



FRIEDRICH

Commercial Resolute[™] Line F-Series[™] Packaged Gas Electric Units



RGEHYB360 Series (30 Ton Models)

Cooling Efficiencies up to: 9.8 EER & 13.0 IEER Nominal Sizes: 30 Tons [105.5 kW] Cooling Capacity: 330k Btu/h [96.71 kW] Refrigerant Type: R-454B ASHRAE 90.1 2022 Compliant Models



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RGEH STANDARD FEATURES INCLUDE:

- Factory charged with R-454B refrigerant
- Wired and run tested at the factory
- Powder Paint Finish meets ASTM B117 test requirements. G90 galvanized steel coated on each side for maximum protection.
- Foil faced insulation encapsulated throughout entire unit minimizes airborne fibers in the air stream
- Cooling operation up to 125°F ambient
- Scroll compressors with internal line break overload and high-pressure protection
- One single-stage and one two-stage compressor for 5 total stages of cooling
- MicroChannel condenser coil and Tube and Fin evaporator coil
- Blower with variable frequency drive (VFD) control
- Single-zone and multi-zone variable air volume (VAV) capable
- · High pressure and low pressure/loss of charge protection
- Permanently lubricated gas heat inducer, evaporator and condenser motors
- Internally protected condenser motors with totally enclosed shaft down design

- · Forkable base rails for easy handling and lifting
- Color-coded and labeled wiring
- Single point electrical connections
- Field convertible airflow vertical downflow or horizontal sideflow
- Solid-core liquid line filter drier
- Hinged major access doors with heavy-duty gasketing and 1/4 turn latches
- Slide-out indoor fan assembly for added service convenience
 - Slide-out, internally sloped condensate drain pan with overflow switch, conforms to ASHRAE 62 standards
- Slide-out filter rack with 2-inch filters
- MERV 8 and MERV 13 filters available as a factory-installed option
- · Factory-installed refrigerant leak detection system
- Standard Modbus interface
- Factory-installed Direct Digital Control (DDC) system and sensors, enabling easy connectivity with LonWorks[®] or BACnet[®] BAS systems for remote monitoring and control

Designing for Sustainability with Low GWP



For 2025, the Environmental Protection Agency (EPA) has set a global warming potential (GWP) limit of 700 for refrigerant used in most heating and cooling systems. This new requirement will result in a 78%¹ lower GWP than previous-generation refrigerants—with only minimal changes to system installation. For us, this is another step toward our ongoing sustainability goal of reducing greenhouse gas emissions, while still delivering an exceptional level of energy efficient, dependable comfort

FACTORY INSTALLED OPTIONS:

- Louvered panels
- Hinged access doors
- Low-Ambient Control Kit
- Freeze Stat Kit

- Economizer w/Single Enthalpy (Downflow/Vertical)
- Economizer w/Single Enthalpy (Downflow/Vertical) DDC
- Comfort Alert/Phase monitor
- Disconnect Switch

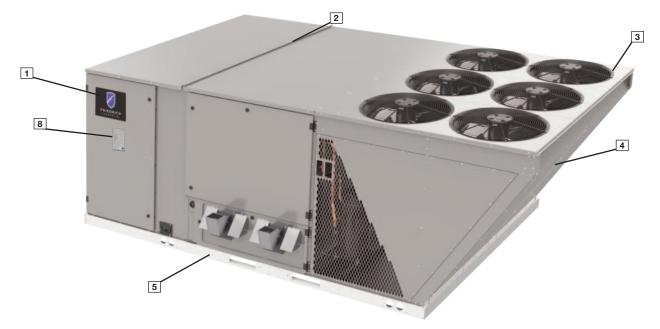
FIELD INSTALLED ACCESSORY EQUIPMENT:

Accessory	Model Number	Factory Installation Available?
Economizers		
DDC Economizer with Single Enthalpy (Downflow) Ruskin Rooftop Systems Economizer with Honeywell Controller	AXRD-01RMDCM3	Yes
DDC Economizer with Single Enthalpy (Downflow) Ruskin Rooftop Systems Economizer with Honeywell Controller w/Smoke Detector	AXRD-01RMDDM3	Yes
DDC Economizer with Single Enthalpy (Horizontal) Ruskin Rooftop Systems Economizer with Honeywell Controller	AXRD-01RMHCM3	No
Non-DDC Economizer with Single Enthalpy (Downflow) Ruskin Rooftop Systems Economizer with Siemens Controller	RXRD-51MHDAM3	Yes
Non-DDC Economizer with Single Enthalpy (Horizontal) Ruskin Rooftop Systems Economizer with Siemens Controller	RXRD-51MHHAM3	No
Economizer Universal DDC Interface Kit	RXRX-DDC02	Yes

Accessory	Model Number	Factory Installation Available?
Comfort Alert (1 per Compressor) (DDC)	RXRX-AZ01	Yes
Communication Card, BACnet	RXRX-AY01	No
Communication Card, LonWorks	RXRX-AY02	No
Concentric Adapter/Transition (30 ton)	RXMC-CL09	No
Concentric Step Down Diffuser (30 ton)	RXRN-AD88	No
Convenience Outlet, Non-Powered	RXRX-AN01	Yes
Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)	RXRX-AV04	No
Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell Non-DDC)	RXRX-BV02	No
Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC)	PD555460	No
Fresh Air Damper ¹ , Manual	AXRF-KFA1	No
Fresh Air Damper, Motorized (DDC)	RXRX-AW05	No
Hail Guard Louvers	AXRX-AAD01L	Yes
Low-Ambient Control Kit (1 Per Compressor)	RXRZ-C02	Yes

Accessory	Model Number	Factory Installation Available?
MERV 8 Filter	RXMF-M08A22520	Yes
MERV 13 Filter	RXMF-M13A22520	Yes
Power Exhaust (208/230V) Kit, Convertible (RRS)	RXRX-BGF05C	No
Power Exhaust (460V) Kit, Convertible (RRS)	RXRX-BGF05D	No
Roofcurb, 14"	RXKG-CBH14	No
Roofcurb Adapter to RXKG-CAF14	RXRX-CJCF14	No
Roofcurb Adapter to RXRK-E56	RXRX-CJCE56	No
Sensor, Carbon Dioxide (Wall Mount)	RXRX-AR02	No
Sensor, Room Humidity	RHC-ZNS4	No
Sensor, Room Temperature and Relative Humidity	RHC-ZNS5	No
Unfused Service Disconnect	RXRX-AP01	Yes

¹Motorized Kit and Manual Fresh Air Damper must be combined for a complete Motorized Outside Air Damper Selection



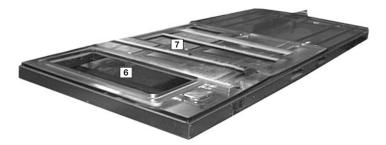
Cabinet and Foundation

Resolute[™] packaged equipment is design from the ground up with the latest features and benefits required to compete in today's market. The clean design stands alone in the industry and is a testament to the quality, reliability, ease of installation and serviceability that goes into each unit. Outwardly, the Friedrich[®] label ([1]) identifies the brand to the customer.

The sheet metal cabinet (2) uses nothing less than 20-gauge material for structural components with an underlying coat of G90. To ensure the leak-proof integrity of these units, the design utilizes a top with a 1/8" drip lip (3), gasket-protected panels and screws. The slanted outdoor coil protects the coil from hail damage (4). Every Friedrich packaged unit uses the toughest finish in the industry, using electro deposition baked-on enamel tested to withstand a rigorous 1000-hour salt spray test, per ASTM B117.

Base Pan and Foundation

Anything built to last must start with the right foundation. In this case, the foundation is a 14-gauge, commercial-grade, full-perimeter base rails ([5]), which integrate fork slots and rigging holes to save set-up time on the job site. The base pan is stamped, which forms a 1-1/8" flange around the supply and return opening and has eliminated the worry of water entering the conditioned space ([6]).



Drain Pan

The drain pan $(\boxed{7})$ is made of plastic that resists the growth of harmful bacteria and drain pan is sloped for the latest IAQ benefits. Furthermore, the drain pan slides out for easy cleaning. The insulation has been placed on the underside of the base pan, removing areas that would allow for potential moisture accumulation, which can facilitate growth of harmful bacteria. All insulation is secured with both adhesive and mechanical fasteners, and all edges are hidden.

Test Standards

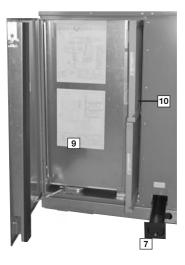
During development, each unit was tested to UL 60335-2-40, ANSI 21.47, AHRI 340/360 and other Friedrich-required reliability tests. Friedrich adheres to stringent ISO 9001:2015 quality procedures, and each unit bears the U.L. and AHRI certification labels located on the unit nameplate (18). Contractors can rest assured that when a Friedrich packaged unit arrives at the job, it is ready to go with a factory charge and quality checks.

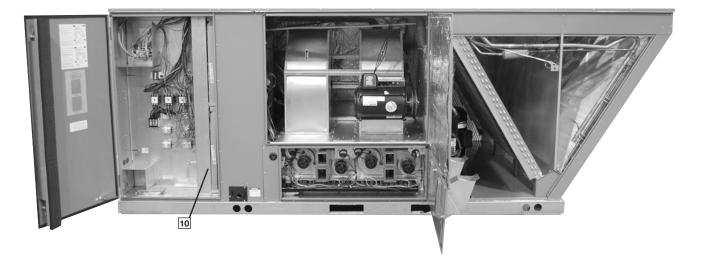
Easy Access

Access all major compartments from the front of the unit, including the filter and electrical compartment, blower compartment,

heating section, and outdoor section. Each panel is permanently embossed with the compartment name (control/ filter access, blower access, and furnace access).

Electrical and filter compartment access is through a large, toolless, hinged-access panel with 1/4 turn latches. On the outside of the panel is the unit nameplate, which contains the model and serial number, electrical data, and other important unit information.





Charging Charts, Wiring Diagrams, & Labels

The unit charging chart is located on the inside of the electrical and filter compartment door. Electrical wiring diagrams are found on the control box cover, which allows contractors to move them to more readable locations. To the right of the control box, the model and serial number can be found. Having this information on the inside will assure model identification for the life of the product. The production line quality test assurance label is also placed in this location ((9)).

Filter Rack

The two-inch throwaway filters (10) are easily removed on a slide-out tracked system for easy replacement.

Blower Assembly

The blower compartment is to the right of the control box and can be accessed by1/4 turn latches. To allow easy maintenance of the blower assembly,

the entire assembly easily slides out by removing four #10 screws from the blower assembly. The adjustable motor pulley (11) can easily be adjusted by loosening the bolts on either side of the motor mount. Removing the bolts allows for easy removal of the blower pulley by pushing the blower assembly up to loosen the belt. Once the belt is removed, the motor sheave can be adjusted to the desired number of turns, ranging from 1 to 6 turns open.

10

Where the demands for the job require high static, Friedrich[®] has high-static drives available that deliver nominal airflow up to 2" of static. By referring to the airflow performance tables listed in the installation instruction, proper static pressure and CFM requirements can be dialed in. The scroll housing (12) and blower scroll provide quiet and efficient airflow. The blower

sheave is secured by an "H" bushing which firmly secures the pulley to the blower shaft for years of trouble-free operation. The "H" bushing allows for easy removal of the blower pulley from the shaft, creating burrs that make blower-pulley removal difficult.



High and Low Pressure Switches & Freeze Stat

The low-pressure switches and high-pressure switches are mounted on the appropriate refrigerant lines in the condenser section. The high-pressure switch will shut off the compressors if pressures exceeding 610 PSIG are detected as may occur if the outdoor fan motor fails. The low-pressure switches shut off the compressors if low pressure is detected due to loss of refrigerant charge. Each factory-installed option is brazed into the appropriate high or low side and wired appropriately. Use of polarized plugs allow for easy field inspection and repair.

Thermostatic Expansion Valve (TXV)

Inside the blower compartment the interlaced evaporator can also be viewed. The evaporator uses fin technology for maximum heat transfer. The TXV (13) metering device assures even distribution of refrigerant throughout the evaporator.



Control Box

Inside the control box (14), each electrical component is clearly identified with a label that matches the component to the wire diagram for ease of trouble shooting. Most of the wiring is numbered on each end of the termination and colorcoded to match the wiring diagram. The integrated furnace control, used to control furnace operation, incorporated a flashing LED troubleshooting device. Flash codes are clearly outlined on the unit wiring diagram. The control transformer has a low



voltage circuit breaker that trips if a low voltage electrical short occurs. There is also a compressor contactor for each compressor.

Convenience Outlet & Service Disconnect

For added convenience in the field, a factory-installed service disconnect switch and convenience outlet (15) are available.

Low and High voltage can enter either from the side or through the base. Low-voltage connections are made through the low-voltage terminal strip. For ease of access, the U.L.-required low voltage barrier can be temporarily removed for low-voltage termination and then reinstalled. The highvoltage connection is terminated at the high-voltage terminal blow. The suggested mounting for the field-installed disconnect is on the exterior side of the electrical control box.



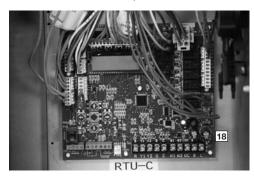
External Gauge Ports

The high (16) and low (17) external gauge ports are located in the outdoor section. With gauge ports mounted externally, an accurate diagnostic of system operation can be performed quickly and without removing exterior panels.



ClearControl

As part of the ClearControl system (18) which allows real time monitoring and communication between rooftop units, the RGEH Packaged AC Unit has a Rooftop Unit Controller (RTU-C) factory mounted and wired in the control panel. The RTU-C is a solid-



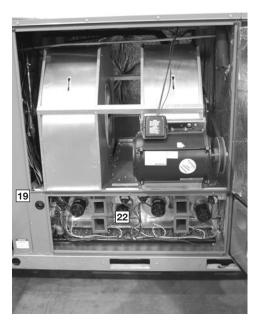
state microprocessor-based control board that provides flexible control and extensive diagnostics for all unit functions. The RTU-C through proportional/integral control algorithms perform specific unit functions that govern unit operation in response to: zone conditions, system temperatures, system pressures, ambient conditions, and electrical inputs. The RTU-C features a 16 x 2 character LCD display and a five-button keypad for local configuration and direct diagnosis of the system. Features include a clogged filter switch (CFS), fan proving switch (FPS), return air temperature sensor (RAT), discharge air temperature sensor (DAT), and outdoor air temperature sensor (OAT). Freeze sensors (FS) are used in place of freezestats to allow measurement of refrigerant suction line temperatures.

The RGEH with the RTU-C is specifically designed to be applied in four distinct applications:

- 1. BACnet Communication The RGEH is compatible with a third party building management system that supports the BACnet Application Specific Controller device profile, with the use of a field installed BACnet Communication Module. The BACnet Communication Module plugs into the unit RTU-C controller and allows communication between ClearControl and the BACnet MSTP or IP network. A zone sensor, a BACnet network zone sensor, a BACnet thermostat or DDC controller may be used to send the zone thermostat or thermostat demands to the RTU-C. The BACnet Communication Module is compatible with MSTP EIA-485 daisy chain networks communicating at 38.4 bps. It is compatible with twisted pair, shielded cables.
- 2. LonWorks Communication The RGEH is compatible with a third party building management system that supports the LonMark Space Comfort Controller (SCC) functional profile or LonMark Discharge Air Controller (DAC) functional profile. This is accomplished with a field installed LonMark communication module. The LonMark Communication Module plugs onto the RTU-C controller and allows communication between ClearControl[™] and a LonWorks network. A zone sensor, a LonTalk network zone sensor, or a LonTalk thermostat or DDC controller may be used to send the zone temperature or thermostat demands to the RTU-C. The LonMark Communication Module utilizes an FTT-10A free topology transceiver communicating at 78.8 kbps. It is compatible with Echelon gualified, twisted pair cable, Belden 8471, or NEMA Level 4 cables. The module can communicate up to 1640 feet with no repeater. The LonWorks limit of 64 nodes per segment applies to this device.
- **3. 24V Thermostat Compatibility** The RGEH is compatible with a programmable 24 volt thermostat. Connections are made via conventional thermostat screw terminals. Extensive unit status and diagnostics are displayed on the LCD screen of the RTU-C.
- 4. Zone Sensor Compatibility The RGEH is compatible with a zone sensor and a mechanical or solid state time clock connected to the RTU-C. Extensive unit status and diagnostics are displayed on the LCD screen of the RTU-C.

Comfort Alert

A factory or field installed Comfort Alert module is available for power phase-monitoring protection and additional compressor diagnostics. The alarms can be displayed on the RTU-C display, through the (BAS) network, or connected to the "L-Terminal" of a thermostat for notification. Wiring throughout the unit is neatly bundled and routed. Where wire harnesses go through the condenser bulkhead or blower deck, a molded wire harness assembly (19) provides an air-tight and water-tight seal, and provides strain relief. Care is also taken to tuck raw edges of insulation behind sheet metal to improve indoor air quality.



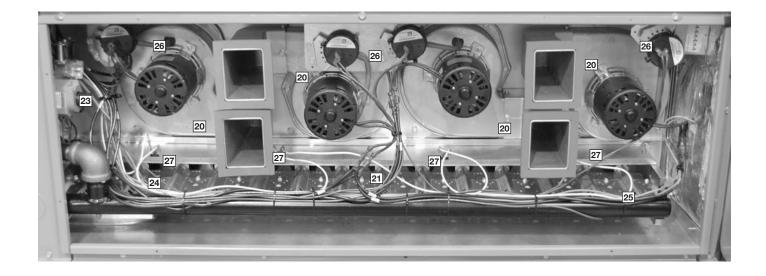
Furnace & Gas Heat Exchanger

The furnace compartment contains the latest furnace technology on the market. The draft inducers (20) draw the flame from the Friedrich® exclusive in-shot burners (21) into the aluminized tubular heat exchanger (22) for clean, efficient gas heat. Stainless steel heat exchangers can be factory installed for those applications that have high fresh-air requirements, or applications in corrosive environments. Each furnace is equipped with a two-stage gas valve (23), which provides two stages of gas heat input. The first stage operates at 50% of the second stage (full fire). 81% steady state efficiency is maintained on both first and second stage by staging the multiple inducers to optimize the combustion airflow and maintain a near stoichiometric burn at each stage.

The direct spark igniter (24) ensures reliable ignition in the most adverse conditions. This is coupled with remote flame sensor (25) to ensure that the flame has carried across the entire length of the burner assembly. Gas supply can be routed from the side or up through the base.

Each furnace has the following safety devices to ensure consistent and reliable operation after ignition:

- Pressures switches (26) to ensure adequate combustion airflow before ignition.
- Rollout switches (27) to ensure no obstruction or cracks in the heat exchanger.
- A limit device that protects the furnace from over-temperature problems.



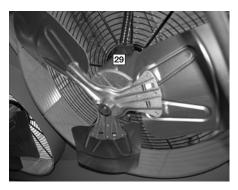
Compressor

The compressor compartment houses the heartbeat of the unit. The scroll compressors (28) are known for their long life and for reliable, guiet, and efficient operation. Each compressor has four rubber grommets (27) on the bottom for sound and vibration dampening. The suction and discharge lines are designed with shock loops to absorb the strain and stress that the starting torque, steady state operation, and shut down cycle impose on the refrigerant tubing. Each compressor and circuit are independent for built-in redundancy, and each circuit is clearly marked throughout the system. Each unit has 5 stages of cooling for precise supply air control.



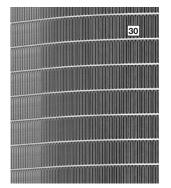
Condenser Fans

The condenser fan motors (29) can easily be accessed and maintained through the top of the unit. A down-mount fan provides corrosion protection and easy removal. The polarized plug connection allows the motor to be changed quickly and eliminated the need to snake wires through the unit.



MicroChannel Condenser Technology

The outdoor coil uses the latest MicroChannel (30) technology for the most effective method of heat transfer. The outdoor coil is protected by optional louvered panels, which allow unobstructed airflow while protecting both the environment and vandalism.



Economizers and Dampers

Each unit is designed for both downflow or horizontal applications for job configuration flexibility. The return air compartment can also contain an economizer. Two models exist: one for downflow applications, and one for horizontal applications. Each unit is pre-wired for the economizer to allow quick plug-in installation. The downflow economizer is also available as a factoryinstalled option. Power Exhaust is easily field-installed.

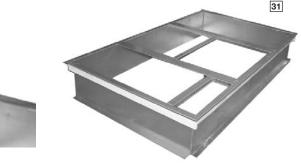
The economizer, which provides free cooling when outdoor conditions are suitable and also provides fresh air to meet local requirements, come standard with single enthalpy controls. The controls can be upgraded to dual enthalpy easily in the field. The direct drive actuator combined with gear drive dampers has eliminated the need for linkage adjustment in the field. The economizer control has a minimum position set-point, an outdoor-air set-point, a mix-air set-point, and a CO₂ set-point.

Barometric relief is standard on all economizers. The power exhaust is housed in the barometric relief opening and is easily slipped in with a plug-in assembly.

Roofcurb

32

The Friedrich[®] roofcurb ((31)) is made for toolless assembly at the jobsite by inserting a pin into a hinge in each corner of the adjacent curb sides ((32)), which makes the assembly process quick and easy.



Variable Frequency Drive

The supply fan Variable Frequency Drive (VFD) (33) optimizes energy usage year round by providing a lower speed for first stage cooling operation, improving IEER's over the conventional constant fan system. Operating in the constant fan mode at the reduced speed can use as little as 1/5 of the energy of a conventional constant fan system. Also, by operating at a lower speed on first stage cooling, up to 51% more moisture is removed, improving comfort during low load



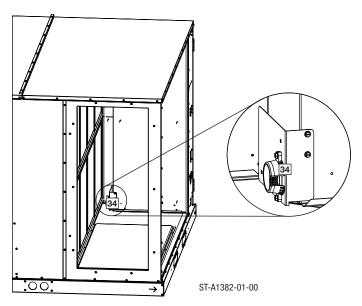
operation. The VFD supply fan meets California Title 24 and ASHRAE 90.1 requirements for multi blower speed control. VFD also ramps up to the desired speed, reducing stress on the supply fan components and noise from a sudden inrush of air. Because the airflow is cut in half during first stage cooling and constant fan operation, noise is much less during these modes of operation.

Variable Air Volume (VAV)

Single and Multi-Zone Variable Air Volume (VAV) allows for enhanced control of airflow and temperature in multiple building zones. Friedrich® VAV technology is compatible with industry standard zoning controls and zone systems. The controls vary the airflow and the cooling capacity to meet the demands of multiple zones. This increases the comfort and air quality of the environment.

Refrigerant Leak Detection

In the event of a detected refrigerant leak, the refrigerant leak detection sensor(s) (34) will trigger the mitigation procedure that shuts off the compressor(s) and turns on the indoor blower motor.



Model Number Identification RGEHYB360 Series

**** GE H Y B 360 G 40 R Α C В C Α 4 5 6 10 12 13 14 1 23 789 11 15 17 18 19 20 21 16

1—Brand

 $R = Friedrich^{\textcircled{R}}$

2, 3–Unit Type

GE = Packaged Gas/Electric

4—Cabinet Type

H = Large Commercial

5-Refrigerant

Y = R-454B

6—Efficiency Level B = Standard Efficiency

7,8,9 – Capacity 360 = 30 Ton

10-Major Series A = 1st Design

A = 1st Design

11-Voltage

C = 3 PH/208-230 V/60 Hz D = 3 PH/460 V/60 Hz Y = 3 PH/575 V/60 Hz

12–Drive

 $F = Belt Drive - VFD Low \\ G = Belt Drive - VFD Medium \\ H = Belt Drive - VFD High$

13, 14—Heat Capacity 30 = 300,000 Btu/h

40 = 400,000 Btu/h

15—Heat Configuration

2 = 2-Stage B = 2-Stage Stainless

16-Control

C = ClearControl & Phase Monitor D = ClearControl & Comfort Alert

17-Minor series

A = 1st design

18, 19, 20, 21 – Option Code

See next page

FACTORY INSTALLED OPTION CODES FOR RGEHYB360

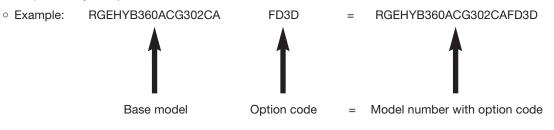
	18	8			19				20			21
LV = Lou	uver Prote	ection		DC = Dis	sconnect ¹			EC = Do	ownflow Ec	onomizer	M8 = ME	ERV 8 Filter
HA = Hir	nged Acce	ess (Stand	dard)	Conveni	on-Powered ence Outlet w Ambient &	t	Stat	RS = Re	eturn Smoke	e Detector	M13 = N	IERV 13 Filter
CC = Cc	ondenser	Coil Coati	ng									
				OPTION	CODE CH	ARACTE	R HIGH	IGHTED	BELOW			
С	HA			Α	Standard			0	Standard		А	Standard
D	LV	HA		В	LF			1	EC		D	M8
F	LV	HA	CC	С	NP			3	EC	RS	G	M13
				D	LF	NP						
				E	DC							
				F	LF	DC						
				н	NP	DC						
				к	LF	NP	DC					

¹Only available with D and Y voltage.

Instructions for Factory Installed Option(s) Selection

Note: Four characters following the model number will be utilized to designate a factory-installed option or combination of options. If no factory option(s) is required, "CA0A" follows the model number.

- Step 1: In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 18. For example, the option code character "F" has Louver Protection, Hinged Access, and Condenser Coil Coating.
- Step 2: In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 19. For example, the option code character "D" has Low Ambient / Freeze Stat and Non-powered convenience outlet.
- Step 3: In the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 20. For example, the option code character "3" has Economizer and Return Smoke.
- Step 4: n the table above, based on the desired features, choose option code character from highlighted options on the left side under the number 21. For example, the option code character "D" has MERV 8 filters.
- The resulting option code from examples above is: "FD3D"
- Step 5: Add your option code selection to the end of model number



To select an RGEH Cooling and Heating unit to meet a job requirement, follow this procedure, with example, using data supplied in this specification sheet.

1. DETERMINE COOLING AND HEATING REQUIREMENTS AND SPECIFIC OPERATING CONDITIONS FROM PLANS AND SPECS.

Example:	
Voltage-	460V – 3 Phase – 60 Hz
Total Cooling Capacity—	340,000 Btu/h [99.6 kW]
Sensible Cooling Capacity-	230,000 Btu/h [67.4 kW]
Heating Capacity—	136,486 Btu/h [40 kW]
*Condenser Entering Air—	95°F [35.0°C] DB
*Evaporator Mixed Air Entering-	– 67°F [19.4°C] WB
	78°F [25.6°C] DB
*Indoor Air Flow—	11000 CFM [5191 L/s]
External Static Pressure –	1.2 in. WG [0.30 kPa]

2. SELECT UNIT TO MEET COOLING REQUIREMENTS.

Since total cooling is within range of a nominal 30 ton unit, use the cooling performance table at 95°F DB condenser inlet air. Interpolate between 9400 CFM [4436 L/s] and 13200 CFM [6230 L/s] to determine total and sensible capacity and Depression Ratio for inlet air at 11000 CFM [5191 L/s] indoor airflow (table basis):

Interpolation Formula:

$$kBtu/h_1 + \left[(CFM - CFM_1) \times \begin{pmatrix} kBtu/h_2 - kBtu/h_1 \\ CFM_2 - CFM_1 \end{pmatrix} \right] = kBtu/h$$

Total Cooling Capacity = 350,000 Btu/h [102.6 kW] Sensible Cooling Capacity = 259,600 Btu/h [76.1 kW] DR = 0.105

When the entering dry bulb temperature (dbE) is not 80°F [26.7°C], the sensible capacity needs to be adjusted. Note: total capacity is unaffected

Sensible Capacity Depression Formula:

Capsensible + [1.10 x CFM x (1 - DR) x (dbE - 80)]

 $\begin{array}{l} 259,600 + [1.10 \ x \ 11,000 \\ v(1-0.105) \ x \ (78-80)] \\ \text{Sensible Cooling Capacity} = 237,941 \ Btu/h \end{array}$

3. CORRECT CAPACITIES OF STEP 2 FOR ACTUAL AIR FLOW.

Select correction factors from the "Airflow Correction Factors" table at the design airflow, 11000 CFM [5191 L/s]. Multiply the gross and sensible capacities determined in Step 2 with these correction factors to obtain the corrected gross capacities. Note: These may have to be interpolated to obtain.

Total Capacity Correction Factor at 11000 CFM [5191 L/s] = 1.03

Sensible Capacity Correction Factor at 11000 CFM [5191 L/s] = 1.13

Corrected Total Capacity = 350,000 x 1.03 = 360,500 Btu/h [105.7 kW]

Corrected Sensible Capacity = 237,941 x 1.13 = 268,873 Btu/h [105.7 kW]

Note: These corrected capacities are Gross Capacities, not yet corrected for blower motor heat.

4. DETERMINE BLOWER SPEED AND BHP TO MEET SYSTEM DESIGN.

Total ESP (external static pressure) per the spec of 1.2 in WG [.030 kPa] includes the system duct and grilles. Add from the table "Component Air Resistance", 0.19 in. WG [0.05 kPa] for wet coil and 0.35 in. WG [0.09 kPa] for downflow to get an ESP of 1.74 in. WG [0.43 kPa]. Using the "Airflow Performance Table", at the specified 11,000 CFM and 1.74 in. WG [0.43 kPa] ESP, determine blower BHP.

RPM = 1189 BHP = 12.98 DRIVE = H

5. CALCULATE INDOOR BLOWER Btu/h HEAT EFFECT FROM MOTOR BHP IN STEP 4.

Assuming an average of 85% motor efficiency, determine the amount of heat generated by the blower motor at the specified CFM and ESP by dividing the BHP by the motor efficiency and solving for the difference. Convert this value from BTU to Btu/h, multiplying by 2542.8 Btu/h/BHP

RHP = 12.98BHP = 12.98 AVG MOTOR EFFICIENCY = 85%

INDOOR BLOWER MOTOR HEAT =

$$\left[\left(\frac{\mathsf{BHP}}{0.85} - \mathsf{BHP}\right)\right] \times 2542.8$$

= [(12.98/0.85)-12.98] x 2542.8 = 5825 Btu/h [1.71 kW]

6. CALCULATE THE NET COOLING CAPACITIES

Net cooling capacities can be calculated by subtracting the motor heat from the gross cooling capacities.

Net Total Capacity = Gross Total Capacity – Indoor Blower Motor Heat

= 360,500 - 5,825 = 354,675 Btu/h [103.9 kW]

Net Sensible Capacity = Gross Sensible Capacity – Indoor Blower Motor Heat

= 2268,873 - 5,825 = 263,048 Btu/h [77.1 kW]

7. SELECT UNIT HEATING CAPACITY

For Gas Heating, choose the gas heat capacity that closest matches the specified heat capacity requirements.

8. CHOOSE MODEL RGEHYB360ADH

GENERAL DATA-RGEHYB360 MODELS-30 TON [105.5 kW]

Model RGEHYB Series	360
Cooling Performance ^A	
Gross Cooling Capacity Btu/h [kW]	348,000 [101.99]
EER	9.8
IEER [®]	13.0
Nominal CFM/AHRI Rated CFM [L/s]	11,000/9,350 [5191/4413]
AHRI Net Cooling Capacity Btu/h [kW]	330,000 [96.71]
Net Sensible Capacity Btu/h [kW]	231,000 [67.70]
Net Latent Capacity Btu/h [kW]	99,000 [29.01]
Net System Power kW	33.67
Compressor	
No./Type	2/Scroll
No. Stages	5
Outdoor Sound Rating (dB) ^C	91
Outdoor Coil—Fin Type	Louvered
Tube Type	MicroChannel
MicroChannel Depth in. [mm]	1 [25.4]
Face Area sq. ft. [sq. m]	52.4 [4.87]
Rows/FPI [FPcm]	2 / 23 [9]
Indoor Coil—Fin Type	Louvered
Tube Type	Rifled
Tube Size in. [mm]	0.375 [9.5]
Face Area sq. ft. [sq. m]	26.7 [2.48]
Rows/FPI [FPcm]	4 / 15 [7]
Refrigerant Control	TX Valves
Drain Connection No./Size in. [mm]	1/1 [25.4]
Outdoor Fan—Type	Propeller
No. Used/Diameter in. [mm]	6/24 [609.6]
	Direct/1
Drive Type/No. Speeds	19,800 [9344]
CFM [L/s]	6 at 3/4 HP
No. Motors/HP	1100 / 1100 / 1130
Motor RPM (208/230V / 460V / 575V)	
Indoor Fan—Type	FC Centrifugal
No. Used/Diameter in. [mm]	2/18x9 [457x229]
Drive Type	Belt (Adjustable)
No. Speeds	Multiple
No. Motors	1
Motor RPM (F-Drive / G-Drive / H-Drive)	1760 / 1760 / 3535
Motor Frame Size (F-Drive / G-Drive / H-Drive)	213T / 215T / 215T
Filter—Type	Disposable
Furnished	Yes
(NO.) Size Recommended in. [mm x mm x mm]	(8)2x25x20 [51x635x508]
Refrigerant Charge Oz. (Sys. 1/Sys. 2) [g]	230.4 [6532]/223.2 [6328]
Weights	
Net Weight Ibs. [kg]	2541 [1153]
Ship Weight Ibs. [kg]	2668 [1210]
NOTE: Please look at the rating plates pasted on the side of the unit to understand the model number of your unit.	[] Designates Metric Conversio

NOTES:

- A. Cooling Performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. AHRI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal CFM. Units are certified in accordance with the Unitary Air Conditioner Equipment certification program, which is based on AHRI Standard 340/360.
- B. EER and Integrated Energy Efficiency Ratio (IEER) are rated at AHRI conditions in accordance with AHRI Standard 340/360.
- C. Outdoor Sound Rating shown is tested in accordance with AHRI Standard 270

COOLING PERFORMANCE DATA-RGEHYB360

				El	NTERING INDOO	R AIR @ 80°F [/	26.7°C] dbE ①				
		wbE		71°F [21.7°C]			67°F [19.4°C]			63°F [17.2°C]	
	C	FM [L/s]	13200 [6230]	9350 [4413]	8800 [4153]	13200 [6230]	9350 [4413]	8800 [4153]	13200 [6230]	9350 [4413]	8800 [4153]
		DR ①	.05	.09	.12	.05	.09	.12	.05	.09	.12
	75 [23.9]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	433.9 [127.2] 253.2 [74.2] 29.8	403.6 [118.3] 212.4 [62.3] 28.8	399.3 [117] 206.5 [60.5] 28.6	407.6 [119.5] 300.1 [88.0] 29.6	379.2 [111.1] 251.7 [73.8] 28.6	375.1 [109.9] 244.8 [71.7] 28.4	383.4 [112.4] 343.6 [100.7] 29.5	356.7 [104.5] 288.2 [84.5] 28.5	352.9 [103.4] 280.3 [82.2] 28.3
0	80 [26.7]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	429.5 [125.9] 250.8 [73.5] 31.2	399.5 [117.1] 210.4 [61.7] 30.1	395.3 [115.9] 204.6 [60] 30.0	403.2 [118.2] 297.7 [87.3] 31.0	375.1 [109.9] 249.7 [73.2] 29.9	371.1 [108.8] 242.8 [71.2] 29.8	379 [111.1] 341.3 [100] 30.9	352.6 [103.3] 286.2 [83.9] 29.9	348.8 [102.2] 278.4 [81.6] 29.7
U T D	85 [29.4]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	423.6 [124.2] 247.7 [72.6] 32.7	394.1 [115.5] 207.8 [60.9] 31.5	389.9 [114.3] 202.1 [59.2] 31.4	397.4 [116.5] 294.6 [86.3] 32.4	369.7 [108.4] 247.1 [72.4] 31.3	365.7 [107.2] 240.3 [70.4] 31.1	373.2 [109.4] 338.2 [99.1] 32.4	347.2 [101.8] 283.7 [83.1] 31.2	343.5 [100.7] 275.9 [80.9] 31.1
O O R D	90 [32.2]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	416.4 [122.0] 243.9 [71.5] 34.1	387.4 [113.5] 204.6 [60.0] 32.9	383.3 [112.3] 199 [58.3] 32.7	390.1 [114.3] 290.8 [85.2] 33.9	363 [106.4] 244 [71.5] 32.7	359.1 [105.2] 237.3 [69.5] 32.5	366 [107.3] 334.4 [98] 33.8	340.5 [99.8] 280.5 [82.2] 32.6	336.8 [98.7] 272.8 [80] 32.4
R Y B	95 [35]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	407.8 [119.5] 239.4 [70.2] 35.5	379.4 [111.2] 200.8 [58.9] 34.3	375.3 [110] 195.3 [57.2] 34.1	381.5 [111.8] 286.3 [83.9] 35.3	354.9 [104] 240.2 [70.4] 34.1	351.1 [102.9] 233.6 [68.5] 33.9	357.3 [104.7] 329.9 [96.7] 35.2	332.5 [97.5] 276.7 [81.1] 34.0	328.9 [96.4] 269.1 [78.9] 33.8
U L B T	100 [37.8]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	397.8 [116.6] 234.2 [68.6] 36.9	370 [108.4] 196.5 [57.6] 35.6	366.1 [107.3] 191.1 [56] 35.4	371.5 [108.9] 281.1 [82.4] 36.7	345.6 [101.3] 235.8 [69.1] 35.4	341.9 [100.2] 229.4 [67.2] 35.2	347.3 [101.8] 324.7 [95.2] 36.6	323.1 [94.7] 272.4 [79.8] 35.3	319.7 [93.7] 264.9 [77.6] 35.2
E M P	105 [40.6]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	386.3 [113.2] 228.3 [66.9] 38.3	359.4 [105.3] 191.5 [56.1] 37.0	355.6 [104.2] 186.3 [54.6] 36.8	360 [105.5] 275.3 [80.7] 38.1	335 [98.2] 230.9 [67.7] 36.8	331.4 [97.1] 224.5 [65.8] 36.6	335.9 [98.4] 318.8 [93.4] 38.1	312.5 [91.6] 267.4 [78.4] 36.7	309.1 [90.6] 260.1 [76.2] 36.5
E R A T U	110 [43.3]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	373.5 [109.5] 221.7 [65.0] 39.8	347.5 [101.8] 186.0 [54.5] 38.4	343.7 [100.7] 180.9 [53] 38.2	347.2 [101.8] 268.6 [78.7] 39.6	323 [94.7] 225.3 [66] 38.2	319.6 [93.7] 219.2 [64.2] 38	323 [94.7] 312.2 [91.5] 39.5	300.5 [88.1] 261.9 [76.8] 38.1	297.3 [87.1] 254.7 [74.6] 37.9
R E °F [°C]	115 [46.1]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	359.2 [105.3] 214.4 [62.8] 41.2	334.2 [97.9] 179.9 [52.7] 39.7	330.6 [96.9] 174.9 [51.3] 39.5	333 [97.6] 261.3 [76.6] 41.0	309.8 [90.8] 219.2 [64.2] 39.5	306.4 [89.8] 213.2 [62.5] 39.3	308.8 [90.5] 304.9 [89.4] 40.9	287.3 [84.2] 255.7 [74.9] 39.5	284.2 [83.3] 248.7 [72.9] 39.3
	120 [48.9]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	343.6 [100.7] 206.4 [60.5] 42.6	319.7 [93.7] 173.1 [50.7] 41.1	316.2 [92.7] 168.4 [49.4] 40.9	317.3 [93.0] 253.3 [74.2] 42.4	295.2 [86.5] 212.5 [62.3] 40.9	292.0 [85.6] 206.7 [60.6] 40.7	293.1 [85.9] 293.1 [85.9] 42.3	272.7 [79.9] 249 [73.0] 40.8	269.8 [79.1] 242.2 [71.0] 40.6
	125 [51.7]	Total kBtu/h [kW] Sens kBtu/h [kW] Power	326.5 [95.7] 197.7 [57.9] 44	303.8 [89.0] 165.8 [48.6] 42.5	300.5 [88.1] 161.3 [47.3] 42.3	300.2 [88.0] 244.6 [71.7] 43.8	279.3 [81.9] 205.2 [60.1] 42.3	276.3 [81.0] 199.5 [58.5] 42.1	276.1 [80.9] 276.1 [80.9] 43.7	256.9 [75.3] 241.7 [70.8] 42.2	254.1 [74.5] 235.1 [68.9] 42.0
DR —	-Depres	sion ratio	Total —Total	capacity x 1000) Btu/h	NOTES: ①	When the enterin	ng air dry bulb is	other than 80°E	[27°C] adjust th	ne sensihle

DR —Depression ratio dbE —Entering air dry bulb wbE—Entering air wet bulb Total —Total capacity x 1000 Btu/h Sens —Sensible capacity x 1000 Btu/h

Power —kW input

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

HEATING PERFORMANCE DATA

Heating Performance (Gas)	RGEHYB360A**30	RGEHYB360A**40
Heating Input Btu/h [KW] (1st Stage / 2nd Stage)	150,000 / 300,000 [43.95 / 87.9]	200,000 / 400,000 [58.6 / 117.2]
Heating Output Btu/h [KW] (1st Stage / 2nd Stage)	121,500 / 243,000 [35.6 / 71.2]	162,000 / 324,000 [47.47 / 94.93]
Temperature Rise Range °F [°C] (1st Stage / 2nd Stage)	15-45 [8.3-25] / 15-45 [8.3-25]	25-55 [13.9-30.6] / 25-55 [13.9-30.6]
Number of Burners	12	14
Number of Stages	2	2
Main Limit Temperature °F	135	150
Rollout Limit Temperature °F	350	350
Max Outlet Air Temperature [°C]	180	180
Steady State Efficiency (%)	81	81
Gas Connection Pipe Size in. [mm]	1.00 [25.4]	1.00 [25.4]

AIRFLOW PERFORMANCE – 30 TON [105.4kW] – 60 Hz – DOWNFLOW (WITH HEAT EXCHANGER)

1.9 [.47] 2.0 [.50]		8701 1169 8	8701 1169 9057 1180	8701 1169 9057 1180 9440 1191	8701 1169 9057 1180 9440 1191 9849 1204	8701 1169 9057 1180 9440 1191 9849 1204 10285 1216	8701 1169 9057 1180 9440 1191 9849 1204 110285 1216 107285 1216	8701 1169 9057 1180 9440 1191 9849 1204 10285 1216 10747 1230 11236 1244	8701 1169 9057 1180 9440 1191 9849 1204 10285 1216 10285 1216 10747 1230 11736 1244 11736 1244 11736 1244 11736 1244 1175 1258	8701 1169 9057 1180 9440 1191 9440 1191 9849 1204 10268 1204 10747 1230 11752 1244 11752 1244 11752 1245 11752 1258 11752 1258 12294	8701 1169 9057 1180 9440 1191 9849 1204 9849 1204 910747 1230 10747 1230 11752 1258 11752 1258 11294 12294 11254	8701 1169 9057 1180 9440 1191 9849 1204 910747 1204 10285 1216 10747 1230 11752 1258 11752 1258 11294 1224 11295 12284 11296 1244	8701 1169 9057 1180 9440 1191 9849 1204 910747 1204 10747 1230 11752 1258 11752 1258 11752 1258 11236 1244 11236 1244 11239 12244	8701 1169 9057 1180 9440 1191 9849 1204 9849 1204 910747 1230 10747 1230 11752 1258 11752 1258 11236 1244 11256 12284	8701 1169 9057 1180 9440 1191 9849 1204 910747 1230 10747 1230 11752 1258 11752 1258 11752 1258 11236 1244 11256 1258 12294	8701 1169 9057 1180 9440 1191 9849 1204 917 1203 91747 1230 10747 1230 11752 1258 11752 1258 11752 1258 12294	8701 1169 9657 1180 9440 1191 9849 1204 9849 1204 10285 1216 10747 1230 11752 1258 11752 1258 11752 1258 12294 <	8701 1169 957 1180 9440 1191 9849 1204 91747 1230 10747 1230 11752 1258 11752 1258 11752 1264 11752 1264 11752 1268 12294 <tr tr=""> </tr>	8701 1169 957 1180 9440 1191 9849 1204 91747 1230 10747 1230 11752 1258 11752 1264 11752 1264 11752 1264 11752 1264 1204 1204 1204 1204 1204 1204 1204 1204 1204 1204 11752 11752 1204 1204 1204 1204 1204 1204 1204 1204 1204 1204 1204 <	8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1230 11752 1258 11752 1264 11752 1264 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 11752 1268 1209 11 1209 11 1209 11 1209 11 1209 11 1209 11 11752 1268 11753 1268 11754 1268 11754 11 <td< th=""><th>8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1230 11752 1258 11752 1258 11752 1264 11752 1258 11266 1-44 112294 </th><th>8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1236 11752 1258 11752 1258 11752 1264 11752 1258 11266 1-44 11266 1-44 1127 1-12 12294 <</th><th>8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1230 11752 1258 11752 1264 11752 1264 11752 1264 11266 1244 11266 1264 1209 1264 1209 1264 1209 126 1209 126 1209 126 1209 126 1209 126 11752 1268 11752 1278 11752 1268 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209</th></td<>	8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1230 11752 1258 11752 1258 11752 1264 11752 1258 11266 1-44 112294	8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1236 11752 1258 11752 1258 11752 1264 11752 1258 11266 1-44 11266 1-44 1127 1-12 12294 <	8701 1169 957 1180 9440 1191 9849 1204 910747 1230 10747 1230 11752 1258 11752 1264 11752 1264 11752 1264 11266 1244 11266 1264 1209 1264 1209 1264 1209 126 1209 126 1209 126 1209 126 1209 126 11752 1268 11752 1278 11752 1268 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209 126 1209
[.45]	>	RPM W 1138 8464	RPM W 1138 8464 1147 8792	RPM W I 1138 8464 1138 8464 1147 8792 1158 9146	RPM W I 1138 8464 1147 8792 1147 8792 1158 9146 1158 9146 1169 9527	RPM W I 1138 8464 1138 8464 1147 8792 1147 8792 1158 9146 1169 9527 1180 9935 1180 9335	RPM W I 1138 8464 1138 8464 1147 8792 1158 9146 1159 9527 1180 9335 1192 19369 1132 10369	RPM W I 1138 8464 1138 8464 1147 8792 1158 9146 1158 9146 9527 1169 9527 1192 9355 1132 10369 1192 10369 1205 10830 1205 10830 12830 12830	RPM W 1138 8464 11158 8146 11158 9146 11169 9527 11180 9535 11192 10369 11192 10369 11192 10369 11192 10369 11192 10369 11192 10369 11205 103830 12121 11318	RPM W 1138 8464 1117 8792 1117 8792 1118 9146 1118 935 11180 955 11180 955 11180 955 11180 955 11180 955 11180 955 11180 955 11180 955 11180 10369 11205 10830 1221 11318 1222 11322	RPM W 1138 8464 1117 8792 1117 8792 1117 8792 1118 9146 1118 9145 1118 935 1118 955 1118 955 1118 955 1118 955 1118 955 1118 10369 1112 10369 1122 10380 1222 11382 1222 11382 1232 1132 1232 11335	RPM W 1138 8464 1138 8464 1147 8792 1158 9146 1159 9935 1189 9363 1192 10389 1202 10389 1212 10389 1218 11318 1218 11318 1222 11382 1246 12373 1246 12373 12161 12940	RPM W 1138 8464 1138 8464 1147 8792 1158 9146 1169 9527 1180 9935 1192 10369 1205 10369 1212 10369 1212 1132 1222 11332 1232 11332 1246 12373 1251 12940 1261 12940	RPM W 1138 8464 11138 8464 11147 8792 11158 9146 11169 9527 11180 9935 11181 10369 11205 10369 12026 10389 12128 11382 1222 11382 1223 11382 12246 12373 12251 12373 12261 12392 12261 12373 12261 12373 12261 12373	RPM W 1138 8464 1113 8192 1114 8192 1115 9146 1116 9527 1119 09395 11205 10389 1205 10389 1205 1132 1205 1133 1205 1133 1205 1133 1205 1133 1205 11332 1205 11332 1205 11332 1205 11332 1205 11332 1205 12373 1205 12373 1206 - - - - -	RPM W 1138 8464 11138 8464 11147 8792 11169 9955 11180 9935 11180 10369 11205 10389 1202 1138 1202 1138 1203 1138 1204 12373 1205 11382 1204 12373 1205 11382 1204 12373 1205 11382 1206 12373 1207 12373 1206 12373 1207 1246 1207 1247 1208 12373 1209 1247 1201 1247 1201 1247	RPM W 1138 8464 1113 8192 1115 9146 1116 9527 1118 9146 1118 1192 11205 10369 1205 10389 1205 1138 1205 1138 1205 11383 1205 11383 1205 11383 1205 11383 1205 11383 1205 11383 1205 11383 1205 11383 1205 11383 1207 11383 12061 12373 12061 12373 12061 12373 12061 1240 1207 1261 1208 1261 1209 1273 1201 1261	RPM W 1138 8464 1138 8464 1147 8792 1169 9527 1189 9395 1192 10395 1205 10380 1218 1138 1205 1138 1216 12373 1221 11382 1246 12373 1261 12373 1261 12940 <tr< td=""><td>RPM W 1138 8464 11138 8464 11147 8792 11169 9527 11180 9955 11180 9955 11180 9956 11180 9955 11180 9955 11205 10369 12120 10369 12121 11218 12222 11382 12232 11382 12246 12373 12273 11482 1221 12491 1221 12373 1221 12373 1221 1240 1221 1240 1221 1241 1221 1241 1221 1241 1221 1241 1221 1241 1221 1241 1221 1241 1221 1241 1221 1241 1221 1241 <tr< td=""><td>RPM W 1138 8464 1113 8192 1115 8192 1116 9527 11180 9935 11180 9363 11205 10389 1205 1138 1205 1138 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37] 1.6 [.40]	RPM	W RPM W 7793 1109 8066	RPM 1109 1117	RPM 1109 1117 1126	RPM 1109 1117 1126 1136	RPM 1109 1117 1126 1136 1136	RPM 1109 1117 11126 1136 1136 1136 1157	RPM 1109 1117 1126 1126 1136 1146 1157 1168	RPM 1109 1117 1115 1126 1136 1146 1157 1168 1168 1180	RPM 11109 11126 11126 11136 1146 1146 1157 1157 1168 1180	RPM 1117 1117 11126 11136 11146 11157 11180 11180 11180 11180	RPM 1109 1117 1126 1126 1157 1157 1158 1168 1168 1180 1180 1193 1226	RPM 1117 1117 1126 1126 1146 1157 1157 1168 1168 1180 1180 1180 1183 1234	RPM 1109 1117 11176 11166 11167 1168 1168 1168 1	RPM 1109 1117 11176 11156 11157 11157 11168 11168 11180 11193 11933 11933 11933 11226 12344 12265 1265	RPM 1110 1117 1116 1115 1116 11180 11180 11181 11180 11181 11251 11261 11220 1220 1224 1249 1249 1249	RPM 1117 1117 1116 1116 1116 1116 1116 111	RPM 1117 1117 11126 11157 11168 11157 11168 11180 11180 11180 11180 11206 11206 11206 11266	RPM 1117 1117 1117 1118 11186 11180 11180 11180 11285 11289 1234 1234 1234 1234 1238 1238 1238 1238 1238 1238 1238 1238	RPM 1117 1117 1118 11186 11186 11188 11180 11180 11285 1234 1234 1234 1234 1234 1234 1234 1234	RPM 11109 11116 11126 11136 11136 11146 11180 11180 11180 11200 11205 11201 112001 11201 1	RPM 11109 11116 11126 11136 11136 11146 11146 11146 11146 11180 11200 11200 11201 11201 11201 11201 11201 11201 11201 11201 11201 11201 11201 1120 1100 1000 1000 1000 1000 1000 1000000	RPM 11109 1117 11126 11156 11156 11156 11158 11158 11158 11158 111280 112855 112855 112855 112855 112855 112855 112855 1128555 1128555 11285555 11285555555555
[.35] 1.5 [.3	W RPM	W RPM 7416 1073	W RPM 7416 1073 7807 1103	W RPM 7416 1073 7807 1103 8209 1112	W RPM 7416 1073 7807 1103 8209 1112 8496 1120	W RPM 7416 1073 7807 1103 8209 1112 8496 1120 8496 1120 8791 1130	W RPM 7416 1073 7807 1103 8209 1112 8496 1120 8791 1130 8791 1130 8791 1130	W RPM 7416 1073 7807 1103 8209 1112 8496 1120 8791 1130 8791 1130 8791 1140 8791 1140 8791 1140 8791 1140 9113 1140 91462 1151	W RPM 7416 1073 7807 1103 8209 1112 8496 1120 8496 1120 8496 1120 8496 1120 8496 1120 8496 1120 8497 1130 9462 1141 9482 1140 9482 1140 9482 1140 9482 1141 94837 1162	W RPM 7416 1073 7807 1103 8209 1112 8496 1120 8791 1130 9113 1140 9113 1142 913 1142 913 1142 913 1142 913 1142 913 1142 9133 1142 9237 1151 9237 1153 9237 1154 9238 1154	W RPM 7416 1073 7807 1103 8809 1112 8496 1120 8496 1120 9113 1140 9113 1140 9113 1140 9113 1140 9113 1140 9113 1141 9113 1140 9113 1141 9113 1141 9113 1141 9113 1141 9113 1141 9113 1141 9113 1141 9113 1141 9113 1141 9105 1151 10238 1174 10667 1187	W RPM 7416 1073 7807 1103 8809 1112 8496 1120 8496 1120 8791 1130 9413 1140 9413 1140 9452 1151 9487 1151 94837 1162 910238 1174 102667 1187 11023 1162 11023 1162 11122 1200	RPM 1073 1103 1112 11120 11130 1151 1151 1151 1151 1151 1151 1151 1151 1151 1151 1162 1174 1187 1187 1214 1214	RPM 1073 1103 1112 1112 1120 1151 1151 1151 1151 1151 1151 1151 1151 1151 1151 1151 1154 1154 1154 1154 1154 1200 1214 1214 1214	RPM 1073 1073 1112 1112 1112 1115 1116 1116 1116 1116 1116 11187 11187 11187 11187 11248 12181 12181 12181 12181 12181 12183 12184	RPM 1073 1120 1120 1120 1120 1120 1120 1120 112	RPM 1073 1112 1112 1112 11140 11140 11174 11174 11174 11174 11174 11200 1228 1228 1228 1228 1228 1228 122	RPM 1073 11073 11121 1121 1121 1121 1121 1121 1121 1	RPM 1073 1112 1112 1112 1112 1112 1117 1117 11	RPM 1073 1110 1112 1112 1112 1112 1112 1112 111	RPM 1103 1112 1103 1112 1112 1112 1112 1113 1113	RPM 1073 1073 1103 1103 1103 1103 1103 1103	RPM 1073 1073 1103 1103 1103 1103 1103 1113 1103 1113 11
1.3 [.32] 1.4 RPM W RPM		7044	7427	7044 7427 7820	7044 7427 7820 8224	7044 7427 7820 8224 8569	7044 7427 7820 8224 8569 8863	7044 7427 7820 8224 8569 8863 9183	7044 7427 7820 8224 8224 8863 8863 9183 9530	7044 7427 7820 88569 8863 9183 99183 9904	7044 7427 7820 8569 8569 8863 9183 9183 9530 9904 10304	1029 7044 1029 7044 1043 7427 1043 7427 1065 7820 1069 8263 1100 8565 1118 9183 1118 9183 1113 9904 1150 10304 1150 10304 1150 10304	1029 7044 1029 7045 1045 7220 1056 7820 1059 8224 1100 8563 1110 8653 1118 9183 1129 9504 1139 9904 1162 10304 1150 10304 1162 10304 1162 10304 1162 10304	1029 7044 1029 7045 1043 7220 1056 7220 1059 8224 1109 8563 1119 8863 1118 9183 11128 9504 11139 9904 11150 10304 11150 10304 11151 11184 11150 10304 11151 10304 11152 101731 11156 101731 11157 11184 11156 11184 11158 11164	Mar Mar 10.21 7.04 1052 10.43 7.24.2 1065 10.66 7.82.0 1716 10.69 822.4 1106 1100 8863 1124 1101 8863 1124 1109 8863 1145 1118 9183 1144 1118 9904 1166 1129 9904 1164 1121 1114 1145 1123 10304 1164 1124 1134 1145 1128 9034 1164 1128 10304 1168 1126 10314 1194 1125 11184 1194 1128 1164 1208 1188 11664 1208 1181 1164 1208 1181 1164 1208 1181 1164 1208 1181 1164 1208	Num Num 1041 1052 1043 7204 1076 1056 7820 1076 1056 7824 1076 1059 8224 1106 1100 8863 1124 1109 8863 1124 1118 9183 1145 1118 9183 1146 1118 9183 1145 1129 9904 1168 1151 1134 1161 1152 10314 1181 1152 10314 1164 1152 10314 1194 1152 11184 1164 1152 1138 1166 1158 11664 1203 1156 1217 1222 11202 1217 1222 1202 1217 1237	Mar Mar 10.21 7.04 105.2 10.43 7.24.2 106.5 10.65 7.82.0 170.6 10.69 822.4 1106 1100 886.9 1115.1 1101 886.3 1124.4 1118 918.3 1146.4 1118 918.3 1146.4 1118 918.3 1146.4 1118 918.3 1146.4 1129 990.4 1168.4 1151 1174.4 1164.4 1152 10731 1181.1 1152 10731 1181.1 1152 1178.4 102.4 1152 1178.4 102.4 1158 1164.4 120.7 1158 120.7 120.7 1158 120.7 1217.1 120.7 1217.1 1227.1 1216.4 1237.1 1237.1 1224.1 1224.4 1237.1	NIIIIII NIIIIIII 1042 7044 1052 1043 7242 1065 1056 7820 1176 1059 8224 1106 1100 8863 1124 1118 9183 1145 1118 9183 1144 1118 9183 1145 1118 9183 1145 1129 9904 1166 1151 1134 1194 1152 10731 1181 1152 10731 1181 1154 10731 1181 1155 11784 1028 1156 10731 1181 1157 11784 1028 1168 11664 1208 11034 1208 1221 11181 1224 1231 11224 12364 1237 1231 13264 1237 1234 13866 1283 <th>NIIIIIII NIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</th> <th>Num Num 1041 1052 1043 7204 1055 1056 7820 1076 1056 7824 1065 1050 8569 1115 1100 8563 1124 1101 8863 1124 1118 9183 1134 1118 9183 1145 1118 1134 1145 1123 9904 1166 1151 1134 1134 1152 10734 1181 1152 10734 1181 1152 10734 1164 1152 1138 1164 1152 1273 1223 1202 1217 1223 1216 1276 1237 1224 13266 - 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1.2 [.30] RPM W		1006 6676	1006 6676 1021 7051	1006 6676 1021 7051 1034 7436	1006 6676 1021 7051 1024 7436 1034 7831	1006 6676 1021 7051 1034 7436 1034 7437 1048 7831 1064 8237	1006 6676 1021 7051 1024 7436 1034 7436 1048 7831 1061 8237 1074 8653	1006 6676 10021 7051 1024 7436 1034 7436 1048 7831 1061 8237 1074 8653 1073 8930	1006 6676 1021 7051 1023 7336 1034 7331 1048 7831 1061 8237 1074 8653 1074 8653 1103 8930 1112 2439	1006 6676 1021 7051 1023 7051 1024 7051 1034 7363 1048 7831 1054 8653 1074 8653 1103 8930 1112 9249 1122 954	1006 6676 1021 7051 1023 7051 1034 7363 1034 7363 1034 7831 1034 7833 1048 7831 1048 7833 1074 8653 1112 9594 1112 9594 1133 967	1006 6676 1001 6676 1021 7051 1024 7051 1034 7436 1034 7436 1034 7436 1034 7436 1103 8930 1112 9534 1112 9534 1133 9967 1133 9967 1144 10365	1006 6676 1021 7051 1024 7051 1024 7351 1034 7351 1034 7351 1048 7331 1058 7337 1061 8237 11074 8653 1112 9249 1112 9544 1112 9544 1133 9667 1144 10365 1156 10791	1006 6676 1021 7051 1021 7051 1024 7351 1024 7351 1048 7831 1054 8653 11074 8653 11078 8653 11078 8653 1112 9249 1112 9544 1112 9544 1133 9667 1144 10365 1156 10791 1156 10791 1156 1122	1006 6676 1021 7051 1021 7051 1024 7351 1024 7351 1024 7331 1048 7831 1051 8633 1102 8653 1112 9249 1112 9544 1123 9967 1144 10365 1156 10791 1169 11242 1156 11242 1169 11242 1156 11242 1169 11242 1156 11242 1156 11242 1156 11242 1158 11242	1006 6676 1021 7051 1024 7435 1024 7831 1048 7831 1064 8653 1074 8653 1102 8930 1112 9249 1112 9544 1113 9967 11144 10365 11156 10791 11158 1122 11144 10365 11158 1122 11169 11242 11156 11242 11156 11242 1156 11222 1156 11222 1156 12226	1006 6676 1021 7351 1024 7435 1024 7831 1048 7831 1064 8653 1074 8653 1102 8653 1112 9249 1112 9544 1112 9544 1113 9967 11144 10365 11156 10791 11158 11222 1156 11222 1156 11222 1156 11222 1156 11222 1156 11222 1156 12225 1155 12256 125756 12758	1006 6676 1021 7351 1024 7351 1048 7831 1048 7831 1048 7831 1048 8653 11074 8653 11074 8653 1107 8653 1112 9249 1112 9544 1113 9567 1113 9567 1114 10365 11156 10791 11158 11222 11169 11222 11160 11222 11156 11222 11156 11222 11156 12256 120355 13316	1006 6676 1021 7351 1024 7331 1048 7831 1048 7831 1061 8237 1074 8653 1102 8653 1112 9249 1112 9544 1113 9967 1113 9967 1114 10365 1113 9112 1113 9122 1116 1122 1116 1122 1116 1122 1116 1122 1116 1122 1116 1123 1116 1123 1116 1123 1116 1123 1126 1123 1126 12356 1201 12731 1226 13316 1226 13316 1226 13316 1226 13316 1226 13901	1006 6676 1021 7351 1024 7331 1048 7831 1048 7831 1061 8237 10174 8653 1112 9249 1112 9544 1112 9544 1113 9967 1113 9967 1114 10365 1113 9112 1114 10365 1114 10365 11156 1122 11169 1122 11160 1122 11156 1123 11161 1226 11163 1226 1256 13316 12556 13361 1256 13361 1256 14512	1006 6676 1021 7351 1024 7351 1028 7331 1048 7831 1061 8237 1074 8653 1102 9249 1112 9249 1112 9544 1113 9967 1114 10365 11133 9967 11144 10365 11156 1122 11156 11222 11156 11222 11156 11222 11156 11222 11156 11221 11261 12256 12556 13316 12556 14512 12556 14512	1006 6676 1021 7051 1024 7351 1048 7831 1061 8237 1074 8653 1074 8653 1112 9249 1112 9249 1112 9249 1112 9267 11133 9967 11133 9967 1114 10365 1112 1122 11133 9967 1114 10365 1112 1123 11163 11221 11163 11222 11163 11221 11163 11221 11163 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 12261 1256 13301 1256 14512 1256 14512 <th>1006 6676 1021 7551 1024 7835 1048 7831 1061 8237 1074 8653 1074 8653 1112 9249 1112 9249 1112 9249 1112 9249 11133 9967 1114 10365 1112 91249 11133 9967 1114 10365 1112 1122 1114 10365 11156 11241 11169 11221 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 12261 1256 13301 1256 14512 1256 14512 </th>	1006 6676 1021 7551 1024 7835 1048 7831 1061 8237 1074 8653 1074 8653 1112 9249 1112 9249 1112 9249 1112 9249 11133 9967 1114 10365 1112 91249 11133 9967 1114 10365 1112 1122 1114 10365 11156 11241 11169 11221 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 11231 11261 12261 1256 13301 1256 14512 1256 14512
25] 1.1 [.27] W RPM W		3 983	983 997	983 997 1012	983 997 1012 1026	983 997 1012 1026 1040	983 997 1012 1026 1026 1040	983 997 1012 1026 1040 1053 1053	983 997 1012 1026 1040 1053 1056 1066	983 997 1012 1026 1026 1053 1053 1056 1066 1079	983 997 1012 1026 1026 1053 1053 1056 1079 11706	983 997 1012 1026 1040 1053 1056 1056 1079 1177 1127	983 997 1012 1012 1026 1053 1053 1053 1056 1079 1106 1116 1127 1138	983 987 997 1012 1012 1026 1053 1053 1066 1066 1079 1079 1106 1116 11138 1150 1150 1150	983 983 997 997 1012 1012 1026 1040 1053 1053 1053 1056 1106 1116 1127 11138 1150 1150 1153 1153	983 997 1012 1026 1036 1056 1059 1056 1079 1079 1079 11127 11127 11127 11138 11150 11150 11150	983 997 1012 1026 1056 1058 1058 1079 1079 1079 1116 11176 11176 11176 11176 11176 11176 11176 11176 11176 11176 11176 11176 11176 11176 11176 11177 11176 11177 1	983 997 1012 1026 1026 1053 1056 1079 1079 1106 11127 11127 11150 11163 11163 11163 11163 11176 11176 11176 11176 11176 11176 11176 11176 111777 11177	983 983 997 997 1012 1026 1053 1056 1066 1079 1079 1079 1116 1116 1113 1138 11163 1163 11163 1163 11164 1163 11176 1113 11176 1113 11176 1113 11176 1113 11176 1113 11176 1113 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 1118 118 118 118 118 118 118 118	983 987 1012 1026 1026 1079 1079 1079 1116 1116 1116 1116 1116 1118 1118 111	983 983 997 997 1012 1026 1026 1079 1079 1079 1106 1116 1112 1112 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1126 1126 1234 1234 1250 1234	983 997 1012 1012 10166 10166 10166 10166 11167 1116 1116	983 997 1012 1012 10166 101050 10050 100000 100500000000
[.22] 1.0[.3 W RPM		5525 937	5525 937 5775 973	5525 937 5775 973 6033 988	5525 937 5775 973 6033 988 6680 1003	5525 937 5575 973 5775 973 6033 988 6680 1003 7060 1017	5525 937 5575 973 5775 973 6603 988 6680 1003 7060 1017 7451 1031	5525 937 5525 937 5775 973 6603 988 6680 1003 7060 1017 7451 1031 7853 1045	5525 337 5775 973 5775 973 6033 988 6680 1003 7060 1017 7451 1031 7853 1045 8265 1058	55.25 93.7 5.775 97.3 5.775 97.3 6.033 988 6.033 988 7.060 1017 7.451 1031 7.853 1045 8265 1058 8265 1058 8265 1058 8265 1058	55.25 93.7 5.775 97.3 5.775 97.3 6.033 988 6.033 988 7.060 1017 7.451 1031 7.853 1045 82265 1058 8287 1071 9419 1007	5525 937 5775 973 6033 988 6033 988 6680 1017 7060 1017 7451 1031 7853 1045 8265 1058 8687 1071 9119 1007 9562 1058 96637 1101	5525 937 5775 973 6033 988 6033 988 6680 1003 7060 1017 7451 1031 7453 1045 8687 1066 9109 1071 9562 1067 9562 1007 9562 1100 9562 1100 9562 1101 9563 1110 9563 1110 9563 1110	5525 937 5775 973 6033 989 6033 989 6680 1003 7060 1017 7451 1031 7853 1045 8887 1071 919 1100 9562 1110 9763 1121 9763 1121 1013 1121 1013 1121 9763 1121 9763 1121 9763 1121 9763 1121 9763 1121 9763 1121 9763 1121 9763 1121 9763 1121	5525 937 5775 973 5775 973 6603 963 6680 1003 7660 1017 7451 1031 7663 1067 7664 1017 7853 1045 8265 1058 8267 1071 9119 1100 9562 1110 9562 1110 9563 1110 9563 1110 9563 1110 9563 1110 9563 1110 9563 1110 9563 1110 9563 1113 10130 1132 101324 1144	5525 937 5775 973 6033 988 6033 988 6680 1003 7060 1017 7451 1031 7453 1045 8687 1071 7853 1045 8687 1071 919 1100 9562 1110 9763 1121 10130 1123 110324 1144 10524 1143 10524 1144 10524 1156 10524 1156	55.25 937 5775 973 5776 973 6633 968 6680 1003 7060 1017 7451 1031 7453 1045 8265 1058 8265 1058 8265 1058 9119 1110 9173 1121 9173 1121 9173 1121 9173 1121 9173 1121 9173 1121 9173 1121 9173 1121 9173 1121 9173 1132 10345 1144 10345 1156 11333 1153	55.26 937 5775 973 5776 973 6633 988 6680 1003 7060 1017 7451 1031 7453 1045 8265 1058 8265 1058 8265 1071 9119 1100 9562 1110 9763 1121 10130 1121 10130 1123 10224 1144 10345 1169 1133 1169 11333 1169 11333 1166 11866 1183	55.26 937 5775 973 5776 973 6633 988 6680 1003 7060 1017 7451 1031 7453 1045 8265 1058 8265 1058 8265 1058 8265 1071 9119 1100 9562 1110 9763 1121 10130 1123 11034 1132 110364 1144 10345 1169 11333 1166 11333 1166 11866 1183 11866 1183 11866 1183 11866 1183 11866 1183 11867 1187	5525 937 5775 973 5775 973 6033 988 6630 1003 7660 1017 7451 1031 7863 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9119 1100 9763 1121 10713 1121 1132 1164 1132 1164 1133 1164 1133 1166 1133 1166 1133 1166 1133 1166 1133 1166 1133 1166 1133 1164 1133 1164 1133 1164 1133 1166 11366 1183 11361 1137 11361 1137 11361 </th <th>5525 937 5775 973 5775 973 6033 988 6680 1003 7660 1017 7451 1031 7863 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9119 1100 9763 1121 10713 1132 1132 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1166 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1134 1133 11354 1157 1134</th> <th>55.55 93.7 57.75 97.3 57.75 97.3 6633 988 6630 1003 7660 1017 7451 1031 7663 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9116 1110 9763 1121 10130 1132 11331 1169 11366 1183 11384 1133 11383 1169 11384 1213 11384 12367 11384 12367 11384 12367 11384 12367 11383 1169 11384 12367 11384 12367 11384 12367 11384 12367 11484 1227 114028 1243</th> <th>55.55 93.7 57.75 97.3 57.75 97.3 6633 968 6630 1003 7060 1017 7451 1031 7663 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9116 1110 9162 1111 91763 1121 10364 1132 103654 1144 11333 1169 11366 1133 11366 1133 11386 1133 113864 1133 113864 1133 113864 1133 113864 1133 113864 1133 113864 1133 114638 1243 1260 1260</th>	5525 937 5775 973 5775 973 6033 988 6680 1003 7660 1017 7451 1031 7863 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9119 1100 9763 1121 10713 1132 1132 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1166 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1133 1164 1134 1133 11354 1157 1134	55.55 93.7 57.75 97.3 57.75 97.3 6633 988 6630 1003 7660 1017 7451 1031 7663 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9116 1110 9763 1121 10130 1132 11331 1169 11366 1183 11384 1133 11383 1169 11384 1213 11384 12367 11384 12367 11384 12367 11384 12367 11383 1169 11384 12367 11384 12367 11384 12367 11384 12367 11484 1227 114028 1243	55.55 93.7 57.75 97.3 57.75 97.3 6633 968 6630 1003 7060 1017 7451 1031 7663 1045 8887 1071 7863 1045 8265 1058 8265 1058 8265 1071 9116 1110 9162 1111 91763 1121 10364 1132 103654 1144 11333 1169 11366 1133 11366 1133 11386 1133 113864 1133 113864 1133 113864 1133 113864 1133 113864 1133 113864 1133 114638 1243 1260 1260
[.20] w		5328	5328 5578	5328 5578 5835	5328 5578 5835 6099	5328 5578 5835 6099 6677	5328 5578 5835 6099 6677 7060	5328 5578 5578 5835 6099 6677 6677 7060 7453	••• 5578 5578 5578 5835 5835 5835 6099 6099 6077 7060 7060 7453 7856 7856	5578 5578 5578 5835 5835 6099 6677 7060 7060 7453 7453 7856 8270	5328 5578 5578 5835 6677 7660 7453 7453 7453 7453 7856 8270 8270	5328 5578 5578 5835 6099 6677 7060 7453 7453 7453 7453 8894 8894 8694 9129	5328 5578 5578 5835 6099 6677 7453 7453 7453 7856 8270 8694 8270 8694 9129	5328 5578 5835 6099 6677 7660 7453 7856 88270 88270 8824 9129 9574 9129	No. No. 5328 922 5355 923 5855 933 5855 933 5855 943 6677 944 7060 1009 7453 1023 7856 1037 7856 1037 8270 1050 8294 1063 9574 1104 9511 1115 9811 1115	N N 5328 922 5355 923 5855 933 5855 933 5856 933 6099 979 6677 994 7060 1009 7453 1023 7856 1037 8270 1050 8270 1065 9129 1076 9274 1067 9274 1076 9274 1017 9117 1115 10177 1126 10177 1126 101769 1138	557 922 5578 922 5585 943 6677 994 6677 994 7080 1009 7458 1023 7453 1023 7456 1023 8270 1056 9574 1104 9574 1104 9574 1114 105 9574 1104 1057 9574 1114 1017 1115 1017 1116 9514 1114 1017 1114 1017 1114 10177 1128 10166 1138 10176 1138 10186 1138	AF AF AF 5578 922 933 55858 943 979 6670 994 994 6677 994 904 7050 1009 7453 7453 1023 7453 7456 1067 904 8270 1056 1075 9110 1056 9174 9121 1104 9175 9121 1115 10177 9121 10177 1126 9121 1126 10157 9121 1126 10157 9121 1126 10157 9121 1126 10156 9121 1128 1058 10126 1138 1058 10132 1150 1058 10142 11453 1153	Web Met 5578 922 5578 923 5558 933 6670 994 6677 994 7050 1009 7453 1023 7453 1023 7454 1061 924 1051 9274 1061 9374 1076 9574 1075 9574 1076 9177 1126 9177 1126 9173 1058 9174 1163 9175 1134 9175 1134 9174 1145 9175 1144 9168 1156 9174 1145 9168 1143 9175 1147 9174 1147	5.328 11.11 5578 932 5578 933 5535 943 6099 979 6677 994 7460 1009 7453 1023 7856 1037 8270 1050 8271 1050 9574 1046 9574 1046 9574 1046 9574 1046 9117 1150 10177 1126 10177 1138 10177 1146 10177 1150 11434 1163 11507 1147 11637 1163 11907 1177 12406 1141	5.328 11.11 5578 932 5578 933 5535 943 6099 979 6677 994 7460 1009 7453 1023 7856 1037 8270 1050 8271 1053 9574 1104 9574 1104 9574 1104 9574 1104 9117 1126 10177 1126 10177 1126 10177 1126 10177 1150 11507 1126 1163 1150 1163 1150 1163 1150 11507 1151 11507 1151 11507 1151 11507 1151 1151 1151 1153 1151 1153 1151 1153 1151 1	5.2.8 11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	5.2.8 11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1
0.7 [.17] 0.8 RPM W RPM		5123	5123 5371	5123 5371 5628	5123 5371 5628 5891	5123 5371 5628 5628 5891 6162	5123 5371 5628 5891 6162 6672	5123 5371 5628 5891 5891 6162 6672 7057	5123 5371 5628 5891 6162 6672 7057 7452	5123 5371 5628 5628 5891 6162 6672 7057 7452 7858				5123 5371 5628 5891 6162 6672 6672 7452 7452 7452 7858 8274 8274 8274 8274 9137 9137	5123 5371 5891 6162 6672 6672 7057 7452 7858 8274 8274 8274 9137 9137	5123 5371 5371 5891 6162 6672 7057 7452 7452 7452 7452 7858 8274 88700 9137 9137 9137		4909 889 51.3 900 5157 900 53.71 917 5412 911 56.28 928 5675 922 5891 938 5946 933 6162 970 6523 961 657 970 6524 933 6162 970 6523 961 6672 985 6503 971 7057 1000 7053 991 7452 1014 7055 901 7452 1014 7055 901 7452 1014 7055 901 7452 1014 7056 1008 8274 1029 7056 1028 8274 1042 8274 1048 8701 1055 8704 1048 9137 1068 9137 1061 1029 9127 9144 1048 9137 1068 91051	889 51.2 906 900 53.71 917 911 56.28 928 922 5891 938 922 5891 938 933 6162 970 961 5672 985 971 7057 1000 961 5672 985 971 7452 1014 900 7452 1014 9107 7452 1014 1006 7858 1029 9137 1064 1042 1014 9137 1068 1014 10041 1095 1012 1024 1004 1014 10041 1016 1112 10241 1113 1125 11028 11472 1138 11472 157	889 5123 906 900 5371 917 911 5628 928 922 5891 938 933 6162 970 951 7557 900 953 6162 950 951 7557 1000 991 7452 1014 1006 7858 1028 1010 7452 1014 1024 1014 1026 1024 1029 1029 1024 1024 1026 1024 1024 1026 1024 1024 1028 1021 1021 1120 1122 1102 1120 1125 1128 1132 1125 1147 1157 1156 1134 1135 1156 1134 1136 1156 1134 1135	889 5123 906 900 5371 917 911 5628 928 922 5891 938 922 5891 938 933 6162 970 951 7057 1000 951 7657 1001 951 7452 1014 1006 7858 1023 9137 7452 1014 1006 7858 1023 1023 8770 1055 1024 9137 1068 1024 9137 1068 1024 9137 1068 1024 9137 1068 1025 1024 1024 1025 1024 1111 1102 1024 1132 1125 11028 1147 1138 11472 1157 1156 1154 1154 1156 1154 1154	889 5123 900 900 5371 917 911 5628 928 922 5891 938 922 5891 938 933 6162 970 951 7557 1000 951 7557 1001 951 7452 1014 1006 7858 1023 917 7452 1014 1006 7858 1023 1014 10041 1103 1014 10041 1103 1014 10041 1102 1112 10241 11041 1112 10241 11041 1112 10219 1112 1112 11023 11472 1156 11043 11472 1156 1144 11474 1156 1154 1154 1156 1154 1154 1156 1154 1154 <tr< td=""><td></td></tr<>	
0.6[.15] 0 RPM W RF	;	871 4909	871 4909 882 5157	871 4909 882 5157 894 5412	871 4909 882 5157 894 5412 905 5675	871 4909 882 5157 882 5412 905 5675 917 5946	871 4909 882 5157 882 5157 894 5412 905 5675 917 5946 928 6223	871 4909 882 5157 882 5157 894 5412 905 5675 917 5946 928 6203 939 6508	871 4909 882 5157 884 5412 905 5675 917 5946 917 5946 928 6203 939 6508 939 7053	871 882 894 905 917 917 928 939 938	871 882 894 905 917 917 939 939 938 983	871 882 894 905 917 917 917 928 939 928 939 983 983 983	871 882 894 905 905 917 928 928 939 939 938 938 983 938 938	871 882 894 905 905 905 905 939 939 939 939 983 983 983 983 983 91012 1012	871 4909 882 5157 882 5157 894 5412 905 5675 917 5946 928 6203 929 6508 939 6508 946 7053 928 7553 929 5763 929 5763 929 5763 940 7053 928 7658 929 7858 928 7858 928 7858 939 7850 940 9143 1012 8776 11040 9143 1053 952	871 4909 882 5157 882 5157 894 5412 905 5675 917 5946 917 5946 917 5946 917 5946 917 5946 928 6203 939 6508 933 7450 946 7053 948 7053 948 7053 948 7053 948 7040 949 9474 940 9443 943 7450 944 9474 944 9443 944 9444 944 9444 944 9444 945 9445 944 9444 944 9444 944 9444 944 9444 944 9444 9444 9444 <td>871 4909 882 5157 882 5412 905 5675 905 5675 917 5946 917 5946 928 6203 939 6508 933 7450 983 7450 983 7450 983 7450 983 7450 983 7450 983 7450 983 7450 983 7450 983 7450 983 7450 983 7653 983 7654 994 974 993 7654 993 7654 993 7654 993 7654</td> <td>871 4909 8 882 5157 9 884 5412 9 894 5412 9 905 5675 9 905 5675 3 917 5946 3 928 5223 9 929 6508 9 968 7053 3 968 7053 3 968 7053 3 968 7053 3 908 7053 3 908 7053 3 908 7053 3 9101 8704 1 1012 8704 1 1053 3592 1 1079 1079 1 1 1079 1079 1079 1 1071 1074 1 1</td> <td>871 4909 8 882 5157 9 884 5412 9 894 5412 9 905 5675 9 905 5675 3 917 5946 9 928 5223 9 929 6508 9 953 6508 9 968 7053 9 968 7053 9 963 7053 9 963 7053 9 963 7053 9 993 7450 1 1012 8276 1 1026 714 1 10553 9592 1 1056 1057 1 1 1079 10564 1 1 1079 1057 1 1 1107 10664 1 1 11071 10671 1 1</td> <td>871 4909 8 882 5157 9 884 5412 9 894 5412 9 905 5675 9 905 5675 3 917 5946 9 928 5233 9 929 6508 9 968 7053 9 968 7053 9 968 7053 9 968 7053 9 975 8756 1 1012 8776 1 1012 8774 1 1012 8704 1 1053 9592 1 1056 1051 1 1079 10521 1 1 1071 10551 1 1 1107 10546 1 1 11071 10664 1 1 11131 115053 1 1<td>871 4909 8 882 5157 9 884 5412 9 894 5412 9 905 5675 9 905 5675 3 917 5946 3 928 523 9 929 6508 9 953 6508 3 968 7053 9 968 7053 3 968 7053 9 968 7053 9 968 7053 9 998 7558 10 1012 8776 1 1012 8774 1 1016 1103 110 10106 10051 1 1107 10521 11 11107 10664 1 1111 10653 11 1111650 111 1 11144 111550 1 <</td><td>466 671 4909 682 5123 4933 682 5157 900 5371 518 894 5412 911 5628 5451 905 5675 922 5891 5720 917 5946 933 6162 5720 917 5946 933 6162 5923 593 916 933 6162 5920 928 923 916 937 7057 6523 939 5053 917 7057 653 6524 938 7450 910 7452 7452 7044 938 7450 1010 7452 7044 938 7451 1014 7451 7044 938 7451 1014 7451 7044 938 7451 1014 1014 7044 938 7451 1014 1014 7044 10451 10451</td><td>871 4909 8 882 5157 9 894 5412 9 905 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938 7451 1014 1014 7044 10451 10451</td> <td>871 4909 8 882 5157 9 894 5412 9 905 5675 9 917 5946 9 905 5675 3 917 5946 9 928 523 9 939 6508 9 968 7053 9 968 7053 9 998 7556 1 998 7558 1 1012 8276 1 1012 8276 1 1012 8704 1 1012 8276 1 1012 8092 1 1056 1051 1 1053 9592 1 1056 10561 1 1107 10551 1 11051 11053 1 1113 11055 1 11113 11055 1</td>	871 4909 8 882 5157 9 884 5412 9 894 5412 9 905 5675 9 905 5675 3 917 5946 3 928 523 9 929 6508 9 953 6508 3 968 7053 9 968 7053 3 968 7053 9 968 7053 9 968 7053 9 998 7558 10 1012 8776 1 1012 8774 1 1016 1103 110 10106 10051 1 1107 10521 11 11107 10664 1 1111 10653 11 1111650 111 1 11144 111550 1 <	466 671 4909 682 5123 4933 682 5157 900 5371 518 894 5412 911 5628 5451 905 5675 922 5891 5720 917 5946 933 6162 5720 917 5946 933 6162 5923 593 916 933 6162 5920 928 923 916 937 7057 6523 939 5053 917 7057 653 6524 938 7450 910 7452 7452 7044 938 7450 1010 7452 7044 938 7451 1014 7451 7044 938 7451 1014 7451 7044 938 7451 1014 1014 7044 938 7451 1014 1014 7044 10451 10451	871 4909 8 882 5157 9 894 5412 9 905 5675 9 917 5946 9 905 5675 3 917 5946 9 928 523 9 939 6508 9 968 7053 9 968 7053 9 998 7556 1 998 7558 1 1012 8276 1 1012 8276 1 1012 8704 1 1012 8276 1 1012 8092 1 1056 1051 1 1053 9592 1 1056 10561 1 1107 10551 1 11051 11053 1 1113 11055 1 11113 11055 1
0.5 [.12] RPM W		4455 851 4686	851 863	851 863 875	851 863 875 887	851 863 875 887 887 899	851 863 875 887 887 899 899 911	851 863 875 887 887 887 899 911 923	851 863 875 875 887 887 899 911 911 923 923	851 863 875 887 887 887 887 897 897 911 923 923 923 923	851 863 875 887 887 887 887 887 897 911 923 923 923 923 923	851 863 875 875 875 899 911 923 923 923 974 959 974	851 863 875 887 887 899 911 923 923 923 923 959 959 959 959 959	851 863 875 887 887 899 911 923 923 923 923 959 959 959 959 974 974 970	851 863 875 875 887 887 897 911 911 911 959 954 954 954 954 959 959 1004 1018	851 863 875 887 887 899 911 923 923 923 924 974 959 974 974 1004 1004 1032			000 4101 600 4450 841 840 841 840 841 940 843 842 5157 900 837 821 4461 843 4705 853 4956 853 5157 900 5371 844 4715 855 4956 875 518 894 5472 911 5626 847 847 849 5712 941 593 5616 593 5616 848 5713 893 5716 941 593 541 593 561 593 <t< td=""><td>55 851 4686 66 875 5188 17 887 5451 86 893 5720 86 893 5720 63 911 5997 64 223 6282 63 911 5997 63 911 5997 64 223 6282 63 911 5997 64 223 6282 64 923 6282 146 923 6282 142 974 7446 140 989 7856 142 974 7446 140 983 7856 152 1004 8776 152 1018 8706 149 1046 9598 149 1046 9598 149 1046 9598 1053 1054 10534 1054 1053</td><td>155 851 4868 702 863 4933 855 875 5188 875 518 5451 188 5451 5461 887 5451 548 887 5451 548 887 541 546 883 511 5997 883 911 5997 883 911 5997 883 914 5997 884 6573 6282 885 959 7047 942 944 7446 942 944 876 942 944 876 944 1018 876 944 1018 876 945 1046 958 944 1046 958 944 1046 958 945 1051 1055 944 1046 958 944 1046</td><td>55 851 4686 02 863 4933 56 875 5188 17 887 5451 86 893 5720 86 893 5720 63 911 5997 63 911 5997 63 911 5997 73 914 6573 37 924 6573 37 924 6573 37 939 7047 446 959 7047 440 989 7856 440 989 7856 512 1004 876 514 1018 8706 774 1018 8706 714 1018 8706 714 1018 8706 714 1018 7047 710 1053 1047 710 1053 1047 7054 11053</td><td>55 851 4686 202 863 4933 56 875 5188 17 887 5451 86 893 5720 86 893 5720 63 911 5997 63 911 5997 764 923 6282 737 934 6573 737 934 6573 736 939 7047 142 974 7446 142 974 7446 140 989 7856 140 989 7856 140 989 7856 140 989 7856 141 1018 8706 142 1018 8706 144 1018 8706 143 1046 9589 144 1048 9586 1053 1054 1053 1054 1103</td></t<>	55 851 4686 66 875 5188 17 887 5451 86 893 5720 86 893 5720 63 911 5997 64 223 6282 63 911 5997 63 911 5997 64 223 6282 63 911 5997 64 223 6282 64 923 6282 146 923 6282 142 974 7446 140 989 7856 142 974 7446 140 983 7856 152 1004 8776 152 1018 8706 149 1046 9598 149 1046 9598 149 1046 9598 1053 1054 10534 1054 1053	155 851 4868 702 863 4933 855 875 5188 875 518 5451 188 5451 5461 887 5451 548 887 5451 548 887 541 546 883 511 5997 883 911 5997 883 911 5997 883 914 5997 884 6573 6282 885 959 7047 942 944 7446 942 944 876 942 944 876 944 1018 876 944 1018 876 945 1046 958 944 1046 958 944 1046 958 945 1051 1055 944 1046 958 944 1046	55 851 4686 02 863 4933 56 875 5188 17 887 5451 86 893 5720 86 893 5720 63 911 5997 63 911 5997 63 911 5997 73 914 6573 37 924 6573 37 924 6573 37 939 7047 446 959 7047 440 989 7856 440 989 7856 512 1004 876 514 1018 8706 774 1018 8706 714 1018 8706 714 1018 8706 714 1018 7047 710 1053 1047 710 1053 1047 7054 11053	55 851 4686 202 863 4933 56 875 5188 17 887 5451 86 893 5720 86 893 5720 63 911 5997 63 911 5997 764 923 6282 737 934 6573 737 934 6573 736 939 7047 142 974 7446 142 974 7446 140 989 7856 140 989 7856 140 989 7856 140 989 7856 141 1018 8706 142 1018 8706 144 1018 8706 143 1046 9589 144 1048 9586 1053 1054 1053 1054 1103
.07] 0.4 [.10] W RPM W		5 830	830 843	830 843 855	830 843 855 868	830 843 855 868 880	830 843 855 855 868 880 893	830 843 855 868 868 880 880 893 905	830 843 855 858 868 868 880 880 893 893 905	830 843 855 868 868 880 893 893 893 893 905 917	830 843 855 868 880 880 893 893 917 917 917 941	830 843 855 868 868 880 880 893 893 917 917 929 929 929 926	830 843 843 843 855 843 855 855 868 868 880 883 907 905 905 9017 917 929 941 941 965 983 941 941 981	830 843 855 868 868 880 893 893 917 917 917 917 917 929 831 941 881 985	830 843 855 868 868 880 893 917 917 917 917 929 929 929 929 929 929 929 921 926	4215 830 4461 843 4461 843 4715 855 524 880 5519 893 5519 893 6693 917 6693 917 6694 941 7008 965 7708 966 8730 917 7083 917 8704 917 917 929 917 929 917 929 917 929 917 929 917 929 917 929 917 929 918 917 82705 1010 82705 1024	4715 830 4461 843 44715 855 6541 880 6542 983 6541 893 6542 965 6033 917 6636 941 7048 965 6541 893 65519 893 7742 941 7445 965 827 966 827 961 7432 941 7446 965 8273 965 8274 830 8274 830 8275 961 8276 963 8277 965 8276 966 8277 965 8276 965 8276 965 8276 966 8276 966 8276 966 8276 966 8276 966 <td>4715 830 4461 843 44715 855 5549 883 5541 800 5542 905 6090 941 6091 965 6495 941 6519 893 6696 941 6696 941 7342 981 7543 969 8770 905 8770 1010 8705 1024 8705 1024 8705 1024 8705 1010 8705 1054 9605 996 8705 1024 8705 1054</td> <td>4215 830 447 4461 843 470 4461 845 495 4715 855 495 4975 868 52 5244 800 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 929 66 6096 941 69 6101 929 68 7132 981 78 7432 981 78 7432 981 78 7101 870 1010 8705 1024 91 9150 1023 96 9655 102 91 8705 1028 91 9655 105 91 9650 105 105</td> <td>4215 830 444 4461 843 470 4461 845 495 4715 855 495 4975 868 52 5244 800 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 929 66 6096 941 69 6101 923 74 7132 981 78 7432 981 78 7432 981 78 7101 870 1010 8705 1024 91 9150 1023 961 9051 1024 91 9150 105 105 9150 105 105 9554 1077 105</td> <td>4215 830 4455 4461 843 4702 4475 855 4956 4975 868 5217 5244 880 537 5519 833 5763 5502 905 6046 6033 917 6337 6391 929 658 6496 941 942 7008 965 7440 7102 965 7440 7492 981 7852 7494 9942 7440 7492 981 7852 7494 996 8774 8870 1010 8706 9150 1024 9149 9150 1028 9602 9150 1024 9149 9150 1024 1142 91051 1056 1054 91052 1051 1054 91054 1077 1054 <t< td=""><td>4215 830 447 4461 843 470 4461 845 493 4715 855 495 4975 868 521 5244 880 541 5519 893 571 5502 905 60 6093 917 63 6191 929 66 6093 917 63 77008 965 74 732 981 78 7432 981 78 7446 966 82 7346 966 82 7846 961 78 7732 981 78 8705 1010 87 9150 1024 91 9150 1055 105 91051 105 105 91053 105 105 91054 1077 116 1053 105</td><td>4215 830 447 4461 843 470 4461 845 493 4715 855 495 4975 868 521 5244 880 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 893 571 6093 917 63 61093 917 63 61093 917 63 7300 965 74 7312 981 73 7446 965 74 77846 966 82 77846 961 87 8705 100 87 9150 103 96 9150 105 105 9105 105 105 9105 105 105 9105 105</td></t<></td>	4715 830 4461 843 44715 855 5549 883 5541 800 5542 905 6090 941 6091 965 6495 941 6519 893 6696 941 6696 941 7342 981 7543 969 8770 905 8770 1010 8705 1024 8705 1024 8705 1024 8705 1010 8705 1054 9605 996 8705 1024 8705 1054	4215 830 447 4461 843 470 4461 845 495 4715 855 495 4975 868 52 5244 800 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 929 66 6096 941 69 6101 929 68 7132 981 78 7432 981 78 7432 981 78 7101 870 1010 8705 1024 91 9150 1023 96 9655 102 91 8705 1028 91 9655 105 91 9650 105 105	4215 830 444 4461 843 470 4461 845 495 4715 855 495 4975 868 52 5244 800 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 929 66 6096 941 69 6101 923 74 7132 981 78 7432 981 78 7432 981 78 7101 870 1010 8705 1024 91 9150 1023 961 9051 1024 91 9150 105 105 9150 105 105 9554 1077 105	4215 830 4455 4461 843 4702 4475 855 4956 4975 868 5217 5244 880 537 5519 833 5763 5502 905 6046 6033 917 6337 6391 929 658 6496 941 942 7008 965 7440 7102 965 7440 7492 981 7852 7494 9942 7440 7492 981 7852 7494 996 8774 8870 1010 8706 9150 1024 9149 9150 1028 9602 9150 1024 9149 9150 1024 1142 91051 1056 1054 91052 1051 1054 91054 1077 1054 <t< td=""><td>4215 830 447 4461 843 470 4461 845 493 4715 855 495 4975 868 521 5244 880 541 5519 893 571 5502 905 60 6093 917 63 6191 929 66 6093 917 63 77008 965 74 732 981 78 7432 981 78 7446 966 82 7346 966 82 7846 961 78 7732 981 78 8705 1010 87 9150 1024 91 9150 1055 105 91051 105 105 91053 105 105 91054 1077 116 1053 105</td><td>4215 830 447 4461 843 470 4461 845 493 4715 855 495 4975 868 521 5244 880 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 893 571 6093 917 63 61093 917 63 61093 917 63 7300 965 74 7312 981 73 7446 965 74 77846 966 82 77846 961 87 8705 100 87 9150 103 96 9150 105 105 9105 105 105 9105 105 105 9105 105</td></t<>	4215 830 447 4461 843 470 4461 845 493 4715 855 495 4975 868 521 5244 880 541 5519 893 571 5502 905 60 6093 917 63 6191 929 66 6093 917 63 77008 965 74 732 981 78 7432 981 78 7446 966 82 7346 966 82 7846 961 78 7732 981 78 8705 1010 87 9150 1024 91 9150 1055 105 91051 105 105 91053 105 105 91054 1077 116 1053 105	4215 830 447 4461 843 470 4461 845 493 4715 855 495 4975 868 521 5244 880 541 5519 893 571 5502 905 60 6093 917 63 61093 917 63 6701 893 571 6093 917 63 61093 917 63 61093 917 63 7300 965 74 7312 981 73 7446 965 74 77846 966 82 77846 961 87 8705 100 87 9150 103 96 9150 105 105 9105 105 105 9105 105 105 9105 105
[.05] 0.3 [.(W RPM		- 808	808 821	808 821 4465 834	808 821 4465 834 4725 847	808 821 821 4465 834 4725 847 4993 860	808 821 821 4465 834 4725 847 493 860 5268 873	808 821 821 4465 834 4725 847 4933 860 5268 873 5550 886	808 821 821 4465 834 4725 847 4993 860 5268 873 5550 886 5840 899	808 821 821 4465 834 4725 847 4725 847 5560 886 5540 899 5137 911	808 821 821 4465 834 4725 847 4725 847 4993 860 5560 886 5540 899 6137 911 6137 914 6441 924	808 821 821 4465 834 4725 847 4933 860 5268 873 5550 886 5640 899 6137 911 6431 924 6533 386 5733 386	808 821 821 4465 834 4725 847 5268 873 5560 886 5540 896 641 924 641 924 653 336 7772 957	808 821 821 4465 834 4725 847 4933 860 5268 873 5500 886 5401 899 6137 911 6431 924 6137 911 6733 336 7702 957 7722 957 7722 957 7722 957	808 821 821 4465 834 4725 847 4933 860 5268 873 5500 886 5401 899 6137 911 6137 914 6733 936 6733 936 7702 957 7722 957 7838 937	808 821 821 4465 834 4725 847 4933 860 5268 873 5500 886 5441 924 6437 911 6441 924 6753 936 6773 936 7702 957 7783 936 7838 937 7838 937 7838 937 7838 937 7838 937 7838 937		808 821 4465 834 4725 847 4726 833 5508 873 5508 886 5540 899 6137 911 6441 924 6433 936 6753 936 7702 957 7722 972 7838 936 7838 937 7838 937 7422 972 7422 972 7338 987 8874 1002 8874 1006 8874 1006 8874 1006 8148 1016 8701 1016 970 970			- 808 4215 - - 821 4461 2 4465 834 4715 6 4725 847 4975 9 4993 860 5244 6 5550 886 5802 6 5550 886 5803 7 911 6391 6 5550 886 5803 7 941 924 6696 8 5540 899 6033 8 5741 924 5696 8 5743 936 7432 8 5743 937 7432 8 5743 937 7432 8 7422 947 5696 8 7422 947 1002 8 7422 947 1007 8 7432 947 1007 8 948 9405 5065 8	BBOD [4123]	8800 [4153] <th< td=""></th<>
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CFM [L/s] 0.1 [8800 [4153] —																			8800 [4153] 9000 [4247] 9200 [4241] 80. 9400 [4356] 80. 9400 [4350] 81. 9400 [4350] 81. 9600 [4530] 81. 9600 [4530] 81. 9600 [4530] 81. 9600 [454] 83. 9800 [454] 83. 10000 [4719] 84. 10000 [5990] 99. 11000 [5191] 91. 11000 [5191] 91. 11000 [5191] 91. 11000 [5191] 92. 11000 [5191] 92. 11000 [5191] 93. 1100 [5265] 93. 11200 [5568] 91. 11200 [5568] 91. 11200 [5568] 91. 12200 [5568] 91. 12200 [5563] 92. 12200 [5563] 93. 12200 [5563] 94. 12200 [5564] 91.	8800 [4153] 9000 [4247] 9200 [4248] 80. 9400 [4356] 80. 9400 [4350] 81. 9500 [4530] 81. 9600 [4530] 81. 9600 [4530] 81. 9800 [4543] 83. 10000 [4719] 81. 11000 [5191] 91. 11100 [5191] 91. 11100 [5194] 93. 11200 [5285] 92. 11200 [5194] 93. 11200 [5194] 93. 11200 [5194] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5187] 94. 12200 [5186] 97. 12200 [5186] 97. 12200 [5181] 94. 12200 [518] 97. 12200 [518] 97. 12200 [518] 98. 12200 [8800 [4153] 9000 [4247] 9200 [4248] 80. 9400 [4356] 80. 9400 [4350] 81. 9500 [4530] 81. 9600 [4530] 81. 9800 [454] 83. 9800 [454] 83. 10000 [4719] 84. 11200 [4191] 91. 11000 [5191] 91. 11000 [5191] 91. 11100 [5186] 92. 11100 [5186] 93. 11100 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 93. 11200 [5186] 94. 11200 [5186] 94. 12200 [5186] 94. 12200 [5186] 94. 12200 [5186] 94. 12200 [5186] 94. 12300 [5186] 94. 12400 [5186] 94. 12200

Drive Package			ш						G						т			
Motor H.P. [W]			7.5 [5592.7	92.7]					10 [7457.0]	57.0]					15 [11185.5]	185.5]		
Blower Sheave			BK130H	HO					BK120H	20H					BK190H	H06		
Motor Sheave			1VP71	71					1VP75	75					1VP71	71		
Turns Open	-	2	3	4	5	9	-	2	с	4	5	9	-	2	3	4	5	9
RPM	938	912	886	859	833	807	1069	1041	1013	972	951	931	1254	1219	1184	1147	1111	1074

NOTES: 1. Factory sheave settings are shown in bold type.
2. Do not set motor sheave below minimum or maximum turns open shown.
3. Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure.
4. Drive data shown is for vertical airflow with dry coil. Add component resistance (below) to duct resistance to determine total External Static Pressure.
5. A RPM meter is required.

					COI	MPONENT AIRI	COMPONENT AIRFLOW RESISTANCE		
Airflow	COR	AIRFLOW Correction factors	ORS	Wet Coil	Downflow Economizer RA Damper Open	Horizontal Economizer RA Damper Open	Concentric Diffuser RXRN-AD88 & Transition RXMC-CL09	MERV 8 Filter	MERV 13 Filter
CFM [L/s]	Total kBtu/h	Sensible kBtu/h	Power kW			Resistance — Inc	Resistance — Inches of Water [kPa]		
8800 [4153]	0.99	0.95	1.00	0.10 [.02]	0.26 [.06]	0.11 [.03]	0.30 [.07]	0.15 [.04]	0.13 [.03]
9200 [4341]	0.99	0.98	1.00	0.12 [.03]	0.28 [.07]	0.12 [.03]	0.36 [.09]	0.16 [.04]	0.15 [.04]
9600 [4341]	1.00	1.01	1.00	0.13 [.03]	0.30 [.07]	0.13 [.03]	0.43 [.11]	0.16 [.04]	0.16 [.04]
10000 [4719]	1.01	1.04	1.01	0.15 [.04]	0.32 [.07]	0.14 [.03]	0.50 [.12]	0.17 [.04]	0.17 [.04]
10400 [4908]	1.02	1.08	1.01	0.16 [.04]	0.34 [.08]	0.15 [.04]	0.56 [.14]	0.18 [.04]	0.18 [.05]
10800 [5096]	1.03	1.11	1.01	0.18 [.04]	0.37 [.09]	0.16 [.04]	0.63 [.16]	0.19 [.05]	0.19 [.05]
11200 [5285]	1.03	1.14	1.02	0.19 [.05]	0.39 [.10]	0.17 [.04]	0.69 [.17]	0.20 [.05]	0.21 [.05]
11600 [5474]	1.04	1.17	1.02	0.21 [.05]	0.41 [.10]	0.18 [.04]	0.76 [.19]	0.20 [.05]	0.22 [.05]
12000 [5663]	1.05	1.20	1.02	0.22 [.05]	0.44 [.11]	0.19 [.05]	0.82 [.20]	0.21 [.05]	0.23 [.06]
12400 [5851]	1.06	1.23	1.03	0.24 [.06]	0.46 [.11]	0.20 [.05]	0.89 [.22]	0.22 [.05]	0.24 [.06]
12800 [6040]	1.06	1.26	1.03	0.25 [.06]	0.49 [.12]	0.21 [.05]	0.96 [.24]	0.23 [.06]	0.26 [.06]
13200 [6229]	1.07	1.29	1.04	0.27 [.07]	0.52 [.13]	0.22 [.05]	1.02 [.25]	0.24 [.06]	0.27 [.07]

[] Designates Metric Conversions

Indoor Airflow Performance RGEHYB360 Series

COMPONENT AIRFLOW RESISTANCE – 30 TON [105.4kW] – 60 Hz – DOWNFLOW (WITH HEAT EXCHANGER)

AIRFLOW PERFORMANCE – 30 TON [105.4kW] – 60 Hz – SIDEFLOW (WITH HEAT EXCHANGER)

	- M						000	000		ľ																												Γ
A i.v	DIN	aer K	MODEL KGEHYB3DU	300	NOIL	VOITAGE 2U0/23U, 40U, 3/3	10/231	J, 40U	C/C	2	JUASE	U U	2																									
															ŭ	External	l Stati	Static Pressure—Inches of Water [kPa]	sure-	-Inche	s of V	Vater	[kPa]															
CEM [1 /s]	0.1[.02]	<u> </u>	0.2 [.05]		0.3[.07]		0.4[.10]		0.5[.12]		0.6[.15]	0.7	7[.17]] 0.8	8 [.20]		0.9[.22]	1.0[.25]	1.1[.27]	_	1.2[. [08.]	1.3[.3	.32] 1	1.4[.3	.35] 1	1.5 [.37]		1.6 [.40]		1.7 [.42]		1.8 [.45]	1.9 [.47]	2.0[[.50]
	_	BHP I	RPM BHP RPM BHP RPM BHP RPM BHP RPM BHP RPM BHP RPM	HP RI	PM BF	HP RP	M BF	IP RP	M BH	P RP	M BH	IP RP	M BHP	IP RPM	M BHP	P RPM	A BHP	RPM	BHP	RPM	BHP RPM	RPM	BHP	3PM F	BHP F	PM B	HP RI	PM BI	HP RI	BHP RPM BHP	IP RP	M BH	P RPN	M BHP	RPM	BHP	RPM	BHP
8800 [4153]		1	-			- 81	814 4317	17 838	8 4563	33 860	0 4808	38 882	2 5053	53 903	3 5296	5 923	5538	942	5779	964	5985	983	6236	1003	6516 1	1024 6	6823 10	1047 71	7158 10	1071 7522	22 1110	10 8217	7 1128	8 8551	1147	8895	1165	9249
9000 [4247]	Ι		- 	- 	 	- 827	7 4553	53 850	0 4804	94 872	2 5053	53 893	3 5302	02 914	4 5549	933	5796	956	6003	974	6252	994	6530	1015 6	6835 1	1038 7	7169 10	1061 75	7530 11	1103 824	8244 1121	21 8575	5 1140	0 8917	1158	9268	1176	9629
9200 [4341]		1	1	8	816 45-	4544 84	840 4799	99 862	2 5054	54 884	4 5308	38 905	5561	51 924	4 5813	3 948	6026	996	6273	986	6549	1007	6853	1028 7	7185 1	1052 7	7544 10	1076 79	7932 11	1115 8607	07 1133	33 8945	1151	1 9294	1169	9652	1187	10020
9400 [4436]	Ι		805 45	4535 8	829 47:	4796 852	2 5056	56 874	4 5315	5 895	5 5573	73 916	6 5831	31 935	5 6087	7 959	6299	978	6573	998	6875	1020	7205	1043 7	7563 1	1067 7	7949 11	1108 86	8644 11	1126 8980	80 1144	44 9325	25 1162	2 9681	1180	10047	1198 1	10422
9600 [4530]	795	4526	819 47	4792 8	843 50	5058 865	55 5323	23 887	7 5586	36 907	7 5849	49 927	7 6110	10 951	1 6330	070 C	6602	990	6902	1012	7231	1034	7587	1058 7	7971 1	1102 8	8688 11	1120 90	9021 11	1138 9364	64 1156	56 9717	7 1174	1174 10079 1192 10452	1192	10452	1210 10835	0835
9800 [4624]	809	4790	833 50	5061 8	856 53	5330 878	8 5599	668 66	9 5867	37 919	9 6135	35 938	8 6401	01 963	3 6636	5 983	6934	1004	7261	1026	7616	1049	. 8667	1074 8	8409 1	1114 9	9068 11	1132 94	9408 11	1150 9758	58 1168		10119 1185	5 10489	9 1203 10869		1221	11259
10000 [4719]	824	5064	847 53	5339 8	869 56	5613 890	0 5887	87 911	1 6159	59 930	0 6431	31 956	6 6675	75 975	5 6972	2 996	7296	1018	7649	1041	8030	1065	8439	1109	9122 1	1126 9	9459 11	1144 98	9807 11	1162 101	10164 117	1179 10531 1197 10909 1214 11296 1232 11693	31 1197	7 10905	1214	11296	1232	1693
10200 [4813]	838	5348	861 56	5628 8	882 59	5906 903	13 6184	84 923	3 6461	31 942	2 6737	37 969	9 7014	14 989	9 7337	1011	7688	1033	8067	1057	8474	1103	9182	1121 9	9517 1	1139 9	9861 11	1156 103	10216 11	1173 105	10580 1191		55 1208	10955 1208 11339	9 1226 11734		1243 1	12138
10400 [4908]	852	5642	874 59	5926 8	895 62	6210 916	6 6492	92 935	5 6773	73 962	2 7061	51 982	2 7382	32 1004	04 7731	1 1026	8108	1049	8514	1074	8947	1116	9581	1133 9	9922 1	1151 10	10274 11	1168 10636		1185 11007		1203 1138	39 122(11389 1220 11781 1237 12182	1237	12182	1254 1	12594
10600 [5002]	867	5947	888 62	6236 9	909 62	6523 928	8 6810	10 956	6 7112	12 976	6 7432	32 997	6777 78	79 1019	19 8155	5 1042	2 8558	1067	8990	1111	9651	1128	. 0666	1145 1	10339 1	1163 10	10697 11	1180 11066		1197 11445		1214 11834 1231 12233 1249 12642	34 123	1 12235	1249	12642	1	
10800 [5096]	881	6262	902 65	6555 9	922 68-	6847 941	1 7138	38 970	0 7487	37 991	1 7833	33 1012	12 8206	1035	35 8608	8 1059	9038	1106	9727	1123	10063	1141 1	10409	1158 1	10766 1	1175 11132		1192 11	11508 12	1209 11894	394 1226		90 124;	12290 1243 12696	1260	13112		
11000 [5191]	895	6587	915 68	6885 9.	935 71	7181 965	5 7547	47 985	5 7891	91 1006	06 8263	53 1029	29 8663	53 1053	53 9091	1 1078	9547	1119	10143	1136	10487	1153 1	10840	1170 11203		1187 11577		1204 11960		1221 123	12353 1238	38 12757	57 1254	4 13170		Ι		
11200 [5285]	606	6923	929 72	7225 9.	959 76	7612 97	979 79	7954 1001	11 8324	24 1023	23 8722	22 1046	46 9149	1071	71 9603	3 1115	5 10230	1132	10570	1148	10921	1165 11281		1182 1	11652 1	1199 12	12033 12	1216 12423		1233 128	12824 1249	13234	34 —		Ι	Ι		
11400 [5379]	923	7269	942 75	7575 9	974 80:	8022 995		8390 1017	7 8787	37 1040	40 9211	11 1065	55 9664	54 1111	11 10323	3 1128	10660	1144	11008	1161	11366	1178 1	11734 -	1194 1	12111 1	1211 12	12499 12	1228 123	12897 12	1244 133	13305 1261	51 13722	22		Ι	Ι	Ι	
11600 [5474]	937	7625	970 8(8095 9	990 84	8461 1012		8856 1035	5 9279	9 1059	59 9730	30 1107	07 10422	22 1124	24 10757	7 1140	11102	1157	11457		1174 11822	1190 12197		1207 12582		1223 12977		1240 13382		1256 137	13797 —	-	-		Ι	Ι		Ι
11800 [5568]	965	8173	986 85	8538 10	1007 89:	8931 1030		9352 1053	3 9801		1078 10278	78 1120	20 10860	60 1137	37 11202	2 1153	11554	1170	11916	1186	12288	1203 1	12670	1219 1	13063 1	1235 13	13465 12	1252 13	13877 -				-		Ι	Ι		Ι
12000 [5663]	981	8619	1003 90	9010 10	1025 94:	9429 1048	48 98	9876 1073 10352 1117 10969	3 103	52 111	17 109.	69 1133	33 11308	08 1150	50 11658	8 1166	3 12017	1182	12386	1199	12766	1215 1	13155	1231 1	13554 1	1248 13	13964 12	1264 140	14383 -						Ι	Ι	Ι	Ι
12200 [5757]	998	9094	1020 95	9511 10	1043 99	9957 1068 10431 1114 11084	38 104	111 111	4 1108	84 115	1130 11421	21 1147	47 11767	67 1163	53 12124	4 1179	12491	1195	12867	1211	13254	1227 1	13650	1244 14057		1260 14	14474 -	' 	' 						Ι	Ι	Ι	Ι
12400 [5851]	1016	9599	1039 10043 1063	043 1(J63 10t	10514 1112 11206 1128 11540 1144 11884	12 112	:06 112	8 1154	40 114	118.	84 1160	50 12238	38 1176	76 12601	1 1192	2 12975	1208	13359	1224	13753	1240 1	14157	1256 1	14570	1	'	' 	' 						Ι	Ι	Ι	Ι
12600 [5946]	1035	10133	1059 10603 1109 11334 1125 11665 1141 12006	603 1	11:	334 11;	25 116	365 114	1 1200		1157 12357	57 1173	<u> </u>	12718 1189	39 13089	9 1205	13470	1221	13861	1237	14262	1252 1	14674	1		-	'	'	' 						Ι	Ι	Ι	Ι
12800 [6040] 1055	1055 1	10697	1079 11193 1123 11797 1139 12136 1155 12484	193 1;	11.	797 11:	39 121	36 115	5 1248	84 117	1170 12842	42 1186	-	3210 1202	13588	8 1218	13977	1233	14375	1249	14783	1265 1	15201				' 	- -						I	I		I	
13000 [6134] 1076 11290 1121 11936 1137 12271 1152 12616 1168 12972 1184 13337	1076 1	1290	1121 11	936 1	137 122	271 11	52 126	316 116	8 129;	72 116	34 133.	37 1199	· ·	13713 1215	15 14098	8 1231	14493	1246	14899	1262	15314	Ι	1	1		1	' 	' 	'						I	Ι	Ι	1
13200 [6229] 1119 12080 1135 12413 1150 12755 1166 13108 1182 13471 1197 13843 1213	1119 1	12080	1135 12	413 11	12;	755 116	36 131	08 118	2 134;	71 115	37 138	43 12		26 125	14226 1228 14619	9 1244	15021	1259	15434	Ι	Ι						' 	-					-		Ι	Ι	Ι	
NOTE: F-Drive left of first bold line, G-Drive in between bold lines, H-Drive right of sec	rive left	of fir.	st bold	line, G	i-Drive	ein bei	tweer	l blod I	ines, I	H-Driv	ve rigt	't of s		cond bold line	line.																							

				9	1077
				9	1112
-	15 [11185.5]	H06	71	4	1149
Н	15 [11	BK190H	1VP71	8	1182
				2	1221
				1	1256
				9	931
				5	952
	57.0]	POH	75	4	973
G	10 [7457.0]	BK120H	1VP75	3	1014
				2	1042
				1	1069
				9	806
				5	833
	92.7]	HO	71	4	859
LL.	7.5 [5592.7	BK130H	1VP71	3	885
				2	912
				-	937
Drive Package	Motor H.P. [W]	Blower Sheave	Motor Sheave	Turns Open	RPM

NOTES: 1. Factory sheave settings are shown in bold type.

Do not set motor sheave below minimum or maximum turns open shown.
 Re-adjustment of sheave required to achieve rated airflow at AHRI minimum External Static Pressure.
 Drive data shown is for horizontal airflow with dry coil. Add component resistance (below) to duct resistance to determine total External Static Pressure.

LOW
SIDEFLOW
I
- 60 Hz
tkW]
[105.4
30 TON [105.4kV
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T AIR EXCF
COMPONENT AIRI (WITH HEAT EXCH
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Airflow CORRECTION FACTORS Airflow Correction Factor CFM [L/s] Total kBtu/h Sensible kBtu/h Poi 8800 [4153] 0.99 0.97 Poi 9200 [4341] 1.00 0.99 0.99 Poi 9600 [4341] 1.00 1.01 1.01 Poi 10000 [4719] 1.01 1.03 Pi Poi 10000 [4719] 1.01 1.03 Pi Pi 10400 [4749] 1.02 1.05 Pi Pi 11200 [5285] 1.03 1.05 Pi Pi 11600 [5474] 1.03 1.07 Pi Pi 10000 [5785] 1.03 1.09 Pi Pi			00	ILUNENI AINI	CUMPUNENI AIRFLUW RESISIANCE		
Total kBtu/h 0.99 0.99 1.00 1.00 1.01 1.01 1.02 1.03 1.03 1.04	-ow N Factors	Wet Coil	Downflow Economizer RA Damper Open	Horizontal Economizer RA Damper Open	Concentric Diffuser RXRN-AD88 & Transition RXMC-CL09	MERV 8 Filter	MERV 13 Filter
0.99 1.00 1.00 1.01 1.02 1.02 1.03 1.03 1.04	kBtu/h Power kW		_	Resistance — Inc	Resistance — Inches of Water [kPa]		
1.00 1.00 1.01 1.01 1.02 1.03 1.03 1.03	7 0.99	0.10 [.02]	0.26 [.06]	0.11 [.03]	0:30 [.07]	0.15 [.04]	0.13 [.03]
1.00 1.01 1.02 1.03 1.03 1.03	9 1.00	0.12 [.03]	0.28 [.07]	0.12 [.03]	0.36 [.09]	0.16 [.04]	0.15 [.04]
1.01 1.02 1.03 1.03 1.04	1 1.00	0.13 [.03]	0.30 [.07]	0.13 [.03]	0.43 [.11]	0.16 [.04]	0.16 [.04]
1.02 1.03 1.03 1.04	3 1.01	0.15 [.04]	0.32 [.07]	0.14 [.03]	0.50 [.12]	0.17 [.04]	0.17 [.04]
1.03 1.03 1.04 1.05	5 1.01	0.16 [.04]	0.34 [.08]	0.15 [.04]	0.56 [.14]	0.18 [.04]	0.18 [.05]
1.03 1.04 1.05	7 1.01	0.18 [.04]	0.37 [.09]	0.16 [.04]	0.63 [.16]	0.19 [.05]	0.19 [.05]
1.04	9 1.02	0.19 [.05]	0.39 [.10]	0.17 [.04]	0.69 [717]	0.20 [.05]	0.21 [.05]
1 05	1 1.02	0.21 [.05]	0.41 [.10]	0.18 [.04]	0.76 [.19]	0.20 [.05]	0.22 [.05]
CU.1	3 1.02	0.22 [.05]	0.44 [.11]	0.19 [.05]	0.82 [.20]	0.21 [.05]	0.23 [.06]
12400 [5851] 1.06 1.15	5 1.03	0.24 [.06]	0.46 [.11]	0.20 [.05]	0.89 [.22]	0.22 [.05]	0.24 [.06]
12800 [6040] 1.07 1.17	7 1.03	0.25 [.06]	0.49 [.12]	0.21 [.05]	0.96 [.24]	0.23 [.06]	0.26 [.06]
13200 [6229] 1.07 1.19	9 1.04	0.27 [.07]	0.52 [.13]	0.22 [.05]	1.02 [.25]	0.24 [.06]	0.27 [.07]

			ELECTRI	CAL DATA	A – RGEHY	YB SERIE	S			
		360ACF	360ACG	360ACH	360ADF	360ADG	360ADH	360AYF	360AYG	360AYH
	Unit Operating Voltage Range	187-253	187-253	187-253	414-506	414-506	414-506	518-633	518-634	518-635
	Volts	208/230	208/230	208/230	460	460	460	575	575	575
	Phase	3	3	3	3	3	3	3	3	3
	Hz	60	60	60	60	60	60	60	60	60
	Minimum Circuit Ampacity	147/147	153/153	166/166	69	72	78	52	54	58
nation	Minimum Circuit Ampacity with Power Exhaust	157/157	163/163	176/176	74	77	82	55	57	61
Unit Information	Minimum Overcurrent Protection Device Size	175/175	175/175	200/200	80	80	90	60	60	70
Ū	Minimum Overcurrent Protection Device Size with Power Exhaust	175/175	200/200	200/200	80	90	90	60	70	70
	Maximum Overcurrent Protection Device Size	200/200	200/200	200/200	90	90	100	70	70	70
	Maximum Overcurrent Protection Device Size with Power Exhaust	200/200	200/200	225/225	90	100	100	70	70	70
	No.	2	2	2	2	2	2	2	2	2
l de	Volts	208/230	208/230	208/230	460	460	460	575	575	575
Σ	Phase	3	3	3	3	3	3	3	3	3
SSO	Amps (RLA), Comp. 1	54.7	54.7	54.7	24.0	24.0	24.0	19.2	19.2	19.2
Compressor Motor	Amps (LRA), Comp. 1	386.3	386.3	386.3	182.0	182.0	182.0	131.0	131.0	131.0
S	Amps (RLA), Comp. 2	31.8	31.8	31.8	15.6	15.6	15.6	12.4	12.4	12.4
	Amps (LRA), Comp. 2	255.0	255.0	255.0	140.0	140.0	140.0	107.6	107.6	107.6
	No.	6	6	6	6	6	6	6	6	6
Condenser Motor	Volts	208/230	208/230	208/230	460	460	460	575	575	575
er N	Phase	1	1	1	1	1	1	1	1	1
lens	HP	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Con	Amps (FLA, each)	4.2	4.2	4.2	2.3	2.3	2.3	1.2	1.2	1.2
	Amps (LRA, each)	11.5	11.5	11.5	5.9	5.9	5.9	4.2	4.2	4.2
[_]	No.	1	1	1	1	1	1	1	1	1
Evaporator Fan	Volts	208/230	208/230	208/230	460	460	460	575	575	575
ator	Phase	3	3	3	3	3	3	3	3	3
bor	HP	7.5	10	15	7.5	10	15	7.5	10	15
Eva	Amps (FLA, each)	21.0	27.0	40.5	9.6	12.5	18.0	7.7	10.0	13.8
	Amps (LRA, each)	127.0	152.0	210.0	63.5	76.0	105.0	50.8	60.8	93.6

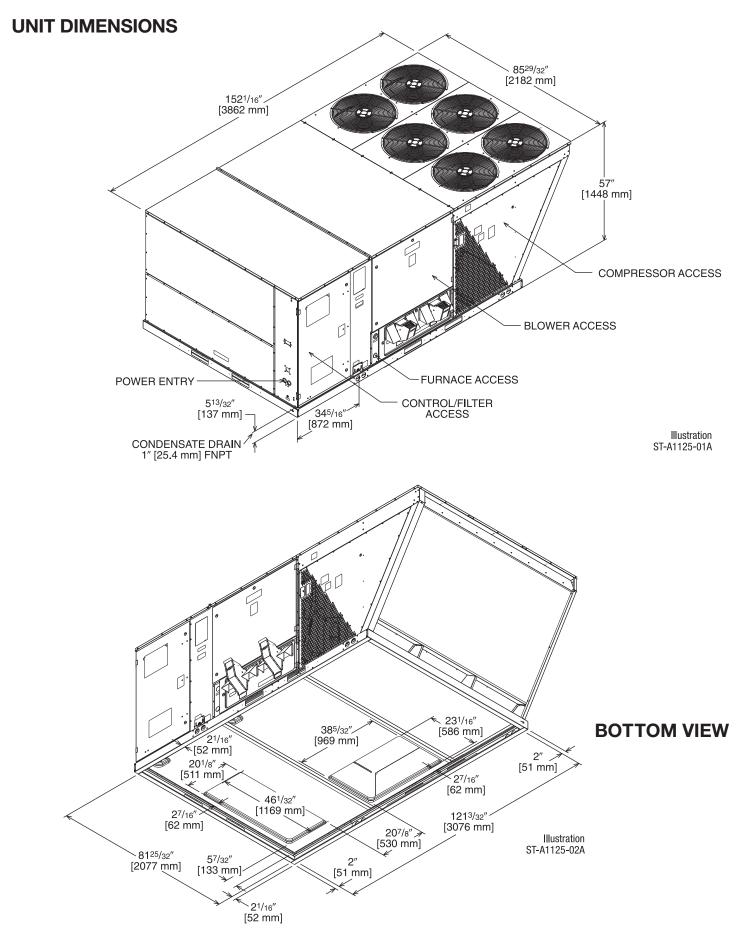
MANUAL MOTOR STARTER AMP SETPOINT

	Motor Part No.	51-102826-10	51-102826-11	51-107478-01	51-107478-02
	Motor HP	10	10	15	15
	208V	27.0	—	39.5	—
Matar Namanlata Amna	230V	25.0	—	36.0	
Motor Nameplate Amps	460V	12.5	—	18.0	
	575V	—	10.0		14.4
	208V	31.1	—	45.4	—
Motor CE amo	230V	28.8	—	41.4	
Motor SF amps	460V	14.4	—	20.7	
	575V	—	11.5		16.6
	208/230V	25.0-32.0	—	40.0-54.0	—
Manual Motor Starter Amp Range	460V	10.0-16.0	—	20.0-25.0	
	575V	—	8.0-12.0		16.0-20.0
	208/230V	42-107877-05	—	42-107877-06	—
Friedrich Part No.	460V	42-107877-02	—	42-107877-04	
	575V	—	42-107877-01	_	42-107877-03
	208V	32.0*	—	47.0*	
Manual Matan Charlen Aren Cataaint	230V	30.0	_	43.0	
Manual Motor Starter Amp Setpoint	460V	15.0		22.0	
	575V	—	12.0	_	17.0
	208/230V	RGEHYB360ACG	—	RGEHYB360ACH	
Unit Model No.	460V	RGEHYB360ADG	—	RGEHYB360ADH	
	575V	—	RGEHYB360AYG	—	RGEHYB360AY

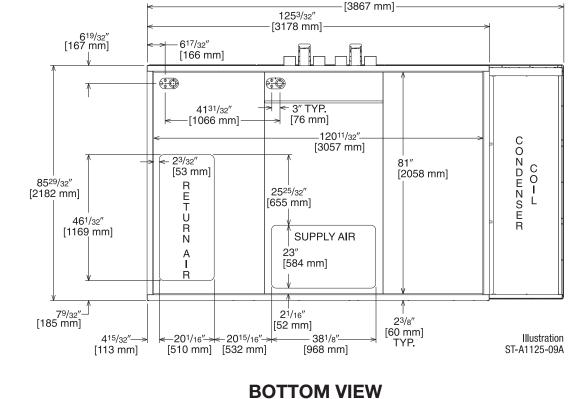
*NOTE: Units ship from factory set for 230 volt operation. Setpoint must be adjusted for 208 volt operation.

A2L INSTALLATION REFRIGERATION SAFETY DATA

Model		RGEHYB360
Refrigerant Charge Weight (oz)	Circuit 1/Circuit 2	230.4/223.2
Minimum circulation airflow	ı, Qmin (CFM)	766
Altitude above Sea Level (Ft.)	Altitude Adjustment Factor	Minimum Total Space Area, TAmin (Sq. Ft.)
0	1.000	425
1000	1.025	435
2000	1.051	446
3000	1.078	458
4000	1.107	470
5000	1.138	483
6000	1.170	497
6500	1.187	504



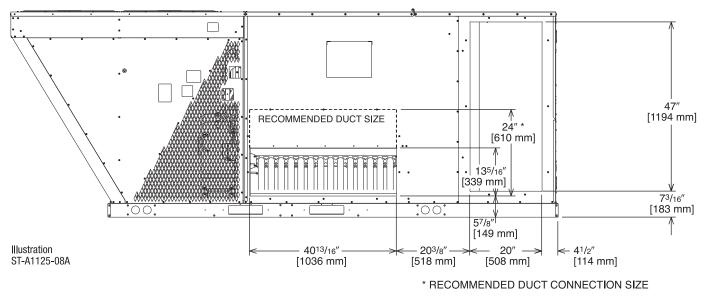
[] Designates Metric Conversions



SUPPLY AND RETURN DIMENSIONS FOR DOWNFLOW APPLICATIONS (VIEW FROM BOTTOM UP)

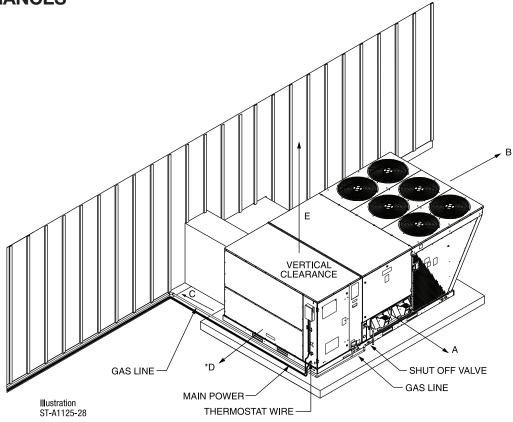
DUCT SIDE VIEW (REAR)

1521/4"



SUPPLY AND RETURN DIMENSIONS FOR HORIZONTAL APPLICATIONS (VIEW FROM REAR DUCT SIDE)

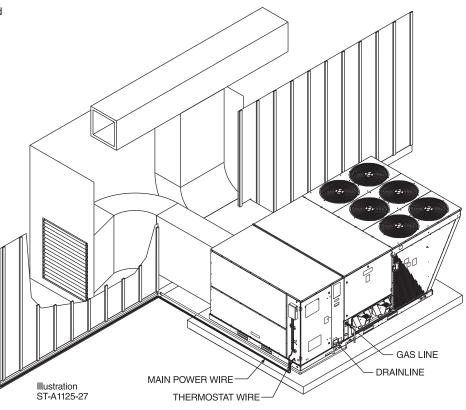
REQUIRED UNIT CLEARANCES



CLEARANCES

The following minimum clearances are recommended for proper unit performance and serviceability.

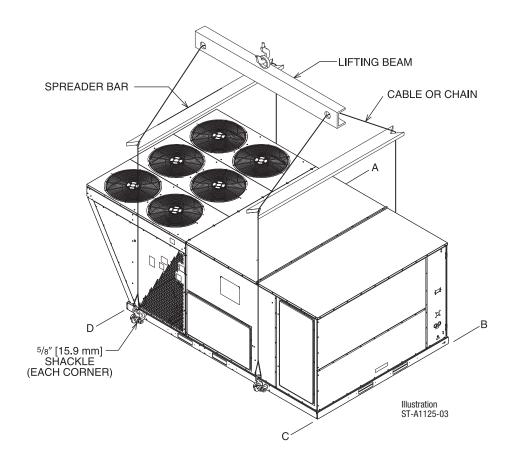
Recommended Clearance In. [mm]	Location
80" [2032]	A - Front
18" [457]	B - Condenser Coil
18" [457] / 42" [1067]	+C - Duct Side
18" [457] / 48" [1219]	*D - Evaporator End
60" [1524]	E - Above



WEIGHTS

(CORNER WEIGHTS	S BY PERCENTAGE	
А	В	С	D
32%	27%	16%	24%

CORNER WEIGHTS MEASURED AT BASE OF UNIT



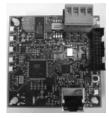
FIELD INSTALLED ACCESSORY EQUIPMENT

Accessory	Model Number	Shipping Weight Lbs. [kg]	Installed Weight Lbs. [kg]	Factory Installation Available?
Economizers				
DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop</i> Systems Economizer with Honeywell Controller	AXRD-01RMDCM3	277 [125.6]	168 [76.2]	Yes
DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop</i> Systems Economizer with Honeywell Controller w/ Smoke Detector	AXRD-01RMDDM3	277 [125.6]	168 [76.2]	Yes
DDC Economizer with Single Enthalpy (Horizontal) <i>Ruskin Rooftop</i> Systems Economizer with Honeywell Controller	AXRD-01RMHCM3	333 [151.0]	301 [36.5]	No
Non-DDC Economizer with Single Enthalpy (Downflow) <i>Ruskin Rooftop</i> Systems Economizer with Siemens Controller	RXRD-51MHDAM3	277 [125.6]	168 [76.2]	Yes
Non-DDC Economizer with Single Enthalpy (Horizontal) <i>Ruskin Rooftop</i> Systems Economizer with Siemens Controller	RXRD-51MHHAM3	333 [151.0]	301 [36.5]	No
Economizer Universal DDC Interface Kit	RXRX-DDC02	40 [18.1]	34 [15.4]	Yes

Accessory	Model Number	Shipping Weight Lbs. [kg]	Installed Weight Lbs. [kg]	Factory Installation Available?
Comfort Alert (1 per Compressor) (DDC)	RXRX-AZ01	3 [1.4]	2 [0.9]	Yes
Communication Card, BACnet	RXRX-AY01	1 [0.5]	1 [0.5]	No
Communication Card, LonWorks	RXRX-AY02	1 [0.5]	1 [0.5]	No
Concentric Adapter/Transition (30 ton)	RXMC-CL09	81 [36.7]	74 [33.6]	No
Concentric Step Down Diffuser (30 ton)	RXRN-AD88	410 [186.0]	370 [67.8]	No
Convenience Outlet, Non-Powered	RXRX-AN01	2 [0.9]	1.5 [0.7]	Yes
Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC)	RXRX-AV04	1 [0.5]	1 [0.5]	No
Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell Non-DDC)	RXRX-BV02	1 [0.5]	1 [0.5]	No
Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC)	PD555460	1 [0.5]	1 [0.5]	No
Fresh Air Damper ¹ , Manual	AXRF-KFA1	61 [27.7]	52 [23.6]	No
Fresh Air Damper, Motorized (DDC)	RXRX-AW05	45 [20.4]	38 [17.2]	No
Hail Guard Louvers	AXRX-AAD01L	55 [24.8]	45 [20.3]	Yes
Low-Ambient Control Kit (1 Per Compressor)	RXRZ-C02	3 [1.4]	2 [0.9]	Yes
MERV 8 Filter	RXMF-M08A22520	2 [0.9]	1 [0.45]	Yes
MERV 13 Filter	RXMF-M13A22520	2 [0.9]	1 [0.45]	Yes
Power Exhaust (208/230V) Kit, Convertible (RRS)	RXRX-BGF05C	119 [54.0]	59 [26.8]	No
Power Exhaust (460V) Kit, Convertible (RRS)	RXRX-BGF05D	119 [54.0]	59 [26.8]	No
Roofcurb, 14"	RXKG-CBH14	184 [83.5]	176 [79.8]	No
Roofcurb Adapter to RXKG-CAF14	RXRX-CJCF14	555 [251.7]	505 [29.1]	No
Roofcurb Adapter to RXRK-E56	RXRX-CJCE56	465 [210.9]	415 [88.2]	No
Sensor, Carbon Dioxide (Wall Mount)	RXRX-AR02	3 [1.4]	2 [1.0]	No
Sensor, Room Humidity	RHC-ZNS4	1 [0.5]	1 [0.5]	No
Sensor, Room Temperature and Relative Humidity	RHC-ZNS5	1 [0.5]	1 [0.5]	No
Unfused Service Disconnect	RXRX-AP01	10 [4.5]	9 [4.1]	Yes

¹Motorized Kit and Manual Fresh Air Damper must be combined for a complete Motorized Outside Air Damper Selection.

COMMUNICATION CARDS Field-Installed



BACnet COMMUNICATION CARD

D RXRX-AY01

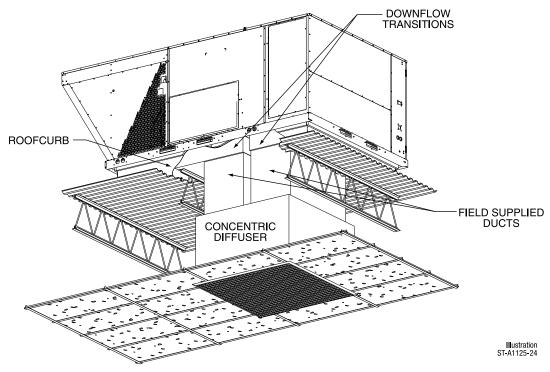
The field installed BACnet Communication Card allows the RTU-C unit controller to communicate with a third party building management system that supports the BACnet Application Specific Controller device profile. The BACnet Communication Module plugs onto the unit RTU-C controller and allows communication between the RTU-C and the BACnet MSTP network.



LonWorks COMMUNICATION CARD RXRX-AY02

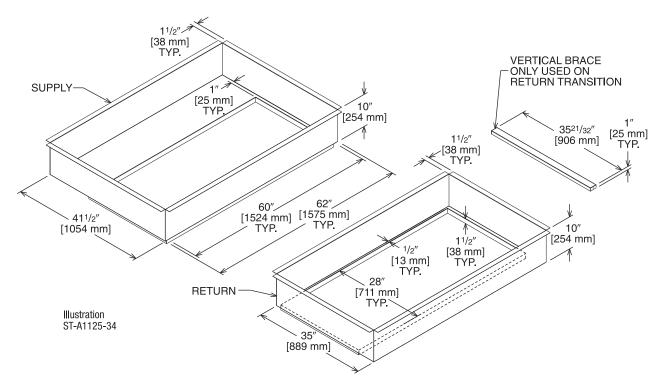
The field installed LonWorks Communication Card allows the RTU-C unit controller to communicate with a third party building management system that supports the LonMark Space Comfort Controller (SCC) functional profile or LonMark Discharge Air Controller (DAC) functional profile. The LonMark Communication Module plugs onto the RTU-C controller and allows communication between the RTU-C and a LonWorks Network.

CONCENTRIC DIFFUSER APPLICATION



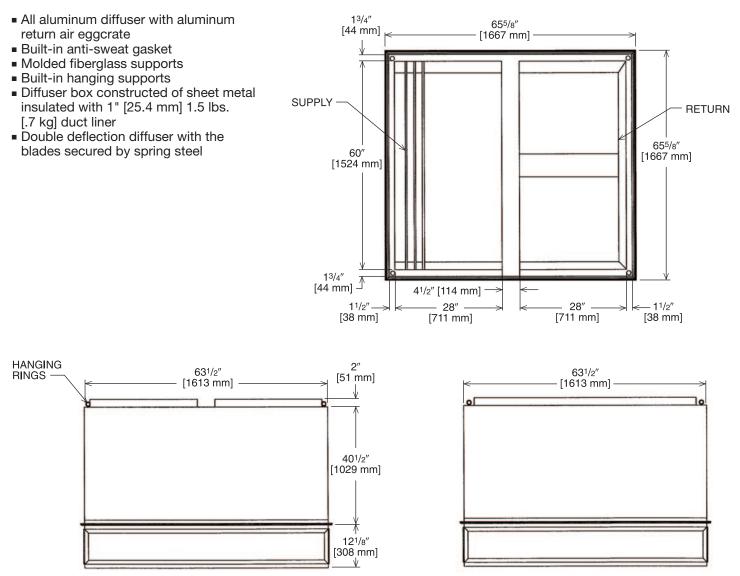
RXMC-CL09 - Concentric Adapter/Transition (30 Ton)

Used with RXRN-AD88 Concentric Diffusers



CONCENTRIC STEP DOWN DIFFUSER (30 TON)

RXRN-AD88



CONCENTRIC DIFFUSER SPECIFICATIONS

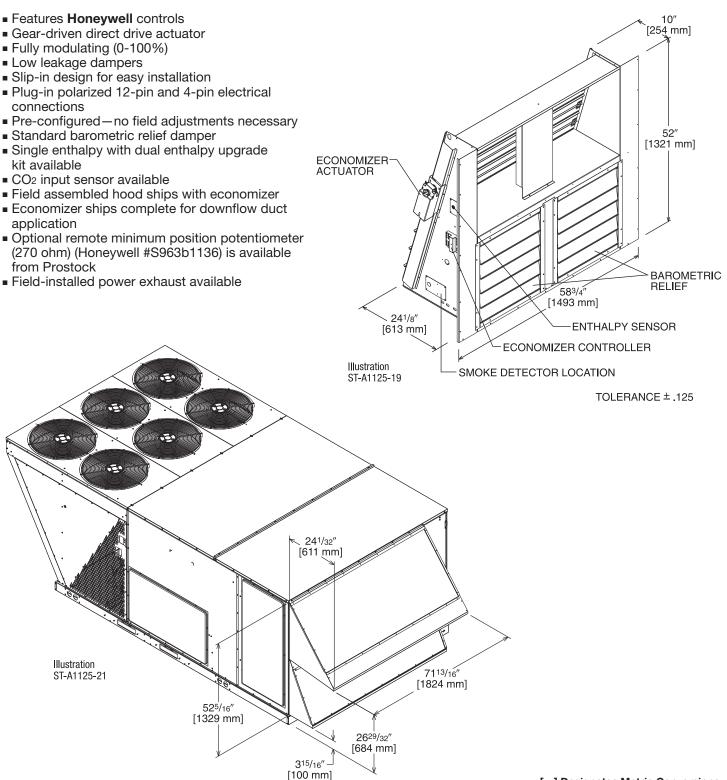
PART NUMBER	CFM [L/s]	STATIC Pressure	THROW FEET	NECK Velocity	JET VELOCITY
	10000 [4719]	0.51	46-54	907	907
	10500 [4955]	0.58	50-58	953	953
	11000 [5191]	0.65	53-61	998	998
RXRN-AD88	11500 [5427]	0.73	55-64	1043	1043
	12000 [5663]	0.82	58-67	1089	1089
	12500 [5898]	0.91	61-71	1134	1134
	13000 [6134]	1.00	64-74	1179	1179

DDC ECONOMIZER WITH SINGLE ENTHALPY (DOWNFLOW) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH HONEYWELL JADE CONTROLLER

Factory or Field-Installed

AXRD-01RMDCM3

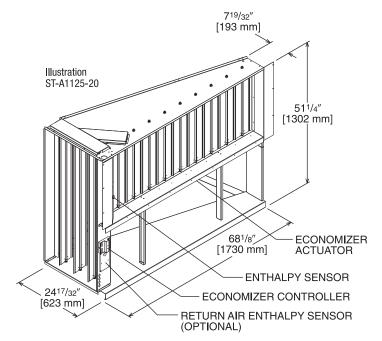
RXRX-AV04—Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC) RXRX-AR02—Sensor, Carbon Dioxide (Wall Mount)



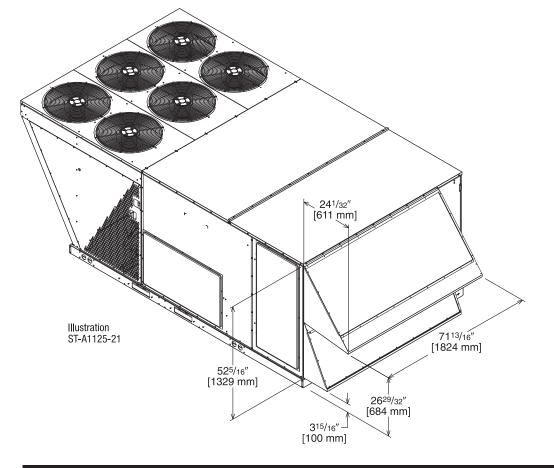
DDC ECONOMIZER WITH SINGLE ENTHALPY (DOWNFLOW) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH HONEYWELL CONTROLLER & SMOKE DETECTOR Factory or Field-Installed

AXRD-01RMDDM3 RXRX-AV04—Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC) RXRX-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features Honeywell controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO₂ input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for horizontal duct application
- Optional remote minimum position potentiometer (270 ohm) (Honeywell #S963b1136) is available from Prostock
- Field-installed power exhaust available
- If connected to a building automation system (BAS), all economizer functions can be viewed on the (BAS) or 16 characters x 2 rows of text LCD screen
- If connected to thermostat, all economizer functions can be viewed on 16 characters x 2 rows of text LCD screen



TOLERANCE ± .125

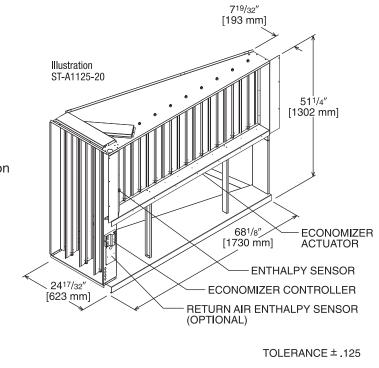


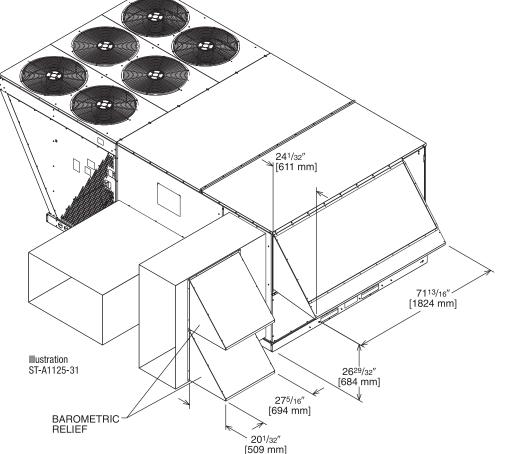
DDC ECONOMIZER (HORIZONTAL) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH HONEYWELL CONTROLLER

Field-Installed Only

AXRD-01RMHCM3 RXRX-AV04—Dual Enthalpy, Temperature and Humidity Sensor (for Honeywell DDC) RXRX-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features Honeywell controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO₂ input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for horizontal duct application
- Optional remote minimum position potentiometer (270 ohm) (Honeywell #S963b1136) is available from Prostock
- Field-installed power exhaust available

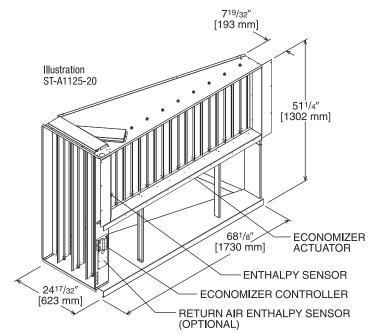




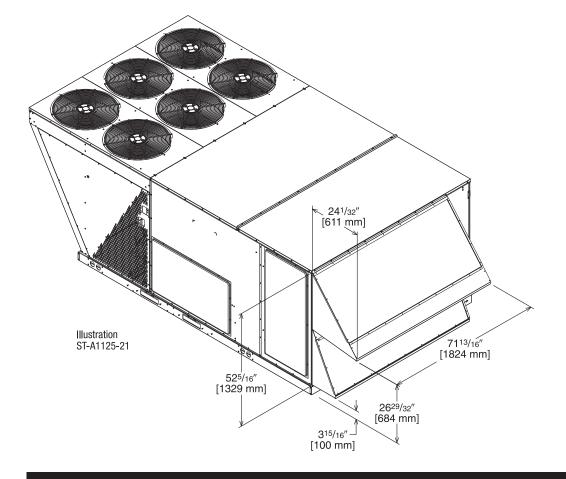
NON-DDC ECONOMIZER WITH SINGLE ENTHALPY (DOWNFLOW) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH SIEMENS CONTROLLER Factory or Field-Installed

RXRD-51MHDAM3 PD555460-Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC) RXRX-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features **Siemens** controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO₂ input sensor available
- Economizer ships complete for downflow duct application
- Field-assembled hood ships with economizer
- Ultra low leak dampers meet California Title 24 requirements and ASHRAE 90.1
- Field-installed power exhaust available
- Can be converted to DDC operation with the economizer universal DDC interface kit (RXRX-DDC02)



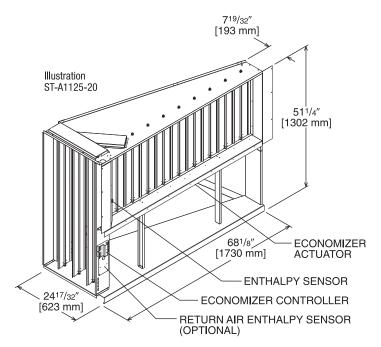
TOLERANCE ± .125



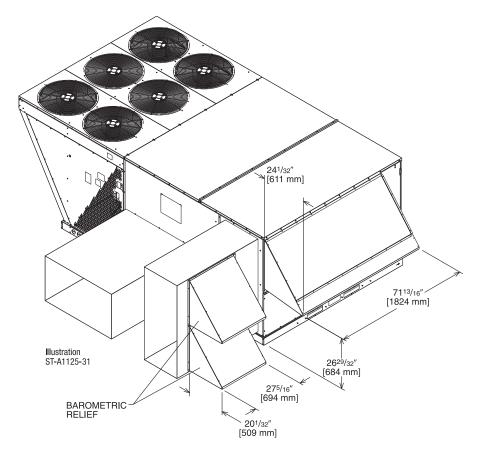
NON-DDC ECONOMIZER WITH SINGLE ENTHALPY (HORIZONTAL) RUSKIN ROOFTOP SYSTEMS ECONOMIZER WITH SIEMENS CONTROLLER Field-Installed Only

RXRD-51MHHAM3 PD555460-Dual Enthalpy, Temperature and Humidity Sensor (for Siemens Non-DDC) RXRX-AR02—Sensor, Carbon Dioxide (Wall Mount)

- Features Siemens controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Standard barometric relief damper
- Single enthalpy with dual enthalpy upgrade kit available
- CO2 input sensor available
- Field-assembled hood ships with economizer
- Economizer ships complete for horizontal duct application
 Ultra low leak dampers meet California Title 24
- requirements and ASHRAE 90.1 Field-installed power exhaust available
- Can be converted to DDC operation with the economizer universal DDC interface kit (RXRX-DDC02)



TOLERANCE ± .125



ECONOMIZER UNIVERSAL DDC INTERFACE KIT Available Factory or Field-Installed

RXRX-DDC02

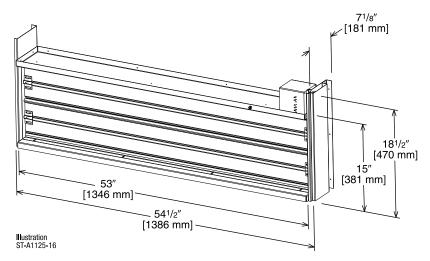
- Allows any non-DDC Economizer to be used with a ClearControl DDC model
- Mounts on the Economizer
- Provides mounting location for Economizer Controller
- Provides wire management for excess wire
- **NOTE**: Older DDC Models, prior to A2L, may require a field update to the ClearControl Software. The minimum version required is 3.15. Models with R-454B refrigerant will come with software version 4.0 or higher.

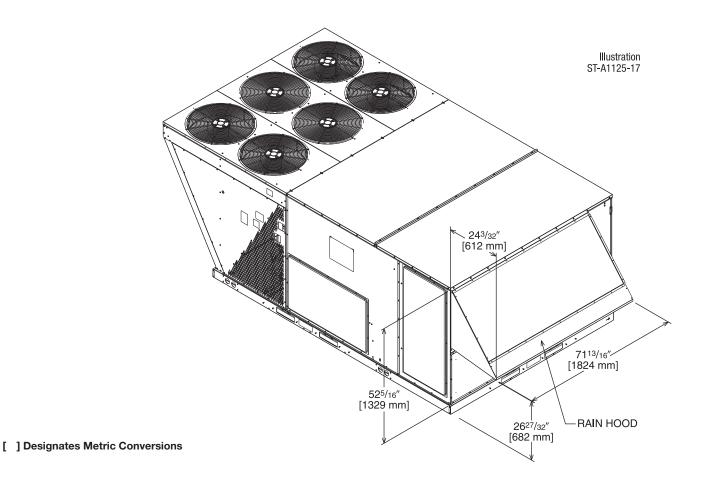
FRESH AIR DAMPER

AXRF-KFA1-Fresh Air Damper, Manual

RXRX-AW05-Fresh Air Damper, Motorized (DDC)

- Features Honeywell controls
- Gear-driven direct drive actuator
- Fully modulating (0-100%)
- Low leakage dampers
- Slip-in design for easy installation
- Plug-in polarized 12-pin and 4-pin electrical connections
- Pre-configured—no field adjustments necessary
- Addition of Dual Enthalpy upgrade kit allows limited economizer function
- CO₂ sensor input available for Demand Control Ventilation (DCV)
- Optional remote minimum position potentiometer (270 ohm) (Honeywell #S963B1136) is available from Prostock
- All fresh air damper functions can be viewed at the RTU-C unit controller display
- If connected to a Building Automation System (BAS), all fresh air damper functions can be viewed on the (BAS), 16 characters x 2 rows of text LCD screen
- If connected to thermostat, all fresh air damper functions can be viewed on 16 characters x 2 rows of text LCD screen





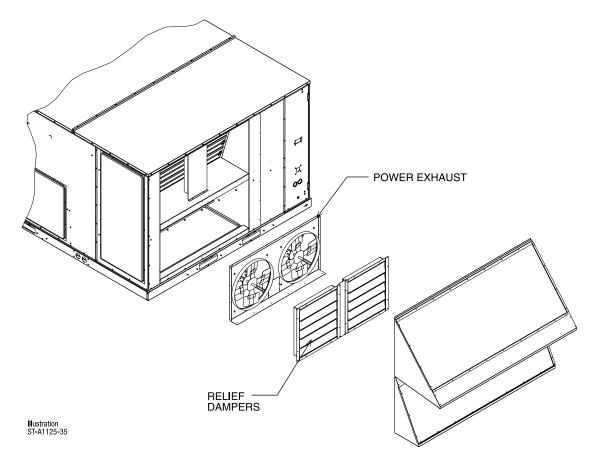
POWER EXHAUST KIT, CONVERTIBLE

RXRX-BGF05 (C, D, or Y)*

*Voltage Code

- Convertible between vertical airflow and horizontal airflow
- Compatible with all H-cabinet economizers
- Economizer sold separately

VERTICAL AIRFLOW INSTALLATION SHOWN HERE



Model No.	No. of Fans	Volts	Phase	HP (ea.)	Low Speed		High Speed®		FLA	LRA
					CFM [L/s]@	RPM	CFM [L/s]©	RPM	(ea.)	(ea.)
RXRX-BGF05C	2	208-230	1	0.75	4100 [1935]	850	5200 [2454]	1050	5	4.97
RXRX-BGF05D	2	460	1	0.75	4100 [1935]	850	5200 [2454]	1050	2.2	3.4
RXRX-BGF05Y	2	575	1	0.75	4100 [1935]	850	5200 [2454]	1050	1.5	2.84

NOTES: ① Power exhaust is factory set on high speed motor tap. ② CFM is per fan at 0" w.c. external static pressure.

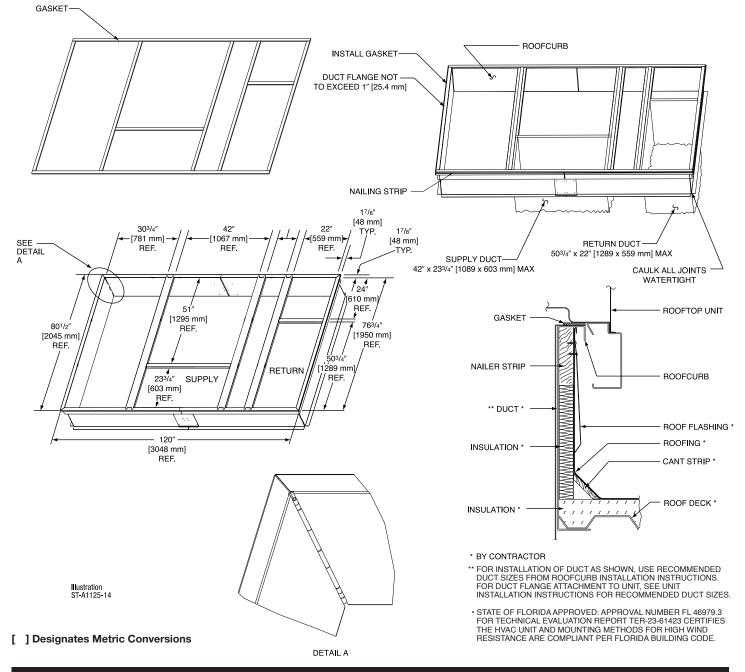
[] Designates Metric Conversions

ROOFCURBS (Full Perimeter) RXKG-CBH14

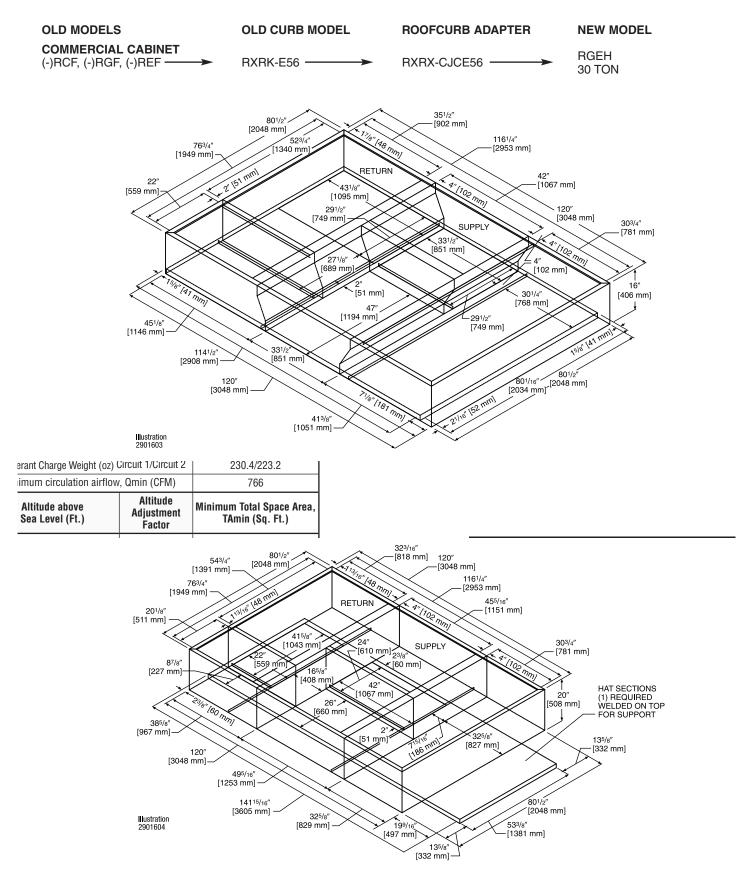
- One available height (14" [356 mm])
- Quick assembly corners for simple and fast assembly
- 1" [25.4 mm] x 4" [102 mm] Nailer provided
- Insulating panels not required because of insulated outdoor base pan
- Sealing gasket (28" [711 mm]) provided with Roofcurb
- Packaged for easy field assembly

TYPICAL INSTALLATION

ROOFCURB ASSEMBLY



ROOFCURB ADAPTER



Guide Specifications RGEHYB360

You may copy this document directly into your building specification. This specification is written to comply with the 2004 version of the "master format" as published by the Construction Specification Institute. www.csinet.org.

GAS HEAT PACKAGED ROOFTOP

HVAC Guide Specifications

Size Range: 30 Nominal Tons

- 1.00 General:
 - A. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a(n) hermetic scroll compressor(s) for cooling duty and heat pump for heating duty.
 - B. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
 - C. Unit shall use environmentally safe, R-454B refrigerant.
 - D. Unit shall be installed in accordance with the manufacturer's instructions.
 - E. Unit must be selected and installed in compliance with local, state, and federal codes.
 - F. Model and serial data shall be printed inside the control box.

1.01

- A. Unit meets ASHRAE 90.1 2022 minimum efficiency requirements.
- B. Unit shall be rated in accordance with AHRI Standards 340/360.
- C. Unit shall be designed to conform to ASHRAE 15.
- D. Unit shall be UL-tested and certified in accordance with Standards and UL-listed and certified under Canadian standards as a total package for safety requirements.
- E. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
- F. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
- G. Roof curb shall be designed to conform to NRCA Standards.
- H. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory and must be available upon request.
- I. Unit shall be designed in accordance with UL Standard 60335-2-40 4th Edition. including tested to withstand rain.
- J. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
- 1.02 Manufacturer Qualifications

Quality Assurance:

- A. Unit shall be designed in accordance with ISO 9001:2015 and shall be manufactured in a facility registered by ISO 9001:2015.
- 1.03 Installer Qualifications:
 - A. The installer shall be trained to install and service equipment with A2L refrigerants.
- 1.04 Delivery, Storage, and Handling:
 - A. Unit shall be stored and handled per manufacturer's recommendations.
 - B. Lifted by crane requires either shipping top panel or spreader bars.
 - C. Unit shall only be stored or positioned in the upright position.
- 1.05 Unit Cabinet:
 - A. Unit cabinet shall be constructed of galvanized steel and shall be coated with a baked enamel finish on all externally exposed surfaces.
 - B. Unit cabinet exterior paint shall be: pre-painted steel with film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F): 60, Hardness: H-2H Pencil hardness.
 - C. The sheet-metal cabinet shall be constructed of 18-gauge material for structural components with an underlying coat of G90.
 - D. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 3/4-in. thick, 1 lb density, flexible fiberglass insulation, foil faced on the air side.
 - E. Shall utilize uniform screw sizing.
 - F. Base of unit shall have a location for thru-the-base gas and electrical connections standard.
 - G. Base Rail:
 - i. Unit shall have base rails on all sides.
 - ii. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
 - iii. Holes shall be provided in the base rail for moving the rooftop for fork truck.
 - iv. Base rail shall be a minimum of 14 gauge thickness.

- H. Condensate pan and connections:
 - i. Shall be a sloped condensate drain pan made of a non-corrosive material and be removable for cleaning.
 - ii. Shall comply with ASHRAE Standard 62.
 - iii. Shall use a 1" 11 1/2 NPT drain connection through either side of the drain pan. Connection shall be made per manufacturer's recommendations.
 - iv. Shall be able to be easily removed.
 - v. Shall be separate from the coil.
- I. Top panel:
 - i. Shall be a single piece top panel over indoor section.
- J. Gas Connections:
 - i. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - ii. Thru-the-base capability:
 - a. Standard unit shall have a thru-the-base gas-line location using a raised, embossed portion of the unit basepan.
 - b. No base pan penetration, other than those authorized by the manufacturer, is permitted.
- K. Electrical Connections:
 - i. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
 - ii. Thru-the-base capability:
 - a. Standard unit shall have a thru-the-base electrical location(s) using a raised, embossed portion of the unit base pan.
 - b. No base pan penetration, other than those authorized by the manufacturer, is permitted.
- L. Component access panels (standard):
 - i. Cabinet panels shall be easily opened for servicing.
 - ii. Stainless steel metal hinges are standard on all doors.
 - iii. Panels covering control box, indoor fan, indoor fan motor, and electric or gas heater components (where applicable), shall have 1/4 turn latches.
 - iv. 1/4 fasteners shall be permanently attached.
- 1.06 Operating Characteristics:
 - A. Unit shall be capable of starting and running at 115°F (46°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 340/360 at ± 10% voltage.
 - B. Compressor with standard controls shall be capable of operation down to 40°F (4°C), ambient outdoor temperatures. Low ambient accessory kit is necessary if mechanically cooling at ambient temperatures to 40°F (4°C).
 - C. Unit shall discharge supply air vertically or horizontally as shown on contract drawings.
 - D. Unit shall be factory configured for vertical supply & return configurations.
 - E. Unit shall be field convertible from vertical to horizontal configuration.
 - F. Unit shall be capable of mixed operation: vertical supply with horizontal return or horizontal supply with vertical return.
- 1.07 Electrical Requirements
 - A. Main power supply voltage, phase, and frequency must match those required by the manufacturer.
- 1.08 Evaporator fan compartment:
 - A. Interior cabinet surfaces shall be insulated with a minimum 3/4-in. thick, minimum 1 LB density, flexible fiberglass insulation bonded with foil face on the air side.
 - B. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
 - C. Insulation shall also be mechanically fastened with welded pin and retainer washer.
- 1.09 Thermostats
 - A. Thermostat must:
 - i. Energize "G" when calling for heat.
 - ii. Have capability to energize 2 different stages of cooling, and 2 different stages of heating.
 - iii. Must include capability for occupancy scheduling.
- 1.10 Electronic Control System for HVAC:
 - A. Shall be complete with self-contained low-voltage control circuit protected by a fuse on the 24-V transformer side (090-150 units have a resettable circuit breaker).
 - B. Shall utilize color-coded wiring.
 - C. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.
 - D. Unit control board shall be provided with 7 segment readout via LCD display for status and diagnostics.

1.10.01 Safeties:

i.

- A. Compressor over-temperature, over current.
- B. Standard Low-pressure switch:
 - Units shall have low pressure, loss of charge automatic reset device that will shut off compressor when tripped.
 - ii. Low pressure control
 - a. Provides active protection in both heating and cooling modes at all outdoor ambient temperatures. The low pressure control is an automatic reset type and opens at approximately 95 psig and closes at approximately 50 psig. Operation is slightly different between cooling and heating modes.
- C. Standard High-pressure switch:
 - i. Unit shall be equipped with high pressure switch device that will shut off compressor when tripped.
 - ii. High pressure control
 - a. The high pressure control is an automatic reset type and opens at approximately 610 psig and closes at approximately 420 psig. The compressor and fan motor will stop when the high pressure control opens and will start again if the high side pressure drops to approximately 420 psig where the automatic reset high pressure control opens 3 times within a particular call for heating or cooling operation, the defrost control will lock out compressor and outdoor fan operation.
- D. Automatic reset, motor thermal overload protector.
- E. The unit must be permanently grounded.
- F. Components are not compatible between different refrigerants. Do not use R-410A service equipment or components on R-454B equipment. System or part failure could occur.
- 1.11 Standard Filter Section:
 - A. Shall consist of factory-installed, low velocity, throwaway 2-in. thick fiberglass filters of commercially available sizes.
 - B. Unit will accept only 2 inch filters.
 - C. Filter face velocity shall not exceed 365 fpm at nominal airflows.
 - D. Filters shall be accessible through an access panel with "no-tool" removal as described in the unit cabinet section of the specification.
 - E. Filters shall be held in place by a sliding filter tray, facilitating easy removal and installation.
 - F. Filters access is specified in the unit cabinet section of this specification.
- 1.12 Coils:
 - A. Standard Aluminum/MicroChannel Condenser Coils:
 - i. Standard condenser coils shall be aluminum.
 - ii. Condenser coils shall be leak tested to 150 psig, pressure tested to 400 psig, and qualified to burst test at 2,200 psi.
 - B. Standard Aluminum/Copper Evaporator Coils.
 - i. Standard evaporator coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
 - ii. Evaporator coils shall be leak tested to 150 psig, pressure tested to 550 psig and qualified to UL 1995 burst test at 2,200 psig.

1.13 Refrigerant Components:

- A. Refrigerant circuit shall include the following control, safety, and maintenance features:
 - i. Thermal Expansion Valve (TXV) with orifice type distributor.
 - ii. Refrigerant filter drier.
 - iii. External service gauge connections to unit suction and discharge lines.
 - iv. Pressure gauge access through an access port in the front and rear panel of the unit.
 - v. External gauge ports shall be lockable.
- B. Compressors:
 - i. Unit shall use one fully hermetic, scroll compressor for each independent refrigeration circuit.
 - ii. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
 - iii. Compressors shall be internally protected from high discharge temperature conditions. Advanced Scroll Temperature Protection on 240-300 sizes.
 - iv. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
 - v. Compressor shall be factory mounted on rubber grommets.

- vi. Compressor motors shall have internal line break thermal and current overload protection.
- vii. Crankcase heaters shall not be required for normal operating range.
- viii. Compressor shall have molded electrical plug.
- 1.14 Evaporator Fan and Motor:
 - A. Evaporator fan motor:
 - i. Shall have permanently lubricated bearings
 - ii. Shall have inherent automatic-reset thermal overload protection.
 - iii. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
 - B. Direct Drive Evaporator Fan:
 - i. Belt drive shall include an adjustable-pitch motor pulley.
 - ii. Shall use sealed, permanently lubricated ball-bearing type.
 - iii. Blower fan shall be double-inlet type with forward-curved blades.
 - iv. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.
 - C. Blower Assembly:

1.15

- i. Entire assembly shall be able to slide out completely.
- ii. Shall be able to slide-out without the removal of the roof and condenser fan motors.
- Condenser Fans and Motors:
- A. Condenser fan motors:
 - i. Shall be a totally enclosed motor.
 - ii. Shall use permanently lubricated bearings.
 - iii. Shall have inherent thermal overload protection with an automatic reset feature.
 - iv. Shall use a shaft-down design. Shaft-up designs including those with "rain-slinger devices" shall not be allowed.
 - B. Condenser Fans shall:
 - i. Shall be a direct-driven propeller type fan
 - ii. Shall have blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.
- 1.16 RTU-C Controller:
 - A. Shall be ASHRAE 62-2001 compliant.
 - B. Shall accept 18-32VAC input power.
 - C. Shall have an operating temperature range from -40°F (-40°C) to 158°F (70°C), 10%-95% RH (non-condensing).
 - D. Controller shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air enthalpy, fire shutdown, return air enthalpy, fan status, remote time clock/door switch.
 - E. Shall accept a CO₂ sensor in the conditioned space and be Demand Control Ventilation (DCV) ready.
 - F. Shall provide the following outputs: Economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust, occupied.
 - G. Unit shall provide surge protection for the controller through a circuit breaker.
 - H. Shall have a field installed communication card allowing the unit to be able to communicate at a Baud rate of 19.2K or faster.
 - I. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
 - J. Optional field installed BACnet[®] plug-in communication card which includes an EIA-485 protocol communication port, or an optional field installed LonWorks[™] plug-in communications card.
 - K. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.
 - L. Shall be shock resistant in all planes to 5G peak, 11ms during operation, and 100G peak, 11ms during storage.
 - M. Shall be vibration resistant in all planes to 1.5G @ 20-300 Hz.
 - N. Shall support a bus length of 4000 ft max, 60 devices per 1000 ft section, and 1 RS-485 repeater per 1000 ft sections.
- 1.17
- Open Protocol, Direct Digital Controller:
- A. Shall be ASHRAE 62-2001 compliant.
- B. Shall accept 18-30VAC, 50-60Hz, and consumer 15VA or less power.
- C. Shall have an operating temperature range from -40°F (-40°C) to 130°F (54°C), 10% 90% RH (non-condensing).
- D. Shall have either a field installed BACnet plug-in communication card which includes an EIA-485 protocol communication port, or a field installed LonWorks plug-in communications card.

- E. The BACnet plug in communication card shall include built-in protocol for BACnet (MS/TP and PTP modes)
- F. The LonWorks plug in communication card shall include the Echelon processor required for all Lon applications.
- G. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
- H. Baud rate Controller shall be selectable through the EIA-485 protocol communication port.
- I. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
- J. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air enthalpy, compressor lock-out, fire shutdown, enthalpy switch, and fan status/filter status/humidity/remote occupancy.
- K. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, exhaust.
- L. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.
- M. Shall be natively equipped with Modbus communication protocol.
- 1.18 Adjustable Frequency Drive:

Gas Heat:

- A. Unit shall be supplied with an electronic variable frequency drive for the supply air fan.
- B. Drive shall be factory installed in an enclosed cabinet.
- C. Drive shall meet UL Standard 60335-2-40 4th Edition.
- D. The completed unit assembly shall be UL listed.
- E. Drives are to be accessible through a tooled access hinged door assembly.
- F. The unit manufacturer shall install all power and control wiring.
- G. The supply air fan drive output shall be controlled by the factory installed main unit control system and drive status and operating speed shall be monitored and displayed at the main unit control panel.
- H. Drive shall be programmed, and factory run tested in the unit.
- 1.19
 - A. Shall have standard two stage gas heat.
 - B. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
 - C. Shall incorporate a direct-spark ignition system and redundant main gas valve.
 - D. Heat exchanger design shall allow combustion process condensate to gravity drain; maintenance to drain the gas heat exchanger shall not be required.
 - E. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
 - F. The heat exchanger shall be controlled by the Core Command microprocessor.
 - i. The Core Command board shall notify users of fault using two 7 segment displays.
 - G. Standard Heat Exchanger construction:
 - i. Heat exchanger shall be of the tubular-section type constructed of a minimum of 20-gauge steel coated with a nominal 1.2 mil aluminum-silicone alloy for corrosion resistance.
 - ii. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 - iii. Burners shall incorporate orifice for rated heat output up to 2,000 ft. (610m) elevation with a gas heating valve of 1050. Alternate orifices may be required depending on local gas heating valves and elevations.
 - iv. Each heat exchanger tube shall contain restrictions similar to dimples for increased heating effectiveness.
 - H. Optional Stainless Steel Heat Exchanger construction:
 - i. Use energy saving, direct-spark ignition system.
 - ii. Use a redundant main gas valve.
 - iii. Burners shall be of the in-shot type constructed of aluminum-coated steel.
 - iv. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
 - v. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gauge type 409 stainless steel.
 - vi. Type 409 stainless steel shall be used in heat exchanger tubes.
 - vii. Complete stainless steel heat exchanger allows for greater application flexibility.
 - I. Induced draft combustion motor and blower
 - i. Shall be a direct-drive, single inlet, forward-curved centrifugal type.
 - ii. Shall be made from steel with a corrosion-resistant finish.
 - iii. Shall be permanently lubricated sealed bearings.
 - iv. Shall have inherent thermal overload protection.
 - v. Shall have an automatic reset feature.

1.20 Special Features:

A. Integrated Economizers:

- i. Integrated, gear-driven parallel modulating blade design type capable of simultaneous economizer and compressor operation.
- ii. Independent modules for vertical or horizontal return configurations shall be available. Vertical return modules shall be available as a factory installed option.
- iii. Damper blades shall be galvanized steel with metal gears. Plastic or composite blades on intake or return shall not be acceptable.
- iv. Shall include all hardware and controls to provide free cooling with outdoor air when temperature and/or humidity are below setpoints.
- v. Shall be equipped with gear driven dampers for both the outdoor ventilation air and the return air for positive air stream control.
- vi. Shall be equipped with low-leakage dampers, not to exceed 2% leakage at 1 in. wg pressure differential.
- vii. Shall be capable of introducing up to 100% outdoor air.
- viii. Shall be equipped with a barometric relief damper capable of relieving up to 100% return air.
- ix. Shall be designed to close damper(s) during loss-of-power situations with spring return built into motor.
- x. Enthalpy sensor shall be provided as standard. Outdoor air sensor set point shall be adjustable and shall range enthalpy equivalent of 63°F @ 50% RH to 73°F @ 50% RH. Additional sensor options shall be available as accessories.
- xi. The economizer controller shall also provide control of an accessory power exhaust unit function. Factory set at 70%, with a range of 0% to 100%.
- xii. The economizer shall maintain minimum airflow into the building during occupied period and provide design ventilation rate for full occupancy. A remote potentiometer may be used to override the damper set point.
- xiii. Dampers shall be completely closed when the unit is in the unoccupied mode.
- xiv. Economizer controller shall accept a 2-10Vdc CO₂ sensor input for IAQ/DCV control. In this mode, dampers shall modulate the outdoor-air damper to provide ventilation based on the sensor input.
- xv. Compressor lockout sensor on the unit controller is factory set at 35°F and is adjustable from 30°F (-1°C) to 50°F (10°C) and resets the cooling lockout at 5°F (+2.7°C) above the set point.
- xvi. Actuator shall be direct coupled to economizer gear. No linkage arms or control rods shall be acceptable.
- xvii. Economizer controller shall provide indications when in free cooling mode, in the DCV mode, or the exhaust fan contact is closed.
- xviii. Economizer wire harness will have provision for smoke detector.
- xix. Shall provide fault detection and diagnostics (FDD) system in accordance with local code. Faults shall be communicated out on an alarm signal.
- B. Two-Position Motorized Damper:
 - i. Damper shall be a Two-Position Motorized Damper. Damper travel shall be from the full closed position to the field adjustable %-open setpoint.
 - ii. Damper shall include adjustable damper travel from 25% to 100% (full open).
 - iii. Damper shall include single or dual blade, gear driven dampers and actuator motor.
 - iv. Actuator shall be direct coupled to damper gear. No linkage arms or control rods shall be acceptable.
 - v. Damper will admit up to 100% outdoor air for applicable rooftop units.
 - vi. Damper shall close upon indoor (evaporator) fan shutoff and/or loss of power.
 - vii. The damper actuator shall plug into the rooftop unit's wiring harness plug. No hard wiring shall be required.
 - viii. Outside air hood shall include aluminum water entrainment filter
- C. Manual damper
 - i. Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 50% outdoor air for year-round ventilation.
- D. Head Pressure Control Package
 - i. Controller shall control coil head pressure by condenser-fan cycling.
- E. Liquid Propane (LP) Conversion Kit
 - i. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit for use with liquefied propane, up to 2000 ft (610m) elevation.
- F. Condenser Coil Hail Guard Assembly:
 - i. Shall protect against damage from hail.
 - ii. Shall be louvered style.

- G. Unit-Mounted, Non-Fused Disconnect Switch:
 - i. Switch shall be factory-installed, internally mounted.
 - ii. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
 - iii. Shall be accessible from outside the unit.
 - iv. Shall provide local shutdown and lockout capability.
- H. Convenience Outlet:
 - i. Non-Powered convenience outlet.
 - ii. Outlet shall be powered from a separate 115V-120V power source.
 - iii. A transformer shall not be included.
 - iv. Outlet shall be field-installed and internally mounted with easily accessible 115V female receptacle.
 - v. Outlet shall include 15-amp GFI receptacle with independent fuse protection.
 - vi. Outlet shall be accessible from outside the unit.
- I. Fan/Filter Status Switch:
 - i. Switch shall provide status of indoor evaporator fan (ON/OFF) or filter (CLEAN/DIRTY).
 - ii. Status shall be displayed either over communication bus (when used with direct digital controls) or through the controller LCD display inside the unit control box.
- J. Flue Discharge Deflector:
 - i. Flue discharge deflector shall direct unit exhaust vertically instead of horizontally.
 - ii. Deflector shall be defined as a "natural draft" device by the National Fuel and Gas (NFG) code.
- K. Propeller Power Exhaust:
 - i. Power exhaust shall be used in conjunction with an integrated economizer.
 - ii. Independent modules for vertical or horizontal return configurations shall be available.
 - iii. Horizontal power exhaust shall be mounted in return ductwork.
 - iv. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0-100% adjustable setpoint on the economizer control.
 - v. Capable of adjustable but constant volume.
- L. Roof Curbs (Vertical):
 - i. Full perimeter roof curb with exhaust capability providing separate air streams for energy recovery from the exhaust air without supply air contamination.
 - ii. Formed galvanized steel with wood nailer strip and shall be capable of supporting entire unit weight.
 - iii. Permits installation and securing of ductwork to curb prior to mounting unit on the curb.
- M. High-Static Indoor Fan Motor(s) and Drive(s)
 - i. High-static motor(s) and drive(s) shall be factory-installed to provide additional performance range.
- N. Universal Gas Conversion Kit
 - i. Package shall contain all the necessary hardware and instructions to convert a standard natural gas unit to operate from 2000-7000 ft (610 to 2134m) elevation with natural gas or from 0-7000 ft (90-2134m) elevation with liquefied propane.
- O. Outdoor Air Enthalpy Sensor
 - i. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.
- P. Return Air Enthalpy Sensor:
 - i. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.
- Q. Indoor Air Quality (CO2) Sensor:
 - i. Shall be able to provide demand ventilation indoor air quality (IAQ) control.
 - ii. The IAQ sensor shall be available in duct mount, wall mount, or wall mount with LED display. The set point shall have adjustment capability.
- R. Smoke detectors:
 - i. Shall be a Four-Wire Controller and Detector.
 - ii. Shall be environmentally compensated with differential sensing for reliable, stable, and drift-free sensitivity.
 - iii. Shall use magnet-activated test/reset sensor switches.
 - iv. Shall have a recessed momentary switch for testing and resetting the detector.

- v. Controller shall include:
 - a. One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel
 - b. Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment
 - c. One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station
 - d. Capable of direct connection to two individual detector modules.
 - e. Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.
- S. Barometric relief:
 - i. Shall include damper, seals, hard-ware, and hoods to relieve excess building pressure.
 - ii. Damper shall gravity-close upon shutdown.
 - iii. Only available with an economizer. Barometric relief is not available as a stand-alone accessory.
- T. Time Guard:
 - i. Shall prevent compressor short cycling by providing a 5-minute delay (±2 minutes) before restarting a compressor after shutdown for any reason.
 - ii. One device shall be required per compressor.
- U. Standard Factory Installed Overflow Switch
 - i. Switch shall monitor the condensate level in drain pan and stops compression operation when overflow conditions occur
- V. Access Panels:
 - i. Hinges with 1/4 turn fasteners shall be permanently attached.
 - ii. Hinges shall be powder coated and made from stainless steel.
- W. Electric Heat:
 - i. Heating Section:
 - a. Heater element open coil resistance wire, nickel-chrome alloy, strung through ceramic insulators mounted on metal frame. Coil ends are staked and welded to terminal screw slots.
 - Heater assemblies are provided with integral fusing for protection of internal heater circuits not exceeding 48 amps each. Auto reset thermostat limit controls, magnetic heater contactors (24V coil) and terminal block all mounted in electric heater control box (minimum 18 gauge galvanized steel) attached to end of heater assembly.
- X. Refrigerant Detection System:
 - i. In the event of a detected refrigerant leak, the refrigerant leak detection sensor will trigger the mitigation procedure that shuts off the compressor(s) and turns on the indoor blower motor.
 - ii. In the event of a detected refrigerant leak, the system will display a fault code on the unitary controller. For DDC systems, 'A2L Event' will appear on the LCD module.



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Friedrich[®] will furnish a replacement for any part of this product which fails in normal use and service within the applicable periods stated, in accordance with the terms of the limited warranty.

Compressor

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