BID/RFP/SOQ RECEIPT

Receipt of Bid/RFP/SOQ Proposal No. 50-00132207

From: AHG Services LLC

Company's Name

Person Received Response: L Caron

Number of Envelopes/Boxes Received: 1 envelope

Jefferson Parish Purchasing Department
General Government Building
200 Derbigny St., Ste. 4400
Gretna, LA 70053

DATE: 10/2/2020

TIME: 10:55

RECEIVED
2020 OCT -2 AM 10:55
JEFFERSON PARISH
PURCHASING

AHG Services, LLC
2225 Piedmont Street
Kenner, LA 70065
(504) 267 – 3800
LA STATE CONTRACTOR'S
LICENSE No 55529

BID NUMBER:

50-00132207

BID OPENING DATE:

10/02/2020

LABOR, MATERIALS AND EQUIPMENT NECESSARY TO REMOVE EXISTING ROOF TOP A/C UNITS, PROVIDE AND INSTALL NEW UNITS PER ATTACHED SPECIFICATIONS FOR THE DEPARTMENT OF RECREATION

DATE: 9/22/2020

INVITATION TO BID
THIS IS NOT AN ORDER

BID NO.: 50-00132207

JEFFERSON PARISH

PURCHASING DEPARTMENT
P.O. BOX 9
GRETNA, LA. 70054-0009
504-364-2678

VENDOR:

BUYER: MBUTTERY

As per LSA-RS 47:301 et seq., all governmental bodies are excluded from payment of sales taxes to any Louisiana taxing body. Quotations shall be based on F.O.B. Agency warehouse or jobsite, anywhere within the Parish as designated by the Purchasing Department.

JEFFERSON PARISH reserves the right to cancel all or any part of an order if not shipped promptly. No charges will be allowed for parking or cartage unless specified in quotation. The order must not be filled at a higher price than quoted. JEFFERSON PARISH reserves the right to cancel at any time and for any reason by issuing a THIRTY (30) day written notice to the contractor.

JEFFERSON PARISH is expecting all products to be new and all work to be done in workman-like manner, according to standard practices. Any deviations or alteration from the specifications must be indicated on the bid form for each item and upon request, product data for same must be submitted by the time specified by the Purchasing Department.

DELIVERY: FOB JEFFERSON PARISH

INDICATE DELIVERY DATE ON EQUIPMENT AND SUPPLIES	4-6 WEEKS
INDICATE STARTING TIME (IN DAYS) FOR CONSTRUCTION WORK	2
INDICATE COMPLETION TIME (IN DAYS) FOR CONSTRUCTION WORK	14

In the event that addenda are issued with this bid, bidders MUST acknowledge all addenda on the bid form. Bidder must acknowledge receipt of an addendum on the bid form as indicated. Failure to acknowledge any addendum on the bid form will result in bid rejection.

Acknowledge Receipt of Addenda: NUMBER: _____
NUMBER: _____
NUMBER: _____
NUMBER: _____

LOUISIANA CONTRACTOR'S LICENSE NO.: (if applicable) 55529

*** ALL BIDDERS MUST COMPLETE SECTION BELOW ***

FIRM NAME:	AHG SERVICES, LLC
SIGNATURE: (Must be signed here)	D A. Duthans
TITLE:	PRINCIPAL
PRINT OR TYPE NAME:	DOUGLAS A. GUTHANS
ADDRESS:	2225 PIEDMONT STREET
CITY, STATE:	KENNER, LA
ZIP:	70062
TELEPHONE:	(504) 267-3800
FAX:	(504) 267-3801
EMAIL ADDRESS:	DGUTHANS@AHGSERVICESLLC.COM

TOTAL PRICE OF ALL BID ITEMS: $ 32,800.00

INVITATION TO BID FROM JEFFERSON PARISH - continued

BID NO.: 50-00132207

SEALED BID

ITEM NUMBER	QUANTITY	U/M	DESCRIPTION OF ARTICLES	UNIT PRICE QUOTED	TOTALS
			LABOR, MATERIALS AND EQUIPMENT NECESSARY TO REMOVE EXISTING ROOF TOP A/C UNITS, PROVIDE AND INSTALL NEW UNITS PER SPECS FOR THE DEPARTMENT OF RECREATION		
1	1.00	JOB	0010 Labor, Materials and Equipment To Remove and Install (4) Four Ton Roof Top Units Location: Cleary Playground Rooms 1 and Rooms 2 3700 Civic Street Metairie, LA 70001 Contact: Justin Mayeux 504-736-6999 or jmayeux@jeffparish.net	$32,800.00	$32,800.00

THE GRAY SURETY

The Gray Insurance Company
The Gray Casualty & Surety Company

Telephone: 504-780-7440
info@graysurety.com

P.O. Box 6202
Metairie, LA 70009

Bid Bond

Know all men by these presents:

THAT AHG Services LLC

of 2225 Piedmont St. Kenner, LA 70062

hereinafter called the Principal, and The Gray Insurance Company of Metairie, Louisiana, a corporation duly organized under the laws of the State of Louisiana, as Surety, hereinafter called the Surety, are held firmly bound unto Jefferson Parish Purchasing Department as Obligee, hereinafter called the Obligee, in the sum of Five Percent (5%) of Total Amount Bid for the payment of which sum and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid:

Job Number: 5000132207

Project Description:

Labor, Materials and Equipment Necessary to Remove Existing Roof Top A/C Units, Provide and Install New Units per Specifications for the Department of Recreation, Project No. 5000132207

Project Location: Jefferson Parish, LA

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specialized in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed this 2nd day of October, 2020, by:

AHG Services LLC
Principal
By: [signature]

The Gray Insurance Company
Surety
By: Catherine R. Froeba
Catherine R. Froeba, Attorney-in-Fact

For Internal Use Only:
Insurance Underwriters LTD
10/01/2020 19:14 90948008904

THE GRAY INSURANCE COMPANY
THE GRAY CASUALTY & SURETY COMPANY

GENERAL POWER OF ATTORNEY

Bond Number: N/A **Principal:** AHG Services, LLC

Project: Labor, Materials and Equipment Necessary to Remove Existing Roof Top A/C Units, Provide and Install New Units per Specifications for the Department of Recreation, Project No. 5000132207

KNOW ALL BY THESE PRESENTS, THAT The Gray Insurance Company and The Gray Casualty & Surety Company, corporations duly organized and existing under the laws of Louisiana, and having their principal offices in Metairie, Louisiana, do hereby make, constitute, and appoint **Edwin D. Schlesinger, William H. Ellsworth, Catherine R. Froeba, Jack T. Landry, Laura Burns, Jill K. Tucker, and Jeffrey E. Kropp of Metairie, Louisiana jointly and severally** on behalf of each of the Companies named above its true and lawful Attorney(s)-in-Fact, to make, execute, seal and deliver, for and on its behalf and as its deed, bonds, or other writings obligatory in the nature of a bond, as surety, contracts of suretyship as are or may be required or permitted by law, regulation, contract or otherwise, provided that no bond or undertaking or contract of suretyship executed under this authority shall exceed the amount of $10,000,000.00.

This Power of Attorney is granted and is signed by facsimile under and by the authority of the following Resolutions adopted by the Boards of Directors of both The Gray Insurance Company and The Gray Casualty & Surety Company at meetings duly called and held on the 26th day of June, 2003.

"RESOLVED, that the President, Executive Vice President, any Vice President, or the Secretary be and each or any of them hereby is authorized to execute a power of Attorney qualifying the attorney named in the given Power of Attorney to execute on behalf of the Company bonds, undertakings, and all contracts of surety, and that each or any of them is hereby authorized to attest to the execution of such Power of Attorney, and to attach the seal of the Company; and it is

FURTHER RESOLVED, that the signature of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be binding upon the Company now and in the future when so affixed with regard to any bond, undertaking or contract of surety to which it is attached.

IN WITNESS WHEREOF, The Gray Insurance Company and The Gray Casualty & Surety Company have caused their official seals to be hereinto affixed, and these presents to be signed by their authorized officers this 12th day of September, 2011.

THE GRAY INSURANCE COMPANY SEAL

By: Michael T. Gray
President, The Gray Insurance Company
and
Vice President,
The Gray Casualty & Surety Company

Attest: Mark S. Manguno
Secretary,
The Gray Insurance Company,
The Gray Casualty & Surety Company

THE GRAY CASUALTY & SURETY COMPANY SEAL

State of Louisiana
ss:
Parish of Jefferson

On this 12th day of September, 2011, before me, a Notary Public, personally appeared Michael T. Gray, President of The Gray Insurance Company and Vice President of The Gray Casualty & Surety Company, and Mark S. Manguno, Secretary of The Gray Insurance Company and The Gray Casualty & Surety Company, personally known to me, being duly sworn, acknowledged that they signed the above Power of Attorney and affixed the seals of the companies as officers of, and acknowledged said instrument to be the voluntary act and deed, of their companies.

LISA S. MILLAR NOTARY PUBLIC STATE OF LOUISIANA

Lisa S. Millar, Notary Public, Parish of Orleans
State of Louisiana
My Commission is for Life

I, Mark S. Manguno, Secretary of The Gray Insurance Company and The Gray Casualty & Surety Company, do hereby certify that the above and forgoing is a true and correct copy of a Power of Attorney given by the companies, which is still in full force and effect.
IN WITNESS WHEREOF, I have set my hand and affixed the seals of the Companies, this 2nd day of October , 2020 .

THE GRAY INSURANCE COMPANY SEAL

THE GRAY CASUALTY & SURETY COMPANY SEAL

Mark S. Manguno, Secretary
The Gray Insurance Company
The Gray Casualty & Surety Company

2020

AHG SERVICES, LLC

AIR-CONDITIONING / PLUMBING / MEDICAL GAS

RESOLUTIONS ADOPTED BY SOLE DIRECTOR, SINGLE MANAGING MEMBER, AND SHAREHOLER OF AHG SERVICES, LLC

The undersigned, being the sole Director, Single Managing Member, and Shareholder, hereby adopts the following resolutions:

1) RESOLVED, that the following person be, and is hereby authorized to sign any project bid forms and bidding documents on behalf of AHG SERVICES, LLC.

2) RESOLVED, that the following person be, and is hereby authorized to sign any building contracts and building contract documents on behalf of AHG SERVICES, LLC.

3) Additionally, RESOLVED, that the following person is legally authorized to bind AHG SERVICES, LLC to a contract.

Douglas A. Guthans

AHG Services, LLC
Principal
Managing Member
Director and Shareholder

10/2/2020
Date

2225 Piedmont Street - Kenner, LA 70062
www.ahgservicesllc.com
Business (504) 267-3800 * Fax (504) 267-3801
info@ahgservicesllc.com

Non-Public Works Bid

AFFIDAVIT

STATE OF LOUISIANA

PARISH/COUNTY OF JEFFERSON

BEFORE ME, the undersigned authority, personally came and appeared: DOUGLAS A. GUTHANS, (Affiant) who after being by me duly sworn, deposed and said that he/she is the fully authorized OWNER / AGENT of AHG SERVICES, LLC (Entity), the party who submitted a bid in response to Bid Number 50-00132207 to the Parish of Jefferson.

Affiant further said:

Campaign Contribution Disclosures

(Choose A or B, if option A is indicated please include the required attachment):

Choice A _____ Attached hereto is a list of all campaign contributions, including the date and amount of each contribution, made to current or former elected officials of the Parish of Jefferson by Entity, Affiant, and/or officers, directors and owners, including employees, owning 25% or more of the Entity during the two-year period immediately preceding the date of this affidavit or the current term of the elected official, whichever is greater. Further. Entity, Affiant, and/or Entity Owners have not made any contributions to or in support of current or former members of the Jefferson Parish Council or the Jefferson Parish President through or in the name of another person or legal entity, either directly or indirectly.

Choice B 101 there are **NO** campaign contributions made which would require disclosure under Choice A of this section.

Debt Disclosures

(Choose A or B, if option A is indicated please include the required attachment):

Choice A _____ Attached hereto is a list of all debts owed by the affiant to any elected or appointed official of the Parish of Jefferson, and any and all debts owed by any elected or appointed official of the Parish to the Affiant.

Choice B OD There are **NO** debts which would require disclosure under Choice A of this section.

Affiant further said:

That Affiant has employed no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the public contract under which he received payment, other than persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project or in securing the public contract were in the regular course of their duties for Affiant; and

[*The remainder of this page is intentionally left blank.*]

That no part of the contract price received by Affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by the Affiant whose services in connection with the construction, alteration or demolition of the public building or project were in the regular course of their duties for Affiant.

Signature of Affiant

DOUGLAS A. GUTHANS
Printed Name of Affiant

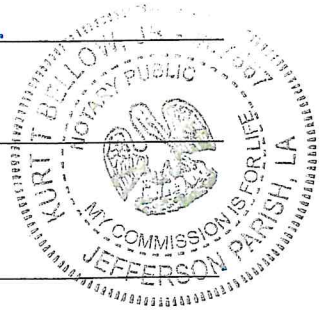
SWORN AND SUBSCRIBED TO BEFORE ME
ON THE 14 DAY OF April, 20 2

Notary Public

KURT T. BELLOW JR.
Printed Name of Notary

67567
Notary/Bar Roll Number

My commission expires



AHGUTHA-03 JACHEE

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 9/24/2020

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Jonathan Landry, CIC, CRA	
Insurance Underwriters, Ltd. P. O. Box 6738 Metairie, LA 70009	PHONE (A/C, No, Ext): (504) 620-1795	FAX (A/C, No): (504) 620-1779
	E-MAIL ADDRESS: jclandry@iulins.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : Travelers Indemnity Co.	25658
INSURED	INSURER B : Phoenix Insurance Company	25623
AHG Services, LLC. 2225 Piedmont Street Kenner, LA 70062	INSURER C : Travelers Property Casualty	25674
	INSURER D : Travelers Casualty & Surety Co	19038
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY			4TCO8293B742TIA20	4/10/2020	4/10/2021	EACH OCCURRENCE	$ 1,000,000
	[ ] CLAIMS-MADE [X] OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 300,000
							MED EXP (Any one person)	$ 5,000
							PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	X POLICY [X] PRO-JECT [ ] LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	X OTHER: Primary&Non Contributory							$
B	AUTOMOBILE LIABILITY			BA9M0633472026S	4/10/2020	4/10/2021	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	[ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	[ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
C	X UMBRELLA LIAB [X] OCCUR			CUP3K417649202S	4/10/2020	4/10/2021	EACH OCCURRENCE	$ 5,000,000
	[ ] EXCESS LIAB [ ] CLAIMS-MADE						AGGREGATE	$ 5,000,000
	[ ] DED X RETENTION $ 10,000							$
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			UB6K780745202SG	4/10/2020	4/10/2021	X PER STATUTE [ ] OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N [ ] N / A						E.L. EACH ACCIDENT	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Re: 5000132207 - Labor, Materials and Equipment necessary to remove existing roof top A/C Units
provide and install new units per attached specifications for the Department of Recreation.

CERTIFICATE HOLDER

Jefferson Parish Purchasing Department
200 Derbigny Street, Suite 4400
Gretna, LA 70053

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Jonathan Landry

State of Louisiana

State Licensing Board for Contractors

This is to Certify that:

AHG SERVICES, L.L.C.
2225 Piedmont Street
Kenner, LA 70062

is duly licensed and entitled to practice the following classifications

BUILDING CONSTRUCTION; HEAVY CONSTRUCTION; MECHANICAL WORK (STATEWIDE); MUNICIPAL AND PUBLIC WORKS CONSTRUCTION; PLUMBING (STATEWIDE); SPECIALTY: STEAM AND HOT WATER HEATING IN BUILDINGS OR PLANTS

STATE OF LOUISIANA — UNION JUSTICE CONFIDENCE

Witness our hand and seal of the Board dated,
Baton Rouge, LA 2nd day of June 2019

Director

Chairman

Treasurer

Expiration Date: June 1, 2022

License No: 55529

This License Is Not Transferrable

Jefferson Parish

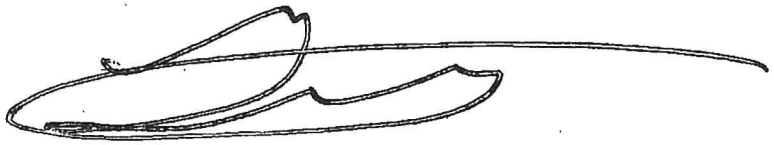
Inspection and Code Enforcement
Regulatory Inspection's Division

Active Mechanical # 60764

This is to certify that **DOUGLAS GUTHANS**
having qualified in accordance with Jefferson Parish Ordinances is hereby granted authorization to engage in the above field as authorized by law.

Issue Date: 1/1/2020

Expiration Date: 12/31/2020



Mechanical Section Chief

THIS LICENSE IS NOT TRANSFERABLE

SUBMITTAL

Project

Cleary Playground

Date

Friday, September 25, 2020

Table Of Contents

Project: Cleary Playground
Prepared By:

09/25/2020
03:37PM

RTU 1 - 4

Tag Cover Sheet
Unit Report
Certified Drawing
Performance Report
Guide Specification

Unit Parameters

Unit Model: **48GCDM05A1A5-0A0A0**
Unit Size: ..... **05 (4 Tons)**
Volts-Phase-Hertz: **230-3-60**
Heating Type: ..... **Gas**
Duct Cfg: ..... **Vertical Supply / Vertical Return**
Low Heat
Two Stage Cooling Models

Dimensions (ft. in.) & Weight (lb.) ***

Unit Length: ..... **6' 2.375"**
Unit Width: ..... **3' 10.625"**
Unit Height: ..... **2' 9.375"**
*** Total Operating Weight: ..... **555** lb

*** Weights and Dimensions are approximate. Weight does not include unit packaging. Approximate dimensions are provided primarily for shipping purposes. For exact dimensions and weights, refer to appropriate product data catalog.

Lines and Filters

Return Air Filter Type: ..... **Throwaway**
Return Air Filter Quantity: **2**
Return Air Filter Size: ..... **16 x 25 x 2**

Unit Configuration

Direct Drive - EcoBlue - Standard Static
Al/Cu - Al/Cu
Base controls set up for field installed air management devices
Standard Packaging

Warranty Information

1-Year parts(std.) .....
5-Year compressor parts(std.) .....
10-Year heat exchanger - Aluminized(std.) .....
Complete Unit Year 2-5 Parts & Carrier CCS Labor .....

NOTE: Please see Warranty Catalog 500-089 for explanation of policies and ordering methods.

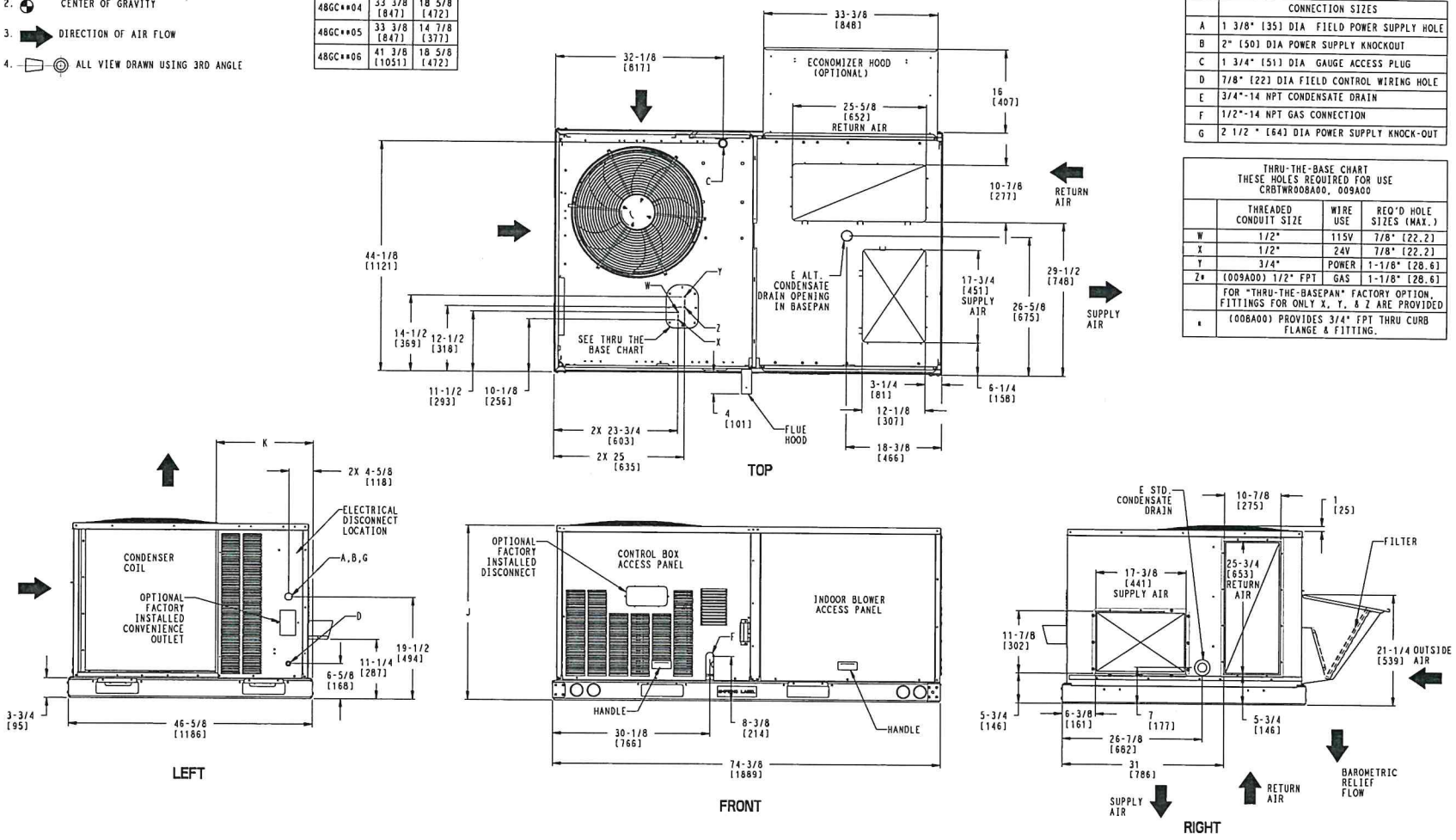
NOTES:

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW
4. ALL VIEW DRAWN USING 3RD ANGLE

UNIT	J	K
48GC**04	33 3/8 [847]	18 5/8 [472]
48GC**05	33 3/8 [847]	14 7/8 [377]
48GC**06	41 3/8 [1051]	18 5/8 [472]

	CONNECTION SIZES
A	1 3/8" [35] DIA FIELD POWER SUPPLY HOLE
B	2" [50] DIA POWER SUPPLY KNOCKOUT
C	1 3/4" [51] DIA GAUGE ACCESS PLUG
D	7/8" [22] DIA FIELD CONTROL WIRING HOLE
E	3/4"-14 NPT CONDENSATE DRAIN
F	1/2"-14 NPT GAS CONNECTION
G	2 1/2 " [64] DIA POWER SUPPLY KNOCK-OUT

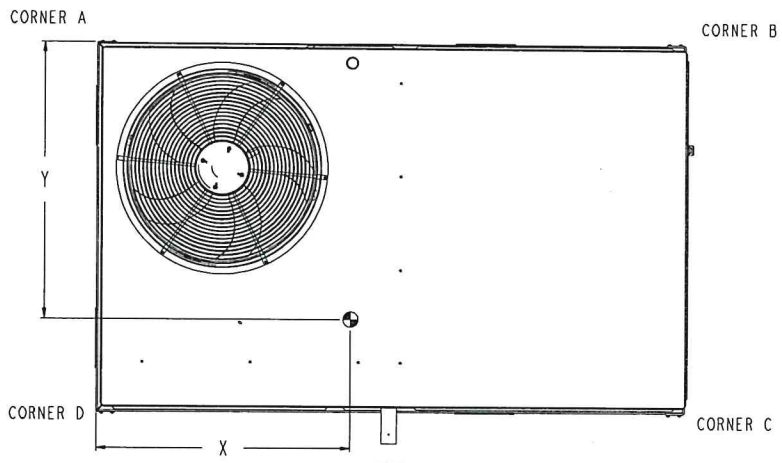
THRU-THE-BASE CHART THESE HOLES REQUIRED FOR USE CRBTWR008A00, 009A00			
	THREADED CONDUIT SIZE	WIRE USE	REQ'D HOLE SIZES (MAX.)
W	1/2"	115V	7/8" [22.2]
X	1/2"	24V	7/8" [22.2]
Y	3/4"	POWER	1-1/8" [28.6]
Z*	(009A00) 1/2" FPT	GAS	1-1/8" [28.6]
	FOR "THRU-THE-BASEPAN" FACTORY OPTION, FITTINGS FOR ONLY X, Y, & Z ARE PROVIDED		
*	(008A00) PROVIDES 3/4" FPT THRU CURB FLANGE & FITTING.		

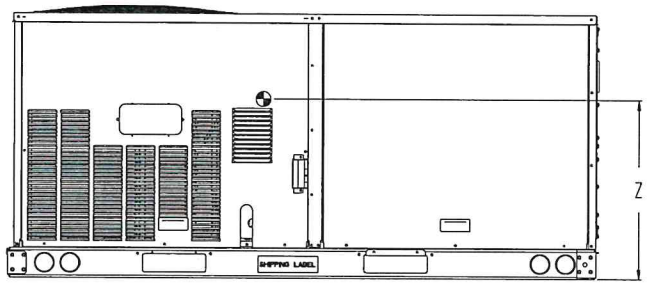


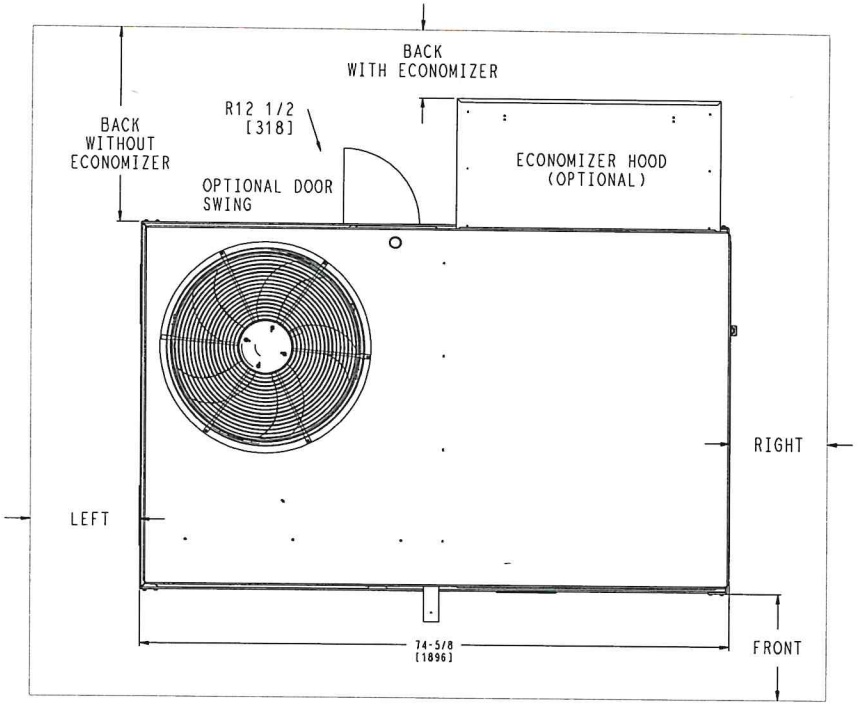
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	1 OF 3	09/07/18	08/03/18	48GC 04-06 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003099	B

UNIT	STD. UNIT WEIGHT *		CORNER WEIGHT (A)		CORNER WEIGHT (B)		CORNER WEIGHT (C)		CORNER WEIGHT (D)		C.G.		HEIGHT
	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	LBS.	KG.	X	Y	Z
48GC**04	513	233	131	59	127	58	125	57	130	59	36 1/2 [927]	23 1/4 [591]	18 1/4 [464]
48GC**05	555	252	142	64	137	62	135	61	141	64	36 1/2 [927]	23 1/4 [591]	18 [457]
48GC**06	600	272	161	73	151	68	140	64	149	68	36 [914]	22 1/2 [572]	19 3/8 [492]

*- STANDARD UNIT WEIGHT IS WITH LOW GAS HEAT AND WITHOUT PACKAGING.
FOR OTHER OPTINS AND ACCESSORIES REFER TO THE PRODUCT DATA CATALOG.





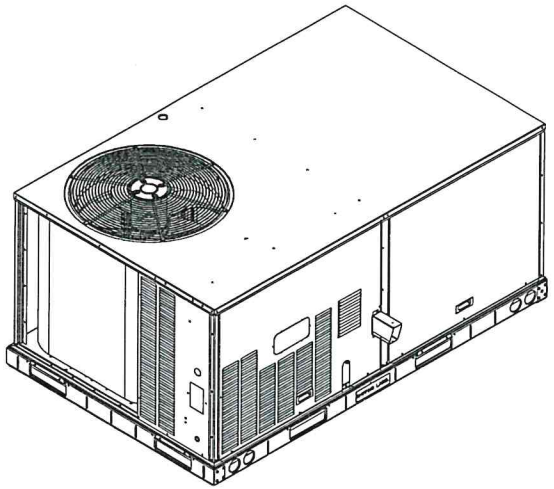


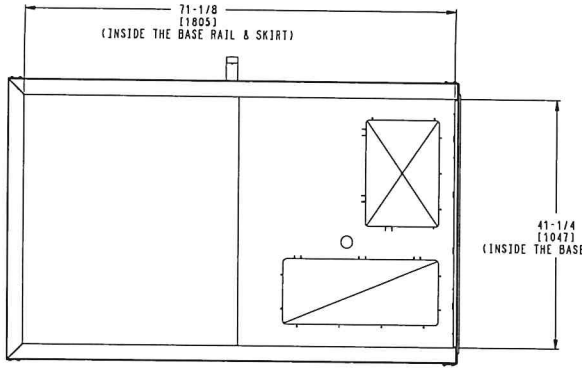
NOTES:

1. FOR ALL MINIMUM CLEARANCES LOCAL CODES OR JURISDICTIONS MAY PREVAIL.

	CLEARANCE		
	SERVICE WITH:	SERVICE WITH:	OPERATING
SURFACE	CONDUCTIVE BARRIER	NONCONDUCTIVE BARRIER	CLEARANCE
FRONT	48 [1219mm]	36 [914mm]	18 [457mm]
LEFT	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK	48 [1219mm]	42 [1067mm]	18 [457mm]
BACK W/HOOD	36 [914mm]	36 [914mm]	18 [457mm]
RIGHT	36 [914mm]	36 [914mm]	18 [457mm]
TOP	72 [1829mm]	72 [1829mm]	72 [1829mm]

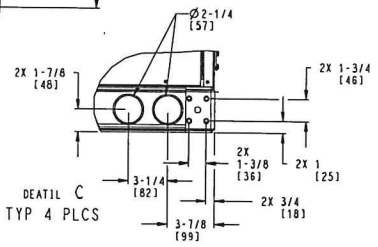
ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	2 OF 3	09/07/18	08/03/18	48GC 04-06 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003099	B

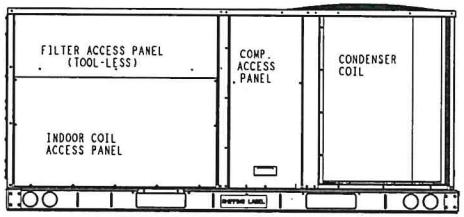




INSIDE BASERAIL DIMENSIONS

BOTTOM





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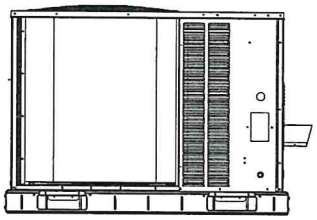

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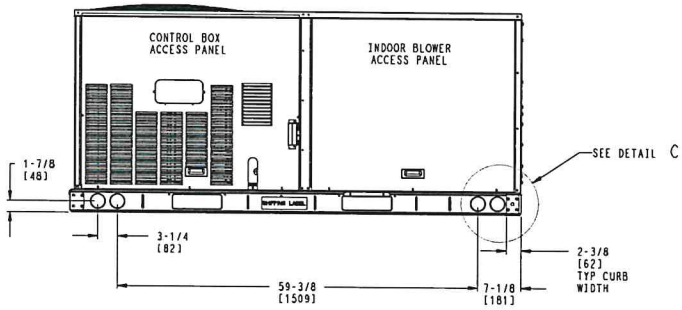


FRONT

ITC CLASSIFICATION	SHEET	DATE	SUPERCEDES			REV
U.S. ECCN:NSR	3 OF 3	09/07/18	08/03/18	48GC 04-06 SINGLE PACKAGE ELECTRICAL COOLING WITH GAS HEAT	48TC003099	B

Part Number:48GCDM05A1A5-0A0A0

ARI SEER:	**16.00**	

Base Unit Dimensions

Unit Length:	**74.4**	in
Unit Width:	**46.6**	in
Unit Height:	**33.4**	in

Operating Weight

Base Unit Weight:	**555**	lb
Total Operating Weight:	**555**	lb

Unit

Unit Voltage-Phase-Hertz:	**230-3-60**	
Air Discharge:	**Vertical**	
Fan Drive Type:	**Direct**	
Actual Airflow:	**1600**	CFM
Site Altitude:	**30**	ft

Cooling Performance

Condenser Entering Air DB:	**93.0**	F
Evaporator Entering Air DB:	**80.5**	F
Evaporator Entering Air WB:	**68.4**	F
Entering Air Enthalpy:	**32.63**	BTU/lb
Evaporator Leaving Air DB:	**59.7**	F
Evaporator Leaving Air WB:	**58.5**	F
Evaporator Leaving Air Enthalpy:	**25.38**	BTU/lb
Gross Cooling Capacity:	**52.09**	MBH
Gross Sensible Capacity:	**35.88**	MBH
Compressor Power Input:	**3.21**	kW
Coil Bypass Factor:	**0.082**	

Mixed Air

Outdoor Air Airflow:	**420**	CFM
Outdoor Air DB:	**93.0**	F
Outdoor Air WB:	**79.0**	F
Outdoor Air Htg. Temp.:	**30.0**	F
Return Air DB:	**76.0**	F
Return Air WB:	**64.0**	F
Return Air Htg. Temp.:	**70.0**	F

Heating Performance

Heating Airflow:	**1600**	CFM
Entering Air Temp:	**59.5**	F
Leaving Air Temp:	**90.8**	F
Gas Heating Input Capacity:	**50.0 / 67.0**	MBH
Gas Heating Output Capacity:	**40.0 / 54.0**	MBH
Temperature Rise:	**31.3**	F
Thermal Efficiency (%):	**81.0**	

Supply Fan

External Static Pressure:	**0.50**	in wg
Fan RPM:	**1793**	
Fan Power:	**0.62**	BHP
NOTE:	**Selected IFM RPM Range: 1262 - 1900**	

Electrical Data

Voltage Range:	**187 - 253**	
Compressor #1 RLA:	**14**	

Compressor #1 LRA: **83**
Indoor Fan Motor Type: **STD**
Indoor Fan Motor FLA: **5**
Combustion Fan Motor FLA (ea): **0.48**
Power Supply MCA: **24**
Power Supply MOCP (Fuse or HACR): **30**
Disconnect Size FLA: **24**
Disconnect Size LRA: **94**
Electrical Convenience Outlet: **None**
Outdoor Fan [Qty / FLA (ea)]: **1 / 1.5**

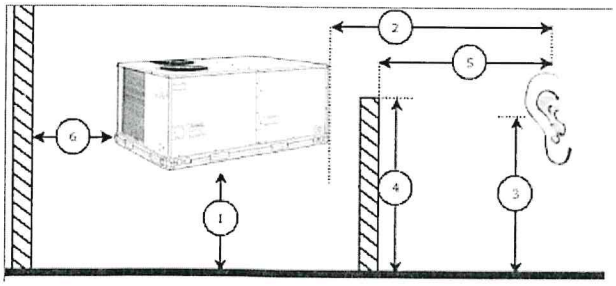
Control Panel SCCR: 5kA RMS at Rated Symmetrical Voltage

Acoustics

Sound Power Levels, db re 10E-12 Watts

	Discharge	Inlet	Outdoor
63 Hz	90.8	87.9	85.6
125 Hz	81.4	76.4	84.7
250 Hz	75.1	70.6	80.5
500 Hz	70.6	62.3	76.0
1000 Hz	66.8	65.0	72.4
2000 Hz	63.8	56.1	68.0
4000 Hz	61.1	49.9	62.8
8000 Hz	58.3	44.0	59.3
A-Weighted	74.2	69.4	79.0

Advanced Acoustics



Advanced Accoustics Parameters

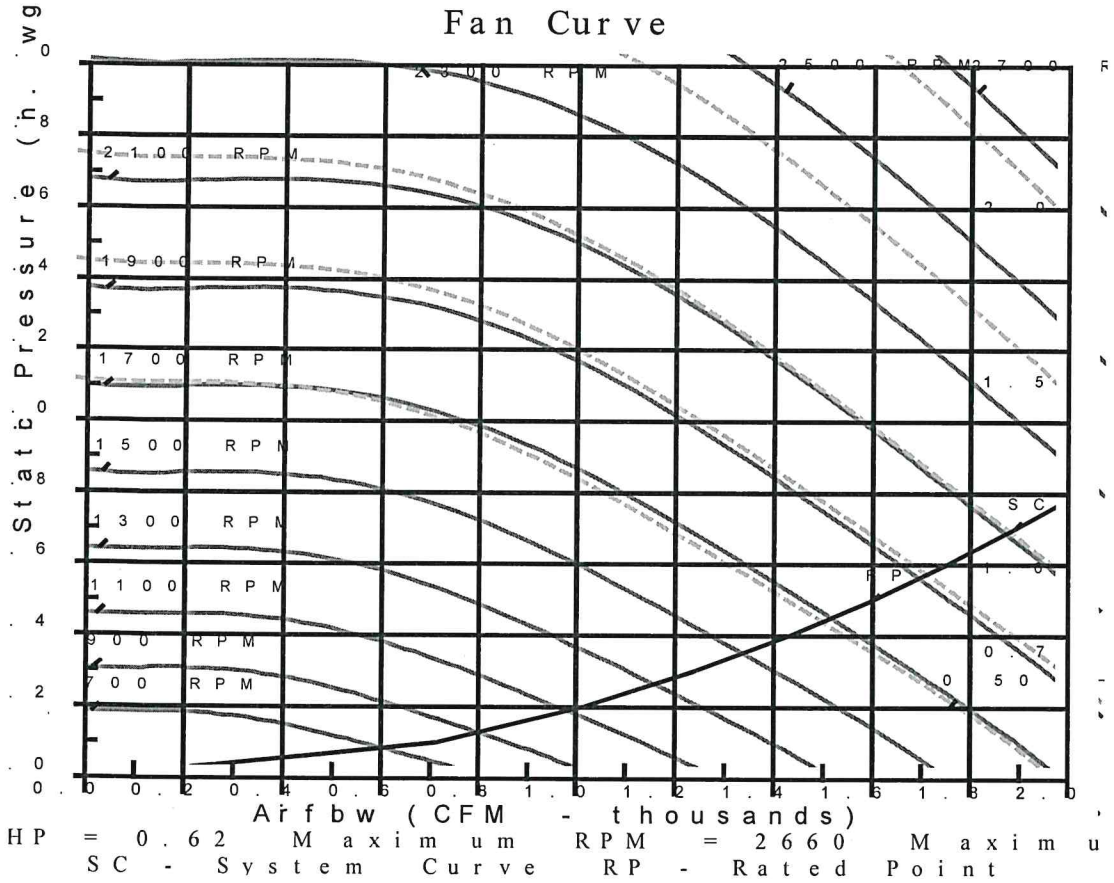
1. Unit height above ground: **30.0** ft
2. Horizontal distance from unit to receiver: **50.0** ft
3. Receiver height above ground: **5.7** ft
4. Height of obstruction: **0.0** ft
5. Horizontal distance from obstruction to receiver: **0.0** ft
6. Horizontal distance from unit to obstruction: **0.0** ft

Detailed Acoustics Information

Octave Band Center Freq. Hz	63	125	250	500	1k	2k	4k	8k	Overall
A	85.6	84.7	80.5	76.0	72.4	68.0	62.8	59.3	89.2 Lw
B	59.4	68.6	71.9	72.8	72.4	69.2	63.8	58.2	78.5 LwA
C	53.2	52.3	48.1	43.6	40.0	35.6	30.4	26.9	56.8 Lp
D	27.0	36.2	39.5	40.4	40.0	36.8	31.4	25.8	46.1 LpA

Legend
A Sound Power Levels at Unit's Acoustic Center, Lw
B A-Weighted Sound Power Levels at Unit's Acoustic Center, LwA
C Sound Pressure Levels at Specific Distance from Unit, Lp
D A-Weighted Sound Pressure Levels at Specific Distance from Unit, LpA

Calculation methods used in this program are patterned after the ASHRAE Guide; other ASHRAE Publications and the AHRI Acoustical Standards. While a very significant effort has been made to insure the technical accuracy of this program, it is assumed that the user is knowledgeable in the art of system sound estimation and is aware of the tolerances involved in real world acoustical estimation. This program makes certain assumptions as to the dominant sound sources and sound paths which may not always be appropriate to the real system being estimated. Because of this, no assurances can be offered that this software will always generate an accurate sound prediction from user supplied input data. If in doubt about the estimation of expected sound levels in a space, an Acoustical Engineer or a person with sound prediction expertise should be consulted.



GUIDE SPECIFICATIONS - 48GC**04-06

Gas Heat/Electric Cooling Packaged Rooftop

HVAC Guide Specifications

Size Range: **3 to 5 Nominal Tons**

Note about this specification:
This specification is in the "Masterformat" as published by the Construction Specification Institute.
Please feel free to copy this specification directly into your building spec.

High Efficiency Gas Heat/Electric Cooling Packaged Rooftop
HVAC Guide Specifications
Size Range: 3 to 5 Nominal Tons
Carrier Model Number: 48GC*04-06

Part 1 — (23 06 80) Schedules for Decentralized HVAC Equipment
1.01 (23 06 80.13) Decentralized Unitary HVAC Equipment Schedule
A. 23 06 80.13.A) Rooftop unit (RTU) schedule
1. Schedule is per the project specification requirements.

Part 2 — (23 07 16) HVAC equipment insulation
2.01 (23 07 16.13) Decentralized, Rooftop Units:
A. (23 07 16.13.A.) Evaporator fan compartment:
1. Interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, minimum 1-1/2-lb density, flexible fiber-glass insulation bonded with a phenolic binder, neoprene coated on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
B. (23 07 16.13.B.) Gas Heat Compartment:
1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

Part 3 — (23 09 13) Instrumentation and control devices for HVAC
3.01 (23 09 13.23) Sensors and Transmitters
A. (23 09 13.23.A.) Thermostats

1. Thermostat must
   a. energize both "W" and "G" when calling for heat.
   b. have capability to energize 2 stages of cooling, and 2 different stages of heating.
   c. include capability for occupancy scheduling.

Part 4 — (23 09 23) Direct Digital Control system for HVAC

4.01 (23 09 23.13) Decentralized, Rooftop Units:

A. (23 09 23.13.A.) SystemVu™ intelligent integrated Direct Digital Control (DDC) shall provide:
   1. Integrated unit operation for comfort cooling, heating ventilation as well as all monitoring, recording and re-porting capabilities. Controller shall also provide diagnostics and alarms of abnormal unit operation through the controller. Controller shall have an intuitive user display and be able to be used in a standalone operation or via building automation system (BAS).
   2. Quick Unit Status LEDs of: Run – meaning all systems are go, ALERT – that indicates there is currently a non-critical issue with the unit, like filters need to be replaced and FAULT – that indicates the unit has a critical issue and will possibly shut down.
   3. Six large navigation keys for easy access. Navigation keys shall consist of: TEST, BACK, ENTER, and MENU along with UP and DOWN arrows.
   4. Full back lit user display with 4 line by 30 character text capabilities. Display menu shall be designed to provide guided major menus and sub menus main menus provided below:
      a. Shutdown Unit
      b. Run Status
      c. Settings
      d. Alerts/Faults
      e. Service
      f. Inputs
      g. Outputs
      h. USB
   5. The capability for standalone operation with conventional thermostat/sensor or use with building automation systems (BAS) of Carrier i-Vu®, BACnet and Carrier Comfort Network® (CCN) systems. No special modules or boards are required for these capabilities. Has the capability to work with Equipment Touch™ and System Touch™ devices and ZS Sensors.
   6. The ability to read refrigerant pressures at display or via BAS network of; Discharge Pressure and Suction Pressure. The need for traditional refrigerant gages is not required.
   7. USB Data Port for flash drive interaction. This will allow the transfer of data for uploads, downloads, perform software upgrades, back-up and restore data and file transfer data such as component number of starts and run hours.
   8. Reverse Rotation Protection of compressors if field three phase wiring is misapplied.
   9. Provide Service Capabilities of:
      a. Auto run test
      b. Manual run test
      c. Component run hours and starts
      d. Commissioning reports
      e. Data logging
      f. Alarm history
   10. Economizer control and diagnostics. Set up economizer operation, receive feedback from actuator. Also meets the most recent California Title 24, ASHRAE 90.1 and IECC* Fault

Detection and Diagnostic (FDD) requirements.

* IECC is a registered trademark of the International Code Council, Inc.

11. Unit cooling operation down to 35°F (2°C).
12. Controller shall have easy access connections around the controller perimeter area and consist of Mate-N-Lok, terminal block and RJ style modular jack connections.
13. 365 day real time clock, 20 holiday schedules along with occupied and unoccupied scheduling.
14. Auto-Recognition for easy installation and commissioning of devices like economizers, space sensors etc.
15. A 5°F temperature difference between cooling and heating set points to meet the latest ASHRAE 90.1 Energy Standard.
16. Contain return air sensor, supply air sensor and outdoor air sensor to help monitor and provide data for the unit comfort operation, diagnostic and alarms.
17. Use of Carrier's field accessory hand-held Navigator™ display, Equipment Touch and System Touch devices.
18. Units with the factory-installed Humidi-MiZer® system option are capable of providing multiple modes of improved dehumidification as a variation of the normal cooling cycle.
19. Supply Air Tempering control operates the gas or electric heat to maintain a minimum supply air temperature during conditions where very cold outdoor air causes the supply air temperature to fall below the configured Supply Air Tempering Setpoint. This occurs during periods where DCV is active and increasing the amount of outdoor air or in cases where the system is operating at very low airflow and the calculated economizer position has increased to maintain a constant ventilation rate.
20. Demand limiting in SystemVu™ is achieved through set point expansion. The systems heating and cooling set points are expanded in steps or levels. The degree to which the set points may be expanded is defined by the 6 demand level offsets and the 2 commanded demand limit levels.
21. 3-year limited part warranty.

B. (23 09 23.13.B.) RTU Open Protocol, Direct Digital Controller:
   1. Shall be ASHRAE 62 compliant.
   2. Shall accept 18 - 30VAC, 50 - 60Hz, and consumer 15VA or less power.
   3. Shall have an operating temperature range from –40°F (–40°C) to 130°F (54°C), 10% to 90% RH (non-condensing).
   4. Shall include built-in protocol for BACnet* (MS/TP and PTP modes), Modbus† (RTU and ASCII), Johnson N2 and LonWorks**. LonWorks Echelon processor required for all Lon applications shall be contained in separate communication board.

   * BACnet is a registered trademark of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers).

   † Modbus is a registered trademark of Schneider Electric.

   ** LonWorks is a registered trademark of Echelon Corporation.

   5. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers.
   6. Baud rate controller shall be selectable using a dipswitch.
   7. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
   8. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, compressor lock-out, fire shutdown,

enthalpy switch, and fan status/filter status/humidity/ remote occupancy.

9. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust, reversing valve/high fan speed.
10. Shall have built-in surge protection circuitry through solid-state polyswitches. Polyswitches shall be used on in-coming power and network connections. Polyswitches will return to normal when the "trip" condition clears.
11. Shall have a battery back-up capable of a minimum of 10,000 hours of data and time clock retention during power outages.
12. Shall have built-in support for Carrier technician tool.
13. Shall include an RS-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an RS-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks communications card.
14. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

Part 5 — (23 09 33) Electric and Electronic Control System for HVAC

5.01 (23 09 33.13) Decentralized, Rooftop Units:

A. (23 09 33.13.A.) General:
   1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24–v transformer side. Transformer shall have 75VA capability.
   2. Shall utilize color-coded wiring.
   3. Shall include a Unit Control Board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, gas controller, economizer, thermostat, DDC control options, and low and high pressure switches. Controller shall also provide an intuitive means to adjust the indoor fan speed through a simple switch and pot adjustment design.
   4. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor. See heat ex-changer section of this specification.
   5. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.

B. (23 09 33.13.B.) Safeties:
   1. Compressor over-temperature, over-current. High internal pressure differential.
   2. Low pressure switch.
      a. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
   3. High pressure switch.
      a. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
   4. Automatic reset, motor thermal overload protector.
   5. Heating section shall be provided with the following minimum protections:
      a. High temperature limit switches.
      b. Induced draft motor speed sensor.
      c. Flame rollout switch.
      d. Flame proving controls.

Part 6 — (23 09 93) Sequence of Operations for HVAC Controls

6.01 (23 09 93.13) Decentralized, Rooftop Units:
A. (23 09 93.13.A.) INSERT SEQUENCE OF OPER-ATION

Part 7 — (23 40 13) Panel Air Filters

7.01 (23 40 13.13) Decentralized, Rooftop Units:
A. (23 40 13.13.A.) Standard filter section
1. Shall consist of factory installed, low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.
2. Unit shall use only one filter size. Multiple sizes are not acceptable.
3. Filters shall be accessible through an access panel with "no-tool" removal as described in the unit cabinet section of this specification (23 81 19.13.G).

Part 8 — (23 81 19) Self-Contained Air Conditioners

8.01 (23 81 19.13) Small-Capacity Self-Contained Air Conditioners
A. (23 81 19.13.A.) General:
1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic scroll com-pressor(s) for cooling duty and gas combustion for heating duty.
2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
3. Unit shall use Puron® (R-410A) refrigerant.
4. Unit shall be installed in accordance with the manufacturer's instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

B. (23 81 19.13.B.) Quality Assurance:
1. Unit meets and exceeds ASHRAE 90.1 minimum efficiency requirements.
2. Unit shall be rated in accordance with AHRI Standards 210/240.
3. Unit shall be designed to conform to ASHRAE 15.
4. Unit shall be UL-tested and certified in accordance with ANSI Z21.47 Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
5. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
6. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
7. Unit shall be designed in accordance with ISO 9001, and shall be manufactured in a facility registered by ISO 9001:2015.
8. Roof curb shall be designed to conform to NRCA Standards.
9. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
10. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.
11. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
12. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.

C. (23 81 19.13.C.) Delivery, Storage, and Handling:
1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

D. (23 81 19.13.D.) Project Conditions:

1. As specified in the contract.

E. (23 81 19.13.E.) Operating Characteristics:
   1. Unit shall be capable of starting and running at 125°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 at ±10% voltage.
   2. Compressor with standard controls shall be capable of operation down to 35°F (2°C), ambient outdoor tem-peratures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures down to 25°F (–4°C).
   3. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
   4. Unit shall be factory configured for vertical supply and return configurations.
   5. Unit shall be field convertible from vertical to horizontal airflow on all models. No special kit required.
   6. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.

F. (23 81 19.13.F.) Electrical Requirements:
   1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

G. (23 81 19.13.G.) Unit Cabinet:
   1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a prepainted baked enamel finish on all externally exposed surfaces.
   2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F/16°C): 60, Hardness: H 2H Pencil hardness.
   3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1 lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
   4. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections (factory-installed or field-installed), standard.
   5. Base Rail:
      a. Unit shall have base rails on a minimum of 2 sides.
      b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
      c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
      d. Base rail shall be a minimum of 16 gage thickness.
   6. Condensate pan and connections:
      a. Shall be a sloped condensate drain pan made of a non-corrosive material.
      b. Shall comply with ASHRAE Standard 62.
      c. Shall use a 3/4-in. 14 NPT drain connection, possible either through the bottom or side of the drain pan. Connection shall be made per manufacturer's recommendations.
   7. Top panel:
      a. Shall be a single piece top panel on all sizes.
   8. Gas Connections:
      a. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
      b. Thru-the-base capability
         1) Standard unit shall have a thru-the-base gas-line location using a raised, embossed portion of the unit basepan.
         2) Optional, factory approved, water-tight connection method must be used for

thru-the-base gas connections.
3) No basepan penetration, other than those authorized by the manufacturer, is permitted.

9. Electrical Connections:
   a. All unit power wiring shall enter unit cabinet at a single, factory prepared, knockout location.
   b. Thru-the-base capability.
      1) Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit basepan.
      2) Optional, factory approved, water-tight connection method must be used for thru-the-base electrical connections.
      3) No basepan penetration, other than those authorized by the manufacturer, is permitted.
10. Component access panels (standard)
   a. Cabinet panels shall be easily removable for servicing.
   b. Unit shall have one factory installed, tool-less, removable, filter access panel.
   c. Panels covering control box, indoor fan, indoor fan motor, gas components (where applicable), and compressors shall have molded composite handles.
   d. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.
   e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
   f. Collars shall be removable and easily replaceable using manufacturer recommended parts.

H. (23 81 19.13.H.) Gas Heat:
1. General
   a. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
   b. Shall incorporate a direct-spark ignition system and redundant main gas valve.
   c. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
2. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.
   a. IGC board shall notify users of fault using an LED (light-emitting diode).
   b. The LED shall be visible without removing the control box access panel.
   c. IGC board shall contain algorithms that modify evaporator fan operation to prevent future cycling on high temperature limit switch.
   d. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame rollout switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.
3. Standard Heat Exchanger construction
   a. Heat exchanger shall be of the tubular-sec-tion type constructed of a minimum of 20 gage steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
   b. Burners shall be of the in-shot type constructed of aluminum-coated steel.
   c. Burners shall incorporate orifices for rated heat output up to 2000 ft (610m) elevation. Additional accessory kits may be required for applications above 2000 ft (610m)

elevation, depending on local gas supply conditions.
d. Each heat exchanger tube shall contain multiple dimples for increased heating effective-ness.

4. Optional Stainless Steel Heat Exchanger construction
   a. Use energy saving, direct-spark ignition system.
   b. Use a redundant main gas valve.
   c. Burners shall be of the in-shot type constructed of aluminum-coated steel.
   d. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
   e. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gage type 409 stainless steel.
   f. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.
   g. Complete stainless steel heat exchanger allows for greater application flexibility.

I. (23 81 19.13.I.) Coils
   1. Standard Aluminum Fin-Copper Tube Coils:
      a. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
      b. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
      c. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
   2. Optional Pre-coated aluminum-fin condenser coils (3 Phase Models Only):
      a. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
      b. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
      c. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.
      d. Corrosion durability of fin stock shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.
      e. Corrosion durability of fin stock shall be confirmed through testing to have no visible corrosion after 48 hour immersion in a room temperature solution of 5% salt, 1% acetic acid.
      f. Fin stock coating shall pass 2000 hours of the following: one week exposure in the prohesion chamber followed by one week of accelerated ultraviolet light testing. Prohesion chamber: the solution shall contain 3.5% sodium chloride and 0.35% ammonium sulfate. The exposure cycle is one hour of salt fog application at ambient followed by one hour drying at 95°F (35°C).
   3. Optional Copper-fin evaporator and condenser coils (3 Phase Models Only):
      a. Shall be constructed of copper fins mechanically bonded to copper tubes and copper tube sheets.
      b. Galvanized steel tube sheets shall not be acceptable.
      c. A polymer strip shall prevent coil assembly from contacting the sheet metal coil pan to minimize potential for galvanic corrosion between coil and pan.
   4. Optional E-coated aluminum-fin evaporator and condenser coils (3 Phase Models Only):
      a. Shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins.
      b. Coating process shall ensure complete coil encapsulation of tubes, fins and headers.

c. Color shall be high gloss black with gloss per ASTM D523-89.
d. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges.
e. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93.
f. Impact resistance shall be up to 160 in.-lb (ASTM D2794-93).
g. Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92).
h. Corrosion durability shall be confirmed through testing to be no less than 1000 hours salt spray per ASTM B117-90.

J. (23 81 19.13.J.) Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
   a. TXV metering system on all models shall include a multiple feed distribution system that optimizes coil performance.
   b. Refrigerant filter drier - Solid core design.
   c. Service gage connections on suction and discharge lines.
   d. Pressure gage access through a specially designed access port in the top panel of the unit.
2. There shall be gage line access port in the skin of the rooftop, covered by a black, removable plug.
   a. The plug shall be easy to remove and replace.
   b. When the plug is removed, the gage access port shall enable maintenance personnel to route their pressure gage lines.
   c. This gage access port shall facilitate correct and accurate condenser pressure readings by enabling the read-ing with the compressor access panel on.
   d. The plug shall be made of a leak proof, UV resistant, composite material.
3. Compressors
   a. Unit shall use fully hermetic, two stage scroll compressor on a single refrigeration circuit.
   b. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
   c. Compressors shall be internally protected from high discharge temperature conditions.
   d. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
   e. Compressor shall be factory mounted on rubber grommets.
   f. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
   g. Crankcase heaters shall not be required for normal operating range, unless required by compressor manufacturer due to refrigerant charge limits.

K. (23 81 19.13.K.) Filter Section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.
3. Shall consist of factory installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filters shall be standard, commercially available sizes.
5. Only one size filter per unit is allowed.

L. (23 81 19.13.L.) Evaporator Fan and Motor with EcoBlue™ Technology

1. Direct Drive Evaporator fan motor:
   a. Shall be a ECM motor design.

b. Shall have permanently lubricated bearings.
c. Shall have inherent automatic-reset thermal overload protection.
d. Shall have slow ramp up to speed capabilities.

2. Evaporator Fan:
   a. Shall be easily set with selection switch and adjustment pot on unit control board or through SystemVu™ controller.
   b. Blower fan shall be a Vane Axial fan design with 75% less moving parts than a conventional belt drive system.
   c. Shall be constructed of a cast aluminum stator and high impact composite material on rotor and air inlet casing.
   d. Shall be a patented pending design with a corrosion resistant material and dynamically balanced.

M. (23 81 19.13.M.) Condenser Fans and Motors
1. Condenser fan motors:
   a. Shall be a totally enclosed motor.
   b. Shall use permanently lubricated bearings.
   c. Shall have inherent thermal overload protection with an automatic reset feature.
   d. Shall use a shaft-down design on all sizes.
2. Condenser Fans:
   a. Shall be a direct-driven propeller type fan constructed of high impact composite material.
   b. Shall have high impact composite blades completely formed into one piece without blade fasteners or connectors and shall be dynamically balanced.

N. (23 81 19.13.N.) Special Features Options and Accessories
1. Integrated EconoMi$er® IV, EconoMi$er2, and EconoMi$er X low leak rate models. (EconoMi$er2, and EconoMi$er X are factory- installed on 3 phase models only. All are field-installed on all 3 and 1 phase models.)
   a. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
   b. Independent modules for vertical or horizontal return configuration shall be available. Vertical return modules shall be available as a factory installed option.
   c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or return shall not be acceptable.
   d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below set-points.
   e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
   f. Standard leak rate shall be equipped with dampers not to exceed 2% leakage at 1 in. wg pressure differential.
   g. Economizer controller on EconoMi$er IV field-installed only) models shall be Honeywell W7212 that provides:
      1) Combined minimum and DCV maximum damper position potentiometers with compressor staging relay.
      2) Functions with solid-state analog enthalpy or dry bulb changeover control sensing.
      3) Contain LED indicates for: when free cooling is available, when module is in DCV mode, when exhaust fan contact is closed.
   h. Economizer controller on EconoMi$er X models shall be the Honeywell W7220 that

. provides:
1) 2-line LCD interface screen for setup, configuration and troubleshooting.
2) On-board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, per California Title 24, ASHRAE 90.1 and IECC.
3) Sensor failure loss of communication identification.
4) Automatic sensor detection.
5) Capabilities for use with multiple-speed or single speed indoor fan systems.
6) Utilize digital sensors: Dry bulb and Enthalpy.

i. Economizer controller on EconoMi$er 2 models with RTU Open or SystemVu controllers shall be a 4 20mA design controlled directly by the controller. RTU Open and SystemVu meet California Title 24, ASHRAE 90.1 and IECC Fault Detection and Diagnostic (FDD) requirements.
j. Shall be capable of introducing up to 100% outdoor air.
k. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.
l. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
m. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory-installed economizers only. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100°F (4 to 38°C). Additional sensor options shall be available as accessories.
n. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
o. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
p. Dampers shall be completely closed when the unit is in the unoccupied mode.
q. Economizer controller shall accept a 2 10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
r. Compressor lockout temperature on W7220 control is adjustable from –45°F to 80°F, set at a factory de-fault of 32°F. W7212 control opens at 35°F (2°C) and closes at 50°F (10°C).
s. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
t. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

2. Integrated EconoMi$er®2, and EconoMi$er X Ultra Low Leak rate models. (Factory installed on 3 phase models only. Field installed on all 3 and 1 phase models.)
a. Integrated, gear driven opposing modulating blade design type capable of simultaneous economizer and compressor operation.
b. Independent modules for vertical or horizontal return configuration shall be available. Vertical return modules shall be available as a factory installed option.
c. Damper blades shall be galvanized steel with composite gears. Plastic or composite blades on intake or re-turn shall not be acceptable.
d. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.

e. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
f. Ultra Low Leak design meets California Title 24 section 140.4 and ASHRAE 90.1 requirements for 4 cfm per sq.ft. on the outside air dampers and 10 cfm per sq. ft. on the return dampers.
g. Economizer controller on EconoMi$er X models shall be the Honeywell W7220 that provides:
   1) 2-line LCD interface screen for setup, configuration and troubleshooting.
   2) On-board Fault Detection and Diagnostics (FDD) that senses and alerts when the economizer is not operating properly, per California Title 24, ASHRAE 90.1 and IECC .
   3) Sensor failure loss of communication identification.
   4) Automatic sensor detection.
   5) Capabilities for use with multiple-speed indoor fan systems.
   6) Utilize digital sensors: Dry bulb and Enthalpy.
h. Economizer controller on EconoMi$er 2 models with RTU Open or SystemVu™ controls shall be a 4 20mA design controlled directly by the controller. RTU Open and SystemVu meet California Title 24, ASHRAE 90.1 and IECC Fault Detection and Diagnostic (FDD) requirements.
i. Shall be capable of introducing up to 100% outdoor air.
j. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air and contain seals that meet ASHRAE 90.1 requirements.
k. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
l. Dry bulb outdoor air temperature sensor shall be provided as standard. Enthalpy sensor is also available on factory-installed economizers only. Outdoor air sensor setpoint shall be adjustable and shall range from 40 to 100° F (4 to 38°C). Additional sensor options shall be available as accessories.
m. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 100%, with a range of 0% to 100%.
n. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy.
o. Dampers shall be completely closed when the unit is in the unoccupied mode.
p. Economizer controller shall accept a 2 10 Vdc CO2 sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor air damper to provide ventilation based on the sensor input.
q. Compressor lockout temperature on W7220 control is adjustable from –45°F to 80°F, set at a factory default of 32°F. W7212 control opens at 35°F (2°C) and closes at 50°F (10°C).
r. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
s. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.

3. Two-Position Damper (field-installed only)
   a. Damper shall be a Two-Position Damper. Damper travel shall be from the full closed position to the field adjustable%-open set-point.
   b. Damper shall include adjustable damper travel from 25% to 100% (full open).

c. Damper shall include single or dual blade, gear driven dampers and actuator motor.
d. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
e. Damper will admit up to 100% outdoor air for applicable rooftop units.
f. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
g. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
h. Outside air hood shall include aluminum water entrainment filter.

4. Manual damper (field-installed only):
   a. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to ad-mit up to 25 or 50% outdoor air for year round ventilation.
5. Humidi-MiZer® Adaptive Dehumidification System (3 Phase Models Only):
   a. The Humidi-MiZer Adaptive Dehumidification System shall be factory installed and shall provide greater de-humidification of the occupied space by two modes of dehumidification operations in addition to its normal design cooling mode:
      1) Subcooling mode further sub cools the hot liquid refrigerant leaving the condenser coil when both tem-perature and humidity in the space are not satisfied.
      2) Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, re-sulting in a neutral leaving air temperature when only humidity in the space is not satisfied.
      3) Includes low ambient controller.
6. Low Ambient Control Package:
   a. Controller shall control coil head pressure by condenser fan speed modulation or condenser fan cycling and wind baffles.
   b. Shall consist of solid-state control and condenser coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to –20°F (–29°C).
7. Propane Conversion Kit
   a. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane, up to 2000 ft (610m) elevation.
   b. Additional accessory kits may be required for applications above 2000 ft (610m) elevation.
8. Flue Shield
   a. Flue shield shall provide protection from the hot sides of the gas flue hood.
9. Condenser Coil Hail Guard Assembly (Factory-installed on 3 Phase Models Only. Field-installed on all 3 and 1 Phase Models.)
   a. Shall protect against damage from hail.
   b. Shall be either hood style or louvered.
10. Unit-Mounted, Non-Fused Disconnect Switch (Available on units with MOCPs of 80 amps or less):
    a. Switch shall be factory installed, internally mounted.
    b. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
    c. Shall be accessible from outside the unit.
    d. Shall provide local shutdown and lockout capability.
    e. Sized only for the unit as ordered from the factory. Does not accommodate

field-installed devices.

11. HACR Breaker
    a. These manual reset devices provide overload and short circuit protection for the unit. Factory wired and mounted with the units, with access cover to help provide environmental protection. On 575V applications, HACR breaker can only be used with WYE power distribution systems. Use on Delta power distribution systems is prohibited.
    b. Sized only for the unit as ordered from the factory. Does not accommodate field-installed devices.
12. Convenience Outlet:
    a. Powered convenience outlet. (3 Phase Mod-els Only)
        1) Outlet shall be powered from main line power to the rooftop unit.
        2) Outlet shall be powered from line side or load side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be UL certified and rated for additional outlet amperage.
        3) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
        4) Outlet shall include 15 amp GFI receptacles with independent fuse protection.
        5) Voltage required to operate convenience outlet shall be provided by a factory installed step-down trans-former.
        6) Outlet shall be accessible from outside the unit.
        7) Outlet shall include a field installed "Wet in Use" cover.
    b. Factory-Installed Non-Powered convenience outlet.
        1) Outlet shall be powered from a separate 115/120v power source.
        2) A transformer shall not be included.
        3) Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
        4) Outlet shall include 15 amp GFI receptacles with independent fuse protection.
        5) Outlet shall be accessible from outside the unit.
        6) Outlet shall include a field installed "Wet in Use" cover.
    c. Field-Installed Non-Powered convenience outlet.
        1) Outlet shall be powered from a separate 115/120v power source.
        2) A transformer shall not be included.
        3) Outlet shall be field-installed and internally mounted with easily accessible 115-v female receptacle.
        4) Outlet shall include 20 amp GFI receptacles. This kit provides a flexible installation method which allows code compliance for height requirements of the GFCI outlet from the finished roof surface as well as the capability to relocate the outlet to a more convenient location.
        5) Outlet shall be accessible from outside the unit.
        6) Outlet shall include a field installed "Wet in Use" cover.
13. Flue Discharge Deflector:
    a. Flue discharge deflector shall direct unit exhaust vertically instead of horizontally.
    b. Deflector shall be defined as a "natural draft" device by the National Fuel and Gas (NFG) code.
14. Thru-the-Base Connectors:
    a. Kits shall provide connectors to permit gas and electrical connections to be brought to the unit through the unit basepan.

b. Minimum of four connection locations per unit.

15. Propeller Power Exhaust:
    a. Power exhaust shall be used in conjunction with an integrated economizer.
    b. Independent modules for vertical or horizontal return configurations shall be available.
    c. Horizontal power exhaust is shall be mounted in return ductwork.
    d. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0 to 100% adjustable setpoint on the economizer control.
16. Roof Curbs (Vertical):
    a. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
    b. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
    c. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
17. High Altitude Gas Conversion Kit:
    a. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit to operate from 2000 to 7000 ft (610 to 2134m) elevation with natural gas or from 0 to 7000 ft (0 to 2134m) elevation with liquefied propane.
18. Outdoor Air Enthalpy Sensor:
    a. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
19. Return Air Enthalpy Sensor:
    a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy con-trol.
20. Indoor Air Quality (CO2) Sensor:
    a. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
    b. The IAQ sensor shall be available in duct mount, wall mount, or wall mount with LED display. The setpoint shall have adjustment capability.
21. Smoke detectors (factory-installed only):
    a. Shall be a Four-Wire Controller and Detector.
    b. Shall be environmental compensated with differential sensing for reliable, stable, and drift-free sensitivity.
    c. Shall use magnet-activated test/reset sensor switches.
    d. Shall have tool-less connection terminal access.
    e. Shall have a recessed momentary switch for testing and resetting the detector.
    f. Controller shall include:
    1) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
    2) Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
    3) One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
    4) Capable of direct connection to two individual detector modules.
    5) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.
22. Winter Start Kit:

a. Shall contain a bypass device around the low pressure switch.
b. Shall be required when mechanical cooling is required down to 25°F (–4°C).
c. Shall not be required to operate on an economizer when below an outdoor ambient of 35°F (2°C).

23. Time Guard:
    a. Shall prevent compressor short-cycling by providing a 5-minute delay (±2 minutes) before restarting a com-pressor after shutdown for any reason.
    b. One device shall be required per compressor.
24. Hinged Access Panels:
    a. Shall provide easy access through integrated quarter turn latches.
    b. Shall be on major panels of: filter, control box, fan motor, and compressor.
25. Condensate overflow switch:
    a. This sensor and related controller monitors the condensate level in the drain pan and shuts down compression operation when overflow conditions occur. It includes:
    1) Indicator light — solid red (more than 10 seconds on water contact – compressors disabled), blinking red (sensor dis-connected).
    2) 10 second delay to break — eliminates nuisance trips from splashing or waves in pan (sensor needs 10 seconds of constant water contact before tripping).
    3) Disables the compressor(s) operation when condensate plug is detected, but still allows fans to run for Economizer.
26. Foil Faced Insulation:
    a. Throughout unit cabinet air stream, non-fibrous and cleanable foil faced insulation is used.
27. MERV-8 Return Air filters:
    a. Factory option to upgrade standard unit filters to MERV-8 filters.
28. Phase Monitor Control:
    a. Shall monitor the sequence of three phase electrical system to provide a phase reversal protection.
    b. Shall monitor the three phase voltage inputs to provide a phase loss protection for the three phase device.
    c. Will work on either a Delta or Wye power connection.
29. Horn/Strobe Annunciator:
    a. Provides an audible/visual signaling device for use with factory-installed option or field installed accessory smoke detectors.
        1) Requires installation of a field-supplied 24-v transformer suitable for 4.2 VA (AC) or 3.0 VA (DC) per horn/strobe accessory.
        2) Requires field-supplied electrical box, North American 1-gang box, 2-in. (51 mm) x 4-in. (102 mm).
        3) Shall have a clear colored lens.