

TE10A

SINGLE PHASE
THYRISTOR



EUROTHERM
CONTROLS



CE

Product
data

TE10A Single phase thyristor

Multiple applications

Car industry (paint drying), Food sector (cooking, browning), Air conditioning, Metallurgy (heat treatment), Plastics (extrusion, thermoforming), Textiles (drying, coating, printing).

Ergonomic design

Compact : reduction in cabinet size. Internal EMC filter.

High performance

Operating mode for short-wave infrared elements.
Compensation for supply fluctuations.

Flexibility - The TE10A is controlled by an analogue signal which is selectable for DC current or voltage . A '5V user' voltage allows local control by a potentiometer. A plug-in connector avoids any risk of wiring error if the unit has to be replaced.

The TE10A can be used with non-standard mains (option).

Standard 45mm DIN window format allows mounting in a housing with a panel cut-out or DIN rail mounting in a cabinet.

Toughness / Reliability - TE10A thyristors can withstand momentary overcurrents up to 15 times the nominal rating. This is important when controlling short-wave infrared elements. The thyristor breakdown voltage is three times greater than the nominal operating voltage. Current derating curves as a function of ambient temperature enable TE10A units to be used up to +60°C.

CE Marking / Safety - TE10A units meet the essential requirements of the European Low Voltage Directive. No exposed parts are at a dangerous voltage.

Eurotherm certifies that TE10A units have successfully passed Electromagnetic Compatibility (EMC) tests and enable the system which incorporates them to comply with the EMC Directive, as far as the TE10A products are concerned.

An EMC installation guide is available on request (part No. HA025464).

Firing modes - The TE10A is available in three basic forms:

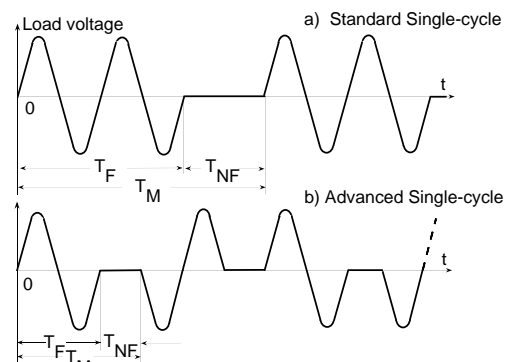
Phase Angle Firing with optional current limit for use with inductive and temperature dependent loads.

Burst Firing which includes single cycle for use with infrared heaters as well as conventional resistive loads.

Advanced Single Cycle for use with infrared heaters (low flicker)

The use of half-cycle for non-firing gives a reduction in flicker and brightness of infrared elements compared with Single-cycle. For a setpoint less than 50%, non-firing is effected on mains half-cycles.

The firing time is fixed at one cycle (20ms at 50Hz). For a setpoint greater than 50%, non-firing is reduced to one half cycle. Firing is effected over whole cycles.



Examples of firing in Single-cycle (a) and in advanced Single-cycle b) modes at 66.6% of nominal power.

TECHNICAL SPECIFICATION

Power

Nominal current at 45°C	16, 25, 40 or 50A (see current derating curve)
Nominal line-to-line voltage	100Vac to 500Vac + 10%, -15% (for operating voltage, see product code)
Supply frequency	50 and 60Hz (±2Hz)
Load	Resistive or short-wave infrared elements - use TE10A Burst Firing Inductive or temperature dependent loads - use TE10A Phase Angle Firing
Power terminal block	Cage terminals for 1.5 to 16 mm ² cables. Tightening torque 1.2Nm
Safety earth	Screw terminal, same cable gauge as power. Tightening torque 2Nm

Control Performance

Control type	The power controlled in the load is proportional to the setpoint
Linearity	Better than ±2% of the full range
Stability	Automatic compensation for supply variations from ±10% of the nominal voltage. Stability better than ± 2% of the full range with constant resistance
Firing modes: Burst Firing Model	‘Burst firing’, ‘Single cycle’ or ‘advanced Single cycle’ (which uses a different firing board) At 50% power the thyristors are: On for 300ms and Off for 300ms (typical time) in ‘Burst firing’ On for one cycle and Off for one cycle in ‘Single cycle’ and ‘advanced Single cycle’ At 66.7% power the thyristors are: On for 400ms and Off for 200ms in ‘Burst firing’ On for two cycles and Off for one cycle in ‘Single cycle’ On for one cycle Off for half a cycle in ‘advanced Single cycle’ Thyristor firing at zero voltage Firing indicated by a green LED
Phase Angle Model	Phase Angle firing varies the thyristors firing angle. Current limit is available as an option on this model

Control

Input signal	Analogue, DC voltage or current: 0 - 5V, 0 - 10V or 4 - 20mA Voltage input impedance: 100kΩ, current input impedance: 250Ω
Local control	10kΩ external potentiometer, a ‘5V user’ voltage is available
Contacts	Contacts for On/Off logic operation
Control terminals	Plug-in connector (0.5 to 1.5mm ² cables) Tightening torque 0.4Nm

Option

Auxiliary power supply	Option for separate electronics power supply fed from 115Vac or 230Vac (when using non-standard three phase supply)
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European Directives

Electromagnetic compatibility	
Immunity	Generic standard : EN 50082-2 Test standards : EN 61000-4-2, EN 61000-4-4, ENV 50140, ENV 50141, ENV 50204
Emission	Generic standard : EN 50081 -2 Test standard : EN 55011 (with external filter for Phase Angle firing model, internal EMC filter fitted on Burst Firing model) Product standard : IEC 1800-3
Electrical safety	Complies with the Low Voltage Directive 73/23/EEC amended by the Directive 93/68/EEC (product installed and used in compliance with its user manual)
CE marking	TE10A products carry the CE mark in compliance with the European Low Voltage Directive. A CE declaration of conformity is available on request

Environment

Temperature	Operating: 0 to 45°C (up to 60°C with derating).
Storage:	-10 to +70°C
Safety standards	EN61010, installation category 3 (voltage transients must not exceed 4.0KV)
Atmospheres	Electrically conductive pollution must be excluded from the cabinet in which this controller is mounted. This product is not suitable for use above 2000m or in corrosive or explosive atmospheres without further protection.
Humidity	Relative humidity: 5 to 95%, non-condensing and non-streaming
Thyristor protection	High-speed external fuse (order separately), internal MOV (varistor) and RC snubber
Protection degree	IP20 (in accordance with IEC 529: 11.4, table 5) Isolation distances comply with IEC 664
Isolation (1 minute test)	Between power and earth: 2000Vac. Between power and control inputs: 3600Vac
Cooling	Natural convection
Dimensions	Height : 115mm. Depth : 92.5mm. Width : TE10A/16A : 52.5mm TE10A/25A : 70mm TE10A/40A : 105mm TE10A/50A : 122.5mm
Weight	TE10A/16A : 550g TE10A/25A : 700g TE10A/40A : 900g TE10A/50A : 1200g
Mounting	Vertical on DIN rail (reference EN50022-35x7.5 or 35x15). Allow at least 10mm between units

In order to maintain its ‘leading edge’ Eurotherm may have to make changes to its specifications without advance notice. For any further information, or if in doubt, please contact your nearest Eurotherm office.

INSTALLATION AND DIMENSIONAL DETAILS

Units must be installed in fan-cooled electrical cabinets and filtered to pollution degree 2.

The cabinet must be closed and bonded to the safety earth to comply with NFC 15-100, IEC 364 standards or current national standards.

Distance between two TE10A units installed side by side :

10mm up to 45°C,

17.5mm above 45°C

Terminal functions:

- 1,3 : Controlled phase
- 2,4 : Direct phase
- 5,6 : Input
- 7 : '5 volt user' output
- 8,10 : Auxiliary power supply (option)

ORDERING CODE

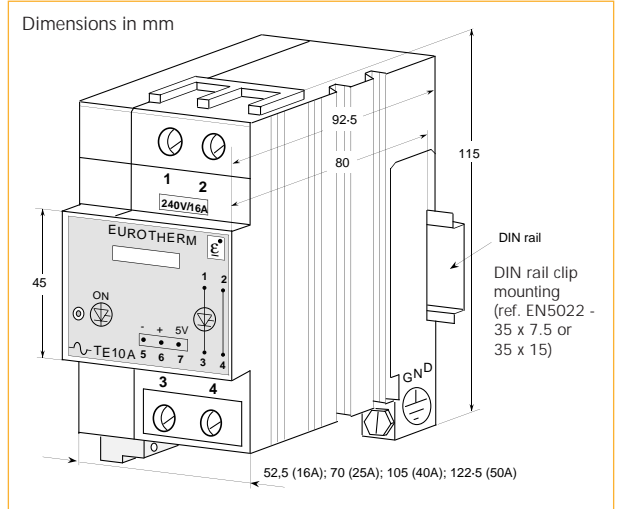
Basic product	Nominal current	Nominal voltage	Input	Firing	Option	End
TE10A						00

Basic product	Code	Nominal voltage
	TE10A	100 volts
Nominal current		
16 amps	16A	200 volts
25 amps	25A	230 volts
40 amps	40A	240 volts
50 amps	50A	277 volts
		380 volts
		400 volts
		415 volts
		440 volts
		480 volts
		500V

Example of product coding

TE10A - 25A - 230V - 0V10 - FC - 00

20A load used at 230Vac, firing in Burst mode, output of temperature controller 0 to 10V



Input	
0-5Vdc	0V5
0-10Vdc	0V10
4-20mAdc	4mA20

Firing	
Burst firing	FC
Single cycle	FC1
Advanced single cycle	SCA
Phase angle	PA

Option		
Aux power supply	115 volts	115V
	230 volts	230V
Current limit (phase angle only)		CL

Notes:

For control by local potentiometer or by contacts, use the input product code 0V5.

For non-standard mains voltage, use the product code for the voltage immediately above and choose auxiliary power supply as an option.

EXTERNAL HIGH SPEED FUSES

Nominal current of TE10A	Fuse rating	Code for fuse and fuse holder	Dimensions H x W x D (mm)
16A	20A	FU1038 16A 00	81 x 17.5 x 68
25A	32A	FU1038 25A 00	81 x 17.5 x 68
40A	50A	FU1451 40A 00	95 x 26 x 86
50A	63A	FU2258/50A/00	140 x 35 x 90

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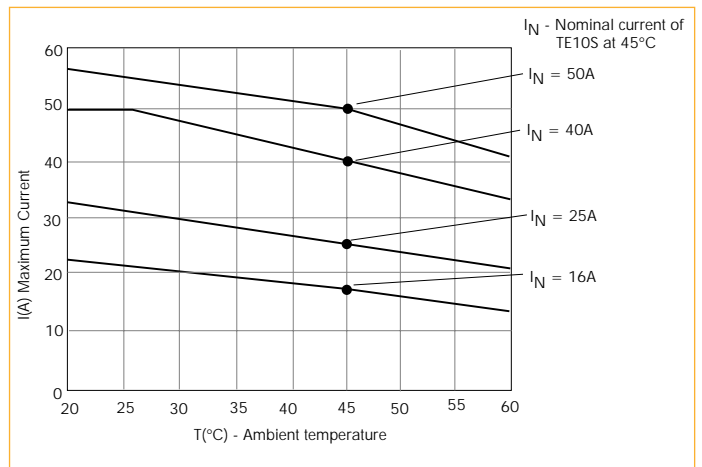
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