TOSHIBA
Carrier

Installation Manual
24V Thermostat Interface

FOR INSTALLER

Model name:

TCB-IFTH2UUG-UL

- Read this manual before using the TCB- IFTH2UUG-UL 24V Thermostat Interface.
- Refer to installation manuals supplied with Indoor Unit, Remote Controller, and Thermostat for any installation instructions.

English

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Precautions for safety

The following instructions must be observed.

- Carefully read these "Precautions for Safety" before installation, and perform installation work safely.
- These precautions contain important information regarding safety.
- After installation work, carry out an operation trial to confirm that there are no problems, and explain to the customer how to operate and maintain the system. Ask the customer to keep this Installation Manual.

Expressions

⚠Warning	Texts which set off in this manner indicate that failure to adhere to the directions in the warning could result in serious bodily harm (*1) or loss of life if the product is handled improperly.
⚠Caution	Texts which set off in this manner indicate that failure to adhere to the directions in the caution could result in serious bodily injury (*2) or damage (*3) to properties if the product is handled improperly.

*1: Serious bodily harm indicates loss of eyesight, injury, burns, electric shock, bone fracture, poisoning, and other injuries which leave after effect and require hospitalization or long-term treatment as an outpatient.
*2: Bodily injury indicates injury, burns, electric shock, and other injuries which do not require hospitalization or long-term treatment as an outpatient.
*3: Damage to property indicates damage extending to buildings, household effects, domestic livestock, and pets.

Graphic symbols

Prohibited	"⃠" indicates prohibited items. The actual contents of the prohibition are indicated by a picture or text placed inside or next to this graphic symbol.
Compulsory	"❗" indicates compulsory (mandatory) items. The actual contents of the obligation are indicated by a picture or text placed inside or next to this graphic symbol.

⚠ Warning

- **Installation and reinstallation should be performed by your dealer or a qualified electrician.**
  Attempting to carry out installation work on your own, and doing so incorrectly, may result in electric shock or fire.
- **Electrical work must be performed by a qualified electrician in accordance with this Installation Manual. The work must satisfy all local, national and international regulations.**
  Inappropriate work may result in electric shock or fire.
- **Be sure to turn off the power before starting work.**
  Failure to do so may result in electric shock.
- **Use predefined wire and connect them with certainty. Keep the connecting terminal free from external force.**
  Improper wire connection or clamping may result in exothermic, fire or malfunction.

- **Do not modify the unit.**
  Doing so may result in excessive heat or fire.
- **There is a 18V DC circuit separate from a 24V AC circuit on the interface. Do not interconnect the outputs of different class 2 circuits.**

⚠ Caution

- **A double-insulated, separately-shielded, copper conductor with a minimum 600 volt rating must be used between the 24V Thermostat Interface, the Indoor Unit and wired controllers.**
- **Use copper conductors only.**
- **When installing the device in a hospital, communication facility, etc., provide sufficient electrical isolation against electromagnetic interference.**
  Power generators, power inverters, high-frequency medical equipment, or radio communication equipment may interfere with the normal operation of this device. Contrarily, the device may also affect medical treatment, image broadcasting, etc., by radiating electromagnetic noise.
- **Electrical wires must be run without tension.**

- **Do not install the device in a location where leakage of flammable gas may occur.**
  The leaked gas may accumulate around the device and ignite.
- **Do not install the device in environments where large amounts of oil (including machine), sulfidizing gas, acidic chemical spray, or alkaline chemical spray is present.**
  These types of substances may damage internal parts and degrade performances of the device. Such condition of the device may cause electric shock.
- **Do not install the device in a high humidity environment where steam could reach the device.**
  Even though this product is designed to withstand condensation in up to 90% RH environments, long term exposure to condensation may cause a chance for electric shock and/or device malfunction.
- **Avoid direct contact to the main circuit board; also, make sure that dust does not accumulate on the main circuit board.**
- **Do not install this device in a location where direct sunlight can reach or where the temperature may become higher than 40°C (104°F) or lower than 0°C (32°F).**
  If the device is installed in such a location, it may result in malfunctions.
- **Do not submerge this device under water.**
  Doing so may lead to electric shock or may cause malfunctions.

Introduction

■ Overview

The 24V Thermostat Interface is an electronic, incorporated control, which allows VRF (Variable Refrigerant Flow)* and Light Commercial (RAV Units) TOSHIBA Carrier indoor units to utilize 3rd party 24VAC thermostat sold in the US market.

*: U-series, future models and other than U-series (backward compatible)

■ Included Items

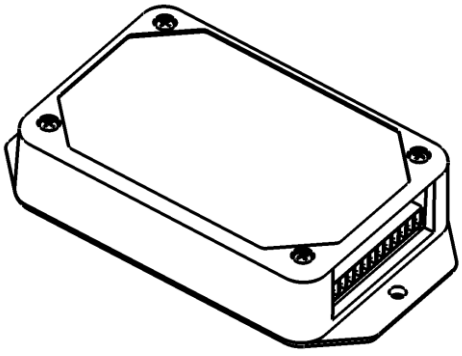
Component	Q'ty	Remarks
24V Thermostat Interface	1	
Wood Screws	2	Kit Mounting Screws #6/ 18X1''
Wall Anchors	2	
Installation Manual	1	

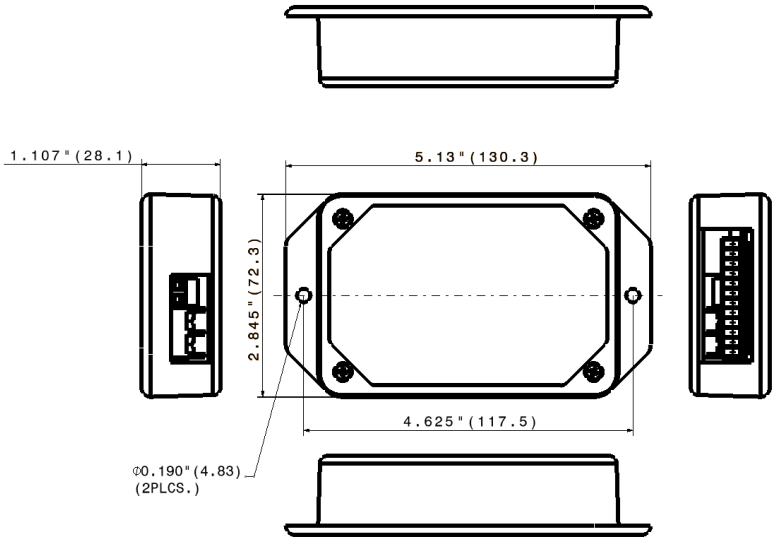
■ Specifications

Power supply	DC18V (+0%, -20%) (provided by an indoor unit), AC24V (±10%) (24V Thermostat Interface circuit; provided by field procured transformer)
Input power	0.5W
Operating current	40mA (DC18V)
Operating temperature range	32 to 104 °F (0°C to 40°C), 10% to 90% RH (no condensation)
Storage temperature range	-4 to 140 °F (−20°C to +60°C), 10% to 90% RH (no condensation)
Dimensions	5.1" (W) x 1.1" (H) x 2.8" (D) inch (130 (W) x 28 (H) x 72 (D) mm)
Weight	0.25 lb (0.113kg)

■ External View (24V Thermostat Interface equipment)

Unit: inch (mm)





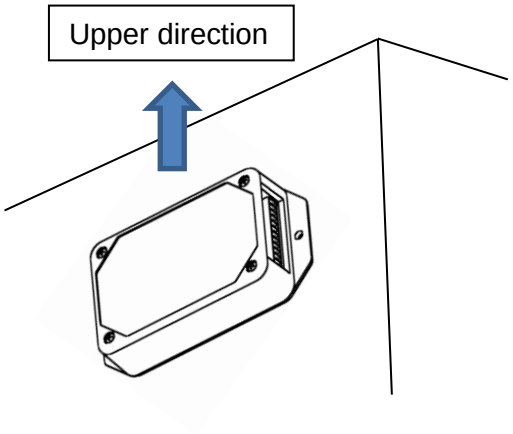
1 Installation

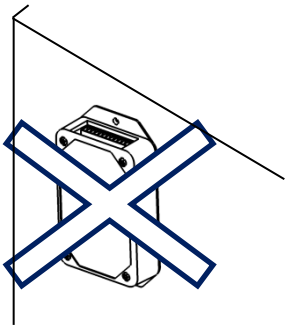
■ 24V Thermostat Interface Installation and Orientation

Install the 24V Thermostat Interface on a flat surface using provided Wood Screws. Make sure that the installation result complies with the local electrical code. The 24V Thermostat Interface is intended for indoor use only.

(1) Wall mount

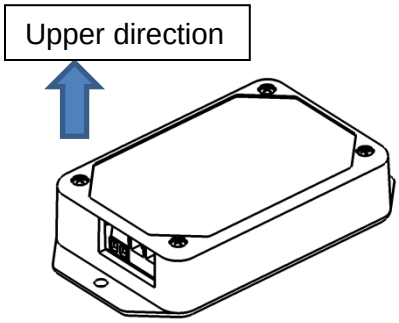
Use the Wood Screws to attach the 24V Thermostat Interface. ⃠ Do not install the 24V Thermostat Interface in a longitudinal direction.





(2) Surface mount

Use the Wood Screws to attach the 24V Thermostat Interface.



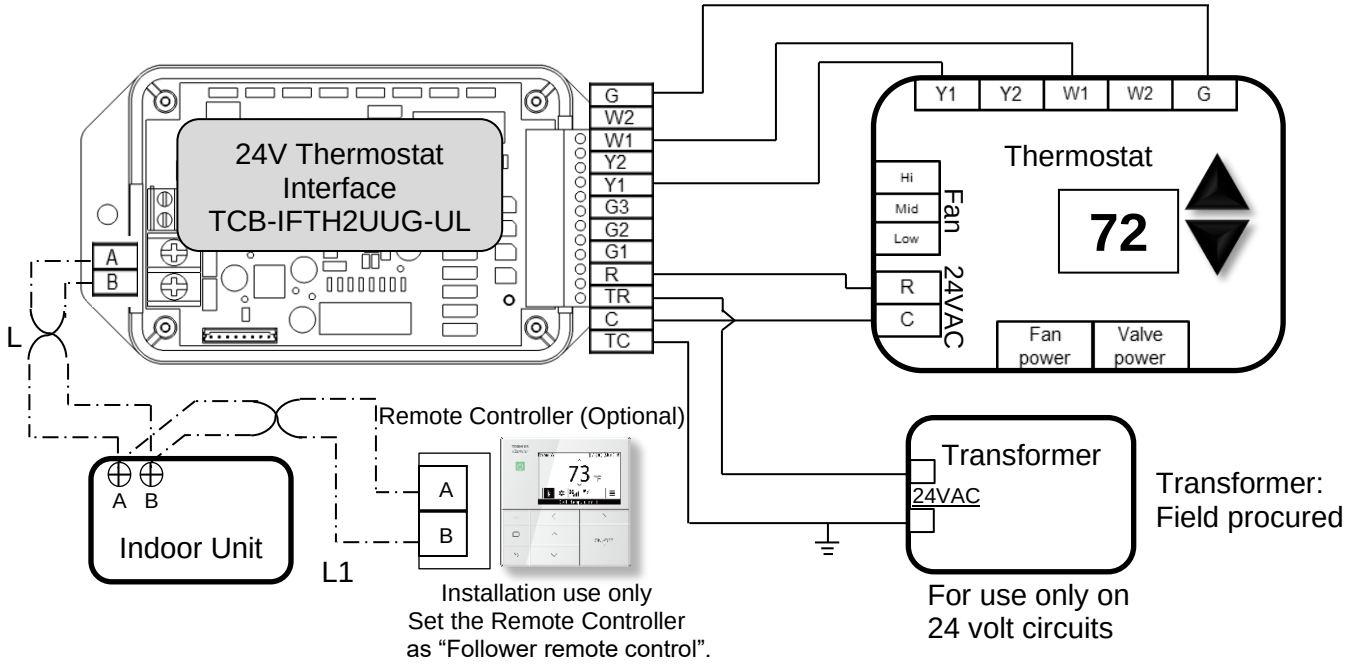
Note: Make sure to comply with local codes and regulations.

■ System Configuration

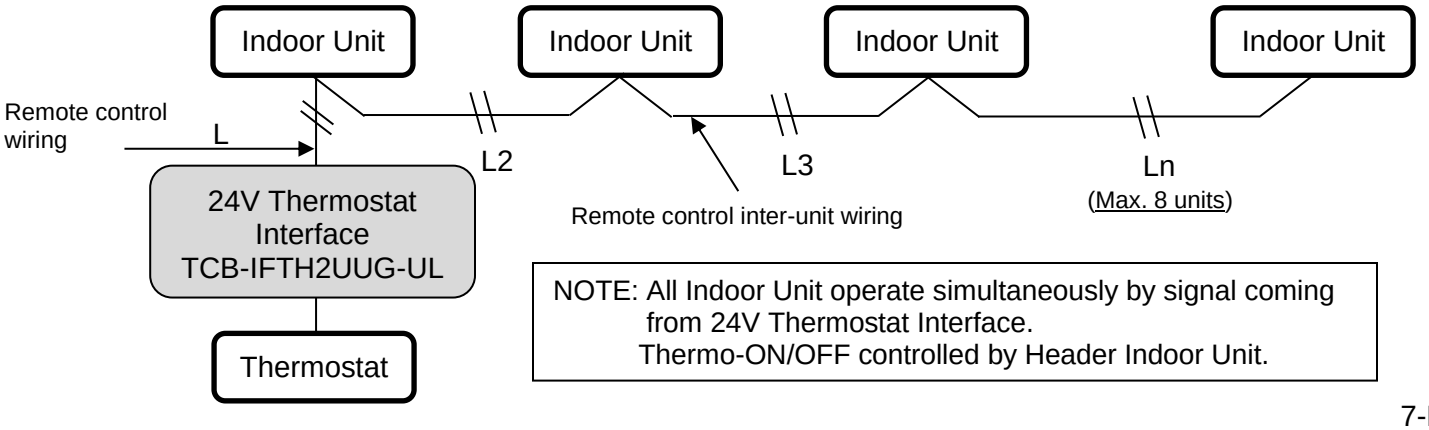
Warning: Thermostat should be configured for conventional single or two stage systems (Refer to Installation Steps and Wiring Example sections below). Refer to the installation manuals supplied with the Indoor Unit, the Remote Controller, and the Thermostat for any installation instructions.

1. All wiring should be Class 2.
2. All wiring shown below should be performed with AWG18 thermostat wire except between the Indoor Unit and the Remote Controller.
3. All wires to be used must satisfy all local and national regulations (Field procured).
4. The wiring between the Indoor Unit, the Remote Controller (optional), and the 24V Thermostat Interface should be performed with AWG20 to AWG14 X 2. Use AWG20 for the group remote controls wiring.
   - Limit the total length of the remote control wiring (L + L1) up to 980 ft (300 m).
   - Limit the total length of the remote control + remote control inter-unit wiring (L + L1 + L2 + … Ln) up to 1640 ft (500 m).
5. W2 and Y2 signals are optional, and may be omitted when a single-stage thermostat is used.
   Note: High/medium/low fan signals are optional, and may not be available on all thermostat models.
6. The Remote Controller is required during the start-up for address setting and diagnostics in case Error codes are shown.
   Set the Remote Controller as “Follower remote control”. Refer to the Installation Manual of the Remote Controller for instructions on configurations of the controller status.

Basic wiring diagram: Single-stage Cooling and Heating



Group remote control wiring



■ Terminal definition of 24V Thermostat Interface

Terminal definition

Terminal	Function
G	Fan
W2	Stage 2 Heating
W1	Stage 1 Heating
Y2	Stage 2 Cooling
Y1	Stage 1 Cooling
G3	High Fan
G2	Medium Fan
G1	Low Fan
R	24VAC (Out)
TR	24VAC (In)
C	Common (Out)
TC	Common (In)

Terminal	Function
A (No polarity)	To Remote Controller
B (No polarity)	To Remote Controller

■ Transformer

Warning: The 24V Thermostat Interface consumes electrical power of 0.5 W (5 VA) and requires 24V (±10%)AC power supply.
Select a reinforced-insulation transformer with proper capacity considering consumption of other connected devices. Improper selection may cause electric shock or fire.

■ Installation Steps

1. Wiring between the Indoor Unit, the Remote Controller, and the 24V Thermostat Interface
   1) Refer to installation manuals supplied with the Indoor Unit and the Remote Controller, and this manual for wiring instructions.
   2) Terminals A and B are interchangeable, i.e., there is no polarity between them.

Warning: Do not connect high voltage power wire to the Terminals A and B.
Do not use a crimp-style connector for the Terminals A and B.

   3) Use AWG20 to AWG14 X 2 wire compliant with local, and national regulations (Field procured).
   4) Set the Remote Controller as “Follower remote control”. Refer to the Installation Manual of the Remote Controller for instructions on configurations of the controller status.

Caution: 24V Thermostat Interface does not allow dual remote control systems.

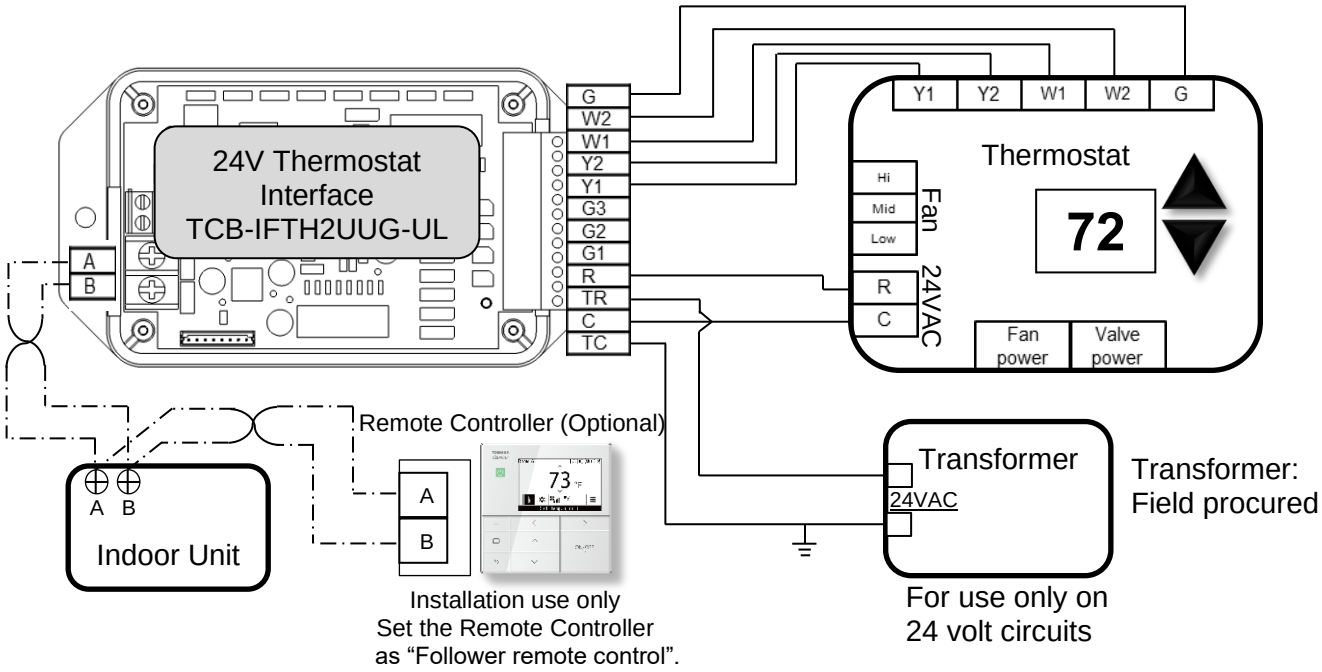
2. Wiring between the 24V Thermostat Interface, the Thermostat, and the Transformer
   1) Refer to installation manuals of the Thermostat and the Transformer, and this manual for wiring instructions.
   2) Use AWG18 wire compliant with local, and national regulations (Field procured).

Warning: Do not connect high voltage power wire to the Terminals G, W2, W1, Y2, Y1, G3, G2, G1, R, TR, C, and TC.
These Terminals are used for 24VAC circuit.

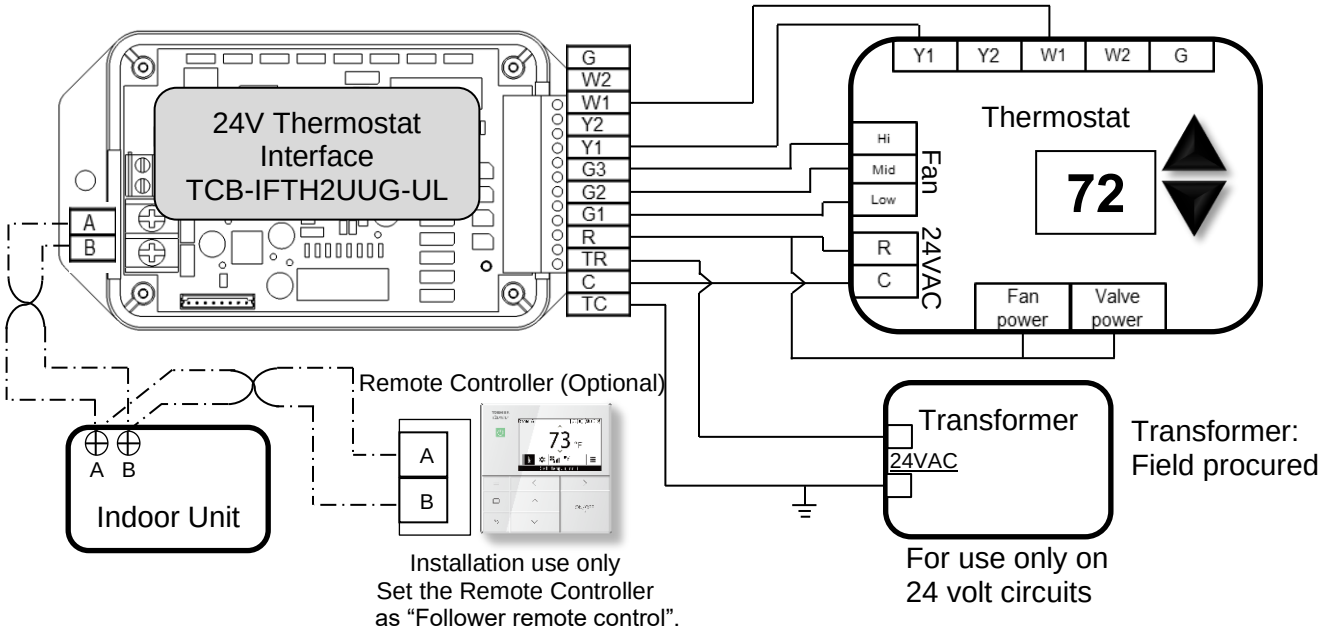
3. Set DIP switches SW01 and SW02 on the main circuit board according to Section “2 Settings” in this manual.
4. Turn the power to the Transformer on and confirm the Thermostat and the 24V Thermostat Interface are powered properly followed by forcing the Thermostat to supply output to the Y1/Y2, W1/W2, and G terminals.

■ Wiring Example

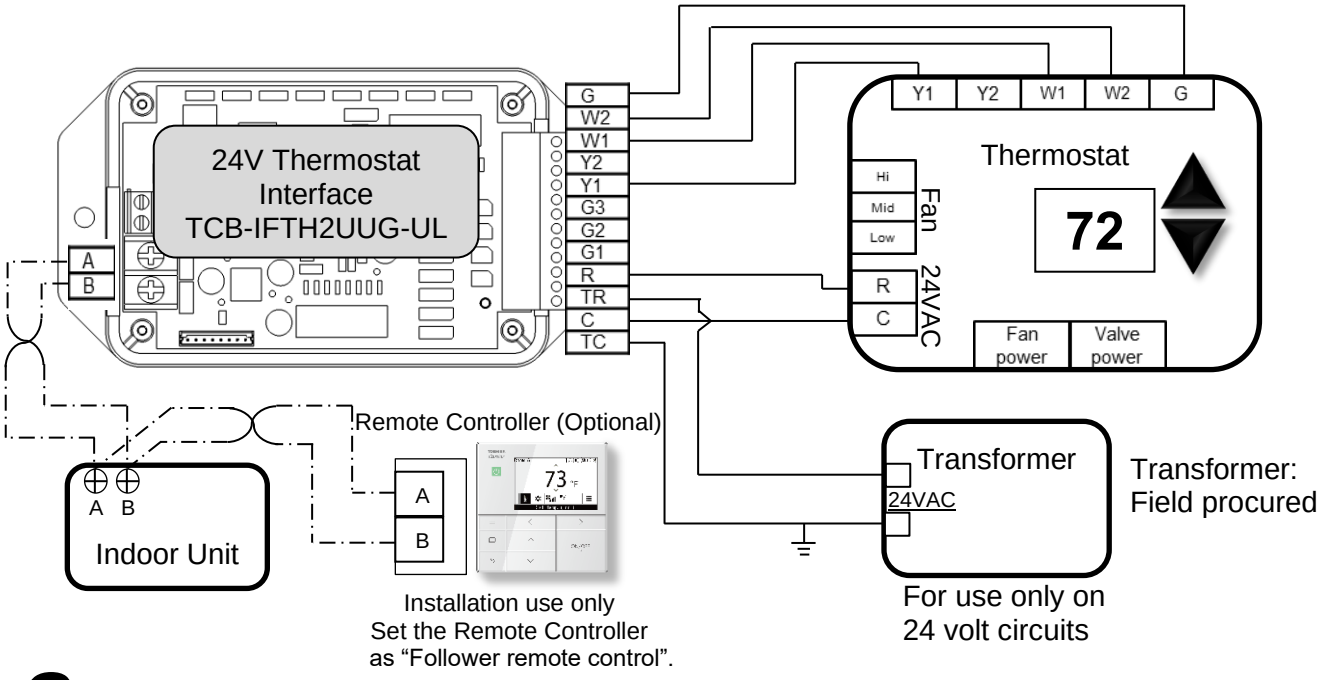
Two-stage Cooling and Heating



Single-stage Cooling and Heating with dedicated three Fan-Speed

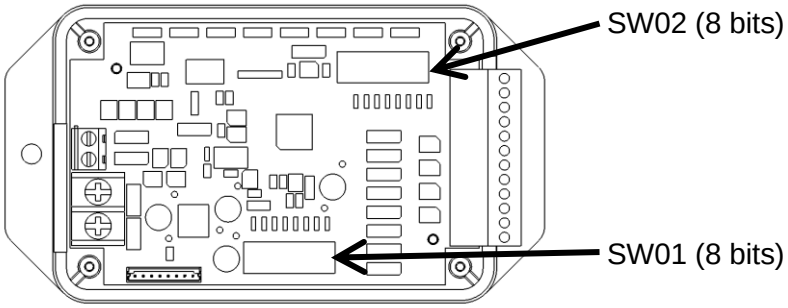


Single-stage Cooling and Two-stage Heating



2 Settings

1. Disconnect any power source before servicing or changing the DIP switches.
2. Remove four screws on the front of the case.
3. Configure SW01 and SW02 based on the following adjustable items. See the diagram below for locations of SW01 and SW02.
4. Replace the four screws removed in step 2 to the original positions.



■ Fan speed (Fan mode) settings

SW01-1, SW01-2: The Indoor Unit's fan speed during Fan mode operation can be set according to the following table.
If G1/G2/G3 input is used, the fan speed will be determined by G1/G2/G3 signal from the Thermostat.

SW01-1	SW01-2	Operation
OFF	OFF	Medium fan speed (Default)
OFF	ON	Low fan speed
ON	OFF	High fan speed
ON	ON	Do not use, reserved

■ Fan speed (Cooling, Heating) settings

SW01-3, SW01-4: The Indoor Unit's fan speed during Cooling or Heating mode operation can be set according to the following table. If G1/G2/G3 input is used, the fan speed will be determined by G1/G2/G3 signal from the Thermostat.

SW01-3	SW01-4	Operation
OFF	OFF	Auto (Default)
OFF	ON	Low fan speed
ON	OFF	Medium fan speed
ON	ON	High fan speed

■ Wind direction (Cooling) settings

SW01-5, SW01-6: The Indoor Unit's wind direction during Cooling mode operation can be set according to the following table.

SW01-5	SW01-6	Operation
OFF	OFF	Determined by Remote Controller setting. (Default)
OFF	ON	F3 (Refer to Owner's Manual of RC)
ON	OFF	F2 (Refer to Owner's Manual of RC)
ON	ON	F1 (Refer to Owner's Manual of RC)



F1 F2 F3

Wind direction Image (Refer to Owner's Manual of Remote Controller)

■ Wind direction (Heating) settings

SW01-7, SW01-8: The Indoor Unit's wind direction during Heating mode operation can be set according to the following table.

SW01-7	SW01-8	Operation
OFF	OFF	Determined by Remote Controller setting. (Default)
OFF	ON	F5 (Refer to Owner's Manual of RC)
ON	OFF	F4 (Refer to Owner's Manual of RC)
ON	ON	F2 (Refer to Owner's Manual of RC)



F2 F4 F5

Wind direction Image (Refer to Owner's Manual of Remote Controller)

■ Temperature control settings (Variable/Fixed)

SW02-1: The 24V Thermostat Interface controls the Indoor Unit by the dry-contact signals from the Thermostat and the room temperature sensed by the Indoor Unit. There are two control modes configurable by the 24V Thermostat Interface. Auto (default) mode provides more comfortable operation by varying the compressor speed. On the other hand, Fixed capacity mode provides On/Off controls instead of varying the compressor speed.

SW02-1	Operation
OFF	Auto (Default), Variable capacity mode
ON	Fixed capacity mode

■ Fixed capacity mode settings

SW02-2, SW02-3

SW02-2, SW02-4: When the system is configured in Fixed capacity mode (SW02-1: ON), the 24V Thermostat Interface provides capacity according to the following table depending on the signals (Y1/Y2, W1/W2) from the Thermostat.

1. Cooling operation

SW02-3	SW02-2	Operation (Capacity)
OFF	OFF	Y1: 75%, Y2: 100% (Default)
OFF	ON	Y1: 50%, Y2: 100%
ON	OFF	Y1: 100%, Y2: 100%
ON	ON	

Note: In case only Y1 signal is used, set SW02-3 at ON position.

2. Heating operation

SW02-4	SW02-2	Operation (Capacity)
OFF	OFF	W1: 75%, W2: 100% (Default)
OFF	ON	W1: 50%, W2: 100%
ON	OFF	W1: 100%, W2: 100%
ON	ON	

Note: In case only W1 signal is used, set SW02-4 at ON position.

■ Minimum Run Timer

SW02-6: The Minimum Run Timer protects the system reliability by maintaining the minimum duration of the system operation based on the following table. The Minimum Run Timer sustains the system operation even if the Thermostat turns off prior to an expiry of the Minimum Run Timer.

SW02-6	Operation
OFF	5 minutes (Default)
ON	10 minutes

Note: SW02-5, SW02-7, and SW02-8 are reserved. Do not change them from OFF position.

3 Usage

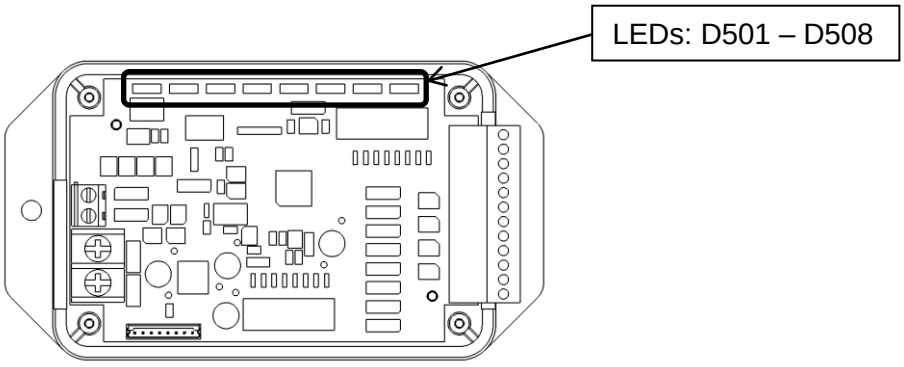
Operate the Thermostat by consulting its user manuals. For proper operation and configuration settings of the Thermostat, consult its user manual.

Cautions:

1. 24V Thermostat Interface is not compatible with dual remote control systems.
2. The Remote Controller (Wired / Wireless) is not needed during normal operation. Therefore, place the Remote Controller (Wired / Wireless) in a location out of reach of users. The Remote Controller (Wired / Wireless) will be used ONLY during installation of the 24V Thermostat Interface.
3. Indoor Unit may restrict the temperature setting based on its specifications. Indoor Unit may suspend its operation to protect the system based on its specifications.
4. The Indoor Unit operates in Fan Mode when only G signal is received from the Thermostat.
5. 24V Thermostat Interface is not compatible with additional control systems such as Web Browser Control, Central Remote Control, BACnet® System, LonWorks® , Touch Screen Controller, etc.

■ LED indicators

1. LEDs (D501-D508) will flash during initial communication between the Indoor Unit and the 24V Thermostat Interface.



2. Meaning of LED indication during normal operation is given in the following table.

LEDs	Color	Remarks
D501	Green	Y1/Y2 input present
D502	Red	W1/W2 input present
D503	Yellow	G input present
D504	Yellow	G1 input present
D505	Yellow	G2 input present
D506	Yellow	G3 input present
D507	Yellow	Communication Error (flashing) *1
D508	Red	Power on / Indoor Unit Error (flashing) *2

*1: Communication error between 24V Thermostat Interface and Indoor Unit.
Duplicated Header remote controller or Follower remote controller.
*2: Error detected by Indoor Unit.

MEMO

MEMO

Carrier Corporation
Carrier Ductless and VRF
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