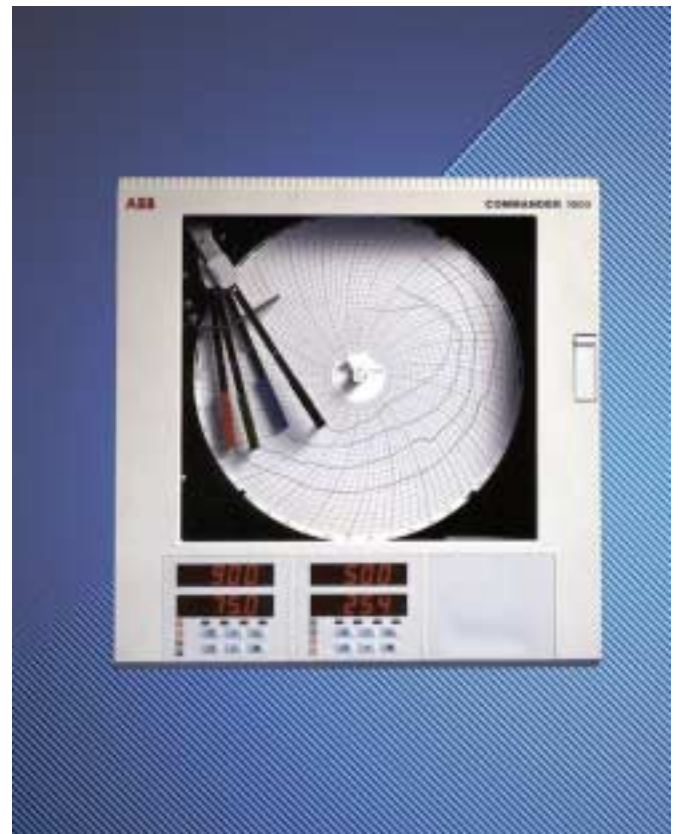




- **1 to 4 pens**
  - full application flexibility
- **NEMA 4X/IP66 construction**
  - hose-down protection
- **Analog, relay outputs, digital inputs and transmitter power supply as standard**
  - range of inputs and outputs built-in
- **Multiple 6-digit indicator panels**
  - continuous display of all signal values
- **0.1% measurement accuracy**
  - precise process information
- **High noise immunity**
  - robust, dependable operation
- **RS485 Modbus serial communications**
  - open systems compatibility
- **Totalizers and math functions built-in**
  - fully integrated solutions



**C1900 – a rugged, reliable recorder with the full capability to meet your needs**



### C1900

The C1900 is a fully programmable circular chart recorder for up to four process signals. The C1900's straightforward operator controls and robust construction make it suitable for a variety of industrial environments. Excellent standard facilities are complemented by a powerful range of options to give the flexibility to match your application.

### Comprehensive Process Information

The C1900 lets you see the status of your process at a glance: high visibility 6-digit displays provide a clear indication of up to four process values simultaneously and active alarms are signalled by flashing LEDs below the main display.

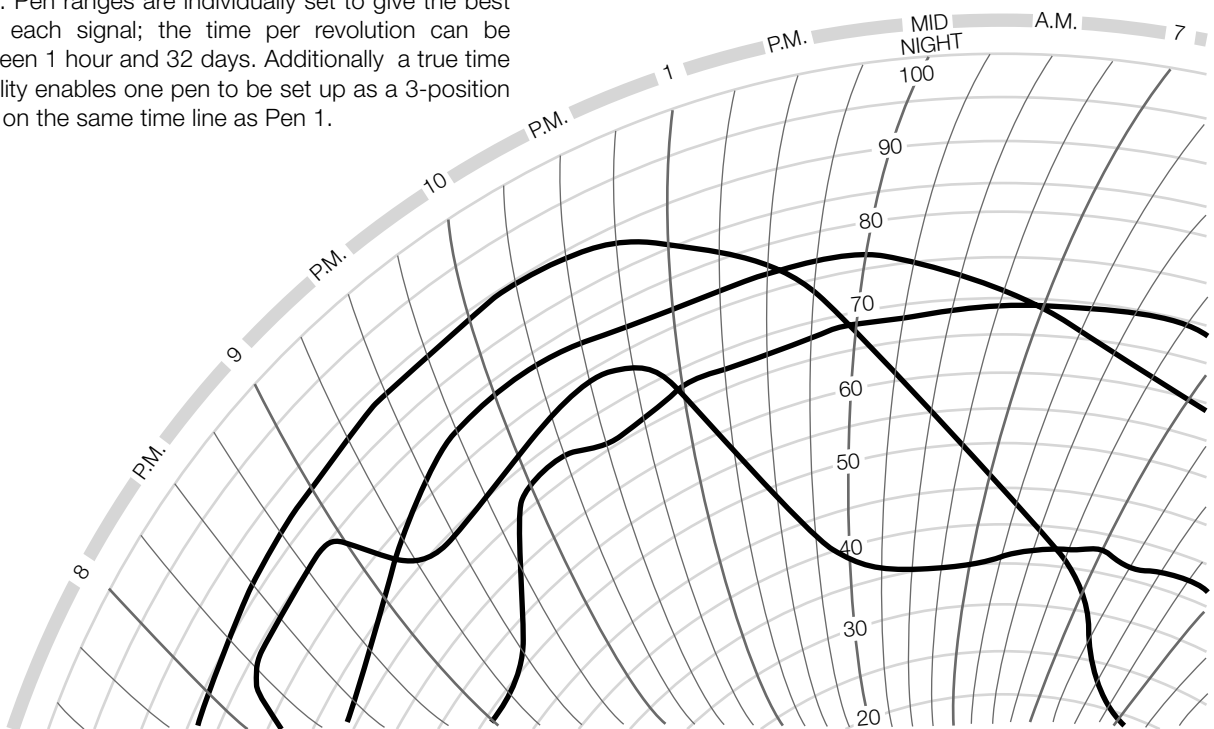
### Simple Operation



The clearly-labelled tactile keypad gives direct access for operator adjustments and configuration programming, without the need to open the recorder's door. Clear text prompts on the digital displays guide the user around the various menus. A password-protected security system prevents unauthorized access to configuration adjustment menus.



The chart is easily set up to show the information you need in the way you want. Pen ranges are individually set to give the best resolution for each signal; the time per revolution can be selected between 1 hour and 32 days. Additionally a true time event pen facility enables one pen to be set up as a 3-position event marker on the same time line as Pen 1.



### Flexibility to Solve Problems

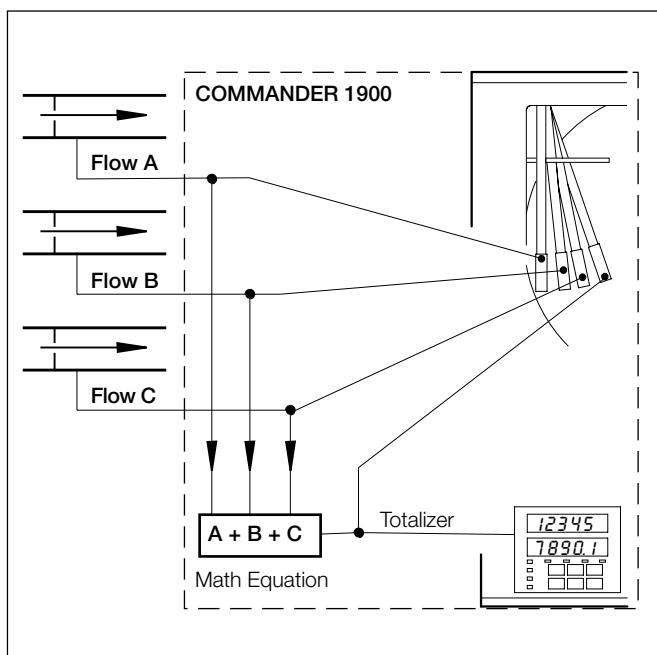
The C1900 offers seamless integration of loop functionality to solve process problems, eliminating the need for auxiliary devices.

### Totalizers, Math and Logic

Integrating fluid flow to calculate total volume is performed by the built-in totalizers available for each channel. Relays can be assigned to increment or reset external counters to match the recorder's totalizer values.

User configurable math functions, mass flow calculations and RH tables are all fully supported.

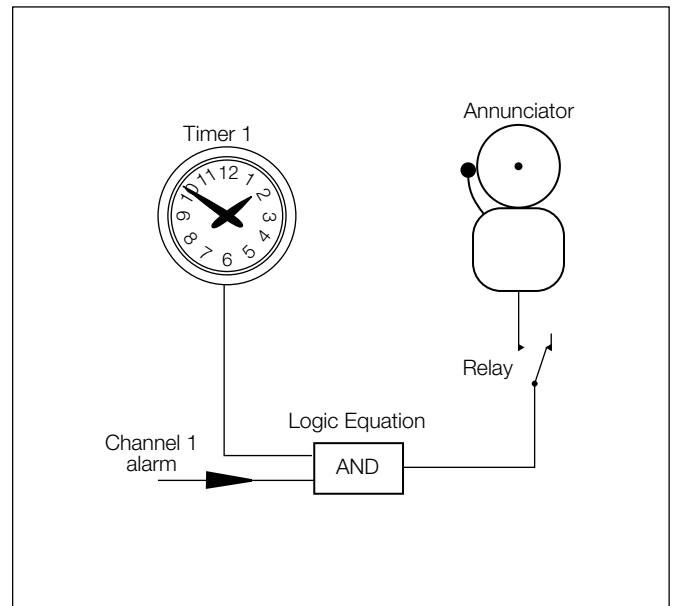
Logic capability allows interlocking and integration of discrete and continuous functions to solve a wide range of process problems.



Summation of Three Flows

### Timers and Clock

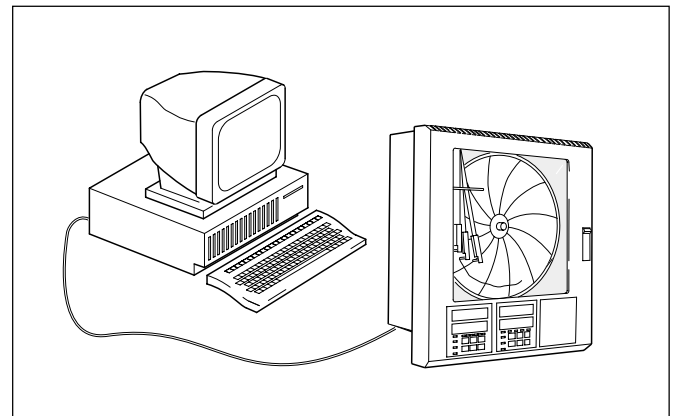
The C1900 offers two event timers driven by the recorder's real-time clock. The timers can be configured to operate relays, start/stop the chart or trigger other actions within the recorder.



Alarm annunciation enabled during night hours only.

### Modbus RS485 Communications

Communications with PCs or PLCs are achieved via the RS485 serial communications link, enabling the C1900 to serve as the front end of plant-wide data acquisition systems. Using Modbus RTU protocol all process inputs and other variables can be continuously read by a host PC running any of a wide variety of standard SCADA packages.



### Built to Meet Your Needs

The C1900's modular architecture gives rise to a high level of hardware choice: up to five I/O modules can be added to the basic instrument.

The standard input/output module supplied with every pen comes complete with a fully isolated analog input, a relay output, transmitter power supply, isolated analog retransmission and two digital inputs.

Further input and output capability is provided by a range of plug-in modules:

- Analog input and relay – for use with math functions
- Four relays – channel alarm outputs
- Eight digital inputs – linked using logic equations
- Eight digital outputs – TTL level alarm outputs
- Modbus RS485 communications – interfaces with PCs

### Expandable for the Future

The C1900 may be quickly upgraded to meet your changing process requirements.

Additional recording channels, math capability or input and output functions can be retrofitted on-site using plug-in cards and easily fitted pen arms. Input calibration data is stored on each card, allowing quick changes to input cards without the need for recalibration.

Changes to input sensors or recording procedures are accommodated by reconfiguration using the main keypad.



### Designed to Survive

NEMA 4X protection ensures the C1900 can survive in the harshest environments and makes the recorder ideal for use in panels which are regularly hosed down. The tough, acid-resistant case and secure cable-entry glands maintain the NEMA 4X rating for wall-mounted or pipe-mounted instruments.

### Noise Immunity

Recording accuracy is maintained in noisy industrial environments due to the advanced EMC shielding within the recorder. The power supply has been designed to give excellent protection from power spikes and brownouts and all configuration and status information is held in nonvolatile memory to ensure rapid recovery after a power failure.

### Minimal Maintenance

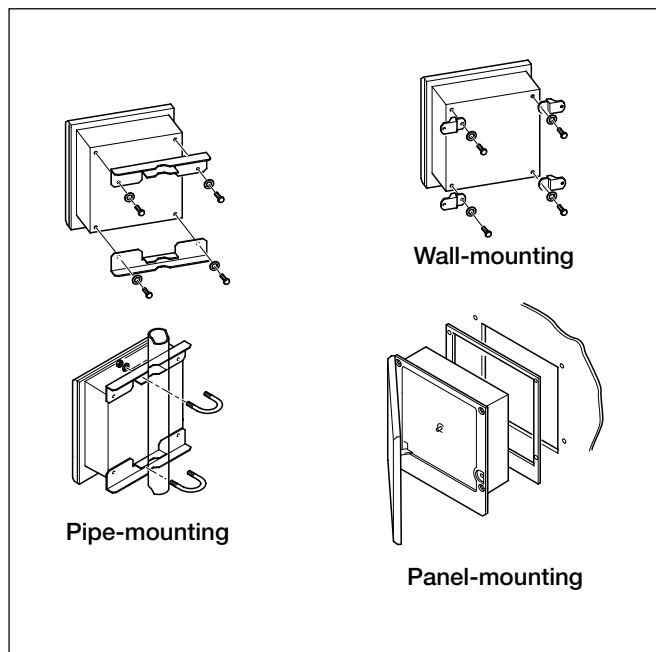
Excellent long-term stability keeps recalibration to a minimum, cutting the costs of ownership. User-selectable chart speeds and long-life pens combine to limit usage of consumables.

### Built-in Quality

The C1900 is designed, manufactured and tested to the highest quality standards, including ISO 9001.

### Easy to Install

A choice of mounting options enables simple installation of the recorder in a panel, on a wall or on a pipe. Detachable terminal blocks allow for trouble-free connection of input and output wiring, with mains isolation provided by a power switch within the instrument. Intégrité des données garantie



## Summary

1, 2, 3 or 4 pens

10 in. chart size

Standard I/O with each pen includes:

Analog input, analog output, transmitter power supply, relay output and 2 digital inputs.

## Specification

### Construction

Size:	15.23 in. (h) x 15.04 in. (w) x 5.57 in. (d) (386.8 x 382.0 x 141.5mm)
Weight:	18lb (8.2kg)
Case material:	Glassfiber-filled reinforced polyester
Window Material:	Polycarbonate
Door latch:	High-compression with optional lock

### Environmental

Operational temperature range:	0° to 55°C (32° to 130°F)
Operational humidity range:	5 to 95%RH (non-condensing) 5 to 80%RH (chart only)
Case sealing:	NEMA 4X (IP66)
Fast transients:	IEC 801-4 Level 3

### Installation

Mounting options:	Panel, wall or pipe
Terminal type:	Screw
Wire size (max):	14 AWG (I/O), 12 AWG (power)

### Operation and Configuration

Programming method:	Via front panel keys
Security:	Password-protected menus

### Safety

General safety:	IEC348
Dielectric:	500V DC (channel/channel) 2kV DC (channel/ground)
Memory protection:	Nonvolatile EEPROM
Approvals:	CE CSA (Option) CSA/FM Class 1 Div. 2 (Option) UL (Option)

### Power Supply

Voltage:	115/230V AC $\pm$ 15%, 50/60Hz
Consumption:	<40 VA (typical for full spec. unit)
Line interruption:	Up to 60ms

## ...Specification

### Process Inputs and Outputs

#### General

Noise Rejection:	Common mode >120dB at 50/60Hz Normal (series) mode >60dB at 50/60Hz
CJC rejection ratio:	<0.05°C/°C
Sensor break protection:	Upscale or downscale drive
Out of range detection:	0 to 100% of engineering span
Temperature stability:	<0.02% of reading/°C or 1µV/°C
Long-term drift:	<0.01% of reading 10µV annually
Input impedance:	>10 MΩ (mV and V inputs) 100 Ω (mA input)

#### Analog Inputs

Signal types:	mV, V, mA, Ω
Thermocouple types:	B, E, J, K, N, R, S, T
Resistance Thermometer:	Pt 100
Other linearizations:	x <sup>1/2</sup> , x <sup>3/2</sup> , x <sup>5/2</sup> , linear
Sample interval:	250ms per channel
Dielectric:	500V DC channel/channel
Digital Filter:	0 to 60s programmable

#### 2-Wire Transmitter Power Supplies

Number:	1 per channel
Voltage:	24V DC nominal
Drive:	Up to 25mA
Isolation:	500V DC channel/channel

#### Analog Outputs

Type:	4 to 20 mA
Accuracy:	±0.1%
Maximum load:	750Ω
Dielectric:	500V DC

#### Relay Outputs

Type:	SPDT
Rating (with non-inductive load):	5A at 115/230V AC

#### Digital Inputs

Type:	TTL or volt-free
Minimum pulse:	250ms
Dielectric:	500V DC between modules, no isolation within module

#### Digital Outputs

Type:	5V TTL
Rating:	5mA per output
Dielectric:	500V DC between modules, no isolation within module

#### Serial Communications

Connections:	RS485, 4-wire
Protocol:	Modbus RTU

#### Pneumatic inputs/outputs

Type:	3 to 15 psig I/P, 3 to 15 psig P/I
Mounting:	External DIN rail on rear of unit

### Analog Input Performance

Type	Range Lo	Range Hi	Min. Span	Accuracy
mV	0	150	5	±0.1% reading or 10µV
V	0	5	0.1	±0.1% reading or 20µV
mA	0	50	1	±0.2% reading or 0.2µA
Ohms (low)	0	750	20	±0.2% reading or 0.1Ω
Ohms (high)	0	10k	400	±0.5% reading or 10Ω

Type	°C		°F		Accuracy (excl. CJC)
	Range Lo	Range Hi	Range Lo	Range Hi	
B	-18	1800	0	3270	±2.0°C (above 200°C)
E	-100	900	-140	1650	±0.5°C
J	-100	900	-140	1650	±0.5°C
K	-100	1300	-140	2350	±0.5°C
N	-200	1300	-325	2350	±0.5°C
R	-18	1700	0	3000	±1.0°C (above 300°)
S	-18	1700	0	3000	±1.0°C (above 200°C)
T	-250	300	-400	550	±0.5°C
PT100	-200	600	-325	1100	±0.5°C

**Recording System**

**Pens**

Number: 1, 2, 3, or 4  
(red, blue, green, black)  
Response: 7 seconds (full scale)  
Resolution: 0.1% steps  
Pen lift: Motor-driven, with optional autodrop

**Event Pens**

Standard: 3-position event recording on any channel  
Real time: 3-position event recording on the same time line as Pen 1

**Chart**

Chart size: 10 in. or 105mm  
Chart speed: 1 to 167 hours or 7 to 32 days per revolution

**Display and Operator Panels**

**Displays**

Number: 2 (1 or 2 pens) or 4 (3 or 4 pens)  
Type: 6-digit red LED, 0.56 in. (14mm) high  
Status indicators: Indicate channel number on display  
Alarm indicators: Indicate channel with active alarms

**Panel keys**

Function: Programming access, increment/decrement, pen lift and user-defined function key

**Alarms and Logic**

**Alarms**

Number: 4 per channel  
Type: High/low process, fast/slow rate of change, time delay  
Adjustments: Hysteresis, time delay

**Logic Equations**

Number: 4  
Function: OR, AND  
Inputs: Alarm states, digital inputs, totalizers, logic  
Outputs: Relays, digital outputs, chart stop, alarm acknowledge

**\*Option Module Types**

Option Module Types	I/O per module							Max. No. per instrument
	Analog I/P	Analog O/P	Trans. PSU	Relays	Digital I/P	Digital O/P	Comms.	
Standard I/O	1	1	1	1	2			3
Analog I/P + relay	1			1				5
4 relays				4				2
8 digital I/P					8			3
8 digital O/P						8		3
RS485 comms.							1	1
1901J (non-upgradeable)	1							

**Advanced Software Functions**

**Totalizers**

Number: 1 per pen  
Size: 99,999,999 max.  
Output: External counter driver, "wrap" pulse signal

**Math**

Number of equations: 4  
Type: +, -, x, ÷, low & high select, max., min., average, mass flow, RH

**Timers**

Number: 2  
Type: Real-time clock driven event, adjustable duration  
Output: Relay, digital output, logic equation

**Option Module\***

Number: 5 plus 1 x standard input/output module  
Connection: Plug-in cards with detachable connection blocks

**EMC**

**Design & Manufacturing Standards**

CSA General Safety Approved  
UL General Safety Approved  
FM General Safety Approved  
CSA/FM Class 1 Div. 2 Approved  
FDA Approved

**Ordering Information**

**PART 1**

<b>COMMANDER 1900 Recorder</b>		<b>19XX</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>XXX</b>
<b>Recorders *</b>	One Pen (Red)	11													
	Two Pens (Red & Green)	12													
	Three Pens (Red, Green, Blue)	13													
	Four Pens (Red, Green, Blue, Black)	14													
<b>Chart Type</b>	Standard		J												
	KPC 105 PX and PXR type charts		K												
	Chessell Brand charts		C												
<b>Electrical Code</b>	Standard			A											
	CSA approval (option)			B											
	CSA/FM Class 1 Div. 2 (option)			F											
	UL approval (option)			U											
<b>Option Module</b>	None				0										
	Additional Modules – Complete PART 2				A										
<b>Options</b>	None					0									
	Totalizer					3									
	Totalizer, Math & Timer					B									
<b>Door Lock</b>	Not Fitted									1					
	Fitted									2					
<b>Power Supply</b>	115V AC														
	230V AC														
	24V AC														
	115V AC with On/Off Switch														
	230V AC with On/Off Switch														
	24V AC with On/Off Switch														
<b>Special Settings</b>	Company Standard														STD
	Customer Setting														CUS
	Special														SXX

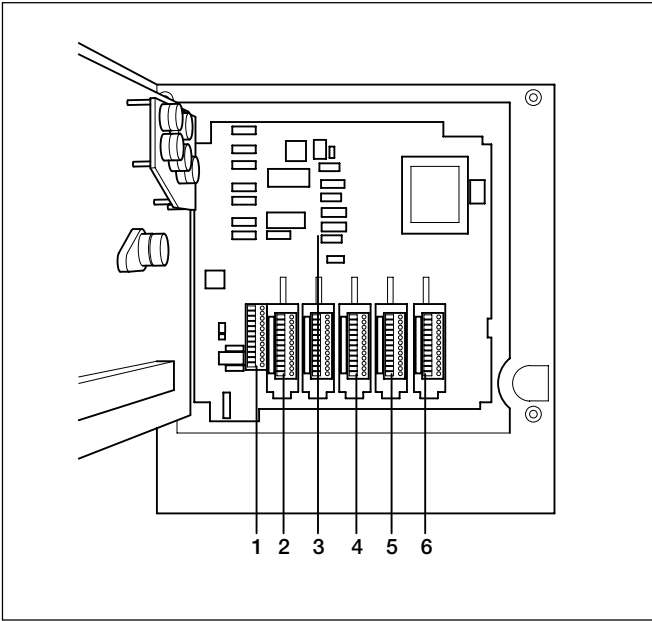
\* Each pen fitted has an associated standard Input/Output module comprising Analog Input, Analog Output, Relay, Transmitter Power Supply and Two Digital Inputs. Additional Input/Output modules may be fitted in the unused Module Positions as required. These additional modules should be specified in PART 2 of the Ordering Information.

<b>PART 2 – Additional Modules</b>	<b>Module Type</b>							
<b>Module Position 2 / Channel 2 Input*</b>	0	1	2					
<b>Module Position 3 / Channel 3 Input*</b>	0	1	2					
<b>Module Position 4 / Channel 4 Input *</b>	0	1	2	3	4	5	6	
<b>Module Position 5</b>	0	0	2	3	4	5		
<b>Module Position 6</b>	0	2	4	5	8			

**Accessories**

Case-to-panel gasket	C1900/0149
Wall-mount kit	C1900/1712
Pipe-mount kit	C1900/0712
Pack of Red Pens	C1900/0121
Pack of Green Pens	C1900/0122
Pack of Blue Pens	C1900/0120
Pack of Black Pens	C1900/0119
Pack of Purple Pens	C1900/0123

**...Ordering Information**



Module Positions

**Key to Module Types**

0 No module fitted / Pen input channel \*

1 Standard Input/Output

2 Analog Input (Math Input) + Relay

3 Four Relays

4 Eight Digital Inputs

5 Eight Digital Outputs

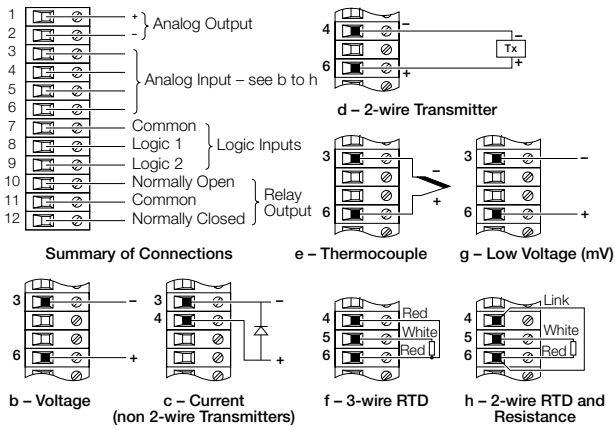
6 True Time Event Pen (Violet)

8 Modbus RS485 Communications

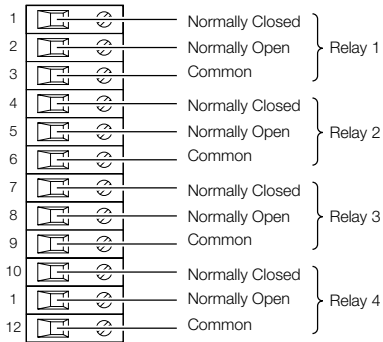
\* On 2, 3 or 4 pen instruments a standard I/O module is always fitted in the corresponding module position (enter '0' in the corresponding order code field).

**Example** 1 9 1 3 J A A 0 1 1 0 0 3 0 8 STD  
 3 pen —————  
 4 relays —————  
 Modbus RS485 Communications —————

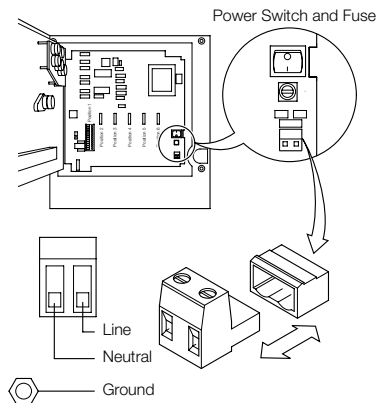
## Electrical Connections



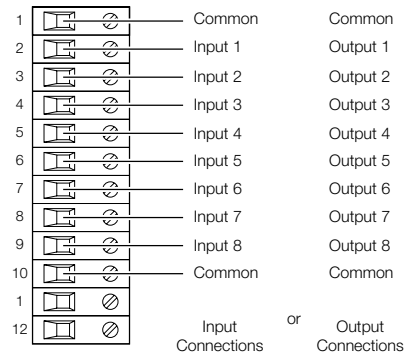
Standard Input/Output Modules



Four Relay Output Module

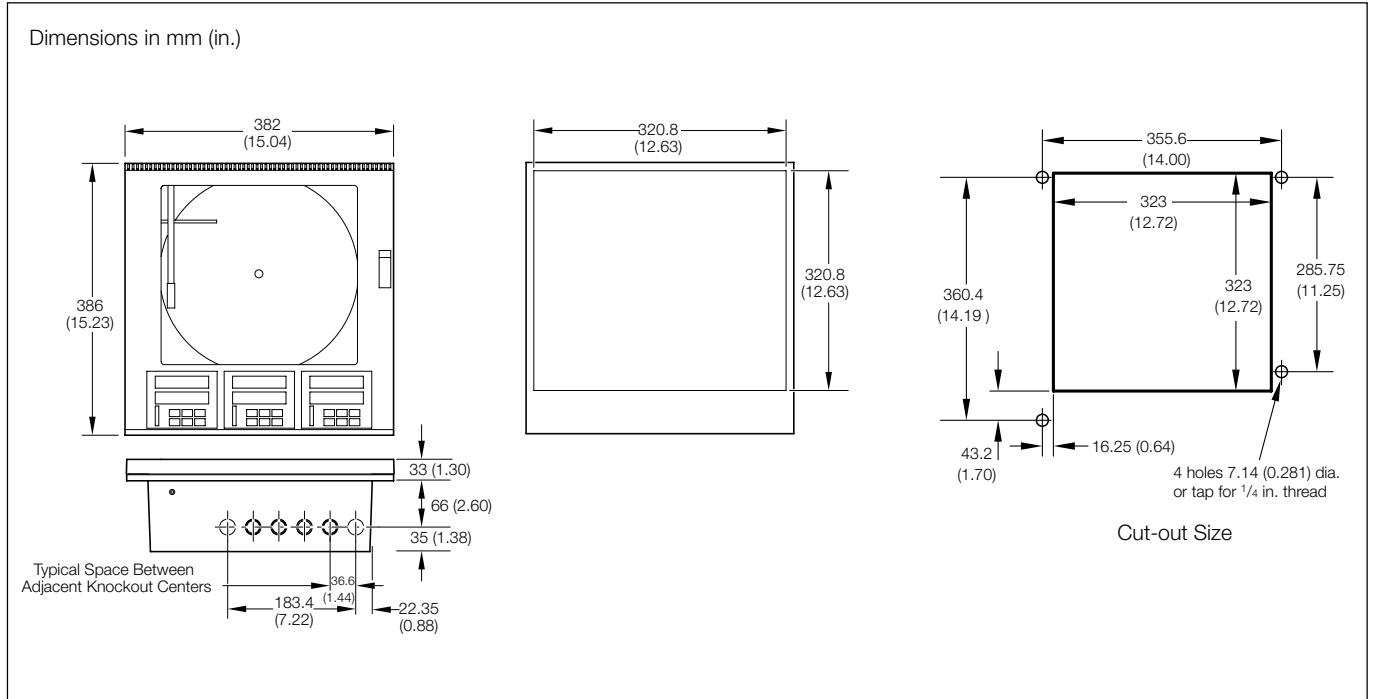


Power Supply Connections



Digital Input/Output Module

**Overall Dimensions**



**ABB** has Sales & Customer Support expertise in over 100 countries worldwide

[www.abb.com](http://www.abb.com)

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.

Printed in UK (09.04)

© ABB 2004



**ABB Limited**

Howard Road, St Neots  
Cambridgeshire  
PE19 8EU  
UK  
Tel: +44 (0)1480 475321  
Fax: +44 (0)1480 217948

**ABB Inc.**

125 E. County Line Road  
Warminster  
PA 18974  
USA  
Tel: +1 215 674 6000  
Fax: +1 215 674 7183