

HEAT CONTROLLER

ENGINEERING DESIGN GUIDE

HRC Series Commercial Console Water-Source Heat Pumps 60Hz

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Unit Features

CONSOLE (HRC) SERIES WITH HFC-410A REFRIGERANT

The Series (HRC) console unit provides a high efficiency WSHP “ductless” solution for spaces where individual, quiet control of the heating and cooling system is important. HRC units are especially ideal where ceiling height and space are limited, or when preserving the integrity of an existing structure. The HRC Series exceeds ASHRAE 90.1 efficiencies, yet maintains small cabinet dimensions. Using HFC-410A refrigerant, the console not only protects the environment, it does so while delivering unprecedented comfort, efficiency, and reliability.

Available in sizes 3/4 ton (2.64 kW) through 1-1/2 tons (5.3 kW) with numerous cabinet, water piping and control choices, the HRC Series offers a wide range of units for most any installation. The HRC has an extended range refrigerant circuit, capable of ground loop (geothermal) applications as well as water loop (boiler-tower) applications. Standard features are many. Microprocessor controls, galvanized steel cabinet, polyester powder coat paint and TXV refrigerant metering device are just some of the features of the flexible HRC series.

Compressors are mounted on specially engineered sound-tested EPDM grommets for quiet operation. Options such as coated air coil, DDC controls, internal pump and factory-installed water solenoid valves allow customized design solutions.

The HRC Series console water-source heat pumps are designed to meet the challenges of today's HVAC demands with a low cost/high value “ductless” solution.

UNIT FEATURES

Sizes 09 (3/4 ton, 2.64 kW) through 18 (1-1/2 ton, 5.3 kW)
Environmentally-friendly (HFC-410A) zero ozone depletion refrigerant
High Efficiency Rotary compressors
Exceeds ASHRAE 90.1 efficiencies
Two-piece chassis/cabinet design
Galvanized steel cabinet with durable Polar Ice powder coat finish and black “matte” finish on subbase
Slope top/aluminum rigid bar supply air grille
UltraQuiet Option
TXV metering device
Extended range (20 to 120°F, -6.7 to 48.9°C) operation
Advanced digital auto change-over unit mounted controls with temperature display and high/low fan speed selection
Remote-mounted controls available
Microprocessor controls standard (optional DXM and/or DDC controls)
LonWorks, BACnet, Modbus and Johnson N2 compatibility options for DDC controls
Right or left-hand piping arrangement
Front or bottom return air configuration
Unit Performance Sentinel™ performance monitoring system
Eight Safeties Standard
Wide variety of options including coated air coil, flow regulator, motorized water valve, stainless steel drain pan, locking control door, disconnect switch, and internal pump. (Pump option requires extended cabinet).

Accessory

Louvered, painted black “matte” finish subbase decorative grille for field-installation.

Selection Procedure

Reference Calculations

Heating	Cooling	
$LWT = EWT - \frac{HE}{GPM \times 500}$	$LWT = EWT + \frac{HR}{GPM \times 500}$	$LC = TC - SC$
$LAT = EAT + \frac{HC}{CFM \times 1.08}$	$LAT (DB) = EAT (DB) - \frac{SC}{CFM \times 1.08}$	$S/T = \frac{SC}{TC}$

Legend and Glossary of Abbreviations

BTUH = BTU(British Thermal Unit) per hour	HWC = hot water generator (desuperheater) capacity, Mbtuh
CFM = airflow, cubic feet/minute	FPT = female pipe thread
COP = coefficient of performance = BTUH output/BTUH input	KW = total power unit input, kilowatts
DB = dry bulb temperature (°F)	LAT = leaving air temperature, °F
EAT = entering air temperature, Fahrenheit (dry bulb/wet bulb)	LC = latent cooling capacity, BTUH
EER = energy efficiency ratio = BTUH output/Watt input	LWT = leaving water temperature, °F
MPT = male pipe thread	MBTUH = 1000 BTU per hour
ESP = external static pressure (inches w.g.)	S/T = sensible to total cooling ratio
EWT = entering water temperature	SC = sensible cooling capacity, BTUH
GPM = water flow in U.S. gallons/minute	TC = total cooling capacity, BTUH
HE = total heat of extraction, BTUH	WB = wet bulb temperature (°F)
HC = air heating capacity, BTUH	WPD = waterside pressure drop (psi & ft. of hd.)
HR = total heat of rejection, BTUH	

Conversion Table - to convert inch-pound (English) to S-I (Metric)

Air Flow	Water Flow	Ext Static Pressure	Water Pressure Drop
Airflow (L/s) = CFM x 0.472	Water Flow (L/s) = gpm x 0.0631	ESP (Pa) = ESP (in of wg) x 249	PD (kPa) = PD (ft of hd) x 2.99

Selection Procedure

- Step 1 Determine the actual heating and cooling loads at the desired dry bulb and wet bulb conditions.
- Step 2 Obtain the following design parameters: Entering water temperature, water flow rate in GPM, air flow in CFM, water flow pressure drop and design wet and dry bulb temperatures. Air flow CFM should be between 300 and 450 CFM per ton. Unit water pressure drop should be kept as close as possible to each other to make water balancing easier. Go to the appropriate tables and find the proper indicated water flow and water temperature.
- Step 3 Select a unit based on total and sensible cooling conditions. Select a unit which is closest to, but no larger than, the actual cooling load.
- Step 4 Enter tables at the design water flow and water temperature. Read the total and sensible cooling capacities (**Note: interpolation is permissible, extrapolation is not**).
- Step 5 Read the heating capacity. If it exceeds the design criteria it is acceptable. It is quite normal for Water-Source Heat Pumps to be selected on cooling capacity only since the heating output is usually greater than the cooling capacity.
- Step 6 Determine the correction factors associated with the variable factors of dry bulb and wet bulb.
- Corrected Total Cooling = tabulated total cooling x wet bulb correction.
- Corrected Sensible Cooling = tabulated sensible cooling x wet/dry bulb correction.
- Step 7 Compare the corrected capacities to the load requirements. Normally if the capacities are within 10% of the loads, the equipment is acceptable. It is better to undersize than oversize, as undersizing improves humidity control, reduces sound levels and extends the life of the equipment.
- Step 8 When completed, calculate water temperature rise and assess the selection. If the units selected are not within 10% of the load calculations, then review what effect changing the GPM, water temperature and/or air flow and air temperature would have on the corrected capacities. If the desired capacity cannot be achieved, select the next larger or smaller unit and repeat the procedure. Remember, when in doubt, undersize slightly for best performance.

Example Equipment Selection For Cooling

Step 1 Load Determination:

Assume we have determined that the appropriate cooling load at the desired dry bulb 80°F and wet bulb 65°F conditions is as follows:

Total Cooling.....	10,200 BTUH
Sensible Cooling.....	8,350 BTUH
Entering Air Temp.....	80°F Dry Bulb/65°F Wet Bulb

Step 2 Design Conditions:

Similarly, we have also obtained the following design parameters:

Entering Water Temp.....	90°F
Water Flow (Based upon 12°F rise in temp.).....	2.3 GPM
Air Flow.....	350 CFM

Step 3, 4 & 5 HP Selection:

After making our preliminary selection (HRC12), we enter the tables at design water flow and water temperature and read Total Cooling, Sens. Cooling and Heat of Rej. capacities:

Total Cooling.....	10,800 BTUH
Sensible Cooling.....	9,200 BTUH
Heat of Rejection.....	13,900 BTUH

Step 6 & 7 Entering Air and Airflow Corrections:

Next, we determine our correction factors.

Table	Ent Air	Air Flow	Corrected
Corrected Total Cooling = 10,800	x 0.976	x 0.954	=10,056
Corrected Sens Cooling = 9,200	x 1.071	x 0.927	= 9,134
Corrected Heat of Reject = 13,900	x 0.979	x 0.958	= 13,037

Step 8 Water Temperature Rise Calculation & Assessment:

Actual Temperature Rise.....	11.3°F
------------------------------	--------

When we compare the Corrected Total Cooling and Corrected Sensible Cooling figures with our load requirements stated in Step 1, we discover that our selection is within +/- 10% of our sensible load requirement. Furthermore, we see that our Corrected Total Cooling figure is slightly undersized as recommended, when compared to the actual indicated load.

HRC Series Nomenclature

1234567891011121314

HRC

12

A

1

C

A

M

S

C

S

R

SERIES

HRC = Heat Controller Console
(R410A)

UNIT SIZE

09
12
15
18

REVISION LEVEL

A = Current Revision All Sizes

VOLTAGE

0 = 115/60/1 (SIZE 09 & 12 ONLY)
1 = 208-230/60/1
8 = 255/60/1

CONTROLS

C = ACO UNIT MOUNTED TSTAT w/ CXM
D = ACO UNIT MOUNTED TSTAT w/ DXM
R = REMOTE MOUNTED TSTAT w/ CXM
S = REMOTE MOUNTED TSTAT w/ DXM
L = REMOTE MOUNTED LON w/ CXM
M = REMOTE MOUNTED LON w/ DXM
N = REMOTE MOUNTED MPC w/ CXM
P = REMOTE MOUNTED MPC w/ DXM

PIPING CONNECTIONS

R = RIGHT PIPING
L = LEFT PIPING
V = LEFT PIPING w/ S.S. DRAIN PAN
W = RIGHT PIPING w/ S.S. DRAIN PAN

WATER CIRCUIT OPTIONS

	Sweat	FPT	MPT
None	S	F	M
Motorized Water Valve	A	G	N
AutoFlow (2.25 gpm/ton)	B	H	P
AutoFlow (3.0 gpm/ton)	C	J	Q
Motorized Water Valve & AFR (2.25)	D	K	R
Motorized Water Valve & AFR (3.0)	E	L	T
Secondary Circulation Pump	U	V	W

Flow Regulator Reference

Size	Option B.H.P.D.K.R		Option C.J.Q.E.L.T	
	US GPM	LPS	US GPM	LPS
HRC09	2.0	0.126	2.5	0.158
HRC12	2.5	0.158	3.0	0.189
HRC15	3.0	0.189	3.5	0.221
HRC18	3.5	0.221	4.0	0.252

GPM = Gallons Per Minute
LPS = Liters Per Second

HEAT EXCHANGER OPTIONS

A = Copper Water Coil w/E-Coated Air Coil
C = Copper Water Coil w/Non-Coated Air Coil
J = Cupro-Nickel Water Coil w/E-Coated Air Coil
N = Cupro-Nickel Water Coil w/Non-Coated Air Coil
V = Copper Water Coil w/E-Coated Air Coil
E = Copper Water Coil w/Non-Coated Air Coil
M = Cupro-Nickel Water Coil w/E-Coated Air Coil
F = Cupro-Nickel Water Coil w/Non-Coated Air Coil

Extended Range

SUBBASE

S = 5" SUBBASE (BLACK)
H = 5" SUBBASE w/MOTORIZED DAMPER
N = NONE

CABINET AND CONSTRUCTION

M = BOTTOM RETURN w/ULTRAQUIET
D = BOTTOM RETURN w/LOCKING CONTROL DOOR w/MUTE
B = FRONT RETURN w/ULTRAQUIET
E = FRONT RETURN w/LOCKING CONTROL DOOR w/ULTRAQUIET
C = NO CABINET, BOTTOM RETURN CHASSIS ONLY w/ULTRAQUIET
J = NO CABINET, FRONT RETURN CHASSIS ONLY w/ULTRAQUIET
S = BOTTOM RETURN (STANDARD)
L = BOTTOM RETURN w/LOCKING CONTROL DOOR (STANDARD)
F = FRONT RETURN (STANDARD)
G = FRONT RETURN w/LOCKING CONTROL DOOR (STANDARD)
N = NO CABINET, BOTTOM RETURN CHASSIS ONLY
H = NO CABINET, FRONT RETURN CHASSIS ONLY (STANDARD)

ULTRAQUIET

STANDARD

POWER TERMINATION & OPTIONS

OPTION	FIELD CONNECTED (HARD WIRE)	20 Amp PLUG & CORD	DISCONNECT SWITCH	BREAKER	RECEPTACLE
A	X	-	-	-	-
B	-	X	-	-	-
D	-	-	-	X	-
F	-	-	X	-	-
K	-	X	X	-	X

NOTES:

1. UNITS ARE ETL APPROVED FOR USA & CANADA.
2. UNITS WITH CXM CONTROLLERS COME STANDARD WITH 50VA TRANSFORMERS. UNITS WITH DXM, LON OR MPC CONTROLLERS COME STANDARD WITH 75VA TRANSFORMERS.
3. "CHASSIS ONLY" IS FOR FRONT & BOTTOM RETURN, REPLACEMENT UNIT.
4. FOR SECONDARY PUMP OPTION DIGIT 7 MUST BE "1"(208-230).
5. HRC 09-15 WATER CONNECTIONS 1/2".
HRC 18 WATER CONNECTIONS 3/4".
6. HRC09-15 w/SECONDARY PUMP SHALL BE IN EXTENDED CABINET 54" LONG.
HRC18 w/SECONDARY PUMP SHALL BE IN EXTENDED CABINET 60" LONG.
7. AVAILABLE IN 115VOLT & 208-230 VOLT ONLY.

*Requires extended unit - see cabinet dimensions.

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Performance Data – AHRI/ASHRAE/ISO 13256-1

ASHRAE/AHRI/ISO 13256-1. English (I-P) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 86°F		Heating 68°F		Cooling 59°F		Heating 50°F		Cooling 77°F		Heating 32°F	
	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP	Capacity Btuh	EER Btuh/W	Capacity Btuh	COP
HRC09	8,600	13.3	11,400	4.6	9,200	18.6	9,500	4.0	8,800	14.9	7,300	3.3
HRC12	11,300	12.8	14,100	4.5	12,500	18.7	11,800	3.9	11,800	14.5	9,300	3.3
HRC15	13,700	12.8	17,500	5.1	15,700	19.4	14,600	4.0	14,500	14.7	11,400	3.3
HRC18	15,600	12.2	20,100	4.5	17,200	17.9	16,500	3.9	16,100	13.8	13,200	3.3

Cooling capacities based upon 80.6°F DB, 66.2°F WB entering air temperature

Heating capacities based upon 68°F DB, 59°F WB entering air temperature

All air flow is rated on high speed, Units factory shipped on medium and low motor taps.

All ratings based upon operation at lower voltage of dual voltage rated models

ASHRAE/AHRI/ISO 13256-1. Metric (S-I) Units

Model	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30°C		Heating 20°C		Cooling 15°C		Heating 10°C		Cooling 25°C		Heating 0°C	
	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP
HRC09	2.52	3.9	3.34	4.6	2.70	5.5	2.78	4.0	2.58	4.4	2.14	3.3
HRC12	3.31	3.8	4.13	4.5	3.66	5.5	3.46	3.9	3.46	4.3	2.73	3.3
HRC15	4.02	3.8	5.13	5.1	4.60	5.7	4.28	4.0	4.25	4.3	3.34	3.3
HRC18	4.57	3.6	5.89	4.5	5.04	5.3	4.84	3.9	4.72	4.0	3.87	3.3

Cooling capacities based upon 27°C DB, 19°C WB entering air temperature

Heating capacities based upon 20°C DB, 15°C WB entering air temperature

All air flow is rated on high speed, Units factory shipped on medium and low motor taps.

All ratings based upon operation at lower voltage of dual voltage rated models

Performance Data – Selection Notes

For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (Leaving Water Temperature) must be calculated. Flow must be maintained to a level such that the LWT is maintained above 42°F [5.6°C] when the JW3 jumper is not clipped (see example below). Otherwise, appropriate levels of a proper antifreeze solution should be used in systems with leaving water temperatures of 42°F [5.6°C] or below and the JW3 jumper should be clipped. This is due to the potential of the refrigerant temperature being as low as 32°F [0°C] with 40°F [4.4°C] LWT, which may lead to a nuisance cutout due to the activation of the Low Temperature Protection. JW3 should never be clipped for standard range equipment or systems without antifreeze.

Example:

At 50°F EWT (Entering Water Temperature) and 1.5 gpm/ton, a 3 ton unit has a HE of 22,500 Btuh. To calculate LWT, rearrange the formula for HE as follows:

HE = TD x GPM x 500, where HE = Heat of Extraction (Btuh);
TD = temperature difference (EWT - LWT) and GPM = U.S.
Gallons per Minute.

$$TD = HE / (GPM \times 500)$$

$$TD = 22,500 / (4.5 \times 500)$$

$$TD = 10^\circ\text{F}$$

$$LWT = EWT - TD$$

$$LWT = 50 - 10 = 40^\circ\text{F}$$

In this example, a higher flow rate will be required for EWTs at or below 50°F without antifreeze. At 2 gpm/ton, the calculation above results in a TD of 7.5. LWT = 50 - 7.5 = 42.5°F, which is above 42°F EWT, and is acceptable for this application.

		Heating - EAT 70°F				
	EER	HC	kW	HE	LAT	COP
10.9	26.7	5.5	0.50	3.8	91.0	3.22
10.9	29.9	6.0	0.51	4.3	93.1	3.44
10.9	31.7	6.3	0.52	4.5	94.1	3.55
10.8	22.9	6.4	0.52	4.7	94.8	3.62
10.9	25.8	6.9	0.53	5.1	96.5	3.79
10.9	27.4	7.2	0.54	5.4	97.9	3.91
10.9	27.4	7.4	0.55	5.6	98.6	3.97
10.9	19.6	7.8	0.56	5.9	100.0	4.10
10.9	22.1	8.2	0.57	6.3	101.6	4.23
10.9		8.4	0.57	6.5	102.4	4.30
10.9		8.7	0.58	6.7	103.6	4.37

Performance Data – HRC09

350 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD*		Cooling - EAT 80/67°F						Heating - EAT 70°F					*WPD Adder for Motorized Valve, HRC09 (Cv = 4.9, MOPD = 150 psi)			
		PSI	FT	TC	SC	Sens/ Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP				
20	2.2	5.0	11.6	Operation not recommended						6.3	0.67	4.0	86.6	2.72	<div>WPD Adder</div> <div>GPM</div> <div>PSI</div> <div>FT</div>			
30	1.1	1.6	3.7	9.2	6.7	0.73	0.44	10.7	20.6	6.9	0.69	4.6	88.2	2.94				
	1.6	2.6	6.0	8.9	6.6	0.74	0.43	10.4	20.7	7.2	0.69	4.8	89.0	3.04				
	2.2	4.5	10.4	8.8	6.5	0.74	0.43	10.2	20.6	7.3	0.69	5.0	89.4	3.11				
40	1.1	1.4	3.2	9.4	6.9	0.73	0.47	11.1	19.9	7.9	0.70	5.5	90.9	3.29				
	1.6	2.3	5.3	9.3	6.8	0.73	0.45	10.9	20.5	8.3	0.71	5.9	91.8	3.41				
	2.2	4.2	9.7	9.2	6.7	0.73	0.45	10.7	20.6	8.5	0.71	6.1	92.4	3.48				
50	1.1	1.2	2.8	9.5	7.0	0.74	0.51	11.3	18.5	8.9	0.72	6.5	93.7	3.63				
	1.6	2.2	5.1	9.5	6.9	0.73	0.49	11.1	19.5	9.3	0.73	6.9	94.7	3.76				
	2.2	3.8	8.8	9.4	6.9	0.73	0.47	11.1	19.9	9.6	0.73	7.1	95.4	3.84				
60	1.1	1.1	2.5	9.4	7.1	0.76	0.56	11.3	16.7	10.0	0.74	7.5	96.4	3.95				
	1.6	2.1	4.9	9.5	7.0	0.74	0.53	11.3	17.9	10.4	0.75	7.9	97.6	4.08				
	2.2	3.7	8.5	9.5	7.0	0.74	0.51	11.2	18.6	10.7	0.75	8.1	98.3	4.16				
70	1.1	1.0	2.3	9.0	7.1	0.79	0.62	11.2	14.5	11.0	0.76	8.4	99.0	4.23				
	1.6	2.0	4.6	9.3	7.1	0.77	0.58	11.3	15.9	11.4	0.77	8.8	100.2	4.36				
	2.2	3.5	8.1	9.4	7.1	0.76	0.56	11.3	16.7	11.7	0.77	9.1	101.0	4.43				
80	1.1	1.0	2.3	8.5	7.0	0.82	0.69	10.9	12.3	11.9	0.78	9.2	101.4	4.47				
	1.6	1.9	4.4	8.8	7.1	0.80	0.65	11.1	13.7	12.3	0.79	9.6	102.6	4.58				
	2.2	3.2	7.4	9.0	7.1	0.79	0.62	11.2	14.5	12.6	0.80	9.9	103.4	4.64				
85	1.1	1.0	2.2	8.1	6.9	0.84	0.73	10.6	11.1	12.3	0.79	9.6	102.5	4.56				
	1.6	1.9	4.4	8.5	7.0	0.82	0.68	10.9	12.5	12.7	0.80	10.0	103.6	4.66				
	2.2	3.1	7.2	8.8	7.0	0.80	0.66	11.0	13.3	13.0	0.81	10.2	104.3	4.71				
90	1.1	0.9	2.1	7.8	6.7	0.87	0.77	10.4	10.1	12.7	0.80	10.0	103.5	4.66				
	1.6	1.9	4.4	8.2	6.9	0.84	0.72	10.7	11.4	13.1	0.81	10.3	104.6	4.74				
	2.2	3.0	6.9	8.5	7.0	0.82	0.69	10.9	12.2	13.3	0.82	10.5	105.2	4.77				
100	1.1	0.9	2.1	6.9	6.3	0.91	0.86	9.8	7.9	Operation not recommended								
	1.6	1.8	4.2	7.4	6.6	0.89	0.81	10.2	9.1									
	2.2	2.9	6.7	7.7	6.7	0.87	0.78	10.4	9.9									
110	1.1	0.9	2.1	5.8	5.6	0.97	0.96	9.1	6.0									
	1.6	1.8	4.2	6.4	6.0	0.94	0.91	9.5	7.0									
	2.2	2.9	6.7	6.7	6.2	0.92	0.87	9.7	7.7									
120	1.1	0.9	2.1	4.5	4.6	1.00	1.07	8.2	4.2									
	1.6	1.8	4.2	5.1	5.1	1.00	1.02	8.6	5.0									
	2.2	2.8	6.5	5.5	5.4	0.98	0.98	8.9	5.6									

Interpolation is permissible; extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.

AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

All performance is based upon the lower voltage of dual voltage rated units.

Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.

Operation below 60°F EWT requires optional insulated water/refrigerant circuit.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in the shaded areas.

Performance Data – HRC12

450 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btu/h

WPD Adder for Motorized Valve, HRC12 (Cv = 4.9, MOPD = 150 psi)			EWT °F	GPM	WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
					PSI	FT	TC	SC	Sens/ Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
			20	3.0	7.8	18.0	Operation not recommended						7.3	0.79	4.7	85.1	2.71
GPM	WPD Adder		30	1.5	2.1	4.9	12.6	8.2	0.65	0.56	14.5	22.4	8.1	0.81	5.4	86.7	2.96
	PSI	FT		2.3	4.5	10.4	12.4	8.0	0.65	0.53	14.2	23.3	8.5	0.81	5.7	87.5	3.06
1.5	0.5	1.0	40	3.0	6.8	15.7	12.3	8.0	0.65	0.52	14.0	23.6	8.7	0.82	5.9	87.9	3.12
2.3	1.2	2.7		1.5	2.0	4.6	12.7	8.4	0.67	0.61	14.7	20.7	9.4	0.83	6.7	89.4	3.35
3.0	2.2	5.0		2.3	4.2	9.7	12.6	8.2	0.65	0.58	14.6	21.9	9.9	0.83	7.1	90.4	3.48
			50	3.0	6.1	14.1	12.6	8.2	0.65	0.56	14.5	22.4	10.2	0.84	7.3	90.9	3.56
				1.5	1.8	4.2	12.5	8.7	0.70	0.67	14.8	18.7	10.8	0.85	8.0	92.3	3.74
				2.3	3.8	8.8	12.6	8.5	0.68	0.63	14.8	20.0	11.4	0.86	8.5	93.5	3.91
			60	3.0	5.8	13.4	12.7	8.4	0.67	0.61	14.7	20.7	11.7	0.86	8.8	94.1	4.00
				1.5	1.7	3.9	12.1	9.0	0.74	0.73	14.6	16.6	12.2	0.87	9.3	95.1	4.14
				2.3	3.7	8.5	12.4	8.8	0.71	0.69	14.7	17.9	12.9	0.87	9.9	96.5	4.32
			70	3.0	5.2	12.0	12.5	8.7	0.70	0.67	14.8	18.6	13.2	0.88	10.2	97.2	4.41
				1.5	1.5	3.5	11.6	9.2	0.79	0.80	14.4	14.5	13.6	0.88	10.6	97.9	4.50
				2.3	3.5	8.1	12.0	9.1	0.76	0.76	14.5	15.8	14.3	0.89	11.2	99.4	4.69
			80	3.0	4.9	11.3	12.1	9.0	0.74	0.73	14.6	16.5	14.6	0.90	11.6	100.1	4.79
				1.5	1.4	3.2	11.0	9.2	0.83	0.89	14.1	12.5	14.8	0.90	11.8	100.5	4.84
				2.3	3.2	7.4	11.4	9.2	0.81	0.83	14.3	13.7	15.5	0.91	12.4	101.9	5.01
			85	3.0	4.8	11.1	11.6	9.2	0.79	0.81	14.4	14.4	15.8	0.91	12.7	102.6	5.10
				1.5	1.4	3.1	10.7	9.1	0.85	0.93	13.9	11.5	15.4	0.90	12.3	101.6	4.98
				2.3	3.1	7.2	11.1	9.2	0.83	0.88	14.1	12.7	16.0	0.91	12.9	102.9	5.13
			90	3.0	4.7	10.7	11.3	9.2	0.81	0.85	14.2	13.4	16.3	0.92	13.1	103.5	5.20
				1.5	1.3	3.0	10.4	9.1	0.87	0.98	13.7	10.6	15.9	0.91	12.8	102.7	5.11
				2.3	3.0	6.9	10.8	9.2	0.85	0.92	13.9	11.7	16.5	0.92	13.3	103.9	5.25
			100	3.0	4.5	10.4	11.0	9.2	0.84	0.89	14.1	12.3	16.7	0.92	13.6	104.4	5.31
				1.5	1.3	3.0	9.7	8.7	0.90	1.08	13.4	9.0	Operation not recommended				
				2.3	2.9	6.7	10.1	9.0	0.88	1.02	13.6	9.9					
3.0	4.3	9.9	10.3	9.0	0.88	0.99	13.7	10.5									
		110	1.5	1.2	2.8	9.0	8.2	0.91	1.20	13.1	7.5						
			2.3	2.9	6.7	9.4	8.5	0.90	1.13	13.3	8.4						
			3.0	4.2	9.7	9.6	8.7	0.90	1.09	13.4	8.8						
		120	1.5	1.2	2.8	8.4	7.5	0.89	1.33	12.9	6.3						
			2.3	2.8	6.5	8.7	7.9	0.91	1.25	13.0	7.0						
			3.0	4.1	9.5	8.9	8.1	0.91	1.21	13.1	7.4						

Interpolation is permissible; extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.

AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

All performance is based upon the lower voltage of dual voltage rated units.

Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.

Operation below 60°F EWT requires optional insulated water/refrigerant circuit.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in the shaded areas.

Performance Data – HRC15

520 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btu/h

EWT °F	GPM	WPD*		Cooling - EAT 80/67°F						Heating - EAT 70°F					*WPD Adder for Motorized Valve, HRC15 (Cv = 4.9, MOPD = 150 psi)		
		PSI	FT	TC	SC	Sens/Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP			
20	3.7	5.1	11.8	Operation not recommended						8.9	0.92	5.8	85.9	2.86	<div>GPM</div> <div>WPD Adder</div> <div>PSI</div> <div>FT</div> <div>1.90.71.7</div> <div>2.81.74.0</div> <div>3.73.37.6</div>		
30	1.9	1.5	3.5	16.9	11.0	0.65	0.62	19.0	27.1	10.0	0.94	6.8	87.8	3.11			
	2.8	3.0	6.9	16.5	10.4	0.63	0.58	18.5	28.6	10.5	0.95	7.2	88.6	3.22			
	3.7	4.7	10.9	16.3	10.1	0.62	0.56	18.2	29.2	10.7	0.96	7.5	89.1	3.28			
40	1.9	1.2	2.8	16.9	11.4	0.67	0.70	19.3	24.1	11.7	0.98	8.4	90.8	3.51			
	2.8	2.6	6.0	16.9	11.2	0.65	0.65	19.1	26.2	12.3	0.99	8.9	91.9	3.64			
	3.7	4.3	9.9	16.9	11.0	0.65	0.62	19.0	27.1	12.6	0.99	9.2	92.4	3.71			
50	1.9	1.0	2.3	16.6	11.5	0.69	0.79	19.3	21.0	13.4	1.01	10.0	93.9	3.91			
	2.8	2.3	5.3	16.9	11.5	0.68	0.73	19.4	23.1	14.1	1.02	10.7	95.2	4.06			
	3.7	3.9	9.0	16.9	11.4	0.67	0.70	19.3	24.2	14.5	1.03	11.0	95.9	4.15			
60	1.9	0.9	2.1	15.9	11.3	0.71	0.89	18.9	17.9	15.2	1.04	11.7	97.1	4.29			
	2.8	2.1	4.9	16.4	11.4	0.70	0.82	19.2	19.9	16.0	1.05	12.4	98.5	4.46			
	3.7	3.5	8.1	16.6	11.5	0.69	0.79	19.3	21.0	16.4	1.06	12.8	99.3	4.56			
70	1.9	0.9	2.1	15.0	10.9	0.73	0.99	18.4	15.2	16.9	1.06	13.3	100.1	4.66			
	2.8	2.0	4.6	15.6	11.2	0.72	0.92	18.8	16.9	17.8	1.08	14.1	101.6	4.84			
	3.7	3.3	7.6	15.9	11.3	0.71	0.89	18.9	17.9	18.2	1.08	14.5	102.5	4.93			
80	1.9	0.9	2.1	14.0	10.5	0.75	1.10	17.8	12.7	18.5	1.09	14.8	103.0	4.99			
	2.8	1.8	4.2	14.6	10.8	0.74	1.03	18.2	14.2	19.4	1.10	15.6	104.5	5.17			
	3.7	3.1	7.2	15.0	10.9	0.73	1.00	18.4	15.0	19.8	1.10	16.1	105.3	5.26			
85	1.9	0.9	2.0	13.4	10.3	0.77	1.16	17.4	11.6	19.2	1.10	15.5	104.3	5.14			
	2.8	1.8	4.0	14.1	10.5	0.75	1.09	17.8	13.0	20.1	1.11	16.3	105.8	5.31			
	3.7	3.0	6.9	14.4	10.7	0.74	1.05	18.0	13.8	20.5	1.11	16.7	106.5	5.40			
90	1.9	0.8	1.8	12.9	10.0	0.78	1.22	17.0	10.5	20.0	1.11	16.2	105.6	5.29			
	2.8	1.7	3.9	13.5	10.3	0.76	1.15	17.5	11.8	20.8	1.12	17.0	107.0	5.45			
	3.7	2.9	6.7	13.9	10.5	0.75	1.11	17.7	12.5	21.2	1.12	17.3	107.7	5.53			
100	1.9	0.8	1.8	11.7	9.6	0.82	1.35	16.3	8.7	Operation not recommended							
	2.8	1.6	3.7	12.4	9.8	0.80	1.27	16.7	9.7								
	3.7	2.8	6.5	12.7	10.0	0.78	1.23	17.0	10.3								
110	1.9	0.8	1.8	10.6	9.2	0.87	1.48	15.7	7.2								
	2.8	1.6	3.7	11.2	9.4	0.84	1.40	16.0	8.0								
	3.7	2.7	6.2	11.5	9.5	0.83	1.37	16.2	8.4								
120	1.9	0.7	1.6	9.6	9.0	0.94	1.62	15.1	5.9								
	2.8	1.5	3.5	10.1	9.1	0.90	1.54	15.4	6.5								
	3.7	2.7	6.2	10.4	9.2	0.88	1.51	15.5	6.9								

Interpolation is permissible; extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.

AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

All performance is based upon the lower voltage of dual voltage rated units.

Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.

Operation below 60°F EWT requires optional insulated water/refrigerant circuit.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in the shaded areas.

Performance Data – HRC18

620 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btu/h

WPD Adder for Motorized Valve, HRC18 (Cv = 4.9, MOPD = 150 psi)			EWT °F	GPM	WPD		Cooling - EAT 80/67°F						Heating - EAT 70°F				
					PSI	FT	TC	SC	Sens/ Tot Ratio	kW	HR	EER	HC	kW	HE	LAT	COP
			20	4.5	7.5	17.3	Operation not recommended						13.9	1.24	9.8	90.8	3.29
GPM	WPD Adder		30	2.3	2.2	5.1	18.6	12.3	0.66	0.72	21.0	25.7	15.3	1.28	11.0	92.8	3.51
	PSI	FT		3.4	4.4	10.2	17.6	11.6	0.66	0.69	19.9	25.3	15.7	1.28	11.3	93.4	3.57
2.3	0.2	0.6		4.5	6.9	15.9	16.9	11.1	0.66	0.68	19.3	24.8	15.8	1.29	11.5	93.7	3.61
3.4	0.6	1.3	40	2.3	2.0	4.6	19.3	13.2	0.68	0.80	22.1	24.2	16.6	1.30	12.2	94.8	3.74
4.5	1.1	2.5		3.4	4.1	9.5	19.0	12.8	0.67	0.75	21.6	25.3	16.9	1.30	12.4	95.2	3.79
				4.5	6.3	14.6	18.8	12.5	0.67	0.73	21.3	25.6	17.0	1.31	12.6	95.4	3.81
			50	2.3	1.8	4.2	19.1	13.5	0.70	0.90	22.2	21.4	17.5	1.31	13.0	96.1	3.91
				3.4	3.8	8.8	19.3	13.3	0.69	0.84	22.2	23.1	17.7	1.31	13.2	96.4	3.95
				4.5	6.0	13.9	19.4	13.2	0.68	0.81	22.1	23.9	17.8	1.31	13.3	96.5	3.97
			60	2.3	1.6	3.7	18.4	13.3	0.72	1.01	21.8	18.2	18.2	1.31	13.8	97.2	4.07
				3.4	3.6	8.3	18.9	13.4	0.71	0.94	22.1	20.1	18.5	1.31	14.0	97.6	4.12
				4.5	5.6	12.9	19.1	13.5	0.70	0.91	22.2	21.0	18.6	1.31	14.2	97.8	4.15
			70	2.3	1.5	3.5	17.2	12.8	0.75	1.13	21.1	15.3	19.3	1.32	14.8	98.8	4.27
				3.4	3.4	7.9	17.9	13.1	0.73	1.06	21.5	17.0	19.7	1.33	15.2	99.5	4.36
				4.5	5.2	12.0	18.2	13.3	0.73	1.02	21.7	17.9	20.0	1.33	15.5	99.9	4.40
			80	2.3	1.4	3.2	15.9	12.1	0.76	1.25	20.2	12.7	21.0	1.35	16.4	101.3	4.55
				3.4	3.2	7.4	16.7	12.6	0.75	1.18	20.7	14.1	21.8	1.37	17.1	102.6	4.68
				4.5	5.0	11.6	17.0	12.7	0.75	1.14	21.0	14.9	22.3	1.38	17.6	103.3	4.75
			85	2.3	1.4	3.1	15.3	11.7	0.77	1.32	19.8	11.6	22.2	1.38	17.6	103.2	4.73
				3.4	3.1	7.15	16.0	12.2	0.76	1.25	20.3	12.9	23.3	1.40	18.6	104.9	4.88
				4.5	4.9	11.35	16.4	12.4	0.76	1.21	20.6	13.6	24.0	1.42	19.2	105.9	4.97
			90	2.3	1.3	3.0	14.6	11.3	0.77	1.39	19.4	10.5	23.5	1.40	18.7	105.1	4.91
				3.4	3.0	6.9	15.3	11.8	0.77	1.32	19.8	11.6	24.9	1.43	20.0	107.2	5.08
				4.5	4.8	11.1	15.7	12.0	0.76	1.28	20.1	12.3	25.7	1.45	20.8	108.4	5.18
			100	2.3	1.3	3.0	13.5	10.5	0.78	1.53	18.8	8.8	Operation not recommended				
				3.4	2.9	6.7	14.1	10.9	0.78	1.46	19.1	9.6					
				4.5	4.6	10.6	14.4	11.1	0.77	1.42	19.2	10.1					
			110	2.3	1.2	2.8	12.8	9.8	0.77	1.67	18.5	7.6					
				3.4	2.8	6.5	13.1	10.1	0.77	1.60	18.6	8.2					
				4.5	4.5	10.4	13.3	10.3	0.78	1.56	18.7	8.5					
			120	2.3	1.2	2.8	12.6	9.4	0.74	1.82	18.9	6.9					
				3.4	2.8	6.5	12.6	9.5	0.76	1.75	18.6	7.2					
				4.5	4.4	10.2	12.7	9.7	0.76	1.71	18.5	7.4					

Interpolation is permissible; extrapolation is not.

All entering air conditions are 80°F DB and 67°F WB in cooling, and 70°F DB in heating.

AHRI/ISO certified conditions are 80.6°F DB and 66.2°F WB in cooling and 68°F DB in heating.

Table does not reflect fan or pump power corrections for AHRI/ISO conditions.

All performance is based upon the lower voltage of dual voltage rated units.

Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.

Operation below 40°F EWT is based upon a 15% methanol antifreeze solution.

Operation below 60°F EWT requires optional insulated water/refrigerant circuit.

See performance correction tables for operating conditions other than those listed above.

See Performance Data Selection Notes for operation in the shaded areas.

Performance Data Correction Tables

Air Flow Correction Table

Airflow	Cooling				Heating		
% of Rated	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
73%	0.946	0.898	0.971	0.951	0.967	1.084	0.937
78%	0.954	0.927	0.976	0.958	0.976	1.062	0.954
83%	0.964	0.953	0.981	0.967	0.983	1.042	0.968
89%	0.974	0.974	0.987	0.977	0.990	1.026	0.981
94%	0.987	0.990	0.993	0.988	0.995	1.012	0.991
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
106%	1.015	1.002	1.008	1.014	1.004	0.991	1.007
111%	1.031	0.996	1.016	1.028	1.006	0.985	1.011

Entering Air Correction Table

Heating			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
60	1.036	0.910	1.068
65	1.019	0.955	1.035
68	1.008	0.982	1.014
70	1.000	1.000	1.000
75	0.980	1.046	0.964
80	0.960	1.091	0.927

Cooling										
Entering Air WB°F	Total Capacity	Sensible Cooling Capacity Multiplier - Entering DB °F							Power	Heat of Rejection
		65	70	75	80	80.6	85	90		
60	0.926	0.632	0.820	1.004	1.182	*	*	*	1.003	0.931
65	0.976		0.615	0.856	1.071	1.095	1.260	*	1.000	0.979
66.2	0.990		0.555	0.807	1.030	1.055	1.224	*	1.000	0.992
67	1.000		0.507	0.765	1.000	1.017	1.188	*	1.000	1.000
70	1.039			0.620	0.865	0.893	1.076	1.252	1.001	1.032
75	1.113				0.566	0.597	0.805	1.013	1.002	1.089

* = Sensible capacity equals total capacity

AHRI/ISO/ASHRAE 13256-1 uses entering air conditions of Cooling - 80.6°F DB/66.2°F WB, 1 and Heating - 68°F DB/59°F WB entering air temperature

Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling			Heating		WPD Corr. Fct. EWT 30°F
		EWT 90°F			EWT 30°F		
		Total Cap	Sens Cap	Power	Htg Cap	Power	
Water	0	1.000	1.000	1.000			1.000
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.997	0.997	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200

Blower Performance & Electrical Data

Blower Performance

Model	Rated CFM	SCFM		
		Low Speed	Medium Speed	High Speed
HRC09	350	270	310	350
HRC12	450	290	360	450
HRC15	520	360	440	520
HRC18	620	400	500	620

Fan speed is user selectable

All airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units

All units AHRI/ISO/ASHRAE 13256-1 rated on high fan speed

All units are designed and rated for zero external static pressure (non-ducted) application

Electrical Data

								Standard Unit			With Secondary Pump		
Model	Voltage Code	Voltage	Min/Max Voltage	Compressor			Fan Motor FLA	Total Unit FLA	Min Circuit Amps	Max Fuse/HACR	Total Unit FLA	Min Circuit Amps	Max Fuse/HACR
				QTY	RLA	LRA							
HRC09	0	115/60/1	104-126	1	8.0	46.5	0.5	8.5	10.5	20	8.8	11.3	20
	1	208-230/60/1	197-254	1	4.5	23.0	0.4	4.9	6.0	15	5.3	6.4	15
	8	265/60/1	239-292	1	5.0	19.0	0.4	5.4	6.7	15	6.2	7.5	15
HRC12	0	115/60/1	104-126	1	9.5	50.0	0.5	10.0	12.4	20	11.5	13.8	20
	1	208-230/60/1	197-254	1	4.7	25.0	0.6	5.3	6.5	15	5.7	7.3	15
	8	265/60/1	239-292	1	4.2	22.0	0.4	4.6	5.7	15	5.4	6.5	15
HRC15	1	208-230/60/1	197-254	1	5.6	30.0	0.8	6.4	7.8	15	7.2	8.6	15
	8	265/60/1	239-292	1	4.7	28.5	0.6	5.3	6.5	15	6.2	7.3	15
HRC18	1	208-230/60/1	197-254	1	6.8	38.0	0.7	7.5	9.2	15	8.3	10.0	15
	8	265/60/1	239-292	1	6.2	29.0	0.6	6.8	8.4	15	7.6	9.2	15

Physical Data

Model	09	12	15	18
Compressor (1 Each)				
Factory Charge HFC-410A (oz) [kg]	28 [0.794]	29 [0.822]	33 [0.907]	39 [1.105]
Blower Wheel				
Blower Wheel Size (dia x w) - (in) [mm] - Qty 2	5.25 x 6.25 [133 x 159]			
Water Connection Size				
O.D. Sweat (in) [mm]	1/2 [12.7]		3/4 [19.1]	
Optional FPT Fittings (in)	1/2		3/4	
Optional MPT Fittings (in)	1/2		3/4	
Coax Volume				
Volume US Gal [Liters]	.09 [.34]	.09 [.34]	.23 [.87]	.26 [.98]
Condensate Connection Size				
I.D. Vinyl Hose (In) [mm]	5/8 [15.9]			
Air Coil Size				
Dimensions (h x w) - (in) [mm]	8 x 26 [203 x 660]	10 x 26 [254 x 660]	10 x 32 [254 x 812]	
Filter Size				
Bottom Return (in) [mm]	1 - 10 x 30 x 1 [254 x 762 x 25]		1 - 10 x 36 x 1 [254 x 914 x 25]	
Front Return (In) [mm]	1 - 7 x 29.5 x 1/8 [178 x 749 x 3.2]		1 - 7 x 35.5 x 1/8 [178 x 902 x 3.2]	
Cabinet Size				
Bottom Return (Std. 5" Base) (W x H x D) - (In) [mm]	48 x 26 x 12 [1219 x 660 x 305]		54 x 26 x 12 [1372 x 660 x 305]	
Front Return (No Subbase) (W x H x D) - (In) [mm]	48 x 21 x 12 [1219 x 533 x 305]		54 x 21 x 12 [1372 x 533 x 305]	
Cabinet Size				
Weight - Operating, (lbs) [kg]	175 [79]	180 [82]	190 [86.2]	220 [99.8]
Weight - Packaged, (lbs) [kg]	185 [83.9]	190 [86]	200 [90.8]	232 [105.2]

* Data not available at time of publication.

All units have rubber grommet compressor mountings and TXV expansion devices.

Unit Maximum Water Working Pressure	
Options	Max Pressure PSIG [kPa]
Base Unit	500 [3,445]
Internal Secondary Pump (ISP)	145 [999]
Internal Motorized Water Valve (MWV)	300 [2,068]
Internal Auto Flow Valve	500 [3,445]

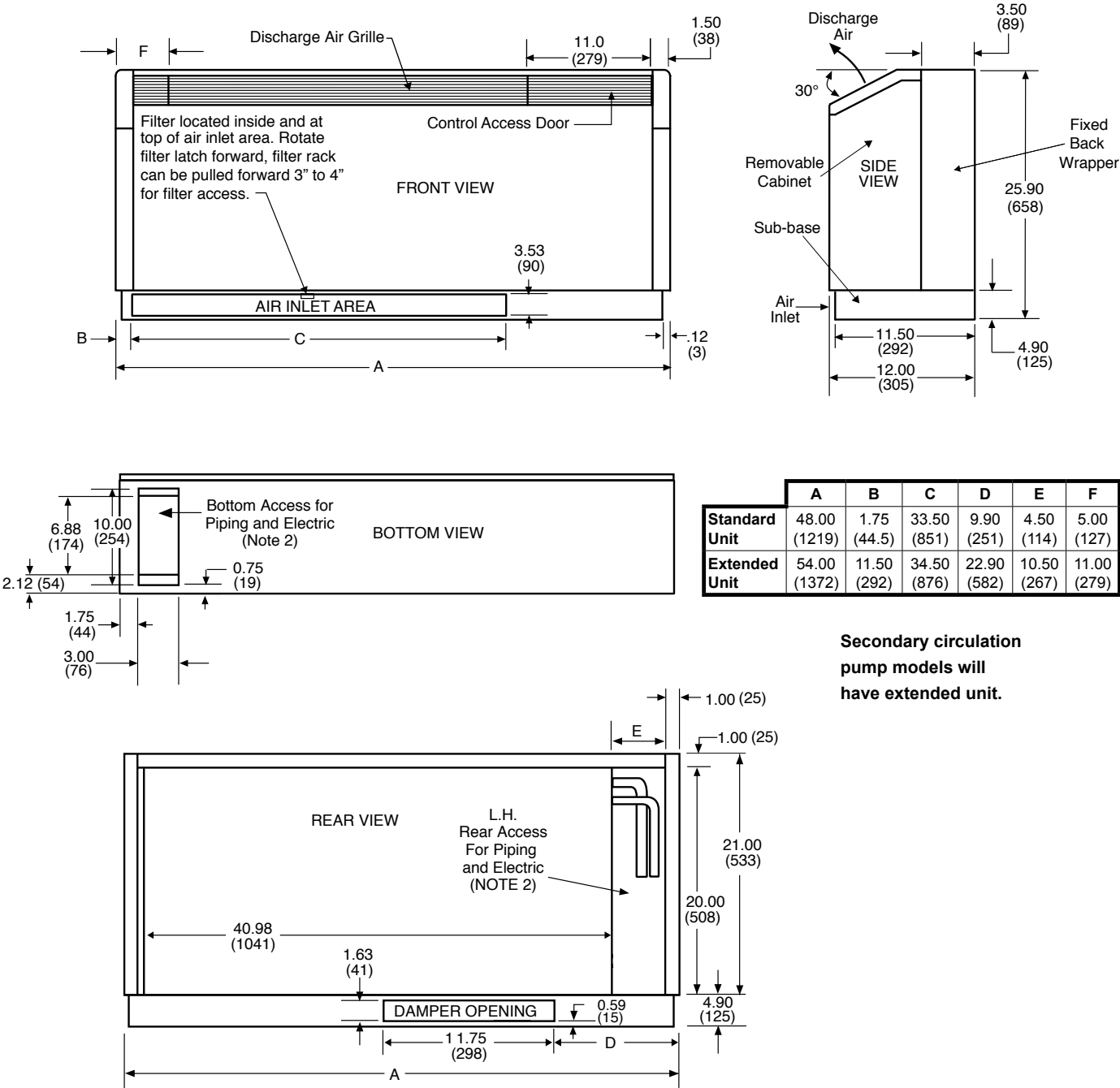
Use the lowest maximum pressure rating when multiple options are combined.

Optional Factory Installed Auto Flow Regulator GPM [LPS]		
Model	2.25 GPM/Ton	3 GPM/Ton
9	2.0 [.126]	2.5 [.158]
12	2.5 [.158]	3.0 [.189]
15	3.0 [.189]	3.5 [.221]
18	3.5 [.221]	4.0 [.252]

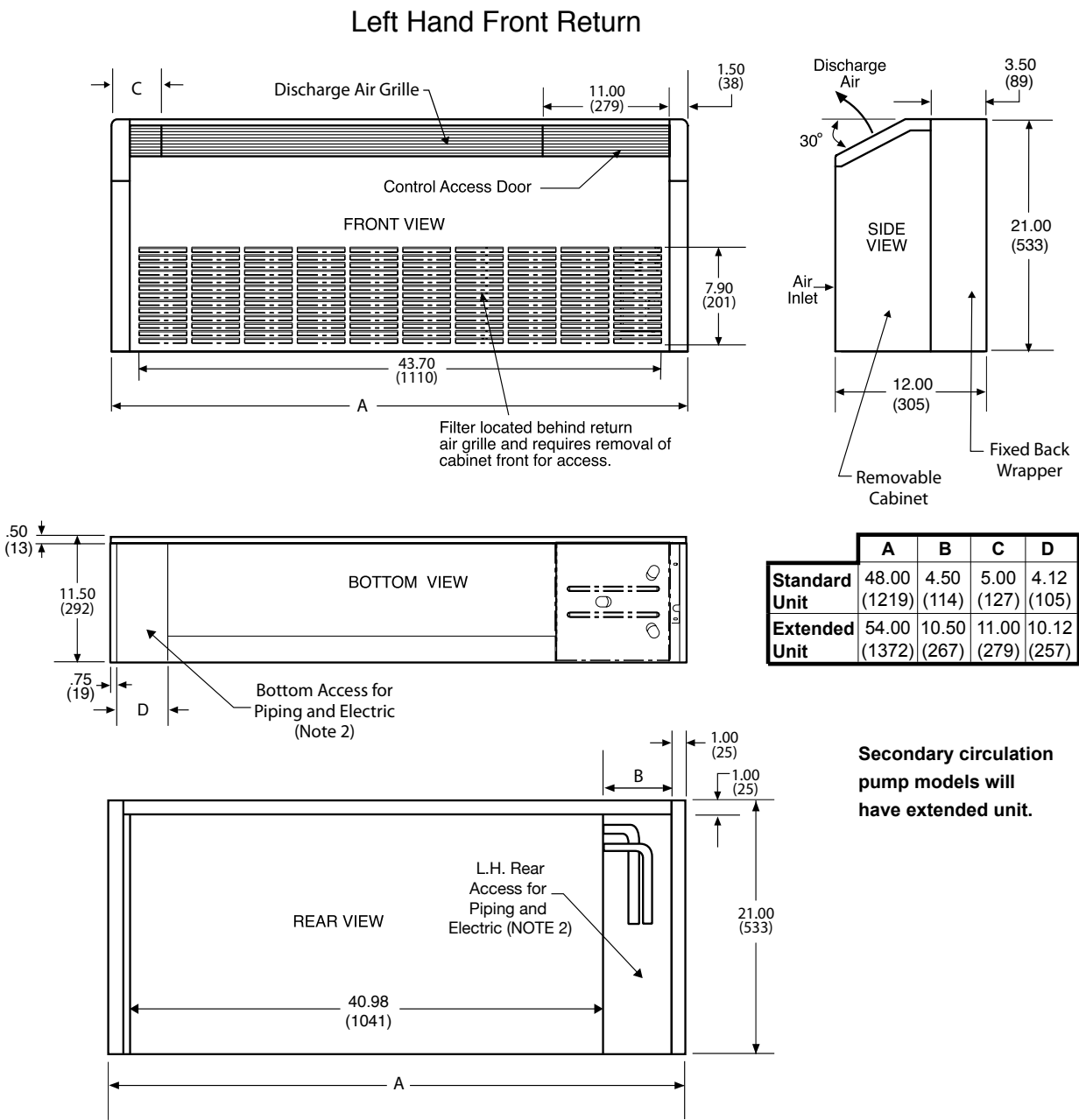
Use the lowest maximum pressure rating when multiple options are combined.

Console Cabinet Dimensions Size 09 -15 - Bottom Return - Left Hand Piping

Left Hand Bottom Return



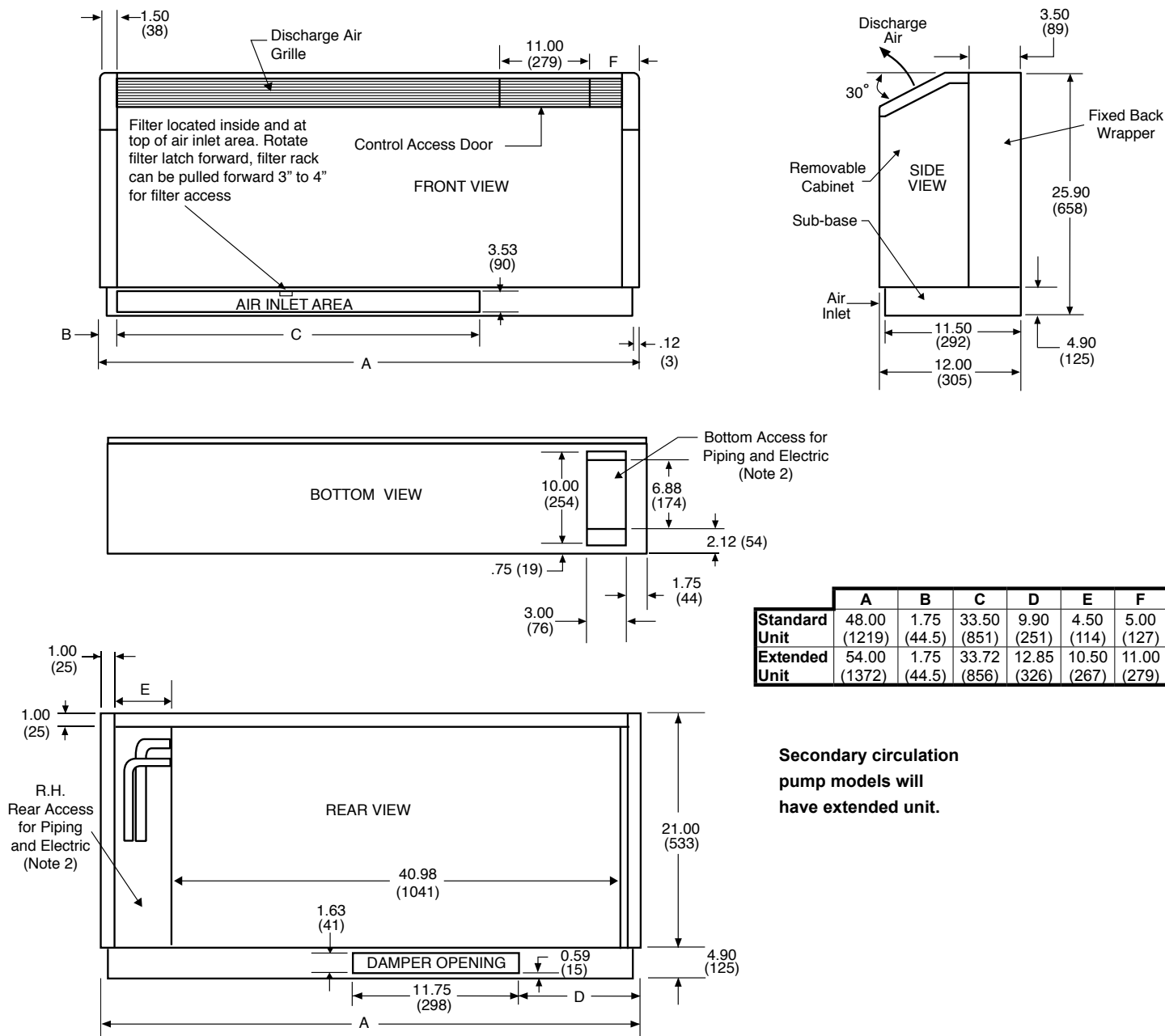
Console Cabinet Dimensions Size 09 - 15 - Front Return - Left Hand Piping



Secondary circulation pump models will have extended unit.

Console Cabinet Dimensions Size 09 - 15 - Bottom Return - Right Hand Piping

Right Hand Bottom Return



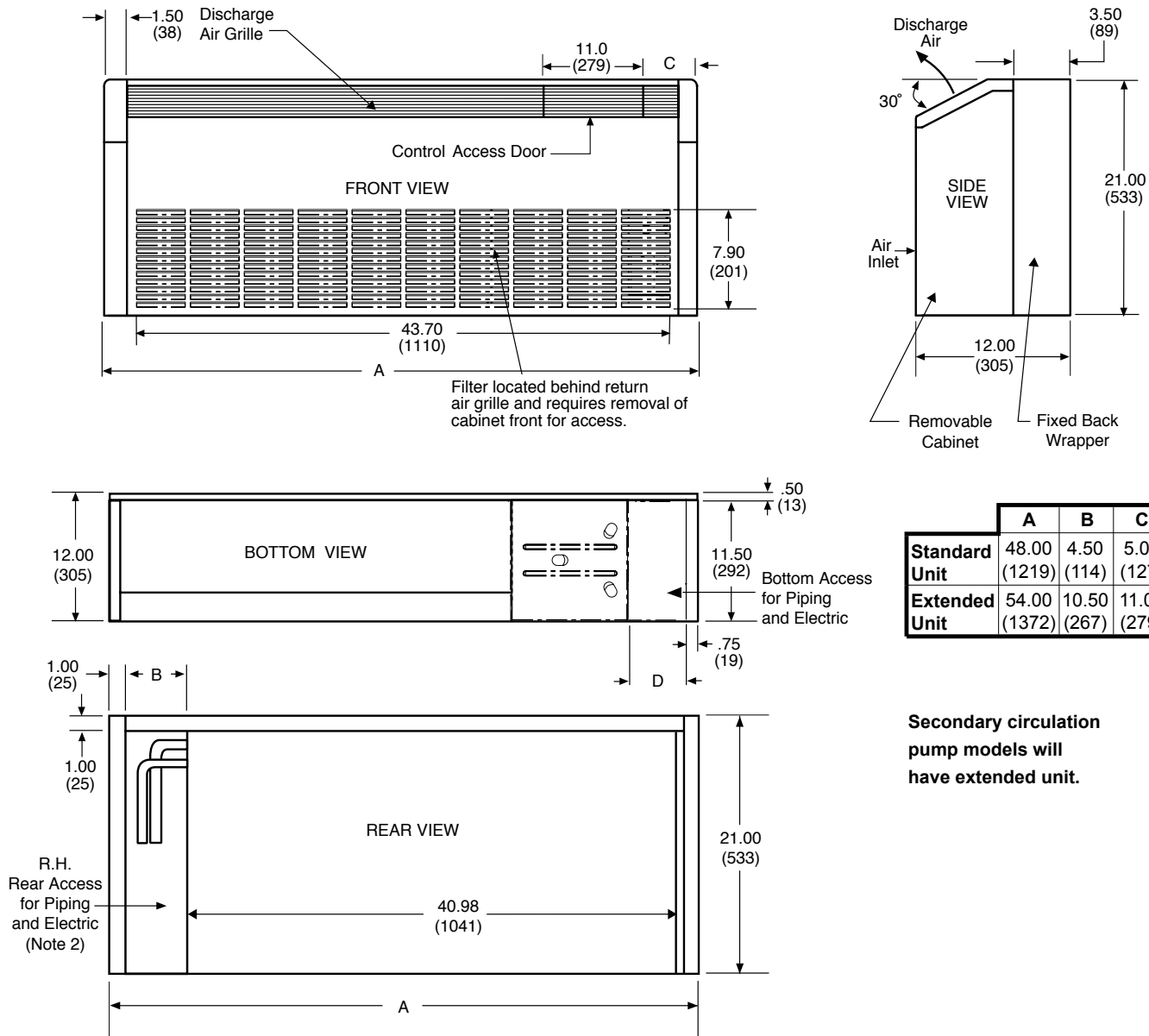
Notes:

1. All Dimensions are in inches (mm).
2. Access is reduced if optional disconnect box is selected.
3. Optional autoflow regulator, motorized water valve, and disconnect box are not shown.
4. Filter is 1"(25) thick fiberglass throwaway.

Secondary circulation pump models will have extended unit.

Console Cabinet Dimensions Size 09 - 15 - Front Return - Right Hand Piping

Right Hand Front Return

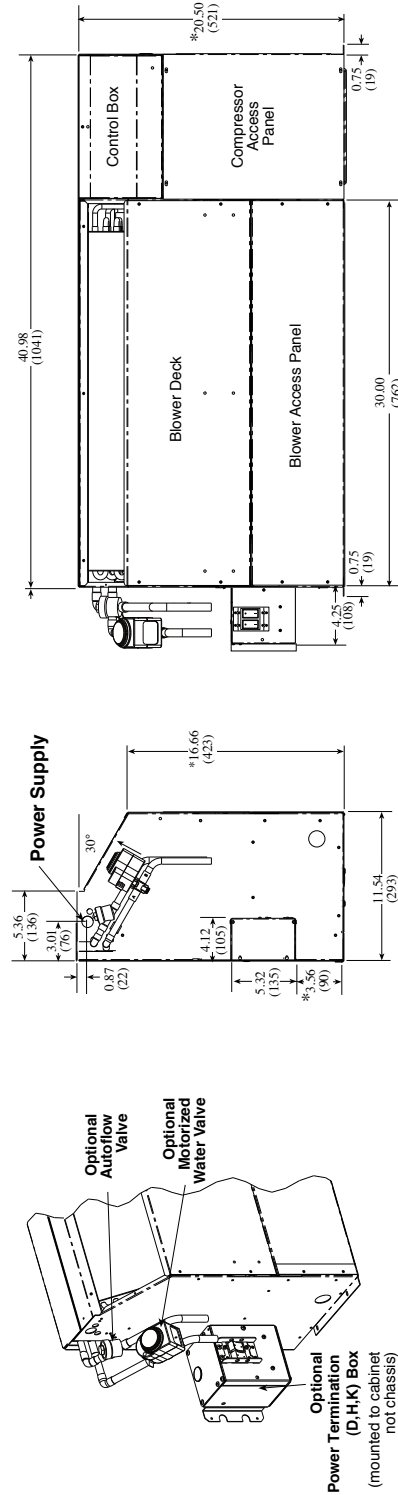
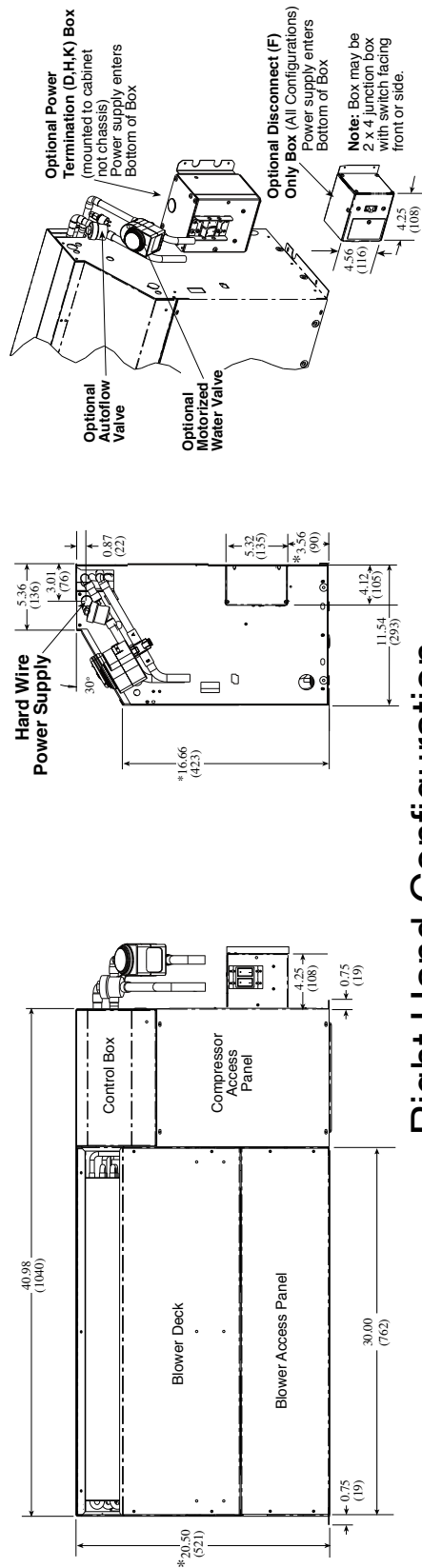


Secondary circulation pump models will have extended unit.

Notes:

1. All dimensions are in inches (mm).
2. Access is reduced if optional disconnect box is selected
3. Optional autoflow regulator, motorized water valve, and disconnect box are not shown.
4. Filter is a cleanable polypropylene mesh.

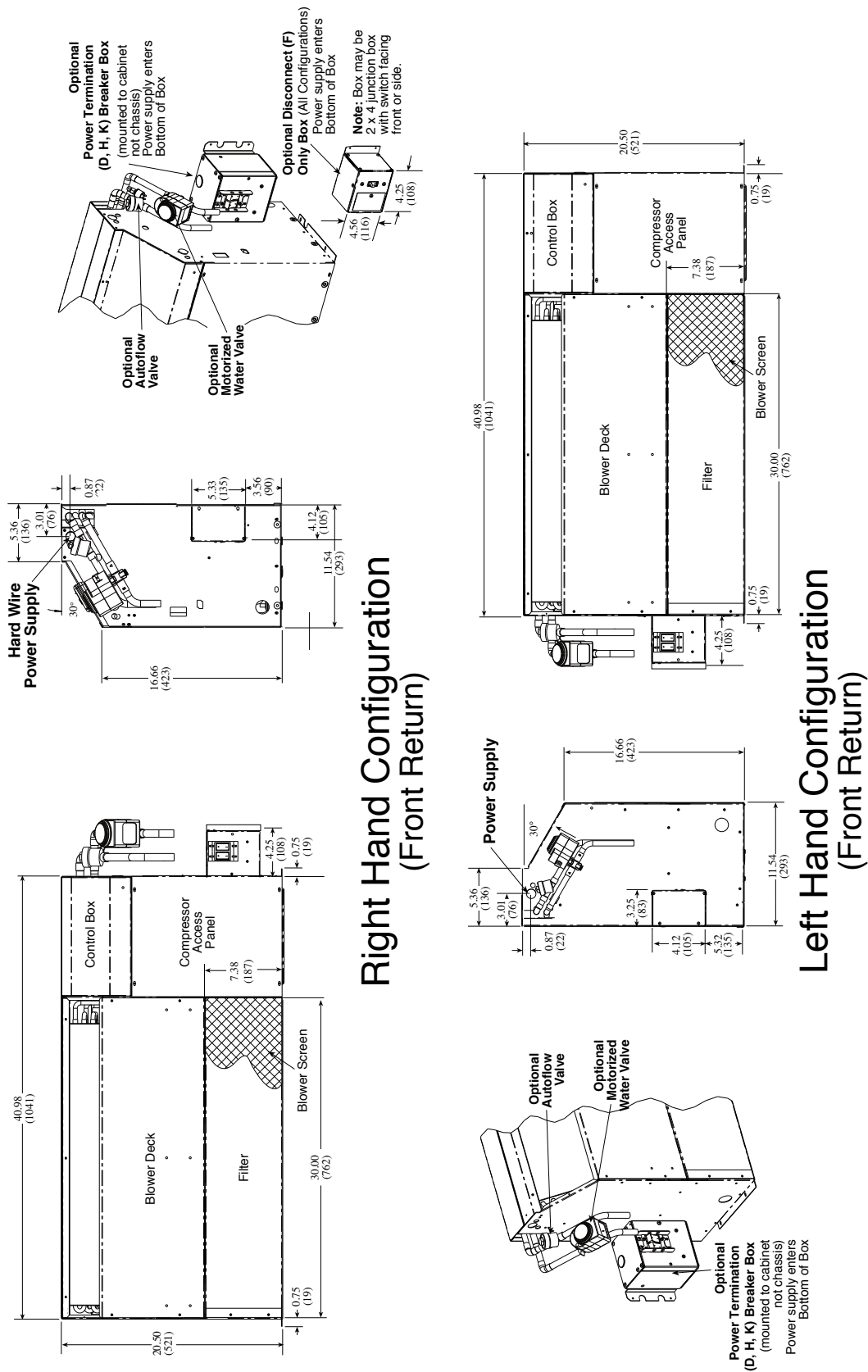
Console Bottom Return Chassis Dimensions Size 09 - 15



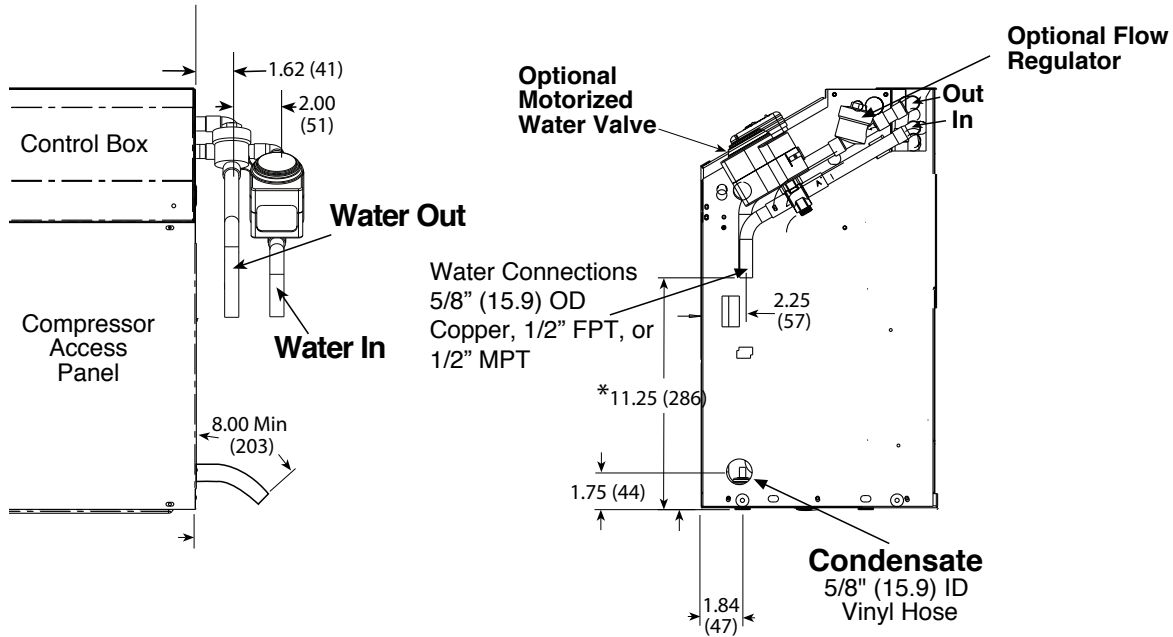
Notes:
 All dimensions are in inches (mm)
 * If subbase option is selected for installed dimension, add to dimension shown 4.90" [124mm] for 5" subbase, or dimension unit is raised above floor (4.90" [124] minimum)
 Optional autoflow valve, motorized water valve and disconnect box are shown.

Rev.: 10/C

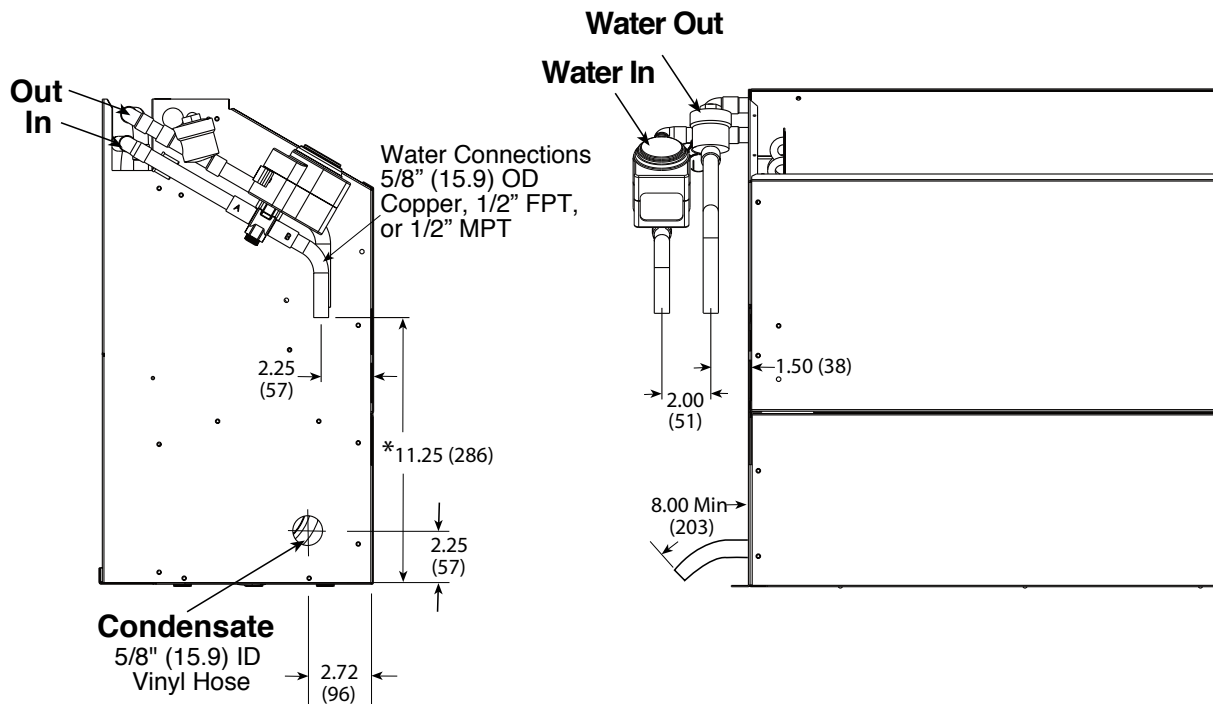
Console Front Return Chassis Dimensions Size 09 - 15



Piping Detail Size 09-15



Right Hand Configuration

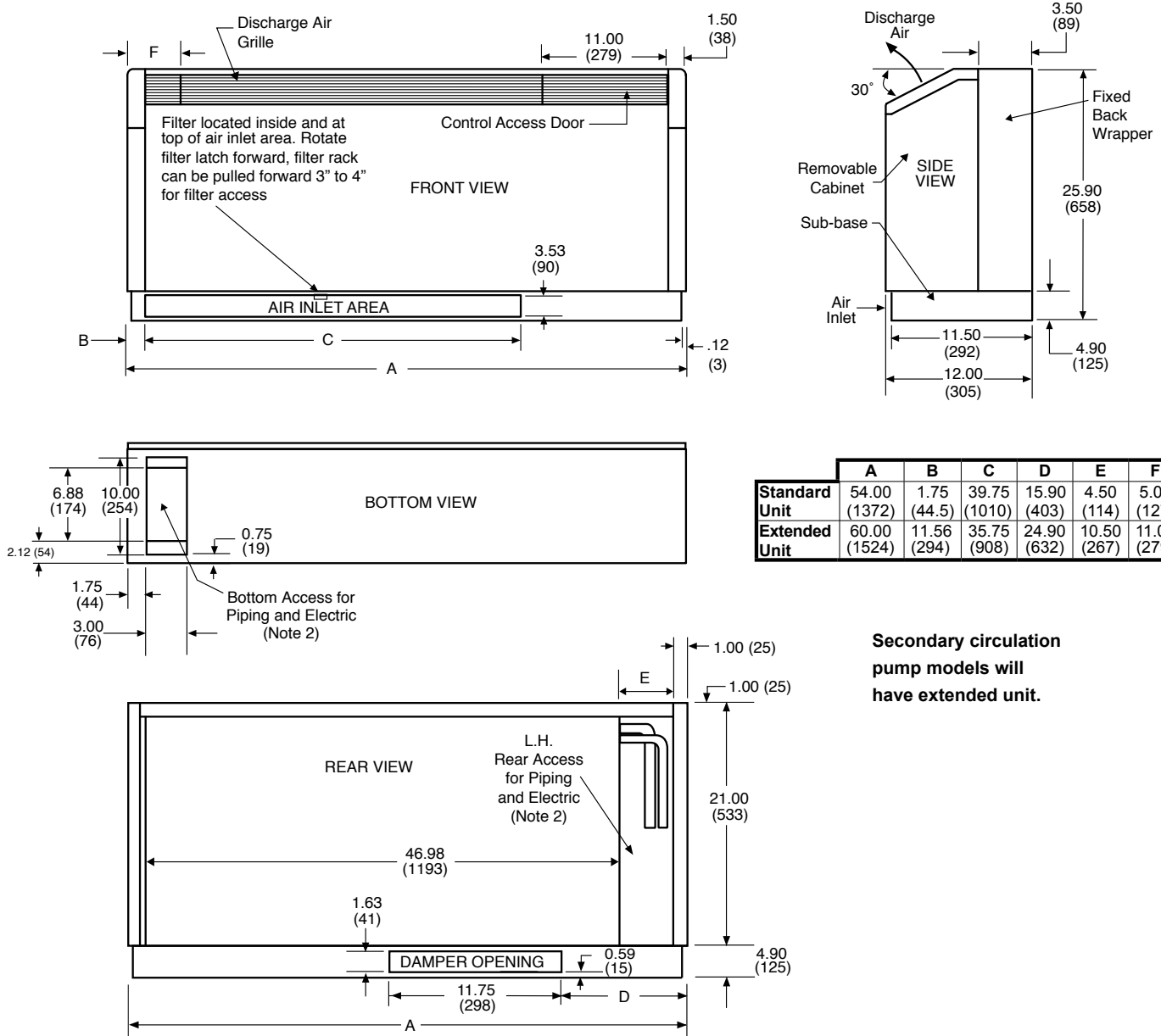


Left Hand Configuration

Notes: * Dimension reduced by fitting if selected

Console Cabinet Dimensions Size 18 - Bottom Return - Left Hand Piping

Left Hand Bottom Return



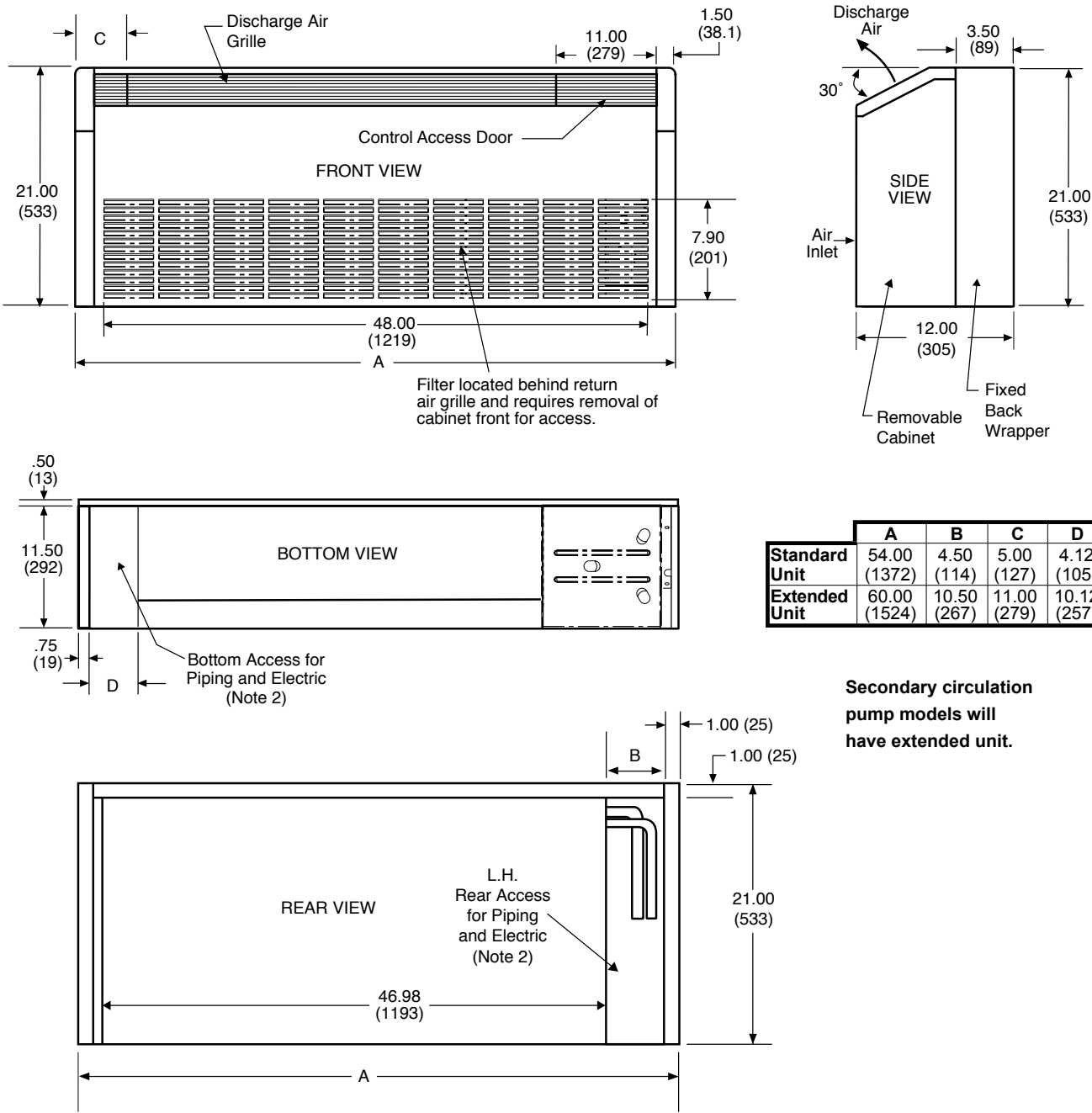
Secondary circulation pump models will have extended unit.

Notes:

1. All Dimensions are in inches (mm).
2. Access is reduced if optional disconnect box is selected.
3. Optional autoflow regulator, motorized water valve, and disconnect box are not shown.
4. Filter is 1" (25) thick fiberglass throwaway.

Console Cabinet Dimensions Size 18 - Front Return - Left Hand Piping

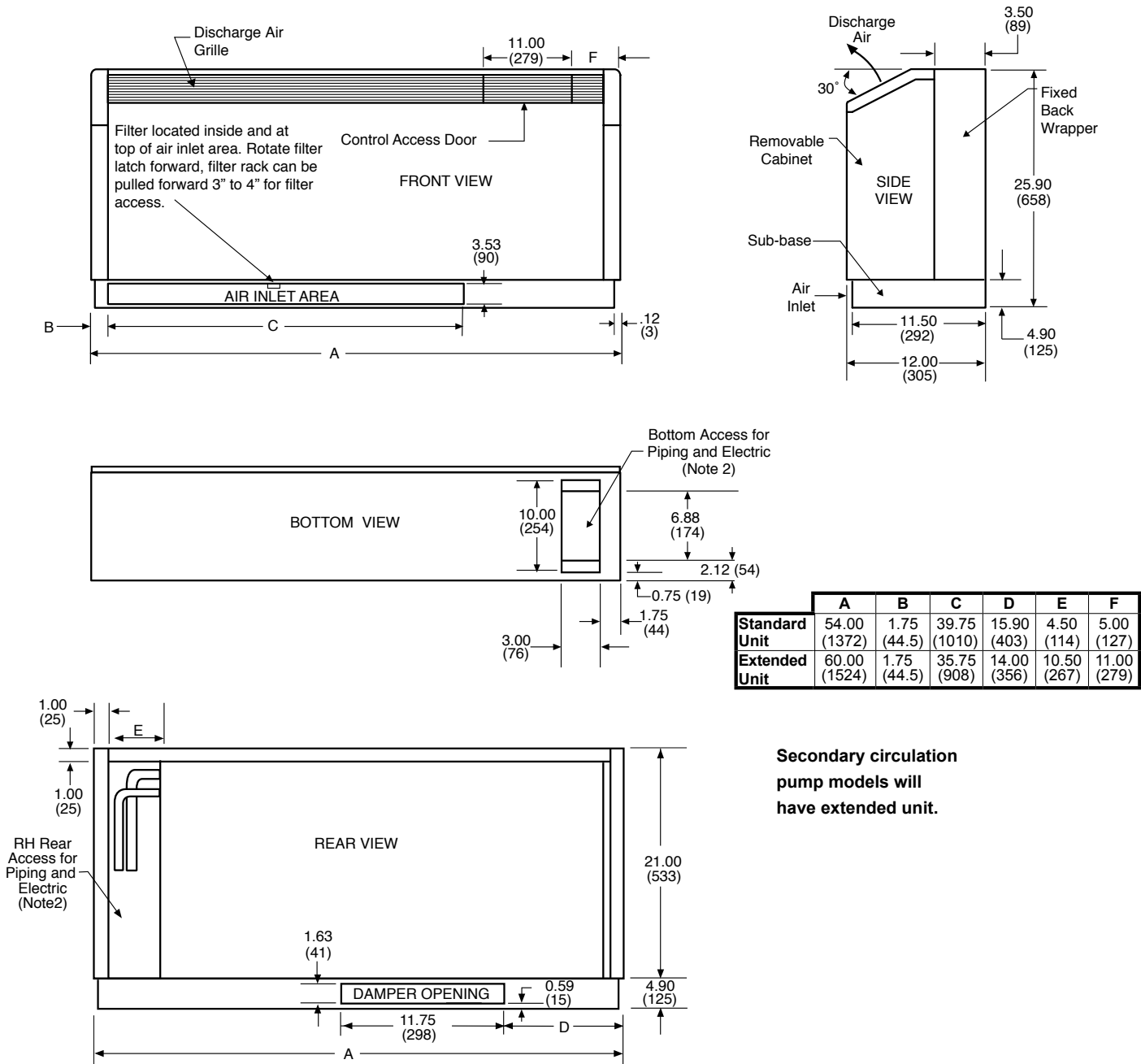
Left Hand Front Return



Secondary circulation pump models will have extended unit.

Console Cabinet Dimensions Size 18 - Bottom Return - Right Hand Piping

Right Hand Bottom Return



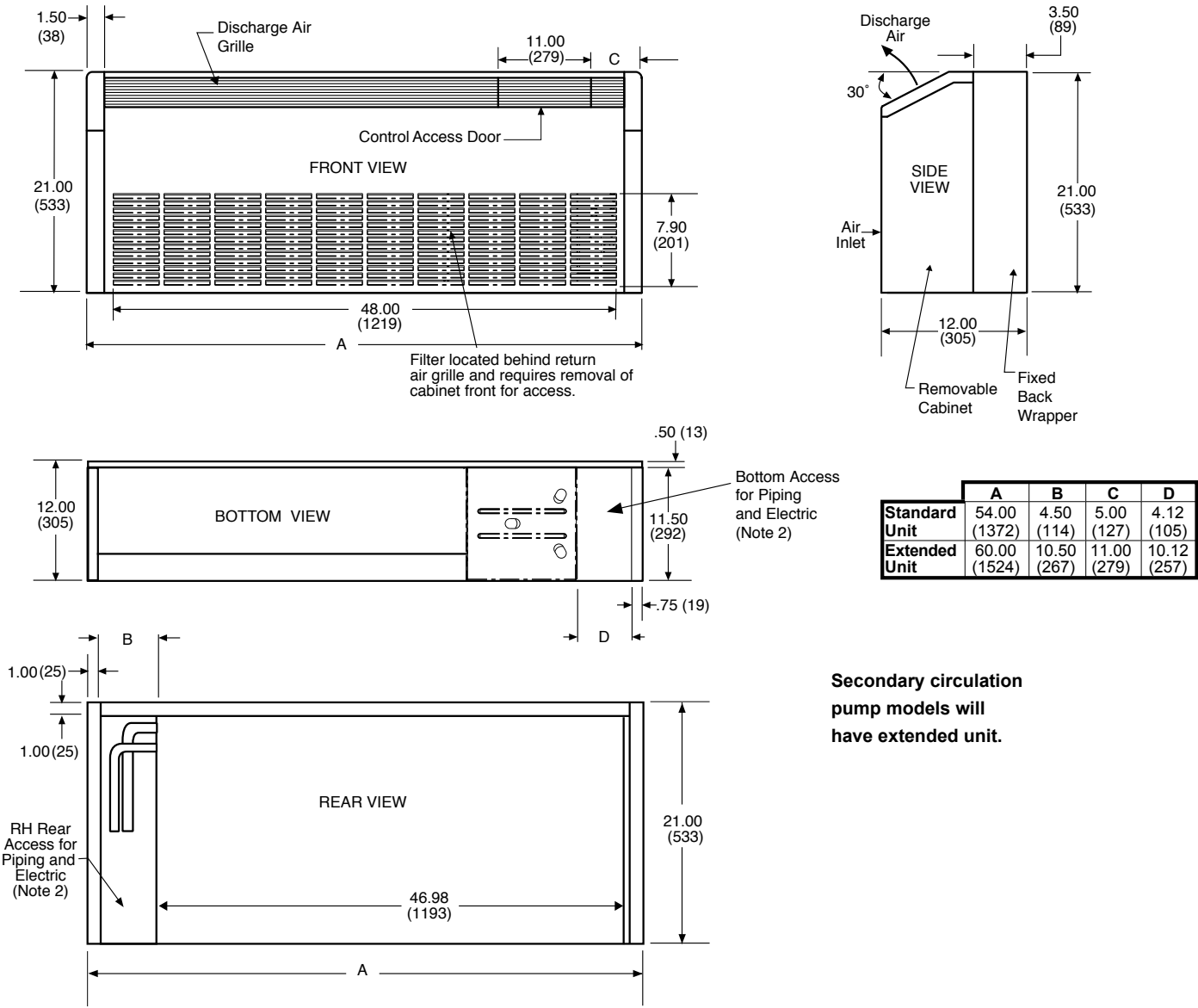
Secondary circulation pump models will have extended unit.

Notes:

1. All Dimensions are in inches (mm).
2. Access is reduced if optional disconnect box is selected.
3. Optional autoflow regulator, motorized water valve, and disconnect box are not shown.
4. Filter is 1" (25) thick fiberglass throwaway.

Console Chassis Dimensions Size 18 - Front Return - Right Hand Piping

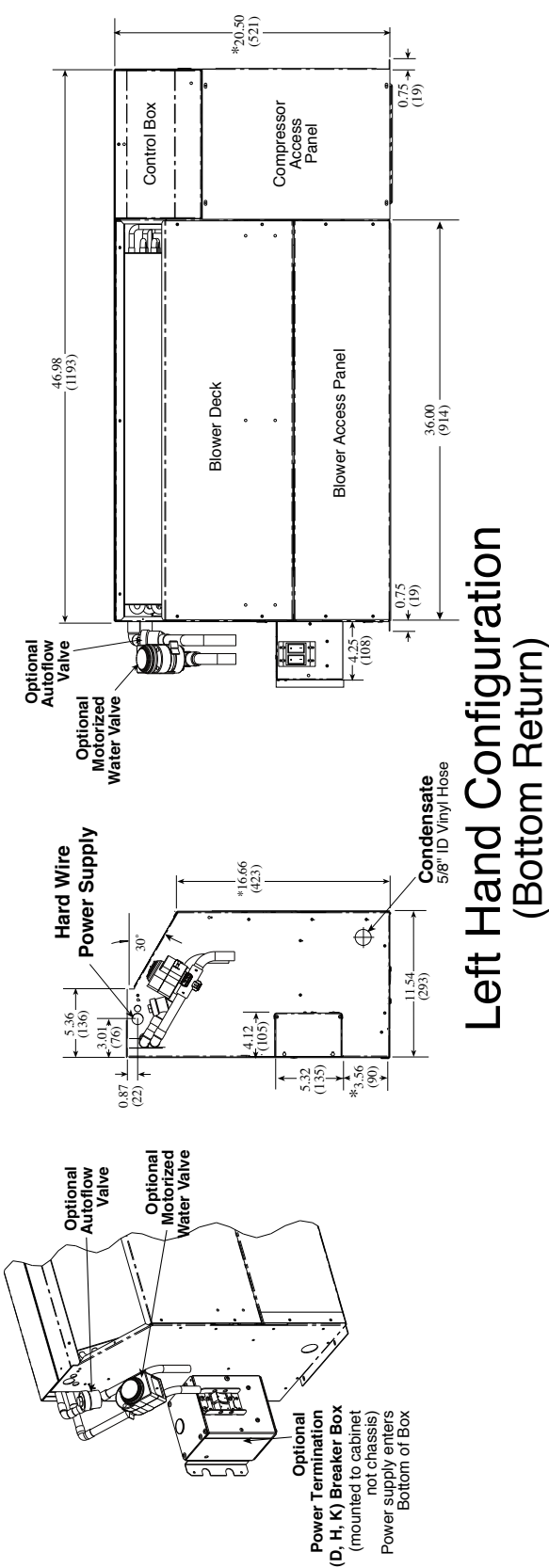
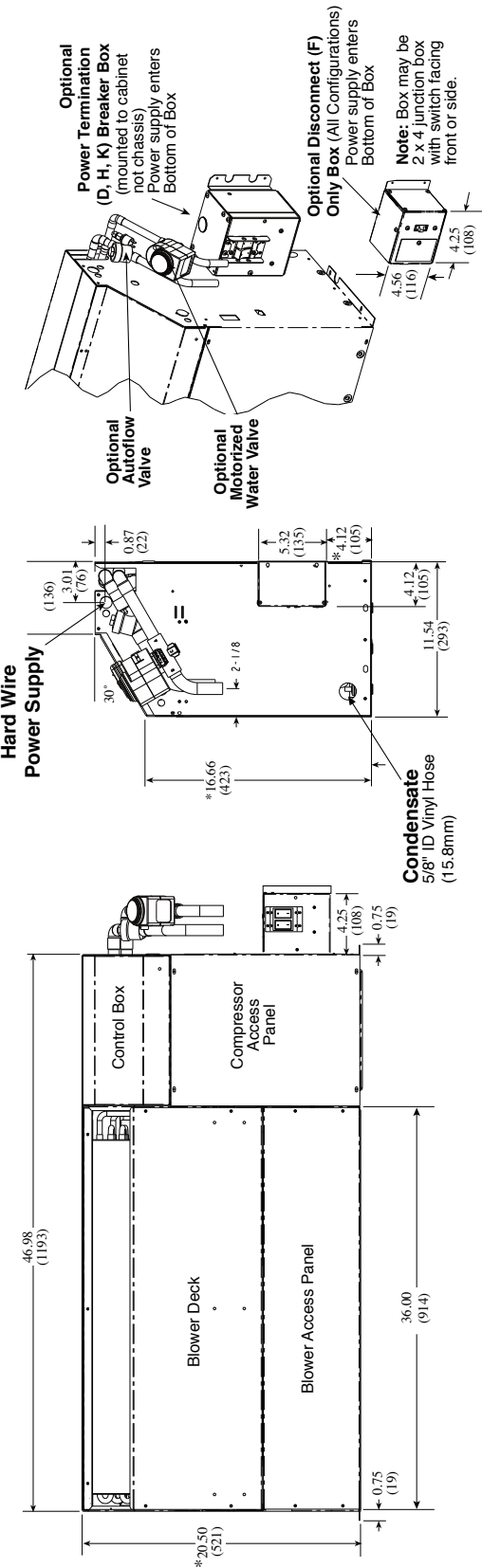
Right Hand Front Return



Secondary circulation pump models will have extended unit.

- Notes:
- 1. All Dimensions are in inches (mm).
 - 2. Access is reduced if optional disconnect box is selected.
 - 3. Optional autoflow regulator, motorized water valve, and disconnect box are not shown.
 - 4. Filter is a cleanable polypropylene mesh.

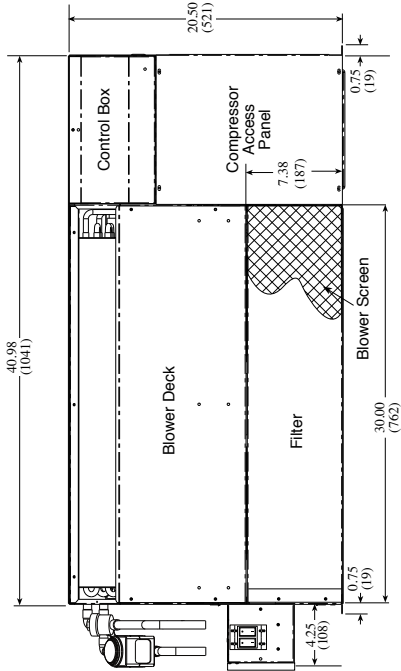
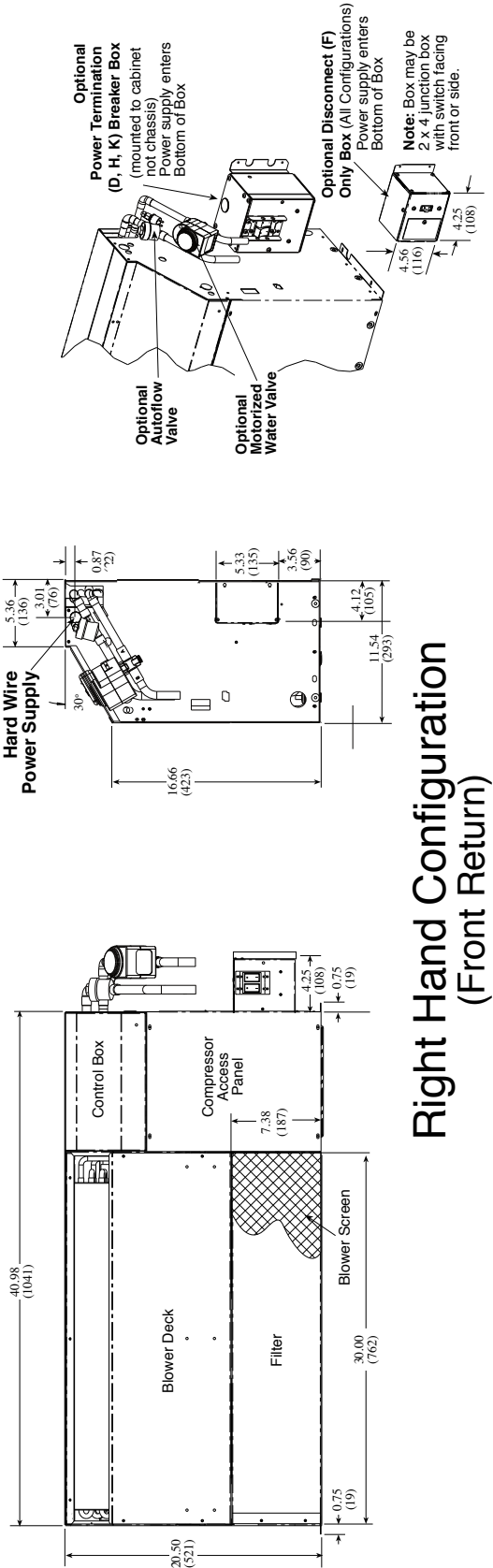
Console Bottom Return Chassis Dimensions Size 18



Notes:

- All Dimensions are in inches (mm)
- * For installed dimension, add to dimension shown 4.9" [124mm] for 5" subbase.
- Optional autoflow valve, motorized water valve and disconnect box are shown.

Console Chassis Dimensions Size 18

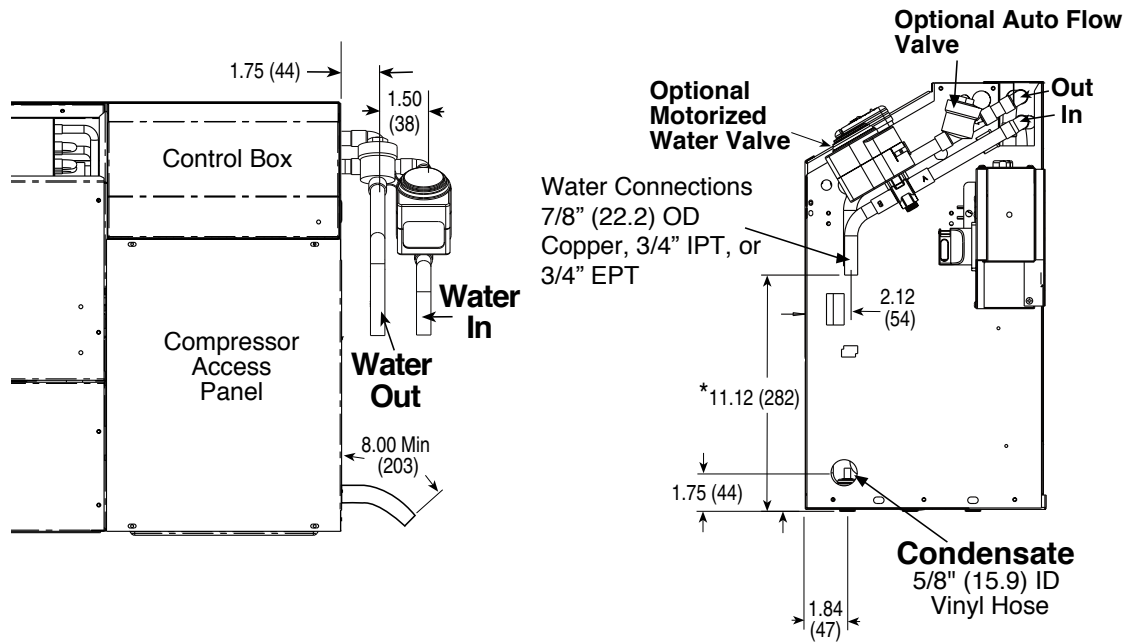


Right Hand Configuration (Front Return)

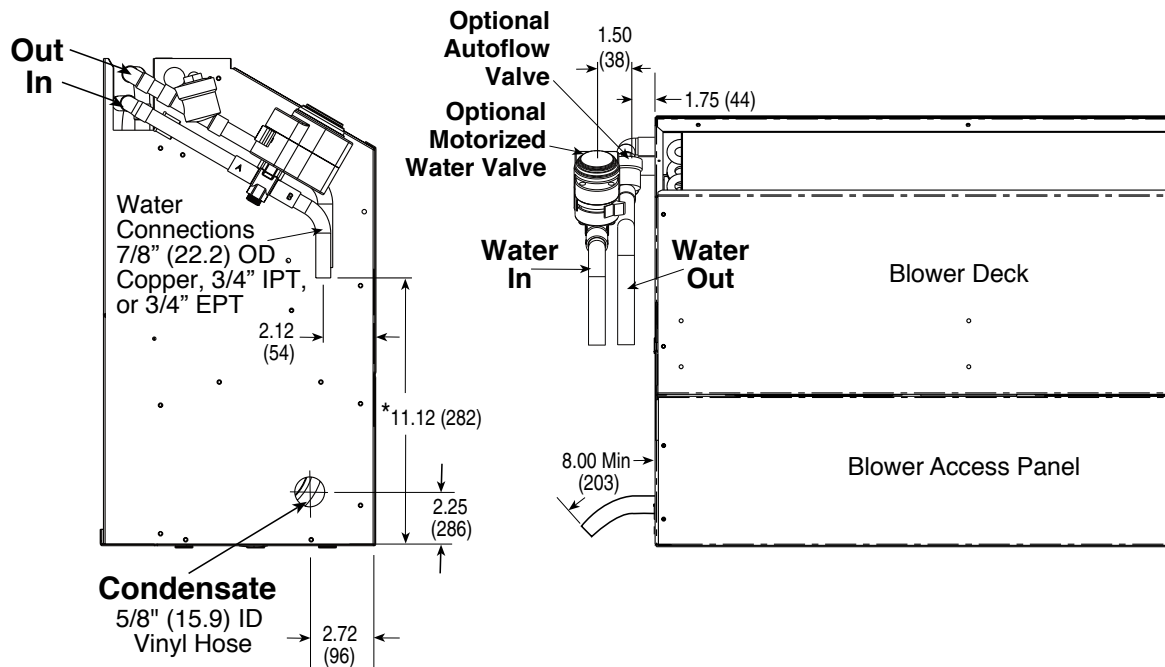
Left Hand Configuration (Front Return)

Notes:
All Dimensions are in inches (mm)
Chassis can mount directly on floor
Optional autoflow valve, motorized water valve and disconnect box are shown.

Piping Detail Size 18



Right Hand Configuration



Left Hand Configuration

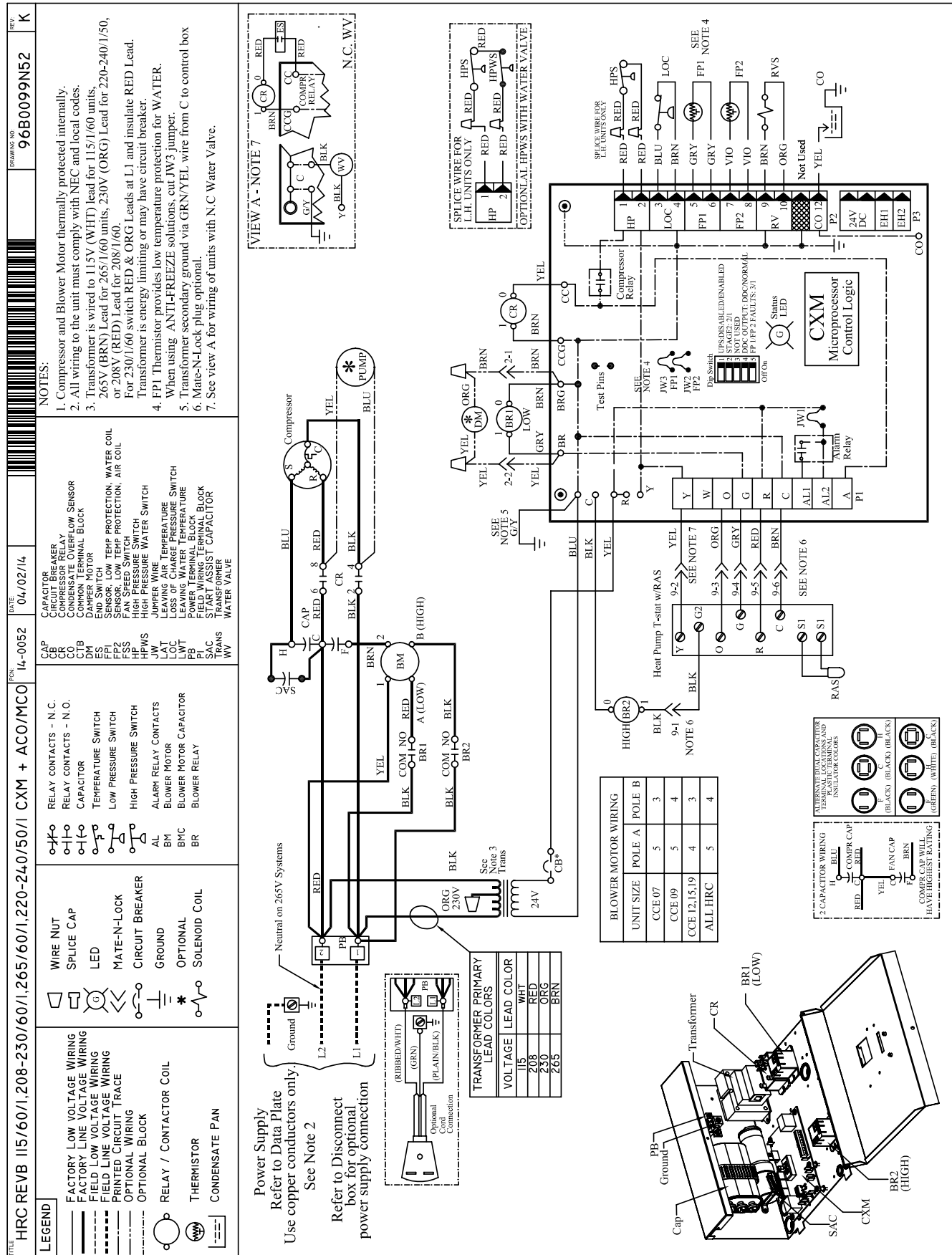
Notes: * Dimension reduced by fitting if selected

HRC Series Wiring Diagram Matrix

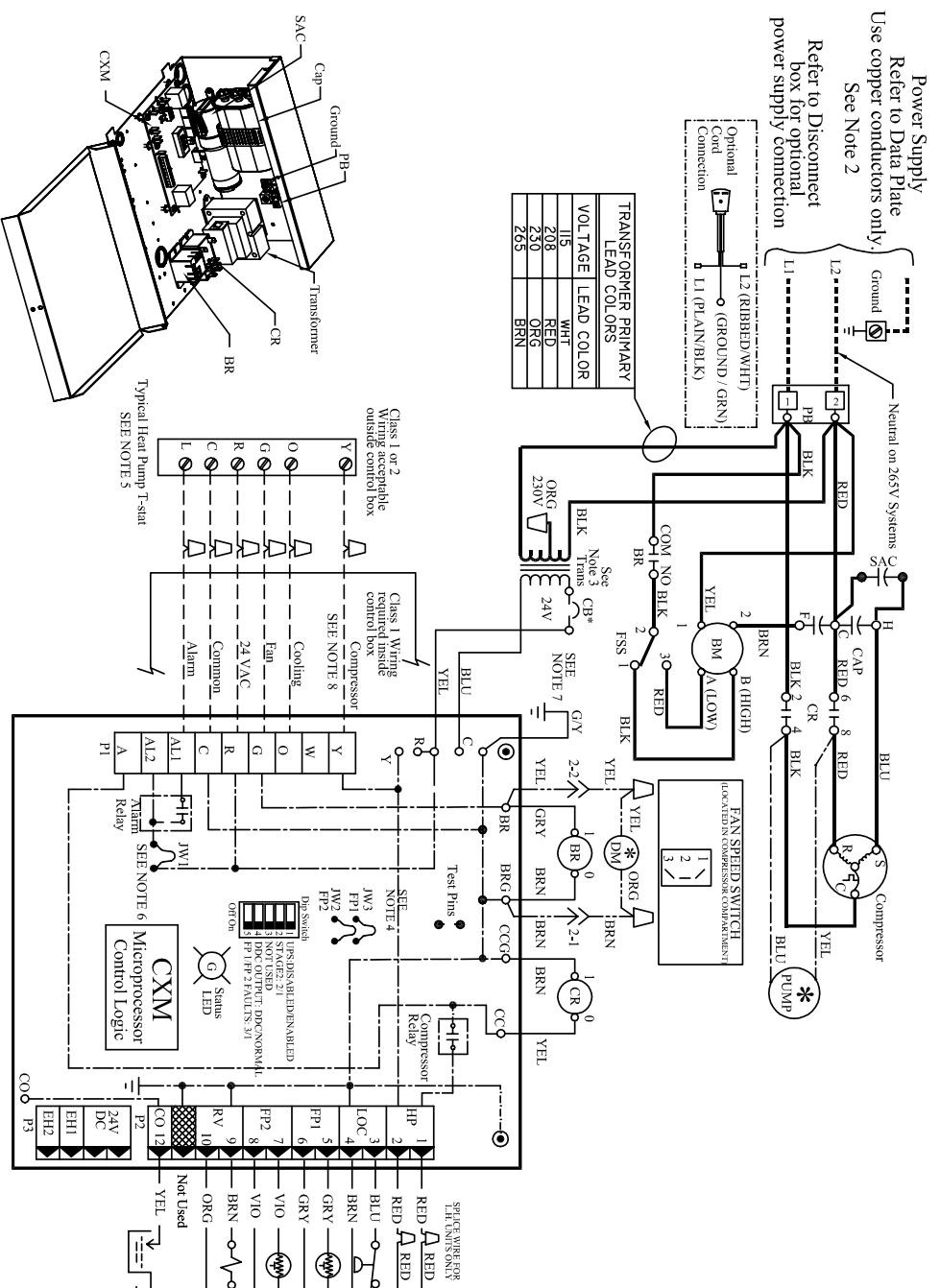
Only CXM and DXM diagrams, with a representative diagram of LON and MPC Options are presented in this submittal. Other diagrams can be located online at Heat Controller.com using the part numbers presented below.

Model	Refrigerant	Wiring Diagram Part Number	Electrical	Control		Agency
HRC09 - HRC18	HFC-410A	96B0099N52	115/60/1, 208-230/60/1, 265/60/1	CXM	ACO/MCO	ETL
	HFC-410A	96B0099N53			REM	ETL
	HFC-410A	96B0099N54			LON	ETL
	HFC-410A	96B0099N55			MPC	ETL
	HFC-410A	96B0100N52	115/60/1, 208-230/60/1, 265/60/1	DXM	ACO/MCO	ETL
	HFC-410A	96B0100N53			REM	ETL
	HFC-410A	96B0100N54			LON	ETL
	HFC-410A	96B0100N55			MPC	ETL

Typical Wiring Diagram – Manual & Auto Change Over HRC Units with CXM Controller

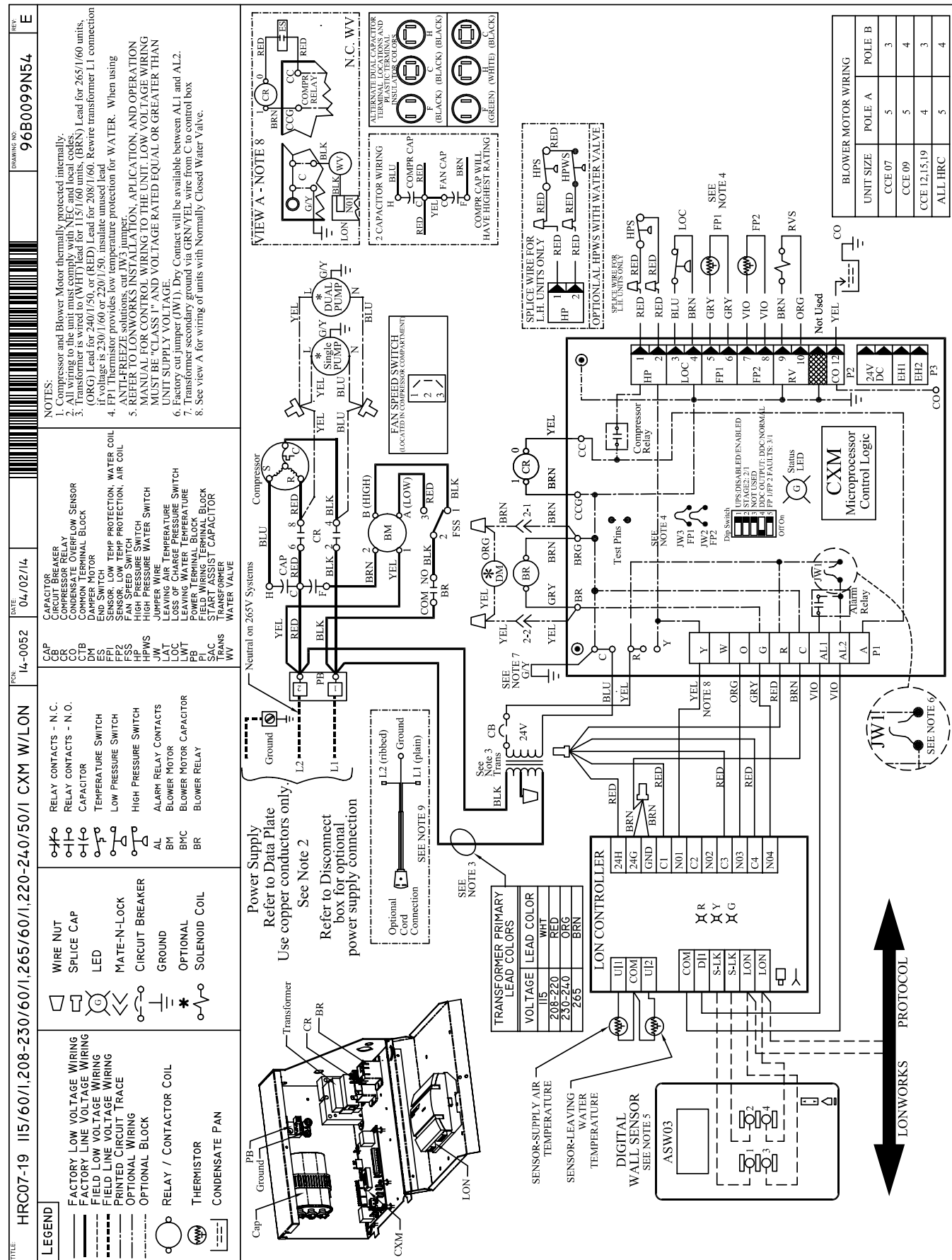


Typical Wiring Diagram –

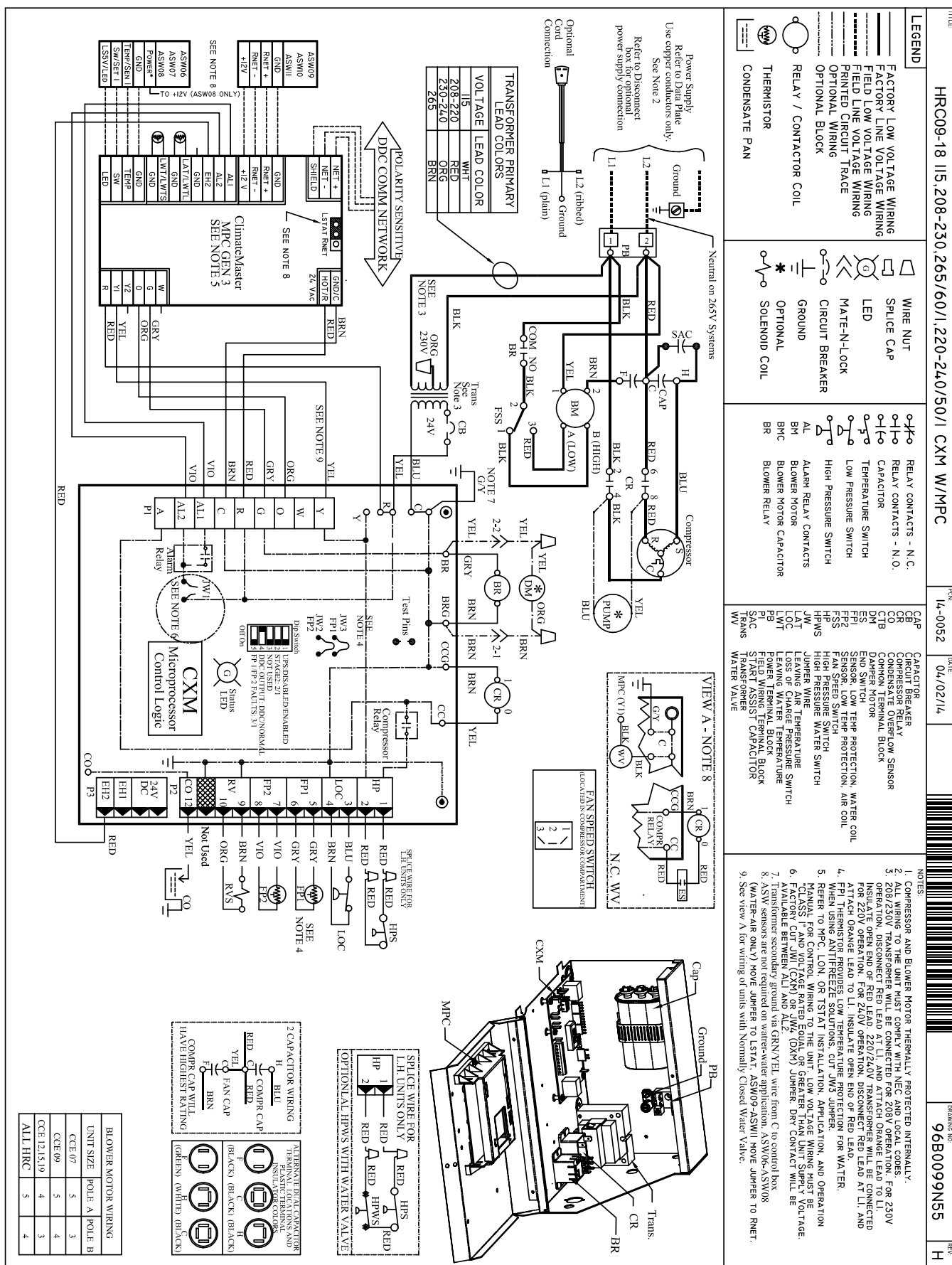


BLOWER MOTOR WIRING		
UNIT SIZE	POLE A	POLE B
CCE 07	5	3
CCE 09	5	4
CCE 1215,19	4	3
ALL HRC	5	4

Typical Wiring Diagram – HRC Units with CXM & LON Controller

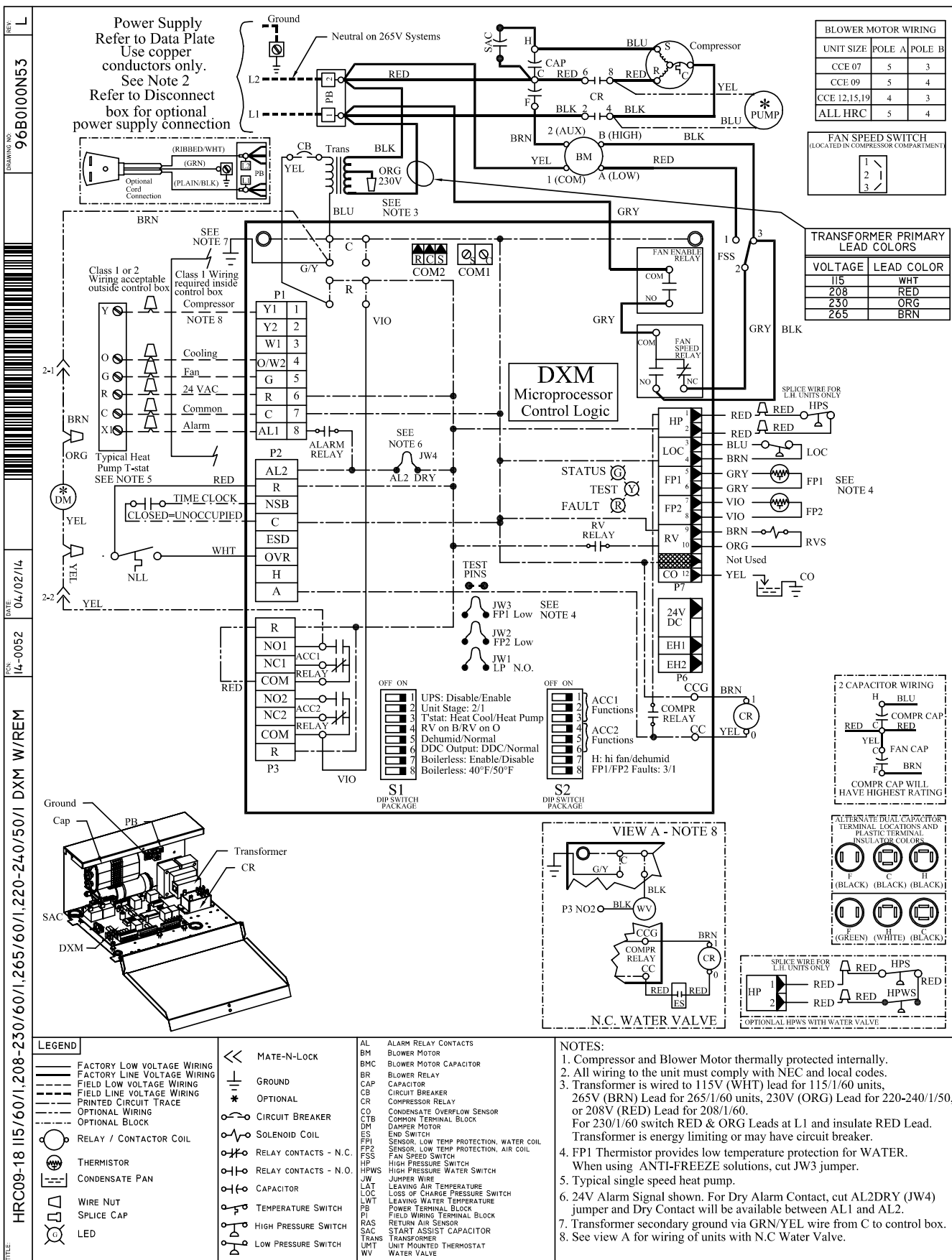


Typical Wiring Diagram – with CXM & MPC Controller

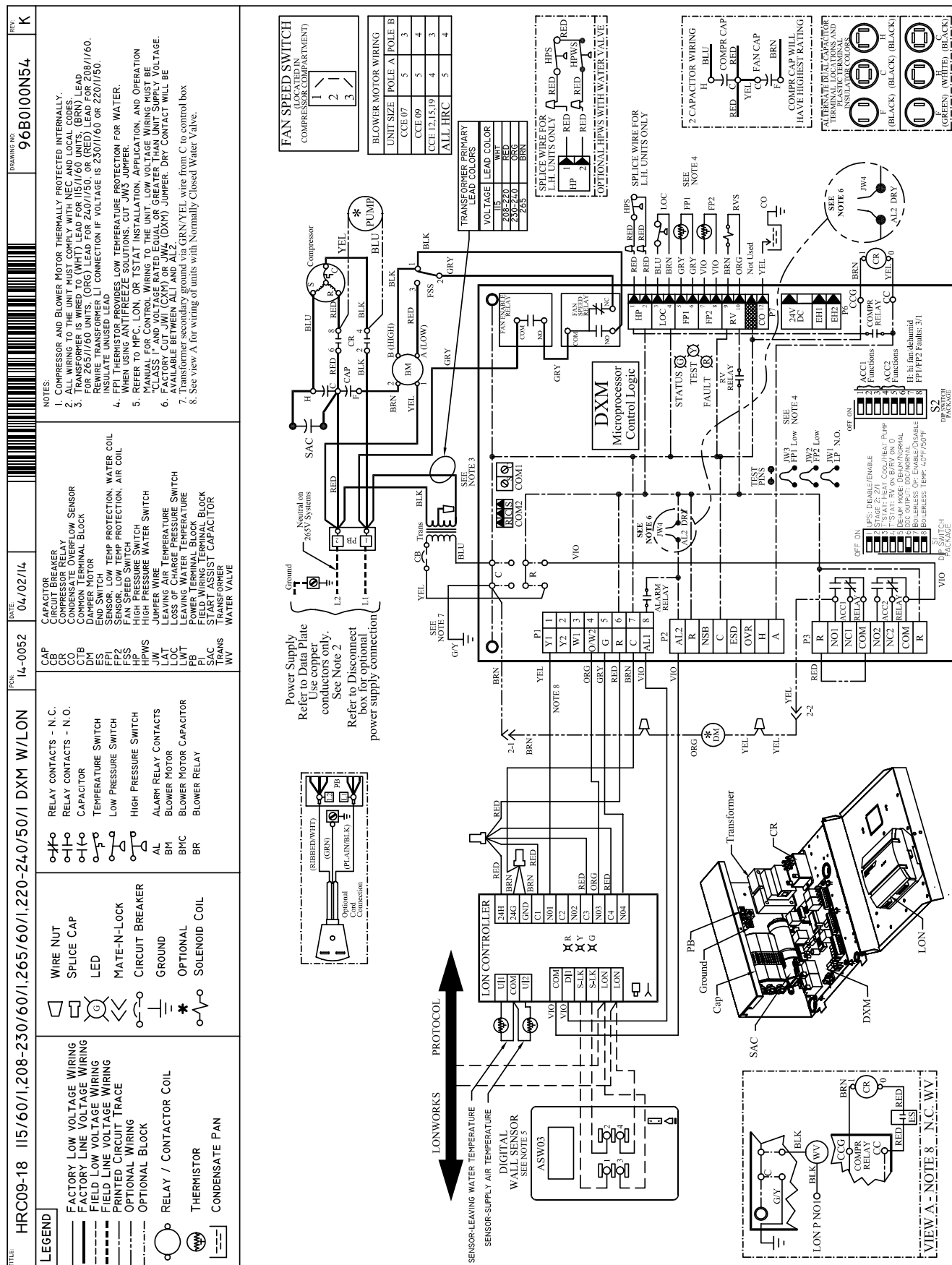


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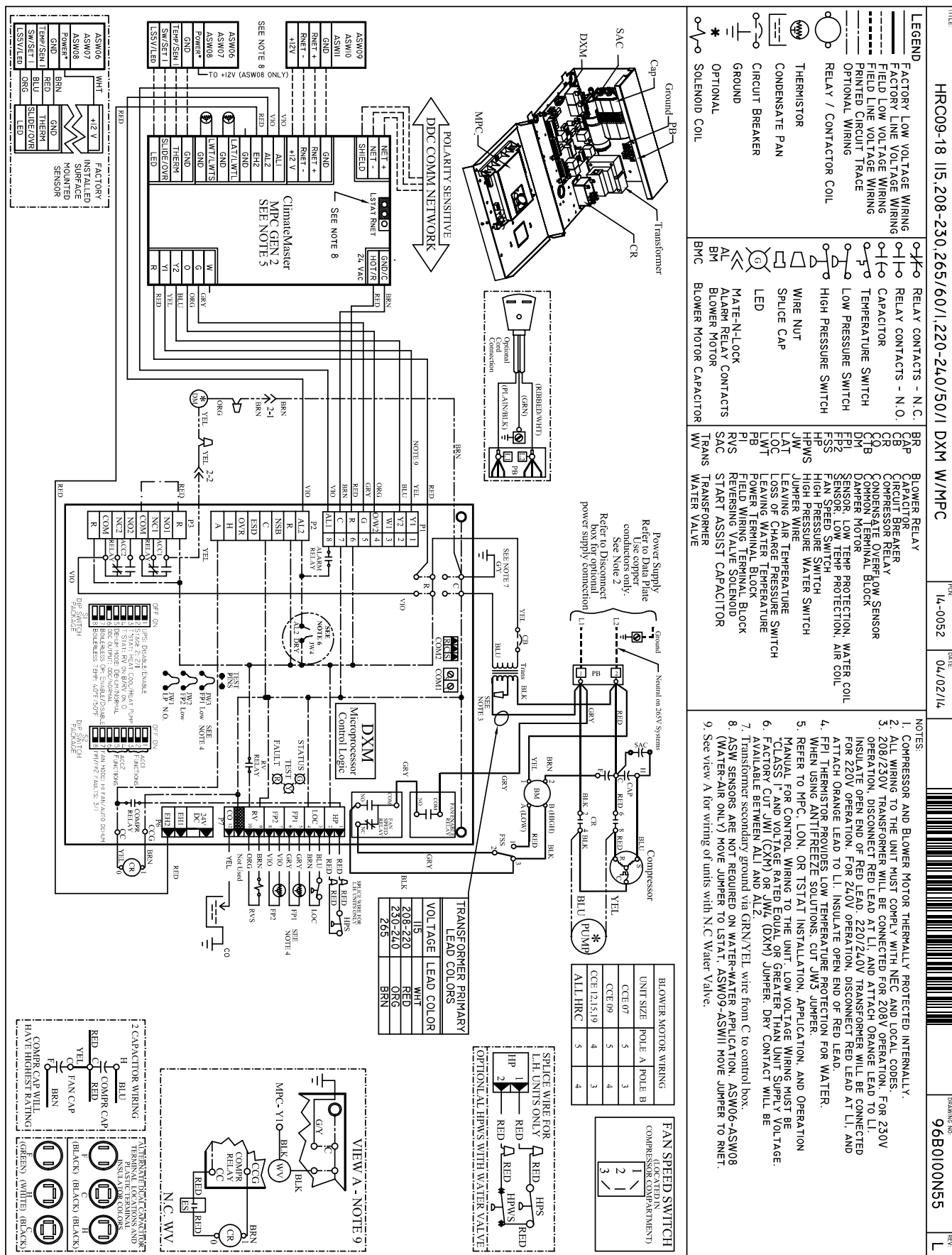
Typical Wiring Diagram – Remote Mounted Thermostat HRC Units with DXM Controller



Typical Wiring Diagram – HRC Units with DXM & LON Controller



Typical Wiring Diagram – With DXM & MPC Controller



Console (HRC) Series 60Hz**Engineering Specifications – Page 1****General:**

Furnish and install Heat Controller “Console” Water Source Heat Pumps, as indicated on the plans. Equipment shall be completely assembled, piped and internally wired. Capacities and characteristics as listed in the schedule and the specifications that follow.

Units shall be supplied completely factory built capable of operating over an entering water temperature range from 20° to 120°F (-6.7° to 48.9°C) as standard. Equivalent units from other manufacturers may be proposed provided approval to bid is given 10 days prior to bid closing. All equipment listed in this section must be rated and certified in accordance with Air-Conditioning, Heating and Refrigeration Institute/International Standards Organization (AHRI/ISO 13256-1). All equipment must be tested, investigated, and determined to comply with the requirements of the standards for Heating and Cooling Equipment UL-1995 for the United States and CAN/CSA-C22.2 NO.236 for Canada, by Intertek Testing Laboratories (ETL). The units shall have AHRI/ISO and ETL-US-C labels.

All units shall be fully quality tested by factory run testing under normal operating conditions as described herein. Quality control system shall automatically perform via computer: triple leak check, pressure tests, evacuation and accurately charge system, perform detailed heating and cooling mode tests, and quality cross check all operational and test conditions to pass/fail criteria. Detailed report card will ship with each unit displaying status for critical tests and components. **Note: If unit fails on any cross check, it shall not be allowed to ship. Serial numbers will be recorded by factory and furnished to contractor on report card for ease of unit warranty status. Units tested without water flow are not acceptable.**

Basic Construction:

Console units shall have one of the following air flow and piping arrangements: Front Inlet/Right-hand Piping; Front Inlet/Left-hand piping; Bottom Inlet/Right-hand piping; or Bottom Inlet/Left-hand piping as shown on the plans. If units with these arrangements are NOT used, the contractor is responsible for any extra costs incurred by other trades. If other arrangements make servicing difficult, the contractor must provide access panels and clear routes to ease service. Architect/Engineer must approve any changes in layout.

The cabinet, wall mounted back wrapper and subbase shall be constructed of heavy gauge galvanized steel with a baked polyester powder coat paint finish. Corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117. **Unit corrosion protection must meet these stringent requirements or unit(s) will not be accepted.** Both sides of the steel shall be painted for added protection. Additionally, the wall mounted back wrapper shall have welded corner bracing. The easily removable cabinet enclosure allows for easy service to the chassis, piping compartment and control compartment.

All interior surfaces shall be lined with 1/4 inch (6.4mm) thick, 2 lb/ft³ (32 kg/m³) acoustic flexible blanket type glass fiber insulation with a non-woven, anti-microbial treated mat face. Insulation placement shall be designed in a manner that will eliminate any exposed edges to prevent the introduction of glass fibers into the air stream. Standard insulation must meet NFPA Fire Hazard Classification requirements 25/50 per ASTM E84, UL 723, CAN/ULC S102-M88 and NFPA 90A requirements; air erosion and mold growth limits of UL-181; stringent fungal resistance test per ASTM-C1071 and ASTM G21; and shall meet zero level bacteria growth per ASTM G22. **Unit insulation must meet these stringent requirements or unit(s) will not be accepted.**

The cabinet shall have a 30° sloped top with aluminum rigid bar type discharge grille. Aluminum discharge grille shall be anodized charcoal grey in color including hinged control door. Cabinet shall have rounded edges (0.325 inch / 8.255 mm minimum radius) on all exposed corners for safety and aesthetic purposes. **Units not having sloped top and rounded corners (0.325 inch/8.255 mm minimum) on front, side, top slope, and top corners shall not be accepted.**

Return Air Filter shall be 1” (25.4mm) fiberglass disposable type media for bottom return units (units with sub-base) or 1/8” (3.2mm) permanent cleanable type media for front return type units.

Option: The unit shall be provided with a keyed lock on the control access door.

Option: The unit shall be provided with a motorized outside air damper and damper assembly, factory mounted and wired.

Option: The unit shall be provided without a subbase (5 inch / 127mm high subbase is standard).

Option: The unit shall include a front return air grille integrally stamped into Cabinet (subbase not required).

Option: The unit shall include an optional architectural-style field installed return air grille to help conceal the subbase return air opening (units with bottom return only).

Console (HRC) Series 60Hz**Engineering Specifications – Page 2**

Option: UltraQuiet package shall consist of high technology sound attenuating material that is strategically applied to the compressor and compressor compartment in addition to the standard system design, to further dampen and attenuate sound transmissions. Compressor is mounted on specially engineered sound-tested EPDM isolators.

Fan and Motor Assembly:

Fan and motor assembly shall be assembled on a slide out fan deck with quick electrical disconnecting means to provide and facilitate easy field servicing. The fan motor shall be multi-speed, permanently lubricated, PSC type, with internal thermal overload protection. Units supplied without permanently lubricated motors must provide external oilers for easy service. The fan motor shall include a torsionally flexible motor mounting system or saddle mount system with resilient rings to inhibit vibration induced high noise levels associated with “hard wire belly band” motor mounting. The airflow rating of the unit shall be based on a wet coil and a clean filter in place. **Ratings based on a dry coil and/or no filter shall NOT be acceptable.**

Refrigerant Circuit:

All units shall contain a (HFC-410A) sealed refrigerant circuit including a high efficiency rotary compressor designed for heat pump operation, a thermostatic expansion valve for refrigerant metering, an enhanced corrugated aluminum lanced fin and rifled copper tube refrigerant to air heat exchanger, reversing valve, coaxial (tube in tube) refrigerant to water heat exchanger, and safety controls including a high pressure switch, low pressure switch (loss of charge), water coil low temperature sensor, and air coil low temperature sensor. Access fittings shall be factory installed on high and low pressure refrigerant lines to facilitate field service. Activation of any safety device shall prevent compressor operation via a microprocessor lockout circuit. The lockout circuit shall be reset at the thermostat or at the optional disconnect switch. **Units that cannot be reset at the thermostat shall not be acceptable.**

Hermetic compressors shall be internally sprung. The compressor will be mounted on specially engineered sound-tested EPDM vibration isolation grommets for maximized vibration attenuation. Compressor shall have thermal overload protection. Compressor shall be located in an insulated compartment away from air stream to minimize sound transmission.

Refrigerant to air heat exchangers shall utilize enhanced corrugated lanced aluminum fins and rifled copper tube construction rated to withstand 625 PSIG (4309 kPa) refrigerant working pressure. Refrigerant to water heat exchangers shall be of copper inner water tube and steel refrigerant outer tube design, rated to withstand 625 PSIG (4309 kPa) working refrigerant pressure and 500 PSIG (3445 kPa) working water pressure. The refrigerant to water heat exchanger shall be “electro-coated” with a low cure cathodic epoxy material a minimum of 0.4 mils thick (0.4 – 1.5 mils range) on all surfaces. The black colored coating shall provide a minimum of 1000 hours salt spray protection per ASTM B117-97 on all external steel and copper tubing. The material shall be formulated without the inclusion of any heavy metals and shall exhibit a pencil hardness of 2H (ASTM D3363-92A), crosshatch adhesion of 4B-5B (ASTM D3359-95), and impact resistance of 160 in-lbs (184 kg-cm) direct (ASTM D2794-93).

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Expansion valves shall be dual port balanced type with external equalizer for optimum refrigerant metering. Units shall be designed and tested for operating ranges of entering water temperatures from 20° to 120°F (-6.7° to 48.9°C). Reversing valve shall be four-way solenoid activated refrigerant valve, which shall default to heating mode should the solenoid fail to function. If the reversing valve solenoid defaults to cooling mode, an additional low temperature thermostat must be provided to prevent over-cooling an already cold room.

Option: The unit will be supplied with cupro-nickel coaxial water to refrigerant heat exchanger.

Option: The unit will be supplied with internally factory mounted two-way water valve for variable speed pumping requirements. A factory-mounted or field-installed high pressure switch shall be installed in the water piping to disable compressor operation in the event water pressures build due to water freezing in the piping system.

Option: The unit will be supplied with internally factory mounted automatic water flow regulators.

Option: The unit will be supplied with internally mounted secondary pump for primary/secondary applications, specifically one-pipe systems. (Requires extended unit).

Option: The unit shall be supplied with extended range Insulation option, which adds closed cell insulation to internal water lines, and provides insulation on suction side refrigeration tubing including refrigerant to water heat exchanger.

Option: The refrigerant to air heat exchanger shall be coated.

Piping:

Water piping shall terminate in the same location regardless of the connection and valve options.

Option: Threaded MPT copper fittings (sweat connections are standard).

Console (HRC) Series 60Hz**Engineering Specifications – Page 3**

Option: Threaded FPT copper fittings (sweat connections are standard).

Drain Pan:

The drain pan shall be constructed of galvanized steel and have a powder coat paint application to further inhibit corrosion. This corrosion protection system shall meet the stringent 1000 hour salt spray test per ASTM B117. If plastic type material is used, it must be HDPE (High Density Polyethylene) to avoid thermal cycling shock stress failure over the lifetime of the unit. Drain pan shall be insulated. Drain outlet shall be located at pan as to allow complete and unobstructed drainage of condensate. The unit as standard will be supplied with solid-state electronic condensate overflow protection. **Mechanical float switches will NOT be accepted.**

Option: The unit shall be supplied with stainless steel drain pan.

Electrical:

Unit control shall be located under the hinged control door in the sloped top grille. Operating control shall consist of push buttons to select mode of operation "OFF", "HEAT," "COOL," "AUTO", Fan "AUTO" (fan cycles with compressor), Fan "ON" (continuous fan), Fan "LO" (low speed fan), and Fan "HI" (high speed fan). Temperature adjustment shall be accomplished via two push buttons, one labeled with an arrow up, and the other labeled with an arrow down. Control shall include an LCD display for display of temperature and setpoint. **Units without an LCD display shall not be accepted.**

A control box shall be located above the unit compressor compartment and shall contain operating controls as outlined in the paragraph above, 24VAC transformer, double-pole compressor relay, and solid-state controller for complete unit operation.

Reversing valve and fan motor wiring shall be routed through this electronic controller. Units shall be name-plated for use with time delay fuses or HACR circuit breakers. A unit-mounted digital thermostat with a remote sensor measuring return air temperature shall control the compressor operation for heating and cooling. Field can configure digital ACO unit mounted thermostat for MCO operation, F or C temperature reading, and offset.

Option: Provisions for remote thermostat (single fan speed).

Option: Disconnect Switch, Non-Fused.

Option: Breaker.

Option: 20A power plug/cord.

Option: 20A plug/cord, receptacle, with breaker.

Option: 20A plug/cord, receptacle, disconnect switch, non-fused.

Solid State Control System (CXM):

Units shall have a solid-state control system. Units utilizing electro-mechanical control shall not be acceptable. The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI, and RFI interference. The control system shall interface with a heat pump type thermostat. The control system shall have the following features:

- a. Anti-short cycle time delay on compressor operation.
- b. Random start on power up mode.
- c. Low voltage protection.
- d. High voltage protection.
- e. Unit shutdown on high or low refrigerant pressures.
- f. Unit shutdown on low water temperature.
- g. Condensate overflow electronic protection.
- h. Option to reset unit at thermostat or disconnect.
- i. Automatic intelligent reset. Unit shall automatically reset the unit 5 minutes after trip if the fault has cleared. If a fault occurs 3 times sequentially without thermostat meeting temperature, then lockout requiring manual reset will occur.
- j. Ability to defeat time delays for servicing.
- k. Light emitting diode (LED) on circuit board to indicate high pressure, low pressure, low voltage, high voltage, low water/air temperature cut-out, condensate overflow, and control voltage status.
- l. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.
- m. 24V output to cycle a motorized water valve or other device with compressor contactor.
- n. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.
- o. Water coil low temperature sensing (selectable for water or anti-freeze).
- p. Air coil low temperature sensing.

Console (HRC) Series 60Hz**Engineering Specifications – Page 4**

NOTE: Units not providing the 8 safety protections of anti-short cycle, low voltage, high voltage, high refrigerant pressure, low pressure (loss of charge), air coil low temperature cut-out, water coil low temperature cut-out, and condensate overflow protections will not be accepted.

Option: Enhanced solid state control system (DXM)

This control system features two stage control of cooling and two stage control of heating modes for exacting temperature and dehumidification purposes.

This control system coupled with a multi-stage thermostat will better dehumidify room air by automatically running the heat pump's fan at lower speed on the first stage of cooling thereby implementing low sensible heat ratio cooling. On the need for higher cooling performance the system will activate the second stage of cooling and automatically switch the fan to the higher fan speed setting. This system may be further enhanced with a humidistat. **Units not having automatic low sensible heat ratio cooling will not be accepted; as an alternate a hot gas reheat coil may be provided with control system for automatic activation.**

Control shall have all of the above-mentioned features of the CXM control system along with the following expanded features:

- a. Removable thermostat connector.
- b. Night setback control.
- c. Random start on return from night setback.
- d. Minimized reversing valve operation (Unit control logic shall only switch the reversing valve when cooling is demanded for the first time. The reversing valve shall be held in this position until the first call for heating, ensuring quiet operation and increased valve life.).
- e. Override temperature control with 2-hour timer for room occupant to override setback temperature at the thermostat.
- f. Dry contact night setback output for digital night setback thermostats.
- g. Ability to work with heat pump or heat/cool (Y, W) type thermostats.
- h. Ability to work with heat pump thermostats using O or B reversing valve control.
- i. Emergency shutdown contacts.
- j. Boilerless system heat control at low loop water temperature.
- k. Ability to allow up to 3 units to be controlled by one thermostat.
- l. Relay to operate an external damper.
- m. Ability to automatically change fan speed from multistage thermostat.
- n. Relay to start system pump.
- o. 75 VA control transformer. Control transformer shall have load side short circuit and overload protection via a built in circuit breaker.

Digital Night Setback with Pump Restart (DXM w/ATP32U03/04)

The unit will be provided with a Digital Night Setback feature using an accessory relay on the DXM controller with an ATP32U03/04 thermostat and an external, field-provided time clock. The external time clock will initiate and terminate the night setback period. The thermostat will have a night setback override feature with a programmable override time period.

An additional accessory relay on the unit DXM controller will energize the building loop pump control for the duration of the override period. **(Note: this feature requires additional low voltage wiring. Consult Application Drawings for details.)**

Remote Service Sentinel (CXM/DXM):

Solid state control system shall communicate with remote thermostat with fault indicator, to display (at the thermostat) the unit status, fault status, and specific fault condition, as well as retrieve previously stored fault that caused unit shutdown. The Remote Service Sentinel allows building maintenance personnel or service personnel to diagnose unit from the wall thermostat. The control board shall provide a signal to the thermostat fault light, indicating a lockout. Upon cycling the G (fan) input 3 times within a 60 second time period, the fault light shall display the specific code as indicated by a sequence of flashes. A detailed flashing code shall be provided at the thermostat LED to display unit status and specific fault status such as over/under voltage fault, high pressure fault, low pressure fault, low water temperature fault, condensate overflow fault, etc. **Units that do not provide this remote service sentinel shall not be acceptable.**

Console (HRC) Series 60Hz**Engineering Specifications – Page 5****Option: Lonworks interface system**

Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a LONWORKS interface board, which is LONMark certified. This will permit all units to be daisy chained via a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

- a. space temperature
- b. leaving water temperature
- c. discharge air temperature
- d. command of space temperature setpoint
- e. cooling status
- f. heating status
- g. low temperature sensor alarm
- h. low pressure sensor alarm
- i. high pressure switch alarm
- j. condensate sensor alarm
- k. hi/low voltage alarm
- l. fan "ON/AUTO" position of space thermostat as specified above
- m. unoccupied/occupied command
- n. cooling command
- o. heating command
- p. fan "ON/AUTO" command
- q. fault reset command
- r. itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Option: MPC (Multiple Protocol Control) interface system

Units shall have all the features listed above (either CXM or DXM) and the control board will be supplied with a Multiple Protocol interface board. Available protocols are BACnet MS/TP, Modbus, or Johnson Controls N2. The choice of protocol shall be field selectable/changeable via the use of a simple selector switch. **Protocol selection shall not require any additional programming or special external hardware or software tools.** This will permit all units to be daisy chain connected by a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

- a. space temperature
- b. leaving water temperature
- c. discharge air temperature
- d. command of space temperature setpoint
- e. cooling status
- f. heating status
- g. low temperature sensor alarm
- h. low pressure sensor alarm
- i. high pressure switch alarm
- j. condensate overflow alarm
- k. hi/low voltage alarm
- l. fan "ON/AUTO" position of space thermostat as specified above
- m. unoccupied/occupied command
- n. cooling command
- o. heating command
- p. fan "ON/AUTO" command
- q. fault reset command
- r. itemized fault code revealing reason for specific shutdown fault (any one of 7)

This option also provides the upgraded 75VA control transformer with load side short circuit and overload protection via a built in circuit breaker.

Console (HRC) Series 60Hz**sEngineering Specifications – Page 6****Warranty:**

Heat Controller shall warranty equipment for a period of 12 months from start up or 18 months from shipping (which ever occurs first).

Option: Extended 4-year compressor warranty covers compressor for a total of 5 years.

Option: Extended 4-year refrigeration circuit warranty covers coils, reversing valve, expansion valve and compressor for a total of 5 years.

Option: Extended 4-year control board warranty covers the CXM/DXM control board for a total of 5 years.

FIELD INSTALLED OPTIONS**Hose Kits:**

Hoses shall be 1 foot (31cm) long, braided stainless steel; fire rated hoses complete with adapters. Only fire rated hoses will be accepted. Note: Threaded connection piping option must be ordered for hose kit connections.

Option: 2 foot (61cm) hose lengths instead of standard 1 foot (31cm) length.

Valves:

The following valves are available and will be shipped loose:

- a. Ball valve; bronze material, standard port full flow design, FPT connections.
- b. Ball valve with memory stop and PT port.
- c. "Y" strainer with blowdown valve; bronze material, FPT connections
- d. Motorized water valve; slow acting, 24v, FPT connections.

Hose Kit Assemblies:

The following assemblies ship with the valves already assembled to the hose described:

- a. Supply and return hoses having ball valve with PT port.
- b. Supply hose having ball valve with PT port; return hose having automatic flow regulator valve with PT ports, and ball valve.
- c. Supply hose having "Y" strainer with blowdown valve, and ball valve with PT port; return hose having automatic flow regulator with PT ports, and ball valve.
- d. Supply hose having "Y" strainer with blowdown valve, and ball valve with PT port; return hose having ball valve with PT port.

Thermostats:

The thermostat shall be a Heat Controller mechanical or electronic type thermostat as selected below with the described features:

- a. Single Stage Standard Manual Changeover (ATM11C11)
Thermostat shall be a single-stage, horizontal mount, manual changeover with HEAT-OFF-COOL system switch and fan ON-AUTO switch. Thermostat shall have a mechanical temperature setpoint indicator. Thermostat shall only require 4 wires for connection. Mercury bulb thermostats are not acceptable.
- b. Single Stage Digital Auto or Manual Changeover (ATA11U01)
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch and fan ON-AUTO switch. Thermostat shall have an LCD display with temperature and setpoint(s) in °F or °C. The Thermostat shall provide permanent memory of setpoint(s) without batteries. A fault LED shall be provided to display specific fault condition. Thermostat shall provide temperature display offset for custom applications.
- c. Single Stage Digital Automatic or Manual Changeover with Two-Speed Fan Control (ATA11U03) – DXM and PSC Fan required
Thermostat shall be a single-stage, digital, auto or manual changeover with HEAT-OFF-COOL-AUTO system switch, fan ON-AUTO switch, and fan LO-HI switch. Thermostat shall have an LCD display with temperature and setpoint(s) in °F or °C. Thermostat shall allow use of a remote temperature sensor (ASW06 or 17B0031N01), but may be operated with internal sensor via orientation of a jumper.

Console (HRC) Series 60Hz**Engineering Specifications – Page 7****d. Multistage Digital Automatic Changeover (ATA22U01)**

Thermostat shall be multi-stage (2H/2C), manual or automatic changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have an LCD display with temperature, setpoint(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of setpoint(s) without batteries. A fault LED shall be provided to indicate specific fault condition(s). Thermostat shall provide temperature display offset for custom applications. Thermostat shall allow unit to provide better dehumidification with optional DXM controller by automatically using lower fan speed on stage 1 cooling (higher latent cooling) as main cooling mode, and automatically shifting to high-speed fan on stage 2 cooling.

e. Multistage Manual Changeover Programmable 5/2 Day (ATP21U01)

Thermostat shall be 5 day/2 day programmable (with up to 4 setpoints per day), multi-stage ON-AUTO settings. Thermostat shall have an LCD display with temperature, setpoint(s), mode, and status indication. The temperature indication shall be selectable for °F or °C. The thermostat shall provide permanent memory of setpoint(s) without batteries. Thermostat shall provide convenient override feature to temporarily change setpoint.

f. Multistage Automatic or Manual Changeover Programmable 7 Day (ATP32U03)

Thermostat shall be 7 day programmable (with up to 4 setpoints per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Thermostat shall have a blue backlit dot matrix LCD display with temperature, setpoints, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24-hour clock. Fault identification shall be provided (when used with Heat Controller CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

g. Multistage Automatic or Manual Changeover Programmable 7 Day with Humidity Control (ATP32U04)

Thermostat shall be 7 day programmable (with up to 4 setpoints per day), multi-stage (3H/2C), automatic or manual changeover with HEAT-OFF-COOL-AUTO-EM HEAT system settings and fan ON-AUTO settings. Separate dehumidification and humidification setpoints shall be configurable for discreet outputs to a dehumidification option and/or an external humidifier. Installer configuration mode shall allow thermostat dehumidification mode to operate with reheat or with ECM fan dehumidification mode via settings changes. Thermostat shall have a blue backlit dot matrix LCD display with temperature, relative humidity, setpoints, mode, and status indication. The temperature indication shall be selectable for °F or °C. Time display shall be selectable for 12 or 24 hour clock. Fault identification shall be provided (when used with Heat Controller CXM or DXM controls) to simplify troubleshooting by providing specific unit fault at the thermostat with red backlit LCD during unit lockout. The thermostat shall provide permanent memory of setpoints without batteries. Thermostat shall provide heating setpoint range limit, cooling setpoint range limit, temperature display offset, keypad lockout, dead-band range setting, and inter-stage differential settings. Thermostat shall provide progressive recovery to anticipate time required to bring space temperature to the next programmed event. Thermostat shall provide an installer setup for configuring options and for setup of servicing contractor name and contact information. Thermostat shall allow the use of an accessory remote and/or outdoor temperature sensor (AST008). Thermostat navigation shall be accomplished via five buttons (up/down/right/left/select) with menu-driven selections for ease of use and programming.

DDC Sensors:

Heat Controller wall mounted DDC sensor to monitor room temperature and interfaces with optional interface system described above. Several types as described below:

- a. Sensor only with no display (LON and MPC).
- b. Sensor with override (LON only).
- c. Sensor with setpoint adjustment and override (MPC only).
- d. Sensor with setpoint adjustment and override, LCD display, status/fault indication (LON and MPC).

Subbase Grille:

Decorative louvered grille covers the front of subbase including the large return air opening. Order separate and field attach.

Revision History

Date:	Item:	Action:
08/13/14	Misc. Edits - Page 4, 16, 22, 43 and Wiring Diagrams and Engineering Specs	Updated
11/26/13	Physical Data Table	Updated
11/15/13	ASHRAE/AHRI/ISO English & Metric Tables	Updated
02/08/13	MCO Thermostat Engineering Specifications Added 2 HPWS to Safeties	Removed Updated
11/29/12	Console - Chassis Dimensional Data, Sizes 09-15 and 18	Updated
02/27/12	Unit Features	Updated
02/20/12	Engineering Specifications	Updated
12/06/11	All	Added Extended Unit for I SP, Deleted Isolation Plate
11/08/11	Electrical Data Table Cabinet Dimension Illustrations	Updated
08/09/11	Unit Maximum Working Water Pressure	Updated to Reflect New Safeties
08/03/11	Engineering Specifications	Added Digital Night Setback with Pump Restart (DXM w/ ATP32U03/04)
07/05/11	Cover Unit Photo	Caption Added
06/13/11	Unit Features Engineering Specifications	Updated
04/07/11	Engineering Specification NOTICE	Updated
02/11/11	Performance Data Selection Notes	Updated
01/03/11	Format All Pages	Updated
07/29/10	Cabinet Dimensions-Size 18 Bottom Return-Left & Right Hand Piping	Updated Dimensions
07/26/10	Wiring Diagrams	Updated
07/26/10	Compressor Mounting Information and Graphics Engineering Specifications	Updated to Reflect Spring/Grommet Change
06/11/10	Engineering Specs	Updated
06/11/10	Format All Pages	Updated
06/11/10	Wiring Diagrams	New Wiring Diagrams
06/11/10	Engineering Specifications	Updated
03/29/10	Physical Data Table	Coax Volume Field Added
05/19/09	Engineering Specifications	Thermostat and Electrical Sections Updated
05/19/09	Stand-Alone and Big Book Submittals	Consolidated
09/22/08	Engineering Specifications	Updated
09/22/08	Cabinet Dimensions Sizes 06-15 and 18	Updated and Verbiage Changes
08/26/08	Physical Data Table	Max Working Pressure Table Added
06/12/08	Wiring Diagram Matrix	ETL Information Added
05/30/07	MWV Pressure Drop Data	Updated
04/19/07	Table of Contents	Added Table of Contents
04/19/07	Specifications	Updated Specifications with new Safety Agency
07/14/06	First published	

Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.

HEAT CONTROLLER

1900 Wellworth Ave., Jackson MI 49203 • Ph. 517-787-2100 • www.heatcontroller.com

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