UNITED TECHNOLOGIES CARRIER

Replacement Components Division
Carrier Corporation

BULLETIN: C9310
DATE: 6/18/93
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SERVICE BULLETIN

SUBJECT: 3200MP CHILLER/GATEWAY SOFTWARE CHANGES
3200MP/ESP AND CCN GATEWAY

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PURPOSE:

To document several 3200MP/ESP EPROM revisions.

BACKGROUND:

This bulletin documents 32MP software corrections and improvements made available in July, 1989 (Matrix items 1-30) and more recently (Matrix items 31-39).

PROCEDURE:

The Replacement Components Division (RCD) stocks the new EPROM's.

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A key difference between the old and new software in RCD is that the new software is not compatible with Gateway versions below 3. If a jobsite uses or is being upgraded to a Gateway module version 3 or higher, new 32MP software is required. The improvements are beneficial for other chillers but not required.
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The part numbers for circuit board assemblies with new EPROM's have changed but RCD may have boards with old EPROM's in stock. The boards themselves have not changed since 1987. It is best to order new EPROM's if boards are ordered to be sure of having the latest software.

EPROM Kits Stocked by RCD

		ESP I	ESP II	
		Single Comp.	Single Comp.	Dual Comp.
EPROM Kit Includes:	Basic	32MP660018	32MP660016	32MP660017
	M/X	HK98EZ101	HK98EZ101	HK98EZ131
	ESP	HK98EZ017	HK98EZ111	HK98EZ141
	Opt-Pak	HK98EZ023	HK98EZ121	HK98EZ151
		32MP400023	N/A	N/A

BOARDS STOCKED BY RCD **	CORRESPONDING EPROM KIT (EPROM ONLY) ESP I **	ESP II SINGLE	ESP II DUAL
PROCESSOR BOARD 32MP400-974	(HK98EZ101)	(HK98EZ101)	32MP660017
MX BOARD 32MP400-954 *	32MP660018	32MP660016	32MP660017
ESP PANEL 32MP400-934	(HK98EZ023)	32MP660016	32MP660017

* Instructions are included to cut W1 jumper to be compatible with ESP I software.

** All boards are stocked with single compressor, ESP II EPROM's.

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3200MP SOFTWARE CORRECTION MATRIX - REV. 06/93

X = APPLICABLE
- = NOT APPLICABLE

		SINGLE COMPRESSOR			DUAL COMPRESSOR	
		BASIC	ESP	ESP II	BASIC	ESP
	CORRECTIONS					
1.	DM algorithm, motor current, lag shutdown factors	X	X	X	X	X
2.	Close wall 1 Dia. code as load drops from 100 to 20%	X	X	X	X	X
3.	Code 77, maintain pumps if starter contacts weld (in start or run or with amps greater than 10%)	X	X	X	X	X
4.	Code 87 shutdown if run contacts open while motor on	X	X	X	X	X
5.	19CB 5 minute pre- & post-lube corrected	X	X	X	-	-
6.	Limit starts to 4 in 6 hours	X	X	X	X	X
7.	Correct motor load control so amps reduce to 100%	-	-	-	-	X
8.	Restart after quick (1 cy) power failure or brown out	-	X	X	-	X
9.	Shutdown if voltage is less than 87% for 5 sec	X	X	X	X	X
10.	Shutdown and display 65 if oil press. is lost between start (1CR energized) and transition (code 29)	X	X	X	X	X
	IMPROVEMENTS TO ESP II FUNCTIONS					
11.	Lead/lag standby - lag starts or runs if lead fails	-	-	X	-	X
12.	Code 81 - chiller reverts to local control	-	-	X	-	X
13.	Display codes improved - specific sensors and pots out of range (64-X, 82, 89-X) and start codes	X	X	X	X	X
14.	Code 64 - reduce sensitivity, require 2 - 3 sec. fault	X	X	X	X	X
15.	In hold, show amps on S/D only, not ESP or Datalogger	X	X	X	X	X
16.	Improve lag start logic - minimize capacity reduction by delaying lead vane close action until lag ready. If lead amps don't decrease to 60% in 3 minutes start lag anyway.	-	-	X	X	X

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		SINGLE COMPRESSOR			DUAL COMPRESSOR	
		BASIC	ESP I	ESP II	BASIC	ESP I
17.	Auto start after power failure-quick restart of lag without waiting for ramping if it had been running	-	-	X	-	X
18.	ESP - read corrected amps, diffuser wall & sensors 3 & 4	-	-	X	-	X
19.	ESP - read active chilled water & demand limit control points	-	-	X	-	X
20.	Move wall to 20% after start, to initiate loading	X	X	X	X	X
21.	Delay manual start if chilled water is less than setpoint + deadband, to go recycle, code 25	X	-	X	X	X
22.	"Jump Start" oil pump if motor starts for any reason	X	X	X	X	X
23.	Improve Return Chilled Water Control option logic	-	-	X	-	X
24.	Make controls compatible with CCN/ Gateway	-	-	X	-	X
25.	Permit lag comp. to be Enabled or Disabled from DIP switch or ESP while running	-	-	-	X	X
26.	Lead/lag switch A-B can be changed while running	-	-	-	X	X
27.	Refined surge algorithm, reduced recognition time	-	-	-	X	X
28.	Code 85 - Allow lag start if wall within 20% (was 15%)	-	-	-	X	X
29.	Improve guide vane response to chilled water changes, decrease vane close duty cycle below setpoint	-	-	-	X	X
30.	Lag compressor tracks lead amps closer	-	-	-	X	X
31.	Use corrected amps for code 80 (recycle with hi amps)	X	X	X	X	X
32.	Correct for premature trips on code 68 (lo voltage)	X	X	X	X	X
33.	Correct for software loop with chiller running	X	X	X	X	X
34.	Correct Return Chilled Water Control option	-	-	X	-	X
35.	Correct auto start after power failure option	-	X	-	-	-
36.	Correct fault code if start tried with hi cond. press	-	-	-	X	X

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		SINGLE COMPRESSOR			DUAL COMPRESSOR	
		BASIC	ESP	ESP II	BASIC	ESP
37.	Correct 4-20 ma chilled water reset option	-	-	X	-	X
38.	Turn diffuser wall solenoids off if oil pump is off	-	-	-	-	X
39.	Table length change to be compatible with Gateway Version 3 or higher	-	-	X	-	X

DESCRIPTION OF CORRECTIONS AND IMPROVEMENTS

1. The DM diffuser wall algorithm has been improved with motor current correction for load and power factor variations and compressor selection adjustments. Lag chiller or compressor shutdown factors are included.

2. A correction factor that changes the slope of the diffuser wall location line on the compressor map has been added. In effect, as the load changes from full to 20%, the impeller diameter factor reduces one diameter permitting operation without surge at part load while not preventing the wall from opening sufficiently to allow full load operation. This should minimize seasonal adjustments of dip switches.

3. Code 77 is displayed and pumps maintained (in start or run) if the run contacts fail to open on a "stop" and the amps are greater than 10%.

4. Code 87 has been added to indicate that the run contacts have opened with the motor still running.

5. When configured for 19C/CB (bank 1, switch 2 on) the post-lube time is 5 minutes. On the first start up after a POR or on "Auto Start after Power Failure" a 5 minute pre-lube is performed to ensure the guide vanes are closed prior to start-up.

6. Logic has been changed to permit 4 starts in 6 hours rather than 8 starts in 12 hours. This reduces the number of starts that can be bunched together around the clock reset time.

7. If the motor current exceeded 105% on dual compressor DR's the overload logic closed the vanes until the amps decreased to 105% rather than 100% which resulted in hunting around the 105% point. It now decreases to 100%.

8. "Auto Start after Power Failure" worked after a power outage of 1-½ sec. or greater but not on shorter power interruptions. It now recognizes a 1-2 cycle interruption.

9. Originally it took 1 min. at moderately reduced voltage to shut the chiller down. The time has been reduced as follows: Also see #32.

	Voltage less than	Time	Code
Low Line Voltage	95v	5 sec.	68
Power Loss	57v	1-2 cycles	67

10. Oil pressure wasn't checked while the starter was in the STAR connection but now it is.

11. The lag chiller or compressor is no longer disabled in the event of a lead failure. If the lag is running when the lead fails it continues to run. If it is off and the lead fails, it will start when the chilled water rises above set point plus deadband. On dual DR's the lag compressor won't go to Standby if there is a failure in a system common to both compressors such as the lube, refrigerant or water systems.

12. An ESP communications failure will not shut down either DR compressor or lead/lag chillers. Code 81 for DR duals or 33 and 34 with single compressor chillers now indicate that the chiller is running without the ESP options. If communications are reestablished the ESP will reset itself.

13. Rather than show a code 64 for all sensors and potentiometers that are out of range, individual devices are now indicated by alternating a 64 with a number for each specific sensor. In addition a missing motor current signal has its own code (82) now and each diffuser wall potentiometer is specified if it malfunctions, (89-4, 89-5).

14. A 2-3 sec. fault is now required before indicating a sensor out of range to reduce nuisance shutdowns.

15. When the S/D board Capacity Control Knob was placed on Hold the % amps were displayed on the S/D, the ESP and on Datalogger. The % amps are now only displayed on the S/D.

16. The control verifies that the diffuser wall on the lag compressor is closed and ready to start before the lead is backed off to 60% and the lag is started.

17. If "Auto Start After Power Failure" is activated the control goes right to code 26 and the chilled water pump is started immediately when power is reestablished.

18. Following are the parameter codes for displaying the values of the spare sensors, the corrected amps and the DM diffuser wall position.

	SINGLE		DUAL	
	LEAD	LAG	COMP A	COMP B
Sensor 3	30	32	30	
Sensor 4	31	33	31	
Corrected Amps	34	36	34	36
DM Wall Position	35	37	35	37

Processor boards shipped with date codes 8727 and later will process spare sensors 3 & 4. The sensors can be connected to the processor as follows:

Spare 3	to 1J2	pin 6	
Spare 4	to 1J2	pin 1	
Common 3 & 4	to 1J1	pin 2	(terminal 31)

The corrected amps and DM wall position will not be listed in published literature since they won't be of much use to a customer but are included here to help service personnel.

19. Key in 9999 then ENTER to display the Active Chilled Water Control Point or key in 8888 to display the Active Demand Limit Control Point. With the L/R switch on the S/D board in local, the values of the Temperature Control Knob and the Demand Limit Knob are displayed. If the L/R switch is in Remote, either the ESP setpoints or the auto reset values (if activated) are displayed.

20. Diffuser wall minimum position after startup - The diffuser wall doesn't open right after start-up on some compressor sizes. The diffuser wall position is a function of amps and lift. On compressors with small diffuser wall openings the wall can restrict gas flow so much that the compressor won't load up and increase the amps when the vanes are first opened. Running with the wall closed overheats the discharge and obviously restricts compressor capacity. The wall will now be moved, after starter transition, from closed (11%) to 20% open. This will permit the compressor to start loading up and to respond to guide vane action.

21. Prior logic didn't check chilled water temperature before starting so even with cold water a chiller would start and then recycle at 5 deg. below set point. Now if the chilled water is less than set point + deadband the chilled water pump starts but the control goes to a modified recycle (code 25) until the temperature rises above set point + deadband.

22. If the compressor starts (amp signal greater than 10%) for any unexpected reason the oil pump is started, code 77 is displayed, and a stop is attempted.

23. Return water temperature control is enabled by putting the desired return water set point in address 13. The return water temp. will move to within 2 degrees of the set point quickly and then approach at 1/8 degree per minute.

24. Software changes were made that permit a 32MP controlled chiller to function on the Carrier Comfort Network through a Gateway.

25. The lag compressor can be disabled while running without a POR. If it is disabled it will do a standard lag stop which takes about 2 minutes.

Lag is	if Switch Bank 6, Switch 8 is	and ESP Address 7 is
Enabled	off (enabled)	0 (enabled)
Disabled	on (disabled)	0 (enabled)
Disabled	on (disabled)	1 (disabled)
Disabled	off (enabled)	1 (disabled)

If the lag is disabled by the ESP and communications are lost, it stays disabled.

26. The dual compressor chiller lead/lag selector switch A-B can be toggled while the chiller is operating (without a POR). The control responds to the switch change at these times:

After a POR
At a "Start" request
If both compressors are running
While in code 39 - standby recovery - which means that the lag is running in place of the lead which has failed but has been reset.

27. Surge or stall of the lag compressor is recognized more quickly (30 sec.) and the recovery process has been improved to minimize the chance of repeated surging and shutdown on code 88.

28. A prerequisite for the lag compressor to start was having the diffuser wall close to less than 15%. Since full closed is considered to be 11% of flow width, a small shift in the diffuser wall pot could prevent the wall from reaching 15% for start-up. A start will now be permitted if the wall is less than 20% open.

29. The lead compressor's guide vane duty cycle has been changed to reduce the chance for overshooting the set point. The vanes operate for shorter periods just below the set point so dual DR's are less likely to pass each other and drive one into stall.

30. The original lag compressor's amp matching algorithm had a +-5% deadband with no duty cycle on the vane signals. It was observed that as the lag vanes closed and the lead opened they were apt to overshoot and drive one of the compressors into stall. Two changes have been made to improve this situation. The vane/amp matching task now runs every second rather than every two and a modified duty cycle has been added as the amps approach each other. Now when the amps are within 3% to 6% of matching, the lag vane motor is pulsed for a max of .6 sec. The dead band has been decreased to +-3%.

31. Actual amps were used for "recycle with amps greater than 60%" code 80 logic rather than "corrected" amps.

32. Low voltage logic was modified as follows:

rev If voltage is < 82% (95v) for 5 sec, shutdown and display code 68.
rev If voltage is < 75% (86v) for 2 sec, shutdown and display code 68.
If voltage is < 50% (57v) for 1 cycle, shutdown and display code 67.

The <82% logic was 1 minute in earlier software. The < 75% logic used to be anywhere from instantaneous to 1 sec. which is expected to be the problem with nuisance code 68's on ESP II software.

33. Control could get into a loop.

34. Corrected the single compressor lead/lag option when coupled with return water control option. The lag chiller wouldn't restart after it once shutdown on chilled water recycle.

The return water control option on both single and dual compressor chillers was corrected since it sometimes settled out 2F high.

35. Chiller wouldn't restart properly after power failure.

36. Display code 73 if try to start with condenser hi pressure switch open. Did give code 74 which permitted the lag compressor to try to start but abort on hi cond. press.

37. Single compressor - Corrected the 4-20 ma reset option so that the reset temperature is immediately acknowledged after the option is activated rather than after the first start. A chiller could start and then immediately recycle on low chilled water once.

Dual compressor - Corrected the 4-20 ma chilled water reset option so that the reset is always honored. When both compressors turned off the reset was ignored and the chilled water control point reverted to the ESP set point. The chiller could recycle based on a reset temperature and then immediately restart if the water was 5 degrees above the ESP setpoint.

38. Corrected so diffuser wall solenoids don't turn on if the oil pump is off. Lag compressor diffuser wall solenoids sometimes pulsed on after the lead compressor and oil pump stopped.

39. Corrected table length to prevent miscommunication between the 3200MP and Building Supervisor using Gateway module CEFA121301-03 and higher. This latest release of the 3200MP Gateway software corrects for nuisance COMM failures and reset operation faults. Datalogger has been revised to version 4.0 to be compatible with the latest 32MP.