

# C310

## Wall-/Pipe-mount Universal Process Controller

C310 – gives you the control that you need wherever you need it



**IP66/NEMA 4X wall/pipe-mount housing**

- no need for an instrument panel

**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**

- direct connection of any process signal, simple installation without recalibration

**RS485 Modbus serial communications**

- SCADA, PLC and open systems integration

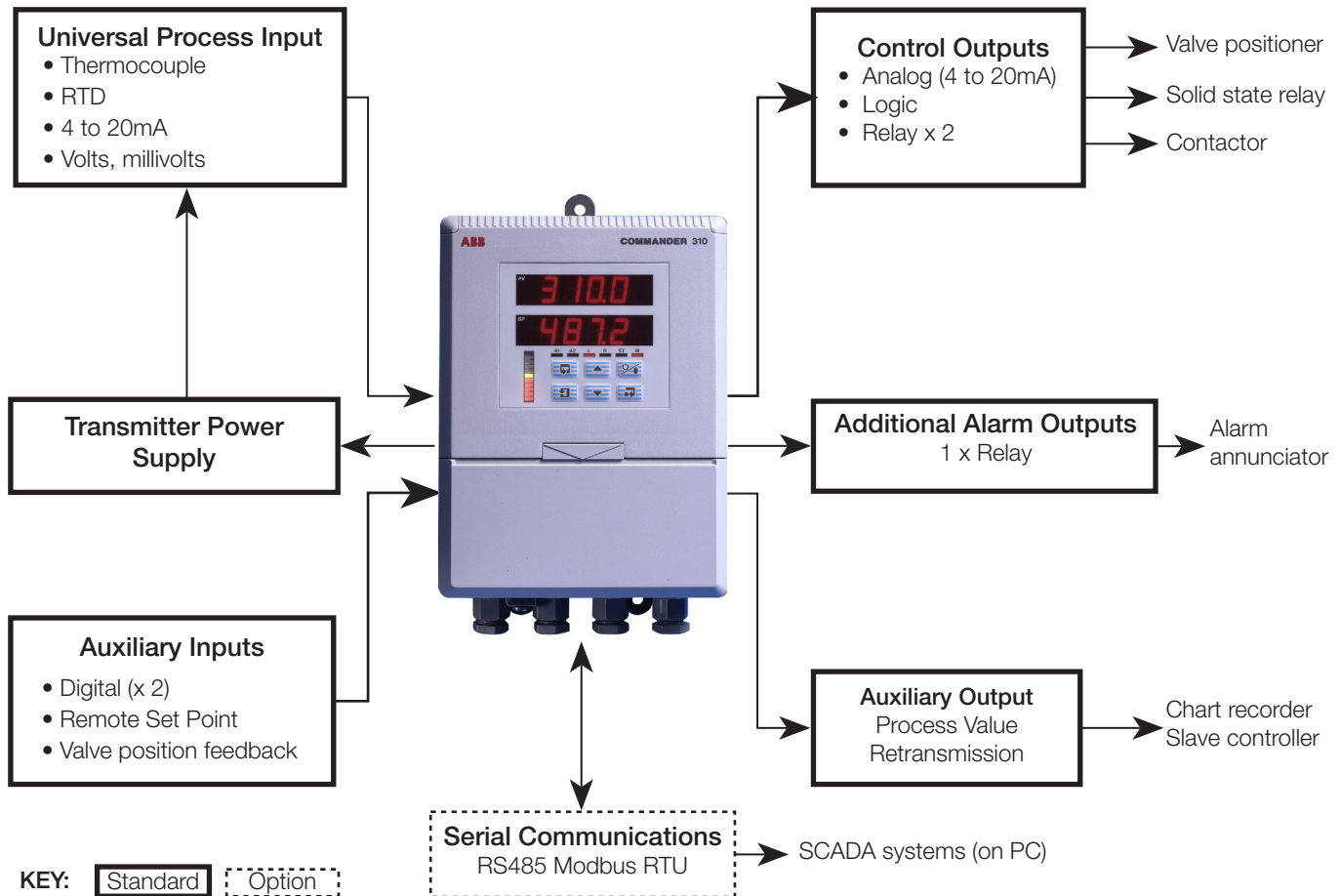
**C310**

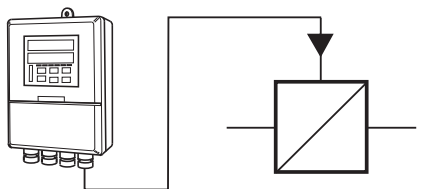
The C310 Wall/pipe-mount Universal Process Controller is a highly versatile single-loop controller packaged in a robust field-mounting housing.

No need to fit an expensive instrument panel when installing or upgrading process equipment. The C310 can be rapidly commissioned by simply fixing it to any flat surface or pipe and making the electrical connections via the cable entry glands on the underside of the unit.

The instrument has extensive control and i/o capabilities fitted as standard, allowing it to be rapidly configured for almost any application.

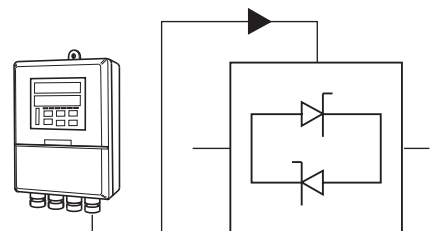
With IP66/NEMA4X water/dust protection the C310 can be mounted right next to your process, no matter how harsh the environment.





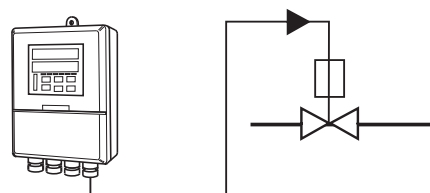
### PID Control

The COMMANDER 310's isolated analog output provides the standard control output to I/P converters, thyristors etc. Alternatively, built-in relays can be used to generate a time-proportioning control output.



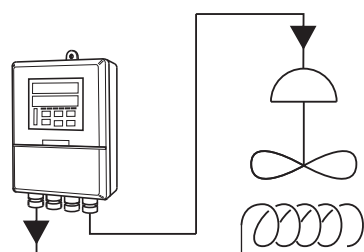
### Solid State Relay SSR

A 12V time-proportioning logic output on the standard C310 can be used to drive solid state relays (SSRs).



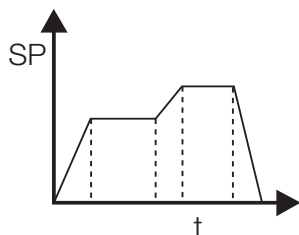
### Valve Position

The C310 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.



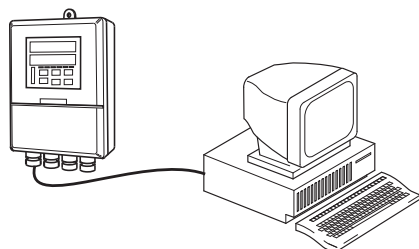
### Heat/Cool

Heat/cool control strategies may be implemented on the standard C310, using a combination of the analog control output and one relay.



### 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.



### Serial Communications

Not only does the C310 provide clear process information in the field, it can also communicate plant data to control rooms via an RS485 link, using Modbus protocol.

## Specification

### Summary

|   |
|---|
| <p>C310 Wall-/Pipe-mount Universal Controller</p> <p>P, PI, PID single loop controller</p> <p>Autotune facility</p> <p>Fully user configurable</p> <p>IP66 (NEMA 4X) front face and housing</p> |
|---|

### Operation

#### Display

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

#### Configuration

User defined via front panel

### Analog Inputs

#### Number

Three universal process inputs

#### Type

Universally configurable for:

|  |   |
|--|---|
| Channels 1 & 2<br>(Process Variable &<br>Remote Set Point) | Thermocouple (THC)<br>Resistance thermometer<br>(RTD)<br>Millivolt<br>Current<br>DC voltage<br>Resistance |
| Channel 3<br>(Actuator Position<br>Feedback)               | DC voltage<br>Current Resistance  |

#### Input sampling rate

160ms per channel

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

#### Linearizer functions

Programmable for input channels 1 and 2

Sqrt, X<sup>3/2</sup>, X<sup>5/2</sup> THC types B, E, J, K, R, S, T, L, N or Pt100

#### Broken sensor protection

Programmable Up/Downscale or None

#### Cold junction compensation

Automatic CJC incorporated as standard

### Temperature limits

| THC/RTD type<br>Per NBS125 &<br>IEC584 | °C   |      |              | °F   |      |              |
|--|------|------|--------------|------|------|--------------|
|  | min. | max. | min.<br>span | min. | max. | min.<br>span |
| 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<br>& 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 rejection >140dB at 50/60Hz with 500Ω imbalance

Series mode rejection >60dB at 50/60Hz

#### Accuracy

Measurement error <±0.1% of reading or ±5μV

Linearizer Typically ±0.1°C (±0.2°F)

Display range -9999 to +9999

CJC accuracy <0.05°C/°C change in ambient

#### Transmitter power supply

24V 30mA max. powers one loop, fitted as standard

## Outputs

### Control output

Configurable as either:

|               |                           |
|---------------|---------------------------|
| <b>Analog</b> | in the range of 0 to 20mA |
| Max. load     | 15V (750Ω at 20mA)        |
| Accuracy      | ≤0.1% of span             |
| Isolation     | 1kV AC                    |
| <b>Logic</b>  | 12V DC (SSR drive)        |
| Max. load     | 400Ω                      |
| Isolation     | 1kV AC                    |

### Retransmission

0 to 20mA configurable for process variable, set point or position feedback values

|           |                    |
|-----------|--------------------|
| Max. load | 15V (750Ω at 20mA) |
| Accuracy  | ≤0.1% of span      |

### Relay outputs

Three relays, configurable for time proportioning control, valve drive or alarms.

SPDT 5A 120/240V AC normally open or normally closed

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## Option

### Serial communications

|             |   |                                       |
|-------------|---|---------------------------------------|
| Connections | - | RS485, 4-wire, 1.2k to 9.6k baud rate |
| Protocol    | - | Modbus RTU                            |

## Electrical

### Voltage

115V ±15% or 230V ±15% 50/60Hz (link selectable)

### Power consumption

<10VA

### Power interruption protection

<60ms/<3 cycles, no effect

>60ms/>3 cycles, controlled reset

### Line interference

Meets IEC 801 Pt IV level 3 (>2kV spikes)

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## Environmental

### Operating limits

-10° to 55°C (14° 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)

### RF protection

Meets IEC 801 Pt. III level 3

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## EMC

### Emissions and Immunity

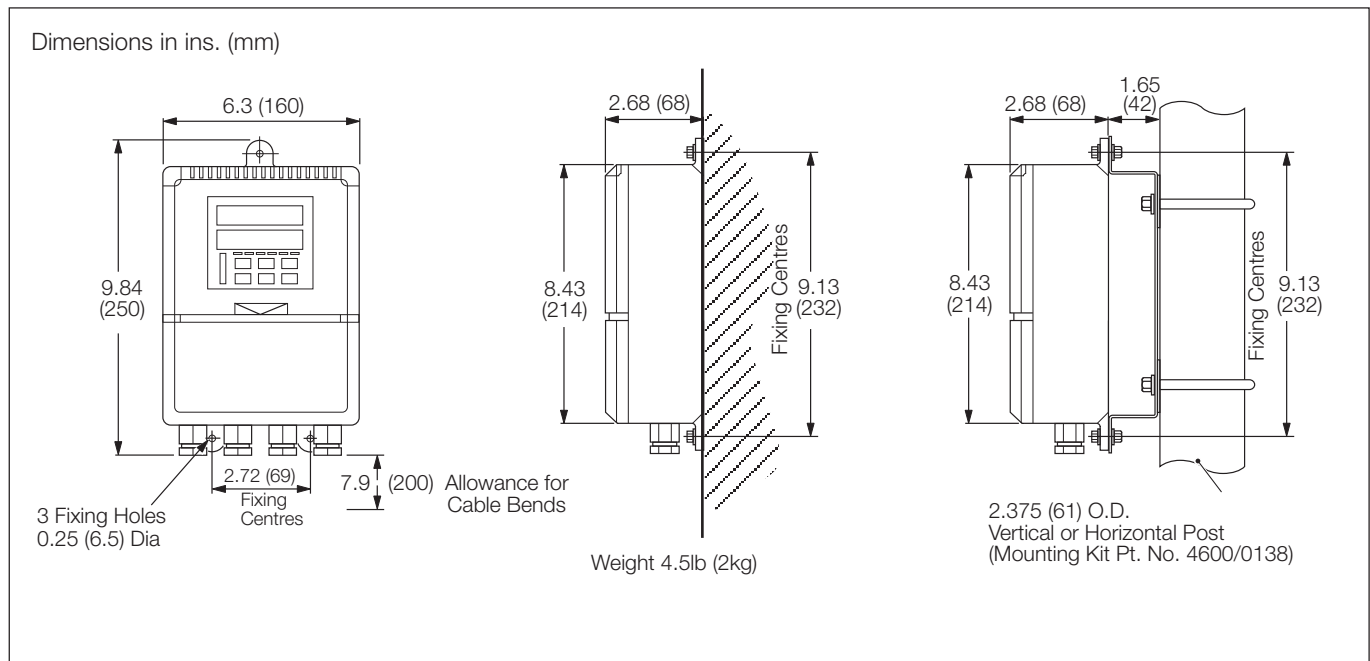
Meets requirements of IEC 61326 for an Industrial Environment

### Design and Manufacturing Standards

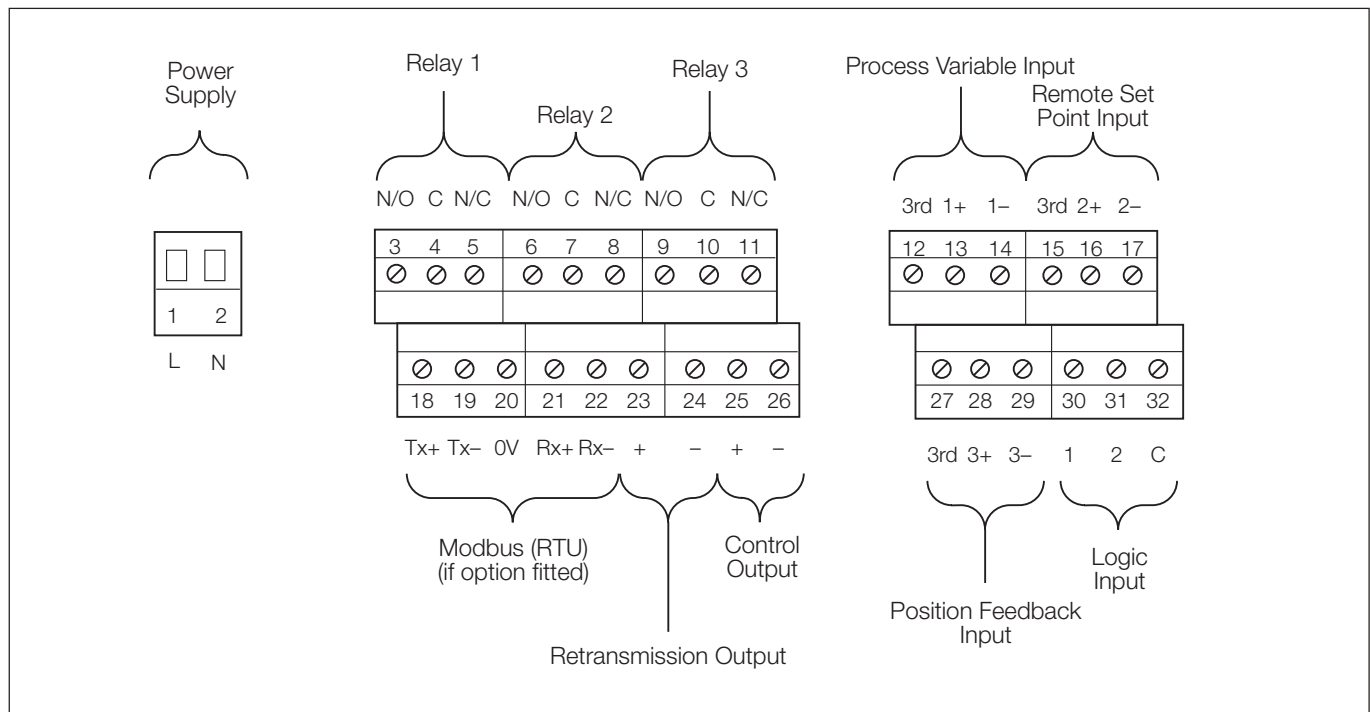
CE

CSA/FM Class 1 Div.2 Hazardous Area

### Dimensions



### Electrical Connections



### Ordering Information

|   |                |          |          |            |             |
|---|----------------|----------|----------|------------|-------------|
| <b>C310 Wall-/Pipe-mount Universal Process Controller</b> | <b>C310 /X</b> | <b>X</b> | <b>X</b> | <b>X /</b> | <b>XXXX</b> |
| <b>Option Board</b>                                       |                |          |          |            |             |
| None  | 0              | 0        |          |            |             |
| RS485 Modbus Communications                               | 0              | 1        |          |            |             |
| <b>Power Supply</b>                                       |                |          |          |            |             |
| 115V AC (NPT fitted with blanking plugs)                  |                |          | 1        |            |             |
| 230V AC (M20 fitted with cable glands)                    |                |          | 2        |            |             |
| 115V AC (M20 fitted with cable glands)                    |                |          | 4        |            |             |
| 230V AC (NPT fitted with blanking plugs)                  |                |          | 5        |            |             |
| <b>Build</b>  |                |          |          |            |             |
| Standard  |                |          |          | 0          |             |
| CSA/FM Cl.1 Div. 2  |                |          |          | 3          |             |
| <b>Programming/Special Features</b>                       |                |          |          |            |             |
| Configured to factory standard                            |                |          |          |            | STD         |
| Configured to customer detail                             |                |          |          |            | CUS         |
| Agreed special features                                   |                |          |          |            | SPXX        |

### Instrument Coding Example

**C310 / 01 1 3 / STD**

C310 Controller

RS485 Modbus Communications

115V AC

CSA/FM Cl.1 Div. 2

Factory standard configuration

### Accessories

Pipe Mount Kit 4600/0138

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