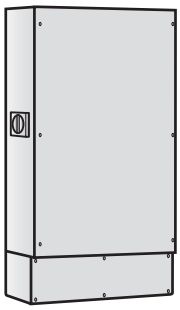
For Installers

TABUCHI ELECTRIC



Installation Manual

Hybrid Solar Inverter (5.5 kW) (For Outdoor Installation)

Product Number : THE-S55P3BB-USW
: THD-S55P3BB-US
: THD-S55P3B-US

- The content in this Installation Manual is meant for installers.
- After installation/configuration, give this manual to the person responsible for maintenance and inspection and store it in a safe place.

Thank you for purchasing this product from Tabuchi Electric.

- The inverter is is a grid support utility interactive inverter.
  The inverter has been tested and certified to be compliant with UL 1741 SA.
  If not setting UL 1741 SA, the Inverter can apply the Institute of Electrical and Electronics Engineers (IEEE) or Hawaiian Electric Company (HECO) settings (refer to pages 48 - 49).
- This product must be correctly installed in order for it to perform and function sufficiently, and to ensure safety.
- Be sure to read these instructions prior to installing the product.
- Be sure to read the section “IMPORTANT SAFETY INSTRUCTIONS” and “Installation Precautions” (Pages 2 - 7)
- To ensure safety, have a qualified person perform installation wiring in accordance with laws and regulations.

Table of Contents

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the THE-S55P3BB-USW, THD-S55P3BB-US and THD-S55P3B-US.
This manual contains important instructions that must be followed during installation and maintenance.
The product is designed and tested in accordance with international safety requirements, however as with all electrical and electronic equipment, certain precautions must be observed when installing and/or operating this product.
To reduce the risk of personal injury and to ensure the safe installation and operation of this product, carefully read and follow all instructions, caution statements, and warnings in this manual.

Product Safety Warnings

The following symbols are used as safety indicators on this product. The meanings of these symbols are explained below.

Symbol	Description
	Dangerous Voltage Warning The symbol of a lightning bolt with an arrow inside of a triangle notifies the user that there is a risk of electric shock. This product uses high levels of voltage and the parts inside this product may cause personal injury due to electric shock. All work performed on this product must be as described in the documentation for this product.
	CAUTION: Hot Surface This product heats up during operation. Do not touch the product while it is in operation. Observe all operating instructions.

General Warnings

THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY.
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT SPECIFIED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

All electrical installations must be made in accordance with the local and National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.
This document does not and is not intended to replace any local, state, provincial, federal or national laws, regulation or codes applicable to the installation and use of this product, including without limitation applicable electrical safety codes.
All installations must conform with the laws, regulations, codes and standards applicable in the jurisdiction of installation.
TABUCHI ELECTRIC assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.
This product contains no user-serviceable parts. For all repairs and maintenance, always return the unit to an authorized TABUCHI ELECTRIC Service Center.
Before installing or using the product, read all of the instructions, cautions, and warnings in this manual. Before connecting the product to the electrical utility grid, contact the local utility company. Only qualified technical persons are allowed to connect this product to the utility grid. Wiring of the product must only be performed by qualified technical persons. The safety precautions in this manual do not replace the safety regulations enforced in the country where this product is installed. Maintenance must be carried out according to the maintenance section of this manual.
Do not use the equipment if any operational anomalies are found. Liabilities associated with commercial components are delegated to the respective manufacturers.

“THD-S55P3B-US” should not be connected to the storage battery other than “EOW-LB100-PNUS”.
“THE-S55P3BB-USW” and “THD-S55P3BB-US” should not be connected to the connection box other than “TOD-BCU-PNUS2” dedicated to “EOW-LB100-PNUS2”.
EOW-LB100-PNUS2 / EOW-LB100-PNUS: Lithium-ion Storage Battery
Rated Capacity: 114.48 Ah
Rated input/output: 86.4 V
Max. output (discharging) current: 26 A
Grounding configuration: ungrounded
The battery installation must be done in accordance with storage battery rules of National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.
The user should not exchange or relocate the storage battery. For information on recycling and discarding dead batteries, contact the vendor or the installer.

■ The symbols below indicate the potential hazards of improper installation or use of this product.

⚠ **WARNING**	May result in serious injury or death.
⚠ **CAUTION**	May result in minor injury or property damage.

■ The symbols below indicate prohibited use of this product and mandatory safety precautions.

	Prohibited use of this product.
	Mandatory safety precautions.

⚠ WARNING

PROHIBITED USE	• **Do not short-circuit the positive (+) terminal cables (black) or negative (-) terminal cables (white) of the solar panels, storage battery and the Connection Box.** Short-circuits may cause a fire or electric shock.	MANDATORY	• **During installation and wiring, follow all safety precautions.** Failure to do so may result in electric shock or equipment failure. ・Keep all switches in the OFF position until wiring is completed. This includes DC Switch-disconnector outside of the inverter, breakers in Backup Load Panel, grid-tied breaker in the ELECTRICAL SERVICE ENTRANCE, and the switch inside the storage battery. ・Confirm there are no live voltages before commencing installation. ・Do not stand on wet ground or work with wet hands or body parts. ・Do not damage the wire sheathing.
MANDATORY	• **Wear protective gloves and use electrically insulated tools during installation and when installing electrical wiring.** Unprotected hands may result in electric shock or injury.		• **High short circuit current from the battery may result in electric shock or burn. Observe proper precautions.**

⚠ CAUTION

PROHIBITED USE	• **Do not drill or cut entry holes in the inverter.** Debris from drilling may adhere to the circuit boards resulting in fire or equipment failure.	MANDATORY	• **Use the recommended wire gauge and connect wiring to the terminal blocks using the specified crimp terminal.** Inadequate wiring materials and connections may result in fire or equipment failure.
PROHIBITED USE	• **Do not mix up the DC wires from the solar panels and the storage battery with the AC wires from the grid.** Incorrect wiring may damage the equipment.	MANDATORY	• **Seal wiring holes on the inverter to protect against weather and pests.** Fire and/or equipment trouble may occur.
MANDATORY	• **Install the inverter on a surface that can withstand the weight of the product.** **Reinforce walls if necessary.** **Installation should be completed by two or more qualified professionals.** Inadequate installation may cause the inverter to tip over or incur other types of damage.	MANDATORY	• **Install the inverter in well-ventilated areas.** Poor ventilation may cause fire.
		MANDATORY	• **Observe IMPORTANT SAFETY INSTRUCTIONS (Page 2).** Fire or accidents may occur if not followed.

Installation Precautions

Electrical Connection Warnings

This grid-tied inverter system operates only when properly connected to the AC utility grid.
Utility interconnection may require approval from the authority having jurisdiction.
Before connecting this inverter to the AC utility grid, contact the local utility company to receive proper approval.
Connection to the AC utility grid must only be made by qualified technical persons.
Wiring methods should conform to the National Electric Code ANSI/NFPA 70, and/or any prevailing local codes and regulations.
AC output circuits are isolated from the enclosure. System grounding, as required by Sections 690.41 - 690.43 of the National Electric Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I is the responsibility of the installer.
The inverter should only be connected to a dedicated branch circuit.
For models that do not include AC output overcurrent protection, it is the responsibility of the end user to provide protection for the AC output circuit.
Connect only to a circuit provided with the maximum branch overcurrent protection device (e.g., AC circuit breaker).

This inverter must only be used in ungrounded PV systems. Do not use grounded PV modules with this inverter, only ground the mounting frame for the PV modules. All DC inputs of an ungrounded PV system must be equipped with overcurrent protection according to the National Electrical Code NEC 690. This inverter must be installed per the requirements contained in Section 690.35 of the National Electrical Code ANSI/NFPA 70.

WARNING

This inverter has a transformerless design and requires connected array(s) to be floating with respect to ground.
Only use with PV modules that do not require one of the terminals to be grounded.
Do not use grounded PV modules with this inverter.
Only ground the mounting frame for the PV module.
PV modules with a high capacity to ground may only be used if their coupling capacity does not exceed 1400nF.
If the inverter is connected to grounded PV modules, error insulation resistance occurs.

- The AC output/neutral is not bonded to ground inside of the inverter.
- The DC and AC operating currents MUST NOT exceed the limits documented in the technical specifications.
- The inverter can only be used if all the technical requirements in this manual are observed and applied.

All components must remain within their permitted operating ranges at all times.
For safety reasons, modification of this product is prohibited along with the installation of components that are not specifically recommended or distributed by TABUCHI ELECTRIC for this product.
This product must only be used in countries for which it is approved or released by TABUCHI ELECTRIC and the grid operator.
Use this product only in accordance with the information provided in the enclosed documentation, and with the locally applicable standards and directives. Any other use may result in personal injury or property damage.
Do not install or connect the inverter as described below.

- Do not mount this product in salty regions (within 500 m (1640 ft.) of coast lines, or locations subject to direct sea breezes).
- Do not mount this product in locations where ambient temperature is below -20°C (-4°F) or above 40°C (104°F). (Avoid direct sunlight.)
- Do not mount this product in highly humid areas.
- Do not mount this product in locations where the required installation space cannot be secured.(See “Preparations” on Page 17.)
- Do not mount this product at elevations exceeding 1000 m (3280 ft.).
- Do not mount this product in locations where temperature fluctuates drastically (where condensing occurs).

- Do not mount this product in locations subjected to stringent noise regulations (Less than 44 dB).
- Do not install this product on flammable construction materials.
- Do not mount this product in locations where it may be exposed or possibly exposed to excessive steam, oily mist, smoke, dust, salt, corrosive materials, explosive/flammable gases, chemical agents, or fire.
- Do not install in locations where vents may be blocked by the accumulation of snow. (For areas with significant snowfall, install the inverter under a roof or in an enclosure.)
- Do not install in locations that are subject to large vibrations or impacts.
- Do not install in locations where wiring holes cannot be drilled into exterior walls.
- EIBS inverters shall not be used with PV panels equipped with optimizer chips due to redundant maximum power point tracking at PV panel level and string level concurrently, causing false arc fault detection and shutdown of the inverter.

The enclosed documentation is an integral part of this product.
- Read and observe all safety warnings, precautions, and instructions in the documentation.
- Keep documentation in a convenient place for future reference.

Knowledge & Skills of Qualified Persons

The tasks described in this document must only be performed by qualified technical persons.
Qualified technical persons must possess the following knowledge and skills.
- Knowledge of how an inverter works and is operated.
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and systems.
- Training in the installation and commissioning of electrical devices and systems.
- Knowledge of the applicable standards and directives.
- Knowledge of and adherence to this document and all safety precautions.

Safety Precautions

This section contains safety precautions that must be observed at all times when working on or with this product.
To prevent personal injury and property damage and to ensure long-term operation of this product, read this section carefully and follow all safety precautions at all times.

DANGER

High voltage levels are used while operating this product and pose a risk of electric shock.
High levels of voltage that pose a risk of fatal or serious injury due to electric shock are present in the live components of this inverter.
- All work on the inverter must only be carried out by qualified technical persons.
- **DO NOT TOUCH** any live components.

Follow the steps below before working on the inverter:
1. Switch off all devices that are connected to the inverter and take precautions against the possibility of reconnection.

The Overcurrent Protection device (e.g., AC circuit breaker)
2. Cover the PV modules.
3. Turn the inverter DC Switch-disconnector counterclockwise by 90° and set to **OFF**.

Prior to performing any work on the inverter, disconnect all voltage sources as described in this document, and wait 5 minutes.
- All work on the inverter should only be carried out as described in this document.

DANGER **Risk of fatal or serious injury due to electric shock caused by a ground fault.**

If a ground fault occurs, parts of the system may still be live. Death or serious injury due to contact with live components may occur.
- Ensure that no voltage is present and wait 5 minutes before touching any part of the PV system or the inverter.

DANGER **Risk of serious burn injuries from hot surfaces.**

The surface of the inverter can get very hot. Touching the surface of the inverter may cause burns.

- Mount the inverter so that it cannot be touched accidently.
- Do not touch hot surfaces.
- Wait 30 minutes for the surface to cool sufficiently.

WARNING

Damage due to intrusion of moisture and dust.

Intrusion of moisture and dust can damage the inverter and impair functionality.

- Tightly close all inverter enclosure openings.
- Never open the inverter when it is raining, snowing, or when the humidity is over 90%.

DANGER **Risk of death or serious injury due to operating damaged equipment.**

Operating a damaged inverter can lead to fatal or serious injuries from electric shock.

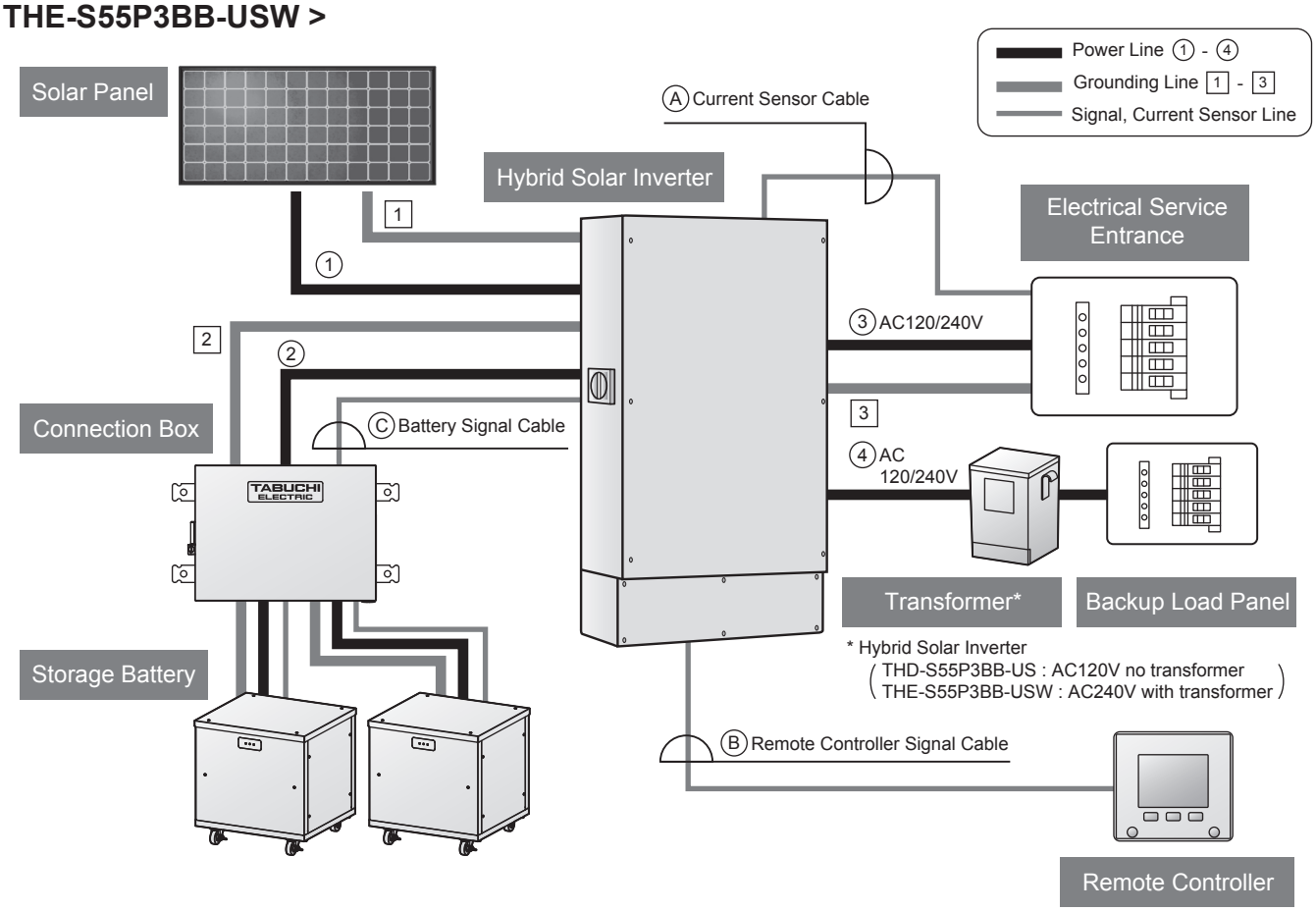
- Only operate the inverter when it is fully functional.
- Regularly check the inverter for visible damage.
- Ensure that all safety equipment is freely accessible at all times.

Acceptance Flow

System Diagram & Components

System Diagram

< THE-S55P3BB-USW >



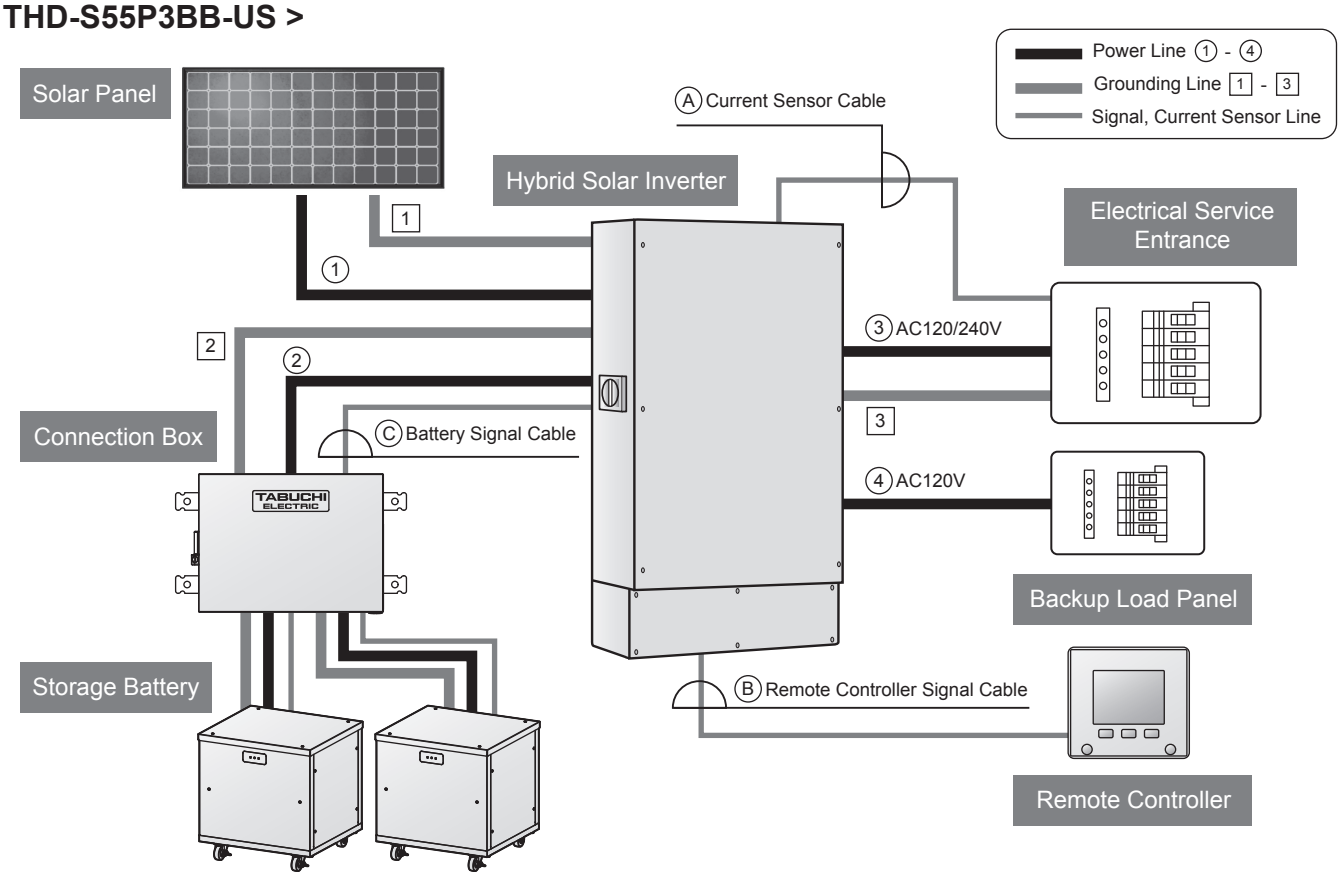
■ Power Line

Power Line	Distribution	Recommended Wire Gauge x Max. Wire Length
①	DC	Use PV wire and match to solar panel specifications.
②	DC	AWG 8 x 10 m (32.8 ft)
③	1φ3W	AWG 10 x 20 m (65.6 ft), AWG 8 x 30 m (98.4 ft)
④	1φ2W	AWG 10 x 15 m (49.2 ft), AWG 8 x 25 m (82.0 ft)

■ Grounding Line

Power Line	Recommended Wire Gauge
1	Match to solar panel specifications.
2	IV 1 conductor AWG 8
3	IV 1 conductor AWG 8

< THD-S55P3BB-US >



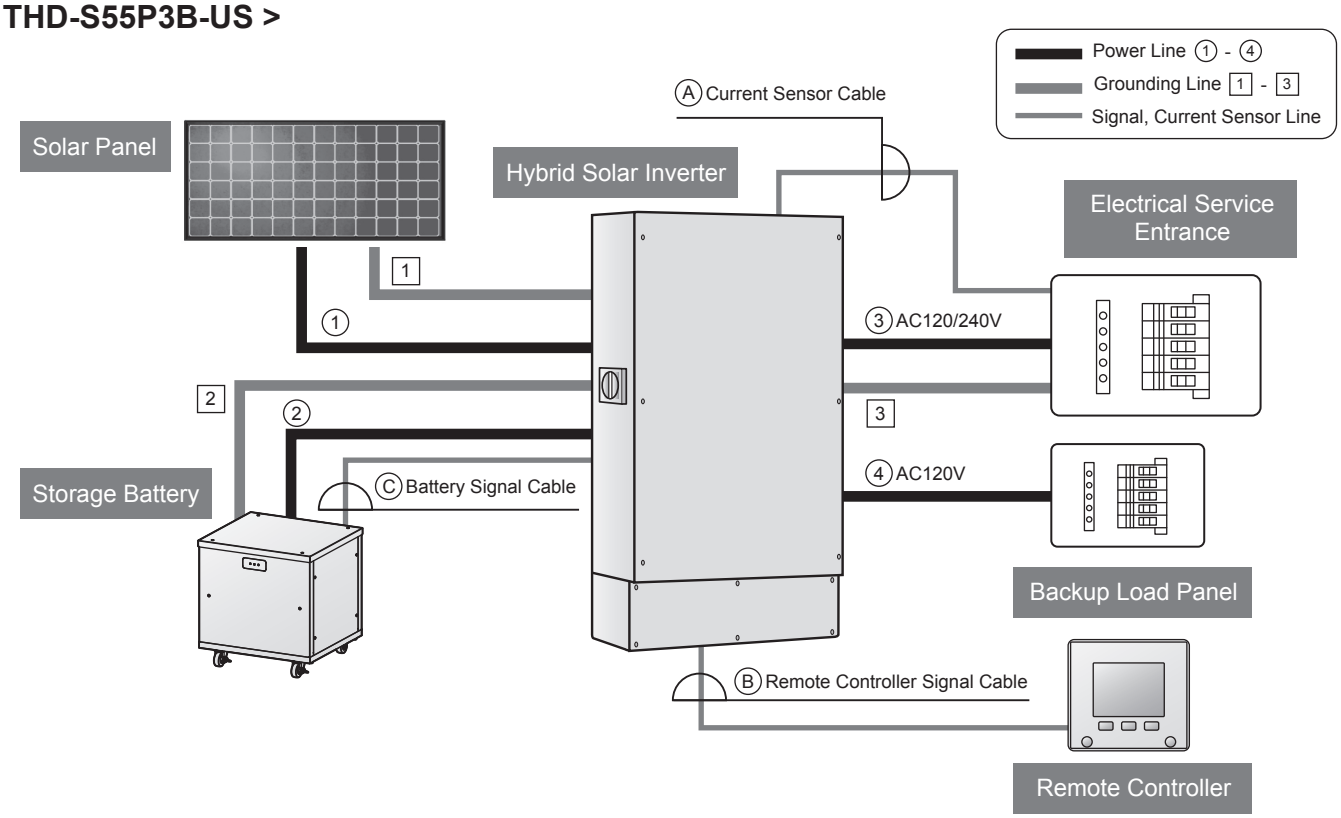
■ Power Line

Power Line	Distribution	Recommended Wire Gauge x Max. Wire Length
①	DC	Use PV wire and match to solar panel specifications.
②	DC	AWG 8 x 10 m (32.8 ft)
③	1φ3W	AWG 10 x 20 m (65.6 ft), AWG 8 x 30 m (98.4 ft)
④	1φ2W	AWG 10 x 15 m (49.2 ft), AWG 8 x 25 m (82.0 ft)

■ Grounding Line

Power Line	Recommended Wire Gauge
1	Match to solar panel specifications.
2	IV 1 conductor AWG 8
3	IV 1 conductor AWG 8

< THD-S55P3B-US >



■ Power Line

Power Line	Distribution	Recommended Wire Gauge x Max. Wire Length
①	DC	Use PV wire and match to solar panel specifications.
②	DC	AWG 8 x 10 m (32.8 ft)
③	1φ3W	AWG 10 x 20 m (65.6 ft), AWG 8 x 30 m (98.4 ft)
④	1φ2W	AWG 10 x 15 m (49.2 ft), AWG 8 x 25 m (82.0 ft)

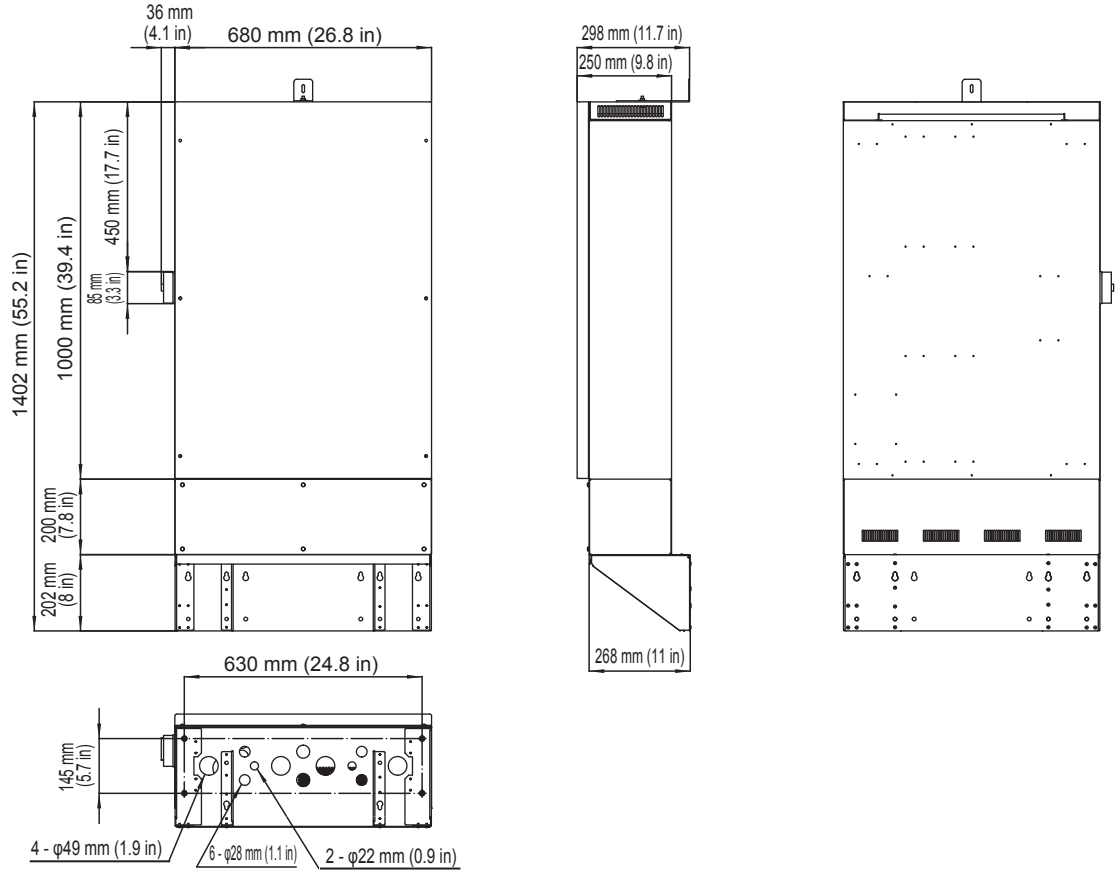
■ Grounding Line

Power Line	Recommended Wire Gauge
1	Match to solar panel specifications.
2	IV 1 conductor AWG 8
3	IV 1 conductor AWG 8

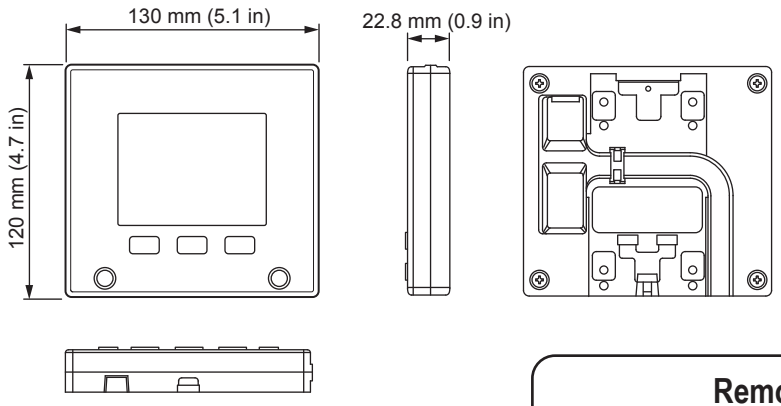
Accessories

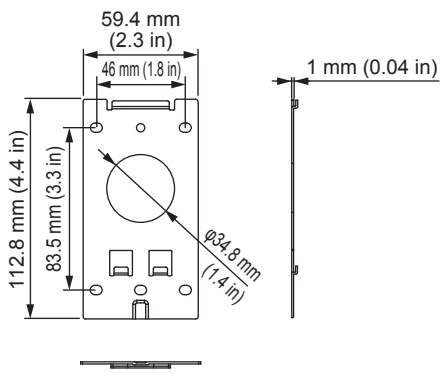
Box	Part	Qty	Box	Part	Qty
Inverter	Remote Controller (With bracket)	1	Base	Base	1
	Screw for Remote Controller Bracket M4 x 16	2		Remote Controller Signal Cable	1
	Attachment	1		Battery Signal Cable	1
	Bracket	1		Current Sensor Cable	1
	Flange Nut M6	1	Shelf	Shelf	1
	Current Sensor	2		Hex Bolt M12 x 30	4
	Base Hex Bolt M8 x 25	4		Flange Nut M6	4
	Test Results	1		Screw for Remote Shelf M6 x 75	4
	Guide Manual	1		Installation Manual (for Shelf)	1

Hybrid Solar Inverter

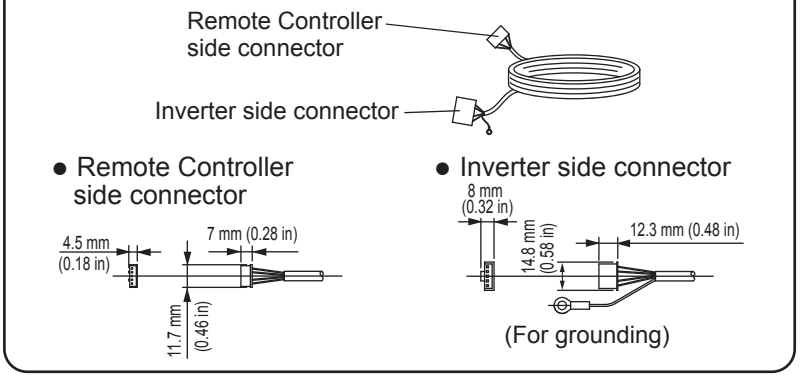


Remote Controller

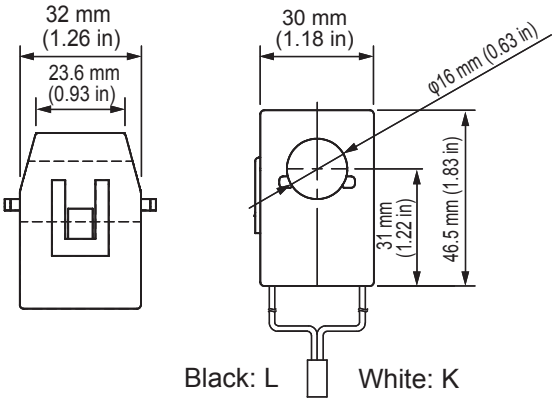




Remote Controller Signal Cable

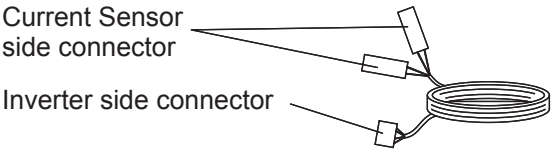


■ Current Sensor

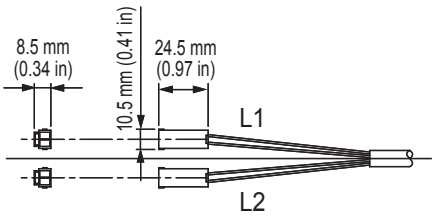


∗Power cable should be AWG 1 or less.

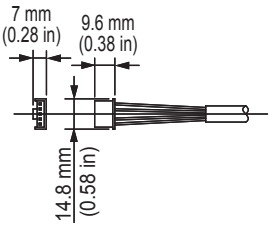
Current Sensor Cable



● Current Sensor side connector

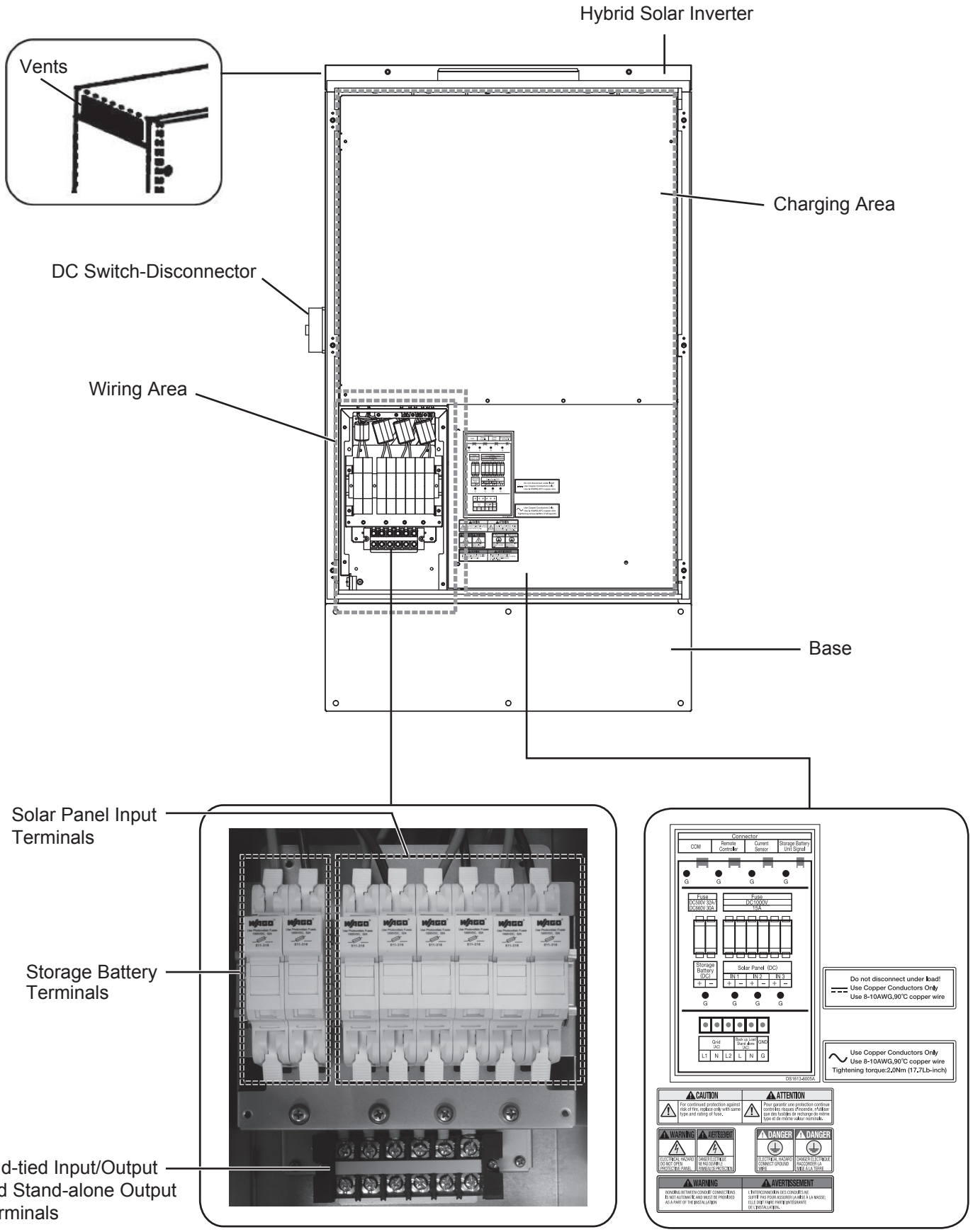


● Inverter side connector



Components (Names & Functions)

Hybrid Solar Inverter & Base



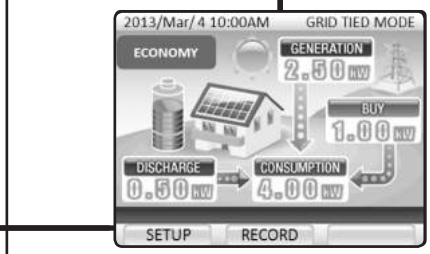
■ Remote Controller

Button Name on Display Area

Displays functions of the buttons below. (Indications change according to the screen.)
Use the operating buttons below to execute the desired functions. (The display is not a touch screen panel.)
To select function [ENTER], press the operating button directly below it.

Display

Displays operating status of the inverter.



Operating Button

Execute the functions appearing on the display. (If the display disappears, pressing any of the operating buttons lights up the display and the home screen appears.)

Indicator colors and functions

Green: Running grid-tied operation
Red: Running stand-alone operation
Flashing red: Automatically stopped

Lights OFF: Grid-tied operation manually stopped
Stand-alone operation manually stopped
Grid-tied operation standby
Stand-alone operation standby

RUN/STOP Button

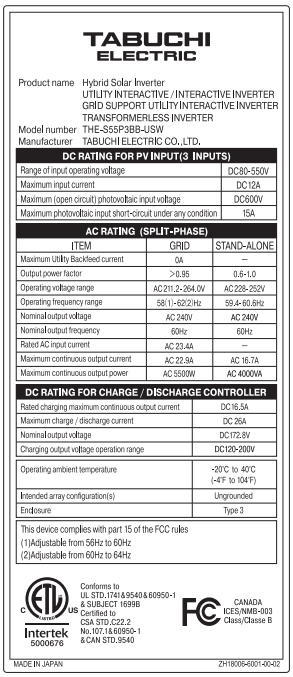
This button will not operate if there is a grid outage, no solar power available, and the battery is not charged (drained, disconnected, or stopped due to a malfunction.)

How to read RUN/STOP Button

GRID-TIED MODE:Green(SELL)
:Orange(BUY)
STAND-ALONE MODE:Green
Others:Lights OFF

■ Inverter Labels

THE-S55P3BB-USW


TABUCHI ELECTRIC

Product name Hybrid Solar Inverter
UTILITY INTERACTIVE / INTERACTIVE INVERTER
GRID SUPPORT UTILITY INTERACTIVE INVERTER
TRANSFORMERLESS INVERTER
Model number THE-S55P3BB-USW
Manufacturer TABUCHI ELECTRIC CO., LTD.

DC RATING FOR PV INPUT(3 INPUTS)	
Range of input operating voltage	DC80-550V
Maximum input current	DC12A
Maximum (open circuit) photovoltaic input voltage	DC600V
Maximum photovoltaic input short-circuit under any condition	15A

AC RATING (SPLIT-PHASE)		
ITEM	GRID	STAND-ALONE
Maximum Utility Backfeed current	0A	—
Output power factor	>0.95	0.6-1.0
Operating voltage range	AC211.2-264.0V	AC228-252V
Operating frequency range	58(1)-62(2)Hz	59.4-60.6Hz
Nominal output voltage	AC 240V	AC 240V
Nominal output frequency	60Hz	60Hz
Rated AC input current	AC 23.4A	—
Maximum continuous output current	AC 22.9A	AC 16.7A
Maximum continuous output power	AC 5500W	AC 4000VA

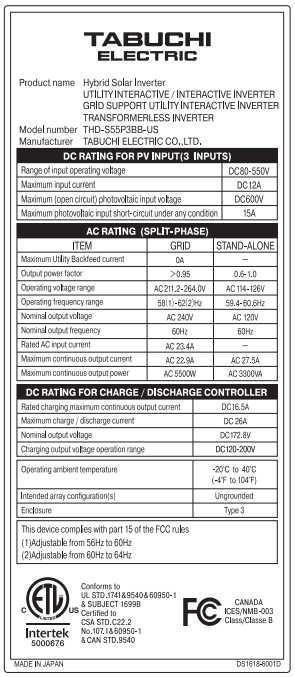
DC RATING FOR CHARGE / DISCHARGE CONTROLLER	
Rated charging maximum continuous output current	DC16.5A
Maximum charge / discharge current	DC 26A
Nominal output voltage	DC172.8V
Charging output voltage operation range	DC120-200V
Operating ambient temperature	-20°C to 40°C (-4°F to 104°F)
Intended array configuration(s)	Ungrounded
Enclosure	Type 3

This device complies with part 15 of the FCC rules
(1)Adjustable from 56Hz to 60Hz
(2)Adjustable from 60Hz to 64Hz

Conforms to UL STD.1741&9540&60950-1 & SUBJECT 1699B Certified to CSA STD.C22.2 No.107.1&60950-1 & CAN STD.9540
CANADA ICES/NMB-003 Class/Classe B
Intertek 5000676

MADE IN JAPAN ZH19006-6001-20-02

THD-S55P3BB-US


TABUCHI ELECTRIC

Product name Hybrid Solar Inverter
UTILITY INTERACTIVE / INTERACTIVE INVERTER
GRID SUPPORT UTILITY INTERACTIVE INVERTER
TRANSFORMERLESS INVERTER
Model number THD-S55P3BB-US
Manufacturer TABUCHI ELECTRIC CO., LTD.

DC RATING FOR PV INPUT(3 INPUTS)	
Range of input operating voltage	DC80-550V
Maximum input current	DC12A
Maximum (open circuit) photovoltaic input voltage	DC600V
Maximum photovoltaic input short-circuit under any condition	15A

AC RATING (SPLIT-PHASE)		
ITEM	GRID	STAND-ALONE
Maximum Utility Backfeed current	0A	—
Output power factor	>0.95	0.6-1.0
Operating voltage range	AC211.2-264.0V	AC 114-126V
Operating frequency range	58(1)-62(2)Hz	59.4-60.6Hz
Nominal output voltage	AC 240V	AC 120V
Nominal output frequency	60Hz	60Hz
Rated AC input current	AC 23.4A	—
Maximum continuous output current	AC 22.9A	AC 27.5A
Maximum continuous output power	AC 5500W	AC 3300VA

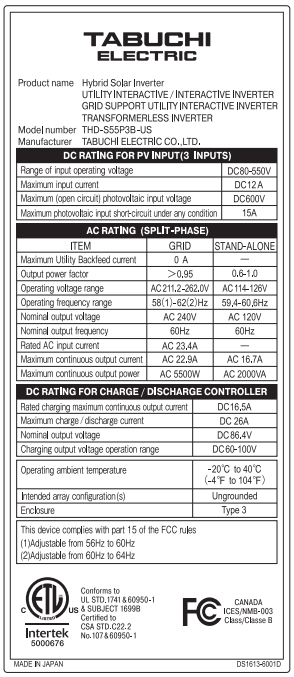
DC RATING FOR CHARGE / DISCHARGE CONTROLLER	
Rated charging maximum continuous output current	DC16.5A
Maximum charge / discharge current	DC 26A
Nominal output voltage	DC172.8V
Charging output voltage operation range	DC120-200V
Operating ambient temperature	-20°C to 40°C (-4°F to 104°F)
Intended array configuration(s)	Ungrounded
Enclosure	Type 3

This device complies with part 15 of the FCC rules
(1)Adjustable from 56Hz to 60Hz
(2)Adjustable from 60Hz to 64Hz

Conforms to UL STD.1741&9540&60950-1 & SUBJECT 1699B Certified to CSA STD.C22.2 No.107.1&60950-1 & CAN STD.9540
CANADA ICES/NMB-003 Class/Classe B
Intertek 5000676

MADE IN JAPAN DS1618-6001D

THD-S55P3B-US


TABUCHI ELECTRIC

Product name Hybrid Solar Inverter
UTILITY INTERACTIVE / INTERACTIVE INVERTER
GRID SUPPORT UTILITY INTERACTIVE INVERTER
TRANSFORMERLESS INVERTER
Model number THD-S55P3B-US
Manufacturer TABUCHI ELECTRIC CO., LTD.

DC RATING FOR PV INPUT(3 INPUTS)	
Range of input operating voltage	DC80-550V
Maximum input current	DC12A
Maximum (open circuit) photovoltaic input voltage	DC600V
Maximum photovoltaic input short-circuit under any condition	15A

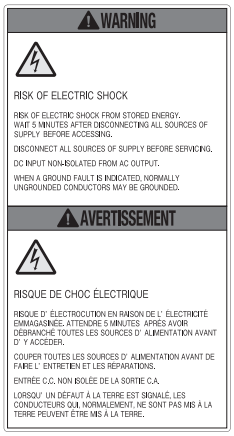
AC RATING (SPLIT-PHASE)		
ITEM	GRID	STAND-ALONE
Maximum Utility Backfeed current	0 A	—
Output power factor	>0.95	0.6-1.0
Operating voltage range	AC211.2-262.0V	AC 114-126V
Operating frequency range	58(1)-62(2)Hz	59.4-60.6Hz
Nominal output voltage	AC 240V	AC 120V
Nominal output frequency	60Hz	60Hz
Rated AC input current	AC 23.4A	—
Maximum continuous output current	AC 22.9A	AC 16.7A
Maximum continuous output power	AC 5500W	AC 2000VA

DC RATING FOR CHARGE / DISCHARGE CONTROLLER	
Rated charging maximum continuous output current	DC16.5A
Maximum charge / discharge current	DC 26A
Nominal output voltage	DC 86.4V
Charging output voltage operation range	DC60-100V
Operating ambient temperature	-20°C to 40°C (-4°F to 104°F)
Intended array configuration(s)	Ungrounded
Enclosure	Type 3

This device complies with part 15 of the FCC rules
(1)Adjustable from 56Hz to 60Hz
(2)Adjustable from 60Hz to 64Hz

Conforms to UL STD.1741&60950-1 & SUBJECT 1699B Certified to CSA STD.C22.2 No.107&60950-1
CANADA ICES/NMB-003 Class/Classe B
Intertek 5000676

MADE IN JAPAN DS1613-6001D


WARNING

RISK OF ELECTRIC SHOCK

RISK OF ELECTRIC SHOCK FROM STORED ENERGY.
WAIT 5 MINUTES AFTER DISCONNECTING ALL SOURCES OF SUPPLY BEFORE ACCESSING.

DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING.

DC INPUT NON-ISOLATED FROM AC OUTPUT.

WHEN A GROUND FAULT IS INDICATED, NORMALLY UNGROUNDED CONDUCTORS MAY BE GROUNDED.

AVERTISSEMENT

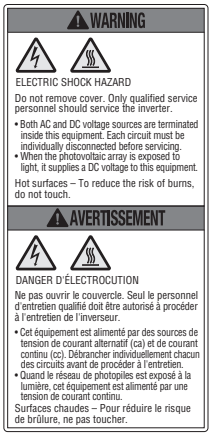
RISQUE DE CHOC ÉLECTRIQUE

RISQUE D' ÉLECTROCUTION EN RAISON DE L' ÉLECTRICITE EMMAGASINÉE. ATTENDRE 5 MINUTES APRÈS AVOIR DÉBRANCHÉ TOUTES LES SOURCES D' ALIMENTATION AVANT D' Y ACCEDER.

COUPER TOUTES LES SOURCES D' ALIMENTATION AVANT DE FAIRE L' ENTRETIEN ET LES REPARATIONS.

ENTRÉE C.C. NON ISOLÉE DE LA SORTIE C.A.

LORSQU' UN DÉFAUT À LA TERRE EST SIGNALÉ, LES CONDUCTEURS QUI, NORMALEMENT, NE SONT PAS MIS À LA TERRE PEUVENT ÊTRE MIS À LA TERRE.


WARNING

ELECTRIC SHOCK HAZARD

Do not remove cover. Only qualified service personnel should service the inverter.

- Both AC and DC voltage sources are terminated inside this equipment. Each circuit must be individually disconnected before servicing.
- When the photovoltaic array is exposed to light, it supplies a DC voltage to this equipment.

Hot surfaces – To reduce the risk of burns, do not touch.

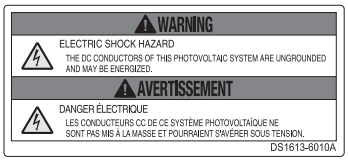
AVERTISSEMENT

DANGER D'ÉLECTROCUTION

Ne pas ouvrir le couvercle. Seul le personnel d'entretien qualifié doit être autorisé à procéder à l'entretien de l'inverseur.

- Cet équipement est alimenté par des sources de tension de courant alternatif (ca) et de courant continu (cc). Débrancher individuellement chacun des circuits avant de procéder à l'entretien.
- Quand le réseau de photopiles est exposé à la lumière, cet équipement est alimenté par une tension de courant continu.

Surfaces chaudes – Pour réduire le risque de brûlure, ne pas toucher.


WARNING

ELECTRIC SHOCK HAZARD

THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

AVERTISSEMENT

DANGER ÉLECTRIQUE

LES CONDUCTEURS CC DE CE SYSTÈME PHOTOVOLTAÏQUE NE SONT PAS MIS À LA MASSE ET POURRAIENT S'AVÉRER SOUS TENSION.

DS1613-6010A

The type label uniquely identifies the inverter.
The information on the type label is required for safe use of the inverter.
For customer support assistance from the TABUCHI ELECTRIC Service Line, the type label must remain permanently attached to the inverter.

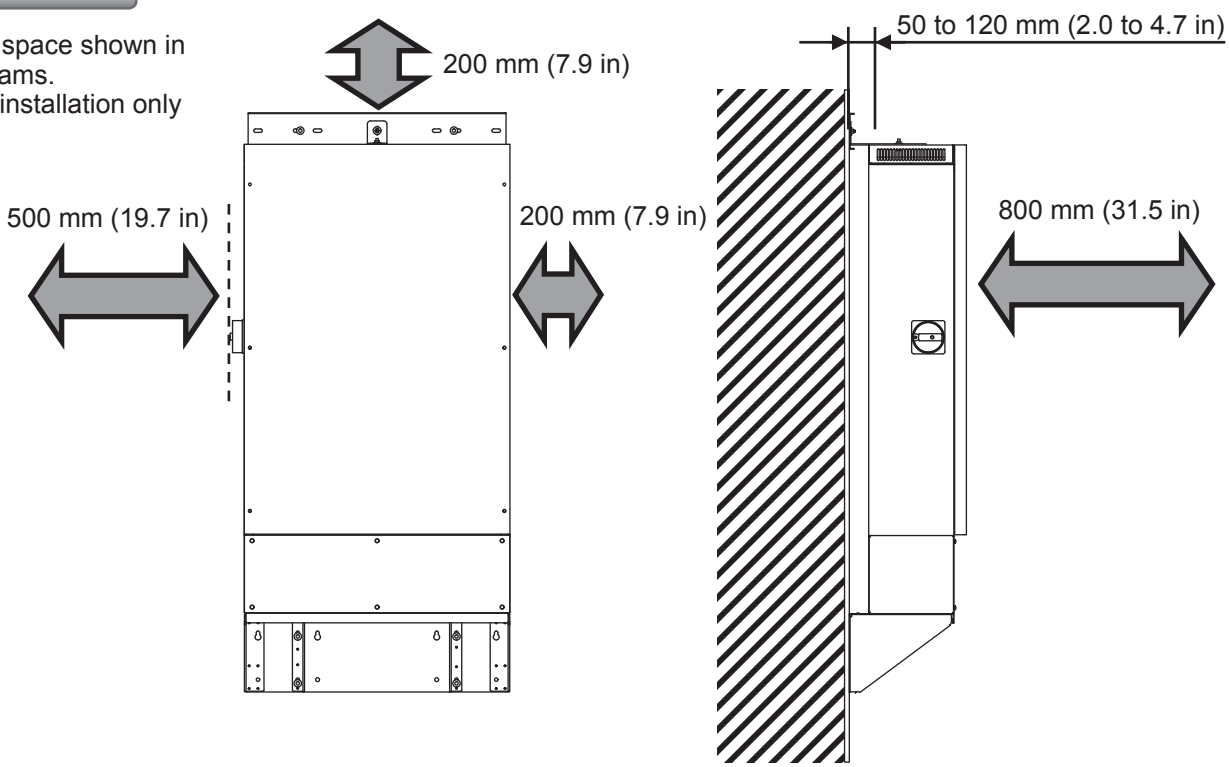
Symbol Definitions

Symbol	Explanation
	Risk of fatal or serious injury due to electric shock from high voltage levels. This product uses high voltage levels for operation. All work on the product must only be carried out by qualified technical persons. Risk of burns from hot surfaces.
	This product can get hot during operation. Avoid contact with the inverter during operation. Allow the product to cool down sufficiently before carrying out any work. Wear personal protective equipment, such as safety gloves.
	Certification Mark

Preparations

Installation Site

Secure the space shown in these diagrams.
※Outdoor installation only



Planning for conduit and cable installation

- Conduits should be installed in accordance with prevailing local code and regulations, and securely fastened to the base.
- Current Sensor Cable should be installed into the main electrical panel in accordance to appropriate regulations.
- Remote controller Signal Cable should be planned prior to installation.

Breakers

- Set the DC Switch-disconnector on the outside of the inverter, the grid-tied breaker in the Electrical Service Entrance, the breakers in the Backup Load Panel, and the switch inside the storage battery to the OFF position.

Inverter Installation

⚠ WARNING	MANDATORY	• **Install the attachment to prevent overturning.** Overturning of the device could result in injury.

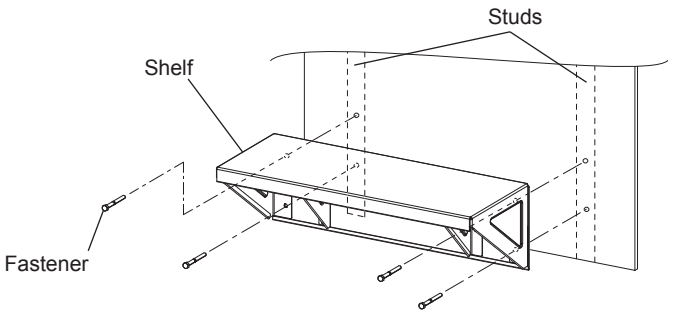
Inverter Installation

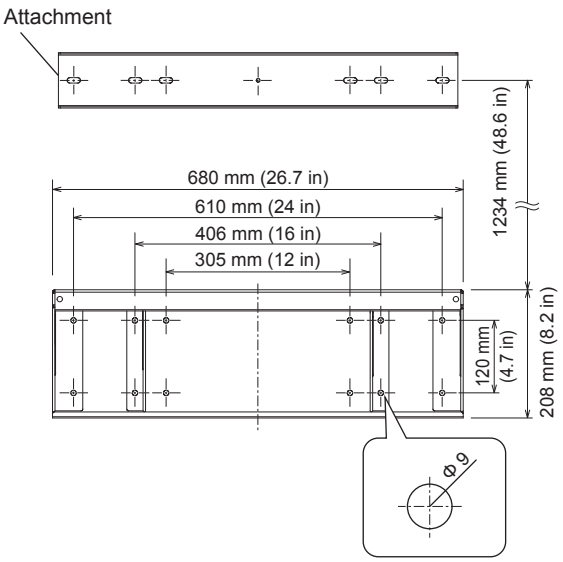
■ Installing the shelf

1 Secure the shelf to a wall using before installing the device.

- Select the holes to use for securement in alignment with wood studs or other structural members.

* Use screws, bolts, anchors, or other fasteners that are listed and appropriate for the building structure.



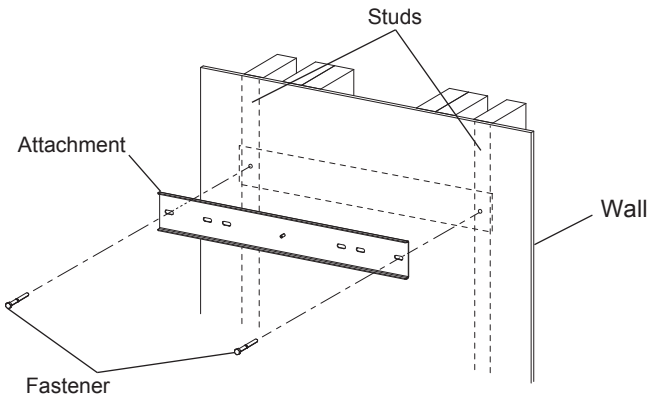


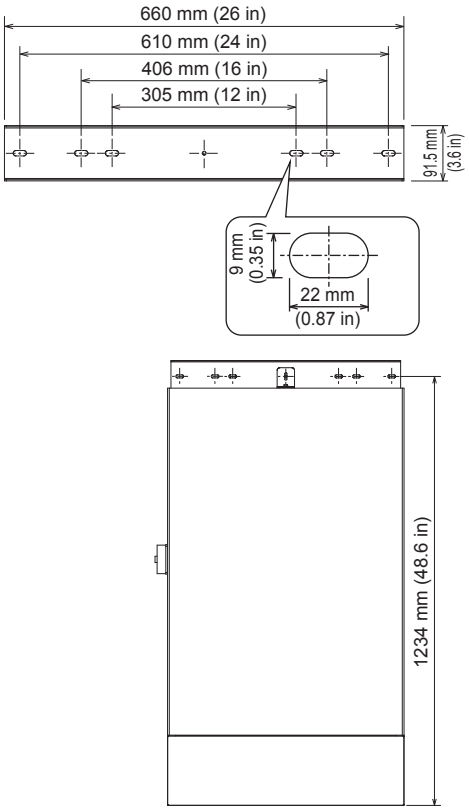
2 Secure the base to the shelf with 4 M12 bolts/nuts. (supplied)

3 Secure the attachment to a wall.

- Select the holes to use for securement in alignment with wood studs or other structural members.

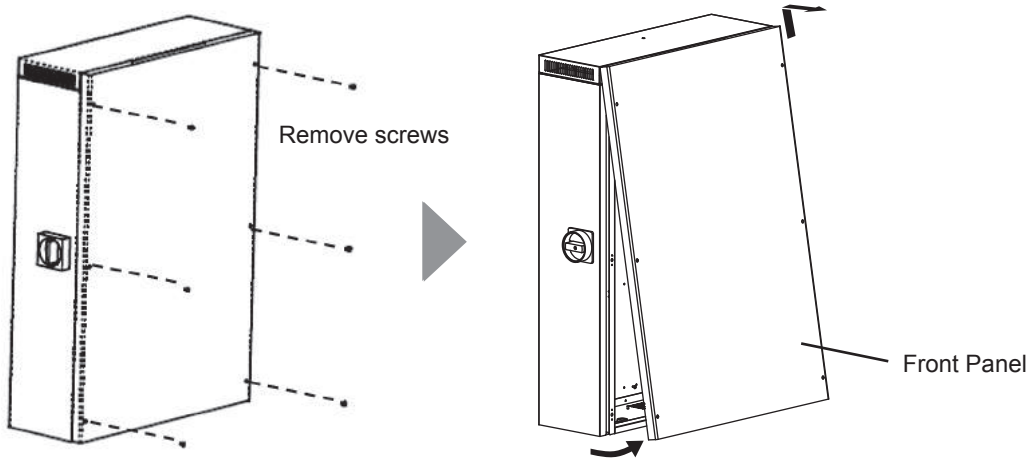
* Use screws, bolts, anchors, or other fasteners that are listed and appropriate for the building structure.



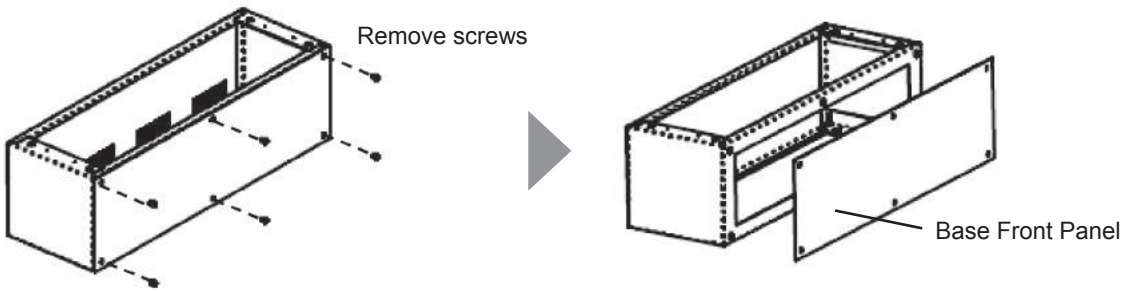


4 Detach the front panels from the Hybrid Solar Inverter and the base.

① Remove the screws (6) from the front panel of the Hybrid Solar Inverter and detach the panel.



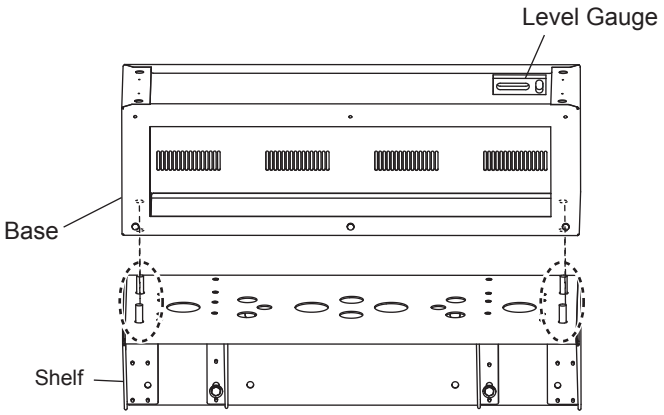
② Remove the screws (6) from the front panel of the base and detach the panel.



5 Install the base on the shelf.

① Place the base on the shelf.

② Use a level gauge to adjust the base so that it sits flat in all directions.

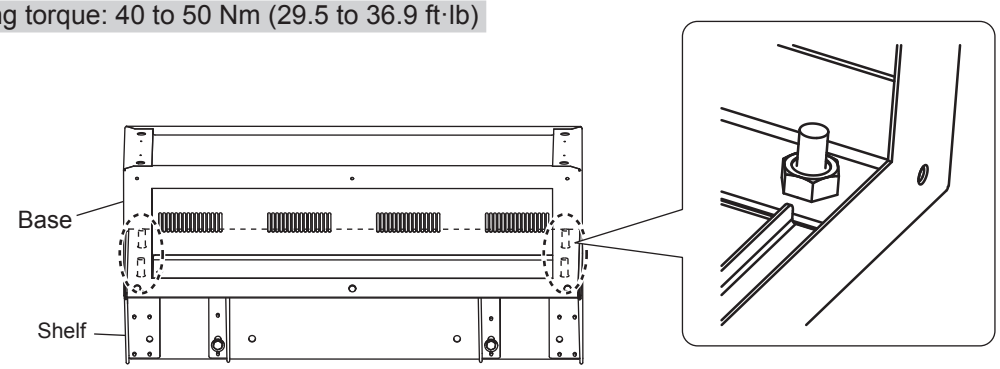


③ Anchor the base on the shelf with hex bolts.

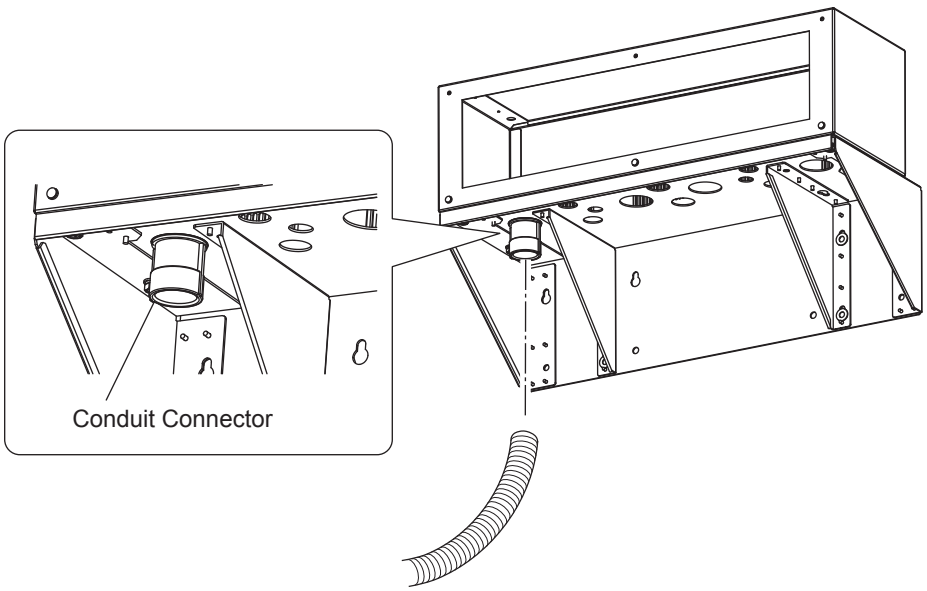
Hex bolt size: M12 (1/2-20)

Adjust the bolt length according to the installation surface.

Tightening torque: 40 to 50 Nm (29.5 to 36.9 ft·lb)

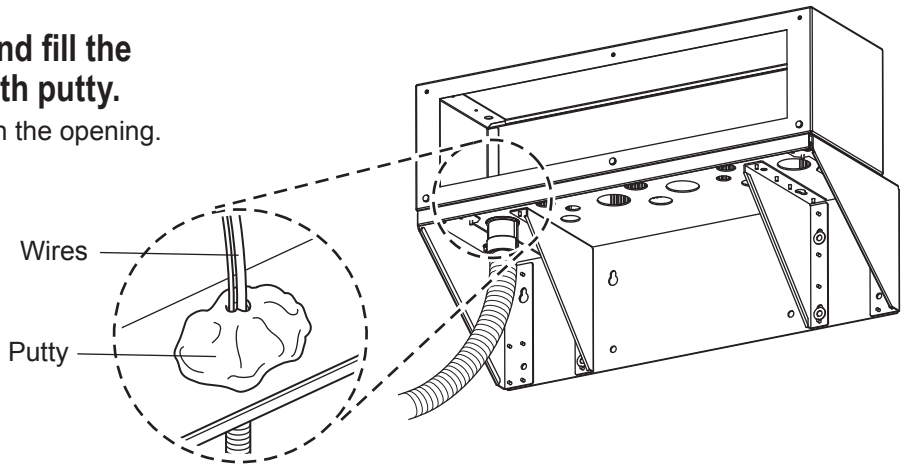


6 Connect the flexible plastic conduit connectors to the shelf.



7 Feed the wires into the base, and fill the inside of the wiring opening with putty.

- Feed each wire into the base through the opening.

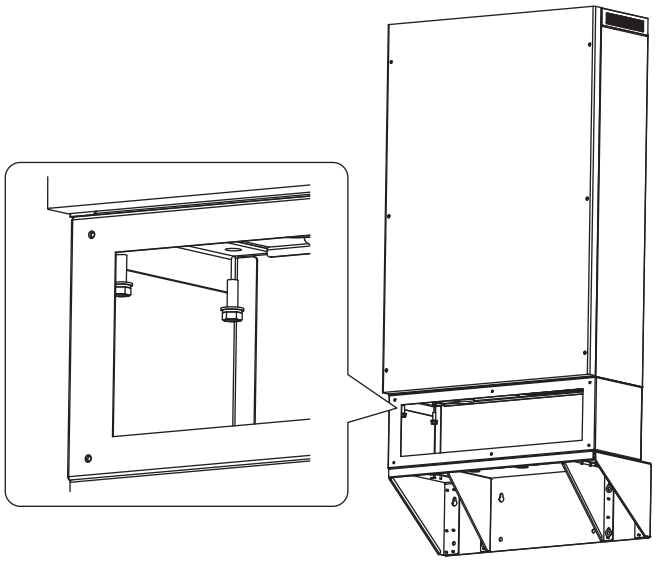


8 Place the Hybrid Solar Inverter on the base.

① Place the Hybrid Solar Inverter on the base.

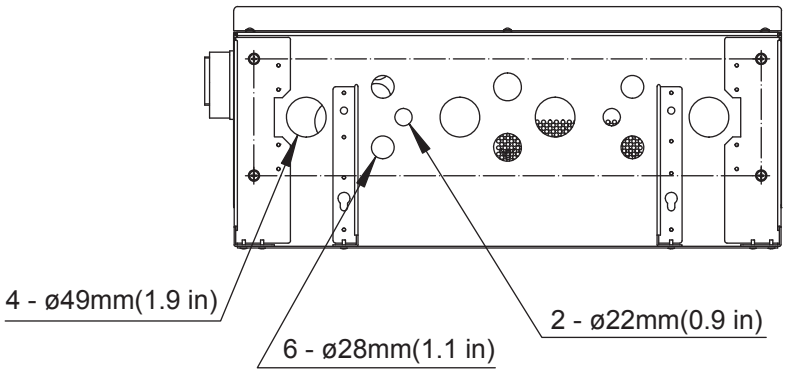
② Connect the Hybrid Solar Inverter and base with the supplied locking bolts (4).
Tightening torque: 8 to 13 Nm (5.9 to 9.6 ft·lb)

③ Secure top of inverter using the supplied bracket.



9 Feed the wires into the Hybrid Solar Inverter.

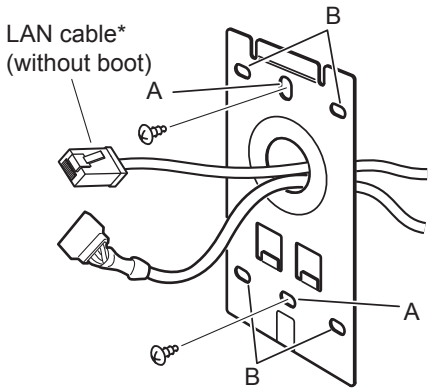
Feed each wire into the Hybrid Solar Inverter through the wiring holes.



Installing the Remote Controller

1 Attach the bracket to the wall.

- The connectors at the two ends of the signal cable are different sizes.
  Check the connector size and connect the smaller one to the Remote Controller.
- Install the bracket to the wall as shown using the supplied M4 x 16 screws.



Notes

- Pay attention not to pinch the cable between the bracket and wall surface.
- Do not excessively tighten the screws when locking the bracket to the wall.
  Excessive force will bend the bracket and make it difficult to mount the Remote Controller.
  (Exercise caution when using the electric screwdriver.)

If attaching the Remote Controller to a switchbox.
Use hole A if attaching the Remote Controller to a one-socket switchbox. Use the hole B if attaching it to a two-socket switch box. Lock the Remote Controller to the switchbox using the screws supplied with the switchbox.

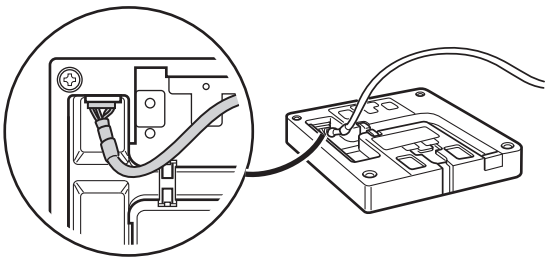
---

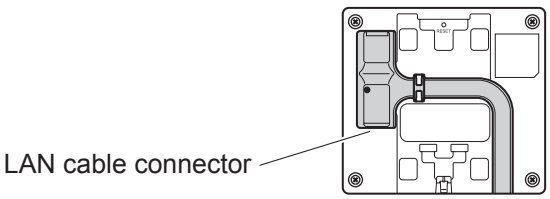
2 Connect the signal cable to the Remote Controller.

① Connect the signal cable connector to the connector on the back of the Remote Controller.

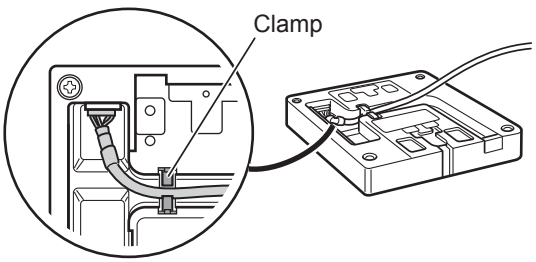
Notes

- Insert the connector all the way into the socket.
- Insert the LAN cable into the connector as illustrated.

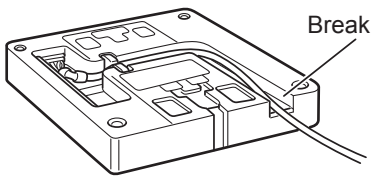




② After confirming that the connector is securely inserted into the socket, tuck the cable into the clamp to lock it in place.

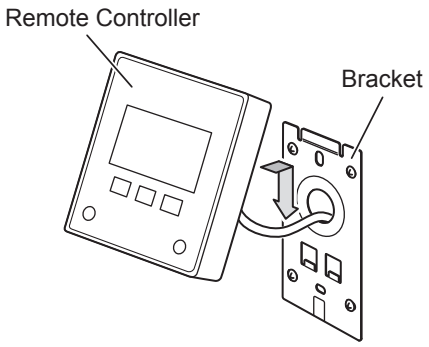


If there is exposed wiring, break off the tab at the point where the cable extends beyond the Remote Controller.



3 Attach the Remote Controller to the bracket.

- Be sure not to pinch the cable between the bracket and the Remote Controller.
- Press the Remote Controller against the bracket and slide it downward. Confirm the Remote Controller is securely clipped to the bracket.



Wiring Installation

DANGER

Risk of death or serious injury due to electric shock when a ground fault occurs.
If a ground fault occurs, parts of the system may still be live. Death or serious injury may occur due to contact with live components.

- Ensure no voltage is present, wait 5 minutes before touching any part of the PV system or the inverter.

DANGER – FIRE HAZARD

- To reduce the risk of fire, connect only to a circuit provided with 50 A maximum branch circuit overcurrent protection device in accordance with the National Electrical Code (NE, ANSI/NFPA 70).

WARNING

Moisture ingress during installation may damage the inverter.

- Never open the inverter when it is raining or snowing, or when the humidity is over 90%.
- Seal all unused openings tightly.

WARNING

Electrostatic discharge may damage the inverter.
Touching electronic components can cause damage to or destroy the inverter through electrostatic discharge.

- Ground yourself before touching any component.

WARNING

Ground faults, unreliable and highly resistive connections due to Wire Nuts®.
Potential damage to or failure of the inverter.

- Do not use Wire Nuts®.

■ Electrical Installations (Wiring Details)

All electrical installations must be carried out in accordance with the local electrical standards and the National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.

- Before connecting the inverter to the utility grid, contact your local grid operator.

The electrical connection of the inverter must be carried out by qualified technical persons only.

- Confirm the cables used for electrical connection are not damaged.

After installation, please attach a label with the following wording or equivalent in a visible location on the Storage Battery.
WARNING: WHEN A GROUND FAULT IS INDICATED, BATTERY TERMINALS AND CONNECTED CIRCUITS MAY BE UNGROUNDED AND HAZARDOUS.

⚠ WARNING

MANDATORY

- **Wear protective gloves and use electrically insulated tools when installing electrical wiring work.**
  Working without protection may result in electric shock or injury.
- **Be sure to observe all of the following precautions when installing electrical wiring work.**
  Failure to do so may result in electric shock or equipment failure.
  - Keep all switches in the OFF position until wiring work is completed. This includes the DC Switch-disconnector on the outside of the inverter, the grid-tied breaker in the Electrical Service Entrance, the breakers in the Backup Load Panel, and the switch inside the storage battery.
  - Do not damage the wire sheathing.

⚠ CAUTION

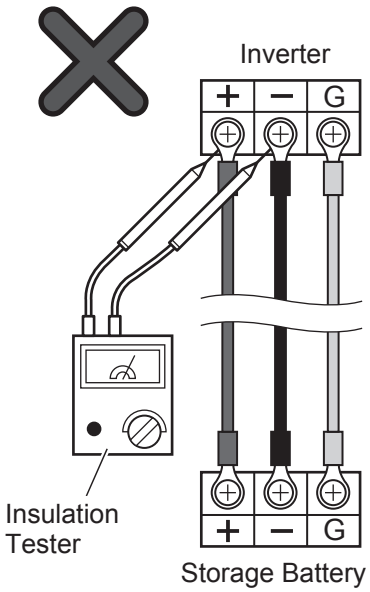
MANDATORY

- **Use wiring of the recommended wire gauge (Page 8, 9, 10) and connect wiring to the terminal blocks using the specified crimp terminal.**
  Inadequate wiring materials and connections may result in fire or equipment failure.

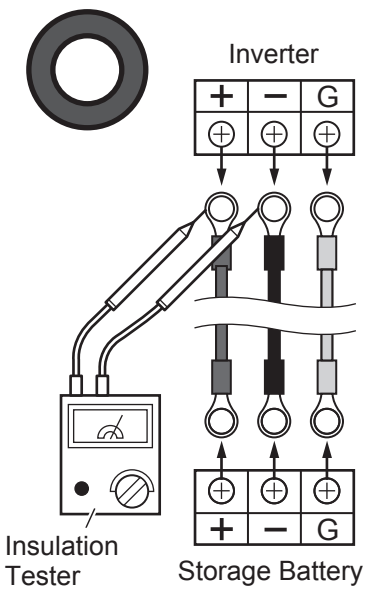
■ To measure insulation resistance

Measuring insulation resistance while the wires are connected will damage the internal circuits. Do not conduct the insulation resistance testing on the inverter terminals. Be sure to disconnect the electric wire from the terminal before measuring insulation resistance.
Also, be sure to disconnect all electric wiring before measuring insulation resistance of the storage batteries or solar panels.

Do not measure resistance between the terminals.



Measure resistance between the wires.



AC Connection Requirements

AC Connection Requirements

Cable Requirements:

The AC cable must be approved for temperatures of over +90°C (+194°F).
The AC cable must be designed in accordance with the local installation requirements.
The AC cable must be made of solid wire or stranded wires.
Conductor cross-section: 10 AWG to 8 AWG
Cable type: Copper wire

Connecting the Inverter to the Utility Grid

Requirements:

All electrical installations must be carried out in accordance with the local standards and the National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code Part I.
The DC input and AC output circuits are isolated from the enclosure and the system grounding, if required by Section 250 of the National Electrical Code ANSI/NFPA 70, is the responsibility of the installer.
The AC cable must be protected using a load-break switch or a listed circuit breaker (see National Electrical Code ANSI/NFPA 70).
The connection requirements of the grid operator must be met.
The line voltage must be within the permissible range. The exact operating range of the inverter is specified in the operating parameters.
To protect the AC connection line of the inverter, TABUCHI ELECTRIC recommends the following characteristics when installing a device for protection against overcurrent:

Type	Typical installations use a 2-pole/240 V rated bi-directional thermal-magnetic circuit breaker, UL489 or equivalent.
Current/ Voltage	30 A/240 V

Using Backup Load Panel for THE-S55P3BB-USW

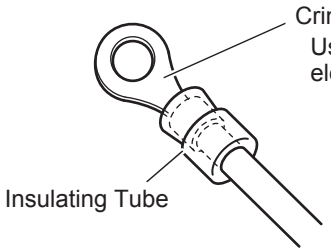
Requirements:

External Isolation Transformer is required when using Backup Load Panel.
Neutral conductors of Backup Load Panel shall be installed in accordance with ANSI/NFPA 70 or the Canadian Electrical Code Part I.
Prepare the external isolation transformer with specifications shown in the table.

■ Specifications External Transformer

Category Type	Power Distribution Transformer, 1-Phase
Isolation Type	Isolation
Capacity	Over 5000VA
Primary voltage	AC 240 V (2Pole)
Secondary voltage	AC 120/240 (3Pole)
Freq.	60 Hz

1 Attach the crimp terminal and insulating tube to the wire.



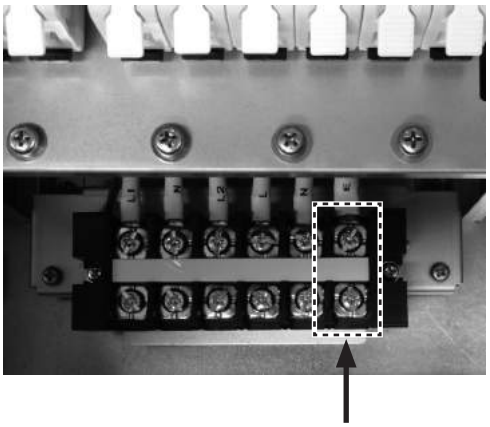
Use the proper crimping tool for the screw size and electric wire diameter of the terminal block.

TERMINAL STUD SIZE: M6 (DIAMETER 0.24 inch)
MINIMUM TERMINAL HOLE DIAMETER: 0.25 inch
TERMINAL MATERIAL: COPPER

2 Connect the grounding line.

Tightening torque: 2.0 to 2.4 Nm (1.5 to 1.8 ft·lb)

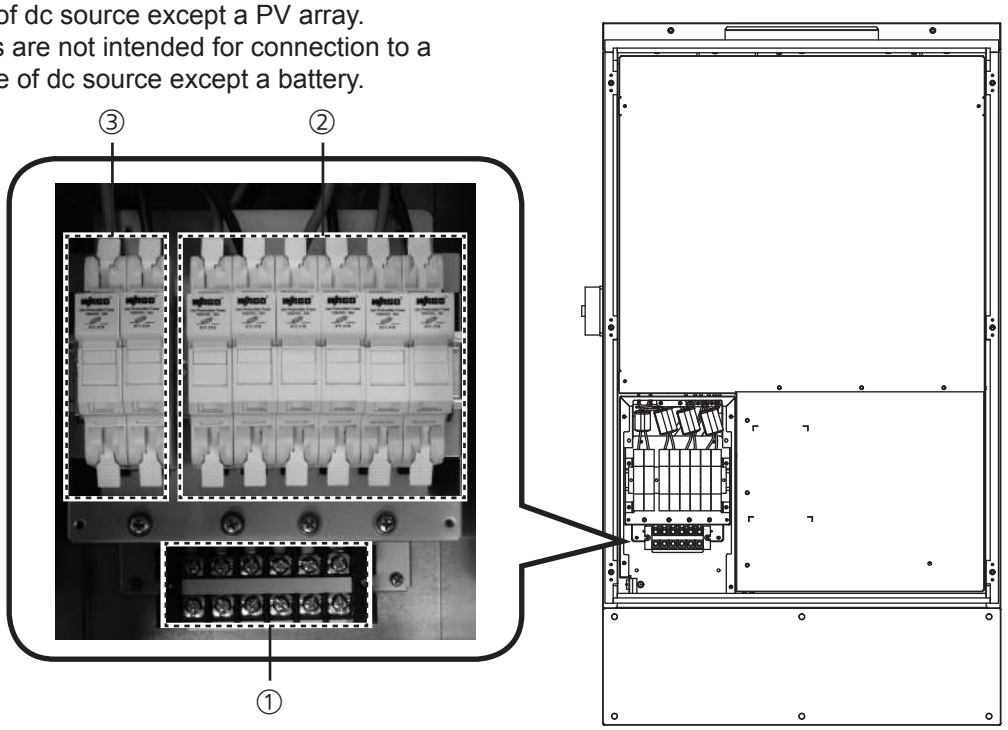
The inverter has a grounding terminal so as to securely ground the equipment.
In order to prevent electric shock, be sure to connect the ground securely.



3 Connect the wires to the inverter terminal block and connectors.

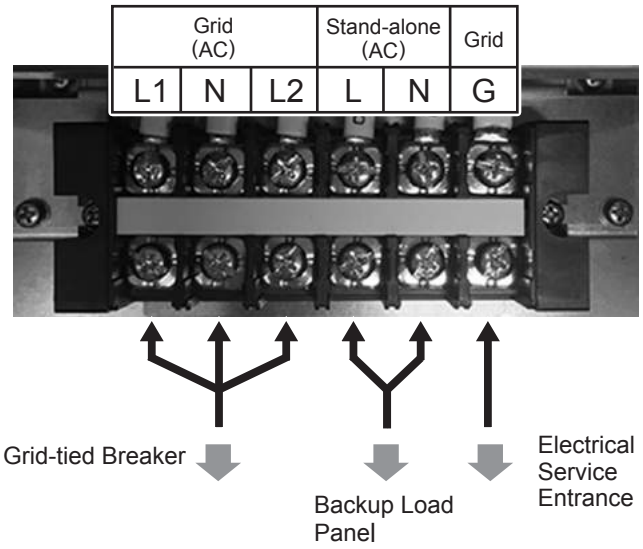
Tightening torque: M5 screw … 2.0 to 2.4 Nm (1.5 to 1.8 ft·lb)

- Solar Panel Input Terminals are not intended for connection to a battery or any other type of dc source except a PV array.
- Storage Battery Terminals are not intended for connection to a PV array or any other type of dc source except a battery.

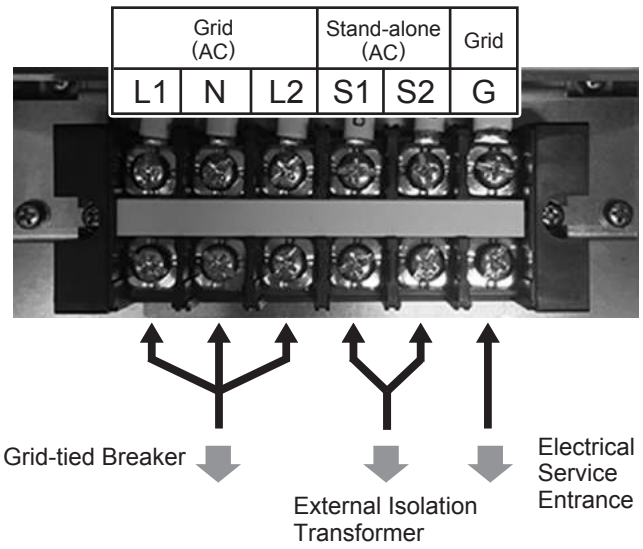


① a. Connect the electric wires from the Grid-tied Breaker (L1, N, L2) respectively to the grid-tied output terminals (L1, N, L2).
b. Connect the electric wires from the Backup Load Panel to the stand-alone output terminals (L, N). For "THE-S55P3BB-USW", connect the electrical wires from the stand-alone output terminals (S1, S2) to the external isolation transformer.
c. Connect the grounding lines from the solar panel, Electrical Service Entrance, and storage battery.

For THD-S55P3BB-US, THD-S55P3B-US



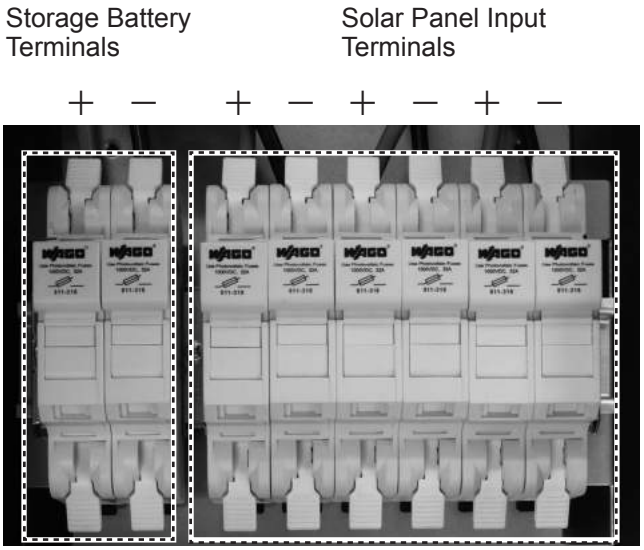
For THE-S55P3BB-USW



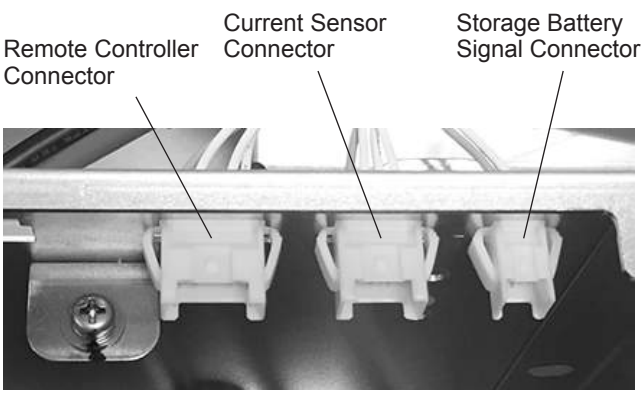
The grid-tied breakers (L1,N,L2) of the inverter are isolated from the enclosure.
Connect the grounding lines to the grounding terminals of the main panel according appropriate local regulations.

② Peel back the sheath of the electric wires from the solar panel about 12 mm (0.47 in) and connect the wires to the solar panel input terminals (+, -).

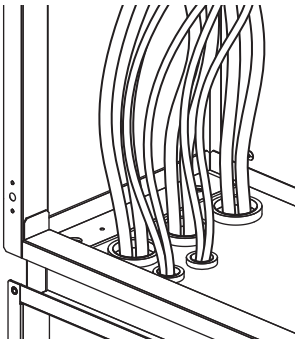
③ Peel back the sheath of the electric wire from the Connection Box about 12 mm (0.47 in) and connect the wires to the storage battery terminals (+, -).



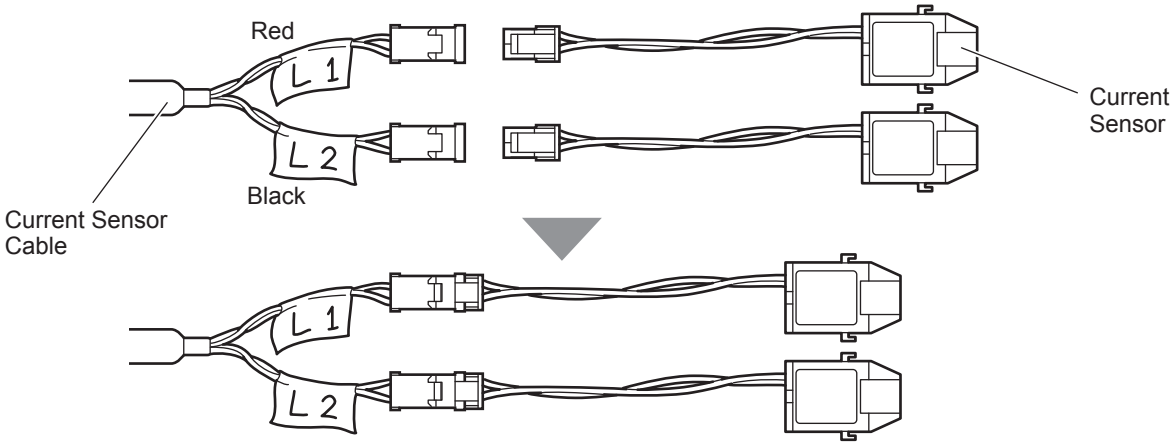
④ Connect the signal wire from the Connection Box to the storage battery signal connector, the signal cable from the Remote Controller to the Remote Controller connector, and the Current Sensor cable to the Current Sensor connector.



4 After wiring is installed, completely seal all penetrations.

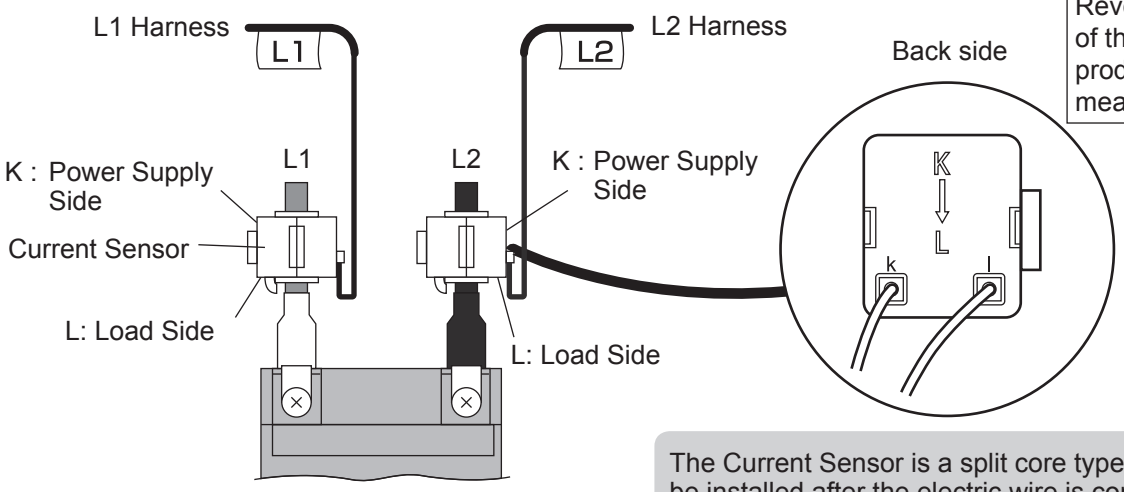


5 Connect the Current Sensor to the Current Sensor cable



6 Connect the Current Sensor to the L1 and L2 phases so that electricity purchases and sales can be monitored and recorded.

- Each cable is labeled.
- The Current Sensor has L1 and L2 sides.
  Check the labels on the Current Sensor cable before installation.
- The Current Sensor has polarity. When fitting the Current Sensor onto the electric wire, orient the Current Sensor so that the “K” (power supply side) indication is on the side of the power meter.



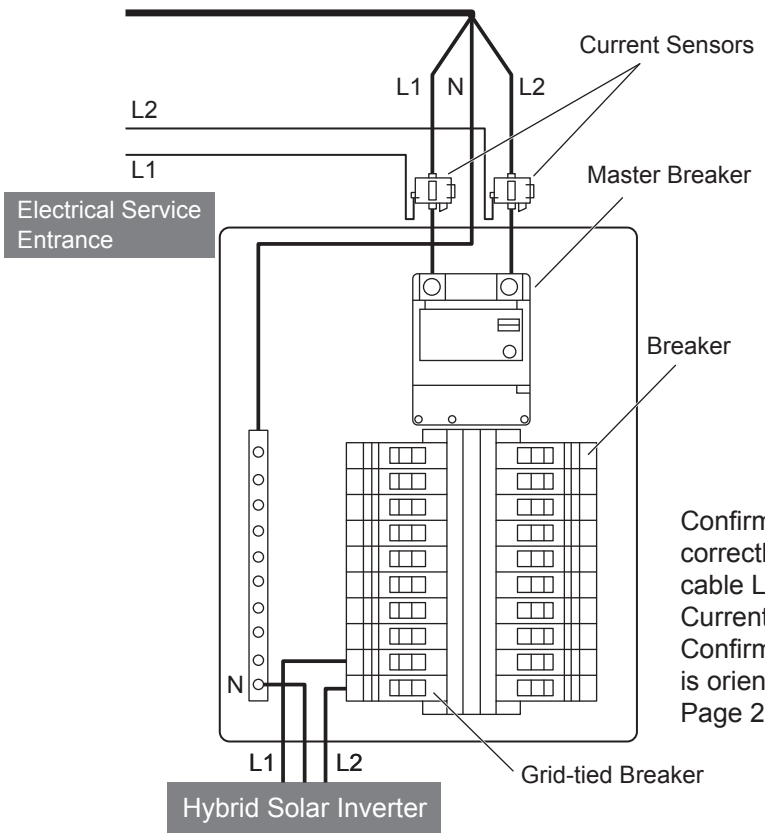
Reversing the polarity of the Current Sensor produces incorrect measurements.

The Current Sensor is a split core type. It can be installed after the electric wire is connected to the terminal.

- See the Current Sensor Installation Diagram on Page 29 regarding installation.

■ Current Sensor Installation Diagram

Tying the inverter to the grid using a secondary feed (Example)

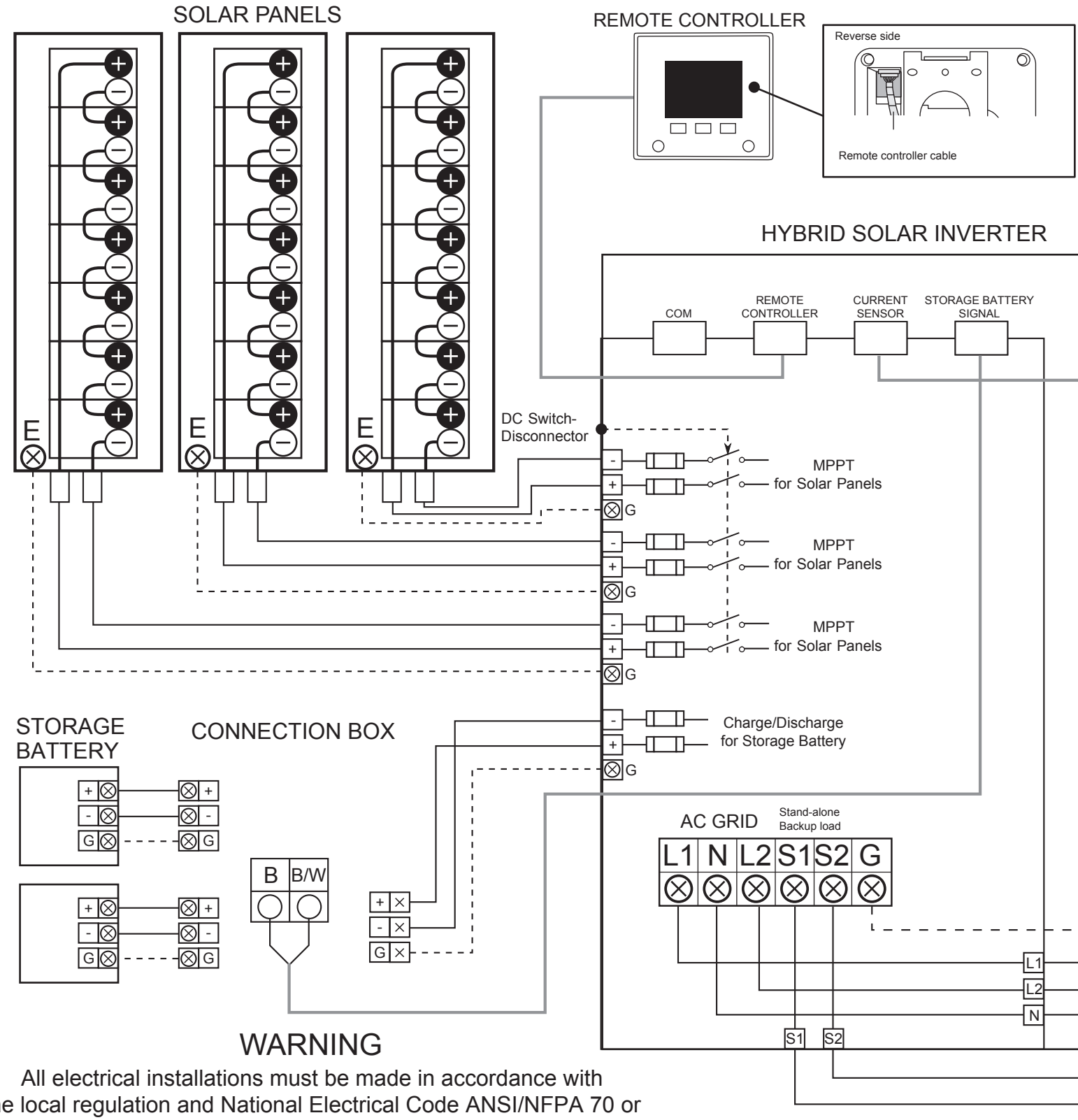


Confirm that the Current Sensor are correctly installed on the electric cable L1 and L2 as the labels on the Current Sensor cable.
Confirm that the Current Sensor is oriented as shown the figure on Page 28.

WIRING SCHEMATIC OF SINGLE PHASE SYSTEM

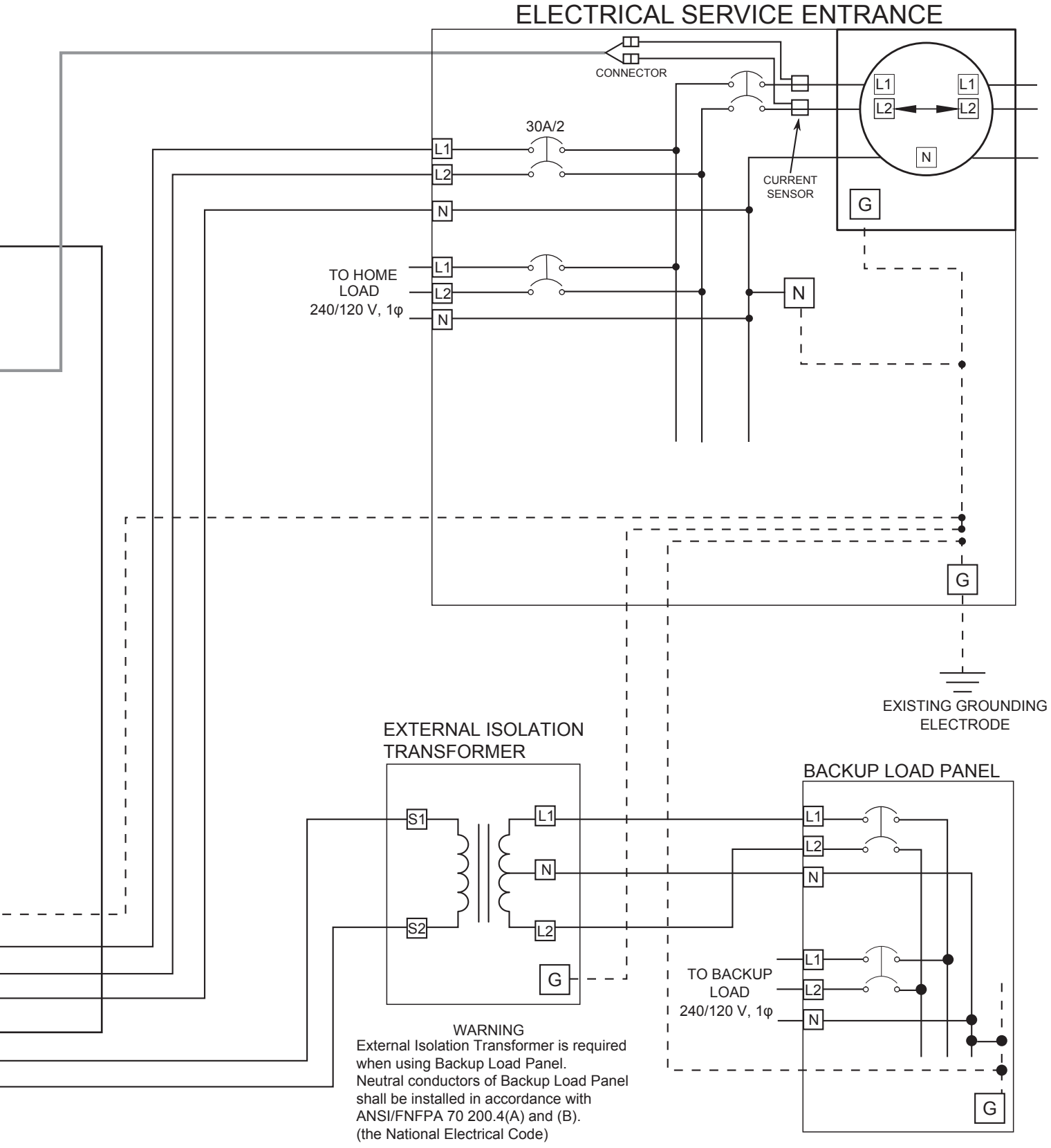
THE-S55P3BB-USW

■ TYPICAL INSTALLATION WITHOUT MAINTENANCE SWITCH PANEL



WARNING

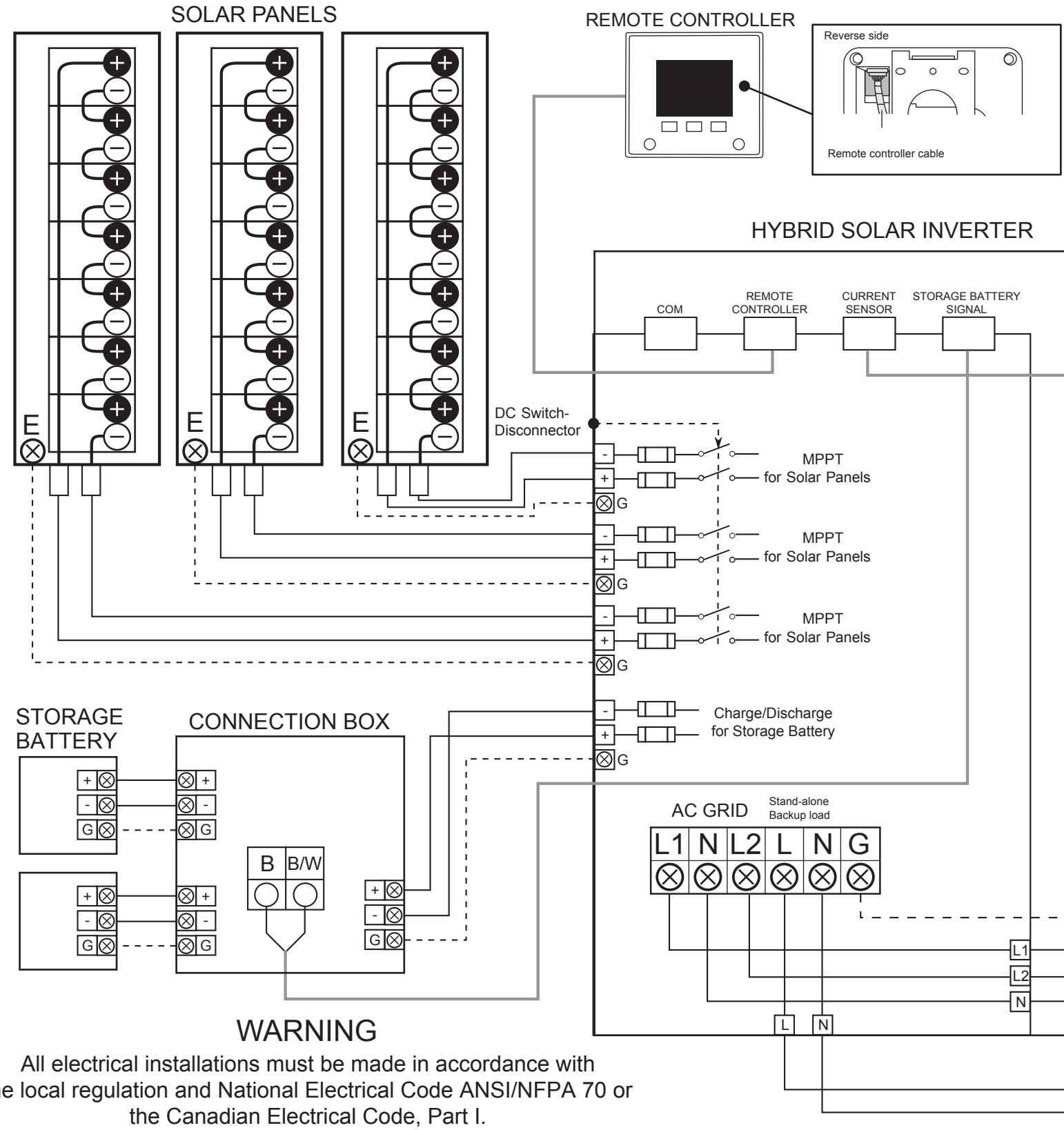
All electrical installations must be made in accordance with the local regulation and National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.


ELECTRICAL SERVICE ENTRANCE
CONNECTOR
30A/2
L1
L2
N
CURRENT SENSOR
G
TO HOME LOAD
240/120 V, 1φ
EXISTING GROUNDING ELECTRODE
EXTERNAL ISOLATION TRANSFORMER
S1
S2
BACKUP LOAD PANEL
TO BACKUP LOAD
240/120 V, 1φ
WARNING
External Isolation Transformer is required when using Backup Load Panel.
Neutral conductors of Backup Load Panel shall be installed in accordance with ANSI/FNFPA 70 200.4(A) and (B).
(the National Electrical Code)

WIRING SCHEMATIC OF SINGLE PHASE SYSTEM

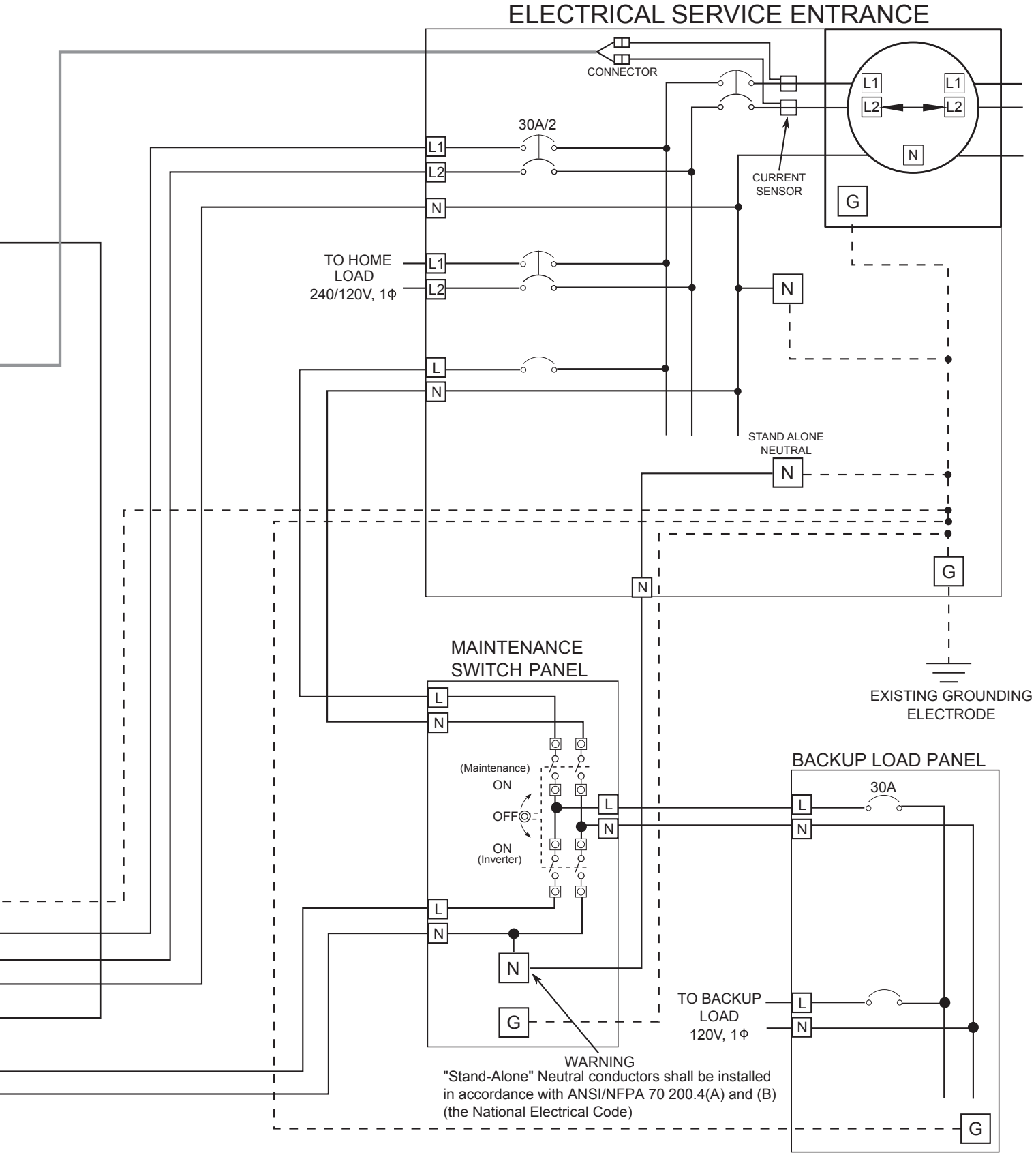
THD-S55P3BB-US

■ TYPICAL INSTALLATION WITH MAINTENANCE SWITCH PANEL



WARNING

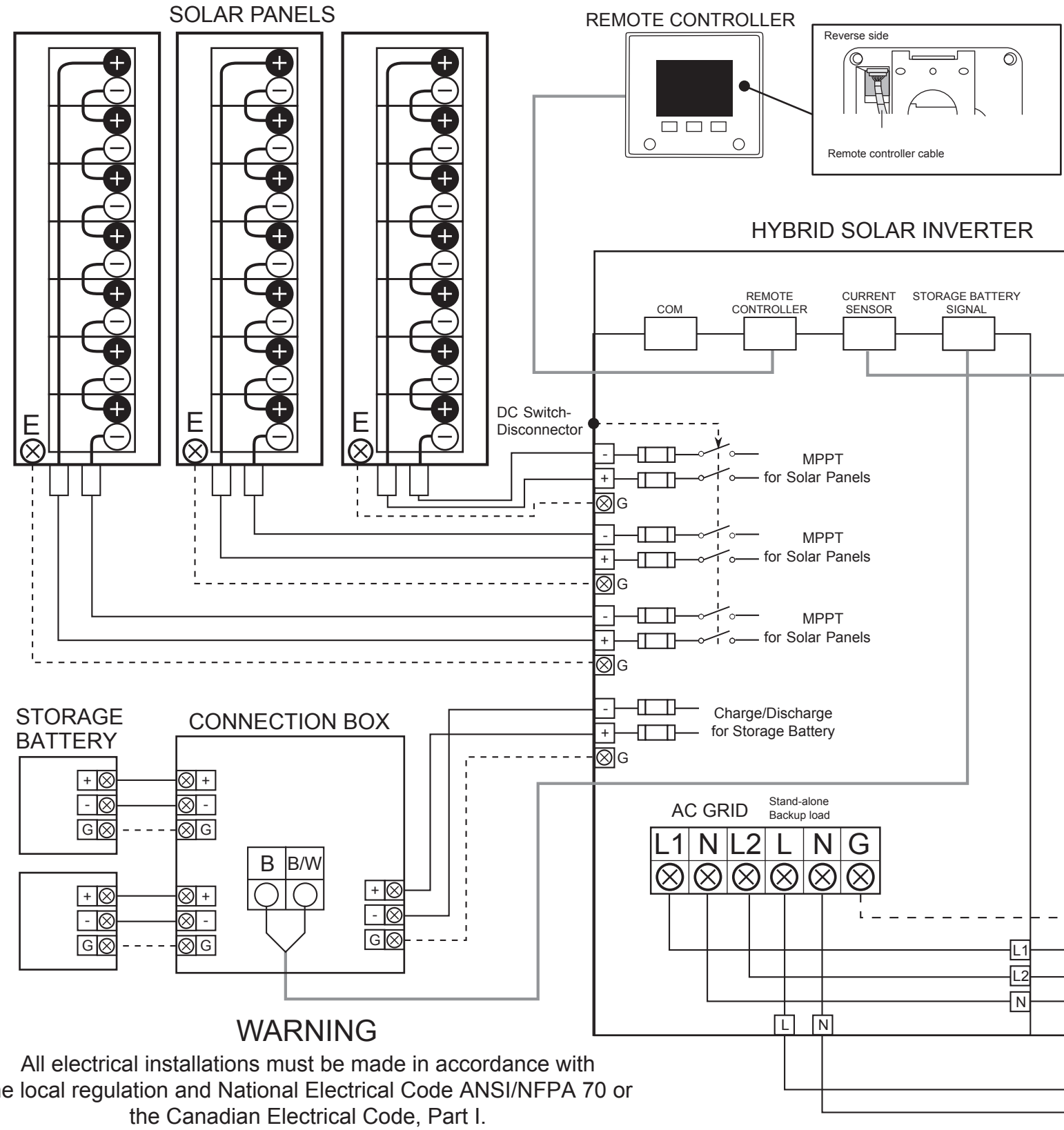
All electrical installations must be made in accordance with the local regulation and National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.


ELECTRICAL SERVICE ENTRANCE
CONNECTOR
L1
L2
N
G
30A/2
CURRENT SENSOR
TO HOME LOAD 240/120V, 1ϕ
STAND ALONE NEUTRAL
MAINTENANCE SWITCH PANEL
(Maintenance) ON
OFF
ON (Inverter)
EXISTING GROUNDING ELECTRODE
BACKUP LOAD PANEL
30A
TO BACKUP LOAD 120V, 1ϕ
WARNING
"Stand-Alone" Neutral conductors shall be installed in accordance with ANSI/NFPA 70 200.4(A) and (B) (the National Electrical Code)

WIRING SCHEMATIC OF SINGLE PHASE SYSTEM

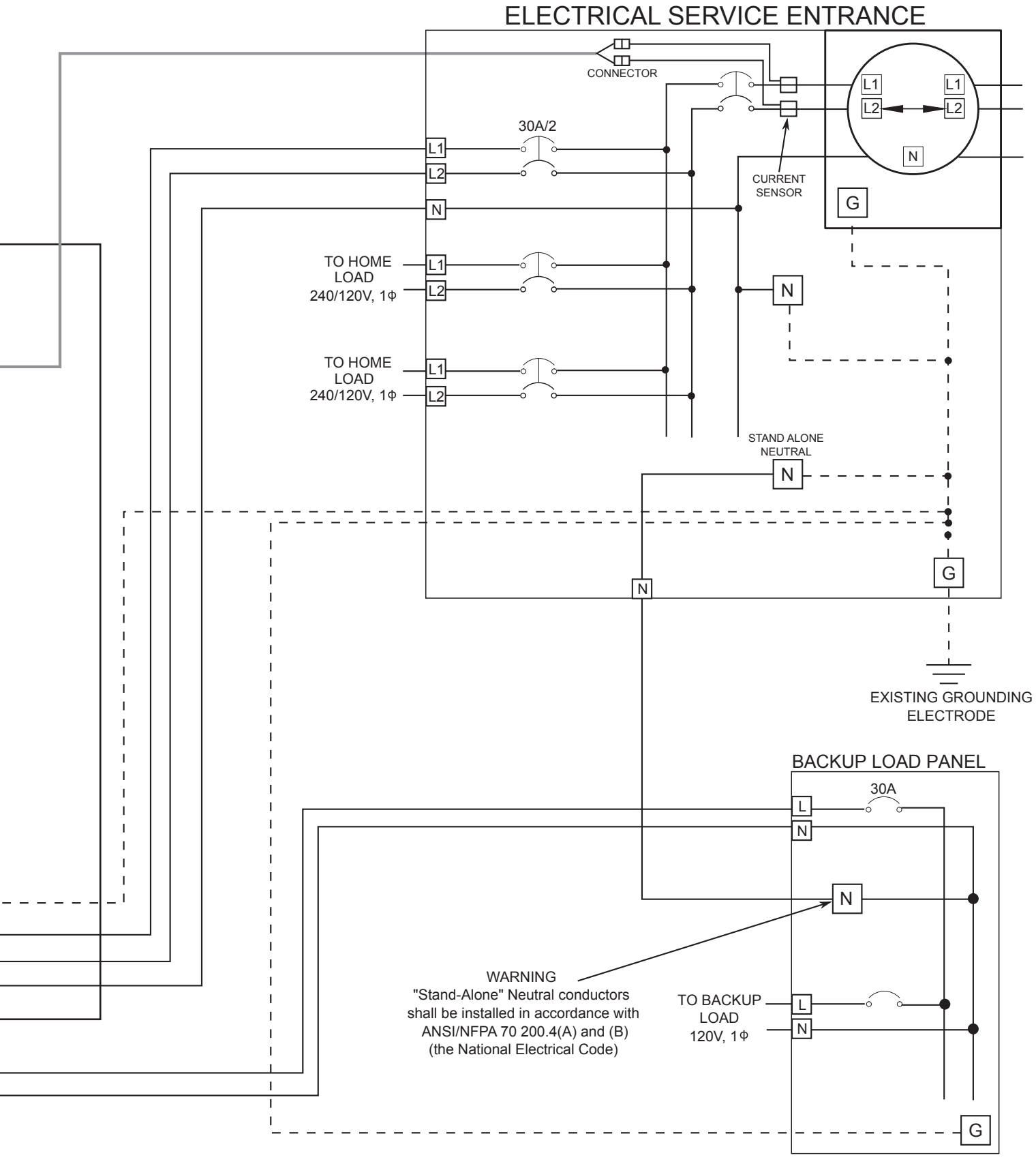
THD-S55P3BB-US

■ TYPICAL INSTALLATION WITHOUT MAINTENANCE SWITCH PANEL



WARNING

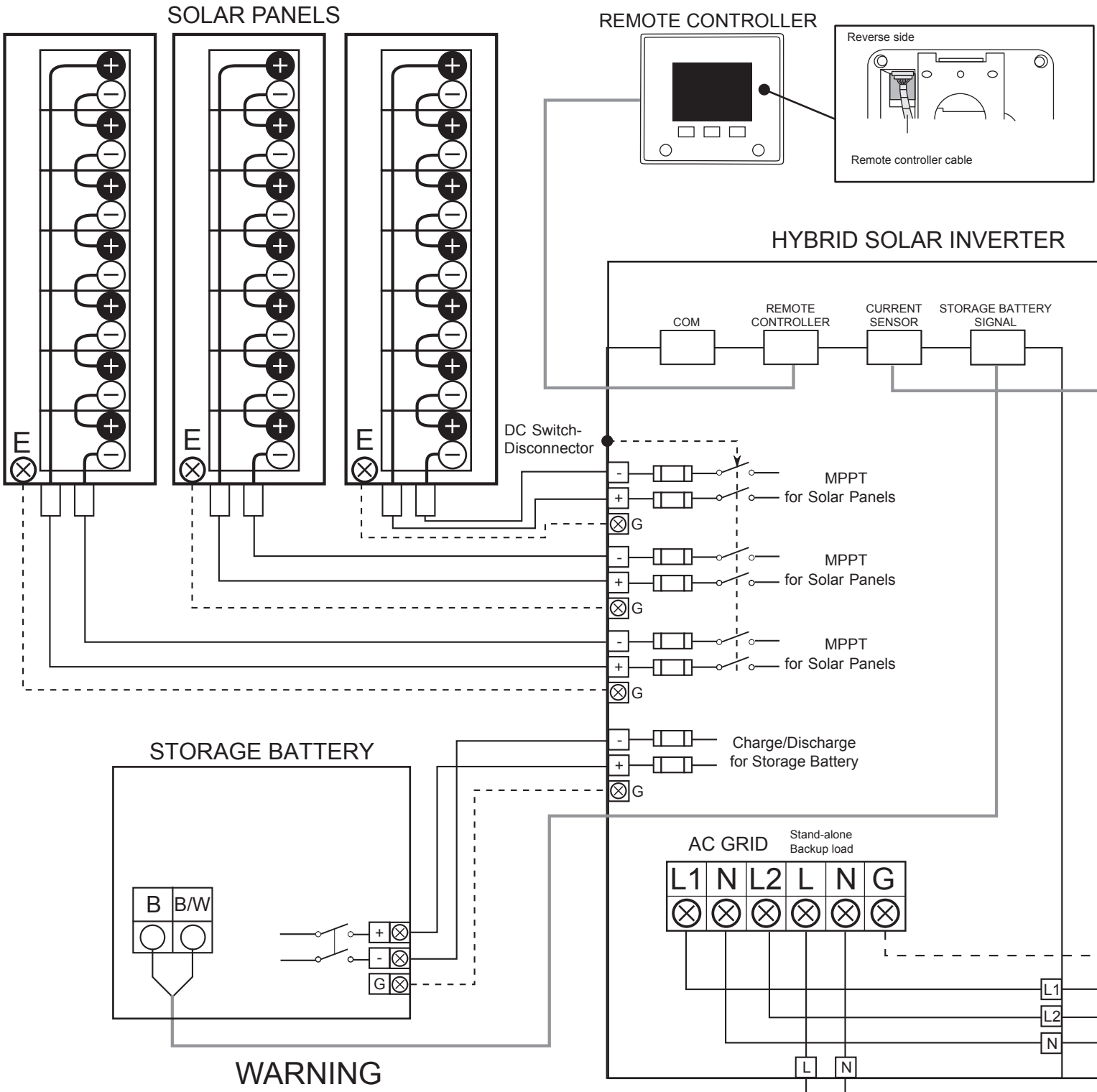
All electrical installations must be made in accordance with the local regulation and National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.


ELECTRICAL SERVICE ENTRANCE
CONNECTOR
30A/2
L1
L2
N
CURRENT SENSOR
G
TO HOME LOAD 240/120V, 1ϕ
TO HOME LOAD 240/120V, 1ϕ
STAND ALONE NEUTRAL
EXISTING GROUNDING ELECTRODE
BACKUP LOAD PANEL
30A
L
WARNING
"Stand-Alone" Neutral conductors shall be installed in accordance with ANSI/NFPA 70 200.4(A) and (B) (the National Electrical Code)
TO BACKUP LOAD 120V, 1ϕ

WIRING SCHEMATIC OF SINGLE PHASE SYSTEM

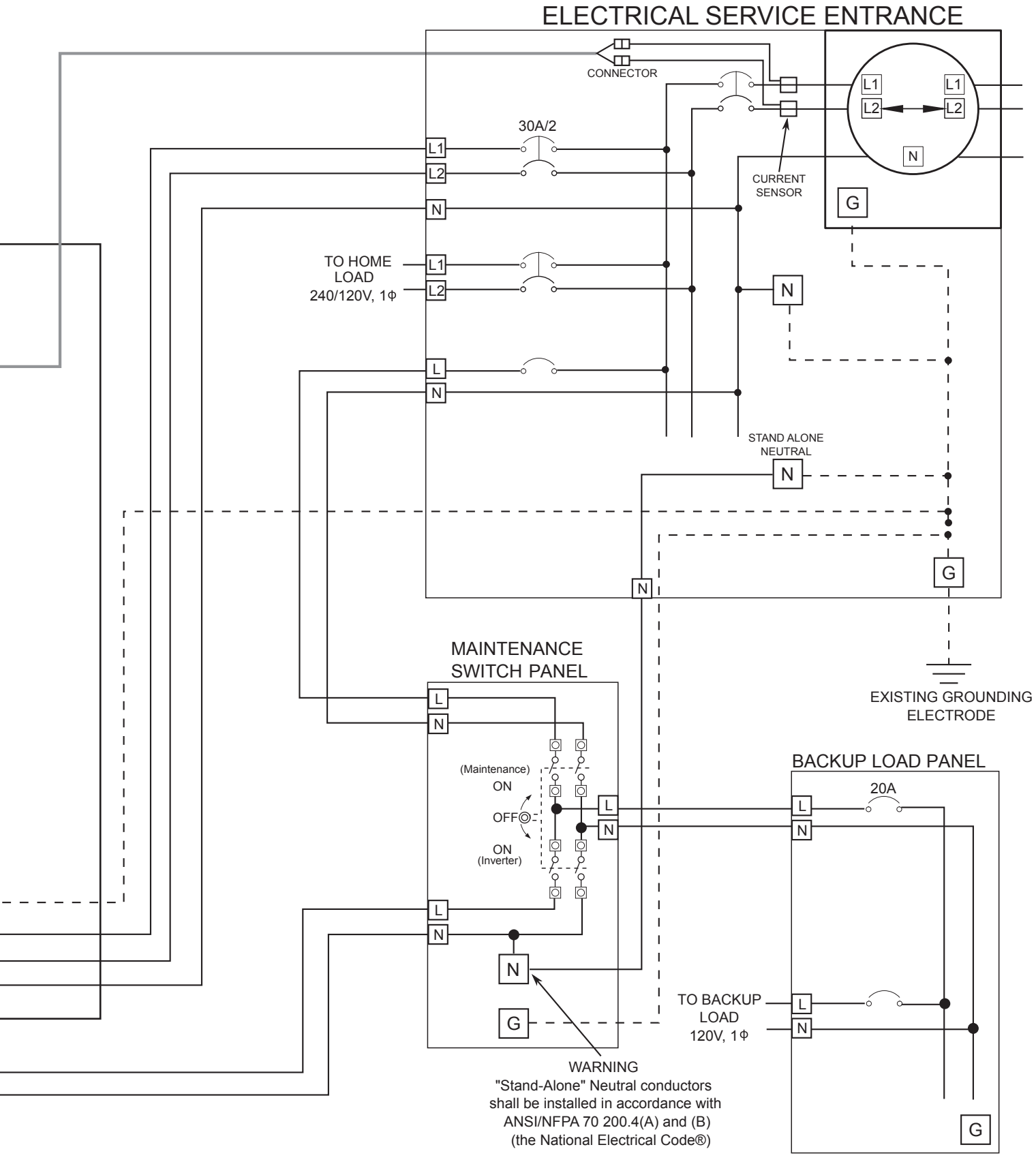
THD-S55P3B-US

■ TYPICAL INSTALLATION WITH MAINTENANCE SWITCH PANEL



WARNING

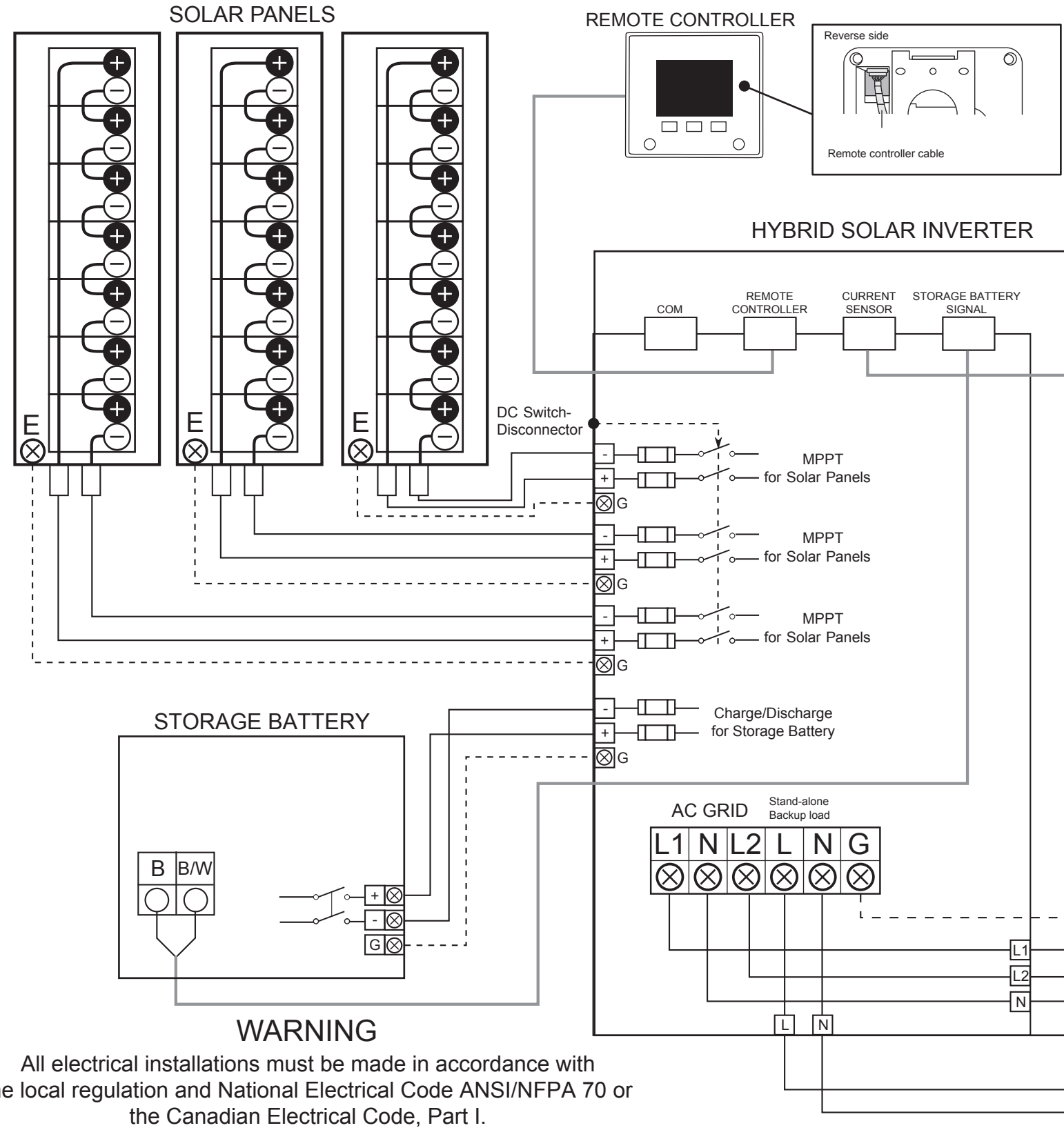
All electrical installations must be made in accordance with the local regulation and National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.


ELECTRICAL SERVICE ENTRANCE
CONNECTOR
30A/2
L1
L2
N
CURRENT SENSOR
G
TO HOME LOAD 240/120V, 1ϕ
L
STAND ALONE NEUTRAL
MAINTENANCE SWITCH PANEL
(Maintenance) ON
OFF
ON (Inverter)
BACKUP LOAD PANEL
20A
TO BACKUP LOAD 120V, 1ϕ
EXISTING GROUNDING ELECTRODE
WARNING
"Stand-Alone" Neutral conductors shall be installed in accordance with ANSI/NFPA 70 200.4(A) and (B) (the National Electrical Code®)

WIRING SCHEMATIC OF SINGLE PHASE SYSTEM

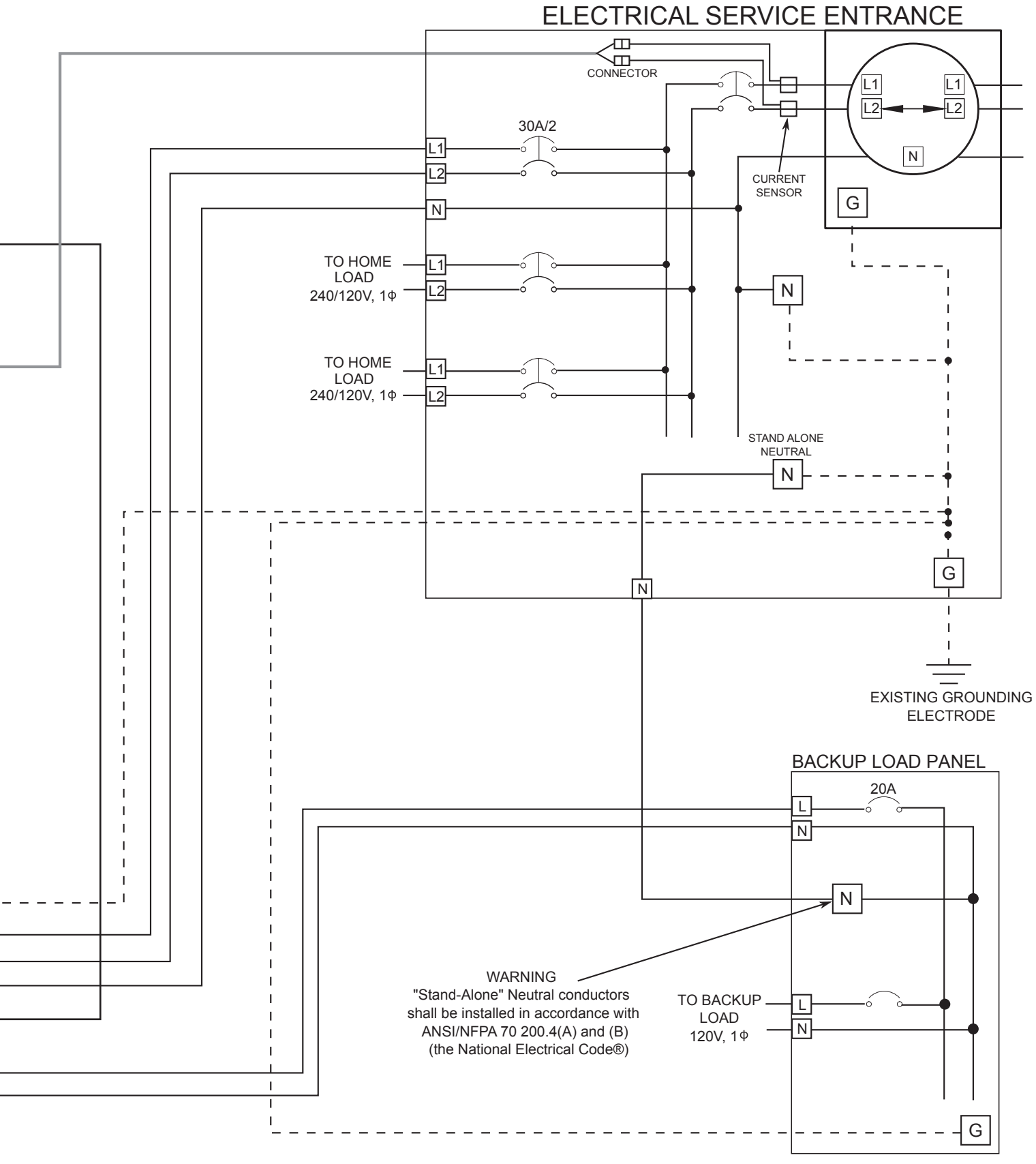
THD-S55P3B-US

■ TYPICAL INSTALLATION WITHOUT MAINTENANCE SWITCH PANEL



WARNING

All electrical installations must be made in accordance with the local regulation and National Electrical Code ANSI/NFPA 70 or the Canadian Electrical Code, Part I.


ELECTRICAL SERVICE ENTRANCE
CONNECTOR
L1
L2
N
G
30A/2
CURRENT SENSOR
TO HOME LOAD 240/120V, 1ϕ
TO HOME LOAD 240/120V, 1ϕ
STAND ALONE NEUTRAL
EXISTING GROUNDING ELECTRODE
BACKUP LOAD PANEL
20A
WARNING
"Stand-Alone" Neutral conductors shall be installed in accordance with ANSI/NFPA 70 200.4(A) and (B) (the National Electrical Code®)
TO BACKUP LOAD 120V, 1ϕ

Setting the Internal Mode Switches

The internal mode switches are located on the control PCB inside the inverter. These switches enable the UL1741SA mode and the Self-supply mode.
If these two modes are not needed for this installation, please disregard this manual.

1 Make sure the following SW/Breakers are OFF.

Refar the “WIRING SCHEMATIC OF SINGLE PHASE SYSTEM” on Pages 32 - 33.

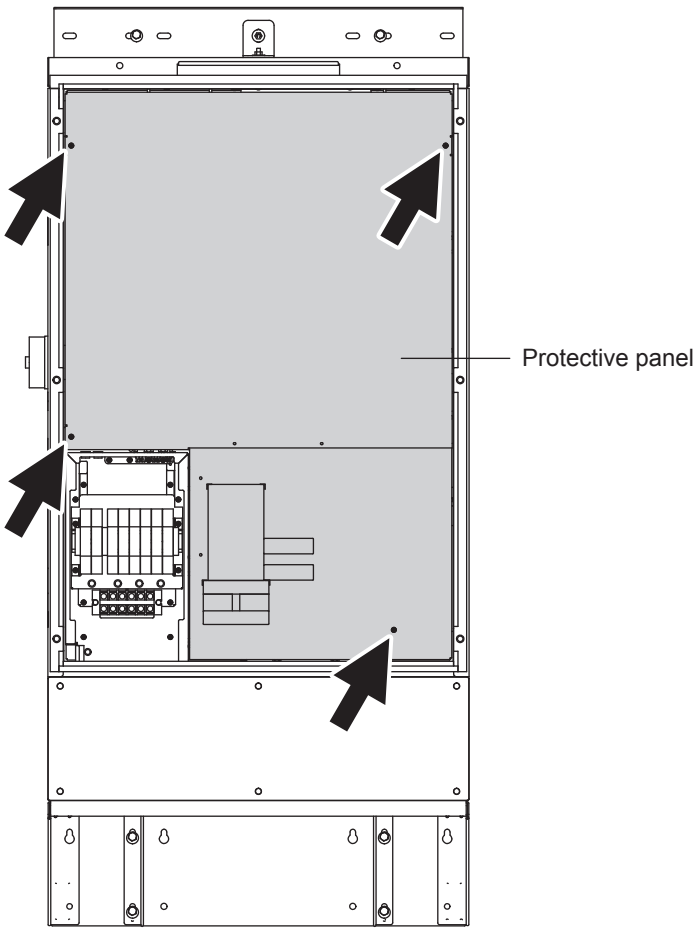
a. DC Disconnect Switch on the left side of the inverter
b. Grid-tied breaker in the Electrical Service Panel
c. All breakers in the Backup Load Panel
d. Battery breaker on the back of the storage battery

DANGER

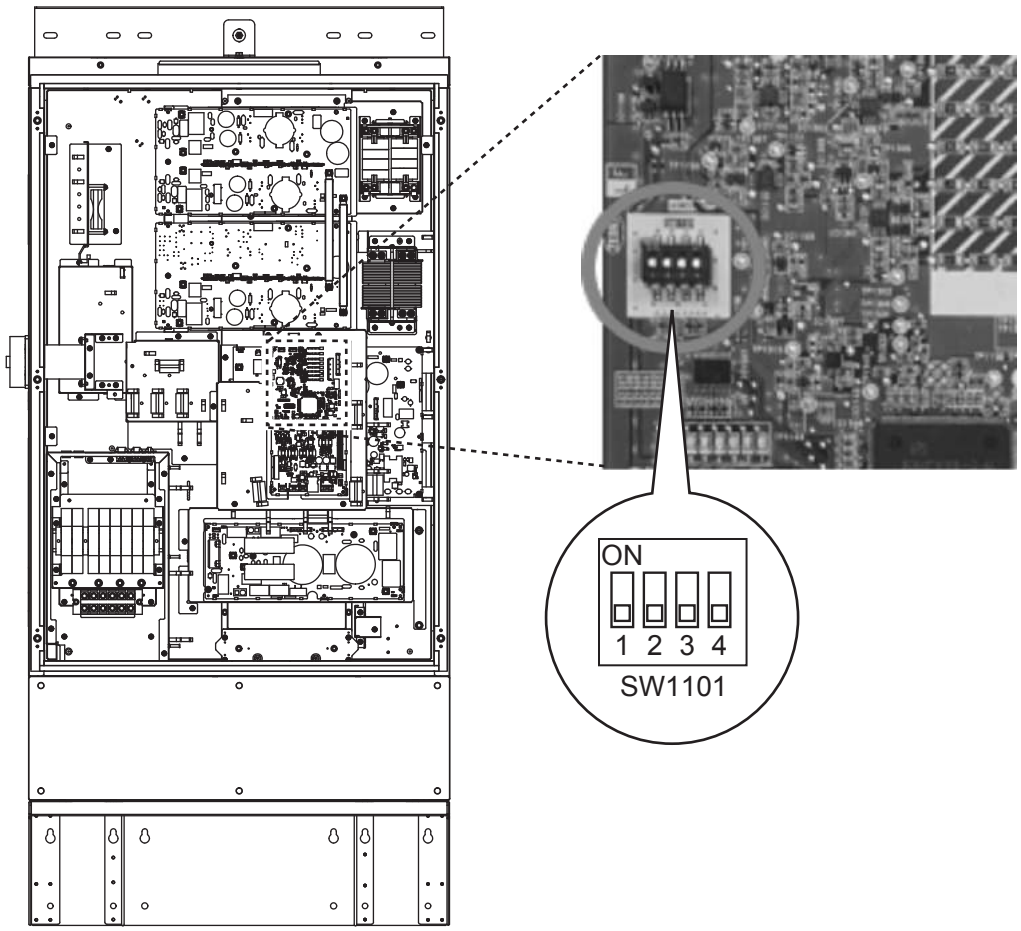
Risk of death or serious injury due to electric shock. Wait 5 minutes after disconnecting the inverter from the utility grid, the PV array and the storage battery.

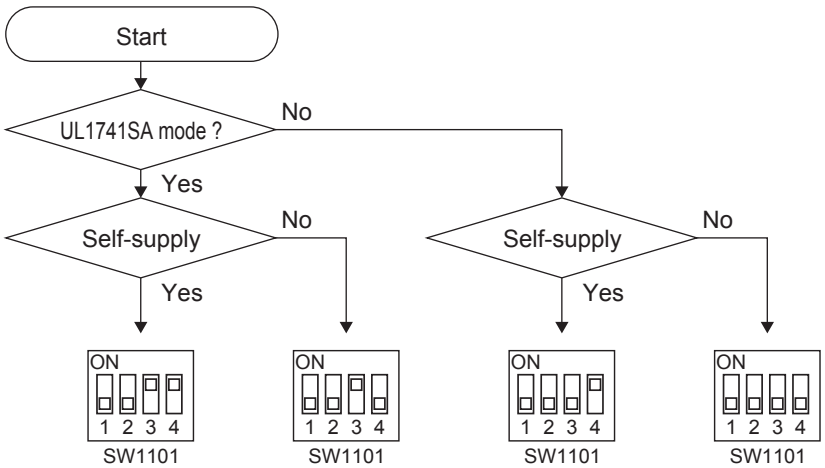
---

2 Remove the (4) screws and detach the protective panel.



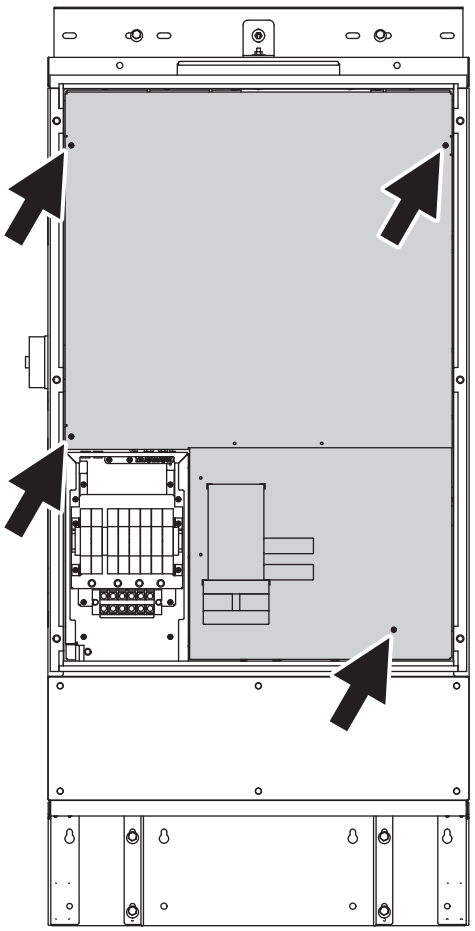
3 Set the SW1101 DIP switches on the PCB for the needed operation mode based on the flowchart below.





4 Reinstall the protective panel (4 screws).

Tightening Torque: 1.37 to 1.57 Nm (1.01 to 1.16 ft·lb)



Stand-alone Operation Check

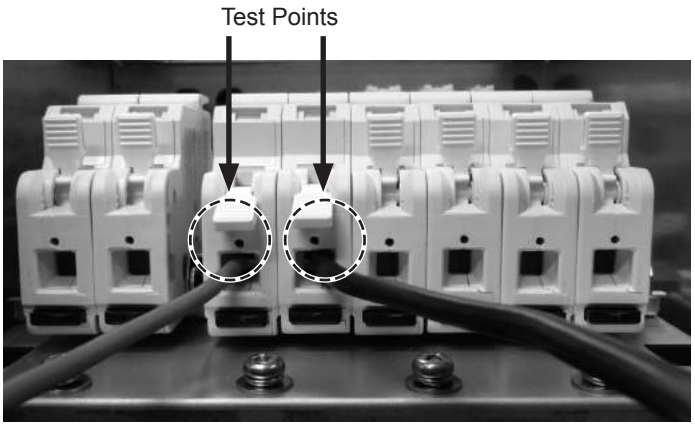
Confirm that the DC Switch-Disconnector on the outside of the inverter, the grid-tied breaker in the Electrical Service Entrance, the breakers in the Backup Load Panel, and the switch inside the storage battery are the OFF position.
Activate power as explained in the following procedure.
Supplying power to improperly connected wires will damage the inverter or storage battery.
(Service required as a result of incorrect wiring or improper installation will be subject to billing.)

1 Check wiring to the solar panels.

CAUTION Do not set the DC Switch-Disconnector on the inverter to the ON position yet.

① Confirm that there is a sufficient amount of sunlight.
② Connect the cable between the solar panels and the inverter.
③ Confirm the voltage to all solar panel input terminals is as written in the box below.
Measure voltage at the test points shown in the picture on the right.

(Pay attention to polarity.)
Voltage between N terminal (-) and P terminal (+):
80 to 600 V DC



2 Activate and check the power of the storage battery.

① Confirm that the [+] and [-] cables are not shorted, open the switch cover and set the switch inside the storage battery to the ON position.
② Confirm the green LED operation light on the storage battery is lit.
③ Measure the voltage across the storage battery terminals inside the inverter as written below.
Measure voltage at the test points as shown in the picture below.

⚠ WARNING

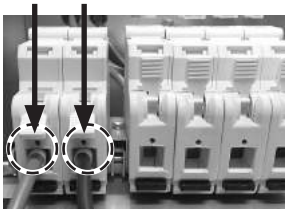
MANDATORY

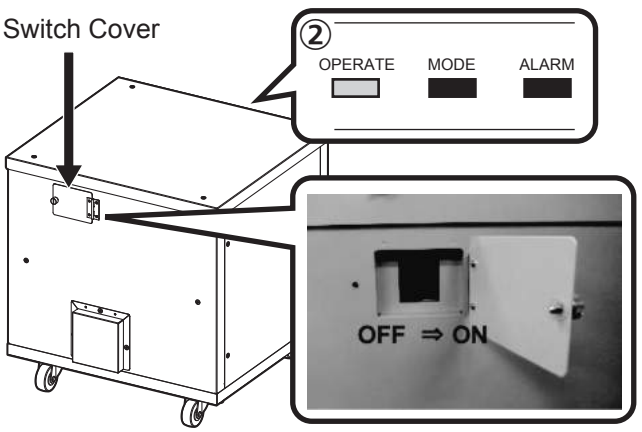
- **Do not short the [+] cable (black) or [-] cable (white) of the storage battery.**
Shorted cables may damage the storage batteries and result in fire or electric shock.

(Pay attention to polarity.)
Voltage between P terminal (+) and N terminal (-):

THE-S55P3BB-USW	120 to 200V DC
THD-S55P3BB-US	120 to 200V DC
THD-S55P3B-US	60 to 100V DC

Test Points





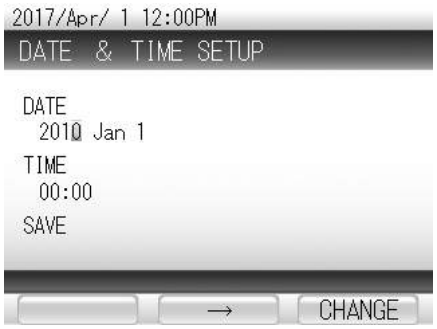
3 Start up the inverter.

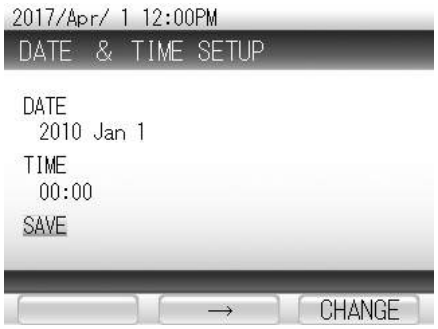
Set the DC Switch-Disconnector to the ON position.

4 Remote Controller initial settings

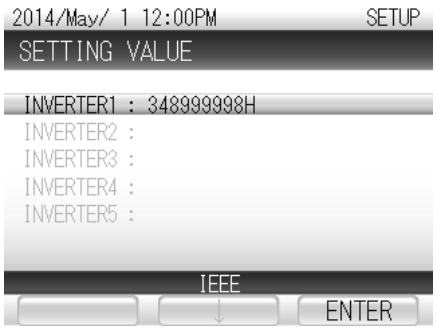
When the inverter is switched on initially, “TIME & DATE SETUP” will appear.

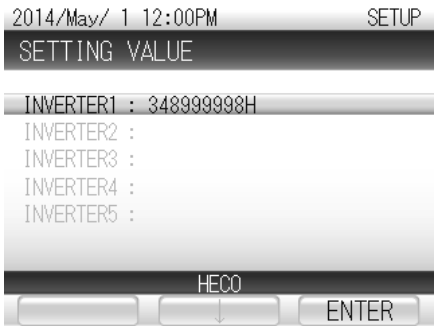
① Set date and time, and press enter by setting cursor position on “SAVE”.



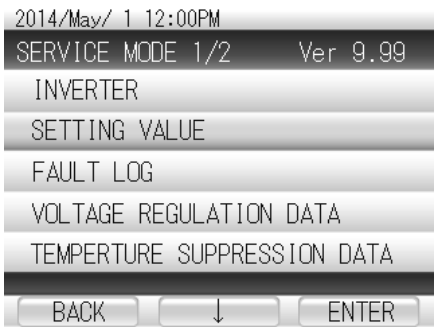


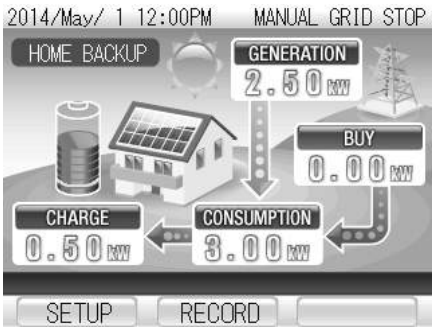
② “SETTING VALUE” will appear after “SAVE”.
Press “ENTER” . “SERVICE MODE 1/2” will appear.



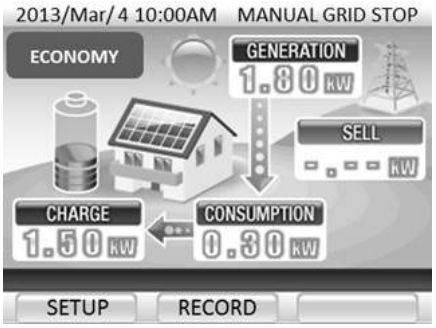


③ Press “BACK” to return to home screen.





5 Confirm communication between the storage battery and stand-alone operation.



① Check the Remote Controller display.
"MANUAL GRID STOP" should be displayed.

② Press the [RUN/STOP] button on the Remote Controller.
The button will turn red.
The amount of solar power generated and the storage battery charge amount will be displayed.

The maximum rate of charge to the storage battery is 3.0 kW. (0 to 3.0 kW will be shown depending on the amount of sunlight). If no load is connected to the inverter, a positive value shown under consumption represents the output power required to operate the inverter.
When solar power is not being generated, power is discharged from the storage battery. On the storage battery, the MODE status indicator will be green when charging and orange when discharging.

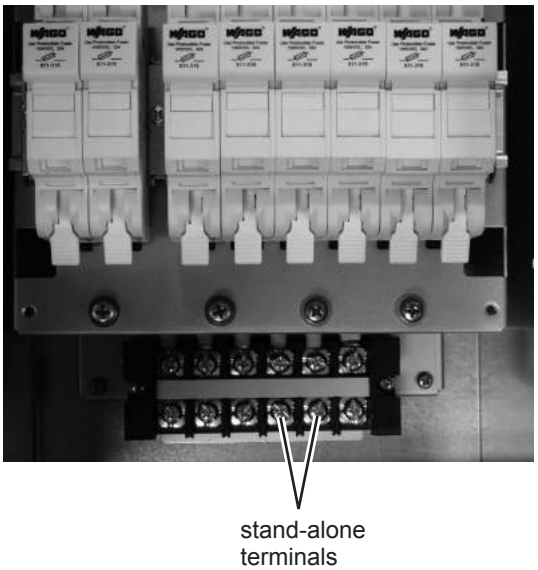
If the inverter does not start operation and any error message is displayed on the Remote Controller, turn off a DC-switch Disconnecter of the inverter, a switch of the storage battery and an AC breaker outside of the inverter. Then wait for about 5min. until the display of the Remote Controller turn off.
Afterward turn on the DC-switch Disconnecter of the inverter, the switch of the storage battery and the AC breaker outside of the inverter. Resume steps ① and ② .

.

6 Check the voltage on the stand-alone terminals.

Confirm that the voltage at the stand-alone terminals is stand-alone output voltage*[1].

*1: THE-S55P3BB-US 240±12V
THD-S55P3BB-US 120±6V
THD-S55P3B-US 120±6V



7 Stop stand-alone operation.

If it takes two or more days until the next grid connection.

- **Perform steps ① to ③ and stop the system.**
  The over-discharge prevention function of the storage battery may trip unless the system is stopped.
  ※ See below.
  (To start grid-tied operation, restart the system.)
- **To check grid-tied operation, perform steps ① to ② and proceed to the "Parameters List" on page 48.**

① Press and hold the [RUN/STOP] button for 5 sec or longer to stop operation.
The status lamp will go out.

② Set the DC Switch-Disconnector on the inverter to the OFF position.

③ Set the switch inside the storage battery to the OFF position, and close the switch cover.

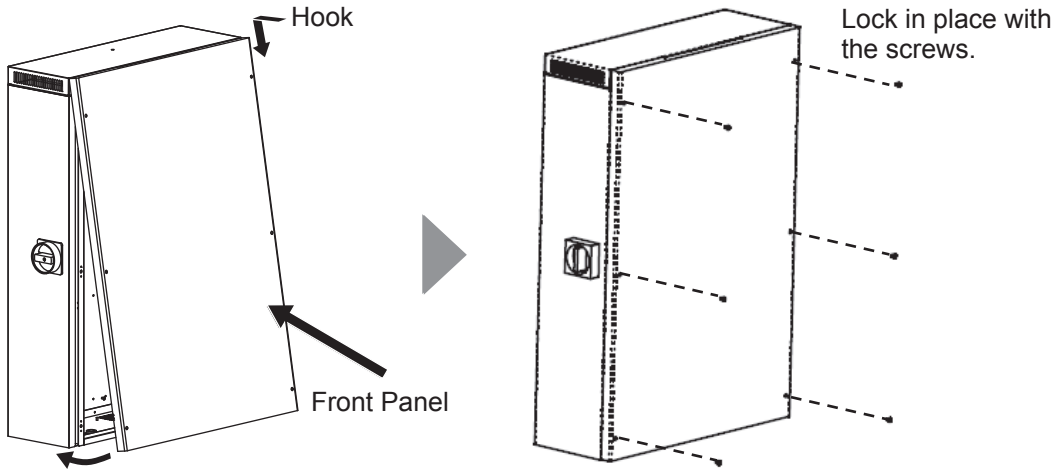
Over-discharge prevention:
The storage battery cannot be charged without power supplied from the commercial power grid or solar panels. If the storage batteries are not charged for 2 days or longer when the remaining charge is 0% then the storage battery switch will automatically turn off to prevent over-discharging.
If the over-discharge prevention function trips, set the switch to the ON position to enable charging of the storage battery.

8 Attach the front panel of the Hybrid Solar Inverter and the panel.

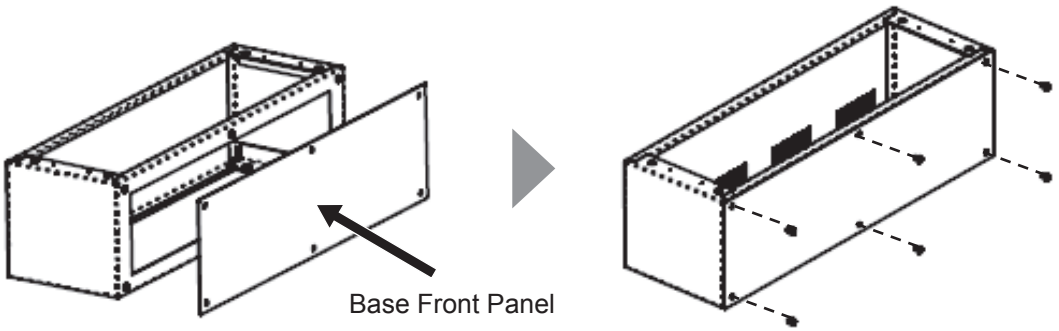
Tightening Torque: 1.88 to 2.08 Nm (1.39 to 1.53 ft·lb)

① Attach the front panel to the Hybrid Solar Inverter (6 screws).

Please close by hooking the front panel to the upper body.



② Attach the front panel to the base (6 screws).



Parameters List

IEEE Parameters List

Display #	Description	Default	Range
OVDLY1	AC Overvoltage Detection Time 1	0.16 sec	0.10 / 0.13/ 0.16 sec
OVDLY2	AC Overvoltage Detection Time 2	1 sec	1 / 2 / 3 / 4 / 5 / 6 / 7 / 9 / 11 / 13 sec
UVDLY1	AC Undervoltage Detection Time 1	0.16 sec	0.10 / 0.13 / 0.16 sec
UVDLY2	AC Undervoltage Detection Time 2	1 sec	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 11 sec
UVDLY3	AC Undervoltage Detection Time 3	2 sec	2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 / 18 / 21 sec
OFR1	AC Overfrequency Detection Level 1	+0.5 Hz	+0.0 / +0.5 / +1.0 / +1.5 / +2.0 / +2.5 / +3.0 / +3.5 / +4.0 Hz
OFDLY1	AC Overfrequency Detection Time 1	2 sec	2 / 5 / 10 / 20 / 50 / 100 / 150 / 200 / 250 / 300 sec
OFR2	AC Overfrequency Detection Level 2	+2.0 Hz	+0.0 / +0.5 / +1.0 / +1.5 / +2.0 / +2.5 / +3.0 / +3.5 / +4.0 Hz
OFDLY2	AC Overfrequency Detection Time 2	0.16 sec	0.16 / 0.5 / 1 / 1.5 / 2 / 2.5 / 4 / 6 / 8 / 10 sec
UFR1	AC Underfrequency Detection Time 1	-0.5 Hz	-0.0 / -0.5 / -1.0 / -1.5 / -2.0 / -2.5 / -3.0 / -3.5 / -4.0 Hz
UFDLY1	AC Underfrequency Detection Time 1	2 sec	2 / 5 / 10 / 20 / 50 / 100 / 150 / 200 / 250 / 300 sec
UFR2	AC Underfrequency Detection Level 2	-3.0 Hz	-0.0 / -0.5 / -1.0 / -1.5 / -2.0 / -2.5 / -3.0 / -3.5 / -4.0 Hz
UFDLY2	AC Underfrequency Detection Time 2	0.16 sec	0.16 / 0.5 / 1 / 1.5 / 2 / 2.5 / 4 / 6 / 8 / 10 sec
TIMER	Power Restoration to Generation Time	300 sec	1 / 10 / 150 / 180 / 240 / 300 sec
VOV	Voltage Increase Limit	129.0 V	OFF / 127.0 / 128.0 / 129.0 / 130.0 / 131.0 / 132.0 V
TDH	Passive Control Detection Level	1.8 Hz	0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2.0 / 3.0 / 4.0 / 5.0 Hz
VOVL	Voltage Increase Limit Level	0 %	0 / 50 %
PF	Power Factor	+1.00	+0.80 / +0.81 / +0.82 / +0.83 / +0.84 / +0.85 / +0.86 / +0.87 / +0.88 / +0.89 / +0.90 / +0.91 / +0.92 / +0.93 / +0.94 / +0.95 / +0.96 / +0.97 / +0.98 / +0.99 / +1.00 / -0.80 / -0.81 / -0.82 / -0.83 / -0.84 / -0.85 / -0.86 / -0.87 / -0.88 / -0.89 / -0.90 / -0.91 / -0.92 / -0.93 / -0.94 / -0.95 / -0.96 / -0.97 / -0.98 / -0.99
SAVOLT	Stand Alone Voltage	120 V	120 / 240 V

* SAVOLT is fixed “120 V”. SAVOLT is not used for all the models.

■ IEEE Fixed List

	Description	Fixed Value
OVR1	AC Overvoltage Detection Level 1	288 V
OVR2	AC Overvoltage Detection Level 2	264 V
UVR1	AC Undervoltage Detection Level 1	108 V
UVR2	AC Undervoltage Detection Level 2	144 V
UVR3	AC Undervoltage Detection Level 3	211.2 V

HECO Parameters List (UL 1741 SA compliance is not required.)

Display #	Description	Default	Range
UVDLY2	AC Undervoltage Detection Time 2	16 sec	11 / 12 / 13 / 14 / 15 / 16 / 17 / 18 / 19 / 20 / 21 sec
TIMER	Power Restoration to Generation Time	300 sec	10 / 300 / 360 / 420 / 480 / 540 / 600 sec
VOV	Voltage Increase Limit	129.0 V	OFF / 127.0 / 128.0 / 129.0 / 130.0 / 131.0 / 132.0 V
TDH	Passive Control Detection Level	1.8 Hz	0.8 / 1.0 / 1.2 / 1.4 / 1.6 / 1.8 / 2.0 / 3.0 / 4.0 / 5.0 Hz
VOVL	Voltage Increase Limit Level	0 %	0 / 50 %
PF	Power Factor	+1.00	+0.80 / +0.81 / +0.82 / +0.83 / +0.84 / +0.85 / +0.86 / +0.87 / +0.88 / +0.89 / +0.90 / +0.91 / +0.92 / +0.93 / +0.94 / +0.95 / +0.96 / +0.97 / +0.98 / +0.99 / +1.00 / -0.80 / -0.81 / -0.82 / -0.83 / -0.84 / -0.85 / -0.86 / -0.87 / -0.88 / -0.89 / -0.90 / -0.91 / -0.92 / -0.93 / -0.94 / -0.95 / -0.96 / -0.97 / -0.98 / -0.99
SAVOLT	Stand Alone Voltage	120 V	120 / 240 V

* SAVOLT is fixed “120 V”. SAVOLT is not used for all the models.

■ HECO Fixed List (UL 1741 SA compliance is not required.)

	Description	Fixed Value
OVR1	AC Overvoltage Detection Level 1	264V
OVDLY1	AC Overvoltage Detection Time 1	1sec
OVR2	AC Overvoltage Detection Level 2	288V
OVDLY2	AC Overvoltage Detection Time 2	0.16sec
UVR1	AC Undervoltage Detection Level 1	211.2V
UVDLY1	AC Undervoltage Detection Time 1	21sec
UVR2	AC Undervoltage Detection Level 2	168V
UVR3	AC Undervoltage Detection Level 3	120V
UVDLY3	AC Undervoltage Detection Time 3	0.16sec
OFR1	AC Overfrequency Detection Level 1	63Hz
OFDLY1	AC Overfrequency Detection Time 1	21sec
OFR2	AC Overfrequency Detection Level 2	64Hz
OFDLY2	AC Overfrequency Detection Time 2	0.16sec
UFR1	AC Underfrequency Detection Level 1	57Hz
UFDLY1	AC Underfrequency Detection Time 1	21sec
UFR2	AC Underfrequency Detection Level 2	56Hz
UFDLY2	AC Underfrequency Detection Time 2	0.16sec

Parameter Setting

When requesting UL 1741 SA compliance, the Parameter Setting is unnecessary.
Use the tool prepared by Tabuchi Electric to set it.
For details on the tool, contact the TABUCHI ELECTRIC Service Line.

To change the initial parameter settings, go through the following steps.
The adjustment of the setting requires approval from the Authority Having Jurisdiction.

1 Restart the system if the system is not running.

① See Page 19 and remove the front panel of the Hybrid Solar Inverter and the base.
Confirm that the DC Switch-Disconnector on the outside of the inverter is in the OFF position.

② Open the switch cover on the storage battery and set the switch to the ON position.

③ Set the grid-tied breaker to the ON position.
(When the inverter is tied to the grid through a secondary feed, set the Master breaker to the ON position, as well.)
Confirm that the terminal voltage of the grid-tied breaker and Master breaker is 120/240 V.

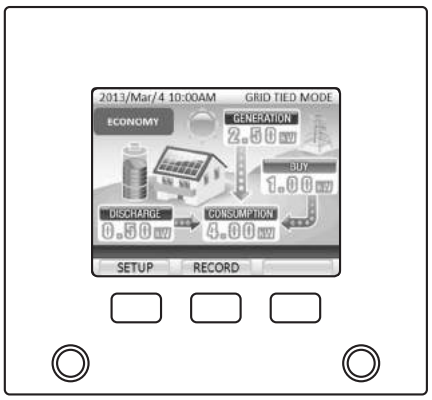
---

2 Set the Remote Controller to the Service Mode.

① From the Home Screen, confirm that stand-alone and grid-tied operation are manually stopped.

② Press and hold the [SETUP] and [RECORD] buttons for 5 seconds or more to enter the Service Mode.

③ Caution Message is displayed, press [ENTER].

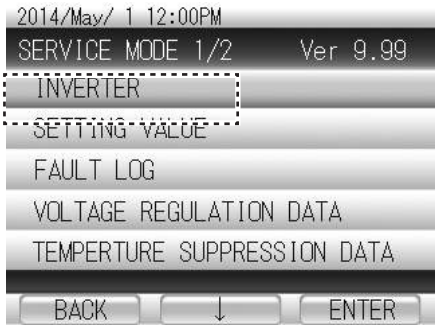


Press and hold both buttons for 5 seconds or more.

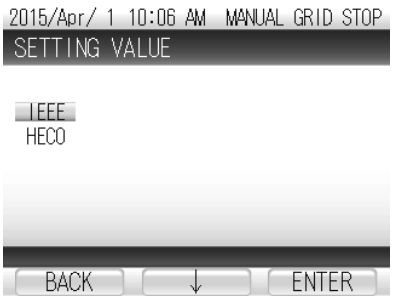
---

3 Set parameters.

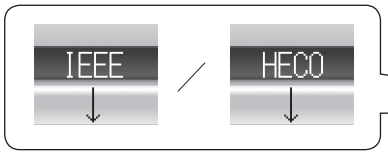
① From the SERVICE MODE 1/2 screen, select "SETTING VALUE" and press [ENTER].

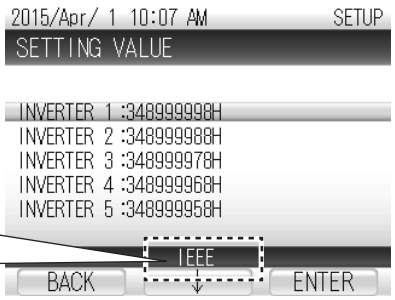


② Press [↓], select "IEEE" or "HECO", and then press [ENTER].



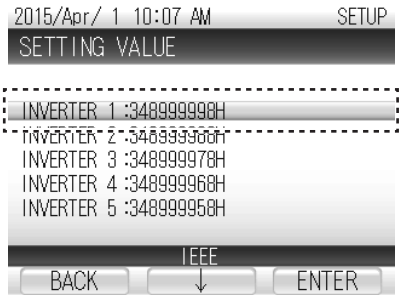
Press [ENTER] to display "IEEE" or "HECO" under subsequent settings screens.



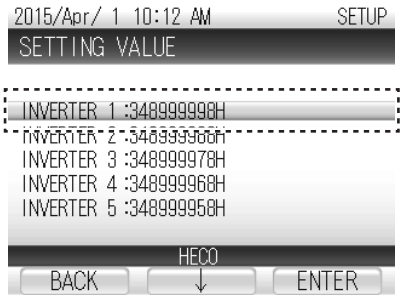


③ Confirm the “SETTING VALUE FOR INVERTER 1” is selected and press [ENTER].

IEEE



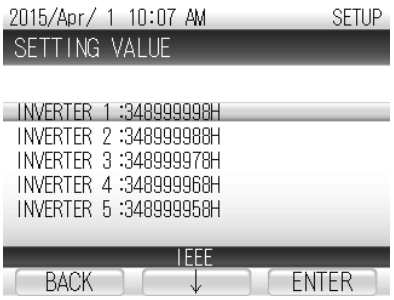
HECO

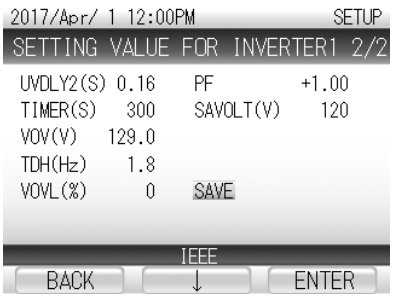


④ The parameter menu will appear. (See Page 48 for a description of the parameters in the parameter menu.)

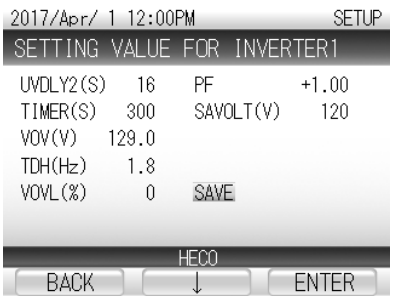
Scroll through the parameter menu using the [↓] button. To select a parameter, press the [ENTER] button.

IEEE



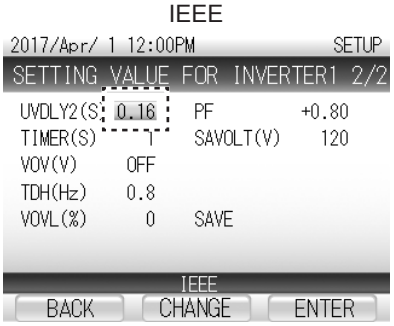


HECO

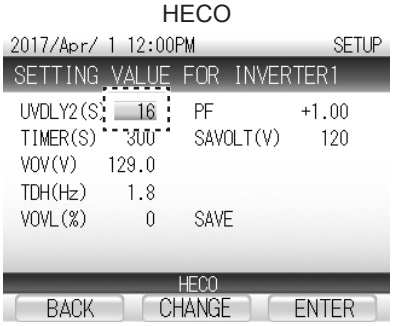


⑤ Press [CHANGE] to change the value to the desired value.

IEEE



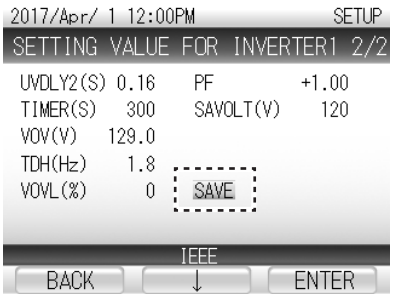
HECO



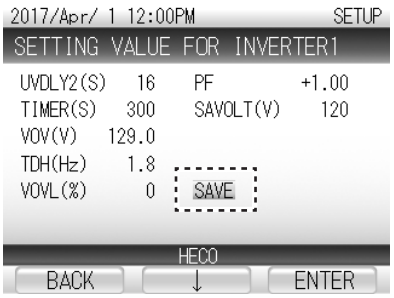
⑥ Press [ENTER] to return to the parameter menu. Repeat Steps ③ to ⑤ to change other parameters.

⑦ When all parameters changes are complete, select “SAVE” and press [ENTER].

IEEE

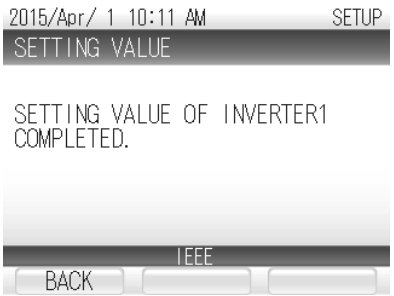


HECO

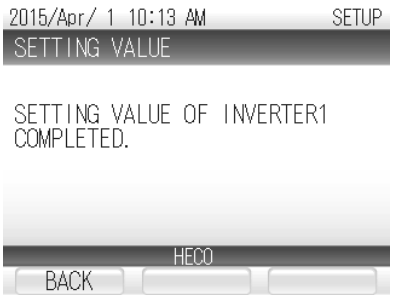


⑧ Settings are entered and a confirmation screen will appear. To return to the Home Screen, press [BACK] three times.

IEEE



HECO



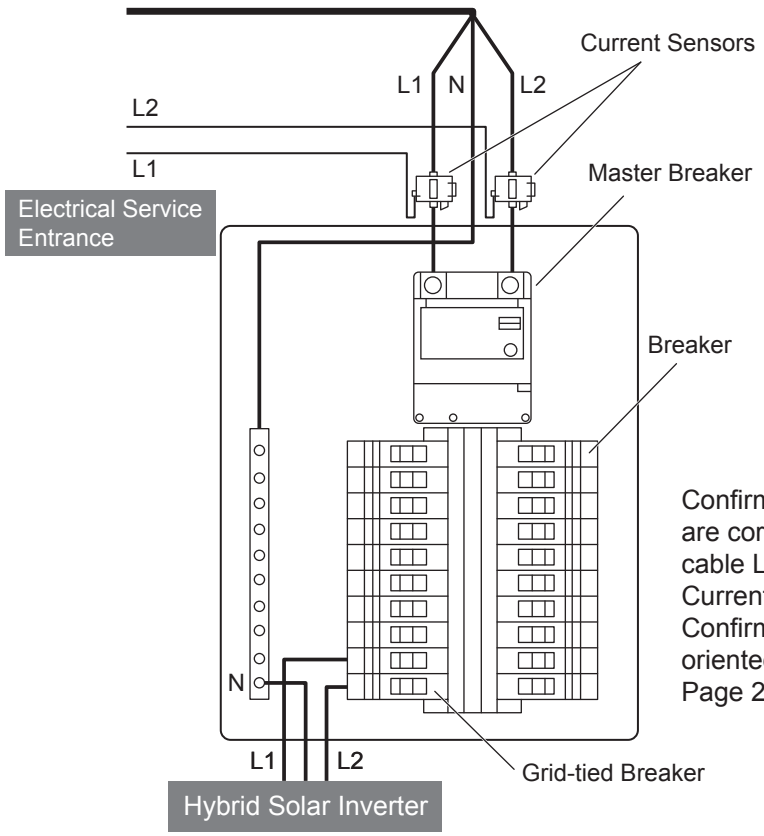
Grid-tied Operation Check

1 Confirm that Current Sensors are installed.

Turn OFF all loads and confirm that only the amount of power charged to the storage battery is correctly measured by the installed Current Sensors.

Confirm the following 2 items:

- Confirm that the DC Switch-Disconnector is in the OFF position and the storage battery switch is in the ON position.
- Confirm that the grid-tied breaker connected to the inverter to is in the ON position and the breakers to the other loads are in the OFF position.



Confirm that the Current Sensors are correctly installed on the electric cable L1 and L2 as the labels on the Current Sensor cables.
Confirm that the Current Sensor is oriented as shown in the figure on Page 28.

① Confirm that grid-tied operation has been manually stopped.

② Press the [RUN/STOP] button on the Remote Controller to start grid-tied operation.
The status light will turn green, and “GRID-TIED MODE” will be displayed.

③ Confirm the storage battery charge on the Remote Controller.
The value should be around 3.0 kW charging.

④ Press and hold the [RUN/STOP] button for 5 seconds or more to stop the grid-tied operation.
“MANUAL GRID STOP” will be displayed and the status light will turn off.

2 Check grid-tied operation.

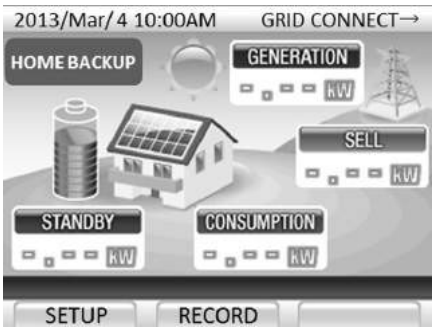
① Set inverter DC Switch-Disconnectors to the ON position.

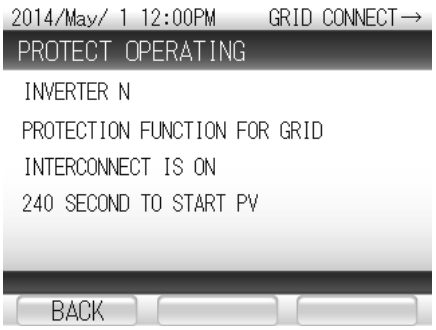
② Set the grid-tied breakers to the ON position.

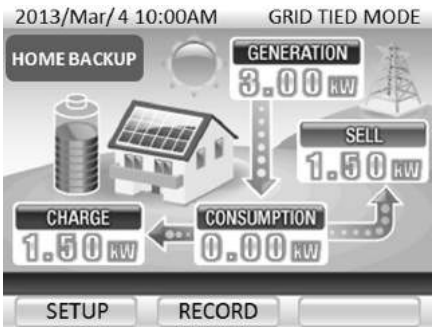
③ Press the [RUN/STOP] button to start grid-tied operation.

"GRID CONNECT→" appears for the duration configured by the setting value. Afterwards, "GRID-TIED MODE" appears and the status light turns green.

The initial operation is set as HOME BACKUP Mode.
The battery will be charged with about 3.0kW power until fully charged.







3 Check the Backup Load Panel connections.

① Confirm that the breakers in the backup load panel are in the OFF position.

② Confirm that the bus voltage in the backup load panel is at 120 V.

4 Confirm that the power recovery is active during a power outage.

① Set both the main breaker and the grid-tied breaker in the Electrical Service Entrance to the OFF position.
The power outage error code “gxxx” should be displayed on the Remote Controller.

② About 5 seconds after Step ① is performed, stand-alone operation starts.
“STAND-ALONE MODE” should be displayed and the status light will turn red.

③ Set both the main breaker and the grid-tied breaker in the Electrical Service Entrance to the ON position.

④ “GRID CONNECT→” should appear after step ③ has been performed. The display changes to “GRID TIED MODE” after the time configured by the setting value elapses.

⑤ Press and hold the [RUN/STOP] button on the Remote Controller for 5 sec or more to stop the grid-tied operation.
“MANUAL GRID STOP” should be displayed and the status light will turn off.

When it takes 2 days or more for equipment to be delivered to a customer (Grid-tied operation starts)

- **Perform Steps ① to ② below to stop the system. Perform steps ③ to ⑤ at the time of delivery to restart the system.**
  (The storage battery over-discharge prevention function of the storage battery may trip unless the system is stopped.)
- **After work is completed, reattach the front panels and the switch cover, and start grid-tied operation as explained in the User’s Manual.**

■ System Shutdown

① Set the DC Switch-Disconnector on the outside of the inverter, the switch inside the storage battery and the grid-tied breaker in the Electrical Service Entrance to the OFF position.

② Attach the front panels to the Hybrid Solar Inverter and base, and close the storage battery switch cover.

■ System Startup

③ Open the storage battery switch cover and set the storage battery switch to the ON position.

④ Set the grid-tied breaker in the Electrical Service Entrance to the ON position.

⑤ Detach the front panel from the Hybrid Solar Inverter and set the DC Switch-Disconnector to the ON position.

■ Configuring the Connection to the Internet

Refer to User ‘s Manual and configure the connection to the Internet.

Troubleshooting

Error Message (Troubleshooting)	Error Code
DETECTED ABNORMALITY INSIDE INVERTER. PLEASE CONTACT THE SERVICE CENTER.	D015, D025, D035, B103 - B104, B106, T001, T003, T004, T006
DETECTED ABNORMALITY INSIDE INVERTER. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE CONTINUES MORE THAN 5 MINUTES.	b101, b109 - b110, E001, E012, E014, E016, E019, E020, e001, e012, e014, e016 - e020, e024, e025
POWER CONSUMPTION ON THE APPLIANCES CONNECTED TO STAND ALONE OUTLET EXCEEDS MAXIMUM POWER LIMIT. PLEASE REDUCE POWER CONSUMPTION BY DISCONNECTING SOME DEVICES.	e009 - e011
INVERTER TEMPERATURE IS OUT OF RANGE. PLEASE CHECK ITS SURROUNDING. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE STAYS ON.	d013, d023, d033, E003, e003
GRID ABNORMALITY DETECTED. WILL RESTART IN 5 MIN. ONCE GRID IS BACK NORMAL. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE CONTINUES MORE THAN 5 MIN.	g001 - g005, g008 - g009
INSUFFICIENT SUNLIGHT OR LOW BATTERY VOLTAGES.	n001, n004
OVER CURRENT IS DETECTED DUE TO THE BACKUP LOAD CURRENT. PLEASE REDUCE THE BACKUP LOAD.	n009
PV VOLTAGE IS HIGH. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE CONTINUES.	d011, d021, d031
PLEASE CONTACT THE SERVICE CENTER IF THIS ERROR MESSAGE CONTINUES.	b103, D011, D013, D021, D023, D031, D033, e008, e026, U026, M055, t006, t007, T007
BATTERY ABNORMALITY DETECTED. PLEASE CONTACT THE SERVICE CENTER.	M034, M037, M039, M041, M043, M044, M046, M047, M049 - M054, M057, M065 - M068, M071, M099, M129 - M132, M137, M138
GRID ABNORMALITY DETECTED. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE CONTINUES MORE THAN 5 MINUTES.	E004, E006, E007, e004, e006, e007
INVERTER FAULT DETECTED. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE CONTINUES MORE THAN 5 MIN.	r-04
INVERTER CANNOT START. RESTART INVERTER WHEN SUNLIGHT RETURNS TO NORMAL. PLEASE CONTACT THE SERVICE CENTER IF INVERTER CANNOT START DURING NORMAL SUNLIGHT.	r-16, r-18
PETRIEVING IP ADDRESS FAILED. PLEASE CONFIRM CONNECTION AND PRESS “RETRY” KEY.	r-10

Error Message (Troubleshooting)	Error Code
STORAGE BATTERY FAULT DETECTED. PLEASE CONTACT THE SERVICE CENTER IF THE ERROR MESSAGE DOESN'T DISAPPEAR AFTER 5 MIN.	m033, m036, m038, m040, m042, m045, m097, m098
REMOTE CONTROLLER IS NOT WORKING PROPERLY. PLEASE CONTACT THE SERVICE CENTER.	R-02, R-03
THE NTP IS OUT OF SYNCHRONIZATION.	r-11
IF OPERATION MODE CANNOT BE SYNCHRONIZED AFTER REST ARTING BY RUN/STOP BUTTON MANUALLY, PLEASE CONTACT THE SERVICE CENTER.	r-14
DATA COPY FAILED.	r-15
INSULATION/GROUND FAULT DETECTED. CONTACT THE SERVICE CENTER.	T008*
INSULATION TEST FAILED. PLEASE CONTACT THE SERVICE CENTER.	T009
ARC TEST FAILED. PLEASE CONTACT THE SERVICE CENTER.	T010
ELECTRIC SHOCK HAZARD ARC FAULT DETECTED. CONTACT THE SERVICE CETER.	U023
ISOLATION TEST NOW PLEASE WAIT A MOMENT.	u030
THE BATTERY STOPPED DUE TO ITS END OF LIFE. PLEASE CONTACT THE SERVICE CENTER.	M058
THE BATTERY WILL SOON REACH ITS END OF LIFE. PLEASE CONTACT THE SERVICE CENTER.	m145
ISOLATION FAULT DETECTED. PLEASE CONTACT THE CENTER.	e027, e028, e029, e030

* WARNING: WHEN A GROUND FAULT IS INDICATED, NORMALLY UNGROUNDED CONDUCTORS MAY BE GROUNDED.
BATTERY TERMINALS AND CONNECTED CIRCUITS MIGHT BE UNGROUNDED AND HAZARDOUS.
Check the PV system for ground faults.

Checking the PV System for Ground Faults

If the Error Code “T008” is displayed in the remote controller, this could indicate a ground fault. The electrical insulation from the PV system to the ground may be defective or insufficient.

DANGER

Risk of death or serious injury due to electric shock.
In the event of a ground fault, high voltage levels can be present.
- Do not touch any exposed parts of the wiring, PV array frame, or inverter circuitry.
- Do not connect PV strings with ground faults to the inverter.

WARNING

Destruction of testing equipment due to overvoltage
- Only use testing equipment with a DC input voltage range up to 1,000 V.

Proceed as following to check each string in the PV system for ground faults.

Procedure:

DANGER **Risk of death or serious injury due to electric shock.**

1. **Disconnect the inverter from all voltage sources.**
2. **Measure the voltages at the DC terminals:**
   - Measure the voltages between the positive terminal and ground.
   - Measure the voltages between the negative terminal and ground.
   - Measure the voltages between the positive and negative terminals.
3. **If the following results are present at the same time, there is a ground fault in the PV system.**
   - All measured voltages are stable.
   - The sum of the two voltages to the ground is approximately equal to the voltage between the positive and negative terminals.
4. **Determine the location of the ground fault via the ratio of the measured voltages.**
5. **Eliminate the ground fault.**

If there is no ground fault and the message is still displayed, contact the TABUCHI ELECTRIC Service Line.

*The voltages between Storage Battery terminals: 120 - 190 V

Disconnecting the Inverter from Voltage Sources
Prior to performing any work on the inverter, always disconnect it from all voltage sources as described in this section.

1. **DANGER** **Risk of death or serious injury due to electric shock.**
   - Disconnect the inverter from the utility grid and confirm that it cannot be reconnected.
   - Disconnect the inverter from the PV array and confirm that it cannot be reconnected.
   - Disconnect the inverter from the storage battery and confirm that it cannot be reconnected.
2. **Wait 5 minutes after disconnecting the inverter from the utility grid, the PV array and the storage battery.**
3. **Remove the 6 screws from the front panel.**
4. **Remove the front panel.**
5. **Use a proper testing equipment to confirm that no voltage is present at the DC terminals.**
6. **Use a proper testing equipment to confirm that no voltage is present at the AC terminals.**

Specifications

Model	THD-S55P3B-US	THD-S55P3BB-US	THE-S55P3B-USW
PV input	3 inputs		
Range of input operating voltage	DC 80-550 V		
Max. input voltage	DC 600 V		
Max. input current	DC 12 A		
Max. photovoltaic input short-circuit current under any condition	DC 15 A		
Intended array configuration(s)	Ungrounded		
For AC grid:			
Output power factor	> 0.95		
Operating voltage range	AC 211.2-264.0 V		
Operating frequency range	58-62 Hz		
Nominal output voltage	AC 240 V		
Nominal output frequency	60 Hz		
Max.continuous output current	AC 22.9 A rms.		
Max.continuous output power	AC 5500 W		
For stand alone:			
Output power factor	0.6-1.0		
Operating voltage range	AC 114-126 V		AC 228-252 V
Operating frequency range	59.4-60.6 Hz		
Nominal output voltage	AC 120 V		AC 240 V
Nominal output frequency	60 Hz		
Max.continuous output current	AC 16.7 A rms.	AC 27.5 A rms.	AC 16.7 A rms.
Max.continuous output power	AC 2000 W	AC 3300 W	AC 4000 W
Max.continuous apparent power	AC 2000 VA	AC 3300 VA	AC 4000 VA
For charge/discharge controller:			
Nominal charging/discharging voltage	DC 86.4 V		DC 172.8 V
Charging/discharging voltage operation range	DC 60-100 V		DC 120-200 V
Max.continuous charging current	DC 16.5 A		
Max.continuous charging power	1500 W	3000 W	
Max.continuous discharging current	DC 26.0 A		
Max.continuous discharging power	2200 W	4400 W	
Operating ambient temperature	-20ºC to 40ºC		
Type of enclosure	NEMA 3		
Noise Emission	≤ 41 dB		
Operating Humidity	≤ 90% (Non-condensing)		
Weight (including base)	Approx. 68 kg (149.9 lb)		
Dimensions (including base)	W 680 × H 1200 × D 250 mm (26.8 × 47.2 × 9.8 in)		

Arc Fault Circuit Protection

The inverter is certified to UL1699B Type 1.
It has protection circuit for arc fault caused by photovoltaics.

FCC Compliance

Notes

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

MEMO

MEMO

Tabuchi Electric Co., Ltd.

DOC02-DS1618-BJ