Instrumentation Systems & Services Ltd

invensys Eurotherm

3504 3508

MODELS

Dual Loop Controller/Programmer

Specification Sheet

- 2 PID loops
- 50 Programs
- Precision PV input
- Carbon potential
- Maths/logic/timers
- Custom user interface
- Recipes
- Digital communications
  - Modbus RTU Master and Slave
  - Ethernet Modbus TCP
  - Profibus DP network
  - DeviceNet® network
- OEM Security
- Multi-language support (French, German, Spanish and Italian)

The latest range of advanced process controllers from Eurotherm provide precision control of temperature and a host of other process variables together with an abundance of advanced options making it the most adaptable product in its class.

The emphasis is on flexibility yet the 3500 controllers still maintain ease of use. A simple 'Quick Start' process is used to configure all the basic functions essential to controlling your process. This includes input sensor type, measurement range, control options and alarms making 'Out the Box' operation truly achievable. More advanced features are configured using a PC based graphical configuration tool enabling users to pick function blocks from a library then connect them together using soft wiring.

The large 5-digit display provides a clear and unambiguous indication of the process value. A four-line message centre provides custom or standard views of important information to the user while vertical and horizontal bargraphs provide at a glance visual indication of the process.

OEM Security enables a user to protect their intellectual property by preventing unauthorised cloning of theconfiguration.

Dual loop
Two independent PID loops make the 3500 ideal for interactive processes such as those found in carburising furnaces, environmental chambers and autoclaves. The loops may also be 'soft' wired together in creative ways to create cascade, ratio or other intelligent control strategies.

Setpoint programmer
Heat treatment and other processes often require the ability to change setpoints with time. The dual loop 3500 has two programmers which can be configured as synchronised or independent programs. 50 programs with up to two channels can be stored with a total of 500 segments.

Input/output flexibility
A range of plug-in I/O modules caters for individual application requirements minimising stock and spares holding. A total of sixteen module types, including relay, logic, triac and analogue, are available to fit into either three slots on 3508 or six slots on 3504.

Carbon potential
The 3500 calculates carbon potential from measuring both the oxygen concentration and temperature of a furnace using a zirconia probe. This enables a dual loop 3500 to be used to control both carbon potential and temperature in an atmosphere controlled furnace.

Customised solutions
The 3500 is more than just a process controller. It also provides a selection of application blocks including maths, logic and timing functions offering the ability to develop custom solutions and create cost effective machine controllers. The custom User Page feature allows an operator to view current information in a style most suitable to the process and terminology of the industry.

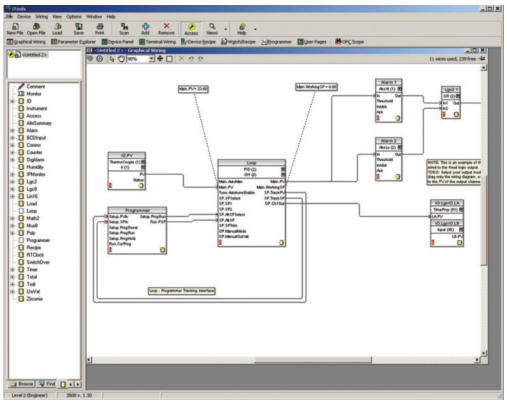
Communications
The 3500 is designed to integrate seamlessly with programmable logic controllers and other supervisory systems. A wide range of serial communication options are catered for including EIA232 and EIA485 using the Modbus RTU protocol along with Profibus DP and DeviceNet. Ethernet connectivity is achieved using the Modbus TCP protocol.

Recipes
Using a PC tool recipes can be created that can be used to change the operating parameters of the 3500 simply by selecting a new recipe via the HMI. This is very useful where multiple products are processed using the same controller but require different parameters to be set.

Infrared configuration adaptor
Communications to the 3500 can be achieved by using an infrared adaptor. Clipping onto the front fascia it provides iTools communications allowing configuration and commissioning to be performed without the need to access the rear terminals of the controller.

Infrared clip connected to the 3504

iTools Graphical Wiring Editor
The GWE is an extremely easy way to create applications. It allows users to select the function blocks they wish to use in their application then connect them together using 'Soft Wiring'. The GWE gives the user a pictorial view of exactly what he has configured and can also be used to monitor runtime conditions.



IO Expander
Extra IO can be provided by the IO Expander. Options are available for 10in 10out and 20in 20out.

Specification

General

Environmental performance

Temperature limits	Operation:	0 to 50°C
	Storage:	–10 to 70°C
Humidity limits	Operation:	5 to 95% RH non condensing
	Storage:	5 to 95% RH non condensing
Panel sealing:		IP65, Nema 4X
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

Suitable for domestic, commercial and light industrial as well as heavy industrial. (Domestic/light (Class B) emissions. Industrial (Class A) environmental immunity emissions.

With Ethernet module fitted product only suitable for Class A emissions.

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.

Physical

Dimennsions:	3508:	48W x 96H x 159Dmm	
	3504:	96W x 96H x 159Dmm	
Weight:	3508:	400g	
	3504:	600g	
Panel:		Mounting	Cut-out dimensions
	3508:	1/8 DIN	45W x 92Hmm
	3504:	1/4 DIN	92W x 92Hmm
Panel depth:	Both	148mm	

Operator interface

Type:		STN LCD with backlight
Main PV display	3508:	4 1/2 digits. green
	3504:	5 digits, green
Message display	3508:	8 character header and 3 lines of 10 characters
	3504:	16 character header and 3 lines of 20 characters
Status beacons:		Units, outputs, alarms, program status, program events, active setpoint, manual, remote SP
Access levels:		3 operator plus config. Password protected

User page

Number:	8
Parameters:	64 total
Functions:	Text, conditional text, values, bargraph
Access level:	User selectable (level 1, 2 or 3)

Power requirements

Supply voltage:	100 to 230V ac, ±15%, 48 to 62Hz, max 20W (3508 15W) 24V ac, –15%, +10%. 24V dc, –15% +20% ±5% ripple voltage max 20W (3508 15W)
Inrush current	
High Voltage (VH):	30A duration <100µS
Low Voltage (VL):	15A duration <100µS

Back up Battery

This instrument is fitted with a back up battery which should be changed between 6 and 10 years of use.

A record of instrument configurations or, preferably, a clone file should be maintained. This can be re-loaded following a battery change or other maintenance.

The battery is not serviceable: contact your local service centre to make suitable arrangements. For further information see User Manual HA027988 at www.eurotherm.co.uk

Approvals

CE, cUL listed (file E57766), Gost
Suitable for use in Nadcap and AMS2750E applications under System Accuracy Test calibration conditions

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Communications

No of ports:	2 modules can be fitted
Slot allocation:	Modbus RTU or I/O expander only in J comms port

Serial communications option

Protocols:	Modbus RTU Slave Profibus DP DeviceNet EI-Bisync (818 style mnemonics) Modbus RTU master broadcast (1parameter) I/O Expander
Isolation:	264V ac, double insulated
Transmission standard:	EIA232, EIA485, CAN (DeviceNet), Profibus

Ethernet communications option

Protocol:	Modbus TCP, 10baseT
Isolation:	264V ac, double insulated
Transmission standard:	802.3
Features:	DHCP client, 4 simultaneous masters,

Main process variable input

Calibration accuracy:	<±0.1% of reading ±1LSD (Note 1)
Sample rate:	9Hz (110ms)
Isolation:	264V ac double insulation from the PSU and communication
Input filter:	Off to 59.9s. Default 1.6s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset

Thermocouple

Range:	Uses 40mV and 80mV ranges dependent on type
Types:	K, J, N, R, S, B, L, T, C, PL2, custom download x 2
Resolution:	16 bits
Linearisation accuracy:	<0.2% of reading
Cold junction compensation:	>40:1 rejection of ambient change External reference of 0°C, 45°C and 50°C
Cold junction accuracy:	<±1°C at 25°C ambient

Resistance thermometer

Range:	0-400Ω (-200°C to +850°C)
Resistance thermometer types:	3-wire Pt100 DIN 43760
Resolution (°C):	<0.050°C with 1.6sec filter
Resolution:	16 bits
Linearity error:	<±0.03% (best fit straight line)
Calibration error:	<±0.310°C/°C, ±0.023% of measurement at 25°C
Drift with temperature:	<±0.010°C/°C, ±25ppm/C of measurement from 25°C
Common mode rejection:	<0.000085°C/V (maximum of 264V rms)
Series mode rejection:	<0.240°C/V (maximum of 280mV pk-pk)
Lead resistance:	0Ω to 22Ω , matched lead resistance
Input impedance:	100MΩ
Bulb current:	200µA

40mV Range

Range:	-40mV to +40mV
Resolution (µV):	<1.0µV with 1.6sec filter
Resolution:	16 bits
Linearity error:	<0.003% (best fit straight line)
Calibration error:	<±4.6µV, ±0.053% of measurement at 25°C
Drift with temperature:	<±0.2µV/C, ±28ppm/C of measurement from 25°C
Common mode rejection:	>175dB (maximum of 264V rms)
Series mode rejection:	>101dB (maximum of 280mV pk-pk)
Input leakage current:	±14nA
Input impedance:	100MΩ

80mV Range

Range:	-80mV to +80mV
Resolution (µV):	<3.3µV with 1.6sec filter
Resolution:	16 bits
Linearity error:	<0.003% (best fit straight line)
Calibration error:	<±7.5µV, ±0.052% of measurement at 25°C
Drift with temperature:	<±0.2µV/°C, ±28ppm/C of measurement from 25°C
Common mode rejection:	>175dB (maximum of 264V rms)
Series mode rejection:	>101dB (maximum of 280mV pk-pk)
Input leakage current:	±14nA
Input impedance:	100MΩ

2V Range

Range:	-1.4V to +2.0V
Resolution (mV):	<90µV with 1.6sec filter
Resolution:	16 bits
Linearity error:	<0.015% (best fit straight line)
Calibration error:	<±420µV, ±0.044% of measurement at 25°C
Drift with temperature:	<±125µV/C, ±28ppm/C of measurement from 25°C
Common mode rejection:	>155dB (maximum of 264Vrms)
Series mode rejection:	>101dB (maximum of 4.5V pk-pk)
Input leakage current:	±14nA
Input impedance:	100MΩ

10V Range

Range:	-3.0V to +10.0V
Resolution (mV):	<550µV with 1.6sec filter
Resolution:	16 bits
Linearity error:	<0.007% of reading for zero source resistance. Add 0.003% for each 10Ω of source plus lead resistance
Calibration error:	<±1.5mV, ±0.063% of measurement at 25°C
Drift with temperature:	<±66µV/C, ±60ppm/C of measurement from 25°C
Common mode rejection:	>145dB (maximum of 264V rms allowed)
Series mode rejection:	>92dB (maximum of 5V pk-pk allowed)
Input impedance:	62.5kΩ to 667kΩ depending on input voltage

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

Digital IO (LA and LB)

Isolation:		Not isolated from each other. 264V ac double insulation from the PSU and communication

Input

Rating:	Voltage level:	Closed 0 to 7.3V dc Open 10.8 to 24V dc
	Contact closure:	Open >1200Ω Closed <480Ω
Functions:		Includes program control, alarm acknowledge, SP2 select, manual, keylock, RSP select, standby

Output

Rating:	18Vdc >9mA <15mA
Functions:	Includes control outputs, alarms, events, status

AA Relay

Type:	Form C (changeover)
Rating:	Min 1mA @ 1V dc, Max 2A @ 264V ac resistive 1,000,000 operations with external snubber
Isolation:	264Vac double insulation
Functions:	Includes control outputs, alarms, events, status

Input / Output modules

IO Modules	3508:	3 modules can be fitted
	3504:	6 modules can be fitted
IO Expander:		20 Digital inputs, 20 relay outputs

Analogue input module

Calibration accuracy:	±0.2% of reading ±1LSD
Sample rate:	9Hz (110ms)
Isolation:	264V ac double insulation
Input filter:	Off to 59.9s. Default 1.6s
Zero offset:	User adjustable over full range
User calibration:	2-point gain & offset
Functions:	Includes process input, remote setpoint, power limit

Thermocouple

Range:	-100mV to +100mV
Types:	K, J, N, R, S, B, L, T, C, PL2, custom
Resolution (µV):	<3.3µV @ 1.6s filter time
Effective resolution:	15.9 bits
Linearisation accuracy:	<0.2% of reading
Cold junction compensation:	>25:1 rejection of ambient change External reference of 0°C, 45°C and 50°C
Cold junction accuracy:	<±1°C at 25°C ambient

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Resistance thermometer

Range:	0-400Ω (-200°C to +850°C)
Resistance thermometer types:	3-wire Pt100 DIN 43760
Resolution (°C):	<±0.08°C with 1.6sec filter
Effective resolution:	13.7 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±(0.4°C +0.15% of reading in °C)
Drift with temperature:	<±(0.015°C +0.005% of reading in °C) per °C
Common mode rejection:	<0.000085°C/V (maximum of 264Vrms)
Series mode rejection:	<0.240°C/V (maximum of 280mV pk-pk)
Lead resistance:	0Ω to 22Ω, matched lead resistance
Bulb current:	300µA

100mV Range

Range:	-100mV to +100mV
Resolution (µV):	<3.3µV with 1.6s filter time
Effective resolution:	15.9 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±10µV, ± 0.2% of measurement at 25°C
Drift with temperature:	<±0.2µV + 0.004% of reading per °C
Common mode rejection:	>146dB (maximum of 264Vrms)
Series mode rejection:	>90dB (maximum of 280mV pk-pk)
Input leakage current:	<1nA
Input impedance:	>100M

2V Range

Range:	-0.2V to +2.0V
Resolution (µV):	30uV with 1.6s filter time
Effective resolution:	16.2bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±2mV + 0.2% of reading
Drift with temperature:	<±0.1mV + 0.004% of reading per °C
Common mode rejection:	>155dB (maximum of 264Vrms)
Series mode rejection:	>101dB (maximum of 4.5V pk-pk)
Input leakage current:	<10nA
Input impedance:	>100M

10V Range

Range:	-3.0V to +10.0V
Resolution (µV):	<200µV with 1.6sec filter
Effective resolution:	15.4 bits
Linearity error:	<0.033% (best fit straight line)
Calibration error:	<±0.1mV + 0.02% of reading per °C
Drift with temperature:	<± 0.1mV + 0.02% of reading per °C
Common mode rejection:	>145dB (maximum of 264Vrms)
Series mode rejection:	>92dB (maximum of 5V pk-pk)
Input impedance:	>69kΩ

Potentiometer input

Type:	Single channel
Resistance:	100Ω to 15kΩ
Excitation:	0.5V dc supplied by module
Isolation:	264V ac double insulation
Functions:	Includes valve position and remote setpoint

Analogue control output

Type:	Single channel
Rating:	0-20mA <600Ω 0-10V dc >500Ω
Accuracy:	<±2.5%
Resolution:	10 bits
Isolation:	264V ac double insulation

Analogue retransmission output

Type:	Single channel
Rating:	0-20mA <600Ω 0-10V dc >500Ω
Accuracy:	<±0.5%
Resolution:	11 bits
Isolation:	264V ac double insulation

Dual 4-20mA OP/24V dc TxPSU

Type:		Dual channel
Rating	Output:	4-20mA dc, <1KΩ
	TxPSU:	24V dc, 22mA
Isolation:		264V ac double insulation between channels
Functions:		Either channel can be control output or TxPSU
Accuracy:		<±1%
Resolution:		11 bits

Logic input modules

Module types:		Triple contact closure, triple logic level
Isolation:		No channel isolation. 264V ac double insulation from other modules and system
Rating	Voltage level:	Open -3 to 5V dc @ <-0.4mA Closed 10.8 to 30V dc @ 2.5mA
	Contact closure:	Open >28kΩ Closed <100Ω
Functions:		Includes program control, alarm acknowledge, SP2 select, manual, keylock, RSP select, standby

Logic output modules

Module types:		Single channel, triple channel
Isolation:		No channel isolation. 264V ac double insulation from other modules and system
Rating	Single:	12V dc >20mA <29mA
	Triple:	12V dc >9mA <12mA
Functions:		Includes control outputs, alarms, events, status

Relay modules

Module types:	Single channel Form A, Single channel Form C, dual channel Form A
Isolation:	264V ac double insulation
Rating:	Min 100mA @ 12V dc, Max 2A @ 264V ac resistive Min 400,000 (max load) operations with external snubber
Functions:	Includes control outputs, alarms, events, status

Triac modules

Module types:	Single channel, dual channel
Isolation:	264V ac double insulation
Rating:	<0.75A @ 264V ac resistive
Functions:	Includes control outputs, alarms, events, status

Transmitter PSU module

Type:	Single channel
Isolation:	264V ac double insulation
Rating:	24V dc @ 20mA

Transducer PSU module

Type:	Single channel
Isolation:	264V ac double insulation
Bridge voltage:	Software selectable 5V dc or 10V dc
Bridge resistance:	300Ω to 15kΩ
Internal shunt resistor:	30.1Ω @0.25%, used for calibration of 350Ω bridge at 80%

I/O Expander

Type	20 I/O:	4 Form C relays, 6 Form A relays, 10 logic inputs
	40 I/O:	4 Form C relays, 16 Form A relays, 20 logic inputs
Isolation:		264V ac double insulation between channels
Ratings	Relay:	Min 100mA @ 12V dc, Max 2A @ 264V ac resistive
	Logic Input:	Open -3 to 5V dc @ <-0.4mA Closed 10.8 to 30V dc @ 2.5mA
Communications:		Using EX comms module in comms slot J

Software features

Control

Number of loops:	2
Loop update:	110ms
Control types:	PID, OnOff, VP, Dual VP
Cooling types:	Linear, fan, oil, water
Modes:	Auto, manual, forced manual, control inhibit
Overshoot inhibition:	High and low cutbacks
Number of PID sets:	3, selectable on PV, SP, OP, On Demand, program segment and remote input
Control options:	Supply voltage compensation, feedforward, output tracking, OP power limiting, SBR safe output
Setpoint options:	Remote SP with trim, SP rate limit, 2nd Setpoint, tracking modes

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Setpoint programmer

Program function:	50 programs, max 500 segments
Program names:	User defined up to 16 characters
No of profile channels:	2 (1 if single loop)
Operation:	Full or partially synchronised
Events:	8 per channel (8 when fully synchronised) 1 timed event, 1 PV event
Segment types:	Rate, dwell, time, call, goback and wait
Digital inputs:	Run, Hold, Reset, RunHold,RunReset, Adv Seg, Skip Seg
Servo action:	Process value, setpoint
Power failure modes:	Continue, ramp, reset
Other functions:	Guaranteed soak, holdback, segment user values, wait inputs, PV hot start

Process alarms

Number:	8
Type:	High, low, devhi, devlo, devband
Latching:	None, auto, manual, event
Other features:	Delay, inhibit, blocking, display message, 3 priority levels

Digital alarms

Number:	8
Type:	PosEdge, negEdge, edge, high, low
Latching:	None, auto, manual, event
Other features:	Delay, blocking, inhibit, display message, 3 priority levels

Zirconia

Number:	1
Functions:	Carbon potential, dewpoint, $\%O_2$ $LogO_2$, probe mV
Supported probes:	Barber Colman, Drayton, MMICarbon, AACC, Accucarb, SSI, MacDhui, $BoschO_2$, BoschCarbon
Gas reference:	Internal or remote analogue input
Probe diagnostics:	Clean recovery time, impedance measurement
Probe burn-off:	Automatic or manual
Other features:	Sooting alarm with tolerance setting, PV

Humidity

Number:	1
Functions:	Relative humidity, dewpoint
Measurement:	Psychrometric (wet & dry) inputs
Atmosphere compensation:	Internal or remote analogue input
Other features:	Psychrometric constant adjust

Recipes

Number:	8
Parameters:	24 per recipe
Length of name:	8 Characters
Selection:	HMI, comms, strategy

Transducer calibration

Number:	2
Type:	Shunt, load cell, comparision
Other features:	Autotare

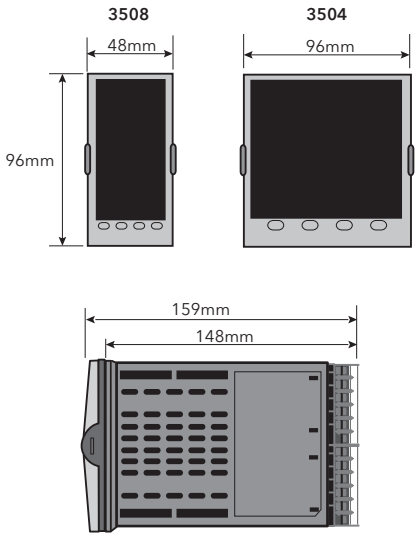
Communication tables

Number:	250
Function:	Modbus remapping (indirection)
Data formats:	Integer, IEEE (full resolution)

Application blocks

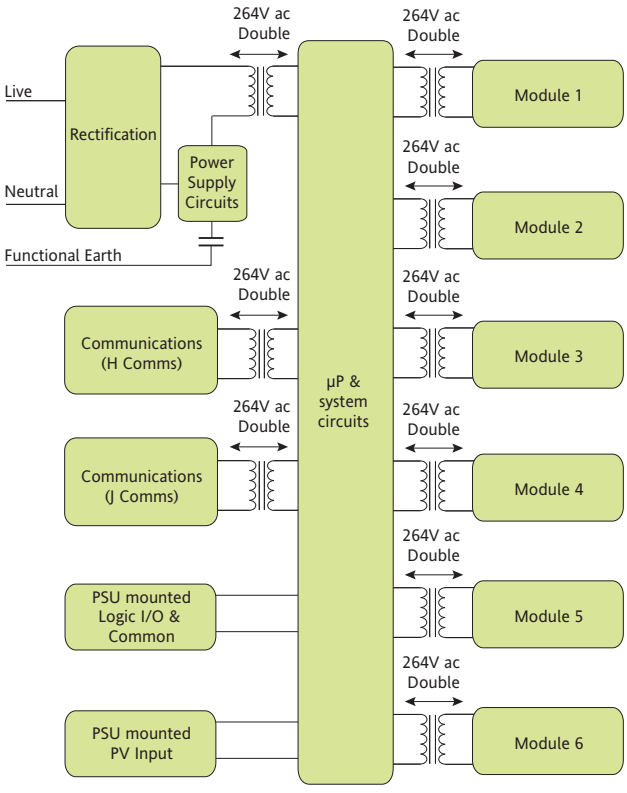
Soft wiring:	Orderable options of 30, 60 120 or 250
User values:	16 real numbers with decimal point
2 IP maths:	24 blocks, add, subtract, multiply, divide, absolute difference, max, min, hot swap, sample and hold, power, square root, Log, Ln, exponential, switch
2 IP logic:	24 blocks, AND, OR, XOR, latch, equal, not equal, greater than, less than, greater than or equal to, less
8 IP logic:	2 blocks. AND, OR, XOR
8 IP multiplexor:	4 blocks. 8 sets of 8 values selected by input parameter
8 IP multiple IP:	3 blocks, average, min, max sum
BCD Input:	2 blocks, 2 Decades
Input monitor:	2 blocks, max, min, time above threshold
16 Pt linearisation:	2 blocks, I6-point linearisation fit
Polynomial fit:	2 blocks, characterisation by Poly Fit table
Switchover:	1 block, smooth transition between 2 values
Timer blocks:	4 blocks, OnPulse, OnDelay, OneShot, MinOn Time
Counter blocks:	2 blocks, Up or down, directional flag
Totaliser blocks:	2 blocks, alarm at threshold value
Real time clock:	1 block, day & time, 2 time based alarms

Mechanical Details



3508 Panel cut-out 92mm (-0.0 +0.8) x 45mm (-0.0 +0.6)
3504 Panel cut-out 92mm (-0.0 +0.8) x 92mm (-0.0 +0.8)

Isolation diagram



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Order codes

Hardware/options coding

1	2	3	4	5	6	7	8	9	10	11	12	13	14
											Note 2	Note 2	Note 2

15	16	17	18	19	20	20	21

Basic Product

3508	48 x 96mm unit
3504	96 x 96mm unit

1 Function

CC	Standard
F	Profibus

2 Supply Voltage

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

3 Loops

1	One loop
2	Two loops

4 Application

XX	Standard
ZC	Zirconia
VP	Dual Valve Positioning (Note 3)

5 Programs

1	1 Progs - 20 Segments
10	10 Progs - 500 Segments
25	25 Progs - 500 Segments
50	50 Progs - 500 Segments

6 Recipes

X	No recipes
1	1 Recipe
4	4 Recipes
8	8 Recipes

7 Toolkit Wires

XXX	Standard 30 Wires
60	60 Wires
120	120 Wires
250	250 Wires

8 Fascia

G	Eurotherm green
S	Silver

9-14 IO Slots 1, 2, 3, 4, 5, 6 (Note 2)

XX	No module fitted
R4	Change over relay
R2	2 pin relay
RR	Dual relay
T2	Triac
TT	Dual triac
D4	DC control
AM	Analogue input (not slot 2 or 5)
D6	DC retransmission
TL	Triple logic input
TK	Triple contact input
TP	Triple logic output
VU	Potentiometer input
MS	24V dc transmitter PSU
G3	Transducer PSU 5 or 10V dc
DO	Dual 4-20mA OP/24V dc PSU (Slots 1, 2 or 4 only)
HR	High resolution DC retrans and 24V dc
LO	Isolated single logic OP

15 H Comms Slot

XX	Not fitted
A2	EIA232 Modbus
Y2	2-wire EIA485 Modbus
F2	4-wire EIA485 Modbus
AE	RS232 EI-Bisynch
YE	2-wire EIA85 EI-Bisynch
M1	RS232 Modbus master
M2	2-wire EIA485 Modbus Master
M3	4-wire EIA485 Modbus Master
FE	4-wire EIA485 EI-Bisynch
ET	Ethernet Modbus 10 base T TCP IP (incl RJ45 Assy)
PB	Profibus DP (Note 1)
PD	Profibus with D type connector fitted (Note 1)
DN	DeviceNet

16 J Comms Slot

XX	Not fitted
A2	EIA232 Modbus
Y2	2-wire EIA485 Modbus
F2	4-wire EIA485 Modbus
AE	EIA232 EI-Bisynch
YE	2-wire EIA485 EI-Bisynch
FE	4-wire EIA485 EI-Bisynch
M1	RS232 Modbus master
M2	2-wire EIA485 Modbus Master
M3	4-wire EIA485 Modbus Master
EX	IO Expander module

17 Configuration Tools

XX	None
IT	Standard iTools (DVD only)

18 Product Language

ENG	English
FRA	French
GER	German
SPA	Spanish
ITA	Italian

19 Manual Language

ENG	English
FRA	French
GER	German
SPA	Spanish
ITA	Italian

20 Warranty

XXXXX	Standard
WL005	Extended

21 Calibration Certificate

XXXXX	None
CERT1	Certificate of Conformity
CERT2	Factory Cal certificate

Notes

1. Only available with the Profibus Controller
2. I/O slots 4, 5 and 6 are only available on the 3504
3. Provides Valve Position option in Heat/Cool applications. Single channel VP included as standard

3500 Accessories

HA027987	User guide
HA027988	Engineering manual
SUB35/ACCESS/249R.1	2.49R Precision resistor
iTools/None/3000IR	Configuration IR clip
iTools/None/3000CK	Configuration clip
2000IO/VL/10LR/XXXX	10IN, 10OUT Expander
2000IO/VL/20LR/20LR	20IN, 20OUT Expander

Hardware/options coding

1	2	3	4	5	6	7	8	9	10	11	12	13	14

15	16	17	18	19	20	20	21	22	23	24
								Note 3	Note 3	Note 3

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Hardware/options coding

1 Configuration

STD	Standard config. (Note 1)
CFG	Factory configured

2 Loop 1 Units

C	Centigrade
F	Fahrenheit
%	Percent
H	%RH
P	PSI
B	Bar
M	mBar
X	None

3 Loop 1 Function

PX	Single Channel PID
FX	Single Ch Valve with feedback
VX	Single Ch Valve w/out feedback
NX	Single Ch On/Off
PP	Dual Channel PID
PN	Dual Ch PID/OnOff
FF	Dual Ch Valve with feedback
VV	Dual Ch Valve w/out feedback
PF	Dual Ch PID/Valve with feedback
PV	Dual Ch PID/Valve w/out feedback

4 Loop 1 PV (From Main PV)

X	Unconfigured
J	J Thermocouple
K	K Thermocouple
T	T Thermocouple
L	L Thermocouple
N	N Thermocouple
R	R Thermocouple
S	S Thermocouple
B	B Thermocouple
P	Platinell II
C	C Thermocouple
Z	Pt 100
A	4-20mA Linear
Y	0-20mA Linear
W	0-5V dc Linear
G	1-5V dc Linear
V	0-10V dc Linear
D	D Thermocouple
E	E Thermocouple
1	Ni/Ni 18% MO
2	Pt20%Rh/Pt40%Rh
3	W/W26%Re (Englehard)
4	W/W26%Re (Hoskins)
5	W5%Re/W26%Re (Englehard)
6	W5%Re/W26%Re (Bucose)
7	Pt10%Rh/Pt40%Rh
Q	Custom Curve

5 Loop 1 Range Low

XXXXX	Enter value with decimal point

6 Loop 1 Range High

XXXXX	Enter value with decimal point

8 Loop 2 Units

C	Centigrade (Note 2)
F	Fahrenheit (Note 2)
%	Percent
H	%RH
P	PSI
B	Bar
M	mBar
X	None

7 Loop 2 Function

XX	Single Loop Only
PXPX	Single Channel PID
FX	Single Ch Valve with feedback
VX	Single Ch Valve w/out feedback
NX	Single Ch On/Off
PP	Dual Channel PID
PN	Dual Ch PID/OnOff
FF	Dual Ch Valve with feedback
VV	Dual Ch Valve w/out feedback
PF	Dual Ch PID/Valve with feedback
PV	Dual Ch PID/Valve w/out feedback

9 Loop 2 PV

X	Unconfigured
J	J Thermocouple
K	K Thermocouple
T	T Thermocouple
L	L Thermocouple
N	N Thermocouple
R	R Thermocouple
S	S Thermocouple
B	B Thermocouple
P	Platinell II
C	C Thermocouple
Z	Pt 100
A	4-20mA Linear
Y	0-20mA Linear
W	0-5V dc Linear
G	1-5V dc Linear
V	0-10V dc Linear
D	D Thermocouple
E	E Thermocouple
1	Ni/Ni 18% MO
2	Pt20%Rh/Pt40%Rh
3	W/W26%Re (Englehard)
4	W/W26%Re (Hoskins)
5	W5%Re/W26%Re (Englehard)
6	W5%Re/W26%Re (Bucose)
7	Pt10%Rh/Pt40%Rh
Q	Custom Curve

10 Loop 2 Range Low

XXXXX	Enter value with decimal point

11 Loop 2 Range High

XXXXX	Enter value with decimal point

12 Alarm 1

XXX	Unconfigured
1_ _	**Loop 1**
2_ _	**Loop 2**
_FH	Full scale high
_FL	Full scale low
_DH	Deviation high
_DL	Deviation low
_DB	Deviation band

13 Alarm 2

XXX	Unconfigured
1_ _	**Loop 1**
2_ _	**Loop 2**
_FH	Full scale high
_FL	Full scale low
_DH	Deviation high
_DL	Deviation low
_DB	Deviation band

14 Alarm 3

XXX	Unconfigured
1_ _	**Loop 1**
2_ _	**Loop 2**
_FH	Full scale high
_FL	Full scale low
_DH	Deviation high
_DL	Deviation low
_DB	Deviation band

Notes

1. If standard config is selected an instrument without configuration will be supplied.
2. If C or F units are selected they must be the same for both loops. If C or F are not selected for Loop 1 they cannot be selected for Loop 2.
3. I/O slots 4, 5 and 6 are only available on the 3504.
4. CH1 = Heat, CH2 = Cool.

15 Alarm 4

XXX	Unconfigured
1_ _	**Loop 1**
2_ _	**Loop 2**
_FH	Full scale high
_FL	Full scale low
_DH	Deviation high
_DL	Deviation low
_DB	Deviation band

16 Logic LA

XX	Unconfigured
1_	**Loop 1**
2_ _	**Loop 2**
_B	Sensor Break
_M	Manual Select
_H	Control Ch1 O/P
_C	Control Ch2 O/P
_R	Remote SP
_S	Setpoint 2 Enable
A_	**Alarm**
_A	Acknowledge All Alarms
_1	Alarm 1 O/P
_2	Alarm 2 O/P
P_	**Programmer**
_R	Run
_H	Hold
_A	Reset
_1	Prog Ch1 Event 1
_2	Prog Ch1 Event 2

17 Logic LB

XX	Unconfigured
1_	**Loop 1**
2_ _	**Loop 2**
_B	Sensor Break
_M	Manual Select
_H	Control Ch1 O/P
_C	Control Ch2 O/P
_R	Remote SP
_S	Setpoint 2 Enable
A_	**Alarm**
_A	Acknowledge All Alarms
_1	Alarm 1 O/P
_2	Alarm 2 O/P
P_	**Programmer**
_R	Run
_H	Hold
_A	Reset
_1	Prog Ch1 Event 1
_2	Prog Ch1 Event 2

18 Relay AA

XX	Unconfigured
1_	**Loop 1**
2_	**Loop 2**
_H	Control Ch1 O/P
_C	Control Ch2 O/P
_B	Sensor Break
SB	Setpoint Break (any loop)
A_	**Alarm**
_A	Any Alarm Active
_N	New Alarm Active
_1	Alarm 1 O/P
_2	Alarm 2 O/P
P_	**Programmer**
_1	Prog Ch 1 Event 1
_2	Prog Ch 1 Event 2

19-24 Slot Functions 1-6 (Note 4)

XXX	Unconfigured
1_ _	**Loop 1**
2_ _	**Loop 2**
Changeover Relay (R4)	
_HX	Control Ch1 O/P
_CX	Control Ch2 O/P
_BX	Sensor Break
2-Pin Relay (R2)	
_HX	Control Ch1 O/P
_CX	Control Ch2 O/P
_BX	Sensor Break

19-24 Slot Functions 1-6 ... continued (Note 4)

Single Logic (LO)	
_HX	Control Ch1 O/P
_CX	Control Ch2 O/P
Single Triac (T2)	
_HX	Control Ch1 O/P
_CX	Control Ch2 O/P
Dual Relay (RR)	
_HC	Ch1 O/P & Ch2
_VT	VP Ch1
_VR	VP Ch2
P12	Prog Event 1 & 2
P34	Prog Event 3 & 4
P56	Prog Event 5 & 6
P78	Prog Event 7 & 8
A12	Alarm 1 & 2 O/P
A34	Alarm 3 & 4 O/P
HHX	Ch1 O/P for loops 1 & 2
CCX	Ch2 O/P for loops 1 & 2
SBR	Sensor Break both loops
Dual Triac (TT)	
_HC	Ch1 O/P & Ch2
_VH	VP Ch1
_VR	VP Ch2
P12	Prog Ch1 Event 1 & 2
P34	Prog Ch1 Event 3 & 4
P56	Prog Ch1 Event 5 & 6
P78	Prog Ch1 Event 7 & 8
A12	Alarm 1 & 2 O/P
A34	Alarm 3 & 4 O/P
HHX	Ch1 O/P for loops 1 & 2
CCX	Ch2 O/P for loops 1 & 2
DC Control (D4)	
For range select third digit from Table 1	
_H_	Ch1 O/P
_C_	Ch2 O/P
DC Retransmission (D6)	
For range select third digit from Table 1	
_T_	PV Retransmission
_S_	SP Retransmission
Analogue Input (AM)	
For range select third digit from Table 1	
2PV	Loop 2 PV
_R_	Remote SP
Potentiometer Input (VU)	
_RS	Remote SP
_VF	Valve Feedback Ch1
_VG	Valve Feedback Ch2
Dual 4-20mA O/P/TxPSU	
_HC	Ch1 O/P & Ch2 O/P
_HT	Ch1 O/P loops1, TxPSU
HHX	Ch O/P for loops 1 & 2
TTX	Both channels TxPSU
Triple Logic IP (TL) or (TK)	
___	Select function below for each ch
X	Unconfigured
M	Loop 1 Manual
N	Loop 2 Manual
Q	Loop 1 Remote SP
V	Loop 2 Remote SP
S	Loop 1 Setpoint 2 enable
T	Loop 2 Setpoint 2 enable
E	Acknowledge All Alarms
P	Program Run
R	Program Reset
H	Program Hold
Triple Logic OP (TP)	
___	Select function below for each ch
X	Unconfigured
F	Loop 1 Control Ch1 O/P
G	Loop 1 Control Ch2 O/P
K	Loop 2 Control Ch1 O/P
L	Loop 2 Control Ch2 O/P
A	Alarm 1 O/P
B	Alarm 2 O/P
C	Alarm 3 O/P
D	Alarm 4 O/P
1	Program Event 1
2	Program Event 2
3	Program Event 3
4	Program Event 4
5	Program Event 5
6	Program Event 6
7	Program Event 7
8	Program Event 8

Table 1

A	4-20mA Linear
Y	0-20mA Linear
W	0-5V dc Linear
G	1-5V dc Linear
V	0-10V dc Linear

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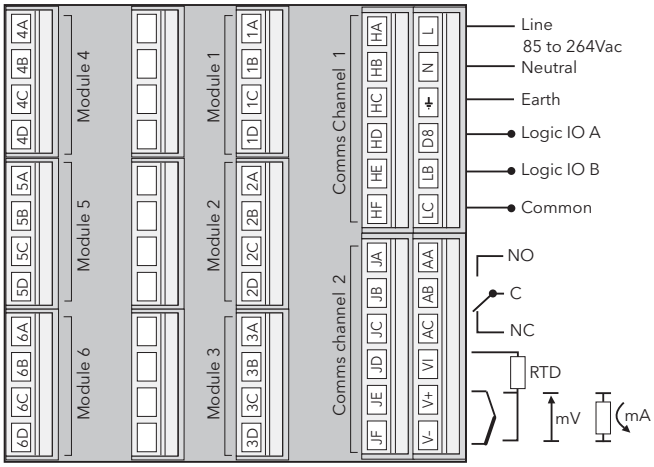
Rear Terminal Conections

3504



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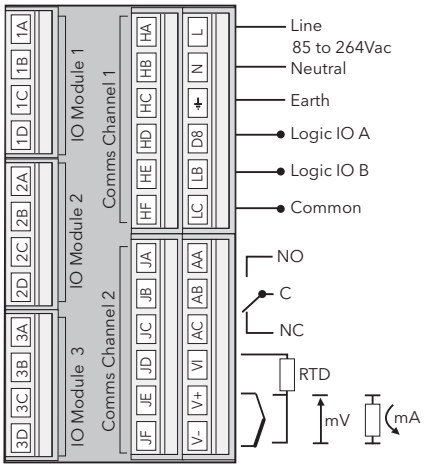

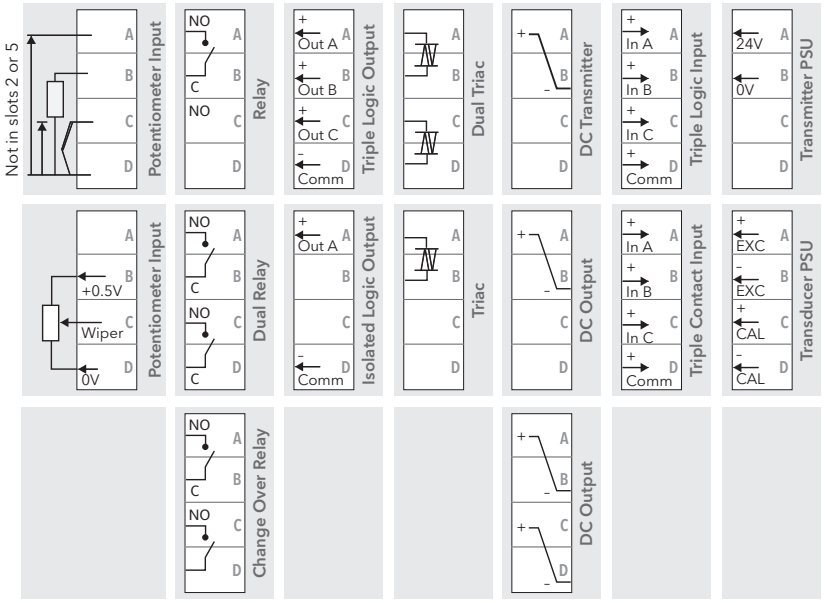

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