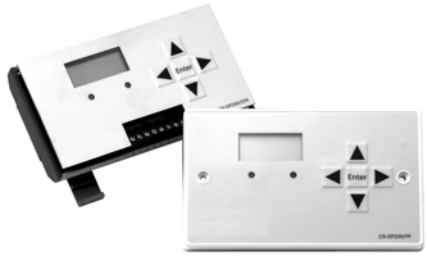
# Digital proportional controller



## Features

- 2 line LCD display
- 0-10Vdc Heating and Cooling proportional outputs
- Front Panel or Din Rail mounting options
- Selectable ºC or ºF display
- Intuitive 5 button human interface
- LED indication for Heating/Cooling

## Specification

| | |
|---|---|
| Display | 2 line 8 character |
| Display resolution | 0.1°C |
| Sensor type | A (10K3A1) |
| LED indication: | |
| Heating | Red |
| Cooling | Green |
| Measurement range | +10°C to +100°C |
| Setpoint range | +10°C to +100°C in 0.5°C steps |
| Remote Offset range | +1°C to +15°C |
| Dead band | 0 to 5°C in 0.5°C steps |
| Outputs: | |
| Heating | 0-10Vdc proportional @10mA |
| Cooling | 0-10Vdc proportional @10mA |
| Connections | 2 Part Pluggable |
| Power supply | 24Vac/dc ±10% |
| Dimensions | 145 x 85 x 23mm (max) |
| Ambient range: | |
| Temperature | 0°C to +40°C |
| RH | 0% to 80% RH non-condensing |
| CE Conformity: | |
| EN 50 081-2 | |
| EN 50 082-1 | |
| CE Marked | |
| Country of origin | UK |

## Product Codes

**CN-DP200-DIN**
Proportional controller for DIN rail mounting

**CN-DP200-FP**
Proportional controller for front panel mounting

## Technical Overview

The CN-DP200 is designed to monitor the temperature in environments such as ducts, rooms etc., and give a 0-10Vdc output proportional to the difference between the setpoint and the measured temperature. The low limit provides a proportional control signal when the supply air temperature falls to the low limit setting maintaining a minimum supply temperature.

## Installation

1. The CN-DP200 should only be installed by a competent, suitably trained technician.

2. Ensure that all power is disconnected before carrying out any work on the CN-DP200.

3. Care must be taken not to over tighten terminals.

4. When mounting the CN-DP200/DIN care should be taken not to stress the PCB when fitting to the DIN rail. If necessary, remove the module from the DIN rail. Be sure to use a flat bladed screwdriver to release the DIN clips.

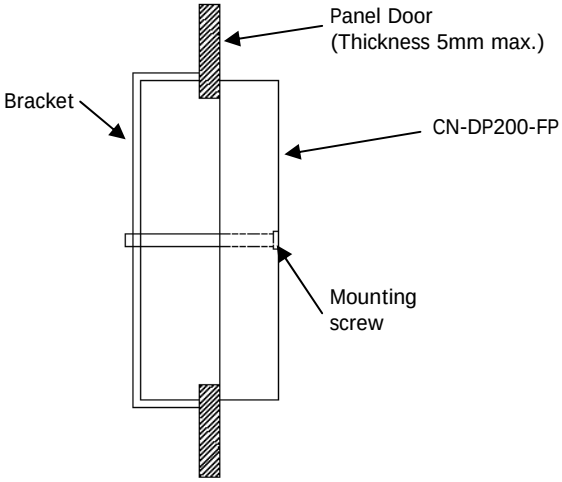
5. The CN-DP200 is designed to operate from a 24Vac/dc supply. In either case one side of the supply is common to the signal ground from the BEMS controller.

6. Screened cable should be used for temperature sensors. The screen should be earthed at one end only to avoid earth hum loops which can create noise. Low voltage signal and supply cables should be routed separately from high voltage or mains cabling via separate conduit or cable trays. Where possible, the screen of the cable feeding the sensor should be connected to a FUNCTIONAL EARTH, rather than the mains safety earth. This will provide better immunity to high frequency noise.

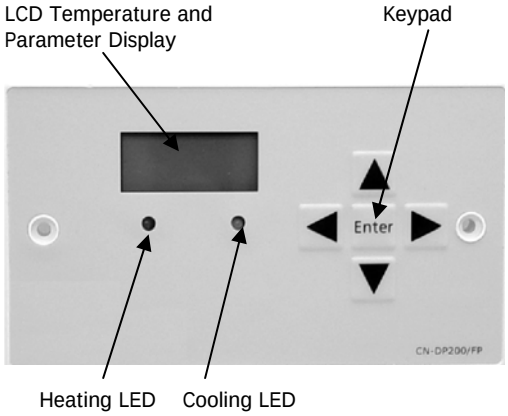
Front Panel Mount

The standard fixing kit supplied with the unit is for use on doors up to 5mm thick.
The unit is designed to fit through a 135mm(W) by 77mm (H) hole cut in the panel fascia.
The plastic housing is then held flush to the surface through the use of the brackets as shown in the diagram.

## Installation (continued)




## Layout




## Connections

| | |
|---|---|
| 1 | +24Vac/dc |
| 2 | Common 0V |
| 3 | Common 0V |
| 4 | 0-10Vdc Heating output |
| 5 | 0-10Vdc Cooling output |
| 6 | Remote setpoint adjustment (1-11KΩ) |
| 7 | Main temperature sensor. Type A (10K3A1) |
| 8 | Limit temperature sensor. Type A (10K3A1) |

⚠ If the limit temperature sensor is not used, a wire link **must** be installed between terminal 8 and common 0V.

## Connections (continued)

Sensors and potentiometer should be connected between appropriate terminal and the Common 0V.
Terminals are numbered 1 to 8 from left to right on -FP units and vice versa on -DIN models.

Default display:
The default is temperature and setpoint. Pressing the up or down button displays the limit temperature.
The default values are:

| | |
|---|---|
| Sepoint | 22.0°C |
| Proportional band | 4.0°C |
| Deadband | 1.0°C |
| Limit setpoint | 12.0°C |
| Limit prop. band | 4.0°C |
| Limit deadband | 1.0°C |
| Remote offset | 3.0°C |
| Temperature | °C |

NB When you change from °C to °F and vice versa, the parameters revert to default.

## Using The Keypad

The unit is fitted with a five button keypad which can be used to configure the controller parameters. The left and right arrows are used to scroll through the parameters and the up and down arrows are used to adjust values. The parameter list wraps around such that if you were to scroll continually to the right you would eventually return to your starting point.
In order to change a parameter a single press of the “Enter” key will switch to adjustment mode and a flashing cursor will appear on the bottom line of the display. The up and down arrows can then be used to adjust the value between it’s preset limits. A further press of the “Enter” key will store the new setting, pressing the left or right arrow keys will display the next parameter without saving a new value.

## Default Display

The default display on the two line LCD during normal operation is main temperature sensor reading on the top line (denoted by a T) and the control setpoint on the bottom line (denoted by an S). This is shown at system start up or if no parameter adjustments are made for 30 seconds.
Depressing the up or down arrow on the keypad from this screen will cause the bottom line to display the limit setpoint (denoted by an L). If the limit setpoint is not being used this value will read “L >100°C”.

## Main Setpoint Adjustment

This is the temperature (space or return air) that is trying to be achieved.
When viewing this screen, the top line will read ”SETPOINT” and the bottom line will show the current value.
Main setpoint can be adjusted between 10°C and 100°C.

## Main Proportional Band Adjustment

This is the band across which proportional control takes place. Essentially it is the °C away from setpoint at which the controller output will reach 100%.
When viewing this screen, the top line will read ”PROPBAND” and the bottom line will show the current value.
Main proportional band can be adjusted between 2°C and 10°C.

## Dead Band Adjustment

Also know as a neutral zone, this is the value around the setpoint where no control takes place. E.G. If the setpoint is at 22°C and the deadband is set at 1°C then the controller will cool to 22.5°C and heat to 21.5°C. If the main temperature is between these two values then there is no output.
When viewing this screen, the top line will read ”DEADBAND” and the bottom line will show the current value.
Dead band can be adjusted between 0°C and 5°C.

## Limit Setpoint Adjustment

This is the minimum permissible air temperature in the supply duct.
When viewing this screen, the top line will read ”LIM SET” and the bottom line will show the current value.
Limit setpoint can be adjusted between 10°C and 100°C.

## Limit Proportional Band Adjustment

As for the main proportional band but relates to the low limit control strategy.
When viewing this screen, the top line will read ”LIM PROP” and the bottom line will show the current value.
Limit proportional band can be adjusted between 2°C and 10°C.

## Limit Dead Band Adjustment

This can be used to offset the limit setpoint if required
When viewing this screen, the top line will read "LIM DEAD" and the bottom line will show the current value.
Limit dead band can be adjusted between 0°C and 5°C.

## Remote Offset Adjustment

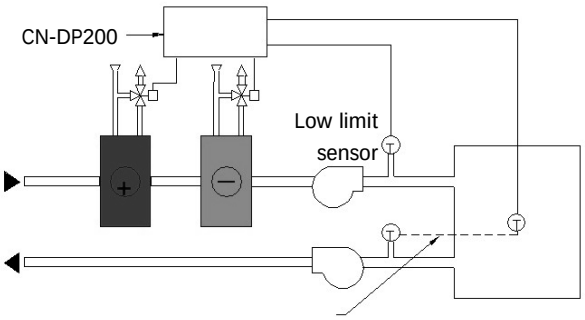
This is the amount that the setpoint will be shifted by when using a remote setpoint 1-11KΩ potentiometer. E.G. If an offset of 3°C is selected then the full span of the potentiometer will shift the controller main setpoint by ±3° C.
When viewing this screen, the top line will read "OFFSET" and the bottom line will show the current value.
Remote offset can be adjusted between 1°C and 15°C.

## Measurement Units

Used to select °C or °F.
When viewing this screen, the top line will read "TEMP" and the bottom line will show the current setting.

## Low Limit Control

In the event that there is a low limit heating and main heating demand, the heating output will be the greater of the two.
More likely is the scenario where there is a low limit heating demand and main cooling demand where the cooling output will drop to zero until the low limit demand ceases.




Only one control sensor is required either in the room or return air

## Control Strategy

The actual setpoint is the value set in the controller plus or minus any offset selected on a remote potentiometer.
The graph shows how the outputs vary in relation to temperature and setpoint.