

Specification DataFile

■ **Single output, Heat/Cool or Motorized Valve control**

- one controller for every PID control application

■ **9 program, 30 segment Ramp/Soak**

- comprehensive set point profiling capabilities

■ **Analog, relay and logic outputs as standard**

- extensive control output requirements built-in

■ **Universal process input with 0.1% accuracy and custom linearizer**

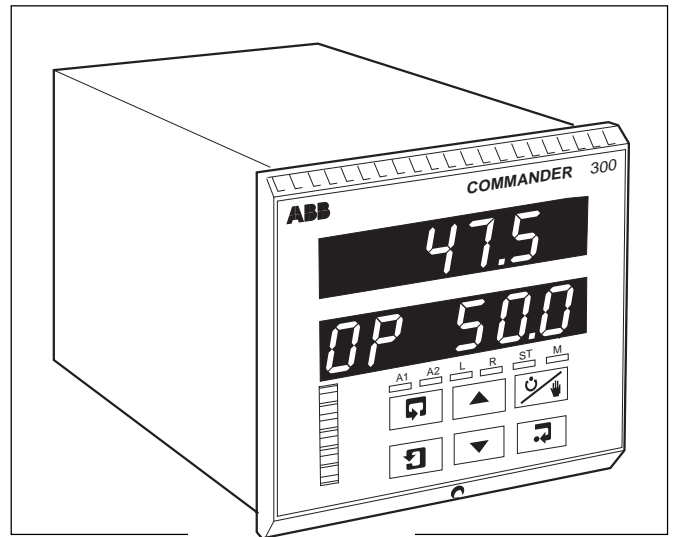
- direct connection of any process signal

■ **IP66/NEMA 4X protection and full noise immunity**

- reliability in the harshest environments

■ **RS485 MODBUS serial communications**

- SCADA, PLC and open systems integration



*COMMANDER 300 –
the only $\frac{1}{4}$ DIN controller you
will ever need*

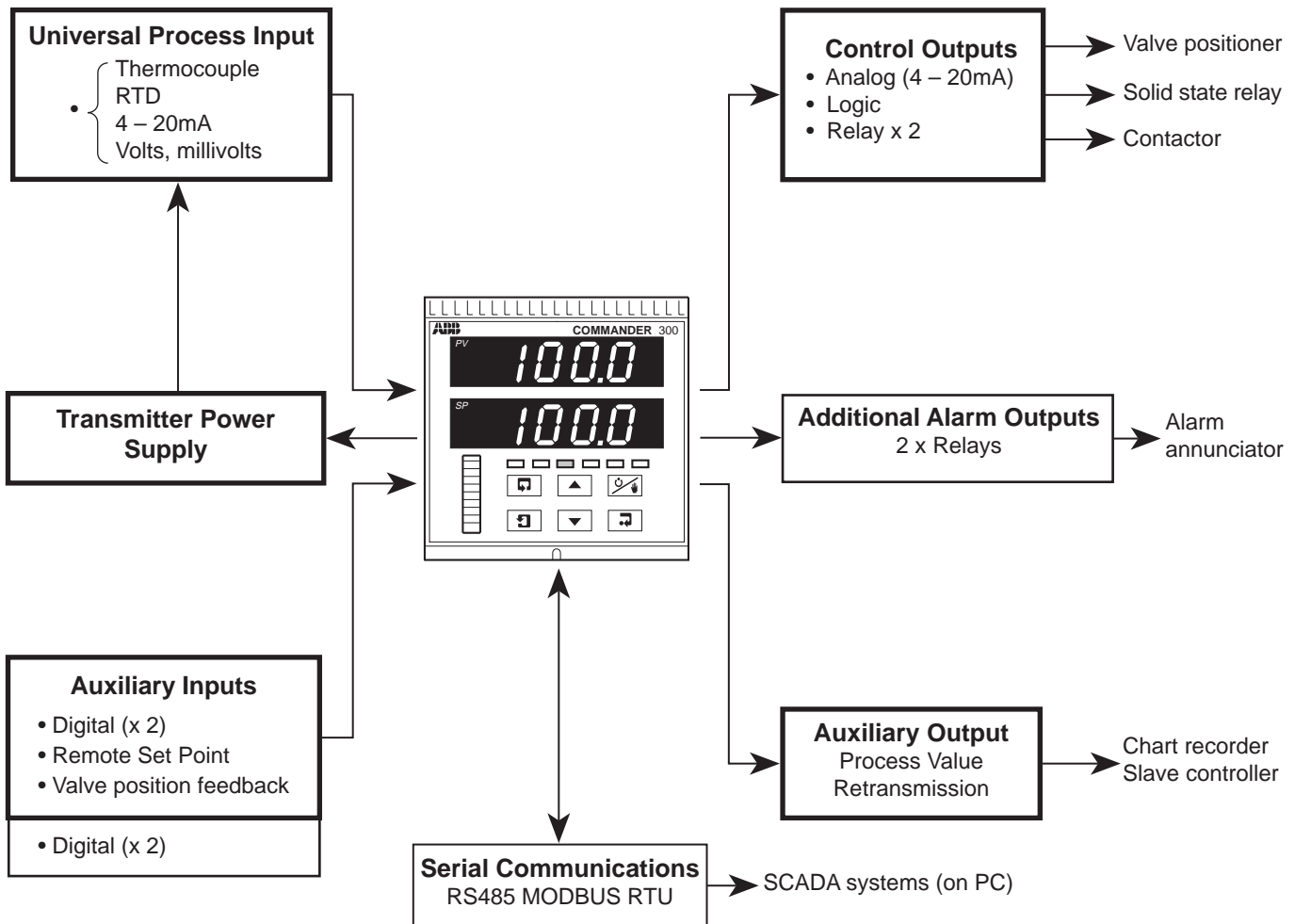
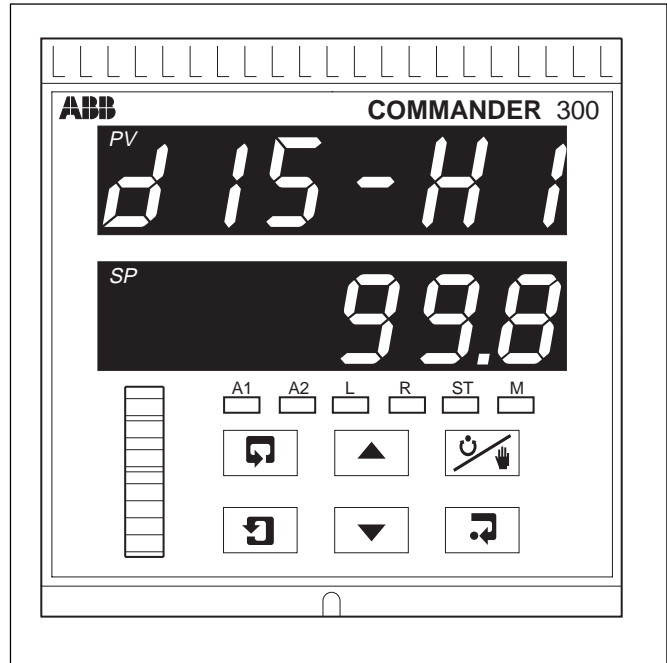
COMMANDER 300

The COMMANDER 300 Universal Process Controller is a highly versatile single-loop PID controller with the full capability to measure, indicate and control temperature, pressure, flow, level and other process variables.

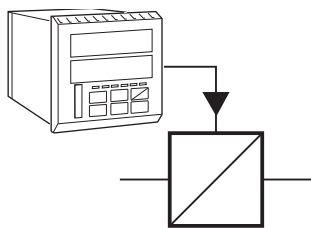
Analog, logic and relay **control outputs** are fitted as standard and a wide choice of control strategies is built-in.

The extensive i/o capability of the standard controller can be augmented by fitting an option board with additional relays and digital inputs. **Serial communication** is also available as an option using MODBUS RTU protocol.

With NEMA 4X/IP66 front panel protection and superior RF immunity as standard, the COMMANDER 300 has been designed to withstand the harshest environments.

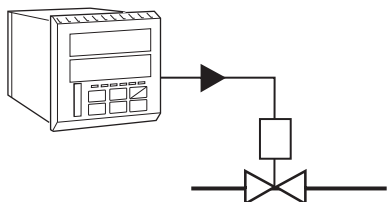


KEY: Standard Option



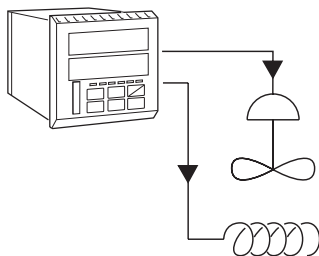
PID Control

The COMMANDER 300's isolated control output can be set up to provide either an analog signal, for i/p converters and thyristors, or a 12V time-proportioning logic output, to drive solid state relays. A time proportioning control output is also available from the in-built 5A relays.



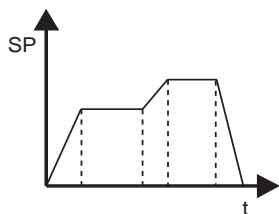
Valve Position

The COMMANDER 300 is fitted with twin relays and a valve-position input for closed-loop control of a motorized valve. Boundless control (without position feedback) and analog control (using 4 to 20mA output) are also available in the standard unit.



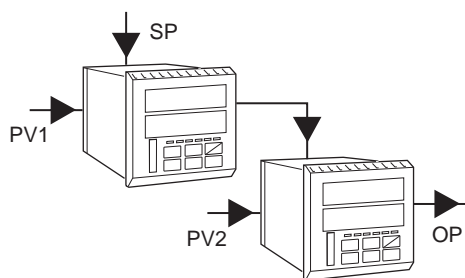
Heat/Cool

Heat/cool control strategies may be implemented on the standard COMMANDER 300, using any combination of analog, logic and relay outputs.



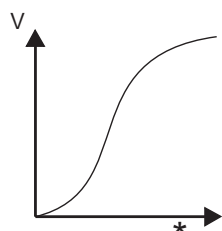
Ramp/Soak Set Point Profiles

The standard ramp/soak facility provides 30 segments, freely assignable amongst 9 programs. A Segment Event function enables relays to be switched on or off at predetermined points within the program. Extended ramp/soak, providing a total of 20 programs with 99 segments, is optionally available (C302 version).



Master/Slave and Cascade

Two or more COMMANDER 300s can be used in master/slave or cascade configuration. Each unit has a remote set point input and retransmission output built-in and fully supports the use of ratio and bias.



Custom Linearizer Option (C301)

The COMMANDER 301 contains a 20-point user-defined input linearizer for processes using non-standard sensors, such as pyrometers and high-temperature thermocouples. A 3-point CJC curve may also be entered to ensure precise compensation for thermocouple inputs.

Specification

Summary

COMMANDER 300 universal single loop PID controller
Autotune facility
Fully user configurable
IP66 (NEMA 4X) front face

Operation

Display

High-intensity 7-segment, 0.56" (14mm) 2 x 6 red LED display

Configuration

User defined via front panel

Analog Inputs

Number

Three universal process inputs

Input sampling rate

160ms per channel

Type

Universally configurable for:

Channels 1 & 2 (Process Variable & Remote Set Point)	– Thermocouple (THC) Resistance thermometer (RTD) Millivolt Current D.C. voltage Resistance
Channel 3 (Actuator Position Feedback)	– D.C. voltage Current Resistance

Input impedance

Millivolts/THC	>10MΩ
Voltage	500kΩ
Current	10Ω

Linearizer functions

Programmable for input channels 1 and 2
Sqrt, $X^{3/2}$, $X^{5/2}$, THC types B, E, J, K, R, S, T, L, N or Pt100
20-point custom linearizer on Channel 1 of C301

Dielectric strength

Input to ground 500V d.c.

Broken sensor protection

Programmable Up/Downscale or None

Cold junction compensation

Automatic CJC incorporated as standard

Temperature limits

THC/RTD type	°C		°F			
	min.	max.	min. span	min.	max.	min. span
Per NBS125 & IEC584						
Type B	–18	1800	710	0	3272	1278
Type E	–100	900	45	–148	1652	81
Type J	–100	900	50	–148	1652	90
Type K	–100	1300	65	–148	2372	117
Type L	–100	900	50	–148	1652	90
Type N	–200	1300	90	–328	2372	162
Type R & S	–18	1700	320	0	3092	576
Type T	–250	300	60	418	572	108
RTD per DIN43760 & IEC751	–200	600	25	–328	1112	45

Notes

Performance accuracy is not guaranteed below 400°C (752°F) for types B, R and S thermocouples
RTD, 3-wire platinum, 100Ω, with range of 0 to 400Ω
Min. span below zero Type T 70°C (126°F)
 Type N 105°C (189°F)

Electrical limits

Input type	Min. value	Max. value	Min. span
Millivolts	–2000	2000	2.5
Volts	–20	20	0.25
Milliamps	–100	100	0.25
Resistance	0	8000	10

Input noise rejection

Common mode isolation >140dB at 50/60Hz with 500Ω imbalance
Series mode rejection >60dB at 50/60Hz

Accuracy

Measurement error

mV inputs	<±0.1% of reading / ±10μV
THC inputs	<±0.1% of reading + linearizer error
mA inputs	<±0.2% of reading / ±2μA
V inputs	<±0.2% of reading / ±2mV
RTD inputs	<±0.2% of reading / ±0.5°C
Linearizer	Typically ±0.1°C (±0.2°F)
Display range	–9999 to +9999
CJC accuracy	<0.05°C/°C change in ambient temperature

Transmitter power supply

24V 30mA max. powers one 2-wire transmitter. Fitted as standard on process variable input

Outputs

Control output configurable as either:

Analog	in the range of 0 to 20mA Max. load 15V (750Ω at 20mA) Accuracy $\leq 0.1\%$ of span Isolation 1kV
Logic*	12Vd.c. (SSR drive) Max. load 400Ω Isolation 1kV

Auxiliary output

0 to 20mA/4 to 20mA, configurable for retransmission of process variable, set point, position feedback or control output values

Max. load 15V (750Ω at 20mA)
Accuracy $\leq 0.1\%$ of span

Relay outputs

Two relays, configurable for on/off or time proportioning control, valve drive or alarms.

SPST 5A 120/240V a.c. normally open or normally closed

*Not configurable on 12/24V d.c. models

Options

One option board only can be installed – see Ordering guide page 7

Serial communications

Connections – RS485, 4-wire, 1.2k to 9.6k baud rate
Protocol – MODBUS RTU Option board 03
or ANSI-X3.28 (SLAVE) Option board 01

Digital inputs

Two dry contact or TTL

Profile control (Ramp/Soak)

Standard	30 segments assignable to 9 programs
Extended (C302)	99 segments assignable to 20 programs

Alarm relays

Two additional relays can be used for alarms or ramp/soak functions

SPST 5A 120/240V a.c. normally open or normally closed

Alarm functions

High/low process, High/low deviation, Rate, Program event or Segment alarm

Electrical

Voltage

115V $\pm 15\%$ or 230V $\pm 15\%$ 50/60Hz (link selectable)
24V a.c.
12V/24V d.c.

Power consumption

<10VA

Power interruption protection

<60ms/<3 cycles, no effect
>60ms/>3 cycles, controlled reset

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

CE marked instruments meet EU regulations
CSA approved
UL approved

Environmental

Operating limits

0° to 55°C (32° to 131°F), 0 to 95%RH non-condensing

Temperature stability

<0.02% of reading or 1μV/°C (0.5μV/°F)

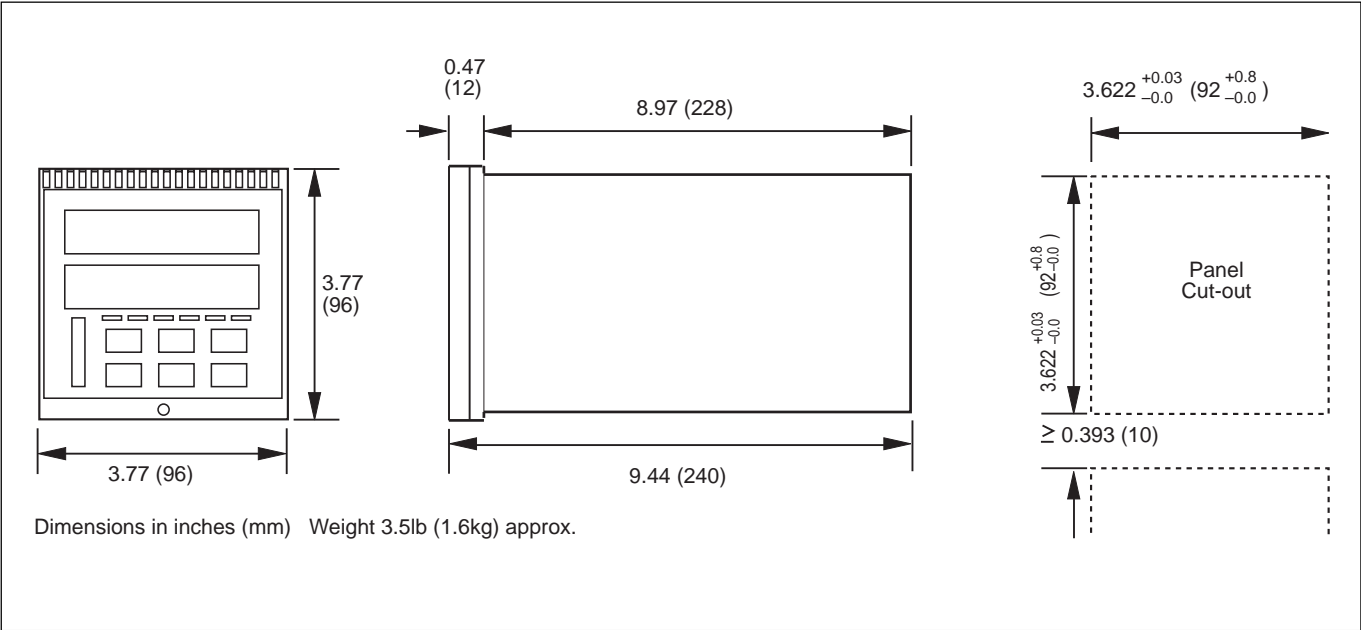
Housing dust/water protection

IP66 (NEMA 4X) when fitted in panel

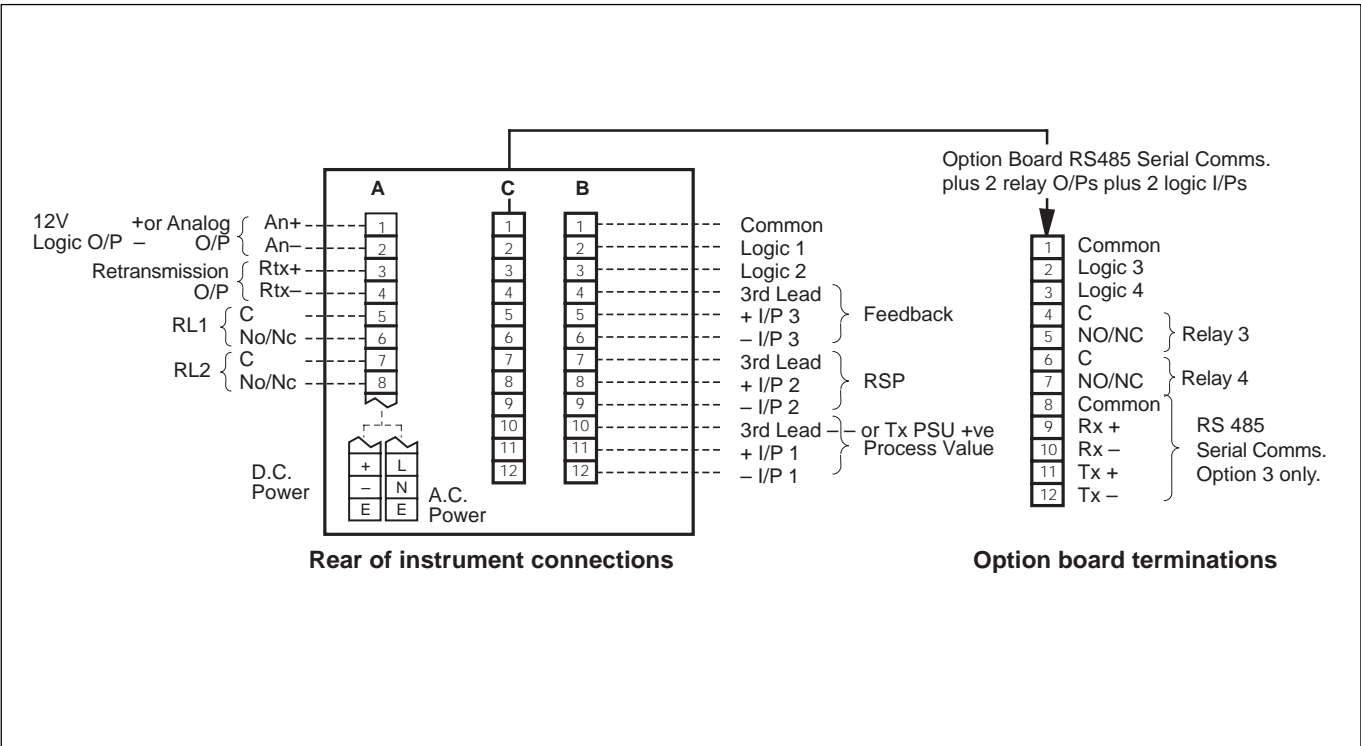
RF protection

Meets IEC 801 Pt. III level 3

Dimensions



Wiring Connections



Ordering Guide

COMMANDER 300 Controller		C30	X	/	X	X	X	X	/	X	X	X	X
Universal Process Controller		0											
Universal Process Controller with Custom Linearizer		1											
Universal Process Controller with Extended Ramp/Soak		2											
Option Board													
None													
Option board 1 – (RS485 ANSI serial comms.+ 2 relay o/p's + 2 digital i/p's)													
Option board 2 – (2 relay o/p's + 2 digital i/p's)													
Option board 3 – (RS485 Modbus RTU serial comms. + 2 relay o/p's + 2 digital i/p's)													
Power Supply													
115V a.c.													
230V a.c.													
24V a.c.													
12V d.c. *													
24V d.c. *													
Build													
Standard													
CSA approved													
UL approved													
Programming/Special Features													
Configured to factory standard													
Configured to customer detail													
Agreed special features													

* Logic O/P not available on d.c. versions

Instrument Coding Example

	C300 /	00	4	0/	STD
COMMANDER 300 Universal Process Controller					
No option board fitted					
12V d.c. power supply					
Standard build					
Configured to factory standard					



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

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