COMMANDER 1900

Circular Chart Recorder

Specification DataFile

1 to 4 pensfull 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



COMMANDER 1900 – a rugged, reliable recorder with the full capability to meet your application needs





COMMANDER 1900

The COMMANDER 1900 is a fully programmable circular chart recorder for up to four process signals. The COMMANDER'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 COMMANDER 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 LED's below the main display.







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.



Flexibility to Solve Problems

The COMMANDER 1900 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.



Timers and Clock

The COMMANDER 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 COMMANDER 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 COMMANDER'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 P.C.s

Expandable for the Future

The COMMANDER 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 COMMANDER can survive in the harshest environments and makes the recorder ideal for use in panels which are regularly hosed down. The **tough**, **acidresistant 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 a 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 COMMANDER 1900 is designed, manufactured and tested to the highest quality standards, including ISO 9001, and is guaranteed by a 2 year parts and labour warranty.





Summary

1, 2, 3 or 4 pens

10" 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" (h) x 15.04" (w) x 5.57" (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

5 to 80%RH (chart only)

NEMA 4X (IP66) IEC 801-4 Level 3

Environmental

Operational temperature range: 32° to 130°F (0° to 55°C) Operational humidity range: 5 to 95%RH (non-condensing)

Case sealing: Fast transients:

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 Password protected menus Security:

Safety

General safety: Dielectric:

Memory protection: Approvals:

Power Supply

Voltage: Consumption:

Line interruption:

IEC348 500V dc (channel/channel) 2kV dc (channel/ground) Nonvolatile EEPROM CSA (optional) CE

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

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 M Ω (mV and V inputs)
		100 Ω (mA input)
An	alog Inputs	
	Signal types:	mV, V, mA, Ω
	Thermocouple types:	B, E, J, K, N, R, S, T
	Resistance Thermometer	: Pt 100
	Other linearizations:	x ^{1/2} , x ^{3/2} , x ^{5/2} , linear
	Sample interval:	250ms per channel
	Dielectric:	500Vdc channel/channel

0 to 60s programmable

2-Wire Transmitter Power Supplies

Digital Filter:

	ener esppnee
Number:	1 per channel
Voltage:	24Vdc nominal
Drive:	Up to 25mA
Isolation:	500Vdc channel/channel

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

Turne	0	С	0	F					
Гуре	Range Lo	Range Hi	Range Lo	Range Hi	Accuracy (excl. CJC)				
В	-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				
К	-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)				
Т	-250	300	-400	550	±0.5°C				
PT100	-200	600	-325	1100	±0.5°C				

Analog Outputs

Type: Accuracy: Maximum load: Dielectric:

Relav Outputs

SPDT Type: Rating (with non-inductive load):

Digital Inputs

Type:

Minimum pulse: Dielectric:

Digital Outputs

Type: Rating: Dielectric:

Serial Communications RS485, 4 wire

4 to 20 mA

±0.1%

750 Ω

250ms

500V dc

TTL or volt-free

Connections: Protocol:

Pneumatic inputs/outputs

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

Recording System

Pens

Number: Response: Resolution: Pen lift:	1, 2, 3, or 4 (red, blue, green, black) 7 seconds (full scale) 0.1% steps 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: Chart speed:	10 in. or 105mm 1 to 167 hours or 7 to 32 days per revolution

Display and Operator Panels

Displays

Number: Type: Status indicators: Alarm indicators: Panel keys

Function:

Alarms and Logic

Number:

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

2 (1 or 2 pens) or 4 (3 or 4 pens)

6-digit red LED, 0.56 in. (14mm) high

Indicate channel number on display

Indicate channel with active alarms

Programming access, increment/

function key.

decrement, pen lift and user-defined

4 OR. AND Alarm states, digital inputs, totalizers, logic Relays, digital outputs, chart stop, alarm acknowledge

Advanced Software Functions

1 per pen 99,999,999 max.

signal

Totalizers

Number: Size: Output:

Outputs:

Math

Number of eqns.: Type:

Timers

Number: Type:

Output:

4 +, -, x, \div , low & high select, max, min, average, mass flow, RH

External counter driver, "wrap" pulse

2 Real-time clock driven event. adjustable duration Relay, digital output, logic equation

Option Module

Number:

Connection:

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

Option Module Types	i/o per module												
	Analog i/p	Analog o/p	Trans. PSU	Relays	Digital i/p	Digital o/p	Comms.	Max. No. per instrmt					
Standardi/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												

500Vdc between modules, no isolation within module Alarms 5V TTL Type: 5mA per output 500Vdc between modules. no Adjustments: isolation within module Logic Equations Number: Function: Inputs:

5A at 115/230Vac

MODBUS RTU

Ordering Guide

PART 1

COMMANDER 19	900 Recorder	19XX	x	x	x	x	x	x	x	x	x	x	x	ххх
Recorders †	One Pen (Red) Two Pens (Red & Green) Three Pens (Red, Green, Blue) Four Pens (Red, Green, Blue, Black)	11 12 13 14												
Chart Type	Standard KPC 105 PX and PXR type charts Chessell Brand charts		J K C											
Electrical Code	Standard CSA approval UL approval CSA/FM Class 1 Div. 2			Â B U F										
Option Module	None Additional Modules –	Complete PART 2			0 A									
Options	None Totalizer Totalizer, Maths & Timer					0 3 B								
Door Lock	Not Fitted Fitted						1 2							
Power Supply	115V A.C. 230V A.C. 24V A.C. 115V A.C. with On/Off Switch 230V A.C. with On/Off Switch 24V A.C. with On/Off Switch							1 2 3 4 5 6						
Special Settings	Company Standard Customer Setting Special]	1	1		1	STD CUS SXX
† Each pen fitted output, Relay, Tra Additional Input/C additional module	has an associated standard Input/Output mo ansmitter Power Supply and Two Digital Inputs Output modules may be fitted in the unused Mo s should be specified in PART 2 of the Orderi	dule comprising Analog s. odule Positions as requi ng Guide	inpu red.	it, A The:	nalo se	g								
PART 2 Addition	PART 2 Additional Modules Module Type													
Module Position	2 / Channel 2 Innut*		0	1	2									

FART 2 Additional modules										
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					



- Key to Module Types
 0 No module fitted / Pen input channel *
- 1 Standard Input/Output

- Standard Input/Output
 Analog Input (Math input) + Relay
 Four Relays
 Eight Digital Inputs
 Eight Digital Outputs
 True Time Event Pen (Violet)
 MODBUS RS485 Communications
- $^{\ast}\,$ 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	А	А	0	1	1	0	0	3	0	8 STD
3 pen															
4 relays															
Module RS485 communications															





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