SRC-200 Series Climate Controllers with Modbus RTU

The SRC-200 series controllers have been designed for climate control in room spaces. The controllers have up to two heating and cooling temperature control stages, fan speed control, optional CO2 level and humidity control. The units can be in various climate control applications including VAV, fan coil units and natural ventilation systems. The controllers have 4 analogue 0..10Vdc outputs and two digital outputs that can be configured for heating, cooling, CO2, humidity, maximum VAV demand or maximum fan demand control. The controllers can operate as Proportional Only or as Proportional + Integral Controllers.

The analogue outputs can be individually configured for any of the heating/cooling stages, CO2, maximum VAV demand or Humidity control. The digital outputs can be configured as 3-point, PWM (thermic) or On/Off control. The SRC-200CO2 versions have built-in CO2 measurement and the outputs can be controlled based on CO2, maximum VAV demand (temperature and CO2), or maximum Fan demand. The SRC-200RH versions humidity measurement and can be used to increase ventilation when high humidity is present.

The controller setpoint can be adjusted -/+3°C (default) by rotating the potentiometer. The display shows comprehensive information on the controller status. With AI options it is possible to monitor/control 0-10V inputs. The controllers have built-in Modbus RS-485 communication for connection to BMS systems.

| Model Type	Model	Description
	SRC200-MOD	Space Climate Controller with Heating and Cooling Outputs, Fan Speed Control, LCD Display, Setpoint Potentiometer, Modbus RS485
	SRC200-CO2-MOD	Space Climate Controller with Heating and Cooling Outputs, CO2 Sensor and Control, Fan Speed Control, LCD Display, Setpoint Potentiometer, Modbus RS485
	SRC200-RH-MOD	Space Climate Controller with Heating and Cooling Outputs, Relative Humidity Sensor and Control, Fan Speed Control, LCD Display, Setpoint Potentiometer, Modbus RS485
	SRC200-CO2RH-MOD	Space Climate Controller with Heating and Cooling Outputs, CO2 Sensor and Control, Relative Humidity Sensor and Control, Fan Speed Control, LCD Display, Setpoint Potentiometer, Modbus RS485
	-PB	Push Button Option (specify Fan icon printing)
	-SPB	Push Button Setpoint Option (Replaces Rotary Potentiometer Setpoint)
	-NPB	Night Mode Push Button (Local Override Option for Night)
	-LL	Light Level and Occupancy Sensor (only available when Rotary Setpoint is not fitted) [Note1]
	-TP	No User Setpoint Adjustment (no potentiometer or push button setpoint provided)
	-BL	No Display or User Setpoint Adjustment (Potentiometer or Buttons) fitted, Blank Cover or Cover with Light Sensor
	-RI2	Extra Resistive Input for Network Measurement Only (device supplied with -SPB option for temp setpoint, no pot)
	-AI1	Converts RI1 to Analogue 0..10Vdc input, network measurement and/or PI-control [Note2]
	-AI2	Second analogue input for Network Measurement (device supplied with -SPB option for temp setpoint, no pot) [Note 3]

-RA	Alternative Bit Switch Range, Bit Switches 1..7 Used for Address, Bit Switch 8 Used for Baud Rate
-ND	No Display Fitted
SW-DCT-USB	Windows Device Configuration Tool with 1.8m USB Cable

Note 1: The LL option disables the external resistive input 1.
Note 2: If AI1 option is selected, RI2 (second resistive input) option is no longer available
Note 3: AI2 option requires AI1 option (it is not possible to have a mix of resistive and analogue inputs)

Technical Data

Power Supply	Power supply	24Vac/dc -10%/+15% <1VA
Displays and Interfaces	LCD	LCD Display for Showing Plant Status (Heating/Cooling Mode, Current Temperature, CO2, Humidity, Setpoint, Valve Position, Fan Speed, Day/Night Mode, Amber/Red Alarms)
	Setpoint Potentiometer	Setpoint Adjust between 18°C and 24°C (limits adjustable)
	Option -PB	Backlit Multi-Step Push Button with Delay Timer; Can be configured Override the Control Loop Outputs
	Option -SPB	Setpoint with 2 Push Buttons (adjustable min/max limits) *Note: If this option is selected PB option becomes 3rd button.*
	Option -NPB	Backlit Push Button Night Override (With moon icon printing)
Signal Outputs	Analogue Outputs	4 x 0..10V < 5mA
	Digital Outputs	2 x 24Vac Triacs; 1A maximum; requires 24Vac Power Supply
Signal Inputs	Built-In Sensor	0..50°C (32..122°F) ±0.3°C @ 25°C
	Resistive Input 1	1 x External NTC10K3 Sensor (Auto-Detect)
	Resistive Input 2 (RI2 Option)	1 x External NTC10K3 Sensor (device supplied with push button setpoint -SPB instead of the setpoint pot)
	Analogue Input (AI1 Option)	1 x 0..10Vdc (replaces the resistive input 1)
	Analogue Input (AI2 Option)	1 x 0..10Vdc (replaces setpoint pot, the device supplied with -SPB push button setpoint)
	Digital Input	2 x Digital Input, Volt-Free Contact, Impedance <1KOhm
Optional Sensing	Carbon Dioxide (CO$_2$ Models)	
Characteristics	Range	0...5000ppm CO$_2$
	Accuracy	± 50ppm + 3% of the reading @ 25°C (@77°F)
	Technology	Auto Calibrating; Patented Non-Dispersive Infrared (NDIR)
	Non-Linearity	<1% FS
	Warm-Up Time	<20 seconds
	Response Time	2 minutes
	Humidity (RH Models)	
	Range	0..100%rH
	Accuracy	±2% rH (within 20..80% rh)
	Light Level and Occupancy; Option -LL	*Note: If this option is selected RI1 (resistive input) is no longer available and need to be left disconnected - this will also disable the sensor auto-detection.*
	Range	0..3,000 Lux
	Occupancy	Infrared Detection (Adjustable Delay)
Communication	Modbus Communications	
	Procotol	Modbus RTU
	Interface	RS485; maximum 63 devices
	Addressing	1..63 via a bit switch; 1..247 via network
	Communication	9k6/19k2/38k4/57k6 Baud; Parity None/Even/Odd, 1 or 2 Stop Bits (baud rate adjustable through bit switch or network)
Connections	Terminal Connections	Solid and Stranded Cable; 55° Angle for Wiring Maximum Size: 0.05 to 1.5mm^2 (EN ISO) / 14 to 30 AWG (UL) Rising Clamp: Size 2.5 x 1.9mm
Environmental Conditions	Operating	
	Temperature	0°C...+50°C (32..122°F)
	Humidity	0...95%rh (non-cond.)
	Storage	
	Temperature	-30°C...+70°C (-22..158°F)

	Humidity	0...95%rh (non-cond.)
Standards	CE Conformity	CE Directive 2004/108/EY EN61000-6-3: 2001 (Generic Emission) EN61000-6-1: 2001 (Generic Immunity).
	Degree of Protection	IP20
Housing	Housing Material	ABS Plastics, Self Extinguishing
	Mounting	Wall or Junction Box Mounting, RAL9010 Pure White
	Dimensions	W86 x H120 x D29mm
	Weight	220g

Wiring Connections
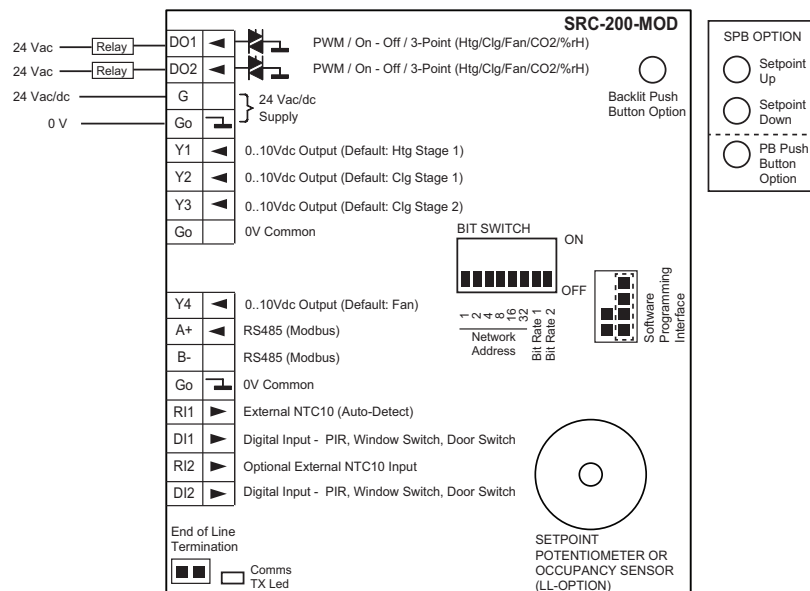
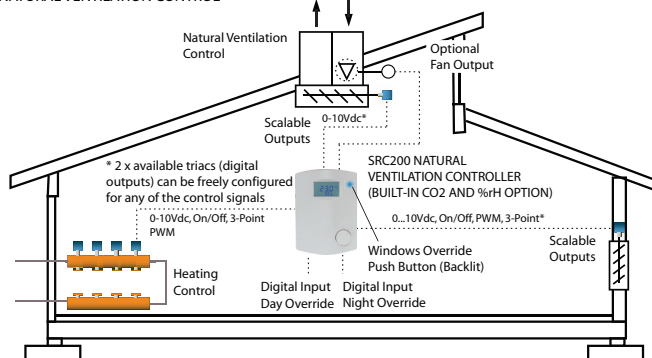| DO1	24Vac Triac; PWM, On/Off; 3-Point Open
DO2	24Vac Triac; PWM, On/Off; 3-Point Close
G	24Vac/dc Power Supply
G0	0V Common
Y1	0..10Vdc Output
Y2	0..10Vdc Output
Y3	0..10Vdc Output
G0	0V Common
Y4	0..10Vdc Output
A+	RS485 A+ Connection (Modbus)
B-	RS485 B- Connection (Modbus)
G0	0V Common
RI1	External NTC10 Sensor (Auto-detect for Main Loop)
DI1	Digital Input; PIR Input, Windows/Condensation Switch
RI2	Optional NTC10 Sensor for Measurement
DI2	Digital Input; PIR Input, Windows/Condensation Switch

Wiring Precautions

Switch off the power before any wiring is carried out.

Display: Unplug the LCD display and then wire the power supply and the analogue outputs, if relevant. After the wiring has been completed; plug-in the display and power up the device.
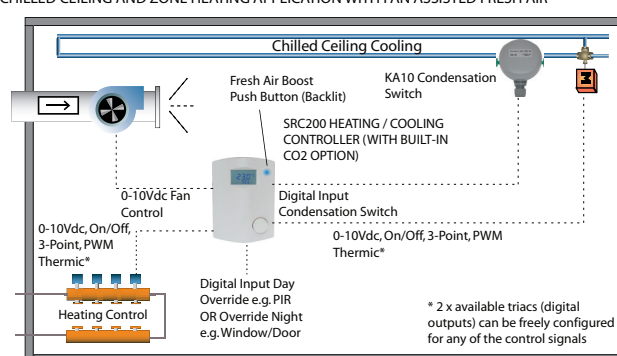
Application Examples

The below application diagrams show few examples of the SRC200 Climate Controller applications. The controller is highly versatile and can be easily configured for most room heating and cooling applications including fan coil unit control, chilled ceiling and zone heating, VAV pressure dependent control and natural ventilation. Please refer to individual set up pages for further details or contact SyxthSense Sales Team for advice.
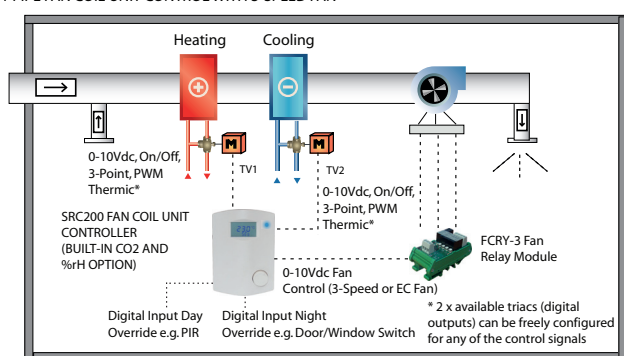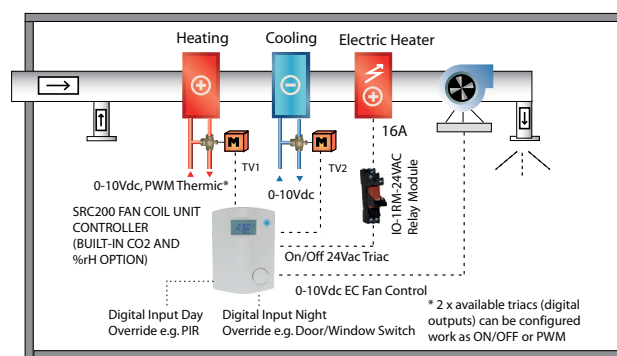
NATURAL VENTILATION CONTROL

Natural Ventilation Control

Optional Fan Output

Scalable Outputs

0-10Vdc*

* 2 x available triacs (digital outputs) can be freely configured for any of the control signals

0-10Vdc, On/Off, 3-Point PWM

SRC200 NATURAL VENTILATION CONTROLLER (BUILT-IN CO2 AND %rH OPTION)

0...10Vdc, On/Off, PWM, 3-Point*

Heating Control

Windows Override Push Button (Backlit)

Digital Input Day Override

Digital Input Night Override

Scalable Outputs

CHILLED CEILING AND ZONE HEATING APPLICATION WITH FAN ASSISTED FRESH AIR

Chilled Ceiling Cooling

Fresh Air Boost Push Button (Backlit)

KA10 Condensation Switch

SRC200 HEATING / COOLING CONTROLLER (WITH BUILT-IN CO2 OPTION)

0-10Vdc Fan Control

0-10Vdc, On/Off, 3-Point, PWM Thermic*

Digital Input Condensation Switch

0-10Vdc, On/Off, 3-Point, PWM Thermic*

Digital Input Day Override e.g. PIR OR Override Night e.g. Window/Door

Heating Control

* 2 x available triacs (digital outputs) can be freely configured for any of the control signals

4-PIPE FAN COIL UNIT CONTROL WITH 3-SPEED FAN

Heating   Cooling

0-10Vdc, On/Off, 3-Point, PWM Thermic*

TV1   TV2

0-10Vdc, On/Off, 3-Point, PWM Thermic*

SRC200 FAN COIL UNIT CONTROLLER (BUILT-IN CO2 AND %rH OPTION)

FCRY-3 Fan Relay Module

0-10Vdc Fan Control (3-Speed or EC Fan)

Digital Input Day Override e.g. PIR

Digital Input Night Override e.g. Door/Window Switch

* 2 x available triacs (digital outputs) can be freely configured for any of the control signals

4-PIPE FAN COIL UNIT CONTROL WITH MODULATING EC FAN AND ELECTRIC HEATER

Heating   Cooling   Electric Heater

0-10Vdc, PWM Thermic*

TV1   TV2

0-10Vdc

16A

IO-1RM-24VAC Relay Module

SRC200 FAN COIL UNIT CONTROLLER (BUILT-IN CO2 AND %rH OPTION)

On/Off 24Vac Triac

0-10Vdc EC Fan Control

Digital Input Day Override e.g. PIR

Digital Input Night Override e.g. Door/Window Switch

* 2 x available triacs (digital outputs) can be configured work as ON/OFF or PWM

4-PIPE FAN COIL UNIT CONTROL WITH 2-SPEED FAN

Heating   Cooling   2-SPEED FAN

0-10Vdc

TV1   TV2

0-10Vdc

IO-1RM-24VAC Relay Module

SRC200 FAN COIL UNIT CONTROLLER (BUILT-IN CO2 AND %rH OPTION)

Fan Speed 1

Fan Speed 2

Digital Input Day Override e.g. PIR

Digital Input Night Override e.g. Door/Window Switch
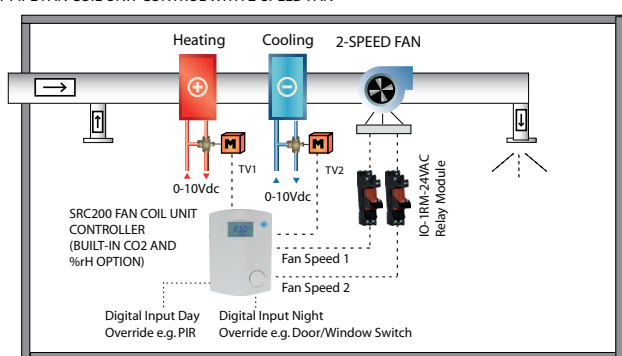
AIR-SIDE FAN COIL UNIT CONTROL WITH 3-SPEED FAN

Cooling

Mid-position = Setpoint

Heating

SRC200 FAN COIL UNIT CONTROLLER (BUILT-IN CO2 AND %rH OPTION)

0-10Vdc, On/Off, 3-Point, PWM Thermic*

0-10Vdc Fan Control (3-Speed or EC Fan)

FCRY-3 Fan Relay Module

Digital Input Day Override e.g. PIR

Digital Input Night Override e.g. Door/Window Switch

* 2 x available triacs (digital outputs) can be freely configured for any of the control signals

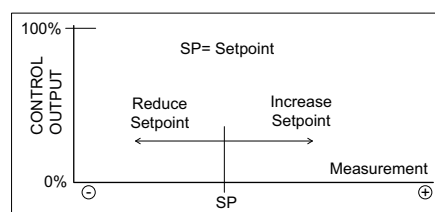**Setpoint Adjustment**

By rotating the setpoint knob option it is possible to adjust the current temperature control setpoint +/-3°C. The adjustment shifts temperature setpoint up and down. Via the configuration tool it is possible to adjust the setpoint centre, and the min and max adjustments of the setpoint.

When the potentiometer is rotated the current setpoint is displayed on the screen, and the backlight is switched on momentarily.
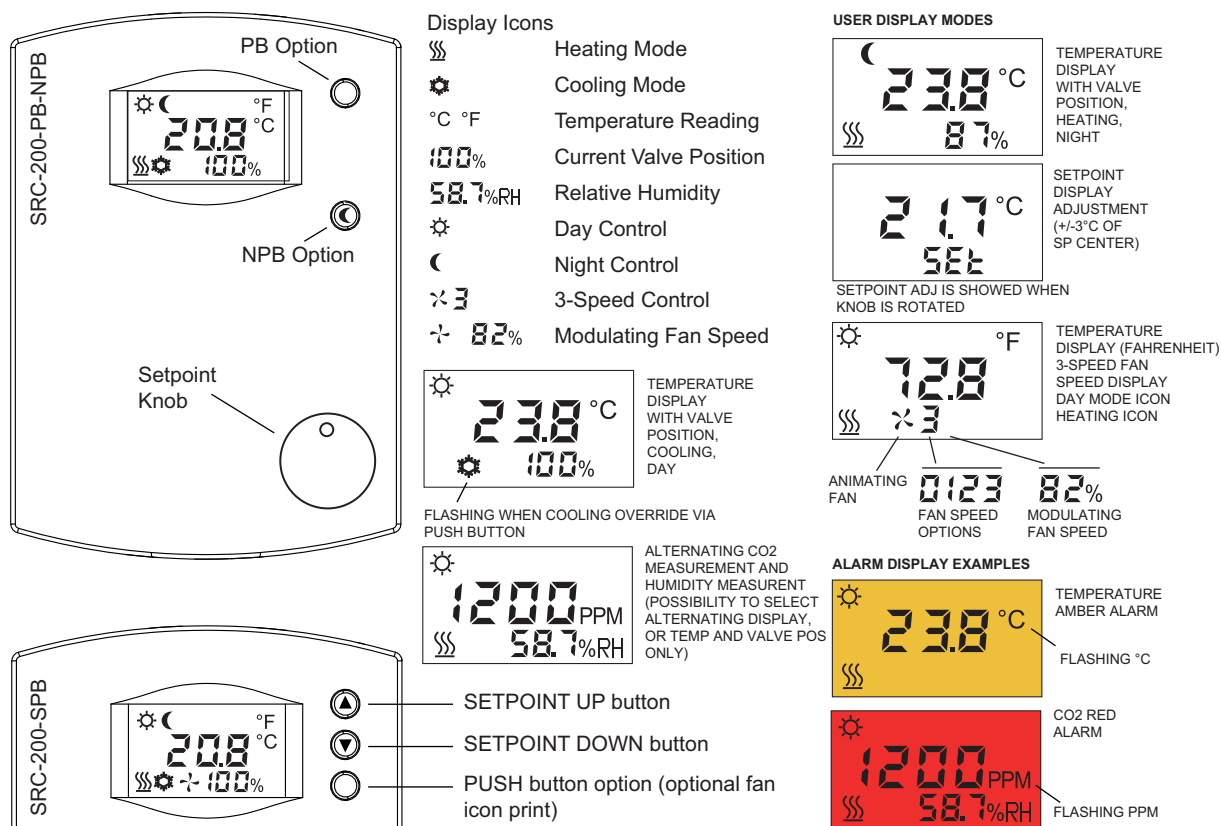

The SPB option provides two push buttons for setpoint instead of the potentiometer. The adjustment shifts the temperature setpoint up or down up to the minimum and maximum allowable setpoint. A configurable parameter (Setpoint Adjust Reset) is available to automatically either reset or retain the current user setpoint adjustment when the setpoint is changed over the network. Setpoint Adjustment can also be reset over the Modbus using a dedicate Modbus Coil. Furthermore Setpoint Adjust Save

parameter is available to enabling saving the user setpoint adjustment to non-volatile memory. If this is enabled, after the power-cycle the controller returns to use the latest user adjusted setpoint.

SRC200 User Interface

The SRC200 controllers have a built-in backlit LCD that can be used to show the current status of the controller. The display is also used to show number of configuration settings. The images below illustrate different display options.

Display Icons

Icon	Description
≶≶≶	Heating Mode
✿	Cooling Mode
°C °F	Temperature Reading
100%	Current Valve Position
58.7%RH	Relative Humidity
☼	Day Control
☾	Night Control
⤨3	3-Speed Control
⤨ 82%	Modulating Fan Speed

PB Option

NPB Option

SRC-200-PB-NPB

Setpoint Knob

SRC-200-SPB

▲ SETPOINT UP button
▼ SETPOINT DOWN button
○ PUSH button option (optional fan icon print)

USER DISPLAY MODES

23.8 °C — TEMPERATURE DISPLAY WITH VALVE POSITION, HEATING, NIGHT

21.7 °C SEt — SETPOINT DISPLAY ADJUSTMENT (+/-3°C OF SP CENTER)

SETPOINT ADJ IS SHOWED WHEN KNOB IS ROTATED

72.8 °F — TEMPERATURE DISPLAY (FAHRENHEIT) 3-SPEED FAN SPEED DISPLAY DAY MODE ICON HEATING ICON

ANIMATING FAN | 0123 FAN SPEED OPTIONS | 82% MODULATING FAN SPEED

23.8 °C TEMPERATURE DISPLAY WITH VALVE POSITION, COOLING, DAY

FLASHING WHEN COOLING OVERRIDE VIA PUSH BUTTON

1200 PPM 58.7%RH — ALTERNATING CO2 MEASUREMENT AND HUMIDITY MEASURENT (POSSIBILITY TO SELECT ALTERNATING DISPLAY, OR TEMP AND VALVE POS ONLY)

ALARM DISPLAY EXAMPLES

23.8 °C — TEMPERATURE AMBER ALARM — FLASHING °C

1200 PPM 58.7%RH — CO2 RED ALARM — FLASHING PPM

LCD Display

The LCD display shows the controller current operation status to the user.

- Temperature, CO2 Level, Humidity Measurement (CO2 model; can be configured to auto-rotate between CO2 and temperature. RH model; configured to auto-rotate between valve/fan position and humidity measurement)
- Current Cooling/Heating Demand with heating and cooling mode icons (set Info Line to Show the Valve Output)
- No heating or cooling icon if neither heating or cooling stages are active. Note: With PI control the outputs are usually active within the deadzone.
- Day Mode / Night Mode icon
- Fan Speed (modulating or A-0-1-2-3; set Info Line to Show Fan Speed)
- CO2, Temperature, Humidity Alarm Display (amber/red)

The display can show either the Fan Speed or Valve position. This is configured during the commissioning. If CO2 is fitted, the CO2 reading can be configured to be rotated with the temperature reading. If RH is fitted, the %rH reading can be configured to be rotated with the fan speed/valve position.

The user interface includes as standard rotary potentiometer for setpoint adjustment, and optional push buttons (PB override push button/fan speed control, NPB night override). SRC200 controllers with SPB option have two push buttons for setpoint instead of the rotary setpoint.

SRC200 with SPB, PB, NPB User Interface Options

The SRC200 controllers with SPB option have two push buttons to change the controller setpoint. PB option provides a multi-function push button. If PB is configured to control the fan speed (e.g. 3-speed user override), the PB option can be supplied with optional fan icon print. NPB option provides a fourth button which allows the controller to be overridden to the Night mode, and comes always with Night icon print.

SETPOINT UP button
SETPOINT DOWN button
FAN button (optional print)
NIGHT MODE button
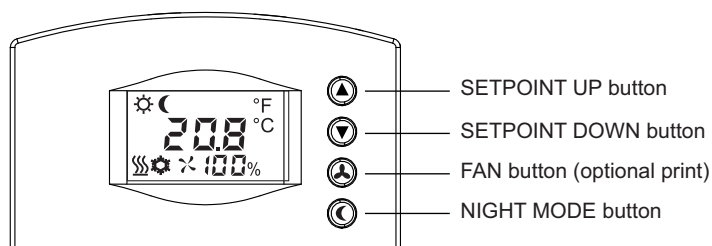
External Sensor Input 1 (RI1 Input)

The controller uses as default the internal temperature sensor for the main temperature control loop. If an external NTC10 temperature sensor is connected to the input RI1, and a valid sensor reading is measured, the controller starts automatically to use the external temperature sensor for the main control loop.

If the Aux Temperature Control Loop has been enabled the RI1 external temperature sensor is used for Aux Control Loop and is no longer available for the main temperature control loop.

External Sensor Input 2 (RI2 Input)

With option RI2 it is possible to provide extra measurement for the external NTC10 sensor. The measurement is available over the communication network.

If the RI2 option is selected, the controller is supplied with -SPB push button setpoint instead of the setpoint potentiometer knob.

0-10V Inputs (AI1 & AI2)

With AI1 option the external sensor input is converted to operate as 0-10V input. The 0-10V input can be used either for control or network monitoring. As default the controller uses the 0-10Vdc input converted as 0..100°C temperature reading for the main temperature control loop.

NOTE: If the internal temperature sensor is required to be used for the temperature control, enable AUX loop (disengages the AI1 input from the control loop). In this case it is also possible to use 0-10V temperature signal for Aux control.

If AI1 option is selected, then with AI2 option it is also possible to have second 0-10V input for measurement only over the communication network. In this case the controller will be supplied with -SPB push button setpoint for the temperature control loop (setpoint knob is no longer available).

NOTE: With AI-options it is no longer possible to have any external resistive NTC10 sensor inputs.

Main Temperature Control Loop Operation

The controllers can have up to 2 heating stages and up to 2 cooling stages (as default one heating stage and one cooling stage) for temperature control. The controller modulates the heating and cooling demand outputs according to the calculated setpoint and the current internal (or external) temperature. The control can be either P-control or PI-control.

As default, heating stage 1 output is linked to Y1 for fully modulating 0..10Vdc control, cooling stage 1 is linked to analogue output Y2 and cooling stage 2 to analogue output Y3.

The controller has also two digital outputs that can be configured to work as PWM or 3-Point control. The PWM or 3-Point control can then be linked to any of the control stages (Heating Stage 1/2 or Cooling Stage 1/2) as required. As default DO1 is linked to PWM control of heating stage 1 and DO2 is linked to the PWM control of cooling stage 1.

Please note that it is possible to set the control loop outputs to direct/reverse, which reverses the control output (valve) running direction (valve drives from 100% to 0%). This can be configured individually for each stage in the Configuration Tool.
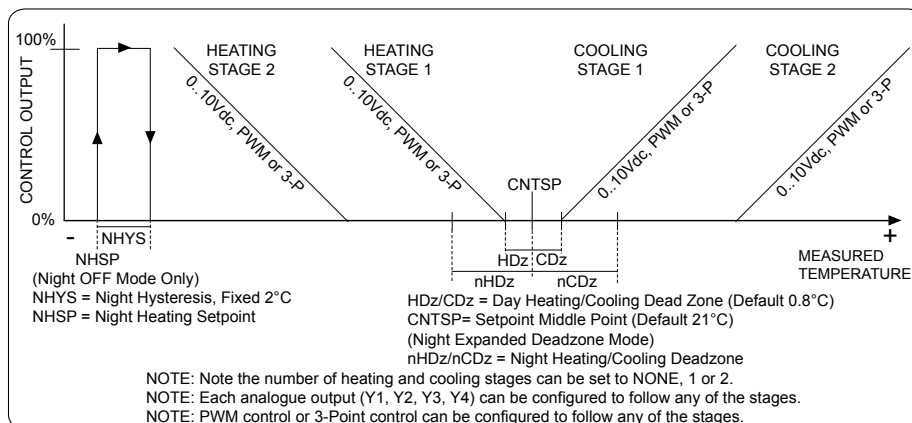
Between heating and cooling stage 1 is a control deadzone. This prevent rapid switching between heating and cooling. The deadzone is divided to heating and cooling part that allows asymmetric deadzones to be configured.

DZ Mode (PI-Control)

The DZ mode parameter sets the integral action operation (applicable to PI-control only) between heating and cooling stages when the temperature is within the deadzone. As default the mode is set to HOLD where the integral term is held inside the deadzone. This reduces the plant wear and tear. By setting the parameter to MODULATE, the integral term modulates to zero within the deadzone if the temperature remains within the deadzone. This drives the heating and cooling outputs to zero.

Day and Night Control

The controller has Day and Night operation modes. When in Day mode the control loop operates with the (Day) Deadzone value. In the Night time the controller controls with the Night Deadzone, if the night mode has been configured to operate in the Expanded Deadzone mode. If in Night Off mode has been enabled the outputs are Off unless the temperature drops below the Frost Setpoint (8°C, adjustable). In this case the Heating Loop Stage 1 and 2 outputs are 100% until the temperature reaches Frost Setpoint + 2°C.

In the Night Mode the LCD display shows the Night Icon (half moon icon). In the day mode the Day Icon is displayed (sun icon).

In Night Modes the users setpoint adjustments do not take effect.

Night/Day Control Activation (Digital Input 1 and 2, or LL-Option)

The controller can be switched to operate between DAY MODE / NIGHT MODE via the communication bus, via the digital inputs (volt-free contact), via built-in Occupancy Sensor (-LL Option) or using Night Mode Push Button (-NPB option).

The Digital Inputs has multiple modes; PIR MODE (override to Day), WINDOW SWITCH MODE (override to Night), CONDENSATION SWITCH MODE (disable cooling).

- In the PIR MODE the controller DAY MODE is activated when the digital input is closed. If the digital input opens, the controller returns to NIGHT MODE (automatic control) after an adjustable time delay
- In the WINDOW SWITCH MODE the controller goes to NIGHT MODE if the digital is open. If the digital input closes, the controller returns to DAY MODE (automatic control) after an adjustable time delay. This can be, for example, used for window contacts or door cards.
- In the CONDENSATION SWITCH MODE, the cooling stages are disabled when the digital input closes.

The built-in Occupancy Sensor (LL-option) operates like the PIR MODE above.

Local overrides have priority over the communication network. Condensation switch mode has priority over the PIR mode. The PIR mode has priority over the window switch mode.

NPB push button option can be used to override the controller locally from Day Mode to Night Mode and to return back to Day Mode. The user set Night override can be reset over the network.

Note: If the network master drives the controller to Night mode, the local Night/Day mode button is disabled.

Fan Speed Control

Fan speed control logic adjusts the fan speed based on the demand (as default heating stage 1, cooling stage 1 control loop outputs). The fan speed control can operate in 1-speed, 2-speed, 3-speed, or EC fan control modes.

The fan speed control type (EC fan, 0-1, 0-1-2, 0-1-2-3) is configured in the Configuration Parameters.

The fan is as default controlled based on the heating stage 1 and cooling stage 1. It is possible to change the fan control source to follow also only the heating stage 1, or only the cooling stage 1, heating/cooling stage 2, heating stage 2, cooling stage 2, humidification, de-humidification, CO2 loop or Aux temperature control loop.

Note: In the Expanded Night Deadzone mode the fan speed is also controlled based on the Heating Stage 1 and/or Cooling Stage 1 demand.

Note: Using external fan control modules such as FCRY-3, it is possible to drive 3-speed fan motors directly. In this case connect analogue output, set to MODULATING FAN, to the FCRY-3 module.
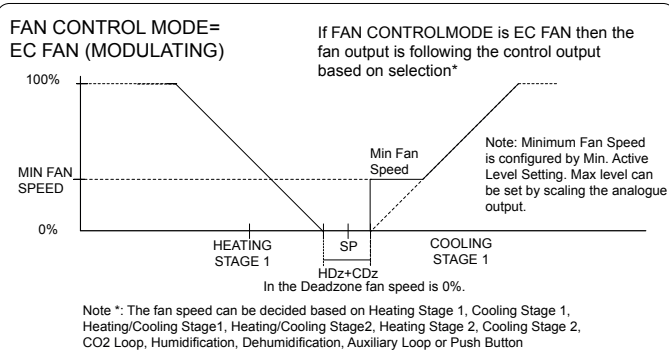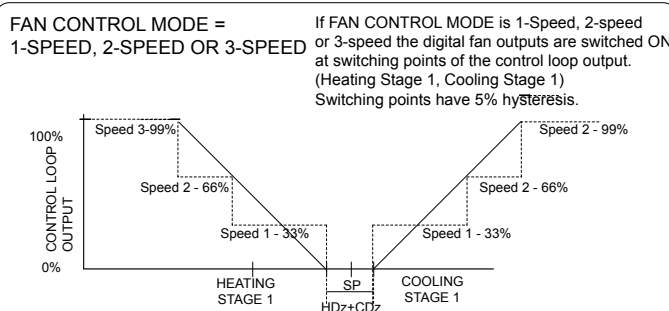
EC Fan Control

When controlling the fan it is possible to set the minimum fan speed level. The fan speed will not drop below the min level in the selected fan control active stage(s) (heating1, cooling2 etc.). When in the deadzone or in other control stages the fan speed drops to 0%.

If the EC Fan is required to be running at the Deadzone, please use the Output Limitation/Scaling.

In the Expanded Night Mode the EC fan output operates as in the Day mode. In the Night Off mode the fan speed is set at 0%.
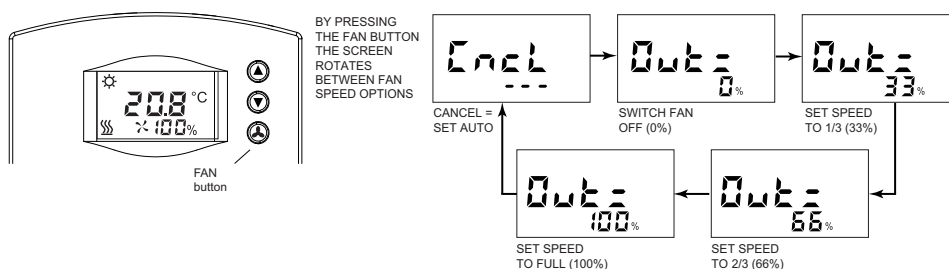
FAN CONTROL MODE =
1-SPEED, 2-SPEED OR 3-SPEED

If FAN CONTROL MODE is 1-Speed, 2-speed or 3-speed the digital fan outputs are switched ON at switching points of the control loop output. (Heating Stage 1, Cooling Stage 1) Switching points have 5% hysteresis.

FAN CONTROL MODE=
EC FAN (MODULATING)

If FAN CONTROLMODE is EC FAN then the fan output is following the control output based on selection*

Note: Minimum Fan Speed is configured by Min. Active Level Setting. Max level can be set by scaling the analogue output.

In the Deadzone fan speed is 0%.

Note *: The fan speed can be decided based on Heating Stage 1, Cooling Stage 1, Heating/Cooling Stage1, Heating/Cooling Stage2, Heating Stage 2, Cooling Stage 2, CO2 Loop, Humidification, Dehumidification, Auxiliary Loop or Push Button

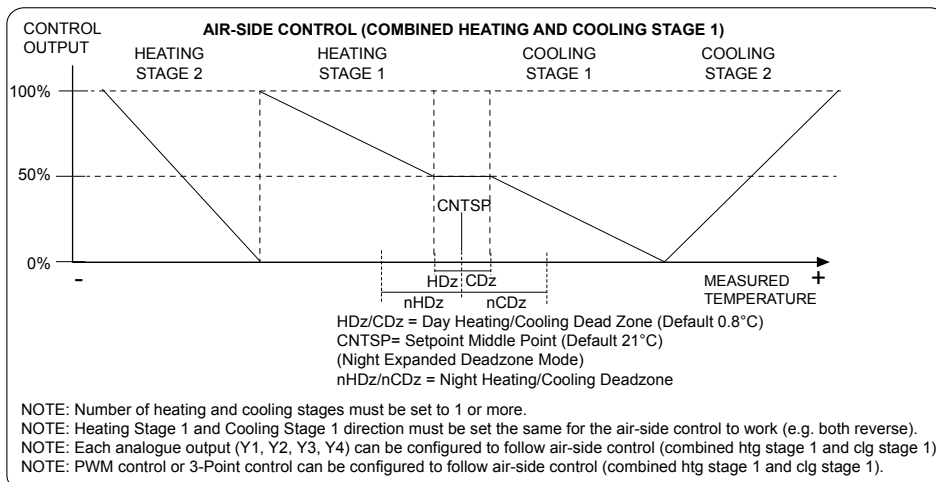Fan Speed Control Button (PB Option)

The SRC-200 controllers with PB push button option can be supplied with fan icon printing. The push button can then be configured to override the fan speed control

Example: The PB mode is configured for "Stepped", number of steps is "3" and Push Button Boost target is "fan control loop". If the Push Button Off Delay has been set 0, the user override is active until it has been cancelled, otherwise the delay off time applies.

BY PRESSING THE FAN BUTTON THE SCREEN ROTATES BETWEEN FAN SPEED OPTIONS

FAN button

CANCEL = SET AUTO

SWITCH FAN OFF (0%)

SET SPEED TO 1/3 (33%)

SET SPEED TO FULL (100%)

SET SPEED TO 2/3 (66%)

Air-Side Control Logic

Air-side control is implemented by combining the Heating Stage1 and Cooling Stage 1 demands. As such to use air-side the number of heating stages must be set to 1 or more and the number of cooling stages must be set to 1 or more. In normal operation the stage direction for heating stage 1 and cooling stage 1 should be set the same.

AIR-SIDE CONTROL (COMBINED HEATING AND COOLING STAGE 1)

CONTROL OUTPUT

HEATING STAGE 2   HEATING STAGE 1   COOLING STAGE 1   COOLING STAGE 2

CNTSP

HDz CDz

nHDz   nCDz

MEASURED TEMPERATURE

HDz/CDz = Day Heating/Cooling Dead Zone (Default 0.8°C)
CNTSP= Setpoint Middle Point (Default 21°C)
(Night Expanded Deadzone Mode)
nHDz/nCDz = Night Heating/Cooling Deadzone

NOTE: Number of heating and cooling stages must be set to 1 or more.
NOTE: Heating Stage 1 and Cooling Stage 1 direction must be set the same for the air-side control to work (e.g. both reverse).
NOTE: Each analogue output (Y1, Y2, Y3, Y4) can be configured to follow air-side control (combined htg stage 1 and clg stage 1).
NOTE: PWM control or 3-Point control can be configured to follow air-side control (combined htg stage 1 and clg stage 1).

Note: The effective proportional band of the Air-side control is twice that of the Heating2 and Cooling2 stages due to the fact there is only one proportional band setting for all stages.

CO2 Sensor Control Loop Operation (SRC200-CO2 Models)

The CO2 models can measure and control the CO2 level. This can then be used in demand based control applications. The CO2 control output can then be configured to linked to any of the physical control outputs Y1, Y2, Y3 or Y4.

The CO2 control loop output corresponds to the CO2 setpoint and the CO2 proportional band. If configured as Direct Control (typical), then if the CO2 level increases above the setpoint the loop output starts to modulate to 100%. When the CO2 level is the amount of the Proportional Band above the setpoint, the loop output is 100%. The configuration is done via the configuration parameters. The CO2 control loop can also be configured to operate as Proportional + Integral control by changing the Integral Action Time from 0 to a required value. The actuator direction can be changed via Output Direction parameter (Direct, Reverse).

In the Night Off mode the CO2 loop output is set to 0%. In the Expanded Deadzone Night mode the CO2 loop operates as in the day mode.

NOTE: CO2 measurement is enabled by inserting CO2 link jumpers (two) on the programming header. As default these are fitted (See programming interface section for further details).
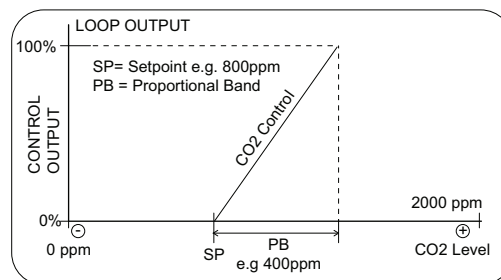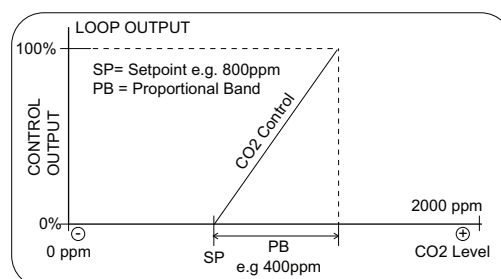
Auxiliary Control Loop

The SRC controllers have auxiliary (temperature) control loop option. When activated, the auxiliary loop uses the RI11 NTC10 temperature reading to calculate the required control output.

The auxiliary loop can be configure to operate direct or reverse.

Note: If auxiliary loop is not activated, the RI1 is used for the main temperature control loop automatically (auto-detect).

If LL-option is ordered RI1 is no longer available. In this case the AUX loop will use RI2 input (option).

When AI1 option is fitted and the auxiliary control loop is enabled, the control loop can be used for 0-10V control. The setpoint and proportional band corresponds to the 0-100% input range. This can be used e.g. in pressure control.

High/Low Limit Control for Auxiliary Control Loop (Reset Control - Requires RI2 Option)

The temperature input RI2 can be used as the high/low limit sensor for the Auxiliary control loop providing high limit and/or low limit control. In high limit control, if the external temperature exceeds the High Limit setpoint, the main control setpoint is reduced by the amount set in the Limit Ratio per degree. E.g. if the Limit Ratio is 2, every degree that the external temperature exceeds the High Limit setpoint, the target (setpoint) is reset by 2 degrees.

The Low Limit control works in reverse. If the external temperature drops below the Low Limit setpoint, the main control setpoint is increased by the amount of the ratio for every degree below the Low Limit setpoint.

The setpoint reset amount follows the formula:-

Setpoint_Reset = (Limit_Setpoint - Temperature) * Limit_Ratio

Note: The limit function is enabled by setting the Limit Ratio parameter (as default 0.0 = disabled).

Note: The limit function is not available with the LL-option.

CO2 Measurement Auto-Calibration

The CO2 sensor has automatic auto-calibration feature. This feature monitors the background CO2 level over the calibration period (8 days), and calibrates the CO2 level to the lowest point measured during this period. The sensors are supplied as factory calibrated to the typical background levels. After powering up the sensor, the sensor carries out initial calibration within 1 day after which the CO2 level is calibrated every 8 days automatically.The auto calibration logic virtually eliminates the need for manual calibration in applications where the indoor CO2 drops to outside levels during unoccupied periods.

NOTE: If the CO2 sensor is fitted in spaces where the background level does not drop close to the typical background level (= fresh air) of 400ppm (e.g. greenhouses) it is essential that the auto-calibration feature is disabled during the commissioning.

VAV Maximum Demand Application

Each of the analogue outputs can also be configured as "Maximum VAV Demand". In this case the corresponding output (Y1, Y2, Y3, Y4) takes the maximum of the CO2 Loop and Cooling Temperature Loop demand output. This is typically used in demand based ventilation (VAV) to control fresh air

damper when there is either demand for more fresh air, or demand for temperature cooling (typically fresh air cools down the room space).

Maximum Fan Demand

Each of the analogue outputs can be configured ad "Maximum Fan Demand". In this configuration the corresponding output (Y1, Y2, Y3, Y4) takes the maximum demand of the CO2 Control Loop and Fan Speed Control Loop. This can provide fan speed boost at high CO2 level and when the fan speed temperature loop has increased the demand.

Humidity Control Loop Operation (SRC-200RH)

The RH models can measure and control the relative humidity level. This can then be used in demand based control applications to increase the fresh air supply e.g. in the high humidity conditions. The control loop has both de-humidification and humidification outputs that can be linked to any of the physical control outputs Y1, Y2, Y3 or Y4. The direction of the both outputs can also be reversed to driver the actuators 100-0% instead of 0-100%.
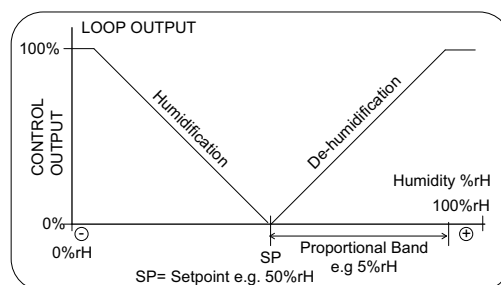
Output Scaling / Output Limitation

Each of the analogue outputs (Y1,Y2,Y3,Y4) can have

- Output minimum voltage (percentage)
- Output maximum voltage (percentage)

The connected control loop output 0..100%is then scaled from minimum voltage to maximum voltage.

For example in the EC fan control, if the fan is required to run always at minimum level, the minimum control output voltage can set to 10% (1V) and the maximum output 70% (7V). In this case the output is 1V when the control loop output is less than 10% and the output is 7V when the control loop output is more than 70%. This allows maximum noise levels to be limited and the fan to have a minimum fan speed. In this example the fan is running at 10% within the deadzone. If the fan is required to be off in the deadzone, please use the Min Active Level in the Fan Speed Control section.

The values are available via the communication network from network master read/write. This allows them to be used e.g. in the natural ventilation application limit the window damper position to different values in winter and summer.

Digital Output Triac Operating Modes, (Thermic Control, 3-Point Control, On/Off Control, Fan Control)

The digital outputs (24Vac Triacs that switch 24Vac to 0V) can be configured to operate as 3-point control, as PWM control (pulse width modulation control) or as On/Off control. They can also be configured as outputs to fan speed control (when 1-speed or 2-speed mode selected). The type of the control is selected via the configuration parameters. If the 3-point actuator mode is selected, the controller modulates the DO1 on when valve is required to be opened and DO2 when the valve is required to be closed. The 3-point operation can be configured to follow any of the heating/cooling stages, CO2 control loop, humidity control loops, air-side control or Maximum VAV/FAN.

It is also possible to reverse the output operation by reversing the corresponding loop output.

When the 3-point output is driven fully open or closed, the output is driven against the edge for a "run on" period (default 6 seconds) and this will be repeated every 10 minutes. The run on time time adjustable via the configuration parameters and this behaviour can be disabled completely by setting the run on time to 0.

If PWM actuator is used the duty cycle is 30 seconds as default (configurable via the tool). E.g. if the output is at 50% then the output is ON for 15 seconds and OFF for 15 seconds.

If the PWM mode has been set to On/Off, then the corresponding digital output is switched ON at the Max Level (default 100%) and are switched OFF at the Min level (default 0%).

Note: Please note digital outputs switch to 0V (24Vac is switched to 0V through the triac).

By setting the Analogue Output Y1, Y2, Y3, Y4 to 3-Point Open or 3-Point Close, the analogue output emulates the digital output. If the 3-point logic drives open, and if the analogue output is set to 3-Point Open, the analogue output is set 10V when opening, otherwise 0V. If the 3-point logic drives close, and if the analogue output is set to 3-Point Close, the analogue output is set 10V when closing, otherwise 0V. This can be used with natural ventilation wiring center to drive window actuators.

The 3-point actuator can have two modes, Linear and Stepped. In Linear Mode the 3-point output operates as standard 3-point control. In Stepped Mode the 3-point loop output will not change until the demand has exceeded the configured step amount. This allows the 3-point loop output to be configured to provide e.g. only output values of 0-25-50-75-100%. This reduces the wear and tear on the Windows actuators. The number of steps is defined by the "Push Button Steps" parameter.

Note: DO1/DO2 can also be configured to switch the DI1/DI2 status. The Digital Input Delay parameter applies.

Note: DO1/DO2 can be configured to send Amber/Red or Red alarm condition to the digital output.

| **CO2, Humidity, Temperature, Fan and Direct Output Override via Push Button (-PB Option)** | Pressing the Push Button, the CO2, Humidity, Fan Speed, Temperature Control Loop Stages or physical Outputs (Y1, Y2, Y3, Y4) can be overridden to 100%, to 0% or to a user adjusted value (Stepped Mode; e.g. 0-25-50-75-100%) for time specified in the override delay parameter. Push Button Operation parameter defines the push button mode (0%, 100% or Stepped). When the override is active, the button backlight in ON. |

The override can be cancelled by pressing the button again. In case of stepped mode push button, press again until "CANCEL" is showed on the display.

In case of Open (100%) or Close (0%) Modes, the override can be cancelled by pressing the push button again. In this case the controller returns to normal automatic operation.

In case of Stepped mode, the output is rotated between Cancel and Stepped positions (see below table). Rotating to the Cancel, cancels the override and the controller returns to normal operation.

The possible "Push Button Steps" Configuration Options:

Push Button Steps	Description
1	Cancel - 0% - 100%
2	Cancel - 0% - 50% - 100%
3	Cancel - 0% - 33% - 66% - 100%
4	Cancel - 0% - 25% - 50% - 75% - 100%
5	Cancel - 0 % - 20% - 40% - 60% - 80% - 100%

The Push Button Boost target defines which control loop the push button overrides.

| Push Button Target	Description
Heating Stage 1	Overrides the Heating Stage 1
Heating Stage 1&2	Overrides the Heating Stage 1&2
Cooling Stage 1	Overrides the Cooling Stage 1
Cooling Stage 1&2	Overrides the Cooling Stage 1&2
Fan Speed Control	Overrides the Fan Speed
CO2 Control Demand	Overrides the CO2 Control
Humidification Demand	Overrides the Humidity Control
De-Humidification Demand	Overrides the Dehumidifying Control
Maximum VAV	Overrides the Maximum VAV Output (Combined Temperature & CO2 Loop)
Output	When Push Button Override is Set to None, the individual outputs can be overridden directly using the push button (Y1,Y2,Y3,Y4,Thermic1,Thermic2,3-Point)
Auxiliary Loop	Overrides the Auxiliary Loop Output
Fan No Scale	Overrides the Y1-Y4 Output without Min/Max Scaling Applied to the Outputs. Only applies when ModulatingFan or MaximumFan option has been set for the output.

NOTE: If the PB (Push Button) option is selected together with SPB option, the push button is the third button down on the controller. As default the push button does not have any printing on it, but on request e.g. fan icon can be printed on it.

| **Occupancy Sensor (-LL Option)** | The LL option offers a low power Passive Infrared Motion sensor with 21mm Fresnel lens designed for HVAC ventilation and lighting control applications. The sensor detects human body within its detection range. The LL sensor employs a dual element pyroelectric infrared sensor with advanced electronics circuitry. |

OCCUPANCY SENSOR DETECTION RANGE

The occupancy sensor can be used for:-

- monitoring only (via network)
- switching the controller to day mode transition (PIR MODE - see DAY/NIGHT CONTROL ACTIVATION section)
- boosting heating stage 1 or cooling stage 1 to 100%
- boosting fan control loop or CO2 control loop to 100%
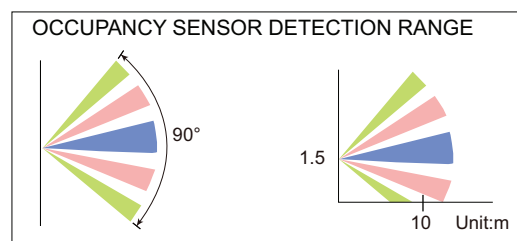
NOTE: If the occupancy sensor is configured to override to day mode, when the override is removed, the controller returns to underlying operating mode. E.g. in stand-alone installations it may be necessary to e.g. use digital input to switch the unit normally to Night mode in order to achieve Day/Night transition using the occupancy sensor.

Digital Input Operation

The controller has two digital inputs that can be used for:-

- Override Day (see DAY/NIGHT CONTROL ACTIVATION section)
- Override Night (see DAY/NIGHT CONTROL ACTIVATION section)
- Disable Cooling Stages when Active
- None (Network Monitoring Only)
- Boosting heating stage 1 or cooling stage 1 to 100% (e.g. using external thermostat)
- Boosting fan control loop or CO_2 control loop to 100%

The digital inputs can also be linked to DO1 output. The digital input delay applies.

Alarm Display

The SRC200 controller provides three Alarm modules each of which can be configured to detect and display Alarm condition on either the CO_2, Humidity or Temperature Sensor (internal or external depending on which is being used). The alarm function can be disabled by setting the alarm source as "NONE". Alarms are disabled by default.

Each Alarm has three alarm states – No Alarm (White/No Backlight), Amber and Red.

HIGH LIMIT ALARM

If the Red threshold is set higher than the amber threshold:

If Sensor >=Amber Threshold; Alarm = amber

If Sensor >= Red Threshold; Alarm = Red

Hysteresis acts to prevent a return to a lower alarm level until the Sensor value falls to a Threshold - Hysteresis

LOW LIMIT ALARM

If the Amber threshold is set higher than the Red Threshold then:

If Sensor <= Amber Threshold; = amber

If Sensor <= Red Threshold; Alarm = Red

ALARM DISPLAY EXAMPLES

TEMPERATURE AMBER ALARM

FLASHING °C

CO2 RED ALARM

FLASHING PPM

Hysteresis acts to prevent a return to a lower alarm level until the Sensor value rises to a Threshold + Hysteresis.

If one or more alarms are in a RED state then the RED backlight is turned on and the associated unit icons will flash on the display to indicate which sensor is causing the alarm(s).

If no red alarms exist Amber Alarms are processed instead and if any exist the AMBER backlight is turned on the associated sensor units flashed.

Note: The unit icons are only flashed when the associated sensor value is being displayed. So to display humidity and/or CO_2 alarm, the display has to be configured to show also these.

Note: Alarm condition can also be configured to drive the digital output on/off.
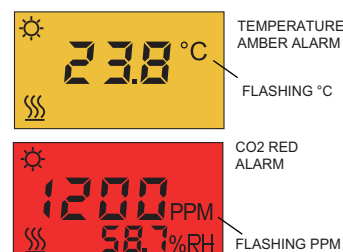
AntiJAM Valve Exercise Function

If the AntiJAM function is enabled the controller monitors for inactivity. If the control outputs have been fully closed or fully open more than the AntiJAM period, the controller will open/close the outputs to by 30% (or ON/OFF in case of ON-OFF mode) for a short period of time. The AntiJAM function is enabled through the configuration parameters or via the DCT configuration tool by selecting the required AntiJAM period by days.

Controller Configuration via Software Configuration Tool

The controller parameter options can be configured either via the Device Configuration Tool software or via the Modbus parameters. The DCT tool is connected via the PC USB cable to the programming header of the controller as shown on the image below.

Programming Header

Red
White
Green
Black

PROG

USB PROGRAMMING CABLE CONNECTOR

USB PROGRAMMING CABLE
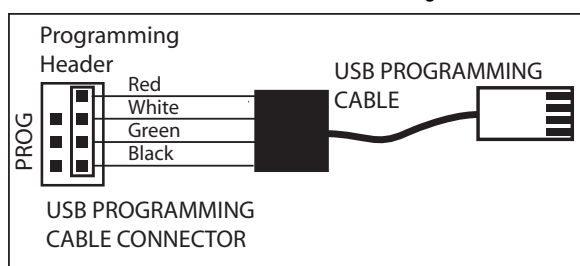
The correct process for connecting the controller via the USB is as follows:-

• Disconnect USB Connector from PC
• Disconnect the Controller from Power
• Plug-In the 4-Way Connector to the Sensor
• Connect the USB to the PC
• Power Up the Controller

NOTE: Always disconnect USB from PC before plugging the cable into the controller.

Common Parameters	
Parameter Name	**Description**
Defaults	Reloads the default configuration from the sensor non-volatile memory. **Note: All modified settings are lost.**
Reset	Performs soft reset of the controller. Apply after major changes.
Read	Reads the controller data.
Write	Writes the new settings to the controller (automatically stored in the non-volatile memory)
COM Port	Select the COM port for the USB Cable or Bluetooth. USB cable driver must be installed in order the Serial to TTL connection to operate.

Live IO-View		
Parameter Name	**Description**	**Range**
INPUTS		
Internal Sensor	Internal Temperature Sensor Reading	0..50°C (32..122°F)
External Sensor 1	External Temperature Sensor 1 Reading (RI1)	0..50°C (32..122°F)
External Sensor 2	External Temperature Sensor 2 Reading (RI2, with -RI2 option)	0..50°C (32..122°F)
0-10V Input 1	Analogue Input 1; 0-10V (AI1 Option)	0..100%
0-10V Input 2	Analogue Input 2; 0-10V (AI2 Option)	0..100%
Humidity Sensor	Relative Humidity Measurement	0..100%
LUX Sensor	LUX Sensor Reading	0..3,000 LUX
Setpoint Adjust	Current Setpoint Adjustment	-20..+20°C/°F
Occupancy	Occupancy Status	Off - On
Digital Input 1	Digital Input 1 Status	Off - On
Digital Input 2	Digital Input 2 Status	Off - On
Configuration Switch	Bit Switch Position	00000000-11111111
OUTPUTS		

Live IO-View		
Parameter Name	**Description**	**Range**
Triac 1	Digital Output 1	Off - On
Triac 2	Digital Output 2	Off - On
Analogue Output 1	Analogue Output 1	0..100%
Analogue Output 2	Analogue Output 2	0..100%
Analogue Output 3	Analogue Output 3	0..100%
Analogue Output 4	Analogue Output 4	0..100%
Thermic1 Position	Thermic Output 1 Position	0..100%
Thermic2 Position	Thermic Output 2 Position	0..100%
Three Point Position	Three Point Output Position	0..100%
CONTROL		
Calculated Setpoint	Calculated Temperature Control Setpoint	12..86°C/°F
Heating Demand	Heating Control Loop Output	0..100%
Cooling Demand	Cooling Control Loop Output	0..100%
CO2 Demand	CO2 Control Loop Output	0..100%
Humidification Demand	%RH Control Loop Humidification Output	0..100%
De-Humidification Demand	%RH Control Loop De-Humidification Output	0..100%
Fan Speed Demand	Fan Control Loop Output	0..100% or 0-1-2-3
Aux Loop Demand	Auxiliary Control Loop Output	0..100%
Override State	Controller Operating Mode Status	0 = None / Day 1 = Night

Control Parameters		
Parameter Name	**Description**	**Range**
Setpoint	Setpoint Middle Position.	12..86°C/°F (Default 21.0°C)
Setpoint Adjust Max	Temperature Setpoint Maximum Adjustment	0.0...20°C/°F (Default 3.0)
Setpoint Adjust Min	Temperature Setpoint Minimum Adjustment	-20.0...0°C/°F (Default -3.0)
Setpoint Adjustment Save	Not Applicable	
Setpoint Adjustment Reset	Not Applicable	
Proportional Band	Proportional Ban	1.0..50.0 °C/°F (Default 4.0)
Integral Action Time	Integral Action time of the control loop. Set to 0 to disable.	0..1,200 seconds (Default 600s)
Heating Deadzone	Deadzone Between Heating Stages and Setpoint in Day Mode	0.0..6.0°C/°F (Default 0.8°C)
Cooling Deadzone	Deadzone Between Cooling Stages and Setpoint in Day Mode	0.0..6.0°C/°F (Default 0.8°C)
Heating Stages	Number of Heating Stages	0 = None 1 = 1-Stage (Default) 2 = 2-Stages
Heating Stage 1 Direction	Heating Stage 1 Direction	0 = Reverse (Default) 1 = Direct
Heating Stage 2 Direction	Heating Stage 2 Direction	0 = Reverse (Default) 1 = Direct
Cooling Stages	Number of Cooling Stages	0 = None 1 = 1-Stage (Default) 2 = 2-Stages
Cooling Stage 1 Direction	Cooling Stage 1 Direction	0 = Reverse 1 = Direct (Default)
Cooling Stage 2 Direction	Cooling Stage 2 Direction	0 = Reverse 1 = Direct (Default)
Night Mode	Night Control Mode	0 = Expanded Deadzone (Default) 1 = Night OFF Mode
Relaxed Heating Deadzone	Deadzone Between Heating Stages and Setpoint in Night Mode (Expanded Deadzone Mode)	0.0..40.0°C/°F (Default 3.0°C)
Relaxed Cooling Deadzone	Deadzone Between Cooling Stages and Setpoint in Night Mode (Expanded Deadzone Mode)	0.0..40.0°C/°F (Default 3.0°C)
Night Frost Setpoint	Night Frost Setpoint (Night OFF Mode)	0.0...71.0°C/°F (Default 8.0°C)
DZ Mode	Integral Action Operation in Deadzone	0 = Hold (Default) 1 = Modulate

Control Parameters		
Parameter Name	**Description**	**Range**
CO2 CONTROL		
CO2 Control Setpoint	CO2 Setpoint	0..5000ppm (Default 1,000 ppm)
CO2 Proportional Band	CO2 Proportional Band	10..5000 ppm (Default = 300 ppm)
CO2 Control Integral Action	Integral Action time of the CO2 control loop. Set to 0 to disable.	0..10,000 seconds (Default 0)
Output Direction	Direction of the CO2 control actuator.	0 = Reverse Acting 1 = Direct Acting (Default)
HUMIDITY		
Humidity Control Setpoint	Humidity Setpoint	0.0...100.0 %rH (Default 50%)
Humidity Proportional Band	Humidity Proportional Band	0.1...100.0 %rH (Default 20.0%)
Humidity Control Integral Action	Integral Action time of the humidity control loop. Set to 0 to disable.	0..10,000 seconds (Default 0)
Humidification Output Direction	Direction of the humidification output (actuator direction, Direct = 0..100%, Reverse = 100..0%).	0 = Reverse Acting 1 = Direct Acting (Default)
De-Humidification Output Direction	Direction of the dehumidification output (actuator direction, Direct = 0..100%, Reverse = 100..0%).	0 = Reverse Acting 1 = Direct Acting (Default)
FAN SPEED CONTROL		
Fan Speed Mode Selection	Selecting the Fan Speed Mode	0 = 0..100% Modulating 1 = 0 - 1 2 = 0 - 1 - 2 (default) 3 = 0 - 1 - 2 - 3 4 = None
Fan Speed By	Fan Speed Control Source	0 = Heating 1 and Cooling 1 Stage (Default) 1 = Heating Stage1 2 = Cooling Stage 1 3 = Heating and Cooling Stage 2 4 = Heating Stage 2 5 = Cooling Stage 2 6 = CO2 7 = Humidification 8 = De-humidification 9 = Auxiliary Loop 10 = Push Button Boost
Min Active Level	Fan Speed Minimum Active Level	0...100 %rH (Default 20%)
AUXILIARY CONTROL LOOP		
Aux Control Setpoint	Aux Loop Setpoint	12..86°C/°F (Default 21.0°C)
Aux Proportional Band	Aux Loop Proportional Band	1.0..50.0 °C/°F (Default 4.0)
Aux Control Integral Action	Integral Action time of the Aux control loop. Set to 0 to disable.	0..1,200 seconds (Default 600s)
Output Direction	Direction of the CO2 control actuator.	0 = Reverse Acting (Default) 1 = Direct Acting
Enable Aux Loop	Enables Auxiliary Control Loop (Activates RI1)	0 = Disabled (Default) 1 = Enabled
High Limit Setpoint	High Limit Control Setpoint	0.0..95.0 °C/°F (Default 36.0)
Low Limit Setpoint	Low Limit Control Setpoint	0.0..95.0 °C/°F (Default 16.0)
Setpoint Adj Ratio	Limit Control Setpoint Adjustment Ratio	0.0..5.0 (Default 0.0)

Inputs / Outputs		
Parameter Name	**Description**	**Range**
INPUTS		
Internal Sensor Offset	One Point Internal Temperature Calibration Field	-10.0..+10.0°C/°K (Default 0°C)
External Sensor 1 Offset	One Point External Temperature Calibration Field, RI1	-10.0..+10.0°C/°K (Default 0°C)
External Sensor 2 Offset	One Point External Temperature Calibration Field, RI2	-10.0..+10.0°C/°K (Default 0°C)
CO2 Sensor Offset	CO2 Sensor Calibration	-500...+500 ppm
Humidity Sensor Offset	Humidity Sensor Calibration	-5...+5%rH

Inputs / Outputs		
Parameter Name	**Description**	**Range**
DI1 Function	Digital Input 1 Function	0 = Override Day (PIR Mode) - Default 1 = Override Night (Windows Switch Mode) 2 = Disable Cooling (Condensation Switch Mode) 3 = None 4 = Boost Heating Stage 1 5 = Boost Cooling Stage 1 6 = Boost Fan Loop 7 = Boost CO2 Loop 8 = Boost Aux.
DI1 Delay	Delay Time Setting for Digital Input 1	0..28800 Seconds (Default 0s)
DI2 Function	Digital Input 2 Function	0 = Override Day (PIR Mode) - Default 1 = Override Night (Windows Switch Mode) 2 = Disable Cooling (Condensation Switch Mode) 3 = None 4 = Boost Heating Stage 1 5 = Boost Cooling Stage 1 6 = Boost Fan Loop 7 = Boost CO2 Loop 8 = Boost Aux.
DI2 Delay	Delay Time Setting for Digital Input 2	0..28800 Seconds (Default 0s)
Push Button Boost	Push Button Boost Target	0 = Heating Stage 1 (Default) 1 = Heating Stage 1&2 2 = Cooling Stage 1 3 = Cooling Stage 1&2 4 = Fan Control Loop 5 = CO2 Control Loop 6 = Humidification 7 = De-humidification 8 = Maximum VAV 9 = Output 10 = Auxiliary Loop 11 = Fan No Scale
Push Button Off Delay	Delay Time Setting for Push Button	0..28800 Seconds (Default 600s) 0 = Permanently On
Push Button Mode	Sets the Operation Mode of the Push Button.	0 = 0% (Overrides to 0%) 1 = 100% (Overrides to 100%, Default) 3 = Stepped (Rotates 0%-25%-50%-75%-100%-Cancel)
Push Button Steps	Sets the number of steps when "Stepped Mode" is used with the Push Button.	0..5
Occupancy Sensor Mode	Selects if the occupancy sensor is used for control or for monitoring only.	0 = Display Only (Default) 1 = Day/Night Control 2 = Boost Heating Stage 1 3 = Boost Cooling Stage 1 4 = Boost Fan Loop 5 = Boost CO2 Loop
Occupancy Off Delay	Delay Time Setting for Occupancy	0..28800 Seconds (Default 600s)
OUTPUT ASSIGNMENTS		

Inputs / Outputs		
Parameter Name	**Description**	**Range**
AO1 (Y1)	Analogue Output Y1 Mode Default: 2 - Heating Stage 1	0 = Network Value 1 = None 2 = Heating Stage 1 3 = Heating Stage 2 4 = Cooling Stage 1 5 = Cooling Stage 2 6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control 9 = Maximum VAV 10 = Maximum Fan 11 = Humidification 12 = De-humidification 13 = Aux Control Loop 14 = 3-Point Open 15 = 3-Point Close 16 = Push Button 17 = Thermic 1 18 = Thermic 2 19 = Max Heating Stage 1 / Cooling Stage 1 20 = Max Heating Stage 2 / Cooling Stage 2
AO2 (Y2)	Analogue Output Y2 Mode Default: 4 - Cooling Stage 1	
AO3 (Y3)	Analogue Output Y3 Mode Default: 5 - Cooling Stage 2	
AO4 (Y4)	Analogue Output Y4 Mode Default: 7 - EC Fan	
AO1 (Y1) Minimum Output	Analogue Output Y1 Minimum Value	0..100%(0% = default)
AO1 (Y1) Maximum Output	Analogue Output Y1 Maximum Value	0..100% (100% = default)
AO2 (Y2) Minimum Output	Analogue Output Y2 Minimum Value	0..100%(0% = default)
AO2 (Y2) Maximum Output	Analogue Output Y2 Maximum Value	0..100% (100% = default)
AO3 (Y3) Minimum Output	Analogue Output Y3 Minimum Value	0..100%(0% = default)
AO3 (Y3) Maximum Output	Analogue Output Y3 Maximum Value	0..100% (100% = default)
AO4 (Y4) Minimum Output	Analogue Output Y4 Minimum Value	0..100%(0% = default)
AO4 (Y4) Maximum Output	Analogue Output Y4 Maximum Value	0..100% (100% = default)
Thermic/On-Off 1	Thermic/On-Off Output 1 Mode (Linked to DO1) Default: 1 - Heating Stage 1	0 = Network Value 1 = None 2 = Heating Stage 1 (Default) 3 = Heating Stage 2 4 = Cooling Stage 1 5 = Cooling Stage 2 6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control 9 = Maximum VAV 10 = Maximum Fan 11 = Humidification 12 = De-humidification 13 = Aux Control Loop 14 = Push Button 15 = Max Heating Stage 1 / Cooling Stage 1 16 = Max Heating Stage 2 / Cooling Stage 2
Thermic/On-Off 2	Thermic/On-Off Output 2 Mode (Linked to DO2) Default: 4 - Cooling Stage 1	
3-Point	Three Point Output Mode (Linked to DO1 & DO2) NOTE: If selected Thermic 1 and Thermic 2 are automatically set to None. Default: 1 - None	
DO1	Digital Output 1 Mode. Set to Control to activate PWM or On/Off control logic. Default: 3 - Thermic 1	0 = Network 1 = Fan Speed 1 2 = Fan Speed 2 3 = Thermic 1 4 = Thermic 2 5 = 3-Point Open 6 = 3-Point Close 7 = Digital Input 1 8 = Digital Input 2 9 = Amber or Red Alarm 10 = Red Alarm
DO2	Digital Output 2 Mode. Set to Control to activate PWM or On/Off control logic. Default: 4 - Thermic 2	
THERMIC ACTUATORS		
Mode	Thermic Actuator Mode	0 = PWM (Pulse Width Modulation, Default) 1 = On/Off
Min. Level	Minimum Output Level (Switch Off Level)	0..100% (Default 0)
Max. Level	Maximum Output Level (Switch On Output)	10..100% (Default 100)
PWM Period	Pulse Width Modulation Period	0..255 seconds (Default 30)

Inputs / Outputs		
Parameter Name	**Description**	**Range**
3-POINT ACTUATOR		
Stroke Time	3-Point Actuator Running Time	30..600 seconds (Default 150)
Run On Time	3-Point Actuator Run On TIme when Fully Open /Closed	0..30 seconds (Default 6)
Output Mode	Sets the 3-Point Output model. Linear = Standard 3-Point. Stepped = Follows the number of steps set in the Push Button Steps parameter.	0 = Linear (Default) 1 = Stepped
VALVE EXERCISE (AntiJAM)		
Anti-Jam Timeout	Valve Exercise Monitoring Period.	0 = Disabled (Default) 1-14 days

| Alarm/Display/Comms		
Parameter Name	**Description**	**Range**
DISPLAY		
Temperature Units	Temperature Unit Selection	0 = Celsius (Default) 1 = Fahrenheit
LCD brightness	Brightness of the LCD white backlight.	Off - 10% to 100% (Default Off)
Alternating Display Options	Alternating CO_2 and RH Display	0 = Disabled (Default) 1 = Alternate CO_2 Only 2 = Alternate RH Only 3 = Alternate CO_2 and RH 4 = Setpoint Adjust
Info Line	Info Line Configuration	0 = Show Valve Position 0-100% (default) 1 = Show Fan Speed 2 = None
COMMS		
Modbus Baud Rate NOTE: Does not show Modbus Baud Rate set via bit switches.	Modbus Baud Rate (can only be set if BR1 and BR2 are in OFF position)	0 = 9600 (Default) 1 = 19200 2 = 38400 3 = 57600
Modbus Parity	Modbus Parity	0 = None (Default) 1 = Odd 2 = Even
Stop Bits	Stop Bits	0 = 1 Stop Bit (Default) 1 = 2 Stop Bits
Address NOTE: Does not show Modbus address set via bit switches.	Modbus Address (can only be set if all address bit switches are in OFF position)	0..247 (Default 1)
ALARMS		
Alarm 1 Source	Source for the Alarm Display	0 = CO_2 Sensor 1 = Temperature 2 = Humidity 3 = None (Default)
Alarm 1 Amber Threshold	Alarm 1 Amber Backlight Switching Point	0..5000 (Default 0)
Alarm 1 Red Threshold	Alarm 1 Amber Backlight Switching Point	0..5000 (Default 0)
Alarm 1 Hysteresis	Hysteresis for Alarm 1	0..5000 (Default 0)
Alarm 2 Source	Source for the Alarm Display	0 = CO_2 Sensor 1 = Temperature 2 = Humidity 3 = None (Default)
Alarm 2 Amber Threshold	Alarm 2 Amber Backlight Switching Point	0..5000 (Default 0)
Alarm 2 Red Threshold	Alarm 2 Amber Backlight Switching Point	0..5000 (Default 0)
Alarm 2 Hysteresis	Hysteresis for Alarm 2	0..5000 (Default 0)
Alarm 3 Source	Source for the Alarm Display	0 = CO_2 Sensor 1 = Temperature 2 = Humidity 3 = None (Default)
Alarm 3 Amber Threshold	Alarm 3 Amber Backlight Switching Point	0..5000 (Default 0)
Alarm 3 Red Threshold	Alarm 3 Amber Backlight Switching Point	0..5000 (Default 0)
Alarm 3 Hysteresis	Hysteresis for Alarm 3	0..5000 (Default 0)

Parameter Storage

The configuration parameters are stored in the non-volatile memory. When the changes are carried out via the Configuration Tool, the parameters are stored in the non-volatile memory when the controller returns to a normal display mode. If the changes are carried out over the network (Modbus), then "NonVol Update" flag is required to be forced on to save the changes.

Setting Up Modbus Address and Baud Rate

The SRC Modbus address and the baud rate are normally set through the bit switch. It is also possible to set the address and baud rate over the over the Modbus communication network.

NOTE: The new settings are activated automatically after approx 5 seconds if the bit switch positions have not been moved. In this case the controller reset is applied to activate the new settings.
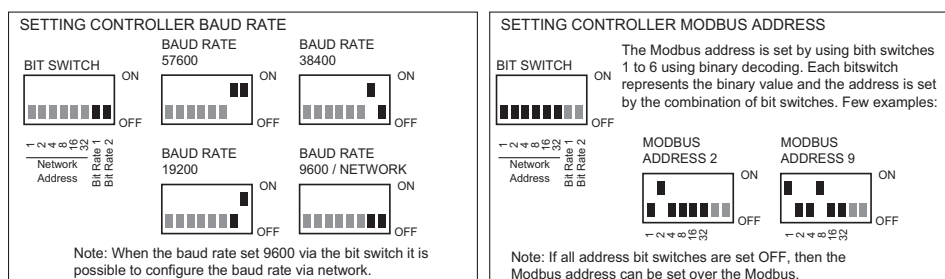
Modbus Registers

The controller supports the following Modbus registers and function codes. The default communication speed is 9600 bps, 8 data bits, Parity None and 1 Stop Bit. The default Modbus Slave address is 0. The device Parity can be changed between Odd, None and Even. The baud rate is selectable between 9600, 19200, 38400 and 57600 bps. The baud rate speeds can be selected using the built-in bit switch, or over the network if BR1 and BR2 are set to OFF. The sensor addresses 1 to 63 can be set using the local bit switch, and over the Modbus the adjustable address range is 1 to 247.

Please note that Modbus register space is specified from the Modbus master perspective as in the Modbus Application Protocol specification. The Modbus registers for Function Codes 02, 03, 06 and 16 have presentation for both Modbus "address blocks" and for actual Modbus register offsets. For example, the Temperature is read from Modbus register 1 using Function Code 04. Some Modbus masters will require Function Code 04, register 1 to be entered, whereas the others will require register 30001 and Function Code 04. The Modbus addressing starts from the zero Base address. (Some Modbus masters start addressing from 1, in this case add one to the listed register values).

Register	Parameter Description	Data Type	Raw Data	Range
	FUNCTION CODE 01 - READ COILS FUNCTION CODE 05 - WRITE SINGLE COIL FUNCTION CODE 15 - WRITE MULTIPLE COILS			
0	Digital Output 1 Override (Network Write)		0..1	Off - On
1	Digital Output 2 Override (Network Write)		0..1	Off - On
2	Night Mode Override		0..1	Off - On
3	Setpoint Adjustment Reset		0..1	Off - On
4	Reset User Night Override Button (PB4)		0..1	Off - On
	FUNCTION CODE 02 - READ DISCRETE INPUTS			
1000**0**	Digital Input 1 Status		0..1	Off - On
1000**1**	Digital Input 2 Status		0..1	Off - On
1000**2**	Digital Output 1 Status		0..1	Off - On
1000**3**	Digital Output 2 Status		0..1	Off - On
1000**4**	Push Button 1 Status (Switch Off Delayed "Delay Time Setting" amount in seconds)		0..1	Off - On
1000**5**	Built-In Occupancy Sensor Status (Switch Off Delayed "Delay Time Setting" amount in seconds)		0..1	Off - On
1000**6**	Night Mode Status		0..1	Off - On
	FUNCTION CODE 04 - READ INPUT REGISTERS			

Register	Parameter Description	Data Type	Raw Data	Range
3000**0**	Built-In Temperature Measurement	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
3000**1**	External Temperature Measurement (Resistive Input 1)	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
3000**2**	Current Calculated Setpoint (°C)	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
3000**3**	Analogue Output Y1	Unsigned 16	0..1000	0..100.0 %
3000**4**	Analogue Output Y2	Unsigned 16	0..1000	0..100.0 %
3000**5**	Analogue Output Y3	Unsigned 16	0..1000	0..100.0 %
3000**6**	Analogue Output Y4	Unsigned 16	0..1000	0..100.0 %
3000**7**	Thermic 1 Level	Unsigned 16	0..1000	0..100.0 %
3000**8**	Thermic 2 Level	Unsigned 16	0..1000	0..100.0 %
3000**9**	Three Point Level	Unsigned 16	0..1000	0..100.0 %
3001**0**	CO2 Measurement	Unsigned 16	0..5000	0..5000 ppm
3001**1**	Relative Humidity Measurement	Unsigned 16	0..1000	0..100.0 %rH
3001**2**	Alarm 1 State	Unsigned 16	0..3	0 = Normal (No Alarm) 1 = Amber Alarm 2 = Red Alarm
3001**3**	Alarm 2 State	Unsigned 16	0..3	0 = Normal (No Alarm) 1 = Amber Alarm 2 = Red Alarm
3001**4**	Alarm 3 State	Unsigned 16	0..3	0 = Normal (No Alarm) 1 = Amber Alarm 2 = Red Alarm
3001**5**	Light Level Measurement	Unsigned 16	0..3000	0..3000 Lux
3001**6**	External Sensor 2 Measurement (Resistive Input 2, Option)	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
3001**7**	Analogue Input 1 Measurement (0-10V, Option)	Unsigned 16	0..1000	0..100.0 %
3001**8**	Analogue Input 2 Measurement (0-10V, Option)	Unsigned 16	0..1000	0..100.0 %
3001**9**	Input Register for Discrete Inputs	Unsigned 16	0..255	Bit 0 = DI1 Status Bit 1 = DI2 Status Bit 2 = DO2 Status Bit 3 = DO2 Status Bit 4 = Push Button Status Bit 5 = Occupancy Status Bit 6 = Night Mode Status
3002**0**	Push Button Current Manual Level Auto =255, otherwise reports the selected push button level (e.g. 0-33-66-100)	Unsigned 16	0..255	0, 100, Selected Push Button Level, 255
3002**1**	Combined Temperature and Humidity Temperature; LSB 8-bit Signed Humidity; MSB 8-bit Unsigned	Signed 16	n/a	n/a
3002**2**	Combined RI1 and SPA Setpoint Adjustment RI1 ; LSB 8-bit Unsigned SPA; MSB 8-bit Signed	Signed 16	n/a	n/a
3002**3**	Combined Y1 and Y2 Y1 ; LSB 8-bit Unsigned Y2; MSB 8-bit Unsigned	Unsigned 16	n/a	n/a
3002**4**	Combined Y3 and Y4 Y3 ; LSB 8-bit Unsigned Y4; MSB 8-bit Unsigned	Unsigned 16	n/a	n/a
3002**5**	Combined Thermic1 and Thermic2 Thermic1 ; LSB 8-bit Unsigned Thermic2; MSB 8-bit Unsigned	Unsigned 16	n/a	n/a
3002**6**	Combined AI1 and AI2 AI1 ; LSB 8-bit Unsigned AI2; MSB 8-bit Unsigned	Unsigned 16	n/a	n/a
3002**7**	Combined RI2 and 3-Point Level RI2 ; LSB 8-bit Signed 3-Point Level; MSB 8-bit Signed	Signed 16	n/a	n/a

Register	Parameter Description	Data Type	Raw Data	Range
30028	Combined Push Button Level and Alarm States Push Button Level ; LSB 8-bit Unsigned Alarm States; MSB 8-bit Unsigned, Bit Encoded	Unsigned 16	n/a	n/a
30029	Auxiliary Loop Calculated Setpoint (°C) - After High/Low Limit Control Influence	Signed 16	-400...3020	-40.0...150.0°C (-40.0..302.0°F)
30100	Firmware Version	Unsigned 16	N/A	N/A

FUNCTION CODE 03 - READ HOLDING REGISTERS
FUNCTION CODE 06 - WRITE SINGLE HOLDING REGISTER
FUNCTION CODE 16 - WRITE MULTIPLE HOLDING REGISTERS

Register	Parameter Description	Data Type	Raw Data	Range
40000	Temperature Control Setpoint	Unsigned 16	120...860	12.0...86.0°C/°F (Default 21°C)
40001	Temperature Proportional Band	Unsigned 16	1...500	0.1...50.0°C/°F (Default 4°C)
40002	Temperature Control Integral Action	Unsigned 16	0..1200	0..1200 seconds (600s default)
40003	Day Heating Deadzone	Unsigned 16	0..60	0...6.0°C/°F (Default 0.8°C)
40004	Number of Heating Stages	Unsigned 16	0..2	0..2
40005	Number of Cooling Stages	Unsigned 16	0..2	0..2
40006	Heating Stage 1 Direction	Unsigned 16	0..1	0 = Reverse, 1 = Direct
40007	Cooling Stage 1 Direction	Unsigned 16	0..1	0 = Reverse, 1 = Direct
40008	Digital Input 1 Override Mode	Unsigned 16	0..8	0 = Override Day (PIR Mode) - Default 1 = Override Night (Windows Switch Mode) 2 = Disable Cooling (Condensation Switch Mode) 3 = None 4 = Boost Heating Stage 1 5 = Boost Cooling Stage 1 6 = Boost Fan Loop 7 = Boost CO2 Loop 8 = Boost Aux.
40009	Temperature Units	Unsigned 16	0..1	0 = Celsius, 1 = Fahrenheit
40010	Analogue Output Y1 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) Default 0
40011	Analogue Output Y2 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) Default 0
40012	Analogue Output Y3 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) Default 0
40013	Analogue Output Y4 Override Value	Unsigned 16	0..1000	0..100% (0..10.0V) Default 0
40014	Analogue Output Y1 Mode Default: 2 - Heating Stage 1	Unsigned 16	0..20	0 = Network Value 1 = None 2 = Heating Stage 1 (Default)
40015	Analogue Output Y2 Mode Default: 4 - Cooling Stage 1	Unsigned 16	0..20	3 = Heating Stage 2 4 = Cooling Stage 1 5 = Cooling Stage 2
40016	Analogue Output Y3 Mode Default: 5 - Cooling Stage 2	Unsigned 16	0..20	6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control
40017	Analogue Output Y4 Mode Default: 7 - EC Fan	Unsigned 16	0..20	9 = Maximum VAV 10 = Maximum Fan 11 = Humidification 12 = De-Humidification 13 = Aux Control Loop 14 = 3-Point Open 15 = 3-Point Close 16 = Push Button 17 = Thermic 1 18 = Thermic 2 19 = Max Heating Stage 1 / Cooling Stage 1 20 = Max Heating Stage 2 / Cooling Stage 2

Register	Parameter Description	Data Type	Raw Data	Range
40018	PWM1 Override Value	Unsigned 16	0..1000	0..100%
40019	Thermic1/PWM1/On-Off Mode Assignment	Unsigned 16	0..16	0 = Network Value 1 = None 2 = Heating Stage 1 (Default) 3 = Heating Stage 2 4 = Cooling Stage 1 5 = Cooling Stage 2 6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control 9 = Maximum VAV 10 = Maximum Fan 11 = Humidification 12 = De-Humidification 13 = Aux Control Loop 14 = Push Button 15 = Max Heating Stage 1 / Cooling Stage 1 16 = Max Heating Stage 2 / Cooling Stage 2
40020	PWM2 Override Value	Unsigned 16	0..1000	0..100%
40021	Thermic2/PWM2/On-Off Mode Assignment	Unsigned 16	0..16	0 = Network Value 1 = None 2 = Heating Stage 1 3 = Heating Stage 2 4 = Cooling Stage 1 (Default) 5 = Cooling Stage 2 6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control 9 = Maximum VAV 10 = Maximum Fan 11 = Humidification 12 = De-Humidification 13 = Aux Control Loop 14 = Push Button 15 = Max Heating Stage 1 / Cooling Stage 1 16 = Max Heating Stage 2 / Cooling Stage 2
40022	3-Point Override Value	Unsigned 16	0..1000	0..100%
40023	3-Point Mode Assignment	Unsigned 16	0..16	0 = Network Value 1 = None 2 = Heating Stage 1 (Default) 3 = Heating Stage 2 4 = Cooling Stage 1 5 = Cooling Stage 2 6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control 9 = Maximum VAV 10 = Maximum Fan 11 = Humidification 12 = De-Humidification 13 = Aux Control Loop 14 = Push Button 15 = Max Heating Stage 1 / Cooling Stage 1 16 = Max Heating Stage 2 / Cooling Stage 2
40024	3-Point Run Time	Unsigned 16	30..600	30..600 Seconds
40025	3-P Run On Time	Unsigned 16	0..30	0..30

Register	Parameter Description	Data Type	Raw Data	Range
40026	DO1 Override Mode	Unsigned 16	0..10	0 = Network
40027	DO2 Override Mode	Unsigned 16	0..10	1 = Fan Speed 1
				2 = Fan Speed 2
				3 = Thermic 1
				4 = Thermic 2
				5 = 3-Point Open
				6 = 3-Point Close
				7 = Digital Input 1
				8 = Digital Input 2
				9 = Amber or Red Alarm
				10 = Red Alarm
40028	Internal Sensor One Point Compensation	Signed 16	-100..100	-10.0..+10.0 °C/°F
40029	External RI1 Sensor One Point Compensation	Signed 16	-100..100	-10.0..+10.0 °C/°F
40030	Setpoint Adjust Minimum	Signed 16	-200..0	-20.0..0.0 °C/°F
40031	Setpoint Adjust Maximum	Signed 16	0..200	0.0..200.0 °C/°F
40032	Digital Input 2 Override Mode	Unsigned 16	0..8	0 = Override Day (PIR Mode) - Default
				1 = Override Night (Windows Switch Mode)
				2 = Disable Cooling (Condensation Switch Mode)
				3 = None
				4 = Boost Heating Stage 1
				5 = Boost Cooling Stage 1
				6 = Boost Fan Loop
				7 = Boost CO2 Loop
				8 = Boost Aux.
40033	Push Button Boost Function Target	Unsigned 16	0..11	0 = Heating Stage 1
				1 = Heating Stage 1&2
				2 = Cooling Stage 1
				3 = Cooling Stage 1&2
				4 = Fan Control Loop
				5 = CO2 Control Loop
				6 = Humidification
				7 = De-Humidification
				8 = Maximum V'AV
				9 = Output
				10 = Auxiliary Loop
				11 = Fan No Scale (Fan/MaxFan)
40034	Delay Time Setting for Digital Input 1	Unsigned 16	0..28800	0..28800 Seconds
40035	Delay Time Setting for Digital Input 2	Unsigned 16	0..28800	0..28800 Seconds
40036	Delay Time Setting for Push Button	Unsigned 16	0..28800	0..28800 Seconds
40037	Fan Speed Mode Selection	Unsigned 16	0..4	0 = 0..100%
				1 = 0 - 1
				2 = 0 - 1 - 2 (default)
				3 = 0 - 1 - 2 - 3
				4 = None
40038	Fan Speed Control Source	Unsigned 16	0..10	0 = Heating 1 and Cooling 1 Stage
				1 = Heating 1 Stage
				2 = Cooling 1 Stage
				3 = Heating and Cooling Stage 2
				4 = Heating Stage 2
				5 = Cooling Stage 2
				6 = CO2
				7 = Humidification
				8 = De-humidification
				9 = Auxiliary Loop
				10 = Push Button Boost
40039	CO2 Control Setpoint	Unsigned 16	0..3250	0..5000ppm (Default 1,000 ppm)
40040	CO2 Proportional Band	Unsigned 16	10..5000	10..5000 ppm (Default = 300 ppm)
40041	CO2 Control Integral Action	Unsigned 16	0..10,000	0..10,000 seconds
40042	CO2 Actuator Output Direction	Unsigned 16	0..1	0 = Reverse Acting
				1 = Direct Acting
40043	Humidity Control Setpoint	Unsigned 16	0...1000	0.0...100.0 %rH (Default 50%)

Register	Parameter Description	Data Type	Raw Data	Range
40044	Humidity Proportional Band	Unsigned 16	1...1000	0.1...100.0 %rH (Default 20.0%)
40045	Humidity Control Integral Action	Unsigned 16	0..10,000	0..10,000 seconds
40046	Humidification Output Direction	Unsigned 16	0..1	0 = Reverse Acting 1 = Direct Acting (Default)
40047	De-Humidification Output Direction	Unsigned 16	0..1	0 = Reverse Acting 1 = Direct Acting (Default)
40048	Fan Control Active Minimum Level	Unsigned 16	0..100	0..100% (Default 0%)
40049	Anti-JAM Interval	Unsigned 16	0..14	0..14 Days (Default 0)
40050	Modbus Address	Unsigned 16	0..247	0..247 (Default 1)
40051	Modbus Baud Rate	Unsigned 16	0...3	0 = 9600 (Default) 1 = 19200 2 = 38400 3 = 57600
40052	Modbus Parity	Unsigned 16	0...2	0 = None (Default) 1 = Odd 2 = Even
40053	Stop Bits	Unsigned 16	0...1	0 = 1 Stop Bit (Default) 1 = 2 Stop Bits
40054	Display Mode	Unsigned 16	0...4	0 = Disabled 1 = Alternate CO2 2 = Alternate RH 3 = Alternate CO2 and RH 4 = Setpoint Adjust
40055	Display Info Line	Unsigned 16	0...2	0 = Show Valve Position 1 = Show Fan Speed 2 = None
40056	3-Point Actuator Mode	Unsigned 16	0...1	0 = Linear (default) 1 = Stepped
40057	DZ Mode (Integral Term in DeadZone)	Unsigned 16	0...1	0 = Hold (default) 1 = Modulating
40060	Alarm 1 Amber Switching Point	Unsigned 16	0..5000	0..5000 (Default 0)
40061	Alarm 1 Red Switching Point	Unsigned 16	0..5000	0..5000 (Default 0)
40062	Alarm 1 Hysteresis	Unsigned 16	0..5000	0..5000 (Default 0)
40063	Alarm 1 Source	Unsigned 16	0..3	0 = CO2 1 = Temperature 2 = Humidity 3 = None (Default)
40064	Alarm 2 Amber Switching Point	Unsigned 16	0..5000	0..5000 (Default 0)
40065	Alarm 2 Red Switching Point	Unsigned 16	0..5000	0..5000 (Default 0)
40066	Alarm 2 Hysteresis	Unsigned 16	0..5000	0..5000 (Default 0)
40067	Alarm 2 Source	Unsigned 16	0..3	0 = CO2 1 = Temperature 2 = Humidity 3 = None (Default)
40068	Alarm 3 Amber Switching Point	Unsigned 16	0..5000	0..5000 (Default 0)
40069	Alarm 3 Red Switching Point	Unsigned 16	0..5000	0..5000 (Default 0)
40070	Alarm 3 Hysteresis	Unsigned 16	0..5000	0..5000 (Default 0)
40071	Alarm 3 Source	Unsigned 16	0..3	0 = CO2 1 = Temperature 2 = Humidity 3 = None (Default)
40072	Enable Aux Loop	Unsigned 16	0..1	0 = Disabled 1 = Enabled
40073	Aux Control Setpoint	Unsigned 16	120..860	12.0...86.0°C/°F (Default 21°C)
40074	Aux Proportional Band	Unsigned 16	10..500	0.1...50.0°C/°F (Default 4°C)
40075	Aux Control Integral Action	Unsigned 16	0..1,200	0..1200 seconds (600s default)
40076	Aux Actuator Output Direction	Unsigned 16	0..1	0 = Reverse Acting 1 = Direct Acting

Register	Parameter Description	Data Type	Raw Data	Range
40077	Occupancy Sensor Mode	Unsigned 16	0..5	0 = Monitoring Only 1 = Day /Night Control 2 = Boost Heating Stage 1 3 = Boost Cooling Stage 1 4 = Boost Fan Loop 5 = Boost CO2 Loop
40078	Delay Time Setting for Occupancy	Unsigned 16	1..28800	1..28800 Seconds
40079	Day Cooling Deadzone	Unsigned 16	0..60	0...6.0°C/°F (Default 0.8°C)
40080	LCD Brightness	Unsigned 16	0...10	0..10
40081	Night Heating Deadzone	Unsigned 16	0..400	0.0..40.0°C/°F (Default 3.0°C)
40082	Night Frost Setpoint	Unsigned 16	0..710	0.0..71.0°C/°F (Default 8.0°C)
40083	Night Mode	Unsigned 16	0..1	0 = Expanded Deadzone (Default) 1 = Night OFF Mode
40084	AO1 (Y1) Minimum Output	Unsigned 16	0..1000	0...100.0 % (Default 0.0%)
40085	AO1 (Y1) Maximum Output	Unsigned 16	0..1000	0...100.0 % (Default 100.0%)
40086	AO2 (Y2) Minimum Output	Unsigned 16	0..1000	0...100.0 % (Default 0.0%)
40087	AO2 (Y2) Maximum Output	Unsigned 16	0..1000	0...100.0 % (Default 100.0%)
40088	AO3 (Y3) Minimum Output	Unsigned 16	0..1000	0...100.0 % (Default 0.0%)
40089	AO3 (Y3) Maximum Output	Unsigned 16	0..1000	0...100.0 % (Default 100.0%)
40090	AO4 (Y4) Minimum Output	Unsigned 16	0..1000	0...100.0 % (Default 0.0%)
40091	AO4 (Y4) Maximum Output	Unsigned 16	0..1000	0...100.0 % (Default 100.0%)
40092	External RI2 Sensor One Point Compensation	Signed 16	-100..100	-10.0..+10.0 °C/°F
40093	Thermic Actuator Mode	Unsigned 16	0..1	0 = PWM (Default) 1 = On/Off
40094	Thermic Actuator Minimum Level	Unsigned 16	0..100	0...100 % (Default 0)
40095	Thermic Actuator Maximum Level	Unsigned 16	0..100	10...100 % (Default 100)
40096	Thermic Actuator PWM Period	Unsigned 16	0..255	0...255s (Default 30)
40097	Push Button Mode	Unsigned 16	0..3	0 = 100% (Default) 1 = 0% 2 = Stepped
40098	Push Button Steps	Unsigned 16	0..5	0..5 (Default 4)
40099	Night Cooling Deadzone	Unsigned 16	0..400	0.0..40.0°C/°F (Default 3.0°C)
40100	Force Reset	Unsigned 16	0..1	0 = Normal 1 = Force Reset
40101	Non Volatile Memory Update	Unsigned 16	0..1 Note 3	0 = Normal 1 = Update
40103	Force Factory Defaults	Unsigned 16	0..1	0 = Normal 1 = Force Defaults
NOTE: Parameters 105/106/107 are WRITE ONLY. The current setting is not read back to the register.				
40105	Calibrate CO2 to Ambient; Forces CO2 Sensor to Ambient Value (Register 107)	Unsigned 16	0..1	0 = Normal 1 = Calibrate Now
40106	Enable CO2 Sensor Auto-Calibration (To read current status, reset the controller)	Unsigned 16	0..1	0 = Disabled 1 = Enabled
40107	Ambient CO2 Level for Calibrate Now (Register 105)	Unsigned 16	0..5000	0..5000
40200	Aux Loop High Limit Setpoint	Unsigned 16	0...950	0..95°C/°F (Default 35.0°C)
40201	Aux Loop Low Limit Setpoint	Unsigned 16	0...950	0..95°C/°F (Default 16.0°C)
40202	Aux Loop Limit Ratio	Unsigned 16	0..50	0.0..5.0 (0.0=Disabled, Default)

Dimensions

120mm

86mm

28mm