

# TE10P

MODEL



## Single phase true power controller

### Specification Sheet

#### Ideal for :

- Loads requiring high stability and accuracy
- Moving loads where the temperature is difficult to monitor
- Loads with characteristics that change with time or temperature

#### Features :

- 16 - 400 amps
- Voltage up to 500V
- True power control
- High precision control
- Modbus + Profibus comms
- Drives all load types

#### High precision control; accuracy and stability better than 1%

The TE10P provides accurate power control for a wide range of industrial, single phase loads. By using either an analogue or digital setpoint, the TE10P can be used for the precise control of power in loads that would otherwise prove difficult to accurately regulate.

#### Flexibility

The TE10P is configurable for different types of input, firing mode, feedback and load type. It is suitable for driving either simple resistive loads or complex loads such as Silicon Carbide, Platinum, Molybdenum or Short Wave Infrared lamps.

Dynamic load fault detection allows continuous monitoring of loads, including those with characteristics that are dependent on temperature or time.

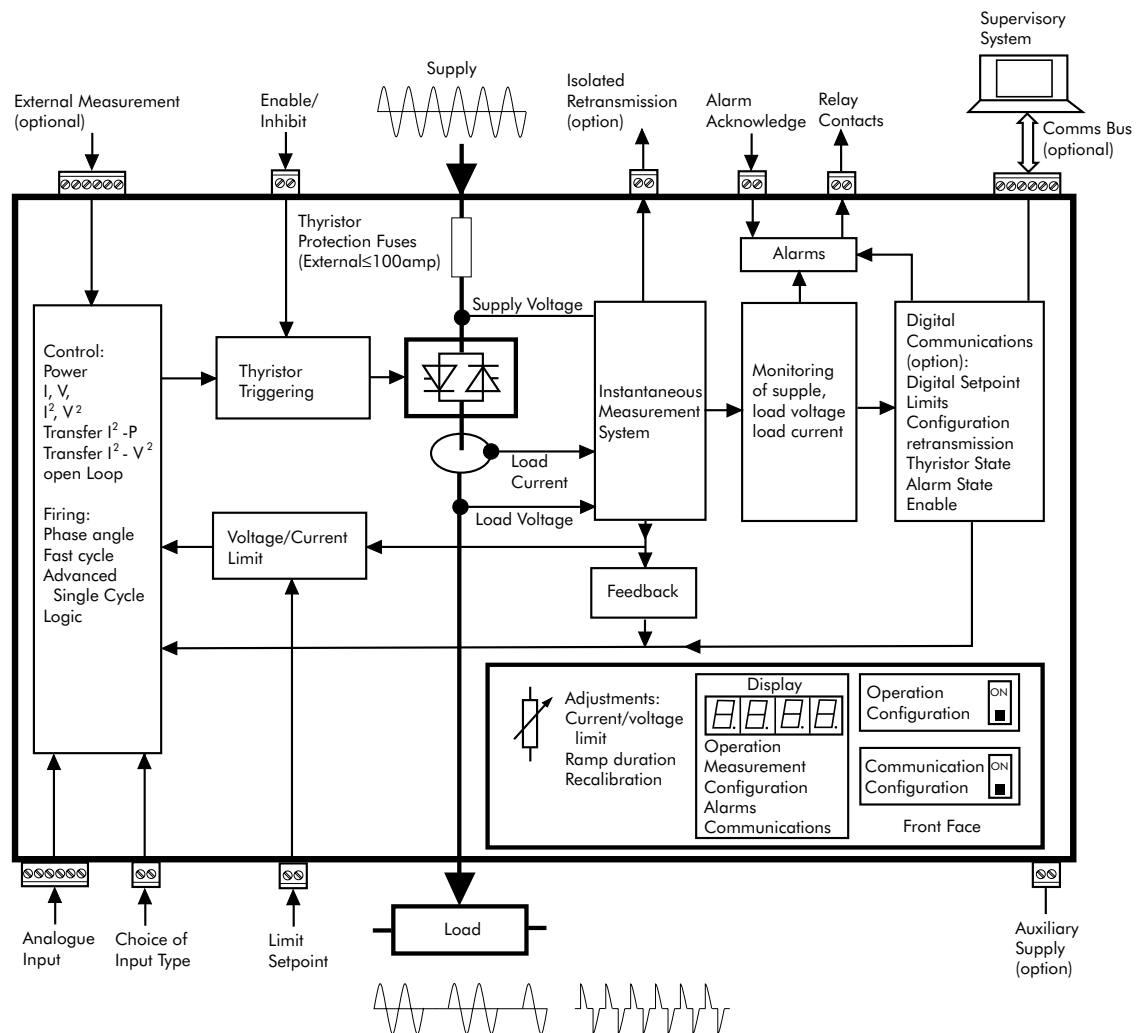
The feedback type can be selected from; RMS Voltage, RMS Current,  $I^2$ ,  $V^2$ , Transfer Between  $I^2$  and  $V^2$ , transfer between  $I^2$  and Power, True Power or Open Loop.

#### Communications

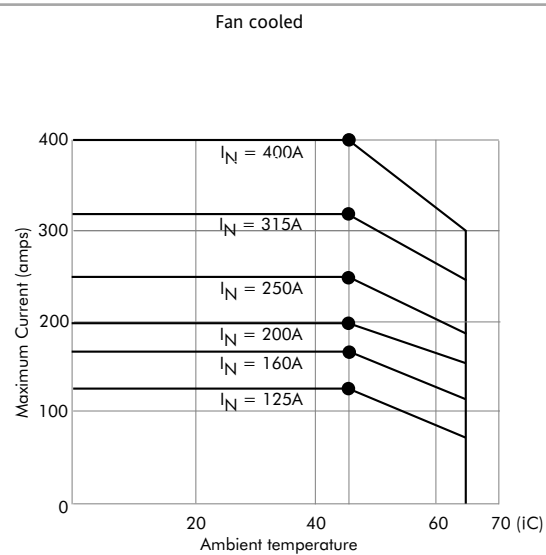
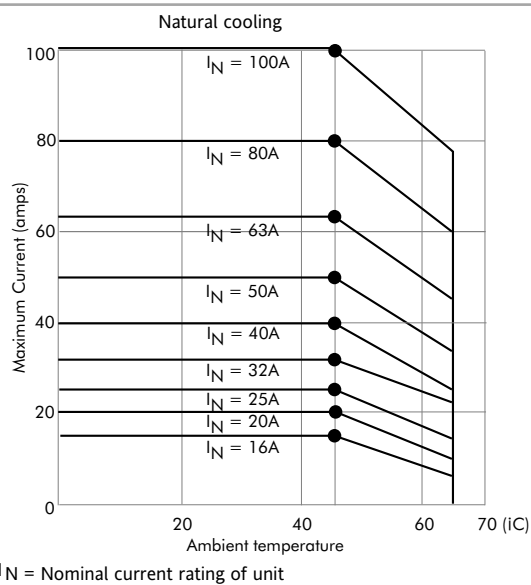
Optional RS422 or RS485 communications with Modbus or Profibus protocol allow the TE10P to be configured or controlled from an external supervisory system.

#### Features

- Current range from 16 to 400 amps, voltage range from 100 to 500 volts.
- Four digit display and single push button, simplify Operating, Commissioning, Maintenance and Configuration.
- Isolated Analogue retransmission of power.
- Configurable Alarm Relay.



### Current Derating Curves



## TECHNICAL SPECIFICATION

Additional information and documentation available on [www.eurotherm.co.uk](http://www.eurotherm.co.uk)

### ELECTRICAL

|                                |                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------|
| Nominal current (at 45 Deg. C) | 16A to 400A                                                                              |
| Nominal voltage                | 100V to 500V (+10%, -15%) as product code                                                |
| Supply frequency               | 40 to 70 Hz automatic adaptation                                                         |
| Electronics supply             | Internal or optionally 115V or 230V external (10VA)                                      |
| Power dissipation              | 1.3 watts per amp                                                                        |
| Fusing                         | High speed fuses: External for 16A to 100A (order separately), internal for 125A to 400A |
| Cooling                        | Natural cooling up to 100amps<br>Fan cooled from 125 amps upwards (25VA fan)             |
| Load                           | Any type of single phase load (except capacitive)                                        |

### OPERATING

|                          |                                                                                                                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                   | 0-5V or 0-10V (Input impedance >100K)<br>0-20mA or 4-20mA (input impedance 250 Ohms)<br>Logic: 5V, 10V or 20mA<br>Digital Comms (optional): RS422 or RS485                                                    |
| Firing modes             | Logic (ON/OFF)<br>Burst firing (selectable soft start)<br>Advanced Single Cycle<br>Phase Angle (selectable ramp)                                                                                              |
| Control mode             | Power - calculated from instantaneous measurements<br>RMS voltage<br>RMS current<br>$V^2$<br>$I^2$<br>Automatic transfer $I^2 \leftrightarrow P$<br>Automatic transfer $I^2 \leftrightarrow V^2$<br>Open Loop |
| Linearity and stability  | Better than $\pm 1\%$ of full scale                                                                                                                                                                           |
| Input limit              | Analogue- by potentiometer or by external signal<br>Digital- by communications bus (optional)                                                                                                                 |
| Current or voltage limit | Either chop-off (with alarm) or revert to phase angle and reduce firing angle                                                                                                                                 |
| Retransmission           | Analogue 0-10V or 4-20mA isolated (accuracy $\pm 1\%$ )<br>Digital via comms link                                                                                                                             |
| Diagnostics              | Diagnostics port available for use with model 260 Diagnostic unit                                                                                                                                             |

### DIGITAL COMMUNICATIONS

|          |                       |
|----------|-----------------------|
| Protocol | PROFIBUS-DP or MODBUS |
|----------|-----------------------|

### ALARMS

|            |                                                      |
|------------|------------------------------------------------------|
| Mains      | Under or over voltage, frequency out of range        |
| Load       | Over current or load fault (static or dynamic)       |
| Thyristors | Short circuit or over temperature (fan cooled units) |

### ENVIRONMENT

|                         |                                                                                                 |
|-------------------------|-------------------------------------------------------------------------------------------------|
| Temperature             | 0 to 45°C operating, -10 to 70°C storage                                                        |
| Humidity                | 5% to 95% RH Non condensing, non streaming                                                      |
| Altitude                | 2000 metres maximum                                                                             |
| Atmosphere              | Non explosive, non conductive and non corrosive                                                 |
| Pollution               | Pollution degree 2 admissible, defined by IEC664                                                |
| Protection (mechanical) | IP20 on front face according to IEC529                                                          |
| Dimensions              | 16 to 100A: 225mm (H) x 116mm (W) x 169mm (D)<br>125 to 400A: 470mm (H) x 133mm (W) x 260mm (D) |
| Weight                  | 16A to 100A: 3.2kg. 125 to 400A: 11.5kg                                                         |
| Mounting                | DIN rail mounting up to 100amps<br>Bulkhead mounting available for all units                    |

### EUROPEAN DIRECTIVES

|                          |                                                                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety                   | The TE10P carries the CE mark to show compliance with the European Low Voltage Directive 73/23/EEC                                                                                                                                                                     |
| EMC- Immunity            | Conforms to: EN 500082-2, EN 61000-4-2, EN 61000-4-4, ENV 50204, ENV 50140, ENV 50141                                                                                                                                                                                  |
| EMC- radiated emission   | Conforms to: EN 55011 class A                                                                                                                                                                                                                                          |
| EMC- conducted Emmission | Conforms to: EN 500081-2 without filter in Burst Firing modes for resistive loads up to 100amps. An external filter may be required for other operating conditions<br>Conforms to IEC 1800-3 (EN610800-3) without filter<br>For use in second (industrial) environment |
| UL approval              | Products $\leq 100A$ are UL approved                                                                                                                                                                                                                                   |

## ORDERING CODE

|       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|
| TE10P | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|

|    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|----|----|----|----|----|----|----|----|----|----|----|----|

| 1 Current                                                                                                                                                                                                                                                                                                                                            | 3 Auxiliary Supply Voltage                                                                                    | 6 Input Limit                                                                                                                                                                                                 | 10 Load Type                                                                                                                                                                                                                                                                       | 12 Current/Voltage Limit*                                                                                                                                                                                                                                                                                          | 15 Alarm Relay                                                                                        | 19 Option 1                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>16A</b> 16 amps<br><b>20A</b> 20 amps<br><b>25A</b> 25 amps<br><b>32A</b> 32 amps<br><b>40A</b> 40 amps<br><b>50A</b> 50 amps<br><b>63A</b> 63 amps<br><b>80A</b> 80 amps<br><b>100A</b> 100 amps<br><b>125A</b> 125 amps<br><b>160A</b> 160 amps<br><b>200A</b> 200 amps<br><b>250A</b> 250 amps<br><b>315A</b> 315 amps<br><b>400A</b> 400 amps | <b>AUTO</b> None (Internal)<br><b>External</b><br><b>115V</b> 115 volts (10VA)<br><b>230V</b> 230volts (10VA) | <b>SPOT</b> Potentiometer On Unit<br><b>External</b><br><b>S0V5</b> 0 - 5 volts<br><b>S0V10</b> 0-10 volts<br><b>S0mA20</b> 0-20 mA<br><b>S4mA20</b> 4-20 mA                                                  | <b>LTCL</b> Low temperature coefficient load<br><b>HTCL</b> High temperature coefficient load (molybdenum, tungsten, molybdenum disilicide)<br><b>TTDL</b> Time and/or temp. dependent loads (Silicon carbide)<br><b>SWIR</b> Short wave infrared load                             | <b>ICHO</b> Stop conduction at current limit<br><b>ILI</b> Reduce firing angle at current limit (PA only)<br><b>VLI</b> Reduce firing angle at voltage limit (PA only)<br><br><i>* For SWIR loads in Phase Angle mode only.<br/>           For HTCL loads use ICHO for SCA firing mode and ILI in other modes.</i> | <b>NC NO</b> Closed in alarm<br>Open in alarm                                                         | <b>Retransmission:</b><br><b>R0V10</b> 0-10V<br><b>R4mA20</b> 4-20mA<br><b>-</b> No option |
| 2 Voltage                                                                                                                                                                                                                                                                                                                                            | 4 Fan Supply Voltage                                                                                          | 7 Firing Mode                                                                                                                                                                                                 | 11 Controlled Parameter                                                                                                                                                                                                                                                            | 13 Current/Voltage Signal                                                                                                                                                                                                                                                                                          | 16 Communications Protocol                                                                            | 20 Option 2                                                                                |
| <b>100V</b> 100 volts<br><b>115V</b> 115 volts<br><b>200V</b> 200 volts<br><b>230V</b> 230 volts<br><b>240V</b> 240 volts<br><b>277V</b> 277 volts<br><b>380V</b> 380 volts<br><b>400V</b> 400 volts<br><b>415V</b> 415 volts<br><b>440V</b> 440 volts<br><b>460V</b> 460 volts<br><b>480V</b> 480 volts<br><b>500V</b> 500 volts                    | <b>000</b> None (Internal)<br><b>External</b><br><b>115</b> 115 volts (10VA)<br><b>230</b> 230volts (10VA)    | <b>LGC</b> Logic (ON/OFF)<br><b>PA</b> 4-20 mA<br><b>Burst firing cycle</b><br><b>FC1</b> 1 cycle<br><b>FC8</b> 8 cycles<br><b>C16</b> 16 cycles<br><b>128</b> 128 cycles<br><b>SCA</b> Advanced single cycle | <b>P</b> Power<br><b>IE</b> RMS current<br><b>VE</b> RMS voltage<br><b>I2</b> I <sup>2</sup><br><b>V2</b> V <sup>2</sup><br><b>OL</b> Open loop<br><b>Transfer of controlled parameter</b><br><b>I2V2</b> I <sup>2</sup> < - > V <sup>2</sup><br><b>I2P</b> I <sup>2</sup> < - > P | <b>LPOT</b> Potentiometer On Unit<br><b>External Signal</b><br>Trim potentiometer on unit<br><b>L0V5</b> 0-5 volts<br><b>L0V10</b> 0-10 volts<br><b>L0mA20</b> 0-20mA<br><b>L4mA20</b> 4-20mA                                                                                                                      | <b>000</b> No digital communications<br><b>MOP</b> Modbus protocol<br><b>PFP</b> Profibus-DP protocol | <b>DB9</b> 9 Pin comms connectors<br><b>-</b> No option                                    |
| 5 Analogue Input                                                                                                                                                                                                                                                                                                                                     | 8 Ramp Start of Burst (or PA)                                                                                 | 9 Ramp Safety                                                                                                                                                                                                 | 14 Fixing                                                                                                                                                                                                                                                                          | 17 Communications Speed                                                                                                                                                                                                                                                                                            | 18 8 Default Configuration                                                                            | 21 Option 3                                                                                |
| <b>0V5</b> 0 - 5 volts<br><b>0V10</b> 0 - 10 volts<br><b>0mA20</b> 0 - 20mA<br><b>4mA20</b> 4 - 20mA                                                                                                                                                                                                                                                 | <b>URP</b> Ramp<br><b>NRP</b> No ramp                                                                         | <b>AR</b> Safety ramp active<br><b>NR</b> No safety ramp                                                                                                                                                      | <b>BKD</b> Bulkhead<br><b>DIN</b> DIN rail (≤100A)                                                                                                                                                                                                                                 | <b>Profibus</b><br><b>RAUT</b> Read only 1.5M bauds<br><b>WAUT</b> Read and write 1.5M bauds<br><b>Modbus</b><br><b>R96</b> Read only 9.6 kbauds<br><b>R192</b> Read only 19.2 kbauds<br><b>W96</b> Read/write 9.6 kbauds<br><b>W192</b> Read/write 19.2 kbauds                                                    | <b>CSW</b> Configuration by switches<br><b>CEP</b> Configuration held in memory                       | <b>IEXT</b> External current measurement<br><b>-</b> No option                             |
| 18 8 Default Configuration                                                                                                                                                                                                                                                                                                                           | 22 Option 4                                                                                                   | 23 Internal Filter                                                                                                                                                                                            | 24 Fuse                                                                                                                                                                                                                                                                            | 25 Language                                                                                                                                                                                                                                                                                                        | 26 Special                                                                                            | 99 Special                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                      | <b>External voltage measurement</b><br><b>XXXV</b> (select range XXX from Voltage field)                      | <b>FILT</b> ≤100A: Internal EMC filter (fast cycle)<br><b>-</b> No internal filter                                                                                                                            | <b>FUSE</b> Fuse and fuseholder<br><b>MSFUSE</b> Microswitch fuse<br><b>NOFUSE</b> No fuse                                                                                                                                                                                         | <b>ENG</b> English<br><b>FRA</b> French<br><b>GER</b> German                                                                                                                                                                                                                                                       |                                                                                                       | <b>-</b> No special                                                                        |

## FUSES - NO MICROSWITCH/TRIP INDICATOR

External fuses (order separately)

| Current rating amps | Fuse holder | Fuse and fuseholder assembly Reference | H x W x D      | Replacement fuse |
|---------------------|-------------|----------------------------------------|----------------|------------------|
| 16                  | CP018525    | FU1038/16A/00                          | 81 x 17.5 x 68 | CH260024         |
| 20                  | CP018525    | FU1038/20A/00                          | 81 x 17.5 x 68 | CH260034         |
| 25                  | CP018525    | FU1038/25A/00                          | 81 x 17.5 x 68 | CH260034         |
| 32                  | CP171480    | FU1451/32A/00                          | 95 x 30 x 86   | CH330044         |
| 40                  | CP171480    | FU1451/40A/00                          | 95 x 30 x 86   | CH330054         |
| 50                  | CP173083    | FU2258/50A/00                          | 140 x 35 x 90  | CS173087U063     |
| 63                  | CP173083    | FU2258/63A/00                          | 140 x 35 x 90  | CS173087U080     |
| 80                  | CP173083    | FU2258/80A/00                          | 140 x 35 x 90  | CS173087U100     |
| 100                 | CP173245    | FU2760/100A/00                         | 150 x 38 x 107 | CS173246U125     |

Internal fuses (included)

| Unit rating | Fuse rating | Reference    |
|-------------|-------------|--------------|
| 125A        | 200A        | LA172468U200 |
| 160A        | 200A        | LA172468U200 |
| 200A        | 400A        | LA172468U400 |
| 250A        | 400A        | LA172468U400 |
| 315A        | 400A        | LA172468U400 |
| 400A        | 500A        | LA172468U500 |

Note: For Fuses with Microswitch/Trip Indicators consult Eurotherm Sales

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