Nomen<u>clature</u>



Universal Heat Pump

Flexible Installation

- Designed to operate with existing indoor air handlers & furnace coil combinations – regardless of brand
- Designed to use 24v thermostats & EcoNet[®] Controls

DoE Approved Test Procedure

• Coil Only Requirement

Rheem Advantage

- Rheem designed algorithm
- Bluetooth, Contractor App, and Advanced Diagnostics
- Rheem Family of Indoors & Furnaces
- Rheem Visual Brand Language



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Indoor Unit Requirements





How Inverters Operate

- A compressor powered by an inverter that can electronically vary compressor speed
 - \circ $\,$ An inverter system does not operate like an on/off switch
 - Think about it like a dimmer switch
- Pressure Relief Valve
 - Quickly releases pressure on the compressor so that during startup there is no load
- Max locked rotor amps is 51
 - Will not see in the field due to soft ramp
 - o Quiet startup compressor starts at very low frequency
 - Looks at the system performance and load conditions & adjusts to perfectly meet the needs of the home
 - o Constant Comfort

\odot Leveraging Rheem Algorithm

- \circ $\;$ Varying compressor speed varies refrigerant flow
- o Varying refrigerant flow varies system capacity



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Methods of Operation

Rheem Algorithm Mode (When Using a 24v Thermostat)

- Install a jumper at the U1/U2 connection on the UODC control
- Call for cooling or heating will enable the Rheem algorithm
- In cooling
 - Unit starts in low-speed
 - Then checks the saturated suction temperature & modulates the system up & down
- In heating,
 - Starts in low speed
 - Ramps up to 75% to help reduce the potential for cold air
 - Then checks the saturated liquid temperature & modulates the system up and down

EcoNet® Operation

• Fully variable system operation versus running the Rheem algorithm





Zoning

If matched with EcoNet[®] indoor & coil – unit can support EcoNet[®] zoning

- Consult Rheem zoning guide
- If zones are properly sized to maintain minimum airflow a bypass damper is not required
- If a bypass is required, it must be a power open power close damper
- Barometric bypass dampers are not allowed





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Competitiv	e Summary	Rheem	🕲 возсн	Midea	🕞 GREE		Z DAIKIN	SAMSUNG	
		RD17AZ	BOV-18	EVOX	FLEXX	AUWR	Fit	Hylex	
	"Universal" Claim								
	Up to Efficiency	19 SEER2	18 SEER2	17.3 SEER2	18 SEER2	18 SEER2	17.5 SEER2	18.5 SEER2	
	OEM Coil Only								
	Tax Credit - North			1.5T – 3T		2T – 4T	1.5T – 4T	2T & 3T	
	Tax Credit - South	2T – 4T	3T & 5T		3T Only				
	% Cooling Capacity	92-95%	66-75-92%	97-100%	90-95%	91-100%	88-95%	95-100%	
	Furnace Matchups		3 rd Party	3 rd Party	3 rd Party				
	115v Matchups								
	# of Matchups*	326**	56	6	19	6	357	10	
	Diagnostics	Bluetooth	7 Segment LED Display	1					
	Commissioning	Contractor App	Dip Switches	Dip Switches	Dip Switches	Dip Switches	Laptop w/ Adaptor***	Laptop w/ Adaptor***	
	Installation	2-Wire	3-Wire	3-Wire	3-Wire	3-Wire	3-Wire	2-Wire	
4 DSC CONFERENCE	Remote Connectivity	EcoNet®					Daikin ONE+		EVATING REXCELLENCE

Universal heat Pump 25c tax Summary

EFFICIENCY LEVEL (Low to High)

	SEER2	EER2	HSPF2
CEE Adv Tier	17	12*	8.1
CEE Tier 1 North	15.2	10	8.1
CEE Tier 1 South & ENERGY STAR®	15.2	11.7	7.8
DOE Minimum	14.3		7.5

Tax Credit

SYSTEM SIZE

	Rheem	BOSCH	Glides	GREE	Hisense	Z DAIKIN	SAMSUNG
		0 8000					
	RD17AZ	BOV-18	EVOX	FLEXX	AUWR	Fit	Hylex
25c Tax Credit - North (CEE Tier 1)	309	15	4	11	5	195	4
25c Tax Credit – South (CEE Tier 1 & ENERGY STAR)	24*	13	0	2	0	0	0

Number of matchups does not include 3rd party indoor matchups Rheem 2T ODU getting re-tested to meet ENERGY STAR

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Rheem will have the most tax credit eligible offerings

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Ratings Summary

	Size	SEER2	EER2	HSPF2
	2T	19	10	8.1
H3VZ	3T	18	11.7	8.1
	4T	17	11.7	8.1
	5T	19	10	8.1
	Size	SEER2	EER2	HSPF2
Size SEER2 EER2 H 2T 19 10 1 3T 18 11.7 1 4T 17 11.7 1 5T 19 10 1 5T 19 10 1 5T 19 10 1 2T 17 10.0 1 2T 17 10 1 2T 17 10 1 2T 17 10 1 3T 19 12 1 4T 16 11.7 1 5T 16 10 1 2T 15.2 10 1 2T 15.2 10 1 2T 15.2 10 1 2T 18 11.7 1 2T 15.2 10 1 15v Ratings 4T 16 10 1 5T 16 10 1 1	2T	17	10	8.1
	3T	19	12	8.5
	8.5			
	8.1			
	Size	SEER2	EER2	HSPF2
	2T	15.2	10	8.1
H2TZ	3T	18	11.7	8.1
15v Ratings	4T	16	10	8.1
	5T	16	10	8.1

Size	SEER2	EER2	HSPF2
2T	16	10	8.1
3T	17	10	8.1

RF2TZ

Up to:

Dual Fuel

Coil Only

RB2TZ

Size	SEER2	EER2	HSPF2
2T	19	10	8.1
3T	19	12	8.5
4T	16	10	8.1
5T	19	10	8.1

SEER2 EER2 HSPF2 Size 2T 14.3 9 7.5 3T 14.3 7.5 9 7.5 14.3 4T 9 7.5 5T 14.3 9

Size	SEER2	EER2	HSPF2
2T	15.2	10	8.1
3T	16	10	8.1

*R97MV and R98MV *R801V, R802V, R921V, and R96V *R802V

*R801V, R802V, R96V, R97MV, and R98MV

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Field Trial Summary

- 35 units operating across the US and Canada
 - \odot 15 months of operation
 - ~13,500 heating hours
 - \circ ~6,500 cooling hours
 - $\,\circ\,$ 17 with Rheem Algorithm
 - \circ 18 with $\mathsf{EcoNet}^{ extsf{8}}$

- Standard Warranty 5 yr parts, 5 yr compressor
- With Registration 10 yr parts, 10 yr compressor
- Unit can be registered as standalone outdoor (HP only





Sustainability Standouts



Heat Pump Tier	Model	Staging	ODU Fan	SEER2	EER2	HSPF2	Bluetooth® Enabled	Sustainability Standout	Compatible Thermostat	Matched With
High	RD17AZ	Mod	BLDC	19*	12*	8.5*	*		Rheem®	RH*V & EcoNet [®] Control
Dual Fuel	RD17AZ	MOD	BLDC	19*	12*	8.5*	*	D S A B A S A S A S A S A S A S A S A S A	75 Rheem®	R98MV & EcoNet® Control
High	RD17AZ	Mod	BLDC	14.3	9.8	7.5	*		2-Stage 24V*	Rheem Coil
High	RD17AZ	Mod	BLDC	**	**	**	*			Competitor Coil

Unit Dimensions

RD17AZ	24A	36A	48A	60A
Height "H" inches [cm]	36.6 [93.0]	46.4 [117.8]	58 [147.3]	58 [147.3]
Length "L' inches [cm]	40.4 [102.6]	42.3 [107.4]	40.4 [102.6]	40.4 [102.6]
Width "W" inches [cm]	19.8 [50.3]	22.8 [57.8]	19.8 [50.3]	19.8 [50.3]



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2 ton





4 & 5 ton

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Stacking Information

Allowable Stacking Requirements

- $2T \rightarrow 3x$ high
- $3T \rightarrow 3x$ high
- $4T \rightarrow 2x$ high
- 5T \rightarrow 2x high





RD17AZ24,36 (Single Fan)								
		Obstruction Min Clearance (in)						
	Rear	Coil Side	Front	Service Panel				
4Open SpaceAbove*12	4	12	48	10				
	4	48	10					
Above*	12	24,36 (Single Fan) Obstruction Min Clearance (in) Coil Side Front Service Path 12 48 10 4 48 10 12 24 10 12 24 10 12 24 10 12 24 10 12 24 10 12 48 10 24 10 10 24 10 10 24 10 10 24 10 10	10					
	4	12	gle Fan) on Min Clearance (in) Front Service Pan 48 10 48 10 24 10 24 10 48 10 24 10 48 10 48 10 48 10 48 10	10				
Open Space Above	12	12	48	10				
Less Than 40"*	20	4	24	10				
	RD17AZ	248,60 (Dua	l Fan)					

	Obstruction Min Clearance (in)						
	Rear	Coil Side	Front	Service Panel			
	6	8	60	10			
Open Space	12	8	60	10			
Above*	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	10					
	Obstruction Min ClearandRearCoil SideFront6860128601212406124012124820460	10					
Open Space Above	12	12	48	10			
Less Than 40"*	20	4	60	10			



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*Always refer to state and local codes for additional requirements

Operating Temperature Ranges

- Maximum operating temperature 125°F
 - While the system has no high-temperature lock out the inverter drive will have various operating temperature limits to protect the equipment.
- Continuous operating temperature down to -30°F,
- These limits will vary based on how the system is operating.
- 100% heating at approximately 20°F*
- 70% heating capacity at 5°F (when used with an EcoNet[®] control)

80 -20 -20 -40 -40 -60 140	
°F	

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System Components





OUTDOOR TRANSFORMER

- Provides 24V control for outdoor unit controls
- Allows replacement of a traditional 2-wire AC system
 - (When using a full Econet systems, indoor, outdoor and control)
- Note: When installing 24 V thermostat or Sure Comfort EcoNet® control do not connect the R wire, or the low voltage fuse will blow













GMCC SINGLE & TWIN ROTARY COMPRESSORS

Motor Type: Three-Phase Induction Motor

Refrigerant Type: R410a

Oil Type: POE

Power Supply:

Voltage - 208-230VAC +/- 10% (187-253VAC)

Phase – 3/ Frequency – 60hz

Rotary

- Single rotor
 - 2-ton
 - Single pipe from accumulator to compressor
- Twin rotor
 - 3, 4, & 5 ton are twin rotor compressors
 - Two pipes from the accumulator to the compressor





CONDENSER BLDC FAN MOTOR

- 3-phase motor powered by inverter drive
- Fan RPM is determined by the frequency delivered
- Variable speed capability
- Quieter operation
- Higher reliability
- Lighter than PSC and ECM motors

Note: Left-handed threads hold fan blade in place.





OUTDOOR UNIT COMPONENTS | 21





HIGH PRESSURE SWITCH

- Opens if high side pressure reaches 610 PSIG & resets at 420 PSIG.
- If it opens 3 times during the same call:
 System locks out compressor
 - -Runs fan
 - -Displays high-pressure error code
- Disconnect/Reconnect power to indoor & outdoor units to reset.
- Common causes for errors:
 - -Overcharging
 - -Dirty Coils
 - -Low air volume in heating mode





REVERSING VALVE

- 24 VAC coil
- Energized in heating mode
- Fail-safe cooling







Accumulators

- Stores excess refrigerant
- One is attached to the compressor
- Second in unit







Pressure Relief Valve

- Solenoid valve from the discharge line to the suction line
 - Ensure less than 20 PSI differential
 - Won't start if there is a >20 PSI differential
- Normally closed valve controlled by the UODC via a 24V plug
- Removable solenoid coil
- It will open during 5 min off cycle delay.
 - Should relieve pressure in 30 seconds
- If lockout timer is stuck at 5 seconds pressure differential is greater than 20 PSI









OUTDOOR COIL

- Copper tube
- Aluminum Fins
- 7MM
- 2 ton
 - Single row coil
- 3 Ton
 - Double row coil
- 4 ton
 - Triple row coil



ELECTRONIC EXPANSION VALVE

- Valve body / Solenoid construction
- Valve meters in heating mode/wide open in cooling mode
- Controlled by 12VDC pulses from UDOC
- Control Board response to superheat is intentionally slow.
- Don't misdiagnose as not responding.







*When installing an EcoNet[®] control or a 24 V thermostat do not connect the R wire to the outdoor unit. This will cause the fuse to blow.



SUCTION TEMPERATURE SENSOR

- 10k ohm NTC Thermistor
- Used to calculate saturated suction temperature and superheat in the heating mode







Coil Temperature Sensor

- 10k ohm NTC thermistor
- Used to calculate saturated liquid temperature and subcooling









OUTDOOR TEMPERATURE SENSOR

- 10k ohm NTC thermistor
- Measuring outside temperature



DISCHARGE TEMPERATURE SENSOR

- 10k ohm thermistor
- Monitors compressor discharge temperature
- If discharge line temperature rises to 225°F, the Inverter board will reduce compressor RPM incrementally until the temperature drops to 200°F
- After discharge line temperature reaches 200°F, inverter board will gradually increase compressor RPM to normal speed.
- Sensor protects compressor from excessively high internal temperatures that can be caused by undercharging, high heat loads, & refrigeration circuit restrictions.





Suction Pressure Transducer

- 3-wire Pressure Transducer
- The transducer has brazed connection
- 5 VDC control voltage
- Feedback voltage varies based on the pressure
- Flow with nitrogen while brazing to prevent a restriction
- 5VDC ± 0.25V control voltage between red & black wires
- Return voltage .5-4.5VDC between black & white wires





LIQUID PRESSURE TRANSDUCER

- 3-wire Pressure Transducer
- The sensor has a brazed connection
- Feedback voltage varies based on the pressure
- Flow with nitrogen while brazing to prevent restricting the transducer
- 5VDC ± 0.25V control voltage between red & black wires
- Return voltage .5-4.5VDC between black & white wires
- Red Vcc, White Vout, Black Ground







Required Clearances Multiple Units

• Follow local and National codes for proper clearance





OPTIONAL ACCESSORIES – COMPRESSOR CRANKCASE HEATER

- Optional field installed accessory
- 2. Used for operation in low ambient. Or to prevent offcycle liquid migration.
- 3. Belly band style heater
- 4. Internal thermostat to regulate operation
- 5. Wired to H1 & H2 at the outdoor unit





Accessories

Optional Accessories - Base Pan Heaters

- Optional field installed accessory
- Two options*
 - 44-109957-01 (2, 4, & 5-ton models)
 - 44-109958-01 (3-ton model)
- Use when operating the heat pump in cold conditions where ice build-up may be possible in the base pan
- Wires to H1 & H2 at the outdoor unit
- Built-in thermostat to regulate operation
- To install
 - Remove fan grill and motor
 - Place under clips in the base pan of the unit
 - Wire to H1 & H2 terminals on the DIN rail
 - Always refer to the included installation instructions for detailed installation instructions









OPTIONAL ACCESSORIES – WIND & HAIL GUARDS

Accessories



- 2. Refer to the accessory installation manual for installation instructions.
- 3. Images for example only, appearance may vary



<Top Down View> "A" -Should be 7 7/8" (200mm) or longer



Installation



Refrigerant Pipe Maximum and Minimum Lengths

- 1. Refrigerant pipe max 150'
- 2. Vert Separation max 50'
- ¾" Vapor line 2 ton only, if outdoor unit is below or level with indoor unit.
- 4. 1-1/8" vapor line 5 ton only if outdoor unit is below or level with indoor unit.
- 5. Always use smallest liquid line allowable





INSTALLATION PROCESSES – LINE SET INSTALLATION – TUBING CONNECTIONS





Remove Caps and Schrader Cores from both pressure ports

WARNING: Do NOT Remove the Schrader Core for the True Suction Pressure Port





Model Name	Phase & Frequency	Voltage	MCA (Min. Circuit Amp.)	MOCP (Max. Overcurrent Protection)
RD17AZ24AJ3CA	1 Phase 60Hz	208-230	19.0*	20*
RD17AZ36AJ3CA	1 Phase 60Hz	208-230	24.5*	25*
RD17AZ48AJ3CA	1 Phase 60Hz	208-230	38.0*	40*
RD17AZ60AJ3CA	1 Phase 60Hz	208-230	41.0*	45*

***** Universal heat pump units are rated in accordance with standard UL1995





HIGH & LOW VOLTAGE KNOCKOUTS



High voltage connection

Low voltage connection



SURGE PROTECTION

- Field-supplied external surge protection highly recommended.
- Follow instructions provided by the surge protector manufacturer.







2-Stage Thermostat

For existing indoor coil and furnace or indoor air handler:

- Recommended to modify to two-stage fan operation
- See diagrams for wiring instructions.
- Install relay rated for applicable voltage and current.
- Low stage airflow should be 75% of high stage.

For non-matching indoor air mover and coil:

 Install jumper to U1 and U2 terminals to allow system to adapt to reasonably mis-matched coils.





LEGACY- TWO STAGE MODE

- If the U1/U2 Jumper is not installed the unit will default to a two-stage system
- Second stage will only be energized if there is a Y1 & Y2 connection at the outdoor unit
- Without a Y2 connection, the unit will only operate at low stage
 - Y1 Predetermined Low Stage
 - 75% nominal high stage capacity
 - Soft start will ramp
- Will ramp up to 75% capacity
 - Y2 High Speed
 - 100%
 - Soft start will ramp
 - Will ramp up to 100% capacity





OPERATION | 46

2-Stage Thermostat with Jumper





2-Stage heat pump with electrical heat using 2-stage thermostat with jumper applied to U1 & U2 terminals



RUUD ALGORITHM MODE

Preferred method of operation

- Install a jumper at the U1/U2 connection on the UDOC control
- Call for cooling or heating will enable suction algo mode
- In cooling
 - Starts in low-speed control,
 - Then checks saturated suction temperature & modulates the system up & down
- In heating,
 - Starts in low speed
 - Ramps up to 75% to help reduce the potential for cold air
 - Then checks the saturated liquid & modulates the system up and down



ECONET® COOLING MODE SEQUENCE OF OPERATIONS

- EcoNet® directs indoor unit to deliver airflow that matches demand of compressor
- Indoor coil EXV goes to remembered position for cooling mode.
- Outdoor unit EXV fully opens
 - LED flashes green when open.
- Compressor Inverter Drive Board begins operation
- Outdoor Fan motor starts
- If time delay expires, compressor & fan motor will start
- Call for cool ends,
 - compressor & outdoor fans shut down.
 - Indoor fan runs 30-45 seconds more.
 - EXV indoors shut down.



Note: 5-minute delay each time heating or cooling modes change. When unit shuts off, it will wait 5 minutes before startup. Also, 5-mute delay on power



ECONET[®] - 2 WIRES

- Requires continuous 18 AWG thermostat wire
- The EcoNet® control system requires two control wires for unit operation:
 - E1 Communications
 - E2 Communications
 - DO NOT Connect R or C to the outdoor unit it will blow a fuse!
- The EcoNet® enabled air handler or furnace is equipped with a 24-volt, 40- or 50-VA transformer for proper system operation. See the wiring diagram for low-voltage wiring connections
- U and U2 terminals can be used for utility load shedding





Diagnosing Compressors – Operational Parameters

- The ranges below vary based on tonnage and operating conditions.
- Actual values can be viewed in the contractor app

Operational Speeds				
Low cooling speed	1800 – 2100 RPM			
Maximum cooling speed	4800 – 5400 RPM			
Cooling Overdrive	Up to 5900 RPM*			
Low heat speed	1900 – 2400 RPM			
Maximum heat speed	7200 RPM			
Heating Overdrive	Up to 7900 RPM*			
Condenser fan minimum speed	300 – 480 RPM			
Condenser fan maximum speed	830 – 895 RPM			
Defrost speed	4200 RPM			
Oil recovery speed	3600 RPM			

*May vary by capacity

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