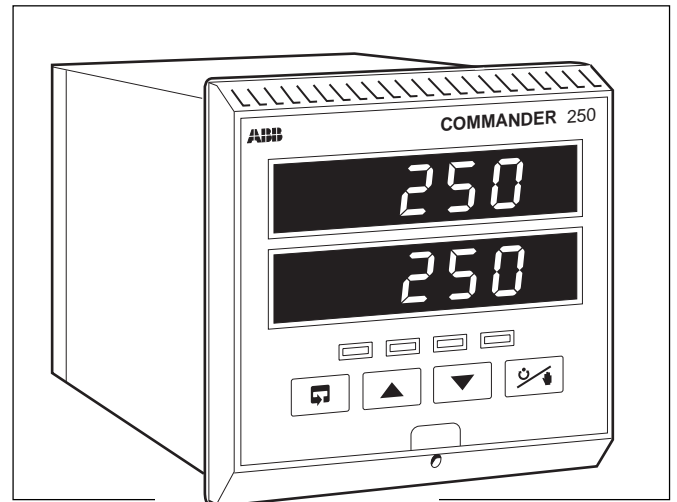


- **PID controller with 'one shot' auto-tune**
  - single loop, heat/cool and ramp/soak as standard
- **Quick code, front face or PC configuration**
  - easy commissioning and operation using our Windows™-based software
- **Selectable control outputs to suit application**
  - analog, relay or logic control capabilities as standard
- **Case depth behind panel less than 125mm**
  - reduced installation and panel costs
- **Accurate universal process input with integral transmitter power supply**
  - direct connection for any process signal
- **NEMA4X/IP66 protection and full noise + EMC immunity**
  - reliability in the harshest environments
- **RS485/MODBUS™ serial communications**
  - SCADA, PLC and open systems integration



*COMMANDER 250 –  
the most comprehensive  
1/4 DIN controller, straight out of  
the box*

## COMMANDER 250

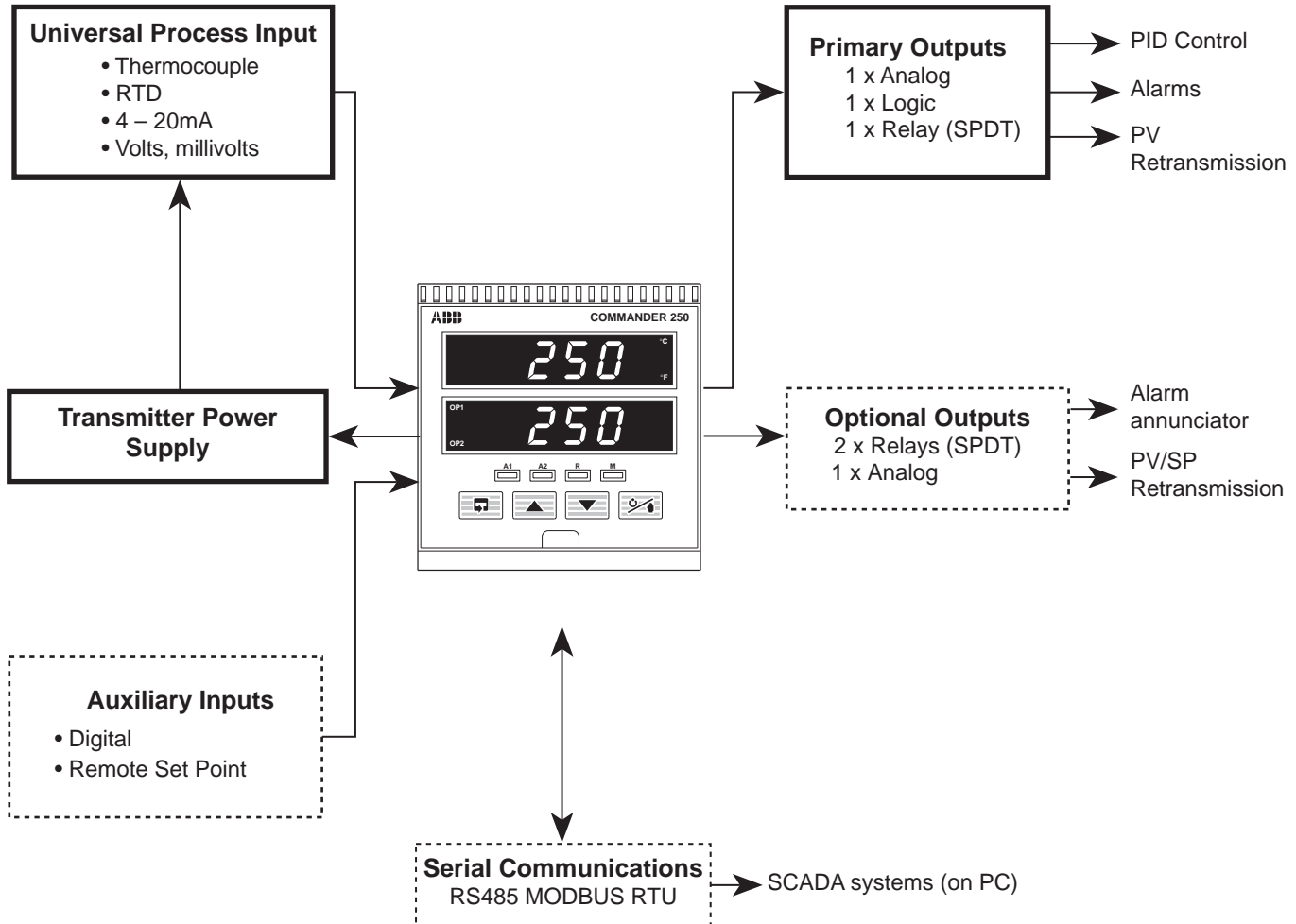
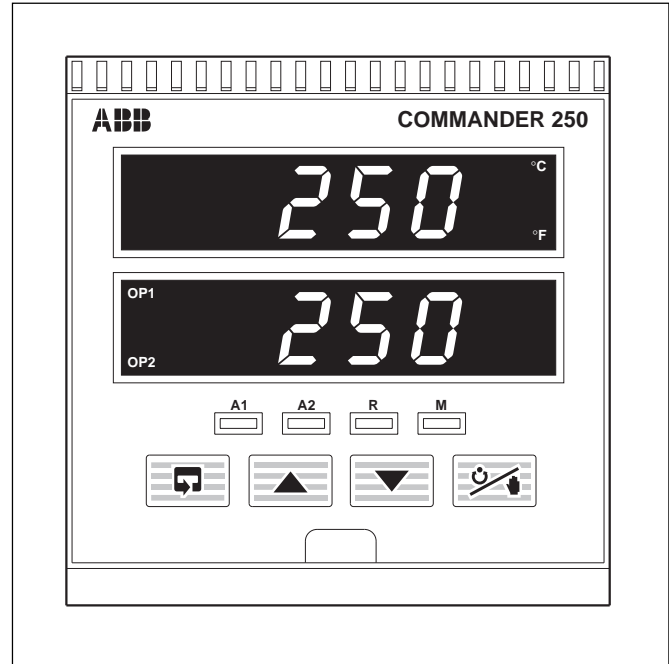
The COMMANDER 250 Process controller is a highly versatile, **single loop controller** in  $\frac{1}{4}$  DIN format that has been designed to be exceptionally easy to set up and operate.

Universal input and an **integral transmitter power supply** ensure that the COMMANDER 250 has the capabilities to measure a wide range of process signals such as temperature, pressure, flow and level.

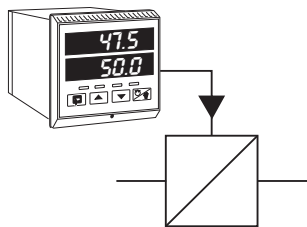
Enhanced performance with **analog, logic and relay control outputs**, all fitted as standard, with the option to add further I/O capabilities such as additional relays, remote set point, analog retransmission and digital input, to suit your application.

The **configuration** of the COMMANDER 250 is achieved by moving the security switch and entering a simple code from the front panel keys or via our PC configuration package. No passwords, no input links, no complications.

With **NEMA4X/IP66** front panel and superior RF immunity as standard the COMMANDER 250 has been designed to control reliably in the harshest of today's industrial environments.



KEY: Standard Option

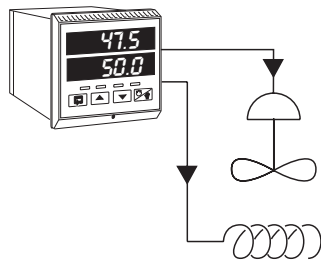


## PID Control

Simple PID control is available using any of the unit's three built-in outputs.

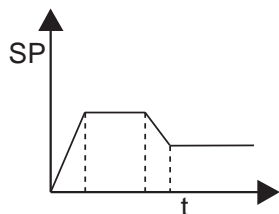
- 4 to 20mA analog output
- Logic 18V time proportioning (to drive solid state relays)
- 5A relay for time proportioning or on/off control

Universal input with direct connection of sensors and built-in transmitter supply. Optional isolated retransmission for input to recorders.



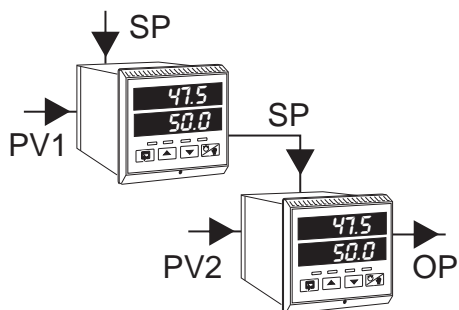
## Heat/Cool

Heat/Cool control strategies may be implemented on the standard COMMANDER 250, using a combination of the analog, logic and relay outputs.



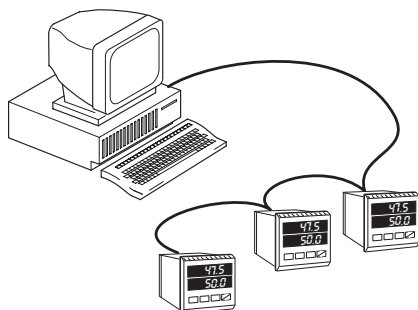
## Ramp/Soak Set Point Profiles

The ramp/soak facility available on every COMMANDER 250 provides for a single program, four-segment profile. This facility also includes guaranteed ramp/soak, repeat program, skip and reset. An optional digital input can initiate start/stop of the ramp/soak cycle.



## Master/Slave and Cascade

Two or more COMMANDER 250s can be used in either a master/slave or cascade configuration, with the addition of the remote set point option to the basic unit.



## RS485/MODBUS

Fitted with an optional RS485 serial communication board, the COMMANDER 250 can communicate with PLCs and SCADA systems using the MODBUS protocol.

## Specification

### Summary

P, PI, PID single loop controller

Autotune facility

Fully user configurable

NEMA4X/IP66

PC Configuration

## Operation

### Display

High-intensity 7-segment, 2 x 4-digit red LED display

Display range –999 to +9999

Display resolution  $\pm 1$  digit

Display height 12mm (0.43 in.)

### Configuration

User defined via front panel or PC configurator

## Standard Functions

### Control types

Programmable for manual, on/off, time proportioning, current proportioning and heat/cool control.

### Set points

Local

Remote

4 selectable, fixed value

Ramping set point

### Profile controller

Number 4 ramp/soak segments

Features Guaranteed ramp/soak, self seeking set point, program repeat

Controls Run, hold and stop from front panel switches

Run/hold or run/stop from digital input

### Alarms

Number Two user-defined

Type High/low process

High/low deviation

Loop break alarm

## Standard Build

### Control output/retransmission

Analog, configurable in the range of 4 to 20mA

Max. load 15V (750 $\Omega$  at 20mA)

Accuracy  $\leq 0.25\%$  of span

Isolation 500V d.c. from input (not isolated from logic output)

### Logic output

18V d.c. at 20mA

Min. load 400 $\Omega$

Isolation 500V d.c. from input (not isolated from control output)

### Relay output

One relay as standard (SPDT) – 5A @ 115/230V a.c.

## Analog Inputs

### Number

One as standard

One optional – 4 to 20mA remote set point input

### Input sampling rate

250ms per channel

### Type

Universally configurable to provide (Channel 1 only):

Thermocouple (THC)

Resistance Thermometer (RTD)

Millivolt

Current

D.C. voltage

### Input impedance

mA 100 $\Omega$

mV, V  $>10M\Omega$

### Linearizer functions

Programmable for standard inputs:

$\sqrt{\phantom{x}}$ , THC types B, E, J, K, N, R, S, T or Pt100

### Broken sensor protection

Upscale drive on THC and RTD

Downscale drive on milliamps and voltage

### Cold junction compensation

Automatic CJC incorporated as standard

Stability  $< 0.05^{\circ}\text{C}/^{\circ}\text{C}$  change in ambient temperature

### Input protection

Common mode isolation  $>120\text{dB}$  at 50/60Hz with 300 $\Omega$  imbalance

Series mode rejection  $> 60\text{dB}$  50/60Hz

### Transmitter power supply

24V, 30mA max. powers one 2-wire transmitter

## Options

One option board can be installed from:

Type 1 One relay

Type 2 Two relays + one digital input + remote set point

Type 3 One relay + one digital input + remote set point + MODBUS serial communications

Type 4 One relay + one digital input + remote set point + retransmission

### Relay output

SPDT 5A @ 115/230V a.c.

### Digital input

Type Volt-free

Minimum pulse 250ms

### MODBUS serial communications

Connections RS422/485, 2- or 4-wire

Speed 2.4k or 9.6k baud rate

Protocol MODBUS RTU slave

### Remote Set Point Input

4 to 20 mA d.c., 100 $\Omega$  nominal input impedance

Preset to process variable engineering units

### Auxiliary Analog Output

Analog, configurable in the range of 4 to 20mA

Max. load 15V (750 $\Omega$  at 20mA)

Isolation 500V d.c. from input

## Standard Analog Input Ranges

Thermocouple	Maximum Range °C	Maximum Range °F	Accuracy (% of reading)
B	–18 to 1800	0 to 3270	0.25% or $\pm 2^{\circ}\text{C}/3.6^{\circ}\text{F}$ (above $200^{\circ}\text{C}/392^{\circ}\text{F}$ )
E	–100 to 900	–140 to 1650	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$
J	–100 to 900	–140 to 1650	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$
K	–100 to 1300	–140 to 2350	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$
N	–200 to 1300	–325 to 2350	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$
R	–18 to 1700	0 to 3000	0.25% or $\pm 1.0^{\circ}\text{C}$ (above $300^{\circ}\text{C}/572^{\circ}\text{F}$ )
S	–18 to 1700	0 to 3000	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$ (above $200^{\circ}\text{C}/392^{\circ}\text{F}$ )
T	–250 to 300	–400 to 550	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$

RTD	Maximum Range °C	Maximum Range °F	Accuracy (% of reading)
PT100	–200 to 600	–325 to 1100	0.25% or $\pm 0.5^{\circ}\text{C}/0.9^{\circ}\text{F}$

Linear Inputs	Range	Accuracy (% of reading)
Milliamps	0 to 20	0.25% or $\pm 2\mu\text{A}$
Milliamps	4 to 20	0.25% or $\pm 2\mu\text{A}$
Volts	0 to 5	0.25% or $\pm 200\mu\text{V}$
Volts	1 to 5	0.25% or $\pm 200\mu\text{V}$
Millivolts	0 to 50	0.25% or $\pm 20\mu\text{V}$

Square Root Input	Range	Accuracy (% of reading)
Milliamps	4 to 20	0.25% or $\pm 2\mu\text{A}$

### Notes.

Performance accuracy is not guaranteed below  $300^{\circ}\text{C}$  B, R & S thermocouples or low end sq. root ranges.

RTD, 3-wire platinum,  $100\Omega$  per DIN 43760 standard (IEC751), with range of 0 to  $400\Omega$ .

Min. span below zero Type T  $70^{\circ}\text{C}/126^{\circ}\text{F}$

Type N  $105^{\circ}\text{C}/189^{\circ}\text{F}$

THC standards DIN 43710 IEC 584

RTD standards DIN 43760 IEC 751

## Physical

### Size

96 wide x 96 high x 122.5mm  
(3.78 in. wide x 3.78 in. high x 4.82 in.)

### Weight

520g (1.1lb) approx.

## Electrical

### Voltage

85 to 265V a.c. (50/60Hz)  
24V d.c.

### Power consumption

< 6VA

### Power interruption protection

<60ms/<3 cycles, no effect  
>60ms/>3 cycles, instrument returns to operation after a controlled reset

## Environmental

### Operating limits

0 to  $55^{\circ}\text{C}$  (32 to  $131^{\circ}\text{F}$ )  
5 to 95%RH non-condensing

### Temperature stability

< 0.02% of reading or  $2\mu\text{V}/^{\circ}\text{C}$  ( $1\mu\text{V}/^{\circ}\text{F}$ )

### Front face

IP66 (NEMA4X), rear IP20

## EMC

### Emissions

Meets requirements of EN50081-2

### Immunity

Meets requirements of EN50082-2

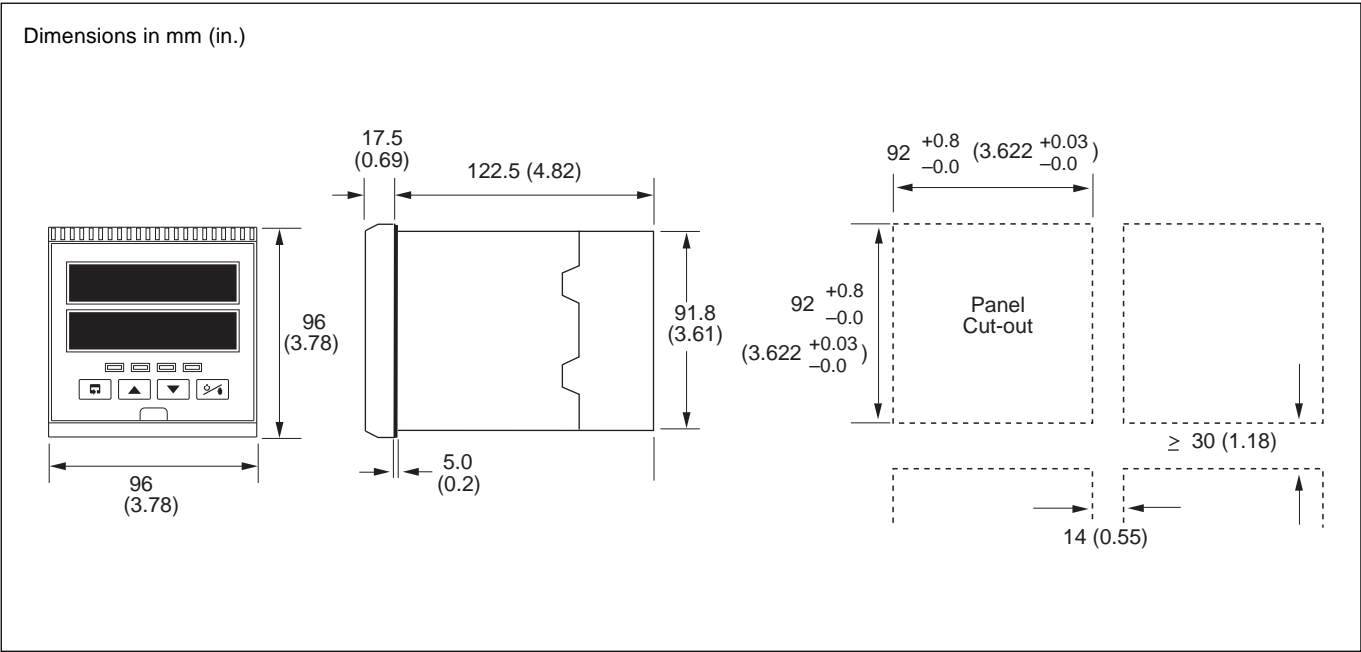
### Design and manufacturing standards

Designed to meet CSA requirements  
CE Mark

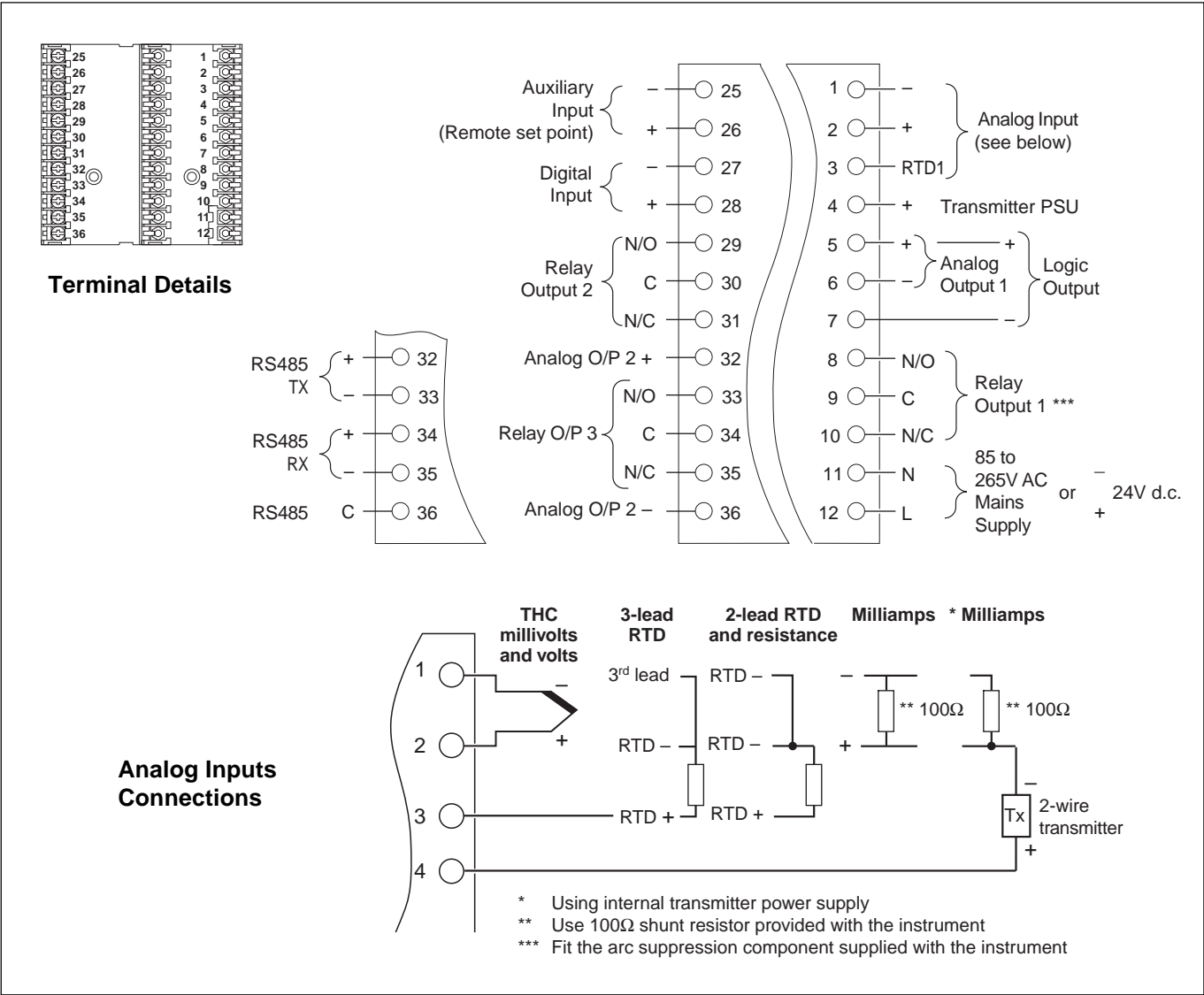
### Electrical safety

EN61010-1

Overall Dimensions



Electrical Connections



## Ordering Guide

<b>COMMANDER 250 Process Controller*</b>	<b>C250 /</b>	<b>X X</b>	<b>X</b>	<b>X</b>	<b>/</b>	<b>X X X X</b>
<b>Option Board</b>						
None		0 0				
One additional relay		0 1				
Two additional relays + one digital input + remote set point 4 to 20mA		0 2				
One additional relay + one digital input + remote set point + RS485/MODBUS		0 3				
One relay + one digital input + remote set point + retransmission		0 4				
<b>Power Supply</b>						
85V to 265V a.c.			0			
24V d.c.			1			
<b>Build</b>						
ABB Standard				0		
CSA approval (pending)				1		
UL approval (pending)				2		
<b>Programming/Special Features</b>						
Configured to factory standard					S	T D
Configured to customer detail					C	U S
Agreed special features					S	P X X

\* As standard the COMMANDER 250 is fitted with one relay, analog output, logic output Universal input and transmitter power supply

## Instrument Coding Example

	<b>C250 /</b>	<b>01</b>	<b>0</b>	<b>0/</b>	<b>STD</b>
COMMANDER 250 Universal Process Controller					
One additional relay					
85V to 265V a.c. power supply					
Standard build					
Configured to factory standard					

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