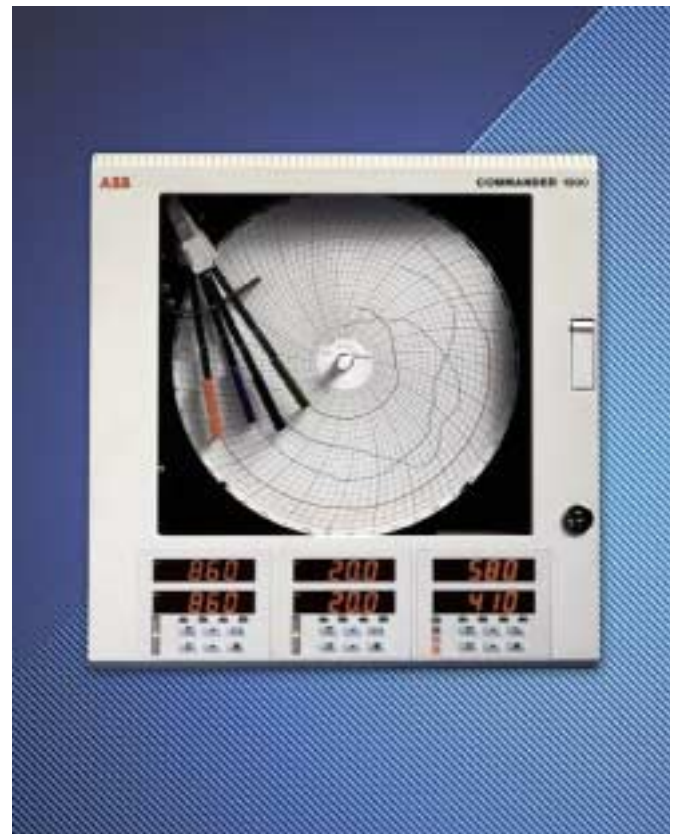




- **1 to 4 pen recording**
 - full application flexibility
- **1 or 2 controllers**
 - integrated control and recording
- **Analog, relay outputs, digital inputs and transmitter power supply as standard**
 - range of inputs and outputs built-in
- **PID autotune on demand**
 - optimum loop control
- **20 programmable ramp/soak profiles**
 - multiple recipe capability
- **NEMA 4X / IP66 construction**
 - hose-down protection
- **0.1% measurement accuracy**
 - precise process information
- **RS485 Modbus serial communications**
 - open system compatibility



**C1900 –
dependable recording and full PID
control united in a rugged,
functional instrument**



C1900

The C1900 is a fully programmable circular chart recorder/controller combining two PID control loops with 4-pen recording. 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.

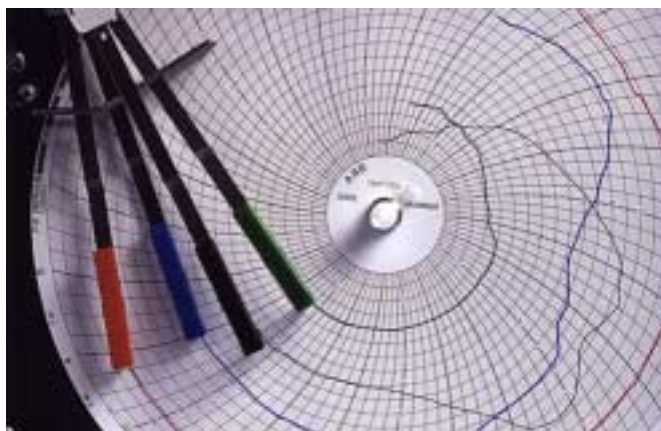
Comprehensive Process Information

The C1900 lets you see the status of your process at a glance: **high visibility 6-digit LED displays** provide a clear indication of all process signals. Dedicated operator stations for each controller give continuous displays of set points, measured values and high-visibility deviation bargraphs. Active alarms are signalled by flashing LEDs below the main displays.



4-pen Recording

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; 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.



Straightforward Operation

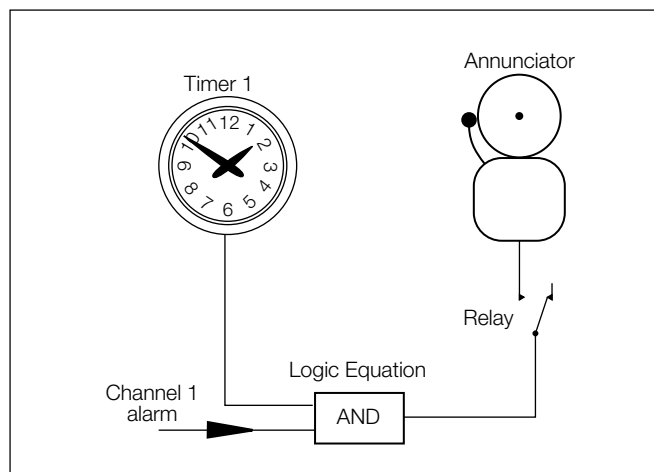
The clearly-labelled tactile keypads permit operator adjustments and configuration programming without the need to open the recorder's door. Separate operator panels for each controller provide a direct route for accessing individual control loops. Clear text prompts on the digital displays guide the user around the various menus. A password-protected security system prevents unauthorized access to configuration adjustment menus.

Flexibility to Solve Problems

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

Totalizers, Math, Logic and Timers

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.



Alarm annunciation enabled during night hours only

User configurable **math functions**, mass flow calculations, RH tables and **logic equations** are all fully supported. The C1900 also offers two event timers driven by the recorder's **real-time clock**.

Modbus RS485 Communications

Communications with PCs or PLCs are achieved via the RS485 serial communications link. 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.

Versatile Process Control

The C1900 provides full PID control of one or two process loops in addition to its powerful recording facilities. The control loops can operate independently or be soft-linked together to implement Cascade or Master/Slave control strategies. Each loop has a dedicated 1/4 DIN-style operator panel for ease of operation and clarity of display.



Analog, Relay or Valve Positioning Output

The control output is selectable to fit any application with a choice of analog, time proportioning or valve positioning relays; use of a feedback potentiometer to ensure precise valve control is fully supported. Heat/cool operation is available on both loops.

Autotune

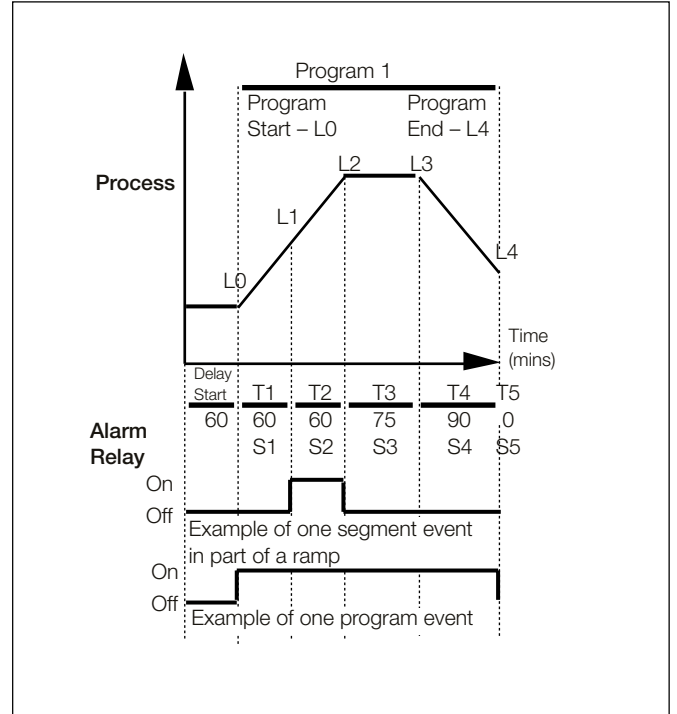
Operation of the autotune function on either loop instigates a tuning routine which allows the C1900 to calculate the optimum PID parameters for that particular loop. Following the completion of autotune, the PID values are automatically updated.

Auto/Manual and Local/Remote

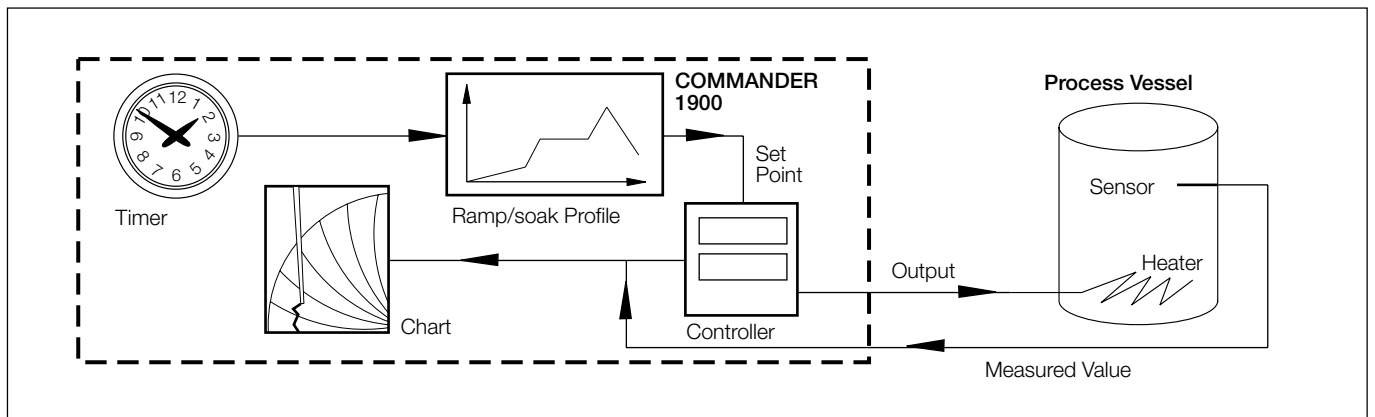
Dedicated membrane keys on each operator panel enable one-touch operation for selection between manual and automatic loop control and for switching from local to remote set point.

Extensive Ramp/Soak Programming

Full control of temperature profiles is provided by 10 program recipes for each controller. A total of 99 ramp/soak segments are available for allocation to these programs. Segment events can be incorporated into the recipes to perform specific functions (e.g. operate relays) at predefined points within the program.



Ramp/Soak Program with Time Event Relay Sequences



Programmed process warm-up triggered by real-time clock

Remote Program Selection

External panel switches can be connected to the C1900's digital inputs to allow remote selection of stored profiles and to initiate ramp/soak programs.

Built to Meet Your Needs

The C1900's modular architecture gives 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 output and two digital inputs. Further input and output capability is provided by a range of plug-in modules:

- Analog input and relay – remote set point
- 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

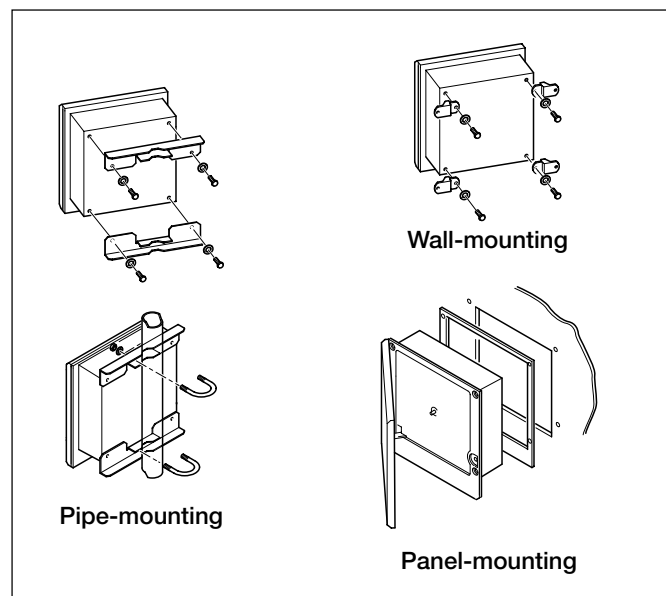
NEMA 4X protection ensures the C1900 can survive in the harshest environments and makes the recorder ideal for use in panels which are regularly hosed down. The tough, acid-resistant case and secure cable-entry glands maintain the NEMA 4X rating for wall-mounted or pipe-mounted instruments.

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.

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 an optional power switch within the instrument.



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, and is guaranteed by a 2 year parts and labour warranty.

Specification

Summary

1, 2, 3 or 4 pens
 1 or 2 PID control loops
 10 in. Chart size
 Standard I/O with each pen includes:
 Analog input, analog output, transmitter power supply, relay output and 2 digital inputs.

General 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
 Isolation 500V DC (channel/channel)
 2kV DC (channel/ground)
 Memory protection Nonvolatile EEPROM
 Approvals CSA (optional)
 CE

Power Supply

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

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
Ω (high)	0	10k	400	±0.5% reading or 0.1Ω
Ω (low)	0	10k	400	±0.5% reading or 10Ω

Type	°C			°F			Accuracy (excl. CJC)
	Range Lo	Range Hi	Min. Span	Range Lo	Range Hi	Min. Span	
B	-18	1800	1278	0	3270	710	±2.0°C (above 200°C)
E	-100	900	81	-140	1650	45	±0.5°C
J	-100	900	90	-140	1650	50	±0.5°C
K	-100	1300	117	-140	2350	65	±0.5°C
N	-200	1300	162	-325	2350	90	±0.5°C
R	-18	1700	576	0	3000	320	±1.0°C (above 300°)
S	-18	1700	576	0	3000	320	±1.0°C (above 200°C)
T	-250	300	108	-400	550	60	±0.5°C
PT100	-200	600	45	-325	1100	25	±0.5°C

...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	>10MΩ (mV and V inputs) 100Ω (mA inputs)

Analog Inputs

Signal types	mV, V, mA, Ω
Thermocouple types	B, E, J, K, N, R, S, T
Resistance Thermometer	Pt100
Other linearizations	x ^{1/2} , x ^{3/2} , x ^{5/2} , linear
Sample interval	250ms per channel
Isolation	500V DC channel/channel
Digital Filter	0 to 60s programmable

2-Wire Transmitter Power Supply

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

Analog Outputs

Type	4 to 20mA
Accuracy	± 0.1%
Maximum load	750Ω
Isolation	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
Isolation	500V DC between modules, no isolation within module

Digital Outputs

Type	5V TTL
Rating	5mA per output
Isolation	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 (0.207 to 1.033 bar I/P, 0.207 to 1.033 bar P/I)
Mounting	External DIN rail on rear of unit

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 auto-drop

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

Display and Operator Panels

Displays

Number	Dual display for process value and set point for each controller, plus individual display for each record-only channel
Type:	6-digit red LED, 14mm (0.56 in.) high
Status indicators	Indicate channel number on display (on record-only channel) Indicate remote set point, autotune or manual operation
Alarm indicators	Indicate channels with active alarms

Panel keys

Function	Programming access, increment/decrement, auto/manual, pen lift and user-defined function key.
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Alarms and Logic

Alarms

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

Logic Equations

Number: 8
 Function: OR, AND
 Inputs: Alarm states, digital inputs, totalizers, logic
 Outputs: Relays, digital outputs, chart stop, alarm acknowledge

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

Advanced Software Functions

Totalizers

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

Math

Number of eqns.: 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

PID Control

No. of loops: 1 or 2
 Control outputs: Relay, logic or DC analog
 Control types: Time-proportioning, analog
 Control action: PID, on/off, motorized valve position, boundless
 Autotune: On demand, at start-up or at set point

Option Modules

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

General

All modules isolated from each other 500V DC

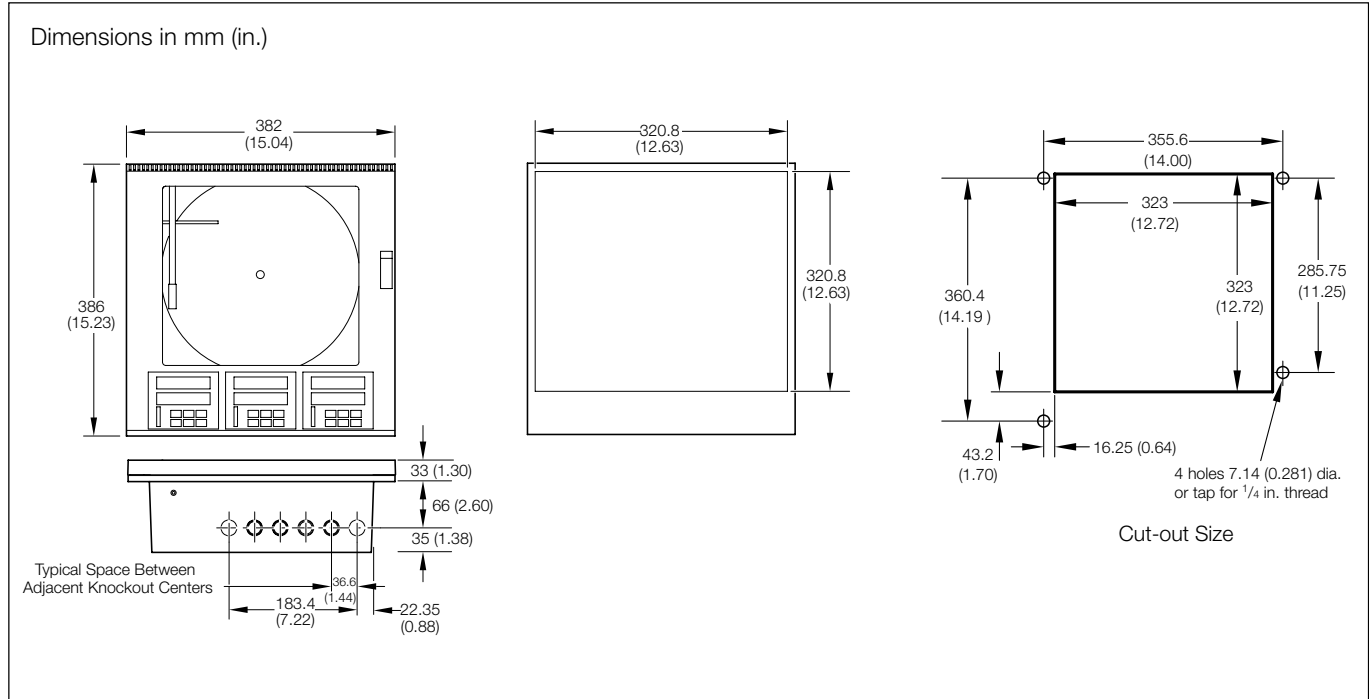
Module specific

Analog O/P isolated from all other I/Ps and O/Ps
 Common of digital I/Ps not isolated from -ve of PV I/P.

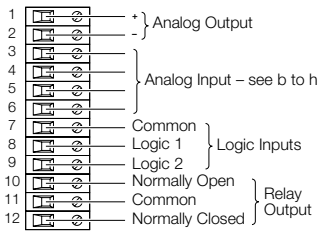
Option Module Types

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 I/P						8		3
RS485 communications							1	1

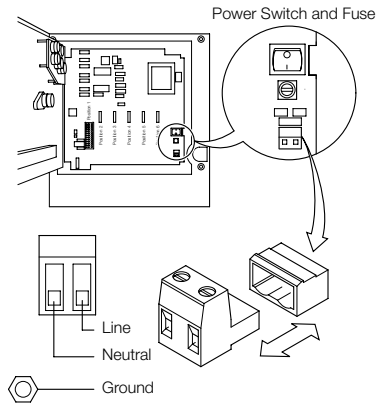
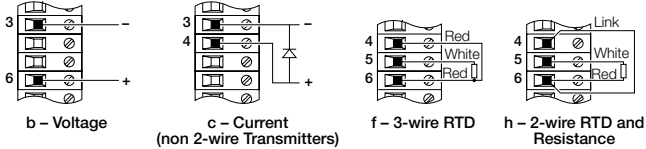
Overall Dimensions



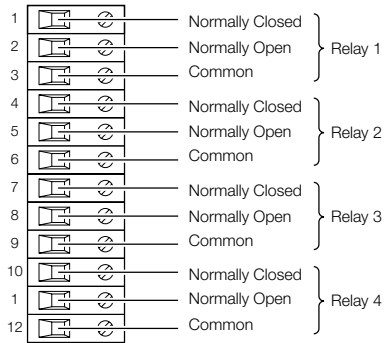
Electrical Connections



Summary of Connections

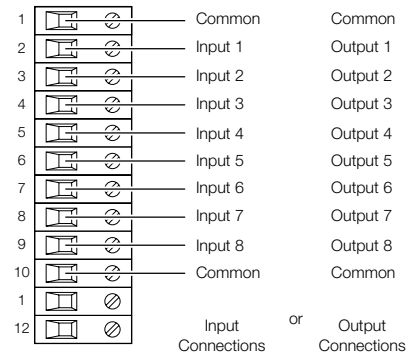


Standard Input/Output Modules



Four Relay Output Module

Power Supply Connections



Digital Input/Output Module

Ordering Information

PART 1

C1900 Recorder/Controller		19 XX	X	X	X	X	X	X	X	X	X	X	X	X	XXX
Recorder/Controllers *	One Control Unit, One Pen (Red)	11													
	One Control Unit, Two Pens (Red & Green)	12													
	One Control Unit, Three Pens (Red, Green, Blue)	13													
	One Control Unit, Four Pens (Red, Green, Blue, Black)	14													
	Two Control Units, Two Pens (Red & Green)	22													
	Two Control Units, Three Pens (Red, Green, Blue)	23													
	Two Control Units, Four Pens (Red, Green, Blue, Black)	24													
Chart Type	Standard (Recorder/Controller)		R												
	KPC105 PX and PXR type charts		S												
	Chessell Brand charts		D												
Electrical Code	Standard			A											
	CSA approved			B											
	UL approved			U											
	CSA/FM Class 1 Div. 2			F											
Option Module	None														
	Additional Modules – Complete PART 2														
Options	None														
	Totalizer														
	Ramp/Soak Profile														
	Math & Timer														
	Totalizer, Math & Timer														
Door Lock	Not Fitted														
	Fitted														
Power Supply	115V AC														
	230V AC														
	24V AC														
	115V AC with On/Off Switch														
	230V AC with On/Off Switch														
	24V AC with On/Off Switch														
Special Settings	Company Standard														STD
	Customer Setting														CJS
	Special														SXX

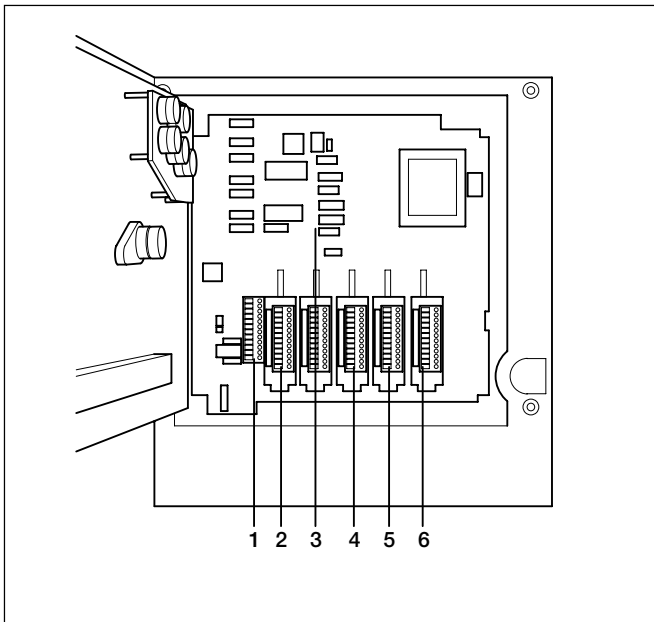
* Each pen fitted has an associated standard Input / Output module comprising Analog Input, Analog output, Relay, Transmitter Power Supply and Two Digital Inputs. Additional Input / Output modules may be fitted in the unused Module Positions as required. These additional modules should be specified in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

PART 2 Additional Modules

	Module Type							
Module Position 2 / Channel 2 Input *	0	1	2					
Module Position 3 / Channel 3 Input *	0	1	2					
Module Position 4 / Channel 4 Input *	0	1	2	3	4	5	6	
Module Position 5	0	0	2	3	4	5		
Module Position 6	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



Module Positions

Key to Module Types

- 0 No module fitted / Pen input channel *
- 1 Standard Input/Output
- 2 Analog Input (Remote set point) + 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 2 2 R A A 0 1 1 0 2 3 0 0 STD
 2 control, 2 pen ————
 Remote set point + Relay —————
 4 relays —————

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