 1 FIELD WIRING INSULATION RATING IS REQUIRED TO BE EQUAL TO OR GREATER THAN THE EQUIPMENT SUPPLY VOLTAGE RATING. CLASS 2 FIELD WIRE INSULATION TO BE RATED AT 300V MINIMUM.

FLAG NOTES:

1. ALL UNIT POWER WIRING MUST BE COPPER CONDUCTORS ONLY, HAVE A MINIMUM INSULATION TEMPERATURE RATING OF 90°C AND BE SELECTED AT 75°C RATINGS.
2. TERMINAL BLOCK 1X1 IS PROVIDED AS STANDARD ON ALL UNITS PNCO=TERM. CIRCUIT BREAKER 1Q1 PNCO=CB AVAILABLE AS OPTION. TERMINAL BLOCK IS REPLACED WITH CIRCUIT BREAKER WHEN THIS OPTION IS SELECTED.
4. REFER TO FAN CHART FOR VALID FAN CONFIGURATIONS.
5. TRANSFORMER FOR 575V UNITS ONLY. (VOLT=575) AND (UAPP=CATC OR WIDC)
6. PUMP PACKAGE:
   – AT LEAST ONE PUMP IS ALWAYS PRESENT AND IS EITHER FIELD OR FACTORY SUPPLIED.
   – WHEN PUMPS ARE FACTORY SUPPLIED, THEY WILL BE DUAL PUMPS.
7. OPTIONAL DUAL FACTORY SUPPLIED EVAP WATER PUMPS. WIRING SHOWN IS FOR VSD OF PUMP PACKAGE. (PTYP=DHHP)
8. OPTIONAL DUAL CUSTOMER SUPPLIED EVAP WATER PUMP(S). 6M2 WIRING PRESENT FOR DUAL PUMP CONFIGURATION ONLY. PUMP CONTROL CONFIGURATION SHOWS WIRING WITH CONTACTORS AND OVERLOAD RELAYS. PUMP(S) CAN ALSO BE POWERED BY CUSTOMER CONTROLLED VSD(S). PUMP STARTER FAULT SIGNAL(S) TO BE FIELD WIRED TO 1A12 (INSET "V").
9. CUSTOMER SUPPLIED PUMP RUN SIGNAL TO BE FIELD WIRED TO 1A9.
10. WIRING FOR 200V/460V UNIT SHOWN. SEE INSET "B" FOR CONTROL POWER TRANSFORMER WIRING OF OTHER VOLTAGES.
11. CONTACT CLOSURE ENABLES ICE MAKING, WHEN ICE MAKING OPTION IS ORDERED. (EVLT=ICE)
12. CLASS 1 FIELD WIRED MODULE.

11 CONTACT CLOSURE ENABLES ICE MAKING, WHEN ICE MAKING OPTION IS ORDERED. (EVLT=ICE)

12 CLASS 1 FIELD WIRED MODULE.

13 RELAY AT 120VAC: 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, 1/3 HP 7.2 FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.

14 FIELD ASSIGNED PROGRAMMABLE RELAYS. STAT=PRLY

15 CUSTOMER SUPPLIED POWER, 120V

16 ONLY USED WHEN PUMP PACKAGE OPTION IS ORDERED. (PTYP=DHHP)

17 ONLY USED WHEN BUFFER TANK OPTION IS ORDERED. (BTNK=BTNK)

18 THE CONTACTS FOR AUTO STOP AND EMERGENCY STOP SWITCHES ARE JUMPERED AT THE FACTORY BY JUMPERS W2 & W3 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED, REMOVE THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.

21 GROUND SCREW IN MAIN CONTROL PANEL.

22 INSIDE THE PUMP VSD ENCLOSURE, MOUNTED ON UNIT FRAME WITH PTYP=DHHP

23 ONLY USED WHEN PARTIAL HEAT RECOVERY (CDHR = PRTF) OPTION IS ORDERED.

24 COMPRESSOR HEATER WIRE COLOR IS DETERMINED BY VOLTAGE IN CHART.

25 PRESENT ON "V" FRAME UNITS NTON = 40, 52, 60 or 70.

26 PRESENT ON "W" FRAME UNITS NTON = 80, 90, 100, 100, 120 or 130.

27 NOT PRESENT ON "W" FRAME UNITS NTON = 80, 90,

28 DISCHARGE REFIGERANT TEMPERATURE SENSOR PRESENT FOR ALL THE FOLLOWING OPTIONS: UNITS WITH ICEMAKING OPTION (EVLT = ICE), UNITS WITH LOW TEMPERATURE PROCESS COOLING (EVLT = PROC) , UNITS WITH PHR FAN CONTROL OPTION (CDHR = PRTF).

29 REFER TO FIELD WIRING DIAGRAM FOR SUGGESTED WIRING.

30 JUMPERS W10 AND W11 ARE INSTALLED BY THE FACTORY ON UNITS ORDERED WITH FIELD PROVIDED PUMPS (PTYP = NONE). JUMPERS W10 AND W11 ARE TO BE REMOVED WHEN PUMPS AND CONTROL ARE INSTALLED.

31 FUSES 1F38, 1F39, 1F40 PRESENT ON ALL SLANT (NTON = 20, 26, 30 or 35) AND V (NTON = 40, 52, 60 or 70) CONFIGURATIONS. PRESENT FOR W (NTON = 80, 90, 100, 110, 120 or 130)CONFIGURATION WHEN LINE VOLTAGE IS 575VAC (VOLT = 575).

32 FUSES 1F35, 1F36, 1F37 PRESENT ON W (NTON = 80, 90, 100, 110, 120 or 130) CONFIGURATIONS WHEN LINE VOLTAGE IS NOT 575VAC (VOLT = 200, 230, 380, 400 or 460).

33 FUSES 1F44, 1F45, 1F46 PRESENT ON ALL V (NTON = 40, 52, 60 or 70) CONFIGURATIONS. PRESENT FOR W (NTON = 80, 90, 100, 110, 120 or 130) CONFIGURATION WHEN LINE VOLTAGE IS (VOLT = 575).

34 FUSES 1F41, 1F42, 1F43 PRESENT ON W (NTON = 80, 90, 100, 110, 120 or 130) CONFIGURATIONS WHEN LINE VOLTAGE IS NOT 575VAC (VOLT = 200, 230, 380, 400 or 460).

35 VENTILATION FAN PRESENT WHEN LINE (VOLT = 200, 230VAC, 380 or 400).

36 1A41, BACNET INTERFACE MODULE USED WHEN (COMM = BCNT).

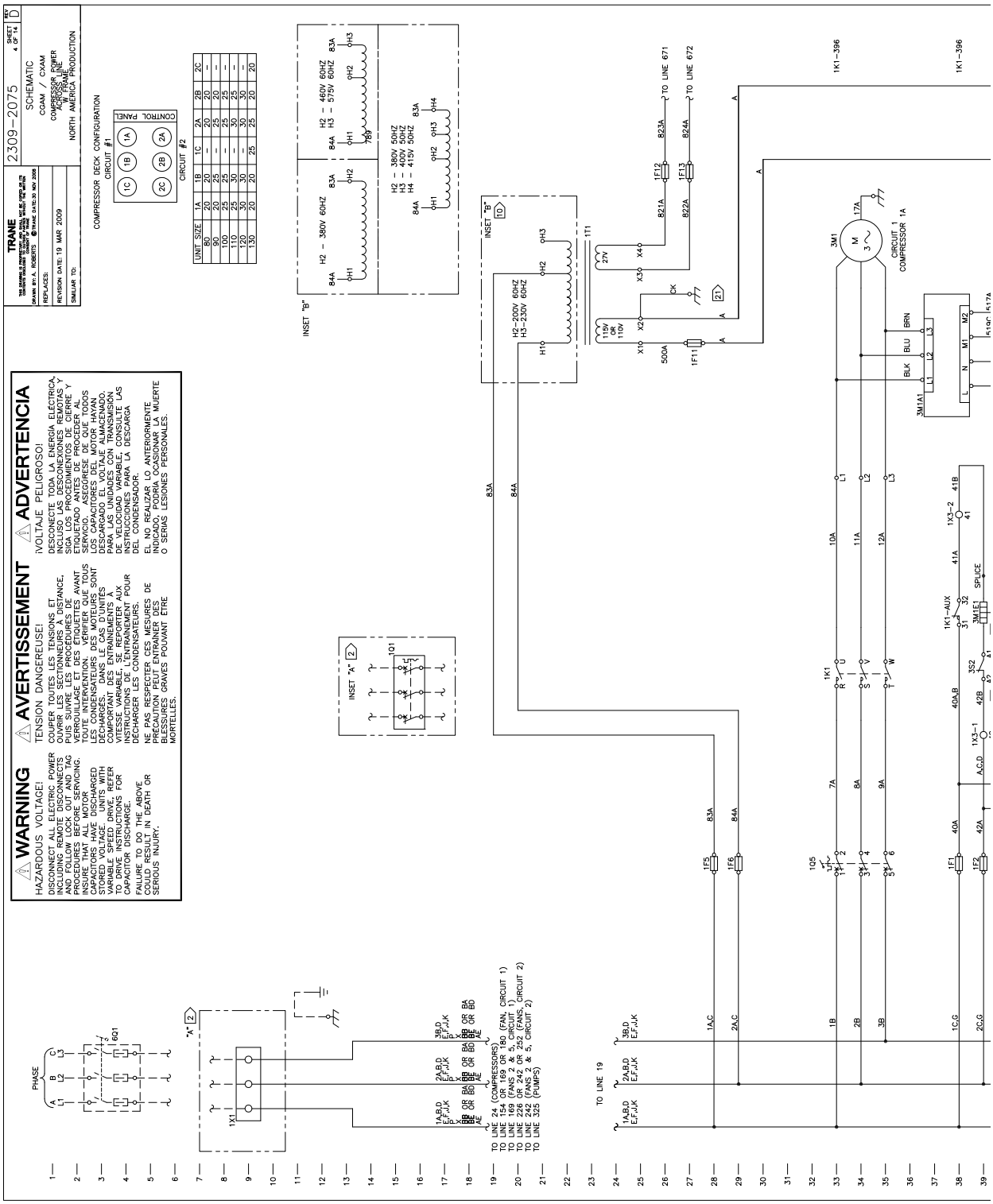
37 THERMOSTATS ARE REQUIRED IN THE COMPRESSOR JUNCTION BOXES ON ALL UNITS WITH COMMERCIAL COMPRESSORS AND SOUND WRAPS TO PREVENT THE PROTECTION MODUAL FROM GETTING TOO HOT. (NTON=30, 35, 60, 70, 80, 90, 100, 110, 120 or 130) (HRTZ = 60 AND SATT = LNUN OR HRTZ = 50 AND SATT = STDN)

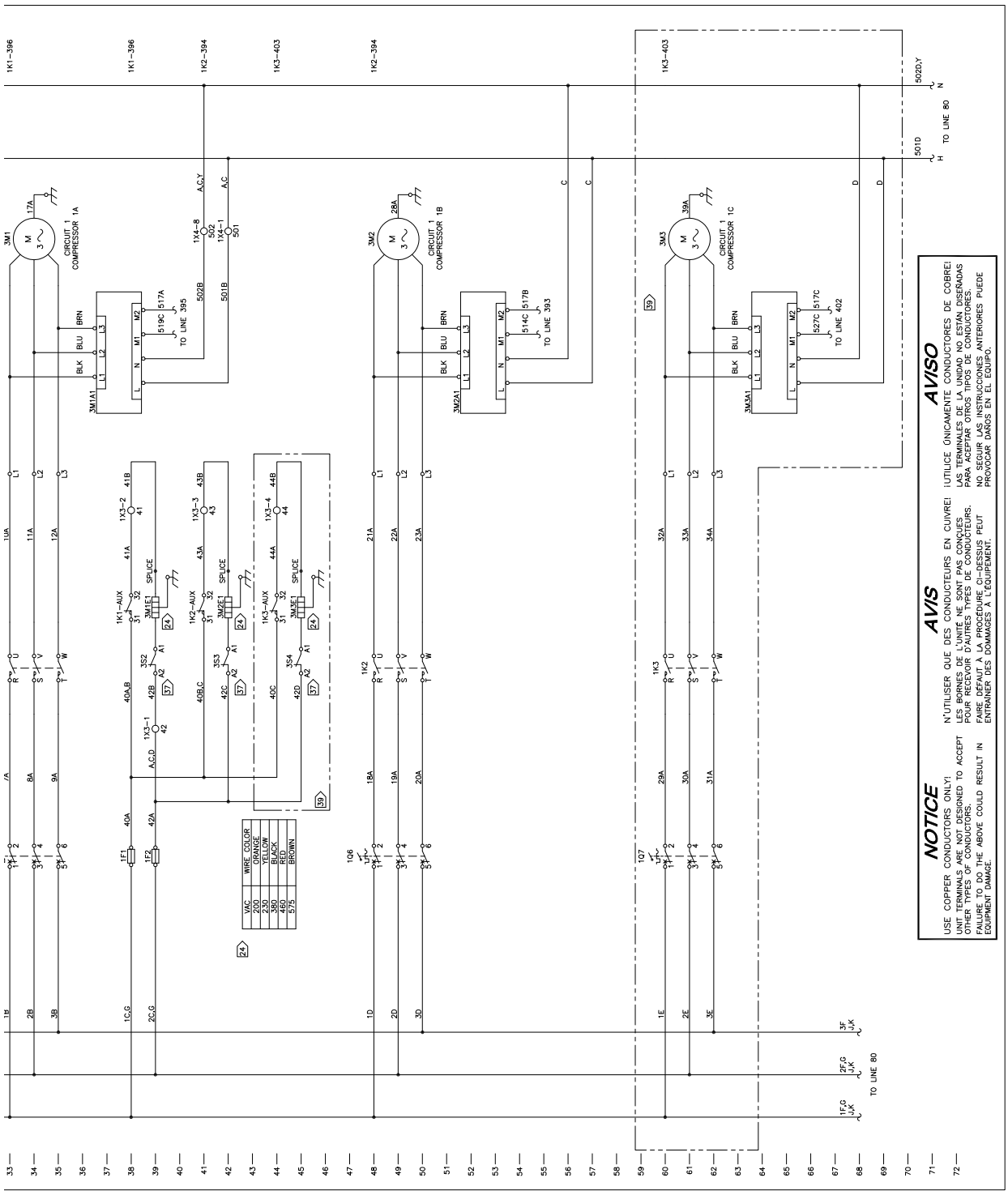
38 THE SAME PUMP MOTOR IS USED FOR 200/230 & 480V UNITS WIRE CONNECTIONS SHOWN FOR BOTH OPTIONS VERIFY WHAT VOLTAGES CHILLER IS BEFORE WIRING.

39 PRESENT ON UNITS NTON=130

40 PRESENT ON UNITS NTON=20, 26, 30, 35 AND PTYP=DHHP

80-130 Ton - "W Frame" - Compressor Power Circuit 1

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FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
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LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
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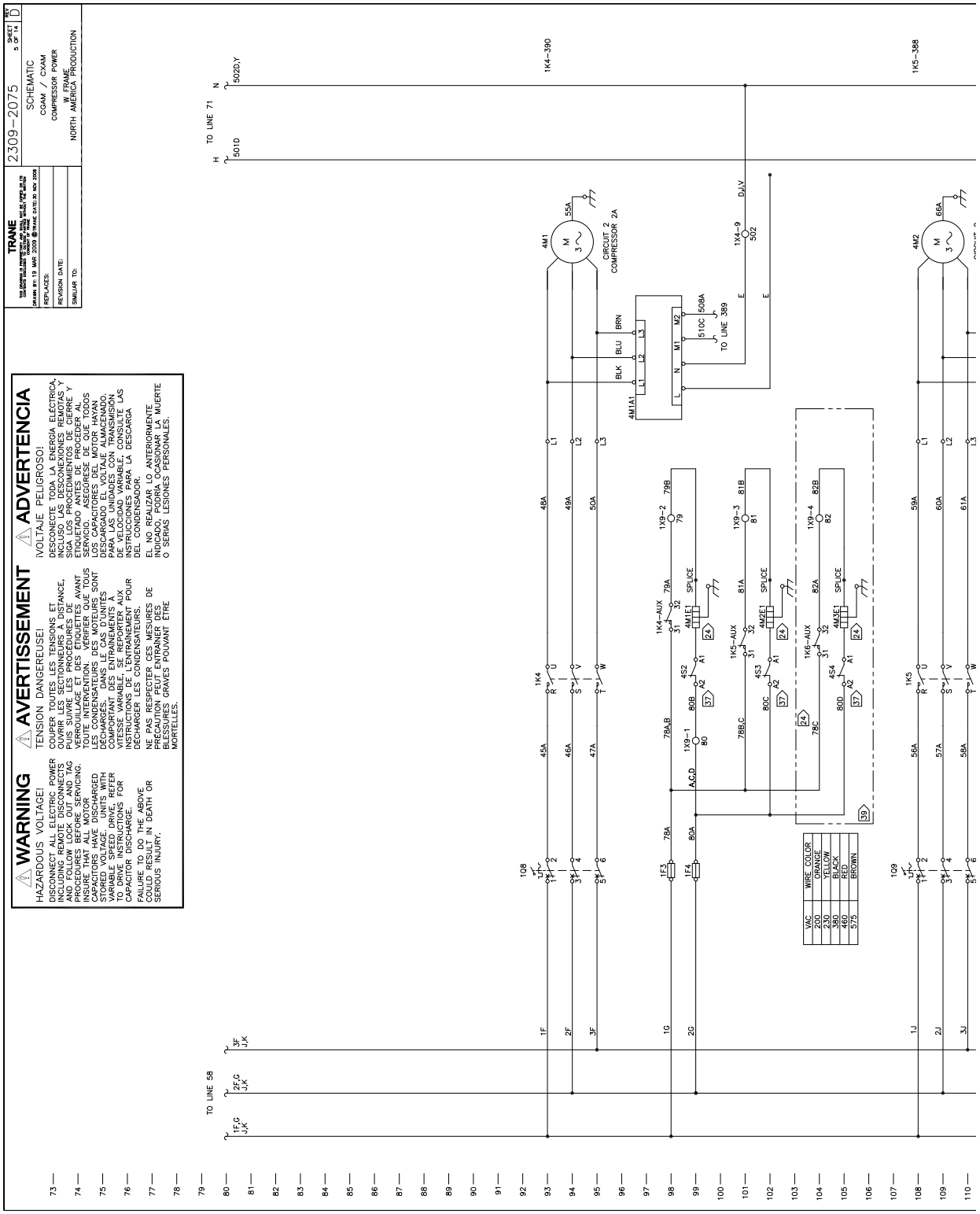
CIRCUIT 1 COMPRESSOR 1A
CIRCUIT 1 COMPRESSOR 1B
CIRCUIT 1 COMPRESSOR 1C
TO LINE 80
TO LINE 395
TO LINE 393
TO LINE 402
SPLICE
WIRE COLOR
ORANGE
YELLOW
BLACK
RED
BROWN
VAC
200
230
460
575


TRANE
2309-2075
SHEET 5 OF 14
REV D
SCHEMATIC
CGAM / CXAM
COMPRESSOR POWER
W FRAME
NORTH AMERICA PRODUCTION
REPLACES:
REVISION DATE:
SIMILAR TO:
⚠ WARNING
HAZARDOUS VOLTAGE!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND TAG OUT AND LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.
FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
⚠ AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, AUSSI BIEN QUE LES PROCÉDURES DE VERROUILLAGE ET D'ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LES UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.
⚠ ADVERTENCIA
¡VOLTAJE PELIGROSO!
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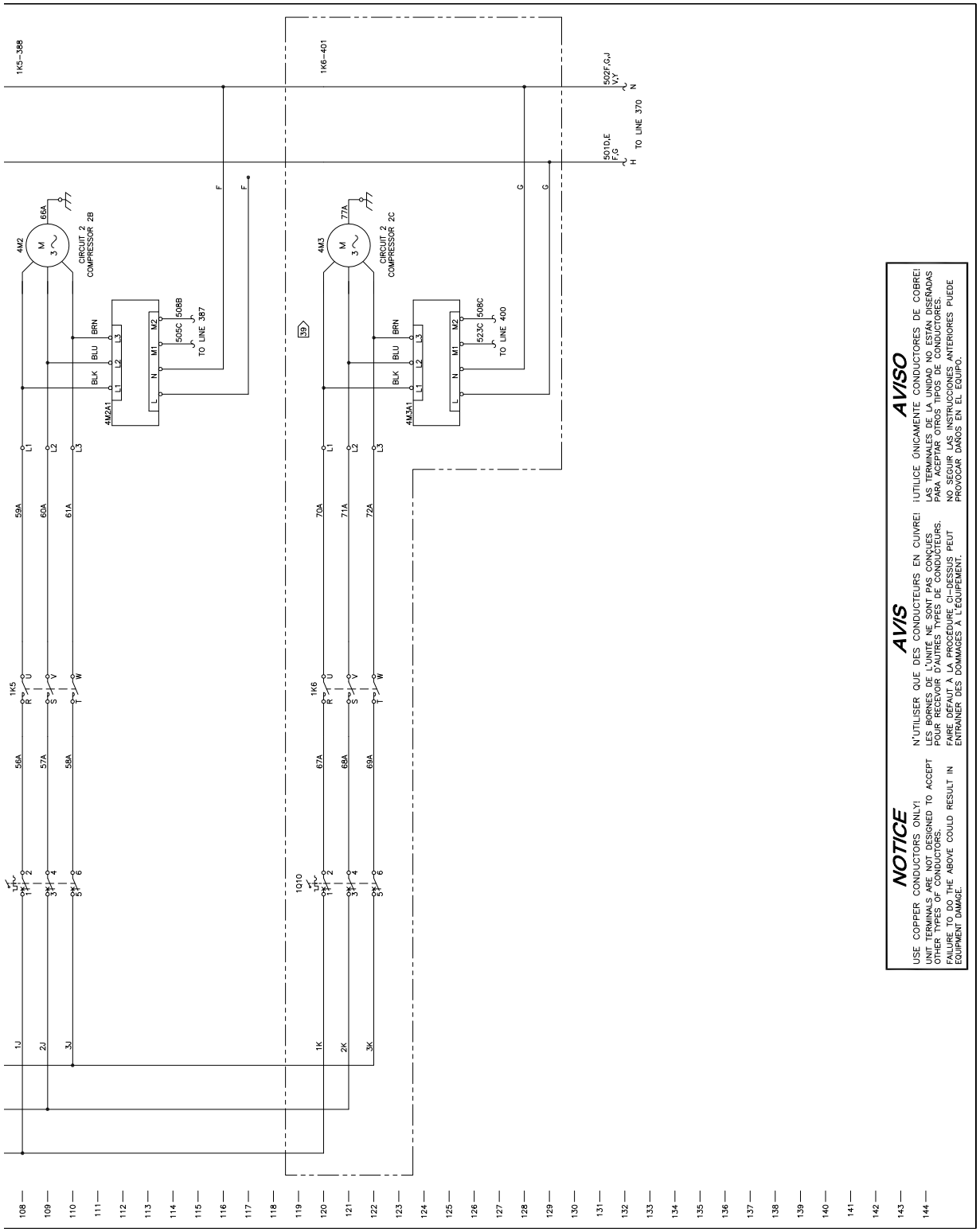
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
TO LINE 58
TO LINE 71
TO LINE 389
CIRCUIT 2 COMPRESSOR 2A
1K4-390
1K5-388
1K4
1K5
1K4-AUX
1K5-AUX
1K6-AUX
4M1
4M2
4M1E1
4M2E1
4M3E1
4S2
4S3
4S4
1X9-1
1X9-2
1X9-3
1X9-4
1X4-9
1F3
1F4
1F5
1F6
SPLICE
WIRE COLOR CHART
VAC
200
230
380
460
575
ORANGE
YELLOW
BLACK
RED
BROWN


1K5--388
1K6--401
502F,G,J
V,Y
N
501D,E
F,G
H
TO LINE 370
4M2
66A
CIRCUIT 2
COMPRESSOR 2B
4M2A1
505C 508B
TO LINE 387
4M3
77A
CIRCUIT 2
COMPRESSOR 2C
4M3A1
523C 508C
TO LINE 400
BRN
BLU
BLK
59A
60A
61A
70A
71A
72A
56A
57A
58A
67A
68A
69A
1K5
1K6
1J
2J
3J
1K
2K
3K
1C10
39
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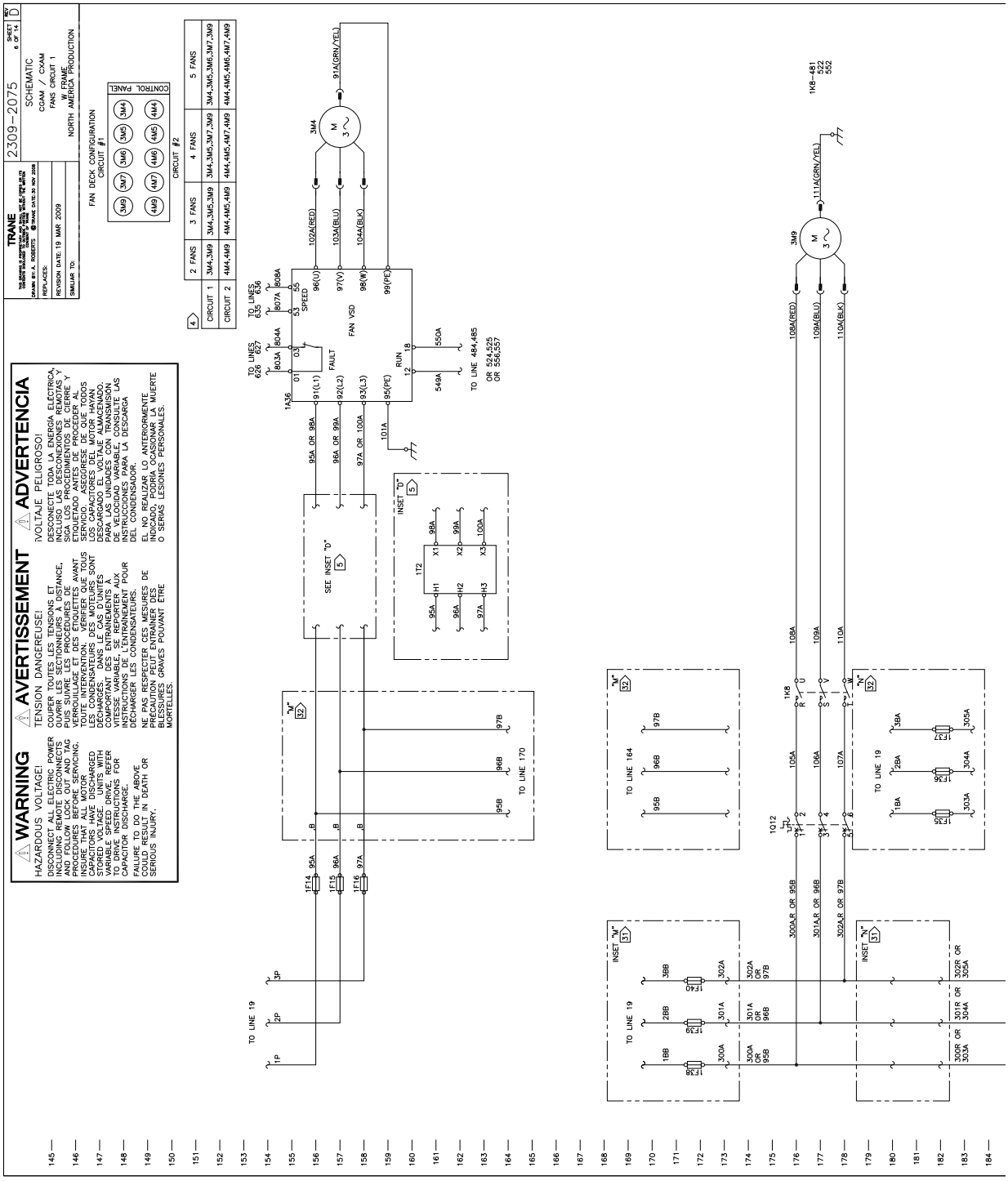
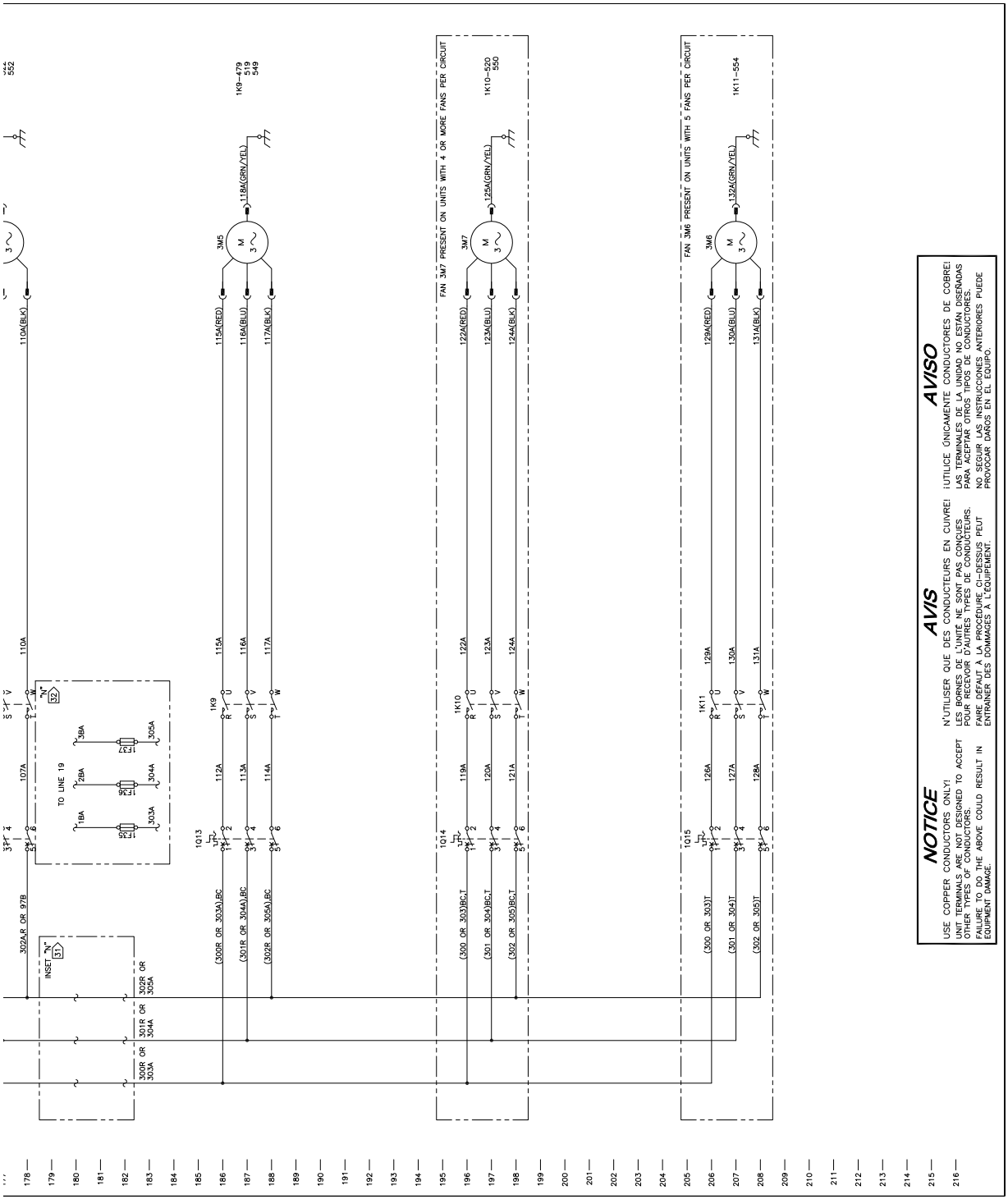
80-130 Ton - "W Frame" - Fan Power Circuit 1

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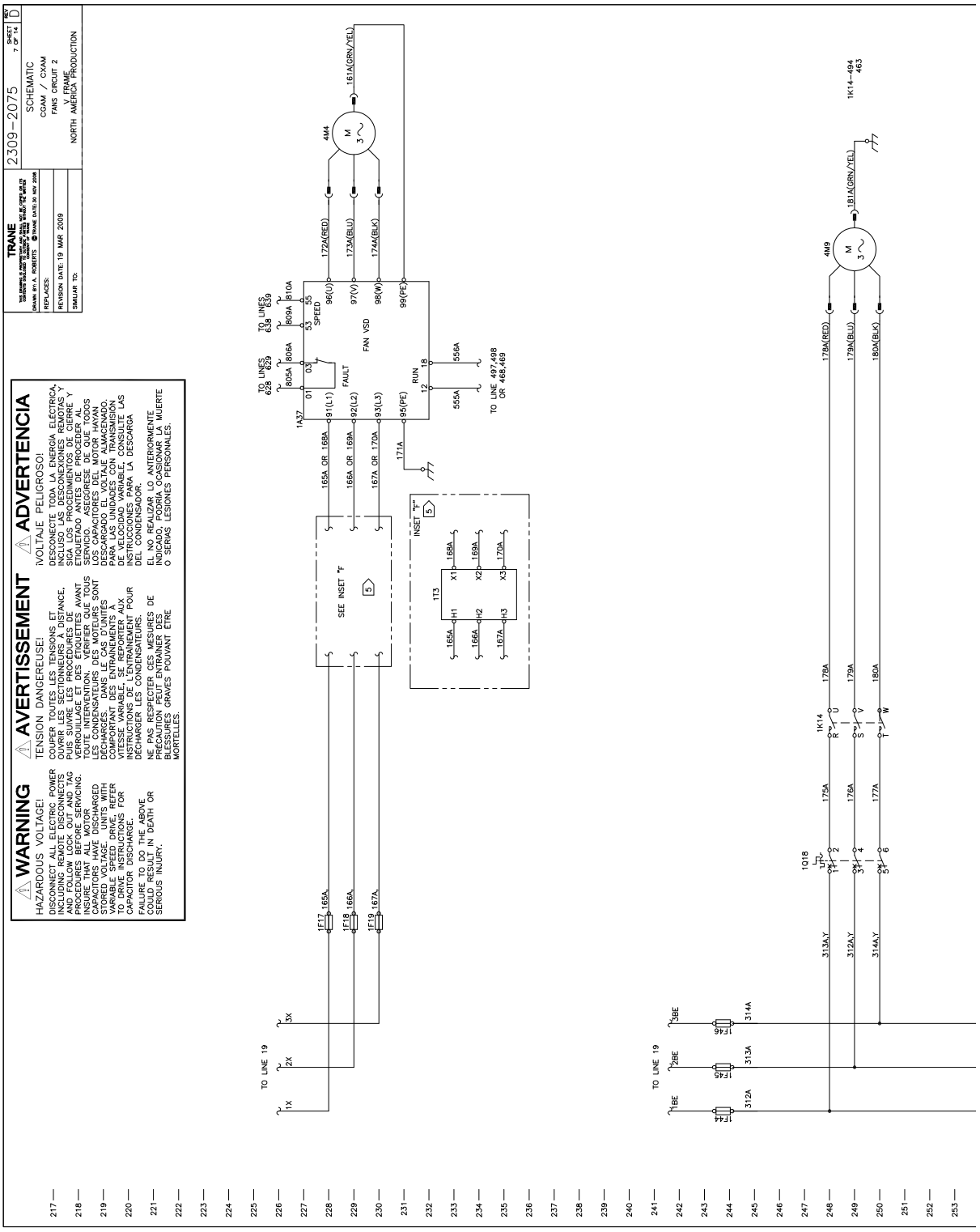
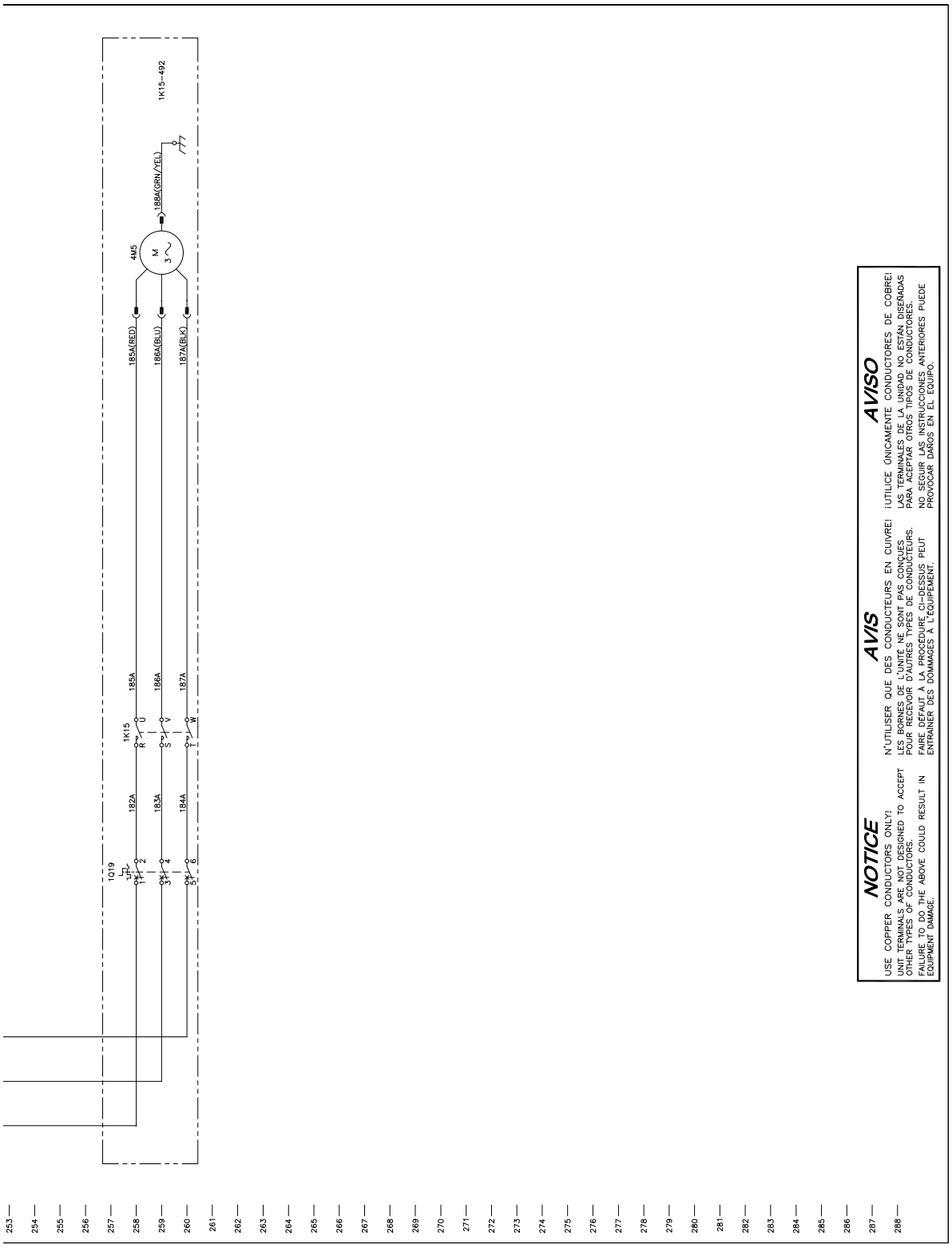
FAN 3M7 PRESENT ON UNITS WITH 4 OR MORE FANS PER CIRCUIT
FAN 3M6 PRESENT ON UNITS WITH 5 FANS PER CIRCUIT
TO LINE 19
INSET "N"
1K9–479 519 549
1K10–520 550
1K11–554

80-130 Ton - "W Frame" - Fan Power Circuit 2





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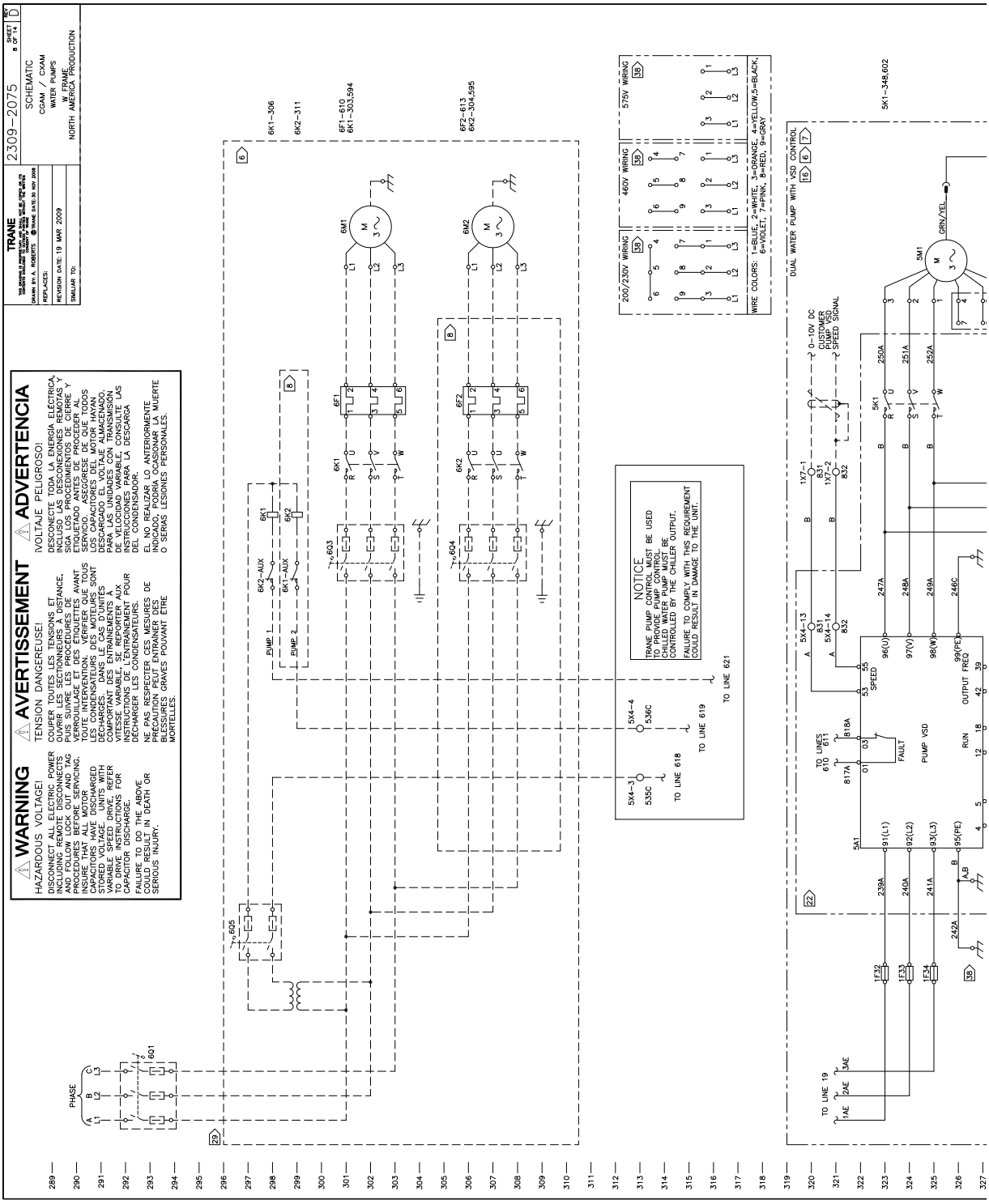
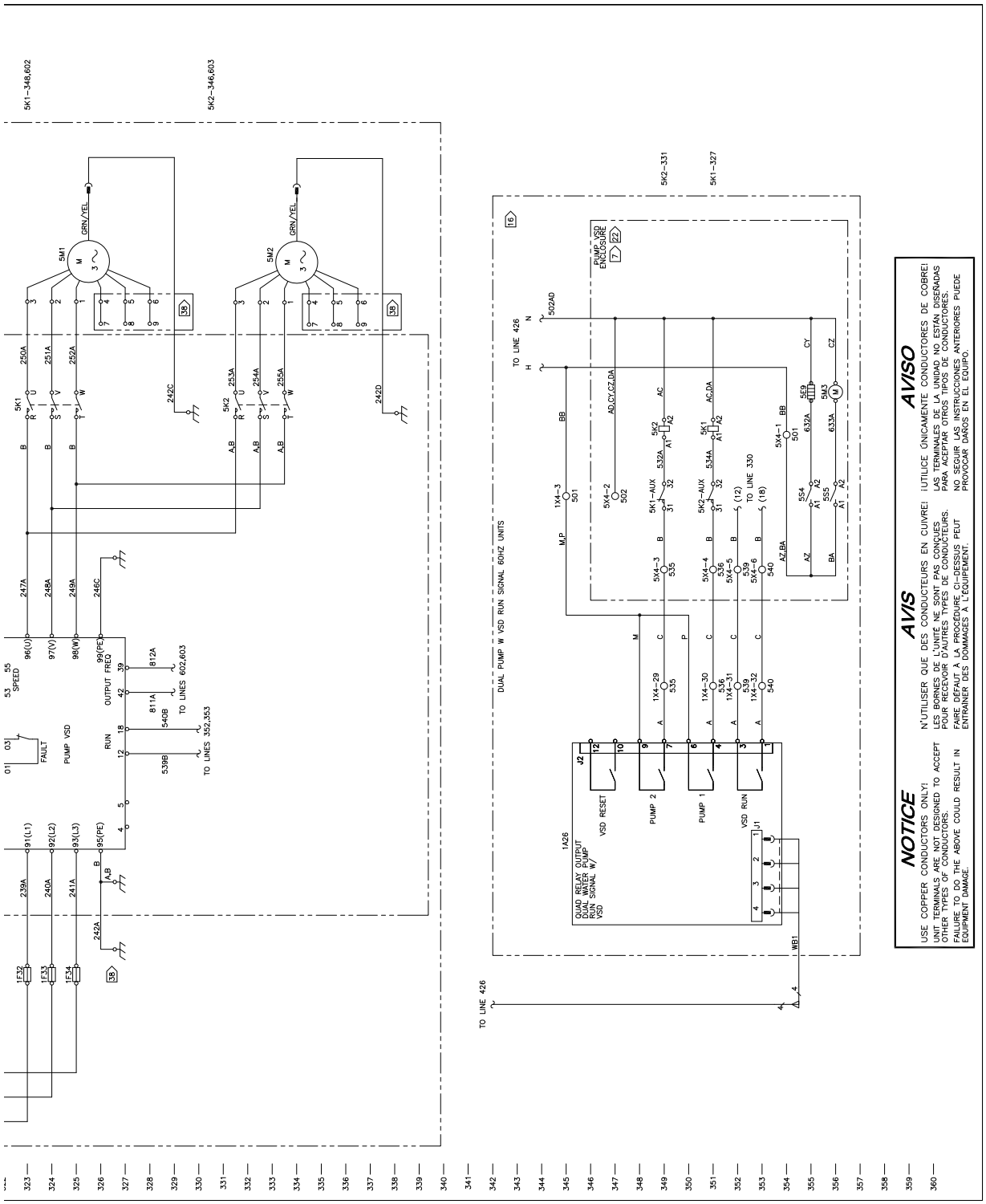
80-130 Ton - "W Frame" - Pump Power/Control




5K1–348,602
5K2–346,603
5K2–331
5K1–327
DUAL PUMP W VSD RUN SIGNAL 60HZ UNITS
TO LINE 426
PUMP VSD ENCLOSURE
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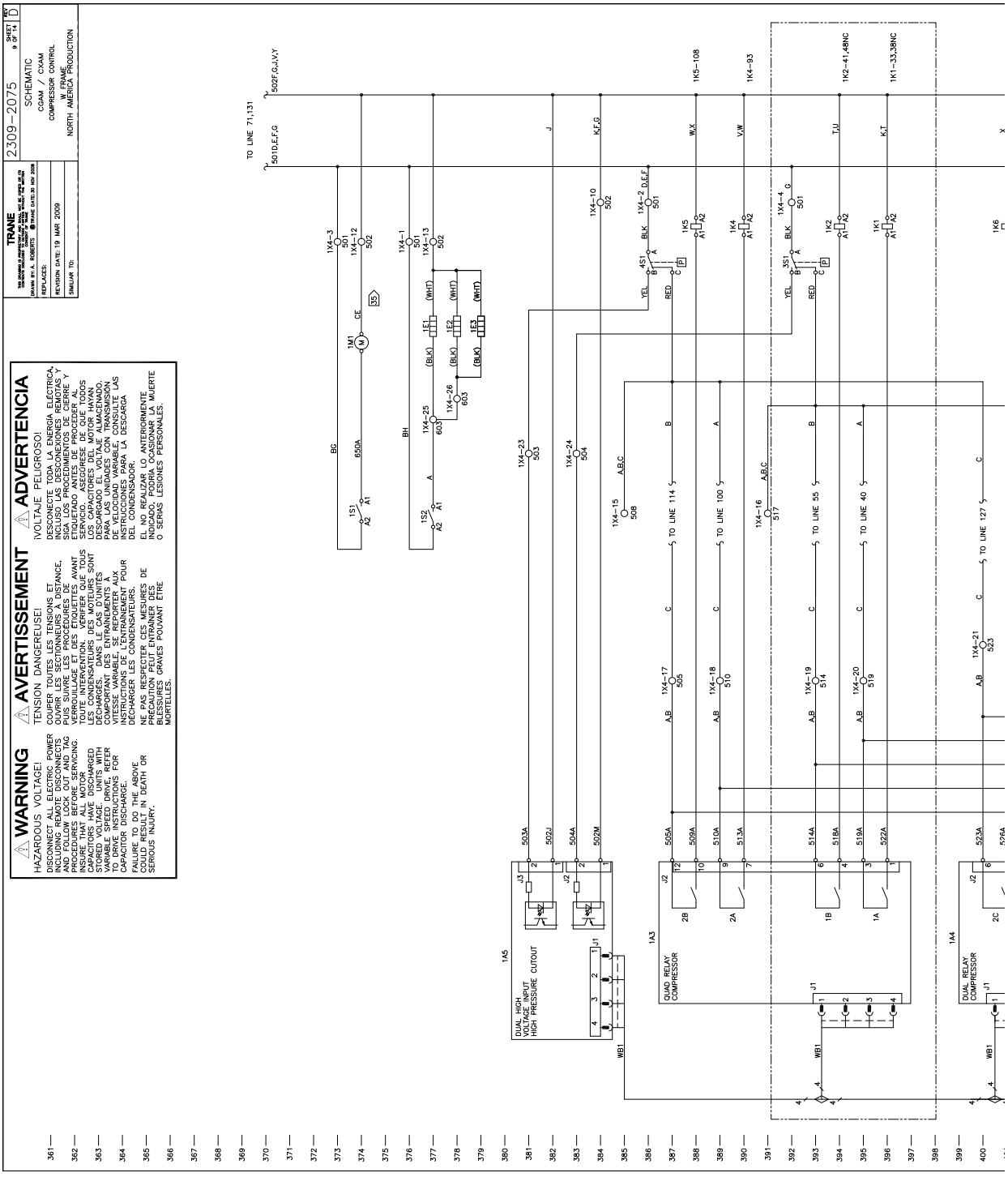
WARNING
HAZARDOUS VOLTAGE!
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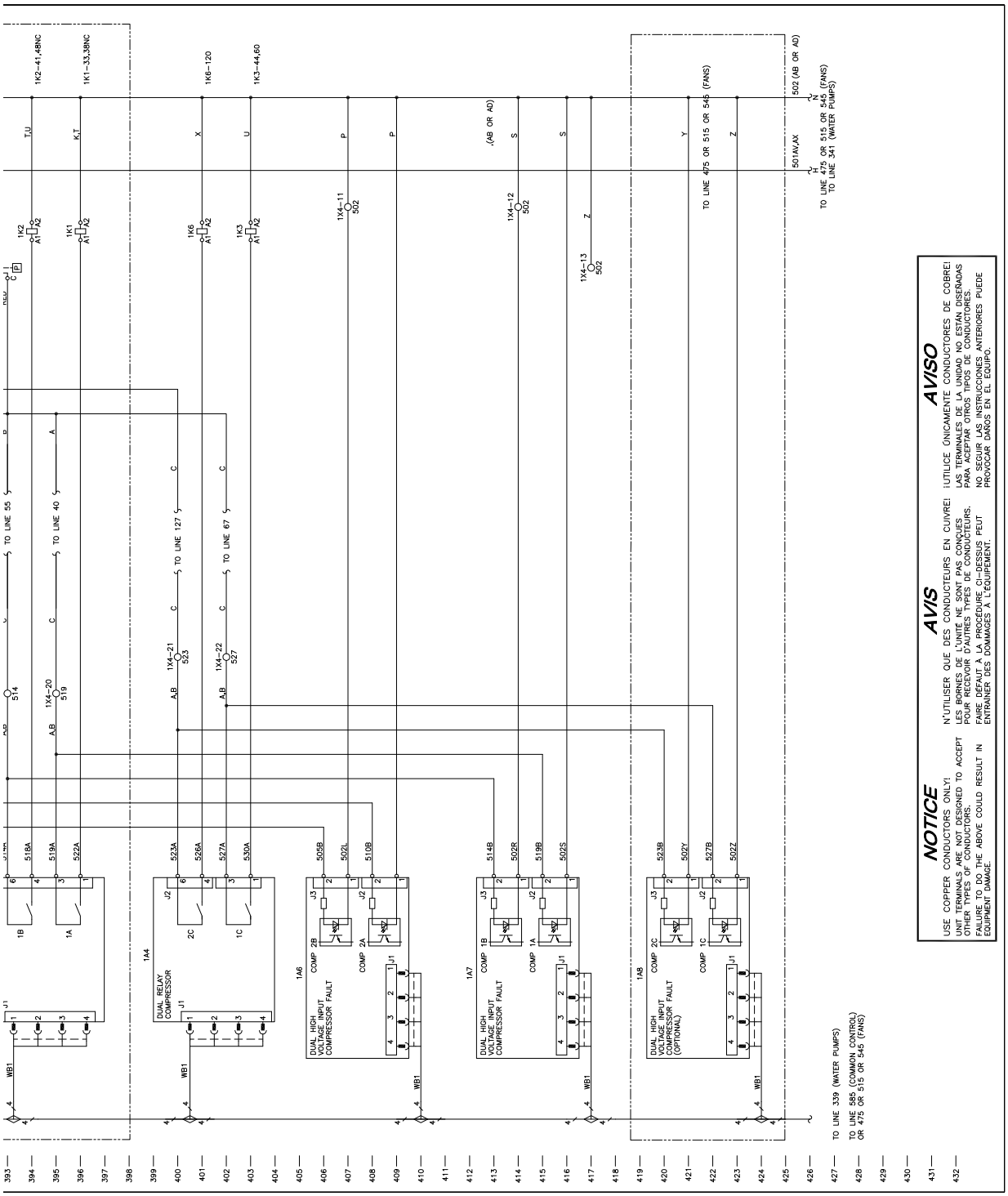
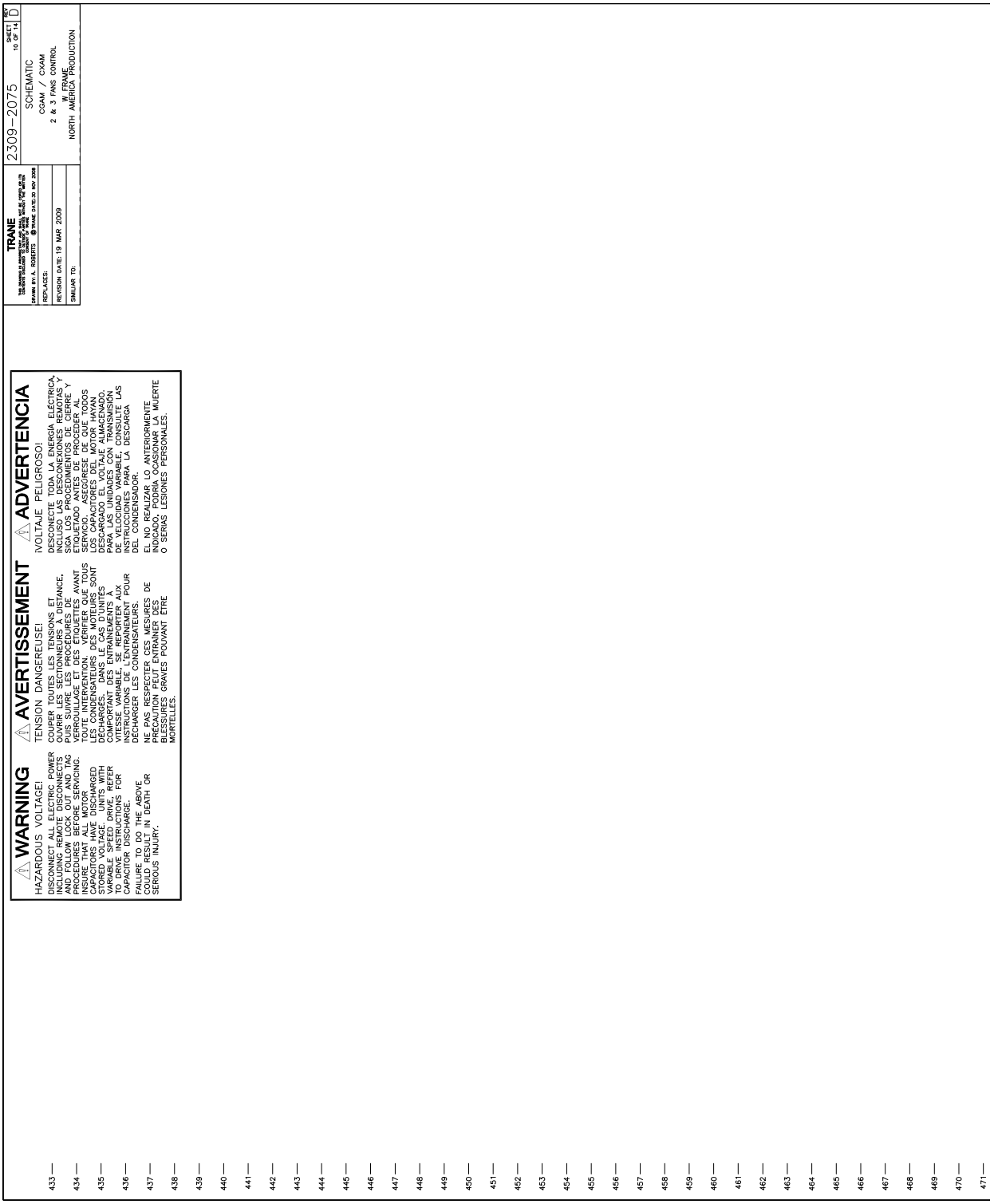
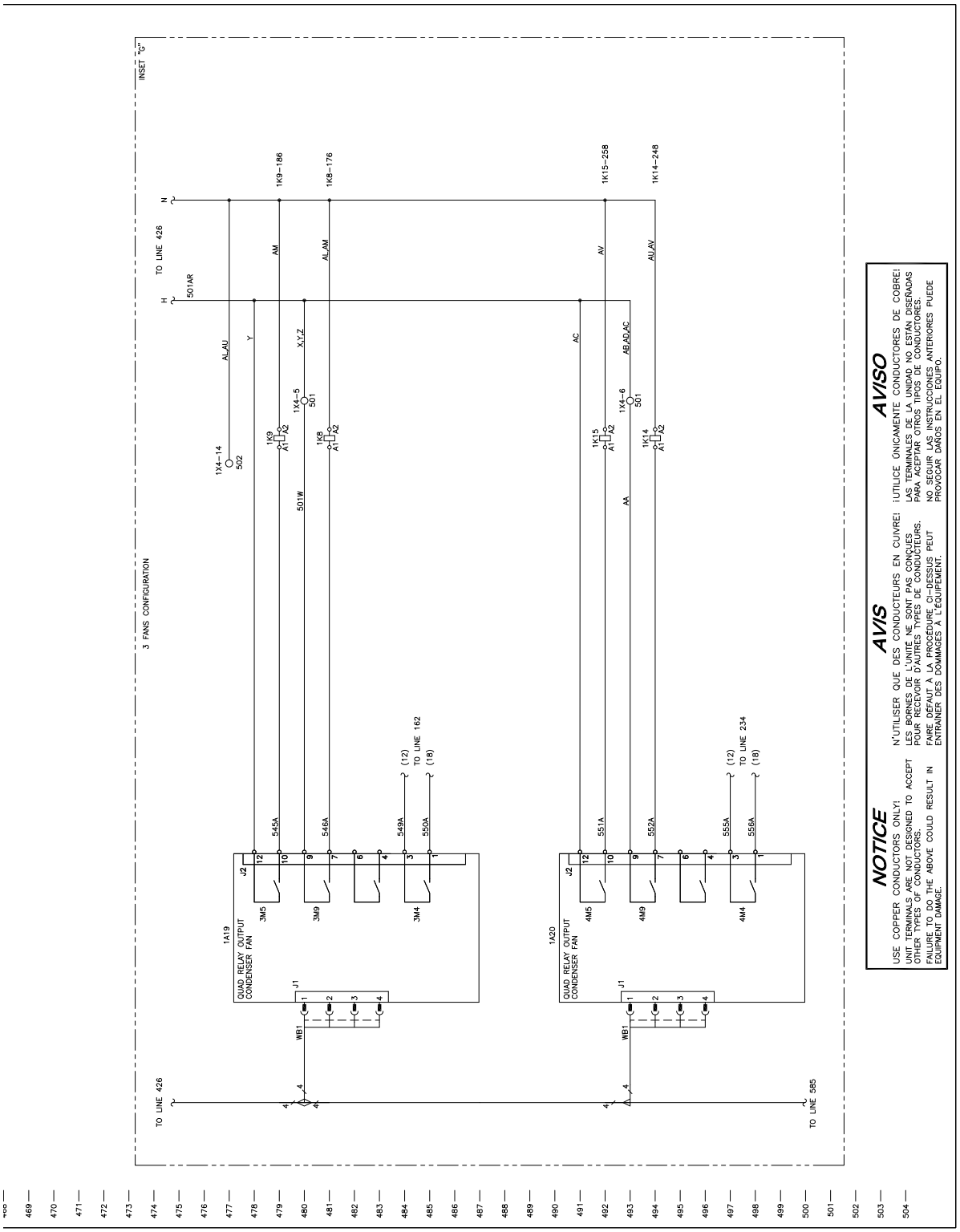
TRANE
2309-2075
SHEET 9 OF 14
REV D
SCHEMATIC
CGAM / CXAM
COMPRESSOR CONTROL
W FRAME
NORTH AMERICA PRODUCTION
REPLACES:
REVISION DATE: 19 MAR 2009
SIMILAR TO:
TO LINE 71,131
5010,E,F,G
502F,G,J,V,Y
1X4-3
1X4-12
1X4-1
1X4-13
1X4-25
1X4-26
1X4-23
1X4-24
1X4-15
1X4-16
1X4-17
1X4-18
1X4-19
1X4-20
1X4-21
1X4-10
1X4-2
1X4-4
1K5
1K4
1K2
1K1
1K6
1K5-108
1K4-93
1K2-41,48NC
1K1-33,38NC
1S1
1S2
1M1
1E1
1E2
1E3
3S1
4S1
650A
603
BG
BH
(BLK)
(WHT)
YEL
RED
BLK
J,K,G
W,X
V,W
T,U
K,T
TO LINE 114
TO LINE 100
TO LINE 55
TO LINE 40
TO LINE 127
A,B,C
A,B
C
503A
502J
504A
502M
505A
509A
510A
513A
514A
518A
519A
522A
523A
WB1
J1
J2
J3
1A5
DUAL HIGH VOLTAGE INPUT HIGH PRESSURE CUTOUT
1A3
QUAD RELAY COMPRESSOR
1A4
DUAL RELAY COMPRESSOR
2B
2A
1B
1A
2C


NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DEFAUT A LA PROCEDURE CI-DESSUS PEUT ENTRAINER DES DOMMAGES A L'EQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTAN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PRODUCIR DAÑOS EN EL EQUIPO.
1K2-41,48NC
1K1-33,38NC
1K6-120
1K3-44,60
TO LINE 55
TO LINE 40
TO LINE 127
TO LINE 67
TO LINE 475 OR 515 OR 545 (FANS)
TO LINE 341 (WATER PUMPS)
TO LINE 339 (WATER PUMPS)
TO LINE 585 (COMMON CONTROL)
OR 475 OR 515 OR 545 (FANS)
DUAL RELAY COMPRESSOR
DUAL HIGH VOLTAGE INPUT COMPRESSOR FAULT
DUAL HIGH VOLTAGE INPUT COMPRESSOR FAULT (OPTIONAL)
1A4
1A6
1A7
1A8
WB1

80-130 Ton - "W Frame" - Fan Control, 2 & 3 Fan Units




INSET "o"
3 FANS CONFIGURATION
TO LINE 426
501AR
1K9-186
1K8-176
1K15-258
1K14-248
1X4-14
502
1K9
1K8
1K15
1K14
1X4-5
1X4-6
501
501W
AL_AU
Y
AM
AL_AM
X,Y,Z
AC
AV
AL_AV
AA
AB,AD,AC
1A19
QUAD RELAY OUTPUT CONDENSER FAN
1A20
J2
J1
WB1
3M5
3M9
3M4
4M5
4M9
4M4
545A
546A
549A
550A
551A
552A
555A
556A
(12)
TO LINE 162
(18)
TO LINE 234
TO LINE 585
NOTICE
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N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
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FAIRE DÉFAUT À LA PROCÉDURE CI–DESSUS PEUT ENTRAÎNER DES DOMMAGES À L'ÉQUIPEMENT.
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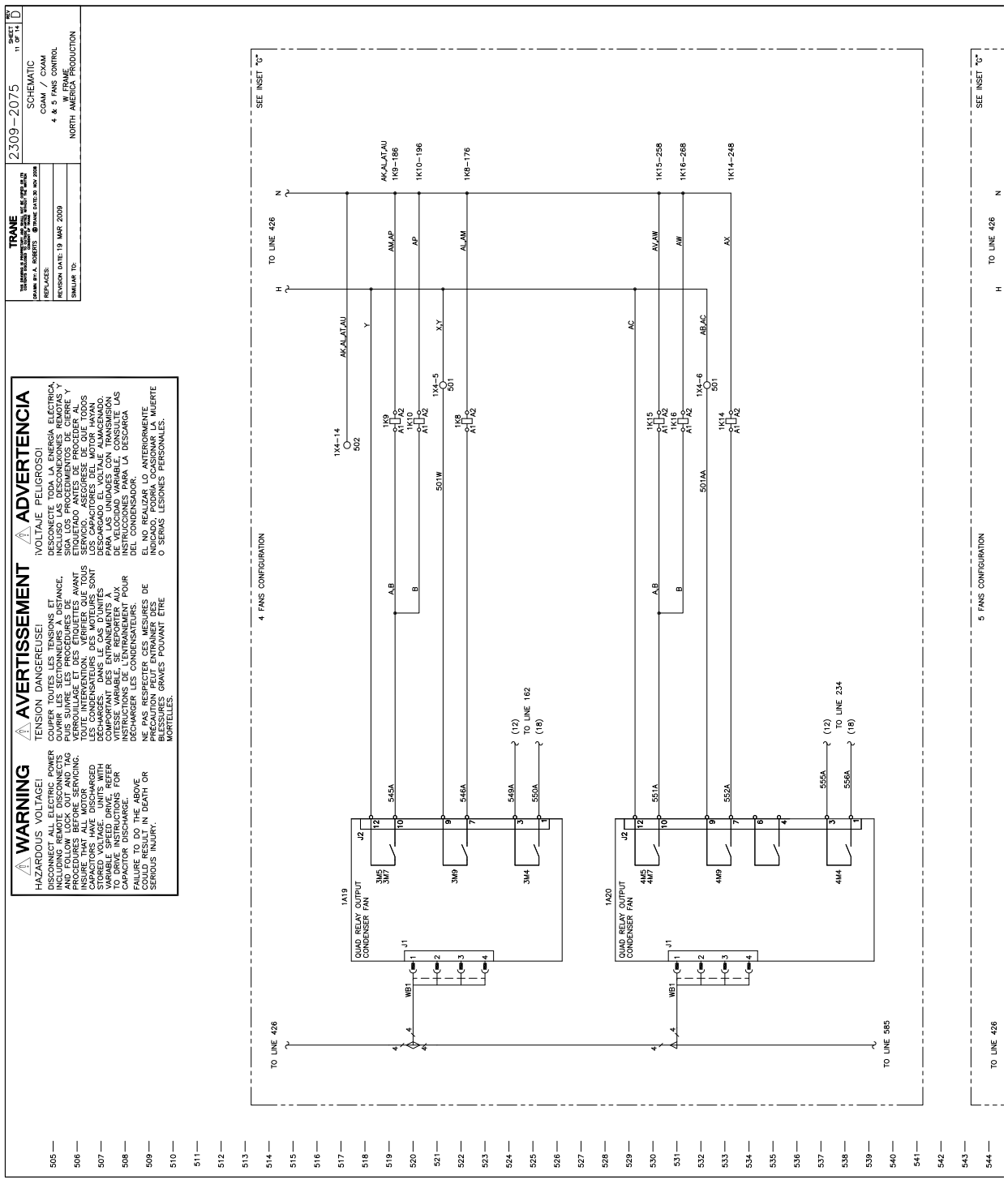
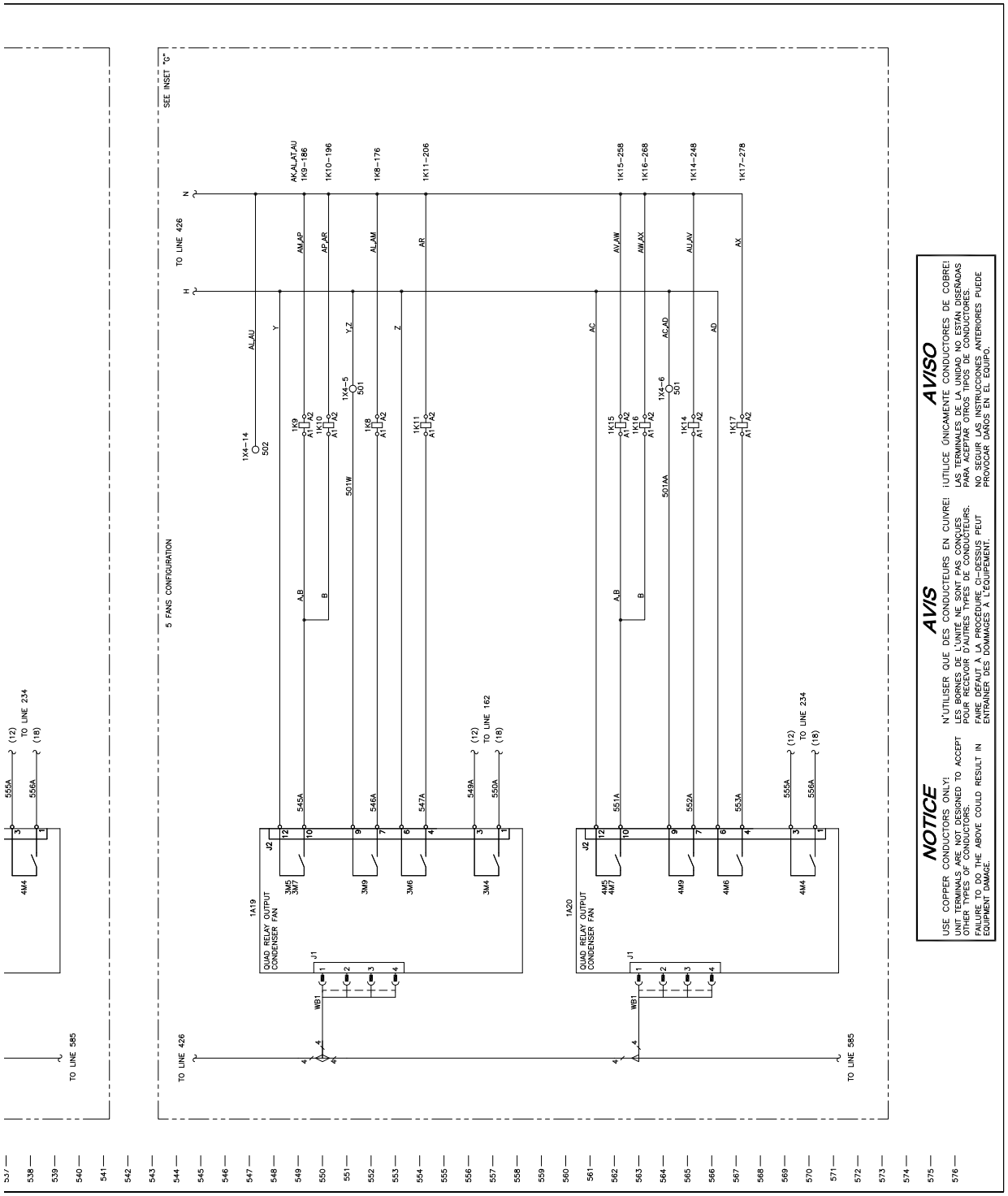
80-130 Ton - "W Frame" - Fan Control, 4 & 5 Fan Units




5 FANS CONFIGURATION
SEE INSET "G"
TO LINE 426
TO LINE 585
TO LINE 234
TO LINE 162
1A19
QUAD RELAY OUTPUT CONDENSER FAN
1A20
QUAD RELAY OUTPUT CONDENSER FAN
1X4-14
1X4-5
1X4-6
1K9
1K10
1K8
1K11
1K15
1K16
1K14
1K17
AK,AL,AT,AU
1K9-186
1K10-196
1K8-176
1K11-206
1K15-258
1K16-268
1K14-248
1K17-278
AL,AU
AM,AP
AP,AR
AL,AM
AR
AV,AW
AW,AX
AU,AV
AX
AC,AD
AC
AD
A,B
B
Y
Y,Z
Z
501
501W
501A
WB1
J1
J2
3M5
3M7
3M9
3M6
3M4
4M5
4M7
4M9
4M6
4M4
545A
546A
547A
549A
550A
551A
552A
553A
555A
556A
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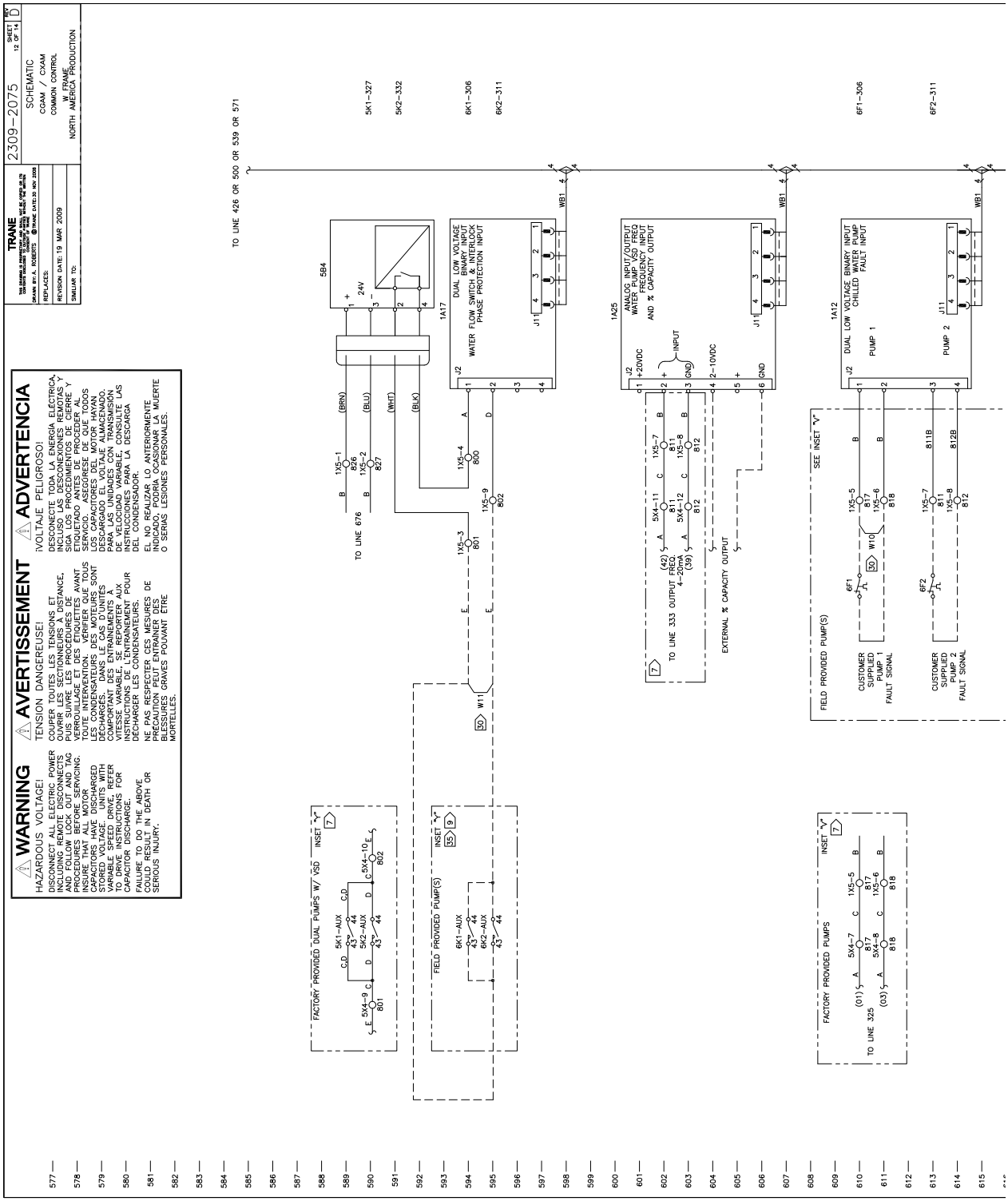
WARNING
HAZARDOUS VOLTAGE!
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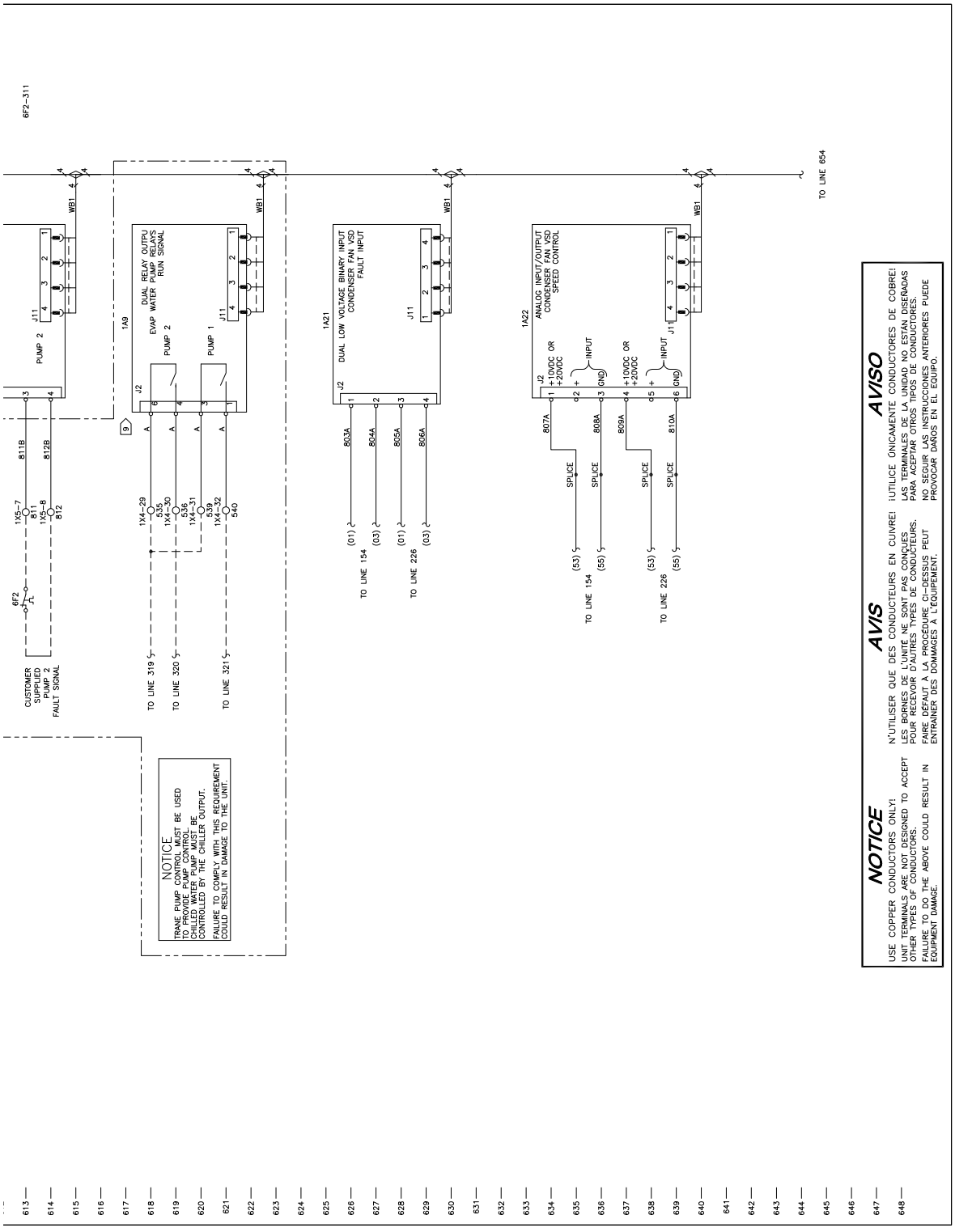
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
TRANE
2309-2075
SCHEMATIC
CGAM / CXAM
COMMON CONTROL
W-FRAME
NORTH AMERICA PRODUCTION
TO LINE 426 OR 500 OR 539 OR 571
5K1-327
5K2-332
6K1-306
6K2-311
6F1-306
6F2-311
5B4
1A17
DUAL LOW VOLTAGE BINARY INPUT
WATER FLOW SWITCH & INTERLOCK
PHASE PROTECTION INPUT
1A25
ANALOG INPUT/OUTPUT
WATER PUMP VSD FREQ
FEEDBACK INPUT
AND % CAPACITY OUTPUT
1A12
DUAL LOW VOLTAGE BINARY INPUT
CHILLED WATER PUMP
FAULT INPUT
PUMP 1
PUMP 2
FACTORY PROVIDED DUAL PUMPS W/ VSD
FIELD PROVIDED PUMP(S)
FACTORY PROVIDED PUMPS
FIELD PROVIDED PUMP(S)
SEE INSET "A"
EXTERNAL % CAPACITY OUTPUT
TO LINE 333 OUTPUT FREQ.
4-20mA
TO LINE 676
TO LINE 325
CUSTOMER SUPPLIED PUMP 1 FAULT SIGNAL
CUSTOMER SUPPLIED PUMP 2 FAULT SIGNAL


6F2-311
TO LINE 654
CUSTOMER SUPPLIED PUMP 2 FAULT SIGNAL
6F2
1X5-7
811B
1X5-8
812B
812
PUMP 2
J11
WB1
1A9
DUAL RELAY OUTPU EVAP WATER PUMP RELAYS RUN SIGNAL
J2
PUMP 2
PUMP 1
1X4-29
535
1X4-30
536
1X4-31
539
1X4-32
540
TO LINE 319
TO LINE 320
TO LINE 321
1A21
DUAL LOW VOLTAGE BINARY INPUT CONDENSER FAN VSD FAULT INPUT
803A
804A
805A
806A
TO LINE 154
TO LINE 226
1A22
ANALOG INPUT/OUTPUT FAN VSD CONDENSER SPEED CONTROL
+10VDC OR +20VDC
INPUT
(GND)
807A
808A
809A
810A
SPLICE
(53)
(55)
NOTICE
TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL CONTROL LED BY THIS RELAY OUTPUT.
FAILURE TO COMPLY WITH THIS REQUIREMENT COULD RESULT IN DAMAGE TO THE UNIT.
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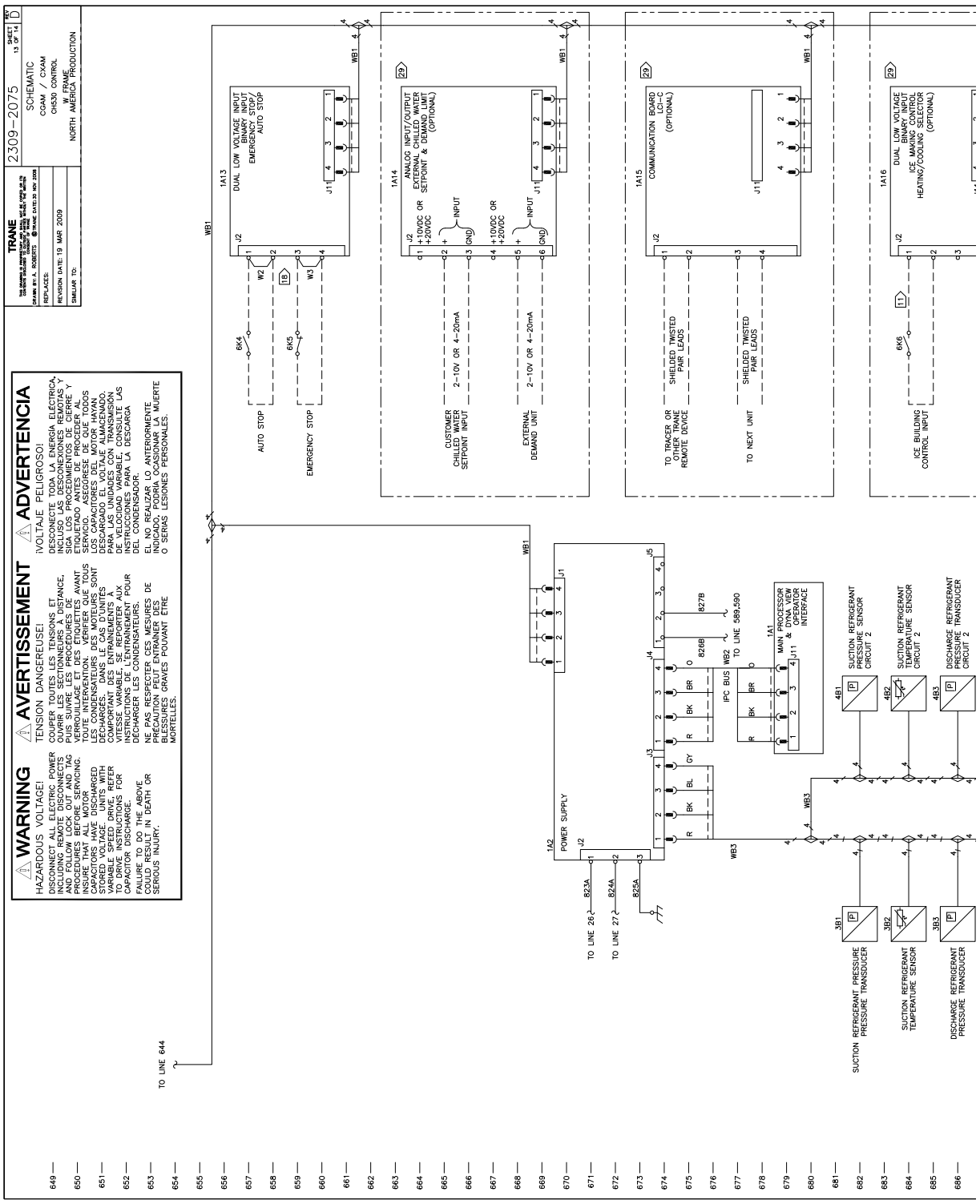
WARNING
HAZARDOUS VOLTAGE!
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FAILURE TO DO THE ABOVE COULD RESULT IN DEATH OR SERIOUS INJURY.
AVERTISSEMENT
TENSION DANGEREUSE!
COUPEZ TOUTES LES TENSIONS, ET, INCLUANT LES SECTIONNEURS À DISTANCE, OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT D'EFFECTUER L'ENTRETIEN. CERTAINS DES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
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EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
TRANE
DRAWN BY: A. ROBERTS
REVISION DATE: 19 MAR 2009
SIMILAR TO:
REPLACES:
2309-2075
SHEET 13 OF 44
REV D
SCHEMATIC
CGAM / CXAM
CH530 CONTROL
W FRAME
NORTH AMERICA PRODUCTION
WB1
1A13
DUAL LOW VOLTAGE INPUT
BINARY INPUT
EMERGENCY STOP/
AUTO STOP
J2
J11
6K4
AUTO STOP
6K5
EMERGENCY STOP
W2
W3
18
1A14
ANALOG INPUT/OUTPUT
EXTERNAL CHILLED WATER
SETPOINT & DEMAND LIMIT
(OPTIONAL)
29
+10VDC OR
+20VDC
INPUT
GND
CUSTOMER
CHILLED WATER
SETPOINT INPUT
2-10V OR 4-20mA
EXTERNAL
DEMAND UNIT
1A15
COMMUNICATION BOARD
LCI-C
(OPTIONAL)
TO TRACER OR
OTHER TRANE
REMOTE DEVICE
SHIELDED TWISTED
PAIR LEADS
TO NEXT UNIT
1A16
DUAL LOW VOLTAGE
BINARY INPUT
ICE MAKING CONTROL/
HEATING/COOLING SELECTOR
(OPTIONAL)
11
6K6
ICE BUILDING
CONTROL INPUT
TO LINE 644
1A2
POWER SUPPLY
J1
J2
J3
J4
J5
823A
824A
825A
TO LINE 26
TO LINE 27
827B
828B
IPC BUS
WB2
TO LINE 589,590
1A1
MAIN PROCESSOR
& DYNA VIEW
OPERATOR
INTERFACE
WB3
3B1
3B2
3B3
4B1
4B2
4B3
SUCTION REFRIGERANT
PRESSURE TRANSDUCER
SUCTION REFRIGERANT
TEMPERATURE SENSOR
DISCHARGE REFRIGERANT
PRESSURE TRANSDUCER
SUCTION REFRIGERANT
PRESSURE SENSOR
CIRCUIT 2
SUCTION REFRIGERANT
TEMPERATURE SENSOR
CIRCUIT 2
DISCHARGE REFRIGERANT
PRESSURE TRANSDUCER
CIRCUIT 2
R
BK
BL
GY
BR
O
649
650
651
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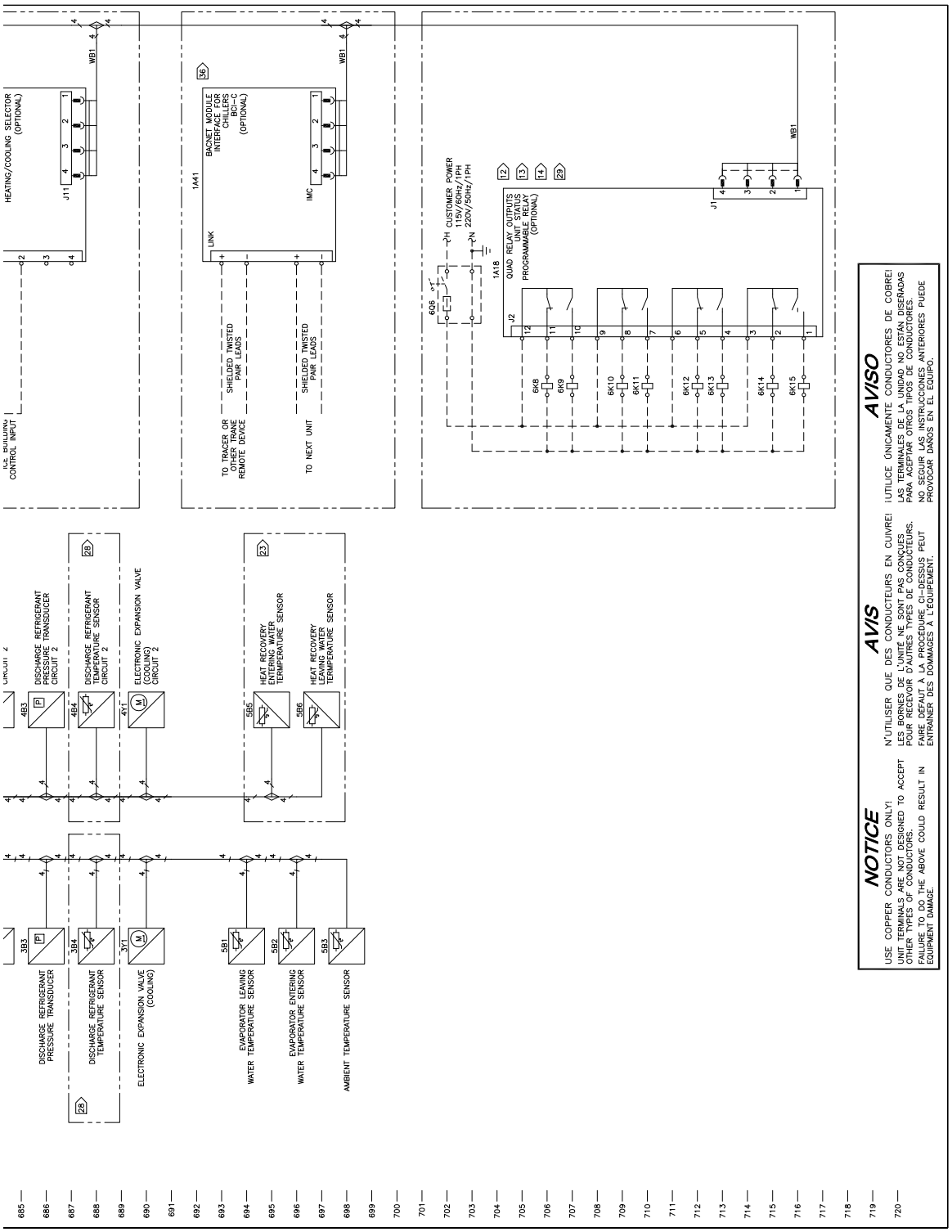
HEATING/COOLING SELECTOR (OPTIONAL)
BACNET MODULE INTERFACE FOR CHILLERS BCI-C (OPTIONAL)
TO TRACER OR OTHER TRANE REMOTE DEVICE
SHIELDED TWISTED PAIR LEADS
TO NEXT UNIT
CUSTOMER POWER 115V/60Hz/1PH 220V/50Hz/1PH
QUAD RELAY OUTPUTS UNIT STATUS PROGRAMMABLE RELAY (OPTIONAL)
DISCHARGE REFRIGERANT PRESSURE TRANSDUCER CIRCUIT 2
DISCHARGE REFRIGERANT TEMPERATURE SENSOR CIRCUIT 2
ELECTRONIC EXPANSION VALVE (COOLING) CIRCUIT 2
HEAT RECOVERY ENTERING WATER TEMPERATURE SENSOR
HEAT RECOVERY LEAVING WATER TEMPERATURE SENSOR
EVAPORATOR LEAVING WATER TEMPERATURE SENSOR
EVAPORATOR ENTERING WATER TEMPERATURE SENSOR
AMBIENT TEMPERATURE SENSOR
NOTICE
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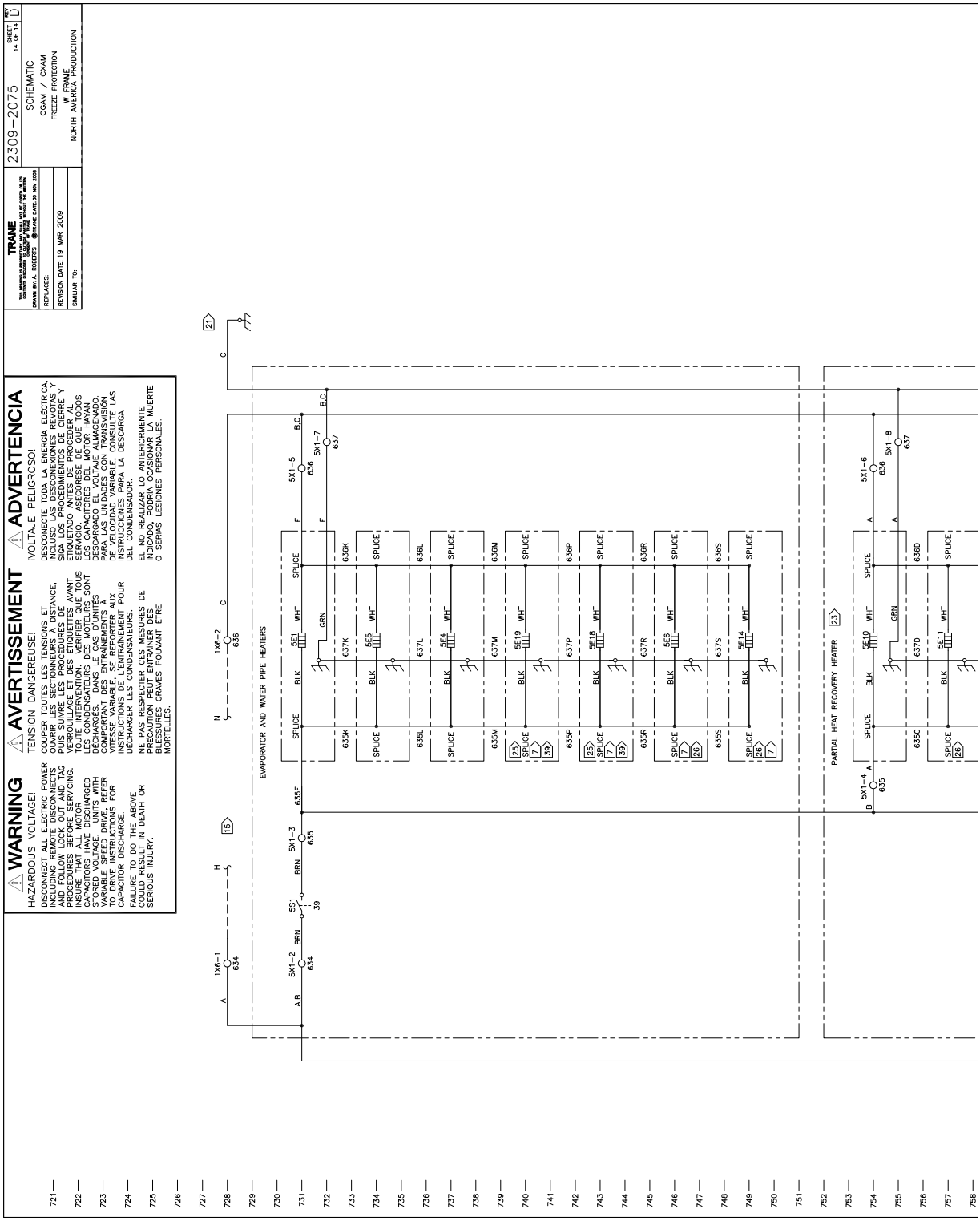
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AVERTISSEMENT
TENSION DANGEREUSE!
COUPER TOUTES LES TENSIONS ET, OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCEDURES DE VERROUILLAGE DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.
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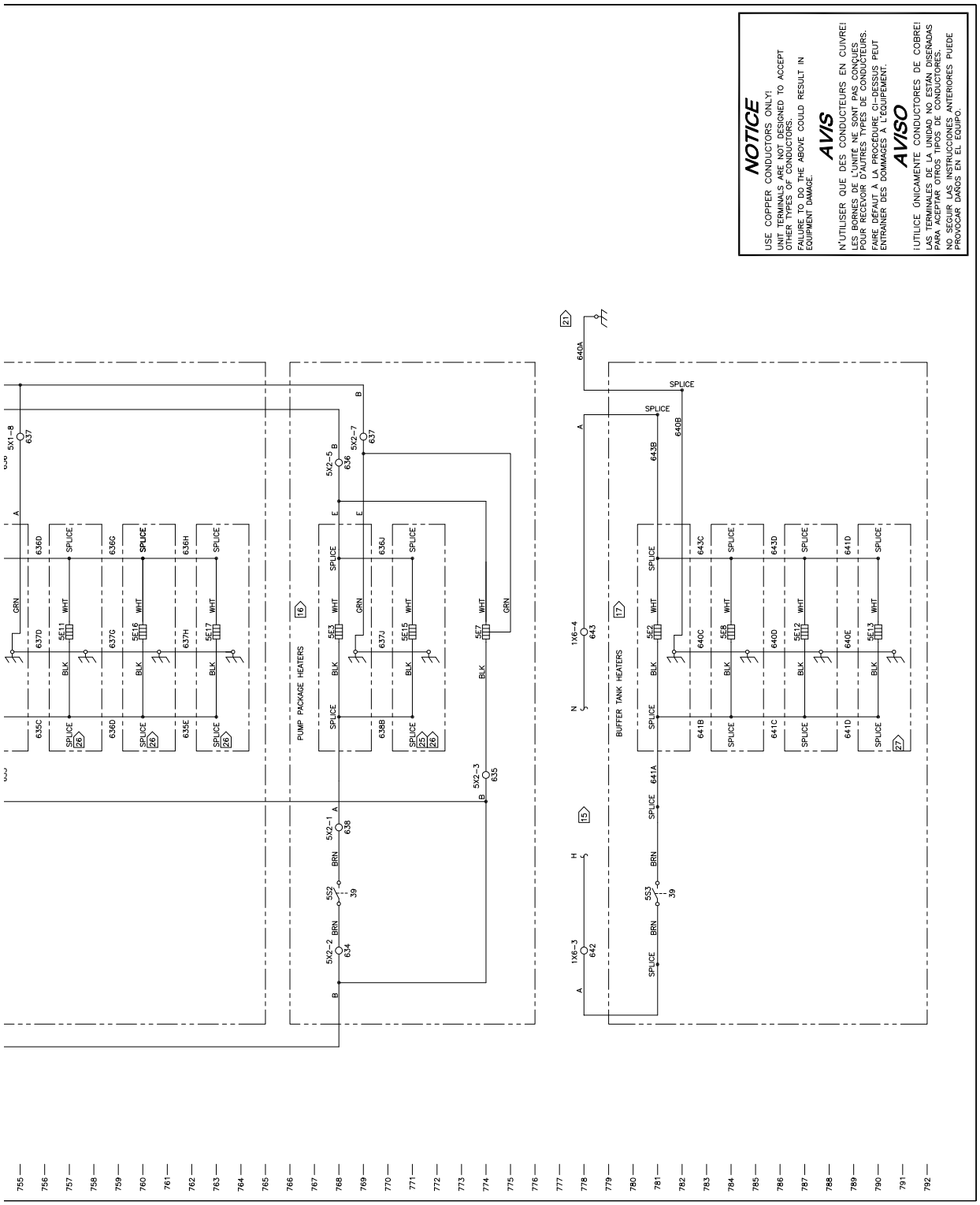
TRANE
DRAWN BY: A. ROBERTS
REPLACES:
REVISION DATE: 19 MAR 2009
SIMILAR TO:
2309-2075
SHEET 14 OF 14
REV D
SCHEMATIC
CGAM / CXAM
FREEZE PROTECTION
W FRAME
NORTH AMERICA PRODUCTION
EVAPORATOR AND WATER PIPE HEATERS
PARTIAL HEAT RECOVERY HEATER
1X6-1
1X6-2
5S1
5X1-2
5X1-3
5X1-4
5X1-5
5X1-6
5X1-7
5X1-8
5E1
5E2
5E3
5E4
5E5
5E6
5E10
5E11
5E14
5E18
5E19
BLK
WHT
GRN
BRN
SPLICE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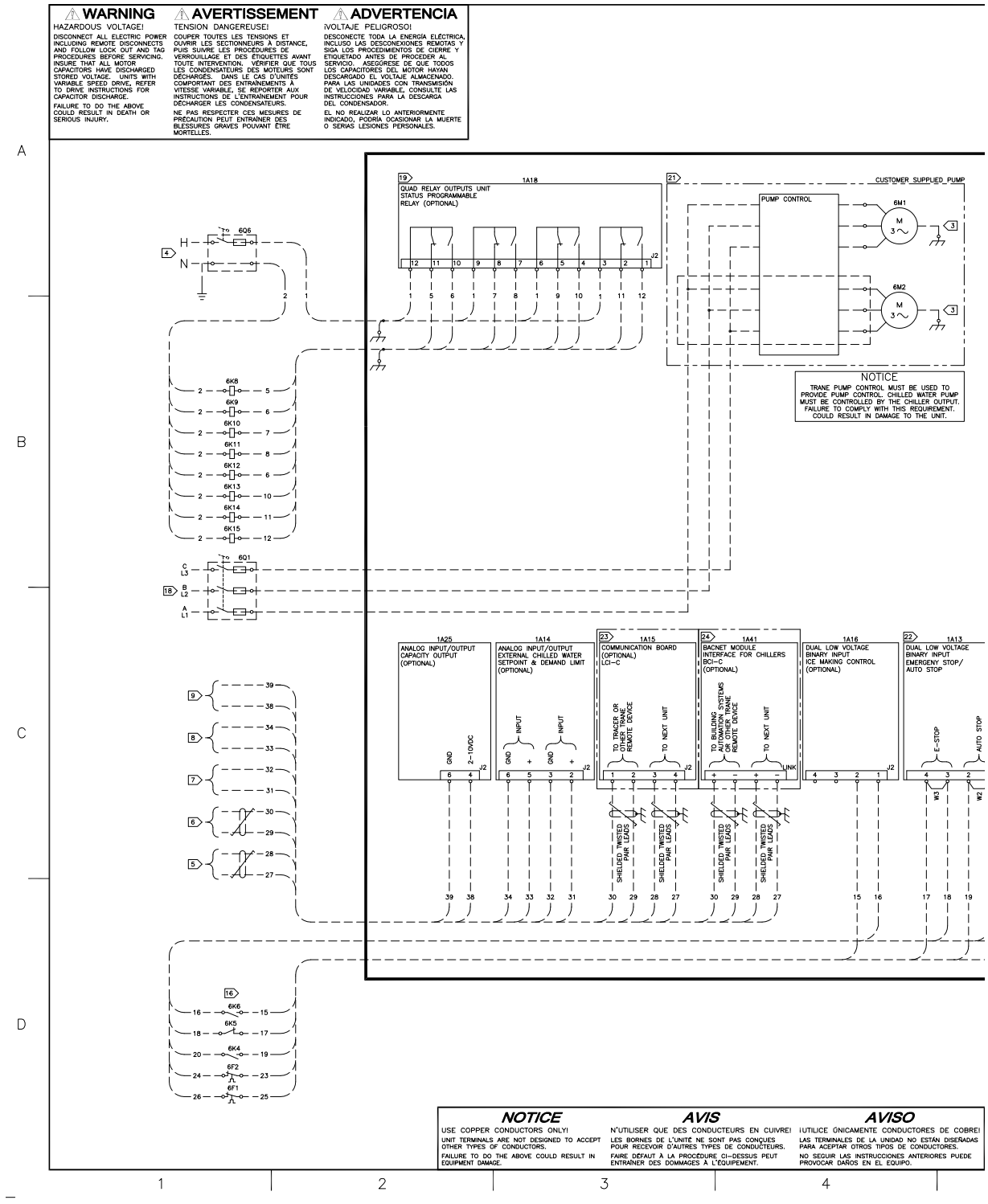
PUMP PACKAGE HEATERS
BUFFER TANK HEATERS
SPLICE
GRN
BLK
WHT
BRN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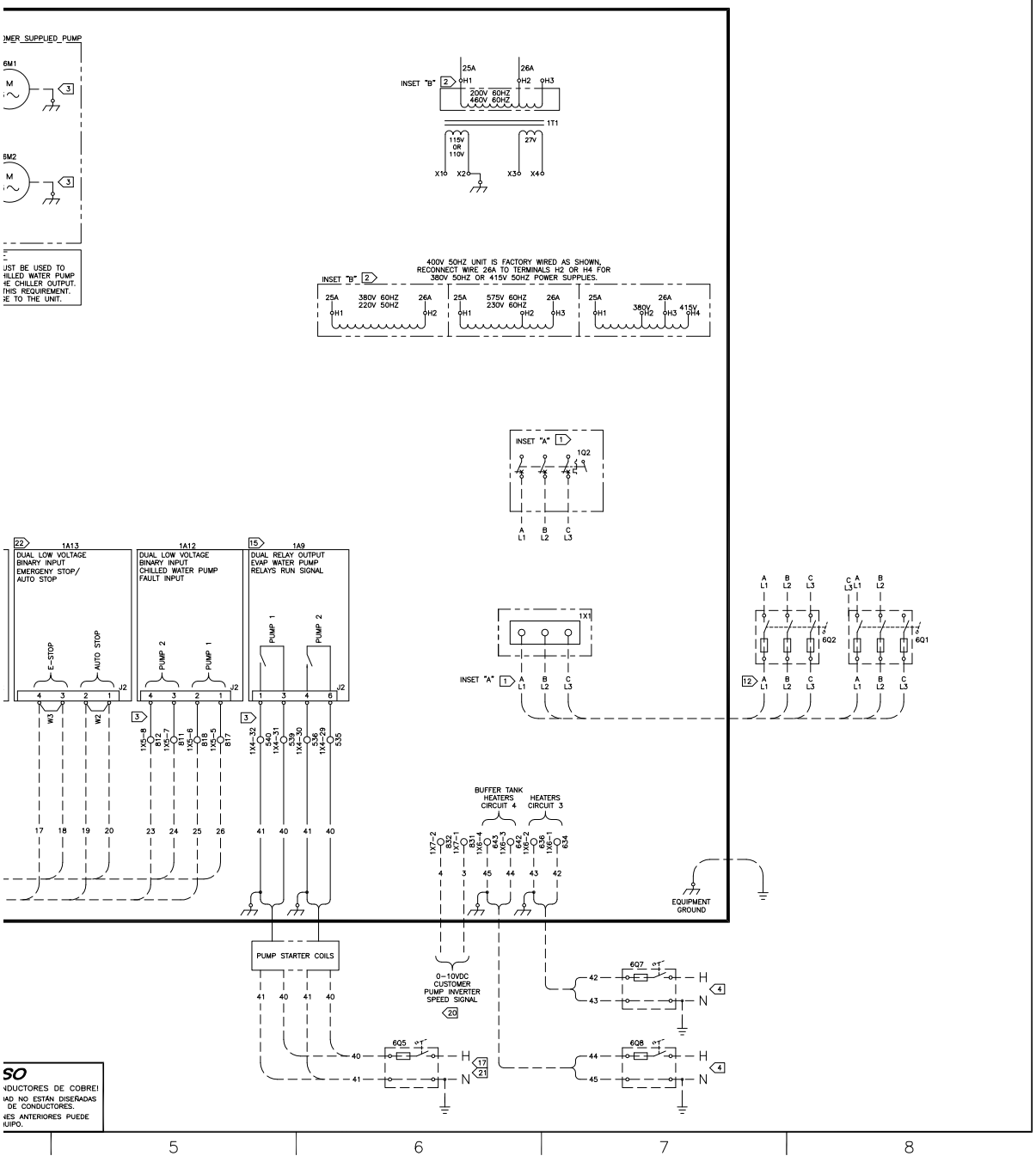
¡VOLTAJE PELIGROSO!
DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON TRANSMISIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.
1A18
QUAD RELAY OUTPUTS UNIT STATUS PROGRAMMABLE RELAY (OPTIONAL)
CUSTOMER SUPPLIED PUMP
PUMP CONTROL
6M1
6M2
NOTICE
TRANE PUMP CONTROL MUST BE USED TO PROVIDE PUMP CONTROL. CHILLED WATER PUMP MUST BE CONTROLLED BY THE CHILLER OUTPUT. FAILURE TO COMPLY WITH THIS REQUIREMENT. COULD RESULT IN DAMAGE TO THE UNIT.
6Q6
6Q1
6K8
6K9
6K10
6K11
6K12
6K13
6K14
6K15
6K6
6K5
6K4
6F2
6F1
1A25
ANALOG INPUT/OUTPUT CAPACITY OUTPUT (OPTIONAL)
1A14
ANALOG INPUT/OUTPUT EXTERNAL CHILLED WATER SETPOINT & DEMAND LIMIT (OPTIONAL)
1A15
COMMUNICATION BOARD (OPTIONAL) LCI–C
1A41
BACNET MODULE INTERFACE FOR CHILLERS BCI–C (OPTIONAL)
1A16
DUAL LOW VOLTAGE BINARY INPUT ICE MAKING CONTROL (OPTIONAL)
1A13
DUAL LOW VOLTAGE BINARY INPUT EMERGENCY STOP/ AUTO STOP
GND
2–10VDC
INPUT
TO TRACER OR OTHER TRANE REMOTE DEVICE
TO NEXT UNIT
TO BUILDING AUTOMATION SYSTEMS OR OTHER TRANE REMOTE DEVICE
LINK
E–STOP
AUTO STOP
SHIELDED TWISTED PAIR LEADS
NOTICE
USE COPPER CONDUCTORS ONLY!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.
FAILURE TO DO THE ABOVE COULD RESULT IN EQUIPMENT DAMAGE.
AVIS
N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!
LES BORNES DE L'UNITE NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.
FAIRE DÉFAUT À LA PROCÉDURE CI–DESSUS PEUT ENTRAINER DES DOMMAGES À L'ÉQUIPEMENT.
AVISO
¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
NO SEGUIR LAS INSTRUCCIONES ANTERIORES PUEDE PROVOCAR DAÑOS EN EL EQUIPO.

TRANE	2309–2076	SHEET 1 OF 2	REV C
THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE.	FIELD WIRING DIAGRAM		
DRAWN BY: ©TRANE DATE: 12/5/08	CGAM (NAR)		
REPLACES:	SLANT, V & W UNITS		
REVISION DATE:			
SIMILIAR TO:			



1. SINGLE SOURCE POWER IS PROVIDED AS STANDARD ON THESE PRODUCTS, FIELD CONNECTIONS ARE MADE TO 1X1, OR 1Q2.
2. FOR VOLTAGES 200V/60HZ, 220V/50HZ, 380V/60HZ, 460V/60HZ, WIRE 26A SHALL BE CONNECTED TO H2. FOR VOLTAGES 230V/60HZ & 575V/60HZ, WIRE 26A SHALL BE CONNECT TO H3. 400V/50HZ UNIT IS FACTORY WIRED WITH 26A CONNECTED TO H3 – RECONNECT WIRE 26A TO H2 FOR 380V/50HZ, OR H4 FOR 415V/50HZ. H4 IS ONLY AVAILABLE WITH 400V/50HZ PANELS.
3. FIELD CONNECTIONS ARE ONLY MADE IN A CUSTOMER PROVIDED PUMP (PTYP=NONE). THESE CONNECTIONS WILL BE MADE BY THE FACTORY WHEN THE PUMP IS PROVIDED BY THE FACTORY (PTYP=DHHP).
4. CUSTOMER SUPPLIED POWER 115/60/1 OR 220/50/1 TO POWER RELAYS. MAX. FUSE SIZE IS 20 AMPS. GROUND ALL CUSTOMER SUPPLIED POWER SUPPLIES AS REQUIRED BY APPLICABLE CODES. GREEN GROUND SCREWS ARE PROVIDED IN UNIT CONTROL PANEL.
5. WIRED TO NEXT UNIT. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO HELIX LF22P0014216 RECOMMENDED. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS NOT TO EXCEED 4500 FEET. CONNECTION TOPOLOGY SHOULD BE DAISY CHAIN. REFER TO BUILDING AUTOMATION SYSTEM (BAS) COMMUNICATION INSTALLATION LITERATURE FOR END OF LINE TERMINATION RESISTOR REQUIREMENTS.
6. WIRED TO TRACER OR OTHER TRANE REMOTE DEVICE. 22 AWG SHIELDED COMMUNICATION WIRE EQUIVALENT TO HELIX LF22P0014216 RECOMMENDED. THE SUM TOTAL OF ALL INTERCONNECTED CABLE SEGMENTS NOT TO EXCEED 4500 FEET. CONNECTION TOPOLOGY SHOULD BE DAISY CHAIN. REFER TO BUILDING AUTOMATION SYSTEM (BAS) COMMUNICATION INSTALLATION LITERATURE FOR END OF LINE TERMINATION RESISTOR REQUIREMENTS.
7. WIRED TO CUSTOMER CHILLED WATER SET POINT 2–10V OR 4–20mA.
8. WIRED TO CUSTOMER EXTERNAL DEMAND LIMIT 2–10V OR 4–20mA.
9. WIRED TO CUSTOMER 2–10V OR 4–20mA % CAPACITY ANNUNICIATOR.
11. REFER TO CGAM ELECTRICAL SCHEMATIC FOR SPECIFIC ELECTRICAL CONNECTION INFORMATION AND NOTES PERTAINING TO WIRING INSTALLATION.
12. ALL UNIT POWER WIRING MUST BE 600 VOLT COPPER CONDUCTORS ONLY AND HAVE A MINIMUM TEMPERATURE INSULATION RATING OF 90 DEGREE C. REFER TO UNIT NAMEPLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION DEVICE. PROVIDE AN EQUIPMENT GROUND IN ACCORDANCE WITH APPLICABLE ELECTRIC CODES. REFER TO WIRE RANGE TABLE FOR LUG SIZES.
13. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE AND LOCAL REQUIREMENTS.
14. ALL CUSTOMER CONTROL CIRCUIT WIRING MUST BE COPPER CONDUCTORS ONLY AND HAVE A MINIMUM INSULATION RATING OF 300 VOLTS. EXCEPT AS NOTED, ALL CUSTOMER WIRING CONNECTIONS ARE MADE TO CIRCUIT BOARD MOUNTED BOX LUGS WITH A WIRE RANGE OF 14 TO 18 AWG OR DIN RAIL MOUNTED SPRING FORCE TERMINALS.
15. UNIT PROVIDED DRY CONTACTS FOR THE CONDENSER/CHILLED WATER PUMP CONTROL. RELAYS ARE RATED FOR 7.2 AMPS RESISTIVE, 2.88 AMPS PILOT DUTY, OR ⅓ HP, 7.2 FLA AT 120 VOLTS 60 HZ, CONTACTS ARE RATED FOR 5 AMPS GENERAL PURPOSE DUTY 240 VOLTS.
16. CUSTOMER SUPPLIED CONTACTS FOR ALL LOW VOLTAGE CONNECTIONS MUST BE COMPATABLE WITH DRY CIRCUIT 24 VOLTS DC FOR A 12 mA RESISTIVE LOAD. SILVER OR GOLD PLATED CONTACTS RECOMMENDED.
17. FIELD CONNECTIONS ARE ONLY MADE IN A CUSTOMER PROVIDED PUMP. THESE CONNECTIONS WILL BE MADE BY THE FACTORY WHEN THE PUMP IS PROVIDED BY THE FACTORY. CUSTOMER SUPPLIED POWER 115V, 60Hz, 1PH.
18. CUSTOMER SUPPLIED 3 PHASE POWER.
19. OPTIONAL FIELD ASSIGNED PROGRAMMABLE RELAYS (STAT=PRLY). CLASS 1 FIELD WIRED MODULE, RELAY AT 120V: 7.2A RESISTIVE 2.88A PILOT DUTY, 1/2HP 7.2FLA; AT 240VAC: 5 AMPS GENERAL PURPOSE.
20. WIRED TO CUSTOMER 0–10 VDC PUMP SPEED SIGNAL.
21. WHEN FACTORY PROVIDED PUMP IS NOT SELECTED. CUSTOMER MUST SUPPLY SUITABLE PUMP SYSTEM. REFER TO PUMP MANUFACTURER FOR WIRING REQUIREMENTS.
22. THE CONTACTS FOR AUTO STOP AND EMERGENCY STOP SWITCHES ARE JUMPERED AT THE FACTORY BY JUMPERS W2 & W3 TO ENABLE UNIT OPERATION. IF REMOTE CONTROL IS DESIRED, REMOVED THE JUMPERS AND CONNECT TO THE DESIRED CONTROL CIRCUIT.
23. 1A15, LCI MODULE USED WHEN (COMM = LCI).
24. 1A41, BACNET INTERFACE MODULE USED WHEN (COMM = BCNT).

TRANE	2309–2076	SHEET 2 OF 2	REV C
THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE.	FIELD WIRING DIAGRAM		
DRAWN BY: ©TRANE DATE: 12/5/08	CGAM (NAR)		
REPLACES:	SLANT, V & W UNITS		
REVISION DATE:			
SIMILIAR TO:			

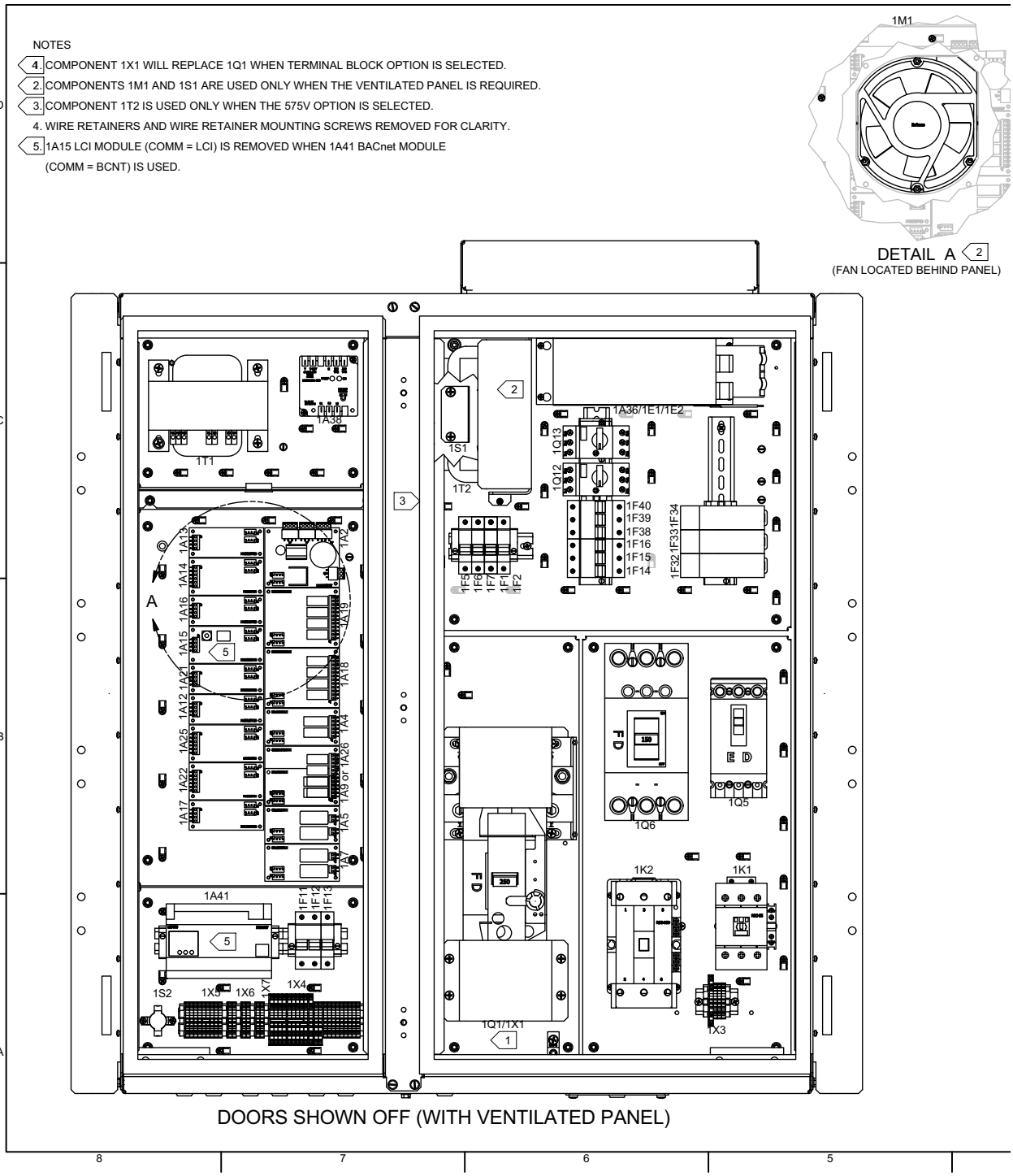
REPLACEMENT FUSE TABLE

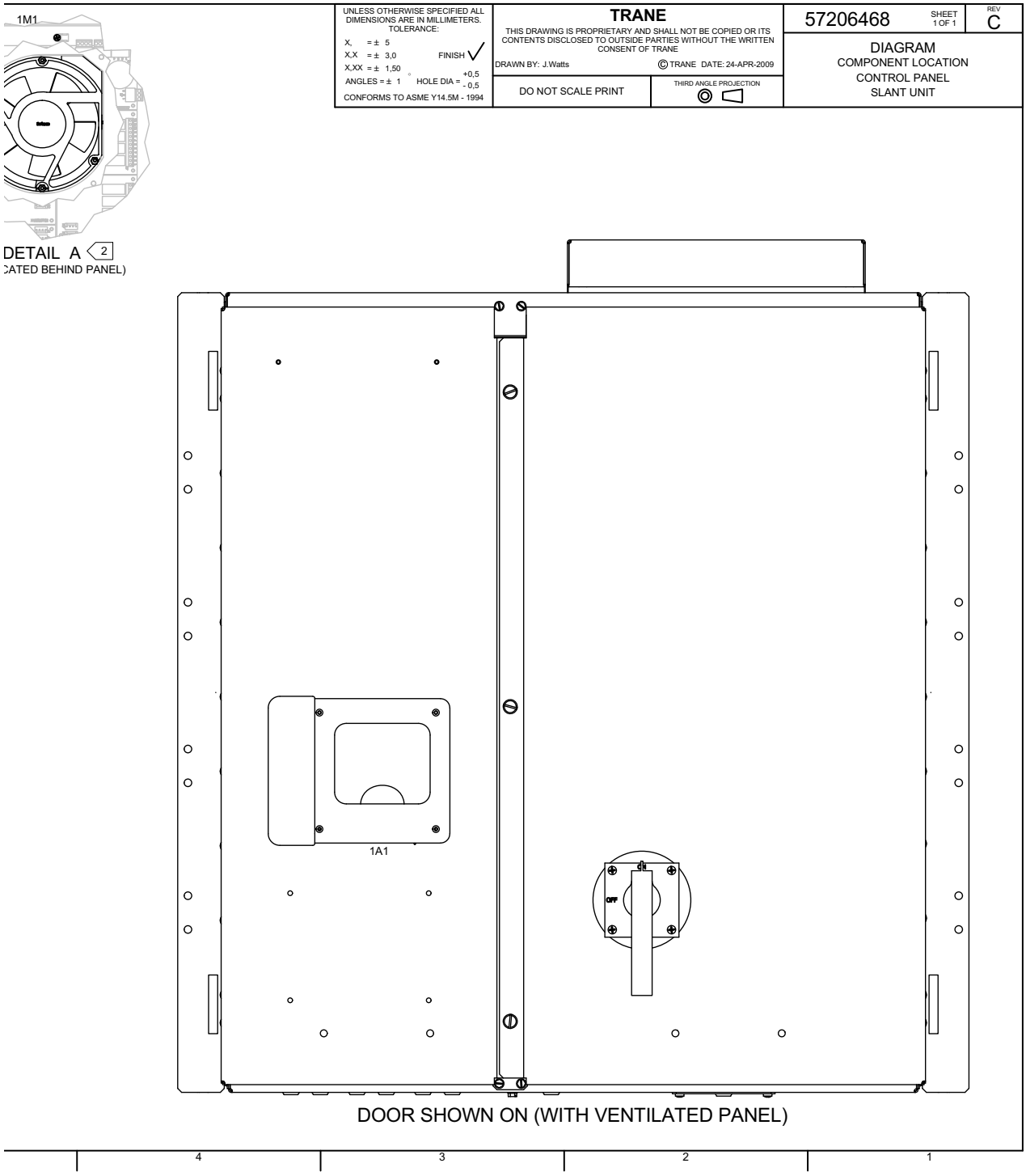
FUSE	VOLTAGE	Hz	CLASS	AMPS	NOTES
1F1	ALL	ALL	CC	10	FUSE, COMPRESSOR CRANKCASE HEATER, CIRCUIT 1
1F2	ALL	ALL	CC	10	
1F3	ALL	ALL	CC	10	FUSE, COMPRESSOR CRANKCASE HEATER, CIRCUIT 2
1F4	ALL	ALL	CC	10	
1F5, 1F6	200	60	CC	10	FUSE, CONTROL POWER TRANSFORMER, PRIMARY
	230	60	CC	8	
	380	60	CC	5	
	400	50	CC	5	
	460	60	CC	5	
	575	60	CC	4	
1F7	200	60	CC	10	THIRD PHASE, PHASE PROTECTION MONITOR
	230	60	CC	8	
	380	60	CC	5	
	400	50	CC	5	
	460	60	CC	5	
	575	60	CC	4	
1F8, 1F9, 1F10	200	60	CC	10	DUAL POINT, POWER SECOND PHASE, PHASE PROTECTION MONITOR
	230	60	CC	8	
	380	60	CC	5	
	400	50	CC	5	
	460	60	CC	5	
	575	60	CC	4	
1F11	ALL	ALL	CC	10	FUSE, CONTROL POWER TRANSFORMER, SECONDARY, 115V
1F12 – 1F13	ALL	ALL	CC	6	FUSE, CONTROL POWER TRANSFORMER, SECONDARY, 24V
1F14 – 1F16 1F17 – 1F19	200–460	ALL	CC	30	FUSE, INVERTER, FAN (FAST ACTING EXCEPT 575V)
	575	60	CC	6	
1F38 – 1F40 1F44 – 1F46	ALL	ALL	CC	30	FAST ACTING FUSE, ATM–R–30
1F38 – 1F40 1F41 – 1F43	ALL	ALL	CC	30	FAST ACTING FUSE, USED ONLY ON W UNITS
FACTORY PROVIDED PUMP INVERTER FUSE					
1F32, 1F33, 1F34	200,230	60	J	30	3.7Kw VSD
	460,575	60	J	25	5.5 Kw VSD
	200,230	60	J	60	7.5Kw VSD
	460,575		CC	30	
	200,230	60	J	60	11Kw VSD
	460,575			40	

5 6 7 8

Unit Wiring

20-35 Ton - "Slant Frame" - Component Location




1M1
DETAIL A 2
CATED BEHIND PANEL)
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS. TOLERANCE:
X, = ± 5
X,X = ± 3,0
X,XX = ± 1,50
ANGLES = ± 1°
FINISH √
HOLE DIA = +0,5 -0,5
CONFORMS TO ASME Y14.5M - 1994
TRANE
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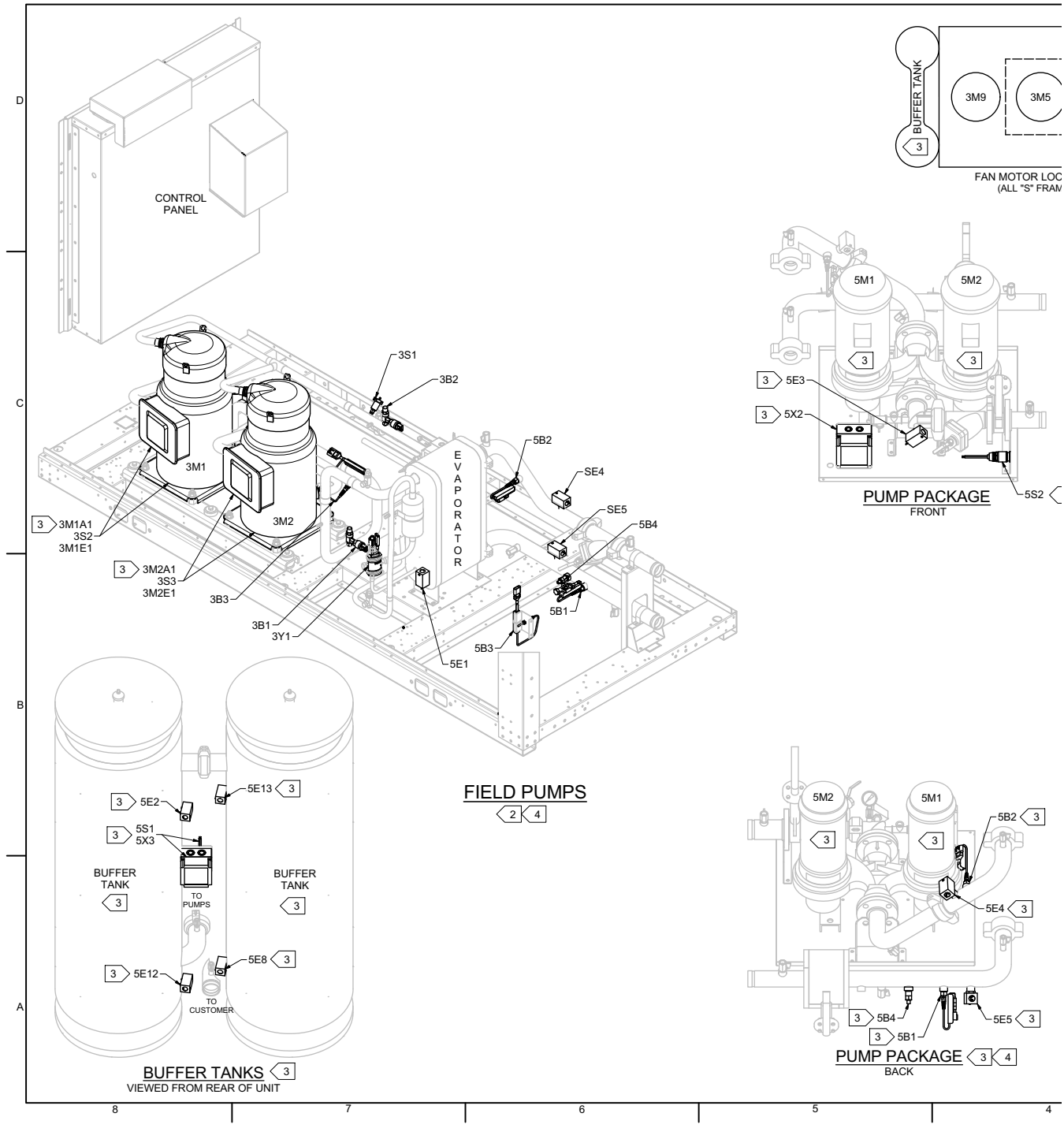
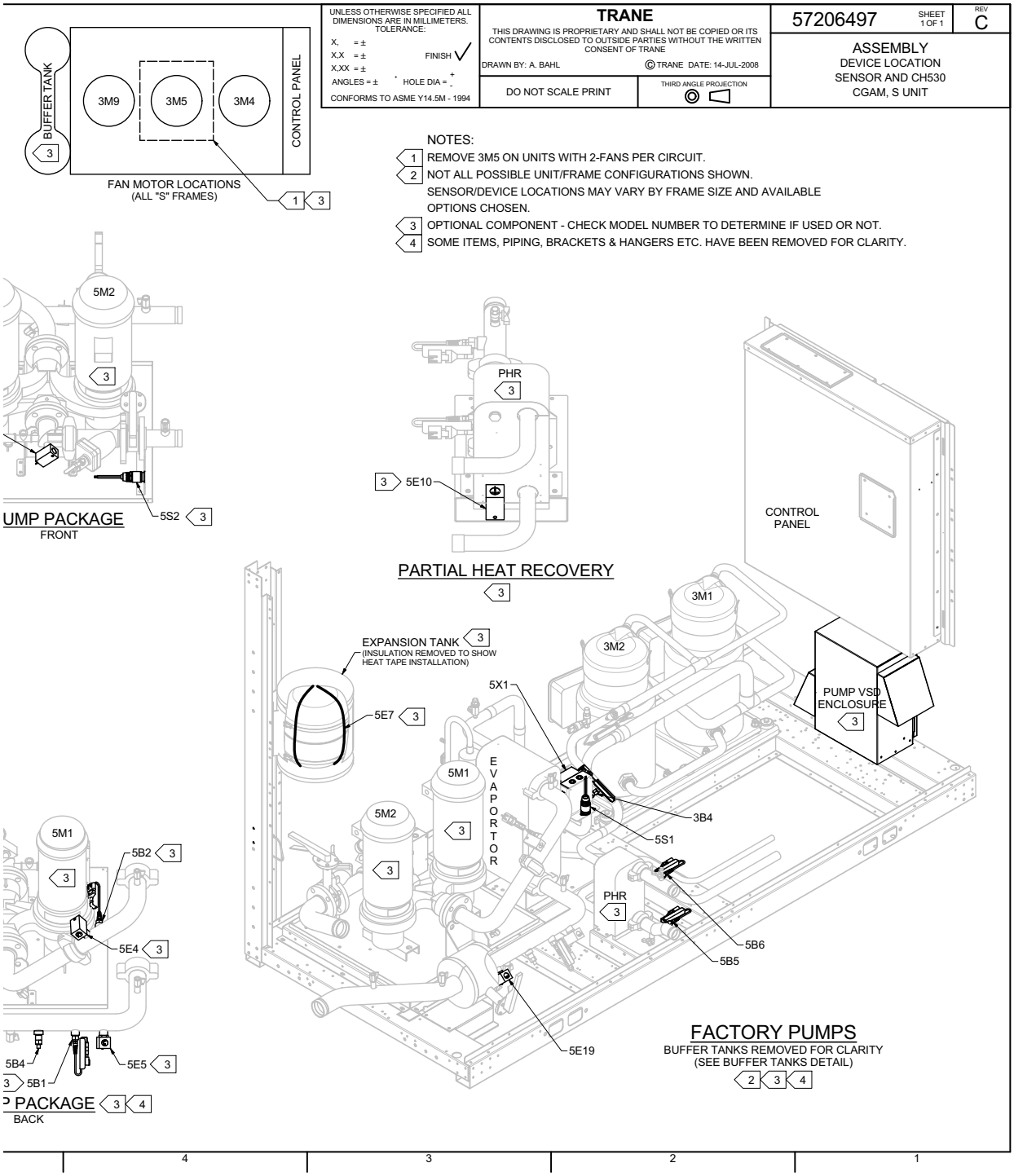
DRAWN BY: J.Watts
© TRANE DATE: 24-APR-2009
DO NOT SCALE PRINT
THIRD ANGLE PROJECTION
57206468
SHEET 1 OF 1
REV C
DIAGRAM
COMPONENT LOCATION
CONTROL PANEL
SLANT UNIT
1A1
OFF
DOOR SHOWN ON (WITH VENTILATED PANEL)
4
3
2
1

Unit Wiring

20-35 Ton - "Slant Frame" - Device Location




UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS. TOLERANCE:
X, = ±
X,X = ±
X,XX = ±
ANGLES = ±
HOLE DIA = +
-
FINISH
CONFORMS TO ASME Y14.5M - 1994
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DRAWN BY: A. BAHL
© TRANE DATE: 14-JUL-2008
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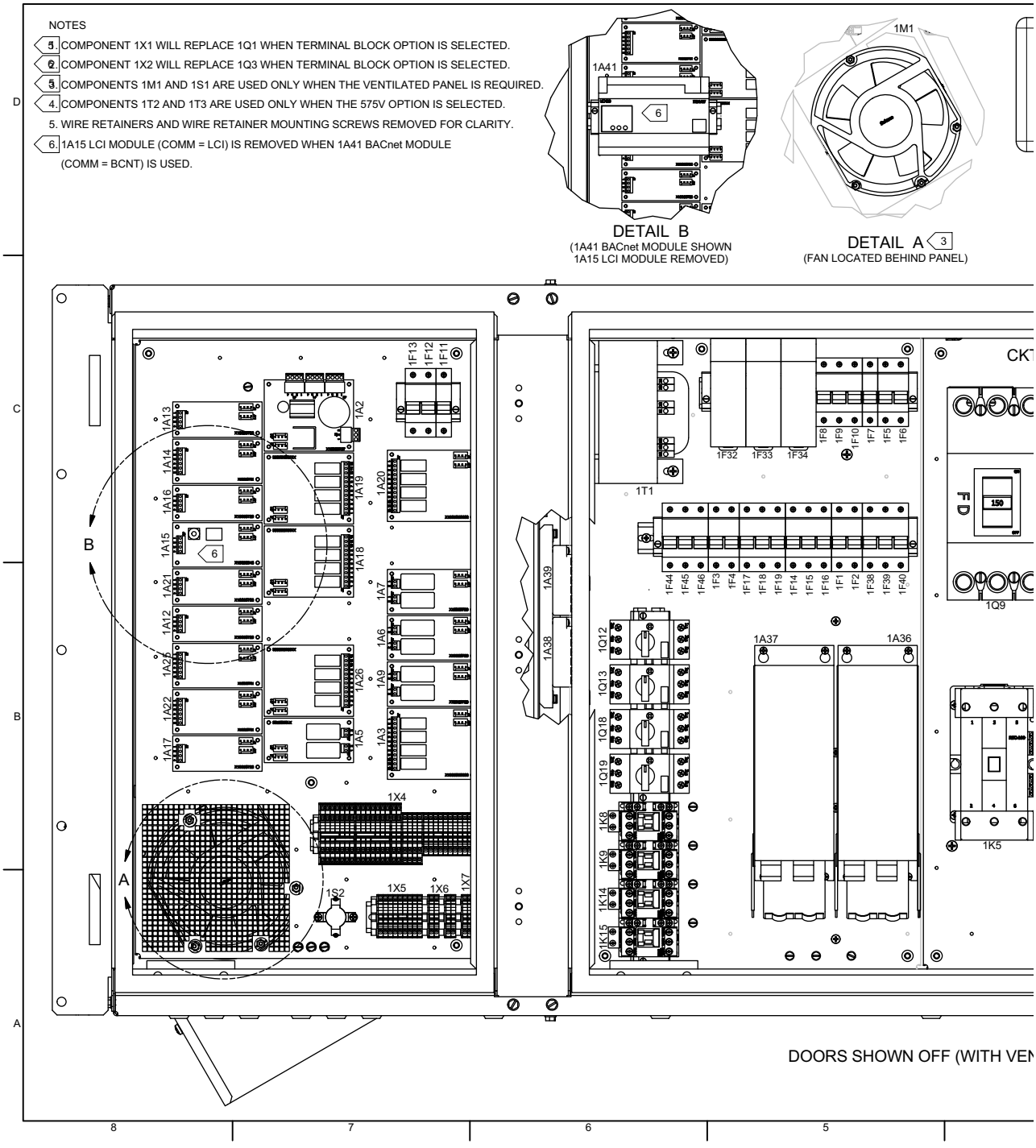
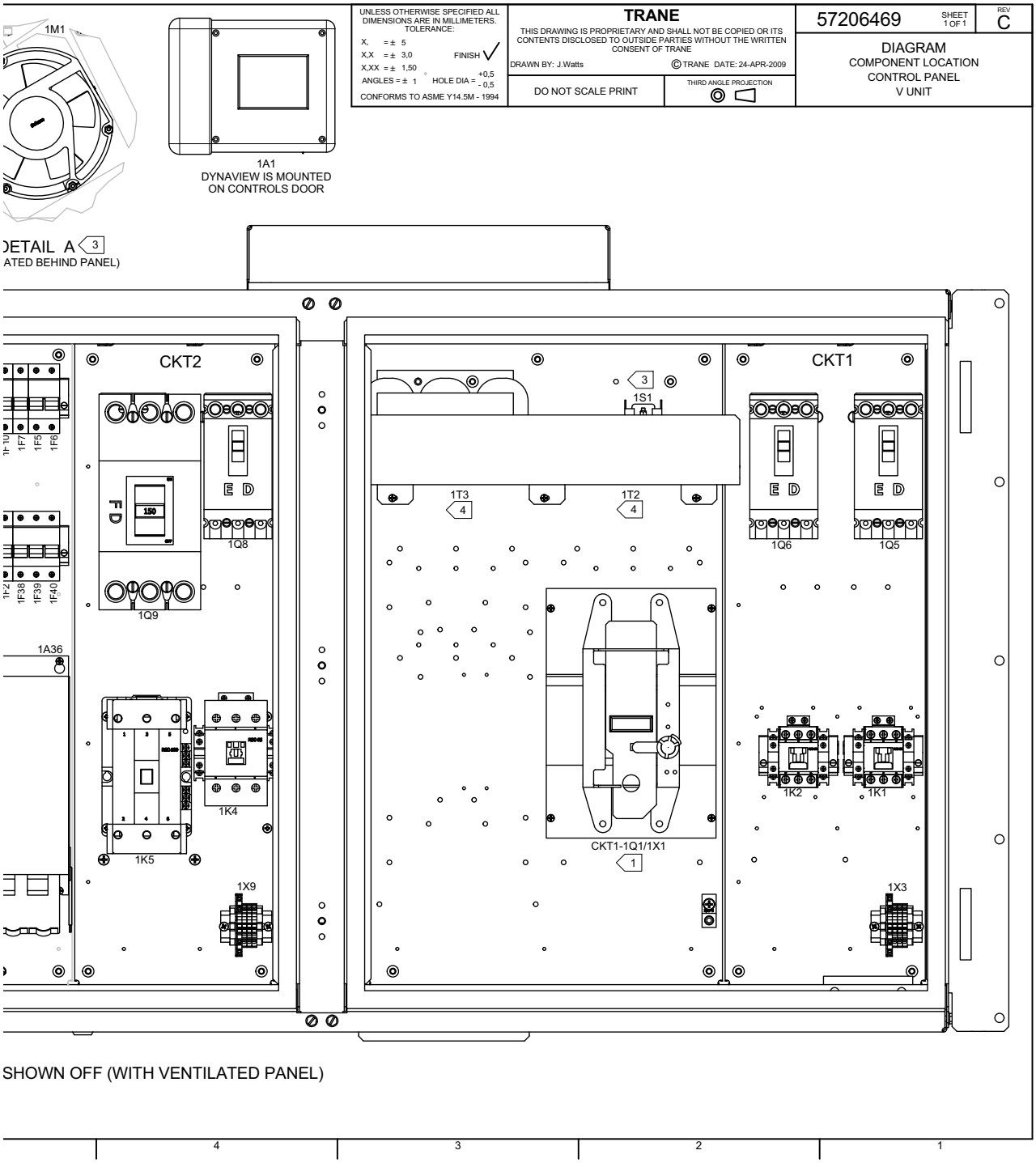
THIRD ANGLE PROJECTION
57206497
SHEET 1 OF 1
REV C
ASSEMBLY
DEVICE LOCATION
SENSOR AND CH530
CGAM, S UNIT
BUFFER TANK
3M9
3M5
3M4
CONTROL PANEL
3
FAN MOTOR LOCATIONS
(ALL "S" FRAMES)
1 3
NOTES:
1 REMOVE 3M5 ON UNITS WITH 2-FANS PER CIRCUIT.
2 NOT ALL POSSIBLE UNIT/FRAME CONFIGURATIONS SHOWN.
SENSOR/DEVICE LOCATIONS MAY VARY BY FRAME SIZE AND AVAILABLE OPTIONS CHOSEN.
3 OPTIONAL COMPONENT - CHECK MODEL NUMBER TO DETERMINE IF USED OR NOT.
4 SOME ITEMS, PIPING, BRACKETS & HANGERS ETC. HAVE BEEN REMOVED FOR CLARITY.
5M2
3
5S2 3
UMP PACKAGE
FRONT
PHR
3
3 5E10
PARTIAL HEAT RECOVERY
3
CONTROL PANEL
3M1
EXPANSION TANK 3
(INSULATION REMOVED TO SHOW HEAT TAPE INSTALLATION)
3M2
5X1
5E7 3
PUMP VSD ENCLOSURE
3
5M1
EVAPORTOR
5M2
3
3
3B4
5S1
PHR
3
5B6
5B5
5E19
5M1
5B2 3
3
5E4 3
5B4
5E5 3
3 5B1
P PACKAGE 3 4
BACK
FACTORY PUMPS
BUFFER TANKS REMOVED FOR CLARITY
(SEE BUFFER TANKS DETAIL)
2 3 4
4
3
2
1

Unit Wiring

40-70 Ton - "V Frame" - Component Location




UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS. TOLERANCE:
X, = ± 5
X,X = ± 3,0
X,XX = ± 1,50
ANGLES = ± 1°
FINISH
HOLE DIA = +0,5 -0,5
CONFORMS TO ASME Y14.5M - 1994
TRANE
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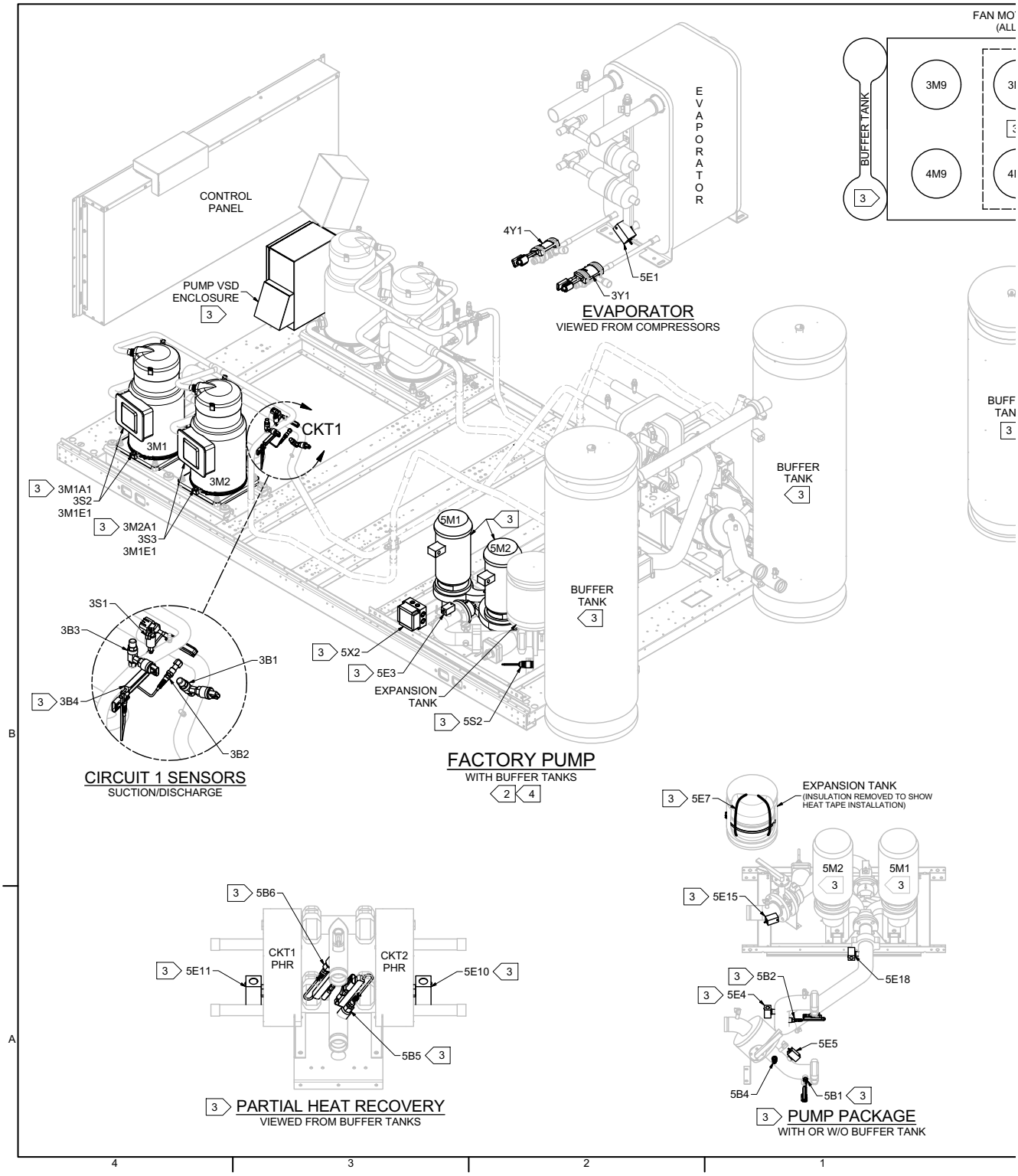
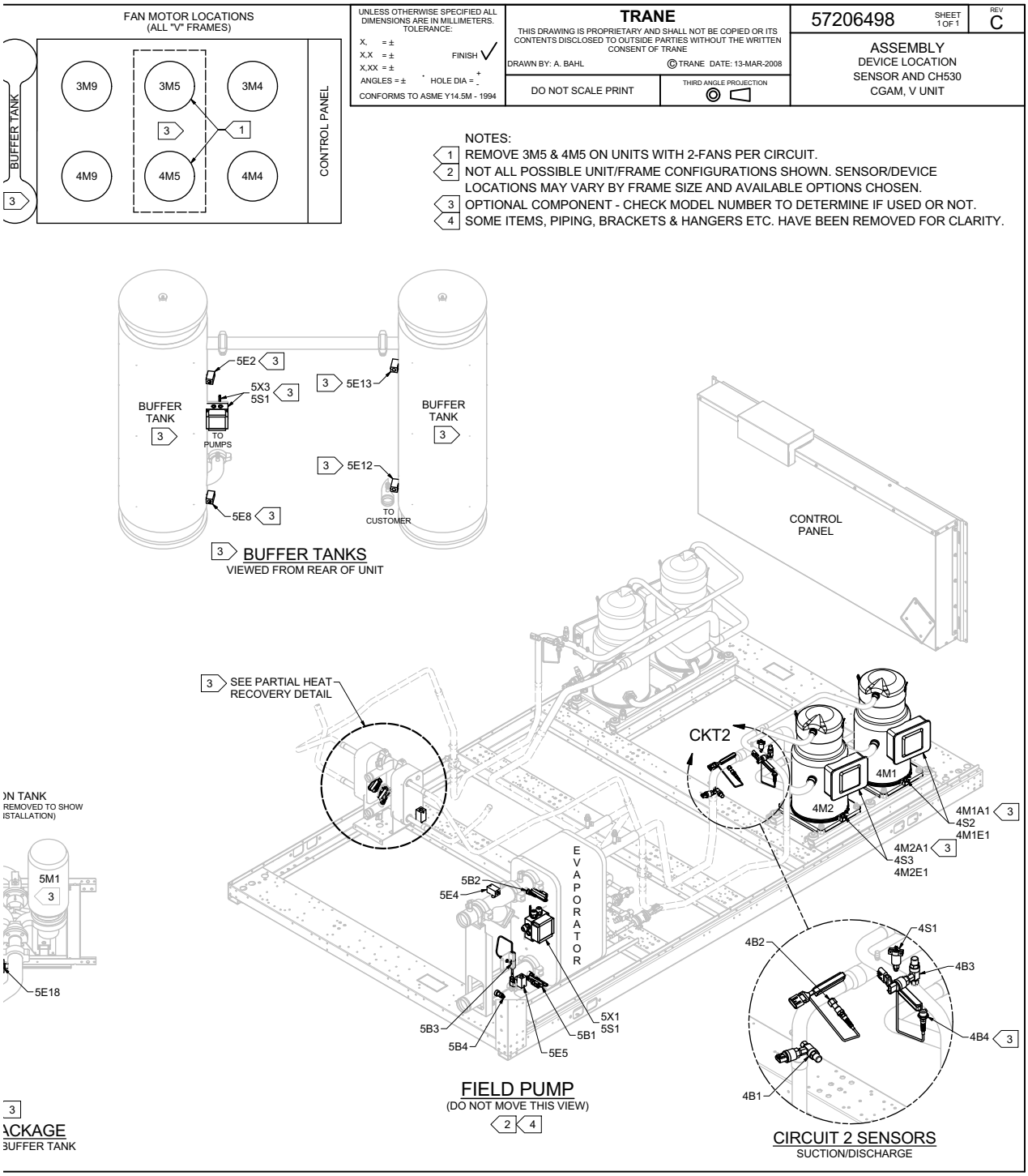
© TRANE DATE: 24-APR-2009
DO NOT SCALE PRINT
THIRD ANGLE PROJECTION
57206469
SHEET 1 OF 1
REV C
DIAGRAM
COMPONENT LOCATION
CONTROL PANEL
V UNIT
1M1
1A1
DYNAVIEW IS MOUNTED ON CONTROLS DOOR
DETAIL A 3
ATED BEHIND PANEL)
CKT2
CKT1
1S1
1T3
1T2
1Q8
1Q9
1Q6
1Q5
1A36
1K4
1K5
1K2
1K1
CKT1-1Q1/1X1
1X9
1X3
SHOWN OFF (WITH VENTILATED PANEL)

40-70 Ton - "V Frame" - Device Location




FAN MOTOR LOCATIONS
(ALL "V" FRAMES)
BUFFER TANK
CONTROL PANEL
3M9
3M5
3M4
4M9
4M5
4M4
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS. TOLERANCE:
X. = ±
X.X = ±
X.XX = ±
ANGLES = ±
FINISH
HOLE DIA = + -
CONFORMS TO ASME Y14.5M - 1994
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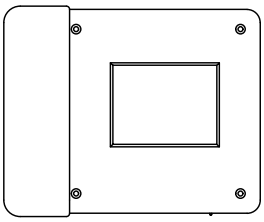
DRAWN BY: A. BAHL
©TRANE DATE: 13-MAR-2008
DO NOT SCALE PRINT
THIRD ANGLE PROJECTION
57206498
SHEET 1 OF 1
REV C
ASSEMBLY
DEVICE LOCATION
SENSOR AND CH530
CGAM, V UNIT
NOTES:
1 REMOVE 3M5 & 4M5 ON UNITS WITH 2-FANS PER CIRCUIT.
2 NOT ALL POSSIBLE UNIT/FRAME CONFIGURATIONS SHOWN. SENSOR/DEVICE LOCATIONS MAY VARY BY FRAME SIZE AND AVAILABLE OPTIONS CHOSEN.
3 OPTIONAL COMPONENT - CHECK MODEL NUMBER TO DETERMINE IF USED OR NOT.
4 SOME ITEMS, PIPING, BRACKETS & HANGERS ETC. HAVE BEEN REMOVED FOR CLARITY.
BUFFER TANK
5E2
5X3
5S1
5E13
TO PUMPS
5E12
5E8
TO CUSTOMER
3 BUFFER TANKS
VIEWED FROM REAR OF UNIT
CONTROL PANel
3 SEE PARTIAL HEAT RECOVERY DETAIL
CKT2
4M1
4M2
4M1A1
4S2
4M1E1
4M2A1
4S3
4M2E1
EVAPORATOR
5B2
5E4
5B3
5B4
5E5
5X1
5S1
5B1
4S1
4B2
4B3
4B4
4B1
FIELD PUMP
(DO NOT MOVE THIS VIEW)
2 4
CIRCUIT 2 SENSORS
SUCTION/DISCHARGE
5M1
5E18

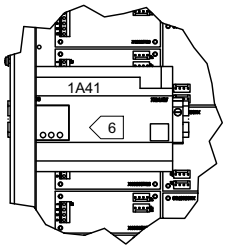
80-130 Ton - "W Frame" - Component Location

NOTES

1. COMPONENT 1X1 WILL REPLACE 1Q1 WHEN TERMINAL BLOCK OPTION IS SELECTED.
2. COMPONENT 1X2 WILL REPLACE 1Q3 WHEN TERMINAL BLOCK OPTION IS SELECTED.
3. COMPONENTS 1M1 AND 1S1 ARE USED ONLY WHEN THE VENTILATED PANEL IS REQUIRED.
4. COMPONENTS 1T2 AND 1T3 ARE USED ONLY WHEN THE 575V OPTION IS SELECTED.
5. WIRE RETAINERS AND WIRE RETAINER MOUNTING SCREWS REMOVED FOR CLARITY.
6. 1A15 LCI MODULE (COMM = LCI) IS REMOVED WHEN 1A41 BACnet MODULE (COMM = BCNT) IS USED.

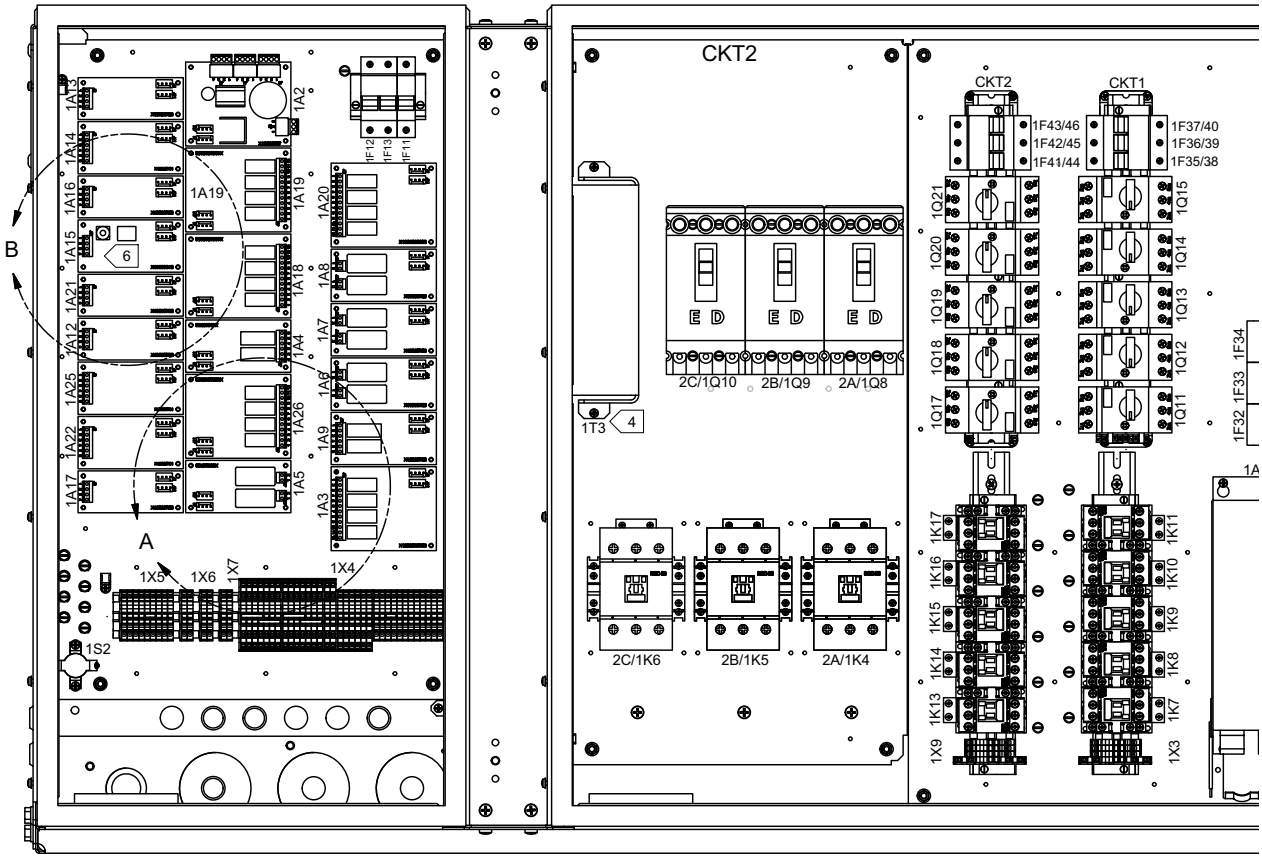


1A1
DYNAVIEW MOUNTED ABOVE
CONTROL PANEL ON UNIT FRAME



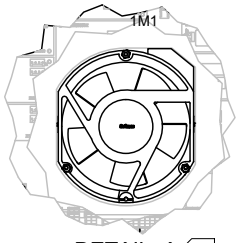
DETAIL B
(1A41 BACnet MODULE SHOWN
1A15 LCI MODULE REMOVED)

(FAN

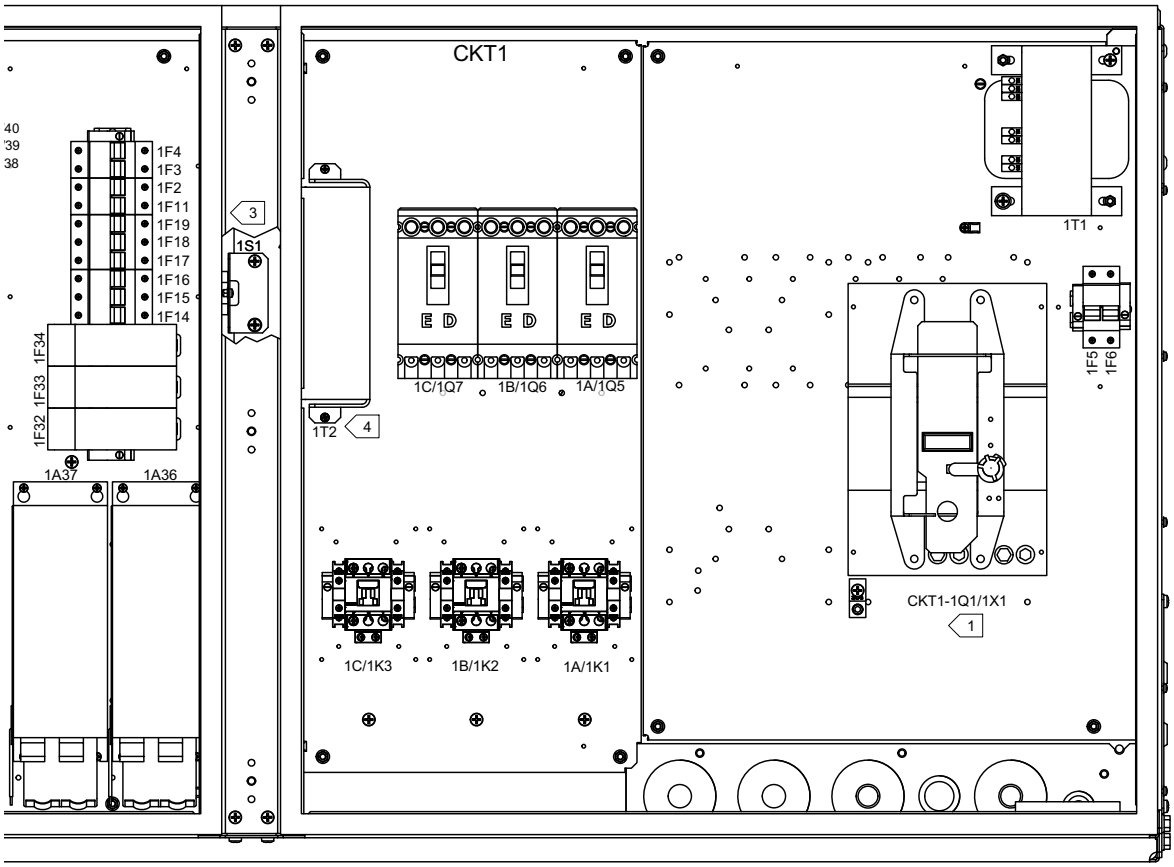


DOORS SHOWN OFF (WITH VE

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS. TOLERANCE: X, = ± 3 X,X = ± 1,5 X,XX = ± 0,08 ANGLES = ± 1 FINISH ✓ HOLE DIA = +0,5 - 0,5 CONFORMS TO ASME Y14.5M - 1994	TRANE THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE DRAWN BY: J. WATTS © TRANE DATE: 24-APR-2008 DO NOT SCALE PRINT THIRD ANGLE PROJECTION	57206470 SHEET 1 OF 1 REV C DIAGRAM COMPONENT LOCATION CONTROL PANEL W UNIT

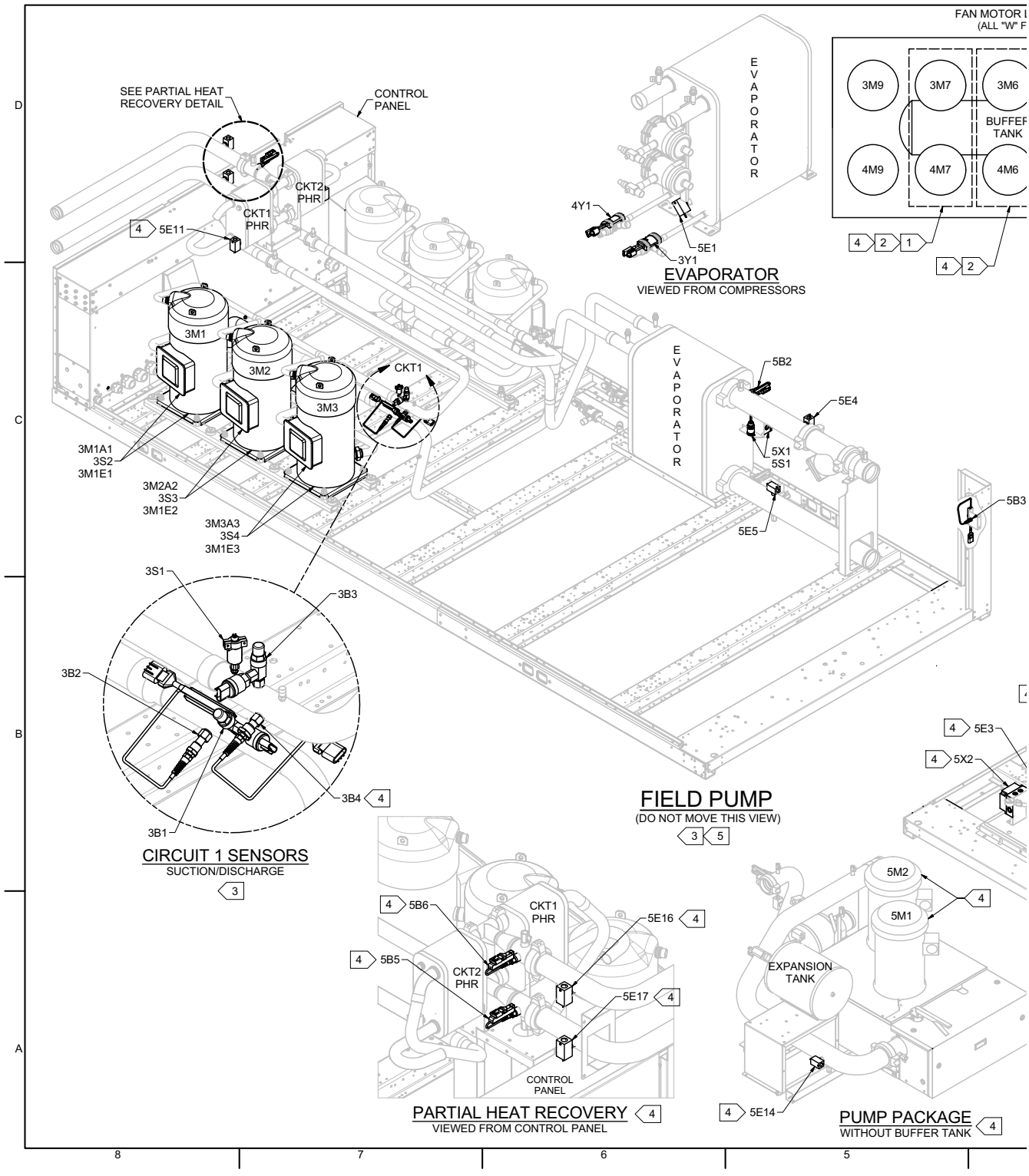


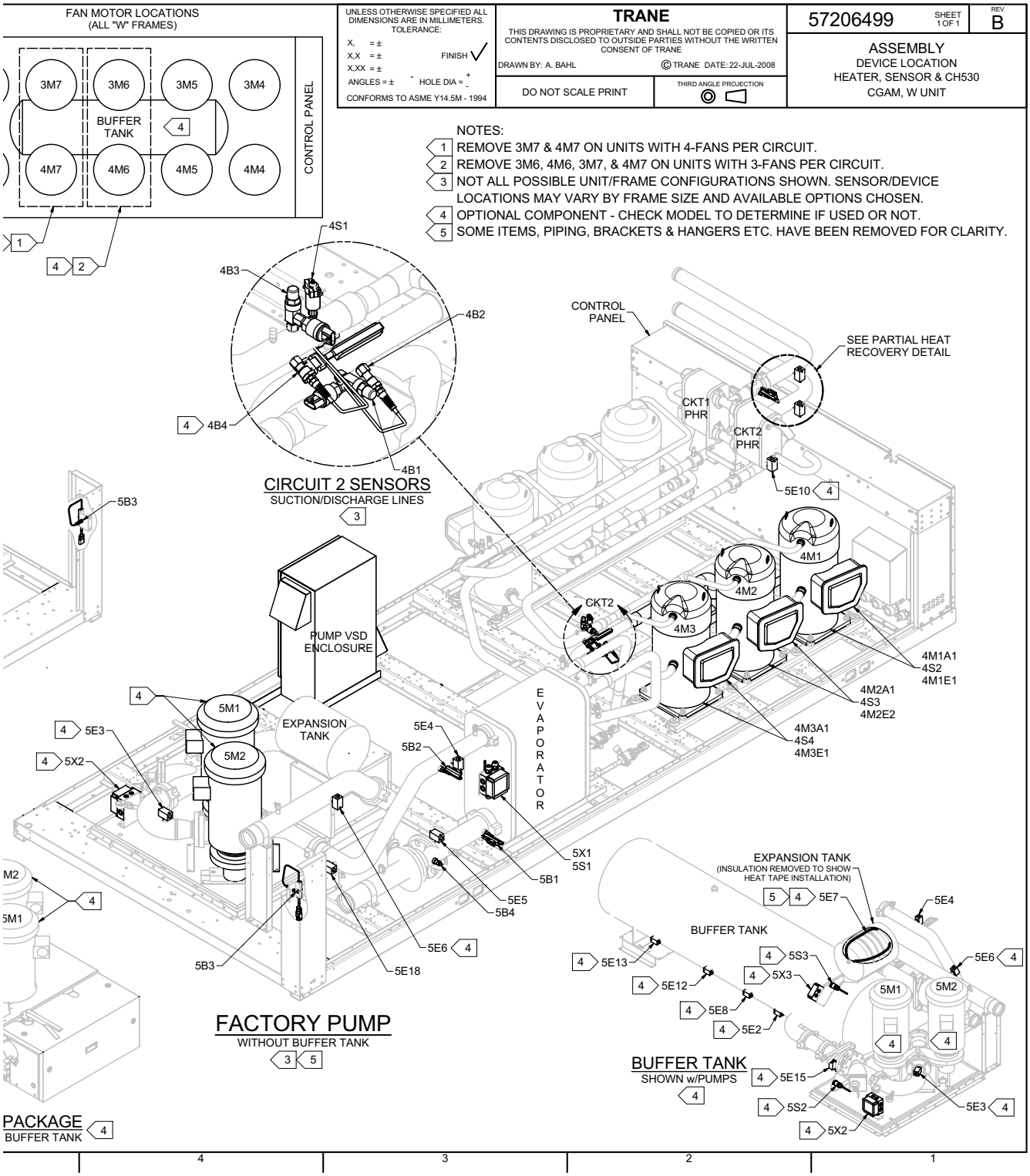
DETAIL A 3
(FAN LOCATED BEHIND PANEL)



TH VENTILATED PANEL)

80-130 Ton - "W Frame" - Device Location




FAN MOTOR LOCATIONS
(ALL "W" FRAMES)
3M7
3M6
3M5
3M4
BUFFER TANK
4
4M7
4M6
4M5
4M4
CONTROL PANEL
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS. TOLERANCE:
X, = ±
X,X = ±
X,XX = ±
FINISH
ANGLES = ±
HOLE DIA = + -
CONFORMS TO ASME Y14.5M - 1994
TRANE
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DRAWN BY: A. BAHL
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DO NOT SCALE PRINT
THIRD ANGLE PROJECTION
57206499
SHEET 1 OF 1
REV B
ASSEMBLY
DEVICE LOCATION
HEATER, SENSOR & CH530
CGAM, W UNIT
NOTES:
1 REMOVE 3M7 & 4M7 ON UNITS WITH 4-FANS PER CIRCUIT.
2 REMOVE 3M6, 4M6, 3M7, & 4M7 ON UNITS WITH 3-FANS PER CIRCUIT.
3 NOT ALL POSSIBLE UNIT/FRAME CONFIGURATIONS SHOWN. SENSOR/DEVICE LOCATIONS MAY VARY BY FRAME SIZE AND AVAILABLE OPTIONS CHOSEN.
4 OPTIONAL COMPONENT - CHECK MODEL TO DETERMINE IF USED OR NOT.
5 SOME ITEMS, PIPING, BRACKETS & HANGERS ETC. HAVE BEEN REMOVED FOR CLARITY.
4S1
4B3
4B2
4B4
4B1
CIRCUIT 2 SENSORS
SUCTION/DISCHARGE LINES
3
CONTROL PANEL
SEE PARTIAL HEAT RECOVERY DETAIL
CKT1 PHR
CKT2 PHR
5E10
4M1
4M2
4M3
CKT2
4M1A1
4S2
4M1E1
4M2A1
4S3
4M2E2
4M3A1
4S4
4M3E1
5B3
PUMP VSD ENCLOSURE
EXPANSION TANK
5M1
5M2
5E3
5X2
5E4
5B2
EVAPORATOR
5X1
5S1
5B1
5E5
5B4
5E6
5E18
5B3
FACTORY PUMP
WITHOUT BUFFER TANK
3 5
PACKAGE
BUFFER TANK
EXPANSION TANK
(INSULATION REMOVED TO SHOW HEAT TAPE INSTALLATION)
5E7
5E4
BUFFER TANK
5E13
5S3
5X3
5E6
5E12
5E8
5E2
5M1
5M2
BUFFER TANK
SHOWN w/PUMPS
5E15
5S2
5X2
5E3

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CG-SVX17D-EN 13 Jan 2011
Supersedes CG-SVX17C-EN (Feb 2010)