

Table 9 — Diagnostic Codes and Troubleshooting Guide

TYPE	CODE NO.	DESCRIPTION/MALFUNCTION	PROBABLE CAUSE/REMEDY
TIMER	10-15	Time Remaining Until Restart (Decreases at one-minute intervals)	15-minute or 3-minute start inhibit timers not expired.
START STATUS	25	Recycle Restart Pending	Leaving chilled water or brine temperature too low for recycle start-up (≤ 5 F [2.8 C] above set point).
	26	Start-Up in Progress	Prestart checks being performed, water flows and oil pressure being established.
RUN STATUS	28	Temperature Capacity Control	Machine operating normally under temperature control.
	29	Ramp Loading Capacity Control	Leaving temperature pulldown rate being limited by ramp loading.
	30	Demand Limit Capacity Control	Compressor motor current > demand limit set point — check motor current calibration.
	35	Motor Temperature Override	Motor temperature > 200 F (93.3 C) — check motor temperature immediately, check sensor resistance.
	36	Refrigerant Temperature Override	Refrigerant temperature $\leq 1^{\circ}$ F (0.56 C) above trip limit — check refrigerant temperature, check sensor resistance, check refrigerant charge.
	37	Excessive Purging	See description/malfunction Purge Cycles Often in AUTO. Position.
	40	Motor Winding Temperature Too High to Start	Motor temperature > 190 F (87.8 C) — check motor temperature, reset when < 190 F (87.8 C), check sensor resistance.
PRESTART FAILURE STATUS	41	More Than 8 Starts in Past 12 Hours	Start inhibited by 8 Starts/12-Hour counter. Depress reset pushbutton if additional start is required.
	42	Failure of Condenser Pump to Establish Flow	Check pump operation, check power supply and pilot relay, check flow switch, check water valves, check for air in water lines.
	43	Failure of Evaporator Pump to Establish Flow	Check pump operation, check power supply and pilot relay, check flow switch, check water valves, check for air in water lines.
	44	Defective Oil Pump Pressure Switch	Oil pressure switch contact closed with pump de-energized; check contacts. Check setting.
	45	Out-of-Range Sensor Readings	Perform controls test to check for defective set point potentiometer(s) or open or shorted sensors; check sensor resistance.
	46	Oil Pressure Switch Not Closed Within 15 Seconds After Pump is Energized (Failure to develop pressure)	Check power to pump, check oil level, check oil pressure switch setting, check for dirty oil filters.
	48	Low/High Line Voltage	Control center voltage supply < 94.3 VAC or > 135.7 VAC for one minute. Check voltage supply. Check control center transformer, check circuit loading, consult power utility if line voltage is low. See I/O Board Replacement.
	60	Compressor Discharge Temperature > 220 F (104 C)	Check discharge temperature immediately, check sensor resistance, check for proper condenser water flow and temperature, check oil reservoir temperature, check condenser for air or water leaks.
SHUTDOWN STATUS	61	Evaporator Refrigerant Temperature < Limit	Check refrigerant temperature, check sensor resistance, check refrigerant charge.
	62	Motor Winding Temperature > 220 F (104 C) Resets at 190 F (88 C)	Check motor temperature immediately, check sensor resistance and connections at compressor junction box, check motor cooling system for restrictions.
	63	Thrust Bearing Temperature > 220 F (104 C)	Check oil reservoir temperature, check oil cooler water flow and solenoid, check oil heater thermostat setting, check sensor resistance and connections at compressor junction box, check journal and thrust bearings if other checks OK.
	64	Sensor Out-of-Range	Perform controls test to check for defective set point potentiometer(s) or open or shorted sensors; check sensor resistance.
	65	Oil Pressure < Limit	Check power to pump, check oil level, check oil pressure switch setting, check for dirty oil filters, check for oil foaming at start-up, reduce ramp loading rate if oil foaming is noted.
	66	Motor Overload Trip	Check motor overload dashpots and setting (do not attempt field calibration), check motor current demand calibration. Check optional compressor motor starter protective devices (e.g., phase loss, ground fault, etc.).
	67	Temporary Loss of Line Voltage	Control center voltage < 57.5 VAC for one cycle — depress reset pushbutton and restart.
	68	Low-Line Voltage	Control center voltage < 94.3 VAC for one minute; check control center voltage, check control center transformer, check circuit loading, consult power.

27-28

Table 9 — Diagnostic Codes and Troubleshooting Guide (cont)

TYPE	CODE NO.	DESCRIPTION/MALFUNCTION	PROBABLE CAUSE/REMEDY
SHUTDOWN STATUS (cont)	69	High-Line Voltage	Control center voltage > 135.7 VAC for one minute. Check control center voltage, check control center transformer, check power company.
	70	Loss of Chilled Water Flow	Check pilot relay, check power to pump, check flow switch, check water valves.
	71	Loss of Condenser Water Flow	Check pilot relay, check power to pump, check flow switch, check water valves.
	72	Faulty Jumper	Check grounded jumper wire.
	73	High Condenser Pressure	Check high condenser pressure switch setting, check for proper condenser water flow and temperature, check for fouled tubes.
	74	Failure of Starter to Complete Transition	Check starter, check run contact, check DIP switch configuration for proper starter type.
	75	Excessive Motor Acceleration Time	Check to ensure guide vane is closed at start-up, check starter transfer time, check guide vane linkage. Check DIP switch configuration for proper starter type.
	76	Illegal Configuration	Check for proper unit configuration.
	77	Run/Transition Contacts Failed to Deactivate On Shutdown	Check run contact, check 1CR relay, check starter for welded contacts.
	78	Manual Override Shutdown	Stop pushbutton depressed with L/R switch in remote position — reset.
	79	Spare Safety Limit Exceeded	Check spare safety contact(s), check spare safety operation.
	80	Recycle with Motor Current > 65% of RLA	Check for proper cooler and condenser water flows and temperatures, check leaving chilled water/brine sensor resistance, check motor current calibration, check guide vane actuator and linkage.
	81*	Loss of Communication	Communication between the basic controller and the ESP not initialized or lost for more than 15 seconds after being initialized. See ESP Operating Instructions.
82	Loss of Motor Current Signal	Failure to establish or maintain a motor current signal from the starter.	
—	—	Chilled Water Temperature Too High (Machine running)	THERMOSTAT SET TOO HIGH — Return thermostat to proper setting. CAPACITY OVERRIDE OR EXCESSIVE COOLING LOAD (Machine at Capacity) — Check for diagnostic code, check for infiltration of outside air into conditioned spaces. CONDENSER TEMPERATURE TOO HIGH — Check condensing water flow. Check condensing water temperature; examine cooling tower operation. Check for air and water leaks, check for fouled tubes. REFRIGERANT LEVEL LOW — Check for leak; repair. Add refrigerant and trim charge. LIQUID BYPASS IN WATER BOX — Examine division plates and gaskets for leaks. GUIDE VANE FAILS TO OPEN — Check for defective actuator — replace. GUIDE VANES FAIL TO OPEN FULLY — Be sure that capacity control switch is in <i>AUTO.</i> position. If vanes will not open with switch at <i>INC.</i> , check for excessive cooling load (see above). Check chilled water or brine sensor resistance. Check guide vane linkage. Check limit switch in actuator, check that sensor is connected to proper terminals.
—	—	Chilled Water or Brine Temperature Too Low (Machine running)	THERMOSTAT SET TOO LOW — Return thermostat to proper setting. GUIDE VANES FAIL TO CLOSE — Be sure that capacity control switch is in <i>AUTO.</i> position. Check chilled water sensor resistance, check guide vane linkage. Check for defective actuator — replace, check that sensor is connected to proper terminals. DEFECTIVE SENSOR — Check sensor resistance. EVAPORATOR REFRIGERANT TEMPERATURE SET POINT IMPROPERLY SET (Brine Chilling Only) — Check refrigerant temperature set point.
—	—	Chilled Water Temperature Fluctuates; Vanes Hunt	DEADBAND TOO NARROW (Erratic Flow or Temperature) — Configure DIP switch for 2 F (1°C) deadband. PROPORTIONAL BAND TOO NARROW (Erratic Flow or Temperature) — Configure DIP switch for 15 F (8.3 C) proportional band. LOOSE GUIDE VANE LINKAGE — Adjust guide vane linkage. DEFECTIVE VANE ACTUATOR — Replace actuator. DEFECTIVE SENSOR — Check sensor resistance.

*Applies only to options available with the ESP (Expanded Services Panel).

Table 4 — Controls Test

STEP NUMBER	TEST DESCRIPTION	DISPLAY CODE OR ACTION
0.1	Display 88 to verify proper operation	88 — OK XX — Faulty
0.2	Display set point of evaporator refrigerant temperature	33 — Water XX — Brine Temperature (adjust with refrigerant temperature set point potentiometer and note set point displayed in LCD).
0.3	Display % RLA of compressor motor current	0 — OK XX — Faulty Calibration (Adjust motor current zero potentiometer and note on LCD).
0.4	Display controller identification number (00 to 07)	XX — Confirm
0.5	Display leaving chilled water sensor input status	1 — OK 0 — Faulty
0.6	Display condenser refrigerant sensor input	1 — OK 0 — Faulty
0.7	Display compressor discharge sensor input status	1 — OK 0 — Faulty
0.8	Display evaporator refrigerant temperature sensor input status	1 — OK 0 — Faulty
0.9	Display motor winding sensor input status	1 — OK 0 — Faulty 2 — Faulty Configuration
1.0	Display thrust bearing sensor input status	1 — OK 0 — Faulty 2 — Faulty Configuration
1.1	Display leaving chilled medium set point potentiometer input status	1 — OK 0 — Faulty
1.2	Display demand limit set point potentiometer input status	1 — OK 0 — Faulty
1.3	Display configuration status	2 — OK 1 — Faulty Configuration 0 — Faulty Configuration
1.4	Energize oil pump starter relay*	14 — Response (Confirm Oil Pump Starter Energized).
1.5	Energize leaving chilled water pump starter relay*	15 — Response (Confirm Leaving Chilled Water Pump Energized).
1.6	Energize condenser water pump starter relay*	16 — Response (Confirm Condenser Water Pump Energized).
1.7	Energize tower fan starter relay*	17 — Response (Confirm Tower Fan Energized).
1.8	Not applicable	18 — (Not Applicable)
1.9	Not applicable	19 — (Not Applicable)
2.0	Energize increase guide vane position digital output* (Capacity control switch in AUTO.)	20 — Response (Confirm increase guide vane position digital output energized).
2.1	Energize decrease guide vane position digital output* (Capacity control switch in AUTO.)	21 — Response (Confirm decrease guide vane position digital output energized).
2.2	Energize purge pump relay	22 — Response (Confirm purge pump energized).
2.3	Energize alarm output indicating safety limit has been exceeded*	23 — Response (Confirm alarm output indicating safety limit has been exceeded energized).
2.4	Display configuration status	1 — OK 0 — Faulty Configuration
2.5	Display configuration status	1 — OK 0 — Faulty Configuration
2.6	Display purge operating switch status	1 — OK (Closed) 0 — Faulty (Open)
2.7	Display configuration status	1 — OK 0 — Faulty Jumper Between 1J2-11 and 1J2-12
2.8	Display spare safety input status	1 — OK (Closed) 0 — Faulty (Open)
2.9	Display chilled water flow switch contact status	1 — OK — Open, Pump Off (Confirm) 0 — Closed, Pump On (Confirm)
3.0	Display condenser water flow switch contact status	1 — OK — Open, Pump Off (Confirm) 0 — Closed, Pump On (Confirm)
3.1	Display oil pressure switch status	1 — OK (Open) 0 — Faulty (Closed)
3.2	Display 1CR auxiliary contact status	1 — OK (Closed) 0 — Faulty (Open)
3.3	Display starter run contact	1 — OK (Open) 0 — Faulty (Closed)
3.4	Cycle back to first test (depress reset pushbutton)	0.1
	End controls test (depress POR pushbutton)	03 Minutes

XX — Represents any other numbers displayed.

*Energize command can be cancelled by depressing reset pushbutton within one second after test number is displayed.

Date/Time	E.C.	Action
6/28 - 16:30	80	High Solids in Cond Water caused by previous days power outages. Switched control & forgot to reset. Control never turned on this spring. Was 1300 supposed to be under 900. Restart at 16:45 ff x W1W

4/29/2010 16:30	66	MOTOR OVERLOAD TRIP RESET NEXT MORNING - GOES BACK TO ECODE 2 THEN GOES INTO START-UP MODE 26. (FSK)
--------------------	----	--