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JUMO TYA 432 Thyristor Power Switch

Brief description

Thyristor power switches are required for contactless switching of alternating current consumers. A typical application is the switching of ohmic-inductive loads at a high switching frequency. This applies especially to the industrial sector in areas such as the plastic packaging industry, air conditioning and heat technology, and industrial furnace construction.

The control and power sections are galvanically isolated by optocouplers.

The control signal range is compatible with the logic outputs of JUMO controllers.

The power section operates as a zero voltage switch. As a result, it is switched on at zero voltage and switched off at zero current, irrespective of the time when the control signal changes.

This way, interference voltage is avoided. A varistor is internally integrated on the output side to protect against voltage peaks from the mains voltage.

The input status is displayed by an LED.



Type 709010/1-50-480

- Load currents 25 A and 50 A (max.)
- Load voltages 240 V and 480 V
- Control voltage DC 4 to 32 V
- UL approval (E223137)

Technical data

Load circuit

Type	709010/1-25-240	709010/1-50-480
Load voltage	24 to 265 V _{eff}	42 to 530 V _{eff}
Load current (maximal)	25 A _{eff}	50 A _{eff}
Load current (minimal)	150 mA _{eff}	
Fuse maximum load integral I ² · t (t = 10ms)	≤ 310 A ² · s	≤ 1800 A ² · s
Frequency	45 to 65 Hz	
Peak blocking voltage	≥ 650 V _s	≥ 1400 V _s
Leakage current	≤ 3 mA	
cos φ	> 0.5 at 230 V _{eff}	> 0.5 at 480 V _{eff}

Control

Control signal range	DC 4 to 32 V
Switch-on voltage	Higher than DC 2.75 V for 709010/1-25-240 Higher than DC 3.75 V for 709010/1-50-480
Switch-off voltage	Lower than DC 2 V
Input current	≤ 10 mA at DC 32 V
Response delay	≤ 0.5 · pulse period

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General specifications

Operating mode	Zero point control
Galvanic isolation	Between the control and power section through optocouplers; insulation voltage ≥ 4 kV
Thermal resistance Barrier housing	0.8 K/W for 709010/1-25- 240 0.5 K/W for 709010/1-50- 480
Admissible ambient temperature	-20 to +70 °C
Storage temperature	-40 to +100 °C
Resistance to climatic conditions	95 % relative air humidity, non-condensing
Electrical connection	By means of screw terminals (load: $\square 16$ mm ² (max.)/control: $\square 2.5$ mm ² (max.))
Electromagnetic compatibility	DIN EN 61000 - 6 - 4 DIN EN 61000 - 6 - 2
Electrical safety	Overvoltage category III Pollution degree 3 (from outside) Pollution degree 2 (in housing)
Housing	Noryl 6FN 1
Protection type	IP20
Weight	60 g

Reduction tables

The maximal thermal resistance between the thyristor power switch's base plate and the surrounding environment $R_{(thSA)}$ is determined depending on the load currents and the various ambient temperatures. The matrix below should be used for this purpose. You can also use this matrix to check the power loss for a given nominal current.

Example:

Current $I = 15$ A resistive load

$T_A = 40$ °C (measured during operation when installed in a control cabinet)

Selected thyristor power switch: 709010/1-25- 240

The matrix shows that the maximal thermal resistance of the heat sink is 3.8 K/W.

Important information:

Use a silicone-based heat-conducting paste between the heat sink and the thyristor power switch. If you use a silicone-free heat-conducting paste, please check to make sure that the chemical silicone replacement does not affect the Noryl SE 1 GFN 1 in the plastic housing. A recommended heat-conducting paste based on silicone is, for example, Dow Corning.

In order to ensure operational safety at maximal output, please pay close attention to the thermal requirements listed in the reduction tables.

709010/1-25-240

Load current [A]	Thermal resistance [°C/W]						Power loss [W]
	20	30	40	50	60	70	
25.0	2.70	2.34	1.98	1.61	1.25	0.89	28
22.5	3.10	2.69	2.28	1.86	1.45	1.04	24
20.0	3.61	3.13	2.65	2.18	1.70	1.23	21
17.5	4.26	3.70	3.14	2.59	2.03	1.47	18
15.0	5.14	4.47	3.80	3.14	2.47	1.80	15
12.5	6.38	5.56	4.73	3.91	3.09	2.27	12
10.0	8.25	7.19	6.14	5.08	4.02	2.97	9
7.5	11.4	9.94	8.49	7.04	5.59	4.14	7
5.0	17.7	15.4	13.2	11.0	8.74	6.51	4
2.5	-	-	-	-	18.2	13.6	2

709010/1-50-480

Load current [A]	Thermal resistance [°C/W]						Power loss [W]
	20	30	40	50	60	70	
50.0	1.03	0.86	0.70	0.53	0.37	0.20	61
45.0	1.27	1.09	0.90	0.71	0.52	0.33	53
40.0	1.54	1.32	1.10	0.89	0.67	0.45	46
35.0	1.85	1.59	1.34	1.08	0.82	0.57	39
30.0	2.26	1.95	1.65	1.34	1.03	0.72	33
25.0	2.85	2.47	2.08	1.70	1.32	0.94	26
20.0	3.73	3.24	2.75	2.26	1.77	1.27	20
15.0	5.22	4.54	3.86	3.19	2.51	1.83	15
10.0	8.21	7.16	6.11	5.05	4.00	2.95	10
5.0	17.2	15.0	12.9	10.7	8.51	6.33	5

Thermal resistance junction-environment, R_{thja}	<20.0	°C/W
Thermal resistance junction-baseplate, R_{thjc}	<0.80	°C/W
Thermal resistance baseplate-heat sink, R_{thcs}	<0.20	°C/W
Max. permissible baseplate temperature	100	°C
Max. permissible junction temperature	125	°C

Thermal resistance junction-environment, R_{thja}	<20.0	°C/W
Thermal resistance junction-baseplate, R_{thjc}	<0.50	°C/W
Thermal resistance baseplate-heat sink, R_{thcs}	<0.20	°C/W
Max. permissible baseplate temperature	100	°C
Max. permissible junction temperature	125	°C

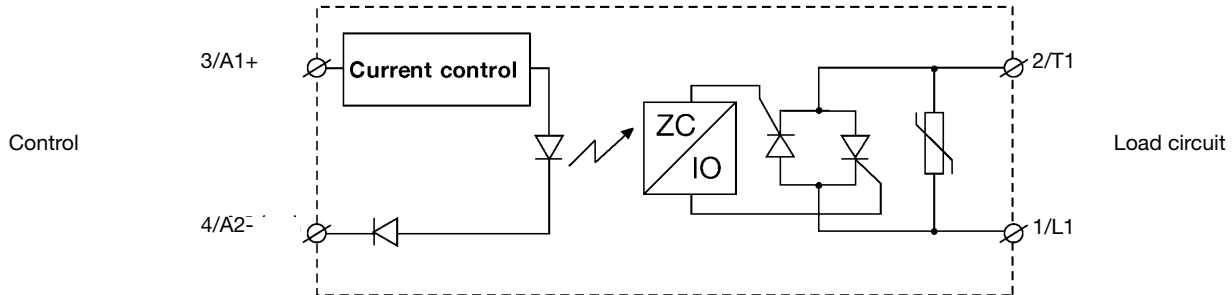
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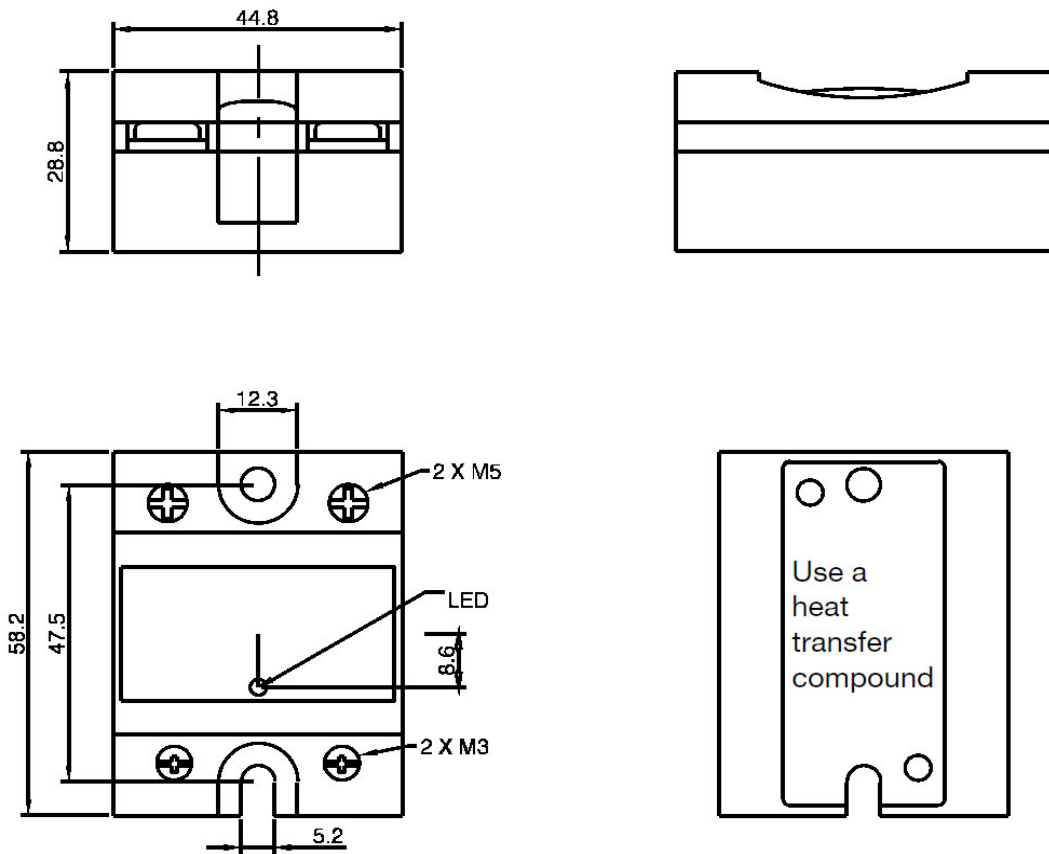
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Connection



Dimensions



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Order details

(1) Basic type	
709010	TYA 432
(2) Circuit type	
1	einphasig
(3) Load current	
25	25 A
50	50 A
(4) Load voltage	
240	AC 240 V
480	AC 480 V

Note:

Load current and load voltage cannot be combined arbitrarily. Only the stock versions are available.

Order code (1) / (2) - (3) - (4)
 / - -

Stock versions

Type	Load voltage	Load current	Part no.
709010/1-25-240	24 to 265 V _{eff}	25 A _{eff}	00673976
709010/1-50-480	42 to 530 V _{eff}	50 A _{eff}	00673981

In order to ensure fault-free operation and improved availability in applications with thyristor power switches, we recommend using a corresponding semiconductor fuse (e.g. by the company Ferraz).