**Data Sheet**

# Caledon

## STA SERIES THYRISTOR STACKS FOR BURST FIRE CONTROL OF TRANSFORMER LOADS

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### FEATURES

- Versions for single or 3-phase loads
- Current rating from 80A to 1000A air cooled
- Operation without derating up to 50°C ambient
- Low cost 2-line control of 3-phase load
- Minimum radio frequency emissions
- Minimum waveform distortion
- No power factor degradation
- Simple installation, commissioning and maintenance
- Microprocessor controlled
- Long life ball-bearing fans
- Compact size, only 290mm deep

*STA-203-315-440*

### GENERAL DESCRIPTION

This is a modern range of thyristor stacks, specifically designed for burst fire control of the primary of transformer coupled loads in heating applications. A typical application example is in high temperature furnaces with low resistance graphite heating elements. These stacks switch on near the peak of the voltage waveform, thus minimising transient flux and transformer inrush without recourse to phase angle operation. This technique enables the control of a 3-phase transformer load by switching only two lines, and causes the minimum possible line disturbance, waveform distortion and radio frequency emissions. Special drive techniques ensure the minimum possible rfi associated with zero crossing commutation of the thyristors, enabling the units to be used with confidence in emc compliant systems. The driver control circuit is microprocessor controlled, and accepts either analogue (1-5V, 4-20mA) or logic input signals. A separate enable input is provided, which can be used in conjunction with system interlocks, current overload monitor etc. A logic output is provided for synchronising other thyristors if required. Semiconductor fuses and power supplies are electronically monitored, and an alarm relay is provided for system integration.These units do not have a current limit facility, and are not suitable for use with loads which have a low cold resistance requiring current limiting.

### ORDERING INFORMATION

Units may be ordered using the code below, or by description.

| TYPE | CONTROLLED LINES | CURRENT RATING | VOLTAGE RATING | FAN SUPPLY VOLTS | OPTION(S) |
|---|---|---|---|---|---|
| STA | | | | | |

101 Single phase operation
203 2-line control 3-phase

80A, 125A, 160A, 200A, 315A, 400A, 600A

250V, 440V, 480V, 660V*

115V, 230V (Fan and driver supply, - AC 50/60Hz)

BUS (Lid cut outs suitable for busbar connections - otherwise rounded slots are provided for cables.

**Notes**

All units require an auxiliary power supply of 115 or 230V +10%, -15%, 50/60 Hz.to power the driver card and the fans where applicable. This supply does not need to be phase related to the main load supply.

All units apart from the 80A unit are fan cooled. All units are fitted with snubber capacitors, MOV transient overvoltage protection, semiconductor fuses and emc filter capacitors.

Above 600A units can be sized to meet your requirements.

* 660V units. Note that impulse withstand voltage is restricted to 4kV and emc filter capacitors are omitted. Consult us.

## OVERALL DIMENSIONS (including driver card box)

Dimensions are approximate Width x Height x Depth when mounted vertically in a control panel. Allow 100mm clearance above and below for ventilation.

| CURRENT RATING | SINGLE PHASE UNIT | TWO PHASE UNIT |
|---|---|---|
| 80A, 125A, 160A | 234mm W x 310mm H x 290mm D | 362mm W x 310mm H x 290mm D |
| 200A, 315A | 234mm W x 400mm H x 290mm D | 362mm W x 400mm H x 290mm D |
| 400A, 600A | 362mm W x 400mm H x 290mm D | 618mm W x 400mm H x 290mm D |
| 1000A (Enquire for latest drawings) | | |

## SPECIFICATIONS

The following standards have been applied in whole or in part in the design of these units: EN 60947-1, EN61010-1, prEN 50178, EN 50 082 part 2, EN 50 081 part 2.

### Environmental

| | |
|---|---|
| Ambient Operating Temperature | 0-50$^{o}$C |
| Storage Temperature | -25 to +70$^{o}$C |
| Relative Humidity | 0-95% non condensing |
| Pollution (IEC 664) | Degree 2 (Only non conductive pollution is allowed. Temporary condensation may occur, but not normally while the equipment is operating). |
| Elevation | Derate current rating 1% per 100 metres above 200 metres |

### Electrical

| | |
|---|---|
| Rated Supply Voltage (Load) | 250V, 440V, 480V, 660V +10%, -50% |
| Rated Current | As ordered. Rated current is specified at 50$^{o}$C ambient. |
| Supply Frequency | 50Hz or 60Hz +/-8% |
| Rated Impulse Withstand Voltage (IEC 664) | 4KV |

### Electromagnetic Compatibility

The control circuits of the unit meet or exceed the requirements of EN 50 082 part 2 and EN 50 081 part 2 (immunity and emissions for industrial environment). The thyristor drive circuitry is designed to minimise conducted emissions associated with the load current, and additional filtering will not normally be necessary. Application notes provide information on system design for compatibility.

### Control Signal Inputs and Outputs

| | |
|---|---|
| Analogue input control signal | 1-5V. (4-20mA in conjunction with external 250 ohm burden resistor). |
| Logic input control signal | Max 30V input. Switching threshold >3V on, <2V off. |
| Logic output signal | +12V (approx.) signal, synchronised to stack turn on. |
| Enable input | Contact closure, npn pull down or link required to enable the stack. |
| +5V supply output | Available to power 10K potentiometer for manual control. |
| Alarm relay output | Volt free changeover contacts, rated 250V AC 1A operate on loss of power, load supply, loss of phase lock, heatsink overtemperature. |

### LED Indicators

1 Auxiliary power supply present.
2 Heatsink temperature within range.
3 Presence of load supply voltages.
4 Phase lock (control system synchronised to load supply voltage).
5 Enable (1-4 correct, and external enable signal present).
6 Demand signal (Stack is asking for current to be supplied to load).
7 Alarm (one of 1-4 is not correct).

### Control Parameters

| | |
|---|---|
| Load burst fire cycle time at 50% duty cycle | 15 seconds (Other cycle times available on request). |
| Burst fire start angle | Adjustable 30-90$^{o}$ after zero crossing by potentiometer. |

After loss of power while load current is flowing, or change of phase rotation, or supply frequency, first switch on is ramped

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