

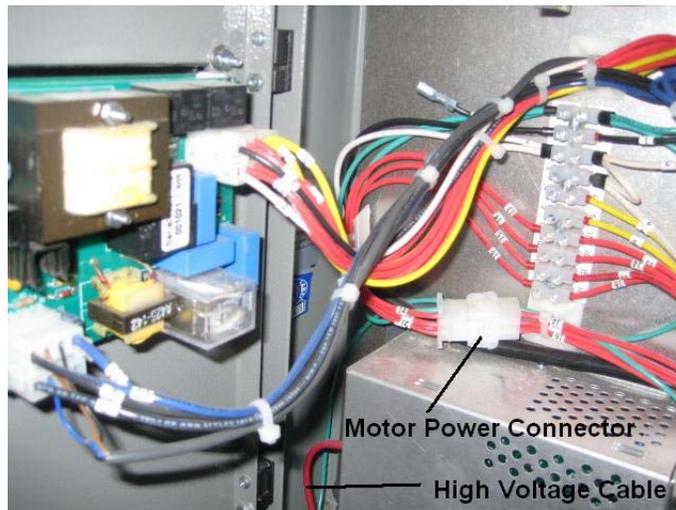


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Troubleshooting a Low Voltage Alarm (Code “0004”)

Declining or low voltage at system start is symptomatic of either water contamination or a failure of the high voltage power supply and/or its cable. It does not happen very often, but there are instances on new installations (even on gas turbines or hydraulic systems where water is not involved) where some free water collects at the bottom of the oil reservoir and is drawn into the Kleentek system during start up leading to saturation of the collectors. Since most hydraulic oils are designed for good water separation there may be no lingering evidence of water in the oil, but the collectors have absorbed the limited free water from the start up. To isolate this problem perform the following steps:

- a.) Power down the system and disconnect the high voltage cable from the high voltage power supply (the red wire shown in the attached picture) by pulling straight out from the box to separate the sleeve from the spade connector in the box, which will isolate the high voltage power supply from the collector chamber



- b.) Turn the system back on and observe the voltage reading on the panel display after the system has completed its start sequence. With the power supply isolated from the collector chamber it should read approximately 11.7 KV DC. Let the system operate in this fashion for 30 minutes, then recheck the voltage reading. A sustained 11.7 KV DC reading indicates the power supply is okay and the problem resides with either the collector circuit or oil quality. If the voltage reading is low or decreases steadily to shutdown, then there is likely a problem with the high voltage power supply.

Voltage Reading(s):

- c.) If the result of step 'b' above indicates no problem, press the FWD/REV button on the panel to pump down the collector chamber(s) and then shut down the system. Be sure and open the vacuum break valve on the chamber cover to allow entry of air as the chamber is emptied of oil, as per the instructions in the service manual. Close this valve when the chamber draining process is completed.

IMPORTANT: IF THERE IS A CHECK VALVE IN THE SUCTION LINE CONNECTING THE KLEENTEK TO THE RESERVOIR, CONTACT THE FACTORY PRIOR TO PERFORMING THIS STEP FOR ADDITIONAL INSTRUCTIONS – DAMAGE TO THE SYSTEM MAY OTHERWISE OCCUR.

- d.) With the collector chamber drained via step 'c' above, open the collector chamber, remove the collector element by removing the retainer, and (to address the possibility the collector is water-logged) do the following:

- 1) Remove the collectors from the systems and place each one in a clean bucket with a brick (or other suitable material permitting drainage of the collector)
- 2) Place the collectors in a dry, air conditioned space (such as the control room) for 72 hours
- 3) If the collectors were water-logged they should be dry after this time; reinstall in the systems and check the voltage reading after start up

- e.) With an ohmmeter (or multi-meter), measure the resistance from the end of the red wire (high voltage cable) in the panel to the top of the electrode shaft at the center of the collector chamber. This should be a fairly low resistance (less than 5 ohms), as electrical continuity should exist. Next measure the resistance between the end of the red wire and the green electrical ground lug inside the panel. This should read 'OL' on the meter for infinite resistance, indicating an open circuit. Repeat this same measurement between the top of the electrode and the wall of the chamber, which should likewise yield an open circuit. If a measurable resistance is detected in either of these two measurements, note this value and contact the factory.

Resistance – HV Wire to Electrode:

Resistance – HV Wire to Ground:

Resistance – Electrode to Chamber Wall:

- f.) If the results of step 'e' above did not indicate an issue, reattach the red wire in the control panel to the power supply that had been removed in step 'a' above, reinstall the collector retainer (without the collector installed), replace the collector cover and restart the system. Observe the panel display for the voltage.

It should read approximately 11.7 KV DC. Note this voltage, then leave the system running for 30 minutes and repeat the measurement.

Voltage Reading:

After 30 Minutes:

- g.) Turn off the system and let it stand offline for 24 hours.
- h.) After 24 hours, remove the access panel (which has the decal on it) below the control panel door and a drain valve should become accessible. Drain a small amount of oil from this valve into a small glass container and observe the oil's clarity and the presence of free water at the bottom of the container.

Is free water present?

Was the oil clear or hazy?

- i.) Cover the oil container with a suitable cover (or cap) and shake the oil, then pour some of the oil onto a metal spoon. In a suitable plant location, place a flame under the spoon and look for signs of bubbling in the oil, which would indicate the presence of emulsified water in the oil. If bubbling is observed, contact the factory with this observation.

Was emulsified water (bubbling) detected?

- j.) If step 'i' above does not indicate an issue, start the system and hit the FWD/REV button on the panel to pump down the collector chamber.

Be sure and open the vacuum break valve on the chamber cover to allow entry of air as the chamber is emptied of oil. Close this valve when the chamber draining process is completed. Shut off the system when the chamber is drained, open the chamber and install either the recovered collector (from step 'd' above, after the 72 hour dry-out period) or a new collector into the chamber.

- k.) Restart the system and after the system has filled with oil and 30 minutes have passed for the collector to become fully saturated with oil, check the voltage reading on the panel display and make note of this figure, which should be approximately 11.7 KV DC. If the voltage reading starts less than 11.0 KV DC, please contact the factory with this observation.

Voltage Reading:

- l.) For the next 6 hours make note of the voltage reading every hour on the hour, looking for any decline of the voltage. The voltage should remain steady within 0.1 KV DC during this time. If it does remain steady, then the likely cause of the low voltage was a pocket of water in the bottom of the reservoir that saturated the collector element during start up and this water has been absorbed by the initial collector element. A 'water-logged' collector can be recovered for reuse by



placing the collector in a clean bucket on top of a brick (or other suitable drainage support) and storing the collector in an air conditioned space (such as the control room) for 72 hours, during which it will dry out and be usable.

Elapsed Time (Hrs) Voltage Reading

Elapsed Time (Hrs)	Voltage Reading
Initial	
1	
2	
3	
4	
5	
6	