



Furnace & oven control

KS 40-1 application



Timer-controlled temperature profiles

Start direct via front-panel key

Maintenance manager

Heating current monitor

Excess temperature monitor

STARTING THE TIMER

Depending on requirements, the timer can be started in different ways:

Start via front-panel key

Pressing the  key will start the configured timer function. The timer setting is adjustable as a parameter. If password protection is defined for the Parameter Level, this also protects the timer setting. If required, the timer setting can also be made accessible in the extended Operating Level.

Start via a digital input

The digital input is configured as a push-button, thereby simulating the start via the  key. In this way, the timer function can be started automatically, e.g. when the furnace door is closed.

Start with power up

Every power up starts the timer function. This makes the automation of cyclically-operated industrial furnaces particularly simple.

Start after pre-selected time

Contrary to the methods described above, this option is suitable for frequently changing timer periods. The timer function is started by altering the timer time  from 0 to the required delay time.

ALARM RELAY

SSR fault or excess temperature

With the KS 40-1 it is possible to connect several alarms to a common relay. In this case, the outputs of the heating current monitor and the excess temperature monitor are signalled by the common relay.

Storing the alarm status

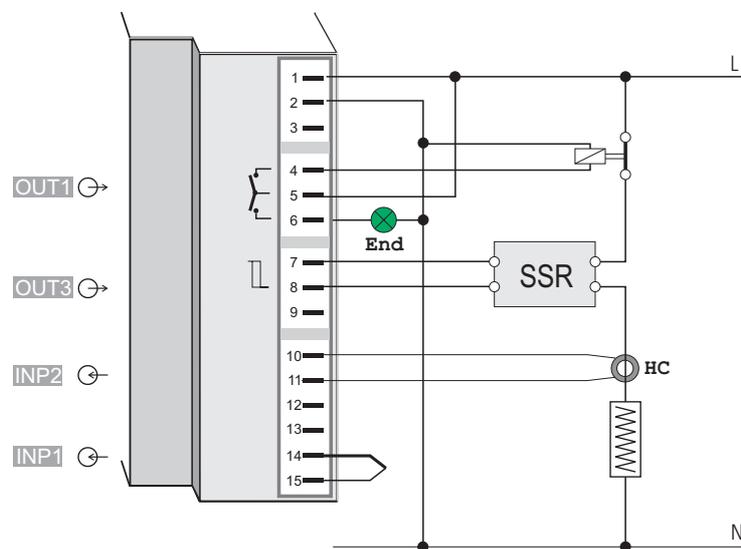
If either of the two alarm conditions is met, the relay is triggered. By means of the „alarm store function“ this status is maintained until it is reset via the front panel or a digital input.

END OF THE TIMER FUNCTION

When the selected timer function has elapsed, the „Run“ LED goes off. Simultaneously, the lower display line shows **End** until any front key is pressed.

Relay is triggered by „End“

Alternatively, the „End“ signal can also be triggered by one of the on-board relays. This enables a separate signal to be used, as described in the diagram below. Frequently, this signal can also be used for an additional automation function of the furnace: a cooling fan is switched on, a charging procedure is started, or any other function is enabled.



MAINTENANCE MANAGER

Preventive maintenance ensures highest quality and low reject rates.

Recalibration warning

Especially with precision applications in a laboratory or medical application, periodic recalibration of the process is necessary. This procedure can be automated by means of a corresponding message in the KS 40-1. Depending on the permissible operating time, the customer-specific message is generated after an adjustable period has elapsed.

MEASUREMENT VALUE CORRECTION

If the measurement error increases due to thermocouple aging, and in spite of periodic recalibration, a correction of the measurement value is possible. This correcting function can be protected by a password. There are two basic alternatives:

Offset correction

In this case, the entire measurement is shifted by a defined value. This particularly simple method can be used, if the necessary correction is the same for the entire measurement range.

Two-point correction

The measured process value is corrected at two defined points. This also enables temperature-dependent errors to be eliminated.

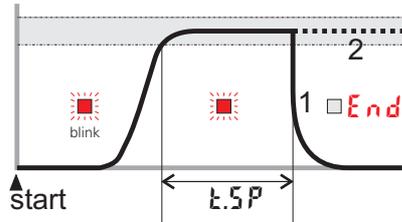
OTHER POSSIBILITIES

Control loop alarm

Alternatively to the heating current monitor with an external current transformer, the control loop can be monitored without any additional equipment. However, because the effects of a fault in the control loop are detected by monitoring the process reaction, a longer response time must be accepted.

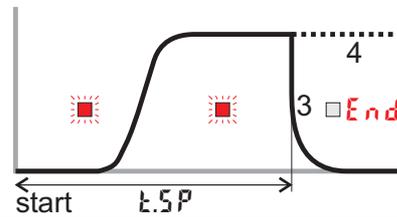
Set-point ramps

Every change of the set-point change can also be limited by means of an adjustable gradient. This ensures that the furnace charge is brought up to the set-point temperature smoothly, and without stresses in the material.



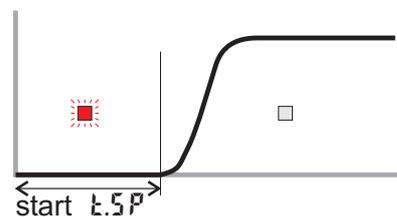
Timer modes 1 and 2:

After starting, the controller switches over to the adjusted set-point. The timer starts when the set-point has been reached. The tolerance band around the set-point is adjustable. When the timed period has elapsed, the KS 40-1 switches itself off (mode 1) or it maintains the set-point temperature (mode 2).



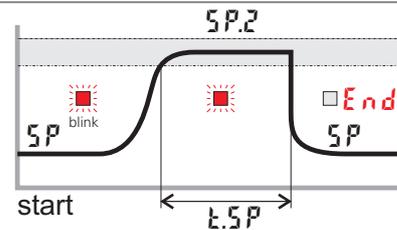
Timer modes 3 and 4:

After starting, the controller switches over to the adjusted set-point. The timer starts immediately. When the timed period has elapsed, the KS 40-1 switches itself off (mode 3) or it maintains the set-point temperature (mode 4).



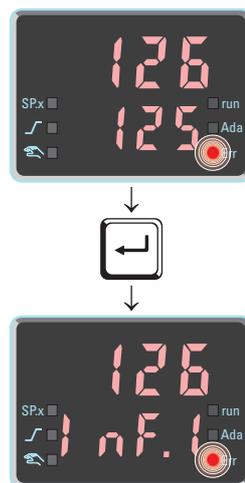
Timer mode 5:

In this mode, the adjusted timer period causes a delayed start. The KS 40-1 is switched on when the timed period has elapsed. There is no "End" display.



Timer mode 6:

In this mode, the temperature is maintained at the set-point temperature SP.2 as long as the timer is running. The timer is started when the process temperature is within the adjusted tolerance band. When the timed period has elapsed, the KS 40-1 returns to the initial set-point.



Maintenance manager

The blinking "Error" LED indicates that there is a new message in the error list. Pressing the "Enter" key displays the new message. The message 1 nF.1 means that recalibration is necessary. Other messages are possible, e.g. as a function of controller output cycles. For example, this could indicate that preventive maintenance is necessary for an actuator (heating contactor, burner, drive motor, etc.).



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