

CONTHERM *Scientific Limited*

TECHNICAL MEMORANDUM

PRODUCT :GP COOLED

No : 0080

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FROM : Contherm Scientific Ltd
TO : ALL AGENTS

DATE : 13/03/2002

SUBJECT: Fault finding GP Refrigeration Systems

This techmemo has been compiled to aid in troubleshooting GP/Cooled Waterbath refrigeration problems in the field.

When a Contherm GP cabinet or Cooled Waterbath fails to cool as expected a number of checks should be made to ascertain the cause of the problem.

Check that the temperature set point is set as expected.

Check that the timer is set to run the cabinet ([:]).

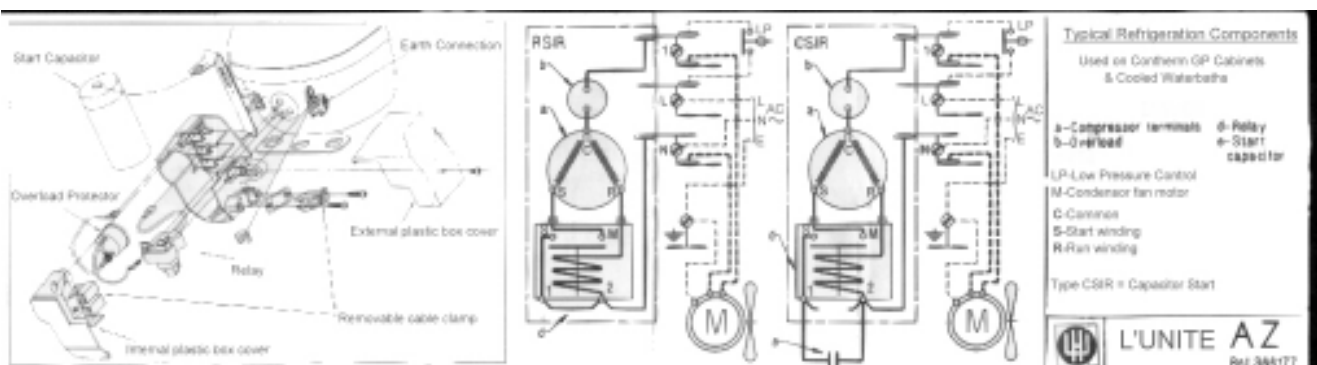
On a GP cabinet you can set the user Hi-Limit to fully anticlockwise – this will prevent the heater from holding the temperature up, if the cabinet/bath now starts to cool the fault may lie within the control circuit board.

Check that the DEFROST (Hot-gas) solenoid is not permanently energised, if the solenoid ‘chatters’ or is being pulsed on & off at short intervals, the cabinet may be ‘configured as a standard incubator instead of a cooled incubator’.

If the compressor fan motor is running but there is no cooling, check to see if the refrigeration compressor is operating (you should be able to feel the vibration and it will get hot). – If the fan motor is not running check the cutout thermostat inside the cabinet top cover. (see note below).

NOTE: On most GP systems a refrigeration CUTOUT thermostat is wired in series with the power to the refrigeration compressor system, this thermostat is usually set to switch the compressor and condenser fan motor OFF if the cabinet/bath temperature is above +40oC. If the current temperature of the cabinet/bath is higher than +40oC the compressor & fan motor will not start until the system has cooled.

If there is power to the compressor, and the compressor is not running – check the overload, starting relay and motor windings. If the compressor is a CSIR model check the starting capacitor. See diagram below for compressor components.



If the compressor and Condenser fan motor are running but there is no cooling, check that the cabinet internal circulating fan is operating, that the fridge evaporator (cooling coil located behind the false back) is not fully ICED UP, and check the system for refrigeration leaks.

To check the Overload: remove all power from the cabinet. Remove the overload from the compressor plastic box. Check that there is continuity between the overload terminals (ie a short circuit). If the overload is open circuit it is faulty.

To check the starting Relay: remove all power from the cabinet. Remove the relay from the compressor plastic box. When the relay is in its normal (upright) position the two contacts will not be connected (contacts 'S' & 'M' in the diagram), when the relay is inverted (turned upside down) you should feel & hear a slight 'clunk', and the two contacts should now be connected. If it works as above check the relay coil for continuity (between points 'M' & '2' on the relay diagram). If this all checks out the relay is OK.

To check the compressor motor windings: remove all power from the cabinet. Remove all connections from the compressor motor windings. Measure the resistance from the motor 'C' terminal to the 'R' terminal (the 'run' winding) it should have a low resistance. Measure the resistance from the 'C' terminal to the 'S' terminal (the Start winding) it should have a slightly higher resistance. Measure the resistance from the 'S' terminal to the 'R' terminal it should measure the combined resistance of the two windings.

Check the insulation from the 'C' terminal to the metal casing (earth). This should be checked with an insulation tester at 500V DC. There must be a least 2M Ω between the terminals and ground (earth).

If the either of the compressor motor windings is open circuit OR the compressor has an insulation fault to earth the compressor is faulty and should be replaced.

To check the starting capacitor (If fitted): On some models the compressor motor is a 'capacitor start' model, and it would then be necessary to also check that the starting capacitor is OK. The best way to check is by substituting a known good capacitor of the SAME CAPACITY and VOLTAGE RATING.