1200°C Solid Tube Furnaces

Thermcraft incorporated

The XSL solid tube furnaces have a continuous solid body design. Process tubes can be inserted through the furnace chamber before attaching end seals.

These furnaces use ceramic refractory heating elements with embedded resistance wire. The tube adapters can be changed by removing the end caps so that multiple process tube sizes can be used with one furnace.

Temperature uniformity is excellent due to the heavy ceramic refractory heating elements and continuous solid tube heated chamber.

XSL-3-0-12-1C-F01

Standard Features

- 1200°C maximum operating temperature

- Ceramic refractory with embedded wire heating elements ensure excellent temperature uniformity

- Thermcraft SmartControl touch screen PID control system (see control system descriptions)

- Long life Inconel sheathed Type K thermocouple

- Accepts process tube outer diameters up to 2.75" (69mm)

- Heated lengths up to 24" (609mm)

- Includes 1 set of tube adapters sized to desired internal diameter

- 10' (3m) interconnecting and power cables

- Furnace and controller ship fully assembled and ready for connection to incoming power supply

- Can be used in horizontal or vertical orientation

Options and Upgrades

- The SmartControl can be upgraded to include profile programming, data acquisition and communications. These options can be purchased individually or separately and can also be purchased as an upgrade after the unit has been shipped and installed

- Independent over temperature control

- Additional sets of tube adapters

- Process tubes in various sizes and materials

- Process tube end seals for gas and vacuum

- Eurotherm 2404 series controls and communications upgrades

- Available without control system

- Custom options and upgrades available upon request, such as output control of external devices, actuators, flow controllers, etc. (extends delivery time)
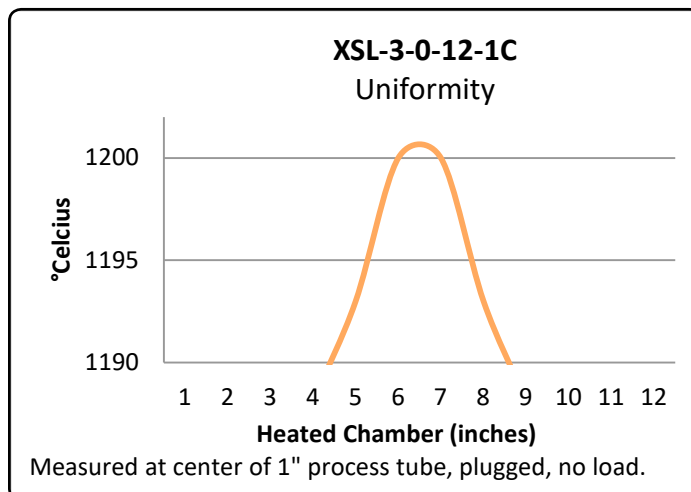
XSL-3-0-18-1C-F01

Specifications

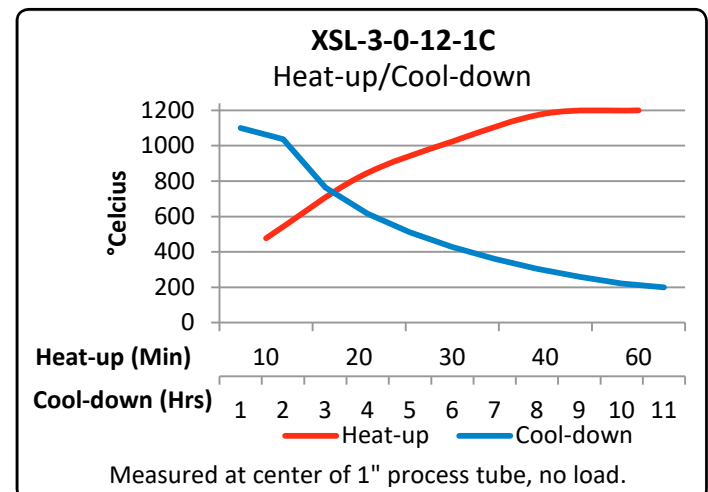| Model	Max Temp (°C)	Heat Zones	Heat Up Time (mins)	Max OD Process Tube in. (mm)	Heated Length in. (mm)	Furnace External Dimensions HxWxD in. (mm)	Control External Dimensions HxWxD in. (mm)	Max Power (Watts)	Volts	Amps	Thermo couple Type	Weight lbs (kg)
XSL-3-0-12-1C	1200	1	60	2.75 (69)	12 (304)	15x15x18 (381x381x457)	9x14x14 (229x356x356)	2260	230	10	K	53 (24)
XSL-3-0-18-1C	1200	1	65	2.75 (69)	18 (457)	15x21x18 (381x533x457)	9x14x14 (229x356x356)	3440	230	15	K	71 (33)
XSL-3-0-24-1C	1200	1	70	2.75 (69)	24 (609)	15x27x18 (381x686x457)	9x14x14 (229x356x356)	4520	230	20	K	89 (41)

Notes   -Continuous operating temperature is 100°C below maximum temperature
-Heat up times are measured under no load

Temperature Profiles

XSL-3-0-12-1C
Uniformity

°Celcius axis: 1190, 1195, 1200
Heated Chamber (inches): 1 2 3 4 5 6 7 8 9 10 11 12

Measured at center of 1" process tube, plugged, no load.

XSL-3-0-12-1C
Heat-up/Cool-down

°Celcius axis: 0, 200, 400, 600, 800, 1000, 1200
Heat-up (Min): 10 20 30 40 60
Cool-down (Hrs): 1 2 3 4 5 6 7 8 9 10 11
— Heat-up — Cool-down

Measured at center of 1" process tube, no load.

- Uniformity profile taken at a set-point of 1200°C

- ±5°C over 5" (127mm), ±1°C over 2" (51mm)

- Uniform length increases respectively in furnace models with longer heated lengths.

- Heat-up time measured from ambient to 1200°C at 100% power output

- Cool-down rate measured with power shut off

- Faster cool-down rates can be achieved with forced cooling (reduces heater life)

SmartControl

SmartControl Standard Controller

The SmartControl System combines all of the features of typical PID controllers, video/chart recorders and data logging systems into a single, intuitive device. The SmartControl provides a 4.3" color touch screen interface with standard, user configurable, runtime features for 1-10 zone control applications. All loop configuration and runtime user access is configurable at the device with no PC software required. SmartControl supports 1-10 control zones, offering up to 4 control outputs per zone, powerful profiling capabilities including up to three event outputs and more.
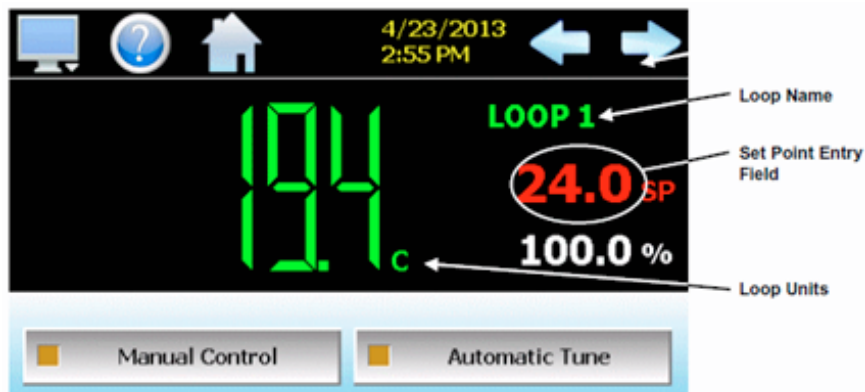
Optional LAN features include e-mail, SMS (text messaging) on alarm, FTP (file transfer protocol for automated file transfer/data backup), remote access (web and VNC embedded servers) and national timeserver time synchronization are standard. The web and VNC servers allow remote access using a PC, tablet or other smart phone devices.

If you can use a "smart device" (iPhone, Android, etc.), you can use SmartControl! User configurable with "slide nav" finger navigation similar to "smart devices" or with a traditional drop down menu system, SmartControl is intuitive to operate and use. With one touch language configuration for all icons, menus and help screens, SmartControl provides ease of use in any one of 28 languages.

Up to 10 Zones Controlled Through One SmartControl Interface

1-10 Zone SmartControl System

Single Zone View

Menu System: User Selectable as Icon or traditional drop down text menu

Text Based Navigation

Icon Based/Slide Page Navigation

SmartControl Intuitive Operation

User configurable with "slide nav" finger icon navigation similar to smart phones or tablets or as a traditional drop down menu system.

The SmartControl display is split into two sections; the icon bar and main display area.

- The Main display area is used to view loop information with configurable tag names, active PV, SP & PID % values, navigation icons and appropriate functions selected; i.e. chart view, PID tuning, profiling, data logging, etc.
- The icon bar is visible at all times providing one touch selection of the Menu (navigation), Help, Home, Alarm (flashes when an alarm occurs) icons, Data/Time field, Notification Window when date/time selected and Navigation Arrows.
  - The Help icon provides the user content sensitive information for every function.
  - The date/time field provides the current date/time and when depressed a Notifications window is opened. The Notification window provides a one-touch snapshot of current SmartControl activity; i.e. PV/SP values, Alarm, Data Logging, Profile, Security activity and more.
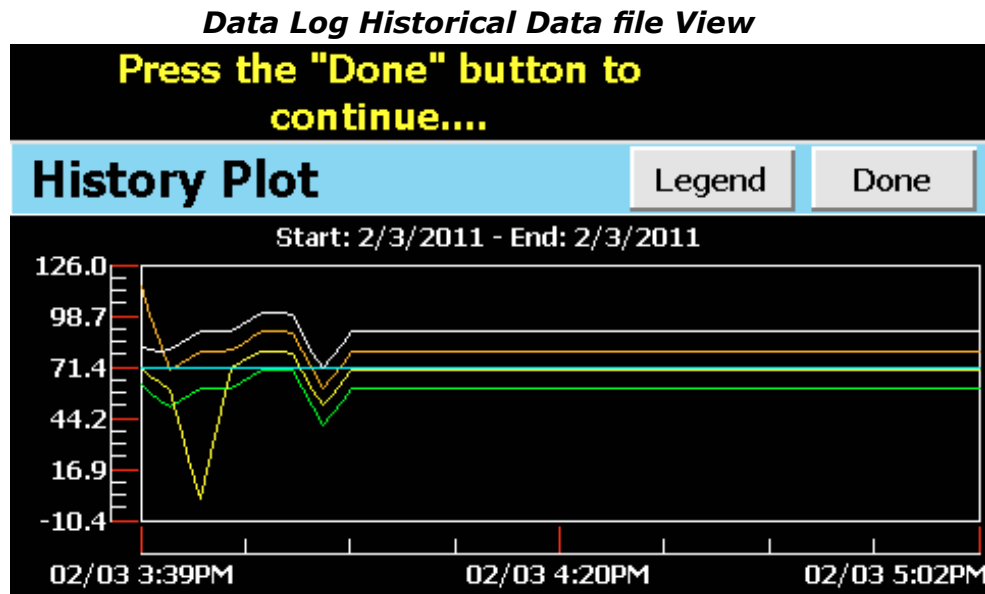
Optional Program Profile Ramp/Soak:
- Profiles: Virtually an unlimited number of program profiles in system memory with up to 64 program steps per program
- Profile Type: System configurable for separate profiles per loop.
- Profile Start: via touch screen or via Event input.
- Profile Name: Free form 16 character (max) naming convention with auto append time/date stamp.
- Global Profile Configuration
- Profile Time Base: Time Ramp (hh:mm or mm:ss)
- Ramp Rate (degrees/minute or hour)
- Starting and Ending SP values (may be individually active or not).
- Guaranteed Soak & Ramp (GS).
- Power Fail / Recovery when Profile is active:
- Continue from last SP value.
- Continue from last PV value.
- Static mode (abort profile) with last static SP entered.
- Jump to Segment: configurable by segment (also nested looping)
- Events: up to 3 events per segment.
- Guaranteed Soak & Ramp: Configurable active or not by segment.
- Configurable functions (mutually exclusive to each other)
  - Profile Run (momentary)
  - Profile Hold (closed profile hold, open profile run)
  - Profile Run/Hold (closed profile run, open profile hold)
  - Step Advance (momentary)
  - Profile Abort (momentary)
  - PID Selection: select PID #1 or PID#2

Historical Audit Trail

Audit Trail File View

Data Log Historical Data file View

Optional Data Acquisition:

- Data log PV, SP and PID Percent.
- Log interval: configurable 6 seconds to 31 minutes with configurable number of days to auto start & name next file (1 to 31 days).
- File Start/Stop: Configurable; operator on-demand, on system boot, profile ramp-soak start/end or digital inputs
- File Interval: Once started a data log file is configurable to auto end and start new file with the same name as previous file with an appended time/date name. Configurable time interval is from 1 to 31 days.
- File name: Operator entered file name, batch & lot number or if running a profile, file name same as profile name. (all file names appended with date-time to file name)
- Operator Comments/Events: Unlimited operator comments/events linked to each file entered manually or via Bar Code Scanner.
- Digital Signatures: full support for user based digital signatures for each data file (data encryption).
- Historical Data File: View & print the data directly from the display (auto scale on X & Y axis with each channel selectable for right or left axis values), from a PC after data is copied/moved via LAN (FTP or e-mail) or USB Flash Memory card provided

Language Selection:

SmartControl provides a one-button language configuration for the following languages:

Afrikaans	Albanian	Arabic	Basque
Belarusian	Czech	Danish	Dutch
English	Finnish	French	Greek
German	Hebrew	Hungarian	Icelandic
Italian	Japanese	Korean	Norwegian
Polish	Portuguese	Russian	Spanish
Swedish	Turkish	Chinese–Simplified	
Chinese–Traditional			

Control System Descriptions

Eurotherm 2404 Series Controllers

These 1/4 DIN size PID controllers offer up to 64 segments of programmable control. Each program segment can be a ramp, step or dwell.

- 2404CC and 2404CG offer 8 programmable segments
- 2404CP offers 16 programmable segments
- 2404P4 offers 4 programs with 16 segments per program

Options and Upgrades

- The 2404 series controllers can be upgraded to include EIA485 2-wire, 4 wire or EIA232. With industry-standard protocols including: Modbus, DeviceNet®, Profibus DP, and Eurotherm® Bisync

- Custom options and upgrades available upon request (extends delivery time)

Eurotherm 3216 and 2416 Series Controllers

These 1/16 DIN size PID controllers offer up to 16 segments of programmable control.

- 3216CP offers 8 programmable segments, each segment a ramp and a dwell
- 2416CP offers 16 programmable segments, each segment may be set as a ramp, dwell or step

Options and Upgrades

- The 3216 controller can be upgraded to include either EIA485 or EIA232, 2-wire, with industry-standard Modbus protocol

- The 2416 controller can be upgraded to include EIA485 2 wire or 4 wire or EIA232. Industry-standard protocols including: Modbus®, Eurotherm Bisync, and SPI

- Custom options and upgrades available upon request (extends delivery time)

Independent Over Temperature Controllers, 1/16 DIN Size

Independent over temperature controllers, sometimes referred to as "high limit controllers", are independent of the main temperature controller. The over temperature controller has its own thermocouple and power relay that will break the power circuit to the heating elements if the temperature should rise above the over temperature control setpoint.

The over temperature controller must be manually reset if the power to the heating elements is interrupted.

All control systems have the option of adding an over temperature controller.

All control systems for furnaces with maximum operating temperatures above 1200°C will come standard with an independent over temperature controller.

Control System Software

SmartControl Standard Control System

Free optional PC software for the SmartControl includes:

- *EnVision* is a FREE SCADA (Supervisory Control and Data Acquisition) package allowing users to assemble a control and data acquisition system for up to 128 devices, each with their own data log file as well as one system data log file of any combination of devices (up to 129 concurrent data log files). Data files include Operator Events (messages) with Digital Signature capability to provide data integrity. Other features include Alarm Logs, operator Audit Trails, General and Service Notes per device, LAN capability (email/text on alarm & Web Page) and more, all standard without the need for programming.
- *DataViewer* is FREE PC Software to View, Graph, Print, export Historical Data, Audit Trail, Alarm & Operator Event Files, validate Data File Digital Signatures and more. The application opens in a spreadsheet type window that displays saved data in cells. These cells can be selected for printing or plotting without additional setup. The data viewer is the main window displayed when the application starts. The data viewer is separated by tabs for the following functions: Data, Operator Events, Audit Trail, Alarm History and Trend Data

Eurotherm Controllers

Free optional PC software for Eurotherm Controllers includes:

- *iTools* is a versatile suite of software tools to allow configuration and monitoring of all Eurotherm 2000 and 3000 series controllers.

Options for all Furnaces and Control Systems

SmartControl (Standard Control System)
Profile Programming - 99x64 Program Segments
Communications - Includes Ethernet and RS232 (adaptable to RS485)
Data Acquisition
Independent Over Temperature Controller (1 per zone required)
Eurotherm Controller (Optional Controllers)
(1 per zone required)
2404CC - 8 Program Segments
2404CP - 16 Program Segments
2404P4 - 4x16 Program Segments
Communications - RS232 or RS485
Independent Over Temperature Controller (1 per zone required)
Protégé Compact Split Tube Furnace
Eurotherm 3216CP - 8 Program Segments (Standard Controller)
Eurotherm 2416CP - 16 Program Segments (Optional Controller)
Communications - RS232 or RS485
XSB Box Furnace
Inlet and Outlet Ports for Gas Purging (for 1/4" (6mm) pipe insertion)
Exhaust Chimney for Fume Ventilation

Custom options available upon request (extends delivery time)