

# Characteristics

## Electrical

### Power supply

Voltage range: 216.2 - 253V  
 Frequency: 50Hz (nom)  
 Single phase  
 Power: 5VA (max)  
 Fuse: none

### Control Relay

Contact type: SPDT  
 Volt-free contacts  
 2A @ 230VAC

### Thermocouple

R, S, K or N type  
*(user selectable)*

### Connectors

2-part connectors  
 Max. wire size 1.5mm<sup>2</sup>  
 Mating plug (supplied) has M2  
 screw connections

## Error Handling

Thermocouple failure detection  
 Thermocouple reversal detection



This instrument complies with Council Directive 89/336/EEC (electromagnetic compatibility) & Council Directive 73/23/EEC (low voltage safety)

## Temperature

### Kiln Temperature Display Range

R & S type: 0 to 1650°C  
 K & N type: 0 to 1260°C  
 Resolution: 1°C

### Kiln Temperature Trip Setting Range

100 to 1700°C  
 Resolution: 1°C

### Room Temperature Trip Setting Range

40 to 60°C  
 Resolution: 5°C

### Kiln Reading & Trip Accuracy

±0.25% FSD ±1 digit  
 Resolution: 5°C

### Room Temperature Trip Accuracy

±3°C

### Cold Junction Compensation: Yes

## Environmental

Operating temperature range: -10° to +60°C  
 Storage temperature range: -10° to +60°C

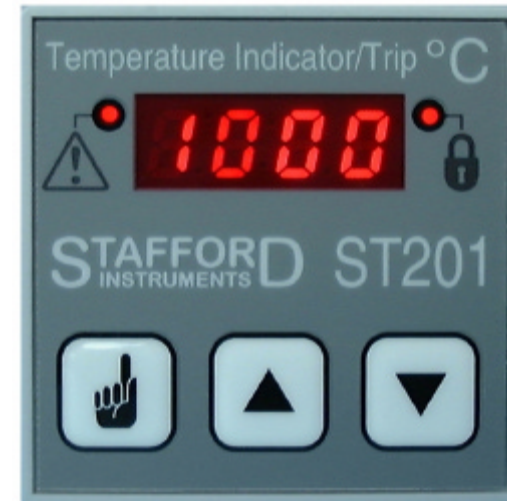
## Enclosure

Sealing: IP31 (rear of panel)  
*(an IP65 front of panel seal can be achieved by the use of an appropriate gasket or sealant)*  
 Material: Glass reinforced Nylon  
 Colour: Light Grey  
 Fixing: Moulded clip + 2 screw (supplied)



# ST201

## User Handbook



# ST201 Temperature Indicator/Trip

Stafford Instruments Ltd.  
 Tel: +44(0)1785 604561  
 Fax: +44(0)1785 602381

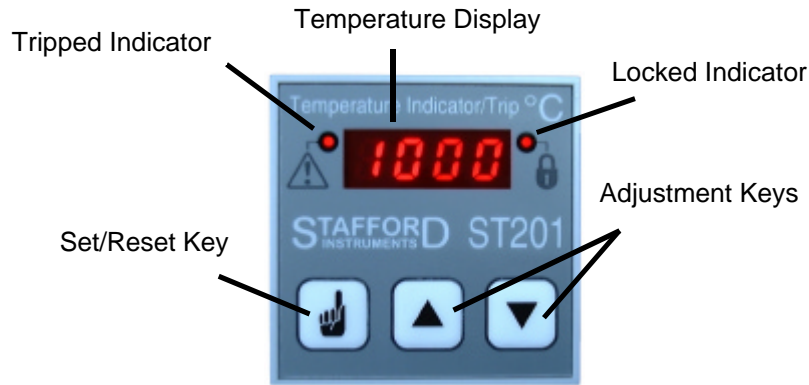
www.stafford-inst.co.uk  
 email: support@stafford-inst.co.uk



<http://www.stafford-inst.co.uk/docs/st201/user201.pdf>

Issue: 1.0A  
 Date: 09 Mar 2000

# Operation



The ST201 is a kiln protection device which does not normally require user attention. It helps to protect the kiln and its controls from over-firing. It continuously displays & monitors kiln temperature. It also simultaneously monitors room temperature. It will trip if either kiln or room temperature exceed their set limits.

The lock symbol shows that the keys have been locked to prevent tampering. To lock or unlock the ST201 press & hold down both adjustment keys for 5 seconds.

The tripped indicator shows that the ST201 has tripped due to an over-temperature condition. To determine the reason for tripping press & hold the set/reset key.

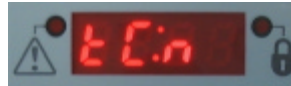
With the set/reset key held down this display indicates that the trip reason was high (i.e. kiln) temperature.

With the set/reset key held down this display indicates that the trip reason was the room temperature

To reset the ST201 either turn the power off then on again or press and hold down the set/reset key for 10 seconds. If the over-temperature fault has cleared the trip indicator will turn off and the ST201 will reset.

# Configuration

To configure the ST201 press & hold down the set/reset key while powering up the instrument. The thermocouple type display will be shown. Release the set/reset key. To change the thermocouple type press either of the setting keys.



This is the 'N' type thermocouple display.



This is the 'K' type thermocouple display.



This is the 'S' type thermocouple display.



This is the 'R' type thermocouple display (factory setting).

**IMPORTANT:** select the thermocouple type to correspond to the type connected to the ST201.

When the correct thermocouple type has been selected press the set/reset key again. The room trip temperature is now shown.



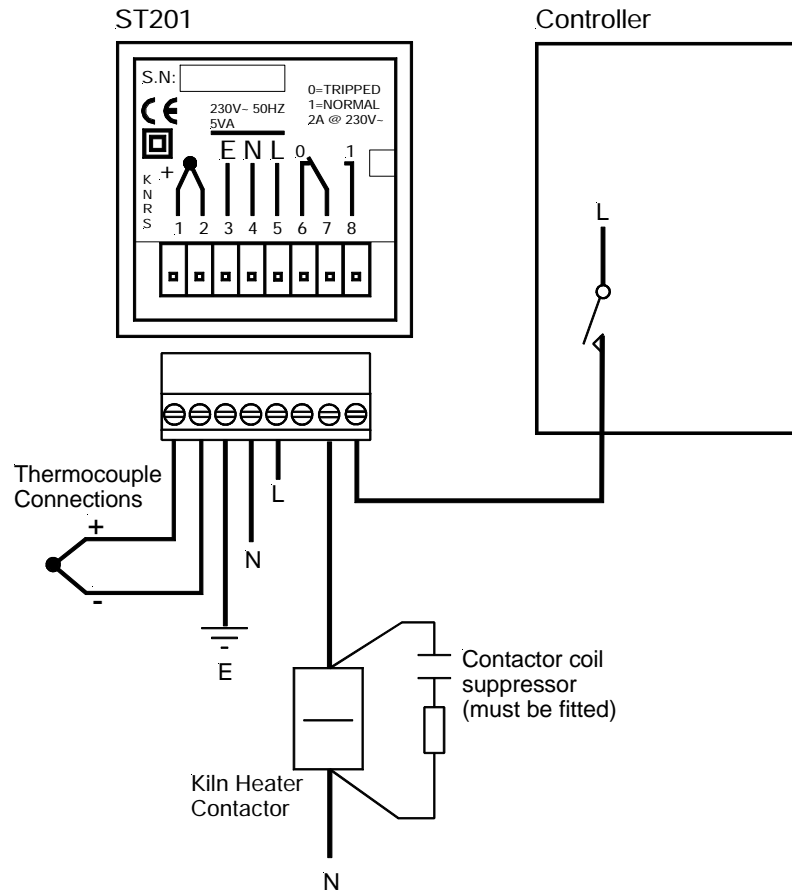
The room trip temperature can be adjusted in 5°C intervals in the range 40°C to 60°C by use of the setting keys.



To disable the room temperature trip facility select 'OFF' (factory setting).

When the desired room trip temperature has been selected press the set/reset key again. This will cause the ST201 to store the new settings then return to normal operation.

## Wiring



A basic wiring scheme is shown above. A better scheme is to use the ST201 to control a secondary contactor. The power contacts for the two contactors are wired in series. This scheme guards against the possibility of the kiln heater contactor failing closed. Some controllers have a secondary output which is de-energised if the controller detects an over-temperature condition. Wire this output to a secondary contactor via the ST201 contacts. Note that the ST201 contacts are volt-free.

The ST201 can utilise the controller thermocouple by parallel connection. A better scheme is to use a duplex thermocouple or a secondary thermocouple.

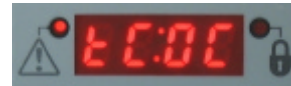
## Setting



To set the required kiln trip temperature press & release the set/reset key. The kiln trip temperature setting will be displayed and the tripped indicator will flash. Adjust the required trip temperature with the adjustment keys – these can be held down for rapid change. A few seconds after finishing adjustment the tripped indicator will turn off, the new kiln trip temperature will be stored and the ST201 will revert to displaying kiln temperature.

To review or change the room temperature trip setting please refer to the configuration information on page 7 in the Installation section of this document.

## Errors



This indicates that the thermocouple connected to the ST201 is open circuit and may need to be replaced. The thermocouple and its associated wiring need checking. The ST201 will have tripped.



This indicates that a kiln temperature of -50°C has been measured. This normally indicates an installation fault – the thermocouple connected to the ST201 is reversed. The ST201 will have tripped.

*Note: when displaying these errors the ST201 cannot be reset by pressing the set/reset key – the instrument must be turned off & the cause of the errors investigated.*

## Power-on

When powered up the ST201 performs the display sequence: display test, embedded firmware version number (e.g. F1.00) & thermocouple type selected (see page 7 for examples). It then shows the kiln temperature.

# Installation

## Installer Information

Installation Category: II  
Pollution Class: 2



230V ~ 50HZ 1.0A

## EMC

To meet Electromagnetic Compatibility requirements both the thermocouple lead and the power leads should not exceed 3.0m in length.

This instrument is designed for use mainly in Domestic & Light Industrial environments where electromagnetic interference may cause a loss of accuracy of the displayed temperature reading of up to 3°C. Specified accuracy will be restored when the interference is removed.

## Contact Suppression

The coil of the contactor connected to the ST201 *must be suppressed* with an RC filter network. The RC network must be connected directly across the coil terminals on the contactor.

Suitable proprietary RC filter networks fitted with insulated wire leads are:-

- |    |                               |                  |
|----|-------------------------------|------------------|
| 1. | RS Components                 | Part No. 210-364 |
| 2. | RS Components (tab fixing)    | Part No. 210-370 |
| 3. | Farnell Electronic Components | Part No. 218-893 |

## Mounting

Mount the instrument into a suitable vertical panel which will not get hot. Choose a position where the instrument is not exposed to direct heat from the kiln – especially when the kiln door or lid is open. Provide ventilation for the behind-panel space.

## Dimensions

