Refrigeration Quick Reference Guide

Refrigeration Troubleshooting								
System Faults	**Mode**	**Discharge Pressure**	**Suction Pressure**	**Super Heat**	**Sub Cooling**	**Air TD**	**Water TD**	**Compressor Amps**
Under Charge	Heat	Low	Low	High	Low	Low	Low	Low
	Cool	Low	Low	High	Low	Low	Low	Low
Over Charge	Heat	High	High/Normal	Normal	High	High	Normal	High
	Cool	High	High/Normal	Normal	High	Normal	High	High
Low Air Flow	Heat	High	High/Normal	Normal	High/Normal	High	Low	High
	Cool	Low	Low/Normal	Low	Normal	High	Low	High/Normal
Low Source Water Flow	Heat	Low	Low/Normal	Low	Normal	High	Low	High/Normal
	Cool	High	High/Normal	Normal	High/Normal	High	Low	High
Low Load Water Flow	Heat	High	High/Normal	Normal	High/Normal	High	Low	High
	Cool	Low	Low/Normal	Low	Normal	High	Low	High/Normal
Restricted TXV/Blocked Strainer	Heat	High	Low	High	High	Low	Low	Low
	Cool	High	Low	High	High	Low	Low	Low
TXV Stuck Open	Heat	Low	High/Normal	Low	Low	Low	Low	High
	Cool	Low	High/Normal	Low	Low	Low	Low	High
Inadequate Compression	Heat	Low	High	High/Normal	Low/Normal	Low	Low	Low
	Cool	Low	High	High/Normal	Low/Normal	Low	Low	Low

Operating Pressures / Temperatures							
Heating - Without Desuperheater							
EWT	**GPM Per Ton**	**Discharge Pressure (PSIG)**	**Suction Pressure (PSIG)**	**Sub Cooling**	**Super Heat**	**Air Temperature Rise F°**	**Water Temperature Rise F°**
30	1.5	285-310	68-76	4-10	8-12	14-20	5-8
	3	290-315	70-80	4-10	8-12	16-22	3-6
50	1.5	315-345	100-110	6-12	9-14	22-28	7-10
	3	320-350	105-115	6-12	9-14	24-30	5-8
70	1.5	355-395	135-145	7-12	10-15	30-36	9-12
	3	360-390	140-150	7-12	10-15	32-38	7-10
Cooling - Without Desuperheater							
EWT	**GPM Per Ton**	**Discharge Pressure (PSIG)**	**Suction Pressure (PSIG)**	**Sub Cooling**	**Super Heat**	**Air Temperature Rise F°**	**Water Temperature Rise F°**
50	1.5	220-235	120-130	10-16	12-20	20-26	19-23
	3	190-215	120-130	10-16	12-20	20-26	9-12
70	1.5	280-300	125-135	8-14	10-16	19-24	18-22
	3	250-270	125-135	8-14	10-16	19-24	9-12
90	1.5	360-380	130-145	8-14	10-14	18-22	17-21
	3	330-350	130-145	8-14	10-14	18-22	8-11

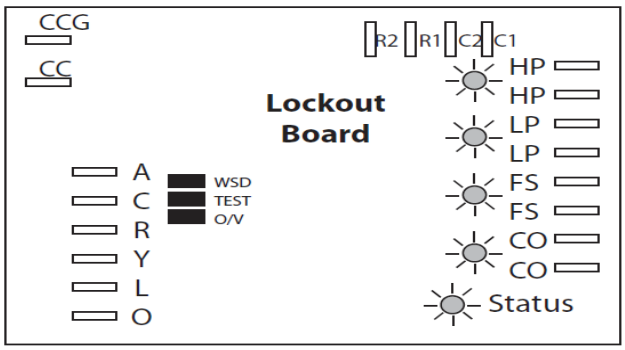
Electrical Quick Reference Guide

Model	Voltage Code	60HZ Power		Compressor		ECM Fan Motor FLA	HWG Pump FLA	Ext Loop Pump FLA	**Total Unit FLA**	**Starting Load Amps with Soft Start**	Min Circuit AMPS	MAX Fuse HACR	Min AWG	Max Ft
		Volts	Phase	LRA	RLA									
024	1	208/230	1	58.3	11.7	3.9	0.5	4.0	20.1	29	23	35	12	49
036	1	208/230	1	83	15.3	3.9	0.5	4.0	23.7	42	23	40	10	70
048	1	208/230	1	104	21.2	5.2	0.5	5.5	32.4	52	37.1	50	8	79
060	1	208/230	1	152.9	27.1	5.2	0.5	5.5	40	76	46.8	70	6	102
072	1	208/230	1	179.2	29.7	5.2	0.5	5.5	42.6	90	50	80	6	95
WT Units														
Model	Voltage Code	60HZ Power		Compressor		HWG Pump FLA	Ext Loop Pump FLA	**Total Unit FLA**	**Starting Load Amps with Soft Start**	Min Circuit AMPS	MAX Fuse HACR	Min AWG	Max Ft	
		Volts	Phase	LRA	RLA									
036	1	208/230	1	104	21.2	0.5	4.0	25.7	52	31	50	8	99	
048	1	208/230	1	152.9	27.1	0.5	5.5	33.1	76	39.9	60	8	77	
060	1	208/230	1	179.2	29.7	0.5	5.5	35.7	90	35.7	70	8	114	
ST Units														
Model	Voltage Code	60HZ Power		Compressor		HWG Pump FLA	Ext Loop Pump FLA	**Total Unit FLA**	**Starting Load Amps with Soft Start**	Min Circuit AMPS	MAX Fuse HACR	Min AWG	Max Ft	
		Volts	Phase	LRA	RLA									
024	1	208/230	1	58.3	11.7	0.5	4.0	16.2	29	19.1	30	14	39	
036	1	208/230	1	83	15.3	0.5	4.0	19.8	42	23.6	35	12	50	
048	1	208/230	1	104	21.2	0.5	5.5	27.2	52	32.5	50	8	94	
60	1	208/230	1	152.9	27.1	0.5	5.5	33.1	76	39.9	60	8	77	
72	1	208/230	1	179.2	29.7	0.5	5.5	35.7	90	43.1	70	6	114	

Notes:

1. All line and low voltage wiring must adhere to National Electric Code and local codes whichever is most stringent
2. Wire length based on one way measurement and 2% voltage drop
3. Wire size based on 60° C copper conductor and minumum circuit ampacity
4. All fuses class RK-5
5. Min/Max voltage 208/230/60/1 = 187/252
6. External loop pump FLA based on a maximum three UP26-116F230V pumps (1/2 HP) for 048 - 072 and two pumps for 024-036
7. Actual LRA will be plus or minus 15%

Lockout Board Troubleshooting (all units)



LED Color	Location	Function	Normal Operation	Fault Retry	Lockout
Green	Top	High Pressure	OFF	Flashing	ON
Orange	2nd	Low Pressure	OFF	Flashing	ON
Red	3rd	Water Flow	OFF	Flashing	ON
Yellow	4th	Condensate Overflow	OFF	Flashing	ON
Green	Bottom	Status	Flashing	Flashing	Flashing

Notes:

1. If all five lights are flashing, the fault is under/over voltage
2. Only the light associated with the particular fault/lockout will be on or flashing. For example, if a high pressure lockout has occurred, the top green light will be on.
3. Status lights will be off when in test mode (when jumper is removed, unit operates in test mode speeding up all delays.
4. When Over/Under jumper (O/V) is installed, the safety is active. Jumper should not be discarded. Voltage tolerance is 208/ 230 volts plus/minus 10%.
5. If flow switch is open for 30 continuous seconds, the compressor operation will be interrupted.
6. If water touches the condensate overflow sensor for 30 continuous seconds, the compressor operation will be interrupted
7. If the LOW PRESSURE switch is open for 30 continuous seconds, compressor operation will be interrupted. At start up, the low pressure switch is not monitored for 90 seconds to avoid nuisance faults.
8. If the HIGH PRESSURE switch opens, the compressor operation will be interrupted and the control will go into fault retry. There is no delay of switch monitoring on startup.
9. All faults are three strikes and unit locks out.
10. If thermostat is powered off then on (Intelligent reset), board will reset but last fault is stored in memory. If power is interrupted, all faults are cleared.