



























Model no. PS6DD__		02	03	04	05
<b>Chilled-water Valve - 2-Way modulating</b>					
Valve Size	in	1	1	1	1
<b>Piping Connection Size</b>					
Liquid Line	- ODM -in	1/2	1/2	1/2	1/2
Hot Gas Line	- ODM -in	5/8	5/8	5/8	5/8
Chilled Water	-ODM -in	1 1/8	1 1/8	1 1/8	1 1/8
Hot Water	- ODM -in	7/8	7/8	7/8	7/8
Steam	- MPT -in	7/8	7/8	7/8	7/8
Steam Condensate	- ODM -in	3/4	3/4	3/4	3/4
Humidifier Water	- ODM -in	1/4	1/4	1/4	1/4
Condensate Drain	- ODM -in	3/4	3/4	3/4	3/4
<b>Physical Details - For units with standard options only; consult factory for special options and configuration</b>					
Dimensions	in		37 (W) x 35-1/8 (D)x 76 (H)		
Approx. Weight	lbs	740	753	753	765
<b>Matching Air-Cooled Condenser – Selected at 95°F Ambient</b>					
Model		KS11-039-1	KS11-065-1	KS11-065-1	KS11-078-1
Width x Depth x Height in		38 x 30 x 36	51 x 30 x 44	51 x 30 x 44	51 x 30 x 44
Weight	lbs	150	170	170	177

<sup>1</sup> Standard options

## Water Dual-cooling System

Model no. PS6HD_ _		02	03	04	05
<b>Cooling Capacity – Direct Expansion - Rated at standard air volume</b>					
<b>75°F (24°C) DB, 50%rh</b>					
Net Total	BTUH	29825	39084	47723	59316
Net Sensible	BTUH	25526	33263	40143	52012
THR	BTUH	37177	48925	60768	77416
<b>75°F (24°C) DB, 45%rh</b>					
Net Total	BTUH	29488	38584	47119	58219
Net Sensible	BTUH	28628	37175	44933	58219
THR	BTUH	36780	48403	60122	76220
<b>72°F (22°C) DB, 50%rh</b>					
Net Total	BTUH	28450	37290	45436	55965
Net Sensible	BTUH	25233	32859	39586	51355
THR	BTUH	35763	47040	58445	73948
<b>72°F (22°C) DB, 45%rh</b>					
Net Total	BTUH	28074	36832	44885	55056
Net Sensible	BTUH	27974	36805	44618	55056
THR	BTUH	35395	46562	57844	72878
<b>68°F (20°C) DB, 50%rh</b>					
Net Total	BTUH	26583	34892	42476	51652
Net Sensible	BTUH	24853	32341	38925	50718
THR	BTUH	33936	44624	55460	69498
<b>68°F (20°C) DB, 45%rh</b>					
Net Total	BTUH	26249	34485	42446	50790
Net Sensible	BTUH	26155	34448	42446	50790
THR	BTUH	33609	44200	54922	68507
<b>Cooling Capacity - Chilled-water - Rated at standard air volume, 45°F entering water &amp; 10°F water temperature rise</b>					
<b>75°F (24°C) DB, 50%rh</b>					
Net Total	BTUH	28938	37206	55374	64409
Net Sensible	BTUH	25036	32622	45201	53288
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	6.3 / 2.8	8.1 / 4.4	12.1 / 11.3	14.4 / 15.6
<b>75°F (24°C) DB, 45%rh</b>					
Net Total	BTUH	26841	34724	50904	59472
Net Sensible	BTUH	26244	34348	47025	55778
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	5.8 / 2.4	7.6 / 3.9	11.2 / 9.8	13.4 / 13.6
<b>72°F (22°C) DB, 50%rh</b>					
Net Total	BTUH	22629	29498	44234	51436
Net Sensible	BTUH	22445	29458	40660	47997
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	4.9 / 1.8	6.5 / 2.9	9.8 / 7.7	11.7 / 10.6
<b>72°F (22°C) DB, 45%rh</b>					
Net Total	BTUH	21954	28705	41995	49110
Net Sensible	BTUH	21954	28705	41995	49110
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	4.8 / 1.7	6.3 / 2.8	9.3 / 7.0	11.2 / 9.8
<b>68°F (20°C) DB, 50%rh</b>					
Net Total	BTUH	15950	21276	32604	37955
Net Sensible	BTUH	15950	21276	32604	37955
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	3.5 / 1.0	4.7 / 1.7	7.3 / 4.6	8.9 / 6.4
<b>68°F (20°C) DB, 45%rh</b>					
Net Total	BTUH	15966	21317	32521	37914
Net Sensible	BTUH	15966	21317	32521	37914

Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	3.5 / 1.0	4.7 / 1.7	7.3 / 4.5	8.8 / 6.4
Model no. PS6HD_ _		02	03	04	05
<b>Fan Section - EC Plenum Fan</b>					
Standard Air Volume	CFM	1400	1900	2400	3000
External Static Pressure in	in	0.3	0.3	0.3	0.3
Quantity of Fans		1	1	1	1
Net Total Fan Motor Power	kW	2.5	2.5	2.5	2.5
Absorbed Power	kW	0.32	0.46	0.81	1.47
<b>Compressor - Refrigerant R407C</b>					
Quantity of Compressors		1	1	1	1
Type		Scroll	Scroll	Scroll	Scroll
<b>Evaporator Coil - Copper tube / aluminium fin - Stainless steel drain pan</b>					
Face Area	ft <sup>2</sup>	7.5	7.5	7.5	7.5
Rows Deep (DX/Chilled Water)		3 / 3	3 / 3	3 / 4	4 / 4
Fins per inch		13	13	13	13
Face Velocity	FPM	187	253	320	400
<b>Reheat Section</b>					
<i>Electric Reheat<sup>1</sup> - Single Stage, finned tubular type heater, SCR Controlled</i>					
Capacity	kW	6	6	6	6
Quantity of Heaters		3	3	3	3
<b>Humidifier Section</b>					
<i>Electrode Boiler Type<sup>1</sup></i>					
Capacity	lb/hr	10	10	10	10
Humidifier Power	kW	3.4	3.4	3.4	3.4
<b>Filter Section - Pleated disposable type, 30%efficiency to ASHRAE 52-76</b>					
<i>Downflow Models</i>					
Quantity of Filters		2 / 1	2 / 1	2 / 1	2 / 1
Nominal Size	LxWxD-in		20 x 24 x 2	12 x 24 x 2	

Model no. PS6HD__		02	03	04	05
<b>Condensing Water Requirement</b>					
<b>75°F EWT</b>					
Flow Rate	GPM	6.5	8.1	10.6	13.6
Unit Pressure Drop	ft-H <sub>2</sub> O	19.9	13.8	20.1	16.5
<b>85°F EWT</b>					
Flow Rate	GPM	5.6	6.8	9.5	12.1 14.4
Unit Pressure Drop	ft-H <sub>2</sub> O	15.5	10.8	17.6	
<b>Water Regulating Valve - 2-way, head pressure controlled</b>					
Size	in	1/2	3/4	3/4	1
<b>Chilled-water Valve - 2-Way modulating</b>					
Valve Size	in	1	1	1	1
<b>Piping Connection Size</b>					
Liquid Line	- ODM -in	1/2	1/2	1/2	1/2
Hot Gas Line	- ODM -in	5/8	5/8	5/8	5/8
Condensing Water	- ODM -in	1-1/8	1-1/8	1-3/8	1-3/8
Chilled Water	-ODM -in	1 1/8	1 1/8	1 5/8	1 5/8
Hot Water	- ODM -in	7/8	7/8	7/8	7/8
Steam	- ODM -in	7/8	7/8	7/8	7/8
Steam Condensate	- ODM -in	3/4	3/4	3/4	3/4
Humidifier Water	- ODM -in	1/4	1/4	1/4	1/4
Condensate Drain	- ODM -in	3/4	3/4	3/4	3/4
<b>Physical Details - For units with standard options only; consult factory for special options and configuration</b>					
Dimensions	in		37 (W) x 35-1/8 (D)x 76 (H)		
Approx. Weight	lbs	750	777	777	819

<sup>1</sup> Standard options



## Glycol Dual-cooling System

Model no. PS6ED _ _		02	03	04	05
<b>Cooling Capacity – Direct Expansion - Rated at standard air volume</b>					
<b>75°F (24°C) DB, 50%rh</b>					
Net Total	BTUH	26898	35447	43167	53000
Net Sensible	BTUH	24713	32224	38753	50851
THR	BTUH	36251	47861	59331	74419
<b>75°F (24°C) DB, 45%rh</b>					
Net Total	BTUH	26565	34947	42553	51934
Net Sensible	BTUH	26430	34877	42553	51830
THR	BTUH	35859	47349	58681	73255
<b>72°F (22°C) DB, 50%rh</b>					
Net Total	BTUH	25618	33703	41020	49865
Net Sensible	BTUH	24579	31916	38351	49592
THR	BTUH	34937	46117	57169	71177
<b>72°F (22°C) DB, 45%rh</b>					
Net Total	BTUH	25248	33248	40466	48902
Net Sensible	BTUH	25140	33178	40453	48861
THR	BTUH	34576	45646	56571	70097
<b>68°F (20°C) DB, 50%rh</b>					
Net Total	BTUH	23875	31475	38247	45783
Net Sensible	BTUH	23715	31392	37929	45529
THR	BTUH	33238	43893	54397	66975
<b>68°F (20°C) DB, 45%rh</b>					
Net Total	BTUH	23576	31054	37764	44953
Net Sensible	BTUH	23534	31017	37746	42612
THR	BTUH	32914	43458	53860	66010
<b>Cooling Capacity - Chilled-water - Rated at standard air volume, 45°F entering water &amp; 10°F water temperature rise</b>					
<b>75°F (24°C) DB, 50%rh</b>					
Net Total	BTUH	28938	37206	55374	64409
Net Sensible	BTUH	25036	32622	45201	53288
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	6.3 / 2.8	8.1 / 4.4	12.1 / 11.3	14.4 / 15.6
<b>75°F (24°C) DB, 45%rh</b>					
Net Total	BTUH	26841	34724	50904	59472
Net Sensible	BTUH	26244	34348	47025	55778
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	5.8 / 2.4	7.6 / 3.9	11.2 / 9.8	13.4 / 13.6
<b>72°F (22°C) DB, 50%rh</b>					
Net Total	BTUH	22629	29498	44234	51436
Net Sensible	BTUH	22445	29458	40660	47997
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	4.9 / 1.8	6.5 / 2.9	9.8 / 7.7	11.7 / 10.6
<b>72°F (22°C) DB, 45%rh</b>					
Net Total	BTUH	21954	28705	41995	49110
Net Sensible	BTUH	21954	28705	41995	49110
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	4.8 / 1.7	6.3 / 2.8	9.3 / 7.0	11.2 / 9.8
<b>68°F (20°C) DB, 50%rh</b>					
Net Total	BTUH	15950	21276	32604	37955
Net Sensible	BTUH	15950	21276	32604	37955
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	3.5 / 1.0	4.7 / 1.7	7.3 / 4.6	8.9 / 6.4
<b>68°F (20°C) DB, 45%rh</b>					
Net Total	BTUH	15966	21317	32521	37914

Net Sensible	BTUH	15966	21317	32521	37914
Flow/Pressure Drop	GPM/ft-H <sub>2</sub> O	3.5 / 1.0	4.7 / 1.7	7.3 / 4.5	8.8 / 6.4
<b>Model no. PS6ED_ _</b>		<b>02</b>	<b>03</b>	<b>04</b>	<b>05</b>
<b>Fan Section - EC Plenum Fan</b>					
Standard Air Volume	CFM	1400	1900	2400	3000
External Static Pressure in	in	0.3	0.3	0.3	0.3
Quantity of Fans		1	1	1	1
Net Total Fan Motor Power	kW	2.5	2.5	2.5	2.5
Absorbed Power	kW	0.32	0.46	0.81	1.47
<b>Compressor - Refrigerant R407C</b>					
Quantity of Compressors		1	1	1	1
Type		Scroll	Scroll	Scroll	Scroll
<b>Evaporator Coil - Copper tube / aluminium fin - Stainless steel drain pan</b>					
Face Area	ft <sup>2</sup>	7.5	7.5	7.5	7.5
Rows Deep (DX/Chilled Water)		3 / 3	3 / 3	3 / 4	4 / 4
Fins per inch		13	13	13	13
Face Velocity	FPM	187	253	320	400
<b>Reheat Section</b>					
<i>Electric Reheat<sup>1</sup> - Single Stage, finned tubular type heater, SCR Controlled</i>					
Capacity	kW	6	6	6	6
Quantity of Heaters		3	3	3	3
<b>Humidifier Section</b>					
<i>Electrode Boiler Type<sup>1</sup></i>					
Capacity	lb/hr	10	10	10	10
Humidifier Power	kW	3.4	3.4	3.4	3.4
<b>Filter Section - Pleated disposable type, 30%efficiency to ASHRAE 52-76</b>					
<i>Downflow Models</i>					
Quantity of Filters		2 / 1	2 / 1	2 / 1	2 / 1
Nominal Size	LxWxD-in		20 x 24 x 2 / 12 x 24 x 2		

Model no. PS6ED_ _		02	03	04	05
<b><i>Glycol Solution Requirement - 40% ethylene glycol</i></b>					
<b>95°F EWT</b>					
Flow Rate	GPM	5.7	10.1	11	16
Unit Pressure Drop	ft-H <sub>2</sub> O	9.3	19.1	10.7	17.7
<b>105°F EWT</b>					
Flow Rate	GPM	5.1	8	9.4	12.2
Unit Pressure Drop	ft-H <sub>2</sub> O	8.0	14.0	8.9	12.2
<b><i>Glycol Solution Regulating Valve - 2-way, head pressure controlled</i></b>					
Size	in.	3/4	3/4	1	1
<b><i>Chilled-water Valve - 2-Way modulating</i></b>					
Valve Size	in.	1	1	1	1
<b><i>Piping Connection Size</i></b>					
Liquid Line	- ODM -in	1/2	1/2	1/2	1/2
Hot Gas Line	- ODM -in	5/8	5/8	5/8	5/8
Glycol Solution	- ODM -in	1-5/8	1-5/8	1-5/8	1-5/8
Chilled Water	-ODM -in	1 1/8	1 1/8	1 1/8	1 1/8
Hot Water	- ODM -in	7/8	7/8	7/8	7/8
Steam	- ODM -in	7/8	7/8	7/8	7/8
Steam Condensate	- ODM -in	3/4	3/4	3/4	3/4
Humidifier Water	- ODM -in	1/4	1/4	1/4	1/4
Condensate Drain	- ODM -in	3/4	3/4	3/4	3/4
<b><i>Physical Details - For units with standard options only; consult factory for special options and configuration</i></b>					
Dimensions	in		37 (W) x 35-1/8 (D)x	76 (H)	
Approx. Weight	lbs	770	797	797	843

<sup>1</sup> Standard options

## Glycol Free-cooling System

Model no. PS6FD_ _		02	03	04	05
<b>Cooling Capacity – Direct Expansion - Rated at standard air volume</b>					
<b>75°F (24°C) DB, 50%rh</b>					
Net Total	BTUH	26898	35447	43167	53000
Net Sensible	BTUH	24713	32224	38753	50851
THR	BTUH	36251	47861	59331	74419
<b>75°F (24°C) DB, 45%rh</b>					
Net Total	BTUH	26565	34947	42553	51934
Net Sensible	BTUH	26430	34877	42553	51830
THR	BTUH	35859	47349	58681	73255
<b>72°F (22°C) DB, 50%rh</b>					
Net Total	BTUH	25618	33703	41020	49865
Net Sensible	BTUH	24579	31916	38351	49592
THR	BTUH	34937	46117	57169	71177
<b>72°F (22°C) DB, 45%rh</b>					
Net Total	BTUH	25248	33248	40466	48902
Net Sensible	BTUH	25140	33178	40453	48861
THR	BTUH	34576	45646	56571	70097
<b>68°F (20°C) DB, 50%rh</b>					
Net Total	BTUH	23875	31475	38247	45783
Net Sensible	BTUH	23715	31392	37929	45529
THR	BTUH	33238	43893	54397	66975
<b>68°F (20°C) DB, 45%rh</b>					
Net Total	BTUH	23576	31054	37764	44953
Net Sensible	BTUH	23534	31017	37746	42612
THR	BTUH	32914	43458	53860	66010
<b>Cooling Capacity – 100% Free-cooling - Rated at standard air volume, 45°F entering glycol</b>					
<b>75°F (24°C) DB, 50%rh</b>					
Net Total	BTUH	24457	28781	51090	60273
Net Sensible	BTUH	23235	28781	43443	51584
<b>75°F (24°C) DB, 45%rh</b>					
Net Total	BTUH	23645	28351	46859	55634
Net Sensible	BTUH	23645	28351	45345	54183
<b>72°F (22°C) DB, 50%rh</b>					
Net Total	BTUH	20817	24790	39296	46989
Net Sensible	BTUH	20817	24790	38617	46164
<b>72°F (22°C) DB, 45%rh</b>					
Net Total	BTUH	20639	24779	38063	45632
Net Sensible	BTUH	20639	24779	38063	45632
<b>68°F (20°C) DB, 50%rh</b>					
Net Total	BTUH	16768	19951	27666	33256
Net Sensible	BTUH	16768	19951	27666	33256
<b>68°F (20°C) DB, 45%rh</b>					
Net Total	BTUH	16785	19979	27704	33357
Net Sensible	BTUH	16785	19979	27704	33357

Model no. PS6FD_ _		02	03	04	05
<b>Fan Section - EC Plenum Fan</b>					
Standard Air Volume	CFM	1400	1900	2400	3000
External Static Pressure	in	0.3	0.3	0.3	0.3
Quantity of Fans		1	1	1	1
Net Total Fan Motor Power	kW	2.5	2.5	2.5	2.5
Absorbed Power	kW	0.32	0.46	0.81	1.47
<b>Compressor - Refrigerant R407C</b>					
Quantity of Compressors		1	1	1	1
Type		Scroll	Scroll	Scroll	Scroll
<b>Evaporator Coil - Copper tube / aluminium fin - Stainless steel drain pan</b>					
Face Area	ft <sup>2</sup>	7.5	7.5	7.5	7.5
Rows Deep (DX/Free Cooling)		3 / 3	3 / 3	3 / 4	4 / 4
Fins per inch		13	13	13	13
Face Velocity	FPM	187	253	320	400
<b>Reheat Section</b>					
<i>Electric Reheat<sup>1</sup> - Single Stage, finned tubular type heater, SCR Controlled</i>					
Capacity	kW	6	6	6	6
Quantity of Heaters		3	3	3	3
<b>Humidifier Section</b>					
<i>Electrode Boiler Type<sup>1</sup></i>					
Capacity	lb/hr	10	10	10	10
Humidifier Power	kW	3.4	3.4	3.4	3.4
<b>Filter Section - Pleated disposable type, 30%efficiency to ASHRAE 52-76</b>					
<i>Downflow Models</i>					
Quantity of Filters		2 / 1	2 / 1	2 / 1	2 / 1
Nominal Size	LxWxD-in		20 x 24 x 2 / 12 x 24 x 2		

Model no. PS6FD_ _		02	03	04	05
<b>Glycol Solution Regulating Valve - 2-way, head pressure controlled</b>					
Valve Size	in	3/4	3/4	1	1
Quantity of Valves		1	1	1	1
<b>Glycol Solution Free-cooling Regulating Valve - 3-way modulating</b>					
Valve Size	in	1	1	1	1
Quantity of Valves		1	1	1	1
<b>Glycol Solution Requirement - 40% ethylene glycol at 7.2°C (45°F) entering temperature, 0°C (32°F) ambient temperature</b>					
Flow Rate	GPM	8.6	10.2	18.1	21.9
Unit Pressure Drop	ft-H <sub>2</sub> O	6.2	8.5	30.1	42.4
<b>Piping Connection Size</b>					
Liquid Line	- ODM -in	1/2	1/2	1/2	1/2
Hot Gas Line	- ODM -in	5/8	5/8	5/8	5/8
Glycol Solution	- ODM -in	1-5/8	1-5/8	1-5/8	1-5/8
Hot Water	- ODM -in	7/8	7/8	7/8	7/8
Steam	- ODM -in	7/8	7/8	7/8	7/8
Steam Condensate	- ODM -in	3/4	3/4	3/4	3/4
Humidifier Water	- ODM -in	1/4	1/4	1/4	1/4
Condensate Drain	- ODM -in	3/4	3/4	3/4	3/4
<b>Physical Details - For units with standard options only; consult factory for special options and configuration</b>					
Dimensions	in		37 (W) x 35-1/8 (D)x 76 (H)		
Approx. Weight	lbs	770	797	797	843

1 Standard options

## Guide Specification – 60 Hz

### 1. General

1.1 The intelligent precision air-conditioning system shall be a **ClimateWorx PS6** model \_\_\_\_\_.

1.2 The unit shall be designed specifically for telecommunication, computer and critical equipment room environmental control with automatic monitoring and control of cooling, heating, humidifying, dehumidifying and air filtration functions.

1.3 The unit shall be self-contained, factory assembled and tested, arranged for (downflow) / (upflow) air delivery.

1.4 The system shall have a total cooling capacity of \_\_\_\_\_ kW(Btu/h) and a sensible cooling capacity of \_\_\_\_\_ kW(Btu/h) rated at an entering air temperature of \_\_\_\_\_°C (\_\_\_\_°F) dry bulb and \_\_\_\_\_% relative humidity.

1.5 The system shall be designed to operate on a \_\_\_\_\_ V \_\_\_\_\_ ph \_\_\_\_\_ Hz electricity supply.

### 2. Mechanical Parts

#### 2.1 Housing

2.1.1 The housing of the unit shall be constructed based on a frame and panel principle with removable panels for maximum service access.

2.1.2 The housing shall be a modular design, which allows multiple units to be installed side by side.

2.1.3 All components shall be accessible through the front panels (**Standard Units ONLY**).

2.1.4 Major components shall be located out of the air-path so as to avoid interrupting unit operation during routine service.

2.1.5 All panels shall be formed and welded from 18

gauge steel and insulated with 25mm (1") thick, 24kg/m<sup>3</sup> (1.5 lb/ft<sup>3</sup>) density fiber-glass insulation.

2.1.6 Front panels shall be hinged and locked with ¼-turn captive fasteners to facilitate quick and easy access.

2.1.7 The entire unit shall be finished with epoxy powder paint to ensure proper surface adhesion. The panel colour shall be Canatal standard off-white. The frame is gray.

#### 2.2 Evaporator Fan Assembly

2.2.1 The unit shall have a backwards inclined wheel with a integral EC motor to deliver \_\_\_\_\_ m<sup>3</sup>/h (cfm) of air at 75 Pa (0.3" w.g.) external static pressure.

2.2.2 The EC Fan shall be statically and dynamically balanced.

2.2.3 All parts of the fan shall be painted, galvanized or corrosion treated.

2.2.6 The speed of the fan shall be adjustable by means of a potentiometer or through the microprocessor controls.

2.2.7 Optional fan can be dropped into a raised floor with a minimum height of 18". Must specify at time of order. See floorstand options to accommodate this feature.

#### 2.3 Filter

2.3.1 The filter chamber shall be an integral part of the system, located at the entrance of return air path and should be serviceable from the front of the unit.

2.3.2 The filters shall be standard capacity, 50mm (2") deep pleated type having a 25-30% efficiency, > 95% arrestance to ASHRAE 52.1 (**MERV 8**).

2.3.3 The filters shall be listed by Underwriters' Laboratories as class 2.

## **2.4 Heater**

2.4.1 Electric resistance heaters shall be provided to offset the sensible cooling effect brought about during dehumidification mode.

2.4.2 The heating element shall have a total heating capacity of \_\_\_\_\_ kW(Btu/h).

2.4.3 The electric heaters shall be Silicon Controlled Rectifier (SCR) controlled, with an extruded aluminum heat sink to prevent room temperature gradient from exceeding 1.5°C (2.7°F) in 10 minutes.

2.4.4 The heating element shall be of low density, tubular finned construction with a non-corrosive metal sheath.

2.4.5 The heating element shall be electrically and thermally protected.

## **2.5 Humidifier**

2.5.1 The humidifier shall be a self-contained electrode boiler type complete with water level control and auto-drain functions.

2.5.2 The humidifier shall have a steam generation capacity of \_\_\_\_\_ kg/h (lbs/h).

2.5.3 The humidifier shall be designed to operate on ordinary tap water and shall be equipped with automatic water supply and flushing system to reduce mineral precipitation.

2.5.4 The humidifier shall have an Auto-Adaptive control system to optimize water conductivity, control automatic drain/flush cycles, minimize energy waste and maximize cylinder life.

## **3. Refrigeration Parts- DX Systems**

### **3.1 Refrigeration system**

3.1.1 The refrigeration circuit shall be available for operation on non-ozone depleting R407C refrigerant.

3.1.2 The refrigeration circuit shall have the following components:

- Thermal expansion valve with external equalizer
- Refrigerant distributor
- Liquid line pump-down solenoid valve
- Liquid line sight glass
- Access valve
- Liquid line filter-drier
- Liquid line shut-off valve
- Low pressure cut-out switch
- High pressure cut-out switch

3.1.3 The refrigeration circuit shall be pre-piped and leak tested ready for field connection.

3.1.4 All refrigerant piping shall be of type L copper pipe.

3.1.5 All units shall be factory run tested to verify operation prior to shipping.

### **3.2 Compressor**

3.2.1 The compressor shall be of the scroll type. Compressor casing shall have no gaskets or seals to eliminate the possibility of refrigerant or oil leakage into the facilities.

3.2.2 The compressor shall be equipped with the following items:

- Suction rotolock valve
- Discharge rotolock valve
- Gauge ports
- Internal thermal overload
- Vibration isolators

3.2.3 The compressor shall be located in a separate compartment apart from the air path so it can be serviceable without disturbing the operation of the unit.

3.2.4 Compressor positive start feature shall be provided to avoid compressor short cycling and low pressure lockout during winter start-up.



### 3.3 Direct Expansion Evaporator Coil

3.3.1 The coil shall be of 3/8" OD copper tubes expanded into aluminum fins.

3.3.2 The coil shall be split to allow for a rapid dehumidification cycle when required.

3.3.3 The coil shall have a face area \_\_\_\_\_ m<sup>2</sup> (ft<sup>2</sup>) and \_\_\_\_\_ rows deep in the direction of the airflow and have a maximum face velocity of \_\_\_\_\_ m/s (fpm).

3.3.4 A stainless steel corrosion free condensate drain pan shall be provided under the coil.

### 3.4 Air-Cooled Condenser (Air-Cooled System only)

3.4.1 The air-cooled condenser shall be low-profile and the cabinet will be constructed of heavy gauge galvanized steel.

3.4.2 The condenser shall be factory matched for \_\_\_\_\_ °C (°F) ambient.

3.4.3 The condenser shall be constructed of aluminum fins and copper tubes staggered in direction of airflow and arranged for vertical / horizontal air discharge.

3.4.4 The winter control system for the air cooled condenser shall be variable speed control / refrigerant head pressure control.

3.4.5 The winter control system shall utilize **ORI and ORD head pressure control (HPC) valves** to flood the condenser. This system shall include a receiver which is factory piped, heat traced, insulated and adequately sized to hold the charge of the condenser and the indoor unit.

3.4.6 The air cooled condenser shall be suitable for \_\_\_\_\_ V \_\_\_\_\_ ph \_\_\_\_\_ Hz power supply.

### 3.5 Water-Cooled Condenser Module (Water/Glycol-Cooled System)

3.5.1 The water-cooled condensers shall be unit mounted and piped.

3.5.2 Each condenser shall be completed with the following items:

- **Two-way pressure actuated water regulating valve (Three-way optional)**
- **Receiver**

3.5.3 The unit shall require \_\_\_\_\_ l/s (USgpm) of 29.4°C (85°F) condensing water and have a maximum pressure drop of \_\_\_\_\_ kPa (psi).

### 3.6 Glycol Cooler (Glycol-Cooled System only)

3.6.1 The glycol cooler shall be low-profile, constructed of heavy gauge galvanized steel.

3.6.2 The glycol cooler shall be factory matched for \_\_\_\_\_ °C (°F) ambient.

3.6.3 The cooler shall be constructed of copper tubes expanded into aluminum fins and pressure tested to 425 psi.

3.6.4 The fan motor shall be drip-proof with permanently lubricated ball bearings and inherent overload protection.

3.6.5 The cooler shall be suitable for \_\_\_\_\_ V \_\_\_\_\_ ph \_\_\_\_\_ Hz power supply.

## 4. Mechanical Parts - (Chilled-Water System)

### 4.1 Chilled-water valve

4.1.1 The chilled-water valve shall be a two-way modulating valve with pressure rating of \_\_\_\_\_ kPa

(psi) (Three way valve Optional).

4.1.2 The valve actuator shall be of an electric type with a totally enclosed dust and water proof enclosure.

4.1.3 The valve actuator shall have a manual operation facility and position indicator.

## 4.2 Cooling Coil

4.2.1 The coil shall be of 3/8" OD copper tubes expanded into aluminum fins.

4.2.2 The coil shall have a face area of \_\_\_\_\_ m<sup>2</sup> (ft<sup>2</sup>) and \_\_\_\_\_ rows deep in the direction of the airflow and have a maximum face velocity of \_\_\_\_\_ m/s (fpm).

4.2.3 A stainless steel corrosion free condensate drain pan shall be provided under the coil.

4.2.4 The coil shall require \_\_\_\_\_ l/s (USgpm) of 7.2°C (45°F) chilled-water and the pressure drop across the coil shall not exceed \_\_\_\_\_ kPa (psi).

## 5. Control System

### 5.1 System

5.1.1 The unit shall have a microprocessor based control system with automatic control and monitoring capability.

5.1.2 The control system shall use **Proportional + Integral + Derivative (PID) control algorithm** to maintain the temperature and humidity to a close tolerance of ±0.5°C (0.9°F) and 3%RH.

5.1.3 The control system shall have a fascia with 240x128 dot resolution touch screen graphical LCD display located on the front panel of the unit for the display and programming functions.

5.1.5 The control system shall display simultaneously the following information:

- **Room temperature in °C/°F**

- **Room humidity in %RH**
- **Unit no.**
- **On/Off mode indicator**
- **Operating status**
- **Active alarms**
- **Date & time**

5.1.6 System configuration and setting shall be stored in non-volatile memory and safeguarded in the event of power failure.

5.1.7 The system shall have at least three levels of programmable password access to prevent unauthorized changes of the system configuration and settings.

5.1.8 The system shall be capable of communicating with a Building Management System (BMS) via an RS485 serial link through a BMS Interface (Communications Bridge) for remote monitoring function.

5.1.9 The system shall have a manual disconnect switch of the locking type, which can be accessed outside of the unit while the door is closed. High voltage electrical components will not be accessible unless the switch is off.

### 5.2 Control Features

5.2.1 System set points and configuration shall be programmable only when access is gained by entering the correct password.

5.2.2 The following programmable control parameters shall be provided for fine tuning the system to suit the site conditions and requirements:

- **Temperature set point**
- **Temperature high limit**
- **Temperature low limit**
- **Cooling proportional band**
- **Heating proportional band**
- **Temperature dead band**
- **Temperature integral action time**
- **Humidity set point**
- **Humidity high limit**
- **Humidity low limit**
- **Humidifying proportional band**
- **Dehumidifying proportional band**

- Humidity dead band
- Humidity integral action time

5.2.3 The control system shall have the following programmable On/Off control mode options:

- **“Local” mode allows unit on/off control via the “I/O” key on the display**
- **“Remote” mode allows unit on/off control via a switch input**
- **“Timer” mode allows 4 event/day weekly automatic on/off control**

5.2.4 A “Standby unit enable” input shall be provided to force the unit to start irrespective of the current On/Off status and On/Off mode setting.

5.2.5 For energy saving and extended system life, a “Relax” feature shall be provided in the “Timer” On/Off mode to allow wider temperature and humidity tolerances when the room is not operational.

5.2.6 The system shall have programmable, manual, or automatic restart option. A programmable startup delay shall be provided for the automatic restart option which allows multiple units to restart progressively when power resumes after a power failure.

5.2.7 The accumulated runtime of the following components shall be logged for energy analysis and planned maintenance:

- **Fan**
- **Compressor**
- **Heaters**
- **Humidifier**

5.2.8 Components shall be scheduled to activate sequentially to minimize inrush current.

5.2.9 The system shall have a temperature and humidity graph which shows the main temperature and humidity variation in the latest 24 hours. The data for the graph shall be logged in 15 minutes interval.

### 5.3 Alarms

5.3.1 The control system shall have the following standard alarms:

- **High/Low temperature, 1 and 2**
- **High/Low humidity, 1 and 2**
- **High/Low voltage**
- **Filter dirty**
- **Fan overload**
- **Low airflow**
- **Compressor high pressure**
- **Compressor low pressure**
- **Heater overheat**
- **Boiler dirty**
- **Fire**
- **Flood**

5.3.2 All alarms shall have programmable reporting / response options which include:

- **Polling enable / disable**
- **Unit shutdown**
- **Activate standby unit**
- **Activate common alarm output**
- **Log alarm event**
- **4 warning sound selection**

5.3.3 Alarm messages, when programmed, shall comprise text description and occurrence time. Messages shall be ranked in the sequence of occurrence for fault analysis.

5.3.4 When a programmed alarm condition exists, the audible alarm shall sound and the common alarm output shall close until acknowledged. Active alarm record shall remain until the alarm condition is cleared.

5.3.5 A historical event log which maintain the latest 50 system events shall be provided. The text description and occurrence time of the following events shall be logged:

- **Power failure**
- **Power restore**
- **Unit start**
- **Unit stop**
- **Alarm raised**
- **Alarm acknowledged**
- **Alarm cleared**

#### **5.4 Co-Work, Multiple Unit Configuration**

5.4.1 The units shall have **built-in** master and slave inter-networking capability, **Co-Work**, which allows a combination of a maximum of 8 master and slave units to form a local area network without the need for external hardware.

5.4.2 To achieve the tightest control tolerance and minimize component on/off, the units shall have a built in control step expansion algorithm which uses a multi-step control scheme to coordinate the on/off of cooling, heating, humidifying and dehumidifying steps in multiple units.

5.4.3 The units shall have a sequential load activation control algorithm to minimize the inrush current when components among multiple units are activated at the same time.

5.4.4 The control of a slave unit shall not be limited to any particular master units. Any master unit can control any slave units. In case of a master unit failure or scheduled service, the remaining master units in the same network shall automatically take over the control.

5.4.5 The units shall have a duty sharing control algorithm that helps maintain the required number of duty units, balancing runtime by automatically coordinating units on/off and providing time based auto-changeover.

5.4.6 The units shall have a data synchronization feature. Operation data such as set points, time schedule, and alarm status shall be automatically synchronized among all the units under the same local area network.

5.4.7 To avoid hunting among multiple units, the units shall have a control value averaging algorithm that allows units to exchange sensor readings and control the room based on the common desired

average values. Units shall be capable of displaying the network average temperature and humidity or individual unit temperature and humidity.

#### **6.0 Optional Accessories**

##### **6.1 Capacity Control**

6.1.1 Capacity control shall consist of pressure regulated hot gas by pass valve. The valve shall be factory set to bypass below 58 psig suction pressure. A solenoid activated shut off valve shall be used for positive shut off.

6.1.2 Each compressor shall have hot gas by pass to preserve the lead/lag functionality.

##### **6.2 Liquid Detection**

6.2.1 Liquid detection shall consist if a single point liquid sensor. Sensor wires directly into the microprocessor and includes 10 feet of wire for field placement.

6.2.2 Liquid detection shall consist of liquid cable sensor. Cable wires directly into the microprocessor and includes 10 feet of wire to extend to the bottom of the unit and 15 feet of sensing cable shall be supplied with the unit for field placement.

##### **6.3 Floor Stand**

6.3.1 Floor stand shall be a welded steel frame with corrosion resistant finish from 8 to 24 inches ( in 2 inch increments) in height. The stands shall have adjustable legs for leveling with  $\pm 1.5$  inch of adjustment. Drop in the floor features require a floorstand with OSHA guards. **Minimum height for dropping fans into the floor is 18 inches)** For floor stands greater than 24 inches please consult factory.

##### **6.4 Return Air Plenum**

6.4.1 Factory plenum matches unit and is internally insulated.

### **6.5 Remote Supervisory Panel**

6.5.1 ClimateWorx M52 remote monitoring and supervisory panel allows monitoring and control of up to **7 master and 1 slave units**. Panel is connected by way of communication cable.

### **6.6 Firestat**

6.6.1 Factory mounted and wired firestat will shut the unit down in the event of high heat detection.

### **6.7 Smoke Detector**

6.7.1 Smoke detector is factory mounted and wired

to shut unit down in the event of the presence of smoke.

### **6.8 Condensate Pump**

6.8.1 Condensate pump shall remove condensate from evaporator and humidifier when a drain is not available nearby. Pump is shipped loose for field installation. Pump shall be capable of 180 GPH at 24 ft. of head.

## **Appendix A: Dimensional Drawings**

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