Eurotherm®
by Watlow

3200i Series

Indicators and Alarm Units

Specification Sheet

The Eurotherm range of 3200i indicators offer accurate indication of temperature and process measurements. Process interlocks, including overtemperature furnace limits, are implemented using relay output channels.

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

Universal input

A wide range of temperature and process inputs can be selected using the front panel push buttons without the need for any hardware change. This provides easy on-site set up.

Strain gauge input

Melt pressure and weigh scale inputs can be energised from an internal 10Vdc transducer supply. An automatic shunt calibration routine is provided to remove zero and span offsets. The display on the 32h8i can show a full 5 digit value.

Process alarms

Four internal alarm setpoints are provided. They can be used to energise up to three relay outputs, which can be latched if required.

A special mode, known as 'Alarm Blocking', is available which ensures that when the unit is powered up an alarm must first enter a good state before the alarm becomes active. This is particularly useful for low alarms which can be blocked while the process is warming up.

- Universal input
- Strain gauge input
- Changeover relay
- PV Retransmission
- FM/EN14597 TW Approval
- Scrolling text messages
- Parameter help text
- Recipes
- Modbus comms
- Multi-language support (French, German, Spanish and Italian)



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Custom text messaging

Custom messages can be created with iTools and downloaded to the 3200i to display when an event, alarm or process condition occurs. This provides the operator with good visibility of what is happening in the process and provides messages that they can understand and act upon.

Recipes iTools recipes can be created that can be used to change the operating parameters of the 3200i simply by selecting a recipe using the 3200i push buttons. This is very useful where multiple products are processed but require different parameters to be set. It can also be used to change the set-up of a indicator therefore allowing one unit to be used as a spare for multiple applications.

Analogue retransmission

The measured process value can be retransmitted as either a mA or voltage signal with a selection of outputs including 4-20mA and 0-10V dc. In the 32h8i this signal is isolated from all other electronics within the unit.

Digital communication

All units support both EIA232 and EIA485 communication using the Modbus protocol as a slave device. It is also possible to digitally retransmit one parameter using a Modbus broadcast to all other Modbus devices on the network.

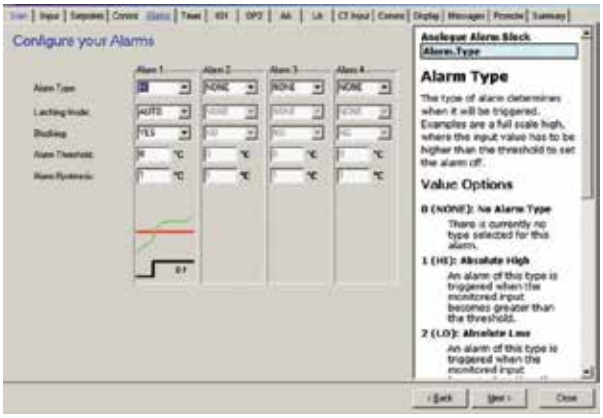
Configuration adaptor

PC configuration to all 3200i indicators 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 3200i series indicators, 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 rate 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

Dimensions	3216i:	48W x 48H x 90D mm	
	3204i:	96W x 96H x 90D mm	
	32h8i:	96W x 48H x 90D mm	
Weight	3216i:	250g	
	3204i:	420g	
	32h8i:	350g	
Panel		Mounting	Cut out dimensions
	3216i:	1/16 DIN	45W x 45H mm
	3204i:	1/4 DIN	92W x 92H mm
	32h8i:	1/8 DIN, horizontal	92W x 45H mm

Operator interface

Type		LCD TN with backlight
Main PV display	3216i, 3204i:	4 digits, green
	32h8i:	5 digits, green or red
Lower display	3216i, 3204i:	5 character starburst, green
	32h8i:	9 character starburst, green
Status beacons:		Units, outputs, alarms

Power requirements

3216i:	100 to 230Vac, ±15%, 48 to 62 Hz, max 6W 24Vac, -15%, +10%. 24Vdc -15% +20% ±5% ripple voltage max 8W
32h8i, 3204i:	100 to 230Vac, ±15% 48 to 62 Hz, max 8W 24Vac, -15%, +10%. 24Vdc -15% +20% ±5% ripple voltage max 8W

Approvals

CE, cUL listed (file E57766), EAC, FM, EN14597 TW approval number TW1222

Transmitter PSU (not 3216i)

Rating:	24V dc, 20mA
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)

Process variable input

Calibration accuracy:	<±0.25% of reading ±1LSD (Note 1)
Sample rate:	10Hz(100ms)
Isolation:	264V ac double insulation from the PSU and communication
Resolution (µV):	<0.5µV with 1.6s filter (mV range)
	<0.25mV with 1.6s filter (Volts range)
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 (200KΩ on volts range C)
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 requires 100KΩ/ 806Ω external divider module (not 32h8i)
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 22 ohms in all leads
Input filter:	Off to 100s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset

Strain gauge input (32h8i)

Input type:	350Ω Bridge
Connection:	4 or 6 wire (6 uses internal shunt)
Calibration accuracy:	+0.1% of full scale
Sample time:	10Hz (100ms)
Isolation:	264V ac double isolation from the PSU and communications
Excitation:	10Vdc +7%
Sensitivity:	1.4 to 4mV/V
Input span:	–27% to +127% of full scale (approx. –10mV to +5mV)
Zero balance:	+ 25% of full scale
Tare:	+ 25% of full scale
Resolution (mV):	0.3mV/V(typical) with 1.6s filter
Resolution (effective bits):	14.3 bits
Drift with temperature:	<100ppm/°C of full scale
Common mode rejection:	48-62Hz, >-120db
Series mode rejection:	48-62Hz, >-60db
Input filter:	Off to 100s

AA relay

Type:	Form C (changeover)
Rating:	Min 100mA@12V dc, max 2A@264V ac resistive
Functions:	Alarms, events

Digital input A/B

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, keylock, alarm inhibit, freeze display, tare, auto zero, peak reset

Digital input A/B

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, keylock, alarm inhibit, freeze display, tare, auto zero, peak reset

Logic I/O module (3216i only)

Output

Rating:	ON 12Vcdc@<44mA, OFF <300mV@100µA
Isolation:	None from PV or system 264V ac double insulated from PSU and communications
Functions:	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, keylock, alarm inhibit, freeze display, tare, auto zero, peak reset

Relay output channels

Type:	3216i	Form A (normally open)
	32h8i, 3204i:	Form C (changeover)
Rating:		Min 100mA@12V dc, max 2A@264V ac resistive
Functions:		Alarms, events

Analogue output

OP1, OP2 (3216i only)

Rating:	0-20mA into <500Ω
Accuracy:	± (<0.5% of Reading + <100µA)
Resolution:	11.5 bits
Isolation:	None from PV or system 264V ac double insulated from PSU and communications
Functions:	Retransmission

OP 3 (not on 3216i)

Isolation:	264V ac double insulated
Functions:	Retransmission

Current Output

Rating:	0-20mA into <500Ω
Accuracy:	±(<0.25% of Reading + <50µA)
Resolution:	13.6 bits

Voltage Output (not on 3204i)

Rating:	0-10V into >500Ω
Accuracy:	±(<0.25% of Reading +<25mV)
Resolution:	13.6 bits

Software features

Alarms

Number:	4
Type:	Absolute high & low, Rate of change (rising or falling)
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, power fail, new alarm, pre-alarm
Output assignment:	Up to four conditions can be assigned to one output

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 19 parameters
Selection:	HMI interface, communications or digital IO

Transducer calibration

Calibration types:	Shunt, load cell, comparison
Other features:	Auto-zero, tare

Other features:

Display colour (32h8i):	Upper display selectable green or red or change on alarm
Scrolling text:	Parameter help, custom messages
Display filter:	Off to zero last 2 digits
Peak monitor:	Stores high and low values

FM/EN14597 TW

Alarm 1 configuration:	Absolute hi or lo, de-energised in alarm Latching output on Form C (AA) Relay All alarms active on sensor break and power fail
Alarm setpoint:	Adjustment protection via password
Configuration security:	FM/EN14597 TW option prevents reconfiguration of alarm config

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.

Order Codes

Hardware/options coding

	1	2	3	4	5	6	7	9	9	10	11	12	13

Basic Product	
3216i	48 x 48mm unit
32h8i	96 x 48mm horizontal unit
3204i	96 x 96mm unit

1	Function
AL	Standard alarm unit
FM	FM alarm unit
DN	EN14597TW alarm unit
SG	32h8i Strain Gauge input

2	Supply Voltage
VH	85-264V ac
VL	24V ac or dc

3	Outputs		
3216i			
	OP1	**OP2**	
LRXX	Logic	Relay	
RRXX	Relay	Relay	
LDXX	Logic	0-20mA	
DDXX	0-20mA	0-20mA	
DRXX	Analogue	Relay	
RXXX	Relay	None	
32h8i/3204i			
	OP1	**OP2**	**OP3**
RXXX	Relay		
RXDX	Relay		Isolated 0-20mA

4	AA Relay (OP4)
X	Disabled
R	Changeover Relay

5	Options Board
3216i	
XXX	None
XXL	Digital input A
2XL	RS232 and Digital input A
4XL	RS2485 and Digital input A
32h8i/3204i	
XXX	None
XXL	Digital input A
2XL	RS232 and Digital input A
4XL	RS2485 and Digital input A
32h8i/SG Options	
XXX	None
2XX	RS232
4XX	RS2485

6	Fascia Colour)
G	Green
S	Silver

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	Input Adaptor
XX	None
V1	0-10V dc
A1	mA burden resistor (2.49R, 0.1%)

10	Warranty
XXXXX	Standard
WL005	Extended

11	Certificates
XXXXX	None
CERT1	Certificate of Conformity
CERT2	Factory Calibration Certificate

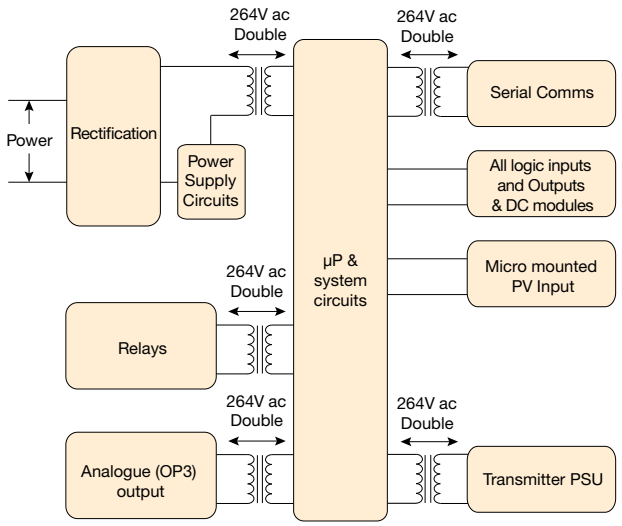
12	Custom Label
XXXXX	None

13	Specials and Accessories
XXXXXX	None
RES250	250R resistor for 0-5V dc OP
RES500	500R resistor for 0-10V dc OP

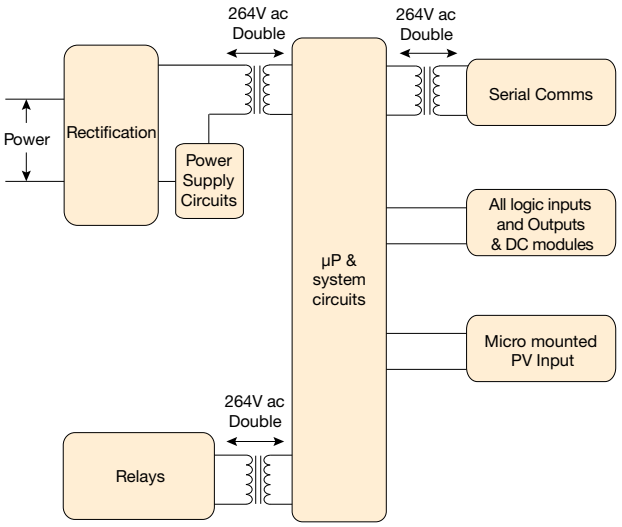
3200i Accessories

HA029005	User guide
HA027986	Engineering manual
SUB35/ACCESS/249R.1	2.49R Precision resistor
iTools/None/3000CK	Configuration clip
SUB21/IV10	0-10V input adaptor
SUB32/SNUBBER	RC Snubber

32h8i/3204i Isolation



3216i Isolation



Optional quick start code (Optional)

1	2	3	4	5	6	7	9	9	10	11	12
			32h8i 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	0-80-mV
2	0-20mA
4	4-20mA
32h8i only	
Linear	
0	0-10V dc
1	1-5V dc
3	2-10V
6	0-5V
Strain Gauge	
G	Strain gauge

2	Display Unites
X	None
C	Centigrade
F	Fahrenheit
K	Kelvin
P	Percentage
32h8i only	
Pressure	
0	Pa
1	mPa
2	Kpa
3	Bar
4	mBar
5	PSI
6	Kg/cm$_2$
7	mmWG
8	inWG
9	mmHG
A	Torr
Flow Rate	
B	L-H
D	L-m
General	
E	%RH
G	%O2
H	%CO2
J	%CP
L	V
M	Amps
R	mA
T	MV
U	Ohm
W	ppm
Y	RPM
Z	m-s

3	Decimal Point
0	nnnnn
1	nnnn.n
2	nnn.nn
3	nn.nnn
4	n.nnnn

4	PV Colour (32h8i only)
X	Not applicable
G	Green
R	Red
C	Change on any alarm. Green to Red

5	Home Display
N	PV only
A	First Alarm SP only
1	PV + Alarm SP
2	PV + Alarm SP (read only)

6	Range Low
Enter Value (Limited by decimal point position)	

7	Range High
Enter Value (Limited by decimal point position)	

8	OP1
X	Unconfigured
Relay, Triac or Logic outputs	
Alarm 1	
H	High Alarm
L	Low Alarm
R	Rising Rate of Change
N	New Alarm
O	Sensor Break
P	Power Fail
Combined with Sensor Break	
7	High Alarm
8	Low Alarm
9	Rising Rate of Change
Combined with Power Fail	
A	High Alarm
B	Low Alarm
C	Rising Rate of Change
Combined with Sensor Break and Power Fail	
E	High Alarm
F	Low Alarm
G	Rising Rate of Change
Digital input (3216i only)	
Logic input	
W	Alarm Acknowledge
K	Keylock
U	Remote UP Button
D	Remote DOWN button
J	Alarm Inhibit
M	Peak Reset
Y	Freeze Displayed PV
V	Recipe 1/2 Select

9	OP2 (3216i)/ OP3 (32h8i, 3204i)
X	Unconfigured
Analogue outputs	
PV Retransmission	
1	4-20mA
2	0-20mA
3	0-5V dc
4	1-5V dc
5	0-10V dc
6	2-10V dc
Relay or Logic output	
Alarm 2 (3216i only)	
H	High Alarm
L	Low Alarm
R	Rising Rate of Change
N	New Alarm
O	Sensor Break
P	Power Fail
Combined with Sensor Break	
7	High Alarm
8	Low Alarm
9	Rising Rate of Change
Combined with Power Fail	
A	High Alarm
B	Low Alarm
C	Rising Rate of Change
Combined with Sensor Break and Power Fail	
E	High Alarm
F	Low Alarm
G	Rising Rate of Change

10	OP4 (AA Relay)
X	Unconfigured
Alarm 4	
PV Retransmission	
H	High Alarm
L	Low Alarm
R	Rising Rate of Change
N	New Alarm
O	Sensor Break
P	Power Fail
Combined with Sensor Break	
7	High Alarm
8	Low Alarm
9	Rising Rate of Chang
Combined with Power Fail	
A	High Alarm
B	Low Alarm
C	Rising Rate of Change
Combined with Sensor Break and Power Fail	
E	High Alarm
F	Low Alarm
G	Rising Rate of Change

11	Digital Input A
X	Unconfigured
W	Alarm Acknowledge
K	Keylock
U	Remote UP Button
D	Remote DOWN button
J	Alarm Inhibit
M	Peak Reset
Y	Freeze Displayed PV
V	Recipe 1/2 Select

12	Digital Input B
X	Unconfigured
W	Alarm Acknowledge
K	Keylock
U	Remote UP Button
D	Remote DOWN button
J	Alarm Inhibit
M	Peak Reset
Y	Freeze Displayed PV
V	Recipe 1/2 Select
32h8i Strain Gauge	
T	Tare correction
Z	Auto shunt (melt pressure) Calibration

Notes

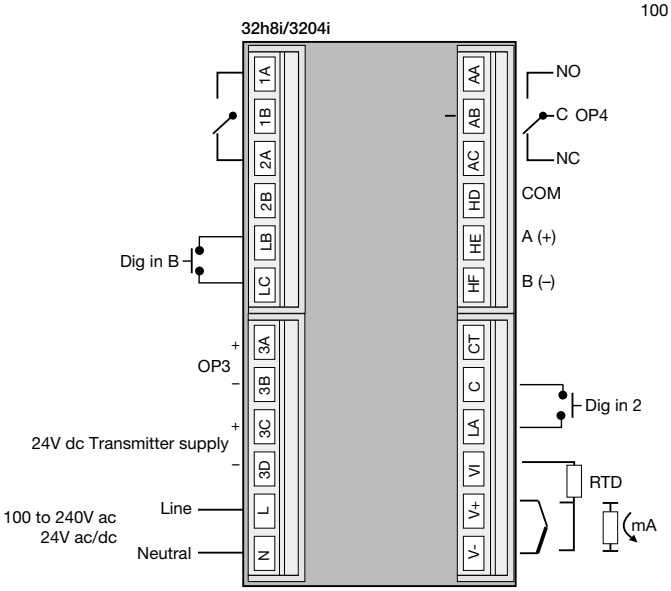
1. Range low and range high values must be entered. These two values will scale the range of linear inputs and the low and high setpoint limits for all input types. By default all alarm outputs will be latched, energised in alarm manual resetting. This gives conformation to EN14597TW and FM.
2. Digital input B is always fitted in the 32h8i and 3204i. It is not available in 3216i.

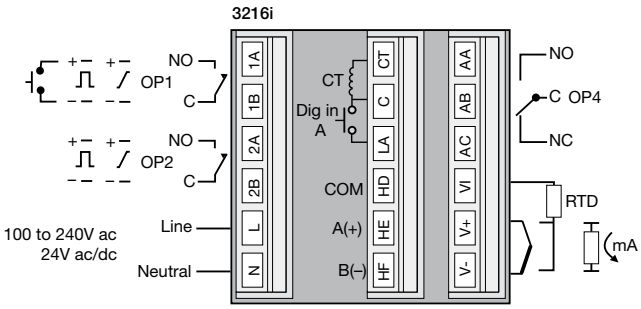


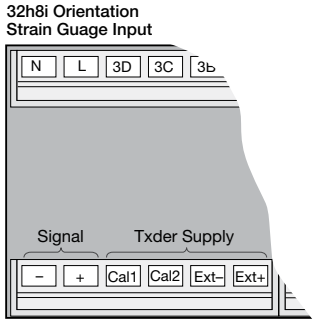




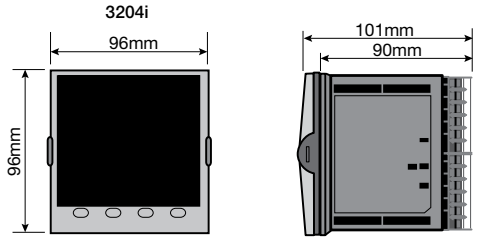
Rear Terminals



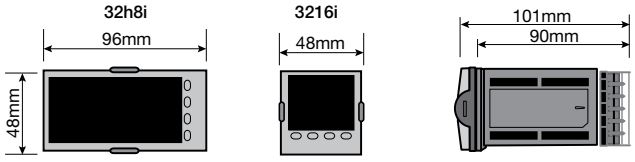




Mechanical Details



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)

Contact your local sales representative

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