TRANE®

Installation
Operation
Maintenance

RTAC Air-Cooled Helical Rotary Liquid Chillers

RTAC 120-400 ton units(50Hz)

X39641183020

February 2014

RTAC-SVX01H-EN-C

NOTICE：

Warnings and Cautions appear at appropriate sections through¬out 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, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠ CAUTION: Indicates a situation that may 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 and 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

Contains Refrigerant!

System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

Failure to follow proper procedures or the use of non-approved refrigerants, refrigerant substitutes, or refrigerant additives could result in death or serious injury or equipment damage.

Contents

Contents

TRANE

Contents

General Information

Literature History

- RTAC-SVX001-EN (December 2000)
  New manual.
- RTAC-SVX01B-EN (September 2001)
  New manual describes installation, operation, and maintenance of RTAC units and the remote evaporator option.
- RTAC-SVX01C-EN (February 2002)
  Revised manual includes additional RTAC units to size 500 tons, new installation and maintenance material, and expanded CH530 diagnostics.
- RTAC-SVX01D-EN (July 2003)
  Revised manual for new evaporator design for 2 compressor units. Design Sequence H0 and later.
- RTAC-SVX01E-EN (July 2004)
  Revised manual for new evaporator design for 3 and 4 compressor units. Design Sequence J0 and later.
- RTAC-SVX01F-EN (January 2006)
  Revised manual for new control panel design.
- RTAC-SVX01F-EN-C (June 2011)
  New manual for 50Hz
- RTAC-SVX01G-EN-C (June 2013)
  Revised manual includes additional RTAC units 120 tons and 130 tons.
- RTAC-SVX01H-EN-C(February 2014)
  Revised manual includes additional RTAC X series for extra efficiency.

Unit Identification – Nameplates

When the unit arrives, compare all nameplate data with ordering, submittal, and ship-ping information. A typical unit nameplate is shown in Figure 1.

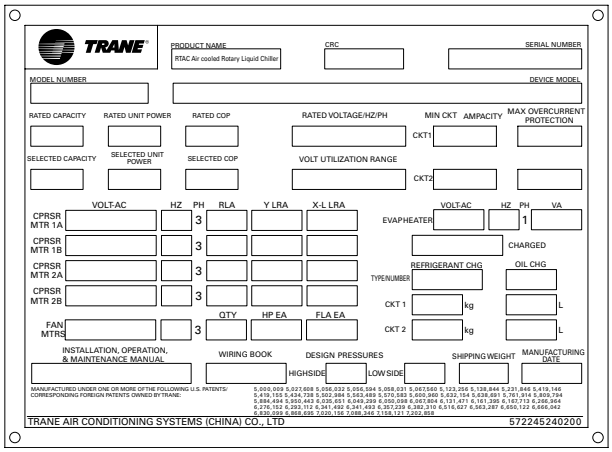


Figure1. Typical Unit Nameplate

Unit Inspection

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 appropri-ate Trane Sales Office. Do not proceed with installation of a damaged unit without sales office approval.

Inspection Checklist

- 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 pos-sible. 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.

Loose Parts Inventory

Check all the accessories and loose parts which are shipped with the unit against the shipping list. Included in these items will be water vessel drain plugs, rigging and electrical diagrams, and service literature, which are placed inside the control panel and/or starter panel for shipment.

Unit Description

The 120 - 400 ton Model RTAC units are helical-rotary type, air-cooled liquid chillers designed for installation outdoors. The compressor circuits are completely assem-bled, hermetic packages that are factory-piped, wired, leak-tested, dehydrated, and tested for proper control operation before shipment.

Figure2. Shows a typical RTAC packaged unit and its components

Chilled water inlet and outlet openings are covered for shipment. Each compressor has a separate compressor motor starter. The RTAC series features Trane's exclusive Adaptive Control ™ logic, which monitors the control variables that govern the operation of the chiller unit.

Adaptive Control logic can adjust capacity variables to avoid chiller shutdown when necessary, and keep producing chilled water. The units feature two independent refrigerant circuits. Compressor unloaders are solenoid actuated and oil pressure operated. Each refrigerant circuit is provided with filter, sight glass, electronic expansion valve, and charging valves. The shell-and-tube type evaporator is manufactured in accordance with ASME standards or other international codes. Each evaporator is fully insulated and is equipped with water drain and vent connections. Packaged units have heat tape protection to - 20℉ (-28.9℃) as standard. As an option, a convenience outlet can be supplied.

General Date

Table 1 through Table 5 contain general RTAC mechanical specifications for all unit sizes.

Table1. General Date-140-250 Ton 50Hz Units-Standard Efficiency

Size		140S	155S	170S	185S	200S	250S
Type		STD	STD	STD	STD	STD	STD
Compressor							
Quantity		2	2	2	2	2	3
Nominal	(Ton)	70/70	85/70	85/85	100/85	100/100	70/70/100
Evaporator							
Water Storage	(gal)	29	32	34	36	40	56
	(l)	110	121	129	136	151	212
Min. Flow	(gpm)	193	214	202	217	241	265
	(l/s)	12	13	13	14	15	17
Max. Flow	(gpm)	709	785	741	796	883	970
	(l/s)	45	50	47	50	56	61
Condenser							
Quantity of Coils		4	4	4	4	4	8
Coil Length	(inch)	156/156	180/156	180/180	216/180	216/216	156/108
	(mm)	3962/3962	4572/3962	4572/4512	5486/4572	5486/5486	3962/2743
Coil Height	(inch)	42	42	42	42	42	42
	(mm)	1067	1067	1067	1067	1067	1067
Fins Distance	(mm)	1.58	1.58	1.58	1.58	1.58	1.58
Number of Rows		3	3	3	3	3	3
Condenser Fan							
Quantity		4/4	5/4	5/5	6/5	6/6	8/6
Diamenter	(inch)	30	30	30	30	30	30
	(mm)	762	762	762	762	762	762
Total Airflow	(cfm)	63346	69507	75671	83236	90803	108698
	(m^3/hr)	107615	118081	128553	141405	154260	184661
Normal Fan Speed	(rpm)	950	950	950	950	950	950
Min Starting/Operating Ambinet							
Standard Unit	(F)	25	25	25	25	25	25
	(℃)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Low Ambient	(F)	0	0	0	0	0	0
	(℃)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8
General Unit							
Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a
No.of Independent		2	2	2	2	2	2
Min.load	%	15	15	15	15	10	10
Refrigerant Charge	(lb)	165/165	175/165	175/175	215/210	215/215	335/200
	(kg)	75/75	79/75	79/79	98/95	98/98	152/91
Oil Charge	(gal)	1.5/1.5	1.5/1.5	1.5/1.5	2.1/1.5	2.1/2.1	4.6/2.1
	(l)	6/6	6/6	6/6	8/6	8/8	17.4/8
Base Length	(mm)	4978 L	4978 L	4978 L	5892 L	5892 L	9203 L
		2260 W	2260 W	2260 W	2260 W	2260 W	2260 W
		2383 H	2383 H	2383 H	2373 H	2373 H	2438 H

1. Date Containing：Temperature of Inlet/onlet:12/7℃，Ambient Temperature:35℃，scaling factor:0.018 m^2·℃/kW。
2. Minimum start-up/operating ambient based on a 5 mph wind across the condenser。

Table2. General Date-275-400 Ton 50Hz Units-Standard Efficiency

Size		275S	300S	350S	375S	400S
Type		STD	STD	STD	STD	STD
Compressor						
Quantity		3	3	4	4	4
Nominal	(Ton)	85/85/100	100/100/100	85/85/85/85	100/100/85/85	100/100/100/100
Evaporator						
Water Storage	(gal)	62	67	75	79	83
	(l)	235	254	284	299	314
Min. Flow	(gpm)	309	339	351	381	404
	(l/s)	20	21	22	24	25
Max. Flow	(gpm)	1134	1243	1287	1396	1483
	(l/s)	72	78	81	88	94
Condenser						
Quantity of Coils		8	8	8	8	8
Coil Length	(inch)	180/108	216/108	180/180	216/180	216/216
	(mm)	4572/2743	5486/2743	4572/4572	5486/4572	5486/5486
Coil Height	(inch)	42	42	42	42	42
	(mm)	1067	1067	1067	1067	1067
Fins Distance	(mm)	1.58	1.58	1.58	1.58	1.58
Number of Rows		3	3	3	3	3
Condenser Fan						
Quantity		10/6	12/6	10/10	12/10	12/12
Diamenter	(inch)	30	30	30	30	30
	(mm)	762	762	762	762	762
Total Airflow	(cfm)	121056	136210	151332	166467	181611
	(m^3/hr)	205655	231399	257089	282801	308528
Normal Fan Speed	(rpm)	950	950	950	950	950
Min Starting/Operating Ambinet						
Standard Unit	(F)	25	25	25	25	25
	(℃)	-3.9	-3.9	-3.9	-3.9	-3.9
Low Ambient	(F)	0	0	0	0	0
	(℃)	-17.8	-17.8	-17.8	-17.8	-17.8
General Unit						
Refrigerant		R134a	R134a	R134a	R134a	R134a
No.of Independent		2	2	2	2	2
Min.load	%	15	15	15	15	15
Refrigerant Charge	(lb)	365/200	415/200	365/365	415/365	415/415
	(kg)	166/91	188/91	166/166	188/166	188/188
Oil Charge	(gal)	4.6/2.1	5.0/2.1	4.6/4.6	5.0/4.6	5.0/5.0
	(l)	17.4/8	19.0/8.0	17.4/17.4	19.0/17.4	19.0/19.0
Base Length	(mm)	9203 L	11023 L	11946 L	11946 L	11946 L
		2260 W	2260 W	2260 W	2260 W	2260 W
		2438 H	2438 H	2438 H	2438 H	2438 H

1. Date Containing：Temperature of Inlet/onlet:12/7°C，Ambient Temperature:35°C，scaling factor:0.018 m^2·°C/kW。
2. Minimum start-up/operating ambient based on a 5 mph wind across the condenser。

Table3. General Date-120-200 Ton 50Hz Units-High Efficiency

Size		120H	130H	140H	155H	170H	185H	200H
Type		HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Compressor								
Quantity		2	2	2	2	2	2	2
Nominal	(Ton)	60/60	70/60	70/70	85/70	85/85	100/85	100/100
Evaporator								
Water Storage	(gal)	29	32	34	36	40	39	43
	(l)	110	121	129	136	151	148	163
Min. Flow	(gpm)	193	214	202	217	241	217	241
	(l/s)	12	13	13	14	15	14	15
Max. Flow	(gpm)	709	785	741	796	883	796	883
	(l/s)	45	50	47	50	56	50	56
Condenser								
Quantity of Coils		4	4	4	4	4	4	4
Coil Length	(inch)	156/156	180/156	180/180	216/180	216/216	252/216	252/252
	(mm)	3962/3962	4572/3962	4572/4572	5486/4572	5486/5486	6401/5486	6401/6401
Coil Height	(inch)	42	42	42	42	42	42	42
	(mm)	1067	1067	1067	1067	1067	1067	1067
Fins Distance	(mm)	1.58	1.58	1.58	1.58	1.58	1.58	1.58
Number of Rows		3	3	3	3	3	3	3
Condenser Fan								
Quantity		4/4	5/4	5/5	6/5	6/6	7/6	7/7
Diamenter	(inch)	30	30	30	30	30	30	30
	(mm)	762	762	762	762	762	762	762
Total Airflow	(cfm)	63346	69507	75575	83130	90687	98256	105826
	(m^3/hr)	107615	118081	128390	141225	154063	166921	179781
Normal Fan Speed	(rpm)	950	950	950	950	950	950	950
Min Starting/Operating Ambinet								
Standard Unit	(F)	25	25	25	25	25	25	25
	(℃)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Low Ambient	(F)	0	0	0	0	0	0	0
	(℃)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8
General Unit								
Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a	R134a
No.of Independent		2	2	2	2	2	2	2
Min.load	%	15	15	15	15	15	15	15
Refrigerant Charge	(lb)	165/165	175/165	175/175	215/205	215/215	225/215	225/225
	(kg)	75/75	79/75	79/79	98/93	98/98	102/98	102/102
Oil Charge	(gal)	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5	1.5/1.5	2.1/1.5	2.1/2.1
	(l)	6/6	6/6	6/6	6/6	6/6	8/6	8/8
Base Length	(mm)	4978 L	4978 L	4978 L	5892 L	5892 L	6810 L	6810 L
		2260 W	2260 W	2260 W	2260 W	2260 W	2260 W	2260 W
		2383 H	2383 H	2383 H	2383 H	2383 H	2383 H	2383 H

1. Date Containing：Temperature of Inlet/onlet:12/7°C，Ambient Temperature:35°C，scaling factor:0.018 m^2·°C/kW。
2. Minimum start-up/operating ambient based on a 5 mph wind across the condenser。

Table4. General Date-250-400 Ton 50Hz Units-High Efficiency

Size		250H	275H	300H	350H	375H	400H
Type		HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
Compressor							
Quantity		3	3	3	4	4	4
Nominal	(Ton)	70/70/100	85/85/100	100/100/100	85/85/85/85	100/100/85/85	100/100/100/100
Evaporator							
Water Storage	(gal)	67	72	72	83	86	91
	(l)	254	273	273	314	326	344
Min. Flow	(gpm)	339	375	375	404	422	461
	(l/s)	21	24	23	25	27	29
Max. Flow	(gpm)	1243	1374	1374	1483	1548	1690
	(l/s)	78	87	87	94	98	107
Condenser							
Quantity of Coils		8	8	8	8	8	8
Coil Length	(inch)	180/108	216/144	252/144	216/216	252/216	252/252
	(mm)	4572/2743	5486/3658	6401/3658	5486/5486	6401/5486	6401/6401
Coil Height	(inch)	42	42	42	42	42	42
	(mm)	1067	1067	1067	1067	1067	1067
Fins Distance	(mm)	1.58	1.58	1.58	1.58	1.58	1.58
Number of Rows		3	3	3	3	3	3
Condenser Fan							
Quantity		10/6	12/6	14/6	12/12	14/12	14/14
Diamenter	(inch)	30	30	30	30	30	30
	(mm)	762	762	762	762	762	762
Total Airflow	(cfm)	120971	142969	158112	181371	194731	211648
	(m^3/hr)	205510	242881	268607	308120	330817	359556
Normal Fan Speed	(rpm)	950	950	950	950	950	950
Min Starting/Operating Ambinet							
Standard Unit	(F)	25	25	25	25	25	25
	(℃)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Low Ambient	(F)	0	0	0	0	0	0
	(℃)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8
General Unit							
Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a
No.of Independent		2	2	2	2	2	2
Min.load	%	15	15	15	15	15	15
Refrigerant Charge	(lb)	365/200	415/200	460/200	415/415	460/415	460/460
	(kg)	166/91	188/91	209/91	188/188	209/188	209/209
Oil Charge	(gal)	4.6/2.1	4.6/2.1	5.0/2.1	4.6/4.6	5.0/5.0	5.0/5.0
	(l)	17.4/8	17.4/8	19.0/8	17.4/17.4	19.0/19.0	19.0/19.0
Base Length	(mm)	9203 L	11023 L	11946 L	11946 L	13766 L	13766 L
		2260 W	2260 W	2260 W	2260 W	2260 W	2260 W
		2438 H	2438 H	2438 H	2438 H	2438 H	2438 H

1. Date Containing：Temperature of Inlet/onlet:12/7℃，Ambient Temperature:35℃，scaling factor:0.018 m^2·℃/kW。
2. Minimum start-up/operating ambient based on a 5 mph wind across the condenser。

Table5. General Data 140-350 Ton 50Hz Units-Extra Efficiency

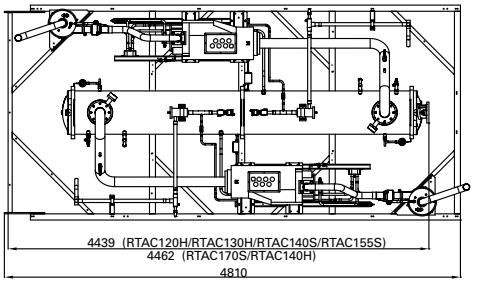
Size		140X	170X	185X	250X	275X	350X
Type		EXTRA	EXTRA	EXTRA	EXTRA	EXTRA	EXTRA
Compressor							
Quantity		2	2	2	3	3	4
Nominal	(Ton)	70/70	85/85	100/85	70/70/85	85/85/85	85/85/85/85
Evaporator							
Water Storage	(gal)	40	43	43	72	72	91
	(l)	151	163	163	273	273	344
Min. Flow	(gpm)	241	241	241	375	375	461
	(l/s)	15	15	15	24	24	29
Max. Flow	(gpm)	883	883	883	1374	1374	1690
	(l/s)	56	56	56	87	87	107
Condenser							
Quantity of Coils		4	4	4	8	8	8
Coil Length	(inch)	216/216	252/252	252/252	216/144	252/144	252/252
	(mm)	5486/5486	6401/6401	6401/6401	5486/3658	6401/3658	6401/6401
Coil Height	(inch)	42	42	42	42	42	42
	(mm)	1067	1067	1067	1067	1067	1067
Fins Distance	(mm)	1.58	1.58	1.58	1.58	1.58	1.58
Number of Rows		3	3	3	3	3	3
Condenser Fan							
Quantity		6/6	7/7	6/8	12/6	14/6	14/14
Diamenter	(inch)	30	30	30	30	30	30
	(mm)	762	762	762	762	762	762
Total Airflow	(cfm)	90687	105826	105826	142969	158112	211648
	(m^3/hr)	154063	179781	179781	242881	268607	359556
Normal Fan Speed	(rpm)	950	950	950	950	950	950
Min Starting/Operating Ambinet							
Standard Unit	(F)	25	25	25	25	25	25
	(℃)	-3.9	-3.9	-3.9	-3.9	-3.9	-3.9
Low Ambient	(F)	0	0	0	0	0	0
	(℃)	-17.8	-17.8	-17.8	-17.8	-17.8	-17.8
General Unit							
Refrigerant		R134a	R134a	R134a	R134a	R134a	R134a
No.of Independent		2	2	2	2	2	2
Min.load	%	15	15	15	15	15	15
Refrigerant Charge	(lb)	216/216	225/225	236/236	415/200	461/200	461/461
	(kg)	98/98	102/102	107/107	188/91	209/91	209/209
Oil Charge	(gal)	1.6/1.6	2.1/2.1	2.4/2.4	4.6/2.1	5.0/2.1	5.0/5.0
	(l)	6.0/6.0	8.0/8.0	9.0/9.0	17.4/8.0	19.0/8.0	19.0/19.0
Base Length	(mm)	5892 L	6810 L	6810 L	11023 L	11946 L	13766 L
		2260 W	2260 W	2260 W	2260 W	2260 W	2260 W
		2383 H	2383 H	2383 H	2438 H	2438 H	2438 H

1. Date Containing：Temperature of Inlet/onlet:12/7°C，Ambient Temperature:35°C，scaling factor:0.018 m^2·°C/kW。
2. Minimum start-up/operating ambient based on a 5 mph wind across the condenser。

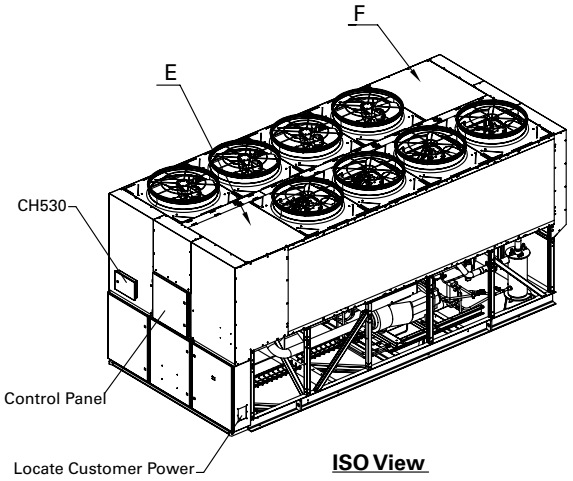
Figure3. Unit dimensions

RTAC140S/RTAC155S/RTAC170S

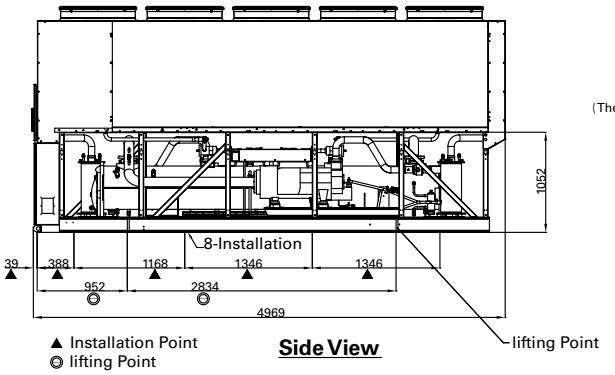
RTAC120H/130H/140H



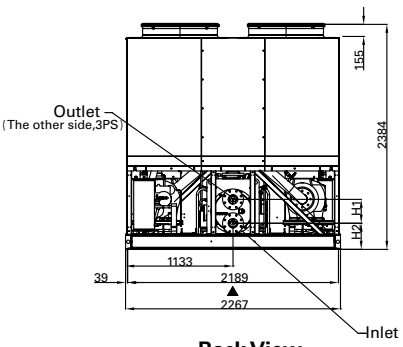
Top View(With fan /coil removed)



ISO View



Side View



Back View

MODEL		RTAC140S RTAC120H	RTAC155S RTAC130H	RTAC170S RTAC140H
FAN	QTY.	8	9	10
	Option E	NO	YES	YES
	Option F	NO	NO	YES

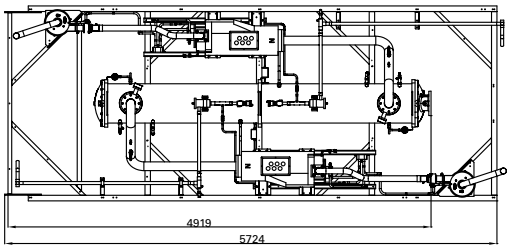
Water Connection		H1	H2	Diameter
RTAC140S RTAC155S	2PS	252	276	DN100
RTAC120H RTAC130H	3PS	255	281	DN100
RTAC170S	2PS	295	324	DN150
RTAC140H	3PS	315	314	DN100

Figure4. Unit dimensions

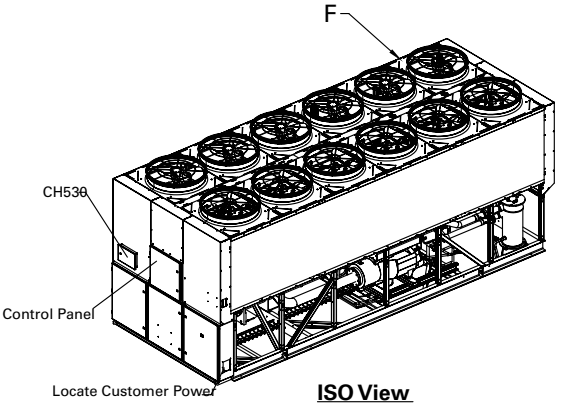
RTAC185S/RTAC200S

RTAC155H/RTAC170H

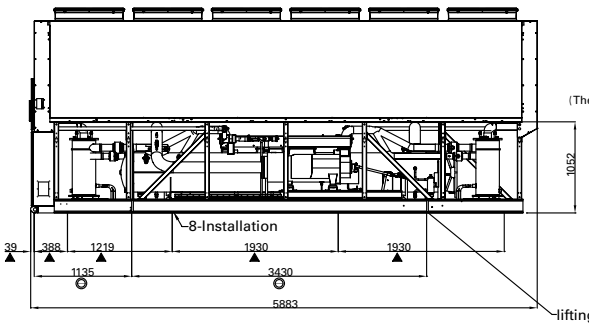
RTAC140X



Top View(With fan /coil removed)

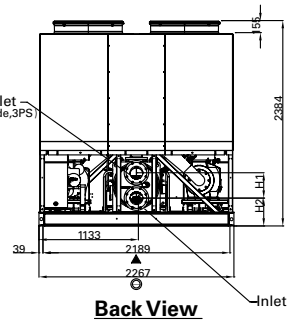


ISO View



▲ Installation Point
◎ lifting Point

Side View



Back View

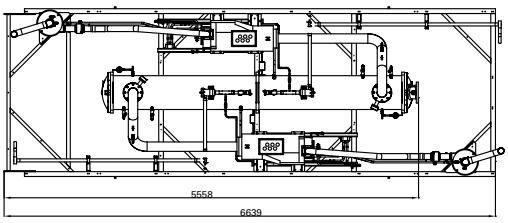
MODEL		RTAC185S RTAC155H	RTAC200S RTAC170H RTAC140X
FAN	QTY.	11	12
	Option E	NO	YES

Water Connection		H1	H2	Diameter
RTAC185S RTAC200S RTAC155H RTAC170H RTAC140X	2PS	295	324	DN150
	3PS	315	314	DN100

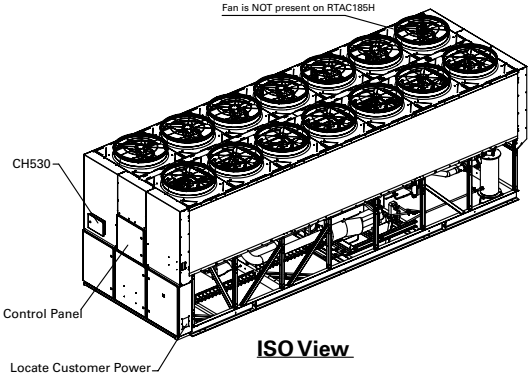
Figure5. Unit dimensions

RTAC185H/RTAC200H

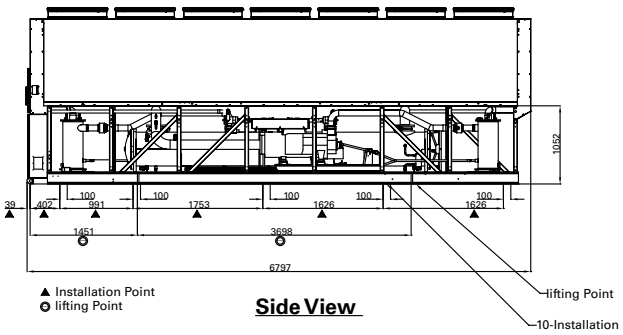
RTAC170X



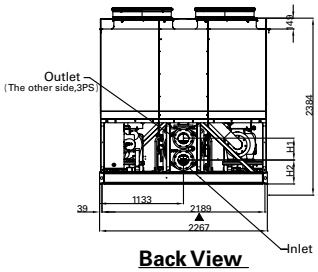
Top View(With fan /coil removed)



ISO View



Side View

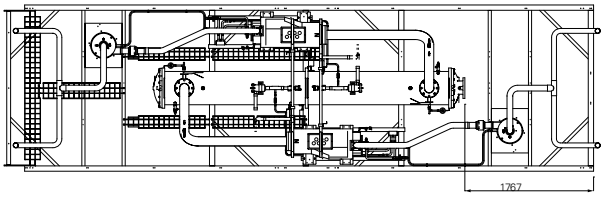


Back View

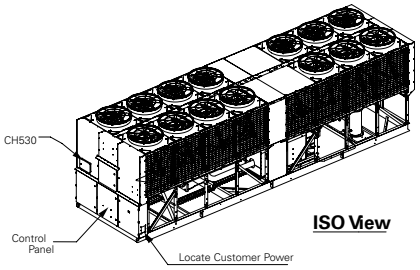
Water Connection		H1	H2	Diameter
RTAC185H RTAC200H RTAC170X	2PS	295	324	DN150
	3PS	315	314	DN100

Figure6. Unit dimensions

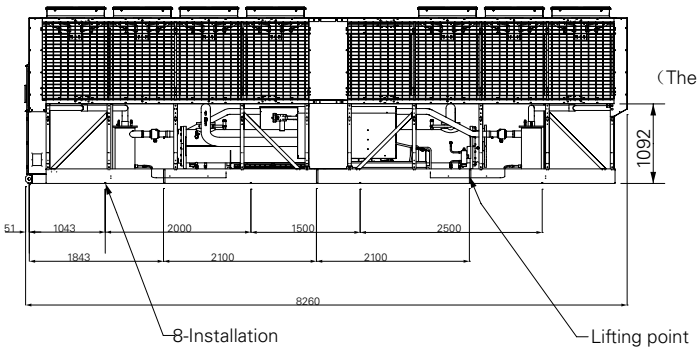
RTAC185X



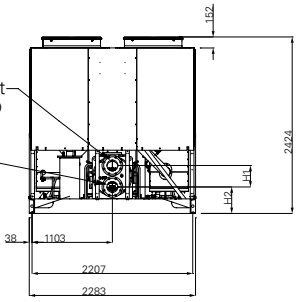
Top View(With fan /coil removed)



ISO View



Front View



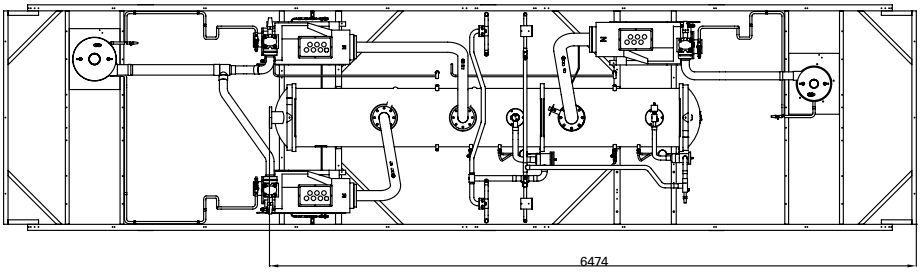
Right View

Water Connection		H1	H2	Diatemer
RTAC185X	2PS	295	364	DN150
	3PS	315	354	DN100

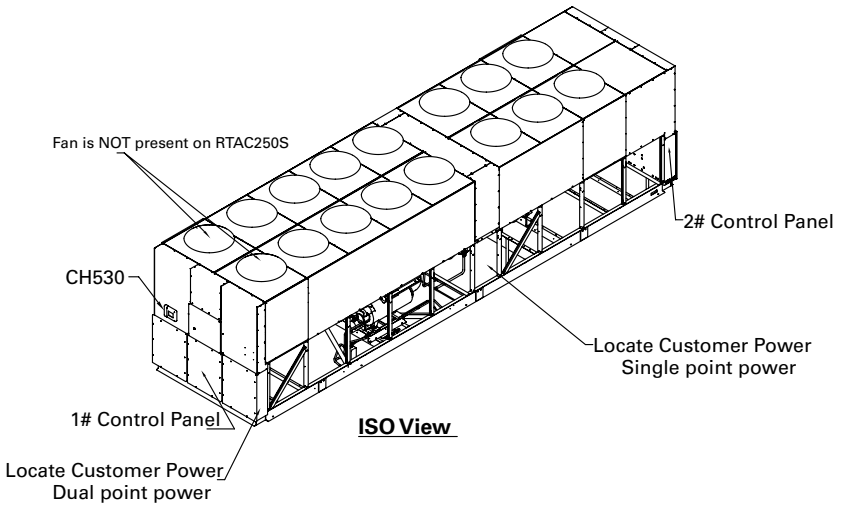
Figure7. Unit dimensions

RTAC250S/RTAC275S

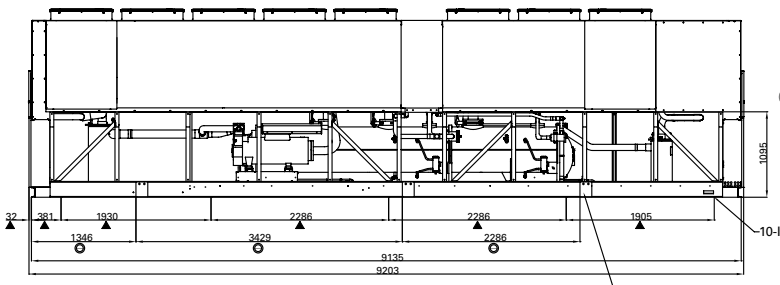
RTAC250H



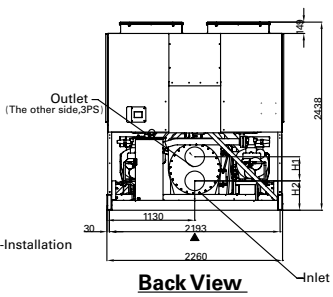
Top View(With fan /coil removed)



ISO View



Side View



Back View

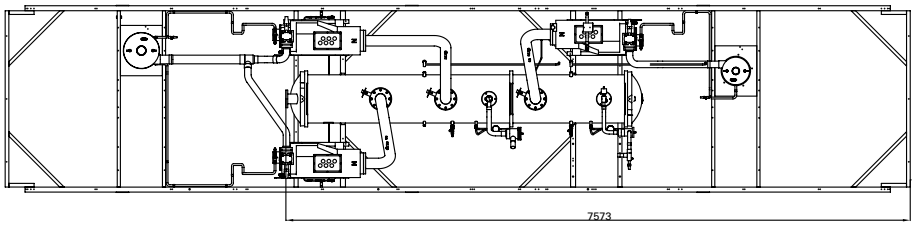
Water Connection		H1	H2	Diameter
RTAC250S RTAC275S RTAC250H	2PS	380	326	DN200
	3PS	360	336	DN150

Figure8. Unit dimensions

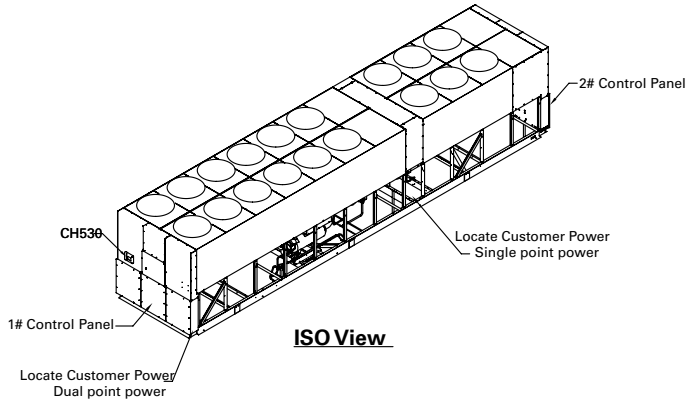
RTAC300S

RTAC275H

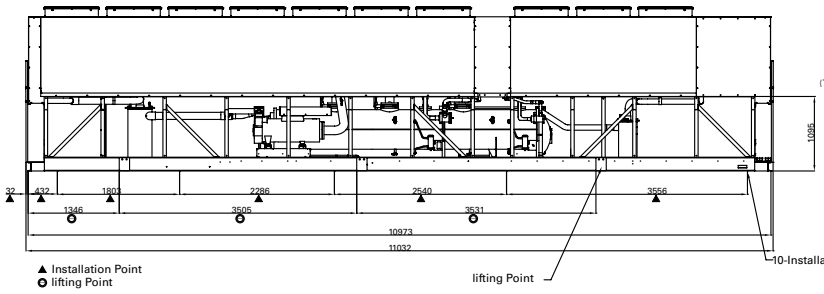
RTAC250X



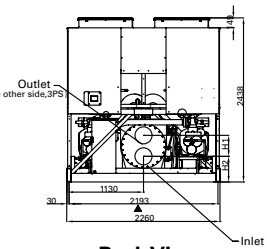
Top View(With fan /coil removed)



ISO View



Side View



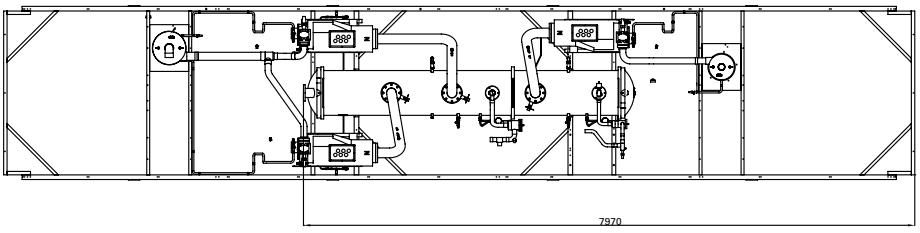
Back View

Water Connection		H1	H2	Diameter
RTAC300S RTAC275H RTAC250X	2PS	380	319	DN200
	3PS	360	329	DN150

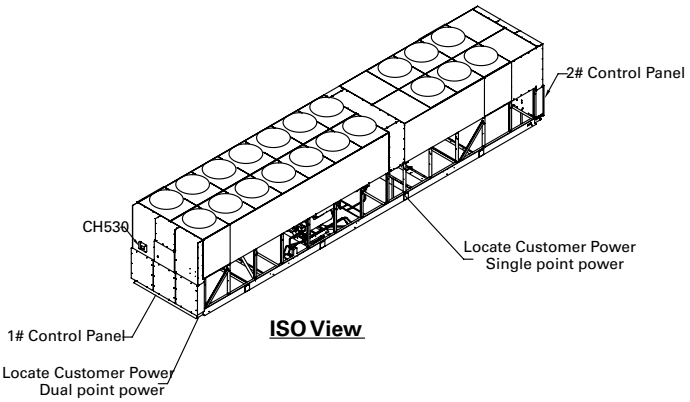
Figure9. Unit dimensions

RTAC300H

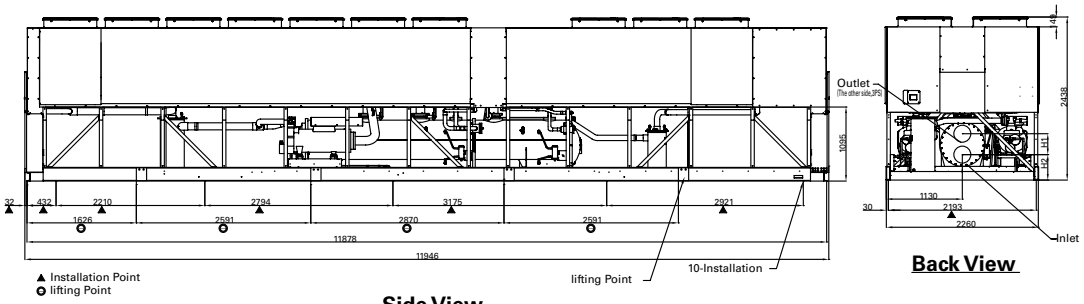
RTAC275X



Top View(With fan /coil removed)



ISO View



Side View

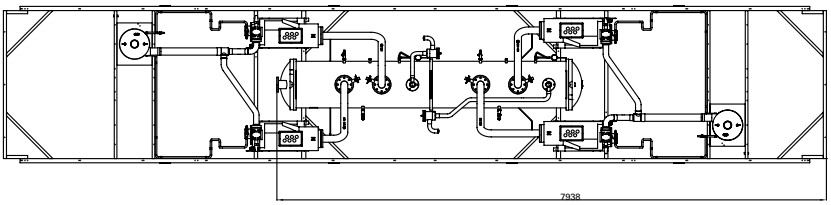
Back View

Water Connection		H1	H2	Diameter
RTAC300H RTAC275X	2PS	380	319	DN200
	3PS	360	329	DN150

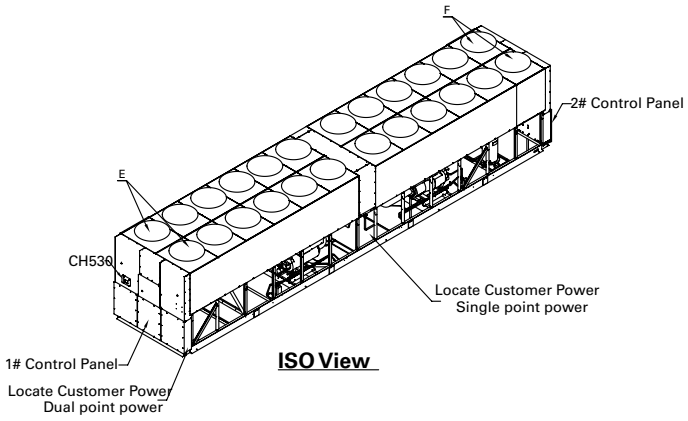
Figure10. Unit dimensions

RTAC350S/RTAC375S/RTAC400S

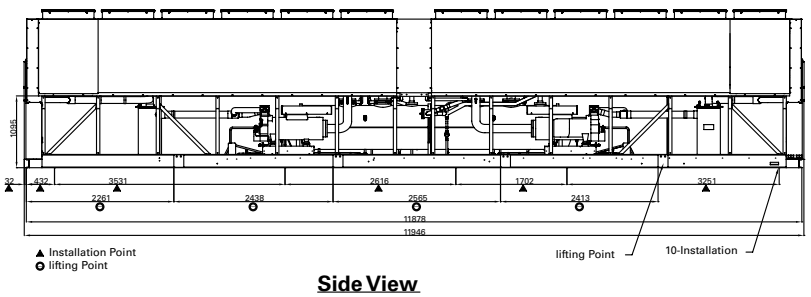
RTAC350H



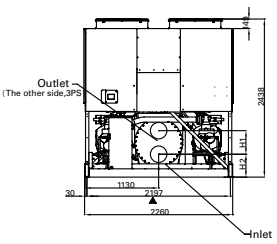
Top View(With fan /coil removed)



ISO View



Side View



Back View

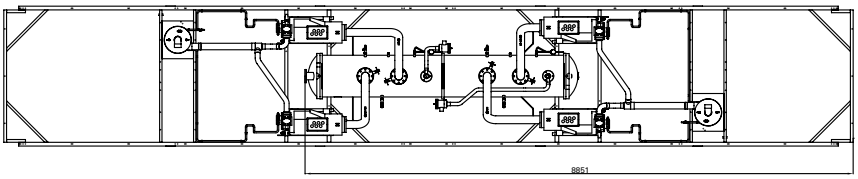
MODEL		RTAC350S	RTAC375S	RTAC350H
FAN	QTY.	13	14	14
	Option E	NO	YES	YES
	Option F	NO	NO	YES

Water Connection		H1	H2	Diameter
RTAC350S RTAC375S RTAC350H	2PS	380	305	DN200
	3PS	387	301	DN200

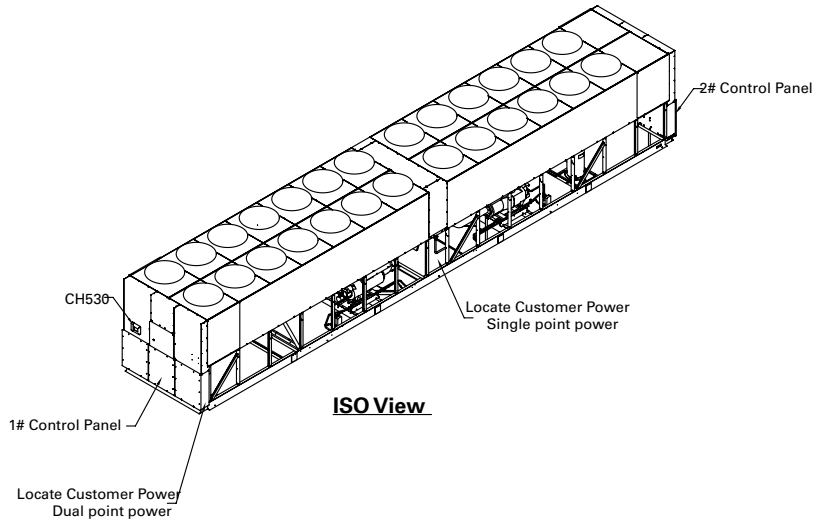
Figure11. Unit dimensions

RTAC375H/RTAC400H

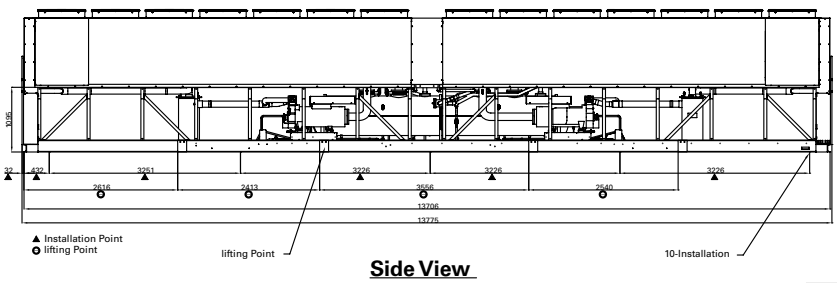
RTAC350X



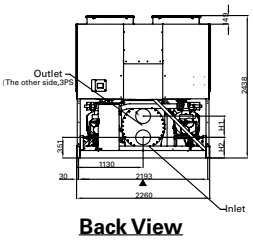
Top View(With fan /coil removed)



ISO View



Side View



Back View

Water Connection		H1	H2	Diameter
RTAC375H RTAC400H RTAC350X	2PS	380	305	DN200
	3PS	387	301	DN200

Model Number Coding System

he model numbers for the unit and the starter are composed of numbers and letters that represent features of the equipment. Shown in the following table is a sample of typical unit model number and the coding system for each.

Each position, or group of positions, in the model number is used to represent a fea¬ture. For example, in the first table, position 08 of the unit model number, Unit Voltage, contains the number "E". A "E" in this position means that the unit voltage is 380V/50Hz/3Ph.

Unit Model Number

An example of a typical unit model number is:

RTAC 200E TJ0H NLFN L1TY 1CDN NA0N N1OG ROES X

Model number digits are selected and assigned in accordance with the following definitions using the model number example shown above.

Digit 1-4 - Unit Model

RTAC = Air Cooled Series chiller

Digit 5-7 Unit Nominal Capacity

120 = 120 Nominal Tons
130 = 130 Nominal Tons
140 = 140 Nominal Tons
155 = 155 Nominal Tons
170 = 170 Nominal Tons
185 = 185 Nominal Tons
200 = 200 Nominal Tons
250 = 250 Nominal Tons
275 = 275 Nominal Tons
300 = 300 Nominal Tons
350 = 350 Nominal Tons
375 = 375 Nominal Tons
400 = 400 Nominal Tons

Digit 8-Unit Voltage

E = 380V/50Hz/3Ph
D = 400V/50Hz/3Ph

Digit 9-Manufacturing Location

T = Taicang

Digit 10, 11-Design Sequence

XX-Factory/ABU Assigned

Digit 12-Unit Type

N = Std. Efficiency/Performance
H = High Efficiency/Performance
A = Extra Efficiency/Performance

Digit 13-Agency Listing

N = No agency listing

Digit 14-Pressure Vessel Code

A = ASME pressure vessel code
L = Chinese code
D = Australian code

Digit 15-Evaporator Temperature Range & Application Type

F = Standard Temp. with Frz Prot
G = Low Temp(<40F), with Frz Prot
C = Standard Temp. no Frz Prot

Digit 16-Evaporator Configuration

N = Standard pass arrangement, 2PS insulated
P = 3PS, insulated

Digit 17-Condenser Temperature Range

N = Standard ambient range ,25-115 deg F

H = High ambient capability ,25-125 deg F

L = Low ambient capability ,0-115 deg F

W = Wide ambient capability ,0-125 deg F

Digit 18-Condenser Fin Material

1 = Standard aluminum slit fins

2 = Copper fins, non-slit fins

4 = Complete Coat aluminum fins

Digit 19-Condenser Fan/ Motor Configuration

W = WLow Noise fans

T = Condenser fans with TEAO motors

Digit 20-Compressor Motor Starter Type

Y = Wye-delta closed transition

Digit 21-Incoming Power Line Connection

1 = Single point power connection

2 = Dual point power connection (1/ckt)

Digit 22-Power Line Connection Type

T = Terminals only

C = Circuit Breaker(s)

D = Non-fused disconnect switch(es)

Digit 23-Unit Operator Interface

D = Dyna-View operator interface

Digit 24-Remote Interface

N = No remote interface

L = LonTalk Communication interface (LCI)

M = LonTalk LCI-C w/modbus

B = BACnet

Digit 25-Control Input Accessories/ Options

N = No remote input

R = Remote leaving water temp stpt

C = Remote current limit setpoint

B = Remote lvg. temp.setpoint and remote current limit setpoint

Digit 26-Control Output Accessories/ Options

A = Alarm relay

D = Icemaking and alarm relay

Digit 27-Short Circuit Rating

0 = No short circuit ,withstand rating

Digit 28-Electrical Accessories and Export Packing

N = No flow switches

F = NEMA-4 flow switch - 150 psi

Digit 29-Control Panel Accessories

N = No convenience outlet

Digit 30-Refrigerant Service Valves

1 = Suction service valves

Digit 31-Compressor Sound Attenuator Option

0 = No sound attenuator

1 = Factory installed sound attenuator

2 = Factory installed Compressor and Pipe Sound Attenuator

Digit 32-Appearance Options

N = No appearance options

A = Architectural louvered panels

C = Half Louvers

G = Access guards

B = Access guards and half louvers

T = Thermoplastic Package

Digit 33-Installation Accessories

N = No installation accessories

R = Neoprene isolators

Digit 34-Factory Test

0 = factory run test

E = Performance test

C = Witness test

Digit 35-Label, and Literature Language

E = English

G = Chinese

Digit 36-Special Order

X = Standard catalog configuration

S = Unit has special order feature

Digit 37-Safety Devices

N = none

X = Standard

Installation - Mechanical

Installation Responsibilities

Generally, the contractor must do the following when installing an RTAC unit:

- Install unit on a flat foundation, level (within 1/4” [6 mm] across the length and width of the unit), and strong enough to support unit loading.
- Install unit per the instructions contained in the Installation-Mechanical and Installation-Electrical sections of this manual.
- Install any optional sensors and make electrical connections at the CH530.
- Where specified, provide and install valves in water piping upstream and downstream of evaporator water connections to isolate the evaporator for maintenance, and to balance/trim system.
- Furnish and install flow switch to prove chilled water flow.
- Furnish and install pressure gauges in inlet and outlet piping of the evaporator.
- Furnish and install a drain valve to the bottom of the evaporator waterbox.
- Supply and install a vent cock to the top of the evaporator waterbox.
- Furnish and install strainers ahead of all pumps and automatic modulating valves, and at inlet of evaporator.
- Provide and install field wiring.
- Install heat tape and insulate the chilled water lines and any other portions of the system, as required, to prevent sweating under normal operating conditions or freezing during low ambient temperature conditions.
- Start unit under supervision of a qualified service technician.

Nameplates

The RTAC outdoor unit nameplates (Figure 1) are applied to the exterior of the Control Panel. A compressor nameplate is located on each compressor.

Outdoor Unit Nameplate

The outdoor unit nameplate provides the following information:

- Unit model and size description.
- Unit serial number.
- Identifies unit electrical requirements.
- Lists correct operating charges of R-134a and refrigerant oil (Trane OIL00048).
- Lists unit test pressures.
- Identifies installation, operation and maintenance and service data literature (Pueblo).
- Lists drawing numbers for unit wiring diagrams (Pueblo).

Compressor Nameplate

The compressor nameplate provides following information:

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

Storage

Extended storage of the outdoor unit prior to installation requires the following pre¬cautionary measures:

1. Store the outdoor unit in a secure area.
2. At least every three months (quarterly), check the pressure in the refrigerant cir¬cuits to verify that the refrigerant charge is intact. If it is not, contact a qualified service organization and the appropriate Trane sales office.
3. Close the discharge and liquid line isolation valves.

General

Report any damage incurred during handling or installation to the Trane sales office immediately.

Location Requirements

A base or foundation is not required if the selected unit location is level and strong enough to support the unit’s operating weight as listed in Table 1 through Table 4 in the General Information section.

See Table 5 for lifting weights and center of gravity (CG) dimensions.

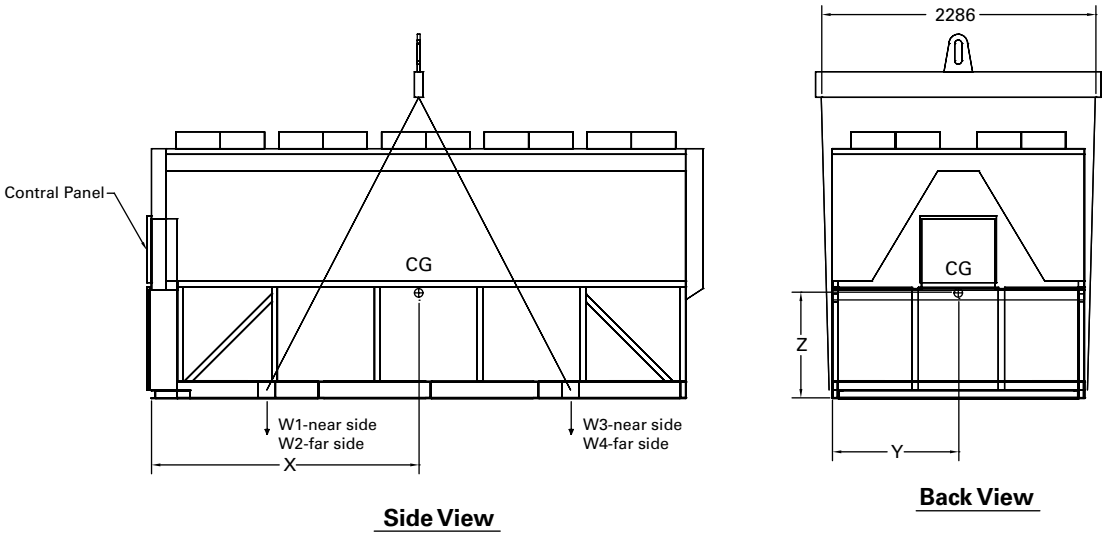


Figure12. 1-Lifting the Unit (Package and Remote) 15-21-foot Base

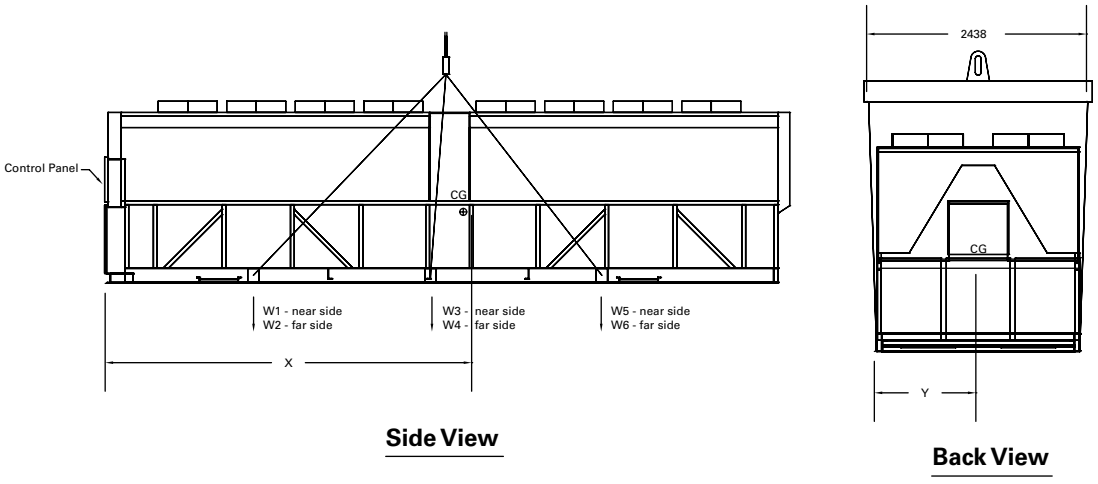


Figure11. 2-Lifting the Unit (Package and Remote) 30-36-foot Base

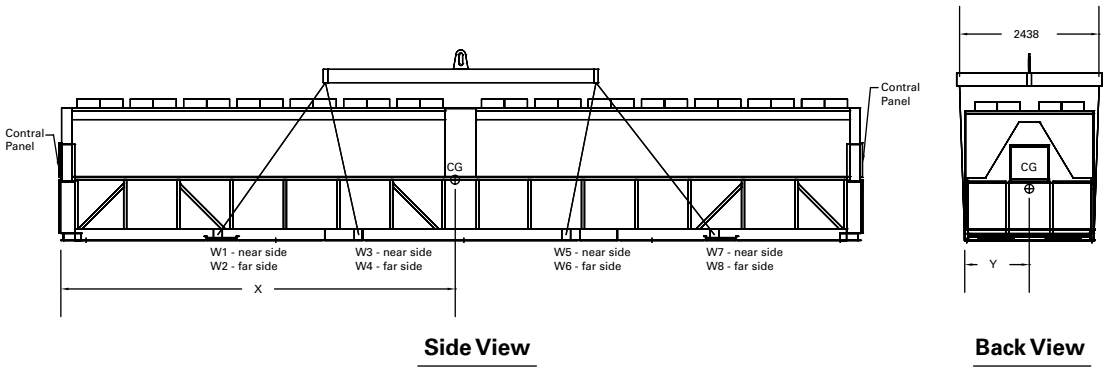


Figure11. 3-Lifting the Unit 39-45-foot Base

1. Lifting chains/cables will not be the same length. Adjust to keep unit level while lifting.
2. Do not fork lift unit.
3. Weights are typical for units with R-134a charge.

Isolation and Sound Emission

The most effective form of isolation is to locate the unit away from any sound sensi-tive area. Structurally transmitted sound can be reduced by elastomeric vibration elim¬inators. Spring isolators are not recommended. Consult an acoustical engineer in critical sound applications.

For maximum isolation effect, isolate water lines and electrical conduit. Wall sleeves and rubber isolated piping hangers can be used to reduce the sound transmitted through water piping. To reduce the sound transmitted through electrical conduit, use flexible electrical conduit.

State and local codes on sound emissions should always be considered. Since the environment in which a sound source is located affects sound pressure, unit place-ment must be carefully evaluated. Sound power levels for Trane air-cooled Series R® chillers are available on request.

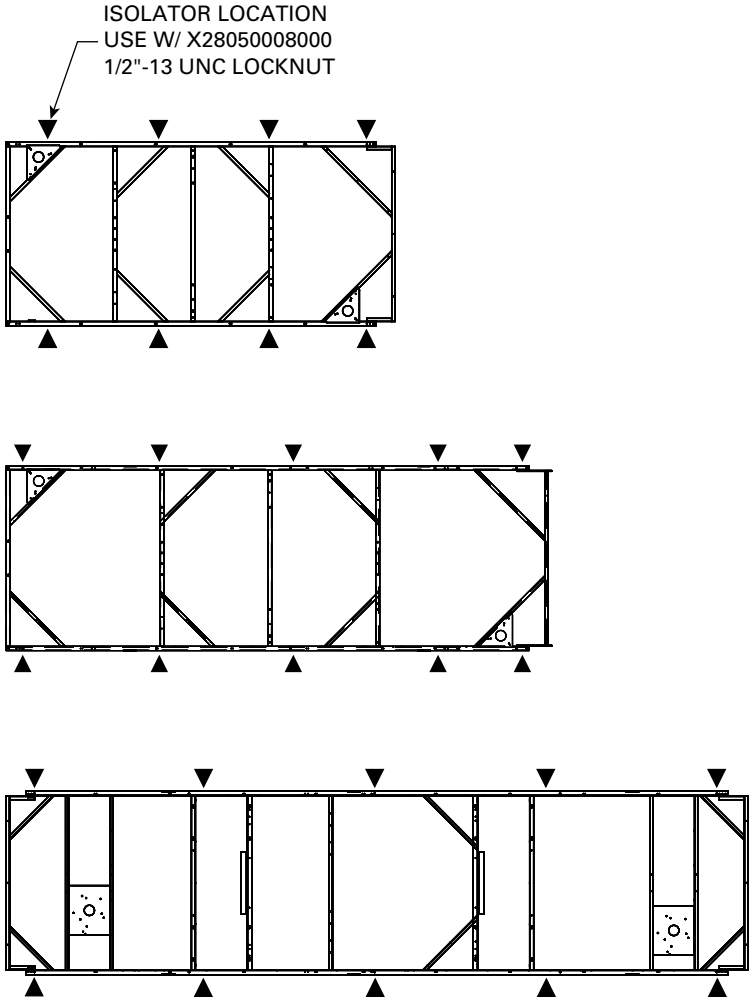


Figure13. Unit Isolator Locations

Table6. Lifting Weights and CG Dimensions (Refer to Figure 11)

Unit	W1 (kg)	W2 (kg)	W3 (kg)	W4 (kg)	W5 (kg)	W6 (kg)	W7 (kg)	W8 (kg)	Shipping Weight (kg)	Xcg (mm)	Ycg (mm)
Aluminum Fins											
120Ton-High Eff	1128	1297	1210	1361					4996	2245	1140
130Ton-High Eff	1180	1307	1267	1376					5130	2243	1120
140Ton-Std Eff	1128	1297	1210	1361					4996	2245	1140
140Ton-High Eff	1134	1303	1218	1369					4949	2245	1140
140Ton-Etra Eff	1501	1688	1252	1439					5880	2695	1140
155Ton-Std Eff	1180	1307	1267	1376					5130	2243	1120
155Ton-High Eff	1488	1628	1246	1386					5748	2695	1123
170Ton-Std Eff	1179	1356	1287	1441					5263	2256	1138
170Ton-High Eff	1501	1688	1252	1439					5880	2695	1140
170Ton-Etra Eff	1714	1928	1440	1655					6737	3147	1140
185Ton-Std Eff	1516	1707	1245	1436					5904	2682	1140
185Ton-High Eff	1655	1905	1412	1661					6633	3160	1153
185Ton-Etra Eff	1136	1206	1008	1189	1222	974			6740	4054	1134
200Ton-Std Eff	1529	1719	1283	1473					6003	2697	1138
200Ton-High Eff	1714	1928	1440	1655					6737	3147	1140
250Ton-Std Eff	1340	1145	1470	1275	1557	1362			8149	4623	1046
250Ton-High Eff	1526	1330	1539	1344	1557	1362			8657	4483	1052
250Ton-Etra Eff	1545	1361	1675	1491	1805	1621			9498	5128	1064
275Ton-Std Eff	1665	1450	1579	1346	1524	1306			8888	4376	1046
275Ton-High Eff	1545	1361	1675	1491	1805	1621			9498	5128	1064
275Ton-Etra Eff	1342	1193	1313	1164	1281	1133	1253	1104	9783	5644	1059
300Ton-Std Eff	1511	1394	1618	1431	1726	1540			9222	5100	1059
300Ton-High Eff	1342	1193	1313	1164	1281	1133	1253	1104	9783	5644	1059
350Ton-Std Eff	1370	1361	1332	1323	1291	1282	1253	1244	10456	5956	1125
350Ton-High Eff	1488	1479	1443	1434	1396	1387	1352	1342	11321	5951	1125
350Ton-Etra Eff	1519	1485	1533	1499	1555	1521	1570	1536	12218	6957	1115
375Ton-Std Eff	1511	1496	1414	1400	1313	1298	1217	1202	10852	5827	1123
375Ton-High Eff	1541	1531	1488	1478	1411	1401	1356	1346	11552	6754	1125
400Ton-Std Eff	1498	1488	1453	1444	1406	1397	1362	1334	11383	5951	1125
400Ton-High Eff	1519	1485	1533	1499	1555	1521	1570	1536	12218	6957	1115

Table6. Lifting Weights and CG Dimensions (Refer to Figure 11)

Unit	W1 (kg)	W2 (kg)	W3 (kg)	W4 (kg)	W5 (kg)	W6 (kg)	W7 (kg)	W8 (kg)	Shipping Weight (kg)	Xcg (mm)	Ycg (mm)
Copper Fins											
120Ton-High Eff	1343	1565	1539	1717					6164	2286	1140
130Ton-High Eff	1394	1575	1596	1732					6297	2286	1125
140Ton-Std Eff	1343	1565	1539	1717					6164	2286	1140
140Ton-High Eff	1348	1571	1547	1726					6192	2289	1140
140Ton-Etra Eff	1839	2081	1635	1876					7431	2743	1140
155Ton-Std Eff	1394	1575	1596	1732					6297	2286	1125
155Ton-High Eff	1827	2020	1629	1823					7299	2743	1128
170Ton-Std Eff	1393	1624	1616	1798					6431	2296	1140
170Ton-High Eff	1839	2081	1635	1876					7431	2743	1140
170Ton-Etra Eff	2138	2420	1916	2198					8672	3200	1140
185Ton-Std Eff	1854	2100	1628	1873					7455	2733	1140
185Ton-High Eff	2080	2396	1888	2204					8568	3211	1151
185Ton-Etra Eff	1443	1532	1280	1510	1551	1237			8553	4050	1134
200Ton-Std Eff	1867	2111	1666	1910					7554	2746	1140
200Ton-High Eff	2138	2420	1916	2198					8672	3200	1140
250Ton-Std Eff	1605	1409	1779	1583	1895	1700			9971	4638	1062
250Ton-High Eff	1954	1758	1901	1705	1866	1670			10855	4422	1067
250Ton-Etra Eff	1982	1797	2097	1912	2212	2027			12027	5070	1077
275Ton-Std Eff	2093	1878	1941	1725	1842	1624			11104	4338	1062
275Ton-High Eff	1982	1797	2097	1912	2212	2027			12027	5070	1077
275Ton-Etra Eff	1742	1592	1675	1526	1601	1451	1534	1385	12505	5575	1074
300Ton-Std Eff	1980	1792	2032	1845	2085	1899			11633	4999	1074
300Ton-High Eff	1742	1592	1675	1526	1601	1451	1534	1385	12505	5575	1074
350Ton-Std Eff	1715	1705	1668	1659	1619	1610	1573	1563	13113	5961	1125
350Ton-High Eff	1895	1885	1840	1930	1783	1773	1729	1719	14453	5956	1125
350Ton-Etra Eff	1971	1936	1983	1948	2000	1966	2013	1978	15795	6939	1118
375Ton-Std Eff	1967	1951	1809	1793	1643	1627	1486	1471	13747	5761	1123
375Ton-High Eff	2044	2034	1927	1916	1754	1744	1631	1620	14669	6632	1125
400Ton-Std Eff	1904	1894	1850	1840	1793	1783	1740	1730	14534	5956	1125
400Ton-High Eff	1971	1936	1983	1948	2000	1966	2013	1978	15795	6939	1118

Table7. Unit Isolators

Tons	Efficiency	Condenser Fin Materal	Isolator Part Number	Quantity
120Ton	High	AL	X10140305620	8
		CU		
130Ton	High	AL	X10140305620	8
		CU		
140Ton	Std	AL	X10140305620	8
		CU		
	High	AL		
		CU		
	Extra	AL		
		CU		
155Ton	Std	AL	X10140305620	8
		CU		
	High	AL		
		CU		
170Ton	Std	AL	X10140305620	8
		CU		
	High	AL		
		CU		
	Etra	AL		10
		CU		
185Ton	Std	AL	X10140305620	8
		CU		
	High	AL		10
		CU		
	Etra	AL	X10140305630	
		CU		
200Ton	Std	AL	X10140305620	8
		CU		
	High	AL		10
		CU		
250Ton	Std	AL	X10140305630	10
		CU		
	High	AL	X10140305640	
		CU		
	Etra	AL		
		CU		
275Ton	Std	AL	X10140305640	10
		CU		
	High	AL		
		CU		
	Etra	AL		
		CU		
300Ton	Std	AL	X10140305640	10
		CU		
	High	AL		
		CU		

Table7. Unit Isolators

Tons	Efficiency	Condenser Fin Materal	Isolator Part Number	Quantity
350Ton	Std	AL	X10140305640	10
		CU		
	High	AL		
		CU		
	Etra	AL		
		CU		
375Ton	Std	AL	X10140305640	10
		CU		
	High	AL		
		CU		
400Ton	Std	AL	X10140305640	10
		CU		
	High	AL		
		CU		

Foundation

Provide rigid, non-warping mounting pads or a concrete foundation of sufficient strength and mass to support the outdoor unit operating weight (i.e., including completed piping, and full operating charges of refrigerant, oil and water). Refer to table 5 for unit shipping weights. Once in place, the outdoor unit must be level within 1/ 4" (6 mm) over its length and width.The Trane Company is not responsible for equipment problems resulting from an improperly designed or constructed foundation.

CAUTION: *To allow for cleaning under the condensing coil, it is recommended that an opening be left between the unit base and the concrete pad.*

Clearances

Provide enough space around the outdoor unit to allow the installation and maintenance personnel unrestricted access to all service points. Refer to submittal drawings for the unit dimensions. A minimum of 4 feet (1.2 m) is recommended for compressor service. Provide sufficient clearance for the opening of control panel doors. Refer to Figure 18 through Figure 19 for minimum clearances. In all cases, local codes which require additional clearances will take precedence over these recommendations.

Unobstructed flow of condenser air is essential to maintain chiller capacity and oper¬ating efficiency. When determining unit placement, give careful consideration to assuring a sufficient flow of air across the condenser heat transfer surface. Two detri¬mental conditions are possible and must be avoided if optimum performance is to be achieved: warm air recirculation and coil starvation.

Warm air recirculation occurs when discharge air from the condenser fans is recycled back to the condenser coil inlet. Coil starvation occurs when free airflow to (or from) the condenser is restricted.

Both warm air recirculation and coil starvation cause reduction in unit efficiency and capacity due to the increased head pressures.

Debris, trash, supplies etc. should not be allowed to accumulate in the vicinity of the unit. Supply air movement may draw debris into the condenser coil, blocking spaces between coil fins and causing coil starvation. Special consideration should be given to low ambient units. Condenser coils and fan discharge must be kept free of snow or other obstructions to permit adequate airflow for satisfactory unit operation.

In situations where equipment must be installed with less clearance than recom¬mended, such as frequently occurs in retrofit and rooftop applications, restricted air¬flow is common. The Main Processor will direct the unit to make as much chilled water as possible given the actual installed conditions. Consult your Trane sales engi-neer for more details.

CAUTION: *If the outdoor unit configuration requires a variance to the clearance dimen-sions, contact your Trane Sales Office Representative. Also refer to Trane Engineering Bulletins for application information on RTAC chillers.*

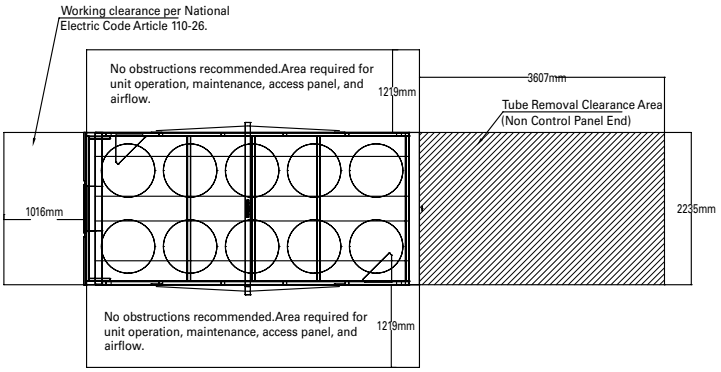


Figure 13.1-Recommended Unit Clearances 15-foot bases

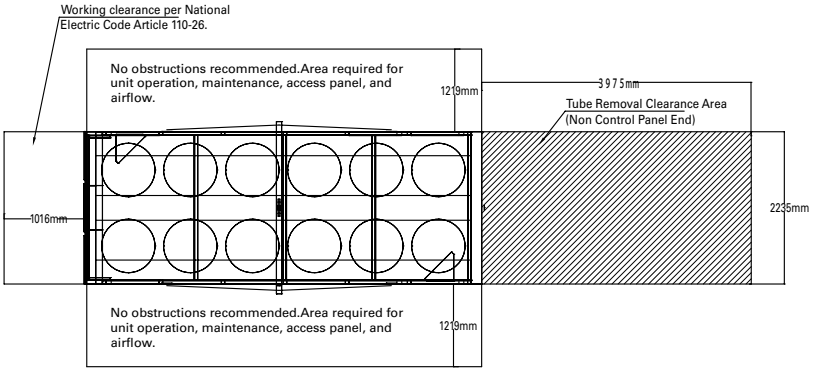


Figure 13.2-Recommended Unit Clearances 15-21-foot bases

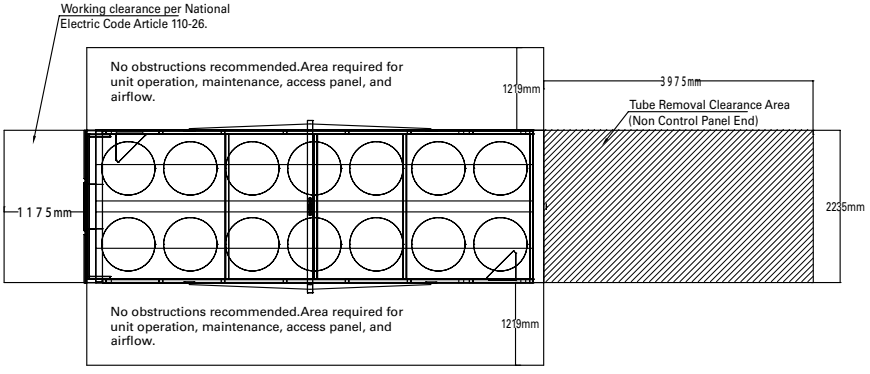


Figure 13.3-Recommended Unit Clearances 30-45-foot bases

Figure14. Recommended Unit Clearances

Unit Isolation and Leveling

For additional reduction of sound and vibration, install the optional neoprene isolators. Construct an isolated concrete pad for the unit or provide concrete footings at the 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-in (6 mm) over the entire length and width. Use shims as necessary to level the unit.

Neoprene Isolator Installation

1. Secure the isolators to the mounting surface using the mounting slots in the iso¬lator base plate. 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 onto the isolators and secure the isolator to the unit with a nut. Maximum isolator deflection should be 1/4 inch (6 mm).
4. Level the unit carefully. Fully tighten the isolator mounting bolts.

Drainage

Provide a large capacity drain for water vessel drain-down during shutdown or repair. The evaporator is provided with a drain connection. All local and national codes apply. The vent on the top of the evaporator waterbox is provided to prevent a vacuum by allowing air into the evaporator for complete drainage.

Evaporator Water Piping

Thoroughly flush all water piping to the unit before making the final piping connec-tions to the unit.

Evaporator Piping

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

⚠ CAUTION

Evaporator Damage!

The chilled water connections to the evaporator are to be” Victaulic” type connections. Do not attempt to weld these connections, as the heat generated from welding can cause microscopic and macroscopic fractures on the cast iron waterboxes that can lead to premature failure of the

waterbox. To prevent damage to chilled water components, do not allow evaporator pressure (maximum working pressure) to exceed 150 psig (10.5 bar).

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 enter¬ing 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.

⚠ CAUTION

Use Piping Strainers!

To prevent evaporator damage, pipe strainers must be installed in the water supplies to protect components from water born debris. Trane is not responsible for equipment-only-damage caused by water born debris.

"Piping components" include all devices and controls used to provide proper water system operation and unit operating safety. These components and their general loca-tions are given below.

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).
- Clean-out tees.
- Pipe strainer.

Leaving Chilled Water Piping

- Air vents (to bleed air from system).
- Water pressure gauges with shutoff valves. Vibration eliminators.
- Shutoff (isolation) valves.
- Thermometers.
- Clean-out tees.
- Balancing valve.
- Flow Switch

Evaporator Drain

A 1/2 inch drain connection is located under the outlet end of the evaporator waterbox. This may be connected to a suitable drain to permit evaporator drainage during unit servicing. A shutoff valve must be installed on the drain line.

Evaporator Flow Switch

Specific connection and schematic wiring diagrams are shipped with the unit. Some piping and control schemes, particularly those using a single water pump for both chilled and hot water, must be analyzed to determine how and or if a flow sensing device will provide desired operation.

Follow the manufacturer' s recommendations for selection and installation proce¬dures. General guidelines for flow switch installation are outlined below.

1. Mount the switch upright, with a minimum of 5 pipe diameters of straight hori-zontal run on each side. Do not install close to elbows, orifices or valves.

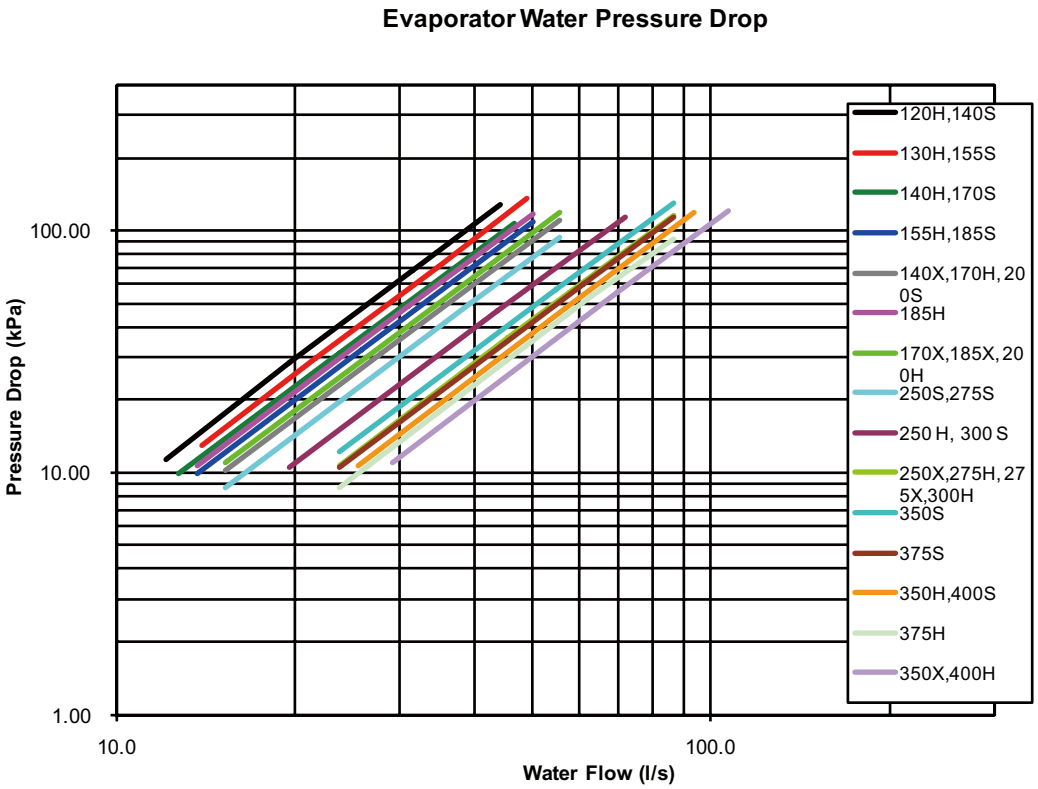
NOTE: *The arrow on the switch must point in the direction of flow.*

2. To prevent switch fluttering, remove all air from the water system.

NOTE: *The CH530 provides a 6-second time delay after a "loss-of-flow" diagnostic before shutting the unit down. Contact a qualified service representative if nuisance machine shutdowns persist.*

3. Adjust the switch to open when water flow falls below the minimum flow rate.
   Evaporator data is given in the General Information section. Flow switch contacts are closed on proof of water flow.
4. Install a pipe strainer in the entering evaporator water line to protect components from waterborne debris.

Figure15. Evaporator Water Pressure Drop RTAC120-400Ton



⚠ CAUTION

Proper Water Treatment!

The use of untreated or improperly treated water in a unit 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.

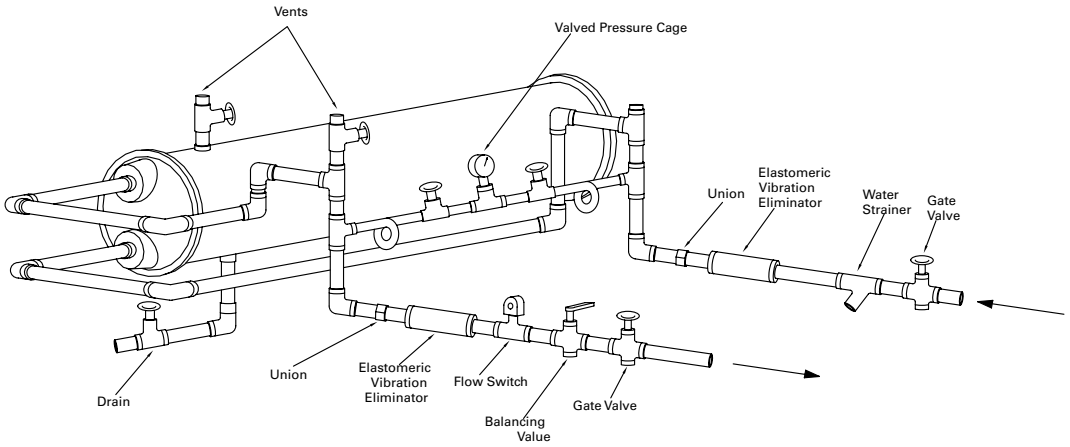
If using an acidic commercial flushing solution, construct a temporary bypass around the unit to prevent damage to internal components of the evaporator.

Dirt, scale, products of corrosion and other foreign material will adversely affect heat transfer between the water and system components. Foreign matter in the chilled water system can also increase pressure drop and, consequently, reduce water flow. Proper water treatment must be determined locally, depending on the type of system and local water characteristics.

Water Pressure Gauges

Install field-supplied pressure components as shown in Figure 15. Locate pressure gauges or taps in a straight run of pipe; avoid placement near elbows, etc. Be sure to install the gauges at the same elevation on each shell if the shells have opposite-end water connections.

Figure16. Suggested Piping for Typical RTAC Evaporator



NOTE: *Once the unit is installed at a site, one vertical or one diagonal unit support can be permanently removed if it creates an obstruction for water piping.*

To read manifolded pressure gauges, open one valve and close the other (depending upon the reading desired). This eliminates errors resulting from differently calibrated gauges installed at unmatched elevations.

Water Pressure Relief Valves

⚠ CAUTION

Shell Damage!

To prevent shell damage, install pressure relief valves in the evaporator water system.

Install a water pressure relief valve in the evaporator inlet piping between the evapo¬rator and the inlet shutoff valve, as shown in Figure 15. Water vessels with close-cou¬pled shutoff valves have a high potential for hydrostatic pressure buildup on a water temperature increase. Refer to applicable codes for relief valve installation guidelines.

Freeze Protection

If the unit will remain operational at subfreezing ambient temperatures, the chilled water system must be protected from freezing. Heaters are factory-installed on the packaged unit evaporator and will help protect it from freezing in ambient tempera-tures down to -20° F (-29° C).

Install heat tape on all water piping, pumps, water box nozzles 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.

Add a non-freezing, low temperature, corrosion inhibiting, heat transfer fluid may also be added to the chilled water system. The solution must be strong enough to provide protection against ice formation at the lowest anticipated ambient temperature. Refer to Table 1 through Table 4in the General Information section for evaporator water storage capacities.

NOTE: *Use of glycol type antifreeze reduces the cooling capacity of the unit and must be considered in the design of the system specifications.*

⚠ CAUTION

Evaporator Damage!

ALL unit chilled water pumps must be controlled by the Trane CH530 to avoid catastrophic damage to the evaporator due to freezing.

Low Evaporator Refrigerant Cutout and % Glycol Recommendations

1. Solution freeze point is 4 deg F below operating point saturation temperature.
2. LRTC is 4 deg F below freeze point.

Procedure

1. Is operating condition contained within Table 7?If no see “Special” below.
2. For leaving fluid temperatures greater than 40 deg F, use settings for 40 degF.
3. Select operating conditions from Table 7.
4. Read off recommended % glycol.
5. Go to Table 8. From the % glycol.

Table8. Glycol Recommendations

		Ethylene Glycol %							Propylene Glycol %						
℃		-15	-14	-13	-12	-11	-10	-9	-15	-14	-13	-12	-11	-10	-9
Leaving Water Temperature (F/C)	3	—	5	5	5	5	6	—	—	6	6	7	7	8	—
	1	—	11	11	11	12	—	—	—	13	13	15	17	—	—
	-1	—	15	16	17	18	—	—	—	19	21	—	—	—	—
	-2	—	18	18	19	—	—	—	—	22	—	—	—	—	—
	-3	—	20	21	22	—	—	—	—	25	—	—	—	—	—
	-4	—	22	23	26	—	—	—	—	—	—	—	—	—	—
	-6	—	24	26	—	—	—	—	—	—	—	—	—	—	—
	-7	—	26	30	—	—	—	—	—	—	—	—	—	—	—
	-8	—	29	—	—	—	—	—	—	—	—	—	—	—	—
	-9	—	31	—	—	—	—	—	—	—	—	—	—	—	—
	-10	30	—	—	—	—	—	—	—	—	—	—	—	—	—
	-11	32	—	—	—	—	—	—	—	—	—	—	—	—	—
	-12	34	—	—	—	—	—	—	—	—	—	—	—	—	—

These tables represent the MINIMUM RECOMMENDED glycol percentages for each operating condition.

Operation is not recommended at certain operating conditions as some chillers may not satisfy maximum or minimum velocity requirements or minimum performance requirements. Contact Trane Sales Representative for more information regarding the operating limits of a particular chiller.

Table9. Recommended Low Evaporator Refrigerant Cutout and % Glycol

	Ethylene Glycol		Propylene Glycol	
% Glycol	Low Refrig. Temp Cutout ℃	Solution Freeze Point ℃	Low Refrig. Temp Cutout ℃	Solution Freeze Point ℃
0	-2.2	0.0	-2.2	0.0
5	-3.9	-1.7	-3.7	-1.5
10	-5.8	-3.6	-5.3	-3.1
15	-8.1	-5.8	-7.2	-4.9
20	-10.7	-8.4	-11.8	-7.1
25	-13.7	-11.4	-14.8	-9.6
30	-17.2	-15.0	-19.5	-12.6
35	-20.6	-19.0	-20.6	-16.3
40	-20.6	-23.8	-20.6	-20.7
45	-20.6	-29.3	-20.6	-25.9
50	-20.6	-35.6	-20.6	-32.1
54	-20.6	-41.3	-20.6	-37.8

Chilled Water Temperature Cutout should be set to 5F below the lowest allowable Chilled Water Set Point bases on the %Glycol.

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 and in Table 9 though Table 11. See the unit order specifications for actual electrical data. Specific electrical schematics and connection diagrams are shipped with the unit.

⚠ WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer¡¯s literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all

capacitors have discharged. Failure to disconnect power and discharge capacitors 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.

Important!

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.

Caution:

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

Table10. Unit Electrical Data for Std. Efficiency at All Ambient Operation

						Motor Data							
						Compressor (Each)				Fans (Each)			
Unit Size	Rated Voltage	Power Conns	MCA (3) Ckt1/ Ckt2	Max. Fuse, HACR Breaker or MOP (11) Ckt1/ Ckt2	Rec. Time Delay or RDE (4) Ckt1/ Ckt2	Qty	RLA (5) Ckt1/ Ckt2	XLRA (8) Ckt1/ Ckt2	YLRA (8) Ckt1/ Ckt2	Qty. Ckt1/ Ckt2	kW	FLA	Control VA (7)
140	380/50/3	1	333	450	400	2	145/145	796/796	259/259	8	0.9	2.8	0.83
	380/50/3	2	184/184	300/300	250/250	2	145/145	796/796	259/259	4/4	0.9	2.8	0.83
155	380/50/3	1	373	500	450	2	177/145	896/796	291/259	9	0.9	2.8	0.83
	380/50/3	2	224/184	350/300	300/250	2	177/145	896/796	291/259	5/4	0.9	2.8	0.83
170	380/50/3	1	406	500	450	2	177/177	896/896	291/291	10	0.9	2.8	0.83
	380/50/3	2	224/224	350/350	300/300	2	177/177	896/896	291/291	5/5	0.9	2.8	0.83
185	380/50/3	1	446	600	500	2	208/177	1089/896	354/291	11	0.9	2.8	0.83
	380/50/3	2	264/224	450/350	350/300	2	208/177	1089/896	354/291	6/5	0.9	2.8	0.83
200	380/50/3	1	479	600	600	2	208/208	1089/1089	354/354	12	0.9	2.8	0.83
	380/50/3	2	264/264	450/450	350/350	2	208/208	1089/1089	354/354	6/6	0.9	2.8	0.83
250	380/50/3	1	563	700	700	3	145/145/208	796/796/1089	259/259/354	14	0.9	2.8	1.20
	380/50/3	2	333/265	450/450	400/350	3	145/145/208	796/796/1089	259/259/354	8/6	0.9	2.8	1.20
275	380/50/3	1	629	800	700	3	177/177/208	896/896/1089	291/291/354	16	0.9	2.8	1.20
	380/50/3	2	406/265	500/450	450/350	3	177/177/208	896/896/1089	291/291/254	10/6	0.9	2.8	1.20
300	380/50/3	1	694	800	800	3	208/208/208	1089/1089/1089	354/354/354	18	0.9	2.8	1.20
	380/50/3	2	480/265	600/450	600/350	3	208/208/208	1089/1089/1089	354/354/354	12/6	0.9	2.8	1.20
350	380/50/3	1	770	800	800	4	177/177/177/177	896/896/896/896	291/291/291/291	20	0.9	2.8	1.59
	380/50/3	2	406/406	500/500	450/450	4	177/177/177/177	896/896/896/896	291/291/291/291	10/10	0.9	2.8	1.59
375	380/50/3	1	844	1000	1000	4	208/208/177/177	1089/1089/896/896	354/354/291/291	22	0.9	2.8	1.59
	380/50/3	2	480/406	600/500	600/450	4	208/208/177/177	1089/1089/896/896	354/354/291/291	12/10	0.9	2.8	1.59
400	380/50/3	1	909	1000	1000	4	208/208/208/208	1089/1089/1089/1089	354/354/354/354	24	0.9	2.8	1.59
	380/50/3	2	480/480	600/600	600/600	4	208/208/208/208	1089/1089/1089/1089	354/354/354/354	12/12	0.9	2.8	1.59

Notes:

1. As standard, 140-200 ton (50Hz) units have a single point power connection. Optional dual point power connections power connections are available. As standard,250-400 ton (50Hz) units have dual point power connections. Optional single point power connections are available on 380V, 400V/50 Hz units.
2. Max Fuse or HACR type breaker = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA per NEC 440-22. (Use FLA per circuit, NOT FLA for the entire unit).
3. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of the second compressor RLA plus the sum of the condenser fans FLAs per NEC 440-33.
4. RECOMMENDED TIME DELAY OR DUAL ELEMENT (RDE) FUSE SIZE: 150 percent of the largest compressor RLA plus 100 percent of the second compressor RLA and the sum of the condenser fan FLAs.
5. RLA - Rated Load Amps - rated in accordance with UL Standard 1995.
6. Local codes may take precedence.
7. Control VA includes operational controls only. Does not include evaporator heaters.
8. XLRA - Locked Rotor Amps - based on full winding (x-line) start units. YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
9. Voltage Utilization Range:Rated Voltage 380/50/3,Use Range342-418.
10. A separate 115/60/1, 20 amp or 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
11. If factory circuit breakers are supplied with the chiller, then these values represent Maximum Overcurrent Protection (MOP).

Table11. Unit Electrical Data for High Efficiency at Std. Ambient Operation

						Motor Data							
						Compressor (Each)				Fans (Each)			
Unit Size	Rated Voltage	Power Conns	MCA (3) Ckt1/ Ckt2	Max. Fuse, HACR Breaker or MOP (11) Ckt1/ Ckt2	Rec. Time Delay or RDE (4) Ckt1/ Ckt2	Qty	RLA (5) Ckt1/ Ckt2	XLRA (8) Ckt1/ Ckt2	YLRA (8) Ckt1/ Ckt2	Qty. Ckt1/ Ckt2	kW	FLA	Control VA (7)
120	380/50/3	1	291	400	400	2	119/119	668/668	217/217	8	0.9	2.8	0.83
	380/50/3	2	160/160	250/250	225/225	2	119/119	668/668	217/217	4/4	0.9	2.8	0.83
130	380/50/3	1	319	450	400	2	139/119	796/668	259/217	9	0.9	2.8	0.83
	380/50/3	2	179/160	300/250	225/225	2	139/119	796/668	259/217	5/4	0.9	2.8	0.83
140	380/50/3	1	325	450	400	2	139/139	796/796	259/259	10	0.9	2.8	0.83
	380/50/3	2	179/179	300/300	225/225	2	139/139	796/796	259/259	5/5	0.9	2.8	0.83
155	380/50/3	1	363	500	450	2	168/139	896/796	291/259	11	0.9	2.8	0.83
	380/50/3	2	217/179	350/300	300/225	2	168/139	896/796	291/259	6/5	0.9	2.8	0.83
170	380/50/3	1	394	500	450	2	168/168	896/896	291/291	12	0.9	2.8	0.83
	380/50/3	2	217/217	350/350	300/300	2	168/168	896/896	291/291	12/12	0.9	2.8	0.83
185	380/50/3	1	433	600	500	2	199/168	1089/896	354/291	13	0.9	2.8	0.83
	380/50/3	2	256/217	400/350	350/300	2	199/168	1089/896	354/291	7/6	0.9	2.8	0.83
200	380/50/3	1	464	600	600	2	199/199	1089/1089	354/354	14	0.9	2.8	0.83
	380/50/3	2	256/256	400/400	350/350	2	199/199	1089/1089	354/354	7/7	0.9	2.8	0.83
250	380/50/3	1	546	700	600	3	139/139/199	796/796/1089	259/259/354	16	0.9	2.8	1.20
	380/50/3	2	325/254	450/400	400/350	3	139/139/199	796/796/1089	259/259/354	10/6	0.9	2.8	1.20
275	380/50/3	1	607	700	700	3	168/168/199	896/896/1089	291/291/354	18	0.9	2.8	1.20
	380/50/3	2	394/254	500/400	450/350	3	168/168/199	896/896/1089	291/291/254	12/6	0.9	2.8	1.20
300	380/50/3	1	671	800	800	3	199/199/199	1089/1089/1089	354/354/354	20	0.9	2.8	1.20
	380/50/3	2	465/254	600/400	600/350	3	199/199/199	1089/1089/1089	354/354/354	14/6	0.9	2.8	1.20
350	380/50/3	1	748	800	800	4	168/168/168/168	896/896/896/896	291/291/291/291	24	0.9	2.8	1.59
	380/50/3	2	394/394	500/500	450/450	4	168/168/168/168	896/896/896/896	291/291/291/291	12/12	0.9	2.8	1.59
375	380/50/3	1	819	1000	1000	4	199/199/168/168	1089/1089/896/896	354/354/291/291	26	0.9	2.8	1.59
	380/50/3	2	465/394	600/500	600/450	4	199/199/168/168	1089/1089/896/896	254/254/291/291	14/12	0.9	2.8	1.59
400	380/50/3	1	882	1000	1000	4	199/199/199/199	1089/1089/1089/1089	354/354/291/291	28	0.9	2.8	1.59
	380/50/3	2	465/465	600/600	600/600	4	199/199/199/199	1089/1089/1089/1089	354/354/354/354	14/14	0.9	2.8	1.59

Notes:

1. As standard, 140-200 ton (50Hz) units have a single point power connection. Optional dual point power connections power connections are available. As standard,250-400 ton (50Hz) units have dual point power connections. Optional single point power connections are available on 380V, 400V/50 Hz units.
2. Max Fuse or HACR type breaker = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA per NEC 440-22. (Use FLA per circuit, NOT FLA for the entire unit).
3. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of the second compressor RLA plus the sum of the condenser fans FLAs per NEC 440-33.
4. RECOMMENDED TIME DELAY OR DUAL ELEMENT (RDE) FUSE SIZE: 150 percent of the largest compressor RLA plus 100 percent of the second compressor RLA and the sum of the condenser fan FLAs.
5. RLA - Rated Load Amps - rated in accordance with UL Standard 1995.
6. Local codes may take precedence.
7. Control VA includes operational controls only. Does not include evaporator heaters.
8. XLRA - Locked Rotor Amps - based on full winding (x-line) start units. YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
9. Voltage Utilization Range:Rated Voltage 380/50/3,Use Range342-418.
10. A separate 115/60/1, 20 amp or 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
11. If factory circuit breakers are supplied with the chiller, then these values represent Maximum Overcurrent Protection (MOP).

Table12. Unit Electrical Data for High Efficiency at High Ambient Operation

						Motor Data							
						Compressor (Each)				Fans (Each)			
Unit Size	Rated Voltage	Power Conns	MCA (3) Ckt1/ Ckt2	Max. Fuse, HACR Breaker or MOP (11) Ckt1/ Ckt2	Rec. Time Delay or RDE (4) Ckt1/ Ckt2	Qty	RLA (5) Ckt1/ Ckt2	XLRA (8) Ckt1/ Ckt2	YLRA (8) Ckt1/ Ckt2	Qty. Ckt1/ Ckt2	kW	FLA	Control VA (7)
120	380/50/3	1	302	400	400	2	124/124	668/668	217/217	8	0.9	2.8	0.83
	380/50/3	2	167/167	250/250	225/225	2	124/124	668/668	217/217	4/4	0.9	2.8	0.83
130	380/50/3	1	331	450	400	2	145/124	796/668	259/217	9	0.9	2.8	0.83
	380/50/3	2	187/167	300/250	225/225	2	145/124	796/668	259/217	5/4	0.9	2.8	0.83
140	380/50/3	1	339	450	400	2	145/145	796/796	259/259	10	0.9	2.8	0.83
	380/50/3	2	187/187	300/300	225/225	2	145/145	796/796	259/259	5/5	0.9	2.8	0.83
155	380/50/3	1	379	500	450	2	168/145	896/796	291/259	11	0.9	2.8	0.83
	380/50/3	2	227/187	350/300	300/225	2	168/145	896/796	291/259	6/5	0.9	2.8	0.83
170	380/50/3	1	412	500	500	2	168/168	896/896	291/291	12	0.9	2.8	0.83
	380/50/3	2	227/227	350/350	300/300	2	168/168	896/896	291/291	6/6	0.9	2.8	0.83
185	380/50/3	1	445	600	500	2	208/168	1089/896	354/291	13	0.9	2.8	0.83
	380/50/3	2	267/227	450/350	350/300	2	208/168	1089/896	354/291	7/6	0.9	2.8	0.83
200	380/50/3	1	485	600	600	2	208/208	1089/1089	354/354	14	0.9	2.8	0.83
	380/50/3	2	267/267	450/450	350/350	2	208/208	1089/1089	354/354	7/7	0.9	2.8	0.83
250	380/50/3	1	569	700	700	3	145/145/208	796/796/1089	259/259/354	16	0.9	2.8	1.20
	380/50/3	2	339/265	450/450	400/350	3	145/145/208	796/796/1089	259/259/354	10/6	0.9	2.8	1.20
275	380/50/3	1	634	800	700	3	168/168/168	896/896/1089	291/291/354	18	0.9	2.8	1.20
	380/50/3	2	412/265	500/450	500/350	3	168/168/168	896/896/1089	291/291/254	12/6	0.9	2.8	1.20
300	380/50/3	1	700	800	800	3	208/208/208	1089/1089/1089	354/354/354	20	0.9	2.8	1.20
	380/50/3	2	485/265	600/450	600/350	3	208/208/208	1089/1089/1089	354/354/354	14/6	0.9	2.8	1.20
350	380/50/3	1	782	800	800	4	168/168/168/168	896/896/896/896	291/291/291/291	24	0.9	2.8	1.59
	380/50/3	2	412/412	500/500	500/500	4	168/168/168/168	896/896/896/896	291/291/291/291	12/12	0.9	2.8	1.59
375	380/50/3	1	855	1000	1000	4	208/208/168/168	1089/1089/896/896	354/354/291/291	26	0.9	2.8	1.59
	380/50/3	2	485/412	600/500	600/500	4	208/208/168/168	1089/1089/896/896	254/254/291/291	14/12	0.9	2.8	1.59
400	380/50/3	1	920	1000	1000	4	208/208/208/208	1089/1089/1089/1089	354/354/354/354	28	0.9	2.8	1.59
	380/50/3	2	485/485	600/600	600/600	4	208/208/208/208	1089/1089/1089/1089	354/354/354/354	14/14	0.9	2.8	1.59

Notes:

1. As standard, 140-200 ton (50Hz) units have a single point power connection. Optional dual point power connections power connections are available. As standard,250-400 ton (50Hz) units have dual point power connections. Optional single point power connections are available on 380V, 400V/50 Hz units.
2. Max Fuse or HACR type breaker = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA per NEC 440-22. (Use FLA per circuit, NOT FLA for the entire unit).
3. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of the second compressor RLA plus the sum of the condenser fans FLAs per NEC 440-33.
4. RECOMMENDED TIME DELAY OR DUAL ELEMENT (RDE) FUSE SIZE: 150 percent of the largest compressor RLA plus 100 percent of the second compressor RLA and the sum of the condenser fan FLAs.
5. RLA - Rated Load Amps - rated in accordance with UL Standard 1995.
6. Local codes may take precedence.
7. Control VA includes operational controls only. Does not include evaporator heaters.
8. XLRA - Locked Rotor Amps - based on full winding (x-line) start units. YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
9. Voltage Utilization Range:Rated Voltage 380/50/3,Use Range342-418.
10. A separate 115/60/1, 20 amp or 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
11. If factory circuit breakers are supplied with the chiller, then these values represent Maximum Overcurrent Protection (MOP).

Table13. Unit Electrical Data for Extra Efficiency at All Ambient Operation

						Motor Data							
						Compressor (Each)				Fans (Each)			
Unit Size	Rated Voltage	Power Conns	MCA (3) Ckt1/ Ckt2	Max. Fuse, HACR Breaker or MOP (11) Ckt1/ Ckt2	Rec. Time Delay or RDE (4) Ckt1/ Ckt2	Qty	RLA (5) Ckt1/ Ckt2	XLRA (8) Ckt1/ Ckt2	YLRA (8) Ckt1/ Ckt2	Qty. Ckt1/ Ckt2	kW	FLA	Control VA (7)
140	380/50/3	1	371	500	400	2	145/145	796/796	259/259	12	0.9	2.8	0.83
	380/50/3	2	198/198	300/300	225/225	2	145/145	796/796	259/259	6/6	0.9	2.8	0.83
170	380/50/3	1	437	600	500	2	177/177	896/896	291/291	14	0.9	2.8	0.83
	380/50/3	2	241/241	400/400	300/300	2	177/177	896/896	291/291	7/7	0.9	2.8	0.83
185	380/50/3	1	476	600	550	2	208/177	1089/896	354/291	14	0.9	2.8	0.83
	380/50/3	2	283/238	450/350	350/300	2	208/177	1089/896	354/291	6/8	0.9	2.8	0.83
250	380/50/3	1	556	700	600	3	145/145/177	796/796/896	259/259/291	18	0.9	2.8	1.20
	380/50/3	2	365/238	500/400	400/300	3	145/145/177	796/796/896	259/259/291	12/6	0.9	2.8	1.20
275	380/50/3	1	631	800	700	3	177/177/177	896/896/896	291/291/291	20	0.9	2.8	1.2
	380/50/3	2	437/238	600/400	500/300	3	177/177/177	896/896/896	291/291/291	14/6	0.9	2.8	1.20
350	380/50/3	1	830	1000	900	4	177/177/177/177	896/896/896/896	291/291/291/291	28	0.9	2.8	1.59
	380/50/3	2	437/437	600/600	500/500	4	177/177/177/177	896/896/896/896	291/291/291/291	14/14	0.9	2.8	1.59

Notes:

1. As standard, 140-200 ton (50Hz) units have a single point power connection. Optional dual point power connections power connections are available. As standard,250-400 ton (50Hz) units have dual point power connections. Optional single point power connections are available on 380V, 400V/50 Hz units.
2. Max Fuse or HACR type breaker = 225 percent of the largest compressor RLA plus 100 percent of the second compressor RLA, plus the sum of the condenser fan FLA per NEC 440-22. (Use FLA per circuit, NOT FLA for the entire unit).
3. MCA - Minimum Circuit Ampacity - 125 percent of largest compressor RLA plus 100 percent of the second compressor RLA plus the sum of the condenser fans FLAs per NEC 440-33.
4. RECOMMENDED TIME DELAY OR DUAL ELEMENT (RDE) FUSE SIZE: 150 percent of the largest compressor RLA plus 100 percent of the second compressor RLA and the sum of the condenser fan FLAs.
5. RLA - Rated Load Amps - rated in accordance with UL Standard 1995.
6. Local codes may take precedence.
7. Control VA includes operational controls only. Does not include evaporator heaters.
8. XLRA - Locked Rotor Amps - based on full winding (x-line) start units. YLRA for wye-delta starters is ~1/3 of LRA of x-line units.
9. Voltage Utilization Range:Rated Voltage 380/50/3,Use Range342-418.
10. A separate 115/60/1, 20 amp or 220/50/1, 15 amp customer provided power connection is required to power the evaporator heaters (1640 watts).
11. If factory circuit breakers are supplied with the chiller, then these values represent Maximum Overcurrent Protection (MOP).

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.
- Fused-disconnect switches or circuit breakers.
- Power factor correction capacitors. (optional)

Power Supply Wiring

All power supply wiring must be sized and selected accordingly by the project

engineer in accordance with NEC Table 310-16.

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer¡¯s literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors 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.

⚠ 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.

Cut holes into the sides of the control panel for the appropriately-sized power wiring conduits. The wiring is passed through these conduits and connected to the terminal blocks, optional unit-mounted disconnects, or HACR type breakers. Refer to Figure 16.

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”. Proper equipment ground must be provided to each ground connection in the panel (one for each customer-supplied conductor per phase).

115 volt field-provided connections (either control or power) are made throughknockouts on the lower left side of the panel (Figure 16). Additional grounds may be required for each 115 volt power supply to the unit. Green lugs are provided for 115V customer wiring.

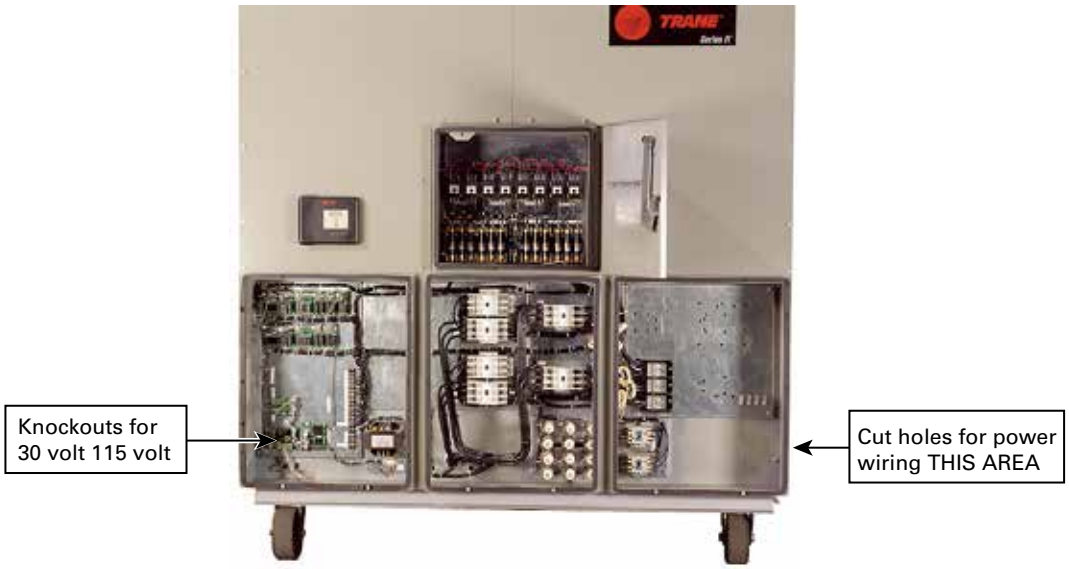


Figure17. Starter Panel

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.

Heater Power Supply and Convenience Outlet (Packaged Units Only)

The evaporator shell is insulated from ambient air and protected from freezing temperatures by two thermostatically-controlled immersion heaters and two strip heaters. Whenever the water 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 (220V 50Hz-15 amp), with a fused-disconnect.

⚠ CAUTION

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.

Interconnecting Wiring

Chilled Water Flow (Pump) Interlock

The Model RTAC Series requiresa field-supplied control voltage contact input through a flow proving switch 5S1 and an auxiliary contact 5K1 AUX. Connect the proving switch and auxiliary contact to 1TB5-8 and 1U11 J3-2. Refer to the field wiring for details. The auxiliary contact can be BAS signal, starter contactor auxiliary. or any signal which indicates the pump is running. A flow switch is still required and cannot be omitted.

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.

CAUTION

Evaporator Damage!

IMPORTANT: ALL unit chilled water pumps must be controlled by the Trane CH530 to avoid catastrophic damage to the evaporator due to freezing. Refer to RLC-PRB012-EN.

The relay output from 1U10 is required to operate the Evaporator Water Pump (EWP) contactor. Contacts should be compatible with 115/240 VAC control circuit. The EWP relay operates in different modes depending on CH530 or Tracer commands, if available, or service pumpdown (See maintenance section). 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 open for an adjustable (using TechView) 0 to 30 minutes. The non-AUTO modes in which the pump is stopped, include Reset (88), Stop (00), External Stop (100), Remote Display Stop (600), Stopped by Tracer (300), Low Ambient Run Inhibit (200), and Ice Building complete (101).

Regardless of whether the chiller is allowed to control the pump on a full-time basis, if the MP 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 start when called upon by the chiller controls.

Table14. Pump Relay Operation

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

NOTE:Exceptions are listed below.

When going from Stop to Auto, the EWP relay is energized immediately. If evaporator water flow is not established in 4 minutes and 15 sec., 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 is re-energized, and normal control resumed.

If evaporator water flow is lost once it had 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.

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. Exceptions (see above table) whereby the relay continues to be energized occur with:A Low Chilled Water Temp. diagnostic (non-latching) (unless also accompanied by an Evap Leaving Water Temperature Sensor Diagnostic)

or

A starter contactor interrupt failure diagnostic, in which a compressor continues to draw current even after commanded to have shutdown

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.

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 13. The relay will be energized when the event/state occurs.

Table15. 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
Alarm	This output is true whenever there is any diagnostic affecting any component, whether latching or auto-matically 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 fil-ter)	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 compressors are 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 compressors are 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 compressors are running (or commanded to be running) on the chiller and false when no compressors are commanded to be running on the chiller.
Maximum Capacity(software 18.0 or later)	This output is true whenever the chiller has reached maximum capacity or had reached its maximum capacity and since that time has not fallen below 70% average current relative to the rated ARI current for the chiller. The output is false when the chiller falls below 70% average current and, since that time, had not reestablished maximum capacity.

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 1U12.

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

Table16. Default Assignments

Relay	
Relay 1 Terminals J2 -12,11,10:	Alarm
Relay 2 Terminals J2 - 9,8,7:	Chiller Running
Relay 3 Terminals J2-6,5,4:	Maximum Capacity (software 18.0 or later)
Relay 4 Terminals J2-3,2,1:	Chiller Limit

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 1U12 (EUR=A4-5)). 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

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.

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 5K14 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 1U4. 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.

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 5K18 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.

NOTE: *When in the Ice Building mode, and the evaporator entering water temper-ature drops below the ice termination setpoint, the chiller terminates the Ice Building mode and changes to the Ice Building Complete Mode.*

⚠ CAUTION

Evaporator Damage!

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

Techview must 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 5K18 contacts) and then switched back into ice building mode (close 5K18 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 5K18 to the proper terminals of 1U7. 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 (Comm3). The arbitration of the various chilled water setpoint sources is described in the flow charts at the end of the section.

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 1U6, terminals 5 and 6 LLID. 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
As generated from external source	VDC=0.1455*(ECWS)+0.5454	mA=0.2909(ECWS)+1.0909
As processed by CH530	ECWS=6.875*(VDC)-3.75	ECWS=3.4375(mA)-3.75

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 Current Limit Setpoint (ECLS) Option

Similar to the above, the CH530 also provides for an optional External Current Limit Setpoint that will accept either a 2-10 VDC (default) or a 4-20 mA signal. The Current Limit Setting can also be set via the DynaView or through digital communication with Tracer (Comm 3). The arbitration of the various sources of current limit is described in the flow charts at the end of this section. The External Current Limit Setpoint may be changed from a remote location by hooking up the analog input signal to the 1 U6 LLID terminals 2 and 3. Refer to the following paragraph on Analog Input Signal Wiring Details.

The following equations apply for ECLS:

	Voltage Signal	Current Signal
As generated from external source	VDC+0.133*(%)-6.0	mA=0.266*(%)-12.0
As processed by UCM	%=7.5*(VDC)+45.0	%=3.75*(mA)+45.0

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

The TechView Service Tool must be used to set the input signal type from the factory default of 2-10 VDC to that of 4-20 mA current. TechView must be also be used to install or remove the External Current Limit Setpoint Option for field installation, or can be used to enable or disable the feature (if installed).

ECLS and ECWS Analog Input Signal Wiring Details:

Both the ECWS and ECLS can be connected and setup as either a 2-10 VDC (factory default), 4-20 mA, or resistance input (also a form of 4-2OmA) 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. ECWS uses terminals J2-5 and J2-6. Both inputs are only compatible with high-side current sources.

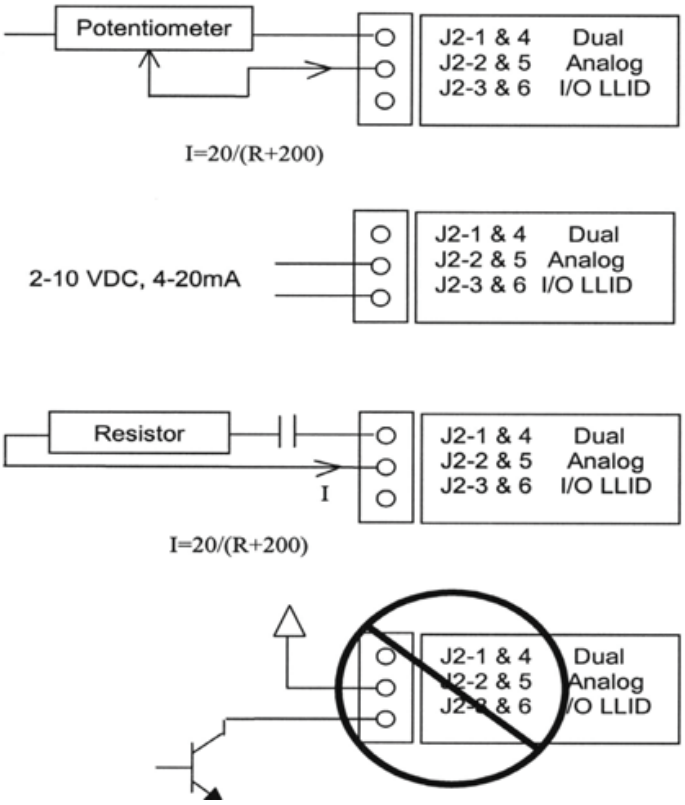


Figure18. Wiring Examples for ECLS and ECWS

Chilled Water Reset (CWR)

CH530 resets the chilled water temperature set point based on either return water temperature, or outdoor air temperature. Return Reset is standard, Outdoor Reset is optional.

The following shall be selectable:

- ne 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℉ (2.2 to 16.7℃)	0 to 20℉ (0.0 to 11.1℃)	1%	1%	50%
Outdoor	80 to -80%	50 to 130 ℉ (10 to 54.4℃)	0 to 20℉ (0.0 to 11.1℃)	1%	1%	10%

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.

Communications Interface options

Optional 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.

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

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:

Table17. Wire Size

Wire Size	通讯线的最大长度
14 AWG(2.5mm²)	5,000FT(1525mm)
16 AWG(1.5mm²)	2,000FT(610mm)
18 AWG(1.0mm²)	1,000FT(305mm)

- 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 LonMark 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
- 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

Table18. LonTalk Points List

LonTalk Communications Interface			
Inputs	**Variable type**		**SNVT_Type**
Chiller Enable/Disable	binary	start(1)/stop(0)	SNVT_switch
Chilled Water Setpoint	analog	temperature	SNVT_temp_p
Current Limit Setpoint	analog	% current	SNVT_lev_percent
Chiller Mode	Note 1		SNVT_hvac_mode
Outputs	**Variable type**		**SNVT_Type**
Chiller On/Off	binary	on(1)/off(0)	SNVT_switch
Active Chilled Water Setpoint	analog	temperature	SNVT_temp_p
Percent	RLAanalog	% current	SNVT_lev_percent
Active Current Limit Setpoint	analog	% current	SNVT_lev_percent
Leaving Chilled Water Temperature	analog	temperature	SNVT_temp_p
Entering Chilled Water Temperature	analog	temperature	SNVT_temp_p
Entering Condenser Water Temperature	analog	temperature	SNVT_temp_p
Leaving Condenser Water Temperature	analog	temperature	SNVT_temp_p
Alarm Description	Note 2		SNVT_str_asc
Chiller Status	Note 3		SNVT_chlr_status

Note 1: Chiller Mode is used to place the chiller into an alternate mode; Cool or Ice Build

Note 2: Alarm Description denotes alarm severity and target. Severity: no alarm, warning, normal shutdown, immediate shutdown Target: Chiller, Platform, Ice Building (Chiller is refrigerant circuit and Plat form is control circuit)

Note 3: Chiller Status describes Chiller Run Mode and Chiller Operating Mode. Run Modes: Off, Starting, Running, Shutting Down Operating Modes: Cool, Ice Build States: Alarm, Run Enabled, Local Control, Limited, CHW Flow, Cond Flow

Operating Principles

This section contains an overview of the operation and maintenance of RTAC units equipped with CH530 control systems. It describes the overall operating principles of the RTAC design.

Refrigeration Cycle

The refrigeration cycle of the RTAC chiller is similar to that of the RTAA air cooled water chiller. The exception is that the evaporating and condensing temperatures have been increased to allow for optimization of the chiller and reduced foot print. The refrigeration cycle is represented in the pressure enthalpy diagram in Figure 18. Key state points are indicated on the figure. The cycle for the full load ARI design point is represented in the plot.

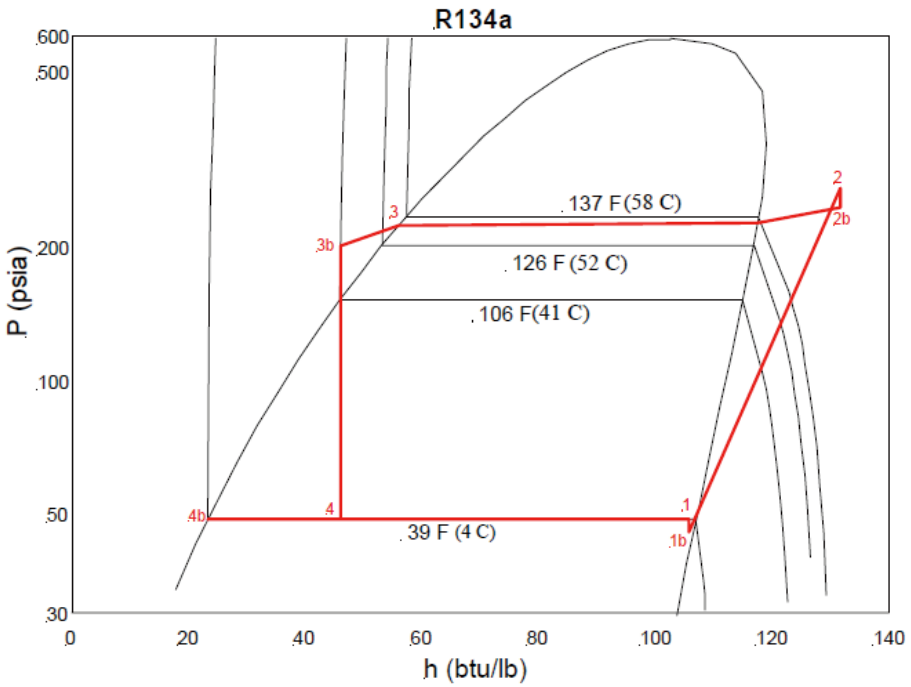
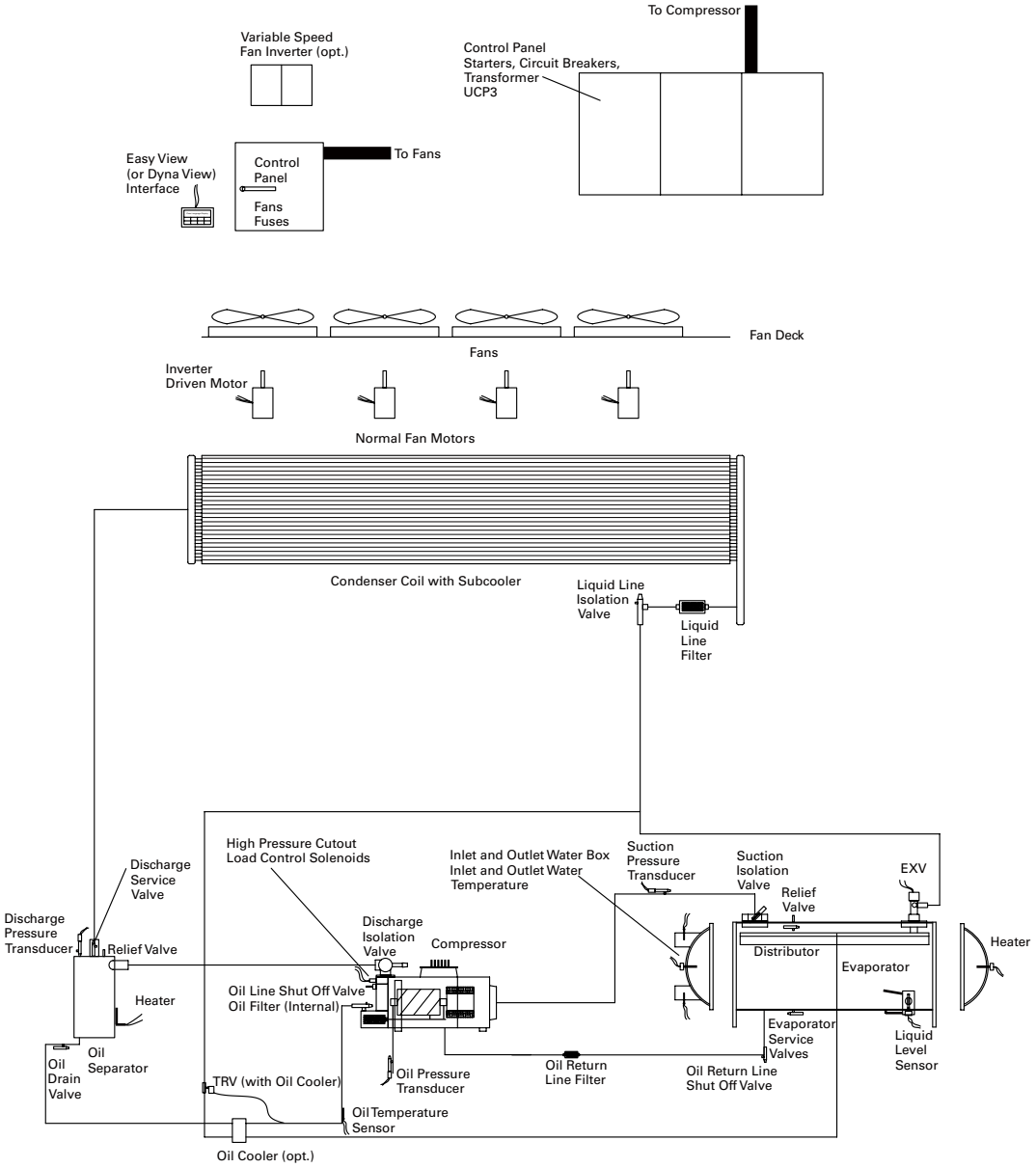


Figure19. Pressure Enthalpy (P-h) diagram of RTAC

The RTAC chiller uses a shell and tube evaporator design with refrigerant evaporating on the shell side and water flowing inside tubes having enhanced surfaces (states 4 to 1). The suction lines and bolt pads are designed to minimize pressure drop.(states 1 to 1b). The compressor is a twin-rotor helical rotary compressor designed similarly to the compressors offered in other Trane Screw Compressor Based Chillers (states 1b to 2). The discharge lines include a highly efficient oil separation system that virtually removes all oil from the refrigerant stream going to the heat exchangers (states 2 to 2b). De-superheating, condensing and sub-cooling is accomplished in a fin and tube air cooled heat exchanger where refrigerant is condensed in the tube (states 2b to

3b). Refrigerant flow through the system is balanced by an electronic expansion valve (states 3b to 4).

Figure20. System Schematic



Refrigerant R134a

he RTAC chiller uses environmentally friendly R134a. 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.

R134a is a medium pressure refrigerant. It may not be used in any condition that would cause the chiller to operate in a vacuum without a purge system. RTAC is not equipped with a purge system. Therefore, the RTAC chiller may not be operated in a condition that would result in a saturated condition in the chiller of –15° F (-26° C) or lower.

R134a requires the use of specific POE oils as designated on the unit nameplate.

Important! *The RTAC units must only operate with R-134a and Trane Oil 00048.*

Compressor

The compressor is a semi-hermetic, direct-drive rotary type compressor. Each compressor has only four moving parts: two rotors that provide compression and male and female load-control valves. The male rotor is attached to the motor and the female rotor is driven by the male rotor. The rotors and motor are supported by bearings.

The helical rotary compressor is a positive displacement device. Refrigerant vapor from the evaporator is drawn into the suction opening of the compressor (state 1b), through a suction strainer screen across the motor (which provides motor cooling) and into the intake of the compressor rotors. The gas is then compressed and discharged through a check valve and into the discharge line (state 2).

There is no physical contact between the rotors and the compressor housing. The rotors contact each other at the point where the driving action between the male and female rotors occurs. Oil is injected into the rotors of the compressor, coating the rotors and the compressor housing interior. Although this oil does provide rotor lubrication, its primary purpose is to seal the clearance spaces between the rotors and compressor housing. A positive seal between these internal parts enhances compressor efficiency by limiting leakage between the high pressure and low pressure cavities.

Capacity control is accomplished by means of a female step load-control valve and a male control valve. The female step valve is the first stage of loading after the compressor starts and the last stage of unloading before the compressor shuts down. The male control valve is positioned by a piston cylinder along the length of the male rotor. Compressor capacity is

dictated by the position of the loading valve relative to the rotors. When the valve slides toward the discharge end of the rotors compressor capacity is reduced.

Condenser and Subcooler

The condenser and subcooler are similar to the condenser used in RTAA chillers. The heat exchanger consists of 3/8" tubes that contain the refrigerant, large fins that are in the air flow and fans that draw air through the fins. Heat is transferred from the refrigerant through the tubes and fins to the air.

High pressure gas from the compressor enters the tubes of the condenser through a distribution header (state 2b). As refrigerant flows through the tubes, the heat of compression and cooling load are rejected to the air. In this process the refrigerant is de-superheated, condensed (states 2b to 3) and finally subcooled (states 3 to 3b) to a temperature slightly above the ambient air temperature. The subcooled liquid refrigerant is collected in the leaving header where it is transferred to the liquid line (state 3b).

A controls algorithm always runs as many fans as possible without reducing the differential pressure (discharge minus suction) below the setpoint (60 psid or 4.2 bar). If a warm enough ambient is sensed, all the fans will run. If the ambient is cooler, some fans are shut off to maintain the pressure differential. Fan staging depends on the chiller load, evaporator pressure, condenser effectiveness, ambient temperature, and numbers and sizes of fans installed on the circuit.

The algorithm pre-starts fans (based on ambient and water temperatures) when a circuit starts the compressor. (For rare conditions such as during some pull-downs, a steady fan state would either violate the 60 psid (4.2 bar) setpoint or cause a high pressure cut-out; in those conditions a fan will cycle on and off.)

For up to two minutes after chiller start-up, the setpoint is 35 psi (2.45 bar) difference, and then before the controls adjust gradually over half a minute up to 60 psi (4.2 bar).

Expansion Valve

Pressure drop occurs in an electronic expansion valve. The unit controller (CH530) uses the valve to regulate the flow through the liquid line to match the flow produced by the compressor. The valve has a variable orifice that is modulated by a stepper motor.

High pressure, subcooled liquid refrigerant enters the expansion valve from the liquid line. As refrigerant passes through the valve the pressure is dropped substantially, which results in vaporization of some of the refrigerant. The heat of vaporization is supplied by the two phase mixture resulting in low temperature low pressure refrigerant which is supplied to the evaporator (state 4) to provide cooling.

Evaporator

The evaporator is composed of a liquid-vapor distributor and falling film evaporator.

A liquid-vapor refrigerant mixture enters the distributor (state 4). The mixture is distributed over the length of the evaporator tubes (state 4b). Liquid is evenly distributed over the length of the evaporator tubes by the two-phase distribution system. A portion of the liquid boils as it falls by gravity from tube to tube, wetting all the tubes of the evaporator. To ensure that the tubes at the bottom of the evaporator do not experience "dry out," a liquid pool is maintained in the bottom few inches of the bundle. Tubes located in the bottom of the evaporator will evaporate the liquid refrigerant by boiling (pool boiling).

Heat is transferred from the water or glycol inside the tubes to the liquid refrigerant as the film of refrigerant evaporates on the surface of the tube. Thin film heat transfer requires a smaller temperature difference for a given amount of heat transfer than nucleate boiling, which is the heat transfer process used in flooded evaporators. Hence, efficiency is enhanced by the use of falling film evaporation. Additionally, the evaporator requires less refrigerant than a comparable flooded evaporator and the evaporator boils the entire refrigerant supply at constant pressure. Refrigerant vapor exits the evaporator through the suction line (state 1).

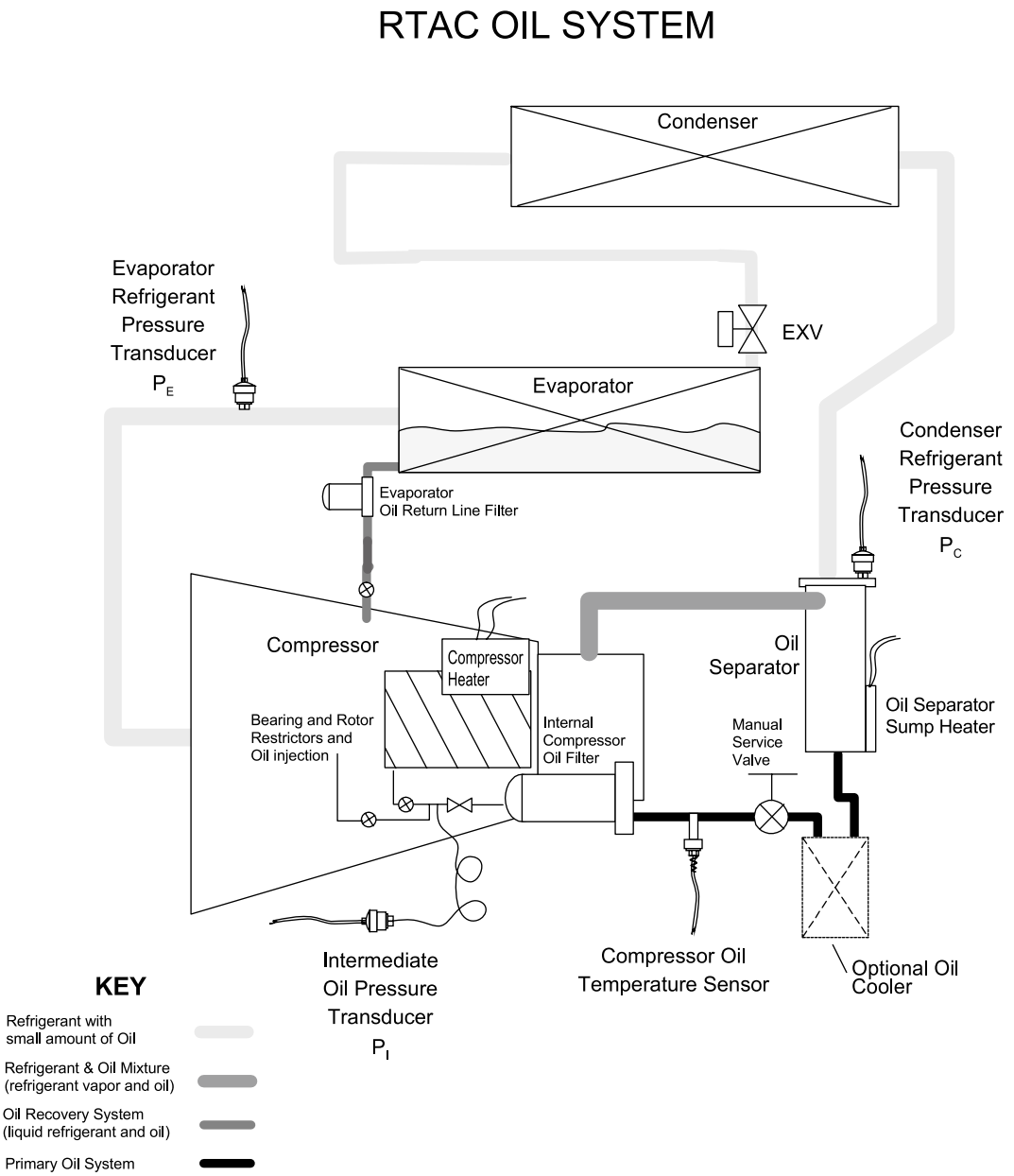
Oil System

Screw compressors require large quantities of oil for lubricating and sealing the rotors and lubricating the bearings. This oil is mixed with refrigerant at the discharge of the compressor. To enhance the performance of the heat exchanger surfaces an oil separation system is placed into the discharge line. The oil separator is located between the compressor and the condenser. It separates oil using highly efficient centrifugal force. Approximately 99.5% of the oil is removed from the refrigerant in the separator.

Oil that is removed from the refrigerant falls by gravity into the oil sump. This oil is directed back to the compressor through the oil lines. Internal to the compressor is a high efficiency filter to clean the oil before it is delivered to the rotors and bearings. Once oil is injected into the compressor rotors it mixes with the refrigerant again and is delivered back to the discharge line.

Oil that gets past the oil separators flows through the condenser, subcooler and expansion valve into the evaporator. This oil is collected in the pool of refrigerant that is maintained in the bottom of the evaporator. A small amount of oil and refrigerant from this pool (state 4b) is returned through a line that is connected to the compressor down stream of the motor. This oil and refrigerant mixes with the refrigerant vapor that was drawn out of the evaporator, prior to injection into the compressor rotors.

Figure21. System Schematic



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 commu¬nicates commands to the starter module and the LLID (for Low Level Intelligent Device) bus. The main processor has an integral display (DynaView).
- Higher level modules (e.g. starter) exist only as necessary to support system level control and communications. The starter module provides control of the starter when starting, running, and stopping the chiller motor. It also processes its own diagnostics and provides motor and compressor protection.
- 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 Inter¬face.

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 communi¬cating at 19.2 Kbaud to allow 3 rounds of data per second on a 64-device network. A typical four-compressor RTAC will have around 50 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 func¬tions. The only exception to this is the Starter module.

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 either the DynaView module and provides further data, adjustment capabilities, diagnostics information using downloadable software.

DynaView Interface

The DynaView share the same enclosure design: weatherproof and durable plastic for use as a stand-alone device on the outside of the unit or mounted nearby.

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. (It is the AUTO button in DynaView Interface.) The radio button model mimics the buttons used on old-fashioned radios to select stations. When one is pressed, the one that was previ¬ously 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 dark-ened, 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 decre¬ment (-) 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.

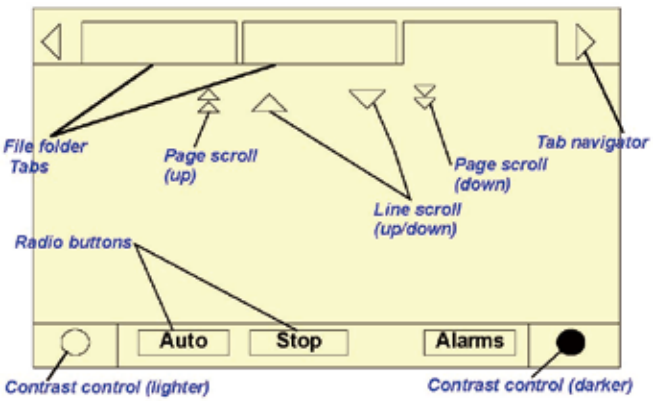
File Folder Tabs

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 sepa¬rate 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 fol¬lowing 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 sig¬nificantly different from those present at last adjustment.

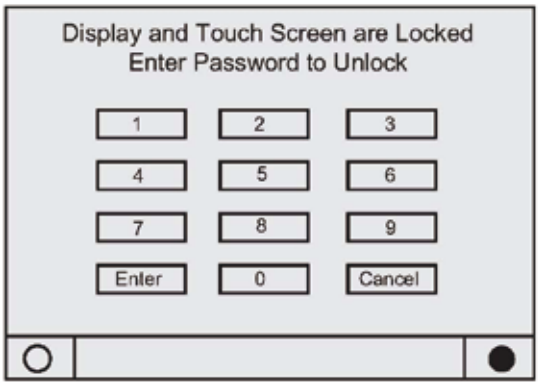
The other functions are critical to machine operation. The AUTO and STOP keys are used to enable or disable the chiller. The key selected is in black (reverse video). The chiller will stop when the STOP key is touched and after completing the Run Unload mode.

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. Press-ing the ALARMS button takes you to the corresponding tab for additional information.

Front Panel Lockout Feature/ Front Panel Display During Cold Ambients



Until the proper password is entered, there will be no access to the DynaView screens including all reports, 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, the following screen is auto-matically displayed if the DynaView Temperature is below freezing and has been 30 minutes after the last

keystroke. Note: This feature is provided to avoid unintended actuations of the keypad, which can occur due to ice build-up on the DynaView's exte¬rior surfaces. Also be aware that at extremes of temperatures, the LCD display screen will change its contrast from the optimal adjustment made at more normal temperatures. It can appear washed out or blacked out. Simply pressing the lower right contrast control on the screen will return the display to readable condition.

Modes Screen

The Mode Screen is only found on software revisions 18 and later. This screen pro¬vides a display for the top level operating mode for each of the components and sub-components of the chiller (i.e. Chiller, Circuits, and Compressors) that exist on the Chiller as it is configured. The modes are displayed as text only without the hex codes.

In software revisions 17.0 and earlier, the top level mode and the sub mode for each component was displayed on the respective component tab on the first two lines. The mode display of the first three lines of the Compressor and Chiller Screen tabs is eliminated with the addition of the Mode Screen

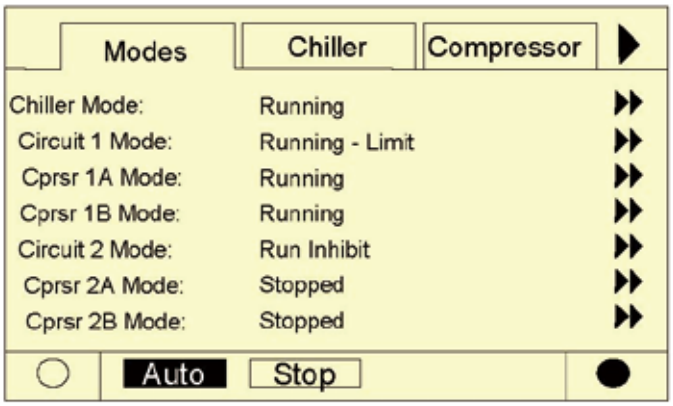


Table19. Chiller Modes

Chiller Modes	Description
Top Level Mode	
Sub-modes	
Stopped	The chiller is not running and cannot run without inter-vention. Further information is provided by the sub-mode:
Local Stop	Chiller is stopped by DynaView Stop button command- cannot be remotely overridden.
Panic Stop	Chiller is stopped by the DynaView Panic Stop (by pressing Stop button twice in succession) - previous shutdown was manually commanded to shutdown immediately without a run-unload or pumpdown cycle - cannot be remotely overridden.
Diagnostic Shutdown - Manual ResetThe chiller	Chiller is stopped by a diagnostic that requires manual intervention to reset.
Other sub-modes are possible in conjunction with at least one of the above modes - See items below for their descriptions: Diagnostic Shutdown - Auto Reset. Start Inhibited by Low CondTemp. Start Inhibited by Low AmbientTempC. Start Inhibited by External Source. Start Inhibited by External Source. Start Inhibited by BAS. Waiting for BAS C ommunications. Ice Building to NormalTransition. Ice Building is Complete. Design Note: Maximum Capa Design Note: Maximum Capacity was eliminated as a annunciated mode prior to any release	

Table19. Chiller Modes

Chiller Modes	Description
Run Inhibit	The chiller is currently being inhibited from starting (and running), but may be allowed to start if the inhibiting or diagnostic condition is cleared. Further information is provided by the sub-mode:
Diagnostic Shutdown - Auto Reset	The entire chiller is stopped by a diagnostic that may automatically clear.
Start Inhibited by Low Cond Temp	The chiller is inhibited from starting by Low Condenser Temperature- Inhibit is active below either 25° F (can be disabled with proper freeze protection) or 0° F (limit set by design, cannot be disabled). As an exception, this will not stop a chiller already running.
Start Inhibited by Low Ambient	TempThe chiller is inhibited from starting (and running) by an outdoor air ambient temperature lower than a specified temperature - per user adjustable settings and can be disabled.
Start Inhibited by External Source	The chiller is inhibited from starting (and running) by the "external stop" hardwired input.
Start Inhibited by BAS	The chiller is inhibited from starting (and running) by command from a Building Automation System via the digital communication link (com 3 or com 5).
Waiting for BAS Communications	This is a transient mode - 15-min. max, and is only possible if the chiller is in the Auto - Remote command mode. After a power up reset, it is necessary to wait for valid communication from a Building Automation System (Tracer) to know whether to run or stay inhibited. Either valid communication will be received from the Building Automation System (e.g. Tracer), or a communication diagnostic ultimately will result. In the latter case the chiller will revert to Local control.
Ice Building to Normal Transition	The chiller is inhibited from running for a brief period of time if it is commanded from active ice building mode into normal cooling mode via the ice building hardwired input or Tracer. This allows time for the external system load to "switchover" from an ice bank to the chilled water loop, and provides for a controlled pull down of the loop's warmer temperature. This mode is not seen if the ice making is automatically terminated on return brine temperature per the mode below.
Ice Building is Complete	The chiller is inhibited from running as the Ice Building process has been normally terminated on the return brine temperature. The chiller will not start unless the ice building command (hardwired input or Building Automation System command)is removed or cycled.
Auto	The chiller is not currently running but can be expected to start at any moment given that the proper conditions and interlocks are satisfied. Further information is provided by thesub-mode:
Waiting For Evap Water Flow	The chiller will wait up to 4 minutes in this mode for evaporator water flow to beestablished per the flow switch hardwired input.

Table19. Chiller Modes

Chiller Modes	Description
Waiting for Need to Cool	The chiller will wait indefinitely in this mode, for an evaporator leaving water temperature higher than the Chilled Water Setpoint plus the Differential to Start.
Starting	The chiller is going through the necessary steps to allow the lead circuit and lead compressor to start.
No Sub Modes	Running At least one circuit and one compressor on the chiller are currently running. Further information is provided by the sub-mode:
Unit is Building Ice	The chiller is running in the Ice Building Mode, and either at or moving towards full capacity available. Ice mode is terminated either with the removal of the ice mode command or with the return brine temperature falling below the Ice Termination Setpoint.
Running - Limited	At least one circuit and one compressor on the chiller are currently running, but the operation of the chiller as a whole is being actively limited by the controls.
Capacity Limited by High Evap Water Temp	This mode will occur if both the OA temperature is above 40° F and the Evap Leaving Water Temperature is above 75° F as is often the case in a high temperature pull-down. While in this mode, no compressors will be allowed to load past their minimum load capacity step, but it will not inhibit compressor staging. This mode is necessary to prevent nuisance trips due to Compressor Overcurrent or High Pressure Cutout. Reasonable pull-down rates can still be expected despite this limit.

Table20. Circuit Modes

Circuit Modes	Description
Top Level Mode	
Sub-modes	
Stopped	The given circuit is not running and cannot run without intervention. Further information is provided by the sub-mode:
Front Panel Lockout	The circuit is manually locked out by the circuit lockout setting - the nonvolatile lockout setting is accessible through either the Dyna-View or TechView.
Diagnostic Shutdown - Manual Reset	The circuit has been shutdown on a latching diagnostic.
	Other sub-modes are possible in conjunction with at least one of the above modes - See items below for their descriptions:Diagnostic Shutdown - Auto ResetStart Inhibited by External Source Start Inhibited by BAS
Run Inhibit	The given circuit is currently being inhibited from starting (and run-ning), but may be allowed to start if the inhibiting or diagnostic con-dition is cleared. Further information is provided by the sub-mode:
Diagnostic Shutdown - Auto Reset	The circuit has been shutdown on a diagnostic that may clear auto-matically.
Start Inhibited by External Source	The circuit is inhibited from starting (and running) by its "external cir-cuit lockout" hardwired input.
Start Inhibited by BAS	The circuit is inhibited from starting (and running) by command from a Building Automation System via the digital communication link (com 3 or com 5).
Auto	The given circuit is not currently running but can be expected to start at any moment given that the proper conditions and interlocks are satisfied.
No Sub Modes	
Starting	The given circuit is going through the necessary steps to allow the lead compressor on that circuit to start.
No Sub Modes	
Running	At least one compressor on the given circuit is currently running. Further information is provided by the sub-mode:
Establishing Min. Cap - Low Diff pressure	The circuit is experiencing low system differential pressure and is being force loaded, irregardless Chilled Water Temperature Control, to develop pressure sooner.
Running - Limited	At least one compressor on the given circuit is currently running, but the capacity of the circuit is being actively limited by the con-trols. Further information is provided by the sub-mode:
Capacity Limited by High Cond Press	The circuit is experiencing condenser pressures at or near the con-denser limit setting. Compressors on the circuit 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. Compres-sors on the circuit will be unloaded to prevent tripping.

Table20. Circuit Modes

Circuit Modes	Description
Capacity Limited by Low Liquid Level	The circuit is experiencing low refrigerant liquid levels and the EXV is at or near full open. The compressors on the circuit will be unloaded to prevent tripping.
Shutting Down	The given circuit is still running but shutdown is imminent. The cir-cuit is going through either a compressor run-unload mode or a cir-cuit operational pumpdown to dry out the evaporator (cold OA ambient only). Shutdown is necessary due to one (or more) of the following sub-modes:
Operational Pumpdown	The circuit is in the process shutting down by performing an opera-tional pumpdown just prior to stopping the last running compres-sor. The EXV is commanded closed. Pumpdown will terminate when both the liquid level and the evap pressure
Front Panel Lockout	The circuit has been manually locked out by the circuit lockout set-ting and is in the process of shutting down - the nonvolatile lockout setting is accessible through either the DynaView or TechView.
Diagnostic Shutdown - Manual Reset	The circuit is in the process of shutdown due to a latching diagnos-tic.
Diagnostic Shutdown - Auto Reset	The circuit is in the process of shutdown due to a diagnostic that may automatically clear.
Start Inhibited by External Source	The circuit is in the process of shutdown due to a command from the external circuit lockout hardwired input.
Start Inhibited by BAS	The circuit is in the process of shutdown due to a command from the Building Automation System (e.g. Tracer)
Service Override	The given circuit is in a Service Override mode
Service Pumpdown	The circuit is running with fan control, via a manual command to perform a Service Pumpdown. Its respective EXV is being held wide open, but the manual liquid line service valve should be closed.

Table21. Compressor Modes

Compressor Modes	Description
Top Level Mode	
Sub-modes	
Stopped	The given compressor is not running and cannot run without inter-vention. Further information is provided by the sub-mode:
Diagnostic Shutdown - Manual Reset	The compressor has been shutdown on a latching diagnostic.
Service Tool Lockout	The compressor has been shutdown due to a command from the TechView Service Tool to be "locked out" and inoperative. This set-ting is nonvolatile and operation canonly be restored by using Tech-View to "unlock" it.
	Other sub-modes are possible in conjunction with at least one of the above modes - See items be low for their descriptions:Diagnostic Shutdown - Auto ResetRestart Inhibit
Run Inhibit	The given compressor is currently being inhibited from starting (and running*), but may be allowed to start if the inhibiting or diagnostic condition is cleared. Further information is provided by the sub-mode:
Diagnostic Shutdown - Auto Reset	The compressor has been shutdown on a diagnostic that may clear automatically.
Restart Inhibit	The compressor is currently unable to start due to its restart inhibit timer. A given compressor is not allowed to start until 5 minutes has expired since its last start.
Auto	The given compressor is not currently running but can be expected to start at any moment given that the proper conditions occur.
No Sub Modes	
Starting	The given compressor is going through the necessary steps to allow it to start. (This mode is short and transitory)
No Sub Modes	
Running	The given compressor is currently running. Further information is provided by the sub-mode:
Establishing Min. Capacity - High Oil Temp	The compressor is running and is being forced loaded to its step load point, without regard to the leaving water temperature control, to prevent tripping on high oil temperature.
Running - Limited	The given compressor is currently running, but its capacity is being actively limited by the controls. Further information is provided by the sub-mode:
Capacity Limited by High Current	The compressor is running and its capacity is being limited by high currents. The current limit setting is 120% RLA (to avoid overcur-rent trips) or lower as set by the compressor's "share" of the active current limit (demand limit) setting for the entire chiller.

Table21. Compressor Modes

Compressor Modes	Description
Capacity Limited by Phase Unbalance	The compressor is running and its capacity is being limited by excessive phase current unbalance.
Shutting Down	The given compressor is still running but shutdown is imminent. The compressor is going through either a run-unload mode or is the active compressor in the operational pumpdown cycle for its circuit. Shutdown is either normal (no sub-mode displayed) or due the fol-lowing sub-modes:
Diagnostic Shutdown - Manual Reset	The compressor is in the process of shutdown due to a latching diagnostic.
Diagnostic Shutdown - Auto Reset	The compressor is in the process of shutdown due to a diagnostic that may clear automatically.
Service Tool Lockout	The compressor is in the process of shutdown due to a command from the TechView Service Tool to be ""locked out"" and inoperative. This setting is nonvolatile and operation can only be restored by using TechView to ""unlock"" it.

Chiller Screen

The chiller screen is a summary of the chiller activity.

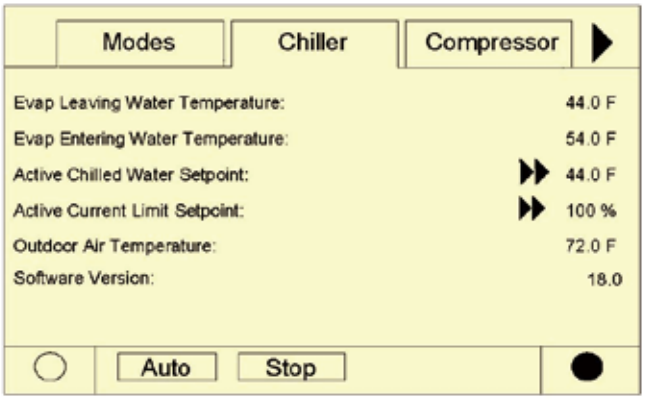


Table22. Chiller Screen

Description	Resolution	Units
Evap Leaving Water Temperature	X.X	℉ / ℃
Evap Entering Water Temperature	X.X	℉ / ℃
Active Chilled Water Setpoint	X.X	℉ / ℃
Active Current Limit Setpoint	X	% RLA
Out Door Temperature	X.X	℉ / ℃
Software Type	RTA	Text
Software Version	X.XX	Text

Compressor Screen

The compressor screen displays information for the one, two, three, or four compres-sors in the format shown. The top line of radio buttons allows you to select the com-pressor of interest. The next three lines show the compressor operating mode. The compressor radio buttons and the compressor operating mode lines don’t change as you scroll down in the menu.

The top screen has no upward scroll keys. The single arrow down scrolls the screen one line at a time. As soon as the display is one line away from the top, the upward pointing arrow appears.

The last screen has a single arrow to scroll upward one line at a time. When in the last position, the single down arrow disappears.

Each compressor has its own screen depending on which radio key is pressed. When toggling between compressor screens, say to compare starts and run time, the same lines can be seen without additional key strokes. For example, toggling from the bot¬tom of the compressor 1A menu accesses the top of the compressor 2A menu.

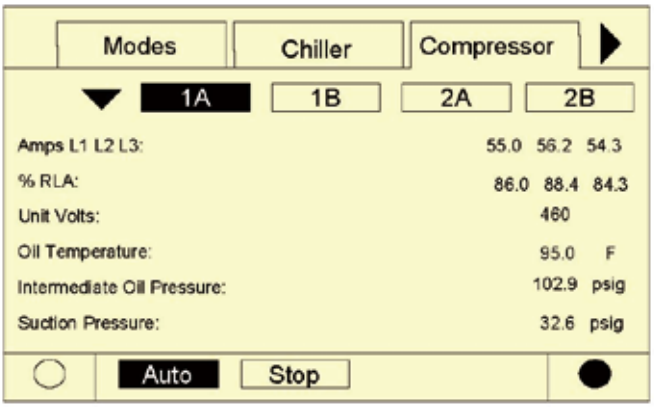


Table23. Compressor Screen

Description	Resolution	Units
Amps L1 L2 L3	XXX	Amps
% RLA L1 L2 L3	X.X	% RLA
Unit Volts	XXX	Volts
Oil Temperature	X.X	℉ / ℃
Intermediate Oil Pressure	X.X	Pressure
Suction Pressure	X.X	Pressure
Starts/ Run Hours	X,XX:XX	hr:min

Refrigerant Screen

The refrigerant screen displays those aspects of the chiller related to the refrigerant circuits.

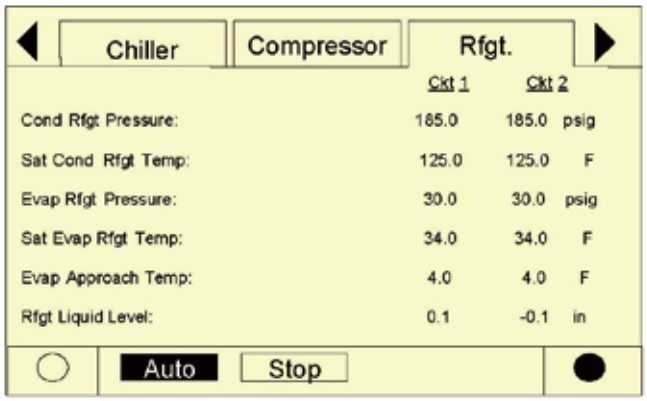


Table24. Refrigerant Screen

Description	Resolution	Units
Cond Rfgt Pressure Ckt1/Ckt2	X.X	Pressure
Sat Cond Rfgt Temp Ckt1/Ckt2	X.X	℉ / ℃
Evap Rfgt Pressure Ckt1/Ckt2	X.X	Pressure
Sat Evap Rfgt Temp Ckt1/Ckt2	X.X	℉ / ℃
Evap Approach Temp Ckt1/Ckt2	X.X	℉ / ℃
Rfgt Liquid Level Ckt1/Ckt2	X.X	Height

Setpoint Screen

The setpoint screen is a two-part screen. Screen 1 lists all setpoints available to change along with their current value. The operator selects a setpoint to change by touching either the verbal description or setpoint value. Doing this causes the screen to switch to Screen 2.

In Screen 1 the language setpoint will always be the last setpoint in the list. This will facilitate language changes by placing that control in a standard position across all CH.530 product lines.

Screen 2 displays the current value of the chosen setpoint in the upper ½ of the dis-play. It is displayed in a changeable format consistent with its type. Binary setpoints are considered to be simple two state enumeration and will use radio buttons. Ana¬log setpoints are displayed as spin buttons. The lower half of the screen is reserved for help screens.

Table25. Setpoint Screen

Description	Resolution	Units
Auto Local or Remote	Remote/Local	Text
Front Panel Chilled Water Setpoint	X.X	℉ / ℃
Front Panel Current Limit Setpoint	XXX	% RLA
Differential to Start	X.X	Temperature
Differential to Stop	X.X	Temperature
Condenser Limit Setpoint	Enable/Disable	Text
Low Ambient Lockout Setpoint	X.X	Temperature
Low Ambient Lockout	Enable/Disable	Text
Ice Build	Enable/Disable	Text
Front Panel Ice Termination Setpoint	X.X	Temperature
Comp 1A Pumpdown	Pumpdown/Abort	Text
Comp 1B Pumpdown	Pumpdown/Abort	Text
Comp 2A Pumpdown	Pumpdown/Abort	Text
Comp 2B Pumpdown	Pumpdown/Abort	Text
EXV Ckt 1 Open	OpenAuto/Open	Text
EXV Ckt 2 Open	OpenAuto/Open	Text
Front Panel Ckt 1	LockoutLocked Out/ Not Locked Out	Text
Front Panel Ckt 2	LockoutLocked Out/ Not Locked Out	Text
Ext Chilled Water Setpoint	X.X	℉ / ℃
Ext Current Limit Setpoint	XXX	% RLA
Date Format	mm dd yyyy, dd mm yyyy	Text
Date		Text
Time Format	12 hr, 24 hr	Text
Time of Day		Text
Keypad/Display	Enable/Disable	Text
Display Units	SI, English	Text
Pressure Units	Absolute, Gauge	Text
Language Selection	Downloaded from TechView	Text

Table26. Setpoint Options/Conditions Displayed

Option	Condition(s)	Explanation
Ice Building	Enable/Disable	If feature is installed, operation can be initiated or stopped
Cprsr Pumpdown 1	Avail	Pumpdown is allowed: only with unit in Stop or when circuit is locked out
	Not Avail	Pumpdown is not allowed because unit is operating or pumpdown has been completed
	Pumpdown	State is displayed while pumpdown is in progress
EXV Ckt Open(For Authorized Service Use Only2)	Avail	Indicates EXV is closed but can be opened manually since unit is in Stop or circuit is locked out
	Not Avail	EXV is closed but cannot be opened manually since unit is operating
	Open	State is displayed when EXV is open. Unit will not start with EXV manually set open, but will initiate valve closure first.
Ckt Lockout	Locked Out	Circuit is locked out at Front Panel; other circuit may be available to run
	Not Locked Out	Circuit is not locked out and is available to run
Ext. Chilled Water Setpt	Enable/Disable	Allows unit to control setpoint; otherwise another loop controller in line will con-trol, as optionally wired.
Ext. Current Limit Setpt	Enable/Disable	Allows unit to control setpoint; otherwise another loop controller in line will con-trol, as optionally wired.

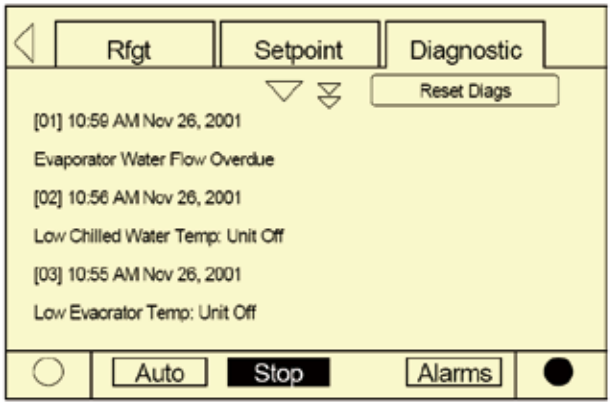
Notes:

1. Pumpdown procedure are discussed in Maintenance section 9.
2. Used for liquid level control or to recover from pumpdown.

Diagnostic Screen

The diagnostic screen (shown following) is accessible by either pressing the blinking ALARMS key or by pressing the **Diagnostic** tab on the screen tab selection.

A hex code and a verbal description appears on the display as shown typically above. This is the last active diagnostic. Pressing the "Reset All Active Diagnostics" will reset all active diagnostics regardless of type, machine or refrigerant circuit. Compres¬sor diagnostics, which hold off only one compressor, are treated as circuit diagnos¬tics, consistent with the circuit to which they belong. One circuit not operating will not shut the chiller down. Viewing the "Compressor" screen will indicate whether a circuit is not operating and for what reason.



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

Power-Up

On Power-Up, DynaView will progress through three screens:

First Screen, Version # of the Boot, full version # displayed.

This screen will display for 5 seconds and move on to the second screen. The con¬trast will also be adjustable from this screen.

Second Screen, Application or No Application.

This screen will display for 5 seconds "A Valid Application Is Present" or "A Valid Application Is Not Present" and move on to the third screen.

Third Screen, First screen of the Application, the Chiller Tab.

Display Formats

Temperature settings are in ℉ or ℃, depending on Display Units settings. Settings can be entered in tenths or whole degrees depending on a menu setting at the Tech¬View.

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

Languages

English plus two alternate languages may be installed with DynaView and will reside in the main processor. English will always be available. Alternate languages must be installed using Tech-View, Software Download View.

TechView

Figure22. TechView

echView 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.

TechView software is available via Trane.com.

(http://www.trane.com/commercial/software/tracerch530/)

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

- Pentium II or higher processor
- 128Mb RAM
- 1024 x 768 resolution of display
- 56K modem
- 9-pin RS-232 serial connection
- Operating system - Windows 2000
- Microsoft Office (MS Word, MS Access, MS Excel)
- Parallel Port (25-pin) or USB Port

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

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).

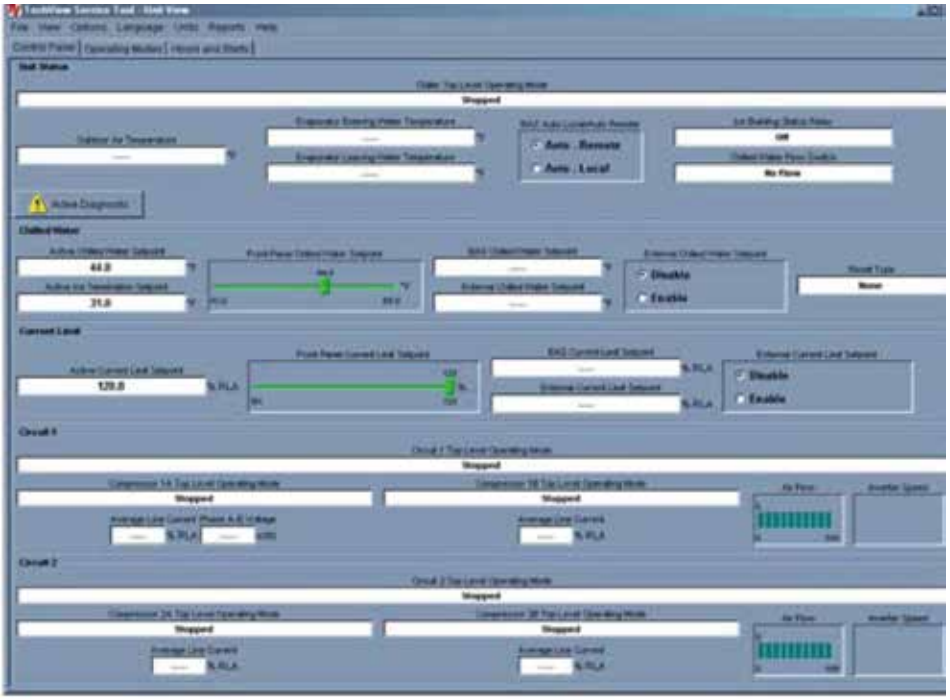
The Operating Mode tab displays the unit, circuit and compressor top level operating modes.

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 Tech View will display UNIT VIEW.

RTAC Unit View is shown below

Figure23. Unit View



Compressor Service View

The Compressor View provides convenient access to service functions for pumping down circuits and test starting compressors. Various operational lockouts allow operation of the rest of the chiller while some parts are awaiting repair.

Figure24. Compressor Service View

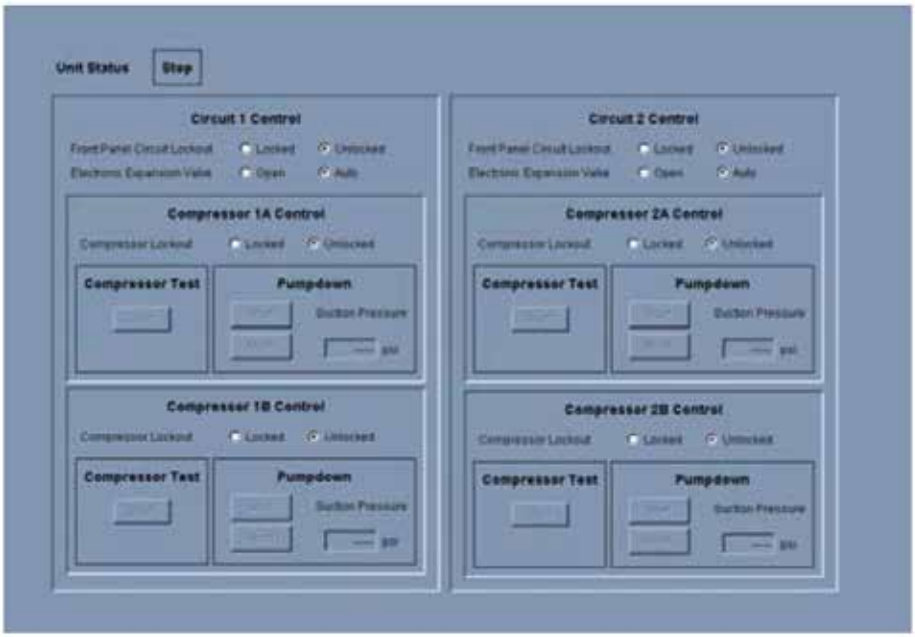


Table27. Compressor Service View Items

Description	Settings
Front Panel Circuit Lock Out	Locked/Unlocked
Electronic Expansion Valve	Open/Auto
Compressor Lockout	Locked/Unlocked
Compressor test	Start
Pumpdown (suction pressure is displayed)	Start/Abort

Status View

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

Figure25. Status View

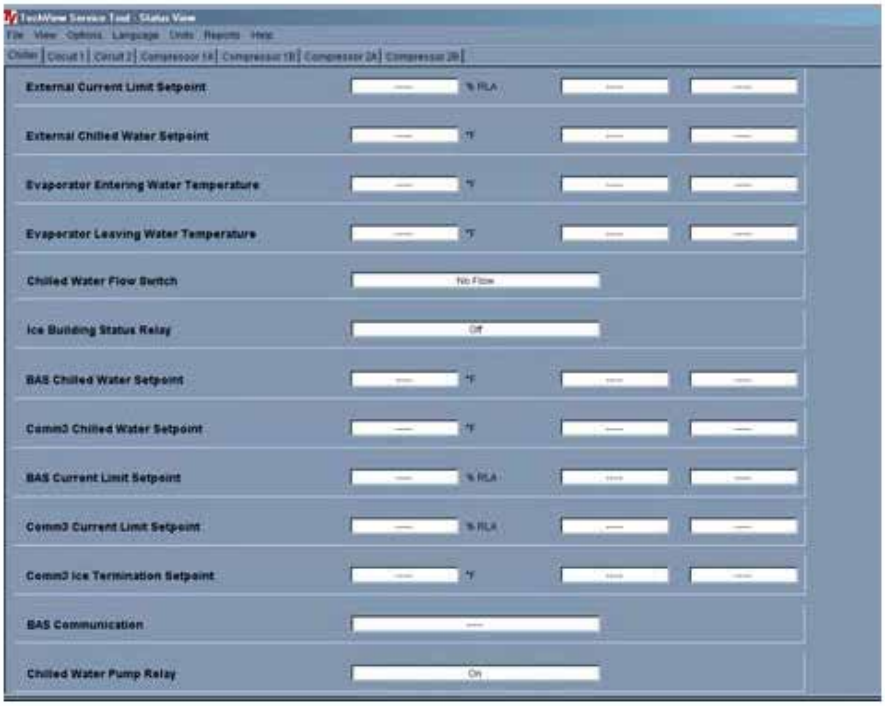


Table28. Status View Items

Tab	Text	Units
Chill	Chiller Top Level Operating Mode	Text
	Chiller Sub Operating Mode	Text
	Operating Mode	Text
	Chiller Sub Operating Mode	Text
	Front Panel Auto/Stop	Text
	Outdoor Air Temperature	Temperature
	External Auto/Stop	Auto/Stop
	External Emergency Stop	Auto/Stop
	Active Chilled Water Setpoint	Temperature
	Active Current Limit Setpoint	Temperature
	Active Ice Termination Setpoint	Temperature
	External Current Limit Setpoint	% RLA
	External Chilled Water Setpoint	Temperature
	Evaporator Entering Water Temperature	Temperature
	Evaporator Leaving Water Temperature	Temperature
	Chilled Water Flow Switch	Flow/NoFlow
	Ice Building Status Relay	Ice Build/Normal
	Comm3 Chilled Water Setpoint	Temperature
	BAS Chilled Water Setpoint	Temperature
	BAS Current Limit Setpoint	% RLA
	Comm3 Current Limit Setpoint	% RLA
	Comm3 Ice Termination Setpoint	Temperature
	BAS Communication	Text
	Chilled Water Pump Relay	on/off
Compressor	Compressor 1 Operating Mode	Text
	Compressor 1 Sub Mode	Text
	Compressor 1 Top Level Operating Mode	Text
	Run Hours	Integer
	Starts	Integer
	Phase A-B voltage	Volts
	Average Line Current	Amps
	Line 1 Current	Amps
	Line 2 Current	Amps
	Line 3 Current	Amps
	Line 1 Current	% RLA
	Line 2 Current	% RLA
	Line 3 Current	% RLA
	Maximum Line Current	Amps
	Supply Oil Temperature	Temperature

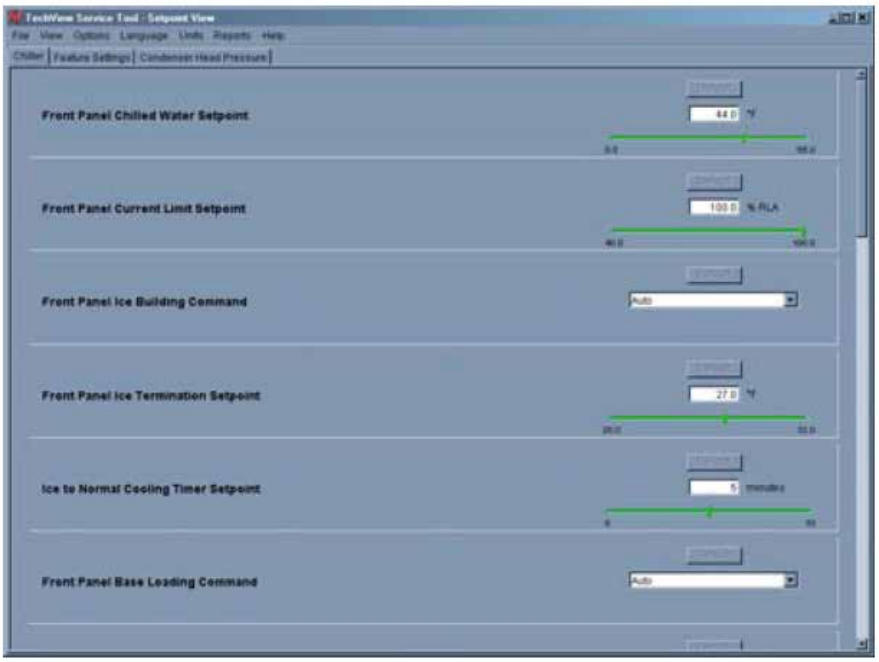
Table28. Status View Items

Tab	Text	Units
Compressor	Intermediate Oil Pressure	Pressure
	Female Step Loader	Loaded/Unloaded
	High Pressure Cutout Switch	Tripped/Not Tripped
Circuit	Circuit Sub Mode	Text
	Circuit Top Level Operating Mode	Text
	External Hardwired Lockout	Locked/Not locked
	Front Panel Lockout	Locked/Not locked
	Air Flow	%
	Inverter Speed	% Full Speed
	Condenser Refrigerant Pressure	Pressure
	Saturated Condenser Refrigerant Temperature	Temperature
	Differential Refrigerant Pressure	Pressure
	Evaporator Refrigerant Pressure	Pressure
	Saturated Evaporator Refrigerant Temperature	Temperature
	EXV Position	% Open
	Evaporator Refrigerant Liquid Level	in

Setpoint View

Setpoint view displays the active setpoints and allows you to make changes.

Figure26. Setpoint View



Setpoint List

The center of the window displays the scrollable list of setpoint panels.

Setpoint Enumeration Panel

A setpoint numeric panel contains a label with the setpoint description and a pull-down list showing the active value and the other selections. The Default button returns the setpoint to the product's factory setting. The text field is updated when the change is complete.

Setpoint Numeric Panel

A setpoint numeric panel contains a label with the setpoint description, a Default button, a text field with a unit label, and a slider.

The Default button changes the setpoint to the product's factory setting. The text field and slider are updated when the change is complete.

You can change a setpoint with the text field or with the slider. When you click on the entry field,

the change setpoint dialog displays to coordinate the setpoint change.

You can change the display units for a setpoint by clicking on the unit label next to the entry field.

Change Setpoint

The change setpoint window allows you to enter a new value for the setpoint into a text field. If the entered value is outside the given range, the background turns red.

Table29. Setpoints View Items

Tab	Text	Min Value	Max Value	Default Value	Unit Type
Chiller	Front Panel Display Units	English, SI	English, SI	English	Display Units
Chiller	Front Panel Chilled Water Setpoint	10（-12.22）	65（18.33）	44（6.67）	Temp DegF(C)
Chiller	Front Panel Current Limit Setpoint	60	120	120	%
Chiller	Differential to Stop	0.5（0.2777）	2.5（1.388）	2.0（1.111）	Differential Temp Deg F(C)
Chiller	Differential to Start	1.0（0.555）	30（16.666）	2（1.111）	Differential Temp Deg F(C)
Chiller	Leaving Water Temp Cutout	0.0（-17.78）	36.0（2.22）	36.0（2.22）	Temp Deg F(C)
Chiller	Low Refrigerant Temp Cutout	-5(-20.56)	36（-2.22）	28（-2.22）	Temp Deg F(C)
Chiller	Front Panel Condenser Limit Setpoint	80	120	90	%
Chiller	Low Ambient Lockout Setpoint	-10(-23.333）	70(21,111)	25（-3.89）	Temp Deg F(C)
Chiller	Low Ambient Lockout	Enable, Disable		Enable	Enabled /Disrnabled
Chiller	Front Panel Ice Termination Setpoint	20（-6.67）	31（-0.56）	31（-0.56）	Temp Deg F(C)
Chiller	External Ice Building Input	Enable, Disable		Disable	Enabled /Disrnabled
Chiller	Under/Over Voltage Protection	Enable, Disable		Disable	Enabled / Disabled
Chiller	Local Atmospheric Pressure	9.93（68.3）	16（110.3）	14.7（68.5）	Absolute Pressure psia(Kpa)
Chiller	Design Delta Temperature	4（2.22）	30（16.666）	10（5.56）	Differential Temp Deg F©
Chiller	Reset Type	None, Return, Outdoor, Constant Return		None	RstTyp
Chiller	Return Reset Ratio	10	120	50	Percent

Tab	Text	Min Value	Max Value	Default Value	Unit Type
Chiller	Return Start Reset	4（2.22）	30（16.666）	10（5.56）	Differential Temp Deg F(C)
Chiller	Return Maximum Reset	0	20（11.11）	5.0（2.78）	Percent
Chiller	Outdoor Reset Ratio	-80	80	10	Differential Temp Deg F(C)
Chiller	Outdoor Start Reset	50（10）	130(54.44)	90(32.22)	Temp Deg F(C)
Chiller	Outdoor Maximum Reset	0	20(11.11)	5(2.78)	Differential Temp Deg F(C)
Chiller	External Chilled Water Setpoint	Enable, Disable		Disabled	Enable, Disable
Chiller	External Current Limit Setpoint	Enable, Disable		Disabled	Enable, Disable
Chiller	Evaporator Water Pump Off Delay	0	30	1	Minutes
Chiller	Chilled Water Setpoint Filter Settling Time	30	1800	200	Seconds
Chiller	Compressor Staging Deadband	0.4（0.222）	4（2.222）	0.05（0.2778）	Differential Temp Deg F(C)

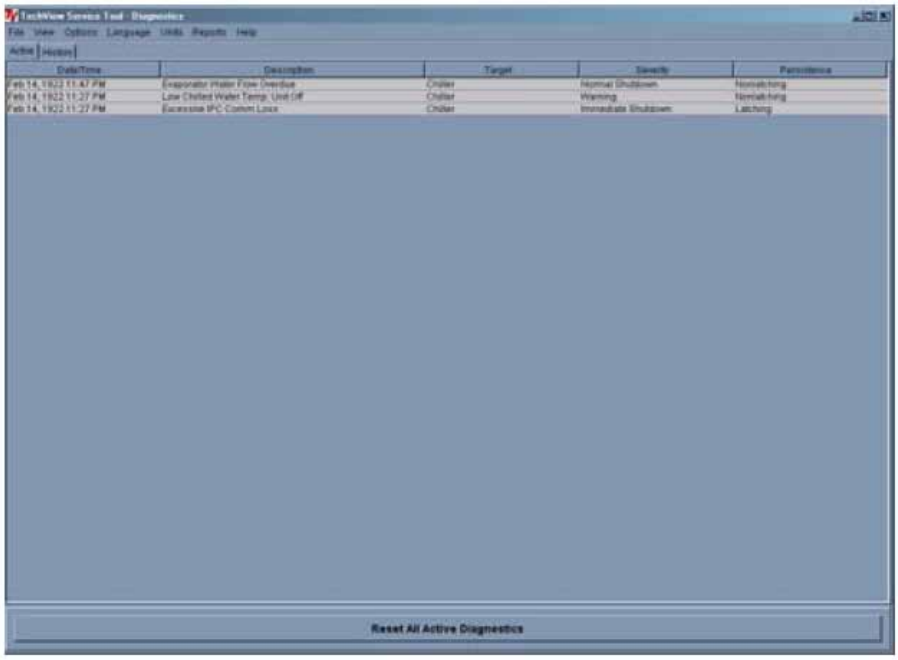
Diagnostics View

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

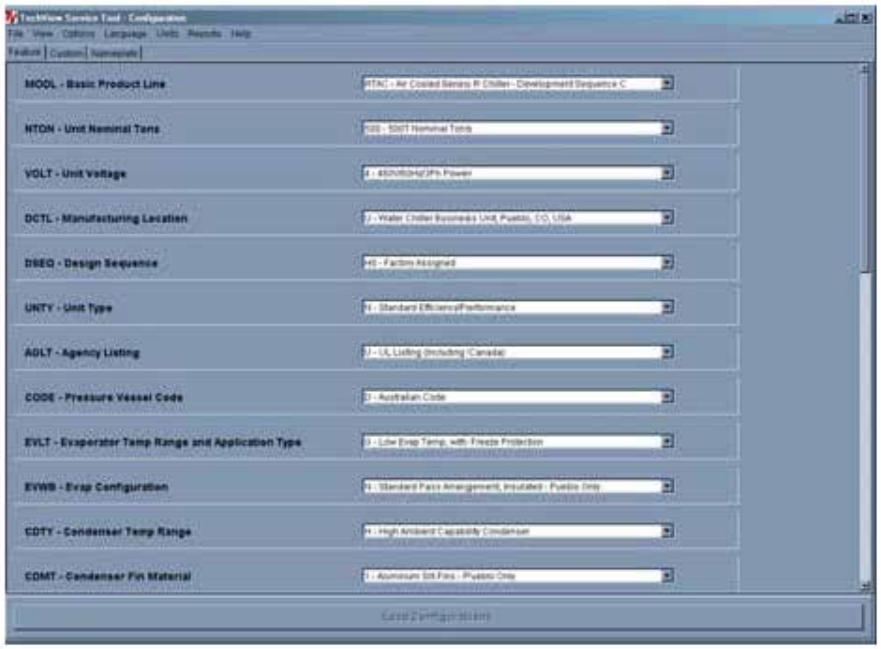
Figure27. Diagnostic View



Configuration View

This view displays the active configuration and allows you to make changes.

Figure28. Configuration View



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.

Any changes made to the configuration will change the unit model number and the confirmation code (CRC). If changes are made to the unit configuration the new model number and CRC should be recorded.

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.

Table30. Configuration View Items

Digit 1-4 - Unit Model

RTAC = Air Cooled Series chiller

Digit 5-7 Unit Nominal Capacity

120 = 120 Nominal Tons
130 = 130 Nominal Tons
140 = 140 Nominal Tons
155 = 155 Nominal Tons
170 = 170 Nominal Tons
185 = 185 Nominal Tons
200 = 200 Nominal Tons
250 = 250 Nominal Tons
275 = 275 Nominal Tons
300 = 300 Nominal Tons
350 = 350 Nominal Tons
375 = 375 Nominal Tons
400 = 400 Nominal Tons

Digit 8-Unit Voltage

E = 380V/50Hz/3Ph
D = 400V/50Hz/3Ph

Digit 9-Manufacturing Location

T = Taicang

Digit 10, 11-Design Sequence

XX-Factory/ABU Assigned

Digit 12-Unit Type

N = Std. Efficiency/Performance
H = High Efficiency/Performance
A = Extra Efficiency/Performance

Digit 13-Agency Listing

N = No agency listing

Digit 14-Pressure Vessel Code

A = ASME pressure vessel code
L = Chinese code
D = Australian code

Digit 15-Evaporator Temperature Range & Application Type

F = Standard Temp. with Frz Prot
G = Low Temp(<40F), with Frz Prot
C = Standard Temp. no Frz Prot

Digit 16-Evaporator Configuration

N = Standard pass arrangement, 2PS insulated
P = 3PS, insulated

Digit 17-Condenser Temperature Range

N = Standard ambient range ,25-115 deg F
H = High ambient capability ,25-125 deg F
L = Low ambient capability ,0-115 deg F
W = Wide ambient capability ,0-125 deg F

Digit 18-Condenser Fin Material

1 = Standard aluminum slit fins
2 = Copper fins, non-slit fins
4 = Complete Coat aluminum fins

Digit 19-Condenser Fan/ Motor Configuration

W = WLow Noise fans
T = Condenser fans with TEAO motors

Digit 20-Compressor Motor Starter Type

Y = Wye-delta closed transition

Digit 21-Incoming Power Line Connection

1 = Single point power connection
2 = Dual point power connection (1/ckt)

Digit 22-Power Line Connection Type

T = Terminals only
C = Circuit Breaker(s)
D = Non-fused disconnect switch(es)

Digit 23-Unit Operator Interface

D = Dyna-View operator interface

Digit 24-Remote Interface

N = No remote interface
L = LonTalk Communication interface (LCI)
M = LonTalk LCI-C w/modbus
B = BACnet

Digit 25-Control Input Accessories/Options

N = No remote input
R = Remote leaving water temp stpt
C = Remote current limit setpoint
B = Remote lvg. temp.setpoint and remote current limit setpoint

Digit 26-Control Output Accessories/Options

A = Alarm relay
D = Icemaking and alarm relay

Digit 27-Short Circuit Rating

0 = No short circuit ,withstand rating

Digit 28-Electrical Accessories and Export Packing

N = No flow switches
F = NEMA-4 flow switch - 150 psi

Digit 29-Control Panel Accessories

N = No convenience outlet

Digit 30-Refrigerant Service Valves

1 = Suction service valves

Digit 31-Compressor Sound Attenuator Option

0 = No sound attenuator
1 = Factory installed sound attenuator
2 = Factory installed Compressor and Pipe Sound Attenuator

Digit 32-Appearance Options

N = No appearance options
A = Architectural louvered panels
C = Half Louvers
G = Access guards
B = Access guards and half louvers
T = Thermoplastic Package

Digit 33-Installation Accessories

N = No installation accessories
R = Neoprene isolators

Digit 34-Factory Test

0 = factory run test
E = Performance test
C = Witness test

Digit 35-Label, and Literature Language

E = English
G = Chinese

Digit 36-Special Order

X = Standard catalog configuration
S = Unit has special order feature

Digit 37-Safety Devices

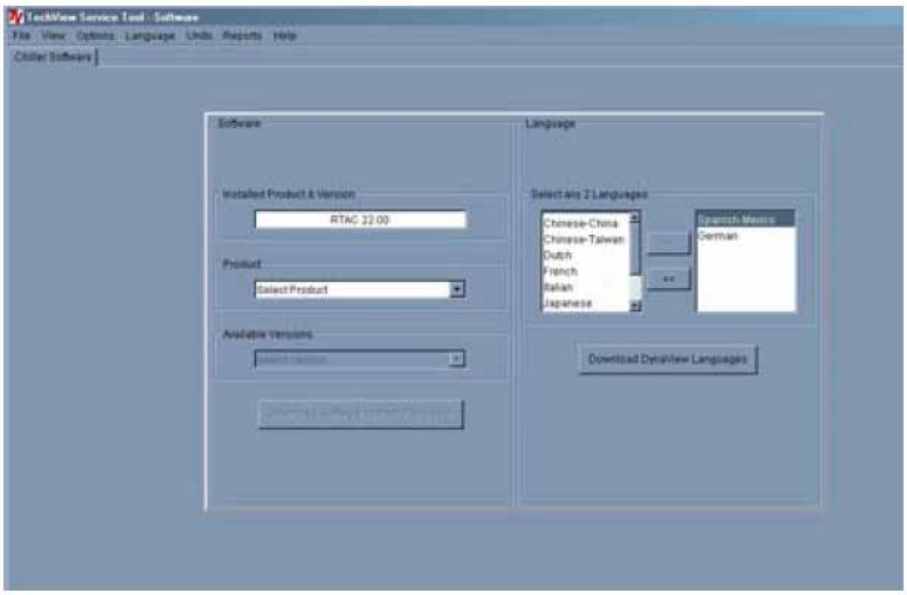
N = none
X = Standard

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.

Figure29. Software View



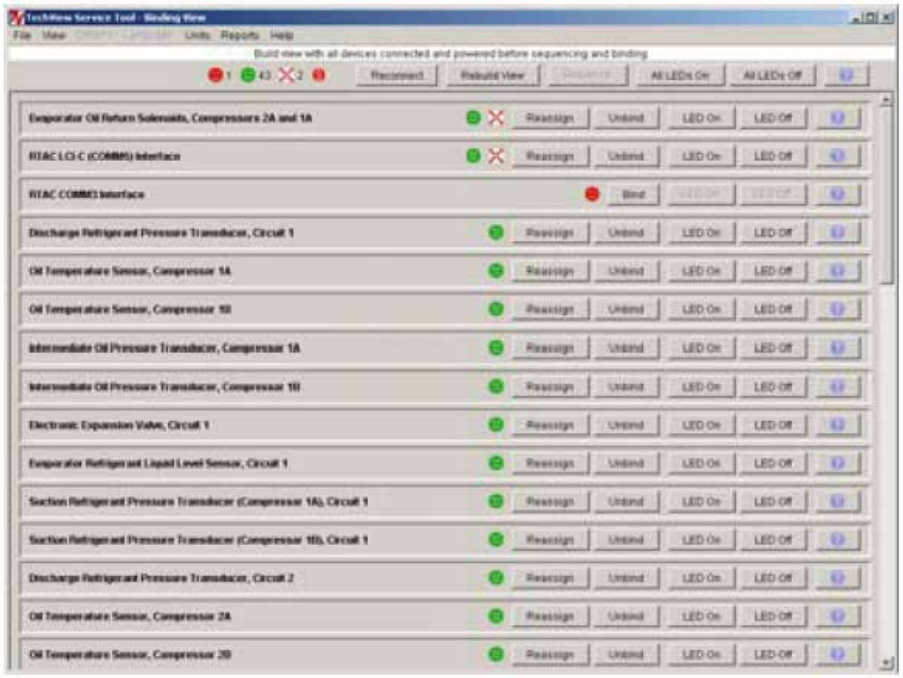
Binding View

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.

Figure30. 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.

Software Download

This information can also be found at

http://www.trane.com/commercial/software/tracerch530/.

1. Create a folder called "CH530" on your C:\ drive. You will select and use this folder in subsequent steps so that downloaded files are easy to locate.
2. Download the Java Runtime installation utility file onto your PC in the CH530 folder (please note that this does not install Java Runtime, it only downloads the installation utility).
3. Download the TechView installation utility file onto your PC in the CH530 folder (please note that this does not install TechView, it only downloads the installation utility).
4. Remember where you downloaded the files (the "CH530" folder). You will need to locate them to finish the installation process.
5. Proceed to "Main Processor Software Download" page and read the instructions to download the latest version of main processor installation files.
   Note: you will first select the chiller type to obtain the available file ver-sions.
6. Select the product family. A table with the download link will appear for that product family.
7. Download the main processor software onto your PC in the CH530 folder (please note that this does not install the main processor, it only down¬loads the installation utility).
8. Remember where you downloaded the files (the "CH530" folder). You will need to locate them to finish the installation process.
9. To complete the installation process, locate the installation utilities you downloaded into the CH530 folder. If necessary, use your PC's file man¬ager to locate the downloaded files.
10. Install the applications in the following order by double-clicking on the install program and following the installation prompts:
    Note: During the Java Runtime Environment installation, you may be prompted to "select the default Java Runtime for the system browsers...". Do not select any system browsers at this step. There should be no default browsers selected for proper operation.
11. Connect your PC to the CH530 main processor using a standard 9-pin male/9-pin female RS-232 cable.
12. Run the TechView software by selecting the TechView icon placed on your desktop during the installation process. The "Help...About" menu can be viewed to confirm proper installation of latest versions.

Diagnostic

The following Diagnostic Table contains all diagnostics possible arranged alphabetically by the name assigned to each diagnostic. Not all diagnostics are available unless TechView is installed.

Hex Code: 3-digit code used to uniquely identify diagnostics.

Diagnostic Name: Name of the diagnostic as it appears at DynaView and/or TechView displays.

Severity: Defines the action of the above effect. Immediate means an instantaneous shutdown of the affected portion. Normal means routine or friendly shutdown of the affected portion. Special Mode means a particular mode of operation is invoked, but without shutdown, and Info 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).

Criteria: Quantitatively defines the criteria used in generating the diagnostic and, if nonlatching, the criteria for auto reset.

Reset Level: Defines the lowest level of manual diagnostic reset command which can clear the diagnostic. The manual diagnostic reset levels in decreasing order of priority are: Local, Remote and Info. For example, a diagnostic that has a reset level of Remote, can be reset by either a remote diagnostic reset command or by a local diagnostic reset command, but not by the lower priority Info Reset command.

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
398	BAS Communication Lost	Special	NonLatch	The BAS was setup as "installed" at the MP and the Comm 3 LLID lost communications with the BAS for 15 contiguous minutes after it had been established. Refer to Section on Setpoint Arbitration to determine how setpoints and operating modes may be effected by the comm loss. The chiller follows the value of the Tracer Default Run Command which can be previously written by Tracer and stored nonvolatilely by the MP (either use local or shutdown).398BAS Communication LostSpecialNonLatchThe BAS was setup as "installed" at the MP and the Comm 3 LLID lost communications with the BAS for 15 contiguous minutes after it had been established. Refer to Section on Setpoint Arbitration to determine how setpoints and operating modes may be effected by the comm loss. The chiller follows the value of the Tracer Default Run Command which can be previously written by Tracer and stored nonvolatilely by the MP (either use local or shutdown).	Remote
390	BAS Failed to Establish Communication	Special	NonLatch	The BAS was setup as "installed" and the BAS did not communicate with the MP within 15 minutes after power-up. Refer to Section on Setpoint Arbitration to determine how setpoints and operating modes may be effected. Note: The original requirement for this was 2 minutes, but was implemented at 15 minutes for RTAC.	Remote
2E6	Check Clock	Info	Latch	The real time clock had detected loss of its oscillator at some time in the past. 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
8A	Chilled Water Flow (Entering Water Temperature)	Info	NonLatch	The entering evaporator water temp fell below the leaving evaporator water temp. by more than 2° F for 100 ° F-sec. For RTAC this diagnostic cannot reliably indicate loss of flow, but can warn of improper flow direction through the evaporator, misbound temperature sensors, or other system problems	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5EF	Comm Loss: Chilled Water Flow Switch	Immediate	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period.	Remote
5F2	Comm Loss: Cond Rfgt Pressure, Circuit #1	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5F3	Comm Loss: Cond Rfgt Pressure, Circuit #2	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
694	Comm Loss: Electronic Expansion Valve, Circuit #1	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
695	Comm Loss: Electronic Expansion Valve, Circuit #2	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5DE	Comm Loss: Emergency Stop	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
68E	Comm Loss: Evap Oil Return Valve, Cprsr 1A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
69E	Comm Loss: Evap Oil Return Valve, Cprsr 1B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
68F	Comm Loss: Evap Oil Return Valve, Cprsr 2A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
69F	Comm Loss: Evap Oil Return Valve, Cprsr 2B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5E4	Comm Loss: Evaporator Entering Water Temperature	Special Model	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5E3	Comm Loss: Evaporator Leaving Water Temperature	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
6BB	Comm Loss: Evaporator Rfgt Drain Valve - Ckt 1	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
6BC	Comm Loss: Evaporator Rfgt Drain Valve - Ckt 2	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
688	Comm Loss: Evaporator Rfgt Liquid Level, Circuit #1	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
689	Comm Loss: Evaporator Rfgt Liquid Level, Circuit #2	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5F0	Comm Loss: Evaporator Rfgt Pressure, Circuit #1	Immediate	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Note: This diagnostic is replaced by diagnostic 5FB below with Rev 15.0	Remote
5F1	Comm Loss: Evaporator Rfgt Pressure, Circuit #2	Immediate	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Note: This diagnostic is replaced by diagnostic 5FD below with Rev 15.0	Remote
5F8	Comm Loss: Evaporator Water Pump Control	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5DD	Comm Loss: External Auto/Stop	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5E9	Comm Loss: External Chilled Water Setpoint	Special Model	NonLatch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall discontinue use of the External Chilled Water Setpoint source and revert to the next higher priority for setpoint arbitration	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5DF	Comm Loss: External Circuit Lockout, Circuit #1	Special Model	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. MP will nonvolatily hold the lockout state (enabled or disabled) that was in effect at the time of comm loss.	Remote
5E0	Comm Loss: External Circuit Lockout, Circuit #2	Special Model	Latch	Same as Comm Loss: External Circuit Lockout, Circuit #1	Remote
5EA	Comm Loss: External Current Limit Setpoint	Special Model	NonLatch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall discontinue use of the External Current limit setpoint and revert to the next higher priority for Current Limit setpoint arbitration	Remote
680	Comm Loss: Fan Control Circuit #1, Stage #1	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
681	Comm Loss: Fan Control Circuit #1, Stage #2	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
682	Comm Loss: Fan Control Circuit #1, Stage #3	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
683	Comm Loss: Fan Control Circuit #1, Stage #4	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
684	Comm Loss: Fan Control Circuit #2, Stage #1	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
685	Comm Loss: Fan Control Circuit #2, Stage #2	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
686	Comm Loss: Fan Control Circuit #2, Stage #3	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
687	Comm Loss: Fan Control Circuit #2, Stage #4	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
68C	Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Special Model	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Operate the remaining fans as fixed speed fan deck.	Remote
68D	Comm Loss: Fan Inverter Fault, Circuit #1, Drive 2	Special Model	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote
69A	Comm Loss: Fan Inverter Fault, Circuit #2 or Circuit #2, Drive 1	Special Model	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote
69B	Comm Loss: Fan Inverter Fault, Circuit #2, Drive 2	Special Model	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote
68A	Comm Loss: Fan Inverter Power, Circuit #1 or Circuit #1 Drive 1 and 2	Normal	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote
698	Comm Loss: Fan Inverter Power, Circuit #2 or Circuit #2 Drive 1 and 2	Normal	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote
68B	Comm Loss: Fan Inverter Speed Command, Circuit #1 or Circuit #1 Drive 1 and 2	Special Model	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote
699	Comm Loss: Fan Inverter Speed Command, Circuit #2 or Circuit #2 Drive 1 and 2	Special Model	Latch	LatchSame as Comm Loss: Fan Inverter Fault, Circuit #1 or Circuit #1, Drive 1	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5D9	Comm Loss: Female Step Load Compressor 1A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5DA	Comm Loss: Female Step Load Compressor 1B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5DB	Comm Loss: Female Step Load Compressor 2A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5DC	Comm Loss: Female Step Load Compressor 2B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5EB	Comm Loss: High Pressure Cutout Switch, Cprsr 1A	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5EC	Comm Loss: High Pressure Cutout Switch, Cprsr 1B	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5ED	Comm Loss: High Pressure Cutout Switch, Cprsr 2A	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5EE	Comm Loss: High Pressure Cutout Switch, Cprsr 2B	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5E1	Comm Loss: Ice-Machine Control	Special Model	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Chiller shall revert to normal (non-ice building) mode regardless of last state.	Remote
5FA	Comm Loss: Ice-Making Status	Special Model	Latch	Same as Comm Loss: Ice-Machine Control	Remote
5F4	Comm Loss: Intermediate Oil Pressure, Cprsr 1A	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5F5	Comm Loss: Intermediate Oil Pressure, Cprsr 1B	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5F6	Comm Loss: Intermediate Oil Pressure, Cprsr 2A	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5F7	Comm Loss: Intermediate Oil Pressure, Cprsr 2B	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
69D	Comm Loss: Local BAS Interface	Special Model	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D2	Comm Loss: Male Port Load Compressor 1A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D4	Comm Loss: Male Port Load Compressor 1B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D6	Comm Loss: Male Port Load Compressor 2A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D8	Comm Loss: Male Port Load Compressor 2B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D1	Comm Loss: Male Port Unload Compressor 1A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D3	Comm Loss: Male Port Unload Compressor 1B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D5	Comm Loss: Male Port Unload Compressor 2A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5D7	Comm Loss: Male Port Unload Compressor 2B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5E5	Comm Loss: Oil Temperature, Circuit #1 or Cprsr 1A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5E6	Comm Loss: Oil Temperature, Circuit #2 or Cprsr 2A	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
696	Comm Loss: Oil Temperature, Cprsr 1B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
697	Comm Loss: Oil Temperature, Cprsr 2B	Normal	Latch	Same as Comm Loss: Chilled Water Flow Switch	Remote
5E2	Comm Loss: Outdoor Air Temperature	Normal	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Note that if this diagnostic occurs, operational pumpdown will be performed regardless of the last valid temperature	Remote
690	Comm Loss: Starter 1A	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
691	Comm Loss: Starter 1B	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
692	Comm Loss: Starter 2A	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
693	Comm Loss: Starter 2B	Immediate	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
6AC	Comm Loss: Starter Panel High Temperature Limit - Panel 1, Cprsr 1B	Info	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
6AB	Comm Loss: Starter Panel High Temperature Limit - Panel 1, Cprsr 2A	Info	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
6AD	Comm Loss: Starter Panel High Temperature Limit - Panel 2, Cprsr 2B	Info	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
6A0	Comm Loss: Status/ Annunciation Relays	Info	Latch	Same as Comm Loss: Chilled Water Flow Switch	Local
5FB	Comm Loss: Suction Pressure Cprsr 1A	Immediate	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Circuit target if no isolation valves, Compressor target if isolation valves or simplex. Design Note: In the case of manifolded compressors w/o isolation valves, the occurrence of this diagnostic will also generate a comm loss with the nonexistent Suction Press Cprsr 2B in order to accomplish circuit shutdown.	Remote
5FC	Comm Loss: Suction Pressure Cprsr 1B	Immediate	Latch	Continual loss of communication between the MP and the Functional ID has occurred for a 30 second period. Design Note: For circuits with manifolded compressors w/o isolation valve option, this diagnostic will occur with the preceding diagnostic, even though this transducer is not required or installed.	Remote
5FD	Comm Loss: Suction Pressure Cprsr 2A	Immediate	Latch	Same as Comm Loss: Suction Pressure Cprsr 1A	Remote
5FE	Comm Loss: Suction Pressure Cprsr 2B	Immediate	Latch	Same as Comm Loss: Suction Pressure Cprsr 1B	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
2A1	Condenser Fan Variable Speed Drive Fault - Circuit 1 (Drive 1)	Special Model	Latch	The MP has received a fault signal from the respective condenser fan Variable Speed Inverter Drive, and unsuccessfully attempted (5 times within 1 minute of each other) to clear the fault. The 4th attempt removes power from the inverter to create a power up reset. If the fault does not clear, the MP will revert to constant speed operation without the use of the inverter's fan. The inverter must be manually bypassed, and fan outputs rebound, for full fixed speed fan operation.	Remote
5B4	Condenser Fan Variable Speed Drive Fault - Circuit 1	Special Model	Latch	Same as Condenser Fan Variable Speed Drive Fault - Circuit 1 (Drive 1)	Remote
2A2	Condenser Fan Variable Speed Drive Fault - Circuit 2 (Drive 1)	Special Model	Latch	Same as Condenser Fan Variable Speed Drive Fault - Circuit 1 (Drive 1)	Remote
5B5	Condenser Fan Variable Speed Drive Fault - Circuit 2 (Drive 2)	Special Model	Latch	Same as Condenser Fan Variable Speed Drive Fault - Circuit 1 (Drive 1)	Remote
5B8	Condenser Refrigerant Pressure Transducer - Circuit 1	Immediate	Latch	Bad Sensor or LLID	Remote
5B9	Condenser Refrigerant Pressure Transducer - Circuit 2	Immediate	Latch	Bad Sensor or LLID	Remote
FD	FDEmergency Stop	Immediate	Latch	EMERGENCY STOP input is open. An external interlock has tripped. Time to trip from input opening to unit stop shall be 0.1 to 1.0 seconds.	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
8E	Evaporator Entering Water Temperature Sensor	Info	Latch	Bad Sensor or LLID a. Normal operation, no effects on control. b. Chiller shall remove any Return or Constant Return Chilled Water Reset, if it was in effect. Apply slew rates per Chilled Water Reset spec.	Remote
AB	Evaporator Leaving Water Temperature Sensor	Normal	Latch	Bad Sensor or LLID	Remote
27D	Evaporator Liquid Level Sensor - Circuit 1	Immediate	Latch	Bad Sensor or LLID	Remote
3F9	Evaporator Liquid Level Sensor - Circuit 2	Immediate	Latch	Bad Sensor or LLID	Remote
6B9	Evaporator Rfgt Drain - Circuit 1	NA	Latch	This diagnostic is effective only with Remote Evap units. The liquid level of the respective evaporator was not seen to be below the level of -21.2 mm (0.83 in) within 5 minutes of the commanded opening of its Drain Valve Solenoid. The diagnostic will not be active if the drain valve is commanded closed.	Remote
6BA	Evaporator Rfgt Drain - - Circuit 2	NA	Latch	The chilled water flow switch input was open for more than 6-10 contiguous seconds. b. This diagnostic does not de-energize the evap pump output c. 6-10 seconds of contiguous flow shall clear this diagnostic. d. Even though the pump times out in the STOP modes, this diagnostic shall not be called out in the STOP modes. Note that this diagnostic will not light the red diagnostic light on the Easy View display.	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
ED	Evaporator Water Flow Lost	Immediate	NonLatch	Evaporator water flow was not proven within 4.25 minutes (RTAC Rev 20 and earlier) or 20 minutes (RTAC Rev 21) of the Chilled water pump relay being energized. With SW Rev 17.0 and earlier, the diagnostic will de-energize the Chilled Water Pump output. It will be re-energized if the diagnostic clears with the return of flow and the chiller will be allowed to restart normally (to accommodate external control of pump) With SW Rev 18.0 and later, the pump command status will not be effected. Note that this diagnostic will not light the red diagnostic light on the EasyView display.	Remote
384	Evaporator Water Flow Overdue	Normal	NonLatch	Evaporator water flow was not proven within 4.25 minutes (RTAC Rev 20 and earlier) or 20 minutes (RTAC Rev 21) of the Chilled water pump relay being energized. With SW Rev 17.0 and earlier, the diagnostic will de-energize the Chilled Water Pump output. It will be re-energized if the diagnostic clears with the return of flow and the chiller will be allowed to restart normally (to accommodate external control of pump) With SW Rev 18.0 and later, the pump command status will not be effected. Note that this diagnostic will not light the red diagnostic light on the EasyView display.	Remote
5C4	Excessive Loss of Comm	Immediate	Latch	Loss of CommImmediateLatchLoss of comm with 75% 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 LLIDS buss using TechView	Remote
87	External Chilled Water Setpoint	Info	NonLatch	Function Not "Enabled": no diagnostics. b. "Enabled ": Out-Of-Range Low or Hi or bad LLID, set diagnostic, default CWS to next level of priority (e.g. Front Panel SetPoint). This Info diagnostic will automatically reset if the input returns to the normal range.	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
89	External Current Limit Setpoint	Info	NonLatch	Same as External Chilled Water Setpoint	Remote
1C6	High Differential Refrigerant Pressure - Circuit 1	Normal	Latch	The system differential pressure for the respective circuit was above 275 Psid for 2 consecutive samples or more than 10 seconds.	Remote
1C7	High Differential Refrigerant Pressure - Circuit 2	Normal	Latch	Same as High Differential Refrigerant Pressure - Circuit 1	Remote
584	High Evaporator Liquid Level - Circuit 1	Normal	Latch	The liquid level sensor is seen to be at or near its high end of range for 80 contiguous minutes while the compressor is running. (The diagnostic timer will hold, but not clear when the circuit is off). Design: 80% or more of bit count corresponding to +21.2 mm or more liquid level for 80 minutes)	Remote
5B7	High Evaporator Liquid Level - Circuit 2	Normal	Latch	Same as High Evaporator Liquid Level - Circuit 1	Remote
6B8	High Evaporator Refrigerant Pressure	Immediate	NonLatch	The evaporator refrigerant pressure of either circuit has risen above 190 psig. 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 of the evaporator pressures fall below 185 psig. This diagnostic has severity of Immediate because if an evaporator pressure reads high without being invalid, the pump would be shut off but the chiller could keep running. Evap water flow diagnostics are not active if the pump is commanded off, only if the pump is commanded on but flow does not occur as expected. occur as expected.	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
1DE	High Oil Temperature - Compressor 1A	Immediate	Latch	The respective oil temperature as supplied to the compressor, exceeded 200° F for 2 consecutive samples or for over 10 seconds. Note: As part of the Compressor High Temperature Limit Mode (aka Minimum Limit), the running compressor's female load step will be forced loaded when its oil temperature exceeds 190F and returned to normal control when the oil temperature falls below 170° F.	Remote
1E0	High Oil Temperature - Compressor 1B	Immediate	Latch	Same as High Oil Temperature - Compressor 1A Remote	Remote
1DD	High Oil Temperature -Compressor 2A	Immediate	Latch	Same as High Oil Temperature - Compressor 1A Remote	Remote
1DF	High Oil Temperature -Compressor 2B	Immediate	Latch	Same as High Oil Temperature - Compressor 1A Remote	Remote
F5	High Pressure Cutout - Compressor 1A	Immediate	Latch	A high pressure cutout was detected on Compressor 1A; trip at 315 ±5 PSIG. Note: Other diagnostics that may occur as an expected consequence of the HPC trip will be suppressed from annunciation. These include Phase Loss, Power Loss, and Transition Complete Input Open.	Local
F6	High Pressure Cutout - Compressor 1B	Immediate	Latch	Same as High Pressure Cutout - Compressor 1A	Local
BE	High Pressure Cutout - Compressor 2A	Immediate	Latch	Same as High Pressure Cutout - Compressor 1A	Local
BF	High Pressure Cutout - Compressor 2B	Immediate	Latch	Same as High Pressure Cutout - Compressor 1A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5BE	Intermediate Oil Pressure Transducer - Compressor 1A	Immediate	Latch	Bad Sensor or LLID	Remote
5BF	Intermediate Oil Pressure Transducer - Compressor 1B	Immediate	Latch	Bad Sensor or LLID	Remote
5C0	Intermediate Oil Pressure Transducer - Compressor 2A	Immediate	Latch	Bad Sensor or LLID	Remote
5C1	Intermediate Oil Pressure Transducer - Compressor 2B	Immediate	Latch	Bad Sensor or LLID	Remote
C5	Low Chilled Water Temp: Unit Off	Special Model	NonLatch	The leaving chilled water temp. 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 (1.1° C) above the cutout setting for 30 minutes.	Remote
C6	Low Chilled Water Temp: Unit On	Immediate and Special Mode	NonLatch	The chilled water temp. fell below the cutout setpoint for 30 degree F Seconds while the compressor was running. Automatic reset occurs when the temperature rises 2 ° F (1.1° C) above the cutout setting for 2 minutes. This diagnostic shall not de-energize the Evaporator Water Pump Output.	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
1AE	Low Differential Refrigerant Pressure - Circuit 1	Immediate	Latch	The system differential pressure for the respective circuit was below 35 Psid for more than 2000 Psid-sec with either a 1 minute (single cprsr circuit) or 2.5 minute (manifolded cprsr circuit) ignore time from the start of the circuit. Remote 1AF Low Differential Refrigerant Pressure - Circuit 2 Immediate Latch Same as Low Differential Refrigerant Pressure - Circuit 1	Remote
1AF	Low Differential Refrigerant Pressure - Circuit 2	Immediate	Latch	Same as Low Differential Refrigerant Pressure - Circuit 1	Remote
583	Low Evaporator Liquid Level - Circuit 1	Info	NonLatch	The liquid level sensor is seen to be at or near its low end of range for 80 contiguous minutes while the compressor is running. Design: 20% or less of bit count corresponding to -21.2 mm or less liquid level for 80 minutes)	Remote
5B6	Low Evaporator Liquid Level - Circuit 2	Info	NonLatch	Same as Low Evaporator Liquid Level - Circuit 1	Remote
194	Low Evaporator Refrigerant Temperature - Circuit 1	Immediate	Latch	a. The inferred Saturated Evap Refrigerant Temperature (calculated from suction pressure transducer(s)) dropped below the Low a,Refrigerant Temperature Cutout Setpoint for 120° F-sec (8° F-sec max rate) while the circuit was running after the ignore period had expired. The integral is held at zero for the ignore time (which is a function of outdoor air temp) following the circuit startup and the integral will be limited to never trip in less than 15 seconds, i.e. the error term shall be clamped to 8° F. The minimum LRTC setpoint is -5° F (18.7 Psia) the point at which oil separates from the refrigerant. b. During the timeout of the trip integral, the unload solenoid(s) of the running compressors on the circuit, shall be energized continuously. Normal load/ unload operation will be resumed if the trip integral is reset by return to temps above the cutout setpoint.	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
195	Low Evaporator Refrigerant Temperature - Circuit 2	Immediate	Latch	Same as Low Evaporator Refrigerant Temperature - Circuit 1	Remote
6B3	Low Evaporator Temp - Ckt 1: Unit Off	Special Model	NonLatch	Any of the evap sat temps fell below the water temp cutout setting while the respective evap liquid level was greater than -21.2mm for 30 degree F seconds while 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 either the evap temp rises 2° F (1.1° C) above the cutout setting or the liquid level falls below -21.2mm for 30 minutes	Remote
6B3	Low Evaporator Temp - Ckt 2: Unit Off	Special Model	NonLatch	Same as Low Evaporator Temp - Ckt 1: Unit Off	Remote
198	Low Oil Flow - Compressor 1A	Immediate	Latch	The intermediate oil pressure transducer for this compressor was out of the acceptable pressure range for 15 seconds, while the Delta Pressure was greater than 35 Psid.: Acceptable range is 0.50 > (PC-PI) / (PC-PE) for the first 2.5 minutes of operation, and 0.25 > (PC-PI) / (PC-PE) thereafter,	Local
199	Low Oil Flow - Compressor 1B	Immediate	Latch	Same as Low Oil Flow - Compressor 1A Local 19A Low Oil Flow - Compressor 2A Immediate Latch Same as Low Oil Flow - Compressor 1A Local 19B Low Oil Flow - Compressor 2B Immediate Latch Same as Low Oil Flow - Compressor 1A	Local
19A	Low Oil Flow - Compressor 2A	Immediate	Latch	Same as Low Oil Flow - Compressor 1A	Local
19B	Low Oil Flow - Compressor 2B	Immediate	Latch	Same as Low Oil Flow - Compressor 1A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
B5	Low Suction Refrigerant Pressure - Circuit 1	Immediate	Latch	a. The Suction Refrigerant Pressure (or either of the compressor suction pressures) dropped below 10 Psia just prior to compressor start (after EXV preposition). b. The pressure fell below 16 Psia while running after the ignore time had expired, or fell below 10 Psia (or 5 Psia in software prior to Oct'02) before the ignore time had expired. The ignore time is function of outdoor air temperature. Note: Part b. is identical to Low Evaporator Refrigerant Temperature diagnostic except for the trip integral and trip point settings.	Local
B6	Low Suction Refrigerant Pressure - Circuit 2	Immediate	Latch	Same as Low Suction Refrigerant Pressure - Circuit 1	Local
B7	Low Suction Refrigerant Pressure - Cprsr 1B	Immediate	Latch	Same as Low Suction Refrigerant Pressure - Circuit 1	Local
B8	Low Suction Refrigerant Pressure - Cprsr 2B	Immediate	Latch	Same as Low Suction Refrigerant Pressure - Circuit 1	Local
BA	Motor Current Overload - Compressor 1A	Immediate	Latch	Compressor current exceeded overload time vs. trip characteristic. For A/C products Must trip = 140% RLA, Must hold=125%, nominal trip 132.5% in 30 seconds	Local
BB	Motor Current Overload - Compressor 1B	Immediate	Latch	Same as Motor Current Overload - Compressor 1A	Local
BC	Motor Current Overload - Compressor 2A	Immediate	Latch	Same as Motor Current Overload - Compressor 1A	Local
BD	Motor Current Overload - Compressor 2B	Immediate	Latch	Same as Motor Current Overload - Compressor 1A	Local
1AD	MP Application Memory CRC Error	Immediate	Latch	Memory error criteria TBD	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
6A1	Could not Store Starts and Hours	Info	Latch	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
5FF	MP: Invalid Configuration	Immediate	Latch	MP has an invalid configuration based on the current software installed	Remote
6A2	MP: Non-Volatile Block Test Error	Info	Latch	MP has determined there was an error with a block in the Non-Volatile memory. Check settings.	Remote
69C	MP: Non-Volatile Memory Reformat	Info	Latch	MP has determined there was an error in a sector of the Non-Volatile memory and it was reformatted. Check settings.	Remote
D9	MP: Reset Has Occurred	Info	NonLatch	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 in TechView	Remote
1E1	Oil Flow Fault - Compressor 1A	Immediate	Latch	The Intermediate Oil Pressure Transducer for this cprsr is reading a pressure either above its respective circuit's Condenser Pressure by 15 Psia or more, , or below its respective Suction Pressure 10 Psia or more for 30 seconds continuously.	Local
1E2	Oil Flow Fault - Compressor 1B	Immediate	Latch	Same as Oil Flow Fault - Compressor 1A	Local
5A0	Oil Flow Fault - Compressor 2A	Immediate	Latch	Same as Oil Flow Fault - Compressor 1A	Local
5A1	Oil Flow Fault - Compressor 2B	Immediate	Latch	Same as Oil Flow Fault - Compressor 1A	Local
1E6	Oil Temperature Sensor - Cprsr 1B	Normal	Latch	Bad Sensor or LLID	Remote
1E8	Oil Temperature Sensor - Cprsr 2B	Normal	Latch	Bad Sensor or LLID	Remote
1E5	Oil Temperature Sensor -Cprsr 1A	Normal	Latch	Bad Sensor or LLID	Remote
1E7	Oil Temperature Sensor -Cprsr 2A	Normal	Latch	Bad Sensor or LLID	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
A1	Outdoor Air Temperature Sensor	Normal	Latch	Bad Sensor or LLID. Note that if this diagnostic occurs, operational pumpdown will be performed regardless of the last valid temperature	Remote
D7	Over Voltage	Normal	NonLatch	a. Line voltage above + 10% of nominal. [Must hold = + 10 % of nominal. Must trip = + 15 % of nominal. Reset differential = min. of 2% and max. of 4%. Time to trip = minimum of 1 min. and maximum of 5 min.) Design: Nom. trip: 60 seconds at greater than 112.5%, + or - 2.5%, Auto Reset at 109% or less.	Remote
19C	Phase Loss - Compressor 1A	Immediate	Latch	a) No current was sensed on one or two of the current transformer inputs while running or starting (See Nonlatching Power Loss Diagnostic for all three phases lost while running). Must hold = 20% RLA. Must trip = 5% RLA. Time to trip shall be longer than guaranteed reset on Starter Module at a minimum, 3 seconds maximum. Actual design trippoint is 10%. The actual design trip time is 2.64 seconds. b) If Phase reversal protection is enabled and current is not sensed on one or more current xformer inputs. Logic will detect and trip in a maximum of 0.3 second from compressor start.	Local
19D	Phase Loss - Compressor 1B	Immediate	Latch	Same as Phase Loss - Compressor 1A	Local
19E	Phase Loss - Compressor 2A	Immediate	Latch	Same as Phase Loss - Compressor 1A	Local
19F	Phase Loss - Compressor 2B	Immediate	Latch	Same as Phase Loss - Compressor 1A	Local
184	Phase Loss - Compressor 1A	Immediate	Latch	A phase reversal was detected on the incoming current. On a compressor startup the phase reversal logic must detect and trip in a maximum of .3 second from compressor start.	Local
185	Phase Reversal - Compressor 1B	Immediate	Latch	Same as Phase Reversal - Compressor 1A	Local
186	Phase Reversal - Compressor 2A	Immediate	Latch	Same as Phase Reversal - Compressor 1A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
187	Phase Reversal - Compressor 2B	Immediate	Latch	Same as Phase Reversal - Compressor 1A	Local
1A0	Power Loss - Compressor 1A	Immediate	NonLatch	The compressor had previously established currents while running and then all three phases of current were lost. Design: Less than 10% RLA, trip in 2.64 seconds. This diagnostic will preclude the Phase Loss Diagnostic and the Transition Complete Input Opened Diagnostic from being called out. To prevent this diagnostic from occurring with the intended disconnect of main power, the minimum time to trip must be greater than the guaranteed reset time of the Starter module. Note: This diagnostic prevents nuisance latching diagnostics due to a momentary power loss - It does not protect motor/ compressor from uncontrolled power reapplication. See Momentary Power Loss Diagnostic for this protection. This diagnostic is not active during the start mode before the transition complete input is proven. Thus a random power loss during a start would result in either a "Starter Fault Type 3" or a "Starter Did Not Transition" latching diagnostic.	Remote
1A1	Power Loss - Compressor 1B	Immediate	NonLatch	Same as Power Loss - Compressor 1A	Remote
1A2	Power Loss - Compressor 2A	Immediate	NonLatch	Same as Power Loss - Compressor 1A	Remote
1A3	Power Loss - Compressor 2B	Immediate	NonLatch	Same as Power Loss - Compressor 1A	Remote
8C	Pumpdown Terminated - Circuit 1	Info	NonLatch	The pumpdown cycle for this circuit was terminated abnormally due to excessive time or due to a specific set of diagnostic criteria - but w/o associated latching diagnostics	Remote
8D	Pumpdown Terminated - Circuit 2	Info	NonLatch	Same as Pumpdown Terminated - Circuit 1	Remote

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
1B2	Severe Current Imbalance - Compressor 1A	Immediate	Latch	A 30% Current Imbalance has been detected on one phase relative to the average of all 3 phases for 90 continuous seconds.	Local
1B3	Severe Current Imbalance - Compressor 1B	Immediate	Latch	Same as Severe Current Imbalance - Compressor 1A	Local
1B4	Severe Current Imbalance - Compressor2A	Immediate	Latch	Same as Severe Current Imbalance - Compressor 1A	Local
1B5	Severe Current Imbalance - Compressor2B	Immediate	Latch	Same as Severe Current Imbalance - Compressor 1A	Local
5CD	Starter 1A Comm Loss: MP	Immediate	Latch	Starter has had a loss of communication with the MP for a 15 second period.	Local
6A7	Starter 1A Dry Run Test	Immediate	Latch	While in the Starter Dry Run Mode either 50 % Line Voltage was sensed at the Potential Transformers or 10 % RLA Current was sensed at the Current Transformers.	Local
5CE	Starter 1B Comm Loss: MP	Immediate	Latch	Starter has had a loss of communication with the MP for a 15 second period.	Local
6A8	Starter 1B Dry Run Test	Immediate	Latch	While in the Starter Dry Run Mode either 50 % Line Voltage was sensed at the Potential Transformers or 10 % RLA Current was sensed at the Current Transformers.	Local
5CF	Starter 2A Comm Loss: MP	Immediate	Latch	Starter has had a loss of communication with the MP for a 15 second period.	Local
6A9	Starter 2A Dry Run Test	Immediate	Latch	While in the Starter Dry Run Mode either 50 % Line Voltage was sensed at the Potential Transformers or 10 % RLA Current was sensed at the Current Transformers.	Local
5D0	Starter 2B Comm Loss: MP	Immediate	Latch	Starter has had a loss of communication with the MP for a 15 second period.	Local
6AA	Starter 2B Dry Run Test	Immediate	Latch	Starter 2B Dry Run Test While in the Starter Dry Run Mode either 50 % Line Voltage was sensed at the Potential Transformers or 10 % RLA Current was sensed at the Current Transformers.	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
CC	Starter Contactor Interrupt Failure - Compressor 2A	Special Model	Latch	Detected compressor currents greater than 10% RLA on any or all phases when the compressor was commanded off. Detection time shall be 5 second minimum and 10 seconds maximum. On detection and until the controller is manually reset: generate diagnostic, energize the appropriate alarm relay, continue to energize the Evap Pump Output, continue to command the affected compressor off, fully unload the effected compressor and command a normal stop to all other compressors. For as long as current continues, perform liquid level and fan control on the circuit effected.	Local
CA	Starter Contactor Interrupt Failure - Compressor 1A	Special Model	Latch	Same as Starter Contactor Interrupt Failure - Compressor 2A	Local
CB	Starter Contactor Interrupt Failure - Compressor 1B	Special Model	Latch	Same as Starter Contactor Interrupt Failure - Compressor 2A	Local
CD	Starter Contactor Interrupt Failure - Compressor 2B	Special Model	Latch	Same as Starter Contactor Interrupt Failure - Compressor 2A	Local
180	Starter Did Not Transition - Compressor1A	Immediate	Latch	The Starter Module did not receive a transition complete signal in the designated time from its command to transition. The must hold time from the Starter Module transition command is 1 second. The Must trip time from the transition command is 6 seconds. Actual design is 2.5 seconds. This diagnostic is active only for Y-Delta, Auto-Transformer, Primary Reactor, and X-Line Starters.	Local
181	Starter Did Not Transition - Compressor1B	Immediate	Latch	Same as Starter Did Not Transition - Compressor 1A	Local
182	Starter Did Not Transition - Compressor2A	Immediate	Latch	Same as Starter Did Not Transition - Compressor 1A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
183	Starter Did Not Transition - Compressor2B	Immediate	Latch	Same as Starter Did Not Transition - Compressor 1A	Local
6A3	Starter Failed to Arm/Start - Cprsr1A	Info	Latch	Starter failed to arm or start within the allotted time (15 seconds).	Local
6A4	Starter Failed to Arm/Start - Cprsr1B	Info	Latch	Same as Starter Failed to Arm/Start - Cprsr 1A	Local
6A5	Starter Failed to Arm/Start - Cprsr2A	Info	Latch	Same as Starter Failed to Arm/Start - Cprsr 1A	Local
6A6	Starter Failed to Arm/Start - Cprsr2B	Info	Latch	Same as Starter Failed to Arm/Start - Cprsr 1A	Local
1E9	Starter Fault Type I - Compressor 1A	Immediate	Latch	This is a specific starter test where 1M(1K1) is closed first and a check is made to ensure that there are no currents detected by the CT's. If currents are detected when only 1M is closed first at start, then one of the other contactors is shorted.	Local
1EA	Starter Fault Type I - Compressor 1B	Immediate	Latch	Same as Starter Fault Type I - Compressor 1A	Local
1EB	Starter Fault Type I - Compressor 2A	Immediate	Latch	Same as Starter Fault Type I - Compressor 1A	Local
1EC	Starter Fault Type I - Compressor 2B	Immediate	Latch	Same as Starter Fault Type I - Compressor 1A	Local
1ED	Starter Fault Type II - Compressor1A	Immediate	Latch	a. This is a specific starter test where the Shorting Contactor (1K3) is individually energized and a check is made to ensure that there are no currents detected by the CT's. If current is detected when only S is energized at Start, then 1M is shorted. b. This test in a. above applies to all forms of starters (Note: It is understood that many starters do not connect to the Shorting Contactor.)	Local
1EE	Starter Fault Type II - Compressor1B	Immediate	Latch	Same as Starter Fault Type II - Compressor 1A	Local
1EF	Starter Fault Type II - Compressor2A	Immediate	Latch	Same as Starter Fault Type II - Compressor 1A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
1F0	Starter Fault Type II - Compressor2B	Immediate	Latch	Same as Starter Fault Type II - Compressor 1A	Local
1F1	Starter Fault Type III - Compressor1A	Immediate	Latch	As part of the normal start sequence to apply power to the compressor, the Shorting Contactor (1K3) and then the Main Contactor (1K1) were energized. 1.6 seconds later there were no currents detected by the CT's for the last 1.2 Seconds on all three phases. The test above applies to all forms of starters except Adaptive Frequency Drives.	Local
1F2	Starter Fault Type III - Compressor1B	Immediate	Latch	Same as Starter Fault Type III - Compressor 1A	Local
1F3	Starter Fault Type III - Compressor2A	Immediate	Latch	Same as Starter Fault Type III - Compressor 1A	Local
1F4	Starter Fault Type III - Compressor2B	Immediate	Latch	Same as Starter Fault Type III - Compressor 1A Local 5C7 Starter Module Memory Error Type 1 - Starter 2A Info Latch Checksum on RAM copy of the Starter LLID configuration failed. Configuration recalled from EEPROM.	Local
5C7	Starter Module Memory Error Type 1 - Starter 2A	Info	Latch	Checksum on RAM copy of the Starter LLID configuration failed. Configuration recalled from EEPROM.	Local
5C8	Starter Module Memory Error Type 1 - Starter 2B	Info	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local
5C5	Starter Module Memory Error Type 1 - Starter 1A	Info	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local
5C6	Starter Module Memory Error Type 1 - Starter 1B	Info	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local
5C9	Starter Module Memory Error Type 2 - Starter1A	Immediate	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5CA	Starter Module Memory Error Type 2 - Starter1B	Immediate	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local
5CB	Starter Module Memory Error Type 2 - Starter2A	Immediate	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local
5CC	Starter Module Memory Error Type 2 - Starter2B	Immediate	Latch	Same as Starter Module Memory Error Type 1 - Starter 2A	Local
6B1	Starter Panel High Temperature Limit - Panel 1, Cprsr 1B	Special Model	Latch	Starter Panel High Limit Thermostat (170° F) trip was detected. Note: Other diagnostics that may occur as an expected consequence of the Panel High Temp Limit trip will be suppressed from annunciation. These include Phase Loss, Power Loss, and Transition Complete Input Open for Cprsr 1B	Local
6B0	Starter Panel High Temperature Limit - Panel 1, Cprsr 2A	Special Model	Latch	Same as Starter Panel High Temperature Limit - Panel 1, Cprsr 1B	Local
6B2	Starter Panel High Temperature Limit - Panel 1, Cprsr 2B	Special Model	Latch	Same as Starter Panel High Temperature Limit - Panel 1, Cprsr 1B	Local
5BA	Suction Refrigerant Pressure Transducer - Circuit 1, Compressor1A	Immediate	Latch	Bad Sensor or LLID Circuit target if no isolation valves, Compressor target if isolation valves. Design Note: In the case of manifolded compressors w/o isolation valves, the occurrence of this diagnostic will also generate a comm loss with the nonexistent Suction Press Cprsr 1B in order to accomplish circuit shutdown.	Local
5BB	Suction Refrigerant Pressure Transducer - Circuit 1, Compressor1B	Immediate	Latch	Same as Suction Refrigerant Pressure Transducer - Circuit 1, Compressor 1A	Local
5BC	Suction Refrigerant Pressure Transducer - Circuit 1, Compressor2A	Immediate	Latch	Same as Suction Refrigerant Pressure Transducer - Circuit 1, Compressor 1A	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5BD	Suction Refrigerant Pressure Transducer - Circuit 1, Compressor2B	Immediate	Latch	Same as Suction Refrigerant Pressure Transducer - Circuit 1, Compressor 1A	Local
5B0	Transition Complete Input Opened - Compressor1A	Immediate	Latch	The Transition Complete input was found to be opened with the compressor motor running after a successful completion of transition. This is active only for Y-Delta, Auto-Transformer, Primary Reactor, and X-Line Starters. To prevent this diagnostic from occurring as the result of a power loss to the contactors, the minimum time to trip must be greater than the trip time for the power loss diagnostic.	Local
5B1	Transition Complete Input Opened - Compressor1B	Immediate	Latch	Same as Transition Complete Input Opened - Compressor 1A	Local
5B2	Transition Complete Input Opened - Compressor2A	Immediate	Latch	Same as Transition Complete Input Opened - Compressor 1A	Local
5B3	Transition Complete Input Opened - Compressor2B	Immediate	Latch	Same as Transition Complete Input Opened - Compressor 1A	Local
5AC	Transition Complete Input Shorted - Compressor 1A	Immediate	Latch	The Transition Complete input was found to be shorted before the compressor was started. This is active for all electromechanical starters.	Local
5AD	Transition Complete Input Shorted - Compressor 1B	Immediate	Latch	Same as Transition Complete Input Opened - Compressor 2B	Local

Hex Code	Diagnostic Name and Source	Severity	Persis-tence	Criteria	Reset Level
5AE	Transition Complete Input Shorted - Compressor 2A	Immediate	Latch	Same as Transition Complete Input Opened - Compressor 2B	Local
5AF	Transition Complete Input Shorted - Compressor 2B	Immediate	Latch	Same as Transition Complete Input Opened - Compressor 2B	Local
D8	Under Voltage	Immediate	NonLatch	a. Line voltage below - 10% of nominal or the Under/ Overvoltage transformer is not connected. [Must hold = - 10 % of nominal. Must trip = - 15 % of nominal. Reset differential = min. of 2% and max. of 4%. Time to trip = min. of 1 min. and max. of 5 min.) Design: Nom. trip: 60 seconds at less than 87.5%, + or - 2.8% at 200V or + or - 1.8% at 575V, Auto Reset at 90% or greater.	Local
771	Very Low Evaporator Refrigerant Pressure - Circuit 1	Immediate	Latch	The evaporator pressure dropped below 10 psia (or 5 psia in software prior to Oct '02)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 compressor or circuit is locked out, the suction pressure transducer(s)associated with it, will be excluded from causing this diagnostic.	Local
772	Very Low Evaporator Refrigerant Pressure - Circuit 2	Immediate	Latch	Same as Very Low Evaporator Refrigerant Pressure - Circuit 1	Local

Pre-Start Checkout

Installation Checklist

Complete this checklist as the unit is installed and verify that all recommended proce-dures are accomplished before the unit is started. This checklist does not replace the detailed instructions given in the "Installation -Mechanical" and "Installation -Electri¬cal" sections of this manual. Read both sections completely, to become familiar with the installation procedures, prior to beginning the work.

Receiving

- Verify that the unit nameplate data corresponds to the ordering information.
- Inspect the unit for shipping damage and any shortages of materials. Report any damage or shortage to the carrier.

Unit Location and Mounting

- Inspect the location desired for installation and verify adequate service access clearances.
- Provide drainage for evaporator water.
- Remove and discard all shipping materials (cartons, etc.)
- Install optional rubber isolators, if required.
- Level the unit and secure it to the mounting surface.

Unit Piping

- Flush all water piping before making final connections to the unit.

⚠ CAUTION

Proper Water Treatment!

The use of untreated or improperly treated water in the Unit 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. If using an acidic commercial flushing solution, construct a temporary bypass around the unit to prevent damage to internal components of the evaporator.

- Connect the chilled water piping to the evaporator.
- Install pressure gauges and shutoff valves on the chilled water inlet and outlet to the evaporator.
- Install a water strainer in the entering chilled water line.
- Install a balancing valve and flow switch (recommended) in the leaving chilled water line.

- Install a drain with shutoff valve or a drain plug on the evaporator waterbox.
- Vent the chilled water system at high points in the system piping.
- Apply heat tape and insulation, as necessary, to protect all exposed piping from freeze-up.

Electrical Wiring

⚠ WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

⚠ CAUTION

Live Electrical Components!

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.

- Connect the unit power supply wiring with fused-disconnect to the terminal block or lugs (or unit-mounted disconnect) in the power section of the control panel.
- Connect power supply wiring to the evaporator heaters.
- Connect power supply wiring to the chilled water pump.
- Connect power supply wiring to any auxiliary heat tapes.
- Connect the flow switch and then connect to the proper terminals.
- Connect the chilled water pump to the proper terminals.
- For the External Auto/Stop function, install wiring from remote contacts (5K14, 5K15) to the proper terminals on the circuit board.
- Connect the power supply for the convenience outlet, if it is separate from the evaporator heater.

⚠ CAUTION

Information in Interconnecting Wiring!

Chilled Water Pump Interlock and External Auto/Stop must be adhered to or equipment damage may occur.

- If alarm and status relay outputs are used, install leads from the panel to the proper terminals on circuit board.
- If the emergency stop function is used, install low voltage leads to terminals on circuit board.
- Connect separate power for the External Emergency Stop option, if applicable.
- If the ice making-option is used, install leads on 5K18 to the proper terminals on 1U7.
- Connect separate power supply for ice making status circuit, if applicable.

General

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 w/Capacitors!

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1. Inspect all wiring connections in the compressor power circuits (disconnects, ter¬minal block, contactors, compressor junction box terminals, etc.). to be sure they are clean and tight.
2. Open all refrigerant valves in the discharge, liquid, suction, oil and oil return lines.
3. Check the power supply voltage to the unit at the main power fused-disconnect switch. Voltage must be within the voltage utilization range and also stamped on the unit nameplate. Voltage imbalance must not exceed 3%.
4. Check the unit power phasing L1-L2-L3 in the starter to be sure that it has been installed in an "ABC" phase sequence.

⚠ CAUTION

Connections!

Verify all connections are made. Loose connections can cause overheating and undervoltage conditions at the compressor motor. 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.

⚠ CAUTION

Compressor Damage!

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

5. Fill the evaporator chilled water circuit. Vent the system while it is being filled. Open the vents on the top of the evaporator waterbox while filling and close when filling is completed.
6. Close the fused-disconnect switch(es) that supplies power to the chilled water pump starter.
7. Start the chilled water pump to begin circulation of the water. Inspect all piping for leakage and make any necessary repairs.
8. With water circulating through the system, adjust water flow and check water pressure drop through the evaporator.
9. Adjust the chilled water flow switch for proper operation.
10. Reapply power to complete procedures.
11. Prove all Interlock and Interconnecting Wiring Interlock and External as described in the Electrical Installation section.
12. Check and set, as required, all CH530 menu items.
13. Stop the chilled water pump.
14. Energize compressor and oil separator heaters 24 hours prior to unit start-up.

⚠ CAUTION

Proper Water Treatment!

The use of untreated or improperly treated water in the unit 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.

⚠ CAUTION

Proper Water Treatment!

The use of untreated or improperly treated water in the unit 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.

⚠ CAUTION

Use Piping Strainers!

To prevent evaporator damage, pipe strainers must be installed in the water supplies to protect components from water born debris. Trane is not responsible for equipment-only-damage caused by water born debris.

Unit Voltage Power Supply

Voltage to the unit must meet the criteria given in the Installation-Electrical Section. 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.

⚠ CAUTION

Equipment Damage!

Provide adequate voltage to the unit. Failure to do so can 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 three-phase system can cause motors to overheat and eventually fail. The maximum allowable imbalance is 3%. Voltage imbalance is determined using the following calculations:

$$\% \text{ Imbalance} = \frac{(Vx - Vave) \times 100}{Vave}$$

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

Vx = phase with the greatest difference from V ave (without regard to the 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 the imbalance is then:

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

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

Unit Voltage Phasing

⚠ CAUTION

Compressor Damage!

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

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 rota¬tion 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 gener-ated, differing in phase by 120 electrical degrees. The order in which the three volt-ages 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 counterclock¬wise, "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 indi¬cator 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, and follow this procedure.

1. Press the STOP key on the CH530.
2. 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 unit-mounted disconnect).

⚠ WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

3. Connect the phase sequence indicator leads to the line Power terminal block, as follows:

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

4. Turn power on by closing the unit supply power fused-disconnect switch.
5. Read the phase sequence on the indicator. The "ABC" LED on the face of the phase indicator will glow if phase is "ABC."
6. 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 dis¬connect). Re-close the main power disconnect and recheck the phasing.
7. Reopen the unit disconnect and disconnect the phase indicator.

⚠ CAUTION

Compressor Damage!

Do not interchange any load leads that are from the unit contactors or the motor terminals. Doing so may damage the equipment.

Water System Flow Rates

Establish a balanced chilled water flow through the evaporator. The flow rates should fall between the minimum and maximum values given on the pressure drop curves. 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 in the evap¬orator.

Water System 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. Do not include valves, strainers fittings in the pressure drop readings.

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

CH530 Set-Up

Use of TechView service tool is required to view and adjust most settings. Refer to the Controls Interface section for instruction on adjustment of the settings.

Unit Start-Up Procedures

Daily Unit Start-Up

The time line for sequence of operation is shown at the end of this section and depicts the nominal delays and sequences that a chiller would experience during a typical operational cycle. The time line begins with a power up of the main power to the chiller. The sequence assumes a 2 circuit, 2 compressor air-cooled RTAC chiller with no diagnostics or malfunctioning components. External events such as the oper¬ator placing the chiller in Auto or Stop, chilled water flow through the evaporator, and application of load to the chilled water loop causing loop water temperature increases are depicted and the chillers responses to those events are shown, with appropriate delays noted. The effects of diagnostics, and other external interlocks other than evaporator water flow proving, are not considered. The response of the EasyView Display is also depicted on the time line.

NOTE: *Unless the CH530 TechView and building automation system are controlling the chilled water pump, the manual unit start sequence is as follows. Operator actions are noted.*

⚠ CAUTION

Compressor Damage!

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

General

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 com¬pressors.

⚠ 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).

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

1. Check the evaporator refrigerant pressure and the condenser refrigerant pressure under Refrigerant Report on the CH530 TechView. The pressures are referenced to sea level (14.6960 psia).
2. 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 some¬times 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 Information Section.

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.*

3. Measure the system subcooling.
4. A shortage of refrigerant is indicated if operating pressures are low and subcool-ing 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 vapor by connecting the charg-ing line to the suction service valve and charging through the backseat port until operating conditions become normal.

⚠ 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 refrigerants specified on the unit nameplate (HFC 134a) and Trane OIL00048. Failure to do so may cause compressor damage and improper unit operation.

Seasonal Unit Start-Up Procedure

1. Close all valves and re-install the drain plugs in the evaporator.
2. Service the auxiliary equipment according to the start-up/maintenance instruc¬tions provided by the respective equipment manufacturers.
3. Close the vents in the evaporator chilled water circuits.
4. Open all the valves in the evaporator chilled water circuits.
5. Open all refrigerant valves to verify they are in the open condition.
6. 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.

7. Check the adjustment and operation of each safety and operating control.
8. Close all disconnect switches.
9. Refer to the sequence for daily unit startup for the remainder of the seasonal startup.

System Restart After Extended Shutdown

Follow the procedures below to restart the unit after extended shutdown:

1. Verify that the liquid line service valves, oil line, compressor discharge service valves and suction service valves are open (backseated).

⚠ 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.

2. Check the oil separator oil level (see Maintenance Procedures section).
3. Fill the evaporator water circuit. Vent the system while it is being filled. Open the vent on the top of the evaporator and condenser while filling and close when fill¬ing is completed

⚠ CAUTION

Proper Water Treatment!

The use of untreated or improperly treated water in the unit 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.

4. Close the fused-disconnect switches that provides power to the chilled water pump.
5. Start the evaporator water pump and, while water is circulating, inspect all piping for leakage. Make any necessary repairs before starting the unit.
6. While the water is circulating, adjust the water flows and check the water pres-sure drops through the evaporator. Refer to “Water System Flow Rates” and “Water System Pressure Drop”.
7. Adjust the flow switch on the evaporator piping for proper operation.
8. Stop the water pump. The unit is now ready for start-up as described in “Start-Up Procedures”.

Unit Shutdown Procedure

Temporary Shutdown And Restart

To shut the unit down for a short time, use the following procedure:

1. Press the STOP key on the CH530. The compressors will continue to operate and, after an unloading period (which may be followed by pumpdown cycle in out¬door ambients below 50oF), will stop when the compressor contactors de-ener¬gize.
2. CH530 pump control will turn off the pump (after a minimum 1 min. delay) when the STOP key is pressed and automatically restart the pump when the unit starts normally.
3. The unit will start normally, provided the following conditions exist:

- The CH530 receives a call for cooling and the differential-to-start is above the setpoint. – All system operating interlocks and safety circuits are satisfied.

Extended Shutdown Procedure

The following procedure is to be followed if the system is to be taken out of service for an extended period of time, e.g. seasonal shutdown:

1. Test the unit for refrigerant leaks and repair as necessary.
2. Open the electrical disconnect switches for the chilled water pump. Lock the switches in the "OPEN" position.

⚠ CAUTION

Chilled Water

Lock the chilled water pump disconnects open, to prevent pump damage.

3. Close all chilled water supply valves. Drain the water from the evaporator.
4. With the water drained from evaporator, the "customer provided" power for the 120-volt evaporator heaters (terminated at 1TB4...terminals 1 & 2) must be must disconnect.
   These heaters consist of 1 well heater in each evaporator end (or water box), and the heat tape, which is wrapped around the bundle itself. They are energized by a klixon temperature control mounted on the side of the evaporator, which energizes at or below 37oF. outside air temp. If there is no liquid in the evaporator and the temp drops below 37 degrees, both of the well heaters will burn up because they have no liquid to transfer their heat into.
5. Open the unit main electrical disconnect and unit-mounted disconnect (if installed) and lock on the "OPEN" position. If the optional control power trans-former is not installed, open and lock the 115V disconnect.

⚠ CAUTION

Disconnect Power!

Lock the disconnects in the "OPEN" position to prevent accidental start-up and damage to the system when it has been setup for extended shutdown.

6. At least every three months (quarterly), check the refrigerant pressure in the unit to verify that the refrigerant charge is intact.

Periodic Maintenance

Perform all maintenance procedures and inspections at the recommended intervals. This will prolong the life of the chiller and minimize the possibility of costly failures.

Use an "Operator's Log", such as that shown at the end of the section, to record an operating history for the unit. 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 does not operate properly during maintenance inspections, refer to "Diagnostics and Troubleshooting".

After the unit has been operating for approximately 30 minutes and the system has stabilized, check the operating conditions and complete the procedures below:

Weekly Maintenance

While unit is running in stable conditions.

1. Check MP pressure for evaporator, condenser and intermediate oil.
2. Observe liquid line sight glass on EXV.
3. If liquid line sight glass has bubbles measure the subcooling entering the EXV. The subcooling should never be less than 4° F under any circumstances.

A clear sightglass alone does not mean that the system is properly charged. Also check the rest of the system operating conditions.

4. 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.

Monthly Maintenance

1. Perform all weekly maintenance procedures.
2. Record the system subcooling.
3. Make any repairs necessary.

Annual Maintenance

1. Perform all weekly and monthly procedures.
2. Check oil sump oil level while unit is off.

NOTE: *Routine changing of the oil is not required. Use an oil analysis to determine the condition of the oil.*

3. Have a qualified laboratory perform a compressor oil analysis to determine sys-tem moisture content and acid level. This analysis is a valuable diagnostic tool.
4. Contact a qualified service organization to leak test the chiller, to check operating and safety controls, and to inspect electrical components for deficiencies.

5. Inspect all piping components for leakage and damage. Clean out any inline strainers.
6. Clean and repaint any areas that show signs of corrosion.
7. Clean the condenser coils.

⚠ WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

8. Check and tighten all electrical connections as necessary.

Table31. RTAC Start-up Test Log

RTAC Start-up Test Log			
Job Name		Job Location	
Model #			
Serial #		CRC#	
Sales Order # Ship Date		Job Elevation (ft. above sea level)	
Starter Data:		**Start-up Only**	
Manufacturer		Chiller Appearance on arrival:	
Type: (wye-delta or x-line)		Machine gauge pressure:	ckt1/ckt2
Vendor ID #/ Model #:		Machine CH.530 pressure	ckt1/ckt2
Volts Amps Hz		Unit R-134a Charge	lbs
Compressor Data:		Unit oil charge (OIL00048)	gal
Compressor A:		**Pressure Test (if required)**	
	Model #:	Vacuum after leak test= mm	
	Serial #	Standing Vacuum test= mm rise in hrs	
	RLA	**Current Transformers**	
	KW	Part number ("X" code and 2-digit extension)	
	Volts	X	
	HZ	X	
Compressor B:		X	
	Model #:	X	
	Serial #	X	
	RLA	X	
	KW	**Summary of Options Installed**	
	Volts	Y N	Tracer Communications Interface
	HZ	Y N	Ice Making
Compressor C:		Y N	Other
	Model #:	Y N	Other
	Serial #	Y N	Other
	RLA	**Evap Design Conditions**	
	KW	GPM	PSID
	Volts	Entering Water:	Leaving Water:
	HZ	% Glycol:	
Compressor D:		Type of Glycol:	
	Model #:		
	Serial #	Evap Actual Conditions	
	RLA	GPM	PSID
	KW	Entering Water:	Leaving Water:
	Volts	% Glycol:	
	HZ	Type of Glycol:	

Table32. RTAC Unit Configuration

RTAC Unit Configuration		
Job Name	Job Location	
Model #		
Serial #	CRC#	
Sales Order # Ship Date	Job Elevation (ft. above sea level)	
Setpoint View *		
Front Panel Degree Units (circle one)		F or C
Front Panel Chilled Water Setpoint		
Front Panel Current Limit		
Differential to Stop		
Differential to Start		
Leaving Water Temperature Cutout		
Low Refrigerant Temperature Cutout		
Condenser Limit		
Low Ambient Lockout Setpoint		
Low Ambient Lockout (circle one)	Enable or Disable	
Under/Over Voltage Protection	Enable or Disable	
Local Atmospheric Pressure		
Design Delta T		
重新设定类型	None	
	Return Reset Type	
	Outdoor Air Temp.	
	Constant Return	
Return Reset Ratio		%
Return Start Reset		
Return Max Reset		
Outdoor Reset Ratio		%
Outdoor Start Reset		
Outdoor Max Reset		
Chilled Water Pump Delay Time		minutes
Chilled Water Setpoint Filtering Settling Time		sec
Compressor Staging Deadband		
Compressor Service View **		
Unit Status:		
Circuit 1 Control		
Front Panel Circuit Lockout (circle one)	Locked or Unlocked	
Electronic Expansion Valve (circle one)	Open or Auto	
Circuit 2 Control		
Front Panel Circuit Lockout (circle one)	Locked or Unlocked	
Electronic Expansion Valve (circle one)	Open or Auto	

Configuration ***
Nameplate
Model #
Confirm Code
Serial Number

Note:

* Using Techview, click on "View" and then click "Setpoint View" Log accordingly.

** Using Techview, click on "View" and then click "Compressor Service View" Log accordingly.

*** Using Techview, click on "View" and then click "Configuration" (Nameplate Tab) Log accordingly.

Table33. RTAC Chiller Log

RTAC Chiller Log							
Job Name				Job Location			
Model #				Serial #			
Status View: *							
Chiller Tab:		15 min	30 min	45 min	15 min	30 min	45 min
Operating Mode							
Outdoor Air Temperature	F or C						
Active Chill Water Setpoint	F or C						
Active Current Limit Setpoint	F or C						
Evaporator Entering Water Temp.	F or C						
Evaporator Leaving Water Temp.	F or C						
		Circuit 1 Tab			**Circuit 2 Tab**		
External Hardwired Lockout		Not Locked out/ Locked out			Not Locked out/ Locked out		
Front Panel Lockout		Not Locked out/ Locked out			Not Locked out/ Locked out		
		15 min	30 min	45 min	15 min	30 min	45 min
AirFlow	%						
Inverter Speed	%						
Condenser Refrigerant Pressure	psig/kPa						
Saturated Condenser Rfgt. Temp.	F or C						
Differential Refrigerant Pressure	psid/kPA						
Evaporator Refrigerant Pressure	psig/kPa						
Saturated Evaporator Rfgt.Temp.	F or C						
EXV Position	%						
Evaporator Rfgt Liquid Level	inches/mm						
		Compressor 1A Tab			**Compressor 1B Tab**		
Operating Mode							
Hours				Hrs/mins			Hrs/mins
Starts							
		15 min	30 min	45 min	15 min	30 min	45 min
Phase A - B Voltage	volts						
Average Line Current	%RLA						
Line 1 current	amps						
Line 2 current	amps						
Line 3 current	amps						
Line 1 current	%RLA						
Line 2 current	%RLA						
Line 3 current	%RLA						

Table33. RTAC Chiller Log

RTAC Chiller Log							
Evaporator Oil Return Solenoid		open /closed	open /closed	open /closed	open /closed	open /closed	open /closed
Supply Oil Temperature	F or C						
Intermediate Oil Pressure	psig/kPa						
Female Step solenoid		load / unload	load / unload	load / unload	load / unload	load / unload	load / unload
High Pressure Cutout switch		Good /Tripped	Good /Tripped	Good /Tripped	Good /Tripped	Good /Tripped	Good /Tripped
Comments:							
		Compressor 2A Tab			**Compressor 2B Tab**		
Operating Mode							
Hours				Hrs/mins			Hrs/mins
Starts							
		15 min	30 min	45 min	15 min	30 min	45 min
Phase A - B Voltage	volts						
Average Line Current	%RLA						
Line 1 current	amps						
Line 2 current	amps						
Line 3 current	amps						
Line 1 current	%RLA						
Line 2 current	%RLA						
Line 3 current	%RLA						
Evaporator Oil Return Solenoid		open /closed	open /closed	open /closed	open /closed	open /closed	open /closed
Supply Oil Temperature	F or C						
Intermediate Oil Pressure	psig/kPa						
Female Step solenoid		load / unload	load / unload	load / unload	load / unload	load / unload	load / unload
High Pressure Cutout switch		Good /Tripped	Good /Tripped	Good /Tripped	Good /Tripped	Good /Tripped	Good /Tripped
Comments:							

Maintenance Procedures

Refrigerant and Oil Charge Management

Proper oil and refrigerant charge is essential for proper unit operation, unit perfor-mance, and environmental protection. Only trained and licensed service personnal should service the chiller.

Some symptoms of a refrigerant under-charged unit:

- Low subcooling
- Higher than normal discharge superheat
- Bubbles in EXV sight glass
- Low liquid level diagnostic
- Larger than normal evaporator approach temperatures (leaving water temperature - saturated evaporator temperature)
- Low evaporator refrigerant temperature limit
- Low refrigerant temperature cutout diagnostic
- Fully open expansion valve
- Possible whistling sound coming from liquid line (due to high vapor velocity)
- High condenser + subcooler pressure drop

Some symptoms of a refrigerant over-charged unit:

- High subcooling
- Evaporator liquid level higher than centerline after shut down
- Larger than normal condenser approach temperatures (entering condenser satu-rated temperature – entering air temperature)
- Condenser pressure limit
- High pressure cutout diagnostic
- More than normal number of fans running
- Erratic fan control
- Higher than normal compressor power
- Very low discharge superheat at startup
- Compressor rattle or grinding sound at startup

Some symptoms of an oil over-charged unit:

- Larger than normal evaporator approach temperatures (leaving water temperature - saturated evaporator temperature)
- Low evaporator refrigerant temperature limit
- Erratic liquid level control
- Low unit capacity
- Low discharge superheat (especially at high loads)
- Low liquid level diagnostics
- High oil sump level after normal shut down

Some symptoms of an oil under-charged unit:

- Compressor rattle or grinding sound
- Lower than normal pressure drop through oil system
- Seized or welded compressor
- Low oil sump level after normal shut down
- Lower than normal oil concentrations in evaporator

R134a Field Charging Procedure

Be certain that the electrical power to the unit is disconnected before performing this procedure.

⚠ WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. For variable frequency drives or other energy storing components provided by Trane or others, refer to the appropriate manufacturer's literature for allowable waiting periods for discharge of capacitors. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

Factory (initial) Refrigerant Charging Procedure

The initial charging procedure should be followed the first time the unit is charged in the factory, as well as for charging any time after the charge has been completely removed from the entire system in the event of repair.

1. As part of automatic vacuum/charge procedure, verify that the EXVs are OPEN.
2. Attach vacuum hoses to evaporator service valves (one per circuit). Open service valves.
3. Attach charging hoses to the charging port on the liquid line filter (one per circuit). The filters contain a port with a ¼" (6mm) flare.
4. Begin semi-automatic vacuum procedure.
5. When vacuum is complete (indicated), manually isolate the unit from vacuum.
6. Charge unit through the filter housing port per Table 1 - Table 4.
7. When charging is complete, shut evaporator service valve and disconnect vacuum and charging hoses.

Field Refrigerant Charging Procedure

Follow this procedure when the unit is empty of all refrigerant and under a vacuum. Add the charge through the evaporator service valve.

⚠ CAUTION

Evaporator Damage!

Water must be flowing through the evaporator during the entire charging process to avoid freezing and rupturing of the evaporator tubes. Charge first with vapor to avoid freezing tubes.

1. Note the weight of the amount of charge removed. Compare it to Table 1 - Table 4. A difference in charge may indicate a leak.
2. Attach charging hose to evaporator service valve (3/8" (9mm) flare). Open service valve.
3. Add charge to evaporator to bring total circuit charge up to the level indicated in the above chart.
4. Close service valve and disconnect charging hose.

Adding charge:

This procedure should be followed when adding charge to an undercharged unit. When low charge is indicated by low subcooling in the liquid line, charge should be added until sufficient subcooling is achieved.

1. Attach charging hose to evaporator service valve (3/8" (9mm) flare). Open service valve.
2. Add 10 pounds of refrigerant (R-134a) charge.
3. Close valve, remove charging hose and start unit. Monitor subcooling.
4. If subcooling is still insufficient, return to step #1.

NOTE: *Proper subcooling can be determined from run log history, service experience, or by contacting Trane technical service.*

Charge Isolation in the high or low side of system

All the refrigerant may be trapped into the high side (condenser) of the unit for main¬tenance on the compressor or low side. With the suction line service valve option, charge may also be isolated in the evaporator for maintenance on the compressor or the high side. It is preferable to isolate the charge in the evaporator, if this option is available.

High side charge isolation procedure:

1. Make sure circuit is off.
2. Shut liquid line service valve.
3. Shut oil return line service valve.
4. Start circuit with the service tool (access compressor service view in Techview)

5. When unit trips, the discharge check valve will close.
6. Close discharge isolation valve.
7. Close oil line shut off valve.
8. Recover the remainder of the refrigerant.– All fans will turn on – EXV will open 100% – Oil return line solenoid (if included) will open – Unit will start at minimum load – Unit will run until it cuts out on low pressure (~6 psia) (0.41 bar) – Monitor pressure with a suction gauge

NOTE: *Remaining vapor can be recovered/stored in the high side of the system.*
Be certain to follow proper recovery procedures to avoid introduction of non-condens-able gases.

9. The low side and compressor may be serviced at this time.

Table34. Charge Holding Capabilities on High Side

Nominal Circuit CapacityRT	Nominal Circuit Charge kg	Condenser Charge Holding Capacity @ 60% full 90o ambient kg	Charge in Oil Separator kg	Oil Separator Level %
70	75	53.6	21.3	97.7
85	79	61.0	18.5	86.0
100	98	74.3	23.3	56.0
120	102	85.3	16.8	41.2
170	166	92.3	73.4	100.0
200	188	128.0	60.4	86.1
240	209	147.8	61.0	86.9
Circuit varies slightly with efficiency and unit configuration				

NOTE: *Units with a design sequence of A0 did not have enough capacity in the condenser to hold the entire charge. Table 32 lists the amount of charge that would flood the oil separator if the charge was isolated in the high side. For this reason, when getting the unit back to running condition, care must be taken to drive the refrig-erant out of the oil separator using the oil separator heaters.*

Returning unit to running condition:

1. Open all valves.
2. Manually open EXV for 15 minutes to allow refrigerant to drain to evaporator by gravity (ensure water is flowing in the evaporator prior to opening the EXV).
3. Let unit sit with heaters on to drive refrigerant out of oil and warm up compressor bearings. Depending upon ambient conditions, this may take up to 24 hours.Ensure the UCM is powered so the pump may be energized if it detects a freeze condition.
4. Once the oil level has returned to normal, the unit can be put back into operation.

Low side charge isolation procedure:

After normal shut down under some conditions most of the charge resides in the evaporator. Running cold water through the evaporator may also drive much of the refrigerant to the evaporator.

1. Make sure circuit is off.
2. Close suction line isolation valve.
3. Close oil return line service valve.
4. Close liquid line service valve.
5. Manually open EXV.
6. Use a liquid pump or vacuum pump to move refrigerant from the condenser to evaporator. The liquid pump will only be effective if there is a lot of charge in the condenser. It may be connected to the condenser drain port on the liquid line isolation valve.

NOTE: *If a pump is to be used, connect it before closing this valve. This port is only isolated when the valve is back seated. If a vacuum pump is used, then connect it to the discharge line service valve near the oil separator.*

A vacuum pump will be required for part of the procedure.

The evaporator is large enough to hold all the charge for any unit to below the center-line of the shell. Therefore, no special precautions are required to restart the unit after isolating the charge in the evaporator.

Refrigerant Filter Replacement Procedure

A dirty filter is indicated by a temperature gradient across the filter, corresponding to a pressure drop. If the temperature downstream of the filter is 8° F (4.4° C) lower than the upstream temperature, the filter should be replaced. A temperature drop can also indicate that the unit is undercharged. Ensure proper subcooling before taking tem¬perature readings.

1. With the unit off, verify that the EXV is closed. Close liquid line isolation valve. On units with remote evaporators or oil cooling circuits, close ball valve on oil cooler liquid line.
2. Attach hose to service port on liquid line filter flange.

3. Evacuate refrigerant from liquid line and store.
4. Remove hose.
5. Depress schrader valve to equalize pressure in liquid line with atmospheric pressure.
6. Remove bolts that retain filter flange.
7. Remove old filter element.
8. Inspect replacement filter element and lubricate o-ring with Trane OIL00048.
9. Install new filter element in filter housing.
10. Inspect flange gasket and replace if damaged.
11. Install flange and torque bolts to 14-16 lb-ft (19-22 n-m).
12. Attach vacuum hose and evacuate liquid line.
13. Remove vacuum hose from liquid line and attach charging hose.
14. Replace stored charge in liquid line.
15. Remove charging hose.
16. Open liquid line isolation valve. On units with remote evaporators or oil cooler

NOTE: *Do not use mineral oil. It will contaminate the system. circuits, open oil cooler liquid line ball valve.*

Lubrication System

The lubrication system has been designed to keep most of the oil lines filled with oil as long as there is a proper oil level in the oil sump.

The total oil charge can be removed by draining the oil system, oil return line from the evaporator, the evaporator, and the compressor. Very small quantities of oil may be found in other components.

Like many machines, an excessive oil charge can cause operational problems. Spe¬cial care should always be taken to avoid adding extra oil.

Units that exhibit the symptoms of an oil overcharge at high loads may still run fine at light loads. An oil overcharged unit may result in an evaporator limit warning or even a low liquid level or low evap temp (LRTC) diagnostic. An oil overcharged unit may exhibit increased approach temperatures and decreased overall unit efficiency.

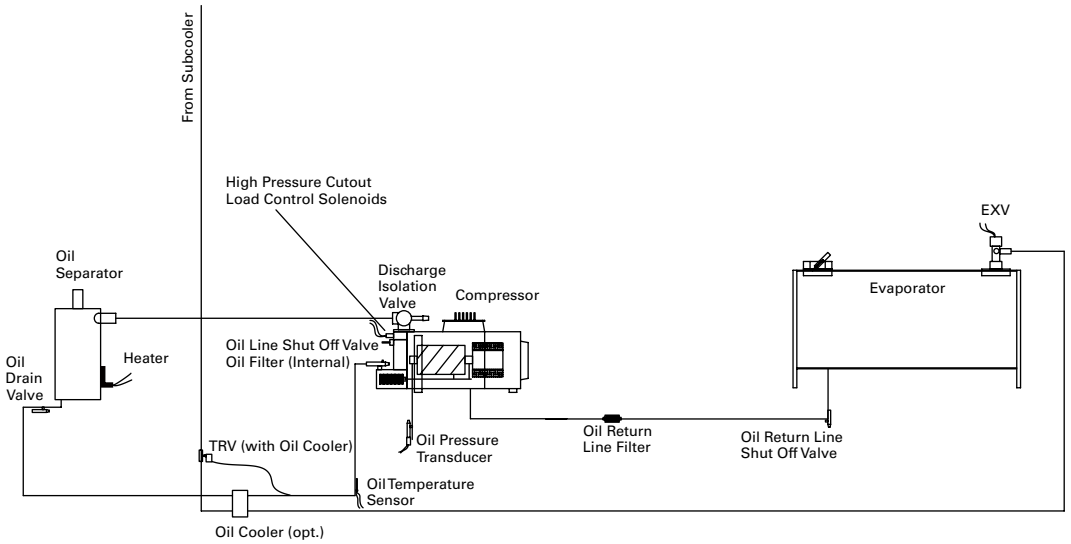
Oil Charging Procedure

Proper charging of the oil system is critical to the reliability of the compressor and chiller. Too little oil can cause the compressor to run hot and inefficient. When taken to an extreme, low oil level may result in instant failure of the compressor. Too much

oil will result in high oil circulation rates which will foul the condenser and evaporator performance. This will result in inefficient operation of the chiller. Taken to an extreme, high oil levels may result in erratic expansion valve control or shut down of the chiller due to low

evaporator refrigerant temperature. Too much oil may contribute to long term bearing wear. Additionally, excessive compressor wear is probable when the compressor is started with the oil lines dry.

Figure31. Oil System Schematic



Oil system consists of the following components:

- Compressor
- Oil separator
- Discharge line with service valve
- Oil line from separator to compressor
- Oil line drain (lowest point in system)
- Oil cooler - optional
- Oil temperature sensor
- Oil line shut off valve with flare service connection
- Oil filter (internal to compressor) with flare fitting service connection and schrader valve
- Oil flow control valve (internal to the compressor after the filter)
- Oil return line from evaporator with shut off valve and strainer

Refer to Table 1 - Table 4 for the standard oil charge for each circuit.

NOTE: *Recommendation: check the oil level in the sump using a sight glass or a manometer, attached to charging hoses.*

Table35. Oil Charging Data

Circuit (Tons)	Approximate sump oil level after running "normal" conditions in	Normal quantity of oil in refrigeration system (evaporator/condenser) lb(gal)
70	7	1.1(0.14)
85	6	1.1(0.14)
100	7	1.8(0.23)
120	7	1.8(0.23)
170	8	3.5(0.44)
200	8	3.5(0.44)
240	8	3.5(0.44)

1. To measure oil level, use the oil drain valve on the oil line and a service valve on the discharge line. This measurement can only be made when the circuit is not running.

Note: *The level is measured from the bottom of the separator and 1" must be subtracted for the thickness of the bottom plate.*

2. The initial oil charge should be approximately at the level in the above chart. This is the approximate oil level if all the oil is in the oil lines, filter and oil sump and the unit is in vacuum so that there is no refrigerant dissolved in the oil.
3. After the unit has run for a while, the oil level in the sump can vary greatly. However, if the unit has run "normal" conditions for a long time the level should resemble the level in the above chart. (+1" to – 4" (25 to -101mm) is acceptable.)

Factory (initial) Oil Charging Procedure

The field charging procedure depends on the circumstances that resulted in the need for oil charge.

1. Some service procedures may result in loss of small quantities of oil which must be replaced (oil analysis, filter replacement, re-tubing the evaporator, etc.).
2. Additionally, some maintenance procedures may result in virtually all of the oil being removed (compressor motor burn or total removal of the charge to trouble shoot a unit).
3. Finally, leaks may result in a loss of oil that must be replaced.

The initial charging procedure should be followed any time the unit is new or has had

all of the oil removed.

4. If the isolation valves is closed, then the charge may be trapped in the evaporator. In either case, the high side of the system should not be pressurized.
5. The oil line shut off valve must be open to allow the oil to pass into the oil lines and the oil separator.

6. The oil charging port is a ¼" (6mm) flare fitting with a schrader valve that is on the side of the oil filter housing. This is the port that must be used to add oil into the compressor so that the filter and lines are full at the first start of the compressor.
7. On single compressor circuits all the oil should be put into the circuit through the oil charging port on the compressor filter housing. On two compressor circuits put approximately ½ of the oil into the unit through each of the two oil charging ports on the two compressors.
8. Oil may be put into the unit using either of two methods:

⚠ CAUTION

Equipment Damage!

Use only Trane OIL00048 in the RTAC units to avoid any catastrophic damage to the compressor or unit.

- Have the unit in vacuum. Note that the vacuum connection should be made on the unit at the service valve that is on the discharge line. Hook up the oil charging hose to the oil charging fitting and submerse the other end into the oil container. Let the vacuum draw the required amount of oil into the unit.
- Have the unit at the same pressure as the oil. Hook up the oil charging hose to the oil charging fitting and the other end to an oil pump. Use the pump to draw oil out of the oil container and push the required amount of oil into the unit.

NOTE: *The compressor filter has an internal shut off valve that will prevent oil from entering the compressor while the compressor is not running. Therefore, there is no concern about flooding the compressor with oil.*

Field Oil Charging Procedure

Use the initial charging procedure under the following circumstances:

- When virtually all of the oil has been removed.
- If the oil charge is removed from the compressor and oil system only but the unit has been run for less than 15 minutes.
- If the oil charge is removed from the compressor and oil system only and the unit has been run for more than 15 minutes. However, reduce the amount of oil added to the unit by the normal quantity of oil in refrigeration system.

NOTE: *This procedure can be followed even with the refrigerant charge isolated in the evaporating section of the unit.*

If small quantities of oil were removed to service refrigeration components, such as the evaporator, simply replace the oil that was removed into the serviced component prior to vacuum and recharge of the refrigerant.

If oil was removed from the compressor only to service a compressor or change the oil filter

follow this procedure:

1. If the compressor is a new compressor or has been removed from the system and reworked, add 1 quart (2 lb.) oil to the motor cavity prior to installing the com¬pressor into the chiller.
2. Install the compressor in the system. Make sure that the filter shut off valve is closed. Other compressor isolation valves may also be closed depending upon the service that was completed. For example, changing the oil filter would require the compressor to be isolated and pulled into vacuum.

NOTE: Make sure that compressor is not pressurized.

3. Open the flare fitting on the oil line shut off valve.
4. Open the flare fitting on the filter housing. This is the port that must be used to put oil into the compressor.
5. Install charging hose on oil charging port (with schrader valve) and the other on the oil canister.
6. Lift the oil canister, or use a pump, to pour oil into the filter housing.
7. When oil comes out of the flare fitting on the oil line shut off valve the filter is full. Stop adding oil.
8. Put the cap on the flare on the oil line shut off valve, remove the charging hose and put the cap back on the flare on the filter housing.
9. Vacuum the compressor (low side) and prepare it for inclusion in the system. There is a service valve on the suction line and on the evaporator. Use these valves to vacuum the compressor.
10. Open the oil line shut off valve. Severe damage to the compressor can result if the oil line shut off valve is closed when the compressor is started.

⚠ 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.

11. Open the other compressor isolation valves.

NOTE: *This procedure assumes that the oil that is put into the filter housing does not have contaminants such as non-condensable gases. The oil forces these gases out of the filter and oil line shut off valve without the need to pull a vacuum on this small volume. If the oil has been in an open container or is otherwise contaminated, then this small volume must be subject to vacuum as well. However, the filter cavity is full of oil. Therefore, be sure to use a flash tank in line with the vacuum pump to make sure that oil, that is pulled out of the filter cavity, does not slug the vacuum pump.*

Evaporator tube replacement

The units were designed for installation of the tubes from the end of the evaporator opposite the control panel end.

The following units will need to have the circuit 2 control panel removed to replace tubes in the evaporator.

- 30' Base - 3 compressor units
- 36' Base - 3 compressor units

⚠ CAUTION

Evaporator Damage!

The tubes are rolled at both ends and in the center. When replacing tubes, take care to ensure that the tube is removed and rolled into the center tube sheet properly. Failure to do so could result in damage to the tubes and improper operation of the system.

Compressor Replacement

If a compressor needs to be replaced follow the procedures listed below.

1. Isolate the refrigerant charge outside of the compressor and close all four valves leading to the compressor. This includes the oil line service valve located on the oil filter cover of the compressor, the valve on the oil return line from the evapora-tor, the discharge service valve, and the suction service valve. In the event that the optional suction service valve was not ordered with the unit, insure that the liquid line service valve is closed.
2. Disconnect power to the chiller. Remove the electrical junction box cover and disconnect the wires.

⚠ 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.

3. Evacuate the compressor through the service fitting provided. If the unit does not have suction service valves, this will include evacuating the low side of the system as well. Disconnect all four lines attached to the compressor, as well as the junction box. Remove three screws from the bottom of the compressor.

4. Remove the compressor by sliding it out of the chiller onto a well supported skid or other platform. The compressor is very heavy, so insure that the support is sturdy. A piece of 1x4 lumber placed between the isolators works well to support the compressor feet as it is pulled from the chiller.
5. Install the new compressor. Reinstall all lines, wires, and screws. Open the service valves, and trim charge as required.

Unit Wiring

Table36 provides a list of field wiring diagrams, electrical schematics and connection diagrams for 120-500 ton RTAC units.The complete unit wiring package is documented in RTAC-SVE01*-EN. A laminated wiring diagram kit is also shipped with each RTAC unit.

Table36. RTAC unit wiring drawing numbers

Drawing Number		Description	
2309-8103	Sheet 1	Schematic - 2 Compressor Units	Table of Contents & Notes
	Sheet 2		Legend
	Sheet 3 (Y-Delta)		Compressor 1A (Y-delta)
	Sheet 4 (Y-Delta)		Compressor 2A (Y-delta)
	Sheet 5		Fans, Std & Prem, Medium Air Cooled
	Sheet 6		Fans, 140 & 155 Std, 120 & 130 Prem 50 Hz
	Sheet 7		Fans 225, 250 Prem 60 Hz, 185 & 200 Extra 60 Hz
	Sheet 8		VSD Fans - Circuits 1 & 2
	Sheet 9		Controls
	Sheet 10		LLID Bus
2309-8105	Sheet 1	Schematic - 3 Compressor, Units Y-Delta	Table of Contents & Notes
	Sheet 2		Devices, Descriptions & Designations
	Sheet 3		Compressor Power 1A & Fan Control Ckt 1
	Sheet 4		Compressor Power 1B
	Sheet 5		Compressor Power 2A & Fan Control Ckt 2
	Sheet 6		Fan Power Circuit 1
	Sheet 7		Fan Power Circuit 2
	Sheet 8		Common Control - Panel LLIDs
	Sheet 9		Common Control - Panel LLIDs
	Sheet 10		Common Control - Panel LLIDs
2309-8107	Sheet 1	Schematic - 4 Compressor Y-Delta	Table of Contents & Notes
	Sheet 2		Devices, Descriptions & Designations
	Sheet 3		Compressor Power 1A & Fan Control Ckt 1
	Sheet 4		Compressor Power 1B
	Sheet 5		Compressor Power 2A & Fan Control Ckt 2
	Sheet 6		Compressor Power 2B
	Sheet 7		Fan Power Circuit 1
	Sheet 8		Fan Power Circuit 2
	Sheet 9		Common Control - Panel LLIDs
	Sheet 10		Common Control - Panel LLIDs
	Sheet 11		Common Control - Panel LLIDs
2309-8116		Component Location	2 Compressor Units
2309-8117		Component Location	3 Compressor Units
2309-8118		Component Location	4 Compressor Units
2309-8114		Field Layout	2 Compressor Units
2309-8115		Field Layout	3 or 4 Compressor Units
2309-8111		Field Wiring; RTAC, 2 Compressor	Units 2 Compressor Units
2309-8112		Field Wiring	3 or 4 Compressor Units, Single Source Power
2309-8113		Field Wiring	3 or 4 Compressor Units, Dual Source Power
2309-7572		Sequence of Operation	2 Compressor Units
2309-7581		Sequence of Operation	3 or 4 Compressor Units

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For more information, contact your local Trane office or e-mail us at comfort@trane.com

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Date:	February 2014
Supersedes:	RTAC-SVX01G-EN-C