

JR SERIES DEDICATED OUTSIDE AIR SYSTEM ENGINEERING GUIDE

100% Outside Air Design

Air Source, Heating and Cooling
Water Source Heat Pump
Air Source Heat Pump

3–70 Ton Cooling Capacity
Up to 18,000 CFM
Model Vintage D



INSTALL CONFIDENCE

Nomenclature

Example Pin Number:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
J R O A - 6 6 0 H 8 A - 4 D A B J - A H 1 B 4 - 1 F J B 0 - H 2 7 0 0 - 0 C 0 0 0 - 0 0 0 0 B 1 - H 1 0 0 - A B D 0 - A L 0 0

DIGITS 1-2: PRODUCT FAMILY

JR: YORK Packaged Rooftop

DIGIT 3: TYPE

O: Outside Air

DIGIT 4: APPLICATION

A: Air-Cooled

W: Water Source Heat Pump

H: Air Source Heat Pump

DIGITS 5-7: NOMINAL CAPACITY

036: 3 ton	300: 25 ton
048: 4 ton	360: 30 ton
060: 5 ton	420: 35 ton
072: 6 ton	480: 40 ton
084: 7 ton	540: 45 ton
096: 8 ton	600: 50 ton
120: 10 ton	660: 55 ton
150: 12.5 ton	720: 60 ton
180: 15 ton	780: 65 ton
210: 17.5 ton	840: 70 ton
240: 20 ton	

DIGITS 8-9: CABINET SIZE

A0: A Cab with 0 Cond Fans

B0: B Cab with 0 Cond Fans

F0: BXL Cab with 0 Cond Fans

C0: C Cab with 0 Cond Fans

G0: CXL Cab with 0 Cond Fans

D0: D Cab with 0 Cond Fans

H0: DXL Cab with 0 Cond Fans

E0: E Cab with 0 Cond Fans

J0: EXL Cab with 0 Cond Fans

A1: A Cab with 1 Cond Fans

A2: A Cab with 2 Cond Fans

B1: A Cab with 1 Cond Fans

B2: A Cab with 2 Cond Fans

B4: A Cab with 4 Cond Fans

F1: BXL Cab with 1 Cond Fans

F2: BXL Cab with 2 Cond Fans

F4: BXL Cab with 4 Cond Fans

C2: C Cab with 2 Cond Fans

C4: C Cab with 4 Cond Fans

C6: C Cab with 6 Cond Fans

K2: CL Cab with 2 Cond Fans

K4: CL Cab with 4 Cond Fans

G2: CXL Cab with 2 Cond Fans

G4: CXL Cab with 4 Cond Fans

G6: CXL Cab with 6 Cond Fans

D4: D Cab with 4 Cond Fans

D6: D Cab with 6 Cond Fans

D8: D Cab with 6 Oversized Cond Fans

H4: DXL Cab with 4 Cond Fans

H6: DXL Cab with 6 Cond Fans

H8: DXL Cab with 6 Oversized Cond Fans

E4: E Cab with 4 Cond Fans

E6: E Cab with 6 Cond Fans

E8: E Cab with 6 Oversized Cond Fans

H4: EXL Cab with 4 Cond Fans

H6: EXL Cab with 6 Cond Fans

H8: EXL Cab with 6 Oversized Cond Fans

DIGIT 10: CONTROLS

A: ALC, Standard Program, DOAS

B: ALC, Std Program, DOAS w/ Recirc NSB

D: ALC, Std Program, w/ Economizer, Enthalpy

E: ALC, Std Program, DOAS for Lonworks

F: ALC, Std Program, DOAS w/ Recirc NSB for Lonworks

H: ALC, Std Program, w/ Economizer, Enthalpy for Lonworks

M: Compressor Lockout Thermostat

N: ALC, Std Program, w/ Economizer, Sensible

P: ALC, Std Program, w/ Economizer, Sensible for Lonworks

DIGIT 11: VOLTAGE

2: 208/3/60

3: 230/3/60

4: 460/3/60

5: 575/3/60

DIGIT 12: MODEL VINTAGE

D: Model Generation

DIGIT 13: AIRFLOW CONFIGURATION

A: Vertical supply and vertical return

B: Horizontal supply and vertical return

C: Vertical supply and side return

D: Horizontal supply and side return

E: Vertical supply and no return

F: Horizontal supply and no return

DIGITS 14-15: SUPPLY BLOWER/SIZE TYPE

AC: 12 inches DD, Airfoil

AD: 14 inches DD, Airfoil

AE: 16 inches DD, Airfoil

AF: 18 inches DD, Airfoil

AG: 20 inches DD, Airfoil

AH: 22 inches DD, Airfoil

AJ: 25 inches DD, Airfoil

BA: 10 inches DD, BI

BB: 11 inches DD, BI

BC: 12 inches DD, BI

BD: 14 inches DD, BI

BE: 16 inches DD, BI

BF: 18 inches DD, BI

BG: 20 inches DD, BI

BH: 22 inches DD, BI

BJ: 25 inches DD, BI

CA: 280mm Single ECM (CIW.087.5FA)

CR: 355mm Single ECM (CIB.112.6FF IE)

CM: 450mm Single ECM (CIB.140.6IF)

C1: EC 310

C2: EC 350

C3: EC 450 (Low) (460V Only)

C4: EC 450 (Hi)

C5: EC 500 (Low)

C6: EC 500 (Hi) (460V Only)

C7: EC 560 (208, 230V Only)

DA: 280mm Dual ECM (CIW.087.5FA)

DK: 355mm Dual ECM (CIB.112.6FF IE)

D1: Dual EC 310

D2: Dual EC 450 (Low) (460V Only)

D3: Dual EC 450 (Hi)

D4: Dual EC 500 (Low)

EA: Dual 14 inches DD, BI

EB: Dual 14 inches DD, AF

EC: Dual 16 inches DD, BI

ED: Dual 16 inches DD, AF

EE: Dual 18 inches DD, BI

EF: Dual 18 inches DD, AF

EG: Dual 20 inches DD, BI

EH: Dual 20 inches DD, AF

DIGIT 16: SUPPLY BLOWER OPTIONS

0: None

A: Rubber Isolation (Comefri Only)

B: Spring Isolation (Comefri Only)

F: Rigid Mount (Comefri Only)

C: Cometer (ECM Only)

D: Rubber Isolation + Piezo Ring (Comefri Only)

E: Spring Isolation + Piezo Ring (Comefri Only)

G: Rigid Mount + Piezo Ring (Comefri Only)

DIGIT 17: SUPPLY MOTOR SIZE

A: 1.0 HP

F: 7.5 HP

B: 1.5 HP

G: 10.0 HP

C: 2.0 HP

H: 15.0 HP

D: 3.0 HP

M: ECM

E: 5.0 HP

DIGIT 18: SUPPLY MOTOR TYPE

1: High efficiency ODP with VFD (CV)

2: High efficiency TEFC with VFD (CV)

3: ECM (CV)

4: High efficiency ODP with VFD and DPT (VAV)

5: High efficiency TEFC with VFD and DPT (VAV)

6: ECM and DPT ALC Only (VAV)

DIGIT 19: COOLING COIL

0: None

B: 6 row Copper Tube Aluminum Fin DX Coil

DIGIT 20: COMPRESSOR TYPE

0: None

1: Single Scroll/Single Circuit

2: Dual Scroll/Dual Circuit

3: Single Digital Scroll/Single Circuit

4: Single Digital Scroll and Single Scroll/ Dual Circuit

5: Dual Digital Scroll/Dual Circuit

6: Dual Scroll/Dual Circuit with Lead Circuit VFD

DIGIT 21: MCA

1: 0-30

2: 30.1-60

3: 60.1-100

4: 100.1-200

5: 200.1-400

6: 400+

DIGITS 22–23: REFRIGERATION CONTROLS OPTIONS

00: None
 AE: Hot Gas Bypass (Lead Circuit)
 AF: Hot Gas Bypass (Lag Circuit)
 AG: Hot Gas Bypass (Dual Circuit)
 AH: Hot Gas Reheat (Single Circuit)
 AJ: Hot Gas Reheat (Dual Circuit)
 AK: Hot Gas Reheat, Modulating (Single Circuit)
 AL: Hot Gas Reheat, Modulating (Dual Circuit)
 AM: Liquid Sub Cooling, Switchable, All Circuits
 DA: AE + AH
 DP: AE + AJ
 DB: AE + AK
 DV: AE + AL
 DC: AE + AM
 DM: AF + AH
 DQ: AF + AJ
 DT: AF + AK
 DW: AF + AL
 DZ: AF + AM
 DN: AG + AH
 DR: AG + AJ
 DU: AG + AK
 DX: AG + AL
 EU: AG + AM
 DD: AH + AM
 DE: AK + AM
 FA: AE + AH + AM
 FB: AE + AK + AM
 FF: AF + AH + AM
 FJ: AF + AK + AM
 FG: AG + AH + AM
 FK: AG + AK + AM

DIGIT 24: HEATING TYPE

0: None
 A: Electric Heat
 B: Natural Gas Heat
 D: LP Gas Heat
 F: Hot Water Heat
 G: Electric Preheat
 H: B + G
 J: D + G
 K: F + G

DIGIT 25: ELECTRIC HEATING CAPACITY

0: None
 A: 5 kW 240/480/575v – 3.75 kW 208v
 B: 10 kW 240/480/575v – 7.5 kW 208v
 C: 15 kW 240/480/575v – 11.25 kW 208v
 D: 20 kW 240/480/575v – 15 kW 208v
 E: 25 kW 240/480/575v – 18.75 kW 208v
 F: 30 kW 240/480/575v – 22.5 kW 208v
 G: 35 kW 240/480/575v – 26.25 kW 208v
 H: 40 kW 240/480/575v – 30 kW 208v
 K: 50 kW 240/480/575v – 37.5 kW 208v
 M: 60 kW 240/480/575v – 45 kW 208v
 N: 70 kW 240/480/575v – 52.5 kW 208v
 P: 80 kW 240/480/575v – 60 kW 208v
 R: 100 kW 240/480/575v – 75 kW 208v
 S: 110 kW 240/480/575v – 81.4 kW 208v
 T: 120 kW 240/480/575v – 90 kW 208v
 U: 130 kW 240/480/575v – 97.5 kW 208v
 V: 140 kW 240/480/575v – 105 kW 208v
 W: 150 kW 240/480/575v – 112.5 kW 208v

DIGITS 26–27: GAS HEATING CAPACITY

00: None
 A1: 75 MBH
 B1: 100 MBH
 C1: 150 MBH
 D1: 200 MBH
 E1: 250 MBH
 F1: 300 MBH
 G1: 350 MBH
 H1: 400 MBH
 J1: 500 MBH
 K1: 600 MBH
 A2: 100 + 100 MBH
 G2: 150 + 150 MBH
 B2: 200 + 200 MBH
 C2: 250 + 250 MBH
 D2: 300 + 300 MBH
 F2: 350 + 350 MBH
 E2: 400 + 400 MBH
 H2: 500 + 500 MBH
 J2: 600 + 600 MBH
 A4: (4) 200 MBH
 B4: (4) 250 MBH
 C4: (4) 300 MBH
 D4: (4) 350 MBH
 E4: (4) 400 MBH

DIGIT 28: HEATER CONTROL

0: None
 1: 1 Stage
 2: 2 Stage
 3: 4 Stage
 9: 8 Stage
 4: SCR
 6: Modulating 5:1 NG, 3:1 LPG
 7: Modulating 10:1 NG, 6:1 LPG
 8: Modulating 20:1 NG, 12:1 LPG

DIGIT 29: HEATING GAS SAFETY CONTROLS

0: None

DIGIT 30: ENERGY RECOVERY

0: None
 A: ECW 244 + 2 inches 30/30 Filter
 B: ECW 324 + 2 inches 30/30 Filter
 C: ECW 364 + 2 inches 30/30 Filter
 D: ECW 424 + 2 inches 30/30 Filter
 E: ECW 484 + 2 inches 30/30 Filter
 F: ECW 486 + 2 inches 30/30 Filter
 G: ECW 544 + 2 inches 30/30 Filter
 H: ECW 604 + 2 inches 30/30 Filter
 J: ECW 606 + 2 inches 30/30 Filter
 K: ECW 664 + 2 inches 30/30 Filter
 L: ECW 666 + 2 inches 30/30 Filter
 M: ECW 706 + 2 inches 30/30 Filter
 N: ECW 724 + 2 inches 30/30 Filter
 P: ECW 726 + 2 inches 30/30 Filter
 Q: ECW 784 + 2 inches 30/30 Filter
 R: ECW 786 + 2 inches 30/30 Filter
 S: ECW 7812 + 2 inches 30/30 Filter
 T: ECW 844 + 2 inches 30/30 Filter
 U: ECW 846 + 2 inches 30/30 Filter
 V: ECW 8412 + 2 inches 30/30 Filter

DIGIT 31: ENERGY RECOVERY OPTIONS

0: None (No ECW)
 A: On/Off Defrost
 B: VFD Temp Defrost
 C: Bypass
 D: A + C
 E: B + C
 F: Standard Control
 G: C + F

DIGIT 32: VENTILATION

A: Hood & Birdscreen w/o Damper
 B: Manual OA Damper w/o Actuator
 C: Motorized 2-Position OA Damper (Class 1 Rated) w/ 2-Position Actuator (ALC, Field DDC, EM)
 D: Motorized Proportional OA Damper (Class 1 Rated) w/ 0–10VDC Actuator (ALC, Field DDC)
 E: Motorized 2-Position OA & RA Dampers (Class 1 Rated) w/ 2-Position Actuators (ALC, Field DDC)
 F: Motorized OA & RA Dampers (Class 1 Rated) w/ 0–10VDC Actuators (ALC, Field DDC)

DIGITS 33–34: EXHAUST BLOWER SIZE

00: None
 AC: 12 inches DD, Airfoil
 AD: 14 inches DD, Airfoil
 AE: 16 inches DD, Airfoil
 AF: 18 inches DD, Airfoil
 AG: 20 inches DD, Airfoil
 AH: 22 inches DD, Airfoil
 AJ: 25 inches DD, Airfoil
 BA: 10 inches DD, BI
 BB: 11 inches DD, BI
 BC: 12 inches DD, BI
 BD: 14 inches DD, BI
 BE: 16 inches DD, BI
 BF: 18 inches DD, BI
 BG: 20 inches DD, BI
 BH: 22 inches DD, BI
 BJ: 25 inches DD, BI
 CA: 280mm Single ECM (CIW.087.5FA)
 CR: 355mm Single ECM (CIB.112.6FF IE)
 CM: 450mm Single ECM (CIB.140.6IF)
 C1: EC 310
 C2: EC 350
 C3: EC 450 (Low) (460V Only)
 C4: EC 450 (Hi)
 C5: EC 500 (Low)
 C6: EC 500 (Hi) (460V Only)
 C7: EC 560 (208,230V Only)
 DA: 280mm Dual ECM (CIW.087.5FA)
 DK: 355mm Dual ECM (CIB.112.6FF IE)
 D1 = Dual EC 310
 D2 = Dual EC 450 (Low) (460V Only)
 D3 = Dual EC 450 (Hi)
 D4 = Dual EC 500 (Low)
 EA: Dual 14 inches DD, BI
 EB: Dual 14 inches DD, AF
 EC: Dual 16 inches DD, BI
 ED: Dual 16 inches DD, AF
 EE: Dual 18 inches DD, BI
 EF: Dual 18 inches DD, AF
 EG: Dual 20 inches DD, BI
 EH: Dual 20 inches DD, AF

Nomenclature (Cont'd)

DIGIT 35: EXHAUST BLOWER OPTIONS

0: None (No Exhaust)
 D: Gravity Relief Damper (ECM and No Exhaust Fan only)
 E: Actuator Damper (ECM and No Exhaust Fan only)
 H: Gravity Relief Damper + Cometer (ECM only)
 L: Actuator Damper + Cometer (ECM only)
 F: Gravity Relief Damper + Rubber Isolation (Comefri only)
 J: Actuator Damper + Rubber Isolation (Comefri only)
 M: Gravity Relief Damper + Rubber Isolation + Piezo Ring (Comefri only)
 N: Actuator Damper + Rubber Isolation + Piezo Ring (Comefri only)
 G: Gravity Relief Damper + Spring Isolation (Comefri only)
 K: Actuator Damper + Spring Isolation (Comefri only)
 P: Gravity Relief Damper + Spring Isolation + Piezo Ring (Comefri only)
 Q: Actuator Damper + Spring Isolation + Piezo Ring (Comefri only)
 T: Gravity Relief Damper + Rigid Mount (Comefri only)
 U: Actuator Damper + Rigid Mount (Comefri only)
 V: Gravity Relief Damper + Rigid Mount + Piezo Ring (Comefri only)
 W: Actuator Damper + Rigid Mount + Piezo Ring (Comefri only)

DIGIT 36: EXHAUST MOTOR SIZE

0: None
 A: 1.0 HP
 B: 1.5 HP
 C: 2.0 HP
 D: 3.0 HP
 E: 5.0 HP
 F: 7.5 HP
 G: 10.0 HP
 H: 15.0 HP
 M: ECM

DIGIT 37: EXHAUST MOTOR TYPE

1: High efficiency ODP with VFD (CV)
 2: High efficiency TEFC with VFD (CV)
 3: ECM (CV)
 4: High efficiency ODP with VFD and DPT (VAV)
 5: High efficiency TEFC with VFD and DPT (VAV)
 6: ECM and DPT ALC Only (VAV)

DIGITS 38–39: CORROSION PROTECTION

00: None
 A1: Corrosion Protection Coating - Cabinet
 F1: Corrosion Protection Coating - Condenser Coil
 H1: Corrosion Protection Coating - Indoor Coils

AE: A1 + F1
 AR: A1 + H1
 BS: A1 + F1 + H1

DIGITS 40–41: MAINTENANCE OPTIONS

00: None
 A1: 115V Convenience Outlet (Field Wired)
 B1: 115V Convenience Outlet (Factory Wired)
 C1: Magnahelic Gauge (One) by Rule
 D1: Magnahelic Gauge (Two) by Rule
 E1: Magnahelic Gauge (Three) by Rule
 F1: Clogged Filter Indicator
 G1: Condensate Overflow Switch
 AA: A1 + C1
 AC: A1 + E1
 AD: A1 + F1
 AE: A1 + G1
 BA: B1 + C1
 BB: B1 + D1
 BC: B1 + E1
 BD: B1 + F1
 BE: B1 + G1
 CA: C1 + F1
 CB: C1 + G1
 DB: D1 + F1
 DA: D1 + G1
 EB: E1 + F1
 EA: E1 + G1
 FA: F1 + G1
 JA: A1 + C1 + F1
 JB: A1 + C1 + G1
 JC: A1 + D1 + F1
 JF: A1 + D1 + G1
 JJ: A1 + E1 + F1
 JK: A1 + E1 + G1
 JL: A1 + F1 + G1
 KA: B1 + C1 + F1
 KB: B1 + C1 + G1
 KE: B1 + D1 + F1
 KF: B1 + D1 + G1
 KJ: B1 + E1 + F1
 KK: B1 + E1 + G1
 KL: B1 + F1 + G1
 LA: C1 + F1 + G1
 MA: D1 + F1 + G1
 NA: E1 + F1 + G1
 RA: A1 + C1 + F1 + G1
 RG: A1 + D1 + F1 + G1
 RN: A1 + E1 + F1 + G1
 SA: B1 + C1 + F1 + G1
 SG: B1 + D1 + F1 + G1
 SN: B1 + E1 + F1 + G1

DIGIT 42: MOCAP

A: 15 Amps	N: 100 Amps
B: 20 Amps	P: 110 Amps
C: 25 Amps	Q: 125 Amps
D: 30 Amps	R: 150 Amps
E: 35 Amps	S: 175 Amps
F: 40 Amps	T: 200 Amps
G: 45 Amps	U: 225 Amps
H: 50 Amps	V: 250 Amps
J: 60 Amps	W: 300 Amps
K: 70 Amps	Y: 350 Amps
L: 80 Amps	Z: 400 Amps
M: 90 Amps	1: 400+ Amps

DIGIT 43: DISCONNECT TYPE

0: None
 1: Nonfused
 2: Fused

DIGITS 44–45: CONTROL OPTIONS

00: None
 AA: Exhaust Fan Interlock
 AB: Energy Management Relay
 BA: AA + AB

DIGITS 46–47: SAFETY CONTROLS

00: None
 AA: High Temperature Alarm (Firestat)
 AB: Factory Installed Smoke Detector
 AE: Carbon Dioxide Detector
 BA: AA + AB
 BD: AA + AE
 BG: AB + AE
 CC: AA + AB + AE

DIGIT 48: PRE-FILTER

A: 2" MERV8 Pleated
 B: 4" MERV8 Pleated
 C: 4" MERV11 Pleated
 D: 4" MERV14 Pleated
 E: 4" MERV8 Pleated w/ 2" MERV8 Pleated
 F: 4" MERV11 Pleated w/ 2" MERV8 Pleated
 G: 4" MERV14 Pleated w/ 2" MERV8 Pleated
 H: 2" Metal Mesh
 J: 4" MERV8 Pleated w/ 2" Metal Mesh
 K: 4" MERV11 Pleated w/ 2" Metal Mesh
 L: 4" MERV14 Pleated w/ 2" Metal Mesh

DIGIT 49: RESERVE FOR FUTURE USE

0: None

DIGITS 50–51: ALC OPTIONS

00: None
 AA: Bacview (Ship With)
 AB: ZS Standard Zone Sensor
 AC: ZS Standard Zone Sensor w/ Humidity
 AD: ZS Standard Zone Sensor w/ CO2
 AE: ZS Standard Zone Sensor w/ Humidity and CO2
 AF: ZS Plus Zone Sensor
 AG: ZS Plus Zone Sensor w/ Humidity
 AH: ZS Plus Zone Sensor w/ CO2
 AJ: ZS Plus Zone Sensor w/ Humidity and CO2
 AK: ZS Pro Zone Sensor
 AL: ZS Pro Zone Sensor w/ Humidity
 AM: ZS Pro Zone Sensor w/ CO2
 AN: ZS Pro Zone Sensor w/ Humidity and CO2
 AP: Smoke Detector
 BA: AA + AB
 BB: AA + AC
 BC: AA + AD
 BD: AA + AE
 BE: AA + AF
 BF: AA + AG
 BG: AA + AH
 BH: AA + AJ
 BJ: AA + AK
 BK: AA + AL

BL: AA + AM
 BM: AA + AN
 CA: AA + AP
 CB: AB + AP
 CC: AC + AP
 CD: AD + AP
 CE: AE + AP
 CF: AF + AP
 CG: AG + AP
 CH: AH + AP
 CJ: AJ + AP
 CK: AK + AP
 CL: AL + AP
 CM: AM + AP
 CN: AN + AP
 DA: AA + AB + AP
 DB: AA + AC + AP
 DC: AA + AD + AP
 DD: AA + AE + AP
 DE: AA + AF + AP
 DF: AA + AG + AP
 DG: AA + AH + AP
 GH: AA + AJ + AP
 DJ: AA + AK + AP
 DK: AA + AL + AP
 DL: AA + AM + AP
 DM: AA + AN + AP

DIGITS 52-53: JR ROOF CURBS

00: None

AA: A Cab Roof Curb 14" Air Handler w/ Exhaust

AB: A Cab Roof Curb 14" w/ 1 Cond Fan
 w/ Exhaust

AC: A Cab Roof Curb 14" w/ 2 Cond Fan
 w/ Exhaust

AD: A Cab Roof Curb 14" Air Handler No Exhaust

AE: A Cab Roof Curb 14" w/ 1 Cond Fan
 No Exhaust

AF: A Cab Roof Curb 14" w/ 2 Cond Fan
 No Exhaust

BA: B Cab Roof Curb 14" Air Handler w/ Exhaust

BB: B Cab Roof Curb 14" w/ 1 Cond Fan
 w/ Exhaust

BC: B Cab Roof Curb 14" w/ 2 Cond Fan
 w/ Exhaust

BD: B Cab Roof Curb 14" w/ 3 Cond Fan
 w/ Exhaust

BE: B Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

BF: B Cab Roof Curb 14" Water Source w/ Exhaust

BG: B Cab Roof Curb 14" Air Handler No Exhaust

BH: B Cab Roof Curb 14" w/ 1 Cond Fan
 No Exhaust

BI: B Cab Roof Curb 14" w/ 2 Cond Fan
 No Exhaust

BJ: B Cab Roof Curb 14" w/ 3 Cond Fan
 No Exhaust

BK: B Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

BL: B Cab Roof Curb 14" Wtr Source No Exhaust

FA: BXL Cab Roof Curb 14" Air Handler w/ Exhaust

FB: BXL Cab Roof Curb 14" w/ 1 Cond Fan
 w/ Exhaust

FC: BXL Cab Roof Curb 14" w/ 2 Cond Fan
 w/ Exhaust

FD: BXL Cab Roof Curb 14" w/ 3 Cond Fan
 w/ Exhaust

FE: BXL Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

FF: BXL Cab Roof Curb 14" Wtr Source w/ Exhaust

FG: BXL Cab Roof Curb 14" Air Handler
 No Exhaust

FH: BXL Cab Roof Curb 14" w/ 1 Cond Fan
 No Exhaust

FI: BXL Cab Roof Curb 14" w/ 2 Cond Fan
 No Exhaust

FJ: BXL Cab Roof Curb 14" w/ 3 Cond Fan
 No Exhaust

FK: BXL Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

FL: BXL Cab Roof Curb 14" Wtr Source
 No Exhaust

CA: C Cab Roof Curb 14" Air Handler w/ Exhaust

CB: C Cab Roof Curb 14" w/ 2 Cond Fan
 w/ Exhaust

CC: C Cab Roof Curb 14" w/ 3 Cond Fan
 w/ Exhaust

CD: C Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

CE: C Cab Roof Curb 14" w/ 6 Cond Fan
 w/ Exhaust

CF: C Cab Roof Curb 14" Wtr Source w/ Exhaust

CG: C Cab Roof Curb 14" Air Handler No Exhaust

CH: C Cab Roof Curb 14" w/ 2 Cond Fan
 No Exhaust

CI: C Cab Roof Curb 14" w/ 3 Cond Fan
 No Exhaust

CJ: C Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

CK: C Cab Roof Curb 14" w/ 6 Cond Fan
 No Exhaust

CL: C Cab Roof Curb 14" Wtr Source No Exhaust

GA: CXL Cab Roof Curb 14" Air Handler
 w/ Exhaust

GB: CXL Cab Roof Curb 14" w/ 2 Cond Fan
 w/ Exhaust

GC: CXL Cab Roof Curb 14" w/ 3 Cond Fan
 w/ Exhaust

GD: CXL Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

GE: CXL Cab Roof Curb 14" w/ 6 Cond Fan
 w/ Exhaust

GF: CXL Cab Roof Curb 14" Water Source
 w/ Exhaust

GG: CXL Cab Roof Curb 14" Air Handler
 No Exhaust

GH: CXL Cab Roof Curb 14" w/ 2 Cond Fan
 No Exhaust

GI: CXL Cab Roof Curb 14" w/ 3 Cond Fan
 No Exhaust

GJ: CXL Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

GK: CXL Cab Roof Curb 14" w/ 6 Cond Fan
 No Exhaust

GL: CXL Cab Roof Curb 14" Water Source
 No Exhaust

DA: D Cab Roof Curb 14" Air Handler w/ Exhaust

DB: D Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

DC: D Cab Roof Curb 14" w/ 6 Cond Fan
 w/ Exhaust

DD: D Cab Roof Curb 14" w/ 6 Oversized Cond
 Fan w/ Exhaust

DE: D Cab Roof Curb 14" Wtr Source w/ Exhaust

DF: D Cab Roof Curb 14" Air Handler No Exhaust

DG: D Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

DH: D Cab Roof Curb 14" w/ 6 Cond Fan
 No Exhaust

DI: D Cab Roof Curb 14" w/ 6 Oversized Cond Fan
 No Exhaust

DJ: D Cab Roof Curb 14" Wtr Source No Exhaust

HA: DXL Cab Roof Curb 14" Air Handler w/
 Exhaust

HB: DXL Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

HC: DXL Cab Roof Curb 14" w/ 6 Cond Fan
 w/ Exhaust

HD: DXL Cab Roof Curb 14" w/ 6 Oversized Cond
 Fan w/ Exhaust

HE: DXL Cab Roof Curb 14" Water Source
 w/ Exhaust

HF: DXL Cab Roof Curb 14" Air Handler No
 Exhaust

HG: DXL Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

HH: DXL Cab Roof Curb 14" w/ 6 Cond Fan
 No Exhaust

HI: DXL Cab Roof Curb 14" w/ 6 Oversized Cond
 Fan No Exhaust

HJ: DXL Cab Roof Curb 14" Water Source No
 Exhaust

EA: E Cab Roof Curb 14" Air Handler w/ Exhaust

EB: E Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

EC: E Cab Roof Curb 14" w/ 6 Cond Fan
 w/ Exhaust

ED: E Cab Roof Curb 14" w/ 6 Oversized Cond
 Fan w/ Exhaust

EE: E Cab Roof Curb 14" Water Source w/ Exhaust

EF: E Cab Roof Curb 14" Air Handler No Exhaust

EG: E Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

EH: E Cab Roof Curb 14" w/ 6 Cond Fan
 No Exhaust

EI: E Cab Roof Curb 14" w/ 6 Oversized Cond Fan
 No Exhaust

EJ: E Cab Roof Curb 14" Wtr Source No Exhaust

JA: EXL Cab Roof Curb 14" Air Handler w/ Exhaust

JB: EXL Cab Roof Curb 14" w/ 4 Cond Fan
 w/ Exhaust

JC: EXL Cab Roof Curb 14" w/ 6 Cond Fan
 w/ Exhaust

JD: EXL Cab Roof Curb 14" w/ 6 Oversized Cond
 Fan w/ Exhaust

JE: EXL Cab Roof Curb 14" Wtr Source w/ Exhaust

JF: EXL Cab Roof Curb 14" Air Handler No
 Exhaust

JG: EXL Cab Roof Curb 14" w/ 4 Cond Fan
 No Exhaust

JH: EXL Cab Roof Curb 14" w/ 6 Cond Fan
 No Exhaust

JI: EXL Cab Roof Curb 14" w/ 6 Oversized Cond
 Fan No Exhaust

JJ: EXL Cab Roof Curb 14" Water Source
 No Exhaust

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Introduction

The YORK Dedicated Outdoor Air System (DOAS) Single Package Units – designed to meet the demands of the market for today and tomorrow.

A DOAS from YORK delivers clean, dehumidified outside air in all weather and climate conditions. New standards for efficiency and high-performance green buildings continue to evolve. With a YORK DOAS, you can meet ASHRAE requirements for fresh air and energy efficiency.

Application Characteristics:

- 100% outside air
- Continuous conditioning of the air
- Extended operation time (up to 24/7)
- Precise unit CFM delivery

Count on high efficiency and proven performance in both heating and cooling conditions. Get the quality performance you expect from YORK equipment including:

- Energy savings no matter what the season
- Robust construction for reliability and long life
- More factory-installed options for easy installation

DESCRIPTION OF OPERATION

The YORK DOAS is a factory-assembled packaged unit that can operate within a broad range of ambient conditions and introduce ventilation air into a building at neutral conditions. The unit can be configured to utilize straight cooling, gas/electric/hot water heating, or an air/water source heat pump. It consists of matched refrigeration and air moving components (system controls, compressor(s), evaporator section, condensing section and fan(s)) designed to cool, heat, and/or dehumidify 100% outside air.

The unit may be provided with several different options and controls to meet various application requirements including optional hot gas reheat and liquid subcooling, energy recovery wheel, and supplemental heat (gas, electric, or hot water) with variable air volume delivery.

DOAS APPLICATION OVERVIEW

A DOAS is a specific HVAC system in which its purpose is to treat outside air for ventilation of air in a space or to an ancillary cooling and heating system. A common application of the JR series is for the use of exclusively treating outside air in order to achieve a high indoor air quality. Poor indoor air quality can lead to negative impacts on the building occupants' comfort and the overall condition of the building.

Introduction (Cont'd)

A DOAS unit may be used in conjunction with ancillary HVAC equipment, serving the same space. The DOAS unit will provide the conditioned ventilation air but will not maintain space temperature or space relative humidity setpoints. As described above, DOAS units are used differently than traditional HVAC units. Traditional HVAC units are designed to focus on maintaining zone temperature, while DOAS units are tasked with providing zone ventilation and dehumidification of outside air. The DOAS is designed specifically to prioritize zone ventilation and dehumidification of incoming air over the zone conditioning. Under no circumstances should a DOAS unit be expected to maintain the zone's temperature and humidity setpoints.

Having a dedicated system for ventilation ensures that the exact amount of ventilation air is delivered to each zone. This helps to maintain high indoor air quality while minimizing energy consumption. Separating the conditioning of ventilation air and zone conditioning air also simplifies sizing and selection of each unit, helping to ensure proper zone comfort. This separation of loads can also help reduce overall system capacity, which saves on first costs and energy costs.

Most applications require the DOAS unit to operate at neutral air conditions typically between 68.0–70.0°F. This prevents over cooling or heating the building space when operating with an ancillary HVAC system.

For these types of applications, please contact a Johnson Controls sales office for further application review.

Features and Benefits

HEATING

Modulating or Staged Gas Heat

- Standard stainless steel construction
- Suitable for natural or propane gas as an option
- Modulating gas heat is available 5:1, 10:1, 20:1 turndown
- Up to eight staged gas control

Hot Water Heat

- Four-row hot water coil
- Coil connection stubs located inside the unit cabinet

Electric Heat

Factory-installed electric heat shall have:

- Staged heat control (one, two, or four stages)
- or
- Silicon controlled rectifier (SCR) control providing infinite capacity adjustment

ADVANCE SINGLE PACKAGE UNIT CONTROLLER

- Microprocessor-based single package controller
- Includes a field-installed space temperature sensor with communication port
 - Utilizes BACnet and Modbus
 - LonWorks protocol capable
- Provides an alarm indicator and an audible alarm signal
 - Displays a current alarm list and an alarm history list
- Compressor minimum run time (3 minutes) and minimum off time (5 minutes)
- Has service run test capability
- Has a service diagnostic mode

FACTORY AIRFLOW CONFIGURATIONS

(Dependent on unit configuration)

Supply and Return

Unit can be mounted on an outdoor roof curb or slab mounted. Units shall be available in the following airflow configurations:

- Vertical supply and vertical return
- Horizontal supply and vertical return
- Vertical supply and side return
- Horizontal supply and side return
- Vertical supply and no return
- Horizontal supply and no return

Features and Benefits (Cont'd)

UNIT CABINET

1. A 2-inch thick double wall design, R-13 closed cell polyisocyanurate foam insulation, constructed of G-90 galvanized steel.
2. The condensate pan double sloped shall be 20-gauge stainless steel insulated with closed cell neoprene insulation.
3. The base rail shall be double flanged 12-gauge galvanized steel or welded closed section structural steel tubing.
4. Roof sections shall be sloped for proper drainage.
5. A unit shall have insulated sealed access doors, hinged for easy access to the controls compartment and all other areas requiring servicing.
6. The outdoor air opening shall have a factory provided hood with bird screen.

CABINET PROTECTION

Unit casing shall be capable of withstanding 2,500-hour salt spray exposure per ASTM B117.

Optional: Harsh environment protective coating on coils and cabinet that exceeds 10,000 hours salt spray.

FILTERS SECTION

Unit has multiple filtration options to improve Indoor Air Quality (IAQ)

- 2-inch MERV8 Pleated
- 4-inch MERV8 Pleated
- 4-inch MERV11 Pleated
- 4-inch MERV14 Pleated
- 4-inch MERV8 Pleated with 2-inch MERV8 Pleated
- 4-inch MERV11 Pleated with 2-inch MERV8 Pleated
- 4-inch MERV14 Pleated with 2-inch MERV8 Pleated
- 2-inch Metal Mesh
- 4-inch MERV8 Pleated with 2-inch Metal Mesh
- 4-inch MERV11 Pleated with 2-inch Metal Mesh
- 4-inch MERV14 Pleated with 2-inch Metal Mesh

SCROLL COMPRESSORS

- Digital scroll, VFD controlled scroll, and standard scroll compressor options
 - Digital scroll compressors modulate down to 10% capacity
- For units 240 MBH and above with dual circuits:
 - Single VFD scroll lead compressor and standard scroll lag compressor
- Multiple options available for compressor configuration

SUPPLY FAN SECTION

- Direct Drive Backward Inclined Plenum Supply Fan
 - Moves high volume of air at a variety of static pressures.
- Airfoil Direct Drive Plenum Supply Fan
 - Option offers higher efficiency and lower sound in certain applications.

VENTILATION

- Motorized OA
- Available Manual Damper

EVAPORATOR AND CONDENSER COIL

- Six row intertwined direct expansion (DX) coil
- Evaporator and condenser coils fabricated of aluminum fins and mechanically expanded, seamless copper refrigeration tubing to help ensure long-term efficient heat transfer from tube to fin
- JROA air source-only products with one, two, and four condenser fan options to include microchannel condenser coils.

MODULATING HOT GAS REHEAT

- Coil shall be available on the lead circuit only or with a second coil for reheat both refrigerant circuits
- Liquid Subcooling Coil
 - Optional factory-installed liquid sub-cooling coil
 - Operation of sub-cooling coil shall produce between 6.0°F and 10.0°F reheat

ENERGY RECOVERY

The factory-installed enthalpy wheel shall be certified to meet the requirements of AHRI Standard 1060 and shall be AHRI listed.

The enthalpy wheel shall be constructed of corrugated synthetic fibrous media with a desiccant intimately bound and uniformly and permanently dispersed throughout the matrix structure of the media.

Energy wheel defrost control and air bypass shall be available including VFD option.

OPTIONAL FACTORY FEATURES

- Air Source units
- Water Source Heat Pump operation
- Air Source Heat Pump operation
- Up to 70 ton capacity
- Multiple cabinet configurations with optional condenser size
- Factory Airflow configurations (eliminates horizontal curb)
- Multiple optional supply horse power and blower sizes

Features and Benefits (Cont'd)

- High efficiency ODP motor with VFD
- High efficiency TEFC motor with VFD
- ECM supply motor
- Standard Scroll compressor operation
- Single VFD scroll and single scroll dual circuit (units with 240 MBH and above only)
- Single digital scroll (36–96 MBH) and single scroll dual circuit (units with 120–210 MBH)
- Hot Gas Bypass single or dual circuit
- 5kw–150kw electric heat capacity (staged, SCR control)
- 75mbh–1600mbh gas heat capacity (5:1,10:1,20:1 turndown)
- VFD Energy Recovery Temperature Defrost
- Energy Recovery air bypass for economizer operation
- Multiple exhaust fan blower sizes (Airfoil and/or Backward Incline)
- Multiple exhaust fan blower type (ODP/TEFC with VFD)
- Cupronickel Water Coil Heat Exchanger
- Convenience Outlet (field or factory wired)
- Magnehelic gauge
- Fused or Nonfused Disconnect
- 2-inch and 4-inch MERV 8,11,14 filters
- Zone Sensors with CO₂ and or humidity sensing
- Smoke Detector
- 14-inch Roof Curb

Application Data

LOCATION

RIGGING

Proper rigging and handling of the equipment is mandatory during unloading and setting it into position to retain warranty status. Rigging and lifting should only be done by a professional rigger in accordance with a written rigging and lifting plan. The most appropriate rigging and lifting method will depend on job specific factors, such as the rigging equipment available and site needs. Therefore, a professional rigger must determine the rigging and lifting method to be used, and it is beyond the scope of this guide to specify rigging and lifting details.

Spreader bars must be used by cranes to prevent damage to the unit casing. All lifting lugs must be used when lifting the unit. Fork lifts will damage the unit and are not recommended. Care must be taken to keep the unit in the upright position during rigging and to prevent damage to the watertight seams in the unit casing. Avoid unnecessary jarring or rough handling.

UNIT PLACEMENT

The unit is typically mounted on a curb with duct work and utility connections usually going through the curb. It may also be pad-mounted. (Contact factory for specific instructions if unit is to be mounted in a different way [e.g. on mounting stand].)

Select a location where external water drainage cannot collect around the unit. Locate the unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level. Where snowfall is anticipated, mount the unit so all intakes and discharges are above the maximum snow depth for the area. Unit shall not be installed with inlet opening facing into the prevailing wind direction in order to help prevent the possibility of moisture entrainment.

When installed at ground level, the unit should be mounted on a level concrete slab, which should extend at least 2 inches (5.1 centimeters) beyond the unit on all sides. The top of the slab should be 2 inches (5.1 centimeters) above the ground level. The depth of the slab below the ground level and its structural design is governed by the type of soil and climatic conditions. The slab must not be in contact with any part of the building wall or foundation. The space between the slab and the building wall prevents the possibility of transmitting vibration to the building.

When installing a unit on the roof of a building, the structural members supporting the unit must be sufficiently strong for the weight of the unit and mounting rails. Structural members supporting the unit must be sufficiently strong for the combined weight of the installation. Transmission of sound into the building can be a problem if the structure is not strong enough.

Do not install the unit in an indoor location. Do not locate the air inlets near contaminated air or near exhaust vents. For optimal operation of the unit, adequate combustion and ventilation air must be provided in compliance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

Application Data (Cont'd)

OPTIMIZING JR CABINET SELECTIONS

Use the following matrix for determining an optimal JR Cabinet when price is a concern.

TABLE 1 - JR CABINET SELECTION GUIDE

CABINET	CFM RANGE	GAS HEATER MAX SIZE	REFRIGERATION SIZES AVAILABLE	WHEN TO USE XL	NOTES
A Cabinet	450–3,300 Horizontal SA 3,300 Max Horizontal RA 2,700 Max	100 MBH (Standard)	3–8 Tons	N/A	ECM fans ONLY. If you need ODP or TEFC, select the B cabinet. PRRA requires 6 row coil for DOE.
B Cabinet	1,000–5,700 Horizontal SA 5,700 Max Horizontal RA 3,300 Max	200 MBH (Standard) 400 MBH (XL)	3–20 Tons	When you need 350–400 MBH	If you need 250–300 MBH, select the C cabinet (the price is always lower).
C Cabinet	3,500–7,600 Horizontal SA 6,200 Max Horizontal RA 3,000 Max	300 MBH (Standard) 800 MBH (XL)	8–35 Tons	350–800 MBH	You may not be able to run ECW above 5,000 CFM in the selection tool. If this occurs, send to the application engineers.
CL Cabinet	3,500–7,600 Horizontal SA 6,200 Max Horizontal RA 3,000 Max	350 and 400 MBH (Standard)	8–35 Tons		No wheel or return options are offered with this cabinet.
D Cabinet	5,000–14,000 Horizontal SA 9,500 Max Horizontal RA 5,500 Max	400 MBH (Standard) 1,200 MBH (XL)	20–55 Tons	400–1,200 MBH Some heat pumps	D cabinet is a better price than E cabinet 99% of the time. Select sub-cooling, and always compare 4 row coil performance to 6 row.
E Cabinet	9,000–20,000 Horizontal SA 15,500 Max (XL ONLY) NO Horizontal RA (E <u>or</u> EXL)	600 MBH (Standard) 1,600 MBH (XL) (Vertical) 1,200 MBH (XL) (Horizontal)	40–70 Tons	Above 600 MBH Required for some tandem compressors	Review 4 row coil performance to ensure price savings. Horizontal furnace for EXL starts at 800 MBH (400 + 400).

REFRIGERATION CONTROLS GUIDELINES

Use the following table to ensure the correct JR selections are made.

TABLE 2 - JR SERIES REFRIGERATION CONTROLS APPLICATION BASED ON COMPRESSOR SELECTION

COMPRESSOR TYPE	HOW TO IMPLEMENT HGRH	HOW TO IMPLEMENT HGBP	NOTES	HOW TO IMPLEMENT LIQUID SUBCOOLING
Standard Scroll / Single Circuit	Single Circuit Staged or Modulating	REQUIRED for 100% OA applications Select HGBP on the lead circuit	Units 96 MBH capacity and BELOW	DO NOT select with dual circuit HGRH Select with single circuit HGRH for proper LAT control DO NOT select with heat pump applications
Dual Scroll / Dual Circuit	Select Dual Circuit OR Single Circuit Staged or Modulating	Required for 100% OA applications Select dual circuit HGBP ONLY	Units 120 MBH capacity and ABOVE	
Digital Scroll / Single Circuit	Single Circuit Staged or Modulating	No HGBP with Digital Scrolls	Units 96 MBH capacity and BELOW Heat pump and water source	
Single Digital and Single Scroll (Dual Circuit)	Select Dual Circuit OR Single Circuit Staged or Modulating	REQUIRED for 100% OA applications Select HGBP on the lag circuit	Digital Scroll ALWAYS on lead circuit Units 120–210 MBH	
Dual Digital Scroll (Dual Circuit with Lead Circuit VFD)	Select Dual Circuit OR Single Circuit Staged or Modulating	REQUIRED for 100% OA applications Select dual circuit HGBP ONLY	VFD ALWAYS on lead circuit Units 240 MBH and ABOVE	

Gas Heat Capacities

TABLE 3 - GAS HEAT CAPACITIES

UNIT CABINET SIZE*	UNIT CAPACITY (TONS)*	INPUT (Btuh)	OUTPUT (Btuh)	XL CABINET REQUIRED	NO. OF GAS HEAT SECTIONS	NO. OF STAGES	MODULATION RANGE (%)**	MAX TEMP RISE (°F) (HORIZONTAL/ VERTICAL SUPPLY)***
A	3-8	75,000	60,000		1	2	5:1	80/100
	3-8	100,000	80,000		1	2	5:1, 10:1	80/100
B	3-20	75,000	60,000		1	2	5:1	80/100
	3-20	100,000	80,000		1	2	5:1, 10:1	80/100
	3-20	150,000	120,000		1	2	5:1, 10:1	80/100
	3-20	200,000	160,000		1	2	5:1, 10:1	80/100
B XL	7-20	200,000	160,000	XL	2	4	10:1	130/160
	7-20	300,000	240,000	XL	2	4	10:1	130/160
	7-20	400,000	320,000	XL	2	4	10:1	130/160
C	7-35	75,000	60,000		1	2	5:1	80/100
	7-35	100,000	80,000		1	2	5:1, 10:1	80/100
	7-35	150,000	120,000		1	2	5:1, 10:1	80/100
	7-35	200,000	160,000		1	2	5:1, 10:1	80/100
	7-35	250,000	200,000		1	2	5:1, 10:1	80/100
	7-35	300,000	240,000		1	2	5:1, 10:1	80/100
CL	7-35	350,000	280,000		1	2	5:1, 10:1	80/100
	7-35	400,000	320,000		1	2	5:1, 10:1	80/100
C XL	7-35	300,000	240,000	XL	2	4	10:1	130/160
	7-35	200,000	160,000	XL	2	4	10:1	130/160
	7-35	400,000	320,000	XL	2	4	10:1	130/160
	7-35	500,000	400,000	XL	2	4	10:1	130/160
	7-35	600,000	480,000	XL	2	4	10:1	130/160
	7-35	700,000	560,000	XL	2	4	10:1	130/160
	7-35	800,000	640,000	XL	2	4	10:1	130/160
D	20-55	100,000	80,000		1	2	5:1, 10:1	80/100
	20-55	150,000	120,000		1	2	5:1, 10:1	80/100
	20-55	200,000	160,000		1	2	5:1, 10:1	80/100
	20-55	250,000	200,000		1	2	5:1, 10:1	80/100
	20-55	300,000	240,000		1	2	5:1, 10:1	80/100
	20-55	350,000	280,000		1	2	5:1, 10:1	80/100
	20-55	400,000	320,000		1	2	5:1, 10:1	80/100
D XL	20-55	400,000	320,000	XL	1	2	10:1	130/160
	20-55	500,000	400,000	XL	1	2	10:1	130/160
	20-55	600,000	480,000	XL	2	4	10:1	130/160
	20-55	700,000	560,000	XL	2	4	10:1	130/160
	20-55	800,000	640,000	XL	2	4	10:1	130/160
	20-55	1,000,000	800,000	XL	2	4	10:1	130/160
	20-55	1,200,000	960,000	XL	2	4	10:1	130/160
E	40-70	300,000	240,000		2	4	10:1	80/100
	40-70	400,000	320,000		2	4	10:1	80/100
	40-70	500,000	400,000		2	4	10:1	80/100
	40-70	600,000	480,000		2	4	10:1	80/100
E XL Horizontal or Vertical	40-70	800,000	640,000	XL	[2] or [4]	4 or 8	10:1, 20:1	[80/100] or [130/160]
	40-70	1,000,000	800,000	XL	[2] or [4]	4 or 8	10:1, 20:1	[80/100] or [130/160]
	40-70	1,200,000	960,000	XL	[2] or [4]	4 or 8	10:1, 20:1	[80/100] or [130/160]
E XL Vertical Only	40-70	1,400,000	1,120,000	XL	4	8	20:1	130/160
	40-70	1,600,000	1,280,000	XL	4	8	20:1	130/160

Electric Heat Capacities

TABLE 4 - ELECTRIC HEAT CAPACITIES

CABINET AND SIZE*	ELECTRIC HEAT kW (240, 480V)	ELECTRIC HEAT kW (208V)	STAGES	AMPS		
				240V	480V	208V
A Cabinet 03–08	5.0	3.8	1	12.0	6.0	10.4
	10.0	7.5	2, SCR	24.1	12.0	20.8
	15.0	11.3	2, SCR	26.1	18.0	31.2
	20.0	15.0	2, SCR	48.1	24.1	41.6
	25.0	18.8	2, SCR	60.1	30.1	52.0
	30.0	22.5	2, SCR	72.2	36.1	62.5
B/BXL Cabinet 03–20 C/CXL Cabinet 07–35	5.0	3.8	1	12.0	6.0	10.4
	10.0	7.5	2, SCR	24.1	12.0	20.8
	15.0	11.3	2, SCR	26.1	18.0	31.2
	20.0	15.0	2, SCR	48.1	24.1	41.6
	25.0	18.8	2, SCR	60.1	30.1	52.0
	30.0	22.5	2, SCR	72.2	36.1	62.5
	35.0	26.3	2, SCR	84.2	42.1	72.9
	40.0	30.0	2, SCR	96.2	48.1	83.3
	50.0	37.5	4, SCR	120.3	60.1	104.1
	60.0	45.0	4, SCR	144.3	72.2	124.9
	70.0	52.5	4, SCR	168.4	84.2	145.7
	80.0	60.0	4, SCR	192.5	96.2	166.5
	100.0	75.0	4, SCR	240.6	120.3	208.2
D/DXL Cabinet 20–35 E/EXL Cabinet	5.0	3.8	1	12.0	6.0	10.4
	10.0	7.5	2, SCR	24.1	12.0	20.8
	15.0	11.3	2, SCR	26.1	18.0	31.2
	20.0	15.0	2, SCR	48.1	24.1	41.6
	25.0	18.8	2, SCR	60.1	30.1	52.0
	30.0	22.5	2, SCR	72.2	36.1	62.5
	35.0	26.3	2, SCR	84.2	42.1	72.9
	40.0	30.0	2, SCR	96.2	48.1	83.3
	50.0	37.5	4, SCR	120.3	60.1	104.1
	60.0	45.0	4, SCR	144.3	72.2	124.9
	70.0	52.5	4, SCR	168.4	84.2	145.7
	80.0	60.0	4, SCR	192.5	96.2	166.5
	100.0	75.0	4, SCR	240.6	120.3	208.2
	110.0	82.5	4, SCR	264.6	132.3	229.0
	120.0	90.0	4, SCR	288.7	144.3	249.8
	150.0	112.5	4, SCR	360.8	180.4	416.4

Performance Data

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE

AIRFLOW (CFM)			ENTERING AIR TEMPERATURE (°F)								
		DRY BULB	90			95			100		
		WET BULB	76	78	80	76	78	80	76	78	80
036 (3 TON)											
375	Total Capacity (Btu/h)	36000	37400	38500	35400	36800	38000	34800	36000	37400	
	Sensible Capacity (Btu/h)	18400	17500	16500	20200	19300	18400	22000	21200	20200	
	Electric Power (Watts)	2854	2859	2863	3016	3022	3027	3193	3197	3202	
	Leaving Air Temp (°F db/°F wb)	45.9 / 45.9	48.3 / 48.3	50.7 / 50.7	46.5 / 46.5	48.8 / 48.8	51.2 / 51.2	47.1 / 47.1	49.4 / 49.4	51.8 / 51.8	
480	Total Capacity (Btu/h)	39500	41000	42500	39000	40000	41500	38000	39500	41000	
	Sensible Capacity (Btu/h)	20600	19400	18100	23000	21800	20600	25200	24200	23000	
	Electric Power (Watts)	2870	2873	2877	3032	3038	3043	3207	3213	3218	
	Leaving Air Temp (°F db/°F wb)	51.6 / 51.6	53.9 / 53.9	56.3 / 56.3	52.0 / 52.0	54.3 / 54.3	56.7 / 56.7	52.5 / 52.5	54.9 / 54.9	57.2 / 57.2	
600	Total Capacity (Btu/h)	42500	43500	45000	41500	43000	44500	40500	42000	43500	
	Sensible Capacity (Btu/h)	22800	21200	19800	25800	24400	22800	28800	27400	26000	
	Electric Power (Watts)	2879	2884	2890	3044	3050	3055	3220	3226	3233	
	Leaving Air Temp (°F db/°F wb)	56.0 / 55.9	58.3 / 58.2	60.6 / 60.6	56.3 / 56.3	58.6 / 58.6	61.0 / 60.9	56.8 / 56.8	59.0 / 59.0	61.3 / 61.3	
048 (4 TON)											
500	Total Capacity (Btu/h)	45500	47500	49000	45000	46500	48500	44000	45500	47500	
	Sensible Capacity (Btu/h)	23400	22200	21000	25800	24600	23400	28200	27000	25800	
	Electric Power (Watts)	3368	3377	3386	3569	3563	3572	3748	3776	3771	
	Leaving Air Temp (°F db/°F wb)	47.9 / 47.9	50.2 / 50.2	52.6 / 52.6	48.4 / 48.4	50.8 / 50.7	53.1 / 53.1	49.1 / 49.0	51.3 / 51.3	53.7 / 53.6	
640	Total Capacity (Btu/h)	50000	51500	53500	49000	50500	52500	48000	49500	51500	
	Sensible Capacity (Btu/h)	26200	24600	23000	29400	27800	26200	32600	31000	29400	
	Electric Power (Watts)	3392	3400	3411	3576	3588	3596	3775	3788	3797	
	Leaving Air Temp (°F db/°F wb)	53.2 / 53.2	55.6 / 55.6	57.9 / 57.9	53.7 / 53.6	56.0 / 56.0	58.3 / 58.3	54.1 / 54.1	56.4 / 56.4	58.7 / 58.7	
800	Total Capacity (Btu/h)	53000	55000	56500	52000	54000	55500	51000	52500	54500	
	Sensible Capacity (Btu/h)	29000	27200	25200	33200	31200	29200	37200	35200	33400	
	Electric Power (Watts)	3412	3423	3435	3598	3607	3620	3798	3808	3820	
	Leaving Air Temp (°F db/°F wb)	57.4 / 57.3	59.7 / 59.6	62.0 / 62.0	57.7 / 57.7	60.0 / 60.0	62.3 / 62.3	58.1 / 58.1	60.4 / 60.4	62.7 / 62.7	
060 (5 TON)											
625	Total Capacity (Btu/h)	54500	56500	58500	53500	55500	57500	52500	54500	56500	
	Sensible Capacity (Btu/h)	28200	26600	25000	31200	29600	28000	34200	32800	31200	
	Electric Power (Watts)	4049	4061	4075	4277	4290	4304	4528	4533	4549	
	Leaving Air Temp (°F db/°F wb)	49.6 / 49.6	52.0 / 52.0	54.4 / 54.4	50.0 / 50.0	52.4 / 52.4	54.8 / 54.8	50.6 / 50.6	53.0 / 52.9	55.3 / 55.3	
800	Total Capacity (Btu/h)	59000	61000	63000	58000	60000	61500	56500	58500	60500	
	Sensible Capacity (Btu/h)	31400	29400	27400	35400	33400	31400	39500	37400	35400	
	Electric Power (Watts)	4082	4097	4112	4309	4324	4339	4553	4568	4582	
	Leaving Air Temp (°F db/°F wb)	54.8 / 54.8	57.2 / 57.1	59.5 / 59.5	55.2 / 55.2	57.5 / 57.5	59.9 / 59.9	55.6 / 55.6	58.0 / 58.0	60.3 / 60.3	
1000	Total Capacity (Btu/h)	62000	64000	66000	61000	63000	65000	60000	61500	63500	
	Sensible Capacity (Btu/h)	34800	32400	29800	40000	37400	35000	44500	42500	40000	
	Electric Power (Watts)	4110	4126	4142	4337	4354	4371	4581	4596	4612	
	Leaving Air Temp (°F db/°F wb)	58.7 / 58.7	61.1 / 61.1	63.4 / 63.4	59.1 / 59.1	61.4 / 61.4	63.7 / 63.7	60.0 / 59.4	61.7 / 61.7	64.1 / 64.1	

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)								
	DRY BULB	90			95			100		
	WET BULB	76	78	80	76	78	80	76	78	80
072 (6 TON)										
750	Total Capacity (Btu/h)	63000	65000	67000	61500	64000	66000	60500	62500	65000
	Sensible Capacity (Btu/h)	32600	30800	28800	36200	34400	32600	40000	38000	36200
	Electric Power (Watts)	4459	4476	4493	4695	4712	4729	4947	4963	4983
	Leaving Air Temp (°F db/°F wb)	51.0 / 51.0	53.3 / 53.3	55.7 / 55.7	51.5 / 51.4	53.8 / 53.8	56.2 / 56.2	52.0 / 52.0	54.3 / 54.3	56.7 / 56.7
960	Total Capacity (Btu/h)	68000	70000	72000	66000	69000	71000	65000	67000	70000
	Sensible Capacity (Btu/h)	36400	34000	31800	41500	39000	36600	46000	44000	41500
	Electric Power (Watts)	4500	4520	4542	4736	4755	4777	4988	5007	5029
	Leaving Air Temp (°F db/°F wb)	55.9 / 55.9	58.2 / 58.2	60.5 / 60.5	56.3 / 56.3	58.6 / 58.6	61.0 / 60.9	56.7 / 56.7	59.0 / 59.0	61.3 / 61.3
1200	Total Capacity (Btu/h)	72000	74000	76000	70000	72000	75000	69000	71000	73000
	Sensible Capacity (Btu/h)	40500	37600	34600	47000	44000	41000	53000	50000	47000
	Electric Power (Watts)	4537	4559	4583	4772	4795	4818	5023	5044	5068
	Leaving Air Temp (°F db/°F wb)	59.6 / 59.6	61.9 / 61.9	64.2 / 64.2	59.9 / 59.9	62.2 / 62.2	64.5 / 64.5	60.2 / 60.2	62.5 / 62.5	64.8 / 64.8
084 (7 TON)										
875	Total Capacity (Btu/h)	79000	81000	84000	77000	80000	83000	76000	79000	81000
	Sensible Capacity (Btu/h)	40500	38000	35800	45000	42500	40500	49000	47000	44500
	Electric Power (Watts)	6485	6538	6567	6764	6829	6885	7088	7137	7199
	Leaving Air Temp (°F db/°F wb)	48.5 / 48.5	51.0 / 51.0	53.4 / 53.4	49.0 / 48.9	51.4 / 51.4	53.9 / 53.9	49.5 / 49.5	51.9 / 51.9	54.4 / 54.4
1120	Total Capacity (Btu/h)	85000	88000	91000	83000	86000	89000	82000	85000	87000
	Sensible Capacity (Btu/h)	45000	42000	39000	50500	48000	45000	56000	53500	50500
	Electric Power (Watts)	6589	6603	6652	6904	6935	6939	7197	7271	7272
	Leaving Air Temp (°F db/°F wb)	53.9 / 53.9	56.5 / 56.3	58.8 / 58.7	54.4 / 54.4	56.7 / 56.7	59.3 / 59.1	54.9 / 54.9	57.2 / 57.2	59.6 / 59.5
1400	Total Capacity (Btu/h)	90000	93000	96000	88000	91000	94000	86000	89000	92000
	Sensible Capacity (Btu/h)	49500	46000	42500	56500	53000	50000	64000	60500	57000
	Electric Power (Watts)	6639	6694	6744	6924	6970	7030	7241	7362	7400
	Leaving Air Temp (°F db/°F wb)	58.2 / 58.1	60.5 / 60.4	62.8 / 62.8	58.7 / 58.4	61.0 / 60.7	63.2 / 63.1	58.9 / 58.8	61.1 / 61.1	63.5 / 63.5
096 (8 TON)										
1000	Total Capacity (Btu/h)	89000	92000	95000	87000	90000	93000	86000	89000	92000
	Sensible Capacity (Btu/h)	45500	43000	40500	50500	48000	45500	55500	53000	50500
	Electric Power (Watts)	7319	7356	7412	7671	7707	7745	8062	8056	8121
	Leaving Air Temp (°F db/°F wb)	49 / 49	51.5 / 51.4	53.9 / 53.9	49.5 / 49.5	51.9 / 51.9	54.4 / 54.3	50.0 / 50.0	52.4 / 52.4	54.9 / 54.9
1280	Total Capacity (Btu/h)	96000	99000	102000	94000	97000	100000	92000	95000	98000
	Sensible Capacity (Btu/h)	50500	47500	44000	57000	54000	50500	63500	60500	57000
	Electric Power (Watts)	7430	7483	7536	7758	7817	7875	8124	8189	8239
	Leaving Air Temp (°F db/°F wb)	54.4 / 54.4	56.8 / 56.8	59.2 / 59.2	54.9 / 54.8	57.2 / 57.2	59.6 / 59.6	55.3 / 55.3	57.6 / 57.6	60.0 / 60.0
1600	Total Capacity (Btu/h)	101000	104000	107000	99000	102000	105000	97000	100000	103000
	Sensible Capacity (Btu/h)	56000	52000	48000	64500	60500	56500	73000	69000	64500
	Electric Power (Watts)	7523	7579	7636	7862	7910	7969	8224	8272	8331
	Leaving Air Temp (°F db/°F wb)	58.5 / 58.5	60.8 / 60.8	63.2 / 63.2	58.8 / 58.8	61.2 / 61.1	63.5 / 63.5	59.1 / 59.1	61.5 / 61.5	63.8 / 63.8

Performance Data (Cont'd)

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)								
	DRY BULB	90			95			100		
	WET BULB	76	78	80	76	78	80	76	78	80
120 (10 TON)										
1250	Total Capacity (Btu/h)	113000	117000	121000	111000	115000	119000	109000	113000	117000
	Sensible Capacity (Btu/h)	58000	55000	51500	64000	61000	58000	70000	67000	64000
	Electric Power (Watts)	8436	8456	8478	8894	8904	8928	9396	9398	9404
	Leaving Air Temp (°F db/°F wb)	48.3 / 48.3	50.7 / 50.7	53.2 / 53.2	48.9 / 48.9	51.3 / 51.3	53.7 / 53.7	49.5 / 49.5	51.8 / 51.8	54.2 / 54.2
1600	Total Capacity (Btu/h)	123000	127000	130000	120000	125000	129000	118000	122000	126000
	Sensible Capacity (Btu/h)	65000	60500	56500	73000	69000	65000	81000	77000	73000
	Electric Power (Watts)	8494	8510	8538	8940	8964	8988	9420	9438	9470
	Leaving Air Temp (°F db/°F wb)	53.6 / 53.6	56.1 / 56.0	58.5 / 58.4	54.1 / 54.1	56.4 / 56.4	58.8 / 58.8	54.5 / 54.5	56.9 / 56.9	59.2 / 59.2
2000	Total Capacity (Btu/h)	130000	134000	138000	128000	132000	136000	125000	129000	134000
	Sensible Capacity (Btu/h)	72000	67000	62000	82000	77000	72000	91000	87000	82000
	Electric Power (Watts)	8544	8572	8602	8984	9018	9046	9460	9494	9518
	Leaving Air Temp (°F db/°F wb)	57.7 / 57.7	60.0 / 60.0	62.4 / 62.4	58.1 / 58.1	60.4 / 60.4	62.7 / 62.7	59.1 / 58.5	60.8 / 60.8	63.2 / 63.1
150 (12.5 TON)										
1500	Total Capacity (Btu/h)	132000	138000	142000	130000	134000	140000	128000	132000	136000
	Sensible Capacity (Btu/h)	68000	64500	60500	76000	72000	68000	83000	79000	75000
	Electric Power (Watts)	10406	10482	10562	10920	11002	11084	11448	11534	11636
	Leaving Air Temp (°F db/°F wb)	49.0 / 49.0	51.6 / 51.6	54.0 / 54.0	49.5 / 49.5	52.0 / 52.0	54.5 / 54.5	50.1 / 50.1	52.5 / 52.5	55.0 / 55.0
1920	Total Capacity (Btu/h)	144000	148000	152000	140000	146000	150000	138000	142000	146000
	Sensible Capacity (Btu/h)	76000	71000	66000	86000	81000	76000	95000	90000	86000
	Electric Power (Watts)	10608	10684	10770	11122	11210	11292	11658	11746	11848
	Leaving Air Temp (°F db/°F wb)	54.4 / 54.4	56.9 / 56.9	59.3 / 59.3	54.8 / 54.8	57.2 / 57.2	59.7 / 59.7	55.3 / 55.3	57.7 / 57.7	60.1 / 60.1
2400	Total Capacity (Btu/h)	152000	156000	160000	148000	152000	158000	146000	150000	154000
	Sensible Capacity (Btu/h)	84000	78000	72000	97000	90000	85000	107000	101000	97000
	Electric Power (Watts)	10766	10850	10940	11284	11364	11460	11818	11918	12000
	Leaving Air Temp (°F db/°F wb)	58.5 / 58.5	60.8 / 60.8	63.2 / 63.2	58.8 / 58.8	61.2 / 61.2	63.5 / 63.5	59.9 / 59.1	62.0 / 61.5	63.9 / 63.9
180 (15 TON)										
1875	Total Capacity (Btu/h)	156000	160000	166000	154000	158000	164000	150000	156000	160000
	Sensible Capacity (Btu/h)	81000	76000	71000	90000	85000	81000	99000	95000	90000
	Electric Power (Watts)	12440	12486	12576	13068	13126	13168	13622	13806	13862
	Leaving Air Temp (°F db/°F wb)	51.3 / 51.3	53.7 / 53.7	56.2 / 56.2	51.7 / 51.7	54.1 / 54.1	56.6 / 56.6	52.3 / 52.2	54.6 / 54.6	57.0 / 57.0
2400	Total Capacity (Btu/h)	168000	172000	178000	164000	170000	174000	162000	166000	172000
	Sensible Capacity (Btu/h)	90000	84000	78000	102000	97000	90000	115000	108000	103000
	Electric Power (Watts)	12606	12680	12764	13188	13286	13352	13860	13902	14006
	Leaving Air Temp (°F db/°F wb)	56.2 / 56.2	58.6 / 58.6	61.0 / 61.0	56.6 / 56.6	58.9 / 58.9	61.4 / 61.3	56.8 / 56.8	59.4 / 59.3	61.7 / 61.7
3000	Total Capacity (Btu/h)	176000	182000	186000	174000	180000	182000	170000	176000	180000
	Sensible Capacity (Btu/h)	100000	93000	85000	116000	109000	101000	128000	122000	117000
	Electric Power (Watts)	12738	12832	12922	13350	13448	13506	13972	14062	14174
	Leaving Air Temp (°F db/°F wb)	60.0 / 59.9	62.3 / 62.3	64.6 / 64.6	60.1 / 60.1	62.4 / 62.4	65.0 / 64.9	61.5 / 60.5	63.5 / 62.7	65.1 / 65.1

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)								
	DRY BULB	90			95			100		
	WET BULB	76	78	80	76	78	80	76	78	80
210 (17.5 TON)										
2187.5	Total Capacity (Btu/h)	188000	194000	200000	184000	190000	196000	182000	188000	194000
	Sensible Capacity (Btu/h)	97000	91000	86000	108000	102000	97000	119000	113000	107000
	Electric Power (Watts)	14696	14770	14848	15414	15492	15570	16192	16256	16336
	Leaving Air Temp (°F db/°F wb)	50.1 / 50.1	52.6 / 52.6	55.1 / 55.1	50.6 / 50.6	53.0 / 53.0	55.5 / 55.5	51.1 / 51.1	53.5 / 53.5	56.0 / 56.0
2800	Total Capacity (Btu/h)	202000	208000	214000	198000	206000	212000	194000	200000	208000
	Sensible Capacity (Btu/h)	108000	101000	94000	122000	115000	108000	134000	129000	122000
	Electric Power (Watts)	14890	14968	15040	15606	15686	15760	16350	16438	16530
	Leaving Air Temp (°F db/°F wb)	55.3 / 55.3	57.7 / 57.7	60.1 / 60.1	55.7 / 55.7	58.0 / 58.0	60.5 / 60.5	56.8 / 56.1	58.4 / 58.4	60.8 / 60.8
3500	Total Capacity (Btu/h)	214000	220000	226000	210000	216000	222000	206000	212000	218000
	Sensible Capacity (Btu/h)	120000	111000	102000	136000	129000	120000	152000	144000	140000
	Electric Power (Watts)	15032	15114	15192	15756	15824	15902	16512	16592	16686
	Leaving Air Temp (°F db/°F wb)	59.2 / 59.2	61.5 / 61.5	63.9 / 63.9	60.1 / 59.4	61.9 / 61.8	64.2 / 64.2	60.8 / 59.7	63.1 / 62.1	64.4 / 64.4
240 (20 TON)										
2500	Total Capacity (Btu/h)	214000	220000	228000	210000	218000	224000	206000	214000	220000
	Sensible Capacity (Btu/h)	111000	104000	97000	123000	117000	110000	136000	129000	122000
	Electric Power (Watts)	16942	17028	17114	17830	17874	17964	18706	18772	18864
	Leaving Air Temp (°F db/°F wb)	50.3 / 50.3	52.7 / 52.7	55.3 / 55.3	50.7 / 50.7	53.2 / 53.2	55.7 / 55.7	51.2 / 51.2	53.7 / 53.6	56.1 / 56.1
3200	Total Capacity (Btu/h)	230000	238000	244000	226000	234000	240000	224000	230000	236000
	Sensible Capacity (Btu/h)	123000	115000	107000	140000	132000	123000	154000	146000	140000
	Electric Power (Watts)	17160	17252	17348	18002	18098	18194	18924	18990	19088
	Leaving Air Temp (°F db/°F wb)	55.4 / 55.4	57.8 / 57.8	60.3 / 60.3	55.8 / 55.7	58.1 / 58.1	60.6 / 60.6	56.6 / 56.0	59.0 / 58.5	60.9 / 60.9
4000	Total Capacity (Btu/h)	242000	250000	256000	238000	248000	254000	234000	240000	250000
	Sensible Capacity (Btu/h)	136000	127000	116000	154000	148000	138000	174000	162000	156000
	Electric Power (Watts)	17334	17434	17540	18180	18306	18416	19070	19158	19296
	Leaving Air Temp (°F db/°F wb)	59.3 / 59.3	61.7 / 61.6	64.1 / 64.0	60.3 / 59.5	61.7 / 61.7	64.1 / 64.1	61.0 / 59.8	63.4 / 62.2	65.1 / 64.4
300 (25 TON)										
3125	Total Capacity (Btu/h)	256000	264000	272000	252000	260000	268000	248000	258000	264000
	Sensible Capacity (Btu/h)	134000	125000	117000	148000	142000	132000	164000	158000	148000
	Electric Power (Watts)	19540	19608	19674	20520	20594	20670	21562	21638	21710
	Leaving Air Temp (°F db/°F wb)	51.6 / 51.6	54.1 / 54.1	56.6 / 56.6	52.1 / 52.1	54.5 / 54.5	57.0 / 57.0	52.4 / 52.4	54.8 / 54.7	57.4 / 57.4
4000	Total Capacity (Btu/h)	274000	282000	292000	270000	278000	290000	266000	274000	282000
	Sensible Capacity (Btu/h)	148000	138000	128000	170000	160000	150000	186000	176000	170000
	Electric Power (Watts)	19682	19748	19822	20694	20746	20864	21738	21808	21904
	Leaving Air Temp (°F db/°F wb)	56.6 / 56.5	59.0 / 58.9	61.4 / 61.4	56.8 / 56.8	59.3 / 59.3	61.4 / 61.4	58.0 / 57.1	60.4 / 59.6	62.0 / 62.0
5000	Total Capacity (Btu/h)	292000	300000	310000	286000	294000	304000	282000	288000	296000
	Sensible Capacity (Btu/h)	168000	154000	142000	188000	180000	168000	212000	200000	188000
	Electric Power (Watts)	19856	19926	19998	20836	20918	20996	21898	21976	22046
	Leaving Air Temp (°F db/°F wb)	60.0 / 60.0	62.3 / 62.3	64.7 / 64.7	61.2 / 60.3	62.7 / 62.6	65.0 / 65.0	61.8 / 60.5	64.0 / 62.9	66.2 / 65.3

Performance Data (Cont'd)

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)								
	DRY BULB	90			95			100		
	WET BULB	76	78	80	76	78	80	76	78	80
360 (30 TON)										
3450	Total Capacity (Btu/h)	302000	312000	322000	298000	308000	318000	292000	302000	312000
	Sensible Capacity (Btu/h)	158000	148000	138000	176000	168000	158000	194000	186000	176000
	Electric Power (Watts)	22718	22668	22664	23804	23920	23842	24948	24938	25196
	Leaving Air Temp (°F db/°F wb)	52.1 / 52.1	54.6 / 54.5	57.3 / 57.0	52.5 / 52.5	55.0 / 55.0	57.5 / 57.4	53.1 / 53.1	55.6 / 55.5	57.9 / 57.9
4800	Total Capacity (Btu/h)	326000	334000	344000	318000	328000	338000	314000	324000	334000
	Sensible Capacity (Btu/h)	178000	164000	152000	200000	190000	176000	222000	214000	202000
	Electric Power (Watts)	22862	22872	22918	23854	23952	24014	25098	25194	25276
	Leaving Air Temp (°F db/°F wb)	56.9 / 56.9	59.3 / 59.3	61.7 / 61.7	57.4 / 57.3	59.7 / 59.6	62.1 / 62.0	58.3 / 57.5	59.8 / 59.8	62.2 / 62.2
6000	Total Capacity (Btu/h)	342000	352000	362000	336000	348000	358000	330000	338000	350000
	Sensible Capacity (Btu/h)	196000	182000	166000	224000	214000	200000	252000	238000	224000
	Electric Power (Watts)	22880	22942	23002	24044	24108	24178	25220	25202	25346
	Leaving Air Temp (°F db/°F wb)	60.5 / 60.5	62.9 / 62.8	65.2 / 65.2	61.4 / 60.6	62.9 / 62.9	65.3 / 65.3	62.2 / 61.0	64.4 / 63.3	66.4 / 65.6
420 (35 TON)										
4375	Total Capacity (Btu/h)	362000	374000	384000	356000	368000	378000	354000	362000	372000
	Sensible Capacity (Btu/h)	188000	176000	164000	210000	198000	188000	234000	220000	210000
	Electric Power (Watts)	30242	30432	30600	31536	31740	31944	32998	33130	33334
	Leaving Air Temp (°F db/°F wb)	51.4 / 51.4	53.8 / 53.8	56.5 / 56.4	51.8 / 51.8	54.2 / 54.2	56.7 / 56.7	52.0 / 52.0	54.7 / 54.7	57.2 / 57.2
5600	Total Capacity (Btu/h)	392000	405000	415000	382000	398000	410000	378000	390000	398000
	Sensible Capacity (Btu/h)	212000	198000	182000	238000	226000	212000	262000	252000	240000
	Electric Power (Watts)	30794	31014	31252	32014	32298	32532	33440	33692	33852
	Leaving Air Temp (°F db/°F wb)	56.0 / 56.0	58.4 / 58.4	60.9 / 60.9	56.6 / 56.6	58.8 / 58.8	61.2 / 61.2	57.7 / 56.8	59.7 / 59.1	61.8 / 61.8
7000	Total Capacity (Btu/h)	415000	425000	435000	405000	415000	430000	400000	405000	425000
	Sensible Capacity (Btu/h)	236000	218000	200000	264000	254000	236000	300000	276000	268000
	Electric Power (Watts)	31196	31436	31690	32470	32720	32974	33918	34000	34448
	Leaving Air Temp (°F db/°F wb)	59.8 / 59.8	62.2 / 62.2	64.6 / 64.5	61.0 / 60.1	62.5 / 62.4	64.8 / 64.8	61.4 / 60.2	64.4 / 62.9	65.7 / 64.9
480 (40 TON)										
5000	Total Capacity (Btu/h)	415000	430000	440000	410000	420000	435000	400000	415000	425000
	Sensible Capacity (Btu/h)	216000	202000	190000	240000	228000	214000	264000	252000	240000
	Electric Power (Watts)	30944	31214	31500	32226	32502	32792	33594	33870	34166
	Leaving Air Temp (°F db/°F wb)	51.3 / 51.3	53.7 / 53.7	56.2 / 56.2	51.7 / 51.7	54.1 / 54.1	56.6 / 56.6	52.2 / 52.2	54.6 / 54.6	57.0 / 57.0
6400	Total Capacity (Btu/h)	445000	460000	475000	440000	450000	465000	430000	445000	455000
	Sensible Capacity (Btu/h)	240000	224000	208000	274000	258000	242000	306000	290000	274000
	Electric Power (Watts)	31606	31914	32242	32874	33188	33516	34212	34538	34878
	Leaving Air Temp (°F db/°F wb)	56.2 / 56.2	58.6 / 58.6	61.0 / 61.0	56.6 / 56.6	58.9 / 58.9	61.3 / 61.3	57.0 / 57.0	59.3 / 59.3	61.6 / 61.6
8000	Total Capacity (Btu/h)	470000	485000	500000	460000	475000	490000	450000	465000	480000
	Sensible Capacity (Btu/h)	268000	248000	228000	310000	290000	270000	342000	324000	312000
	Electric Power (Watts)	32172	32508	32862	33422	33762	34120	34744	35072	35454
	Leaving Air Temp (°F db/°F wb)	59.9 / 59.9	62.2 / 62.2	64.6 / 64.6	60.2 / 60.2	62.5 / 62.5	64.9 / 64.9	61.4 / 60.5	63.6 / 62.8	65.1 / 65.1

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)								
	DRY BULB	90			95			100		
	WET BULB	76	78	80	76	78	80	76	78	80
540 (45 TON)										
5625	Total Capacity (Btu/h)	510000	530000	545000	505000	520000	540000	495000	510000	530000
	Sensible Capacity (Btu/h)	262000	248000	234000	290000	276000	262000	318000	304000	290000
	Electric Power (Watts)	39406	39610	39824	41424	41636	41854	43618	43832	44060
	Leaving Air Temp (°F db/°F wb)	48.1 / 48.1	50.5 / 50.5	53.0 / 53.0	48.6 / 48.6	51.0 / 51.0	53.4 / 53.4	49.1 / 49.1	51.6 / 51.5	53.9 / 53.9
7200	Total Capacity (Btu/h)	555000	575000	590000	545000	565000	580000	535000	555000	570000
	Sensible Capacity (Btu/h)	294000	274000	256000	328000	310000	292000	364000	346000	328000
	Electric Power (Watts)	39970	40190	40426	41986	42220	42458	44178	44414	44664
	Leaving Air Temp (°F db/°F wb)	53.4 / 53.4	55.9 / 55.9	58.3 / 58.3	53.9 / 53.9	56.3 / 56.3	58.7 / 58.7	54.3 / 54.3	56.7 / 56.7	59.1 / 59.1
9000	Total Capacity (Btu/h)	590000	610000	625000	580000	595000	615000	565000	585000	605000
	Sensible Capacity (Btu/h)	324000	302000	280000	370000	348000	326000	410000	388000	372000
	Electric Power (Watts)	40434	40666	40906	42452	42698	42956	44636	44882	45160
	Leaving Air Temp (°F db/°F wb)	57.6 / 57.6	60.0 / 60.0	62.3 / 62.3	57.9 / 57.9	60.3 / 60.3	62.6 / 62.6	59.1 / 58.3	61.3 / 60.6	63.0 / 63.0
600 (50 TON)										
6250	Total Capacity (Btu/h)	570000	590000	610000	560000	580000	600000	550000	570000	590000
	Sensible Capacity (Btu/h)	294000	278000	262000	324000	308000	292000	354000	338000	322000
	Electric Power (Watts)	42532	42536	42778	44744	44860	44870	46970	47286	47350
	Leaving Air Temp (°F db/°F wb)	47.9 / 47.9	50.3 / 50.2	52.7 / 52.7	48.4 / 48.4	50.8 / 50.8	53.2 / 53.2	48.9 / 48.9	51.4 / 51.4	53.7 / 53.7
8000	Total Capacity (Btu/h)	625000	645000	665000	610000	630000	650000	600000	620000	640000
	Sensible Capacity (Btu/h)	328000	308000	286000	368000	346000	328000	405000	388000	366000
	Electric Power (Watts)	42924	43172	43378	45108	45246	45512	47508	47608	47702
	Leaving Air Temp (°F db/°F wb)	53.2 / 53.2	55.6 / 55.6	58.2 / 58.1	53.6 / 53.6	56.1 / 56.1	58.5 / 58.5	54.1 / 54.1	56.5 / 56.5	59.0 / 58.9
10000	Total Capacity (Btu/h)	665000	685000	705000	650000	670000	690000	635000	655000	675000
	Sensible Capacity (Btu/h)	364000	338000	312000	415000	388000	364000	455000	440000	415000
	Electric Power (Watts)	43440	43682	43940	45516	45730	46036	47692	47944	48252
	Leaving Air Temp (°F db/°F wb)	57.4 / 57.4	59.7 / 59.7	62.1 / 62.1	57.7 / 57.7	60.1 / 60.1	62.4 / 62.4	58.9 / 58.2	60.5 / 60.5	62.8 / 62.8
660 (55 TON)										
6875	Total Capacity (Btu/h)	620000	640000	665000	615000	635000	655000	605000	625000	640000
	Sensible Capacity (Btu/h)	320000	300000	278000	352000	334000	316000	388000	370000	352000
	Electric Power (Watts)	50100	50662	50350	51726	52208	52850	54484	55488	55932
	Leaving Air Temp (°F db/°F wb)	48.3 / 48.3	50.8 / 50.8	54.0 / 53.1	48.9 / 48.6	51.4 / 51.1	54.0 / 53.7	49.2 / 49.2	51.7 / 51.7	54.2 / 54.2
8800	Total Capacity (Btu/h)	675000	665000	690000	665000	680000	710000	650000	670000	690000
	Sensible Capacity (Btu/h)	356000	276000	300000	400000	378000	346000	435000	415000	396000
	Electric Power (Watts)	51312	48204	58954	53914	54860	53528	54788	55428	56578
	Leaving Air Temp (°F db/°F wb)	53.6 / 53.6	62.0 / 57.4	59.6 / 59.6	54.0 / 54.0	56.5 / 56.5	59.8 / 58.8	55.3 / 54.5	57.5 / 57.0	59.7 / 59.3
11000	Total Capacity (Btu/h)	707228	685000	751484	690000	725000	750000	690000	710000	730000
	Sensible Capacity (Btu/h)	391370	348000	329698	410000	425000	396000	490000	480000	445000
	Electric Power (Watts)	51740	64980	52846	51810	55058	56410	55884	59154	57158
	Leaving Air Temp (°F db/°F wb)	58.1 / 582	61.7 / 61.7	63.3 / 62.8	61.5 / 58.5	60.4 / 60.4	62.8 / 62.8	59.8 / 58.5	60.8 / 60.8	63.7 / 63.2

Performance Data (Cont'd)

TABLE 5 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)								
	DRY BULB	90			95			100		
	WET BULB	76	78	80	76	78	80	76	78	80
720 (60 TON)										
7500	Total Capacity (Btu/h)	615000	640000	660000	605000	625000	645000	590000	610000	635000
	Sensible Capacity (Btu/h)	322000	302000	284000	358000	340000	320000	394000	376000	356000
	Electric Power (Watts)	46614	46874	47136	48772	49038	49312	51062	51342	51612
	Leaving Air Temp (°F db/°F wb)	51.5 / 51.5	53.9 / 53.9	56.3 / 56.3	52.1 / 52.1	54.4 / 54.4	56.8 / 56.8	52.7 / 52.6	55.0 / 55.0	57.4 / 57.4
9600	Total Capacity (Btu/h)	665000	685000	705000	650000	670000	690000	630000	655000	675000
	Sensible Capacity (Btu/h)	360000	336000	312000	405000	382000	358000	455000	430000	405000
	Electric Power (Watts)	47220	47494	47780	49350	49616	49914	51620	51934	52196
	Leaving Air Temp (°F db/°F wb)	56.3 / 56.3	58.7 / 58.7	61.1 / 61.1	56.9 / 56.9	59.3 / 59.2	61.6 / 61.6	57.4 / 57.4	59.6 / 59.6	62.1 / 62.0
12000	Total Capacity (Btu/h)	695000	720000	740000	680000	700000	720000	665000	685000	705000
	Sensible Capacity (Btu/h)	398000	370000	340000	460000	430000	400000	520000	490000	460000
	Electric Power (Watts)	47662	47982	48276	49786	50088	50394	52100	52346	52668
	Leaving Air Temp (°F db/°F wb)	60.2 / 60.1	62.4 / 62.4	64.7 / 64.7	60.6 / 60.5	62.8 / 62.8	65.2 / 65.1	60.8 / 60.8	63.2 / 63.2	65.5 / 65.5
780 (65 TON)										
8125	Total Capacity (Btu/h)	675000	700000	725000	665000	685000	710000	650000	670000	695000
	Sensible Capacity (Btu/h)	352000	332000	310000	392000	372000	350000	430000	410000	390000
	Electric Power (Watts)	53328	53698	54088	55744	56124	56518	58306	58708	59084
	Leaving Air Temp (°F db/°F wb)	51.1 / 51.1	53.5 / 53.5	55.9 / 55.9	51.7 / 51.7	54.0 / 54.0	56.4 / 56.4	52.3 / 52.2	54.5 / 54.5	57.1 / 57.0
10400	Total Capacity (Btu/h)	725000	750000	770000	710000	735000	755000	695000	715000	740000
	Sensible Capacity (Btu/h)	394000	366000	340000	445000	420000	390000	495000	470000	445000
	Electric Power (Watts)	54196	54560	54994	56572	56998	57374	59110	59514	59958
	Leaving Air Temp (°F db/°F wb)	56.1 / 56.1	58.6 / 58.5	60.8 / 60.8	56.6 / 56.6	58.9 / 58.9	61.4 / 61.3	57.1 / 57.1	59.5 / 59.4	61.7 / 61.7
13000	Total Capacity (Btu/h)	760000	785000	810000	745000	770000	790000	730000	750000	775000
	Sensible Capacity (Btu/h)	435000	400000	370000	505000	470000	435000	570000	535000	505000
	Electric Power (Watts)	54828	55242	55670	57252	57668	58050	59834	60210	60630
	Leaving Air Temp (°F db/°F wb)	60.0 / 59.9	62.3 / 62.3	64.6 / 64.6	60.2 / 60.2	62.5 / 62.5	65.0 / 64.9	60.5 / 60.5	62.8 / 62.8	65.2 / 65.2
840 (70 TON)										
8750	Total Capacity (Btu/h)	770000	795000	820000	755000	780000	805000	740000	765000	790000
	Sensible Capacity (Btu/h)	396000	374000	352000	440000	415000	394000	480000	460000	435000
	Electric Power (Watts)	62968	63538	64138	65808	66388	67004	68854	69440	70044
	Leaving Air Temp (°F db/°F wb)	49.3 / 49.3	51.7 / 51.7	54.2 / 54.2	49.9 / 49.9	52.3 / 52.3	54.7 / 54.7	50.4 / 50.4	52.8 / 52.8	55.3 / 55.3
11200	Total Capacity (Btu/h)	830000	855000	880000	810000	840000	865000	795000	820000	850000
	Sensible Capacity (Btu/h)	440000	415000	384000	495000	470000	440000	550000	525000	495000
	Electric Power (Watts)	64374	65014	65680	67206	67836	68526	70214	70838	71572
	Leaving Air Temp (°F db/°F wb)	54.6 / 54.6	57.0 / 57.0	59.4 / 59.4	55.1 / 55.1	57.5 / 57.5	59.9 / 59.9	55.5 / 55.5	58.0 / 57.9	60.2 / 60.2
14000	Total Capacity (Btu/h)	875000	900000	925000	855000	880000	910000	835000	860000	890000
	Sensible Capacity (Btu/h)	490000	455000	420000	560000	525000	490000	630000	595000	560000
	Electric Power (Watts)	65518	66230	66942	68332	69002	69726	71326	72012	72702
	Leaving Air Temp (°F db/°F wb)	58.7 / 58.7	61.0 / 61.0	63.3 / 63.3	59.0 / 59.0	61.4 / 61.4	63.8 / 63.7	59.4 / 59.4	61.7 / 61.7	64.1 / 64.1

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)												
		COOLING									HEATING			
		DRY BULB	90			95			100			20	30	40
		WET BULB	76	78	80	76	78	80	76	78	80			
036 (3 TON)														
375	Total Capacity (Btu/h)	36000	37400	38500	35400	36800	38000	34800	36200	37400	26000	29000	32000	
	Sensible Capacity (Btu/h)	18400	17500	16600	20200	19300	18400	22000	21200	20200				
	Electric Power (Watts)	2850	2853	2858	3013	3017	3022	3187	3191	3197	2455	2948	3481	
	Leaving Air Temp (°F db/°F wb)	45.9 / 45.9	48.2 / 48.2	50.6 / 50.6	46.4 / 46.4	48.8 / 48.8	51.2 / 51.2	47.1 / 47.1	49.4 / 49.4	51.7 / 51.7	83.7	101.3	118.4	
480	Total Capacity (Btu/h)	39500	41000	42500	39000	40500	41500	38000	39500	41000	26800	30200	34000	
	Sensible Capacity (Btu/h)	20600	19400	18200	23000	21800	20600	25400	24200	23000				
	Electric Power (Watts)	2864	2868	2871	3027	3032	3037	3200	3207	3212	2230	2641	3131	
	Leaving Air Temp (°F db/°F wb)	51.5 / 51.5	53.8 / 53.8	56.2 / 56.2	52.0 / 51.9	54.3 / 54.2	56.6 / 56.6	52.5 / 52.5	54.8 / 54.8	57.1 / 57.1	71.4	87.7	104.8	
600	Total Capacity (Btu/h)	42500	44000	45500	41500	43000	44500	40500	42000	43500	27600	31400	34800	
	Sensible Capacity (Btu/h)	22800	21400	19900	25800	24400	22800	28800	27400	26000				
	Electric Power (Watts)	2873	2879	2885	3038	3043	3050	3214	3220	3227	2080	2428	2870	
	Leaving Air Temp (°F db/°F wb)	55.9 / 55.8	58.1 / 58.1	60.5 / 60.5	56.2 / 56.2	58.6 / 58.5	60.9 / 60.8	56.7 / 56.7	58.9 / 58.9	61.2 / 61.2	62.4	78.1	93.0	
048 (4 TON)														
500	Total Capacity (Btu/h)	45500	47000	49000	44500	46500	48000	44000	45500	47000	32200	36200	40500	
	Sensible Capacity (Btu/h)	23400	22200	20800	25800	24600	23400	28200	27000	25800				
	Electric Power (Watts)	3363	3368	3374	3553	3556	3562	3742	3760	3763	2886	3468	4077	
	Leaving Air Temp (°F db/°F wb)	48.1 / 48.1	50.4 / 50.4	52.7 / 52.7	48.6 / 48.6	50.9 / 50.9	53.2 / 53.2	49.2 / 49.1	51.5 / 51.5	53.8 / 53.8	79.2	96.6	114.0	
640	Total Capacity (Btu/h)	49500	51500	53500	49000	50500	52500	48000	49500	51500	33600	37400	42000	
	Sensible Capacity (Btu/h)	26200	24600	23000	29400	27800	26200	32600	31000	29400				
	Electric Power (Watts)	3379	3386	3396	3566	3574	3581	3762	3770	3780	2642	3140	3688	
	Leaving Air Temp (°F db/°F wb)	53.3 / 53.3	55.7 / 55.6	58.0 / 58.0	53.8 / 53.7	56.1 / 56.1	58.4 / 58.4	54.2 / 54.2	56.5 / 56.5	58.8 / 58.8	68.2	83.8	99.9	
800	Total Capacity (Btu/h)	53000	55000	56500	52000	53500	55500	51000	52500	54500	34400	38500	43000	
	Sensible Capacity (Btu/h)	29000	27000	25200	33200	31200	29200	37200	35200	33200				
	Electric Power (Watts)	3396	3407	3419	3582	3592	3604	3780	3790	3800	2474	2914	3414	
	Leaving Air Temp (°F db/°F wb)	57.4 / 57.4	59.7 / 59.7	62.0 / 62.0	57.8 / 57.8	60.1 / 60.0	62.4 / 62.3	58.2 / 58.2	60.4 / 60.4	62.8 / 62.7	59.7	74.5	89.5	
060 (5 TON)														
625	Total Capacity (Btu/h)	54500	56500	58500	54000	56000	58000	52500	54500	57000	39000	44000	49000	
	Sensible Capacity (Btu/h)	28200	26600	25200	31400	29800	28200	34400	33000	31400				
	Electric Power (Watts)	3956	3959	3969	4203	4179	4193	4450	4453	4435	3421	4055	4767	
	Leaving Air Temp (°F db/°F wb)	49.4 / 49.4	51.8 / 51.8	54.2 / 54.2	50.0 / 50.0	52.3 / 52.2	54.6 / 54.6	50.5 / 50.5	52.8 / 52.8	55.1 / 55.1	77.8	95.0	112.0	
800	Total Capacity (Btu/h)	59500	61500	63500	58000	60000	62500	57000	59000	61000	40500	45000	51000	
	Sensible Capacity (Btu/h)	31600	29600	27600	35400	33600	31600	39500	37600	35600				
	Electric Power (Watts)	3972	3981	3989	4195	4206	4207	4423	4437	4446	3134	3701	4294	
	Leaving Air Temp (°F db/°F wb)	54.6 / 54.6	56.9 / 56.9	59.3 / 59.3	55.1 / 55.0	57.3 / 57.3	59.8 / 59.7	55.6 / 55.5	57.8 / 57.8	60.2 / 60.1	66.8	81.9	98.7	
1000	Total Capacity (Btu/h)	63000	65000	67000	61500	63500	66000	60000	62000	64000	41500	46500	53000	
	Sensible Capacity (Btu/h)	35000	32600	30000	40000	37800	35200	44500	42500	40500				
	Electric Power (Watts)	3989	4001	4008	4215	4225	4228	4445	4453	4475	2935	3463	3979	
	Leaving Air Temp (°F db/°F wb)	58.6 / 58.6	60.8 / 60.8	63.2 / 63.2	58.9 / 58.9	61.2 / 61.2	63.6 / 63.5	59.9 / 59.3	61.7 / 61.6	63.8 / 63.8	58.2	72.9	88.4	

Performance Data (Cont'd)

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)			ENTERING AIR TEMPERATURE (°F)														
			COOLING									HEATING					
			DRY BULB			90			95			100			20	30	40
			WET BULB			76	78	80	76	78	80	76	78	80			
072 (6 TON)																	
750	Total Capacity (Btu/h)	62000	64000	66000	60500	63000	65000	59500	61500	64000	43000	48500	54000				
	Sensible Capacity (Btu/h)	32200	30400	28400	35800	34000	32200	39500	37800	36000							
	Electric Power (Watts)	4492	4509	4526	4728	4746	4764	4981	4998	5016	3397	3979	4708				
	Leaving Air Temp (°F db/°F wb)	51.5 / 51.5	53.8 / 53.8	56.2 / 56.2	52.0 / 51.9	54.3 / 54.3	56.6 / 56.6	52.5 / 52.5	54.8 / 54.8	57.1 / 57.1	72.8	89.3	106.0				
960	Total Capacity (Btu/h)	67000	69000	71000	65000	68000	70000	64000	66000	68000	45000	51000	55500				
	Sensible Capacity (Btu/h)	36000	33600	31200	41000	38500	36200	45500	43500	41000							
	Electric Power (Watts)	4532	4552	4574	4769	4790	4811	5018	5041	5063	3133	3633	4251				
	Leaving Air Temp (°F db/°F wb)	56.3 / 56.3	58.6 / 58.6	60.9 / 60.9	56.7 / 56.7	58.9 / 58.9	61.3 / 61.3	57.2 / 57.1	59.4 / 59.4	61.7 / 61.7	63.4	78.7	92.9				
1200	Total Capacity (Btu/h)	70000	73000	75000	69000	71000	74000	67000	70000	72000	45500	51000	57000				
	Sensible Capacity (Btu/h)	40000	37200	34200	46500	43500	40500	52500	49500	47000							
	Electric Power (Watts)	4568	4590	4613	4805	4827	4851	5053	5074	5101	2949	3395	3940				
	Leaving Air Temp (°F db/°F wb)	60.0 / 59.9	62.2 / 62.2	64.6 / 64.5	60.2 / 60.2	62.5 / 62.5	64.8 / 64.8	60.6 / 60.6	62.9 / 62.9	65.1 / 65.1	54.9	69.2	83.5				
084 (7 TON)																	
875	Total Capacity (Btu/h)	76000	79000	82000	75000	78000	80000	74000	76000	79000	61000	69000	76000				
	Sensible Capacity (Btu/h)	39500	37200	35000	44000	41500	39500	48000	46000	44000							
	Electric Power (Watts)	6584	6601	6608	6873	6932	6950	7181	7239	7305	5690	6669	7783				
	Leaving Air Temp (°F db/°F wb)	49.5 / 49.5	51.9 / 51.9	54.4 / 54.3	50.0 / 50.0	52.4 / 52.4	54.8 / 54.8	50.6 / 50.6	52.9 / 52.9	55.4 / 55.4	84.2	102.8	119.8				
1120	Total Capacity (Btu/h)	82000	85000	88000	81000	84000	87000	79000	82000	85000	62500	71000	80000				
	Sensible Capacity (Btu/h)	44000	41000	38000	50000	47000	44000	55000	52000	49500							
	Electric Power (Watts)	6659	6683	6698	6981	7001	7027	7212	7255	7368	5250	6136	7092				
	Leaving Air Temp (°F db/°F wb)	54.8 / 54.8	57.1 / 57.1	59.6 / 59.5	55.2 / 55.2	57.5 / 57.5	59.9 / 59.9	55.9 / 55.6	58.2 / 57.9	60.3 / 60.3	71.5	88.3	105.2				
1400	Total Capacity (Btu/h)	87000	90000	93000	85000	88000	91000	84000	86000	89000	64000	72000	82000				
	Sensible Capacity (Btu/h)	48500	45000	41500	56000	53000	49500	63000	59500	56000							
	Electric Power (Watts)	6707	6734	6786	7019	7093	7121	7293	7386	7378	4948	5771	6605				
	Leaving Air Temp (°F db/°F wb)	58.8 / 58.7	61.2 / 61.0	63.5 / 63.4	59.1 / 59.1	61.4 / 61.4	63.7 / 63.7	59.6 / 59.4	61.7 / 61.7	64.3 / 64.0	62.0	77.5	93.6				
096 (8 TON)																	
1000	Total Capacity (Btu/h)	88000	91000	94000	86000	89000	92000	85000	88000	91000	72000	81000	92000				
	Sensible Capacity (Btu/h)	45000	42500	40000	50000	47500	45000	55000	52500	50000							
	Electric Power (Watts)	7355	7406	7456	7712	7741	7796	8054	8124	8153	6733	7897	9271				
	Leaving Air Temp (°F db/°F wb)	49.4 / 49.3	51.8 / 51.8	54.2 / 54.2	49.8 / 49.8	52.3 / 52.2	54.7 / 54.7	50.4 / 50.4	52.8 / 52.8	55.3 / 55.2	86.5	104.9	124.0				
1280	Total Capacity (Btu/h)	95000	98000	101000	93000	96000	99000	91000	94000	97000	74000	84000	94000				
	Sensible Capacity (Btu/h)	50500	47000	44000	57000	53500	50500	63500	60000	57000							
	Electric Power (Watts)	7471	7520	7567	7815	7859	7913	8186	8231	8280	6198	7218	8402				
	Leaving Air Temp (°F db/°F wb)	54.7 / 54.6	57.1 / 57.0	59.5 / 59.4	55.1 / 55.1	57.5 / 57.4	59.8 / 59.8	55.5 / 55.5	57.9 / 57.9	60.2 / 60.2	73.0	90.4	107				
1600	Total Capacity (Btu/h)	100000	103000	106000	98000	101000	104000	96000	99000	102000	75000	85000	96000				
	Sensible Capacity (Btu/h)	56000	52000	47500	64000	60000	56000	72000	68000	64500							
	Electric Power (Watts)	7558	7606	7660	7899	7949	7997	8265	8312	8368	5820	6766	7803				
	Leaving Air Temp (°F db/°F wb)	58.7 / 58.7	61.0 / 61.0	63.4 / 63.3	59.0 / 59.0	61.3 / 61.3	63.7 / 63.7	59.3 / 59.3	61.7 / 61.7	64.0 / 64.0	63.0	78.6	94.9				

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)			ENTERING AIR TEMPERATURE (°F)											
			COOLING									HEATING		
			90			95			100			20	30	40
			WET BULB			76	78	80	76	78	80	76	78	80
120 (10 TON)														
1250	Total Capacity (Btu/h)	124000	128000	132000	121000	126000	130000	119000	123000	127000	91000	104000	116000	
	Sensible Capacity (Btu/h)	64500	60500	57000	72000	68000	64000	79000	75000	71000				
	Electric Power (Watts)	8576	8600	8632	9024	9052	9078	9506	9532	9554	7368	8786	10676	
	Leaving Air Temp (°F db/°F wb)	51.4 / 51.4	53.8 / 53.7	56.2 / 56.2	52.0 / 51.9	54.3 / 54.3	56.7 / 56.6	52.5 / 52.5	54.8 / 54.8	57.3 / 57.2	87.2	106.2	124.8	
1600	Total Capacity (Btu/h)	124000	128000	132000	121000	126000	130000	119000	123000	127000	94000	107000	120000	
	Sensible Capacity (Btu/h)	64500	60500	57000	72000	68000	64000	79000	75000	71000				
	Electric Power (Watts)	8576	8600	8632	9024	9052	9078	9506	9532	9554	6626	7728	9198	
	Leaving Air Temp (°F db/°F wb)	51.4 / 51.4	53.8 / 53.7	56.2 / 56.2	52.0 / 51.9	54.3 / 54.3	56.7 / 56.6	52.5 / 52.5	54.8 / 54.8	57.3 / 57.2	74.4	91.4	108.5	
2000	Total Capacity (Btu/h)	124000	128000	132000	121000	126000	130000	119000	123000	127000	97000	110000	123000	
	Sensible Capacity (Btu/h)	64500	60500	57000	72000	68000	64000	79000	75000	71000				
	Electric Power (Watts)	8576	8600	8632	9024	9052	9078	9506	9532	9554	6130	7050	8238	
	Leaving Air Temp (°F db/°F wb)	51.4 / 51.4	53.8 / 53.7	56.2 / 56.2	52.0 / 51.9	54.3 / 54.3	56.7 / 56.6	52.5 / 52.5	54.8 / 54.8	57.3 / 57.2	64.7	80.4	96.5	
150 (12.5 TON)														
1500	Total Capacity (Btu/h)	138000	142000	148000	136000	140000	144000	132000	138000	142000	110000	124000	140000	
	Sensible Capacity (Btu/h)	71000	67000	63000	78000	74000	70000	85000	81000	78000				
	Electric Power (Watts)	10582	10668	10756	11100	11190	11282	11646	11742	11836	8518	10238	12228	
	Leaving Air Temp (°F db/°F wb)	47.7 / 47.7	50.1 / 50.1	52.6 / 52.6	48.3 / 48.3	50.7 / 50.7	53.2 / 53.2	48.9 / 48.9	51.3 / 51.3	53.7 / 53.7	87.4	106.1	125.2	
1920	Total Capacity (Btu/h)	150000	154000	160000	146000	152000	156000	144000	148000	154000	113000	132000	146000	
	Sensible Capacity (Btu/h)	79000	74000	69000	88000	83000	78000	98000	93000	88000				
	Electric Power (Watts)	10814	10906	11002	11334	11430	11524	11884	11982	12086	7720	9116	10872	
	Leaving Air Temp (°F db/°F wb)	53.2 / 53.2	55.7 / 55.6	58.1 / 58.0	53.6 / 53.6	56.1 / 56.1	58.6 / 58.5	54.1 / 54.1	56.5 / 56.5	58.9 / 58.9	74.2	93.0	110.1	
2400	Total Capacity (Btu/h)	160000	164000	168000	156000	160000	166000	152000	158000	162000	115000	134000	148000	
	Sensible Capacity (Btu/h)	87000	81000	75000	99000	93000	87000	111000	106000	100000				
	Electric Power (Watts)	11006	11100	11200	11524	11624	11726	12074	12176	12280	7200	8376	9930	
	Leaving Air Temp (°F db/°F wb)	57.4 / 57.4	59.8 / 59.7	62.2 / 62.1	57.8 / 57.8	60.1 / 60.1	62.5 / 62.5	58.2 / 58.2	60.5 / 60.5	62.9 / 62.9	64.3	81.5	96.2	
180 (15 TON)														
1875	Total Capacity (Btu/h)	164000	170000	174000	160000	166000	172000	158000	164000	168000	121000	140000	154000	
	Sensible Capacity (Btu/h)	84000	80000	75000	94000	89000	84000	103000	98000	93000				
	Electric Power (Watts)	12604	12690	12768	13194	13294	13386	13876	13922	14028	9574	11342	13506	
	Leaving Air Temp (°F db/°F wb)	49.5 / 49.5	52.0 / 52.0	54.4 / 54.4	50.1 / 50.1	52.5 / 52.5	54.9 / 54.9	50.6 / 50.6	53.1 / 53.0	55.5 / 55.4	79.6	98.8	114.8	
2400	Total Capacity (Btu/h)	178000	182000	188000	174000	180000	186000	170000	176000	182000	124000	144000	160000	
	Sensible Capacity (Btu/h)	94000	88000	82000	106000	101000	94000	118000	112000	107000				
	Electric Power (Watts)	12810	12908	13010	13420	13520	13618	14050	14158	14264	8818	10282	12094	
	Leaving Air Temp (°F db/°F wb)	54.8 / 54.7	57.2 / 57.1	59.6 / 59.5	55.2 / 55.1	57.5 / 57.5	59.9 / 59.9	55.7 / 55.6	57.9 / 57.9	60.3 / 60.3	67.5	85.0	100.8	
3000	Total Capacity (Btu/h)	188000	194000	200000	184000	190000	196000	180000	186000	192000	126000	145000	162000	
	Sensible Capacity (Btu/h)	105000	98000	89000	120000	113000	105000	134000	128000	121000				
	Electric Power (Watts)	13006	13108	13206	13602	13702	13808	14220	14324	14442	8298	9778	11156	
	Leaving Air Temp (°F db/°F wb)	58.6 / 58.6	60.9 / 60.9	63.4 / 63.3	59.0 / 59.0	61.3 / 61.3	63.6 / 63.6	59.4 / 59.4	61.7 / 61.7	64.0 / 64.0	58.8	74.4	89.7	

Performance Data (Cont'd)

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)			ENTERING AIR TEMPERATURE (°F)														
			COOLING									HEATING					
			DRY BULB			90			95			100			20	30	40
			WET BULB			76	78	80	76	78	80	76	78	80			
210 (17.5 TON)																	
2187.5	Total Capacity (Btu/h)	186000	192000	198000	182000	190000	196000	180000	186000	192000	146000	160000	178000				
	Sensible Capacity (Btu/h)	96000	91000	85000	107000	102000	96000	118000	112000	107000							
	Electric Power (Watts)	14724	14794	14866	15446	15520	15594	16214	16288	16364	11774	13798	16390				
	Leaving Air Temp (°F db/°F wb)	50.4 / 50.4	52.9 / 52.9	55.4 / 55.4	50.9 / 50.9	53.3 / 53.3	55.8 / 55.8	51.4 / 51.4	53.8 / 53.8	56.3 / 56.3	81.4	97.6	114.7				
2800	Total Capacity (Btu/h)	200000	206000	214000	198000	204000	210000	192000	200000	206000	152000	166000	189000				
	Sensible Capacity (Btu/h)	108000	101000	93000	122000	115000	108000	134000	129000	122000							
	Electric Power (Watts)	14906	14976	15046	15624	15702	15776	16376	16462	16544	10800	12514	14610				
	Leaving Air Temp (°F db/°F wb)	55.5 / 55.5	57.9 / 57.9	60.3 / 60.3	55.9 / 55.9	58.2 / 58.2	60.6 / 60.6	57.1 / 56.3	58.6 / 58.6	61 / 61	69.9	84.5	101.9				
3500	Total Capacity (Btu/h)	212000	218000	224000	208000	214000	220000	204000	210000	216000	156000	170000	196000				
	Sensible Capacity (Btu/h)	119000	111000	102000	136000	129000	120000	152000	144000	138000							
	Electric Power (Watts)	15034	15108	15186	15764	15828	15900	16526	16600	16682	10132	11610	13816				
	Leaving Air Temp (°F db/°F wb)	59.3 / 59.3	61.7 / 61.7	64.0 / 64.0	60.2 / 59.6	62.0 / 61.9	64.4 / 64.3	61.0 / 59.9	63.2 / 62.3	64.6 / 64.5	60.9	74.8	91.3				
240 (20 TON)																	
2500	Total Capacity (Btu/h)	212000	220000	226000	208000	216000	222000	206000	212000	218000	172000	194000	220000				
	Sensible Capacity (Btu/h)	110000	104000	97000	122000	116000	110000	134000	128000	122000							
	Electric Power (Watts)	17032	17094	17162	17904	17966	18034	18858	18844	18956	14536	17806	21444				
	Leaving Air Temp (°F db/°F wb)	50.5 / 50.5	52.9 / 52.9	55.4 / 55.4	51.0 / 51.0	53.4 / 53.4	55.8 / 55.8	51.4 / 51.4	54.0 / 53.9	56.3 / 56.3	83.3	101.6	120.5				
3200	Total Capacity (Btu/h)	230000	236000	244000	226000	232000	240000	222000	228000	234000	178000	202000	228000				
	Sensible Capacity (Btu/h)	123000	115000	107000	140000	132000	123000	154000	146000	140000							
	Electric Power (Watts)	17200	17274	17346	18058	18138	18218	18996	19042	19132	13450	15836	18814				
	Leaving Air Temp (°F db/°F wb)	55.5 / 55.5	57.9 / 57.9	60.3 / 60.3	55.9 / 55.9	58.2 / 58.2	60.7 / 60.7	56.7 / 56.1	59.2 / 58.6	61.0 / 61.0	71.5	88.1	105.2				
4000	Total Capacity (Btu/h)	242000	248000	256000	238000	246000	254000	234000	240000	248000	182000	206000	232000				
	Sensible Capacity (Btu/h)	136000	126000	116000	154000	148000	138000	174000	162000	156000							
	Electric Power (Watts)	17322	17404	17492	18204	18302	18390	19122	19188	19280	12510	14566	17112				
	Leaving Air Temp (°F db/°F wb)	59.4 / 59.3	61.8 / 61.7	64.1 / 64.1	60.4 / 59.6	61.8 / 61.8	64.1 / 64.1	60.9 / 59.8	63.4 / 62.3	65.3 / 64.5	62.1	77.5	93.1				
300 (25 TON)																	
3125	Total Capacity (Btu/h)	256000	264000	272000	252000	260000	268000	246000	256000	264000	215000	238000	265000				
	Sensible Capacity (Btu/h)	134000	126000	117000	150000	142000	132000	164000	156000	148000							
	Electric Power (Watts)	18642	18690	18738	19578	19632	19676	20554	20614	20674	17026	20064	23894				
	Leaving Air Temp (°F db/°F wb)	51.6 / 51.6	54.1 / 54.1	56.6 / 56.6	52.1 / 52.1	54.5 / 54.5	57.1 / 57.0	52.7 / 52.6	55.0 / 55.0	57.4 / 57.4	83.4	100.1	117.7				
4000	Total Capacity (Btu/h)	276000	284000	292000	270000	282000	290000	264000	274000	284000	224500	247000	272000				
	Sensible Capacity (Btu/h)	148000	138000	128000	170000	160000	150000	186000	176000	170000							
	Electric Power (Watts)	18754	18800	18846	19708	19776	19830	20688	20748	20822	15600	18066	20738				
	Leaving Air Temp (°F db/°F wb)	56.6 / 56.5	59.0 / 58.9	61.4 / 61.3	56.8 / 56.8	59.0 / 59.0	61.4 / 61.4	58.2 / 57.3	60.4 / 59.6	61.8 / 61.8	71.7	86.9	102.3				
5000	Total Capacity (Btu/h)	294000	302000	310000	286000	296000	304000	278000	288000	298000	232000	255000	285000				
	Sensible Capacity (Btu/h)	168000	156000	142000	188000	180000	168000	208000	200000	188000							
	Electric Power (Watts)	18866	18912	18958	19812	19868	19924	20786	20862	20924	14594	16734	19388				
	Leaving Air Temp (°F db/°F wb)	59.9 / 59.9	62.3 / 62.3	64.6 / 64.6	61.1 / 60.3	62.6 / 62.6	65.0 / 64.9	62.4 / 60.8	64.1 / 62.9	66.2 / 65.3	62.8	76.8	92.2				

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)		ENTERING AIR TEMPERATURE (°F)												
		COOLING									HEATING			
		90			95			100			20	30	40	
		WET BULB			76	78	80	76	78	80	76	78	80	
360 (30 TON)														
3450	Total Capacity (Btu/h)	302000	312000	322000	296000	306000	316000	292000	300000	310000	241000	270000	296000	
	Sensible Capacity (Btu/h)	158000	148000	138000	178000	168000	158000	196000	186000	176000				
	Electric Power (Watts)	22770	22742	22736	23924	23950	23916	25082	25198	25210	19048	21998	25896	
	Leaving Air Temp (°F db/°F wb)	52.2 / 52.2	54.6 / 54.6	57.3 / 57.1	52.6 / 52.6	55.1 / 55.1	57.5 / 57.5	53.1 / 53.1	55.5 / 55.5	57.9 / 57.9	79.3	96.4	112.4	
4800	Total Capacity (Btu/h)	324000	334000	344000	318000	328000	338000	312000	322000	334000	252000	282000	310000	
	Sensible Capacity (Btu/h)	178000	166000	152000	200000	188000	176000	222000	210000	202000				
	Electric Power (Watts)	22884	22912	22958	23922	23994	24056	25116	25238	25296	17580	20046	23226	
	Leaving Air Temp (°F db/°F wb)	56.9 / 56.9	59.3 / 59.3	61.7 / 61.7	57.4 / 57.3	59.7 / 59.6	62.1 / 62.0	58.4 / 57.6	60.6 / 60.0	62.2 / 62.2	68.4	84	99.3	
6000	Total Capacity (Btu/h)	342000	352000	362000	336000	348000	358000	328000	340000	350000	258000	290000	318000	
	Sensible Capacity (Btu/h)	196000	182000	168000	224000	214000	200000	252000	238000	226000				
	Electric Power (Watts)	22918	23002	23054	24076	24152	24216	25228	25280	25404	16552	18702	21466	
	Leaving Air Temp (°F db/°F wb)	60.5 / 60.5	62.8 / 62.8	65.2 / 65.2	61.4 / 60.7	62.9 / 62.9	65.3 / 65.3	62.3 / 61.0	64.3 / 63.3	66.3 / 65.6	59.7	74.5	88.7	
420 (35 TON)														
4375	Total Capacity (Btu/h)	364000	374000	386000	356000	368000	380000	354000	362000	374000	300000	342000	382000	
	Sensible Capacity (Btu/h)	190000	178000	166000	210000	200000	188000	234000	222000	210000				
	Electric Power (Watts)	30140	30300	30468	31462	31636	31808	32954	33046	33226	25568	30104	35512	
	Leaving Air Temp (°F db/°F wb)	51.3 / 51.3	53.7 / 53.7	56.2 / 56.2	51.7 / 51.7	54.1 / 54.1	56.6 / 56.6	51.9 / 51.9	54.6 / 54.6	57.0 / 57.0	83.3	102	119.9	
5600	Total Capacity (Btu/h)	396000	405000	420000	384000	400000	415000	380000	388000	405000	306000	350000	392000	
	Sensible Capacity (Btu/h)	214000	198000	184000	240000	226000	214000	264000	248000	240000				
	Electric Power (Watts)	30590	30784	30994	31866	32080	32304	33328	33442	33690	23574	27336	31854	
	Leaving Air Temp (°F db/°F wb)	55.9 / 55.9	58.3 / 58.3	60.7 / 60.7	56.5 / 56.5	58.7 / 58.6	61.0 / 61.0	57.5 / 56.7	60.1 / 59.3	61.5 / 61.4	70.5	87.5	104.1	
7000	Total Capacity (Btu/h)	415000	430000	440000	410000	420000	435000	405000	410000	430000	312000	360000	405000	
	Sensible Capacity (Btu/h)	236000	218000	200000	266000	256000	238000	300000	280000	268000				
	Electric Power (Watts)	30942	31158	31386	32258	32474	32698	33710	33804	34080	22276	25488	29364	
	Leaving Air Temp (°F db/°F wb)	59.7 / 59.6	62.0 / 62.0	64.4 / 64.4	60.7 / 59.9	62.2 / 62.2	64.6 / 64.6	61.3 / 60.1	64.2 / 62.7	65.7 / 64.8	61.1	77.2	93.1	
480 (40 TON)														
5000	Total Capacity (Btu/h)	420000	435000	450000	410000	425000	440000	405000	420000	430000	314000	354000	398000	
	Sensible Capacity (Btu/h)	218000	204000	192000	242000	230000	216000	266000	254000	242000				
	Electric Power (Watts)	30364	30592	30768	31750	31862	32108	32922	33346	33460	24300	28442	33466	
	Leaving Air Temp (°F db/°F wb)	51.0 / 51.0	53.3 / 53.3	55.9 / 55.8	51.5 / 51.5	53.8 / 53.8	56.2 / 56.2	52.1 / 51.9	54.3 / 54.3	56.7 / 56.7	77.7	95	112.9	
6400	Total Capacity (Btu/h)	450000	465000	480000	445000	460000	475000	435000	450000	465000	322000	364000	410000	
	Sensible Capacity (Btu/h)	242000	226000	210000	276000	258000	244000	308000	292000	278000				
	Electric Power (Watts)	30854	31124	31402	32160	32358	32646	33572	33772	34078	22594	26028	30190	
	Leaving Air Temp (°F db/°F wb)	56.0 / 55.9	58.3 / 58.2	60.7 / 60.6	56.3 / 56.3	58.7 / 58.6	61.1 / 60.9	56.7 / 56.7	59.0 / 59.0	61.3 / 61.3	66.3	82.4	98.9	
8000	Total Capacity (Btu/h)	475000	490000	510000	470000	485000	500000	455000	470000	490000	328000	372000	420000	
	Sensible Capacity (Btu/h)	270000	250000	230000	312000	294000	274000	344000	326000	314000				
	Electric Power (Watts)	31338	31628	31932	32630	32902	33202	33904	34182	34526	21480	24464	28004	
	Leaving Air Temp (°F db/°F wb)	59.7 / 59.6	62.0 / 61.9	64.3 / 64.2	59.9 / 59.9	62.2 / 62.2	64.5 / 64.5	61.2 / 60.3	63.3 / 62.5	64.8 / 64.8	57.8	72.7	88.2	

Performance Data (Cont'd)

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)			ENTERING AIR TEMPERATURE (°F)											
			COOLING									HEATING		
		DRY BULB	90			95			100			20	30	40
		WET BULB	76	78	80	76	78	80	76	78	80			
540 (45 TON)														
5625	Total Capacity (Btu/h)	515000	530000	550000	505000	520000	540000	495000	510000	530000	388000	440000	490000	
	Sensible Capacity (Btu/h)	264000	250000	234000	290000	276000	262000	318000	304000	290000				
	Electric Power (Watts)	39510	39696	39888	41542	41734	41932	43754	43944	44148	33096	40092	48528	
	Leaving Air Temp (°F db/°F wb)	48.0 / 48.0	50.4 / 50.4	52.8 / 52.8	48.5 / 48.5	50.9 / 50.9	53.3 / 53.3	49.1 / 49.1	51.5 / 51.5	53.8 / 53.8	83.7	102	119.8	
7200	Total Capacity (Btu/h)	560000	575000	595000	550000	565000	585000	535000	555000	575000	400000	455000	515000	
	Sensible Capacity (Btu/h)	294000	276000	256000	330000	312000	294000	366000	348000	330000				
	Electric Power (Watts)	40022	40222	40412	42050	42264	42478	44264	44474	44692	30300	35454	42166	
	Leaving Air Temp (°F db/°F wb)	53.3 / 53.3	55.8 / 55.8	58.2 / 58.2	53.8 / 53.8	56.2 / 56.2	58.6 / 58.6	54.2 / 54.2	56.6 / 56.6	59.0 / 59.0	71.3	88.2	105.2	
9000	Total Capacity (Btu/h)	595000	610000	630000	580000	600000	620000	570000	590000	605000	410000	465000	525000	
	Sensible Capacity (Btu/h)	326000	302000	280000	372000	350000	328000	410000	390000	372000				
	Electric Power (Watts)	40440	40632	40846	42466	42708	42930	44654	44920	45134	28824	32834	38228	
	Leaving Air Temp (°F db/°F wb)	57.5 / 57.5	59.9 / 59.9	62.3 / 62.2	57.9 / 57.9	60.2 / 60.2	62.5 / 62.5	59.1 / 58.3	61.1 / 60.5	62.9 / 62.9	61.9	77.6	93.4	
600 (50 TON)														
6250	Total Capacity (Btu/h)	555000	575000	595000	550000	565000	585000	540000	555000	575000	430000	485000	545000	
	Sensible Capacity (Btu/h)	286000	270000	254000	318000	302000	286000	348000	332000	316000				
	Electric Power (Watts)	44098	44350	44612	46300	46558	46824	48640	48898	49170	36866	43898	52694	
	Leaving Air Temp (°F db/°F wb)	48.8 / 48.8	51.2 / 51.2	53.7 / 53.7	49.3 / 49.3	51.7 / 51.7	54.2 / 54.2	49.8 / 49.8	52.3 / 52.2	54.7 / 54.7	83.6	101.1	119.7	
8000	Total Capacity (Btu/h)	605000	625000	645000	595000	610000	630000	580000	600000	620000	446000	500000	549000	
	Sensible Capacity (Btu/h)	320000	300000	278000	360000	340000	320000	400000	380000	360000				
	Electric Power (Watts)	44774	45050	45338	46964	47248	47538	49300	49588	49868	33494	39244	46576	
	Leaving Air Temp (°F db/°F wb)	54.1 / 54.1	56.5 / 56.5	58.9 / 58.9	54.5 / 54.5	56.9 / 56.9	59.3 / 59.3	55.0 / 55.0	57.3 / 57.3	59.7 / 59.7	71.4	87.5	102.9	
10000	Total Capacity (Btu/h)	640000	660000	680000	625000	645000	665000	615000	635000	655000	468000	525000	555000	
	Sensible Capacity (Btu/h)	354000	330000	304000	405000	382000	356000	445000	425000	405000				
	Electric Power (Watts)	45332	45624	45906	47502	47810	48124	49802	50138	50428	31072	35984	43270	
	Leaving Air Temp (°F db/°F wb)	58.1 / 58.1	60.5 / 60.5	62.9 / 62.9	58.5 / 58.5	60.8 / 60.8	63.2 / 63.2	59.9 / 58.9	61.9 / 61.2	63.5 / 63.5	63.1	78.2	90.8	
660 (55 TON)														
6875	Total Capacity (Btu/h)	615000	635000	655000	605000	625000	645000	595000	615000	635000	494000	560000	630000	
	Sensible Capacity (Btu/h)	316000	298000	280000	350000	332000	314000	384000	366000	348000				
	Electric Power (Watts)	50602	50952	51312	53078	53434	53798	55704	56050	56430	42186	50566	61052	
	Leaving Air Temp (°F db/°F wb)	48.8 / 48.8	51.3 / 51.3	53.7 / 53.7	49.3 / 49.3	51.7 / 51.7	54.2 / 54.2	49.8 / 49.8	52.2 / 52.2	54.7 / 54.7	86.2	104.6	123.9	
8800	Total Capacity (Btu/h)	665000	685000	705000	650000	670000	695000	640000	660000	680000	508000	570000	645000	
	Sensible Capacity (Btu/h)	352000	328000	306000	396000	374000	350000	435000	420000	396000				
	Electric Power (Watts)	51536	51904	52296	53994	54378	54768	56612	56998	57380	38102	45104	53620	
	Leaving Air Temp (°F db/°F wb)	54.1 / 54.1	56.6 / 56.6	59.0 / 59.0	54.5 / 54.5	56.9 / 56.9	59.4 / 59.4	55.0 / 55.0	57.4 / 57.4	59.8 / 59.8	73.2	89.7	107.2	
11000	Total Capacity (Btu/h)	700000	725000	745000	690000	710000	730000	675000	695000	715000	515000	585000	680000	
	Sensible Capacity (Btu/h)	390000	362000	334000	440000	420000	392000	485000	465000	440000				
	Electric Power (Watts)	52284	52674	53080	54720	55136	55546	57290	57742	58130	35376	41494	48668	
	Leaving Air Temp (°F db/°F wb)	58.2 / 58.2	60.6 / 60.6	63.0 / 63.0	59.2 / 58.5	60.9 / 60.9	63.2 / 63.2	60.1 / 58.9	62.1 / 61.2	64.3 / 63.6	63.2	78.7	96.6	

TABLE 6 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)			ENTERING AIR TEMPERATURE (°F)											
			COOLING									HEATING		
			90			95			100			20	30	40
			WET BULB			76	78	80	76	78	80	76	78	80
720 (60 TON)														
7500	Total Capacity (Btu/h)	610000	630000	650000	595000	615000	635000	585000	600000	625000	465000	515000	560000	
	Sensible Capacity (Btu/h)	322000	302000	284000	358000	340000	320000	396000	376000	358000				
	Electric Power (Watts)	46818	47086	47364	48974	49242	49528	51292	51530	51830	34188	39584	46460	
	Leaving Air Temp (°F db/°F wb)	51.9 / 51.9	54.3 / 54.3	56.7 / 56.7	52.3 / 52.3	54.7 / 54.7	57.1 / 57.1	52.8 / 52.8	55.3 / 55.3	57.6 / 57.6	77.2	93.2	108.7	
9600	Total Capacity (Btu/h)	650000	670000	695000	635000	660000	680000	620000	640000	665000	485000	530000	595000	
	Sensible Capacity (Btu/h)	360000	334000	310000	410000	384000	360000	455000	430000	410000				
	Electric Power (Watts)	47424	47678	47974	49562	49852	50150	51814	52106	52422	31720	36354	41810	
	Leaving Air Temp (°F db/°F wb)	56.7 / 56.7	59.2 / 59.2	61.5 / 61.5	57.0 / 57.0	59.4 / 59.4	61.7 / 61.7	57.5 / 57.5	59.9 / 59.9	62.2 / 62.2	66.6	81	96.8	
12000	Total Capacity (Btu/h)	685000	705000	725000	670000	690000	710000	655000	670000	695000	490000	545000	625000	
	Sensible Capacity (Btu/h)	400000	368000	338000	460000	430000	400000	525000	495000	465000				
	Electric Power (Watts)	47888	48154	48462	50022	50286	50600	52294	52590	52900	30034	34194	38872	
	Leaving Air Temp (°F db/°F wb)	60.3 / 60.3	62.7 / 62.7	65.1 / 65.1	60.5 / 60.5	63.0 / 63.0	65.3 / 65.3	60.9 / 60.9	63.1 / 63.1	65.5 / 65.5	57.7	71.9	87.6	
780 (65 TON)														
8125	Total Capacity (Btu/h)	665000	685000	710000	650000	675000	695000	640000	660000	680000	510000	570000	650000	
	Sensible Capacity (Btu/h)	350000	330000	308000	390000	370000	350000	430000	410000	390000				
	Electric Power (Watts)	53516	53898	54296	55938	56310	56714	58526	58866	59302	38310	44856	52586	
	Leaving Air Temp (°F db/°F wb)	51.6 / 51.6	54.0 / 54.0	56.4 / 56.4	52.0 / 52.0	54.5 / 54.5	56.9 / 56.9	52.4 / 52.4	55.0 / 55.0	57.3 / 57.3	77.7	94.8	113.2	
10400	Total Capacity (Btu/h)	710000	735000	755000	695000	720000	740000	680000	700000	725000	520000	590000	660000	
	Sensible Capacity (Btu/h)	392000	366000	336000	445000	415000	392000	495000	470000	445000				
	Electric Power (Watts)	54374	54782	55150	56734	57162	57608	59284	59692	60110	35268	41014	47532	
	Leaving Air Temp (°F db/°F wb)	56.4 / 56.4	58.8 / 58.8	61.4 / 61.4	56.9 / 56.9	59.2 / 59.2	61.5 / 61.5	57.3 / 57.3	59.7 / 59.7	62.0 / 62.0	66.2	82	98.1	
13000	Total Capacity (Btu/h)	745000	770000	795000	730000	755000	775000	715000	735000	760000	530000	600000	675000	
	Sensible Capacity (Btu/h)	435000	405000	370000	500000	470000	440000	570000	535000	505000				
	Electric Power (Watts)	54992	55454	55878	57372	57834	58268	60008	60378	60816	33134	38374	44232	
	Leaving Air Temp (°F db/°F wb)	60.3 / 60.3	62.4 / 62.4	64.8 / 64.8	60.5 / 60.5	62.7 / 62.7	65.0 / 65.0	60.6 / 60.6	63.0 / 63.0	65.4 / 65.4	57.6	72.5	87.5	
840 (70 TON)														
8750	Total Capacity (Btu/h)	750000	775000	805000	740000	760000	790000	720000	745000	775000	570000	650000	740000	
	Sensible Capacity (Btu/h)	394000	370000	348000	435000	415000	392000	480000	455000	435000				
	Electric Power (Watts)	63178	63750	64358	66024	66588	67212	69018	69616	70270	46092	54332	64306	
	Leaving Air Temp (°F db/°F wb)	50.0 / 50.0	52.4 / 52.4	54.9 / 54.9	50.4 / 50.4	52.9 / 52.9	55.3 / 55.3	51.0 / 51.0	53.4 / 53.4	55.7 / 55.7	80.3	98.3	117.5	
11200	Total Capacity (Btu/h)	810000	835000	860000	790000	820000	845000	775000	800000	825000	585000	675000	775000	
	Sensible Capacity (Btu/h)	435000	410000	380000	495000	465000	435000	550000	520000	495000				
	Electric Power (Watts)	64542	65188	65870	67340	68036	68688	70380	70994	71734	42510	49376	57550	
	Leaving Air Temp (°F db/°F wb)	55.2 / 55.2	57.6 / 57.6	59.9 / 59.9	55.6 / 55.6	57.8 / 57.8	60.3 / 60.3	55.8 / 55.8	58.3 / 58.3	60.6 / 60.6	68.2	85.6	103.5	
14000	Total Capacity (Btu/h)	850000	880000	905000	830000	860000	885000	815000	840000	865000	595000	675000	800000	
	Sensible Capacity (Btu/h)	485000	450000	415000	555000	520000	490000	620000	595000	560000				
	Electric Power (Watts)	65644	66360	67046	68412	69120	69884	71414	72146	72822	40144	46428	53142	
	Leaving Air Temp (°F db/°F wb)	59.1 / 59.1	61.4 / 61.4	63.9 / 63.9	59.4 / 59.4	61.8 / 61.8	64.0 / 64.0	60.3 / 60.0	61.9 / 61.9	64.4 / 64.4	59.4	74.5	92.6	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
036 (3 TON)												
375	50	9.00	Total Capacity (Btu/h)	38000	39500	41000	38000	39500	41000	38000	39500	41000
			Sensible Capacity (Btu/h)	18600	17700	16800	20800	19900	18900	22800	22000	21000
			Electric Power (Watts)	2059	2060	2060	2060	2061	2062	2061	2062	2063
			Leaving Air Temp (°F db/°F wb)	45.4 / 43.6	47.7 / 45.9	50.0 / 48.2	45.2 / 43.4	47.5 / 45.7	49.9 / 48	45.0 / 43.2	47.3 / 45.4	49.7 / 47.8
	60	9.00	Total Capacity (Btu/h)	37000	38500	40000	37000	38500	40000	37000	38500	40000
			Sensible Capacity (Btu/h)	18100	17200	16200	20200	19300	18400	22400	21400	20600
			Electric Power (Watts)	2239	2240	2240	2240	2241	2243	2241	2242	2243
			Leaving Air Temp (°F db/°F wb)	46.7 / 44.8	49.0 / 47.1	51.4 / 49.5	46.4 / 44.6	48.8 / 46.9	51.2 / 49.2	46.3 / 44.4	48.6 / 46.7	50.9 / 49.0
	75	9.00	Total Capacity (Btu/h)	35200	36600	38000	35200	36600	38000	35400	36800	38000
			Sensible Capacity (Btu/h)	17200	16300	15400	19400	18500	17500	21400	20600	19700
			Electric Power (Watts)	2573	2575	2575	2574	2576	2578	2575	2577	2579
			Leaving Air Temp (°F db/°F wb)	48.7 / 46.8	51.0 / 49.1	53.4 / 51.5	48.5 / 46.6	50.8 / 48.9	53.2 / 51.2	48.3 / 46.4	50.6 / 48.7	53.0 / 51.0
	85	9.00	Total Capacity (Btu/h)	34000	35200	36600	34000	35400	36800	34200	35400	36800
			Sensible Capacity (Btu/h)	16600	15700	14800	18800	17900	16900	20800	20000	19100
			Electric Power (Watts)	2843	2845	2847	2845	2846	2848	2846	2847	2849
			Leaving Air Temp (°F db/°F wb)	50.2 / 48.2	52.5 / 50.5	54.9 / 52.8	50.0 / 48.0	52.3 / 50.2	54.7 / 52.6	49.8 / 47.9	52.1 / 50.1	54.5 / 52.4
480	50	9.00	Total Capacity (Btu/h)	42000	44000	45500	42500	44000	45500	42500	44000	45500
			Sensible Capacity (Btu/h)	21000	19800	18600	23600	22600	21400	26400	25200	24000
			Electric Power (Watts)	2061	2062	2064	2063	2063	2065	2064	2066	2067
			Leaving Air Temp (°F db/°F wb)	50.7 / 49.2	53.1 / 51.6	55.5 / 53.9	50.6 / 49.0	52.9 / 51.4	55.3 / 53.7	50.5 / 48.9	52.8 / 51.2	55.2 / 53.5
	60	9.00	Total Capacity (Btu/h)	41000	42500	44000	41000	42500	44000	41000	42500	44500
			Sensible Capacity (Btu/h)	20400	19200	18000	23000	22000	20800	25800	24600	23400
			Electric Power (Watts)	2241	2243	2245	2244	2244	2246	2244	2247	2249
			Leaving Air Temp (°F db/°F wb)	51.8 / 50.3	54.2 / 52.6	56.5 / 55.0	51.7 / 50.1	54 / 52.4	56.3 / 54.7	51.6 / 50.0	53.9 / 52.2	56.3 / 54.6
	75	9.00	Total Capacity (Btu/h)	39000	40500	42000	39000	40500	42000	39000	40500	42000
			Sensible Capacity (Btu/h)	19400	18300	17100	22200	21000	19900	24800	23800	22600
			Electric Power (Watts)	2578	2579	2582	2579	2582	2583	2580	2583	2586
			Leaving Air Temp (°F db/°F wb)	53.7 / 52.0	55.9 / 54.3	58.3 / 56.6	53.4 / 51.8	55.8 / 54.1	58.0 / 56.4	53.3 / 51.7	55.6 / 53.9	58 / 56.3
	85	9.00	Total Capacity (Btu/h)	37400	39000	40000	37600	39000	40500	37600	39000	40500
			Sensible Capacity (Btu/h)	18800	17700	16500	21600	20400	19200	24200	23000	21800
			Electric Power (Watts)	2848	2848	2852	2849	2852	2854	2850	2853	2857
			Leaving Air Temp (°F db/°F wb)	54.9 / 53.2	57 / 55.5	59.4 / 57.8	54.7 / 53.0	57 / 55.3	59.2 / 57.6	54.5 / 52.9	56.8 / 55.1	59.2 / 57.4

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
					76	78	80	76	78	80	76	78	80
036 (3 TON) CONT'D													
600	50	9.00	Total Capacity (Btu/h)	45500	47500	49000	46000	47500	49000	46000	47500	49500	
			Sensible Capacity (Btu/h)	23400	21800	20400	26600	25200	23800	30000	28600	27200	
			Electric Power (Watts)	2064	2066	2068	2066	2066	2069	2067	2069	2070	
			Leaving Air Temp (°F db/°F wb)	55 / 53.8	57.4 / 56.1	59.8 / 58.5	55.0 / 53.6	57.2 / 56.0	59.6 / 58.3	54.9 / 53.5	57.2 / 55.8	59.4 / 58.1	
	60	9.00	Total Capacity (Btu/h)	44500	46000	47500	44500	46000	47500	44500	46000	48000	
			Sensible Capacity (Btu/h)	22800	21200	19700	26000	24600	23200	29400	28000	26600	
			Electric Power (Watts)	2245	2248	2251	2248	2249	2252	2248	2251	2253	
			Leaving Air Temp (°F db/°F wb)	56.0 / 54.7	58.3 / 57.0	60.7 / 59.3	55.9 / 54.5	58.1 / 56.9	60.4 / 59.2	55.8 / 54.4	58.1 / 56.7	60.3 / 59.0	
	75	9.00	Total Capacity (Btu/h)	42000	43500	45000	42000	43500	45000	42000	43500	45000	
			Sensible Capacity (Btu/h)	21800	20400	18800	25000	23800	22200	28400	27000	25600	
			Electric Power (Watts)	2581	2585	2590	2585	2586	2590	2585	2589	2592	
			Leaving Air Temp (°F db/°F wb)	57.4 / 56.2	59.7 / 58.4	62.0 / 60.7	57.4 / 56.0	59.5 / 58.3	61.8 / 60.6	57.2 / 55.9	59.5 / 58.1	61.7 / 60.4	
	85	9.00	Total Capacity (Btu/h)	40000	41500	43000	40500	42000	43500	40500	42000	43500	
			Sensible Capacity (Btu/h)	21200	19700	18200	24400	23000	21400	27800	26400	25000	
			Electric Power (Watts)	2851	2856	2861	2855	2860	2865	2857	2860	2863	
			Leaving Air Temp (°F db/°F wb)	58.4 / 57.2	60.7 / 59.4	63.0 / 61.7	58.4 / 57.0	60.7 / 59.2	63.0 / 61.5	58.3 / 56.9	60.5 / 59.1	62.7 / 61.4	
048 (4 TON)													
500	50	12.00	Total Capacity (Btu/h)	48500	50500	52500	48500	50500	52500	48500	50500	52500	
			Sensible Capacity (Btu/h)	23800	22600	21200	26600	25400	24200	29400	28200	27000	
			Electric Power (Watts)	2497	2500	2505	2499	2503	2506	2500	2505	2510	
			Leaving Air Temp (°F db/°F wb)	47.3 / 45.5	49.6 / 47.8	52.0 / 50.1	47.1 / 45.3	49.4 / 47.5	51.8 / 49.8	46.9 / 45.0	49.2 / 47.3	51.6 / 49.6	
	60	12.00	Total Capacity (Btu/h)	47000	49000	51000	47000	49000	51000	47500	49000	51000	
			Sensible Capacity (Btu/h)	23000	21800	20600	26000	24800	23600	28800	27600	26400	
			Electric Power (Watts)	2746	2749	2755	2748	2753	2757	2749	2754	2760	
			Leaving Air Temp (°F db/°F wb)	48.5 / 46.7	50.8 / 49.0	53.2 / 51.3	48.3 / 46.5	50.7 / 48.7	53.0 / 51.1	48.2 / 46.3	50.5 / 48.5	52.8 / 50.9	
	75	12.00	Total Capacity (Btu/h)	45000	46500	48500	45000	46500	48500	45000	47000	48500	
			Sensible Capacity (Btu/h)	22000	20800	19500	24800	23600	22400	27600	26400	25200	
			Electric Power (Watts)	3158	3163	3167	3159	3164	3171	3160	3166	3172	
			Leaving Air Temp (°F db/°F wb)	50.5 / 48.6	52.9 / 50.9	55.2 / 53.2	50.3 / 48.4	52.7 / 50.6	55.0 / 52.9	50.2 / 48.2	52.5 / 50.4	54.8 / 52.7	
	85	12.00	Total Capacity (Btu/h)	43000	45000	46500	43500	45000	47000	43500	45000	47000	
			Sensible Capacity (Btu/h)	21200	20000	18800	24000	22800	21600	26800	25800	24400	
			Electric Power (Watts)	3472	3477	3480	3474	3479	3484	3475	3480	3486	
			Leaving Air Temp (°F db/°F wb)	51.9 / 49.9	54.2 / 52.2	56.5 / 54.4	51.7 / 49.7	54.0 / 52.0	56.3 / 54.2	51.5 / 49.5	53.8 / 51.8	56.1 / 54.0	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
					76	78	80	76	78	80	76	78	80
048 (4 TON) CONT'D													
640	50	12.00	Total Capacity (Btu/h)	53500	55500	57500	54000	56000	58000	54000	56000	58000	
			Sensible Capacity (Btu/h)	26800	25200	23600	30400	28800	27200	34000	32400	30800	
			Electric Power (Watts)	2509	2515	2523	2512	2517	2525	2513	2520	2526	
			Leaving Air Temp (°F db/°F wb)	52.4 / 50.9	54.8 / 53.2	57.2 / 55.6	52.3 / 50.7	54.6 / 53.0	57.0 / 55.4	52.2 / 50.6	54.5 / 52.8	56.8 / 55.2	
	60	12.00	Total Capacity (Btu/h)	52000	54000	56000	52000	54000	56000	52000	54000	56000	
			Sensible Capacity (Btu/h)	26000	24400	22800	29600	28000	26400	33200	31600	30200	
			Electric Power (Watts)	2759	2766	2774	2762	2768	2776	2763	2771	2777	
			Leaving Air Temp (°F db/°F wb)	53.5 / 52.0	55.8 / 54.2	58.2 / 56.6	53.4 / 51.8	55.6 / 54.0	58.0 / 56.4	53.2 / 51.6	55.5 / 53.9	57.8 / 56.2	
	75	12.00	Total Capacity (Btu/h)	49000	51000	53000	49500	51500	53000	49500	51500	53500	
			Sensible Capacity (Btu/h)	24800	23200	21600	28400	27000	25400	32000	30600	29000	
			Electric Power (Watts)	3170	3177	3186	3173	3179	3187	3175	3182	3188	
			Leaving Air Temp (°F db/°F wb)	55.1 / 53.5	57.4 / 55.8	59.8 / 58.1	55.0 / 53.4	57.2 / 55.6	59.6 / 57.9	54.9 / 53.2	57.1 / 55.5	59.4 / 57.8	
	85	12.00	Total Capacity (Btu/h)	47500	49000	51000	47500	49500	51000	47500	49500	51000	
			Sensible Capacity (Btu/h)	24000	22400	21000	27600	26200	24600	31200	29800	28200	
			Electric Power (Watts)	3485	3489	3497	3486	3491	3499	3487	3494	3500	
			Leaving Air Temp (°F db/°F wb)	56.3 / 54.6	58.6 / 56.9	60.9 / 59.2	56.1 / 54.5	58.3 / 56.7	60.7 / 59.0	56.0 / 54.3	58.3 / 56.6	60.4 / 58.8	
800	50	12.00	Total Capacity (Btu/h)	58000	60000	62000	58000	60000	62500	58000	60000	62500	
			Sensible Capacity (Btu/h)	29800	27800	25800	34400	32400	30400	39000	36800	35000	
			Electric Power (Watts)	2523	2532	2541	2524	2533	2543	2527	2534	2544	
			Leaving Air Temp (°F db/°F wb)	56.6 / 55.3	58.9 / 57.6	61.2 / 59.9	56.4 / 55.1	58.7 / 57.4	61.1 / 59.7	56.3 / 55.0	58.6 / 57.3	60.9 / 59.5	
	60	12.00	Total Capacity (Btu/h)	56000	58000	60000	56000	58000	60000	56000	58000	60500	
			Sensible Capacity (Btu/h)	29000	27000	25000	33600	31600	29600	38000	36000	34200	
			Electric Power (Watts)	2774	2783	2793	2775	2784	2794	2778	2785	2796	
			Leaving Air Temp (°F db/°F wb)	57.4 / 56.1	59.7 / 58.4	62.1 / 60.7	57.3 / 56.0	59.6 / 58.2	61.9 / 60.5	57.2 / 55.9	59.5 / 58.1	61.7 / 60.4	
	75	12.00	Total Capacity (Btu/h)	53000	54500	56500	53000	55000	57000	53000	55000	57000	
			Sensible Capacity (Btu/h)	27800	25800	23800	32400	30400	28400	36800	34800	33000	
			Electric Power (Watts)	3184	3193	3203	3186	3195	3205	3188	3196	3207	
			Leaving Air Temp (°F db/°F wb)	58.8 / 57.5	61.0 / 59.7	63.4 / 62.0	58.7 / 57.3	60.9 / 59.6	63.2 / 61.8	58.5 / 57.2	60.8 / 59.4	63.1 / 61.7	
	85	12.00	Total Capacity (Btu/h)	50500	52500	54500	51000	52500	54500	51000	52500	54500	
			Sensible Capacity (Btu/h)	27000	25000	23000	31400	29600	27600	35800	34000	32200	
			Electric Power (Watts)	3495	3504	3514	3497	3505	3515	3502	3507	3517	
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.4	62.0 / 60.6	64.3 / 62.9	59.6 / 58.3	61.8 / 60.5	64.1 / 62.7	59.6 / 58.1	61.7 / 60.4	64.0 / 62.6	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
060 (5 TON)												
625	50	15.00	Total Capacity (Btu/h)	59000	61500	63500	59500	61500	64000	59500	61500	64000
			Sensible Capacity (Btu/h)	29000	27400	25800	32600	31000	29400	36000	34400	33000
			Electric Power (Watts)	2995	2998	3004	2999	3001	3005	3001	3006	3012
			Leaving Air Temp (°F db/°F wb)	48.4 / 46.5	50.7 / 48.9	53.2 / 51.3	48.2 / 46.3	50.5 / 48.6	52.9 / 51.0	48.0 / 46.1	50.4 / 48.4	52.8 / 50.8
	60	15.00	Total Capacity (Btu/h)	57500	59500	61500	57500	59500	62000	57500	60000	62000
			Sensible Capacity (Btu/h)	28000	26600	25000	31600	30000	28600	35200	33600	32000
			Electric Power (Watts)	3294	3295	3302	3296	3302	3303	3298	3304	3311
			Leaving Air Temp (°F db/°F wb)	49.6 / 47.7	52.0 / 50.0	54.4 / 52.4	49.4 / 47.5	51.8 / 49.8	54.1 / 52.2	49.3 / 47.3	51.7 / 49.6	54.0 / 52.0
	75	15.00	Total Capacity (Btu/h)	54500	56500	58500	54500	57000	59000	55000	57000	59000
			Sensible Capacity (Btu/h)	26800	25200	23800	30400	28800	27200	33800	32200	30800
			Electric Power (Watts)	3787	3792	3792	3789	3794	3801	3790	3797	3804
			Leaving Air Temp (°F db/°F wb)	51.6 / 49.5	53.9 / 51.9	56.2 / 54.2	51.4 / 49.3	53.7 / 51.6	56.1 / 54.0	51.2 / 49.2	53.6 / 51.5	55.9 / 53.7
	85	15.00	Total Capacity (Btu/h)	52500	54500	56500	52500	54500	57000	53000	55000	57000
			Sensible Capacity (Btu/h)	25800	24200	22800	29400	27800	26200	32800	31400	29800
			Electric Power (Watts)	4165	4170	4166	4167	4172	4178	4169	4174	4181
			Leaving Air Temp (°F db/°F wb)	52.9 / 50.8	55.3 / 53.1	57.4 / 55.4	52.7 / 50.6	55.1 / 52.9	57.4 / 55.2	52.6 / 50.4	54.9 / 52.7	57.2 / 55.0
800	50	15.00	Total Capacity (Btu/h)	65000	67000	69000	65000	67000	70000	65000	67000	70000
			Sensible Capacity (Btu/h)	32400	30400	28400	37000	35000	33000	41500	39500	37400
			Electric Power (Watts)	3007	3015	3023	3010	3016	3025	3011	3019	3028
			Leaving Air Temp (°F db/°F wb)	53.6 / 52.0	55.9 / 54.3	58.4 / 56.7	53.4 / 51.8	55.8 / 54.1	58.2 / 56.5	53.3 / 51.7	55.6 / 54.0	58.0 / 56.4
	60	15.00	Total Capacity (Btu/h)	62500	65000	67000	63000	65000	68000	63000	65000	68000
			Sensible Capacity (Btu/h)	31600	29600	27600	36000	34200	32200	40500	38500	36600
			Electric Power (Watts)	3305	3313	3322	3308	3314	3324	3309	3318	3327
			Leaving Air Temp (°F db/°F wb)	54.6 / 53.0	56.9 / 55.3	59.3 / 57.7	54.4 / 52.8	56.7 / 55.1	59.1 / 57.5	54.3 / 52.7	56.6 / 55.0	59.0 / 57.3
	75	15.00	Total Capacity (Btu/h)	59500	61500	64000	59500	62000	64000	59500	62000	64000
			Sensible Capacity (Btu/h)	30200	28200	26200	34800	32800	30800	39000	37200	35200
			Electric Power (Watts)	3795	3803	3813	3798	3804	3814	3800	3808	3818
			Leaving Air Temp (°F db/°F wb)	56.1 / 54.5	58.4 / 56.8	60.8 / 59.1	55.9 / 54.3	58.2 / 56.6	60.6 / 58.9	55.8 / 54.2	58.2 / 56.5	60.5 / 58.8
	85	15.00	Total Capacity (Btu/h)	57000	59000	61500	57500	59500	61500	57500	59500	61500
			Sensible Capacity (Btu/h)	29000	27400	25400	33800	31800	30000	38500	36400	34400
			Electric Power (Watts)	4179	4176	4185	4172	4181	4187	4174	4182	4191
			Leaving Air Temp (°F db/°F wb)	57.4 / 55.6	59.5 / 57.8	61.8 / 60.1	57.0 / 55.4	59.3 / 57.7	61.6 / 60.0	56.9 / 55.3	59.2 / 57.5	61.5 / 59.8

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
					76	78	80	76	78	80	76	78	80
060 (5 TON) CONT'D													
1000	50	15.00	Total Capacity (Btu/h)	69000	72000	74000	69000	72000	74000	69000	72000	74000	
			Sensible Capacity (Btu/h)	36000	33600	31000	41500	39000	36800	47000	44500	42500	
			Electric Power (Watts)	3022	3031	3041	3027	3032	3043	3026	3038	3043	
			Leaving Air Temp (°F db/°F wb)	57.6 / 56.3	60.0 / 58.6	62.3 / 61.0	57.6 / 56.2	59.8 / 58.5	62.2 / 60.8	57.4 / 56.1	59.8 / 58.4	62.0 / 60.7	
	60	15.00	Total Capacity (Btu/h)	67000	69000	72000	67000	69000	72000	67000	70000	72000	
			Sensible Capacity (Btu/h)	35200	32600	30200	40500	38500	35800	46500	44000	41500	
			Electric Power (Watts)	3320	3330	3341	3323	3331	3342	3324	3334	3348	
			Leaving Air Temp (°F db/°F wb)	58.4 / 57.1	60.8 / 59.4	63.1 / 61.7	58.3 / 57.0	60.6 / 59.3	62.9 / 61.6	58.2 / 56.9	60.5 / 59.2	62.9 / 61.5	
	75	15.00	Total Capacity (Btu/h)	63500	65000	68000	63500	66000	68000	63500	66000	68000	
			Sensible Capacity (Btu/h)	33800	31400	28800	39500	37000	34600	45000	42500	40000	
			Electric Power (Watts)	3810	3820	3831	3813	3821	3832	3814	3824	3840	
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.4	62.0 / 60.6	64.3 / 62.9	59.6 / 58.3	61.8 / 60.5	64.1 / 62.8	59.5 / 58.2	61.8 / 60.4	64.2 / 62.7	
	85	15.00	Total Capacity (Btu/h)	60500	63000	65000	61000	63000	65000	61000	63000	65000	
			Sensible Capacity (Btu/h)	32800	30400	28000	38500	35800	33600	44000	41500	39000	
			Electric Power (Watts)	4181	4191	4202	4186	4200	4203	4188	4196	4213	
			Leaving Air Temp (°F db/°F wb)	60.5 / 59.2	62.8 / 61.5	65.1 / 63.8	60.5 / 59.1	62.9 / 61.4	64.9 / 63.6	60.4 / 59.0	62.6 / 61.3	65.1 / 63.5	
072 (6 TON)													
750	50	18.00	Total Capacity (Btu/h)	67000	69000	72000	67000	70000	72000	67000	70000	72000	
			Sensible Capacity (Btu/h)	32800	31000	29200	37200	35400	33400	41500	39500	37800	
			Electric Power (Watts)	3282	3292	3304	3281	3280	3306	3282	3292	3292	
			Leaving Air Temp (°F db/°F wb)	50.6 / 48.8	53.0 / 51.1	55.4 / 53.4	50.5 / 48.6	52.6 / 50.9	55.2 / 53.2	50.3 / 48.5	52.6 / 50.7	54.8 / 53.0	
	60	18.00	Total Capacity (Btu/h)	65000	67000	70000	65000	68000	70000	65000	68000	70000	
			Sensible Capacity (Btu/h)	32000	30200	28200	36200	34600	32600	40500	38500	37000	
			Electric Power (Watts)	3577	3599	3611	3590	3589	3602	3591	3602	3602	
			Leaving Air Temp (°F db/°F wb)	51.6 / 49.8	54.1 / 52.2	56.5 / 54.5	51.7 / 49.7	53.7 / 52.0	56.1 / 54.3	51.5 / 49.5	53.8 / 51.8	55.9 / 54.1	
	75	18.00	Total Capacity (Btu/h)	61500	64000	66000	61500	64000	67000	62000	64000	67000	
			Sensible Capacity (Btu/h)	30400	28800	26800	34600	33000	31200	39000	37000	35200	
			Electric Power (Watts)	4101	4098	4121	4102	4099	4114	4103	4114	4128	
			Leaving Air Temp (°F db/°F wb)	53.6 / 51.6	55.7 / 53.9	58.2 / 56.2	53.4 / 51.4	55.5 / 53.7	57.8 / 56.0	53.3 / 51.3	55.6 / 53.5	57.9 / 55.8	
	85	18.00	Total Capacity (Btu/h)	59000	61500	63500	59500	61500	64000	59500	62000	64000	
			Sensible Capacity (Btu/h)	29200	27800	25800	33600	31800	30200	37800	36000	34200	
			Electric Power (Watts)	4494	4486	4510	4495	4506	4502	4495	4506	4519	
			Leaving Air Temp (°F db/°F wb)	54.9 / 52.8	56.9 / 55.1	59.4 / 57.4	54.7 / 52.6	57.0 / 54.9	59.1 / 57.2	54.6 / 52.5	56.8 / 54.7	59.2 / 57.0	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
072 (6 TON) CONT'D													
960	50	18.00	Total Capacity (Btu/h)	73000	76000	78000	73000	76000	79000	73000	76000	79000	
			Sensible Capacity (Btu/h)	37200	34800	32200	42500	40500	38000	48000	46000	43000	
			Electric Power (Watts)	3295	3308	3339	3295	3309	3325	3306	3308	3344	
			Leaving Air Temp (°F db/°F wb)	55.2 / 53.8	57.5 / 56.1	60.1 / 58.5	55.0 / 53.7	57.3 / 56.0	59.7 / 58.3	55.1 / 53.5	57.2 / 55.9	59.8 / 58.1	
	60	18.00	Total Capacity (Btu/h)	71000	73000	76000	71000	74000	76000	71000	74000	76000	
			Sensible Capacity (Btu/h)	36200	33800	31400	41500	39500	37000	47000	44500	42000	
			Electric Power (Watts)	3605	3620	3636	3605	3621	3637	3616	3635	3652	
			Leaving Air Temp (°F db/°F wb)	56.1 / 54.7	58.5 / 57.0	60.8 / 59.3	55.9 / 54.6	58.3 / 56.9	60.6 / 59.2	56.0 / 54.5	58.4 / 56.7	60.7 / 59.0	
	75	18.00	Total Capacity (Btu/h)	67000	69000	72000	67000	70000	72000	67000	70000	72000	
			Sensible Capacity (Btu/h)	34600	32200	29800	40000	37800	35400	45000	42500	40500	
			Electric Power (Watts)	4115	4130	4147	4115	4132	4149	4134	4155	4169	
			Leaving Air Temp (°F db/°F wb)	57.6 / 56.2	59.9 / 58.4	62.2 / 60.7	57.4 / 56.1	59.7 / 58.3	62.0 / 60.5	57.6 / 55.9	60.1 / 58.1	62.3 / 60.4	
	85	18.00	Total Capacity (Btu/h)	64000	67000	69000	64500	67000	69000	64500	67000	69000	
			Sensible Capacity (Btu/h)	33600	31200	28800	39000	36800	34400	44000	41500	39500	
			Electric Power (Watts)	4502	4517	4533	4501	4518	4535	4523	4545	4558	
			Leaving Air Temp (°F db/°F wb)	58.6 / 57.2	60.9 / 59.4	63.2 / 61.7	58.4 / 57.1	60.7 / 59.3	63.0 / 61.5	58.7 / 56.9	61.1 / 59.1	63.4 / 61.4	
1200	50	18.00	Total Capacity (Btu/h)	78000	81000	84000	78000	81000	84000	78000	81000	84000	
			Sensible Capacity (Btu/h)	41500	38500	35400	48000	45000	42000	54500	52000	49000	
			Electric Power (Watts)	3337	3353	3371	3339	3356	3375	3340	3358	3377	
			Leaving Air Temp (°F db/°F wb)	59.1 / 57.8	61.4 / 60.1	63.7 / 62.4	59.0 / 57.7	61.3 / 59.9	63.6 / 62.2	58.9 / 57.6	61.2 / 59.8	63.5 / 62.1	
	60	18.00	Total Capacity (Btu/h)	75000	78000	81000	76000	78000	81000	76000	78000	81000	
			Sensible Capacity (Btu/h)	40500	37400	34400	47000	44000	41000	53500	51000	48000	
			Electric Power (Watts)	3643	3660	3678	3645	3663	3682	3647	3664	3684	
			Leaving Air Temp (°F db/°F wb)	59.8 / 58.5	62.1 / 60.8	64.4 / 63.1	59.7 / 58.4	62.0 / 60.7	64.3 / 62.9	59.7 / 58.3	61.9 / 60.6	64.2 / 62.8	
	75	18.00	Total Capacity (Btu/h)	71000	74000	76000	71000	74000	76000	71000	74000	77000	
			Sensible Capacity (Btu/h)	38500	35800	33000	45500	42500	39500	52000	49000	46500	
			Electric Power (Watts)	4150	4167	4178	4152	4170	4189	4153	4172	4191	
			Leaving Air Temp (°F db/°F wb)	61.0 / 59.7	63.3 / 62.0	65.4 / 64.2	60.9 / 59.6	63.2 / 61.8	65.4 / 64.1	60.8 / 59.5	63.1 / 61.7	65.4 / 64.0	
	85	18.00	Total Capacity (Btu/h)	68000	70000	73000	68000	71000	73000	68000	71000	73000	
			Sensible Capacity (Btu/h)	37600	34800	32000	44500	41500	38500	51000	48000	45500	
			Electric Power (Watts)	4536	4552	4562	4538	4555	4574	4540	4557	4575	
			Leaving Air Temp (°F db/°F wb)	61.8 / 60.5	64.1 / 62.8	66.2 / 65.0	61.8 / 60.4	64.0 / 62.7	66.3 / 64.9	61.7 / 60.3	63.9 / 62.6	66.2 / 64.8	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
084 (7 TON)												
875	50	21.00	Total Capacity (Btu/h)	81000	83000	86000	81000	84000	87000	81000	84000	87000
			Sensible Capacity (Btu/h)	39500	37200	34800	44000	42500	40000	49000	47000	45000
			Electric Power (Watts)	4685	4748	4804	4717	4744	4811	4721	4775	4806
			Leaving Air Temp (°F db/°F wb)	49.4 / 47.6	52.0 / 50.0	54.4 / 52.4	49.5 / 47.4	51.6 / 49.7	54.2 / 52.2	49.4 / 47.3	51.8 / 49.6	53.8 / 52.0
	60	21.00	Total Capacity (Btu/h)	78000	81000	84000	78000	81000	84000	79000	81000	84000
			Sensible Capacity (Btu/h)	38500	36200	33800	43000	41000	39000	48000	46000	44000
			Electric Power (Watts)	5017	5052	5102	5022	5069	5108	5027	5074	5124
			Leaving Air Temp (°F db/°F wb)	50.7 / 48.7	53.1 / 51.0	55.5 / 53.4	50.5 / 48.5	52.9 / 50.9	55.3 / 53.2	50.4 / 48.4	52.8 / 50.6	55.2 / 53.0
	75	21.00	Total Capacity (Btu/h)	75000	77000	80000	75000	78000	80000	75000	78000	81000
			Sensible Capacity (Btu/h)	36600	34400	32200	41500	39500	37200	46500	44500	42000
			Electric Power (Watts)	5606	5651	5688	5611	5657	5694	5599	5663	5703
			Leaving Air Temp (°F db/°F wb)	52.4 / 50.3	54.8 / 52.7	57.2 / 55.0	52.2 / 50.1	54.6 / 52.5	57.0 / 54.8	51.9 / 50.0	54.4 / 52.3	56.8 / 54.6
	85	21.00	Total Capacity (Btu/h)	73000	76000	77000	73000	76000	78000	73000	76000	79000
			Sensible Capacity (Btu/h)	36600	33600	32400	41000	38500	36000	46000	43500	41500
			Electric Power (Watts)	6046	6144	6109	6110	6150	6290	6114	6154	6204
			Leaving Air Temp (°F db/°F wb)	52.5 / 51.1	55.5 / 53.4	56.9 / 56.2	53.0 / 50.9	55.3 / 53.2	58.2 / 55.7	52.8 / 50.8	55.2 / 53.0	57.5 / 55.4
1120	50	21.00	Total Capacity (Btu/h)	88000	91000	94000	88000	91000	94000	88000	91000	94000
			Sensible Capacity (Btu/h)	44000	41500	38500	50500	48000	45000	57000	54000	50500
			Electric Power (Watts)	4829	4890	4953	4826	4882	4960	4828	4891	4994
			Leaving Air Temp (°F db/°F wb)	54.6 / 53.0	57.0 / 55.4	59.4 / 57.7	54.4 / 52.8	56.6 / 55.2	59.3 / 57.6	54.2 / 52.7	56.6 / 55.1	59.5 / 57.5
	60	21.00	Total Capacity (Btu/h)	85000	88000	91000	85000	88000	91000	85000	88000	92000
			Sensible Capacity (Btu/h)	43000	40000	37400	49000	46000	43500	55500	52500	51000
			Electric Power (Watts)	5118	5172	5229	5137	5205	5258	5143	5196	5206
			Leaving Air Temp (°F db/°F wb)	55.5 / 53.9	57.9 / 56.2	60.3 / 58.6	55.5 / 53.7	58.0 / 56.1	60.4 / 58.4	55.4 / 53.6	57.7 / 55.9	59.4 / 58.2
	75	21.00	Total Capacity (Btu/h)	81000	84000	87000	81000	84000	87000	81000	84000	87000
			Sensible Capacity (Btu/h)	41500	38500	35600	47500	44000	42000	54000	51000	47500
			Electric Power (Watts)	5690	5738	5787	5708	5797	5793	5714	5758	5852
			Leaving Air Temp (°F db/°F wb)	56.8 / 55.2	59.2 / 57.5	61.6 / 59.9	56.8 / 55.1	59.6 / 57.4	61.4 / 59.7	56.7 / 55.0	59.0 / 57.3	61.9 / 59.6
	85	21.00	Total Capacity (Btu/h)	78000	81000	83000	78000	81000	84000	78000	81000	84000
			Sensible Capacity (Btu/h)	40000	37200	34600	46500	43500	41000	52500	50000	47000
			Electric Power (Watts)	6176	6219	6259	6180	6219	6264	6191	6236	6284
			Leaving Air Temp (°F db/°F wb)	57.9 / 56.2	60.2 / 58.5	62.5 / 60.8	57.8 / 56.1	60.0 / 58.4	62.3 / 60.7	57.8 / 55.9	60.0 / 58.3	62.6 / 60.5

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
					76	78	80	76	78	80	76	78	80
084 (7 TON) CONT'D													
1400	50	21.00	Total Capacity (Btu/h)	93000	97000	100000	94000	97000	100000	94000	97000	100000	
			Sensible Capacity (Btu/h)	48500	46000	42000	58000	54500	51000	65000	60500	59000	
			Electric Power (Watts)	4969	4997	5066	4905	4978	5051	4940	5050	5048	
			Leaving Air Temp (°F db/°F wb)	58.9 / 57.2	60.7 / 59.5	63.1 / 61.8	57.8 / 57.1	60.1 / 59.4	62.5 / 61.7	58.2 / 57.0	61.2 / 59.3	62.2 / 61.6	
	60	21.00	Total Capacity (Btu/h)	91000	94000	97000	91000	94000	97000	91000	94000	97000	
			Sensible Capacity (Btu/h)	48500	45000	40500	56500	53000	49500	63500	59500	56000	
			Electric Power (Watts)	5185	5248	5355	5182	5248	5315	5219	5315	5374	
			Leaving Air Temp (°F db/°F wb)	58.8 / 57.9	61.1 / 60.2	64.2 / 62.5	58.6 / 57.8	60.9 / 60.1	63.3 / 62.4	59.0 / 57.7	61.8 / 60.0	64.1 / 62.3	
	75	21.00	Total Capacity (Btu/h)	86000	89000	92000	86000	89000	92000	86000	89000	92000	
			Sensible Capacity (Btu/h)	45500	43500	40000	55500	50000	48000	61500	58000	55500	
			Electric Power (Watts)	5825	5793	5850	5716	5861	5854	5792	5842	5877	
			Leaving Air Temp (°F db/°F wb)	60.9 / 59.1	62.2 / 61.3	64.6 / 63.6	59.5 / 59.0	63.0 / 61.2	64.4 / 63.5	60.2 / 58.8	62.6 / 61.1	64.6 / 63.4	
	85	21.00	Total Capacity (Btu/h)	83000	85000	88000	83000	85000	89000	83000	86000	88000	
			Sensible Capacity (Btu/h)	44500	41500	38000	53000	49500	45500	60500	57000	53500	
			Electric Power (Watts)	6257	6288	6338	6248	6296	6360	6265	6309	6360	
			Leaving Air Temp (°F db/°F wb)	61.5 / 59.8	63.4 / 62.1	65.8 / 64.4	61.0 / 59.7	63.3 / 62.0	66.1 / 64.2	61.0 / 59.6	63.4 / 61.9	65.7 / 64.2	
096 (8 TON)													
1000	50	24.00	Total Capacity (Btu/h)	90000	93000	97000	91000	94000	97000	91000	94000	97000	
			Sensible Capacity (Btu/h)	44500	41500	39000	50000	47500	45000	55500	53500	50500	
			Electric Power (Watts)	5376	5448	5510	5381	5441	5517	5384	5446	5511	
			Leaving Air Temp (°F db/°F wb)	50.1 / 48.3	52.7 / 50.7	55.1 / 53.1	49.9 / 48.1	52.3 / 50.5	55.0 / 52.9	49.8 / 48.0	52.1 / 50.3	54.6 / 52.7	
	60	24.00	Total Capacity (Btu/h)	88000	91000	94000	88000	91000	95000	88000	91000	95000	
			Sensible Capacity (Btu/h)	43000	40500	38000	49000	46000	43500	54500	51500	49000	
			Electric Power (Watts)	5728	5792	5849	5733	5819	5855	5735	5826	5882	
			Leaving Air Temp (°F db/°F wb)	51.2 / 49.3	53.7 / 51.7	56.1 / 54.0	51.0 / 49.1	53.7 / 51.5	56.0 / 53.9	50.8 / 49.0	53.5 / 51.4	55.9 / 53.7	
	75	24.00	Total Capacity (Btu/h)	84000	87000	90000	84000	87000	90000	84000	87000	90000	
			Sensible Capacity (Btu/h)	41000	38500	36200	47000	44500	42000	52500	50000	47500	
			Electric Power (Watts)	6417	6480	6512	6423	6486	6532	6426	6492	6538	
			Leaving Air Temp (°F db/°F wb)	53.0 / 51.0	55.5 / 53.3	57.8 / 55.7	52.8 / 50.8	55.3 / 53.1	57.7 / 55.5	52.7 / 50.6	55.1 / 53.0	57.5 / 55.3	
	85	24.00	Total Capacity (Btu/h)	81000	84000	87000	81000	84000	87000	81000	84000	87000	
			Sensible Capacity (Btu/h)	40500	37400	34800	46500	43000	40500	52000	48500	46000	
			Electric Power (Watts)	6905	7017	7063	6899	7023	7084	6900	7028	7091	
			Leaving Air Temp (°F db/°F wb)	53.5 / 52.1	56.6 / 54.4	59.0 / 56.8	53.3 / 51.9	56.4 / 54.2	58.8 / 56.6	53.2 / 51.8	56.2 / 54.1	58.7 / 56.4	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
096 (8 TON) CONT'D													
1280	50	24.00	Total Capacity (Btu/h)	98000	102000	105000	99000	102000	106000	99000	102000	106000	
			Sensible Capacity (Btu/h)	49500	46500	43000	57000	54000	50500	64000	61000	58500	
			Electric Power (Watts)	5537	5602	5671	5529	5592	5664	5530	5601	5636	
			Leaving Air Temp (°F db/°F wb)	55.3 / 53.6	57.7 / 56.0	60.1 / 58.3	54.9 / 53.4	57.2 / 55.8	59.6 / 58.1	54.8 / 53.3	57.2 / 55.7	58.9 / 58.0	
	60	24.00	Total Capacity (Btu/h)	95000	99000	102000	96000	99000	102000	96000	99000	103000	
			Sensible Capacity (Btu/h)	48500	45500	42000	55500	53000	50000	63000	59500	57500	
			Electric Power (Watts)	5851	5915	5980	5866	5890	5959	5868	5931	5957	
			Leaving Air Temp (°F db/°F wb)	55.9 / 54.4	58.3 / 56.8	60.7 / 59.1	55.9 / 54.3	57.7 / 56.6	60.1 / 58.9	55.7 / 54.2	58.1 / 56.5	59.8 / 58.8	
	75	24.00	Total Capacity (Btu/h)	91000	94000	97000	91000	94000	97000	91000	94000	98000	
			Sensible Capacity (Btu/h)	46500	43000	40000	53500	50500	46500	61000	57500	54500	
			Electric Power (Watts)	6536	6577	6631	6521	6592	6700	6523	6580	6640	
			Leaving Air Temp (°F db/°F wb)	57.5 / 55.8	59.9 / 58.1	62.2 / 60.4	57.3 / 55.7	59.7 / 57.9	62.6 / 60.3	57.1 / 55.5	59.5 / 57.8	61.9 / 60.1	
	85	24.00	Total Capacity (Btu/h)	87000	90000	93000	87000	91000	94000	88000	91000	94000	
			Sensible Capacity (Btu/h)	45000	41500	38500	52500	49000	45000	59500	56500	53000	
			Electric Power (Watts)	7083	7120	7170	7065	7120	7242	7080	7122	7179	
			Leaving Air Temp (°F db/°F wb)	58.5 / 56.7	60.8 / 59.0	63.2 / 61.3	58.2 / 56.6	60.6 / 58.9	63.5 / 61.2	58.2 / 56.5	60.5 / 58.7	62.8 / 61.0	
1600	50	24.00	Total Capacity (Btu/h)	105000	108000	112000	105000	108000	112000	105000	108000	112000	
			Sensible Capacity (Btu/h)	56000	51500	47500	65000	61500	57500	73000	70000	64000	
			Electric Power (Watts)	5613	5714	5789	5610	5687	5767	5651	5716	5860	
			Leaving Air Temp (°F db/°F wb)	58.4 / 57.7	61.2 / 60.0	63.6 / 62.3	58.2 / 57.6	60.5 / 59.9	62.9 / 62.2	58.7 / 57.5	60.9 / 59.8	64.1 / 62.1	
	60	24.00	Total Capacity (Btu/h)	101000	105000	108000	101000	105000	108000	101000	105000	108000	
			Sensible Capacity (Btu/h)	55000	51000	47000	62000	58000	56000	72000	67000	64500	
			Electric Power (Watts)	5932	6002	6072	6019	6078	6074	5975	6066	6105	
			Leaving Air Temp (°F db/°F wb)	59.2 / 58.4	61.5 / 60.7	63.9 / 63.0	60.1 / 58.3	62.4 / 60.6	63.6 / 62.9	59.5 / 58.2	62.1 / 60.5	64.0 / 62.8	
	75	24.00	Total Capacity (Btu/h)	96000	99000	102000	96000	99000	103000	96000	100000	103000	
			Sensible Capacity (Btu/h)	51000	49000	45000	61000	56000	52500	70000	66000	62500	
			Electric Power (Watts)	6677	6625	6690	6618	6710	6763	6618	6678	6720	
			Leaving Air Temp (°F db/°F wb)	61.4 / 59.5	62.6 / 61.8	65.0 / 64.1	60.8 / 59.4	63.5 / 61.6	65.8 / 63.9	60.6 / 59.2	63.0 / 61.5	65.0 / 63.8	
	85	24.00	Total Capacity (Btu/h)	92000	95000	98000	92000	95000	98000	93000	96000	99000	
			Sensible Capacity (Btu/h)	52000	45500	41500	59500	54500	53500	68000	64000	60500	
			Electric Power (Watts)	7075	7266	7313	7153	7280	7182	7157	7245	7268	
			Leaving Air Temp (°F db/°F wb)	60.9 / 60.3	64.5 / 62.5	66.8 / 64.8	61.6 / 60.1	64.5 / 62.4	65.1 / 64.7	61.4 / 60.0	64.1 / 62.3	66.1 / 64.6	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
120 (10 TON)												
1250	50	30.00	Total Capacity (Btu/h)	122000	126000	132000	122000	127000	132000	122000	127000	132000
			Sensible Capacity (Btu/h)	59500	56500	53500	67000	63500	60500	74000	71000	68000
			Electric Power (Watts)	6004	6008	6022	6008	6020	6026	6010	6022	6038
			Leaving Air Temp (°F db/°F wb)	47.1 / 45.3	49.4 / 47.6	51.9 / 50.0	46.9 / 45.0	49.3 / 47.4	51.6 / 49.8	46.7 / 44.8	49.1 / 47.2	51.5 / 49.5
	60	30.00	Total Capacity (Btu/h)	118000	123000	127000	118000	123000	127000	119000	123000	128000
			Sensible Capacity (Btu/h)	58000	55000	51500	65000	62000	59000	72000	69000	66000
			Electric Power (Watts)	6598	6602	6618	6602	6614	6620	6604	6618	6634
			Leaving Air Temp (°F db/°F wb)	48.4 / 46.5	50.7 / 48.9	53.1 / 51.3	48.2 / 46.3	50.6 / 48.7	52.9 / 51.0	48.0 / 46.1	50.4 / 48.5	52.8 / 50.8
	75	30.00	Total Capacity (Btu/h)	112000	116000	121000	113000	117000	121000	113000	117000	122000
			Sensible Capacity (Btu/h)	55000	52000	49000	62000	59000	56000	69000	66000	63000
			Electric Power (Watts)	7580	7582	7598	7584	7598	7602	7586	7600	7618
			Leaving Air Temp (°F db/°F wb)	50.5 / 48.5	52.7 / 50.9	55.1 / 53.2	50.3 / 48.3	52.6 / 50.6	54.9 / 53.0	50.1 / 48.2	52.5 / 50.4	54.9 / 52.8
	85	30.00	Total Capacity (Btu/h)	108000	112000	116000	108000	112000	117000	109000	113000	117000
			Sensible Capacity (Btu/h)	53000	50000	47000	60000	57000	54000	67000	64000	61000
			Electric Power (Watts)	8334	8330	8346	8338	8350	8348	8338	8352	8368
			Leaving Air Temp (°F db/°F wb)	51.9 / 49.9	54.1 / 52.2	56.5 / 54.5	51.7 / 49.7	54.1 / 52.0	56.2 / 54.3	51.5 / 49.5	53.9 / 51.8	56.3 / 54.1
1600	50	30.00	Total Capacity (Btu/h)	134000	140000	144000	134000	140000	144000	136000	140000	146000
			Sensible Capacity (Btu/h)	67000	63000	59000	76000	72000	68000	85000	81000	77000
			Electric Power (Watts)	6032	6050	6070	6034	6054	6072	6048	6066	6086
			Leaving Air Temp (°F db/°F wb)	52.2 / 50.8	54.7 / 53.1	57.1 / 55.6	52.0 / 50.6	54.4 / 53.0	56.8 / 55.4	52.0 / 50.4	54.4 / 52.8	56.8 / 55.1
	60	30.00	Total Capacity (Btu/h)	130000	134000	140000	130000	136000	140000	130000	136000	140000
			Sensible Capacity (Btu/h)	65000	61500	57000	74000	70000	66000	83000	79000	76000
			Electric Power (Watts)	6628	6646	6668	6640	6660	6670	6642	6662	6674
			Leaving Air Temp (°F db/°F wb)	53.3 / 51.9	55.7 / 54.2	58.1 / 56.6	53.3 / 51.7	55.7 / 54.0	57.9 / 56.4	53.1 / 51.5	55.5 / 53.8	57.7 / 56.2
	75	30.00	Total Capacity (Btu/h)	123000	127000	132000	124000	128000	132000	124000	128000	134000
			Sensible Capacity (Btu/h)	62500	58500	54000	71000	67000	63000	80000	76000	72000
			Electric Power (Watts)	7606	7626	7648	7622	7642	7662	7624	7644	7668
			Leaving Air Temp (°F db/°F wb)	55.0 / 53.5	57.4 / 55.9	59.8 / 58.2	55.0 / 53.3	57.4 / 55.7	59.8 / 58.0	54.8 / 53.2	57.2 / 55.5	59.6 / 57.8
	85	30.00	Total Capacity (Btu/h)	118000	122000	127000	119000	123000	127000	119000	123000	128000
			Sensible Capacity (Btu/h)	60500	56500	52500	69000	65000	61000	78000	74000	70000
			Electric Power (Watts)	8352	8370	8390	8372	8388	8408	8370	8392	8414
			Leaving Air Temp (°F db/°F wb)	56.1 / 54.7	58.5 / 57.0	60.9 / 59.3	56.2 / 54.5	58.6 / 56.8	60.9 / 59.1	56.0 / 54.4	58.4 / 56.6	60.8 / 58.9

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
120 (10 TON) CONT'D													
2000	50	30.00	Total Capacity (Btu/h)	144000	150000	154000	146000	150000	156000	146000	150000	156000	
			Sensible Capacity (Btu/h)	75000	70000	65000	86000	81000	76000	97000	92000	88000	
			Electric Power (Watts)	6072	6092	6116	6076	6098	6120	6084	6100	6126	
			Leaving Air Temp (°F db/°F wb)	56.3 / 55.2	58.7 / 57.5	61.1 / 59.9	56.2 / 55.1	58.6 / 57.4	60.9 / 59.7	56.2 / 54.9	58.4 / 57.2	60.8 / 59.6	
	60	30.00	Total Capacity (Btu/h)	140000	144000	150000	140000	146000	150000	140000	146000	150000	
			Sensible Capacity (Btu/h)	73000	68000	63000	84000	79000	74000	95000	90000	86000	
			Electric Power (Watts)	6668	6690	6714	6672	6694	6718	6684	6698	6724	
			Leaving Air Temp (°F db/°F wb)	57.3 / 56.1	59.6 / 58.4	61.9 / 60.8	57.1 / 56.0	59.5 / 58.3	61.8 / 60.6	57.2 / 55.8	59.3 / 58.1	61.7 / 60.4	
	75	30.00	Total Capacity (Btu/h)	132000	136000	140000	132000	136000	142000	132000	138000	142000	
			Sensible Capacity (Btu/h)	70000	65000	60000	81000	76000	71000	92000	87000	83000	
			Electric Power (Watts)	7646	7668	7692	7650	7672	7698	7662	7676	7702	
			Leaving Air Temp (°F db/°F wb)	58.7 / 57.5	61.0 / 59.8	63.3 / 62.1	58.5 / 57.4	60.8 / 59.6	63.2 / 61.9	58.6 / 57.2	60.7 / 59.5	63.0 / 61.8	
	85	30.00	Total Capacity (Btu/h)	126000	130000	134000	127000	130000	136000	127000	132000	136000	
			Sensible Capacity (Btu/h)	68000	63000	58000	79000	74000	69000	90000	85000	80000	
			Electric Power (Watts)	8388	8408	8432	8392	8414	8438	8406	8418	8442	
			Leaving Air Temp (°F db/°F wb)	59.6 / 58.5	61.9 / 60.7	64.2 / 63.0	59.5 / 58.3	61.8 / 60.6	64.1 / 62.9	59.6 / 58.2	61.7 / 60.5	64.0 / 62.7	
150 (12.5 TON)													
1500	50	36.00	Total Capacity (Btu/h)	142000	148000	154000	144000	148000	154000	144000	148000	154000	
			Sensible Capacity (Btu/h)	70000	66000	62000	78000	75000	71000	87000	83000	79000	
			Electric Power (Watts)	8046	8122	8210	8054	8140	8222	8062	8150	8242	
			Leaving Air Temp (°F db/°F wb)	48.1 / 46.2	50.5 / 48.6	53.0 / 51.1	47.9 / 46.0	50.4 / 48.4	52.7 / 50.8	47.7 / 45.8	50.2 / 48.2	52.7 / 50.6	
	60	36.00	Total Capacity (Btu/h)	138000	144000	148000	140000	144000	150000	140000	144000	150000	
			Sensible Capacity (Btu/h)	68000	64000	60500	76000	73000	69000	85000	81000	77000	
			Electric Power (Watts)	8582	8646	8726	8592	8666	8736	8598	8676	8758	
			Leaving Air Temp (°F db/°F wb)	49.4 / 47.4	51.7 / 49.8	54.2 / 52.2	49.2 / 47.1	51.6 / 49.5	53.9 / 52.0	48.9 / 47.0	51.4 / 49.3	53.8 / 51.7	
	75	36.00	Total Capacity (Btu/h)	132000	136000	142000	132000	138000	142000	132000	138000	142000	
			Sensible Capacity (Btu/h)	65000	61000	57000	73000	69000	66000	82000	78000	74000	
			Electric Power (Watts)	9614	9664	9734	9624	9690	9744	9630	9698	9770	
			Leaving Air Temp (°F db/°F wb)	51.2 / 49.2	53.5 / 51.6	56.0 / 54.0	51.0 / 49.0	53.5 / 51.4	55.8 / 53.8	50.8 / 48.8	53.3 / 51.2	55.8 / 53.5	
	85	36.00	Total Capacity (Btu/h)	127000	132000	136000	128000	132000	138000	128000	132000	138000	
			Sensible Capacity (Btu/h)	62500	58500	55000	71000	67000	63500	80000	76000	72000	
			Electric Power (Watts)	10458	10520	10566	10466	10530	10598	10472	10538	10608	
			Leaving Air Temp (°F db/°F wb)	52.6 / 50.5	55.1 / 52.8	57.3 / 55.3	52.4 / 50.3	54.8 / 52.6	57.3 / 55.0	52.2 / 50.1	54.6 / 52.4	57.1 / 54.8	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
150 (12.5 TON) CONT'D													
1920	50	36.00	Total Capacity (Btu/h)	156000	162000	168000	158000	162000	168000	158000	164000	168000	
			Sensible Capacity (Btu/h)	79000	74000	69000	89000	84000	79000	100000	95000	91000	
			Electric Power (Watts)	8274	8370	8472	8294	8394	8496	8302	8402	8500	
			Leaving Air Temp (°F db/°F wb)	53.2 / 51.8	55.7 / 54.1	58.2 / 56.6	53.2 / 51.6	55.7 / 53.9	58.2 / 56.4	53.0 / 51.4	55.4 / 53.7	57.7 / 56.2	
	60	36.00	Total Capacity (Btu/h)	152000	158000	162000	152000	158000	164000	152000	158000	164000	
			Sensible Capacity (Btu/h)	76000	72000	66000	87000	82000	77000	98000	93000	89000	
			Electric Power (Watts)	8776	8862	8952	8798	8886	8976	8804	8894	8978	
			Leaving Air Temp (°F db/°F wb)	54.2 / 52.7	56.6 / 55.1	59.1 / 57.5	54.2 / 52.5	56.7 / 54.9	59.2 / 57.3	54.0 / 52.4	56.4 / 54.7	58.7 / 57.2	
	75	36.00	Total Capacity (Btu/h)	144000	148000	154000	144000	150000	154000	144000	150000	154000	
			Sensible Capacity (Btu/h)	73000	68000	63500	84000	79000	74000	95000	90000	85000	
			Electric Power (Watts)	9786	9858	9922	9796	9872	9950	9798	9878	9954	
			Leaving Air Temp (°F db/°F wb)	56 / 54.2	58.4 / 56.6	60.6 / 59.0	55.8 / 54.0	58.3 / 56.4	60.7 / 58.8	55.6 / 53.9	58.0 / 56.3	60.4 / 58.6	
	85	36.00	Total Capacity (Btu/h)	138000	144000	148000	140000	144000	148000	140000	144000	148000	
			Sensible Capacity (Btu/h)	70000	65000	60500	81000	76000	71000	92000	87000	83000	
			Electric Power (Watts)	10616	10684	10754	10626	10698	10770	10626	10702	10772	
			Leaving Air Temp (°F db/°F wb)	57.1 / 55.3	59.5 / 57.7	61.9 / 60.0	56.9 / 55.1	59.4 / 57.5	61.8 / 59.8	56.7 / 55.0	59.1 / 57.3	61.4 / 59.7	
2400	50	36.00	Total Capacity (Btu/h)	168000	174000	178000	168000	174000	180000	168000	174000	180000	
			Sensible Capacity (Btu/h)	87000	81000	74000	101000	94000	88000	114000	108000	102000	
			Electric Power (Watts)	8488	8592	8702	8492	8610	8720	8510	8618	8736	
			Leaving Air Temp (°F db/°F wb)	57.5 / 56.1	59.9 / 58.4	62.4 / 60.8	57.2 / 55.9	59.8 / 58.3	62.2 / 60.7	57.3 / 55.8	59.7 / 58.1	62 / 60.5	
	60	36.00	Total Capacity (Btu/h)	162000	168000	172000	162000	168000	174000	164000	168000	174000	
			Sensible Capacity (Btu/h)	85000	78000	72000	99000	92000	86000	112000	106000	100000	
			Electric Power (Watts)	8964	9056	9154	8966	9072	9170	8982	9082	9186	
			Leaving Air Temp (°F db/°F wb)	58.4 / 56.9	60.8 / 59.2	63.2 / 61.6	58.0 / 56.8	60.6 / 59.1	63.0 / 61.4	58.1 / 56.6	60.5 / 58.9	62.9 / 61.3	
	75	36.00	Total Capacity (Btu/h)	154000	158000	164000	154000	160000	164000	154000	160000	164000	
			Sensible Capacity (Btu/h)	81000	75000	69000	95000	89000	82000	106000	102000	96000	
			Electric Power (Watts)	9930	10008	10092	9926	10024	10108	9946	10032	10122	
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.2	62.1 / 60.5	64.4 / 62.8	59.3 / 58.0	61.9 / 60.3	64.3 / 62.7	60.0 / 57.9	61.8 / 60.2	64.1 / 62.5	
	85	36.00	Total Capacity (Btu/h)	148000	152000	156000	148000	152000	158000	148000	152000	158000	
			Sensible Capacity (Btu/h)	79000	73000	66000	92000	86000	80000	104000	100000	94000	
			Electric Power (Watts)	10746	10818	10896	10758	10834	10912	10760	10842	10924	
			Leaving Air Temp (°F db/°F wb)	60.6 / 59.0	63.0 / 61.4	65.3 / 63.7	60.5 / 58.9	62.8 / 61.2	65.2 / 63.5	61.0 / 58.8	62.7 / 61.1	65.0 / 63.4	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
180 (15 TON)												
1875	50	45.00	Total Capacity (Btu/h)	170000	176000	182000	170000	176000	182000	170000	178000	184000
			Sensible Capacity (Btu/h)	84000	79000	74000	94000	89000	85000	105000	100000	95000
			Electric Power (Watts)	9394	9496	9606	9424	9526	9620	9432	9538	9648
			Leaving Air Temp (°F db/°F wb)	49.9 / 48.2	52.4 / 50.6	54.9 / 53.0	49.9 / 48.0	52.3 / 50.3	54.7 / 52.8	49.7 / 47.8	52.1 / 50.1	54.6 / 52.5
	60	45.00	Total Capacity (Btu/h)	164000	170000	176000	166000	172000	178000	166000	172000	178000
			Sensible Capacity (Btu/h)	81000	77000	72000	92000	87000	82000	102000	98000	93000
			Electric Power (Watts)	9974	10066	10162	10014	10102	10176	10022	10112	10210
			Leaving Air Temp (°F db/°F wb)	51.0 / 49.3	53.5 / 51.7	56.0 / 54.1	51 / 49.1	53.4 / 51.4	55.7 / 53.9	50.8 / 48.9	53.2 / 51.3	55.7 / 53.6
	75	45.00	Total Capacity (Btu/h)	156000	162000	168000	158000	162000	168000	158000	164000	170000
			Sensible Capacity (Btu/h)	77000	73000	68000	88000	83000	78000	98000	94000	89000
			Electric Power (Watts)	11182	11230	11308	11190	11264	11372	11194	11272	11352
			Leaving Air Temp (°F db/°F wb)	53.0 / 51.0	55.2 / 53.4	57.6 / 55.8	52.8 / 50.8	55.3 / 53.2	57.9 / 55.6	52.6 / 50.6	55.1 / 53.0	57.5 / 55.4
	85	45.00	Total Capacity (Btu/h)	150000	156000	162000	152000	156000	162000	152000	158000	162000
			Sensible Capacity (Btu/h)	74000	71000	66000	86000	80000	77000	97000	91000	86000
			Electric Power (Watts)	12292	12148	12218	12082	12240	12226	12094	12246	12320
			Leaving Air Temp (°F db/°F wb)	54.7 / 52.3	56.2 / 54.6	58.7 / 57.0	53.7 / 52.1	56.5 / 54.4	58.4 / 56.8	53.5 / 51.9	56.3 / 54.2	58.8 / 56.6
2400	50	45.00	Total Capacity (Btu/h)	186000	192000	198000	186000	192000	198000	186000	192000	200000
			Sensible Capacity (Btu/h)	94000	88000	81000	107000	101000	94000	121000	115000	108000
			Electric Power (Watts)	9666	9780	9904	9700	9816	9936	9702	9824	9956
			Leaving Air Temp (°F db/°F wb)	54.9 / 53.4	57.3 / 55.9	59.7 / 58.2	55.0 / 53.2	57.4 / 55.6	59.8 / 58.0	54.7 / 53.1	57.0 / 55.5	59.7 / 57.8
	60	45.00	Total Capacity (Btu/h)	180000	186000	192000	180000	186000	192000	180000	186000	194000
			Sensible Capacity (Btu/h)	91000	85000	79000	104000	98000	92000	118000	112000	106000
			Electric Power (Watts)	10232	10308	10416	10248	10348	10452	10246	10354	10472
			Leaving Air Temp (°F db/°F wb)	56.1 / 54.3	58.2 / 56.8	60.6 / 59.1	55.9 / 54.1	58.3 / 56.5	60.8 / 58.9	55.6 / 54.0	58.0 / 56.4	60.6 / 58.7
	75	45.00	Total Capacity (Btu/h)	170000	176000	182000	170000	176000	182000	170000	176000	182000
			Sensible Capacity (Btu/h)	88000	82000	75000	101000	94000	88000	114000	108000	102000
			Electric Power (Watts)	11282	11398	11490	11368	11464	11544	11372	11458	11538
			Leaving Air Temp (°F db/°F wb)	56.9 / 55.8	59.6 / 58.2	62.0 / 60.5	57.3 / 55.6	59.9 / 57.9	62.2 / 60.3	57.2 / 55.5	59.5 / 57.8	61.8 / 60.2
	85	45.00	Total Capacity (Btu/h)	162000	168000	174000	164000	168000	174000	164000	170000	176000
			Sensible Capacity (Btu/h)	86000	80000	74000	98000	93000	87000	111000	105000	99000
			Electric Power (Watts)	12234	12306	12386	12330	12316	12396	12330	12408	12496
			Leaving Air Temp (°F db/°F wb)	58 / 56.8	60.3 / 59.2	62.6 / 61.5	58.4 / 56.6	60.1 / 59.0	62.4 / 61.3	58.3 / 56.5	60.5 / 58.8	63.0 / 61.1

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
180 (15 TON) CONT'D												
3000	50	45.00	Total Capacity (Btu/h)	198000	204000	210000	198000	204000	212000	198000	206000	212000
			Sensible Capacity (Btu/h)	104000	96000	88000	121000	113000	106000	134000	130000	123000
			Electric Power (Watts)	9910	10032	10164	9928	10056	10188	9940	10070	10206
			Leaving Air Temp (°F db/°F wb)	58.9 / 57.5	61.3 / 59.9	63.7 / 62.2	58.8 / 57.3	61.2 / 59.7	63.6 / 62.1	59.4 / 57.2	61.0 / 59.5	63.4 / 61.9
	60	45.00	Total Capacity (Btu/h)	190000	196000	204000	192000	198000	204000	192000	198000	204000
			Sensible Capacity (Btu/h)	101000	94000	86000	118000	111000	103000	132000	125000	120000
			Electric Power (Watts)	10422	10528	10642	10438	10548	10664	10446	10562	10682
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.3	62.1 / 60.6	64.5 / 63.0	59.6 / 58.1	61.9 / 60.4	64.3 / 62.8	60.3 / 58.0	62.4 / 60.3	64.2 / 62.6
	75	45.00	Total Capacity (Btu/h)	180000	186000	192000	180000	186000	192000	182000	188000	194000
			Sensible Capacity (Btu/h)	97000	89000	82000	114000	107000	99000	128000	121000	116000
			Electric Power (Watts)	11508	11592	11690	11520	11612	11704	11526	11622	11720
			Leaving Air Temp (°F db/°F wb)	61.0 / 59.5	63.3 / 61.8	65.7 / 64.1	60.8 / 59.3	63.2 / 61.6	65.5 / 63.9	61.6 / 59.2	63.7 / 61.5	65.4 / 63.8
	85	45.00	Total Capacity (Btu/h)	172000	178000	184000	174000	178000	184000	174000	180000	186000
			Sensible Capacity (Btu/h)	96000	87000	79000	111000	104000	96000	125000	119000	113000
			Electric Power (Watts)	12360	12524	12614	12462	12542	12624	12458	12556	12638
			Leaving Air Temp (°F db/°F wb)	61.1 / 60.3	64.2 / 62.6	66.6 / 64.9	61.7 / 60.1	64.0 / 62.4	66.4 / 64.7	62.5 / 60.0	64.4 / 62.2	66.2 / 64.6
210 (17.5 TON)												
2187.5	50	52.50	Total Capacity (Btu/h)	204000	210000	218000	204000	212000	218000	204000	212000	220000
			Sensible Capacity (Btu/h)	100000	94000	89000	112000	107000	101000	124000	119000	113000
			Electric Power (Watts)	11000	11038	11092	11010	11064	11102	11018	11072	11128
			Leaving Air Temp (°F db/°F wb)	49.1 / 47.2	51.5 / 49.6	53.9 / 52.0	48.9 / 47.0	51.3 / 49.3	53.6 / 51.8	48.7 / 46.8	51.1 / 49.1	53.6 / 51.5
	60	52.50	Total Capacity (Btu/h)	198000	204000	212000	198000	206000	212000	198000	206000	214000
			Sensible Capacity (Btu/h)	97000	91000	86000	109000	104000	98000	122000	116000	110000
			Electric Power (Watts)	11928	11960	12014	11938	11988	12022	11944	11996	12050
			Leaving Air Temp (°F db/°F wb)	50.3 / 48.4	52.6 / 50.8	55.1 / 53.1	50.1 / 48.1	52.5 / 50.5	54.8 / 52.9	49.9 / 47.9	52.3 / 50.2	54.8 / 52.7
	75	52.50	Total Capacity (Btu/h)	188000	194000	202000	188000	196000	202000	188000	196000	202000
			Sensible Capacity (Btu/h)	92000	87000	81000	105000	99000	94000	117000	112000	106000
			Electric Power (Watts)	13508	13532	13580	13518	13564	13588	13524	13572	13622
			Leaving Air Temp (°F db/°F wb)	52.2 / 50.1	54.4 / 52.5	56.8 / 54.9	52.0 / 49.9	54.3 / 52.3	56.6 / 54.7	51.8 / 49.7	54.1 / 52.0	56.6 / 54.4
	85	52.50	Total Capacity (Btu/h)	180000	188000	194000	182000	188000	194000	182000	188000	196000
			Sensible Capacity (Btu/h)	89000	83000	78000	102000	96000	90000	114000	108000	103000
			Electric Power (Watts)	14726	14770	14786	14734	14780	14820	14740	14786	14834
			Leaving Air Temp (°F db/°F wb)	53.5 / 51.4	55.9 / 53.7	58.0 / 56.1	53.2 / 51.2	55.7 / 53.5	58.0 / 55.9	53.0 / 51.0	55.4 / 53.3	57.9 / 55.7

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
210 (17.5 TON) CONT'D													
2800	50	52.50	Total Capacity (Btu/h)	222000	230000	238000	224000	232000	240000	224000	232000	240000	
			Sensible Capacity (Btu/h)	112000	105000	98000	128000	121000	113000	144000	136000	129000	
			Electric Power (Watts)	11128	11182	11242	11154	11208	11264	11160	11218	11278	
			Leaving Air Temp (°F db/°F wb)	54.0 / 52.5	56.4 / 54.9	58.9 / 57.3	54.0 / 52.3	56.4 / 54.7	58.8 / 57.1	53.8 / 52.2	56.2 / 54.5	58.7 / 56.9	
	60	52.50	Total Capacity (Btu/h)	216000	224000	230000	216000	224000	232000	218000	226000	232000	
			Sensible Capacity (Btu/h)	109000	102000	95000	125000	118000	110000	140000	134000	126000	
			Electric Power (Watts)	12056	12094	12148	12070	12122	12174	12074	12130	12188	
			Leaving Air Temp (°F db/°F wb)	55.1 / 53.5	57.4 / 55.9	59.8 / 58.2	55.0 / 53.3	57.3 / 55.6	59.8 / 58.0	54.8 / 53.1	57.2 / 55.5	59.6 / 57.8	
	75	52.50	Total Capacity (Btu/h)	204000	212000	218000	206000	212000	220000	206000	214000	220000	
			Sensible Capacity (Btu/h)	104000	97000	90000	120000	113000	106000	136000	129000	122000	
			Electric Power (Watts)	13624	13670	13718	13634	13684	13732	13636	13690	13732	
			Leaving Air Temp (°F db/°F wb)	56.7 / 55.0	59.1 / 57.3	61.5 / 59.7	56.5 / 54.8	58.9 / 57.1	61.3 / 59.5	56.3 / 54.6	58.7 / 56.9	61.0 / 59.3	
	85	52.50	Total Capacity (Btu/h)	196000	204000	210000	198000	204000	212000	198000	204000	212000	
			Sensible Capacity (Btu/h)	100000	93000	86000	116000	109000	102000	132000	125000	119000	
			Electric Power (Watts)	14832	14874	14920	14842	14890	14934	14842	14896	14930	
			Leaving Air Temp (°F db/°F wb)	57.8 / 56.0	60.2 / 58.3	62.5 / 60.7	57.6 / 55.8	60.0 / 58.1	62.4 / 60.5	57.4 / 55.7	59.8 / 58.0	62.0 / 60.3	
3500	50	52.50	Total Capacity (Btu/h)	238000	246000	254000	240000	248000	256000	240000	248000	256000	
			Sensible Capacity (Btu/h)	124000	115000	106000	144000	136000	126000	162000	156000	146000	
			Electric Power (Watts)	11258	11314	11370	11260	11328	11384	11270	11324	11394	
			Leaving Air Temp (°F db/°F wb)	58.1 / 56.7	60.5 / 59.0	62.9 / 61.4	57.8 / 56.5	60.3 / 58.8	62.7 / 61.2	58.5 / 56.4	60.0 / 58.7	62.5 / 61.0	
	60	52.50	Total Capacity (Btu/h)	230000	238000	246000	232000	240000	248000	232000	240000	248000	
			Sensible Capacity (Btu/h)	121000	112000	103000	142000	132000	123000	158000	150000	144000	
			Electric Power (Watts)	12164	12216	12270	12164	12228	12282	12174	12224	12294	
			Leaving Air Temp (°F db/°F wb)	58.9 / 57.5	61.3 / 59.8	63.7 / 62.1	58.6 / 57.3	61.1 / 59.6	63.5 / 62.0	59.4 / 57.2	61.4 / 59.5	63.3 / 61.8	
	75	52.50	Total Capacity (Btu/h)	218000	226000	232000	218000	226000	234000	220000	226000	234000	
			Sensible Capacity (Btu/h)	116000	107000	98000	138000	127000	118000	152000	144000	138000	
			Electric Power (Watts)	13718	13764	13814	13702	13776	13826	13724	13786	13838	
			Leaving Air Temp (°F db/°F wb)	60.2 / 58.7	62.6 / 61.0	64.9 / 63.4	59.8 / 58.6	62.4 / 60.8	64.8 / 63.2	60.7 / 58.5	63.0 / 60.7	64.6 / 63	
	85	52.50	Total Capacity (Btu/h)	208000	216000	222000	210000	216000	224000	210000	218000	224000	
			Sensible Capacity (Btu/h)	113000	104000	95000	132000	124000	115000	148000	142000	134000	
			Electric Power (Watts)	14902	14962	15008	14926	14974	15020	14924	14964	15032	
			Leaving Air Temp (°F db/°F wb)	60.9 / 59.6	63.5 / 61.9	65.8 / 64.2	61.0 / 59.4	63.3 / 61.7	65.6 / 64.0	61.7 / 59.3	63.8 / 61.6	65.5 / 63.9	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
					76	78	80	76	78	80	76	78	80
240 (20 TON)													
2500	50	60.00	Total Capacity (Btu/h)	230000	238000	246000	232000	240000	248000	232000	240000	248000	
			Sensible Capacity (Btu/h)	113000	107000	100000	127000	121000	115000	142000	134000	129000	
			Electric Power (Watts)	12176	12218	12296	12190	12260	12308	12198	12272	12352	
			Leaving Air Temp (°F db/°F wb)	49.5 / 47.5	51.8 / 50.0	54.3 / 52.4	49.2 / 47.3	51.7 / 49.7	54.0 / 52.2	49.1 / 47.1	51.5 / 49.5	53.9 / 51.9	
	60	60.00	Total Capacity (Btu/h)	224000	232000	240000	224000	232000	240000	224000	234000	242000	
			Sensible Capacity (Btu/h)	110000	104000	97000	124000	117000	111000	138000	132000	125000	
			Electric Power (Watts)	13344	13378	13452	13356	13424	13466	13366	13436	13512	
			Leaving Air Temp (°F db/°F wb)	50.6 / 48.7	52.9 / 51.1	55.4 / 53.5	50.4 / 48.5	52.9 / 50.8	55.1 / 53.3	50.2 / 48.3	52.7 / 50.6	55.1 / 53.0	
	75	60.00	Total Capacity (Btu/h)	212000	220000	228000	214000	220000	228000	214000	222000	230000	
			Sensible Capacity (Btu/h)	104000	98000	92000	119000	112000	106000	132000	127000	120000	
			Electric Power (Watts)	15278	15336	15364	15290	15350	15414	15296	15360	15430	
			Leaving Air Temp (°F db/°F wb)	52.5 / 50.4	55.0 / 52.8	57.1 / 55.3	52.3 / 50.2	54.7 / 52.6	57.2 / 55.0	52.1 / 50.0	54.5 / 52.4	56.9 / 54.8	
	85	60.00	Total Capacity (Btu/h)	204000	212000	218000	206000	212000	220000	206000	214000	222000	
			Sensible Capacity (Btu/h)	101000	94000	89000	115000	109000	102000	129000	123000	117000	
			Electric Power (Watts)	16752	16804	16808	16760	16816	16876	16764	16824	16886	
			Leaving Air Temp (°F db/°F wb)	53.8 / 51.7	56.3 / 54.0	58.3 / 56.5	53.6 / 51.5	56.0 / 53.8	58.5 / 56.2	53.3 / 51.3	55.8 / 53.6	58.2 / 56.0	
3200	50	60.00	Total Capacity (Btu/h)	252000	260000	268000	254000	262000	270000	254000	262000	272000	
			Sensible Capacity (Btu/h)	126000	118000	110000	144000	136000	128000	162000	154000	146000	
			Electric Power (Watts)	12374	12458	12554	12390	12480	12574	12398	12492	12598	
			Leaving Air Temp (°F db/°F wb)	54.6 / 52.9	57.0 / 55.3	59.5 / 57.7	54.3 / 52.7	56.8 / 55.1	59.3 / 57.5	54.2 / 52.5	56.5 / 54.9	59.1 / 57.3	
	60	60.00	Total Capacity (Btu/h)	244000	252000	260000	246000	254000	262000	246000	254000	262000	
			Sensible Capacity (Btu/h)	123000	114000	106000	142000	132000	125000	160000	152000	144000	
			Electric Power (Watts)	13526	13606	13694	13542	13628	13714	13548	13636	13718	
			Leaving Air Temp (°F db/°F wb)	55.5 / 53.8	58.0 / 56.2	60.4 / 58.6	55.3 / 53.6	57.8 / 56.0	60.2 / 58.4	55.1 / 53.5	57.5 / 55.8	59.9 / 58.2	
	75	60.00	Total Capacity (Btu/h)	232000	238000	246000	232000	240000	248000	232000	240000	248000	
			Sensible Capacity (Btu/h)	117000	109000	101000	136000	128000	119000	152000	146000	138000	
			Electric Power (Watts)	15434	15504	15582	15448	15504	15604	15448	15530	15598	
			Leaving Air Temp (°F db/°F wb)	57.0 / 55.3	59.5 / 57.6	61.9 / 60.0	56.8 / 55.1	59.1 / 57.5	61.7 / 59.8	57.2 / 55.0	59.0 / 57.3	61.3 / 59.6	
	85	60.00	Total Capacity (Btu/h)	222000	230000	236000	224000	230000	238000	224000	232000	238000	
			Sensible Capacity (Btu/h)	113000	105000	97000	132000	125000	116000	148000	142000	134000	
			Electric Power (Watts)	16886	16946	17016	16898	16938	17012	16894	16970	17024	
			Leaving Air Temp (°F db/°F wb)	58.2 / 56.3	60.5 / 58.6	62.9 / 61.0	57.9 / 56.1	60.1 / 58.5	62.5 / 60.8	58.4 / 56.0	60.1 / 58.3	62.3 / 60.6	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
240 (20 TON) CONT'D													
4000	50	60.00	Total Capacity (Btu/h)	270000	278000	286000	270000	278000	288000	270000	280000	288000	
			Sensible Capacity (Btu/h)	140000	130000	120000	164000	154000	142000	182000	172000	166000	
			Electric Power (Watts)	12562	12660	12766	12562	12664	12786	12578	12692	12808	
			Leaving Air Temp (°F db/°F wb)	58.5 / 57.0	60.9 / 59.4	63.3 / 61.7	58.2 / 56.9	60.5 / 59.2	63.1 / 61.6	59.0 / 56.7	61.2 / 59.0	62.9 / 61.4	
	60	60.00	Total Capacity (Btu/h)	260000	268000	276000	260000	270000	278000	262000	270000	280000	
			Sensible Capacity (Btu/h)	138000	127000	116000	160000	150000	140000	178000	168000	162000	
			Electric Power (Watts)	13680	13788	13888	13694	13808	13910	13716	13824	13932	
			Leaving Air Temp (°F db/°F wb)	59.1 / 57.8	61.7 / 60.1	64.1 / 62.5	58.9 / 57.6	61.5 / 59.9	63.9 / 62.3	59.9 / 57.5	62.1 / 59.8	63.7 / 62.1	
	75	60.00	Total Capacity (Btu/h)	246000	254000	262000	246000	254000	262000	248000	256000	264000	
			Sensible Capacity (Btu/h)	132000	122000	111000	152000	144000	134000	172000	164000	154000	
			Electric Power (Watts)	15558	15640	15748	15586	15678	15768	15594	15674	15770	
			Leaving Air Temp (°F db/°F wb)	60.4 / 59.0	62.7 / 61.4	65.3 / 63.7	61.0 / 58.8	62.7 / 61.1	65.1 / 63.5	61.3 / 58.7	63.3 / 61.0	65.4 / 63.4	
	85	60.00	Total Capacity (Btu/h)	236000	242000	250000	238000	244000	252000	236000	246000	252000	
			Sensible Capacity (Btu/h)	128000	118000	108000	148000	142000	132000	168000	160000	150000	
			Electric Power (Watts)	16980	17058	17138	17016	17076	17160	17018	17094	17176	
			Leaving Air Temp (°F db/°F wb)	61.2 / 59.9	63.5 / 62.2	65.9 / 64.5	61.6 / 59.6	63.4 / 62.0	65.7 / 64.3	62.2 / 59.6	63.9 / 61.8	66.3 / 64.2	
300 (25 TON)													
3125	50	75.00	Total Capacity (Btu/h)	282000	290000	300000	282000	292000	302000	284000	292000	304000	
			Sensible Capacity (Btu/h)	138000	130000	122000	156000	148000	140000	174000	166000	158000	
			Electric Power (Watts)	14200	14120	14078	14190	14162	14108	14194	14164	14120	
			Leaving Air Temp (°F db/°F wb)	50.4 / 48.5	52.7 / 50.9	55.3 / 53.4	50.2 / 48.2	52.7 / 50.6	55.2 / 53.1	50.0 / 48.0	52.5 / 50.4	55.0 / 52.9	
	60	75.00	Total Capacity (Btu/h)	272000	282000	290000	274000	282000	292000	274000	284000	294000	
			Sensible Capacity (Btu/h)	134000	125000	118000	152000	144000	134000	170000	162000	152000	
			Electric Power (Watts)	15830	15808	15768	15834	15824	15802	15838	15830	15816	
			Leaving Air Temp (°F db/°F wb)	51.7 / 49.6	54.1 / 52.1	56.4 / 54.5	51.4 / 49.4	53.9 / 51.8	56.4 / 54.2	51.2 / 49.2	53.7 / 51.6	56.2 / 54.0	
	75	75.00	Total Capacity (Btu/h)	258000	266000	276000	258000	268000	276000	260000	268000	278000	
			Sensible Capacity (Btu/h)	127000	119000	110000	144000	136000	128000	162000	154000	146000	
			Electric Power (Watts)	18276	18286	18306	18284	18306	18318	18288	18312	18334	
			Leaving Air Temp (°F db/°F wb)	53.6 / 51.5	56.0 / 53.9	58.5 / 56.3	53.4 / 51.3	55.8 / 53.6	58.2 / 56.0	53.2 / 51.1	55.6 / 53.4	58.0 / 55.8	
	85	75.00	Total Capacity (Btu/h)	248000	256000	264000	248000	258000	266000	250000	258000	268000	
			Sensible Capacity (Btu/h)	122000	114000	106000	140000	132000	124000	158000	150000	142000	
			Electric Power (Watts)	20010	20032	20064	20018	20052	20078	20018	20056	20094	
			Leaving Air Temp (°F db/°F wb)	54.9 / 52.7	57.3 / 55.1	59.8 / 57.5	54.7 / 52.5	57.1 / 54.9	59.6 / 57.2	54.5 / 52.3	56.9 / 54.6	59.3 / 57.0	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
300 (25 TON) CONT'D													
4000	50	75.00	Total Capacity (Btu/h)	306000	316000	326000	308000	318000	328000	308000	318000	330000	
			Sensible Capacity (Btu/h)	154000	144000	134000	176000	166000	156000	198000	190000	180000	
			Electric Power (Watts)	14084	14040	13988	14094	14040	13990	14092	14044	13970	
			Leaving Air Temp (°F db/°F wb)	55.4 / 53.7	57.9 / 56.1	60.3 / 58.5	55.2 / 53.5	57.6 / 55.9	60.1 / 58.3	55.6 / 53.3	57.4 / 55.7	59.8 / 58.1	
	60	75.00	Total Capacity (Btu/h)	296000	306000	316000	298000	306000	316000	298000	308000	318000	
			Sensible Capacity (Btu/h)	150000	140000	129000	172000	162000	152000	192000	184000	176000	
			Electric Power (Watts)	15794	15780	15762	15806	15786	15768	15804	15790	15750	
			Leaving Air Temp (°F db/°F wb)	56.4 / 54.6	58.9 / 57.1	61.3 / 59.4	56.2 / 54.4	58.7 / 56.8	61.1 / 59.2	56.6 / 54.3	58.4 / 56.6	60.7 / 59.1	
	75	75.00	Total Capacity (Btu/h)	278000	288000	298000	280000	290000	298000	280000	290000	300000	
			Sensible Capacity (Btu/h)	144000	132000	122000	166000	156000	146000	186000	178000	168000	
			Electric Power (Watts)	18298	18338	18358	18334	18324	18346	18332	18356	18368	
			Leaving Air Temp (°F db/°F wb)	57.8 / 56.2	60.4 / 58.5	62.8 / 60.9	57.7 / 55.9	60.0 / 58.3	62.4 / 60.7	58.3 / 55.8	60.0 / 58.1	62.3 / 60.5	
	85	75.00	Total Capacity (Btu/h)	268000	276000	284000	268000	278000	286000	270000	278000	288000	
			Sensible Capacity (Btu/h)	138000	129000	118000	160000	152000	142000	180000	174000	164000	
			Electric Power (Watts)	20050	20086	20122	20094	20092	20130	20088	20132	20160	
			Leaving Air Temp (°F db/°F wb)	58.8 / 57.2	61.2 / 59.5	63.6 / 61.9	58.8 / 57.0	61.0 / 59.3	63.4 / 61.7	59.4 / 56.9	61.0 / 59.1	63.3 / 61.5	
5000	50	75.00	Total Capacity (Btu/h)	326000	336000	346000	328000	338000	348000	328000	340000	350000	
			Sensible Capacity (Btu/h)	172000	158000	146000	198000	188000	176000	222000	212000	204000	
			Electric Power (Watts)	13974	13944	13890	13968	13918	13866	13990	13934	13876	
			Leaving Air Temp (°F db/°F wb)	59.1 / 57.7	61.6 / 60.1	64.0 / 62.5	59.5 / 57.6	61.3 / 59.9	63.7 / 62.3	59.9 / 57.4	62.1 / 59.7	63.6 / 62.1	
	60	75.00	Total Capacity (Btu/h)	314000	324000	334000	316000	326000	336000	316000	328000	338000	
			Sensible Capacity (Btu/h)	168000	156000	142000	192000	184000	170000	218000	208000	196000	
			Electric Power (Watts)	15746	15730	15708	15764	15728	15728	15766	15732	15712	
			Leaving Air Temp (°F db/°F wb)	59.9 / 58.5	62.2 / 60.9	64.6 / 63.2	60.5 / 58.3	62.0 / 60.7	64.6 / 63.0	60.8 / 58.2	62.6 / 60.4	64.9 / 62.9	
	75	75.00	Total Capacity (Btu/h)	296000	304000	314000	298000	308000	316000	298000	310000	320000	
			Sensible Capacity (Btu/h)	162000	148000	136000	186000	178000	164000	210000	200000	188000	
			Electric Power (Watts)	18332	18350	18370	18344	18352	18378	18362	18372	18408	
			Leaving Air Temp (°F db/°F wb)	61.1 / 59.8	63.4 / 62.1	65.8 / 64.4	61.5 / 59.5	63.0 / 61.8	65.6 / 64.2	62.2 / 59.5	63.9 / 61.6	66.2 / 63.9	
	85	75.00	Total Capacity (Btu/h)	284000	292000	300000	286000	296000	304000	284000	296000	306000	
			Sensible Capacity (Btu/h)	156000	142000	132000	182000	174000	160000	204000	196000	184000	
			Electric Power (Watts)	20130	20162	20176	20130	20166	20200	20150	20172	20210	
			Leaving Air Temp (°F db/°F wb)	62.1 / 60.6	64.4 / 62.9	66.6 / 65.2	62.4 / 60.3	64.0 / 62.6	66.3 / 64.9	63.1 / 60.3	64.8 / 62.5	66.9 / 64.8	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
360 (30 TON)												
3750	50	90.00	Total Capacity (Btu/h)	330000	342000	352000	332000	342000	354000	332000	344000	356000
			Sensible Capacity (Btu/h)	162000	152000	142000	184000	174000	164000	204000	194000	186000
			Electric Power (Watts)	15876	15824	15764	15936	15818	15760	15936	15878	15814
			Leaving Air Temp (°F db/°F wb)	51.1 / 49.3	53.5 / 51.7	56.0 / 54.1	51.0 / 49.0	53.3 / 51.5	55.8 / 53.9	50.8 / 48.9	53.3 / 51.2	55.8 / 53.6
	60	90.00	Total Capacity (Btu/h)	320000	330000	342000	320000	332000	342000	322000	332000	344000
			Sensible Capacity (Btu/h)	158000	148000	138000	178000	170000	160000	200000	190000	180000
			Electric Power (Watts)	17774	17758	17738	17838	17756	17736	17838	17820	17796
			Leaving Air Temp (°F db/°F wb)	52.2 / 50.4	54.7 / 52.8	57.1 / 55.3	52.2 / 50.2	54.4 / 52.6	56.9 / 55.0	52.1 / 50.0	54.5 / 52.4	57.0 / 54.8
	75	90.00	Total Capacity (Btu/h)	302000	312000	324000	304000	314000	324000	304000	316000	326000
			Sensible Capacity (Btu/h)	150000	140000	132000	170000	160000	152000	192000	182000	172000
			Electric Power (Watts)	20574	20598	20622	20658	20676	20694	20658	20682	20708
			Leaving Air Temp (°F db/°F wb)	54.0 / 52.2	56.4 / 54.5	58.8 / 57.0	54.1 / 52.0	56.5 / 54.3	59.0 / 56.7	53.9 / 51.8	56.3 / 54.1	58.8 / 56.5
	85	90.00	Total Capacity (Btu/h)	290000	300000	310000	292000	302000	312000	292000	302000	314000
			Sensible Capacity (Btu/h)	144000	136000	126000	166000	156000	146000	186000	178000	168000
			Electric Power (Watts)	22628	22564	22606	22634	22672	22704	22628	22674	22714
			Leaving Air Temp (°F db/°F wb)	55.6 / 53.4	57.5 / 55.8	60.0 / 58.1	55.4 / 53.2	57.8 / 55.5	60.2 / 57.9	55.1 / 53.0	57.5 / 55.3	60.0 / 57.7
4800	50	90.00	Total Capacity (Btu/h)	360000	370000	382000	360000	372000	384000	362000	374000	386000
			Sensible Capacity (Btu/h)	182000	168000	156000	208000	196000	184000	236000	224000	212000
			Electric Power (Watts)	15782	15720	15652	15788	15720	15652	15778	15690	15622
			Leaving Air Temp (°F db/°F wb)	56.0 / 54.3	58.5 / 56.7	61.0 / 59.1	55.9 / 54.1	58.3 / 56.5	60.8 / 58.9	55.7 / 54.0	58.0 / 56.4	60.4 / 58.8
	60	90.00	Total Capacity (Btu/h)	346000	358000	370000	348000	360000	372000	348000	360000	372000
			Sensible Capacity (Btu/h)	176000	164000	152000	204000	192000	178000	228000	220000	208000
			Electric Power (Watts)	17778	17752	17722	17754	17758	17726	17776	17728	17700
			Leaving Air Temp (°F db/°F wb)	57.0 / 55.3	59.5 / 57.7	61.9 / 60.0	56.7 / 55.1	59.3 / 57.4	61.7 / 59.8	57.2 / 55.0	58.9 / 57.3	61.3 / 59.7
	75	90.00	Total Capacity (Btu/h)	328000	338000	348000	328000	340000	350000	328000	340000	352000
			Sensible Capacity (Btu/h)	168000	156000	144000	196000	184000	170000	220000	210000	200000
			Electric Power (Watts)	20694	20708	20722	20664	20686	20736	20692	20716	20706
			Leaving Air Temp (°F db/°F wb)	58.6 / 56.7	60.9 / 59.1	63.3 / 61.4	58.2 / 56.6	60.5 / 58.9	63.2 / 61.2	58.8 / 56.4	60.6 / 58.7	62.7 / 61.1
	85	90.00	Total Capacity (Btu/h)	314000	324000	334000	314000	326000	336000	316000	326000	338000
			Sensible Capacity (Btu/h)	162000	150000	138000	192000	180000	166000	214000	206000	194000
			Electric Power (Watts)	22706	22736	22770	22662	22704	22746	22700	22748	22780
			Leaving Air Temp (°F db/°F wb)	59.6 / 57.7	62.0 / 60.0	64.3 / 62.4	59.2 / 57.6	61.5 / 59.9	63.9 / 62.2	59.8 / 57.4	61.6 / 59.7	63.9 / 62.0

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
					76	78	80	76	78	80	76	78	80
360 (30 TON) CONT'D													
6000	50	90.00	Total Capacity (Btu/h)	382000	394000	405000	384000	396000	410000	384000	396000	410000	
			Sensible Capacity (Btu/h)	202000	186000	172000	236000	222000	206000	264000	250000	240000	
			Electric Power (Watts)	15656	15586	15518	15654	15582	15508	15656	15584	15506	
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.3	62.1 / 60.6	64.5 / 63.0	59.6 / 58.1	61.9 / 60.4	64.3 / 62.8	60.4 / 58.0	62.6 / 60.3	64.2 / 62.6	
	60	90.00	Total Capacity (Btu/h)	368000	380000	392000	370000	382000	394000	370000	382000	394000	
			Sensible Capacity (Btu/h)	196000	182000	166000	226000	216000	200000	258000	244000	234000	
			Electric Power (Watts)	17724	17692	17658	17726	17694	17660	17732	17698	17662	
			Leaving Air Temp (°F db/°F wb)	60.5 / 59.0	62.9 / 61.4	65.3 / 63.7	61.0 / 58.9	62.7 / 61.2	65.1 / 63.5	61.3 / 58.8	63.4 / 61.1	65.0 / 63.4	
	75	90.00	Total Capacity (Btu/h)	346000	358000	368000	348000	360000	370000	348000	360000	372000	
			Sensible Capacity (Btu/h)	188000	174000	158000	218000	208000	192000	250000	236000	224000	
			Electric Power (Watts)	20718	20732	20744	20726	20742	20754	20706	20722	20736	
			Leaving Air Temp (°F db/°F wb)	61.7 / 60.2	64.1 / 62.5	66.4 / 64.8	62.3 / 60.1	63.9 / 62.3	66.3 / 64.7	62.5 / 60.0	64.6 / 62.3	66.7 / 64.6	
	85	90.00	Total Capacity (Btu/h)	332000	342000	352000	332000	342000	354000	334000	346000	354000	
			Sensible Capacity (Btu/h)	184000	168000	152000	212000	204000	188000	246000	232000	218000	
			Electric Power (Watts)	22756	22790	22822	22734	22772	22838	22744	22774	22816	
			Leaving Air Temp (°F db/°F wb)	62.6 / 61.0	64.9 / 63.3	67.3 / 65.6	63.1 / 60.9	64.6 / 63.2	67.1 / 65.5	63.1 / 60.7	65.2 / 63.0	67.5 / 65.4	
420 (35 TON)													
4375	50	105.00	Total Capacity (Btu/h)	396000	410000	425000	398000	410000	425000	398000	415000	425000	
			Sensible Capacity (Btu/h)	194000	182000	170000	220000	208000	196000	244000	232000	222000	
			Electric Power (Watts)	24308	24510	24728	24338	24546	24772	24362	24576	24804	
			Leaving Air Temp (°F db/°F wb)	50.2 / 48.3	52.7 / 50.7	55.3 / 53.1	49.9 / 48.0	52.4 / 50.4	55.0 / 52.9	49.7 / 47.8	52.2 / 50.2	54.7 / 52.6	
	60	105.00	Total Capacity (Btu/h)	384000	396000	410000	386000	398000	410000	386000	400000	415000	
			Sensible Capacity (Btu/h)	188000	176000	164000	214000	202000	190000	238000	228000	216000	
			Electric Power (Watts)	25732	25920	26122	25760	25956	26164	25782	25984	26198	
			Leaving Air Temp (°F db/°F wb)	51.3 / 49.4	53.9 / 51.8	56.4 / 54.2	51.1 / 49.1	53.6 / 51.5	56.1 / 53.9	50.9 / 48.9	53.3 / 51.3	55.8 / 53.7	
	75	105.00	Total Capacity (Btu/h)	364000	376000	390000	366000	378000	392000	368000	380000	394000	
			Sensible Capacity (Btu/h)	180000	168000	156000	204000	194000	182000	230000	218000	206000	
			Electric Power (Watts)	28358	28526	28706	28382	28562	28750	28400	28584	28780	
			Leaving Air Temp (°F db/°F wb)	53.2 / 51.1	55.7 / 53.5	58.2 / 56.0	53 / 50.9	55.4 / 53.2	57.9 / 55.7	52.7 / 50.7	55.2 / 53.0	57.6 / 55.5	
	85	105.00	Total Capacity (Btu/h)	350000	362000	374000	352000	364000	376000	354000	366000	378000	
			Sensible Capacity (Btu/h)	172000	162000	150000	198000	186000	176000	224000	212000	200000	
			Electric Power (Watts)	30490	30646	30812	30514	30680	30854	30522	30700	30886	
			Leaving Air Temp (°F db/°F wb)	54.5 / 52.4	57.0 / 54.7	59.5 / 57.1	54.2 / 52.1	56.7 / 54.5	59.2 / 56.9	54.0 / 51.9	56.4 / 54.2	58.9 / 56.6	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
420 (35 TON) CONT'D													
5600	50	105.00	Total Capacity (Btu/h)	430000	445000	460000	435000	450000	460000	435000	450000	465000	
			Sensible Capacity (Btu/h)	218000	202000	188000	250000	236000	220000	278000	268000	252000	
			Electric Power (Watts)	24852	25108	25360	24908	25130	25382	24926	25182	25428	
			Leaving Air Temp (°F db/°F wb)	55.1 / 53.5	57.7 / 55.9	60.2 / 58.3	54.9 / 53.3	57.3 / 55.7	59.8 / 58.1	55.3 / 53.1	57.1 / 55.5	59.5 / 57.9	
	60	105.00	Total Capacity (Btu/h)	415000	430000	445000	420000	435000	445000	420000	435000	450000	
			Sensible Capacity (Btu/h)	212000	198000	182000	244000	230000	216000	272000	260000	246000	
			Electric Power (Watts)	26218	26436	26674	26278	26478	26716	26290	26534	26780	
			Leaving Air Temp (°F db/°F wb)	56.0 / 54.4	58.5 / 56.8	60.9 / 59.2	55.9 / 54.2	58.2 / 56.6	60.7 / 59.0	56.3 / 54.0	58.1 / 56.4	60.6 / 58.8	
	75	105.00	Total Capacity (Btu/h)	394000	405000	420000	398000	410000	425000	398000	410000	430000	
			Sensible Capacity (Btu/h)	202000	188000	174000	234000	220000	206000	262000	252000	240000	
			Electric Power (Watts)	28756	28954	29166	28832	29022	29208	28836	29062	29318	
			Leaving Air Temp (°F db/°F wb)	57.5 / 55.9	59.9 / 58.3	62.3 / 60.6	57.4 / 55.7	59.8 / 58.0	62.1 / 60.4	58.0 / 55.5	59.6 / 57.8	61.7 / 60.0	
	85	105.00	Total Capacity (Btu/h)	378000	390000	405000	380000	394000	405000	382000	396000	410000	
			Sensible Capacity (Btu/h)	196000	182000	168000	228000	214000	198000	254000	242000	234000	
			Electric Power (Watts)	30824	31008	31206	30866	31084	31282	30910	31130	31362	
			Leaving Air Temp (°F db/°F wb)	58.5 / 56.9	60.9 / 59.3	63.3 / 61.6	58.3 / 56.7	60.8 / 59.0	63.2 / 61.4	59.1 / 56.5	61.3 / 58.8	62.7 / 61.0	
7000	50	105.00	Total Capacity (Btu/h)	460000	475000	490000	460000	475000	490000	465000	480000	495000	
			Sensible Capacity (Btu/h)	242000	224000	206000	278000	264000	246000	312000	298000	282000	
			Electric Power (Watts)	25362	25618	25866	25386	25652	25932	25430	25692	25982	
			Leaving Air Temp (°F db/°F wb)	59.0 / 57.5	61.4 / 59.9	63.7 / 62.3	59.3 / 57.4	61.1 / 59.7	63.5 / 62.1	59.8 / 57.2	61.8 / 59.6	64.0 / 61.9	
	60	105.00	Total Capacity (Btu/h)	445000	460000	470000	450000	460000	475000	450000	465000	480000	
			Sensible Capacity (Btu/h)	236000	218000	200000	272000	258000	240000	306000	294000	280000	
			Electric Power (Watts)	26658	26900	27154	26784	26956	27220	26750	27052	27358	
			Leaving Air Temp (°F db/°F wb)	59.6 / 58.3	62.0 / 60.7	64.4 / 63.1	60.0 / 58.0	61.9 / 60.5	64.2 / 62.9	60.6 / 58.0	62.4 / 60.2	64.1 / 62.5	
	75	105.00	Total Capacity (Btu/h)	420000	430000	445000	425000	440000	450000	420000	440000	455000	
			Sensible Capacity (Btu/h)	226000	208000	190000	262000	250000	234000	296000	284000	268000	
			Electric Power (Watts)	29162	29380	29608	29236	29496	29716	29216	29500	29758	
			Leaving Air Temp (°F db/°F wb)	61.0 / 59.5	63.4 / 61.8	65.7 / 64.2	61.2 / 59.2	63.0 / 61.5	65.2 / 63.9	61.9 / 59.2	63.6 / 61.4	65.7 / 63.7	
	85	105.00	Total Capacity (Btu/h)	405000	415000	430000	405000	420000	430000	405000	420000	435000	
			Sensible Capacity (Btu/h)	222000	204000	186000	256000	244000	226000	288000	274000	260000	
			Electric Power (Watts)	31234	31444	31674	31264	31488	31722	31264	31546	31754	
			Leaving Air Temp (°F db/°F wb)	61.5 / 60.2	63.8 / 62.5	66.2 / 64.8	62.1 / 60.0	63.7 / 62.3	66.1 / 64.6	62.9 / 60.0	64.7 / 62.2	66.6 / 64.5	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
480 (40 TON)													
5000	50	120.00	Total Capacity (Btu/h)	445000	465000	480000	450000	465000	480000	450000	465000	485000	
			Sensible Capacity (Btu/h)	220000	208000	194000	248000	236000	224000	276000	264000	252000	
			Electric Power (Watts)	25644	25884	26170	25672	25940	26204	25694	25968	26234	
			Leaving Air Temp (°F db/°F wb)	50.6 / 48.7	52.9 / 51.0	55.4 / 53.4	50.4 / 48.5	52.8 / 50.8	55.1 / 53.2	50.2 / 48.3	52.6 / 50.6	54.9 / 53.0	
	60	120.00	Total Capacity (Btu/h)	435000	450000	465000	435000	450000	465000	435000	450000	470000	
			Sensible Capacity (Btu/h)	212000	202000	188000	242000	228000	216000	270000	258000	244000	
			Electric Power (Watts)	27026	27246	27514	27054	27304	27546	27074	27332	27608	
			Leaving Air Temp (°F db/°F wb)	51.8 / 49.7	54.0 / 52.1	56.4 / 54.5	51.6 / 49.5	53.9 / 51.9	56.2 / 54.3	51.4 / 49.4	53.7 / 51.7	56.2 / 54.1	
	75	120.00	Total Capacity (Btu/h)	410000	425000	440000	415000	430000	445000	415000	430000	445000	
			Sensible Capacity (Btu/h)	204000	192000	178000	232000	220000	208000	260000	248000	234000	
			Electric Power (Watts)	29592	29774	30020	29618	29846	30052	29634	29870	30122	
			Leaving Air Temp (°F db/°F wb)	53.5 / 51.5	55.7 / 53.8	58.2 / 56.2	53.3 / 51.3	55.7 / 53.6	57.9 / 56.0	53.1 / 51.1	55.5 / 53.4	57.9 / 55.8	
	85	120.00	Total Capacity (Btu/h)	396000	410000	425000	398000	415000	425000	398000	415000	430000	
			Sensible Capacity (Btu/h)	196000	186000	172000	224000	212000	200000	252000	240000	228000	
			Electric Power (Watts)	31686	31836	32068	31710	31924	32098	31720	31944	32182	
			Leaving Air Temp (°F db/°F wb)	54.8 / 52.6	56.9 / 55.0	59.3 / 57.3	54.6 / 52.5	56.9 / 54.7	59.1 / 57.1	54.4 / 52.3	56.7 / 54.6	59.1 / 56.9	
6400	50	120.00	Total Capacity (Btu/h)	490000	505000	520000	490000	505000	525000	490000	510000	525000	
			Sensible Capacity (Btu/h)	248000	232000	214000	282000	268000	252000	318000	302000	288000	
			Electric Power (Watts)	26324	26634	26968	26384	26668	27006	26404	26734	27048	
			Leaving Air Temp (°F db/°F wb)	55.3 / 53.8	57.7 / 56.1	60.1 / 58.5	55.3 / 53.6	57.5 / 56.0	59.9 / 58.3	55.1 / 53.4	57.5 / 55.8	59.7 / 58.2	
	60	120.00	Total Capacity (Btu/h)	475000	490000	505000	475000	490000	505000	475000	490000	510000	
			Sensible Capacity (Btu/h)	242000	224000	208000	276000	262000	246000	312000	296000	280000	
			Electric Power (Watts)	27638	27930	28246	27702	27962	28282	27716	28022	28356	
			Leaving Air Temp (°F db/°F wb)	56.2 / 54.7	58.6 / 57.0	61 / 59.4	56.2 / 54.5	58.4 / 56.9	60.8 / 59.2	56.0 / 54.4	58.4 / 56.7	60.8 / 59.0	
	75	120.00	Total Capacity (Btu/h)	445000	465000	480000	450000	465000	480000	450000	465000	480000	
			Sensible Capacity (Btu/h)	230000	214000	198000	266000	250000	236000	302000	286000	270000	
			Electric Power (Watts)	30102	30374	30660	30174	30448	30696	30190	30466	30780	
			Leaving Air Temp (°F db/°F wb)	57.6 / 56.1	60.0 / 58.4	62.3 / 60.7	57.6 / 55.9	60.0 / 58.2	62.1 / 60.6	57.5 / 55.8	59.8 / 58.1	62.3 / 60.4	
	85	120.00	Total Capacity (Btu/h)	430000	445000	460000	430000	445000	460000	430000	445000	465000	
			Sensible Capacity (Btu/h)	224000	208000	192000	258000	242000	226000	294000	280000	262000	
			Electric Power (Watts)	32124	32380	32648	32210	32468	32734	32222	32480	32782	
			Leaving Air Temp (°F db/°F wb)	58.6 / 57.1	60.9 / 59.4	63.3 / 61.7	58.7 / 56.9	61.0 / 59.2	63.4 / 61.5	58.5 / 56.8	60.8 / 59.1	63.3 / 61.3	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
480 (40 TON) CONT'D													
8000	50	120.00	Total Capacity (Btu/h)	520000	540000	555000	520000	540000	555000	525000	540000	560000	
			Sensible Capacity (Btu/h)	276000	256000	236000	322000	302000	282000	360000	346000	326000	
			Electric Power (Watts)	26946	27290	27658	26978	27332	27706	26998	27358	27748	
			Leaving Air Temp (°F db/°F wb)	59.0 / 57.8	61.3 / 60.1	63.7 / 62.4	58.9 / 57.6	61.2 / 59.9	63.5 / 62.3	59.4 / 57.5	61.1 / 59.8	63.5 / 62.1	
	60	120.00	Total Capacity (Btu/h)	505000	520000	535000	505000	520000	540000	505000	520000	540000	
			Sensible Capacity (Btu/h)	270000	250000	230000	314000	294000	276000	352000	340000	320000	
			Electric Power (Watts)	28206	28530	28878	28236	28572	28926	28290	28596	28960	
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.5	62.0 / 60.8	64.4 / 63.2	59.6 / 58.4	61.9 / 60.7	64.3 / 63.0	60.4 / 58.3	61.8 / 60.6	64.2 / 62.9	
	75	120.00	Total Capacity (Btu/h)	475000	490000	505000	475000	490000	510000	475000	495000	510000	
			Sensible Capacity (Btu/h)	260000	240000	220000	304000	284000	264000	340000	330000	310000	
			Electric Power (Watts)	30596	30892	31208	30624	30932	31258	30688	30954	31288	
			Leaving Air Temp (°F db/°F wb)	60.9 / 59.7	63.2 / 62.0	65.5 / 64.3	60.8 / 59.6	63.1 / 61.8	65.4 / 64.1	61.7 / 59.4	63.0 / 61.7	65.3 / 64.0	
	85	120.00	Total Capacity (Btu/h)	455000	470000	485000	455000	470000	485000	460000	470000	490000	
			Sensible Capacity (Btu/h)	252000	232000	212000	296000	278000	258000	332000	316000	302000	
			Electric Power (Watts)	32574	32852	33148	32602	32888	33194	32672	32912	33226	
			Leaving Air Temp (°F db/°F wb)	61.7 / 60.5	64.0 / 62.8	66.3 / 65.1	61.6 / 60.4	63.9 / 62.6	66.2 / 64.9	62.6 / 60.2	64.5 / 62.5	66.1 / 64.8	
	540 (45 TON)												
	5625	50	135.00	Total Capacity (Btu/h)	550000	570000	590000	550000	570000	590000	555000	575000	595000
				Sensible Capacity (Btu/h)	270000	256000	240000	302000	288000	272000	334000	320000	304000
				Electric Power (Watts)	31570	31690	31784	31586	31706	31822	31596	31718	31836
Leaving Air Temp (°F db/°F wb)				46.9 / 45.1	49.4 / 47.5	51.8 / 50.0	46.7 / 44.9	49.2 / 47.3	51.7 / 49.8	46.5 / 44.7	49.0 / 47.1	51.5 / 49.5	
60		135.00	Total Capacity (Btu/h)	535000	555000	570000	535000	555000	575000	535000	555000	575000	
			Sensible Capacity (Btu/h)	262000	248000	234000	294000	280000	264000	326000	312000	296000	
			Electric Power (Watts)	32880	33020	33126	32900	33040	33180	32914	33058	33198	
			Leaving Air Temp (°F db/°F wb)	48.2 / 46.4	50.7 / 48.8	53.0 / 51.3	48.0 / 46.2	50.5 / 48.6	53.0 / 51.0	47.8 / 46.0	50.3 / 48.4	52.7 / 50.8	
75		135.00	Total Capacity (Btu/h)	505000	525000	545000	510000	525000	545000	510000	530000	550000	
			Sensible Capacity (Btu/h)	248000	234000	220000	280000	266000	252000	312000	298000	284000	
			Electric Power (Watts)	36142	36292	36398	36164	36318	36476	36180	36340	36500	
			Leaving Air Temp (°F db/°F wb)	50.3 / 48.4	52.8 / 50.8	55.0 / 53.1	50.1 / 48.2	52.5 / 50.5	55.0 / 52.9	49.9 / 48.0	52.3 / 50.3	54.8 / 52.7	
85		135.00	Total Capacity (Btu/h)	490000	505000	525000	490000	510000	525000	490000	510000	530000	
			Sensible Capacity (Btu/h)	240000	226000	210000	272000	258000	244000	304000	290000	276000	
			Electric Power (Watts)	39214	39360	39516	39236	39388	39546	39252	39410	39570	
			Leaving Air Temp (°F db/°F wb)	51.8 / 49.7	54.2 / 52.1	56.6 / 54.5	51.6 / 49.5	53.9 / 51.9	56.4 / 54.2	51.3 / 49.4	53.7 / 51.7	56.2 / 54.0	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
540 (45 TON) CONT'D													
7200	50	135.00	Total Capacity (Btu/h)	605000	625000	645000	605000	625000	650000	610000	630000	650000	
			Sensible Capacity (Btu/h)	302000	284000	266000	342000	326000	306000	384000	364000	346000	
			Electric Power (Watts)	31866	31972	32074	31904	31982	32084	31914	32022	32124	
			Leaving Air Temp (°F db/°F wb)	52.2 / 50.9	54.7 / 53.3	57.2 / 55.7	52.2 / 50.6	54.5 / 53.1	56.9 / 55.5	52.0 / 50.5	54.5 / 52.9	56.9 / 55.3	
	60	135.00	Total Capacity (Btu/h)	585000	605000	625000	590000	610000	630000	590000	610000	630000	
			Sensible Capacity (Btu/h)	294000	276000	256000	334000	318000	298000	374000	356000	338000	
			Electric Power (Watts)	33218	33352	33488	33272	33370	33502	33282	33422	33558	
			Leaving Air Temp (°F db/°F wb)	53.3 / 51.9	55.7 / 54.3	58.2 / 56.7	53.3 / 51.7	55.5 / 54.1	58.0 / 56.5	53.1 / 51.5	55.5 / 53.9	58.0 / 56.3	
	75	135.00	Total Capacity (Btu/h)	555000	575000	595000	555000	575000	595000	560000	580000	600000	
			Sensible Capacity (Btu/h)	282000	262000	244000	320000	302000	286000	360000	344000	324000	
			Electric Power (Watts)	36484	36644	36812	36562	36726	36830	36570	36740	36910	
			Leaving Air Temp (°F db/°F wb)	54.9 / 53.5	57.4 / 55.9	59.8 / 58.2	55.0 / 53.3	57.4 / 55.7	59.6 / 58.1	54.8 / 53.2	57.2 / 55.5	59.6 / 57.8	
	85	135.00	Total Capacity (Btu/h)	535000	550000	570000	535000	555000	570000	535000	555000	575000	
			Sensible Capacity (Btu/h)	270000	254000	236000	310000	292000	278000	352000	334000	316000	
			Electric Power (Watts)	39598	39684	39862	39620	39788	39884	39622	39802	39982	
			Leaving Air Temp (°F db/°F wb)	56.3 / 54.6	58.5 / 57.0	60.8 / 59.3	56.1 / 54.4	58.5 / 56.8	60.6 / 59.1	55.9 / 54.3	58.3 / 56.6	60.7 / 58.9	
9000	50	135.00	Total Capacity (Btu/h)	650000	670000	690000	650000	670000	695000	650000	675000	695000	
			Sensible Capacity (Btu/h)	334000	312000	290000	386000	362000	338000	430000	415000	390000	
			Electric Power (Watts)	32116	32174	32264	32132	32226	32314	32120	32220	32328	
			Leaving Air Temp (°F db/°F wb)	56.7 / 55.3	58.9 / 57.7	61.3 / 60.1	56.5 / 55.2	58.9 / 57.5	61.4 / 59.9	56.9 / 55.1	58.7 / 57.4	61.2 / 59.8	
	60	135.00	Total Capacity (Btu/h)	630000	645000	670000	630000	650000	670000	630000	650000	675000	
			Sensible Capacity (Btu/h)	324000	304000	282000	376000	354000	330000	420000	405000	382000	
			Electric Power (Watts)	33540	33618	33746	33554	33684	33808	33564	33682	33830	
			Leaving Air Temp (°F db/°F wb)	57.6 / 56.2	59.7 / 58.6	62.1 / 60.9	57.4 / 56.0	59.8 / 58.4	62.2 / 60.7	57.9 / 55.9	59.6 / 58.2	62.1 / 60.6	
	75	135.00	Total Capacity (Btu/h)	595000	610000	630000	595000	615000	635000	595000	615000	635000	
			Sensible Capacity (Btu/h)	312000	288000	266000	364000	340000	318000	405000	392000	368000	
			Electric Power (Watts)	36862	37018	37182	36858	37056	37210	36892	37050	37240	
			Leaving Air Temp (°F db/°F wb)	58.9 / 57.5	61.3 / 59.8	63.7 / 62.2	58.7 / 57.4	61.2 / 59.7	63.5 / 62.0	59.3 / 57.2	60.9 / 59.5	63.4 / 61.9	
	85	135.00	Total Capacity (Btu/h)	570000	585000	605000	570000	590000	610000	570000	590000	610000	
			Sensible Capacity (Btu/h)	302000	280000	256000	354000	330000	308000	396000	382000	358000	
			Electric Power (Watts)	39916	40082	40258	39904	40126	40300	39944	40124	40324	
			Leaving Air Temp (°F db/°F wb)	59.9 / 58.4	62.2 / 60.7	64.6 / 63.0	59.6 / 58.3	62.1 / 60.5	64.4 / 62.9	60.3 / 58.2	61.9 / 60.4	64.3 / 62.7	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
600 (50 TON)													
6250	50	150.00	Total Capacity (Btu/h)	600000	620000	645000	600000	625000	645000	605000	625000	645000	
			Sensible Capacity (Btu/h)	294000	280000	262000	330000	314000	298000	366000	350000	334000	
			Electric Power (Watts)	32648	32812	33062	32676	32912	33092	32700	32940	33190	
			Leaving Air Temp (°F db/°F wb)	47.7 / 45.9	50.0 / 48.4	52.5 / 50.8	47.5 / 45.7	49.9 / 48.1	52.3 / 50.5	47.3 / 45.5	49.7 / 47.9	52.2 / 50.3	
	60	150.00	Total Capacity (Btu/h)	580000	605000	625000	585000	605000	625000	585000	605000	630000	
			Sensible Capacity (Btu/h)	286000	270000	254000	322000	306000	290000	356000	342000	326000	
			Electric Power (Watts)	35128	35348	35514	35156	35382	35618	35178	35408	35650	
			Leaving Air Temp (°F db/°F wb)	49.0 / 47.1	51.4 / 49.5	53.7 / 51.9	48.8 / 46.9	51.2 / 49.3	53.6 / 51.7	48.5 / 46.7	51.0 / 49.1	53.4 / 51.5	
	75	150.00	Total Capacity (Btu/h)	555000	575000	595000	555000	575000	595000	555000	580000	600000	
			Sensible Capacity (Btu/h)	272000	256000	242000	308000	292000	276000	344000	328000	312000	
			Electric Power (Watts)	39568	39770	39878	39594	39804	40024	39606	39826	40054	
			Leaving Air Temp (°F db/°F wb)	50.9 / 49.0	53.3 / 51.4	55.5 / 53.7	50.7 / 48.8	53.1 / 51.1	55.6 / 53.5	50.5 / 48.6	52.9 / 50.9	55.3 / 53.3	
	85	150.00	Total Capacity (Btu/h)	535000	555000	575000	535000	555000	575000	535000	555000	580000	
			Sensible Capacity (Btu/h)	262000	246000	230000	298000	282000	266000	334000	318000	302000	
			Electric Power (Watts)	43100	43290	43492	43124	43322	43530	43106	43342	43556	
			Leaving Air Temp (°F db/°F wb)	52.3 / 50.3	54.7 / 52.6	57.1 / 55.0	52.0 / 50.1	54.5 / 52.4	56.9 / 54.7	51.8 / 49.9	54.2 / 52.2	56.7 / 54.5	
8000	50	150.00	Total Capacity (Btu/h)	660000	680000	705000	660000	685000	705000	660000	685000	710000	
			Sensible Capacity (Btu/h)	332000	310000	290000	376000	356000	336000	420000	400000	380000	
			Electric Power (Watts)	33236	33500	33776	33334	33526	33808	33348	33620	33898	
			Leaving Air Temp (°F db/°F wb)	52.8 / 51.5	55.3 / 53.9	57.7 / 56.3	52.8 / 51.3	55.0 / 53.7	57.5 / 56.1	52.6 / 51.2	55.1 / 53.5	57.5 / 55.9	
	60	150.00	Total Capacity (Btu/h)	640000	660000	680000	640000	660000	685000	640000	665000	685000	
			Sensible Capacity (Btu/h)	322000	302000	280000	366000	348000	326000	410000	392000	370000	
			Electric Power (Watts)	35666	35924	36192	35774	35952	36228	35784	36054	36324	
			Leaving Air Temp (°F db/°F wb)	53.8 / 52.5	56.2 / 54.9	58.7 / 57.3	53.9 / 52.3	56.0 / 54.6	58.5 / 57.1	53.7 / 52.1	56.1 / 54.4	58.5 / 56.9	
	75	150.00	Total Capacity (Btu/h)	605000	625000	645000	610000	630000	650000	610000	630000	655000	
			Sensible Capacity (Btu/h)	306000	288000	268000	352000	332000	314000	396000	376000	356000	
			Electric Power (Watts)	40112	40242	40500	40140	40378	40534	40142	40398	40656	
			Leaving Air Temp (°F db/°F wb)	55.7 / 54	57.8 / 56.4	60.2 / 58.7	55.5 / 53.8	57.9 / 56.2	60.0 / 58.5	55.3 / 53.7	57.7 / 56.0	60.1 / 58.3	
	85	150.00	Total Capacity (Btu/h)	580000	600000	620000	585000	605000	625000	585000	605000	630000	
			Sensible Capacity (Btu/h)	296000	278000	258000	342000	322000	304000	388000	368000	346000	
			Electric Power (Watts)	43594	43658	43910	43614	43842	43944	43610	43854	44104	
			Leaving Air Temp (°F db/°F wb)	56.8 / 55.1	58.8 / 57.4	61.2 / 59.8	56.5 / 54.9	59.0 / 57.2	61.0 / 59.6	56.4 / 54.8	58.8 / 57.1	61.2 / 59.4	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
600 (50 TON) CONT'D													
10000	50	150.00	Total Capacity (Btu/h)	705000	730000	750000	710000	730000	755000	710000	735000	760000	
			Sensible Capacity (Btu/h)	368000	342000	318000	420000	394000	376000	470000	455000	425000	
			Electric Power (Watts)	33788	34068	34364	34000	34276	34394	33882	34178	34616	
			Leaving Air Temp (°F db/°F wb)	56.9 / 55.9	59.3 / 58.2	61.7 / 60.6	57.2 / 55.7	59.6 / 58.1	61.5 / 60.5	57.5 / 55.6	59.2 / 57.9	61.9 / 60.3	
	60	150.00	Total Capacity (Btu/h)	685000	705000	730000	685000	710000	730000	685000	710000	735000	
			Sensible Capacity (Btu/h)	360000	334000	308000	410000	386000	360000	460000	445000	420000	
			Electric Power (Watts)	36188	36460	36750	36374	36636	36912	36288	36582	36896	
			Leaving Air Temp (°F db/°F wb)	57.8 / 56.7	60.1 / 59.0	62.5 / 61.4	58.0 / 56.5	60.4 / 58.8	62.7 / 61.2	58.4 / 56.4	60.0 / 58.7	62.4 / 61	
	75	150.00	Total Capacity (Btu/h)	645000	665000	690000	650000	670000	690000	650000	670000	695000	
			Sensible Capacity (Btu/h)	340000	320000	294000	400000	372000	348000	445000	425000	405000	
			Electric Power (Watts)	40614	40730	41006	40578	40910	41164	40652	40872	41142	
			Leaving Air Temp (°F db/°F wb)	59.4 / 57.9	61.4 / 60.3	63.7 / 62.6	59.1 / 57.8	61.6 / 60.1	64.0 / 62.4	59.9 / 57.7	62.0 / 60.0	63.6 / 62.3	
	85	150.00	Total Capacity (Btu/h)	620000	640000	660000	620000	645000	665000	625000	645000	665000	
			Sensible Capacity (Btu/h)	330000	310000	286000	388000	362000	338000	435000	415000	396000	
			Electric Power (Watts)	44064	44120	44382	44034	44338	44570	44078	44288	44526	
			Leaving Air Temp (°F db/°F wb)	60.4 / 58.8	62.2 / 61.1	64.6 / 63.4	60.1 / 58.7	62.5 / 60.9	64.9 / 63.3	60.9 / 58.5	62.9 / 60.8	64.5 / 63.1	
	660 (55 TON)												
	6875	50	165.00	Total Capacity (Btu/h)	655000	675000	700000	655000	680000	705000	655000	680000	705000
				Sensible Capacity (Btu/h)	320000	302000	286000	360000	342000	324000	398000	382000	364000
				Electric Power (Watts)	37578	37910	38190	37620	37962	38322	37648	38000	38368
Leaving Air Temp (°F db/°F wb)				48.2 / 46.3	50.6 / 48.7	52.9 / 51.1	48.0 / 46.1	50.4 / 48.5	52.8 / 50.9	47.8 / 45.9	50.2 / 48.3	52.6 / 50.6	
60		165.00	Total Capacity (Btu/h)	635000	660000	680000	640000	660000	685000	640000	665000	685000	
			Sensible Capacity (Btu/h)	312000	294000	278000	350000	334000	316000	390000	372000	356000	
			Electric Power (Watts)	40462	40772	41006	40502	40816	41150	40534	40854	41192	
			Leaving Air Temp (°F db/°F wb)	49.3 / 47.4	51.8 / 49.8	54.0 / 52.2	49.1 / 47.2	51.5 / 49.5	54.0 / 51.9	48.9 / 47.0	51.3 / 49.3	53.7 / 51.7	
75		165.00	Total Capacity (Btu/h)	605000	630000	650000	610000	630000	655000	610000	635000	655000	
			Sensible Capacity (Btu/h)	298000	280000	262000	336000	320000	302000	376000	358000	342000	
			Electric Power (Watts)	45500	45772	46094	45536	45816	46108	45530	45848	46150	
			Leaving Air Temp (°F db/°F wb)	51.1 / 49.1	53.6 / 51.5	56.0 / 53.9	50.9 / 48.9	53.3 / 51.3	55.8 / 53.6	50.7 / 48.7	53.1 / 51.0	55.6 / 53.4	
85		165.00	Total Capacity (Btu/h)	585000	605000	630000	590000	610000	630000	590000	610000	635000	
			Sensible Capacity (Btu/h)	288000	270000	252000	326000	310000	292000	366000	350000	332000	
			Electric Power (Watts)	49434	49690	49958	49552	49732	50002	49580	49754	50044	
			Leaving Air Temp (°F db/°F wb)	52.4 / 50.3	54.8 / 52.7	57.3 / 55.1	52.2 / 50.1	54.6 / 52.5	57.0 / 54.8	52.1 / 50.0	54.3 / 52.3	56.8 / 54.6	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
660 (55 TON) CONT'D													
8800	50	165.00	Total Capacity (Btu/h)	720000	745000	770000	720000	745000	770000	725000	750000	775000	
			Sensible Capacity (Btu/h)	362000	340000	316000	410000	390000	368000	460000	435000	415000	
			Electric Power (Watts)	38440	38832	39248	38580	38870	39292	38602	39006	39416	
			Leaving Air Temp (°F db/°F wb)	53.1 / 51.8	55.5 / 54.1	58.0 / 56.5	53.1 / 51.6	55.3 / 53.9	57.7 / 56.4	53.0 / 51.4	55.3 / 53.7	57.8 / 56.1	
	60	165.00	Total Capacity (Btu/h)	700000	720000	745000	700000	725000	750000	700000	725000	750000	
			Sensible Capacity (Btu/h)	350000	330000	306000	400000	378000	358000	450000	430000	405000	
			Electric Power (Watts)	41320	41578	41964	41364	41722	42006	41380	41760	42142	
			Leaving Air Temp (°F db/°F wb)	54.4 / 52.7	56.4 / 55.1	58.9 / 57.4	54.1 / 52.5	56.5 / 54.8	58.6 / 57.2	54.0 / 52.3	56.3 / 54.6	58.8 / 57.0	
	75	165.00	Total Capacity (Btu/h)	665000	685000	710000	665000	690000	710000	670000	690000	715000	
			Sensible Capacity (Btu/h)	334000	316000	292000	384000	362000	344000	435000	415000	390000	
			Electric Power (Watts)	46224	46392	46746	46264	46580	46784	46272	46612	46956	
			Leaving Air Temp (°F db/°F wb)	55.9 / 54.1	57.9 / 56.5	60.3 / 58.8	55.6 / 53.9	58.1 / 56.3	60.1 / 58.6	55.4 / 53.8	57.8 / 56.1	60.3 / 58.4	
	85	165.00	Total Capacity (Btu/h)	640000	660000	685000	640000	665000	685000	645000	665000	690000	
			Sensible Capacity (Btu/h)	324000	300000	284000	374000	352000	334000	425000	400000	380000	
			Electric Power (Watts)	50088	50572	50500	50122	50418	50536	50116	50440	50764	
			Leaving Air Temp (°F db/°F wb)	56.9 / 55.1	59.5 / 57.5	61.2 / 59.8	56.7 / 55.0	59.1 / 57.3	61.0 / 59.6	56.5 / 54.8	58.9 / 57.1	61.3 / 59.4	
11000	50	165.00	Total Capacity (Btu/h)	770000	795000	820000	775000	800000	825000	775000	800000	830000	
			Sensible Capacity (Btu/h)	405000	376000	348000	460000	430000	410000	515000	495000	465000	
			Electric Power (Watts)	39256	39678	40124	39384	39982	40170	39394	39834	40494	
			Leaving Air Temp (°F db/°F wb)	57.1 / 56.1	59.5 / 58.4	61.9 / 60.8	57.2 / 55.9	59.8 / 58.2	61.6 / 60.6	57.8 / 55.8	59.4 / 58.1	62.1 / 60.4	
	60	165.00	Total Capacity (Btu/h)	745000	770000	795000	750000	775000	800000	750000	775000	800000	
			Sensible Capacity (Btu/h)	388000	366000	338000	450000	425000	394000	505000	480000	460000	
			Electric Power (Watts)	42148	42340	42752	42090	42592	42986	42098	42508	42954	
			Leaving Air Temp (°F db/°F wb)	58.3 / 56.8	60.3 / 59.2	62.6 / 61.5	58.1 / 56.6	60.5 / 59.0	62.9 / 61.3	58.7 / 56.5	60.8 / 58.8	62.5 / 61.2	
	75	165.00	Total Capacity (Btu/h)	710000	730000	755000	710000	735000	760000	710000	735000	760000	
			Sensible Capacity (Btu/h)	372000	346000	324000	435000	410000	380000	490000	465000	445000	
			Electric Power (Watts)	46914	47228	47422	46876	47302	47646	46874	47246	47606	
			Leaving Air Temp (°F db/°F wb)	59.6 / 58.0	61.9 / 60.3	63.8 / 62.7	59.3 / 57.8	61.8 / 60.1	64.1 / 62.5	60.0 / 57.7	62.2 / 60.0	63.7 / 62.3	
	85	165.00	Total Capacity (Btu/h)	680000	705000	725000	685000	705000	730000	685000	710000	730000	
			Sensible Capacity (Btu/h)	362000	334000	306000	425000	400000	370000	475000	450000	435000	
			Electric Power (Watts)	50734	51006	51312	50668	50934	51384	50652	51006	51308	
			Leaving Air Temp (°F db/°F wb)	60.5 / 58.8	62.8 / 61.2	65.1 / 63.5	60.2 / 58.7	62.3 / 61.0	65.0 / 63.3	61.0 / 58.6	63.1 / 60.9	64.5 / 63.2	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
720 (60 TON)													
7500	50	180.00	Total Capacity (Btu/h)	725000	755000	780000	725000	755000	780000	725000	755000	785000	
			Sensible Capacity (Btu/h)	358000	340000	312000	398000	382000	364000	440000	420000	405000	
			Electric Power (Watts)	38494	38900	39720	38638	38920	39356	38660	39066	39370	
			Leaving Air Temp (°F db/°F wb)	47.1 / 45.6	49.5 / 47.9	52.8 / 50.3	47.3 / 45.5	49.3 / 47.8	51.7 / 50.1	47.1 / 45.3	49.5 / 47.6	51.5 / 49.9	
	60	180.00	Total Capacity (Btu/h)	705000	730000	760000	705000	730000	760000	705000	735000	760000	
			Sensible Capacity (Btu/h)	348000	330000	310000	388000	372000	354000	430000	410000	392000	
			Electric Power (Watts)	41296	41668	42062	41460	41688	42090	41482	41852	42244	
			Leaving Air Temp (°F db/°F wb)	48.4 / 46.8	50.7 / 49.1	53.0 / 51.5	48.5 / 46.6	50.5 / 48.9	52.8 / 51.3	48.4 / 46.5	50.7 / 48.8	53.1 / 51.1	
	75	180.00	Total Capacity (Btu/h)	670000	695000	720000	670000	700000	725000	675000	700000	725000	
			Sensible Capacity (Btu/h)	328000	314000	296000	372000	352000	338000	415000	394000	376000	
			Electric Power (Watts)	46400	46532	46884	46430	46744	46908	46446	46768	47110	
			Leaving Air Temp (°F db/°F wb)	50.6 / 48.7	52.5 / 51.0	54.9 / 53.3	50.5 / 48.5	52.8 / 50.8	54.7 / 53.1	50.3 / 48.4	52.7 / 50.6	55.1 / 52.9	
	85	180.00	Total Capacity (Btu/h)	645000	670000	695000	645000	670000	695000	650000	670000	700000	
			Sensible Capacity (Btu/h)	318000	300000	280000	360000	342000	322000	400000	388000	364000	
			Electric Power (Watts)	50322	50580	50880	50350	50634	51048	50336	50504	50968	
			Leaving Air Temp (°F db/°F wb)	52.0 / 50.0	54.3 / 52.3	56.7 / 54.6	51.9 / 49.8	54.2 / 52.1	56.7 / 54.4	51.7 / 49.7	53.6 / 52.0	56.4 / 54.3	
9600	50	180.00	Total Capacity (Btu/h)	800000	830000	860000	805000	830000	860000	805000	835000	865000	
			Sensible Capacity (Btu/h)	405000	380000	356000	455000	435000	410000	510000	480000	460000	
			Electric Power (Watts)	39626	40096	40588	39872	40110	40614	39784	40388	40890	
			Leaving Air Temp (°F db/°F wb)	52.2 / 51.1	54.5 / 53.4	56.9 / 55.7	52.6 / 50.9	54.3 / 53.2	56.7 / 55.6	52.3 / 50.8	54.9 / 53.1	57.2 / 55.4	
	60	180.00	Total Capacity (Btu/h)	775000	805000	835000	780000	805000	835000	780000	805000	835000	
			Sensible Capacity (Btu/h)	394000	370000	346000	440000	420000	394000	500000	475000	450000	
			Electric Power (Watts)	42302	42738	43190	42536	42958	43410	42504	42882	43352	
			Leaving Air Temp (°F db/°F wb)	53.2 / 52.1	55.5 / 54.4	57.9 / 56.7	53.6 / 51.9	55.9 / 54.2	58.3 / 56.5	53.2 / 51.8	55.5 / 54.1	57.9 / 56.4	
	75	180.00	Total Capacity (Btu/h)	735000	765000	790000	735000	765000	795000	740000	765000	795000	
			Sensible Capacity (Btu/h)	370000	352000	328000	430000	400000	376000	480000	460000	435000	
			Electric Power (Watts)	47270	47440	47844	47184	47682	48068	47254	47578	47998	
			Leaving Air Temp (°F db/°F wb)	55.3 / 53.6	57.1 / 56.0	59.5 / 58.3	54.9 / 53.5	57.6 / 55.8	59.9 / 58.1	55.0 / 53.4	57.1 / 55.7	59.5 / 58.0	
	85	180.00	Total Capacity (Btu/h)	705000	735000	760000	710000	735000	760000	710000	735000	760000	
			Sensible Capacity (Btu/h)	358000	334000	318000	415000	392000	364000	465000	445000	425000	
			Electric Power (Watts)	51094	51408	51542	51070	51314	51810	51052	51438	51704	
			Leaving Air Temp (°F db/°F wb)	56.5 / 54.7	58.9 / 57.1	60.5 / 59.4	56.3 / 54.6	58.4 / 56.9	61.1 / 59.2	56.1 / 54.5	58.5 / 56.8	60.5 / 59.1	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
720 (60 TON) CONT'D													
12000	50	180.00	Total Capacity (Btu/h)	865000	895000	925000	865000	895000	925000	865000	895000	930000	
			Sensible Capacity (Btu/h)	445000	415000	394000	515000	485000	450000	580000	550000	520000	
			Electric Power (Watts)	40832	41338	41632	40726	41254	41944	40780	41376	41922	
			Leaving Air Temp (°F db/°F wb)	56.9 / 55.4	59.2 / 57.7	60.7 / 60.0	56.4 / 55.3	58.7 / 57.6	61.5 / 59.9	56.3 / 55.2	58.9 / 57.4	61.2 / 59.8	
	60	180.00	Total Capacity (Btu/h)	835000	865000	895000	835000	865000	895000	835000	865000	895000	
			Sensible Capacity (Btu/h)	430000	400000	372000	500000	475000	445000	570000	540000	510000	
			Electric Power (Watts)	43380	43844	44330	43368	43770	44276	43332	43822	44336	
			Leaving Air Temp (°F db/°F wb)	57.7 / 56.2	60.1 / 58.5	62.4 / 60.8	57.5 / 56.1	59.5 / 58.4	61.9 / 60.7	57.2 / 56.1	59.5 / 58.3	61.9 / 60.6	
	75	180.00	Total Capacity (Btu/h)	785000	815000	845000	790000	815000	845000	790000	815000	845000	
			Sensible Capacity (Btu/h)	420000	388000	354000	485000	455000	425000	550000	525000	495000	
			Electric Power (Watts)	47888	48306	48818	47934	48352	48794	48008	48376	48822	
			Leaving Air Temp (°F db/°F wb)	58.8 / 57.6	61.1 / 59.9	63.8 / 62.1	58.7 / 57.5	61.0 / 59.7	63.3 / 62.0	58.8 / 57.4	60.9 / 59.6	63.2 / 61.9	
	85	180.00	Total Capacity (Btu/h)	755000	780000	805000	755000	780000	810000	755000	785000	810000	
			Sensible Capacity (Btu/h)	405000	376000	346000	470000	445000	415000	540000	505000	480000	
			Electric Power (Watts)	51578	51960	52358	51626	52008	52412	51646	52088	52438	
			Leaving Air Temp (°F db/°F wb)	59.7 / 58.5	62.0 / 60.8	64.3 / 63.1	59.6 / 58.4	61.9 / 60.7	64.2 / 63.0	59.5 / 58.3	62.0 / 60.6	64.1 / 62.9	
780 (65 TON)													
8125	50	195.00	Total Capacity (Btu/h)	770000	795000	825000	770000	800000	830000	770000	800000	830000	
			Sensible Capacity (Btu/h)	390000	370000	338000	430000	415000	396000	475000	460000	440000	
			Electric Power (Watts)	33976	34400	35322	34130	34412	34868	34140	34598	34872	
			Leaving Air Temp (°F db/°F wb)	47.0 / 46.5	49.3 / 48.9	52.8 / 51.3	47.2 / 46.4	49.1 / 48.7	51.5 / 51.1	47.0 / 46.2	49.3 / 48.6	51.2 / 51.0	
	60	195.00	Total Capacity (Btu/h)	745000	775000	800000	750000	775000	805000	750000	775000	805000	
			Sensible Capacity (Btu/h)	380000	360000	338000	420000	405000	386000	465000	445000	430000	
			Electric Power (Watts)	36734	37124	37536	36920	37132	37554	36928	37312	37554	
			Leaving Air Temp (°F db/°F wb)	48.1 / 47.7	50.4 / 50.0	52.8 / 52.4	48.3 / 47.5	50.2 / 49.8	52.6 / 52.2	48.2 / 47.3	50.5 / 49.7	52.4 / 52.1	
	75	195.00	Total Capacity (Btu/h)	710000	730000	765000	710000	735000	765000	710000	740000	765000	
			Sensible Capacity (Btu/h)	358000	328000	322000	405000	382000	364000	455000	430000	420000	
			Electric Power (Watts)	41832	43126	42294	41854	42368	42528	41784	42186	42144	
			Leaving Air Temp (°F db/°F wb)	50.3 / 49.5	53.9 / 52.0	54.5 / 54.2	50.2 / 49.3	52.8 / 51.7	54.9 / 54.0	49.8 / 49.2	52.4 / 51.5	53.9 / 53.9	
	85	195.00	Total Capacity (Btu/h)	685000	710000	735000	685000	710000	735000	685000	710000	735000	
			Sensible Capacity (Btu/h)	354000	324000	306000	392000	380000	350000	440000	420000	405000	
			Electric Power (Watts)	45354	46212	46330	45760	45648	46548	45666	45944	45966	
			Leaving Air Temp (°F db/°F wb)	50.9 / 50.8	54.2 / 53.2	56.4 / 55.5	51.5 / 50.6	53.0 / 53.0	56.5 / 55.3	51.1 / 50.5	53.3 / 52.8	55.2 / 55.2	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
780 (65 TON) CONT'D													
10400	50	195.00	Total Capacity (Btu/h)	840000	870000	905000	845000	875000	905000	845000	875000	905000	
			Sensible Capacity (Btu/h)	440000	410000	386000	490000	465000	445000	550000	525000	500000	
			Electric Power (Watts)	35088	35574	36080	35388	35868	36096	35236	35728	36252	
			Leaving Air Temp (°F db/°F wb)	52.2 / 52.0	54.5 / 54.3	56.9 / 56.7	52.7 / 51.9	55.1 / 54.2	56.6 / 56.6	52.3 / 51.8	54.5 / 54.1	56.9 / 56.4	
	60	195.00	Total Capacity (Btu/h)	815000	845000	875000	815000	845000	875000	820000	845000	880000	
			Sensible Capacity (Btu/h)	425000	400000	376000	480000	450000	425000	540000	515000	490000	
			Electric Power (Watts)	37724	38170	38636	37860	38448	38908	37990	38312	38796	
			Leaving Air Temp (°F db/°F wb)	53.1 / 53.0	55.5 / 55.3	57.8 / 57.7	53.3 / 52.8	56.0 / 55.2	58.4 / 57.5	53.4 / 52.7	55.5 / 55.1	57.9 / 57.4	
	75	195.00	Total Capacity (Btu/h)	775000	800000	830000	775000	800000	830000	775000	805000	830000	
			Sensible Capacity (Btu/h)	400000	384000	358000	465000	440000	410000	520000	495000	470000	
			Electric Power (Watts)	42726	42812	43232	42556	42962	43520	42624	43090	43488	
			Leaving Air Temp (°F db/°F wb)	55.3 / 54.5	56.9 / 56.8	59.3 / 59.2	54.8 / 54.4	57.2 / 56.7	59.9 / 59.0	54.9 / 54.2	57.3 / 56.5	59.6 / 58.9	
	85	195.00	Total Capacity (Btu/h)	740000	770000	795000	745000	770000	795000	745000	770000	800000	
			Sensible Capacity (Btu/h)	398000	372000	346000	450000	430000	400000	510000	485000	455000	
			Electric Power (Watts)	46026	46372	46896	46468	46358	47062	46410	46742	47208	
			Leaving Air Temp (°F db/°F wb)	55.6 / 55.6	57.9 / 57.9	60.3 / 60.2	56.3 / 55.5	57.8 / 57.8	60.5 / 60.1	56.0 / 55.4	58.2 / 57.6	60.8 / 59.9	
	13000	50	195.00	Total Capacity (Btu/h)	900000	930000	965000	905000	935000	965000	905000	935000	965000
				Sensible Capacity (Btu/h)	475000	445000	410000	550000	525000	490000	625000	595000	565000
				Electric Power (Watts)	36322	36840	37382	36284	36694	37254	36282	36748	37338
				Leaving Air Temp (°F db/°F wb)	57.1 / 56.3	59.5 / 58.6	61.8 / 61.0	56.8 / 56.2	58.8 / 58.5	61.1 / 60.8	56.7 / 56.1	58.8 / 58.4	61.2 / 60.7
60		195.00	Total Capacity (Btu/h)	870000	900000	930000	870000	900000	935000	875000	905000	935000	
			Sensible Capacity (Btu/h)	470000	440000	400000	540000	510000	480000	615000	585000	550000	
			Electric Power (Watts)	38682	39166	39790	38738	39224	39734	38798	39238	39756	
			Leaving Air Temp (°F db/°F wb)	57.5 / 57.1	59.8 / 59.4	62.6 / 61.7	57.5 / 57.0	59.8 / 59.3	62.1 / 61.6	57.5 / 56.9	59.6 / 59.2	62.0 / 61.5	
75		195.00	Total Capacity (Btu/h)	820000	850000	880000	825000	850000	880000	825000	855000	880000	
			Sensible Capacity (Btu/h)	450000	415000	388000	525000	495000	460000	595000	565000	535000	
			Electric Power (Watts)	43284	43750	44116	43298	43722	44168	43314	43786	44184	
			Leaving Air Temp (°F db/°F wb)	58.8 / 58.4	61.4 / 60.7	63.4 / 63.0	58.7 / 58.3	61.0 / 60.6	63.3 / 62.9	58.6 / 58.2	61.1 / 60.4	63.2 / 62.8	
85		195.00	Total Capacity (Btu/h)	785000	815000	840000	790000	815000	840000	790000	815000	845000	
			Sensible Capacity (Btu/h)	440000	400000	370000	510000	480000	450000	585000	550000	520000	
			Electric Power (Watts)	46958	47408	47796	46970	47354	47762	46988	47438	47842	
			Leaving Air Temp (°F db/°F wb)	59.7 / 59.3	62.3 / 61.5	64.6 / 63.9	59.6 / 59.2	61.9 / 61.5	64.2 / 63.8	59.5 / 59.1	62.0 / 61.3	64.3 / 63.6	

Performance Data (Cont'd)

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)									
				COOLING									
				DRY BULB	90			95			100		
				WET BULB	76	78	80	76	78	80	76	78	80
840 (70 TON)													
8750	50	210.00	Total Capacity (Btu/h)	855000	885000	920000	855000	890000	920000	860000	890000	920000	
			Sensible Capacity (Btu/h)	435000	415000	390000	480000	460000	440000	530000	505000	485000	
			Electric Power (Watts)	41440	42014	42632	41698	42290	42658	41720	42320	42962	
			Leaving Air Temp (°F db/°F wb)	45.4 / 45.1	47.8 / 47.5	50.2 / 49.9	45.7 / 45.0	48.1 / 47.3	50.0 / 49.7	45.5 / 44.8	47.9 / 47.2	50.4 / 49.6	
	60	210.00	Total Capacity (Btu/h)	830000	860000	895000	835000	865000	895000	835000	865000	895000	
			Sensible Capacity (Btu/h)	420000	400000	378000	470000	445000	430000	515000	495000	475000	
			Electric Power (Watts)	44482	44816	45406	44510	45060	45432	44530	45090	45692	
			Leaving Air Temp (°F db/°F wb)	47.0 / 46.3	49.0 / 48.7	51.4 / 51.1	46.9 / 46.2	49.3 / 48.5	51.2 / 50.9	46.7 / 46.0	49.1 / 48.4	51.5 / 50.8	
	75	210.00	Total Capacity (Btu/h)	790000	820000	850000	795000	825000	855000	795000	825000	855000	
			Sensible Capacity (Btu/h)	400000	382000	360000	450000	430000	410000	500000	480000	455000	
			Electric Power (Watts)	49742	50014	50572	49770	50264	50590	49794	50294	50838	
			Leaving Air Temp (°F db/°F wb)	48.9 / 48.2	50.8 / 50.5	53.3 / 52.9	48.7 / 48.1	51.1 / 50.4	53.1 / 52.8	48.6 / 47.9	50.9 / 50.2	53.3 / 52.6	
	85	210.00	Total Capacity (Btu/h)	765000	790000	820000	765000	795000	820000	765000	795000	825000	
			Sensible Capacity (Btu/h)	388000	362000	342000	435000	415000	390000	485000	465000	445000	
			Electric Power (Watts)	54046	54792	55054	54074	54532	55322	54134	54562	55072	
			Leaving Air Temp (°F db/°F wb)	50.2 / 49.5	53.0 / 51.9	55.1 / 54.2	50.1 / 49.4	52.4 / 51.7	55.2 / 54.1	50.1 / 49.2	52.3 / 51.6	54.6 / 53.9	
11200	50	210.00	Total Capacity (Btu/h)	940000	975000	1005000	940000	975000	1010000	945000	975000	1010000	
			Sensible Capacity (Btu/h)	485000	460000	430000	540000	510000	495000	605000	580000	555000	
			Electric Power (Watts)	43034	43720	44452	43472	44164	44474	43404	43944	44704	
			Leaving Air Temp (°F db/°F wb)	50.9 / 50.9	53.3 / 53.2	55.7 / 55.7	51.6 / 50.7	54.0 / 53.1	55.5 / 55.5	51.3 / 50.6	53.4 / 53.0	55.8 / 55.4	
	60	210.00	Total Capacity (Btu/h)	910000	945000	975000	915000	945000	980000	915000	945000	980000	
			Sensible Capacity (Btu/h)	465000	445000	420000	535000	500000	470000	595000	570000	540000	
			Electric Power (Watts)	46082	46406	47112	45932	46790	47484	45944	46608	47334	
			Leaving Air Temp (°F db/°F wb)	52.7 / 51.8	54.3 / 54.2	56.7 / 56.6	52.2 / 51.7	54.9 / 54.0	57.4 / 56.4	52.2 / 51.6	54.3 / 53.9	56.8 / 56.3	
	75	210.00	Total Capacity (Btu/h)	865000	895000	925000	865000	900000	930000	870000	900000	930000	
			Sensible Capacity (Btu/h)	445000	420000	390000	515000	485000	460000	575000	545000	520000	
			Electric Power (Watts)	51166	51734	52354	50992	51614	52274	51178	51712	52402	
			Leaving Air Temp (°F db/°F wb)	54.3 / 53.4	56.6 / 55.8	59.0 / 58.1	53.7 / 53.3	56.1 / 55.6	58.5 / 58.0	53.8 / 53.2	56.1 / 55.5	58.6 / 57.8	
	85	210.00	Total Capacity (Btu/h)	835000	860000	890000	835000	865000	895000	835000	865000	895000	
			Sensible Capacity (Btu/h)	430000	405000	376000	500000	475000	445000	560000	535000	505000	
			Electric Power (Watts)	55406	55920	56486	55238	55736	56362	55328	55838	56526	
			Leaving Air Temp (°F db/°F wb)	55.4 / 54.5	57.8 / 56.8	60.1 / 59.2	54.9 / 54.4	57.1 / 56.7	59.5 / 59.0	54.9 / 54.3	57.2 / 56.6	59.7 / 58.9	

TABLE 7 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)								
				COOLING								
			DRY BULB	90			95			100		
			WET BULB	76	78	80	76	78	80	76	78	80
840 (70 TON) CONT'D												
14000	50	210.00	Total Capacity (Btu/h)	1005000	1040000	1075000	1010000	1045000	1075000	1010000	1045000	1080000
			Sensible Capacity (Btu/h)	535000	490000	455000	610000	575000	545000	685000	655000	620000
			Electric Power (Watts)	44628	45658	46472	44832	45608	46258	44824	45504	46400
			Leaving Air Temp (°F db/°F wb)	55.7 / 55.4	58.7 / 57.7	61.1 / 60.1	55.9 / 55.3	58.3 / 57.6	60.2 / 60.0	55.7 / 55.1	57.9 / 57.5	60.3 / 59.9
	60	210.00	Total Capacity (Btu/h)	975000	1005000	1040000	975000	1010000	1045000	975000	1010000	1045000
			Sensible Capacity (Btu/h)	520000	485000	450000	600000	565000	525000	675000	645000	610000
			Electric Power (Watts)	47220	47956	48736	47290	48048	48896	47316	48072	48872
			Leaving Air Temp (°F db/°F wb)	56.5 / 56.2	58.9 / 58.5	61.3 / 60.9	56.5 / 56.1	58.9 / 58.4	61.4 / 60.7	56.4 / 56.0	58.7 / 58.3	61.1 / 60.7
	75	210.00	Total Capacity (Btu/h)	925000	955000	985000	925000	955000	985000	925000	955000	990000
			Sensible Capacity (Btu/h)	495000	465000	430000	580000	545000	510000	655000	620000	585000
			Electric Power (Watts)	52224	52794	53506	52184	52862	53592	52270	52954	53686
			Leaving Air Temp (°F db/°F wb)	58.1 / 57.5	60.2 / 59.8	62.5 / 62.1	57.8 / 57.4	60.1 / 59.7	62.4 / 62.0	57.9 / 57.3	60.2 / 59.6	62.5 / 61.9
	85	210.00	Total Capacity (Btu/h)	885000	915000	945000	890000	915000	945000	890000	920000	950000
			Sensible Capacity (Btu/h)	485000	455000	420000	560000	530000	495000	640000	605000	570000
			Electric Power (Watts)	56310	56806	57480	56324	56950	57560	56364	56994	57680
			Leaving Air Temp (°F db/°F wb)	59.0 / 58.4	61.0 / 60.7	63.4 / 63.0	58.9 / 58.3	61.2 / 60.6	63.3 / 62.9	58.8 / 58.2	61.1 / 60.4	63.4 / 62.7

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
036 (3 TON)						
375	40	9.00	Total Capacity (Btu/h)	34000	33400	33000
			Electric Power (Watts)	2756	2987	3223
			Leaving Air Temp (°F db/°F wb)	103.6	112.4	121.3
	50	9.00	Total Capacity (Btu/h)	38000	37400	37000
			Electric Power (Watts)	3004	3223	3468
			Leaving Air Temp (°F db/°F wb)	113.5	122.1	131.2
	60	9.00	Total Capacity (Btu/h)	42500	41500	41500
			Electric Power (Watts)	3237	3480	3707
			Leaving Air Temp (°F db/°F wb)	124.0	132.7	141.6
	70	9.00	Total Capacity (Btu/h)	47000	46500	46000
			Electric Power (Watts)	3514	3715	4002
			Leaving Air Temp (°F db/°F wb)	135.1	143.9	153.6
480	40	9.00	Total Capacity (Btu/h)	34400	34000	33600
			Electric Power (Watts)	2443	2660	2900
			Leaving Air Temp (°F db/°F wb)	86.3	95.5	104.6
	50	9.00	Total Capacity (Btu/h)	39000	38000	37800
			Electric Power (Watts)	2648	2880	3121
			Leaving Air Temp (°F db/°F wb)	94.8	103.4	112.5
	60	9.00	Total Capacity (Btu/h)	43500	42500	42000
			Electric Power (Watts)	2842	3073	3320
			Leaving Air Temp (°F db/°F wb)	103.5	112.2	121.1
	70	9.00	Total Capacity (Btu/h)	48000	47500	47000
			Electric Power (Watts)	3052	3294	3547
			Leaving Air Temp (°F db/°F wb)	112.7	121.3	129.9
600	40	9.00	Total Capacity (Btu/h)	35200	34600	34000
			Electric Power (Watts)	2251	2449	2673
			Leaving Air Temp (°F db/°F wb)	74.3	83.3	92.4
	50	9.00	Total Capacity (Btu/h)	39500	39000	38500
			Electric Power (Watts)	2408	2622	2859
			Leaving Air Temp (°F db/°F wb)	81	90	98.9
	60	9.00	Total Capacity (Btu/h)	44500	43500	43000
			Electric Power (Watts)	2580	2796	3025
			Leaving Air Temp (°F db/°F wb)	88.2	97.3	106
	70	9.00	Total Capacity (Btu/h)	49500	49000	48000
			Electric Power (Watts)	2733	2969	3202
			Leaving Air Temp (°F db/°F wb)	96.1	105.3	113.5

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
048 (4 TON)						
500	40	12.00	Total Capacity (Btu/h)	43000	42500	42000
			Electric Power (Watts)	3373	3633	3901
			Leaving Air Temp (°F db/°F wb)	99.1	108.4	117.2
	50	12.00	Total Capacity (Btu/h)	48500	47500	47000
			Electric Power (Watts)	3618	3895	4173
			Leaving Air Temp (°F db/°F wb)	109.3	118.0	126.6
	60	12.00	Total Capacity (Btu/h)	54000	53000	52500
			Electric Power (Watts)	3897	4184	4481
			Leaving Air Temp (°F db/°F wb)	119.4	127.9	136.6
	70	12.00	Total Capacity (Btu/h)	59500	59000	58000
			Electric Power (Watts)	4226	4527	4789
			Leaving Air Temp (°F db/°F wb)	130.1	138.6	147.1
640	40	12.00	Total Capacity (Btu/h)	44000	43000	42500
			Electric Power (Watts)	3045	3304	3559
			Leaving Air Temp (°F db/°F wb)	83.4	92.2	101.0
	50	12.00	Total Capacity (Btu/h)	49500	48500	48000
			Electric Power (Watts)	3251	3499	3774
			Leaving Air Temp (°F db/°F wb)	91.3	100.0	108.9
	60	12.00	Total Capacity (Btu/h)	55500	54500	53500
			Electric Power (Watts)	3467	3733	4019
			Leaving Air Temp (°F db/°F wb)	99.9	108.5	117.3
	70	12.00	Total Capacity (Btu/h)	61500	60500	59500
			Electric Power (Watts)	3720	3996	4291
			Leaving Air Temp (°F db/°F wb)	108.8	117.3	125.8
800	40	12.00	Total Capacity (Btu/h)	44500	44000	43000
			Electric Power (Watts)	2815	3061	3324
			Leaving Air Temp (°F db/°F wb)	71.6	80.6	89.6
	50	12.00	Total Capacity (Btu/h)	50500	49500	48500
			Electric Power (Watts)	3013	3248	3504
			Leaving Air Temp (°F db/°F wb)	78.0	87.0	96.1
	60	12.00	Total Capacity (Btu/h)	56500	56000	54500
			Electric Power (Watts)	3186	3429	3694
			Leaving Air Temp (°F db/°F wb)	85.3	94.4	103.0
	70	12.00	Total Capacity (Btu/h)	63500	62500	61000
			Electric Power (Watts)	3378	3647	3910
			Leaving Air Temp (°F db/°F wb)	93.0	102.1	110.3

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
060 (5 TON)						
625	40	15.00	Total Capacity (Btu/h)	53000	52000	51500
			Electric Power (Watts)	4166	4492	4845
			Leaving Air Temp (°F db/°F wb)	98.2	107.2	116.3
	50	15.00	Total Capacity (Btu/h)	60000	59000	58500
			Electric Power (Watts)	4494	4838	5205
			Leaving Air Temp (°F db/°F wb)	108.4	117.0	126.1
	60	15.00	Total Capacity (Btu/h)	67000	66000	65000
			Electric Power (Watts)	4883	5227	5539
			Leaving Air Temp (°F db/°F wb)	118.8	127.3	136.5
	70	15.00	Total Capacity (Btu/h)	74000	73000	73000
			Electric Power (Watts)	5290	5624	6154
			Leaving Air Temp (°F db/°F wb)	129.3	137.9	147.3
800	40	15.00	Total Capacity (Btu/h)	54000	53000	52500
			Electric Power (Watts)	3809	4107	4438
			Leaving Air Temp (°F db/°F wb)	82.2	91.3	100.3
	50	15.00	Total Capacity (Btu/h)	61500	60000	59500
			Electric Power (Watts)	4061	4368	4717
			Leaving Air Temp (°F db/°F wb)	90.8	99.4	108.5
	60	15.00	Total Capacity (Btu/h)	68000	67000	67000
			Electric Power (Watts)	4323	4662	5031
			Leaving Air Temp (°F db/°F wb)	99.0	107.7	116.8
	70	15.00	Total Capacity (Btu/h)	77000	75000	74000
			Electric Power (Watts)	4651	4998	5363
			Leaving Air Temp (°F db/°F wb)	108.3	116.5	125.2
1000	40	15.00	Total Capacity (Btu/h)	54500	54000	53000
			Electric Power (Watts)	3571	3852	4166
			Leaving Air Temp (°F db/°F wb)	70.5	79.7	89.1
	50	15.00	Total Capacity (Btu/h)	62000	61000	60500
			Electric Power (Watts)	3752	4049	4374
			Leaving Air Temp (°F db/°F wb)	77.3	86.5	95.6
	60	15.00	Total Capacity (Btu/h)	70000	69000	68000
			Electric Power (Watts)	3967	4277	4617
			Leaving Air Temp (°F db/°F wb)	84.9	93.6	102.6
	70	15.00	Total Capacity (Btu/h)	78000	77000	76000
			Electric Power (Watts)	4212	4539	4892
			Leaving Air Temp (°F db/°F wb)	92.1	100.8	109.8

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
072 (6 TON)						
750	40	18.00	Total Capacity (Btu/h)	56500	55500	54500
			Electric Power (Watts)	3957	4276	4628
			Leaving Air Temp (°F db/°F wb)	89.5	98.2	107.1
	50	18.00	Total Capacity (Btu/h)	63500	62500	61500
			Electric Power (Watts)	4287	4636	4999
			Leaving Air Temp (°F db/°F wb)	98.2	107.0	115.9
	60	18.00	Total Capacity (Btu/h)	71000	70000	69000
			Electric Power (Watts)	4629	4986	5368
			Leaving Air Temp (°F db/°F wb)	107.5	116.3	125.0
	70	18.00	Total Capacity (Btu/h)	79000	78000	77000
			Electric Power (Watts)	5020	5375	5761
			Leaving Air Temp (°F db/°F wb)	117.8	125.6	134.2
960	40	18.00	Total Capacity (Btu/h)	58000	56500	55500
			Electric Power (Watts)	3629	3916	4239
			Leaving Air Temp (°F db/°F wb)	75.7	84.5	93.5
	50	18.00	Total Capacity (Btu/h)	65000	64000	63000
			Electric Power (Watts)	3871	4188	4535
			Leaving Air Temp (°F db/°F wb)	82.7	91.5	100.4
	60	18.00	Total Capacity (Btu/h)	73000	72000	71000
			Electric Power (Watts)	4160	4480	4827
			Leaving Air Temp (°F db/°F wb)	90.4	99.2	108.0
	70	18.00	Total Capacity (Btu/h)	82000	80000	79000
			Electric Power (Watts)	4444	4780	5143
			Leaving Air Temp (°F db/°F wb)	98.7	107.2	115.8
1200	40	18.00	Total Capacity (Btu/h)	59000	57500	56500
			Electric Power (Watts)	3381	3667	3976
			Leaving Air Temp (°F db/°F wb)	65.2	74.3	83.5
	50	18.00	Total Capacity (Btu/h)	67000	65000	64000
			Electric Power (Watts)	3586	3887	4215
			Leaving Air Temp (°F db/°F wb)	71.2	80.1	89.2
	60	18.00	Total Capacity (Btu/h)	75000	73000	72000
			Electric Power (Watts)	3834	4148	4466
			Leaving Air Temp (°F db/°F wb)	77.8	86.3	95.2
	70	18.00	Total Capacity (Btu/h)	84000	82000	81000
			Electric Power (Watts)	4070	4381	4715
			Leaving Air Temp (°F db/°F wb)	84.5	93.1	102.1

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
			DRY BULB	20	30	40
084 (7 TON)						
875	40	21.00	Total Capacity (Btu/h)	71000	70000	69000
			Electric Power (Watts)	5548	5925	6317
			Leaving Air Temp (°F db/°F wb)	95.1	103.8	112.9
	50	21.00	Total Capacity (Btu/h)	80000	79000	78000
			Electric Power (Watts)	6055	6449	6872
			Leaving Air Temp (°F db/°F wb)	104.3	113.3	121.9
	60	21.00	Total Capacity (Btu/h)	89000	88000	87000
			Electric Power (Watts)	6626	7046	7490
			Leaving Air Temp (°F db/°F wb)	114.1	122.9	131.6
	70	21.00	Total Capacity (Btu/h)	99000	97000	96000
			Electric Power (Watts)	7257	7707	8147
			Leaving Air Temp (°F db/°F wb)	124.4	132.8	141.3
1120	40	21.00	Total Capacity (Btu/h)	73000	72000	70000
			Electric Power (Watts)	5076	5455	5855
			Leaving Air Temp (°F db/°F wb)	79.9	89.0	97.9
	50	21.00	Total Capacity (Btu/h)	82000	80000	79000
			Electric Power (Watts)	5518	5889	6295
			Leaving Air Temp (°F db/°F wb)	87.5	96.3	105.3
	60	21.00	Total Capacity (Btu/h)	92000	90000	89000
			Electric Power (Watts)	5968	6370	6803
			Leaving Air Temp (°F db/°F wb)	95.7	104.4	113.2
	70	21.00	Total Capacity (Btu/h)	102000	100000	99000
			Electric Power (Watts)	6481	6906	7360
			Leaving Air Temp (°F db/°F wb)	104.2	112.7	121.2
1400	40	21.00	Total Capacity (Btu/h)	74000	72000	72000
			Electric Power (Watts)	4760	5110	5505
			Leaving Air Temp (°F db/°F wb)	68.6	77.8	87.2
	50	21.00	Total Capacity (Btu/h)	83000	82000	80000
			Electric Power (Watts)	5165	5515	5895
			Leaving Air Temp (°F db/°F wb)	75.0	84.0	93.1
	60	21.00	Total Capacity (Btu/h)	94000	92000	91000
			Electric Power (Watts)	5538	5905	6311
			Leaving Air Temp (°F db/°F wb)	81.9	90.8	99.7
	70	21.00	Total Capacity (Btu/h)	105000	103000	101000
			Electric Power (Watts)	5961	6349	6774
			Leaving Air Temp (°F db/°F wb)	89.3	97.8	106.6

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				20	30	40
096 (8 TON)						
1000	40	24.00	Total Capacity (Btu/h)	80000	79000	78000
			Electric Power (Watts)	6393	6819	7261
			Leaving Air Temp (°F db/°F wb)	93.8	102.7	111.9
	50	24.00	Total Capacity (Btu/h)	90000	89000	88000
			Electric Power (Watts)	6977	7424	7902
			Leaving Air Temp (°F db/°F wb)	103.1	112.2	121.2
	60	24.00	Total Capacity (Btu/h)	101000	100000	98000
			Electric Power (Watts)	7618	8116	8615
			Leaving Air Temp (°F db/°F wb)	113.1	121.9	130.4
	70	24.00	Total Capacity (Btu/h)	112000	110000	109000
			Electric Power (Watts)	8371	8882	9330
			Leaving Air Temp (°F db/°F wb)	123.4	132.0	140.8
1280	40	24.00	Total Capacity (Btu/h)	81000	80000	79000
			Electric Power (Watts)	5902	6321	6751
			Leaving Air Temp (°F db/°F wb)	78.6	87.9	97.2
	50	24.00	Total Capacity (Btu/h)	92000	91000	90000
			Electric Power (Watts)	6375	6809	7261
			Leaving Air Temp (°F db/°F wb)	86.4	95.4	104.6
	60	24.00	Total Capacity (Btu/h)	103000	102000	100000
			Electric Power (Watts)	6894	7358	7854
			Leaving Air Temp (°F db/°F wb)	94.6	103.4	112.3
	70	24.00	Total Capacity (Btu/h)	115000	113000	112000
			Electric Power (Watts)	7488	7981	8504
			Leaving Air Temp (°F db/°F wb)	103.2	111.8	120.4
1600	40	24.00	Total Capacity (Btu/h)	82000	81000	80000
			Electric Power (Watts)	5542	5951	6396
			Leaving Air Temp (°F db/°F wb)	67.5	76.9	86.3
	50	24.00	Total Capacity (Btu/h)	94000	92000	91000
			Electric Power (Watts)	5976	6381	6814
			Leaving Air Temp (°F db/°F wb)	74.0	83.1	92.4
	60	24.00	Total Capacity (Btu/h)	106000	104000	102000
			Electric Power (Watts)	6404	6832	7301
			Leaving Air Temp (°F db/°F wb)	80.9	89.9	98.9
	70	24.00	Total Capacity (Btu/h)	118000	116000	114000
			Electric Power (Watts)	6895	7345	7839
			Leaving Air Temp (°F db/°F wb)	88.2	97.0	105.8

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
120 (10 TON)						
1250	40	30.00	Total Capacity (Btu/h)	107000	105000	103000
			Electric Power (Watts)	7522	8094	8736
			Leaving Air Temp (°F db/°F wb)	98.9	107.3	116.1
	50	30.00	Total Capacity (Btu/h)	120000	118000	116000
			Electric Power (Watts)	8178	8780	9482
			Leaving Air Temp (°F db/°F wb)	108.4	116.8	125.5
	60	30.00	Total Capacity (Btu/h)	134000	132000	129000
			Electric Power (Watts)	8894	9592	10310
			Leaving Air Temp (°F db/°F wb)	118.3	126.9	135.4
	70	30.00	Total Capacity (Btu/h)	148000	146000	142000
			Electric Power (Watts)	9752	10476	11216
			Leaving Air Temp (°F db/°F wb)	128.9	137.1	145.5
1600	40	30.00	Total Capacity (Btu/h)	110000	107000	105000
			Electric Power (Watts)	6770	7302	7892
			Leaving Air Temp (°F db/°F wb)	83.2	91.8	100.8
	50	30.00	Total Capacity (Btu/h)	123000	121000	119000
			Electric Power (Watts)	7248	7814	8446
			Leaving Air Temp (°F db/°F wb)	91.2	99.7	108.5
	60	30.00	Total Capacity (Btu/h)	138000	136000	132000
			Electric Power (Watts)	7794	8422	9078
			Leaving Air Temp (°F db/°F wb)	99.7	108.3	116.6
	70	30.00	Total Capacity (Btu/h)	154000	150000	148000
			Electric Power (Watts)	8432	9082	9818
			Leaving Air Temp (°F db/°F wb)	108.3	116.6	125.1
2000	40	30.00	Total Capacity (Btu/h)	112000	109000	107000
			Electric Power (Watts)	6256	6764	7320
			Leaving Air Temp (°F db/°F wb)	71.6	80.4	89.5
	50	30.00	Total Capacity (Btu/h)	126000	124000	121000
			Electric Power (Watts)	6620	7160	7746
			Leaving Air Temp (°F db/°F wb)	78.1	87.0	95.9
	60	30.00	Total Capacity (Btu/h)	142000	140000	136000
			Electric Power (Watts)	7066	7630	8238
			Leaving Air Temp (°F db/°F wb)	85.4	94.3	102.8
	70	30.00	Total Capacity (Btu/h)	158000	154000	152000
			Electric Power (Watts)	7562	8150	8802
			Leaving Air Temp (°F db/°F wb)	93.1	101.4	109.8

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
150 (12.5 TON)						
1500	40	36.00	Total Capacity (Btu/h)	128000	127000	125000
			Electric Power (Watts)	9306	9972	10666
			Leaving Air Temp (°F db/°F wb)	99.0	108.0	117.1
	50	36.00	Total Capacity (Btu/h)	144000	142000	140000
			Electric Power (Watts)	10216	10938	11686
			Leaving Air Temp (°F db/°F wb)	108.6	117.3	126.3
	60	36.00	Total Capacity (Btu/h)	160000	158000	156000
			Electric Power (Watts)	11260	12024	12812
			Leaving Air Temp (°F db/°F wb)	118.7	127.2	135.9
	70	36.00	Total Capacity (Btu/h)	178000	174000	172000
			Electric Power (Watts)	12452	13218	13924
			Leaving Air Temp (°F db/°F wb)	129.1	137.4	146.3
1920	40	36.00	Total Capacity (Btu/h)	132000	129000	127000
			Electric Power (Watts)	8464	9078	9738
			Leaving Air Temp (°F db/°F wb)	83.1	92.1	101.3
	50	36.00	Total Capacity (Btu/h)	148000	146000	144000
			Electric Power (Watts)	9172	9828	10552
			Leaving Air Temp (°F db/°F wb)	91.3	99.9	108.9
	60	36.00	Total Capacity (Btu/h)	166000	162000	160000
			Electric Power (Watts)	9990	10698	11468
			Leaving Air Temp (°F db/°F wb)	99.4	108.1	116.9
	70	36.00	Total Capacity (Btu/h)	184000	180000	178000
			Electric Power (Watts)	10924	11676	12494
			Leaving Air Temp (°F db/°F wb)	108.3	116.6	125.2
2400	40	36.00	Total Capacity (Btu/h)	134000	132000	129000
			Electric Power (Watts)	7906	8470	9096
			Leaving Air Temp (°F db/°F wb)	71.5	80.5	89.8
	50	36.00	Total Capacity (Btu/h)	152000	148000	146000
			Electric Power (Watts)	8490	9082	9752
			Leaving Air Temp (°F db/°F wb)	78.2	87.1	96.1
	60	36.00	Total Capacity (Btu/h)	170000	166000	164000
			Electric Power (Watts)	9162	9794	10496
			Leaving Air Temp (°F db/°F wb)	85.1	93.9	102.8
	70	36.00	Total Capacity (Btu/h)	188000	184000	182000
			Electric Power (Watts)	9926	10594	11344
			Leaving Air Temp (°F db/°F wb)	92.6	101.1	109.8

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
180 (15 TON)						
1875	40	45.00	Total Capacity (Btu/h)	154000	150000	148000
			Electric Power (Watts)	10996	11752	12570
			Leaving Air Temp (°F db/°F wb)	95.6	104.2	113.2
	50	45.00	Total Capacity (Btu/h)	172000	170000	166000
			Electric Power (Watts)	12040	12876	13760
			Leaving Air Temp (°F db/°F wb)	104.6	113.3	122.2
	60	45.00	Total Capacity (Btu/h)	192000	188000	186000
			Electric Power (Watts)	13260	14152	15078
			Leaving Air Temp (°F db/°F wb)	114.3	122.8	131.4
	70	45.00	Total Capacity (Btu/h)	212000	208000	206000
			Electric Power (Watts)	14648	15554	16398
			Leaving Air Temp (°F db/°F wb)	124.7	132.6	141.2
2400	40	45.00	Total Capacity (Btu/h)	158000	154000	152000
			Electric Power (Watts)	10048	10750	11528
			Leaving Air Temp (°F db/°F wb)	80.4	89.2	98.3
	50	45.00	Total Capacity (Btu/h)	176000	174000	170000
			Electric Power (Watts)	10876	11640	12476
			Leaving Air Temp (°F db/°F wb)	87.9	96.7	105.7
	60	45.00	Total Capacity (Btu/h)	198000	194000	190000
			Electric Power (Watts)	11846	12660	13552
			Leaving Air Temp (°F db/°F wb)	96.0	104.7	113.4
	70	45.00	Total Capacity (Btu/h)	220000	216000	212000
			Electric Power (Watts)	12956	13814	14752
			Leaving Air Temp (°F db/°F wb)	104.7	112.8	121.4
3000	40	45.00	Total Capacity (Btu/h)	160000	156000	154000
			Electric Power (Watts)	9416	10070	10802
			Leaving Air Temp (°F db/°F wb)	69.1	78.1	87.3
	50	45.00	Total Capacity (Btu/h)	180000	176000	174000
			Electric Power (Watts)	10118	10806	11582
			Leaving Air Temp (°F db/°F wb)	75.4	84.4	93.5
	60	45.00	Total Capacity (Btu/h)	202000	198000	196000
			Electric Power (Watts)	10928	11652	12472
			Leaving Air Temp (°F db/°F wb)	82.4	91.1	100.0
	70	45.00	Total Capacity (Btu/h)	226000	222000	218000
			Electric Power (Watts)	11848	12610	13472
			Leaving Air Temp (°F db/°F wb)	89.8	98.1	106.8

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
210 (17.5 TON)						
2187.5	40	52.50	Total Capacity (Btu/h)	188000	186000	184000
			Electric Power (Watts)	13470	14446	15538
			Leaving Air Temp (°F db/°F wb)	99.7	108.4	117.4
	50	52.50	Total Capacity (Btu/h)	212000	208000	206000
			Electric Power (Watts)	14714	15804	16956
			Leaving Air Temp (°F db/°F wb)	109.3	118.1	127.0
	60	52.50	Total Capacity (Btu/h)	236000	232000	230000
			Electric Power (Watts)	16138	17284	18412
			Leaving Air Temp (°F db/°F wb)	119.6	127.9	136.7
	70	52.50	Total Capacity (Btu/h)	260000	256000	252000
			Electric Power (Watts)	17688	18758	19812
			Leaving Air Temp (°F db/°F wb)	129.9	138.0	146.6
2800	40	52.50	Total Capacity (Btu/h)	194000	190000	188000
			Electric Power (Watts)	12250	13118	14112
			Leaving Air Temp (°F db/°F wb)	83.9	92.7	101.8
	50	52.50	Total Capacity (Btu/h)	218000	214000	210000
			Electric Power (Watts)	13212	14158	15194
			Leaving Air Temp (°F db/°F wb)	91.7	100.4	109.4
	60	52.50	Total Capacity (Btu/h)	242000	238000	236000
			Electric Power (Watts)	14274	15318	16438
			Leaving Air Temp (°F db/°F wb)	100.0	108.6	117.6
	70	52.50	Total Capacity (Btu/h)	270000	264000	260000
			Electric Power (Watts)	15486	16570	17738
			Leaving Air Temp (°F db/°F wb)	108.9	117.1	125.8
3500	40	52.50	Total Capacity (Btu/h)	198000	194000	190000
			Electric Power (Watts)	11378	12206	13130
			Leaving Air Temp (°F db/°F wb)	72.2	81.1	90.2
	50	52.50	Total Capacity (Btu/h)	222000	218000	214000
			Electric Power (Watts)	12144	13038	14014
			Leaving Air Temp (°F db/°F wb)	78.5	87.5	96.5
	60	52.50	Total Capacity (Btu/h)	248000	244000	240000
			Electric Power (Watts)	13030	13966	15002
			Leaving Air Temp (°F db/°F wb)	85.6	94.4	103.3
	70	52.50	Total Capacity (Btu/h)	278000	272000	266000
			Electric Power (Watts)	14008	14978	16054
			Leaving Air Temp (°F db/°F wb)	93.2	101.6	110.2

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				20	30	40
240 (20 TON)						
2500	40	60.00	Total Capacity (Btu/h)	214000	210000	208000
			Electric Power (Watts)	15596	16844	18204
			Leaving Air Temp (°F db/°F wb)	98.8	107.7	116.7
	50	60.00	Total Capacity (Btu/h)	240000	236000	234000
			Electric Power (Watts)	17082	18426	19892
			Leaving Air Temp (°F db/°F wb)	108.5	117.1	126.4
	60	60.00	Total Capacity (Btu/h)	266000	264000	260000
			Electric Power (Watts)	18762	20156	21584
			Leaving Air Temp (°F db/°F wb)	118.5	127.2	136.0
	70	60.00	Total Capacity (Btu/h)	296000	290000	290000
			Electric Power (Watts)	20686	21968	23070
			Leaving Air Temp (°F db/°F wb)	129.0	137.3	146.9
3200	40	60.00	Total Capacity (Btu/h)	220000	214000	212000
			Electric Power (Watts)	14064	15164	16404
			Leaving Air Temp (°F db/°F wb)	83.3	92.0	101.0
	50	60.00	Total Capacity (Btu/h)	246000	242000	238000
			Electric Power (Watts)	15212	16380	17678
			Leaving Air Temp (°F db/°F wb)	91.0	99.7	108.8
	60	60.00	Total Capacity (Btu/h)	276000	270000	266000
			Electric Power (Watts)	16510	17768	19148
			Leaving Air Temp (°F db/°F wb)	99.5	107.9	116.9
	70	60.00	Total Capacity (Btu/h)	306000	300000	294000
			Electric Power (Watts)	18010	19316	20738
			Leaving Air Temp (°F db/°F wb)	108.1	116.3	124.9
4000	40	60.00	Total Capacity (Btu/h)	222000	218000	216000
			Electric Power (Watts)	12944	14016	15178
			Leaving Air Temp (°F db/°F wb)	71.2	80.5	89.6
	50	60.00	Total Capacity (Btu/h)	250000	246000	242000
			Electric Power (Watts)	13886	15000	16212
			Leaving Air Temp (°F db/°F wb)	77.9	86.9	96.0
	60	60.00	Total Capacity (Btu/h)	282000	276000	272000
			Electric Power (Watts)	14990	16144	17408
			Leaving Air Temp (°F db/°F wb)	85.1	93.8	102.7
	70	60.00	Total Capacity (Btu/h)	314000	308000	302000
			Electric Power (Watts)	16242	17432	18736
			Leaving Air Temp (°F db/°F wb)	92.5	100.9	109.6

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				20	30	40
300 (25 TON)						
3125	40	75.00	Total Capacity (Btu/h)	214000	258000	254000
			Electric Power (Watts)	18756	20004	21444
			Leaving Air Temp (°F db/°F wb)	98.5	106.5	115.3
	50	75.00	Total Capacity (Btu/h)	296000	290000	286000
			Electric Power (Watts)	20286	21762	23352
			Leaving Air Temp (°F db/°F wb)	107.2	115.8	124.6
	60	75.00	Total Capacity (Btu/h)	328000	322000	318000
			Electric Power (Watts)	22180	23712	25282
			Leaving Air Temp (°F db/°F wb)	116.8	125.2	134.0
	70	75.00	Total Capacity (Btu/h)	362000	356000	352000
			Electric Power (Watts)	24144	25704	27184
			Leaving Air Temp (°F db/°F wb)	126.7	135.0	143.7
4000	40	75.00	Total Capacity (Btu/h)	274000	266000	262000
			Electric Power (Watts)	16998	18202	19540
			Leaving Air Temp (°F db/°F wb)	83.0	91.4	100.4
	50	75.00	Total Capacity (Btu/h)	304000	298000	294000
			Electric Power (Watts)	18190	19496	20938
			Leaving Air Temp (°F db/°F wb)	90.3	98.7	107.7
	60	75.00	Total Capacity (Btu/h)	340000	332000	326000
			Electric Power (Watts)	19600	21028	22530
			Leaving Air Temp (°F db/°F wb)	98.3	106.7	115.5
	70	75.00	Total Capacity (Btu/h)	376000	368000	362000
			Electric Power (Watts)	21178	22688	24256
			Leaving Air Temp (°F db/°F wb)	106.6	114.8	123.4
5000	40	75.00	Total Capacity (Btu/h)	278000	272000	266000
			Electric Power (Watts)	15700	16942	18204
			Leaving Air Temp (°F db/°F wb)	71.4	80.4	89.2
	50	75.00	Total Capacity (Btu/h)	312000	306000	300000
			Electric Power (Watts)	16642	17958	19326
			Leaving Air Temp (°F db/°F wb)	77.5	86.4	95.3
	60	75.00	Total Capacity (Btu/h)	348000	340000	334000
			Electric Power (Watts)	17762	19134	20594
			Leaving Air Temp (°F db/°F wb)	84.2	92.8	101.8
	70	75.00	Total Capacity (Btu/h)	386000	378000	370000
			Electric Power (Watts)	19006	20456	21980
			Leaving Air Temp (°F db/°F wb)	91.2	99.6	108.2

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
360 (30 TON)						
3750	40	90.00	Total Capacity (Btu/h)	214000	294000	288000
			Electric Power (Watts)	20512	21962	23546
			Leaving Air Temp (°F db/°F wb)	93.7	102.3	110.8
	50	90.00	Total Capacity (Btu/h)	334000	328000	324000
			Electric Power (Watts)	22178	23760	25496
			Leaving Air Temp (°F db/°F wb)	102.4	110.8	119.8
	60	90.00	Total Capacity (Btu/h)	372000	366000	360000
			Electric Power (Watts)	24076	25788	27632
			Leaving Air Temp (°F db/°F wb)	111.6	120.0	128.8
	70	90.00	Total Capacity (Btu/h)	410000	405000	398000
			Electric Power (Watts)	26190	27958	29746
			Leaving Air Temp (°F db/°F wb)	121.0	129.3	137.8
4800	40	90.00	Total Capacity (Btu/h)	308000	302000	296000
			Electric Power (Watts)	18674	20068	21528
			Leaving Air Temp (°F db/°F wb)	79.3	88.0	96.9
	50	90.00	Total Capacity (Btu/h)	346000	338000	332000
			Electric Power (Watts)	19938	21406	22982
			Leaving Air Temp (°F db/°F wb)	86.5	95.0	103.9
	60	90.00	Total Capacity (Btu/h)	386000	376000	372000
			Electric Power (Watts)	21382	22966	24652
			Leaving Air Temp (°F db/°F wb)	94.1	102.5	111.4
	70	90.00	Total Capacity (Btu/h)	425000	415000	410000
			Electric Power (Watts)	23010	24686	26462
			Leaving Air Temp (°F db/°F wb)	102.0	110.2	119.0
6000	40	90.00	Total Capacity (Btu/h)	314000	308000	302000
			Electric Power (Watts)	17330	18722	20148
			Leaving Air Temp (°F db/°F wb)	68.4	77.4	86.4
	50	90.00	Total Capacity (Btu/h)	352000	346000	338000
			Electric Power (Watts)	18280	19770	21296
			Leaving Air Temp (°F db/°F wb)	74.2	83.2	92.1
	60	90.00	Total Capacity (Btu/h)	396000	386000	380000
			Electric Power (Watts)	19406	20974	22596
			Leaving Air Temp (°F db/°F wb)	80.8	89.4	98.3
	70	90.00	Total Capacity (Btu/h)	440000	430000	420000
			Electric Power (Watts)	20674	22320	24020
			Leaving Air Temp (°F db/°F wb)	87.4	96.0	104.7

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
420 (35 TON)						
4375	40	105.00	Total Capacity (Btu/h)	214000	366000	362000
			Electric Power (Watts)	28298	30106	32088
			Leaving Air Temp (°F db/°F wb)	98.3	107.2	116.2
	50	105.00	Total Capacity (Btu/h)	415000	410000	405000
			Electric Power (Watts)	30746	32674	34768
			Leaving Air Temp (°F db/°F wb)	107.8	116.4	125.2
	60	105.00	Total Capacity (Btu/h)	460000	455000	450000
			Electric Power (Watts)	33556	35602	37712
			Leaving Air Temp (°F db/°F wb)	117.6	126.1	134.7
	70	105.00	Total Capacity (Btu/h)	510000	505000	511000
			Electric Power (Watts)	36878	38800	40312
			Leaving Air Temp (°F db/°F wb)	128.0	136.1	147.8
5600	40	105.00	Total Capacity (Btu/h)	380000	374000	368000
			Electric Power (Watts)	26038	27646	29438
			Leaving Air Temp (°F db/°F wb)	82.6	91.6	100.7
	50	105.00	Total Capacity (Btu/h)	430000	420000	415000
			Electric Power (Watts)	27988	29688	31590
			Leaving Air Temp (°F db/°F wb)	90.5	99.2	108.1
	60	105.00	Total Capacity (Btu/h)	480000	470000	460000
			Electric Power (Watts)	30246	32052	34056
			Leaving Air Temp (°F db/°F wb)	98.7	107.3	116.0
	70	105.00	Total Capacity (Btu/h)	530000	520000	510000
			Electric Power (Watts)	32888	34784	36874
			Leaving Air Temp (°F db/°F wb)	107.5	115.6	124.2
7000	40	105.00	Total Capacity (Btu/h)	388000	380000	374000
			Electric Power (Watts)	24568	26022	27676
			Leaving Air Temp (°F db/°F wb)	71.1	80.1	89.4
	50	105.00	Total Capacity (Btu/h)	440000	430000	420000
			Electric Power (Watts)	26188	27716	29438
			Leaving Air Temp (°F db/°F wb)	77.8	86.7	95.6
	60	105.00	Total Capacity (Btu/h)	490000	480000	470000
			Electric Power (Watts)	28100	29712	31510
			Leaving Air Temp (°F db/°F wb)	84.8	93.4	102.2
	70	105.00	Total Capacity (Btu/h)	545000	535000	525000
			Electric Power (Watts)	30318	32018	33900
			Leaving Air Temp (°F db/°F wb)	92.1	100.5	109.1

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				20	30	40
480 (40 TON)						
5000	40	120.00	Total Capacity (Btu/h)	214000	386000	382000
			Electric Power (Watts)	27740	29528	31478
			Leaving Air Temp (°F db/°F wb)	92.8	101.4	110.4
	50	120.00	Total Capacity (Btu/h)	440000	435000	430000
			Electric Power (Watts)	29906	31762	33802
			Leaving Air Temp (°F db/°F wb)	101.7	110.4	118.9
	60	120.00	Total Capacity (Btu/h)	495000	485000	475000
			Electric Power (Watts)	32430	34382	36484
			Leaving Air Temp (°F db/°F wb)	111.0	119.3	127.9
	70	120.00	Total Capacity (Btu/h)	545000	535000	525000
			Electric Power (Watts)	35364	37380	39508
			Leaving Air Temp (°F db/°F wb)	120.6	128.8	137.1
6400	40	120.00	Total Capacity (Btu/h)	405000	396000	390000
			Electric Power (Watts)	25764	27288	29056
			Leaving Air Temp (°F db/°F wb)	78.3	87.2	96.2
	50	120.00	Total Capacity (Btu/h)	455000	445000	440000
			Electric Power (Watts)	27574	29116	30886
			Leaving Air Temp (°F db/°F wb)	86.0	94.4	103.3
	60	120.00	Total Capacity (Btu/h)	510000	500000	490000
			Electric Power (Watts)	29616	31230	33074
			Leaving Air Temp (°F db/°F wb)	93.8	102.0	110.5
	70	120.00	Total Capacity (Btu/h)	565000	555000	540000
			Electric Power (Watts)	31972	33716	35650
			Leaving Air Temp (°F db/°F wb)	101.6	109.9	118.2
8000	40	120.00	Total Capacity (Btu/h)	415000	405000	396000
			Electric Power (Watts)	24426	25846	27434
			Leaving Air Temp (°F db/°F wb)	67.6	76.6	85.7
	50	120.00	Total Capacity (Btu/h)	465000	455000	445000
			Electric Power (Watts)	26022	27428	29030
			Leaving Air Temp (°F db/°F wb)	73.7	82.6	91.6
	60	120.00	Total Capacity (Btu/h)	525000	510000	500000
			Electric Power (Watts)	27792	29228	30894
			Leaving Air Temp (°F db/°F wb)	80.6	89.1	97.9
	70	120.00	Total Capacity (Btu/h)	585000	570000	555000
			Electric Power (Watts)	29850	31342	33066
			Leaving Air Temp (°F db/°F wb)	87.5	95.8	104.3

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
540 (45 TON)						
5625	40	135.00	Total Capacity (Btu/h)	214000	475000	470000
			Electric Power (Watts)	36558	39324	42636
			Leaving Air Temp (°F db/°F wb)	99.0	107.8	116.9
	50	135.00	Total Capacity (Btu/h)	540000	530000	525000
			Electric Power (Watts)	40046	43116	46538
			Leaving Air Temp (°F db/°F wb)	108.7	117.4	126.3
	60	135.00	Total Capacity (Btu/h)	605000	595000	585000
			Electric Power (Watts)	44186	47450	50892
			Leaving Air Temp (°F db/°F wb)	119.1	127.4	136.3
	70	135.00	Total Capacity (Btu/h)	670000	660000	655000
			Electric Power (Watts)	48970	52120	55818
			Leaving Air Temp (°F db/°F wb)	129.7	138.0	147.4
7200	40	135.00	Total Capacity (Btu/h)	495000	485000	475000
			Electric Power (Watts)	33390	35534	38190
			Leaving Air Temp (°F db/°F wb)	83.6	92.2	101.2
	50	135.00	Total Capacity (Btu/h)	555000	545000	540000
			Electric Power (Watts)	35834	38310	41244
			Leaving Air Temp (°F db/°F wb)	91.4	100.1	108.9
	60	135.00	Total Capacity (Btu/h)	620000	610000	600000
			Electric Power (Watts)	38708	41518	44730
			Leaving Air Temp (°F db/°F wb)	99.7	108.3	117.1
	70	135.00	Total Capacity (Btu/h)	695000	680000	670000
			Electric Power (Watts)	42136	45230	48694
			Leaving Air Temp (°F db/°F wb)	108.9	117.0	125.7
9000	40	135.00	Total Capacity (Btu/h)	510000	495000	485000
			Electric Power (Watts)	31696	33324	35526
			Leaving Air Temp (°F db/°F wb)	72.1	80.8	89.9
	50	135.00	Total Capacity (Btu/h)	575000	560000	550000
			Electric Power (Watts)	33472	35404	37862
			Leaving Air Temp (°F db/°F wb)	78.8	87.5	96.4
	60	135.00	Total Capacity (Btu/h)	640000	625000	615000
			Electric Power (Watts)	35542	37814	40562
			Leaving Air Temp (°F db/°F wb)	85.8	94.3	103.1
	70	135.00	Total Capacity (Btu/h)	710000	695000	685000
			Electric Power (Watts)	37954	40588	43636
			Leaving Air Temp (°F db/°F wb)	92.9	101.5	110.2

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
600 (50 TON)						
6250	40	150.00	Total Capacity (Btu/h)	214000	520000	515000
			Electric Power (Watts)	40746	43778	47066
			Leaving Air Temp (°F db/°F wb)	98.0	107.0	116.0
	50	150.00	Total Capacity (Btu/h)	595000	585000	575000
			Electric Power (Watts)	44650	47894	51328
			Leaving Air Temp (°F db/°F wb)	107.5	116.2	125.3
	60	150.00	Total Capacity (Btu/h)	665000	650000	640000
			Electric Power (Watts)	49058	52370	55952
			Leaving Air Temp (°F db/°F wb)	117.9	125.8	134.6
	70	150.00	Total Capacity (Btu/h)	730000	720000	710000
			Electric Power (Watts)	54028	57290	60836
			Leaving Air Temp (°F db/°F wb)	128.2	136.1	145.0
8000	40	150.00	Total Capacity (Btu/h)	540000	535000	525000
			Electric Power (Watts)	36920	39666	42668
			Leaving Air Temp (°F db/°F wb)	82.5	91.5	100.5
	50	150.00	Total Capacity (Btu/h)	610000	600000	590000
			Electric Power (Watts)	39914	42806	45992
			Leaving Air Temp (°F db/°F wb)	90.4	99.2	108.0
	60	150.00	Total Capacity (Btu/h)	680000	670000	660000
			Electric Power (Watts)	43324	46404	49768
			Leaving Air Temp (°F db/°F wb)	98.7	107.4	116.0
	70	150.00	Total Capacity (Btu/h)	755000	745000	730000
			Electric Power (Watts)	47186	50444	53942
			Leaving Air Temp (°F db/°F wb)	107.4	115.8	124.4
10000	40	150.00	Total Capacity (Btu/h)	555000	545000	535000
			Electric Power (Watts)	34400	36908	39680
			Leaving Air Temp (°F db/°F wb)	71.0	80.2	89.3
	50	150.00	Total Capacity (Btu/h)	625000	615000	600000
			Electric Power (Watts)	36824	39448	42368
			Leaving Air Temp (°F db/°F wb)	77.7	86.6	95.6
	60	150.00	Total Capacity (Btu/h)	700000	685000	675000
			Electric Power (Watts)	39584	42358	45432
			Leaving Air Temp (°F db/°F wb)	84.7	93.5	102.3
	70	150.00	Total Capacity (Btu/h)	780000	765000	750000
			Electric Power (Watts)	42714	45646	48850
			Leaving Air Temp (°F db/°F wb)	92.1	100.7	109.4

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				20	30	40
660 (55 TON)						
6875	40	165.00	Total Capacity (Btu/h)	214000	580000	575000
			Electric Power (Watts)	46880	50120	53674
			Leaving Air Temp (°F db/°F wb)	98.7	107.9	117.0
	50	165.00	Total Capacity (Btu/h)	660000	650000	640000
			Electric Power (Watts)	51386	54828	58578
			Leaving Air Temp (°F db/°F wb)	108.3	117.3	126.2
	60	165.00	Total Capacity (Btu/h)	730000	725000	715000
			Electric Power (Watts)	56462	60062	63870
			Leaving Air Temp (°F db/°F wb)	118.3	127.0	135.7
	70	165.00	Total Capacity (Btu/h)	810000	795000	785000
			Electric Power (Watts)	61904	65502	68410
			Leaving Air Temp (°F db/°F wb)	128.6	136.4	145.3
8800	40	165.00	Total Capacity (Btu/h)	600000	590000	585000
			Electric Power (Watts)	42492	45544	48780
			Leaving Air Temp (°F db/°F wb)	82.9	92.0	101.3
	50	165.00	Total Capacity (Btu/h)	675000	665000	655000
			Electric Power (Watts)	46084	49288	52692
			Leaving Air Temp (°F db/°F wb)	90.9	99.8	108.9
	60	165.00	Total Capacity (Btu/h)	755000	745000	730000
			Electric Power (Watts)	50144	53504	57140
			Leaving Air Temp (°F db/°F wb)	99.3	108.0	116.7
	70	165.00	Total Capacity (Btu/h)	840000	825000	810000
			Electric Power (Watts)	54656	58156	61890
			Leaving Air Temp (°F db/°F wb)	108.0	116.4	124.9
11000	40	165.00	Total Capacity (Btu/h)	610000	600000	590000
			Electric Power (Watts)	39548	42408	45516
			Leaving Air Temp (°F db/°F wb)	71.3	80.4	89.7
	50	165.00	Total Capacity (Btu/h)	690000	680000	670000
			Electric Power (Watts)	42572	45526	48758
			Leaving Air Temp (°F db/°F wb)	78.0	87.0	96.0
	60	165.00	Total Capacity (Btu/h)	775000	760000	750000
			Electric Power (Watts)	45978	49040	52368
			Leaving Air Temp (°F db/°F wb)	85.1	93.9	102.9
	70	165.00	Total Capacity (Btu/h)	865000	850000	830000
			Electric Power (Watts)	49770	52942	56390
			Leaving Air Temp (°F db/°F wb)	92.6	101.2	109.9

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
720 (60 TON)						
7500	40	180.00	Total Capacity (Btu/h)	214000	530000	520000
			Electric Power (Watts)	32284	34880	37792
			Leaving Air Temp (°F db/°F wb)	87.0	95.4	103.9
	50	180.00	Total Capacity (Btu/h)	610000	600000	585000
			Electric Power (Watts)	35270	38132	41230
			Leaving Air Temp (°F db/°F wb)	95.2	103.7	112.1
	60	180.00	Total Capacity (Btu/h)	680000	665000	655000
			Electric Power (Watts)	38814	41738	45090
			Leaving Air Temp (°F db/°F wb)	104.0	112.1	120.5
	70	180.00	Total Capacity (Btu/h)	755000	740000	725000
			Electric Power (Watts)	42846	45906	49310
			Leaving Air Temp (°F db/°F wb)	113.2	121.2	129.1
9600	40	180.00	Total Capacity (Btu/h)	565000	550000	540000
			Electric Power (Watts)	29136	31504	34142
			Leaving Air Temp (°F db/°F wb)	74.3	83.0	91.7
	50	180.00	Total Capacity (Btu/h)	640000	625000	610000
			Electric Power (Watts)	31544	34034	36782
			Leaving Air Temp (°F db/°F wb)	81.4	90.0	98.5
	60	180.00	Total Capacity (Btu/h)	715000	700000	685000
			Electric Power (Watts)	34290	36896	39772
			Leaving Air Temp (°F db/°F wb)	88.9	97.4	105.8
	70	180.00	Total Capacity (Btu/h)	800000	780000	760000
			Electric Power (Watts)	37390	40112	43162
			Leaving Air Temp (°F db/°F wb)	96.8	104.8	113.1
12000	40	180.00	Total Capacity (Btu/h)	580000	565000	555000
			Electric Power (Watts)	27054	29252	31722
			Leaving Air Temp (°F db/°F wb)	64.7	73.6	82.6
	50	180.00	Total Capacity (Btu/h)	660000	640000	630000
			Electric Power (Watts)	29126	31404	33920
			Leaving Air Temp (°F db/°F wb)	70.7	79.4	88.3
	60	180.00	Total Capacity (Btu/h)	745000	725000	705000
			Electric Power (Watts)	31396	33732	36340
			Leaving Air Temp (°F db/°F wb)	77.1	85.7	94.4
	70	180.00	Total Capacity (Btu/h)	830000	810000	790000
			Electric Power (Watts)	33914	36352	39078
			Leaving Air Temp (°F db/°F wb)	83.9	92.4	100.8

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
780 (65 TON)						
8125	40	195.00	Total Capacity (Btu/h)	214000	585000	575000
			Electric Power (Watts)	37140	40228	43520
			Leaving Air Temp (°F db/°F wb)	87.7	96.5	105.3
	50	195.00	Total Capacity (Btu/h)	675000	660000	650000
			Electric Power (Watts)	40960	44048	47586
			Leaving Air Temp (°F db/°F wb)	96.6	105.2	113.7
	60	195.00	Total Capacity (Btu/h)	755000	740000	725000
			Electric Power (Watts)	45294	48642	52260
			Leaving Air Temp (°F db/°F wb)	105.8	114.0	122.2
	70	195.00	Total Capacity (Btu/h)	835000	820000	800000
			Electric Power (Watts)	50120	53624	57286
			Leaving Air Temp (°F db/°F wb)	115.1	123.0	131.0
10400	40	195.00	Total Capacity (Btu/h)	615000	605000	590000
			Electric Power (Watts)	33386	36222	39308
			Leaving Air Temp (°F db/°F wb)	74.6	83.6	92.5
	50	195.00	Total Capacity (Btu/h)	700000	685000	670000
			Electric Power (Watts)	36538	39400	42526
			Leaving Air Temp (°F db/°F wb)	82.0	90.8	99.6
	60	195.00	Total Capacity (Btu/h)	790000	770000	755000
			Electric Power (Watts)	40034	42986	46242
			Leaving Air Temp (°F db/°F wb)	90.0	98.4	1070
	70	195.00	Total Capacity (Btu/h)	880000	860000	840000
			Electric Power (Watts)	43936	46992	50384
			Leaving Air Temp (°F db/°F wb)	98.2	106.4	114.6
13000	40	195.00	Total Capacity (Btu/h)	630000	620000	605000
			Electric Power (Watts)	30826	33552	36510
			Leaving Air Temp (°F db/°F wb)	64.7	74.0	830
	50	195.00	Total Capacity (Btu/h)	720000	705000	690000
			Electric Power (Watts)	33682	36338	39228
			Leaving Air Temp (°F db/°F wb)	71.1	80.0	88.8
	60	195.00	Total Capacity (Btu/h)	815000	795000	780000
			Electric Power (Watts)	36674	39344	42310
			Leaving Air Temp (°F db/°F wb)	77.8	86.5	95.2
	70	195.00	Total Capacity (Btu/h)	915000	895000	870000
			Electric Power (Watts)	40012	42730	45760
			Leaving Air Temp (°F db/°F wb)	84.9	93.4	101.9

Performance Data (Cont'd)

TABLE 8 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

AIRFLOW (CFM)	EWT (°F)	WATER FLOW (GPM)		ENTERING AIR TEMPERATURE (°F)		
				HEATING		
				DRY BULB	20	30
840 (70 TON)						
8750	40	210.00	Total Capacity (Btu/h)	214000	670000	660000
			Electric Power (Watts)	45482	48972	52774
			Leaving Air Temp (°F db/°F wb)	92.3	100.9	109.6
	50	210.00	Total Capacity (Btu/h)	770000	755000	740000
			Electric Power (Watts)	50094	53744	57838
			Leaving Air Temp (°F db/°F wb)	101.4	109.7	118.2
	60	210.00	Total Capacity (Btu/h)	860000	845000	825000
			Electric Power (Watts)	55334	59328	63658
			Leaving Air Temp (°F db/°F wb)	110.8	119.2	127.2
	70	210.00	Total Capacity (Btu/h)	950000	935000	910000
			Electric Power (Watts)	61730	65844	70228
			Leaving Air Temp (°F db/°F wb)	120.4	128.4	136.0
11200	40	210.00	Total Capacity (Btu/h)	710000	695000	680000
			Electric Power (Watts)	41228	44176	47618
			Leaving Air Temp (°F db/°F wb)	78.5	87.3	96.2
	50	210.00	Total Capacity (Btu/h)	800000	785000	770000
			Electric Power (Watts)	44796	47956	51518
			Leaving Air Temp (°F db/°F wb)	86.1	94.7	103.4
	60	210.00	Total Capacity (Btu/h)	900000	885000	865000
			Electric Power (Watts)	49058	52410	56144
			Leaving Air Temp (°F db/°F wb)	94.3	102.8	111.2
	70	210.00	Total Capacity (Btu/h)	1005000	980000	960000
			Electric Power (Watts)	54056	57586	61522
			Leaving Air Temp (°F db/°F wb)	102.8	110.9	119.2
14000	40	210.00	Total Capacity (Btu/h)	725000	710000	695000
			Electric Power (Watts)	38338	41118	44184
			Leaving Air Temp (°F db/°F wb)	67.9	76.9	85.9
	50	210.00	Total Capacity (Btu/h)	825000	810000	790000
			Electric Power (Watts)	41524	44316	47500
			Leaving Air Temp (°F db/°F wb)	74.5	83.3	92.1
	60	210.00	Total Capacity (Btu/h)	930000	910000	890000
			Electric Power (Watts)	45118	48018	51320
			Leaving Air Temp (°F db/°F wb)	81.5	90.1	98.8
	70	210.00	Total Capacity (Btu/h)	1045000	1020000	995000
			Electric Power (Watts)	49350	52378	55820
			Leaving Air Temp (°F db/°F wb)	88.8	97.2	105.7

Heating

TABLE 9 - GAS FURNACE OPTIONS

FURNACE MBH INPUT	FURNACE MBH OUTPUT	HEATERS	STAGES	MODULATION
75	60	(1) 75	2	5:1
100	80	(1) 100	2	5:1, 10:1
150	120	(1) 150	2	5:1, 10:1
200	160	(1) 200	2	5:1, 10:1
250	200	(1) 250	2	5:1, 10:1
300	240	(1) 300	2	5:1, 10:1
350	280	(1) 350	2	5:1, 10:1
400	320	(1) 400	2	5:1, 10:1
500	400	(1) 500	2	5:1, 10:1
600	480	(1) 600	2	5:1, 10:1
200	160	(2) 100	4	10:1
300	240	(2) 150	4	10:1
400	320	(2) 200	4	10:1
500	400	(2) 250	4	10:1
600	480	(2) 300	4	10:1
700	560	(2) 350	4	10:1
800	640	(2) 400	4	10:1
1000	800	(2) 500	4	10:1
1200	960	(2) 600	4	10:1
800	640	(4) 200	8	20:1
1000	800	(4) 250	8	20:1
1200	960	(4) 300	8	20:1
1400	1120	(4) 350	8	20:1
1600	1280	(4) 400	8	20:1

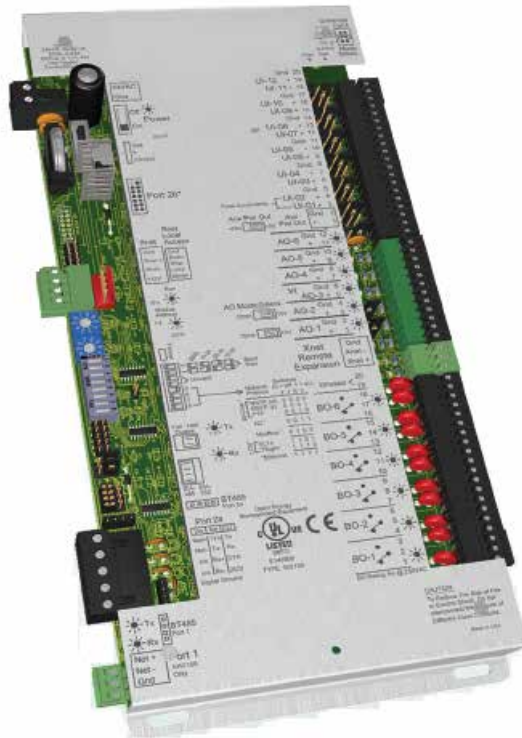
TABLE 10 - ELECTRIC HEAT OPTIONS

208 V CAPACITY kW	280/480 V CAPACITY kW	HEATER CONTROL STAGES
3.65	5	1, SCR
7.50	10	2, SCR
11.25	15	2, SCR
15.00	20	2, 4, SCR
18.75	25	2, 4, SCR
22.50	30	2, 4, SCR
26.25	35	2, 4, SCR
30.00	40	2, 4, SCR
37.50	50	4, SCR
45.00	60	4, SCR
52.50	70	4, SCR
60.00	80	4, SCR
75.00	100	4, SCR
81.40	110	4, SCR
90.00	120	4, SCR
97.50	130	4, SCR
105.00	140	4, SCR
112.50	150	4, SCR

Controls

STANDALONE CONTROLLER

The unit controller is a general use controller that can be easily customized to meet various sequence of operation needs. Capable of operating in a 100% standalone control mode, the unit controller can connect to a Building Automation System (BAS) using the four leading protocols. The point mapping to these protocols can be preset so that the protocol and baud rates desired can be easily field-selected without the need for additional downloads or technician assistance. The unit controller provides ample input/output capacity on the base controller plus support for an expander board if additional input/output capacity is needed.



Design Features

- Up to 24 input/output points
- Built in protocol support for BACnet, Modbus, N2 and LonWorks (**Note:** LonWorks does require an additional plug in PC board)
- Remote access support over the Internet/Intranet or modem
- Powerful, high-speed 16-bit microprocessor
- The unit controller on a 100% outside air unit utilizes an outdoor temperature sensor and a leaving air (duct) temperature sensor

Specifications

7. Power

24 VAC \pm 15%, 50–60 Hz, 20 VA power consumption (single Class 2 source only, 100 VA or less)

8. Physical

Rugged aluminum housing, removable screw terminals with custom silk-screening available

9. Environmental Operating Range

-40°F to 150°F (-40°C to 65.5°C); 10–95% relative humidity, non-condensing

10. Digital Outputs

Six digital outputs, relay contacts rated at 5 A resistive @ 250 VAC; configured as dry contact, normally open or normally closed

11. Universal Inputs

Twelve inputs, configurable for 0–10 V, RTD Therm Dry, or 0–20 mA Inputs 1 and 2 may be used for pulse counting

12. Analog Outputs

Six analog outputs: analog outputs 1 and 2 are configurable for 0–10 V or 0–20 mA, while analog outputs 3 through 6 are 0–10 V only

13. Standard Communication Ports

Port 1: Connect to an ARCNET only

Port 2a: Configurable for EIA-232 or EIA-485 (2-wire or 4-wire)

Rnet port: Interface with handheld keypad

Xnet Remote Expansion port: Connect to a board expander

14. Optional Plug-ins

Ethernet - for local or Internet access to controller

15. Status Indication

Visual (LED) status of power, running, and errors; LED indicators transmit/receive for Port 1, Port 2a, and for each of the 12 outputs

16. Battery

Provides a minimum of 10,000 hours of data retention during power outages

17. Protection

Surge and transient protection circuitry for power and communications

18. Listed By

FCC Part 15 - Subpart B - Class A; Pending listings at the time of publishing this document: UL 916 (PAZX), cUL C22.2 No. 205-M1983 (PAZX7), CE (1997)

19. Weight

1 lb, 3 oz (.5 kg)

Controls (Cont'd)

20. Overall Dimensions

WIDTH	HEIGHT	DEPTH
DIMENSIONS IN INCHES		
5	11-3/4	2*
DIMENSIONS IN MILLIMETERS		
127	299	51*

*Recommended depth

21. Mounting Hole Dimensions

WIDTH	HEIGHT
DIMENSIONS IN INCHES	
4	11-3/8
DIMENSIONS IN MILLIMETERS	
102	289

EQUIPMENT TOUCH INTERFACE

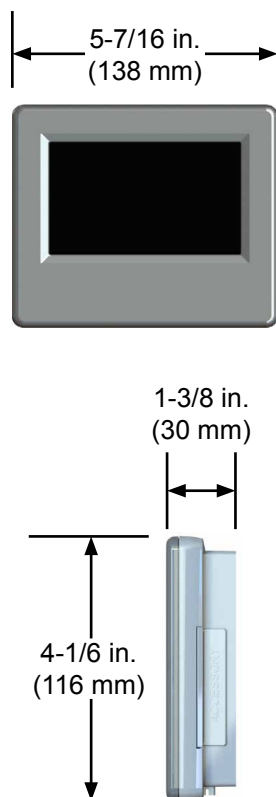
The Equipment Touch (E-Touch) display is designed altogether as an equipment interface, a temperature sensor, and a diagnostic tool. With programmed screens, the E-Touch interface has a color LCD touchscreen able to provide a custom graphic interface to control the DOAS equipment.



Features and Benefits

- 4.3-inch color touchscreen
- Onboard temperature and humidity sensor
- Access to nearly any data point in the controller
- BACnet explorer shows network visible BACnet objects
- Schedule interface allows for BACnet schedule view and edit functionality
- Alarm view displays the controller's alarm history buffer
- Supports 13 languages
- Trending
- Multi-level password protection limits access based on credentials
- Screens offer a library of interactive controls

Specifications



POWER	24 VAC (±15%), 5 VA, 50–60 Hz, Class 2
BACKLIT COLOR LCD	4.3-inch resistive touchscreen color LCD with backlighting WQVGA 480 x 272 pixels
OPERATING RANGE	-4.0–140.0°F (-20.0–60.0°C), 10–90% RH non-condensing
COMMUNICATION	Rnet: 2-wire EIA-485 (115 kbps)
MEMORY	<ul style="list-style-type: none"> • 16 MB flash memory to store screen file • 1.5 MB RAM to store variable data and LCD data • 4 KB serial EEPROM to store nonvolatile configuration data
TEMPERATURE SENSOR	Range: -4.0–140.0°F (-20.0–60.0°C) Accuracy from 30.0–100.0°F: ±1.0°F (±0.55°C) Accuracy over full range: ±2.0°F (±1.1°C) Resolution: 0.2°F (0.1°C)
HUMIDITY SENSOR	Range: 0–100% RH Accuracy from 20–80% RH:: ±3% RH Accuracy over full range: ±5% RH Resolution: 0.05% RH
LISTED BY	UL-916 (PAZX), CE, FCC Part 15-Subpart B-Class A

Zone Sensor Data

The communicating zone sensors allow for the flexibility to easily manage the conditions to ensure the comfort and productivity of the zone occupants. The ZS sensors are available in a variety of zone sensing combinations to address your application needs. These combinations include temperature, relative humidity, and indoor air quality.


ZS Standard Sensor

- Temperature, CO₂, and Humidity
- Addressable/supports daisy chaining
- Local communication point
- Mounts on a standard 2-inch x 4-inch electrical box



ZS Standard Sensor



ZS Plus Sensor

- Slide potentiometer to make the zone warmer or cooler
-  button to override the schedule and put the zone in an occupied state or force the zone to an unoccupied state
- Green LED to indicate occupied state
- Temperature, CO₂, and Humidity
- Addressable/supports daisy chaining
- Local communication point
- Mounts on a standard 2-inch x 4-inch electrical box



ZS Plus Sensor

ZS Pros Sensor

- LCD display
-  button to override the schedule and put the zone in an occupied state or force the zone to an unoccupied state
- ▲ and ▼ buttons to change any editable property, such as the setpoint temperature
-  button to cycle through information defined in the control program
- Green LED to indicate occupied state
- Temperature, CO₂, and Humidity
- Addressable/supports daisy chaining
- Local communication point
- Mounts on a standard 2-inch x 4-inch electrical box
- Setpoint adjust
- Alarm indicator



ZS Pro Sensor

Consult the *ZS Sensor Application Guide* to configure the control program for the desired user interaction with the sensor, as well as the *ZS Sensor User Guide* for basic user instructions.

TABLE 11 - SENSOR SPECIFICATIONS

Sensing Element Range and Accuracy	TEMPERATURE ONLY	
	Range	32.0°F–122.0°F (0.0°C–50.0°C)
	Accuracy	± 0.35°F (0.2°C)
	TEMPERATURE IF HUMIDITY IS INCLUDED	
	Range	50.0°F–104.0°F (10.0°C–40.0°C)
	Accuracy	± 0.5°F (0.3°C)
	OPTIONS	HUMIDITY
		Range
		10–90%
		Accuracy
		2% typical
		CO₂
Power Requirements	TEMPERATURE ONLY	
	ZS Standard or ZS Plus	12 Vdc @ 6 mA
	ZS Pro	12 Vdc @ 7 mA
	TEMPERATURE WITH HUMIDITY	
	ZS Standard or ZS Plus	12 Vdc @ 7 mA
	ZS Pro	12 Vdc @ 8 mA
	TEMPERATURE WITH HUMIDITY AND CO₂	
	All Models	12 Vdc @ 15 mA (idle) to 190 mA (CO ₂ measurement cycle)
	TEMPERATURE AND CO₂	
	All Models	12 Vdc @ 14 mA (idle) to 189 mA (CO ₂ measurement cycle)
Power Supply	The four-conductor Rnet cable from a controller supplies +12 Vdc @ 210 mA. For additional power, use an external power supply. Use the above power requirements to calculate the size of the external power supply.	
Communication	115 kbps	
Local Access Port	For local access to start up and troubleshoot the system	
Environmental Operating Range	-4.0°F–122.0°F (-20.0°C–50.0°C), 10–90% relative humidity, non-condensing	
Mounting	Standard 4x2-inch electrical box using the 6-32 x 1/2-inch mounting screws	
Overall Dimensions	TEMPERATURE SENSOR OF TEMPERATURE WITH HUMIDITY SENSOR	
	Width	3 inch (7.62 cm)
	Height	4-13/16 inch (12.22 cm)
	Depth	13/16 inch (2.01 cm)

Sequence of Operation

Air Source Cooling 100% Outside Air

The unit controller is turned on by a switch located on its front upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the BACview display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

NOTE: All temperature-related events have an additional 10 second (fixed) “delay on make” to allow temperatures to settle.

OCCUPIED MODE

When the BACview Schedule calls for the start of the Occupied Mode and the unit controller has verified that there are no fault or shutdown conditions, after a 30 second (fixed) delay the unit goes into Occupied Mode.

1. Outdoor Air Damper (OD)

- After the unit goes into Occupied Mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close.
- The OA damper stays open until the system reaches the end of the Occupied Mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

2. Supply Fan (SF)

- As the OA damper opens, the OADA auxiliary switch will close and the SF will turn on.
- The SF will run for 60 seconds (fixed) before cooling, dehumidification, or heating will be enabled.
 - The SF shall operate continuously while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the SF will continue to run for an additional 2 minutes before turning off.
 - SF-VSC: Supply Fan with Variable Speed Control.
 - The SF-VSC will modulate its speed based upon the SF Differential Pressure Transmitter (SF-DPT) signal and the supply duct static pressure set-point.
 - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

3. Exhaust Fan (EF)

- At the same time the SF turns on, the EF will be enabled to run.
- The EF shall be enabled to run while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the EF will be enabled to run for an additional 2 minutes before turning off.
- EF-VSC: Exhaust Fan with Variable Speed Control.
 - If the Zone Differential Pressure Transmitter (ZN-DPT) signal is above the building static pressure setpoint, the EF-VSC will modulate its speed based upon the ZN-DPT and the setpoint. If the ZN-DPT signal is below the building static pressure setpoint, the EF will modulate down to 0% (adjustable) speed.
 - **Optional:** For constant air volume (CAV), select "Manual Override" in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

4. Cooling Mode

- Cooling Mode is available when the Outdoor Air Temperature (OAT) is 1°F (fixed) above the OAT cooling lower limit (55°F, adjustable) and there is a demand for cooling.
- When the Outdoor Air Temperature (OAT) is 1°F (adjustable) or more above the OAT cooling setpoint 70°F, adjustable), compressor #1 turns on.
- When the SAT is 2°F (adjustable) or more above the SAT cooling setpoint (70°F, adjustable), compressor #2 turns on -- not less than 30 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2°F (adjustable) or more below the SAT cooling setpoint (70°F, adjustable), compressor #2 turns off.
- When the OAT is 1°F (adjustable) or more below the OAT cooling setpoint (70°F, adjustable), compressor #1 turns off.
- Minimum SF-VSC modulation shall be 50% (adjustable; 50% min.).
- **Optional:** When enabled, if there is a call for 1st stage cooling, 2nd stage cooling will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the cooling setpoint. Default is "OFF."
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time and a 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressors:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based upon the SAT sensor and setpoint (70°F, adjustable).
 - If the DX LAT drops to 38°F or less for 3 minutes, the unit controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55°F or more, the compressor turns back on.

Sequence of Operation

Air Source Cooling 100% Outside Air (Cont'd)

- If there is a current call for 1st stage cooling and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.
- Hot Gas Reheat (HGRH) – On/Off:
 - When the SAT is 1°F (adjustable) or more below the SAT cooling setpoint (70°F, adjustable), HGRH turns on and cycles based upon the SAT cooling setpoint.
 - When SAT is 2°F (adjustable) or more above the SAT cooling setpoint, HGRH turns off.

5. Dehumidification Mode

- Dehumidification Mode is available if the OAT is 1°F (fixed) above the dehumidification lower limit of 60°F (adjustable) and there is no call for heating.
- When the Outdoor Air Dew Point (OADP) is 1°F (adjustable) or more above the Supply Air Dew Point (SADP) setpoint (53°F, adjustable), Dehumidification Mode is enabled. After the minimum time-off delay, compressor #1 turns on.
- When the SADP is 2°F (adjustable) or more above the SADP setpoint (53°F, adjustable) and after minimum time-off delay, compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on. Both compressors respond in sequence and run at full cooling.
- HGRH is enabled to operate as necessary based upon the SAT dehumidification setpoint (70°F, adjustable).
- When SADP is 1°F (adjustable) or more below SADP setpoint (53°F, adjustable), compressor #2 turns off.
- When the OADP is 2°F (adjustable) or more below the SADP setpoint (53°F, adjustable), compressor #1 turns off and Dehumidification Mode is disabled.
- Digital Compressors:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based upon the SADP sensor and SADP setpoint (53°F, adjustable).
- Hot Gas Reheat (HGRH) – On/Off:
 - When the SAT is 1°F (adjustable) or more below the SAT dehumidification setpoint, HGRH turns on and cycles based upon the SAT dehumidification setpoint .
 - When the SAT is 2°F (adjustable) or more above the SAT dehumidification setpoint, HGRH turns off.

6. Heating Mode

- Heating Mode is available when the OAT is 1°F (fixed) below the OAT heating upper limit (60°F, adjustable) and there is a demand for heating.
- When the OAT is 1°F (adjustable) or more below the OAT heating setpoint (55°F, adjustable), heating is enabled and operates based upon SAT heating setpoint (70°F, adjustable).
- When OAT is 1°F (adjustable) or more above the OAT heating setpoint (55°F, adjustable), heating is disabled.

UNOCCUPIED MODE

When the Occupancy Control indicates the end of the Occupied Mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time) or the heating system will turn off. The SF and EF will continue to run for 2 minutes before turning off. After this, the OA damper will close. The unit is now off.

Safety Switches

- **High Pressure Switch (HPS1):** If HPS1 is open, compressor #1 will turn off and the unit controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records 3 high pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and HPS2.
- **Low Pressure Switch (LPS1):** If LPS1 is open after the LPS1 by-pass time, the unit controller will issue an alarm and compressor #1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three low pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lock-out can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and LPS2.

Safety Shutdown

- If a compressor fails to start three times in an hour due to high pressure switch lockout.
- If a compressor fails to start three times in an hour due to low pressure switch lockout.
- If a compressor fails to start three times in an hour due to DX leaving air temperature lockout.
- If the unit controller detects an SAT sensor failure.

Sequence of Operation

Air Source Cooling 100% Outside Air (Cont'd)

Standard Alarms

(Alarms require reset in the BACview or cycling the power of the unit controller unless noted)

1. **OADA Alarm:** When the OADA fails to open or closes due to OADA-A (adj.) being open, following 2 minute (adjustable) delay. Unit will automatically shut down.
2. **OADA Hand:** When the OADA is commanded closed but the OADA-A (adj.) still indicates to the unit controller it is open, following 2 minute (adjustable) delay.
3. **Supply Fan Alarm:** When the SF fails to start and the SF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay. Unit will automatically shut down.
4. **Supply Fan Hand:** When the SF is commanded off and the SF-APS still indicates air flow to unit controller, following 1 minute (adjustable) delay. OA Damper (if existing) will be commanded to remain open.
5. **Supply Fan Run Time:** When the SF run time has exceeded the maximum run time allotted (adjustable).
6. **Exhaust Fan Alarm:** When the EF fails to start and the EF-APS does not confirm air flow to unit controller, following 1 minute (adjustable) delay.
7. **Exhaust Fan Hand:** When the EF is commanded off and the EF-APS still indicates air flow to unit controller, following 1 minute (adjustable) delay.
8. **Exhaust Fan Run Time:** When the EF run time has exceeded the maximum run time allotted (adjustable).
9. **Compressor #1 Alarm:** Compressor stops due to CC1-CS open, following 60 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Compressor #1 STOP).
10. **Compressor #1 Hand:** Compressor is commanded off but the CC1-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
11. **Compressor #1 Run Time:** When the C1 run time has exceeded the maximum run time allotted (adjustable).
12. **High Pressure Switch #1 Alarm:** Compressor stops due to HPS1 open, following 30 second (fixed) delay. Requires HPS1 manual reset. Compressor lockout occurs if alarm happens 3 times in 1 hour (High Pressure Switch #1 STOP).
13. **Low Pressure Switch #1 Alarm:** Compressor stops due to LPS1 open; following 90 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #1 STOP).
14. **Freeze Protection #1 Alarm:** Compressor stops due to DX LAT1 freeze condition, following 3 minute (adjustable) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (FP #1 STOP).
15. **Compressor #2 Alarm:** Compressor stops due to CC2-CS open; following 60 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Compressor #2 STOP).
16. **Compressor #2 Hand:** Compressor is commanded off but the CC2-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.

17. **Compressor #2 Run Time:** When the C2 run time has exceeded the maximum run time allotted (adjustable).
18. **High Pressure Switch #2 Alarm:** Compressor stops due to HPS2 open, following 30 second (fixed) delay. Requires HPS2 manual reset. Compressor lockout occurs if alarm happens 3 times in 1 hour (High Pressure Switch #2 STOP).
19. **Low Pressure Switch #2 Alarm:** Compressor stops due to LPS2 open, following 90 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #2 STOP).
20. **Freeze Protection #2 Alarm:** Compressor stops due to DX LAT2 freeze condition, following 3 minute (adjustable) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (FP #2 STOP).
21. **Sensor Failure:** Readings exceed sensor limits, following 2 minute (fixed) delay. Alarms reset automatically.
22. **SAT Sensor Failure:** Open: -60.2°F, Short: 296°F. Unit will automatically shut down.
23. **High SAT Alarm:** SAT high limit, 130°F (adjustable) with Gas Furnace Heat. Alarm resets automatically.
24. **Low SAT Alarm:** SAT low limit, 40°F (adjustable), following 10 minute (adjustable) delay. Unit will automatically shut down.
25. **Heat Failure:** In heating mode and the SAT falls below 50°F (adjustable), following 10 minute (adjustable) delay. Alarm resets automatically.

Sequence of Operation

Air Source Heat Pump 100% Outside Air

The unit controller is turned on by a switch located on its front upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the BACview display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

NOTE: All temperature-related events have an additional 10 second (fixed) “delay on make” to allow temperatures to settle.

OCCUPIED MODE

When the BACview Schedule calls for the start of the Occupied Mode and the unit controller has verified that there are no fault or shutdown conditions, after a 30 second (fixed) delay the unit goes into Occupied Mode.

1. Outdoor Air Damper (OD)

- After the unit goes into Occupied Mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close.
- The OA damper stays open until the system reaches the end of the Occupied Mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

2. Supply Fan (SF)

- As the OA damper opens, the OADA auxiliary switch will close and the SF will turn on.
- The SF will run for 60 seconds (fixed) before cooling, dehumidification, or heating will be enabled.
 - The SF shall operate continuously while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the SF will continue to run for an additional 2 minutes before turning off.
 - The Supply Fan with Variable Speed Control (SF-VSC) will modulate its speed based upon the SF Differential Pressure Transmitter (SF-DPT) signal and the supply duct static pressure setpoint.
 - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

3. Exhaust Fan (EF)

- At the same time the SF turns on, the EF will be enabled to run.
- The EF shall be enabled to run while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the EF will be enabled to run for an additional 2 minutes before turning off.

- EF-VSC: Exhaust Fan with Variable Speed Control.
 - If the Zone Differential Pressure Transmitter (ZN-DPT) signal is above the building static pressure setpoint, the EF-VSC will modulate its speed based upon the ZN-DPT and the setpoint.
 - If the ZN-DPT signal is below the building static pressure setpoint, the EF will modulate down to 0% (adjustable) speed.
 - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

4. Cooling Mode

- Reversing Valve is “OFF” in Cooling Mode.
- Cooling Mode is available when the Outdoor Air Temperature (OAT) is 1°F (fixed) above the OAT cooling lower limit (55°F, adjustable) and there is a demand for cooling.
- When the Outdoor Air Temperature (OAT) is 1°F (adjustable) or more above the OAT cooling setpoint (70°F, adjustable), compressor #1 turns on.
- When the SAT is 2°F (adjustable) or more above the SAT cooling setpoint (70°F, adjustable), compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2°F (adjustable) or more below the SAT cooling setpoint (70°F, adjustable), compressor #2 turns off.
- When the OAT is 1°F (adjustable) or more below the OAT cooling setpoint (70°F, adjustable), compressor #1 turns off.
- Minimum SF-VSC modulation shall be 50% (adjustable; 50% min.).
- **Optional:** When enabled, if there is a call for 1st stage cooling, 2nd stage cooling will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the cooling setpoint. Default is “OFF.”
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time and a 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressors:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based upon the SAT sensor and setpoint (70°F, adjustable).
 - If the DX LAT drops to 38°F or less for 3 minutes, the unit controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55°F or more, the compressor turns back on.
- If there is a current call for 1st stage cooling and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.

Sequence of Operation

Air Source Heat Pump 100% Outside Air (Cont'd)

- Hot Gas Reheat (HGRH) – On/Off:
 - When the SAT is 1.0°F (adjustable) or more below the SAT cooling setpoint (70.0°F, adjustable), HGRH turns on and cycles based upon the SAT cooling setpoint.
 - When SAT is 2.0°F (adjustable) or more above the SAT cooling setpoint, HGRH turns off.

5. Dehumidification Mode

- Reversing Valve is “OFF” in Dehumidification Mode.
- Dehumidification Mode is available if the OAT is 1.0°F (fixed) above the dehumidification lower limit of 60°F (adjustable) and there is no call for heating.
- When the Outdoor Air Dew Point (OADP) is 1.0°F (adjustable) or more above the Supply Air Dew Point (SADP) setpoint (53.0°F, adjustable), Dehumidification Mode is enabled. After the minimum time-off delay, compressor #1 turns on.
- When the SADP is 2°F (adjustable) or more above the SADP setpoint (53.0°F, adjustable), and after minimum time-off delay, compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on. Both compressors respond in sequence and run at full cooling.
- HGRH is enabled to operate as necessary based upon the SAT dehumidification setpoint (70.0°F, adjustable).
- When SADP is 1.0°F (adjustable) or more below SADP setpoint (53.0°F, adjustable), compressor #2 turns off.
- When the OADP is 2.0°F (adjustable) or more below the SADP setpoint (53.0°F, adjustable), compressor #1 turns off and Dehumidification Mode is disabled.
- Digital Compressors:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based upon the SADP sensor and SADP setpoint (53.0°F, adjustable).
- Hot Gas Reheat (HGRH) – On/Off:
 - When the SAT is 1.0°F (adjustable) or more below the SAT dehumidification setpoint, HGRH turns on and cycles based upon the SAT dehumidification setpoint .
 - When the SAT is 2.0°F (adjustable) or more above the SAT dehumidification setpoint, HGRH turns off.

6. Heating Mode

- Heating Mode is available when the OAT is 1.0°F (fixed) below the OAT heating upper limit (60.0°F, adjustable) and there is a demand for heating.
- Reversing Valve is “ON” in Heating Mode.

- When the OAT is 1.0°F (adjustable) or more below the OAT heating setpoint (55.0°F, adjustable), compressor #1 turns on.
- When the SAT is 2.0°F (adjustable) or more below the SAT heating setpoint (70.0°F, adjustable), compressor #2 turns on, not less than 10 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2.0°F (adjustable) or more above the SAT heating setpoint (70.0°F, adjustable), compressor #2 turns off.
- When the OAT is 2.0°F (adjustable) or more above the OAT heating setpoint (55.0°F, adjustable), compressor #1 turns off.
- Heat pump operation shall be disabled if the SF-VSC modulation drops below 85% (adjustable).
- **Optional:** When enabled, if there is a call for 1st stage heating, 2nd stage heating will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the heating setpoint. Default is "OFF."
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time as well as the 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressor:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based on the SAT sensor and SAT heating setpoint (70.0°F, adjustable).
 - If there is a current call for 1st stage heating and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.
- Defrost Mode: On defrost mode, the reversing valve will switch to cooling to defrost the built-up ice on the condenser coil.
 - The unit is equipped with a Defrost Timer. The defrost timer provides a selectable time interval between defrost cycles. It will allow a 10 minute defrost every 30/60/90 minutes as long as the defrost thermostat is closed. The timer is factory set at 60 minutes. The time interval may be changed to 30 or 90 minutes if desired (disconnect power to the unit before moving the jumper). The hold input on the defrost timer allows the timer to accumulate time while the compressor is running in heating mode. A warm outdoor coil causes the defrost thermostat to open which will prevent time accumulation or end the Defrost period. The defrost timer allows up to a 10 minutes defrost cycle if the defrost thermostat is closed. When the defrost period ends, either by opening of the defrost thermostat or after the 10 minutes defrost period has elapsed, the timer is reset. By shorting the two test terminals together on the defrost timer, a 60 minute delay is reduced to 14 seconds and a 10 minute delay is reduced to 2.3 seconds for testing purposes.
 - During defrost cycle, the auxiliary heat will energize based upon the SAT setpoint.

Sequence of Operation

Air Source Heat Pump 100% Outside Air (Cont'd)

- Supplemental Heat:
 - After either heat pump has been enabled, when the SAT is 2.0°F (adjustable) or more below the SAT heating setpoint (70.0°F, adjustable), and after a 10-minute (adjustable) delay period, supplemental heating will be enabled. When the SAT is equal to the SAT heating setpoint (70.0°F, adjustable), supplemental heating will be disabled.
- Modulated Supplemental Heat:
 - Modulating Gas Furnace: On demand for supplemental heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0°F, adjustable).

7. Auxiliary (Emergency) Heating Mode

- Compressors are “OFF” in Auxiliary (Emergency) Heating Mode.
- Auxiliary (Emergency) Heating mode is selectable using the BACview display pad or BAS (default is “OFF”). Auxiliary (Emergency) Heating mode will automatically be turned on if both heat pump compressors fail or are disabled due to either the OAT going below the Compressor Disable setpoint of 26.0°F (adjustable) or the SF-VSC modulating below 85% (adjustable).
- Auxiliary (Emergency) Heating Mode is available when the OAT is below the OAT heating upper limit (60.0°F, adjustable) and there is a demand for heating.
- Modulated Auxiliary (Emergency) Heat:
 - Modulating Gas Furnace: On demand for auxiliary (emergency) heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0°F, adjustable).

UNOCCUPIED MODE

When the Occupancy Control indicates the end of the Occupied Mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time). The SF and EF will continue to run for 2 minutes before turning off. After this, the OA damper will close. The unit is now off.

Safety Switches

- **High Pressure Switch (HPS1):** If HPS1 is open, compressor #1 will turn off and the unit controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three high pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and HPS2.
- **Low Pressure Switch (LPS1):** If LPS1 is open after the LPS1 by-pass time, the unit controller will issue an alarm and compressor #1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three low pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and LPS2.

Safety Shutdown

- If a compressor fails to start three times in an hour due to high pressure switch lockout.
- If a compressor fails to start three times in an hour due to low pressure switch lockout.
- If a compressor fails to start three times in an hour due to DX leaving air temperature lockout.
- If the unit controller detects an SAT sensor failure.

Standard Alarms

(alarms require reset in the BACview or cycling the power of the unit controller unless noted)

1. **OADA Alarm:** When the OADA fails to open or closes due to OADA-A (adjustable) being open, following 2 minute (adjustable) delay. Unit will automatically shut down.
2. **OADA Hand:** When the OADA is commanded closed but the OADA-A (adjustable) still indicates to the unit controller it is open, following 2 minute (adjustable) delay.
3. **Supply Fan Alarm:** When the SF fails to start and the SF-APS does not confirm air flow to unit controller, following 1 minute (adjustable) delay. Unit will automatically shut down.
4. **Supply Fan Hand:** When the SF is commanded off and the SF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay. OA Damper (if existing) will be commanded to remain open.
5. **Supply Fan Run Time:** When the SF run time has exceeded the maximum run time allotted (adjustable).
6. **Exhaust Fan Alarm:** When the EF fails to start and the EF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay.
7. **Exhaust Fan Hand:** When the EF is commanded off and the EF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay.
8. **Exhaust Fan Run Time:** When the EF run time has exceeded the maximum run time allotted (adjustable).
9. **Compressor #1 Alarm:** Compressor stops due to CC1-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #1 STOP).
10. **Compressor #1 Hand:** Compressor is commanded off but the CC1-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
11. **Compressor #1 Run Time:** When the C1 run time has exceeded the maximum run time allotted (adjustable).
12. **High Pressure Switch #1 Alarm:** Compressor stops due to HPS1 open, following 30 second (fixed) delay. Requires HPS1 manual reset. Compressor lock out occurs if alarm happens 3 times in 1 hour (High Pressure Switch #1 STOP).
13. **Low Pressure Switch #1 Alarm:** Compressor stops due to LPS1 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #1 STOP).

Sequence of Operation

Air Source Heat Pump 100% Outside Air (Cont'd)

14. **Freeze Protection #1 Alarm:** Compressor stops due to DX LAT1 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #1 STOP).
15. **Compressor #2 Alarm:** Compressor stops due to CC2-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #2 STOP).
16. **Compressor #2 Hand:** Compressor is commanded off but the CC2-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
17. **Compressor #2 Run Time:** When the C2 run time has exceeded the maximum run time allotted (adjustable).
18. **High Pressure Switch #2 Alarm:** Compressor stops due to HPS2 open, following 30 second (fixed) delay. Requires HPS2 manual reset. Compressor lock out occurs if alarm happens 3 times in 1 hour (High Pressure Switch #2 STOP).
19. **Low Pressure Switch #2 Alarm:** Compressor stops due to LPS2 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #2 STOP).
20. **Freeze Protection #2 Alarm:** Compressor stops due to DX LAT2 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #2 STOP).
21. **Sensor Failure:** Readings exceed sensor limits, following 2 minute (fixed) delay. Alarms reset automatically.
22. **SAT Sensor Failure:** Open: -60.2°F, Short: 296°F. Unit will automatically shut down.
23. **High SAT Alarm:** SAT high limit, 130°F (adjustable) with Gas Furnace Heat. Alarm resets automatically.
24. **Low SAT Alarm:** SAT low limit, 40°F (adjustable), following 10 minute (adjustable) delay. Unit will automatically shut down.
25. **Heat Failure:** In heating mode and the SAT falls below 50°F (adjustable), following 10 minute (adjustable) delay. Alarm resets automatically.

Sequence of Operation

Water Source Heat Pump 100% Outside Air

The unit controller is turned on by a switch located on its front upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the BACview display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

NOTE: All temperature-related events have an additional 10 second (fixed) “delay on make” to allow temperatures to settle.

OCCUPIED MODE

When the BACview Schedule calls for the start of the Occupied Mode, and the unit controller has verified that there are no fault or shutdown conditions, after a 30 second (fixed) delay the unit goes into Occupied Mode.

1. Outdoor Air Damper (OD)

- After the unit goes into Occupied Mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close.
- The OA damper stays open until the system reaches the end of the Occupied Mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

2. Supply Fan (SF)

- As the OA damper opens, the OADA auxiliary switch will close and the SF will turn on.
- The SF will run for 60 seconds (fixed) before cooling, dehumidification, or heating will be enabled.
 - The SF shall operate continuously while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the SF will continue to run for an additional 2 minutes before turning off.
 - The Supply Fan with Variable Speed Control (SF-VSC) will modulate its speed based upon the SF Differential Pressure Transmitter (SF-DPT) signal and the supply duct static pressure setpoint.
 - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

3. Exhaust Fan (EF)

- At the same time the SF turns on, the EF will be enabled to run.
- The EF shall be enabled to run while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the EF will be enabled to run for an additional 2 minutes before turning off.

Sequence of Operation

Water Source Heat Pump 100% Outside Air (Cont'd)

- EF-VSC: Exhaust Fan with Variable Speed Control.
 - If the Zone Differential Pressure Transmitter (ZN-DPT) signal is above the building static pressure setpoint, the EF-VSC will modulate its speed based upon the ZN-DPT and the setpoint. If the ZN-DPT signal is below the building static pressure setpoint, the EF will modulate down to 0% (adjustable) speed.
 - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

4. Cooling Mode

- Reversing Valve is “ON” in Cooling Mode.
- Cooling Mode is available when the Outdoor Air Temperature (OAT) is 1.0°F (fixed) above the OAT cooling lower limit (55.0°F, adjustable) and there is a demand for cooling.
- When the Outdoor Air Temperature (OAT) is 1.0°F (adjustable) or more above the OAT cooling setpoint (70.0°F, adjustable), compressor #1 turns on.
- When the SAT is 2.0°F (adjustable) or more above the SAT cooling setpoint (70.0°F, adjustable), compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2.0°F (adjustable) or more below the SAT cooling setpoint (70.0°F, adjustable), compressor #2 turns off.
- When the OAT is 1°F (adjustable) or more below the OAT cooling setpoint (70.0°F, adjustable), compressor #1 turns off.
- Minimum SF-VSC modulation shall be 50% (adjustable; 50% min.).
- **Optional:** When enabled, if there is a call for 1st stage cooling, 2nd stage cooling will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the cooling setpoint. Default is “OFF.”
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time and a 5-minute (fixed) minimum timeoff delay to prevent compressor short cycling.
- Digital Compressors:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based upon the SAT sensor and setpoint (70.0°F, adjustable).
 - If the DX LAT drops to 38.0°F or less for 3 minutes, the unit controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55.0°F or more, the compressor turns back on.
- If there is a current call for 1st stage cooling and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.

- Hot Gas Reheat (HGRH) – On/Off:
 - When the SAT is 1.0°F (adjustable) or more below the SAT cooling setpoint (70.0°F, adjustable), HGRH turns on and cycles based upon the SAT cooling setpoint.
 - When SAT is 2.0°F (adjustable) or more above the SAT cooling setpoint, HGRH turns off.

5. Dehumidification Mode

- Reversing Valve is “ON” in Dehumidification Mode.
- Dehumidification Mode is available if the OAT is 1.0°F (fixed) above the dehumidification lower limit of 60.0°F (adjustable) and there is no call for heating.
- When the Outdoor Air Dew Point (OADP) is 1.0°F (adjustable) or more above the Supply Air Dew Point (SADP) setpoint (53.0°F, adjustable), Dehumidification Mode is enabled. After the minimum time-off delay, compressor #1 turns on.
- When the SADP is 2.0°F (adjustable) or more above the SADP setpoint (53.0°F, adjustable), and after minimum time-off delay, compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on. Both compressors respond in sequence and run at full cooling.
- HGRH is enabled to operate as necessary based upon the SAT dehumidification setpoint (70.0°F, adjustable).
- When SADP is 1.0°F (adjustable) or more below SADP setpoint (53.0°F, adjustable), compressor #2 turns off.
- When the OADP is 2.0°F (adjustable) or more below the SADP setpoint (53.0°F, adjustable), compressor #1 turns off and Dehumidification Mode is disabled.
- Digital Compressors:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based upon the SADP sensor and SADP setpoint (53.0°F, adjustable).
- Hot Gas Reheat (HGRH) – On/Off:
 - When the SAT is 1.0°F (adjustable) or more below the SAT dehumidification setpoint, HGRH turns on and cycles based upon the SAT dehumidification setpoint .
 - When the SAT is 2.0°F (adjustable) or more above the SAT dehumidification setpoint, HGRH turns off.

6. Heating Mode

- Heating Mode is available when the OAT is 1.0°F (fixed) below the OAT heating upper limit (60.0°F, adjustable) and there is a demand for heating.
- Reversing Valve is “OFF” in Heating Mode.
- When the OAT is 1.0°F (adjustable) or more below the OAT heating setpoint (55°F, adjustable), compressor #1 turns on.

Sequence of Operation

Water Source Heat Pump 100% Outside Air (Cont'd)

- When the SAT is 2.0°F (adjustable) or more below the SAT heating setpoint (70°F, adjustable), compressor #2 turns on, not less than 10 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2.0°F (adjustable) or more above the SAT heating setpoint (70°F, adjustable), compressor #2 turns off.
- When the OAT is 2.0°F (adjustable) or more above the OAT heating setpoint (55°F, adjustable), compressor #1 turns off.
- Heat pump operation shall be disabled if the SF-VSC modulation drops below 85% (adjustable).
- **Optional:** When enabled, if there is a call for 1st stage heating, 2nd stage heating will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the heating setpoint. Default is "OFF."
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time as well as the 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressor:
 - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
 - The digital compressor will modulate based on the SAT sensor and SAT heating setpoint (70.0°F, adjustable).
 - If there is a current call for 1st stage heating and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.
- Auxiliary Heat:
 - After either heat pump has been enabled, when the SAT is 2.0°F (adjustable) or more below the SAT heating setpoint (70.0°F, adjustable), and after a 10-minute (adjustable) delay period, auxiliary heating will be enabled. When the SAT is equal to the SAT heating setpoint (70.0°F, adjustable), auxiliary heating will be disabled.
- Modulated Auxiliary Heat:
 - Modulating Gas Furnace: On demand for auxiliary heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0°F, adjustable).

7. Emergency Heating Mode

- Compressors are "OFF" in Emergency Heating Mode.
- Emergency Heating mode is selectable using the BACview display pad or BAS (default is "OFF"). Emergency Heating mode will automatically be turned on if both heat pump compressors fail or are disabled due to either the OAT going below the Compressor Disable setpoint of 26.0°F (adjustable) or the SF-VSC modulating below 85% (adjustable).

- **Modulated Emergency Heat:**
 - **Modulating Gas Furnace:** On demand for emergency heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0°F, adjustable).

UNOCCUPIED MODE

When the Occupancy Control indicates the end of the Occupied Mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time). The SF and EF will continue to run for 2 minutes before turning off. After this, the OA damper will close. The unit is now off.

Safety Switches

- **High Pressure Switch (HPS1):** If HPS1 is open, compressor #1 will turn off and the unit controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three high pressure start/restart failure incidents within an hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and HPS2.
- **Low Pressure Switch (LPS1):** If LPS1 is open after the LPS1 by-pass time, the unit controller will issue an alarm and compressor #1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three low pressure start/restart failure incidents within an hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and LPS2.

Safety Shutdown

- If a compressor fails to start three times in an hour due to high pressure switch lockout.
- If a compressor fails to start three times in an hour due to low pressure switch lockout.
- If a compressor fails to start three times in an hour due to DX leaving air temperature lockout.
- If the unit controller detects an SAT sensor failure.

Standard Alarms

(alarms require reset in the BACview or cycling the power of the unit controller unless noted)

1. **OADA Alarm:** When the OADA fails to open or closes due to OADA-A (adjustable) being open, following 2 minute (adjustable) delay. Unit will automatically shut down.
2. **OADA Hand:** When the OADA is commanded closed but the OADA-A (adjustable) still indicates to the unit controller it is open, following 2 minute (adjustable) delay.
3. **Supply Fan Alarm:** When the SF fails to start and the SF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay. Unit will automatically shut down.

Sequence of Operation

Water Source Heat Pump 100% Outside Air (Cont'd)

4. **Supply Fan Hand:** When the SF is commanded off and the SF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay. OA Damper (if existing) will be commanded to remain open.
5. **Supply Fan Run Time:** When the SF run time has exceeded the maximum run time allotted (adjustable).
6. **Exhaust Fan Alarm:** When the EF fails to start and the EF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay.
7. **Exhaust Fan Hand:** When the EF is commanded off and the EF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay.
8. **Exhaust Fan Run Time:** When the EF run time has exceeded the maximum run time allotted (adjustable).
9. **Compressor #1 Alarm:** Compressor stops due to CC1-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #1 STOP).
10. **Compressor #1 Hand:** Compressor is commanded off but the CC1-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
11. **Compressor #1 Run Time:** When the C1 run time has exceeded the maximum run time allotted (adjustable).
12. **High Pressure Switch #1 Alarm:** Compressor stops due to HPS1 open, following 30 second (fixed) delay. Requires HPS1 manual reset. Compressor lockout occurs if alarm happens 3 times in 1 hour (High Pressure Switch #1 STOP).
13. **Low Pressure Switch #1 Alarm:** Compressor stops due to LPS1 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #1 STOP).
14. **Freeze Protection #1 Alarm:** Compressor stops due to DX LAT1 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #1 STOP).
15. **Compressor #2 Alarm:** Compressor stops due to CC2-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #2 STOP).
16. **Compressor #2 Hand:** Compressor is commanded off but the CC2-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
17. **Compressor #2 Run Time:** When the C2 run time has exceeded the maximum run time allotted (adjustable).
18. **High Pressure Switch #2 Alarm:** Compressor stops due to HPS2 open, following 30 second (fixed) delay. Requires HPS2 manual reset. Compressor lock out occurs if alarm happens 3 times in 1 hour (High Pressure Switch #2 STOP).
19. **Low Pressure Switch #2 Alarm:** Compressor stops due to LPS2 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #2 STOP).

20. **Freeze Protection #2 Alarm:** Compressor stops due to DX LAT2 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #2 STOP).
21. **Sensor Failure:** Readings exceed sensor limits, following 2 minute (fixed) delay. Alarms reset automatically.
22. **SAT Sensor Failure:** Open: -60.2°F, Short: 296.0°F. Unit will automatically shut down.
23. **High SAT Alarm:** SAT high limit, 130.0°F (adjustable) with Gas Furnace Heat. Alarm resets automatically.
24. **Low SAT Alarm:** SAT low limit, 40.0°F (adjustable), following 10 minute (adjustable) delay. Unit will automatically shut down.
25. **Heat Failure:** In heating mode and the SAT falls below 50.0°F (adjustable), following 10 minute (adjustable) delay. Alarm resets automatically.
26. **Freeze Stat Alarm:** If Freeze Stat (FZT) relay opens indicating a water line freeze condition. Both compressors will automatically shut down. Alarm resets automatically when FZT relay closes.
27. **Water Flow Alarm:** If Water Flow Switch (WFS) relay opens indicating a no flow or low flow in water line. Both compressors will automatically shut down. Alarm resets automatically when WFS relay closes.



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