Instrumentation Systems & Services Ltd

invensys Eurotherm

3200 SERIES

Temperature/ Process Controllers

Specification Sheet

- 8 Segment programmer
- Heater failure detection
- Current monitoring
- Internal timer
- Scrolling text messages
- Recipes
- Modbus comms
- Modbus SP retransmission
- Analogue retransmission
- Remote setpoint
- Help text
- Type approved to EN14597 TR
- Multi-language support (French, German, Spanish and Italian)

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 iTools, 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 iTools 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.

Remote setpoint
An option exists for the 3200 to have a Remote Analogue Input. This can be either volts or mA and is used to allow the setpoint to be generated by a master controller or PLC.

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

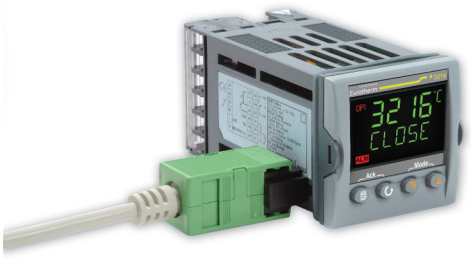
Timer
An internal timer is configurable as an interval timer, delay timer or to provide a soft start for hot runner control.

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 communications. Master Modbus in the 3200 allows a broadcast of a single parameter to the network.

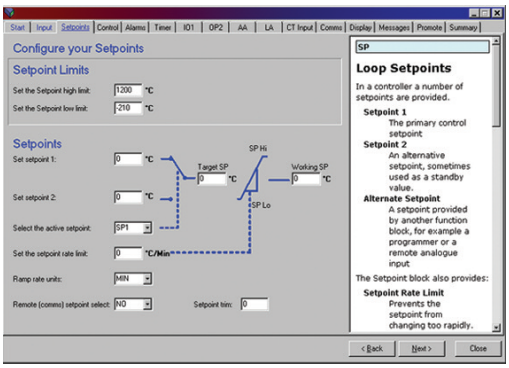
A typical application is a setpoint being retransmitted to a number of slave controllers in a multi-zone furnace.

Modbus communications
All units support both EIA232 and 2-wire EIA485 communications using the Modbus protocol. The 3216 supports 4-wire EIA485.

Configuration adaptor
iTools 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 the need for 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.



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

Electrical safety

(BS EN61010):	Installation cat. II; Pollution degree 2

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.

EN14597 TR APPROVAL
Registration Number TR1229.

Physical

Dimensions:	3216:	48W X 48H X 90Dmm	
	3208:	48W X 96H X 90Dmm	
	3204:	96W X 96H X 90Dmm	
	32h8:	96W X 48H X 90Dmm	
Weight:	3216:	250g	
	3208:	350g	
	3204:	420g	
	32h8:	350g	
Panel:		Mounting	Cut-out dimensions
	3216:	1/16 DIN	45W x 45Hmm
	3208:	1/8 DIN	45W x 92Hmm
	3204:	1/4 DIN	92W x 92Hmm
	32h8:	1/8 DIN, horizontal	92W x 45Hmm
Panel depth:	All:	101mm	

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 240V ac, –15%, +10%, 48 to 62 Hz, max 6W 24V ac, –15%, +10%. 24V dc, –15% +20% ±5% ripple voltage max 6W
3208, 32h8, 3204:	100 to 240Vac, –15%, +10%, 48 to 62 Hz, max 8W 24V ac, –15%, +10%. 24V dc, –15% +20% ±5% ripple voltage max 8W

Approvals

CE, cUL listed (file E57766), Gost, DIN 3440 (3216 only)
Suitable for use in Nadcap and AMS2750D applications under Systems Accuracy Test calibration conditions

Transmitter PSU (not 3216)

Rating:	24V dc, >28mA, <33mA
Isolation:	264V ac double insulated

Communications

Serial communications option

Protocol:	Modbus RTU slave Modbus RTU Master broadcast (1 parameter)
Isolation:	264V ac, double insulated
Transmission standard:	EIA232 or EIA485 (2-wire) EIA485 (4-wire) on 3216 only

Process variable input

Calibration accuracy:	<±0.25% of reading ±1LSD (Note 1)
Sample rate:	4Hz (250ms)
Isolation:	264V ac double insulation from the PSU and communication

Resolution (µV):	<0.5µV with 1.6 sec 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 (Note 2)
Resistance thermometer types:	3-wire Pt100 DIN 43760
Bulb current:	0.2mA
Lead compensation:	No error for 22Ω in all leads
Input filter:	Off to 59.9s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset

AA relay

Type:	Form C (changeover)
Rating:	Min 100mA@12V dc, max 2A@264V ac 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 264V ac 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 12V dc@<44mA, OFF <300mV@100µA
Isolation:	None from PV or system. 264V ac 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 264V ac 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@12V dc, max 2A@264V ac resistive
Functions:	Control outputs, alarms, events

Triac output

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

Analogue output (Note 3)

OP1, OP2

Rating:	0-20mA into <500Ω
Accuracy:	± (<1% of Reading + <100µA)
Resolution:	13.5 bits
Isolation:	264V ac double insulated from PSU and communications Module code C provides full 264V ac double isolated
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:	264V ac double insulated
Functions:	Control outputs, retransmission

Remote setpoint input

Calibration accuracy:	<±0.25% or reading ±1LSD
Sample rate:	4Hz (250ms)
Isolation:	264V ac double insulation from instrument
Resolution:	<0.5mV (for 0-10V) or <2µA (for 4-20mA)
Resolution (effective bits):	>14bits
Drift with temperature:	<50ppm (typical) <150ppm (worst case)
Common mode refection:	48-62Hz, >-120dB
Series mode rejection:	48-62Hz, >-90dB
Input impedance: Voltage:	223KΩ and Current: 2R49
Normal input range:	0 to 10V and 4 to 20mA
Max input range:	-1V to 11V and 3.36mA to 20.96mA

Software features

Control

Number of loops:	1
Loop update:	250ms
Control types:	PID, ON/OFF, VP
Cooling types:	Linear, fan, oil, water
Modes:	Auto, manual, standby, forced manual
Overshoot inhibition:	High, low

Alarms

Number:	4
Type:	Absolute high & low, deviation high, low or band, rate of change
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 (Note 4)
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

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

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.
3. Voltage putput can be achived by external adator.
4. By using recipes five SP programs can be stored.

Order codes

Hardware/options coding

1	2	3	4	5	6	7	8	9	10	11	12

Basic Product

3216	48 x 48mm unit
3208	48 x 96mm unit
32h8	96 x 48mm horizontal unit
3204	96 x 96mm unit

1 Function

CC	Standard controller
CP	Standard programmer
VC	Motorised valve controller
VP	Motorised valve programmer

2 Supply Voltage

VH	85-264V ac
VL	24V ac or dc

3 Outputs

3216

	OP1	OP2
XXXX	None fitted	None fitted
LXXX	Logic	None fitted
LRXX	Logic	Relay
RRXX	Relay	Relay
LLXX	Logic	Logic
LDXX	Logic	0-20mA
DRXX	0-20mA	Relay
RCXX	Relay	Isolated 0-20mA
LCXX	Logic	Isolated 0-20mA
DCXX	0-20mA	Isolated 0-20mA
Not available with Low Voltage PSU		
DDXX	0-20mA	0-20mA
LTXX	Logic	Triac
TTXX	Triac	Triac

3208/32h8/3204

	OP1	OP2	OP3
LRRX	Logic	Relay	Relay
RRRX	Relay	Relay	Relay
LRDX	Logic	Relay	0-20mA
RRDX	Relay	Relay	0-20mA
LLDX	Logic	Logic	0-20mA
LDDX	Logic	0-20mA	0-20mA
RDRX	Relay	0-20mA	Relay
DRDX	0-20mA	Relay	0-20mA
Not available with Low Voltage PSU			
LLRX	Logic	Logic	Relay
DDDX	0-20mA	0-20mA	0-20mA
LTRX	Logic	Triac	Relay
TTRX	Triac	Triac	Relay
LTDX	Logic	Triac	0-20mA
TDDX	Triac	0-20mA	0-20mA
TTDX	Triac	Triac	0-20mA

4 AA Relay (OP4)

X	Not fitted
R	Relay
A	Dual relay (From A-OP3 and OP4)

5 Options Board

XXX	None fitted
XXL	Logic input
XCL	CT + Logic IP
2XL	RS232 Comms + Logic IP
4XL	2-wire RS232 comms + Logic IP
2CL	RS232 Comms CT + Logic IP
4CL	2-wire RS232 Comms CT + Logic IP

6 Fascia Colour

G	Green
S	Silver
W	Washdown (not 32h8/04)

7 Product Language

ENG	English
FRA	French
GER	German
SPA	Spanish
ITA	Italian

8 Manual Language

ENG	English
FRA	French
GER	German
SPA	Spanish
ITA	Italian

9 Warranty

XXXXX	Standard
WL005	Extended

10 Certificates

XXXXX	None
CERT1	Certificate of Conformity
CERT2	Factory Calibration Certificate

11 Custom Label

XXXXX	None

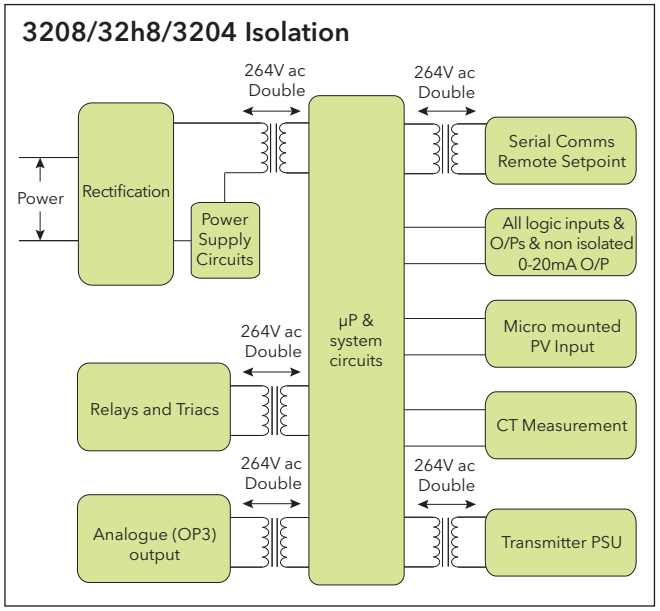
12 Specials and Accessories

XXXXX	None
RES250	250R resistor for 0-5V dc OP
RES500	500R resistor for 0-10V dc OP

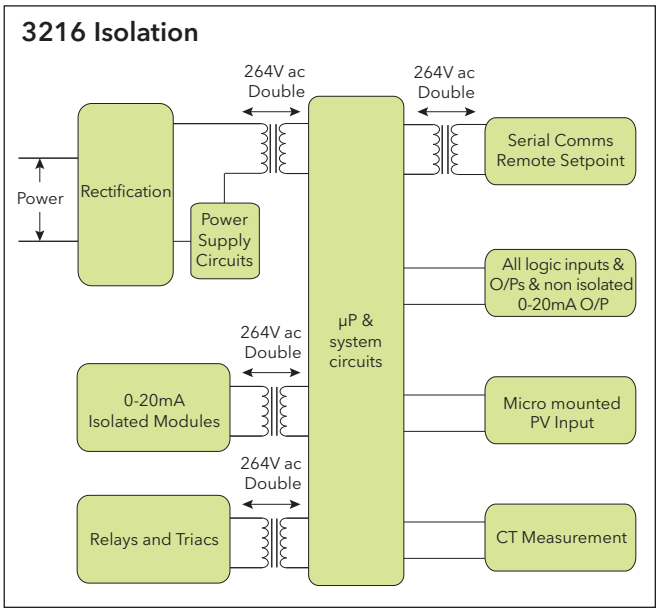
3200 Accessories

HA029714	Installation guide
HA027986	Engineering manual
SUB35/ACCESS/249R.1	2.49R Precision resistor
CTR100000/000	10A Current transformer
CTR200000/000	25A Current transformer
CTR400000/000	50A Current transformer
CTR500000/000	100A Current transformer
iTools/None/3000CK	Configuration clip
SUB21/IV10	0-10V input adaptor

3208/32h8/3204 Isolation



3216 Isolation



Optional quick start code (Optional)

1	2	3	4	5	6	7	8	9	10
							3208/h8 /04 only	3208/h8 /04 only	

1 Input Type

Thermocouple	
B	Type B
J	Type J
K	Type K
L	Type L
N	Type N
R	Type R
S	Type S
T	Type T
C	Custom/Type C
RTD	
P	Pt100
Linear	
M	0-80mV
2	0-20mA
4	4-20mA
X	Unconfigured

2 Setpoint Limits

Full PV Range	
C	Deg C full range
F	Deg F full range
Centigrade	
0	0 to 100 deg C
1	0 to 200 deg C
2	0 to 400 deg C
3	0 to 600 deg C
4	0 to 800 deg C
5	0 to 1000 deg C
6	0 to 1200 deg C
7	0 to 1400 deg C
8	0 to 1600 deg C
9	0 to 1800 deg C
Fahrenheit	
G	32 to 212 deg F
H	32 to 392 deg F
J	32 to 752 deg F
K	32 to 1112 deg F
L	32 to 1472 deg F
M	32 to 1832 deg F
N	32 to 2192 deg F
P	32 to 2552 deg F
R	32 to 2912 deg F
T	32 to 3272 deg F
X	Unconfigured

3 Output 1 (OP1)

XX	Unconfigured
Relay, DC, Triac or Logic outputs	
Control	
H	Heat (PID)
C	Cool (PID)
J	Heat (On/off)
K	Cool (On/off)
Alarm output Energised in alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm output De-energised in alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
DC outputs	
Control	
H	4-20mA heating
C	4-20mA cooling
J	0-20mA heating
K	0-20mA cooling
Retransmission	
D	4-20mA setpoint
E	4-20mA Process value
F	4-20mA output
N	0-20mA setpoint
Y	0-20mA Process value
Z	0-20mA output
Logic input	
W	Alarm acknowledge
M	Manual select
R	Timer/Prog Run
L	Keylock
P	Setpoint 2 select
T	Timer/prog Reset
U	Remote SP select
V	Recipe 2/1 select
A	Remote up button
B	Remote down button
G	Time/prog Run/reset
I	Timer/prog Hold
Q	Standby select

4 Output 2 (OP2)

XX	Unconfigured
Relay, DC, Triac or Logic outputs	
Control	
H	Heat (PID)
C	Cool (PID)
J	Heat (On/off)
K	Cool (On/off)
Alarm output Energised in alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm output De-energised in alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
DC outputs	
Control	
H	4-20mA heating
C	4-20mA cooling
J	0-20mA heating
K	0-20mA cooling
Retransmission	
D	4-20mA setpoint
E	4-20mA Process value
F	4-20mA output
N	0-20mA setpoint
Y	0-20mA Process value
Z	0-20mA output

5 AA Relay (OP4)

XX	Unconfigured
Relay, Triac or Logic outputs	
Control	
H	Heat (PID)
C	Cool (PID)
J	Heat (On/off)
K	Cool (On/off)
Alarm output Energised in alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm output De-energised in alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band

6 CT Input Scaling

XX	Not fitted
1	10 Amps
2	25 Amps
5	50 Amps
6	100 Amps

7 - 8 Dig Input A, Dig Input B

X	Unconfigured
W	Alarm acknowledge
M	Manual select
R	Timer/Prog Run
L	Keylock
P	Setpoint 2 select
T	Timer/prog Reset
U	Remote SP select
V	Recipe 2/1 select
A	Remote up button
B	Remote down button
G	Time/prog Run/reset
I	Timer/prog Hold
Q	Standby select

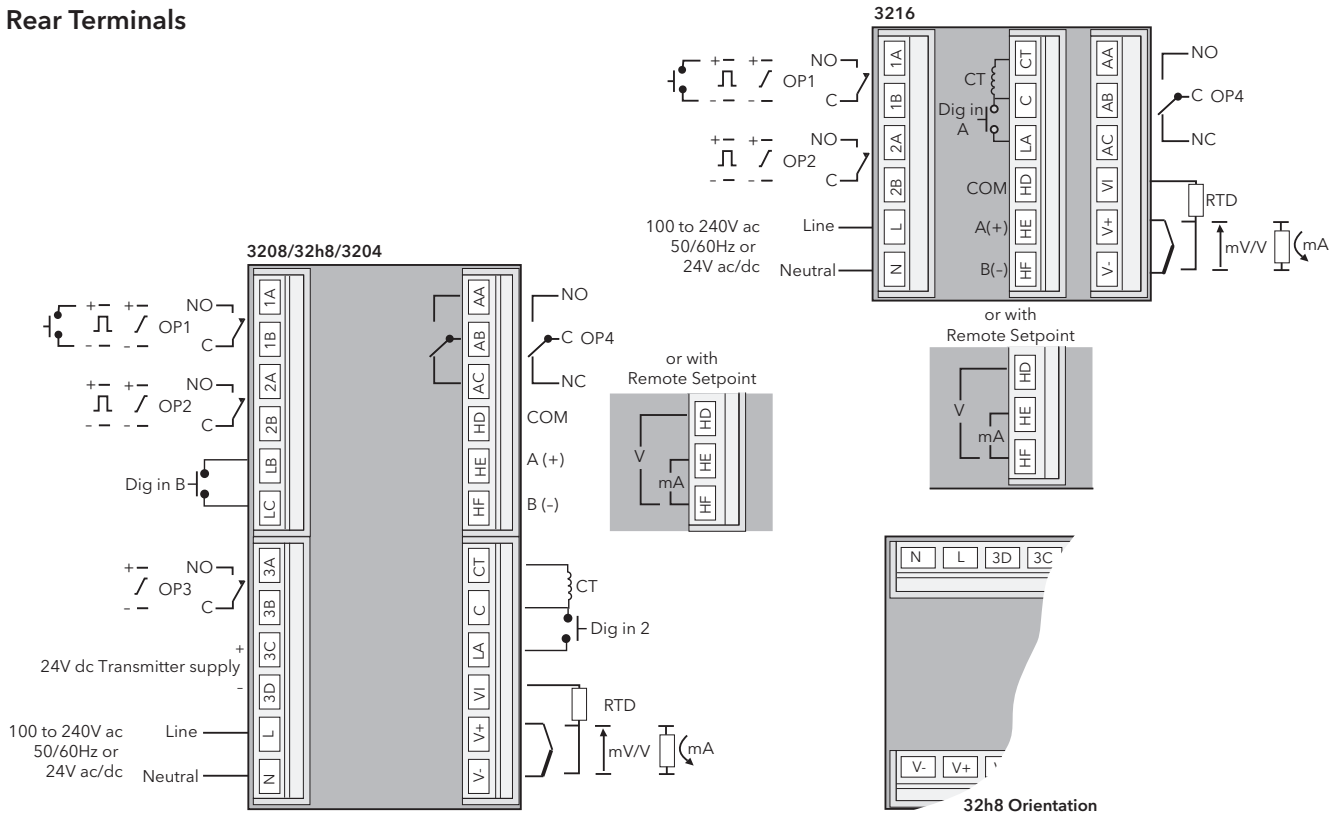
9 Output 3 (OP3)

XX	Unconfigured
Relay, DC or Logic outputs	
Control	
H	Heat (PID)
C	Cool (PID)
J	Heat (On/off)
K	Cool (On/off)
Alarm output Energised in alarm	
0	High alarm
1	Low alarm
2	Deviation high
3	Deviation low
4	Deviation band
Alarm output De-energised in alarm	
5	High alarm
6	Low alarm
7	Deviation high
8	Deviation low
9	Deviation band
DC outputs	
Control	
H	4-20mA heating
C	4-20mA cooling
J	0-20mA heating
K	0-20mA cooling
Retransmission	
D	4-20mA setpoint
E	4-20mA Process value
F	4-20mA output
N	0-20mA setpoint
Y	0-20mA Process value
Z	0-20mA output

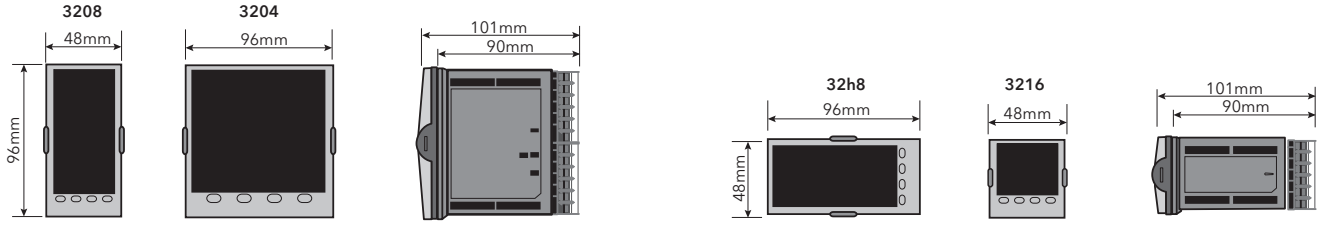
10 Lower Display

X	Unconfigured
T	Setpoint
S	Target setpoint
P	Output power %
R	Time remaining
E	Elapsed time
1	1st alarm setpoint
D	Dwell/ramp - Time/target
C	SP with output meter
M	SP with ammeter
A	Load amps
N	None

Rear Terminals



Mechanical Details



3208 Panel cut-out 92mm (-0.0 +0.8) x 45mm (-0.0 +0.6)
3204 Panel cut-out 92mm (-0.0 +0.8) x 92mm (-0.0 +0.8)

3216 Panel cut-out 45mm (-0.0 +0.6) x 45mm (-0.0 +0.6)
32h8 Panel cut-out 45mm (-0.0 +0.6) x 92mm (-0.0 +0.8)