

CRISTAL

CC-ONYX

User Manual

Version 0.1 - 2026-10-21



Table of Contents

1	Overview	5
1.1	General Description	5
1.2	Specifications	6
1.3	Overview	7
1.3.1	Product	7
1.3.2	Terminals	9
1.4	Dimensions	10
1.5	Safety Warnings	10
2	Installation	12
2.1	Installation	12
2.1.1	Installation on a junction box	12
2.1.2	Installation with screws	12
2.1.3	Cover locks	12
2.1.4	Holes with cover	13
2.1.5	ONYX Quick Connect Accessories Connectors	14
2.2	Identifications	15
2.2.1	Lead Wires Identification	15
2.2.2	Buttons and LED Indicators Identification	16
2.2.3	Terminals Identification	16
2.2.4	Jumpers Identification	18
2.2.5	Dipswitches Identification	18
2.3	Wiring	19
2.3.1	Screw type terminal blocks wires	19
2.3.2	Maximum wires length for 0-10V outputs	19
2.4	Buttons and LED Indicators	20
2.4.1	Buttons	20
2.4.2	LED Indicators	20
2.5	Inputs	21
2.5.1	Occupancy Sensor	21
2.5.2	Light Level Sensor	21
2.5.3	Wall-Switches	21
2.5.4	Isolated Digital Inputs	21
2.5.5	Digital Input	22
2.5.6	Potentiometer / Analog Input	22
2.6	Outputs	22

2.6.1	Relays.....	22
2.6.2	Dimming 0-10V	22
2.6.3	Dry Contact Outputs	23
2.7	Jumpers	23
2.7.1	Active +24V OUT	23
2.7.2	INT. GND.....	23
2.8	Dipswitches.....	23
2.8.1	CONFIG.....	23
2.8.2	SCENARIOS	23
3	Typical Wirings.....	24
3.1	Typical Wirings.....	24
3.1.1	0-10 V Drivers Wiring (Independent Circuit)	24
3.1.2	0-10 V Drivers Wiring (Single Neutral).....	25
3.1.3	Sensors Wiring	26
3.1.4	Wall Switch Wiring	27
3.1.5	Dry Contact Input (Independent Common) Wiring	27
3.1.6	Dry Contact Input (Internal Common) Wiring	28
3.1.7	Dry Contact Input #2 Wiring.....	30
3.1.8	Dry Contact Output Receptacle Wiring	31
3.1.9	Dry Contact Outputs Wiring	32
3.1.10	Potentiometer Wiring	32
3.1.11	BACnet MS/TP Wiring	33
3.1.12	DALI Wiring	34
4	Operation	36
4.1	Operation	36
4.1.1	Occupancy.....	36
4.1.2	Daylight Harvesting	36
4.1.3	Receptacle Control	36
4.1.4	Scenes.....	36
4.1.5	Reset	36
4.1.6	Communications.....	36
5	Scenarios.....	37
5.1	Overview	37
5.1.1	How Scenarios Work	37
5.1.2	Scenario Occupancy Event Flow Chart	38
5.1.3	Factory Default Positions.....	40

5.1.4	Using the Dipswitch	41
5.2	Scenarios Details	43
5.2.1	Dipswitch	43
5.2.2	Positions ID	43
5.2.3	RT - Room Type	44
5.2.4	TD - Time Delay	45
5.2.5	OS - Occupancy Sensor	45
5.2.6	OC - Occupied Command	46
5.2.7	UC - Unoccupied Command	46
5.2.8	DL - Daylight Harvesting	46
5.2.9	SM - Switch Mode	47
6	BACnet	49
6.1.1	BACnet MS/TP	49
6.1.2	BACnet Objects	49
6.1.3	BACnet Browser Configuration Software	56
7	DALI	57
7.1.1	DALI	57
8	Legal Notice	58

1 Overview

1.1 General Description



The CC-ONYX is a 2 zones 0-10V dimming room controller with 20 A relays dedicated to lighting control.

It is designed to integrate several accessories such as a light level sensor, occupancy sensors and wall switches.

The Quick Connect accessories for CC-ONYX allow connection of wall switches, light level sensors, and occupancy sensors using a single cable.

It has 3 dry contact outputs for connection to HVAC systems, building automation systems (B.A.S.) or power pack control.

It has 3 dry contact inputs for the connection of the HVAC system or the building automation system (B.A.S.), for demand response or other functionalities.

It can be used completely independently. It can also be controlled from a BACnet MS/TP or DALI communication network.

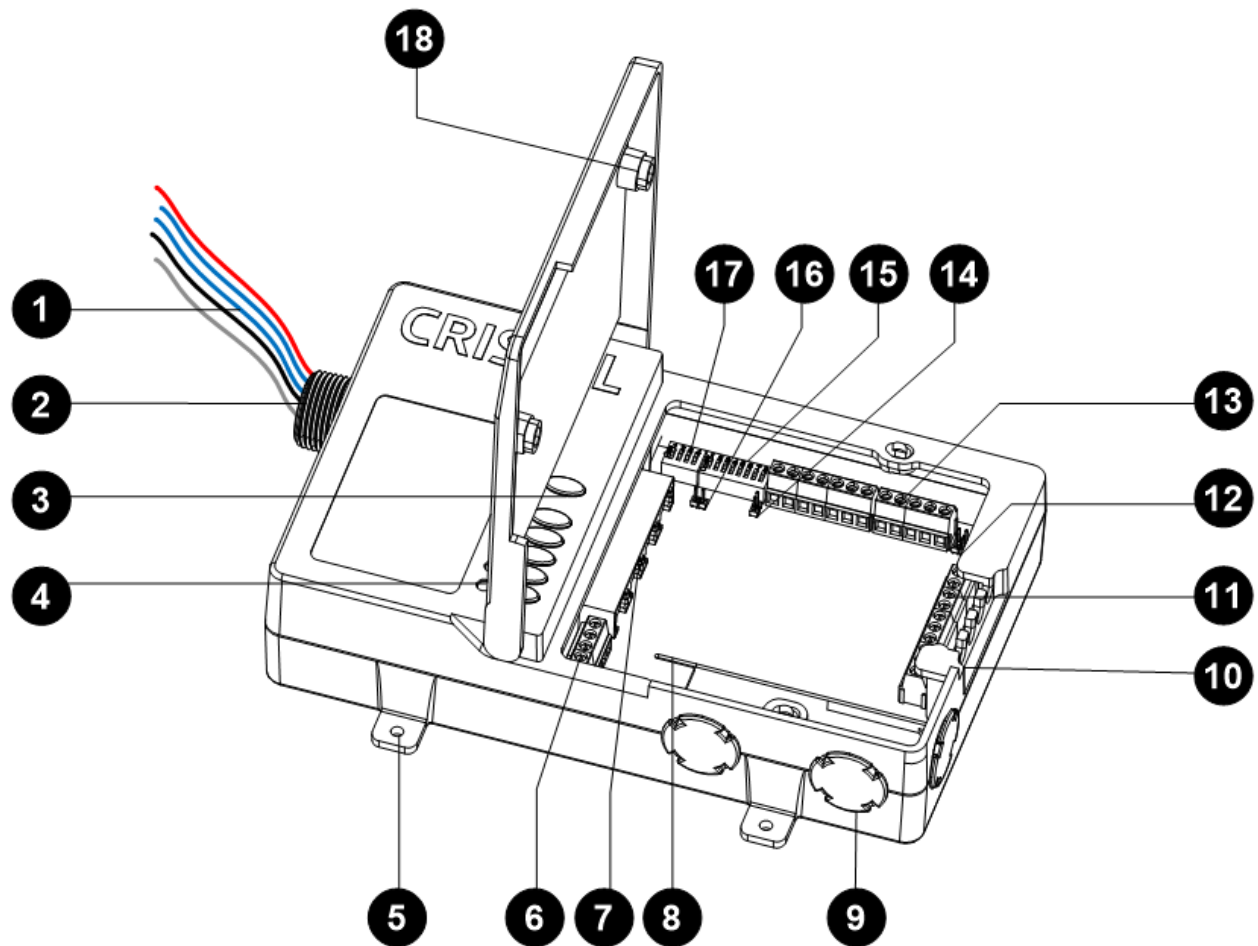
CC-ONYX makes it possible to create a simple and effective lighting control automation system.

1.2 Specifications

Specification	Value
Power Supply	120-347 Vac, 50/60 Hz
Dimensions(L x W x H)	9" x 5.5" x 2.1"[228 x 139 x 53 mm]
Threaded Nipple Dimensions	1" (NPT)[2.54 cm]
Low Voltage Holes	3 x ¾" (NPT)[3 x 19.05 mm]
Surface Mounting Tab Fixations	4 x 0.17" holes for #8 US screws[4 x 4.2 mm holes for M4 screws]
Relays Switching Capacity	2 x 120-277 Vac, 20 A Standard / Electronic ballast2 x 347 Vac, 16 A Standard / Electronic ballast
Dimming Outputs	2 x 0-10 Vdc(50 compatible sink drivers, maximum 10 mA source drivers)
Dry Contact Inputs	8 x 10-24 Vdc(Wall-switches, occupancy sensors, demand response, etc.)
Analog Inputs	2 x 0-10 Vdc(Light level sensor for daylight harvesting, potentiometer, etc.)
Dry Contact Outputs	3 x 30 Vac / Vdc, 200 mA
Supply Outputs	1 x 24 Vdc, 250 mA
Buttons and LED Indicators	6
RTC Battery	CR1220
Operating Temperature	0 °C to 40 °C [32 °F to 104 °F], indoor use only
Storage Temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Communications	BACnet MS/TP (⅛ Unit Load)DALI (2 mA load)
Certifications	UL 916UL 2043 Plenum ratedCSA C22.2 NO. 205FCC – part 15ASHRAE 90.1 compliantNECB compliant

1.3 Overview

1.3.1 Product



product overview image

Nu
mb
er

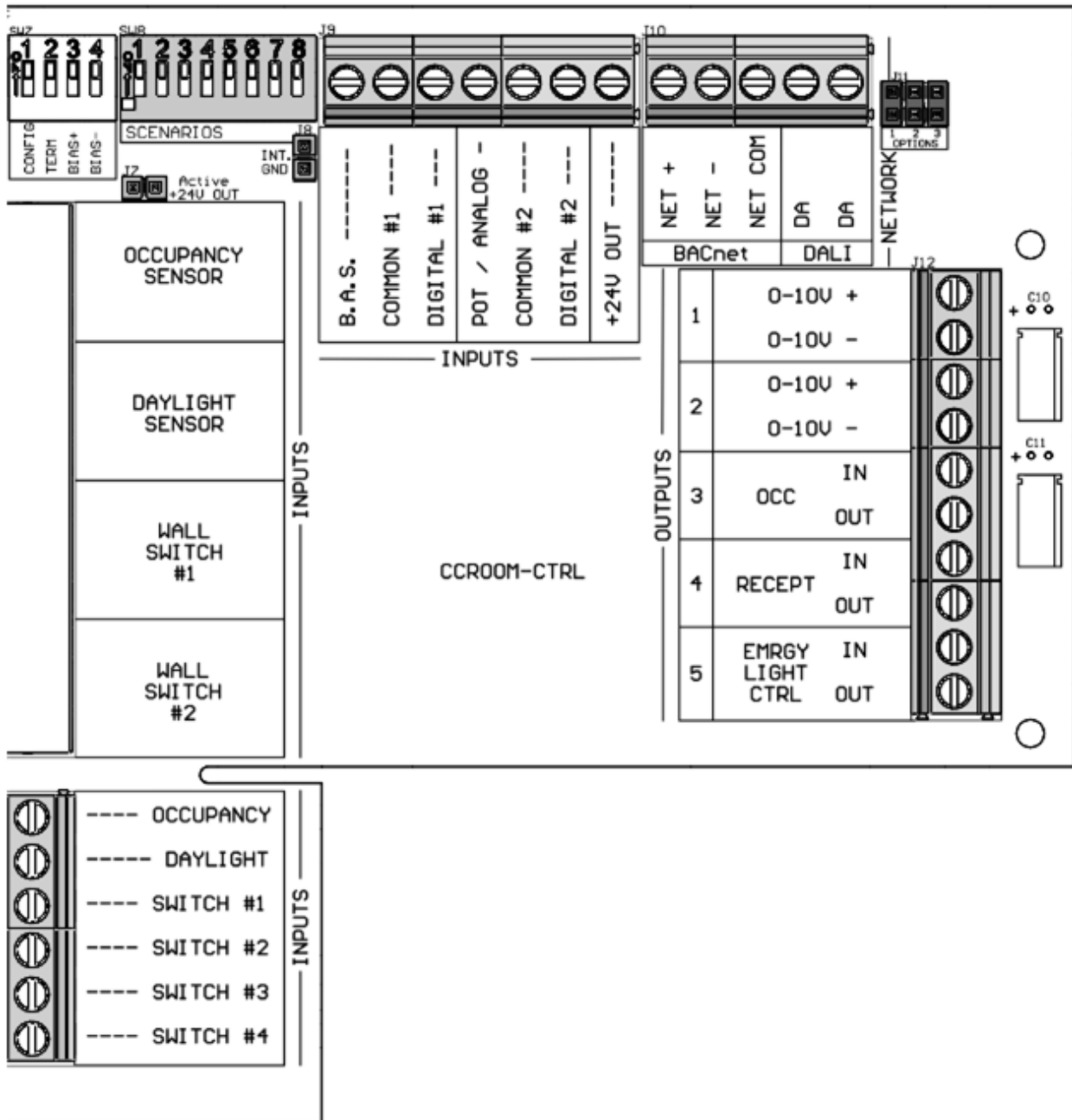
Description

- | | |
|---|--|
| 1 | 5 x lead wires for power supply and relays |
| 2 | 1 inch [2.54 cm] (NPT) threaded nipple with lock nut |
| 3 | 6 x buttons for tests, configuration and reset |
| 4 | 6 x LED indicators for status |
| 5 | 4 x mounting tabs for surface fixation with screws |
| 6 | Screw type terminal blocks for inputs |

CRISTAL

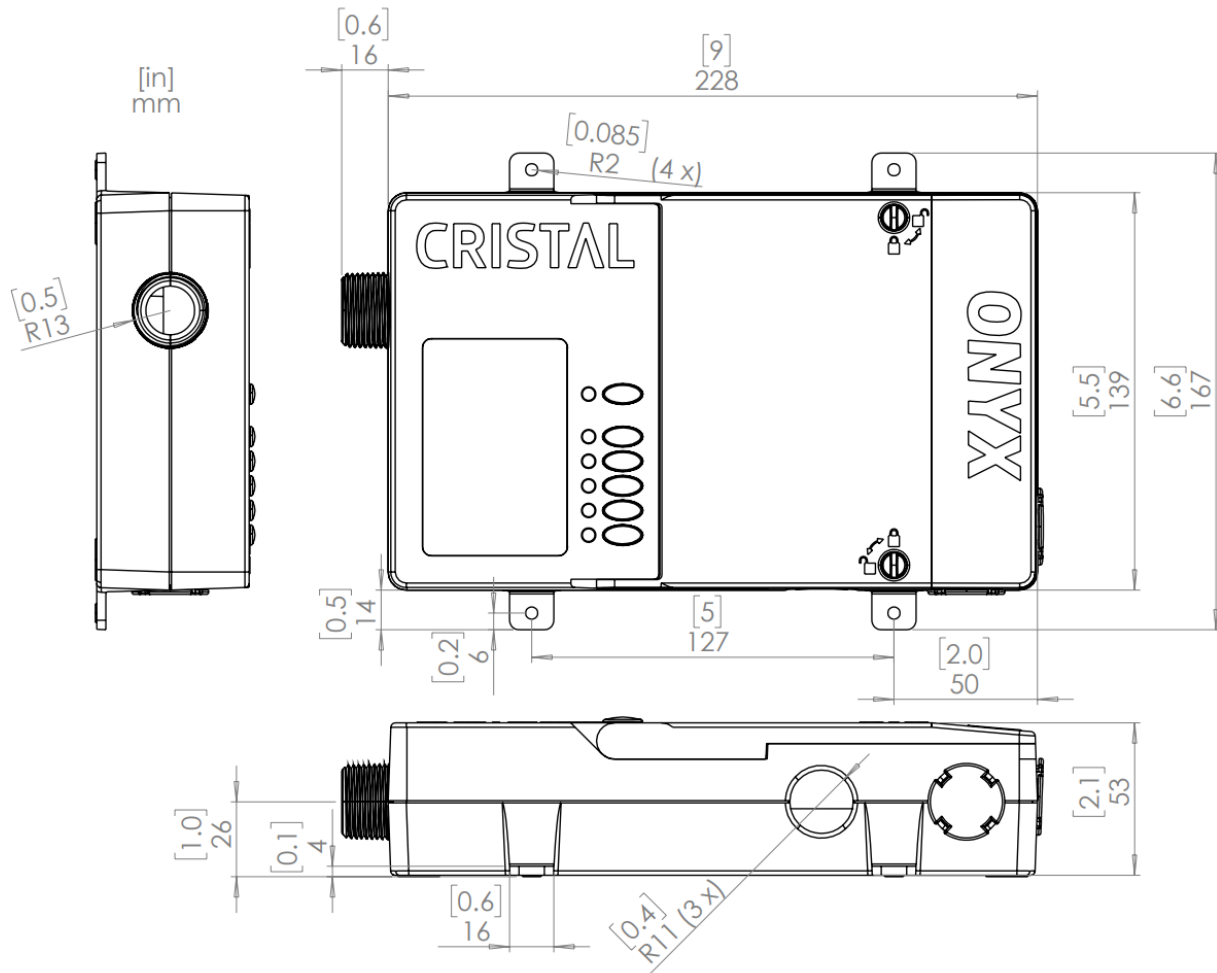
Number	Description
7	4 x RJ45 connectors for compatible <i>ONYX Quick Connect</i> accessories
8	Access for the RTC battery
9	3 x ¾" [19.05 mm] (NPT) holes with covers
10	4 x openings for cables of the <i>ONYX Quick Connect</i> accessories
11	Screw type terminal blocks for outputs
12	3 x jumpers for configuration options
13	Screw type terminal blocks for communication networks and inputs
14	Jumper for the internal common selection
15	Dipswitches for the scenarios
16	Jumper for activating +24V OUT for the <i>ONYX Quick Connect</i> accessories
17	Dipswitches for RS-485 communication and configuration
18	2 x cover locks

1.3.2 Terminals



CRISTAL

1.4 Dimensions



An image containing text, diagram, sketch, Technical drawing Description generated automatically

1.5 Safety Warnings



WARNING: ELECTRICAL RISK Turn off the power supply before the beginning of the installation. Otherwise, it can cause electrical shocks and damage the equipment.

- This device is intended **for indoor use only**. Do not use outdoors.
- It should not be installed near an electric heater, gas source or in a very humid/wet environment.

CRISTAL

- This product should always be installed **by a qualified professional** and should be installed in accordance with national and local electrical codes.
- If it is installed contrary to the manual, Cristal Controls cannot guarantee its proper functioning and the application of its guarantee.

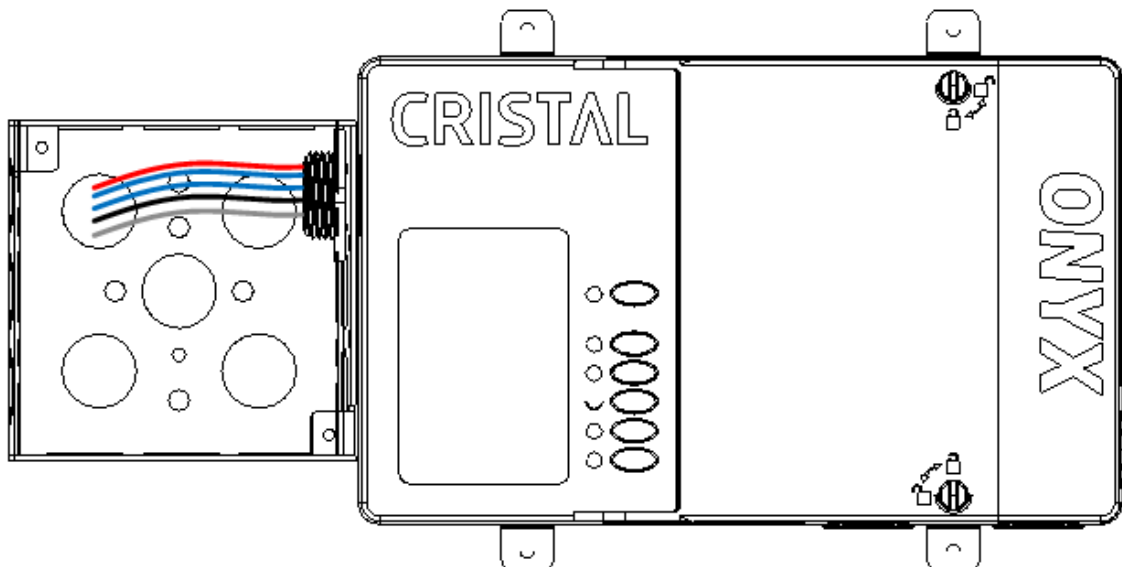
2 Installation

2.1 Installation

2.1.1 Installation on a junction box

The room controller can be installed to a junction box with a 1 inch [2.54 cm] knockout. Refer to the dimensions of the room controller to correctly choose junction box with the appropriate height for the installation.

- Remove the lock nut from the 1 inch [2.54 cm] nipple.
- Insert the wires and the 1 inch [2.54 cm] nipple through the junction box knockout.
- Reinstall the lock nut.



2.1.2 Installation with screws

The room controller can be fixed on a flat surface with screws.

- Fix the room controller using four screws through the holes of the mounting tabs.

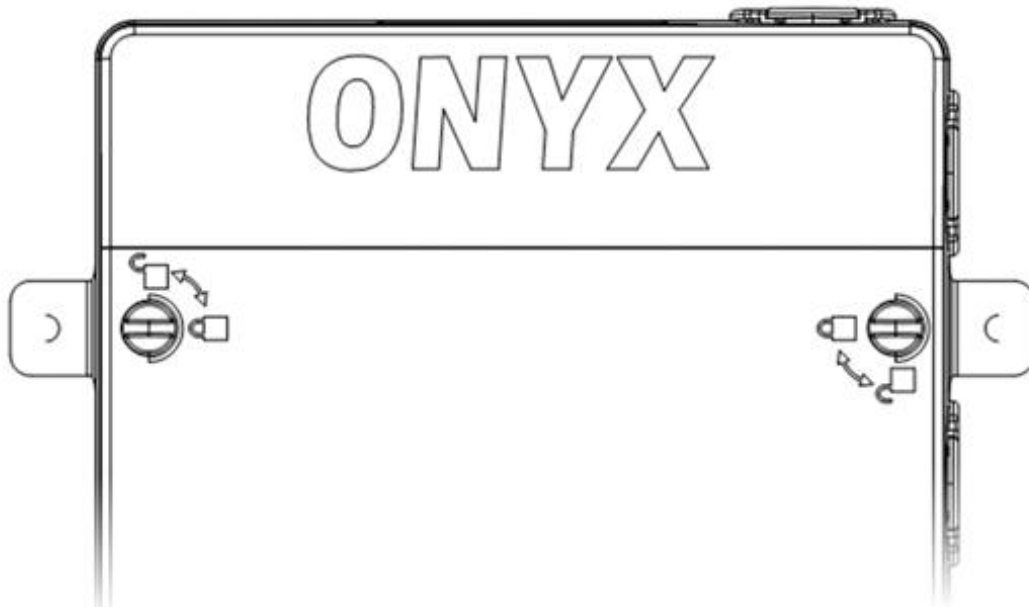
2.1.3 Cover locks

Use a flathead screwdriver to lock and unlock the cover.

Turn the cover locks a quarter turn clockwise to lock the cover.

CRISTAL

Turn the cover locks a quarter turn counterclockwise to unlock the cover.

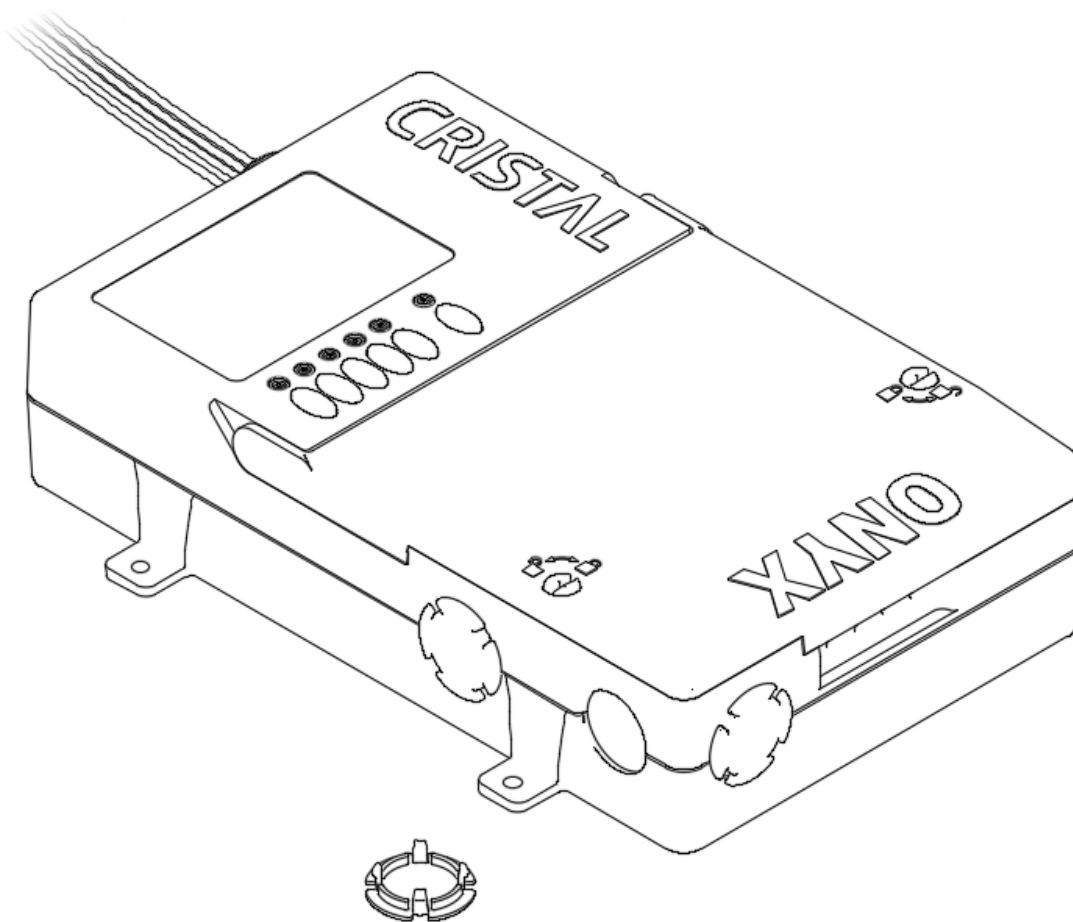


Une image contenant texte, Police, écriture manuscrite, croquis Description générée automatiquement

2.1.4 Holes with cover

The three holes with covers allow to pass the wires to the terminal blocks.

With the cover removed, a cable clamp connector can be used to pass the wires inside the room controller.



Une image contenant texte, croquis, diagramme, conception Description générée automatiquement

2.1.5 ONYX Quick Connect Accessories Connectors

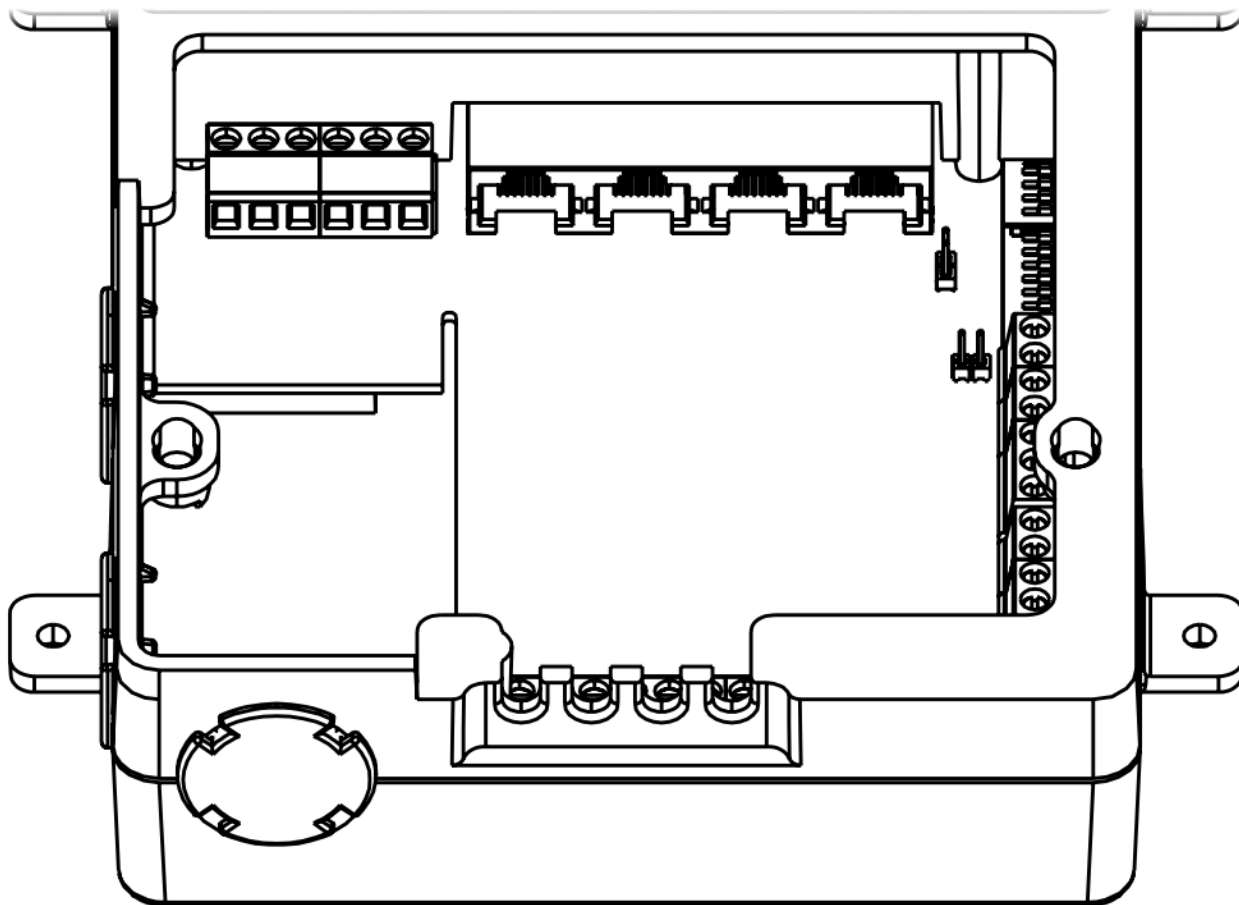
Use the 4 openings to easily pass the cables to the *ONYX Quick Connect* connectors.



WARNING: ELECTRICAL RISK The four *ONYX Quick Connect* connectors are only intended for the connection of CC-ONYX compatible accessories. Do not connect any other type of equipment to those connectors, including standard Ethernet equipment. Otherwise, irreversible damage may result both to the room controller and to the connected equipment.

The *ONYX Quick Connect* connectors are named **QUICK CONNECT 1 (QC)** and **QUICK CONNECT 2 (QC)**.

CRISTAL



Une image contenant diagramme, texte, Dessin technique, croquis Description générée automatiquement

2.2 Identifications

2.2.1 Lead Wires Identification

Color	Description
BLACK	120-347 Vac power supply line.
WHITE	120-347 Vac power supply neutral.
RED	Relay 1 contact line.
BLUE	Relay 2 contact.
BLUE	Relay 2 contact.

CRISTAL

2.2.2 Buttons and LED Indicators Identification

Name	Description
LED STATUS	Indicates the status of the configuration.
BUTTON STATUS	Allows rebooting or reset the configuration.
LED 1LED 2LED 3LED 4LED 5	Indicates the status of the associated output.
BUTTON 1BUTTON 2BUTTON 3BUTTON 4BUTTON 5	

2.2.3 Terminals Identification

2.2.3.1 Inputs

Name	Description
DI5 - OCCUPANCY 1	Digital input for the contact of occupancy sensors.
AI1 - DAYLIGHT 1	Analog input for the 0-10 Vdc light level sensor.
DI1 - SWITCH 1	Digital input for the switch 1.
DI2 - SWITCH 2	Digital input for the switch 2.
DI3 - SWITCH 3	Digital input for the switch 3.
DI4 - SWITCH 4	Digital input for the switch 4.
DI6 - AUX IN 1	Dry contact input for the building automation system (B.A.S.).
COMMON AUX IN	Common signal for the inputs DI6 - AUX IN 1 and DI7 - AUX IN 2 .
DI7 - AUX IN 2	Dry contact input 1.

Name	Description
AI2 - DAYLIGHT 2	Generic 0-10 Vdc input.
COMMON	Common signal for the inputs AI2 - DAYLIGHT 2 and DI8 - OCCUPANCY 2 .
DI8 - OCCUPANCY 2	Dry contact input 2.
+24V OUT	Power supply of 24 Vdc / 140 mA, for the light level sensor, occupancy sensors and wall switches.

2.2.3.2 Inputs *ONYX Quick Connect*

Name	Description
QUICK CONNECT 1 (QC)	RJ45 quick connect for compatible accessories.
QUICK CONNECT 2 (QC)	RJ45 quick connect for compatible accessories.

2.2.3.3 Communication Network

Name	Description
NET +	RS-485 communication, positive signal.
NET –	RS-485 communication, negative signal.
NET COM	RS-485 communication, common signal.
DA	DALI communication signal.
DA	DALI communication signal.

2.2.3.4 Outputs

Name	Description
AO1 - OUTPUT 0-10V 1 (+)	Positive signal for the 0-10 Vdc output 1. To be connected to the positive 0-10 Vdc signal of ballasts or LED drivers.
AO1 - OUTPUT 0-10V 1 (–)	Common of the 0-10 Vdc output 1. To be connected to the common 0-10 Vdc signal of ballasts or LED drivers.
AO2 - OUTPUT 0-10V 2 (+)	Positive signal for the 0-10 Vdc output 2. To be connected to the positive 0-10 Vdc signal of ballasts or LED drivers.

Name	Description
AO2 - OUTPUT 0- 10V 2 (-)	Common of the 0-10 Vdc output 2. To be connected to the common 0-10 Vdc signal of ballasts or LED drivers.
DO3 - RELAY 3 AUX	Dry contact output for the occupancy.
DO4 - RELAY 4 AUX	Dry contact output for the receptacle control.
DO5 - RELAY 5 AUX	Dry contact output for generic uses.

2.2.4 Jumpers Identification

Name	Description
Active +24V OUT	When activated, it connects the power supply +24V OUT to the <i>ONYX Quick Connect</i> connectors for use with compatible accessories.
INT. GND	When activated, it connects the internal common of the controller to the terminal COMMON AUX IN .

2.2.5 Dipswitches Identification

2.2.5.1 CONFIG

Name	Description
CONFIG	Allows to enable or disable software options.
TERM	The position ON enables the RS-485 termination resistor.
BIAS+	The position ON enables the RS-485 positive bias voltage.
BIAS-	The position ON enables the RS-485 negative bias voltage.

2.2.5.2 SCENARIOS

Name	Description
1-8	Allows selecting the predefined operating scenarios.

2.3 Wiring

Before the beginning of the wiring, turn off the power supply and verify that there is no voltage using a voltmeter. After the wiring is completed, verify that it is correct before turning on the power supply to avoid damaging the room controller and the connected accessories.

2.3.1 Screw type terminal blocks wires

Value

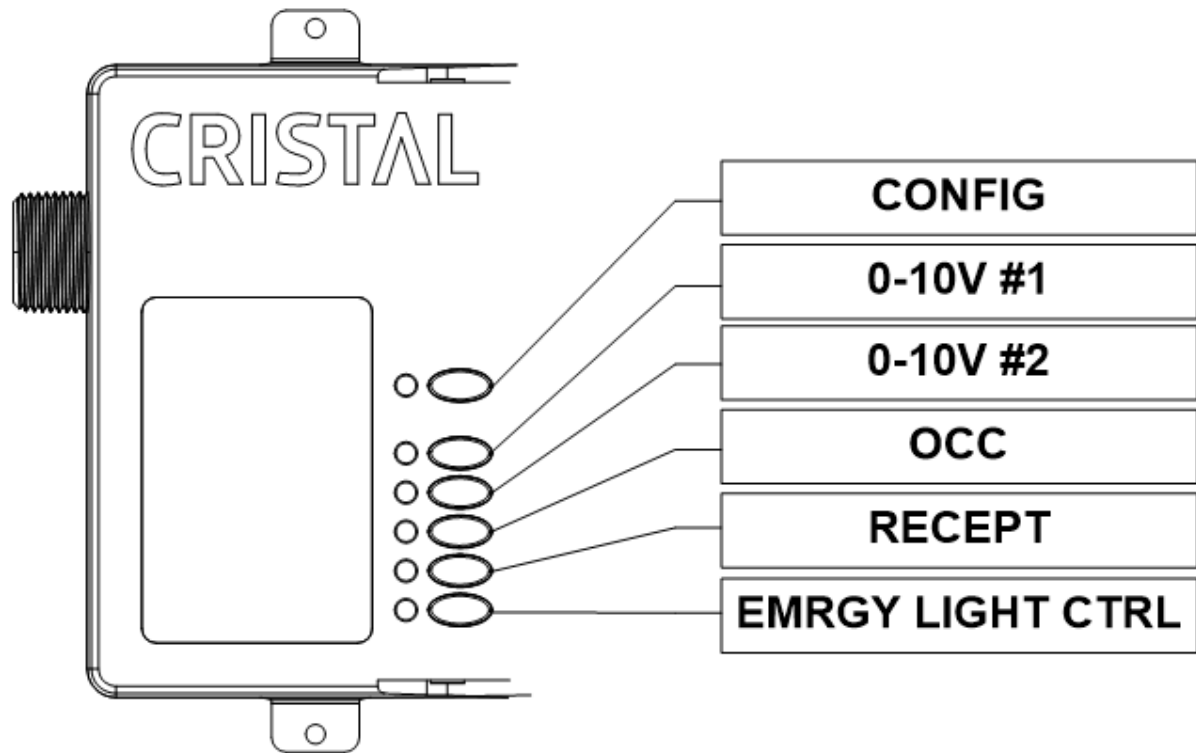
Wire Range 24-12 AWG[2.5 mm²]

Strip Length 9/32"[7 mm]

2.3.2 Maximum wires length for 0-10V outputs

Diameter	Length
18 AWG[0.75 mm ²]	164 feet[50 meters]
16 AWG[1.5 mm ²]	328 feet[100 meters]
14 AWG[2.5 mm ²]	492 feet[150 meters]

2.4 Buttons and LED Indicators



2.4.1 Buttons

The buttons **1**, **2**, **3**, **4** and **5** allow testing the associated outputs by cycling their states.

For dimming outputs, it cycles between 0%, 50% and 100% with each press of the associated button.

For non-dimming outputs, it cycles between Off and On with each press of the associated button.

The **STATUS** button allows resetting the controller.

2.4.2 LED Indicators

The LED indicators **1**, **2**, **3**, **4** and **5** allow visualizing the current state of the associated output. When a LED indicator is Off the associated output is Off and On otherwise.

For dimming outputs, the LED indicators is Off when the associated output is at 0%, it is On otherwise.

CRISTAL

For non-dimming outputs, the LED indicator is Off when the associated output is Off, it is On when the associated output is On.

The **STATUS** LED indicator shows the status of the controller. It is slowly blinking in normal operation and can also show the reset state.

2.5 Inputs

2.5.1 Occupancy Sensor

Support the integration of contact occupancy sensors. Occupancy state actions are configurable via configuration software or the dipswitches **SCENARIOS**. The **+24V OUT** signal can be used to provide power supply to the occupancy sensors.

The occupancy input is named **DI5 - OCCUPANCY 1** and **QUICK CONNECT 1 (QC)**.

2.5.2 Light Level Sensor

Support the integration of 0-10 Vdc light level sensor. The lux reading range is configurable via the configuration software or the dipswitches **SCENARIOS**. Light level is used in daylight harvesting control. Daylight harvesting is configurable via configuration software or the dipswitches **SCENARIOS**. The **+24V OUT** signal can be used to provide power supply the light level sensor.

The light level inputs are named **AI1 - DAYLIGHT 1**, **QUICK CONNECT 1 (QC)** and **AI2 - DAYLIGHT 2**.

2.5.3 Wall-Switches

Support the integration of momentary push buttons and maintained switches. The associated actions are configurable via configuration software or the dipswitches **SCENARIOS**. The **+24V OUT** signal can be used for the common signal of the wall-switches.

The wall-switch inputs are named **DI1 - SWITCH 1**, **DI2 - SWITCH 2**, **DI3 - SWITCH 3**, **DI4 - SWITCH 4**, **QUICK CONNECT 1 (QC)** and **QUICK CONNECT 2 (QC)**.

2.5.4 Isolated Digital Inputs

Support the integration of digital outputs from other equipment. The associated actions are configurable via configuration software or the dipswitches **SCENARIOS**.

Those inputs are isolated from the controller's common and can be used with an external common signal connected to the terminal **COMMON AUX IN**.

It is also possible to use the internal common of the controller and use the **+24V OUT** for the input signal, in this case the jumper **INT. GND** must be active.

The dry contact inputs are named **DI6 - AUX IN 1** and **DI7 - AUX IN 2**.

2.5.5 Digital Input

Support the integration of a digital output from other equipment. The actions associated with the dry contact is configurable via configuration software or the dipswitches **SCENARIOS**.

This input is not isolated from the controller's common, it uses the internal common of the controller and uses the **+24V OUT** for the signal of the input.

The dry contact input is named **DI8 - OCCUPANCY 2**.

2.5.6 Potentiometer / Analog Input

Support the integration of 0-10 Vdc potentiometer or generic 0-10 Vdc analog signal. The actions associated with the input are configurable via configuration software or the dipswitches **SCENARIOS**.

The input is named **AI2 - DAYLIGHT 2**, **AI1 - DAYLIGHT 1** and **QUICK CONNECT 1 (QC)**.

2.6 Outputs

2.6.1 Relays

The controller has two relays for standard or electronic drivers and ballasts.

The first relay (**red** wire) uses the line (**black** wire) of the controller.

The second relay (**blue** wires) can be used to control an independent circuit.

The relays are the lead wires **red** and **blue**.

2.6.2 Dimming 0-10V

The controller changes its output using linear voltage mode.

This output can drive up to 50 compatible sink drivers or a maximum of 10 mA for source drivers. The number of ballasts or LED drivers may change from manufacturers and models.

The minimum, maximum, sink or source voltages and other parameters are configurable via configuration software.

The 0-10V outputs are named **(1) 0-10V** and **(2) 0-10V**.

2.6.3 Dry Contact Outputs

These are outputs for traditional relay control using 24 Vac or 24 Vdc. The activation and deactivation of those outputs are configurable via configuration software or the dipswitches **SCENARIOS**.

The dry contact outputs are named **RELAY 3**, **RELAY 4** and **RELAY 5**.

2.7 Jumpers

2.7.1 Active +24V OUT

When activated it connects the power signal **+24V OUT** to the *ONYX Quick Connect* connectors for use with compatible accessories.

2.7.2 INT. GND

When activated it connects the internal common of the controller to the terminal **COMMON AUX IN**. For use with the inputs **DI7 - AUX IN 2** and **DI6 - AUX IN 1**.

2.8 Dipswitches

2.8.1 CONFIG

2.8.1.1 CONFIG

Allows to enable or disable software options.

2.8.1.2 TERM

Allows enabling the 120 Ω terminating resistor on the RS-485 communication network.

2.8.1.3 BIAS+

Allows enabling the 604 Ω pull-up bias on the RS-485 communication network.

2.8.1.4 BIAS-

Allows enabling the 604 Ω pull-down bias on the RS-485 communication network.

2.8.2 SCENARIOS

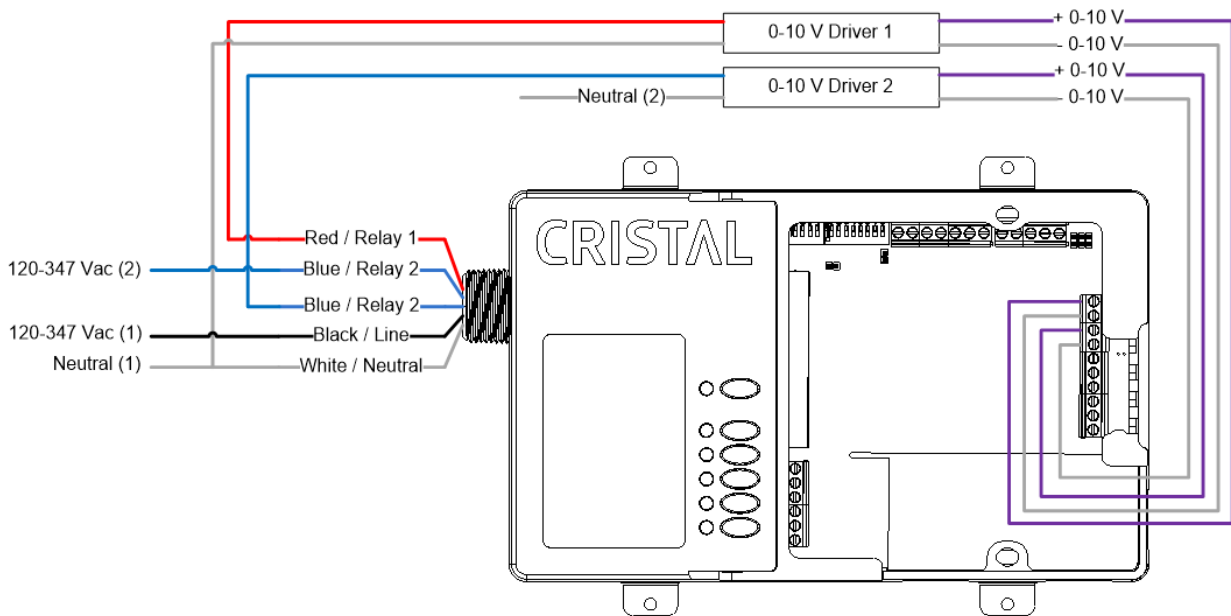
Allows setting the predefined scenario of operation.

3 Typical Wirings

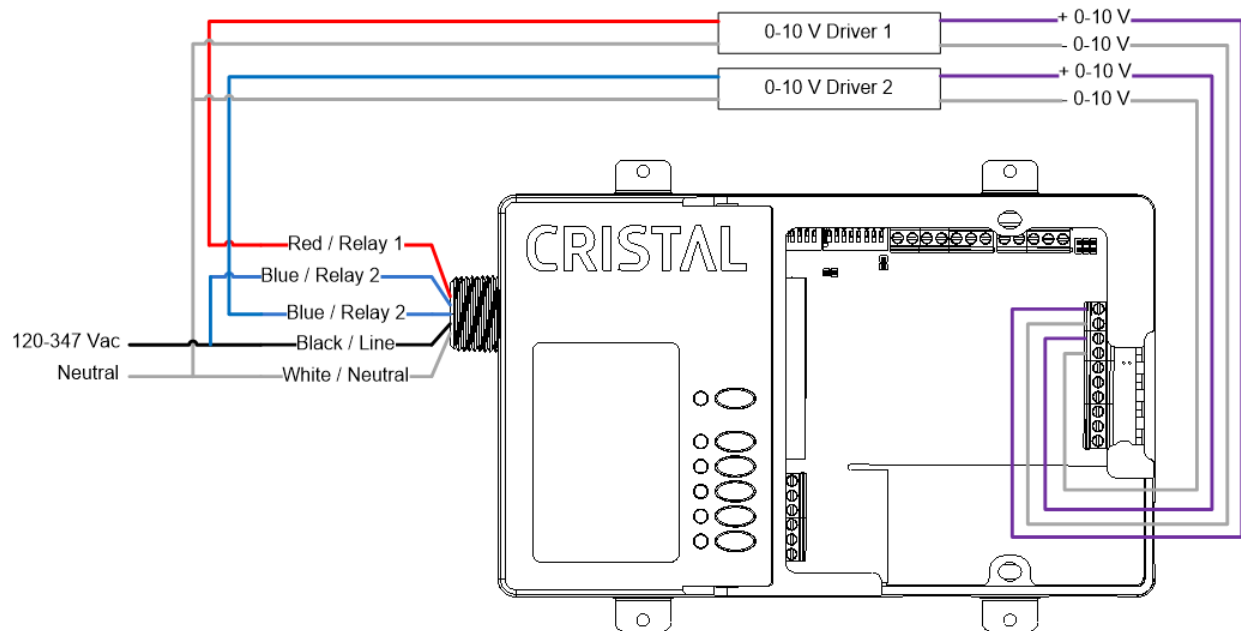
3.1 Typical Wirings

The following wirings are examples only. Also refer to the connected accessories documentation for their complete specifications and wiring requirements.

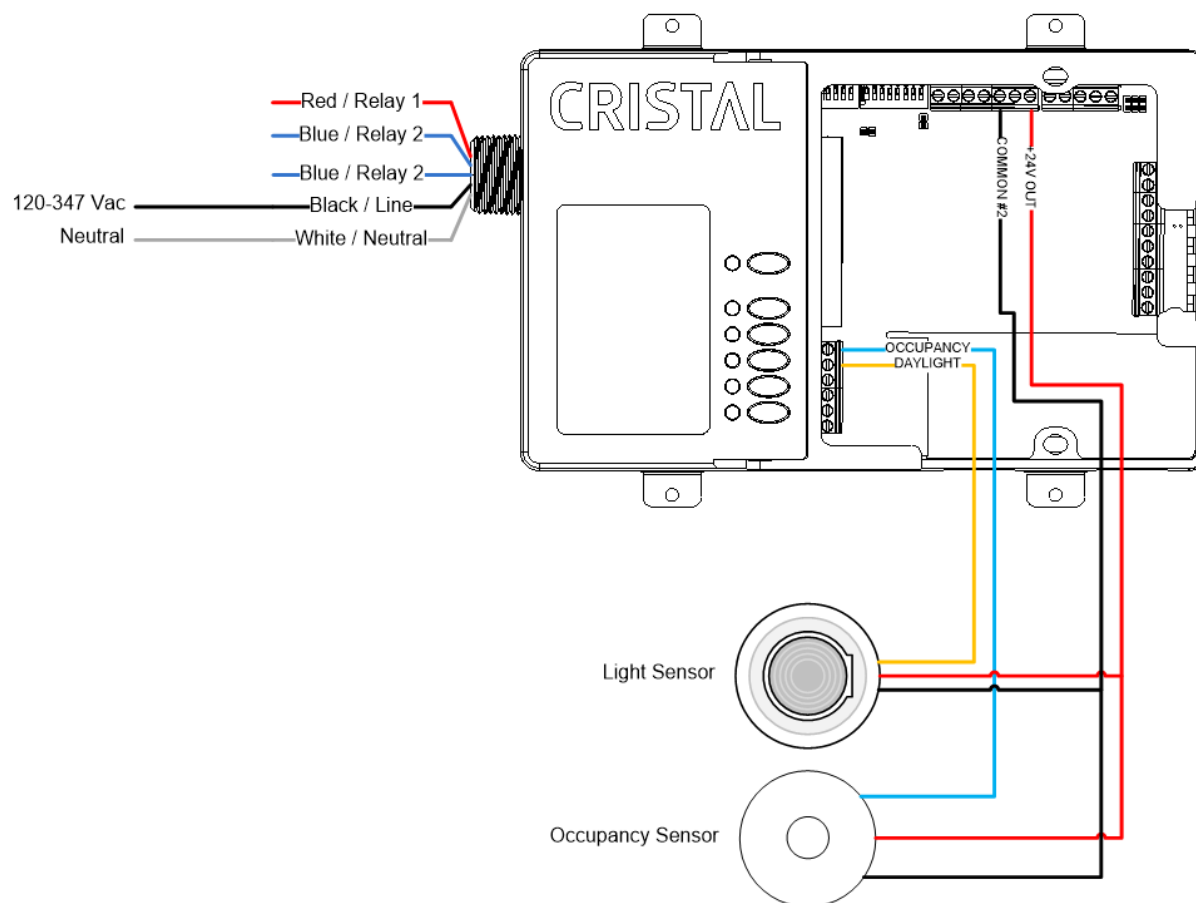
3.1.1 0-10 V Drivers Wiring (Independent Circuit)



3.1.2 0-10 V Drivers Wiring (Single Neutral)

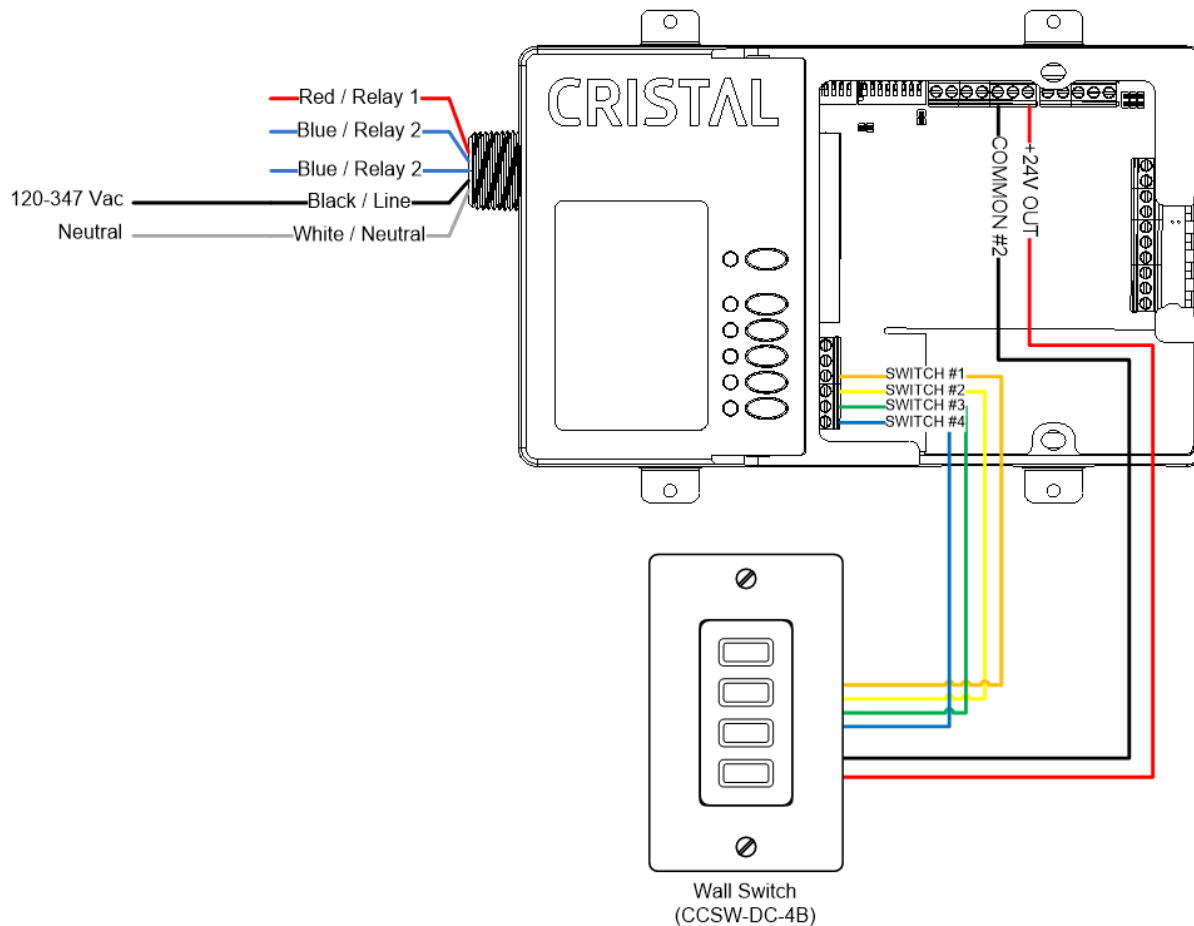


3.1.3 Sensors Wiring



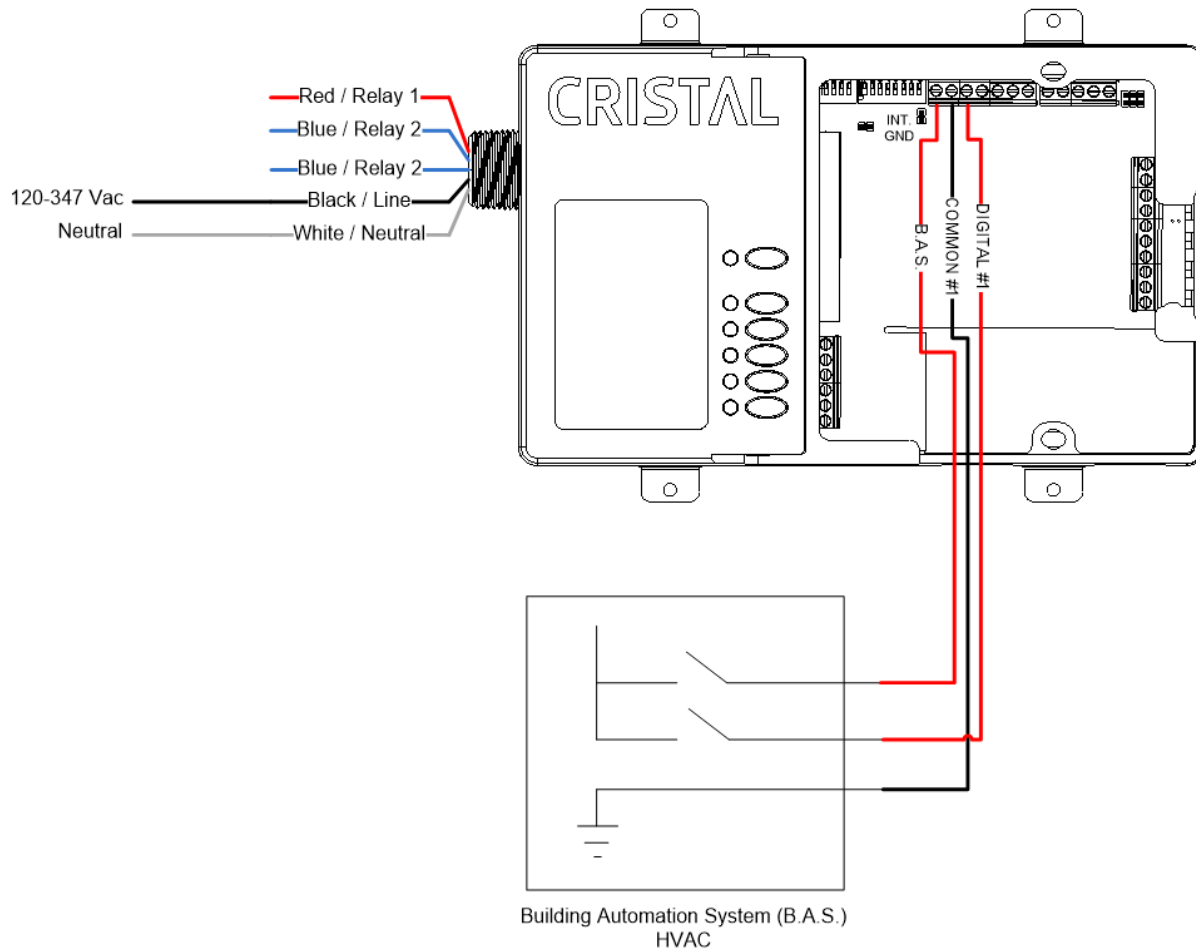
CRISTAL

3.1.4 Wall Switch Wiring



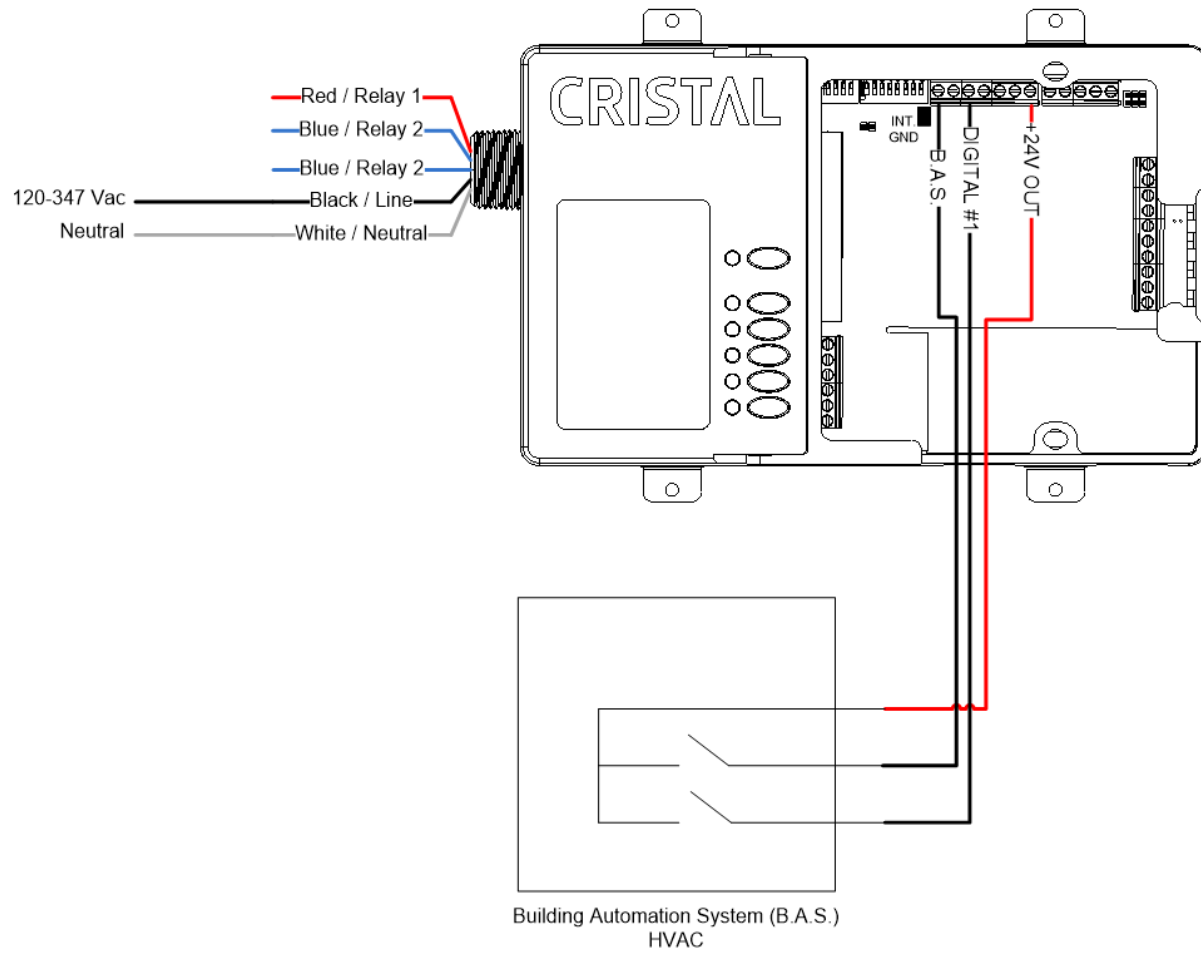
3.1.5 Dry Contact Input (Independent Common) Wiring

The inputs **DI7 - AUX IN 2** and **DI6 - AUX IN 1** can be used with an independent common. When used with an independent common, do not install the jumper **INT. GND**.



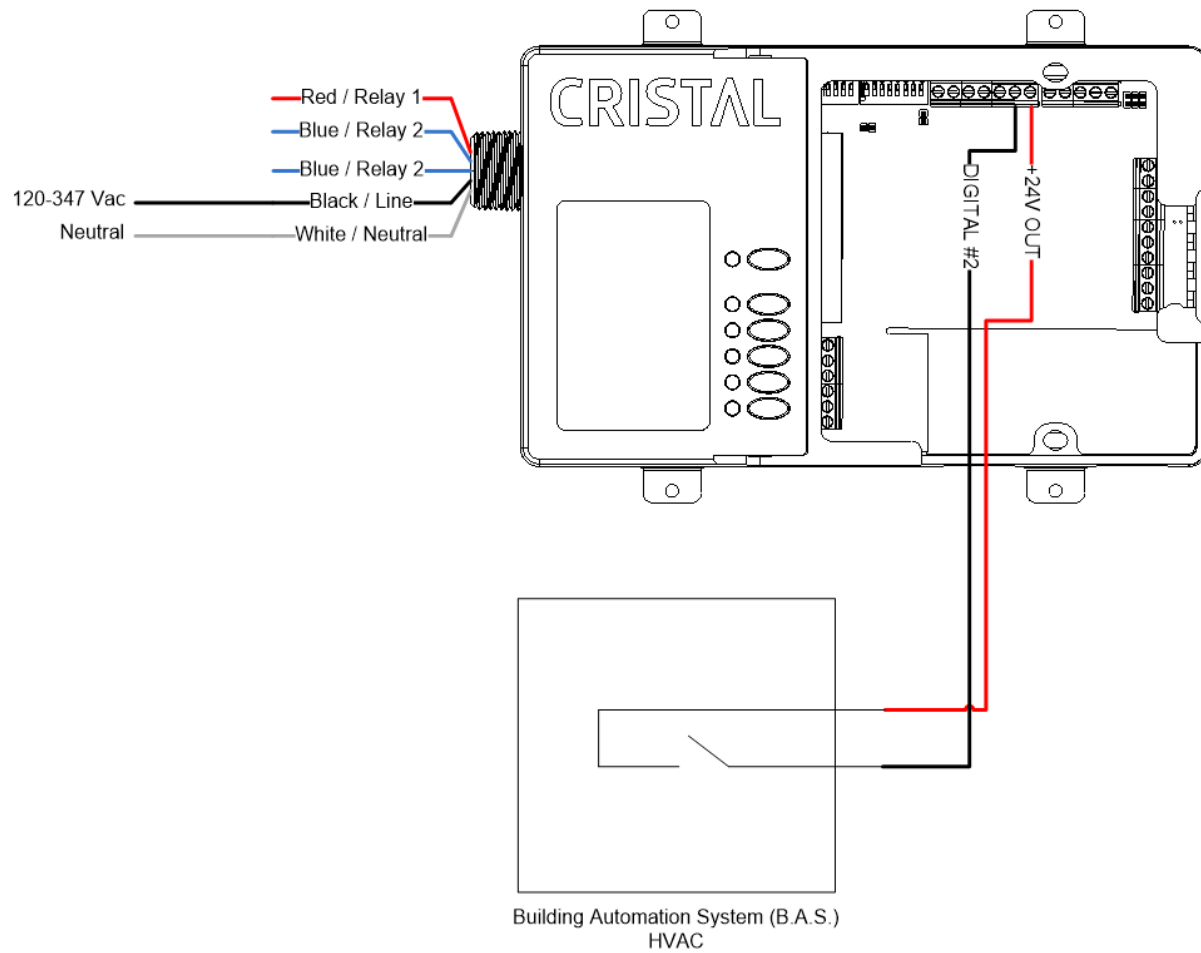
3.1.6 Dry Contact Input (Internal Common) Wiring

The inputs **DI7 - AUX IN 2** and **DI6 - AUX IN 1** can be used with an independent common. When used with the internal common install the jumper **INT. GND**.



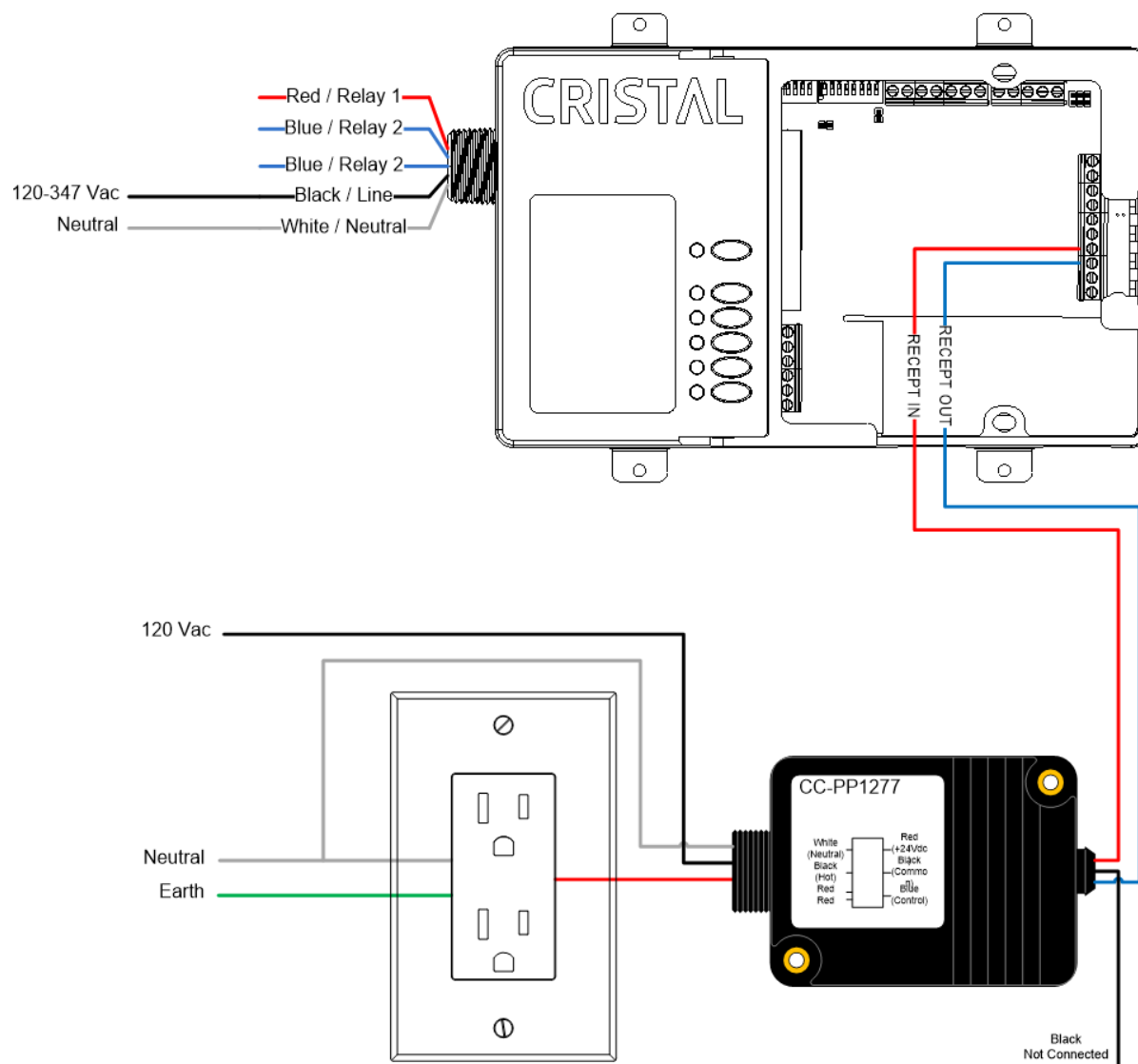
CRISTAL

3.1.7 Dry Contact Input #2 Wiring



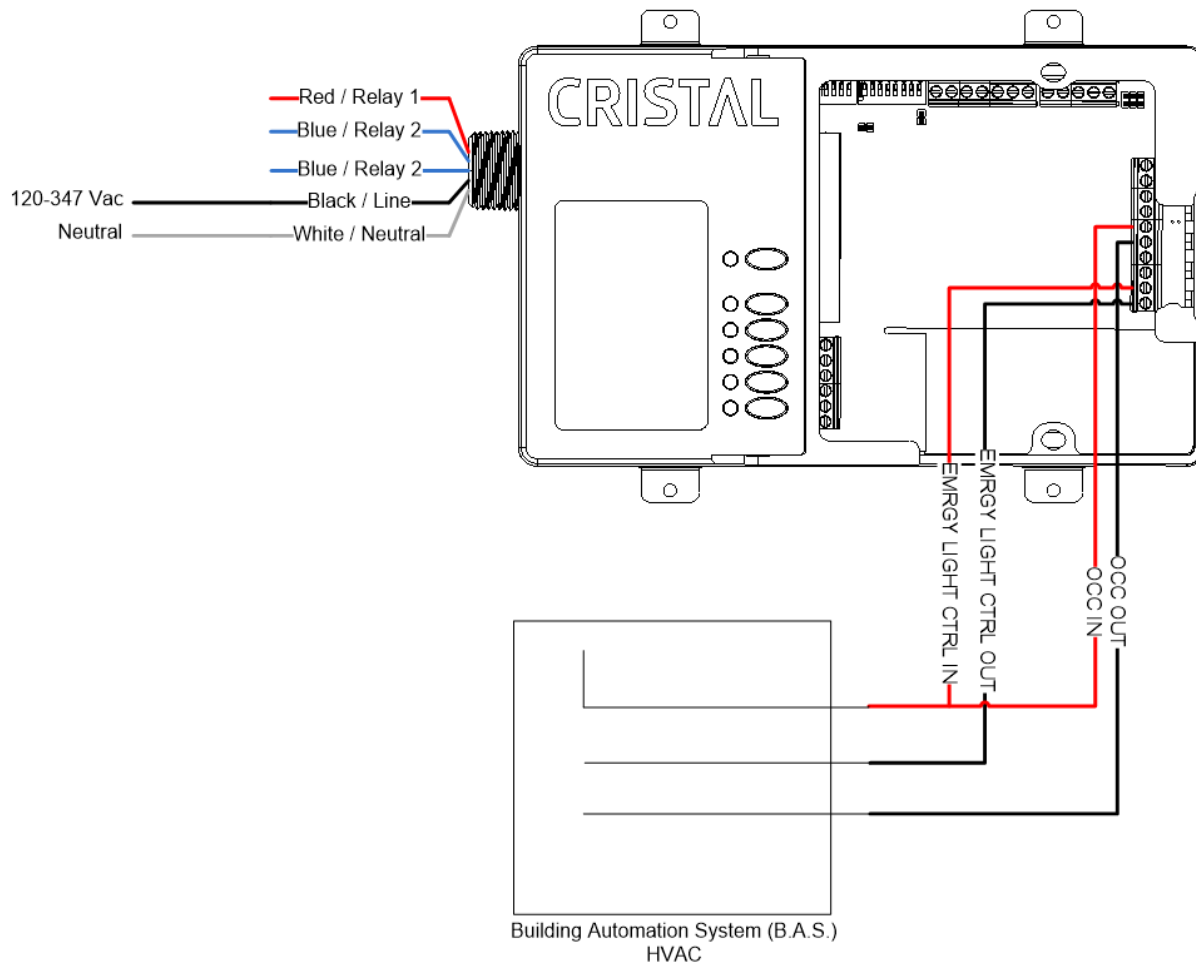
CRISTAL

3.1.8 Dry Contact Output Receptacle Wiring



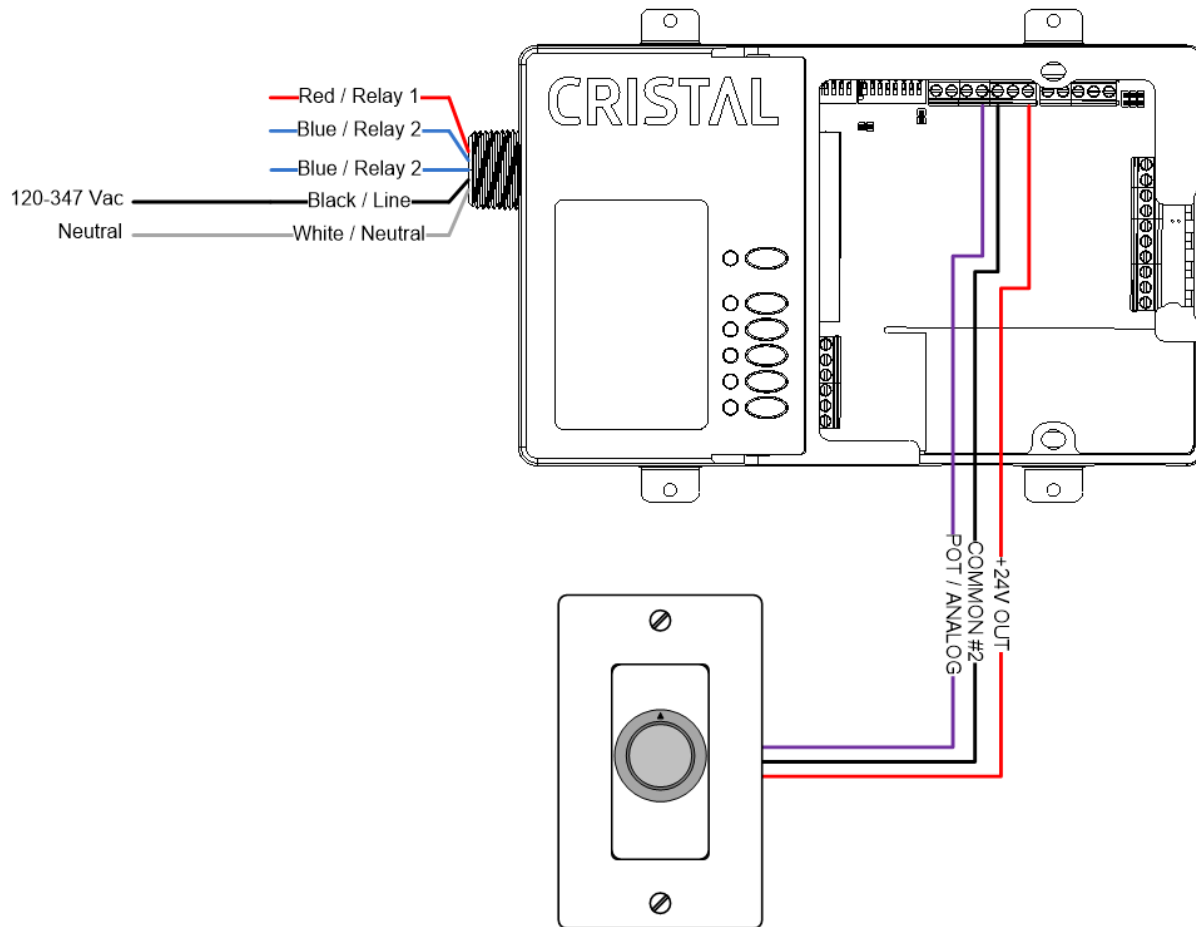
CRISTAL

3.1.9 Dry Contact Outputs Wiring



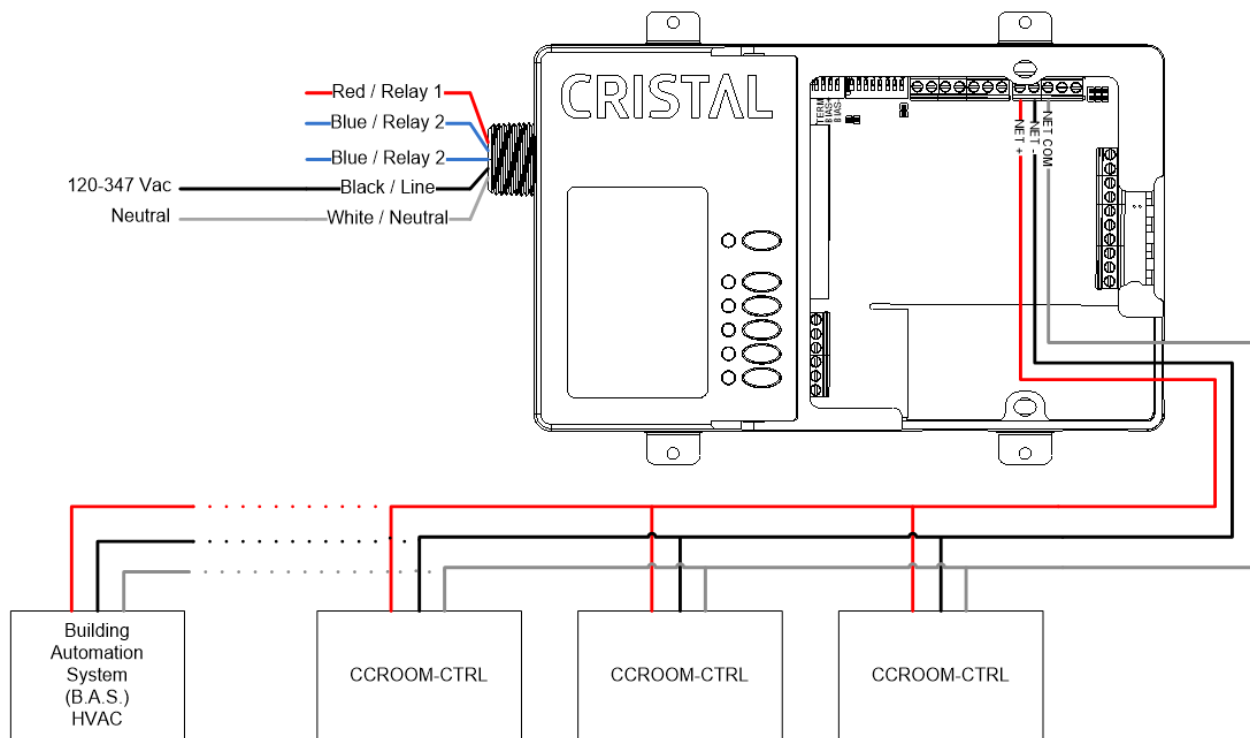
3.1.10 Potentiometer Wiring

The input **AI2 - DAYLIGHT 2** is to be used with a 0-10 Vdc analog signal.



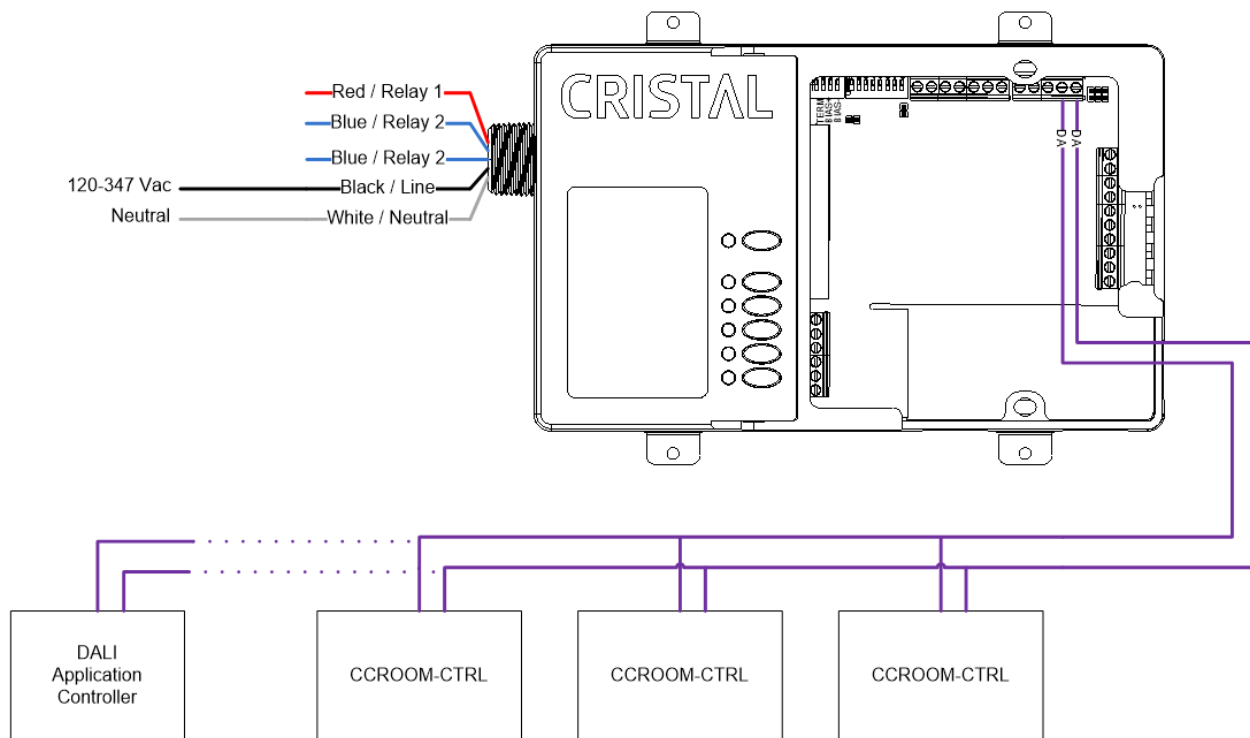
3.1.11 BACnet MS/TP Wiring

See the section BACnet MS/TP, for selecting the appropriate cable and wiring of a BACnet MS/TP network.



3.1.12 DALI Wiring

See the section DALI, for selecting the appropriate cable and wiring of a DALI network.



CRISTAL

4 Operation

4.1 Operation

4.1.1 Occupancy

Allows for the automatic control of the lights based on the occupancy state of the room.

4.1.2 Daylight Harvesting

Allows for the automatic dimming of the lights based on the room light level.

4.1.3 Receptacle Control

Allows for the control of a receptacle based on the room occupancy.

4.1.4 Scenes

Light scenes can be recalled via wall-switches, occupancy sensors, dry contact inputs, or the via the communication networks.

4.1.5 Reset

The **CONFIG** button allows resetting the controller and its configurations. Resets are also available via the configuration software.

4.1.6 Communications

The controller can use BACnet MS/TP and DALI communication networks.

5 Scenarios

5.1 Overview

The room controller can be configured quickly using the 8-position SCENARIOS dipswitch or through the configuration software.

For a simple, straightforward setup, use the physical SCENARIOS dipswitch for fast configuration. If advanced customization is required, use the configuration software.

A scenario is a predefined combination of room control settings, including:

- How many rooms are controlled
- How long the lights remain ON after the room becomes vacant
- Whether lights turn ON automatically
- The light level used when the room becomes occupied
- The light level used when the room becomes unoccupied
- Whether daylight harvesting is enabled
- The behavior of the wall switches

Each of the eight SCENARIOS dipswitch positions controls one aspect of the room operation. Setting each position to ON or OFF creates a complete operational profile for the space.

Refer to the Scenario Details for a complete description of all inputs and outputs used by the scenarios.

5.1.1 How Scenarios Work

Each dipswitch position corresponds to a specific operational setting:

- **Position 1** – Room type (one room or two rooms)
- **Position 2** – Occupancy time delay

- **Position 3** – Occupancy sensor mode
- **Position 4** – Light level when occupied
- **Position 5** – Light level when unoccupied
- **Position 6** – Daylight harvesting
- **Position 7** – Switch mode selection
- **Position 8** – Switch mode selection

Together, these positions form a unique Scenario ID, for example: RT1-TDS-OSO-UCH-UCO-DL0-SM1.

This ID provides a concise representation of all selected operational behaviors.

5.1.2 Scenario Occupancy Event Flow Chart

This flow chart shows how the SCENARIOS manages lighting based on occupancy sensor events. It illustrates the decisions from sensor detection and daylight harvesting to the final light output level.

flowchart TB

%% SCENARIOS Light Control Flow

%% Occupancy Detection

subgraph Occupancy["Occupancy Detection Event"]

direction LR

SensorDetected["**Occupancy Detected?**"]

Yes or No

*Note: Occupied event occurs as soon as presence is detected.

Vacant event occurs after the configured occupancy timeout (TDS / TDL)*"]

SensorVacant["Room Vacant"]

SensorDetected -->|Yes| SensorOccupiedMode

SensorDetected -->|No| SensorVacant

end

%% Occupancy Sensor Mode

```

    subgraph SensorMode["Occupancy Sensor Mode"]
        direction LR
        SensorOccupiedMode["***Occupancy Mode?"]
    *OSO* (Occupancy)
    or
    *OSV* (Vacancy)"]
        OccupancyMode["***Occupancy**
        Auto ON / Auto OFF (*OSO*)"]
        VacancyMode["***Vacancy**
        Manual ON / Auto OFF (*OSV*)
    User must turn lights ON manually"]
        SensorOccupiedMode -->|*OSO*| OccupancyMode
        SensorOccupiedMode -->|*OSV*| VacancyMode
    end

%% Daylight Harvesting (checked before occupied level)
    subgraph Daylight["Daylight Harvesting"]
        direction TB
        DaylightDecision{***Daylight Harvesting Enabled?}
    *DL0* (Disabled)
    or
    *DL1* (Enabled)}
        DaylightNo["Apply pre-defined occupied light level"]
        DaylightYes["Adjust lights automatically based on daylight"]
        OccupancyMode --> DaylightDecision
        DaylightDecision -->|*DL0*| DaylightNo
        DaylightDecision -->|*DL1*| DaylightYes
    end

%% Occupied Light Level (only if *OSO* and *DL0*)
    subgraph LightLevel["Occupied Light Level"]
        direction LR
        OccupiedLevel["***Pre-defined Light Level**
    *OCH* (High - 100%)
    or
    *OCM* (Medium - 50%)"]
        DaylightNo --> OccupiedLevel
        DaylightLevel["***Daylight Control**
        Automatically adjust the light level to maintain a predefined illuminance setpoint
    *OCH* target: 400 lux · *OCM* target: 250 lux"]

```

```

    DaylightYes --> DaylightLevel
end

%% Unoccupied Light Level
subgraph UnoccupiedLevelBox["Unoccupied Light Level"]
    direction LR
    UnoccupiedLevel["***Unoccupied Light Level**"]
*UCO* (OFF)
or
*UCM* (Medium - 50%)]
    SensorVacant --> UnoccupiedLevel
end

%% Final Lights Output
OccupiedLevel --> LightsOccupied["***Lights Output
(Occupied)**"]
DaylightLevel --> LightsOccupied
VacancyMode --> LightsVacancy["***Lights Output
(Manual / Vacancy Mode)**"]
Unchanged, user must turn lights ON manually"]
    UnoccupiedLevel --> LightsUnoccupied["***Lights Output
(Unoccupied)**"]

```

5.1.3 Factory Default Positions

By default, all positions are set to OFF.

This corresponds to the scenario: RT1-TDS-OSO-OCH-UCO-DL0-SM1.

In practical terms, this results in:

- One room
- 20-minute occupancy timeout
- Lights turn ON automatically
- 100% light level when occupied

- Lights turn OFF when unoccupied
- No daylight harvesting
- Standard wall switch mode

This default configuration is suitable for most standard single-room installations.

5.1.4 Using the Dipswitch

The SCENARIOS dipswitch contains eight positions. Each position controls a specific part of the room control behavior. Setting a position to ON or OFF immediately updates the room controller operation.

5.1.4.1 Position 1 – Room Type

Determines whether one or two rooms are controlled by the scenario.

When configured for two rooms, both rooms must require similar control behavior. Two-room mode primarily affects the behavior and actions of the wall switches.

- OFF (RT1): Controls one room
- ON (RT2): Controls two rooms

5.1.4.2 Position 2 – Occupancy Time Delay

Determines how long lights remain ON after the room becomes vacant.

After this delay, the UCO or UCM light level is applied.

- OFF (TDS): Short delay – lights remain ON 20 minutes
- ON (TDL): Long delay – lights remain ON 40 minutes

5.1.4.3 Position 3 – Occupancy Sensor Mode

Determines whether lights turn ON automatically based on occupancy detected by the sensor.

- OFF (OSO): Occupancy mode – lights turn ON (OCH or OCM) automatically when the room becomes occupied and turn OFF (UCO or UCM) automatically when vacant

- ON (OSV): Vacancy mode – lights must be turned ON manually but turn OFF (UCO or UCM) automatically when vacant

Vacancy Mode (OSV) - Grace Period

In vacancy mode (OSV), when the room becomes vacant, a 15-second grace period begins. If the occupant returns during this period, lights are automatically restored to their previous level without requiring manual activation. Daylight harvesting is also restarted if it was active.

5.1.4.4 Position 4 – Occupied Light Level

Determines the light level when the room becomes occupied.

This applies when the occupancy sensor controls the lights (OSO) as the room becomes occupied.

- OFF (OCH): High – 100% brightness when occupied, or maintain a 400 lux illuminance setpoint if daylight harvesting (DL1) is enabled
- ON (OCM): Medium – 50% brightness when occupied, or maintain a 250 lux illuminance setpoint if daylight harvesting (DL1) is enabled

5.1.4.5 Position 5 – Unoccupied Light Level

Determines the light level when the room becomes unoccupied.

This applies when the occupancy sensor controls the lights as the room becomes unoccupied.

- OFF (UCO): Lights turn OFF when the room is unoccupied
- ON (UCM): Medium – 50% brightness when unoccupied

5.1.4.6 Position 6 – Daylight Harvesting

Determines whether daylight harvesting control is enabled.

- OFF (DL0): Daylight harvesting is disabled
- ON (DL1): Lights adjust automatically based on natural daylight

5.1.4.7 Positions 7 and 8 – Switch Mode

Determines how the wall switches behave.

Select how wall switches control the room. Options depend on the number of buttons, the number of rooms, whether daylight harvesting is enabled, and the overall control scheme (see Scenarios Details for a complete description).

5.2 Scenarios Details

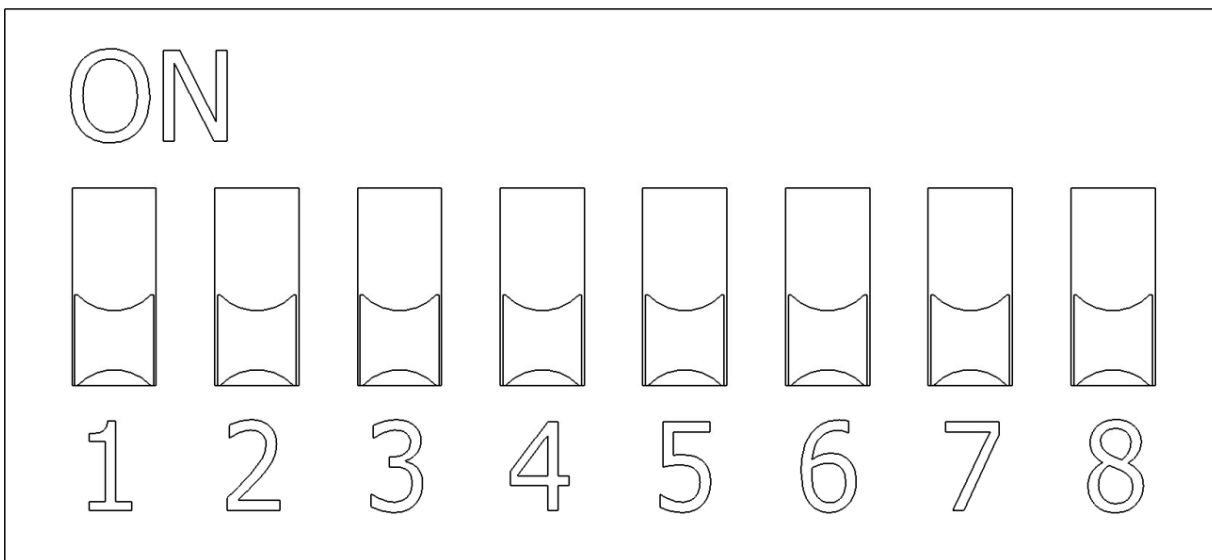
The predefined scenarios of operation are selectable via the 8-position dipswitches **SCENARIOS** or through the configuration software.

A complete **SCENARIOS** ID is formed by the different position ID selections, separated by dashes (e.g., RT1-TDS-OSO-OCH-UCO-DL0-SM1).

The factory default positions for the dipswitch **SCENARIOS** are all OFF, corresponding to the ID RT1-TDS-OSO-OCH-UCO-DL0-SM1.

5.2.1 Dipswitch

The **SCENARIOS** dipswitch has eight positions and allows the selection of the different scenarios.



dipswitch-8-positions

5.2.2 Positions ID

Position	ID	Name	Value OFF	Value ON
1	RT	Room Type	RT1 — One room	RT2 — Two rooms
2	TD	Timing Delay	TDS — Short time delay	TDL — Long time delay

Position	ID	Name	Value OFF	Value ON
3	O S	Occupancy Sensor	OSO — Occupancy mode	OSV — Vacancy mode
4	O C	Occupied Command	OCH — Occupied high level	OCM — Occupied medium level
5	U C	Unoccupied Command	UCO — Unoccupied off level	UCM — Unoccupie d medium level
6	DL	Daylight Harvesting	DL0 — Daylight harvesting is not available	DL1 — Daylight harvesting is available
7, 8	S M	Switch Mode	See SM details below	See SM details below

5.2.3 RT - Room Type

Position	Value	ID	Number	Description
1	OFF	RT1	0	One room.
1	ON	RT2	1	Two rooms.

5.2.3.1 RT1 - One room

When this option is selected, it controls a single room with a single occupancy state and possibly a single daylight harvesting zone.

5.2.3.1.1 Room 1

- The occupancy input is named **DI5 - OCCUPANCY 1** and **QUICK CONNECT 1 (QC)**.
- The light level input is named **AI1 - DAYLIGHT 1** and **QUICK CONNECT 1 (QC)**.
- The wall-switch inputs are according to the selected SM mode.

5.2.3.2 RT2 - Two rooms

When this option is selected, it controls two rooms, each with a single occupancy state and possibly a single daylight harvesting zone.

5.2.3.2.1 Room 1

- The occupancy input is named **DI5 - OCCUPANCY 1** and **QUICK CONNECT 1 (QC)**.
- The light level input is named **AI1 - DAYLIGHT 1** and **QUICK CONNECT 1 (QC)**.
- The wall-switch inputs are according to the selected SM mode.

5.2.3.2.2 Room 2

- The occupancy input is named **DI8 - OCCUPANCY 2**.
- The light level input is named **AI2 - DAYLIGHT 2**.
- The wall-switch inputs are according to the selected SM mode.

5.2.4 TD - Time Delay

Position	Value	ID	Number	Description
2	OFF	TD S	0	Short time delays.The occupancy delay is configured to 20 minutes.
2	ON	TD L	2	Long time delays.The occupancy delay is configured to 40 minutes.

5.2.5 OS - Occupancy Sensor

Position	Value	ID	Number	Description
3	OFF	OS	0	The occupancy sensor is in occupancy mode.Occupied and unoccupied states of the sensor are used for the control.
3	ON	OS V	4	The occupancy sensor is in vacancy mode.Only unoccupied state of the sensor is used for the control.

5.2.5.1 Grace Period (Vacancy Mode)

When vacancy mode (OSV) is selected, a 15-second grace period is automatically enabled after the occupancy time delay (TDS or TDL) expires.

If the space becomes re-occupied during this grace period, lights are automatically restored to their previous level without requiring manual switch action. Daylight harvesting also resumes if it was active. If the grace period expires without re-occupation, the unoccupied command (UCO or UCM) takes full effect.

5.2.6 OC - Occupied Command

Position	Value	ID	Number	Description
4	OFF	OC	0	Occupied high level.Occupied level is 100%, or maintain a 400 lux illuminance setpoint if DL1 is selected.
4	ON	OC	8	Occupied medium level.Occupied level is 50%, or maintain a 250 lux illuminance setpoint if DL1 is selected.

5.2.7 UC - Unoccupied Command

Position	Value	ID	Number	Description
5	OFF	UC	0	Unoccupied OFF level.Unoccupied level is OFF.
5	ON	UC	16	Unoccupied medium level.Unoccupied level is 50%.

5.2.8 DL - Daylight Harvesting

Position	Value	ID	Number	Description
6	OFF	DL0	0	Daylight harvesting is not available.
6	ON	DL1	32	Daylight harvesting is available.

5.2.9 SM - Switch Mode

5.2.9.1 Positions

Position 7	Position 8	ID	Number	Support
OFF	OFF	SM1	0	2 buttons, 4 buttons
ON	OFF	SM2	64	2 buttons, 4 buttons
OFF	ON	SM3	128	4 buttons
ON	ON	SM4	192	4 buttons (RT1 + DL1 only)

5.2.9.2 Commands

I D	R T	SWITCH #1	SWITCH #2	SWITCH #3	SWITCH #4
S M 1	R T 1	ON / Up [lo1, lo3]Start Daylight / Up [lo1]	OFF / Down [lo1, lo3]	ON / Up [lo2, lo4]	OFF / Down [lo2, lo4]
	R T 2	ON / Up [lo1, lo3]Start Daylight / Up [lo1]	OFF / Down [lo1, lo3]	ON / Up [lo2, lo4]Start Daylight / Up [lo2]	OFF / Down [lo2, lo4]
S M 2	R T 1	Last Level / Up [lo1, lo3]Start Daylight / Up [lo1]	OFF / Down [lo1, lo3]	Last Level / Up [lo2, lo4]	OFF / Down [lo2, lo4]
	R T 2	Last Level / Up [lo1, lo3]Start Daylight / Up [lo1]	OFF / Down [lo1, lo3]	Last Level / Up [lo2, lo4]Start Daylight / Up [lo2]	OFF / Down [lo2, lo4]
S M 3	R T 1	ON [lo1, lo3, lo2, lo4]Start Daylight [lo1]	Up [lo1, lo3, lo2, lo4]	Down [lo1, lo3, lo2, lo4]	OFF [lo1, lo3, lo2, lo4]
	R T 2	*Reserved	*Reserved	*Reserved	*Reserved
S M 4	R T 1	Start Daylight / Up [lo1]	OFF / Down [lo1, lo3]	Start Daylight / Up [lo2]	OFF / Down [lo2, lo4]

I	R	SWITCH #1	SWITCH #2	SWITCH #3	SWITCH #4
D	T				
	R	*Reserved	*Reserved	*Reserved	*Reserved
	T				
	2				

*Io1 refers to the 0-10V #1 output

*Io2 refers to the 0-10V #2 output

*Io3 refers to the OCC output

*Io4 refers to the RECEPT outputs

*Reserved for future use (All SWITCH commands are UNDEFINED).

SM4 - Dual-Zone Daylight Harvesting

SM4 is only defined for RT1 + DL1. It enables daylight harvesting on **both** control zones from a **single** occupancy sensor (**DI5 - OCCUPANCY 1**) and a **single** light sensor (**AI1 - DAYLIGHT 1**). Both zones recall the occupied scene on occupancy, and SWITCH #1 / SWITCH #3 each start daylight on their zone. Any other combination with SM4 is reserved (all SWITCH commands are UNDEFINED, no daylight on the second zone).

6 BACnet

6.1.1 BACnet MS/TP

BACnet MS/TP allows the configuration of the controller via the BACnet Browser software from Cristal Controls. Multiple BACnet objects exist to allow for the integration of the controller into a BACnet system.

When at the end of a RS-485 network, we may enable the 120 Ω terminating resistor by activating the **TERM** dipswitch to terminate the network. The dipswitches **BIAS+** and **BIAS-** allow enabling 604 Ω pull-up and pull-down bias.

For more RS-485 network information, refer to the Cristal Controls “Setting up a RS-485 Network” manual. Go to our website or call customer service to get a PDF copy.

6.1.2 BACnet Objects

Many objects allow direct control on inputs and outputs of the controller. The table below lists every object. For the full property list of each object, including the proprietary properties, see the BACnet Objects reference pages.

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
Device	72	CC-ONYX					
AI	0	OUTPUT 0-10V 1 FB	0	100	percent	0-10V + (1)	
AI	1	OUTPUT 0-10V 2 FB	0	100	percent	0-10V + (2)	
AI	2	INPUT 0-10V 1	0	100	percent	AI1 - DAYLIGHT 1	
AI	3	INPUT 0-10V 2	0	100	percent	AI2 - DAYLIGHT 2	
AI	4	24VDC FB	0	100	percent	+24V OUT	
AI	5	LAMP 1 FB	0	100	percent	Lamp 1	

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
AI	6	LAMP 2 FB	0	100	percent	Lamp 2	
AI	7	LAMP 3 FB	0	100	percent	Lamp 3	
AI	8	LAMP 4 FB	0	100	percent	Lamp 4	
AI	9	LAMP 5 FB	0	100	percent	Lamp 5	
AO	0	OUTPUT 0-10V 1	0	100	percent	OUTPUT 0-10V 1	
AO	1	OUTPUT 0-10V 2	0	100	percent	OUTPUT 0-10V 2	
AO	2	LAMP 1 CMD	0	100	percent		
AO	3	LAMP 2 CMD	0	100	percent		
AO	4	LAMP 3 CMD	0	100	percent		
AO	5	LAMP 4 CMD	0	100	percent		
AO	6	LAMP 5 CMD	0	100	percent		
AV	0	DAYLIGHT SETPOINT UNOCC 1			luxes		
AV	1	DAYLIGHT SETPOINT 1			luxes		
AV	2	DAYLIGHT SETPOINT UNOCC 2			luxes		
AV	3	DAYLIGHT SETPOINT 2			luxes		

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
AV	4	INPUT LIGHT 1			no-units		
AV	5	INPUT LIGHT 2			no-units		
AV	8	INPUT LIGHT 3			no-units		
AV	9	INPUT LIGHT 4			no-units		
AV	6	LAMP BAND 2-1 FB	0	100	percent		
AV	7	LAMP BAND 2-2 FB	0	100	percent		
AV	101	CONTROL OUTPUT 1 - POWER LIMIT	0	100	percent		
AV	201	CONTROL OUTPUT 2 - POWER LIMIT	0	100	percent		
AV	301	CONTROL OUTPUT 3 - POWER LIMIT	0	100	percent		
AV	401	CONTROL OUTPUT 4 - POWER LIMIT	0	100	percent		
AV	501	CONTROL OUTPUT 5 - POWER LIMIT	0	100	percent		
AV	100	CONTROL OUTPUT 1 - LIGHT VALUE			luxes		
AV	200	CONTROL OUTPUT 2 - LIGHT VALUE			luxes		
AV	300	CONTROL OUTPUT 3 - LIGHT VALUE			luxes		
AV	400	CONTROL OUTPUT 4 - LIGHT VALUE			luxes		

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
AV	500	CONTROL OUTPUT 5 - LIGHT VALUE			luxes		
BI	0	DIGITAL INPUT 1				DI1 - SWITCH 1	
BI	1	DIGITAL INPUT 2				DI2 - SWITCH 2	
BI	2	DIGITAL INPUT 3				DI3 - SWITCH 3	
BI	3	DIGITAL INPUT 4				DI4 - SWITCH 4	
BI	4	DIGITAL INPUT 5				DI5 - OCCUPAN CY 1	
BI	5	DIGITAL INPUT 6				DI6 - AUX IN 1	
BI	6	DIGITAL INPUT 7				DI7 - AUX IN 2	
BI	7	DIGITAL INPUT 8				DI8 - OCCUPAN CY 2	
BI	8	RELAY 1 FB					
BI	9	RELAY 2 FB					
BI	10	RELAY 3 FB					
BI	11	RELAY 4 FB					
BI	12	RELAY 5 FB					
BI	13	BUTTON LOCAL STATUS					
BI	14	BUTTON LOCAL 1					
BI	15	BUTTON LOCAL 2					
BI	16	BUTTON LOCAL 3					

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
BI	17	BUTTON LOCAL 4					
BI	18	BUTTON LOCAL 5					
BO	0	RELAY 1 CMD				K1	
BO	1	RELAY 2 CMD				K2	
BO	2	RELAY 3 CMD				RELAY 3 AUX	
BO	3	RELAY 4 CMD				RELAY 4 AUX	
BO	4	RELAY 5 CMD				RELAY 5 AUX	
BV	0	OCCUPIED MODE 1					
BV	1	OCCUPIED MODE 2					
BV	2	NETWORK DIGITAL INPUT 1					
BV	3	NETWORK DIGITAL INPUT 2					
BV	4	NETWORK DIGITAL INPUT 3					
BV	5	NETWORK DIGITAL INPUT 4					
BV	6	NETWORK DIGITAL INPUT 5					
BV	7	NETWORK DIGITAL INPUT 6					
BV	8	NETWORK DIGITAL INPUT 7					
BV	9	NETWORK DIGITAL INPUT 8					
BV	10	NETWORK DIGITAL INPUT 9					

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
BV	11	NETWORK DIGITAL INPUT 10					
BV	12	NETWORK DIGITAL INPUT 11					
BV	13	NETWORK DIGITAL INPUT 12					
BV	14	NETWORK DIGITAL INPUT 13					
BV	15	NETWORK DIGITAL INPUT 14					
BV	16	NETWORK DIGITAL INPUT 15					
BV	17	NETWORK DIGITAL INPUT 16					
BV	19	OCCUPIED MODE 4					
BV	20	OCCUPIED MODE 5					
BV	200	CONTROL OUTPUT 2 - OCCUPANCY STATE					
BV	300	CONTROL OUTPUT 3 - OCCUPANCY STATE					
BV	400	CONTROL OUTPUT 4 - OCCUPANCY STATE					
BV	500	CONTROL OUTPUT 5 - OCCUPANCY STATE					
MSV	0	SCENE CONTROL LOCAL 1					
MSV	1	SCENE CONTROL LOCAL 2					

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
MSV	2	SCENE CONTROL LOCAL 3					
MSV	3	SCENE CONTROL LOCAL 4					
MSV	4	SCENE CONTROL LOCAL 5					
MSV	100	CONTROL OUTPUT 1 - ACTIVE SCENE					
MSV	200	CONTROL OUTPUT 2 - ACTIVE SCENE					
MSV	300	CONTROL OUTPUT 3 - ACTIVE SCENE					
MSV	400	CONTROL OUTPUT 4 - ACTIVE SCENE					
MSV	500	CONTROL OUTPUT 5 - ACTIVE SCENE					
MSV	1000	SEQUENCE CONTROL					
MSV	1001	SCHEDULE CONTROL					
Channel	1	CHANNEL 1					
Channel	2	CHANNEL 2					
Channel	3	CHANNEL 3					
Channel	4	CHANNEL 4					
File	0	ConfigSystem.bin					
File	1	ConfigOutput.bin					
File	2	ConfigScheduler.bin					

Type	Instance	Name	Minimum	Maximum	Unit	Physical signal	Note
File	3	syslog.txt					
File	4	syslog_old.txt					
File	5	ConfigDataPolling.bin					
File	6	ConfigSequencer.bin					
File	7	ConfigNames.bin					
File	100	Flash.bin					
File	101	FlashFS.bin					
File	102	FlashRaw.bin					
File	103	ConfigBoard.bin					

6.1.3 BACnet Browser Configuration Software

BACnet Browser is a configuration software available for the Windows operating system and available on the Cristal Controls website. It allows the configuration of all the parameters of the room controller.

7 DALI

7.1.1 DALI

According to the configuration, it appears as a “DALI control gear – Fluorescent lamps (device type 0)” or “control gear – Switching function (device type 7)”.

The controller is not powered by the DALI signal.

8 Legal Notice

No representation or reproduction, in whole or in part, may be made without the consent of Cristal Controls Ltd. The information contained in this document is subject to change without notice and does not represent a commitment on the part of Cristal Controls Ltd. Cristal Controls Ltd assumes no responsibility for any errors that may appear in this document.

© Cristal Controls Ltd. All rights reserved 1996 - 2026.