FTD-HC-23-1920-71

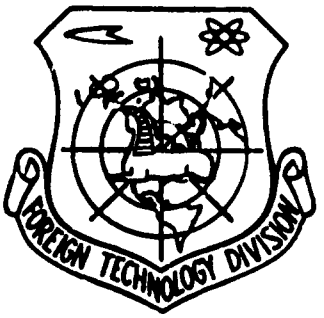
FOREIGN TECHNOLOGY DIVISION

THIS IS AN UNEDITED ROUGH DRAFT TRANSLATION BY JOINT PUBLICATIONS RESEARCH SERVICES

AUTOMATIC TEMPERATURE CONTROL IN OIL AND GREASE HEATING EQUIPMENT

by

T. Jez



DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Foreign Technology Division Air Force Systems Command U. S. Air Force	2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED 2b. GROUP

3. REPORT TITLE

AUTOMATIC TEMPERATURE CONTROL IN OIL AND GREASE HEATING EQUIPMENT

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Translation

5. AUTHOR(S) (First name, middle initial, last name)

Jez, T.

6. REPORT DATE 1971	7a. TOTAL NO. OF PAGES 3	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO. b. PROJECT NO. 7343 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) FTD-HC-23-1920-71 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Foreign Technology Division Wright-Patterson AFB, Ohio

13. ABSTRACT

The authors describe a relay and contractor system for controlling temperature in equipment for warming up oil and grease, incorporating an ovvershooting means to maintain the previously set temperature. The system is also provided with an additional means for protecting the heaters from an excessive temperature increase. [AP1112308]

DD FORM 1 NOV 65 1473

UNCLASSIFIED
Security Classification

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Automatic Temperature Control Lubricating Oil Grease Heating						

UNEDITED ROUGH DRAFT TRANSLATION

by Joint Publications Research Services

AUTOMATIC TEMPERATURE CONTROL IN OIL AND GREASE HEATING EQUIPMENT

By: T. Jez

English pages: 3

Source: Pomiary Automatyka Kontrola (Measurements,Automation, Control) 1971, Vol. 17, No. 4, pp. 179-180

PO/0034-71-017-004

PREPARED BY:

TRANSLATION DIVISION
FOREIGN TECHNOLOGY DIVISION
WP-AFB, OHIO.

AUTOMATIC TEMPERATURE CONTROL IN OIL AND GREASE HEATING EQUIPMENT

Author: T. Jez

Source: Measurements, Automation, Control 1971
Vol. 17, No 4, pp 179-180

Abstract: Description is given of a contacting relay system for use in oil and grease heating installations that is capable of automatically maintaining preset temperatures. The system incorporates additional safety features designed to protect the heating installation from excessive temperature increase.

Despite rapid growth of instrumentation, plants within the metalworking industry continue to encounter difficulties when buying installations equipped with control instruments. The difficulties in question apply to a variety of equipment types such as fully fireproof ovens, baths, and degreasing and surface treatment tanks featuring automatic controls.

These equipment types are mostly deficient in safety measures designed to protect against damage to the heater control units and malfunctions resulting from inattention on the part of operators. Incorporation of the control system described below in various heating units will protect them against excessive temperature rise and possible ignition of the contents. The basic concept of the system is shown in the control system (Fig. 1) and power supply (Fig. 2) block diagrams.

The red "on" indicator lamp indicates that power is on. Contactor ST_4 is actuated by pressing button P_2, and is maintained in that position by means of contacts PP ans ST_4. Closing the other ST_4 contact causes power to be fed to the coil of contactor St_1, timer relay PC coil, thermoregulator servomotor and contactor St_5 coil. Contact St_5 is itself maintained and feeds power through the other St_5 contact to the coil of contact St_2, thus actuating the delta system. The green indicator lamp indicates that the delta system is on.

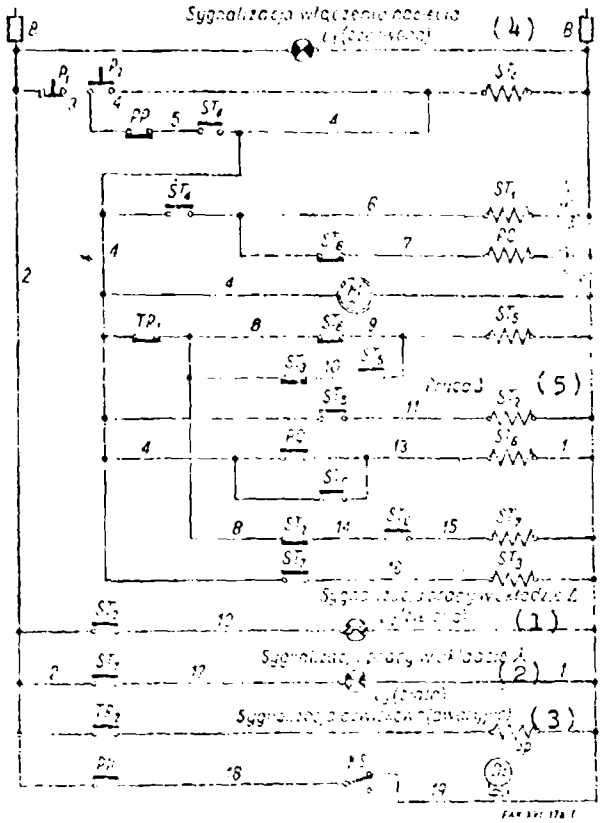


Fig. 1. Control system block diagram.
/Key:/ B - safety fuses; L - indicator lights; Dz - alarm bell; KS - bell switch; P - control switches; PP - auxiliary relay; PC - time switch; ST_{4-7} - auxiliary contactors; TR - temperature regulator; 1 - indicator lamp L_2 (green denotes delta system on); 2 - indicator lamp L_2 (white denotes wye system on); 3 - alarm bell; 4 - "on" indicator lamp (red); 5 - operation in delta mode.

Following the preset time lapse (about 5 sec) the timer relay closes contact PC, thus actuating contactor ST_6. Actuation of ST_6 causes interruption of the timer relay PC power supply and prepares the ST6 contactor system for automatic actuation of the wye mode. Contactor ST_7 will not close since the system is operating in the delta mode and contact ST_2 is open. When the temperature preset by means of the thermoregulator is attained, the thermoregulator contact TR_1 will open, and the delta system will be switched off. Reactuation will occur when the temperature falls 15°C. Then the thermoregulator contact TR_1 will close, and power will be

to contactor ST_7 coil. Contactor ST_5 coil will not be switched off since ST_6 contact remains open. Contactor ST_7 will close, supplying power to contactor ST_3 coil and thus switching on the wye system. The opening and closing of thermoregulator contact TR_1 causes on and off switching of the wye system in order to maintain the preset temperature. Actuation of the wye system is signalled by the white indicator lamp L_3.

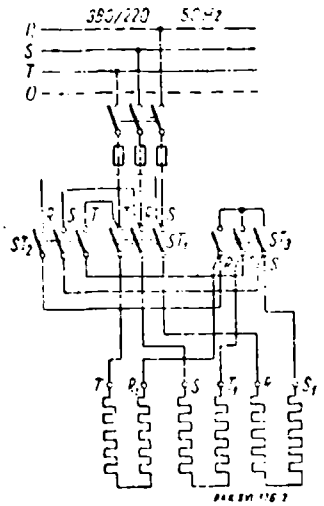


Fig. 2. Heater circuit block diagram. ST_{1-3} - main contactors.

At the end of the operation, the oil heater installation power supply is cut off by pressing switch P_1, and the control system power supply is interrupted by throwing the main switch.

Mention should be made of the safety system used to prevent fire in the event of damage to the heater switch system. When the temperature rises, the temperature regulator TR_2 set at a value 15°C higher will attain the preset temperature and will cause contact TR_2 to close. The relay PP will switch off contactor ST_4, thereby turning off the entire temperature control system. Breakdown deactivation of the system is signalled by ringing of the alarm bell. The ringing can be stopped by pushing switch KS. The heating system is reactivated after the necessary repairs are carried out.

The system described above has been incorporated in oil and grease heating installations at Stalowa Wola steel plant. Systems without the delta-wye switching capability were utilized in installations rated at below 8 kW.

In summary, incorporation of the control system described protects oil and grease heating installations from fire hazard. The fail-safe system switches off the control circuits immediately upon increase in temperature. The system can be reactivated after the necessary repairs are carried out, and the fail-safe mechanism re-set.

END