/ Perfect Welding / Solar Energy / Perfect Charging

FRONIUS INVERTER TRAINING

INSTALLATION, COMMISSIONING, SERVICE

AGENDA

- **Fronius SnapINverter installation & commissioning**
- Monitoring with Fronius Datamanager
- Fronius Smart Meter
- Fronius Solar.web
- Troubleshooting and board replacement
- FSP Service Process, SOS

SNAPINVERTER

SNAPINVERTER – RESIDENTIAL

Galvo 1.5-3.1

- 1.5 / 2.0 / 2.5 / 3.0 / 3.1 kW
- 1 MPP tracker
- 1 phase inverter
- **Topology: HF transformer**
- Efficiency: 96 %
- Protection class IP65

Symo/Primo 3.0 – 8.2-3 S / M

- 3.0 / 3.7 / 4.5 / 5.0 / 6.0 / 7.0 / 8.2 kW
- 1-2 MPP trackers
- Symo 3 phase inverter
- Primo single phase inverter
- **Topology: tranformerless**
- Efficiency: 98 %
- Protection class IP65

Symo Hybrid 3.0 – 5.0 S

- 3.0 / 4.0 / 5.0 kW
- 1 MPP tracker
- 3 phase inverter
- **Topology: tranformerless**
- Efficiency: 97,6 %
- Protection class IP65

SNAPINVERTER – COMMERCIAL

Symo 10.0 – 20.0-3-M

- 10.0 / 12.5 / 15.0 / 17.5 / 20.0 kW
- **2 MPP Trackers – 2 x 3 strings**
- Min. Input voltage 200 V_{DC} max 1000 V_{DC}
- Topology: transformerless
- Higher Efficiency: 98,1 %
- Protection class IP66

Eco 25.0 - 27.0-3-S

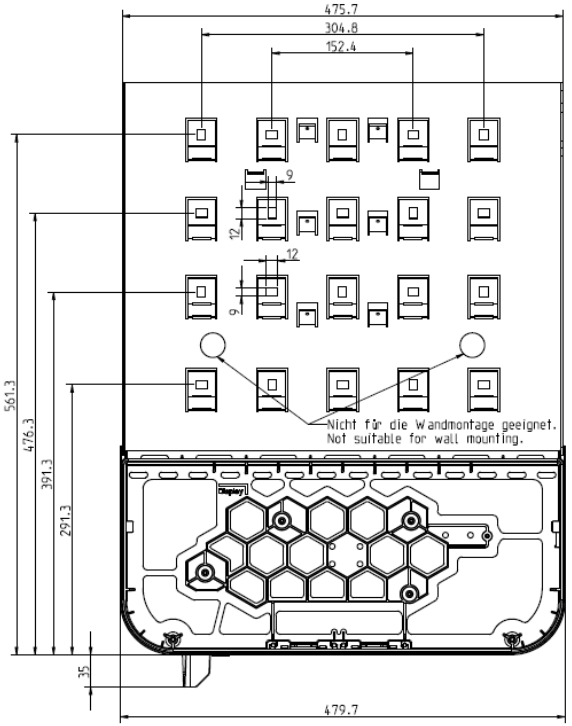
- 25.0 / 27.0 kW
- **1 MPP Tracker – 1 x 6 strings**
- Min. Input voltage 580 V_{DC} max 1000 V_{DC}
- Topology: transformerless
- Higher Efficiency: 98,3 %
- Protection class IP66

SNAPINVERTER Installation

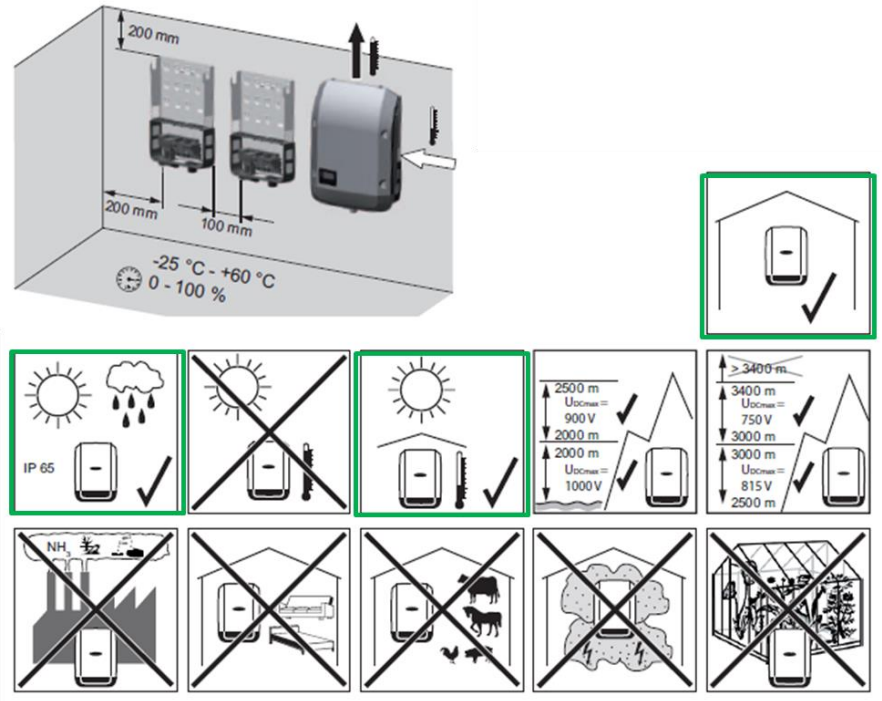
PRODUCT OVERVIEW

MOUNTING BASE

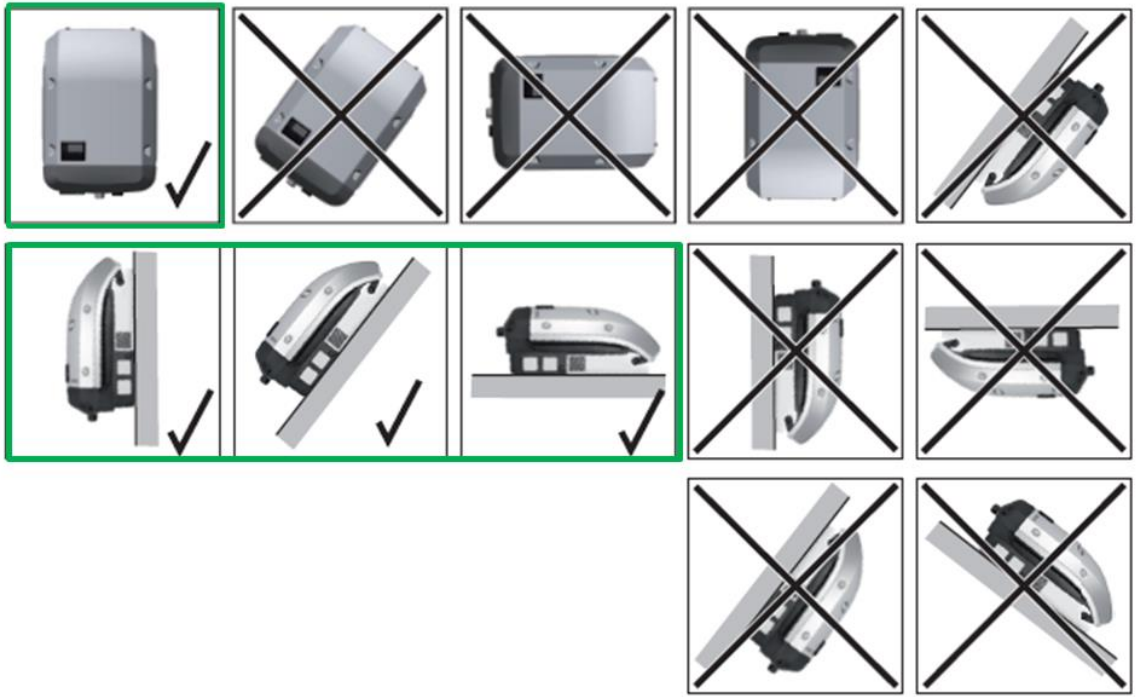
- Seperated wall bracket
  - Powder coated aluminium; in the lower part covered with plastics
  - IP20 (without inverter)
  - no electronics inside
  - lashes for uneven walls
  - Has to be mounted with 4 screws miniumum



REQUIREMENTS FOR ZUM SUITABLE LOCATIONS

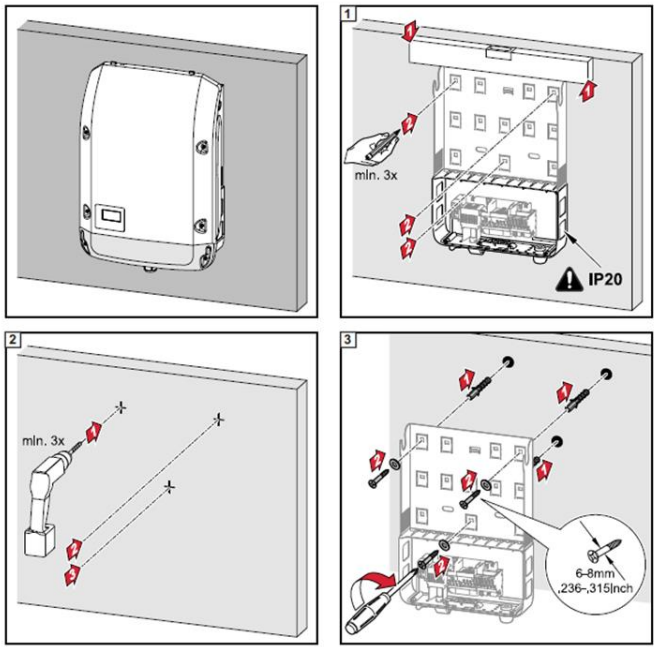


POSSIBLE ORIENTATIONS

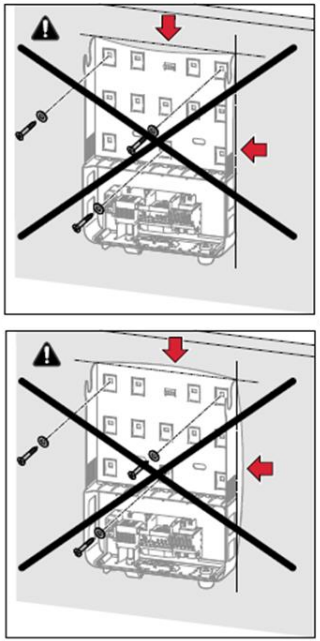


RECOMMONDATIONS FOR WALL-MOUNTING

Small housings (3.0 - 8.2 kW)

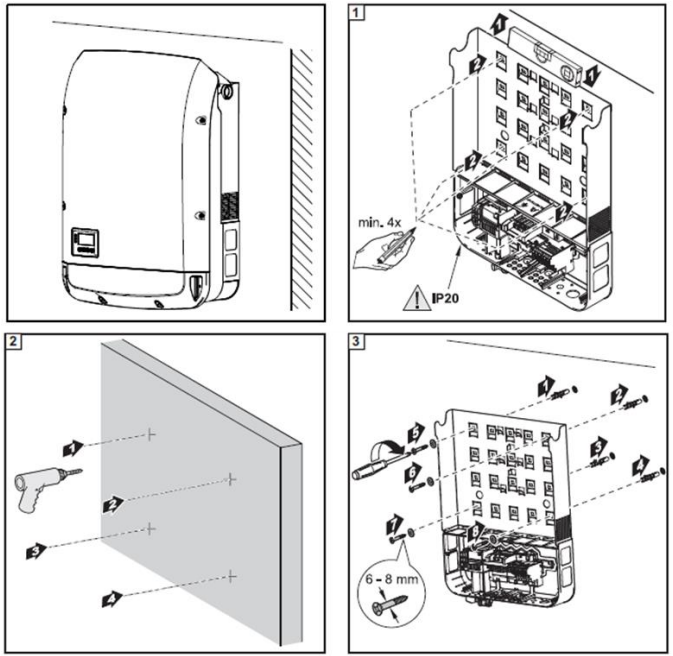


Uneven surfaces



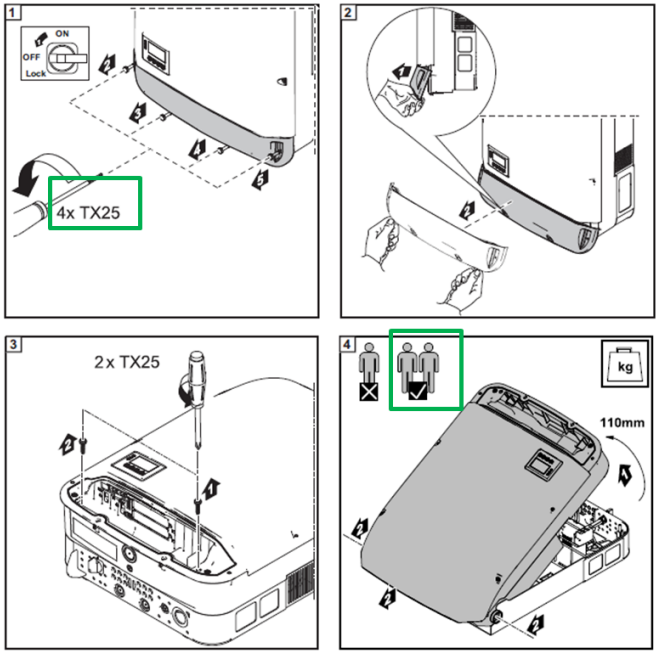
RECOMMONDATIONS FOR WALL-MOUNTING

Big housings (10 - 27 kW)



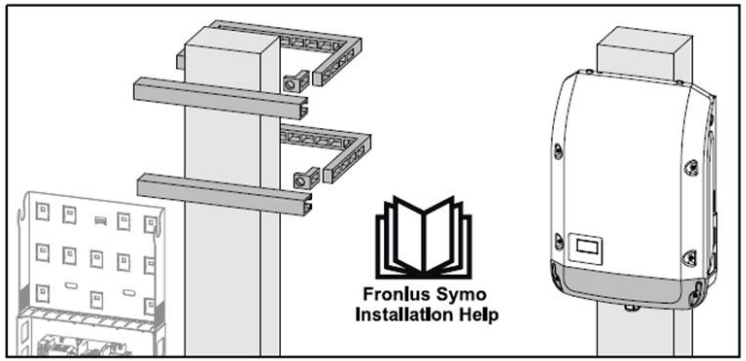
INVERTER AND WALL BRACKET

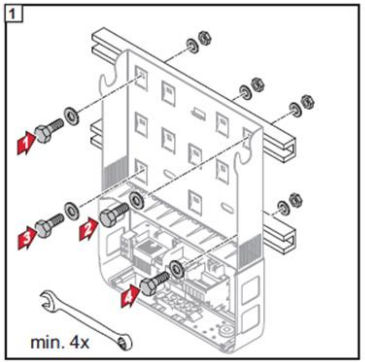
Big housings (10 - 27 kW)



Weight: 35 – 43 kg

POLE MOUNTING

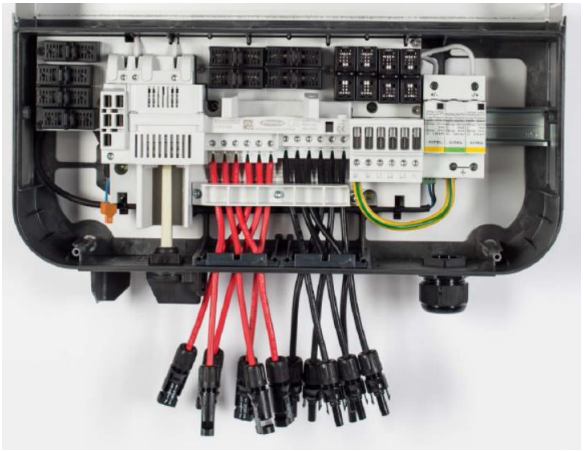




For pole mounting
(e.g. underneath PV modules)
Fronius recommends the mounting kit „Pole clamp“ (Order No: SZ 2584.000) from company Rittal GmbH, Germany.

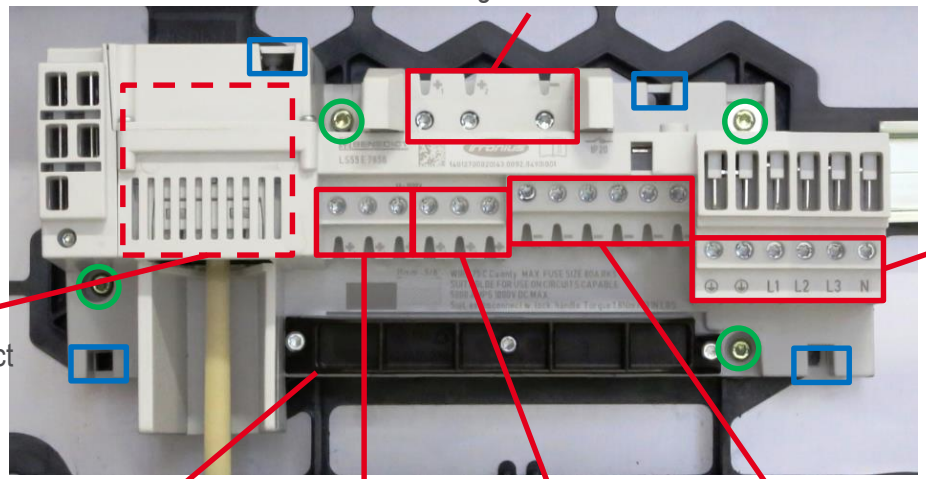
Possible pole diameters:
40 – 190 mm

OPTIONS



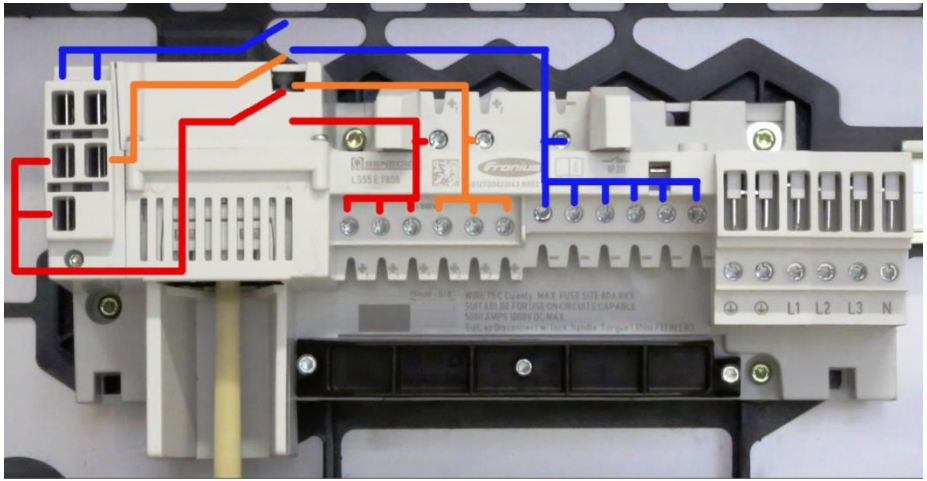
PRODUCT OVERVIEW

DC DISCONNECT UNIT



PRODUCT OVERVIEW

DC DISCONNECT UNIT



Plus 1 (MPPT1)

Plus 2 (MPPT2)

Minus (both MPPTs)

AC CONNECTION SYMO / ECO

- Cable from 2,5 mm² – 16 mm²
- Copper or aluminum cables
- Inverter may be used in TN and TT grids (voltage N-PE <30V)
- M32 cable entry for 11-21 mm diameter

opening for ext. PE

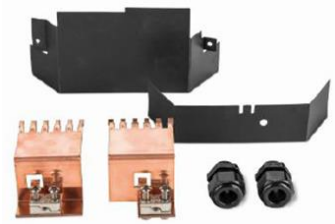
M32 cable entry for AC cable

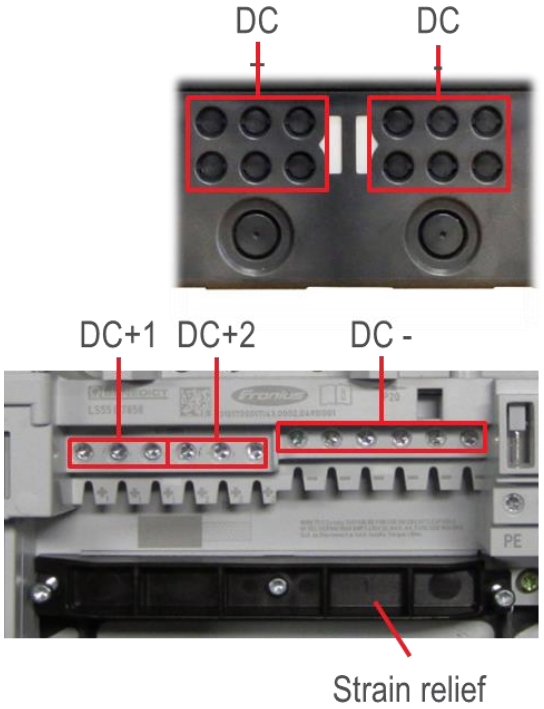
DC CONNECTION SYMO / ECO

- / Cables from 2,5 mm² – 16 mm²
- / Copper or Aluminium cables

- / Symo: 3 strings per MPP Tracker
- / Eco: 6 strings / 1 MPPT - String fuses integrated

- / DC con kit 35 – for cables up to 35mm²

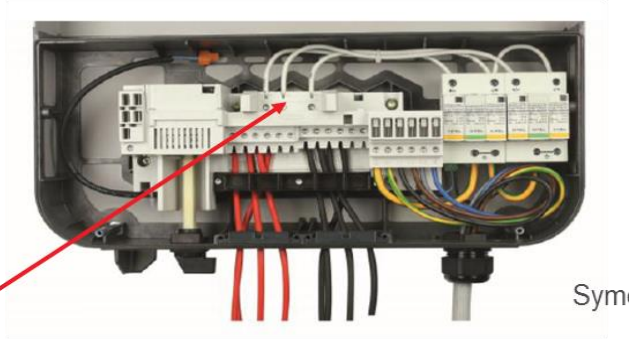




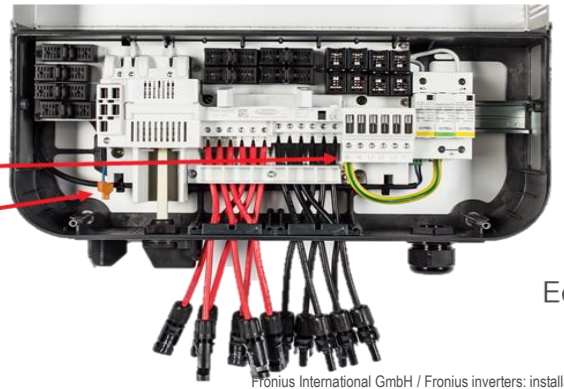
OVERVOLTAGE PROTECTION SYMO / ECO

- **OVP can be fixed on DIN rail**
  - max. 106 x 90 x 74mm (L x W x D)

- **Typ I / II S or M version (one per MPPT)**
  - DC+ and DC- can be directly connected to screw terminal
  - PE from AC terminal or external
  - signaling output to RECERBO card for monitoring

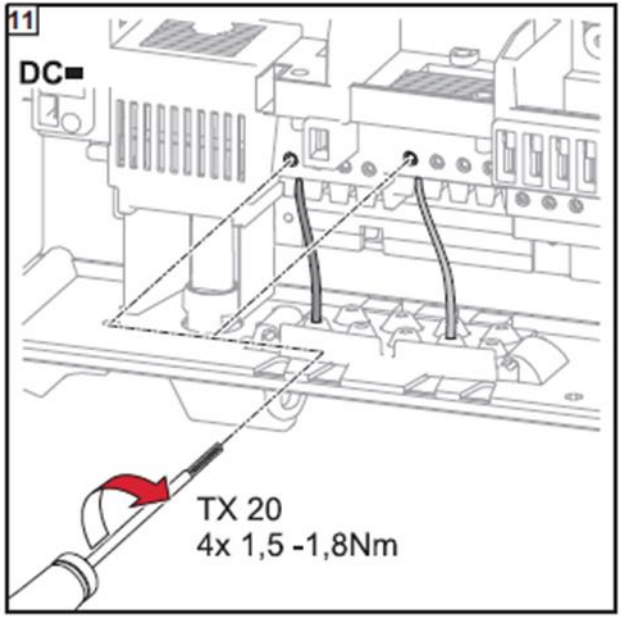


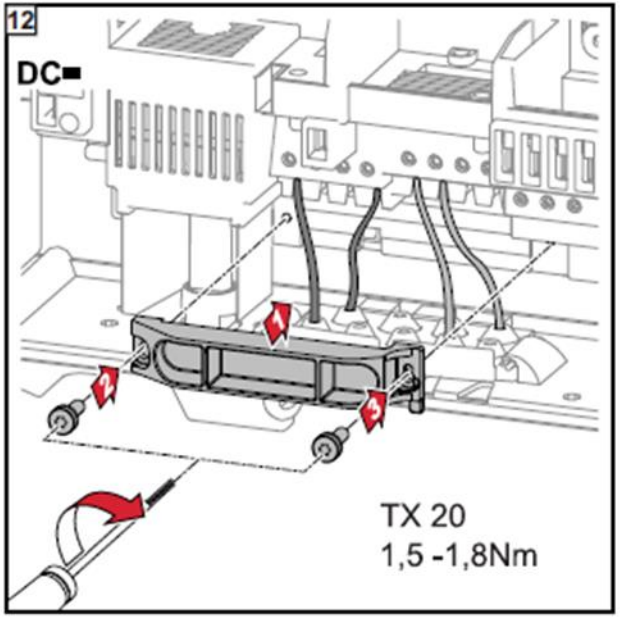
Symo



Eco

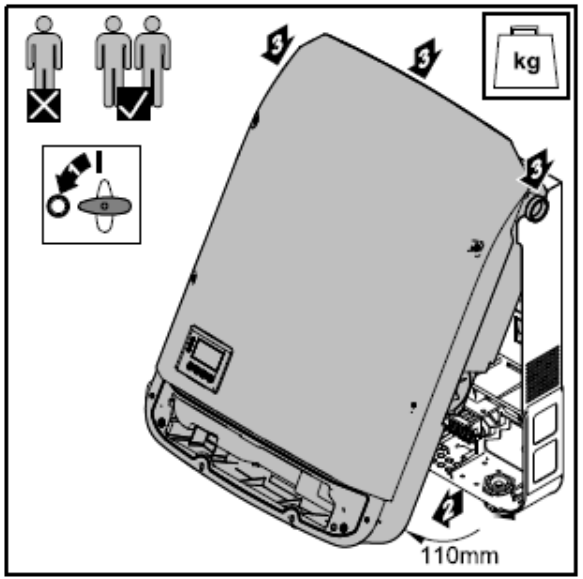
CONNECTION OF PV GENERATOR



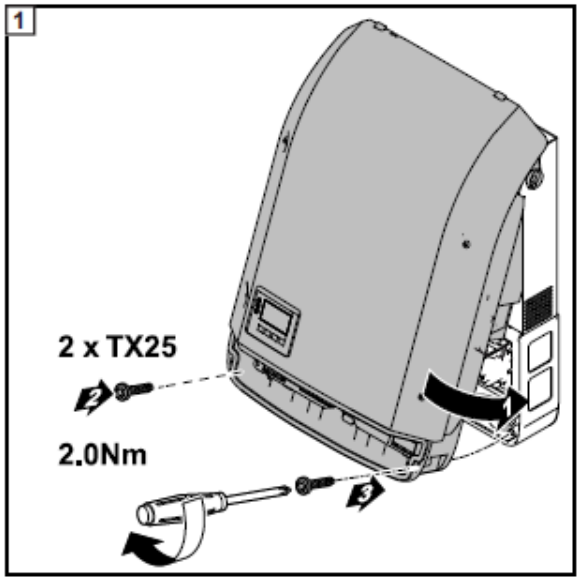


CONNECTION OF INVERTER TO WALL BRACKET

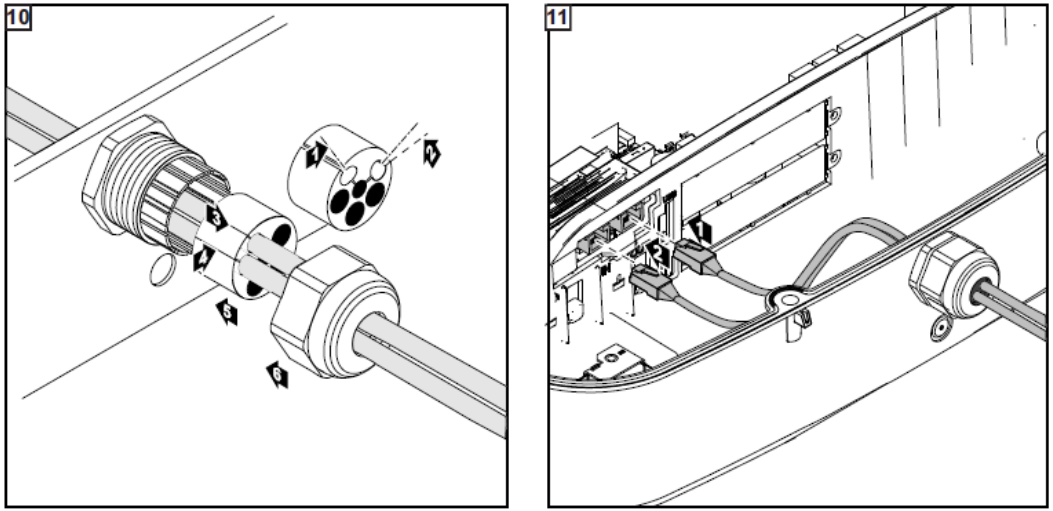
Big housings (10 - 27 kW)



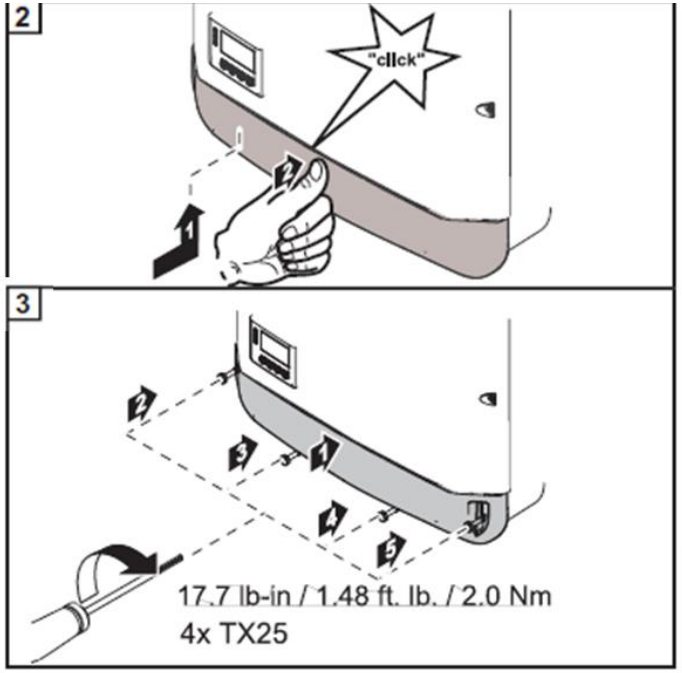
Small housings

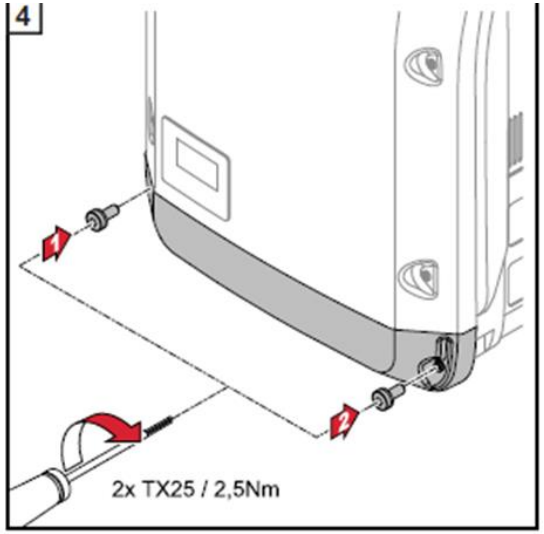


CABLE INLET FOR COMMUNICATION



MOUNTING OF DATCOM COVER





MANUALS

- 3 manuals:
  - Installation manual without text, symbols only; delivered with the inverter
  - Installation manual („Full version“ with text description) → available for download
  - Operation manual (text version) available for download

- www.fronius.com / Home / Solar Energy / Products / Grid-connected inverters

STARTUP & DISPLAY NAVIGATION

START-UP PROCEDURE

Start-up assistant („Installation wizard“)

/ …for simple commissioning

/ …turns up at the first start-up

/ 1) Choose language
2) Choose country setup
3) Set time
4) Set date
5) MPPT2 ON/OFF

/ …can be re-entered via an AC-reset

TROUBLESHOOTING SERVICE MENU

Selection of service menu

- **Start** Code : 78278
- **Key** Code : 12321
  - Keylock
- **State Counter** Code: 37767
  - Shows frequency of a selected number of state codes
- **Country Setup Menu** Code: 73887
  - Adjust country setup
    (Grid parameters of specific country)
- **Service Menu Basic** Code: 22742
  - Change of inverter settings

SERVICE MENU – START SETTINGS

78278

- / Language
- / Country setup
- / Time
- / Date

SERVICE MENU – KEY CODE

12321

/ Setup lock

SERVICE MENU - STATE COUNTER

37767

- / Memory of all state codes
  - / State codes “Today”
  - / State codes “Last day”
  - / State codes “Total”
- / Order by
  - / frequency
  - / numerical
- / Counter reset

SERVICE MENU – COUNTRY SETUP MENUE

73887

/ Selection of country setup loads grid parameters according to country specific norm

SERVICE MENU – BASIC

22742

- MPP tracker 1
  - DC operating mode (MPP auto / fix voltage / MPP user)
  - Dynamic peak manager (ON / OFF)
  - Fix voltage
  - MPP tracker 1 start voltage
- MPP tracker 2
  - MPP tracker 2 (ON / OFF)
  - DC operating mode (MPP auto / fix voltage / MPP User)
  - Dynamic peak manager (ON / OFF)
  - Fix voltage
  - MPP tracker 2 start voltage

SERVICE MENU - BASIC

22742

- USB LogBook
- SMS Delay & Event Counter
  - Event CFG set criteria for sending of state codes (255 min. or 50x)
- Signal input
  - Mode of operation (S0 meter / ext. signal)
- Insulation settings
  - Insulation warning (ON / OFF)
  - Threshold warning
- TEMP warn active state 561 – power limitation due to high temperature
- Total reset

SERVICE MENU – PROFESSIONAL

A one-off code request is done

Parameters for voltage and frequency

- / **U**IL Max, **f**IL Max
- / **U**IL Max Triptime, **f**IL Max Triptime
- / **U**IL Min, **f**IL Min,
- / **U**IL Min Triptime, **f**IL Min Triptime
- / **U** Longtime Limit
  (Activation threshold for 10 min. average)

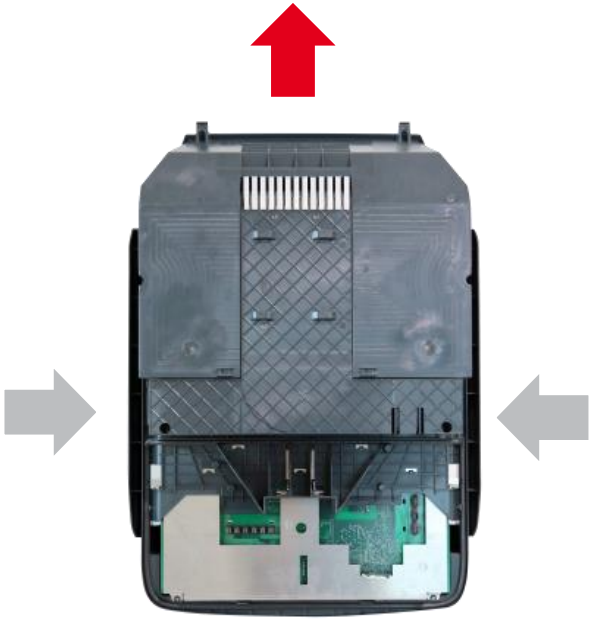
/ Manual power limitation

/ Mains connection time for first start

/ Mains reconnection time
after disconnection

SNAPINVERTER Features

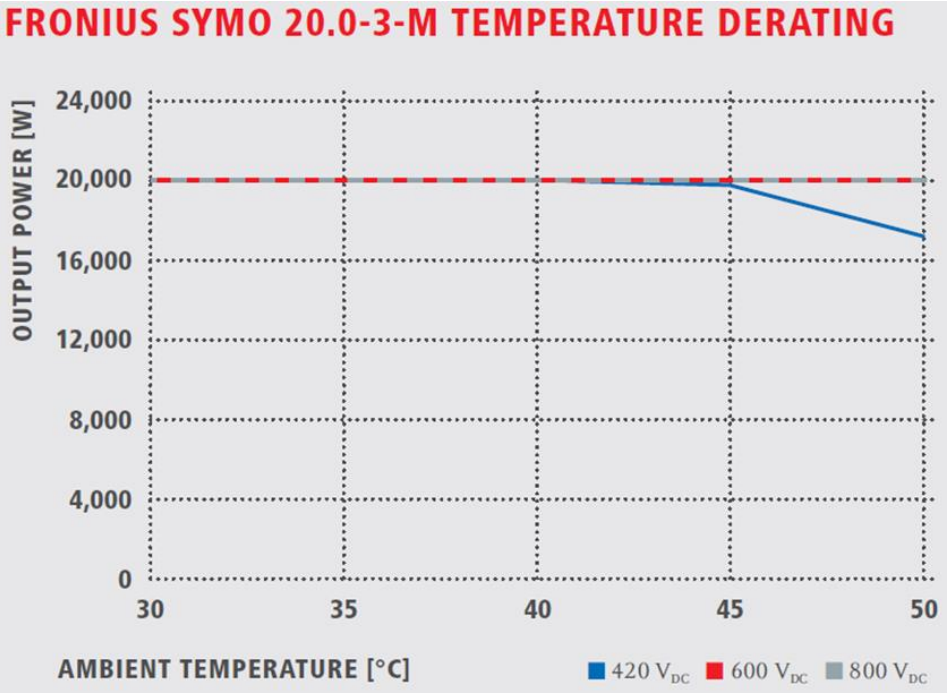
VENTILATION CONCEPT



Fronius Symo

- / 2-3 speed controlled fans
- / Airflow from the left to the right side, then up to the upper part of the inverter
  - / Mounting side to side is possible (20 cm distance)

VENTILATION CONCEPT - DERATING



- At 75-80 °C reducing output power
- If temperature still rises, the inverter shuts down (State 304)

SAFETY ELEMENTS

- **Isolation measurement**
  active at night before DC is on
- **RCMU**
  Monitoring feed-in process for differential current
- **Anti-islanding**
  to identify a power failure and shut down instantly
- **Reverse voltage protection**
  Via diode → short circuit
- **Overvoltage protection**
  overvoltage protection can be integrated (DIN rail)
- **Output power reduction**
  to avoid overload and high temperature

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Fronius Symo

ALL-IN DATA MONITORING

FRONIUS DATAMANAGER

/ Fronius datamanager – plug-in card

= datalogger, web server, WLAN

/ Monitoring of up to 100 inverters

/ Visualisation via Fronius Solar.web portal, Fronius Solar.web app, Fronius Solar.TV

/ Open interface

- / Modbus TCP SunSpec (Ethernet) and Modbus RTU SunSpec (RS-485)
- / Fronius Solar API (JSON)
- / Fronius Smart Meter (RS-485)
- / Energymanagement output

EASY STARTUP

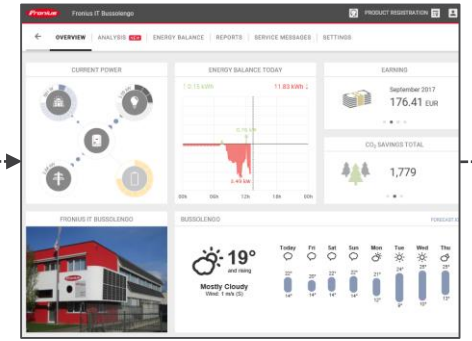
- / Connect with Fronius datamanager 2.0 via WLAN (PC or Smart device)
- / Setup Wizard starts automatically
- / More inverters equipped with Fronius datamanager 2.0 in the same DATCOM-ring the master can be defined by master / slave switch. Others can be deactivated.

OVERVIEW INTEGRATED INTERFACES?

1. FRONIUS SOLAR NET IN
2. FRONIUS SOLAR NET OUT
3. USB-INTERFACE
4. POTENTIAL – FREE RELAIS
5. WLAN ANTENNA
6. DIGITAL I/O‘S
7. ETHERNET
8. STATUS LED‘S

FRONIUS DATAMANAGER FOR SOLAR.WEB

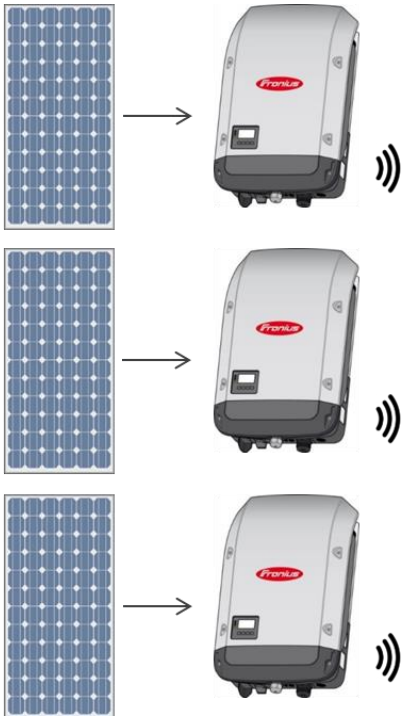
Configuration: http://datamanager



Visualisation: www.solarweb.com

View on all end devices with internet (webbrowser); Apps for Android, Apple IOS and Windows (Desktop & Phone)

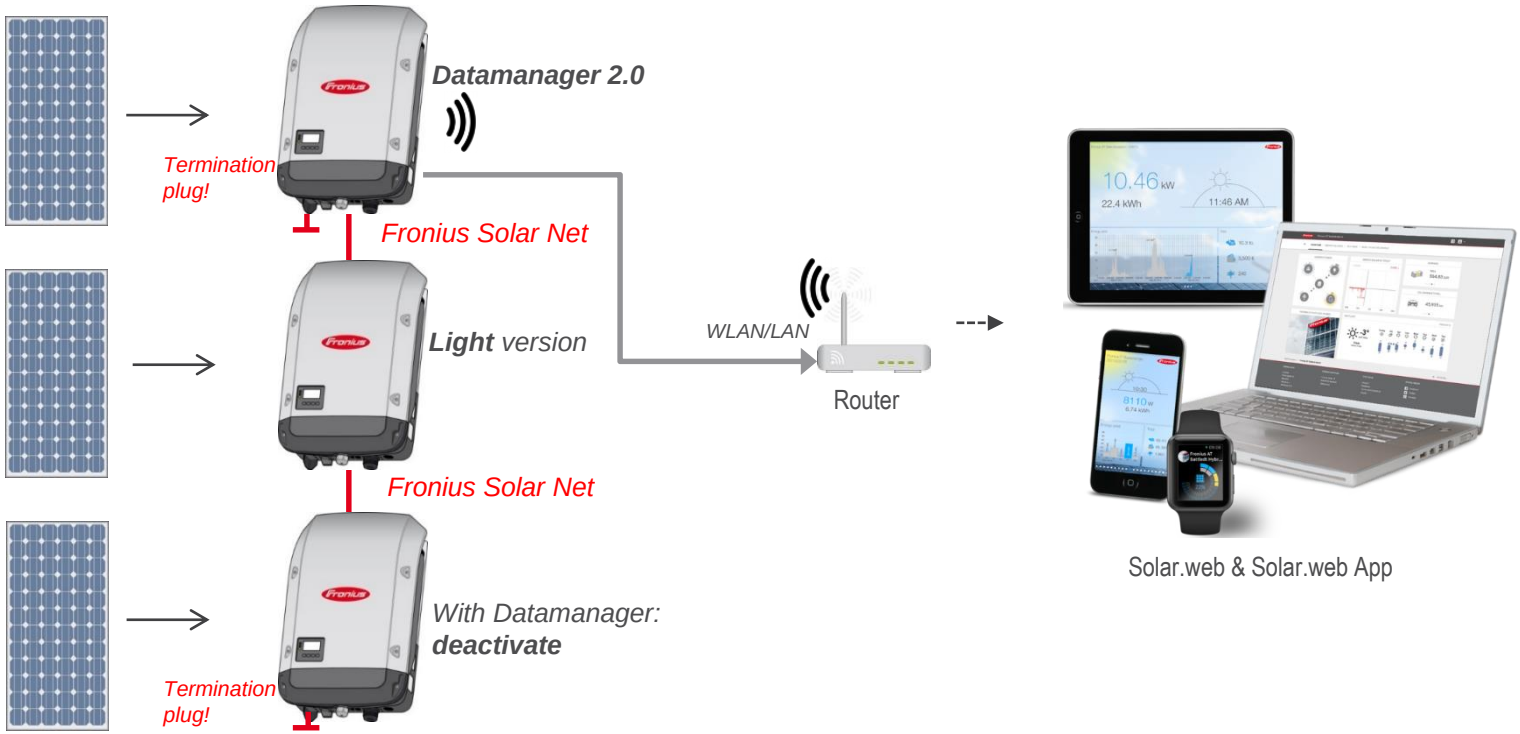
DATA COMMUNICATION VIA WLAN



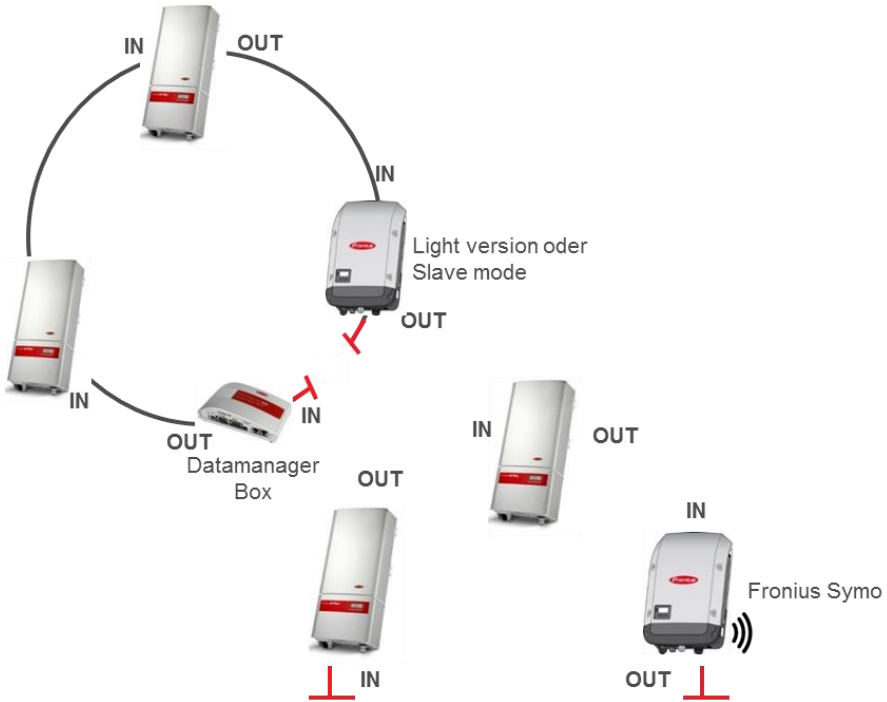
Router

Solar.web & Solar.web App

DATA COMMUNICATION VIA CABLE



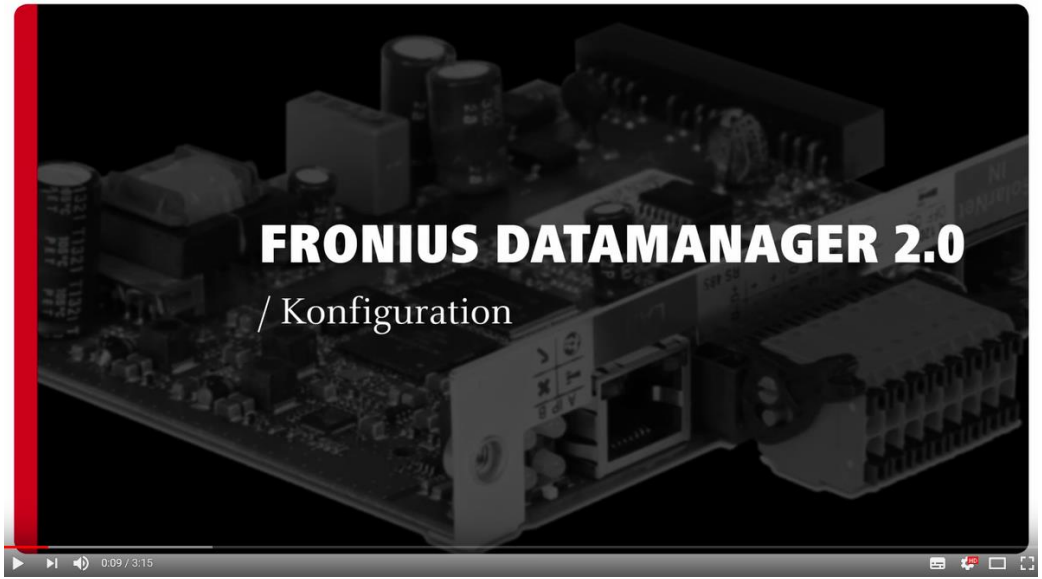
FRONIUS SOLAR.NET



- For different inverter types except Fronius Symo Hybrid
- **Fronius Solar.net** = specific protocol for CAT5 connection
- Ring – topology with IN and OUT sockets on every device
- Fronius - own protocol
- Termination plugs necessary!

FRONIUS DATAMANAGER COMMISSIONING

CONFIGURATION DATAMANAGER



/ Configuration of the Fronius Datamanager – demonstration video:
https://www.youtube.com/watch?v=u_DX7PmHPXQ

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FRONIUS SMART METER

FRONIUS SMART METER – TYPES

63 A-1

- For 1-Phase

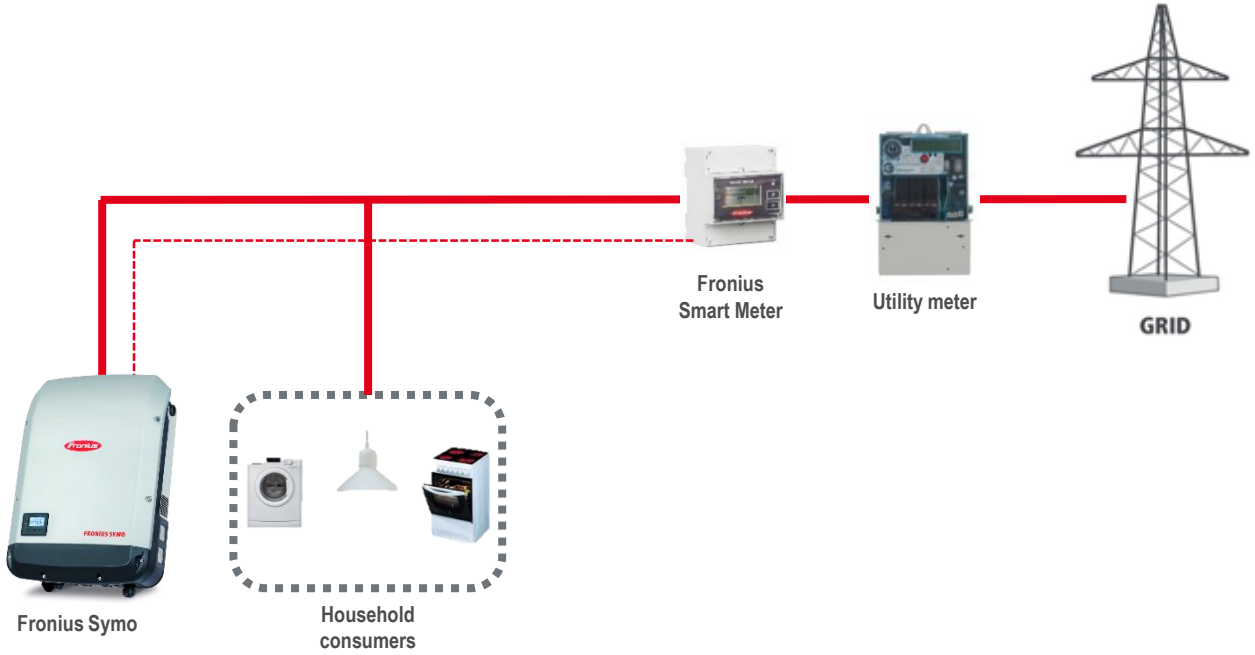
63 A-3

- 3-Phase
- For residential use

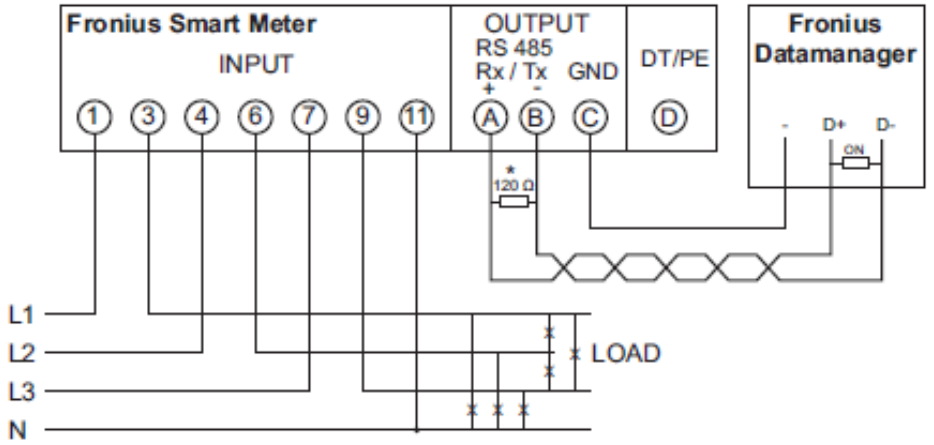
50 kA-3

- 3-phase
- Commercial use
- Up to 50 kA
- External current sensors

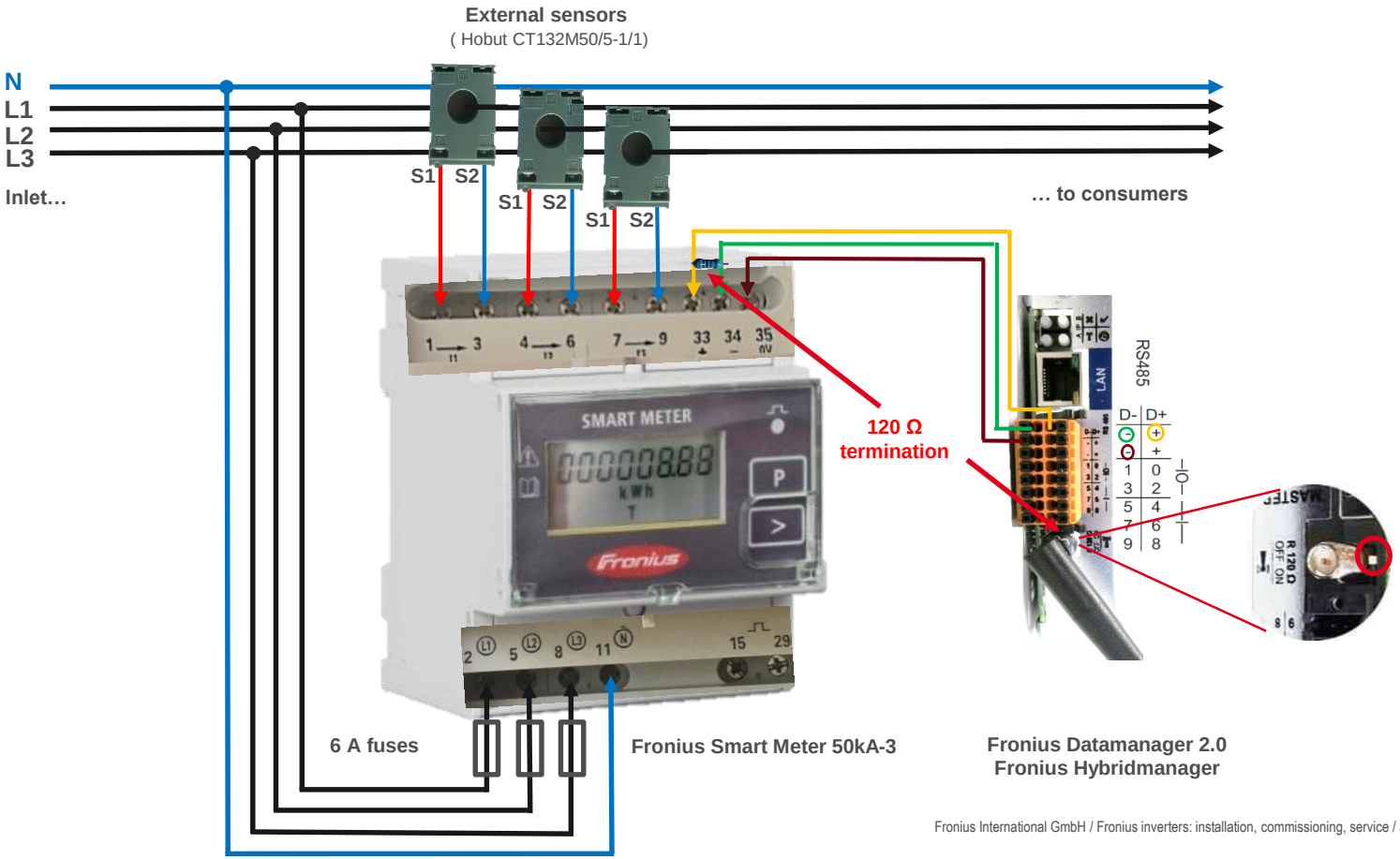
FRONIUS SMART METER INSTALLATION



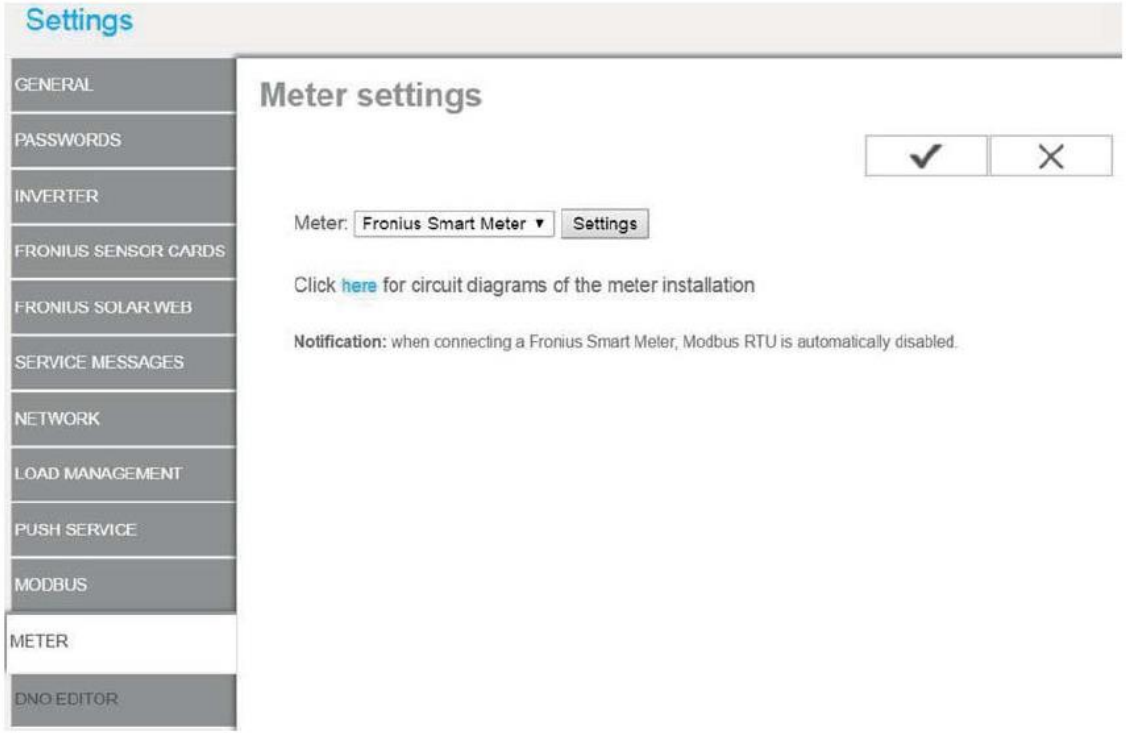
FRONIUS SMART METER 63A



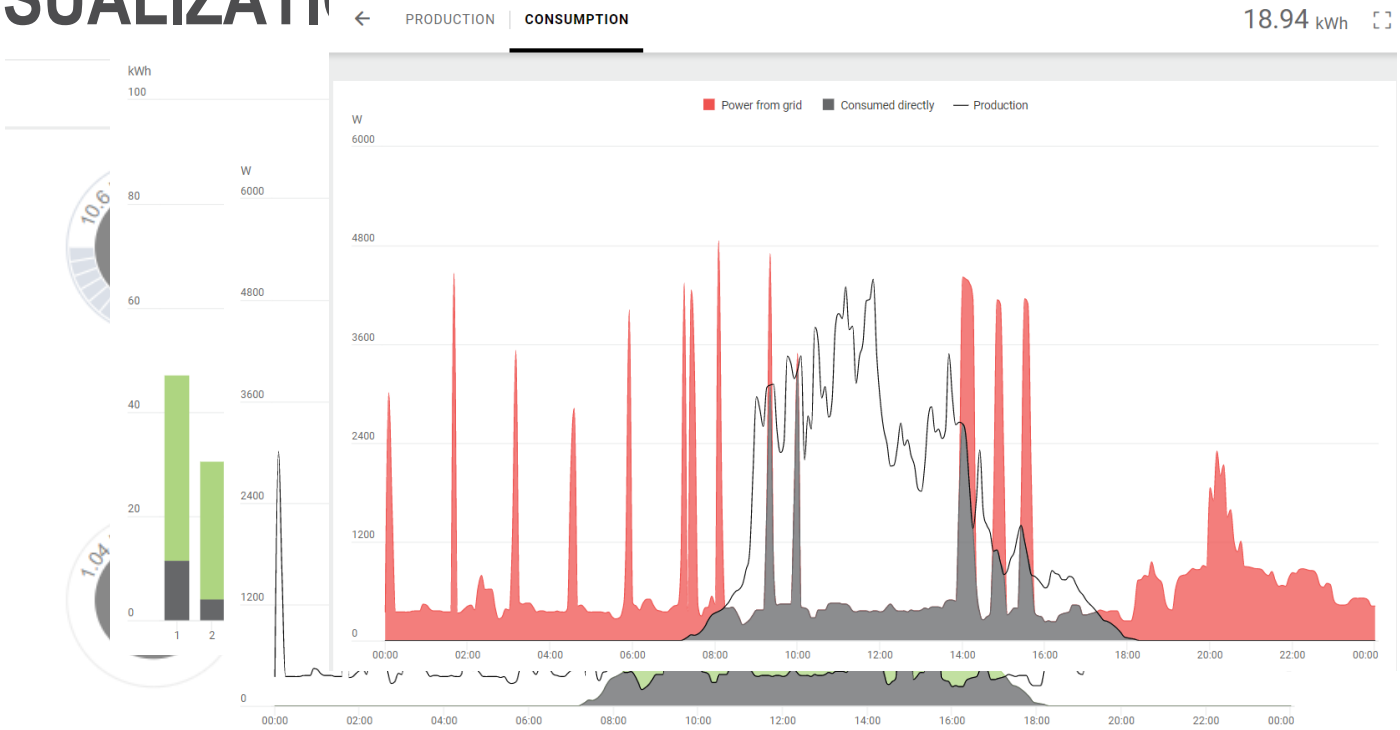
No additional preferences necessary!


External sensors
(Hobut CT132M50/5-1/1)
N
L1
L2
L3
Inlet…
S1
S2
S1
S2
S1
S2
… to consumers
SMART METER
kWh
Fronius
120 Ω
termination
RS485
D-
D+
LAN
6 A fuses
Fronius Smart Meter 50kA-3
Fronius Datamanager 2.0
Fronius Hybridmanager

ACTIVATION SMART METER FOR RETROFITTING



VISUALIZATION



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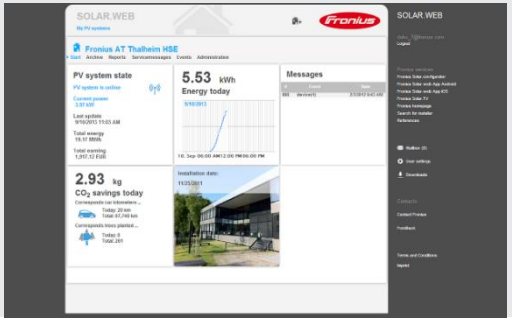
FRONIUS SOLAR.WEB

SOLAR.WEB FEATURES

Solar.Web Classic

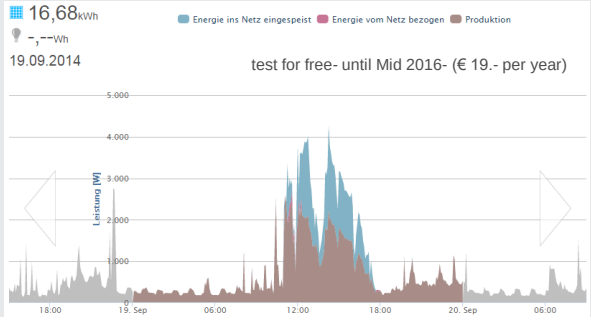
- Monitoring of **actual and archive** production data
- **Self consumption** display
- **Comparison** of inverters
- **Error messages**



Solar.Web

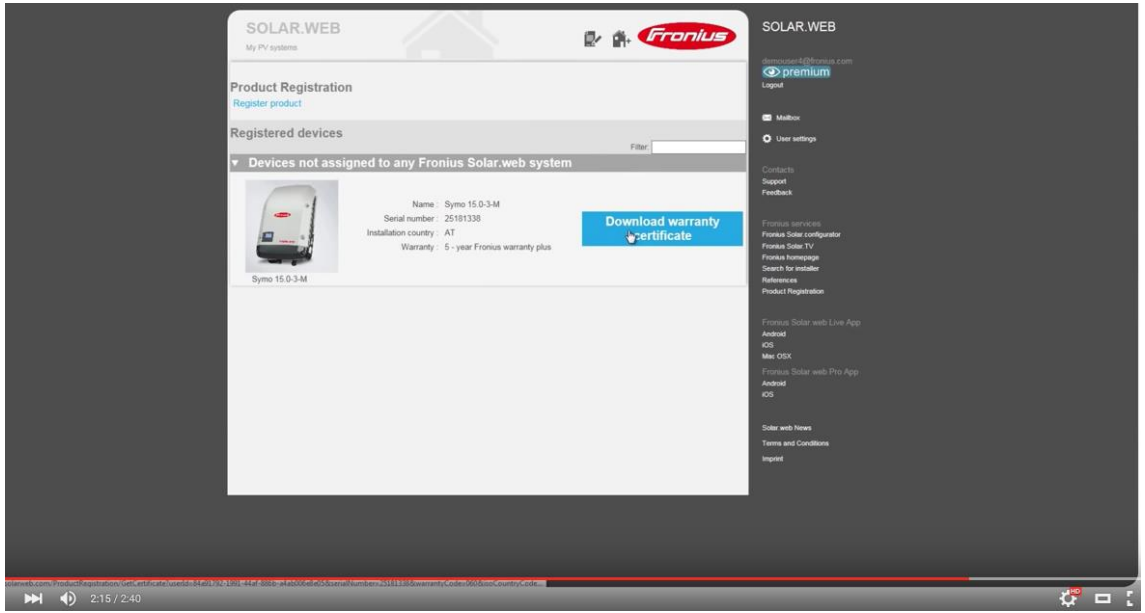
premium

- **Visualization and analysis** incl. all hystorical data
- **CSV export** of self-consumption data
- **Monitoring at MPP tracker** level



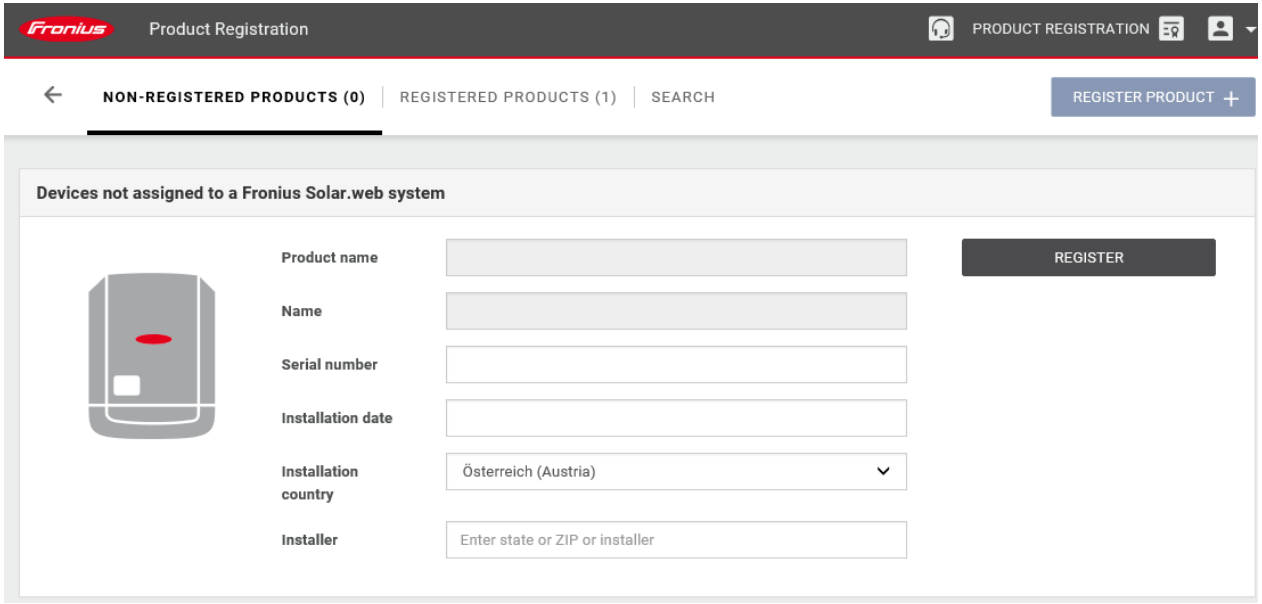
Product Registration and Warranty

WARRANTY REGISTRATION



https://www.youtube.com/watch?v=8c33xG7tVv8

PRODUCT REGISTRATION



WARRANTY OPTIONS

- **Warranty** from delivery: 2 years (material, service, transport)
- Extendable by product registration in Fronius Solar.web
- Option 1: **further 3 years Fronius Warranty Plus** (material, service, transport)
- Option 2: **further 5 years Fronius Warranty** (material warranty)

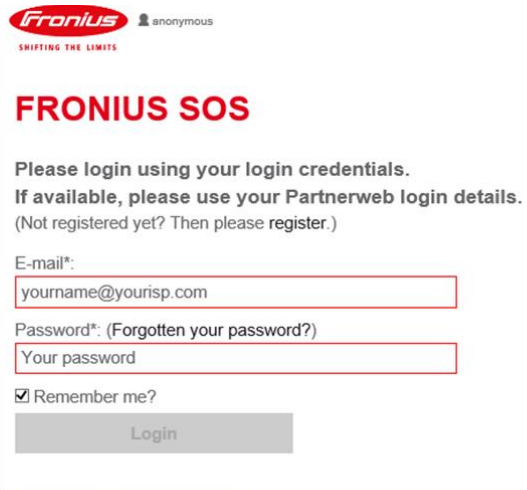
- **Extension possible:**
  Purchase of **10, 15 or 20 years of warranty**

AGENDA

- / Fronius SnapINverter installation & commissioning
- / Monitoring with Fronius Datamanager
- / Fronius Smart Meter
- / Fronius Solar.web
- / **Troubleshooting and board replacement**
- / FSP Service Process, SOS

Troubleshooting

SOLAR ONLINE SUPPORT TOOL



https://sos.fronius.com/

- Online Support - https://sos.fronius.com/
- Requirement: customer / FSP number

- Online troubleshooting for inverter
- Request of warranty data
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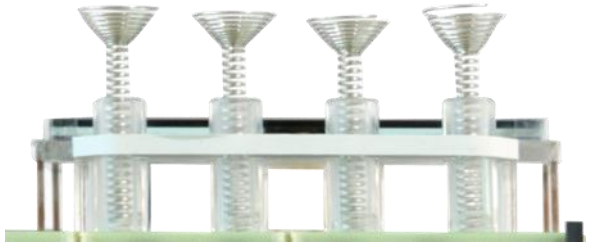
TROUBLESHOOTING – STATE CODES



- **Class 1**
  - Transient error – very likely caused by public grid
- **Class 3**
  - Temporary error → automatic rectification
- **Class 4**
  - Could need intervention – service replacement
- **Class 5**
  - No interruption of feed-in operation → Quit by buttons
- **Class 6**
  - Operation interrupted (RCMU or external shutdown via signal input)
- **Class 7**
  - Error related to control unit, configuration and data recording

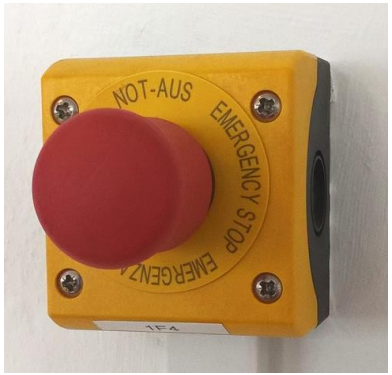
BOARD EXCHANGE

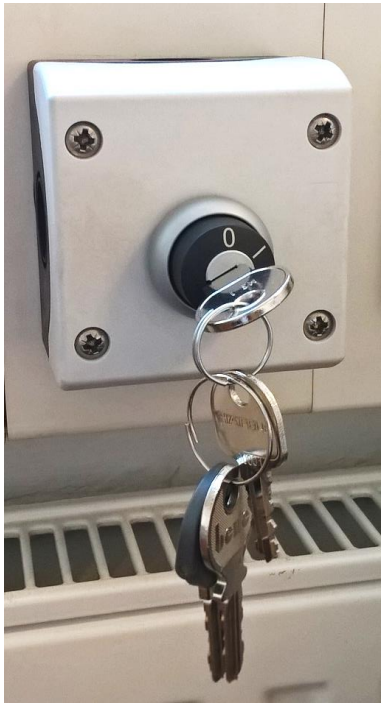
GENERAL INFORMATION

- **Power supply is switched off for security reasons**
- Start-up of inverters by trainers only!

Pleas note safety instructions in training facility!

- Emergency power breaker
- Take care by handling heavy weight inverters –
- Take out inverters by 2 persons
- Safety shoes are available





SAFETY RULES DURING BOARD EXCHANGE

5 Safety rules

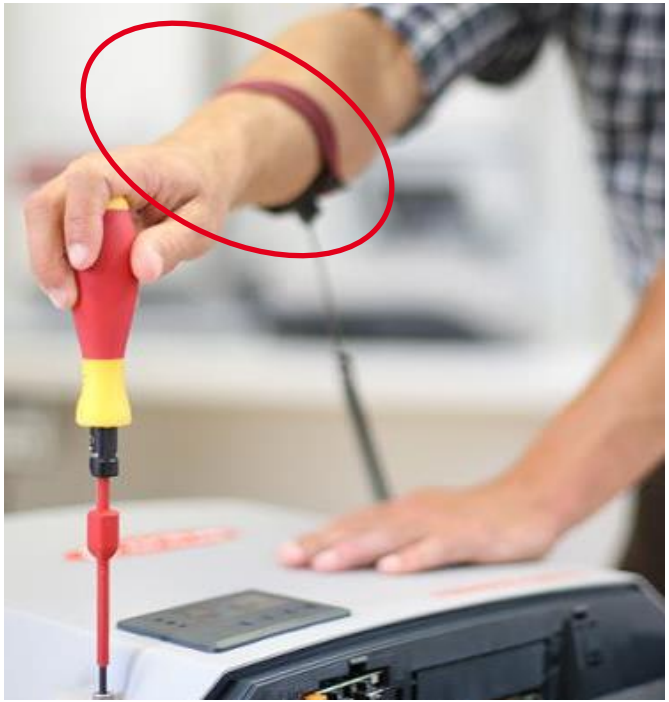
Before you start working:

- **Switch off all power circuits**
- **Protect against resetting**
- **Wait until capacitors are discharged**
- **Make sure that circuits are voltage-free**
- **Protect nearby supplied parts against touching**

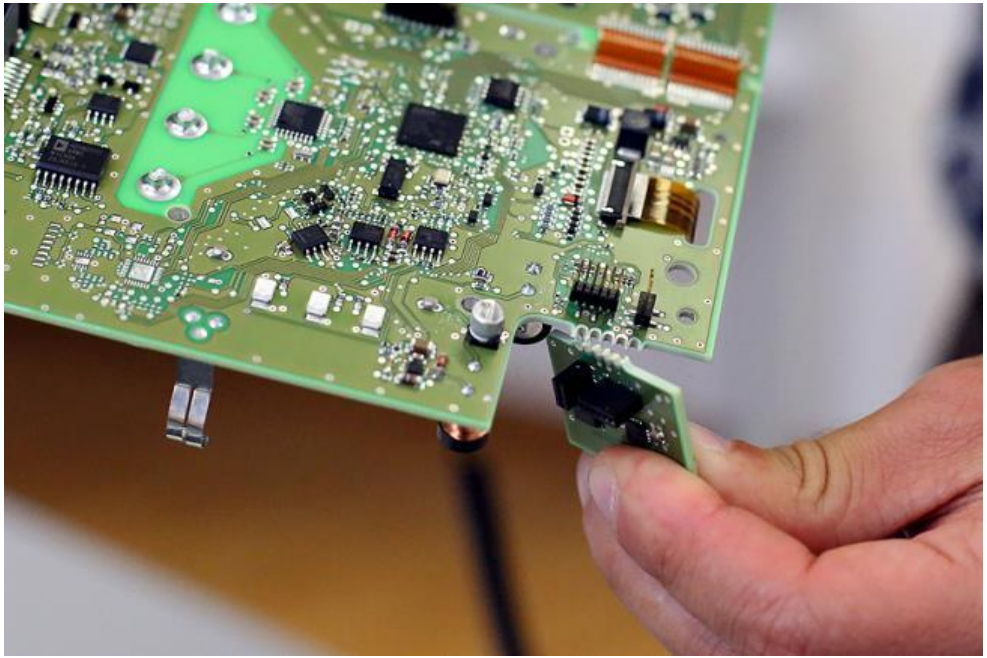
HINTS FOR SERVICE

- At Inverter exchange:
  - Transport cover has to be returned to Fronius
- Don‘t return working Datamanager cards:
  - Fronius Datamanager Card has to be taken out of the defective inverter and inserted into the exchange inverter
- When Recerbo has to be exchanged:
  - Break-off print of the defective Recerbo has to be putted on the new Recerbo print (see next slides)
- After every board exchange, update the related software!

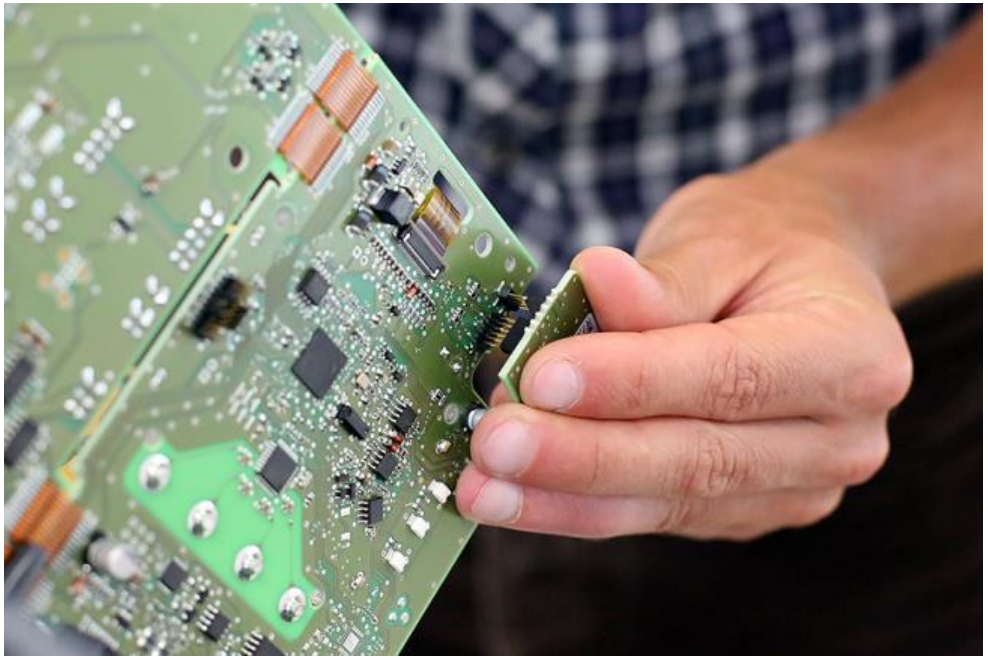
PUT ON THE ESD WRIST BAND DURING SERVICE



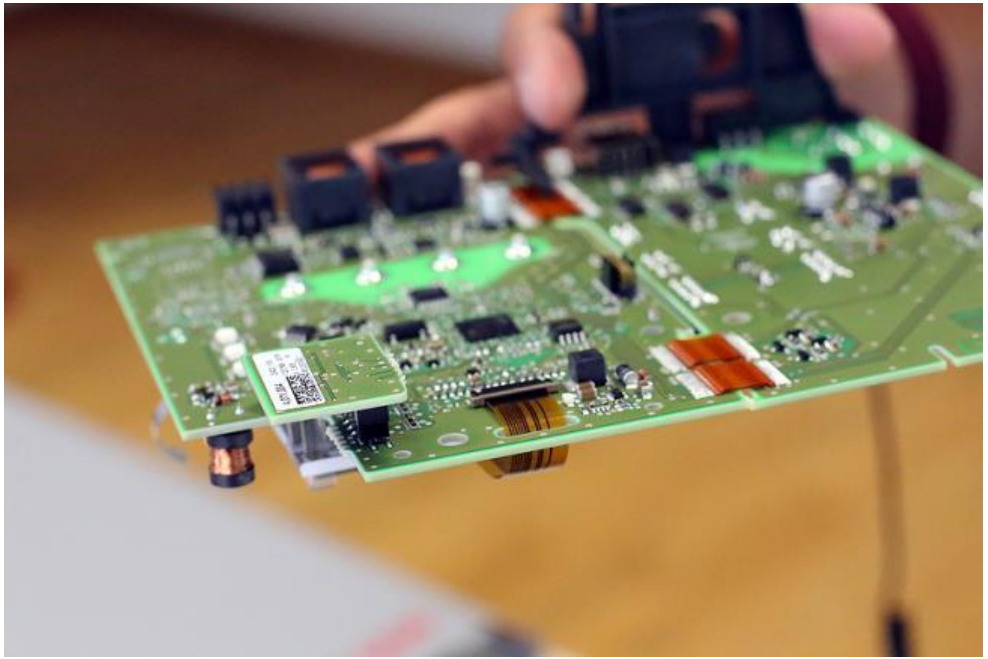
BREAK OFF MEMORY PRINT



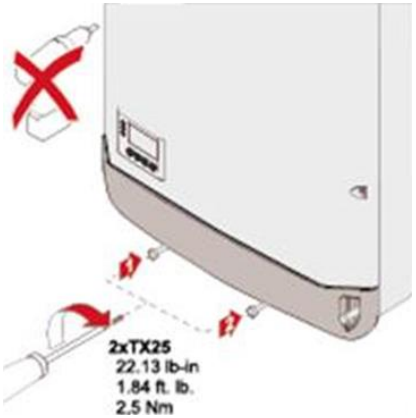
… AND PUT BACK ON THE NEW RECERBO PRINT

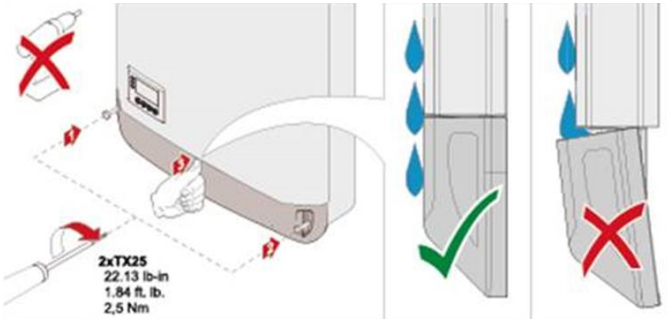


CONNECTED BREAK-OFF PRINT ON NEW BOARD



CORRECT INSTALLATION OF DATCOM COVER





Use torque screwdriver only!

2,5Nm

PRACTICAL PART: FIRMWARE UPDATE VIA USB

USB FIRMWARE UPDATE

Fronius
SHIFTING THE LIMITS

REMOTE UPDATE of Datamanager and inverter via Solar.web

/ Fronius SnapINverter (Fronius Galvo, Fronius Symo, Fronius ECO, Fronius Primo)

/ Fronius Datamanager (Software version greater than or equal to 3.4.1-9)

/ Fronius Solar.web system which is **online**!

/ Stable internet connection on site

AGENDA

- / Fronius SnapINverter installation & commissioning
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- / **FSP Service Process & SOS tool**

FSP SERVICE PROCESS & SOS TOOL

THE FRONIUS SERVICE PARTNER PROGRAMME

SERVICE PARTNER

FRONIUS TRAININGS & WEBINARS

TRAINING COURSES

/ Fronius solutions & system design training
/ Fronius consumption optimization training (E-mobility & battery storage solutions)

WEBINARS

/ Fronius Symo Hybrid and LG Chem RESU battery
/ How to heat with PV (Fronius Ohmpilot)
/ How to charge an EV with PV surplus energy

Sign up online! www.fronius.com/en/pv-trainings

HOW DOES IT WORK?

TRAINING

Training programme for service technicians

SERVICE CASE

Enables on-site service by installer

TECH SUPPORT

Remote diagnosis and support

SUPPORT TOOLS

Support tools for an efficient process

FRONIUS SERVICE CASE

Advantages:

- / Fast response time
- / Demonstration of expertise
- / Saves time and costs
- / "Tailor-made": the Fronius Service Partner fills the box with the items that meet his own particular requirements.
- / Rapid service response → selling point!

TROUBLESHOOTING - GUIDELINES

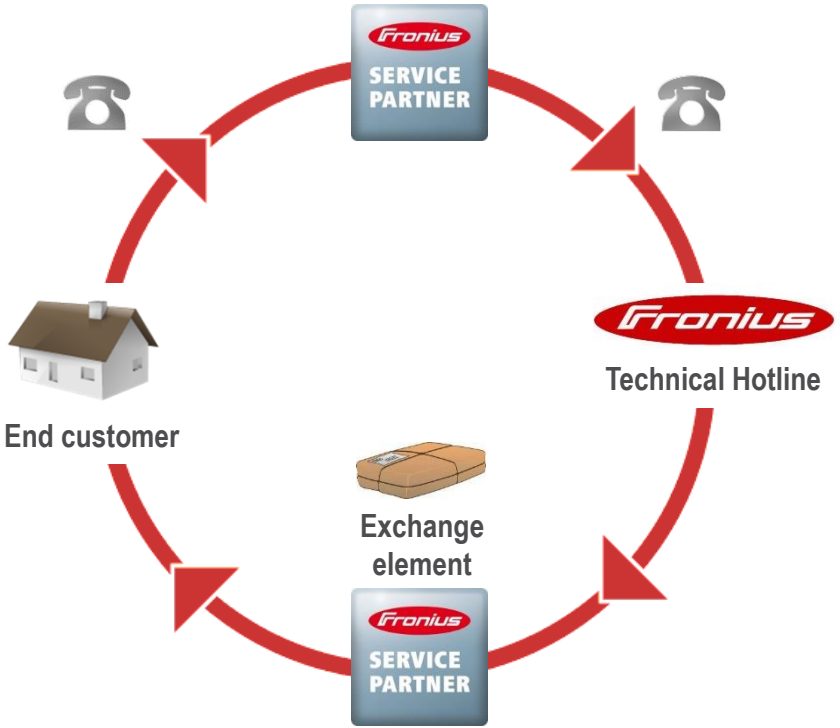
Important in the event of error

- Serial number of the inverter
- Inverter display
  - STATE code
  - STATE PS
- Type of error
  - Permanent, temporary, abnormal behavior
- Datalogger ID

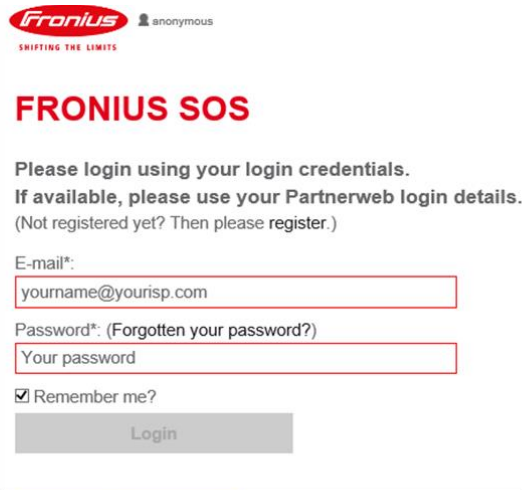
Other details:

- FSP Number
- Delivery / pickup address
- Details of PV system

REPLACEMENT PROCESS



SOLAR ONLINE SUPPORT TOOL



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Feedback & Questions

YOUR FRONIUS SOLAR ENERGY TEAM

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