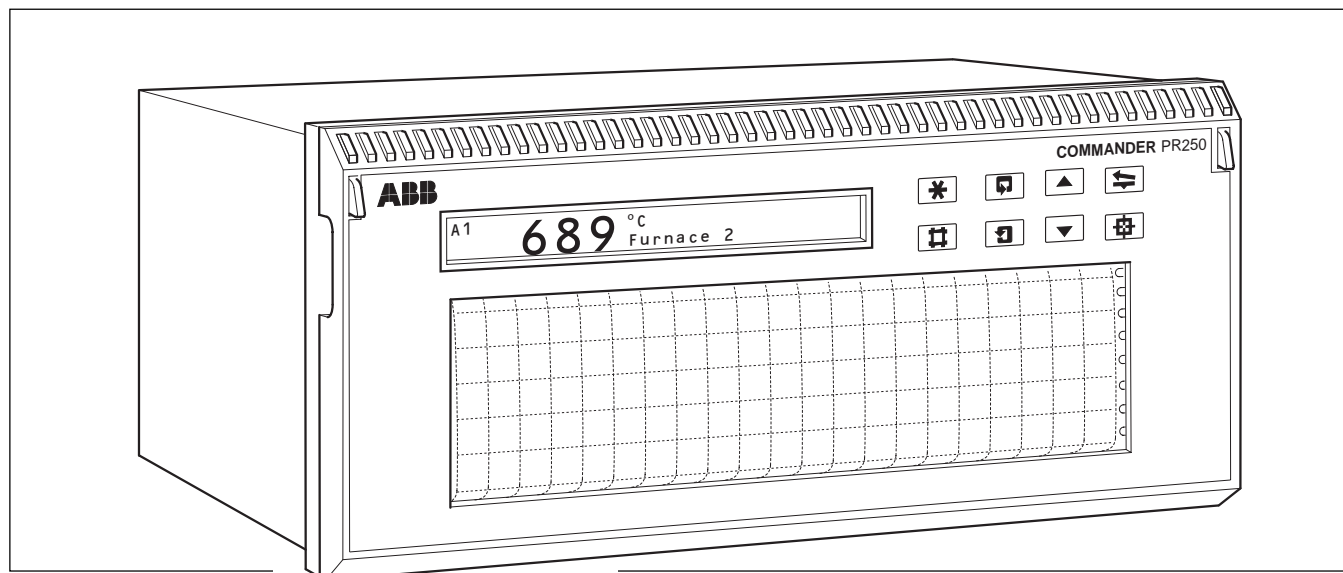


Specification DataFile**COMMANDER PR250**

*All the processing power you need in a rugged,
compact 250mm recorder*

- **24-Channel recording on 250mm Chart**
 - with individual trace colors
- **Universal process inputs**
 - accepts thermocouples, RTDs, mA, mV & V
- **Totalizers, maths and logic equations**
 - advanced processing capabilities
- **MODBUS® Serial communications**
 - provide full integration with your control system
- **Unique Cue/Review incident analysis**
 - historical data at the touch of a button
- **High clarity graphics display**
 - shows process status at a glance
- **Dust- and water-resistant to IP65 (NEMA 3)**
 - for harsh industrial environments
- **PC memory card data storage**
 - full data logging and configuration back-up

COMMANDER PR250

The **COMMANDER PR250** is a 250mm strip chart recorder providing accurate and reliable recording of up to 24 channels. The PR250 also provides a range of advanced processing capabilities such as flow totalization, maths blocks, logic equations, configurable displays and full message printing.

With the option to fit **PC** memory card data storage, **RS485 MODBUS** communication and up to 18 alarm relays, the recorder becomes a very powerful signal processing tool.

To assist the operator in analyzing any process problem the **PR250** has a unique **Cue-and-Review** system, allowing the user to examine historical data anywhere on the chart at the push of a button.

The **PR250** can be supplied for panel mounting or for portable use. The front facia, rated IP65 (NEMA 3), is resistant to hosedown and dusty environments.

Application areas include:

- **Furnace Surveys**
- **Water Treatment Plants**
- **Large Cold Stores**
- **Stack Gas Monitoring**
- **Sterilizer Surveys**
- **Laboratory**

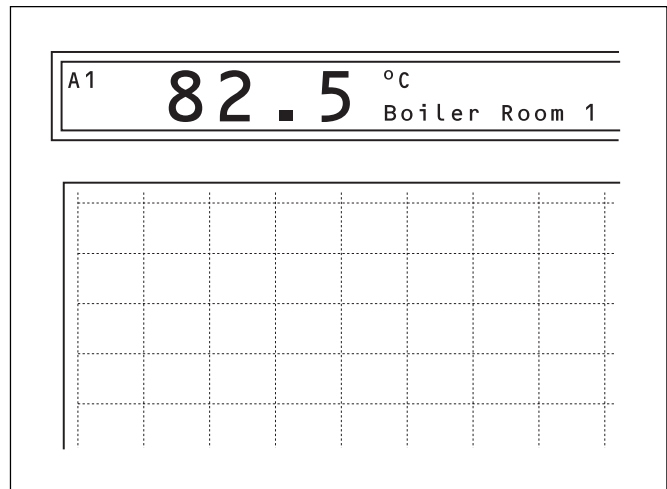
Recording

The **COMMANDER PR250**'s high-speed multi-point printing system updates all 24 traces in 3 seconds. This system produces **continuous lines** on the chart for speeds of up to 500mm/hr.

The **printing sequence** is intelligently managed by the recorder's control system to give priority to fast-changing signals or events, ensuring the most comprehensive process record is traced on the chart.

The PR250 supports **full text printing** to provide detailed annotation on the chart. In addition to the time, date, channel identity and chart speed, the recorder can print scales for each channel, alarm messages, totalizer values and an operator-defined batch name.

The **'Easy-view'** facility enables the user to see the latest recordings at the push of a button.



Operation

A graphic LCD display provides a choice of five different display formats to suit the application.

During normal operation the display cycles through each channel in sequence.

Clear text prompts on the LCD display assist the operator in accessing functions, such as chart reload and alarm acknowledge. Tactile membrane keys on the front of the recorder are used to access these functions. A second, identical keypad is provided inside the recorder for use when the door is open.

Password protection prevents unauthorized access to the recorder's configuration.

Quickly-fitted pen cartridges and an easily-removable chart cassette ensure simple and efficient pen and chart replacement.

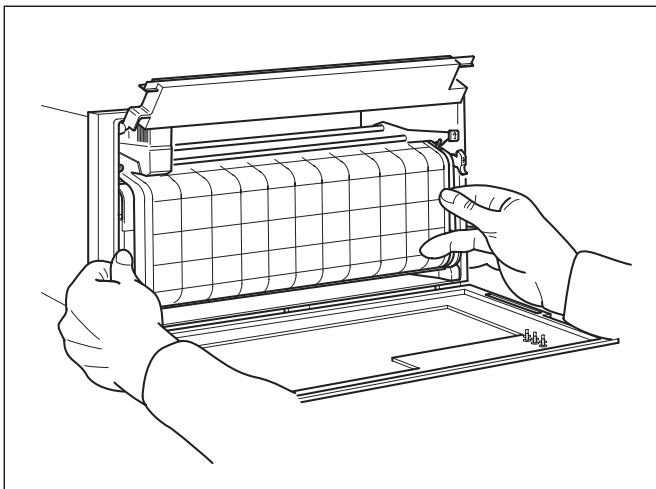
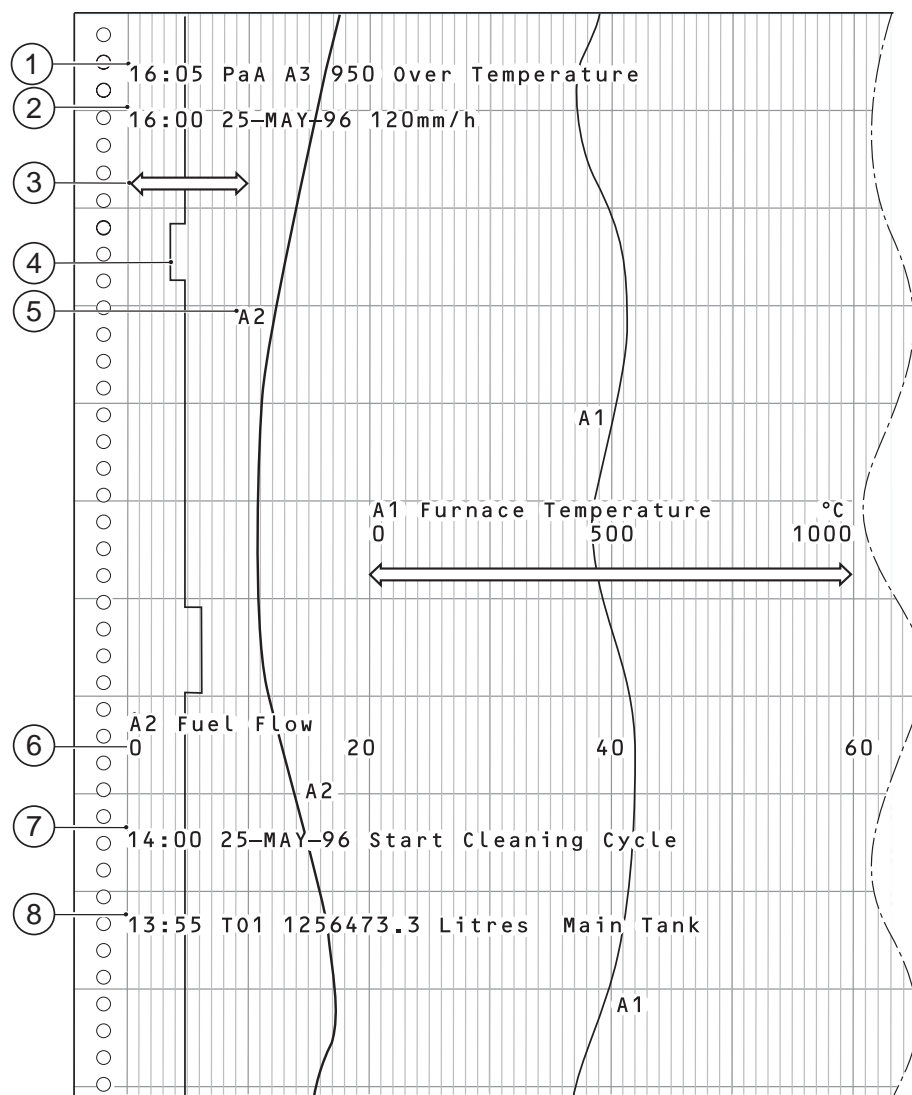
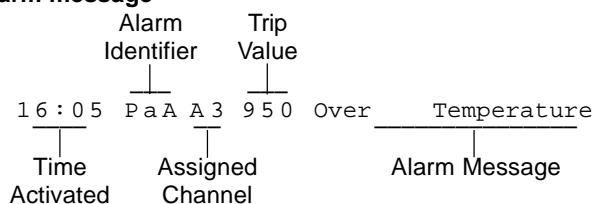


Chart Annotation



1 Alarm message



2 Time / Date / Chart speed – printed on power-up and at 240mm intervals (approx.). The time is printed every 60mm (approx.).

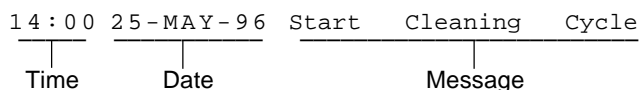
3 Zone – the 250mm chart width can be split into zones. (10 max.). The zone margins can be set to any major chart division and traces can be configured to record in any zone. Zones can overlap.

4 Event recording – assigned to digital inputs and alarms. Any trace can be configured as a 3-position event marker, recording in the centre of the zone, with a 3mm deviation when a digital input is active.

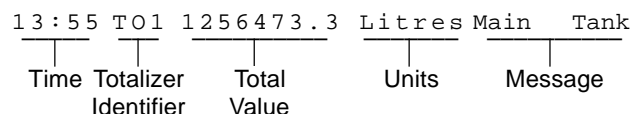
5 Channel Identifiers – one identifier per trace.

6 Scale marking – one scale per trace, printed across the width of the zone, at intervals of 20 to 240mm.

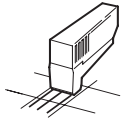
7 Batch message – printed on demand from a digital signal or via the front panel keys.



8 Totalizer print-out – printed at programmable intervals (between 5 and 720 minutes).



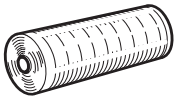
SUMMARY SPECIFICATION



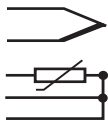
A **6-color print-head**, using our patented **Z-trace** printing provides 24 unique traces, printed-out in under 3 seconds.



The recorder prints **time, date and chart speed** automatically at regular intervals. Channel scales, alarm messages, batch identifiers, totalizers, events and maths results can also be printed on the chart periodically or on demand.



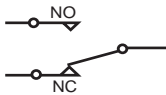
Roll charts with a recording width of 250mm are available with 80, 100, 120, 140 and 150 divisions.



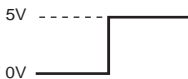
Universal process inputs can be set up for all standard types of thermocouple, RTD, 4 to 20mA and V or mV signals. All 24 inputs are sampled every 3 seconds. Transmitter power supplies are available for loop-powered devices.



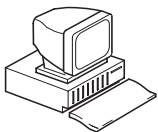
Up to **24 process alarms** can be set up within the recorder. The alarms can be used to operate relay outputs, print messages on the chart or change the chart speed.



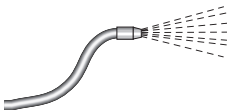
A maximum of **18 relays** can be fitted within the recorder for use as alarm outputs. A single common relay can be set up to be triggered by multiple alarms.



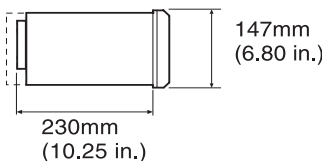
Up to **18 digital inputs** can be fitted for remote changing of chart speed, alarm acknowledgment, input to logic equations and event recording.



RS485 2- or 4-wire communication using MODBUS protocol provides a real-time link to SCADA systems or PLCs.



The **IP65 (NEMA 3)** front face and door seals protect panel-mounted recorders against dust and water jets.

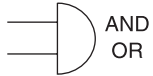


With a **panel depth** of only 230mm (8.7 in.) and weighing less than 6kg (13 lb) the COMMANDER PR250 is the most compact 250mm recorder available.

Width 327mm (12.87 in.)

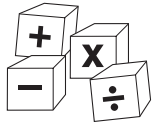
SUMMARY SPECIFICATION

1548097

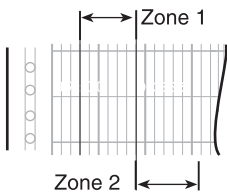


The PR250 includes, as standard, **12 independent flow totalizers**. These can be set to count up or down, with end of batch alarm if required.

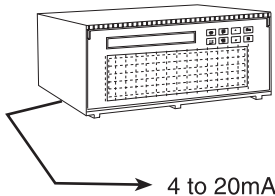
Internal soft wiring of functions using **10 logic equations** minimizes installation costs and maximises functionality.



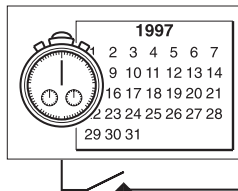
There are **8 maths blocks** available, each with up to 3 inputs. Also included are preset maths blocks for mass flow, %RH, max., min. and average calculations.



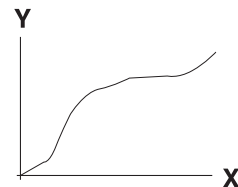
Up to **10 programmable zones** can be selected on the chart. The size of each zone is variable and can be set by the user.



Six analog outputs can be fitted for **retransmission** of any input signal or maths function result.



Four **event timers** can be set to activate hourly, daily or weekly and can be used in logic equations.



Included as standard are two **20-breakpoint custom linearizers** for use on non-standard thermocouples, tank level or other unusual input ranges.

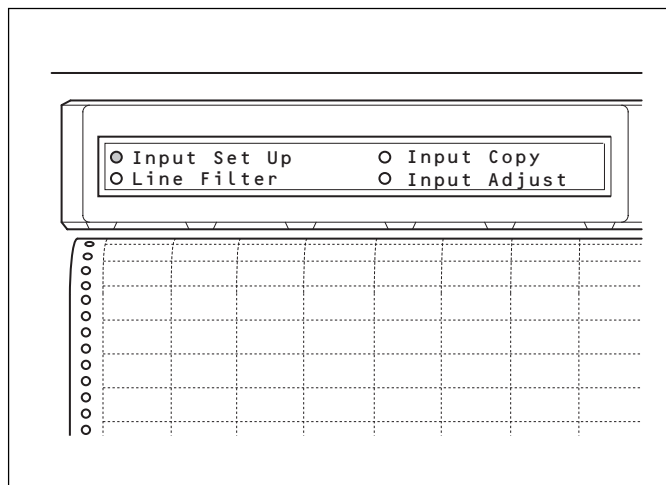


Up to **24 parameters** can be continuously logged on to a PC card from selected process signals, maths results or totalizers. The card also provides configuration, save and restore facilities.

Unique Post-Incident Analysis (Cue-and-Review)

The Commander PR250's unique Cue-and-Review feature allows the user to rapidly search any part of the roll chart, process event or alarm occurrence – enabling rapid and accurate analysis of process records.

The 10 most recent alarms are held in a buffer, allowing the user to examine the order of process incidents and to review the corresponding part of the chart for detailed evaluation.



Set-up

The COMMANDER PR250 can be easily set up to match your process in either of two ways:

For small changes the simplest method is by means of the keypad on the front of the unit. Entry of the correct password gives access to the recorder's configuration. A simple menu structure with clear text descriptions provides an intuitive approach to the recorder set-up.

The fastest way to set up multiple COMMANDER PR250 recorders is by means of the COMMANDER Configurator. This Windows-based package provides a simple 'point-and-click' approach to generating a full recorder configuration off-line. The completed configuration can be printed out or saved onto disk before being downloaded to the recorder.

A COMMANDER interface cable is used to provide the connection between the PC's serial port and the configuration port on the recorder.

Option Modules

All recorders are fitted with at least one universal input module for analog process signals plus a transmitter power supply for up to two 4 to 20 mA devices.

The capabilities of your recorder can be extended further by the addition of option modules. Each recorder can support up to 4 input modules plus 3 option modules.

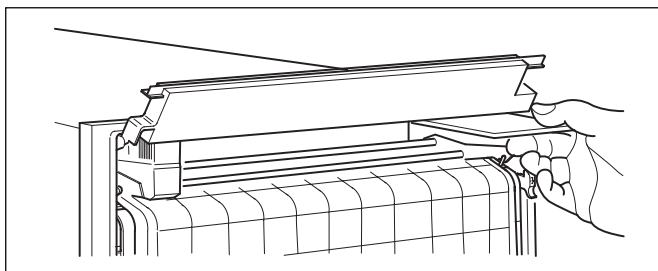
Type	Standard	Option
Universal Inputs	3, 6, 9, 12, 15, 18, 21 or 24	
Relay	0	18
Transmitter Power Supply	2	12
Serial Communications	X	✓
Digital inputs	1 *	18
Digital outputs	0	18
Analog outputs	0	6

* per universal input module

Memory Card Data Storage

The PR250 supports a simple plug-in, card-based logging system with the ability to record data from up to 24 process signals. The information is stored in DOS format which can be easily imported by the majority of standard spreadsheets. On applications which do not run continuously the data logging can be started/stopped from an external digital source.

Configuration Save-and-Restore is also supported by the card, allowing rapid downloading of frequently-used configurations and simple copying from one recorder to another.



Mounting Options

Instead of standard panel clamps the COMMANDER PR250 can be supplied with a rugged carrying case, making it ideal for bench-top or on-site use.

The carrying case, combined with the recorders' light weight, provides a perfect instrument for survey work.

PERFORMANCE SPECIFICATION

Summary

Choice of 3, 6, 9, 12, 15, 18, 21 or 24 traces

250mm wide roll chart

Fully user-programmable

IP65 (NEMA 3) protection

CHART

Traces

1 trace per input channel, analog trend or 3-position event

Colors

Magenta, red, black, green, blue and brown basic plus
18 multicolor Z-traces

Pen Life

3 months typically (at 20mm/hr with normal scale printing)

Chart

25m Roll chart

Quick-load cassette

Standard chart graduation: 100 divisions

80, 120, 140, 150 divisions also available

Chart Speed

Configurable between 1 and 1500mm/hr in 1mm/hr steps
Logic or switch selectable at three configured speeds
and stop (0mm/h)

Trace Response

3s for update of 24 traces max.
2.2s for update of 12 traces max.
1.5s for update of 6 traces max.

Trace Resolution

0.2mm

OPERATION

Graphics display – backlit LCD

Characters 10.4mm or 5.1mm high

Display of Programming/Configuration

Five selectable operator displays :

- 1 Large PV + engineering units + channel tag
- 2 Large PV + engineering units + totalizer value
- 3 3 x PVs + engineering units
- 4 PV + engineering units + 200 element bargraph
- 5 Digital signals + text on/off message

Languages

User configurable for English, French or German

Switches

Sealed tactile membrane – duplicate keypads on door
and inside case

Security Levels

All levels are protected by a user-configured password

ANALOG INPUTS

Number

3, 6, 9, 12, 15, 18, 21 or 24 Standard Analog Inputs

Input Sampling Rate

125ms per channel – 24 channels in 3s

Type

Universally Configurable to provide:

Thermocouple (THC)

Resistance thermometer (RTD)*

Millivolt

Current

Voltage*

Resistance*

*RTD, Resistance and Volts (>2V) inputs not available on 500V
Isolated Analog Inputs

Linearizer Functions

Programmable for all inputs including: $\sqrt{}$, $x^{3/2}$, $x^{5/2}$.

THC types B, E, J, K, R, S, T, L, N, or Pt100

Two 20-breakpoint custom linearizers

Broken Sensor Detection

Programmable UP/DOWN scale or NONE

RTD short/open circuit detection

User-programmable fault detection level percentage

Cold Junction Compensation

Automatic CJC incorporated as standard for THC input
types, accuracy < 0.05°C/°C

Input impedance

Current: 10Ω

Voltage: 500kΩ

mV & THC: >10MΩ

2-Wire Transmitter Power Supply

45mA max. (2 loops), fitted as standard.

Additional loops can be powered from optional TXPSU
modules

Standard Input Module

Channel-to-channel 12V d.c. dielectric strength

Channel-to-ground 500V d.c. dielectric strength

500V Input Module

Channel-to-channel 500V d.c. dielectric strength

Channel-to-ground 500V d.c. dielectric strength

Common Mode Rejection

> 120dB at 50/60Hz with 300Ω imbalance resistance

Series Mode Rejection

> 60dB at 50/60Hz

Temperature Stability

0.02% of reading/°C or 2μV/°C (whichever is greater)

Long Term Drift

< 0.01% of reading or ±5μV annually

Filtering

Off, 5 to 60s digital filter

ELECTRICAL

Power supply

85 to 265V 50/60Hz
24V d.c. $\pm 4V$ (optional)

Power consumption

40VA max
20W d.c. (typical)

Electrical safety

EN61010-1, IEC348
CSA (optional)

Electrical connections

Screw terminals

RANGES AND ACCURACY

Input Ranges

Input Type	Min. Value	Max. Value	Min. Span	Accuracy (% of reading)
Millivolts	-2000	2000	2.5	$\pm 0.1\%$ or $\pm 10\mu V$
Volts	-20	20	0.25	$\pm 0.2\%$ or $\pm 2mV$
Milliamps	-100	100	0.25	$\pm 0.2\%$ or $\pm 2\mu A$
Resistance	0	8000	10	$\pm 0.2\%$ or $\pm 0.08\Omega$

ADVANCED PROCESSING FUNCTIONS

Totalizers

Twelve independent, with configurable wraparound, digital/manual reset, stop/start and print

Text Messages

24 configurable messages (20-character) assignable to any digital source or alarm function
24 process alarm messages (20-character), 1 per alarm
1 operator message for batch identification (20-character)

Alarms

24 high/low process alarms with programmable level and time hysteresis
4 real-time events with programmable on-time and duration

Math Functions

8 user-configurable functions, programmable for standard arithmetic functions or for mass flow, %RH or F-value calculations

Logic Functions

10 logic equations, user-defined up to 15 elements per equation (AND, OR, etc.)

Thermocouple and RTD Ranges and Accuracy

THC/RTD Type	°C				°F			
	Min.	Max.	Min. Span	Accuracy	Min.	Max.	Min. Span	Accuracy
Type B	-18	1800	710	$\pm 2.0^*$	0	3272	1278	$\pm 3.6^*$
Type E	-100	900	45	± 0.5	-148	1652	81	± 0.9
Type J	-100	900	50	± 0.5	-148	1652	90	± 0.9
Type K	-100	1300	65	± 0.5	-148	2372	117	± 0.9
Type L	-100	900	50	± 0.5	-148	1652	90	± 0.9
Type N	-200	1300	90	± 0.5	-328	2372	162	± 0.9
Type R & S	-18	1700	320	$\pm 0.1^*$	0	3092	576	$\pm 1.8^*$
Type T	-250	300	60	± 0.5	-418	572	108	± 0.9

* For thermocouple types B, R and S performance accuracy cannot be guaranteed below 300°C (572°F).

RTD	-200	600	25	$\pm 0.5^{**}$	-328	1112	45	$\pm 0.9^{**}$
-----	------	-----	----	----------------	------	------	----	----------------

** For temperatures between 300° and 600°C (572° and 1112°F) accuracy is $\pm 1.0^\circ$ ($\pm 1.8^\circ$).

PHYSICAL

Size

326.8mm (12.87 in.) x 147.0mm (5.78 in.)
x 230.0mm (9.00 in.) (depth behind panel)

Weight

6kg (13 lbs.) approx.

Panel cut-out

302.8mm (11.92 in.) x 138.0mm (5.43 in.)

Case material

Stainless steel, painted

Door material

Glass-filled polycarbonate

Window material

Polycarbonate

Keypad material

Polyester

ENVIRONMENTAL

Operating limits

0 to 50°C (32° to 122°F),

Electronics < 95%RH (non-condensing)

Chart < 80%RH (non-condensing)

Storage temperature limits

–20°C to 80°C

Dust/Water Protection

Front face IP65

Rear of instrument IP20

Electromagnetic Compatibility

EN50081-2, EN50082-2

CE marked

Vibration

Designed to meet IEC68

OPTION MODULES

3 or 6 Relay Output Module

Universally assignable to any alarm signal

Relay type Single pole changeover

Voltage 250V a.c. 30V d.c.

Current 5A a.c. 5A d.c.

Loading (non-inductive) 1250VA 150W

Note. The total load for all relays within the instrument must not exceed 36A.

Hybrid Module

Two isolated analog outputs

Universally assignable to any analog signal or maths result

Configurable current range 0 to 20mA

Maximum load 750Ω

Six digital outputs

Universally assignable to any alarm signal or system event, positive or negative logic

True 5V TTL outputs

Six digital inputs

5V TTL or volt-free contact triggered

Analog output isolation 500V from any other input or output

Digital I/O isolation 500V from rest of instrument

2-wire Transmitter Power Supply Module

Two isolated 24V outputs (45mA each)

Each output capable of driving 2 loops

RS485 Serial Communication (MODBUS) Module

EIA communications standard RS485 (2- or 4-wire)

Protocol MODBUS rtu (slave)

Baud rate User selectable up to 9600

Isolation 500V from rest of instrument

Memory Card Port

PCMCIA/SRAM 'credit card' type

Card sizes: 64kb, 128kb, 256kb, 512kb, 1Mb, 2Mb, 4Mb

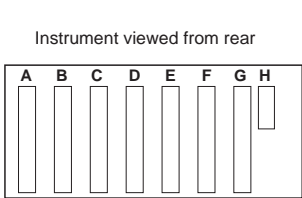
Configuration storage: DOS format files

Configuration capacity: 32 configurations max.

Data logging format: DOS files, spreadsheet compatible

Sample interval 3 to 3600s

Electrical Connections



H
Power Supply

1	⊗	L	Line	
2	⊗	N	Neutral	A.C.
3	⊗	E	Earth	
4	⊗	+	+	D.C.
5	⊗	-	-	
6	⊗			
7	⊗	+24V	+	2-wire Transmitter
8	⊗	0V	-	DC Power

A, B
Analog Input
Connector

⊗	1	+	Analog I/P 1
⊗	2	-	3rd lead RTD
⊗	3		
⊗	4	+	Analog I/P 2
⊗	5	-	3rd lead RTD
⊗	6		
⊗	7	+	Analog I/P 3
⊗	8	-	3rd lead RTD
⊗	9		
⊗	10	+	Analog I/P 4
⊗	11	-	3rd lead RTD
⊗	12		
⊗	13	+	Analog I/P 5
⊗	14	-	3rd lead RTD
⊗	15		
⊗	16	+	Analog I/P 6
⊗	17	-	3rd lead RTD
⊗	18		
⊗	19		Logic I/P
⊗	20		0V

Analog input 1, 2 and 3 only
for a 3-input module

E, F
Relay Output

⊗	1	NC	
⊗	2	NO	Relay 1
⊗	3	C	
⊗	4	NC	
⊗	5	NO	Relay 2
⊗	6	C	
⊗	7	NC	
⊗	8	NO	Relay 3
⊗	9	C	
⊗	10	- Spare	
⊗	11	NC	
⊗	12	NO	Relay 4
⊗	13	C	
⊗	14	NC	
⊗	15	NO	Relay 5
⊗	16	C	
⊗	17	NC	
⊗	18	NO	Relay 6
⊗	19	C	
⊗	20		

E, F, G
Transmitter d.c.
Power Supply

⊗	1	+	
⊗	2	+	24V
⊗	3	-	
⊗	4		
⊗	5	- Spare	
⊗	6	- Spare	
⊗	7	+	
⊗	8	+	24V
⊗	9	-	
⊗	10	-	
⊗	11		
⊗	12		
⊗	13		
⊗	14		
⊗	15		
⊗	16		
⊗	17		
⊗	18		
⊗	19		
⊗	20		

E, F, G
Hybrid

⊗	1	Dig I/P 1
⊗	2	Dig I/P 2
⊗	3	Dig I/P 3
⊗	4	Dig I/P 4
⊗	5	Dig I/P 5
⊗	6	Dig I/P 6
⊗	7	Common I/P
⊗	8	Common I/P
⊗	9	Dig O/P 1
⊗	10	Dig O/P 2
⊗	11	Dig O/P 3
⊗	12	Dig O/P 4
⊗	13	Dig O/P 5
⊗	14	Dig O/P 6
⊗	15	Common O/P
⊗	16	Common O/P
⊗	17	+ Analog O/P 1
⊗	18	- Analog O/P 1
⊗	19	+ Analog O/P 2
⊗	20	- Analog O/P 2

G
RS 485 Comms

⊗	1	-	TX 4-wire
⊗	2	-	
⊗	3	+	TX 4-wire
⊗	4	+	
⊗	5	- Spare	
⊗	6	+	TX/RX 2-wire
⊗	7	+	& RX 4-wire
⊗	8	-	TX/RX 2-wire
⊗	9	-	& RX 4-wire
⊗	10	- Spare	
⊗	11	-	Common
⊗	12	-	
⊗	13		
⊗	14		
⊗	15		
⊗	16		
⊗	17		
⊗	18		
⊗	19		
⊗	20		

Note. Refer to instrument code for module positions
Relay 1, 2 and 3 fitted for 3-relay module

Ordering Guide

COMMANDER PR250 Advanced Process Recorder PR250 /		X X	X	/ X	X	0	/ X	X	X	/ X	X	X	XX
Number of traces and Input Channels	3	0 3											
	6	0 6											
	9	0 9											
	12	1 2											
	15	1 5											
	18	1 8											
	21	2 1											
	24	2 4											
Input dielectric strength (channel-to-channel)	12V		S										
	500V *		H										
Build	Standard			B									
	CSA (pending)			C									
	UL (pending)			U									
Memory card port	None				0								
	PCMCIA				M								
Option Module E	None						0						
	3 relays						3						
	6 relays						6						
	Digital I/O & analog output						H						
	Transmitter power supply unit						T						
Option Module F	None							0					
	3 relays							3					
	6 relays							6					
	Digital I/O & analog output							H					
	Transmitter power supply unit							T					
Options Module G	None								0				
	3 relays								3				
	6 relays								6				
	Digital I/O & analog output								H				
	Transmitter power supply unit								T				
	MODBUS serial communications								S				
Case option	Panel mount									1			
	Panel mount with terminal cover									2			
	Portable									3			
	Portable with terminal cover									4			
Chart type	Roll chart										1		
Power supply	85V to 265V a.c.											2	
	24V a.c./d.c.											3	
Configuration	Custom												CM
	Standard												ST

* 500V Input dielectric strength only available on 6, 12, 18, 24 channel versions

Overall Dimensions

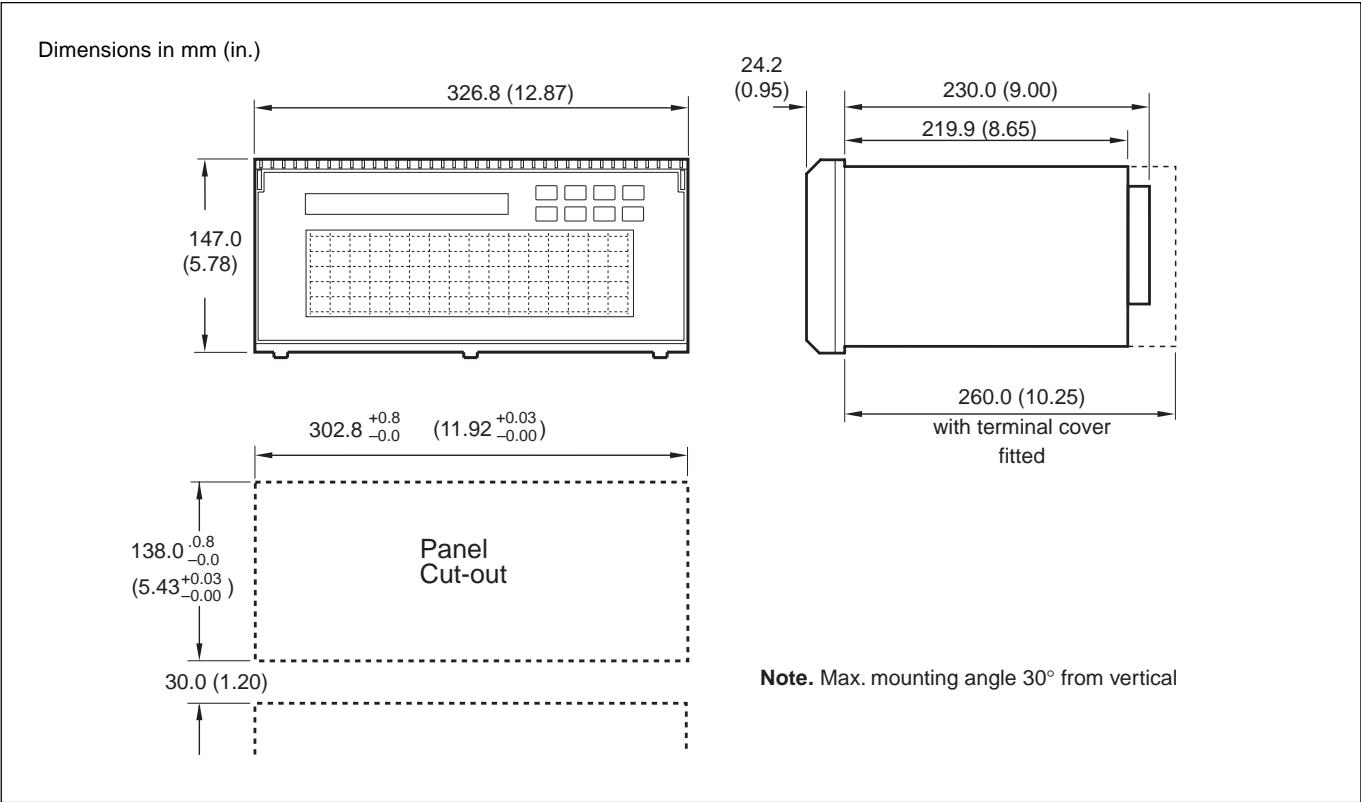


ABB Kent-Taylor Ltd.
St. Neots
Cambs.
England, PE19 3EU
Tel: +44 (0) 1480 475321
Fax: +44 (0) 1480 217948

ABB Instrumentation Inc.
PO Box 20550, Rochester
New York 14602-0550
USA
Tel: +1 716 292 6050
Fax: +1 716 273 6207

ABB Kent-Taylor SpA
22016 Lenno
Como
Italy
Tel: +39 (0) 344 58111
Fax: +39 (0) 344 56278

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.
© ABB 1998 (4.98)