



MULTI V™

DRY CONTACT with ECONOMIZER INTERFACE INSTALLATION MANUAL



V-NET

**Controls for
Multi V™ Systems**


Model PQDSBC1

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Please read carefully and store in a safe place for future reference.
Content familiarity required for proper installation.

The instructions included in this manual must be followed to prevent product malfunction, property damage, injury, or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.

 **WARNING** This symbol indicates that the action or lack thereof could possibly cause death, personal injury, or property damage.

 **Note:** This symbol indicates that the action or lack thereof could possibly cause equipment malfunction or failure.

 This symbol indicates that the following action should not be performed.

A summary of safety precautions is on page 4.

**For more technical materials such as submittals, engineering
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The instructions below must be followed to prevent product malfunction, property damage, injury or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.

⚠ WARNING This symbol indicates that the action or lack thereof could possibly cause death or personal injury.

⚠ Note: This symbol indicates that the action or lack thereof could possibly cause equipment malfunction or failure.

 This symbol indicates that the following action should not be performed.

⚠ WARNING

Do not install, remove, or re-install the unit by yourself (customer). Ask the dealer or an authorized technician to install the unit.

Improper installation by the user may result in water leakage, fire, explosion, electric shock, physical injury or death.

For replacement of an installed unit, always contact an authorized LG service provider.

There is risk of fire, electric shock, explosion, and physical injury or death.

Do not install the unit outside or in any location exposed to rain. Do not install the unit in a humid location or a location exposed to open flame or extreme heat. Do not touch the unit with wet hands.

There is risk of fire, electric shock, explosion, and physical injury or death.

Dispose the packing materials safely.

Tear apart and throw away plastic packaging bags so that children may not play with them and risk suffocation and death.

Do not store or use flammable gas or combustibles near the unit. Do not install the unit in a location that generates oil, steam, salt, sulfuric acid, etc.

There is risk of product failure, fire, explosion, and physical injury or death.

Replace all control box and panel covers.

If cover panels are not installed securely, dust, water or other foreign objects may enter the interior of a disassembled unit, causing fire, electric shock, and physical injury or death.

The information contained in this manual is intended for use by an industry-qualified, experienced, certified electrician familiar with the U.S. National Electric Code (NEC) who is equipped with the proper tools and test instruments.

Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury or

death.

All electric work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions given in this manual.

If the power source capacity is inadequate or the electric work is not performed properly, it may result in fire, electric shock, physical injury or death.

Do not cut, lengthen or shorten the communications and power cable between the dry contact unit and its connected indoor unit. Do not install the unit in a location where the communications and power cable cannot be safely and easily connected between the two units. Do not allow strain on this cable.

Ensure no power is connected to the unit other than as directed in this manual. Remove power from the unit before removing or servicing the unit.

Do not spill water inside of the unit or drop the unit into water. If the unit is immersed in water or other liquid, contact your dealer for support.

This unit and its associated air conditioning system are intended for comfort air conditioning only. Do not use for mission critical applications such as preserving food, flora and fauna, precision instruments or works of art.

Turn the power off at the nearest disconnect before servicing the equipment.

Electrical shock may cause physical injury or death.

Do not supply power to the unit until all installation and pre-commissioning tasks are complete and the commissioning agent indicates it is safe to do so.

Clean up the site after servicing is finished, and check that no metal scraps, screws, or bits of wiring have been left inside or surrounding the unit.

Dry Contact with Economizer Interface

This manual describes how to install and configure the Dry Contact with Economizer Interface, Model PQDSBC1. The dry contact is used with LG Electronics' Variable Refrigerant Flow (VRF) Systems. The Economizer is an indoor unit (IDU) that allows or prevents outside air entering conditioned spaces through the air ducts of the VRF system. To economically help satisfy conditioned zones that call for cooling, the Economizer routes cool outside air through the ducted system to these zones. For zones that call for heating, the dry contact control prevents the Economizer from routing outside air to those spaces. The dry contact controls Economizer operation according to its internal control settings and external control signals.

▲ Note:

Your indoor unit may require a firmware update to be compatible with the Dry Contact with Economizer Interface. Contact your local LG representative for additional information.

Other Dry Contact Functions

In addition to controlling an Economizer, the dry contact can be configured to interface with other types of indoor units such as high and low static ducted units and vertical air handlers. Configure the dry contact as necessary for your system.

Component Parts

Figure 1 shows dry contact components. The dry contact is composed of a plastic case, an internal printed circuit board (PCB), a communications cable (not shown), and mounting hardware (not shown). Table 1 lists and describes the connectors and controls on the internal PCB. These components are connected and configured during the installation procedure.

Figure 1: Dry Contact Components

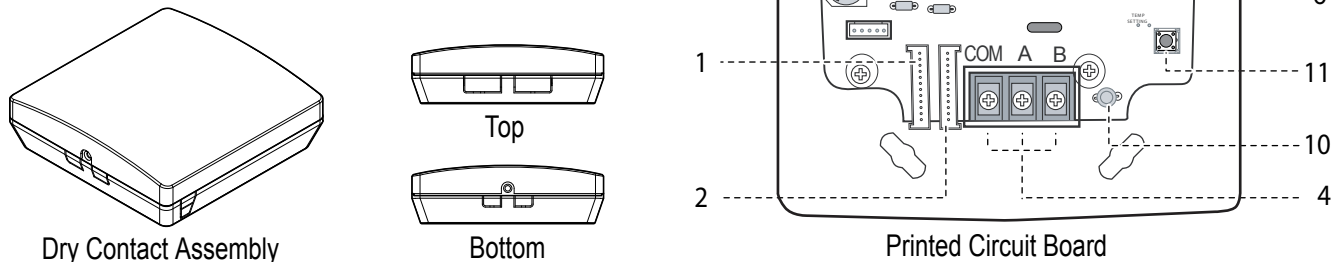


Table 1: PCB Connectors and Controls

| Item | PCB Component | Description |
|------|-----------------|---|
| 1 | CN_INDOOR | Connector for the included dry contact to indoor unit cable. |
| 2 | CN_PI485 | PI485 connector. Used only with PI485 PCB (additional component, not included) |
| 3 | CHANGE_OVER_SW | Must be set to match voltage applied to input terminals A, B, and common. |
| 4 | CN_CONTROL | Terminals for two contact closure input signals: A, B, and common. |
| 5 | CONTROL_MODE_SW | Rotary switch. Selects dry contact unit function. |
| 6 | SETTING_SW | DIP switch. Set as necessary for your system. |
| 7 | TEMP_SETTING | Rotary switch. Selects temperature setpoint for the connected indoor unit. |
| 8* | CN_OUT (O1, O2) | Two terminal connections. In mode E (economizer), outputs Cooling Thermal Mode On signal when cooling is demanded. In all other modes, if indoor unit is operating, contact closes and outputs an indoor unit ON status signal. |
| 9* | CN_OUT (E3, E4) | Two terminal connections. Not used in operating mode E (economizer). In all other operating modes, if the indoor unit has an operational error, contact closes and outputs a signal. |
| 10 | DISPLAY_LED | LED that displays the operational and communication status of the dry contact. |
| 11 | RESET_SW | Pushbutton reset switch. |

* Outputs function differently depending on configured mode.

Safety

Safety of personnel is the primary concern during all procedures. Read and understand the safety summary at the front of this manual. Read and understand this installation procedure before beginning installation. Use the appropriate tools and accessories during installation. Plan your work and do not work alone, if possible. Know how to obtain emergency medical and firefighting assistance.

Select a Location

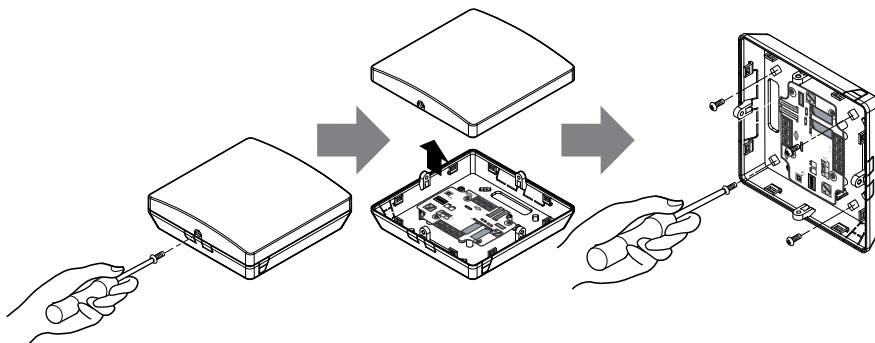
Select the location to install the dry contact. Be sure the location allows for secure mounting of the dry contact case and that the case is not exposed to adverse conditions such as water, moisture, extreme hot or cold, magnetic fields or radio frequency (RF) emissions. The supplied dry contact to IDU communications cable is approximately 30 inches in length. The installation location must allow this cable to be securely and safely connected without binding or strain on connectors.

If used with a wall mounted IDU, the dry contact is typically mounted on the wall near the IDU. Ducted IDUs are typically installed above a ceiling, so wall mounting is usually not possible. In these instances, choose a secure mounting location that is in compliance with local codes.

Install the Dry Contact Case

1. Refer to Figure 2
2. Remove one screw securing the front case to the back case.
3. Locate the four back case mounting screws.
4. Determine the mounting location and how to orient the back case. The back case contains small knockout sections to allow cables to enter. Consider how the dry contact to IDU communications cable will be routed. This cable connects to the CN_INDOOR connector on the dry contact PCB. This cable is approximately 30 inches and must be routed and connected without binding or strain on the connectors.
5. Position the back case as necessary and secure with the four mounting screws. Tighten the screws for secure mounting but do not over tighten. Excessive tightening can deform the case and damage the dry contact.
6. Carefully remove the case knockout for the communications cable.

Figure 2: Install Dry Contact Case



Connect the Communications Cable

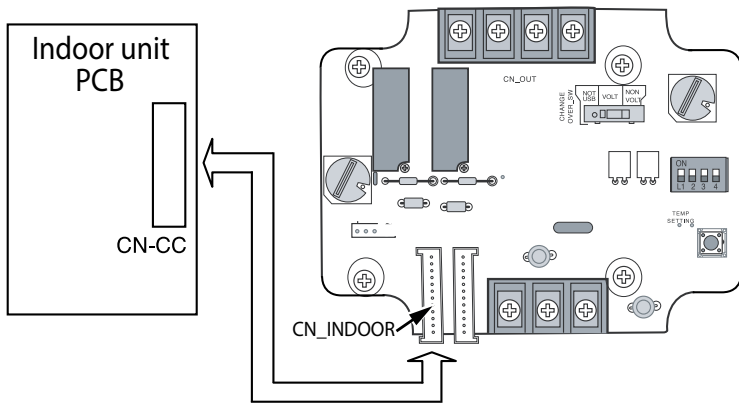
⚠ WARNING

Turn the power off at the nearest disconnect before installing or servicing the equipment.
Electrical shock may cause physical injury or death.

1. Refer to Figure 3.
2. Locate the included dry contact to IDU communications cable.
3. Remove input power to the IDU.
4. Remove the cover of the IDU control box.

5. Determine how the communications cable will be routed in/out of the IDU control box. Typically it is routed through a knockout in the metal control box. Do not route the communications cable through the same knockout as an input power cable. If not already present, install a grommet in the knockout hole to prevent cable damage.
6. Carefully connect one end of the communications cable to the CN_CC connector in the IDU control box.
7. Carefully connect the other end of the communications cable to the CN_INDOOR connector in the dry contact.
8. Reinstall the IDU control box cover.

Figure 3: Connect Communications Cable

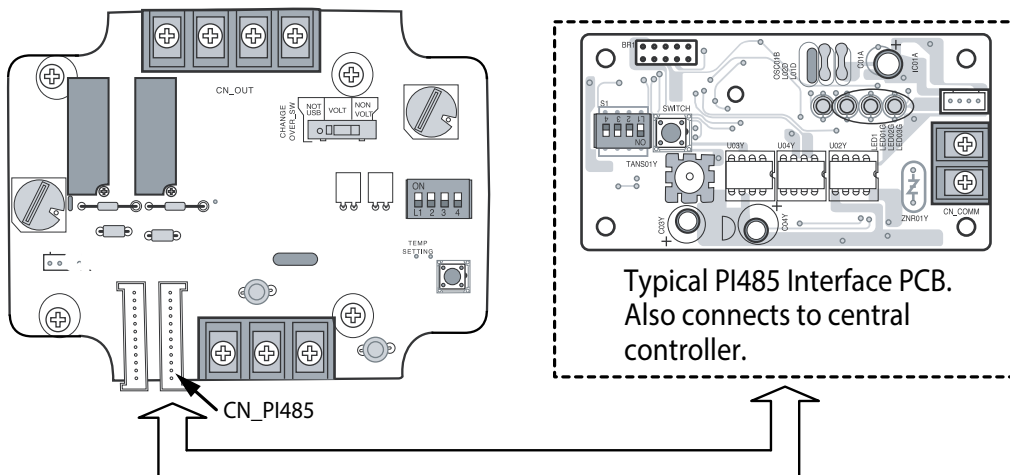


Install the Optional PI485 Module

If your installation includes the optional PI485 module, install it near the dry contact so that its cable can easily reach to the CN_PI485 connector on the dry contact PCB.

1. Refer to Figure 4.
2. Install the PI485 module according to the instructions in its installation manual.
3. Connect the PI485 communications cable as directed in its installation manual.
4. Carefully connect the other end of the communications cable to the CN_PI485 connector on the dry contact PCB. Do not route the communications cable through the same knockout as the power cable.
5. If additional wiring or configuration are required, continue to the following procedures.
6. If you are finished wiring and configuring the dry contact, reapply IDU power, press the dry contact reset switch, and reinstall the dry contact front cover. Refer to Figure 1, item 11.

Figure 4: PI485 Module Installation



Connect Input Signal Cables

The input signal cables connect to the three connection terminal strip on the dry contact PCB. Refer to Figure 1, item 4. There are two possible configurations, with external power and without. Refer to your organizations installation documents for this location to determine which one to use.

⚠ WARNING

Turn the power off at the nearest disconnect before installing or servicing the equipment.
Electrical shock may cause physical injury or death.

Ensure the CHANGE_OVER_SW is positioned correctly for your application.
If voltage is applied when the CHANGE_OVER_SW is positioned to NON VOLT, the dry contact will be damaged.

1. For the no external power application, position the CHANGE_OVER_SW slide switch to NON VOLT
2. Connect the signal wires as shown in Figure 5.
3. For the external power application, position the CHANGE_OVER_SW slide switch to VOLT.
4. Connect the signal wires as shown in Figure 6.
5. If additional wiring or configuration are required, continue to the following procedures.
6. If you are finished wiring and configuring the dry contact, reapply IDU power, press the dry contact reset switch (Figure 1, item 11), and reinstall the dry contact front cover.

Figure 5: Input Signal Cables with No Power Option

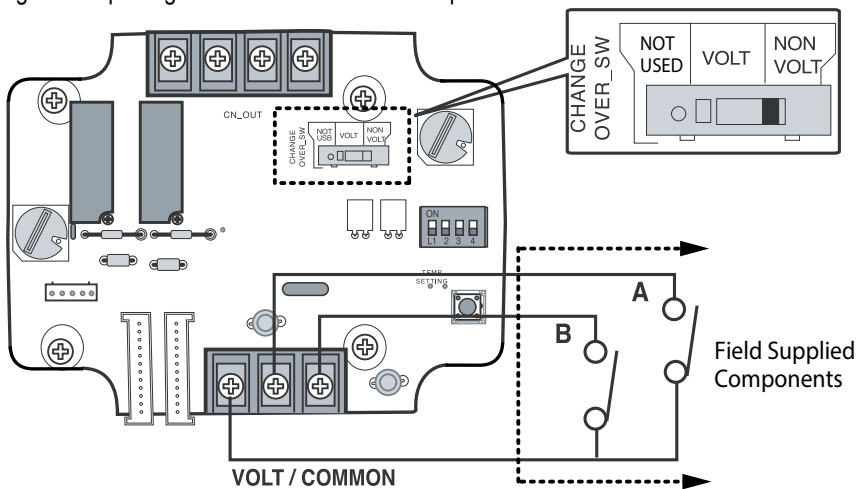
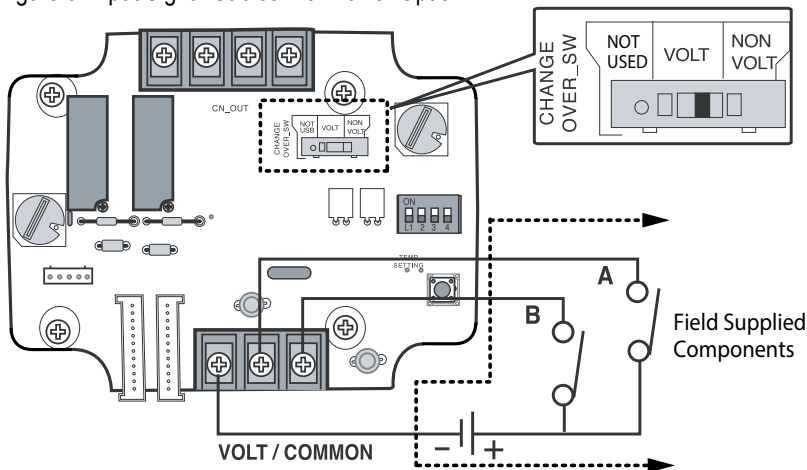


Figure 6: Input Signal Cables with Power Option



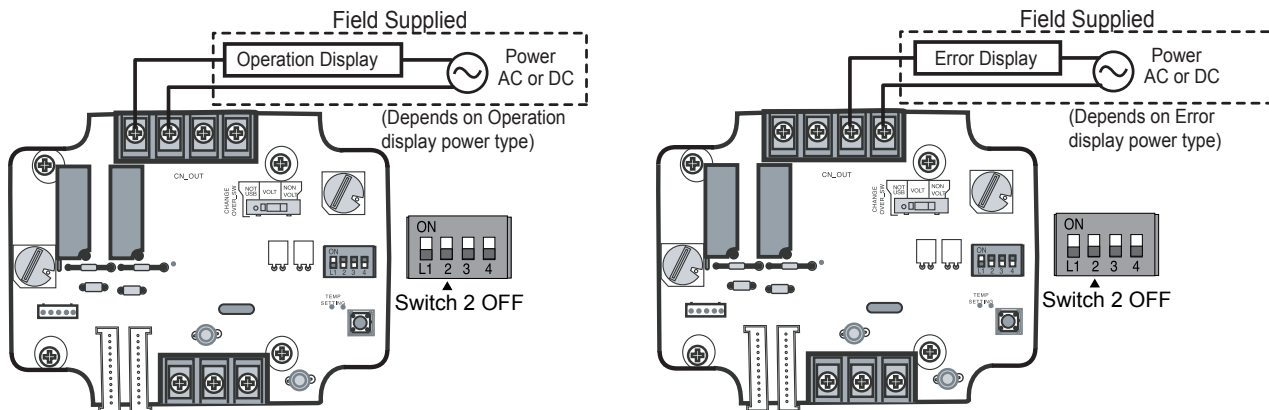
▲ Connect separate external voltage of DC 5V~DC 12V

Connect Output Signal Cables to IDU

Use this procedure for all indoor units except the economizer. The output signal cables connect to the four connection terminal strip on the dry contact PCB. Refer to Figure 1, items 8 and 9. The two connections of item 8 provide an output signal to indicate when the indoor unit is operating. The two connections of item 9 provide an output signal indicating when the indoor unit is in an error state.

1. For any indoor unit except an economizer, connect the output signal wires as shown in Figure 7
2. Position switch 2 of DIP switch SETTING_SW to OFF.
3. If additional wiring or configuration are required, continue to the following procedures.
4. If you are finished wiring and configuring the dry contact, reapply IDU power, press the dry contact reset switch (Figure 1, item 11), and reinstall the dry contact front cover.

Figure 7: Output Signal Cable Connections

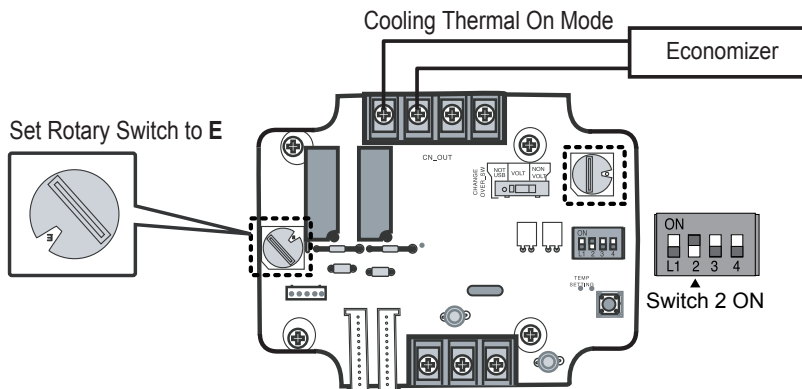


Connect Output Signal Cables to Economizer IDU

Use this procedure with the economizer indoor unit. The output signal cables to the economizer connect to the two connections on the dry contact terminal strip indicated as item 8 on Figure 1. This output signal sends a cooling thermal on signal to the economizer. The two connections of Figure 1, item 9 are not used with the economizer.

1. For the economizer indoor unit, connect the signal wires as shown in Figure 8.
2. Position switch 2 of DIP switch SETTING_SW to ON.
3. If additional wiring or configuration are required, continue to the following procedures.
4. If you are finished wiring and configuring the dry contact, reapply IDU power, press the dry contact reset switch (Figure 1, item 11), and reinstall the dry contact front cover.

Figure 8: Output Signal Cable Connections for Economizer



Configuring the Fixed Setpoint Function

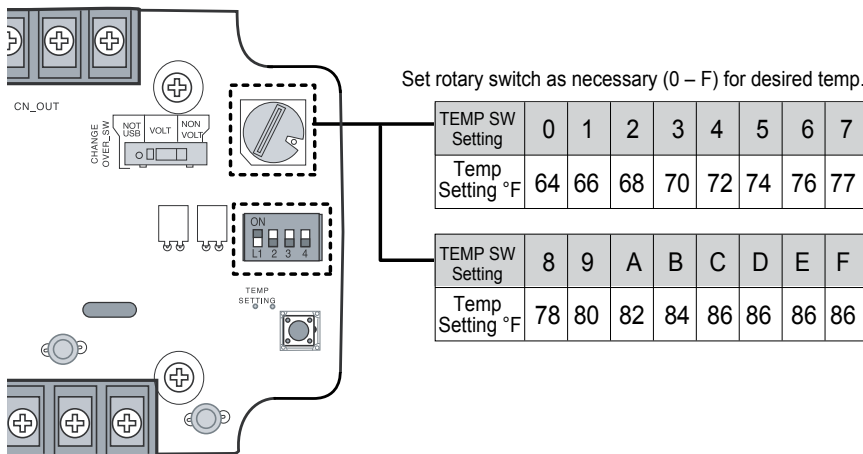
⚠ WARNING

Turn the power off at the nearest disconnect before installing or servicing the equipment.
Electrical shock may cause physical injury or death.

The dry contact allows you to configure a fixed setpoint temperature for the connected indoor unit. This function can be enabled or disabled according to your requirements. When the indoor unit is unlocked, the setpoint temperature can be changed by a system central controller.

1. Ensure power is off before performing this procedure.
2. To disable the fixed setpoint function, position switch 1 of DIP switch SETTING_SW to OFF. Do not perform the remainder of this procedure.
3. To enable the fixed setpoint function, position switch 1 of DIP switch SETTING_SW to ON.
4. For the initial temperature setting, position the rotary switch TEMP_SETTING to 0 (64°F).
5. If additional wiring or configuration are required, continue to the following procedures.
6. If you are finished wiring and configuring the dry contact, reapply power and press the reset switch (Figure 1, item 11).

Figure 9: Configure Fixed Setpoint



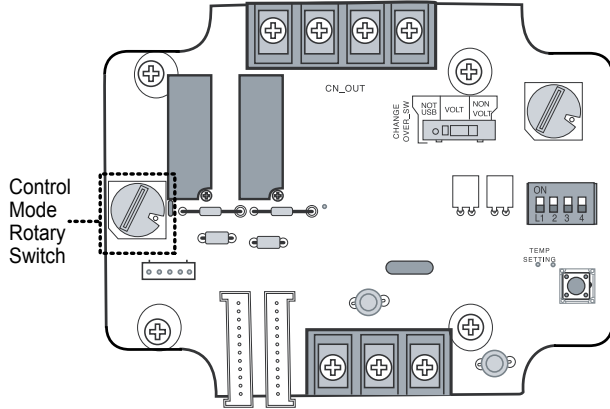
Setting the Control Mode

The dry contact control mode is set with rotary switch CONTROL_MODE_SW on the PCB. Available settings are 0 through E (F is unused). The specific operating mode is selected by the states of Input A and Input B. The two inputs allow four combinations of ON/OFF conditions. The dry contact controls indoor unit operation according to the selected mode when there is a change in the input A and B signals.

1. Ensure power is off before performing this procedure.
2. Position rotary switch CONTROL_MODE_SW as required for your system. Refer to the tables below for details of each mode.
3. If additional wiring or configuration are required, continue to the following procedures.
4. If you are finished wiring and configuring the dry contact, reapply IDU power, press the dry contact reset switch (Figure 1, item 11), and reinstall the dry contact front cover.

Dry Contact for Economizer

Figure 10: Setting the Mode Rotary Switch



▲ Note:

The control source priority for the indoor unit is:

1. Central Controller
2. Dry Contact
3. Wired/Wireless Remote Controller

Control Mode: OFF (0)

Use this setting when the dry contact is installed but not used.

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| 0 | OFF | OFF | Dry contact function is off. No change in indoor unit operation. |
| | ON | OFF | |
| | OFF | ON | |
| | ON | ON | |

General Mode (1 - 6)

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| 1 | OFF | OFF | Indoor unit stopped, locked |
| | ON | OFF | Indoor unit prior operating condition maintained, unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit stopped, locked |
| 2 | OFF | OFF | Indoor unit stopped, locked |
| | ON | OFF | Indoor unit operating, unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit stopped, locked |
| 3 | OFF | OFF | Indoor unit stopped, locked |
| | ON | OFF | Indoor unit stopped, locked |
| | OFF | ON | Indoor unit prior operating condition maintained, unlocked |
| | ON | ON | Indoor unit operating, unlocked |

General Mode (1 - 6) - continued

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| 4 | OFF | OFF | Indoor unit stopped, locked |
| | ON | OFF | Indoor unit stopped, locked |
| | OFF | ON | Indoor unit prior operating condition maintained, unlocked |
| | ON | ON | Indoor unit prior operating condition maintained, unlocked |
| 5 | OFF | OFF | Indoor unit prior operating condition maintained, locked |
| | ON | OFF | Indoor unit prior operating condition maintained, locked |
| | OFF | ON | Indoor unit prior operating condition maintained, locked |
| | ON | ON | Indoor unit prior operating condition maintained, unlocked |
| 6 | OFF | OFF | Indoor unit prior operating condition maintained, locked |
| | ON | OFF | Indoor unit prior operating condition maintained, locked |
| | OFF | ON | Indoor unit prior operating condition maintained, locked |
| | ON | ON | Indoor unit operating, unlocked |

Fan Level Setting Mode (7, 8)

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| 7 | OFF | OFF | Indoor unit fan operating at low level, locked |
| | ON | OFF | Indoor unit fan operating at low level, unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit stopped, unlocked |
| 8 | OFF | OFF | Indoor unit fan operating at low level, locked |
| | ON | OFF | Indoor unit fan operating at low level, unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit operating condition maintained, unlocked |

Power Save Mode (9, A)

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| 9 | OFF | OFF | Indoor unit operating in power save mode, locked |
| | ON | OFF | Indoor unit operating in power save mode, unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit operating not in power save, unlocked |
| A | OFF | OFF | Indoor unit operating in power save mode, locked |
| | ON | OFF | Indoor unit operating in power save mode, unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit stopped, locked |

Compressor Stop Mode (B)

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| B | OFF | OFF | Indoor unit operating (Compressor in stop mode), locked |
| | ON | OFF | Indoor unit prior operating condition maintained (Compressor not in stop mode), unlocked |
| | OFF | ON | Indoor unit stopped, locked |
| | ON | ON | Indoor unit stopped, locked |

Operating Mode Selection (C, D)

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|---|
| C | OFF | OFF | Indoor unit stopped, unlocked |
| | ON | OFF | Indoor unit operating in cool mode / fan high, unlocked |
| | OFF | ON | Indoor unit operating in heat mode / fan high, unlocked |
| | ON | ON | Indoor unit operating in fan high, unlocked |
| D | OFF | OFF | Indoor unit stopped, locked |
| | ON | OFF | Indoor unit operating in cool mode / fan high, locked |
| | OFF | ON | Indoor unit operating in heat mode / fan high, locked |
| | ON | ON | Indoor unit operating in fan high, locked |

Economizer Control Mode (E)

| CONTROL_MODE_SW Setting | Input A | Input B | Operating Mode Description |
|-------------------------|---------|---------|--|
| E | OFF | OFF | Indoor unit prior operating condition maintained, unlocked |
| | ON | OFF | Indoor unit operating with thermal off in cooling mode, unlocked |
| | OFF | ON | Indoor unit prior operating condition maintained, unlocked |
| | ON | ON | Indoor unit operating with thermal off in cooling mode, unlocked |



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