

### LED Parameter Table

Parameter	Function	Description	Factory Setting	Range	Increments
<b>SC</b>	Calibrates Water Sensor	This will allow the temperature displayed to be adjusted to match a temperature reading from an external source.	0	-9 to 10	1
<b>dB</b>	Dead Band	This parameter is used to determine when the compressor should be activated. If the setpoint is below the setpoint minus the dB value (in heating mode), then the compressor will activate.	1	1 to 15	1
<b>CF</b>	Celsius/Fahrenheit Selection	This parameter selects the units for which the temperature will be displayed.	F	F or C	N/A
<b>FP</b>	Freeze Detection Setting	There are three (3) settings for this parameter, OL, CL, and P. OL is the open loop setting which corresponds to 30°F (0°C). CL is the closed loop setting which is 15°F (-10°C). P is the process setting which is 5°F (-15°C).	OL	P, CL, OL	N/A
<b>SL</b>	Primary/Secondary Setting	Primary mode utilizes an internal aquastat to determine the activity of the compressor. In secondary mode, the compressor output is determined by an external aquastat.	0 (Primary)	0 or 1	0 = Primary 1 = Secondary
<b>IC</b>	Initial Condition	This parameter is used to determine the state of the secondary output of the primary unit. If the actual water temperature is greater than the IC value away from the setpoint, the secondary output will be activated.	10	0 to 20	1
<b>d</b>	Derivative	This parameter is used to determine the state of the secondary output of the primary and secondary unit. If the change in temperature is less than the d value, the secondary output will activate.	1	0 to 5	1
<b>P</b>	Period	This determines how often the derivative will be calculated.	5 min.	1 to 5 min.	1 min.
<b>PS</b>	Pump Sampling Time Selection	This parameter determines how long the pump is activated before the controller takes a sample of the water temperature. The range of this parameter is from 1 to 5 minutes and is factory set to 3 minutes. The pump can also be set to run continuously when the display reads "C."	3 min.	1 to 5 min. or C	1 min.
<b>Fd</b>	Freeze Detection Display	This displays the current temperature of the freeze detection sensor.	N/A	0 to 130	N/A

### Troubleshooting Guideline for Refrigerant Circuit

The chart below will assist in determining if measurements taken at the unit are within factory specifications and aid in accurate diagnosis (SYMPTOM) and repair. The chart is general in nature and represents whether a symptom would result in normal, high, or low readings from the typical operating range.

Symptom	Head Pressure	Suction Pressure	Compressor AMP Draw	Superheat	Subcooling	Water (Loop) Temperature Differential
Under Charged System (Possible Leak)	Low	Low	Low	High*	Low	Low
Over Charged System	High	High	High	Normal	High	Normal
Low Air Flow Heating	High	High	High*	High/Normal	Low	Low
Low Air Flow Cooling	Low	Low	Low	Low/Normal	High	Low
Low Water Flow Heating	Low/Normal	Low/Normal	Low	Low	High	High
Low Water Flow Cooling	High	High	High	High*	Low	High
High Air Flow Heating	Low	Low	Low	Low	High	Low
High Air Flow Cooling	Low	High	Normal	High*	Low	Normal
High Water Flow Heating	Normal	Low	Normal	High*	Normal	Low
High Water Flow Cooling	Low	Low	Low	Low	High	Low
Low Indoor Air Temperature Heating	Low	Low	Low	Normal	High	Normal/High
Low Indoor Air Temperature Cooling	Low	Low	Low	Normal/Low	High	Low
High Indoor Air Temperature Heating	High	High	High	Normal/High*	Normal/Low	Normal
High Indoor Air Temperature Cooling	High	High	High	High*	Low	High
Restricted TXV	High	Low	Normal/Low	High*	High	Low
Insufficient Compressor (Possible Bad Values)	Low	High	Low	High*	Normal/High	Low
TXV - Bulb Loss of Charge	High	Low	Low	High*	High	Low
Scaled Coaxial Heat Exchange Heating	Low	Low	Low	Normal/Low	High	Low
Scaled Coaxial Heat Exchanger Cooling	High	High	High	Normal/Low	Low	Low
Restricted Filter Drier	Check temperature difference (delta T) across filter drier					

\* Superheat will be high with high evaporator temperatures.

## Temperature Change thru Coaxial Heat Exchanger Table

Water Flow Rate (GPM)	Water Temperature Change (°F)	
	Rise (Cooling)	Drop (Heating)
For Closed Loops: Earth Coupled or Cooler/Boiler systems, use 3 gpm/ton	8 - 14	3 - 9
For Open Loops: Well systems use 1.5 gpm/ton	18 - 25	5 - 11

## Thermistor Table

Thermistor Temperature (°F)	Resistance (Ohms)
78.8	9,230 - 10,007
77.5	9,460 - 10,032
76.5	9,690 - 10,580
75.5	9,930 - 10,840
33.5	30,490 - 32,080
32.5	31,370 - 33,010
31.5	32,270 - 33,690
30.5	33,190 - 34,940
1.5	79,110 - 83,750
0.5	81,860 - 86,460
0.0	82,960 - 87,860

## Pressure Drop Tables

Model	GPM	Pressure Drop (psi)				
		30°F	60°F	80°F	100°F	120°F
018R*	3.0	0.5	0.4	0.4	0.3	0.3
	4.0	1.1	0.9	0.9	0.8	0.8
	5.0	1.6	1.4	1.4	1.3	1.3
	6.0	2.1	1.9	1.9	1.8	1.8
025R*	4.0	1.0	0.9	0.9	0.8	0.8
	5.5	2.2	2.0	1.9	1.8	1.7
	7.0	3.3	3.0	2.9	2.7	2.6
040H/R	5.0	0.9	0.6	0.6	0.5	0.5
	7.5	2.3	2.1	2.0	1.9	1.8
	10.0	3.7	3.5	3.3	3.2	3.0
050H/R	12.5	5.0	4.7	4.4	4.2	4.0
	8.0	1.7	1.4	1.4	1.3	1.3
	11.5	3.6	3.4	3.2	3.0	2.8
060H/R	15.0	5.6	5.4	5.0	4.6	4.2
	18.5	8.3	8.1	7.6	7.2	6.8
	9.0	1.4	1.1	1.0	1.0	0.9
	13.5	4.2	3.9	3.5	3.1	2.7
075H/R	18.0	6.9	6.7	6.0	5.2	4.5
	22.5	10.7	10.5	10.0	9.4	8.7
	10.0	3.2	3.0	2.8	2.7	2.5
	14.5	5.5	5.3	5.1	4.9	4.7
075H/R	19.0	7.9	7.6	7.3	7.1	6.8
	23.5	11.5	11.3	11.0	10.8	10.5

**NOTES:** Temperatures are Entering Water Temperatures 7/13/09  
 \*Domestic water heating units source side pressure drop and reversible units load and source pressure drop.

## Typical Superheat/Subcooling (°F)

Evaporator (EWT)	Superheat	Subcooling
30	6 - 10	6 - 12
50	10 - 17	7 - 15
70	16 - 33	4 - 15
90	30 - 50	4 - 15

## Typical Operating Pressures (Refrigerant PSIG)

Condenser (EWT)	Evaporator (EWT)			
	30		50	
	Suction	Discharge	Suction	Discharge
70	75 - 105	270 - 370	95 - 130	235 - 325
90	75 - 105	295 - 405	95 - 135	315 - 430
110	75 - 105	350 - 480	95 - 135	375 - 510

## Compressor Resistance Table (77°F) 35%

Terminals	018 ZP16K3E	025 ZP23K3E	040 HRH034U	050 ZP51K5E	060 HRH056U	075 HLJ072T
C to S	1.87	2.28	1.395	0.792	0.819	0.841
C to R	1.32	1.01	0.532	0.453	0.280	0.291
S to R	3.19	3.29	1.927	1.245	1.099	1.132

**NOTE:** Resistance listed are for single phase compressors.

## NSW Heating Only Load Side

Model	GPM	Pressure Drop (psi)			
		60°F	80°F	100°F	120°F
018H	3.0	0.5	0.4	0.4	0.3
	4.0	1.4	1.3	1.2	1.2
	5.0	2.2	2.1	2.1	2.0
	6.0	3.0	2.9	2.9	2.8
025H	4.0	1.3	1.3	1.2	1.2
	5.5	3.0	2.9	2.8	2.7
	7.0	4.6	4.4	4.3	4.1
	8.5	6.7	6.5	6.4	6.2

**NOTE:** Temperatures are Entering Water Temperatures 7/13/09