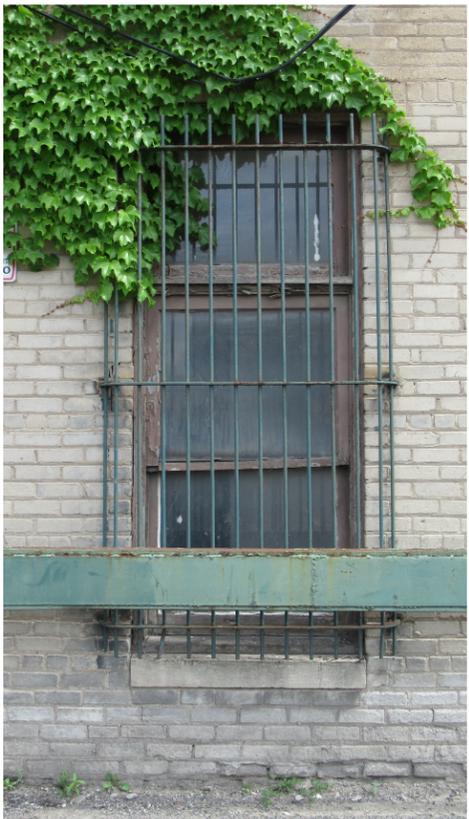
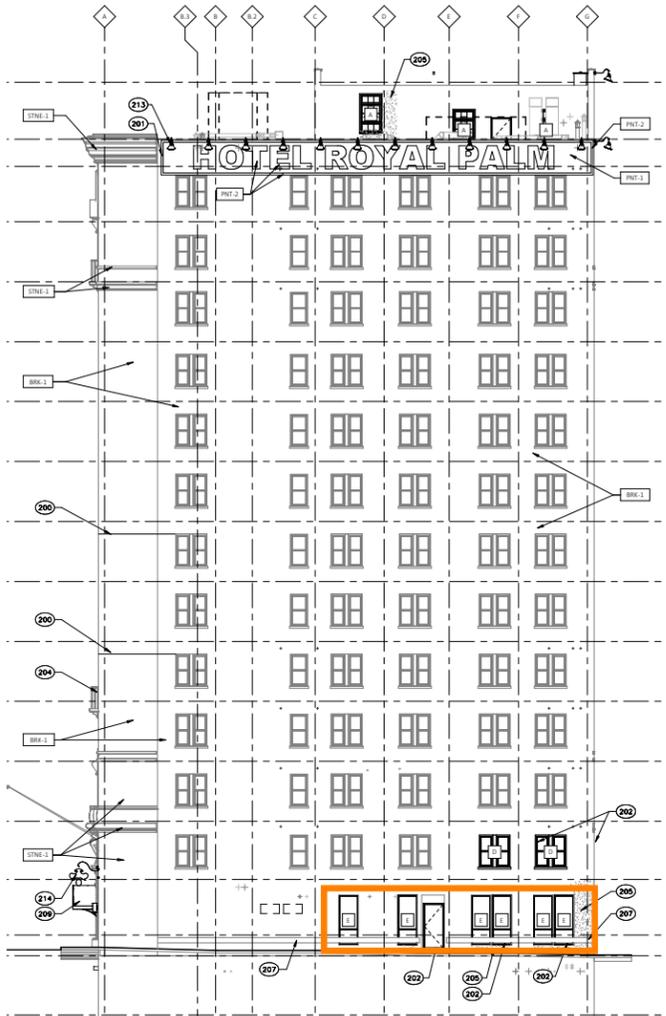


SINGLE HUNG
ALUMINUM/WOOD
HISTORIC REPLICA

E



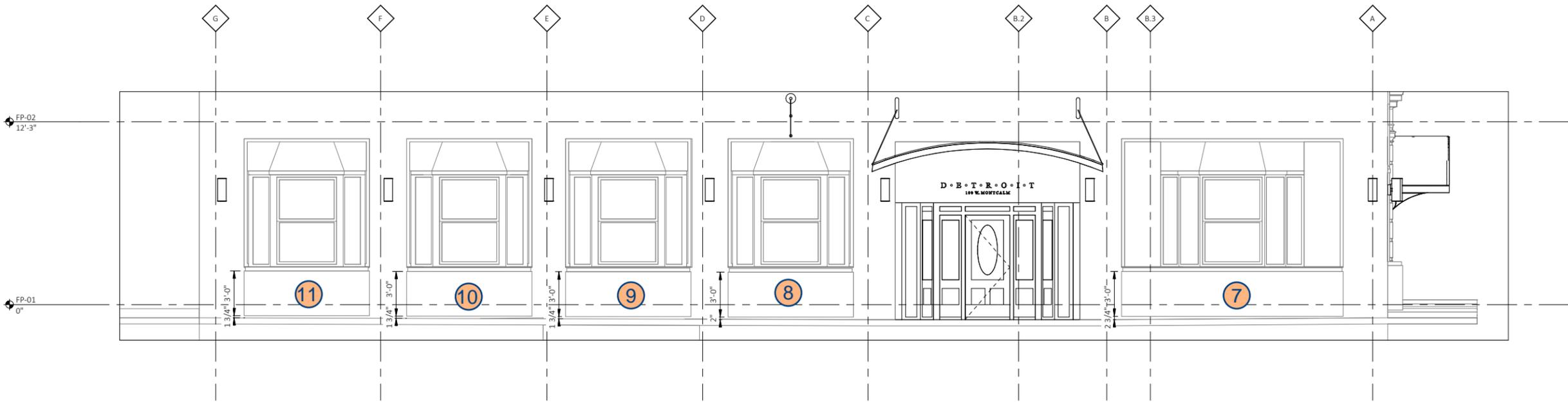
Existing Photo



North Elevation (Alley)



1 EAST ELEVATION (PARK AVE) - ENLARGED
A212 SCALE: 1/4" = 1'-0"
REFERENCE LOCATIONS: A201



2 SOUTH ELEVATION (MONTCALM) - ENLARGED
A212 SCALE: 1/4" = 1'-0"
REFERENCE LOCATIONS: A202





EXISTING PHOTOS



2



2



3



3



EXISTING PHOTOS



5



5



EXISTING PHOTOS



6



6



EXISTING PHOTOS



7



7



EXISTING PHOTOS



9



9



EXISTING PHOTOS



10

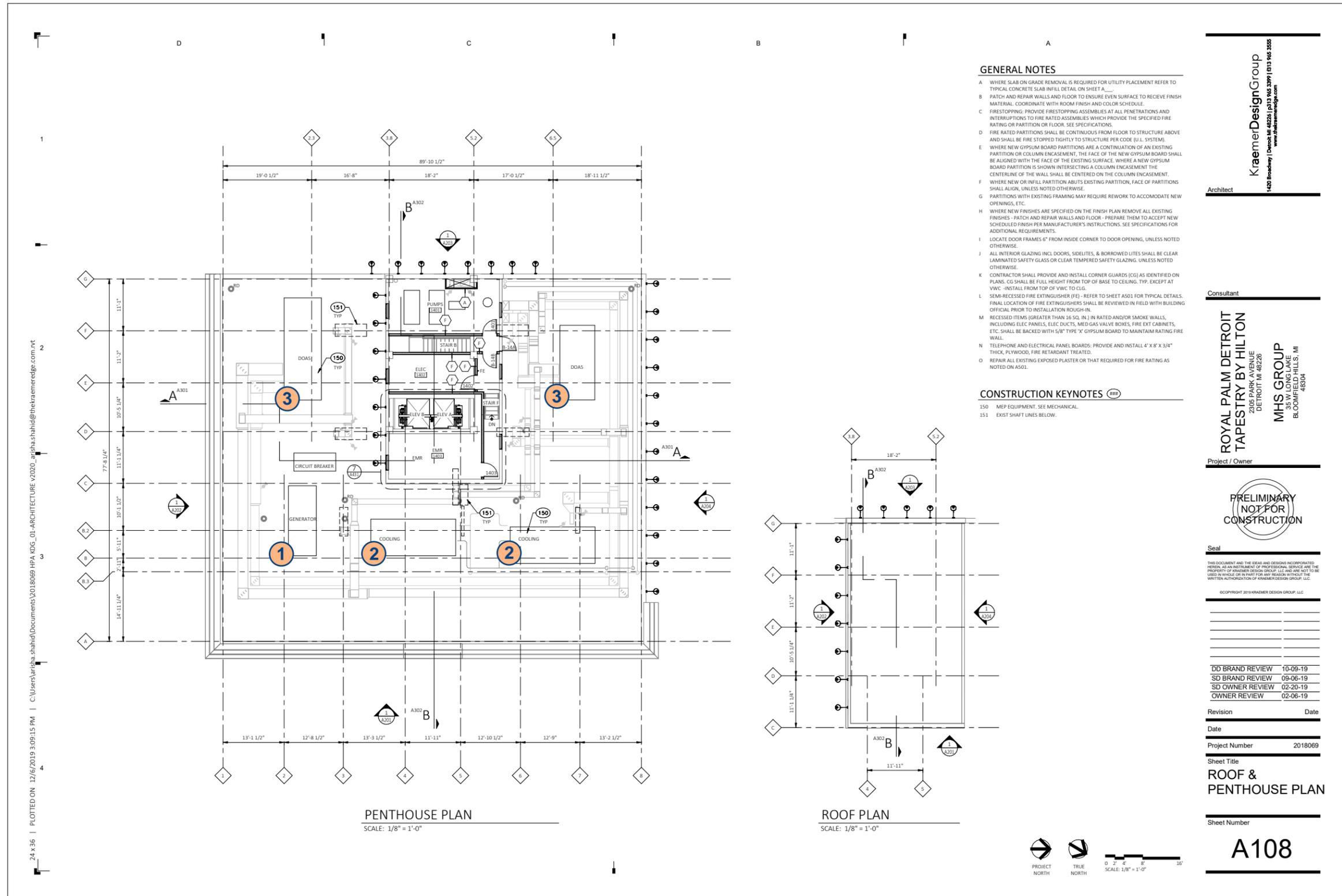


10

 EXISTING PHOTOS



EXISTING PHOTOS



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Consultant

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Seal

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DD BRAND REVIEW	10-09-19
SD BRAND REVIEW	09-06-19
SD OWNER REVIEW	02-20-19
OWNER REVIEW	02-06-19

Revision _____ Date _____

Date _____

Project Number 2018069

Sheet Title
**ROOF &
PENTHOUSE PLAN**

Sheet Number

A108



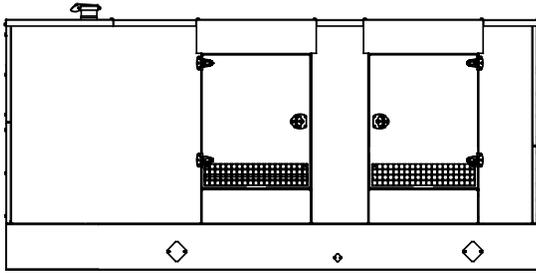
**Applicable to the following:
180- 450REZXB, 180- 400RZXB, and 300REZXC**

Weather Enclosure Features

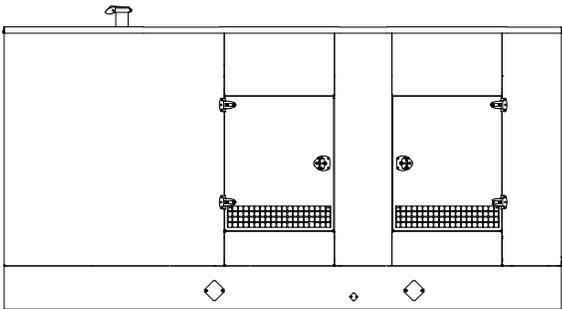
- Internal-mounted critical silencer with rain cap and flexible exhaust connector.
- Skid-mounted, steel construction with hinged doors.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor™ automotive-grade textured finish.
- Enclosure has four (180- 250REZXB/RZXB and 300REZXC) or six (300- 400REZXB/RZXB and 450REZXB) large access doors which allow for easy maintenance.
- Lockable, flush-mounted door latches.
- Vertical air inlet and outlet hoods with 90 degree angles to redirect air and reduce noise.
- Automatic door holders keep doors open during maintenance.
- Steel weather enclosure is designed to 150 mph (241 kph) wind load rating.

Sound Enclosure Features

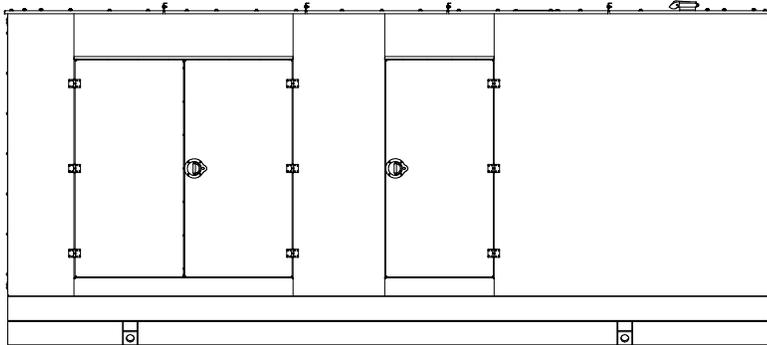
- Includes all of the weather enclosure features with the addition of sound attenuation material.
- Skid-mounted, steel or aluminum construction with hinged doors. Aluminum enclosures are recommended for high humidity and/or high salt/coastal regions.
- Acoustic insulation that meets UL 94 HF1 flammability classification and repels moisture absorption.
- Steel sound enclosure is designed to 150 mph (241 kph) wind load rating.
- Aluminum sound enclosure is certified to 186 mph (299 kph) wind load rating for 180- 200REZXB/RZXB models.
- Aluminum sound enclosure is certified to 181 mph (291 kph) wind load rating for 250- 400REZXB/RZXB, 450REZXB and 300REZXC models.



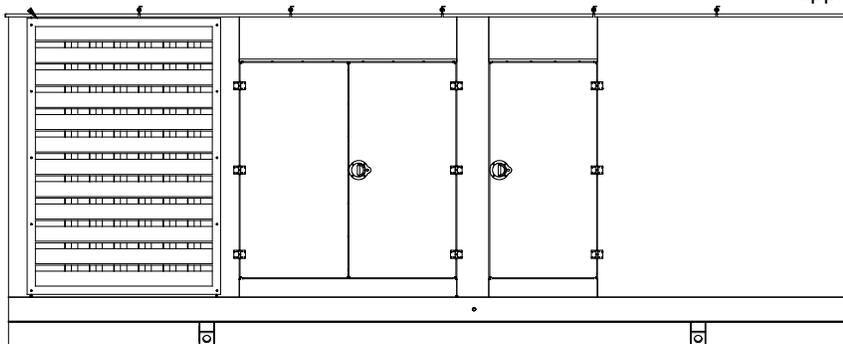
180/200REZXB/RZXB Enclosure



250REZXB/RZXB and 300REZXC Enclosure



300/350REZXB/RZXB Enclosure



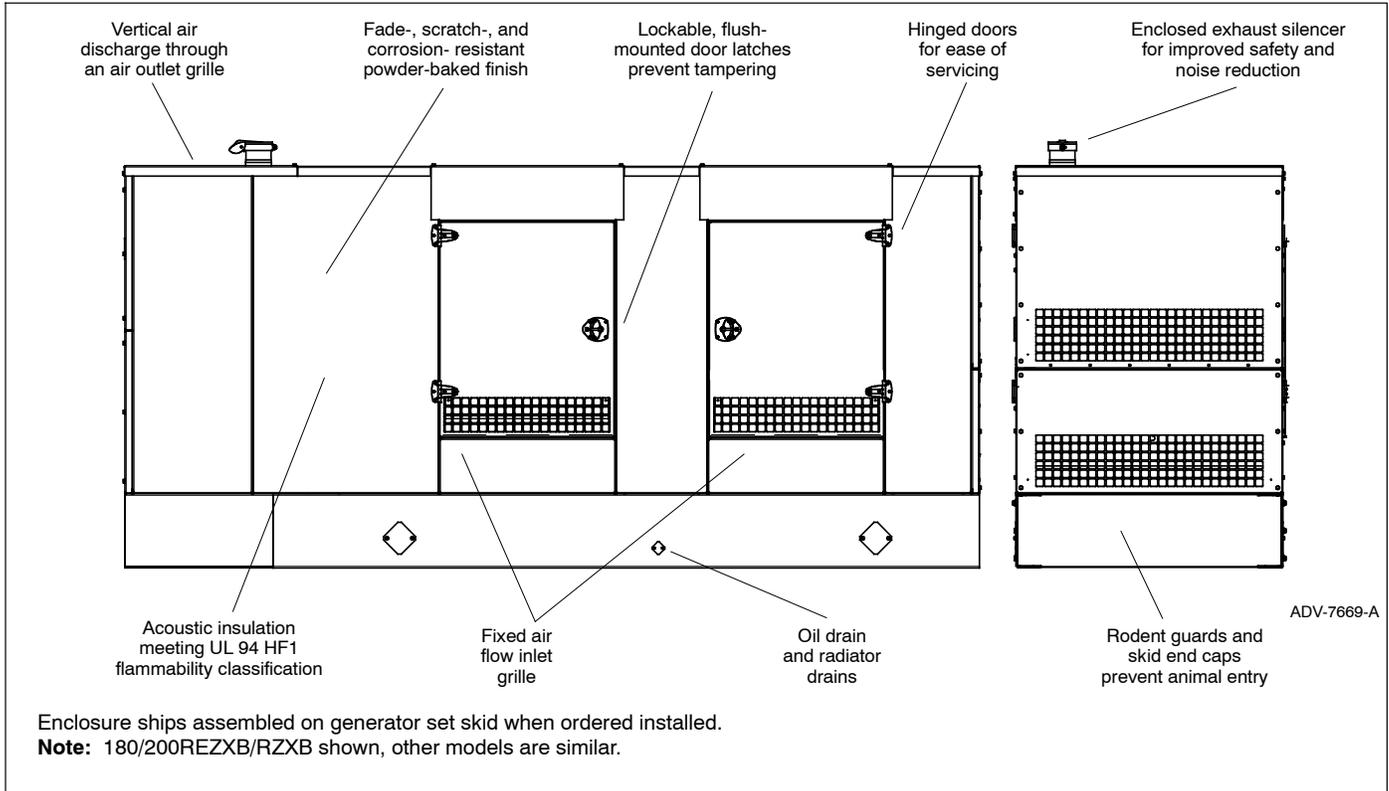
400REZXB/RZXB and 450REZXB Enclosure

Available Approvals and Listings

- UL 2200 Listing
- CSA Certified
- cUL Listing
- IBC Seismic Certification
- Hurricane Rated Enclosure - Available on sound aluminum, 180REZXB/200REZXB, 250REZXB and 300REZXC models (Impact rated for Large Missile Level E and Wind load rated per Florida Building Code tested to TAS201- 94, TAS202- 94 and TAS203- 94 standards)

NOTE: Some models may have limited third-party approvals; see your local distributor for details.

180-250REZXB/RZXB and 300REZXC Weather and Sound Enclosure



Enclosure Features

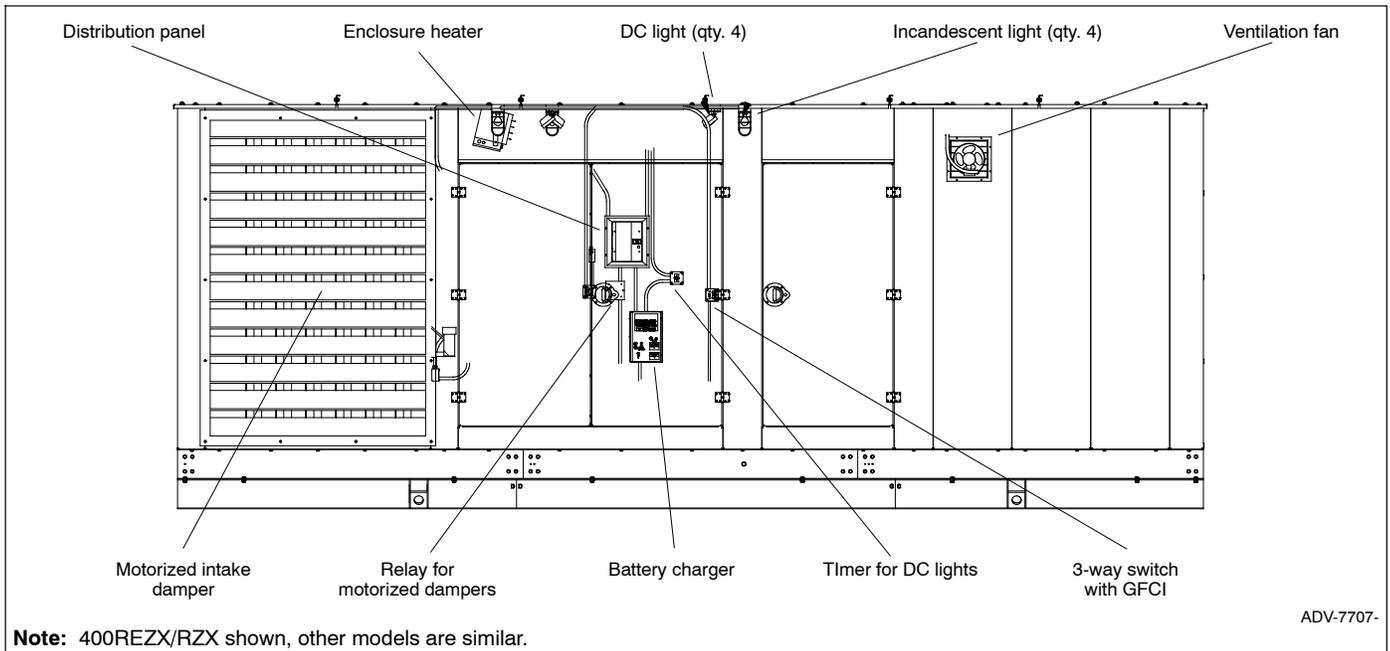
- Available in steel formed panel, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting directly to skid.
- Power Armor™ automotive-grade finish resulting in advanced corrosion and abrasion protection as well as enhanced edge coverage and color retention.
- Internal critical exhaust silencer offering maximum component life and operator safety.
NOTE: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Cooling/combustion air intake with a horizontal air inlet. Sized for maximum cooling airflow.

- Service access. Multi-personnel doors for easy access to generator set control and servicing of the oil fill and battery.
- Cooling air discharge. Weather protective design featuring a vertical air discharge outlet grille. Redirects cooling air up and above enclosures to reduce noise ambient.

Additional Sound Enclosure Features

- Available in steel or aluminum formed panel, solid construction.
- Attenuated design. Acoustic insulation UL 94 HF1 listed for flame resistance with up to 51 mm (2 in.) thickness.
- Cooling air discharge. The sound enclosures include acoustic insulation with urethane film.

300-400REZXB/RZXB and 450REZXB Weather and Sound Enclosure Options



Basic Electrical Package (BEP)

Distribution Panel/Load Center. Prewired AC power distribution of all factory-installed features including block heater, two GFCI-protected internal 120-volt service receptacles, internal lighting, and commercial grade wall switch. The load center is powered by building source power and protected by a main circuit breaker, rated for 100 amps with capacity and circuit positions for future expansion. AC power distribution installed in accordance with NEC and all wiring within EMT thin wall conduit. Four incandescent or fluorescent lights located within UL-listed fixtures designed for wet locations.

- BEP available with single-phase load center 120/240 VAC.
- BEP available with 3-phase load center 120/208/ 240 VAC.

Enclosure Heater

Heater, 5 kW Ceiling Mounted. Electrical utility heater prewired to load center inside the enclosure. Rated at 17100 Btu includes adjustable louvers offering down flow and horizontal air tuning, built-in thermostat with automatic fan delay controls.

- Heater available in single phase at 240 VAC.
- Heater available in three phase at 208 or 240 VAC.

DC Light Package

- DC Light Package (DLP).** Prewired DC light package offering an economical alternative light source within the enclosure, as a complement to the BEP or a source of light when AC power is not available. Battery drain limited with fuse protection and controlled through a 0- 60 minute, spring-wound, no-hold timer.

Miscellaneous Package Options

- Battery Charger, Mounted.** Mounting, prewiring of DC output and AC input when optional BEP is selected. Battery charger located inside the enclosure and accessible through an access door.

Block Heater, Junction Box. Factory-supplied block heater prewired to a junction box providing a convenient location for the customer wiring of the block heater.

- Heater available in single phase at 240 VAC.
- Heater available in three phase at 208 or 240 VAC.

Enclosure Design Options

- Aluminum Enclosure** (available with sound enclosure only)
- Steel Enclosure**
- Panic Bar** for each latching door. Provides additional safety for individuals working on the generator set while in the enclosure.

Motorized Variable Damper and Ventilation

Motorized Air Inlets

- Aluminum construction
- Galvanized steel construction (available with sound enclosure only)

Motorized Air Outlets

- Aluminum construction
- Galvanized steel construction (available with sound enclosure only)
- Ventilation Fan, 22.6 cm/min. (800 cfm) Wall Mount.** Direct drive 3-blade 305 mm (12 in.) aluminum propeller fan with automatic shutters, driven by a totally enclosed air-over motor housed within a corrosion-resistant housing. Remote thermostatically controlled over a temperature range of 27°C to 54°C (80°F to 130°F). All components are prewired and installed.
- Gravity Air Outlet Louver.** Aluminum louvers closed when unit is not running. After the unit starts, the forced cooling air opens the outlet louvers.

roughly 15' long by 6' wide by 8' high

KOHLER CO., Kohler, Wisconsin 53044 USA
 Phone 920-457-4441, Fax 920-459-1646
 For the nearest sales and service outlet in the
 US and Canada, phone 1-800-544-2444
 KOHLERPower.com

Weather and Sound Enclosure Specifications

Model	Max. Dimensions, mm (in.)			Weight, kg (lb.) †			Sound Enclosure, Sound Pressure Level, dB(A) *
	Length	Width	Height	Steel Weather Enclosure	Steel Sound Enclosure	Aluminum Sound Enclosure	
180REZXB/RZXB	4347(171.2)	1350 (53.2)	2164 (85.2)	3177 (6900)	3205 (7050)	2995 (6585)	71
200REZXB/RZXB	4347(171.2)	1350 (53.2)	2164 (85.2)	3307 (7275)	3354 (7335)	3145 (6870)	71
250REZXB/RZXB, 300REZXC	4526(178.2)	1786 (70.3)	2460 (96.9)	3942 (8690)	3969 (8750)	3647 (8040)	71
300REZXB/RZXB	6305(248.2)	2229 (87.8)	2816(110.9)	5386 (11875)	6203 (13675)	5117 (11280)	70
350REZXB/RZXB	6305(248.2)	2229 (87.8)	2816(110.9)	5386 (11875)	6203 (13675)	5117 (11280)	70
400REZXB/RZXB, 450REZXB	7230(284.6)	2493 (98.2)	2858(112.5)	6498 (14295)	6711 (14795)	6043 (13295)	71

Note: Refer to the respective ADV drawings for details.

* Log average sound pressure level of 8 measured positions around the perimeter of the unit at a distance of 7 m (23 ft). Refer to TIB-114 for details.

† Weight includes the generator set (wet), enclosure, and silencer. The generator set weight represents using the largest alternator option.

DISTRIBUTED BY:

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator set distributor for availability.

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(3) LRWB 8-7N12

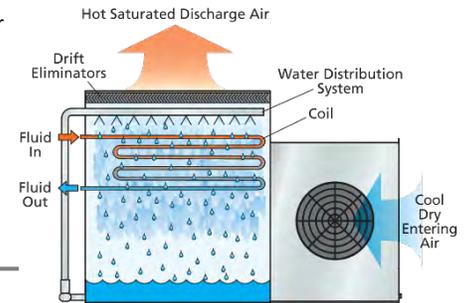
Project Details

Project Name : 110 Sproat
Location: TBD

Date: 3/20/2019
Customer:
Contact:
Contact Email:

Product Description

The LRWB is a low-profile forced draft closed circuit cooler with a centrifugal fan. The ideal application for this type of closed circuit cooler is any environment with strict height or sound constraints; it is also an effective solution for designs incorporating indoor installation that require ducting. The LRWB utilizes EVAPCO's Thermal-Pak® Coil, featuring **CrossCool™ Internal Tube Enhancement**, which increases the cooling capacity of the unit. The LRWB is designed for ease of maintenance and extended trouble-free operation. Units come standard with CTI certified performance and IBC Compliant construction. The standard construction of the LRWB contains a **304 stainless steel pan as standard**.



Selection Criteria

	Total	Each Unit	Required Capacity
Flow:	950.0 GPM 30%	316.7 GPM 30%	4,519.18 MBH 301.28 Tons
Fluid:	Propylene Glycol	Propylene Glycol	
Entering Fluid Temp:	95.0 F	95.0 F	
Leaving Fluid Temp:	85.0 F	85.0 F	
Entering Wet Bulb:	78.0 F	78.0 F	

Unit Selected

Three(3) EVAPCO LRWB 8-7N12 at 102.9% capacity (1,549.85 MBH each)

Product line is CTI/ECC certified for water, propylene glycol or ethylene glycol as process fluid. Selection is rated in accordance with CTI Standard 201 RS.



Physical Data Per Unit

Overall Dimensions (WxLxH):	7'-10" x 18'-2 5/8" x 9'-3 3/4"
Operating Weight:	23,410 lbs
Shipping Weight:	14,980 lbs
Heaviest Section:	14,980 lbs

*weights and dimensions could vary depending on options selected

Fan Motor Data per Unit

Number of Fans:	2
# of Fan Motors:	1
Nameplate Power (460/3/60):	40.00 HP Per Motor

Additional Details Per Unit

Air Flow:	56,700 CFM
Riser Pipe Diameter:	6"

Layout Criteria

From FACE B/D to wall:	6.00ft
From FACE A/C to wall:	12.00ft
Between FACE B/D ends:	4.00ft
Between FACE A/C sides:	0.00ft

Accessories

(1) Fan Motor: Inverter Capable, Premium Efficient
(1) Stainless Steel Basin

(1) Fan Motor: Space Heaters
(1) 1.0 Importance Factor Specified

(1) IBC Standard Structural Design
(1) CrossCool Coil

IBC Design Capability

IBC Standard Structural Design
1.0 Importance Factor Specified
Seismic(SDs): up to 0.67 g, z/h = 0
Wind Load(P): up to 288 psf

Pump Motor Data per Unit

No. of Pumps: 1
Nameplate Power (460/3/60): 3 HP per pump motor

Hydraulic Data

Pressure Drop Through Coil: 3.4 psi
Evaporated Water Rate: 2.41 GPM
Spray Water Flow: 545 GPM

Sound Data(dB(A) @ 5'/50')

Face A (Opp Mtr. Side):	77/64	Face C (Motor Side):	77/64
Face B (End):	81/63	Face D (Opp End):	69/57
Top:	77/65		

Notes: Sound Pressure Levels are according to CTI Standard ATC-128. Sound data is shown for 1 cell operating at full speed. The use of frequency inverters (Variable Frequency Drives) can increase sound levels. Sound Options: None



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SECTION 23 65 00 CLOSED CIRCUIT COOLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes factory assembled and tested, closed circuit mechanical forced-draft vertical discharge closed circuit cooler.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, pressure drop, performance curves with selected points indicated, furnished specialties, and accessories.

B. Shop Drawings: Complete set of manufacturer's prints of equipment assemblies, control panels, sections and elevations, and unit isolation. Include the following:

1. Assembled unit dimensions.
2. Weight and load distribution.
3. Required clearances for maintenance and operation.
4. Sizes and locations of piping and wiring connections.
5. Wiring Diagrams: For power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.

C. Operation and Maintenance Data: Each unit to include operation and maintenance manual.

1.4 QUALITY ASSURANCE

A. Verification of Performance:

1. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Lacking such certification, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105, by a Certified CTI Thermal Testing Agency. The Evaporative Heat Rejection Equipment shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.

2. Unit Sound Performance ratings shall be tested according to CTI ATC-128 standard. Sound ratings shall not exceed specified ratings.

B. Unit shall meet or exceed energy efficiency per ASHRAE 90.1

1.5 WARRANTY

A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace components of the unit that fail in materials and workmanship within the specified warranty period.

1. The Entire Unit shall have a comprehensive one (1) year warranty against defects in

materials and workmanship from startup, not to exceed eighteen (18) month from shipment of the unit.

2. Fan Motor/Drive System: Warranty Period shall be Five (5) years from date of unit shipment from Factory (fan motor(s), fan(s), fan shaft(s), bearings, mechanical support, sheaves, bushings and belt(s)).

3. Heat Transfer Coil: Warranty Period shall be One (1) year from date of unit shipment from Factory.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide closed circuit coolers manufactured by one of the following:

1. EVAPCO Model LRWB 8-7N12
2. Approved Substitute

2.2 THERMAL PERFORMANCE

A. Each unit shall be capable to cool 316.7 GPM of 30% propylene glycol entering at 95.0° F leaving at 85.0° F at a design entering wet bulb of 78.0° F with a pressure drop across the coil not to exceed 3.39 psi.

2.3 IBC COMPLIANCE

A. The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of International Building Code (IBC) for: $I_p = 1.0$, $S_{DS} = 0.67$; $z/h = 0$, $P = 288$ psf.

2.4 COMPONENTS

A. Description: Factory assembled and tested, forced draft counter flow closed circuit cooler.

B. Materials of Construction

1. Unit cold water basin shall be Type 304 Stainless Steel. All remaining panels including the fan snouts, housings and supports shall be constructed of hot-dip galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot of area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.

C. Fan(s):

1. Fans shall be forward curved centrifugal of hot dipped galvanized construction. The fans shall be factory installed, and statically and dynamically balanced for vibration free operation

D. Fan Housing

1. The complete drive system, including the electric motor, belts, bearings, fan, and drives shall be completely enclosed in a protective housing which covers the drive system and provides sound reduction.

E. Drift Eliminators

1. Drift eliminators shall be constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate.

F. Water Distribution System

1. Spray nozzles shall be precision molded ABS with large orifice threaded into branch

pipng with internal sludge ring to eliminate clogging. Spray header and branches shall be schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance.

G. Heat Transfer Media

1. Heat transfer coil shall be elliptical tubes of prime surface steel, encased in steel framework with entire assembly hot-dip galvanized after fabrication. The coil assembly shall be designed with sloping tubes for liquid drainage and air pressure tested to 390 psig air under water. Coil shall be in compliance with ASME/ANSI B31.5.

H. Pump

1. Unit shall have EISA close-coupled centrifugal pump with mechanical seal. The pump shall be installed in a vertical position so that water will drain from the pump when the cold water basin is emptied. Pump motor shall be totally enclosed with protective canopy for outdoor operation.

I. Bleed-off

1. Unit shall have a waste water bleed line with a manual adjustable valve provided.

J. Air Inlet Screens

1. Protective screens shall be provided over air inlet

K. Make up Float Valve Assembly

1. Make up float assembly shall be a mechanical brass valve with an adjustable plastic float.

L. Pan Strainer

1. Pan Strainer(s) shall be all Type 304 Stainless Steel construction with large area removable perforated screens.

2.5 MOTORS AND DRIVES

A. General requirements for motors are specified in Division 23 Section "Motors"

B. Fan Motor

1. Fan motor(s) shall be totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design. Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.

2. Fan motor(s) shall include strip-type space heaters with separate leads brought to the motor conduit box.

C. Fan Drive

1. The fan drive shall be V-belt type with QD tapered bushings designed for 150% of the motor nameplate power. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Belt adjustment shall be accomplished from the exterior of the unit.

D. Fan Shaft

1. Fan shaft shall be solid, ground and polished steel. Exposed surface shall be coated with rust preventative.

E. Fan Shaft Bearings

1. Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on exterior of unit.

2.6 MAINTENANCE ACCESS

A. Fan Section

1. Fan screens shall be removable for fan motor and drive access at grade.

B. Basin Section

1. Circular access door shall be located above the basin to allow for easy access to pan interior

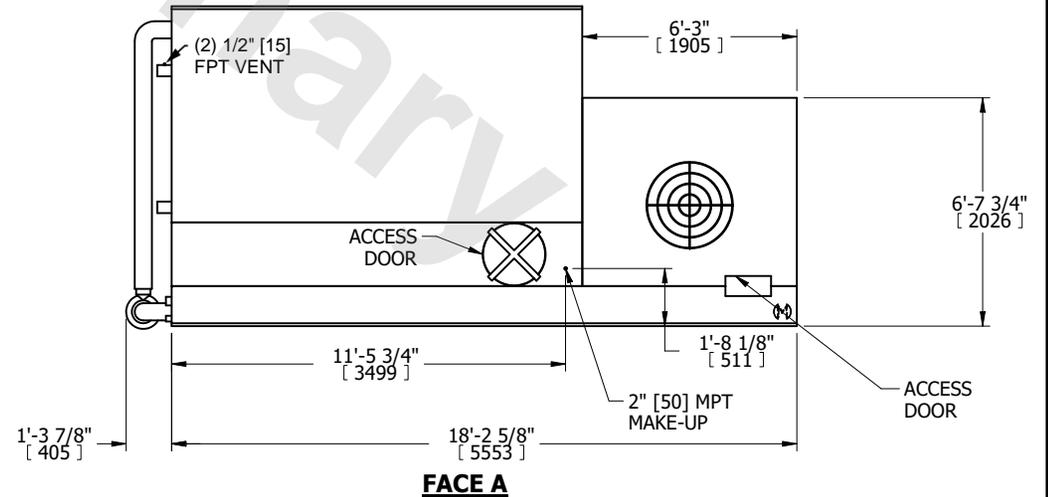
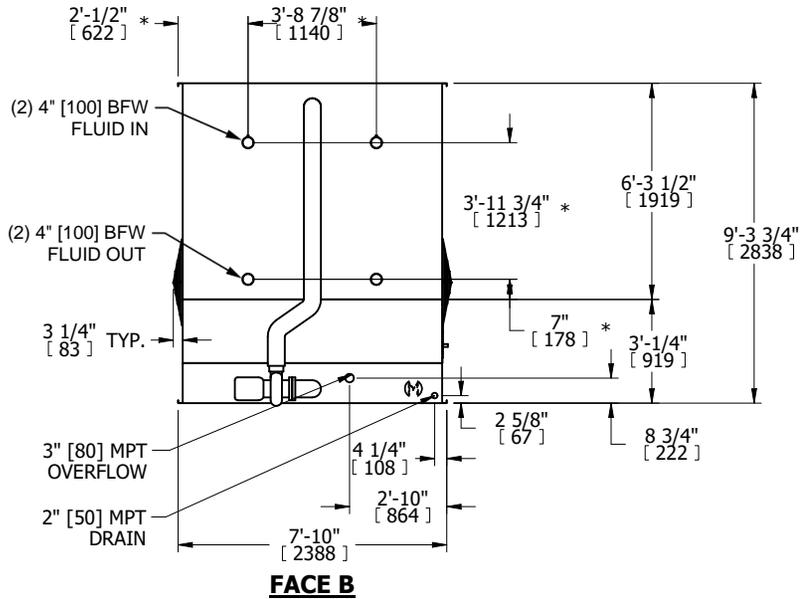
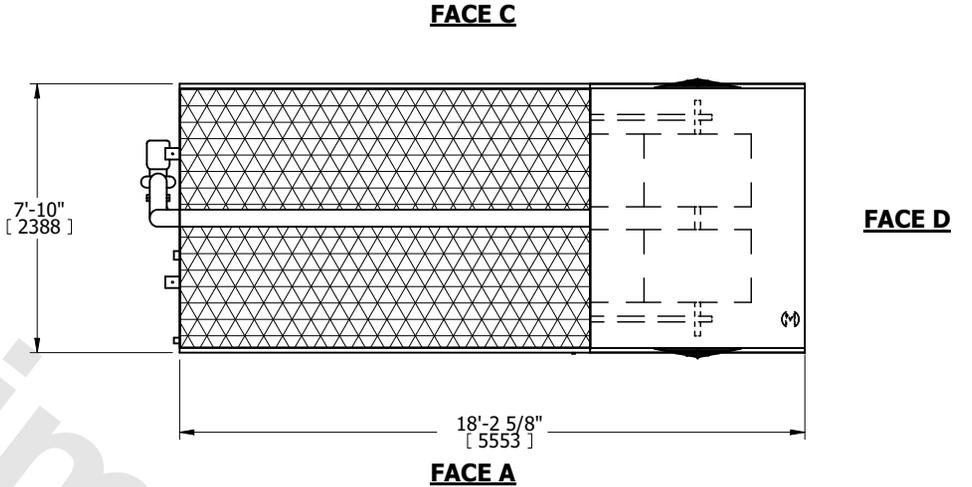
UNIT	CLOSED CIRCUIT COOLER	
MODEL #	LRWB 8-7N12	SCALE NTS

EVAPCO, INC.

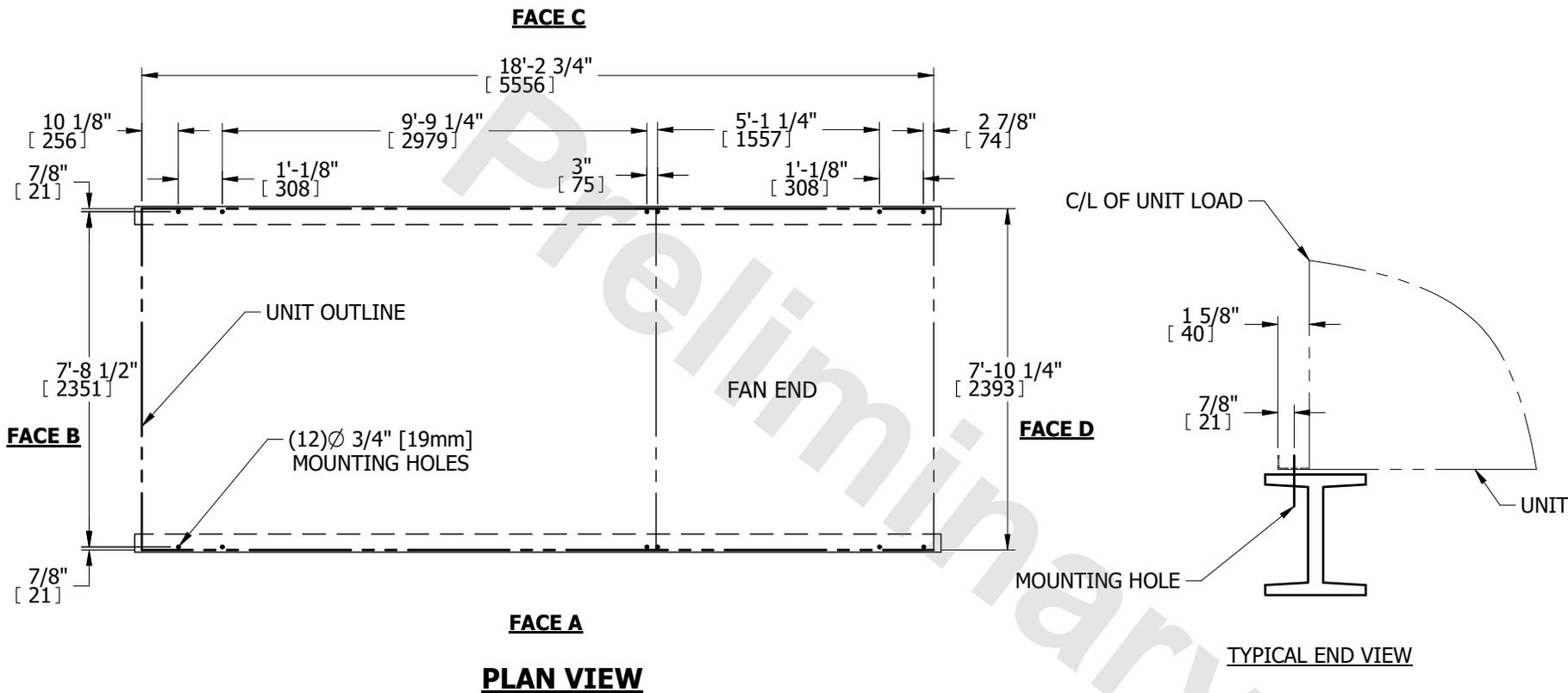
DWG. #	WV081214-DRE-ST	REV.	-
SERIAL #		DATE	3/20/2019

- NOTES:**
- (M)- FAN MOTOR LOCATION
 - MPT DENOTES MALE PIPE THREAD
FPT DENOTES FEMALE PIPE THREAD
BFW DENOTES BEVELED FOR WELDING
GVD DENOTES GROOVED
FLG DENOTES FLANGE
PE DENOTES PLAIN END
 - +UNIT WEIGHT DOES NOT INCLUDE ACCESSORIES (SEE ACCESSORY DRAWINGS)
 - 3/4" [19mm] DIA. MOUNTING HOLES. REFER TO RECOMMENDED STEEL SUPPORT DRAWING
 - DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT IN [METRIC] [mm]
 - * - APPROXIMATE DIMENSIONS DO NOT USE FOR PRE-FABRICATION OF CONNECTING PIPING
 - MAKE-UP WATER PRESSURE
20 psi [137 kPa] MIN, 50 psi [344 kPa] MAX

FACE B
PLAN VIEW



SHIPPING WEIGHT	14980 lbs+ [6795] kg+	OPERATING WEIGHT	23410 lbs+ [10620] kg+	HEAVIEST SECTION WEIGHT	14980 lbs+ [6795] kg+	NO. OF SHIPPING SECTIONS	1	DRAWN BY:	TLS
-----------------	-----------------------	------------------	------------------------	-------------------------	-----------------------	--------------------------	---	-----------	-----



NOTES:

1. BEAMS SHOULD BE SIZED IN ACCORDANCE WITH ACCEPTED STRUCTURAL PRACTICES. MAXIMUM DEFLECTION OF BEAM UNDER UNIT TO BE 1/360 OF UNIT LENGTH NOT TO EXCEED 1/2" [13mm].
2. DEFLECTION MAY BE CALCULATED BY USING 55% OF THE OPERATING WEIGHT AS A UNIFORM LOAD ON EACH BEAM. SEE CERTIFIED PRINT FOR OPERATING WEIGHT.
3. SUPPORT BEAMS AND ANCHOR HARDWARE ARE TO BE FURNISHED BY OTHERS. ANCHOR HARDWARE TO BE ASTM - A325 5/8" [16mm] BOLT OR EQUIVALENT.
4. BEAMS MUST BE LOCATED UNDER THE FULL LENGTH OF THE PAN SECTION.
5. SUPPORTING BEAM SURFACE MUST BE LEVEL. DO NOT LEVEL THE UNIT BY PLACING SHIMS BETWEEN THE UNIT MOUNTING FLANGE AND THE SUPPORTING BEAM.
6. THE FACTORY RECOMMENDED STEEL SUPPORT CONFIGURATION IS SHOWN. CONSULT THE FACTORY FOR ALTERNATE SUPPORT CONFIGURATIONS.
7. UNIT SHOULD BE POSITIONED ON STEEL SUCH THAT THE ANCHORING HARDWARE FULLY PENETRATES THE BEAM'S FLANGE AND CLEARS THE BEAM'S WEB.
8. DIMENSIONS LISTED AS FOLLOWS: ENGLISH FT-IN [METRIC] [mm]



ROOFTOP DEDICATED OUTDOOR AIR SYSTEMS (DOAS) ENGINEERING MANUAL



Base Rooftop DOAS
650 to 12,000 CFM

Energy Recovery Wheel Rooftop DOAS
650 to 18,000 CFM

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A summary list of safety precautions is on page 3.

To access additional technical documentation such as submittals, installation, service, general best practice, and building ventilation manuals, as well as white papers, catalogs, software programs, and more, log in to www.lghvac.com.

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General Data	9-12
Electrical Data.....	13-14
Acoustic Data	15-17
Dimensions	18-31
Selection Process	32-35

TABLE OF SYMBOLS

 DANGER	<i>This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</i>
 WARNING	<i>This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</i>
 CAUTION	<i>This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</i>
Note:	<i>This symbol indicates situations that may result in equipment or property damage accidents only.</i>
	<i>This symbol indicates an action that should not be performed.</i>

UNIT NOMENCLATURE



MECHANICAL SPECIFICATIONS

Rooftop Dedicated Outdoor Air Systems (DOAS)

Rooftop Dedicated Outdoor Air Systems (DOAS)

Casing

The unit is designed to mount outdoors on a roof curb, framing, or concrete pad.

- Supply air discharge is bottom discharge (vertical) for duct connections. Optional side discharge (horizontal) is available without using transitional curb.
- Outdoor air intake hood is on the end of the unit and opening is protected by bird screen mesh. Optional airflow monitoring damper is available.
- Motorized outdoor air intake damper is equipped with damper blade seals and frame jamb seals to minimize air leakage. Damper frame and blades are constructed of 16 gauge galvanized steel. Damper axle bearings are synthetic sleeve-type, and rotate inside extruded holes in the damper frame.
- Base rails are constructed of 10 gauge galvanized steel with 16 gauge integral floor pan. All floor seams have raised rib joints. Floor penetrations have a minimum 3/8 inch raised rib around each opening. Optional insulated floor pan is available.
- Side and roof panels are constructed with two (2) inch, foam injected, double wall panels with an insulation value of R-6 per lineal inch. Individual panels are constructed so that there is no metal-to-metal contact between interior and exterior sheet metal of each panel. Interior side of panel is 22 gauge galvanized steel. Exterior side of panel is 22 gauge painted steel rated for 1,000 hours in accordance with ASTM B-117 and as prepared per ASTM D-1654.
- Access doors are provided with minimum of two (2) quarter-turn compression latches with adjustable catches. Door latches are lockable with an Allen-wrench. Access doors are double wall construction, similar to casing panels. Access doors are equipped with full-perimeter gasket constructed of D-shaped gasket constructed of EPDM sponge rubber.
- Optional bottom return air opening with motorized return air damper is available.
- Optional gravity relief damper is available when bottom return air opening is selected.
- Optional roof curbs 12", 18", or 24" high are available.

Supply / Exhaust Fan Assembly and Control

Fan assemblies are direct drive without the use of fan belts. The fan wheel is manufactured with a corrosion-resistant, fiber-reinforced polyamide with backward curved blades or welded aluminum with airfoil blades. Fan wheels are tested in accordance with AMCA 210. Each fan is controlled by a variable frequency drive (VFD) that is mounted, wired and programmed. The VFD is located in the control center of the unit. Fan motors are premium efficiency (PE), VFD-rated, ODP-type, and EPA-compliant. Fan vibration isolators are optional. Inlet fan cone airflow monitors are optional.

Figure 1: Energy Recovery Wheel Rooftop DOAS.



Filters

Outdoor air intake hood comes with birdscreen mesh as standard, and has an option for one (1) inch aluminum filter media, accessible at the outdoor intake hood. Supply air filters are standard two (2) inch MERV 8. Supply air filter options are available for four (4) inch MERV 8, four (4) inch MERV 11, four (4) inch MERV 14 filters, accessible through double wall hinged access doors. Energy recovery wheel return air filters are standard two (2) inch MERV 8 with optional two (2) inch aluminum mesh filters, accessible through double wall hinged access doors. Energy recovery wheel outdoor air filters are standard two (2) inch MERV 8 with optional two (2) inch aluminum mesh filters, accessible through double wall hinged access doors. Note that energy recovery wheel outdoor air filters are not available when electric preheater option is selected. Optional filter pressure gauge or filter pressure switch is available.

Refrigerant System

DOAS units are completely piped, wired, tested and charged with R410A refrigerant at the factory. The 110 chassis is single circuit and single compressor. The 210 chassis is dual circuit with dual compressors. The 310 and 352 chassis are dual circuit with four (4) compressors.

Evaporator Direct Expansion (DX) Coil

The DX coil (evaporator coil) is six (6) rows deep and equipped with a thermal expansion valve. Coils are rated in accordance with ARI standards and pressure tested to 250 psi working pressure. Coil tubes are 1/2 inch diameter, 0.016 inch thick seamless copper. Coil casing is constructed of 16 gauge steel casing, and coil fins are 0.006 inch thick aluminum. Coil drain pan is constructed of 18 gauge Type 201 stainless steel, and is double sloped to ensure condensate removal. Drain pan extends minimum eight (8) inches past the evaporator coil to ensure condensate retention. Optional corrosion resistance coating of coil is available. An option for a four (4) row large face area DX coil called "high airflow option" is available for the 11-XX, 21-XX, and 31-XX chassis.

MECHANICAL SPECIFICATIONS

Rooftop Dedicated Outdoor Air Systems (DOAS)

Hot Gas Reheat Coil

The modulating hot gas reheat coil is separated from evaporator coil by a minimum of six (6) inches in the direction of airflow to prevent re-evaporation of condensate. The six (6) inch separation provides room for coil cleaning and allows control system to monitor evaporator coil leaving air temperature. Hot gas reheat is modulated by a factory mounted control valve. Hot gas reheat coil is rated in accordance with ARI standards and pressure tested to 250 psi working pressure. Coil tubes are 5/16 inch diameter, 0.012 inch thick seamless copper. Coil casing is constructed of 16 gauge steel casing and coil fins are 0.006 inch thick aluminum. Optional corrosion resistance coating of coil is available.

Hot gas reheat coil will initiate a purge cycle if hot gas control valve has not been open 80% for two (2) consecutive minutes or more within the last hour. During a purge cycle, the hot gas reheat control valve is forced 100% open for two (2) minutes. Purge cycle may occur once every sixty (60) minutes.

Condenser Coil

The condenser coil tubes are 5/16 inch diameter, 0.012 inch thick seamless copper. Coil casing is constructed of 16 gauge steel casing and coil fins are 0.006 inch thick aluminum. Optional corrosion resistance coating of coil is available. Optional expanded aluminum coil guards (hail guards) are available.

Condenser Fans

Condenser fans are 1,140 RPM direct drive. Fan assembly is statically and dynamically balanced in accordance with AMCA Standard 204-05. Fan assembly consists of aluminum-bladed propeller fan wheel, formed-channel base, formed inlet venter, and coated steel basket guard on the discharge. One condenser fan motor is controlled with a VFD to maintain consistent condensing temperature (head pressure control) in cooling and dehumidification modes. All other condenser fans are fixed speed.

Compressors

Single compressor chassis have digital scroll (variable capacity) compressor. Dual and quad compressor chassis have combination of digital scroll and fixed speed (on / off) type compressors. All compressors are hermetic scroll type and include the following items:

- Suction and discharge service valves
- Reverse rotation protection
- Oil level adjustment
- Rotary dirt trap
- Short cycling control
- High and low pressure limits
- Crankcase heaters

Compressors are mounted in an isolated compartment separate from supply airflow, return airflow, microprocessor controller, disconnect, compressor relays, fan motor VFD, and all other electrical components. Compressors are mounted on rubber vibration isolators and a raised double wall platform. Options for compressors include sight glasses and compressor isolation valves.

Energy Recovery Wheel

AR-DE models are equipped with an enthalpy energy recovery wheel constructed of lightweight polymer substrate with permanently bonded silica gel desiccant. Energy recovery wheel media is mounted in a fully removable slide out cassette oriented at a 90° angle with respect to the unit base. Individual pie shaped wheel sections are removable from wheel cassette for maintenance. Energy recovery wheel cassette includes seals, drive motor, and drive belt. An optional VFD drive for wheel motor is available that can vary the speed of the energy wheel when defrost is needed. Wheel bearings are selected to provide an L-10 life in excess of 400,000 hours. Rim is continuous rolled stainless steel and wheel is connected to the shaft by means of taper locks. Latent energy is transferred entirely in the vapor phase. Thermal performance is certified by wheel manufacturer in accordance with ASHRAE Standard 84 (Method of Testing Air-to-air Heat Exchangers) and ARI Standard 1060 (Rating Air-to-Air Energy Recovery Ventilation Equipment). An optional wheel rotation sensor is available. Optional electric preheater for energy recovery wheel is available when outdoor air design temperature is below 10°F. Note that when electric preheater option is selected, outdoor air filters for energy recovery wheel cannot be selected.

Heating System

Indirect Gas Furnace

Unit is provided with AGA-certified forced draft 4:1 turndown indirect gas furnace. Furnace assembly includes electronic modulating gas valve, two-speed combustion fan, and Type 409 stainless steel heat exchanger. Optional 10:1 gas turndown is available on 11-XX, 21-XX, 31-XX chassis. The 10:1 gas turndown is standard on 35-XX chassis.

Electric Heat

In lieu of gas heat, electric heat with SCR (silicon controlled rectifier) for capacity modulation is available.

Electrical

Units are factory wired with a single point power connection and are wired in accordance with NEC and listed per ETL. Voltages are selectable between 208V / 3 phase, 230V / 3phase, or 460V / 3 phase. ETL listing covers all components of the unit and is not limited to the control panel. All major electrical components are UL listed. Integral control center is isolated from supply airflow, exhaust airflow, compressors, and heating elements. Control center includes the following items:

- Non-fused disconnect
- Sub-circuit fusing
- Low voltage transformers
- Terminal block
- Fan motor variable frequency drives
- Microprocessor controller
- Phase and voltage monitor

MECHANICAL SPECIFICATIONS

Rooftop Dedicated Outdoor Air Systems (DOAS)

Options for the control panel include:

- Factory supplied and factory wired 115V GFCI convenience outlet receptacle with 15A circuit breaker
- Factory supplied and field wired 115V GFCI convenience outlet receptacle with 15A circuit breaker
- Electric strip heater to maintain minimum 0°F temperature inside the control cabinet

Controls

Unit includes factory mounted, wired, programmed, and tested microprocessor controls for discharge air control. Microprocessor controller includes a seven (7) day time clock and Modbus® protocol to communicate with AC Smart and ACP central controllers. (Modbus® is a registered trademark of Schneider Automation Inc.) The following sensors are factory mounted and wired inside the unit:

- Outdoor air humidity sensor
- Outdoor air temperature sensor
- Evaporator coil leaving air temperature sensor
- Energy wheel rotation sensor

The following sensors are shipped loose inside the unit for field mounting and wiring:

- Supply air temperature sensor
- Smoke detectors (optional)
- Room humidity and temperature sensors (optional)

Controller has options for BACnet® IP, BACnet® MSTP, LonWorks® protocols for integration into building management systems. (BACnet® IP, BACnet® MSTP, or LonWorks® control protocols (BACnet® is a trademark of ASHRAE; LonWorks® is a trademark of Echlelon Corporation.) Controller includes a Web UI (user interface) for remote web-based access. The following temperature control sequences are available:

- Discharge air control – The controller enables cooling, dehumidification, or heating modes to maintain a user-defined discharge air set-point, as monitored by the field mounted duct discharge air temperature sensor. Dehumidification mode is started when outdoor air dew point temperature set-point is exceeded. In Dehumidification mode, the DX coil will cool the air down to 55°F (adjustable set-point) and the hot gas reheat coil will heat the air to room neutral 75°F (adjustable discharge air set-point). In cooling mode, the DX coil will cool the air to the discharge air set-point (adjustable). In heating mode, the heating section will heat the air to the discharge air set-point (adjustable). Supply fan will run continuously during occupied mode and fan will turn off in unoccupied mode.
- (Optional) Discharge air control with space temperature and humidity sensors – Similar to Discharge air control, but includes wall humidity and temperature sensors for display purposes only.

- (Optional) Space temperature and humidity control with supply air reset – The controller enables cooling, dehumidification, or heating modes with a variable discharge air set-point. The user can define the minimum and maximum discharge air temperature set-points and the actual discharge air set-point will fluctuate between the minimum and maximum as need to maintain space temperature set-points.

Factory Testing

DOAS units are run tested prior to shipment from the factory. Factory run test report can be provided at the request of engineer, contractor, or owner. Factory run test includes a dielectric (hipot) test. All motorized dampers are cycled on full stroke while installed in the unit using the factory provided motorized damper actuators. The following tests are performed:

- Supply fan is visually inspected during ramp-up and ramp-down. Fan rotation direction is checked. Fan pressure proving switch operation is checked.
- Exhaust fan is visually inspected during ramp-up and ramp-down. Fan rotation direction is checked. Fan pressure proving switch operation is checked.
- Energy recovery wheel is visually inspected to be free to rotate within the cassette. Belt drive mechanism is visually inspected. Energy recovery wheel is enabled to ensure proper rotation.
- Indirect gas furnace is run tested while installed inside the unit with 8.5 inches wg pressure natural gas. Leaving air temperature (LAT) and manifold pressure is measured and recorded at minimum / maximum fire.
- Condensing fans are inspected to rotate freely without obstruction and for proper rotation. Amount of current drawn by each condensing fan is measured and recorded.
- Refrigeration system sub-cooling and superheat are measured after fifteen (15) minutes of steady-state operation with hot gas reheat valve fully closed (0%). Refrigeration system sub-cooling and superheat are measured after fifteen (15) minutes of steady-state operation with hot gas reheat valve fully open (100%). If the unit has a second refrigerant circuit, that circuit's sub-cooling and superheat are measured after fifteen (15) minutes of steady-state operation.

FEATURES AND BENEFITS / OPTIONS

Features and Benefits

Rooftop Dedicated Outdoor Air System (DOAS) units provide 100% outdoor air in heating, cooling and dehumidification modes. Working with LG VRF systems, the LG Rooftop DOAS unit provides a complementary system solution to condition code-required outdoor air.

- Airflow range from 650 CFM to 18,000 CFM
- Tonnage range from five (5) tons to seventy (70) tons
- Down discharge or side discharge duct connections
- Available in 208, 230, or 460 Volt / 3 phase power
- Double wall casing with foam injection
- Gas heat with 4:1 turndown
- Six (6) row direct expansion (DX) cooling coil
- Modulating hot gas reheat coil for dehumidification mode
- Variable capacity compressor (combined with fixed speed compressor on multi-compressor units)
- Head pressure control of condenser fans to ensure reheat capacity
- Direct drive supply fan with variable-frequency drive (VFD)
- Microprocessor controller connectible to AC Smart or ACP central controllers (or stand-alone operation)
- Web access to controller
- 2" MERV 8 supply-air filters
- Discharge air control sequence with field mounted duct temperature sensor
- Flexible design to match local design outdoor temperatures
- Adjustable DX cooling coil discharge air set-point temperatures and unit discharge air temperatures
- Dehumidification mode is triggered based on adjustable outdoor air dew point temperature set-points
- Extensive end of line testing at factory
- Insulated floor pan for AR-DE models
- Bottom return or side return duct connections for AR-DE models
- Direct drive exhaust fan with VFD for AR-DE models
- Phase voltage monitor

Options

- Energy recovery wheel with rotation sensor (standard for AR-DE models)
- Corrosion resistance coating for DX cooling, reheat, and condenser coils
- High turndown (10:1) gas heat control
- Electric heat with silicon-controlled rectifier (SCR) control
- Curbs (12", 18", or 24" high)
- Condenser coil guards
- Airflow monitoring intake damper or fan inlet cone sensors
- VFD option for energy recovery wheel
- Energy recovery wheel rotation sensor option
- Energy recovery wheel electric preheat coil
- 4" MERV 8, 11, or 14 filters
- Convenience outlet
- BACnet® IP, BACnet® MSTP, or LonWorks® control protocols (BACnet® is a trademark of ASHRAE; LonWorks® is a trademark of Echelon Corporation.)
- Supply air filter pressure gage
- Supply air filter pressure switch
- Smoke detector
- Strip heater for control cabinet
- Sight glass
- Fan isolation
- Compressor isolation valves
- Return air opening with motorized damper for AR-DR models
- Gravity relief damper for AR-DR models
- Discharge air control with space temperature and humidity sensors
- Space temperature and humidity control with outdoor air reset
- Spare set of 2" MERV 8 supply filters
- Insulated floor pan for AR-DR models
- Four (4) row high airflow DX coil option

Note:

- *Wiring diagrams are custom made to match each unit's configuration and can be found on the inside of the control cabinet access door.*
- *Performance data for each unit will vary depending on entering air temperatures, design leaving air temperature, and airflow rates. LG CAPS Rooftop DOAS Selection Software should be used for each application to generate accurate performance data. (LG CAPS software will be available at www.myLGHVAC.com in Spring 2017, or contact a local LG sales representative.)*
- *See the Rooftop DOAS Installation manual for details on mounting, condensate piping, etc.*

GENERAL DATA

Base Rooftop DOAS

Table 1: Base Rooftop DOAS.

Model No.	AR-DR11-05A	AR-DR11-08A	AR-DR11-10A	AR-DR21-10A	AR-DR21-13A	AR-DR21-16A	AR-DR21-18A	AR-DR21-20A
Design Airflow (CFM)	1,000	1,400	1,800	2,000	2,400	2,900	3,300	3,700
ESP (in. wg)	1.9	2	2	2	2	2	2	2
Entering Air Summer DB / WB (°F)	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75
Entering Air Winter DB (°F)	0	0	0	0	0	0	0	0
Cooling Performance								
Coil LAT DB / WB (°F)	55.4 / 55.1	54.8 / 54.5	54.8 / 54.5	55.8 / 55.5	55.2 / 55.0	55.4 / 55.1	55.3 / 55.0	54.7 / 54.3
Unit LAT DB / WB (°F)	77.5 / 63.4	78.8 / 63.5	75 / 62.1	77.7 / 63.7	78 / 63.5	77.9 / 63.5	78.4 / 63.6	77.4 / 62.9
Total Cooling Capacity (MBH)	70.3	100.9	129.8	138.1	169.5	203.9	232.9	267.8
Sensible Cooling Capacity (MBH)	43.6	62	79.7	86.4	105.2	126.5	144.2	164.1
Hot Gas Reheat Coil Capacity (MBH)	21	32	34.9	41.7	50.6	62.2	73.8	82.3
Evaporator Coil Depth (Rows)	6	6	6	6	6	6	6	6
No. of Compressors	1	1	1	2	2	2	2	2
Compressor Type(s)	Digital Scroll	Digital Scroll	Digital scroll	Digital Scroll / Fixed Speed				
Refrigerant Charge (lbs.)	10.7	15.6	20.2	17.8	23.9	29.9	33.2	36.4
Heating								
Fuel	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Capacity Input (MBH)	100	150	200	200	250	300	300	350
Capacity Output (MBH)	80	120	160	160	200	240	240	280
LAT (°F)	73.7	79	81.9	73.7	76.8	76.3	67	69.7
Turndown Type	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Turndown Ratio	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Supply Fan Data								
Fan Quantity	1	1	1	1	1	1	1	1
Wheel Diameter (in.)	12	14	16	16	18	18	18	18
Wheel Speed (RPM)	2,343	2,095	2,880	1,942	1,707	1,746	1,810	1,850
Motor HP	1	1.5	1.5	2	3	3	3	3
Configuration								
Outdoor Air Intake	End	End	End	End	End	End	End	End
Supply Air Discharge	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Weight (lbs.)	1,771	1,832	1,969	2,414	2,546	2,708	2,801	2,955
Filtration								
Hood	None	None	None	None	None	None	None	None
Supply	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8

Note:

- Capacity data above may change if entering air temperatures, leaving air temperatures (LAT), or airflow rates are varied.
- Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

GENERAL DATA

Base Rooftop DOAS

Table 2: Base Rooftop DOAS, continued.

Model No.	AR-DR21-25A	AR-DR31-25A	AR-DR31-30A	AR-DR31-35A	AR-DR31-40A	AR-DR35-30A	AR-DR35-40A	AR-DR35-50A	AR-DR35-60A	AR-DR35-70A
Design Airflow (CFM)	4,200	4,500	5,300	5,600	7,000	5,200	6,700	8,500	9,800	12,000
ESP (in. wg)	2	2	2	2	2.5	2.5	2	2	2	3
Entering Air Summer DB/WB (°F)	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75
Entering Air Winter DB (°F)	0	0	0	0	0	0	0	0	0	0
Cooling Performance										
Coil LAT DB / WB (°F)	54.5 / 54.2	55.3 / 54.9	54.9 / 54.5	54.3 / 54.1	54.8 / 54.5	54.8 / 54.4	54.9 / 54.5	54.8 / 54.4	54.7 / 54.5	54.2 / 53.9
Unit LAT DB / WB (°F)	76.6 / 62.6	76.6 / 63.0	76.5 / 62.7	77.1 / 62.7	77.2 / 63	82.1 / 64.6	78.6 / 63.5	76.3 / 62.6	74.6 / 62.1	72.8 / 61.1
Total Cooling Capacity (MBH)	305.3	318.2	381.3	409.3	503.1	375	482	612.9	705.1	882.5
Sensible Cooling Capacity (MBH)	187.2	196.8	234.1	251.1	310.1	229.9	295.8	375.8	434.6	538.6
Hot Gas Reheat Coil Capacity (MBH)	86.4	92	107.3	121.2	141.9	136.7	155.1	171.5	182.8	199.9
Evaporator Coil Depth (Rows)	6	6	6	6	6	6	6	6	6	6
No. of Compressors	2	4	4	4	4	4	4	4	4	4
Compressor Type(s)	Digital Scroll / Fixed Speed	2 Digital Scroll / 2 Fixed Speed								
Refrigerant Charge (lbs.)	39.7	43.9	50.2	56.5	58.2	75.3	90.5	104.1	111.5	116.8
Heating										
Fuel	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Capacity Input (MBH)	400	400	500	500	700	600	600	800	1,000	1,200
Capacity Output (MBH)	320	320	400	400	560	480	480	640	800	960
LAT (°F)	70.2	65.5	69.6	65.8	73.7	85.1	66	69.4	75.2	73.7
Turndown Type	Standard	Standard	Standard	Standard	Standard	High	High	High	High	High
Turndown Ratio	4:1	4:1	4:1	4:1	4:1	10:1	10:1	10:1	10:1	10:1
Supply Fan Data										
Fan Quantity	1	2	2	2	2	2	2	3	2	2
Wheel Dia. (in.)	18	16	18	18	18	15	16	15	18	20
Wheel Speed (RPM)	1,952	1,959	1,692	1,728	2,560	2,345	2,083	2,299	2,012	2,002
Motor HP	5	2	3	3	5	5	3	3	5	7.5
Configuration										
Outdoor Air Intake	End	End	End	End	End	End	End	End	End	End
Supply Air Discharge	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Weight (lbs.)	3,148	3,746	4,039	4,225	4,432	6,817	7,168	7,805	8,077	8,267
Filtration										
Hood	None	None	None	None	None	None	None	None	None	None
Supply	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8

Note:

- Capacity data above may change if entering air temperatures, leaving air temperatures (LAT), or airflow rates are varied.
- Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.



GENERAL DATA

Energy Recovery Wheel Rooftop DOAS

New House
DOAS-2

House DOAS

Table 3: Energy Recovery Wheel Rooftop DOAS.

Model No.	AR-DE11-05A	AR-DE11-08A	AR-DE11-10A	AR-DE21-10A	AR-DE21-13A	AR-DE21-16A	AR-DE21-18A	AR-DE21-20A	AR-DE21-25A
Design Airflow (CFM)	1,900	2,400	3,000	3,600	4,200	4,900	5,500	6,000	6,600
ESP (in. wg)	1	2	1.8	2	1.6	1.6	1.6	1.6	1.5
Entering Air Summer DB / WB (°F)	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75
Entering Air Winter DB (°F)	0	0	0	0	0	0	0	0	0
Cooling Performance									
Coil EAT DB / WB (°F)	79.6 / 66.1	80.5 / 66.7	81.6 / 67.3	79.5 / 66	80 / 66.4	80.6 / 66.8	81.1 / 67.1	81.6 / 67.3	82.1 / 67.7
Coil LAT DB / WB (°F)	55.2 / 54.6	54.2 / 53.7	54.5 / 53.9	54.6 / 54.2	54.4 / 53.9	54.5 / 54	54.6 / 54.1	54.1 / 53.5	53.9 / 53.4
Unit LAT DB / WB (°F)	70.6 / 60.7	74.5 / 61.6	71.5 / 60.7	71.3 / 60.7	70.9 / 60.4	73.9 / 61.6	72.9 / 61.3	73.5 / 61.2	71.9 / 60.6
Total Cooling Capacity (MBH)	68.8	98.4	127.3	133.3	164.5	198.3	227.3	261.5	299
Sensible Cooling Capacity (MBH)	50.8	69.4	89.2	98.3	118.2	140.4	159.9	181.1	204.5
Hot Gas Reheat Coil Capacity (MBH)	25.8	38.7	41.1	51	61	74.7	88.2	97.5	100.8
Evaporator Coil Depth (Rows)	6	6	6	6	6	6	6	6	6
Number of Compressors	1	1	1	2	2	2	2	2	2
Compressor Type(s)	Digital Scroll			Digital Scroll / Fixed Speed					
Refrigerant Charge (lbs.)	10.7	15.6	20.2	17.8	23.9	29.9	33.2	36.4	39.7
Heating									
Fuel	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Capacity Input (MBH)	100	100	100	200	200	200	200	200	200
Capacity Output (MBH)	80	80	80	160	160	160	160	160	160
LAT (°F)	92.9	81.4	71.1	95.6	87.7	80.4	75.1	71.3	67
Turndown Type	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Turndown Ratio	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Fan Data									
Supply Fan Quantity	1	1	1	1	1	2	1	2	1
Supply Fan Wheel Diameter (in.)	14	16	18	18	18	16	18	18	20
Supply Fan Wheel Speed (RPM)	2,383	2,366	2,140	2,163	2,195	2,386	2,366	2,145	2,119
Supply Fan Motor HP	2	5	5	5	5	5	7.5	5	10
Exhaust Fan Quantity	1	1	1	1	2	2	2	2	2
Exhaust Fan Wheel Diameter (in.)	14	18	18	18	16	16	18	18	18
Exhaust Fan Wheel Speed (RPM)	1,852	1,695	1,757	1,781	1,796	1,900	1,669	1,726	1,775
Exhaust Fan Motor HP	1	3	3	3	1.5	2	3	3	3
Configuration									
Outdoor Air Intake	End	End	End	End	End	End	End	End	End
Supply Air Discharge	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Return Air Opening	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Weight (lbs.)	2,618	2,618	2,746	3,447	3,623	3,919	3,986	4,133	4,247
Filtration									
Hood	1" Aluminum	1" Aluminum	1" Aluminum	1" Aluminum	1" Aluminum	1" Aluminum	1" Aluminum	1" Aluminum	1" Aluminum
Supply	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8	2" MERV 8

Note:

- Capacity data above may change if entering air temperatures, leaving air temperatures (LAT), or airflow rates are varied.
- Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

GENERAL DATA

Energy Recovery Wheel Rooftop DOAS

New Tenant DOAS-1

Tenant DOAS

Table 4: Energy Recovery Wheel Rooftop DOAS, continued

Model No.	AR-DE31-25A	AR-DE31-30A	AR-DE31-35A	AR-DE31-40A	AR-DE35-30A	AR-DE35-40A	AR-DE35-50A	AR-DE35-60A	AR-DE35-70A
Design Airflow (CFM)	7,500	8,500	9,200	10,000	9,400	11,600	13,500	16,000	18,000
ESP (in. wg)	2	2	2	2	1.4	1.4	1.4	3	3
Entering Air Summer DB/WB (°F)	95 / 75	95 / 75	95/75	95/75	95 / 75	95 / 75	95 / 75	95 / 75	95 / 75
Entering Air Winter DB (°F)	0	0	0	0	0	0	0	0	0
Cooling Performance									
Coil EAT DB/WB (°F)	81.8 / 67.5	82.5 / 67.9	83/68.2	83.6/68.6	79.9 / 66.3	80.8 / 66.9	81.5 / 67.3	82.4 / 67.9	83.1 / 68.3
Coil LAT DB/WB (°F)	55.1 / 54.5	54.7 / 54.1	54.9/54.5	53.7/53.3	54.6 / 53.8	54.7 / 54	53.9 / 53.3	54.8 / 54.3	53.7 / 53.2
Unit LAT DB/WB (°F)	72 / 61.1	72.8 / 61.2	73.2/61.6	72.5/60.7	74.4 / 61.7	73.2 / 61.3	70.8 / 60.1	72 / 61.1	69.8 / 59.7
Total Cooling Capacity (MBH)	312.4	375.2	406.5	489.7	367.2	473.1	596.9	696.2	866.2
Sensible Cooling Capacity (MBH)	220.1	259.2	284.1	328.6	261.4	332.7	409.1	485.6	581.3
Hot Gas Reheat Coil Capacity (MBH)	108.8	125.1	141.4	162.1	173.7	191.7	205.9	217.1	231.4
Evaporator Coil Depth (Rows)	6	6	6	6	6	6	6	6	6
Number of Compressors	4	4	4	4	4	4	4	4	4
Compressor Type(s)	2 Digital Scroll/ 2 Fixed Speed								
Refrig. Charge (lbs.)	43.9	50.2	56.5	58.2	75.3	90.5	104.1	111.5	116.8
Heating									
Fuel	Natural Gas								
Capacity Input (MBH)	400	400	400	400	600	600	600	600	800
Capacity Output (MBH)	320	320	320	320	480	480	480	480	640
LAT (°F)	85.1	77.8	73.4	68.6	99.9	87.8	79.8	71.2	73.6
Turndown Type	Standard	Standard	Standard	Standard	High	High	High	High	High
Turndown Ratio	4:1	4:1	4:1	4:1	10:1	10:1	10:1	10:1	10:1
Fan Data									
Supply Fan Quantity	2	1	1	1	2	2	2	2	2
Supply Fan Wheel Diameter (in.)	18	24	24	24	18	18	20	24	24
Supply Fan Wheel Speed (RPM)	2,203	1,669	1,805	1,869	2,094	2,366	2,038	1,937	1,915
Supply Fan Motor HP	5	15	5	15	5	7.5	7.5	15	15
Exhaust Fan Qty.	2	2	2	2	2	3	2	2	2
Exhaust Fan Wheel Diameter (in.)	18	18	18	18	18	18	20	24	24
Exhaust Fan Wheel Speed (RPM)	1,895	2,009	2,197	2,308	1,812	1,735	1,791	1,545	1,651
Exhaust Fan Motor HP	5	5	5	5	3	3	2	10	10
Configuration									
Outdoor Air Intake	End								
Supply Air Discharge	Bottom								
Return Air Opening	Bottom								
Weight (lbs.)	5,204	5,421	5,687	5,724	9,339	9,857	10,180	10,670	10,772
Filtration									
Hood None	1" Aluminum	None	None						
Supply	2" MERV 8								

Note:

- Capacity data above may change if entering air temperatures, leaving air temperatures (LAT), or airflow rates are varied.
- Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim or destroy R410A refrigerant according to applicable regulations (40 CFR Part 82, Subpart F) under section 608 of CAA.

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ELECTRICAL DATA

Base Rooftop DOAS

Table 5: Base Rooftop DOAS Electrical Data.

Model No.	AR-DR11-05A	AR-DR11-08A	AR-DR11-10A	AR-DR21-10A	AR-DR21-13A	AR-DR21-16A	AR-DR21-18A	AR-DR21-20A	AR-DR21-25A
Design Airflow (CFM)	1,000	1,400	1,800	2,000	2,400	2,900	3,300	3,700	4,200
ESP (in. wg)	1.9	2	2	2	2	2	2	2	2
<i>Voltage (V/P/C) 208/3/60</i>									
MCA (amps)	35.5	45.9	53	60.6	72.3	83.5	90.3	99.3	127.2
MOP (amps)	50	70	80	80	90	110	110	125	175
<i>Voltage (V/P/C) 230/3/60</i>									
MCA (amps)	35.5	45.4	52.5	60	71.7	82.9	89.7	98.5	125.6
MOP (amps)	50	70	80	80	90	110	110	125	175
<i>Voltage (V/P/C) 460/3/60</i>									
MCA (amps)	17	21.7	28.1	30.3	35.5	38.1	44.5	51.7	60.6
MOP (amps)	25	30	45	40	45	50	60	60	80

Table 6: Base Rooftop DOAS Electrical Data, continued.

Model No.	AR-DR31-25A	AR-DR31-30A	AR-DR31-35A	AR-DR31-40A	AR-DR35-30A	AR-DR35-40A	AR-DR35-50A	AR-DR35-60A	AR-DR35-70A
Design Airflow (CFM)	4,500	5,300	5,600	7,000	5,200	6,700	8,500	9,800	12,000
ESP (in. wg)	2	2	2	2.5	2.5	2	2	2	3
<i>Voltage (V/P/C) 208/3/60</i>									
MCA (amps)	131	151.9	163.1	190.8	140.5	172.5	265.9	282	351.3
MOP (amps)	150	175	175	200	150	200	300	300	400
<i>Voltage (V/P/C) 230/3/60</i>									
MCA (amps)	130	150.9	162.1	188.2	139.5	171.1	264.1	278.6	347.5
MOP (amps)	150	175	175	200	150	200	300	300	400
<i>Voltage (V/P/C) 460/3/60</i>									
MCA (amps)	63.7	78.7	80.7	98.4	70.7	91.7	109.6	129.3	160.4
MOP (amps)	70	90	90	110	80	100	125	150	175

Note:

- MCA = Minimum Circuit Ampacity.
- MOP = Maximum overcurrent protection.
- Electrical data above may vary if design airflow rate or external static pressures are varied.

ELECTRICAL DATA

Energy Recovery Wheel Rooftop DOAS

Table 7: Energy Recovery Wheel Rooftop DOAS Electrical Data.

Model No.	AR-DE11-05A	AR-DE11-08A	AR-DE11-10A	AR-DE21-10A	AR-DE21-13A	AR-DE21-16A	AR-DE21-18A	AR-DE21-20A	AR-DE21-25A
Design Airflow (CFM)	1,900	2,400	3,000	3,600	4,200	4,900	5,500	6,000	6,600
ESP (in. wg)	1	2	1.8	2	1.6	1.6	1.6	1.6	1.5
<i>Voltage (V / P / C) 208 / 3 / 60</i>									
MCA (amps)	42.2	64.8	71.9	78.2	87.7	115.5	120.1	136.7	157.1
MOP (amps)	60	90	100	90	110	125	150	150	200
<i>Voltage (V / P / C) 230 / 3 / 60</i>									
MCA (amps)	41.5	63.4	70.5	76.6	85.9	113.1	118.3	134.1	155.1
MOP (amps)	60	90	100	90	110	125	150	150	200
<i>Voltage (V / P / C) 460 / 3 / 60</i>									
MCA (amps)	20.3	30.6	37	38.6	42.9	53.3	58.8	69.5	75.3
MOP (amps)	30	40	50	45	50	60	70	80	90

Table 8: Energy Recovery Wheel Rooftop DOAS Electrical Data.

Model No.	AR-DE31-25A	AR-DE31-30A	AR-DE31-35A	AR-DE31-40A	AR-DE35-30A	AR-DE35-40A	AR-DE35-50A	AR-DE35-60A	AR-DE35-70A
Design Airflow (CFM)	7,500	8,500	9,200	10,000	9,400	11,600	13,500	16,000	18,000
ESP (in. wg)	2	2	2	2	1.4	1.4	1.4	3	3
<i>Voltage (V / P / C) 208 / 3 / 60</i>									
MCA (amps)	178	204.8	216	231.8	171.1	224.4	311.8	383.4	439.9
MOP (amps)	200	225	250	250	175	250	350	400	500
<i>Voltage (V / P / C) 230 / 3 / 60</i>									
MCA (amps)	173.8	199.7	210.9	226.7	168.5	221	306.4	375.6	432.1
MOP (amps)	175	225	225	250	175	250	350	400	500
<i>Voltage (V / P / C) 460 / 3 / 60</i>									
MCA (amps)	85.6	102.7	104.7	117.4	85.2	116	130.9	177.8	202.7
MOP (amps)	90	110	110	125	90	125	150	200	225

Note:

- MCA = Minimum Circuit Ampacity.
- MOP = Maximum overcurrent protection.
- Electrical data above may vary if design airflow rate or external static pressures are varied.

ACOUSTIC DATA

Base Rooftop DOAS

Table 9: Base Rooftop DOAS Acoustic Data.

	Sound Power by Octave Band (Lw)								Lwa
	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
AR-DR11-05A									
Supply Air Discharge	78	73	84	82	82	82	74	69	87
Casing Radiated	87	93	83	81	80	74	70	66	85
AR-DR11-08A									
Supply Air Discharge	80	77	88	83	84	84	75	72	89
Casing Radiated	87	93	83	81	80	75	70	66	85
AR-DR11-10A									
Supply Air Discharge	81	77	89	85	88	86	79	76	92
Casing Radiated	88	93	85	82	81	75	70	66	86
AR-DR21-10A									
Supply Air Discharge	81	78	89	85	88	86	79	76	92
Casing Radiated	92	92	88	86	85	79	74	70	89
AR-DR21-13A									
Supply Air Discharge	85	79	93	88	89	88	81	77	94
Casing Radiated	92	82	89	86	85	79	74	70	89
AR-DR21-16A									
Supply Air Discharge	85	79	93	88	89	88	81	77	94
Casing Radiated	92	92	89	86	85	79	74	70	89
AR-DR21-18A									
Supply Air Discharge	89	83	97	92	93	92	85	81	98
Casing Radiated	93	92	91	87	86	80	75	70	90
AR-DR21-20A									
Supply Air Discharge	89	83	97	92	93	92	85	81	98
Casing Radiated	93	92	91	87	86	80	75	70	90
AR-DR21-25A									
Supply Air Discharge	89	83	97	92	93	92	85	81	98
Casing Radiated	93	92	91	87	86	80	75	70	90
AR-DR31-25A									
Supply Air Discharge	84	80	92	88	91	89	82	79	95
Casing Radiated	94	94	90	88	86	90	76	71	91
AR-DR31-30A									
Supply Air Discharge	88	81	96	91	92	91	84	80	97
Casing Radiated	94	94	91	88	86	81	76	71	91
AR-DR31-35A									
Supply Air Discharge	88	81	96	91	92	91	84	80	97
Casing Radiated	94	94	91	88	86	81	76	71	91
AR-DR31-40A									
Supply Air Discharge	92	85	100	95	96	95	88	84	101
Casing Radiated	95	94	94	89	88	82	75	72	92
AR-DR35-30A									
Supply Air Discharge	80	79	82	89	85	83	80	77	91
Casing Radiated	96	97	95	92	90	87	81	86	95
AR-DR35-40A									
Supply Air Discharge	85	80	83	89	84	82	79	75	90
Casing Radiated	92	97	95	82	90	87	80	76	95
AR-DR35-50A									
Supply Air Discharge	82	81	84	91	87	85	82	79	93
Casing Radiated	96	97	95	93	90	87	81	88	96
AR-DR35-60A									
Supply Air Discharge	83	86	90	96	93	92	86	83	99
Casing Radiated	96	97	96	97	92	89	82	77	98
AR-DR35-70A									
Supply Air Discharge	89	90	94	97	95	93	90	85	100
Casing Radiated	96	97	96	93	92	88	83	77	96

Product Data

Note:

- Lw = Sound power level (dB).
- Lwa = A-weighted sound power level (dB).
- Sound power data is calculated based on design conditions listed in the General Data tables.



ACOUSTIC DATA

Energy Recovery Wheel Rooftop DOAS

Table 10: Energy Recovery Wheel Rooftop DOAS Acoustic Data.

	Sound Power by Octave Band (Lw)								Lwa
	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
AR-DE11-05A									
Supply Air Discharge	84	81	92	87	88	88	79	76	93
Return Air Intake	76	72	76	71	66	66	59	56	74
Casing Radiated	89	93	90	86	86	85	77	74	91
AR-DE11-08A									
Supply Air Discharge	82	78	90	86	89	87	80	80	93
Return Air Intake	79	72	80	73	68	68	60	58	76
Casing Radiated	89	93	91	86	87	84	78	74	91
AR-DE11-10A									
Supply Air Discharge	94	92	94	90	90	86	83	78	94
Return Air Intake	79	72	90	73	68	68	60	58	76
Casing Radiated	98	95	93	87	87	84	78	74	92
AR-DE21-10A									
Supply Air Discharge	90	84	98	93	94	93	86	82	99
Return Air Intake	85	79	86	79	74	74	66	64	82
Casing Radiated	95	93	97	92	92	90	83	79	96
AR-DE21-13A									
Supply Air Discharge	90	84	98	93	94	93	86	82	99
Return Air Intake	85	82	85	80	76	73	68	65	83
Casing Radiated	94	93	95	91	92	90	83	80	97
AR-DE21-16A									
Supply Air Discharge	85	82	93	89	92	90	83	83	96
Return Air Intake	87	84	87	82	78	75	70	67	85
Casing Radiated	94	93	95	91	93	91	84	81	97
AR-DE21-18A									
Supply Air Discharge	79	83	85	92	89	88	82	77	94
Return Air Intake	83	77	84	77	72	72	64	62	80
Casing Radiated	93	93	95	94	91	90	83	78	97
AR-DE21-20A									
Supply Air Discharge	97	96	97	93	93	89	86	81	97
Return Air Intake	83	77	84	77	72	72	64	62	80
Casing Radiated	100	95	96	91	91	89	62	78	96
AR-DE21-25A									
Supply Air Discharge	85	86	87	91	89	86	81	77	94
Return Air Intake	83	77	84	77	72	72	64	62	80
Casing Radiated	93	92	95	92	91	89	82	78	96
AR-DE31-25A									
Supply Air Discharge	93	86	101	96	97	96	89	85	102
Return Air Intake	92	85	93	86	81	81	73	71	89
Casing Radiated	98	95	102	97	97	96	89	85	102

Note:

- Lw = Sound power level (dB).
- Lwa = A-weighted sound power level (dB).
- Sound power data is calculated based on design conditions listed in the General Data tables.

ACOUSTIC DATA

Energy Recovery Wheel Rooftop DOAS

Table 11: Energy Recovery Wheel Rooftop DOAS Acoustic Data, continued.

	Sound Power by Octave Band (Lw)								Lwa
	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
AR-DE31-30A									
Supply Air Discharge	81	84	91	93	89	84	78	74	94
Return Air Intake	92	85	93	86	81	81	73	71	89
Casing Radiated	96	95	102	97	97	96	89	85	102
AR-DE31-35A									
Supply Air Discharge	84	87	91	95	91	85	79	76	95
Return Air Intake	93	86	94	87	82	82	74	72	90
Casing Radiated	97	95	102	98	98	97	90	86	103
AR-DE31-40A									
Supply Air Discharge	84	87	91	95	91	85	79	76	95
Return Air Intake	93	86	94	87	82	82	74	72	90
Casing Radiated	97	95	102	98	98	97	90	86	103
AR-DE35-30A									
Supply Air Discharge	83	86	90	96	93	92	86	83	99
Return Air Intake	82	81	88	97	86	87	80	75	96
Casing Radiated	96	97	96	98	95	93	86	83	100
AR-DE35-40A									
Supply Air Discharge	85	88	91	97	94	93	87	82	100
Return Air Intake	90	84	91	84	79	79	71	69	87
Casing Radiated	97	97	100	98	96	95	88	83	101
AR-DE35-50A									
Supply Air Discharge	89	90	94	97	95	93	90	85	100
Return Air Intake	82	79	89	84	80	80	76	70	87
Casing Radiated	96	97	97	95	93	91	85	80	98
AR-DE35-60A									
Supply Air Discharge	90	93	97	100	96	90	84	91	101
Return Air Intake	81	85	94	92	85	82	77	73	93
Casing Radiated	96	98	99	99	95	91	84	80	100
AR-DE3570A									
Supply Air Discharge	90	93	97	100	96	90	84	91	101
Return Air Intake	81	85	94	92	85	82	77	73	93
Casing Radiated	96	98	99	99	95	91	84	80	100

Product Data

Note:

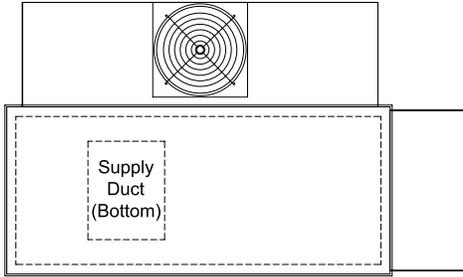
- Lw = Sound power level (dB).
- Lwa = A-weighted sound power level (dB).
- Sound power data is calculated based on design conditions listed in the General Data tables.



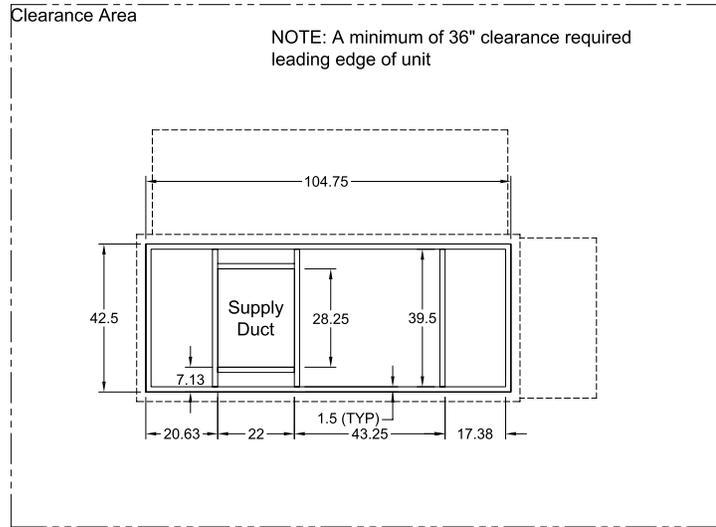
DIMENSIONS

AR-DR11-05A, AR-DR11-08A, AR-DR11-10A Base Rooftop DOAS

Top Drawing

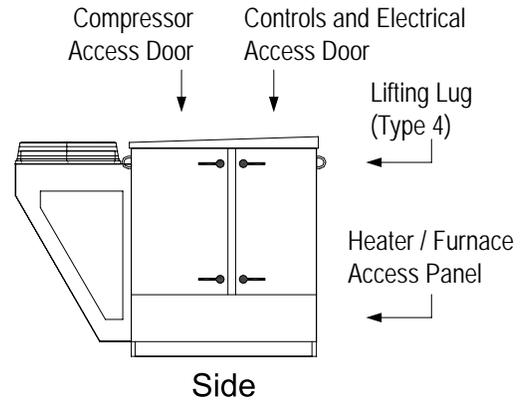
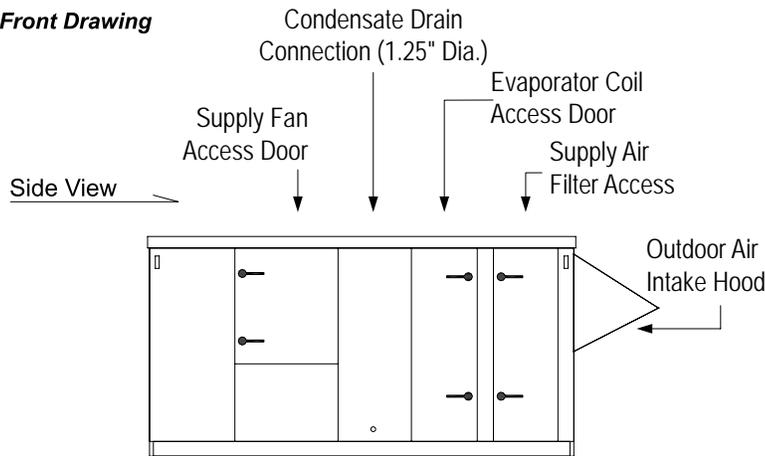


Plan



Footprint

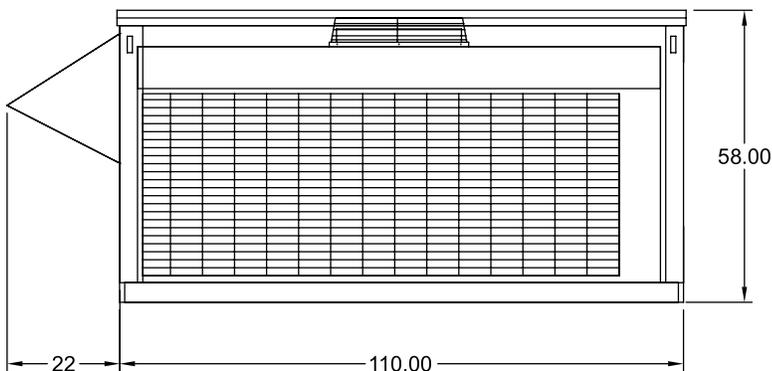
Front Drawing



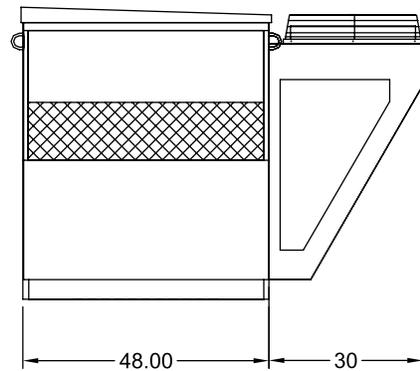
Side

Reverse Drawing

End View



Back

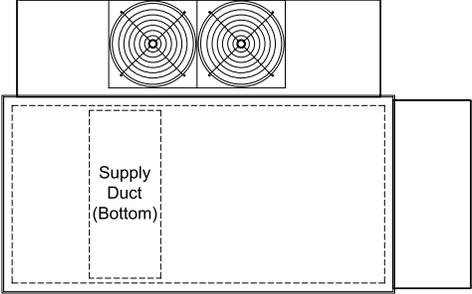


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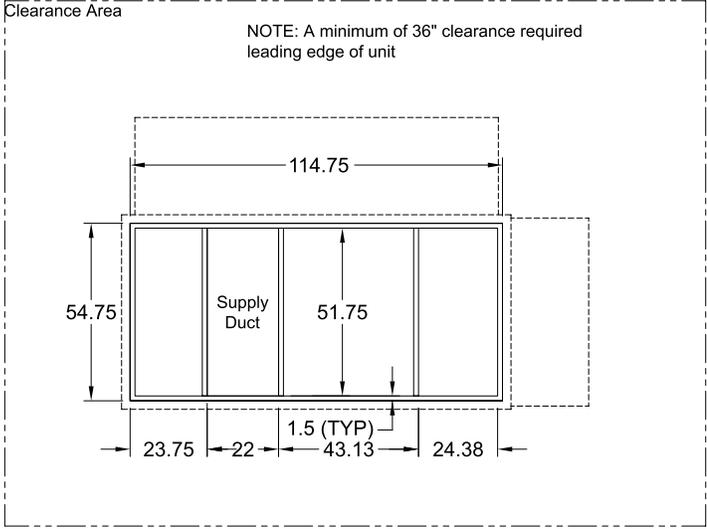
DIMENSIONS

AR-DR21-10A, AR-DR21-13A, AR-DR21-16A, AR-DR21-18A Base Rooftop DOAS

Top Drawing

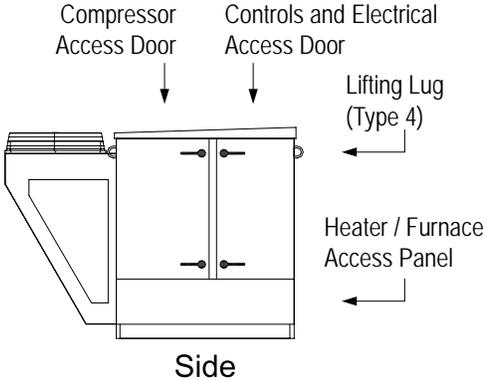
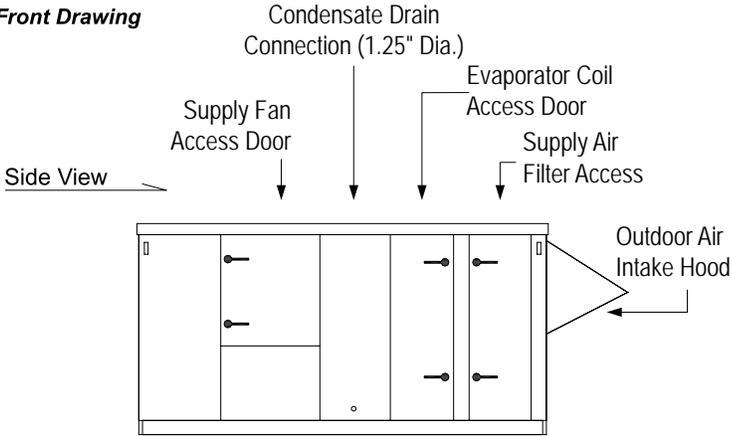


Plan



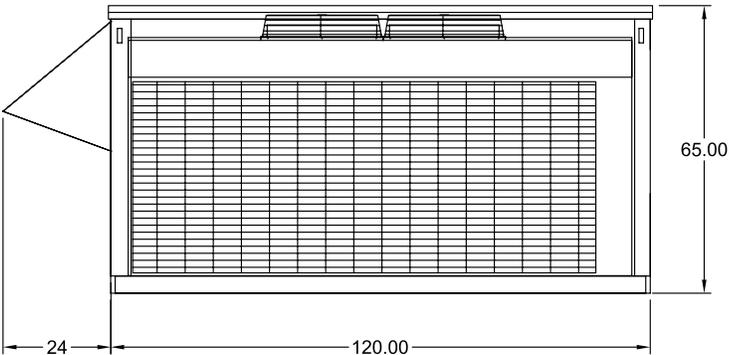
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Front Drawing

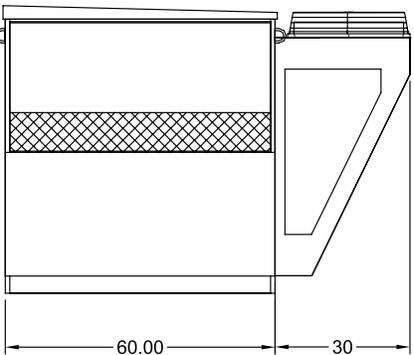


Reverse Drawing

End View



Back



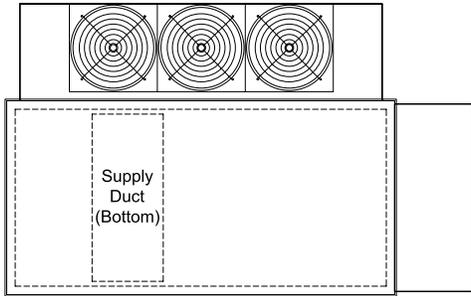
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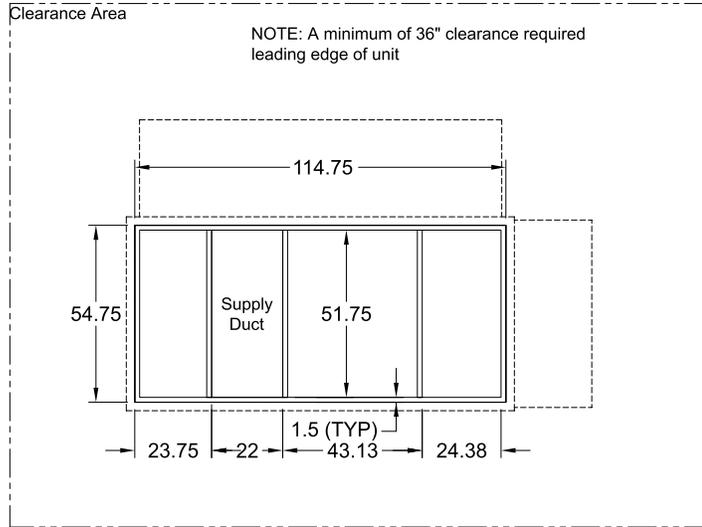
DIMENSIONS

AR-DR21-20A, AR-DR21-25A Base Rooftop DOAS

Top Drawing

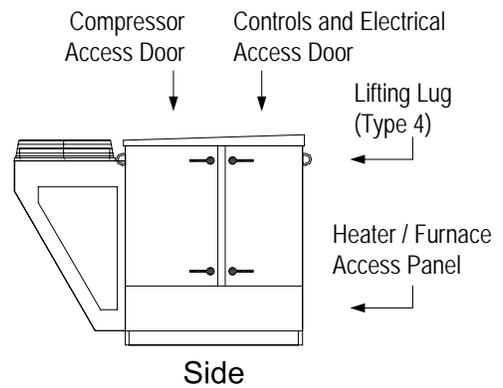
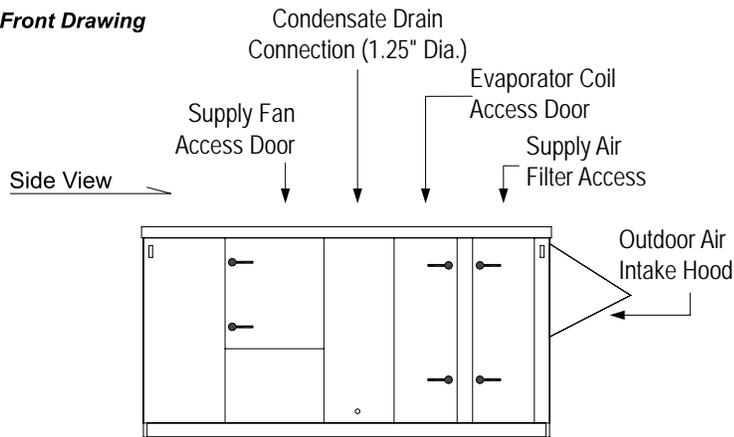


Plan



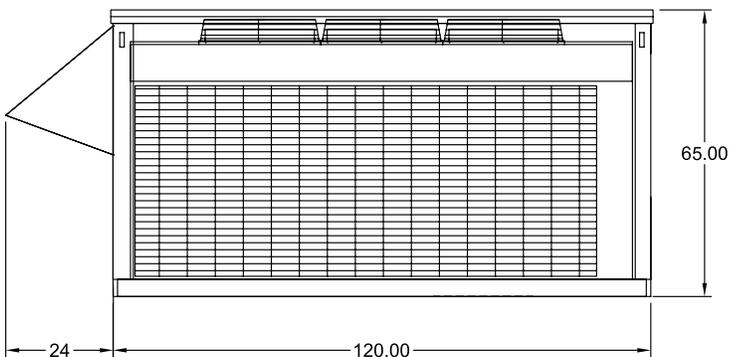
Footprint

Front Drawing

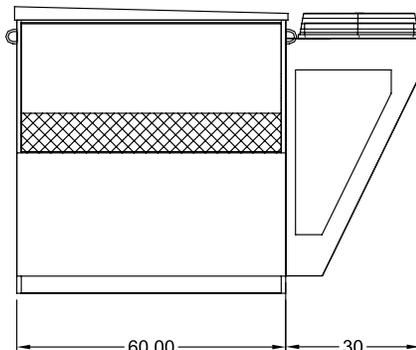


Reverse Drawing

End View



Back

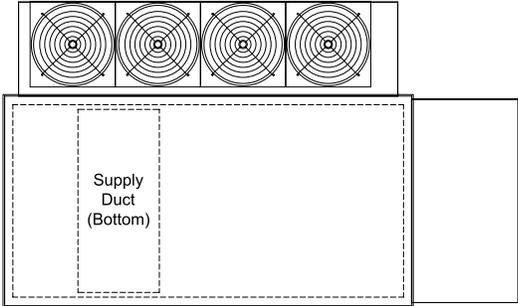


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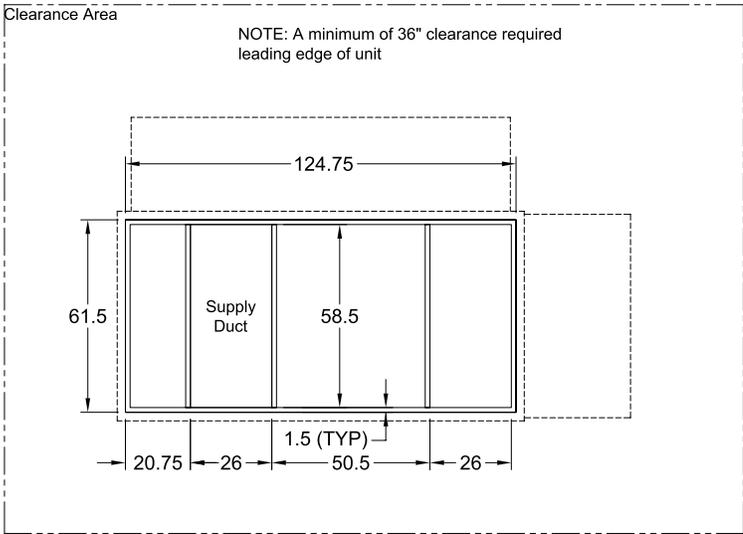
DIMENSIONS

AR-DR31-25A, AR-DR31-30A, AR-DR31-35A, AR-DR31-40A Base Rooftop DOAS

Top Drawing



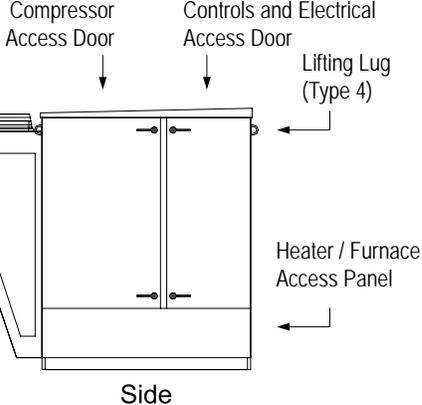
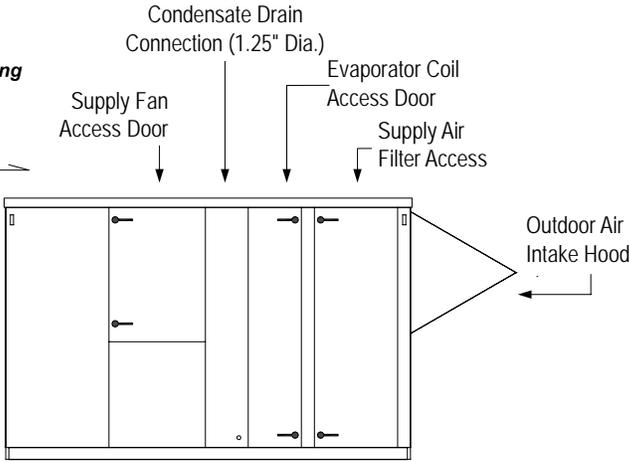
Plan



Footprint

Front Drawing

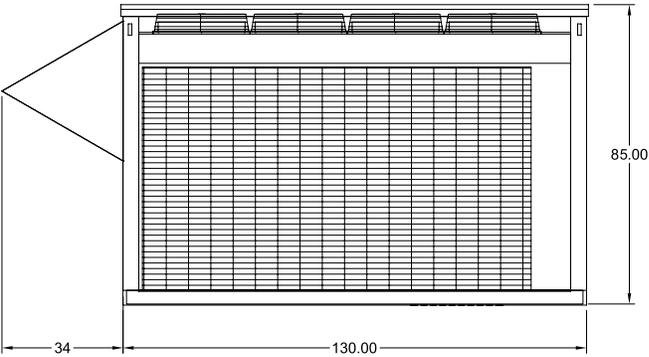
Side View



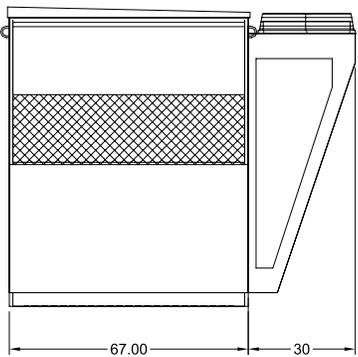
Side

Reverse Drawing

End View



Back



End

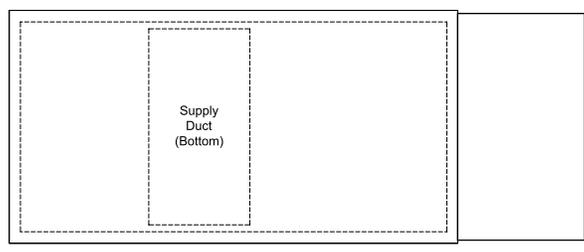
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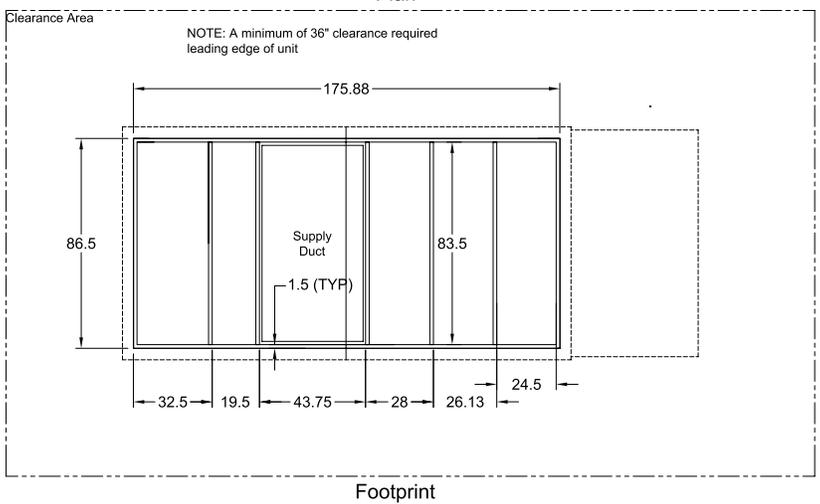
DIMENSIONS

AR-DR35-30A Base Rooftop DOAS

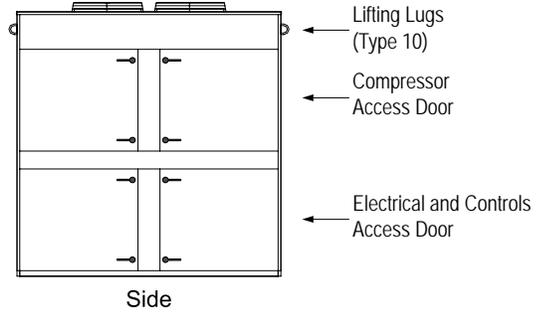
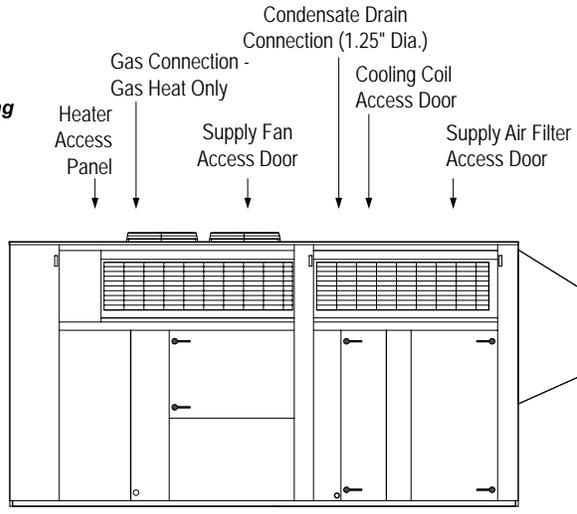
Top Drawing



Plan

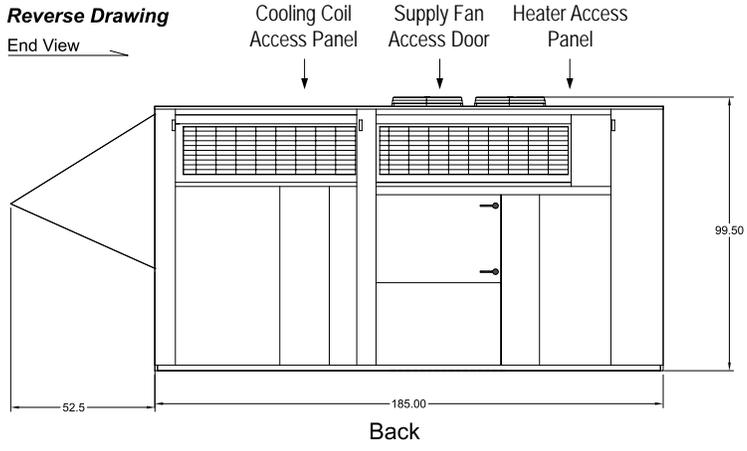


Front Drawing
Side View

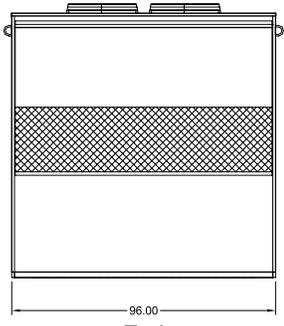


Side

Reverse Drawing
End View



Back

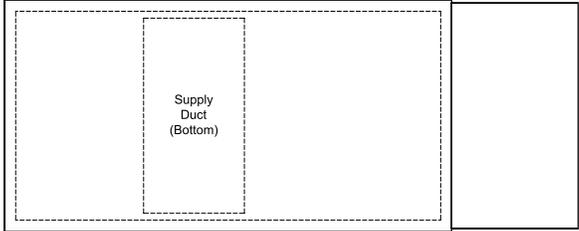


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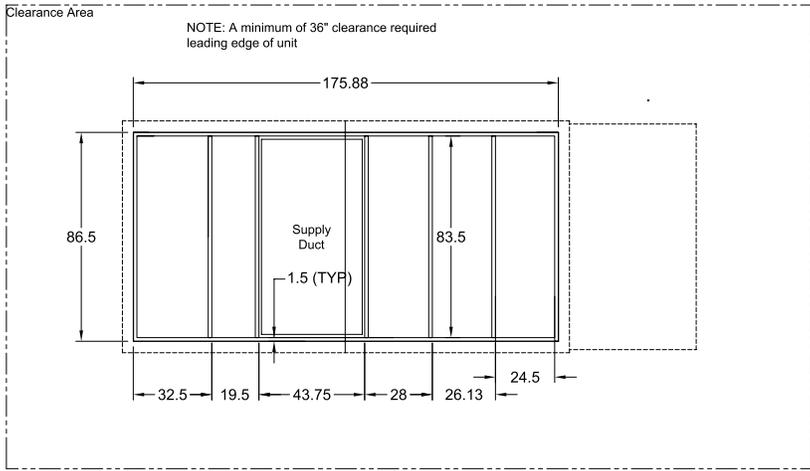
DIMENSIONS

AR-DR35-40A Base Rooftop DOAS

Top Drawing



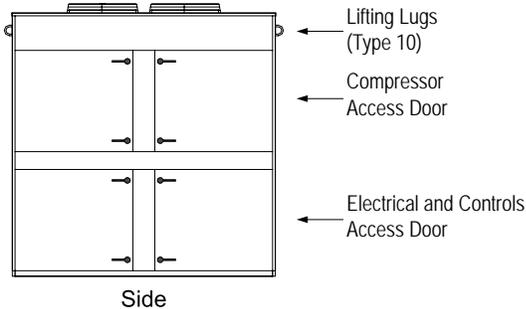
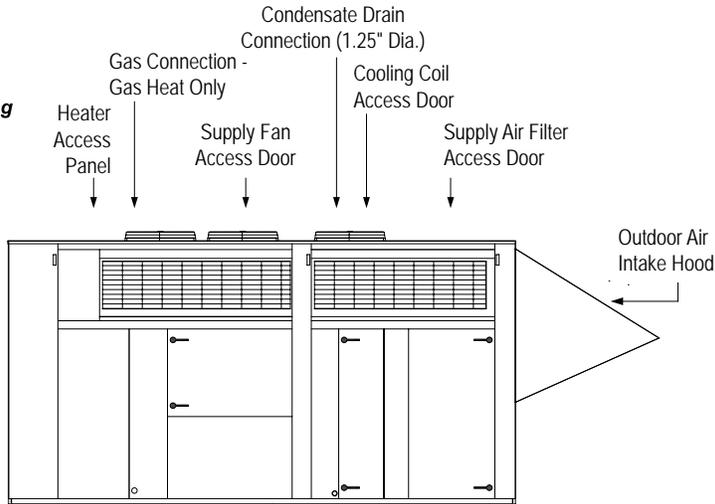
Plan



Footprint

Front Drawing

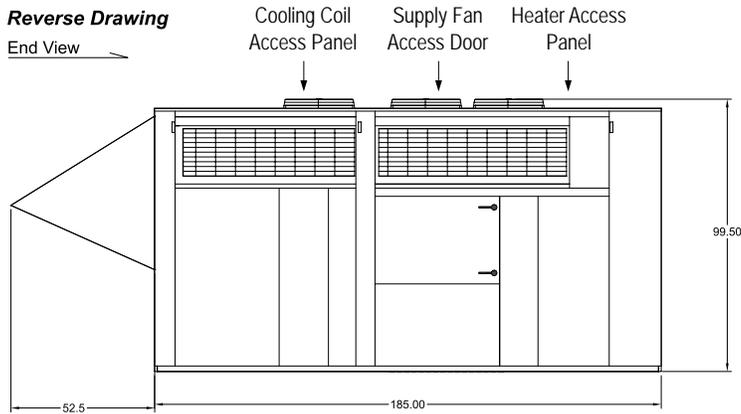
Side View



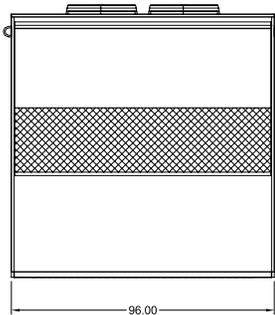
Side

Reverse Drawing

End View



Back



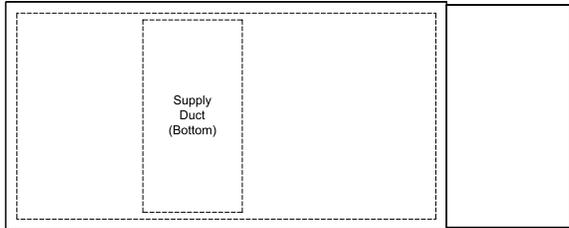
End

Product Data

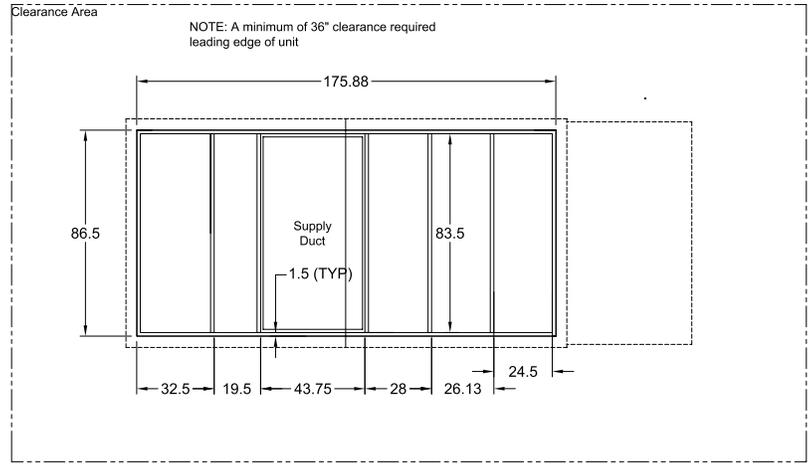
DIMENSIONS

AR-DR35-50A, AR-DR35-60A, AR-DR35-70A Base Rooftop DOAS

Top Drawing



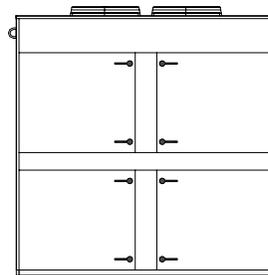
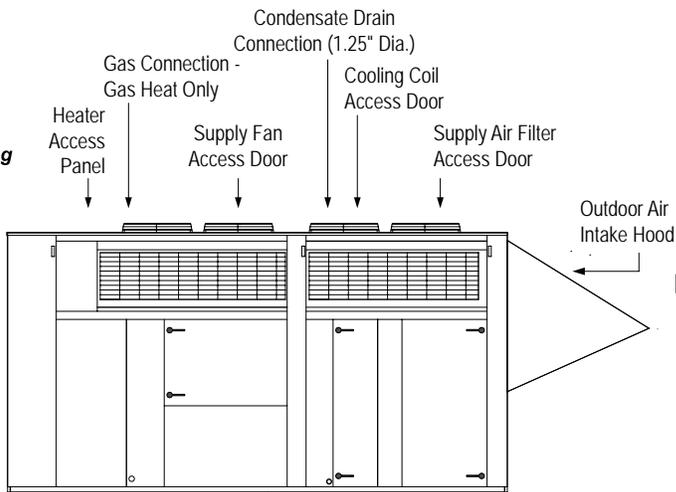
Plan



Footprint

Front Drawing

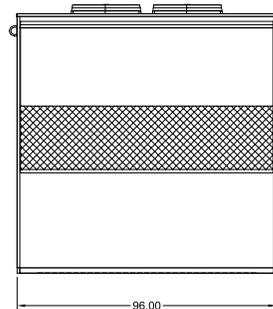
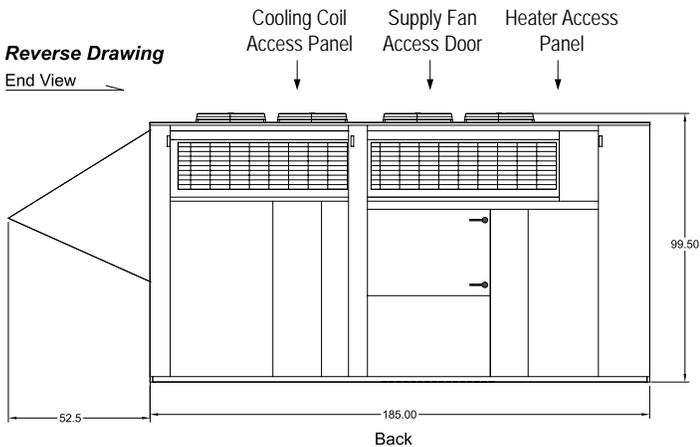
Side View



Side

Reverse Drawing

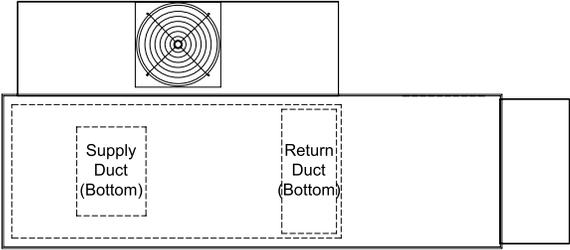
End View



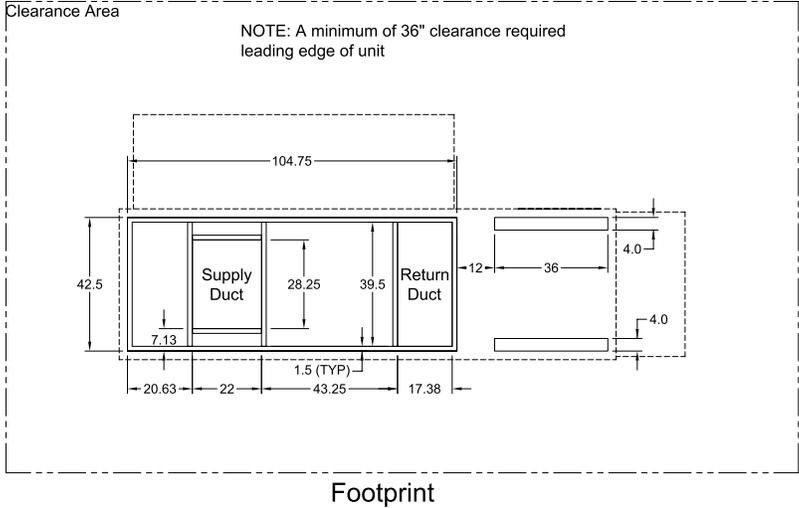
DIMENSIONS

AR-DE11-05A, AR-DE11-08A, AR-DE11-10A Energy Recovery Wheel Rooftop DOAS

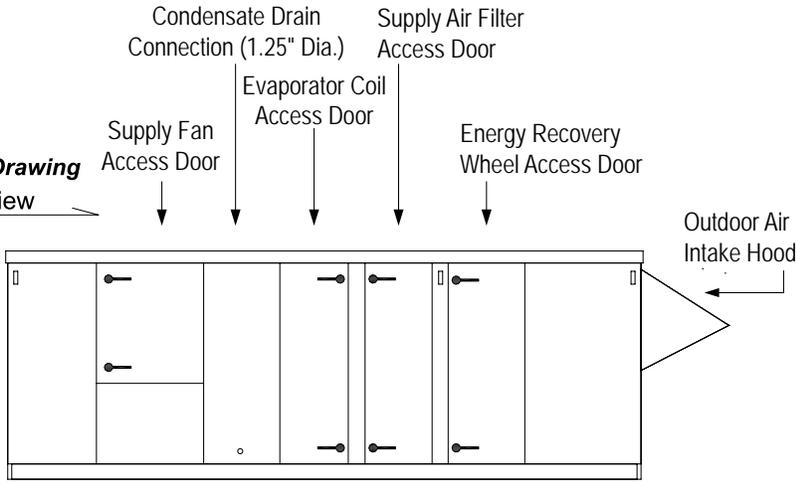
Top Drawing



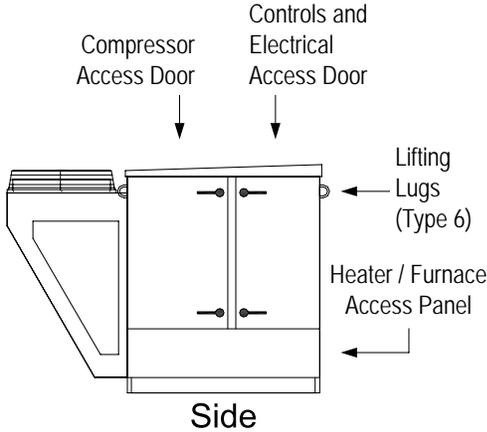
Plan



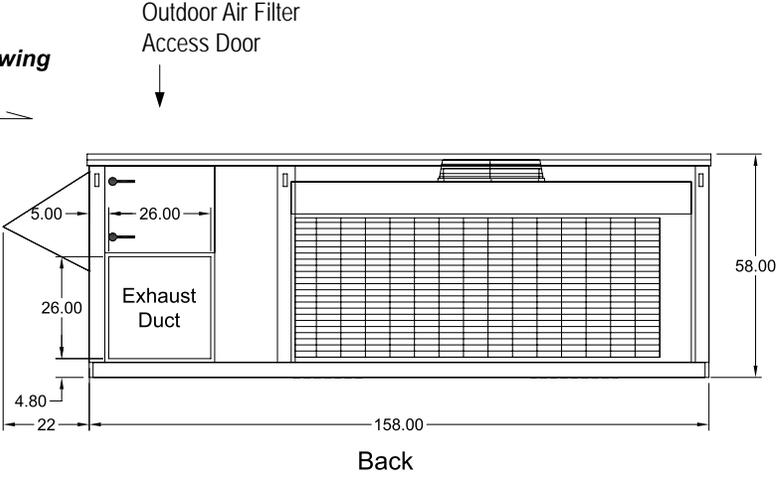
Front Drawing Side View



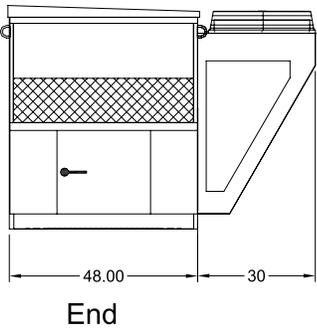
Compressor Access Door



Reverse Drawing End View



Exhaust Fan Access Door



Product Data

House DOAS-2

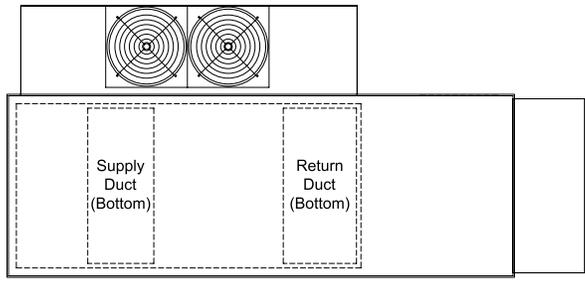
DIMENSIONS

AR-DE21-10A, AR-DE21-13A, **AR-DE21-16A**, AR-DE21-18A

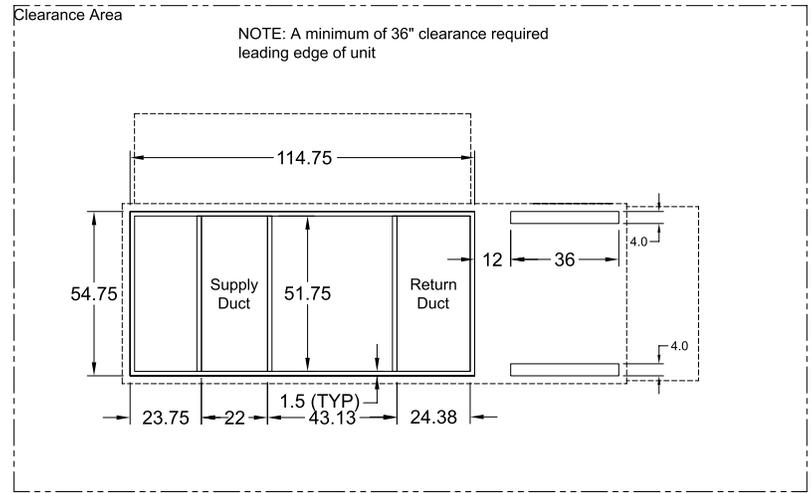
Energy Recovery Wheel Rooftop DOAS

Rooftop Dedicated Outdoor Air System Engineering Manual

Top Drawing

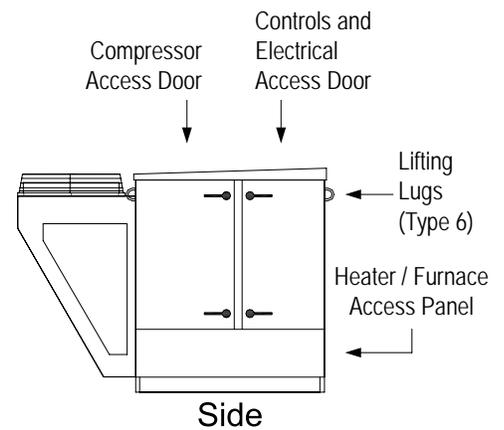
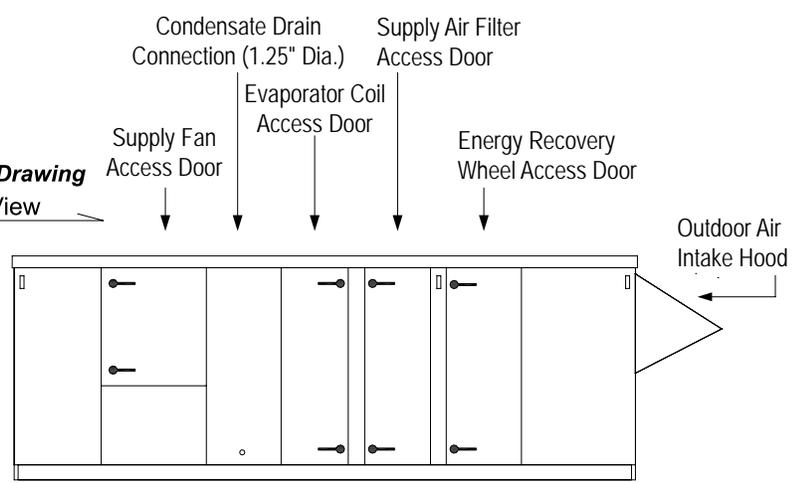


Plan



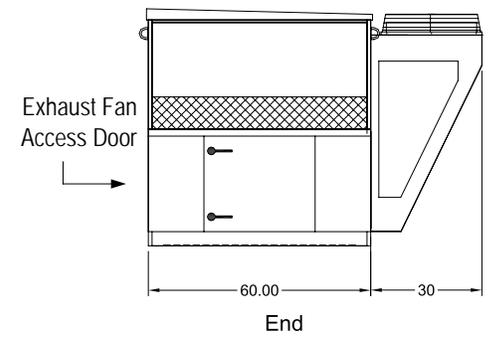
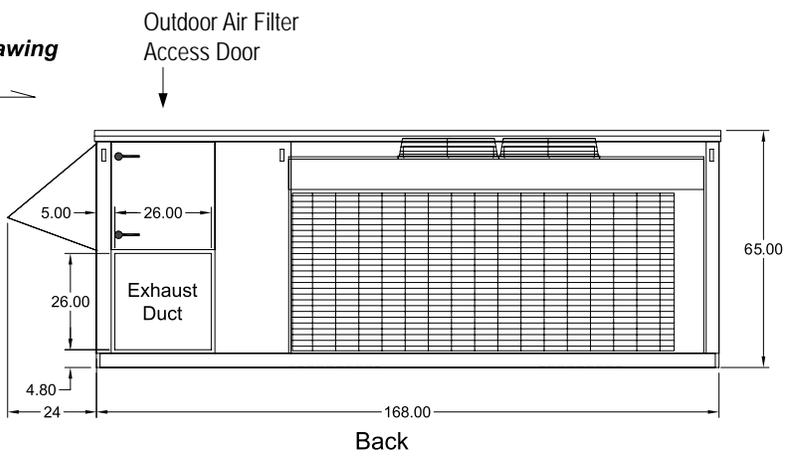
Footprint

Front Drawing
Side View



Side

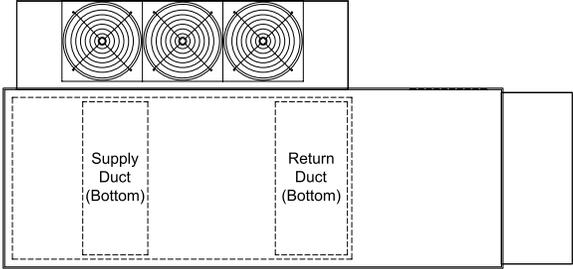
Reverse Drawing
End View



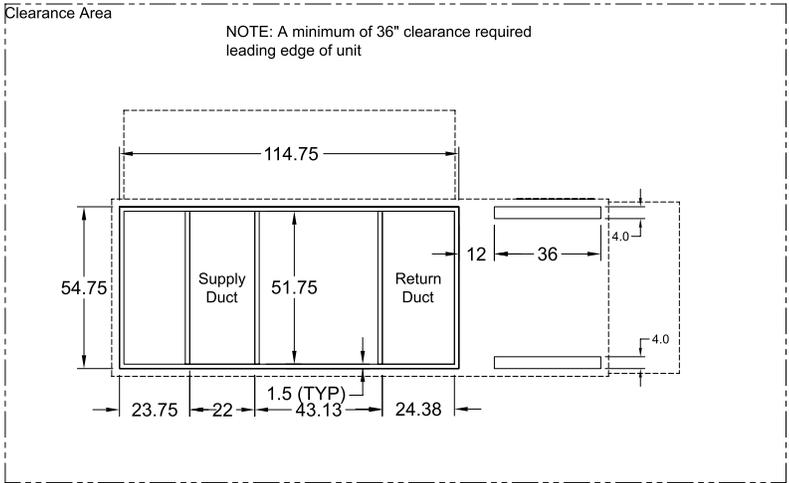
DIMENSIONS

AR-DE21-20A, AR-DE21-25A Energy Recovery Wheel Rooftop DOAS

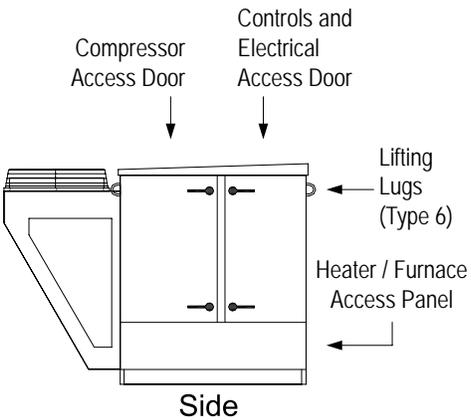
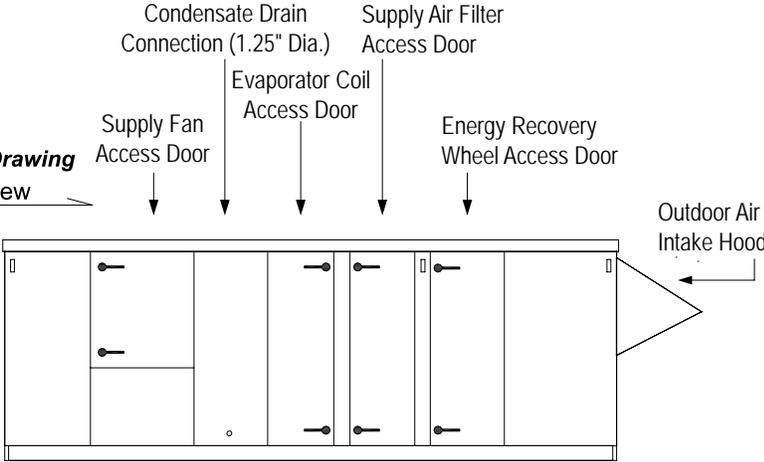
Top Drawing



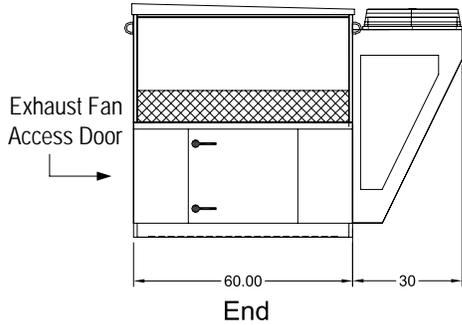
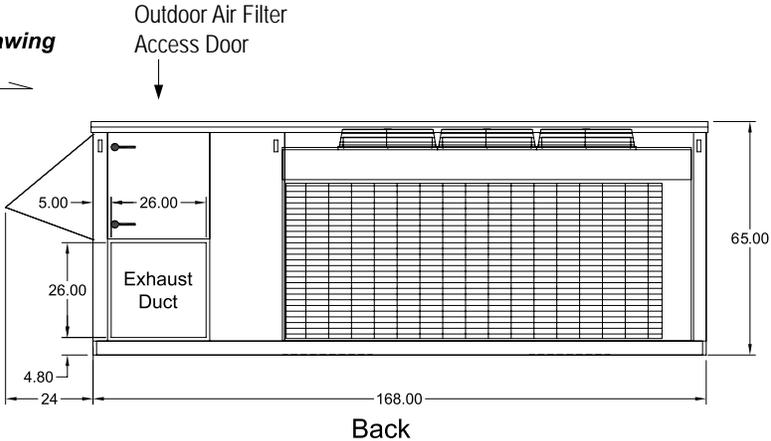
Plan



Front Drawing Side View



Reverse Drawing End View



Product Data

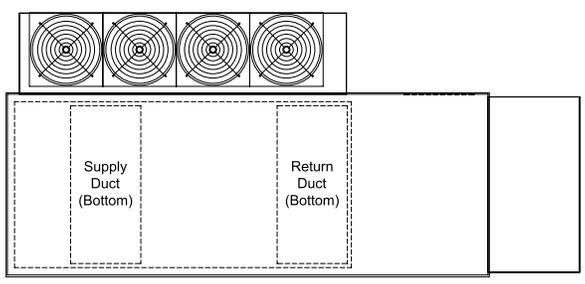
Tenant DOAS-1

DIMENSIONS

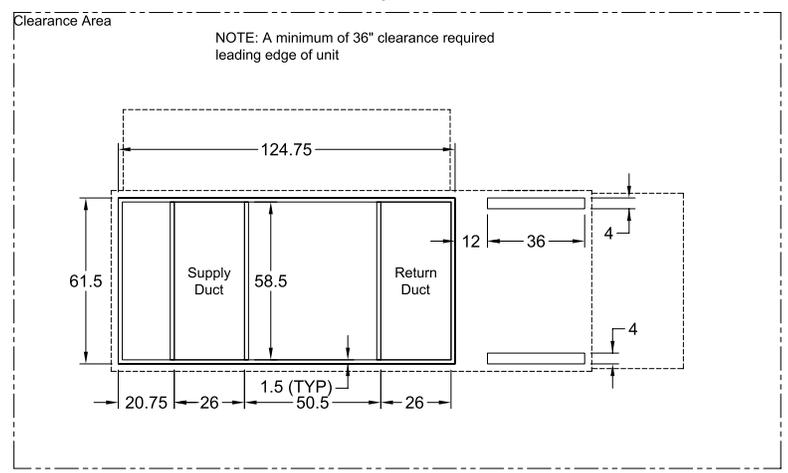
AR-DE31-25A, AR-DE31-30A, **AR-DE31-35A**, AR-DE31-40A Energy Recovery Wheel Rooftop DOAS

Rooftop Dedicated Outdoor Air System Engineering Manual

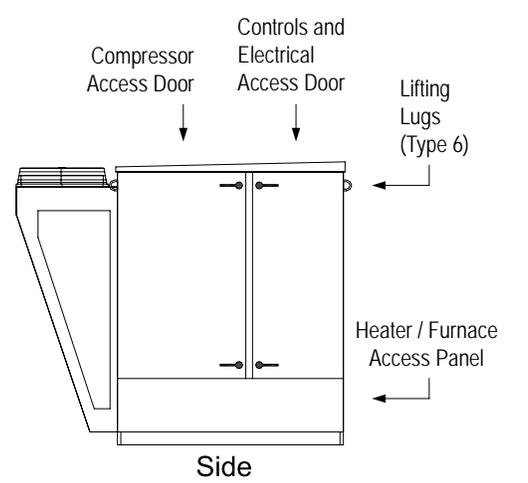
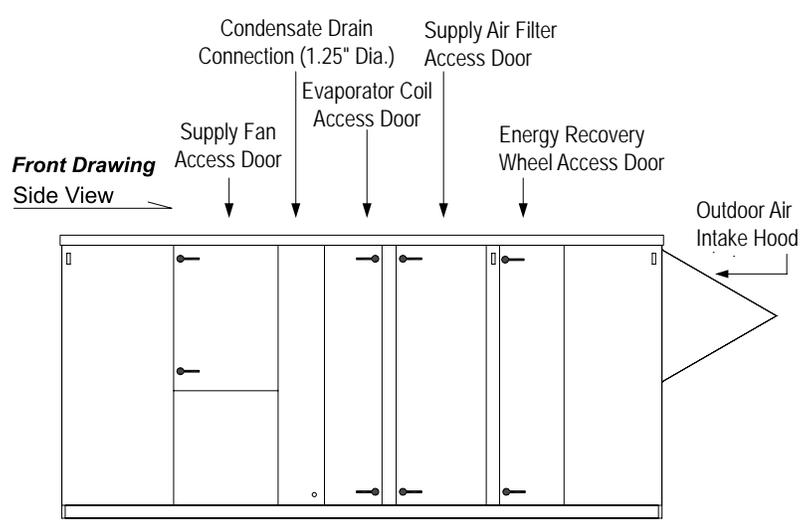
Top Drawing



Plan

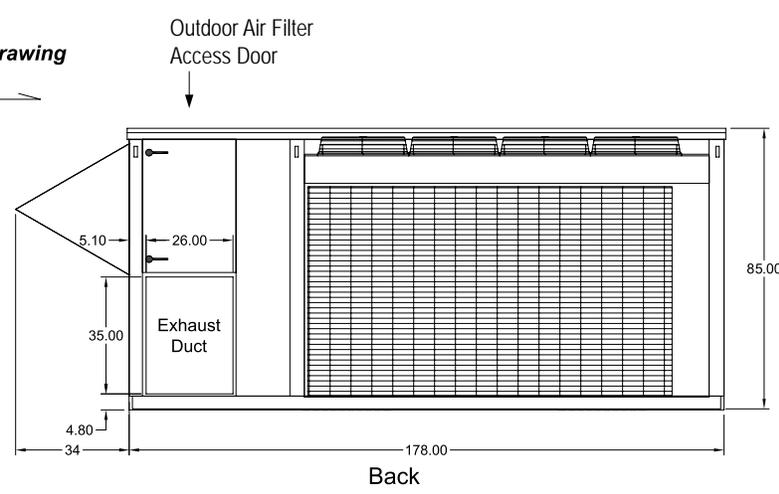


Footprint

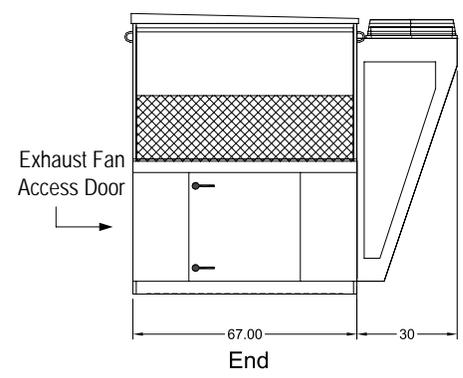


Side

Reverse Drawing End View



Back

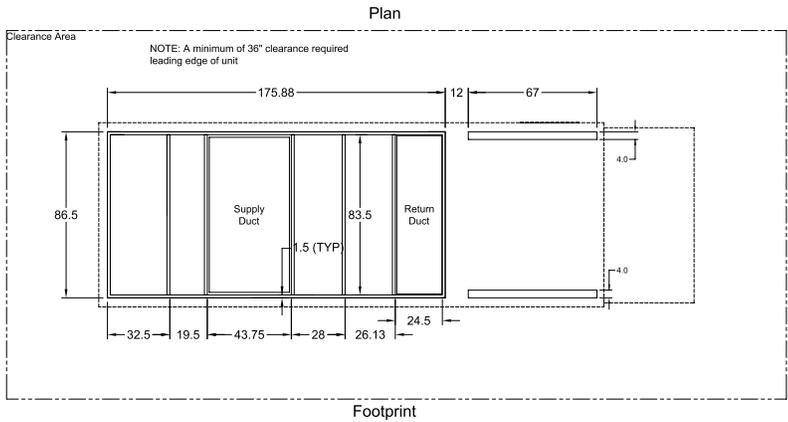
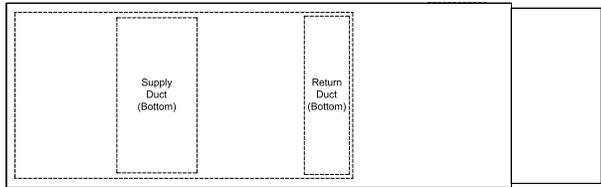


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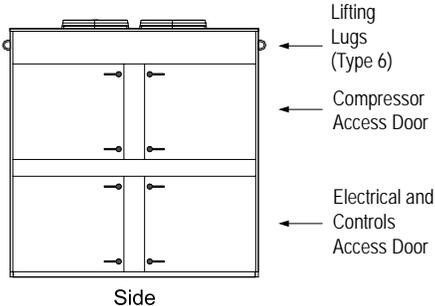
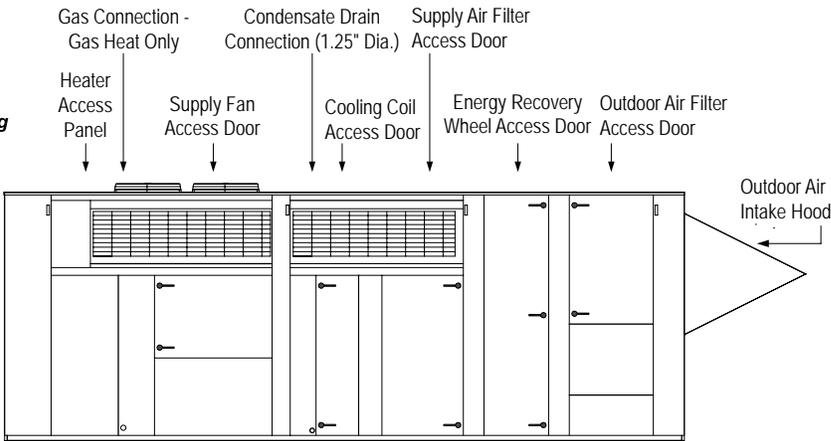
DIMENSIONS

AR-DE35-30A Energy Recovery Wheel Rooftop DOAS

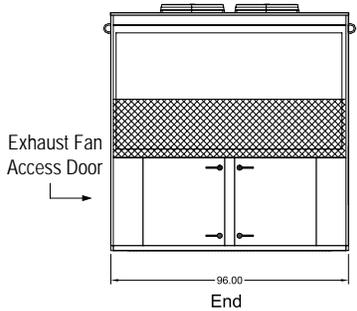
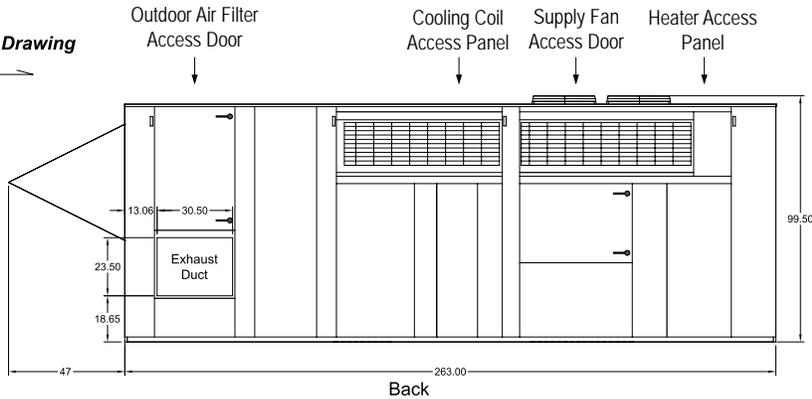
Top Drawing



Front Drawing
Side View



Reverse Drawing
End View

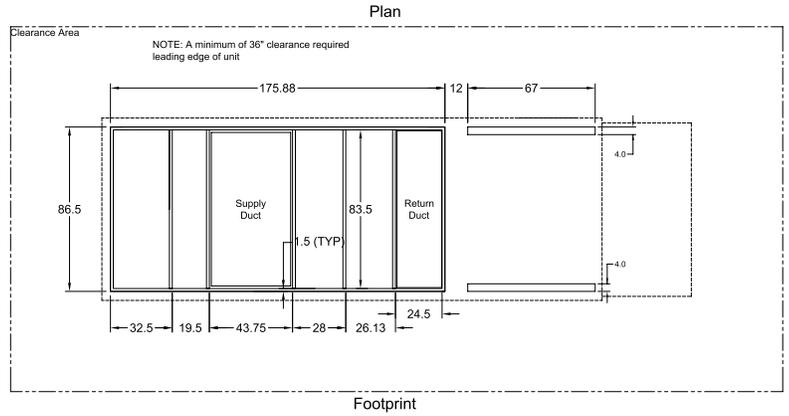
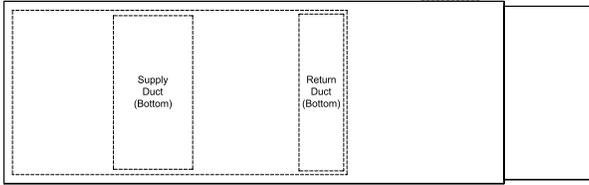


Product Data

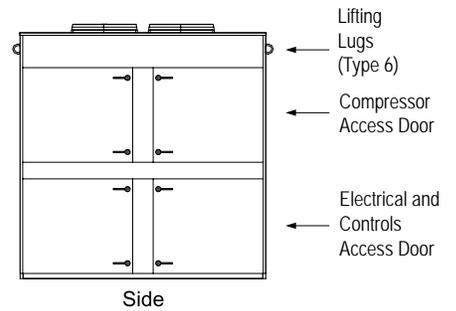
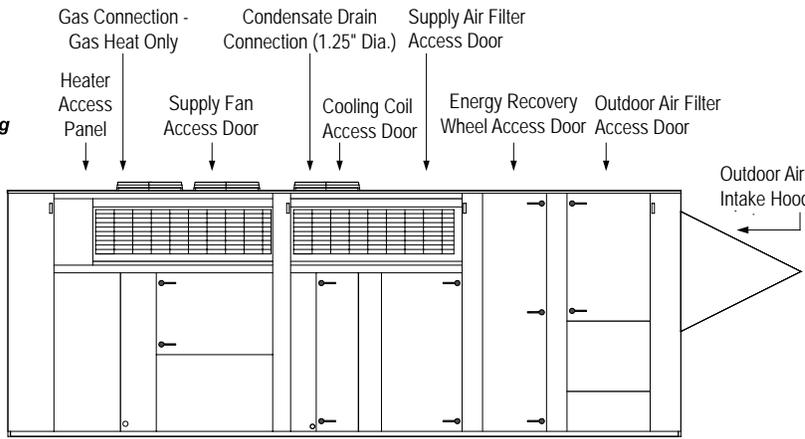
DIMENSIONS

AR-DE35-40A Energy Recovery Wheel Rooftop DOAS

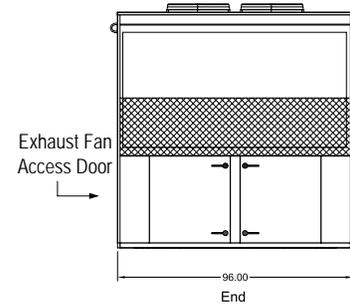
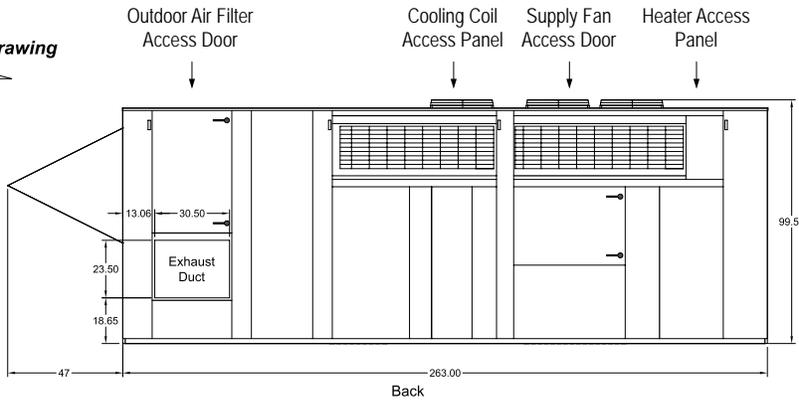
Top Drawing



Front Drawing
Side View



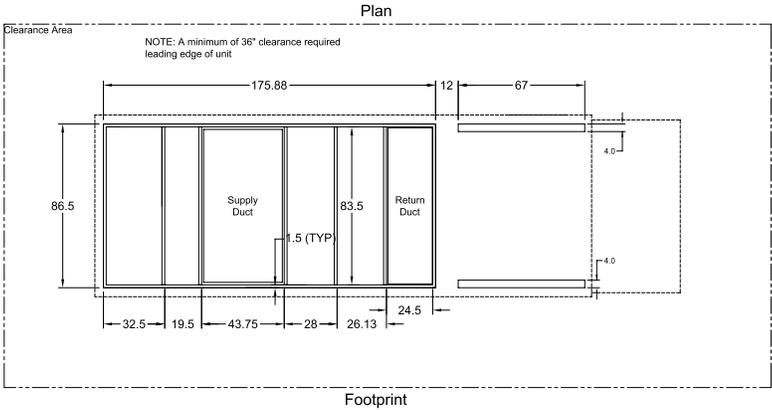
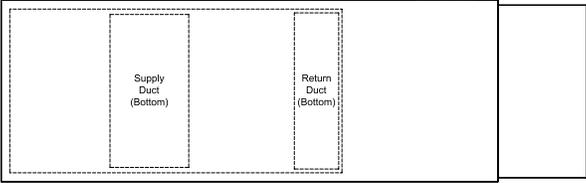
Reverse Drawing
End View



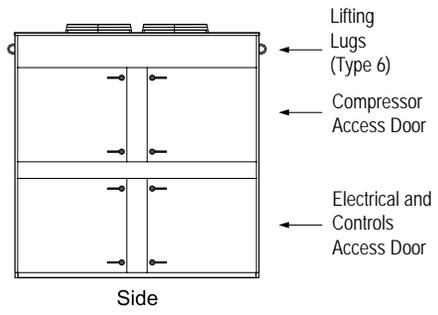
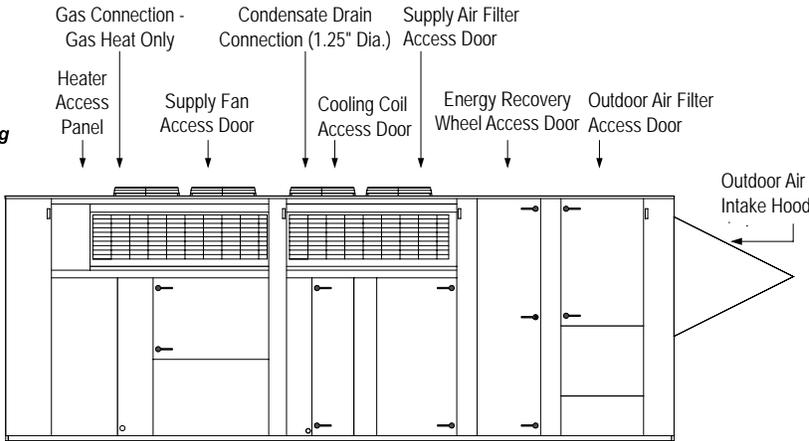
DIMENSIONS

AR-DE35-50A, AR-DE35-60A, AR-DE35-70A Energy Recovery Wheel Rooftop DOAS

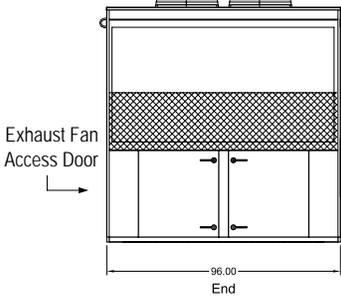
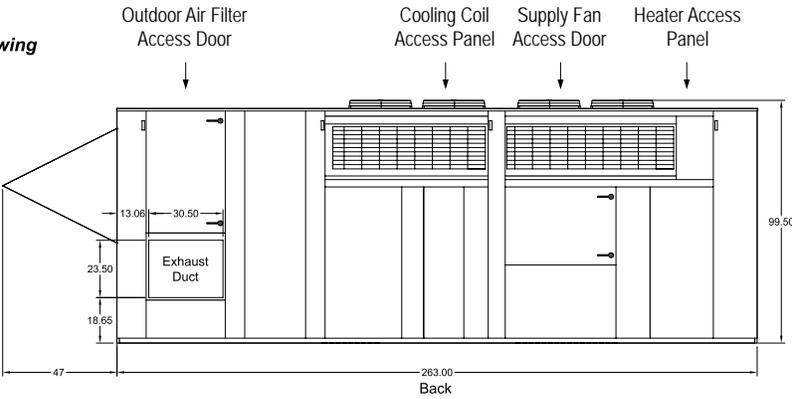
Top Drawing



Front Drawing Side View



Reverse Drawing End View



Product Data

SELECTION PROCESS

Selection Process

LG CAPS software will be available for selecting the proper rooftop DOAS unit. (LG CAPS will be available at www.myLGHVAC.com in Spring 2017, or contact your local LG sales representative.) If LG CAPS software is not yet available and you need help in sizing the Rooftop DOAS unit, please contact your local LG representative. The designer will need to know the following items to properly size rooftop DOAS unit:

- Entering air dry bulb (DB) and wet bulb (WB) temperatures for cooling (°F)
- Entering air DB temperature for heating (°F)
- Airflow rate (CFM)
- Airflow external static pressure (in. wg)
- Direct expansion (DX) coil leaving air temperature (LAT) (°F)
- Unit LAT in cooling and heating modes (°F)

Regional outdoor design temperatures are varied across the United States market, and it is important to input the appropriate outdoor design temperatures in the LG CAPS selection software. Over-sizing or under-sizing the DOAS unit capacity may result in discharge air temperatures that do not meet set-point. By entering both the DB and WB outdoor cooling design temperatures, the compressors and coils can be accurately sized to dehumidify the outdoor air. The DX coil leaving air temperature for dehumidification mode is commonly selected at 55°F to help remove the moisture from the air. The General Data tables on pages 9 to 12 are based on 55°F DX coil LATs, but some regions require different LATs.

The tables on the following pages were generated at 50°F, 55°F, and 60°F LATs, and at the following entering air temperatures (EATs):

- 84°F DB / 70°F WB
- 95°F DB / 75°F WB
- 95°F DB / 78°F WB
- 95°F DB / 80°F WB

Airflow capacities at other temperatures not shown in the tables can be generated using the LG CAPS selection software. These tables were generated for a quick reference to illustrate the effects of various EATs, and various DX coil LATs.

EAT TO LAT PERFORMANCE EXAMPLES

Table 12: DX Coil with LAT Target at 50°F.

Model No.	Max CFM at 84°F DB / 70°F WB EAT	Max CFM at 95°F DB / 75°F WB EAT	Max CFM at 95°F DB / 78°F WB EAT	Max CFM at 95°F DB / 80°F WB EAT
<i>Base Rooftop DOAS</i>				
AR-DR11-05A	1,050	780	680	650
AR-DR11-08A	1,500	1,100	1,040	
AR-DR11-10A	1,880	1,440	1,290	
AR-DR21-10A	2,000	1,510	1,300	
AR-DR21-13A	2,450	1,870	1,680	
AR-DR21-16A	2,900	2,250	2,150	
AR-DR21-18A	3,400	2,600	2,350	
AR-DR21-20A	3,950	3,000	2,580	
AR-DR21-25A	4,600	3,500	3,230	
AR-DR31-25A	4,610	3,510	3,230	
AR-DR31-30A	5,450	4,250	3,870	
AR-DR31-35A	6,070	4,710	4,600	
AR-DR31-40A	7,350	5,600	5,160	
AR-DR35-30A	5,450	4,160	3,870	
AR-DR35-40A	7,090	5,510	5,180	
AR-DR35-50A	9,150	7,080	6,500	
AR-DR35-60A	10,400	10,300	7,800	
AR-DR35-70A	13,000	9,900	9,000	
<i>Energy Recovery Wheel Rooftop DOAS</i>				
AR-DE11-05A	1,480	1,360	1,290	1,240
AR-DE11-08A	2,080	1,870	1,780	1,710
AR-DE11-10A	2,600	2,350	2,200	2,100
AR-DE21-10A	2,900	2,650	2,500	2,400
AR-DE21-13A	3,500	3,200	3,000	2,900
AR-DE21-16A	4,100	3,750	3,550	3,400
AR-DE21-18A	4,700	4,250	3,950	3,800
AR-DE21-20A	5,300	4,750	4,500	4,300
AR-DE21-25A	6,000	5,350	5,050	4,850
AR-DE31-25A	6,300	5,700	5,300	5,100
AR-DE31-30A	7,450	6,600	6,200	5,950
AR-DE31-35A	7,980	7,100	6,650	6,350
AR-DE31-40A	9,500	8,360	7,820	7,460
AR-DE35-30A	7,700	7,100	6,700	6,450
AR-DE35-40A	9,800	8,850	8,350	8,050
AR-DE35-50A	12,600	11,200	9,990	9,850
AR-DE35-60A	14,000	12,400	11,600	11,200
AR-DE35-70A	17,000	15,000	14,000	13,400
	Indicates that the actual discharge air temperature exceeds target discharge temperature.			
	Indicates no selection available at design temperatures.			

Selection Process

EAT TO LAT PERFORMANCE EXAMPLES

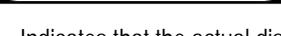
Table 13: DX Coil with LAT Target at 55°F.

Model No.	Max CFM at 84°F DB / 70°F WB EAT	Max CFM at 95°F DB / 75°F WB EAT	Max CFM at 95°F DB / 78°F WB EAT	Max CFM at 95°F DB / 80°F WB EAT
<i>Base Rooftop DOAS</i>				
AR-DR11-05A	1,350	1,000	800	750
AR-DR11-08A	1,950	1,400	1,200	1,050
AR-DR11-10A	2,520	1,800	1,530	1,380
AR-DR21-10A	2,650	2,000	1,600	1,450
AR-DR21-13A	3,300	2,400	2,000	1,800
AR-DR21-16A	3,950	2,900	2,400	2,150
AR-DR21-18A	4,550	3,300	2,750	2,450
AR-DR21-20A	5,200	3,700	3,150	2,850
AR-DR21-25A	6,200	4,200	3,750	3,350
AR-DR31-25A	6,210	4,500	3,760	3,380
AR-DR31-30A	7,400	5,300	4,530	4,050
AR-DR31-35A	8,100	5,600	4,900	4,520
AR-DR31-40A	9,800	7,000	5,950	5,350
AR-DR35-30A	7,400	5,200	4,450	3,980
AR-DR35-40A	9,350	6,700	5,700	5,350
AR-DR35-50A	11,900	8,500	7,200	6,500
AR-DR35-60A	14,090	9,800	8,400	7,920
AR-DR35-70A	16,900	12,000	10,000	9,500
<i>Energy Recovery Wheel Rooftop DOAS</i>				
AR-DE11-05A	2,060	1,900	1,750	1,650
AR-DE11-08A	2,900	2,530	2,350	2,250
AR-DE11-10A	3,600	3,000	2,850	2,700
AR-DE21-10A	4,200	3,600	3,400	3,250
AR-DE21-13A	5,000	4,200	4,100	3,900
AR-DE21-16A	5,800	4,900	4,700	4,450
AR-DE21-18A	6,500	5,500	5,200	4,950
AR-DE21-20A	7,300	6,000	5,800	5,600
AR-DE21-25A	8,750	6,600	6,450	6,150
AR-DE31-25A	8,700	7,500	6,850	6,550
AR-DE31-30A	10,000	8,500	7,900	7,600
AR-DE31-35A	10,000	9,200	8,450	8,000
AR-DE31-40A	10,000	10,000	9,850	9,300
AR-DE35-30A	11,000	9,400	8,900	8,550
AR-DE35-40A	13,600	11,600	10,900	10,400
AR-DE35-50A	16,800	13,500	13,200	12,600
AR-DE35-60A	18,000	16,000	15,000	14,200
AR-DE35-70A	18,000	18,000	17,700	16,600
	Indicates that the actual discharge air temperature exceeds target discharge temperature.			
	Indicates no selection available at design temperatures.			



EAT TO LAT PERFORMANCE EXAMPLES

Table 14: DX Coil with LAT Target at 60°F.

Model No.	Max CFM at 84°F DB / 70°F WB EAT	Max CFM at 95°F DB / 75°F WB EAT	Max CFM at 95°F DB / 78°F WB EAT	Max CFM at 95°F DB / 80°F WB EAT
<i>Base Rooftop DOAS</i>				
AR-DR11-05A	2,000	1,300	1,100	950
AR-DR11-08A	2,700	1,900	1,550	1,350
AR-DR21-10A	3,900	2,550	2,050	1,850
AR-DR21-13A	4,850	3,200	2,550	2,250
AR-DR21-16A	5,750	3,750	3,050	2,700
AR-DR21-18A	6,600	4,300	3,500	3,100
AR-DR21-20A	7,500	4,950	4,050	3,600
AR-DR21-25A	8,900	5,700	4,650	4,050
AR-DR31-25A	9,100	5,900	4,800	4,200
AR-DR31-30A	10,800	7,100	5,800	5,100
AR-DR31-35A	12,000	7,800	6,300	5,550
AR-DR35-40A	13,700	8,900	7,300	6,400
AR-DR35-50A	17,200	11,300	9,300	7,950
AR-DR35-60A	18,000	13,100	10,700	9,200
AR-DR35-70A	18,000	16,500	15,000	11,800
<i>Energy Recovery Wheel Rooftop DOAS</i>				
AR-DE11-05A		2,060	2,060	2,000
AR-DE11-08A		3,500	3,200	3,000
AR-DE11-10A		3,600	3,600	3,550
AR-DE21-10A		4,350	4,200	4,000
AR-DE21-13A		5,260	5,260	5,260
AR-DE21-16A		7,020	6,400	6,000
AR-DE21-18A		7,800	7,150	6,600
AR-DE21-20A		8,000	7,800	7,350
AR-DE21-25A		9,900	9,200	8,000
AR-DE31-25A		9,990	9,250	8,600
AR-DE31-30A		10,000	10,000	9,800
AR-DE35-30A		12,000	12,000	11,800
AR-DE35-40A		15,000	15,000	14,200
AR-DE35-50A		17,500	17,500	16,800
AR-DE35-60A		18,000	18,000	18,000
AR-DE35-70A		18,000	18,000	18,000
	Indicates that the actual discharge air temperature exceeds target discharge temperature.			
	Indicates no selection available at design temperatures.			

Selection Process



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