STAFFORD INSTRUMENTS

Installation Instructions
ST215 / ST216
Temperature Programmers

www.staffordinstruments.co.uk

CE

See separate handbook for User Instructions

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Installation

Safety Warnings

DISCONNECT BEFORE REMOVING COVER (NO USER SERVICEABLE PARTS INSIDE)

WARNING

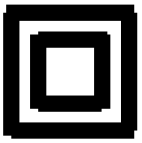
ISOLATE KILN & PROGRAMMER FROM ELECTRICAL SUPPLY BEFORE ATTEMPTING INSTALLATION OR REPAIR WORK

Installer Information

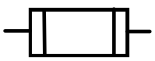
Installation Category: II
Pollution Class: 2

100-240V ~ 50/60HZ 1.0A

Fuse: 3.15A Anti-surge
20mm ceramic HRC



IP50



CE

EMC

To meet Electromagnetic Compatibility requirements the controller lead should not exceed 3.0m in length.

This instrument is designed for use mainly in Domestic, Commercial & 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.

Mounting

Mounting Location

Mount the instrument on a suitable vertical surface 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.

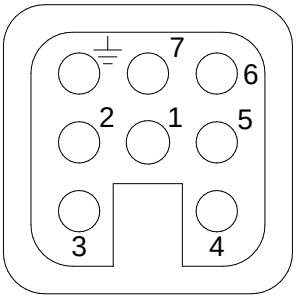
Wall Mounting Bracket

This is a ôholsterôstyle ABS moulded bracket which can be wall attached with 2 screws. The bracket mounting holes are spaced 70mm. The instrument can be removed from this bracket for in-hand programming if required.

Connecting Lead

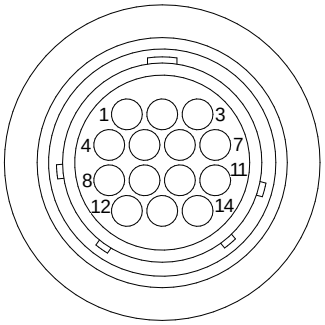
The ST21X range of Temperature Programmers are fitted as standard with a connecting lead and plug. The lead lengths can be either 2m or 3m. The plug type will be either a Harting Han7D or a Tyco CPC14. The wiring of the mating Han7D kiln socket follows an industry standard (as shown below). ***The wiring of the mating CPC14 kiln socket varies between kiln manufacturers!***

Han7D plug



View on pins

CPC14 plug



View on pins

Wire function	Wire colour	Han7D pin	CPC14 pin
Mains (L) supply	Brown	5	8
Mains (N) supply	Blue	2	9
Mains Earth	Green/Yellow	8	11
Heating control output (L)	White/Black	6	14
Alarm control output (L)	Yellow	7	12
Control output (N)	Black	1	13
Thermocouple +ve	Orange	3	1
Thermocouple ï ve	White	4	2

Contactor Coil Suppression

The coil of each kiln contactor ***should be suppressed*** with an RC suppressor. The RC suppressor must be connected directly across the coil terminals on the contactor. Suitable proprietary RC suppressors are often available from contactor manufacturers as add-on blocks. A suitable RC suppressor with insulated wire leads (fly leads) is the Okaya Electric XEB1201B.

Configuring

To enter configuration mode power down the ST21X. Press and hold down the ʒ ■ key while powering up the ST21X.

When the thermocouple type is displayed release the ʒ ■ key.

The first setup parameter number is now displayed (flashing 00). Refer to the code tables overleaf for a description of the available configurable parameters.

Change the parameter number with the ƶ & Ɛ keys. To display the parameter value press the ʒ key.

The parameter value can now be altered with the ƶ & Ɛ keys. To select another parameter press the ʒ key.

Pressing the ʒ ■ key at any time causes the configuration parameters to be stored. The instrument will then reboot.

Note: in the above sequence if no key presses are detected for 30 seconds the instrument will exit configuration mode without saving any changes.

ERROR MESSAGES

Certain error messages can be disabled by the use of configuration parameters. Error messages should normally be left enabled. Error messages should only be disabled as a short term measure: to diagnose kiln problems for example.

The alarm output contact closes at the start of a firing and opens when the firing is complete. If an error message is generated the firing is terminated, the alarm buzzer sounds and the alarm output contact opens. This output is usually used to drive a secondary (policeman) contactor to isolate power to the kiln elements.

Error messages are provided to detect kiln faults and so offer some protection to the kiln. For increased protection the use of a heat fuse or other independent over-temperature trip is recommended. For maximum protection an independent thermocouple, trip & heater contactor circuit should be used.

Note: Power fail recovery may need to be disabled if un-attended firing is not allowed.

Setup Parameters

No.	Function	Min.	Max.	Default	Notes
0	Thermocouple type	0	3	2	0=K, 1=N, 2=R, 3=S
1	Error 1 enable	0	1	1	0=disabled, 1=enabled
2	Max. user temperature	100	1400	1320	°C
3	Display brightness	0	6	3	0=dim, 6=bright
4	Error 4 enable	0	1	1	0=disabled, 1=enabled
5	Error 5 enable	0	1	1	0=disabled, 1=enabled
6	Error 6 firing hours trip	10	1000	1000	1000=disabled
7	Room temperature trip	30	71	50	°C. 71=disabled
8	Power fail recovery enable	0	1	1	0=disabled,1=enabled
9	Paused time limit (hours)	1	11	2	11=disabled
10	Set point offset	-99	99	0	°C
11	Proportional band	1	999	55	°C
12	Integral time (seconds)	0	9999	200	0=disabled
13	Differential time (seconds)	0	999	10	0=disabled
14	Kiln element power	0	9999	0	1 unit = 0.1kW
42	Program Linking (ST216 only)	0	1	0	0=disabled, 1=enabled
43	Engineer lockup on error	0	1	0	0=disabled, 1=enabled
44	Control cycle time	5	120	30	Seconds
46	Remember start delay	0	1	0	0=forget, 1=remember
47	Skip start delay after power failure	0	1	0	0=resume delay, 1=skip delay
60	Operating units °C/°F	0	1	0	0=°C, 1=°F

Configuration Notes

Parameter	Note
10	**Setpoint offset:** This is added to the setpoint defined by the user program. This will normally be left at 0.
42	**Linking:** Enables program linking on the ST216 only. Ignored by the ST215. With linking enabled program n can be optionally linked to program n+1 etc.
43	**Engineer lock-up on error:** If this feature is enabled then errors cannot be cleared by cycling the power to the controller i.e: cannot be cleared by the user. This forces an engineer call out to determine the cause of the error and a repair to be implemented.
46	**Remember start delay:** By default this feature is disabled and the controller sets the initial value for start delay to 00:00. If enabled the controller remembers the user entered start delay from the previous firing (useful for repetitive overnight firings). In either case the actual start delay can be edited by the user.
47	**Skip start delay after power failure:** By default this feature is disabled and in the event of a power failure while executing the start delay, the controller times off the remainder of the start delay when power is restored. If enabled the controller immediately starts firing when the power is restored. Note: the controller does not contain a real time clock and so does not know how long the power has been off.
60	**Operating Units °C/°F:** When units are changed the controller will reload its default set of programs (in either °C or °F units as required). ***Warning! - this will over-write any existing programs!***

Characteristics

Electrical

Power supply
Voltage range: 90 - 264VAC
Frequency: 50/60Hz
Power: Controller 4VA (max)
Switched outputs 125VA

Fuse: 3.15A slow-blow HRC
20mm x 5mm ceramic

Control Relays (2)
Contact type: SPST NO
Switched Line voltage O/P @500mA max
(for contactor driving)

Thermocouple
R,S,K & N type.

Lead & Connector
2m or 3m flexible grey polyurethane lead
Fitted with either Han7D or CPC14 connector

Environmental

Operating temperature range: -10°C to +55°C
Storage temperature range: -10ºC to +55ºC

Error Handling

Thermocouple failure detection
Thermocouple reversal detection
Heater failure detection
Kiln over-temperature detection
Room over-temperature detection
Lock-up on error facility
Firing run time hours limiter
User program check
Alarm buzzer (buzzer)

Other

Keyboard lock facility & indication
Kiln heating indicator
Program running indicator
Energy used display

Wall Bracket

Material: ABS flame retardant UL 94V-0
Colour: Black RAL9011
Fixing slot centres (vertical): 70mm
Fixing slot size: 8mm x 4mm

Temperature

Temperature setting
Range: 0 to 1400ºC (R/S) 0 to 1200°C (K/N)
Resolution: 1ºC

Control Accuracy
P.I.D. Control or on/off control (selectable)
Reading accuracy: ±0.25% FSD ±1 digit

Time

Start delay range: 00:00 to 99hr 59min
Soak time range: 00:00 to 99hr 59min
Resolution: 1 min

Ramps

Ramp rate: 1 to 999°C/hour or full power
Ramps can be heating or cooling

Enclosure

Material: ABS flame retardant UL 94V-0
Sealing: IP51
Size: 80/68mm(W), 165mm(L), 28mm(D)
Colour: Black/Dark Grey
(RAL9011/RAL7012)

Weight

Instrument + wall bracket: 0.460kg (max)

Packaging

Packaged size: 248 x 185 x 58mm
Packaged weight: 0.570kg (max)

CE This instrument complies with Council Directive 89/336/EC (EMC) & Council Directive 2006/95/EC (safety)

Council Directives 2002/96/EC & 2003/108/EC

The crossed out bin symbol, placed on this product, reminds you of the need to dispose of the product properly at the end of its life. Electrical & Electronic Equipment should never be disposed of with general waste but must be separately collected for proper treatment. In this way you will assist in the recovery, recycling & reuse of many of the materials used in this product.