



# CoolLinkBridge for Zone Controllers

## User Manual

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# 1. Introduction

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This User Manual (UM) provides the information necessary, for installers and integrators, to effectively use the CoolLinkBridge for connecting with zone controllers of multiple manufacturers.

## 1.1 Compatibility

| CoolLinkBridge Model | Zone controller Manufacturer | Models                                     | Notes                                                 |
|----------------------|------------------------------|--------------------------------------------|-------------------------------------------------------|
| CoolLinkBridge DKZ   | Daikin                       | BRC24Z4<br>BRC24Z8<br>BRC240Z4<br>BRC240Z8 | CoolLinkBridge DKZ is used only as a slave controller |
| CoolLinkBridge IZN   | Air Stream (iZone)           |                                            | "Bridge (CB)" Ethernet Adapter Required               |

## 2. Overview

The CoolLinkBridge enables integration of the Zone Controller device with Home Automation and BMS (Building Management System) controllers.

When controlling the Zone Controller device through the CoolLinkBridge, the user is able to control AC unit and each zone as if it was a separate Indoor unit.

The CoolLinkBridge comprises the following capabilities and interfaces:

- RS232 (ASCII)
- RS485 (Modbus RTU according to the EIA/TIA-485 standard), BACnet MSTP
- Ethernet (ASCII, Modbus IP, REST, BACnet IP) for control and monitoring of the HVAC system's operation
- KNX (Optional).
- Remote access via smart phone, tablet or PC using the CoolRemote application

### 2.1 Conventions

This document provides screen prints and corresponding narrative to describe how to use the CoolLinkBridge.

When an action is required on the part of the reader, it is indicated by a line beginning with the word "Action:" For example:

**Action:** Click on OK.

Fields or buttons to be acted upon are indicated in bold italics in the Action statement; links to be acted upon are indicated as links in underlined blue text in the Action statement.

**Note:** The term 'user' is used throughout this document to refer to a person who requires and/or has acquired access to the CoolLinkBridge.

### 2.2 Revisions History

| Version Number | Date      | Author/Owner | Description of Change                         |
|----------------|-----------|--------------|-----------------------------------------------|
| 0.1            | 25/3/2019 | CA           | Preliminary CoolLink <b>Bridge</b> manual     |
| 2.0            | 8/7/2019  | CA           | Update with additional zone controller brands |
|                |           |              |                                               |

Table 1 - Record of Changes to document

## 2.3 Related Documentation

| Document Name                 | Document Location and/or URL                                                                                                                                                                          |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BACnet integration guidelines | <a href="https://coolautomation.com/lib/doc/CoolMasterNet/manual/CoolMasterNet-BACnet-guidelines.pdf">https://coolautomation.com/lib/doc/CoolMasterNet/manual/CoolMasterNet-BACnet-guidelines.pdf</a> |
| Modbus Integration Guidelines | <a href="http://coolautomation.com/lib/doc/CoolMasterNet/manual/CoolMasterNet-Modbus-guidelines.pdf">http://coolautomation.com/lib/doc/CoolMasterNet/manual/CoolMasterNet-Modbus-guidelines.pdf</a>   |

Table 2 - Referenced Documents

## 2.4 Acronyms and Abbreviations

| Acronym | Literal Translation                      |
|---------|------------------------------------------|
| DTE     | Data Terminal Equipment                  |
| GPIO    | General Purpose Input / Output           |
| HVAC    | Heating Ventilation and Air Conditioning |
| N.C.    | Not Connected                            |
| TBD     | To Be Defined                            |

Table 3 – Acronyms and Abbreviations

## 3. System Layout and Connectivity

The following sub-sections provide details on the different connectivity options of the system and how to use the various functions of the CoolLinkBridge.

CoolLinkBridge has multiple models, with different interfaces, for connecting to the different auxiliaries. Please make sure you are using the right model for your Auxiliary device, based on the [compatibility table](#).

### 3.1 CoolLinkBridge DKZ

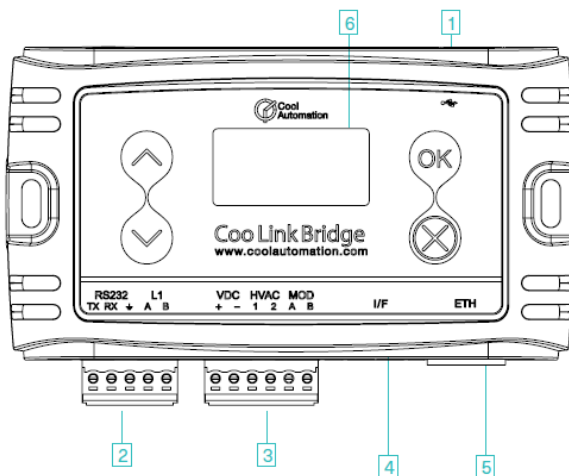
#### 3.1.1 Power

The CoolLinkBridge can be powered by one of the following methods:

- From the P1 P2 interface
- AC/DC adapter via VDC+ and VDC- terminals
- 12-24V DC from HVAC or other equipment via VDC+ and VDC- terminals
- USB device port

**Note:** Unit is shipped without power adapter.

#### 3.1.2 Device Layout and Connectivity



- (1) Mini USB Device Connector
- (2) RS232, I/O Connector
- (3) Power, HVAC, Modbus Connector
- (4) I/F Connector (Not in use)
- (5) ETH Connector
- (6) LCD Screen

*Figure 1 – Device Layout*

### 3.1.2.1 Mini USB Device Connector

Used to connect the CoolinkBridge to the PC USB Host for firmware updates and maintenance operations.

### 3.1.2.2 RS232 I/O Connector

The RS232 Interface in CoolinkBridge is available from the RS232 I/O connector. An adapter cable routes RS232 signals to the DB9 connector according to the table below:

| RS232/I/O Pin | Pin Name | DP9 Pin | Signal Level | Function Description            |
|---------------|----------|---------|--------------|---------------------------------|
| 1             | RS232_TX | 2       | ±12V         | TxD Data from CoolinkBridge DKZ |
| 2             | RS232_RX | 3       | ±12V         | RxD Data to CoolinkBridge DKZ   |
| 3             | VDC-     | 5       | GND          | Ground                          |
| 4             | L1 A     |         |              | General Purpose IO              |
| 5             | L1 B     |         |              | General Purpose IO              |

*Table 4 – RS232 I/O connector – RS232 to DB9 pin mapping*

The length of the RS232 cable should not exceed 25m.

The default CoolinkBridge RS232 port settings are:

| Parameter      | Value |
|----------------|-------|
| Baud Rate      | 9600  |
| Data Bits      | 8     |
| Parity Control | None  |
| Stop Bits      | 1     |
| Flow Control   | None  |

*Table 5 – RS232 port settings*

By default, the RS232 interface is dedicated for the ASCII I/F protocol.

### 3.1.2.3 Power, HVAC, Modbus Connector

| Pin Number | Pin Name | Function                 |
|------------|----------|--------------------------|
| 1          | VDC+     | Input Voltage (optional) |
| 2          | VDC-     | Ground (optional)        |
| 3          | HVAC1    | P1 P2 wire               |

| Pin Number | Pin Name | Function             |
|------------|----------|----------------------|
| 4          | HVAC2    | P1 P2 wire           |
| 5          | MOD_A    | Modbus A(+) Terminal |
| 6          | MOD_B    | Modbus B(-) Terminal |

Table 6 - Power, HVAC, Modbus Connector

By default, terminals MOD A and MOD B are used as an RS485 Interface line for DTE connection. CoolinkBridge DKZ supports the following RS485-based protocol:

- Modbus RTU (Slave mode)
- BACnet MSTP

### 3.1.2.4 ETH Connector

The CoolinkBridge incorporates an IEEE 802.3 compatible 10/100 Mb/s Ethernet port via an RJ45 connector. Below are the main port features.

| Parameter                    | Value               | Notes                   |
|------------------------------|---------------------|-------------------------|
| Max Ethernet cable length    | 137m                | CAT5 twisted pair cable |
| Bit Rate                     | 10/100 Mb/s         |                         |
| Supported Ethernet Protocols | 10BASE-T/100BASE-TX |                         |
| Protocol Auto-Negotiation    | Enabled             | Against Link Partner    |

Table 7 - Ethernet port features

The RJ45 connector comprises Link and Activity indication LEDs used as specified below.

| LED          | Color  | Function                            |
|--------------|--------|-------------------------------------|
| Link LED     | Green  | ON for good link<br>OFF for no link |
| Activity LED | Orange | BLINK for Tx/Rx activity            |

Table 8 - Ethernet activity indication LED

The Ethernet interface is used by a number of protocols available in the CoolinkBridge

- ASCII I/F (via the ASCII I/F IP server)
- CoolRemote (cloud integration)
- Modbus IP
- BACnet IP
- REST API



Network settings of the CoolinkBridge are controlled using the [ifconfig command](#).

### 3.1.2.5 ASCII I/F IP Server

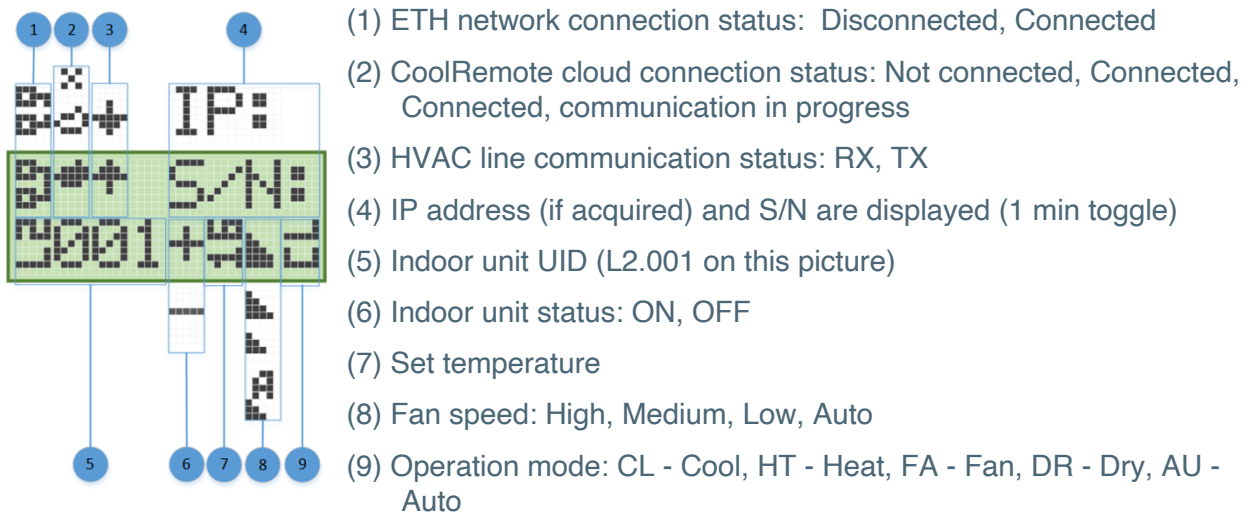
The ASCII I/F IP server referenced as a server is a classic TCP/IP socket server. The server has the following default characteristics:

| Characteristic                         | Value |
|----------------------------------------|-------|
| Max number of simultaneous connections | 4     |
| Default TCP/IP port                    | 10102 |

Table 9 - ASCII I/F IP server characteristics

### 3.1.2.6 LCD Screen

The CoolinkBridge is equipped with an alphanumeric 8x2 characters LCD that presents important device parametric and status information.



## 3.2 CoolLinkBridge IZN

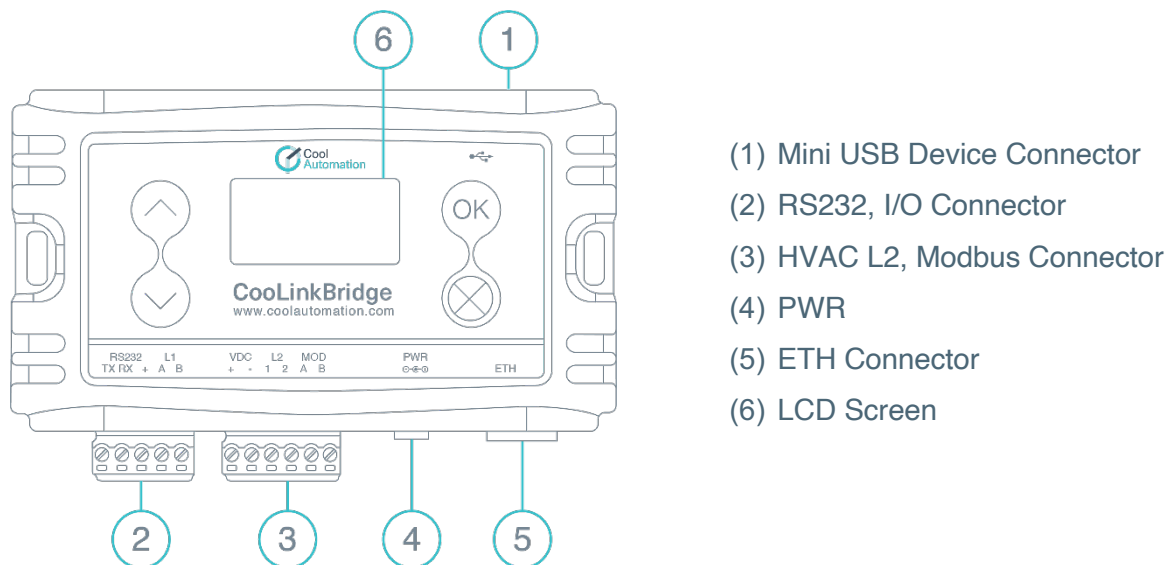
### 3.2.1 Power

The CoolLinkBridge can be powered by one of the following methods:

- AC/DC adapter via VDC+ and VDC- terminals
- 12-24V DC from HVAC or other equipment via VDC+ and VDC- terminals
- USB device port
- 12-24V DC from power adapter through PWR terminal

**Note:** Unit is shipped without power adapter.

### 3.2.2 Device Layout and Connectivity



- (1) Mini USB Device Connector
- (2) RS232, I/O Connector
- (3) HVAC L2, Modbus Connector
- (4) PWR
- (5) ETH Connector
- (6) LCD Screen

Figure 2 – Device Layout

#### 3.2.2.1 Mini USB Device Connector

Used to connect the CoolLinkBridge to the PC USB Host for firmware updates and maintenance operations.

### 3.2.2.2 RS232 I/O Connector

The RS232 Interface in CoolLinkBridge is available from the RS232 I/O connector. An adapter cable routes RS232 signals to the DB9 connector according to the table below:

| RS232/I/O Pin | Pin Name | DP9 Pin | Signal Level | Function Description             |
|---------------|----------|---------|--------------|----------------------------------|
| 1             | RS232_TX | 2       | ±12V         | TxD Data from CoolLinkBridge DKZ |
| 2             | RS232_RX | 3       | ±12V         | RxD Data to CoolLinkBridge DKZ   |
| 3             | VDC-     | 5       | GND          | Ground                           |
| 4             | L1 A     |         |              |                                  |
| 5             | L1 B     |         |              |                                  |

Table 10 – RS232 I/O connector – RS232 to DB9 pin mapping

The length of the RS232 cable should not exceed 25m.

The default CoolLinkBridge RS232 port settings are:

| Parameter      | Value |
|----------------|-------|
| Baud Rate      | 9600  |
| Data Bits      | 8     |
| Parity Control | None  |
| Stop Bits      | 1     |
| Flow Control   | None  |

Table 11 – RS232 port settings

By default, the RS232 interface is dedicated for the ASCII I/F protocol.

### 3.2.2.3 Power, HVAC, Modbus Connector

| Pin Number | Pin Name | Function                 |
|------------|----------|--------------------------|
| 1          | VDC+     | Input Voltage (optional) |
| 2          | VDC-     | Ground (optional)        |
| 3          | L2 1     | not in use               |
| 4          | L2 2     | Not in use               |
| 5          | MOD_A    | Modbus A(+) Terminal     |
| 6          | MOD_B    | Modbus B(-) Terminal     |

Table 12 - Power, HVAC, Modbus Connector

By default, terminals MOD A and MOD B are used as an RS485 Interface line for DTE connection. CoolinkBridge IZN supports the following RS485-based protocol:

- Modbus RTU (Slave mode)
- BACnet MSTP

### 3.2.2.4 ETH Connector

The CoolinkBridge incorporates an IEEE 802.3 compatible 10/100 Mb/s Ethernet port via an RJ45 connector. Below are the main port features.

| Parameter                    | Value               | Notes                   |
|------------------------------|---------------------|-------------------------|
| Max Ethernet cable length    | 137m                | CAT5 twisted pair cable |
| Bit Rate                     | 10/100 Mb/s         |                         |
| Supported Ethernet Protocols | 10BASE-T/100BASE-TX |                         |
| Protocol Auto-Negotiation    | Enabled             | Against Link Partner    |

Table 13 - Ethernet port features

The RJ45 connector comprises Link and Activity indication LEDs used as specified below.

| LED          | Color  | Function                            |
|--------------|--------|-------------------------------------|
| Link LED     | Green  | ON for good link<br>OFF for no link |
| Activity LED | Orange | BLINK for Tx/Rx activity            |

Table 14 - Ethernet activity indication LED

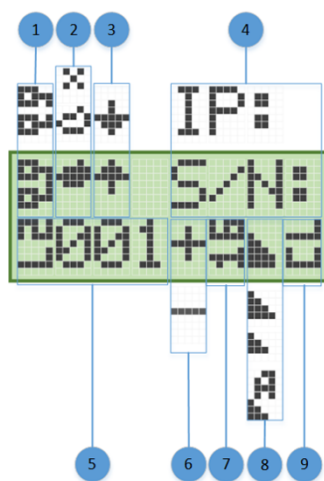
The Ethernet interface is used by a number of protocols available in the CoolinkBridge

- ASCII I/F (via the ASCII I/F IP server)
- CoolRemote (cloud integration)
- Modbus IP
- BACnet IP
- REST API

**Network settings** of the CoolinkBridge are controlled using the [ifconfig command](#).

### 3.2.2.5 LCD Screen

The CoolinkBridge is equipped with an alphanumeric 8x2 characters LCD that presents important device parametric and status information.



- (1) ETH network connection status: Disconnected, Connected
- (2) CoolRemote cloud connection status: Not connected, Connected, Connected, communication in progress
- (3) HVAC line communication status: RX, TX
- (4) IP address (if acquired) and S/N are displayed (1 min toggle)
- (5) Indoor unit UID (L2.001 on this picture)
- (6) Indoor unit status: ON, OFF
- (7) Set temperature
- (8) Fan speed: High, Medium, Low, Auto
- (9) Operation mode: CL - Cool, HT - Heat, FA - Fan, DR - Dry, AU - Auto

## 4. Installation Guidelines

### 4.1 Daikin DKZ

#### 4.1.1 How to connect

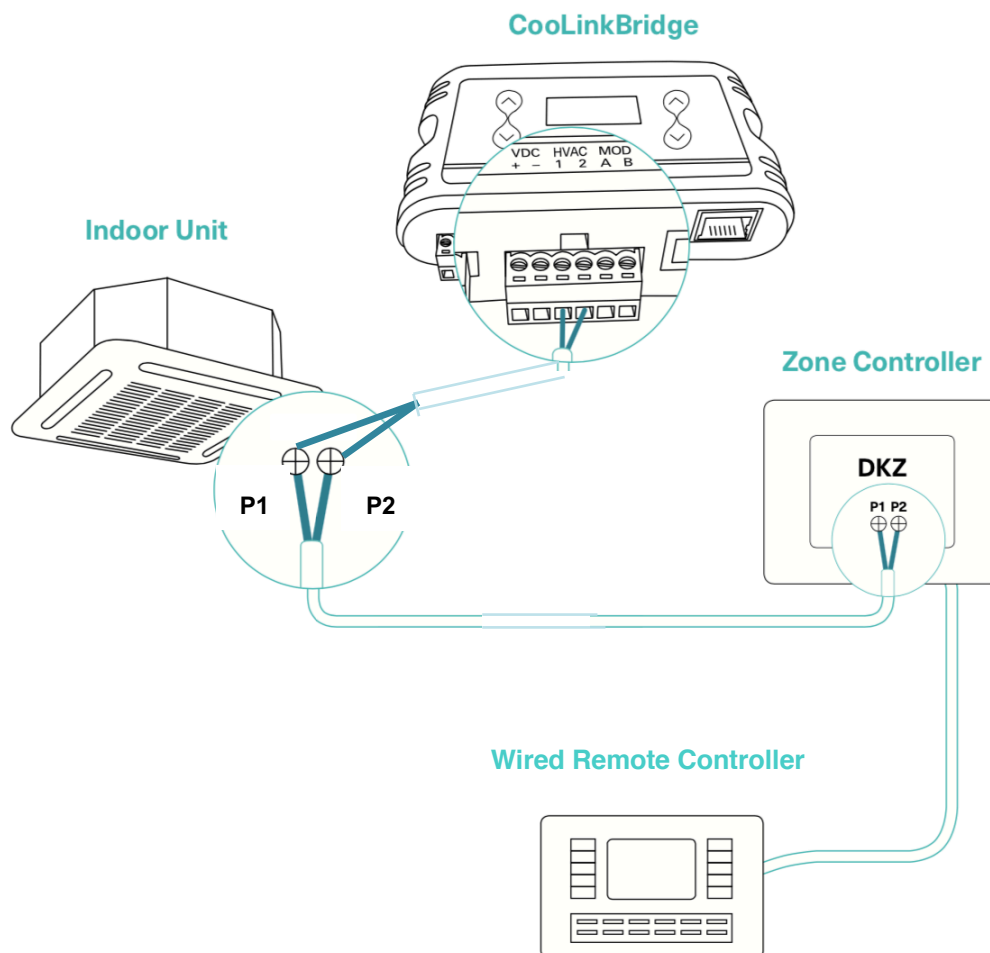


Figure 3 - System Wiring Diagram

Follow the procedure below to connect the CoolLinkBridge DKZ to the Zone Controller and Indoor Unit:

- Connect the CoolLinkBridge HVAC terminals to the P1 P2 terminals on the Indoor unit
- Reset power to the Indoor unit and to the Zone Controller
- Connect the relevant interface (Ethernet, Modbus, BACnet) and verify that zones can be controlled through the relevant commands.

## 4.1.2 Functional Limitations

The following limitations should be considered when installing and integrating with the CoolinkBridge DKZ:

- Only one original panel (BRC230Z4/8 or BRC24Z4/8) can be used with the CoolinkBridge DKZ. Usage of a secondary BRCSZC slave controller is prohibited.
- Zones can be turned ON only after indoor unit is turned ON
- Modes and Fan speed can be controlled only for Indoor unit and not for zones

## 4.2 iZone

### 4.2.1 How to connect

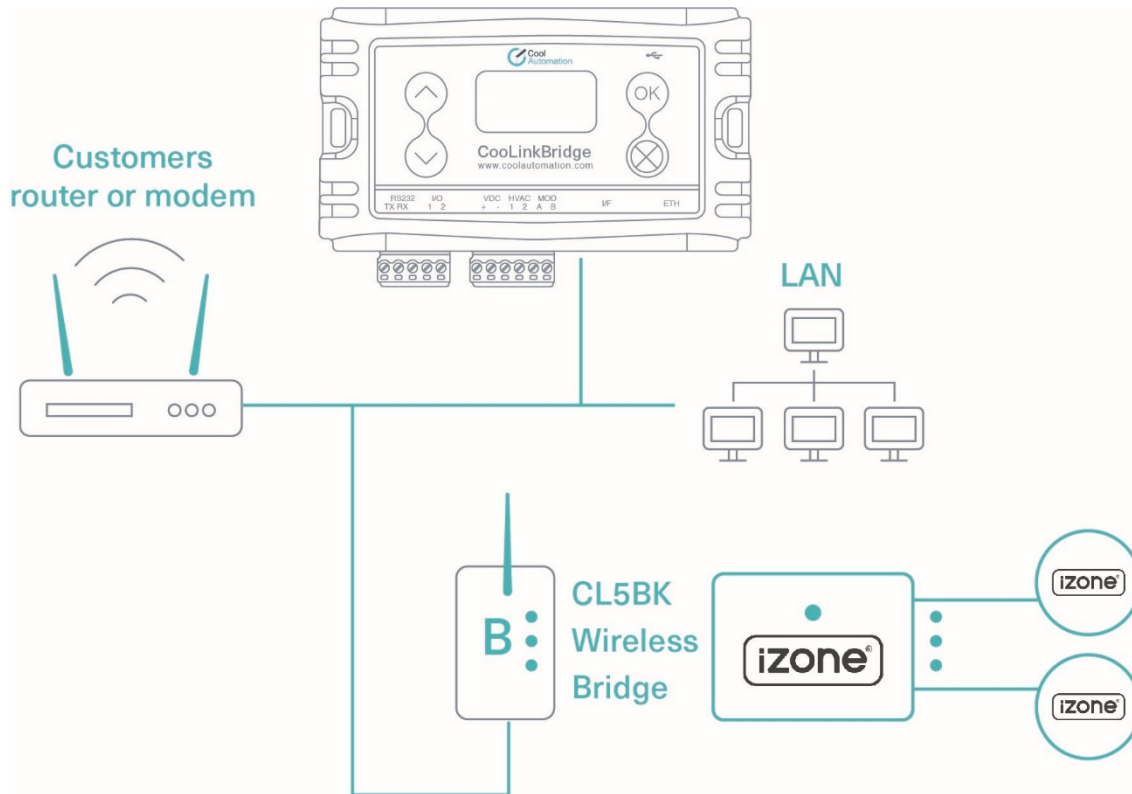


Figure 4 - System Wiring Diagram

Follow the procedure below to connect the CooLinkBridge IZN to the iZone Zone Controller:

- Connect the iZone zone controller to the local network using iZone Wireless CL5BK bridge.
- Connect the CooLinkBridge to the same local network of the iZone controller, through the ETH port
- iZone Zone Controllers are discovered automatically by CooLinkBridge
- On the CooLinkBridge, the AC indoor unit will be shown on the CooLinkBridge as UID XX0, while Zones UID will be shown as XX1 .. XX9
- Connect the relevant interface (Ethernet, Modbus, BACnet) and verify that zones can be controlled through the relevant commands.

### 4.2.2 Functional Limitations

The following limitations should be considered when installing and integrating with the CooLinkBridge IZN:



- Mode of operation can only be set for the AC indoor unit and not for the zones. The zone's mode will follow the AC unit's mode
- Fan speed can only be set for the AC indoor unit and not for the zones. For all the zones, Fan speed value reported by CoolinkBridge indicates the damper status: closed/open/auto and is a read only value.

## 5. Configuration

---

### 5.1 Network Configuration

Network configuration is made using the `ifconfig` command as described below.

#### SYNOPSIS

```
ifconfig
```

```
ifconfig <PROPERTY> <VALUE>
```

```
ifconfig enable | disable
```

#### DESCRIPTION

Query or configure Ethernet network settings. Without parameters, the **ifconfig** command lists the current configuration. To change the configuration, use the format with the parameters **<PROPERTY>** and **<VALUE>**. Parameter **IP** can be set to **DHCP** (DHCP client) or fixed IP number. In case of DHCP - Netmask and Gateway values are provided by the DHCP server. By default, CoolLinkBridge DKZ is configured for DHCP client operation. The CoolLinkBridge DKZ Ethernet module can be enabled or disabled with the corresponding command.

## EXAMPLE

### 5.1.1 Query network settings

```
>ifconfig  
  
MAC : 28:3B:96:FF:FF:FE  
  
Link : Up  
  
IP : 192.168.1.109 (DHCP)  
  
Netmask: 255.255.255.0  
  
Gateway: 192.168.1.1  
  
OK
```

### 5.1.2 Configure fixed IP and Gateway

```
>ifconfig IP 192.168.1.102  
  
OK, Boot Required!  
  
>ifconfig Gateway 192.168.1.0  
  
OK, Boot Required!
```

### 5.1.3 Configure DHCP client operation

```
>ifconfig IP DHCP  
  
OK
```

### 5.1.4 Disable Ethernet

```
>ifconfig disable  
  
OK, Boot Required!
```

## 6. Specifications

| Parameter                                                 |                          | Data                                        |
|-----------------------------------------------------------|--------------------------|---------------------------------------------|
| Power supply                                              | Min load*                | 5V/60mA (via mini USB); 12V/35mA; 24V/20mA  |
|                                                           | Max load**               | 5V/100mA (via mini USB); 12V/70mA; 24V/40mA |
| <b>Mounting</b>                                           |                          | <b>Magnet</b>                               |
| Operating conditions                                      | Ambient temperature      | -10°C ~ 60°C / 14°F ~ 140°F                 |
|                                                           | Humidity                 | 0% ~ 96% non-condensing                     |
| Storage conditions                                        | Ambient temperature      | -20°C ~ 70°C / -4°F ~ 158°F                 |
|                                                           | Humidity                 | 0 % ~ 98 % non-condensing                   |
| Dimensions                                                | H x W x D                | 65 x 115 x 31 [mm] / 2.56 x 4.50 x 1.22 ["] |
| LCD                                                       | Size / color / interface | 2 x 8 / grey / HD44780                      |
| Communication functions                                   | Direct HVAC connection   | Connection to HVAC Indoor Unit              |
|                                                           | MODBUS (A / B)           | RS-485 communication line                   |
|                                                           | Ethernet                 | 100 Mbps                                    |
|                                                           | RS-232                   | 9600Bps, ASCII                              |
|                                                           | USB Device               | 12 Mbps                                     |
| Maximal allowable wiring length (to BMS) over RS232       |                          | 25 [m] / 82 [ft]                            |
| Maximal allowable wiring length (to BMS) over RS485       |                          | 1000 [m] / 3300 [ft]                        |
| Maximal allowable wiring length (to router) over Ethernet |                          | 137 [m] / 450 [ft]                          |

Table 10 - Specifications