

## SRC-21x Series Climate Controllers with Modbus RTU

The SRC-21x series controllers have been designed for climate control in room spaces. The controllers have up to two heating and cooling temperature control stages and fan speed control. The units can be used in various climate control applications including fan coil units, VAV units and chilled ceiling control. The controllers can operate as Proportional Only or as Proportional + Integral Controllers.

The controllers have four (4) analogue outputs that can be individually configured for any of the heating/cooling stages, or fan speed control. The digital outputs can be configured as 3-point, PWM (thermic) or On/Off control.

The SRC-210 controller is typically connected to an external room unit (TER-NTC10-SP) that provides temperature measurement and setpoint adjustment. SRC-211 models have two external temperature sensors.

SRC-212 models have 2 x 0-10Vdc inputs instead of resistive inputs. They are used for external temperature (0..10V = 0..50°C) and for CO2 sensor (0..10V = 0..2,000ppm).



The controllers have built-in Modbus RS-485 communication for connection to BMS systems.

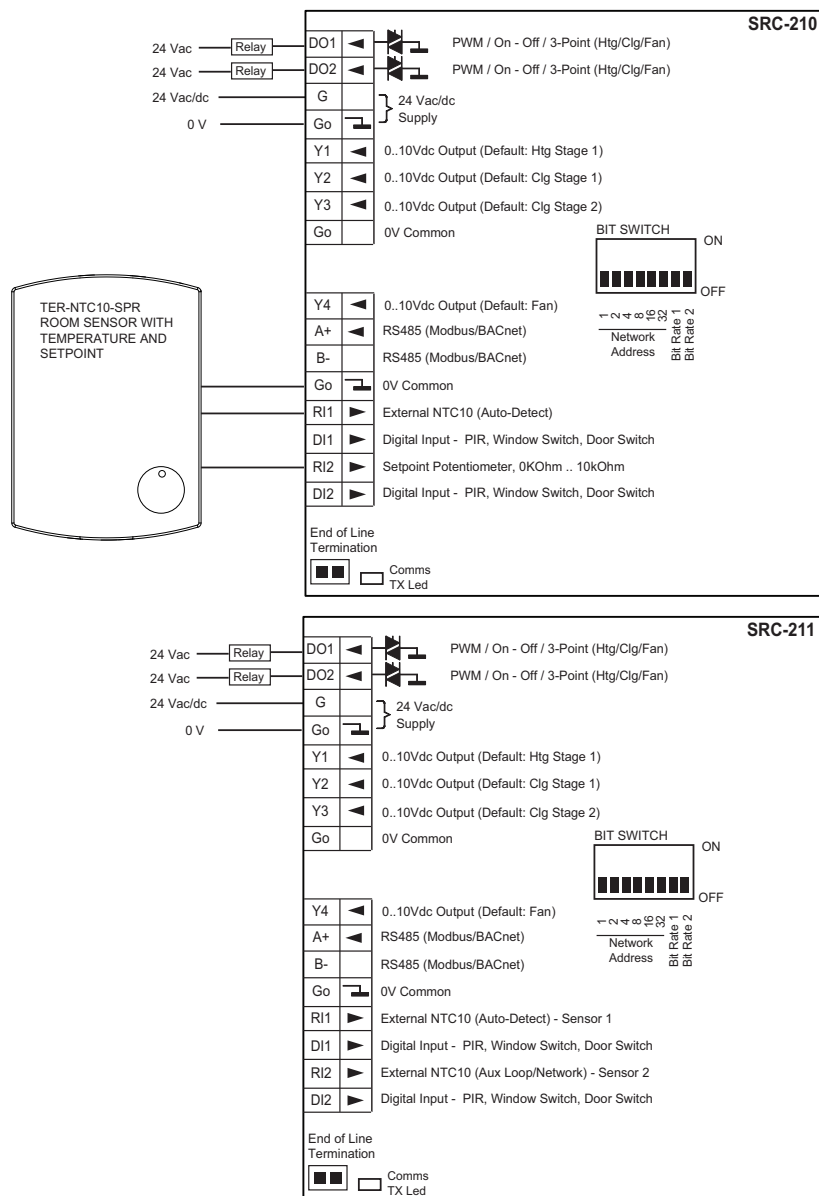
Model Type	Model	Description
	<b>SRC-210-MOD</b>	Space Climate Controller with Heating and Cooling Outputs, Fan Speed Control, DIN-Rail Mounted, Modbus RS485, 1xRI, 1xSP
	<b>SRC-211-MOD</b>	Space Climate Controller with Heating and Cooling Outputs, Fan Speed Control, DIN-Rail Mounted, Modbus RS485, 2xRI
	<b>SRC-212-MOD</b>	Space Climate Controller with Heating and Cooling Outputs, Fan Speed Control, CO2 Control, DIN-Rail Mounted, Modbus RS485, 2 x 0-10Vdc Inputs
	<b>SW-DCT-USB</b>	Windows Device Configuration Tool with 1.8m USB Cable

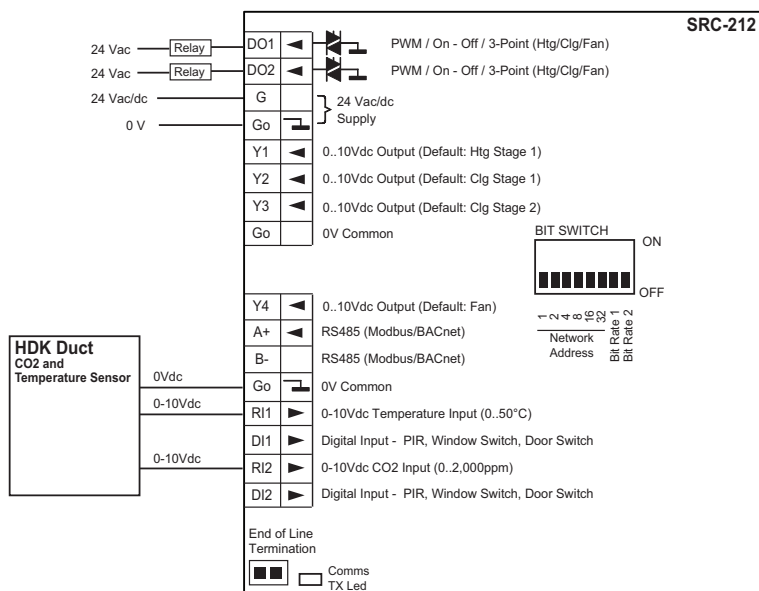
### Technical Data

Power Supply	Power supply	24Vac -10%/+15% <1VA
Signal Outputs	Analogue Outputs	4 x 0..10V < 5mA
	Digital Outputs	2 x 24Vac Triacs; 1A maximum; requires 24Vac Power Supply
Signal Inputs	Resistive Inputs (SRC-210/211):	SRC-210/211: 1 x External NTC10K3 Sensor (RI1) SRC-210: 1 x Setpoint Potentiometer, 0..10kOhm (RI2) SRC-211: 1 x Additional External NTC10K3 Sensor (RI2)
	Analogue Inputs (SRC-212):	1 x 0..10Vdc Temperature Input (0..10V = 0..50°C) 1 x 0..10Vdc CO2 Input (0..10V = 0..2,000ppm)
	Digital Inputs	2 x Digital Input, Volt-Free Contact, Impedance <1KOhm
Communication	Modbus Communications	
	Protocol	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, Plug-In Connectors Maximum Size: 0.05 to 2.5mm <sup>2</sup> (EN ISO) / 12 to 30 AWG (UL) Rising Clamp: Size 2.5 x 2.4mm
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	DIN-Rail Mounting
	Dimensions	W106 x H97 x D38mm
	Weight	180g

**Wiring Connections**





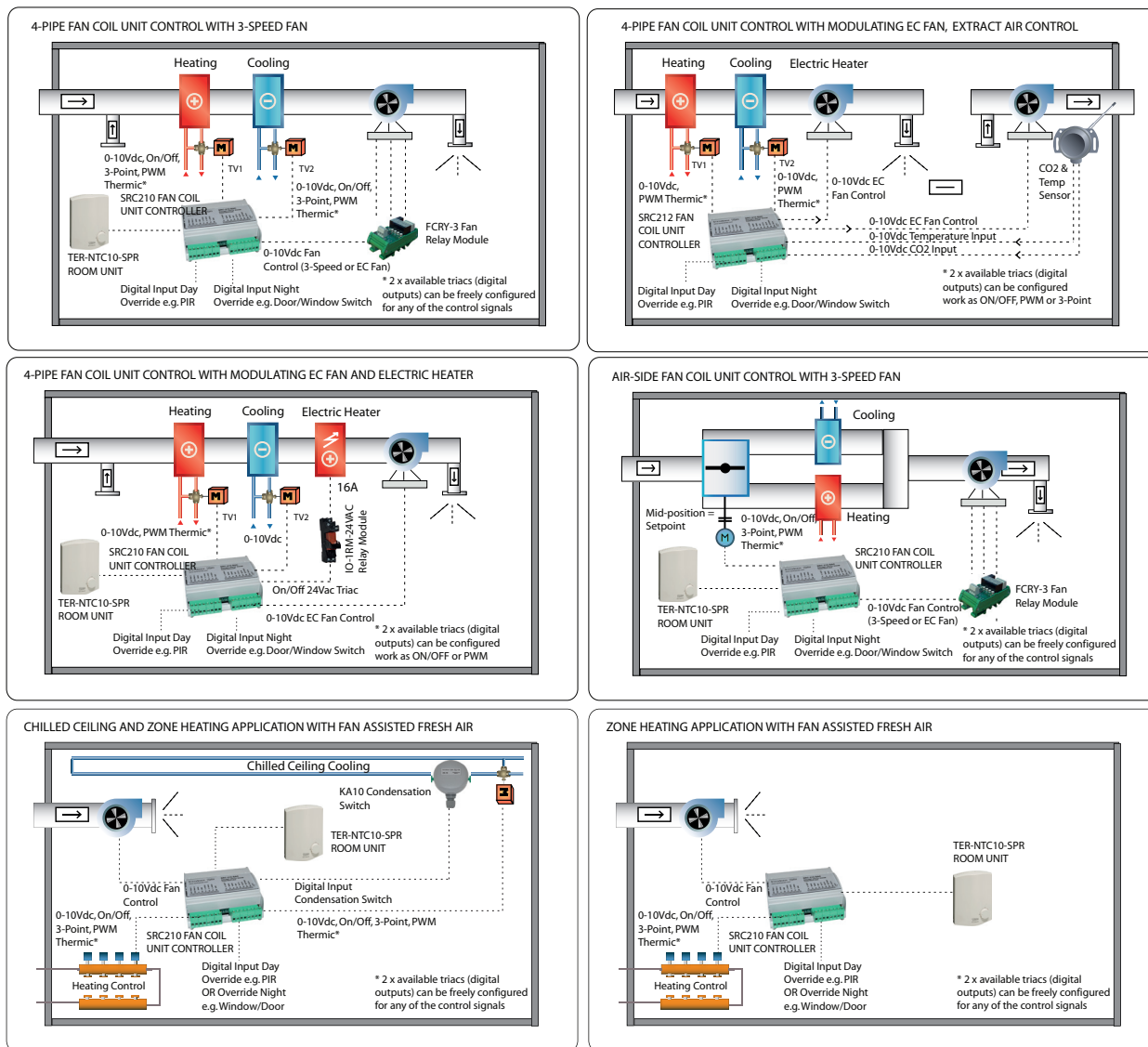
DO1	24Vac Triac; PWM, On/Off; 3-Point Open
DO2	24Vac Triac; PWM, On/Off; 3-Point Close
G	24Vac/dc Power Supply
G0	0V Common
Y1	0..10Vdc Output
Y2	0..10Vdc Output
Y3	0..10Vdc Output
G0	0V Common
Y4	0..10Vdc Output
A+	RS485 A+ Connection (Modbus)
B-	RS485 B- Connection (Modbus)
G0	0V Common
RI1	SRC-210/211: External NTC10 Sensor (Auto-detect for Main Loop) SRC-212: External 0-10Vdc Input for Temperature
DI1	Digital Input; PIR Input, Windows/Condensation Switch
RI2	SRC-210: Setpoint Input, 0..10kOhm SRC-211: NTC10K3A1 Sensor SRC-212: 0-10Vdc for CO2
DI2	Digital Input; PIR Input, Windows/Condensation Switch

**Wiring Precautions**

Switch off the power before any wiring is carried out.

**Application Examples**

The below application diagrams show few examples of the SRC210 Fan Coil and Climate Controller applications. The controller is highly versatile and can be easily configured for many room heating and cooling applications including fan coil unit control, chilled ceiling and zone heating. Please refer to individual set up pages for further details or contact SyxthSense Sales Team for advice.



**Main Temperature Control Loop Operation**

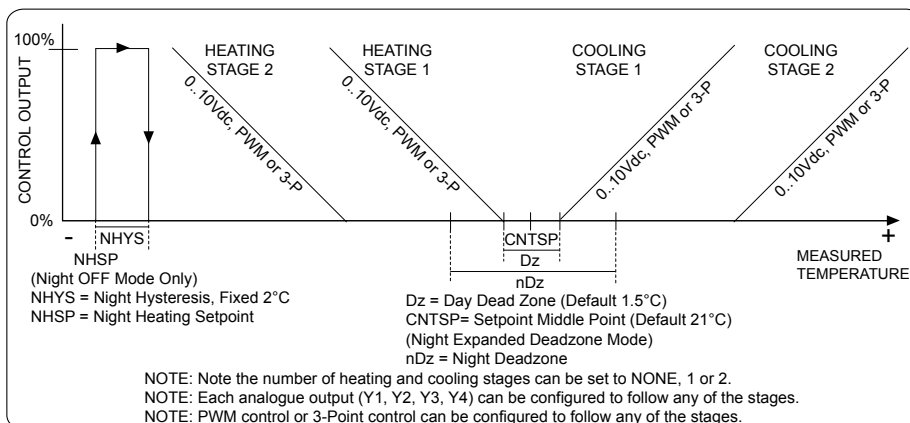
The controllers can have up to 2 heating stages and up to 2 cooling stages (as default one heating stage and one cooling stage) for temperature control. The controller modulates the heating and cooling demand outputs according to the calculated setpoint and measured temperature. The control can be either 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.

**NOTE: SRC-210/211 controllers use external NTC10 sensor connected to RI1. SRC-212 uses 0..10Vdc temperature transmitter connected to RI1 to measure the temperature (e.g. HDK combined CO2 and temperature sensor).**

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.



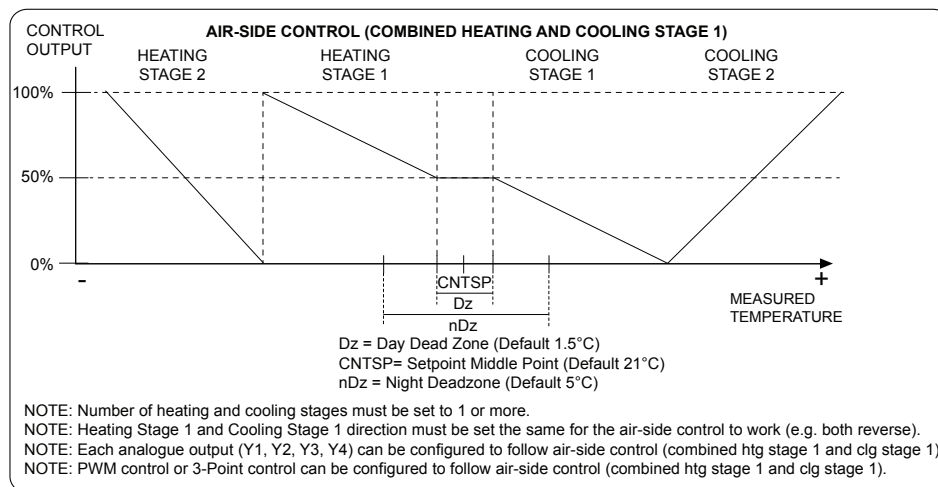
Between heating and cooling stage 1 is a control deadband. This prevents rapid switching between heating and cooling.

**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 Night Off mode has been enabled the outputs are Off unless the temperature drops below the Frost Setpoint (8°C, adjustable). In case of frost the Heating Loop Stage 1 and 2 outputs are 100% until the temperature reaches Frost Setpoint + 2°C.

**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 the same.



**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.

**Night/Day Control Activation (Digital Input 1 and 2)**

The controller can be switched to operate between DAY MODE / NIGHT MODE via the communication bus or via the digital inputs (volt-free contact).

The Digital Inputs have 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.

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.

**Fan Speed Control**

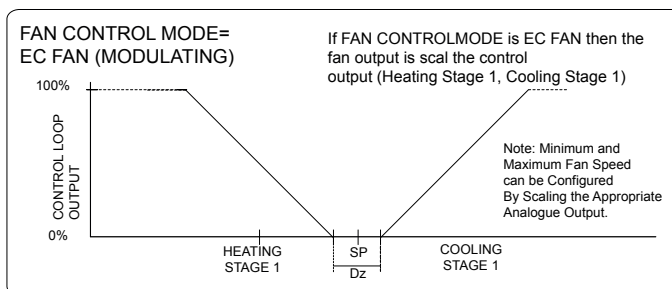
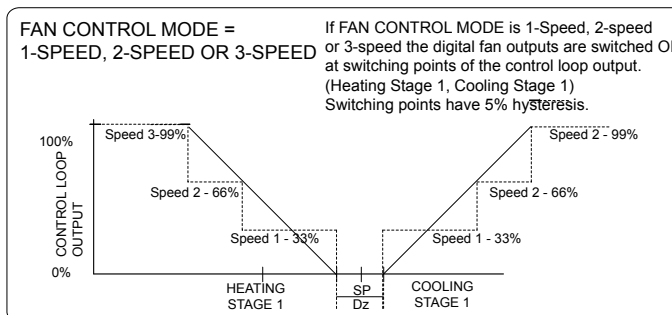
Fan speed control logic adjusts the fan speed based on the demand (as default based on heating stage 1 and cooling stage 1 demands). The fan speed control can operate in 1-speed, 2-speed, 3-speed, or EC fan control modes.

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 or cooling stage 2.

**NOTE: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. In the Night Off mode, the fan speed is controlled based on the Frost Stage demand.**

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



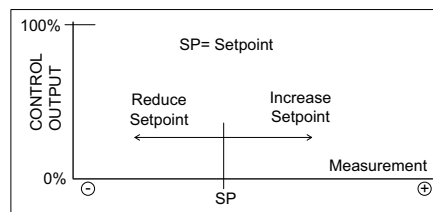
**External Sensor Input R1 (Main Sensor)**

The SRC-210/211 controllers uses NTC10 sensor for the main control loop. Connect sensor such as TER-NTC10 room sensor or TEKY-NTC10 flying lead sensor to this input.

The SRC-212 controller provides 0-10Vdc input at the RI1 for the temperature sensor connection. The 0..10Vdc is scaled as 0..50°C. This is used, for example, with combined duct CO2 and temperature sensors.

**Remote Setpoint Adjustment Input RI2 (SRC-210 Only)**

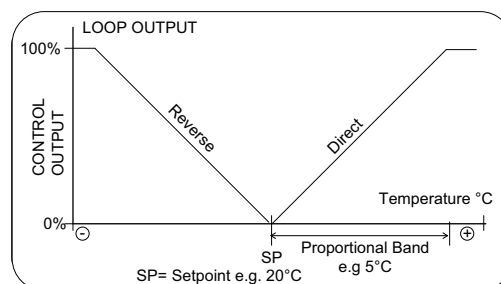
It is possible to connect the SRC-210 controller to a remote setpoint unit, typically to TER-NTC10-SPR room sensor, to terminals RI2. The remote setpoint uses 0..10kOhm potentiometer. This is auto-detected by the application. By rotating the setpoint knob on the remote sensor it is possible to adjust 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.



**External Temperature Sensor Input RI2 (SRC-211 Only)**

SRC-211 controller has a second NTC10 sensor input at terminals RI2. This can be used either for network monitoring, or for the auxiliary temperature control loop. When tehe auxiliary control loop is activated, the auxiliary loop uses the Sensor 2 NTC10 temperature reading to calculate the required control output.

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

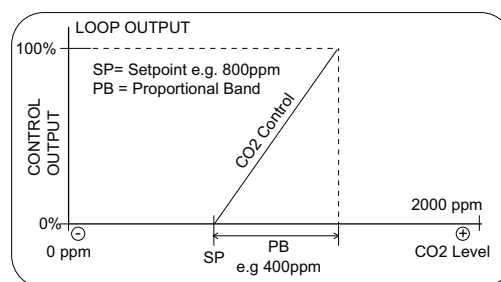


**External CO2 Sensor Input RI2 (SRC-212 Only)**

The SRC-212 controller RI2 input acts as a 0..10Vdc input for CO2 measurement. The 0..10Vdc input is scaled by the application as 0..2,000ppm (parts per million) of CO2 concentration. The CO2 measurement can be used for the CO2 control or monitoring the CO2 levels over the network

**CO2 Control (SRC-212 Only)**

The SRC-212 controller 0..10Vdc input RI2 can be connected to CO2 sensor e.g a duct CO2 sensor such as HDK. The CO2 measurement can then be used in demand based control applications via the CO2 control loop. 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).

The CO2 control output can be configured to linked to any of the physical control outputs Y1, Y2, Y3 or Y4. 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.

Maximum VAV Control

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 also be configured as "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. You can also link fan speed loop to follow the heating stage and in this case the output can take the maximum of CO2 loop and the Heating control loop.

**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, the minimum control output voltage is set to 10% (1V) and the maximum output 70% (7V). In this case the output is 1V when the control loop output is 0% and the output is 7V when the control loop output is 100%. 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.

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 or fan speed.

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%).

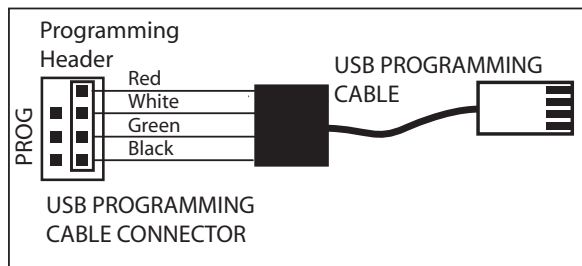
**Note:** Please note digital outputs switch to 0V (24Vac is switched to 0V through the triac).

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

**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.



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. <b>Note: All modified settings are lost.</b>
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
<b>INPUTS</b>		
Internal Sensor	Not Applicable	
External Sensor 1 (SRC-210/211)	External Temperature Sensor 1 Reading (RI1)	0..50°C (32..122°F)
External Sensor 2 (SRC-211 Only)	External Temperature Sensor 2 Reading	0..50°C (32..122°F)
0-10V Input 1 (SRC-212 Only)	RI1 0-10V Input Measurement in °C	0.0..50.0°C
0-10V Input 2 (SRC-212 Only)	RI2 0-10V Input Measurement	0.0..100.0%
Humidity Sensor	Not Applicable	
LUX Sensor	Not Applicable	0..3,000 LUX
Setpoint Adjust	Current Setpoint Adjustment (SRC-210 Only)	-20..+20°C/°F
Occupancy	Not Applicable	
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
<b>OUTPUTS</b>		
Triac 1	Digital Output 1	Off - On



<b>Live IO-View</b>		
<b>Parameter Name</b>	<b>Description</b>	<b>Range</b>
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%
<b>CONTROL</b>		
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 (SRC-212 Only)	CO2 Demand	0..100%
Humidification Demand	Not Applicable	
De-Humidification Demand	Not Applicable	
Fan Speed Demand	Fan Control Loop Output	0..100% or 0-1-2-3
Aux Loop Demand	Not Applicable	
Override State	Controller Operating Mode Status	0 = None / Day 1 = Night

<b>Control Parameters</b>		
<b>Parameter Name</b>	<b>Description</b>	<b>Range</b>
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)
Deadzone	Deadzone Between Heating and Cooling Stages in Day Mode	0.0..6.0°C/°F (Default 1.5°C)
Night Deadzone	Deadzone Between Heating and Cooling Stages in Night Mode (Expanded Deadzone Mode)	0.0..40.0°C/°F (Default 6.0°C)
Night Frost Setpoint	Night Frost Setpoint (Night OFF Mode)	0.0...71.0°C/°F (Default 8.0°C)
Night Mode	Night Control Mode	0 = Expanded Deadzone (Default) 1 = Night OFF Mode
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)
<b>CO2 CONTROL - ONLY APPLICABLE TO SRC-212</b>		
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)

<b>Control Parameters</b>		
<b>Parameter Name</b>	<b>Description</b>	<b>Range</b>
<b>HUMIDITY - NOT APPLICABLE</b>		
<b>FAN SPEED CONTROL</b>		
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 (SRC-212) 7 = Humidification (N/A) 9 = De-humidification (N/A)
<b>AUXILIARY CONTROL LOOP (NOT APPLICABLE)</b>		

<b>Inputs / Outputs</b>		
<b>Parameter Name</b>	<b>Description</b>	<b>Range</b>
<b>INPUTS</b>		
Internal Sensor Offset	Not Applicable	
External Sensor 1 Offset (SRC-210/211)	One Point External Temperature Calibration Field for Sensor Input 1	-10.0..+10.0°C/°K (Default 0°C)
External Sensor 2 Offset (SRC-211 Only)	One Point External Temperature Calibration Field for Sensor Input 2	-10.0..+10.0°C/°K (Default 0°C)
External Sensor 1 (RI1) Offset (SRC-212)	One Point External RI1 0-10V Input Calibration Field (temperature)	-10.0..+10.0°C
External Sensor 2 (RI2) Offset (SRC-212)	One Point External RI2 0-10V Input Calibration Field	-10.0..+10.0 % of 0..100%
CO2 Sensor Offset	Not Applicable	Not Applicable
Humidity Sensor Offset	Not Applicable	
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
DI1 Delay	Delay Time Setting for Digital Input 1	0..7200 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
DI2 Delay	Delay Time Setting for Digital Input 2	0..7200 Seconds (Default 0s)
Push Button Boost	Not Applicable	
Push Button Off Delay	Not Applicable	
Push Button Mode	Not Applicable	
Push Button Steps	Sets the number of steps when "Stepped Mode" is used with Stepped Analogue Output.	0..5
Occupancy Sensor Mode	Not Applicable	
Occupancy Off Delay	Not Applicable	
<b>OUTPUT ASSIGNMENTS</b>		

Inputs / Outputs		
Parameter Name	Description	Range
AO1 (Y1)	Analogue Output Y1 Mode	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 (SRC-212)) 9 = Maximum VAV (SRC-212)) 10 = Maximum Fan (SRC-212)) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = 3-Point Open 15 = 3-Point Close 16 = Push Button (N/A)
AO2 (Y2)	Analogue Output Y2 Mode	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = 3-Point Open 15 = 3-Point Close 16 = Push Button (N/A)
AO3 (Y3)	Analogue Output Y3 Mode	0 = Network Value 1 = None 2 = Heating Stage 1 3 = Heating Stage 2 4 = Cooling Stage 1 5 = Cooling Stage 2 (Default) 6 = Air-Side 7 = Modulating Fan (EC or Step) 8 = CO2 Control (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = 3-Point Open 15 = 3-Point Close 16 = Push Button (N/A)
AO4 (Y4)	Analogue Output Y4 Mode	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) (Default) 8 = CO2 Control (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = 3-Point Open 15 = 3-Point Close 16 = Push Button (N/A)
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)

Inputs / Outputs		
Parameter Name	Description	Range
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)	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = Push Button (N/A)
Thermic/On-Off 2	Thermic/On-Off Output 2 Mode (Linked to DO2)	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = Push Button (N/A)
3-Point	Three Point Output Mode (Linked to DO1 & DO2) NOTE: If selected Thermic 1 and Thermic 2 are automatically set to None.	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = Humidification (N/A) 12 = De-humidification (N/A) 13 = Aux Control Loop (N/A) 14 = Push Button (N/A)
DO1	Digital Output 1 Mode. Set to Control to activate PWM or On/Off control logic.	0 = Network 1 = Fan Speed 1 2 = Fan Speed 2 3 = Thermic 1 4 = Thermic 2 5 = 3-Point Open 6 = 3-Point Close
DO2	Digital Output 2 Mode. Set to Control to activate PWM or On/Off control logic.	0 = Network 1 = Fan Speed 1 2 = Fan Speed 2 3 = Thermic 1 4 = Thermic 2 5 = 3-Point Open 6 = 3-Point Close
<b>THERMIC ACTUATORS</b>		
Mode	Thermic Actuator Mode	0 = PWM (Pulse Width Modulation, Default) 1 = On/Off

Inputs / Outputs		
Parameter Name	Description	Range
Min. Level	Minimum Output Level (Switch Off Level)	0..100% (Default 0)
Max. Level	Maximum Output Level (Switch On Output)	0..100% (Default 100)
PWM Period	Pulse Width Modulation Period	0..255 seconds (Default 30)
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

Alarm/Display/Comms		
Parameter Name	Description	Range
<b>DISPLAY - NOT APPLICABLE</b>		
<b>COMMS</b>		
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)
<b>ALARMS - NOT APPLICABLE</b>		

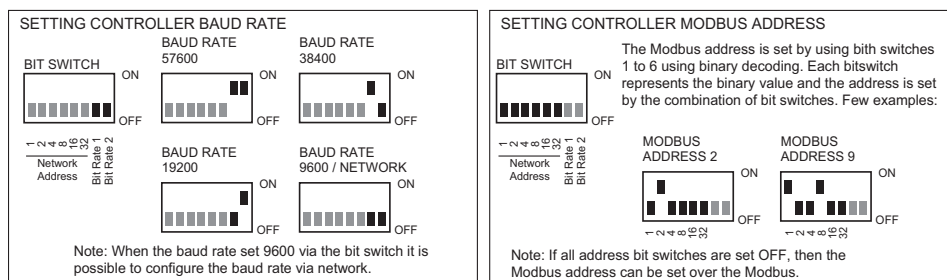
**Parameter Storage**

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
FUNCTION CODE 02 - READ DISCRETE INPUTS				
10000	Digital Input 1 Status		0..1	Off - On
10001	Digital Input 2 Status		0..1	Off - On
10002	Digital Output 1 Status		0..1	Off - On
10003	Digital Output 2 Status		0..1	Off - On
FUNCTION CODE 04 - READ INPUT REGISTERS				
30001	Temperature Measurement RI2 (Resistive Input 1) - SRC210/211	Signed 16	-400...3020	-40.0...150.0°C (-40.0...302.0°F)
30002	Current Calculated Setpoint (°C)	Signed 16	-400...3020	-40.0...150.0°C (-40.0...302.0°F)
30003	Analogue Output Y1	Unsigned 16	0..1000	0..100.0 %
30004	Analogue Output Y2	Unsigned 16	0..1000	0..100.0 %
30005	Analogue Output Y3	Unsigned 16	0..1000	0..100.0 %
30006	Analogue Output Y4	Unsigned 16	0..1000	0..100.0 %
30007	Thermic 1 Level	Unsigned 16	0..1000	0..100.0 %
30008	Thermic 2 Level	Unsigned 16	0..1000	0..100.0 %
30009	Three Point Level	Unsigned 16	0..1000	0..100.0 %
30010	CO2 Measurement - SRC-212 Only	Unsigned 16	0..5000	0..5000 ppm
30016	External Sensor 2 Measurement (Resistive Input 2) - SRC-210/211	Signed 16	-400...3020	-40.0...150.0°C (-40.0...302.0°F)
30017	Analogue Input 1 Measurement (0-10V Temperature) - SRC-212 Only	Unsigned 16	0..1000	0..100.0 %
30018	Analogue Input 2 Measurement (0-10V CO2) - SRC-212 Only	Unsigned 16	0..1000	0..100.0 %
30019	Input Register for Discrete Inputs	Unsigned 16		Bit 0 = DI1 Status Bit 1 = DI2 Status Bit 2 = DO2 Status Bit 3 = DO2 Status
FUNCTION CODE 03 - READ HOLDING REGISTERS FUNCTION CODE 06 - WRITE SINGLE HOLDING REGISTER FUNCTION CODE 16 - WRITE MULTIPLE HOLDING REGISTERS				
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	Deadzone	Unsigned 16	0..60	0...6.0°C/°F (Default 1.5°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

Register	Parameter Description	Data Type	Raw Data	Range
40008	Digital Input 1 Override Mode	Unsigned 16	0..3	0 = Override Day (PIR Mode) - Default 1 = Override Night (Windows Switch Mode) 2 = Disable Cooling (Condensation Switch Mode) 3 = None
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	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = N/A 12 = N/A 13 = N/A 14 = 3-Point Open 15 = 3-Point Close
40015	Analogue Output Y2 Mode	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = N/A 12 = N/A 13 = N/A 14 = 3-Point Open 15 = 3-Point Close
40016	Analogue Output Y3 Mode	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = N/A 12 = N/A 13 = N/A 14 = 3-Point Open 15 = 3-Point Close

Register	Parameter Description	Data Type	Raw Data	Range
40017	Analogue Output Y4 Mode	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212) 11 = N/A 12 = N/A 13 = N/A 14 = 3-Point Open 15 = 3-Point Close
40018	PWM1 Override Value	Unsigned 16	0..1000	0..100%
40019	PWM1/On-Off Mode Assignment	Unsigned 16	0..14	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212)
40020	PWM2 Override Value	Unsigned 16	0..1000	0..100%
40021	PWM2/On-Off Mode Assignment	Unsigned 16	0..14	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212)
40022	3-Point Override Value	Unsigned 16	0..1000	0..100%
40023	3-Point Mode Assignment	Unsigned 16	0..14	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 (SRC-212) 9 = Maximum VAV (SRC-212) 10 = Maximum Fan (SRC-212)
40024	3-Point Run Time	Unsigned 16	30..600	30..600 Seconds
40025	3-P Run On Time	Unsigned 16	0..30	0..30
40026	DO1 Override Mode	Unsigned 16	0..6	0 = Network 1 = Fan Speed 1 2 = Fan Speed 2 3 = Thermic 1 4 = Thermic 2 5 = 3-Point Open 6 = 3-Point Close
40027	DO2 Override Mode	Unsigned 16	0..6	0 = Network 1 = Fan Speed 1 2 = Fan Speed 2 3 = Thermic 1 4 = Thermic 2 5 = 3-Point Open 6 = 3-Point Close
40029	External Sensor RI1 One Point Compensation	Signed 16	-100..100	-10.0..+10.0 °C/°F



Register	Parameter Description	Data Type	Raw Data	Range
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..3	0 = Override Day (PIR Mode) - Default 1 = Override Night (Windows Switch Mode) 2 = Disable Cooling (Condensation Switch Mode) 3 = None
40034	Delay Time Setting for Digital Input 1	Unsigned 16	1..7200	1..7200 Seconds
40035	Delay Time Setting for Digital Input 2	Unsigned 16	1..7200	1..7200 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..9	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
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
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
40081	Night Deadzone	Unsigned 16	0..400	0.0..40.0°C/°F (Default 6.0°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
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

