

CONTACTLESS DEVICES ON THYRISTORS

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Abstract- Switching semi-conductor devices (thyristors) are widely applied in contact less schemes of management, protection. Contact less electric devices on thyristors are perspective for their application as switches in chains of constant and variable currents.

Keywords: Thyristor, The Management Scheme, The Protection Scheme, Semi-Conductor, Switching Devices.

I. INTRODUCTION

In contact less schemes of management and protection switching semi-conductor devices (thyristor) are widely applied. Thanks to a split-hair accuracy of switching and small dimensions at considerable capacity thyristor are rather perspectives for their application as contact less switches in a chain of constant and variable currents. They can carry out functions of contact less relays, switches, powerful contact less etc. Thus thanks to absence of moving parts and a great speed of switching they provide the best results, than mechanical switches contact less and the relay. Thyristors possess the big advantages at their use in the schemes demanding frequent switching's where elimination of deterioration of contacts and reliability increase has essential value.

II. METHODOLOGY

The elementary scheme thyristor the alternating current switch is resulted on Figure 1. Management of work of this device is carried out by the button of management. The pressure divider on resistors R_2, R_3 serves for restriction of an operating current. The management button can be replaced by the automatic device reacting to a current, pressure, speed etc. Considered switch use in schemes of protection and management of various power-plants.

On Figure 2 the elementary scheme thyristor the switch of a direct current with push-button management is resulted. At button short circuit B positive pressure on an operating electrode thyristor moves and it opens. Thus the management current is limited to resistor R . After inclusion thyristor the condenser C is charged to pressure of a source of a direct current. By pressing the switching-off button "O" the condenser C it is discharged through a loading chain. For the period of the condenser category positive pressure is put to the cathode thyristor.

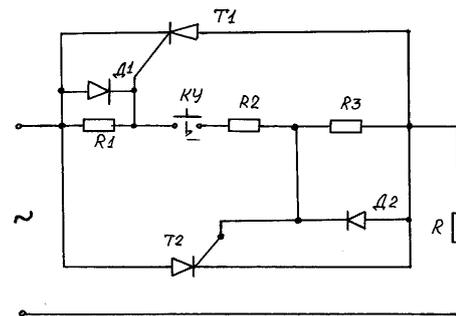


Figure 1. The scheme thyristor the switch alternating current

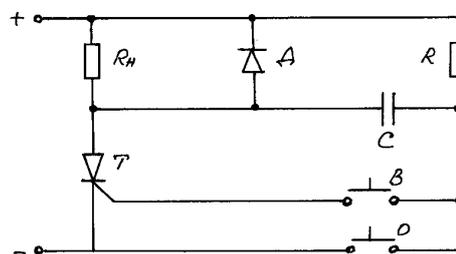


Figure 2. The scheme thyristor the switch direct current

III. DISCUSSIONS

The scheme thyristor the switch with protection against super currents with use of additional thyristor T_3 and a stabilatron of C_m is resulted on Figure 3.

At short circuit of the button of inclusion B positive pressure on an operating electrode of thyristor T_1 moves, and it opens. After inclusion of a thyristor the condenser C is charged to full pressure of a source of a direct current. At occurrence of super currents the power failure on shunt R_{sh} becomes more than threshold pressure of a stabilatron, and it passes a current on an operating electrode of thyristor T_3 which thus instantly opens. At open thyristor T_3 the condenser is discharged and thyristor T_1 is locked, interrupting an emergency current. Switching-off of the switch and thyristors is carried out by the button O .

Similar thyristors switches can be used in schemes of rheostat start-up of engines of a direct current. One of such schemes is shown on Figure 4. In this scheme analogue linear contactor is thyristor T_1 . At opening its

anchor of the engine is connected on pressure of a network of a direct current. Condenser C_1 is thus charged. The starting current is limited to steps of starting resistors R_1, R_2 . In process of engine dispersal unlocking signals move on operating electrodes of thyristors T_2, T_3 which at opening shunt starting resistors and charge condenser C_2 . Thus, thyristors T_2 and T_3 carry out function contactors accelerations. For engine switching-off it is necessary to give unlocking signal on thyristor T_4 . At its opening as a result of the category of condensers C_1 and C_2 other thyristors will be closed. As well as in contact control systems, engine start-up can be carried out as a current, time or frequency of rotation at corresponding formation of operating impulses.

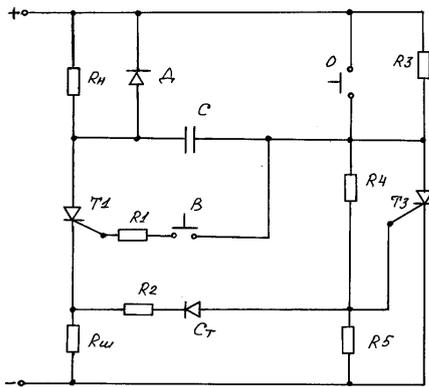


Figure 3. Scheme thyristor the switch with protection against super currents

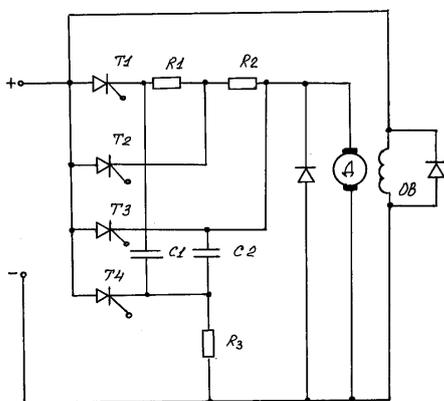


Figure 4. Scheme of contact less engine management

On switching semi-conductor devices switching of electric chains can be executed without the arc. The principle without the arc switching consists in shunting of the main contacts of the device by switching devices at the moment of disconnection of the main contacts that excludes the arc category on a contact interval and by that raises electric wear resistance the device (Figure 5). Relay P winding joins through a chain of management of K . To in parallel main contact P_1 it is included simistor. The operating signal on it arrives through auxiliary contact P_2 from a network and limiting resistor R . At pressure giving on a winding of the relay contact P_1

becomes isolated later, than P_2 , and at removal of pressure from the relay - at first is disconnected P_1 , then P_2 . Thus, the current through simistor passes only during switching. Simistor works in the facilitated thermal mode and without special heat-conducting paths can switch the big capacities in loading. Contacts become isolated and disconnected at included simistor, the arc does not arise, than and raises wear resistance contacts.

Without the arc switching can be received by main thing shunting contactor in pair meeting-in parallel included thyristors. The thyristors device as a separate constructive element is attached to contactor or established separately from it. On the basis of contact less thyristors switchboards (relay amplifiers) with loading on an alternating current controllers for management one- and two-high-speed engines of an alternating current are executed. Management of controllers are push-button or from controller command. Controllers provide start-up, a backspacing, braking of engines and consist from thyristors blocks: switches of directions, speed, a brake, dynamic braking and power units of chains of management, protection against repressure of thyristors, the control of assemblage of the scheme. Switching of chains of management of thyristors is made the relay, executed on base gerkon. Thyristors switchboards are applied also in the ship electric drives operated magnetic controllers and cammed by controllers for increase electric wear resistance of switching power equipment.

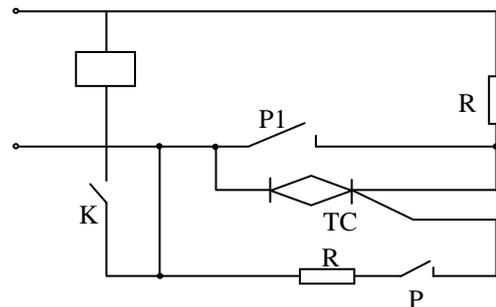


Figure 5. The scheme without the arc switch on simistor

IV. CONCLUSIONS

The big speeds of switching thyristors give the chance to use them in various schemes of protection against repressor and super currents. Operation of protection during one half-cycle is thus provided. Besides, thyristor can be used in schemes of rheostat start-up of engines of a direct current. Thus, in control systems, engine start-up can be carried out as a current, frequency of rotation, time at corresponding formation of operating impulses.

Hence, thyristors switchboards possess a number of advantages: high speed, high reliability of application in explosive premises, the big factor of strengthening on capacity. Specified confirms ample opportunities of practical application thyristors by working out of devices and automatic control and regulation systems.

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BIOGRAPHIES



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