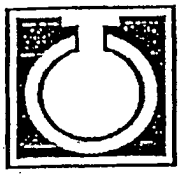


Glas-Col®

CE

OPERATING AND SAFETY INSTRUCTIONS
for
CE SERIES O and TM
HEATING MANTLES

5. Safety

This product has been designed for safe operation when in normal use. Please read the following Safety Information before operating the equipment.

Unless specifically designated otherwise, Glas-Col mantles are not intended for use with flammable or in hazardous areas.

If a mantle has more than one circuit, caution must be exercised and one or more circuits turned off to ensure that a partially filled vessel is not overheated.

Series O, and series TM heating mantles, should not be operated above 450° C (840° F).

Only Glas-Col supports should be used with Glas-Col heating mantles. Glas-Col assumes no responsibility for any damage resulting from the use of any other supporting device.

Do not charge or discharge a vessel while still in the mantle.

Check the mantle before each operation. Damaged mantles should be removed from service immediately.

Always use a flask clamp to secure flask in heating mantle.

Do not place hand around the edge or inside the mantle during operation.

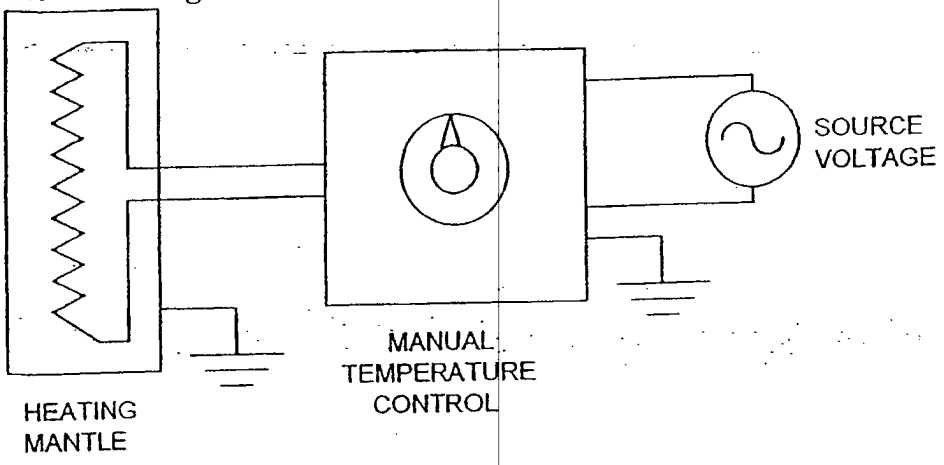
6. Maintenance

Glas-Col mantles do not require regularly scheduled maintenance. However, regular inspection is recommended. Glas-Col mantles should be protected from chemical spillage, mechanical damage and corrosive atmospheres so far as possible. Contamination, overheating and general misuse will greatly reduce the life of a mantle. Damage from spillage on TM mantles can be reduced greatly by using the Glas-Col Splash Guard or Poncho Safety Shield.

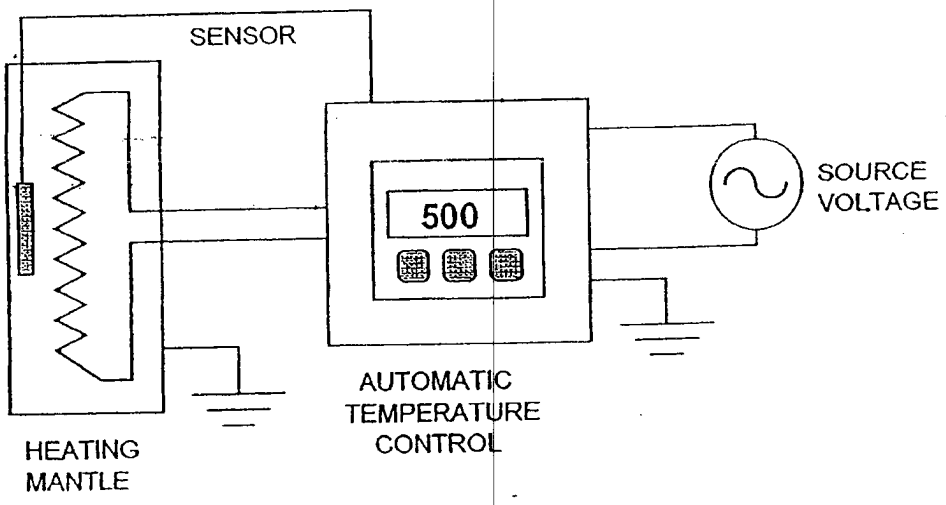
7. Spare Parts

Spare parts for Glas-Col mantles are not generally available with the exception of fastener components, electrical connectors and cord sets. To stock other spare parts, a complete spare mantle is usually necessary.

10. Wiring



TYPICAL CIRCUIT FOR MANUAL CONTROL



TYPICAL CIRCUIT FOR AUTOMATIC CONTROL

Figure 1. Types of Control Methods

Warning: To avoid potential electrical shock, use National Electric Code (NEC) safety practices when wiring and connecting this unit to a power source. Failure to do so could result in injury or death.

Heating:

1. When a fractionation or distillation is being taken nearly to dryness in a large glass vessel, zoned heating must be employed. As the liquid level recedes below the half full point on the vessel, the power input to the upper zones in the heating mantle must be reduced or shut off entirely in order to prevent superheating of the bare wall above the liquid level. Heavy heat input should be applied only to a surface which has liquid adjacent to it on the other side. Controls (variable transformers or automatic devices) should be used to reduce the heat in the bottom zone when the liquid level is low.

2. If very high boiling residues remain toward the end of a fractionation and it is necessary to distill them, this should not be done in vessels of 72-liter and larger. The **distillation of high boiling residues should not be continued when the liquid remaining in the large vessel is less than about five percent of its capacity.** The high boiling residues should be transferred to a smaller vessel for distillation to dryness.

3. If a distillation is being conducted under reduced pressure in a large vessel, a Poncho Safety Shield should be used to protect the vessel from falling objects. Glass vessels are especially sensitive to small blows when operated at reduced pressure.

4. At the end of a high vacuum distillation, air should not be let into the vessel while it is still hot because explosive mixtures with the hot vapors can form.

5. If a liquid containing a large amount of suspended solids is being heated in a large vessel, care should be taken to prevent the formation of a mud or sludge at the bottom of the vessel due to settling of the solids. **If this is unavoidable, then the bottom heating circuit should not be used.**

6. In some operations a batch of material is heated in a vessel and then removed through a bottom outlet. The vessel should not be emptied immediately after the heating has ceased because there in enough stored heat in the mantle to make the bottom half of the vessel hot and dry. Drops of condensation remaining in the top half of the vessel can then collapse and fall to the bottom hot area an cause cracking from severe thermal shock. **The vessel should be allowed to rest in the mantle for at least thirty minutes before emptying while purging the mantle with air.**