SERVICE BULLETIN

Title: **19XL Oil Loss Symptoms and Solutions**
Models Affected: **19XL**

Number: **C9321**
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Supersedes:
Date:

Purpose:

To inform the field about 19XL oil loss: its symptoms, causes, and solutions.

File: Compressor, Motor

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Symptoms Of Oil Loss:

1. The machine appears to have refrigerant carry-over:
    - The guide vane housing sweats.
    - The discharge temperature is cold (below 100 F)
2. The machine is at full load amps, but the guide vanes are only around 5% open. (The normal FLA guide vane opening is usually above 15% target.)
3. The machine may be tripping on high amperage (110% FLA for 30 sec.).
4. Guide vane hunting is severe.
5. The compressor operates very quietly, then very noisily.
6. The oil level in the sump is decreasing very slowly, over a period of a day, not within an hour. Rapid oil loss will be discussed at the end of this bulletin.

Symptom Cause:

Excessive amounts of oil in the cooler (one to two gallons can be excessive!) lost from the oil sump will foam up in the cooler then will be sucked into the compressor. Refrigerant is also carried with this foam, causing the carry-over symptoms. The controls cannot react fast enough to prevent the sudden over-amping and hunting of the vanes.

Oil Loss Causes and Solutions:

1. Too much or too little refrigerant in the machine - Service bulletin C9312 has the latest updated refrigerant charge amounts for the 19XL machine. Check that the refrigerant charge in the

machine is the same as what is written on the bulletin. Oil loss will happen before any change in approach temperature is seen.

At light load conditions only, if the operating refrigerant level is too high or too low, the oil reclaim line on the side of the cooler will not pick up the oil floating on top of the refrigerant. During the full load condition, the machine brings back oil through the guide vane housing oil reclaim lines. At light loads, the gas velocity into the suction is not great enough to bring oil up with it into the compressor, so the oil stays in the cooler. That is why the oil reclaim cooler side pick up is vital to the oil system.

A method to determine proper refrigerant charge without weighing the refrigerant is to add a sight glass to the oil reclaim line coming back from the cooler. Monitor the sight glass when the load on the machine is small. Too low a refrigerant level will show no flow, too high a refrigerant level will show clear flow. When the level is correct, (at light load condition only) the flow will be very bubbly.

2. OIL IN THE COOLER AT INITIAL START-UP - If the unit has been shipped with the refrigerant charge, and any of the isolation valves were opened or leaked through without the oil heater being energized, the refrigerant will migrate into the oil and displace the oil into the cooler. This situation can also happen anytime the controls are powered off for more than 2 to 3 hours without pumping the refrigerant charge into the condenser or other holding tank.

It is also possible for a small amount of oil to be 'lost' to the cooler but not be discovered during a short factory run test.

3. PLUGGED OIL RECLAIM FILTERS, LINES, EDUCTOR - Feel the reclaim lines for temperature to determine proper flow. The cooler oil reclaim line is cold while in operation, the discharge line to the eductor should be hot, and the eductor outlet into the oil sump will be warm. Plugged oil lines, filters or the eductor will cause gradual oil loss.
4. OIL RECLAIM CHECK VALVE - If the check valve is stuck open or closed, oil will be lost. A visual internal check of this valve is required.
5. OIL RECLAIM SOLENOIDS WIRED BACKWARDS - Check to see that the lower, horizontal oil reclaim solenoid is energized and the upper, vertical solenoid is de-energized when the guide vanes are below 25% open. (The solenoids switch when the vanes go above 25% open).
6. POWER LOSS - After excessive lengths of time without power on the controls and the oil heater, the refrigerant will be absorbed by the oil in the sump, causing the oil level to rise and overflow into the cooler. When this occurs, the oil remaining in the sump must be heated to 100 F above cooler refrigerant temperature in order to drive all refrigerant out. This can be done through the latest Ver. 8 software through energizing the oil heater manually, or removing the remaining oil/refrigerant, and replacing with a fresh oil charge.
7. COLD CONDENSER WATER TEMPERATURE - If the condenser pressure approaches the same pressure as the cooler due to cold condenser water temperatures (or warm cooler water temperatures), problems with oil loss will occur. The differential pressure needed to form a pressure boundary between the motor and the oil sump is lost with low tower water temperature and

the oil will drain from both the motor labyrinth and the forward high speed labyrinth.

Rapid Oil Loss:

If the oil is being lost rapidly (within a one hour span), then an inspection of the internal components of the machine may be necessary. The following components should be inspected for leaks, missing parts, or proper clearances:

1. Oil reclaim check valve
2. Motor refrigerant drain line orifice
3. Motor pressure gas line in the transmission
4. Gear oil wiper in the transmission
5. Gear shroud
6. Demistor vent line filter
7. High speed thrust assembly o-rings.

Recovering Displaced Oil:

The machine will not run in a normal fashion until all the oil has been returned to the oil sump, even though the initial problem was fixed. It will take some operating run hours after the oil loss problem has been corrected for the unit to start to operate normally. It should take about two to three hours of operation to determine if the problem truly has been corrected, because the shutdown oil level will be higher than at the start of the reclaim process.

In order to help with over-amping and hunting of the machine during operation while trying to recover the oil, manually target the guide vanes (through the LID module STATUS01 screen) to the highest position possible without over-amping. Do not use the Demand Limit setting to hold the vanes as it will not control well enough. Usually 4 to 5 percent target position will be all that is possible to open the vanes when the machine is first operated to get back the oil. Let the machine run with as much load as possible, and a high tower water temperature. As the oil returns, the guide vane position can be increased. When all the oil is returned, then release the force on the guide vane target.

Once the oil loss problem has been found and corrected, the oil will return as the machine is operated. Usually the oil will recover at the rate of 1 gallon every one to two hours. About one inch in the oil sight glass is equal to one gallon.

Remove excess oil as it returns back to the oil sump. High oil level can cause high bearing and oil sump temperatures as the oil is whipped into the gear. The normal shutdown oil level is a full lower oil sight glass.