Thank you very much for purchasing this TOSHIBA / Carrier LN interface.

Please read this manual carefully beforehand for proper installation of the LN interface.

Contents

1 Precautions for safety ...................................................... 2
2 Introduction ........................................................................... 3
3 Before installation ..................................................................... 4
4 Installation ............................................................................... 4
5 Connection of power cables / communication cables / earth wires ............... 5
6 Setting ...................................................................................... 7
7 Test run. .................................................................................... 9

* "LONWORKS®" and "LON" are registered trademarks of Echelon Corporation in United States and other countries.
1 Precautions for safety

• Read these “Precautions for Safety” carefully before installation.
• The precautions described below include important items regarding safety. Observe them without fail. Understand the following details (indications and symbols) before reading the body text, and follow the instructions.
• After the installation work has been completed, perform a test run to check for any problems. Explain how to use and maintain the unit to the customer.
• Ask customer to keep this Manual at accessible place for future reference.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Meaning of Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>![WARNING]</td>
<td>Text set off in this manner indicates 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.</td>
</tr>
<tr>
<td>![CAUTION]</td>
<td>Text set off in this manner indicates that failure to adhere to the directions in the caution could result in serious bodily injury (*2) or damage (*3) to property if the product is handled improperly.</td>
</tr>
</tbody>
</table>

*1: Serious bodily harm indicates loss of eyesight, injury, burns, electric shock, bone fracture, poisoning, and other injuries which leave aftereffect 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.

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Meaning of Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>![ ]</td>
<td>“x” Indicates prohibited items. The actual contents of the prohibition are indicated by a picture or text placed inside or next to the graphic symbol.</td>
</tr>
<tr>
<td>![ ]</td>
<td>“O” Indicates compulsory (mandatory) items. The actual contents of the obligation indicated by a picture or text placed inside or next to the graphic symbol.</td>
</tr>
</tbody>
</table>

**WARNING**

- Ask an authorized dealer or qualified installation professional to install or reinstall this unit. Inappropriate installation 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 all main power supply switches before starting any electrical work. Failure to do so may result in electric shock.

- Do not modify the unit. A fire or an electric shock may occur.

**CAUTION**

- Do not install this unit where flammable gas may leak. If gas leaks and accumulates around the unit, it may cause a fire.
- Perform wiring correctly in accordance with specified the current capacity. Failure to do so may result in short-circuiting, overheating or fire.
- Use predefined cable and connect them certainly. Keep the connecting terminal free from external force. It may cause an exothermic or a fire.


2 Introduction

■ Applicable air conditioners

TCC-LINK compatible air conditioners

■ Applications / functions / features

Applications
The LN interface is used to control TCC-LINK compatible TOSHIBA / Carrier air conditioners by the building control system using LON (Local Operating Network).

Functions
The LN interface converts signals between TCC-LINK signals for air conditioners and LONWORKS® signals.

Features
The LN interface enables various settings such as air conditioner operation stop, temperature, operation mode switching by the building control system, as well as monitoring of operating status, room temperature, various settings, etc.
One LN interface has a capacity to control indoor units of up to 64 units.
A free topology FT-X1 transceiver is used as the LONWORKS® transceiver (also communicatable with FTT-10A).

■ Specifications

<table>
<thead>
<tr>
<th>Name</th>
<th>LN interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>TCB-IFLN642TLUL</td>
</tr>
<tr>
<td>Power supply</td>
<td>120 VAC, 60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>5 W</td>
</tr>
<tr>
<td>Number of connectable indoor units</td>
<td>64 units</td>
</tr>
<tr>
<td>Operating temperature / humidity</td>
<td>32 to 104 °F (0 to 40 °C), 10 to 90% RH (no condensation)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-4 to 140 °F (-20 to +60 °C)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>2.59&quot; (H) x 7.59&quot; (W) x 9.68&quot; (D) inch (66 (H) x 193 (W) x 246 (D) mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>2.98 lb (1.35 kg)</td>
</tr>
</tbody>
</table>

■ External view

Unit: inch (mm)
3 Before installation

Check the following package contents.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LN interface</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Installation Manual</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Screw</td>
<td>4</td>
<td>5/32&quot; x 0.47&quot; (M4 x 12 mm) tapping screws</td>
</tr>
</tbody>
</table>

Use the following wiring materials to connect the signal lines and power lines. (Locally procured)

<table>
<thead>
<tr>
<th>No.</th>
<th>Line</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>For TCC-LINK</td>
<td>2-core shield wires</td>
<td>Wire size AWG16 (1.25 mm²), 3200 ft (1000 m) max. (total length including air conditioner area)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Length AWG14 (2.00 mm²), 6500 ft (2000 m) max.</td>
</tr>
<tr>
<td>2</td>
<td>For LonWorks®</td>
<td>Twisted pair shield cable (dedicated cable or equivalent)</td>
<td>Wire size AWG21 (0.65 mm) x 1P</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Free topology: 1600 ft (500 m) max. (total length)</td>
<td>Bus topology: 3200 ft (1000 m) max.</td>
</tr>
<tr>
<td>3</td>
<td>For power</td>
<td>UL, CSA approved power supply wire</td>
<td>Wire size AWG18 (0.75 mm²), 160 ft (50 m) max.</td>
</tr>
</tbody>
</table>

4 Installation

**Installation method and orientation**

There are five installation methods as shown in the figure: surface mount and wall mount.

Do not install the unit in any other orientation.

Use the attached screws.

**REQUIREMENT**

Do not install the unit in any of the following places.

- Humid or wet place
- Dusty place
- Place exposed to direct sunlight or at a high temperature
- Place where there is a TV set or radio within one meter
- Place exposed to rain (outdoors, under eaves, etc.)

**Installation space and maintenance space**

A side space for connecting through cable inlets and an upper space for maintenance must be reserved before installation.

The other sides can be adjacent to surrounding objects.
5 Connection of power cables / communication cables / earth wires

Connect power cables, communication cables, and earth wires to the specified terminals on the terminal block.

**Length of stripped communication cable**

1.97" (50) 0.39" (10)

**Length of stripped power cable**

1.39" (35) 0.39" (10)

The TCC-LINK communication cable must be earthed on the air conditioner. Do not connect the shield wire to the terminal block. It should be open and insulated.

Connect the shield wire of the LonWorks communication cable to the earth terminal of the chassis. Do not connect the shield wire to the terminal block. It should be open and insulated.

Connect the earth wire of the LonWorks communication cable to the earth on the upper system side. Do not connect the shield wire to the terminal block. It should be open and insulated.

**REQUIREMENT**

- Disconnect the appliance from the main power supply.
  This appliance must be connected to the main power supply by a circuit breaker or switch with a contact separation of at least 3 mm.
- The TCC-LINK communication cable and the LonWorks communication cable have no polarity.
- Fasten the screws to the terminal with torque of 0.5 Nm.
The following describes a connection example on the system.

## Terminator resistor setting

### TCC-LINK terminator resistor
The TCC-LINK terminator resistor is set on the air conditioner side. 
(See “6 Setting” for setting.)

### LON terminator resistor
The LON terminator resistor is set on the upper LONWORKS® system side.

## Shield grounding of communication cables

### TCC-LINK communication cable
Do not connect the shield wire to the terminal block. It should be open and insulated. The TCC-LINK communication cable must be earthed on the air conditioner.

### LONWORKS® communication cable
Do not connect the shield wire to the terminal block. It should be open and insulated. Connect the shield wire of the LONWORKS communication cable to the earth on the upper system side.
6 Setting

The following settings are necessary to use the LN interface.

**TCC-LINK**

- **SW1 / SW2** Set the number of indoor units to be connected. Set the maximum of the indoor unit central control address according to the table below. The factory setting is “3F” (64 units connected).

**REQUIREMENT**

The set data is read only when the power is turned on. When changing the SW1 / SW2 setting, push the reset switch SW6 after setting.

(*) Set the indoor unit central control address from 1 to 64 consecutively. This means that the maximum of the central control address equals the number of connected indoor units. However, if an address is omitted, the maximum of the central control address differs from the number of connected indoor units. In this case, set the maximum of the central control address according to the table below.

**Note:**

The system works normally when the set value is larger than the maximum. However, it will result in communication loss.

### Indoor unit central control address and SW1 / SW2 setting

<table>
<thead>
<tr>
<th>Indoor unit central control address</th>
<th>SW1</th>
<th>SW2</th>
<th>Indoor unit central control address</th>
<th>SW1</th>
<th>SW2</th>
<th>Indoor unit central control address</th>
<th>SW1</th>
<th>SW2</th>
<th>Indoor unit central control address</th>
<th>SW1</th>
<th>SW2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0 0 17 1 0 33 2 0 49 3 0</td>
<td></td>
<td></td>
<td>2 0 1 18 1 1 34 2 1 50 3 1</td>
<td></td>
<td></td>
<td>3 0 2 19 1 2 35 2 2 51 3 2</td>
<td></td>
<td></td>
<td>4 0 3 20 1 3 36 2 3 52 3 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LONWORKS® LN INTERFACE

- SW3  Test switch (not used for normal operation, all OFF)
- SW4  Test switch (not used for normal operation)
- SW5  Used to set TCC-LINK terminator resistor.
        The TCC-LINK terminator resistor is set on the air conditioner side, and
        is not set here. Set SW5 to “Open”.

- SW6  Reset switch
        When changing the setting of the number of connected indoor units with SW1 and SW2, push this reset
        switch after setting to read the set value.

LONWORKS® system

LONWORKS® peculiar settings called commissioning and binding are necessary.
A specific tool is used for the setting. Ask a professional engineer for this process.

- SW8  Service pin for LONWORKS® system
        Used for Commissioning with the upper LONWORKS® system.
7 Test run

REQUIREMENT

• Be sure to specify each unique central control address of the indoor unit.
• Be sure to push the reset switch, SW6 on the LN interface after changing or adding the central control address of the indoor unit.

Check the communication status between LN interface and indoor units. It can be checked even when the LONWORKS® system is not running.
By using SW1, SW2, and SW3, check the communication status of each connected indoor unit with LED4 and LED5.

■ Checking TCC-LINK communication status

Set bit 2 of SW3 to “ON” during normal operation.
Set the central control address of the target indoor unit with SW1 and SW2 according to “Indoor unit central control address and SW1 / SW2 setting”

Example:
When checking communication status of indoor unit of central control address 25:
Set bit 2 of SW3 to “ON”, SW1 to “1”, and SW2 to “8”.

■ Indication of TCC-LINK communication status

LED4 and LED 5 show communication status of the indoor unit selected by SW1 and SW2.

<table>
<thead>
<tr>
<th>TCC-LINK communication status</th>
<th>LED5</th>
<th>LED4</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>ON</td>
<td>ON</td>
<td>Communication with the indoor unit was established previously, but is disabled currently.</td>
</tr>
<tr>
<td>No indoor unit</td>
<td>OFF</td>
<td>ON</td>
<td>Communication with the indoor unit has never been established.</td>
</tr>
<tr>
<td>Invalid indoor unit</td>
<td>OFF</td>
<td>OFF</td>
<td>More indoor units are connected than the LN interface can control.</td>
</tr>
</tbody>
</table>

■ End of TCC-LINK communication status check

Re-set SW1 and SW2 to the number of connected indoor units, and set bit2 of SW3 to “OFF”.

REQUIREMENT
Be sure to re-set SW1 and SW2 correctly.
Wrong setting may result in a malfunction when the unit is reset.
LED indication during normal operation

<table>
<thead>
<tr>
<th>LED</th>
<th>Normal operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED1</td>
<td><strong>POWER</strong> Power indicator Lights while the power is on.</td>
</tr>
<tr>
<td>LED2</td>
<td><strong>TCC-LINK</strong> TCC-LINK communication status indicator Blinks during TCC-LINK communication.</td>
</tr>
<tr>
<td>LED3</td>
<td><strong>USB</strong> Not used</td>
</tr>
<tr>
<td>LED4</td>
<td><strong>BUSY</strong> TCC-LINK busy indicator Lights temporarily when TCC-LINK is busy (during auto address setting of an air conditioner, etc.). Communication restarts soon.</td>
</tr>
<tr>
<td>LED5</td>
<td><strong>TEST</strong> Test indicator Used in the test mode.</td>
</tr>
<tr>
<td>LED6</td>
<td><strong>UP-LINK</strong> LonWorks® communication status indicator Blinks during LonWorks® communication.</td>
</tr>
<tr>
<td>LED7</td>
<td><strong>RESET</strong> Reset indicator Lights when reset operation is performed.</td>
</tr>
<tr>
<td>LED8</td>
<td><strong>SERVICE</strong> LonWorks® indicator</td>
</tr>
</tbody>
</table>

(*) Ask the manufacturer of the upper system for test run check of the LonWorks® system.