INSTALLATION INSTRUCTIONS

FOR THE RHEEM H2AC ROOFTOP UNIT FEATURING eSYNC™ INTEGRATION TECHNOLOGY
RLHL-C SERIES 10 TON [35.2 kW]

eSYNC™ INTEGRATION TECHNOLOGY



Featuring Industry Standard R-410A

R-410A

c UL us LISTED

AHRI CERTIFIED™ www.ahridirectory.org
Unitary Large AC
AHRI Standard 340/360
Certification applies only when the complete system is listed with AHRI.

Accredited by the RvA
ABS Quality Evaluations, Inc. Management System Certification
ANAB ACCREDITED
ISO 9001:2008
Certificate Number: 30164

⚠ Recognize this symbol as an indication of Important Safety Information!

DO NOT DESTROY
PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE.

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

[ ] Designates Metric Conversions

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II. INTRODUCTION

⚠ WARNING

THE MANUFACTURER'S WARRANTY DOES NOT COVER ANY DAMAGE OR DEFECT TO THE AIR CONDITIONER CAUSED BY THE ATTACHMENT OR USE OF ANY COMPONENTS, ACCESSORIES OR DEVICES (OTHER THAN THOSE AUTHORIZED BY THE MANUFACTURER) INTO, ONTO OR IN CONJUNCTION WITH THE AIR CONDITIONER. YOU SHOULD BE AWARE THAT THE USE OF UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES MAY ADVERSELY AFFECT THE OPERATION OF THE AIR CONDITIONER AND MAY ALSO ENDANGER LIFE AND PROPERTY. THE MANUFACTURER DISCLAIMS ANY RESPONSIBILITY FOR SUCH LOSS OR INJURY RESULTING FROM THE USE OF SUCH UNAUTHORIZED COMPONENTS, ACCESSORIES OR DEVICES.

This booklet contains the installation and operating instructions for your air conditioner. There are a few precautions that should be taken to derive maximum satisfaction from it. Improper installation can result in unsatisfactory operation or dangerous conditions.

Read this booklet and any instructions packaged with separate equipment required to make up the system prior to installation. Give this booklet to the owner and explain its provisions. The owner should retain this booklet for future reference.

III. CHECKING PRODUCT RECEIVED

Upon receiving the unit, inspect it for any damage from shipment. Claims for damage, either shipping or concealed, should be filed immediately with the shipping company. Check the unit model number, heating size, electrical characteristics, and accessories to determine if they are correct.

IV. EQUIPMENT PROTECTION FROM THE ENVIRONMENT

The metal parts of this unit may be subject to rust or deterioration in adverse environmental conditions. This oxidation could shorten the equipment's useful life. Salt spray, fog or mist in seacoast areas, sulphur or chlorine from lawn watering systems, and various chemical contaminants from industries such as paper mills and petroleum refineries are especially corrosive.

If the unit is to be installed in an area where contaminants are likely to be a problem, special attention should be given to the equipment location and exposure.

1. Avoid having lawn sprinkler heads spray direction on the unit cabinet.
2. In coastal areas, locate the unit on the side of the building away from the waterfront.
3. Shielding provided by a fence or shrubs may give some protection.

Regular maintenance will reduce the buildup of contaminants and help to protect the unit's finish.

⚠ WARNING

DISCONNECT ALL POWER TO THE UNIT BEFORE STARTING MAINTENANCE. FAILURE TO DO SO CAN RESULT IN SEVERE ELECTRICAL SHOCK OR DEATH.

1. Frequent washing of the cabinet, fan blade and coil with fresh water will remove most of the salt or other contaminants that build up on the unit.
2. Regular cleaning and waxing of the cabinet with a good automobile polish will provide some protection.
3. A good liquid cleaner may be used several times a year to remove matter that will not wash off with water.

Several different types of protective coatings are offered in some areas. These coatings may provide some benefit, but the effectiveness of such coating materials cannot be verified by the equipment manufacturer.

The best protection is frequent cleaning, maintenance and minimal exposure to contaminants.

V. SPECIFICATIONS

A. GENERAL

The H_2AC Rooftop Unit with optional Electric Heat is available with a Cooling capacity of 10 nominal tons and optional 10, 15, 20, 30, 40, or 50 kW of electric heat.

Potable water heating capacities range from approximately 120,000 BTUH to 168,000 BTUH depending on water temperature, indoor air temperatures, and indoor CFM.

Units are designed for downflow-only supply and return air and are weatherized and intended for outdoor installation.

Since the H2AC Rooftop Unit only functions during the cooling mode, the unit should be installed to serve the area of the structure having the largest cooling run-time load, for instance the kitchen area of the restaurant, in order to provide the greatest water heating and energy saving benefits.

The information on the rating plate is in compliance with the FTC and DOE rating for single phase units. The following information is for three phase units which **are not** covered under the DOE certification program.

1. The efficiency rating of this unit is a product thermal efficiency rating determined under continuous operating conditions independent of any installed system.

B. MAJOR COMPONENTS

The unit includes a hermetically-sealed refrigerating system (consisting of a compressor, evaporator coil with thermal expansion valve), a circulation air blower, a condenser fan, a refrigerant to air heat exchanger assembly, a refrigerant to water heat exchanger assembly, 3-way valve, two solenoid valves, and all necessary internal electrical wiring. The cooling system of these units is factory-evacuated, charged and performance tested. Refrigerant amount and type are indicated on rating plate.

C. R-410A REFRIGERANT

All units are factory charged with R-410A refrigerant.

1. Specification of R-410A:

Application: **R-410A is not a drop-in replacement for R-22;** equipment designs must accommodate its higher pressures. It cannot be retrofitted into R-22 units.

Pressure: The pressure of R-410A is approximately 60% (1.6 times) greater than R-22. Recovery and recycle equipment, pumps, hoses and the like need to have design pressure ratings appropriate for R-410A. *Manifold sets need to range up to 800 psig high-side and 250 psig low-side with a 550 psig low-side retard. Hoses need to have a service pressure rating of 800 psig. Recovery cylinders need to have a 400 psig service pressure rating.* DOT 4BA400 or DOT BW400.

Combustibility: At pressures above 1 atmosphere, mixture of R-410A and air can become combustible. **R-410A and air should never be mixed in tanks or supply lines, or be allowed to accumulate in storage tanks. Leak checking should never be done with a mixture of R-410A and air.** Leak checking can be performed safely with nitrogen or a mixture of R-410A and nitrogen.

2. Quick Reference Guide For R-410A

- R-410A refrigerant operates at approximately 60% higher pressure (1.6 times) than R-22. Ensure that servicing equipment is designed to operate with R-410A.
- R-410A refrigerant cylinders are pink.
- R-410A, as with other HFC's is only compatible with POE oils.
- Vacuum pumps will not remove moisture from POE oil.
- R-410A systems are to be charged with liquid refrigerants. Prior to March 1999, R-410A refrigerant cylinders had a dip tube. These cylinders should be kept upright for equipment charging. Post March 1999 cylinders do not have a dip tube and should be inverted to ensure liquid charging of the equipment.
- Do not install a suction line filter drier in the liquid line.
- A liquid line filter drier is standard on every unit.
- Desiccant (drying agent) must be compatible for POE oils and R-410A.

3. Evaporator Coil / TXV

The thermostatic expansion valve is specifically designed to operate with R-410A. **DO NOT use an R-22 TXV. The existing evaporator must be replaced with the factory specified TXV evaporator specifically designed for R-410A.**

4. Tools Required For Installing & Servicing R-410A Models

Manifold Sets:
- -Up to 800 PSIG High side
- -Up to 250 PSIG Low Side
- -550 PSIG Low Side Retard

Manifold Hoses:
- -Service Pressure Rating of 800 PSIG

Recovery Cylinders:
- -400 PSIG Pressure Rating
- -Dept. of Transportation 4BA400 or BW400

⚠ CAUTION

R-410A systems operate at higher pressures than R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

Unit Dimensions

IMPORTANT: THIS UNIT MUST BE MOUNTED LEVEL IN BOTH DIRECTIONS TO ALLOW WATER TO DRAIN FROM THE CONDENSER SECTION AND CONDENSATE PAN.

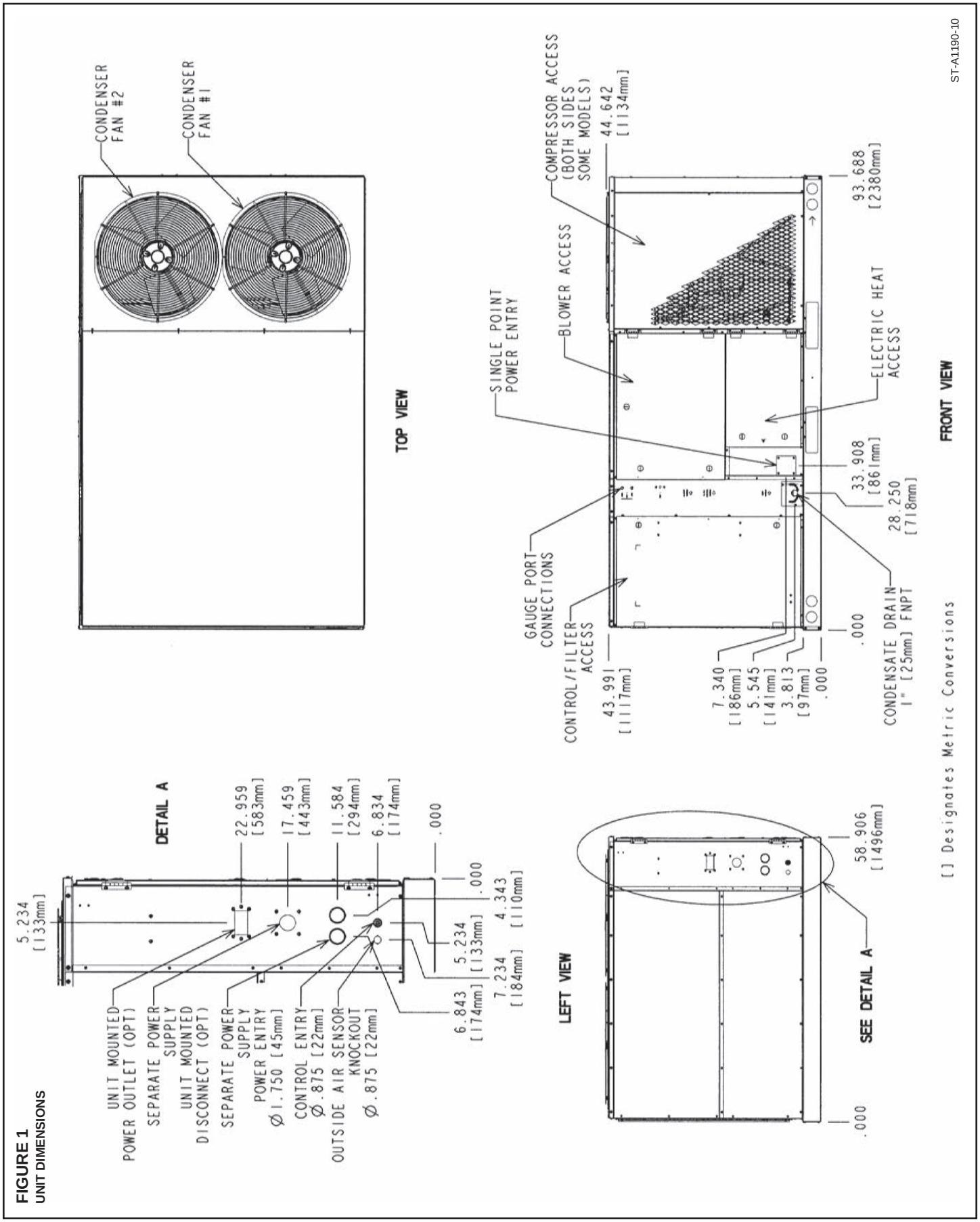
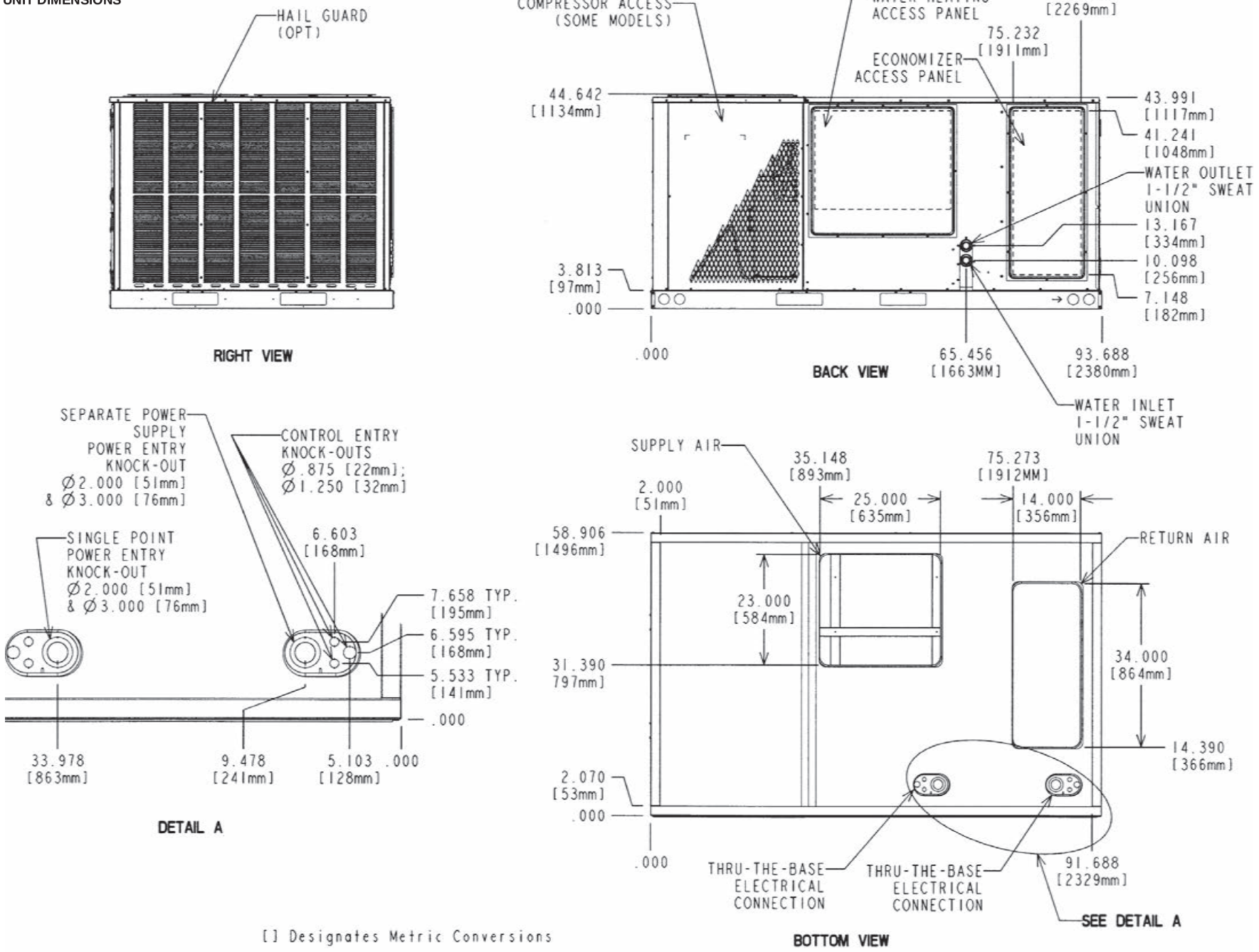


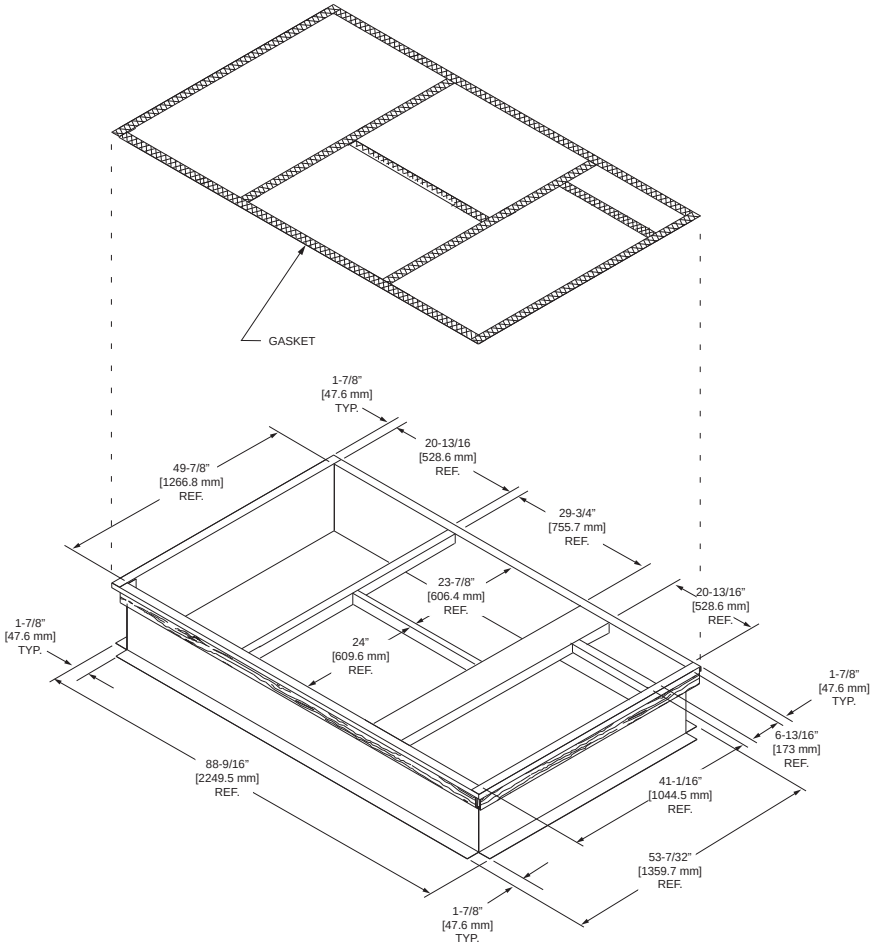
FIGURE 1
UNIT DIMENSIONS

FIGURE 2
UNIT DIMENSIONS



ST-A1190-11

FIGURE 3



ST-A1190-11

GENERAL DATA - RLHL

NOM. SIZE 10 TON [35.2 kW]

Model RLHL-Series	C120CL	C120CM	C120DL	C120DM
Cooling Performance[1]				CONTINUED →
Gross Cooling Capacity Btu [kW]	119,000 [34.87]	119,000 [34.87]	119,000 [34.87]	119,000 [34.87]
EER/SEER[2]	11.25/NA	11.25/NA	11.25/NA	11.25/NA
Nominal CFM/AHRI Rated CFM [L/s]	4000/3600 [1888/1699]	4000/3600 [1888/1699]	4000/3600 [1888/1699]	4000/3600 [1888/1699]
AHRI Net Cooling Capacity Btu [kW]	115,000 [33.69]	115,000 [33.69]	115,000 [33.69]	115,000 [33.69]
Net Sensible Capacity Btu [kW]	85,300 [24.99]	85,300 [24.99]	85,300 [24.99]	85,300 [24.99]
Net Latent Capacity Btu [kW]	29,700 [8.7]	29,700 [8.7]	29,700 [8.7]	29,700 [8.7]
IEER[3]	11.9	11.9	11.9	11.9
Net System Power kW	10.2	10.2	10.2	10.2
Compressor				
No./Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Outdoor Sound Rating (dB)[5]	88	88	88	88
Outdoor Coil—Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	MicroChannel	MicroChannel	MicroChannel	MicroChannel
Tube Size in. [mm] OD	1 [25.4]	1 [25.4]	1 [25.4]	1 [25.4]
Face Area sq. ft. [sq. m]	27 [2.51]	27 [2.51]	27 [2.51]	27 [2.51]
Rows / FPI [FPcm]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]	1 / 23 [9]
Indoor Coil—Fin Type	Louvered	Louvered	Louvered	Louvered
Tube Type	Rifled	Rifled	Rifled	Rifled
Tube Size in. [mm]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]	0.375 [9.5]
Face Area sq. ft. [sq. m]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]	13.5 [1.25]
Rows / FPI [FPcm]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]	2 / 22 [9]
Refrigerant Control	Tx Valves	Tx Valves	Tx Valves	Tx Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]	1/1 [25.4]
Outdoor Fan—Type	Propeller	Propeller	Propeller	Propeller
No. Used/Diameter in. [mm]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]	2/24 [609.6]
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
CFM [L/s]	8400 [3964]	8400 [3964]	8400 [3964]	8400 [3964]
No. Motors/HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP	2 at 1/3 HP
Motor RPM	1075	1075	1075	1075
Indoor Fan—Type	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
No. Used/Diameter in. [mm]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]	1/15x15 [381x381]
Drive Type/No. Speeds	Belt/Variable	Belt/Variable	Belt/Variable	Belt/Variable
No. Motors	1	1	1	1
Motor HP	2	3	2	3
Motor RPM	1725	1725	1725	1725
Motor Frame Size	56	56	56	56
Potable Water Heat Recovery				
Heat Exchanger Type	Vented Double-Wall Flat Plate	Vented Double-Wall Flat Plate	Vented Double-Wall Flat Plate	Vented Double-Wall Flat Plate
Material	Cu Brazed Stainless Steel	Cu Brazed Stainless Steel	Cu Brazed Stainless Steel	Cu Brazed Stainless Steel
No. Flat Plates	25	25	25	25
Unit Water Connections No./Size in. [mm]	2/1.625 [41.3]	2/1.625 [41.3]	2/1.625 [41.3]	2/1.625 [41.3]
Water Pump - Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1	Direct/1
Housing Material	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
GPM [L/s]	30 [1.89]	30 [1.89]	30 [1.89]	30 [1.89]
Head Pressure ft. H2O [kPa]	25 [74.7]	25 [74.7]	25 [74.7]	25 [74.7]
Motor HP	1/3	1/3	1/3	1/3
Motor RPM	3450	3450	3450	3450
Filter—Type	Disposable	Disposable	Disposable	Disposable
Furnished	Yes	Yes	Yes	Yes
(No.) Size Recommended in. [mm x mm x mm]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]	(6)2x18x18 [51x457x457]
Refrigerant Charge Oz. [g]	217.6 [6169]	217.6 [6169]	217.6 [6169]	217.6 [6169]
Weights				
Net Weights lbs. [kg]	984 [446]	992 [450]	984 [446]	992 [450]
Ship Weights lbs. [kg]	1021 [463]	1029 [467]	1021 [463]	1029 [467]

NOTES:

1. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20° of nom cfm. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Stanard 340/360.
2. EER and/or SEER are rated at AHRI conditions and in accordance with DOE test procedures.
3. IEER is rated in accordance with AHRI Standard 340/360.
4. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270.

ELECTRICAL DATA - RLHL

ELECTRICAL DATA - RLHL SERIES					
		C120CL	C120CM	C120DL	C120DM
Unit Information	Unit Operating Voltage Range	187-253	187-253	414-506	414-506
	Volts	208/230	208/230	460	460
	Minimum Circuit Ampacity	61/61	66/66	35	35
	Minimum Overcurrent Protection Device Size	60/60	70/70	35	35
	Maximum Overcurrent Protection Device Size	90/90	100/100	50	50
Compressor Motor	No.	1	1	1	1
	Volts	200/240	200/240	480	480
	Phase	3	3	3	3
	RPM	3450	3450	3450	3450
	HP, Compressor 1	10	10	10	10
	Amps (RLA), Comp. 1	37.1/37.1	37.1/37/1	20.9	20.9
	Amps (LRA), Comp. 1	225/225	225/225	114	114
Condenser Motor	No.	2	2	2	2
	Volts	208/230	208/230	460	460
	Phase	1	1	1	1
	HP	1/3	1/3	1/3	1/3
	Amps (FLA, each)	2.4/2.4	2.4/2.4	1.4	1.4
	Amps (LRA, each)	4.7/4.7	4.7/4.7	2.4	2.4
Evaporator Fan	No.	1	1	1	1
	Volts	208/230	208/230	460	460
	Phase	3	3	3	3
	HP	2	3	2	3
	Amps (FLA, each)	8/8	13/13	4	7
	Amps (LRA, each)	56/56	56/56	28	38.1
Water Pump	No.	1	1	1	1
	Volts	208/230	208/230	208/230	208/230
	Phase	1	1	1	1
	HP	1/3	1/3	1/3	1/3
	Amps (FLA, each)	1.7	1.7	1.7	1.7
	Amps (LRA, each)	5.1	5.1	5.1	5.1

HEATER KIT CHARACTERISTICS

AUXILIARY HEATER KITS CHARACTERISTICS AND APPLICATION (RLHL MODELS)

208/240 VOLT, THREE PHASE, 60 HZ, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION

Single Power Supply for Both Unit and Heater Kit									Separate Power Supply for Both Unit and Heater Kit				
RHEEM Model Number	Heater Kit					Air Conditioner			Heater Kit		Air Conditioner		
	RXJJ-Heater Kit Nominal kW	No. of Sequence Steps	Rated Heater kW @ 208/240 V	Heater KBTU/Hr @ 208/240 V	Heater Amp. @ 208/240 V	Unit Min. Ckt. Ampacity @ 208/240 V	Over Current Protective Device Size		Min. Ckt. Ampacity 208/240V	Max. Fuse Size 208/240V	Min. Circuit Ampacity 208/240V	Over Current Protective Device Size	
							Min./Max. @ 208 V	Min./Max. @ 240 V				Min./Max. @ 208 V	Min./Max. @ 240 V
RLHL-C120CL	No Heat	—	—	—	—	61/61	60/90	60/90	—	—	61/61	60/90	60/90
	CC10C	1	7.2/9.6	24.56/32.75	20/23.1	61/61	70/90	70/90	25/29	25/30	61/61	60/90	60/90
	CC15C	1	10.8/14.4	36.84/49.13	30/34.6	61/61	70/90	70/90	38/44	40/45	61/61	60/90	60/90
	CC20C	1	14.4/19.2	49.13/65.5	40/46.2	61/68	70/90	70/90	50/58	50/60	61/61	60/90	60/90
	CC30C	1	21.6/28.8	73.69/98.25	60/69.3	85/97	90/90	100/100	75/87	80/90	61/61	60/90	60/90
	CC40C	1	28.8/38.4	98.25/131	80.1/92.4	111/126	125/125	150/150	101/116	110/125	61/61	60/90	60/90
	CC50C	1	36.1/48	123.16/163.75	100.1/115.5	136/155	150/150	175/175	126/145	150/150	61/61	60/90	60/90
RLHL-C120CM	No Heat	—	—	—	—	66/66	70/100	70/100	—	—	66/66	70/100	70/100
	CC10C	1	7.2/9.6	24.56/32.75	20/23.1	66/66	80/100	80/100	25/29	25/30	66/66	70/100	70/100
	CC15C	1	10.8/14.4	36.84/49.13	30/34.6	66/66	80/100	80/100	38/44	40/45	66/66	70/100	70/100
	CC20C	1	14.4/19.2	49.13/65.5	40/46.2	67/75	80/100	80/100	50/58	50/60	66/66	70/100	70/100
	CC30C	1	21.6/28.8	73.69/98.25	60/69.3	92/103	100/100	110/110	75/87	80/90	66/66	70/100	70/100
	CC40C	1	28.8/38.4	98.25/131	80.1/92.4	117/132	125/125	150/150	101/116	110/125	66/66	70/100	70/100
	CC50C	1	36.1/48	123.16/163.75	100.1/115.5	142/161	150/150	175/175	126/145	150/150	66/66	70/100	70/100

480 VOLT, THREE PHASE, 60 HZ, AUXILIARY ELECTRIC HEATER KITS CHARACTERISTICS AND APPLICATION

Single Power Supply for Both Unit and Heater Kit									Separate Power Supply for Both Unit and Heater Kit				
RHEEM Model Number	Heater Kit					Air Conditioner			Heater Kit		Air Conditioner		
	RXJJ-Heater Kit Nominal kW	No. of Sequence Steps	Rated Heater kW @ 480 V	Heater KBTU/Hr @ 480 V	Heater Amp. @ 480 V	Unit Min. Ckt. Ampacity @ 480 V	Over Current Protective Device Size		Min. Ckt. Ampacity 480V	Max. Fuse Size 480V	Min. Circuit Ampacity 480V	Over Current Protective Device Size	
							Min./Max. @ 480 V	Min./Max. @ 480 V				Min./Max. @ 480 V	Min./Max. @ 480 V
RLHL-C120DL	No Heat	—	—	—	—	35	35/50	—	—	—	35	35/50	—
	CC10D	1	9.6	32.75	11.5	35	40/50	—	15	15	35/35	35/50	0/50
	CC15D	1	14.4	49.13	17.3	35	40/50	—	22	25	35/35	35/50	0/50
	CC20D	1	19.2	65.5	23.1	35	40/50	—	29	30	35/35	35/50	0/50
	CC30D	1	28.8	98.25	34.6	49	50/50	—	44	45	35/35	35/50	0/50
	CC40D	1	38.4	131	46.2	63	70/70	—	58	60	35/35	35/50	0/50
	CC50D	1	48	163.75	57.7	78	80/80	—	73	80	35/35	35/50	0/50
RLHL-C120DM	No Heat	—	—	—	—	38	35/50	—	—	—	38	35/50	—
	CC10D	1	9.6	32.75	11.5	38	45/50	—	15	15	38/38	35/50	0/50
	CC15D	1	14.4	49.13	17.3	38	45/50	—	22	25	38/38	35/50	0/50
	CC20D	1	19.2	65.5	23.1	38	45/50	—	29	30	38/38	35/50	0/50
	CC30D	1	28.8	98.25	34.6	52	60/60	—	44	45	38/38	35/50	0/50
	CC40D	1	38.4	131	46.2	67	70/70	—	58	60	38/38	35/50	0/50
	CC50D	1	48	163.75	57.7	81	90/90	—	73	80	38/38	35/50	0/50

GROSS SYSTEMS PERFORMANCE DATA — RLHL-C120

ENTERING INDOOR AIR @ 80°F [26.7°C] dbE ①

Outdoor DB	wbE CFM [L/s] DR ①	71ºF [21.7ºC]			67ºF [19.4ºC]			63ºF [17.2ºC]		
		4800 [2266] 0	3600 [1699] 0.05	3200 [1510] 0.08	4800 [2266] 0	3600 [1699] 0.05	3200 [1510] 0.08	4800 [2266] 0	3600 [1699] 0.05	3200 [1510] 0.08
75ºF [23.9ºC]	Total BTUH [kW]	146.9 [43.0]	138.5 [40.6]	135.7 [39.8]	138.9 [40.7]	130.9 [38.4]	128.3 [37.6]	132.6 [38.9]	125 [36.6]	122.5 [35.9]
	Sens BTUH [kW]	98.7 [28.9]	77 [22.6]	70.4 [20.6]	115.7 [33.9]	92.1 [27.0]	84.9 [24.9]	129.1 [37.8]	104.1 [30.5]	96.3 [28.2]
	Power	7.6	7.4	7.3	7.5	7.3	7.2	7.5	7.2	7.2
80ºF [26.7ºC]	Total BTUH [kW]	144.2 [42.3]	135.9 [39.8]	133.2 [39.0]	136.1 [39.9]	128.4 [37.6]	125.8 [36.9]	129.9 [38.1]	122.4 [35.9]	120 [35.2]
	Sens BTUH [kW]	98.6 [28.9]	77 [22.6]	70.4 [20.6]	115.4 [33.8]	92.2 [27.0]	85 [24.9]	129.1 [37.8]	104.2 [30.5]	96.5 [28.3]
	Power	8	7.8	7.7	7.9	7.7	7.6	7.8	7.6	7.5
85ºF [29.4ºC]	Total BTUH [kW]	141.2 [41.4]	133.2 [39.0]	130.5 [38.2]	133.2 [39.0]	125.6 [36.8]	123 [36.0]	126.9 [37.2]	119.7 [35.1]	117.3 [34.4]
	Sens BTUH [kW]	97.9 [28.7]	76.7 [22.5]	70.2 [20.6]	114.9 [33.7]	91.8 [26.9]	84.6 [24.8]	126.9 [37.2]	103.9 [30.4]	96.2 [28.2]
	Power	8.4	8.1	8.1	8.3	8.1	8	8.2	8	7.9
90ºF [32.2ºC]	Total BTUH [kW]	138.1 [40.5]	130.2 [38.1]	127.6 [37.4]	130 [38.1]	122.6 [35.9]	120.1 [35.2]	123.8 [36.3]	116.7 [34.2]	114.3 [33.5]
	Sens BTUH [kW]	96.8 [28.4]	75.9 [22.2]	69.5 [20.4]	113.7 [33.3]	91 [26.7]	83.9 [24.6]	123.8 [36.3]	103 [30.2]	95.4 [28.0]
	Power	8.8	8.5	8.5	8.7	8.5	8.4	8.6	8.4	8.3
95ºF [35.0ºC]	Total BTUH [kW]	134.7 [39.5]	127 [37.2]	124.4 [36.4]	126.7 [37.1]	119.4 [35.0]	117 [34.3]	120.4 [35.3]	113.5 [33.3]	111.2 [32.6]
	Sens BTUH [kW]	95.1 [27.9]	74.6 [21.9]	68.3 [20.0]	112.1 [32.8]	89.7 [26.3]	82.8 [24.3]	120.4 [35.3]	101.8 [29.8]	94.3 [27.6]
	Power	9.2	9	8.9	9.2	8.9	8.8	9.1	8.8	8.7
100ºF [37.8ºC]	Total BTUH [kW]	131.1 [38.4]	123.6 [36.2]	121.1 [35.5]	123.1 [36.1]	116.1 [34.0]	113.7 [33.3]	116.8 [34.2]	110.2 [32.3]	107.9 [31.6]
	Sens BTUH [kW]	92.9 [27.2]	72.9 [21.4]	66.7 [19.5]	109.9 [32.2]	88.1 [25.8]	81.3 [23.8]	116.8 [34.2]	100.2 [29.4]	92.8 [27.2]
	Power	9.7	9.4	9.4	9.6	9.4	9.3	9.6	9.3	9.2
105ºF [40.6ºC]	Total BTUH [kW]	127.3 [37.3]	120.1 [35.2]	117.6 [34.5]	119.3 [35.0]	112.5 [33.0]	110.2 [32.3]	113 [33.1]	106.6 [31.2]	104.4 [30.6]
	Sens BTUH [kW]	90.2 [26.4]	70.9 [20.8]	64.9 [19.0]	107.2 [31.4]	86 [25.2]	79.4 [23.3]	113 [33.1]	98 [28.7]	90.8 [26.6]
	Power	10.2	9.9	9.8	10.2	9.9	9.8	10.1	9.8	9.7
110ºF [43.3ºC]	Total BTUH [kW]	123.3 [36.1]	116.3 [34.1]	113.9 [33.4]	115.3 [33.8]	108.7 [31.8]	106.5 [31.2]	109 [31.9]	102.8 [30.1]	100.7 [29.5]
	Sens BTUH [kW]	87 [25.5]	68.3 [20.0]	62.5 [18.3]	104 [30.5]	83.4 [24.4]	77 [22.6]	109 [31.9]	95.5 [28.0]	88.6 [26.0]
	Power	10.8	10.5	10.4	10.7	10.4	10.3	10.6	10.3	10.2
115ºF [46.1ºC]	Total BTUH [kW]	119.1 [34.9]	112.3 [32.9]	110 [32.2]	111.1 [32.6]	104.7 [30.7]	102.6 [30.1]	104.8 [30.7]	98.8 [28.9]	96.8 [28.4]
	Sens BTUH [kW]	83.3 [24.4]	65.3 [19.1]	59.7 [17.5]	100.3 [29.4]	80.4 [23.6]	74.2 [21.7]	104.8 [30.7]	92.5 [27.1]	85.8 [25.1]
	Power	11.3	11	10.9	11.3	10.9	10.8	11.2	10.9	10.7

DR — Depression ratio
dbE — Entering air dry bulb
wbE — Entering air wet bulb

Total — Total capacity x 1000 BTUH
Sens — Sensible capacity x 1000 BTUH
Power — KW input

NOTES: ① When the entering air dry bulb is other than 80°F [27°C], adjust the sensible capacity from the table by adding [1.10 x CFM x (1 – DR) x (dbE – 80)].

[ ] Designates Metric Conversions

WATER HEATING PERFORMANCE DATA - C120

		ENTERING INDOOR AIR @ 80°F [26.7°C] dbe											
		wbe	71°F [21.7°C]			67°F [19.4°C]			63°F [19.4°C]				
		CFM [Ls]	4800 [2266]	3600 [1699]	3200 [1510]	4800 [2266]	3600 [1699]	3200 [1510]	4800 [2266]	3600 [1699]	3200 [1510]		
OUTLET WATER TEMP. °F [°C]	75 [23.9]	Total MBTUH [kW]	168.41 49.36	166.75 48.87	161.74 47.40	157.95 46.29	156.39 45.83	151.69 44.46	147.43 43.21	145.97 42.78	141.59 41.50		
		Power, Watts	8780	7980	7580	8623	7823	7423	8545	7745	7345		
	80 [26.7]	Total MBTUH [kW]	166.19 48.71	164.54 48.23	159.61 46.78	155.73 45.64	154.18 45.19	149.56 43.83	145.20 42.56	143.77 42.14	139.45 40.87		
		Power, Watts	9218	8418	8018	9052	8252	7852	8970	8170	7770		
	85 [29.4]	Total MBTUH [kW]	163.97 48.06	162.34 47.58	157.41 46.15	153.50 44.99	151.98 44.54	147.42 43.21	142.98 41.91	141.57 41.49	137.32 40.25		
		Power, Watts	9655	8855	8455	9482	8682	8282	9295	8595	8195		
	90 [32.2]	Total MBTUH [kW]	161.74 47.40	160.14 46.93	155.34 45.53	151.28 44.34	149.78 43.90	145.29 42.58	140.76 41.25	139.37 40.85	135.18 39.62		
		Power, Watts	10093	9293	8893	9911	9111	8711	9819	9019	8619		
	95 [35.0]	Total MBTUH [kW]	159.52 46.75	157.94 46.29	153.20 44.90	149.06 43.69	147.58 43.25	143.15 41.96	138.54 40.60	137.16 40.20	133.05 38.99		
		Power, Watts	10530	9730	9330	10340	9540	9140	10244	9444	9044		
	100 [37.8]	Total MBTUH [kW]	157.30 46.10	155.74 45.64	151.07 44.28	146.83 43.03	145.38 42.61	141.02 41.33	136.31 36.95	134.96 39.56	130.91 38.37		
		Power, Watts	10968	10168	9768	10769	9969	9569	9869	9869	9469		
	105 [40.6]	Total MBTUH [kW]	155.07 45.45	153.54 45.00	148.93 43.65	144.61 42.38	143.18 41.96	138.88 40.70	134.09 39.30	132.76 38.91	128.78 37.74		
		Power, Watts	11406	10606	10206	11198	10398	9998	11094	10294	9894		
	110 [43.3)	Total MBTUH [kW]	152.85 44.80	151.34 44.35	146.80 43.02	142.39 41.73	140.98 41.32	136.75 40.08	131.37 38.65	130.56 38.27	126.64 37.12		
		Power, Watts	11406	11043	10643	11627	10827	10427	11085	10285	9885		
	115 [46.1]	Total MBTUH [kW]	150.63 44.15	149.14 43.71	144.66 42.40	140.16 41.08	138.78 40.67	134.61 39.45	129.64 38.00	128.36 37.62	124.51 36.49		
		Power, Watts	12281	11481	11081	12056	11256	10856	11943	11143	10743		
	1251/85 [51.7]	Total MBTUH [kW]	146.18 42.84	144.74 42.42	140.39 41.15	135.72 39.78	134.38 39.38	130.34 38.20	125.20 36.69	123.96 36.33	120.24 35.24		
		Power, Watts	13156	12356	11956	12941	12114	11714	12792	11992	11592		

VI. INSTALLATION

A. GENERAL

1. PRE-INSTALLATION CHECK-POINTS

   Before attempting any installation, the following points should be carefully considered:

   a. Structural strength of supporting members. (rooftop installation)

   b. Clearances and provision for servicing.

   c. Power supply and wiring.

   d. Air duct connections.

   e. Drain facilities and connections.

   f. Location for minimum noise.

2. LOCATION

   These units are designed for outdoor installations. They can be mounted on rooftop. They are not to be installed within any part of a structure such as an attic, crawl space, closet, or any other place where condenser air flow is restricted or other than outdoor ambient conditions prevail. Since the application of the units is of the outdoor type, it is important to consult your local code authorities at the time the first installation is made.

B. H2AC ROOFTOP UNIT SPECIAL CONSIDERATIONS

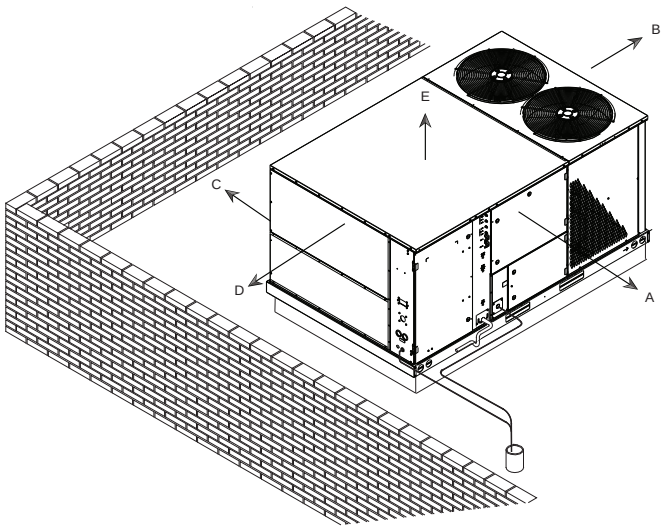
Since the H2AC Rooftop unit only functions during the cooling mode, the unit should be installed to serve the area of the structure having the largest cooling run-time, for instance the kitchen area of a restaurant, in order to provide the greatest water heating and energy saving benefits.

The H2AC Rooftop unit is equipped with an outdoor temperature sensor that energizes the water pump continuously below 35°F to minimize the chance of the water system freezing, however this is not intended to be the sole method of unit freeze protection. **If the H2AC Rooftop unit is installed in a geographic location where freezing temperature can occur, the water lines, valves, and couplings connected outside the unit must be adequately protected with insulation and heat tape suitable for the lowest expected temperatures.**

Alternately, the unit and all connecting lines can be drained of water and the unit heat exchanger, pump, and internal piping winterized using a non-toxic recreational vehicle type of anti-freeze suitable for potable water systems.

The H2AC Rooftop unit is equipped with a water leak sensor designed to sense water that would accumulate in the pan under the water pump and refrigerant-to-water heat exchanger assembly located on the blower deck. If a leak is sensed in that area an alarm is triggered on the RTU-C (ClearControl) control board and a water shutoff relay is energized to activate the **optional** RXMV-AH electric water shut-off valve. It is strongly recommended that the RXMV-AH be installed to minimize the chance of water damage to the structure in case of a water leak in the unit.

FIGURE 4
ROOFTOP INSTALLATION



C. CLEARANCES

The following minimum clearances must be observed for proper unit performance and serviceability. See Figure 4.

Recommended Clearance	Location
48” [1219.2 mm]	A - Front
18” [457.2 mm]	B - Condenser Coil
18” [457.2 mm]	C - Duct Side
18”* [457.2 mm]	D - Evaporator End
60” [1524 mm]	E - Above
*Without Economizer. 48” [1219.2 mm] With Economizer	

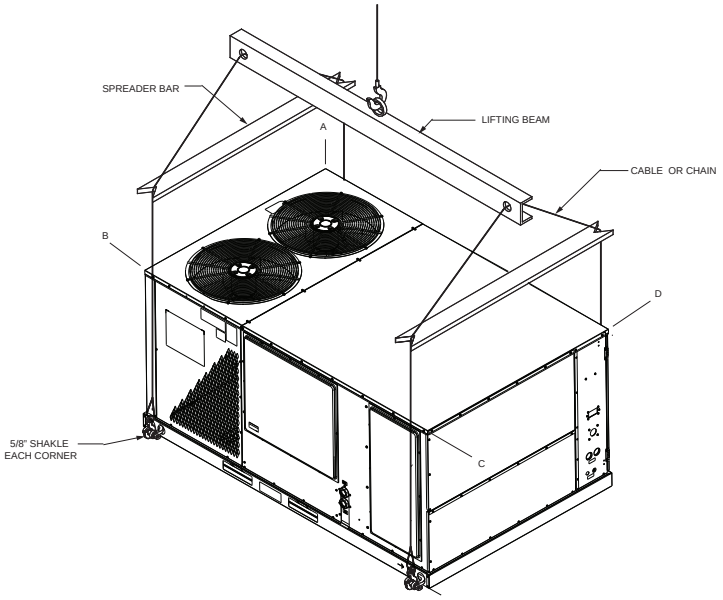
D. ROOFTOP INSTALLATION

1. Before locating the unit on the roof, make sure that the strength of the roof and beams is adequate at that point to support the weight involved. **This is very important and user's responsibility.**
2. For rigging and roofcurb details, see Figures 5 and 6. Use field-furnished spreaders.
3. For roofcurb assembly, see Roofcurb Installation Instructions.
4. If the roofcurb is not used, provisions for disposing of condensate water runoff must be provided.
5. The unit should be placed on a solid and level roofcurb or platform of adequate strength. See Figure 7.
6. The location of the unit on the roof should be such as to provide proper access for inspection and servicing.

IMPORTANT: *If unit will not be put into service immediately, cover supply and return openings to prevent excessive condensation.*

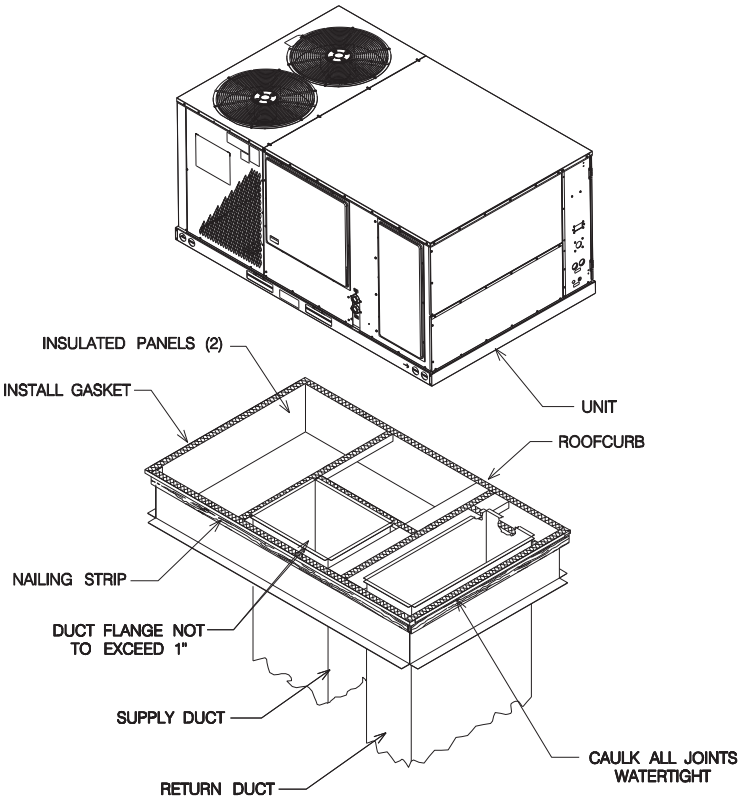
FIGURE 5
RIGGING FOR LIFTING

CORNER WEIGHTS BY PERCENTAGE			
A	B	C	D
29%	29%	21%	26%

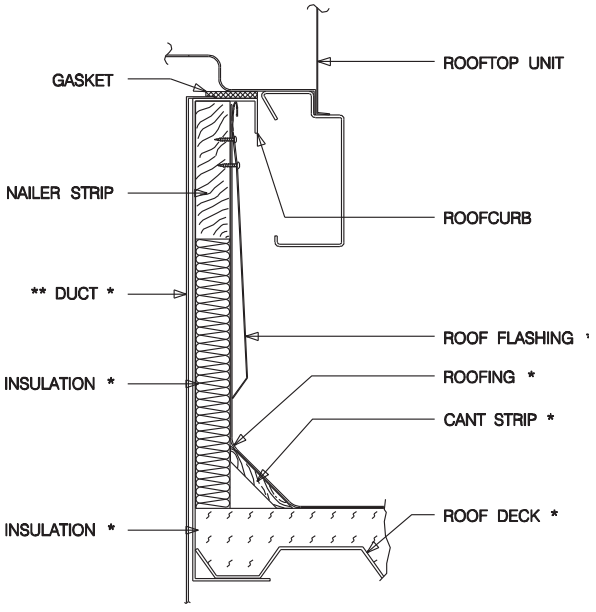


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FIGURE 6
ROOFCURB INSTALLATION



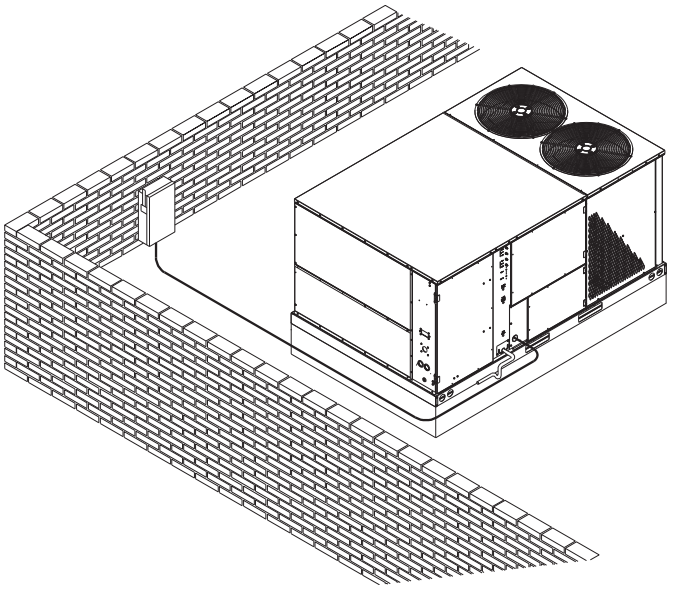
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* BY CONTRACTOR

** FOR INSTALLATION OF DUCT AS SHOWN, USE RECOMMENDED DUCT SIZES FROM ROOFCURB INSTALLATION INSTRUCTIONS. FOR DUCT FLANGE ATTACHMENT TO UNIT, SEE UNIT INSTALLATION INSTRUCTIONS FOR RECOMMENDED DUCT SIZES.

FIGURE 7
FLAT ROOFTOP INSTALLATION, ATTIC OR DROP CEILING DISTRIBUTION SYSTEM. MOUNTED ON ROOFCURB. CURB MUST BE LEVEL



A1112-03

VII. DUCTWORK

Ductwork should be fabricated by the installing contractor in accordance with local codes and NFPA90A. Industry manuals may be used as a guide when sizing and designing the duct system - contact Air Conditioning Contractors of America, 1513 16th St. N.W., Washington, D.C. 20036.

⚠ WARNING

DO NOT, UNDER ANY CIRCUMSTANCES, CONNECT RETURN DUCTWORK TO ANY OTHER HEAT PRODUCING DEVICE SUCH AS A FIREPLACE INSERT, STOVE, ETC. UNAUTHORIZED USE OF SUCH DEVICES MAY RESULT IN FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

The unit should be placed as close to the space to be air conditioned as possible allowing clearance dimensions as indicated. Ducts should be run as directly as possible to supply and return outlets. Use of non-flammable waterproof flexible connectors on both supply and return connections at the unit to reduce noise transmission is recommended.

It is preferable to install the unit on the roof of the structure if the registers or diffusers are located on the wall or in the ceiling.

On ductwork exposed to outside air conditions of temperature and humidity, use a minimum of 2" [50.8 mm] of insulation and a vapor barrier. Distribution system in attic, furred space or crawl space should be insulated with at least 2" [50.8 mm] of insulation with vapor barrier. One-half to 1" [25.4 mm] thickness of insulation is usually sufficient for ductwork inside the air conditioned space.

Balancing dampers should be provided for each branch duct in the supply system. Ductwork should be properly supported from the structure.

When installing ductwork, consider the following items:

1. Noncombustible flexible connectors should be used between ductwork and unit to reduce noise and vibration transmission into the ductwork.
2. When auxiliary heaters are installed, use noncombustible flexible connectors and clearance to combustible material of 0" [0 mm] for the first 3 feet [.91 m] of discharge duct. Clearance to unit top and side is 0" [0 mm].

VIII. FILTERS

This unit is provided with 6 - 2" x 18" x 18" [51mm x 457 mm x 457 mm] disposable filters. When replacing filters, ensure they are inserted fully to the back to prevent bypass.

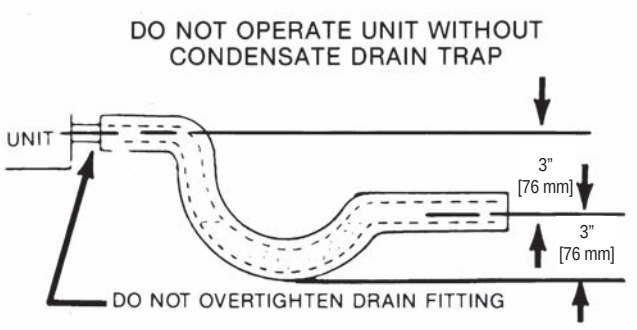
IX. CONDENSATE DRAIN

IMPORTANT: Install a condensate trap to ensure proper condensate drainage. See Figure 8.

The condensate drain pan has a threaded female 1 inch NPT (11.5 TPI) connection. Consult local codes or ordinances for specific requirements of condensate drain piping and disposal.

- To use the removable drain pan feature of this unit, some of the condensate line joints should assembled for easy removal and cleaning.
- Use a thin layer of Teflon tape or paste on drain pan connections and install only hand tight.
- Do not over tighten drain pan connections as damage to the drain pan may occur.
- Drain line MUST NOT block service access panels.
- Drain line must be no smaller than drain pan outlet and adequately sized to accommodate the condensate discharge from the unit.
- Drain line should slope away from unit a minimum of 1/8” per foot to ensure proper drainage.
- Drain line must be routed to an acceptable drain or outdoors in accordance with local codes.
- Do not connect condensate drain line to a closed sewer pipe.
- Drain line may need insulation or freeze protection in certain applications.

FIGURE 8
CONDENSATE DRAIN



X. ELECTRICAL WIRING

Field wiring must comply with the National Electrical Code (CEC in Canada) and local ordinances that may apply.

A. POWER WIRING

1. This unit incorporates single-point electrical connections for the unit and electric heat accessory.
2. It is important that proper electrical power is available to the unit. Voltage should not vary more than 10% from the values marked on the unit rating plate. Phase voltages must be balanced within 3%.
3. Install a branch circuit disconnect within sight of the unit. Use the unit rating plate or RLNL-B Electrical Data to determine the required size.
4. The branch circuit wire must be sized in accordance with the National Electrical Code (C.E.C. in Canada) and local ordinances that may apply using the minimum circuit ampacity found on the unit rating plate.
5. Field-installed power wiring must be run through grounded rain-tight conduit attached to the unit power entry panel and connected as follows:

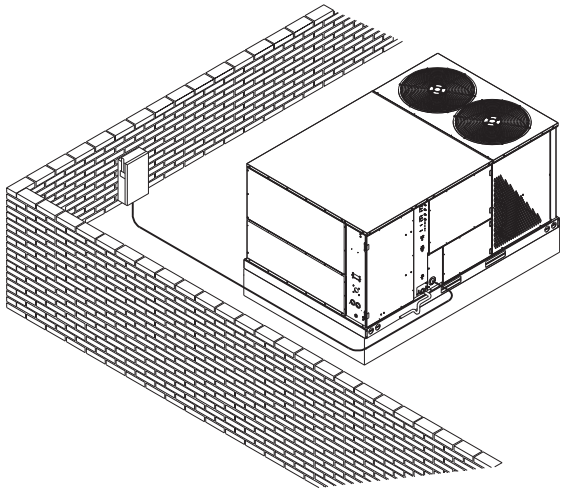
   UNITS WITHOUT ELECTRIC HEAT - Connect power wiring to the power terminal block located on the left side of the electric heat compartment. Connect the ground wire to the adjacent ground lug.

   UNITS WITH FACTORY INSTALLED ELECTRIC HEAT - Connect power wiring to the power terminal block located on the electric heater kit. Connect the ground wire to the adjacent ground lug. DO NOT connect aluminum wiring directly to the electric heater terminal block. Wiring to the unit contactors is factory-connected.
6. For field installation of an electric heater kit, follow the instructions below. Refer to the information supplied with the kit.
   a. Removing screws as required, open heater access door and detach adjacent power entry panel.
   b. Remove wires to unit contactor (1L1, 1L2, 1L3) from unit terminal block on the left side of the electric heat compartment. Remove and discard the terminal block and the adjacent ground lug.
   c. Remove the heater kit block-off panel and install the heater kit in its place using 9 of the 12 screws previously removed.
   d. Connect the unit contactor wires (1L1, 1L2, 1L3) to the compressor fuse block on the heater kit.
   e. Re-install the power entry panel & run conduit and the proper size field wiring through the opening in the panel.
   f. Connect field wiring to the power terminal block located on the electric heater kit. Connect ground wire to the adjacent ground lug.
   g. Connect heater kit control plug to the receptacle on the control wiring harness.
   h. Close heater access door and secure with screws previously removed.

B. CONTROL WIRING (Class II)

1. Low voltage wiring should not be run in conduit with power wiring.
2. Control wiring is routed through the 7/8" [22 mm] hole in the unit side panel. See Figure 10. Use a minimum #18 AWG thermostat wire. For wire lengths exceeding 50' [15.24 m] use #16 AWG thermostat wire. Connect the control wiring to the low voltage terminal block located on the unit integrated control. Route wires under the control voltage shield. See Figure 10.
3. It is necessary that only approved thermostats be used. Please contact your distributor for part number information. See thermostat specification catalog for recommended thermostat.

FIGURE 9
BRANCH CIRCUIT DISCONNECT LOCATION



4. Figure 14 shows representative low voltage connection diagrams. Read your thermostat installation instructions for any special requirements for your specific thermostat.

C. INTERNAL WIRING

1. A diagram of the internal wiring of this unit is located on the inside of the control access panel and in this manual. If any of the original wiring must be replaced, the wire gauge and insulation must be the same as original wiring.

   Transformer is factory-wired for 230 volts on 208/230 volt models and must be changed for 208-volt applications. See unit wiring diagram for 208-volt wiring.

D. GROUNDING

⚠ WARNING

THE UNIT MUST BE PERMANENTLY GROUNDED. A GROUNDING LUG IS PROVIDED IN THE ELECTRIC HEAT ACCESS AREA FOR A GROUND WIRE. FAILURE TO GROUND THIS UNIT CAN RESULT IN FIRE OR ELECTRICAL SHOCK CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH.

E. THERMOSTAT

The thermostat should be mounted on an inside wall about five feet above the floor in a location where it will not be affected by unconditioned air, sun, or drafts from open doors or other sources. READ installation instructions in air conditioner thermostat package CAREFULLY because each has some different wiring requirements.

XI. INDOOR AIR FLOW DATA

Belt-drive blower models have motor sheaves set for proper CFM at a typical external static. See Tables C through G for blower performance.

XII. CRANKCASE HEAT (OPTIONAL)

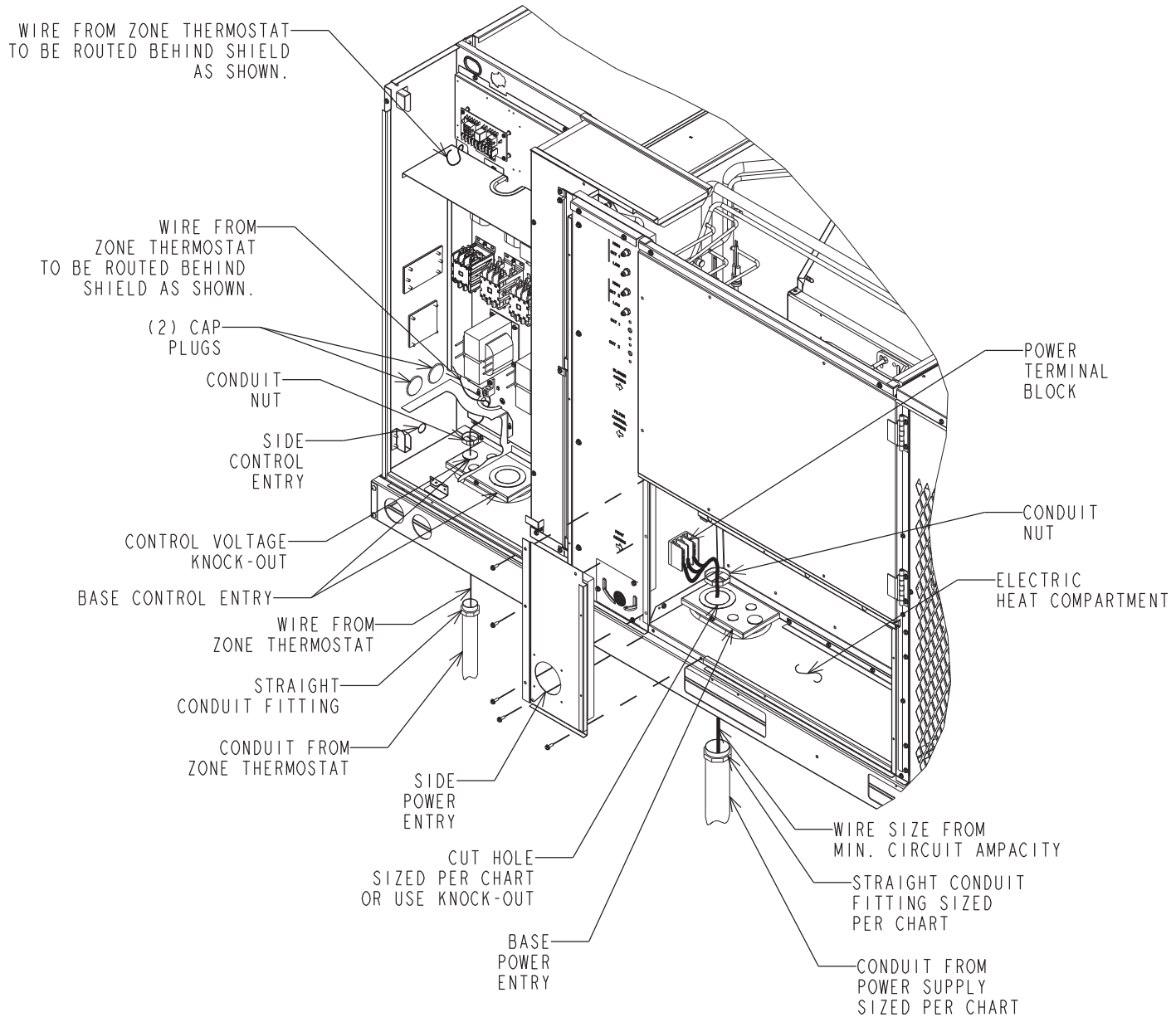
Crankcase heat is not required but may be desirable under certain conditions.

XIII. WATER CONNECTIONS AND START UP FOR POTABLE WATER HEATING

A. WATER PIPING

1. Use of copper pipe suitable for potable water is recommended. Plumbing must meet applicable national and local plumbing and building codes.

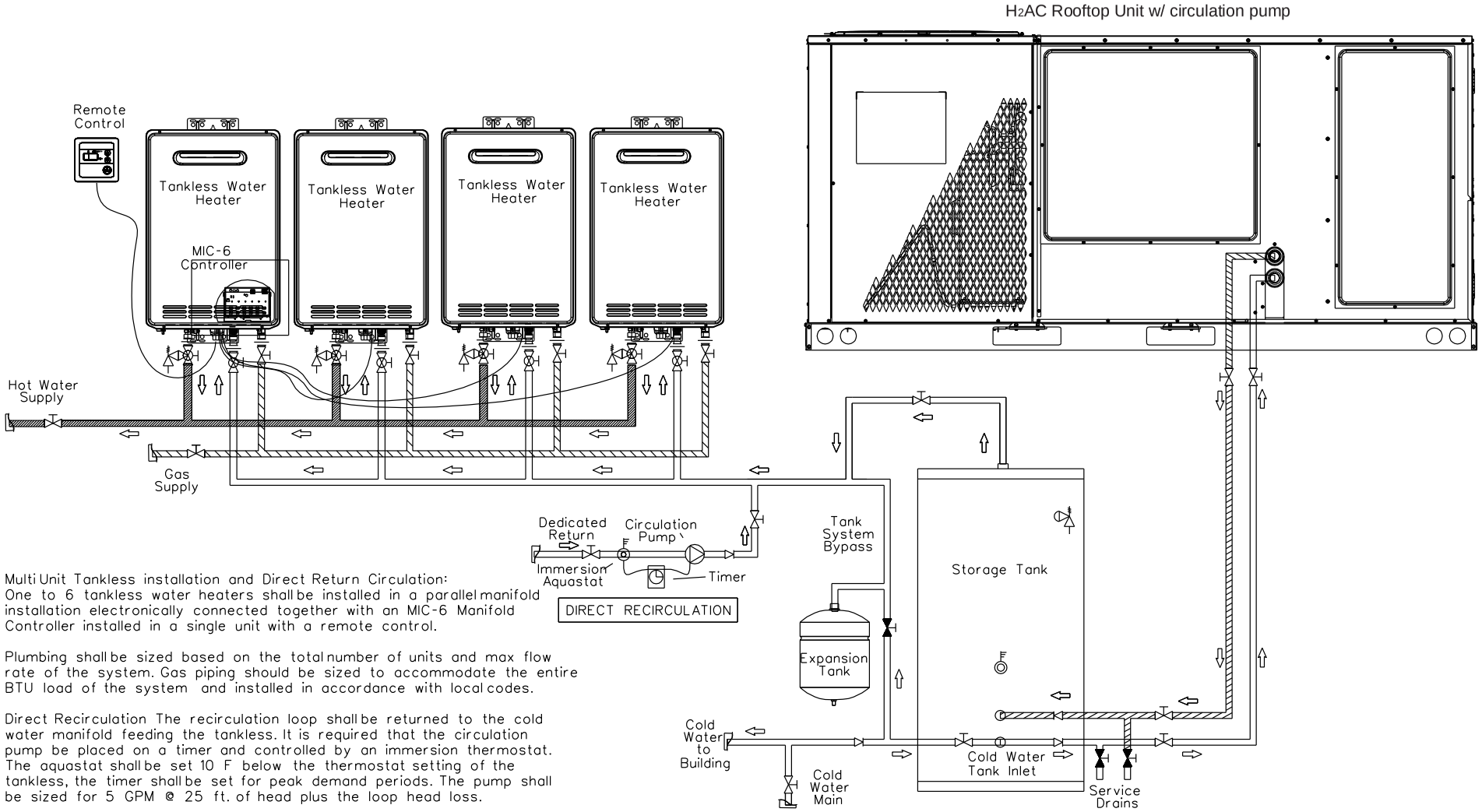
FIGURE 10



2. The H_2AC Rooftop unit should be installed as close to the storage tank as possible to minimize heat loss from interconnecting piping.
3. Use only solder, brazing, and pipe thread sealing materials approved for potable water systems.
4. Refer to connection diagram for typical piping, storage tank, and valve configurations.
5. **It is highly recommended that the H_2AC Rooftop unit be installed with isolation/flushing valves (see illustration, Webstone #40436 or similar) on the inlet and outlet water connections to facilitate required periodic lime and scale removal from the water-to-refrigerant heat exchanger.**
6. Maximum equivalent length of water piping is to be in accordance with the procedure shown in this manual. Consult the pressure loss tables for the values associated with the required water fittings, valves, and straight lengths.
7. Use the H_2AC Rooftop Unit Water Flowrate vs. Water Pressure Drop graph to verify that total system equivalent piping length will not result in less than the 15 GPM minimum flow rate.

B. SYSTEM PRESSURE TEST AND START UP

1. Pressure test system complete system after all plumbing connections are made using accepted plumbing leak test procedures.
2. **The refrigerant-to-water heat exchanger and water pump housing will contain a small amount of non-toxic RV-type water system anti-freeze left over from the factory run test. Be certain to flush the unit and all connecting piping with fresh water prior to start up and initial use.**
3. Verify that air bleed valve in blower section on Hybrid unit is open during initial filling with water. Air must be bled from the highest point in the system. If unit installation results in



Multi Unit Tankless installation and Direct Return Circulation:
One to 6 tankless water heaters shall be installed in a parallel manifold installation electronically connected together with an MIC-6 Manifold Controller installed in a single unit with a remote control.

Plumbing shall be sized based on the total number of units and max flow rate of the system. Gas piping should be sized to accommodate the entire BTU load of the system and installed in accordance with local codes.

Direct Recirculation The recirculation loop shall be returned to the cold water manifold feeding the tankless. It is required that the circulation pump be placed on a timer and controlled by an immersion thermostat. The aquastat shall be set 10 F below the thermostat setting of the tankless, the timer shall be set for peak demand periods. The pump shall be sized for 5 GPM @ 25 ft. of head plus the loop head loss.

Legend

- Cold Water Isolator Valve Assembly
- Hot Water Isolator Valve Assembly
- Pressure Relief Valve
- Circulation Pump
- Normally Open Shut-off Valve
- Normally Closed Shut-off Valve
- Check Valve
- Union
- Gas Pipe
- Cold Water Pipe
- Hot Water Pipe
- Return Circulation Line

This drawing is intended as a guide only. It is not to be used as an alternative to a professionally engineered project drawing. This drawing does not imply compliance with local building codes. Installation may vary, depending on installation location, and must be done in accordance with all local building codes. Consult with local building officials prior to installation.

PROCEDURE FOR CALCULATING THE TOTAL EQUIVALENT LENGTH OF TUBING

List all piping components from the storage tank to the H_2AC rooftop unit and back again. The equivalent length of straight tubing is the same as the actual length. The equivalent length of fittings are obtained from the table below. Sum all of the individual component lengths to find the Total Equivalent Length.

***Pressure Loss in Fittings and Valves Expressed as Equivalent Length of Tube, feet**

Nominal or Standard Size, in		1-1/2"	2"
Fittings	Standard 90° Elbow	4	5.5
	Standard 45° Elbow	1.5	2
	90° Tee - Side Branch	7	9
	90° Tee - Straight Run	0.5	0.5
	Coupling	0.5	0.5
Valves	Ball	0.5	0.5
	Gate	—	0.5
	Btfly	—	7.5
	Check	6.5	9

No.	Inlet	EQUIV. Length (ft.)	No.	Outlet	EQUIV. Length (ft.)
1	side branch Tee	7	18	straight tubing	1
2	straight tubing	1	19	90° elbow	4
3	Check valve	6.5	20	straight tubing	0.5
4	straight tubing	0.5	21	1-1/2" MPT adapter ①	1
5	straight run Tee	0.5	22	Ball Isolation valve	0.5
6	straight tubing	1.5	23	1-1/2" MPT adapter ①	1
7	Ball valve	0.5	24	straight tubing	20
8	straight tubing	5	25	coupling	0.5
9	90° elbow	4	26	straight tubing	19.6
10	straight tubing	20	27	90° elbow	4
11	coupling	0.5	28	straight tubing	4
12	straight tubing	20	29	Ball valve	0.5
13	1-1/2" MPT adapter ①	1	30	straight tubing	1.5
14	Ball Isolation valve	0.5	31	straight run Tee	0.5
15	1-1/2" MPT adapter ①	1	32	straight tubing	0.5
16	straight tubing	0.5	33	Check valve	6.5
17	90° elbow - fitting	4	34	straight tubing	1
			35	90° elbow	4
		74.0			70.6
	Total Equivalent length (ft.)	144.6			

*NOTES: ① For threaded fittings, double the allowances shown in the table.

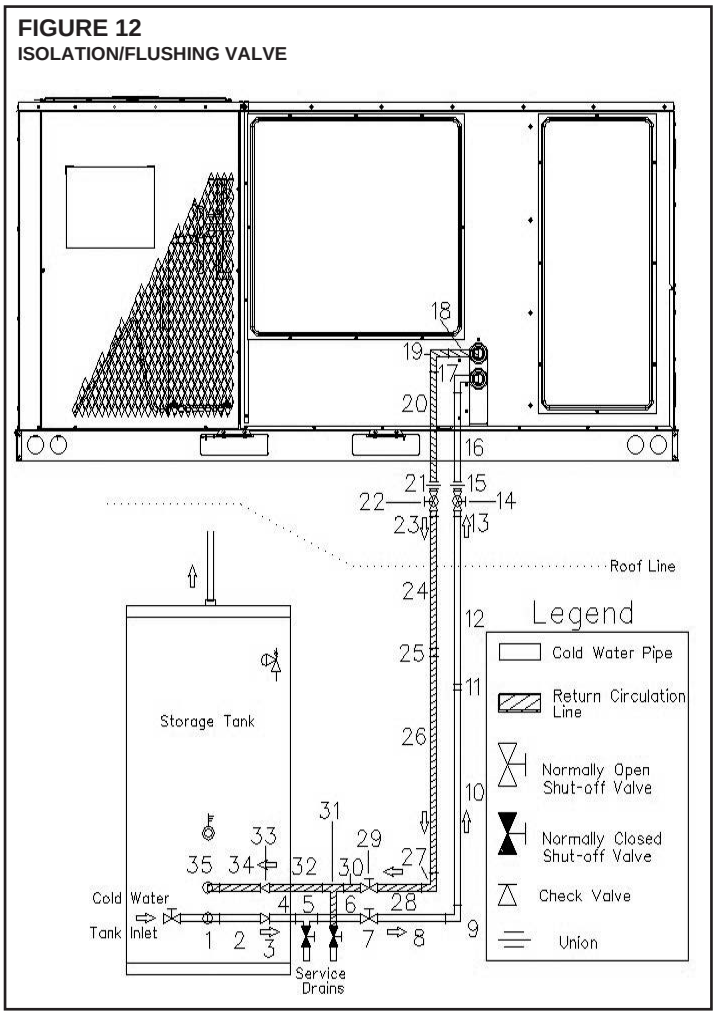
Data condensed from Table 7 of the Copper Development Organization.

Allowances are for streamlined soldered fittings and recessed threaded fittings.

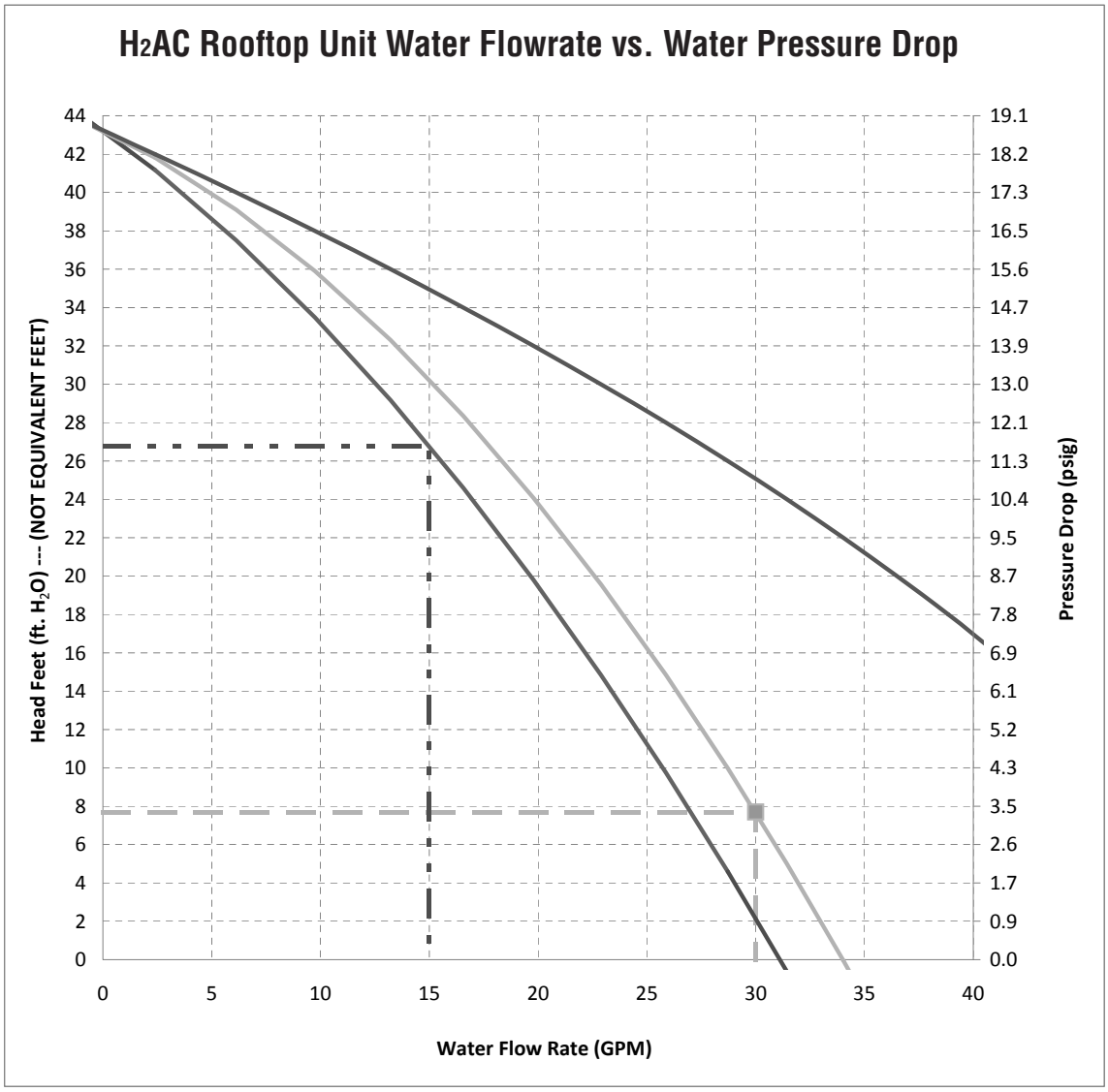
The equivalent lengths presented above are based upon a C factor of 150 in the Hazen-Williams friction loss formula. The lengths shown are rounded to the nearest half foot.

In a closed system application the static (elevation) head is ignored. Only the pipe friction is used to calculate pressure drop.

FIGURE 12
ISOLATION/FLUSHING VALVE



Water Flow Rate (GPM) (15 GPM minimum)		15	20	25	**30**
Water Velocity using 1-1/2" Nom. Type L Copper Tubing (fps)		2.71	3.61	4.51	5.41
Available Pressure Head at Unit @ 230/460 Volts	(Head ft.) (psig)	30.3 13.1	23.8 10.3	16.3 7.1	7.7 3.3
Maximum Equivalent Feet of 1-1/2 Nom. Type L. Copper tubing (ft.) at 230/460V		1504	695	314	106
Available Pressure Head at Unit @ 208 Units	(Head ft.) (psig)	26.8 11.6	19.5 8.4	11.3 4.9	2.2 0.9
Maximum Equivalent Feet of 1-1/2" Nom. Type L Copper Tubing (ft.) @ 208 V		1332	569	218	30



a higher point than the integral air bleed valve, an additional valve needs to be installed at that point.

4. Start unit and verify the correct sequence of operation.

FIGURE 11
ISOLATION/FLUSHING VALVE



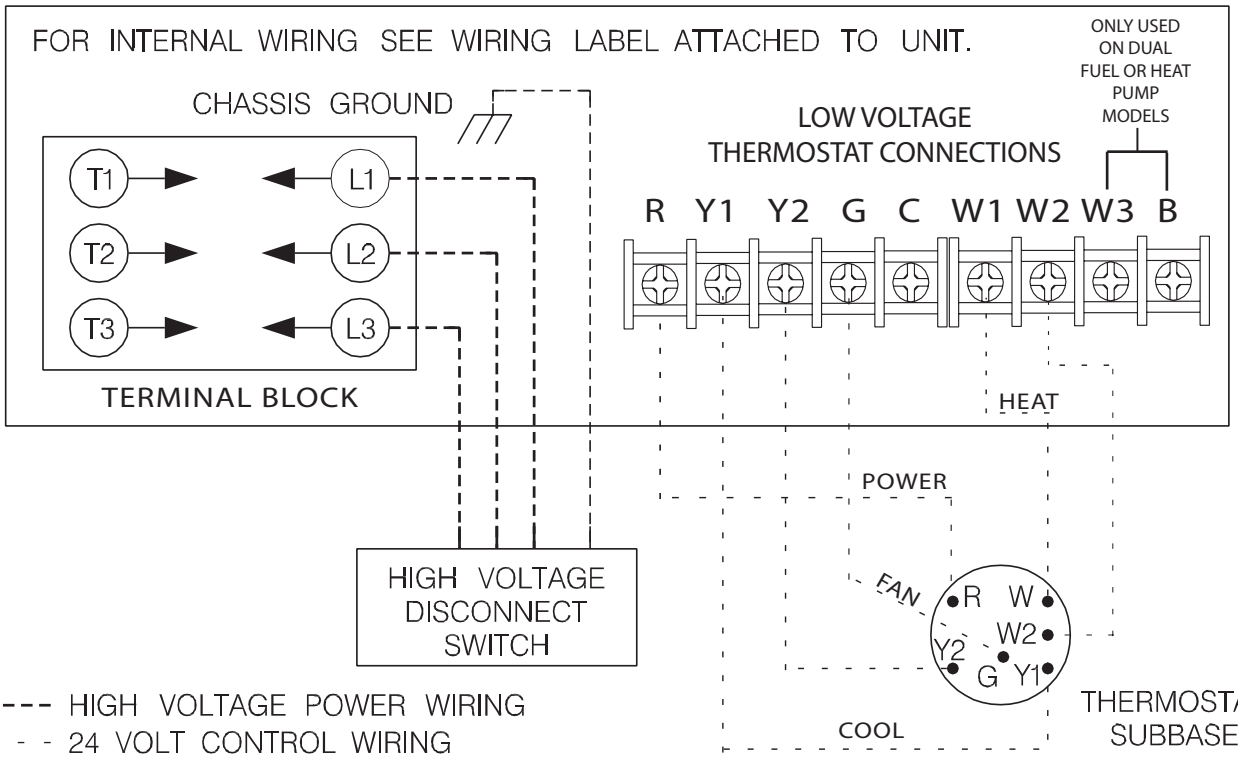
XIV. LIME AND SCALE FLUSHING PROCEDURE

Periodic flushing is required for the refrigerant-to-water heat exchanger contained in the Rheem H2AC Rooftop Unit to remove lime and scale buildup and to prevent degradation of water heating performance. How often this is required depends on the hardness of the water in your area and the run time in the water heating mode. The below instructions provide a safe and effective means of removing the lime and scale buildup in the heat exchanger. If you are not comfortable with the procedure, seek out the assistance of a plumbing professional.

FIGURE 13
ISOLATION/FLUSHING VALVE (WEBSTONE #41436 OR SIMILAR



FIGURE 14
THERMOSTAT CONNECTIONS DIAGRAM



This procedure assumes that isolation/flushing valves have been installed on the unit water inlet and outlet connections. If the unit was installed without valves, it is recommended that flushing be performed by a plumbing professional.

Required items:

- Five gallon bucket
- Small circulation pump
- Hoses with connections suitable for the unit drain valves and pump.
- 2-3 gallons of food-grade white vinegar.
- **The bucket, pump, and hoses can be ordered as Rheem flush kit RTG20124.**

Instructions:

1. Turn off the electric supply to the unit.
2. Shut off the water supply to the unit using the isolation ball valves. Consult the valve manufacturer's instructions for specifics in using their valve assemblies.
3. Attach a short hose to the threaded fittings on each drain valve. Connect the hose on the inlet valve to the outlet of a small circulation pump.
4. Pour approximately two to three gallons of food-grade white vinegar into the pail.
5. Place the inlet hose from the pump and the drain hose from the outlet valve on the unit into the pail.
6. Open the drain valves and turn on the pump. Allow the vinegar solution to circulate for 45-60 minutes.
7. Turn off pump and drain vinegar from the heat exchanger. Close the inlet water drain valve.
8. Open the inlet water supply shutoff valve and allow fresh water to flush the heat exchanger for at least five minutes to remove all traces of vinegar from the system.
9. Close the outlet water drain valve and open the outlet water supply shut-off valve.
10. Restore electrical power and verify correct unit operation.

XV. PRE-START CHECK

1. Is unit properly located and slightly slanted toward indoor condensate drain?
2. Is ductwork insulated, weatherproofed, with proper spacing to combustible materials?
3. Is air free to travel to and from outdoor coil? (See Figure 4.)
4. Is the wiring correct, tight, and according to unit wiring diagram?
5. Is unit grounded?
6. Are field supplied air filters in place and clean?
7. Do the outdoor fan and indoor blower turn freely without rubbing, and are they tight on the motor shafts?

XVI. STARTUP

1. Turn thermostat to "OFF," turn "on" power supply at disconnect switch.
2. Turn temperature setting as high as it will go.
3. Turn fan switch to "ON."
4. Indoor blower should run. Be sure it is running in the right direction.
5. Turn fan switch to "AUTO." Turn system switch to "COOL" and turn temperature setting below room temperature. Unit should run in cooling mode.
6. Is outdoor fan operating correctly in the right direction?
7. Is compressor running correctly.
   Record the following after the unit has run some time.
   A. Operating Mode _____
   B. Discharge Pressures (High) _____PSIG [kPa]
   C. Vapor Pressure at Compressors (Low) _____PSIG [kPa]
   D. Vapor Line Temperature at Compressors _____°F [C°].

E. Indoor Dry Bulb _____°F [C°].
F. Indoor Wet Bulb_____°F [C°].
G. Outdoor Dry Bulb_____°F [C°].
H. Outdoor Wet Bulb _____°F [C°].
I. Voltage at Contactor _____Volts
J. Current at Contactors _____ Amps
K. Model Number_____
L. Serial Number _____
M. Location_____
N. Owner _____
O. Date_____

8. Turn thermostat system switch to "HEAT." Unit compressors should stop. Raise temperature setting to above room temperature. Unit should run in heating mode and auxiliary heaters, if installed, should come on.
9. Check the refrigerant charge using the instructions located on unit charging chart. Replace service port caps. Service port cores are for system access only and will leak if not tightly capped.
10. Adjust discharge air grilles and balance system.
11. Check ducts for condensation and air leaks.
12. Check unit for tubing and sheet metal rattles.
13. Instruct the owner on operation and maintenance.
14. Leave "INSTALLATION" and "USE AND CARE" instructions with owner.

XVII. OPERATION

COOLING MODE

With thermostat in the cool mode, fan auto and the room temperature higher than the thermostat setting:

A. Indoor blower contactor is energized through thermostat contact (G).
B. Compressor contactors are energized through thermostat contacts (Y1) & (Y2) and high pressure controls.
C. Economizer enthalpy control (if installed) controls operation of first-stage cooling and positions fresh air damper to maintain mixed air temperature. Second-stage cooling operates normally as required by second stage of thermostats.
D. The system will continue in cooling operation as long as all safety controls are closed, until the thermostat is satisfied.

HEATING MODE

With the thermostat in heat mode, fan on auto, and the room temperature lower than the thermostat setting, the Indoor blower contactor is energized through thermostat contact (G).

⚠ WARNING

ONLY ELECTRIC HEATER KITS SUPPLIED BY THIS MANUFACTURER AS DESCRIBED IN THIS PUBLICATION HAVE BEEN DESIGNED, TESTED, AND EVALUATED FOR USE WITH THIS UNIT. USE OF ANY OTHER MANUFACTURED ELECTRIC HEATERS INSTALLED WITHIN THIS UNIT MAY CAUSE HAZARDOUS CONDITIONS RESULTING IN PROPERTY DAMAGE, FIRE, BODILY INJURY OR DEATH.

In the heating mode, the thermostat will energize one or more supplementary heaters.

XVIII. H2AC ROOFTOP UNIT SEQUENCE OF OPERATION

1. On a call for cooling ("Y" from T'stat energized), unit always starts in air-cooled condenser mode and runs for two minutes.
   a. Liquid line solenoid from water-cooled heat exchanger is energized during this time to expedite transfer of refrigerant from water-cooled condenser.
2. After two minutes water pump is energized for 60 seconds while water temperature is sampled by a thermistor.
   a. If water pressure transducer does not sense adequate pressure (5 psig), or water inlet temperature is >95°F go to step 7.
3. If water pressure transducer senses adequate pressure and water inlet temperature is <95°F, unit switches to water-cooled condenser mode*.
   a. Three-way valve is energized.
   b. Outdoor fans are switched off.
   c. Outdoor coil liquid line solenoid is energized to for two minutes to expedite return of liquid refrigerant in air-cooled condenser.
4. Unit operates in water-cooled condenser (water heating) mode until the call for cooling ends, outlet water temperature reaches 138°F, or liquid line pressure >570 psig.
5. The control will record the water inlet temperature when the refrigerant pressure reaches 550 psig. The control will use this value minus 20°F for the hybrid water inlet restart temperature.
6. If termination of a call for cooling ends the water-cooled condenser (water heating) cycle, the unit will restart as described in item 1 above on the next call for cooling.
7. If the water-cooled condenser (water heating) cycle terminates on water temperature rise (138°F) or pressure (>570 psig) and there is still a call for cooling, the unit three-way valve switches back to the air-cooled condenser mode, turns on the outdoor fans, and energizes the liquid line solenoid from the water-cooled condenser for two minutes.
8. If a cooling ("Y") call continues, return to Step 2 after a selectable delay default is ten minutes.

FAULTS/LOCKOUTS/Misc.

1. **Low-temperature lockout** - Occurs at 40°F for the water-cooled condenser (water heating) mode. Unit will only operate in the air-cooled condenser mode below 40°F.
2. **Standard DDC control lockouts** – High pressure control, low pressure control, low ambient control, etc.
3. **Three-way valve failure or water pump failure** – A rapid rise in liquid line pressure will occur. If liquid line pressure increases above 530 psig in less than one minute. If three of these trips occur during a call for cooling, a hard lockout of the water heating mode will occur, but the unit will still function in the air-cooled condenser mode.
4. **Airside solenoid valve failure** – shows up as an undercharge in the water heating mode. If subcooling is less than 4° or superheat is more than 25° after 2 minutes, 30 seconds unit will return to air cooled mode. If this happens three times in a row without a successful run of at least four minutes in the water heating mode, then a hard lockout of the water heatiing mode will occur, but the unit will still function in the air-cooled condenser mode.
5. **Freeze protection** - If ambient is <35°F, water pump is energized until ambient is >37°F.
6. **Leak detection** - If leak detector senses water, an alarm signal is sent to the thermostat and waterside operation is locked out until leak detection ends.

Misc.

1. Water pump is energized once every 24 hours to keep water from stagnating in times of no cooling operation.

XIX. MISCELLANEOUS

REPLACEMENT PARTS

Contact your local distributor for a complete parts list.

XX. AIRFLOW DATA TABLES

AIR-FLOW PERFORMANCE – 10 TON RLHL-C120 MODEL

Air Flow CFM [L/s]	Capacity 10 Ton [35.2 kW]																																											
	External Static Pressure—Inches of Water [kPa]																																												
	0.1 [.02]		0.2 [.05]		0.3 [.07]		0.4 [.10]		0.5 [.12]		0.6 [.15]		0.7 [.17]		0.8 [.20]		0.9 [.22]		1.0 [.25]		1.1 [.27]		1.2 [.30]		1.3 [.32]		1.4 [.35]		1.5 [.37]		1.6 [.40]		1.7 [.42]		1.8 [.45]		1.9 [.47]		2.0 [.50]		2.1 [.52]		2.2 [.55]		2.3 [.57]	
	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W	RPM	W
3200 [1510]	—	—	—	—	—	—	657	1170	715	1245	742	1319	770	1394	797	1468	825	1543	852	1617	880	1692	956	1698	976	1703	996	1817	1017	1930	1037	2044	1057	2157	1077	2271	1098	2384	1118	2498	1138	2611	1159	2725	1179	2838
3300 [1557]	—	—	—	—	673	1179	701	1253	728	1328	756	1402	783	1477	811	1551	838	1626	866	1700	943	1705	963	1708	948	1822	976	1935	1024	2049	1044	2162	1065	2276	1085	2390	1105	2503	1125	2617	1146	2730	1166	2844	1186	2957
3400 [1605]	—	—	—	—	687	1261	714	1336	742	1410	769	1485	797	1559	824	1634	852	1708	879	1763	950	1811	971	1827	962	1941	989	2054	1032	2168	1052	2281	1072	2395	1092	2508	1113	2622	1133	2735	1153	2849	1174	2962	1194	3076
3500 [1652]	—	—	673	1270	700	1344	728	1419	755	1493	783	1588	810	1642	838	1717	865	1791	938	1813	958	1832	978	1946	975	2059	1003	2173	1039	2286	1059	2400	1080	2513	1100	2627	1120	2740	1141	2854	1161	2968	1181	3081	—	—
3600 [1699]	—	—	686	1352	714	1427	741	1501	769	1576	796	1650	824	1725	851	1799	879	1874	945	1892	966	1951	986	2065	989	2178	1016	2292	1047	2405	1067	2519	1087	2632	1108	2746	1128	2859	1148	2973	1168	3086	1189	3200	—	—
3700 [1746]	672	1361	700	1435	727	1510	755	1584	782	1659	810	1733	837	1808	865	1882	933	1896	953	1956	973	2070	993	2183	1002	2297	1030	2410	1054	2524	1075	2637	1095	2751	1115	2864	1135	2978	1156	3091	1176	3205	1196	3318	—	—
3800 [1793]	686	1443	713	1518	741	1592	768	1667	796	1741	823	1818	861	1890	878	1965	940	2003	960	2075	981	2189	1001	2302	1016	2416	1043	2529	1062	2643	1082	2756	1102	2870	1123	2983	1143	3097	1163	3210	1183	3324	—	—	—	—
3900 [1841]	699	1526	727	1601	754	1675	782	1750	809	1824	837	1899	864	1973	927	2015	948	2080	968	2194	988	2307	1008	2421	1029	2534	1057	2648	1069	2761	1090	2875	1110	2988	1130	3102	1150	3215	1171	3329	1191	3442	—	—	—	—
4000 [1888]	713	1609	740	1683	768	1758	795	1832	823	1907	850	1961	878	2056	935	2085	955	2199	975	2312	996	2426	1016	2539	1043	2653	1070	2767	1077	2880	1097	2994	1117	3107	1138	3221	1158	3334	1178	3448	1199	3561	—	—	—	—
4100 [1935]	726	1692	754	1766	781	1841	809	1915	836	1990	864	2064	922	2091	942	2204	963	2318	983	2431	1003	2545	1024	2658	1056	2772	1084	2885	1084	2999	1105	3112	1125	3226	1145	3339	1166	3453	1186	3566	—	—	—	—	—	—
4200 [1982]	740	1774	767	1849	795	1923	822	1998	850	2072	877	2147	930	2209	950	2323	970	2438	990	2550	1011	2663	1031	2777	1070	2890	1097	3004	1092	3117	1112	3231	1133	3345	1153	3458	1173	3572	1193	3685	—	—	—	—	—	—
4300 [2029]	753	1857	781	1932	808	2006	836	2081	853	2155	917	2215	937	2328	957	2442	978	2555	998	2669	1018	2782	1039	2896	1083	3009	1111	3123	1099	3236	1120	3350	1140	3453	1160	3577	1181	3690	—	—	—	—	—	—	—	—
4400 [2077]	767	1940	794	2014	822	2089	849	2163	877	2238	924	2333	945	2447	965	2560	985	2674	1006	2787	1026	2901	1046	3014	1097	3128	1124	3241	1107	3355	1127	3468	1148	3582	1168	3695	1188	3809	—	—	—	—	—	—	—	—
4500 [2124]	780	2023	808	2097	835	2172	863	2248	912	2338	932	2452	952	2585	973	2679	993	2793	1013	2906	1033	3020	1054	3133	1110	3247	1138	3360	1115	3474	1135	3587	1155	3701	1175	3814	1196	3928	—	—	—	—	—	—	—	—
4600 [2171]	794	2105	821	2180	840	2254	876	2329	919	2457	940	2571	960	2684	980	2798	1000	2911	1021	3025	1041	3138	1061	3252	1124	3365	1151	3479	1122	3592	1142	3706	1163	3819	1183	3933	—	—	—	—	—	—	—	—	—	—
4700 [2218]	807	2188	835	2263	862	2337	906	2462	927	2576	947	2689	967	2803	988	2916	1008	3030	1028	3143	1048	3257	1069	3371	1137	3484	1165	3598	1130	3711	1150	3825	1170	3938	1190	4052	—	—	—	—	—	—	—	—	—	—
4800 [2265]	821	2271	848	2345	876	2420	914	2581	934	2695	955	2808	975	2922	995	3035	1015	3149	1036	3262	1056	3376	1076	3489	1151	3603	1178	3716	1137	3830	1157	3943	1178	4057	1198	4170	—	—	—	—	—	—	—	—	—	—

NOTE: L-Drive left of bold line, M-Drive right of bold line.

Drive Package	L						M					
Motor H.P. [W]	2.0 [1491.4]						3.0 [2237.1]					
Blower Sheave	BK90						BK65					
Motor Sheave	1VP-44						1VP-44					
Turns Open	**1**	2	3	4	5	6	1	2	3	4	5	**6**
RPM	**845**	810	775	739	704	669	1138	1089	1041	992	943	**894**

NOTES: 1. Factory sheave settings are shown in bold print.
2. Re-adjustment of sheave required to achieve rated airflow at ARI minimum E.S.P.
3. Do not operate above blower RPM shown as motor overloading will occur.
4. Do not set motor sheave below one turn open.

AIRFLOW CORRECTION FACTORS
10 TON [35.2 kW]

ACTUAL—CFM [L/s]	3200 [1510]	3400 [1605]	3600 [1699]	3800 [1793]	4000 [1888]	4200 [1982]	4400 [2077]	4600 [2171]	4800 [2265]
TOTAL MBH	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04
SENSIBLE MBH	0.91	0.93	0.95	0.97	1.00	1.02	1.05	1.07	1.09
POWER kW	0.98	0.98	0.99	0.99	1.00	1.00	1.01	1.01	1.01

NOTES: 1. Multiply correction factor times gross performance data.
2. Resulting sensible capacity cannot exceed total capacity.

[ ] Designates Metric Conversions

COMPONENT AIR RESISTANCE, IWC
10 TON [35.2 kW]

Component	Standard Indoor Airflow—CFM [L/s]								
	3200 [1510]	**3400 [1604]**	**3600 [1699]**	**3800 [1793]**	**4000 [1888]**	**4200 [1982]**	**4400 [2076]**	**4600 [2171]**	**4800 [2265]**
	Resistance—Inches Water [kPa]								
Wet Coil	0.065 [0.016]	0.071 [0.018]	0.076 [0.019]	0.082 [0.020]	0.087 [0.022]	0.093 [0.023]	0.099 [0.025]	0.105 [0.026]	0.110 [0.027]
Concentric Diffuser RXRN-FA65 or FA75 & Transition RXMC-CD04	0.31 [0.077]	0.37 [0.092]	DNA	DNA	DNA	DNA	DNA	DNA	DNA
Concentric Diffuser RXRN-AA61 or AA71 & Transition RXMC-CE05	DNA	DNA	0.17 [0.042]	0.18 [0.045]	0.21 [0.052]	0.24 [0.060]	0.27 [0.067]	DNA	DNA
Concentric Diffuser RXRN-AA66 or AA76 & Transition RXMC-CF06	DNA	DNA	DNA	DNA	DNA	DNA	DNA	0.31 [0.077]	0.32 [0.080]
Economizer 100% R.A. Damper Open	0.09 [0.022]	0.10 [0.025]	0.11 [0.027]	0.12 [0.030]	0.13 [0.032]	0.14 [0.035]	0.15 [0.037]	0.16 [0.040]	0.17 [0.042]
Horizontal Economizer 100% R.A. Damper Open	0.05 [0.012]	0.06 [0.014]	0.06 [0.015]	0.07 [0.017]	0.08 [0.020]	0.09 [0.021]	0.09 [0.022]	0.10 [0.024]	0.10 [0.025]
Horizontal Economizer 100% O.A. Damper Open	0.11 [0.027]	0.12 [0.030]	0.13 [0.032]	0.15 [0.0.36]	0.16 [0.040]	0.18 [0.044]	0.19 [0.047]	0.20 [0.50]	0.21 [0.052]

NOTE: Add component resistance to duct resistance to determine total external static pressure.
DNA = Data not Available.

XXI. TROUBLE SHOOTING CHART

⚠ WARNING

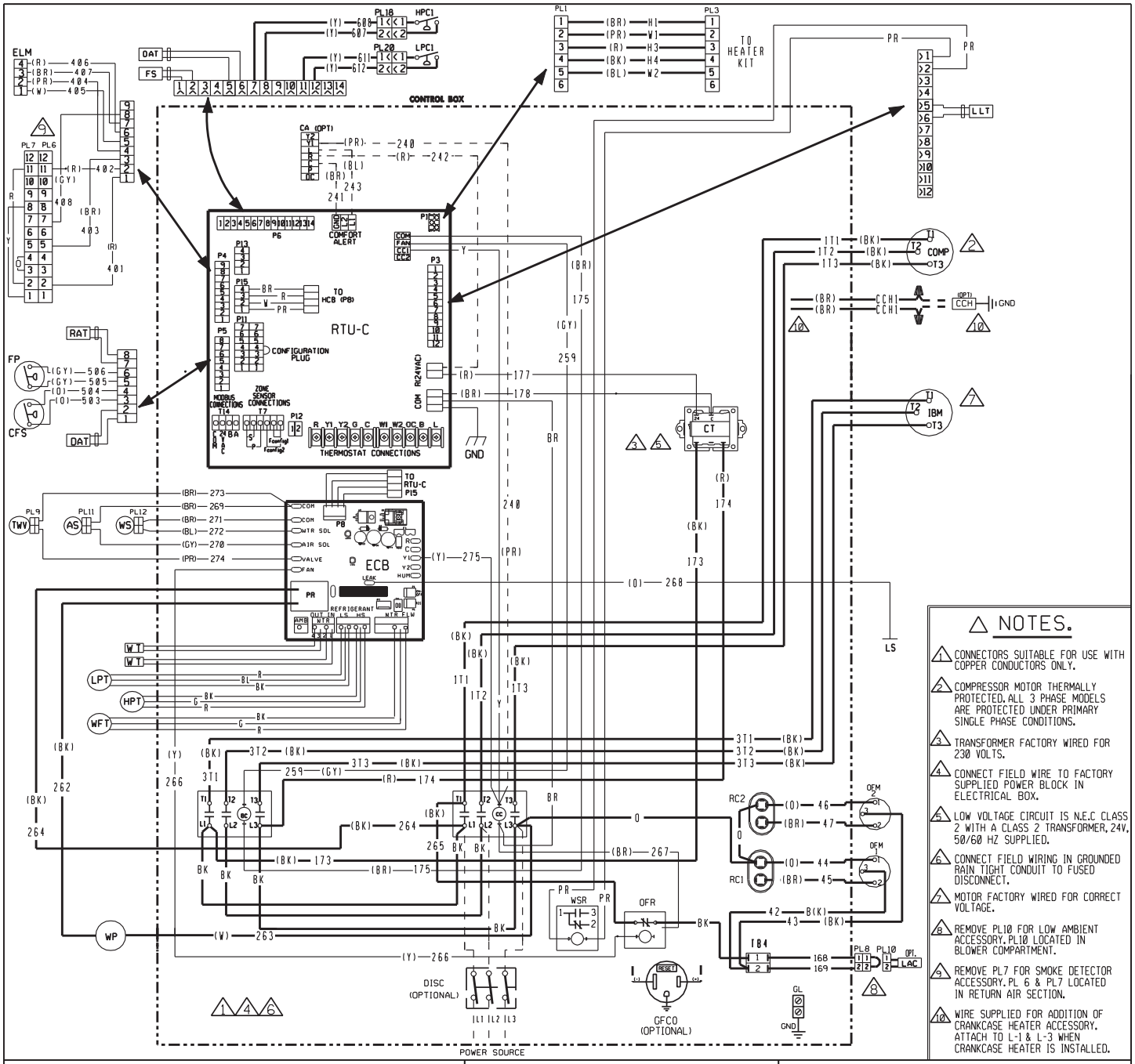
DISCONNECT ALL POWER TO UNIT BEFORE SERVICING. CONTACTOR MAY BREAK ONLY ONE SIDE. FAILURE TO SHUT OFF POWER CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

SYMPTOM	POSSIBLE CAUSE	REMEDY
Unit will not run	• Power off or loose electrical connection • Thermostat out of calibration-set too high • Defective contactor • Blown fuses • Transformer defective • High pressure control open (if provided) • Interconnecting low voltage wiring damaged	• Check for correct voltage at compressor contactor in control box • Reset • Check for 24 volts at contactor coil - replace if contacts are open • Replace fuses • Check wiring-replace transformer • Reset-also see high head pressure remedy- • Replace thermostat wiring
Condenser fan runs, compressor doesn't	• Run capacitor defective (single phase only) • Loose connection • Compressor stuck, grounded or open motor winding open internal overload. • Low voltage condition	• Replace • Check for correct voltage at compressor - check & tighten all connections • Wait at least 2 hours for overload to reset. If still open, replace the compressor. At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating.
Insufficient cooling	• Improperly sized unit • Improper airflow • Incorrect refrigerant charge • Air, non-condensibles or moisture in system • Incorrect voltage	• Recalculate load • Check - should be approximately 400 CFM [188.78 L/s] per ton. • Charge per procedure attached to unit service panel. • Recover refrigerant, evacuate & recharge, add filter drier • At compressor terminals, voltage must be within 10% of rating plate volts when unit is operating.
Compressor short cycles	• Incorrect voltage • Defective overload protector • Refrigerant undercharge	• At compressor terminals, voltage must be ± 10% of nameplate marking when unit is operating. • Replace - check for correct voltage • Add refrigerant
Registers sweat	• Low evaporator airflow	• Increase speed of blower or reduce restriction - replace air filter
High head-low vapor pressures	• Restriction in liquid line, expansion device or filter drier • Flow check piston size too small • Incorrect capillary tubes • TXV does not open	• Remove or replace defective component • Change to correct size piston • Change coil assembly • Replace TXV
High head-high or normal vapor pressure - Cooling mode	• Dirty condenser coil • Refrigerant overcharge • Condenser fan not running • Air or non-condensibles in system	• Clean coil • Correct system charge • Repair or replace • Recover refrigerant, evacuate & recharge
High head-high or normal vapor pressure - Heating mode	• Low air flow - condenser coil • Refrigerant overcharge • Air or non-condensibles in system • Dirty condenser coil	• Check filters - correct to speed • Correct system charge • Recover refrigerant, evacuate & recharge • Check filter - clean coil
Low head-high vapor pressures	• Defective Compressor valves	• Replace compressor
Low vapor - cool compressor - iced evaporator coil	• Low evaporator airflow • Operating below 65°F outdoors • Moisture in system • TXV limiting refrigerant flow	• Increase speed of blower or reduce restriction - replace air filter • Add Low Ambient Kit • Recover refrigerant - evacuate & recharge - add filter drier • Replace TXV
High vapor pressure	• Excessive load • Defective compressor	• Recheck load calculation • Replace
Fluctuating head & vapor pressures	• TXV hunting • Air or non-condensibles in system	• Check TXV bulb clamp - check air distribution on coil - replace TXV • Recover refrigerant, evacuate & recharge
Gurgle or pulsing noise at expansion device or liquid line	• Air or non-condensibles in system	• Recover refrigerant, evacuate & recharge

XXII. H2AC ROOFTOP UNIT ALARMS AND TROUBLESHOOTING

Alarm Designation	MODBUS "Current Alarm" Code	Description	Troubleshooting Information
H2AC Rooftop Unit Water Leakage	102	The sensor in the water heating (hybrid) section of the unit has detected a water leak and stopped water heating operation. A relay output for an optional field-installed water shutoff valve is energized.	> Check for loose or defective air vent valve on water discharge line in water heating section. > Check for water pump seal leakage. > Check that sensor is installed correctly on control. > Replace the sensor.
H2AC Rooftop Unit Low Water Pressure	103	No alarm is set. The water sensor measures potable water pressure in the water heating section. If the water pressure is below 5 PSIG, water heating operation will not begin. If the sensor becomes unavailable, water heating operation terminates. The unit can continue to operate in cooling mode.	> Check that sensor is correctly installed on control. > The sensor has three wires that attach to the hybrid control. Check for 5VDC between the outer terminals. If 5VDC is not present, replace the hybrid control. > Replace the sensor.
H2AC Rooftop Unit Freeze Protection Mode	104	The outdoor ambient sensor on the RTU-C has detected outdoor ambient temperature below 35°F. The water pump is energiced continuously until the outdoor ambient temperature rises above 38°F.	> Check that sensor is installed correctly on control. > Check sensor location. > Replace the sensor.
H2AC Rooftop Unit Solenoid Fault	105	At the beginning of each water heating cycle, if the high pressure sensor value exceeds 530 PSIG after 3 seconds but before 60 seconds are elapsed, an alarm is set.	> Check water pump operation, shut-off valves, etc. for adequate water flow. > Check for 24VAC at control transformer > Check for 24VAC at hybrid unit 3-way refrigerant valve. > Increase water sample delay time using DIP switches on hybrid control. > Replace 3-way refrigerant valve if it fails to shift.
H2AC Rooftop Unit Ambient Sensor Fault	106	The water pump is energzed continuously until the sensor becomes available.	> Extreme temperatures. > Check that sensor is installed correctly. > Replace the sensor.
H2AC Rooftop Unit Water Inlet Sensor Fault	107	If the sensor becomes unavailable, an alarm will be set and water heating operation terminates. Unit can continue to operate in cooling mode.	> Extreme temperatures. > Check that sensor is installed correctly. > Replace the sensor.
H2AC Rooftop Unit Water Outlet Sensor Fault	108	If the sensor becomes unavailable, an alarm will be set and water heating operation terminates. Unit can continue to operate in cooling mode.	> Extreme temperatures. > Check that sensor is installed correctly. > Replace the sensor.
H2AC Rooftop Unit Water Inlet and Outlet Sensor Fault	109	If both sensors becomes unavailable, an alarm will be set and water heating operation terminates. Unit can continue to operate in cooling mode.	> Extreme temperatures. > Check that sensor is installed correctly. > Replace the sensors.
H2AC Rooftop Unit High Pressure Sensor Fault	110	The high pressure sensor measures liquid refrigerant pressure. If the sensor becomes unavailable, water heating operation terminates and an alarm is set. Unit can continue to operate in cooling mode.	> Check that sensor is correctly installed on control. > The sensor has three wires that attach to the hybrid control. Check for 5VDC between the outer terminals. If 5VDC is not present, replace the hybrid control. > Replace the sensor.
H2AC Rooftop Unit Low Pressure Sensor Fault	111	The low pressure sensor measures liquid refrigerant pressure. If the sensor becomes unavailable, water heating operation terminates and an alarm is set. Unit can continue to operate in cooling mode.	> Check that sensor is correctly installed on control. > The sensor has three wires that attach to the hybrid control. Check for 5VDC between the outer terminals. If 5VDC is not present, replace the hybrid control. > Replace the sensor.
H2AC Rooftop Unit Lockout Fault	112	If alarms 105, 115, 116, 117, or 118 are initiated more than 3 times from unit power-up, an alarm is set and water heating mode is terminated until the alarm is cleared. **The lockout fault can only be cleared by removing power to the unit or by sending a "Clear All Alarms" command through the BAS network.**	> Check individual alarms.
H2AC Rooftop Unit Low Subcooling - water heating mode	115	If, 2 minutes after the 3-way valve has shifted, low subcooling was continuously measured for more than 30 seconds during the water heating mode an alarm is set. Unit operation continues.	> If low subcooling occurs after exiting the air conditioning mode, check wiring and verify operation of outdoor refrigerant (air side) solenoid. > Check location of liquid line temperature sensor. > Verify correct refrigerant charge.
Low Subcooling - air conditioning mode	116	If, 2 minutes after the 3-way valve has shifted, low subcooling was continuously measured for more than 30 seconds during the air conditining mode an alarm is set. Unit operation continues.	> If low subcooling occurs after exiting the water heating mode, check wiring and verify operation of flat plate heat exchanger (water side) solenoid. > Check location of liquid line temperature sensor. > Verify correct refrigerant charge.
High Superheat - water heating mode	117	If, 2 minutes after the 3-way valve has shifted, high superheat was continuously measured for more than 30 seconds during the water heating mode an alarm is set. Unit operation continues.	> High internal building load. > Expansion valve is not operating correctly.
High Superheat - air conditioning heating mode	118	If, 2 minutes after the 3-way valve has shifted, high superheat was continuously measured for more than 30 seconds during the air conditioning mode an alarm is set. Unit operation continues.	> If high superheat occurs after exiting the water heating mode, check wiring and verify operation of flat plate heat exchanger (water side) solenoid. > High internal building lode. > Expansion valve is not operating correctly.

XXIII. WIRING DIAGRAMS



NOTES.

1. CONNECTORS SUITABLE FOR USE WITH COPPER CONDUCTORS ONLY.
2. COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. TRANSFORMER FACTORY WIRED FOR 230 VOLTS.
4. CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRICAL BOX.
5. LOW VOLTAGE CIRCUIT IS N.E.C CLASS 2 WITH A CLASS 2 TRANSFORMER, 24V, 50/60 HZ SUPPLIED.
6. CONNECT FIELD WIRING IN GROUNDED RAIN TIGHT CONDUIT TO FUSED DISCONNECT.
7. MOTOR FACTORY WIRED FOR CORRECT VOLTAGE.
8. REMOVE PL10 FOR LOW AMBIENT ACCESSORY. PL10 LOCATED IN BLOWER COMPARTMENT.
9. REMOVE PL7 FOR SMOKE DETECTOR ACCESSORY. PL 6 & PL7 LOCATED IN RETURN AIR SECTION.
10. WIRE SUPPLIED FOR ADDITION OF CRANKCASE HEATER ACCESSORY. ATTACH TO L-1 & L-3 WHEN CRANKCASE HEATER IS INSTALLED.

COMPONENT CODE

AS	AIR SOLENOID
BC	BLOWER CONTACTOR
CA	COMFORT ALERT MODULE
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
CFS	CLOGGED FILTER SWITCH
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DAT	DISCHARGE AIR SENSOR
DISC	DISCONNECT SWITCH
ECB	eSYNC CONTROL BOARD
FLMS	FLAME SENSOR
FP	FAN PROVING
FS	FREEZE SENSOR
GFCO	GROUND FAULT CONVENIENCE OUTLET
GL	GROUND LUG
GND	GROUND
HPC	HIGH PRESSURE CONTROL
HPT	HIGH PRESSURE TRANSFORMER
IBM	INDOOR BLOWER MOTOR BELT DRIVE
LAC	LOW AMBIENT COOLING CONTROL
LLT	LIQUID LINE TEMPERATURE
LPC	LOW PRESSURE CONTROL
LPT	LOW PRESSURE TRANSDUCER
LS	LEAK SENSOR
OAT	OUTSIDE AIR SENSOR
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
PL	PLUG
PR	PUMP RELAY
RAT	RETURN AIR SENSOR
RC	RUN CAPACITOR
RTU-C	ROOFTOP UNIT CONTROL
TB	TERMINAL BLOCK
WFT	WATER FLOW TRANSDUCER
WP	WATER PUMP
WS	WATER SOLENOID
WSR	WATER SHUTOFF RELAY
WT	WATER TEMPERATURE SENSOR
▲	WIRE NUT

WIRING INFORMATION

LINE VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

LOW VOLTAGE
- -FACTORY STANDARD
- -FACTORY OPTION
- -FIELD INSTALLED

REPLACEMENT WIRE
- -MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)

WARNING
- -CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C., AND LOCAL CODES AS APPLICABLE.

WIRE COLOR CODE

BK	BLACK	O	ORANGE
BR	BROWN	PR	PURPLE
BL	BLUE	R	RED
G	GREEN	W	WHITE
GY	GRAY	Y	YELLOW

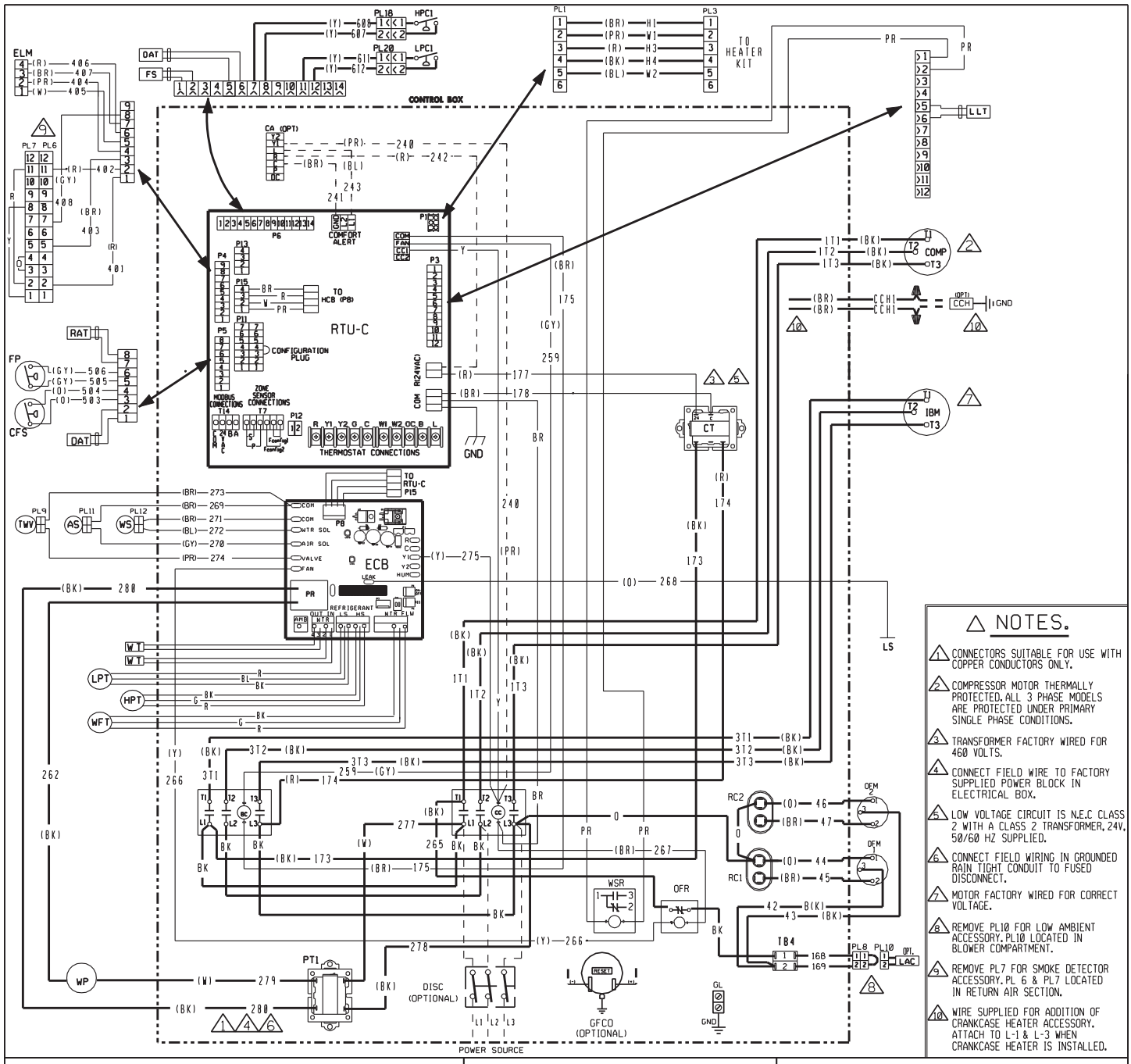
WIRING DIAGRAM

?LHL-C120C

208-230V 3 PH, 60 HZ.

PACKAGE A/C W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
MGR		1-14-11	90-103089-15	01



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2. COMPRESSOR MOTOR THERMALLY PROTECTED. ALL 3 PHASE MODELS ARE PROTECTED UNDER PRIMARY SINGLE PHASE CONDITIONS.
3. TRANSFORMER FACTORY WIRED FOR 460 VOLTS.
4. CONNECT FIELD WIRE TO FACTORY SUPPLIED POWER BLOCK IN ELECTRICAL BOX.
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AS	AIR SOLENOID
BC	BLOWER CONTACTOR
CA	COMFORT ALERT MODULE
CC	COMPRESSOR CONTACTOR
CCH	CRANKCASE HEATER
CFS	CLOGGED FILTER SWITCH
COMP	COMPRESSOR
CT	CONTROL TRANSFORMER
DAT	DISCHARGE AIR SENSOR
DISC	DISCONNECT SWITCH
ECB	eSYNC CONTROL BOARD
FLMS	FLAME SENSOR
FP	FAN PROVING
FS	FREEZE SENSOR
GFCO	GROUND FAULT CONVENIENCE OUTLET
GL	GROUND LUG
GND	GROUND
HPC	HIGH PRESSURE CONTROL
HPT	HIGH PRESSURE TRANSDUCER
IBM	INDOOR BLOWER MOTOR BELT DRIVE
LAC	LOW AMBIENT COOLING CONTROL
LLT	LIQUID LINE TEMPERATURE
LPC	LOW PRESSURE CONTROL
LPT	LOW PRESSURE TRANSDUCER
LS	LEAK SENSOR
OAT	OUTSIDE AIR SENSOR
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
PL	PLUG
PR	PUMP RELAY
PT	POWER TRANSFORMER
RAT	RETURN AIR SENSOR
RC	RUN CAPACITOR
RTU-C	ROOFTOP UNIT CONTROL
TB	TERMINAL BLOCK
WFT	WATER FLOW TRANSDUCER
WP	WATER PUMP
WS	WATER SOLENOID
WSR	WATER SHUTOFF RELAY
WT	WATER TEMPERATURE SENSOR
⚠	WIRE NUT

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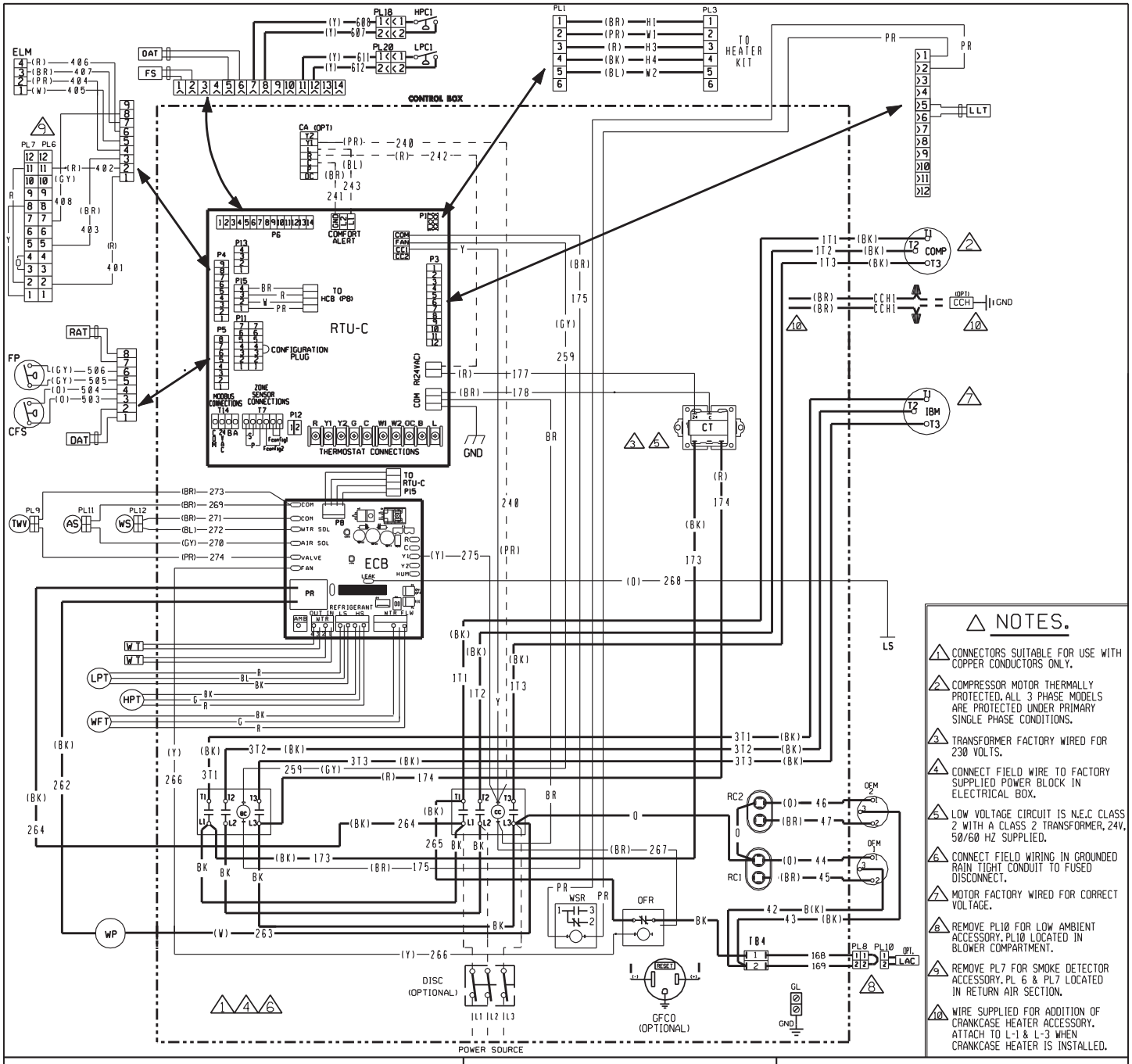
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WIRE COLOR CODE

BK	BLACK	O	ORANGE
BR	BROWN	PR	PURPLE
BL	BLUE	R	RED
G	GREEN	W	WHITE
GY	GRAY	Y	YELLOW

WIRING DIAGRAM
?LHL-C120D
460V 3 PH, 60 HZ.
PACKAGE A/C W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
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OFR	OUTDOOR FAN RELAY
PL	PLUG
PR	PUMP RELAY
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WT	WATER TEMPERATURE SENSOR
▲	WIRE NUT

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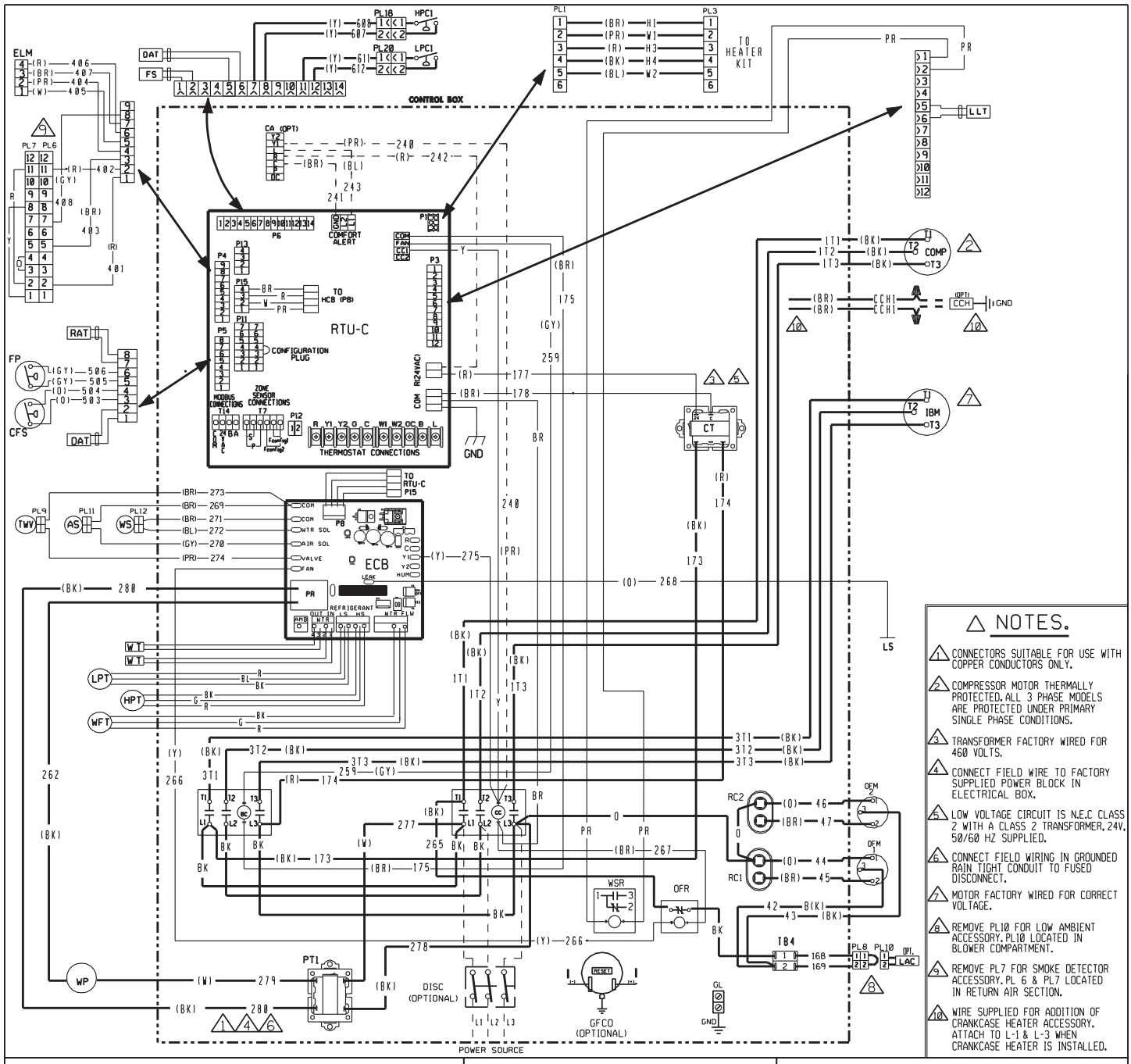
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460V 3 PH, 60 HZ.
PACKAGE A/C W/RTU-C

DR. BY	APP. BY	DATE	DWG. NO.	REV
MGR		1-14-11	90-103089-17	Ø1

XXIV. CHARGING CHART

RLHL SYSTEM CHARGE CHART

FIGURE 15

