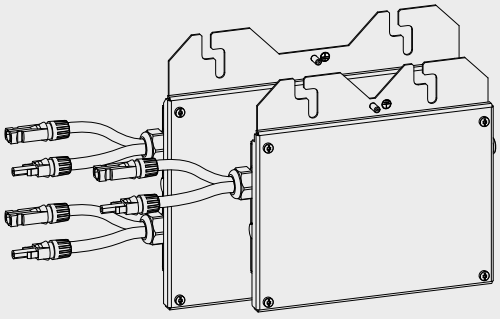
Rapid Shutdown Box - Duo
Rapid Shutdown Box - Quattro

EN-US
Installation Instructions
Balance of System

ES-MX
Instrucciones de instalación
Balance of System

FR
Instructions d'installation
Balance of System



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General

Safety

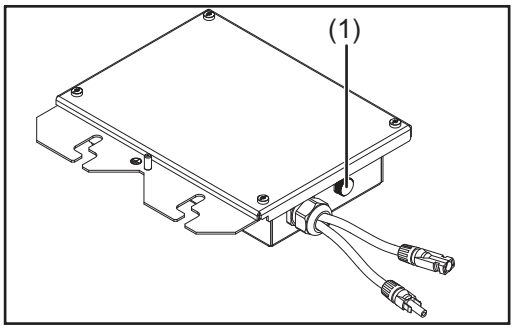
WARNING! Incorrect operation and incorrectly performed work can cause serious injury and damage to property. Only qualified staff are authorized to commission the Rapid Shutdown Box (RSB) and only within the scope of the respective technical regulations. Read the safety rules before installing and performing maintenance work.

WARNING! Work performed incorrectly can cause serious injury and damage. The Rapid Shutdown Box should only be installed and connected by licensed electricians.
Follow the safety rules!
Before any installation or connection work is carried out, disconnect the AC supply to the inverter and the DC supply to the Rapid Shutdown Box.

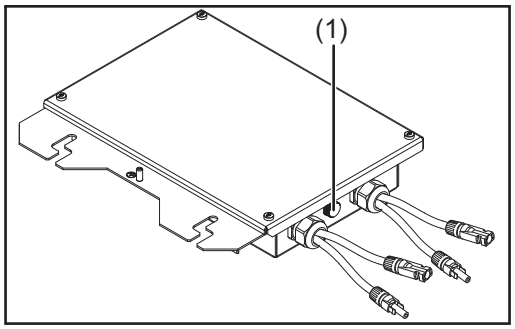
WARNING! An electric shock can be fatal. Inadequately sized electrical components can cause serious injury and damage to property.
- All electrical connections must be made in accordance with the National Electrical Code, ANSI/NFPA 70, and any other regulations applicable to the installation site.
- Installations in Canada must be carried out in accordance with applicable Canadian standards.
- Use copper wire for all spring clamp terminals.
- Use min.194°F (90°C) copper wire for all grounding wires and DC Output wires.
- See NEC table 250.122 for proper ground wire sizing.
- Voltage drop and other considerations may mean larger cable cross sections need to be used.

WARNING! An inadequate ground conductor connection can cause serious injury and damage to property. The housing screws provide an adequate ground conductor connection for grounding the housing and should not be replaced under any circumstances by other screws that do not provide a reliable ground conductor connection.

CAUTION! The following points must be observed in order to prevent damage to the Rapid Shutdown Box:
- The technical specifications must be followed.
- The pressure compensation membrane (1) must not be used for cabling.



Rapid Shutdown Box - Duo



Rapid Shutdown Box - Quattro

NOTE! Photovoltaic modules exposed to light supply energy to the Rapid Shutdown Box when connected.

NOTE! When installing outdoors, only use waterproof conduit fittings and conduits. Conduit fittings and conduits are not included in the Rapid Shutdown Box's scope of supply. Conduit fittings must always be installed with a locking nut. Ensure that the conduit fittings are installed and sealed correctly.

NOTE! When connecting DC cables, ensure the polarity is correct.

IMPORTANT! The system status indicator (inverter) shall be installed in a location in close proximity to the system initiator, where the indication of safe shutdown can be clearly seen. If the rapid shutdown initiation is loss of AC, the inverter acts as system initiator and indicator.

FCC / RSS Compliance

FCC

This device corresponds to the limit values for a digital device of class B in accordance with Part 15 of the FCC regulations. The limit values should provide adequate protection against harmful interference in homes. This device creates and uses high frequency energy and can interfere with radio communications when not used in accordance with the instructions. However, there is no guarantee against interference occurring in a particular installation.
If this device interferes with radio or television reception when turning the device on and off, it is recommended that the user solve this with one or more of the following measures:

- adjust or reposition the receiving antenna
- increase the distance between the device and the receiver
- connect the device to another circuit, which does not include the receiver
- for further support, please contact the retailer or an experienced radio/ TV technician.

Industry Canada RSS

The device corresponds to the license-free Industry Canada RSS standards. Operation is subject to the following conditions:
(1) The device may not cause harmful interference
(2) The device must accept any interference received, including interference that may cause undesired operation.

Device concept

The Rapid Shutdown Box provides a convenient and safe way to comply with Article 690.12 in the 2014 Edition of the National Electrical Code. The device is powered directly by the PV array and is controlled depending on the state of the signal port. This signal port can be controlled by a relay terminal in the inverter. The use of a DC relay, which also functions as a switch-disconnector, ensures that the PV array is galvanically isolated in the case of a Rapid Shutdown.

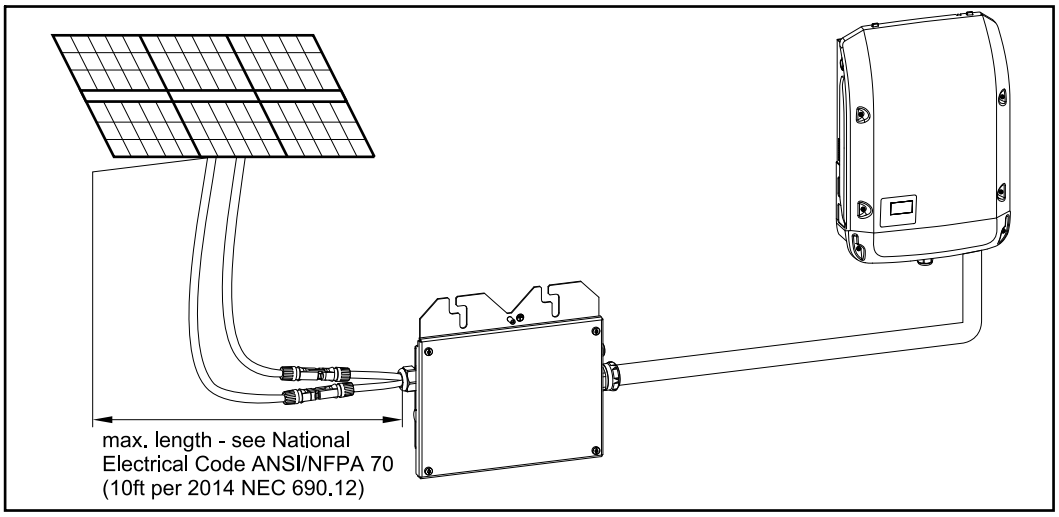
The Rapid Shutdown Box ensures that residual energy in the capacitors of the inverter is discharged within the required time period. To ensure that the entire system functions correctly, the signal ports of all Rapid Shutdown Boxes must be serially connected (see section "Connecting the Rapid Shutdown Box"). For this purpose, Duo and Quattro variants of the device and also the discontinued versions RSB Single and RSB Multi can be mixed randomly.

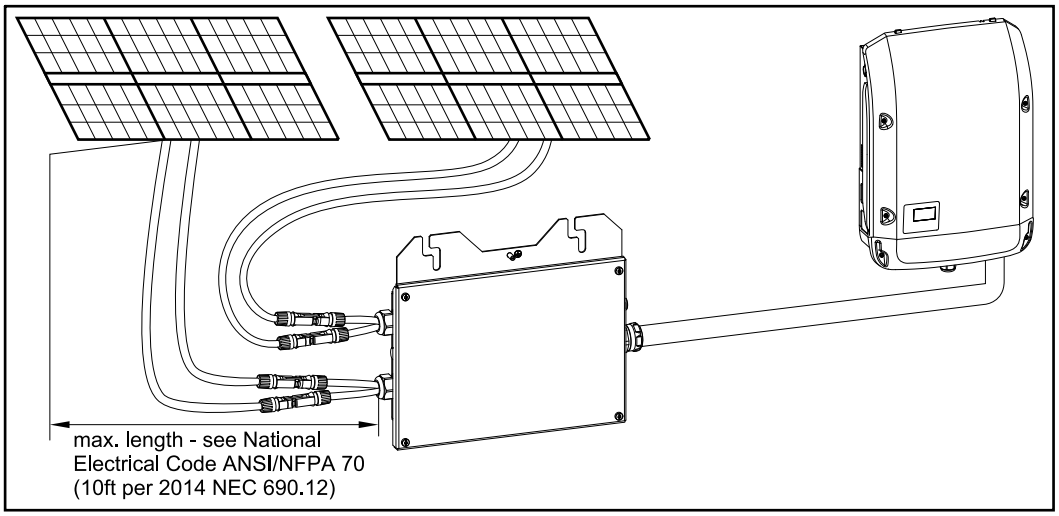
The Rapid Shutdown can be initialized by means of AC failure if the signal lines are connected to the inverter. Alternatively or additionally, an emergency stop button that interrupts the signal wires can be used.

System Limitations

- Maximum number of Rapid Shutdown Boxes per inverter: 5
- Maximum line resistance permitted in the signal loop: 300 Ω
- Maximum permissible wire length for signal loop using AWG 14, 16, 18 or 20: 3200ft (1000m)

Maximum Distance Between the Rapid Shutdown Box and the PV Array





Technical Data

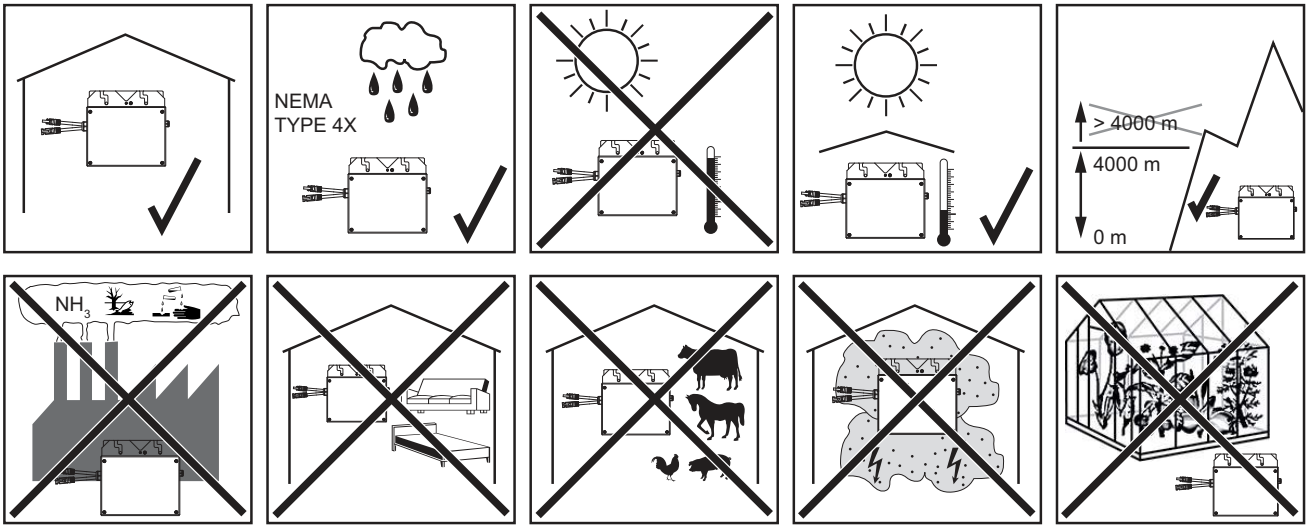
	RSB Duo	RSB Quattro
Max. voltage	600 V DC	
Start voltage	80 V DC	
Max. input current	25 A	25 A / 25 A
Power supply	DC (from the PV array)	
Self-consumption during operation	2 W	
Permissible operating temperature	-40° F to +149° F (-40° C to +65° C)	
Permissible humidity	0 - 100 % (not condensing)	
Max. altitude	13,123 ft. (4000 m)	

Max. number of *Controlled* circuits (per NEC)	1	2
Enclosure type	NEMA 4X	
Device dimensions h x w x d	11.26 x 9.7 x 2.62 in. (286 x 246,5 x 66,6 mm)	13.82x11.54x2.62 in. (351 x 293 x 66,6 mm)
Shipping dimensions h x w x d	13 x 12 x 5.9 in. (330x305x150 mm)	13.78x11.81x6.1in. (350x300x155 mm)
Shipping weight	5.95 lbs. (2,7 kg)	8.16 lbs. (3,7 kg)
Standards and regulations	UL1741; LTR AE-004-2015; FCC15 Class B	

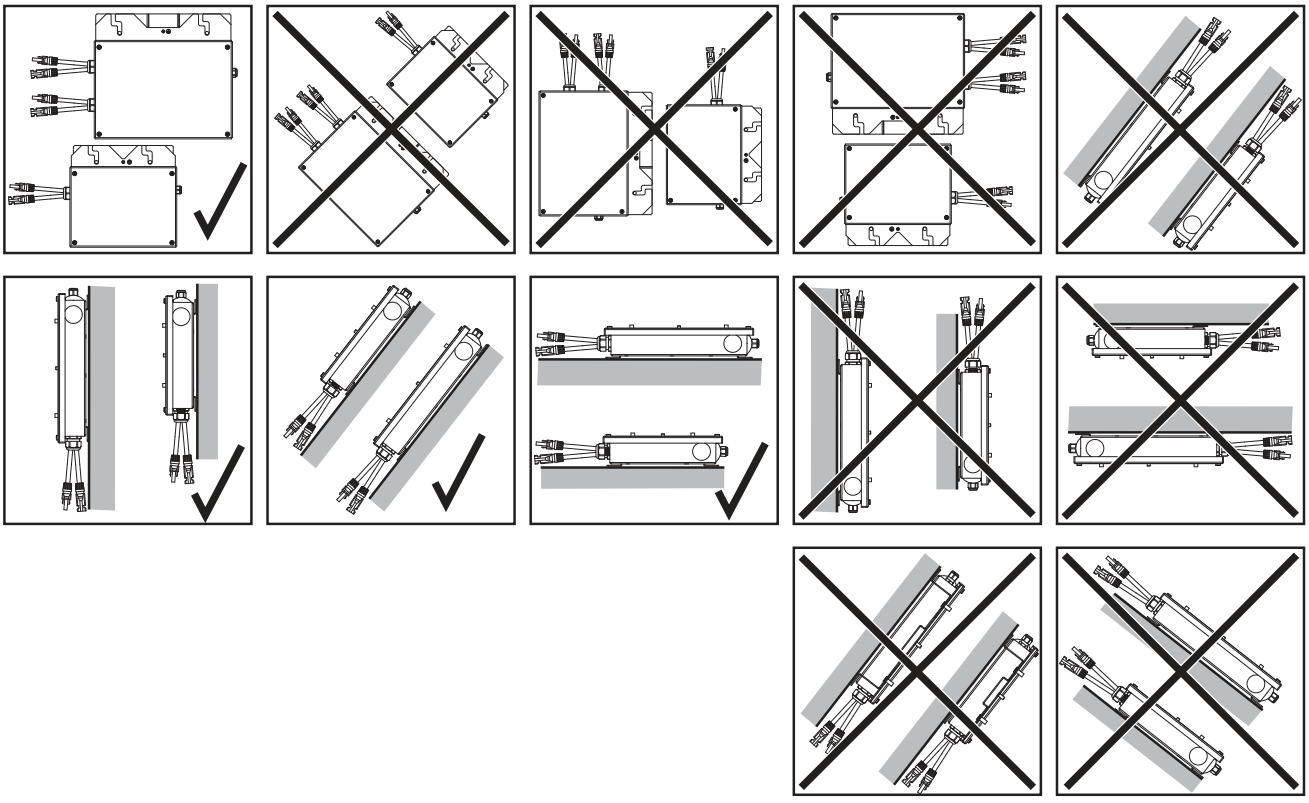
Compatibility with Inverters

Inverter	Rapid Shutdown Box – Duo	Rapid Shutdown Box – Quattro
Fronius Galvo 1.5-1 208-240	✓	✓
Fronius Galvo 2.0-1 208-240	✓	✓
Fronius Galvo 2.5-1 208-240	✓	✓
Fronius Galvo 3.1-1 208-240	✓	✓
Fronius Primo 3.8-1 208-240	✓	✓
Fronius Primo 5.0-1 208-240	✓	✓
Fronius Primo 6.0-1 208-240	✓	✓
Fronius Primo 7.6-1 208-240	✓	✓
Fronius Primo 8.2-1 208-240	✓	✓
Fronius Primo 10.0-1 208-240 *)	✓	✓
Fronius Primo 11.4-1 208-240 *)	✓	✓
Fronius Primo 12.5-1 208-240 *)	✓	✓
Fronius Primo 15.0-1 208-240 *)	✓	✓
Fronius Symo 10.0-3 208-240	✓	✓
Fronius Symo 12.0-3 208-240	✓	✓
Fronius Symo 15.0-3 208	-	-
Fronius Symo 10.0-3 480 **)	✓	✓
Fronius Symo 12.5-3 480 **)	✓	✓
Fronius Symo 15.0-3 480 **)	✓	✓
Fronius Symo 17.5-3 480 **)	✓	✓
Fronius Symo 20.0-3 480 **)	✓	✓
Fronius Symo 22.7-3 480 **)	✓	✓

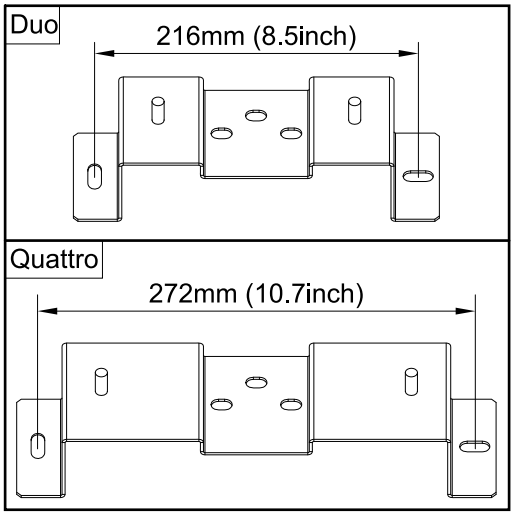
Installing the Rapid Shutdown Box



Possible mounting positions for outdoor use:



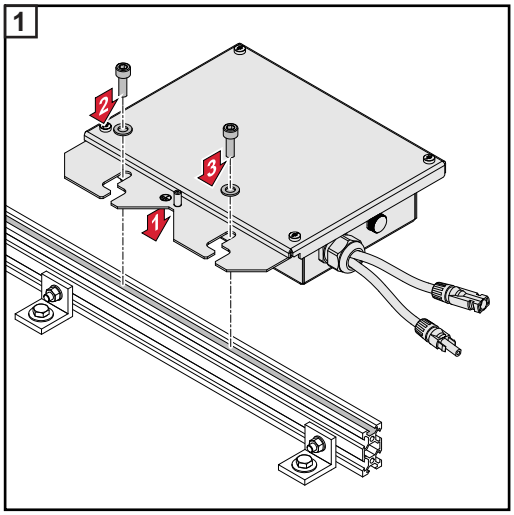
Drilling pattern



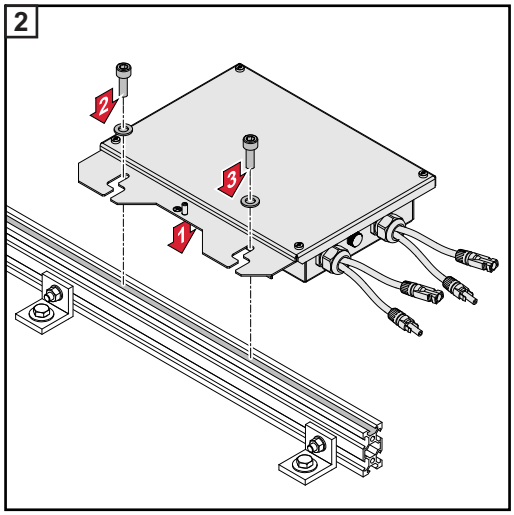
Nameplate and warning labels should be accessible after mounting.

Mounting the Rapid Shutdown Box - Duo on a rail

IMPORTANT! When mounting the Rapid Shutdown Box on a rail it is recommended to fix the rail in an elevated position for increased installation comfort.

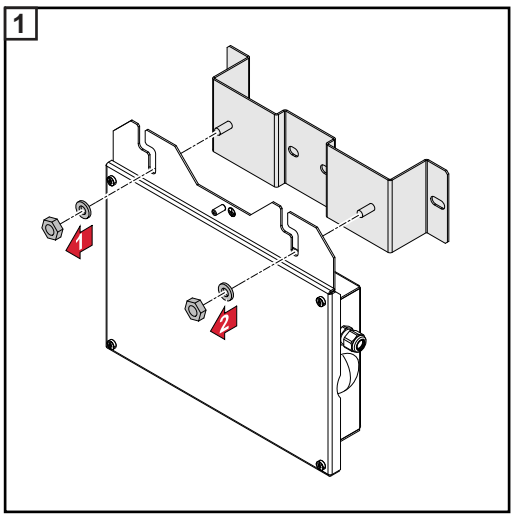


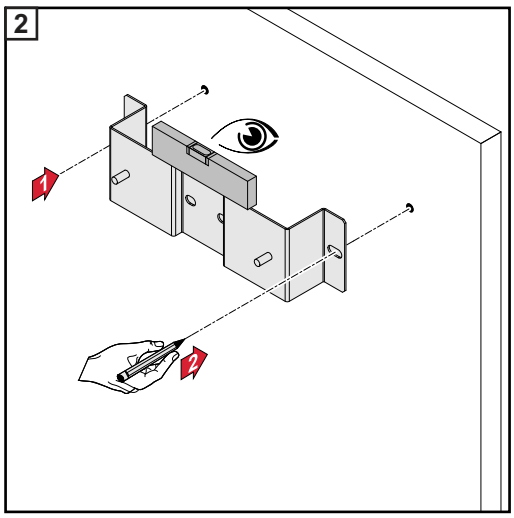
Rapid Shutdown Box - Duo

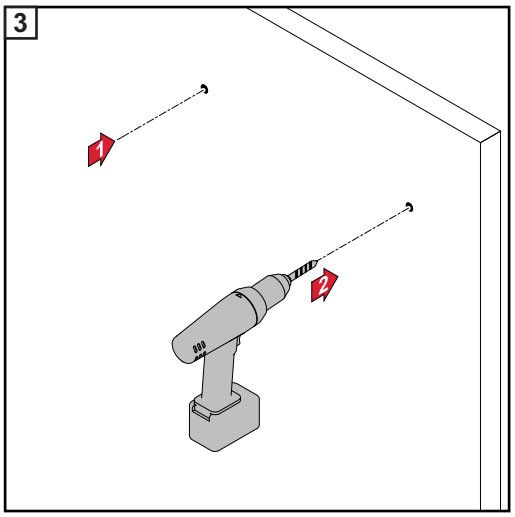


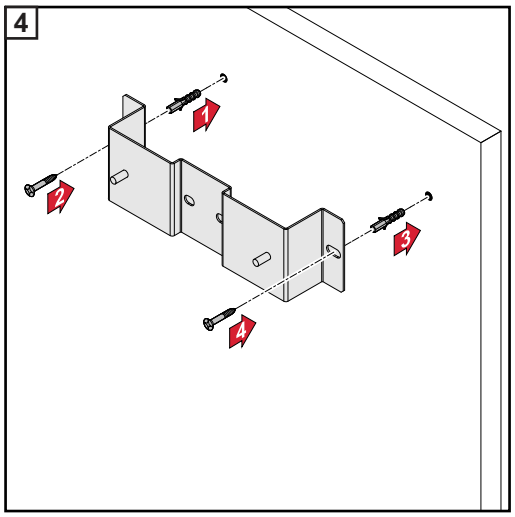
Rapid Shutdown Box - Quattro

Attaching the Rapid Shutdown Box to the wall

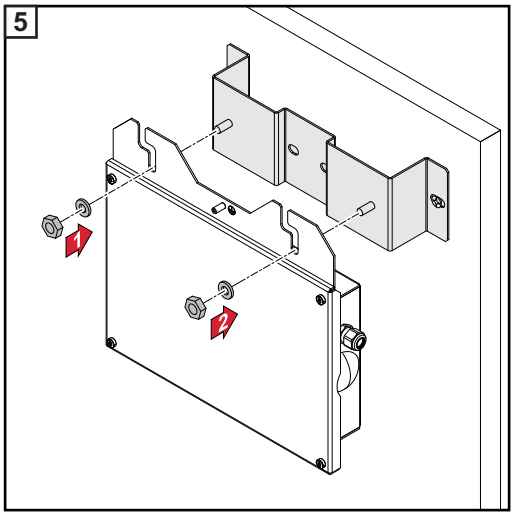






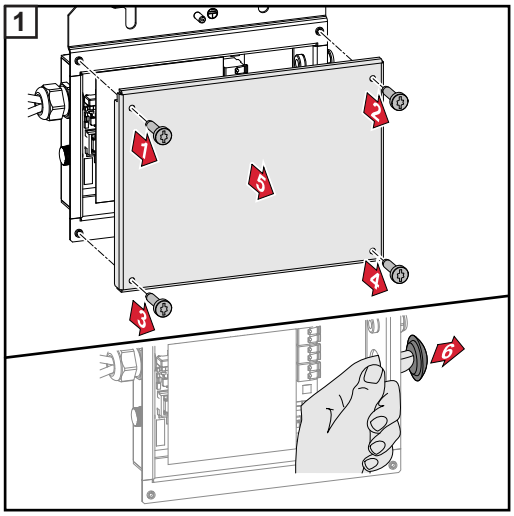


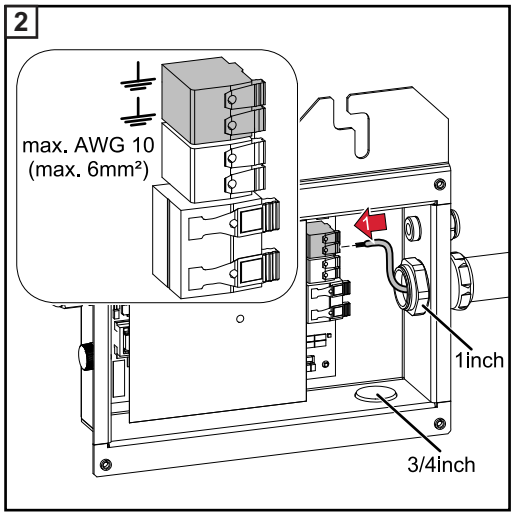
Fasteners not included

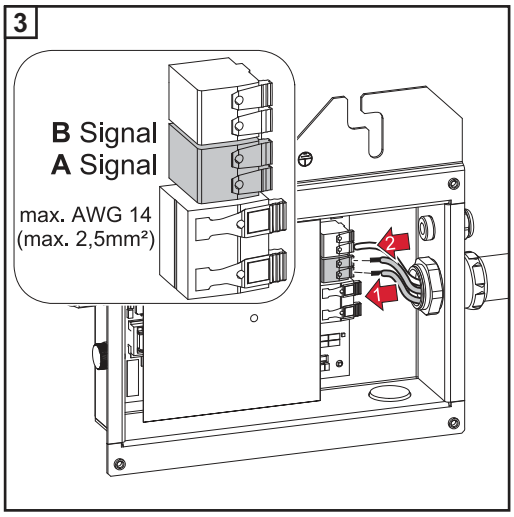


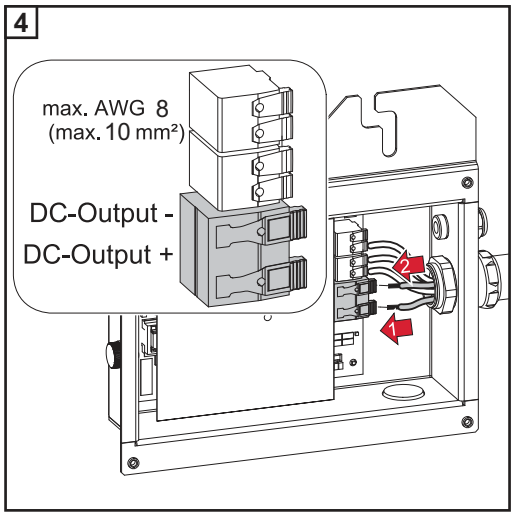
Connecting the Rapid Shutdown Box

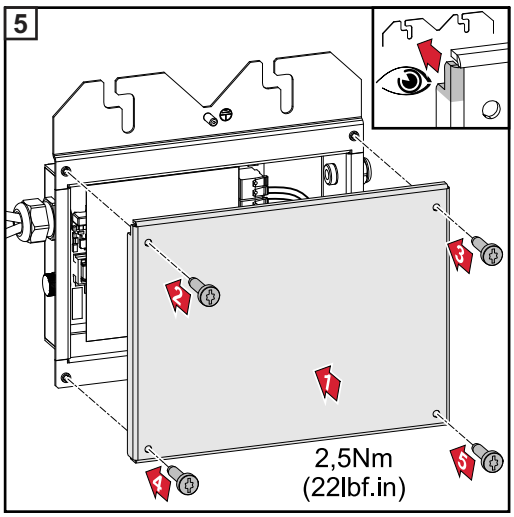
Wiring of the Rapid Shutdown Box - Duo

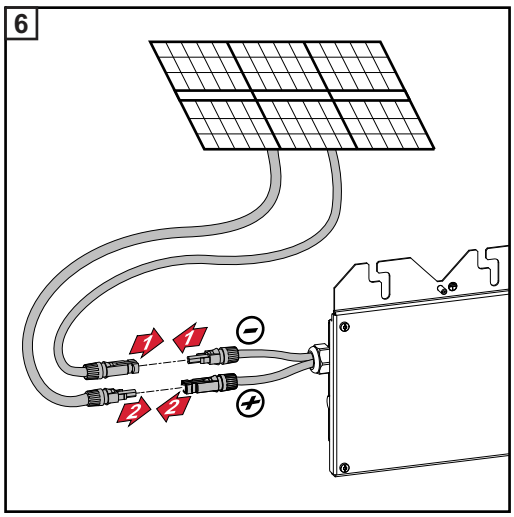






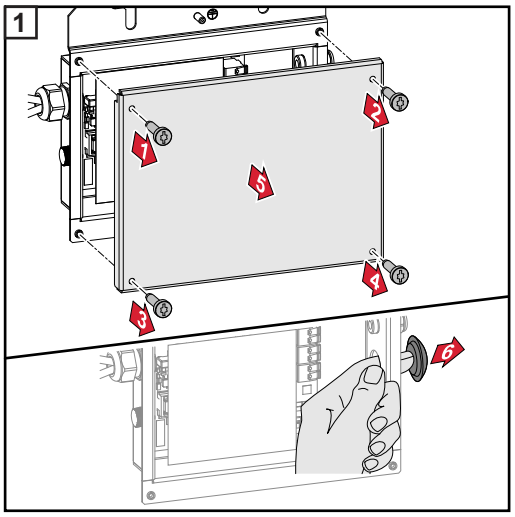


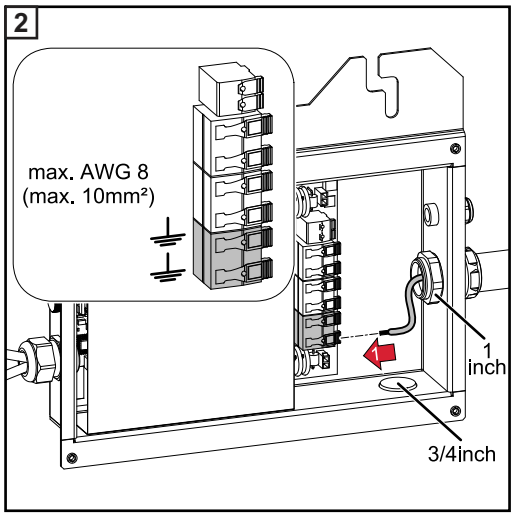


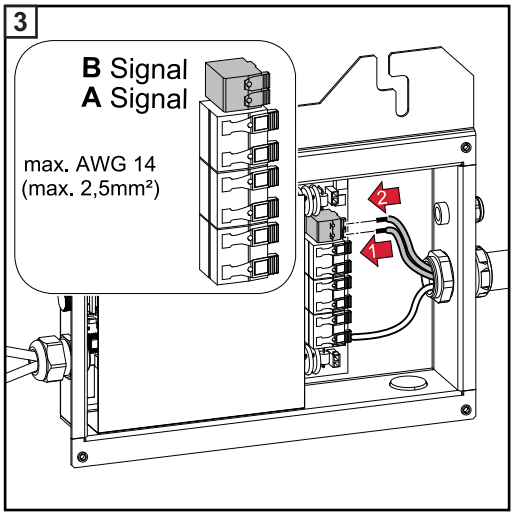


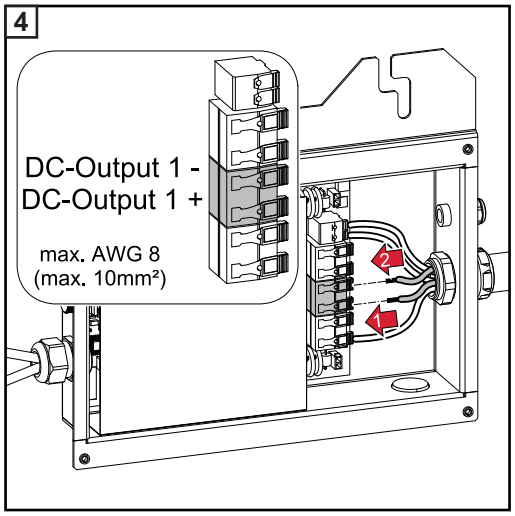
Connecting the wires Rapid Shutdown Box - Quattro

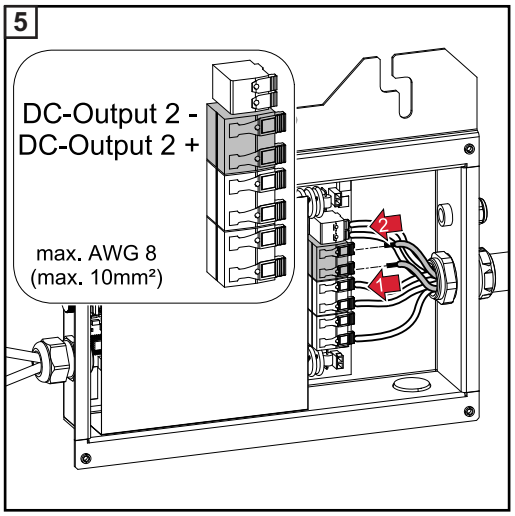
IMPORTANT! Using 2 strings at least one string must be connected to input 1 because the Rapid Shutdown Box gets the supply from this input.

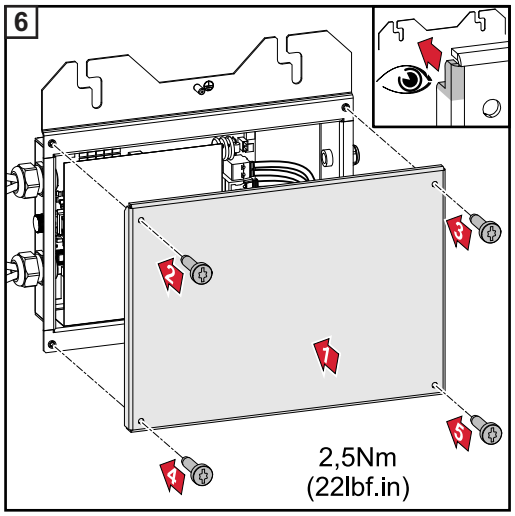


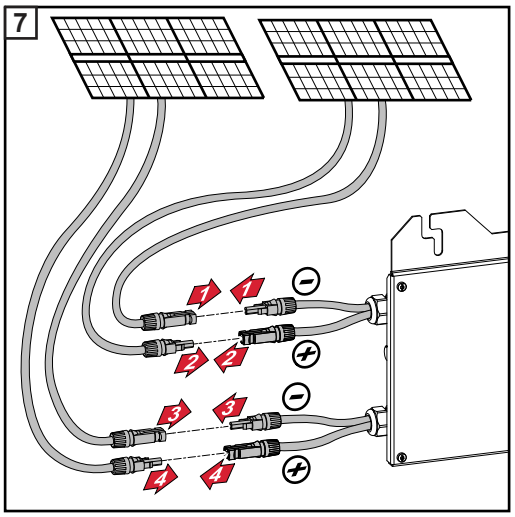








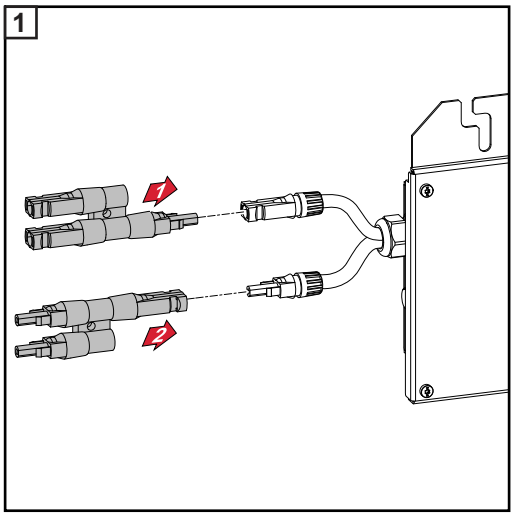


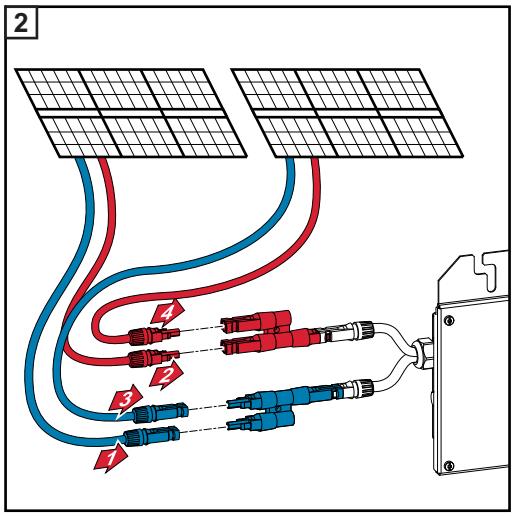


If other connectors than MC4 (Stäubli) shall be used in conjunction with the Fronius Rapid Shutdown Box it is recommended to cut the preconfigured MC4 connectors and to be replaced by preferred connector brand using proper tools and methods. Removal of the hole cable set is not recommended and will void warranty

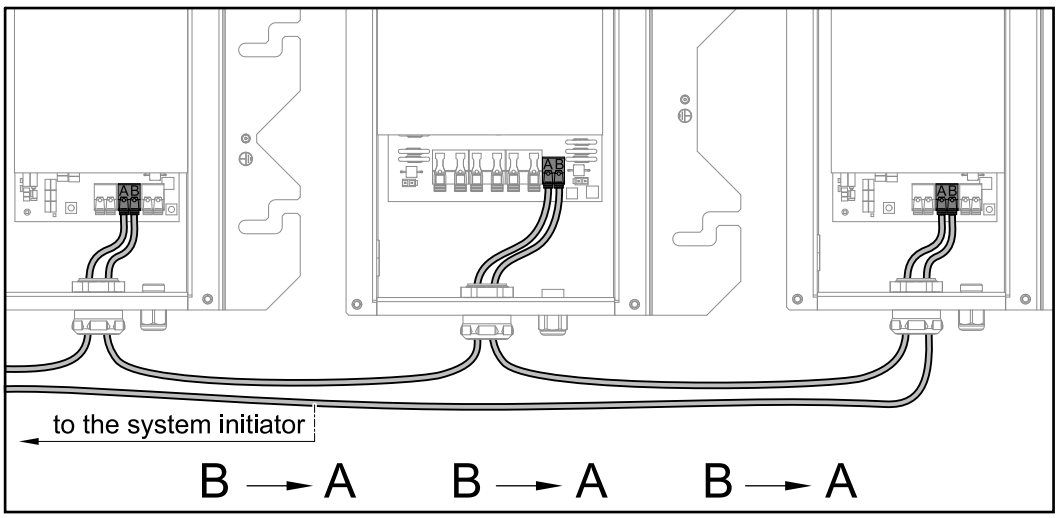
Connecting a MC4-Y-Connector

If multiple strings are connected to an MPP tracker, the string voltages should be as equal as possible in order to avoid power losses.

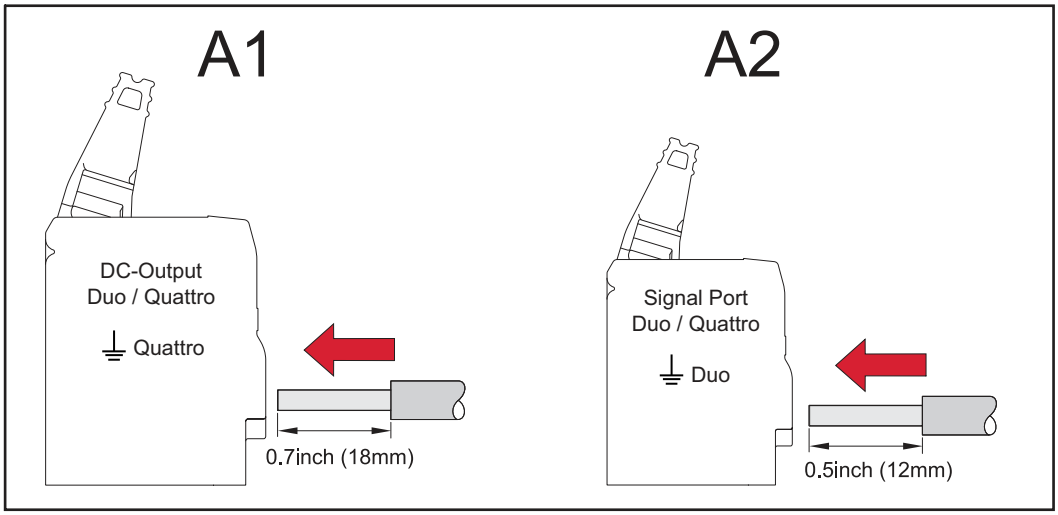


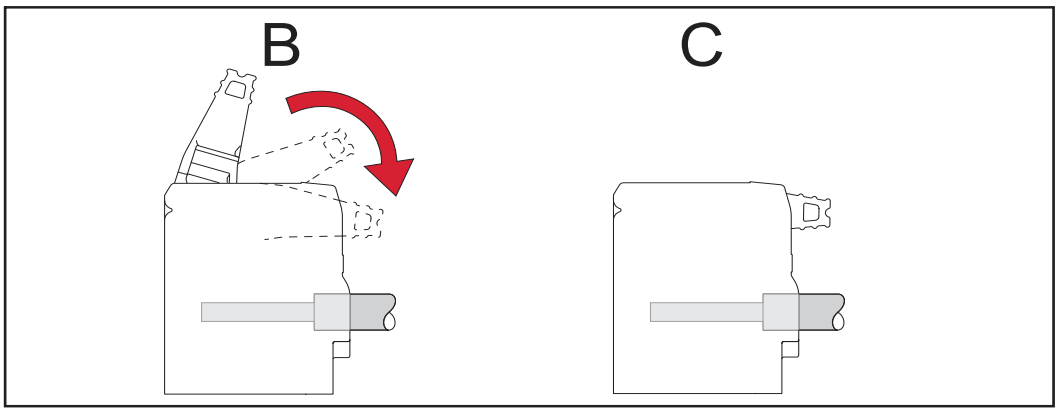


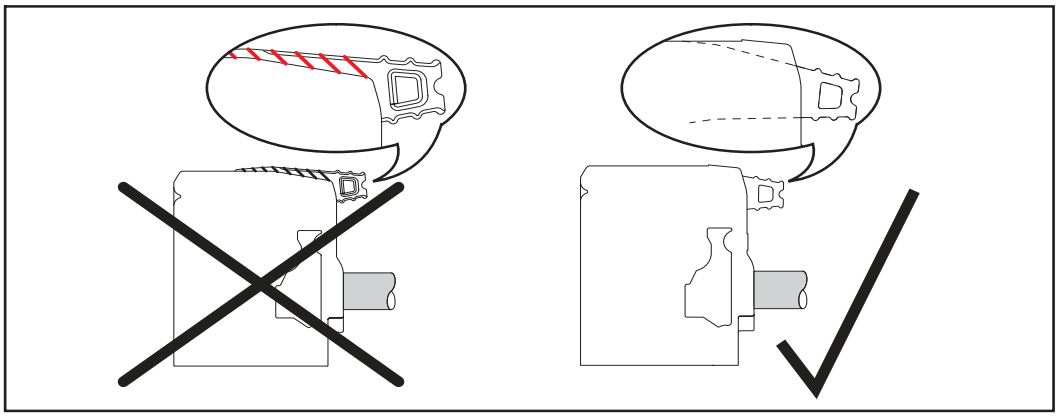
Connecting several Rapid Shutdown Boxes



Connecting the wires to the Terminals





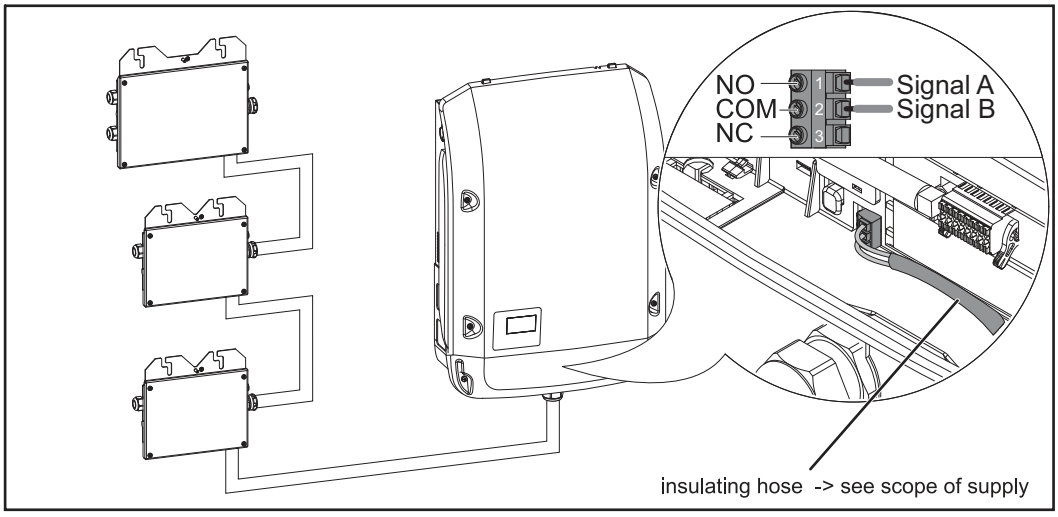


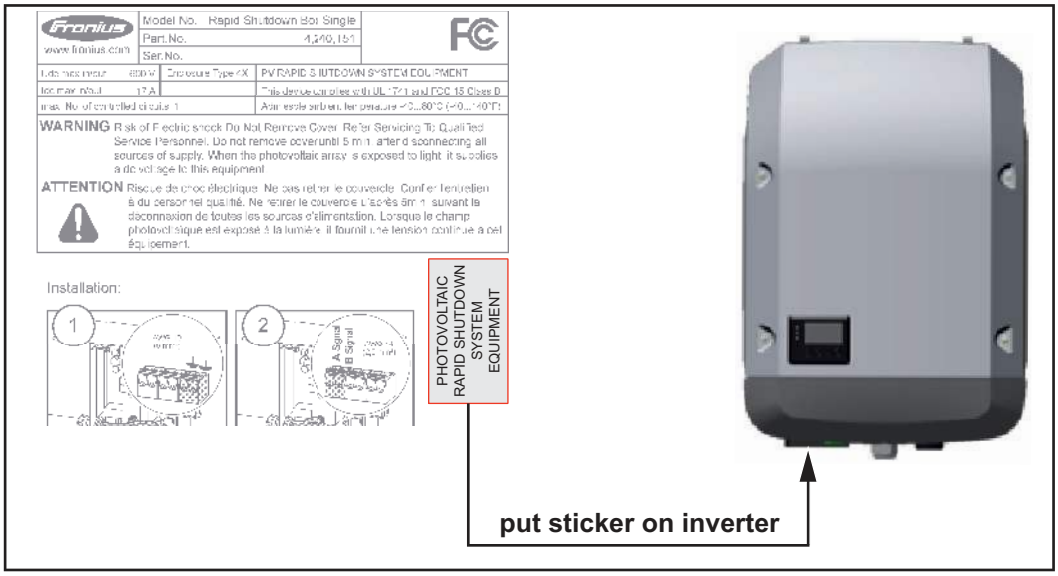
Connecting the Rapid Shutdown Box to an Inverter

Connection to the Inverter:
If the AC supply to the inverter is interrupted, the inverter disconnects the PV DC supply via the Rapid Shutdown Box. As soon as the AC supply is reinstated, the DC supply will resume.

The signal relay in the Fronius inverter is designed to open when the inverter loses AC power signaling the Rapid Shutdown Box to disconnect. **However, the signal relay cannot be used for further functions (Energy Manager, alarm, etc.)**, if the Rapid Shutdown is to be initialized by means of an AC failure.

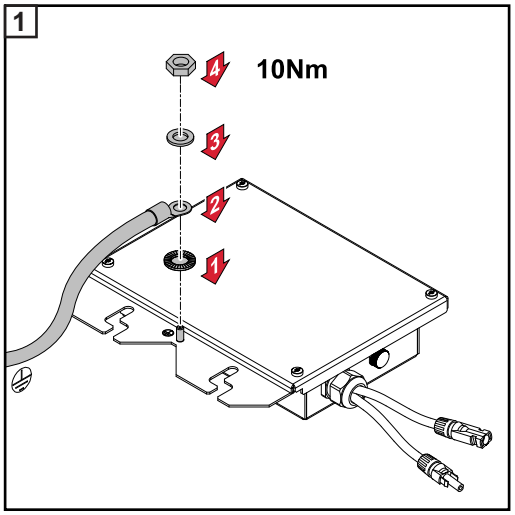
The inverter doesn‘t have to be configured after the installation of the Rapid Shutdown Box. If changes were made in the section energy management, check this section in the inverters user manual. The energy manager (Relay Mode) must be set ‚ON‘ (default value).



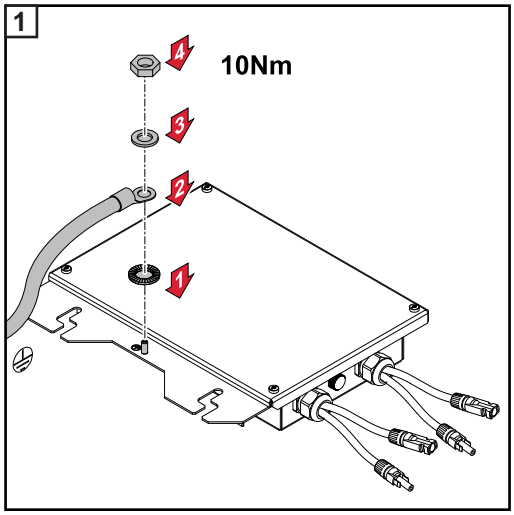


Connecting the Rapid Shutdown Box Grounding

The hexagon nut and the spring washer required for connecting the grounding on the threaded post are included in the scope of supply. The threaded post is electrically bonded to the Rapid Shutdown Box.

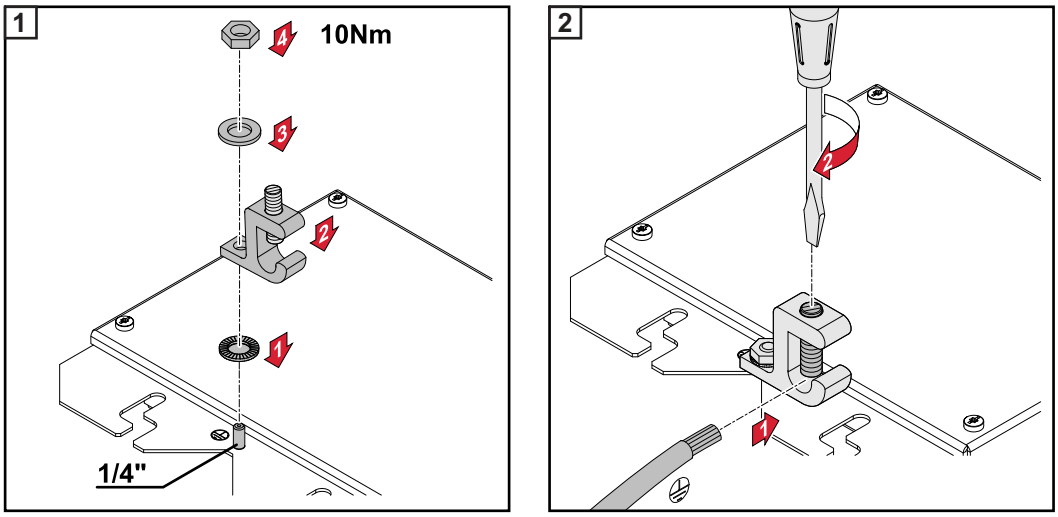


Equipment grounding of RSB - Duo

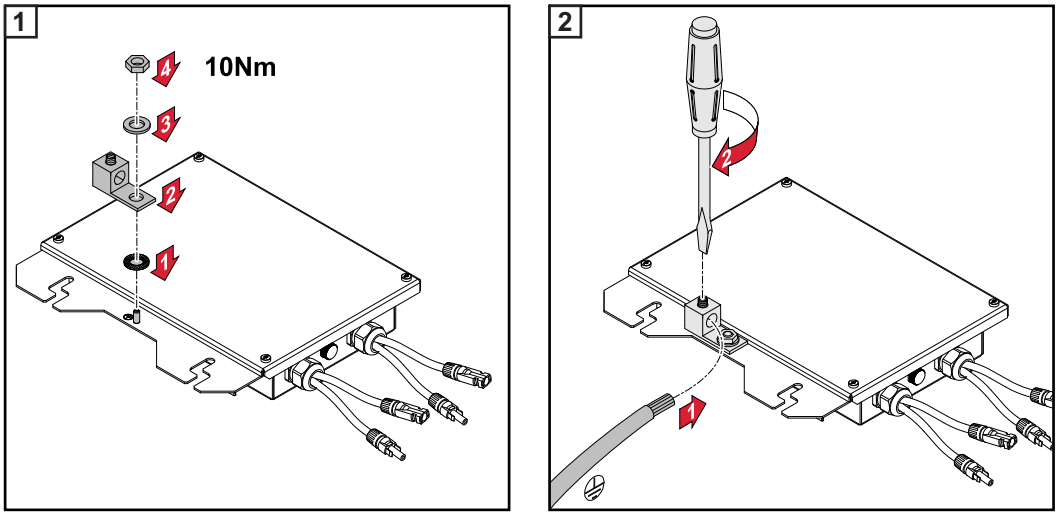


Equipment grounding of RSB - Quattro

Optional: Connecting the Grounding to a Ground Lug - Variant 1



Optional: Connecting the Grounding to a Ground Lug - Variant 2



Connecting the Rapid Shutdown Box to an Emergency Stop Button

Connection to an External Emergency Stop Button:
If an external emergency stop is needed, it can be installed anywhere in the Signal line using standard electrical installation procedures. When pressing the Emergency Stop button rapid shutdown is initiated and the pv-array is disconnected in the rapid shutdown box. As soon as the Emergency Stop button returns to its original position, the pv-array is reconnected.

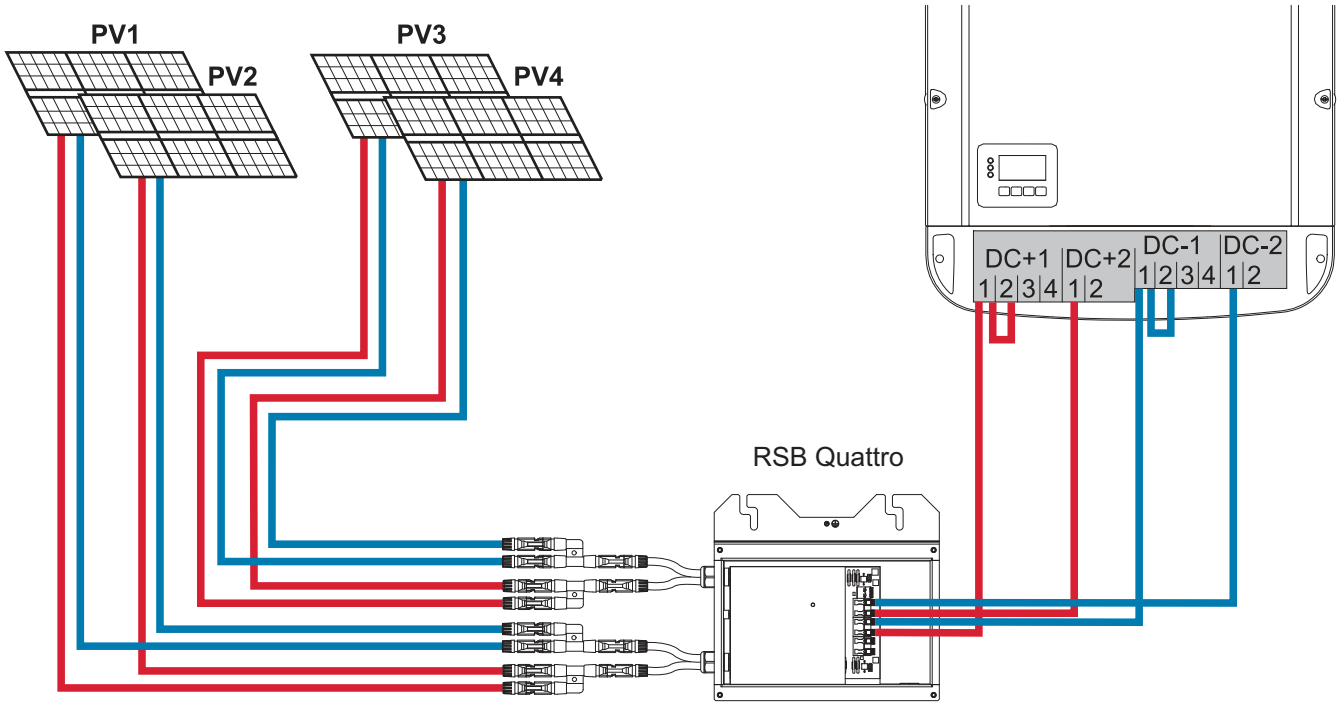
Requirements for the external emergency stop button:
- Maximum switching load 30 V DC / 5 mA
- Rated voltage between contacts and housing: 600 V DC

Connecting the Rapid Shutdown Box to a Fronius Primo 10.0 / 11.4 / 12.5 / 15.0

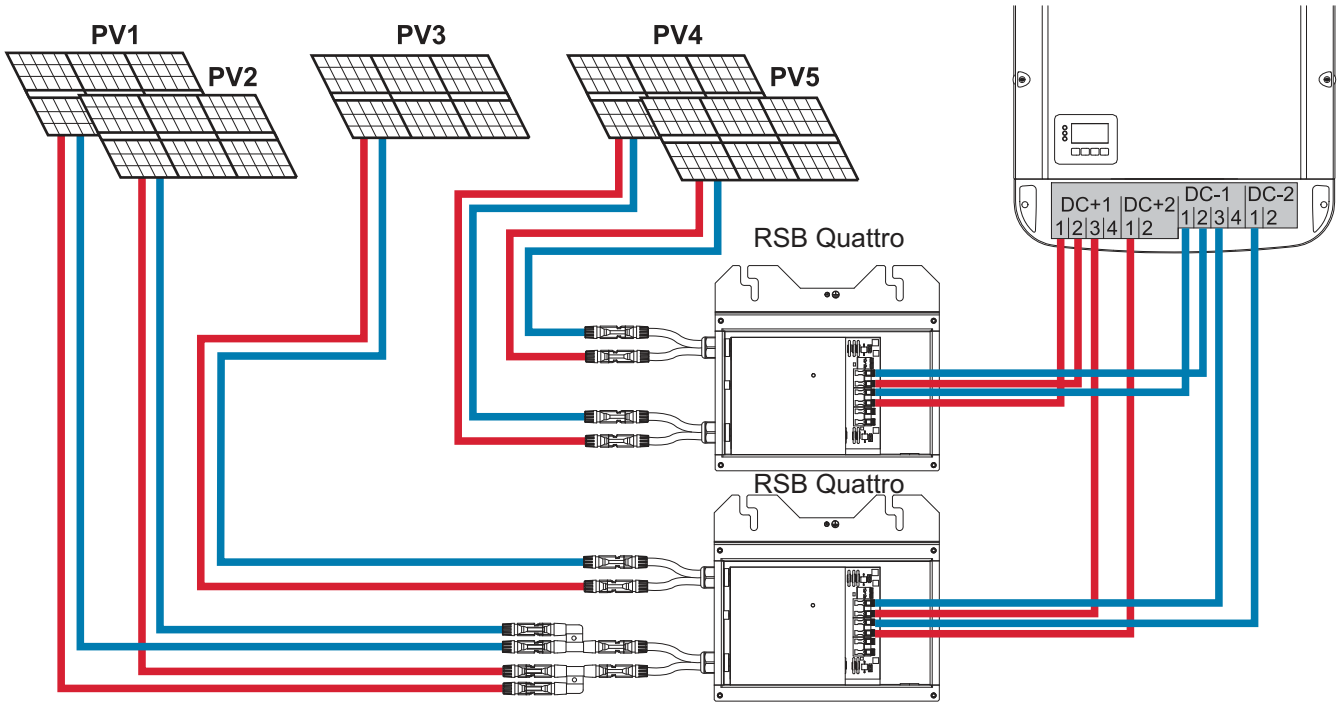
IMPORTANT! Wiring schemes show best practice examples assuming that more than two PV strings connected in parallel require overcurrent protection (e.g. fusing). Refer to Primo installation manual regarding multi conductor wiring and fusing details

If multiple strings are connected to an MPP tracker, the string voltages should be as equal as possible in order to avoid power losses.

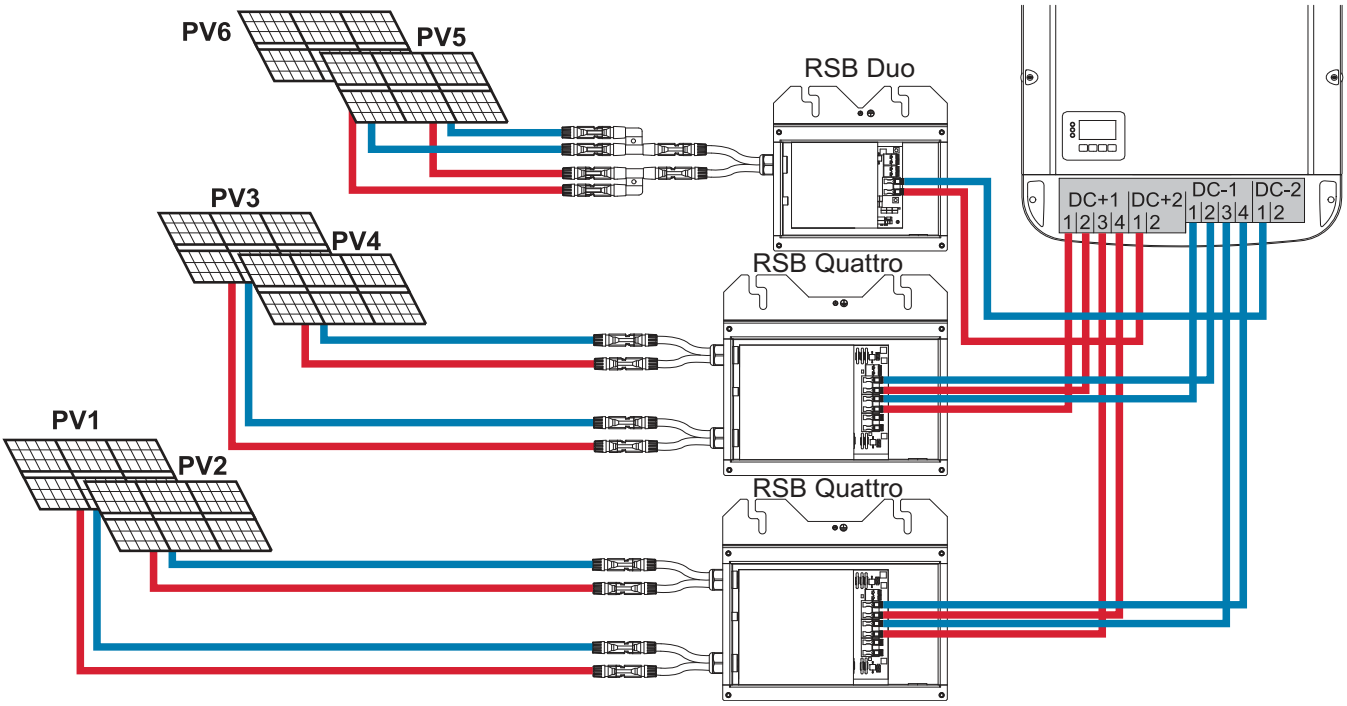
Connecting 4 Solar Module Strings to the Fronius Primo 10.0 / 11.4 / 12.5 / 15.0



Connecting 5 Solar Module Strings to the Fronius Primo 10.0 / 11.4 / 12.5 / 15.0



Connecting 6 Solar Module Strings to the Fronius Primo 10.0 / 11.4 / 12.5 / 15.0



General

Seguridad

¡ADVERTENCIA! Los fallos del sistema y el trabajo realizado de manera incorrecta pueden causar heridas graves y daño a la propiedad. Solo personal cualificado tiene autorización para poner en servicio la Caja de cierre rápido (RSB) y solo dentro del alcance de las respectivas normas técnicas. Lea las normas de seguridad antes de instalar y llevar a cabo el trabajo de mantenimiento.

¡ADVERTENCIA! El trabajo realizado de manera incorrecta puede causar heridas graves y daños. Solo electricistas autorizados deben instalar y conectar la Caja de cierre rápido.
¡Siga las normas de seguridad!
Antes de llevar a cabo una instalación o conexión, desconecte el suministro eléctrico de CA al inversor y el suministro eléctrico de CC a la Caja de cierre rápido.

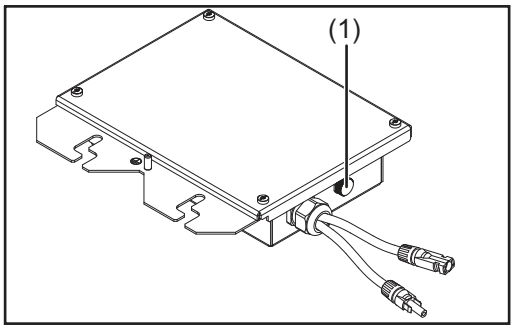
¡ADVERTENCIA! Una descarga eléctrica puede ser mortal. Los componentes eléctricos de tamaños inadecuados pueden causar heridas graves y daño a la propiedad.

- Todas las conexiones eléctricas se deben realizar en conformidad con el Código Eléctrico Nacional, ANSI/NFPA 70 y demás regulaciones aplicables al lugar de instalación.
- Las instalaciones llevadas a cabo en Canadá deben cumplir con las normas canadienses correspondientes.
- Utilice alambre de cobre en todos los bornes de brida de resorte.
- Use un alambre de cobre de mín. 194 °F (90 °C) para todos los cables de puesta a tierra y cables de salida CC.
- Consulte la tabla de NEC 250.122 para conocer el tamaño correcto de cable a tierra.
- La pérdida de tensión y otras consideraciones pueden significar que se deban utilizar diámetros más grandes de cable.

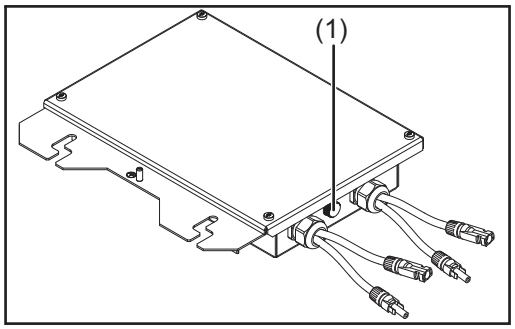
¡ADVERTENCIA! Una conexión de conductor protector inadecuada puede causar lesiones graves y daño a la propiedad. Los tornillos de la carcasa proporcionan una conexión de conductor protector adecuada para poner a tierra la carcasa y no deben ser reemplazados, bajo ninguna circunstancia, por ningún otro tornillo que no proporcione una conexión de conductor protector confiable.

¡PRECAUCIÓN! Se deben observar los siguientes puntos para evitar que la Caja de cierre rápido se dañe:

- Se deben seguir las especificaciones técnicas.
- No se debe utilizar la membrana de compensación de presión (1) para el cableado.



Caja de cierre rápido - Duo



Caja de cierre rápido - Quattro

¡OBSERVACIÓN! Los módulos fotovoltaicos expuestos a la luz suministran energía a la Caja de cierre rápido cuando esta se conecta.

¡OBSERVACIÓN! Al instalarse a la intemperie, solo utilice tubos y conexiones a prueba de agua. Los tubos y conexiones no se suministran con la Caja de cierre rápido. Las conexiones siempre se deben instalar con una tuerca autoblocante. Asegúrese de que las conexiones se instalen y sellen correctamente.

¡OBSERVACIÓN! Al conectar cables de CC, asegúrese de que la polaridad sea correcta.

¡IMPORTANTE! La indicación del estado del sistema (inversor) se debe instalar en una ubicación cercana al iniciador del sistema, en donde se pueda ver claramente la indicación de desconexión segura. Si la iniciación de cierre rápido pierde energía CA, el inversor actúa como indicador e iniciador del sistema.

Conformidad con FCC / RSS

FCC

Este dispositivo corresponde a los valores límites para un dispositivo digital de clase B, de conformidad con la Parte 15 de las normas FCC. Los valores límites deben proporcionar una protección adecuada contra interferencias perjudiciales en las residencias. Este dispositivo crea y utiliza energía de alta frecuencia y puede interferir en las radiocomunicaciones cuando no se utiliza según las instrucciones. Sin embargo, no se garantiza que no exista interferencia en una determinada instalación.
Si este dispositivo interfiere con la recepción de radio o televisión al encenderlo o apagarlo, se recomienda que el usuario resuelva el problema con una o más de las siguientes medidas:

- Ajustar o reponer la antena de recepción.
- Aumentar la distancia entre el dispositivo y el receptor.
- Conectar el dispositivo a otro circuito, que no incluya el receptor.
- Para obtener mayor asistencia, comuníquese con el vendedor minorista o un técnico de radio/TV con experiencia.

Industry Canada RSS

El dispositivo corresponde a los estándares de Industry Canada RSS sin licencia. El funcionamiento depende de las siguientes condiciones:
(1) El dispositivo no debe causar interferencia perjudicial.
(2) El dispositivo debe aceptar cualquier interferencia recibida, incluida interferencia que pueda causar una operación indeseada.

Concepto del sistema

La Caja de cierre rápido brinda una manera práctica y segura de cumplir con el Artículo 690.12 de la edición 2014 del Código Eléctrico Nacional. El dispositivo se alimenta directamente de un conjunto fotovoltaico y es controlado en función del estado del puerto de señal. El puerto de señal se puede controlar mediante un borne relé en el inversor. El uso de un relé CC, que también funciona como interruptor-seccionador, garantiza que el conjunto fotovoltaico esté aislado galvánicamente en el caso de un cierre rápido.

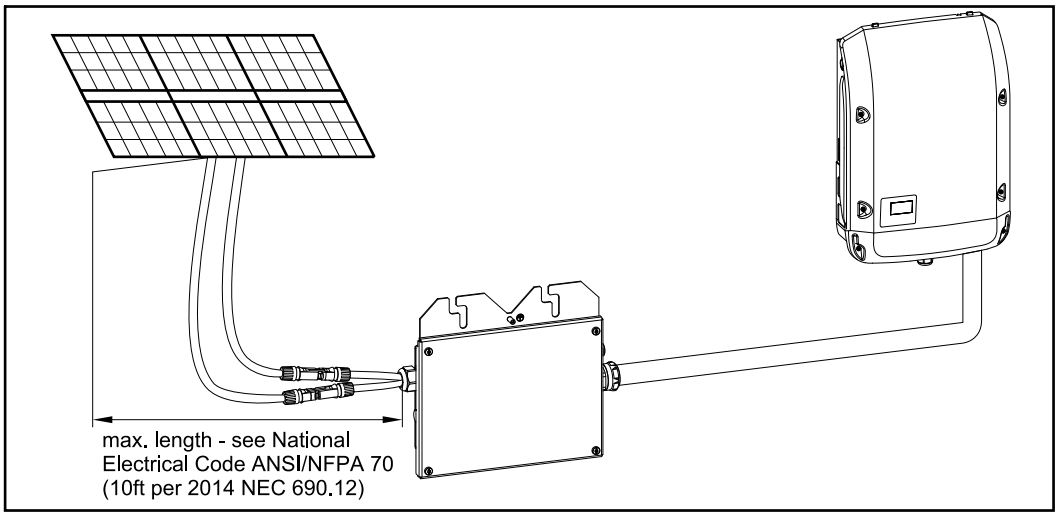
La Caja de cierre rápido garantiza que la energía residual en los condensadores del inversor se descargue en el período requerido. Para garantizar que todo el sistema funcione correctamente, los puertos de señal de todas las Cajas de cierre rápido se deben conectar en serie (consulte la sección „Conexión de la Caja de cierre rápido“). Para ello, se pueden combinar aleatoriamente las variantes Duo y Quattro del dispositivo y también las versiones descontinuadas RSB Single y RSB Multi.

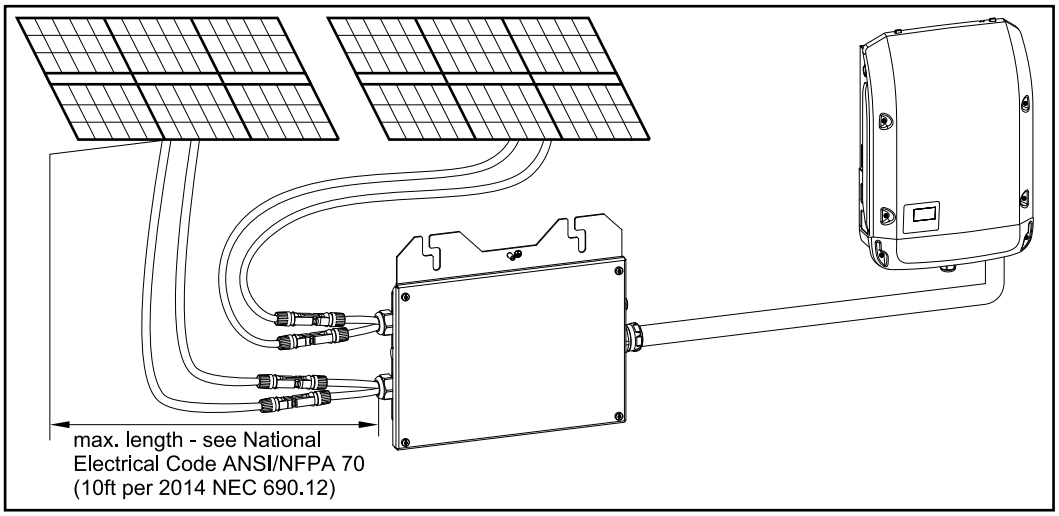
La Caja de cierre rápido se puede inicializar mediante una avería de CA, si los cables de señal están conectados al inversor. Además, se puede utilizar un botón de parada de emergencia que interrumpe los cables de señal.

Limitaciones del sistema

- Cantidad máxima de Cajas de cierre rápido por inversor: 5
- Máxima resistencia de cable permitida por ciclo de señal: 300 Ω
- Máxima longitud de cable permitida para ciclo de señal utilizando AWG 14, 16, 18 o 20: 3200 ft (1000 m)

Distancia máxima entre la Caja de cierre rápido y el conjunto fotovoltaico





Datos técnicos

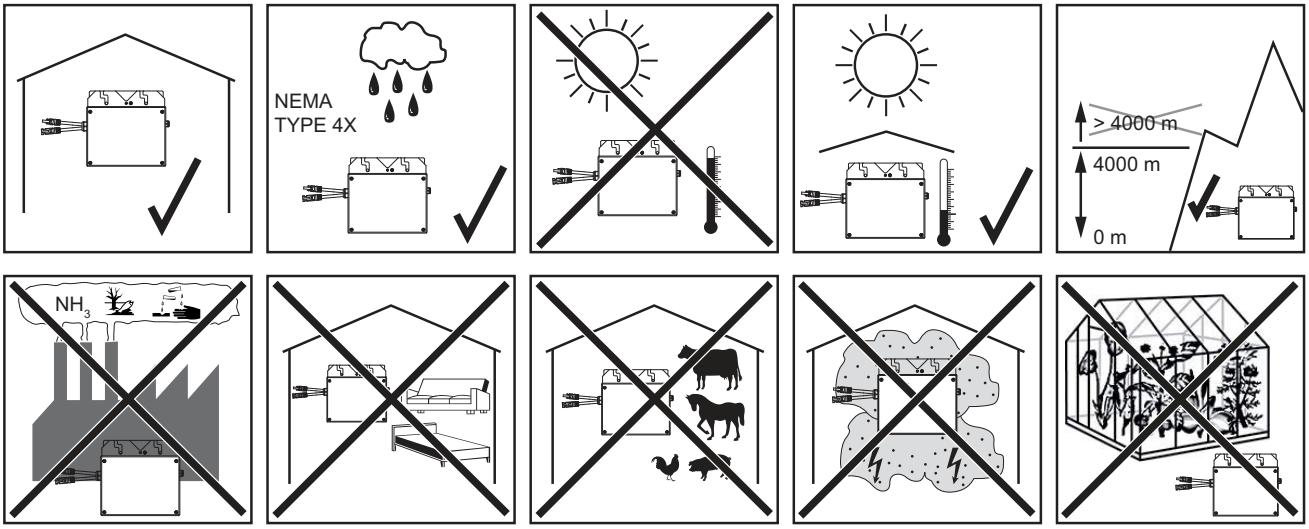
	RSB Duo	RSB Quattro
Voltaje máximo	600 VCC	
Tensión inicial	80 VCC	
Máxima corriente de entrada	25 A	25 A / 25 A
Alimentación principal	CC (del conjunto fotovoltaico)	
Autoconsumo durante el funcionamiento	2 W	
Temperatura operativa permitida	-40 °F a +149 °F (-40 °C a +65 °C)	
Humedad permitida	0 - 100 % (sin condensación)	
Altitud máxima	13,123 ft (4000 m)	

Cantidad máx. de circuitos eléctricos *controlados* (según NEC)	1	2
Tipo de gabinete	NEMA 4X	
Dimensiones del dispositivo a x a x p	11.26 x 9.7 x 2.62 in. (286 x 246,5 x 66,6 mm)	13.82x11.54x2.62 in. (351 x 293 x 66,6 mm)
Dimensiones de envío a x a x p	13 x 12 x 5.9 in. (330x305x150 mm)	13.78x11.81x6.1in. (350x300x155 mm)
Peso de envío	5.95 lbs. (2,7 kg)	8.16 lbs. (3,7 kg)
Normas y regulaciones	UL1741; LTR AE-004-2015; FCC15 Clase B	

Compatibilidad con inversores

Inversor	Rapid Shutdown Box - Duo	Rapid Shutdown Box - Quattro
Fronius Galvo 1.5-1 208-240	✓	✓
Fronius Galvo 2.0-1 208-240	✓	✓
Fronius Galvo 2.5-1 208-240	✓	✓
Fronius Galvo 3.1-1 208-240	✓	✓
Fronius Primo 3.8-1 208-240	✓	✓
Fronius Primo 5.0-1 208-240	✓	✓
Fronius Primo 6.0-1 208-240	✓	✓
Fronius Primo 7.6-1 208-240	✓	✓
Fronius Primo 8.2-1 208-240	✓	✓
Fronius Primo 10.0-1 208-240 *)	✓	✓
Fronius Primo 11.4-1 208-240 *)	✓	✓
Fronius Primo 12.5-1 208-240 *)	✓	✓
Fronius Primo 15.0-1 208-240 *)	✓	✓
Fronius Symo 10.0-3 208-240	✓	✓
Fronius Symo 12.0-3 208-240	✓	✓
Fronius Symo 15.0-3 208	-	-
Fronius Symo 10.0-3 480 **)	✓	✓
Fronius Symo 12.5-3 480 **)	✓	✓
Fronius Symo 15.0-3 480 **)	✓	✓
Fronius Symo 17.5-3 480 **)	✓	✓
Fronius Symo 20.0-3 480 **)	✓	✓

Instalación de la Caja de cierre rápido



Posibles posiciones de montaje para uso a la intemperie: