

TOSHIBA

Carrier

LONWORKS® LN INTERFACE

Installation Manual

Model name:

TCB-IFLN642TLUL

- Thank you very much for purchasing this TOSHIBA / Carrier LN interface.
- Please read this manual carefully beforehand for proper installation of the LN interface.



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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.

Indication	Meaning of Indication
 WARNING	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.
 CAUTION	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.



- *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.

Symbols	Meaning of Symbols
	“  ” Indicates prohibited items. The actual contents of the prohibition are indicated by a picture or text placed inside or next to the graphic symbol.
	“  ” Indicates compulsory (mandatory) items. The actual contents of the obligation indicated by a picture or text placed inside or next to the graphic symbol.

WARNING

	<ul style="list-style-type: none"> • 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.
	<ul style="list-style-type: none"> • Do not modify the unit. A fire or an electric shock may occur.

CAUTION

	<ul style="list-style-type: none"> • Do not install this unit where flammable gas may leak. If gas leaks and accumulates around the unit, it may cause a fire.
	<ul style="list-style-type: none"> • 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.

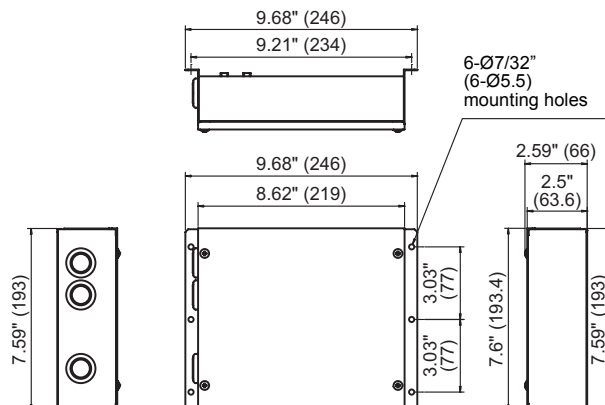
A free topology FT-X1 transceiver is used as the LONWORKS® transceiver (also communicatable with FTT-10A).

■ Specifications

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

■ External view

Unit: inch (mm)



3 Before installation

Check the following package contents.

No.	Item	Quantity	Remarks
1	LN interface	1	
2	Installation Manual	1	
3	Screw	4	5/32" x 0.47" (M4 x 12 mm) tapping screws

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

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

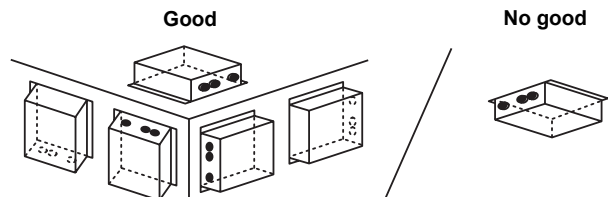
4 Installation

■ 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

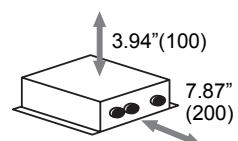
Do not install the unit in any of the following places.

- 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.

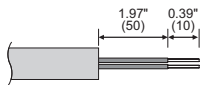
The other sides can be adjacent to surrounding objects.



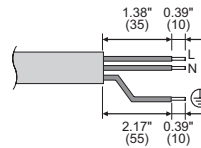
5 Connection of power cables / communication cables / earth wires

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

Length of stripped communication cable

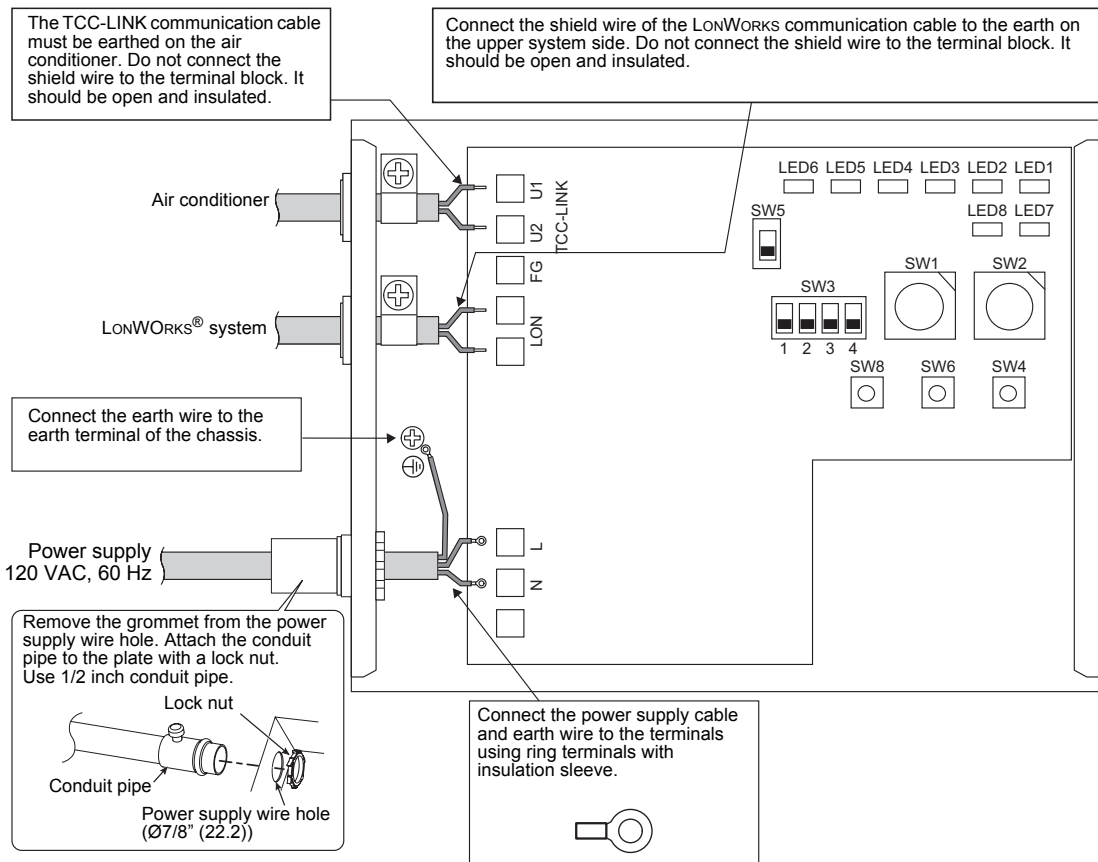


Length of stripped power cable



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.

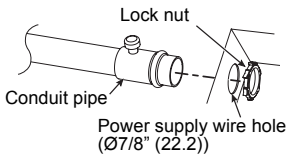
Connect the shield wire of the LONWORKS communication cable to the earth on the upper system side. Do not connect the shield wire to the terminal block. It should be open and insulated.



Connect the earth wire to the earth terminal of the chassis.

Power supply
120 VAC, 60 Hz

Remove the grommet from the power supply wire hole. Attach the conduit pipe to the plate with a lock nut. Use 1/2 inch conduit pipe.



Connect the power supply cable and earth wire to the terminals using ring terminals with insulation sleeve.



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.

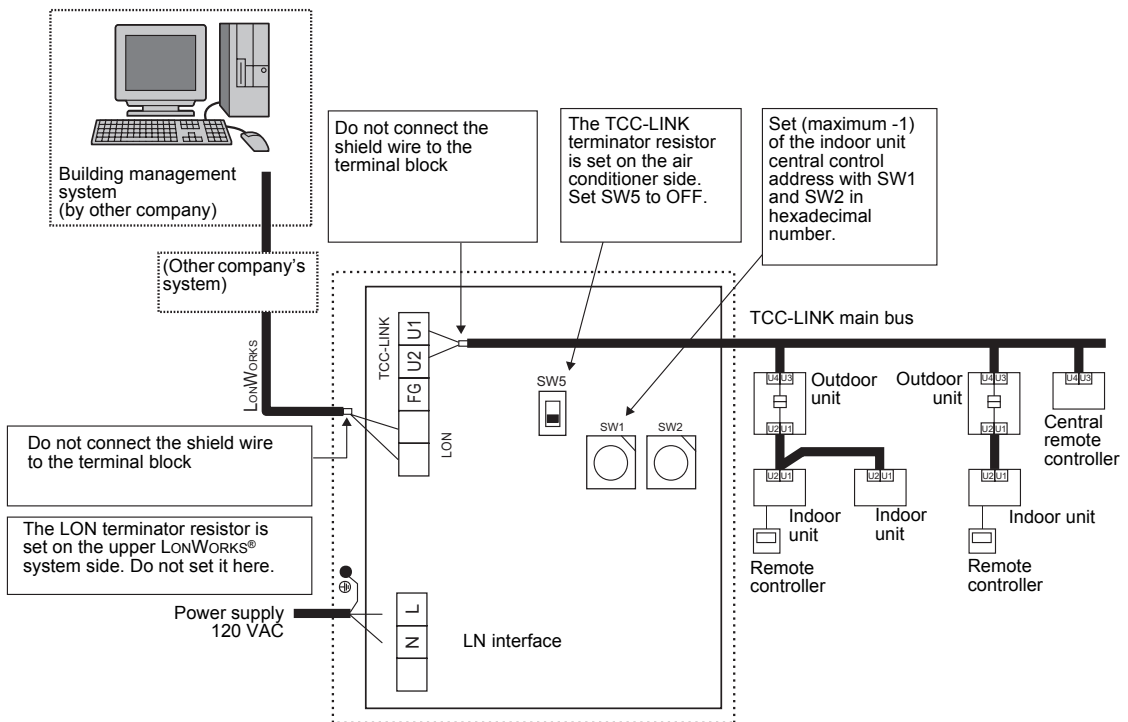
■ Shield grounding of communication cables

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

Indoor unit central control address	SW1	SW2	Indoor unit central control address	SW1	SW2	Indoor unit central control address	SW1	SW2	Indoor unit central control address	SW1	SW2
1	0	0	17	1	0	33	2	0	49	3	0
2	0	1	18	1	1	34	2	1	50	3	1
3	0	2	19	1	2	35	2	2	51	3	2
4	0	3	20	1	3	36	2	3	52	3	3
5	0	4	21	1	4	37	2	4	53	3	4
6	0	5	22	1	5	38	2	5	54	3	5
7	0	6	23	1	6	39	2	6	55	3	6
8	0	7	24	1	7	40	2	7	56	3	7
9	0	8	25	1	8	41	2	8	57	3	8
10	0	9	26	1	9	42	2	9	58	3	9
11	0	A	27	1	A	43	2	A	59	3	A
12	0	B	28	1	B	44	2	B	60	3	B
13	0	C	29	1	C	45	2	C	61	3	C
14	0	D	30	1	D	46	2	D	62	3	D
15	0	E	31	1	E	47	2	E	63	3	E
16	0	F	32	1	F	48	2	F	64	3	F

- 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".

SW5 TCC-LINK terminator resistor select switch	
ON 	ON 
100 ohm	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.

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

■ 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

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

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

