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Data Sheet 1.59/2

Fast Switch-Off Circuit with Control Type H404-DPO

Application

The fast switch-off circuit is applied for HV AC test systems based on test transformers. It enables the fast reduction (within less than 1 ms) of the primary voltage of the test transformer (to about 50% of previous value) in case of a breakdown of the test object until the circuit breaker switches off. This causes the early extinction of the breakdown arc and avoids multiple ignitions of the arc as well as related overvoltages. The stress of the test object and the damage of its insulation are reduced.

Principle

The fast switch-off control H404-DPO is used for the fast detection of breakdowns, based on measuring the voltage gradient du/dt . It generates the necessary signals to trigger a thyristor module. This module switches an additional high inductive load (reactor for low-voltage power supply of the HV AC test system or transformer for high-voltage power supply of the HV AC test system) in parallel to the primary winding of the test transformer and reduces in combination with the impedance of the power supply the primary voltage to approx. 50 % (see Figure 1).

A microcontroller in the fast switch-off control H404-DPO measures the incoming AC voltage in periods of 50 μ s and calculates the voltage amplitude and the du/dt . If the measured du/dt exceeds an adjustable limit and the test voltage is higher than a given limit, the microcontroller generates the ignition signals for the thyristors (SCRs).

Additional the H404-DPO contains an optical input which allows to trigger the thyristors also in case of receiving an optical pulse from an impulse detection module type H371-2 (see Data Sheet 1.57).

Design

The H404-DPO communicates with the overall AC control system via a Profibus-DP interface. Therefore it contains no operating elements like switches or trimmers to set its parameters and can be used in combination with a PROFIBUS master device only.

The input of the control H404-DPO has a high impedance and can be connected directly to the output of the capacitive voltage divider in the HV circuit.

The thyristor interface can drive up to three thyristor modules via the ignition boards TSA-1. The readiness of the thyristor modules is supervised by digital inputs. In case of thyristor modules malfunction, the control H404-DPO prevents the switching-on of the operating switch relay of the AC control system.

The inductive load is selected according to the data of the test system.

Table 1: Main parameters

Type	Power supply	Signal input				Monitor output	
		Impedance	Voltage	Frequency	Connector type	Impedance	Voltage
			V (peak)	Hz		Ω	
H404-DPO	24 VDC / 200 mA	10 MΩ / 33 pF	20 ... 1000	20 ... 300	N	300	input voltage:100

Table 2: Relay and thyristor characteristics

Type	Relay output	Thyristor interface			Delay after breakdown	
		Numbers	Output (open collector)	Input (supervision)	Relay contact	SCR ignition impulse
					ms	μs
H404-DPO	250 VAC / 3 A max. change-over contact, potential free	3	max. 30 V / 40 mA	24 VDC / 10 mA	< 3	< 100

Table 3: Dimensions (approx.)

Type	Length	Width	Height
	mm	mm	mm
H404-DPO	190	125	65

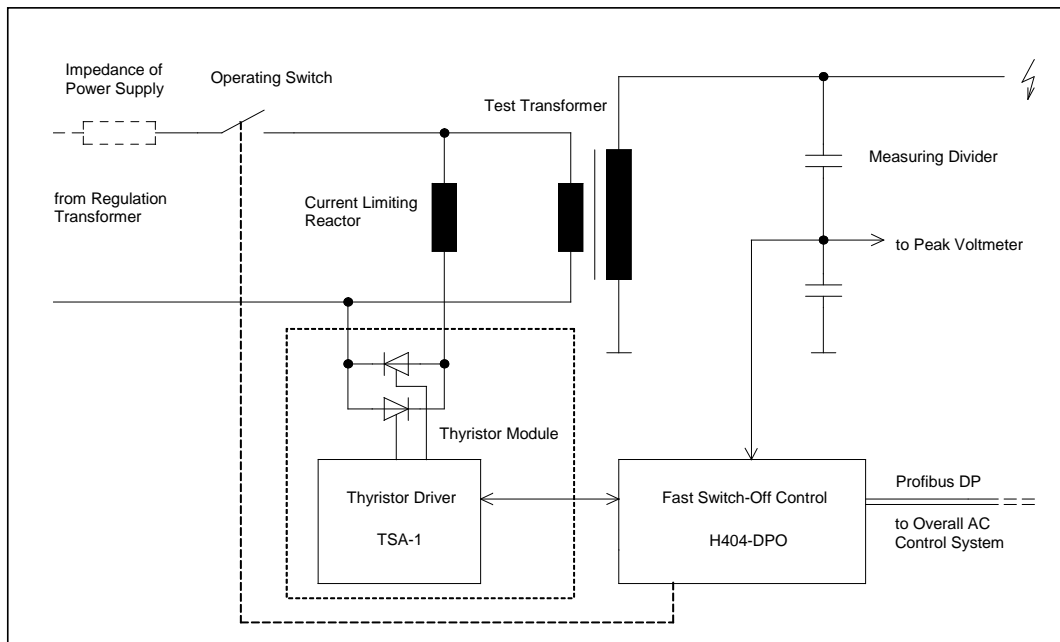


Figure 1: Application of the control H404-DPO in an AC test system