Tranquility® Vertical Stack (TRM) Series

Submittal Data

Models TRM09 - 36 60Hz - HFC-410A

LC384

Rev.: November 18, 2016

CLIMATEMASTER®
Water-Source Heat Pump Systems

Table of Contents

TRM Series

Document page number is shown next to part number (e.g. LC384 - 3 = page 3). Since not all pages are typically used in the submittals process, the page number in the lower right corner can still be used (page ____of_____).

TRM Series

TRANQUILITY® VERTICAL STACK (TRM) SERIES WITH EARTHPURE® REFRIGERANT

The Tranquility® Vertical Stack (TRM) Series offers an innovative, labor-saving solution for spaces where individual, quiet control of the heating and cooling system is important. TRM units' pre-piped risers and pre-wired cabinets are especially ideal for multi-story buildings. Cabinets can operate as stand-alone "ductless" systems, or can be ducted to an adjacent room, making them convenient for low-rise buildings as well. The TRM Series exceeds ASHRAE 90.1 efficiencies, yet maintains small cabinet dimensions. Using EarthPure® (HFC-410A) refrigerant, the TRM Series not only protects the environment, it does so while delivering unprecedented comfort, efficiency, and reliability.

Available in sizes 3/4 ton (2.6 kW) through 3 tons (10.6 kW) with numerous cabinet, water piping and control choices, the TRM Series offers a wide range of units for most any installation. The TRM 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, TXV metering device, galvanized steel cabinet, torsion-flex blower motor mounting, and (optional) ECM motor for all models are just some of the features of the innovative TRM Series.

ClimateMaster's exclusive double isolation compressor mounting system makes the TRM Series the quietest vertical stack units on the market. Compressors are mounted on specially engineered sound-tested EPDM grommets to a heavy gauge mounting plate, which is then isolated from the cabinet base with grommets for maximized vibration/sound attenuation. Options such as DDC controls, internal pump and factory-installed water solenoid valves allow customized design solutions.

The TRM Series vertical stack water-source heat pumps are designed to meet the challenges of today's HVAC demands with a low cost/high value solution.

UNIT FEATURES

- Sizes 09 (3/4 ton, 2.6 kW) through 36 (3 ton, 10.6 kW)
- Environmentally-friendly EarthPure® (HFC-410A) zero ozone depletion refrigerant
- High efficiency rotary and scroll compressors
- Exceeds ASHRAE 90.1 efficiencies
- Removable chassis allows staged installation and ease of maintenance
- Galvanized steel cabinet
- Unique double isolation compressor mounting for quiet operation
- UltraQuiet option
- TXV metering device
- Cabinet construction for unit or remote-mounted controls
- Microprocessor controls standard (optional DXM and/or DDC controls)
- LonWorks, BACnet, Modbus and Johnson N2 compatibility options for DDC controls
- Unit Performance Sentinel performance monitoring system
- Integrated drain pan with condensate overflow sensor
- Attractive return air panel with hinged access door ("G" panel)
- Multiple supply air discharge options
- Full port shut-off valves with memory stop, for supply and return, located opposite return air panel inside cabinet
- Stainless steel braided hose kits for connection from piping risers to chassis
- Eight Safeties Standard
- Wide variety of cabinet options including disconnect switch, breaker, stand, thermostat whip with molex connector, isolation pad, air vent, stainless steel drain pan, riser chase, ECM motor and electric heater
- Wide variety of chassis options including stainless steel drain pan, coated air coil, insulated tubing for extended range operation, autoflow regulator, motorized water valve either normally closed or normally open, secondary circulating pump, and cupro-nickel coaxial heat exchanger
- Selection of thermostats including manual changeover, automatic changeover, or programmable are available.

Reference Calculations

Heating

$$LWT = EWT - \frac{HE}{GPM \times 500}$$

$$LAT = EAT + \frac{HC}{CFM \times 1.08}$$

Cooling

$$LWT = EWT + \frac{HR}{GPM \times 500}$$

$$LAT\ (DB) = EAT\ (DB) - \frac{SC}{CFM \times 1.08}$$

$$LC = TC - SC$$

$$S/T = \frac{SC}{TC}$$

Legend and Glossary of Abbreviations

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

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

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.....15,100 BTUH
Sensible Cooling.....10,500 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 10°F rise in temp.).....4.5 GPM
Air Flow.....515 CFM

Step 3, 4 & 5 HP Selection:

After making our preliminary selection (TRM18), we enter the tables at design water flow and water temperature and read Total Cooling, Sens. Cooling and Heat of Rej. capacities:

Total Cooling.....16,800 BTUH
Sensible Cooling.....12,500 BTUH
Heat of Rejection.....21,300 BTUH

Step 6 & 7 Entering Air and Airflow Corrections:

Next, we determine our correction factors.

	Table		Ent Air		Air Flow		Corrected
Corrected Total Cooling =	16,800	x	0.957	x	0.934	=	15,016
Corrected Sens Cooling =	12,500	x	1.093	x	0.833	=	11,381
Corrected Heat of Reject =	21,300	x	0.970	x	0.952	=	19,669

Step 8 Water Temperature Rise Calculation & Assessment:

Actual Temperature Rise.....8.9°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.

TRM Series Nomenclature

Cabinet

1 2	3	4	5	6	7	8	9 10	11	12	13	14	15
0 9	S	G	O	N	A	A	1 A	O	O	O	O	A

REVISION LEVEL
A = CURRENT R410A UNITS

STANDARD
O = STANDARD
A, B, C etc.... = SPECIAL 1, 2, 3 etc....

UNIT SIZE

(TRM) SIZE / HFC-410A
09
12
15
18
24
30
36

CABINET STYLE

(TRM) HFC-410A		
	P = STANDARD Q = MASTER R = SLAVE	.625 Flange "H" PANEL
	S = STANDARD T = MASTER U = SLAVE	1.250 Flange "G" PANEL

VOLTAGE

OPTION	Volt/Hertz/Phaze
G	208-230/60/1
E	265/60/1

OPTIONS

OPTION	S.S. DRAIN PAN	MANUAL AIR VENT	RISER CHASE
A	X	-	-
D	X	X	-
M	-	X	-
1	X	-	X
4	X	X	X
7	-	X	X
O	NO OPTIONS		

CONTROLS

OPTION	CXM	DXM	SURFACE/ REMOTE/ WALL SENSOR	X-MOTOR	LON MPC/ M M L L - - - - M L
C	X	-	W	-	
D	-	X	W	-	
L	X	-	W	-	
M	-	X	W	-	
N	X	-	R	-	
P	X	-	S	-	
R	-	X	R	-	
S	-	X	S	-	
1	-	X	R	X	
2	-	X	S	X	
5	-	X	W	X	
7	-	X	W	X	
O	NO OPTION				

POWER TERMINATION

OPTION	DISCONNECT SWITCH	BREAKER	NLLS	2 SPD FAN SW	ELECTRIC HEAT
A	X	-	-	-	-
C	-	X	-	-	-
D	X	-	X	-	-
E	-	X	X	-	-
F	-	-	X	-	-
G	X	-	-	X	-
H	-	X	-	X	-
J	-	-	-	X	-
2	-	X	-	-	2.5Kw
3	-	X	-	-	5.0Kw
4	-	X	-	-	7.5Kw
6	-	X	X	-	2.5Kw
7	-	X	X	-	5.0Kw
8	-	X	X	-	7.5Kw
O	NO OPTIONS				

CABINET HEIGHT

OPTION	80"	88"	8" CABINET STAND	ISO PAD
A	-	X	-	-
B	X	-	-	-
C	-	X	X	-
D	X	-	X	-
E	-	X	-	X
F	X	-	-	X
G	-	X	X	X
H	X	-	X	X

SUPPLY AIR OPENING SIZES

A = 10"W x 6"H	G = 14"W x 6"H
B = 10"W x 8"H	H = 14"W x 8"H
C = 10"W x 10"H	M = 16"W x 6"H
D = 12"W x 10"H	P = 16"W x 10"H
E = 12"W x 12"H	Q = 16"W x 12"H
F = 12"W x 6"H	R = 16"W x 14"H
O = NO OPENINGS	

RIGHT
LEFT
FRONT

TOP DISCHARGE OPENINGS BY UNIT SIZE	
UNIT SIZE	OPENING
TRM-09 & 12	10" x 10"
TRM-15 & 18	13" x 13"
TRM-24, 30 &36	17" x 17"

RETURN & SUPPLY AIR

QUANTITY OF AIR FLOW SUPPLIES	RETURN AIR POSITION	DIGIT 9 & 10	SUPPLY AIR POSITION FRONT	RIGHT	LEFT	TOP
SINGLE SUPPLY	FRONT	1A	X	-	-	-
	FRONT	1B	-	X	-	-
	FRONT	1C	-	-	X	-
	FRONT	1D	-	-	-	X
	RIGHT	1E	X	-	-	-
	RIGHT	1F	-	X	-	-
	RIGHT	1G	-	-	X	-
	RIGHT	1H	-	-	-	X
	LEFT	1J	X	-	-	-
	LEFT	1K	-	X	-	-
	LEFT	1L	-	-	X	-
	LEFT	1M	-	-	-	X
DOUBLE SUPPLY	FRONT	2A	X	X	-	-
	FRONT	2B	X	-	X	-
	FRONT	2C	X	-	-	X
	FRONT	2D	-	X	X	-
	FRONT	2E	-	X	-	X
	FRONT	2F	-	-	X	X
	RIGHT	2G	X	X	-	-
	RIGHT	2H	X	-	X	-
	RIGHT	2J	X	-	-	X
	RIGHT	2K	-	X	X	-
	RIGHT	2L	-	X	-	X
	RIGHT	2M	-	-	X	X
	LEFT	2N	X	X	-	-
	LEFT	2P	X	-	X	-
	LEFT	2Q	X	-	-	X
	LEFT	2R	-	X	X	-
	LEFT	2S	-	X	-	X
	LEFT	2T	-	-	X	X

QUANTITY OF AIR FLOW SUPPLIES	RETURN AIR POSITION	DIGIT 9 & 10	SUPPLY AIR POSITION FRONT	RIGHT	LEFT	TOP
TRIPLE SUPPLY	FRONT	3A	X	X	X	-
	FRONT	3B	X	X	-	X
	FRONT	3C	X	-	X	X
	FRONT	3D	-	X	X	X
	RIGHT	3E	X	X	X	-
	RIGHT	3F	X	X	-	X
	RIGHT	3G	X	-	X	X
	RIGHT	3H	-	X	X	X
	LEFT	3J	X	X	X	-
	LEFT	3K	X	X	-	X
	LEFT	3L	X	-	X	X
	LEFT	3M	-	X	X	X

QUANTITY OF AIR FLOW SUPPLIES	RETURN AIR POSITION	DIGIT 9 & 10	SUPPLY AIR POSITION FRONT	RIGHT	LEFT	TOP
QUAD SUPPLY	FRONT	4A	X	X	X	X
	RIGHT	4B	X	X	X	X
	LEFT	4C	X	X	X	X

QUANTITY OF AIR FLOW SUPPLIES	RETURN AIR POSITION	DIGIT 9 & 10	SUPPLY AIR POSITION FRONT	RIGHT	LEFT	TOP
NO SUPPLY (Zero)	FRONT	0A	-	-	-	-
	RIGHT	0B	-	-	-	-
	LEFT	0C	-	-	-	-

BACK

LEFT — SUPPLY — DRAIN — RETURN — RIGHT

FRONT

DRAWN:	DR	DATE:	07/20/04	ENG:	Neru	DATE:	07/20/04
ISSUED:	04-0254	DATE:	07/20/04	DWG #:	See Description	A	SHEET 1-3

TRM Series Nomenclature

Chassis

1 2 3	4 5	6	7	8	9	10	11	12
T R M	18	G	S	S	S	C	S	A

Series
TRM = Tranquility® High Rise Chassis

Unit Size
9, 12, 15, 18, 24, 30, 36

Voltage
G = 208-230/60/1
E = 265/60/1

Options

OPTION	S.S. Drain Pan	MUTE	- RAS
A	X	-	-
D	-	-	X
E	X	-	X
1	-	X	
2	X	X	
5	-	X	X
6	X	X	X
S	-	-	

RAS = Return Air Sensor

Note - Only P Control

Water Valve & Pump Optio
S = No Water valve
M = Normally Closed Water Valve
P = Secondary Circulating Pump

Heat Exchanger Options

	Non Coated Air Coil		Tin-Plated Air Coil	
	Copper	Cupro-nickel	Copper	Cupro-nickel
Standard	L	M	C	N
Extended Range	F	G	D	E

Standard
S = Standard

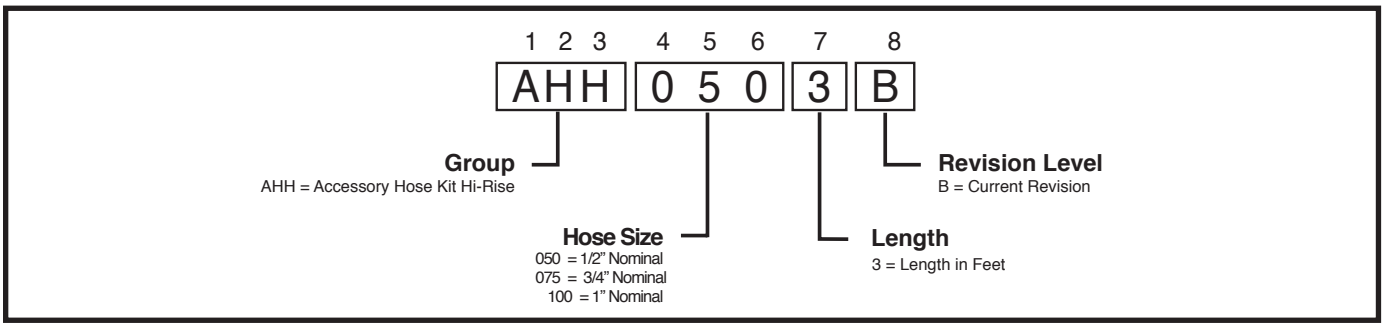
Revision Level
A = 24, 30, 36
B = 09, 12, 15, 18

Auto Flow Regulator

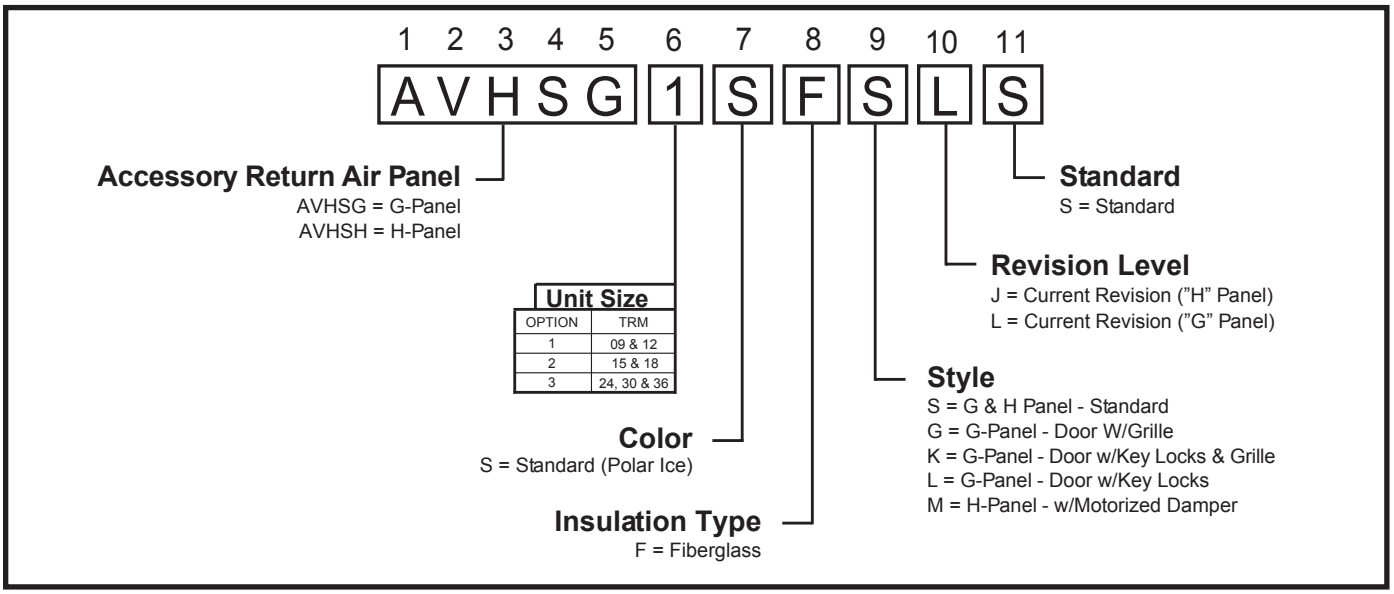
	5/8 SWEAT		7/8 SWEAT				
	UNIT 09	UNIT 12	UNIT 15	UNIT 18	UNIT 24	UNIT 30	UNIT 36
C	1.5	-	-	-	-	-	-
D	2.0	2.0	-	-	-	-	--
E	2.5	2.5	2.5	-	-	-	-
F	3.0	3.0	3.0	3.0	-	-	-
G	-	3.5	3.5	3.5	-	-	-
H	-	-	4.0	4.0	4.0	-	-
J	-	-	-	5.0	5.0	5.0	-
K	-	-	-	-	6.0	6.0	6.0
L	-	-	-	-	7.0	7.0	7.0
M	-	-	-	-	-	8.0	8.0
N	-	-	-	-	-	-	9.0
P	-	-	-	-	-	-	10.0
S = STANDARD - NO FLOW REGULATOR							

TRM Series Nomenclature

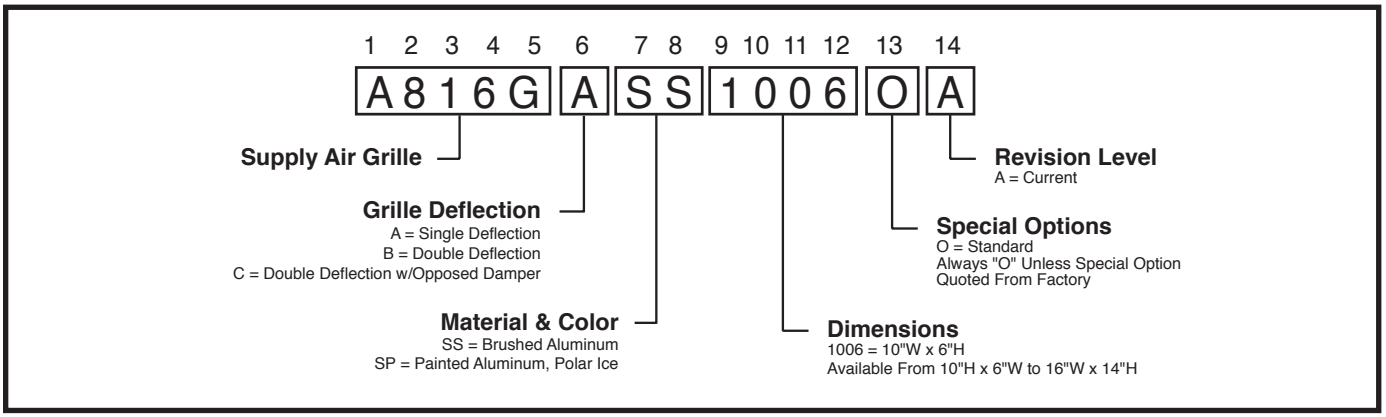
Hose Kit



Return Air Panel



Supply Air Grille



Performance Data – AHRI/ASHRAE/ISO 13256-1

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

Model with PSC Motor	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
TRM09	8,800	13.0	12,500	4.6	10,100	19.5	9,800	3.8	9,300	14.7	7,200	3.1
TRM12	11,600	13.0	15,400	4.5	13,200	20.0	12,700	3.8	12,200	15.0	9,500	3.1
TRM15	13,800	13.0	18,800	4.7	16,500	20.0	15,500	3.8	14,600	14.6	11,500	3.1
TRM18	16,200	13.0	22,600	4.7	19,600	19.5	18,200	3.8	17,600	13.9	14,000	3.1
TRM24	22,100	13.0	29,400	4.5	26,400	20.0	23,100	3.8	23,600	14.8	18,000	3.1
TRM30	27,100	13.0	33,100	4.6	30,600	18.6	27,200	3.9	29,200	15.1	20,600	3.1
TRM36	32,000	12.5	37,400	4.6	36,700	18.8	32,000	3.8	33,000	14.3	23,500	3.0

Model with ECM Motor	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
TRM09	8,800	14.0	12,500	4.8	10,100	22.0	9,800	4.1	9,300	16.3	7,200	3.2
TRM12	11,600	13.4	15,800	4.6	13,700	20.2	12,700	3.9	12,200	15.7	9,500	3.2
TRM15	13,800	14.1	19,600	5.2	16,500	23.5	15,500	4.3	15,200	16.5	11,500	3.4
TRM18	16,700	14.0	22,600	5.0	19,600	22.3	18,200	4.1	17,600	16.4	14,000	3.4
TRM24	22,100	13.8	29,200	4.9	26,400	22.0	22,900	4.0	23,800	16.2	17,800	3.3
TRM30	27,100	13.6	33,000	4.7	30,700	19.6	27,600	4.1	29,300	16.2	20,500	3.2
TRM36	32,300	13.0	39,200	4.7	37,000	19.6	31,700	3.9	33,300	14.9	24,700	3.2

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 units AHRI/ISO/ASHRAE 13256-1 rated on high speed motor TAP
All ratings based upon operation at lower voltage of dual voltage rated models

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

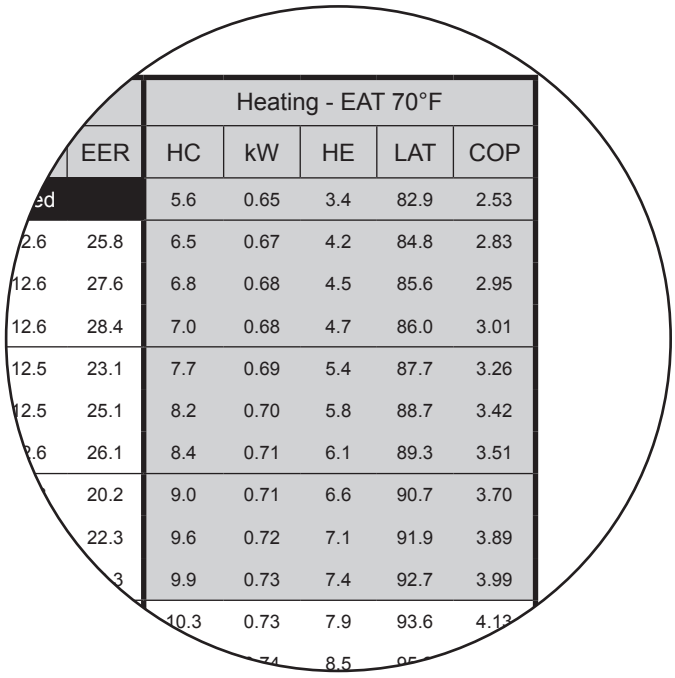
Model with PSC Motor	Water Loop Heat Pump				Ground Water Heat Pump				Ground Loop Heat Pump			
	Cooling 30°C		Heating 20°C		Cooling 15°C		Heating 10°C		Cooling 25°C		Heating 0°C	
	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP	Capacity kW	EER W/W	Capacity kW	COP
TRM09	2.58	3.8	3.66	4.6	2.93	5.7	2.87	3.8	2.73	4.3	2.11	3.1
TRM12	3.40	3.8	4.51	4.5	3.87	5.9	3.72	3.8	3.58	4.4	2.78	3.1
TRM15	4.05	3.8	5.51	4.7	4.84	5.9	4.54	3.8	4.28	4.3	3.37	3.1
TRM18	4.75	3.8	6.62	4.7	5.74	5.7	5.33	3.8	5.16	4.1	4.10	3.1
TRM24	6.48	3.8	8.62	4.5	7.74	5.9	6.77	3.8	6.92	4.3	5.28	3.1
TRM30	7.94	3.8	9.70	4.6	8.97	5.5	7.97	3.9	8.56	4.4	6.04	3.1
TRM36	9.38	3.7	10.96	4.6	10.76	5.5	9.38	3.8	9.67	4.2	6.89	3.0

Model with ECM Motor	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
TRM09	2.58	4.1	3.66	4.8	2.96	6.4	2.87	4.1	2.73	4.8	2.11	3.2
TRM12	3.40	3.9	4.63	4.6	4.02	5.9	3.72	3.9	3.58	4.6	2.78	3.2
TRM15	4.04	4.1	5.74	5.2	4.84	6.9	4.54	4.3	4.45	4.8	3.37	3.4
TRM18	4.89	4.1	6.62	5.0	5.74	6.5	5.33	4.1	5.16	4.8	4.10	3.4
TRM24	6.48	4.0	8.56	4.9	7.74	6.4	6.71	4.0	6.98	4.8	5.22	3.3
TRM30	7.94	4.0	9.67	4.7	9.00	5.7	8.09	4.1	8.59	4.8	6.01	3.2
TRM36	9.47	3.8	11.49	4.7	10.84	5.7	9.29	3.9	9.76	4.4	7.24	3.2

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 units AHRI/ISO/ASHRAE 13256-1 rated on high speed motor TAP
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 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.



		Heating - EAT 70°F				
	EER	HC	kW	HE	LAT	COP
ed		5.6	0.65	3.4	82.9	2.53
2.6	25.8	6.5	0.67	4.2	84.8	2.83
12.6	27.6	6.8	0.68	4.5	85.6	2.95
12.6	28.4	7.0	0.68	4.7	86.0	3.01
12.5	23.1	7.7	0.69	5.4	87.7	3.26
12.5	25.1	8.2	0.70	5.8	88.7	3.42
2.6	26.1	8.4	0.71	6.1	89.3	3.51
	20.2	9.0	0.71	6.6	90.7	3.70
	22.3	9.6	0.72	7.1	91.9	3.89
	3	9.9	0.73	7.4	92.7	3.99
		10.3	0.73	7.9	93.6	4.13
				8.5		

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 x 500)

TD = 22,500 / (4.5 x 500)

TD = 10°F

LWT = EWT - TD

LWT = 50 - 10 = 40°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.

Performance Data – TRM09 with PSC Motor

405 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	5.7	13.3	Operation not recommended						5.74	0.65	3.55	83.1	2.6
30	2.0	1.9	5.6	11.30	7.30	0.65	0.41	11.90	27.8	6.90	0.68	4.60	85.7	3.0
	2.3	2.4	5.6	11.29	7.30	0.65	0.40	12.61	28.4	7.00	0.68	4.72	86.0	3.0
	3.0	5.5	12.7	11.32	7.31	0.65	0.39	12.62	28.9	7.16	0.68	4.86	86.4	3.1
40	2.0	1.8	4.3	11.10	7.30	0.66	0.43	12.60	25.6	8.30	0.70	5.90	89.0	3.5
	2.3	2.3	5.3	11.15	7.26	0.65	0.43	12.57	26.1	8.44	0.71	6.07	89.3	3.5
	3.0	5.3	12.3	11.19	7.27	0.65	0.42	12.58	26.8	8.65	0.71	6.26	89.8	3.6
50	2.0	1.8	4.1	10.90	7.20	0.66	0.48	12.50	22.7	9.70	0.72	7.30	92.3	3.9
	2.3	2.2	5.1	10.92	7.22	0.66	0.47	12.48	23.4	9.91	0.73	7.46	92.7	4.0
	3.0	5.1	11.9	10.99	7.23	0.66	0.46	12.51	24.2	10.17	0.73	7.70	93.2	4.1
60	1.5	1.3	3.0	10.39	7.11	0.68	0.55	12.24	18.9	10.83	0.74	8.33	94.8	4.3
	2.3	2.1	4.9	10.61	7.16	0.67	0.52	12.35	20.4	11.37	0.75	8.85	96.0	4.5
	3.0	5.0	11.5	10.70	7.18	0.67	0.50	12.39	21.2	11.67	0.75	9.13	96.7	4.6
70	1.5	1.3	3.0	9.91	6.98	0.70	0.61	11.99	16.1	12.17	0.75	9.61	97.8	4.7
	2.3	2.1	4.8	10.18	7.05	0.69	0.58	12.13	17.6	12.77	0.76	10.18	99.2	4.9
	3.0	4.9	11.2	10.31	7.09	0.69	0.56	12.20	18.3	13.09	0.77	10.49	99.9	5.0
80	1.5	1.3	3.0	9.32	6.77	0.73	0.69	11.64	13.6	13.45	0.77	10.83	100.8	5.1
	2.3	2.0	4.7	9.64	6.89	0.71	0.65	11.83	14.9	14.07	0.78	11.43	102.2	5.3
	3.0	4.8	11.0	9.80	6.94	0.71	0.63	11.92	15.6	14.40	0.78	11.73	102.9	5.4
90	1.5	1.3	2.9	8.60	6.48	0.75	0.76	11.19	11.3	14.63	0.78	11.95	103.4	5.5
	2.3	2.0	4.6	8.98	6.64	0.74	0.72	11.43	12.4	15.23	0.79	12.52	104.8	5.6
	3.0	4.7	10.8	9.16	6.71	0.73	0.70	11.54	13.0	15.53	0.80	12.80	105.5	5.7
100	2.0	1.6	3.7	8.00	6.20	0.78	0.82	10.80	9.8	Operation not recommended				
	2.3	2.0	4.6	8.18	6.28	0.77	0.80	10.91	10.2					
	3.0	4.7	10.7	8.39	6.38	0.76	0.78	11.05	10.7					
110	2.0	1.6	3.7	7.10	5.70	0.80	0.90	10.10	7.9					
	2.3	2.0	4.5	7.24	5.79	0.80	0.89	10.27	8.2					
	3.0	4.6	10.7	7.47	5.91	0.79	0.87	10.42	8.6					
120	2.0	1.6	3.7	6.00	5.00	0.83	1.00	9.30	6.1					
	2.3	2.0	4.5	6.15	5.13	0.83	0.97	9.48	6.3					
	3.0	4.6	10.7	6.40	5.29	0.83	0.95	9.66	6.7					

***WPD Adder for Motorized Valve, TRM09 (Cv = 4.9, MOPD = 150 psi)**

GPM	WPD Adder	
	PSI	FT
1.5	0.09	0.22
2.3	0.21	0.49
3.0	0.38	0.87

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 – TRM12 with PSC Motor

445 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM12 (Cv = 4.9, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
2.0	0.17	0.38
2.9	0.38	0.87
4.0	0.63	1.47

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	4.0	9.6	22.2	Operation not recommended						7.58	0.76	5.03	85.8	2.9
30	2.5	4.2	9.7	13.80	8.40	0.61	0.44	15.20	31.6	9.00	0.78	6.30	88.7	3.4
	2.9	5.4	12.4	13.69	8.25	0.60	0.43	15.09	32.0	9.12	0.78	6.48	89.0	3.4
	4.0	9.2	21.3	13.56	8.10	0.60	0.42	14.94	32.4	9.33	0.79	6.67	89.4	3.5
40	2.5	4.1	9.5	13.90	8.70	0.63	0.48	15.50	28.9	10.60	0.81	7.80	92.1	3.8
	2.9	5.3	12.1	13.91	8.64	0.62	0.47	15.46	29.7	10.79	0.81	8.05	92.5	3.9
	4.0	8.9	20.6	13.89	8.56	0.62	0.46	15.39	30.4	11.04	0.82	8.28	93.0	4.0
50	2.5	4.0	9.2	13.70	8.80	0.64	0.54	15.60	25.5	12.20	0.84	9.30	95.4	4.3
	2.9	5.0	11.4	13.80	8.77	0.64	0.52	15.53	26.4	12.42	0.84	9.57	95.8	4.3
	4.0	8.5	19.6	13.86	8.75	0.63	0.51	15.54	27.3	12.70	0.85	9.83	96.4	4.4
60	2.0	2.6	6.0	13.13	8.61	0.66	0.63	15.22	21.0	13.43	0.86	10.52	97.9	4.6
	2.9	4.8	11.0	13.41	8.70	0.65	0.59	15.37	22.8	13.98	0.87	11.04	99.1	4.7
	4.0	8.3	19.2	13.54	8.74	0.65	0.57	15.44	23.8	14.29	0.87	11.33	99.7	4.8
70	2.0	2.6	6.0	12.44	8.35	0.67	0.70	14.81	17.7	14.88	0.88	11.88	101.0	4.9
	2.9	4.7	10.7	12.80	8.49	0.66	0.66	15.03	19.3	15.48	0.89	12.44	102.2	5.1
	4.0	8.1	18.7	12.98	8.56	0.66	0.64	15.14	20.2	15.81	0.90	12.75	102.9	5.2
80	2.0	2.5	5.8	11.61	8.01	0.69	0.79	14.28	14.7	16.26	0.91	13.18	103.8	5.3
	2.9	4.5	10.3	12.03	8.18	0.68	0.75	14.54	16.1	16.88	0.92	13.76	105.1	5.4
	4.0	7.9	18.2	12.24	8.27	0.68	0.72	14.68	16.9	17.22	0.92	14.08	105.8	5.5
90	2.0	2.5	5.8	10.69	7.62	0.71	0.88	13.67	12.2	17.56	0.93	14.40	106.5	5.6
	2.9	4.4	10.0	11.13	7.81	0.70	0.84	13.96	13.3	18.18	0.94	14.99	107.8	5.7
	4.0	7.7	17.8	11.36	7.90	0.70	0.81	14.11	14.0	18.51	0.94	15.31	108.5	5.8
100	2.5	3.5	8.1	10.00	7.30	0.73	0.95	13.20	10.5	Operation not recommended				
	2.9	4.4	10.0	10.15	7.39	0.73	0.93	13.31	10.9					
	4.0	7.6	17.6	10.38	7.49	0.72	0.91	13.47	11.4					
110	2.5	3.4	7.9	8.90	6.90	0.78	1.05	12.50	8.5					
	2.9	4.2	9.6	9.13	6.96	0.76	1.03	12.64	8.9					
	4.0	7.4	17.1	9.36	7.06	0.75	1.01	12.79	9.3					
120	2.5	3.4	7.9	7.90	6.50	0.82	1.15	11.90	6.9					
	2.9	4.1	9.4	8.10	6.54	0.81	1.13	11.97	7.1					
	4.0	7.3	16.9	8.32	6.63	0.80	1.11	12.11	7.5					

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 – TRM15 with PSC Motor

595 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	5.4	4.8	11.0	Operation not recommended						9.97	1.00	6.62	85.5	2.9
30	3.0	2.4	5.4	16.80	10.20	0.61	0.61	18.90	27.4	11.20	1.00	7.70	87.5	3.2
	4.1	3.2	7.4	16.30	9.54	0.59	0.60	18.29	27.2	11.54	1.03	8.07	88.0	3.3
	5.4	4.4	10.0	15.89	9.08	0.57	0.59	17.86	26.8	11.73	1.03	8.26	88.3	3.3
40	3.0	2.3	5.3	17.60	11.40	0.65	0.67	19.90	26.4	13.20	1.10	9.60	90.5	3.7
	4.1	3.1	7.2	17.47	11.04	0.63	0.64	19.60	27.1	13.57	1.06	10.01	91.1	3.8
	5.4	4.1	9.4	17.29	10.77	0.62	0.63	19.38	27.4	13.85	1.06	10.27	91.6	3.8
50	3.0	2.1	4.7	17.80	11.80	0.66	0.74	20.10	23.7	15.30	1.10	11.60	93.8	4.2
	4.1	2.8	6.5	17.72	11.70	0.66	0.71	20.08	25.0	15.82	1.08	12.16	94.6	4.3
	5.4	3.7	8.4	17.73	11.61	0.65	0.69	20.03	25.6	16.18	1.08	12.50	95.2	4.4
60	2.5	1.1	2.5	16.88	11.53	0.68	0.84	19.71	20.0	17.26	1.10	13.54	96.9	4.6
	4.1	2.6	6.0	17.31	11.71	0.68	0.79	19.96	21.8	18.14	1.10	14.39	98.2	4.8
	5.4	3.5	8.0	17.46	11.76	0.67	0.77	20.04	22.6	18.57	1.11	14.81	98.9	4.9
70	2.5	1.1	2.5	15.82	10.98	0.69	0.94	19.00	16.8	19.44	1.12	15.64	100.2	5.1
	4.1	2.5	5.8	16.42	11.30	0.69	0.89	19.41	18.5	20.42	1.13	16.58	101.8	5.3
	5.4	3.3	7.5	16.66	11.42	0.69	0.87	19.57	19.3	20.89	1.13	17.03	102.5	5.4
80	2.5	1.0	2.3	14.54	10.27	0.71	1.05	18.10	13.8	21.52	1.14	17.64	103.5	5.5
	4.1	2.3	5.3	15.21	10.64	0.70	1.00	18.57	15.3	22.54	1.15	18.61	105.1	5.7
	5.4	3.1	7.0	15.51	10.80	0.70	0.97	18.78	16.0	23.00	1.16	19.05	105.8	5.8
90	2.5	1.0	2.3	13.14	9.55	0.73	1.17	17.11	11.3	23.41	1.16	19.44	106.4	5.9
	4.1	2.2	5.1	13.82	9.89	0.72	1.11	17.59	12.4	24.34	1.18	20.32	107.9	6.1
	5.4	2.9	6.6	14.13	10.06	0.71	1.09	17.81	13.0	24.74	1.18	20.69	108.5	6.1
100	3.0	1.6	3.7	11.90	9.00	0.76	1.30	16.20	9.4	Operation not recommended				
	4.1	2.2	5.1	12.37	9.18	0.74	1.23	16.56	10.0					
	5.4	2.8	6.4	12.66	9.32	0.74	1.21	16.77	10.5					
110	3.0	1.5	3.4	10.60	8.50	0.80	1.40	15.40	7.6					
	4.1	2.0	4.6	10.98	8.60	0.78	1.36	15.61	8.1					
	5.4	2.6	5.9	11.24	8.70	0.77	1.33	15.78	8.4					
120	3.0	1.4	3.2	9.50	8.20	0.86	1.50	14.70	6.3					
	4.1	1.9	4.4	9.79	8.26	0.84	1.48	14.86	6.6					
	5.4	2.5	5.7	9.99	8.30	0.83	1.46	14.98	6.8					

*WPD Adder for Motorized Valve, TRM15 (Cv = 4.9, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
2.5	0.28	0.65
3.0	0.4	0.92
4.1	0.67	1.54
5.4	1.21	2.80

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 – TRM18 with PSC Motor

685 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM18 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
3.0	0.08	0.18
3.4	0.11	0.25
5.1	0.25	0.57
6.8	0.44	1.01

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	6.8	7.8	18.0	Operation not recommended						12.08	1.16	8.18	86.3	3.1
30	3.4	1.6	3.7	19.93	12.08	0.61	0.73	22.36	27.2	13.65	1.19	9.64	88.4	3.4
	5.1	4.6	10.6	19.16	11.26	0.59	0.71	21.54	26.8	14.08	1.20	10.04	89.0	3.4
	6.8	7.4	17.1	18.71	10.81	0.58	0.71	21.06	26.4	14.31	1.20	10.25	89.3	3.5
40	3.4	1.5	3.5	20.84	13.35	0.64	0.80	23.49	26.1	15.84	1.23	11.70	91.4	3.8
	5.1	4.5	10.4	20.57	12.89	0.63	0.77	23.11	26.9	16.39	1.24	12.21	92.2	3.9
	6.8	7.1	16.4	20.36	12.60	0.62	0.75	22.86	27.1	16.69	1.24	12.50	92.6	3.9
50	3.4	1.4	3.2	20.79	13.85	0.67	0.88	23.73	23.6	18.15	1.26	13.87	94.5	4.2
	5.1	4.2	9.7	20.91	13.70	0.66	0.84	23.71	24.9	18.84	1.28	14.52	95.5	4.3
	6.8	6.7	15.5	20.91	13.58	0.65	0.82	23.65	25.5	19.21	1.28	14.87	96.0	4.4
60	3.0	0.8	1.8	19.70	13.85	0.70	1.03	23.21	19.1	19.50	1.29	15.10	96.3	4.4
	5.1	4.0	9.2	20.47	13.88	0.68	0.93	23.59	21.9	21.37	1.31	16.91	98.9	4.8
	6.8	6.5	15.0	20.63	13.89	0.67	0.91	23.67	22.7	21.81	1.32	17.33	99.5	4.9
70	3.0	0.7	1.6	18.60	13.30	0.72	1.15	25.22	16.2	22.70	1.32	18.20	99.8	5.0
	5.1	3.9	9.0	19.47	13.60	0.70	1.04	22.97	18.7	23.96	1.35	19.37	102.4	5.2
	6.8	6.3	14.6	19.73	13.70	0.69	1.02	23.14	19.4	24.48	1.36	19.86	103.1	5.3
80	3.0	0.6	1.5	17.20	12.70	0.74	1.20	21.29	14.3	24.88	1.34	20.31	103.0	5.4
	5.1	3.7	8.5	18.10	13.04	0.72	1.16	22.02	15.6	26.59	1.39	21.86	105.9	5.6
	6.8	6.1	14.1	18.41	13.18	0.72	1.13	22.24	16.2	27.17	1.39	22.41	106.7	5.7
90	3.0	0.6	1.4	16.40	12.14	0.75	1.40	21.17	11.7	27.30	1.40	22.53	107.5	5.7
	5.1	3.6	8.3	16.52	12.32	0.75	1.29	20.89	12.8	29.22	1.42	24.34	109.5	6.0
	6.8	5.9	13.6	16.85	12.47	0.74	1.26	21.13	13.3	29.87	1.43	24.96	110.4	6.1
100	3.4	1.1	2.5	14.29	11.32	0.79	1.48	19.33	9.6	Operation not recommended				
	5.1	3.6	8.3	14.88	11.57	0.78	1.43	19.74	10.4					
	6.8	5.8	13.4	15.20	11.71	0.77	1.40	19.96	10.8					
110	3.4	1.0	2.3	12.84	10.75	0.84	1.62	18.38	7.9					
	5.1	3.4	7.9	13.34	10.93	0.82	1.57	18.70	8.5					
	6.8	5.6	12.9	13.61	11.04	0.81	1.54	18.87	8.8					
120	3.4	1.0	2.3	11.80	10.49	0.89	1.77	17.74	6.7					
	5.1	3.3	7.6	12.05	10.54	0.87	1.72	17.92	7.0					
	6.8	5.5	12.7	12.25	10.58	0.86	1.69	18.03	7.2					

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 – TRM24 with PSC Motor

850 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	8.2	7.3	16.9	Operation not recommended						14.42	1.56	9.19	85.7	2.7
30	4.0	2.9	6.7	28.10	18.70	0.67	1.01	31.44	27.9	16.67	1.59	11.33	88.2	3.1
	6.1	5.5	12.6	27.26	17.91	0.66	0.97	30.46	28.2	17.27	1.60	11.89	88.8	3.2
	8.2	6.9	15.9	26.71	17.40	0.65	0.95	29.84	28.3	17.61	1.60	12.21	89.2	3.2
40	4.0	2.8	6.5	28.87	19.51	0.68	1.10	32.53	26.2	19.84	1.64	14.31	91.6	3.5
	6.1	5.4	12.4	28.63	19.22	0.67	1.05	32.12	27.2	20.64	1.65	15.07	92.5	3.7
	8.2	6.6	15.2	28.39	18.98	0.67	1.03	31.80	27.6	21.11	1.66	15.50	93.0	3.7
50	4.0	3.9	9.0	28.61	19.51	0.68	1.21	32.66	23.6	23.18	1.70	17.45	95.3	4.0
	6.1	3.9	9.0	28.85	19.59	0.68	1.15	32.70	25.0	24.21	1.72	18.40	96.4	4.1
	8.2	6.2	14.2	28.89	19.57	0.68	1.13	32.63	25.7	24.79	1.73	18.95	97.0	4.2
60	4.0	3.7	8.5	27.63	18.99	0.69	1.34	32.12	20.6	26.62	1.76	20.65	99.0	4.4
	6.1	3.7	8.5	28.21	19.31	0.68	1.27	32.47	22.2	27.85	1.79	21.78	100.3	4.6
	8.2	6.0	13.7	28.46	19.43	0.68	1.24	32.60	23.0	28.54	1.80	22.42	101.1	4.6
70	4.0	3.7	8.5	26.11	18.19	0.70	1.49	31.13	17.5	30.07	1.84	23.83	102.8	4.8
	6.1	3.6	8.3	26.92	18.62	0.69	1.41	31.67	19.0	31.46	1.87	25.10	104.3	4.9
	8.2	5.8	13.3	27.32	18.83	0.69	1.37	31.93	19.9	32.24	1.89	25.82	105.1	5.0
80	4.0	3.6	8.3	24.22	17.27	0.71	1.67	29.85	14.5	33.44	1.92	26.91	106.4	5.1
	6.1	3.4	7.9	25.17	17.72	0.70	1.58	30.49	15.9	34.93	1.96	28.26	108.0	5.2
	8.2	5.6	12.8	25.65	17.96	0.70	1.53	30.82	16.7	35.75	1.98	29.01	108.9	5.3
90	4.0	2.4	5.5	22.10	16.34	0.74	1.87	28.46	11.8	36.63	2.01	29.80	109.9	5.4
	6.1	4.5	10.3	23.10	16.76	0.73	1.77	29.11	13.0	38.15	2.05	31.15	111.6	5.5
	8.2	5.4	12.5	23.62	17.00	0.72	1.72	29.46	13.7	38.96	2.08	31.87	112.4	5.5
100	4.0	2.4	5.5	19.89	15.50	0.78	2.11	27.08	9.4	Operation not recommended				
	6.1	4.5	10.3	20.86	15.86	0.76	2.00	27.67	10.4					
	8.2	5.3	12.2	21.39	16.06	0.75	1.95	28.00	11.0					
110	4.0	2.3	5.3	17.70	14.81	0.84	2.39	25.86	7.4					
	6.1	4.3	9.8	18.60	15.07	0.81	2.27	26.34	8.2					
	8.2	5.1	11.8	19.09	15.23	0.80	2.21	26.61	8.7					
120	4.0	2.3	5.3	16.27	14.35	0.88	2.72	24.96	6.0					
	6.1	4.2	9.6	16.45	14.50	0.88	2.58	25.27	6.4					
	8.2	5.0	11.6	16.88	14.60	0.86	2.51	25.47	6.7					

Operation not recommended

*WPD Adder for Motorized Valve, TRM24 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
4.0	0.16	0.37
6.1	0.36	0.84
8.2	0.63	1.47

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 – TRM30 with PSC Motor

1140 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM30 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
5.0	0.23	0.52
7.4	0.52	1.19
9.8	0.90	2.09

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	9.8	10.3	23.8	Operation not recommended						17.31	1.81	11.23	84.1	2.8
30	5.0	3.0	6.9	30.47	19.13	0.63	1.29	34.79	23.6	20.08	1.86	13.82	86.3	3.2
	7.4	5.7	13.2	30.13	18.59	0.62	1.24	34.27	24.2	20.82	1.87	14.52	86.9	3.3
	9.8	9.1	21.0	29.94	18.31	0.61	1.22	34.00	24.5	21.20	1.88	14.88	87.2	3.3
40	5.0	2.9	6.7	30.92	20.10	0.65	1.40	35.60	22.1	23.71	1.91	17.26	89.3	3.6
	7.4	5.3	12.2	30.76	19.67	0.64	1.35	35.26	22.8	24.61	1.92	18.13	90.0	3.8
	9.8	8.6	19.9	30.65	19.45	0.63	1.32	35.06	23.2	25.08	1.93	18.58	90.4	3.8
50	5.0	2.6	6.0	30.96	20.77	0.67	1.52	36.05	20.4	27.21	1.94	20.63	92.1	4.1
	7.4	4.9	11.3	30.99	20.49	0.66	1.46	35.88	21.2	28.22	1.95	21.61	92.9	4.2
	9.8	7.9	18.2	30.97	20.32	0.66	1.43	35.76	21.6	28.73	1.96	22.10	93.3	4.3
60	5.0	2.5	5.8	30.58	21.11	0.69	1.66	36.15	18.5	30.42	1.97	23.74	94.7	4.5
	7.4	4.6	10.6	30.82	20.99	0.68	1.59	36.14	19.4	31.44	1.98	24.72	95.5	4.7
	9.8	7.2	16.6	30.90	20.90	0.68	1.55	36.11	19.9	31.93	1.98	25.20	95.9	4.7
70	5.0	2.4	5.5	29.79	21.07	0.71	1.81	35.92	16.4	33.17	1.99	26.40	96.9	4.9
	7.4	4.5	10.4	30.24	21.13	0.70	1.73	36.07	17.4	34.04	2.00	27.24	97.6	5.0
	9.8	7.1	16.4	30.41	21.13	0.69	1.70	36.12	17.9	34.44	2.01	27.62	98.0	5.0
80	5.0	2.3	5.3	28.58	20.63	0.72	2.00	35.36	14.3	35.21	2.02	28.35	98.6	5.1
	7.4	4.2	9.7	29.22	20.89	0.71	1.91	35.67	15.3	35.77	2.03	28.87	99.0	5.2
	9.8	6.7	15.5	29.50	20.98	0.71	1.86	35.79	15.8	35.97	2.03	29.06	99.2	5.2
90	5.0	2.3	5.3	26.95	19.77	0.73	2.23	34.50	12.1	36.24	2.04	29.27	99.4	5.2
	7.4	4.5	10.4	27.78	20.23	0.73	2.12	34.95	13.1	36.27	2.06	29.25	99.5	5.2
	9.8	6.4	14.8	28.15	20.42	0.73	2.06	35.14	13.6	36.18	2.07	29.14	99.4	5.1
100	5.0	2.2	5.1	24.88	18.49	0.74	2.49	33.35	10.0	Operation not recommended				
	7.4	3.9	9.0	25.89	19.13	0.74	2.36	33.92	11.0					
	9.8	6.3	14.6	26.35	19.42	0.74	2.30	34.17	11.4					
110	5.0	2.1	4.9	22.38	16.77	0.75	2.80	31.92	8.0					
	7.4	3.9	9.0	23.54	17.58	0.75	2.65	32.59	8.9					
	9.8	6.1	14.1	24.09	17.96	0.75	2.59	32.90	9.3					
120	5.0	2.1	4.9	19.44	14.63	0.75	3.15	30.22	6.2					
	7.4	3.8	8.8	20.73	15.59	0.75	2.99	30.97	6.9					
	9.8	6.1	14.1	21.35	16.03	0.75	2.92	31.32	7.3					

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 – TRM36 with PSC Motor

1250 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	10.00	10.8	24.9	Operation not recommended						20.82	2.18	13.50	85.4	2.8
30	5.00	3.5	8.1	40.08	26.81	0.67	1.53	45.18	26.1	23.68	2.19	16.31	87.5	3.2
	7.50	6.2	14.3	39.56	25.92	0.66	1.46	44.43	27.0	24.59	2.20	17.20	88.2	3.3
	10.00	9.6	22.2	39.14	25.33	0.65	1.43	43.89	27.3	25.09	2.20	17.68	88.6	3.3
40	5.00	3.4	7.9	40.04	27.47	0.69	1.67	45.60	24.0	27.61	2.23	20.11	90.5	3.6
	7.50	5.8	13.4	40.19	27.19	0.68	1.58	45.47	25.4	28.74	2.24	21.18	91.3	3.8
	10.00	9.1	21.0	40.13	26.93	0.67	1.55	45.27	25.9	29.34	2.25	21.75	91.7	3.8
50	5.00	3.1	7.2	39.10	27.32	0.70	1.82	45.20	21.5	31.52	2.28	23.81	93.3	4.1
	7.50	5.4	12.5	39.76	27.49	0.69	1.73	45.52	23.0	32.83	2.30	25.04	94.3	4.2
	10.00	8.4	19.4	39.98	27.49	0.69	1.68	45.59	23.8	33.53	2.31	25.70	94.8	4.2
60	5.00	3.0	6.9	37.52	26.62	0.71	2.00	44.24	18.8	35.35	2.35	27.40	96.2	4.4
	7.50	5.1	11.8	38.52	27.09	0.70	1.89	44.86	20.4	36.81	2.38	28.76	97.3	4.5
	10.00	7.8	18.0	38.96	27.27	0.70	1.84	45.12	21.2	37.59	2.39	29.48	97.8	4.6
70	5.00	1.9	4.4	35.49	25.58	0.72	2.21	42.95	16.1	39.07	2.42	30.85	98.9	4.7
	7.50	5.0	11.6	36.70	26.21	0.71	2.08	43.72	17.6	40.65	2.46	32.30	100.1	4.9
	10.00	7.6	17.6	37.28	26.50	0.71	2.03	44.09	18.4	41.49	2.48	33.07	100.7	4.9
80	5.00	2.8	6.5	33.18	24.38	0.73	2.45	41.49	13.5	42.64	2.50	34.14	101.6	5.0
	7.50	4.7	10.9	34.50	25.06	0.73	2.31	42.31	14.9	44.30	2.54	35.66	102.8	5.1
	10.00	7.2	16.6	35.15	25.40	0.72	2.24	42.73	15.7	45.16	2.56	36.45	103.5	5.2
90	5.00	2.7	6.2	30.75	23.19	0.75	2.74	40.06	11.2	46.01	2.58	37.24	104.1	5.2
	7.50	5.0	11.6	32.07	23.82	0.74	2.58	40.82	12.4	47.69	2.61	38.79	105.3	5.4
	10.00	6.9	15.9	32.74	24.16	0.74	2.50	41.22	13.1	48.55	2.63	39.59	106.0	5.4
100	5.00	2.7	6.2	28.35	22.13	0.78	3.07	38.82	9.2	Operation not recommended				
	7.50	4.4	10.2	29.59	22.65	0.77	2.89	39.43	10.2					
	10.00	6.7	15.5	30.23	22.94	0.76	2.81	39.77	10.8					
110	5.00	2.6	6.0	26.14	21.36	0.82	3.46	37.96	7.6					
	7.50	4.4	10.2	27.22	21.70	0.80	3.26	38.33	8.4					
	10.00	6.6	15.2	27.80	21.92	0.79	3.16	38.57	8.8					
120	5.00	2.6	6.0	24.29	21.08	0.87	3.92	37.70	6.2					
	7.50	4.3	9.9	25.15	21.15	0.84	3.68	37.74	6.8					
	10.00	6.6	15.2	25.63	21.24	0.83	3.57	37.83	7.2					

Operation not recommended

*WPD Adder for Motorized Valve, TRM36 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
5.00	0.24	0.54
7.50	0.57	1.31
10.00	0.94	2.18

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 – TRM09 with ECM Motor

450 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM09 (Cv = 4.9, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
1.5	0.09	0.22
2.3	0.21	0.49
3.0	0.38	0.87

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	5.7	13.3	Operation not recommended						5.74	0.60	3.55	83.1	2.8
30	2.0	1.9	5.6	11.30	7.30	0.65	0.36	11.90	31.4	6.90	0.63	4.60	85.7	3.2
	2.3	2.4	5.6	11.29	7.30	0.65	0.35	12.61	32.5	7.00	0.63	4.72	86.0	3.3
	3.0	5.5	12.7	11.32	7.31	0.65	0.34	12.62	33.1	7.16	0.63	4.86	86.4	3.3
40	2.0	1.8	4.3	11.10	7.30	0.66	0.38	12.60	29.2	8.30	0.65	5.90	89.0	3.7
	2.3	2.3	5.3	11.15	7.26	0.65	0.38	12.57	29.6	8.44	0.66	6.07	89.3	3.8
	3.0	5.3	12.3	11.19	7.27	0.65	0.37	12.58	30.5	8.65	0.66	6.26	89.8	3.9
50	2.0	1.8	4.1	10.90	7.20	0.66	0.43	12.50	25.3	9.70	0.67	7.30	92.3	4.2
	2.3	2.2	5.1	10.92	7.22	0.66	0.42	12.48	26.2	9.91	0.68	7.46	92.7	4.3
	3.0	5.1	11.9	10.99	7.23	0.66	0.41	12.51	27.1	10.17	0.68	7.70	93.2	4.4
60	1.5	1.3	3.0	10.39	7.11	0.68	0.50	12.24	20.8	10.83	0.69	8.33	94.8	4.6
	2.3	2.1	4.9	10.61	7.16	0.67	0.47	12.35	22.6	11.37	0.70	8.85	96.0	4.8
	3.0	5.0	11.5	10.70	7.18	0.67	0.45	12.39	23.6	11.67	0.70	9.13	96.7	4.9
70	1.5	1.3	3.0	9.91	6.98	0.70	0.56	11.99	17.6	12.17	0.70	9.61	97.8	5.1
	2.3	2.1	4.8	10.18	7.05	0.69	0.53	12.13	19.2	12.77	0.71	10.18	99.2	5.3
	3.0	4.9	11.2	10.31	7.09	0.69	0.51	12.20	20.1	13.09	0.72	10.49	99.9	5.4
80	1.5	1.3	3.0	9.32	6.77	0.73	0.64	11.64	14.7	13.45	0.72	10.83	100.8	5.5
	2.3	2.0	4.7	9.64	6.89	0.71	0.60	11.83	16.1	14.07	0.73	11.43	102.2	5.7
	3.0	4.8	11.0	9.80	6.94	0.71	0.58	11.92	16.9	14.40	0.73	11.73	102.9	5.8
90	1.5	1.3	2.9	8.60	6.48	0.75	0.71	11.19	12.1	14.63	0.73	11.95	103.4	5.8
	2.3	2.0	4.6	8.98	6.64	0.74	0.67	11.43	13.3	15.23	0.74	12.52	104.8	6.0
	3.0	4.7	10.8	9.16	6.71	0.73	0.65	11.54	14.0	15.53	0.75	12.80	105.5	6.1
100	2.0	1.6	3.7	8.00	6.20	0.78	0.77	10.80	10.4	Operation not recommended				
	2.3	2.0	4.6	8.18	6.28	0.77	0.75	10.91	10.9					
	3.0	4.7	10.7	8.39	6.38	0.76	0.73	11.05	11.4					
110	2.0	1.6	3.7	7.10	5.70	0.80	0.85	10.10	8.4					
	2.3	2.0	4.5	7.24	5.79	0.80	0.84	10.27	8.7					
	3.0	4.6	10.7	7.47	5.91	0.79	0.82	10.42	9.1					
120	2.0	1.6	3.7	6.00	5.00	0.83	0.95	9.30	6.3					
	2.3	2.0	4.5	6.15	5.13	0.83	0.92	9.48	6.7					
	3.0	4.6	10.7	6.40	5.29	0.83	0.90	9.66	7.1					

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 – TRM12 with ECM Motor

500 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	4.0	9.6	22.2	Operation not recommended						7.58	0.73	5.03	85.8	3.0
	2.5	4.2	9.7	13.80	8.40	0.61	0.41	15.20	33.7	9.00	0.75	6.30	88.7	3.5
30	2.9	5.4	12.4	13.69	8.25	0.60	0.40	15.09	34.4	9.12	0.75	6.48	89.0	3.5
	4.0	9.2	21.3	13.56	8.10	0.60	0.39	14.94	34.9	9.33	0.76	6.67	89.4	3.6
	2.5	4.1	9.5	13.90	8.70	0.63	0.45	15.50	30.9	10.60	0.78	7.80	92.1	4.0
40	2.9	5.3	12.1	13.91	8.64	0.62	0.44	15.46	31.7	10.79	0.78	8.05	92.5	4.0
	4.0	8.9	20.6	13.89	8.56	0.62	0.43	15.39	32.6	11.04	0.79	8.28	93.0	4.1
	2.5	4.0	9.2	13.70	8.80	0.64	0.51	15.60	26.9	12.20	0.81	9.30	95.4	4.4
50	2.9	5.0	11.4	13.80	8.77	0.64	0.49	15.53	28.0	12.42	0.81	9.57	95.8	4.5
	4.0	8.5	19.6	13.86	8.75	0.63	0.48	15.54	29.0	12.70	0.82	9.83	96.4	4.6
	2.0	2.6	6.0	13.13	8.61	0.66	0.60	15.22	22.1	13.43	0.83	10.52	97.9	4.7
60	2.9	4.8	11.0	13.41	8.70	0.65	0.56	15.37	24.0	13.98	0.84	11.04	99.1	4.9
	4.0	8.3	19.2	13.54	8.74	0.65	0.54	15.44	25.1	14.29	0.84	11.33	99.7	5.0
	2.0	2.6	6.0	12.44	8.35	0.67	0.67	14.81	18.5	14.88	0.85	11.88	101.0	5.1
70	2.9	4.7	10.7	12.80	8.49	0.66	0.63	15.03	20.2	15.48	0.86	12.44	102.2	5.3
	4.0	8.1	18.7	12.98	8.56	0.66	0.61	15.14	21.2	15.81	0.87	12.75	102.9	5.3
	2.0	2.5	5.8	11.61	8.01	0.69	0.76	14.28	15.3	16.26	0.88	13.18	103.8	5.4
80	2.9	4.5	10.3	12.03	8.18	0.68	0.72	14.54	16.8	16.88	0.89	13.76	105.1	5.6
	4.0	7.9	18.2	12.24	8.27	0.68	0.69	14.68	17.6	17.22	0.89	14.08	105.8	5.7
	2.0	2.5	5.8	10.69	7.62	0.71	0.85	13.67	12.6	17.56	0.90	14.40	106.5	5.7
90	2.9	4.4	10.0	11.13	7.81	0.70	0.81	13.96	13.8	18.18	0.91	14.99	107.8	5.9
	4.0	7.7	17.8	11.36	7.90	0.70	0.78	14.11	14.5	18.51	0.91	15.31	108.5	6.0
	2.5	3.5	8.1	10.00	7.30	0.73	0.92	13.20	10.9					
100	2.9	4.4	10.0	10.15	7.39	0.73	0.90	13.31	11.3					
	4.0	7.6	17.6	10.38	7.49	0.72	0.88	13.47	11.8					
	2.5	3.4	7.9	8.90	6.90	0.78	1.02	12.50	8.7					
110	2.9	4.2	9.6	9.13	6.96	0.76	1.00	12.64	9.1	Operation not recommended				
	4.0	7.4	17.1	9.36	7.06	0.75	0.98	12.79	9.6					
	2.5	3.4	7.9	7.90	6.50	0.82	1.12	11.90	7.1					
120	2.9	4.1	9.4	8.10	6.54	0.81	1.10	11.97	7.3					
	4.0	7.3	16.9	8.32	6.63	0.80	1.08	12.11	7.7					

*WPD Adder for Motorized Valve, TRM12 (Cv = 4.9, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
2.0	0.17	0.38
2.9	0.38	0.87
4.0	0.63	1.47

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 – TRM15 with ECM Motor

600 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM15 (Cv = 4.9, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
2.5	0.28	0.65
3.0	0.4	0.92
4.1	0.67	1.54
5.4	1.21	2.80

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	5.4	4.8	11.0	Operation not recommended						9.97	0.88	6.62	85.5	3.3
30	3.0	2.4	5.4	16.80	10.20	0.61	0.49	18.90	34.1	11.20	0.88	7.70	87.5	3.7
	4.1	3.2	7.4	16.30	9.54	0.59	0.48	18.29	33.8	11.54	0.91	8.07	88.0	3.7
	5.4	4.4	10.0	15.89	9.08	0.57	0.48	17.86	33.4	11.73	0.92	8.26	88.3	3.8
40	3.0	2.3	5.3	17.60	11.40	0.65	0.55	19.90	31.8	13.20	0.98	9.60	90.5	3.9
	4.1	3.1	7.2	17.47	11.04	0.63	0.53	19.60	33.2	13.57	0.94	10.01	91.1	4.2
	5.4	4.1	9.4	17.29	10.77	0.62	0.51	19.38	33.6	13.85	0.94	10.27	91.6	4.3
50	3.0	2.1	4.7	17.80	11.80	0.66	0.62	20.10	28.6	15.30	0.98	11.60	93.8	4.6
	4.1	2.8	6.5	17.72	11.70	0.66	0.59	20.08	29.9	15.82	0.96	12.16	94.6	4.8
	5.4	3.7	8.4	17.73	11.61	0.65	0.58	20.03	30.8	16.18	0.97	12.50	95.2	4.9
60	2.5	1.1	2.5	16.88	11.53	0.68	0.73	19.71	23.2	17.26	0.98	13.54	96.9	5.2
	4.1	2.6	6.0	17.31	11.71	0.68	0.68	19.96	25.6	18.14	0.99	14.39	98.2	5.4
	5.4	3.5	8.0	17.46	11.76	0.67	0.65	20.04	26.7	18.57	0.99	14.81	98.9	5.5
70	2.5	1.1	2.5	15.82	10.98	0.69	0.83	19.00	19.1	19.44	1.00	15.64	100.2	5.7
	4.1	2.5	5.8	16.42	11.30	0.69	0.77	19.41	21.2	20.42	1.01	16.58	101.8	5.9
	5.4	3.3	7.5	16.66	11.42	0.69	0.75	19.57	22.3	20.89	1.01	17.03	102.5	6.0
80	2.5	1.0	2.3	14.54	10.27	0.71	0.94	18.10	15.5	21.52	1.02	17.64	103.5	6.2
	4.1	2.3	5.3	15.21	10.64	0.70	0.88	18.57	17.3	22.54	1.03	18.61	105.1	6.4
	5.4	3.1	7.0	15.51	10.80	0.70	0.85	18.78	18.2	23.00	1.04	19.05	105.8	6.5
90	2.5	1.0	2.3	13.14	9.55	0.73	1.05	17.11	12.5	23.41	1.05	19.44	106.4	6.6
	4.1	2.2	5.1	13.82	9.89	0.72	0.99	17.59	13.9	24.34	1.06	20.32	107.9	6.7
	5.4	2.9	6.6	14.13	10.06	0.71	0.97	17.81	14.6	24.74	1.07	20.69	108.5	6.8
100	3.0	1.6	3.7	11.90	9.00	0.76	1.18	16.20	10.1	Operation not recommended				
	4.1	2.2	5.1	12.37	9.18	0.74	1.11	16.56	11.1					
	5.4	2.8	6.4	12.66	9.32	0.74	1.09	16.77	11.6					
110	3.0	1.5	3.4	10.60	8.50	0.80	1.28	15.40	8.3					
	4.1	2.0	4.6	10.98	8.60	0.78	1.24	15.61	8.9					
	5.4	2.6	5.9	11.24	8.70	0.77	1.21	15.78	9.2					
120	3.0	1.4	3.2	9.50	8.20	0.86	1.38	14.70	6.9					
	4.1	1.9	4.4	9.79	8.26	0.84	1.37	14.86	7.2					
	5.4	2.5	5.7	9.99	8.30	0.83	1.34	14.98	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 – TRM18 with ECM Motor

650 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	6.8	7.8	18.0	Operation not recommended						12.08	1.06	8.18	86.3	3.3
	3.4	1.6	3.7	19.93	12.08	0.61	0.64	22.36	31.2	13.65	1.10	9.64	88.4	3.7
30	5.1	4.6	10.6	19.16	11.26	0.59	0.62	21.54	30.9	14.08	1.10	10.04	89.0	3.7
	6.8	7.4	17.1	18.71	10.81	0.58	0.61	21.06	30.5	14.31	1.11	10.25	89.3	3.8
	3.4	1.5	3.5	20.84	13.35	0.64	0.70	23.49	29.7	15.84	1.13	11.70	91.4	4.1
40	5.1	4.5	10.4	20.57	12.89	0.63	0.67	23.11	30.7	16.39	1.14	12.21	92.2	4.2
	6.8	7.1	16.4	20.36	12.60	0.62	0.66	22.86	31.0	16.69	1.15	12.50	92.6	4.3
	3.4	1.4	3.2	20.79	13.85	0.67	0.79	23.73	26.5	18.15	1.17	13.87	94.5	4.5
50	5.1	4.2	9.7	20.91	13.70	0.66	0.75	23.71	28.1	18.84	1.18	14.52	95.5	4.7
	6.8	6.7	15.5	20.91	13.58	0.65	0.73	23.65	28.8	19.21	1.19	14.87	96.0	4.7
	3.0	0.8	1.8	19.70	13.85	0.70	0.94	23.21	21.1	19.50	1.20	15.10	96.3	4.8
60	5.1	4.0	9.2	20.47	13.88	0.68	0.84	23.59	24.4	21.37	1.22	16.91	98.9	5.1
	6.8	6.5	15.0	20.63	13.89	0.67	0.82	23.67	25.3	21.81	1.22	17.33	99.5	5.2
	3.0	0.7	1.6	18.60	13.30	0.72	1.06	25.22	17.6	22.70	1.23	18.20	99.8	5.4
70	5.1	3.9	9.0	19.47	13.60	0.70	0.95	22.97	20.6	23.96	1.25	19.37	102.4	5.6
	6.8	6.3	14.6	19.73	13.70	0.69	0.92	23.14	21.4	24.48	1.26	19.86	103.1	5.7
	3.0	0.6	1.5	17.20	12.70	0.74	1.11	21.29	15.6	24.88	1.25	20.31	103.0	5.9
80	5.1	3.7	8.5	18.10	13.04	0.72	1.07	22.02	17.0	26.59	1.29	21.86	105.9	6.0
	6.8	6.1	14.1	18.41	13.18	0.72	1.04	22.24	17.7	27.17	1.30	22.41	106.7	6.1
	3.0	0.6	1.4	16.40	12.14	0.75	1.31	21.17	12.6	27.30	1.31	22.53	107.5	6.1
90	5.1	3.6	8.3	16.52	12.32	0.75	1.20	20.89	13.8	29.22	1.33	24.34	109.5	6.4
	6.8	5.9	13.6	16.85	12.47	0.74	1.17	21.13	14.4	29.87	1.34	24.96	110.4	6.5
	3.4	1.1	2.5	14.29	11.32	0.79	1.39	19.33	10.3					
100	5.1	3.6	8.3	14.88	11.57	0.78	1.33	19.74	11.2					
	6.8	5.8	13.4	15.20	11.71	0.77	1.31	19.96	11.6					
	3.4	1.0	2.3	12.84	10.75	0.84	1.53	18.38	8.4					
110	5.1	3.4	7.9	13.34	10.93	0.82	1.48	18.70	9.0	Operation not recommended				
	6.8	5.6	12.9	13.61	11.04	0.81	1.45	18.87	9.4					
	3.4	1.0	2.3	11.80	10.49	0.89	1.67	17.74	7.1					
120	5.1	3.3	7.6	12.05	10.54	0.87	1.62	17.92	7.4					
	6.8	5.5	12.7	12.25	10.58	0.86	1.60	18.03	7.7					

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.

***WPD Adder for Motorized Valve, TRM18 (Cv = 10.3, MOPD = 150 psi)**

GPM	WPD Adder	
	PSI	FT
3.0	0.08	0.18
3.4	0.11	0.25
5.1	0.25	0.57
6.8	0.44	1.01

Performance Data – TRM24 with ECM Motor

900 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM24 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
4.0	0.16	0.37
6.1	0.36	0.84
8.2	0.63	1.47

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	8.2	7.3	16.9	Operation not recommended						14.42	1.46	9.19	85.7	2.9
30	4.0	2.9	6.7	28.10	18.70	0.67	0.91	31.44	31.0	16.67	1.49	11.33	88.2	3.3
	6.1	5.5	12.6	27.26	17.91	0.66	0.87	30.46	31.5	17.27	1.50	11.89	88.8	3.4
	8.2	6.9	15.9	26.71	17.40	0.65	0.85	29.84	31.6	17.61	1.50	12.21	89.2	3.4
40	4.0	2.8	6.5	28.87	19.51	0.68	1.00	32.53	28.8	19.84	1.54	14.31	91.6	3.8
	6.1	5.4	12.4	28.63	19.22	0.67	0.95	32.12	30.0	20.64	1.55	15.07	92.5	3.9
	8.2	6.6	15.2	28.39	18.98	0.67	0.93	31.80	30.6	21.11	1.56	15.50	93.0	4.0
50	4.0	3.9	9.0	28.61	19.51	0.68	1.11	32.66	25.7	23.18	1.60	17.45	95.3	4.3
	6.1	3.9	9.0	28.85	19.59	0.68	1.05	32.70	27.4	24.21	1.62	18.40	96.4	4.4
	8.2	6.2	14.2	28.89	19.57	0.68	1.03	32.63	28.2	24.79	1.63	18.95	97.0	4.5
60	4.0	3.7	8.5	27.63	18.99	0.69	1.24	32.12	22.2	26.62	1.66	20.65	99.0	4.7
	6.1	3.7	8.5	28.21	19.31	0.68	1.17	32.47	24.0	27.85	1.69	21.78	100.3	4.8
	8.2	6.0	13.7	28.46	19.43	0.68	1.14	32.60	25.0	28.54	1.70	22.42	101.1	4.9
70	4.0	3.7	8.5	26.11	18.19	0.70	1.39	31.13	18.8	30.07	1.74	23.83	102.8	5.1
	6.1	3.6	8.3	26.92	18.62	0.69	1.31	31.67	20.5	31.46	1.77	25.10	104.3	5.2
	8.2	5.8	13.3	27.32	18.83	0.69	1.27	31.93	21.4	32.24	1.79	25.82	105.1	5.3
80	4.0	3.6	8.3	24.22	17.27	0.71	1.57	29.85	15.5	33.44	1.82	26.91	106.4	5.4
	6.1	3.4	7.9	25.17	17.72	0.70	1.48	30.49	17.0	34.93	1.86	28.26	108.0	5.5
	8.2	5.6	12.8	25.65	17.96	0.70	1.43	30.82	17.9	35.75	1.88	29.01	108.9	5.6
90	4.0	2.4	5.5	22.10	16.34	0.74	1.77	28.46	12.5	36.63	1.91	29.80	109.9	5.6
	6.1	4.5	10.3	23.10	16.76	0.73	1.67	29.11	13.8	38.15	1.95	31.15	111.6	5.7
	8.2	5.4	12.5	23.62	17.00	0.72	1.62	29.46	14.6	38.96	1.98	31.87	112.4	5.8
100	4.0	2.4	5.5	19.89	15.50	0.78	2.01	27.08	9.9	Operation not recommended				
	6.1	4.5	10.3	20.86	15.86	0.76	1.90	27.67	11.0					
	8.2	5.3	12.2	21.39	16.06	0.75	1.85	28.00	11.6					
110	4.0	2.3	5.3	17.70	14.81	0.84	2.29	25.86	7.7					
	6.1	4.3	9.8	18.60	15.07	0.81	2.17	26.34	8.6					
	8.2	5.1	11.8	19.09	15.23	0.80	2.11	26.61	9.1					
120	4.0	2.3	5.3	16.27	14.35	0.88	2.62	24.96	6.2					
	6.1	4.2	9.6	16.45	14.50	0.88	2.48	25.27	6.6					
	8.2	5.0	11.6	16.88	14.60	0.86	2.41	25.47	7.0					

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 – TRM30 with ECM Motor

1150 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

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	9.8	10.3	23.8	Operation not recommended						17.31	1.70	11.23	84.1	3.0
	5.0	3.0	6.9	30.47	19.13	0.63	1.18	34.79	25.9	20.08	1.75	13.82	86.3	3.4
30	7.4	5.7	13.2	30.13	18.59	0.62	1.13	34.27	26.7	20.82	1.76	14.52	86.9	3.5
	9.8	9.1	21.0	29.94	18.31	0.61	1.10	34.00	27.1	21.20	1.76	14.88	87.2	3.5
	5.0	2.9	6.7	30.92	20.10	0.65	1.29	35.60	24.1	23.71	1.80	17.26	89.3	3.9
40	7.4	5.3	12.2	30.76	19.67	0.64	1.23	35.26	25.0	24.61	1.81	18.13	90.0	4.0
	9.8	8.6	19.9	30.65	19.45	0.63	1.21	35.06	25.4	25.08	1.81	18.58	90.4	4.1
	5.0	2.6	6.0	30.96	20.77	0.67	1.40	36.05	22.0	27.21	1.83	20.63	92.1	4.4
50	7.4	4.9	11.3	30.99	20.49	0.66	1.34	35.88	23.1	28.22	1.84	21.61	92.9	4.5
	9.8	7.9	18.2	30.97	20.32	0.66	1.32	35.76	23.5	28.73	1.84	22.10	93.3	4.6
	5.0	2.5	5.8	30.58	21.11	0.69	1.54	36.15	19.9	30.42	1.86	23.74	94.7	4.8
60	7.4	4.6	10.6	30.82	20.99	0.68	1.47	36.14	21.0	31.44	1.86	24.72	95.5	4.9
	9.8	7.2	16.6	30.90	20.90	0.68	1.44	36.11	21.5	31.93	1.87	25.20	95.9	5.0
	5.0	2.4	5.5	29.79	21.07	0.71	1.70	35.92	17.5	33.17	1.88	26.40	96.9	5.2
70	7.4	4.5	10.4	30.24	21.13	0.70	1.62	36.07	18.7	34.04	1.89	27.24	97.6	5.3
	9.8	7.1	16.4	30.41	21.13	0.69	1.58	36.12	19.2	34.44	1.89	27.62	98.0	5.3
	5.0	2.3	5.3	28.58	20.63	0.72	1.89	35.36	15.1	35.21	1.90	28.35	98.6	5.4
80	7.4	4.2	9.7	29.22	20.89	0.71	1.79	35.67	16.3	35.77	1.91	28.87	99.0	5.5
	9.8	6.7	15.5	29.50	20.98	0.71	1.75	35.79	16.9	35.97	1.92	29.06	99.2	5.5
	5.0	2.3	5.3	26.95	19.77	0.73	2.11	34.50	12.8	36.24	1.93	29.27	99.4	5.5
90	7.4	4.5	10.4	27.78	20.23	0.73	2.00	34.95	13.9	36.27	1.95	29.25	99.5	5.5
	9.8	6.4	14.8	28.15	20.42	0.73	1.95	35.14	14.4	36.18	1.95	29.14	99.4	5.4
	5.0	2.2	5.1	24.88	18.49	0.74	2.37	33.35	10.5	Operation not recommended				
100	7.4	3.9	9.0	25.89	19.13	0.74	2.25	33.92	11.5					
	9.8	6.3	14.6	26.35	19.42	0.74	2.19	34.17	12.0					
	5.0	2.1	4.9	22.38	16.77	0.75	2.68	31.92	8.3					
110	7.4	3.9	9.0	23.54	17.58	0.75	2.54	32.59	9.3					
	9.8	6.1	14.1	24.09	17.96	0.75	2.47	32.90	9.7					
	5.0	2.1	4.9	19.44	14.63	0.75	3.03	30.22	6.4					
120	7.4	3.8	8.8	20.73	15.59	0.75	2.88	30.97	7.2					
	9.8	6.1	14.1	21.35	16.03	0.75	2.80	31.32	7.6					

*WPD Adder for Motorized Valve, TRM30 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
5.0	0.23	0.52
7.4	0.52	1.19
9.8	0.90	2.09

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 – TRM36 with ECM Motor

1290 CFM Nominal (Rated) Airflow

Performance capacities shown in thousands of Btuh

*WPD Adder for Motorized Valve, TRM36 (Cv = 10.3, MOPD = 150 psi)		
GPM	WPD Adder	
	PSI	FT
5.00	0.24	0.54
7.50	0.57	1.31
10.00	0.94	2.18

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	10.0	10.8	24.9	Operation not recommended						20.82	2.00	13.50	85.4	3.0
30	5.0	3.5	8.1	40.08	26.81	0.67	1.36	45.18	29.6	23.68	2.01	16.31	87.5	3.4
	7.5	6.2	14.3	39.56	25.92	0.66	1.29	44.43	30.8	24.59	2.02	17.20	88.2	3.6
	10.0	9.6	22.2	39.14	25.33	0.65	1.25	43.89	31.2	25.09	2.02	17.68	88.6	3.6
40	5.0	3.4	7.9	40.04	27.47	0.69	1.49	45.60	26.9	27.61	2.05	20.11	90.5	4.0
	7.5	5.8	13.4	40.19	27.19	0.68	1.41	45.47	28.6	28.74	2.06	21.18	91.3	4.1
	10.0	9.1	21.0	40.13	26.93	0.67	1.37	45.27	29.3	29.34	2.07	21.75	91.7	4.2
50	5.0	3.1	7.2	39.10	27.32	0.70	1.64	45.20	23.8	31.52	2.10	23.81	93.3	4.4
	7.5	5.4	12.5	39.76	27.49	0.69	1.55	45.52	25.7	32.83	2.12	25.04	94.3	4.5
	10.0	8.4	19.4	39.98	27.49	0.69	1.50	45.59	26.6	33.53	2.14	25.70	94.8	4.6
60	5.0	3.0	6.9	37.52	26.62	0.71	1.82	44.24	20.6	35.35	2.17	27.40	96.2	4.8
	7.5	5.1	11.8	38.52	27.09	0.70	1.71	44.86	22.5	36.81	2.20	28.76	97.3	4.9
	10.0	7.8	18.0	38.96	27.27	0.70	1.66	45.12	23.5	37.59	2.21	29.48	97.8	5.0
70	5.0	1.9	4.4	35.49	25.58	0.72	2.03	42.95	17.5	39.07	2.25	30.85	98.9	5.1
	7.5	5.0	11.6	36.70	26.21	0.71	1.91	43.72	19.3	40.65	2.28	32.30	100.1	5.2
	10.0	7.6	17.6	37.28	26.50	0.71	1.85	44.09	20.2	41.49	2.30	33.07	100.7	5.3
80	5.0	2.8	6.5	33.18	24.38	0.73	2.28	41.49	14.6	42.64	2.32	34.14	101.6	5.4
	7.5	4.7	10.9	34.50	25.06	0.73	2.13	42.31	16.2	44.30	2.36	35.66	102.8	5.5
	10.0	7.2	16.6	35.15	25.40	0.72	2.07	42.73	17.0	45.16	2.38	36.45	103.5	5.6
90	5.0	2.7	6.2	30.75	23.19	0.75	2.56	40.06	12.0	46.01	2.40	37.24	104.1	5.6
	7.5	5.0	11.6	32.07	23.82	0.74	2.40	40.82	13.4	47.69	2.44	38.79	105.3	5.7
	10.0	6.9	15.9	32.74	24.16	0.74	2.33	41.22	14.1	48.55	2.45	39.59	106.0	5.8
100	5.0	2.7	6.2	28.35	22.13	0.78	2.89	38.82	9.8	Operation not recommended				
	7.5	4.4	10.2	29.59	22.65	0.77	2.71	39.43	10.9					
	10.0	6.7	15.5	30.23	22.94	0.76	2.63	39.77	11.5					
110	5.0	2.6	6.0	26.14	21.36	0.82	3.28	37.96	8.0					
	7.5	4.4	10.2	27.22	21.70	0.80	3.08	38.33	8.8					
	10.0	6.6	15.2	27.80	21.92	0.79	2.98	38.57	9.3					
120	5.0	2.6	6.0	24.29	21.08	0.87	3.74	37.70	6.5					
	7.5	4.3	9.9	25.15	21.15	0.84	3.50	37.74	7.2					
	10.0	6.6	15.2	25.63	21.24	0.83	3.39	37.83	7.6					

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.

Air Flow Correction Table

Airflow	Cooling				Heating		
% of Rated	Total Capacity	Sensible Capacity	Power	Heat of Rejection	Heating Capacity	Power	Heat of Extraction
70%	0.921	0.800	0.969	0.943	0.942	1.077	0.934
75%	0.934	0.833	0.974	0.952	0.952	1.062	0.947
80%	0.946	0.866	0.979	0.961	0.961	1.048	0.958
85%	0.958	0.899	0.985	0.970	0.971	1.035	0.969
90%	0.971	0.932	0.990	0.979	0.980	1.023	0.979
95%	0.985	0.966	0.995	0.989	0.990	1.011	0.989
100%	1.000	1.000	1.000	1.000	1.000	1.000	1.000
105%	1.017	1.035	1.005	1.013	1.010	0.989	1.011

Entering Air Correction Table

Heating			
Entering Air DB°F	Heating Capacity	Power	Heat of Extraction
45	1.107	0.768	1.181
50	1.085	0.814	1.143
55	1.064	0.860	1.108
60	1.043	0.906	1.072
65	1.022	0.952	1.036
68	1.009	0.981	1.015
70	1.000	1.000	1.000
75	0.982	1.050	0.962
80	0.953	1.103	0.921

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	95	
55	0.789	0.896	0.877	1.102	1.325	1.385	*	*	*	0.910	0.851
60	0.851	0.750	0.854	1.091	1.235	1.261	*	*	*	0.996	0.896
65	0.957		0.617	0.857	1.093	1.152	1.326	*	*	0.999	0.970
66.2	0.983		0.561	0.801	1.037	1.097	1.270	1.520	*	1.000	0.988
67	1.000		0.523	0.763	1.000	1.059	1.232	1.482	*	1.000	1.000
70	1.064			0.623	0.861	0.920	1.090	1.339	1.563	1.002	1.045
75	1.171				0.629	0.688	0.854	1.101	1.318	1.005	1.119

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

Antifreeze Correction Table

Antifreeze Type	Antifreeze %	Cooling EWT 40°F			WPD Corr. Fct. EWT 40°F
		Total Cap	Sens Cap	Power	
Propylene Glycol	15	0.968	0.968	0.990	1.210
	25	0.947	0.947	0.983	1.360
Methanol	15	0.968	0.968	0.990	1.160
	25	0.949	0.949	0.984	1.220
Ethanol	15	0.944	0.944	0.983	1.300
	25	0.917	0.917	0.974	1.360
Ethylene Glycol	15	0.980	0.980	0.994	1.120
	25	0.966	0.966	0.990	1.200

TRM with PSC Motor

Airflow in CFM with wet coil and clean air flilter.

Model	Motor TAP	Rated Airflow	Min CFM	Airflow (cfm) at External Static Pressure (in. wg)															
				0.00	0.01	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70
TRM09	HI	405	284	408	403	376	346	319	292										
	LOW			349	343	320	296	Operation not recommended											
TRM12	HI	445	312	445	434	409	378	349	320										
	LOW			345	341	325													
TRM15	HI	595	416	689	686	672	664	652	642	633	618	605	590	568	539	511	477		
	MED			595	593	576	564	554	544	534	525	509	493	447	427				
	LOW			519	516	505	487	475	449	437	423								
TRM18	HI	685	480	685	682	674	664	653	640	627	612	594	575	553	528	500			
	MED			591	589	581	572	562	552	541	529	515	498	480					
	LOW			514	511	503	492	482											
TRM24	HI	850	596	850	845	830	808	783	785	730	703	672	641	611					
	MED			761	749	727	707	679	655	628	602								
	LOW			653	648	630	610	596											
TRM30	HI	1140	798	1346	1340	1310	1284	1221	1172	1135	1108	1069	1036	996	959	910	864		
	MED			1140	1130	1113	1101	1077	1056	1030	1010	979	952	917	886	840	798		
	LOW			1008	996	980	968	949	934	914	897	870	846	810					
TRM36	HI	1260	882	1262	1259	1234	1209	1180	1153	1122	1091	1057	1024	989	954	913			
	MED			1129	1125	1107	1090	1068	1046	1020	996	965	935	901					
	LOW			1010	1007	995	980	962	940	938	916	893							

Units with CXM factory shipped on medium speed TAP. Units with DXM factory shipped on medium and HIGH TAPs. Field select other TAPs if needed.
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 speed motor TAP.

TRM with ECM Motor

Airflow in CFM with wet coil and clean air flilter.

Size	Programmed for	Rated CFM	Min CFM	Unit External Static Pressure (in. wg)								
				0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
09	High	450	285	450	437	422	407	390				
	Medium	350		350	334	317	300	290				
	Low	300		300	295	285	Operation not recommended					
12	High	500	310	500	490	477	462	440				
	Medium	400		403	388	371	355	320				
	Low	300		350	334	317	310					

TRM with ECM-X Motor

Model	Motor TAP	Rated Airflow	Min CFM	Airflow (cfm) at External Static Pressure (in. wg)										
				0.0	0.1	0.2	0.25	0.3	0.35	0.4	0.5	0.6	0.7	0.8
TRM15	HI	600	416	Operation not recommended						650	590			
	MED HI							650	635	620	560			
	MED			650	640	630	615	600	595	590	520			
	MED LOW*			600	590	575	550	540	535	525	425			
	LOW			500	480	470	460	450	435	423				
TRM18	HI	650	480						675	650	590			
	MED HI						680	650	635	620	560			
	MED*			650	640	630	615	600	595	590	520			
	MED LOW			600	590	575	550	540	535	525				
	LOW			500	480									
TRM24	HI	900	596							925	875	840	800	750
	MED HI								920	900	840	800	750	700
	MED					925	900	880	850	815	750	700	620	
	MED LOW*			900	870	850	820	790	760	740	645			
	LOW			850	770	730	690	650	630	610				
TRM30	HI	1150	798		1200	1150	1100	1050	1030	995	950	925	875	840
	MED HI			1,200	1120	1050	1010	975	950	920	880	830	800	
	MED*			1,150	1070	1020	990	950	920	880	800			
	MED LOW			1,000	950	910	880	860	840	800				
	LOW			900	850	800								
TRM36	HI	1290	820			1310	1290	1260	1240	1170	1090	1025	920	840
	MED HI*			1290	1260	1230	1150	1120	1100	1070	1030	960	880	805
	MED			1190	1160	1140	1038	1010	990	950	910	860	820	
	MED LOW			860	840	825	800							
	LOW			820										

All units AHRI/ISO/ASHRAE 13256-1 rated on * speed motor TAP.
Airflow is rated at lowest Voltage if unit is dual Voltage rated, i.e. 208V for 208-230V units.
Unit must have DXM. Factory shipped on low and medium tap. Field select other taps if needed.

Physical Data

Model	09	12	15	18	24	30	36
Compressor (1 Each)	Rotary				Scroll		
Factory Charge HFC-410A (oz) [kg]	33.5 [0.95]	35 [0.99]	43 [1.22]	48.5 [1.38]	71 [2.01]	75 [2.13]	75 [2.13]
Blower Wheel							
Blower Wheel Size (dia x w) - (in) [mm]	6.75 x 7.25 [174 x 184]	6.75 x 7.25 [174 x 184]	9.50 x 7.12 [241 x 181]	9.50 x 7.12 [241 x 181]	9.50 x 7.12 [241 x 181]	9.50 x 8.06 [241 x 205]	9.50 x 8.06 [241 x 205]
ECM* Motor & Blower							
Fan Motor (hp) [W]	1/8 [93]	1/8 [93]	1/3 [248]	1/3 [248]	1/3 [248]	1/2 [373]	
Blower Wheel Size (dia x w) - (in) [mm]	6.75 x 7.25 [174 x 184]	6.75 x 7.25 [174 x 184]	9.50 x 7.12 [241 x 181]	9.50 x 7.12 [241 x 181]	10.00 x 8.00 [254 x 205]		
COAX							
Internal Volume U.S. Gallon (L)	.22 (.84)	.26 (.98)	.37 (1.40)	.37 (1.40)	.60 (2.27)	.60 (2.27)	.60 (2.27)
Hose Kit (AHH Series Required)							
FPT (in)	1/2	1/2	3/4	3/4	1	1	1
Drain Hose							
Internal Diameter In (mm)	.875 (22.2)						
Chassis Air Coil							
Air Coil Dimensions (h x w) - (in) [mm]	22 x 11.5 [559 x 292]	22 x 11.5 [559 x 292]	28 x 14 [711 x 356]	28 x 14 [711 x 356]	30 x 18 [762 x 457]	30 x 18 [762 x 457]	30 x 18 [762 x 457]
Standard Filter - 1" [25.4mm] Throwaway, qty (in) [mm]	14 x 24 [356 x 610]	14 x 24 [356 x 610]	16 x 30 [406 x 762]	16 x 30 [406 x 762]	20 x 32 [508 x 813]	20 x 32 [508 x 813]	20 x 32 [508 x 813]
Weight							
Chassis - (lbs) [kg]	90 [41]	97 [44]	115 [52]	115 [52]	176 [80]	182 [83]	182 [83]
Cabinet - (lbs) [kg]	174 [79]	174 [79]	189 [86]	189 [86]	243 [110]	243 [110]	243 [110]

* 09,12 ECM; 15-36 ECM-X

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

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

Electrical Data - PSC Motor

Model with PSC Motor	Electric Heater kW	Voltage Code	Voltage	Min/ Max Voltage	Compressor		FM FLA	Standard Unit			Unit with Secondary Loop Pump		
					RLA	LRA		Total Unit FLA	Min. Circuit Amps	Max Fuse/ HACR	Total Unit FLA	Min. Circuit Amps	Max Fuse/ HACR
TRM09	none	G	208-230/60/1	197/254	3.7	22.0	0.3	4.0	4.9	15	4.8	5.7	15
	2.5	G	208-230/60/1	197/254	3.7	22.0	0.3	14.4	18.0	20	15.2	19.0	20
TRM12	none	G	208-230/60/1	197/254	4.7	25.0	0.7	5.4	6.6	15	6.2	7.4	15
	2.5	G	208-230/60/1	197/254	4.7	25.0	0.7	15.8	19.8	25	16.6	20.8	25
TRM15	none	G	208-230/60/1	197/254	5.6	29.0	1.0	6.6	8.0	15	7.4	8.8	15
	2.5	G	208-230/60/1	197/254	5.6	29.0	1.0	17.0	21.3	25	17.8	22.3	25
	5	G	208-230/60/1	197/254	5.6	29.0	1.0	27.4	34.3	35	28.2	35.3	40
TRM18	none	G	208-230/60/1	197/254	6.6	33.0	1.0	7.6	9.3	15	8.4	10.1	15
	2.5	G	208-230/60/1	197/254	6.6	33.0	1.0	18.0	22.5	25	18.8	23.5	25
	5	G	208-230/60/1	197/254	6.6	33.0	1.0	28.4	35.5	35	29.2	36.5	40
	7.5	G	208-230/60/1	197/254	6.6	33.0	1.0	38.8	48.5	50	39.6	49.5	50
TRM24	none	G	208-230/60/1	197/254	12.8	58.3	1.1	13.9	17.1	30	14.7	17.9	30
	2.5	G	208-230/60/1	197/254	12.8	58.3	1.1	24.3	30.4	40	25.1	31.4	40
	5	G	208-230/60/1	197/254	12.8	58.3	1.1	34.7	43.4	50	35.5	44.4	50
	7.5	G	208-230/60/1	197/254	12.8	58.3	1.1	45.1	56.4	60	45.9	57.4	60
TRM30	none	G	208-230/60/1	197/254	12.8	64.0	1.8	14.6	17.8	30	15.4	18.6	30
	2.5	G	208-230/60/1	197/254	12.8	64.0	1.8	25.0	31.3	40	25.8	32.3	40
	5	G	208-230/60/1	197/254	12.8	64.0	1.8	35.4	44.3	50	36.2	45.3	50
	7.5	G	208-230/60/1	197/254	12.8	64.0	1.8	45.8	57.3	60	46.6	58.3	60
TRM36	none	G	208-230/60/1	197/254	14.1	77.0	1.8	15.9	19.4	30	16.7	20.2	30
	2.5	G	208-230/60/1	197/254	14.1	77.0	1.8	26.3	32.9	40	27.1	33.9	40
	5	G	208-230/60/1	197/254	14.1	77.0	1.8	36.7	45.9	50	37.5	46.9	50
	7.5	G	208-230/60/1	197/254	14.1	77.0	1.8	47.1	58.9	60	47.9	59.9	60
TRM09	none	E	265/60/1	239/292	3.5	22.0	0.3	3.8	4.7	15	4.5	na	15
	2.5	E	265/60/1	239/292	3.5	22.0	0.3	13.2	16.5	20	13.9	na	15
TRM12	none	E	265/60/1	239/292	4.2	22.0	0.6	4.8	5.9	15	5.5	na	15
	2.5	E	265/60/1	239/292	4.2	22.0	0.6	14.2	17.8	20	14.9	na	20
TRM15	none	E	265/60/1	239/292	5.0	28.0	0.9	5.9	7.2	15	6.6	7.9	15
	2.5	E	265/60/1	239/292	5.0	28.0	0.9	15.3	19.1	20	16.0	20.0	20
	5	E	265/60/1	239/292	5.0	28.0	0.9	24.8	31.0	35	25.5	31.9	35
TRM18	none	E	265/60/1	239/292	5.6	28.0	0.9	6.5	7.9	15	7.2	8.6	15
	2.5	E	265/60/1	239/292	5.6	28.0	0.9	15.9	19.9	20	16.6	20.8	25
	5	E	265/60/1	239/292	5.6	28.0	0.9	25.4	31.8	35	26.1	32.6	35
TRM24	none	E	265/60/1	239/292	9.6	54.0	1.0	10.6	13.0	20	11.3	13.7	20
	2.5	E	265/60/1	239/292	9.6	54.0	1.0	20.0	25.0	30	20.7	25.9	30
	5	E	265/60/1	239/292	9.6	54.0	1.0	29.5	36.9	40	30.2	37.8	40
TRM30	none	E	265/60/1	239/292	10.9	60.0	1.8	12.7	15.4	25	13.4	16.1	25
	2.5	E	265/60/1	239/292	10.9	60.0	1.8	22.1	27.6	35	22.8	28.5	35
	5	E	265/60/1	239/292	10.9	60.0	1.8	31.6	39.5	45	32.3	40.4	45
TRM36	none	E	265/60/1	239/292	12.2	72.0	1.9	14.1	17.2	25	14.8	17.9	30
	2.5	E	265/60/1	239/292	12.2	72.0	1.9	23.5	29.4	35	24.2	30.3	35
	5	E	265/60/1	239/292	12.2	72.0	1.9	33.0	41.3	45	33.7	42.1	45

Voltage	Heater kW	Amps	Heater Breaker at Unit
208/230	2.5	9.1/10.4	15
208/230	5	18.3/20.8	30
208/230	7.5	27.4/31.2	40
265	2.5	9.4	15
265	5	18.9	25

Electrical Data - ECM* Motor

Model with ECM* Motor	Electric Heater kW	Voltage Code	Voltage	Min/Max Voltage	Compressor		Fan Motor FLA	Standard Units			Units with Secondary Loop Pump		
					RLA	LRA		Total Unit FLA	Min. Circuit Amps	Max Fuse/ HACR	Total Unit FLA	Min. Circuit Amps	Max Fuse/ HACR
TRM09	none	G	208-230/60/1	197/254	3.7	22.0	2.2	5.9	6.8	15	6.7	7.6	15
	2.5	G	208-230/60/1	197/254	3.7	22.0	2.2	16.3	20.4	20	17.1	21.4	20
TRM12	none	G	208-230/60/1	197/254	4.7	25.0	2.2	6.9	8.1	15	7.7	8.9	15
	2.5	G	208-230/60/1	197/254	4.7	25.0	2.2	17.3	21.6	25	18.1	22.6	25
TRM15	none	G	208-230/60/1	197/254	5.6	29.0	2.8	8.4	9.8	15	9.2	10.6	15
	2.5	G	208-230/60/1	197/254	5.6	29.0	2.8	18.8	23.5	25	19.6	24.5	25
	5	G	208-230/60/1	197/254	5.6	29.0	2.8	29.2	36.5	35	30.0	37.5	40
TRM18	none	G	208-230/60/1	197/254	6.6	33.0	2.8	9.4	11.1	15	10.2	11.9	15
	2.5	G	208-230/60/1	197/254	6.6	33.0	2.8	19.8	24.8	25	20.6	25.8	25
	5	G	208-230/60/1	197/254	6.6	33.0	2.8	30.2	37.8	35	31.0	38.8	40
	7.5	G	208-230/60/1	197/254	6.6	33.0	2.8	40.6	50.8	50	41.4	51.8	50
TRM24	none	G	208-230/60/1	197/254	12.8	58.3	2.8	15.6	18.8	30	16.4	19.6	30
	2.5	G	208-230/60/1	197/254	12.8	58.3	2.8	26.0	32.5	40	26.8	33.5	40
	5	G	208-230/60/1	197/254	12.8	58.3	2.8	36.4	45.5	50	37.2	46.5	50
	7.5	G	208-230/60/1	197/254	12.8	58.3	2.8	46.8	58.5	60	47.6	59.5	60
TRM30	none	G	208-230/60/1	197/254	12.8	64.0	4.0	16.8	20.0	30	17.6	20.8	30
	2.5	G	208-230/60/1	197/254	12.8	64.0	4.0	27.2	34.0	40	28.0	35.0	40
	5	G	208-230/60/1	197/254	12.8	64.0	4.0	37.6	47.0	50	38.4	48.0	50
	7.5	G	208-230/60/1	197/254	12.8	64.0	4.0	48.0	60.0	60	48.8	61.0	60
TRM36	none	G	208-230/60/1	197/254	14.1	77.0	4.0	18.1	21.6	30	18.9	22.4	30
	2.5	G	208-230/60/1	197/254	14.1	77.0	4.0	28.5	35.6	40	29.3	36.6	40
	5	G	208-230/60/1	197/254	14.1	77.0	4.0	38.9	48.6	50	39.7	49.6	50
	7.5	G	208-230/60/1	197/254	14.1	77.0	4.0	49.3	61.6	65	50.1	62.6	65
TRM09	none	E	265/60/1	239/292	3.5	22.0	2.0	5.5	6.4	15	6.2	7.1	15
	2.5	E	265/60/1	239/292	3.5	22.0	2.0	14.9	18.6	20	15.6	19.5	20
TRM12	none	E	265/60/1	239/292	4.2	22.0	2.0	6.2	7.3	15	6.9	8.0	15
	2.5	E	265/60/1	239/292	4.2	22.0	2.0	15.6	19.5	20	16.3	20.4	20
TRM15	none	E	265/60/1	239/292	5.0	28.0	2.6	7.8	9.1	15	8.5	9.8	15
	2.5	E	265/60/1	239/292	5.0	28.0	2.6	17.2	21.5	20	17.9	22.4	25
	5	E	265/60/1	239/292	5.0	28.0	2.6	26.7	33.4	35	27.4	34.3	35
TRM18	none	E	265/60/1	239/292	5.6	28.0	2.6	8.4	9.8	15	9.1	10.5	15
	2.5	E	265/60/1	239/292	5.6	28.0	2.6	17.8	22.3	20	18.5	23.1	25
	5	E	265/60/1	239/292	5.6	28.0	2.6	27.3	34.1	35	28.0	35.0	35
TRM24	none	E	265/60/1	239/292	9.6	54.0	2.6	12.2	14.6	20	12.9	15.3	20
	2.5	E	265/60/1	239/292	9.6	54.0	2.6	21.8	27.3	30	22.5	28.1	30
	5	E	265/60/1	239/292	9.6	54.0	2.6	31.3	39.1	40	32.0	40.0	40
TRM30	none	E	265/60/1	239/292	10.9	60.0	3.6	14.9	17.6	25	15.6	18.3	25
	2.5	E	265/60/1	239/292	10.9	60.0	3.6	24.3	30.4	35	25.0	31.3	35
	5	E	265/60/1	239/292	10.9	60.0	3.6	33.8	42.3	45	34.5	43.1	45
TRM36	none	E	265/60/1	239/292	12.2	72.0	3.6	16.2	19.3	30	16.9	20.0	30
	2.5	E	265/60/1	239/292	12.2	72.0	3.6	25.6	32.0	35	26.3	32.9	35
	5	E	265/60/1	239/292	12.2	72.0	3.6	35.1	43.9	45	35.8	44.8	50

* 09 and 12 ECM, 15-36 ECM-x

Voltage	Heater kW	Amps	Heater Breaker at Unit
208/230	2.5	9.1/10.4	15
208/230	5	18.3/20.8	30
208/230	7.5	27.4/31.2	40
265	2.5	9.4	15
265	5	18.9	25

TRM Series Wiring Diagram Matrix

All current diagrams can be located online at climatemaster.com. Click 'Commercial Professional' (go to 'Resources/literature/wiring diagrams' in the upper right), use part numbers below to lookup wiring diagrams

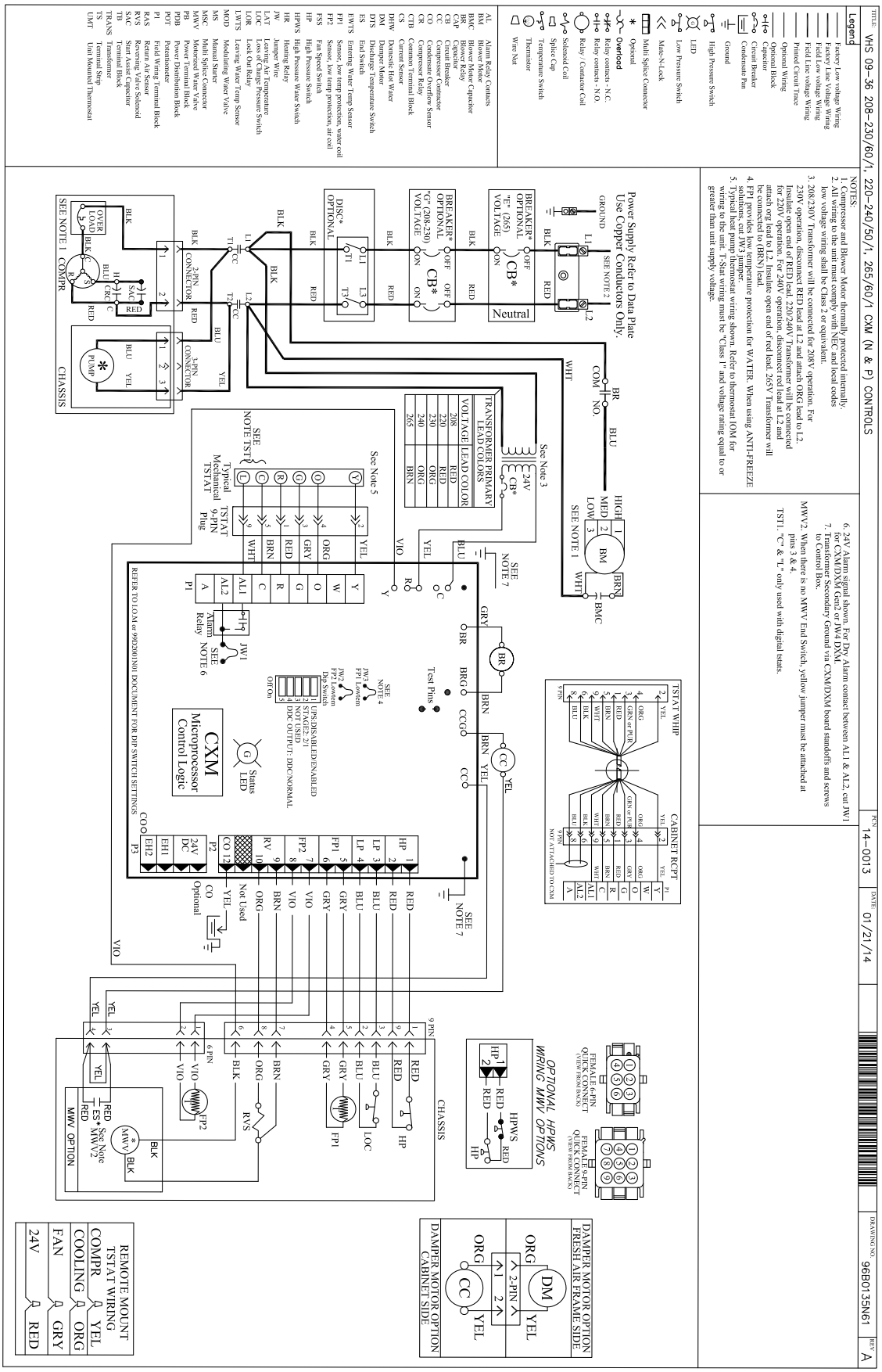
Cabinet

Model	Refrigerant	Wiring Diagram Part Number	Electrical	Control		Agency
TRM09-36 PSC Motor	EarthPure® (HFC-410A)	96B0135N61	208-230/60/1, 265/60/1	CXM	ACO/MCO	ETL
		96B0135N67			LON	
		96B0135N65			MPC	
		96B0135N62	208-230/60/1, 265/60/1	DXM	ACO/MCO	
		96B0135N68			LON	
		96B0135N66			MPC	
TRM09-12 ECM Motor		96B0173N27	208-230/60/1, 265/60/1		ACO/MCO	
		96B0173N25			LON	
		96B0173N26			MPC	
TRM15-36 ECM-X Motor		96B0135N92	208-230/60/1 265/60/1		ACO/MCO	
		96B0135N98			LON	
		96B0135N96			MPC	
TRM09-36 Electric Heater		96B0135N70	208-230/60/1 265/60/1		ACO/MCO	

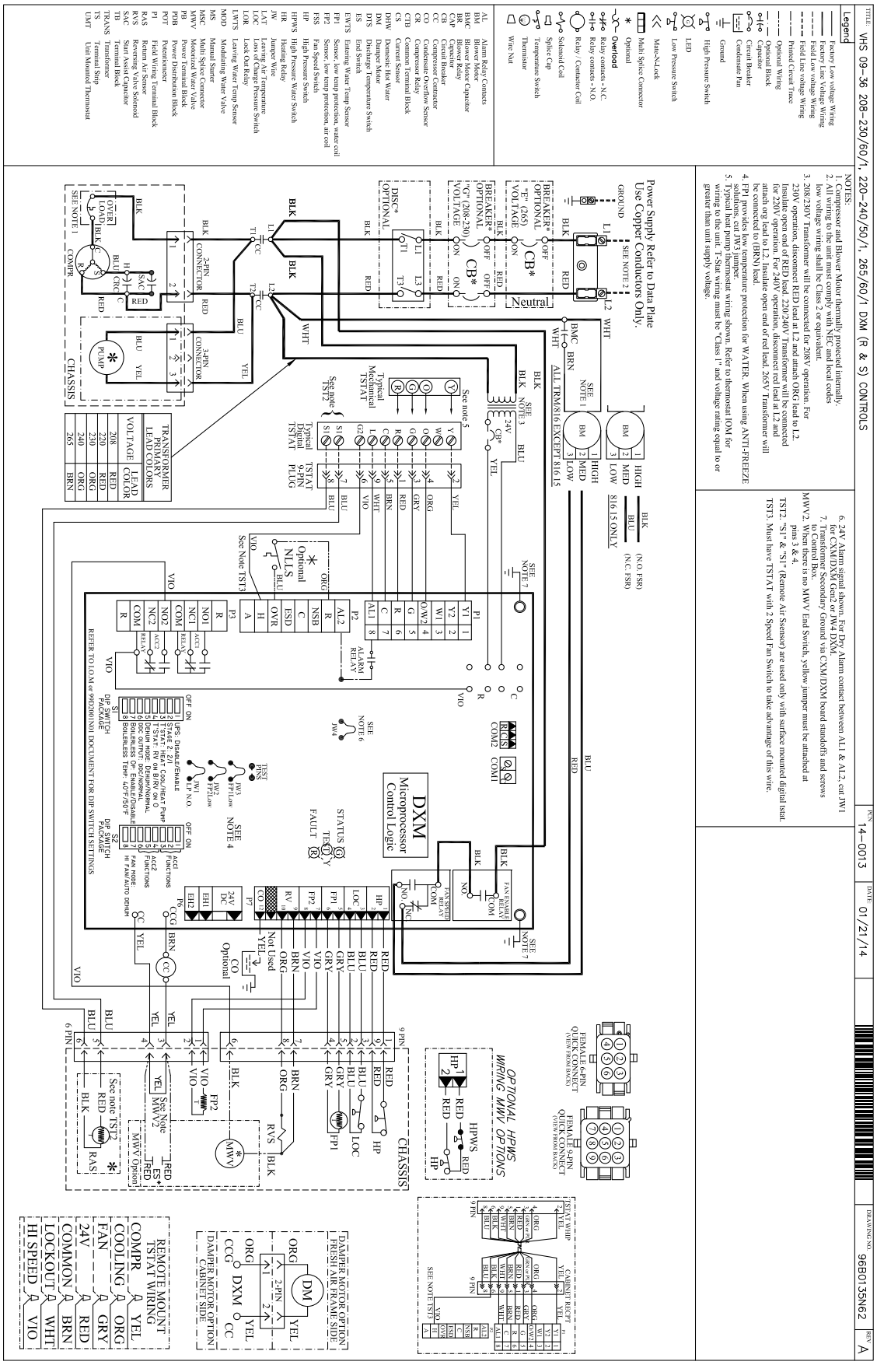
Chassis

Model	Refrigerant	Wiring Diagram Part Number	Electrical	Control	Agency
TRM09-36	EarthPure® (HFC-410A)	96B0036N18	208-230/60/1, 265/60/1	CXM, DXM	ETL

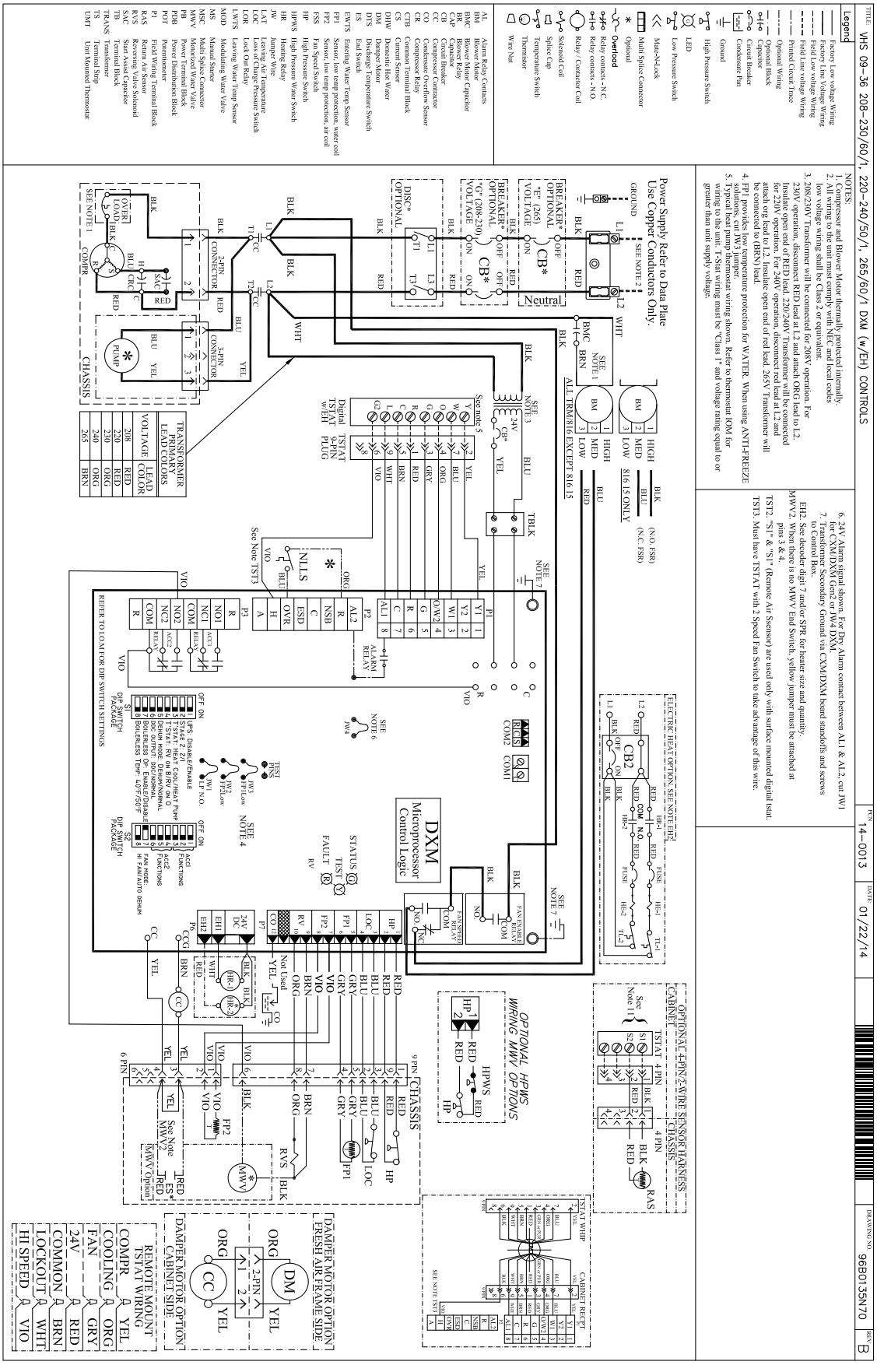
Typical Wiring Diagram – Single Phase TRM Units with CXM Controller



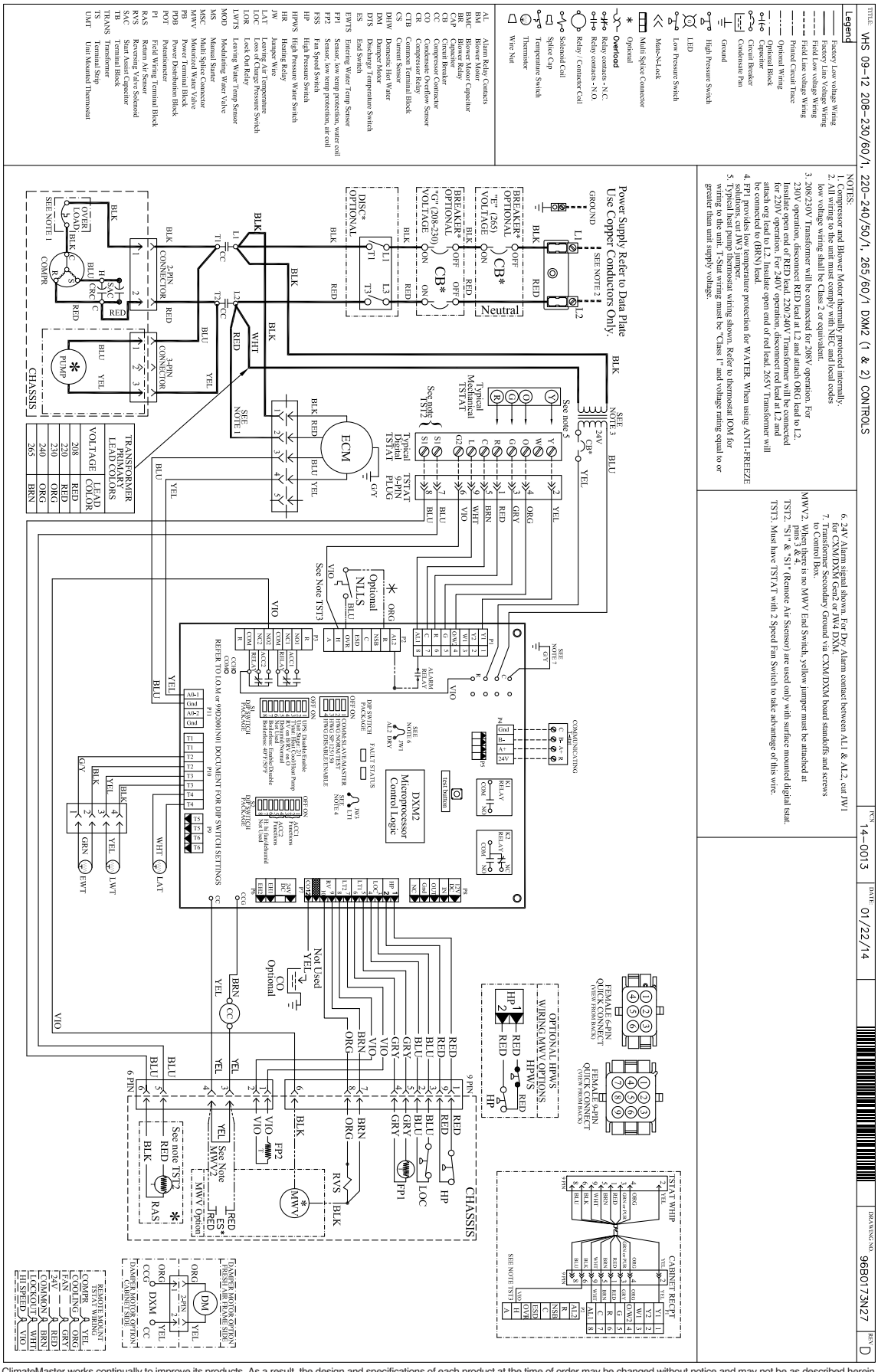
Typical Wiring Diagram – Single Phase TRM Units with DXM Controller



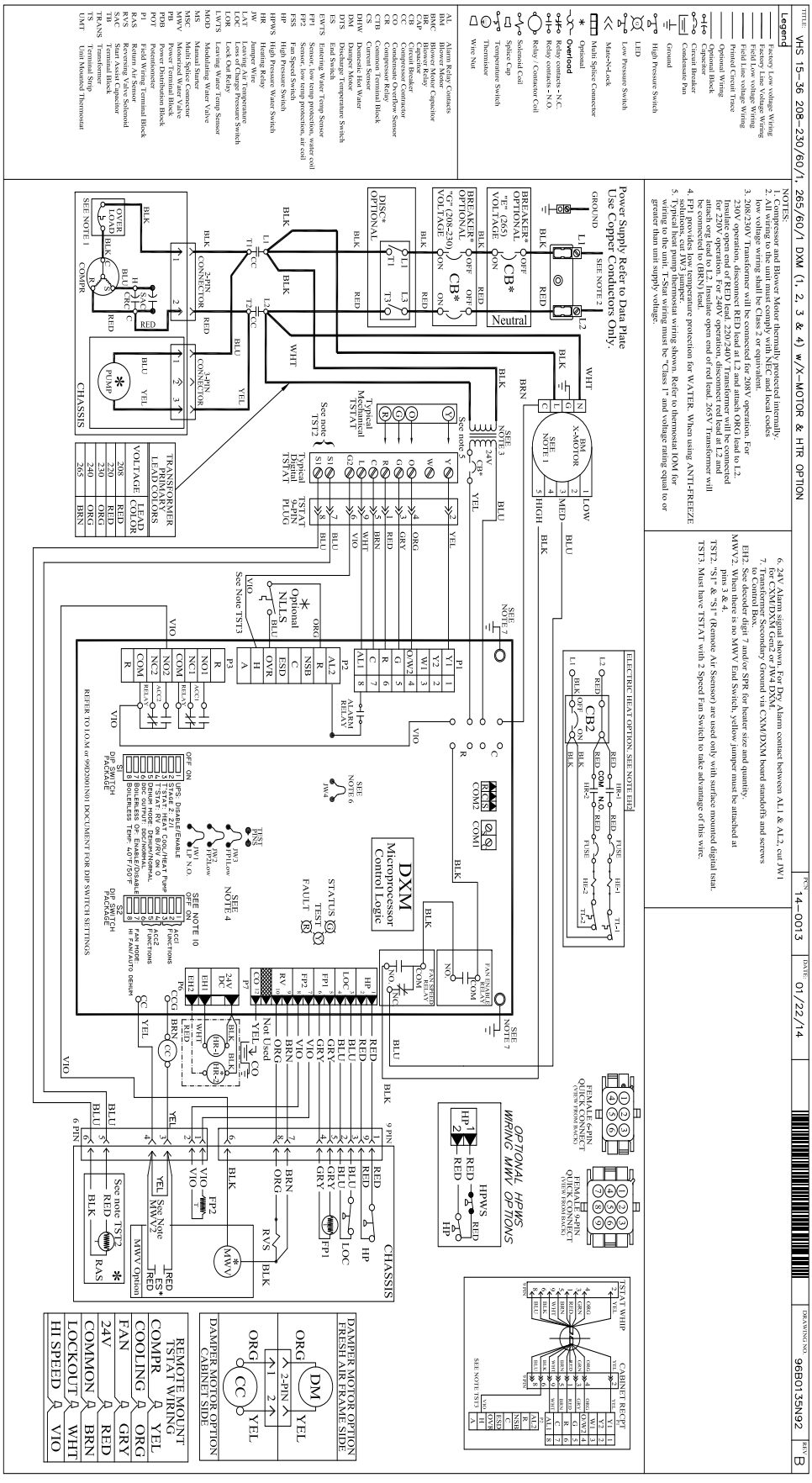
Typical Wiring Diagram – Single Phase TRM Units with Electric Heat/ DXM



Typical Wiring Diagram – TRM09,12 with ECM Motor

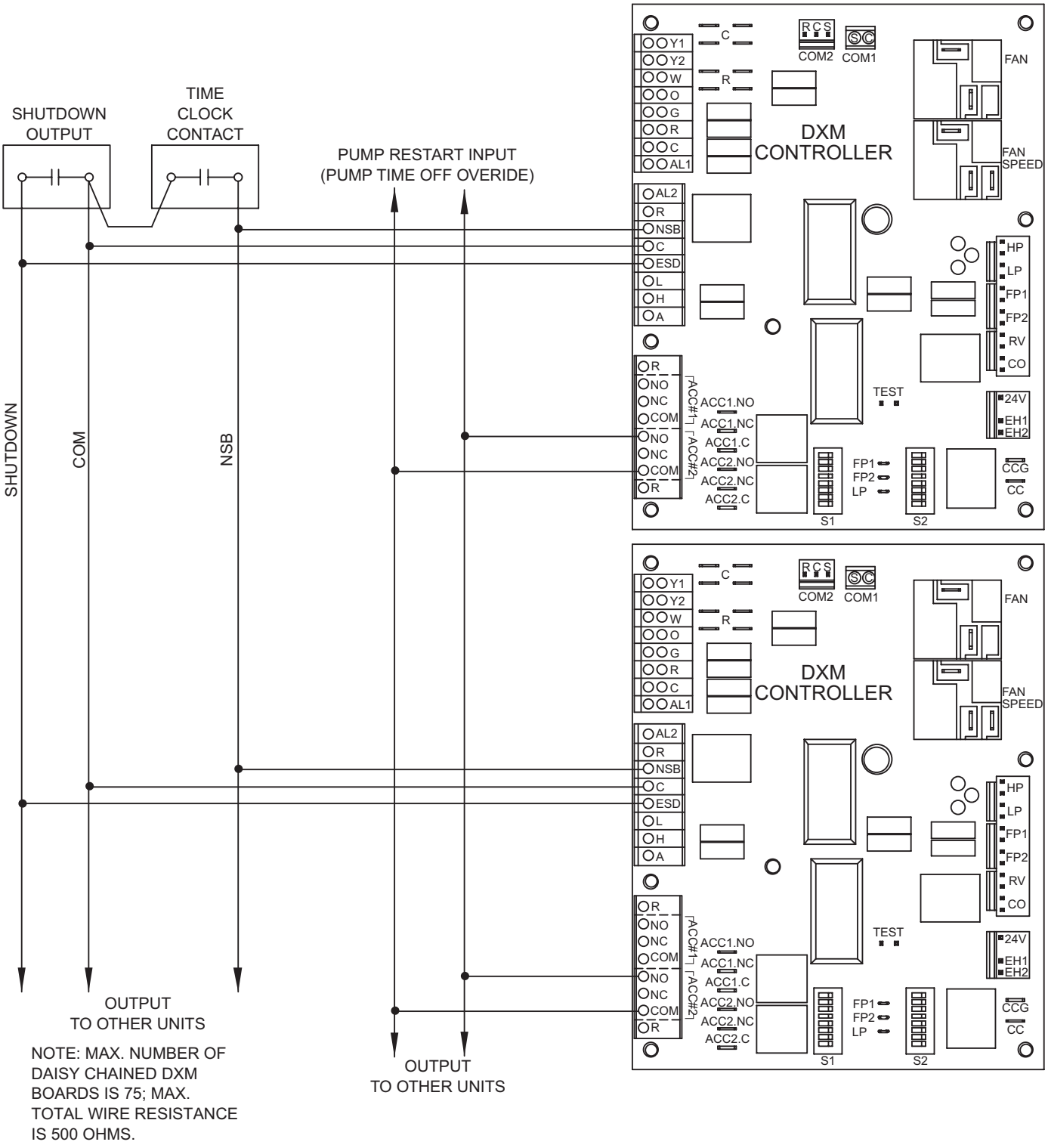


Typical Wiring Diagram – TRM15-36 with ECM-X Motor



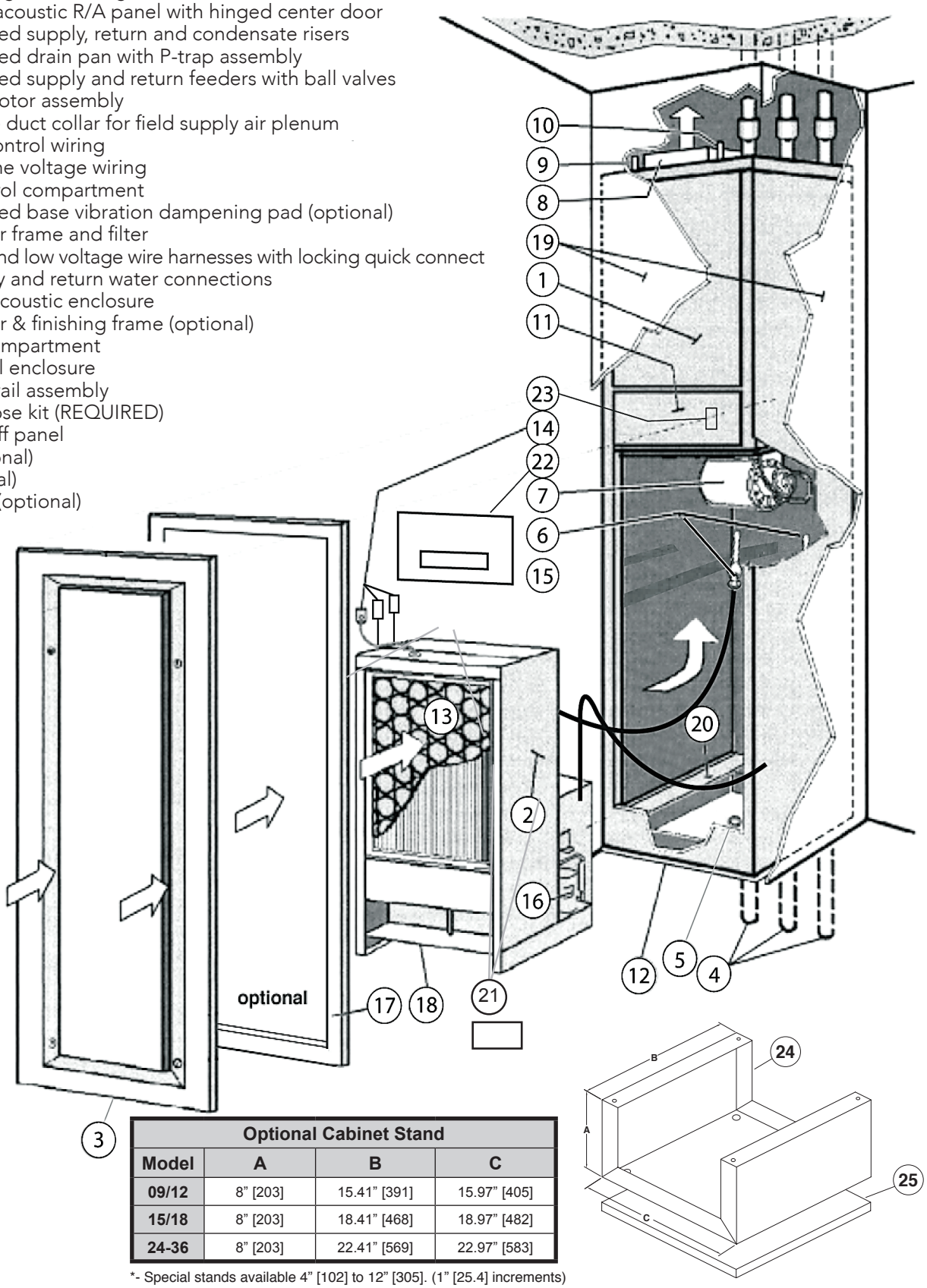
ClimateMaster works continually to improve its products. As a result, the design and specifications of each product at the time of order may be changed without notice and may not be as described herein. Please contact ClimateMaster's Customer Service Department at 1-405-745-6000 for specific information on the current design and specifications. Statements and other information contained herein are not express warranties and do not form the basis of any bargain between the parties, but are merely ClimateMaster's opinion or commendation of its products. The latest version of this document is available at **climatemaster.com**.

Typical Wiring Diagram – Single Phase TRM Units with DXM Controller with Night Setback, Emergency Shutdown, & Pump Restart



Typical Unit - Exploded View – Single Unit: Furred In & Ducted

1. TSM cabinet (furred-in)
2. Slide-in heating and cooling chassis
3. Architectural acoustic R/A panel with hinged center door
4. Factory installed supply, return and condensate risers
5. Factory installed drain pan with P-trap assembly
6. Factory installed supply and return feeders with ball valves
7. Blower and motor assembly
8. Top discharge duct collar for field supply air plenum
9. Conduit for control wiring
10. Conduit for line voltage wiring
11. Electr. & control compartment
12. Factory installed base vibration dampening pad (optional)
13. Return air filter frame and filter
14. Chassis high and low voltage wire harnesses with locking quick connect
15. Chassis supply and return water connections
16. Compressor acoustic enclosure
17. R/A panel filler & finishing frame (optional)
18. Condenser compartment
19. Typical drywall enclosure
20. Chassis slide rail assembly
21. AHH series hose kit (REQUIRED)
22. Upper blockoff panel
23. Breaker (optional)
24. Stand (optional)
25. Isolation pad (optional)



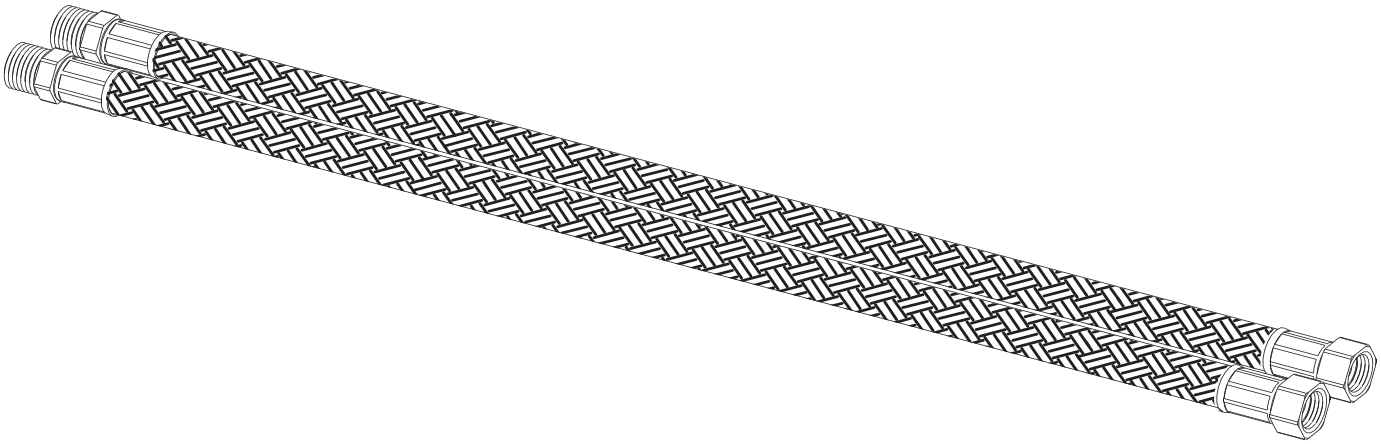
Optional Cabinet Stand			
Model	**A**	**B**	**C**
09/12	8” [203]	15.41” [391]	15.97” [405]
15/18	8” [203]	18.41” [468]	18.97” [482]
24-36	8” [203]	22.41” [569]	22.97” [583]

*- Special stands available 4” [102] to 12” [305]. (1” [25.4] increments)

AHH Series – Stainless Steel Braided Hose Kit

Specifications:

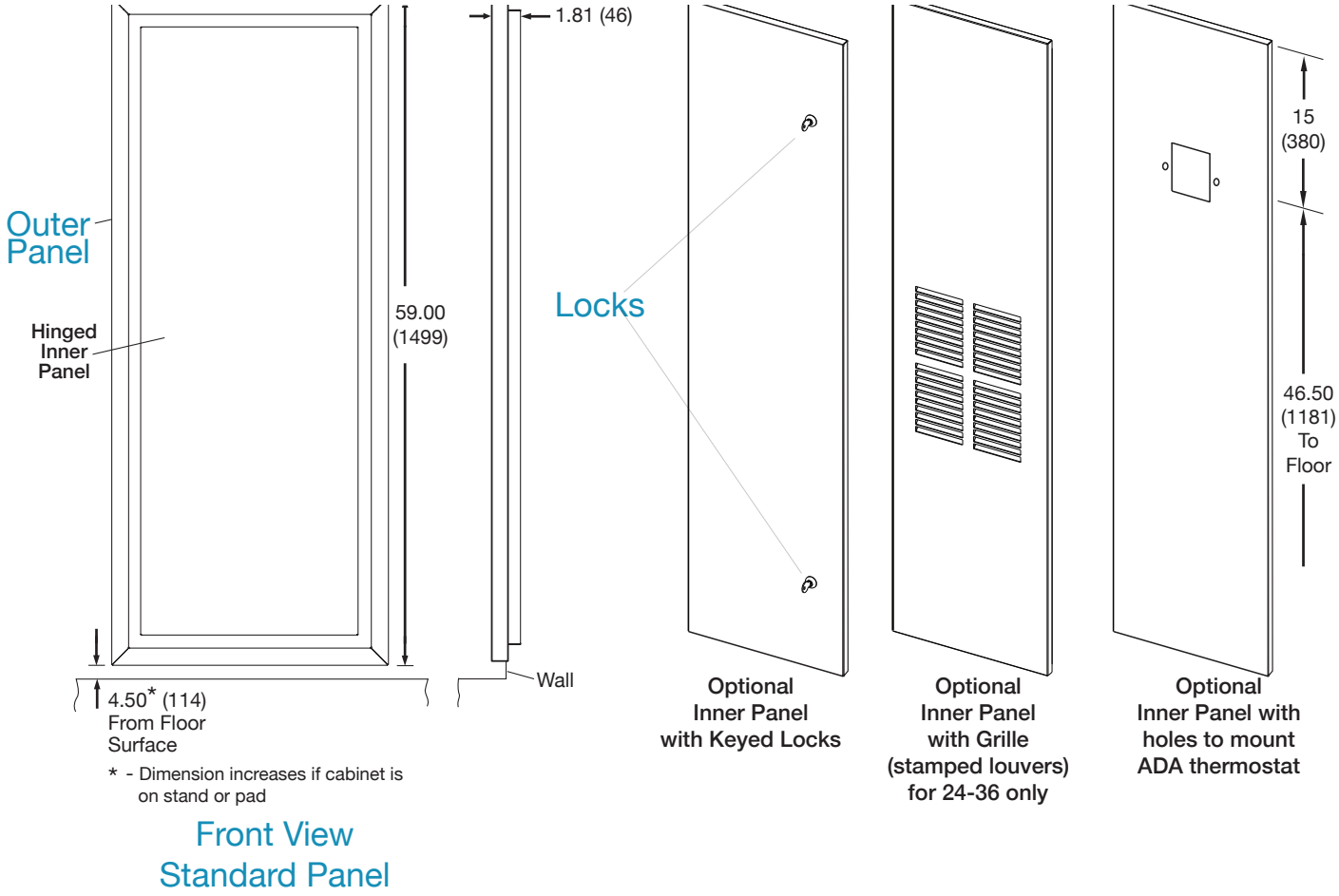
- Designed for VHS water source heat pump applications.
- Kevlar® reinforced EPDM core with ANSI 302/304 stainless steel outer braid.
- Fire rated materials per ASTM E 84-00 (NFPA 255, ANSI/UL 723 & UBC 8-1).
- NPT(E) (External Pipe Thread) fitting at one end; swivel with NPSH thread connector (Internal Thread) at the other end (seals via fiber or EPDM gasket, shipped inside connection).
- Swivel connection provides union between chassis and risers.
- Brass fittings, stainless steel ferrules.
- Temperature range of 15°F [9°C] to 180°F [82°C]. (Operation below 32°F requires antifreeze)
- Max. working pressure of 400 psi [2756 kPa].
- Min. burst pressure of four times working pressure.



Physical Data

Unit	Part #	Inside Diameter inches	Length feet [cm]	Working Pressure psi [kPa]	Min. Burst Pressure psi [kPa]	Min. Bend Radius inches [mm]
09, 12	AHH0502B	0.50	2 [61]	400 [2756]	1600 [11024]	2.5 [63.5]
15, 18	AHH0753B	0.75	3 [91]	400 [2756]	1600 [11024]	4.5 [114.3]
24-36	AHH1003B	1.00	3 [91]	400 [2756]	1600 [11024]	5.5 [139.7]

Hinged "G" Style Return Air Panel – AVHSG Series

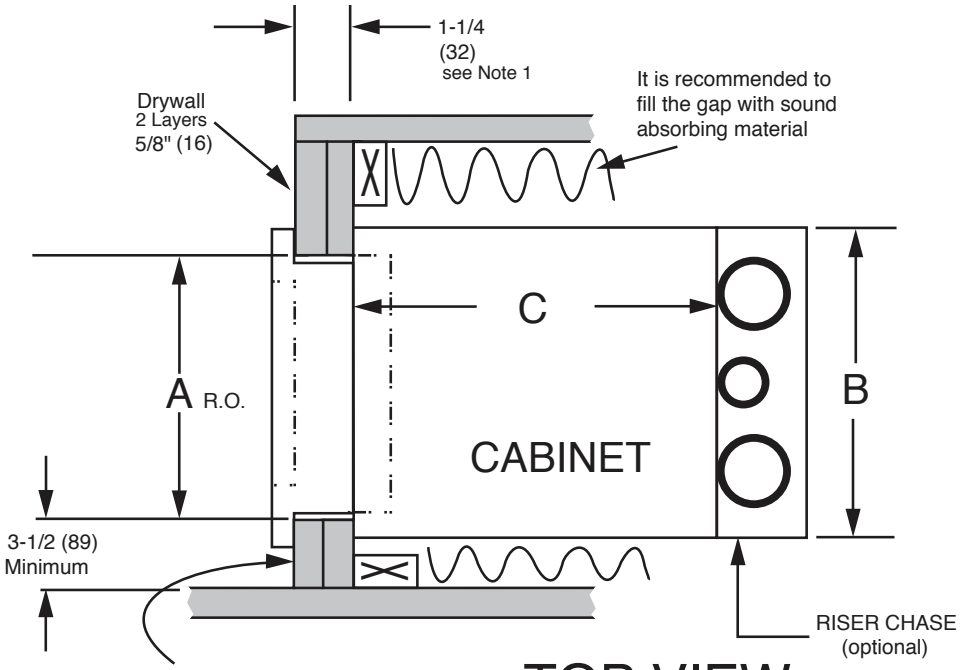


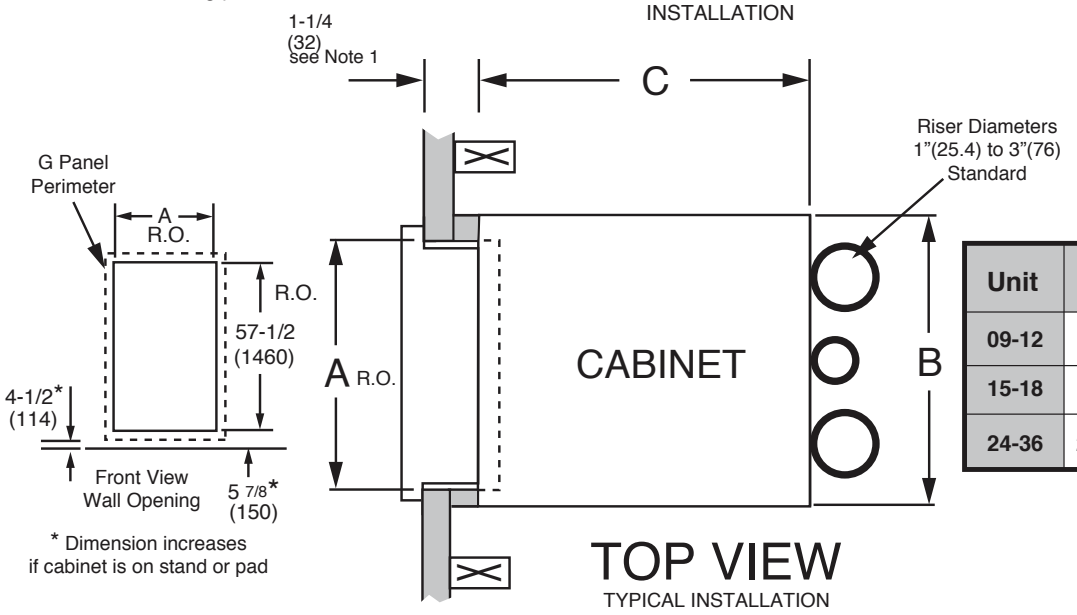
Notes:

1. Dimensions are in inches (mm).
2. Panel painted polar ice.
3. Inner panel pivots open 90°, for filter replacement without removing panel.
4. Shipped as left-hand pivot, but can be field converted to right hand. Cannot convert panel with grille.
5. Optional locks and/or louvered panel available.
6. See mounting methods.

Unit	Digit 6	A
09 - 12	1	18.50 (470)
15 - 18	2	21.50 (546)
24 - 36	3	25.50 (648)

"G" Style Return Air Panel with – Cabinet Flush Mounted



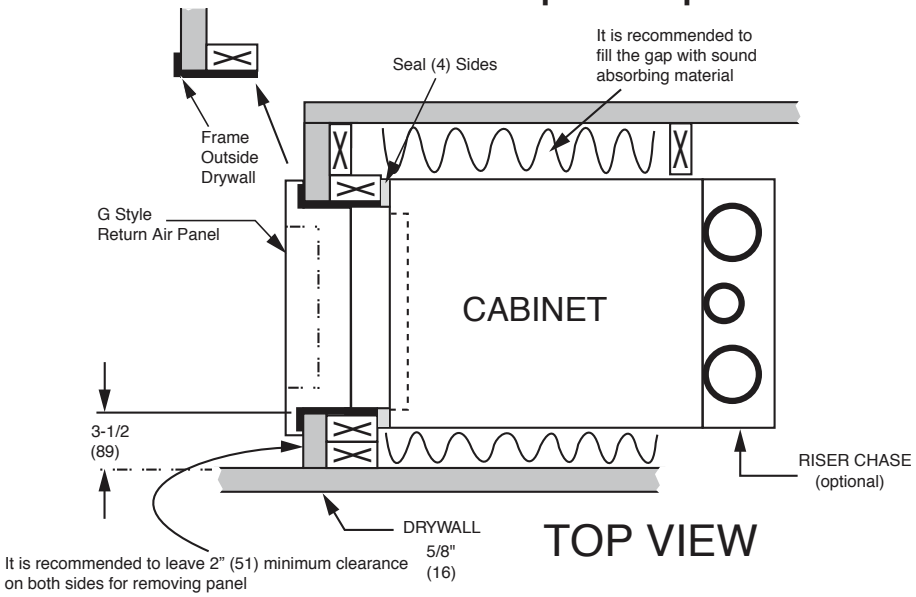


Unit	A	B,C
09-12	16.00 (406)	17.00 (432)
15-18	19.00 (483)	20.00 (508)
24-36	23.00 (584)	24.00 (610)

Notes:

1. Must have 1-1/4 (32) from front of drywall to front surface of cabinet for correct fit of "G" panel.
2. Drywall can be attached directly to front surface of cabinet, use 2 layers of 5/8 (16).
3. Drywall can be applied directly to cabinet sides, however, for best sound attenuation, a furred in stud wall installation is recommended. Studs should not touch cabinet.
4. G Panel attaches to cabinet. Do not caulk outer panel to wall.
5. All measurements are in inches (mm). All studs - nominal 2x4 (1.50 [38] x 3.50 [89])
6. For filter access, pivot panel, open filter access snap. For chassis removal, remove G Panel and slide out chassis.
7. If supply air grilles do not penetrate cabinet angles, field must provide flex duct collar or extensions.

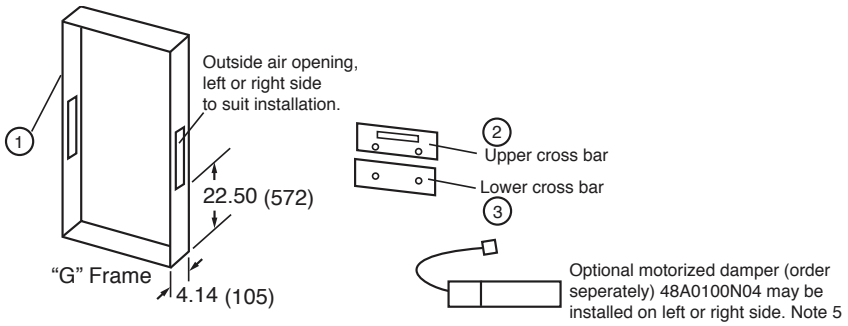
"G" Style Return Air Panel with Cabinet Recessed Frame Kit Required – And Motorized Damper Required If Ducting In Outside Air



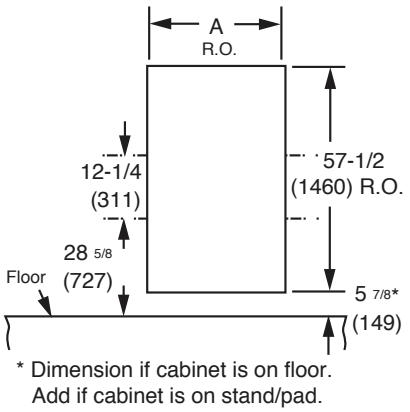
NOTICE: Seal between the frame and cabinet with weather seal material to avoid air being pulled in from the wall cavity. Attach frame to studs not cabinet.

Notes:

1. Drywall can be applied directly to side surfaces, however, for best sound attenuation, a furred in stud wall installation is recommended. Studs should not touch cabinet.
2. G Panel attaches to frame cross bars. Cabinet can be recessed behind wall. Do not caulk outer panel to wall.
3. Dimensions are in inches (mm). All studs nominal 2x4, 1.50 (38) x 3.50 (89)
4. For filter access, pivot inner panel, open filter acces snap. For chassis removal, remove G Panel, remove 2 cross bars, slide out chassis.
5. If motorized damper is used, mixed air temperature must be no lower than 45°F (7°C).
6. For filter access, pivot panel, open filter access snap. For chassis removal, remove G Panel and slide out chassis.
7. If supply air grilles do not penetrate cabinet angles, field must provide flex duct collar or extensions.



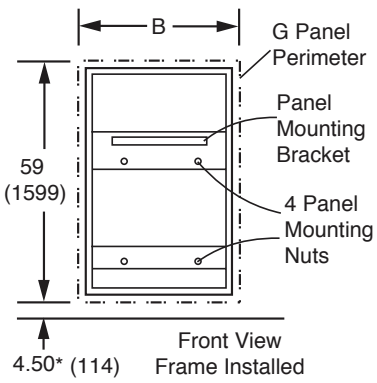
Kit Part	Qty	Description
1	1	Frame
2	1	Upper Cross Bar
3	1	Lower Cross Bar



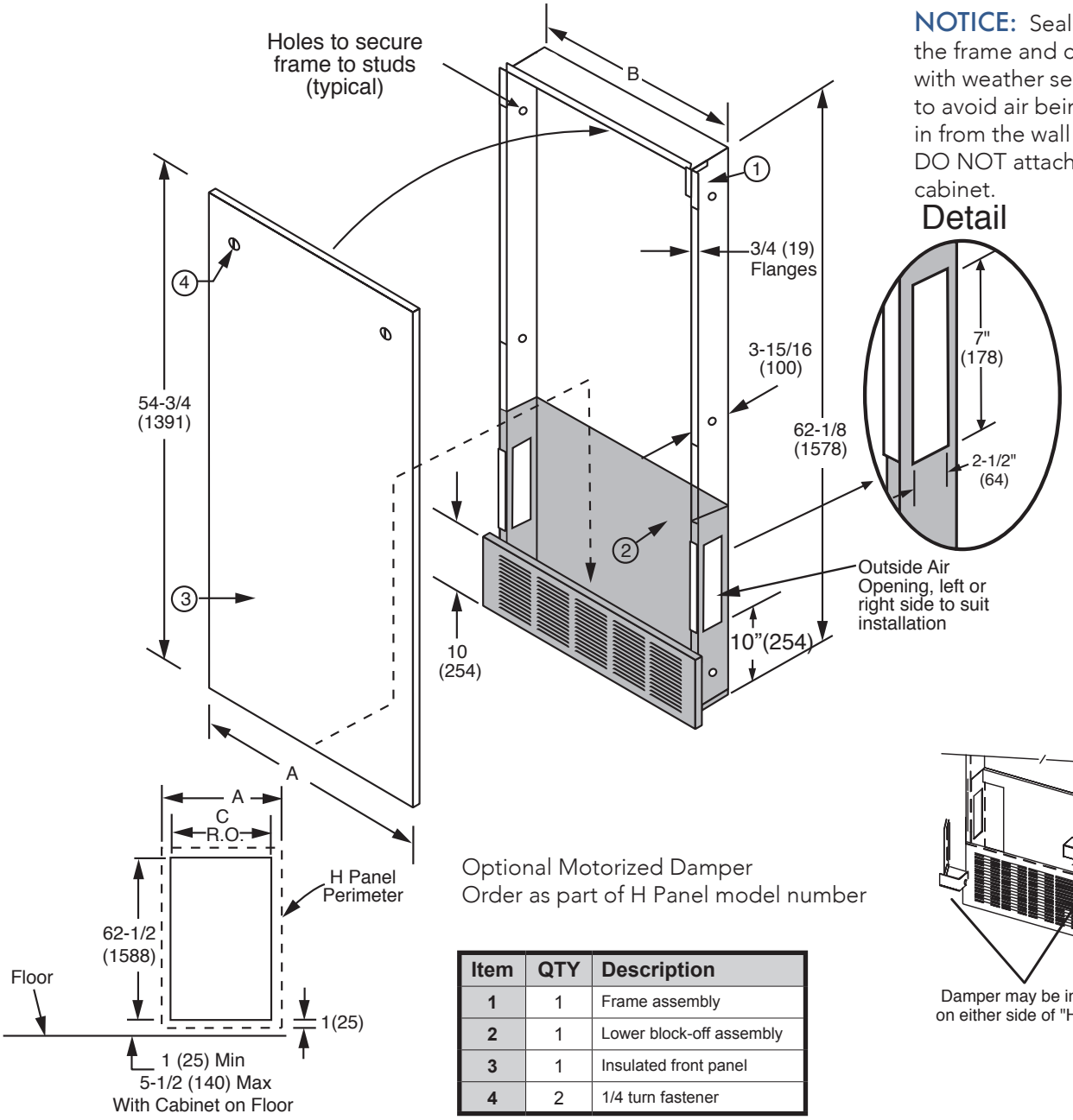
Frame Kit

Kit	Size	A	B
48A0100N11	9-12	16 5/8 (400)	18.50 (470)
48A0100N12	15-18	19 5/8 (498)	21.50 (546)
48A0100N13	24-36	23 5/8 (600)	25.50 (648)

Note: When outside air is used, contractor must supply outside air duct and cut hole in stud.



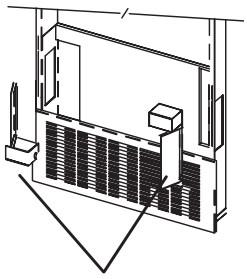
AVHSH Series"H" Style Return Air Panel – (Frame Required and Motorized Damper Required if Ducting in Outside Air)



NOTICE: Seal between the frame and cabinet with weather seal material to avoid air being pulled in from the wall cavity. DO NOT attach frame to cabinet.

Detail

Optional Motorized Damper
Order as part of H Panel model number



Damper may be installed on either side of "H" panel

Item	QTY	Description
1	1	Frame assembly
2	1	Lower block-off assembly
3	1	Insulated front panel
4	2	1/4 turn fastener

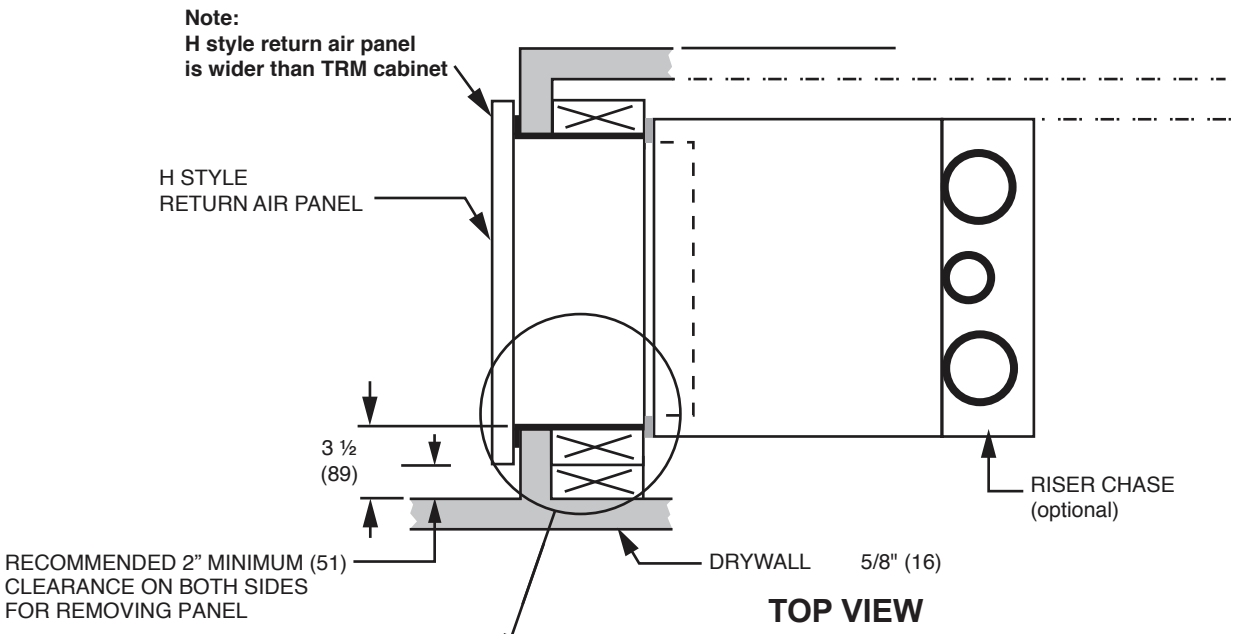
Unit Size	Frame (IT#1)	A	B	C
09 - 12	49A0077GNN	18 5/8 [473]	16 3/4 [425]	17 (433)
15 - 18	49A0078GNN	21 5/8 [549]	19 3/4 [502]	20 (508)
24 - 36	49A0079GNN	25 5/8 [650]	23 3/4 [603]	24 (610)

Note: When outside air is used, contractor must supply outside air duct and cut hole in stud.

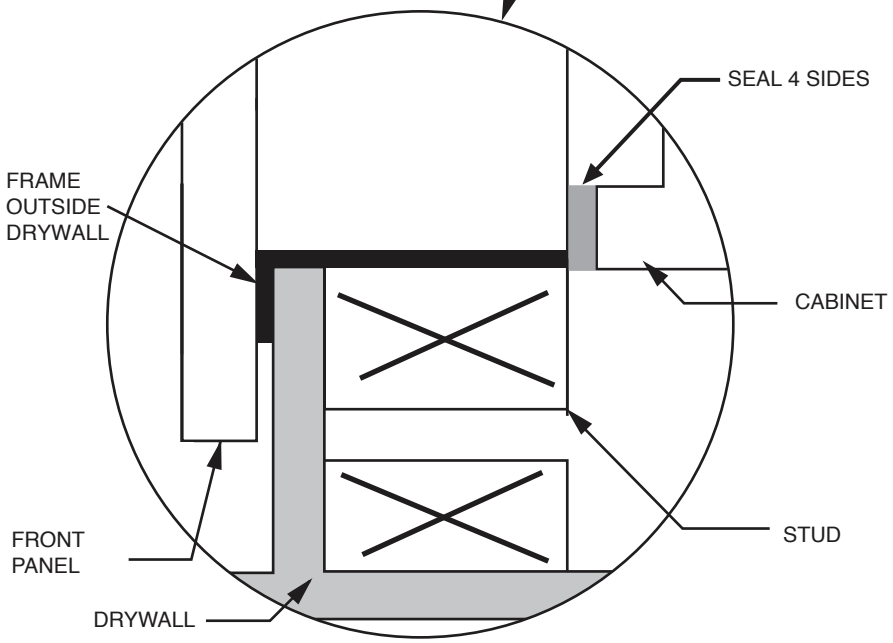
Notes:

1. For filter access, remove panel. For chassis removal, remove both panel and block-off.
2. All measurements are in inches (mm). All studs - nominal 2x4 (1.50 [38] x 3.50 [89])
3. Do not caulk panel or lower blockoff to wall.
4. If motorized damper is used, mixed air temperature must be no lower than 45°F (7°C).
5. If supply air grilles do not penetrate cabinet angles, field must provide flex duct collar or extensions.

"H" Style Return Air Panel

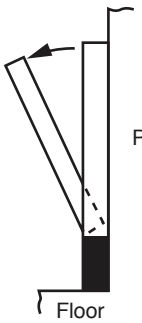


TOP VIEW



NOTICE: Seal between the frame and cabinet with weather seal material to avoid air being pulled in from the wall cavity. DO NOT attach frame to cabinet.

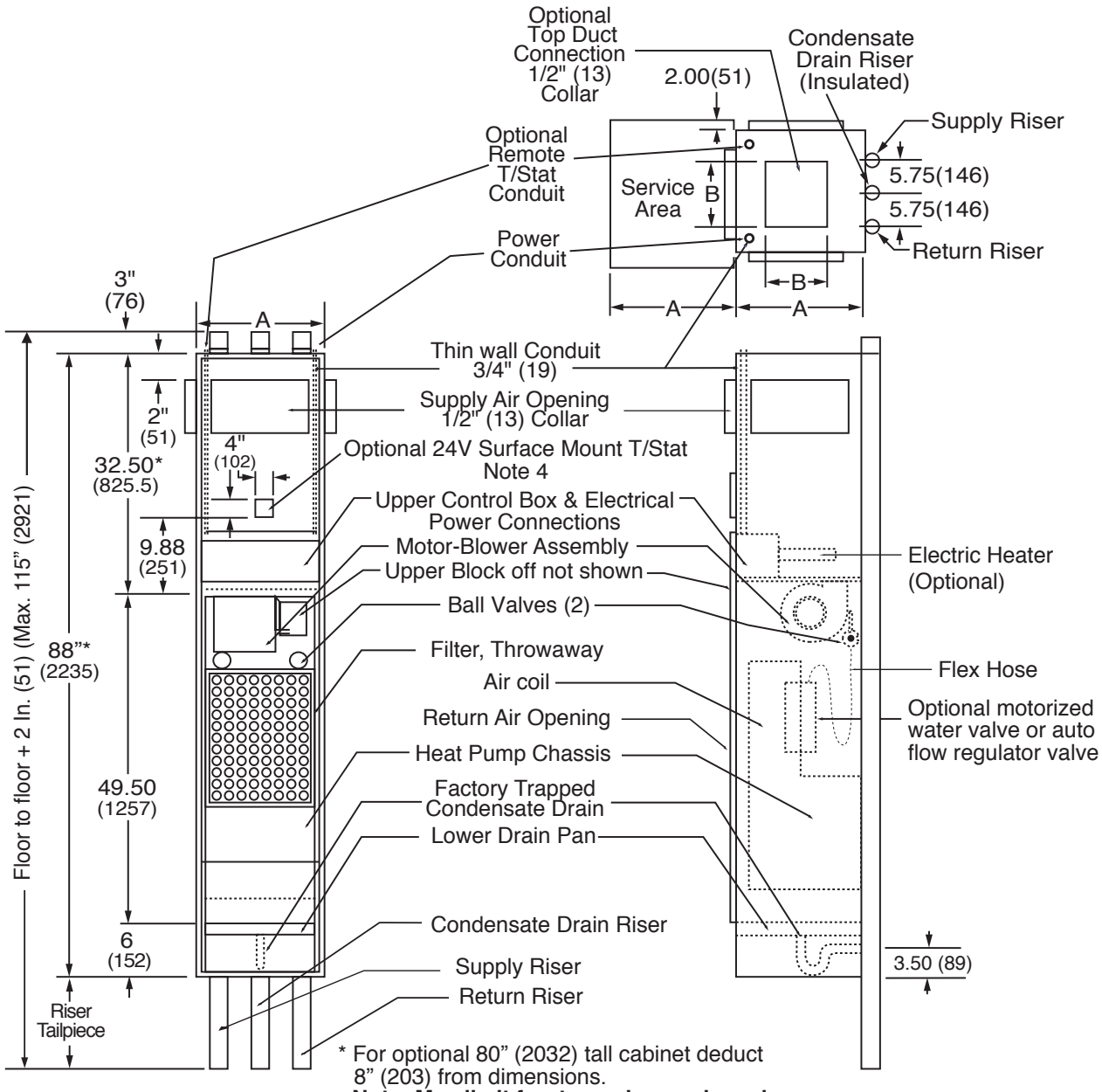
Note: All measurements are in inches, millimeters are in parenthesis.
All studs nominal 2x4, 1.50 (38) x 3.50 (89)



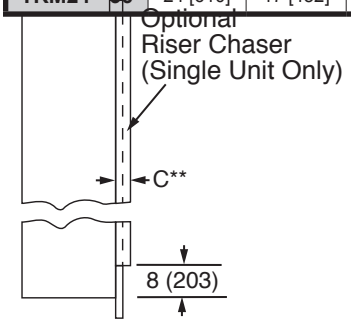
Panel Removal
1 - Unlock Cams
2 - Pivot Forward
3 - Lift Off Lower Assy.

SIDE VIEW

TRM Unit Dimensions – Single Unit, Furred In Cabinet (88 in. [2235mm] Height) with Risers



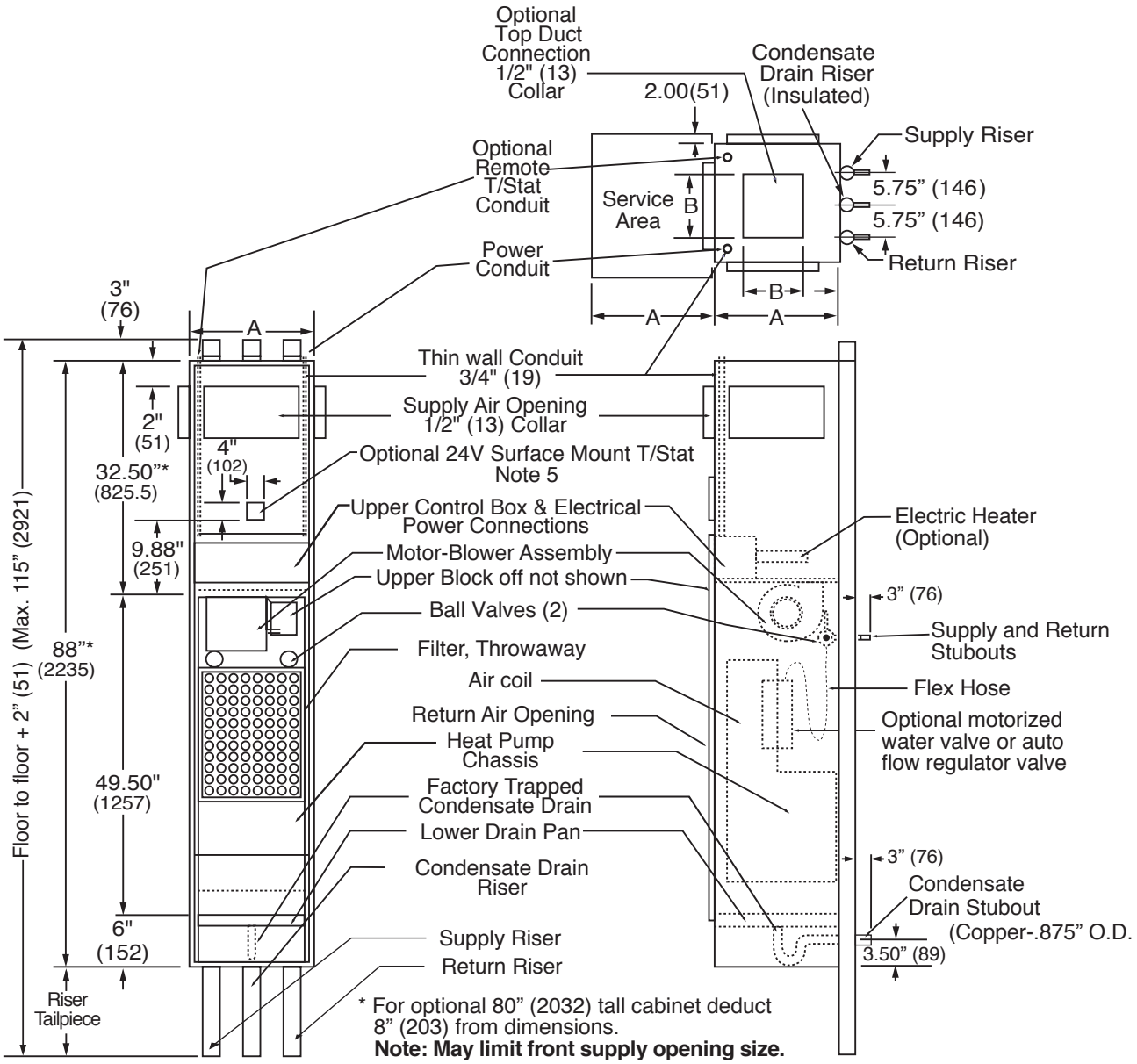
Unit Size	A	B	C**
TRM09 - 12	17 [432]	10 [254]	4.25 [92]
TRM15 - 18	20 [508]	13 [330]	4.25 [92]
TRM24 - 36	24 [610]	17 [432]	4.25 [92]



Notes:

1. The riser compartment is defined as being the rear of each unit. Supply air grilles and return air/access panel can be any side except rear.
2. ** C Dimension = 4-1/4" (92) for risers up to 2-1/2" (64) diameter.Consult factory for larger diameter risers.
3. All measurements are in inches (mm).
4. Ball valves are always located opposite of the return air opening. Return riser is on the right.
5. Units with 24v surface mount T/stat option have 2x4 tile rings factory installed. Contractor must specify horizontal vertical orientation to suit thermostat type.

TRM Unit Dimensions – Master Unit, Furred In Cabinet (88 in. [2235mm] Height)

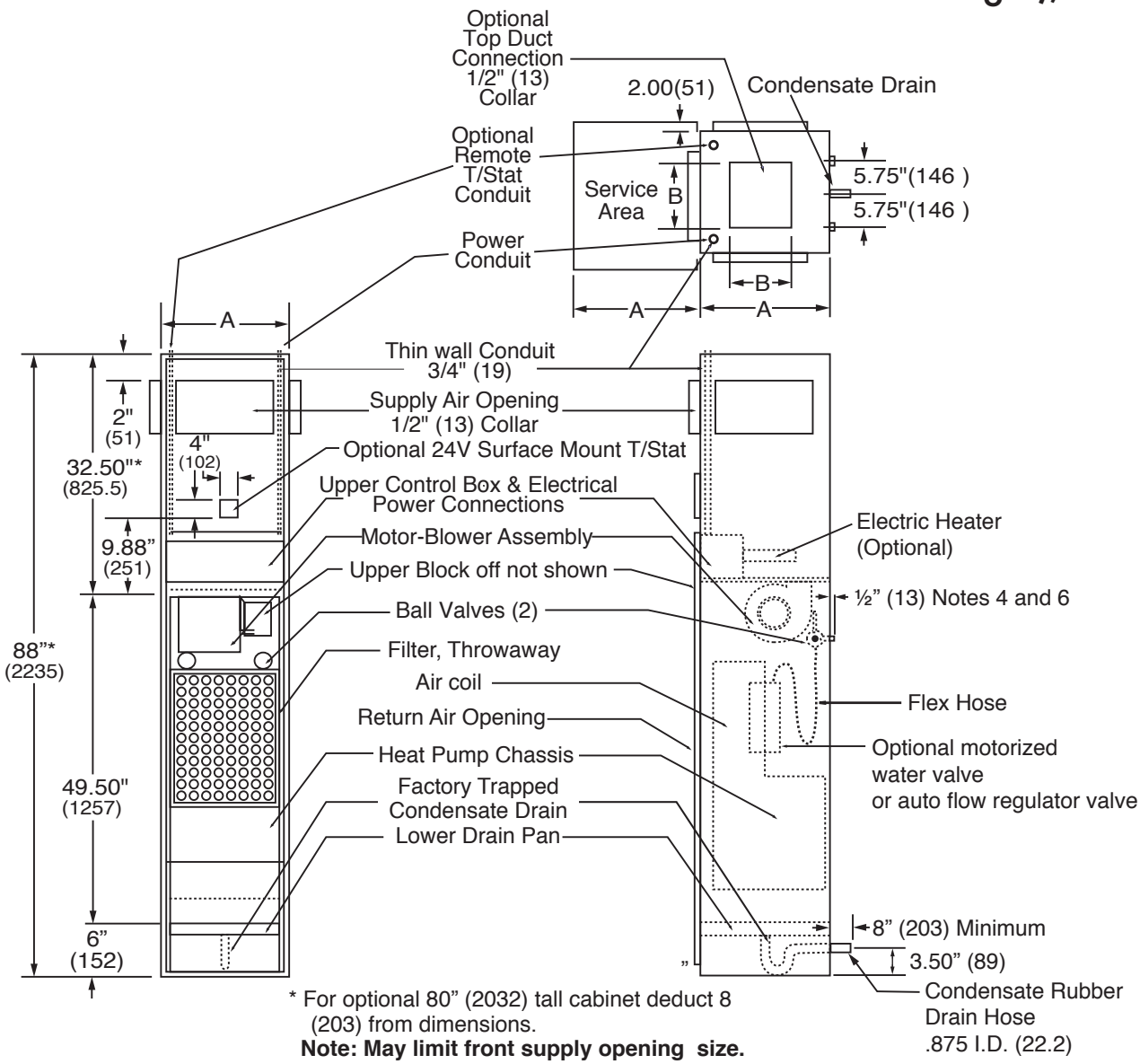


Unit Size	A	B
TRM09 - 12	17 [432]	10 [254]
TRM15 - 18	20 [508]	13 [330]
TRM24 - 36	24 [610]	17 [432]

Notes:

1. The riser compartment is defined as being the rear of each unit. Supply air grilles and return air/access panel can be any side except rear.
2. All measurements are in inches (mm).
3. Installer must provide crossover water piping from Master to Slave unit.
4. See master-slave cabinet connected.
5. Units with 24v surface mount T/stat option have 2x4 tile rings factory installed. Contractor must specify horizontal vertical orientation to suit thermostat type.
6. Ball valves are always located opposite return air opening and the return riser is on the right.

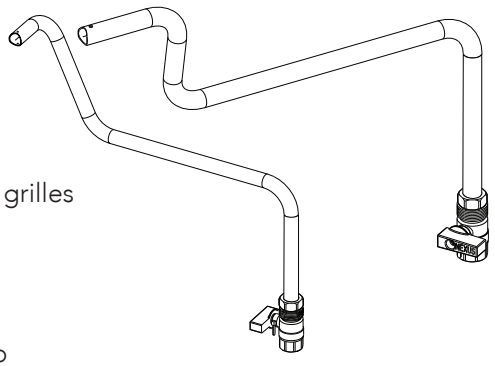
TRM Unit Dimensions – Slave Unit, Furred In Cabinet (88 in. [2235mm] Height), No Risers



* For optional 80" (2032) tall cabinet deduct 8 (203) from dimensions.

Note: May limit front supply opening size.

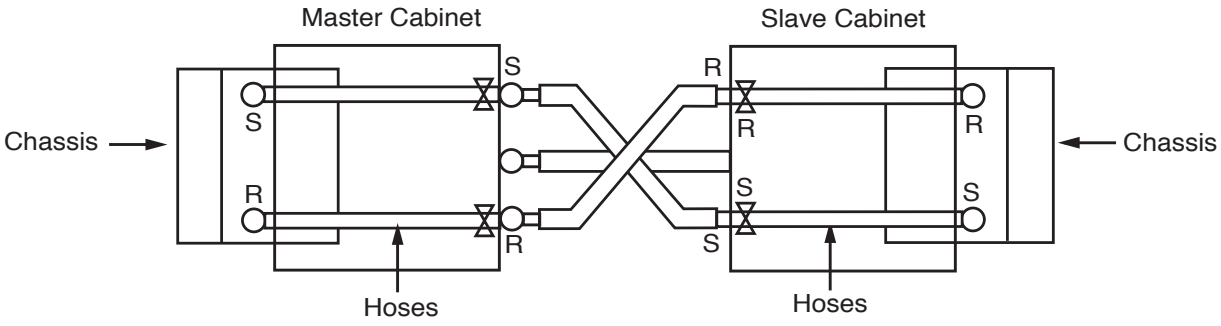
Unit Size	A	B
TRM09 - 12	17 [432]	10 [254]
TRM15 - 18	20 [508]	13 [330]
TRM24 - 36	24 [610]	17 [432]



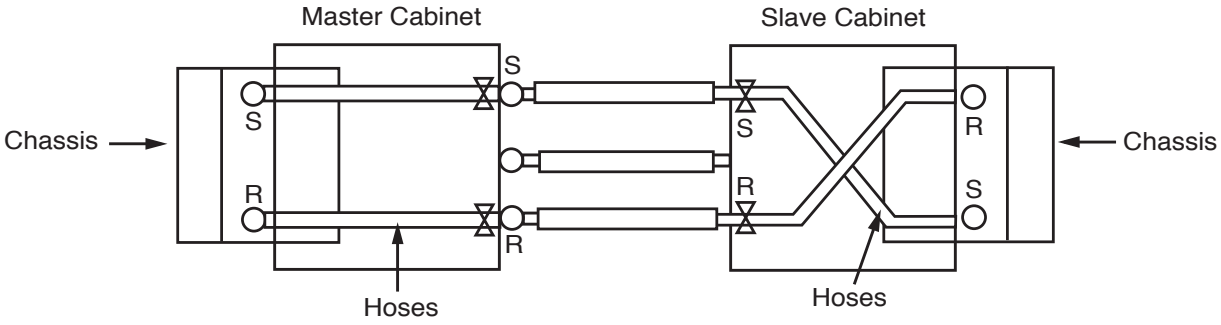
Ball Valve Package
(Notes 4 & 8) Right Return Shown

Notes:

1. The riser compartment is defined as being the rear of each unit. Supply air grilles and return air/access panel can be any side except rear.
2. All measurements are in inches (mm).
3. Installer must provide crossover water piping from Master to Slave unit.
4. Ball valve package is shipped loose. Field must position in cabinet (valve opposite RA side and copper protruding ½" out of cabinet) and connect to master riser stubouts.
5. Units with 24v surface mount T/stat option have 2x4 tile rings factory installed. Contractor must specify horizontal vertical orientation to suit thermostat type.
6. Supply and return depends on which option (see next page) installer uses to connect master.



Option 1 - Cross field supplied piping between cabinets. Mark shutoffs inside slave cabinet. Run hoses straight across.



Option 2 - Field supplied and brazed piping to be straight across. Mark shutoffs inside slave cabinet. Cross hoses to chassis.

Notes:

1. Distance between cabinets must suit local codes and installer.
2. Both cabinets must have shutoffs inside (factory standard).
3. Condensate drains are internally trapped. Do not trap or allow tubing to sag outside cabinet.
4. Chassis shown partway out of cabinet for clarity.
5. Field-supplied piping must have same or higher pressure rating as risers.

Optional Cabinet Disconnect Switch

Located on control box access door. Can be accessed through slot in "G" Panel Frame. Classified as motor disconnect.

Optional Cabinet Circuit Breaker

Located on control box access door. Can be accessed through slot in "G" Panel Frame. All 208/230V and 265V/15 and 20 amp classified as HACR breaker.
265V 25 amp and higher classified as supplemental breaker.

Optional Electric Heater

Single point power

Heater Sizes

Voltage	Models	Nominal KW	Heater Amperage	Stages
208/240	All	1.9/2.5	9.1/10.4	Single
208/240	TRM15-36	3.8/5.0	18.3/20.8	Two: 2.5 and 2.5
208/240	TRM18-36	5.7/7.5	27.4/31.2	Two: 2.5 and 5.0
265	All	2.5	9.4	Single
265	TRM15-36	5.0	18.9	Two: 2.5 and 2.5

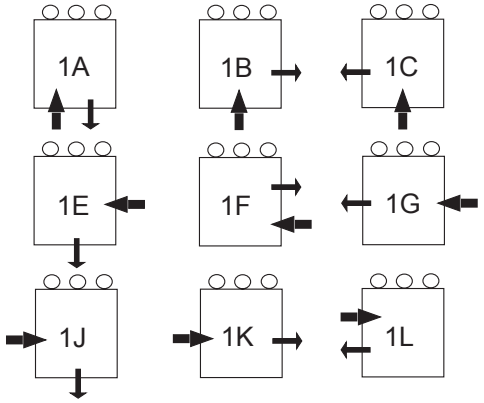
- Electric Heater will be factory installed. Requires DXM and breaker options.
- Field connection will be single-point power.
- Electric Heaters above 2.5 kw are two stage.
- Electric Heater access will be through the cabinet control compartment.

With thermostat that has 2 heat stages and emergency heat selections, similar to ATP32U03, unit will operate in 3 heating modes.

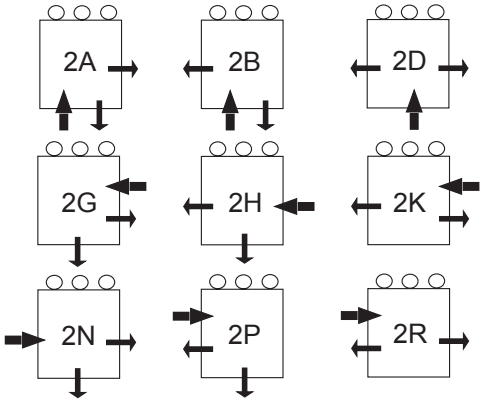
- Mode 1 will be compressor heat only.
- Mode 2 will be compressor and electric heater.
- Mode 3 will be emergency Heat, electric heat only.

TRM Cabinet Configurations

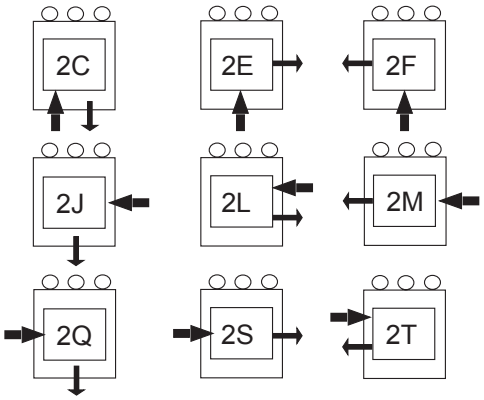
Single Supply - Side



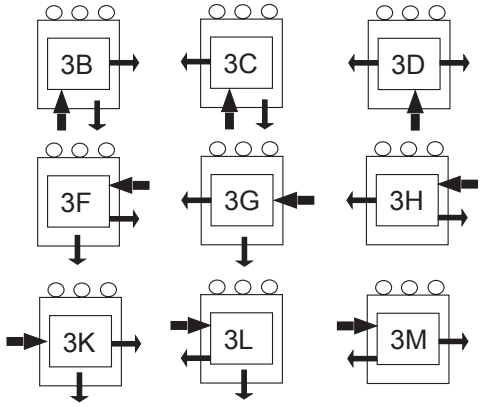
Double Supply - Side



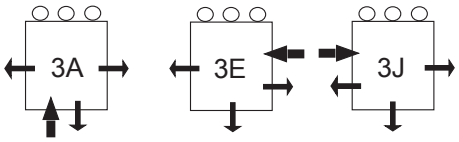
Double Supply - Top & Side



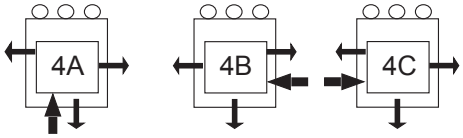
Triple Supply - Top & 2 Sides



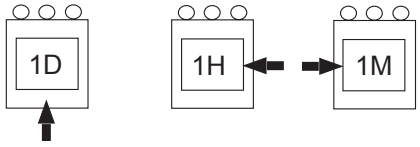
Triple Supply - 3 Sides



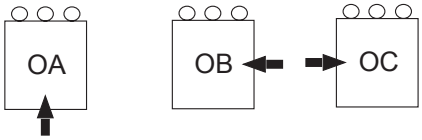
Quadruple Supply - Top & 3 Sides

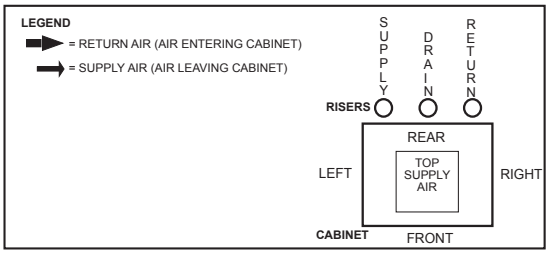


Single Supply - Top



No Supply - For Field Modification





Notes:

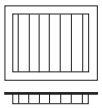
1. The riser compartment is defined as being the rear of each unit. Supply air grilles and return air/access panel can be any side except rear.
2. Return air side also defines control location and service access.
3. Supply and Return shut offs are always on side opposite return air side.
4. Triple discharge openings are not recommended for sizes TRM09 & TRM12. Single discharge openings are not recommended for sizes TRM24, 30, 36 (Except top discharge).
5. Solid plenum option for field conversion of discharge air arrangement is available.

Air Flow vs. Grille Selection

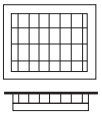
* Grilles are shipped loose for field installation after drywall has been applied to cabinets that are furred in.

** Grilles are brushed aluminum or painted (polar ice).

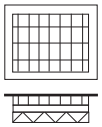
Single Deflection- Adjustable vertical blades for controlling horizontal path of discharge air.



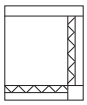
Double Deflection- Adjustable vertical and horizontal blades for controlling horizontal and vertical path of discharge air. (Recommended for all standard applications.)



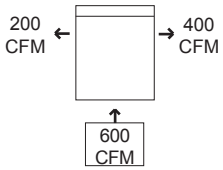
Double Deflection with Opposed Blade Damper- Addition of opposed blade damper to grille allows control of air volume (CFM) and path of discharge air. (Recommended for applications requiring unequal air flow or side discharge grille(s) with additional top discharge air opening.)



Unequal Air Flow- Air discharges requiring different air volumes (CFM). Use double deflection grilles with opposed blade damper.



Note: Units with adjacent grilles and opposed blade dampers may require special grilles. Consult factory with specific application.



Top Discharge- Units are designed to operate against relatively low air resistance (external static). Use of liberal duct sizing is recommended to maximize total unit air flow (CFM). Top duct outlet will offer more resistance to air flow than side outlets on the same cabinet. Therefore side outlet grille(s) must have opposed blade dampers to field balance the air flow.

Multiple Discharge/Top Grille & Opening Sizing When Air Flow Is Divided Equally

Unit Size	Single Discharge	Double Discharge	Triple Discharge
TRM09	12" x 10" [305 x 254]	10" x 6" [254 x 152]	Not Recommended
TRM12	12" x 12" [305 x 305]	10" x 8" [254 x 203]	Not Recommended
TRM15 - 18	16" x 12" [406 x 305]	14" x 8" [356 x 203]	14" x 6" [356 x 152]
TRM24	Not Recommended	16" x 10" [406 x 254]	16" x 6" [406 x 152]
TRM30	Not Recommended	16" x 12" [406 x 305]	12" x 10" [305 x 254]
TRM36	Not Recommended	16" x 14" [406 x 356]	16" x 10" [406 x 254]

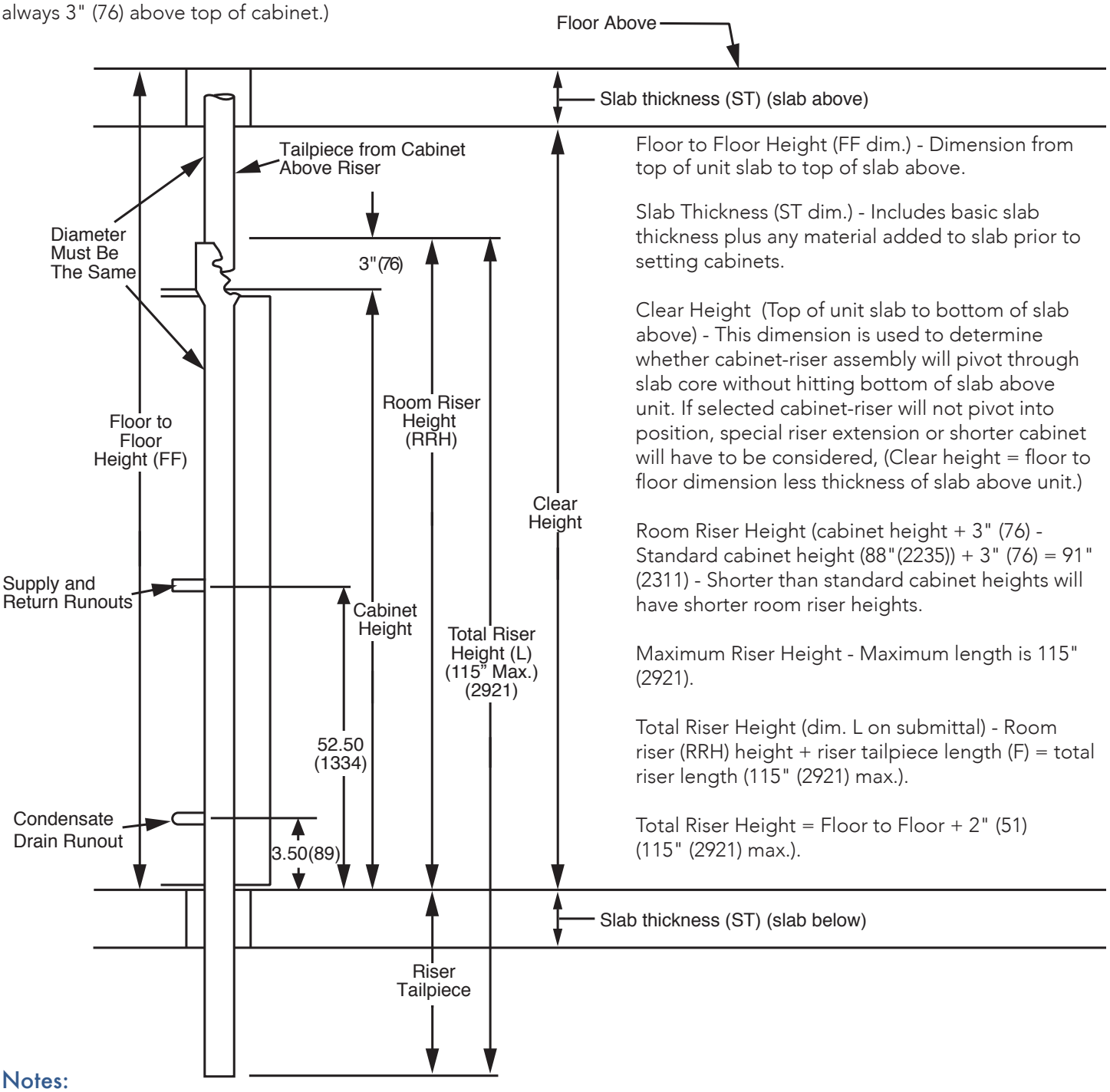
Multiple Discharge/Top Discharge Grille & Opening Sizing When Air Flow Is Divided Unequally

Model	Specified Discharge CFM	Grille Selection Chart												Top Discharge Opening Size (Up to 100% Unit CFM
		10" [254] Wide x			12" [305] Wide x			14" [356] Wide x		16" [406] Wide x				
		6"H	8"H	10"H	6"H	10"H	12"H	6"H	8"H	6"H	10"H	12"H	14"H	
09 12	100 - 150	X			X									10 x 10 [254 x 254]
	175 - 225		X											
	250 - 275			X			X							
15 18	150 - 200							X						13 x 13 [330 x 330]
	250 - 325								X					
	400 - 450										X			
24 30 36	200 - 275									X				17 x 17 [432 x 432]
	300 - 350					X								
	375 - 450										X			
	500 - 600											X		
	625 - 725												X	

Riser Definitions

Riser Tailpiece (length of riser that extends down from cabinet bottom) -
Dimension F on submittal drawing- Riser tailpiece sized for 2" (51) insertion into 3" (76) expanded section at top of cabinet. Actual job fit may be 1" (25) to 3" (76) insertion (built-in +1" (25) floor to floor tolerance). Riser tailpiece should extend beneath bottom of slab a minimum of 5" (127) to facilitate brazing.

3" Swage (Expanded) Section - Riser expanded at top of unit to accept a pipe diameter from cabinet above. (Top of riser always 3" (76) above top of cabinet.)



Floor to Floor Height (FF dim.) - Dimension from top of unit slab to top of slab above.

Slab Thickness (ST dim.) - Includes basic slab thickness plus any material added to slab prior to setting cabinets.

Clear Height (Top of unit slab to bottom of slab above) - This dimension is used to determine whether cabinet-riser assembly will pivot through slab core without hitting bottom of slab above unit. If selected cabinet-riser will not pivot into position, special riser extension or shorter cabinet will have to be considered, (Clear height = floor to floor dimension less thickness of slab above unit.)

Room Riser Height (cabinet height + 3" (76) - Standard cabinet height (88"(2235)) + 3" (76) = 91" (2311) - Shorter than standard cabinet heights will have shorter room riser heights.

Maximum Riser Height - Maximum length is 115" (2921).

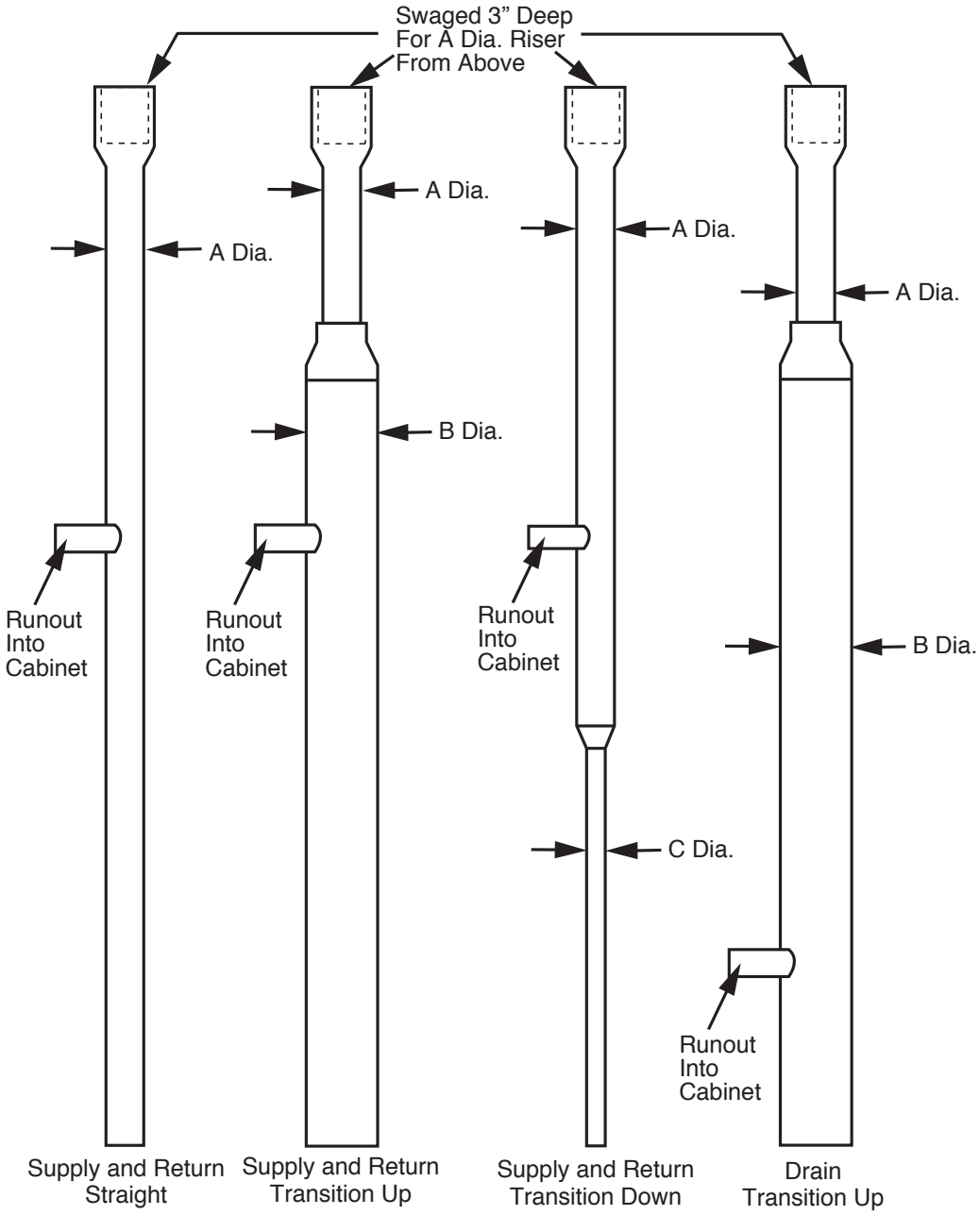
Total Riser Height (dim. L on submittal) - Room riser (RRH) height + riser tailpiece length (F) = total riser length (115" (2921) max.).

Total Riser Height = Floor to Floor + 2" (51) (115" (2921) max.).

Notes:

1. Dimensions are in inches (mm)
2. Standard Riser Dimensions - 1, 1¼, 1½, 2, 2½, 3. Type M or L available.
3. Drain Riser Insulated standard. Supply and Return Riser Insulated optional.

Riser Definitions



Notes

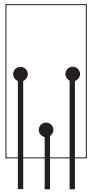
1. You must know water flow direction to determine if cabinet requires transition up or down.
2. Transitions can only change by one diameter (1" to 1¼", 1¼" to 1½", etc.)
3. Riser transition couplings and runouts are factory brazed.
4. All risers are factory pressure tested.
5. Standard riser diameters are 1", 1¼", 1½", 2", 2½" and 3".
6. Copper Type M and L available.
7. Drain riser insulated standard. Supply and return insulated optional.

A	1.00	1.25	1.50	2.00	2.50	3.00
B	1.25	1.50	2.00	2.50	3.00	-
C	-	1.00	1.25	1.50	2.00	2.50

Riser Arrangements – Top Floor Units

1. All Risers Capped At Cabinet Run-Outs
   - System piping is bottom supply & return

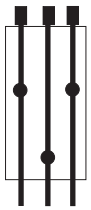
Standard for bottom supply & return unless otherwise specified.



---

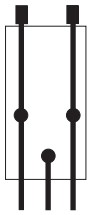
2. All Risers Open At Top
   - Bottom supply & return piping for supplying water to other units
   - Bottom supply & return piping for drain vent to roof, flushing crossover
   - Top supply & return piping

Standard for top supply & return unless otherwise specified.



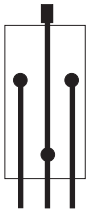
---

3. Supply & Return Open, Drain Capped At Cabinet Run-Out
   - Bottom supply & return piping with open top for venting or flushing crossover
   - Top supply & return



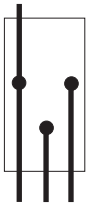
---

4. Capped Supply and Return, Drain Open At Top
   - Bottom supply & return piping with open drain riser for venting to roof or picking up drain from other equipment above



---

5. Supply Or Return Open At Top, Others Capped At Cabinet Run- Out
   - Bottom supply & top return piping
   - Top supply & bottom return piping

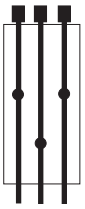


Note: Check system flushing & air venting specifications.

Riser Arrangements – Bottom Floor Units

1. All Riser Through Slab At Bottom
   - Bottom supply & return
   - Top supply & return feeding other equipment below

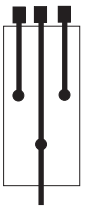
   Standard for bottom supply & return unless otherwise specified.



---

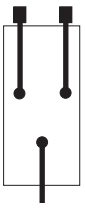
2. Supply & Return Capped At Cabinet Run-Out, Drain Through Slab
   - Top supply & return
   - Supply & return mains above these units on "Between-Floors" main piping

   Standard for top supply & return unless otherwise specified.



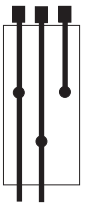
---

3. All Risers Capped At Cabinet Run-Out, Drain Through Slab
   - Isolated unit top supply & return from adjacent riser with separate drain
   - Check riser venting



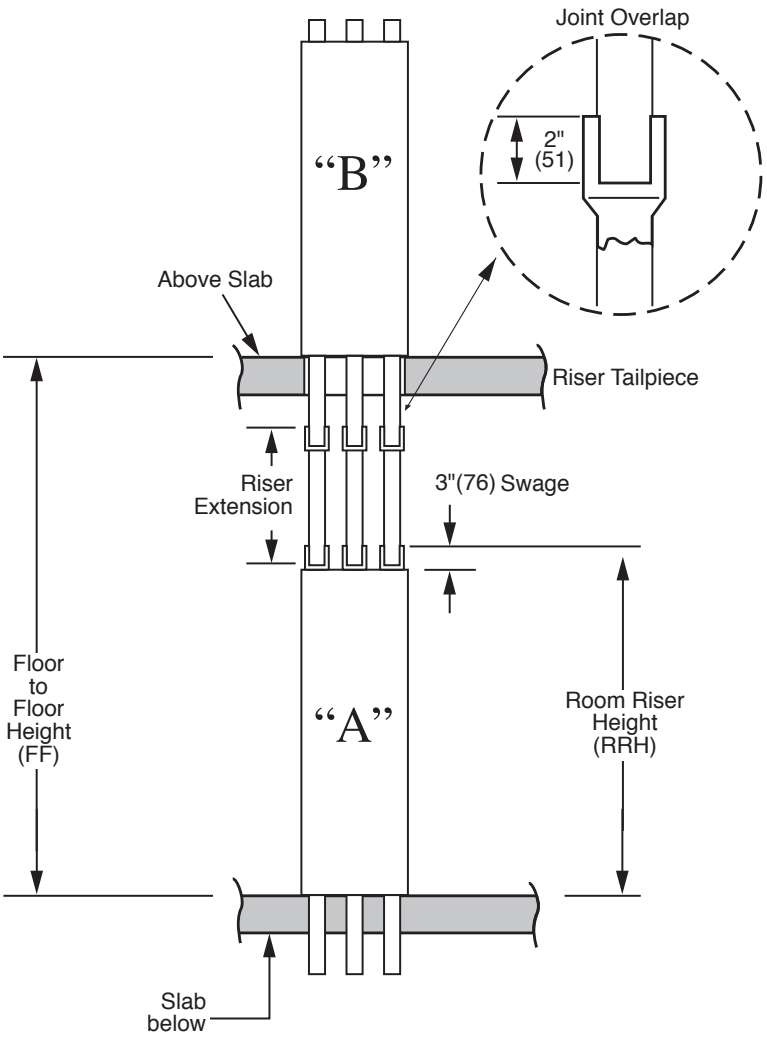
---

4. Supply Or Return Capped At Cabinet Run-Out, Other Risers Extend Through Slab
   - Bottom supply, top return piping
   - Bottom return, top supply piping



Note: Check system flushing and air venting specifications.

Riser Extension Sizing



Riser Tail Piece: Length of riser extending down from the cabinet. Riser tail piece must extend a minimum of 5" (127) below slab.

Room Riser Height (RRH): Cabinet height + 3" (76). Standard Cabinet is 88" (2235) + 3" (76) = 91" (2311).

Floor To Floor Height (FF): Distance from top of unit slab to top of above slab.

Riser Extension Length: Start with the floor to floor Dim. (FF) From this subtract the room riser height and tail piece length. Then add 4" (102) to the two joint overlaps.

Riser Extension: FF - (tailpiece + RRH) + 4" (102).

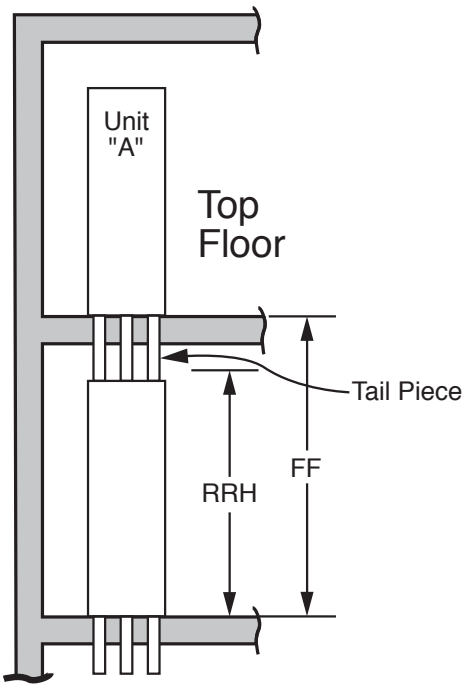
Example: Floor to floor (FF) = 120" (3048)
Room Riser Height (RRH) = 91" (2311)
Tail Piece = 13" (330).

Riser Extension: 120" (3048) - (13" (330) + 91" (2311)) + 4" (102) = 20" (508).

Notes:

1. Example shown - riser extensions would be ordered with "A" and assembled between "A" and "B".
2. Riser "A" Top and Riser "B" bottom must be the same diameter. Extensions cannot transition.

Riser Length Sizing



To determine the riser tail piece length of a unit (unit "A").

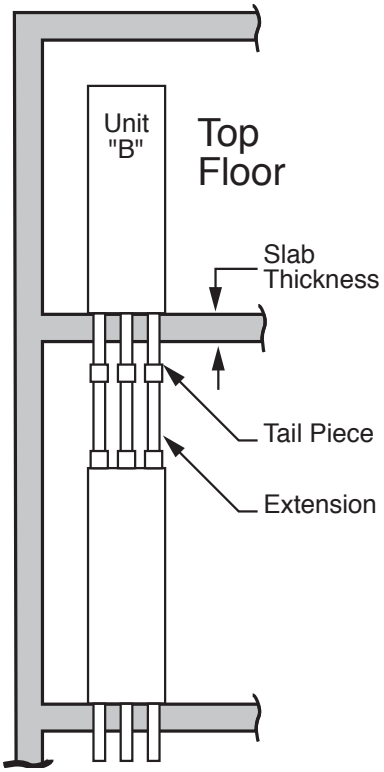
Riser Tail Piece (of unit A)= FF - RRH + 2" (51).

RRH: Room riser height is cabinet height + 3" (76).

Standard cabinet height is 88" (2235).

RRH= 88" (2235) + 3" (76) = 91" (2311).

FF: Floor to Floor height is the dimension from the top of the slab above to the top of the slab below.



To determine the riser tail piece length of a unit (unit "B") that will require riser extensions to a unit below.

Minimum Tail Piece Length (of unit "B") = slab thickness + 5" (127).

To determine riser extensions lengths see page Riser Extension Sizing.

Note: If riser length exceeds 115" (2921), riser extensions must be used. See Riser Extension Sizing. The riser tail piece must extend through the slab a minimum of 5" (127) to facilitate brazing. Special care must be taken in sizing riser lengths and tail piece lengths when:

A) Riser extensions are used.
B) Floor to floor heights vary.
C) Slab thickness varies from floor to floor.

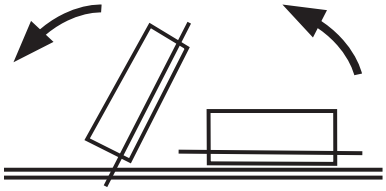
See Riser Arrangement for selection of top floor riser applications.

Cabinet Height & Slab Slot Size

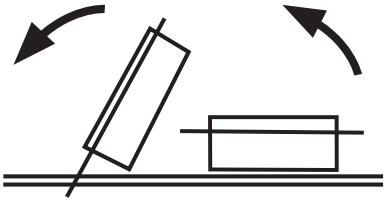
To determine the slab slot size required for the risers and to determine if clear height is OK for unit installation, use the cabinet height and slab slot charts on the next page.

To use the charts you will need the clear height in the room the unit is in, size of unit, number of risers, riser dimensions and type of installation. (See below)

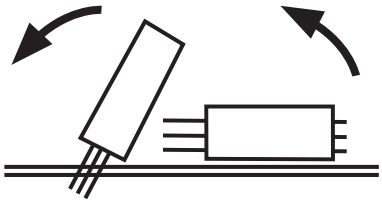
Type 1 Single Units
With a minimum clear height of 94" (2388). Start with the unit lying on the chase.



Type 2 Single Units
With a minimum clear height of 96" (2438). Start with the unit lying with the chase on top.



Type 3 Single
With a minimum clear height of 94" (2388). Start with the unit lying on its side as shown.

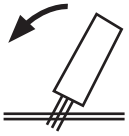


If any clear height is less than 96" (2438) check the minimum cabinet height and slot size chart to determine if the size unit you need will fit. If the standard 88" (2235) cabinet does not fit check the short 80" (2032) cabinet height and slot size chart. Call the factory if the short 80" (2032) cabinet does not fit. Check with the contractor for OK to use 80" (2032) cabinet.

Clear Height (swing height) = Floor to Floor Dimensions - Slab Thickness of Slab above the unit. CH = FF - ST.

Slab Slot Chart - 3 Pipe

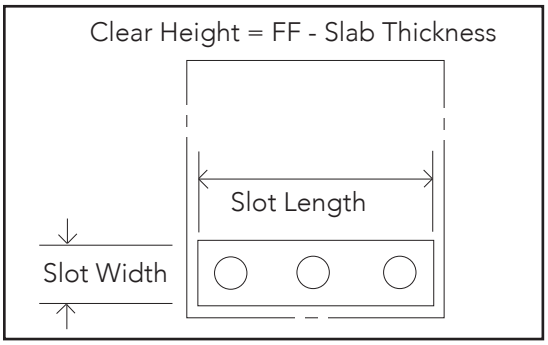
3 Pipe Standard 88" Cabinet

Model TRM	Clear Height	Slab Slot Size Type of Installation Type 1	Type 2	Type 3
				
		W x L	W x L	W x L
09 - 12	96 95 94 93 92	5 7/8" X 15" [149 X 381] 6 1/4" X 15" [159 X 381] 6 5/8" X 15" [168 X 381] 7" X 15" [179 X 381] 7 1/2" X 15" [191 X 381]	5 7/8" X 15" [149 X 381] 5 3/8" X 15" [137 X 381] 5 3/8" X 15" [137 X 381] Not Recommended Not Recommended	5" X 15" [127 X 381] 5" X 15" [127 X 381] 5" X 15" [127 X 381] 5" X 15" [127 X 381] Not Recommended
15 - 18	96 95 94 93	6 1/4" X 18" [159 X 457] 6 3/4" X 18" [171 X 457] 7 1/8" X 18" [181 X 457] 7 5/8" X 18" [194 X 457]	5 1/8" X 18" [130 X 457] 5 3/8" X 18" [137 X 457] Not Recommended Not Recommended	5" X 18" [127 X 457] 5" X 18" [127 X 457] 5" X 18" [127 X 457] 5" X 18" [127 X 457]
24 - 36	96 95 94	7" X 22" [178 X 559] 7 1/2" X 22" [191 X 559] 8" X 22" [203 X 559]	5 1/8" X 22" [130 X 599] Not Recommended Not Recommended	5" X 22" [149 X 599] 5" X 22" [149 X 599] 5" X 22" [149 X 599]
09 - 12	91 or less	Not Recommended	Not Recommended	Not Recommended
15 - 18	92 or less	Not Recommended	Not Recommended	5" X 18" [149 x 457]
24 - 36	93 or less	Not Recommended	Not Recommended	5" X 22" [127 x 599]

To use this chart look down the model column to find the model. Then look across to find the clear height. If your clear height exceeds 96" use the 96" slab slot size. Then under the type of installation read the slab slot size.

Above charts allow 1" tolerance in clear height to allow for variance in floor to floor dimensions.

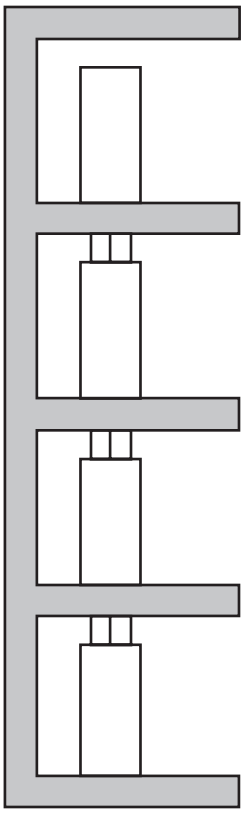
Clear height is the floor to floor dimension of the floor the unit is on minus the slab thickness above.



Riser GPM Sizing

Riser GPM requirements and individual Unit GPM requirements are necessary to select the proper Riser Piping diameters. Refer to this page to determine GPM requirement, then refer to Riser Diameter Sizing Table to determine Riser Piping diameters.

Example is for bottom supply - bottom return system feed loop. GPM's are dependent upon unit load and system loop water temperatures. Please refer to Performance Charts for individual Unit GPM requirements.



Unit GPM (UGPM) = Required gallon per minute from "Performance Charts," in "Vertical Stacked Design Guide."

Total Riser GPM (TRGPM) = The sum of, all Units, GPM on each Riser.

Total GPM Per Floor (TGF) = Total GPM minus the sum of Unit GPM from all floors below. TGF = TRGPM - (sum UGPM from units below).

Example: Four floors, Consisting of units sizes TRM24, TRM12 and TRM09, as shown in diagram. GPM's are 6.0, 3.0 and 2.0 respectively.

TRGPM = 6.0 + 3.0 + 3.0 + 2.0 = 14 GPM.

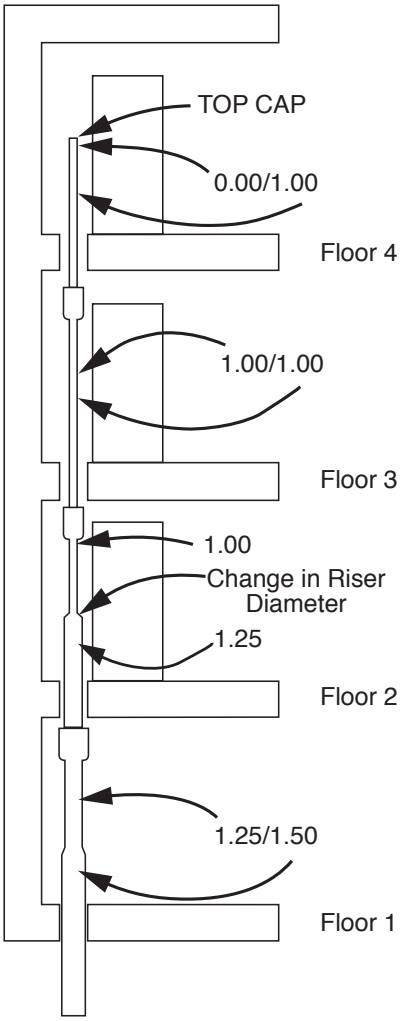
Floor 4: TGF = 14 - (3.0 + 3.0 + 2.0) = 2 GPM needed at floor 4.
Floor 3: TGF = 14 - (3.0 + 2.0) = 5 GPM needed at floor 3.
Floor 2: TGF = 14 - (2.0) = 8 GPM needed at floor 2.
Floor 1: TGF = 14 - (no floors below) = 14 GPM needed at floor 1.

Refer to Riser Diameter Sizing page.

Riser Diameter Sizing

Refer to Riser GPM Sizing for the prefix to this example.

Each TRM Vertical Stack unit has three riser pipes. The following example will be for one riser pipe (from the top floor to the bottom floor), and will be representative of the remaining two riser pipes.



From Table 1 (below) determine the proper riser diameter needed to satisfy the required GPM's at each unit. Refer to Table 2 (below) for a summary.

The following nomenclature is used to designate the diameters at the top and bottom of each unit.

Top Cap - Top half of riser is eliminated and sealed.
Bottom Cap - Bottom half of riser is eliminated and sealed.
0.00/1.00 - Indicates top cap/1" bottom.
1.00/1.25 - Indicates 1" top/1.25" bottom.
1.25/0.00 - Indicates 1.25" top/bottom cap.
(from this we develop Table 3)

Note: Transitions limited to 1 nominal diameter size larger or smaller within each floor.

Values from Table 3 are to be entered on the Riser Piping Schedule. Top diameter must match bottom diameter of floor above.

Table 1 (Max GPM for Frictional Loss = 4 PD FT/100 FT)

Maximum GPM	7	12	20	44	78	130
Nominal Riser Diameter	1”	1-1/4”	1-1/2”	2”	2-1/2”	3”

Table 2

Floor	GPM	Diameter From Table 1
4	2	1” [25.4]
3	5	1 [25.4]
2	8	1.25” [31.8]
1	14	1.50” [38.1]

Table 3

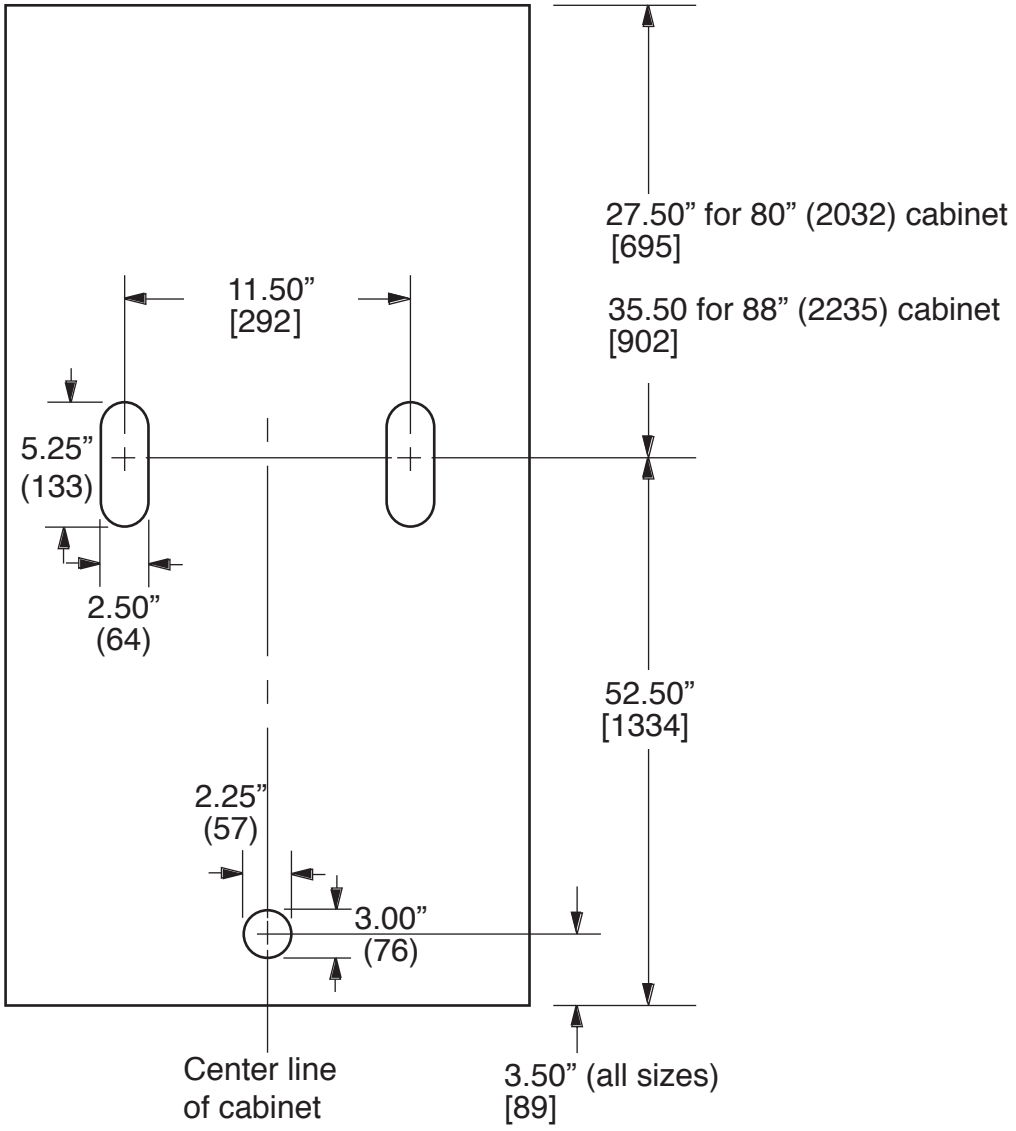
Nomenclature per Unit	Description
0.00/1.00	Top Cap, w/1” Bot Feed
1.00/1.00	1” Full Length Riser
1.00/1.25	1” Top, 1.25” to 1st Floor
1.25/1.50	1.25” Top, 1.50" Bottom

Table 4

Drain Diameter	Max Tonnage
1" [25 mm]	6
1¼" [32mm]	30
1½" [38mm]	50
2" [51mm]	150

Values from Table 3 are to be entered on the Riser Piping Schedule. Top diameter must match bottom diameter of floor above.
Table 4 shows max A/C tonnage for drain riser diameter.

Riser Slot Arrangements



Slots allow for riser stack expansion and contraction. Riser stub should be centered in slot. Dimensions are inches [mm].

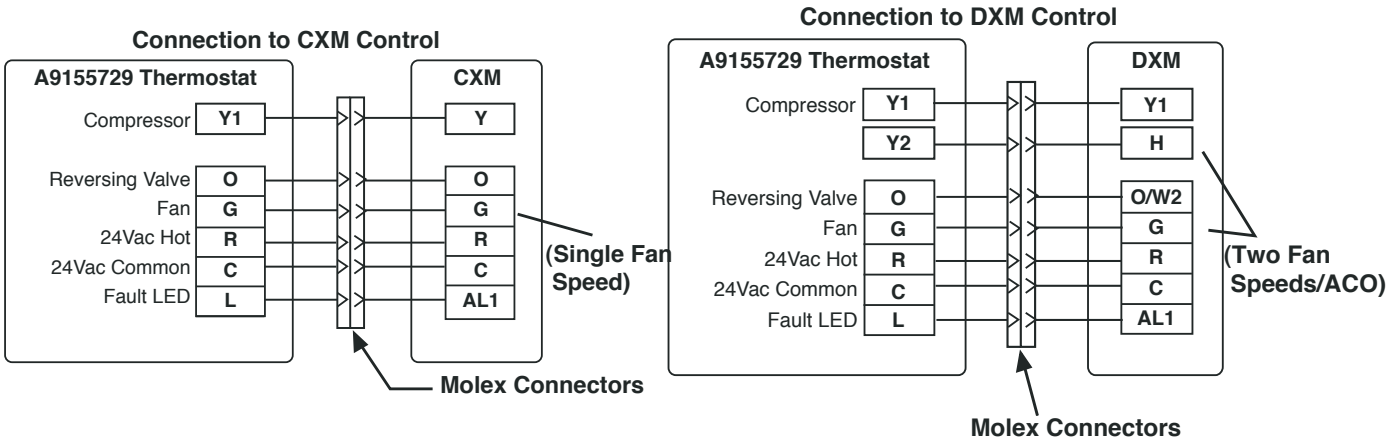
Two types of thermostats are available -
AT Series - require field to make wiring connections to screw terminals on thermostat. Cabinet construction for remote thermostat with field supplied whip (wires long enough to reach wall thermostat location) use AT Series.

A91557 Series - are the AT Series thermostats with a pigtail factory assembled, 6" long wires terminating with 9 pin molex connector. Cabinet construction for surface mount or remote mount thermostat with factory whip (15 foot standard, up to 45 foot as special) wires terminate with 9 pin molex for quick connection to A91557 Series thermostats.

Thermostats connected to CXM may not have all the thermostat features as if connected to DXM. See table.

Customer supplied thermostats should be approved by ClimateMaster Engineering Department prior to using. For cabinets with surface mount construction, field will have to cut off the molex plug and wire to thermostat per wire diagram.

A9155729 shown below is ATP32U03 with factory pigtail.



Thermostat Only+	Thermostat Assembly with Molex Connector 6" Pigtail	Remote	Surface	Requires Remote Sensor on Chassis	CXM	DXM	Manual Changeover	Automatic Changeover	Programmable	Digital	Fault Indicator	Setback Override	Fan Speeds
ATA11C04	A9155725	X				X	X	X		X	X		2 *
ATA11C04	A9155727		X	X		X	X	X		X	X		2 *
ATP32U03	A9155729	X				X	X	X	X	X	X	X	1 or 2**
ATP32U03	A9155731		X	X		X	X	X	X	X	X	X	1 or 2**
ATA11U01	A9155736	X			X	X	X	X		X	X		1
ATM11C11	A9155740	X	X		X	X	X						1
ATA22U01	A9155744	X			X	X	X	X		X	X		1 or 2**
ATP21U01	A9155745	X			X	X	X		X	X			1

*Fan speed selection on thermostat, requires DXM.
**Fan speed change automatic through Y2 signal to DXM. Single speed with CXM.

Units Are Shipped FOB Factory

ClimateMaster Hi-Rise Cabinets are normally shipped to the jobsite on dedicated open flatbed trailers, palletized for maximum shipping density, grouped together by building, size, and floor where possible, wrapped and covered with tarp for protection (Figure 1). The size of each pallet depends upon the cabinet size and number of cabinets (Figure 2).

Special shipping accommodations can be provided by ClimateMaster. Examples might include:

- Closed truck or container shipping, on special end fork pallets.
- Reduced height, width or weight pallets.
- Unit grouped on pallets by riser instead of floor (for example, a retrofit job).
- Export or over-crating.
- Risers shipped separately from cabinets.

However, any such special shipping needs must be included with the order of the units. ClimateMaster will charge extra for any accommodations which significantly increase the cost of the shipment.

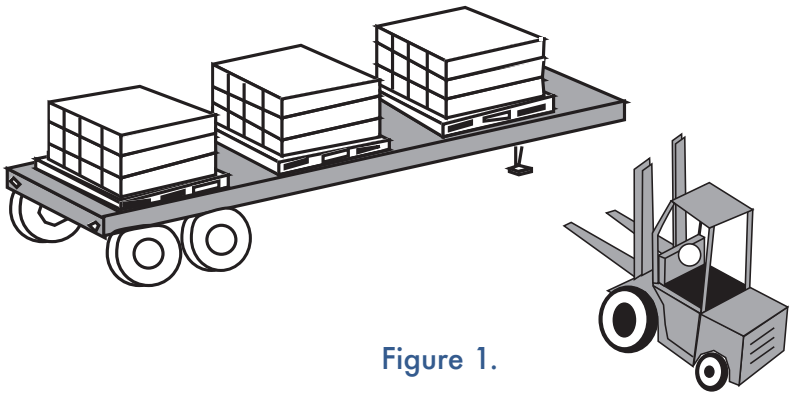


Figure 1.

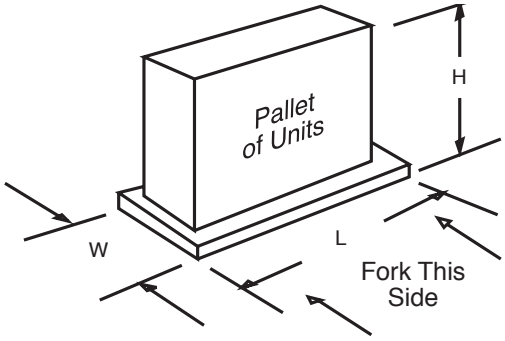


Figure 2.

Cabinet Size	# of Cabinets	L (in.)	W (in.)	H (in.)	Approx. Weight per Pallet	Approx. Quantity per Truck
09-12	4	106*	22	84	725	80
	8	106*	44	84	1450	80
15-18	4	106*	25	96	785	80
	8	106*	50	96	1570	80
24-36	3	106*	29	87	750	60
	6	106*	58	87	1500	60

* 106" for standard, 104" long risers (typically add 2" to riser length.)

Tranquility® Modular - TRM Series
Engineering Specifications – Page 1

General:

Furnish and install ClimateMaster Tranquility® "Vertical Stack" Water Source Heat Pumps, as indicated on the plans with 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 pass a factory acceptance test. The quality control system shall automatically perform the factory acceptance test via computer. A detailed report card from the factory acceptance test shall ship with each unit. ***(Note: If unit fails the factory acceptance test it shall not be allowed to ship. Unit serial number will be recorded by factory acceptance test and furnished on report card for ease of unit warranty status.)***

Basic Construction:

The cabinet panels shall be fabricated from heavy gauge galvanized steel. The rigid one-piece cabinet assembly shall be constructed so that it is self-supporting, and can be installed prior to the chassis arrival, and to be able to avoid damage during construction. Top, base, fan deck, and other metal structural parts are to be 16 gauge construction, while exterior panels to be 20 gauge; unit further strengthened by structural breaks at corners. **Units not constructed of a minimum of these thicknesses are not acceptable**. Cabinet shall have a top panel and a bottom panel for structural rigidity of the cabinet**; no "open" top or "open" bottom designs allowed.**

The cabinet base shall contain a secondary drain pan fully insulated with a pressure differential drain trap connected to the condensate riser pipe, and guide rails for the slide in refrigeration chassis. Drain pan(s) shall be easily accessible for cleaning. All interior surfaces shall be lined with 1/2 inch (12.7mm) thick, 1-1/2 lb/ft3 (24 kg/m3) acoustic type fiberglass insulation. All fiber glass shall be coated and have exposed edges butted up to flanges 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.**

Cabinet arrangements shall allow symmetrical placement of riser piping on any one of the three sides of the cabinet not used for the chassis access. All Cabinet openings shall have dry wall flanges on all sides. Supply air openings shall be factory cut and flanged as shown on plans. For air noise attenuation purposes, the discharge air from fan shall discharge into insulated plenum that also contains insulated x-shape air baffle. **Units not having supply air noise baffles are not acceptable**. Cabinet design shall allow a full height base board (4.50 inches/114mm) beneath the return air "G" panel. The cabinet shall contain an easily removable motor/blower assembly.

Electrical conduit shall be installed from electrical unit control compartment to top of cabinet for low voltage control wiring as well as separate conduit for main power wiring. **Units without these two factory installed electric conduits will not be accepted.**

Full-length supply, return, and insulated condensate water risers shall be type M copper. Supply and return risers have integral internal piping including ball valves (for shut off purposes at unit). Risers and piping shall be factory pressure tested to check for leaks. Field installed hose kits are required to connect the chassis piping to the cabinet ball valve. The condensate riser shall be insulated with 3/8" (9.5mm) Armaflex type insulation. The top of each riser shall be deeply swaged (3 in./76.2mm) to accept connection to the

riser above/below, allowing for a floor to floor dimensional variance of ± one inch (25.4mm). **Units not having swaged riser-piping connections shall not be acceptable. Couplings and trim pieces shall not be allowed.**

Option: Type L riser piping.

Option: Supply and return risers insulated with 3/8" (9.5mm) ARMAFLEX type insulation.

Option: Unit mounted Thermostat provisions – includes insulated junction box mounted inside discharge plenum that is connected to Molex-type connector wired to unit thermostat terminals, and having tile ring on cabinet for drywall installation to accept thermostat mounting. Use part number A9155740, A915531 or A9155727 thermostat assembly, which is thermostat model ATM11C11, ATP32U03 or ATA11C04, respectively with mating Molex-type connector.

Option: Low voltage 15 foot whip with molex-type connector for connection to remote thermostat. Use part number A9155725, A9155729, or A9155740 thermostat assembly, which is thermostat model ATA11C04, ATP32U03, or ATM11C11 respectively with mating molex-type connector.

Option: Electric Heater - Factory Mounted. Field connection will be single point power. kW available varies with model sizes.

Fan and Motor Assembly:

The cabinet shall contain a removable motor/blower assembly. Units shall have a direct drive centrifugal fan. The fan motor shall be 3 speed, permanently lubricated, PSC type with thermal overload protection. The fan motor for small size units (09 and 12) shall be isolated from the fan housing by a torsionally flexible motor mounting system with rubber type grommets to inhibit vibration induced high noise levels associated with "hard wire belly band" motor mounting. The fan motor on medium and large units (15-36) shall be isolated with flexible rubber type isolation grommets only. Airflow/External static pressure rating of the unit shall be based on a wet coil and clean filter. **Ratings based on a dry coil and/or no air filter shall not be acceptable.**

Option: ECM Motor, high efficient, preprogrammed motor for constant torque. Utilize up to 2 of the 5 speed taps for optimum CFM and lowest starting sound. Requires DXM controller. Recommend 2 speed thermostat.

Chassis:

The chassis, which incorporates the air coil, water coil, drain pan, and compressor, shall be easily installed for quick jobsite installation and future servicing purposes. The slide in chassis shall have insulated panels surrounding the compressor. Compressors are not in the air stream. The chassis base shall be fabricated from heavy gauge galvanized steel formed to match the slide in rails of the cabinet. All electrical connections between the chassis and cabinet shall be made via locking quick-connects. Units shall have a factory installed 1 inch (25.4mm) thick filter bracket and throwaway type glass fiber filter. Furnish one spare set of filters.

Option: UltraQuiet package shall consist of high technology sound attenuating material that is strategically applied to the compressor (rotary only) and inside compressor compartment to dampen and attenuate sound transmissions. Compressor is mounted on specially engineered sound-tested isolators.

Water connections between chassis and the cabinet shall be accomplished via a hose kit consisting of Kevlar-reinforced EPDM core hose surrounded by a stainless-steel braid. Hose kit shall have brass fittings with stainless-steel ferrules. Hose ends shall be solid External MPT which connects to mating fitting on cabinet shut off ball valve(s), and Internal NPSM (National Pipe Straight Mechanical) swivel end with fiber or EPDM washer which connects to mating threaded end connection on chassis. The hose kit shall be rated for

400 psi (2756 kPa) design working pressure.

Refrigerant Circuit:

All units shall contain an EarthPure® (HFC-410A) sealed refrigerant circuit including a high efficiency scroll or 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 contractor supplied disconnect switch. **Units that cannot be reset at the thermostat shall not be acceptable.**

Hermetic compressors shall be internally sprung and externally isolated. The compressor shall have a dual level vibration isolation system. The compressor will be mounted on specially engineered sound-tested EPDM vibration isolation grommets to a large heavy gauge compressor mounting plate, which is then isolated from the cabinet base with grommets for maximized vibration attenuation. All units (except units with rotary compressors) shall include a discharge muffler to further enhance sound attenuation. Compressor shall have thermal overload protection.

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).

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

Refrigerant metering shall be accomplished by thermostatic expansion valve only. Expansion valves shall be dual port balanced types 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. Valve to be normally closed type.

Option: 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.

Cabinet 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 fully

insulated. Drain pan shall have at a minimum a doubled sloped surface to allow positive drainage to the outlet opening, which shall be at the lowest level of the entire pan suface. Drain outlet shall be connected from pan outlet to condensate riser (if supplied) with factory installed trap inside of cabinet. The unit as standard will be supplied with solid-state electronic condensate overflow protection. Mechanical float switches will NOT be accepted.

Option: Stainless steel drain pan

Electrical:

A control compartment shall be located within the cabinet and shall contain a 50VA transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring 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. Unit controls shall be 24 Volt and provide heating or cooling as required by the remote thermostat/sensor.

Option: Disconnect Switch, Non-Fused, classified as motor disconnect.

Option: Circuit Breaker, all 208/230 volt and 265 volt, 15 and 20 amp - HACR rated, 265 volt 25 amp and higher - supplemental rated.

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.

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 thermostat 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.**

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.

Return Panel/Supply Grilles:

The return panel shall be architecturally designed, acoustic type, flush mounted with hinged door for easy and quick access to filter and unit interior. Chassis shall be easily removed. The hinged return panel shall be made of heavy gauge die formed galvanized steel with a powder coat finish in "polar ice" color.

Return air panels that protrude from wall more than 5/8 inch (15.9mm) are not acceptable. Supply grille(s) shall be architecturally designed "brushed" aluminum or powder coated steel (color: polar ice).

Option: Style "G" return air panel with frame.

Option: Supply grille with double deflection style louvers.

Option: Supply grille with double deflection style louvers with opposed damper.

Option: Motorized fresh air damper for either "G" or "H" panel with frame - allows outside air to enter on right or left side.

Option: Style "H" return air panel with frame (Note: This option eliminates unit-mounted thermostat option).

Warranty:

ClimateMaster 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 - AHH Series (required for field water connections):

Water connections between chassis and the cabinet shall be accomplished via a hose kit consisting of Kevlar-reinforced EPDM core hose surrounded by a stainless-steel braid. Hose kit shall have brass fittings with stainless-steel ferrules. Hose ends shall be solid External NPT which connects to mating fitting on cabinet shut off ball valve(s), and Internal NPSM (National Pipe Straight Mechanical)

swivel end with fiber or EPDM washer which connects to mating threaded end connection on chassis. The hose kit shall be rated for 400 psi (2756 kPa) design working pressure. This hose kit accessory is required for each cabinet.

Thermostats:

The thermostat shall be a ClimateMaster 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 (ATA11C04) – 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. A fault LED shall be provided to display specific fault condition. Thermostat shall allow use of an accessory remote temperature sensor (AST009), but may be operated with internal sensor via orientation of a jumper.

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 (2H/1C), manual changeover with HEAT-OFF-COOL-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. 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 ClimateMaster 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 ClimaDry® 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 ClimateMaster 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:

ClimateMaster 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).

Performance Sheet

SUBMITTAL DATA - S-I UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ kW

EER: _____

Heating Capacity: _____ kW

COP: _____

Ambient Air Temp: _____ °C

Entering Water Temp (Clg): _____ °C

Entering Air Temp (Clg): _____ °C

Entering Water Temp (Htg): _____ °C

Entering Air Temp (Htg): _____ °C

Airflow: _____ l/s

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (kg)

ELECTRICAL DATA

Power Supply: _____ Volts

_____ Phase _____ Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

SUBMITTAL DATA - I-P UNITS

Unit Designation: _____

Job Name: _____

Architect: _____

Engineer: _____

Contractor: _____

PERFORMANCE DATA

Cooling Capacity: _____ Btuh

EER: _____

Heating Capacity: _____ Btuh

COP: _____

Ambient Air Temp: _____ °F

Entering Water Temp (Clg): _____ °F

Entering Air Temp (Clg): _____ °F

Entering Water Temp (Htg): _____ °F

Entering Air Temp (Htg): _____ °F

Airflow: _____ CFM

Fan Speed or Motor/RPM/Turns: _____

Operating Weight: _____ (lb)

ELECTRICAL DATA

Power Supply: _____ Volts

_____ Phase _____ Hz

Minimum Circuit Ampacity: _____

Maximum Overcurrent Protection: _____

Notes

Revision History

Date:	Item:	Action:
11/15/16	Document Design Update	Updated
03/8/16	Page 65	Edit Engineering specs
09/24/14	Corrected TRM30 and 36G Electrical Data	Updated
04/23/14	Decoder page 8	Updated
11/26/13	Physical Data Table	Updated
11/15/13	ASHRAE/AHRI/ISO English & Metric Tables	Updated
11/15/13	Corrected the page #'s for 65-71	Updated
07/17/12	Wiring Diagrams and Matrix	Updated
07/17/12	Electrical Data Tables	Updated
04/27/12	Miscellaneous	Edited
04/27/12	ECM Motor for 09 and 12	Added
03/22/12	ATP21	Corrected thermostat description
02/17/12	ATA11C06 Information	Removed
09/20/11	All	Revised flow regulators and performance data. Added thermostat table and inner G panel with louvers.
08/23/11	Physical Data Table	Updated
08/09/11	Unit Maximum Working Water Pressure	Updated to Reflect New Safeties
08/03/11	Engineering Specifiations	Added Digital Night Setback with Pump Restart (DXM w/ ATP32U03/04)
04/07/11	Engineering Specification NOTICE	Updated
03/21/11	AT Series and A91557 Series Thermostats	Added
02/11/11	Performance Data Selection Notes	Updated
02/03/11	Electrical Data Table	Updated
01/03/11	Format - All Pages	Updated
10/06/10	Cabinet and Chassis Nomenclature	Updated
10/04/10	Riser Extension Sizing	Updated Notes
10/04/10	Performance Data TRM 09 - 36	Updated
09/28/10	Engineering Specifications	Updated
09/22/10	Electrical Data	Updated
09/22/10	Unit Features	Updated
08/16/10	"G" Style Return Air Panel with Cabinet Flush Mounted	Updated
08/16/10	Blower Performance Data	Updated Table Notes
07/29/10	Wiring Diagram Matrix	Updated
07/29/10	Electrical Data	Updated
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	Format - All Pages	Updated
06/11/10	Engineering Specifiations	Updated
03/30/10	G-Panel Diagrams	Updated Dimensions
03/30/10	Electrical Data	Revised Electrical Data
01/07/09	Miscellaneous ECM-X	Edited
01/07/09	816 Information	Removed
11/20/09	ECM-X Motor TRM24 Electrical Data	Corrected
05/28/09	Stand-Alone and Big Book Submittals	Consolidated
12/12/08	Riser Slot Arrangement Diagram	Figures added and edited
12/12/08	Cabinet Diagrams on pages 22, 24-31	Edited and Updated
11/19/08	Electrical Data	Data Updated
10/27/08	Blower Performance Data	Notes Updated
08/26/08	Physical Data Table	Max Working Pressure Table Added
06/19/08	Electrical Data	Table Expanded
05/30/08	MWV Pressure Drop Data	Updated
04/19/07	Table of Contents	Added Table of Contents
04/19/07	Specifications	Updated Specifications for new Safety Agency
11/16/06	Performance Data	Added new rated voltage note
11/16/06	Decoders	Updated Cabinet and Chassis decoder
11/16/06	G-Panel	Updated dimensions
11/16/06	Various	Minor formatting changes
07/14/06	First Published	