



ELECTRUM AV

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TD6

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SIX-CHANNEL THYRISTOR DRIVER TD6

USER'S MANUAL

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1 APPLICATION AND USE

A six-channel thyristor driver TD6 (hereinafter - driver) is intended to generate galvanically isolated pulses to control thyristors in circuits of power thyristors converters.

The driver can be used:

- in bridge and neutral circuits of regulated thyristor rectifiers;
- in thyristor power regulators;
- in thyristor contactor switches;
- in thyristor devices of smooth start (soft-starters).

2 CONFIGURATION AND OPERATION DESCRIPTION

By circuit the driver is a six-channel galvanically isolated thyristors control pulses shaper controlled by an external logic device. The galvanic input isolation depending on the version can be either optocoupler, or fiber optic one (fiber optic receivers of type HFBR). The galvanic output isolation is carried out with isolating pulsing transformers.

At the heart of the driver operation is a method of transmitting of "wide" control pulse through the pulse transformer by frequency filling of "narrow" pulses.

All the six channels of the driver are galvanically isolated both for the inputs and outputs that allows using the driver to control by one or more thyristor converters, that is controlled both from the group control unit, and from the individual controls, having various level of the control signals and the various potentials between the "grounds".

For the drivers operation as a part of reversing thyristor converters, there is a group blocking of control pulses in the driver that switches from a separate electrically isolated input. The level of the blocking switch-on signal can be either a low logic level or a logic high one (selected when ordering). Power supply of the driver is carried out from an external supply source $24\text{ V} \pm 10\%$.

The driver has an LED indication of the presence of the control signals on outputs for each of the six channels.

Structural scheme of the driver is represented on Figures 1, 2. Diagram showing the operation is on Figure 3.

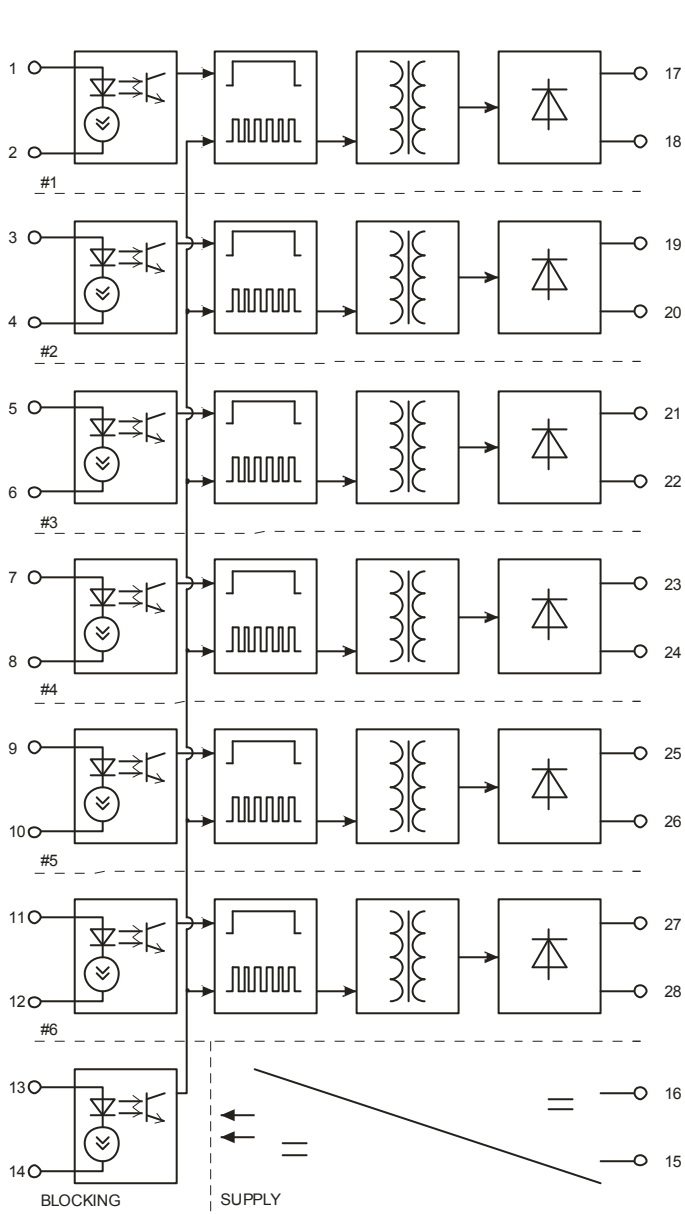


Figure 1 – Driver structural diagram with optocoupler input isolation

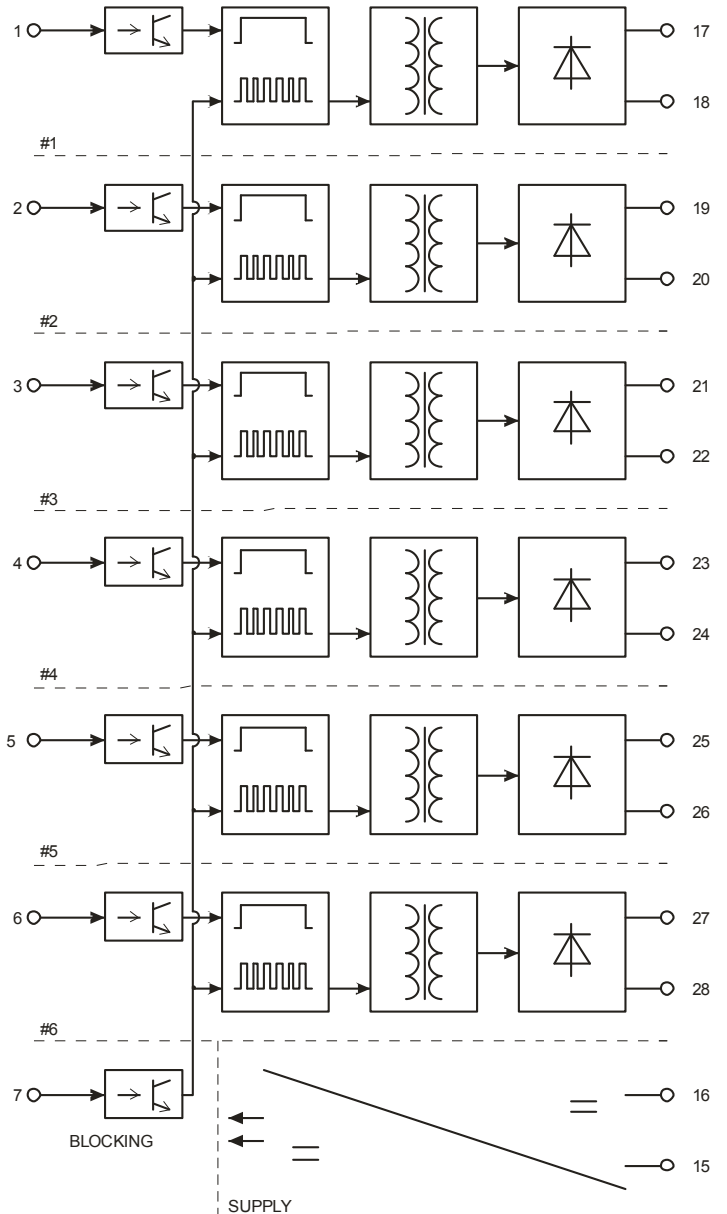


Figure 2 – Driver structural diagram with fiber optic input isolation

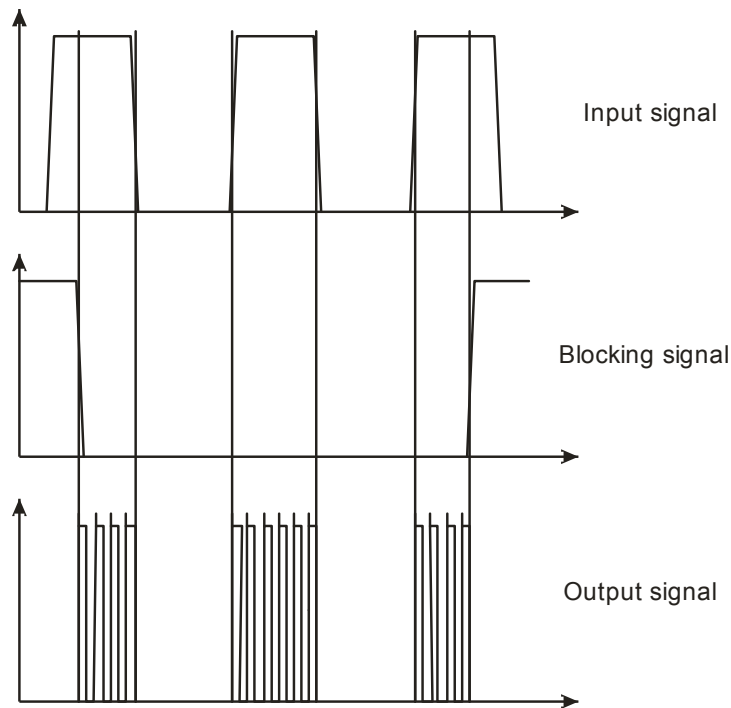


Figure 3 – Operation diagram (version with blocking switched by high level of logic signal)

3 BASIC PARAMETERS

Basic parameters of TD6 at temperature 25 °C are represented in Table 1.

Table 1 – Basic and maximum permissible electric parameters

Parameter name	Value	Note
Converter's parameter		
1. Maximum operation voltage of thyristor converter, V	500 ±10% (50 ±20% Hz)	current value
2. Voltage peak value, V	1300	
Input signals parameters*		
1. Voltage value of control signal; the value corresponds to high logic level, V	4 ÷ 32	
2. Current consumed by control input, mA at 4 V at 32 V	8 12	max max
3. Voltage value of control signal; the value corresponds to low logic level, V	1.5	min
4. Value of optical control signal	according to specification for receiver HFBR	
* When connecting the signal polarity is not important. The control signal can be unipolar, unipolar containing interleaved pickets, bipolar containing interleaved pickets and bipolar. In the last two cases the «dead time» between the filling pulses should not exceed 1 μs.		
Output signals parameters		
1. Output pulse current, A	not less than 1	at $U_{sup} = 24 V$ $R_L = 1 \Omega$
2. Rise rate of output current, A/μs	not less than 2	$R_L = 1 \Omega$
3. Output pulse voltage, V	not less than 22	$R_L = 1 k\Omega$
4. Frequency of filling pulses, kHz	4.5 ±5%	
5. Filling coefficient, %	not less than 20	

Continuation of Table 1

Supply parameters		
1. Supply voltage, V	24 ±10%	
2. Maximum consumed current, A	max 1.0	at $U_{sup} = 24 V$ duty cycle of input pulses 2
3. Consumed current when no controlled signals, mA	max 50	at $U_{sup} = 24 V$
Voltage of electrical isolation strength, kV		
1. Input circuits relatively to output circuits and supply circuits	2.5	50 Hz during 1 minute
2. Output circuits relatively to input circuits and supply circuits		
3. Supply circuits relatively to input circuits and output ones		
Mechanical parameters		
1. Overall dimensions, mm	200 x 130 x 27	
2. Weight, g	TD6-H-Bx	265
	TD6-O-Bx	290
3. Mounting	6 screws M3	to bars

4 CONSTRUCTION

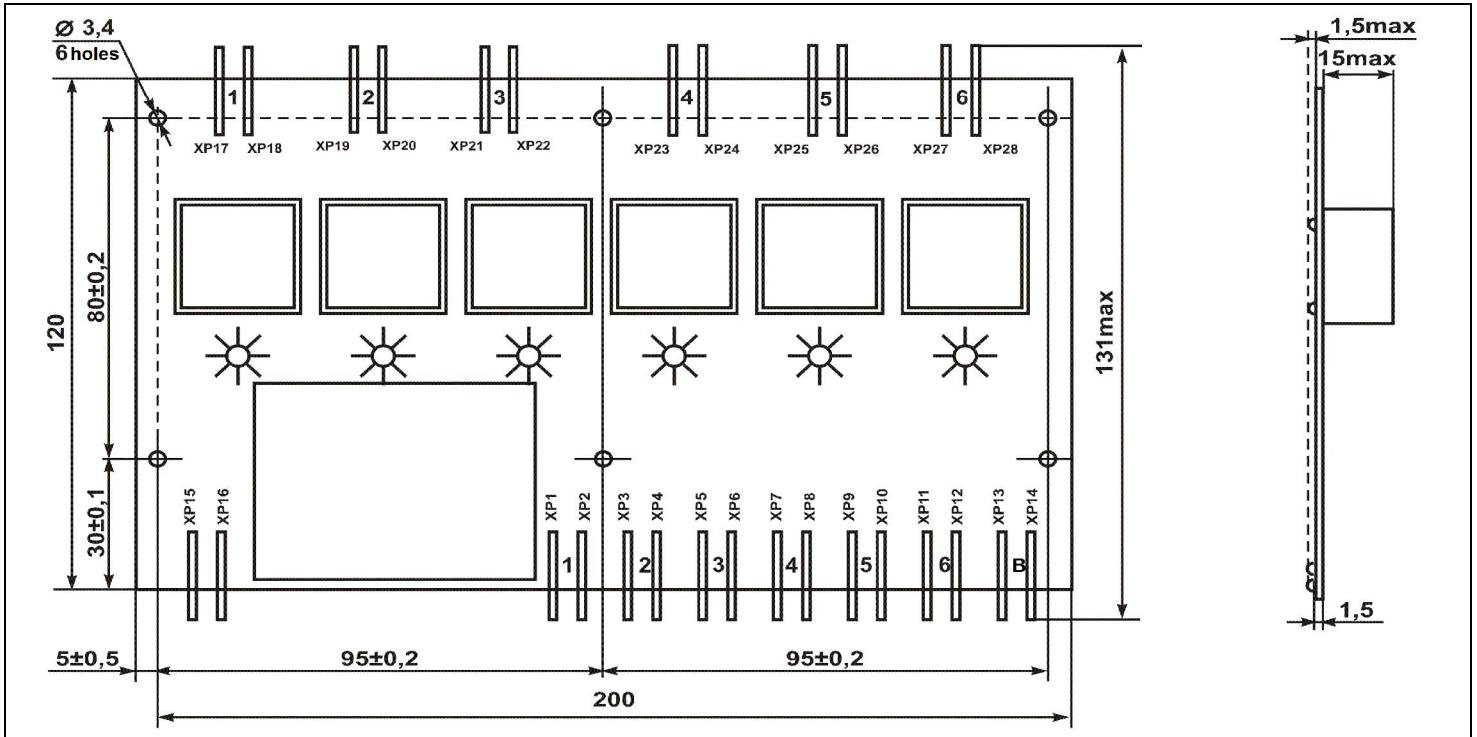


Figure 4a – Overall drawing TD6-H-Bx

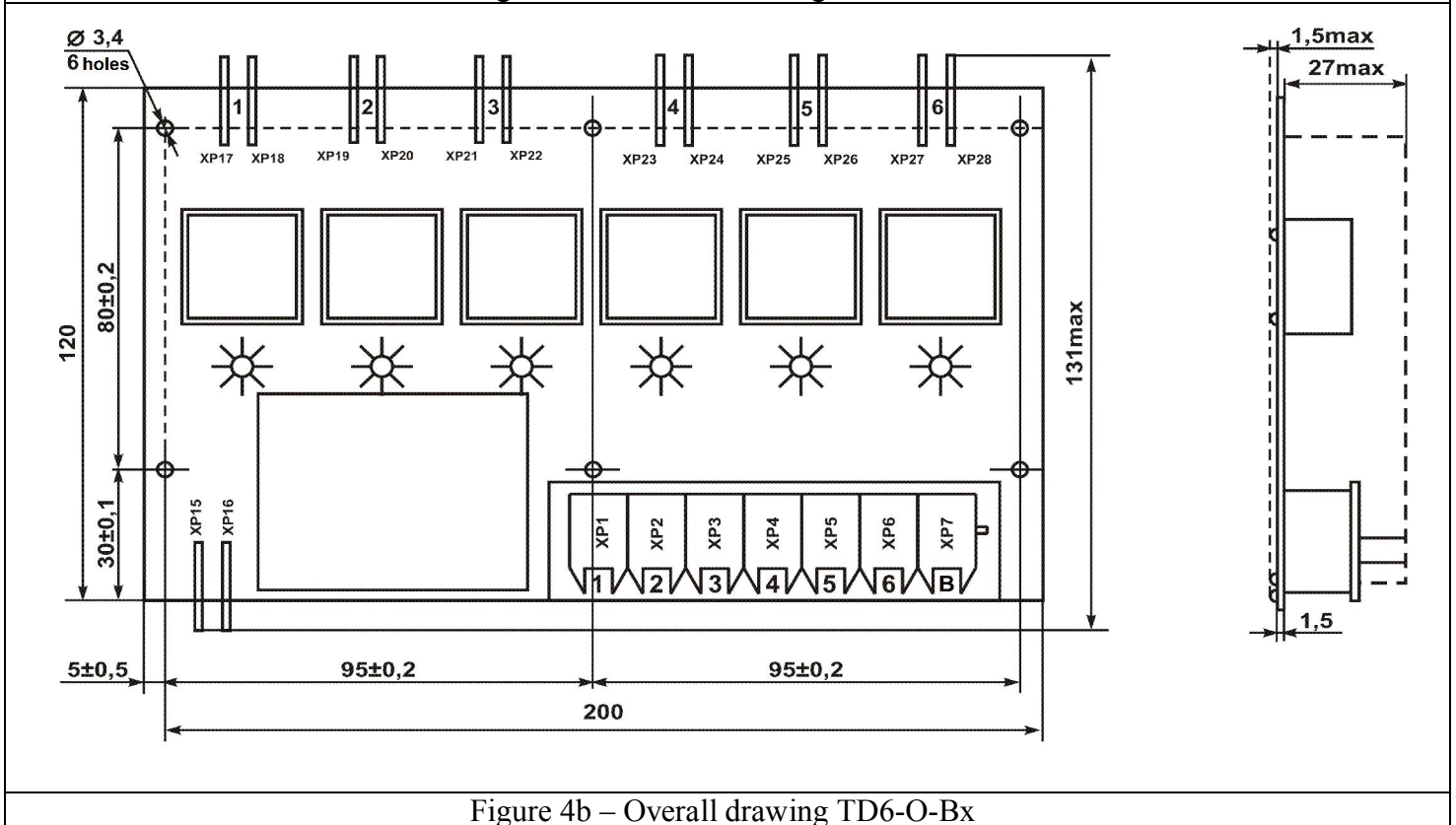


Figure 4b – Overall drawing TD6-O-Bx

By design the driver is made on PCB. The LED lights are located on the board. Connection of the external wires is carried out using knife edges terminals (kind of fast-on). Connection of the light guide is carried out directly to fiber optic receiver HFBR through a special connector that is installed on the light guide end.

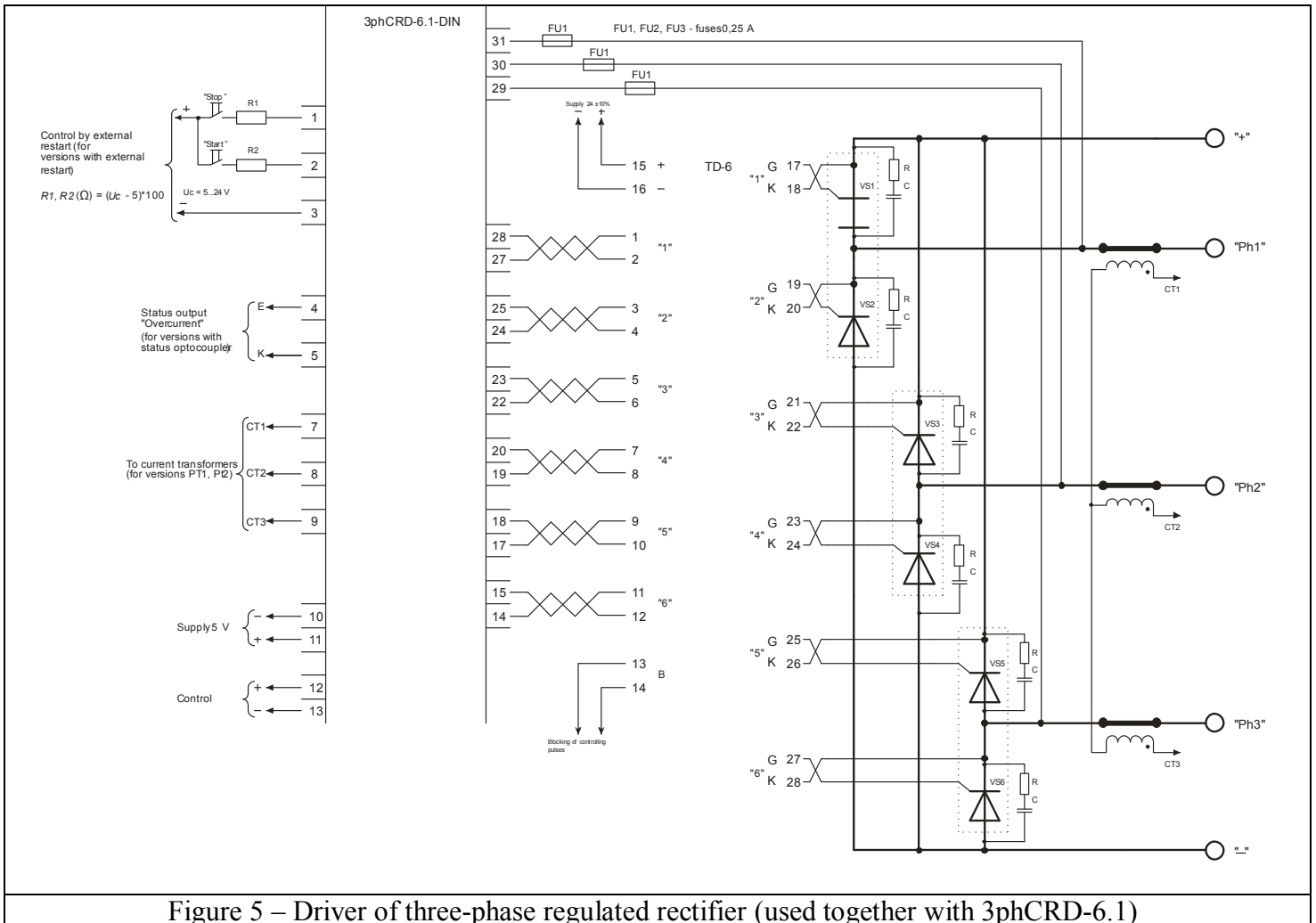
Table 2 – Functional application of outputs for Overall drawing TD6-H-Bx

XP1, XP2	Control input of channel 1	XP19	Thyristor controlling electrode of channel 2
XP3, XP4	Control input of channel 2	XP20	Thyristor cathode of channel 2
XP5, XP6	Control input of channel 3	XP21	Thyristor controlling electrode of channel 3
XP7, XP8	Control input of channel 4	XP22	Thyristor cathode of channel 3
XP9, XP10	Control input of channel 5	XP23	Thyristor controlling electrode of channel 4
XP11, XP12	Control input of channel 6	XP24	Thyristor cathode of channel 4
XP13, XP14	Control input «Blocking»	XP25	Thyristor controlling electrode of channel 5
XP15	Supply «+»	XP26	Thyristor cathode of channel 5
XP16	Supply «-»	XP27	Thyristor controlling electrode of channel 6
XP17	Controlling electrode of thyristor of channel 1	XP28	Thyristor cathode of channel 6
XP18	Thyristor cathode of channel 1		

Table 3 – Functional application of outputs for Overall drawing TD6-O-Bx

XP1	Control input of channel 1	XP19	Thyristor controlling electrode of channel 2
XP2	Control input of channel 2	XP20	Thyristor cathode of channel 2
XP3	Control input of channel 3	XP21	Thyristor controlling electrode of channel 3
XP4	Control input of channel 4	XP22	Thyristor cathode of channel 3
XP5	Control input of channel 5	XP23	Thyristor controlling electrode of channel 4
XP6	Control input of channel 6	XP24	Thyristor cathode of channel 4
XP7	Control input «Blocking»	XP25	Thyristor controlling electrode of channel 5
XP15	Supply «+»	XP26	Thyristor cathode of channel 5
XP16	Supply «-»	XP27	Thyristor controlling electrode of channel 6
XP17	Thyristor controlling electrode of channel 1	XP28	Thyristor cathode of channel 6
XP18	Thyristor cathode of channel 1		

5 CIRCUITS OF DRIVER APPLICATION



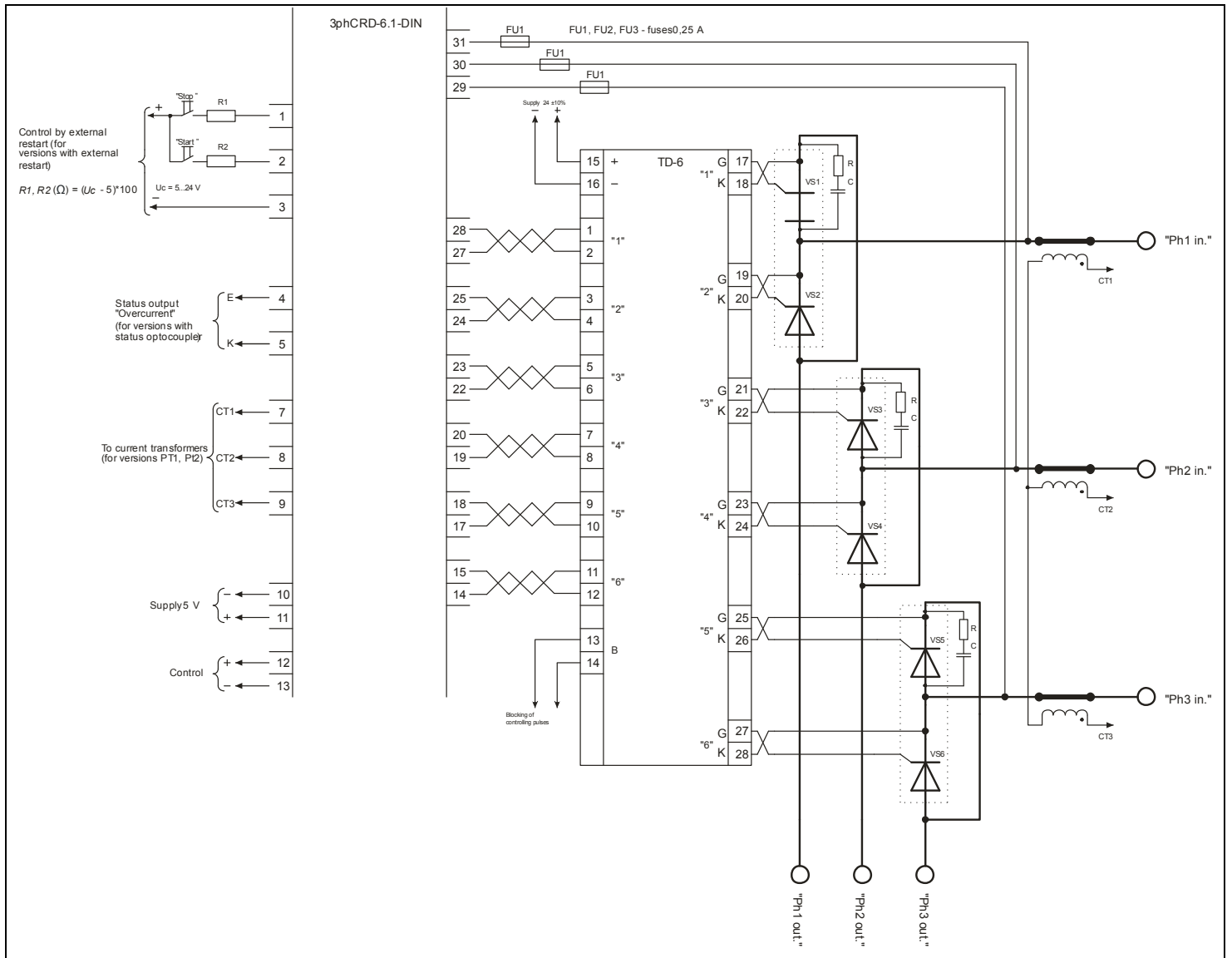


Figure 6 – Driver of three-phase regulated rectifier with regulation in transformer primary circuit (used together with 3phCRD-6.1)

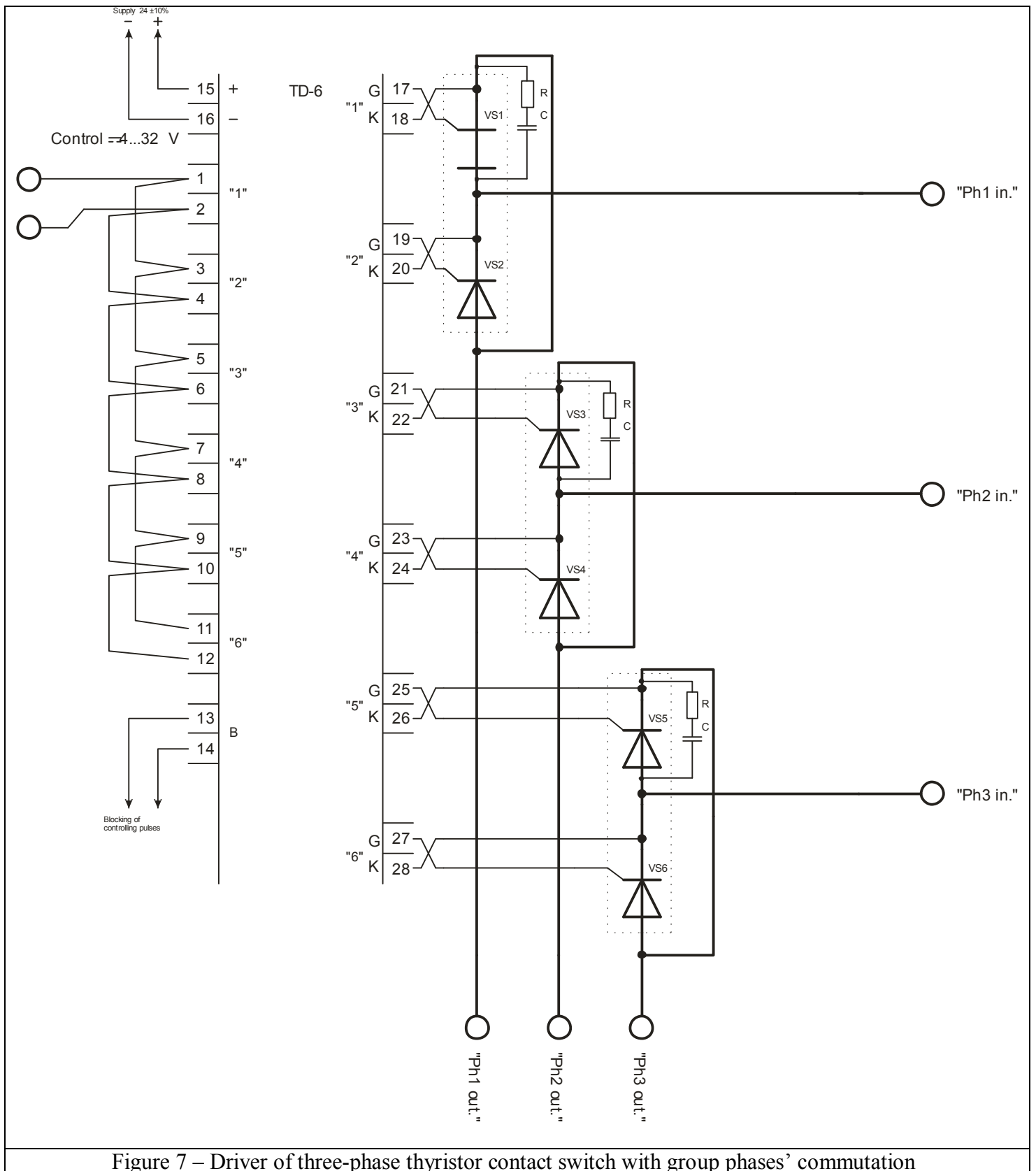


Figure 7 – Driver of three-phase thyristor contact switch with group phases' commutation

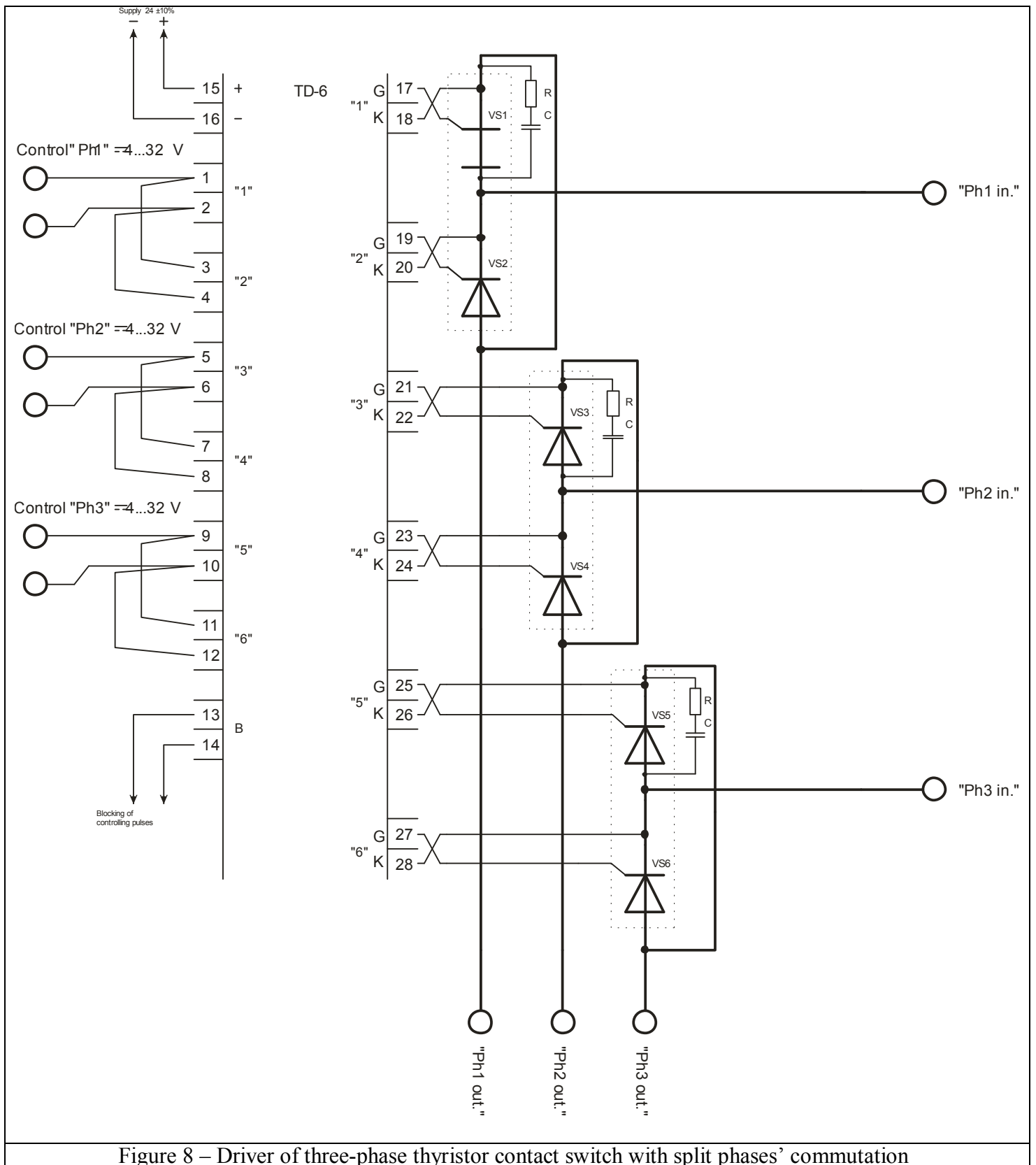


Figure 8 – Driver of three-phase thyristor contact switch with split phases' commutation

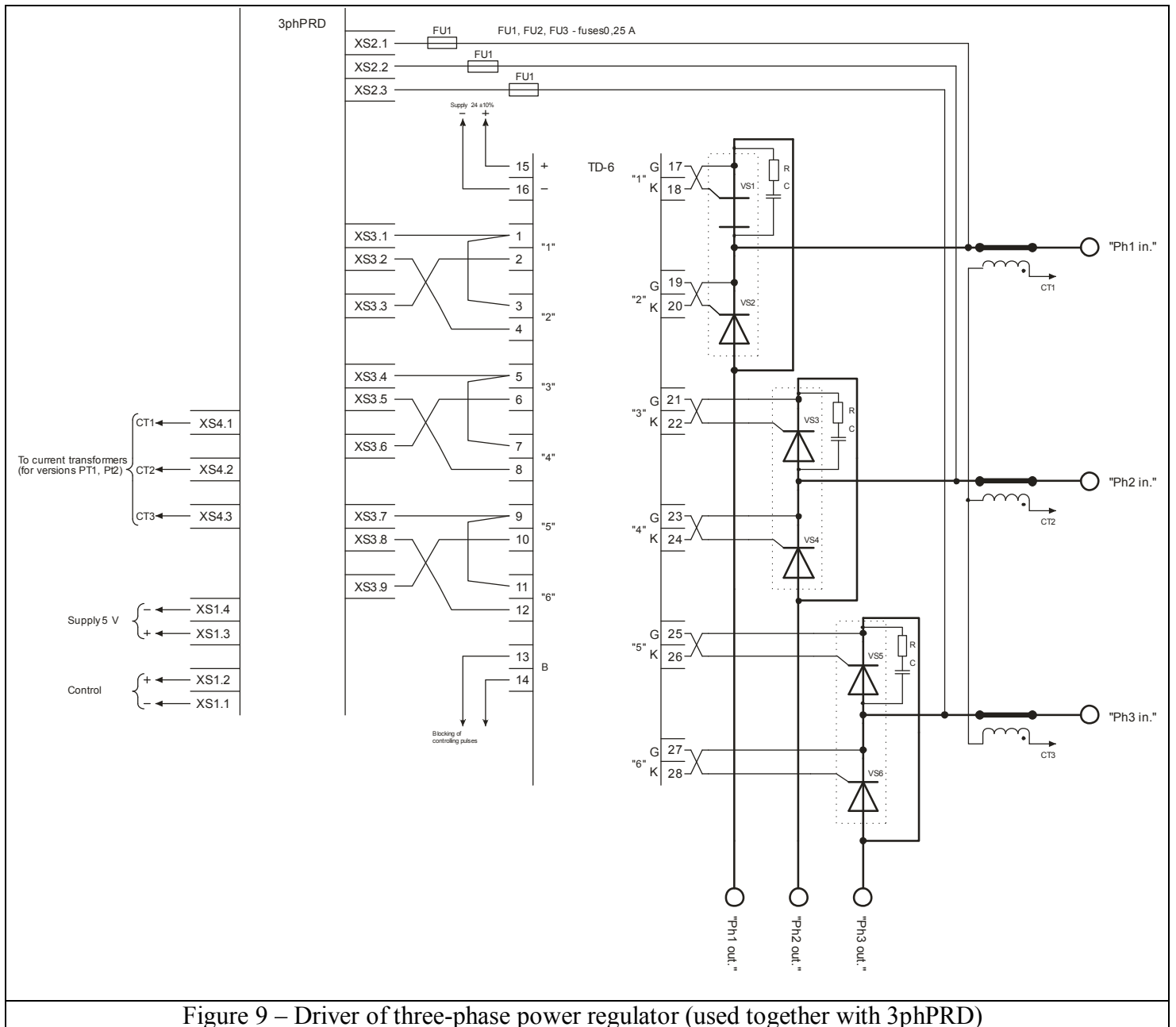


Figure 9 – Driver of three-phase power regulator (used together with 3phPRD)

6 SYMBOLS SYSTEM

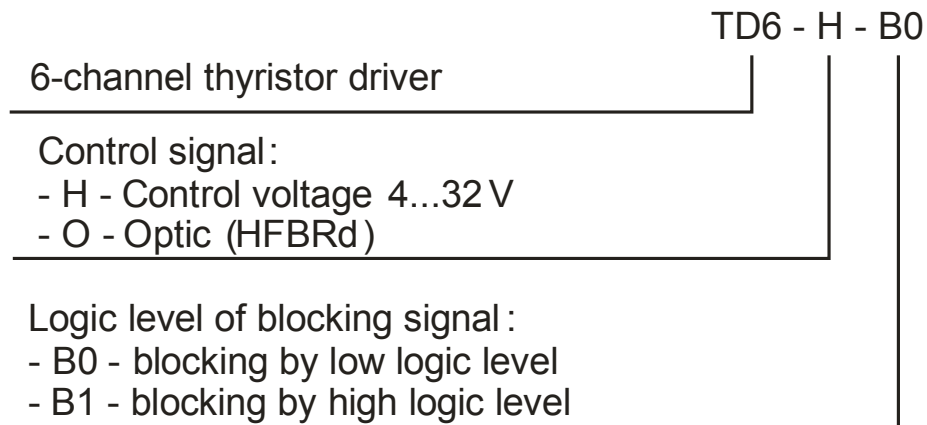


Figure 10 – Symbol system for produced drivers

Precious metals are not contained.

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