

# **Evaporator control**

# **KS 98** application

Master/slave control for an evaporator with 5 heating power stages

Five heating power stages Linear control of 0...100% per stage Outflow and return are controlled by a master/slave loop Extremely precise control

#### **KEY WORDS**

Evaporator, outflow control, Thermex DIPHYL®, heat transfer oil, master/slave control, heating power control

#### DESCRIPTION

For the production of nylon thread, the raw material granulate in the extruder is heated to approx. 270 °C by means of vaporized Thermex (DIPHYL®) heat transfer oil with a max. temperature deviation of 1°C. The thermal oil is evaporated, whereby the boiling point is kept constant via the steam pressure.



The control equipment of the evaporator regulates the heating power for the outflow (product temperature). The working point for the necessary heating energy is determined from the difference between outflow and return flow temperatures.







# IMPLEMENTATION

Control of outflow and return flow is performed by a master/slave loop, whereby the outflow temperature controller is the master. The slave controller (return flow) regulates the electric heating power. The slave's set-point is an external signal representing the outflow temperature reduced by a defined value. This value is modified by the output value of the master controller. The output signal of the master controller is monitored for exceeded limits. Depending on the actual controller output, and via delay circuits, the limit contacts switch the different heating stages on and off sequentially. Individual thyristor regulators control the electric power between 0 and 100% for each heating stage.



Apart from the operator's screen displays for outflow and return flow, there are also trend displays for outflow and return flow temperatures, boiler temperature, and heating power. Alternatively, all of these process values can also be displayed as bargraphs. With the bargraph display, a status line also shows the numeric values.

## CONFIGURATION

The page "Bediensperre" contains the access code to the adjustment pages for times, power limits, and general parameters such as standby set-point, outflow min. alarm, etc.

#### Operating page "Times":

Switch-on delay for activating the next power stage.

For example: Time2 = 5s means that the power stage 2 will be switched on after 5 seconds.

## Operating page "Grenzw Leistung":

Trigger points of the individual power stages in percent



#### Operating page "allg parameter":

W2 is the (reduced) standby set-point for the outflow temperature, VL MIN is the low alarm limit for the outflow temperature. Adaptation (scaling) of the thyristor regulator output is done in the Configuration Level (offline).

# UNLIMITED VERSATILITY

The flexible configurability of the KS 98 enables the above application to be extended with pre-configured library functions such as password protection, timer, programmer, etc., or even "homemade" partial Engineerings. With additional operating screens, for example 6-line text display, trend display, and bar- graphs, the projecting engineer is able to increase the plant's operational func- tions. Moreover, by means of a user- specific menu structure, the transparency of the process data can be adapted precisely to individual requirements.



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