



invensys  
**EUROTHERM**

# 3200

## MODELS

Ideal for :

- Plastic extrusion
- Hot runners
- Thermoforming
- Ovens
- Chillers
- Trace heating
- Stress relieving

Features :

- 8 Segment programmer
- Heater failure detection
- Current monitoring
- Internal timer
- Scrolling text messages
- Help text
- Recipes
- Modbus comms
- Modbus SP retransmission
- Analogue retransmission



## Temperature/Process Controllers Specification Sheet

The innovative range of 3200 controllers offer precision control of temperature and other process variables together with a host of advanced features not normally found in this class of controller.

The emphasis is on ease of use. A simple 'Quick Start' code is used to configure all the functions essential for controlling your process. This includes input sensor type, measurement range, control options, and alarms, making 'Out the Box' operation truly achievable. In operator mode every parameter has a scrolling text message describing its function and is available in English, German, French, Spanish or Italian. More advanced features are configured using a PC based configuration wizard which is an easy to use and instructive guide to all the functions in the controller.

### Heater Current Monitoring

A current transformer input provides display of the heater current and a health check on the load. Partial load failure, heater open circuit and SSR faults are detected and displayed as scrolling alarm messages as well as providing an alarm output. On the 3208 and 3204 a front panel ammeter displays the heater current.

### Setpoint Programmer

Heat treatment profiles can be programmed using the 8-segment programmer. Holdback, at the beginning of each segment can be used to guarantee the soak periods. A digital event output can be triggered in any segment to initiate actions within the process.

### Custom Text Messaging

Custom messages can be created with a PC tool and downloaded to the 3200 to display when an event, alarm or process condition occurs. This provides the operator with good visibility of the status of the process.

## Recipes

Using a PC tool recipes can be created that can be used to change the operating parameters of the 3200 simply by selecting a new recipe using the 3200 HMI. This is very useful where multiple products are processed using the same controller but require different parameters to be set.

## Timer

An internal timer is configurable as an interval timer, delay timer or to provide a soft start for hot runner control.

## Setpoint Retransmission

Sending the setpoint or other parameters from the 3200 to slave devices can be achieved either using conventional analogue communications or using Master Modbus comms. Master Modbus in the 3200 allows a broadcast of 1 parameter to the network. A typical application is a setpoint being retransmitted to a number of slave controllers in a multi-zone furnace.

## Modbus Communications

All units support both EIA232 and 2-wire EIA485 communicating using the Modbus protocol.

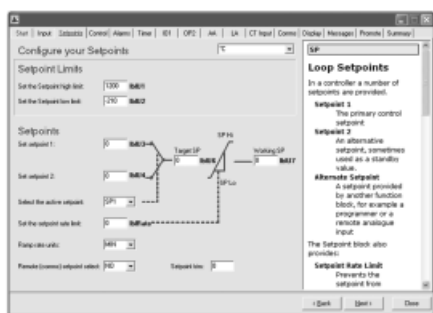
## Configuration Adaptor

PC configuration to all 3200 controllers can be achieved by using a configuration adaptor. It provides iTools with the ability to communicate with and configure devices without any power being connected.



## iTools Wizard

Used to simplify the set up of 3200 series controllers. The wizard guides the user through the configuration process with interactive help and graphical demonstrations of features.



## TECHNICAL SPECIFICATION

### General

#### Environmental performance

Temperature Limits	Operation:	0 to 55°C
	Storage:	-10 to 70°C
Humidity limits	Operation:	5 to 90% RH non condensing
	Storage:	5 to 90% RH non condensing
Panel Sealing		IP65, Nema 4X
Shock		BS EN61010
Vibration		2g peak, 10 to 150Hz
Altitude:		<2000 metres
Atmospheres		Not suitable for use in explosive or corrosive atmosphere

#### Electromagnetic compatibility (EMC)

Emissions and immunity	BS EN61326
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#### Electrical safety

(BS EN61010)	Installation cat. II; Pollution degree 2
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#### INSTALLATION CATEGORY II

The rated impulse voltage for equipment on nominal 230V mains is 2500V.

#### POLLUTION DEGREE 2

Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected

### Physical

Panel mounting	3216:	1/16 DIN
	3208:	1/8 DIN
	3204:	1/4 DIN
	32h8:	1/8 DIN, horizontal
Weight	3216:	250g
	3208:	350g
	3204:	420g
	32h8:	350g
Panel cut-out dimensions:	3216:	45W x 45Hmm
	3208:	45W x 92Hmm
	3204:	92W x 92Hmm
	32h8:	92W x 45Hmm
Panel depth:	All:	90mm
Operator interface		
Type		LCD TN with backlight
Main PV display		4 digits, green
Lower display	3216, 3208, 3204:	5 character starburst, green
	32h8:	9 character starburst, green
Status beacons		Units, outputs, alarms, active setpoint

#### Power requirements

3216:	100 to 240Vac, -15%, +10%, 48 to 62 Hz, max 6W 24Vac, -15%, +10%. 24Vdc, -15% +20% ±5% ripple voltage max 6W
3208/h8/04:	100 to 240Vac, -15%, +10%, 48 to 62 Hz, max 8W 24Vac, -15%, +10%. 24Vdc -15% +20% ±5% ripple voltage max 8W

### Approvals

CE, cUL listed (file E57766), Gost, DIN 3440 (3216 only)

#### Transmitter PSU (not 3216)

Rating	24Vdc, 20mA
Isolation	264Vac double insulated

### Communications

Serial communications option	
Protocol	Modbus RTU slave Modbus RTU Master broadcast (1 parameter)
Isolation	264Vac, double insulated
Transmission standard	EIA232 or EIA485 (2 wire)

### Process Variable Input

Calibration accuracy	<±0.25% of reading ±1LSD <sup>(1)</sup>
Sample rate	4Hz(250ms)
Isolation	264Vac double insulation from the PSU and communication
Resolution (µV)	<0.5µV with 1.6sec filter
Resolution (effective bits)	>17 bits
Linearisation accuracy	< 0.1% of reading
Drift with temperature	<50ppm (typical) <100ppm (worst case)
Common mode rejection	48-62Hz, >-120db
Series mode rejection	48-62Hz, >-93dB
Input impedance	100MΩ
Cold junction compensation	>30:1 rejection of ambient change
External cold junction	Reference of 0°C
Cold junction accuracy	<±1°C at 25°C ambient
Linear(process) input range	-10 to 80mV, 0 to 10V with 100KΩ/806Ω external divider module
Thermocouple types	K, J, N, R, S, B, L, T, C, custom download <sup>(2)</sup>
Resistance Thermometer types	3-wire Pt100 DIN 43760
Bulb current	0.2mA
Lead compensation	No error for 22 ohms in all leads
Input filter	Off to 59.9s
Zero offset	User adjustable over full range
User calibration	2-point gain & offset

#### Notes

- (1) Calibration accuracy quoted over full ambient operating range and for all input linearisation types  
(2) Contact Eurotherm for details of availability of custom downloads for alternative sensors

### AA Relay

Type	Form C (changeover)
Rating	Min 100mA@12Vdc, max 2A@264Vac resistive
Functions	Control outputs, alarms, events

### Current Transformer Input

Input range	0-50mA rms, 48/62Hz. 10Ω burden resistor fitted inside module
Calibration accuracy:	<1% of reading (Typical), <4% of reading (Worst case)
Isolation	By using external CT
Input impedance	<20Ω
Measurement scaling	10, 25, 50 or 100 Amps
Functions:	Partial load failure, SSR fault

### Digital Input (DigIn A/B, B not on 3216)

Contact closure	Open >600Ω, closed <300Ω
Input current	<13mA
Isolation	None from PV or system 264Vac double insulated from PSU and communications
Functions	Includes alarm acknowledge, SP2 select, manual keylock, timer functions, standby select, RSP select

### Logic I/O Module

#### Output

Rating	ON 12Vdc@<44mA, OFF <300mV@100µA
Isolation	None from PV or system. 264Vac double insulated from PSU and communications
Functions	Control outputs, alarms, events

#### Digital Input

Contact closure	Open >500Ω, closed <150Ω
Isolation	None from PV or system 264Vac double insulated from PSU and communications
Functions	Includes alarm acknowledge, SP2 select, manual, keylock, timer functions, standby select, RSP select

### Relay Output Channels

Type	Form A (normally open)
Rating	Min 100mA@12vdc, max 2A@264Vac resistive
Functions	Control outputs, alarms, events

### Triac Output

Rating	0.75A (rms) 30 to 264V(rms) resistive load
Isolation	264Vac double insulated
Functions	Control outputs, alarms, events

### Analogue Output <sup>(3)</sup>

#### OP1, OP2

Rating	0-20mA into <500Ω
Accuracy	± (<1% of Reading + <100µA)
Resolution	11.5 bits
Isolation	None from PV or system. 264Vac double insulated from PSU and communications
Functions	Control outputs, retransmission

#### OP 3 (not on 3216)

Rating	0-20mA into <500Ω
Accuracy	±(<0.25% of Reading + <50µA)
Resolution	13.6 bits
Isolation	264Vac double insulated
Functions	Control outputs, retransmission

### Software Features

#### Control

Number of loops	1
Control types	PID, ON/OFF, VP
Cooling types	Linear, fan, oil, water
Modes	Auto, manual, standby
Overshoot inhibition	High, low

#### Alarms

Number	4
Type	Absolute high & low, deviation high, low or band
Latching	Auto or manual latching, non-latching, event only
Output assignment	Up to four conditions can be assigned to one output

#### Other Status Outputs

Functions	Including sensor break, manual mode, timer status, loop break, heater diagnostics, program event
Output assignment	Up to four conditions can be assigned to one output

#### Setpoint Programmer

Program function	1 program x 8 segments with 1 event output <sup>(4)</sup>
Start mode	Servo from PV or SP
Power fail recovery	Continue at SP or Ramp back from PV
Guaranteed soak	Inhibits dwell timing until PV within limits

#### Timer

Modes	Dwell when setpoint reached Delayed control action, Soft start limits power below PV threshold
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#### Current Monitor

Alarm types	Partial load failure, over current, SSR short circuit, SSR open circuit
Indication type	Numerical or ammeter

#### Custom Messages

Number	15 scrolling text messages
No of Characters	127 characters per message max
Languages	English, German, French, Spanish, Italian
Selection	Active on any parameter status using conditional command

#### Recipes

Number	5 recipes with 38 parameters
Selection	HMI interface, communications or digital IO

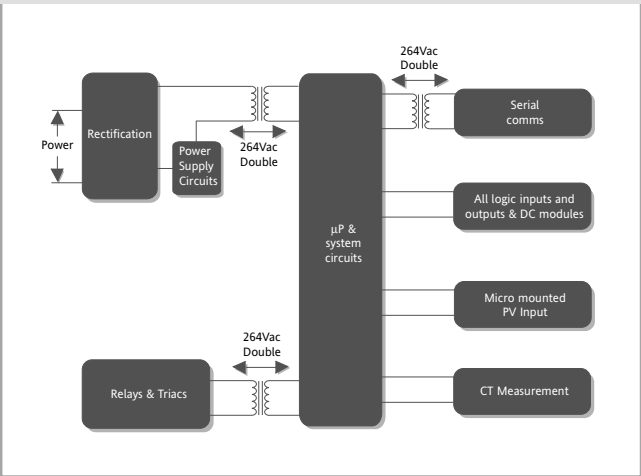
#### Notes

(3) Voltage output can be achieved by external adaptor

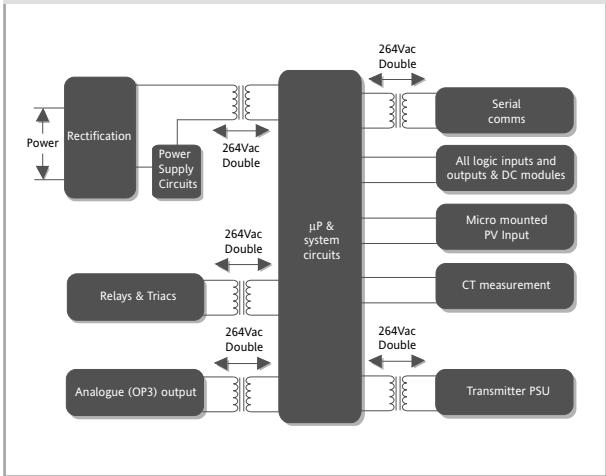
(4) By using recipes five SP programs can be stored

ISOLATION DIAGRAMS

3216

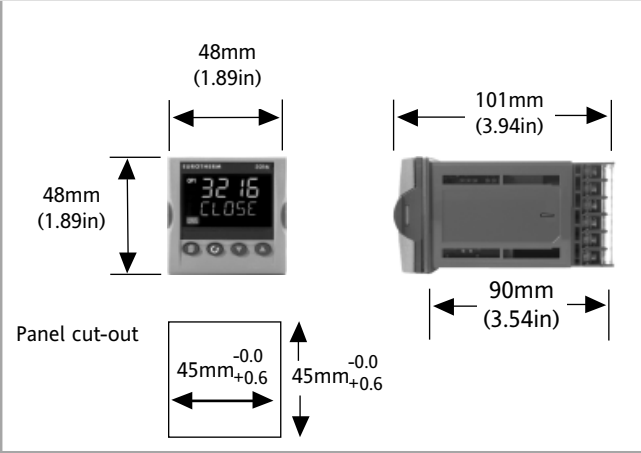


3208/h8/04

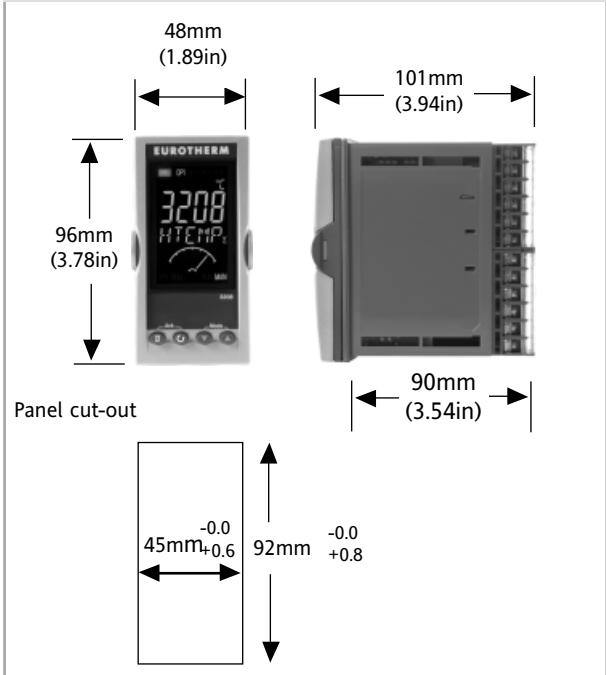


DIMENSIONAL DETAILS

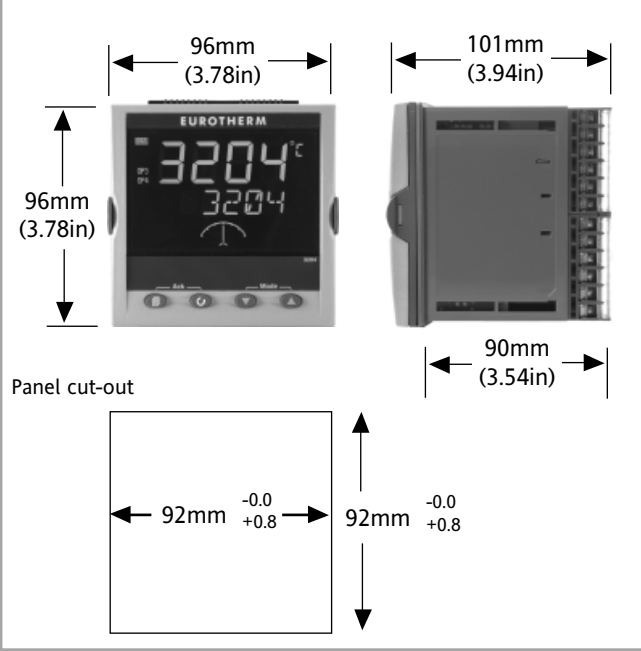
3216



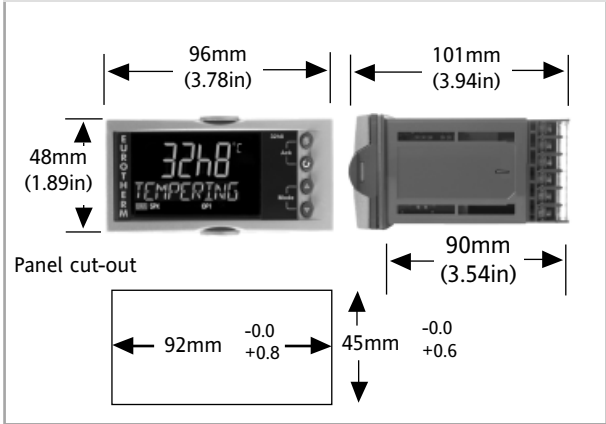
3208



3204



32h8



ORDERING CODE

Model Number	Function	Power Supply	OP1	OP2	OP3	AA Relay	Options	Fascia Colour	Product Language	Manual Language	Warranty	Calibration Certification	Custom Label	Specials & Accessories

Model Number	Power Supply	AA Relay	Fascia Colour	Warranty
3216 3208 32h8 3204	VH 85 - 264Vac VL 24Vac/dc	X Disabled R Relay (Form C)	G Green S Silver W Washdown (not 32h8/04)	XXXXX Standard WL005 5 Year
Function	3216 OP1, OP2	Options	Product Language	Calibration Certificates
CC Controller CP Programmer VC Valve VP Controller VP Valve VP Programmer	OP1 OP2 L X X X L R X X R R X X L L X X L D X X D D X X D R X X L T X X T T X X	XXX Not fitted XCL CT & Dig in A 2CL RS232, CT & Dig in A 4CL RS485, CT & Dig in A 2XL* RS232 Dig in A 4XL* RS485 Dig in A XXL* Dig in A	ENG English FRA French GER German SPA Spanish ITA Italian	XXXXXX None CERT1 Certificate of Conformity CERT2 Factory input calibration per input
		* 3216 only	Manual Language	Custom Label
			ENG English FRA French GER German SPA Spanish ITA Italian	XXXXXX None
				Specials and Accessories
				XXXXXX None RES250 250R resistor for 0-5Vdc OP RES500 500R resistor for 0-10Vdc OP

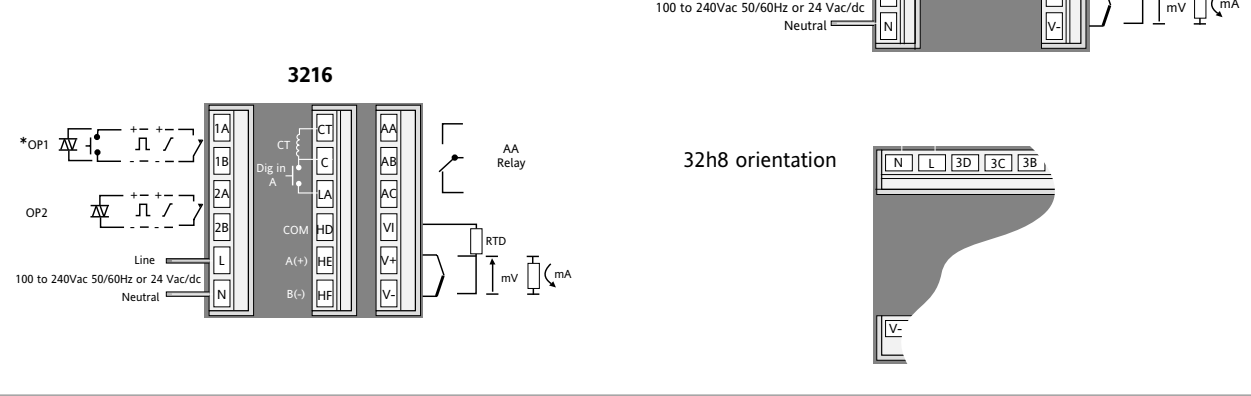
Where  
L = Logic,  
R = Relay,  
D = 0-20mA,  
T = Triac  
X = Not fitted

Example (order code)  
3216/CP/VH/LDXX/R/4CL/S/ENG/ENG/WL005/XXXXX/XXXXX/RES250  
This code describes a 3216 controller with setpoint programmer, OP1 as Logic, OP2 as 0-20mA, AA Relay, RS485 Comms, CT Input, Dig In A, English language, 5 year warranty, resistor for 0-5V output

3200 ACCESSORIES

User guide	HA028582
Engineering manual	HA027986
2.49R Precision resistor	SUB35/ACCESS/249R.1
10A Current transformer	CTR100000/000
25A Current transformer	CTR200000/000
50A Current transformer	CTR400000/000
100A Current transformer	CTR500000/000
Configuration clip	iTools/None/3000CK
0-10V input adaptor	SUB21/IV10

REAR TERMINAL CONNECTIONS



## OPTIONAL QUICK START CODE

Input Type	Setpoint Limits	OP1	OP2	AA Relay	CT Input	Dig in A	Dig in B	OP3	Lower Display
							3208/h8/ 04 only	3208/h8/ 04 only	

Input Type	Setpoint Limits	OP1, OP2, AA Relay, OP3	CT Input	Lower Display
<b>Thermocouple</b> <b>B</b> Type B <b>J</b> Type J <b>K</b> Type K <b>L</b> Type L <b>N</b> Type N <b>R</b> Type R <b>S</b> Type S <b>T</b> Type T <b>C</b> Custom/Type C <b>RTD</b> <b>P</b> Pt100 <b>Linear</b> <b>M</b> 0-80mV <b>2</b> 0-20mA <b>4</b> 4-20mA <b>X</b> Unconfigured	<b>Temperature</b> <b>C</b> Deg C full range <b>F</b> Deg F full range <b>Centigrade</b> <b>0</b> 0 to 100 °C <b>1</b> 0 to 200 °C <b>2</b> 0 to 400 °C <b>3</b> 0 to 600 °C <b>4</b> 0 to 800 °C <b>5</b> 0 to 1000 °C <b>6</b> 0 to 1200 °C <b>7</b> 0 to 1400 °C <b>8</b> 0 to 1600 °C <b>9</b> 0 to 1800 °C <b>X</b> Unconfigured <b>Fahrenheit</b> <b>G</b> 32 to 212 °F <b>H</b> 32 to 392 °F <b>J</b> 32 to 752 °F <b>K</b> 32 to 1112 °F <b>L</b> 32 to 1472 °F <b>M</b> 32 to 1832 °F <b>N</b> 32 to 2192 °F <b>P</b> 32 to 2552 °F <b>R</b> 32 to 2912 °F <b>T</b> 32 to 3272 °F	<b>X</b> Unconfigured <b>Relay, Triac or Logic outputs</b> <b>Control</b> <b>H</b> Heat (PID) <b>C</b> Cool (PID) <b>J</b> Heat (On/off) <b>K</b> Cool (On/off) <b>Alarm output</b> <b>Energised in alarm</b> <b>0</b> High alarm <b>1</b> Low alarm <b>2</b> Deviation high <b>3</b> Deviation low <b>4</b> Deviation band <b>Alarm output</b> <b>De-energised in alarm</b> <b>5</b> High alarm <b>6</b> Low alarm <b>7</b> Deviation high <b>8</b> Deviation low <b>9</b> Deviation band <b>DC outputs</b> <b>Control</b> <b>H</b> 4-20mA heating <b>C</b> 4-20mA cooling <b>J</b> 0-20mA heating <b>K</b> 0-20mA cooling <b>Retransmission</b> <b>D</b> 4-20mA setpoint <b>E</b> 4-20mA process value <b>F</b> 4-20mA output <b>N</b> 0-20mA setpoint <b>Y</b> 0-20mA process value <b>Z</b> 0-20mA output <b>Logic input</b> <b>W</b> Alarm acknowledge <b>M</b> Manual select <b>R</b> Timer/Prog Run <b>L</b> Keylock <b>P</b> Setpoint 2 select <b>T</b> Timer/prog reset <b>U</b> Remote SP select <b>V</b> Recipe 2/1 select <b>A</b> Remote up button <b>B</b> Remote down button <b>G</b> Time/prog run/reset <b>I</b> Timer/prog hold <b>Q</b> Standby select	<b>X</b> Unconfigured <b>1</b> 10 Amps <b>2</b> 25 Amps <b>5</b> 50 Amps <b>6</b> 100 Amps <b>Dig in A, Dig in B, OP1</b> <b>X</b> Unconfigured <b>W</b> Alarm acknowledge <b>M</b> Manual select <b>R</b> Timer/Prog Run <b>L</b> Keylock <b>P</b> Setpoint 2 select <b>T</b> Timer/prog reset <b>U</b> Remote SP select <b>V</b> Recipe 2/1 select <b>A</b> Remote up button <b>B</b> Remote down button <b>G</b> Time/prog run/reset <b>I</b> Timer/prog hold <b>Q</b> Standby select	<b>T</b> Working setpoint <b>S</b> Target setpoint <b>P</b> Output demand <b>R</b> Time to run <b>E</b> Elapsed time <b>1</b> Alarm setpoint <b>A</b> Load amps <b>D</b> Dwell/ramp - time/target <b>N</b> None

**Example (Quick Start)**  
**K/6/H/E/5/5/P/X/X/T**

This code will provide a controller configured as 0-1200 °C, Type K, Heat Output, 4-20mA PV retrans, High Alarm, 50A CT measurement, SP select via Dig In A, Lower display showing working setpoint

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