BULLETIN

Carrier Corporation

Carrier
A United Technologies Company

North American Operations

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Title:	Oil Pressure Alarms						
Category:	*GENERAL*				Termination Date:		
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Models Affected: CAC: 19XR centrifugal chillers
BDP:

Purpose:

To advise the field of two known problems relating to oil pressure alarms on 19XR centrifugal chillers with PIC II controls. This addendum describes the two problems, suspected root causes, and alternatives available for fixes.

Note: This updates and includes information contained in Bulletin C9912A.

Situation 1: Low Oil Pressure When Running:

Symptom:

Machine shuts down in Alarm State 228, "Protective Limit - Low Oil Pressure" (pressure below 13 psi when machine is RUNNING and startup is complete).

Information:

There have been reports of 19XR chillers going down on a low oil pressure alarm, often soon after start up. Typically oil pressure of 24 to 28 psid is established during the pre-lube cycle. The chiller initiates a start, continues to operate through transition and then, anywhere between 30 to 90 seconds into the start, before the guide vanes start to open, it may go down on low oil pressure. The oil pressure loss has been observed in (at least) three forms:

1. The alarm is caused by a transient drop in oil pressure below the trip threshold. In some cases this may result from cavitation at the inlet of the pump. In other cases, variations in oil pump construction may result in significant high frequency pressure pulsations, the low point of which may drop below the alarm threshold, while the mean value is satisfactory. The PIC II controls are designed to recognize and respond to loss of oil pressure when the duration of the loss is a fraction of a second.
2. Gradual loss of oil pressure causes an alarm. In this case the decrease is slow enough to be observed and tracked on the CVC

display. After the chiller starts a small drop occurs down to about 21 psid, continues past the alert level of 18 psid to the alarm level of 15 psid where the chiller shuts down on low oil pressure.

3. The third form is a hybrid of the first two where after start up the pressure difference gradually decreases and then dips in a transient as described in number 1.

Corrective Action:

Corrective action is intended primarily to address the situation described in cases (1) and (3) above. On all 19XR chillers (or compressors) in which a problem with low oil pressure alarms arises, install a 100 microfarad capacitor, rated for 16 volts or higher, between terminals 4 and 5 on the upper J3 plug as shown in Figure 1 below. (If the capacitor is of the electrolytic type, with a + or - polarity indicated, attach the "-" end to J3-4.) The capacitor smoothes out the oil pump discharge pressure transducer signal without substantially affecting oil pressure sensing.

If this modification does not resolve your problem, please report the problem to Service Engineering so that other solutions can be discussed. The factory installed this capacitor on all 19XR chillers starting the first week of June, 1999.

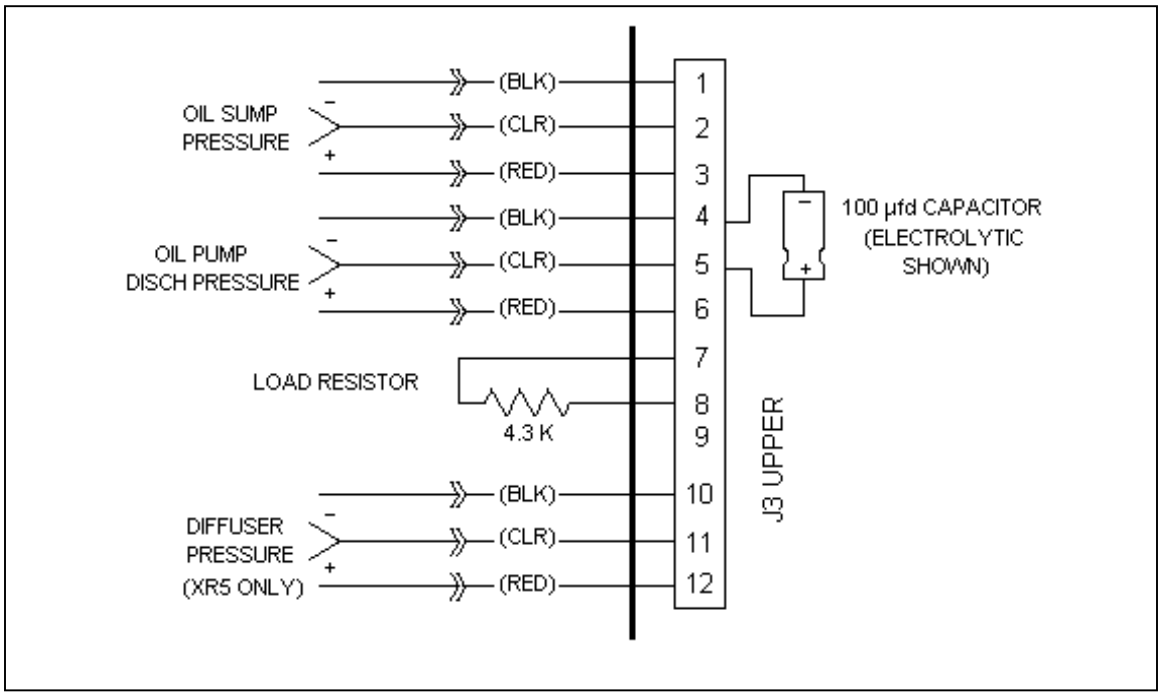

Figure 1. Wiring Diagram for Capacitor Placement

Addressing Low Oil Pressure

Situation 2: Oil Pressure > 4 Psi When Machine is Off:

Symptom:

Alarm State 227, "Protective Limit - Oil Pressure Sensor Fault", is declared based on oil pressure exceeding 4 psi when the chiller and oil pump are OFF.

Information:

There have been numerous reports of 19XR chillers generating this alarm when the chiller is off. This has been linked to high frequency noise, marginal grounding of the CCM, and problems with the hardware and software filtering performed within the CCM. If you watch the oil pressure in the STATUS/COMPR screen on the CVC for several minutes, a "calm" reading (without the problem) will normally show a variation or bounce within a range of approximately 0.50 to 0.75 psi. If you have this problem you are likely to see greater variation, with a range of 2 psi or more within a span of 5 to 10 minutes.

Corrective Action:

At this time there are three actions which can address this problem. In most (but not all) cases, it is likely that any one of them will be sufficient to relieve or eliminate the problem.

1. Improve the grounding of the CCM, especially the sump oil pressure channel, to the chiller. Add a grounding conductor from J3-1 and/or one of the screws passing through a standoff (at any of the CCM's corners, for example) to one of the control panel's ground screws. Also assure that the control panel is well-grounded to the chiller itself.
2. Install [another] 100 microfarad capacitor, rated for 16 volts or higher, between terminals 1 and 2 on the upper J3 plug as shown in Figure 2 below (which also shows the capacitor added for the low pressure oil fault described above). If the capacitor is of the electrolytic type, with a + or - polarity indicated, attach the "-" end to J3-1. This capacitor will filter out high frequency noise (which may not necessarily be detectable with a standard voltmeter) on the input or on the CCM ground. These capacitors were installed on production units starting on or about May 1, 2000.
3. Upgrade the CVC to use Version 04 software (19XR) along with the OTP microchip Version 68 or 69. These were formally released for production in June, 2000. This software will check to see if oil pressure exceeds the 4 psi limit only for a 10-second window immediately before a startup, instead of continuously when the chiller is off.

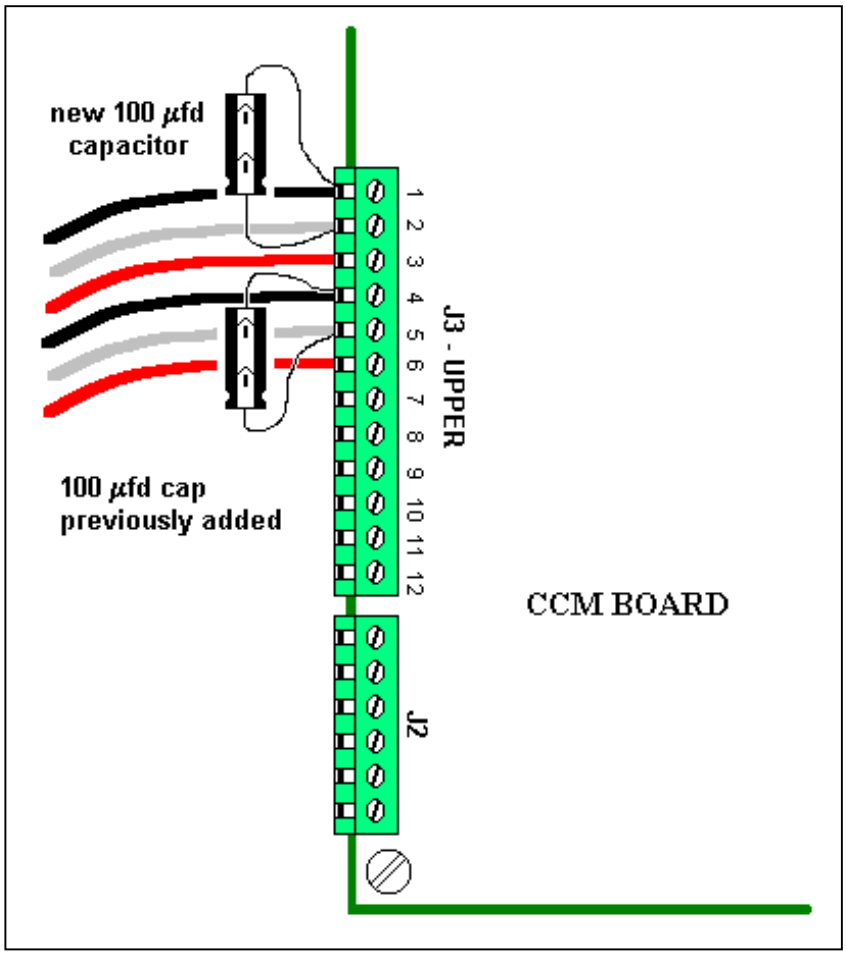

Figure 2. Wiring Diagram for Capacitor Placement
Addressing Both Oil Pressure Issues