Overview

- **Application**: Precise and uniform temperature control of oil drums and automatic daily start up
- **Products**: 1650 PID Controller and profile programmer, 650L Over temperature limit controller and GRS-H SSR (Solid State Relay) for driving heating resistors

The process

The storage and preparation of heat-sensitive substances is an important aspect in the production processes of the chemical, pharmaceutical, food and textile industries. For example, some oils in the chemical and Oil & Gas sectors tend to thicken at low temperatures.

For this reason, the drums holding such oil are required to be stored in hot chamber to ensure the required viscosity for easy mixing or pumping.

Another example: In the food sector, honey tends to crystallize at low temperatures and needs to be stored in hot chambers to maintain the fluidity required for the mixing phases.

Hot chambers, in addition to storing, are also used to preheat the material to a temperature close to the process temperature (max 150 ° C / 302 ° F), in order to facilitate the transfer and mixing in the subsequent production phases.
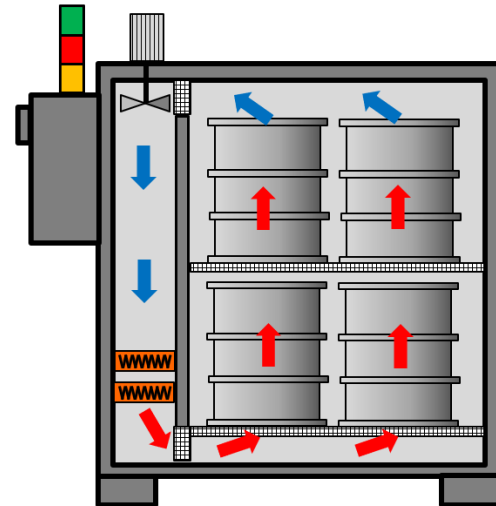

Figure 1 – Preheating chamber

The challenge

The drums of oil required for the production batch are placed in the preheating chamber and brought to temperature (120 ° C / 248 ° F) before being mixed with other chemical products.

The uniformity of temperature inside the individual drums and the heating gradient are the characteristics that can influence the subsequent processing steps and the quality of the final product.

For energy management purposes and process efficiency, the liquid should reach the target temperature when the production phase requires and not in advance.

Product benefits

1650 PID Controller cum programmer

- Combine the traditional operator interface with a top end PID control and Ramp soak as per specific process requirement
- Provides with logic and Math functions, supported by two level of connectivity Web server and Mod bus TCP

650L Limit Controller

- Makes the heating control system safe in case the process temperature exceeds the safety limit
- Retentive alarm condition and acknowledgment (ACK) to define necessary safety action upon safety limit alarm

GRS-H Solid State Relay

- SCR zero crossing heating resistor control
- Heater break alarm and diagnostics
- Operation overtemperature protection

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Solution

The solution is based on the 1650 PID controller features to perform…

- Temperature control of the preheating phase of the chambers by using the combination of logic and real time clock control block and Ramp and soak profile generator.
- Any delayed start of the air recycling fan will be detected by the logic control block (Figure 2) and the alarm is activated.
- Automatic/Manual operation selection depending on the process need.

Remote service and diagnostics

- Web server connectivity allows diagnostics and remote control with access to process parameters using devices such as PC, Tablet, mobile phone etc. (Figure 3)
- Recycle fan start-up count with settable warning threshold for preventive maintenance purposes.
- Partial and absolute totalizer is available to measure the energy transferred to the heating system.
- Control and data acquisition from plant supervisor via Modbus TCP factory automation network (optional)

Electric heater coil control

GRS-H - Solid state relay with integrated diagnostics

- SCR with Zero Crossing (ZC) ignition resistance control – this limits EMC noise emission
- Load break and power failure diagnostic by LED signal and alarm digital output (Figure 4)

650L - Overtemperature safety threshold

- The limit controller 650L is required for safety purpose to break the heating control circuit in case of overtemperature.
- The front instrument "Reset" push button to reset and re-establish the working conditions.
- Retentive alarm condition
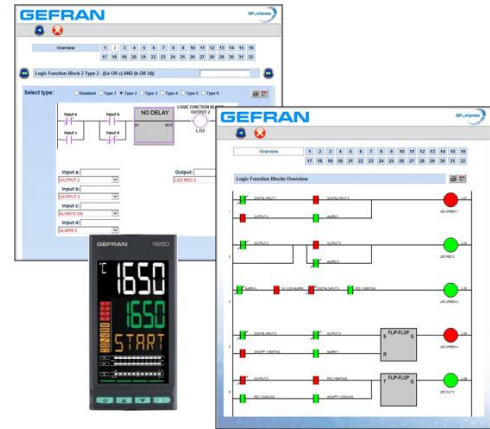- FM (Factory Mutual) certification

Figure 2 – Math and logic function

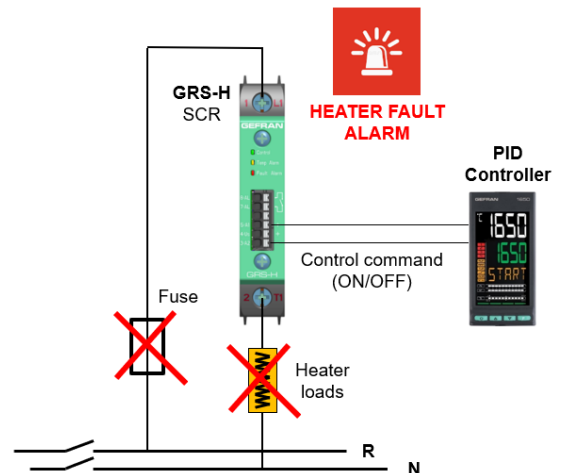Figure 3 –Webserver remote connection

Figure 4 – Diagnostic and heater break alarm

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